IDENTIFICATION

PRODUCT CODE:	MAINDEC-08-DGDRA-A-D
PRODUCT NAME:	DR8-EA DIAGNOSTIC (FOR USE ON SYSTEMS THAT HAVE A TRADITIONAL PDP-8 PROCESSOR WITH A DW8/E OMNIBUS CONVERTER
DATE REVISED:	JULY 3, 1973
MAINTAINER:	DIAGNOSTIC GROUP
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1. ABSTRACT

THIS DIAGNOSTIC HAS BEEN MODIFIED FOR TESTING THE DR8-EA INTERFACE ON SYSTEMS THAT HAVE A TRADITIONAL PDP-8 PROCESSOR WITH A DW8/E BUS CONVERTER.

THIS PROGRAM IS A DIAGNOSTIC AND EXERCISER FOR THE DR8-EA 12 CHANNEL BUFFERED DIGITAL INTERFACE. ALL FUNCTIONS ARE TESTED AND ERRORS ARE REPORTED BY HALTS AND/OR ERROR TYPEOUTS.

2. REQUIREMENTS

2.1 EQUIPMENT

TRADITIONAL PDP-8 COMPUTER WITH 4K OF CORE
ASR-33 TELETYPE (OR EQUIVALENT)
DW8/E BUS CONVERTER
DR8-EA WITH TEST CABLE

2.2 STORAGE

THE PROGRAM USES LOCATIONS 0000-4121

3. LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING BINARY TAPES SHOULD BE USED.

4. STARTING PROCEDURE

4.1 STARTING ADDRESS

200-INPUT DEVICE CONFIGURATION
201-START WITH STANDARD CONFIGURATION

4.2 SWITCH SETTINGS

FOR EITHER STARTING ADDRESS, NORMAL SETTING IS SR0-SR11=
0 (DOWN).

4.3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY
SET SWITCH REGISTER TO DESIRED STARTING ADDRESS
LOAD ADDRESS
CLEAR SWITCHES
PRESS CLEAR AND CONTINUE

4.3.1 FOR STARTING ADDRESS 200

THE PROGRAM WILL TYPE "SET SR FOR DEVICE CODE AND CONT"
AND THEN HALT.

SET SWITCHES TO 000X WHERE X IS AN OCTAL
NUMBER CORRESPONDING TO THE 3 LSB OF THE DEVICE SELECTOR CODE,
E.G. IF DEVICE CODE IS 53, SET SR TO 0003,
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING
"SET SR FOR INTERRUPT JUMPERS AND CONT" AND THEN HALT.
SET SWITCHES FOR ALL INPUT REGISTER BITS JUMPERED TO INTERRUPT,
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING
"SET SR FOR FLIPFLOP JUMPERS AND CONT" AND THEN HALT.
SET SWITCHES FOR ALL INPUT REGISTER FLIPFLOPS,
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING
"SET SR FOR RUN" AND THEN HALT.
SET SWITCHES AS DESIRED. (REFER TO SECTION 5.1)
PRESS CONTINUE.

PROGRAM WILL BEGIN TEST EXECUTION

4.3.2 FOR STARTING ADDRESS 201

SET SWITCHES AS DESIRED. (REFER TO SECTION 5.1)
DEPRESS CONTINUE.

PROGRAM WILL BEGIN TEST EXECUTION

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

SR0=1, SUPPRESS ERROR HALT
SR1=1, SUPPRESS ERROR TYPEOUT
SR2=1, LOOP ON CURRENT TEST
SR3=1, LOOP WITH CURRENT DATA
SR4=1, SUPPRESS BELL OR TYPEOUT AT END OF PASS
SR5=1, SUPPRESS ITERATIONS
SR6=1, ESCAPE TO NEXT TEST ON ERROR

5.2 PROGRAM AND/OR OPERATOR ACTION

5.2.1.1 WITH SWITCHES SET AS IN 4.2, THE PROGRAM WILL RUN ALL TESTS SEQUENTIALLY. EACH IOT TEST WILL BE REPEATED 4096 TIMES. EACH DATA TEST WILL BE REPEATED 50 TIMES. AFTER ALL TESTS HAVE BEEN COMPLETED, THE PROGRAM WILL TYPE "DR" AND START ALL TESTS AGAIN.
IF AN ERROR OCCURS, THE PROGRAM WILL HALT AND TYPE AN APPROPRIATE ERROR MESSAGE (SEE SECTION 6 FOR DETAILS).

5.2.1.2 WITH SR0=1 (UP), PROGRAM ACTION WILL BE AS IN 5.2.1.1, EXCEPT NO TYPEOUT WILL OCCUR.

5.2.1.3 WITH SR2=1(UP) PROGRAM ACTION WILL BE AS IN 5.2.1.1. EXCEPT NO TYPEOUT WILL OCCUR. THE ADDRESS OF THE FAILING TEST WILL BE DISPLAYED IN THE COMPUTER AC.

5.2.1.4 WITH SR4=1(UP), PROGRAM ACTION WILL BE AS IN 5.2.1.1 EXCEPT NO END OF PASS TYPEOUT WILL OCCUR.

5.2.1.5 WITH SR5=1 (UP), EACH TEST WILL BE EXECUTED ONLY ONCE. INSTEAD OF TYPING "DR", THE PROGRAM WILL RING THE TTY BELL

5.2.1.6 WITH SR0=1 AND SR6=1, PROGRAM ACTION WILL BE AS IN 5.2.1.1 IF NO ERRORS OCCUR.
IF AN ERROR OCCURS, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND IMMEDIATLY TERMINATE ITERATIONS OF THE FAILING TEST. THE PROGRAM WILL THEN START THE NEXT TEST IN SEQUENCE.

6. ERRORS

6.1 NORMAL OPERATION

IF AN ERROR OCCURS WITH SWITCHES SET AS IN 4.2, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE (WITH DATA IF APPLICABLE) AND HALT.

THE FORMAT OF THE ERROR TYPEOUT IS

```
XXXX    MESSAGE
        HEADER FOR DATA (IF APPLICABLE)
        DATA            (IF APPLICABLE)
```

WHERE XXXX= ADDRESS OF JMS TO ERROR ROUTINE IN TEST THAT FAILED.

6.2 ERROR RECOVERY

SET SR6=1(UP) TO ESCAPE TO NEXT TEST, PRESS CONTINUE.

6.3 ERROR LOOP (IOTS)

SET SRØ=1 TO SUPPRESS HALT
SET SR1=1 TO SUPPRESS TYPEOUT
SET SR2=1 TO LOOP ON CURRENT FAILING TEST

6.4 ERROR LOOP (DATA)

SAME AS 6.3 EXCEPT USE SR3 INSTEAD OF SR2 TO LOOP WITH CURRENT DATA.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

TEST JUMPER CABLE MUST BE INSTALLED.
ANY FLOATING INPUTS TO INPUT REGISTER SHOULD BE GROUNDED, OR ERRORS MAY OCCUR.

7.2 OPERATING RESTRICTIONS

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIME

EXECUTION TIME IS APPROXIMATELY 9 MINUTES FOR FULL ITERATION
AND APPROXIMATELY 10 SECONDS WITH ITERATIONS SUPPRESSED.

9. PROGRAM DESCRIPTION

THE DR8-EA IS A TEST OF ALL FUNCTIONS OF THE INTERFACE.

THE PROGRAM SEQUENCE IS AS FOLLOWS:

ALL BASIC IOT TESTS ARE EXECUTED 4096 TIMES.
ALL OUTPUT REGISTER FUNCTIONS ARE TESTED WITH BINARY COUNT PATTERNS.
ALL INPUT REGISTER FUNCTIONS ARE TESTED USING BINARY COUNT PATTERNS.
INTERACTION BETWEEN INPUT AND OUTPUT REGISTERS IS TESTED FOR
WITH BINARY COUNT PATTERNS.
ALL SKIPS AND INTERRUPTS ARE TESTED USING BINARY COUNT PATTERNS.

10. LISTING

```
                    /MAINDEC-08-DGDRA-A DR8-EA DIAGNOSTIC FOR TRADITIONAL PDP8 PROCESSORS
                    /WITH A DW8/E OMNIBUS CONVERTER
                            /COPYRIGHT 1972,1973 DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                            /
                            /STARTING ADDRESS:              200-INPUT DEVICE CONFIGURATION
                            /                               201-USE STANDARD CONFIGURATION
                            /
                            /SWITCH REGISTER OPTIONS
                            /
                            /SR00  =1, SUPPRESS HALT ON ERROR
                            /SR01  =1, SUPPRESS ERROR TYPEOUT
                            /SR02  =1, LOOP ON CURRENT TEST
                            /SR03  =1, LOOP WITH CURRENT DATA
                            /SR04  =1, SUPPRESS BELL AT END OF PASS
                            /SR05  =1, SUPPRESS ITERATIONS
                            /SR06  =1, ESCAPE TO NEXT TEST ON ERROR
                            /
                            /INSTRUCTION DEFINITIONS
                            /
          3114              MQL=DCA MQ
          4115              MQA=JMS SIMMQA
          4046              BSW=JMS SIMBSW
          4063              CAF=JMS SIMCAF
          4076              SRQ=JMS SIMSRQ
          4432              DBEI=JMS I XDBEI
          4433              DBSK=JMS I XDBSK
          4434              DBCI=JMS I XDBCI
          4435              DBRI=JMS I XDBRI
          4436              DBCO=JMS I XDBCO
          4437              DBSO=JMS I XDBSO
          4440              DBRO=JMS I XDBRO
                            /
                            /LOCATION EQUIVALENCIES
                            /
          3026              MSTDGT=ERADR+1
          3027              LSTDGT=ERADR+2
                            /
                            /GENERAL VARIABLES
                            /
          0001      *1
    0001  5402              JMP I 2
          0010      *10
    0010  0000      POINT1, 0
          0020      *20
    0020  0000      CNTR1,  0
    0021  0000      DATA1,  0
    0022  0000      DATA2,  0
    0023  0000      DATA3,  0
    0024  0000      DATA4,  0
    0025  0000      DATA5,  0
    0026  7777      IJUMPE, 7777            /INTERRUPT JUMPER MASK

    0027  7777      FJUMPE, 7777            /FLIPFLOP JUMPER MASK
    0030  0000      TYPFLG, 0
```

```
0031  0000   LPCNT,  0

                     /
                     /INDIRECT POINTERS
                     /
0032  0266   XDBEI,  DBEIX
0033  0273   XDBSK,  DBSKX
0034  0300   XDBCI,  DBCIX
0035  0305   XDBRI,  DBRIX
0036  0312   XDBCO,  DBCOX
0037  0317   XDBSO,  DBSOX
0040  0324   XDBRO,  DBROX
0041  3200   XPRINT, PRINT
0042  3251   XTYPE,  TYPE
0043  2600   XERROR, ERROR
0044  2667   XLOOP1, LOOP1
0045  2712   XLOOP2, LOOP2
0046  0000   SIMBSW, 0
0047  3113           DCA     TYE1
0050  7012           RTR
0051  7012           RTR
0052  7012           RTR
0053  1113           TAD     TYE1
0054  0062           AND     K7700
0055  1113           TAD     TYE1
0056  7006           RTL
0057  7006           RTL
0060  7006           RTL
0061  5446           JMP I SIMBSW
0062  7700   K7700,  7700
              /
0063  0000   SIMCAF, 0
0064  6002           IOF
0065  7240           CLA CMA
0066  4434           DBCI
0067  7410           SKP
0070  7402           HLT                     /DBCI SKIPPED
0071  4436           DBCO
0072  7410           SKP
0073  7402           HLT                     /DBCO SKIPPED
0074  7300           CLA CLL
0075  5463           JMP I SIMCAF
              /
0076  0000   SIMSRQ, 0
0077  3113           DCA     TYE1
0100  1177           TAD     (RETURN
0101  3002           DCA     2
0102  6001           ION
0103  7000           NOP
0104  6002           IOF                     /NO INTERRUPT
0105  7410           SKP
0106  2076   RETURN, ISZ     SIMSRQ
0107  7324           CLA CLL CML RAL
0110  3002           DCA     2
0111  1113           TAD     TYE1
```

```
0112  5476            JMP I SIMSRQ
0113  0000   TYE1,    0
0114  0000   MQ,      0
             /
0115  0000   SIMMQA,  0
0116  3113            DCA     TYE1
0117  1113            TAD     TYE1
0120  7040            CMA
0121  0114            AND     MQ
0122  1113            TAD     TYE1
0123  5515            JMP I SIMMQA
             /

                      /
                      /TEST INITIALIZATION
                      /
      0200   *200
0200  5202            JMP     START1
0201  5244            JMP     START2
0202  4063   START1,  CAF                     /CLEAR ALL FLAGS
0203  4441            JMS I   XPRINT          /TYPE "SET SR FOR DEVICE
0204  3377            M1-1                    /CODE AND CONT"
0205  7402            HLT                     /HALT FOR SWITCHES
0206  7604            LAS                     /GET SWITCHES
0207  0377            AND     (7              /MASK DEVICE CODE
0210  7106            CLL RTL                 /POSITION BITS
0211  7004            RAL
0212  1376            TAD     (6500           /GENERATE BASIC IOT
0213  3247            DCA     IOTS            /SAVE BASIC IOT
0214  4441            JMS I   XPRINT          /TYPE "SET SR FOR JUMPERS
0215  3420            M2-1                    /AND CONT"
0216  7402            HLT                     /HALT FOR SWITCHES
0217  7604            LAS                     /GET SWITCHES
0220  3026            DCA     IJUMPER         /SAVE JUMPER MASK
0221  4441            JMS I   XPRINT
0222  3444            M2A-1
0223  7402            HLT
0224  7604            LAS
0225  3027            DCA     FJUMPER
0226  1375            TAD     (-10            /8 IOTS WILL BE
0227  3020            DCA     CNTR1           /SET UP
0230  1260            TAD     DIOT            /STORE INSTRUCTION FOR
0231  3233            DCA     PNTR1           /IOT SET UP
0232  1247            TAD     IOTS            /GET IOT
0233  0000   PNTR1,   0                       /STORE IT
0234  2233            ISZ     PNTR1           /PREPARE TO STORE
0235  2247            ISZ     IOTS            /NEXT IOT
0236  2020            ISZ     CNTR1
0237  5232            JMP     PNTR1-1
0240  4441            JMS I   XPRINT          /TYPE "SET SR FOR RUN
0241  3475            M3-1                    /AND CONT
0242  7402            HLT                     /HALT FOR SWITCHES
0243  7300            CLA CLL
0244  3030   START2,  DCA     TYPFLG          /CLEAR ERROR FLAG                /CLEAR TYPE FLAG
0245  5646            JMP I   .+1             /GO TO FIRST TEST
```

```
0246  0400            INIT1


                      /
                      /INITIALIZATION CONSTANTS AND VARIABLES
                      /
0247  0000    IOTS,   0                          /BASIC IOT
0250  0262    TIOT,   DBDIX+1
0251  0267            DBEIX+1
0252  0274            DBSKX+1
0253  0301            DBCIX+1
0254  0306            DBRIX+1
0255  0313            DBCOX+1
0256  0320            DBSOX+1
0257  0325            DBROX+1
0260  3650    DIOT,   DCA I   TIOT
                      /
                      /IOT SUBROUTINES
                      /
                      /DISABLE DATA BUFFER INTERRUPT (DBDI,65X0)
                      /
0261  0000    DBDIX,  0
0262  6500            6500

0263  7410            SKP                          /TRAP FOR UNDESIRED
0264  7402            HLT                          /SKIPS
0265  5661            JMP I   DBDIX
                      /
                      /ENABLE DATA BUFFER INTERRUPTS (DBEI,65X1)
                      /
0266  0000    DBEIX,  0
0267  6501            6501

0270  7410            SKP                          /TRAP FOR UNDESIRED
0271  7402            HLT                          /SKIPS
0272  5666            JMP I   DBEIX
                      /
                      /SKIP ON DATA BUFFER INPUT FLAG (DBSK,65X2)
0273  0000    DBSKX,  0
0274  6502            6502

0275  7410            SKP
0276  2273            ISZ     DBSKX
0277  5673            JMP I   DBSKX
                      /
                      /0S TO INPUT REGISTER CORRESPONDING
                      /TO 1S IN AC (DBCI,65X3)
                      /
0300  0000    DBCIX,  0
0301  6503            6503

0302  7410            SKP                          /TRAP FOR UNDESIRED
0303  7402            HLT                          /SKIPS
0304  5700            JMP I   DBCIX
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```
                        /
                        /INPUT REGISTER TO AC (DBRI,65X4)
                        /
0305  0000    DBRIX,    0
0306  6504              6504

0307  7410              SKP                     /TRAP FOR UNDESIRED
0310  7402              HLT                     /SKIPS
0311  5705              JMP I   DBRIX

                        /
                        /ZEROS TO OUTPUT REGISTER CORRESPONDING TO
                        /ONES IN AC (DBCO,65X5)
0312  0000    DBCOX,    0
0313  6505              6505

0314  7410              SKP                     /TRAP FOR UNDESIRED
0315  7402              HLT                     /SKIPS
0316  5712              JMP I   DBCOX
                        /
                        /1S TO OUTPUT REGISTER CORRESPONDING
                        /TO 1S IN AC (DBSO,65X6)
                        /
0317  0000    DBSOX,    0
0320  6506              6506

0321  7410              SKP                     /TRAP FOR UNDESIRED
0322  7402              HLT                     /SKIPS
0323  5717              JMP I   DBSOX
                        /
                        /JAM TRANSFER OUTPUT REGISTER TO AC (DBRO 65X7)
                        /
0324  0000    DBROX,    0
0325  6507              6507

0326  7410              SKP                     /TRAP FOR UNDESIRED
0327  7402              HLT                     /SKIPS
0330  5724              JMP I   DBROX
0375  7770
0376  6500
0377  0007
      0400    PAGE


                        /
                        /IS OUTPUT REGISTER CLEARED BY INITIALIZE?
                        /
0400  3030    INIT1,    DCA     TYPFLG          /CLEAR ERROR FLAG
0401  3031              DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
0402  4063              CAF                     /INITIALIZE INTERFACE
0403  4440              DBRO                    /READ OUTPUT REGISTER
0404  3021              DCA     DATA1           /SAVE REGISTER DATA
0405  1021              TAD     DATA1           /GET REGISTER DATA
0406  7650              SNA CLA                 /WAS REGISTER CLEARED BY INITIALIZE
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0407  5214            JMP     .+5             /DATA CORRECT, CONTINUE
0410  4443            JMS I   XERROR          /NO, ERROR
0411  3645            INIT1E-1                /"OUTPUT REGISTER NOT CLEARED"
0412  3515            DH1-1                   /"REGISTER DATA"
0413  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
0414  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0415  5202            JMP     INIT1+2         /LOOP ON CURRENT TEST
                      /
                      /IS INPUT REGISTER CLEARED BY INITIALIZE?
                      /
0416  3030    INIT2,  DCA     TYPFLG          /CLEAR ERROR FLAG
0417  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
0420  7410            SKP
0421  4063            CAF                     /INITIALIZE INTERFACE
0422  4435            DBRI                    /READ INPUT REGISTER
0423  3021            DCA     DATA1           /SAVE REGISTER DATA
0424  1021            TAD     DATA1           /GET REGISTER DATA
0425  7650            SNA CLA                 /WAS REGISTER CLEARED
0426  5233            JMP     .+5             /DATA CORRECT, CONTINUE
0427  4443            JMS I   XERROR          /NO, ERROR
0430  3661            INIT2E-1                /"INPUT REGISTER NOT CLEARED"
0431  3515            DH1-1                   /"REGISTER DATA"
0432  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
0433  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0434  5221            JMP     INIT2+3         /LOOP ON CURRENT TEST
                      /
                      /IS SKIP FLAG SET AFTER INITIALIZE
                      /
0435  3030    INIT3,  DCA     TYPFLG          /CLEAR ERROR FLAG
0436  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
0437  7410            SKP
0440  4063            CAF                     /INITIALIZE INTERFACE
0441  4432            DBEI                    /ENABLE INTERFACE INTERRUPTS
0442  4433            DBSK                    /IS INTERFACE FLAG SET
0443  5250            JMP     .+5             /FLAG NOT SET, CONTINUE
0444  4443            JMS I   XERROR          /FLAG SET, ERROR
0445  3674            INIT3E-1                /"SKIP FLAG SET"
0446  3514            DH0-1                   /NO DATA HEADER
0447  0000            0                       /NO DATA
0450  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0451  5240            JMP     INIT3+3         /LOOP ON CURRENT TEST

                      /
                      /DOES OUTPUT REGISTER JAM TRANSFER TO AC?
                      /
0452  3030    TRAN1,  DCA     TYPFLG          /CLEAR ERROR FLAG
0453  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
0454  4063            CAF                     /INITIALIZE INTERFACE
0455  7340            CLA CLL CMA             /SET AC =7777
0456  4440            DBRO                    /READ OUTPUT REGISTER
0457  3021            DCA     DATA1           /SAVE AC CONTENTS
0460  1021            TAD     DATA1           /GET AC CONTENTS
0461  7650            SNA CLA                 /WAS AC CLEARED BY TRANSFER
0462  5267            JMP     .+5             /DATA CORRECT, CONTINUE
0463  4443            JMS I   XERROR          /NO, ERROR
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0464  3703          TRAN1E-1              /"DBRO DID NOT CLEAR AC"
0465  3525          DH2-1                 /"AC CONTENTS"
0466  7777          -1                    /NUMBER OF WORDS TO BE OUTPUT
0467  4444          JMS I   XLOOP1        /CHECK FOR LOOP ON CURRENT TEST
0470  5254          JMP     TRAN1+2       /LOOP ON CURRENT TEST
                    /
                    /DOES INPUT REGISTER JAM TRANSFER TO AC
                    /
0471  3030  TRAN2,  DCA     TYPFLG        /CLEAR ERROR FLAG
0472  3031          DCA     LPCNT         /SET ITERATION COUNT TO 4096(DECIMAL)
0473  4063          CAF                   /INITIALIZE INTERFACE
0474  7340          CLA CLL CMA           /SET AC =7777
0475  4435          DBRI                  /READ INPUT REGISTER
0476  3021          DCA     DATA1         /SAVE AC CONTENTS
0477  1021          TAD     DATA1         /GET AC CONTENTS
0500  7650          SNA CLA               /WAS AC CLEARED BY TRANSFER
0501  5306          JMP     .+5           /DATA CORRECT, CONTINUE
0502  4443          JMS I   XERROR        /NO, ERROR
0503  3716          TRAN2E-1              /"DBRI DID NOT CLEAR AC"
0504  3525          DH2-1                 /"AC CONTENTS"
0505  7777          -1                    /NUMBER OF WORDS TO BE OUTPUT
0506  4444          JMS I   XLOOP1        /CHECK FOR LOOP ON CURRENT TEST
0507  5273          JMP     TRAN2+2       /LOOP ON CURRENT TEST
                    /
                    /DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=7777,DBSO)
                    /
0510  3030  TRAN3,  DCA     TYPFLG        /CLEAR ERROR FLAG
0511  3031          DCA     LPCNT         /SET ITERATION COUNT TO 4096(DECIMAL)
0512  4063          CAF                   /INITIALIZE INTERFACE
0513  7340          CLA CLL CMA           /SET AC =7777
0514  4437          DBSO                  /BIT SET OUTPUT REGISTER
0515  3021          DCA     DATA1         /SAVE AC CONTENTS
0516  1021          TAD     DATA1         /GET AC CONTENTS
0517  7040          CMA                   /COMPLIMENT DATA TO TEST FOR 7777
0520  7650          SNA CLA               /DID AC CHANGE
0521  5326          JMP     .+5           /DATA CORRECT, CONTINUE
0522  4443          JMS I   XERROR        /NO, ERROR
0523  3731          TRAN3E-1              /"DBSO CHANGED AC"
0524  3525          DH2-1                 /"AC CONTENTS"
0525  7777          -1                    /NUMBER OF WORDS TO BE OUTPUT
0526  4444          JMS I   XLOOP1        /CHECK FOR LOOP ON CURRENT TEST
0527  5312          JMP     TRAN3+2       /LOOP ON CURRENT TEST

                    /
                    /DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=7777, DBCO)
                    /
0530  3030  TRAN4,  DCA     TYPFLG        /CLEAR ERROR FLAG
0531  3031          DCA     LPCNT         /SET ITERATION COUNT TO 4096(DECIMAL)
0532  4063          CAF                   /INITIALIZE INTERFACE
0533  7340          CLA CLL CMA           /SET AC =7777
0534  4436          DBCO                  /BIT CLEAR OUTPUT REGISTER
0535  3021          DCA     DATA1         /SAVE AC CONTENTS
0536  1021          TAD     DATA1         /GET AC CONTENTS
0537  7040          CMA                   /COMPLIMENT DATA TO TEST FOR 7777
0540  7650          SNA CLA               /DID AC CHANGE
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0541  5346            JMP      .+5              /DATA CORRECT, CONTINUE
0542  4443            JMS I    XERROR           /NO, ERROR
0543  3741            TRAN4E-1                  /"DBCO CHANGED AC"
0544  3525            DH2-1                     /"AC CONTENTS"
0545  7777            -1                        /NUMBER OF WORDS TO BE OUTPUT
0546  4444            JMS I    XLOOP1           /CHECK FOR LOOP ON CURRENT TEST
0547  5332            JMP      TRAN4+2          /LOOP ON CURRENT TEST
                      /
                      /DOES TRANSFER TO INPUT REGISTER CHANGE AC (WITH AC=7777, DBCI)
                      /
0550  3030    TRAN5,  DCA      TYPFLG           /CLEAR ERROR FLAG
0551  3031            DCA      LPCNT            /SET ITERATION COUNT TO 4096(DECIMAL)
0552  4063            CAF                       /INITIALIZE INTERFACE
0553  7340            CLA CLL CMA               /SET AC =7777
0554  4434            DBCI                      /BIT CLEAR INPUT REGISTER
0555  3021            DCA      DATA1            /SAVE AC CONTENTS
0556  1021            TAD      DATA1            /GET AC CONTENTS
0557  7040            CMA                       /COMPLIMENT DATA TO TEST FOR 7777
0560  7650            SNA CLA                   /DID AC CHANGE
0561  5366            JMP      .+5              /DATA CORRECT, CONTINUE
0562  4443            JMS I    XERROR           /NO, ERROR
0563  3751            TRAN5E-1                  /"DBCI CHANGED AC"
0564  3525            DH2-1                     /"AC CONTENTS"
0565  7777            -1                        /NUMBER OF WORDS TO BE OUTPUT
0566  4444            JMS I    XLOOP1           /CHECK FOR LOOP ON CURRENT TEST
0567  5352            JMP      TRAN5+2          /LOOP ON CURRENT TEST
0570  5777            JMP      TRAN6            /GO TO NEXT TEST
0577  0600
      0600    PAGE


                      /
                      /DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=0,DBSO)
                      /
0600  3030    TRAN6,  DCA      TYPFLG           /CLEAR ERROR FLAG
0601  3031            DCA      LPCNT            /SET ITERATION COUNT TO 4096 (DECIMAL)
0602  4063            CAF                       /INITIALIZE INTERFACE
0603  4437            DBSO                      /BIT SET OUTPUT REGISTER
0604  3021            DCA      DATA1            /SAVE AC CONTENTS
0605  1021            TAD      DATA1            /GET AC CONTENTS
0606  7650            SNA CLA                   /WAS AC CHANGED
0607  5214            JMP      .+5              /DATA CORRECT, CONTINUE
0610  4443            JMS I    XERROR           /AC CHANGED, ERROR
0611  3731            TRAN3E-1                  /"DBSO CHANGED AC"
0612  3525            DH2-1                     /"AC CONTENTS"
0613  7777            -1                        /NUMBER OF WORDS TO BE OUTPUT
0614  4444            JMS I    XLOOP1           /CHECK FOR LOOP ON CURRENT TEST
0615  5202            JMP      TRAN6+2          /LOOP ON CURRENT TEST
                      /
                      /DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=0,DBCO)
                      /
0616  3030    TRAN7,  DCA      TYPFLG           /CLEAR ERROR FLAG
0617  3031            DCA      LPCNT            /SET ITERATION COUNT TO 4096 (DECIMAL)
0620  4063            CAF                       /INITIALIZE INTERFACE
0621  4436            DBCO                      /BIT CLEAR OUTPUT REGISTER
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0622  3021          DCA     DATA1          /SAVE AC CONTENTS
0623  1021          TAD     DATA1          /GET AC CONTENTS
0624  7650          SNA CLA                /IS AC STILL 0
0625  5232          JMP     .+5            /DATA CORRECT, CONTINYE
0626  4443          JMS I   XERROR         /NO, ERROR
0627  3741          TRAN4E-1               /"DBCO CHANGED AC"
0630  3525          DH2-1                  /"AC CONTENTS"
0631  7777          -1                     /NUMBER OF WORDS TO BE OUTPUT
0632  4444          JMS I   XLOOP1         /CHECK FOR LOOP ON CURRENT TEST
0633  5220          JMP     TRAN7+2        /LOOP ON CURRENT TEST
                    /
                    /DOES TRANSFER TO INPUT REGISTER CHANGE AC (WITH AC=0, DBCI)
                    /
0634  3030    TRAN8, DCA    TYPFLG         /CLEAR ERROR FLAG
0635  3031          DCA     LPCNT          /SET ITERATION COUNT TO 4096 (DECIMAL)
0636  4063          CAF                    /INITIALIZE INTERFACE
0637  4434          DBCI                   /BIT CLEAR INPUT REGISTER
0640  3021          DCA     DATA1          /SAVE AC CONTENTS
0641  1021          TAD     DATA1          /GET AC CONTENTS
0642  7650          SNA CLA                /IS AC STILL 0
0643  5250          JMP     .+5            /DATA CORRECT, CONTINUE
0644  4443          JMS I   XERROR         /AC CHANGED, ERROR
0645  3751          TRAN5E-1               /"DBCI CHANGED AC"
0646  3525          DH2-1                  /"AC CONTENTS"
0647  7777          -1                     /NUMBER OF WORDS TO BE OUTPUTED
0650  4444          JMS I   XLOOP1         /CHECK FOR LOOP ON CURRENT TEST
0651  5236          JMP     TRAN8+2        /LOOP ON CURRENT TEST
0652  5777          JMP     OUT1           /GO TO NEXT TEST
0777  1000
      1000    PAGE

                    /
                    /CAN ALL BITS IN OUTPUT REGISTER BE SET (DBSO)
                    /DOES INITIALIZE CLEAR OUTPUT REGISTER
                    /
1000  3030    OUT1, DCA     TYPFLG         /CLEAR ERROR FLAG
1001  3031          DCA     LPCNT          /SET ITERATION COUNT TO 4096(DECIMAL)
1002  4063          CAF                    /INITIALIZE INTERFACE
1003  7340          CLA CLL CMA            /SET AC =7777
1004  4437          DBSO                   /BIT SET OUTPUT REGISTER
1005  4440          DBRO                   /READ OUTPUT REGISTER
1006  3021          DCA     DATA1          /SAVE REGISTER DATA
1007  1021          TAD     DATA1          /GET REGISTER DATA
1010  7040          CMA                    /COMPLIMENT DATA TO TEST FOR 7777
1011  7650          SNA CLA                /IS REGISTER=7777
1012  5217          JMP     .+5            /DATA CORRECT, CONTINUE
1013  4443          JMS I   XERROR         /NO, ERROR
1014  3761          OUT1E-1                /"DBSO ERROR"
1015  3515          DH1-1                  /"REGISTER DATA"
1016  7777          -1                     /NUMBER OF WORDS TO BE OUTPUT
1017  4063          CAF                    /INITIALIZE INTERFACE
1020  4440          DBRO                   /READ OUTPUT REGISTER
1021  3021          DCA     DATA1          /SAVE REGISTER DATA
1022  1021          TAD     DATA1          /GET REGISTER DATA
1023  7650          SNA CLA                /WAS REGISTER CLEARED
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1024  5231          JMP     .+5          /DATA CORRECT, CONTINUE
1025  4443          JMS I   XERROR       /NO, ERROR
1026  3645          INIT1E-1             /"OUTPUT REG NOT CLEARED"
1027  3515          DH1-1                /"REGISTER DATA"
1030  7777          -1                   /NUMBER OF WORDS TO BE OUTPUT
1031  4444          JMS I   XLOOP1       /CHECK FOR LOOP ON CURRENT TEST
1032  5202          JMP     OUT1+2       /LOOP ON CURRENT TEST
                    /
                    /CAN ALL BITS OF OUTPUT REGISTER BE CLEARED (DBCO)
                    /
1033  3030    OUT2, DCA     TYPFLG       /CLEAR ERROR FLAG
1034  3031          DCA     LPCNT        /SET ITERATION COUNT TO 4096(DECIMAL)
1035  7340          CLA CLL CMA          /SET AC =7777
1036  4437          DBSO                 /BIT SET OUTPUT REGISTER
1037  4436          DBCO                 /BIT CLEAR OUTPUT REGISTER
1040  7300          CLA CLL
1041  4440          DBRO                 /READ OUTPUT REGISTER
1042  3021          DCA     DATA1        /SAVE REGISTER DATA
1043  1021          TAD     DATA1        /GET REGISTER DATA
1044  7650          SNA CLA              /WAS OUTPUT REGISTER CLEARED
1045  5252          JMP     .+5          /DATA CORRECT, CONTINUE
1046  4443          JMS I   XERROR       /NO, ERROR
1047  3645          INIT1E-1             /"OUTPUT REGISTER NOT CLEARED"
1050  3515          DH1-1                /"REGISTER DATA"
1051  7777          -1                   /NUMBER OF WORDS TO BE OUTPUT
1052  4444          JMS I   XLOOP1       /CHECK FOR LOOP ON CURRENT TEST
1053  5235          JMP     OUT2+2       /LOOP ON CURRENT TEST

                    /
                    /CAN EACH BIT OF OUTPUT REGISTER BE SET
                    /INDEPENDENTLY (DBSO)
                    /
1054  3030    OUT3, DCA     TYPFLG       /CLEAR ERROR FLAG
1055  1176          TAD     [-62         /SET ITERATION COUNT
1056  3031          DCA     LPCNT        /TO 50(DECIMAL)
1057  3021          DCA     DATA1        /CLEAR TEST DATA
1060  4063    OUT3A, CAF                 /INITIALIZE INTERFACE
1061  1021          TAD     DATA1        /GET TEST DATA
1062  4437          DBSO                 /BIT SET OUTPUT REGISTER
1063  7300          CLA CLL
1064  4440          DBRO                 /READ OUTPUT REGISTER
1065  3022          DCA     DATA2        /SAVE REGISTER DATA
1066  1021          TAD     DATA1        /GET TEST DATA
1067  7041          CIA
1070  1022          TAD     DATA2        /COMPARE TO REGISTER CONTENTS
1071  7650          SNA CLA              /DO THEY COMPARE
1072  5277          JMP     .+5          /DATA CORRECT, CONTINUE
1073  4443          JMS I   XERROR       /NO, ERROR
1074  3761          OUT1E-1              /"DBSO ERROR"
1075  3560          DH4-1                /"EXPECTED RECEIVED"
1076  7776          -2                   /NUMBER OF WORDS TO BE OUTPUT
1077  4445          JMS I   XLOOP2       /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1100  5260          JMP     OUT3A        /LOOP WITH SAME DATA
1101  2021          ISZ     DATA1        /INCREMENT DATA PATTERN
1102  5260          JMP     OUT3A        /CONTINUE TEST
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1103  4444          JMS I   XLOOP1        /CHECK FOR LOOP ON CURRENT TEST
1104  5257          JMP     OUT3+3        /LOOP ON CURRENT TEST
                    /
                    /CAN EACH BIT OF OUTPUT REGISTER BE CLEARED
                    /INDEPENDENTLY (DBCO)
                    /
1105  3030  OUT4,   DCA     TYPFLG        /CLEAR ERROR FLAG
1106  1176          TAD     [-62          /SET ITERATION COUNT
1107  3031          DCA     LPCNT         /TO 50(DECIMAL)
1110  3021          DCA     DATA1         /CLEAR TEST DATA
1111  4063  OUT4A,  CAF                   /INITIALIZE INTERFACE
1112  1021          TAD     DATA1         /GET MASK
1113  7040          CMA                   /COMPLIMENT TO GET EXPECTED RESULT
1114  3022          DCA     DATA2         /SAVE EXPECTED RESULT
1115  7040          CMA                   /SET OUTPUT REGISTER TO 7777
1116  4437          DBSO                  /BIT SET OUTPUT REGISTER
1117  7300          CLA CLL
1120  1021          TAD     DATA1         /GET PATTERN TO CLEAR OUTPUT REGISTER
1121  4436          DBCO                  /BIT CLEAR OUTPUT REGISTER
1122  4440          DBRO                  /READ OUTPUT REGISTER
1123  3023          DCA     DATA3         /SAVE REGISTER DATA
1124  1022          TAD     DATA2         /GET EXPECTED RESULT
1125  7041          CIA
1126  1023          TAD     DATA3         /COMPARE TO RECEIVED DATA
1127  7650          SNA CLA               /WERE CORRECT BITS IN OUTPUT REGISTER CLEARED
1130  5335          JMP     .+5           /DATA CORRECT, CONTINUE
1131  4443          JMS I   XERROR        /NO, ERROR
1132  3767          OUT4E-1               /"DBCO ERROR"
1133  3534          DH3-1                 /MASK EXPECTED RECEIVED
1134  7775          -3                    /NUMBER OF WORDS TO BE OUTPUT
1135  4445          JMS I   XLOOP2        /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1136  5311          JMP     OUT4A         /LOOP WITH SAME DATA
1137  2021          ISZ     DATA1         /INCREMENT DATA PATTERN
1140  5311          JMP     OUT4A         /CONTINUE TEST
1141  4444          JMS I   XLOOP1        /CHECK FOR LOOP ON CURRENT TEST
1142  5310          JMP     OUT4+3        /LOOP ON CURRENT TEST
1143  5777          JMP     OUT5
1177  1200
      1200  PAGE
                    /
                    /WITH OUTPUT REGISTER CLEARED, DOES CLEARING
                    /OUTPUT REGISTER CHANGE ANY BIT IN OUTPUT
                    /
1200  3030  OUT5,   DCA     TYPFLG        /CLEAR ERROR FLAG
1201  1176          TAD     [-62          /SET ITERATION COUNT
1202  3031          DCA     LPCNT         /TO 50 (DECIMAL)
1203  3021          DCA     DATA1         /CLEAR TEST DATA
1204  3022          DCA     DATA2         /CLEAR EXPECTED RESULT
1205  4063  OUT5A,  CAF                   /INITIALIZE INTERFACE
1206  1021          TAD     DATA1         /GET TEST DATA
1207  4436          DBCO                  /BIT CLEAR OUTPUT REGISTER
1210  7300          CLA CLL
1211  4440          DBRO                  /READ OUTPUT REGISTER
1212  3023          DCA     DATA3         /SAVE REGISTER DATA
1213  1023          TAD     DATA3         /GET REGISTER DATA
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1214  7650          SNA CLA                 /IS OUTPUT REGISTER 0
1215  5222          JMP     .+5             /DATA CORRECT, CONTINUE
1216  4443          JMS I   XERROR          /NO, ERROR
1217  3767          OUT4E-1                 /"DBCO ERROR"
1220  3534          DH3-1                   /"MASK EXPECTED RECEIVED"
1221  7775          -3                      /NUMBER OF DATA WORDS
1222  4445          JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA
1223  5205          JMP     OUT5A           /LOOP WITH SAME DATA
1224  2021          ISZ     DATA1           /INCREMENT DATA PATTERN
1225  5205          JMP     OUT5A           /CONTINUE
1226  4444          JMS I   XLOOP1          /CHECH FOR LOOP ON CURRENT TEST
1227  5203          JMP     OUT5+3          /LOOP ON CURRENT TEST

                    /
                    /DOES SETTING OUTPUT REGISTER TWICE WITH SAME
                    /DATA CHANGE OUTPUT REGISTER
                    /
1230  3030  OUT6,   DCA     TYPFLG          /CLEAR ERROR FLAG
1231  1176          TAD     [-62            /SET ITERATION COUNT
1232  3031          DCA     LPCNT           /TO 50 (DECIMAL)
1233  3021          DCA     DATA1           /CLEAR TEST DATA
1234  4063  OUT6A,  CAF                     /INITIALIZE INTERFACE
1235  1021          TAD     DATA1           /GET TEST DATA
1236  4437          DBSO                    /BIT SET OUTPUT REGISTER
1237  4437          DBSO                    /BIT SET OUTPUT REGISTER
1240  7300          CLA CLL
1241  4440          DBRO                    /READ OUTPUT REGISTER
1242  3022          DCA     DATA2           /SAVE REGISTER DATA
1243  1021          TAD     DATA1           /GET TEST DATA
1244  7041          CIA
1245  1022          TAD     DATA2           /COMPARE TO REGISTER DATA
1246  7650          SNA CLA                 /AARE THEY THE SAME
1247  5254          JMP     .+5             /DATA CORRECT, CONTINE
1250  4443          JMS I   XERROR          /NO, ERROR
1251  3767          OUT4E-1                 /"DBSO ERROR"
1252  3560          DH4-1                   /"EXPECTED RECEIVED"
1253  7776          -2                      /NUMBER OF DATA WORDS
1254  4445          JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA
1255  5234          JMP     OUT6A           /LOOP WITH SAME DATA
1256  2021          ISZ     DATA1           /INCREMENT DATA PATTERN
1257  5234          JMP     OUT6A           /CONTINUE
1260  4444          JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1261  5233          JMP     OUT6+3          /LOOP ON CURRENT TEST

                    /
                    /DOES READING OUTPUT REGISTER TWICE CHANGE
                    /OUTPUT REGISTER
                    /
1262  3030  OUT7,   DCA     TYPFLG          /CLEAR ERROR FLAG
1263  1176          TAD     [-62            /SET ITERATION COUNT
1264  3031          DCA     LPCNT           /TO 50 (DECIMAL)
1265  3021          DCA     DATA1           /CLEAR TEET DATA
1266  4063  OUT7A,  CAF                     /INITIALIZE INTERFACE
1267  1021          TAD     DATA1           /GET TEST DATA
1270  4437          DBSO                    /BIT SET OUTPUT REGISTER
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1271  7300            CLA CLL
1272  4440            DBRO                    /READ OUTPUT REGISTER
1273  7300            CLA CLL
1274  4440            DBRO                    /READ OUTPUT REGISTER
1275  3022 -          DCA     DATA2           /SAVE REGISTER DATA
1276  1021            TAD     DATA1           /GET TEST DATA
1277  7041            CIA
1300  1022            TAD     DATA2           /COMPARE TO REGISTER DATA
1301  7650            SNA CLA                 /ARE THEY THE SAME
1302  5307            JMP     .+5             /DATA CORRECT, CONTINUE
1303  4443            JMS I   XERROR          /NO, ERROR
1304  3775            OUT7E-1                 /"DBRO ERROR"
1305  3560            DH4-1                   /"EXPECTED RECEIVED"
1306  7776            -2                      /NUMBER OF DATA WORDS
1307  4445            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
1310  5266            JMP     OUT7A           /LOOP WITH SAME DATA
1311  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
1312  5266            JMP     OUT7A           /CONTINUE
1313  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1314  5265            JMP     OUT7+3          /LOOP ON CURRENT TEST

                      /
                      /DOES CLEARING OUTPUT REGISTER TWICE
                      /CHANGE ANY BIT IN OUTPUT REGISTER
                      /
1315  3030    OUT8,   DCA     TYPFLG          /CLEAR ERROR FLAG
1316  1176            TAD     [-62            /SET ITERATION COUNT
1317  3031            DCA     LPCNT           /TO 50 (DECIMAL)
1320  3021            DCA     DATA1           /CLEAR TEST DATA
1321  3022            DCA     DATA2           /CLEAR EXPECTED RESULT
1322  4063    OUT8A,  CAF                     /INITIALIZE INTERFACE
1323  1021            TAD     DATA1           /GET TEST DATA
1324  4437            DBSO                    /BIT SET OUTPUT RETISTER
1325  4436            DBCO                    /BIT CLEAR OUTPUT REGISTER
1326  4436            DBCO                    /BIT CLEAR OUTPUT REGISTER
1327  7300            CLA CLL
1330  4440            DBRO                    /READ OUTPUT REGISTER
1331  3023            DCA     DATA3           /SAVE REGISTER DATA
1332  1023            TAD     DATA3           /GET REGISTER DATA
1333  7650            SNA CLA                 /IS REGISTER 0
1334  5341            JMP     .+5             /DATA CORRECT, CONTINUE
1335  4443            JMS I   XERROR          /NO, ERROR
1336  3767            OUT4E-1                 /"DBCO ERROR"
1337  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
1340  7775            -3                      /NUMBER OF DATA WORDS
1341  4445            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
1342  5322            JMP     OUT8A           /LOOP WITH SAME DATA
1343  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
1344  5322            JMP     OUT8A           /CONTINUE
1345  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1346  5320            JMP     OUT8+3          /LOOP ON CURRENT TEST
1347  5777            JMP     IN1
1377  1400
      1400    PAGE
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                        /
                        /CAN ALL BITS IN INPUT REGISTER BE SET
                        /DOES INITIALIZE CLEAR INPUT REGISTER
                        /
1400  3030    IN1,      DCA     TYPFLG          /CLEAR ERROR FLAG
1401  3031              DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
1402  4063              CAF                     /INITIALIZE INTERFACE
1403  7340    IN1A,     CLA CLL CMA             /SET AC =7777
1404  4437              DBSO                    /BIT SET OUTPUT REGISTER
1405  7300              CLA CLL
1406  4435              DBRI                    /READ INPUT REGISTER
1407  3021              DCA     DATA1           /SAVE REGISTER DATA
1410  1021              TAD     DATA1           /GET REGISTER DATA
1411  7040              CMA             /COMPLIMENT TO TEST FOR 7777
1412  7650              SNA CLA                 /WAS INPUT REGISTER SET TO 7777
1413  5220              JMP     .+5             /DATA CORRECT, CONTINUE
1414  4443              JMS I   XERROR          /NO, ERROR
1415  4011              IN3E-1                  /"INPUT REGISTER NOT CORRECT"
1416  3515              DH1-1                   /"REGISTER DATA"
1417  7777              -1                      /NUMBER OF WORDS TO BE OUTPUT
1420  4063    IN1B,     CAF                     /INITIALIZE INTERFACE
1421  4435              DBRI                    /READ INPUT REGISTER
1422  3021              DCA     DATA1           /SAVE REGISTER DATA
1423  1021              TAD     DATA1
1424  7650              SNA CLA
1425  5232              JMP     .+5             /DATA CORRECT, CONTINUE
1426  4443              JMS I   XERROR          /NO, ERROR
1427  3661              INIT2E-1                /"INPUT REGISTER NOT CLEARED"
1430  3515              DH1-1                   /"REGISTER DATA"
1431  7777              -1                      /NUMBER OF WORDS TO BE OUTPUT
1432  4444              JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1433  5203              JMP     IN1A            /LOOP ON CURRENT TEST

                        /
                        /CAN ALL BITS IN INPUT REGISTER BE CLEARED (DBCI)
                        /
1434  3030    IN2,      DCA     TYPFLG          /CLEAR ERROR FLAG
1435  3031              DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
1436  4063              CAF                     /INITIALIZE INTERFACE
1437  7340              CLA CLL CMA             /SET AC =7777
1440  0027              AND     FJUMPER         /MASK TO TEST ONLY FLIPFLOP BITS
1441  3021              DCA     DATA1           /SAVE MASK
1442  3022              DCA     DATA2           /SAVE EXPECTED RESULT
1443  1021              TAD     DATA1           /GET MASK
1444  4437              DBSO                    /BIT SET OUTPUT REGISTER
1445  4434              DBCI                    /BIT CLEAR INPUT REGISTER
1446  7300              CLA CLL
1447  4435              DBRI                    /READ INPUT REGISTER
1450  3023              DCA     DATA3           /SAVE REGISTER DATA
1451  1023              TAD     DATA3           /COMPARE TO REGISTER DATA
1452  7650              SNA CLA                 /WERE CORRECT BITS CLEARED
1453  5260              JMP     .+5             /DATA CORRECT, CONTINUE
1454  4443              JMS I   XERROR          /NO, ERROR
1455  4003              IN2E-1                  /"DBCI ERROR"
1456  3534              DH3-1                   /"MASK EXPECTED RECEIVED"
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1457  7775            -3                      /NUMBER OF WORDS TO BE OUTPUT
1460  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1461  5236            JMP     IN2+2           /LOOP ON CURRENT TEST

                      /
                      /CAN EACH BIT OF INPUT REGISTER BE SET INDEPENDENTLY
                      /
1462  3030    IN3,    DCA     TYPFLG          /CLEAR ERROR FLAG
1463  1176            TAD     [-62            /SET ITERATION COUNT
1464  3031            DCA     LPCNT           /TO 50(DECIMAL)
1465  3021            DCA     DATA1           /CLEAR TEST DATA
1466  4063    IN3A,   CAF                     /INITIALIZE INTERFACE
1467  1021            TAD     DATA1           /GET TEST DATA
1470  4437            DBSO                    /BIT SET OUTPUT REGISTER
1471  7300            CLA CLL
1472  4435            DBRI                    /READ INPUT REGISTER
1473  3022            DCA     DATA2           /SAVE REGISTER DATA
1474  1021            TAD     DATA1           /GET TEST DATA
1475  7041            CIA
1476  1022            TAD     DATA2           /COMPARE TO RECEIVED DATA
1477  7650            SNA CLA                 /ARE THEY THE SAME
1500  5305            JMP     .+5             /DATA CORRECT, CONTINUE
1501  4443            JMS I   XERROR          /NO, ERROR
1502  4011            IN3E-1                  /"INPUT REGISTER DATA ERROR"
1503  3560            DH4-1                   /"EXPECTED RECEIVED"
1504  7776            -2                      /NUMBER OF WORDS TO BE OUTPUT
1505  4445            JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1506  5266            JMP     IN3A            /LOOP WITH SAME DATA
1507  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
1510  5266            JMP     IN3A            /CONTINUE TEST
1511  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1512  5265            JMP     IN3+3           /LOOP ON CURRENT TEST
1513  5777            JMP     IN5
1577  1600
      1600    PAGE

                      /
                      /VERIFY THAT ALL LATCHING INPUT LINES HOLD DATA
                      /

1600  3030    IN5,    DCA     TYPFLG          /CLEAR ERROR FLAG
1601  1176            TAD     [-62            /SET ITERATION COUNT
1602  3031            DCA     LPCNT           /TO 50(DECIMAL)
1603  3023            DCA     DATA3           /CLEAR TEST DATA
1604  4063    IN5A,   CAF                     /INITIALIZE INTERFACE
1605  1023            TAD     DATA3           /GET TEST DATA
1606  0027            AND     FJUMPER         /MASK OFF NON LATCHING BITS
1607  3021            DCA     DATA1           /SAVE AS EXPECTED RESULT
1610  1021            TAD     DATA1           /GET TEST DATA
1611  7450            SNA                     /ARE ANY BITS TO BE TESTED
1612  5233            JMP     IN5C            /NO, GET NEXT DATA WORD
1613  4437            DBSO                    /BIT SET OUTPUT REGISTER
1614  4436            DBCO                    /BIT CLEAR OUTPUT REGISTER
1615  7300            CLA CLL
1616  4435            DBRI                    /READ INPUT REGISTER
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1617  3022          DCA     DATA2          /SAVE REGISTER DATA
1620  1021          TAD     DATA1          /GET EXPECTED RESULT
1621  7041          CIA
1622  1022          TAD     DATA2          /COMPARE TO RECEIVED DATA
1623  7650          SNA CLA                /ARE THEY THE SAME
1624  5231          JMP     .+5            /DATA CORRECT, CONTINUE
1625  4443          JMS I   XERROR         /NO, ERROR
1626  4026          IN4E-1                 /"LATCH ERROR"
1627  3560          DH4-1                  /"EXPECTED RECEIVED"
1630  7776          -2                     /NUMBER OF WORDS TO BE OUTPUT
1631  4445          JMS I   XLOOP2         /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1632  5204          JMP     IN5A           /LOOP WITH SAME DATA
1633  2023    IN5C, ISZ     DATA3          /INCREMENT DATA PATTERN
1634  5204          JMP     IN5A           /CONTINUE TEST
1635  4444          JMS I   XLOOP1         /CHECK FOR LOOP ON CURRENT TEST
1636  5203          JMP     IN5+3          /LOOP ON CURRENT TEST
                    /

                    /VERIFY ALL NON LATCHING DATA BITS DO NOT HOLD DATA
                    /
1637  3030    IN6,  DCA     TYPFLG         /CLEAR ERROR FLAG
1640  1176          TAD     [-62           /SET ITERATION COUNT
1641  3031          DCA     LPCNT          /TO 50(DECIMAL)
1642  3024          DCA     DATA4          /CLEAR TEST DATA
1643  3022          DCA     DATA2          /CLEAR EXPECTED RESULT
1644  4063    IN6A, CAF                    /INITIALIZE INTERFACE
1645  1027          TAD     FJUMPER        /GET MASK FOR NON LATCHING BITS
1646  7040          CMA                    /CHANGE TO MASK OFF LATCHING BITS
1647  0024          AND     DATA4
1650  3021          DCA     DATA1          /SAVE FOR TRANSMISSION
1651  1021          TAD     DATA1          /GET TEST DATA
1652  7450          SNA                    /ARE ANY BITS TO BE TESTED
1653  5272          JMP     IN6C           /NO GET NEXT DATA WORD
1654  4437          DBSO                   /BIT SET OUTPUT REGISTER
1655  4436          DBCO                   /BIT CLEAR OUTPUT REGISTER
1656  7300          CLA CLL
1657  4435          DBRI                   /READ INPUT REGISTER
1660  3023          DCA     DATA3          /SAVE REGISTER DATA
1661  1023          TAD     DATA3          /GET RECEIVED DATA
1662  7650          SNA CLA        /DID ANY BITS HOLD DATA
1663  5270          JMP     .+5            /DATA CORRECT, CONTINUE
1664  4443          JMS I   XERROR         /YES, ERROR
1665  4026          IN4E-1                 /"LATCH ERROR"
1666  3534          DH3-1                  /"MASK EXPECTED RECEIVED"
1667  7775          -3                     /NUMBER OF WORDS TO BE OUTPUT
1670  4445          JMS I   XLOOP2         /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1671  5244          JMP     IN6A           /LOOP WITH SAME DATA
1672  2024    IN6C, ISZ     DATA4          /INCREMENT DATA PATTERN
1673  5244          JMP     IN6A           /CONTINUE TEST
1674  4444          JMS I   XLOOP1         /CHECK FOR LOOP ON CURRENT TEST
1675  5242          JMP     IN6+3          /LOOP ON CURRENT TEST


                    /
                    /VERIFY THAT ALL LATCHING LINES CAN BE CLEARED INDEPENDENTLY
```

```
                        /
1676  3030    IN7,      DCA     TYPFLG          /CLEAR ERROR FLAG
1677  1176              TAD     [-62            /SET ITERATION COUNT
1700  3031              DCA     LPCNT           /TO 50(DECIMAL)
1701  3024              DCA     DATA4           /CLEAR TEST
1702  4063    IN7A,     CAF                     /INITIALIZE INTERFACE
1703  1027              TAD     FJUMPER         /GET MASK FOR LATCHING BITS
1704  0024              AND     DATA4           /MASK OFF NON LATCHING BITS
1705  3021              DCA     DATA1           /SAVE FOR TRANSMISSION
1706  3022              DCA     DATA2           /EXPECTED RESULT
1707  1021              TAD     DATA1           /SET OUTPUT REGISTER-7777
1710  4437              DBSO                    /BIT SET OUTPUT REGISTER
1711  4436              DBCO                    /BIT CLEAR OUTPUT REGISTER
1712  7300              CLA CLL
1713  1021              TAD     DATA1           /GET TEST DATA
1714  4434              DBCI                    /BIT CLEAR INPUT REGISTER
1715  7300              CLA CLL
1716  4435              DBRI                    /READ INPUT REGISTER
1717  3023              DCA     DATA3           /SAVE REGISTER DATA
1720  1023              TAD     DATA3           /COMPARE TO RECEIVED DATA
1721  7650              SNA CLA                 /ARE THEY THE SAME
1722  5327              JMP     .+5             /DATA CORRECT, CONTINUE
1723  4443              JMS I   XERROR          /NO, ERROR
1724  4026              IN4E-1                  /"LATCH ERROR"
1725  3534              DH3-1                   /"MASK EXPECTED RECEIVED"
1726  7775              -3                      /NUMBER OF WORDS TO BE OUTPUT
1727  4445              JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1730  5302              JMP     IN7A            /LOOP WITH SAME DATA
1731  2024    IN7C,     ISZ     DATA4           /INCREMENT DATA PATTERN
1732  5302              JMP     IN7A            /CONTINUE TEST
1733  4444              JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1734  5301              JMP     IN7+3           /LOOP ON CURRENT TEST
1735  5777              JMP     IN8             /GO TO NEXT TEST
1777  2000
      2000    PAGE

                        /
                        /WITH THE INPUT REGISTER CLEARED, DOES CLEARING
                        /THE INPUT REGISTER SET ANY BIT IN INPUT
                        /
2000  3030    IN8,      DCA     TYPFLG          /CLEAR ERROR FLAG
2001  1176              TAD     [-62            /SET ITERATION COUNT
2002  3031              DCA     LPCNT           /TO 50 (DECIMAL)
2003  3021              DCA     DATA1           /CLEAR TEST DATA
2004  3022              DCA     DATA2           /CLEAR EXPECTED RESULT
2005  4063    IN8A,     CAF                     /INITIALIZE INTERFACE
2006  1021              TAD     DATA1           /GET    TEST DATA
2007  4434              DBCI                    /BIT CLEAR INPUT REGISTER
2010  7300              CLA CLL
2011  4435              DBRI                    /READ INPUT REGISTER
2012  3023              DCA     DATA3           /SAVE REGISTER DATA
2013  1023              TAD     DATA3           /GET REGISTER DATA
2014  7650              SNA CLA                 /IS INPUT REGISTER 0
2015  5222              JMP     .+5             /DATA CORRECT, CONTINUE
2016  4443              JMS I   XERROR          /NO, ERROR
```

```
2017  4003          IN2E-1                  /"DBCI ERROR"
2020  3534          DH3-1                   /"MASK EXPECTED RECEIVED"
2021  7775          -3                      /NUMBER OF DATA WORDS
2022  4445          JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
2023  5205          JMP     IN8A            /LOOP WITH SAME DATA
2024  2021          ISZ     DATA1           /INCREMENT DATA PATTERN
2025  5205          JMP     IN8A            /CONTINUE
2026  4444          JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2027  5203          JMP     IN8+3           /LOOP ON CURRENT TEST

                    /
                    /DOES READING THE INPUT REGISTER TWICE
                    /CHANGE THE INPUT REGISTER
                    /
2030  3030    IN9,  DCA     TYPFLG          /CLEAR ERROR FLAG
2031  1176          TAD     [-62            /SET ITERATION COUNT
2032  3031          DCA     LPCNT           /TO 50 (DECIMAL)
2033  3021          DCA     DATA1           /CLEAR TEST DATA
2034  4063    IN9A, CAF                     /INITIALIZE INTERFACE
2035  1021          TAD     DATA1           /GET TEST DATA
2036  4437          DBSO                    /BIT SET OUTPUT REGISTER
2037  7300          CLA CLL
2040  4435          DBRI                    /READ INPUT REGISTER
2041  7300          CLA CLL
2042  4435          DBRI                    /READ INPUT REGISTER
2043  3022          DCA     DATA2           /SAVE REGISTER DATA
2044  1021          TAD     DATA1           /GET TEST DATA
2045  7041          CIA
2046  1022          TAD     DATA2           /COMPARE TO REGISTER DATA
2047  7650          SNA CLA                 /ARE THEY THE SAME
2050  5255          JMP     .+5             /DATA CORRECT, CONTINUE
2051  4443          JMS I   XERROR          /NO, ERROR
2052  4034          IN9E-1                  /"DBRI ERROR"
2053  3560          DH4-1                   /"EXPECTED RECEIVED"
2054  7776          -2                      /NUMBER OF DAT WORDS
2055  4445          JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
2056  5234          JMP     IN9A            /LOOP WITH SAME DATA
2057  2021          ISZ     DATA1           /INCREMENT DATA PATTERN
2060  5234          JMP     IN9A            /CONTINUE
2061  4444          JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2062  5233          JMP     IN9+3           /LOOP ON CURRENT TEST

                    /
                    /DOES CLEARING INPUT REGISTER TWICE SET ANY BIT
                    /IN INPUT REGISTER
                    /
2063  3030    IN10, DCA     TYPFLG          /CLEAR ERROR FLAG
2064  1176          TAD     [-62            /SET ITERATION COUNT
2065  3031          DCA     LPCNT           /TO 50 (DECIMAL)
2066  3022          DCA     DATA2           /CLEAR EXPECTED RESULT
2067  3021          DCA     DATA1           /CLEAR TEST DATA
2070  4063    IN10A, CAF                    /INITIALIZE INTERFACE
2071  1021          TAD     DATA1           /GET TEST DATA
2072  4437          DBSO                    /BIT SET OUTPUT REGISTER
2073  4436          DBCO                    /BIT CLEAR OUTPUT REGISTER
```

```
2074  4434            DBCI                    /BIT CLEAR INPUT REGISTER
2075  4434            DBCI                    /BIT CLEAR INPUT REGISTER
2076  7300            CLA CLL
2077  4435            DBRI                    /READ INPUT REGISTER
2100  3023            DCA     DATA3           /SAVE REGISTER DATA
2101  1023            TAD     DATA3           /GET REGISTER DATA
2102  7650            SNA CLA                 /IS INPUT REGISTER 0
2103  5310            JMP     .+5             /DATA CORRECT, CONTINUE
2104  4443            JMS I   XERROR          /NO, ERROR
2105  4003            IN2E-1                  /"DBCI ERROR"
2106  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
2107  7775            -3                      /NUMBER OF DATA WORDS
2110  4445            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
2111  5270            JMP     IN10A           /LOOP WITH SAME DATA
2112  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
2113  5270            JMP     IN10A           /CONTINUE
2114  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2115  5266            JMP     IN10+3          /LOOP ON CURRENT TEST
2116  5777            JMP     INOU1           /GO TO NEXT TEST
2177  2200
      2200    PAGE

                      /
                      /WITH BOTH INPUT AND OUTPUT REGISTERS CLEARED
                      /DOES CLEARING OUTPUT SET
                      /ANY BIT IN INPUT
                      /
2200  3030    INOU1,  DCA     TYPFLG          /CLEAR ERROR FLAG
2201  1176            TAD     [-62            /SET ITERATION COUNT
2202  3031            DCA     LPCNT           /TO 50 (DECIMAL)
2203  3021            DCA     DATA1           /CLEAR TEST DATA
2204  3022            DCA     DATA2           /CLEAR EXPECTED RESULT
2205  4063    INOU1A, CAF                     /INITIALIZE INTERFACE
2206  1021            TAD     DATA1           /GET TEST DATA
2207  4436            DBCO                    /BIT CLEAR OUTPUT REGISTER
2210  7300            CLA CLL
2211  4435            DBRI                    /READ INPUT REGISTER
2212  3023            DCA     DATA3           /SAVE REGISTER DATA
2213  1023            TAD     DATA3           /GET REGISTER DATA
2214  7650            SNA CLA                 /IS OUTPUT REGISTER 0
2215  5222            JMP     .+5             /DATA CORRECT, CONTINUE
2216  4443            JMS I   XERROR          /NO, ERROR
2217  3767            OUT4E-1                 /"DBCO ERROR"
2220  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
2221  7775            -3                      /NUMBER OF DATA WORDS
2222  4445            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
2223  5205            JMP     INOU1A          /LOOP WITH SAME DATA
2224  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
2225  5205            JMP     INOU1A          /CONTINUE
2226  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2227  5203            JMP     INOU1+3         /LOOP ON CURRENT TEST

                      /
                      /WITH BOTH INPUT AND OUTPUT REGISTERS CLEARED
                      /DOES CLEARING INPUT SET ANY BIT IN OUTPUT
```

```
                        /
2230  3030   INOU2,    DCA     TYPFLG          /CLEAR ERROR FLAG
2231  1176             TAD     [-62            /SET ITERATION COUNT
2232  3031             DCA     LPCNT           /TO 50 (DECIMAL)
2233  3021             DCA     DATA1           /CLEAR TEST DATA
2234  3022             DCA     DATA2           /CLEAR EXPECTED RESULT
2235  4063   INOU2A,   CAF                     /INITIALIZE INTERFACE
2236  1021             TAD     DATA1           /GET TEST DATA
2237  4434             DBCI                    /BIT CLEAR INPUT REGISTER
2240  7300             CLA CLL
2241  4440             DBRO                    /READ OUTPUT REGISTER
2242  3023             DCA     DATA3           /SAVE REGISTER DATA
2243  1023             TAD     DATA3           /GET REGISTER DATA
2244  7650             SNA CLA                 /IS OUTPUT REGISTER 0
2245  5252             JMP     .+5             /DATA CORRECT, CONTINUE
2246  4443             JMS I   XERROR          /NO, ERROR
2247  4003             IN2E-1                  /"DBCI ERROR"
2250  3534             DH3-1                   /"MASK EXPECTED RECEIVED"
2251  7775             -3                      /NUMBER OF DATAA WORDS
2252  4445             JMS I   XLOOP2          /TEST FOR LOOP WITH CURRENT DATA
2253  5235             JMP     INOU2A          /LOOP WITH SAME DATA
2254  2021             ISZ     DATA1           /INCREMENT DATA PATTERN
2255  5235             JMP     INOU2A          /CONTINUE
2256  4444             JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2257  5233             JMP     INOU2+3         /LOOP ON CURRENT TEST
                        /
                        /WITH THE OUTPUT REGISTER SET TO ALL 1S, AND
                        /THE INPUT REGISTER CLEARED, DOES SELECTIVELY
                        /CLEARING THE OUTPUT REGISTER SET ANY BIT IN
                        /THE INPUT REGISTER
                        /
2260  3030   INOU3,    DCA     TYPFLG          /CLEAR ERROR FLAG
2261  1176             TAD     [-62            /SET ITERATION COUNT
2262  3031             DCA     LPCNT           /TO 50 (DECIMAL)
2263  3021             DCA     DATA1           /CLEAR TEST DATA
2264  3022             DCA     DATA2           /CLEAR EXPECTED RESULT
2265  4063   INOU3A,   CAF                     /INITIALIZE INTERFACE
2266  7040             CMA                     /SET AC=7777
2267  4437             DBSO                    /BIT SET OUTPUT REGISTER
2270  4434             DBCI                    /BIT CLEAR INPUT REGISTER
2271  7300             CLA CLL
2272  1027             TAD     FJUMPER         /GET FLIPFLOP JUMPER MASK
2273  7040             CMA
2274  3022             DCA     DATA2
2275  1021             TAD     DATA1           /GET TEST DATA2
2276  7040             CMA                     /COMPLEMENT
2277  0022             AND     DATA2           /AND WITH COMPLEMENT OF JUMPER MASK
2300  3022             DCA     DATA2           /TO GET EXPECTED RESULT
2301  1021             TAD     DATA1           /GET TEST DATA
2302  4436             DBCO                    /BIT CLEAR OUTPUT REGISTER
2303  7300             CLA CLL
2304  4435             DBRI                    /READ INPUT REGISTER
2305  3023             DCA     DATA3           /SAVE REGISTER DATA
2306  1023             TAD     DATA3           /GET REGISTER DATA
2307  7041             CIA
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2310  1022            TAD     DATA2           /COMPARE TO EXPECTED RESULT
2311  7650            SNA CLA                 /ARE THEY THE SAME
2312  5317            JMP     .+5             /DATA CORRECT, CONTINUE
2313  4443            JMS I   XERROR          /NO, ERROR
2314  3767            OUT4E-1                 /"DBCO ERROR"
2315  3534            DH3-1                   /"MASK EXPECTED RECEIVED
2316  7775            -3                      /NUMBER OF DATA WORDS
2317  4445            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
2320  5265            JMP     INOU3A          /LOOP WITH SAME DATA
2321  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
2322  5265            JMP     INOU3A          /CONTINUE
2323  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2324  5263            JMP     INOU3+3         /LOOP ON CURRENT TEST
                      /
                      /WITH THE INPUT REGISTER SET TO ALL 1S, DOES SELECTIVELY
                      /CLEARING THE OUTPUT REGISTER CLEAR ANY BITS IN THE INPUT
                      /REGISTER (EXCEPT THOSE NOT FLIPFLOPS)
                      /
2325  3030    INOU4,  DCA     TYPFLG          /CLEAR ERROR FLAG
2326  1176            TAD     [-62            /SET ITERATION COUNT
2327  3031            DCA     LPCNT           /TO 50 (DECIMAL)
2330  3021            DCA     DATA1           /CLEAR TEST DATA
2331  4063    INOU4A, CAF                     /INITIALIZE INTERFACE
2332  7040            CMA                     /SET AC TO 7777
2333  4437            DBSO                    /BIT SET OUTPUT REGISTER
2334  7300            CLA CLL
2335  1027            TAD     FJUMPER         /GET FLIPFLOP JUMPER MASK
2336  7040            CMA
2337  0021            AND     DATA1           /COMBINE WITH MASK
2340  7040            CMA
2341  3022            DCA     DATA2           /TO GET EXPECTED RESULT
2342  1021            TAD     DATA1           /GET TEST DATA
2343  4436            DBCO                    /BIT CLEAR OUTPUT REGISTER
2344  7300            CLA CLL
2345  4435            DBRI                    /READ INPUT REGISTER
2346  3023            DCA     DATA3           /SAVE REGISTER DATA
2347  1022            TAD     DATA2           /GET EXPECTED RESULT
2350  7041            CIA
2351  1023            TAD     DATA3           /COMPARE TO RECEIVED DATA
2352  7650            SNA CLA                 /ARE THEY THE SAME
2353  5360            JMP     .+5             /DATA CORRECT, CONTINUE
2354  4443            JMS I   XERROR          /NO, ERROR
2355  3767            OUT4E-1                 /"DBCO ERROR"
2356  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
2357  7775            -3                      /NUMBER OF DATA WORDS
2360  4445            JMS I   XLOOP2          /TEST FOR LOOP WITH CURRENT DATA
2361  5331            JMP     INOU4A          /LOOP WITH SAME DATA
2362  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
2363  5331            JMP     INOU4A          /CONTINUE
2364  4444            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2365  5330            JMP     INOU4+3         /LOOP ON CURRENT TEST
2366  5777            JMP     INT1            /GO TO NEXT TEST
2377  2400
      2400    PAGE
```

```
                        /
                        /VERIFY THAT EACH BIT SET UP TO  SKIP DOES
                        /
2400  3030    INT1,     DCA     TYPFLG          /CLEAR ERROR FLAG
2401  1176              TAD     [-62            /SET ITERATION COUNT
2402  3031              DCA     LPCNT           /TO 50(DECIMAL)
2403  3022              DCA     DATA2
2404  4063    INT1A,    CAF                     /INITIALIZE INTERFACE
2405  1022              TAD     DATA2
2406  0026              AND     IJUMPER
2407  7450              SNA
2410  5233              JMP     INT1D
2411  3021              DCA     DATA1           /SAVE TEST DATA
2412  1021              TAD     DATA1
2413  4437              DBSO                    /BIT SET OUTPUT REGISTER
2414  7300              CLA CLL
2415  4432              DBEI                    /ENABLE INTERFACE
2416  4076              SRQ                     /IS INTERRUPT ACTIVE
2417  5223              JMP     INT1AE          /NO, ERROR
2420  4433              DBSK                    /IS FLAG SET
2421  5240              JMP     INT1BE          /NO, ERROR
2422  5231              JMP     INT1OK          /INTERRUPT ACTIVE, FLAG SET
2423  4433    INT1AE,   DBSK                    /IS INTERFACE FLAG SET
2424  5245              JMP     INT1CE
2425  4443              JMS I   XERROR          /NO, ERROR
2426  4042              INT1E-1
2427  3515              DH1-1
2430  7777              -1                      /NUMBER OF WORDS TO BE OUTPUT
2431  4445    INT1OK,   JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA, ESCAPE ON DATA ERROR
2432  5204              JMP     INT1A           /LOOP WITH SAME DATA
2433  2022    INT1D,    ISZ     DATA2           /INCREMENT DATA PATTERN
2434  5204              JMP     INT1A           /CONTINUE
2435  4444              JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2436  5203              JMP     INT1+3          /LOOP ON CURRENT TEST
2437  5252              JMP     INT3            /GO TO NEXT TEST
2440  4443    INT1BE,   JMS I   XERROR          /NO, ERROR
2441  4065              INT3E-1
2442  3515              DH1-1
2443  7777              -1                      /NUMBER OF WORDS TO BE OUTPUT
2444  5231              JMP     INT1OK
2445  4443    INT1CE,   JMS I   XERROR          /NO, ERROR
2446  4077              INT4E-1
2447  3515              DH1-1
2450  7777              -1                      /NUMBER OF WORDS TO BE OUTPUT
2451  5231              JMP     INT1OK

                        /
                        /VERIFY THAT EACH BIT NOT JUMPERD TO SKIP DOES NOT
                        /
2452  3030    INT3,     DCA     TYPFLG          /CLEAR ERROR FLAG
2453  1176              TAD     [-62            /SET ITERATION COUNT
2454  3031              DCA     LPCNT           /TO 50 (DECIMAL)
2455  3022              DCA     DATA2           /CLEAR TEST DATA
2456  4063    INT3A,    CAF                     /INITIALIZE INTERFACE
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2457  1026            TAD     IJUMPER         /GET JUMPER MASK
2460  7040            CMA                     /COMPLIMENT FOR NO SKIP BITS
2461  0022            AND     DATA2           /GET BITS TO BE TESTED
2462  7450            SNA                     /ARE ANY BITS TO BE TESTED
2463  5300            JMP     INT3C           /NO, GET NEXT DATA PATTERN
2464  3021            DCA     DATA1           /SAVE FOR OUTPUT
2465  1021            TAD     DATA1           /GET TEST DATA
2466  4437            DBSO                    /BIT SET OUTPUT REGISTER
2467  7300            CLA CLL
2470  4433            DBSK                    /IS FLAG SET
2471  5276            JMP     .+5             /NO, CONTINUE
2472  4443            JMS I   XERROR          /YES, ERROR
2473  3674            INIT3E-1                /"SKIP FLAG SET"
2474  3515            DH1-1           /"REGISTER DATA"
2475  7777            -1
2476  4445            JMS I   XLOOP2
2477  5256            JMP     INT3A
2500  2022    INT3C,  ISZ     DATA2
2501  5256            JMP     INT3A
2502  4444            JMS I   XLOOP1
2503  5255            JMP     INT3+3
2504  5777'           JMP     EPASS

                      /
                      /ERROR HANDLER
                      /
2577  3257
      2600    PAGE
2600  0000    ERROR,  0
2601  7300            CLA CLL
2602  1600            TAD I   ERROR           /GET POINTER TO ERROR MESSAGE
2603  3234            DCA     MESG            /SAVE POINTER
2604  2200            ISZ     ERROR
2605  1600            TAD I   ERROR           /GET POINTER TO DATA HEADER
2606  3236            DCA     DHDER           /SAVE HEADER
2607  2200            ISZ     ERROR                   /NUMBER OF WORDS TO BE OUTPUT
2610  1600            TAD I   ERROR           /GET NUMBER OF DATA WORDS TO BE TYPED
2611  3264            DCA     DATCNT          /SAVE
2612  1200            TAD     ERROR           /GET ADDRESS OF TEST THAT FAILED
2613  1377            TAD     (-3
2614  3776'           DCA     LSTDGT
2615  1776'           TAD     LSTDGT
2616  3266            DCA     ERRAD
2617  7604            LAS
2620  0334            AND     SR01
2621  7640            SZA CLA
2622  5254            JMP     EHALT
2623  1030            TAD     TYPFLG
2624  7640            SZA CLA
2625  5241            JMP     DATOUT
2626  7040            CMA
2627  3030            DCA     TYPFLG          /CLEAR ERROR FLAG
2630  4775'           JMS     OCTASC
2631  4441            JMS I   XPRINT
2632  3024            ERADR-1
```

```
4441            JMS I   XPRINT
0000    MESG,   0
4441            JMS I   XPRINT
0000    DHDER,  0
4441            JMS I   XPRINT                  /NUMBER OF WORDS TO BE OUTPUT
3512            CRLF-1
1264    DATOUT, TAD     DATCNT
7650            SNA CLA
5254            JMP     EHALT
1265            TAD     DATAP
3010            DCA     POINT1
1410    BITS,   TAD I   POINT1
4774'           JMS     BITOUT
2264            ISZ     DATCNT
5246            JMP     BITS
4441            JMS I   XPRINT
3512            CRLF-1
7604    EHALT,  LAS
0333            AND     SR00
7640            SZA CLA
5262            JMP     .+3
1266            TAD     ERRAD
7402            HLT
2200            ISZ     ERROR
5600            JMP I   ERROR
0000    DATCNT, 0
0020    DATAP,  DATA1-1
0000    ERRAD,  0
                /
                /TEST FOR LOOP ON CURRENT TEST
                /
0000    LOOP1,  0
1030            TAD     TYPFLG
7650            SNA CLA
5277            JMP     LP1EXA
7604            LAS
0341            AND     SR06
7640            SZA CLA
5310            JMP     LP1EXX-1
7604    LP1EXA, LAS
0340            AND     SR05
7640            SZA CLA
5305            JMP     LP1EXT
2031            ISZ     LPCNT
5311            JMP     LP1EXX
7604    LP1EXT, LAS
0335            AND     SR02
7650            SNA CLA
2267            ISZ     LOOP1
5667    LP1EXX, JMP I   LOOP1
                /
                /TEST FOR LOOP ON CURRENT DATA
                /
0000    LOOP2,  0
1030            TAD     TYPFLG
```

```
2714  7650            SNA CLA
2715  5326            JMP     LP2EXT
2716  7604            LAS
2717  0341            AND     SR06
2720  7650            SNA CLA
2721  5326            JMP     .+5             /DATA CORRECT, CONTINUE
2722  1312            TAD     LOOP2
2723  1373            TAD     (5
2724  3312            DCA     LOOP2
2725  5712            JMP I   LOOP2
2726  7604    LP2EXT, LAS
2727  0336            AND     SR03
2730  7650            SNA CLA
2731  2312            ISZ     LOOP2
2732  5712            JMP I   LOOP2
2733  4000    SR00,   4000
2734  2000    SR01,   2000
2735  1000    SR02,   1000
2736  0400    SR03,   400
2737  0200    SR04,   200
2740  0100    SR05,   100
2741  0040    SR06,   40


                      /
                      /OCTAL TO PACKED ASCII CONVERSION
2773  0005
2774  3031
2775  3000
2776  3027
2777  7775
      3000    PAGE    /
3000  0000    OCTASC, 0
3001  7300            CLA CLL
3002  1227            TAD     LSTDGT          /GET WORD TO BE CONVERTED
3003  4046            BSW                     /SWAP HALVES, SEPARATE DIGITS,
3004  4212            JMS     SPLIT           /CONVERT MOST SIGNIFICANT
3005  3226            DCA     MSTDGT          /DIGITS TO ASCII
3006  1227            TAD     LSTDGT          /CONVERT LEAST SIGNIFICANT
3007  4212            JMS     SPLIT           /DIGITS TO ASCII
3010  3227            DCA     LSTDGT
3011  5600            JMP I   OCTASC          /RETURN
3012  0000    SPLIT,  0
3013  0377            AND     (77
3014  3114            MQL
3015  4115            MQA
3016  7106            CLL RTL
3017  7004            RAL
3020  0376            AND     (707
3021  4115            MQA
3022  0376            AND     (707
3023  1375            TAD     (6060
3024  5612            JMP I   SPLIT
3025  3736    ERADR,  TEXT    /←?     /
3026  4040
```

```
3027  4040
3030  4000
                    /
                    /OUTPUT 12 BIT BINARY WORD
                    /
3031  0000  BITOUT, 0
3032  3114          MQL                     /SAVE DATA IN MQ
3033  1374          TAD     (-14            /SET UP TO OURPUT
3034  3020          DCA     CNTR1           /12 BITS
3035  4115  BIT01,  MQA                     /GET DATA
3036  7104          CLL RAL                 /GET MSB INTO LINK
3037  3114          MQL                     /SAVE REST OF WORD
3040  1373          TAD     ("1             /GET ASCII 1 INTO AC
3041  7420          SNL
3042  0372          AND     ("0             /IS BIT=1
3043  4442          JMS I   XTYPE           /NO, CHANGE TO ASCII Ø
3044  2020          ISZ     CNTR1           /OUTPUT BIT
3045  5235          JMP     BIT01           /CONTINUE
3046  1371          TAD     (24Ø            /TYPE 2 SPACES
3047  4442          JMS I   XTYPE           /AFTER LAST BIT HAS BEEN
3050  1371          TAD     (24Ø            /OUTPUTTED
3051  4442          JMS I   XTYPE
3052  5631          JMP I   BITOUT          /RETURN


                    /
                    /CHARACTER STRING OUTPUT ROUTINE
3171  0240
3172  0260
3173  0261
3174  7764
3175  6060
3176  0707
3177  0077
      3200  PAGE    /
3200  0000  PRINT,  0
3201  7300          CLA CLL
3202  1600          TAD I   PRINT           /GET POINTER TO MESSAGE
3203  3010          DCA     POINT1          /SET UP AUTO-INDEX REGISTER
3204  2200          ISZ     PRINT           /SET UP RETURN
3205  1410          TAD I   POINT1          /GET PACKED WORD
3206  3114          MQL                     /SAVE IN MQ
3207  4115          MQA                     /GET WORD
3210  4046          BSW                     /SWAP HALVES
3211  4215          JMS     TYPSET          /DECODE AND OUTPUT
3212  4115          MQA                     /GET WORD
3213  4215          JMS     TYPSET          /DECODE AND OUTPUT
3214  5205          JMP     PRINT+5         /CONTINUE
                    /
                    /UNPACK, DECODE, OUTPUT
                    /
3215  0000  TYPSET, 0
3216  0243          AND     K0077           /MASK UNWANTED BITS
3217  7450          SNA                     /IS AC=0
3220  5600          JMP I   PRINT           /YES, END OF MESSAGE, EXIT
```

```
3221  1244            TAD     M40             /SUBTRACT 40
3222  7510            SPA                     /IS PACKED CHARACTER >40
3223  5226            JMP     .+3             /NO
3224  1250            TAD     K240            /YES, CONVERT TO ASCII
3225  5241            JMP     MTP             /OUTPUT
3226  7001            IAC                     /ADD 1 TO AC
3227  7440            SZA                     /IS CHARACTER=37
3230  5233            JMP     .+3             /NO,
3231  1245            TAD     K215            /GET CODE FOR CARRIAGE RETURN
3232  5241            JMP     MTP             /OUTPUT
3233  7001            IAC                     /ADD 1 TO AC
3234  7440            SZA                     /IS CHARACTER=37
3235  5240            JMP     .+3             /NO
3236  1246            TAD     K212            /GET CODE FOR LINE FEED
3237  5241            JMP     MTP             /OUTPUT
3240  1247            TAD     K336            /PACKED CHARACTER >40, CONVERT TO ASCII
3241  4442    MTP,    JMS I   XTYPE           /OUTPUT
3242  5615            JMP I   TYPSET
3243  0077    K0077,  77
3244  7740    M40,    -40
3245  0215    K215,   215
3246  0212    K212,   212
3247  0336    K336,   336
3250  0240    K240,   240
                      /
                      /OUTPUT ONE CHARACTER TO TTY
                      /
3251  0000    TYPE,   0
3252  6046            TLS
3253  6041            TSF
3254  5253            JMP     .-1
3255  7200            CLA
3256  5651            JMP I   TYPE
                      /
                      /
                      /
3257  7604    EPASS,  LAS
3260  0777'           AND     SR04
3261  7640            SZA CLA
3262  5776'           JMP     INIT1
3263  7604            LAS
3264  0775'           AND     SR05
3265  7640            SZA CLA
3266  5272            JMP     EPAS1
3267  4441            JMS I   XPRINT
3270  3274            MEP-1
3271  5776'           JMP     INIT1
3272  1374    EPAS1,  TAD     (207
3273  4251            JMS     TYPE
3274  5776'           JMP     INIT1
3275  3736    MEP,    TEXT    /*+DR/
3276  0422
3277  0000
```

```
                        /
                        /TELETYPE MESSAGES
                        /
3374  0207
3375  2740
3376  0400
3377  2737
      3400    PAGE
3400  3736    M1,     TEXT    /←↑SET SR FOR DEVICE CODE AND CONT/
3401  2305
3402  2440
3403  2322
3404  4006
3405  1722
3406  4004
3407  0526
3410  1103
3411  0540
3412  0317
3413  0405
3414  4001
3415  1604
3416  4003
3417  1716
3420  2400
3421  3736    M2,     TEXT    /←↑SET SR FOR INTERRUPT JUMPERS AND CONT/
3422  2305
3423  2440
3424  2322
3425  4006
3426  1722
3427  4011
3430  1624
3431  0522
3432  2225
3433  2024
3434  4012
3435  2515
3436  2005
3437  2223
3440  4001
3441  1604
3442  4003
3443  1716
3444  2400
3445  3736    M2A,    TEXT    /←↑SET SWITCHES FOR FLIPFLOP JUMPERS AND CONTINUE/
3446  2305
3447  2440
3450  2327
3451  1124
3452  0310
3453  0523
3454  4006
3455  1722
3456  4006
```

```
3457  1411
3460  2006
3461  1417
3462  2040
3463  1225
3464  1520
3465  0522
3466  2340
3467  0116
3470  0440
3471  0317
3472  1624
3473  1116
3474  2505
3475  0000
3476  3736    M3,     TEXT    /←↑SET SR FOR RUN AND CONT/
3477  2305
3500  2440
3501  2322
3502  4006
3503  1722
3504  4022
3505  2516
3506  4001
3507  1604
3510  4003
3511  1716
3512  2400
3513  3736    CRLF,   TEXT    /←↑/
3514  0000
                      /
                      /DATA HEADERS
                      /
3515  0000    DH0,    0
3516  3736    DH1,    TEXT    /←↑REGISTER DATA/
3517  2205
3520  0711
3521  2324
3522  0522
3523  4004
3524  0124
3525  0100
3526  3736    DH2,    TEXT    /←↑AC CONTENTS/
3527  0103
3530  4003
3531  1716
3532  2405
3533  1624
3534  2300
3535  3736    DH3,    TEXT    /←↑MASK          EXPECTED      RECEIVED/
3536  1501
3537  2313
3540  4040
3541  4040
3542  4040
```

```
3543  4040
3544  4040
3545  0530
3546  2005
3547  0324
3550  0504
3551  4040
3552  4040
3553  4040
3554  2205
3555  0305
3556  1126
3557  0504
3560  0000
3561  3736    DH4,    TEXT    /←↑EXPECTED      RECEIVED/
3562  0530
3563  2005
3564  0324
3565  0504
3566  4040
3567  4040
3570  4040
3571  2205
3572  0305
3573  1126
3574  0504
3575  0000
3576  3736    DH5,    TEXT    /←↑REGISTER      DATA OUT      DATA IN/
3577  2205
3600  0711
3601  2324
3602  0522
3603  4040
3604  4040
3605  4040
3606  4004
3607  0124
3610  0140
3611  1725
3612  2440
3613  4040
3614  4040
3615  4040
3616  0401
3617  2401
3620  4011
3621  1600
3622  3736    DH6,    TEXT    /←↑AC CONTENTS   DATA OUT      DATA IN/
3623  0103
3624  4003
3625  1716
3626  2405
3627  1624
3630  2340
3631  4040
```

```
3632  4004
3633  0124
3634  0140
3635  1725
3636  2440
3637  4040
3640  4040
3641  4040
3642  0401
3643  2401
3644  4011
3645  1600
                        /
                        /ERROR MESSAGE
                        /
3646  1725    INIT1E, TEXT    /OUTPUT REG NOT CLEARED/
3647  2420
3650  2524
3651  4022
3652  0507
3653  4016
3654  1724
3655  4003
3656  1405
3657  0122
3660  0504
3661  0000
3662  1116    INIT2E, TEXT    /INPUT REG NOT CLEARED/
3663  2025
3664  2440
3665  2205
3666  0740
3667  1617
3670  2440
3671  0314
3672  0501
3673  2205
3674  0400
3675  2313    INIT3E, TEXT    /SKIP FLAG SET/
3676  1120
3677  4006
3700  1401
3701  0740
3702  2305
3703  2400
3704  0402    TRAN1E, TEXT    /DBRO DID NOT CLEAR AC/
3705  2217
3706  4004
3707  1104
3710  4016
3711  1724
3712  4003
3713  1405
3714  0122
3715  4001
```

```
0300
0402    TRAN2E, TEXT    /DBRI DID NOT CLEAR AC/
2211
4004
1104
4016
1724
4003
1405
0122
4001
0300
0402    TRAN3E, TEXT    /DBSO CHANGED AC/
2317
4003
1001
1607
0504
4001
0300
0402    TRAN4E, TEXT    /DBCO CHANGED AC/
0317
4003
1001
1607
0504
4001
0300
0402    TRAN5E, TEXT    /DBCI CHANGED AC/
0311
4003
1001
1607
0504
4001
0300
0402    OUT1E,  TEXT    /DBSO ERROR/
2317
4005
2222
1722
0000
0402    OUT4E,  TEXT    /DBCO ERROR/
0317
4005
2222
1722
0000
0402    OUT7E,  TEXT    /DBRO ERROR/
2217
4005
2222
1722
0000
0402    IN2E,   TEXT    /DBCI ERROR/
```

```
4005  0311
4006  4005
4007  2222
4010  1722
4011  0000
4012  1116    IN3E,   TEXT    /INPUT REGISTER DATA ERROR/
4013  2025
4014  2440
4015  2205
4016  0711
4017  2324
4020  0522
4021  4004
4022  0124
4023  0140
4024  0522
4025  2217
4026  2200
4027  1401    IN4E,   TEXT    /LATCH ERROR/
4030  2403
4031  1040
4032  0522
4033  2217
4034  2200
4035  0402    IN9E,   TEXT    /DBRI ERROR/
4036  2211
4037  4005
4040  2222
4041  1722
4042  0000
4043  1116    INT1E,  TEXT    /INTERRUPT ACTIVE/
4044  2405
4045  2222
4046  2520
4047  2440
4050  0103
4051  2411
4052  2605
4053  0000
4054  1617    INT2E,  TEXT    /NO INTERRUPT, SKIP/
4055  4011
4056  1624
4057  0522
4060  2225
4061  2024
4062  5440
4063  2313
4064  1120
4065  0000
4066  1116    INT3E,  TEXT    /INTERRUPT, NO SKIP/
4067  2405
4070  2222
4071  2520
4072  2454
4073  4016
```

```
4074  1740
4075  2313
4076  1120
4077  0000
4100  1617    INT4E,  TEXT    /NO INTERRUPT, NO SKIP/
4101  4011
4102  1624
4103  0522
4104  2225
4105  2024
4106  5440
4107  1617
4110  4023
4111  1311
4112  2000
4113  1617    INT5E,  TEXT    /NO SKIP/
4114  4023
4115  1311
4116  2000
4117  2313    INT6E,  TEXT    /SKIP/
4120  1120
4121  0000

            $
0176  7716
0177  0106
```

```
0000  01000000  10000000  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11110020  00000000  00000000  00000000  00000000  00000011

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  10000000  00000000  00000000  00000000  00000111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10000001

0600  11111111  11111111  11111111  11111111  11111111  11100000  00000000  00000000
0700  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000001


1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11110000  00000000  00000000  00000001

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  00000000  00000000  00000001

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11110000  00000000  00000000  00000000  00000000  00000000  00000001

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111100  00000000  00000000  00000000  00000001


2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111110  00000000  00000000  00000000  00000000  00000000  00000001

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111110  00000001

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111000  00000000  00000000  00000000  00000000  00000000  00000000  00000001

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11000000  00000000  00000000  00011111


3000  11111111  11111111  11111111  11111111  11111111  11100000  00000000  00000000
3100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  01111111

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00001111

3400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
```

```
4000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4100  11111111  11111111  11000000  00000000  00000000  00000000  00000000  00000000

4200
4300

4400
4500

4600
4700


5000
5100

5200
5300

5400
5500

5600
5700


6000
6100

6200
6300

6400
6500

6600
6700


7000
7100

7200
7300

7400
7500

7600
7700
```

BIT01	3035	IN2	1434	K212	3246	SR00	2733
BITOUT	3031	IN2E	4004	K215	3245	SR01	2734
BITS	2646	IN3	1462	K240	3250	SR02	2735
BSW	4046	IN3A	1466	K336	3247	SR03	2736
CAF	4063	IN3E	4012	K7700	0062	SR04	2737
CNTR1	0020	IN4E	4027	LOOP1	2667	SR05	2740
CRLF	3513	IN5	1600	LOOP2	2712	SR06	2741
DATA1	0021	IN5A	1604	LP1EXA	2677	SRQ	4076
DATA2	0022	IN5C	1633	LP1EXT	2705	START1	0202
DATA3	0023	IN6	1637	LP1EXX	2711	START2	0244
DATA4	0024	IN6A	1644	LP2EXT	2726	TIOT	0250
DATA5	0025	IN6C	1672	LPCNT	0031	TRAN1	0452
DATAP	2665	IN7	1676	LSTDGT	3027	TRAN1E	3704
DATCNT	2664	IN7A	1702	M1	3400	TRAN2	0471
DATOUT	2641	IN7C	1731	M2	3421	TRAN2E	3717
DBCI	4434	IN8	2000	M2A	3445	TRAN3	0510
DBCIX	0300	IN8A	2005	M3	3476	TRAN3E	3732
DBCO	4436	IN9	2030	M40	3244	TRAN4	0530
DBCOX	0312	IN9A	2034	MEP	3275	TRAN4E	3742
DBDIX	0261	IN9E	4035	MESG	2634	TRAN5	0550
DBEI	4432	INIT1	0400	MQ	0114	TRAN5E	3752
DBEIX	0266	INIT1E	3646	MQA	4115	TRAN6	0600
DBRI	4435	INIT2	0416	MQL	3114	TRAN7	0616
DBRIX	0305	INIT2E	3662	MSTDGT	3026	TRAN8	0634
DBRO	4440	INIT3	0435	MTP	3241	TYE1	0113
DBROX	0324	INIT3E	3675	OCTASC	3000	TYPE	3251
DBSK	4433	INOU1	2200	OUT1	1000	TYPFLG	0030
DBSKX	0273	INOU1A	2205	OUT1E	3762	TYPSET	3215
DBSO	4437	INOU2	2230	OUT2	1033	XDBCI	0034
DBSOX	0317	INOU2A	2235	OUT3	1054	XDBCO	0036
DH0	3515	INOU3	2260	OUT3A	1060	XDBEI	0032
DH1	3516	INOU3A	2265	OUT4	1105	XDBRI	0035
DH2	3526	INOU4	2325	OUT4A	1111	XDBRO	0040
DH3	3535	INOU4A	2331	OUT4E	3770	XDBSK	0033
DH4	3561	INT1	2400	OUT5	1200	XDBSO	0037
DH5	3576	INT1A	2404	OUT5A	1205	XERROR	0043
DH6	3622	INT1AE	2423	OUT6	1230	XLOOP1	0044
DHDER	2636	INT1BE	2440	OUT6A	1234	XLOOP2	0045
DIOT	0260	INT1CE	2445	OUT7	1262	XPRINT	0041
EHALT	2654	INT1D	2433	OUT7A	1266	XTYPE	0042
EPAS1	3272	INT1E	4043	OUT7E	3776		
EPASS	3257	INT1QK	2431	OUT8	1315		
ERADR	3025	INT2E	4054	OUT8A	1322		
ERRAD	2666	INT3	2452	PNTR1	0233		
ERROR	2600	INT3A	2456	POINT1	0010		
FJUMPE	0027	INT3C	2500	PRINT	3200		
IJUMPE	0026	INT3E	4066	RETURN	0106		
IN1	1400	INT4E	4100	SIMBSW	0046		
IN10	2063	INT5E	4113	SIMCAF	0063		
IN10A	2070	INT6E	4117	SIMMQA	0115		
IN1A	1403	IOTS	0247	SIMSRQ	0076		
IN1B	1420	K0077	3243	SPLIT	3012		

ERRORS DETECTED: 0

LINKS GENERATED: 18

RUN-TIME: 10 SECONDS

3K CORE USED