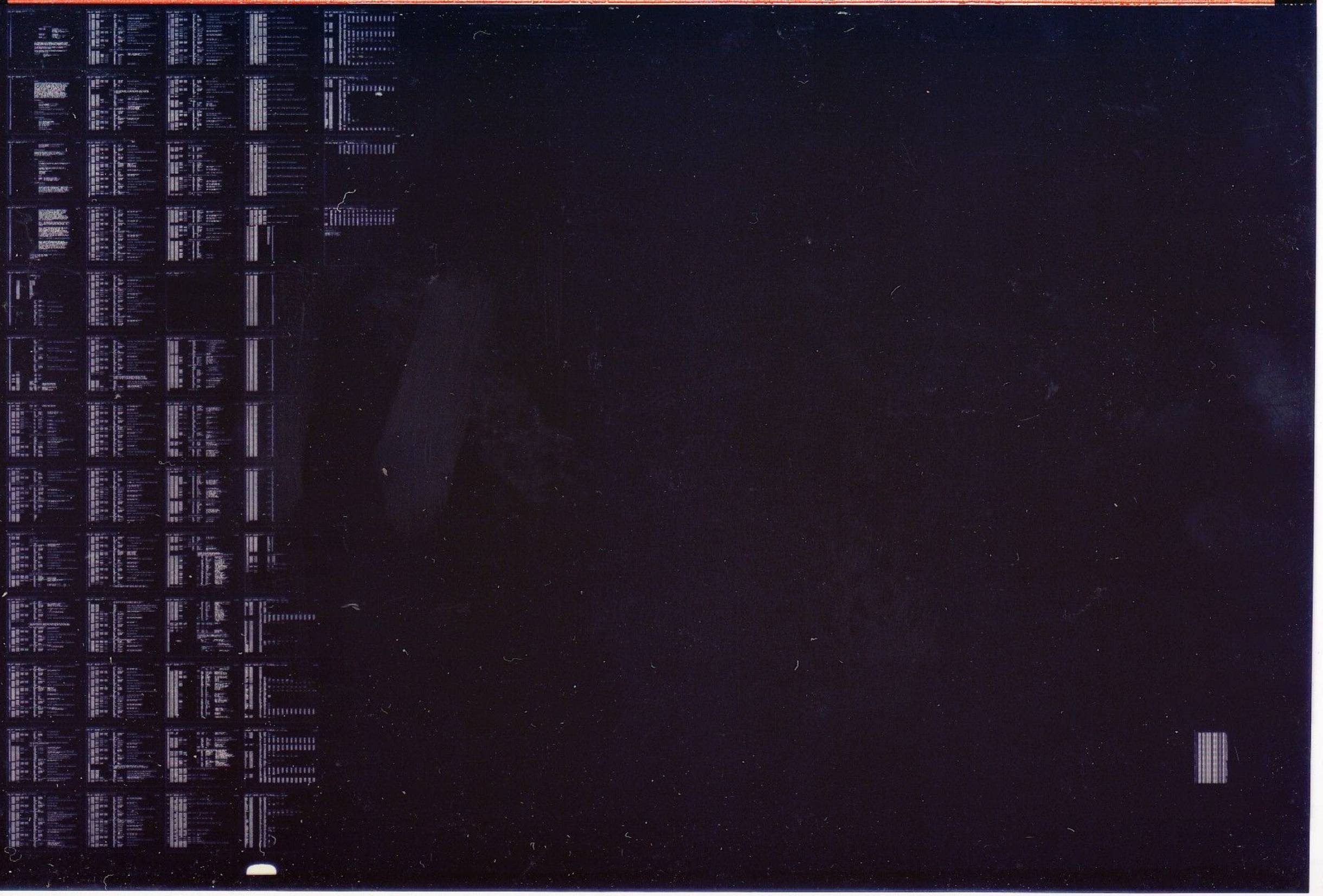
CTS11-JC CTS11-JC 7 BIT ASCII AH-F415A-MC
CZCTAA0 FICHE 1 OF 1



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1                               .REM _
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IDENTIFICATION

PRODUCT CODE:	AC-F414A-MC
PRODUCT NAME:	CZCTAA0 CTS11-JC 7 BIT ASCII 8035-8045 (11/70) 80 COLUMN CARD TERMINAL CONTROL DATA FORMAT: 7 BIT ASCII
UPDATE DATE	20-MARCH 80
MAINTAINER:	JIM BENNETT COMPUTER SPECIAL SYSTEMS
AUTHOR:	P.W. DUKE
UPDATE AUTHOR:	VIJAY ANANDWALA

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                1.0     ABSTRACT

                        THIS PROGRAM TESTS THE OPERATIONAL ABILITY OF THE CTS11-JC TO
                        INTERFACE TO AN 8035-8045  80 COLUMN READER/PUNCH.  THE PROGRAM
                        CONSISTS OF TWO SETS OF TESTS, LOGIC TESTS AND CARD TESTS.
                        THE LOGIC TESTS ARE PERFORMED WITHOUT CARDS IN THE 8035-8045 .
                        THE CARD TESTS ARE A FOUR PASS SERIES OF TESTS WHICH USE 20
                        CARDS.  THE CARD TESTS SHOULD NOT BE RUN UNTIL THE LOGIC
                        TESTS HAVE RUN SUCCESSFULLY.  THE PROGRAM IS DEVICE CODE
                        INDEPENDENT AND THERE IS AN INPUT ROUTINE WHICH ALLOWS
                        THE OPERATOR TO SPECIFY DEVICE ADDRESS, INTERRUPT VECTOR
                        ADDRESS AND BR LEVEL.  THIS ROUTINE IS RUN AT THE
                        BEGINNING OF EVERY PASS THROUGH THE PROGRAM.  THERE IS A
                        GREAT DEAL OF INTERACTION REQUIRED BETWEEN THE OPERATOR
                        AND THE PROGRAM.  THIS INTERACTION IS ACCOMPLISHED BY MEANS
                        OF TELETYPE DIRECTIONS AND MESSAGES TYPED OUT DURING THE
                        RUNNING OF THE PROGRAM WHICH FREQUENTLY REQUIRES OPERATOR
                        RESPONSE.  DIRECTIONS GIVEN TO THE OPERATOR VIA THE TELETYPE
                        MUST BE FOLLOWED EXACTLY TO ACHIEVE SUCCESSFUL TESTING.


                2.0     REQUIREMENTS

                        2.1     EQUIPMENT

                                PDP-11 WITH MINIMUM OF 4K OF MEMORY
                                CTS11-JC INTERFACE
                                8035-8045  80 COLUMN READER/PUNCH

                        2.2     PRELIMINARY PROGRAMS

                                ALL PROCESSOR DIAGNOSTICS MUST RUN ERROR FREE


                3.0     LOADING PROCEDURE

                        PROCEDURE FOR LOADING NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.


                4.0     STARTING PROCEDURE

                        4.1     CONTROL SWITCH SETTINGS

                                SR15=1 CONTINUE AFTER ERROR
                                SR14=1 DELETE ERROR TYPEOUTS
                                SR13=1 LOOP ON ERROR
                                SR2=1 BYPASS DEVICE CODE ENTRY ROUTINE
                                SR1=1 DO LOGIC TESTS
                                SR0=1 DO CARD TESTS

                        4.2     OPERATOR ACTION

                                LOAD PROGRAM INTO MEMORY
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                                SET SWITCH REGISTER TO STARTING ADDRESS 200(8)
                                PRESS LOAD ADDRESS
                                SET SWITCH REGISTER TO DESIRED OPTIONS
                                PRESS START


        5.0     OPERATING PROCEDURE

                FOLLOW DIRECTIONS GIVEN ON THE TELETYPE EXACTLY.  THIS IS
                NECESSARY FOR SUCCESSFUL TESTING.  AT THE END OF A
                COMPLETE PASS THROUGH THE SELECTED ROUTINES THE PROGRAM
                WILL TYPE OUT 'END OF TESTING'' AND HALT.  TO REPEAT
                FOR ONE PASS, PRESS CONTINUE.


        6.0     ERRORS

                6.1     ERROR HALTS

                        THE MEANING OF AN ERROR HALT CAN BE DETERMINED BY READING
                        THE PROGRAM LISTING AT THE ADDRESS OF THE ERROR HALT.

                6.2     ERROR TYPEOUTS

                        ALL ERROR TYPEOUTS WILL INCLUDE THE FIRST LINE
                        SHOWN BELOW, AND WHEN RELEVANT ONE OR MORE OF THE
                        OTHER THREE LINES.

                        'ERROR AT ADDRESS AAAAAA
                        'GOOD=BBBBBB
                        'BAD =CCCCCC
                        ''COLUMN #=DD''

                        WHERE:

                        AAAAAA = THE ADDRESS OF THE ERROR
                        BBBBBB = THE EXPECTED RESULT FROM A TEST
                        CCCCCC = THE ACTUAL RESULT FROM A TEST
                        DD     = THE COLUMN NUMBER IN ERROR


        7.0     PROGRAM DESCRIPTION

                7.1     LOGIC TESTS

                        THE LOGIC TESTS ARE A SERIES OF 6 TESTSS WHICH DO NOT
                        REQUIRE CARDS TO BE IN THE 8035-8045 .  THESE 6 TESTS PERFORM
                        BASIC CHECKS ON THE 4 REGISTERS ON THE INTERFACE AND
                        TESTS AS MUCH AS POSSIBLE OF THE OPERATIONAL CAPABILITY
                        OF THE INTERFACE WHILE IN A STATIC CONDITION.  CORRECT
                        RESPONSE BY THE OPERATOR TO INSTRUCTIONS GIVEN VIA TYPE
                        OUTS IS NECESSARY FOR THIS TEST TO BE SUCCESSFUL.

                7.2     CARD TESTS
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                        THE CARD TESTS ARE A SERIES OF 4 ROUTINES (PASSES)
                        WHICH CHECK THE ABILITY OF THE INTERFACE TO PERFORM
                        CORRECTLY IN CARD HANDLING OPERATIONS.  THE TESTS
                        REQUIRE A DECK OF 20 BLANK CARDS WHICH ARE PASSED
                        THROUGH THE 8035-8045  4 TIMES, WHICH AT THE
                        CONCLUSION OF THE 4 PASSES CONTAIN PUNCHED
                        INFORMATION WHICH MUST BE VISUALLY VERIFIED BY THE
                        OPERATOR.  VERIFICATION OF CORRECT OPERATION OF THESE
                        4 PASSES IS DONE BY THE OPERATOR BASED ON INSTRUCTIONS
                        GIVEN VIA TYPE OUTS AT THE BEGINNING AND END OF EACH
                        PASS.  DETAILED DESCRIPTIONS OF WHAT IS DONE DURING
                        EACH PASS IS GIVEN BELOW.

                        PASS 1 - THE OPERATOR PUTS 10 BLANK CARDS IN EACH INPUT
                        HOPPER.  THE PROGRAM READS THESE CARDS AND PUTS THEM INTO
                        THE 2 STACKERS, 10 BLANK CARDS IN EACH STACKER.  THE
                        OPERATOR VERIFIES THAT THERE ARE 10 BLANK CARDS IN EACH
                        STACKER.

                        PASS 2 - THE OPERATOR PUTS THE 20 BLANK CARDS IN THE
                        PRIMARY HOPPER.  THE PROGRAM READS THESE CARDS AND ALSO
                        PUNCHES THE CHARACTER SET ON EACH CARD.  THE
                        CARDS ARE PUNCHED IN A PRECESS FASHION WITH THE 1ST
                        PUNCHED CHARACTER OF CARD #1 APPEARING IN COLUMN #11
                        AND SO ON UNTIL THE 1ST PUCNCHED CHARACTER OF CARD #20
                        IS IN COLUMN #31.  THE CARDS ARE ALL PLACED IN STACKER
                        #1, THE OPERATOR VERIFIES THAT THE CHARACTER
                        SET APPEARS IN EACH CARD AND THAT PUNCHING WAS DONE IN
                        A PRECESS FASHION.  THE CHARACTERS APPEAR ON THE CARDS
                        IN THE ORDER SHOWN BELOW:

                        '"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ_

                .REM _
                        PASS 3 - THE OPERATOR PUTS THE 20 CARDS IN THE
                        PRIMARY HOPPER.  THE PROGRAM READS THE CARDS AND ALSO
                        PUNCHES MORE CHARACTERS ON EACH CARD BEGINNING WITH
                        COLUMN #1, CARD #1 WILL HAVE 1 CHARACTER PUNCHED ON IT,
                        CARD #2 WILL HAVE 2 CHARACTERS UP TO CARD #20 WHICH
                        WILL HAVE 20 CHARACTERS PUNCHED ON IT.  ALL THE
                        CHARACTERS PUNCHED IN THIS TEST WILL BE THE "A"
                        CHARACTER.  THE CARDS WILL BE PLACED IN STACKER #1,
                        THE OPERATOR VERIFIES THAT THESE CHARACTERS WERE
                        PUNCHED CORRECTLY

                        THIS IS THE END OF THE CARD TESTS.
                -

                ;
                ;CTS11-JC 80 COLUMN CARD TERMINAL CONTROL INTERFACE TEST (11/70)
                ;DATA IS IN  (7 BIT) ASCII FORMAT
                ;   ***** MODEL 8035-8045  *****
                ;DECSPEC-AONCDA
                ;AUTHORS:
                ;       P. W. DUKE
                ;       A. L. UNSER
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```
                                ;19-DEC-73
                                ;[UPDATED-MARCH-80]
                                :
                                        .LIST   ME
                                        .ABS

        177776                  PS=177776
        177570                  SR=177570
        177560                  TKS=177560
        177562                  TKB=177562
        177564                  TPS=177564
        177566                  TPB=177566
        000000                  R0=%0
        000001                  R1=%1
        000002                  R2=%2
        000003                  R3=%3
        000004                  R4=%4
        000005                  R5=%5
        000006                  SP=%6
        000007                  PC=%7
        000000                  XX=HALT
        104000                  ERR=EMT
        104400                  TYPE=TRAP
        000004                  COL=4
        000003                  GB=3
        000002                  G=2
        000001                  B=1

                                .MACR   WTDONE
                                BIT     #200,@TCR
                                BEQ     .-6             ;WAIT FOR DONE FLAG
                                .ENDM

                                .MACR   WTODR
                                BITB    #200,@TIRHI
                                BEQ     .-6             ;WAIT FOR OUTPUT DATA REQUEST
                                .ENDM

                                .MACR   WTIDR
                                BIT     #200,@TIR
                                BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
                                .ENDM
                                .MACR   LOOP A
                                .NLIST
                                CMP     #1,SCOPE
                                BNE     .+16
                                CMP     #.-10,LASTPC
                                BNE     .+6
                                .LIST
                                JMP     @#A
                                .ENDM

                                .MACR   CKTCR A,B
                                LP=.
                                MOV     A,GOOD
                                MOV     @TCR,BAD        ;READ CMD REGISTER
```

```
                                        CMP     GOOD,BAD
                                        BEQ     .+4
                                        ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
                                        LOOP    B
                                        .ENDM

                                        .MACR   CKTSR A,B
                                        LP=.
                                        MOV     A,GOOD
                                        MOV     @TSR,BAD        ;READ STATUS REGISTER
                                        CMP     GOOD,BAD
                                        BEQ     .+4
                                        ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
                                        LOOP    B
                                        .ENDM

                                        .MACR   CKTDR A,B
                                        LP=.
                                        MOV     A,GOOD
                                        MOV     @TDR,BAD        ;READ DATA REGISTER
                                        CMP     GOOD,BAD
                                        BEQ     .+4
                                        ERR+GB                  ;DATA REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
                                        LOOP    B
                                        .ENDM

                                        .MACR   CKTIR A,B
                                        LP=.
                                        MOV     A,GOOD
                                        MOV     @TIR,BAD        ;READ INTERRUPT REGISTER
                                        CMP     GOOD,BAD
                                        BEQ     .+4
                                        ERR+GB                  ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
                                        LOOP    B
                                        .ENDM
            000000                      .=0
            000030                      .=30
000030  013126                          .WORD   ERROR
000032  000340                          .WORD   340
            000034                      .=34
000034  013312                          .WORD   TYPOUT
000036  000340                          .WORD   340
            000174                      .=174
000174  000000              DISPREG:.WORD 0
000176  000000              SWREG:  .WORD 0
            000004          ERRVEC=4                ;TIME OUT AND OTHER ERROR
            177570          DSWR=177570             ;HARDWARE SWITCH REGISTER
            177570          DDISP=177570            ;HARDWARE DISPLAY REGISTER
            000500                      .=500
000500  177570              SWR:    .WORD   DSWR  ;;ADDRESS OF SWITCH REGISTER
000502  177570              DISPLAY:.WORD   DDISP  ;ADDRESS OF DISPLAY REGISTER
000504  000000              APASS:  .WORD   0     ;PASS COUNT
000506  000000              AENVM:  .WORD   0     ;ENVIRONMENT REGISTER
000510  000000              ASWREG: .WORD   0     ;APT SWITCH REGISTER
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                                AUTOB:  .WORD   0       ;AUTOMATIC MODE INDICATOR
                                INTAG:  .WORD   0       ;INTERRUPT MODE INDICATOR

                        000200  .=200
000200  000167  000574          JMP     START
                        001000  .=1000

001000  012767  000340  176770 START:  MOV     #340,PS         ;SET BPU TO LEVEL #7
001006  012706  001000          MOV     #1000,SP        ;INITIALIZE THE STACK POINTER
001012  005067  017514          CLR     SCOPE           ;INITIALIZE SCOPE
001016  004767  013520          JSR     PC,SWRCK
001022  104400                  TYPE
001024  017303                  PROGNM                   ;''CZCTAA.SRC''
001026  004767  012722          JSR     PC,GTSWR

001032  032777  000004  177440  BIT     #4,@SWR
001040  001002                  BNE     ST1             ;IF SR2=0
001042  004767  011644          JSR     PC,DEVCOD       ;GO TO DEVICE CODE ENTRY ROUTINE

001046  032777  000002  177424 ST1:    BIT     #2,@SWR
001054  001402                  BEQ     ST2             ;IF @SWR1=1
001056  004767  000026          JSR     PC,INIT         ;GO DO LOGIC TESTS

001062  032777  000001  177410 ST2:    BIT     #1,@SWR
001070  001402                  BEQ     ST3             ;IF SR0=1
001072  004767  003144          JSR     PC,PASS1        ;GO DO CARD TESTS

001076  104400                 ST3:    TYPE
001100  017442                  ENDMSG                  ;''END OF TESTING''
001102  000000                  XX                      ;HALT AT END
001104  000137  001046          JMP     @#ST1
                                ;
                                ;3 REGISTERS SHOULD EQUAL ZERO AT INITIALIZATION
                                ;
001110  104400                 INIT:   TYPE
001112  015177                  LOGTST                  ;''***** LOGIC TESTS *****''
001114  104400                  TYPE
001116  015233                  INITM1                  ;''PUT THE 8035-8045  OFF-LINE, REMOVE ALL CARDS
001120  104400                  TYPE
001122  017001                  P2MSG4                  ;PRESS STOP-RESET ON 8035-8045
001124  004767  010656          JSR     PC,CONTIN       ;''PRESS CR TO CONTINUE''
001130  000005                 INIT1:  RESET
001132                          CKTCR   #0,INIT1        ;TEST CMD REG FOR 0
                        001132  LP=.
001132  012767  000000  017350  MOV     #0,GOOD
001140  017767  017374  017332  MOV     @TCR,BAD        ;READ CMD REGISTER
001146  026767  017336  017324  CMP     GOOD,BAD
001154  001401                  BEQ     .+4
001156  104003                  ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
001160                          LOOP    INIT1
001200  000137  001130          JMP     @#INIT1
001204                          CKTSR   #0,INIT1        ;TEST STATUS REG FOR 0
                        001204  LP=.
001204  012767  000000  017276  MOV     #0,GOOD
001212  017767  017326  017260  MOV     @TSR,BAD        ;READ STATUS REGISTER
001220  026767  017264  017252  CMP     GOOD,BAD
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(1)  001226  001401                          BEQ     .+4
(1)  001230  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  001232                                  LOOP    INIT1
(2)  001252  000137  001130                  JMP     @#INIT1
380  001256                                  CKTIR   #0,INIT1        ;TEST INTERRUPT REG FOR 0
(1)          001256                          LP=.
(1)  001256  012767  000000  017224          MOV     #0,GOOD
(1)  001264  017767  017264  017206          MOV     @TIR,BAD        ;READ INTERRUPT REGISTER
(1)  001272  026767  017212  017200          CMP     GOOD,BAD
(1)  001300  001401                          BEQ     .+4
(1)  001302  104003                          ERR+GB                  ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  001304                                  LOOP    INIT1
(2)  001324  000137  001130                  JMP     @#INIT1
381
382  001330  000137  001334                  JMP     @#TEST1
383
384                                  ;
385                                  ;LOAD-READ TEST OF COMMAND REGISTER
386                                  ;
386  001334  012702  001520          TEST1:  MOV     #T1LST,R2
387  001340  012267  017146          T1A:    MOV     (R2)+,HOLD
388  001344  016777  017142  017166  T1B:    MOV     HOLD,@TCR       ;LOAD CMD REGISTER
389  001352                                  CKTCR   HOLD,T1B        ;TEST CMD REG FOR CORRECT VALUE
(1)          001352                          LP=.
(1)  001352  016767  017134  017130          MOV     HOLD,GOOD
(1)  001360  017767  017154  017112          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  001366  026767  017116  017104          CMP     GOOD,BAD
(1)  001374  001401                          BEQ     .+4
(1)  001376  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  001400                                  LOOP    T1B
(2)  001420  000137  001344                  JMP     @#T1B
390  001424  020227  001552                  CMP     R2,#T1END+2
391  001430  001343                          BNE     T1A
392                                  ;NOW SEE IF RESET CLEARS ALL BITS THAT CAN BE SET IN THE COMMAND REGISTER
393  001432  012777  074136  017100  T1C:    MOV     #74136,@TCR     ;LOAD COMMAND REG WITH ALL BITS
394  001440  000005                          RESET
395  001442                                  CKTCR   #0,T1C          ;TEST CMD REG FOR 0
(1)          001442                          LP=.
(1)  001442  012767  000000  017040          MOV     #0,GOOD
(1)  001450  017767  017064  017022          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  001456  026767  017026  017014          CMP     GOOD,BAD
(1)  001464  001401                          BEQ     .+4
(1)  001466  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  001470                                  LOOP    T1C
(2)  001510  000137  001432                  JMP     @#T1C
396
397  001514  000137  001552                  JMP     @#TEST2
398
399  001520  000000                  T1LST:  0
400  001522  040000                          40000
401  001524  020000                          20000
402  001526  010000                          10000
403  001530  004000                          4000
404  001532  000100                          100
405  001534  000020                          20
406  001536  000010                          10
407  001540  000004                          4
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 408  001542  000002                          2
 409  001544  000000                          0
 410  001546  074136                          74136
 411  001550  000000                  T1END:  0
 412                                  ;
 413                                  ;TEST THAT DONE BIT IS ONLY BIT SET IN 3 REGISTERS
 414                                  ;
 415  001552  104400                  TEST2:  TYPE
 416  001554  015412                          T2MSG1                  ;'PUT 8035-8045  ON-LINE AND PRESS START ON THE 8035''
 417  001556  004767  010224                  JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
 418                                  ;DONE SHOULD BE THE ONLY BIT SET IN 3 REGISTERS
 419  001562                                  CKTCR   #200,LP         ;TEST CMD REG FOR DONE FLAG
 (1)          001562                         LP=.
 (1)  001562  012767  000200  016720         MOV     #200,GOOD
 (1)  001570  017767  016744  016702         MOV     @TCR,BAD        ;READ CMD REGISTER
 (1)  001576  026767  016706  016674         CMP     GOOD,BAD
 (1)  001604  001401                         BEQ     .+4
 (1)  001606  104003                         ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
 (1)  001610                                 LOOP    LP
 (2)  001630  000137  001562                 JMP     @#LP
 420  001634                                 CKTSR   #0,LP           ;TEST STATUS REG FOR 0
 (1)          001634                         LP=.
 (1)  001634  012767  000000  016646         MOV     #0,GOOD
 (1)  001642  017767  016676  016630         MOV     @TSR,BAD        ;READ STATUS REGISTER
 (1)  001650  026767  016634  016622         CMP     GOOD,BAD
 (1)  001656  001401                         BEQ     .+4
 (1)  001660  104003                         ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
 (1)  001662                                 LOOP    LP
 (2)  001702  000137  001634                 JMP     @#LP
 421  001706                                 CKTIR   #0,LP           ;TEST INTERRUPT REG FOR 0
 (1)          001706                         LP=.
 (1)  001706  012767  000000  016574         MOV     #0,GOOD
 (1)  001714  017767  016634  016556         MOV     @TIR,BAD        ;READ INTERRUPT REGISTER
 (1)  001722  026767  016562  016550         CMP     GOOD,BAD
 (1)  001730  001401                         BEQ     .+4
 (1)  001732  104003                         ERR+GB                  ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
 (1)  001734                                 LOOP    LP
 (2)  001754  000137  001706                 JMP     @#LP
 422
 423  001760  000137  001764                 JMP     @#TEST3
 424                                  ;
 425                                  ;TEST THAT DONE BIT CAUSES INTERRUPT TO CORRECT ADDRESS AND BR LEVEL
 426                                  ;
 427  001764  012767  000340  176004  TEST3:  MOV     #340,PS
 428  001772  012767  000007  016520          MOV     #7,LEVEL
 429  002000  012777  002072  016552          MOV     #T3INT,@PCV     ;SETUP PC VECTOR
 430  002006  012777  000340  016546          MOV     #340,@PSV       ;SETUP PS VECTOR
 431                                  ;SHOULD GET AN INTERRUPT WHEN BPU IS SET TO ONE LEVEL BELOW BR LEVEL FOR DEVICE
 432  002014  012777  000100  016516          MOV     #100,@TCR       ;ENABLE INTERRUPT IN CMD REG
 433  002022  162767  000040  175746  T3A:    SUB     #40,PS          ;DROP BPU LEVEL BY 1
 434  002030  000240                          NOP
 435  002032  000240                          NOP
 436  002034  005367  016460                  DEC     LEVEL           ;IF LEVEL IS 0 OR HIGHER
 437  002040  100370                          BPL     T3A             ;GO WAIT FOR INT
 438  002042  104000                          ERR                     ;GOT NO INTERRUPT WITH BPU AT LEVEL 0
 439  002044                                  LOOP    TEST3
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(1)  002064  000137  001764                    JMP     @#TEST3
440  002070  000427                            BR      T3B
441                                    ;GOT INTERRUPT, NOW TEST TO SEE THAT IT OCCURRED AT CORRECT LEVEL
442  002072  062706  000004              T3INT:  ADD     #4,SP           ;HOUSE KEEPING OF STACK
443  002076  016767  016462  016404              MOV     BRLV,GOOD       ;GOOD=BR LEVEL OF DEVICE
444  002104  016767  016410  016366              MOV     LEVEL,BAD       ;BAD=LEVEL AT WHICH INTERRUPT OCCURRED
445  002112  026767  016372  016360              CMP     GOOD,BAD
446  002120  001401                              BEQ     .+4
447  002122  104003                              ERR+GB                  ;INTERRUPT OCCURRED AT WRONG LEVEL
448  002124                                      LOOP    TEST3
(1)  002144  000137  001764                      JMP     @#TEST3
449  002150  000005                      T3B:    RESET                   ;CLEAR OUT CMD REG WITH RESET
450  002152                                      CKTCR   #200,T3B                ;TEST CMD REG FOR DONE
(1)          002152                              LP=.
(1)  002152  012767  000200  016330              MOV     #200,GOOD
(1)  002160  017767  016354  016312              MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  002166  026767  016316  016304              CMP     GOOD,BAD
(1)  002174  001401                              BEQ     .+4
(1)  002176  104003                              ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  002200                                      LOOP    T3B
(2)  002220  000137  002150                      JMP     @#T3B
451
452  002224  000137  002230                    JMP     @#TEST4
453                                    ;
454                                    ;TEST THAT HOPPER EMPTY CAN BE DETECTED WHEN HOPPERS ARE SELECTED, THAT
455                                    ;HOPPER EMPTY BEING SET CAUSES INPUT ERROR TO SET AND THIS IN TURN CAUSES
456                                    ;ERROR BIT TO SET IN THE CMD REG. TEST THAT ERROR BIT CAUSES AN INTERRUPT.
457                                    ;
458                                    ;TEST FOR PRIMARY HOPPER EMPTY
459  002230  112777  000040  016304    TEST4:  MOVB    #40,@TCRHI      ;SELECT PRIMARY HOPPER
460  002236                                      CKTSR   #220,TEST4      ;TEST FOR IE + HE
(1)          002236                              LP=.
(1)  002236  012767  000220  016244              MOV     #220,GOOD
(1)  002244  017767  016274  016226              MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  002252  026767  016232  016220              CMP     GOOD,BAD
(1)  002260  001401                              BEQ     .+4
(1)  002262  104003                              ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  002264                                      LOOP    TEST4
(2)  002304  000137  002230                      JMP     @#TEST4
461  002310                                      CKTCR   #120200,TEST4   ;TEST FOR ERR + HSO + DONE
(1)          002310                              LP=.
(1)  002310  012767  120200  016172              MOV     #120200,GOOD
(1)  002316  017767  016216  016154              MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  002324  026767  016160  016146              CMP     GOOD,BAD
(1)  002332  001401                              BEQ     .+4
(1)  002334  104003                              ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  002336                                      LOOP    TEST4
(2)  002356  000137  002230                      JMP     @#TEST4
462                                    ;TEST THAT RESET WILL CLEAR OUT CMD REG
463  002362  000005                      T4A:    RESET                   ;CLEAR OUT CMD REG WITH RESET
464  002364                                      CKTCR   #200,T4A                ;TEST CMD REG FOR DONE
(1)          002364                              LP=.
(1)  002364  012767  000200  016116              MOV     #200,GOOD
(1)  002372  017767  016142  016100              MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  002400  026767  016104  016072              CMP     GOOD,BAD
(1)  002406  001401                              BEQ     .+4
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(1) 002410 104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 002412                                 LOOP    T4A
(2) 002432 000137 002362                   JMP     @#T4A
465                                ;TEST FOR SECONDARY HOPPER EMPTY
466 002436 112777 000100 016076    T4B:    MOVB    #100,@TCRHI     ;SELECT SECONDARY HOPPER
467 002444                                 CKTSR   #220,T4B        ;TEST FOR IE + HE
(1)        002444                          LP=.
(1) 002444 012767 000220 016036            MOV     #220,GOOD
(1) 002452 017767 016066 016020            MOV     @TSR,BAD        ;READ STATUS REGISTER
(1) 002460 026767 016024 016012            CMP     GOOD,BAD
(1) 002466 001401                          BEQ     .+4
(1) 002470 104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 002472                                 LOOP    T4B
(2) 002512 000137 002436                   JMP     @#T4B
468 002516                                 CKTCR   #140200,T4B     ;TEST FOR ERR + HS1 + DONE
(1)        002516                          LP=.
(1) 002516 012767 140200 015764            MOV     #140200,GOOD
(1) 002524 017767 016010 015746            MOV     @TCR,BAD        ;READ CMD REGISTER
(1) 002532 026767 015752 015740            CMP     GOOD,BAD
(1) 002540 001401                          BEQ     .+4
(1) 002542 104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 002544                                 LOOP    T4B
(2) 002564 000137 002436                   JMP     @#T4B
469                                ;TEST THAT ERROR BIT IN CMD REG CAUSES AN INT
470 002570 112777 000100 015742            MOVB    #100,@TCR       ;ENABLE INT
471 002576 012777 002662 015754            MOV     #T4INT,@PCV     ;SETUP PC VECTOR
472 002604 012777 000340 015750            MOV     #340,@PSV       ;SETUP PS VECTOR
473 002612 012767 000040 175156    T4C:    MOV     #40,PS          ;SET BPU TO LEVEL #1
474 002620 000240                          NOP
475 002622 000240                          NOP
476 002624 012767 000340 175144            MOV     #340,PS         ;SET BPU TO LEVEL #7
477 002632 104000                          ERR                     ;WITH ERROR BIT SET IN CMD REG INT DIDN'T OCCUR
478 002634                                 LOOP    T4C
(1) 002654 000137 002612                   JMP     @#T4C
479 002660 000402                          BR      T4D
480 002662 062706 000004           T4INT:  ADD     #4,SP           ;HOUSE KEEPING ON STACK
481 002666                         T4D:    CKTCR   #140300,T4D     ;TEST FOR ERR + HS1 + IE + DONE
(1)        002666                          LP=.
(1) 002666 012767 140300 015614            MOV     #140300,GOOD
(1) 002674 017767 015640 015576            MOV     @TCR,BAD        ;READ CMD REGISTER
(1) 002702 026767 015602 015570            CMP     GOOD,BAD
(1) 002710 001401                          BEQ     .+4
(1) 002712 104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 002714                                 LOOP    T4D
(2) 002734 000137 002666                   JMP     @#T4D
482                                ;TEST THAT WRITING A 1 TO ERROR BIT WILL CLEAR IT
483 002740 012777 000400 015572    T4E:    MOV     #400,@TCR       ;CLEAR ERROR BIT BY WRITING A 1 TO IT
484 002746                                 CKTCR   #200,T4E                ;TEST CMD REG FOR DONE
(1)        002746                          LP=.
(1) 002746 012767 000200 015534            MOV     #200,GOOD
(1) 002754 017767 015560 015516            MOV     @TCR,BAD        ;READ CMD REGISTER
(1) 002762 026767 015522 015510            CMP     GOOD,BAD
(1) 002770 001401                          BEQ     .+4
(1) 002772 104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 002774                                 LOOP    T4E
(2) 003014 000137 002740                   JMP     @#T4E
```

```
485  003020                                          CKTSR   #0,T4E          ;TEST STATUS REG FOR 0
(1)            003020                               LP=.
(1)  003020    012767  000000  015462               MOV     #0,GOOD
(1)  003026    017767  015512  015444               MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  003034    026767  015450  015436               CMP     GOOD,BAD
(1)  003042    001401                               BEQ     .+4
(1)  003044    104003                               ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  003046                                         LOOP    T4E
(2)  003066    000137  002740                       JMP     @#T4E
486
487  003072    000137  003076                       JMP     @#TEST5
488                                         ;
489                                         ;TEST FOR PROPER STACKER FULL DETECTION FROM BOTH STACKERS INDIVIDUALLY
490                                         ; AND THEN IN STACKER OVERFLOW MODE
491                                         ;
492                                         ;TEST FOR STACKER #1 FULL
493  003076    104400                       TEST5:  TYPE
494  003100    015504                               T5M1                    ;'PUT 8035-8045  OFF-LINE
495  003102    004767  006700                       JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
496  003106    000005                               RESET
497  003110    112777  000010  015424               MOVB    #10,@TCRHI      ;SELECT STACKER #1
498  003116    104400                               TYPE
499  003120    015412                               T2MSG1                  ;'PUT 8035-8045  ON-LINE AND PRESS START ON 8035''
500  003122    004767  006660                       JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
501  003126    104400                               TYPE
502  003130    015576                               T5MSG1                  ;'PULL CARD PLATE OF STACKER #1 BACK TO POSITION WHICH
503  003132    104400                               TYPE
504  003134    015665                               T5MSG2                  ;WILL SIMULATE STACKER FULL AND RELEASE''
505  003136    104400                               TYPE
506  003140    015735                               T5MSG3                  ;'PROGRAM WILL WAIT FOR STACKER FULL FLAG''
507  003142    132777  000020  015376  T5A:  BITB    #20,@TSRHI
508  003150    001774                               BEQ     T5A             ;WAIT FOR STACKER FULL FLAG
509  003152                                         CKTSR   #110000,T5A     ;TEST FOR OE + SF
(1)            003152                               LP=.
(1)  003152    012767  110000  015330               MOV     #110000,GOOD
(1)  003160    017767  015360  015312               MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  003166    026767  015316  015304               CMP     GOOD,BAD
(1)  003174    001401                               BEQ     .+4
(1)  003176    104003                               ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  003200                                         LOOP    T5A
(2)  003220    000137  003142                       JMP     @#T5A
510  003224                                         CKTCR   #104000,LP      ;TEST FOR ERR + SSO
(1)            003224                               LP=.
(1)  003224    012767  104000  015256               MOV     #104000,GOOD
(1)  003232    017767  015302  015240               MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  003240    026767  015244  015232               CMP     GOOD,BAD
(1)  003246    001401                               BEQ     .+4
(1)  003250    104003                               ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  003252                                         LOOP    LP
(2)  003272    000137  003224                       JMP     @#LP
511  003276    104400                               TYPE
512  003300    016715                               P2MSG3          ;'PRESS STOP-RESET AND PRESS START ON THE 8035-8045 ''
513  003302    132777  000020  015236  T5B:  BITB    #20,@TSRHI
514  003310    001374                               BNE     T5B             ;WAIT FOR STACKER FULL TO GO AWAY
515  003312                                         CKTSR   #0,T5B          ;TEST STATUS REG FOR 0
(1)            003312                               LP=.
```

```
(1)  003312  012767  000000  015170          MOV     #0,GOOD
(1)  003320  017767  015220  015152          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  003326  026767  015156  015144          CMP     GOOD,BAD
(1)  003334  001401                          BEQ     .+4
(1)  003336  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  003340                                  LOOP    T5B
(2)  003360  000137  003302                  JMP     @#T5B
516  003364                                  CKTCR   #104000,LP      ;TEST FOR ERR + SSO
(1)          003364                          LP=.
(1)  003364  012767  104000  015116          MOV     #104000,GOOD
(1)  003372  017767  015142  015100          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  003400  026767  015104  015072          CMP     GOOD,BAD
(1)  003406  001401                          BEQ     .+4
(1)  003410  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  003412                                  LOOP    LP
(2)  003432  000137  003364                  JMP     @#LP
517                             ;TEST FOR STACKER #2 FULL
518  003436  132777  000031  015076          MOVB    #31,@TCRHI      ;SELECT STACKER #2 + CLEAR ERR
519  003444  104400                          TYPE
520  003446  016046                          T5MSG5                  ;'PULL CARD PLATE OF STACKER #2 BACK TO POSITION WHICH
521  003450  104400                          TYPE
522  003452  015665                          T5MSG2                  ;WILL SIMULATE STACKER FULL AND HOLD IT THERE''
523  003454  104400                          TYPE
524  003456  015735                          T5MSG3                  ;'PROGRAM WILL WAIT FOR STACKER FULL FLAG''
525  003460  132777  000020  015060  T5C:    BITB    #20,@TSRHI
526  003466  001774                          BEQ     T5C             ;WAIT FOR STACKER FULL FLAG
527  003470                                  CKTSR   #110000,T5C     ;TEST FOR OE + SF
(1)          003470                          LP=.
(1)  003470  012767  110000  015012          MOV     #110000,GOOD
(1)  003476  017767  015042  014774          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  003504  026767  015000  014766          CMP     GOOD,BAD
(1)  003512  001401                          BEQ     .+4
(1)  003514  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  003516                                  LOOP    T5C
(2)  003536  000137  003460                  JMP     @#T5C
528  003542  104400                          TYPE
529  003544  016715                          P2MSG3                  ;'PRESS STOP-RESET AND PRESS ON THE 8035-8045 ''
530  003546  132777  000020  014772  T5D:    BITB    #20,@TSRHI
531  003554  001374                          BNE     T5D             ;WAIT FOR STACKER FULL TO GO AWAY
532  003556                                  CKTSR   #0,T5D          ;TEST STATUS REG FOR 0
(1)          003556                          LP=.
(1)  003556  012767  000000  014724          MOV     #0,GOOD
(1)  003564  017767  014754  014706          MOV     @TSR,BAD        ;READ STAT   REGISTER
(1)  003572  026767  014712  014700          CMP     GOOD,BAD
(1)  003600  001401                          BEQ     .+4
(1)  003602  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  003604                                  LOOP    T5D
(2)  003624  000137  003546                  JMP     @#T5D
533                             ;TEST FOR STACKER FULL IN STACKER OVERFLOW MODE
534  003630  104400                          TYPE
535  003632  015536                          T5M2                    ;'PRESS START ON THE 8035-8045 ''
536  003634  004767  006146                  JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE
537  003640  000005                          RESET                   ;CLEAR OUT CMD REG
538  003642  012777  000001  014670          MOV     #1,@TCR         ;SET STACKER OVERFLOW MODE + GO
539  003650  104400                          TYPE
540  003652  015576                          T5MSG1                  ;'PULL CARD PLATE OF STACKER #1 BACK TO POSITION WHICH
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                                                TYPE
                                                T5MSG2                  ;WILL SIMULATE STACKER FULL AND RELEASE''
003660  132777  000020  014660  T5E:          BITB    #20,@TSRHI
003666  001401                                BEQ     .+4
003670  104000                                ERR                     ;STACKER FULL FLAG SET WITH ONLY STACKER #1
                                                                        ;FULL WHEN IN OVERFLOW MODE
003672                                        LOOP    T5E
(1) 003712  000137  003660                    JMP     @#T5E
003716  004767  006064                        JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
003722  104400                                TYPE
003724  016046                                T5MSG5                  ;'PULL CARD PLATE OF STACKER #2 BACK TO POSITION WHICH
003726  104400                                TYPE
003730  015665                                T5MSG2                  ;WILL SIMULATE STACKER FULL AND RELEASE''
003732  104400                                TYPE
003734  015735                                T5MSG3                  ;'PROGRAM WILL WAIT FOR STACKER FULL FLAG''
003736  132777  000020  014602  T5F:          BITB    #20,@TSRHI
003744  001774                                BEQ     T5F             ;WAIT FOR STACKER FULL FLAG
003746                                        CKTSR   #110000,T5F     ;TEST FOR OE + SF
(1)             003745                        LP=.
(1) 003746  012767  110000  014534            MOV     #110000,GOOD
(1) 003754  017767  014564  014516            MOV     @TSR,BAD        ;READ STATUS REGISTER
(1) 003762  026767  014522  014510            CMP     GOOD,BAD
(1) 003770  001401                            BEQ     .+4
(1) 003772  104003                            ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 003774                                    LOOP    T5F
(2) 004014  000137  003736                    JMP     @#T5F
004020                                        CKTCR   #100000,LP      ;TEST FOR ERR
(1)             004020                        LP=.
(1) 004020  012767  100000  014462            MOV     #100000,GOOD
(1) 004026  017767  014506  014444            MOV     @TCR,BAD        ;READ CMD REGISTER
(1) 004034  026767  014450  014436            CMP     GOOD,BAD
(1) 004042  001401                            BEQ     .+4
(1) 004044  104003                            ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 004046                                    LOOP    LP
(2) 004066  000137  004020                    JMP     @#LP
004072  000005                                RESET

004074  000137  004100                        JMP     @#TEST6

                                        ;
                                        ;FORCE INPUT CHECK ERROR BY TRYING TO FEED A CARD FROM AN EMPTY HOPPER
                                        ;
004100  000005                          TEST6: RESET
004102  104400                                TYPE
004104  016715                                P2MSG3                  ;'PRESS  STOP-RESET AND PRESS ON THE 8035-8045 ''
004106  004767  005674                        JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
004112  012777  020001  014420                MOV     #20001,@TCR     ;ISSUE GO COMMAND TO PRIMARY HOPPER
004120  005067  014360                        CLR     CNT
004124  162767  000001  014352                SUB     #1,CNT
004132  001374                                BNE     .-6
004134  162767  000001  014342                SUB     #1,CNT
004142  001374                                BNE     .-6
004144  162767  000001  014332                SUB     #1,CNT
004152  001374                                BNE     .-6
004154  162767  000001  014322                SUB     #1,CNT
004162  001374                                BNE     .-6             ;DELAY 1 SECOND
004164                                        CKTSR   #320,LP         ;TEST FOR IE + IC + HE
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(1)             004164
(1)   004164  012767  000320  014316          LP=.
(1)   004172  017767  014346  014300          MOV     #320,GOOD
(1)   004200  026767  014304  014272          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)   004206  001401                          CMP     GOOD,BAD
(1)   004210  104003                          BEQ     .+4
(1)   004212                                  ERR+GB                  ;STATUS REC - VALUE READ NOT EQUAL TO EXPECTED VALUE
(2)   004232  000137  004164                  LOOP    LP
580   004236  000005                          JMP     @#LP
581                                           RESET
582   004240  000207                          RTS     PC              ;EXIT LOGIC TEST
583                                   ;
584                                   ;THIS TEST FEEDS 20 BLANK CARDS, 10 FROM EACH HOPPER, INTO THE STACKERS
585                                   ;       (10 INTO EACH STACKER). THE CARDS ARE TESTED FOR ALL SPACES AND
586                                   ;       TESTING IS DONE TO INSURE THAT THE INPUT DATA REQUEST CAN CAUSE
587                                   ;       AN INTERRUPT.
588                                   ;
589   004242  000005                  PASS1:  RESET
590   004244  104400                          TYPE
591   004246  016274                          CRDTST                  ;''***** CARD TESTS *****''
592   004250  104400                          TYPE
593   004252  016327                          P1MSG1                  ;'REMOVE ALL CARDS AND PUT THE 8035-8045  OFF-LINE''
594   004254  004767  005526                  JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
595   004260  004767  007420                  JSR     PC,CKSWR
596   004264  000005                          RESET
597   004266  112777  000010  014246          MOVB    #10,@TCRHI      ;SELECT STACKER #1
598   004274  104400                          TYPE
599   004276  016412                          P1MSG2                  ;'PUT 10 BLANK CARDS IN EACH INPUT HOPPER''
600   004300  104400                          TYPE
601   004302  016464                          P1MSG3                  ;'PUT 8035-8045  ON-LINE AND PRESS
602                                                                   ; START ON THE 8035-8045 ''
603   004304  004767  005476                  JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
604                                   ;DONE + SSO SHOULD BE THE ONLY BITS SET IN THE CMD REG
605   004310                                  CKTCR   #4200,LP        ;TEST FOR SSO + DONE FLAG
(1)             004310                        LP=.
(1)   004310  012767  004200  014172          MOV     #4200,GOOD
(1)   004316  017767  014216  014154          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)   004324  026767  014160  014146          CMP     GOOD,BAD
(1)   004332  001401                          BEQ     .+4
(1)   004334  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)   004336                                  LOOP    LP
(2)   004356  000137  004310                  JMP     @#LP
606                                   ;SEE IF ISSUING GO CLEARS THE DONE FLAG (READ 1ST CARD)
607   004362  012777  024001  014150          MOV     #24001,@TCR     ;ISSUE HSO + SSO + GO
608   004370                                  CKTCR   #24000,LP       ;TEST FOR HSO + SSO
(1)             004370                        LP=.
(1)   004370  012767  024000  014112          MOV     #24000,GOOD
(1)   004376  017767  014136  014074          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)   004404  026767  014100  014066          CMP     GOOD,BAD
(1)   004412  001401                          BEQ     .+4
(1)   004414  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)   004416                                  LOOP    LP
(2)   004436  000137  004370                  JMP     @#LP
609   004442  005067  014036                  CLR     CNT
610   004446  162767  000001  014030          SUB     #1,CNT
611   004454  001374                          BNE     .-6
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   612  004456  162767  000001  014020          SUB     #1,CNT
   613  004464  001374                          BNE     .-6             ;DELAY 1 SECOND
   614  004466                                  CKTSR   #4011,LP        ;TEST FOR CIW + RDR
   (1)          004466                          LP=.
   (1)  004466  012767  004011  014014          MOV     #4011,GOOD
   (1)  004474  017767  014044  013776          MOV     @TSR,BAD        ;READ STATUS REGISTER
   (1)  004502  026767  014002  013770          CMP     GOOD,BAD
   (1)  004510  001401                          BEQ     .+4
   (1)  004512  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  004514                                  LOOP    LP
   (2)  004534  000137  004466                  JMP     @#LP
   615  004540                                  CKTIR   #200,LP         ;TEST FOR IDR
   (1)          004540                          LP=.
   (1)  004540  012767  000200  013742          MOV     #200,GOOD
   (1)  004546  017767  014002  013724          MOV     @TIR,BAD        ;READ INTERRUPT REGISTER
   (1)  004554  026767  013730  013716          CMP     GOOD,BAD
   (1)  004562  001401                          BEQ     .+4
   (1)  004564  104003                          ERR+GB                  ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  004566                                  LOOP    LP
   (2)  004606  000137  004540                  JMP     @#LP
   616                          ;SEE IF INPUT DATA REQUEST WILL CAUSE AN INTERRUPT
   617  004612  052777  001100  013720          BIS     #1100,@TCR      ;ENABLE INT
   618  004620  012777  004704  013732          MOV     #P1INT,@PCV     ;SETUP PC VECTOR
   619  004626  012777  000340  013726          MOV     #340,@PSV       ;SETUP PS VECTOR
   620  004634  012767  000040  173134  P1A:    MOV     #40,PS          ;SET BPU TO LEVEL #1
   621  004642  000240                          NOP
   622  004644  000240                          NOP
   623  004646  012767  000340  173122          MOV     #340,PS         ;SET BPU TO LEVEL #7
   624  004654  104000                          ERR                     ;INPUT DATA REQUEST DIDN'T CAUSE AN INTERRUPT
   625  004656                                  LOOP    P1A
   (1)  004676  000137  004634                  JMP     @#P1A
   626  004702  000402                          BR      P1B
   627  004704  062706  000004          P1INT:  ADD     #4,SP           ;HOUSE KEEPING ON STACK
   628  004710  004767  005122          P1B:    JSR     PC,BLKCRD       ;TEST FOR BLANK CARD
   629  004714                                  CKTSR   #4010,LP        ;TEST FOR CIW
   (1)          004714                          LP=.
   (1)  004714  012767  004010  013566          MOV     #4010,GOOD
   (1)  004722  017767  013616  013550          MOV     @TSR,BAD        ;READ STATUS REGISTER
   (1)  004730  026767  013554  013542          CMP     GOOD,BAD
   (1)  004736  001401                          BEQ     .+4
   (1)  004740  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  004742                                  LOOP    LP
   (2)  004762  000137  004714                  JMP     @#LP
   630  004766                                  CKTCR   #25300,LP       ;TEST FOR HSO + SSO + DONE + INT EN
   (1)          004766                          LP=.
   (1)  004766  012767  025300  013514          MOV     #25300,GOOD
   (1)  004774  017767  013540  013476          MOV     @TCR,BAD        ;READ CMD REGISTER
   (1)  005002  026767  013502  013470          CMP     GOOD,BAD
   (1)  005010  001401                          BEQ     .+4
   (1)  005012  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  005014                                  LOOP    LP
   (2)  005034  000137  004766                  JMP     @#LP
   631                          ;READ CARDS #2-9 FROM PRIMARY HOPPER
   632  005040  012767  000010  013440          MOV     #10,CNT1
   633  005046  012777  025001  013464  P1D:    MOV     #25001,@TCR     ;ISSUE HSO + SSO + GO
   634  005054                                  WTIDR
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(1)  005054  032777  000200  013472          BIT     #200,@TIR
(1)  005062  001774                           BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
635  005064                                   CKTSR   #4011,LP        ;TEST FOR CIW + RDR
(1)          005064                          LP=.
(1)  005064  012767  004011  013416          MOV     #4011,GOOD
(1)  005072  017767  013446  013400          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  005100  026767  013404  013372          CMP     GOOD,BAD
(1)  005106  001401                          BEQ     .+4
(1)  005110  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  005112                                  LOOP    LP
(2)  005132  000137  005064                  JMP     @#LP
636  005136  004767  004674                  JSR     PC,BLKCRD       ;TEST FOR BLANK CARD
637  005142                                   CKTCR   #25200,LP       ;TEST FOR HS0 + SS0 + DONE
(1)          005142                          LP=.
(1)  005142  012767  025200  013340          MOV     #25200,GOOD
(1)  005150  017767  013364  013322          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  005156  026767  013326  013314          CMP     GOOD,BAD
(1)  005164  001401                          BEQ     .+4
(1)  005166  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  005170                                  LOOP    LP
(2)  005210  000137  005142                  JMP     @#LP
638  005214  005367  013266                  DEC     CNT1
639  005220  001312                          BNE     P1D
640                              ;READ CARD #10 OUT OF PRIMARY HOPPER
641  005222  012777  025001  013310          MOV     #25001,@TCR     ;ISSUE HS0 + SS0 + GO
642  005230                                   WTIDR
(1)  005230  032777  000200  013316          BIT     #200,@TIR
(1)  005236  001774                          BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
643  005240  004767  004572                  JSR     PC,BLKCRD       ;TEST FOR BLANK CARD
644  005244                                   CKTSR   #4230,LP        ;TEST FOR CIW + IE + HE
(1)          005244                          LP=.
(1)  005244  012767  004230  013236          MOV     #4230,GOOD
(1)  005252  017767  013266  013220          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  005260  026767  013224  013212          CMP     GOOD,BAD
(1)  005266  001401                          BEQ     .+4
(1)  005270  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  005272                                  LOOP    LP
(2)  005312  000137  005244                  JMP     @#LP
645  005316                                   CKTCR   #125200,LP      ;TEST FOR ERR + HS0 + SS0 + DONE
(1)          005316                          LP=.
(1)  005316  012767  125200  013164          MOV     #125200,GOOD
(1)  005324  017767  013210  013146          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  005332  026767  013152  013140          CMP     GOOD,BAD
(1)  005340  001401                          BEQ     .+4
(1)  005342  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  005344                                  LOOP    LP
(2)  005364  000137  005316                  JMP     @#LP
646                              ;READ CARD #11 OUT OF SECONDARY HOPPER
647  005370  012777  045401  013142          MOV     #045401,@TCR    ;ISSUE CLEAR ERR + HS1 + SS0 + GO
648  005376                                   WTIDR
(1)  005376  032777  000200  013150          BIT     #200,@TIR
(1)  005404  001774                          BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
649  005406                                   CKTSR   #4011,LP        ;TEST FOR CIW + RDR
(1)          005406                          LP=.
(1)  005406  012767  004011  013074          MOV     #4011,GOOD
(1)  005414  017767  013124  013056          MOV     @TSR,BAD        ;READ STATUS REGISTER
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   (1)  005422  026767  013062  013050          CMP     GOOD,BAD
   (1)  005430  001401                          BEQ     .+4
   (1)  005432  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  005434                                  LOOP    LP
   (2)  005454  000137  005406                  JMP     @#LP
   650  005460  004767  004352                  JSR     PC,BLKCRD       ;TEST FOR BLANK CARD
   651  005464                                  CKTCR   #45200,LP       ;TEST FOR HS1 + SS0 + DONE
   (1)          005464                          LP=.
   (1)  005464  012767  045200  013016          MOV     #45200,GOOD
   (1)  005472  017767  013042  013000          MOV     @TCR,BAD        ;READ CMD REGISTER
   (1)  005500  026767  013004  012772          CMP     GOOD,BAD
   (1)  005506  001401                          BEQ     .+4
   (1)  005510  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  005512                                  LOOP    LP
   (2)  005532  000137  005464                  JMP     @#LP
   652                          ;READ CARDS #12-19 AND PUT THEM IN STACKER #2
   653  005536  012767  000010  012742          MOV     #10,CNT1
   654  005544  012777  055001  012766  P1E:    MOV     #55001,@TCR     ;ISSUE HS1 + SS1 + GO
   655  005552                                  WTIDR
   (1)  005552  032777  000200  012774          BIT     #200,@TIR
   (1)  005560  001774                          BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
   656  005562  004767  004250                  JSR     PC,BLKCRD       ;TEST FOR BLANK CARD
   657  005566                                  WTDONE
   (1)  005566  032777  000200  012744          BIT     #200,@TCR
   (1)  005574  001774                          BEQ     .-6             ;WAIT FOR DONE FLAG
   658  005576                                  CKTSR   #4010,LP        ;TEST FOR CIW
   (1)          005576                          LP=.
   (1)  005576  012767  004010  012704          MOV     #4010,GOOD
   (1)  005604  017767  012734  012666          MOV     @TSR,BAD        ;READ STATUS REGISTER
   (1)  005612  026767  012672  012660          CMP     GOOD,BAD
   (1)  005620  001401                          BEQ     .+4
   (1)  005622  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  005624                                  LOOP    LP
   (2)  005644  000137  005576                  JMP     @#LP
   659  005650                                  CKTCR   #55200,LP       ;TEST FOR HS1 + SS1 + DONE
   (1)          005650                          LP=.
   (1)  005650  012767  055200  012632          MOV     #55200,GOOD
   (1)  005656  017767  012656  012614          MOV     @TCR,BAD        ;READ CMD REGISTER
   (1)  005664  026767  012620  012606          CMP     GOOD,BAD
   (1)  005672  001401                          BEQ     .+4
   (1)  005674  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  005676                                  LOOP    LP
   (2)  005716  000137  005650                  JMP     @#LP
   660  005722  005367  012560                  DEC     CNT1
   661  005726  001306                          BNE     P1E
   662                          ;READ CARD #20 OUT OF SECONDARY HOPPER
   663  005730  012777  051001  012602          MOV     #51001,@TCR     ;ISSUE HS1 + SS1 + GO
   664  005736                                  WTIDR
   (1)  005736  032777  000200  012610          BIT     #200,@TIR
   (1)  005744  001774                          BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
   665  005746  004767  004064                  JSR     PC,BLKCRD       ;TEST FOR BLANK CARD
   666  005752                                  CKTSR   #4230,LP        ;TEST FOR CIW + IE + HE
   (1)          005752                          LP=.
   (1)  005752  012767  004230  012530          MOV     #4230,GOOD
   (1)  005760  017767  012560  012512          MOV     @TSR,BAD        ;READ STATUS REGISTER
   (1)  005766  026767  012516  012504          CMP     GOOD,BAD
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(1)  005774  001401                        BEQ     .+4
(1)  005776  104003                        ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006000                                 LOOP    LP
(2)  006020  000137  005752                 JMP     @#LP
667  006024                                 CKTCR   #151200,LP      ;TEST FOR ERR + HS1 + SS1 + DONE
(1)          006024                         LP=.
(1)  006024  012767  151200  012456         MOV     #151200,GOOD
(1)  006032  017767  012502  012440         MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  006040  026767  012444  012432         CMP     GOOD,BAD
(1)  006046  001401                         BEQ     .+4
(1)  006050  104003                         ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006052                                 LOOP    LP
(2)  006072  000137  006024                 JMP     @#LP
668                             ;PUT CARD #20 IN STACKER #2
669  006076  012777  011401  012434         MOV     #11401,@TCR     ;ISSUE CLEAR ERR + SS1 + GO
670  006104                                 WTDONE
(1)  006104  032777  000200  012426         BIT     #200,@TCR
(1)  006112  001774                         BEQ     .-6             ;WAIT FOR DONE FLAG
671  006114                                 CKTSR   #0,LP           ;TEST FOR STATUS=0
(1)          006114                         LP=.
(1)  006114  012767  000000  012366         MOV     #0,GOOD
(1)  006122  017767  012416  012350         MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  006130  026767  012354  012342         CMP     GOOD,BAD
(1)  006136  001401                         BEQ     .+4
(1)  006140  104003                         ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006142                                 LOOP    LP
(2)  006162  000137  006114                 JMP     @#LP
672  006166                                 CKTCR   #11200,LP       ;TEST FOR SS1 + DONE
(1)          006166                         LP=.
(1)  006166  012767  011200  012314         MOV     #11200,GOOD
(1)  006174  017767  012340  012276         MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  006202  026767  012302  012270         CMP     GOOD,BAD
(1)  006210  001401                         BEQ     .+4
(1)  006212  104003                         ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006214                                 LOOP    LP
(2)  006234  000137  006166                 JMP     @#LP
673
674  006240  000137  006244                 JMP     @#PASS2
675                                 ;
676                                 ;THIS TEST PUNCHES THE ENTIRE CHAR SET ON EACH CARD IN A PRECESSED
677                                 ;       FASHION. THIS MEANS THE 1ST PUNCHED CHAR ON CARD #1 IS IN
678                                 ;       COLUMN #11 AND THE 1ST PUNCHED CHAR OF CARD #20 IS IN COLUMN
679                                 ;       #31. ALSO TEST THAT OUTPUT DATA REQUEST CAN CAUSE AN INTERRUPT.
680                                 ;
681  006244  104400                 PASS2:  TYPE
682  006246  016555                         P2MSG1                  ;'VERIFY THAT THERE ARE 10 BLANK CARDS IN EACH STACKER''
683  006250  104400                         TYPE
684  006252  016643                         P2MSG2                  ;'PLACE ALL 20 CARDS IN THE PRIMARY HOPPER''
685  006254  104400                         TYPE
686  006256  016715                         P2MSG3                  ;'PRESS STOP-RESET AND PRESS START ON THE 8035-8045 ''
687  006260  004767  003522                 JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
688  006264  004767  003700                 JSR     PC,CLRBFS       ;PREPARE BUFFER FOR PUNCHING
689                             ;FEED CARD #1
690  006270  012777  021401  012242         MOV     #021401,@TCR    ;ISSUE CLEAR ERR + HS0 + GO
691  006276                                 WTIDR
(1)  006276  032777  000200  012250         BIT     #200,@TIR
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(1)  006304  001774                          BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
692  006306  004767  003524                  JSR     PC,BLKCRD       ;TEST FOR BLANK CARD
693  006312                                  WTDONE
(1)  006312  032777  000200  012220          BIT     #200,@TCR
(1)  006320  001774                          BEQ     .-6             ;WAIT FOR DONE FLAG
694  006322                                  CKTSR   #4010,LP        ;TEST FOR CIW
(1)          006322                          LP=.
(1)  006322  012767  004010  012160          MOV     #4010,GOOD
(1)  006330  017767  012210  012142          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  006336  026767  012146  012134          CMP     GOOD,BAD
(1)  006344  001401                          BEQ     .+4
(1)  006346  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006350                                  LOOP    LP
(2)  006370  000137  006322                  JMP     @#LP
695  006374                                  CKTCR   #21200,LP       ;TEST FOR HSO + DONE
(1)          006374                          LP=.
(1)  006374  012767  021200  012106          MOV     #21200,GOOD
(1)  006402  017767  012132  012070          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  006410  026767  012074  012062          CMP     GOOD,BAD
(1)  006416  001401                          BEQ     .+4
(1)  006420  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006422                                  LOOP    LP
(2)  006442  000137  006374                  JMP     @#LP
696                             ;FEED CARDS #2-19, INHIBIT READ FOR THESE CARDS
697  006446  012767  017534  012054          MOV     #BF1,PTR
698  006454  012767  000022  012024          MOV     #22,CNT1        ;CNT1=18
699  006462  012777  021027  012050  P2A:    MOV     #21027,@TCR     ;ISSUE HSO + IR + PRI + PUN + GO
700  006470                                  WTODR
(1)  006470  132777  000200  012060          BITB    #200,@TIRHI
(1)  006476  001774                          BEQ     .-6             ;WAIT FOR OUTPUT DATA REQUEST
701  006500                                  CKTSR   #4410,LP        ;TEST FOR PUDR
(1)          006500                          LP=.
(1)  006500  012767  004410  012002          MOV     #4410,GOOD
(1)  006506  017767  012032  011764          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  006514  026767  011770  011756          CMP     GOOD,BAD
(1)  006522  001401                          BEQ     .+4
(1)  006524  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006526                                  LOOP    LP
(2)  006546  000137  006500                  JMP     @#LP
702  006552  004767  003452                  JSR     PC,P2SEND       ;SEND DATA TO PUNCH
703  006556  162767  000002  011744          SUB     #2,PTR
704  006564                                  WTDONE
(1)  006564  032777  000200  011746          BIT     #200,@TCR
(1)  006572  001774                          BEQ     .-6             ;WAIT FOR DONE FLAG
705  006574                                  CKTSR   #4010,LP        ;TEST FOR CIW
(1)          006574                          LP=.
(1)  006574  012767  004010  011706          MOV     #4010,GOOD
(1)  006602  017767  011736  011670          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  006610  026767  011674  011662          CMP     GOOD,BAD
(1)  006616  001401                          BEQ     .+4
(1)  006620  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006622                                  LOOP    LP
(2)  006642  000137  006574                  JMP     @#LP
706  006646                                  CKTCR   #21226,LP       ;TEST FOR HSO + DONE + IR + PRI + PUN
(1)          006646                          LP=.
(1)  006646  012767  021226  011634          MOV     #21226,GOOD
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(1)  006654  017767  011660  011616          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  006662  026767  011622  011610          CMP     GOOD,BAD
(1)  006670  001401                          BEQ     .+4
(1)  006672  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006674                                  LOOP    LP
(2)  006714  000137  006646                  JMP     @#LP
707  006720                                  CKTIR   #0,LP           ;TEST FOR 0
(1)          006720                          LP=.
(1)  006720  012767  000000  011562          MOV     #0,GOOD
(1)  006726  017767  011622  011544          MOV     @TIR,BAD        ;READ INTERRUPT REGISTER
(1)  006734  026767  011550  011536          CMP     GOOD,BAD
(1)  006742  001401                          BEQ     .+4
(1)  006744  104003                          ERR+GB                  ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  006746                                  LOOP    LP
(2)  006766  000137  006720                  JMP     @#LP
708  006772  005367  011510                  DEC     CNT1            ;IF ALL CARDS ARE NOT DONE
709  006776  001231                          BNE     P2A             ;GO PUNCH ANOTHER CARD
710                              ;FEED CARD #20
711  007000  012777  021007  011532          MOV     #21007,@TCR     ;ISSUE HSO + PRI + PUN + GO
712  007006                                  WTODR
(1)  007006  132777  000200  011542          BITB    #200,@TIRHI
(1)  007014  001774                          BEQ     .-6             ;WAIT FOR OUTPUT DATA REQUEST
713  007016  004767  003206                  JSR     PC,P2SEND       ;SEND DATA TO PUNCH
714  007022  162767  000002  011500          SUB     #2,PTR
715  007030                                  WTIDR
(1)  007030  032777  000200  011516          BIT     #200,@TIR
(1)  007036  001774                          BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
716  007040  004767  002772                  JSR     PC,BLKCRD       ;TEST FOR BLANK CARD
717  007044                                  WTDONE
(1)  007044  032777  000200  011466          BIT     #200,@TCR
(1)  007052  001774                          BEQ     .-6             ;WAIT FOR DONE FLAG
718  007054                                  CKTSR   #4230,LP        ;TEST FOR CIW + IE + HE
(1)          007054                          LP=.
(1)  007054  012767  004230  011426          MOV     #4230,GOOD
(1)  007062  017767  011456  011410          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  007070  026767  011414  011402          CMP     GOOD,BAD
(1)  007076  001401                          BEQ     .+4
(1)  007100  104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  007102                                  LOOP    LP
(2)  007122  000137  007054                  JMP     @#LP
719  007126                                  CKTCR   #121206,LP      ;TEST FOR ERR + HSO + DONE + PRI + PUN
(1)          007126                          LP=.
(1)  007126  012767  121206  011354          MOV     #121206,GOOD
(1)  007134  017767  011400  011336          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  007142  026767  011342  011330          CMP     GOOD,BAD
(1)  007150  001401                          BEQ     .+4
(1)  007152  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  007154                                  LOOP    LP
(2)  007174  000137  007126                  JMP     @#LP
720                              ;CARD #20 PUNCH AND PRINT
721  007200  012777  001407  011332          MOV     #1407,@TCR      ;ISSUE CLEAR ERR + PRI + PUN + GO
722  007206                                  WTODR
(1)  007206  132777  000200  011342          BITB    #200,@TIRHI
(1)  007214  001774                          BEQ     .-6             ;WAIT FOR OUTPUT DATA REQUEST
723  007216                                  CKTIR   #100000,LP      ;TEST FOR ODR
(1)          007216                          LP=.
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    (1)  007216  012767  100000  011264          MOV     #100000,GOOD
    (1)  007224  017767  011324  011246          MOV     @TIR,BAD        ;READ INTERRUPT REGISTER
    (1)  007232  026767  011252  011240          CMP     GOOD,BAD
    (1)  007240  001401                          BEQ     .+4
    (1)  007242  104003                          ERR+GB                  ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
    (1)  007244                                  LOOP    LP
    (2)  007264  000137  007216                  JMP     @#LP
   724   007270                                  CKTCR   #1006,LP                ;TEST FOR PRI + PUN
    (1)          007270                         LP=.
    (1)  007270  012767  001006  011212          MOV     #1006,GOOD
    (1)  007276  017767  011236  011174          MOV     @TCR,BAD        ;READ CMD REGISTER
    (1)  007304  026767  011200  011166          CMP     GOOD,BAD
    (1)  007312  001401                          BEQ     .+4
    (1)  007314  104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
    (1)  007316                                  LOOP    LP
    (2)  007336  000137  007270                  JMP     @#LP
   725
   726   007342  052777  001100  011170  ;SEE IF OUTPUT DATA REQUEST WILL CAUSE AN INTERRUPT
   727   007350  012777  007434  011202          BIS     #1100,@TCR      ;ENABLE INTERRUPT
   728   007356  012777  000340  011176          MOV     #P2INT,@PCV     ;SETUP PC VECTOR
   729   007364  012767  000040  170404          MOV     #340,@PSV       ;SETUP PS VECTOR
   730   007372  000240                          MOV     #40,PS          ;SET BPU TO LEVEL #1
   731   007374  000240                          NOP
   732   007376  012767  000340  170372          NOP
   733   007404  104000                          MOV     #340,PS         ;SET BPU TO LEVEL #7
   734   007406                         P2B:     ERR                     ;OUTPUT DATA REQUEST DIDN'T CAUSE AN INTERRUPT
    (1)  007426  000137  007404                  LOOP    P2B
   735   007432  000402                          JMP     @#P2B
   736   007434  062706  000004          P2INT:  BR      P2C
   737   007440  004767  002564          P2C:    ADD     #4,SP           ;HOUSE KEEPING ON STACK
   738   007444                                  JSR     PC,P2SEND       ;SEND DATA TO PUNCH
    (1)  007444  032777  000200  011066          WTDONE
    (1)  007452  001774                          BIT     #200,@TCR
   739   007454                                  BEQ     .-6             ;WAIT FOR DONE FLAG
    (1)          007454                         CKTSR   #0,LP           ;TEST FOR STATUS =0
    (1)  007454  012767  000000  011026          LP=.
    (1)  007462  017767  011056  011010          MOV     #0,GOOD
    (1)  007470  026767  011014  011002          MOV     @TSR,BAD        ;READ STATUS REGISTER
    (1)  007476  001401                          CMP     GOOD,BAD
    (1)  007500  104003                          BEQ     .+4
    (1)  007502                                  ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
    (2)  007522  000137  007454                  LOOP    LP
   740   007526                                  JMP     @#LP
    (1)          007526                         CKTCR   #1306,LP                ;TEST FOR DONE + INT EN + PRI + PUN
    (1)  007526  012767  001306  010754          LP=.
    (1)  007534  017767  011000  010736          MOV     #1306,GOOD
    (1)  007542  026767  010742  010730          MOV     @TCR,BAD        ;READ CMD REGISTER
    (1)  007550  001401                          CMP     GOOD,BAD
    (1)  007552  104003                          BEQ     .+4
    (1)  007554                                  ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
    (2)  007574  000137  007526                  LOOP    LP
   741                                           JMP     @#LP
   742   007600  000137  007604
   743                                   ;
   744                                   ;THIS TEST PERFORMS PUNCHING WITHOUT PRINTING. ONE ALL ONES CHAR IS
   745                                   ;       PUNCHED IN COLUMN 1 OF CARD 1 AND SO ON UNTIL 20 ALL ONES CHARS
```

```
                                        ;       ARE PUNCHED IN THE 1ST 20 COLUMNS OF CARD 20. THIS TEST
                                        ;       VERIFIES THE DATA READ FROM PUNCHING DONE IN PASS 2.
                                        ;
007604  104400                          PASS3:  TYPE
007606  017044                                  P3MSG1                  ;'VERIFY THAT ALL CHARS WERE PUNCHED ON EACH CARD IN A
007610  104400                                  TYPE
007612  017132                                  P3MSG2                  ;PRECESS FASHION BEGINNING WITH COLUMN 11 OF 1ST CARD''
007614  104400                                  TYPE
007616  016643                                  P2MSG2                  ;'PLACE ALL 20 CARDS IN THE PRIMARY HOPPER''
007620  104400                                  TYPE
007622  016715                                  P2MSG3                  ;'PRESS STOP-RESET AND PRESS START ON THE 8035-8045 ''
007624  004767  002156                        JSR     PC,CONTIN       ;'PRESS CR TO CONTINUE''
                                        ;FEED CARD #1
007630  012767  017534  010656                MOV     #BF1,INPTR
007636  012777  021401  010674                MOV     #021401,@TCR    ;ISSUE CLEAR ERR + HSO + GO
007644                                        WTIDR
(1) 007644  032777  000200  010702            BIT     #200,@TIR
(1) 007652  001774                            BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
007654  004767  002624                        JSR     PC,CKDATA       ;CHECK INPUT DATA FROM PASS 2
007660  162767  000002  010626                SUB     #2,INPTR
007666                                        WTDONE
(1) 007666  032777  000200  010644            BIT     #200,@TCR
(1) 007674  001774                            BEQ     .-6             ;WAIT FOR DONE FLAG
007676                                        CKTSR   #4010,LP        ;TEST FOR CIW
(1) 007676                                    LP=.
(1) 007676  012767  004010  010604            MOV     #4010,GOOD
(1) 007704  017767  010634  010566            MOV     @TSR,BAD        ;READ STATUS REGISTER
(1) 007712  026767  010572  010560            CMP     GOOD,BAD
(1) 007720  001401                            BEQ     .+4
(1) 007722  104003                            ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 007724                                    LOOP    LP
(2) 007744  000137  007676                    JMP     @#LP
007750                                        CKTCR   #21200,LP       ;TEST FOR HSO + DONE
(1) 007750                                    LP=.
(1) 007750  012767  021200  010532            MOV     #21200,GOOD
(1) 007756  017767  010556  010514            MOV     @TCR,BAD        ;READ CMD REGISTER
(1) 007764  026767  010520  010506            CMP     GOOD,BAD
(1) 007772  001401                            BEQ     .+4
(1) 007774  104003                            ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1) 007776                                    LOOP    LP
(2) 010016  000137  007750                    JMP     @#LP
                                        ;FEED CARDS #2-19, CHECKING INPUT DATA AND PUNCHING 1 CHAR IN 1ST CARD,
                                        ;       2 IN 2ND ETC. UP TO 20 CHARS IN CARD 20
010022  012767  000022  010456                MOV     #22,CNT1        ;CNT1=18
010030  012767  000001  010444                MOV     #1,CARD         ;CARD=1
010036  012777  021003  010474  P3A:         MOV     #21003,@TCR     ;ISSUE HSO + PUN + GO
010044                                        WTODR
(1) 010044  132777  000200  010504            BITB    #200,@TIRHI
(1) 010052  001774                            BEQ     .-6             ;WAIT FOR OUTPUT DATA REQUEST
010054  004767  002224                        JSR     PC,P3SEND       ;SEND DATA TO PUNCH
010060  062767  000001  010414                ADD     #1,CARD
010066                                        WTIDR
(1) 010066  032777  000200  010460            BIT     #200,@TIR
(1) 010074  001774                            BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
010076  004767  002402                        JSR     PC,CKDATA       ;CHECK INPUT DATA FROM PASS 2
010102  162767  000002  010404                SUB     #2,INPTR
```

```
   778  010110                                          WTDONE
   (1)  010110  032777  000200  010422                 BIT     #200,@TCR
   (1)  010116  001774                                 BEQ     .-6             ;WAIT FOR DONE FLAG
   779  010120                                          CKTCR   #21202,LP       ;TEST FOR HSO + DONE + PUN
   (1)          010120                                 LP=.
   (1)  010120  012767  021202  010362                 MOV     #21202,GOOD
   (1)  010126  017767  010406  010344                 MOV     @TCR,BAD        ;READ CMD REGISTER
   (1)  010134  026767  010350  010336                 CMP     GOOD,BAD
   (1)  010142  001401                                 BEQ     .+4
   (1)  010144  104003                                 ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  010146                                         LOOP    LP
   (2)  010166  000137  010120                         JMP     @#LP
   780  010172                                          CKTSR   #4010,LP        ;TEST FOR CIW
   (1)          010172                                 LP=.
   (1)  010172  012767  004010  010310                 MOV     #4010,GOOD
   (1)  010200  017767  010340  010272                 MOV     @TSR,BAD        ;READ STATUS REGISTER
   (1)  010206  026767  010276  010264                 CMP     GOOD,BAD
   (1)  010214  001401                                 BEQ     .+4
   (1)  010216  104003                                 ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  010220                                         LOOP    LP
   (2)  010240  000137  010172                         JMP     @#LP
   781  010244                                          CKTIR   #0,LP           ;TEST INTERRUPT REG FOR 0
   (1)          010244                                 LP=.
   (1)  010244  012767  000000  010236                 MOV     #0,GOOD
   (1)  010252  017767  010276  010220                 MOV     @TIR,BAD        ;READ INTERRUPT REGISTER
   (1)  010260  026767  010224  010212                 CMP     GOOD,BAD
   (1)  010266  001401                                 BEQ     .+4
   (1)  010270  104003                                 ERR+GB                  ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  010272                                         LOOP    LP
   (2)  010312  000137  010244                         JMP     @#LP
   782  010316  005367  010164                         DEC     CNT1
   783  010322  001245                                 BNE     P3A             ;GO PUNCH AND READ MORE CARDS
   784                                  ;FEED CARD #20
   785  010324  012777  021003  010206                 MOV     #21003,@TCR     ;ISSUE HSO + PUN + GO
   786  010332                                          WTODR
   (1)  010332  132777  000200  010216                 BITB    #200,@TIRHI
   (1)  010340  001774                                 BEQ     .-6             ;WAIT FOR OUTPUT DATA REQUEST
   787  010342  004767  001736                         JSR     PC,P3SEND       ;SEND DATA TO PUNCH
   788  010346  062767  000001  010126                 ADD     #1,CARD
   789  010354                                          WTIDR
   (1)  010354  032777  000200  010172                 BIT     #200,@TIR
   (1)  010362  001774                                 BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
   790  010364  004767  002114                         JSR     PC,CKDATA       ;CHECK INPUT DATA FROM PASS 2
   791  010370                                          WTDONE
   (1)  010370  032777  000200  010142                 BIT     #200,@TCR
   (1)  010376  001774                                 BEQ     .-6             ;WAIT FOR DONE FLAG
   792  010400                                          CKTSR   #4230,LP        ;TEST FOR CIW + IE + HE
   (1)          010400                                 LP=.
   (1)  010400  012767  004230  010102                 MOV     #4230,GOOD
   (1)  010406  017767  010132  010064                 MOV     @TSR,BAD        ;READ STATUS REGISTER
   (1)  010414  026767  010070  010056                 CMP     GOOD,BAD
   (1)  010422  001401                                 BEQ     .+4
   (1)  010424  104003                                 ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1)  010426                                         LOOP    LP
   (2)  010446  000137  010400                         JMP     @#LP
   793  010452                                          CKTCR   #121202,LP      ;TEST FOR ERR + HSO + DONE + PUN
```

```
(1)             010452
(1)  010452  012767  121202  010030          LP=.
(1)  010460  017767  010054  010012          MOV     #121202,GOOD
(1)  010466  026767  010016  010004          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  010474  001401                          CMP     GOOD,BAD
(1)  010476  104003                          BEQ     .+4
(1)  010500                                  ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(2)  010520  000137  010452                  LOOP    LP
794                                          JMP     @#LP
795  010524  012777  001003  010006  ;PUNCH CARD #20
796  010532                          MOV     #1003,@TCR              ;ISSUE PUN + GO
(1)  010532  132777  000200  010016          WTODR
(1)  010540  001774                          BITB    #200,@TIRHI
797  010542  004767  001536                  BEQ     .-6             ;WAIT FOR OUTPUT DATA REQUEST
798  010546                          JSR     PC,P3SEND       ;SEND DATA TO PUNCH
(1)  010546  032777  000200  007764          WTDONE
(1)  010554  001774                          BIT     #200,@TCR
799  010556                          BEQ     .-6             ;WAIT FOR DONE FLAG
(1)             010556                       CKTSR   #0,LP           ;TEST FOR STATUS=0
(1)  010556  012767  000000  007724          LP=.
(1)  010564  017767  007754  007706          MOV     #0,GOOD
(1)  010572  026767  007712  007700          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)  010600  001401                          CMP     GOOD,BAD
(1)  010602  104003                          BEQ     .+4
(1)  010604                                  ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(2)  010624  000137  010556                  LOOP    LP
800  010630                                  JMP     @#LP
(1)             010630                       CKTCR   #001202,LP      ;TEST FOR ERR + DONE
(1)  010630  012767  001202  007652          LP=.
(1)  010636  017767  007676  007634          MOV     #001202,GOOD
(1)  010644  026767  007640  007626          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)  010652  001401                          CMP     GOOD,BAD
(1)  010654  104003                          BEQ     .+4
(1)  010656                                  ERR+GB                  ;CMD REC - VALUE READ NOT EQUAL TO EXPECTED VALUE
(2)  010676  000137  010630                  LOOP    LP
801  010702  000137  010706                  JMP     @#LP
802                                          JMP     @#PASS4
803                                  ;
804                                  ;THIS TEST PERFORMS A SEPARATE PRINT OPERATION ON ALL CARDS BY
805                                  ;       PRINTING ''CARD 01'' IN COLUMNS 1-7 OF CARD 1 UP TO ''CARD 20'' IN
806                                  ;       COLUMNS 1-7 OF CARD 20. VERIFY CORRECT DATA READ FROM PUNCHING
807                                  ;       DONE IN PASSES 2 + 3
808  010706  104400                  ;
809  010710  017220          PASS4:  TYPE
810  010712  104400                  P4MSG1                  ;''VERIFY THAT THERE IS 1 ALL ONES CHAR PUNCHED IN CARD 1
811  010714  017373                  TYPE
812  010716  104400                  P4MSG2                  ;UP TO 20 ALL ONES CHARS PUNCHED IN CARD 20''
813  010720  016643                  TYPE
814  010722  104400                  P2MSG2                  ;''PLACE ALL 20 CARDS IN THE PRIMARY HOPPER''
815  010724  016715                  TYPE
816  010726  004767  001054          P2MSG3                  ;''PRESS STOP-RESET AND PRESS START ON THE 8035-8045 ''
817  010732  004767  001252          JSR     PC,CONTIN       ;''PRESS CR TO CONTINUE''
818                                   JSR     PC,SETBFS       ;PREPARE BUFFER FOR DATA COMPARE
819  010736  012767  017534  007550  ;FEED CARD #1
820  010744  012777  021401  007566          MOV     #BF1,INPTR
821  010752                          MOV     #21401,@TCR     ;ISSUE CLEAR ERR + HSO + GO
                                     WTIDR
```

```
   (1) 010752 032777 000200 007574          BIT     #200,@TIR
   (1) 010760 001774                        BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
   822 010762 004767 001516                 JSR     PC,CKDATA       ;CHECK INPUT DATA FROM PASSES 2 + 3
   823 010766 162767 000002 007520          SUB     #2,INPTR
   824 010774                               WTDONE
   (1) 010774 032777 000200 007536          BIT     #200,@TCR
   (1) 011002 001774                        BEQ     .-6             ;WAIT FOR DONE FLAG
   825 011004                               CKTSR   #4010,LP        ;TEST FOR CIW
   (1)        011004                        LP=.
   (1) 011004 012767 004010 007476          MOV     #4010,GOOD
   (1) 011012 017767 007526 007460          MOV     @TSR,BAD        ;READ STATUS REGISTER
   (1) 011020 026767 007464 007452          CMP     GOOD,BAD
   (1) 011026 001401                        BEQ     .+4
   (1) 011030 104003                        ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1) 011032                               LOOP    LP
   (2) 011052 000137 011004                 JMP     @#LP
   826 011056                               CKTCR   #21200,LP       ;TEST FOR HSO + DONE
   (1)        011056                        LP=.
   (1) 011056 012767 021200 007424          MOV     #21200,GOOD
   (1) 011064 017767 007450 007406          MOV     @TCR,BAD        ;READ CMD REGISTER
   (1) 011072 026767 007412 007400          CMP     GOOD,BAD
   (1) 011100 001401                        BEQ     .+4
   (1) 011102 104003                        ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1) 011104                               LOOP    LP
   (2) 011124 000137 011056                 JMP     @#LP
   827                          ;FEED CARDS #2-19, CHECKING INPUT DATA AND PRINTING IN COLUMNS 1-7
   828 011130 012767 000022 007350          MOV     #22,CNT1        ;CNT1=18
   829 011136 012767 020046 007360          MOV     #CARD01,OUTPTR  ;OUTPTR=CARD01
   830 011144 012777 021015 007366 P4A:     MOV     #21015,@TCR     ;ISSUE HSO + SPD + PRI + GO
   831 011152                               WTODR
   (1) 011152 132777 000200 007376          BITB    #200,@TIRHI
   (1) 011160 001774                        BEQ     .-6             ;WAIT FOR OUTPUT DATA REQUEST
   832 011162 004767 001212                 JSR     PC,P4SEND       ;SEND DATA TO PRINTER
   833 011166                               WTIDR
   (1) 011166 032777 000200 007360          BIT     #200,@TIR
   (1) 011174 001774                        BEQ     .-6             ;WAIT FOR INPUT DATA REQUEST
   834 011176 004767 001302                 JSR     PC,CKDATA       ;CHECK INPUT DATA FROM PASSES 2 + 3
   835 011202 162767 000002 007304          SUB     #2,INPTR
   836 011210                               WTDONE
   (1) 011210 032777 000200 007322          BIT     #200,@TCR
   (1) 011216 001774                        BEQ     .-6             ;WAIT FOR DONE FLAG
   837 011220                               CKTCR   #21214,LP       ;TEST FOR HSO + DONE + SPD + PRI
   (1)        011220                        LP=.
   (1) 011220 012767 021214 007262          MOV     #21214,GOOD
   (1) 011226 017767 007306 007244          MOV     @TCR,BAD        ;READ CMD REGISTER
   (1) 011234 026767 007250 007236          CMP     GOOD,BAD
   (1) 011242 001401                        BEQ     .+4
   (1) 011244 104003                        ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
   (1) 011246                               LOOP    LP
   (2) 011266 000137 011220                 JMP     @#LP
   838 011272                               CKTSR   #4010,LP        ;TEST FOR CIW
   (1)        011272                        LP=.
   (1) 011272 012767 004010 007210          MOV     #4010,GOOD
   (1) 011300 017767 007240 007172          MOV     @TSR,BAD        ;READ STATUS REGISTER
   (1) 011306 026767 007176 007164          CMP     GOOD,BAD
   (1) 011314 001401                        BEQ     .+4
```

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(1)  011316  104003                          ERR+GB                ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  011320                                   LOOP    LP
(2)  011340  000137  011272                   JMP     @#LP
839  011344                                   CKTIR   #0,LP         ;TEST INTERRUPT REG FOR 0
(1)            011344                         LP=.
(1)  011344  012767  000000  007136           MOV     #0,GOOD
(1)  011352  017767  007176  007120           MOV     @TIR,BAD      ;READ INTERRUPT REGISTER
(1)  011360  026767  007124  007112           CMP     GOOD,BAD
(1)  011366  001401                           BEQ     .+4
(1)  011370  104003                           ERR+GB                ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  011372                                   LOOP    LP
(2)  011412  000137  011344                   JMP     @#LP
840  011416  005367  007064                   DEC     CNT1
841  011422  001250                           BNE     P4A           ;GO PRINT AND READ MORE CARDS
842                                 ;FEED CARD #20
843  011424  012777  021015  007106           MOV     #21015,@TCR   ;ISSUE HSO + SPD + PRI + GO
844  011432                                   WTODR
(1)  011432  132777  000200  007116           BITB    #200,@TIRHI
(1)  011440  001774                           BEQ     .-6           ;WAIT FOR OUTPUT DATA REQUEST
845  011442  004767  000732                   JSR     PC,P4SEND     ;SEND DATA TO PRINTER
846  011446                                   WTIDR
(1)  011446  032777  000200  007100           BIT     #200,@TIR
(1)  011454  001774                           BEQ     .-6           ;WAIT FOR INPUT DATA REQUEST
847  011456  004767  001022                   JSR     PC,CKDATA     ;CHECK INPUT DATA FROM PASSES 2 + 3
848  011462  162767  000002  007024           SUB     #2,INPTR
849  011470                                   WTDONE
(1)  011470  032777  000200  007042           BIT     #200,@TCR
(1)  011476  001774                           BEQ     .-6           ;WAIT FOR DONE FLAG
850  011500                                   CKTSR   #4230,LP      ;TEST FOR CIW + IE + HE
(1)            011500                         LP=.
(1)  011500  012767  004230  007002           MOV     #4230,GOOD
(1)  011506  017767  007032  006764           MOV     @TSR,BAD      ;READ STATUS REGISTER
(1)  011514  026767  006770  006756           CMP     GOOD,BAD
(1)  011522  001401                           BEQ     .+4
(1)  011524  104003                           ERR+GB                ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  011526                                   LOOP    LP
(2)  011546  000137  011500                   JMP     @#LP
851  011552                                   CKTCR   #121214,LP    ;TEST FOR ERR + HSO  + SPD + PRI + DONE
(1)            011552                         LP=.
(1)  011552  012767  121214  006730           MOV     #121214,GOOD
(1)  011560  017767  006754  006712           MOV     @TCR,BAD      ;READ CMD REGISTER
(1)  011566  026767  006716  006704           CMP     GOOD,BAD
(1)  011574  001401                           BEQ     .+4
(1)  011576  104003                           ERR+GB                ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)  011600                                   LOOP    LP
(2)  011620  000137  011552                   JMP     @#LP
852                                 ;PRINT CARD #20
853  011624  012777  001415  006706           MOV     #01415,@TCR   ;ISSUE CLEAR ERR + SPD + PRI + GO
854  011632                                   WTODR
(1)  011632  132777  000200  006716           BITB    #200,@TIRHI
(1)  011640  001774                           BEQ     .-6           ;WAIT FOR OUTPUT DATA REQUEST
855  011642  004767  000532                   JSR     PC,P4SEND     ;SEND DATA TO PRINTER
856  011646                                   WTDONE
(1)  011646  032777  000200  006664           BIT     #200,@TCR
(1)  011654  001774                           BEQ     .-6           ;WAIT FOR DONE FLAG
857  011656                                   CKTSR   #0,LP         ;TEST FOR STATUS=0
```

```
(1)             011656                          LP=.
(1)   011656    012767  000000  006624          MOV     #0,GOOD
(1)   011664    017767  006654  006606          MOV     @TSR,BAD        ;READ STATUS REGISTER
(1)   011672    026767  006612  006600          CMP     GOOD,BAD
(1)   011700    001401                          BEQ     .+4
(1)   011702    104003                          ERR+GB                  ;STATUS REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)   011704                                    LOOP    LP
(2)   011724    000137  011656                  JMP     @#LP
858   011730                                    CKTCR   #1214,LP                ;TEST FOR DONE + SPD + PRI
(1)             011730                          LP=.
(1)   011730    012767  001214  006552          MOV     #1214,GOOD
(1)   011736    017767  006576  006534          MOV     @TCR,BAD        ;READ CMD REGISTER
(1)   011744    026767  006540  006526          CMP     GOOD,BAD
(1)   011752    001401                          BEQ     .+4
(1)   011754    104003                          ERR+GB                  ;CMD REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)   011756                                    LOOP    LP
(2)   011776    000137  011730                  JMP     @#LP
859
860   012002    000005                          RESET
861   012004    000207                          RTS     PC              ;EXIT CARD TEST
862
863                                     ;
                                        ;SUBROUTINE TO WAIT FOR CR
864                                     ;
865   012006    104400                CONTIN:   TYPE
866   012010    015307                          CONMSG                  ;'PRESS CR TO CONTINUE''
867   012012    004767  001666                  JSR     PC,CKSWR
868   012016    004767  001634        CONT1:    JSR     PC,TTYIN        ;GET A CHAR
869   012022    022704  000015                  CMP     #15,R4          ;WAS IT CR ?
870   012026    001373                          BNE     CONT1           ;NO - KEEP WAITING
871   012030    004767  001546                  JSR     PC,TTYOUT       ;YES - TYPE CR + LF
872   012034    000207                          RTS     PC
873
874                                     ;
                                        ;SUBROUTINE TO TEST FOR BLANK CARD (ALL SPACES)
875                                     ;
876   012036    012700  000001        BLKCRD:   MOV     #1,R0
877   012042    004767  001636                  JSR     PC,CKSWR
878   012046    032777  000200  006500  BC1:    BIT     #200,@TIR
879   012054    001774                          BEQ     BC1             ;WAIT FOR INPUT DATA REQUEST
880   012056    012767  000040  006424          MOV     #40,GOOD
881   012064    017767  006460  006406          MOV     @TDR,BAD        ;READ DATA REGISTER
882   012072    026767  006412  006400          CMP     GOOD,BAD
883   012100    001401                          BEQ     .+4
884   012102    104007                          ERR+GB+COL              ;DATA REG - COMPARE ERROR AT INDICATED COLUMN
885   012104    005200                          INC     R0
886   012106    022700  000121                  CMP     #121,R0
887   012112    001355                          BNE     BC1             ;IF MORE COLUMNS TO READ GO DO IT
888   012114                                    CKTIR   #0,LP           ;TEST THAT IDR IS 0
(1)             012114                          LP=.
(1)   012114    012767  000000  006366          MOV     #0,GOOD
(1)   012122    017767  006426  006350          MOV     @TIR,BAD        ;READ INTERRUPT REGISTER
(1)   012130    026767  006354  006342          CMP     GOOD,BAD
(1)   012136    001401                          BEQ     .+4
(1)   012140    104003                          ERR+GB                  ;INTERRUPT REG - VALUE READ NOT EQUAL TO EXPECTED VALUE
(1)   012142                                    LOOP    LP
(2)   012162    000137  012114                  JMP     @#LP
889   012166    000207                          RTS     PC              ;EXIT
```

```
                                        ;
                                        ;PUT SPACE CHAR IN ALL LOCS BF20 - BF1+10
                                        ;
012170  012702  017466          CLRBFS: MOV     #BF20,R2
012174  012722  000040          CB1:    MOV     #40,(R2)+
012200  022702  017560                  CMP     #BF1+24,R2
012204  001373                          BNE     CB1
012206  000207                          RTS     PC
                                        ;
                                        ;PUT 1 CHAR (A) IN LOCS BF20 - BF1
                                        ;
012210  012702  017466          SETBFS: MOV     #BF20,R2
012214  012722  000101          SB1:    MOV     #101,(R2)+
012220  022702  017536                  CMP     #BF1+2,R2
012224  001373                          BNE     SB1
012226  000207                          RTS     PC
                                        ;
                                        ;SEND 80 CHARS BEGINNING AT LOC POINTED TO BY PTR
                                        ;
012230  016700  006274          P2SEND: MOV     PTR,R0
012234  004767  001444                  JSR     PC,CKSWR
012240  012701  000120                  MOV     #120,R1
012244  132777  000200  006304  P2SD1:  BITB    #200,@TIRHI
012252  001774                          BEQ     P2SD1           ;WAIT FOR OUTPUT DATA REQUEST
012254  011077  006270                  MOV     (R0),@TDR       ;SEND A CHAR
012260  062700  000002                  ADD     #2,R0
012264  005301                          DEC     R1              ;ALL 80 CHARS SENT ?
012266  001366                          BNE     P2SD1           ;NO - GO SEND ANOTHER ONE
012270  132777  000200  006260          BITB    #200,@TIRHI
012276  001401                          BEQ     .+4
012300  000000                          XX                      ;ERROR - GOT MORE THAN 80 ODR'S
012302  000207                          RTS     PC
                                        ;
                                        ;SEND 1 CHAR TO CARD #1 UP TO 20 CHARS TO CARD #20
                                        ;
012304  016767  006172  006224  P3SEND: MOV     CARD,TOG1
012312  012700  000001                  MOV     #1,R0
012316  004767  001362                  JSR     PC,CKSWR
012322  132777  000200  006226  P3SD1:  BITB    #200,@TIRHI
012330  001774                          BEQ     P3SD1           ;WAIT FOR OUTPUT DATA REQUEST
012332  012777  000101  006210          MOV     #101,@TDR       ;SEND "A" CHARACTER
012340  005200                          INC     R0
012342  005367  006170                  DEC     TOG1            ;HAVE ALL CHARS BEEN SENT
012346  001365                          BNE     P3SD1           ;NO - GO SEND ANOTHER ONE
012350  132777  000200  006200  P3SD2:  BITB    #200,@TIRHI
012356  001774                          BEQ     P3SD2           ;WAIT FOR OUTPUT DATA REQUEST
012360  012777  000040  006162          MOV     #40,@TDR        ;SEND SPACE CHAR
012366  005200                          INC     R0
012370  022700  000121                  CMP     #121,R0         ;HAVE ALL 80 CHARS BEEN SENT
012374  001365                          BNE     P3SD2           ;NO - GO SEND MORE
012376  000207                          RTS     PC
                                        ;
                                        ;SEND 7 CHARS TO BE PRINTED "CARD XX" AND THEN ALL SPACES
                                        ;
012400  005067  006132          P4SEND: CLR     TOG1
012404  004767  001274                  JSR     PC,CKSWR
```

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946  012410  132777  000200  006140  P4SD1:  BITB    #200,@TIRHI
947  012416  001774                  BEQ     P4SD1           ;WAIT FOR OUTPUT DATA REQUEST
948  012420  017777  006100  006122          MOV     @OUTPTR,@TDR    ;SEND A CHAR
949  012426  062767  000002  006070          ADD     #2,OUTPTR
950  012434  005267  006076                  INC     TOG1
951  012440  022767  000007  006070          CMP     #7,TOG1         ;HAVE ALL PRINTING CHARS BEEN SENT
952  012446  001360                  BNE     P4SD1           ;NO - GO PRINT MORE
953  012450  132777  000200  006100  P4SD2:  BITB    #200,@TIRHI
954  012456  001774                  BEQ     P4SD2           ;WAIT FOR OUTPUT DATA REQUEST
955  012460  012777  000040  006062          MOV     #40,@TDR        ;SEND SPACE CHAR
956  012466  005267  006044                  INC     TOG1
957  012472  022767  000120  006036          CMP     #120,TOG1       ;HAVE ALL 80 CHARS BEEN SENT
958  012500  001363                  BNE     P4SD2           ;NO - GO SEND MORE CHARS
959  012502  000207                  RTS     PC
960                          ;
961                          ;COMPARE INPUT DATA PATTERN BEGINNING AT INPTR
962                          ;
963  012504  012700  000001  CKDATA: MOV     #1,R0
964  012510  016767  006000  006012          MOV     INPTR,PTR
965  012516  032777  000200  006030  CD1:    BIT     #200,@TIR
966  012524  001774                  BEQ     CD1             ;WAIT FOR INPUT DATA REQUEST
967  012526  017767  005776  005754          MOV     @PTR,GOOD
968  012534  017767  006010  005736          MOV     @TDR,BAD        ;READ DATA REG
969  012542  026767  005742  005730          CMP     GOOD,BAD
970  012550  001401                  BEQ     .+4
971  012552  104007                  ERR+GB+COL              ;DATA REG - COMPARE ERROR AT INDICATED COLUMN
972  012554  005200                  INC     R0
973  012556  062767  000002  005744          ADD     #2,PTR
974  012564  022700  000121                  CMP     #121,R0
975  012570  001352                  BNE     CD1             ;IF MORE COLUMNS TO READ GO DO IT
976  012572  000207                  RTS     PC              ;EXIT
977                          ;
978                          ;CONVERT OCTAL # IN R0 TO DECIMAL # AND TYPE OUT DECIMAL #
979                          ;
980  012574  010067  000110  OCTDEC: MOV     R0,TOG
981  012600  005067  000100          CLR     ONES
982  012604  005067  000076          CLR     TENS
983  012610  005267  000070  OD1:    INC     ONES
984  012614  022767  000012  000062          CMP     #12,ONES
985  012622  001404                  BEQ     OD2
986  012624  005367  000060                  DEC     TOG
987  012630  001367                  BNE     OD1
988  012632  000407                  BR      OD3
989  012634  005067  000044  OD2:    CLR     ONES
990  012640  005267  000042          INC     TENS
991  012644  005367  000040                  DEC     TOG
992  012650  001357                  BNE     OD1
993  012652  016704  000030  OD3:    MOV     TENS,R4
994  012656  062704  000060          ADD     #60,R4
995  012662  004767  000714                  JSR     PC,TTYOUT       ;TYPEOUT TENS
996  012666  016704  000012                  MOV     ONES,R4
997  012672  062704  000060                  ADD     #60,R4
998  012676  004767  000700                  JSR     PC,TTYOUT       ;TYPEOUT ONES
999  012702  000207                  RTS     PC
1000 012704  000000  ONES:   XX
1001 012706  000000  TENS:   XX
```

SEQ 0031

1002 012710 000000   TOG: XX

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1004
1005  012712  104400                  ;INPUT ROUTINE FOR DEVICE ADDRESS, INT VECTOR ADDRESS AND BR LEVEL
1006  012714  014654          DEVCOD: TYPE
1007  012716  104400                  DCMSG1                  ;'THE FOLLOWING VALUES ARE BEING USED''
1008  012720  014722                  TYPE
1009  012722  104406                  DCMSG2                  ;''    DEVICE ADDRESS = ''
1010  012724  020540                  TYPE+6
1011  012726  104400                  TCR                     ;TYPE TCR ADDRESS
1012  012730  014751                  TYPE
1013  012732  104403                  DCMSG3                  ;''    PC INTERRUPT VECTOR ADDRESS = ''
1014  012734  020560                  TYPE+3
1015  012736  104400                  PCV                     ;TYPE PCV ADDRESS
1016  012740  015015                  TYPE
1017  012742  104401                  DCMSG4                  ;''    BUS REQUEST LEVEL = ''
1018  012744  020564                  TYPE+1
1019                                  BRLV                    ;TYPE BRLV
1020  012746  104400          ;TEST TO SEE IF VALUES ARE TO BE CHANGED
1021  012750  015047                  TYPE
1022  012752  004767  000700          DCMSG5                  ;'DO YOU WANT TO CHANGE ANY OF THESE VALUES (Y OR N)?''
1023  012756  022704  000131  DC1:    JSR     PC,TTYIN        ;INPUT A CHAR
1024  012762  001004                  CMP     #131,R4         ;IS IT Y ?
1025  012764  004767  000612          BNE     DC2             ;NO - GO CHECK FOR N
1026  012770  000167  000014          JSR     PC,TTYOUT       ;YES - ECHO Y
1027  012774  022704  000116          JMP     DC3             ;GO GET NEW VALUES
1028  013000  001364          DC2:    CMP     #116,R4         ;IS IT N ?
1029  013002  004767  000574          BNE     DC1             ;NO - GO BACK TO INPUT
1030  013006  000207                  JSR     PC,TTYOUT       ;YES - ECHO N
1031                                  RTS     PC              ;EXIT
1032  013010  104400          ;VALUES ARE TO BE CHANGED
1033  013012  015135          DC3:    TYPE
1034  013014  104400                  DCMSG6                  ;''  ENTER VALUE AFTER (=) IS TYPED''
1035  013016  014722                  TYPE
1036  013020  012705  000006          DCMSG2                  ;''    DEVICE ADDRESS = ''
1037  013024  004767  000464          MOV     #6,R5
1038  013030  042704  000007          JSR     PC,RDOCT        ;GET NEW DEVICE ADDRESS
1039  013034  012705  020540          BIC     #7,R4
1040  013040  042715  177770  DC4:    MOV     #TCR,R5
1041  013044  050425                  BIC     #177770,(R5)
1042  013046  020527  020560          BIS     R4,(R5)+        ;STORE 4 NEW DEVICE ADDRESSES
1043  013052  001372                  CMP     R5,#PCV
1044  013054  104400                  BNE     DC4
1045  013056  014751                  TYPE
1046  013060  012705  000003          DCMSG3                  ;''    PC INTERRUPT VECTOR ADDRESS = ''
1047  013064  004767  000424          MOV     #3,R5
1048  013070  010467  005464          JSR     PC,RDOCT        ;GET NEW INT VECTOR ADDRESS
1049  013074  062704  000002          MOV     R4,PCV          ;SET NEW PC VECTOR ADDRESS
1050  013100  010467  005456          ADD     #2,R4
1051  013104  104400                  MOV     R4,PSV          ;SET NEW PS VECTOR ADDRESS
1052  013106  015015                  TYPE
1053  013110  012705  000001          DCMSG4                  ;''    BUS REQUEST LEVEL = ''
1054  013114  004767  000374          MOV     #1,R5
1055  013120  010467  005440          JSR     PC,RDOCT        ;GET NEW BR LEVEL
1056  013124  000207                  MOV     R4,BRLV         ;SET NEW BR LEVEL
1057                                  RTS     PC              ;EXIT
1058                          ;
1059                          ;ERROR SUBROUTINE
                              ;
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1060  013126  004767  000552          ERROR:  JSR     PC,CKSWR
1061  013132  032777  020000  165340          BIT     #20000,@SWR
1062  013140  001403                          BEQ     .+10            ;IS LOOP ON ERROR SELECTED ?
1063  013142  012767  000001  005362          MOV     #1,SCOPE        ;YES - SET SCOPE TO A 1
1064  013150  011667  005342                  MOV     (SP),LASTPC     ;PUT ADDRESS OF ERROR IN LASTPC
1065  013154  032777  040000  165316          BIT     #40000,@SWR     ;IF SR14=1 DELETE TYPEOUT
1066  013162  001041                          BNE     E3              ;EXIT NOW
1067  013164  104400                          TYPE
1068  013166  015335                          PCMSG                   ;'ERROR AT ADDRESS''
1069  013170  011667  005302                  MOV     (SP),ADR
1070  013174  162767  000002  005274          SUB     #2,ADR
1071  013202  104406                          TYPE+6
1072  013204  020476                          ADR                     ;TYPE CONTENTS OF ADR
1073  013206  032777  000002  005262          BIT     #2,@ADR         ;TYPE GOOD ?
1074  013214  001404                          BEQ     E1              ;NO
1075  013216  104400                          TYPE
1076  013220  015361                          GDMSG                   ;'GOOD=''
1077  013222  104406                          TYPE+6
1078  013224  020510                          GOOD                    ;TYPE CONTENTS OF GOOD
1079  013226  032777  000001  005242  E1:     BIT     #1,@ADR         ;TYPE BAD ?
1080  013234  001404                          BEQ     E2              ;NO
1081  013236  104400                          TYPE
1082  013240  015370                          BDMSG                   ;'BAD =''
1083  013242  104406                          TYPE+6
1084  013244  020500                          BAD                     ;TYPE CONTENTS OF BAD
1085  013246  032777  000004  005222  E2:     BIT     #4,@ADR
1086  013254  001404                          BEQ     E3
1087  013256  104400                          TYPE
1088  013260  015377                          COLMSG                  ;'COLUMN #=''
1089  013262  004767  177306                  JSR     PC,OCTDEC       ;TYPEOUT DECIMAL COLUMN # IN ERROR
1090  013266  012704  000015          E3:     MOV     #15,R4
1091  013272  004767  000304                  JSR     PC,TTYOUT       ;TYPE CR + LF
1092  013276  032777  100000  165174          BIT     #100000,@SWR    ;IF SR15=1
1093  013304  001001                          BNE     E4              ;BYPASS THE ERROR HALT
1094  013306  000000          ERRHLT: XX                              ;ERROR HALT
1095  013310  000002          E4:     RTI                             ;EXIT
1096                           ;
1097                           ;DETERMINE IF THIS TYPEOUT IS FOR MESSAGE OR OCTAL VALUE AND BRANCH ACCORDINGLY
1098                           ;
1099  013312  011603          TYPOUT: MOV     (SP),R3         ;GET PC FROM STACK
1100  013314  162703  000002          SUB     #2,R3           ;SUBTRACT 2
1101  013320  032713  000007          BIT     #7,(R3)         ;TEST LOW ORDER 3 BITS OF TRAP INSTRUCTION
1102  013324  001401                  BEQ     TYPMSG          ;IF 0'S GO TO TYPMSG
1103  013326  000417                  BR      TYPOCT          ;IF NOT 0'S GO TO TYPOCT
1104                           ;
1105                           ;MESSAGE TYPEOUT - R5=ADDRESS OF BEGINNING OF MESSAGE
1106                           ;
1107  013330  011604          TYPMSG: MOV     (SP),R4
1108  013332  011405                  MOV     (R4),R5         ;R5=ADDRESS OF MESSAGE
1109  013334  112504          TM1:    MOVB    (R5)+,R4        ;PUT CHAR IN R4
1110  013336  001410                  BEQ     TM3             ;IF IT EQUALS 0 TERMINATE
1111  013340  022704  000046          CMP     #46,R4          ;DOES CHAR = CRLF FLAG ?
1112  013344  001002                  BNE     TM2             ;NO - GO TYPE CHAR
1113  013346  012704  000015          MOV     #15,R4          ;YES - TYPE CR+LF
1114  013352  004767  000224  TM2:    JSR     PC,TTYOUT       ;GO TYPE CONTENTS OF R4
1115  013356  000766                  BR      TM1             ;GO GET NEXT CHAR
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1116  013360  062716  000002          TM3:    ADD     #2,(SP)         ;ADD 2 TO SP FOR RETURN
1117  013364  000002                          RTI                     ;EXIT
1118                                  ;
1119                                  ;OCTAL TYPEOUT - R4=VALUE  R5=# OF DIGITS TO TYPE
1120                                  ;
1121  013366  011305                  TYPOCT: MOV     (R3),R5
1122  013370  042705  177770                  BIC     #177770,R5      ;R5 = # OF DIGITS TO BE TYPED
1123  013374  062703  000002                  ADD     #2,R3
1124  013400  011367  005122                  MOV     (R3),PT
1125  013404  017704  005116                  MOV     @PT,R4          ;R4 = VALUE TO BE TYPED
1126  013410  010567  005070                  MOV     R5,CNT          ;SET CNT FOR STACKING
1127  013414  010467  005114          TO.1:   MOV     R4,TEMP         ;PUT VALUE IN TEMP
1128  013420  042767  177770  005106        BIC     #177770,TEMP    ;MASK OUT ALL BUT BITS 2,1+0
1129  013426  062767  000060  005100        ADD     #60,TEMP        ;MAKE ASCII NUMBER
1130  013434  016746  005074                MOV     TEMP,-(SP)      ;STORE NUMBER ON STACK
1131  013440  006004                        ROR     R4
1132  013442  006004                        ROR     R4
1133  013444  006004                        ROR     R4
1134  013446  005367  005032                DEC     CNT             ;IF CNT IS NOT ZERO
1135  013452  001360                        BNE     TO.1            ;GO STACK ANOTHER NUMBER
1136  013454  022705  000006                CMP     #6,R5
1137  013460  001002                        BNE     TO.2            ;IF 6 NUMBERS WERE SELECTED
1138  013462  042716  000006                BIC     #6,(SP)         ;CLEAR BITS 1+0 OF LAST NUMBER STACKED
1139  013466  010567  005012          TO.2: MOV     R5,CNT          ;SET CNT FOR TYPING
1140  013472  012604                  TO.3: MOV     (SP)+,R4        ;GET A NUMBER FROM THE STACK
1141  013474  004767  000102                JSR     PC,TTYOUT       ;TYPE THE NUMBER
1142  013500  005367  005000                DEC     CNT             ;IF COUNT IS NOT ZERO
1143  013504  001372                        BNE     TO.3            ;GO TYPE ANOTHER NUMBER
1144  013506  062716  000002                ADD     #2,(SP)         ;ADD 2 TO SP FOR RETURN
1145  013512  000002                        RTI                     ;EXIT
1146                                  ;
1147                                  ;OCTAL TYPEIN - R5=#OF DIGITS TO BE INPUT INTO R4
1148                                  ;
1149  013514  010567  004764          RDOCT:  MOV     R5,CNT          ;CNT=# OF DIGITS TO BE INPUT
1150  013520  005067  005010                  CLR     TEMP
1151  013524  004767  000126          RD.1:   JSR     PC,TTYIN        ;GET CHAR FROM TTY
1152  013530  004767  000046                  JSR     PC,TTYOUT       ;ECHO IT
1153  013534  042704  177770                  BIC     #177770,R4      ;MAKE CHAR OCTAL
1154  013540  006167  004770                  ROL     TEMP
1155  013544  006167  004764                  ROL     TEMP
1156  013550  006167  004760                  ROL     TEMP
1157  013554  042767  000007  004752        BIC     #7,TEMP         ;CLEAR TEMP BITS 2,1+0
1158  013562  060467  004746                  ADD     R4,TEMP         ;ADD INPUT CHAR TO OTHERS
1159  013566  005367  004712                  DEC     CNT             ;IF ALL CHARS NOT READ IN
1160  013572  001354                        BNE     RD.1            ;GO READ ANOTHER ONE
1161  013574  016704  004734                MOV     TEMP,R4         ;PUT FINAL OCTAL VALUE IN R4
1162  013600  000207                        RTS     PC              ;EXIT
1163                                  ;
1164                                  ;TYPE THE CHARACTER IN R4
1165                                  ;
1166  013602  032777  040000  164670  TTYOUT: BIT     #40000,@SWR     ;IF SR14=1 DELETE TYPEOUT
1167  013610  001021                        BNE     TTO.3
1168  013612  010467  163750                MOV     R4,TPB          ;TYPE CHAR IN R4
1169  013616  105767  163742          TTO.1:  TSTB    TPS
1170  013622  100375                        BPL     TTO.1           ;WAIT FOR DONE
1171  013624  022704  000015                CMP     #15,R4          ;WAS IT A CR ?
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1172  013630  001003                          BNE     TTO.2           ;IF NO - GO EXIT
1173  013632  012704  000012                  MOV     #12,R4          ;IF YES - PUT LF IN R4
1174  013636  000761                          BR      TTYOUT          ;GO TYPE THE LF
1175  013640  012767  040000  004654  TTO.2:  MOV     #40000,LOC
1176  013646  005367  004650                  DEC     LOC
1177  013652  001375                          BNE     .-4
1178  013654  000207                  TTO.3:  RTS     PC              ;EXIT
1179                                  ;
1180                                  ;READ CHAR FROM TTY INTO R4
1181                                  ;
1182  013656  005267  163676          TTYIN:  INC     TKS             ;FETCH A CHAR
1183  013662  032767  000200  163670  TTI.1:  BIT     #200,TKS
1184  013670  001774                          BEQ     TTI.1           ;WAIT FOR DONE FLAG
1185  013672  016704  163664                  MOV     TKB,R4          ;READ CHAR INTO R4
1186  013676  042704  177600                  BIC     #177600,R4      ;MASK R4 WITH ALL BUT 177
1187  013702  000207                          RTS     PC              ;EXIT
1188                                  ;
1189                                  ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
1190                                  ;*ROUTINE IS ENTERED FROM TRAP HANDLERR,AND WILL
1191                                  ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
1192                                  ;*WHEN OPERATING IN TTY FLAG MODE.
1193  013704  022767  000176  164566  CKSWR:  CMP     #SWREG,SWR      ;IS THE SOFT-SWR SELECTED?
1194  013712  001075                          BNE     K15             ;BRANCH IF NO
1195  013714  105767  163640                  TSTB    TKS             ;CHAR THERE?
1196  013720  100072                          BPL     K15             ;IF NO,DON'T WAIT AROUND
1197  013722  116746  163634                  MOVB    TKB,-(SP)       ;SAVE THE CHAR
1198  013726  042716  177600                  BIC     #^C177,(SP)     ;STRIP OFF THE ASCII
1199  013732  022726  000007                  CMP     #7,(SP)+        ;IS IT A CONTROL G?
1200  013736  001063                          BNE     K15             ;NO RETURN TO USER
1201  013740  126727  164546  000001          CMPB    AUTOB,#1        ;ARE WE RUNNING IN AUTO-MODE?
1202  013746  001457                          BEQ     K15             ;BRANCH IF YES
1203  013750  104400  014211                  TYPE    ,CNTLG          ;ECHO THE CONTROL-G (^G)
1204  013754  104400  014216  GTSWR:  TYPE    ,MSWR           ;TYPE CURRENT CONTENTS
1205  013760  016746  164212                  MOV     SWREG,-(SP)     ;SAVE SWREG FOR TYPEOUT
1206  013764  004767  000300                  JSR     PC,TYPOC        ;GO TYPE-OCTAL ASCII(ALL DIGITS)
1207  013770  104400  014226                  TYPE    ,MNEW           ;PROMPT FOR NEW SWR
1208  013774  005046                  K19:    CLR     -(SP)           ;CLEAR COUNTER
1209  013776  005046                          CLR     -(SP)           ;NEW SWR
1210  014000  105767  163554          K7:     TSTB    TKS             ;CHAR THERE?
1211  014004  100375                          BPL     K7              ;IF NOT TRY AGAIN
1212  014006  116746  163550                  MOVB    TKB,-(SP)       ;PICK UP CHAR
1213  014012  042716  177600                  BIC     #^C177,(SP)     ;MAKE IT 7-BIT ASCII
1214  014016  021627  000025          K9:     CMP     (SP),#25        ;IT IS A CONTROL-U?
1215  014022  001005                          BNE     K10             ;BRANCH IF NOT
1216  014024  104400  014204                  TYPE    ,CNTLU          ;YES ECHO CONTROL - U(^U)
1217  014030  062706  000006          K20:    ADD     #6,SP           ;IGNORE PREVIOUS INPUT
1218  014034  000757                          BR      K19             ;LET'S TRY IT AGAIN
1219  014036  021627  000015          K10:    CMP     (SP),#15        ;IS IT A <CR>?
1220  014042  001022                          BNE     K16             ;BRANCH IF NO
1221  014044  005766  000004                  TST     4(SP)           ;YES,IS IT THE FIRST CHAR?
1222  014050  001403                          BEQ     K11             ;BRANCH IF YES
1223  014052  016677  000002  164420          MOV     2(SP),@SWR      ;SAVE NEW SWR
1224  014060  062706  000010  K11:    ADD     #10,SP          ;CLEAR UP STACK
1225                                  ;TTY INPUT ROUTINE
1226                                  ;
1227  014064  104400  014240  K14:    TYPE    ,CRLF           ;ECHO <CR> AND <LF>
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1228  014070  126727  164420  000001
1229  014076  001003
1230  014100  012767  000100  163452
1231  014106  000207
1232  014110  004767  000356
1233  014114  021627  000060
1234  014120  002420
1235  014122  021627  000067
1236  014126  003015
1237  014130  042726  000060
1238  014134  005766  000002
1239  014140  001403
1240  014142  006316
1241  014144  006316
1242  014146  006316
1243  014150  005266  000002
1244  014154  056616  177776
1245  014160  000707
1246  014162  104400  014237
1247  014166  000720
1248  014170  000014
1249
1250
1251  014204  052536  005015     000
1252  014211     136  006507  000012
1253  014216  005015  053523  036522
      014224  000040
1254
1255  014226  020040  042516  020127
      014234  020075     000
1256
1257  014237     077
1258  014240     015
1259  014241     012     000
1260
1261
1262
1263
1264
1265
1266
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1281
```

```
        CMPB    INTAG,#1        ;RE-ENABLE TTY KBD INTERRUPTS
        BNE     K15             ;BRANCH IF NOT
        MOV     #100,TKS       ;RE-ENABLE TTY KBD INTERRUPTS
K15:    RTS     PC              ;RETURN
K16:    JSR     PC,TYPEC        ;ECHO CHAR
        CMP     (SP),#60        ;CHAR < 0?
        BLT     K18             ;BRANCH IF YES
        CMP     (SP),#67        ;CHAR > 7?
        BGT     K18             ;BRANCH IF YES
        BIC     #60,(SP)+       ;STRIP-OFF ASCII
        TST     2(SP)           ;IS THIS THE FIRST CHAR
        BEQ     K17             ;BRANCH IF YES
        ASL     (SP)            ;NO SHIFT PRESENT
        ASL     (SP)            ;CHAR OVER TO MAKE
        ASL     (SP)            ;ROOM FOR NEW ONE
 K17:   INC     2(SP)           ;KEEP COUNT OF CHARACTER
        BIS     -2(SP),(SP)     ;SET IN NEW CHAR
        BR      K7              ;GET THE NEXT ONE
K18:    TYPE    ,QUES           ;TYPE ?<CR><LF>
        BR      K20             ;SIMULATE CONTROL-U
TTYN:   .BLKB   12.              ;RESERVE 12 BYTE FOR TTYT
                                 ;Y INPUT

CNTLU:  .ASCIZ  /^U/<15><12>    ;CONTROL 'U'
CNTLG:  .ASCIZ  /^G/<15><12>    ;CONTROL 'G'
MSWR:   .ASCIZ  <15><12>/SWR= /

MNEW:   .ASCIZ  /  NEW = /

QUES:   .ASCII  /?/             ;QUESTION MARK
CRLF:   .ASCII  <15>            ;CARRIAGE RETURN
LF:     .ASCIZ  <12>            ;LINE FEED
;*************************************************************

;THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO
;*A 6-DIGIT OCTAL (ASCII) NUMBER AND TYPE IT
;*TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF
;*DIGITS TO TYPE
;*CALL:
;*      MOV     NUM,-(SP)       ;NUMBER TO BE TYPED
;*      TYPOS                   ;CALL FOR TYPE OUT
;*      .BYTE   N               ;N=1 TO 6 FOR NUMBER OF DIGITS
        ;*TO TYPE
        ;*      .BYTE   M               ;M=1  OR 0
                                        ;1=TYPE LEADING ZEROS
                                        ;0=SUPPRESS LEADING ZEROS
        ;*
        ;*TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS
        ;*THE LAST
        ;*TYPOS OR TYPOC
        ;*CALL:
        ;*      MOV     NUM,-(SP)       ;NUMBER TO BE TYPED
        ;*      TYPON                   ;CALL FOR TYPEOUT
        ;*
```

```
1282
1283
1284
1285
1286            014244
1287  014244    017646  000000
1288  014250    116667  000001  000211
1289  014256    112667  000207
1290  014262    062716  000002
1291  014266    000406
1292  014270    112767  000001  000171
1293  014276    112767  000006  000165
1294  014304    112767  000005  000154
1295  014312    010346
1296  014314    010446
1297  014316    010546
1298  014320    116704  000145
1299  014324    005404
1300  014326    062704  000006
1301  014332    110467  000132
1302  014336    116704  000125
1303  014342    016605  000010
1304  014346    005003
1305  014350    006105
1306  014352    000404
1307  014354    006105
1308  014356    006105
1309  014360    006105
1310  014362    010503
1311  014364    006103
1312  014366    105367  000076
1313  014372    100022
1314  014374    042703  177770
1315  014400    001002
1316  014402    005704
1317  014404    001403
1318  014406    005204
1319  014410    052703  000060
1320  014414    052703  000040
1321  014420    110367  000040
1322  014424    010446
1323  014426    010546
1324  014430    104400  014464
1325  014434    012605
1326  014436    012604
1327  014440    105367  000022
1328  014444    003343
1329  014446    002402
1330  014450    005204
1331  014452    000740
1332  014454    012605
1333  014456    012604
1334  014460    012603
1335  014462    000207
1336  014464       000
1337  014465       000
```

```
                        ;*TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                        ;*CALL:
                        ;*      MOV     NUM,-(SP)       ;NUMBER TO BE TYPED
                        ;*      TYPOC                   ;CALL FOR TYPEOUT
                .EVEN
TYPOS:  MOV     @(SP),-(SP)     ;PICKUP THE MODE
        MOVB    1(SP),FILL0     ;LOAD ZERO FILL SWITCH
        MOVB    (SP)+,MODE0+1   ;NUMBER OF DIGIT TO TYPE
        ADD     #2,(SP)          ;ADJUST RETURN ADDRESS
        BR      TYPON
TYPOC:  MOVB    #1,FILL0         ;SET THE ZERO FILL SWITCH
        MOVB    #6,MODE0+1       ;SET FOR SIX(6) DIGITS
TYPON:  MOVB    #5,CNT0          ;SET THE ITERATION COUNT
        MOV     R3,-(SP)         ;SAVR R3
        MOV     R4,-(SP)         ;SAVE R4
        MOV     R5,-(SP)         ;SAVE R5
        MOVB    MODE0+1,R4       ;GET THE NUMBER OF DIGIT TO TYPE
        NEG     R4
        ADD     #6,R4            ;SUBSTRACT IT FOR MAX.ALLOWED
        MOVB    R4,MODE0         ;SAVE IT FOR USE
        MOVB    FILL0,R4         ;GET THE ZERO FILL SWITCH
        MOV     10(SP),R5        ;PICK UP THE INPUT NUMBER
        CLR     R3               ;CLEAR THE OUTPUT WORD
A1:     ROL     R5               ;ROTATE MSB INTO "C"
        BR      A3               ;GO TO MSB
A2:     ROL     R5               ;FORM THIS DIGIT
        ROL     R5
        ROL     R5
        MOV     R5,R3
A3:     ROL     R3               ;GET LSB OF THIS DIGIT
        DECB    MODE0            ;TYPE THIS DIGIT?
        BPL     A7              ;BR IF NO
        BIC     #177770,R3       ;GET RID OF JUNK
        BNE     A4               ;TEST FOR 0
                TST     R4                ;SUPPRESS THIS 0?
        BEQ     A5              ;BR IF YES
A4:     INC     R4               ;DON'T SUPPRESS ANYMORE 0'S
        BIS     #'0,R3           ;MAKE THIS DIGIT ASCII
A5:     BIS     #' ,R3           ;MAKE ASCII IF NOT ALREA
        MOVB    R3,A8            ;SAVE FOR TYPING
        MOV     R4,-(SP)
        MOV     R5,-(SP)         ;
        TYPE    ,A8              ;GO TYPE THIS DIGIT
        MOV     (SP)+,R5
        MOV     (SP)+,R4
A7:     DECB    CNT0             ;COUNT BY ONE
        BGT     A2               ;BRANCH IF MORE TO DO
        BLT     A6               ;BRANCH IF DONE
        INC     R4               ;INSURE LAST DIGIT IS NOT A BLANK
        BR      A2
A6:     MOV     (SP)+,R5        ;RESTORE R5
        MOV     (SP)+,R4        ;RESTORE R4
        MOV     (SP)+,R3        ;RESTORE R3
        RTS     PC
A8:     .BYTE    0              ;STORAGE FOR ASCII DIGIT
        .BYTE    0              ;TERMINATOR FOR TYPE ROUTINE
```

```
 1338  014466     000
 1339  014467     000
 1340  014470  000000
 1341
 1342
 1343
 1344  014472  105767  163066
 1345  014476  100375
 1346  014500  116667  000002  163060
 1347  014506  122766  000015  000002
 1348  014514  001003
 1349  014516  105067  000014
 1350  014522  000406
 1351  014524  122766  014241  000002
 1352  014532  001402
 1353  014534  105227
 1354  014536  000000
 1355  014540  000207
 1356
 1357
 1358
 1359  014542  013746  000004
 1360  014546  012737  014602  000004
 1361  014554  012767  177570  163716
 1362  014562  012767  177570  163712
 1363  014570  022777  177777  163702
 1364  014576  001012
 1365
 1366  014600  000403
 1367  014602  012716  014610
 1368  014606  000002
 1369  014610  012767  000176  163662
 1370  014616  012767  000174  163656
 1371  014624  012637  000004
 1372  014630  005067  163650
 1373  014634  132767  000200  163644
 1374  014642  001403
 1375  014644  012767  000510  163626
 1376  014652  000207
 1377
 1378  014654  023046  044124  020105  DCMSG1: .ASCIZ /&&THE FOLLOWING VALUES ARE BEING USED/
       014662  047506  046114  053517
       014670  047111  020107  040526
       014676  052514  051505  040440
       014704  042522  041040  044505
       014712  043516  052440  042523
       014720  000104
 1379  014722  020046  020040  042040  DCMSG2: .ASCIZ  /&    DEVICE ADDRESS = /
       014730  053105  041511  020105
       014736  042101  051104  051505
       014744  020123  020075     000
 1380  014751     046  020040  020040  DCMSG3: .ASCIZ  /&    PC INTERRUPT VECTOR ADDRESS = /
       014756  041520  044440  052116
       014764  051105  052522  052120
       014772  053040  041505  047524
       015000  020122  042101  051104
```

```
CNTO:    .BYTE    0              ;OCTAL DIGIT COUNTER
FILLO:   .BYTE    0              ;ZERO FILL SWITCH
MODEO:   .WORD    0              ;NUMBER OF DIGIT TO TYPE
;
;
;
TYPEC:   TSTB     TPS            ;WAIT UNTIL THE PRINTER IS READY
         BPL      TYPEC
         MOVB     2(SP),TPB      ;LOAD CHARACTER TO BE TYPED INTO DATA REG
         CMPB     #15,2(SP)       ;IS CHAR CARRIAGE RETURN?
         BNE      B1
         CLRB     CHARCNT        ;YES CLEAR CHAR COUNT
         BR       TYPEX          ;EXIT
B1:      CMPB     #LF,2(SP)      ;IS CHAR LINE FEED?
         BEQ      TYPEX          ;BRANCH IF YES
         INCB     (PC)+          ;COUNT THE CHARS
CHARCNT:.WORD     0              ;CHARACTER COUNT SPACE
TYPEX:    RTS     PC

;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
SWRCK:   MOV      @#ERRVEC,-(SP)    ;SAVE ERROR VECTOR
         MOV      #RT1,@#ERRVEC      ;SET UP ERROR VECTOR
         MOV      #DSWR,SWR         ;SET UP FOR HARDWARE SWR
         MOV      #DDISP,DISPLAY    ;AND A HARDWARE DISPLAY REGISTER
         CMP      #-1,@SWR          ;TRY TO REFERENCE HARDWARE SWR
         BNE      RT3               ;BRANCH IF NO TIME OUT TRAP OCCURED
                                    ;AND THE HARDWARE SWR IS NOT = -1
         BR       RT2               ;BRANCH IF NO TIME OUT
RT1:     MOV      #RT2,(SP)         ;SET UP FOR TRAP RETURN
         RTI
RT2:     MOV      #SWREG,SWR        ;POINT TO SOFTWARE SWR
         MOV      #DISPREG,DISPLAY
RT3:     MOV      (SP)+,@#ERRVEC    ;RESTORE ERROR VECTOR
         CLR      APASS             ;CLEAR PASS COUNT
         BITB     #200,AENVM        ;TEST USER SIZE UNDER APT
         BEQ      RT4               ;YES,USE NON-APT SWITCH
         MOV      #ASWREG,SWR       ;NO,USE APT SWITCH REGISTER
RT4:     RTS      PC
```

```
                015006  051505  020123  020075
                015014     000
     1381       015015     046  020040  020040  DCMSG4: .ASCIZ  /&    BUS REQUEST LEVEL = /
                015022  052502  020123  042522
                015030  052521  051505  020124
                015036  042514  042526  020114
                015044  020075     000
     1382       015047     046  042046  020117  DCMSG5: .ASCIZ  /&&DO YOU WANT TO CHANGE ANY OF THESE VALUES (Y OR N)?/
                015054  047531  020125  040527
                015062  052116  052040  020117
                015070  044103  047101  042507
                015076  040440  054516  047440
                015104  020106  044124  051505
                015112  020105  040526  052514
                015120  051505  024040  020131
                015126  051117  047040  037451
                015134     000
     1383       015135     046  020040  047105  DCMSG6: .ASCIZ  /&  ENTER VALUE AFTER (=) IS TYPED/
                015142  042524  020122  040526
                015150  052514  020105  043101
                015156  042524  020122  036450
                015164  020051  051511  052040
                015172  050131  042105     000
     1384       015177     046  025046  025052  LOGTST: .ASCIZ  /&&***** LOGIC TESTS *****&&/
                015204  025052  046040  043517
                015212  041511  052040  051505
                015220  051524  025040  025052
                015226  025052  023046     000
     1385       015233     046  050046  052125  INITM1: .ASCIZ  /&&PUT 8035-8045  OFF-LINE, REMOVE ALL CARDS/
                015240  034040  031460  026465
                015246  030070  032464  020040
                015254  043117  026506  044514
                015262  042516  020054  042522
                015270  047515  042526  040440
                015276  046114  041440  051101
                015304  051504     000
     1386       015307     046  051120  051505  CONMSG: .ASCIZ  /&PRESS CR TO CONTINUE/
                015314  020123  051103  052040
                015322  020117  047503  052116
                015330  047111  042525     000
     1387       015335     046  042446  051122  PCMSG:  .ASCIZ  /&&ERROR AT ADDRESS /
                015342  051117  040440  020124
                015350  042101  051104  051505
                015356  020123     000
     1388       015361     046  047507  042117  GDMSG:  .ASCIZ  /&GOOD=/
                015366  000075
     1389       015370  041046  042101  036440  BDMSG:  .ASCIZ  /&BAD =/
                015376     000
     1390       015377     046  047503  052514  COLMSG: .ASCIZ  /&COLUMN #=/
                015404  047115  021440  000075
     1391       015412  023046  052520  020124  T2MSG1: .ASCIZ  /&&PUT 8035-8045  ON-LINE AND PRESS START ON THE 8035-8045/
                015420  030070  032463  034055
                015426  032060  020065  047440
                015434  026516  044514  042516
                015442  040440  042116  050040
                015450  042522  051523  051440
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                015456  040524  052122  047440
                015464  020116  044124  020105
                015472  030070  032463  034055
                015500  032060  000065
 1392           015504  023046  052520  020124  T5M1:    .ASCIZ  /&&PUT 8035-8045  OFF-LINE/
                015512  030070  032463  034055
                015520  032060  020065  047440
                015526  043106  046055  047111
                015534  000105
 1393           015536  023046  051120  051505  T5M2:    .ASCIZ  /&&PRESS START ON THE 8035-8045 /
                015544  020123  052123  051101
                015552  020124  047117  052040
                015560  042510  034040  031460
                015566  026465  030070  032464
                015574  000040
 1394           015576  023046  052520  046114  T5MSG1: .ASCIZ  /&&PULL CARD PLATE OF STACKER #1 BACK TO POSITION WHICH/
                015604  041440  051101  020104
                015612  046120  052101  020105
                015620  043117  051440  040524
                015626  045503  051105  021440
                015634  020061  040502  045503
                015642  052040  020117  047520
                015650  044523  044524  047117
                015656  053440  044510  044103
                015664     000
 1395           015665     046  044527  046114  T5MSG2: .ASCIZ  /&WILL SIMULATE STACKER FULL AND RELEASE/
                015672  051440  046511  046125
                015700  052101  020105  052123
                015706  041501  042513  020122
                015714  052506  046114  040440
                015722  042116  051040  046105
                015730  040505  042523     000
 1396           015735     046  051120  043517  T5MSG3: .ASCIZ  /&PROGRAM WILL WAIT FOR STACKER FULL FLAG/
                015742  040522  020115  044527
                015750  046114  053440  044501
                015756  020124  047506  020122
                015764  052123  041501  042513
                015772  020122  052506  046114
                016000  043040  040514  000107
 1397           016006  023046  051120  051505  T5MSG4: .ASCIZ  /&&PRESS START ON THE 8035-8045 /
                016014  020123  052123  051101
                016022  020124  047117  052040
                016030  042510  034040  031460
                016036  026465  030070  032464
                016044  000040
 1398           016046  023046  052520  046114  T5MSG5: .ASCIZ  /&&PULL CARD PLATE OF STACKER #2 BACK TO POSITION WHICH/
                016054  041440  051101  020104
                016062  046120  052101  020105
                016070  043117  051440  040524
                016076  045503  051105  021440
                016104  020062  040502  045503
                016112  052040  020117  047520
                016120  044523  044524  047117
                016126  053440  044510  044103
                016134     000
 1399           016135     046  050046  042522  T5MSG6: .ASCIZ  /&&PRESS START ON THE 8035-8045 /
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                016142  051523  051440  040524
                016150  052122  047440  020116
                016156  044124  020105  030070
                016164  032463  034055  032060
                016172  020065    000
1400            016175    046   050046  042522  T5MSG7: .ASCIZ  /&&PRESS START ON THE 8035-8045 /
                016202  051523  051440  040524
                016210  052122  047440  020116
                016216  044124  020105  030070
                016224  032463  034055  032060
                016232  020065    000
1401            016235    046   051120  051505  T6MSG1: .ASCIZ  /&PRESS START ON THE 8035-8045 /
                016242  020123  052123  051101
                016250  020124  047117  052040
                016256  042510  034040  031460
                016264  026465  030070  032464
                016272  000040
1402            016274  023046  025052  025052  CRDTST: .ASCIZ  /&&***** CARD TESTS *****&&/
                016302  020052  040503  042122
                016310  052040  051505  051524
                016316  025040  025052  025052
                016324  023046    000
1403            016327    046   051046  046505  P1MSG1: .ASCIZ  /&&REMOVE ALL CARDS AND PUT THE 8035-8045  OFF-LINE/
                016334  053117  020105  046101
                016342  020114  040503  042122
                016350  020123  047101  020104
                016356  052520  020124  044124
                016364  020105  030070  032463
                016372  034055  032060  020065
                016400  047440  043106  046055
                016406  047111  000105
1404            016412  023046  052520  020124  P1MSG2: .ASCIZ  /&&PUT 10 BLANK CARDS IN EACH INPUT HOPPER/
                016420  030061  041040  040514
                016426  045516  041440  051101
                016434  051504  044440  020116
                016442  040505  044103  044440
                016450  050116  052125  044040
                016456  050117  042520  000122
1405            016464  050046  052125  034040  P1MSG3: .ASCIZ  /&PUT 8035-8045  ON-LINE AND PRESS START ON THE 8035-8045/
                016472  031460  026465  030070
                016500  032464  020040  047117
                016506  046055  047111  020105
                016514  047101  020104  051120
                016522  051505  020123  052123
                016530  051101  020124  047117
                016536  052040  042510  034040
                016544  031460  026465  030070
                016552  032464    000
1406            016555    046   042526  044522  P2MSG1: .ASCIZ  /&VERIFY THAT THERE ARE 10 BLANK CARDS IN EACH STACKER/
                016562  054506  052040  040510
                016570  020124  044124  051105
                016576  020105  051101  020105
                016604  030061  041040  040514
                016612  045516  041440  051101
                016620  051504  044440  020116
                016626  040505  044103  051440
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        016634  040524  045503  051105
        016642     000
 1407   016643     046  046120  041501  P2MSG2: .ASCIZ  /&PLACE ALL 20 CARDS IN THE PRIMARY HOPPER/
        016650  020105  046101  020114
        016656  030062  041440  051101
        016664  051504  044440  020116
        016672  044124  020105  051120
        016700  046511  051101  020131
        016706  047510  050120  051105
        016714     000
 1408   016715     046  051120  051505  P2MSG3: .ASCIZ  /&PRESS STOP-RESET AND PRESS START ON THE 8035-8045 /
        016722  020123  052123  050117
        016730  051055  051505  052105
        016736  040440  042116  050040
        016744  042522  051523  051440
        016752  040524  052122  047440
        016760  020116  044124  020105
        016766  030070  032463  034055
        016774  032060  020065     000
 1409   017001     046  051120  051505  P2MSG4: .ASCIZ  /&PRESS STOP-RESET ON THE 8035-8045/
        017006  020123  052123  050117
        017014  051055  051505  052105
        017022  047440  020116  044124
        017030  020105  030070  032463
        017036  034055  032060  000065
 1410   017044  053046  051105  043111  P3MSG1: .ASCIZ  /&VERIFY THAT ALL CHARS WERE PUNCHED ON EACH CARD IN A/
        017052  020131  044124  052101
        017060  040440  046114  041440
        017066  040510  051522  053440
        017074  051105  020105  052520
        017102  041516  042510  020104
        017110  047117  042440  041501
        017116  020110  040503  042122
        017124  044440  020116  000101
 1411   017132  050046  042522  042503  P3MSG2: .ASCIZ  /&PRECESS FASHION BEGINNING WITH COLUMN 11 OF 1ST CARD/
        017140  051523  043040  051501
        017146  044510  047117  041040
        017154  043505  047111  044516
        017162  043516  053440  052111
        017170  020110  047503  052514
        017176  047115  030440  020061
        017204  043117  030440  052123
        017212  041440  051101  000104
 1412   017220  053046  051105  043111  P4MSG1: .ASCIZ  /&VERIFY THAT THERE IS 1 ''A'' CHAR PUNCHED IN CARD 1/
        017226  020131  044124  052101
        017234  052040  042510  042522
        017242  044440  020123  020061
        017250  040442  020042  044103
        017256  051101  050040  047125
        017264  044103  042105  044440
        017272  020116  040503  042122
        017300  030440     000
 1413   017303     046  025052  020052  PROGNM:.ASCIZ /&*** DECSPEC-11-CZCTAA0-CTS11-JC-7 BIT ASCII-TEST ****&/
        017310  042504  051503  042520
        017316  026503  030461  041455
        017324  041532  040524  030101
```

```
                017332  041455  051524  030461
                017340  045055  026503  020067
                017346  044502  020124  051501
                017354  044503  026511  042524
                017362  052123  025040  025052
                017370  023052     000
1414            017373     046  050125  052040  P4MSG2: .ASCIZ  /&UP TO 20 ''A'' CHARS PUNCHED IN CARD 20/
                017400  020117  030062  021040
                017406  021101  041440  040510
                017414  051522  050040  047125
                017422  044103  042105  044440
                017430  020116  040503  042122
                017436  031040  000060
1415            017442  023046  047105  020104  ENDMSG: .ASCIZ  /&&END OF TESTING&&/
                017450  043117  052040  051505
                017456  044524  043516  023046
                017464     000
1416                    017466                          .EVEN
1417            017466  000040                  BF20:   40
1418            017470  000040                  BF19:   40
1419            017472  000040                  BF18:   40
1420            017474  000040                  BF17:   40
1421            017476  000040                  BF16:   40
1422            017500  000040                  BF15:   40
1423            017502  000040                  BF14:   40
1424            017504  000040                  BF13:   40
1425            017506  000040                  BF12:   40
1426            017510  000040                  BF11:   40
1427            017512  000040                  BF10:   40
1428            017514  000040                  BF9:    40
1429            017516  000040                  BF8:    40
1430            017520  000040                  BF7:    40
1431            017522  000040                  BF6:    40
1432            017524  000040                  BF5:    40
1433            017526  000040                  BF4:    40
1434            017530  000040                  BF3:    40
1435            017532  000040                  BF2:    40
1436            017534  000040                  BF1:    40
1437            017536  000040                          40
1438            017540  000040                          40
1439            017542  000040                          40
1440            017544  000040                          40
1441            017546  000040                          40
1442            017550  000040                          40
1443            017552  000040                          40
1444            017554  000040                          40
1445            017556  000040                          40
1446            017560  000041                          41
1447            017562  000042                          42
1448            017564  000043                          43
1449            017566  000044                          44
1450            017570  000045                          45
1451            017572  000046                          46
1452            017574  000047                          47
1453            017576  000050                          50
1454            017600  000051                          51
```

```
 1455  017602  000052                          52
 1456  017604  000053                          53
 1457  017606  000054                          54
 1458  017610  000055                          55
 1459  017612  000056                          56
 1460  017614  000057                          57
 1461  017616  000060                          60
 1462  017620  000061                          61
 1463  017622  000062                          62
 1464  017624  000063                          63
 1465  017626  000064                          64
 1466  017630  000065                          65
 1467  017632  000066                          66
 1468  017634  000067                          67
 1469  017636  000070                          70
 1470  017640  000071                          71
 1471  017642  000072                          72
 1472  017644  000073                          73
 1473  017646  000074                          74
 1474  017650  000075                          75
 1475  017652  000076                          76
 1476  017654  000077                          77
 1477  017656  000100                          100
 1478  017660  000101                          101
 1479  017662  000102                          102
 1480  017664  000103                          103
 1481  017666  000104                          104
 1482  017670  000105                          105
 1483  017672  000106                          106
 1484  017674  000107                          107
 1485  017676  000110                          110
 1486  017700  000111                          111
 1487  017702  000112                          112
 1488  017704  000113                          113
 1489  017706  000114                          114
 1490  017710  000115                          115
 1491  017712  000116                          116
 1492  017714  000117                          117
 1493  017716  000120                          120
 1494  017720  000121                          121
 1495  017722  000122                          122
 1496  017724  000123                          123
 1497  017726  000124                          124
 1498  017730  000125                          125
 1499  017732  000126                          126
 1500  017734  000127                          127
 1501  017736  000130                          130
 1502  017740  000131                          131
 1503  017742  000132                          132
 1504  017744  000133                          133
 1505  017746  000134                          134
 1506  017750  000135                          135
 1507  017752  000136                          136
 1508  017754  000137                          137
 1509  017756  000173                          173
 1510  017760  000175
```

```
 1511  017762  000040                          40
 1512  017764  000040                          40
 1513  017766  000040                          40
 1514  017770  000040                          40
 1515  017772  000040                          40
 1516  017774  000040                          40
 1517  017776  000040                          40
 1518  020000  000040                          40
 1519  020002  000040                          40
 1520  020004  000040                          40
 1521  020006  000040                          40
 1522  020010  000040                          40
 1523  020012  000040                          40
 1524  020014  000040                          40
 1525  020016  000040                          40
 1526  020020  000040                          40
 1527  020022  000040                          40
 1528  020024  000040                          40
 1529  020026  000040                          40
 1530  020030  000040                          40
 1531  020032  000040                          40
 1532  020034  000040                          40
 1533  020036  000040                          40
 1534  020040  000040                          40
 1535  020042  000040                          40
 1536  020044  000040                          40
 1537  020046  000103              CARD01:     103
 1538  020050  000101                          101
 1539  020052  000122                          122
 1540  020054  000104                          104
 1541  020056  000040                          40
 1542  020060  000060                          60
 1543  020062  000061                          61
 1544  020064  000103              CARD02:     103
 1545  020066  000101                          101
 1546  020070  000122                          122
 1547  020072  000104                          104
 1548  020074  000040                          40
 1549  020076  000060                          60
 1550  020100  000062                          62
 1551  020102  000103              CARD03:     103
 1552  020104  000101                          101
 1553  020106  000122                          122
 1554  020110  000104                          104
 1555  020112  000040                          40
 1556  020114  000060                          60
 1557  020116  000063                          63
 1558  020120  000103              CARD04:     103
 1559  020122  000101                          101
 1560  020124  000122                          122
 1561  020126  000104                          104
 1562  020130  000040                          40
 1563  020132  000060                          60
 1564  020134  000064                          64
 1565  020136  000103              CARD05:     103
 1566  020140  000101                          101
```

```
 1567  020142  000122                          122
 1568  020144  000104                          104
 1569  020146  000040                          40
 1570  020150  000060                          60
 1571  020152  000065                          65
 1572  020154  000103                CARD06:   103
 1573  020156  000101                          101
 1574  020160  000122                          122
 1575  020162  000104                          104
 1576  020164  000040                          40
 1577  020166  000060                          60
 1578  020170  000066                          66
 1579  020172  000103                CARD07:   103
 1580  020174  000101                          101
 1581  020176  000122                          122
 1582  020200  000104                          104
 1583  020202  000040                          40
 1584  020204  000060                          60
 1585  020206  000067                          67
 1586  020210  000103                CARD08:   103
 1587  020212  000101                          101
 1588  020214  000122                          122
 1589  020216  000104                          104
 1590  020220  000040                          40
 1591  020222  000060                          60
 1592  020224  000070                          70
 1593  020226  000103                CARD09:   103
 1594  020230  000101                          101
 1595  020232  000122                          122
 1596  020234  000104                          104
 1597  020236  000040                          40
 1598  020240  000060                          60
 1599  020242  000071                          71
 1600  020244  000103                CARD10:   103
 1601  020246  000101                          101
 1602  020250  000122                          122
 1603  020252  000104                          104
 1604  020254  000040                          40
 1605  020256  000061                          61
 1606  020260  000060                          60
 1607  020262  000103                CARD11:   103
 1608  020264  000101                          101
 1609  020266  000122                          122
 1610  020270  000104                          104
 1611  020272  000040                          40
 1612  020274  000061                          61
 1613  020276  000061                          61
 1614  020300  000103                CARD12:   103
 1615  020302  000101                          101
 1616  020304  000122                          122
 1617  020306  000104                          104
 1618  020310  000040                          40
 1619  020312  000061                          61
 1620  020314  000062                          62
 1621  020316  000103                CARD13:   103
 1622  020320  000101                          101
```

```
 1623  020322  000122                          122
 1624  020324  000104                          104
 1625  020326  000040                          40
 1626  020330  000061                          61
 1627  020332  000063                          63
 1628  020334  000103                CARD14:   103
 1629  020336  000101                          101
 1630  020340  000122                          122
 1631  020342  000104                          104
 1632  020344  000040                          40
 1633  020346  000061                          61
 1634  020350  000064                          64
 1635  020352  000103                CARD15:   103
 1636  020354  000101                          101
 1637  020356  000122                          122
 1638  020360  000104                          104
 1639  020362  000040                          40
 1640  020364  000061                          61
 1641  020366  000065                          65
 1642  020370  000103                CARD16:   103
 1643  020372  000101                          101
 1644  020374  000122                          122
 1645  020376  000104                          104
 1646  020400  000040                          40
 1647  020402  000061                          61
 1648  020404  000066                          66
 1649  020406  000103                CARD17:   103
 1650  020410  000101                          101
 1651  020412  000122                          122
 1652  020414  000104                          104
 1653  020416  000040                          40
 1654  020420  000061                          61
 1655  020422  000067                          67
 1656  020424  000103                CARD18:   103
 1657  020426  000101                          101
 1658  020430  000122                          122
 1659  020432  000104                          104
 1660  020434  000040                          40
 1661  020436  000061                          61
 1662  020440  000070                          70
 1663  020442  000103                CARD19:   103
 1664  020444  000101                          101
 1665  020446  000122                          122
 1666  020450  000104                          104
 1667  020452  000040                          40
 1668  020454  000061                          61
 1669  020456  000071                          71
 1670  020460  000103                CARD20:   103
 1671  020462  000101                          101
 1672  020464  000122                          122
 1673  020466  000104                          104
 1674  020470  000040                          40
 1675  020472  000062                          62
 1676  020474  000060                          60
 1677                                          .EVEN
 1678
```

```
 1679  020476  000000                  ADR:    XX
 1680  020500  000000                  BAD:    XX
 1681  020502  000000                  CARD:   XX
 1682  020504  000000                  CNT:    XX
 1683  020506  000000                  CNT1:   XX
 1684  020510  000000                  GOOD:   XX
 1685  020512  000000                  HOLD:   XX
 1686  020514  000000                  INPTR:  XX
 1687  020516  000000                  LASTPC: XX
 1688  020520  000000                  LEVEL:  XX
 1689  020522  000000                  LOC:    XX
 1690  020524  000000                  OUTPTR: XX
 1691  020526  000000                  PT:     XX
 1692  020530  000000                  PTR:    XX
 1693  020532  000000                  SCOPE:  XX
 1694  020534  000000                  TEMP:   XX
 1695  020536  000000                  TOG1:   XX
 1696
 1697                                  ;
 1698                                  ;******** DEVICE ADDRESSES ********
 1699                                  ;
 1700  020540  177160                  TCR:    177160
 1701  020542  177161                  TCRHI:  177161
 1702  020544  177162                  TSR:    177162
 1703  020546  177163                  TSRHI:  177163
 1704  020550  177164                  TDR:    177164
 1705  020552  177165                  TDRHI:  177165
 1706  020554  177166                  TIR:    177166
 1707  020556  177167                  TIRHI:  177167
 1708                                  ;
 1709                                  ;******** INTERRUPT VECTOR ADDRESSES ********
 1710                                  ;
 1711  020560  000230                  PCV:    230
 1712  020562  000232                  PSV:    232
 1713                                  ;
 1714                                  ;******** BUS REQUEST LEVEL ********
 1715                                  ;
 1716  020564  000004                  BRLV:   4
 1717
 1718          000001                          .END
```

K 4

CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0049

```
ADR     020476            1069* 1070* 1072  1073  1079  1085  1679#
AENVM   000506             334# 1373
APASS   000504             333# 1372*
ASWREG  000510             335# 1375
AUTOB   000512             336# 1201
A1      014350            1305#
A2      014354            1307# 1328  1331
A3      014364            1306  1311#
A4      014406            1315  1318#
A5      014414            1317  1320#
A6      014454            1329  1332#
A7      014440            1313  1327#
A8      014464            1321* 1324  1336#
B     = 000001             244#
BAD     020500             378*  379*  380*  389*  395*  419*  420*  421*  444*  445   450*  460*  461*
                           464*  467*  468*  481*  484*  485*  509*  510*  515*  516*  527*  532*  557*
                           558*  579*  605*  608*  614*  615*  629*  630*  635*  637*  644*  645*  649*
                           651*  658*  659*  666*  667*  671*  672*  694*  695*  701*  705*  706*  707*
                           718*  719*  723*  724*  739*  740*  765*  766*  779*  780*  781*  792*  793*
                           799*  800*  825*  826*  837*  838*  839*  850*  851*  857*  858*  881*  882
                           888*  968*  969  1084  1680#
BC1     012046            878#  879   887
BDMSG   015370           1082  1389#
BF1     017534             697   759   819   895   903  1436#
BF10    017512           1427#
BF11    017510           1426#
BF12    017506           1425#
BF13    017504           1424#
BF14    017502           1423#
BF15    017500           1422#
BF16    017476           1421#
BF17    017474           1420#
BF18    017472           1419#
BF19    017470           1418#
BF2     017532           1435#
BF20    017466            893   901  1417#
BF3     017530           1434#
BF4     017526           1433#
BF5     017524           1432#
BF6     017522           1431#
BF7     017520           1430#
BF8     017516           1429#
BF9     017514           1428#
BLKCRD  012036            628   636   643   650   656   665   692   716   876#
BRLV    020564            443  1018  1055* 1716#
B1      014524           1348  1351#
CARD    020502            770*  774*  788*  925  1681#
CARD01  020046            829  1537#
CARD02  020064           1544#
CARD03  020102           1551#
CARD04  020120           1558#
CARD05  020136           1565#
CARD06  020154           1572#
CARD07  020172           1579#
CARD08  020210           1586#
CARD09  020226           1593#
```

```
CARD10  020244            1600#
CARD11  020262            1607#
CARD12  020300            1614#
CARD13  020316            1621#
CARD14  020334            1628#
CARD15  020352            1635#
CARD16  020370            1642#
CARD17  020406            1649#
CARD18  020424            1656#
CARD19  020442            1663#
CARD20  020460            1670#
CB1     012174             894#   896
CD1     012516             965#   966    975
CHARCN  014536            1349*  1354#
CKDATA  012504             762    776    790    822    834    847    963#
CKSWR   013704             595    867    877    910    927    945   1060   1193#
CLRBFS  012170             688    893#
CNT     020504             570*   571*   573*   575*   577*   609*   610*   612*  1126*  1134*  1139*  1142*  1149*
                          1159*  1682#
CNTLG   014211            1203   1252#
CNTLU   014204            1216   1251#
CNTO    014466            1294*  1327*  1338#
CNT1    020506             632*   638*   653*   660*   698*   708*   769*   782*   828*   840*  1683#
COL   = 000004             241#   884    971
COLMSG  015377            1088   1390#
CONMSG  015307             866   1386#
CONTIN  012006             376    417    495    500    536    548    568    594    603    687    757    816    865#
CONT1   012016             868#   870
CRDTST  016274             591   1402#
CRLF    014240            1227   1258#
DCMSG1  014654            1006   1378#
DCMSG2  014722            1008   1035   1379#
DCMSG3  014751            1012   1045   1380#
DCMSG4  015015            1016   1052   1381#
DCMSG5  015047            1021   1382#
DCMSG6  015135            1033   1383#
DC1     012752            1022#  1028
DC2     012774            1024   1027#
DC3     013010            1026   1032#
DC4     013040            1040#  1043
DDISP = 177570             329#   332    1362
DEVCOD  012712             353   1005#
DISPLA  000502             332#  1362*  1370*
DISPRE  000174             325#  1370
DSWR  = 177570             328#   331    1361
ENDMSG  017442             364   1415#
ERR   = 104000             239#   378    379    380    389    395    419    420    421    438    447    450    460
                           461    464    467    468    477    481    484    485    509    510    515    516    527
                           532    545    557    558    579    605    608    614    615    624    629    630    635
                           637    644    645    649    651    658    659    666    667    671    672    694    695
                           701    705    706    707    718    719    723    724    733    739    740    765    766
                           779    780    781    792    793    799    800    825    826    837    838    839    850
                           851    857    858    884    888    971
ERRHLT  013306            1094#
ERROR   013126             318   1060#
ERRVEC= 000004             327#  1359   1360*  1371*
```

```
E1      013226          1074    1079#
E2      013246          1080    1085#
E3      013266          1066    1086    1090#
E4      013310          1093    1095#
FILLO   014467          1288*   1292*   1302    1339#
G     = 000002           243#
GB    = 000003           242#    378     379     380     389     395     419     420     421     447     450     460     461
                         464     467     468     481     484     485     509     510     515     516     527     532     557
                         558     579     605     608     614     615     629     630     635     637     644     645     649
                         651     658     659     666     667     671     672     694     695     701     705     706     707
                         718     719     723     724     739     740     765     766     779     780     781     792     793
                         799     800     825     826     837     838     839     850     851     857     858     884     888
                         971
GDMSG   015361          1076    1388#
GOOD    020510           378*    379*    380*    389*    395*    419*    420*    421*    443*    445     450*    460*    461*
                         464*    467*    468*    481*    484*    485*    509*    510*    515*    516*    527*    532*    557*
                         558*    579*    605*    608*    614*    615*    629*    630*    635*    637*    644*    645*    649*
                         651*    658*    659*    666*    667*    671*    672*    694*    695*    701*    705*    706*    707*
                         718*    719*    723*    724*    739*    740*    765*    766*    779*    780*    781*    792*    793*
                         799*    800*    825*    826*    837*    838*    839*    850*    851*    857*    858*    880*    882
                         888*    967*    969     1078    1684#
GTSWR   013754           349     1204#
HOLD    020512           387*    388     389     1685#
INIT    001110           357     370#
INITM1  015233           373     1385#
INIT1   001130           377#    378     379     380
INPTR   020514           759*    763*    777*    819*    823*    835*    848*    964     1686#
INTAG   000514           337#    1228
K 2     014036          1215    1219#
K11     014060          1222    1224#
K14     014064          1227#
K15     014106          1194    1196    1200    1202    1229    1231#
K16     014110          1220    1232#
K17     014150          1239    1243#
K18     014162          1234    1236    1246#
K19     013774          1208#   1218
K20     014030          1217#   1247
K7      014000          1210#   1211    1245
K9      014016          1214#
LASTPC  020516           378     379     380     389     395     419     420     421     439     448     450     460     461
                         464     467     468     478     481     484     485     509     510     515     516     527     532
                         547     557     558     579     605     608     614     615     625     629     630     635     637
                         644     645     649     651     658     659     666     667     671     672     694     695     701
                         705     706     707     718     719     723     724     734     739     740     765     766     779
                         780     781     792     793     799     800     825     826     837     838     839     850     851
                         857     858     888     1064*   1687#
LEVEL   020520           428*    436*    444     1688#
LF      014241          1259#   1351
LOC     020522          1175*   1176*   1689#
LOGTST  015177           371     1384#
LP    = 012114           378#    379#    380#    389#    395#    419#    420#    421#    450#    460#    461#    464#    467#
                         468#    481#    484#    485#    509#    510#    515#    516#    527#    532#    557#    558#    579#
                         605#    608#    614#    615#    629#    630#    635#    637#    644#    645#    649#    651#    658#
                         659#    666#    667#    671#    672#    694#    695#    701#    705#    706#    707#    718#    719#
                         723#    724#    739#    740#    765#    766#    779#    780#    781#    792#    793#    799#    800#
                         825#    826#    837#    838#    839#    850#    851#    857#    858#    888#
```

N 4

CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0052

```
MNEW    014226            1207    1255#
MODE0   014470            1289*   1293*   1298    1301*   1312*   1340#
MSWR    014216            1204    1253#
OCTDEC  012574             980#   1089
OD1     012610             983#    987     992
OD2     012634             985     989#
OD3     012652             988     993#
ONES    012704             981*    983*    984     989*    996     1000#
OUTPTR  020524             829*    948     949*   1690#
PASS1   004242             361     589#
PASS2   006244             674     681#
PASS3   007604             742     749#
PASS4   010706             801     808#
PCMSG   015335            1068    1387#
PCV     020560             429*    471*    618*    727*   1014     1042    1048*   1711#
PROGNM  017303             348    1413#
PS    = 177776             224#    343*    427*    433*    473*    476*    620*    623*    729*    732*
PSV     020562             430*    472*    619*    728*   1050*   1712#
PT      020526            1124*   1125    1691#
PTR     020530             697*    703*    714*    909     964*    967     973*   1692#
P1A     004634             620#    625
P1B     004710             626     628#
P1D     005046             633#    639
P1E     005544             654#    661
P1INT   004704             618     627#
P1MSG1  016327             593    1403#
P1MSG2  016412             599    1404#
P1MSG3  016464             601    1405#
P2A     006462             699#    709
P2B     007404             733#    734
P2C     007440             735     737#
P2INT   007434             727     736#
P2MSG1  016555             682    1406#
P2MSG2  016643             684     754     813    1407#
P2MSG3  016715             512     529     567     686     756     815    1408#
P2MSG4  017001             375    1409#
P2SD1   012244             912#    913     917
P2SEND  012230             702     713     737     909#
P3A     010036             771#    783
P3MSG1  017044             750    1410#
P3MSG2  017132             752    1411#
P3SD1   012322             928#    929     933
P3SD2   012350             934#    935     939
P3SEND  012304             773     787     797     925#
P4A     011144             830#    841
P4MSG1  017220             809    1412#
P4MSG2  017373             811    1414#
P4SD1   012410             946#    947     952
P4SD2   012450             953#    954     958
P4SEND  012400             832     845     855     944#
QUES    014237            1246    1257#
RDOCT   013514            1037    1047    1054    1149#
RD.1    013524            1151#   1160
RT1     014602            1360    1367#
RT2     014610            1366    1367    1369#
RT3     014624            1364    1371#
```

```
RT4     014652          1374    1376#
SB1     012214           902#    904
SCOPE   020532           345*    378     379     380     389     395     419     420     421     439     448     450     460
                         461     464     467     468     478     481     484     485     509     510     515     516     527
                         532     547     557     558     579     605     608     614     615     625     629     630     635
                         637     644     645     649     651     658     659     666     667     671     672     694     695
                         701     705     706     707     718     719     723     724     734     739     740     765     766
                         779     780     781     792     793     799     800     825     826     837     838     839     850
                         851     857     858     888    1063*   1693#
SETBFS  012210           817     901#
SR    = 177570           225#
START   001000           340     343#
ST1     001046           352     355#    366
ST2     001062           356     359#
ST3     001076           360     363#
SWR     000500           331#    351     355     359    1061    1065    1092    1166    1193    1223*   1361*   1363    1369*
                        1375*
SWRCK   014542           346    1359#
SWREG   000176           326#   1193    1205    1369
TCR     020540           378     388*    389     393*    395     419     432*    450     461     464     468     470*    481
                         483*    484     510     516     538*    558     569*    605     607*    608     617*    630     633*
                         637     641*    645     647*    651     654*    657     659     663*    667     669*    670     672
                         690*    693     695     699*    704     706     711*    717     719     721*    724     726*    738
                         740     760*    764     766     771*    778     779     785*    791     793     795*    798     800
                         820*    824     826     830*    836     837     843*    849     851     853*    856     858    1010
                        1039    1700#
TCRHI   020542           459*    466*    497*    518*    597*   1701#
TDR     020550           881     914*    930*    936*    948*    955*    968    1704#
TDRHI   020552          1705#
TEMP    020534          1127*   1128*   1129*   1130    1150*   1154*   1155*   1156*   1157*   1158*   1161    1694#
TENS    012706           982*    990*    993    1001#
TEST1   001334           382     386#
TEST2   001552           397     415#
TEST3   001764           423     427#    439     448
TEST4   002230           452     459#    460     461
TEST5   003076           487     493#
TEST6   004100           561     565#
TIR     020554           380     421     615     634     642     648     655     664     691     707     715     723     761
                         775     781     789     821     833     839     846     878     888     965    1706#
TIRHI   020556           700     712     722     772     786     796     831     844     854     912     918     928     934
                         946     953    1707#
TKB   = 177562           227#   1185    1197    1212
TKS   = 177560           226#   1182*   1183    1195    1210    1230*
TM1     013334          1109#   1115
TM2     013352          1112    1114#
TM3     013360          1110    1116#
TOG     012710           980*    986*    991*   1002#
TOG1    020536           925*    932*    944*    950*    951     956*    957    1695#
TO.1    013414          1127#   1135
TO.2    013466          1137    1139#
TO.3    013472          1140#   1143
TPB   = 177566           229#   1168*   1346*
TPS   = 177564           228#   1169    1344
TSR     020544           379     420     460     467     485     509     515     527     532     557     579     614     629
                         635     644     649     658     666     671     694     701     705     718     739     765     780
                         792     799     825     838     850     857    1702#
```

```
TSRHI   020546          507   513   525   530   543   555  1703#
TTI.1   013662         1183#  1184
TTO.1   013616         1169#  1170
TTO.2   013640         1172   1175#
TTO.3   013654         1167   1178#
TTYIN   013656          868   1022  1151  1182#
TTYN    014170         1248#
TTYOUT  013602          871   995   998   1025  1029  1091  1114  1141  1152  1166# 1174
TYPE  = 104400          240#  347   363   370   372   374   415   493   498   501   503   505   511
                        519   521   523   528   534   539   541   549   551   553   566   590   592
                        598   600   681   683   685   749   751   753   755   808   810   812   814
                        865   1005  1007  1009  1011  1013  1015  1017  1020  1032  1034  1044  1051
                       1067   1071  1075  1077  1081  1083  1087  1203  1204  1207  1216  1227  1246
                       1324
TYPEC   014472         1232   1344# 1345
TYPEX   014540         1350   1352  1355#
TYPMSG  013330         1102   1107#
TYPOC   014270         1206   1292#
TYPOCT  013366         1103   1121#
TYPON   014304         1291   1294#
TYPOS   014244         1287#
TYPOUT  013312          322   1099#
T1A     001340          387#   391
T1B     001344          388#   389
T1C     001432          393#   395
T1END   001550          390    411#
T1LST   001520          386    399#
T2MSG1  015412          416    499   1391#
T3A     002022          433#   437
T3B     002150          440    449#  450
T3INT   002072          429    442#
T4A     002362          463#   464
T4B     002436          466#   467   468
T4C     002612          473#   478
T4D     002666          479    481#
T4E     002740          483#   484   485
T4INT   002662          471    480#
T5A     003142          507#   508   509
T5B     003302          513#   514   515
T5C     003460          525#   526   527
T5D     003546          530#   531   532
T5E     003660          543#   547
T5F     003736          555#   556   557
T5MSG1  015576          502    540   1394#
T5MSG2  015665          504    522   542   552   1395#
T5MSG3  015735          506    524   554   1396#
T5MSG4  016006         1397#
T5MSG5  016046          520    550   1398#
T5MSG6  016135         1399#
T5MSG7  016175         1400#
T5M1    015504          494   1392#
T5M2    015536          535   1393#
T6MSG1  016235         1401#
XX    = 000000          238#  365   920   1000  1001  1002  1094  1679  1680  1681  1682  1683  1684
                       1685   1686  1687  1688  1689  1690  1691  1692  1693  1694  1695
.     = 020566          309#  314   317#  321#  324#  330#  339#  341#  378   379   380   389   395
```

419	420	421	439	446	448	450	460	461	464	467	468	478
481	484	485	509	510	515	516	527	532	544	547	557	558
572	574	576	578	579	605	608	611	613	614	615	625	629
630	634	635	637	642	644	645	648	649	651	655	657	658
659	664	666	667	670	671	672	691	693	694	695	700	701
704	705	706	707	712	715	717	718	719	722	723	724	734
738	739	740	761	764	765	766	772	775	778	779	780	781
786	789	791	792	793	796	798	799	800	821	824	825	826
831	833	836	837	838	839	844	846	849	850	851	854	856
857	858	883	888	919	970	1062	1177	1248#	1286#	1416#		

```
CKTCR     270#  378  389  395  419  450  461  464  468  481  484  510  516  558  605
          608   630  637  645  651  659  667  672  695  706  719  724  740  766  779
          793   800  826  837  851  858
CKTDR     290#
CKTIR     300#  380  421  615  707  723  781  839  888
CKTSR     280#  379  420  460  467  485  509  515  527  532  557  579  614  629  635
          644   649  658  666  671  694  701  705  718  739  765  780  792  799  825
          838   850  857
LOOP      260#  378  379  380  389  395  419  420  421  439  448  450  460  461  464
          467   468  478  481  484  485  509  510  515  516  527  532  547  557  558
          579   605  608  614  615  625  629  630  635  637  644  645  649  651  658
          659   666  667  671  672  694  695  701  705  706  707  718  719  723  724
          734   739  740  765  766  779  780  781  792  793  799  800  825  826  837
          838   839  850  851  857  858  888
WTDONE    246#  657  670  693  704  717  738  764  778  791  798  824  836  849  856
WTIDR     256#  634  642  648  655  664  691  715  761  775  789  821  833  846
WTODR     251#  700  712  722  772  786  796  831  844  854

. ABS.  020566     000

 ERRORS DETECTED:  0

 CZCTAA,CZCTAA/CRF=CZCTAA.SRC
 RUN-TIME: 9 18 2 SECONDS
 RUN-TIME RATIO: 157/30=5.2
 CORE USED:  8K  (15 PAGES)
```