

DataGeneral

**DIAGNOSTIC
LISTING**

LISTING

096-000190-05

PROGRAM

LINE PRINTER TEST I

TAPE

095-000040-05

ABSTRACT

LINE PRINTER TEST I IS A MAINTENANCE PROGRAM DESIGNED TO TEST
LINE PRINTER TYPES 4034A (DATA PRODUCTS), 4034B (DATA PRODUCTS),
4034C (CENTRONICS), 4034D (CENTRONICS). THIS PROGRAM WILL ALSO
TEST THE ZONE SELECT AND FORMAT CONTROL OPTIONS.

0001 .MAIN

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NAME: LPT.5K PART NUMBER: 894-000107

DESCRIPTION: LINE PRINTER TEST I

REVISION HISTORY:

REV.	DATE
00	12/01/70
01	11/02/72
02	12/11/72
03	09/06/74
04	03/07/75

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4 0002 .MAIN

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LINE PRINTER TEST I

11. ABSTRACT

LINE PRINTER TEST I IS A MAINTENANCE PROGRAM DESIGNED TO TEST LINE PRINTER TYPES 4034A (DATA PRODUCTS), 4034B (DATA PRODUCTS), 4034C (CENTRONICS), 4034D (CENTRONICS). THIS PROGRAM WILL ALSO TEST THE ZONE SELECT AND FORMAT CONTROL OPTIONS.

12. MACHINE REQUIREMENTS

12.1 NUVA FAMILY PROCESSOR
12.2 4K READ/WRITE MEMORY
12.3 TELETYPE OR CRT DISPLAY
12.4 TYPE 4034 LINE PRINTER INTERFACE
12.5 TYPE 4034A, 4034B, 4034C, OR 4034D LINE PRINTER.

13. SWITCH SETTINGS

STARTING ADDRESS=2 EXECUTE ALL TEST
STARTING ADDRESS=401 DIAGNOSTIC
STARTING ADDRESS=402 PRINT LETTER "E"
STARTING ADDRESS=403 PRINT LETTER "H"
STARTING ADDRESS=404 PRINT LETTER "M"
STARTING ADDRESS=405 ONE LETTER EACH LINE
STARTING ADDRESS=406 PRINT CHARACTER SET
STARTING ADDRESS=407 ZONE PRINT OPTION
STARTING ADDRESS=408 FORMAT CONTROL OPTION
STARTING ADDRESS=409 KEYBOARD ECHO ON PRINTER

SWITCH 0(1)=REQUEST OPERATOR PARAMETERS (UPON STARTING A PROGRAM).
SWITCH 0(1)=PROCEED FROM AN ERROR
SWITCH 1(1)=INHIBIT TELETYPE PRINTING
SWITCH 2(1)=PRINT FAILURE RATE

A 4040 - MAIN

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01
02 14. OPERATING PROCEDURE
03 14.1 LOAD THE PROGRAM VIA THE BINARY LOADER
04 14.2 MAKE THE PRINTER READY AND SET IT TO THE
05 1 ON LINE CONDITION.
06 14.3 SET THE SWITCHES TO 000002
07 14.4 PRESS START
08 14.5 THE PROGRAM WILL BEGIN BY REQUESTING THE
09 1 OPERATOR TO TYPE THE DEVICE CODE, A 2-DIGIT
10 1 OCTAL NUMBER FOLLOWED BY A CARRIAGE RETURN.
11 1 THIS NUMBER SHOULD CORRESPOND TO THE DEVICE
12 1 CODE OF THE PRINTER UNDER TEST (USUALLY 17).
13 14.6 TYPE THE COLUMN WIDTH OF THE PRINTER (THIS
14 1 WILL NOT OCCUR OR RESTART UNLESS SWITCH
15 1 N IS SET). THE OPERATOR SHOULD RESPOND
16 1 WITH A DECIMAL NUMBER REPRESENTING THE
17 1 WIDTH. THIS NUMBER IS USUALLY 80 OR 132.
18 1 OPERATOR THEN TYPES A CARRIAGE RETURN.
19 14.7 THE PROGRAM WILL REQUEST A "Y" BE TYPED
20 1 IF THE ZONE SELECT OPTION IS TO BE TESTED.
21 1 OPERATOR TYPES "Y" IF YES, A CARRIAGE
22 1 RETURN IF NO.
23 14.8 THE PROGRAM WILL REQUEST A "Y" BE TYPED
24 1 IF THE FORMAT CONTROL OPTION IS TO BE
25 1 TESTED. OPERATOR TYPES "Y" IF YES, A
26 1 CARRIAGE RETURN IF NO.
27 14.9 EXECUTION OF THE TEST PROGRAM WILL BEGIN.
28 14.10 STARTING THE PROGRAM AT ONE OF THE
29 1 SEVERAL TEST WILL CAUSE THE PROGRAM
30 1 TO REMAIN IN THAT TEST UNTIL MANUALLY
31 1 STOPPED. STARTING AT LOCATION 2
32 1 WILL CAUSE THE SEVERAL TEST TO
33 1 BE REPEATEDLY EXECUTED IN SEQUENCE.
34

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A 4040 - MAIN

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01
02 FROM DESCRIPTION/PROGRAM OUTLINE
03 10.1 PRINTER DIAGNOSTIC (START ADDRESS 421)
04 10.1.1 WHEN AN ERROR IS DETECTED BY THE
05 1 DIAGNOSTIC THE PROGRAM WILL HALT AT
06 1 LOCATION 4000. EXAMINE ACS TO
07 1 OBTAIN THE ADDRESS OF THE FAILING
08 1 ROUTINE. CONSULT THE LISTING TO DETER-
09 1 MINE THE CAUSE OF THE ERROR. PRESSING
10 1 CONTINUE WILL CAUSE THE PROGRAM TO
11 1 ENTER A FAILING LOOP SUITABLE FOR
12 1 SCOPING. SETTING SWITCH 2(1) WILL PRINT
13 1 THE FAILURE RATE. SETTING SWITCH 2(1)
14 1 WILL CAUSE THE PROGRAM TO PROCEED
15 1 TO THE NEXT TEST.
16 1 A SPECIAL CARRIAGE POSITIONER TEST IS PROVIDED
17 1 (APPLICABLE TO PRINTER TYPES 40340 AND 40340
18 1 ONLY) TO PROVIDE VISUAL VERIFICATION OF PROPER
19 1 OPERATION. FIRST SECTION PRINTS A LINE OF LETTERS
20 1 DIAGONALLY OVER SEVERAL PAGES, FROM COLUMN 1 TO
21 1 COLUMN N. THE SECOND SECTION PRINTS A SOLID
22 1 RIGHT TRIANGLE, FORMED BY POSITION PRINTING
23 1 OF ONE LETTER.
24 1 THE WORD "PASS" WILL BE PRINTED ON THE
25 1 TELETYPE AT THE END OF EACH ITERATION
26 1 OF THE DIAGNOSTIC.
27 10.1.2 WHEN A HALT IS EXECUTED IN ROUTINES
28 1 OTHER THAN THE DIAGNOSTIC CONSULT THE
29 1 LISTING FOR THE CAUSE OF THE ERROR.
30
31 10.2 SINGLE LETTER TEST
32 10.2.1 THESE ROUTINES STARTING AT LOCATIONS
33 1 402-403-404 PRINT TWO PAGES OF THE
34 1 LETTERS E, M, AND N. PAGES OF THESE
35 1 LETTERS OFTEN PROVE USEFUL WHEN
36 1 MAKING MECHANICAL ADJUSTMENTS ON
37 1 THE PRINTER.
38 10.3 ONE LETTER EACH LINE (STARTING ADDRESS=405)
39 10.3.1 THE FIRST LINE PRINTED CONTAINS ALL SPACES.
40 1 THE LETTER A IS PRINTED ON THE SECOND LINE,
41 1 B'S ARE PRINTED ON THE THIRD, ETC. A
42 1 TOTAL OF 4 PAGES ARE PRINTED.
43 10.4 PRINT CHARACTER SET (STARTING ADDRESS=406)
44 10.4.1 THE CHARACTER SET IS PRINTED AND RIPPLES
45 1 SUCH THAT AFTER 64 LINES EACH PRINT
46 1 HAMMER HAS PRINTED EVERY CHARACTER OF
47 1 THE SET.
48 10.5 ZONE PRINT OPTION (START ADDRESS=407)
49 10.5.1 IF THE OPERATOR FAILED TO TYPE A "Y"
50 1 FOR THE ZONE SELECT OPTION THIS TEST
51 1 WILL NOT BE EXECUTED.
52 10.5.2 THIS TEST PRINTS A PAGE WITH A (1) IN
53 1 THE FIRST POSITION OF ZONE 1. A PAGE
54 1 WITH A 2 IN THE FIRST POSITION OF
55 1 ZONE 2, ETC.
56

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A 0005 .MAIN

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01
02      15.6  FORMAT CONTROL OPTION (START ADDRESS=410)
03      15.6.1 IF THE OPERATOR FAILED TO TYPE A "Y"
04      /      FOR THE FORMAT OPTION THIS TEST WILL
05      /      NOT BE EXECUTED.
06      15.6.2 THIS TEST USES THE FORMAT CONTROL
07      /      OPTION FOR VERTICAL PAPER MOTION. A
08      /      LINE INDICATING THE NUMBER OF LINES
09      /      TO BE SLEWED IS PRINTED ON THE LINE
10      /      PRINTER. THE OPERATOR MUST COUNT
11      /      THE NUMBER OF LINES FROM THE PREVIOUS
12      /      LINE TO CHECK THE SLEWING. THE
13      /      SECOND PART OF THE TEST SLEWS AS
14      /      A FUNCTION OF THE FORMAT CONTROL
15      /      TAPE. THE OPERATOR MUST CHECK
16      /      THE PRINTER OUTPUT WITH THE HOLES
17      /      PUNCHED IN THE FORMAT TAPE.
18
19      15.7  KEYBOARD ECHO ON PRINTER (START ADDRESS=411)
20      15.7.1 THIS ROUTINE PERMITS THE OPERATOR TO
21      /      INPUT A STRING OF CHARACTERS VIA THE
22      /      TELETYPE TO BE OUTPUT ON THE PRINTER.
23      /      CHARACTERS ARE STORED IN MEMORY AND
24      /      SENT TO THE PRINTER UPON RECEIPT OF A
25      /      (CNTRL Z) CHARACTER. THE TYPED LINE
26      /      WILL BE ECHOED ON THE PRINTER
27      /      UNTIL ANOTHER TELETYPE KEY IS STRUCK.
28      15.7.2 A (ESC) KEY WILL CAUSE
29      /      A CARRIAGE RETURN AND LINE FEED TO
30      /      BE PRINTED ON THE TELETYPE BUT
31      /      NOT SENT TO THE PRINTER.
32      15.8  STARTING THIS PROGRAM AT LOCATION 2
33      /      WILL CAUSE ALL OF THE PREVIOUSLY
34      /      MENTIONED TESTS, EXCEPT THE KEYBOARD
35      /      TEST, TO BE REPEATEDLY EXECUTED.

```

A 0006 .MAIN

```

01      000000 .LOC 0
02      000000 003446      DIRT
03
04      000002 .LOC 2
05      000002 002175      JMP #IBEG
06      000003 002175      JMP #IBEG
07
08      000045 .LOC 45
09      000045 000203      EGGS
10      000050 .LOC 50
11      000017 .LPT=17
12      000050 000000 GURLET 0
13      000051 000000 WHAT 0
14      000052 0000767 IUCODE 0 DEVIC
15      000053 000000 TOTRET 0
16      000054 0000413 TOTBEG 0 HERE+1
17      000055 0000423 TOTEND 0 HERE
18      000056 0000000 DISPAT 0
19      000057 0000105 QEI 0 "E
20      000058 0000075 EQQUAL 0 "E
21      000059 0000115 QMI 0 "M
22      000062 0000000 LETTEN 0
23      000063 0000000 AUJRET 0
24      000064 0000000 PAGE 0
25      000065 0000000 VERT 0
26      000066 0000014 K14 14
27      000067 0000015 K15 15
28      000068 0000012 K12 12
29      000071 0000670 INPUT PUT
30      000071 0000071 PRINT JSR #INPUT
31      000072 0000000 MURZI 0
32      000073 0000076 VLINE 62.
33      000074 0000553 .FINI FIN
34      000074 0000074 FINISH JSR #.FIN
35      000075 0000000 LBLKETI 0
36      000076 0000646 INI ENAB
37      000076 0000076 INIT JSR #INI

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IBEGIN LINE PRINTER TEST

IVERTICAL LINES THIS PAGE

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A 0007 .MAIN
01 00077 000000 K40: 40
02 00100 000140 SET: 140
03 00101 000004 K41 4
04 00102 000000 ROTRET: 0
05 00103 0003175 CBEG0: DATA
06 00104 0003402 ENDOU0: DATA+2ND
07 00105 000000 IBUF: 0
08 00106 000000 OBUF: 0
09 00107 177767 MASK: 177767
10 00110 000000 GRNET: 0
11 00111 000000 FTERET: 0
12 00112 000000 CHAN: 0
13 00113 000020 K20: 20
14 00114 000010 K10: 10
15 00115 000000 HOLRET: 0
16 00116 001262 IPMES: PMES
17 00117 000000 PRNRET: 0
18 00120 000000 ROTEM: 0
19 00121 002205 .SP: .SPA
20 00121 000121 SPACE=JSR 0.SP
21 00122 002214 IPAUS: PAWS
22 00122 000122 PAUSE=JSR 0IPAUS
23 00123 002203 .LI: .LIN
24 00123 000123 LINE=JSR 0.LI
25 00124 000077 K77: 77
26 00125 001042 INTIN: TIN
27 00126 000032 K32: 32
28 00127 002550 ICRLF: CRLF
29 00130 002425 IMESS: MESS
30 00131 000000 DIARET: 0
31 00132 177400 M400: -400
32 00133 002224 .EN: ENTER
33 00133 000133 SETUP=JSR 0.EN
34 00134 002245 .CY: CYCLE
35 00134 000134 LOOP=JSR 0.CY
36 00135 002322 .ER: ERR
37 00135 000135 ENALT=JSR 0.ER
38 00136 000101 K101: 101
39 00137 000755 .WA: HOLD
40 00137 000137 WAIT=JSR 0.WA
41 00140 000741 .DON: DON
42 00140 000140 DONE=JSR 0.DON

```

1 CHARACTER SET TERMINATOR

1 BEGIN OF OUTPUT BUFFER,
1 END OF OUTPUT BUFFER

1 PRIORITY MASK

```

A 0008 .MAIN
01 00141 000017 K17: 17
02 00142 000011 K11: 11
03 00143 000025 K5: 5
04 00144 000035 K35: 35
05 00145 000055 K55: 55
06 00146 000115 K115: 115
07 00147 000000 CORRET: 0
08 00150 000000 K80: 80
09 00151 177760 K20: -20
10 00152 000000 PRERET: 0
11 00153 000120 COL: 120
12 00154 000000 ZONE: 0
13 00155 000000 FORMAT: 0
14 00156 000000 PASS: 0
15 00157 000000 FPOINT: 0
16 00160 000000 OLRET: 0
17 00161 000211 K136: 137
18 00162 000131 QY: "Y"
19 00163 000200 TINKET: 0
20 00164 000177 K177: 177
21 00165 000072 K72: 72
22 00166 177720 M60: -60
23 00167 000000 ZOPRET: 0
24 00170 000000 ZSEL: 0
25 00171 000000 TEM: 0
26 00172 000144 C144: 144
27 00173 000000 MS4V: 0
28 00174 000000 COO: 00
29 00175 000400 IDEG: 400
30 00175 001042 ITIN: TIN
31 00177 000030 K24: 24
32 00200 000017 DEVCO: .LPT
33 00201 000076 K76: 76
34 00202 002005 IDCPNG: DCHNG
35 00203 000000 EGGS: 0
36 00204 000000 0
37 00205 000000 0
38 00206 000000 0
39 00207 000000 0
40
41
42 00210 000204 STAK: L04 0,EGGS+1
43 00211 000200 L04 1,DEVCO
44 00212 100405 SUMZ: 0,1,SNR
45 00213 000215 JMP #18EG
46 00214 000202 JSR #IDCHNG
47 00215 000200 DEVCO
48 00216 000400 HERE
49 00217 000223 CHAUS
50 00220 000215 JMP #INEG

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1 COLUMN WIDTH,
1 0 IF NO ZONE OPTION
1 0 IF NO FORMAT OPTION
1 ITERATION COUNTER

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A 0009 .MAIN
01
02 000400 .LOC 400
03
04 00400 004424 HERE: JSR GOGO      /EXECUTE ALL TEST ROUTINES
05 00401 004423      JSR GOGO      /EXECUTE DIAGNOSTIC
06 00402 004422      JSR GOGO      /PRINT LETTER "E"
07 00403 004421      JSR GOGO      /PRINT LETTER "H"
08 00404 004420      JSR GOGO      /PRINTER LETTER "H"
09 00405 004417      JSR GOGO      /PRINT ONE LETTER EACH LINE
10 00406 004416      JSR GOGO      /PRINT RIPPLED CHAR SET.
11 00407 004415 THERE: JSR GOGO      /TEST ZONE PRINTING
12 00410 004414      JSR GOGO      /TEST PAPER LOOP CNTL.
13 00411 004413      JSR GOGO      /KEYBOARD TO PRINTER
14
15 00412 000440 .HERE: TOTAL
16 00413 001302      A00          /DIAG
17 00414 000453      ADJ0          /E
18 00415 000455      ADJ1          /H
19 00416 000457      ADJ2          /M
20 00417 000521      LBL          /LINE BY LINE
21 00420 000572      ROT          /RIPPLE
22 00421 001104      ZOPT          /ZONE CHECK
23 00422 001161      FTEST
24 00423 000577 .HERE: KTP          /KEYS
25
26 00424 004050 GOGO: STA 3,GORET    /MAIN DISPATCH
27 00425 000203      LDA 0,EGGS      /ROUTINE FOR PRINTER
28 00426 001004      MOV 0,0,SZR     /TEST
29 00427 000406      JMP GOGO1       /WHEN MODE
30 00430 000477      READS 0
31 00431 001100      MOVL 0,0
32 00432 000051      LDA 0,WHAT
33 00433 001007      MOVC 0,0,SNB    /INPUT
34 00434 000052      JSR 0,IDCODE     /OPERATOR PARAMETERS
35
36 00435 004050 GOGO1: LDA 3,GORET
37 00436 007411      JSR 0,HERE-HERE-1,3
38 00437 000776      JMP GOGO1
39
40 00440 004053 TOTAL: STA 3,TOTNET   /TOTAL
41 00441 000054      LDA 0,TOTBEG    /RUN THE OTHER P
42 00442 000056      STA 0,DISPAT
43
44 00443 000056 TOT1:  LDA 2,DISPAT
45 00444 007000      JSR 0,2
46 00445 001005      ISZ DISPAT
47 00446 000056      LDA 0,DISPAT
48 00447 004055      LDA 1,TOTEND
49 00450 000414      SUB# 0,1,SZR
50 00451 000772      JMP TOT1
51 00452 000253      JMP 0,TOTRET
52

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A 0010 .MAIN
01
02 00453 020057 ADJ0:  LDA 0,0E      /"E"
03 00454 001001      MOV 0,0,SKP
04 00455 020060 ADJ1:  LDA 0,0EQUAL  /"H"
05 00456 001001      MOV 0,0,SKP
06 00457 020061 ADJ2:  LDA 0,0M      /"M"
07 00460 040062      STA 0,LETTER   /PRINT 2 PAGES OF
08 00461 004063      STA 3,ADJRET    /THE SPECIFIED LETTER.
09
10 00462 000076 PCS1:  INIT
11 00463 002400      SUB 0,0
12 00464 040064      STA 0,PAGE
13 00465 040065      STA 0,VERT
14
15 00466 020066 PCS0:  LDA 0,K14      /PRINT A FORM FEED
16 00467 000071      PRINT
17
18 00470 002400 PCS1:  SUB 0,0      /PRINT A CARRIAGE
19 00471 040072      STA 0,HORZ     /AND A LINE FEED
20 00472 020007      LDA 0,K15
21 00473 000071      PRINT
22 00474 020070      LDA 0,K12
23 00475 000071      PRINT
24
25 00476 020062 PCS2:  LDA 0,LETTER  /PRINT A LINE OF "E,0,ETC"
26 00477 000071      PRINT
27 00500 0010072      ISZ HORZ
28 00501 020072      LDA 0,HORZ
29 00502 024153      LDA 1,COL
30 00503 000404      SUB 0,1,SZR
31 00504 000772      JMP PCS2
32
33 00505 001005 PCS3:  ISZ VERT
34 00506 020073      LDA 0,VLINE
35 00507 024065      LDA 1,VERT
36 00510 000404      SUB 0,1,SZR
37 00511 000757      JMP PCS1
38 00512 044065      STA 1,VERT
39
40 00513 001004 PCS4:  ISZ PAGE
41 00514 020064      LDA 0,PAGE
42 00515 001212      MOVR# 0,0,SZC  /PRINT 2 PAGES OF THE
43 00516 000750      JMP PCS0       /LETTER.
44 00517 000074      FINISH
45 00520 002063      JMP 0,ADJRET    /WAIT FOR PRINTER TO FINISH
46                               /EXIT

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A 0011 .MAIN

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01
02 00521 054075 LBL1: STA 3,LBLRET      ;PRINT ONE LINE OF EACH CHAR.
03 00522 006076      INIT          ;AAA.
04 00523 102400      SUB 0,0        ;BBB.
05 00524 040064      STA 0,PAGE
06 00525 040065      STA 0,VERT
07 00526 020077      LDA 0,K40
08 00527 040062      STA 0,LETTER

09
10 00530 020066 LBL0: LDA 0,K14      ;PRINT FORM FEED
11 00531 006071      PRINT
12
13 00532 102400 LBL1: SUB 0,0
14 00533 040072      STA 0,HORZ
15 00534 020070      LDA 0,K12      ;PRINT CARRIAGE
16 00535 006071      PRINT          ;AND LINE FEED
17 00536 020067      LDA 0,K15
18 00537 006071      PRINT
19
20 00540 020062 LBL2: LDA 0,LETTER   ;PRINT THE LETTER
21 00541 006071      PRINT          ;ACROSS THE PAGE UNTIL
22 00542 010072      ISZ HORZ       ;LAST COL IS REACHED
23 00543 020072      LDA 0,HORZ
24 00544 024153      LUA 1,COL
25 00545 106414      SUB# 0,1,SZR
26 00546 000772      JMP LBL2
27
28 00547 010062 LBL3: ISZ LETTER
29 00550 030077      LDA 2,K40
30 00551 024100      LDA 1,SET
31 00552 020062      LDA 0,LETTER
32 00553 106415      SUB# 0,1,SNR
33 00554 050062      STA 2,LETTER

34
35 00555 010065 LBL4: ISZ VERT
36 00556 020073      LDA 0,VLINE
37 00557 024065      LDA 1,VERT
38 00558 106404      SUB 0,1,SZR
39 00559 000751      JMP LBL1
40 00562 044065      STA 1,VERT
41
42 00563 010064 LBL5: ISZ PAGE
43 00564 020064      LDA 0,PAGE
44 00565 024101      LDA 1,K4
45 00566 106414      SUB# 0,1,SZR
46 00567 000741      JMP LBL0
47 00570 006074      FINISH
48 00571 002075      JMP 0,LBLRET
49

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A 0012 .MAIN

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01
02 00572 054102 ROT1: STA 3,ROTRET   ;ROTATE THE CHARACTER SET
03 00573 006076      INIT          ;INITIALIZE INTERRUPT SYSTEM.
04 00574 102400      SUB 0,0
05 00575 040064      STA 0,PAGE
06 00576 040065      STA 0,VERT
07 00577 020077 ROT2: LDA 0,K40
08 00578 040120      STA 0,ROTEM

09
10 00601 020066      LDA 0,K14
11 00602 006071      PRINT          ;PRINT FORM FEED
12
13 00603 102400 ROT1: SUB 0,0
14 00604 040072      STA 0,HORZ
15 00605 020120      LDA 0,ROTEM
16 00606 040062      STA 0,LETTER
17 00607 020070      LDA 0,K12
18 00610 006071      PRINT          ;PRINT CARRIAGE
19 00611 020067      LDA 0,K15
20 00612 006071      PRINT
21
22 00613 020062 ROT2: LDA 0,LETTER
23 00614 006071      PRINT
24 00615 010002      ISZ LETTER
25 00616 024062      LDA 0,LETTER
26 00617 024100      LDA 1,SET
27 00620 030077      LDA 2,K40
28 00621 106415      SUB# 0,1,SNR
29 00622 050062      STA 2,LETTER
30 00623 010072      ISZ HORZ
31 00624 020072      LDA 0,HORZ
32 00625 024153      LDA 1,COL
33 00626 106414      SUB# 0,1,SZR
34 00627 000764      JMP ROT2
35
36 00630 010065 ROT3: ISZ VERT
37 00631 010120      ISZ ROTEM
38 00632 020073      LDA 0,VLINE
39 00633 024065      LDA 1,VERT
40 00634 106404      SUB 0,1,SZR
41 00635 000746      JMP ROT1
42
43 00636 010064 ROT4: ISZ PAGE
44 00637 044065      STA 1,VERT
45 00640 020064      LDA 0,PAGE
46 00641 024101      LDA 1,K4
47 00642 106414      SUB# 0,1,SZR
48 00643 000734      JMP ROT0
49 00644 006074      FINISH
50 00645 042102      JMP 0,ROTRET

```

```

A 0013 .MAIN
01
02 00046 052677 ENAB1 IORST      INITIALIZE
03 00047 020103      LDA 0,CBEGOUT
04 00050 040105      STA 0,IBUF
05 00051 040106      STA 0,OBUF
06 00052 001400      JMP 0,3
07
08 00053 063517 FIN1  SKPBZ ,LPT    IWAIT FOR PRINTER
09 00054 000777      JMP ,=1        ITO FINISH,
10 00055 063517      SKPBZ ,LPT
11 00056 000775      JMP FIN
12 00057 001400      JMP 0,3
13
14 00060 054110 GRIEF: STA 3,GRRET    ITIME READY STATUS OF
15 00061 000130      JSR 0,MESS      IPRINTER IS NOT SET,
16 00062 003003      MESRDY         IPRINT MESSAGE
17 00063 064417      DIA 1,,LPT      IWAIT UNTIL READY,
18 00064 125213      MOVW 1,1,SNC
19 00065 000776      JMP ,=2
20 00066 034110      LDA 3,GRRET
21 00067 000404      JMP PUT0
22
23 00070 064417 PUT:  DIA 1,,LPT    ICHECK STATUS OF
24 00071 125213      MOVW 1,1,SNC    IPRINTER
25 00072 000766      JMP GRIEF
26
27 00073 063517 PUT0: SKPBZ ,LPT
28 00074 000774      JMP PUT
29 00075 061117      DDAS 0,,LPT
30 00076 001400      JMP 0,3
31

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A 0014 .MAIN
01
02
03 00077 000775 KTP1: INIT          IPRINT ON THE LINE PRINTER
04 00700 000176      JSR 0,ITIN     ITHE DATA FROM THE KEYS
05 00701 030105      LDA 2,IBUF
06 00702 024126      LDA 1,K32
07 00703 106415      SUB# 0,1,SNR
08 00704 000427      JMP KTP22
09 00705 122015      ADC# 1,0,SNR
10 00706 000423      JMP KTP3
11
12 00707 010105 KTP1: ISZ IBUF
13 00710 041001      STA 0,1,2
14 00711 024104      LDA 1,ENDOUT
15 00712 140014      ADC# 2,1,SNR
16 00713 000705      JMP KTP+1
17
18
19 00714 010106 KTP2: ISZ OBUF
20 00715 022106      LDA 0,0,OBUF
21 00716 000071      PRINT
22 00717 020106      LDA 0,OBUF
23 00720 024105      LDA 1,IBUF
24 00721 106436      SUBZ# 0,1,SEZ
25 00722 000772      JMP KTP2
26 00723 020103      LDA 0,CBEGOUT
27 00724 040106      STA 0,OBUF
28 00725 063610      SKPUN TTI
29 00726 000766      JMP KTP2
30 00727 000074      FINISH
31 00730 000747      JMP KTP
32
33 00731 000127 KTP3: JSR 0,ICRLF
34 00732 000746      JMP KTP+1
35
36 00733 020106 KTP22: LDA 0,OBUF
37 00734 024105      LDA 1,IBUF
38 00735 106415      SUB# 0,1,SNR
39 00736 000741      JMP KTP
40 00737 000755      JMP KTP2
41
42 00740 000000 HOLZ1 0

```

A 0010 MAIN

```

01
02 00741 054147 DONE: STA 3,DONRET ;SET LPT DONE FLAG
03 00742 034077 LDA 3,K40 ;VIA CARRIAGE RETURN.
04 00743 063517 SKPBZ ,LPT
05 00744 000777 JMP ,=-1
06 00745 075117 DDAS 3,,LPT
07 00746 034067 LDA 3,K15 ; CARRIAGE RETURN CONSTANT.
08 00747 063517 SKPBZ ,LPT
09 00750 000777 JMP ,=-1
10 00751 075117 DDAS 3,,LPT
11 00752 063517 SKPBZ ,LPT
12 00753 000777 JMP ,=-1
13 00754 002147 JMP #DONRET
14
15 00755 054115 HOLD: STA 3,HOLRET
16 00756 034101 LDA 3,K4
17 00757 054701 STA 3,MULZ ;WAIT FOR BUSY TO
18 00760 063417 HOL: SKPBN ,LPT ;GO ZERO OR WAIT A
19 00761 002115 JMP #HOLRET ;LONG TIME IF IT
20 00762 175404 INC 3,3,SZR ;DOESN'T.
21 00763 000775 JMP HOL1
22 00764 014754 DSZ HOLZ
23 00765 000773 JMP HOL1
24 00766 002115 JMP #HOLRET
25
26 00767 054100 DEVIC: STA 3,DCRET ;CHANGE DEVICE CODE, IF NECESSARY
27 00770 000130 JSR #IMESS ;"TYPE 2 DIGIT DEVICE
28 00771 003144 MCODE ;CODE, THEN CARRIAGE RETURN"
29 00772 004464 JSR ASSDIG
30 00773 000774 JMP DEVIC ;INPUT ERROR
31 00774 024201 LDA 1,K76
32 00775 141000 MOV 2,0
33 00776 151004 MOV 2,2,SZR ;USE OCTAL RETURN
34 00777 132432 SUBZ# 1,2,SZR ;8<CODE>76 ALLOWED
35 01000 000707 JMP DEVIC
36 01001 000202 JSR #IDCMNG
37 01002 000200 DEVCD
38 01003 000400 HERE ;FIRST LOCATION TO BE CHANGED
39 01004 002223 CPAUS ;LAST LOCATION TO BE CHANGED
40 01005 000130 DCODE: JSR #IMESS
41 01006 002054 MESCOL
42 01007 004447 JSR ASSDIG
43 01010 000775 JMP DCODE
44 01011 034101 LDA 3,K136.
45 01012 125004 MOV 1,1,SZR
46 01013 130433 SUBZ# 1,3,SNC
47 01014 000771 JMP DCODE
48 01015 044153 STA 1,COL
49 01016 000130 DC1: JSR #IMESS ;ASK ABOUT ZONE CNTL
50 01017 002703 MESZON ;OPTION
51 01020 004436 JSR ASSDIG
52 01021 024102 LDA 1,UY
53 01022 044154 STA 1,ZONE ;IF IF NO
54 01023 125004 MOV 1,1,SZR
55 01024 100415 SUB# 0,1,SNC
56 01025 101001 MOV 1,0,SKP
57 01026 000757 JMP DCODE ;OPERATOR ERROR
58
59 01027 000130 DC2: JSR #IMESS ;ASK ABOUT FORMAT

```

0010 MAIN

```

01 01030 002700
02 01031 004425
03 01032 024102
04 01033 044155
05 01034 125004
06 01035 100415
07 01036 102001
08 01037 000746
09 01040 040001
10 01041 002100
11

```

```

MESZON ;TAPE OPTION
JSR ASSDIG
LUA 1,UY
STA 1,FORMAT
MOV 1,1,SZR
SUB# 0,1,SNC
AUC 0,0,SKP
JMP DCODE ;ERROR
STA 0,WHAT
JMP #DCRET

```

```

A 0017 .MAIN
01
02 01042 063610 TINI: SKPDN TTI      /ACCEPT INPUT FROM THE
03 01043 000777      JMP ,=-1      /TELETYPE KEYBOARD.
04 01044 000610      DIAC 0,TTI
05 01045 003511      SKPBZ TTD
06 01046 000777      JMP ,=-1
07 01047 001111      DOAS 0,TTD
08 01050 003511      SKPBZ TTD
09 01051 000777      JMP ,=-1
10 01052 054103      STA 3,TINRET
11 01053 034104      LDA 3,K177      /MASK THE PARITY BIT.
12 01054 103400      AND 3,0
13 01055 002103      JMP 0TINRET
14
15 01056 054425 ASSOIG: STA 3,ASSRET /ASSEMBLE IN OCTAL
16 01057 152400      SUB 2,2      /A NUMBER IN AC2.
17 01058 120400      SUB 1,1      /DECIMAL IN AC1.
18 01061 000176      JSR 0ITIN
19 01062 034105      LDA 3,K72
20 01063 110032      ADCIN 0,3,SZC
21 01064 034105      LDA 3,M00
22 01065 117046      ADDO 0,3,SEZ
23 01066 000411      JMP ASS1
24 01067 121000      MOV 1,0
25 01070 127120      ADDZL 1,1      /C(1)*10
26 01071 107120      ADDZL 0,1
27 01072 107000      AUD 3,1
28 01073 151123      MOVZL 2,2,SNC /OCTAL ASSEMBLY.
29 01074 153120      ADDZL 2,2
30 01075 173003      AUD 3,2,SNC
31 01076 000763      JMP ASSDIG+3
32 01077 034067 ASS1:  LDA 3,K15
33 01100 110415      SUB# 0,3,SNR
34 01101 010402      ISZ ASSRET
35 01102 002401      JMP #ASSRET
36 01103 000000 ASSRET: 0
37
38 01104 054167 ZOPT:  STA 3,ZOPRET /ZONE SELECT OPTION.
39 01105 020104      LDA 0,ZONE
40 01106 101005      MOV 0,0,SNR
41 01107 002167      JMP 0ZOPRET /IF OPTION NOT PRESENT
42 01110 000076      INIT      /DON'T PERFORM THE TEST.
43 01111 102400      SUB 0,0
44 01112 040170      STA 0,ZSEL /PRINT (1) IN LEFT MOST COL
45 01113 040065      STA 0,VERT /OF ZONE ONE, (2) IN NEXT
46                                     /ZONE ETC.

```

```

A 0018 .MAIN
01
02 01114 020066 ZOPT1: LDA 0,K14
03 01115 000071      PRINT      /FORM FEED
04 01116 102400      SUB 0,0
05 01117 040065      STA 0,VERT
06 01120 020170      LDA 0,ZSEL
07 01121 100405      NEG 0,0,SNR
08 01122 000411      JMP ZOPT2
09 01123 024177      LDA 1,K24. /CHECK FOR LAST ZONE.
10 01124 152400      SUB 2,2
11 01125 133000      ADD 1,2
12 01126 101404      INC 0,0,SZR
13 01127 000776      JMP ,=-2
14 01130 024153      LDA 1,COL
15 01131 140433      SUBZ# 2,1,SNC
16 01132 000425      JMP ZOPT3      /LAST ZONE.
17
18 01133 020067 ZOPT2: LDA 0,K15
19 01134 000071      PRINT      /PRINT CARRIAGE AND
20 01135 020070      LDA 0,K12      /LINE FEED.
21 01136 000071      PRINT
22 01137 000074      FINISH
23 01140 020170      LDA 0,ZSEL
24 01141 002117      DOBS 0,.LPT /ZONE SELECT VIA
25 01142 003517      SKPBZ .LPT /C(ACB) AND DOB.
26 01143 000777      JMP ,=-1
27 01144 024106      LDA 1,M00
28 01145 122400      SUB 1,0
29 01146 101400      INC 0,0
30 01147 000071      PRINT
31 01150 010065      ISZ VERT
32 01151 020073      LDA 0,VLINE
33 01152 024065      LDA 1,VERT /TEST FOR END OF
34 01153 100414      SUB# 0,1,SZK /PAGE.
35 01154 000757      JMP ZOPT2
36 01155 010170      ISZ ZSEL
37 01156 000730      JMP ZOPT1
38
39 01157 000074 ZOPT3: FINISH
40 01160 002167      JMP 0ZOPRET /WAIT FOR
41 01161 054111 FTEST: STA 3,FTERET /TEST Y.
42 01162 020155      LDA 0,FORMAT /CTRL OF
43 01163 101005      MOV 0,0,SNR /V IN THE
44 01164 002111      JMP 0FTERET /PRINTER
45 01165 102400      SUB 0,0 /EXIT IF OPTION NOT PRESENT.
46 01166 040112      STA 0,CHAN /CLEAR THE CHANNEL
47

```

```

A 0019 .MAIN
01
02 01167 006116 FT1: JSR #IPMES      ;TEST THE SLEN
03 01170 003030 MESFF      ;LOGIC WHEN BIT 5(1)
04 01171 006074 FT2: FINISH
05 01172 010112      ISZ CHAN
06 01173 020112      LDA 0,CHAN
07 01174 024113      LDA 1,K20
08 01175 106415      SUB# 0,1,SNR
09 01176 000411      JMP FT3
10 01177 123000      ADD 1,0
11 01200 152620      SUBZR 2,2
12 01201 143000      ADD 2,0
13 01202 062117      DOBS 0,,LPT      ;PAPER INSTRUCTION
14 01203 006116      JSR #IPMES
15 01204 003077      MESK
16 01205 004425      JSR PRNUM
17 01206 000763      JMP FT2
18
19 01207 102400 FT3: SUB 0,0      ;TEST THE PAPER FORMAT.
20 01210 040112      STA 0,CHAN
21 01211 006116      JSR #IPMES
22 01212 003030      MESFF
23
24 01213 006074 FT4: FINISH      ;TEST THE PAPER READER
25 01214 010112      ISZ CHAN      ;LOGIC IN THE PRINTER.
26 01215 020112      LDA 0,CHAN
27 01216 024114      LDA 1,K10
28 01217 106415      SUB# 0,1,SNR
29 01220 000410      JMP FT5
30 01221 152620      SUBZR 2,2
31 01222 143000      ADD 2,0
32 01223 062117      DOBS 0,,LPT      ;PAPER INSTRUCTION
33 01224 006116      JSR #IPMES
34 01225 003121      MES1
35 01226 004404      JSR PRNUM
36 01227 000764      JMP FT4
37
38 01230 006074 FT5: FINISH      ;FINISHED
39 01231 002111      JMP #FTERET
40
41 01232 054117 PRNUM: STA 3,PRNRET ;PRINT THE CHANNEL
42 01233 030130      LDA 2,K60      ;NUMBER.
43 01234 020112      LDA 0,CHAN
44 01235 024151      LDA 1,M20
45 01236 123400      AND 1,0
46 01237 024142      LDA 1,K11
47 01240 106433      SUBZR 0,1,SNR
48 01241 000406      JMP PRN2
49 01242 143000 PRN1: ADD 2,0      ;ONLY ONE DIGIT
50 01243 000471      PRINT
51 01244 020067 PRN1: LDA 0,K15      ;CARRIAGE RETURN
52 01245 000471      PRINT
53 01246 002117      JMP #PRNRET      ;EXIT
54

```

```

A 0020 .MAIN
01
02 01247 141400 PRN2: INC 2,0      ;DIGIT "1"
03 01250 000071      PRINT
04 01251 020112      LDA 0,CHAN
05 01252 024151      LDA 1,M20
06 01253 123400      AND 1,0
07 01254 120120      ADCZL 1,1
08 01255 123000      ADD 1,0
09 01256 030150      LDA 2,K60
10 01257 143000      ADD 2,0
11 01260 000071      PRINT      ;SECOND DIGIT
12 01261 000763      JMP PRN1
13
14 01262 054152 PRN3: STA 3,PRNRET ;PRINT AN ASCII MESSAGE
15 01263 010152      ISZ PRNRET      ;ON THE LINE PRINTER
16 01264 031400      LDA 2,0,3
17 01265 050157      STA 2,MPOINT
18
19 01266 022157 PRN4: LDA 0,MPOINT ;PRINT RIGHT CHARACTER
20 01267 024104      LDA 1,K177
21 01270 123400      AND 1,0,SNR
22 01271 002152      JMP #PRNRET      ;EXIT ON ZERO CHAR
23 01272 000071      PRINT
24 01273 022157      LDA 0,MPOINT ;PRINT LEFT CHARACTER
25 01274 124132      LDA 1,M400
26 01275 123705      ANDS 1,0,SNR
27 01276 002152      JMP #PRNRET      ;EXIT ON ZERO CHAR.
28 01277 000471      PRINT
29 01300 010157      ISZ MPOINT
30 01301 000765      JMP PRN5

```

A 0021 .MAIN

```

01
02 01302 054131 A001 STA 3,DIAMET JENTER THE DIAGNOSTIC
03 01303 006133 SETUP JSELB LINE (A00) IS
04 01304 063500 SKPBZ 0 JGROUND, CHECK BACK
05 01305 006135 EHALLT JANNEL ETC.
06 01306 006134 LOOP
07
08 01307 006133 A011 SETUP JSELB LINE (A02) IS
09 01310 063700 SKPDZ 0 JGROUND, CHECK BACK
10 01311 006135 EHALLT JANNEL ETC.
11 01312 006134 LOOP
12
13 01313 006133 A021 SETUP JSELECTING LPT GROUNDED
14 01314 063717 SKPDZ .LPT JTHE SELB LINE, DONE FLAG
15 01315 006135 EHALLT JSHOULD BE ZERO, CHECK FLOP
16 01316 006134 LOOP JO.C. GATE TO SELB ETC.
17
18 01317 006133 A031 SETUP JSELECTING LPT GROUNDED
19 01320 063517 SKPBZ .LPT JTHE SELB LINE A(00), BUSY
20 01321 006135 EHALLT JFLOP SHOULD BE ZERO, CHECK
21 01322 006134 LOOP JFLOP, O.C. GATE TO SELB ETC.
22
23 01323 006133 A041 SETUP J"DIB" TO DEVICE 0 READ
24 01324 061400 DIB 0,0 JA BIT 15, PERHAPS I/O
25 01325 101212 MOVW 0,0,SZR JBUS LINE 15 GROUNDED VIA
26 01326 006135 EHALLT JO.C. GATES IN PRINTER CNTL.
27 01327 006134 LOOP
28
29 01330 006133 A051 SETUP J"DIB" TO THE LINE PRINTER
30 01331 061417 DIB 0,.LPT JSHOULD NOT READ BACK ANY
31 01332 101004 MOV 0,0,SZR JBITS, IF BIT 15 OF A00 IS
32 01333 006135 EHALLT JSET, CHECK AND GATE
33 01334 006134 LOOP J(LPT SELECT, DATIA), THE DATIA
34 JINPUT SHOULD NOT BE TRUE
35 JURING SELECT.
36
37 01335 006133 A061 SETUP J"DIA" TO DEVICE 0 SHOULD
38 01336 060400 DIA 0,0 JSET NO BITS, IF BIT 15 IS
39 01337 101004 MOV 0,0,SZR JSET CHECK AND GATE (DATIA,
40 01340 006135 EHALLT JLPT SELECT), CHECK LPT
41 01341 006134 LOOP JSELECT LOGIC.
42

```

A 0022 .MAIN

```

01
02 01342 006133 A071 SETUP JNO INTERRUPT SHOULD OCCUR
03 01343 102020 SUBR 0,0 JWHEN THE INTERRUPTS ARE
04 01344 040001 STA 0,1 JENABLED, CHECK INTR LINE
05 01345 102000 ADC 0,0 J(B20), LPT INT REQ FLOP,
06 01346 062077 MSKO 0 JAND GATE (LPT DONE(1), LPT
07 01347 050177 INTEN JINT DISABLE(0) TO THE
08 01350 101000 MOV 0,0 JLPT INT REQ FLOP.
09 01351 063477 SKPBN CPU
10 01352 006135 EHALLT
11 01353 060277 NIOC CPU
12 01354 006134 LOOP
13
14 01355 006133 A081 SETUP JENABLE OF THE INTERRUPT
15 01356 060277 NIOC CPU JSYSTEM ALLOWED A INTERRUPT
16 01357 060177 INTEN JTO OCCUR, CHECK AND GATE
17 01360 101000 MOV 0,0 J(LPT DONE(1), LPT INT DISABLE(0))
18 01361 063477 SKPBN CPU JTHE LPT DONE INPUT.
19 01362 006135 EHALLT
20 01363 060277 NIOC CPU
21 01364 006134 LOOP
22
23 01365 006133 A091 SETUP JINTA SHOULD READ BACK
24 01366 061477 INTA 0 JNO BITS BECAUSE ALL
25 01367 101004 MOV 0,0,SZR JDONE FLAG HAVE BEEN RESET.
26 01370 006135 EHALLT JCHECK AND GATE INTA
27 01371 006134 LOOP JLPT INT REQ(1).
28
29 01372 006133 A101 SETUP JSEND CARRIER RETURNS
30 01373 006121 SPACE
31 01374 020007 LDA 0,K15 JAND TEST FOR BUSY(1).
32 01375 061117 DOAS 0,.LPT JCHECK LPT SELECT, BUSY
33 01376 063417 SKPBN .LPT JFLOP, AND DEMAND
34 01377 006135 EHALLT JLEVEL FROM THE PRINTER0.
35 01400 006137 WAIT JWAIT FOR BUSY(5).
36 01401 006134 LOOP
37
38 01402 006133 A111 SETUP JREADY SHOULD BE
39 01403 060417 DIA 0,.LPT JIS THE " " LINE?
40 01404 101213 MOVW 0,0,SNC JPAPER
41 01405 006135 EHALLT JOVER " "
42 01406 006134 LOOP
43

```

A 0023 .MAIN

```

01
02 01407 000133 A12:  SETUP      ;SEND CARRIAGE AND TEST
03 01410 000121      SPACE
04 01411 020007      LDA 0,K15    ;FOR BUSY GOING TO ZERO.
05 01412 061117      DOAS 0,.LPT ;CHECK STROBE AND
06 01413 000137      WAIT        ;DEMAND LINES ETC.
07 01414 000137      SKPBZ .LPT
08 01415 000135      EHALLT
09 01416 000134      LOOP
10
11
12 01417 000133 A14:  SETUP      ;A START PULSE TO A
13 01420 000121      SPACE
14 01421 020007      LDA 0,K15    ;DEVICE OTHER THAN THE
15 01422 051100      DOAS 0,0    ;LPT SHOULD NOT SET
16 01423 063517      SKPBZ .LPT  ;LPT BUSY, CHECK AND
17 01424 000135      EHALLT      ;GATE (LPT SELECT, STRT).
18 01425 000134      LOOP
19
20 01426 000133 A15:  SETUP      ;BUSY SHOULD NOT SET
21 01427 000121      SPACE
22 01430 020007      LDA 0,K15    ;WITHOUT A LPT SELECT
23 01431 061017      DOA 0,.LPT  ;LEVEL.
24 01432 063517      SKPBZ .LPT
25 01433 000135      EHALLT
26 01434 000134      LOOP
27
28 01435 000133 A16:  SETUP      ;A CLR PULSE FAILED TO
29 01436 000121      SPACE
30 01437 020007      LDA 0,K15    ;CLEAN THE LPT BUSY FLOP.
31 01440 061117      DOAS 0,.LPT ;CHECK AND GATE (CLR,
32 01441 060217      NI0C .LPT  ;LPT SELECT) AND OR GATE
33 01442 063517      SKPBZ .LPT  ;TO RESET SIDE OF BUSY
34 01443 000135      EHALLT
35 01444 000122      PAUSE
36 01445 000134      LOOP
37
38 01446 000133 A17:  SETUP      ;SET LPT BUSY FLOP.
39 01447 000121      SPACE
40 01450 020007      LDA 0,K15    ;CHECK TO INSURE OTHER
41 01451 061117      DOAS 0,.LPT ;DEVICE CODES DO NOT
42 01452 063500      SKPBZ 0     ;READ THIS FLOP ONTO THE
43 01453 000135      EHALLT      ;SELB LINE, CHECK O.C. GATE
44 01454 000137      WAIT        ;(LPT BUSY, LPT SELECT) TO
45 01455 000134      LOOP      ;SELB LINE (A02).
46

```

A 0024 .MAIN

```

01
02 01456 000133 A18:  SETUP      ;A CLR PULSE TO DEVICE
03 01457 000121      SPACE
04 01460 020007      LDA 0,K15    ;B CLEARED THE LPT
05 01461 061117      DOAS 0,.LPT ;BUSY FLOP, CHECK AND
06 01462 000200      NI0C 0      ;GATE (LPT SELECT, CLR),
07 01463 063417      SKPBZ .LPT  ;THE LPT SELECT INPUT
08 01464 000135      EHALLT      ;SHOULD NOT BE TRUE
09 01465 000137      WAIT        ;AT CLR TIME.
10 01466 000134      LOOP
11
12 01467 000133 A19:  SETUP      ;SELECT OF LPT WITHOUT
13 01470 000121      SPACE
14 01471 020007      LDA 0,K15    ;A CLR PULSE SHOULD NOT
15 01472 061117      DOAS 0,.LPT ;RESET THE BUSY FLOP, CHECK
16 01473 060017      NI0 .LPT  ;AND GATE (LPT SELECT, CLR)
17 01474 063417      SKPBZ .LPT  ;THE CLR INPUT SHOULD
18 01475 000135      EHALLT      ;NOT BE TRUE AT SELECT
19 01476 000137      WAIT        ;TIME.
20 01477 000134      LOOP
21
22 01500 000133 A20:  SETUP      ;TEST (IORST) ABILITY TO
23 01501 000121      SPACE
24 01502 020007      LDA 0,K15    ;CLEAN THE LPT BUSY
25 01503 061117      DOAS 0,.LPT ;FLOP, CHECK GATES TO
26 01504 062677      IORST      ;RESET SIDE OF BUSY.
27 01505 063517      SKPBZ .LPT
28 01506 000135      EHALLT
29 01507 000122      PAUSE
30 01510 000134      LOOP
31
32 01511 020077 A21:  LDA 0,K40
33 01512 040171      STA 0,TEM
34 01513 000133      SETUP
35 01514 000121      SPACE
36 01515 020171      LDA 0,TEM
37 01516 024421      LDA 1,CNIOC
38 01517 131000      MOV 1,2
39 01520 113520      ANDZL 0,2
40 01521 107000      ADD 0,1
41 01522 140400      SUB 2,1
42 01523 044403      STA 1,A21A
43 01524 020007      LDA 0,K15
44 01525 061117      DOAS 0,.LPT
45 01526 000000 A21A:  W
46 01527 063417      SKPBZ .LPT
47 01530 000135      EHALLT
48 01531 000137      WAIT
49 01532 000134      LOOP
50 01533 020171      LDA 0,TEM
51 01534 101224      MOVZ 0,0,SR
52 01535 000755      JMP A21+1
53 01536 101001      MOV 0,0,SKP
54 01537 060217 CNIOC: NI0C .LPT

```

A 0025 ,MAIN

```

01
02 01540 006133 A22: SETUP
03 01541 006121 SPACE
04 01542 020067 LDA 0,K15
05 01543 061017 DOA 0,.LPT
06 01544 024136 LDA 1,K101
07 01545 065000 DOA 1,0
08 01546 060117 NIOS .LPT
09 01547 102620 SUBZR 0,0
10 01550 063417 SKPBN .LPT
11 01551 006135 EHMT
12 01552 101224 MOVZR 0,0,SZR
13 01553 000775 JMP ,-3
14 01554 000137 WAIT
15 01555 006134 LOOP
16
17 01556 006133 A23: SETUP
18 01557 006121 SPACE
19 01560 020067 LDA 0,K15
20 01561 061117 DOAS 0,.LPT
21 01562 006137 WAIT
22 01563 063617 SKPDZ .LPT
23 01564 006135 EHMT
24 01565 006134 LOOP
25
26 01566 006133 A24: SETUP
27 01567 006121 SPACE
28 01570 020067 LDA 0,K15
29 01571 061117 DOAS 0,.LPT
30 01572 006137 WAIT
31 01573 060217 NIOC .LPT
32 01574 063717 SKPDZ .LPT
33 01575 006135 EHMT
34 01576 006134 LOOP
35
36 01577 006133 A25: SETUP
37 01600 006121 SPACE
38 01601 020067 LDA 0,K15
39 01602 061117 DOAS 0,.LPT
40 01603 006137 WAIT
41 01604 020077 LDA 0,K40
42 01605 061117 DOAS 0,.LPT
43 01606 063717 SKPDZ .LPT
44 01607 006135 EHMT
45 01610 006137 WAIT
46 01611 006134 LOOP
47

```

```

;CHECK TO INSURE A "DOA"
;INSTRUCTION TO A DEVICE
;OTHER THAN THE LINE PRINTER
;WILL NOT LOAD THE DATA
;REGISTERS TO THE PRINTER.
;IF THE LETTER "A" (ASCII 101)
;IS LOADED THE BUSY FLAG
;WILL CLEAR QUICKLY, CHECK
;AND GATE (LPT SELECT, DATOA).
;ITERATES 16 TIMES.

```

```

;PRINTING A CARRIAGE
;RETURN SHOULD SET
;THE DONE FLAG, CHECK
;LPT DONE FLOP, O.C. GATE
;TO SELD LINE, TIME
;FOR SINLGE SHOT TO "D"
;SIDE OF LPT DONE, ETC.

```

```

;PRINTING A CARRIAGE RETURN
;SHOULD SET DONE FLAG, A
;CLR PULSE SHOULD RESET IT.
;CHECK RESET SIDE OF DONE
;FLOP VIA CLR.

```

```

;SET THE DONE FLAG
;VIA CARRIAGE, THEN TRY
;TO CLEAR IT VIA STRT
;PULSE.
;CHECK RESET TO LPT DONE
;VIA STRT PULSE, 2 INPUT
;OR GATE, ETC.

```

A 0026 ,MAIN

```

01
02 01612 006133 A26: SETUP
03 01613 006121 SPACE
04 01614 020067 LDA 0,K15
05 01615 061117 DOAS 0,.LPT
06 01616 006137 WAIT
07 01617 020077 LDA 0,K40
08 01620 061117 DOAS 0,.LPT
09 01621 102620 SUBZR 0,0
10 01622 065000 NIO 0
11 01623 101224 MOVZR 0,0,SZR
12 01624 000775 JMP ,-2
13 01625 063717 SKPDZ .LPT
14 01626 006135 EHMT
15 01627 006134 LOOP
16
17 01630 006133 A27: SETUP
18 01631 006140 DONE
19 01632 063700 SKPDZ 0
20 01633 006135 EHMT
21 01634 006134 LOOP
22
23 01635 006133 A28: SETUP
24 01636 006140 DONE
25 01637 061477 INTA 0
26 01640 101005 MOV 0,0,SNR
27 01641 006135 EHMT
28 01642 006134 LOOP
29
30
31 01643 006133 A29: SETUP
32 01644 006140 DONE
33 01645 060400 DIA 0,0
34 01646 101004 MOV 0,0,SZR
35 01647 006135 EHMT
36 01650 006134 LOOP
37
38 01651 006133 A30: SETUP
39 01652 006140 DONE
40 01653 030124 LDA 2,K77
41 01654 024402 LDA 1,-2
42 01655 147401 AND 2,1,SKP
43 01656 060017 NIO .LPT
44 01657 061477 INTA 0
45 01660 100414 SUBW 0,1,SZR
46 01661 006135 EHMT
47 01662 006134 LOOP
48

```

```

;PRINT CARRIAGE, THEN SPACE.
;THE DONE FLAG SHOULD NOT
;SET ON THE LETTER SPACE,
;SINGLE SHOT TO THE "D"
;INPUT OF DONE FLOP FAILED
;TO SET, ALSO 2 INPUT OR
;GATE ON "D" SIDE MAY HAVE
;FAILED

```

```

;SET THE DONE FLOP.
;THIS SHOULD NOT EFFECT
;THE DONE FLOP IN DEVICE 0.
;CHECK O.C. GATE TO SELD LINE

```

```

;SET THE DONE FLOP.
;THE LINE PRINTER DEVICE
;CODE SHOULD BE READ
;BACK VIA INTA, CHECK AND
;GATE (LPT INT REQ(1), INTA).
;ALSO FOLLOWING INVERTER,
;INTP IN LEVEL, ETC.

```

```

;SET THE DONE FLOP.
;THE LPT DEVICE CODE IS
;BEING PLACED ON THE BUS
;WITHOUT THE INTA INSTRUCTION.

```

```

;SET LPT DONE FLOP.
;CHECK LPT DEVICE
;CODE VIA INTA.
;CHECK GATES FORMING
;DEVICE (AC1)*CORRECT
;C(AC0)*ERROR

```

A 0027 .MAIN

```

01
02 01063 102000 A31: ADC 0,0
03 01064 061111 DDAS 0,TTU
04 01065 063011 SKPDN TTD
05 01066 000777 JMP , -1
06 01067 006140 DONE
07 01070 061477 INTA 0
08 01071 024405 LDA 1,KTTO
09 01072 106414 SUB# 0,1,SNR
10 01073 006135 EHMT
11 01074 101000 MOV 0,0
12 01075 101001 MOV 0,0,SKP
13 01076 000011 KTTO: TTD
14
15 01077 006133 A32: SETUP
16 01700 102620 SUBZR 0,0
17 01701 140001 STA 0,1
18 01702 000277 NIIC CPU
19 01703 006140 DONE
20 01704 006177 INTEN
21 01705 101000 MOV 0,0
22 01706 003577 SKPBZ CPU
23 01707 006135 EHMT
24 01710 006134 LOOP
25
26
27 01711 006133 A33: SETUP
28 01712 102000 ADC 0,0
29 01713 000277 MSKO 0
30 01714 006140 DONE
31 01715 061477 INTA 0
32 01716 101004 MOV 0,0,SNR
33 01717 006135 EHMT
34 01720 006134 LOOP
35
36 01721 006133 A34: SETUP
37 01722 006140 DONE
38 01723 102400 SUB 0,0
39 01724 052077 MSKO 0
40 01725 061477 INTA 0
41 01726 101005 MOV 0,0,SNR
42 01727 006135 EHMT
43 01730 006134 LOOP
44

```

THE TELETYPE IS CLOSER
 TO THE PROCESSOR THEN
 THE LPT. THUS WHEN BOTH
 HAVE THERE DONE FLAGS SET
 ONLY THE TELETYPE SHOULD
 SHOULD RESPOND.
 IACI=TELETYPE DEVICE CODE
 IACB=RESULT OF INTA.
 ICHECK INTP IN LINE TO THE
 LPT LOGIC. OPERATOR MUST
 FORM HIS OWN SCOPE LOOP!!!

THE LPT INT REQ FLOP
 FAILED TO CAUSE A
 INTERRUPT. CHECK THE
 I.O.C. GATE GROUNDING THE
 INTR LINE (B29).

LPT INT DISABLE FLOP
 FAILED TO INHIBIT THE
 SET TO LPT INT REQ
 FLOP. CHECK MSKO,
 DATA 12, DISABLE AND
 INT REQ FLOPS.

SET DONE FLAG. CHECK
 TO INSURE MSKO DOES
 NOT SET THE (LPT INT
 DISABLE FLOP) WHEN
 DATA 12 IS NOT PRESENT

A 0020 .MAIN

```

01
02 01731 006133 A35: SETUP
03 01732 000277 NIIC CPU
04 01733 006140 DONE
05 01734 006177 INTEN
06 01735 002477 DIC 0,CPU
07 01736 003477 SKPBZ CPU
08 01737 006135 EHMT
09 01740 000277 NIIC CPU
10 01741 006134 LOOP
11
12 01742 006133 A36: SETUP
13 01743 102000 ADC 0,0
14 01744 002077 MSKO 0
15 01745 002677 IURST
16 01746 006140 DONE
17 01747 006177 INTEN
18 01750 101000 MOV 0,0
19 01751 003577 SKPBZ CPU
20 01752 006135 EHMT
21 01753 000277 NIIC CPU
22 01754 006134 LOOP
23
24 01755 006133 A37: SETUP
25 01756 006140 DONE
26 01757 006121 SPACE
27 01760 020141 LDA 0,K17
28 01761 061117 DDAS 0,LPT
29 01762 003517 SKPBZ .LPT
30 01763 000777 JMP , -1
31 01764 063717 SKPDZ .LPT
32 01765 006135 EHMT
33 01766 006134 LOOP
34
35 01767 006133 A38: SETUP
36 01770 006140 DONE
37 01771 006121 SPACE
38 01772 020142 LDA 0,K11
39 01773 061117 DDAS 0,LPT
40 01774 003517 SKPBZ .LPT
41 01775 000777 JMP , -1
42 01776 063717 SKPDZ .LPT
43 01777 006135 EHMT
44 02000 006134 LOOP
45
46 02001 006123 LINE
47

```

CHECK TO INSURE THAT
 I/O RESET CLEARS THE
 LPT INT REQ FLOP.

TEST TO INSURE I/O RESET
 WILL CLEAR THE (LPT
 INT DISABLE) FLOP.

PRINT CARRIAGE RETURN AND
 ANOTHER CHARACTER WITH

ONLY BIT 14 DIFFERENT.
 IF BIT 14 IS LOST
 PRINTER WILL RECEIVE (CR)
 AND DONE WILL SET A
 SECOND TIME.

PRINT CARRIAGE RETURN AND
 ANOTHER CHARACTER WITH

ONLY BIT 13 DIFFERENT.
 IF BIT 13 IS FALSELY SET
 THE PRINTER WILL RECEIVE
 A (CR) AND DONE WILL SET
 A SECOND TIME.

```

A 0029 ,MAIN
01
02 02002 000133 A391  SETUP
03 02003 000140  DONE
04 02004 000121  SPACE
05 02005 020143  LDA 0,K5
06 02006 061117  DOAS 0,,LPT
07 02007 063517  SKPBZ .LPT
08 02010 000777  JMP ,-1
09 02011 063717  SKPDZ .LPT
10 02012 000135  EHMT
11 02013 000134  LOOP
12
13 02014 000123  LINE
14
15
16 02015 000133 A401  SETUP
17 02016 000140  DONE
18 02017 000121  SPACE
19 02020 020144  LDA 0,K35
20 02021 061117  DOAS 0,,LPT
21 02022 063517  SKPBZ .LPT
22 02023 000777  JMP ,-1
23 02024 063717  SKPDZ .LPT
24 02025 000135  EHMT
25 02026 000134  LOOP
26
27 02027 000123  LINE
28
29
30 02030 000133 A411  SETUP
31 02031 000140  DONE
32 02032 000121  SPACE
33 02033 020145  LDA 0,K55
34 02034 061117  DOAS 0,,LPT
35 02035 063517  SKPBZ .LPT
36 02036 000777  JMP ,-1
37 02037 063717  SKPDZ .LPT
38 02040 000135  EHMT
39 02041 000134  LOOP
40
41 02042 000123  LINE
42
43
44 02043 000133 A421  SETUP
45 02044 000140  DONE
46 02045 000121  SPACE
47 02046 020146  LDA 0,K115
48 02047 061117  DOAS 0,,LPT
49 02050 063517  SKPBZ .LPT
50 02051 000777  JMP ,-1
51 02052 063717  SKPDZ .LPT
52 02053 000135  EHMT
53 02054 000134  LOOP
54

```

```

/PRINT CARRIAGE RETURN AND
/ A SECOND CHARACTER WITH

/ONLY BIT 12 DIFFERENT.
/IF BIT 12 IS PICKED UP
/ THE LINE PRINTER WILL
/RECEIVE A CARRIAGE RETURN
/AND THE DONE FLAG WILL
/SET A SECOND TIME.

```

```

/PRINT CARRIAGE RETURN AND
/ A SECOND CHARACTER WITH

/ONLY BIT 11 DIFFERENT.
/IF BIT 11 IS DROPPED
/ THE LINE PRINTER WILL
/RECEIVE A CARRIAGE RETURN
/AND THE DONE FLAG WILL
/SET A SECOND TIME.

```

```

/ BIT 10 (PRINTER DATA 6)
/ WAS NOT SENT TO THE

/PRINTER VIA "DOA" INSTRUCTION
/SEE PREVIOUS TEST.

```

```

/ BIT 9 (PRINTER DATA 7)
/ WAS NOT SENT TO THE

/PRINTER VIA "DOA" INSTRUCTION.
/SEE PREVIOUS TEST.

```

```

A 0032 ,MAIN
01
02 02055 000133 A431  SETUP
03 02056 020070  LDA 0,K12
04 02057 061117  DOAS 0,,LPT
05 02060 063517  SKPBZ .LPT
06 02061 000777  JMP ,-1
07 02062 063617  SKPDZ .LPT
08 02063 000135  EHMT
09 02064 000134  LOOP
10
11
12
13
14
15
16 02065 000140 A441  DONE
17 02066 062677  IORST
18 02067 102400  SUB 0,0
19 02070 040072  STA 0,HORZ
20 02071 020066  LDA 0,K14
21 02072 000071  PRINT
22 02073 020070  LDA 0,K12
23 02074 000071  PRINT
24 02075 061121  SPACE
25 02076 020067  LDA 0,K15
26 02077 000071  PRINT
27 02100 000137 NXLD11 WAIT
28 02101 020072  LDA 0,HORZ
29 02102 101015  MOVN 0,0,SNR
30 02103 000405  JMP ,+5
31 02104 040171  STA 0,TEM
32 02105 000121  SPACE
33 02106 014171  OSZ TEM
34 02107 000776  JMP ,-2
35 02110 020061  LDA 0,QM
36 02111 000071  PRINT
37 02112 020067  LDA 0,K15
38 02113 000071  PRINT
39 02114 020070  LDA 0,K12
40 02115 000071  PRINT
41 02116 020072  LDA 0,HORZ
42 02117 024153  LDA 1,COL
43 02120 100405  SUB 0,1,SNR
44 02121 000405  JMP ,+5
45 02122 010072  ISZ HORZ
46 02123 000402  JMP ,+2
47 02124 063077  HALT
48 02125 000753  JMP NXLD1
49 02126 020066  LDA 0,K14
50 02127 000071  PRINT
51 02130 020070  LDA 0,K12
52 02131 000071  PRINT
53 02132 000121  SPACE
54 02133 020067  LDA 0,K15
55 02134 000071  PRINT
56 02135 102520  SUBZL 0,0
57 02136 040072  STA 0,HORZ

/ CHECK TO INSURE CODE 12
/ (LINE FEED) SETS THE DONE
/ FLAG. CHECK PRINTER DATA 1
/ (I/O BUS BIT 15), ETC.

THIS SECTION PRINTS OUT A DIAGONAL LINE,
AND A SOLID RIGHT TRIANGLE FORMED BY THE
LETTER "M", TO PROVIDE VISUAL VERIFICATION THAT
THE CARRIAGE POSITIONER IS WORKING PROPERLY.

/ DONE HERE CLEANS THE PRINT BUFFER,
/ CLEARS CONTROL.

/ CLEAR THE HORIZONTAL COUNTER.

/ SEND A FORM FEED.

/ SEND A LINE FEED.

/ SEND A CARRIAGE RETURN.
/ WAIT FOR THE PRINTER TO FINISH.
/ GET CURRENT POSITION COUNT.
/ IF IT IS FIRST PASS,
/ SKIP THE SPACES.
/ ITEM IS DECRMT COUNTER.
/ LETTER COLUMN POSITION= # SPACES
/ TO BE PRINTED=1.

/ SEND LETTER "M".

/ CARRIAGE RETURN TO PRINT THE LINE.

/ SEND LINE
/ GET HCN NT INC COMPARE
/ FOR END INC POSITION.

/ INC POSITION COUNT.

/ HORZ SHOULD NEVER OVRFLOW.
/ LOOP AND PRINT NEXT LINE.

/ FORM FEED.

/ LINE FEED.

/ CARRIAGE RETURN.

```

A 0031 .MAIN

```

01
02 02137 000137 NXLD21 WAIT
03 02140 020072 LDA 0,MORZ
04 02141 040171 STA 0,TEM
05 02142 020061 LDA 0,DM
06 02143 000071 PRINT
07 02144 014171 DSZ TEM
08 02145 000775 JMP ,+3
09 02146 020067 LDA 0,K15
10 02147 000071 PRINT
11 02150 020070 LDA 0,K12
12 02151 000071 PRINT
13 02152 020072 LDA 0,MORZ
14 02153 024153 LDA 1,COL
15 02154 100405 SUB 0,1,SNR
16 02155 000405 JMP ,+5
17 02156 010072 ISZ MORZ
18 02157 000402 JMP ,+2
19 02160 063077 MALT
20 02161 000756 JMP NXLD2
21 02162 020066 LDA 0,K14
22 02163 000071 PRINT
23 02164 000137 WAIT
24 02165 024203 A45: LDA 1,EGGS
25 02166 125004 MOV 1,1,SR
26 02167 000403 JMP ,+3
27 02170 000150 JSR 0,MESS
28 02171 002776 PASHES
29 02172 024203 LDA 1,EGGS
30 02173 125005 MOV 1,1,SNR
31 02174 002131 JMP 0,DIARET
32 02175 014200 DSZ EGGS+3
33 02176 002131 JMP 0,DIARET
34 02177 034207 LDA 3,EGGS+4
35 02200 024206 LDA 1,EGGS+3
36 02201 045776 STA 1,-2,3
37 02202 001400 JMP 0,3
38 02203 020070 .LIN: LDA 0,K12
39 02204 101001 MOV 0,0,SKP
40 02205 020077 .SPA: LDA 0,K40
41 02206 061117 DOAS 0,.LPT
42 02207 063417 SKPBH .LPT
43 02210 001400 JMP 0,3
44 02211 101404 INC 0,0,SR
45 02212 000775 JMP ,+3
46 02213 001400 JMP 0,3
47
48 02214 054406 PAWS: STA 3,SVPAW
49 02215 034406 LDA 3,CPAUS
50 02216 050017 NIO .LPT
51 02217 170404 INC 3,3,SR
52 02220 000776 JMP ,+2
53 02221 002401 JMP 0,SVPAW
54 02222 000000 SVPAW: R
55 02223 107665 CPAUS: 107665

```

```

;WAIT FOR PRINTER TO FINISH.
;GET CURRENT POSITION COUNT.
;ITEM IS DECRMT COUNTER.
;PRINTS LETTER "M" IN INCREASING ORDER
;ACROSS THE PAGE, MM'S PRINTED
;J = COLUMN POSITION. COLUMN 1=1M,
;COLUMN 2=2M, COLUMN 3=3M, ETC.

;CARRIAGE RETURN TO PRINT LINE.

;LINE FEED.
;COMPARE MORZ COUNT AGAINST
;COLUMNS FOR END OF LINE POSITION.

;INC POSITION COUNT.

;MORZ SHOULD NEVER OVRFLOW.
;LOOP AND PRINT NEXT LINE.

;FINAL FORM FEED.

;END OF DIAGNOSTIC PASS.

```

```

;PRINT LINE FEED
;PRINT SPACE

```

;MIN. PAUSE, 16 MS W/800 CPU.

A 0032 .MAIN

```

01
02
03 02224 054420 ENTER: STA 3,LOOFR
04 02225 034407 LDA 3,ITR
05 02226 054407 STA 3,ITRCT
06 02227 170404 SUM 3,3
07 02230 054406 STA 3,ESWIT
08 02231 054406 STA 3,ENHCT
09 02232 062077 IORST
10 02233 002411 JMP 0,LOOFR
11
12 02234 000012 ITR: 12
13 02235 000000 ITRCT: 0
14 02236 000000 ESWIT: 0
15 02237 000000 ENRCT: 0
16 02240 000000 RETURN: 0
17 02241 000000 SAV2: 0
18 02242 000000 SAV1: 0
19 02243 000000 SAV0: 0
20 02244 000000 LOOFR: 0
21
22 02245 054773 CYCLE: STA 3,RETURN
23 02246 050773 STA 2,SAV2
24 02247 044773 STA 1,SAV1
25 02250 040773 STA 0,SAV0
26 02251 014764 DSZ ITRCT
27 02252 000436 JMP CYCTS
28
29 02253 034701 LDA 3,ITR
30 02254 054701 STA 3,ITRCT
31 02255 174477 READS 3
32 02256 030760 LDA 2,ESWIT
33 02257 175120 MOVZL 3,3
34 02260 175100 MOVL 3,3
35 02261 151005 MOV 2,2,SNR
36 02262 000417 JMP NOEX
37 02263 175103 MOVL 3,3,SNR
38 02264 000421 JMP PCENT=1
39
40 02265 000127 JSR 0,ICHLF
41 02266 024751 LDA 1,ENHCT
42 02267 030172 LDA 2,C144
43 02270 004523 JSR MULT
44 02271 030743 LDA 2,ITR
45 02272 004507 JSR DIVID
46 02273 000503 JSR 0,IPDEC
47 02274 020412 LDA 0,PCENT
48 02275 000477 JSR 0,ICHLF
49 02276 063611 SKPBH TTD
50 02277 000777 JMP ,+1
51 02300 000405 JMP PCENT=1
52
53 02301 020742 NOEX: LDA 0,SAV0
54 02302 024740 LDA 1,SAV1
55 02303 030736 LDA 2,SAV2
56 02304 002734 JMP 0,RETURN
57

```

```

;LOOP ITEMATE RETURN
;THIS ROUTINE INITIALIZES
;EACH TEST

```

;I/O RESET

```

;END OF TEST ITERATION
;ROUTINE
;MOVE THE ACS

```

;NOT 100 TIMES ITERATED

;RESET ITERATION CNTR

```

;IF SWITCH 2=(1)
;AND A ERROR HAS OCCURED
;THE ERROR RATE WILL
;BE PRINTED

```

;PRINT CARRIAGE

```

;PRINT VALUE
;EXAMPLE: 89%

```

;WAIT DONE FLAG

;NORMAL EXIT,NO ERR

```

A 0033 .MAIN
01
02 02305 102401 SUB 0,0,SKP
03 02306 000245 PCENT: 245
04 02307 040730 STA 0,ERRCT
05 02310 020733 CYCTS: LDA 0,SAV0
06 02311 024731 LDA 1,SAV1
07 02312 030727 LDA 2,SAV2
08 02313 034723 LDA 3,ESWIT
09 02314 175004 MOV 3,3,SNR
10 02315 074477 READS 3
11 02316 062677 IONST
12 02317 175113 MOVL 3,3,SNR
13 02320 002724 JMP 0LOOP
14 02321 002717 JMP 0RETURN
15
16
17 02322 054716 ERR: STA 3,RETURN
18 02323 050716 STA 2,SAV2
19 02324 044716 STA 1,SAV1
20 02325 040716 STA 0,SAV0
21
22 02326 034710 LDA 3,ESWIT
23 02327 175005 MOV 3,3,SNR
24 02330 000407 JMP ERR1
25 02331 030710 ERET: LDA 2,SAV2
26 02332 024710 LDA 1,SAV1
27 02333 020710 LDA 0,SAV0
28 02334 010703 ISZ ERRCT
29 02335 101000 MOV 0,0
30 02336 042702 JMP 0RETURN
31
32 02337 034701 ERR1: LDA 3,RETURN
33 02340 004407 JSR AUTOEN
34 02341 054675 STA 3,ESWIT
35 02342 074477 READS 3
36 02343 175100 MOVL 3,3
37 02344 175113 MOVL 3,3,SNR
38 02345 004416 JSR EPRINT
39 02346 000703 JMP ERET
40
41 02347 054413 AUTOEN: STA 3,AA03
42 02350 024203 LDA 1,EGGS
43 02351 125004 MOV 1,1,SNR
44 02352 000405 JMP 0+5
45 02353 024607 LDA 1,SAV1
46 02354 034904 LDA 3,RETURN
47 02355 063077 HALT
48 02356 002404 JMP 0,AA03
49 02357 004404 JSR EPRINT
50 02360 034207 LDA 3,EGGS+4
51 02361 001400 JMP 0,3
52 02362 000000 .AA03: 0

```

```

I CHARACTER
I RESET ERROR COUNT
I RESTORE ACS

I I/O RESET
I SWITCH 0
I (1)=LOOP ROUTINE
I (0)=PROCEED TO NEXT TEST

```

```

I ERROR SUBROUTINE

```

```

I RESTORE ACS

```

```

I COUNT
I ERRORS, I/O RESET
I EXIT

```

```

I ERROR, C(3)=PC
I OPERATOR, SET SWITCHES

```

```

I LOOK AT SWITCH 1
I PRINT ERROR DATA

```

```

A 0034 .MAIN
01
02
03 02363 054653 EPRINT: STA 3,ESWIT
04 02364 006127 JSR 0ICRLF
05 02365 005130 JSR 0IMESS
06 02366 002377 HEADEN
07 02367 020601 LDA 0,RETURN
08 02370 120000 ADC 1,1
09 02371 107000 ADD 0,1
10 02372 004402 JSR PUCT
11 02373 002643 JMP 0ESWIT
12
13 02374 002521 ICHAR: CHAN
14 02375 002573 ITYPE: TYPE
15 02376 002447 IPDEC: PDEC
16
17
18 02377 041520 PC
19 02400 000011
20
21 02401 054173 DIVID: STA 3,MSAV
22 02402 034151 LDA 3,M20
23 02403 125120 MOVZL 1,1
24 02404 101100 DLOOP: MOVL 0,0
25 02405 142412 SUB# 2,0,SZC
26 02406 142400 SUB 2,0
27 02407 125100 MOVL 1,1
28 02410 175404 INC 3,3,SNR
29 02411 000773 JMP DLOOP
30 02412 002173 JMP 0MSAV
31
32 02413 102400 MULTI: SUBC 0,0
33 02414 054173 STA 3,MSAV
34 02415 034151 LDA 3,M20
35 02416 125203 MLOOP: MOVL 1,1,SNR
36 02417 101201 MOVN 0,0,SKP
37 02420 143200 ADDZ 2,0
38 02421 175404 INC 3,3,SNR
39 02422 000774 JMP MLOOP
40 02423 125200 MOVER 1,1
41 02424 002173 JMP 0MSAV

```

```

I ERROR MESSAGE PRINTER
I PRINT CARRIAGE
I AND HEADER

```

```

I PC OF ERROR
I RETURN TO CALL

```

```

HEADER: .TXT 1
PC 1

```

```

I DIVIDE

```

```

I MULTIPLY

```

A 0035 ,MAIN

```

01
02      JTO NON INTERRUPT PACKAGE
03      J"MESS" PRINTS ASCII MESSAGES AS SPECIFIED BY ASSEMBLR
04      J"CHAR" PRINTS ASCII CHARACTER, C(0)N,C(0)L MUST BE 0
05      J"ILL RETURN +2 IF C(0)N=0,CORRECTS THE PARITY,33 SIMULATE
06      J"TYPE" PRINTS C(0)N. MUST HAVE PROPER PARITY. RETURN IS
07      JTO CALL+1,REPLACE THIS ROUTINE WITH INTERRUPT TYPE IF DESIRED.
08      J"CKLF" PRINTS A CARRIAGE RETURN
09      J"POCT" PRINTS C(1) IN OCTAL FOLLOWED BY A TAB
10      J"PDEC" PRINTS C(1) IN DECIMAL,LEADING ZEROS SUPPRESSED,
11      JFOLLOWED BY A TAB.
12
13 02425 054545 MESS: STA 3,MESSR      JPRINT A TEXT MESSAGE
14 02426 010544      ISZ MESSR
15 02427 031400      LDA 2,0,3          IC(2) POINTS TO MESSAGE
16 02430 024541      LDA 1,C377       JA 8 BIT MASK
17 02431 021000      LDA 0,0,2          IC(2)=DATA WORD
18 02432 125112      MOVLM 1,1,SZC
19 02433 123701      ANDS 1,0,SKP
20 02434 123401      AND 1,0,SKP       IC(0)=DATA CHARACTER RIGHT
21 02435 151400      INC 2,2          JINC TO NEXT WORD
22 02436 124000      COM 1,1         JFLIP MASK
23 02437 104402      JSR CHAR        JPRINT
24 02440 000771      JMP MESS+4      JANOHER
25 02441 002531      JMP 0MESSH     JLAST
26
27 02442 020525 ZOCT: LDA 0,CH240
28 02443 101001      MOV 0,R,SKP
29
30 02444 020174 POCT: LDA 0,C00
31 02445 030433      LDA 2,OCTAB     JPRINT C(1) IN OCTAL
32 02446 000403      JMP ,+3
33 02447 030441 PDEC: LDA 2,DECTB   JPRINT C(1) IN DECIMAL
34 02450 020517      LDA 0,CH240     JSUPPRESS LEADING ZEROS
35 02451 054447      STA 3,RADRET    J80TH ENTRY'S PRINT NUMBER
36 02452 040445      STA 0,ZSUPP     JTHEN TAB TO NEXT POSITION
37 02453 050401      STA 2,+,+1
38 02454 000000 DECOCT: 0
39 02455 010777      ISZ ,+1
40 02456 034442      LDA 3,RADRET    JSETUP "TAB" AT END
41 02457 020503      LDA 0,CHTAB
42 02460 151005      MOV 2,2,SNR     JIF TABLE ENTRY=0
43 02461 000440      JMP CHAR        JEXIT WITH TAB
44 02462 034435      LDA 3,ZSUPP     JZEROS SUPPRESS STUF
45 02463 102400      SUB 0,0
46 02464 140512 DECOI: SUBLM 2,1,SZC
47 02465 001405      JMP DECP
48 02466 140400      SUB 2,1
49 02467 034174      LDA 3,C00
50 02470 101400      INC 0,0
51 02471 000773      JMP DECOI
52 02472 151235 DECP: MOVZRM 2,2,SNR
53 02473 034174      LDA 3,C00
54 02474 054423      STA 3,ZSUPP     IC(0)=DIGIT
55 02475 163000      ADD 3,0         JMAKE ASCII
56 02476 004423      JSR CHAR        JPRINT
57 02477 000735      JMP DECOCT     JGET NEXT DIGIT
58

```

A 0030 ,MAIN

```

01
02
03 02500 030425 OCTAB: LDA 2,+,+,-DECOCT
04 02501 100000      100000
05 02502 010000      100000
06 02503 071000      1000
07 02504 000100      100
08 02505 000010      10
09 02506 000001      1
10 02507 000000      0
11
12 02510 030435 DECTB: LDA 2,+,+,-DECOCT
13 02511 023420      .NDX 10
14 02512 023420      10000
15 02513 001750      1000
16 02514 000144      100
17 02515 000012      10
18 02516 000001      1
19 02517 000000      0
20 02518 000010 .NDX 0
21
22 02519 000000 ZSUPP: 0
23 02520 000000 RADRET: 0
24
25 02521 054442 CHAR: STA 3,CHRET   JPRINT C(0) RIGHT
26 02522 101325      MOVZS 0,0,SNR   JRETURN +2 IF NULL
27 02523 001401      JMP 1,3
28 02524 040440      STA 0,CHSAV
29 02525 170000      ADC 3,3          JCOMPUTE THE PARITY
30 02526 117000      ADD 0,3
31 02527 163404      AND 3,0,SZR
32 02530 000775      JMP ,+3
33 02531 170000      SUBCR 3,3       JCOMBINE PARITY WITH CHAR
34 02532 020432      LDA 0,CHSAV
35 02533 163300      ADDS 3,0
36
37 02534 034426 CHAK1: LDA 3,CHTAB   JIS THIS A TAB
38 02535 110405      SUB 0,3,SNR
39 02536 000403      JMP ,+3         JYES
40 02537 004434      JSR TYPE        JNO PRINT IT
41 02540 002423      JMP 0CHRET     JEXIT
42
43 02541 020424      LDA 3,CHOKZ
44 02542 034424      LDA 3,CHAK7
45 02543 117405      AND 0,3,SNR
46 02544 002417      JMP 0CHRET
47 02545 021422      LDA 0,CH240
48 02546 004425      JSR TYPE
49 02547 000772      JMP ,+6
50

```

A 0037 .MAIN

```

01
02
03
04 02550 054420 CRLF: STA 3,CRLF      ;SAVE RETURN
05 02551 020410 LDA 0,C215
06 02552 004747 JSR CHAR          ;PRINT CARRIAGE AND LF
07 02553 020405 LDA 0,C212
08 02554 004745 JSR CHAR
09 02555 002400 SUB 0,0
10 02556 040407 STA 0,CMORZ      ;CLEAR MORZ POSITION
11 02557 002411 JMP 0CRLF        ;EXIT
12
13 02560 000212 C212: 212
14 02561 000215 C215: 215
15 02562 000011 CMTAB: 11
16 02563 000000 CHRET: 0
17 02564 000000 CHSAV: 0
18 02565 000000 CMORZ: 0
19 02566 000007 CHAR7: 7
20 02567 000240 CM240: 240
21 02570 000000 CRLF: 0
22
23 02571 000377 C377: 377
24 02572 000000 MESSR: 0
25 02573 054412 TYPEI STA 3,TYPEI    ;TYPE THE C(0)R IF
26 02574 010771 ISZ CMORZ          ;SWITCH 1(0).
27 02575 074477 READS 3
28 02576 175100 MOVL 3,3
29 02577 175102 MOVL 3,3,SZC
30 02600 002405 JMP 0TYPRET        ;INHIBIT TYPE EXIT.
31 02601 003511 SKPBZ TTO
32 02602 000777 JMP ,=1
33 02603 001111 DOAS 0,TTO
34 02604 002401 JMP 0TYPRET
35 02605 000000 TYPRET: 0

```

A 0038 .MAIN

```

01 ;CHANGE ALL DEVICE CODES FROM THE LOCATION IN CALL+2
02 ;UP TO BUT NOT THE LOCATION IN CALL+3, FROM THE OLD CODE
03 ;WHOSE ADDRESS IS IN CALL+1 TO WHAT IS IN AC0.
04 ;IGNORES CODE 77
05 ;EXIT TO CALL+4
06 02606 171400 OCHNG: INC 3,2
07 02607 151400 INC 2,2
08 02610 050441 STA 2,DCM,5
09 02611 024441 LDA 1,DCM,1
10 02612 037376 LDA 3,0-2,2
11 02613 137400 AND 1,3
12 02614 057376 STA 3,0-2,2
13 02615 123400 AND 1,0
14 02616 040435 STA 0,DCM,6
15 02617 031377 LDA 2,-1,2
16 02620 135414 SUB# 1,3,SZR
17 02621 122415 SUB# 1,0,SNR
18 02622 000424 JMP DCM,2
19 02623 021000 DCM,4: LDA 0,0,2
20 02624 103112 ADDL# 0,0,SZC ;IS IT AN I,0, INSTR?
21 02625 101103 MOVL 0,0,3NC
22 02626 103113 ADDL# 0,0,3NC
23 02627 000412 JMP DCM,3 ;NO
24 02630 101200 MOVH 0,0
25 02631 162400 SUB 3,0
26 02632 123414 AND# 1,0,SZR
27 02633 000406 JMP DCM,3 ;NOT OLD DEVICE CODE
28 02634 034417 LDA 3,DCM,6
29 02635 103000 ADD 3,0
30 02636 041000 STA 0,0,2
31 02637 034412 LDA 3,DCM,5
32 02640 037776 LDA 3,0-2,3
33 02641 151400 DCM,3: INC 2,2
34 02642 022407 LDA 0,0,DCM,5
35 02643 142414 SUB# 2,0,SZR
36 02644 000757 JMP DCM,4
37 02645 034406 LDA 3,DCM,6
38 02646 030403 DCM,2: LDA 2,DCM,5
39 02647 057376 STA 3,0-2,2
40 02650 001001 JMP 1,2
41 02651 000000 DCM,5: 0
42 02652 000077 DCM,1: 77
43 02653 000000 DCM,6: 0
44
45

```

```

A 0039 .MAIN
01 MESCOL: .TXTE I<15><12>
02 02654 005215
02 02655 147510 HOW MANY COLUMNS WIDE IS THIS PRINTER?
02656 120327
02657 040515
02658 054516
02659 141640
02660 146317
02661 040525
02662 051516
02663 153640
02664 042311
02665 120305
02666 051711
02667 152240
02668 144510
02669 120123
02670 151120
02671 047311
02672 142724
02673 037722
02674 120240
02675 004411
02676 000000
03
04 MESZON: .TXTE I<15><12>
05 02703 005215
05 02704 054724 TYPE Y IF ZONE SELECT OPTION PRESENT, CARRIAGE IF NO
02705 142520
02706 054640
02707 144640
02708 120305
02709 147532
02710 142516
02711 051640
02712 146305
02713 141705
02714 120324
02715 050317
02716 144724
02717 047317
02718 050240
02719 142722
02720 142523
02721 152116
02722 120254
02723 040703
02724 151322
02725 040711
02726 142507
02727 144640
02728 120306
02729 147516
02730 004411
02731 000000
06
07 MESFOR: .TXTE I<15><12>
08 02740 005215
08 02741 054724 TYPE Y IF FORMAT CONTROL OPTION PRESENT, CARRIAGE IF NO

```

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0040 .MAIN
02742 142524
02743 054640
02744 144640
02745 120306
02746 147706
02747 040722
02748 152101
02749 141640
02750 047317
02751 151324
02752 146317
02753 147040
02754 152120
02755 147711
02756 120116
02757 151120
02758 051705
02759 047305
02760 120324
02761 141640
02762 151101
02763 144722
02764 043501
02765 120305
02766 143311
02767 047240
02768 004717
02769 000000
01
02 PAMES: .TXTE I<15><12> PASS 1
02770 005215
02771 050240
03000 051501
03001 120123
03002 000000
03
04 MESKDY: .TXTE I<15><12>
05 03003 005215
05 03004 142722 READY STATUS S NOT SET, CHECK PRINTER.
03005 042101
03006 120101
03007 152123
03008 152101
03009 051525
03010 051640
03011 047240
03012 152317
03013 051640
03014 152305
03015 120254
03016 044303
03017 141705
03018 120113
03019 151120
03020 047311
03021 142724
03022 027322
03023 000240
06

```

0041 .MAIN
01 MESFF: .TXTE 1<14>15> FF IS RESULT OF TAPE CHANNEL 0.

03030 100414
03031 143240
03032 120300
03033 051711
03034 151240
03035 051705
03036 140125
03037 120324
03040 143317
03041 152240
03042 050101
03043 120305
03044 044303
03045 047101
03046 142516
03047 120314
03050 027000
03051 152240
03052 144510
03053 120123
03054 144714
03055 142516
03056 051640
03057 147510
03060 140125
03061 120104
03062 142502
03063 040640
03064 120324
03065 044324
03066 120305
03067 147724
03070 120120
03071 143317
03072 040640
03073 050240
03074 043501
03075 120305
03076 000000

03
04
05 MESU: .TXTE 1
PAPER FEED BIT 5(1), LINES SLEWED 1

03077 040520
03100 142520
03101 120322
03102 142700
03103 042305
03104 041240
03105 152311
03106 032640
03107 130450
03110 120251
03111 146240
03112 047311
03113 051705
03114 051640
03115 142714
03116 142727
03117 130504

0042 .MAIN
03120 000240

01
02 MES11 .TXTE 1
03 SLEW IS A FUNCTION OF TAPE CHANNEL 1

03121 140123
03122 153705
03123 144640
03124 120123
03125 120101
03126 052705
03127 141510
03130 144724
03131 047317
03132 147040
03133 120305
03134 040724
03135 142520
03136 141640
03137 040510
03140 047116
03141 146305
03142 120240
03143 000240

04
05 MCODE: .TXTE 1<19>412>

06 TYPE 2 DIGIT DEVICE CODE, THEN CARRIAGE RETURN 1

03144 005215
03145 054724
03146 142520
03147 131240
03150 042240
03151 043711
03152 152311
03153 042240
03154 053305
03155 141711
03156 120305
03157 147703
03160 142504
03161 120254
03162 044324
03163 047305
03164 141640
03165 151101
03166 144722
03167 043501
03170 120305
03171 142722
03172 052724
03173 047322
03174 000240

A 0043 .MAIN
01
02 J00220 DATA: .BLK 220
03
04 .TXT /COPYRIGHT (C) DGC, 1972,74,75

03415 047503
03416 054520
03417 044522
03420 044107
03421 020124
03422 041450
03423 020051
03424 043504
03425 020103
03426 030440
03427 033471
03430 020062
03431 032067
03432 033454
05 03433 040465 ALL RIGHTS RESERVED/
03434 040114
03435 051040
03436 043511
03437 052110
03440 020123
03441 042522
03442 042523
03443 053122
03444 042105
03445 000000

06
07
08 DIR: .TXTE ILPT DIAG 51

03446 050314
03447 120324
03450 144504
03451 043501
03452 032640
03453 000000
09 03454 000020
10 03455 000210
11 03456 000002
12 03457 000001
13 03458 000000
14 03459 000000
15 03462 000000
16 03463 100017

000020
STAKT
000002
000001
000000
000000
000000
000000
100017

17
18 .END JEND OF SOURCE TAPE

0044 .MAIN

A00 001302 9/10 21/02
A01 001307 21/00
A02 001313 21/13
A03 001317 21/18
A04 001323 21/23
A05 001330 21/29
A06 001335 21/37
A07 001342 22/02
A08 001355 22/14
A09 001365 22/23
A10 001372 22/29
A11 001402 22/38
A12 001407 23/02
A14 001417 23/12
A15 001420 23/20
A16 001435 23/20
A17 001440 23/30
A18 001456 24/02
A19 001467 24/12
A20 001500 24/22
A21 001511 24/32 24/52
A21A 001520 24/42 24/45
A22 001540 25/02
A23 001556 25/17
A24 001566 25/26
A25 001577 25/36
A26 001612 26/02
A27 001630 26/17
A28 001635 26/23
A29 001643 26/31
A30 001651 26/36
A31 001663 27/02
A32 001677 27/15
A33 001711 27/27
A34 001721 27/36
A35 001731 28/02
A36 001742 28/12
A37 001755 28/24
A38 001767 28/35
A39 002002 29/02
A40 002015 29/16
A41 002030 29/30
A42 002043 29/44
A43 002055 30/02
A44 002065 30/16
A45 002165 31/24
ADJA 002453 9/17 10/02
ADJ1 002455 9/18 10/04
ADJ2 002457 9/19 10/06
ADJRE 002463 6/23 10/08 10/45
ASS1 001677 17/23 17/32
ASSDI 001456 15/29 15/42 15/51 16/02 17/15 17/31
ASSRE 001103 17/15 17/34 17/35 17/36
AUTOE 002347 33/33 33/41
C144 000172 8/26 32/42
C212 002500 37/07 37/13
C215 002501 37/05 37/14
C377 002571 35/16 37/23
C0R 000174 8/26 35/30 35/49 35/53

0045 .MAIN

CDELO	000103	7/05	13/03	14/26						
CM24H	002067	35/27	35/34	36/47	37/20					
CHAN	000112	7/12	18/46	19/05	19/06	19/20	19/25	19/26	19/43	
		20/04								
CHAR	002021	34/13	35/23	35/43	35/56	36/25	37/06	37/08		
CHAR1	002034	36/37								
CHAR7	002566	36/44	37/19							
CHDRZ	002565	36/43	37/10	37/18	37/26					
CHRET	002563	36/25	36/41	36/46	37/16					
CHSAV	002564	36/26	36/34	37/17						
CHTAB	002562	35/41	36/37	37/15						
CNIOC	001537	24/37	24/54							
COL	000153	8/11	10/29	11/24	12/32	15/48	18/14	38/42	31/14	
CPAUS	002223	8/49	15/39	31/49	31/55					
CRLF	002550	7/28	37/04							
CRLFR	002570	37/04	37/11	37/21						
CYCLE	002245	7/34	32/22							
CYCTS	002310	32/27	33/05							
DATA	003175	7/05	7/06	43/02						
DC1	001010	15/49								
DC2	001027	15/59								
DCHNG	002606	8/34	38/06							
DCH.1	002652	38/09	38/42							
DCH.2	002646	38/18	38/38							
DCH.3	002641	38/23	38/27	38/33						
DCH.4	002623	38/19	38/36							
DCH.5	002651	38/08	38/31	38/34	38/38	38/41				
DCH.6	002653	38/14	38/28	38/37	38/43					
DCODE	001005	15/40	15/43	15/47	15/57	16/08				
DCRET	000160	8/16	15/26	16/10						
DECODE	002454	35/38	35/57	36/03	36/12					
DECOT	002464	35/46	35/51							
DECP	002472	35/47	35/52							
DECTB	002510	35/33	36/12							
DEVCO	000200	8/32	8/43	8/47	15/37					
DEVIC	000767	6/14	15/26	15/30	15/35					
DIARE	000131	7/30	21/02	31/31	31/33					
DIRT	003446	6/02	43/08							
DISPA	000056	6/18	9/42	9/44	9/46	9/47				
DIVIO	002401	32/45	34/20							
DLOOP	002404	34/23	34/28							
DON	000741	7/41	15/02							
DONE	000140	7/42	26/18	26/24	26/32	26/39	27/06	27/19	27/30	
		27/37	28/04	28/16	28/25	28/36	29/03	29/17	29/31	
		29/45	30/16							
DUNRE	000147	8/07	15/02	15/13						
EGGS	000203	6/09	8/35	8/42	9/27	31/24	31/29	31/32	31/34	
		31/35	33/42	33/50						
EMALT	000135	7/37	21/05	21/10	21/15	21/20	21/26	21/32	21/40	
		22/10	22/19	22/26	22/34	22/41	23/08	23/17	23/25	
		23/34	23/43	24/08	24/18	24/26	24/47	25/11	25/23	
		25/33	25/44	26/14	26/20	26/27	26/35	26/46	27/10	
		27/23	27/33	27/42	28/00	28/20	28/32	28/43	29/10	
		29/24	29/38	29/52	30/08					
ENAB	000040	6/36	13/02							
ENDOU	000104	7/06	14/14							
ENTER	002224	7/32	32/03							
EPRIN	002363	33/38	33/49	34/03						
ERET	002331	33/25	33/39							

0040 .MAIN

ENR	002022	7/30	33/17							
ENR1	002037	33/24	33/32							
ENRCT	002237	32/08	32/15	32/41	33/04	33/28				
ESWIT	002236	32/07	32/14	32/32	33/08	33/22	33/34	34/03	34/11	
FIN	000053	6/33	13/08	13/11						
FINIS	000074	6/34	14/44	11/47	12/49	14/30	18/22	18/39	19/04	
		19/24	19/38							
FORMA	000155	8/13	16/04	16/42						
FT1	001167	19/02								
FT2	001171	19/04	19/17							
FT3	001207	19/09	19/19							
FT4	001213	19/24	19/36							
FT5	001230	19/29	19/38							
FTERE	000111	7/11	18/41	18/44	19/36					
FTEST	001161	9/23	18/41							
GUGO	000424	9/04	9/05	9/06	9/07	9/08	9/09	9/10	9/11	
		9/12	9/13	9/26						
GOGO1	000435	9/29	9/36	9/38						
GURET	000050	6/12	9/26	9/36						
GRIEF	000060	13/14	13/25							
GRRET	000110	7/10	13/14	13/20						
HEADE	002377	34/06	34/17							
HERE	000400	8/46	9/04	9/37	15/38					
HOL1	000760	15/18	15/21	15/23						
HOLD	000755	7/39	15/15							
HOLRE	000115	7/15	15/15	15/19	15/24					
HOLZ	000740	14/42	15/17	15/22						
MORZ	000072	6/31	10/19	10/27	10/28	11/14	11/22	11/23	12/14	
		12/30	12/31	30/19	30/20	30/41	30/45	30/57	31/03	
		31/13	31/17							
ISDEG	000175	6/05	6/06	8/29	8/45	8/50				
IDUF	000105	7/07	13/04	14/05	14/12	14/23	14/37			
ICMAH	002374	32/46	34/13							
ICRLF	000127	7/28	14/33	32/46	34/04					
IDCHW	000202	8/34	8/46	15/36						
IDCOD	000052	6/14	9/34							
IMESS	000130	7/29	13/15	15/27	15/40	15/48	15/59	31/27	34/05	
INI	000076	6/36	6/37							
INIT	000076	6/37	10/10	11/03	12/03		17/42			
INTIN	000125	7/26								
IPAU5	000122	7/21	7/22							
IPDLC	002376	32/46	34/15							
IPMES	000110	7/16	19/02	19/14	19/21					
IPUT	000071	6/29	6/30							
ITIN	000176	8/30	14/04	17/18						
ITR	002234	32/04	32/12	32/29	32/44					
ITRCT	002235	32/05	32/13	32/26	32/30					
ITYPE	002375	34/14								
K10	000114	7/14	19/27							
K101	000130	7/38	25/06							
K11	000142	8/02	19/46	28/36						
K115	000146	8/06	29/47							
K12	000070	6/28	10/22	11/15	12/17	18/20	30/03	30/22	30/39	
		30/51	31/11	31/30						
K136.	000161	8/17	15/44							
K14	000060	6/26	10/15	11/10	12/10	18/02	30/20	30/49	31/21	
K15	000067	6/27	10/20	11/17	12/19	15/07	17/32	18/10	19/51	
		22/31	23/04	23/14	23/22	23/30	23/40	24/04	24/14	
		24/24	24/43	25/04	25/19	25/28	25/36	26/04	30/25	

0047 MAIN

K17	000141	30/37	30/54	31/89					
K177	000164	8/01	20/27	20/20					
K20	000113	8/20	17/11						
K24	000177	7/13	19/07						
K32	000126	8/31	18/09						
K35	000144	7/27	14/06						
K4	000101	8/04	29/19						
K40	000077	7/03	11/44	12/46	15/16				
		7/01	11/07	11/29	12/07	12/27	15/03	24/32	25/41
		26/07	31/46						
K5	000143	8/03	29/05						
K55	000145	8/05	29/33						
K60	000150	8/08	19/42	20/09					
K72	000165	8/21	17/19						
K76	000201	8/33	15/31						
K77	000124	7/25	26/40						
KTP	000077	9/24	14/03	14/16	14/31	14/34	14/39		
KTP1	000077	14/12							
KTP2	0000714	14/19	14/25	14/29	14/48				
KTP22	0000733	14/08	14/36						
KTP3	0000731	14/10	14/33						
KTP0	0001676	27/08	27/13						
L0L	0000521	9/20	11/02						
L0L0	0000530	11/10	11/46						
L0L1	0000532	11/13	11/39						
L0L2	0000540	11/20	11/26						
L0L3	0000547	11/28							
L0L4	0000555	11/35							
L0L5	0000563	11/42							
L0LRE	0000875	6/35	11/02	11/46					
LETE	0000662	6/22	10/07	10/25	11/08	11/20	11/28	11/31	11/33
		12/16	12/22	12/24	12/25	12/29			
LINE	000123	7/24	20/46	20/13	20/27	20/41			
LOOP	000134	7/35	21/06	21/11	21/16	21/21	21/27	21/33	21/41
		22/12	22/21	22/27	22/36	22/42	23/09	23/18	23/26
		23/36	23/45	24/10	24/20	24/30	24/40	25/15	25/24
		25/34	25/46	26/15	26/21	26/28	26/36	26/47	27/04
		27/34	27/43	28/10	28/22	28/33	28/44	29/11	29/25
		29/39	29/53	30/09					
LOOPR	002244	32/03	32/10	32/20	33/13				
M20	000151	8/09	19/44	20/05	34/21	34/33			
M400	000132	7/31	20/25						
M60	000166	8/22	17/21	18/27					
MASK	000107	7/09							
MCODE	000144	15/20	42/05						
MES0	000377	19/15	41/04						
MES1	0003121	12/34	42/02						
MESCO	002654	15/41	39/01						
MESFF	0003030	19/03	19/22	41/01					
MESFO	002740	16/01	39/07						
MESRO	0003003	13/16	40/04						
MES5	002425	7/29	35/13	35/24					
MES5R	002572	35/13	35/14	35/25	37/24				
MESZO	002703	15/50	39/04						
MLOOP	002410	34/34	34/38						
MPO1N	000157	8/15	20/17	20/19	20/24	20/29			
MSAV	000173	8/27	34/20	34/29	34/32	34/40			
MULT	002413	32/43	34/31						
NUEX	002301	32/36	32/53						

0048 MAIN

NKLD1	002100	30/27	30/48						
NKLD2	002137	31/02	31/26						
DBUF	000100	7/06	13/05	14/19	14/20	14/22	14/27	14/36	
OCTAB	002060	35/31	36/03						
PAGE	000064	6/24	10/12	10/40	10/41	11/05	11/42	11/43	12/05
		12/43	12/45						
PASME	002770	31/28	40/02						
PASS	000150	8/14							
PAUSE	000122	7/22	23/35	24/29					
PAWS	002214	7/21	31/48						
PCENT	002306	32/38	32/47	32/51	33/03				
PCS	000462	10/10							
PCSN	000460	10/15	10/43						
PCS1	000470	10/18	10/37						
PCS2	000470	10/25	10/31						
PCS3	000505	10/33							
PCS4	000513	10/40							
PDEC	002447	34/15	35/33						
PMERE	000152	8/10	20/14	20/15	20/22	20/27			
PMES	001262	7/10	20/14						
PMESR	001260	20/19	20/30						
POCT	002444	34/10	35/30						
PRINT	000471	6/30	10/16	10/21	10/23	10/26	11/11	11/16	11/18
		11/21	12/11	12/18	12/20	12/23	14/21	18/03	18/19
		18/21	18/30	19/50	19/52	20/03	20/11	20/23	20/28
		30/21	30/23	30/26	30/36	30/38	30/40	30/50	30/52
		30/55	31/06	31/10	31/12	31/22			
PRN1	001242	19/49							
PRN11	001244	19/51	20/12						
PRN2	001247	19/46	20/02						
PRNRE	000117	7/17	19/41	19/53					
PRNUM	001232	19/16	19/35	19/41					
PUT	000670	6/29	13/23	13/28					
PUT0	000073	13/21	13/27						
QE	000057	6/19	10/02						
QEQUA	000060	6/20	10/04						
QM	000061	6/21	10/06	30/35	31/05				
QY	000162	8/16	15/52	16/03					
RADRE	002520	35/35	35/40	36/23					
RETUR	002240	32/16	32/22	32/56	33/14	33/17	33/30	33/32	33/46
		34/07							
ROT	000572	9/21	12/02						
ROT0	000577	12/07	12/48						
ROT1	000503	12/13	12/41						
ROT2	000013	12/22	12/34						
ROT3	000530	12/30							
ROT4	000530	12/43							
ROTEM	000120	7/16	12/06	12/15	12/37				
ROTHE	000102	7/04	12/02	12/50					
SAV0	002243	32/19	32/25	32/53	33/05	33/20	33/27		
SAV1	002242	32/16	32/24	32/54	33/06	33/19	33/26	33/45	
SAV2	002241	32/17	32/23	32/55	33/07	33/10	33/25		
SET	000100	7/02	11/30	12/26					
SETUP	000133	7/33	21/03	21/06	21/13	21/18	21/23	21/29	21/37
		22/02	22/14	22/23	22/29	22/30	23/02	23/12	23/20
		23/20	23/30	24/02	24/12	24/22	24/34	25/02	25/17
		25/20	25/36	26/02	26/17	26/23	26/31	26/38	27/15
		27/27	27/36	28/02	28/12	28/24	28/35	29/02	29/16
		29/30	29/44	30/02					

0049 .MAIN

SPACE	000121	7/20	22/30	23/03	23/13	23/21	23/29	23/30	24/03
		24/13	24/23	24/35	25/03	25/18	25/27	25/37	26/03
		28/26	28/37	29/04	29/18	29/32	29/46	30/24	30/32
		30/53							
START	000210	8/42	43/10						
SVPAW	002222	31/48	31/53	31/54					
TEM	000171	8/25	24/33	24/36	24/50	30/31	30/33	31/04	31/07
THERE	000407	9/11							
TIN	001042	7/26	8/30	17/02					
TINRE	000163	8/19	17/10	17/13					
TOT1	000443	9/44	9/50						
TOTAL	000440	9/15	9/40						
TOTBE	000054	6/16	9/41						
TOTEN	000055	6/17	9/48						
TOTRE	000053	6/15	9/40	9/51					
TYPE	002573	34/14	36/40	36/48	37/25				
TYPRE	002005	37/25	37/30	37/34	37/35				
VERT	000005	6/25	10/13	10/33	10/35	10/38	11/06	11/35	11/37
		11/40	12/06	12/36	12/39	12/44	17/45	18/05	18/31
		18/33							
VLIN	000073	6/32	10/34	11/36	12/38	10/32			
WAIT	000137	7/40	22/35	23/06	23/44	24/09	24/19	24/46	25/14
		25/21	25/30	25/40	25/45	26/06	30/27	31/02	31/23
WHAT	000051	6/13	9/32	16/09					
ZOCT	002442	35/27							
ZONE	000154	8/12	15/53	17/39					
ZOPRE	000167	8/23	17/30	17/41	18/40				
ZOPT	001104	9/22	17/38						
ZOPT1	001114	10/02	18/37						
ZOPT2	001133	10/08	18/18	18/35					
ZOPT3	001157	10/16	18/39						
ZSEL	000170	8/24	17/44	18/06	18/23	18/36			
ZSUPP	002517	35/36	35/44	35/54	36/22				
.AA03	002362	33/41	33/48	33/52					
.CY	000134	7/34	7/35						
.DON	000140	7/41	7/42						
.EN	000133	7/32	7/33						
.ER	000135	7/36	7/37						
.FIN	000074	6/33	6/34						
.HER	000423	6/17	9/24						
.HERE	000412	6/16	9/15	9/37					
.LI	000123	7/23	7/24						
.LIN	002203	7/23	31/38						
.LPT	000017	6/11	8/32	13/08	13/10	13/17	13/23	13/27	13/29
		15/04	15/06	15/08	15/10	15/11	15/18	16/24	16/25
		19/13	19/32	21/14	21/19	21/30	22/32	22/33	22/39
		23/05	23/07	23/16	23/23	23/24	23/31	23/32	23/33
		23/41	24/05	24/07	24/15	24/16	24/17	24/25	24/27
		24/44	24/46	24/54	25/05	25/08	25/10	25/20	25/22
		25/26	25/31	25/32	25/39	25/42	25/43	26/05	26/08
		26/43	28/28	28/29	28/31	28/39	28/40	28/42	29/06
		29/07	29/09	29/20	29/21	29/23	29/34	29/35	29/37
		29/48	29/49	29/51	30/04	30/05	30/07	31/41	31/42
		31/50							
.SP	000121	7/19	7/20						
.SPA	002205	7/19	31/40						
.WA	000137	7/39	7/40						