DataGeneral

DIAGNOSTIC LISTING

LISTING

096-000189-05

PROGRAM

CARD READER TEST

TAPE

095-000027-05

ABSTRACT

CARD READER TEST IS A MAINTENANCE PROGRAM DESIGNED TO TEST THE TYPE 4016 CARD READER. THE PROGRAM READS AND CHECKS THE DATA FROM A TEST DECK OF 80 COLUMN HOLLERITH CARDS.

```
00001 CORDR MACRO REV 03.00              11:54:29  06/10/76

01
02
03
04
05
06
07              ;*****************************************************************
08              ;
09              ; NAME: CORDR.SR                          PART NUMBER: 094-000027
10              ;
11              ;
12              ; DESCRIPTION: CARD READER TEST
13              ;
14              ;
15              ; REVISION HISTORY:
16              ;
17              ;       REV.            DATE
18              ;
19              ;       00              03/12/70
20              ;       01              10/24/72
21              ;       02              09/06/74
22              ;       03              07/03/75
23              ;       04              04/02/76
24              ;       05              06/10/76
25              ;
26              ;
27              ; COPYRIGHT (C) DATA GENERAL CORPORATION, 1970,72,74,75,76
28              ; ALL RIGHTS RESERVED.
29              ;*****************************************************************
```

```
00002 CORDR

                        .TITL   CORDR.SR

62
63              ;               CARD READER TEST
64              ;****** ECLIPSE COMPATIBLE RUN MODIFIED 6/28/75
65              ;****** AUTO-RUN AUTO LOAD MODIFIED 1/31/72
66
67
68              ;1.     ABSTRACT
69              ;           CARD READER TEST IS A MAINTENANCE PROGRAM
70              ;           DESIGNED TO TEST THE TYPE 4616 CARD READER.
71              ;           THE PROGRAM READS AND CHECKS THE DATA FROM
72              ;           A TEST DECK OF 80 COLUMN HOLLARITH CARDS.
73
74              ;2.     MACHINE REQUIREMENTS
75              ;2.1        NOVA, SUPERNOVA, OR ECLIPSE PROCESSOR
76              ;2.2        2K READ/WRITE MEMORY
77              ;2.3        TELETYPE OR CRT DISPLAY
78              ;2.4        TYPE 4616 CARD READER
79              ;2.5        DECK OF TEST CARDS
80
81              ;3.     SWITCH SETTINGS
82              ;3.1        STARTING ADDRESS    =000R02 OR 200
83              ;3.2        SWITCH 1(1)         =PROCEED FROM ERROR
84              ;3.3        SWITCH 2(1)         =INHIBIT TTY OUTPUT
85              ;3.4        SWITCH 3(1)         =PRINT FAILURE RATE
86              ;3.5        SWITCH 5(1)         =OUTPUT TO LPT
87              ;3.6        SWITCH 7(1)         =INHIBIT ERROR PC PRINTOUT
88
89              ;4.     OPERATING PROCEEDURE
90
91
92              ;           NOTE:   WHEN IT IS DESIRED TO START THE PROGRAM AT A
93              ;                   GIVEN ADDRESS AND ALSO HAVE A GIVEN CONFIGURATIO
94              ;                   OF DATA SWITCHES SET UPON STARTING,DO THE FOLLOW
95              ;                   ENTER THE STARTING ADDRESS IN DATA SWITCHES,PRES
96              ;                   "EXAMINE",RESET ALL DATA SWITCHES EXCEPT THOSE
97              ;                   DESIRED TO BE SET,PRESS "CONTINUE"
98
99              ;4.1            LOAD THE PROGRAM VIA THE BINARY LOADER,DTOS,
100             ;4.2            OR DOOS SYSTEMS,SET SWITCHES TO 200
101             ;4.3            LOAD THE TEST DECK PRINTED SIDE
102             ;               DOWN, 12 EDGE OUT.
103             ;4.4            PRESS CARD READER POWER ON
104             ;4.5            PRESS CARD READER MOTER ON
105             ;4.6            PRESS CARD READER START
106             ;4.7            PRESS START ON THE COMPUTER
107             ;4.8            IF NO ERRORS ARE DETECTED THE TEST DECK
108             ;               SHOULD READ UNTIL THE HOPPER IS EMPTY.
109
110             ;5.     PROGRAM OUTPUT/ERROR DESCRIPTION
111             ;5.1        SOME OF THE TEST ROUTINES DO NOT REQUIRE
112             ;           THE READING OF A CARD. ERRORS DETECTED VIA
113             ;           THESE ROUTINES WILL HALT AT LOCATION ERR1,
114             ;           AC3 WILL CONTAIN THE LOCATION OF THE ERROR.
115             ;           PRESSING CONTINUE WILL CAUSE A SCOPE LOOP
116             ;           CONTROLLED BY SWITCHES 1 AND 3.
117             ;5.2        STATUS BIT ERRORS DETECTED DURING THE PRO-
118             ;           CESS OF READING A CARD WILL BE SAVED FOR
119             ;           PRINTOUT WHEN THE READING OF THE CARD IS
120             ;           COMPLETE. THE DIAGNOSTIC MESSAGE IS
```

```
 0003 CORDR
01                  )       "ERROR AT XXXXX" WHERE XXXXX IS THE ADD=
02                  )       RESS AT WHICH THE ERROR WAS DETECTED. ONLY
03                  )       THE FIRST ERROR DETECTED IS SAVED. THE DATA
04                  )       FROM THE CARD IS NOT CHECKED.
```

```
 0004 CORDR
01
02                  )5.3        IF NO STATUS BIT ERRORS WERE DETECTED THE
03                  )           DATA FROM THE CARD IS CHECKED. THE ERROR
04                  )           MESSAGE CONTAINS THE FAILING COLUMN,THE
05                  )           GOOD DATA IF IT IS KNOWN, THE DATA FROM
06                  )           THE CARD, AND A PARITY ERROR IF ONE IS
07                  )           PRESENT. PARITY IS CHECKED BY SOFTWARE
08                  )           FROM THE 12 DATA BITS READ.
09
10                  )6.     PROGRAM DESCRIPTION
11                  )6.1        THE TEST DECK CONSISTS OF ODD PARITY PSEUDO
12                  )           RANDOM NUMBERS PUNCHED IN EACH OF 80 COL=
13                  )           UMNS. THE DATA IN COLUMN 2 IS A FUNCTION
14                  )           OF THE DATA IN COLUMN 1, COLUMN 3 IS A
15                  )           FUNCTION OF COLUMN 2, ETC.
16                  )6.2        THE PROGRAM EXAMINES THE DATA FROM COLUMN
17                  )           1 AND IF NO PARITY ERROR EXIST THIS DATA
18                  )           INITIALIZES THE RANDOM NUMBER GENERATOR FOR
19                  )           THE REMAINDER OF THE CARD. IF COLUMN 1
20                  )           CONTAINS A PARITY ERROR, THE FIRST COLUMN
21                  )           WITHOUT AN ERROR WILL INITIALIZE THE RANDOM
22                  )           NUMBER GENERATOR FOR THE FOLLOWING COLUMNS.
23                  )           IT IS THEREFORE POSSIBLE FOR THE ERROR
24                  )           PRINTER TO OMIT THE PRINTING OF GOOD DATA
25                  )           SINCE IT IS NOT YET KNOWN.
26                  )6.3        THE ORDER OF THE CARDS IN THE TEST DECK IS
27                  )           NOT IMPORTANT.
28
29                  )7.     MISC
30                  )           IN TESTING CARD READER DEVICE SELECTION
31                  )           START PULSES ARE ISSUED  TO DEVICES 17,14,
32                  )           12,6,36 AND 56.
33
```

```
10005 CDROR
01
02                                      ;DO NOT INSERT,LOC 0
03                                      ;CONTAINS DIRT POINTER
04          000000 .LOC 0
05 00000 002317         DIRT
06
07          000002 .LOC 2
08 00002 002003         JMP .+1
09 00003 000450         A
10                                      ;DO NOT INSERT,LOC 45
11                                      ;CONTAINS EGGS POINTER
12
13          000045      .LOC 45
14 00045 000046         EGGS
15
16 00046 000000 EGGS:   0               ;WEN FLAG
17 00047 000000         0               ;NOT USED
18 00050 000000         0               ;DATA BLK ADDR
19 00051 000000         0               ;# OF PASSES
20 00052 000000         0               ;RETURN ADDR
21 00053 000000         0               ;SWITCH REGISTER
22
23 00054 000536 IDIAG:  DIAG
24 00055 000650 IRD:    RD
25 00056 001145 ICK:    CK
26 00057 000177 K177:   177
27          000016 .CDR=16              ;DEVICE CODE FOR CARD READER.
28 00060 000000 DIARET: 0
29 00061 001324 TIME:   XTIME
30 00062 001562 SETUP:  ENTER
31 00063 001602 LOOP:   CYCLE
32 00064 001651 ER:     ERR
33          000064 EHALT=JSR @ER
34 00065 000034 C34:    34
35 00066 002055 ICRLF:  CRLF
36 00067 000004 C4:     4
37 00070 001712 IMESS:  MESS
38 00071 000010 C10:    10
39 00072 000020 C20:    20
40
41 00073 000000 EPTR:   0
42 00074 001440 CDAT:   DAT-1
43 00075 001121 REND:   EOC
44 00076 001136 EE:     E
45          000076 ERROR=JSR @EE
46 00077 000040 C40:    40
47 00100 000002 C2:     2
48
49          000012 .RDX 10
50 00101 177663 KD77:   -77
51          000010 .RDX 8
52 00102 001252 RAN:    RAND
53 00103 000000 RDTEM:  0
54 00104 000000 RDRET:  0
55 00105 001744 IPOCT:  POCT
56 00106 000000 ETEM:   0
57 00107 000000 CKRET:  0
58 00110 177657 M121:   -121
59 00111 000000 COL:    0
60 00112 000000 PCTR:   0
```

```
0006 CDROR
01 00113 000000 DATA:   0
02 00114 000000 PE:     0
03 00115 000000 R:      0
04 00116 000121 K121:   121
05 00117 001750 IPDEC:  PDEC
06 00120 000000 DCODE:  0                       ;NEW DEVICE CODE
07 00121 002220 IDVCH:  DVCH
08 00122 002141 ITINO:  TINO
09 00123 000016 C16:    16
10 00124 000056 C56:    56
11
12          000200      .LOC    200
13                      ;
14                      ; LOCATIONS 200 TO 203 ARE FIXED
15                      ;
16
17 00200 002202 PROGB:  JMP     @BGNADR         ;START PROGRAM HERE
18 00201 000000 LOOPR:  0                       ;CURRENT TEST ADDR LOCATION
19 00202 000450 BGNADR: A                       ;STARTING ADDRESS FOR THIS PROGR
20 00203 000000 PASS:   0                       ;PASS COUNT
21
```

```
!0007 CORDR
01
02
03                  0R0450 .LOC 450
04 00450 006R7R A1      JSR @!MESS          !ASK FOR DEVICE CODE
05 00451 001421         MSG1                !ACCEPT IT
06 00452 006122         JSR @!TINO          !INPUT ERROR
07 00453 000775         JMP A
08 00454 020123         LDA 0,C16
09 00455 106415         SUB# 0,1 SNR        !IS IT 16?
10 00456 000404         JMP OK              !YES
11 00457 020124         LDA 0,C56
12 00460 106414         SUB# 0,1 SZR        !NO, INVALID CODE
13 00461 000767         JMP A
14 00462 044120 OK1:    STA 1,DCODE
15 00463 006121         JSR @IDVCH          !CHANGE 16'S TO NEW CODE
16 00464 000016         16
17 00465 000120         DCODE
18 00466 000512         OK1
19 00467 002317         DIRT
20 00470 006121         JSR @IDVCH          !CHANGE 56'S TO NEW CODE
21 00471 000056         56
22 00472 000120         DCODE
23 00473 000510         OK1
24 00474 002317         DIRT
25 00475 020120         LDA 0,DCODE
26 00476 024123         LDA 1,C16
27 00477 106415         SUB# 0,1 SNR        !16 OR 56?
28 00500 000406         JMP I16             !16
29 00501 020402         LDA 0,.+2
30 00502 000402         JMP .+2
31 00503 060116         NIOS 16
32 00504 040537         STA 0,A13A
33 00505 000405         JMP OK1
34 00506 020402 I16:    LDA 0,.+2
35 00507 000402         JMP .+2
36 00510 060156         NIOS 56
37 00511 040532         STA 0,A13A
38 00512 102400 OK1:    SUB 0,0
39 00513 044203         STA 0,PASS
40 00514 006054         JSR @!DIAG          !DIAGNOSTIC
41 00515 006055 B1:     JSR @!RD            !READ A CARD
42 00516 000777         JMP .-1
43 00517 006056         JSR @!CK            !CHECK THE CARD
44 00520 010203         ISZ PASS
45 00521 020203         LDA 0,PASS
46 00522 024R57         LDA 1,K177
47 00523 107414         AND# 0,1,SZR
48 00524 000771         JMP B
49
50 00525 060116         NIOS .CDR           !I/O RESET FAILED
51 00526 062077         IORST               !TO CLEAR CARD READER BUSY.
52 00527 063516         SKPBZ .CDR
53 00530 000R64         EHALT
54
55 00531 102400         SUB 0,0             !WAIT FOR THE
56 00532 060000         NIO 0               !CARD TO PASS AFTER
57 00533 101404         INC 0,0,SZR         !THE I/O RESET.
58 00534 000776         JMP .-2
59 00535 000757         JMP B-1
60
```

```
0008 CORDR
01 00536 054060 DIAG:   STA 3,DIARET
02 00537 006062 A00:    JSR @!SETUP         !THE SELB LINE IS
03 00540 063500         SKPBZ 0             !GROUNDED. CHECK O.C.
04 00541 000064         EHALT               !GATE CDR BUSY AND
05 00542 000063         JSR @LOOP           !CDR SELECT.
06
07 00543 006062 A01:    JSR @!SETUP         !THE SELB LINE IS
08 00544 063700         SKPDZ 0             !GROUNDED. CHECK O.C.
09 00545 000064         EHALT               !GATE (CDR DONE,CDR SELECT).
10 00546 000063         JSR @LOOP
11
12 00547 006062 A02:    JSR @!SETUP         !THE SELB LINE WAS
13 00550 063516         SKPBZ .CDR          !GROUNDED WHEN CDR WAS
14 00551 000064         EHALT               !SELECTED. CHECK O.C. GATE
15 00552 000063         JSR @LOOP           !(CDR BUSY,CDR SELECT) THE
16                                          !BUSY FLOP INPUT. CHECK
17                                          !CDR BUSY FLOP.
18
19 00553 006062 A03:    JSR @!SETUP         !THE SELB LINE WAS
20 00554 063716         SKPDZ .CDR          !GROUNDED WHEN CDR WAS
21 00555 000064         EHALT               !SELECTED. CHECK O.C. GATE
22 00556 000063         JSR @LOOP           !(CDR DONE,CDR SELECT) THE
23                                          !DONE FLOP INPUT. CHECK
24                                          !CDR DONE FLOP.
```

```
10009 CDRDR
01
02 00557 006062 A04:    JSR @SETUP      ;AFTER A I/O RESET
03 00560 102000         ADC 0,0         ;WITH INTERRUPTS MASK
04 00561 062077         MSKO 0          ;INTA SHOULD READ BACK
05 00562 061477         INTA 0          ;ALL ZEROS, CHECK D.C. GATES
06 00563 101004         MOV 0,0,SZR     ;AND GATE(INTA,CDR INT REQ(1))
07 00564 006064         EMALT           ;AND THE CDR INT REQ
08 00565 006063         JSR @LOOP       ;FLOP.
09
10 00566 006062 A05:    JSR @SETUP      ;AND GATE (CDR DONE(1),
11 00567 061477         INTA 0          ;CDR INT DISABLE(0)) FEEDING
12 00570 101004         MOV 0,0,SZR     ;THE CDR INT REQ FLOP FAILED.
13 00571 006064         EMALT           ;CHECK THE CDR DONE(1) INPUT,
14 00572 006063         JSR @LOOP       ;INT REQ SHOULD NOT SET.
15
16 00573 006062 A06:    JSR @SETUP      ;A INTERRUPT OCCURED WHEN
17 00574 102020         SUBZR 0,0       ;THE INTERRUPT SYSTEM WAS
18 00575 040001         STA 0,1         ;TURNED ON, PERHAPS THE
19 00576 060177         NIOS CPU        ;INTR LINE (B29) IS GROUNDED.
20 00577 101000         MOV 0,0         ;CHECK D.C. GATE FROM
21 00600 063477         SKPBN CPU       ;CDR INT REQ FLOP TO INTR LINE.
22 00601 006064         EMALT
23 00602 006063         JSR @LOOP
24 00603 060277         NIOC CPU
25
26 00604 006062 A07:    JSR @SETUP      ;A STRT PULSE TO
27 00605 060100         NIOS 0          ;DEVICE 0 SET THE
28 00606 063516         SKPBZ .CDR      ;CDR BUSY FLOP, CHECK
29 00607 006064         EMALT           ;AND GATE (STRT,CDR SELECT)
30 00610 006063         JSR @LOOP       ;AND CDR SELECT LEVEL.
31
32 00611 006062 A08:    JSR @SETUP      ;A STRT PULSE TO
33 00612 060117         NIOS 17         ;DEVICE 17 SET THE
34 00613 063516         SKPBZ .CDR      ;CDR BUSY FLOP, CHECK
35 00614 006064         EMALT           ;AND GATE OF DEVICE
36 00615 006063         JSR @LOOP       ;SELECT LINES.
37
38 00616 006062 A09:    JSR @SETUP      ;STRT TO DEVICE 14
39 00617 060114         NIOS 14         ;SET CDR BUSY.
40 00620 063516         SKPBZ .CDR
41 00621 006064         EMALT
42 00622 006063         JSR @LOOP
43
44 00623 006062 A10:    JSR @SETUP      ;STRT TO DEVICE 12
45 00624 060112         NIOS 12         ;SET CDR BUSY.
46 00625 063516         SKPBZ .CDR
47 00626 006064         EMALT
48 00627 006063         JSR @LOOP
```

```
10010 CDRDR
01
02 00630 006062 A11:    JSR @SETUP      ;STRT TO DEVICE 6
03 00631 060106         NIOS 6          ;SET CDR BUSY.
04 00632 063516         SKPBZ .CDR
05 00633 006064         EMALT
06 00634 006063         JSR @LOOP
07
08 00635 006062 A12:    JSR @SETUP      ;STRT TO DEVICE 36
09 00636 060136         NIOS 36         ;SET  CDR BUSY.
10 00637 063516         SKPBZ .CDR
11 00640 006064         EMALT
12 00641 006063         JSR @LOOP
13
14 00642 006062 A13:    JSR @SETUP      ;START TO DEVICE 56
15 00643 060156 A13A:   NIOS 56         ;SET CDR BUSY.
16 00644 063516         SKPBZ .CDR
17 00645 006064         EMALT
18 00646 006063         JSR @LOOP
19 00647 002060         JMP @DIARET
20
21 00650 054104 RD1:    STA 3,RDRET     ;READ A CARD.....
22 00651 054201         STA 3,LOOPR
23 00652 051416         DIB 0,.CDR
24 00653 024065         LDA 1,C34
25 00654 107415         ANDW 0,1,SNR
26 00655 000425         JMP RD1         ;O.K.
27 00656 006066         JSR @ICRLF      ;CARRIAGE, SOMETHING IS
28 00657 051416         DIB 0,.CDR      ;WRONG.
29 00660 024067         LDA 1,C4
30 00661 107415         ANDW 0,1,SNR
31 00662 000403         JMP .+3
32 00663 006070         JSR @IMESS      ;"LIGHT/DARK TROUBLE "
33 00664 001334         TRBL
34 00665 051416         DIB 0,.CDR
35 00666 024071         LDA 1,C18
36 00667 107415         ANDW 0,1,SNR
37 00670 000403         JMP .+3
38 00671 006070         JSR @IMESS      ;"PICK FAIL "
39 00672 001347         PICK
40 00673 051416         DIB 0,.CDR
41 00674 024072         LDA 1,C2A
42 00675 107415         ANDW 0,1,SNR
43 00676 000404         JMP RD1
44 00677 006070         JSR @IMESS      ;"HOPPER/STACKER "
45 00700 001356         HOPPER
46 00701 000401         JMP RD1
```

```
18811 CDRDR
01
02 00782 061416 RD1:    DIB 0,.CDR      ;WAIT HERE FOR
03 00783 101200         MOVR 0,0        ;THE CARD READER
04 00784 101203         MOVR 0,0,SNC    ;TO BECOME READY.
05 00785 000776         JMP RD1         ;CHECK READER FOR
06                                      ;TROUBLE INDICATORS, DATIB
07 00786 102400         SUB 0,0         ;AND CDR SELECT IN
08 00787 040073         STA 0,EPTR      ;INTERFACE LOGIC ETC.
09
10 00710 176440         SUBO 3,3
11 00711 061416 RD2:    DIB 0,.CDR      ;THE CARD IN READER
12 00712 175405         INC 3,3,SNR     ;STATUS IS SET. CHECK
13 00713 000076         ERROR           ;CARD BED.
14 00714 101212         MOVR# 0,0,SZC
15 00715 000774         JMP .-4
16
17 00716 020077 RD3:    LDA 0,C40       ;SET MASK, MAKE
18 00717 062077         MSKO 0          ;SURE RESET CLEARS IT.
19 00720 062077         IORST           ;INIT LOC 1 FOR
20 00721 102620         SUBZR 0,0       ;INTERRUPT.
21 00722 040001         STA 0,1
22
23 00723 061416 RD4:    DIB 0,.CDR      ;A DIB INSTRUCTION TO DEVICE
24 00724 065400         DIB 1,0         ;CDR AND DEVICE 0
25 00725 100415         SUB# 0,1,SNR    ;OBTAINED THE SAME RESULT.
26 00726 000076         ERROR           ;SUGGEST DIB READING NOT
27                                      ;A FUNCTION OF SELECT. CHECK
28                                      ;AND (DATIB,CDR SELECT).
29
30 00727 062416 RD5:    DIC 0,.CDR      ;A DIC INSTRUCTION TO
31 00730 101064         MOV 0,0,SZR     ;THE CARD READER SHOULD
32 00731 000076         ERROR           ;NOT READ ANY STATUS BITS
33                                      ;BACK. CHECK AND GATES
34 00732 020074         LDA 0,CDAT      ;(DATIB,CDR SELECT),(DATIA,
35 00733 040021         STA 0,21        ;CDR SELECT), D.C. GATES ETC.
36
37 00734 060116 RD6:    NIOS .CDR
38 00735 063516         SKPBZ .CDR      ;BUSY FAIL TO SET AFTER
39 00736 000403         JMP .+3         ;A NIOS TO THE CARD READER.
40 00737 000076         ERROR           ;CHECK STRT PULSE,BUSY FLOP
41 00740 002075         JMP @REND       ;ETC,ETC.
42
43 00741 063500 RD7:    SKPBZ 0         ;DEVICE 0 SHOULD NOT BE
44 00742 000076         ERROR           ;BUSY. CHECK D.C. GATE
45                                      ;(CDR BUSY,CDR SELECT)
46
47 00743 060200 RD8:    NIOC 0          ;A "C" PULSE TO DEVICE 0
48 00744 063416         SKPBN .CDR      ;CLEARED THE CDR BUSY FLOP.
49 00745 000076         ERROR           ;CHECK AND GATE (CDR SELECT,
50                                      ;CLR).
```

```
18812 CDRDR
01
02 00746 000001 RD9:    JSR @TIME
03 00747 063616         SKPDN .CDR
04 00750 101013         MOV# 0,0,SNC
05 00751 000403         JMP RD10
06 00752 000076         ERROR           ;CHECK D.C. GATE TO SELD,
07 00753 002075         JMP @REND       ;XXXX CDR DONE FLOP, ETC.
08
09 00754 063700 RD10:   SKPDZ 0         ;DEVICE 0 DONE FLAG
10 00755 000076         ERROR           ;WAS ASSERTED WITH CDR
11                                      ;DONE FLAG. CHECK D.C.
12                                      ;GATE TO SELD LINE.
13
14 00756 060177 RD11:   NIOS CPU        ;THE DONE FLAG
15 00757 101000         MOV 0,0         ;FAILED TO CAUSE A
16 00760 063577         SKPBZ CPU       ;INTERRUPT. CHECK D.C.
17 00761 000076         ERROR           ;GATE TO INTR LINE.
18                                      ;CDR INT REQ FLOP,
19                                      ;RESET TO CDR INT
20                                      ;DISABLE ETC,ETC.
21
22 00762 020077 RD12:   LDA 0,C40       ;DATA BIT 10 AND
23 00763 062077         MSKO 0          ;MSKO SHOULD PREVENT
24 00764 060177         NIOS CPU        ;THE INTERRUPT FROM
25 00765 101000         MOV 0,0         ;THE DONE FLAG. CHECK
26 00766 063477         SKPBN CPU       ;CDR INT DISABLE ETC.
27 00767 000076         ERROR
28
29 00770 102400 RD13:   SUB 0,0         ;A MSKO INSTRUCTION
30 00771 062077         MSKO 0          ;WITHOUT BIT 10 SHOULD
31 00772 101000         MOV 0,0         ;ALLOW THE INTERRUPT.
32 00773 101000         MOV 0,0
33 00774 063577         SKPBZ CPU       ;CHECK "0" INPUT TO
34 00775 000076         ERROR           ;CDR INT DISABLE FLOP.
35
36 00776 060016         NIO .CDR
37 00777 063616 RD14:   SKPDN .CDR      ;DONE FLAG CLEARED
38 01000 000076         ERROR           ;VIA NIO INSTRUCTION.
39
40 01001 060300 RD15:   NIOP 0          ;A "P" PULSE TO DEVICE 0
41 01002 063616         SKPDN .CDR      ;CHANGED THE STATE OF
42 01003 000076         ERROR           ;CDR DONE FLOP. CHECK
43                                      ;AND GATE(IOPLS,CDR SELECT).
```

```
10013 CDRDR
01
02 01004 001477 RD10: INTA 0           ;NO BITS WERE RECEIVED
03 01005 101005        MOV 0,0,SNR     ;FROM A INTA INSTRUCTION
04 01006 000076        ERROR           ;CHECK AND GATE (INTA,
05                                     ;CDR INT REQ(1)) AND FOLLOWING
06                                     ;INVERTER, ALSO CDR  INTP.
07
08 01007 001477 RD17: INTA 9
09 01010 024100        LDA 1,C2        ;O.C. GATE TO DATA 14
10 01011 107415        AND# 0,1,SNR    ;FROM INTA FAILED.
11 01012 000076        ERROR
12
13 01013 001477 RD18: INTA 8           ;O.C. GATE TO DATA 13
14 01014 024057        LDA 1,C4        ;FROM INTA FAILED.
15 01015 107415        AND# 0,1,SNR
16 01016 000076        ERROR
17
18 01017 001477 RD19: INTA 8           ;O.C. GATE TO DATA 12
19 01020 024071        LDA 1,C10       ;FROM INTA FAILED.
20 01021 107415        AND# 0,1,SNR
21 01022 000076        ERROR
22
23 01023 001477 RD20: INTA 8           ;CHECK THE DEVICE
24 01024 024120        LDA 1,DCODE
25 01025 103414        SUB# 0,1,SZR
26 01026 000076        ERROR
27
28 01027 001416 RD21: DIB 0,.CDR       ;ICTR LEVEL FAILED
29 01030 101213        MOVR# 0,0,SNC   ;CARD SHOULD BE IN READ
30 01031 000076        ERROR           ;STATION.
31
32 01032 000416 RD22: DIA 0,.CDR       ;DIA READ ALL ZEROS
33 01033 101005        MOV 0,0,SNR     ;CARD SHOULD HAVE
34 01034 000076        ERROR           ;HOLES IN IT!
35
36 01035 000416 RD23: DIA 0,.CDR       ;DIA RESULTS FROM DEVICE
37 01036 004400        DIA 1,0         ;0 ARE SAME AS FROM CDR.
38 01037 101005        MOV 0,0,SNR
39 01040 000403        JMP .+3
40 01041 106415        SUB# 0,1,SNR    ;CHECK AND GATE (DATIA,
41 01042 000076        ERROR           ;CDR SELECT).
42
43 01043 000416 RD24: DIA 0,.CDR
44 01044 042021        STA 0,021       ;STORE COL 1 ..........
```

```
10014 CDRDR
01
02 01045 000316 RD25: NIOP .CDR        ;A "P" PULSE TO THE CDR
03 01046 003716        SKPDZ .CDR      ;FAILLD TO CLEAR DONE FLOP.
04 01047 000076        ERROR           ;CHECK AND (IOPLS,CDR SELECT)
05                                     ;AND FOLLOWING GATES TO
06                                     ;RESET SIDE OF CDR DONE.
07
08 01050 003616 RD26: SKPDN .CDR
09 01051 000777        JMP .-1         ;WAIT FOR A DONE FLAG.
10 01052 000416        DIA 0,.CDR
11 01053 042021        STA 0,021       ;STORE COL 2 ..........
12
13 01054 000116 RD27: NIOS .CDR        ;A STRT PULSE TO
14 01055 003716        SKPDZ .CDR      ;CDR FAILED TO CLEAR
15 01056 000076        ERROR           ;CDR DONE FLOP.
16
17 01057 003616 RD28: SKPDN .CDR
18 01060 000777        JMP .-1         ;WAIT FOR DONE FLAG.
19 01061 000416        DIA 0,.CDR
20 01062 042021        STA 0,021       ;STORE COL 3 ..........
21
22 01063 000277 RD29: NIOC CPU         ;A "P" PULSE FAILED
23 01064 000316        NIOP .CDR       ;TO CLEAR CDR INT REQ
24 01065 000177        NIOS CPU        ;FLOP. CHECK THE
25 01066 101006        MOV 0,6         ;CLEAR (RESET) SIDE OF
26 01067 003477        SKPBN CPU       ;REQ FLOP.
27 01070 000076        ERROR
28 01071 003277        NIOC CPU
29
30 01072 020101 RD30: LDA 0,KD77       ;77 MORE COL TO READ.
31 01073 040103        STA 0,RDTEM
32 01074 000061        JSR @TIME
33 01075 003616        SKPDN .CDR
34 01076 101002        MOV 0,0,SZC
35 01077 000421        JMP RD34        ;NO DONE FLAG.
36 01100 002716        DIAP 0,.CDR
37 01101 042021        STA 0,021       ;STORE COL 4-80 .........
38 01102 010103        ISZ RDTEM
39 01103 000771        JMP RD30+2
40
41 01104 003416        SKPBN .CDR      ;BUSY WENT AWAY TO SOON
42 01105 000076        ERROR
43
44 01106 000061 RD31: JSR @TIME        ;WAIT FOR BUSY TO BE
45 01107 003516        SKPBZ .CDR      ;CLEARED VIA (IRDY)
46 01110 101002        MOV 0,0,SZC     ;LEVEL. CHECK BUSY FLOP
47 01111 000076        ERROR           ;C=D INPUTS.
48
49 01112 003616 RD32: SKPDN .CDR       ;CDR DONE FLAG FAIL TO
50 01113 000076        ERROR           ;SET WHEN BUSY GOES TO 0.
51
52 01114 000216 RD33: NIOC .CDR        ;CDR DONE FLOP WAS
53 01115 003716        SKPDZ .CDR      ;NOT CLEARED VIA "C"
54 01116 000076        ERROR           ;PULSE.
55
56 01117 101001        MOV 0,0,SKP     ;WHEN READING A COL
57 01120 000076 RD34: ERROR            ;DONE FAILED TO SET.
```

```
10015 CORDR
01
02 01121 034073 EOC:    LDA 3,EPTR      ;END OF CARD
03 01122 175885          MOV 3,3,SNR     ;IF AC3=# (NO ERROR)
04 01123 010104          ISZ RDRET       ;EXIT TO CALL+2
05 01124 175805          MOV 3,3,SNR
06 01125 002104          JMP @RDRET
07
08 01126 006066          JSR @ICRLF      ;ERROR WHEN READING
09 01127 006070          JSR @IMESS      ;"ERROR AT "
10 01130 001367          ERAT
11 01131 020073          LDA 0,EPTR
12 01132 126000          ADC 1,1
13 01133 107000          ADD 0,1         ;PRINT PROGRAM COUNTER
14 01134 006105          JSR @IPOCT      ;OF ERROR.
15 01135 002104          JMP @RDRET      ;EXIT
16
17 01136 054106 E:       STA 3,ETEM      ;ERROR ROUTINE USED
18 01137 054201          STA 3,LOOPR
19 01140 034073          LDA 3,EPTR      ;WHEN READING A CARD.
20 01141 175815          MOV# 3,3,SNR
21 01142 034106          LDA 3,ETEM      ;SAVE LOCATION OF FIRST
22 01143 054073          STA 3,EPTR      ;ERROR.
23 01144 002106          JMP @ETEM       ;EXIT ERROR
24
25 01145 054107 CK:      STA 3,CKRET
26 01146 054201          STA 3,LOOPR
27 01147 102400          SUB 0,0
28 01150 040115          STA 0,R
29 01151 020110          LDA 0,M121
30 01152 040111          STA 0,COL       ;80 COL CARD.
31 01153 020074          LDA 0,CDAT
32 01154 040021          STA 0,21        ;POINT TO CARD BUFFER.
33 01155 102120          ADCZL 0,0
34 01156 040112          STA 0,PCTR      ;ERROR COUNTER
35
36 01157 022021 CK1:     LDA 0,@21       ;GET COL OF DATA
37 01160 010111          ISZ COL         ;COUNT COL#
38 01161 101021          MOVZ 0,0,SKP
39 01162 002107          JMP @CKRET      ;EXIT AFTER 80 COL.
40
41 01163 040113 CK2:     STA 0,DATA      ;CALCULATE PARITY
42 01164 126000          ADC 1,1
43 01165 107000          ADD 0,1
44 01166 123404          AND 1,0,SZR
45 01167 000775          JMP .-3
46 01170 126500          SUBL 1,1
47 01171 044114          STA 1,PE        ;=1 IF PARITY ERROR.
```

```
10016 CORDR
01
02 01172 030113 CK3:     LDA 2,DATA
03 01173 020115          LDA 0,R
04 01174 107014          ADD# 0,1,SZR
05 01175 000403          JMP CK4         ;PARITY ERR OR NOT FIRST COL.
06 01176 050115          STA 2,R         ;INIT RANDOM.
07 01177 000760          JMP CK1
08
09 01200 101004 CK4:     MOV 0,0,SZR
10 01201 006102          JSR @RAN        ;GENERATE RANDOM#
11 01202 040115          STA 0,R
12 01203 024113          LDA 1,DATA
13 01204 014114          DSZ PE          ;TEST PARITY ERROR FLAG.
14 01205 106414          SUB# 0,1,SZR
15 01206 000402          JMP CKEP        ;DATA ERROR
16 01207 000750          JMP CK1
17
18 01210 006066 CKER:    JSR @ICRLF
19 01211 020112          LDA 0,PCTR
20 01212 126120          ADCZL 1,1
21 01213 106415          SUB# 0,1,SNR
22 01214 006063          JSR @ICRLF
23 01215 006070          JSR @IMESS      ;"COL= "
24 01216 001375          MCOL
25 01217 020116          LDA 0,K121
26 01220 024111          LDA 1,COL
27 01221 107000          ADD 0,1
28 01222 006117          JSR @IPDEC      ;PRINT COL#
29
30 01223 020115          LDA 2,R
31 01224 101005          MOV 0,0,SNR
32 01225 000405          JMP .+5         ;" GOOD= "
33 01226 006070          JSR @IMESS      ;PRINT GOOD DATA
34 01227 001411          MGOOD           ;IF ITS KNOWN.
35 01230 024115          LDA 1,R
36 01231 006105          JSR @IPOCT
37
38 01232 006070          JSR @IMESS      ;" BAD "
39 01233 001415          MBAD            ;DATA FROM CARD.
40 01234 024113          LDA 1,DATA
41 01235 006105          JSR @IPOCT
42 01236 010114          ISZ PE
43 01237 000402          JMP .+2
44 01240 000403          JMP .+3
45 01241 006070          JSR @IMESS      ;"PARITY ERROR"
46 01242 001401          MPAR
47 01243 010112          ISZ PCTR
48 01244 101000          MOV 0,0
49 01245 020112          LDA 0,PCTR
50 01246 126520          SUBZL 1,1
51 01247 106414          SUB# 0,1,SZR
52 01250 000707          JMP CK1         ;NOT THIRD ERROR.
53 01251 002107          JMP @CKRET      ;THIRD ERROR EXIT
```

```
;0017 CORDR
01
02 01252 054436 RAND:   STA 3,RANDR
03 01253 030432         LDA 2,RMSK1     ;RANDOM NUMBER GENERATOR
04 01254 113400         AND 0,2
05 01255 024426         LDA 1,RM0
06 01256 004432         JSR .MPYU
07 01257 024425         LDA 1,RM1
08 01260 004431         JSR .MPYA
09 01261 034425         LDA 3,RMSK2
10 01262 137400         AND 1,3
11 01263 145120         MOVZL 2,1
12 01264 147000         ADD 2,1
13 01265 107000         ADD 0,1
14 01266 020421         LDA 0,RMSK3
15 01267 123400         AND 1,0
16 01270 163320         ADDZS 3,0
17 01271 105000         MOV 0,1
18 01272 152000         ADC 2,2
19 01273 133000         ADD 1,2
20 01274 147404         AND 2,1,SZR     ;XXX
21 01275 000775         JMP .-3
22 01276 024427         LDA 1,RMSK1
23 01277 125403         INC 1,1,SNC
24 01300 123000         ADD 1,0
25 01301 002401         JMP @RANDR
26
27 01302 000000 RANDR:  0
28 01303 175575 RM0:    175575
29 01304 040763 RM1:    040763
30 01305 003777 RMSK1:  3777
31 01306 177400 RMSK2:  177400
32 01307 000007 RMSK3:  7
33
34 01310 102460 .MPYU:  SUBC 0,0
35 01311 054411 .MPYA:  STA 3,.C003
36 01312 034411         LDA 3,.C002
37 01313 125003 .C0991: MOVR 1,1,SNC
38 01314 101201         MOVR 0,0,SKP
39 01315 143223         ADDZR 2,0
40 01316 175404         INC 3,3,SZR
41 01317 002774         JMP .CR0C
42 01320 125200         MOVCR 1,1
43 01321 002401         JMP @.C003
44 01322 000000 .C003:  0
45 01323 177760 .CR2M:  -20
46
47 01324 021400 XTIME:  LDA 0,@,3       ;WAIT FOR IOT TO SKIP
48 01325 040404         STA 0,.+4       ;C(CARRY)=1 IF TIME OUT.
49 01326 126040         ADCO 1,1
50 01327 125402         INC 1,1,SZC
51 01330 001401         JMP 1,3
52 01331 000000         0
53 01332 000775         JMP .-3
54 01333 001401         JMP 1,3
```

```
;0018 CORDR
01
02 01334 144714 TRBL:   .TXTE |LIGHT/DARK TROUBLE  |
03       044107
04       127724
05       040504
06       045722
07       152240
08       147722
09       041125
10       142714
11       120240
12       000000
13 01347 050240 PICK:   .TXTE | PICK FAIL  |
14       141711
15       120113
16       040706
17       146311
18       120240
19       000000
20 01356 044240 HOPPER: .TXTE | HOPPER/STACKER  |
21       050317
22       142520
23       127722
24       152123
25       141501
26       142513
27       120322
28       000040
29 01367 142640 ERAT:   .TXTE | ERROR AT |
30       151322
31       151317
32       040640
33       120324
34       000000
35 01375 141640 MCOL:   .TXTE | COL= |
36       146317
37       120275
38       000000
39 01401 050240 MPAR:   .TXTE | PARITY ERROR |
40       151101
41       150311
42       120131
43       151305
44       147722
45       120322
46       000000
47 01411 043640 MGOOD:  .TXTE | GOOD= |
48       147717
49       136504
50       000240
51 01416 041240 MBAD:   .TXTE | BAD= |
52       042101
53       120275
54       000000
55
56 01421 005215 MS01:   .TXTE |<15><12>ENTER DEVICE CODE(10 OR 50)<15><19>|
57       047305
58       142724
59       120322
60       142504
```

```
 0019 CORDR
01          144523
02          142703
03          141540
04          042317
05          022305
06          033261
07          147640
08          120322
09          033055
10          100651
11          000012
12 01441 000121 DAT:    .BLK 121
```

```
 0020 CORDR
01
02
03 01562 054221 ENTER:  STA 3,LOOPR      ;LOOP ITERATE RETURN
04 01563 034407         LDA 3,ITR        ;THIS ROUTINE INITIALIZES
05 01564 054407         STA 3,ITRCT      ;EACH TEST
06 01565 176400         SUB 3,3
07 01566 054406         STA 3,ESWIT
08 01567 054406         STA 3,ERRCT
09 01570 062477         IORST            ;,I/O RESET
10 01571 002301         JMP @LOOPR
11
12 01572 000144 ITR:    144
13 01573 000000 ITRCT:  0
14 01574 000000 ESWIT:  0
15 01575 000000 ERRCT:  0
16 01576 000000 RETURN: 0
17 01577 000000 SAV2:   0
18 01600 000000 SAV1:   0
19 01601 000000 SAV0:   0
20
21 01602 054774 CYCLE:  STA 3,RETURN     ;END OF TEST ITERATION
22 01603 050774         STA 2,SAV2       ;ROUTINE
23 01604 044774         STA 1,SAV1       ;SAVE THE ACS!
24 01605 040774         STA 0,SAV0
25 01606 014765         DSZ ITRCT
26 01607 000430         JMP CYCTS        ;NOT 100 TIMES ITERATED
27
28 01610 034762         LDA 3,ITR        ;RESET ITERATION CNTR
29 01611 054762         STA 3,ITRCT
30 01612 074477         READS 3
31 01613 030761         LDA 2,ESWIT      ;IF SWITCH 3=(1)
32 01614 177120         ADDZL 3,3        ;AND AN ERROR HAS OCCURED
33 01615 175100         MOVL 3,3         ;THE ERROR RATE WILL
34 01616 151005         MOV 2,2,SNR      ;BE PRINTED
35 01617 000411         JMP NOEX
36 01620 175103         MOVL 3,3,SNC
37 01621 000413         JMP PCENT-1
38
39 01622 006066         JSR @ICRLF       ;PRINT CARRIAGE
40 01623 024752         LDA 1,ERRCT
41 01624 006117         JSR @IPDEC       ;PRINT VALUE
42 01625 020410         LDA 0,PCENT      ;EXAMPLE:  69%
43 01626 006461         JSR @ICHAR
44 01627 000405         JMP PCENT-1
45
46 01630 020751 NOEX:   LDA 0,SAV0       ;NORMAL EXIT,NO ERR
47 01631 024747         LDA 1,SAV1
48 01632 030745         LDA 2,SAV2
49 01633 002743         JMP @RETURN
50
```

```
10021 CDROR
01
02 01634 102401          SUB 0,0,SKP
03 01635 000245 PCENT:   245                ;CHARACTOR
04 01636 040737          STA 0,ERRCT        ;RESET ERROR COUNT
05 01637 020742 CYCTS:   LDA 0,SAV0         ;RESTORE ACS
06 01640 024740          LDA 1,SAV1
07 01641 030736          LDA 2,SAV2
08 01642 034732          LDA 3,ESWIT
09 01643 175004          MOV 3,3,SZR
10 01644 074477          READS 3
11 01645 062677          IORST              ;I/O RESET
12 01646 177113          ADOLM 3,3,SNC      ;SWITCH 1
13 01647 002201          JMP @LOOPR         ;(1)=LOOP ROUTINE
14 01650 002726          JMP @RETURN        ;(0)=PROCEED TO NEXT TEST
15
16
17 01651 054725 ERR:     STA 3,RETURN       ;ERROR SUBROUTINE
18 01652 050725          STA 2,SAV2
19 01653 044725          STA 1,SAV1
20 01654 040725          STA 0,SAV0
21
22 01655 034717          LDA 3,ESWIT
23 01656 175005          MOV 3,3,SNR
24 01657 000407          JMP ERR1
25 01660 030717 ERET:    LDA 2,SAV2         ;RESTORE ACS
26 01661 024717          LDA 1,SAV1
27 01662 020717          LDA 0,SAV0
28 01663 010712          ISZ ERRCT          ;COUNT
29 01664 101000          MOV 0,0            ;ERRORS,I/O RESET
30 01665 002711          JMP @RETURN        ;EXIT
31
32 01666 034710 ERR1:    LDA 3,RETURN       ;ERROR, C(3)=PC
33 01667 063077          HALT
34 01670 054704          STA 3,ESWIT
35 01671 074477          READS 3
36 01672 175300          MOVS 3,3
37 01673 175213          MOVRM 3,3,SNC      ;LOOK AT SWITCH 7
38 01674 004402          JSR EPRINT         ;PRINT ERROR DATA
39 01675 000763          JMP ERET
40                       .
```

```
10022 CDROR
01
02
03 01676 054676 EPRINT:  STA 3,ESWIT        ;ERROR MESSAGE PRINTER
04 01677 006066          JSR @ICRLF         ;PRINT CARRIAGE
05 01700 006070          JSR @IMESS         ;AND HEADER
06 01701 001710          HEADER
07 01702 020674          LDA 0,RETURN
08 01703 126000          ADC 1,1
09 01704 107000          ADD 0,1
10 01705 006105          JSR @IPOCT         ;PC OF ERROR
11 01706 002666          JMP @ESWIT         ;RETURN TO CALL
12
13 01707 002030 ICHAR:   CHAR
14
15       001710 HEADER:  .TXT |
16 01710 041520 PC       |
17       000011
18
```

```
;0023 CORDR
01                      ;TELETYPE NON INTERRUPT PACKAGE
02                      ;AC1,AC2 SAVED
03                      ;"MESS" PRINTS ASCII MESSAGES AS SPECIFIED BY ASSEMBLER
04                      ;"CRLF" PRINTS A CARRIAGE RETURN
05                      ;"POCT" PRINTS C(1) IN OCTAL
06                      ;"ZOCT" PRINTS C(1) IN OCTAL, LEADING ZEROS SUPPRESSED
07                      ;"PDEC" PRINTS C(1) IN DECIMAL, LEADING ZEROS SUPPRESSED,
08                      ;THE ABOVE THREE ARE FOLLOWED BY THE TAB IN P.TAB
09                      ;"TINO" ACCEPTS OCTAL, AND
10                      ;"TIND" ACCEPTS DECIMAL SINGLE PRECISION SIGNED INTEGERS
11                      ;INTO AC1 FROM THE TTI.  LEADING NULLS, TABS,
12                      ;AND SPACES ARE IGNORED.  A 16 BIT UNSIGNED INTEGER IS
13                      ;FORMED, THEN NEGATED IF A MINUS SIGN IS TYPED.
14                      ;EXIT AT CALL+1 IF INPUT ERROR WITH AC0=BAD CHARACTER.
15                      ; (NOT A LEGAL DIGIT OR TERMINATING CHARACTER)
16                      ;EXIT AT CALL+2 UPON TERMINATING CHARACTER
17                      ; WITH AC0=0, 9, 40, 12, 55
18                      ; FOR NULL, TAB, SPACE, CARRIAGE RETURN, COMMA
19                      ;THE ABOVE WAIT FOR TTO DONE, THEN CLEAR TTO.
20                      ;"CHAR" PRINTS ASCII CHARACTER IN C(0)R; C(0)L MUST BE 0.
21                      ;EXITS CALL +2 IF C(0)R=0, CORRECTS THE PARITY.
22                      ;SIMULATES TAB ON ASR33.
23                      ;"TYPE" PRINTS C(0)R.  MUST HAVE PROPER PARITY.  EXITS AT
24                      ;CALL+1.  REPLACE "TYPE" WITH INTERRUPT TYPE IF DESIRED.
25
26 01712 054554 MESS:   STA 3,MESSR     ;PRINT A TEXT MESSAGE
27 01713 044510         STA     1,P.AC1
28 01714 050510         STA     2,P.AC2
29 01715 010551         ISZ MESSR
30 01716 031400         LDA 2,0,3       ;C(2) POINTS TO MESSAGE
31 01717 024510         LDA 1,P.377     ;A 8 BIT MASK
32 01720 021000         LDA 0,0,2       ;C(2)=DATA WORD
33 01721 125112         MOVL# 1,1,SZC
34 01722 123701         ANDS 1,0,SKP
35 01723 123401         AND 1,0,SKP     ;C(0)=DATA CHARACTOR RIGHT
36 01724 151400         INC 2,2         ;INC TO NEXT WORD
37 01725 124000         COM 1,1         ;FLIP MASK
38 01726 004502         JSR CHAR        ;PRINT
39 01727 000771         JMP MESS+6      ;ANOTHER
40 01730 000402         JMP     .+2
41 01731 004477 P.LST:  JSR     CHAR
42 01732 024471 PEXIT:  LDA     1,P.AC1
43 01733 034471         LDA     2,P.AC2
44 01734 063511         SKPBZ TTO       ;NO,CLEAR TTO
45 01735 000777         JMP .-1
46 01736 060211         NIOC TTO
47 01737 063517         SKPBZ LPT
48 01740 000777         JMP .-1
49 01741 060217         NIOC LPT
50 01742 002524         JMP @MESSR      ;LAST
```

```
;0024 CORDR
01 01743 122401 ZOCT:   SUB 0,0,SKP
02 01744 020462 POCT:   LDA     0,P.C6R
03 01745 050457         STA     2,P.AC2
04 01746 030435         LDA 2,OCTAB     ;PRINT C(1) IN OCTAL
05 01747 000404         JMP .+4
06 01750 050454 PDEC:   STA     2,P.AC2
07 01751 030442         LDA 2,DECTB     ;PRINT C(1) IN DECIMAL
08 01752 122400         SUB 0,0
09 01753 054513         STA 3,MESSR     ;BOTH ENTRYS PRINT NUMBER
10 01754 044447         STA     1,P.AC1
11 01755 040445         STA 0,ZSUPP     ;THEN TAB TO NEXT POSITION
12 01756 050401         STA 2,.+1
13 01757 000000 DECOCT: 0               ;A"LDA 2,TABLE" INSTRUCTION
14 01760 010777         ISZ .-1
15 01761 020444         LDA 0,P.TAB
16 01762 151005         MOV 2,2,SNR     ;IF TABLE ENTRY=0
17 01763 000747         JMP PEXIT       ;EXIT WITH NO TAB
18 01764 034436         LDA 3,ZSUPP     ;ZEROS SUPPRESS STUF
19 01765 102400         SUB 0,0
20 01766 146452 DECO1:  SUBOM 2,1,SZC
21 01767 000405         JMP DECP
22 01770 146400         SUB 2,1         ;FORM THE DIGIT
23 01771 034435         LDA 3,P.C6R
24 01772 101400         INC 0,0
25 01773 000773         JMP DECOT
26 01774 151235 DECP:   MOVZRM 2,2,SNR
27 01775 034431         LDA 3,P.C6R
28 01776 054424         STA 3,ZSUPP     ;C(0)=DIGIT
29 01777 163000         ADD 3,0         ;MAKE ASCII
30 02000 175004         MOV 3,3,SZR
31 02001 004427         JSR CHAR        ;PRINT
32 02002 000755         JMP DECOCT      ;GET NEXT DIGIT
33
34 02003 030425 OCTAB:  LDA 2,.+1+.-DECOCT
35 02004 100000         100000
36 02005 010000         10000
37 02006 001000         1000
38 02007 000100         100
39 02010 000010         10
40 02011 000001         1
41 02012 000000         0
42 02013 030435 DECTB:  LDA 2,.+1+.-DECOCT
43                      000012 ,RDX 10
44 02014 023420         10000
45 02015 001750         1000
46 02016 000144         100
47 02017 000012         10
48 02020 000001         1
49 02021 000000         0
50                      000010 ,RDX 8
51 02022 000000 ZSUPP:  0
52 02023 000000 P.AC1:  0
53 02024 000000 P.AC2:  0
54 02025 000011 P.TAB:  11      ;CHARACTER PRINTED AFTER NUMBERS
55 02026 000060 P.C6R:  60
56 02027 000377 P.377:  377
```

```
18025 CORDR
01 02030 054434 CHAR:   STA 3,CHRET      ;PRINT C(0) RIGHT
02 02031 101306         MOVS 0,0,SNR     ;RETURN +2 IF NULL
03 02032 001401         JMP 1,3
04 02033 115120         MOVZL   0,3      ;COMPUTE EVEN PARITY
05 02034 177004         ADD     3,3,SZR
06 02035 000777         JMP     .-1
07 02036 103200         ADDR    0,0
08 02037 101300         MOVS    0,0
09 02040 034462 CHAR1:  LDA     3,P.C11 ;IS THIS A TAB
10 02041 116415         SUBN 0,3,SNR
11 02042 000403         JMP CHA.3                ;YES
12 02043 004424         JSR TYPE         ;NO PRINT IT
13 02044 002420         JMP @CHRET       ;EXIT
14 02045 020460 CHA.3:  LDA     0,P.240  ;SIMULATE A TAB
15 02046 004421         JSR     TYPE     ;WITH 1 TO 7 SPACES
16 02047 020415         LDA     0,CHORZ
17 02050 034451         LDA     3,P.C7
18 02051 103404         AND     3,0,SZR
19 02052 000773         JMP     CHA.3
20 02053 040412         STA 0,CHORZ
21 02054 002410         JMP @CHRET
22
23 02055 054411 CRLF:   STA 3,MESSR      ;SAVE RETURN
24 02056 044745         STA     1,P.AC1
25 02057 054745         STA     2,P.AC2
26 02060 020444         LDA 0,P.C15
27 02061 004747         JSR CHAR         ;PRINT CARRIAGE AND LF
28 02062 020441         LDA     0,P.C12
29 02063 000646         JMP     P.LST
30
31 02064 000000 CHRET:  0
32 02065 000000 CHORZ:  0
33 02066 000000 MESSR:  0
```

```
18026 CORDR
01 02067 054440 TYPE:   STA 3,TYPRET     ;TYPE THE C(0)R IF
02 02070 074477         READS 3          ;SWITCH 2(0).
03 02071 175100         MOVL 3,3
04 02072 177122         ADDZL 3,3,SZC
05 02073 000404         JMP TYPE3        ;INHIBIT TYPE
06 02074 063511         SKPBZ TTO
07 02075 000777         JMP .-1
08 02076 061111         DOAS 0,TTO
09 02077 175100 TYPE3:  MOVL 3,3
10 02100 177102         ADDL 3,3 SZC     ;IS SW5 SET?
11 02101 000414         JMP TYPE2        ;YES,GO TO LPT
12 02102 034725 TYPE1:  LDA     3,P.377
13 02103 175220         MOVZR   3,3
14 02104 103400         AND     3,0
15 02105 116043         ADCO    0,3,SNC
16 02106 034420         LDA     3,P.C4R
17 02107 152432         SUBZ#   3,0,SZC ;SKIP NON-PRINTING CHAR
18 02110 010755         ISZ     CHORZ
19 02111 034413         LDA     3,P.C15
20 02112 116445         SUBO    0,3,SNR
21 02113 054752         STA     3,CHORZ ;CLR HORZ POS
22 02114 002413         JMP @TYPRET
23 02115 063517 TYPE2:  SKPBZ LPT
24 02116 000777         JMP .-1
25 02117 061117         DOAS 0,LPT
26 02120 000762         JMP TYPE1
27 02121 000007 P.C7:   7
28 02122 000011 P.C11:  11
29 02123 000012 P.C12:  12
30 02124 000015 P.C15:  15
31 02125 000240 P.240:  240
32 02126 000440 P.C4R:  40
33 02127 000000 TYPRET: 0
```

```
10027 CORDR
01 02130 023773 TINC.:  LDA     0,P.C19
02 02131 004735         JSR     TYPE
03 02132 010734 TINX.:  ISZ     MESSR
04 02133 024670 TINR.:  LDA     1,P.AC1
05 02134 034666         LDA     3,ZSUPP
06 02135 175102         MOVL    3,3,SZC
07 02136 124400         NEG     1,1
08 02137 002401         JMP     @.+1
09 02140 001732         PEXIT
10
11 02141 102121 TINO:   ADCZL   0,0,SKP ;OCTAL ENTRY
12 02142 102440 TINO:   SUBO    0,0     ;DECIMAL ENTRY
13 02143 054723         STA     3,MESSR
14 02144 050560         STA     2,P.AC2 ;AC2 IS SAVED
15 02145 030756         LDA     2,P.C12
16 02146 113000         ADD     0,2
17 02147 102440         SUBO    0,0
18 02150 040652         STA     0,ZSUPP ;MINUS SIGN AND LEADING SPACES FLAG
19 02151 034651 TINS.:  LDA     3,ZSUPP
20 02152 175004         MOV     3,3,SZR
21 02153 000757         JMP     TINX.
22 02154 054647 TINM.:  STA     3,P.AC1
23 02155 063610         SKPDN   TTI
24 02156 000777         JMP     .-1
25 02157 000610         DIAC    0,TTI
26 02160 004659         JSR     CHAR
27 02161 034745         LDA     3,P.C4@
28 02162 116414         SUBM    0,3,SZR
29 02163 101015         MOVM    0,0,SNR
30 02164 000765         JMP     TINS.   ;SPACE, TAB, OR NULL
31 02165 024432         LDA     1,TIN2.
32 02166 106915         ADCM    0,1,SNR ;COMMA
33 02167 000743         JMP     TINX.
34 02170 106424         SUBZ    0,1,SZR ;MINUS
35 02171 000405         JMP     TINM.   ;NO
36 02172 034638         LDA     3,ZSUPP
37 02173 177200         ADDR    3,3     ;COMPLEMENT SIGN
38 02174 054626         STA     3,ZSUPP
39 02175 000733         JMP     TINM.+1
40 02176 136415 TINM.:  SUBM    1,3,SNR ;IS IT A CARRIAGE RETURN?
41 02177 000731         JMP     TINC.
42 02200 024416 TINN.:  LDA     1,TIN1.
43 02201 177022         ADDZ    0,1,SZC ;SKIP IF NOT A DIGIT
44 02202 146513         SUBLM   2,1,SNC ;SKIP IF DIGIT
45 02203 000730         JMP     TINR.
46 02204 010616         ISZ     ZSUPP   ;OUT OF LEADING SPACES
47 02205 020616         LDA     0,P.AC1
48 02206 101120         MOVZL   0,0
49 02207 115120         MOVZL   0,3
50 02210 175120         MOVZL   3,3
51 02211 137000         ADD     1,3     ;0 OLD P.AC1'S + NEW DIGIT
52 02212 145220         MOVZR   2,1
53 02213 125202         MOVZRM  1,1,SZC ;SKIP IF OCTAL MODE
54 02214 117000         ADD     0,3     ;ADD 2 OLD P.AC1'S
55 02215 000737         JMP     TINM.
56 02216 177720 TIN1.:  -60
57 02217 000055 TIN2.:  55
```

```
10028 CORDR
01
02              ;
03              ; SUBROUTINE DVCH
04              ;
05              ; THIS SUBROUTINE CHANGES THE DEVICE CODE OF I/O INSTRUCTIONS
06              ; WITH DEVICE CODE IN (CALL+1) TO THE DEVICE CODE DEFINED IN
07              ; LOCATION IN (CALL+2) . THE BEGIN AND END OF SCANNING ADDRESSES
08              ; ARE DEFINED IN (CALL+3) AND (CALL+4) RESPECTIVELY.
09              ; RETURN IS AT (CALL+5)
10              ;
11              ; THE CALLING SEQUENCE IS:
12              ;
13              ;       JSR     @IDVCH
14              ;       DEVICE CODE TO BE CHANGED
15              ;       NEW DEVICE CODE LOCATION
16              ;       START OF SCAN
17              ;       END OF SCAN
18              ;       RETURN
19              ;
20
21 02220 054435 DVCH:   STA     3,DVCHX         ;SAVE EXIT PNTR
22 02221 021400         LDA     0,0,3           ;C(AC0)= DEVICE CODE TO BE
23 02222 024437         LDA     1,DVC1          ;CHANGED + 60000
24 02223 123000         ADD     1,0             ;
25 02224 033401         LDA     2,@1,3          ;
26 02225 147000         ADD     2,1             ;
27 02226 044430         STA     1,DVT1          ;
28 02227 031403         LDA     2,3,3           ;
29 02230 050430         STA     2,DVT3          ;
30 02231 035402         LDA     3,2,3           ;
31 02232 031400 DVCH2:  LDA     2,0,3           ;
32 02233 024427         LDA     1,DVC2          ;
33 02234 147400         AND     2,1             ;
34 02235 044422         STA     1,DVT2          ;
35 02236 024425         LDA     1,DVC3          ;
36 02237 147400         AND     2,1             ;
37 02240 106414         SUBM    0,1,SZR         ;I/O INSTR. TO BE CHANGED?
38 02241 000405         JMP     DVCH1           ;NO,SCAN MORE
39 02242 024414         LDA     1,DVT1          ;YES,CHANGE DEVICE CODE TO
40 02243 030414         LDA     2,DVT2          ;NEW CODE
41 02244 133000         ADD     1,2             ;
42 02245 051400         STA     2,0,3           ;
43 02246 030412 DVCH1:  LDA     2,DVT3          ;
44 02247 156415         SUBM    2,3,SNR         ;IS IT END OF SCAN?
45 02250 000403         JMP     .+3             ;YES,GO TO EXIT
46 02251 175400         INC     3,3             ;NO,CONTINUE
47 02252 000760         JMP     DVCH2           ;
48 02253 034402         LDA     3,DVCHX         ;YES,EXIT
49 02254 001404         JMP     4,3             ;
50
51 02255 000000 DVCHX:  0
52 02256 000000 DVT1:   0
53 02257 000000 DVT2:   0
54 02260 000000 DVT3:   0
55 02261 060000 DVC1:   60000
56 02262 017700 DVC2:   17700
57 02263 160077 DVC3:   160077
58
```

```
:0029 CORDR
01 02264 047503          .TXT |COPYRIGHT (C) DGC,1978,78,74,75,76
02       054520
03       044522
04       044107
05       020124
06       041450
07       020051
08       043504
09       023103
10       034461
11       030067
12       033454
13       026062
14       032067
15       033454
16       026065
17       033067
18       002305
19 02305 046101 ALL RIGHT RESERVED!
20       020114
21       044522
22       044107
23       020124
24       042522
25       042523
26       053122
27       042105
28       000000
29
30 02317 042303 DIRT!    .TXTE |CORDR TST03!
31       042322
32       120322
33       051724
34       030304
35       052065
36 02325 002000          0
37 02326 000200          PROGB
38 02327 000001          1
39 02330 070707          70707
40 02331 070707          70707
41 02332 070707          70707
42 02333 070707          70707
43 02334 100016          100016
44
45                       .END
```

```
0030 CORDR

A       000458      5/89    6/19    7/04    7/07    7/13
A00     000537      8/02
A01     000543      8/07
A02     000547      8/12
A03     000553      8/19
A04     000557      9/02
A05     000566      9/10
A06     000573      9/16
A07     000604      9/26
A08     000611      9/32
A09     000616      9/36
A10     000623      9/44
A11     000630     10/02
A12     000635     10/06
A13     000642     10/14
A13A    000643      7/32    7/37    10/15
B       000515      7/41    7/48    7/50
BGNAD   000202      6/17    6/19
C10     000071      5/38    10/35   13/19
C16     000123      6/09    7/08    7/26
C2      000100      5/47    13/09
C20     000072      5/39    10/41
C34     000065      5/34    10/24
C4      000067      5/36    10/29   13/14
C40     000077      5/46    11/17   12/22
C56     000124      6/10    7/11
COAT    000074      5/42    11/34   15/31
CHAR    002030     22/13   23/36   23/41   24/31   25/01   25/27   27/26
CHAR1   002040     25/09
CHA,3   002045     25/11   25/14   25/19
CHORZ   002065     25/16   25/20   25/32   26/16   26/21
CHRET   002064     25/01   25/13   25/21   25/31
CK      001146      5/25    15/25
CK1     001157     15/36   16/07   16/10   16/52
CK2     001163     15/41
CK3     001172     16/02
CK4     001200     16/05   16/09
CKER    001210     16/15   16/18
CKRET   000107      5/57    15/25   15/30   16/53
COL     000111      5/59    15/30   15/37   16/26
CRLF    002055      5/35    25/23
CYCLE   001602      5/31    20/21
CYCTB   001637     20/26   21/05
DAT     001441      5/42    19/12
DATA    003113      6/01    15/41   16/02   16/12   16/40
DCODE   000120      6/06     7/14    7/17    7/22    7/25   13/24
DECOC   001757     24/13   24/32   24/34   24/42
DECOT   001766     24/20   24/25
DECP    001774     24/21   24/26
DECTB   002013     24/07   24/42
DIAG    000536      5/23    8/01
DIARE   000060      5/20    8/01   10/19
DIRT    002317      5/05    7/19    7/24   20/38
DVC1    002261     28/23   28/55
DVC2    002262     28/32   28/56
DVC3    002263     28/35   28/57
DVCH    002220      6/07   28/21
DVCH1   002246     28/30   28/43
DVCH2   002232     28/31   28/47
```

8033 CORDR

RD3C	001112	14/49						
RD33	001114	14/52						
RD34	001120	14/55	14/57					
RD4	000723	11/23						
RD5	000727	11/30						
RD6	000734	11/37						
RD7	000741	11/43						
RD8	000743	11/47						
RD9	000746	12/02						
RDRET	000104	5/54	10/21	15/04	15/06	15/15		
RDTEM	000103	5/53	14/31	14/38				
REND	000C76	5/43	11/41	12/07				
RETUR	001576	20/16	20/21	20/49	21/14	21/17	21/30	21/32
		22/07						
RK0	001383	17/03	17/26					
RK1	001364	17/07	17/29					
RK3K1	001305	17/03	17/22	17/30				
RK3K2	001306	17/09	17/31					
RK3K3	001307	17/14	17/32					
SAV0	001301	20/19	20/24	20/46	21/05	21/20	21/27	
SAV1	001600	20/13	20/23	20/47	21/06	21/19	21/26	
SAV2	001577	20/17	20/22	20/48	21/07	21/18	21/25	
SETUP	000062	8/30	8/02	8/07	8/12	8/19	9/02	9/18
		9/15	9/26	9/32	9/36	9/44	10/02	10/08
		10/14						
TIME	000001	5/29	12/02	14/32	14/44			
TIN1,	002216	27/42	27/56					
TIN2,	002217	27/31	27/57					
TINC,	002130	27/01	27/41					
TIND	000142	27/12						
TINH,	002176	27/35	27/48					
TINR,	002200	27/42						
TIND	002141	6/03	27/11					
TINR,	002133	27/04	27/45					
TINS,	002151	27/19	27/38					
TINW,	000154	27/22	27/39	27/53				
TINX,	002132	27/03	27/21	27/33				
TRBL	001334	10/33	10/02					
TYPE	002067	25/12	25/15	26/01	27/02			
TYPE1	002102	26/12	26/26					
TYPE2	002115	26/11	26/23					
TYPES	002077	26/05	26/09					
TYPRE	002107	26/01	26/22	26/33				
XTIME	001324	5/29	17/47					
ZCCT	001743	24/01						
ZSUPP	002022	24/11	24/18	24/28	24/51	27/05	27/10	27/19
		27/38	27/38	27/46				
.C303	001322	17/35	17/43	17/44				
.C828	001323	17/35	17/45					
.C899	001313	17/37	17/41					
.CDR	000016	5/27	7/50	7/52	8/13	8/28	9/28	9/34
		9/49	9/46	10/04	10/10	10/16	10/23	10/28
		10/34	10/40	11/02	11/11	11/23	11/30	11/37
		11/30	11/46	12/03	12/36	12/37	12/41	13/08
		13/32	13/35	13/43	14/02	14/03	14/06	14/10
		14/13	14/14	14/17	14/19	14/23	14/33	14/36
		14/41	14/45	14/49	14/52	14/53		
.MPYA	001311	17/00	17/05					

8034 CORDR

.MPYU	001310	17/06	17/34