IDENTIFICATION

PRODUCT NAME: ADGE,AMBE AND CONVERTER AND MULTIPLEXER DIAGNOSTIC

PRODUCT CODE: MAINDEC-8E-D4BB-D-LB

DATE CREATED: JULY 14, 1971

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: MATT TAFFEL

READ THIS DOCUMENT PRIOR TO RUNNING PROGRAM!

1. ABSTRACT

This program performs basic tests on the Input/Output control logic and multiplexer. The analog tests are designed to provide a means of calibrating the converter and checking conversion parameters.

2. REQUIREMENTS

2.1 Equipment

PDP-8/E with 4K core, ASR33 teletype, AD8E A-D Converter, (AM8E Multiplexer optional), Adjustable High Quality Voltage Source (0.01% or better, Z out <1.0ohm).

NOTE: To run MONOTINICITY TEST, a wave form generator, sine or ramp, must be used.

2.2 Storage

Maindec resides in locations 0000-4177.

2.3 Preliminary Programs

All basic CPU and teletype Maindecs must have been run successfully.

NOTE: If external enable utilizing the DK8-E REAL TIME CLOCK is to be run, the Maindec for the DK8-E must be successfully run first. In addition, VC8-E Control Tests must be run prior to special LAB-E SYSTEM CHECK routine.

3. LOADING PROCEDURE

The binary loader is used to load the program.

4. USAGE PROCEDURE

SEE SPECIFICATIONS FOR MAXIMUM VOLTAGE INPUTS!!

INSURE THAT TELETYPE IS ON-LINE.

A. CONTROL SWITCHES

SW0 = Suppress error messages and "END LOGIC TEST" message
SW1 = Halt on error with PC displayed in AC.
SW2 = Scope loop override to exit from loop on error and permit continuance of test. Also halts with converted word in AC for EXTERNAL ENABLE when there is no error.
SW3 = Enables halt during calibration routine. Converted word is displayed in AC.
SW4 = Must be set to run EXTERNAL ENABLE test.
SW5 = Allows operator to explicity select any one of the logic routines.

B. Normal start for control logic tests.

1. LOAD 200.

2. Press CLEAR then CONTINUE. HALT will occur.

3. Select options from switches 0,1,2,5.

4. If SW5 is present (1), select test from SW6-11.

5. Press CONTINUE.

NOTE: With SW5 down and SW2 up, any error will be reported once, then program will continue to next test.

C. IOT Scope Loop

1. LOAD 201.

2. Place low order six bits of IOT 65xx in SW6-11.

3. Press CLEAR, then CONTINUE.

NOTE: IOT may be reselected while running.

D', Display Converted Value is AC',

1', Apply voltage to A-D converter input or preamplifiers',

2', LOAD 202,

3', If a HALT after conversion is desired, select SW3',

4', Select MPX channel from SW0-11',

5', Press CLEAR, then CONTINUE',

6', When SW3 halt select is engaged, operator may change channels, if desired, then press CONTINUE to loop. SW3 may be deselected at this time,

E', External Enable with Real Time Clock

1', Apply voltage to A-D converter input or preamplifiers, if desired',

2', LOAD 203,

3', Set SW4',

4', Select switches 0 or 2 as desired',

5', Select channel with SW 6-11',

6', Press CLEAR, then CONTINUE,

NOTE: Channel may be changed while running test,

F', Monotinicity Test

NOTE: Ramp Speed of function generator must be slower than slow rate of converter, See ENGINEERING SPECIFICATIONS',

1', LOAD 204

2', Select SW0 if desired',

3, Press CLEAR, then CONTINUE,

4', Program will halt',

5, Select Stall time between tests Iterations by setting SW0-11', The larger the number in the switch register, the greater the stall time,

6. Press CONTINUE.

7. If error occurs, program will halt with word "XX" in AC. Pressing CONTINUE will display XXXX word in AC. Pressing CONTINUE again will restart test.

C. Resolution Accuracy Test

1. Apply a known voltage to A-D converter input.

2. LOAD 295.

3. Select SW3 A,I if desired.

4. Select channel with SW8-11.

5. Press CLEAR, then CONTINUE.

6. If error occurs, program will display the channel number on TTY then beep continuously.

7. If no error occurs, TTY bell will ring once. The program will recycle.

D. Successive Reads Test

1. Apply some voltage to the A-D converter input.

2. LOAD 295.

3. Select SW3 if desired.

4. Select channel from SW8-11.

5. Press CLEAR, then CONTINUE.

6. If error occurs, program will halt with first read in AC. Press CONTINUE to get second read into AC.

7. To restart, press continue.

8. If no error occurs, TTY bell will ring once. The program will recycle.

E. Multiplexer noise test

1. LOAD 297.

2. Select channel in SW8-11 and apply voltage to that channel.

3', Select SW0 if desired,

4', Press CLEAR, then CONTINUE,

5', If error occurs, message will be typed on TTY, then routine will recycle,

K', LAB8/E SYSTEM TEST

1', LOAD 203

2', Press CLEAR, then CONTINUE,

3', Program will HALT,

4', Load CLOCK FREQUENCY into SW6-8,

5', Press CONTINUE, then follow TTY instructions,

6', Press CONTINUE,

5', PROGRAM DESCRIPTION

5,1 Control Logic Tests

TST0 = Checks that A-D DONE and TIMING ERROR flags are cleared by Initialize,

TST1 = Checks that A-D DONE flag can be set then cleared,

TST2 = Checks that TIMING ERROR flag can be set then cleared,

TST3 = Tests for unexpected interrupt request,

TST4 = Tests to see if ADRB jam transfers to AC,

TST5 = Tests to see if ADRS jam transfers to AC,

TST6 = Tests to see if enable register can be loaded and read back,

TST7 = Tests to see if A-D DONE will generate interrupt,

TST10= Tests to see if TIMING ERROR will generate interrupt,

TST11- Tests that MPX Register can be loaded and read back.

TST12- Tests that all channels can be loaded into MPX register and read back.

TST13- Tests auto-increment mode of MPX register.

TST14- Tests to see if conversion can be made in specified time.

5.2 Miscellaneous Tests

A. 10? Speed Load Test - [illegible] for A/D [illegible]

B. External Start Test - [illegible]

C. Display Converted Value [illegible] converted. [illegible]

D. [illegible] system as [illegible]

5.3 Analog Tests

A. Successive Reads Test - checks for [illegible] in the buffer logic.

B. Monotonicity Test - checks that all possible values can be converted.

C. Resolution Accuracy Test - samples a [illegible] 64 times and checks that resolution is within specification.

D. Multiplexer Noise Test - checks for noise in the [illegible] ENABLE, and STATUS REGISTER.

6. ERROR REPORTS

6.1 Logic Errors

Message will be typed out once per error on teletypewriter stating test number and nature of failure.

6.2 Other Errors

Message will be typed out on teletypewriter stating nature of failure.

```
        /MAINDEC-8E-D8IA-B [illegible] CONVERTER [illegible]
        /ADOP[illegible] AM03A, AM03B
        /COPYRIGHT 197[illegible], DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS. [illegible]
        /AUTHOR: [illegible]
        /DATE: 14 JUL 7[illegible]

        /IOT DEFINITIONS
6520    ADCL=   JMS I   XADCL           /CLEAR ALL
6521    ADLM=   JMS I   XADLM           /LOAD [illegible] REG FROM AC [illegible]
6522    ADST=   JMS I   XADST           /CLEAR FLAGS, START CONVERSION
6523    ADRB=   JMS I   XADRB           /CLEAR DONE, READ A/D BUFFER IN[illegible]
6524    ADSK=   JMS I   XADSK           /SKIP ON A/D DONE, DO NOT CLEAR [illegible]
6525    ADSE=   JMS I   XADSE           /SKIP ON TMG ERROR, DO NOT CLEAR [illegible]
6526    ADLE=   JMS I   XADLE           /LOAD ENAB REG FROM AC [illegible]
6527    ADRS=   JMS I   XADRS           /READ STATUS, ENAB, MPX REG INTO AC
6530    CLOE=   JMS I   XCLOE           /AC TO CLOCK ENABLE
6531    CLSK=   JMS I   XCLSK           /SKIP ON CLOCK OVERFLOW
6532    CLEE=   JMS I   XCLEE           /ONES IN AC CLEAR CLOCK ENABLE REGISTER
6533    CLSA=   JMS I   XCLSA           /CLOCK STATUS TO AC, AC [illegible]
6534    CLED=   JMS I   XCLED           /CLOCK ENABLE TO AC
6535    CLAB=   JMS I   XCLAB           /AC ONES TO CLOCK BUFFER
6536    DISD=   JMS I   XDISD           /SKIP ON DISPLAY DONE
6537    DILX=   JMS I   XDILX           /LOAD X
6540    DILY=   JMS I   XDILY           /LOAD Y
6541    DIXY=   JMS I   XDIXY           /INTENSIFY
6542    DILE=   JMS I   XDILE           /LOAD DISPLAY ENABLE FROM AC

6007    CAF=    6007
7002    BSW=    7002

        /MPX, ENABLE, STATUS REGISTER

        / 0   AD DONE
        / 1   TIMING ERROR
        / 2   ENABLE INTERRUPT ON AD DONE
        / 3   ENABLE INTERRUPT ON TIMING ERROR
        / 4   ENABLE EXTERNAL AD START
        / 5   AUTO-INCREMENT MODE
        / 6,7   NOT USED
        / 8-11   MPX CHANNEL 0-17 OCTAL


        /STARTING ADDRESS          TEST
        /
        /[illegible]                 NORMAL START FOR CONTROL LOGIC TESTS
        /[illegible]                 [illegible] LOOP
        /[illegible]                 DISPLAY CONVERTED VALUE IN AC
        /[illegible]                 EACH [illegible] ENABLE TEST
        /[illegible]                 [illegible] TEST
        /[illegible]                 [illegible] ACCURACY TEST
        /[illegible]                 [illegible] READS TEST
        /[illegible]                 [illegible] NOISE TEST
        /[illegible]                 [illegible] CHECK FOR [illegible]
```

```
                0000    *0
0000  0000               0
0001  5402               JMP I   .+1
0002  0022               3
0003  5404               JMP I   .+1
0004  0020               2
0005  0020               2


                0017    *17
0017  2145    XMSGPNT, ERMSG

                0020    *20
0020  4020    SW0,     4000           /SWITCH REG 0 INHIBIT TYPEOUT
0021  2000    SW1,     2000           /            1 HALT ON ERROR
0022  1000    SW2,     1000           /            2 SCOPE LOOP OVERRIDE
0023  0400    SW3,     0400           /            3 CALIBRATION TEST HALT
0024  0200    SW4,     0200           /            4 EXTERNAL ENABLE
0025  0100    SW5,     0100           /            5 SELECT TEST
0026  0000    TEMPB,   0              /STORAGE BUFFER 0
0027  0000    TEMPA,   0              /STORAGE BUFFER A
0030  0000    TEMPR,   0              /               B
0031  0000    TEMPC,   0              /               C
0032  0000    CNTR1,   0              /MONOTONICITY COUNTER
0033  0000    TALLY,   0
0034  1226    ERR,     ERTYP          /ERROR REPORT ROUTINE
0035  1000    XCONVT,  CONVT          /DISPLAY CONVERTED VALUE
0036  1400    XINSTR,  INSTR          /DOT SCOPE LOOP
0037  2000    XMONOT,  MONOT          /MONOTONICITY TEST
0040  0207    K207,    207            /BELL CODE
0041  0212    K212,    212            /LINE FEED
0042  0215    K215,    215            /CARRIAGE RETURN
0043  6500    K6500,   6500
0044  7777    M1,      7777
0045  7776    M2,      7776
0046  7774    M4,      7774
0047  1000    K1000,   1000
0050  0077    K77,     0077
0051  1200    XMOVE,   MOVE
0052  1024    EXTBL,   EXTL
0053  2267    XSTOR,   STORAG-1
0054  2420    XCOMPR,  COMPAR
0055  2200    XRESOL,  RESOL
0056  2051    XNOISE,  NOISE
0057  2123    XGLIT,   GLITCH
0060  2622    XSYST,   SYST
0061  7777    ERSWIT,  7777
0062  0002    CHAN,    2
0063  1600    TAL,     XTAL
0064  1647    SELECT,  XSELEC
0065  1552    SETUP,   XSETUP
                0077    *77
0077  0000    CHNL,    0
0100  0001             1
```

```
0101  0002        2
0102  0003        3
0103  0004        4
0104  0005        5
0105  0006        6
0106  0007        7
0107  0010        10
0110  0011        11
0111  0012        12
0112  0013        13
0113  0014        14
0114  0015        15
0115  0016        16
0116  0017        17
0117  0020        [illegible]


      0120        *120

                  /IOT LINKS

0120  1410        XADCL,  XXADCL
0121  1414        XADLM,  XXADLM
0122  1420        XADST,  XXADST
0123  1424        XADRB,  XXADRB
0124  1430        XADSK,  XXADSK
0125  1436        XADSE,  XXADSE
0126  1444        XADLE,  XXADLE
0127  1450        XADRS,  XXADRS
0130  1454        XCLDC,  XXCLDC
0131  1460        XCLSK,  XXCLSK
0132  1466        XCLBC,  XXCLBC
0133  1472        XCLSA,  XXCLSA
0134  1476        XCLED,  XXCLED
0135  1502        XCLAB,  XXCLAB
0136  1506        XDISD,  XXDISD
0137  1514        XDILX,  XXDILX
0140  1522        XDILY,  XXDILY
0141  1524        XDIXY,  XXDIXY
0142  1530        XDILE,  XXDILE

      0145        *145

                  /ERROR MESSAGE LINKS

0145  3202        ERMSG,  EMSG0
0146  3234                EMSG1
0147  3312                EMSG2
0150  3331                EMSG3
0151  3372                EMSG4
0152  3422                EMSG5
0153  3452                EMSG6
0154  3506                EMSG7
0155  [illegible]         EMSG10
0156  [illegible]         EMSG11
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0157  3637          EMSG12
0160  3677          EMSG13
0161  3744          EMSG14
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      0200      *200
0200  5211              JMP     START           /NORMAL START
0201  5436              JMP I   XINSTR          /SCOPE LOOP OPTION
0202  5435              JMP I   XCONVT          /DISPLAY CONVERTED VALUE OPTION
0203  5452              JMP I   EXTBL           /EXTERNAL ENABLE TEST
0204  5437              JMP I   XMONOT          /MONOTINICITY TEST
0205  5455              JMP I   XRESOL          /RESOLUTION ACCURACY TEST
0206  5456              JMP I   XNOISE          /SUCCESSIVE READS TEST
0207  5457              JMP I   XGLIT           /MPX NOISE TEST
0210  5460              JMP I   XSYST           /LAB8-E SYSTEM CHECK
0211  7402      START,  HLT
0212  7604              LAS
0213  0025              AND     SW5             /SELECT SPECIFIC TEST?
0214  7440              SZA                     /SKIP IF NO
0215  4464              JMS I   SELECT          /YES


                /HOUSEKEEPING
0216  7300      INITL,  CLA CLL
0217  4777'             JMS     MESAGE
0220  4161              XLABEL
0221  1376              TAD     (144
0222  3017              DCA     MSGPNT          /INITIALIZE ERROR POINTER
0223  4465              JMS I   SETUP
0224  6007      TST0,   CAF
0225  4524              ADSK                    /CHECK FOR DONE FLAG - SHOULD BE CLEARED BY INIT
0226  5231              JMP     .+3
0227  4434              JMS I   ERR             /DONE FLAG NOT CLEARED
0230  0224              TST0
0231  4525              ADSE                    /CHECK FOR TIMING ERROR FLAG - SHOULD BE CLEARED BY INIT
0232  5237              JMP     .+5
0233  4434              JMS I   ERR             /TIMING ERROR FLAG NOT CLEARED
0234  0224              TST0
0235  5240              JMP     TST1-1
0236  5224              JMP     TST0
0237  4463              JMS I   TAL

                /CHECK TO SET DONE FLAG AND CLEAR DONE FLAG
0240  4465              JMS I   SETUP
0241  7200      TST1,   CLA
0242  4522              ADST                    /CONVERT, RESULTS NOT NEEDED
0243  1177              TAD     C-122
0244  3026              DCA     TEMP2
0245  2026              ISZ     TEMP2
0246  5245              JMP     .-1
0247  4524              ADSK
0250  7410              SKP
0251  5255              JMP     .+4
0252  4434              JMS I   ERR             /FLAG NOT SET
0253  0241              TST1
0254  5265              JMP     TST2-1
0255  4522              ADCL                    /CLEAR FLAG
0256  4524              ADSK                    /CHECK FOR FLAG
0257  5264              JMP     .+5             /FLAG CLEARED
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0263  4434            JMS I   ERR             /FLAG NOT CLEARED
0264  0241            TST1
0265  5265            JMP     TST2-1
0266  5241            JMP     TST1
0267  4463            JMS I   TAL

                /CHECK TO SET TIMING ERROR FLAG AND CLEAR TIMING ERROR FLAG
0270  4465            JMS I   SETUP
0271  7200    TST2,   CLA
0272  4522            ADST                    /TWO A-D STARTS TO PRODUCE TIMING ERROR
0273  4522            ADST
0274  4525            ADSE                    /CHECK FOR TIMING ERROR FLAG
0275  7410            SKP
0276  5276            JMP     .+3
0277  4434            JMS I   ERR             /FLAG NOT SET
0300  0266            TST2
0301  4520            ADCL                    /CLEAR FLAG
0302  4525            ADSE                    /CHECK FLAG
0303  5305            JMP     .+5
0304  4434            JMS I   ERR             /FLAG NOT CLEARED
0305  0266            TST2
0306  5306            JMP     TST3-1
0307  5266            JMP     TST2
0310  4463            JMS I   TAL

                /TEST FOR UNEXPECTED INTERRUPT REQUEST
0311  4465            JMS I   SETUP
0312  7200    TST3,   CLA
0313  1176            TAD     [TST3S
0314  3004            DCA     4
0315  1317            TAD     .+5             /ERROR TRAP
0316  3001            DCA     1
0317  6001            ION                     /TURN INT ON
0320  7000            NOP
0321  5322            JMP     .+4
0322  4434            JMS I   ERR             /UNEXPECTED INTERRUPT OCCURRED
0323  0307            TST3
0324  5326            JMP     TST4-1
0325  6002    TST3S,  IOF                     /TURN INT OFF
0326  7410            SKP
0327  5307            JMP     TST3
0330  4463            JMS I   TAL

                /TEST THAT ADRB JAM TRANSFERS TO AC

0331  4465            JMS I   SETUP
0332  7240    TST4,   CLA CMA                 /AC=7777
0333  4523            ADRB                    /SHOULD CLEAR AC
0334  3027            DCA     TEMPA           /SAVE AC
0335  7040            CMA
0336  4523            ADRB                    /READ WITH ADRB
0337  7041            CIA
0340  1027            TAD     TEMPA
0341  7440            SZA                     /EQUAL?
0342  7410            SKP
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0342  5345            JMP     .+3
0341  4434            JMS I   ERR             /NO-ERROR
0342  7327            TST4
0343  5346            JMP     TST5+1
0344  5327            JMP     TST4
0345  4463            JMS I   TAL

                /TEST THAT ADRS JAM TRANSFERS TO AC

0346  4465            JMS I   SETUP
0347  4532    TST5,   ADCL
0350  4521            ADLY
0351  4522            ADST
0352  4524            ADSK
0353  5352            JMP     .+1
0354  7540            CLA CMA CLL             /AC=7777
0355  4527            ADRS
0356  3027            DCA     TEMPA           /SAVE AC, SHOULD BE 4000
0357  1027            TAD     TEMPA
0360  7004            RAL
0361  7440            SZA                     /DID ADRS CLEAR AC?
0362  7410            SKP
0363  5370            JMP     .+5
0364  4434            JMS I   ERR             /NO
0365  0347            TST5
0366  5775'           JMP     TST5+1
0367  5347            JMP     TST5
0370  4463            JMS I   TAL
0371  5775'           JMP     TST5+1

0372  0423
0373  0144
0374  1274
      0400      PAGE

                /CHECKS THAT ENABLE REGISTER CAN BE LOADED AND READ BACK

0400  4605            JMS I   SETUP
0401  7300    TST6,   CLA CLL
0402  1175            TAD     D17             /GET BITS AND
0403  7002            BSW                     /PLACE IN AC 6-8
0404  4535            ADLE                    /LOAD
0405  7440            SZA
0406  5410            SKP
0407  5212            JMP     .-3
0410  4434            JMS I   ERR             /DID NOT CLEARED BY ADLE
0411  0401            TST6
0412  7040            CMA
0413  4537            ADRB                    /READ BACK
0414  7002            BSW
0415  1174            TAD     .7761           /CHECK FOR ONLY AC 6-8 SET
0416  7440            SZA
0417  7412            SKP
0420  5225            JMP     .+3
0421  4434            JMS I   ERR             /ERROR BITS
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0422  0421            TST6
0423  5226            JMP     TST7-1
0424  5221            JMP     TST6
0425  4463            JMS I   TAL             /DONE?

                 /GENERATE INTERRUPT WITH A-D DONE FLAG
0426  4465            JMS I   SETUP
0427  7200   TST7,    CLA
0430  4522            ADST                    /CONVERT
0431  4524            ADSK                    /DONE?
0432  5231            JMP     .-1             /WAIT
0433  1173            TAD     CDON1
0434  3002            DCA     2               /RETURN POINTER
0435  1047            TAD     K1000
0436  4526            ADLE                    /LOAD INTERRUPT ENABLE
0437  6001            ION
0440  7000            NOP
0441  6002            IOF
0442  4434            JMS I   ERR             /DID NOT INTERRUPT
0443  0427            TST7
0444  5251            JMP     TST10-1
0445  4520   DON1,    ADCL                    /CLEAR WORLD
0446  7410            SKP
0447  5227            JMP     TST7
0450  4463            JMS I   TAL

                 /GENERATE INTERRUPT WITH TIMING ERROR FLAG
0451  4465            JMS I   SETUP
0452  7200   TST10,   CLA
0453  1172            TAD     CTMG1
0454  3002            DCA     2
0455  4522            ADST                    /CAUSE ERROR HERE
0456  4522            ADST
0457  4524            ADSK                    /DONE?
0460  5257            JMP     .-1
0461  4525            ADSE                    /TIMING ERROR?
0462  5261            JMP     .-1
0463  7300            CLA CLL
0464  1047            TAD     K1000
0465  7010            RAR
0466  4526            ADLE                    /LOAD INTERRUPT ENABLE
0467  6001            ION                     /INT ON
0470  7000            NOP
0471  6002            IOF                     /INT OFF
0472  4434            JMS I   ERR             /DID NOT INTERRUPT
0473  0452            TST10
0474  5321            JMP     TST11-1
0475  4520   TMG1,    ADCL                    /CLEAR WORLD
0476  7410            SKP
0477  5252            JMP     TST10
0500  4463            JMS I   TAL


                 /LOAD AND READ MPX REG
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```
0501  4465                 JMS I   SETUP
0502  7240        TST11,   CLA CMA
0503  4521                 ADLM
0504  7450                 SNA                     /CHECK IF AC CLEARED
0505  5311                 JMP     .+4
0506  4434                 JMS I   ERR             /AC WAS NOT CLEARED BY ADLM
0507  0502                 TST11
0510  7200                 CLA
0511  4521                 ADLM                    /LOAD MPX REG WITH 00
0512  4527                 ADRS                    /READ MPX REG
0513  0175                 AND     C17             /MASK FOR MPX REG
0514  7440                 SZA
0515  7410                 SKP
0516  5321                 JMP     .+3
0517  4434                 JMS I   ERR             /MPX REG NOT 0
0520  0502                 TST11
0521  7040                 CMA
0522  0175                 AND     C17
0523  4521                 ADLM                    /MPX REG SET TO 17
0524  4527                 ADRS                    /READ MPX REG
0525  0175                 AND     C17
0526  1171                 TAD     C7760           /MASK
0527  7040                 CMA
0530  7440                 SZA
0531  7410                 SKP
0532  5337                 JMP     .+5
0533  4434                 JMS I   ERR             /MPX REG NOT 17
0534  0502                 TST11
0535  5777'                JMP     TST12-1
0536  5302                 JMP     TST11
0537  4464                 JMS I   TAL
0540  5777'                JMP     TST12-1

0577  0600
      0600        PAGE

                  /LOAD MPX REG WITH EACH CHANNEL
0600  4465                 JMS I   SETUP
0601  7300        TST12,   CLA CLL
0602  3026                 DCA     TEMP0
0603  1026                 TAD     TEMP0           /CHANNEL INTO AC
0604  7040                 CMA
0605  3027                 DCA     TEMP1           /COMPLEMENTED CHANNEL
0606  1026                 TAD     TEMP0
0607  4521                 ADLM                    /LOAD IT
0610  4527                 ADRS                    /READ MPX REG
0611  0175                 AND     C17             /MASK 8-11
0612  3030                 DCA     TEMP2           /STORE IT
0613  1027                 TAD     TEMP1           /CHECK IT
0614  1030                 TAD     TEMP2
0615  7001                 IAC
0616  7440                 SZA
0617  7410                 SKP
0620  5224                 JMP     .+4
0621  4434                 JMS I   ERR             /WRONG CHANNEL
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0622  7601            TST12
0623  5245            JMP     TST13+1
0624  1171            TAD     C7762
0625  7326            TAD     TEMPC
0626  7421            MIF
0627  7440            SZA                     /DONE WITH ALL CHANNELS?
0630  7410            SKP                     /NO
0631  5235            JMP     .+4             /YES
0632  7602            CLA CLL
0633  2026            ISZ     TEMPB           /SET NEXT CHANNEL
0634  5223            JMP     TST12+2
0635  4463            JMS I   TAG             /DONE WITH TEST?


                /AUTO-INCREMENT MODE TEST
0636  4465            JMS I   SETUP
0637  7300    TST13,  CLA CLL
0640  1176            TAD     C76
0641  3010            DCA     12
0642  4522            ADSC
0643  7200    AUTO1,  CLA
0644  1410            TAD I   10              /CHANNEL A
0645  3027            DCA     TEMPA
0646  1027            TAD     TEMPA
0647  7040            CMA
0650  3030            DCA     TEMPB
0651  1225            TAD     SB5             /AUTO-INCREMENT BIT
0652  4526            ADLE                    /LOAD ENABLE REG
0653  1027            TAD     TEMPA           /CHANNEL A
0654  4521            ADLM                    /LOAD MPX REG
0655  4522            ADSF                    /START CONVERSION
0656  4524            ADSM                    /WAIT FOR
0657  5256            JMP     .-1             /DONE FLAG
0660  4527            ADRB                    /READ STATUS
0661  0175            AND     I17             /MASK OUT ALL BUT MPX REG
0662  3031            DCA     TEMPC
0663  1027            TAD     TEMPA           /CHECK IF CHANNEL 17 INCREMENTED TO 0
0664  1174            TAD     C7761
0665  7640            SZA CLA                 /IF CHANNEL 17 SKIP
0666  5272            JMP     .+4
0667  1410            TAD I   10
0670  1231            TAD     TEMPC
0671  5274            JMP     AUTO2           /AC SHOULD = 0
0672  1231            TAD     TEMPC
0673  1230            TAD     TEMPB           /CHECK FOR CHANNEL A+3
0674  7442    AUTO2,  SZA
0675  7410            SKP
0676  5322            JMP     .+4
0677  4434            JMS I   ERR             /WRONG CHANNEL
0700  0637            TST13
0701  5610            JMP     TST14+1
0702  1031            TAD     TEMPC
0703  7442            SZA                     /LAST CHANNEL?
0704  5243            JMP     AUTO1           /NO
0705  7412            SKP
```

```
2726  5237              JMP     TST13
2727  4463              JMS I   TAL

                        /ROUTINE TO CHECK THAT CONVERSION CAN BE MADE IN 24 MICROSECS
2710  4465              JMS I   SETUP
2711  7300    TST14,    CLA CLL
2712  1377              TAD     (-6
2713  3026              DCA     TEMP2
2714  4522              ADCC
2715  4522              ADST
2716  2026              ISZ     TEMP2
2717  5316              JMP     .-1
2720  4524              ADSK
2721  7410              SKP
2722  5327              JMP     .+5
2723  4434              JMS I   ERR             /TIME OUT ERROR
2724  2711              TST14
2725  5330              JMP     FINIS
2726  5311              JMP     TST14
2727  4463              JMS I   TAL
2730  7604    FINIS,    LAS
2731  0020              AND     SW0             /SWITCH SET TO DELETE
2732  7640              SZA CLA                 /TYPEOUT OF END LOGIC TEST
2733  5337              JMP     .+4
2734  4776'             JMS     MESAGE
2735  4146              XRSD
2736  7200              CLA
2737  1040              TAD     K207
2740  4775'             JMS     PRLP
2741  5774'             JMP     TST0-3          /RETURN TO BEGINNING OF LOGIC TESTS.


2774  0221
2775  1534
2776  1274
2777  7772
      1000    PAGE

                        /ROUTINE TO DISPLAY CONVERTED VALUE IN AC.
1000  4520    CONVT,    ADC.                    /CLEAR WORLD
1001  3026              DCA     TEMP2
1002  7604              LAS                     /LOAD CHANNEL
1003  4521              ADCM                    /LOAD MPX REG
1004  4522              ADST                     CONVERT
1005  4524              ADSK                    /DONE?
1006  5205              JMP     .-1             /WAIT
1007  4523              ADRB                    /READ AND BUFFER
1010  2026              ISZ     TEMP2           /SMALL TO DISPLAY
1011  5210              JMP     .-1             /CONVERTED VALUE
1012  7026              TSF     TEMP2           /IN AC YET
1013  5212              JMP     .-1             /NO MILLISECONDS
1014  7031              SCL     TEMP2
1015  7604              LAS                     /CHECK IF VALID RESULT
1016  1073              TAD     K3
```

```
1017  7650            SNA CLA
1020  5223            JMP      .+3
1021  1031            TAD      TEMPC
1022  7402            HLT                       /PRESS CONTINUE ... ROUTINE
1023  5200            JMP      CONVT            /LOOP


              /ROUTINE TO CHECK FOR EXTERNAL ENABLE FROM REAL TIME CLOCK

1024  4465    EXTL,   JMS I    SETUP
1025  4520            ADCL                      /CLEAR ALL
1026  7604            LAS
1027  0024            AND      SW4              /CHECK FOR EXT'L ENABLE SWITCH
1030  7450            SNA
1031  7402            HLT                       /SWITCH NOT SET  STOP!
1032  7604    EXT1,   LAS
1033  0024            AND      SW4
1034  4526            ADLE
1035  7604            LAS
1036  0175            AND      C17
1037  4521            ADLM                      /LOAD CHANNEL FROM SW8-11
1040  1377            TAD      (4340            /LOAD CLOCK ENABLE REG
1041  4530            CLOE                      /TRIGGER FROM RTC
1042  7040            CMA
1043  4532            CLBE
1044  4531            CLSK                      /OCCURS ON OVERFLOW
1045  5244            JMP      .-1
1046  4533            CLSA                      /STOP CLOCK
1047  7240            CLA CMA
1050  4532            CLBE
1051  7200            CLA
1052  2026            ISZ      TEMPB            /TIME OUT
1053  5252            JMP      .-1
1054  4524            ADSK
1055  4776'           JMS      ERR13            /CONVERSION NOT MADE
1056  4523            ADRB
1057  3027            DCA      TEMPA            /STORE CONVERSION
1060  7604            LAS
1061  0022            AND      SW2              /LOOP?
1062  7650            SNA CLA
1063  5266            JMP      EXTTE            /YES
1064  1027            TAD      TEMPA            /HALT WITH CONVERTED
1065  7402            HLT                       /VALUE IN AC.
1066  4465    EXTTE,  JMS I    SETUP
1067  4520            ADCL
1070  7604            LAS
1071  0024            AND      SW4
1072  4526            ADLE
1073  7240            CLA CMA
1074  4535            CLAB                      /CLOCK BUFFER = 7777
1075  7200            CLA
1076  1375            TAD      (1540            /TO GIVE TIMING ... CLOCK
1077  4530            CLOE
1100  7000            NOP
```

```
1101  4525          ADSK                /TIME ... FLAG
1102  4776'         JMS     ERRT3       /DID NOT RAISE FLAG
1103  7240          CLA CMA
1104  4532          CLAC
1105  7200          CLA
1106  4520          ADCL
1107  1024          TAD     SW4
1110  4526          ADLE
1111  7240          CLA CMA
1112  4535          CLAB
1113  7200          CLA
1114  4535          CLAB
1115  1374          TAD     (-6
1116  3031          DCA     TEMPC
1117  2031          ISZ     TEMPC
1120  5317          JMP     .-1
1121  4524          ADSK
1122  5325          JMP     .+3
1123  4776'         JMS     ERRT3
1124  4520          ADCL
1125  7200          CLA
1126  1040          TAD     K207
1127  4773'         JMS     PRLP
1130  5232          JMP     EXIT



1173  1534
1174  7772
1175  1640
1176  1732
1177  4340
      1200    PAGE

              /SUBROUTINE TO MOVE VARIABLE LENGTH DATA FIELDS

1200  0000    MOVE,   0
1201  7300            CLA CLL
1202  1600            TAD I   MOVE        /GET "FROM ADDR" AND
1203  3223            DCA     FADDR       /STORE
1204  2200            ISZ     MOVE
1205  1600            TAD I   MOVE        /GET "TO ADDR" AND
1206  3224            DCA     TADDR       /STORE
1207  2200            ISZ     MOVE
1210  1600            TAD I   MOVE        /GET "MOVE COUNT" AND
1211  3225            DCA     CNTR        /STORE
1212  2200            ISZ     MOVE        /SETUP FOR EXIT
1213  7200    MOVEA,  CLA
1214  1623            TAD I   FADDR       /GET "FROM" WORD
1215  3624            DCA I   TADDR       /STORE AT "TO" LOCATION
1216  2223            ISZ     FADDR       /+1 TO "FROM" ADDR
1217  2224            ISZ     TADDR       /+1 TO "TO" ADDR
1220  2225            ISZ     CNTR        /ALL WORDS MOVED?
1221  5213            JMP     MOVEA       /NO, RETURN
1222  5600            JMP I   MOVE        /YES, EXIT
```

```
1223 0000     TADR?,  0
1224 0000     TADR?,  0
1225 0000     ?CTR,   0


              /ERROR TYPEOUT ROUTINE

1226 0000     ERTYP,  0
1227 7200             CLA
1230 1346             TAD     IND
1231 7640             SZA CLA
1232 5243             JMP     EOUT+4          /TYPE ERROR MESSAGE ONE TIME ONLY
1233 7604             LAS
1234 0020             AND     SW0             /SUPPRESS TYPEOUT
1235 7710             SPA CLA
1236 5247             JMP     EOUT+5          /YES
1237 1417             TAD I   MSGPNT          /GET POINTER FOR ERROR MESSAGE
1240 3242             DCA     EOUT
1241 4274             JMS     MESAGE
1242 7402     EOUT,   HLT
1243 7200             CLA
1244 1346             TAD     IND
1245 7640             SZA CLA
1246 5250             JMP     .+2
1247 2346             ISZ     IND
1250 7604             LAS
1251 0021             AND     SW1             /HALT ON ERROR SWITCH ON?
1252 7650             SNA CLA                 /SKIP IF ON
1253 5257             JMP     SCOPE
1254 1226             TAD     ERTYP
1255 1044             TAD     M1
1256 7402             HLT                     /HALT WITH ERROR P.C. IN AC.
1257 7604     SCOPE,  LAS
1260 0022             AND     SW2             /ON ERROR LOOP?
1261 7640             SZA CLA
1262 5272             JMP     .+10
1263 1626             TAD I   ERTYP           /NO
1264 3271             DCA     EXIT
1265 1017             TAD     MSGPNT
1266 1044             TAD     M1
1267 3017             DCA     MSGPNT
1270 5671             JMP I   EXIT
1271 7402     EXIT,   HLT
1272 2226             ISZ     ERTYP           /YES
1273 5626             JMP I   ERTYP

              /MESSAGE ROUTINE FOR LOGIC ERRORS

1274 0000     MESAGE, 0
1275 7240             CLA CMA
1276 1674             TAD I   MESAGE
1277 3012             DCA     LZ
1300 2274             ISZ     MESAGE
```

```
1321  1410            TAD I   12
1322  3513            DCA     MSRGHT
1323  1413            TAD     MSRGHT
1324  7012            RTL
1325  7012            RTL
1326  7012            RTL
1327  4614            JMS     TYPECH
1330  1413            TAD     MSRGHT
1331  4614            JMS     TYPECH
1332  5601            JMP     MESAGE+5
1333  0000    MSRGHT, 0
1334  0000    TYPECH, 0
1335  0050            AND     K77
1336  7450            SNA
1337  5674            JMP I   MESAGE
1340  1377            TAD     (-40
1341  7510            SPA
1342  5345            JMP     .+3
1343  1376            TAD     (240
1344  5340            JMP     MTP
1345  7001            IAC
1346  7440            SZA
1347  5352            JMP     .+3
1350  1042            TAD     K215
1351  5342            JMP     MTP
1352  7001            IAC
1353  7440            SZA
1354  5357            JMP     .+3
1355  1041            TAD     K212
1356  5342            JMP     MTP
1357  1375            TAD     (336
1360  6046    MTP,    TLS
1361  6041            TSF
1362  5361            JMP     .-1
1363  6042            TCF
1364  7200            CLA
1365  5714            JMP I   TYPECH
1366  0000    IND,    0


1375  0336
1376  0240
1377  7742
      1400    PAGE
              /SCOPE LOOK FOR IOTS 65XX.
1400  7000    INSTR,  NOP
1401  7604            LAS                     /SELECT IOT FROM SR 6-11
1402  0050            AND     K77             /MASK OUT ALL BUT 8-9
1403  1043            TAD     K6592           /CREATE IOT
1404  6205            DCA     .+1
1405  7402            HLT                     /LOCATION OF IOT
1406  7402            HLT                     /POSSIBLE SKIP
1407  7401            JMP     INSTR+1         /LOOP
```

```
                        /[C* SUBROUTINES

1410  0000  XXADCL, 0
1411  6537            ADCL            /CLEAR ALL
1412  5612            JMP I   XXADCL
1413  7402            HLT

1414  0000  XXADLM, 0
1415  6531            6531            /LOAD MPX REG
1416  5614            JMP I   XXADLM
1417  7402            HLT

1420  0000  XXADST, 0
1421  6532            6532            /START CONVERSION
1422  5620            JMP I   XXADST
1423  7402            HLT

1424  0000  XXADRB, 0
1425  6533            6533            /READ A-D BUFFER
1426  5624            JMP I   XXADRB
1427  7402            HLT

1430  0000  XXADSK, 0
1431  6534            6534            /SKIP ON A-D DONE
1432  7410            SKP
1433  2230            ISZ     XXADSK
1434  5630            JMP I   XXADSK
1435  7402            HLT

1436  0000  XXADSE, 0
1437  6535            6535            /SKIP ON TIMING ERROR
1440  7410            SKP
1441  2236            ISZ     XXADSE
1442  5636            JMP I   XXADSE
1443  7402            HLT

1444  0000  XXADLE, 0
1445  6536            6536            /LOAD ENABLE REGISTER
1446  5644            JMP I   XXADLE
1447  7402            HLT

1450  0000  XXADRS, 0
1451  6537            6537            /READ STATUS REGISTER
1452  5650            JMP I   XXADRS
1453  7402            HLT

1454  0000  XXCLDE, 0
1455  6132            6132            /LOAD CLOCK ENABLE
1456  5654            JMP I   XXCLDE
1457  7402            HLT

1460  0000  XXCLSK, 0
1461  6131            6131            /SKIP ON CLOCK DONE
1462  7410            SKP
1463  2260            ISZ     XXCLSK
```

```
1464  5660          JMP I   XXCLSK
1465  7402          HLT

1466  0002  XXCLZE, 2
1467  6132          6132                    /ONES IN AC CLEAR CLOCK ENABLE REG
1470  5666          JMP I   XXCLZE
1471  7402          HLT

1472  0000  XXCLSA, 0
1473  6135          6135                    /CLOCK STATUS TO AC, AC ONES CLR CLK STATUS REG
1474  5672          JMP I   XXCLSA
1475  7402          HLT

1476  0000  XXCLED, 0
1477  6134          6134                    /CLOCK ENABLE TO AC
1500  5676          JMP I   XXCLED
1501  7402          HLT

1502  0000  XXCLAB, 0
1503  6133          6133                    /AC ONES TO CLOCK BUFFER
1504  5702          JMP I   XXCLAB
1505  7402          HLT


1506  0000  XXDISD, 0
1507  6052          6052                    /SKIP ON DISPLAY DONE
1510  7410          SKP
1511  2306          ISZ     XXDISD
1512  5706          JMP I   XXDISD
1513  7402          HLT

1514  0000  XXDILX, 0
1515  6053          6053                    /LOAD X
1516  5714          JMP I   XXDILX
1517  7402          HLT

1520  0000  XXDILY, 0
1521  6054          6054                    /LOAD Y
1522  5720          JMP I   XXDILY
1523  7402          HLT

1524  0000  XXDIYY, 0
1525  6055          6055                    /INTENSITY
1526  5724          JMP I   XXDIXY
1527  7402          HLT

1530  0000  XXDILE, 0
1531  6036          6036                    /LOAD ENABLE FROM AC, CLEAR AC
1532  5732          JMP I   XXDILE
1533  7402          HLT



              /PRINT ROUTINE
1534  0000  PRLP,   0
```

```
1535 6046            TLS                    /XMIT CHARACTER
1536 6041            TSF                    /WAIT FOR FLAG
1537 5336            JMP     .-1
1540 7200            CLA
1541 5734            JMP I   PRLP           /RETURN

             /CARRIAGE RETURN LINE FEED ROUTINE
1542 0000    CRLF,   0
1543 7240            CLA CMA
1544 0342            AND     K215           /CARRIAGE RETURN CODE
1545 4334            JMS     PRLP           /PRINT ROUTINE
1546 7240            CLA CMA
1547 0341            AND     K212           /LINE FEED CODE
1550 4334            JMS     PRLP           /PRINT ROUTINE
1551 5742            JMP I   CRLF           /RETURN


             /ROUTINE TO CLEAR WORKING BUFFERS PRIOR TO TEST

1552 0000    XSETUP, 0
1553 4451            JMS I   XMOVE          /CLEAR WORK AREA
1554 0026            TEMP0
1555 0027            TEMPA
1556 7773            -5
1557 6002            IOF
1560 6007            CAF
1561 1167            TAD     C5400
1562 3001            DCA     1
1563 7040            CMA
1564 3061            DCA     ERSWIT
1565 3767            DCA I   XIND
1566 5752            JMP I   XSETUP
1567 1346    XIND,   IND

     1600    PAGE

             /ROUTINE TO CHECK IF TEST COMPLETED ITERATION


1600 0000    XTAL,   0
1601 7604            LAS
1602 0022            AND     SW2            /LOOP OVERRIDE?
1603 7640            SZA CLA
1604 5232            JMP     XTAL1          /YES
1605 7604            LAS
1606 0025            AND     SW5            /TEST SELECTED?
1607 7640            SZA CLA
1610 5214            JMP     .+4
1611 2033            ISZ     TALLY          /DONE WITH TEST?
1612 7410            SKP                    /NO
1613 5232            JMP     XTAL1          /YES
1614 1061            TAD     ERSWIT         /CHECK FOR ERROR
1615 7640            SZA CLA                /ERROR THIS PASS?
1616 5224            JMP     .+6            /NO
1617 1017            TAD     MSGPNT         /GET MESSAGE POINTER
```

```
1620  1044          TAD     M1              /DECREMENT POINTER
1621  3017          DCA     MSGPNT          /RESTORE POINTER
1622  1244          TAD     M1
1623  3061          DCA     ERSWIT          /RESTORE ERROR INDICATOR
1624  1222          TAD     XTAL            /SET RETURN ADDRESS
1625  1045          TAD     M2
1626  3200          DCA     XTAL            /STORE RETURN ADDRESS
1627  5602          JMP I   XTAL
1630  2017  XTAL1, ISZ     MSGPNT
1631  5620          JMP I   XTAL
                    /POINTER FOR SELECTED TEST OPTION

1632  0223  XTEST,  TST0-1
1633  0242          TST1-1
1634  0265          TST2-1
1635  0306          TST3-1
1636  0326          TST4-1
1637  0346          TST5-1
1640  0400          TST6-1
1641  0426          TST7-1
1642  0451          TST10-1
1643  0501          TST11-1
1644  0600          TST12-1
1645  0636          TST13-1
1646  0710          TST14-1

                    /ROUTINE TO SELECT SPECIFIC LOGIC TEST SUBROUTINE

1647  0000  XSELEC, 0
1650  7604          LAS                     /GET TEST
1651  0175          AND     C17
1652  3026          DCA     TEMP0           /STORE TEST
1653  1026          TAD     TEMP0
1654  1044          TAD     M1
1655  1166          TAD     C140
1656  3017          DCA     I7              /MESSAGE POINTER SET NOW
1657  1026          TAD     TEMP0           /GET TEST
1660  1266          TAD     JMPLOC          /DEVELOP POINTER
1661  0050          AND     K77
1662  1267          TAD     JMPINS          /DEVELOP INSTRUCTION
1663  3264          DCA     JMPPTR
1664  7402  JMPPTR, HLT                     /DO IT!
1665  7402          HLT                     /TRAP
1666  1632  JMPLOC, XTEST
1667  5603  JMPINS, 5603



                    /ERROR HANDLERS FOR OPEN LOOP TESTS

1670  0000  ERPT1,  0
1671  7604          LAS
1672  0020          AND     SW0
1673  7710          SPA CLA
1674  5320          JMP     .+4
```

```
1676  4777'          JMS     MESAGE
1676  4023           EMSG20
1677  4776'          JMS     CRLF
1700  4775'          JMS     MESS
1701  4776'          JMS     CRLF
1702  7624           LAS
1703  0021           AND     SW1             /HALT ON ERRORS
1704  7650           SNA CLA                 /SKIP IF YES
1705  5670           JMP !   ERPT1
1706  7402           HLT
1707  5774'          JMP     RESOL           /RETURN TO ROUTINE

1710  0000    ERPT2, 0
1711  7624           LAS
1712  0020           AND     SW0
1713  7710           SPA CLA
1714  5320           JMP     .+4
1715  4777'          JMS     MESAGE
1716  4034           EMSG21
1717  4776'          JMS     CRLF
1720  7624           LAS
1721  0021           AND     SW1             /HALT ON ERRORS
1722  7650           SNA CLA                 /SKIP IF YES
1723  5710           JMP !   ERPT2
1724  1027           TAD     TEMPA
1725  7402           HLT
1726  7200           CLA
1727  1030           TAD     TEMPB
1730  7402           HLT
1731  5773'          JMP     NOISE           /RETURN TO ROUTINE

1732  0000    ERPT3, 0
1733  7624           LAS
1734  0020           AND     SW0
1735  7710           SPA CLA
1736  5342           JMP     .+4
1737  4777'          JMS     MESAGE
1740  4056           EMSG22
1741  4776'          JMS     CRLF
1742  7624           LAS
1743  0021           AND     SW1
1744  7650           SNA CLA
1745  5732           JMP !   ERPT3
1746  1332           TAD     ERPT3
1747  1244           TAD     M1
1750  7402           HLT

1751  0000    ERPT4, 0
1752  4777'          JMS     MESAGE
1753  4125           EMSG23
1754  4776'          JMS     CRLF
1755  5751           JMP !   ERPT4

1756  0000    ERPT5, 0
1757  7624           LAS
```

```
1760  0020          AND     SW0
1761  7710          SPA CLA
1762  5366          JMP     .+4
1763  4777'         JMS     MESAGE
1764  4122          EMSG24
1765  4776'         JMS     CRLF
1766  5756          JMP I   ERPTS



1773  2051
1774  2200
1775  3000
1776  1542
1777  1274
      2000    PAGE
              /MONOTONICITY TEST
2000  7300    MONOT,  CLA CLL
2001  3027          DCA     TEMPA           /CLEAR N AND
2002  3030          DCA     TEMPB           /N+1 CONVERSION STORAGE
2003  4520          ADCL                    /CLEAR CONVERTER
2004  4522          ADST                    /START CONVERSION
2005  4524          ADSK                    /WAIT FOR DONE
2006  5205          JMP     .-1
2007  4523          ADRB                    /READ A-D BUFFER
2010  3027          DCA     TEMPA           /STORE NTH CONVERSION
2011  7604    CONT.   LAS                   /GET SWITCHES
2012  7040          CMA                     /COMPLEMENT FOR DOWN COUNT
2013  3032          DCA     CNTR1
2014  4522          ADST                    /DO N+1ST CONVERSION
2015  4524          ADSK
2016  5215          JMP     .-1
2017  4523          ADRB
2020  3030          DCA     TEMPB           /SAVE
2021  1027          TAD     TEMPA           /SUBTRACT
2022  7041          CIA
2023  1030          TAD     TEMPB
2024  7510          SPA                     /N>0?

2025  7041          CIA                     /NO, TAKE ABSOLUTE VALUE
2026  7450          SNA                     /DIFFERENCE 0?
2027  5243          JMP     OK              /YES, OK.
2030  1044          TAD     M1
2031  7650          SNA CLA                 /DIFFERENCE = 1?
2032  5243          JMP     OK              /YES, O.K.
2033  4777'         JMS     ERPT4
2034  7220          CLA
2035  1027          TAD     TEMPA           /DIFFERENCE > 1, DISPLAY NTH CONVERSION
2036  7402          HLT
2037  7300          CLA CLL
2040  1030          TAD     TEMPB           /DISPLAY N+1 CONVERSION
2041  7402          HLT
2042  5200          JMP     MONOT           /RESTART TO RESYNC
2043  2032    OK,     ISZ     CNTR1         /LOOP
```

```
2044  5243        JMP     .-1
2045  7300        CLA CLL
2046  1030        TAD     TEMP4   /NO CONVERSION OCCURRED
2047  3027        DCA     TEMP4   /N
2050  5211        JMP     CONT    /START NEXT CONVERSION
```

```
                /ROUTINE TO TEST FOR EQUALITY OF TWO SUCCESSIVE A/D'S.

2051  7300    NOISE,  CLA CLL
2052  1177            TAD     E-100           /SET TALLY FOR 64 TIMES
2053  3026            DCA     TEMP2
2054  1022            TAD     SW2             /ENABLE DONE BIT
2055  4521            ADLM                    /LOAD MPX REG
2056  4522            ADST                    /CONVERT
2057  4524            ADSK                    /DONE FLAG?
2060  5257            JMP     .-1             /NO
2061  4523            ADRB                    /YES, READ AD BUFFER
2062  3027            DCA     TEMP4           /STORE
2063  4523            ADRB                    /RE-READ
2064  3030            DCA     TEMP5           /STORE
2065  1027            TAD     TEMP4           /COMPARE FOR EQUALITY
2066  7041            CIA
2067  1030            TAD     TEMP5
2070  7420            SNL                     /LINK SHOULD BE SET
2071  4776'           JMS     ERPT2           /NOT EQUAL
2072  7440            SZA
2073  4776'           JMS     ERPT2           /NOT EQUAL
2074  7300            CLA CLL
2075  2026            ISZ     TEMP0           /CONTINUE
2076  5256            JMP     NOISE+5         /YES
2077  7200            CLA
2100  1040            TAD     K207
2101  4775'           JMS     PRLP            /RING BELL
2102  5251            JMP     NOISE           /GO TEST AGAIN
                /ROUTINE TO CHECK FOR NOISE IN MULTIPLEXER

2103  7300    GLITCH, CLA CLL
2104  1177            TAD     E-100
2105  3026            DCA     TEMP2
2106  7604            LAS                     /OPERATOR TO SELECT CHANNEL
2107  0175            AND     C37
2110  3031            DCA     TEMP6
2111  1031            TAD     TEMP6
2112  4521            ADLM
2113  4522            ADST
2114  4524            ADSK
2115  5314            JMP     .-1
2116  4523            ADRB
2117  3027            DCA     TEMP4
2120  4544    CHAN1,  JMS     RANDOM          /GET RANDOM CHANNEL
2121  1277            TAD     CHAN
2122  4521            ADLM
2123  4527            ADRS
2124  2026            ISZ     TEMP0
2125  5320            JMP     CHAN1
2126  7300            CLA CLL
2127  4523            ADRB
2130  3030            DCA     TEMP5
2131  1027            TAD     TEMP4
```

```
2132  7041          CIA
2133  1030          TAD     TEMP0
2134  7420          SNL
2135  4774'         JMS     ERPT0
2136  7440          SZA
2137  4774'         JMS     ERPT0
2140  7620          CLA CLL
2141  1040          TAD     K207
2142  4775'         JMS     PR0P
2143  5323          JMP     GLITCH

2144  1357    RANCHN, TAD     FSTNO
2145  7006          RTL
2146  3357          DCA     FSTNO
2147  1357          TAD     FSTNO
2150  1360          TAD     SECNO
2151  7006          RTL
2152  1360          TAD     SECNO
2153  7012          RTR
2154  0175          AND     D17
2155  3077          DCA     CHNL
2156  5744          JMP I   RANCHN

2157  0437    FSTNO,  0437
2160  2525    SECNO,  2525
```

```
2174  1736
2175  1534
2176  1712
2177  1751
      2200     PAGE
               /ROUTINE TO PERFORM 64 CONVERSIONS OF ANY GIVEN VOLTAGE ON SELECTED CHANNEL

2200  2065     RESOL,  SETUP
2201  1053             TAD      XSTOR
2202  3012             DCA      12
2203  3270             DCA      STORAG
2204  4451             JMS I    XMOVE           /CLEAR WORK AREA
2205  2270             STORAG
2206  2271             STORAG+1
2207  7700             -100
2210  1177             TAD      C-100
2211  3026             DCA      TEMP2
2212  4520             ADCL
2213  7604             LAS                      /GET CHANNEL
2214  0175             AND      C17
2215  3062             DCA      CHAN            /STORE CHANNEL
2216  1062             TAD      CHAN
2217  4521             ADLM                     /LOAD CHANNEL
2220  4522             ADST
2221  4524             ADSK
2222  5221             JMP      .-1
2223  4523             ADRB
2224  3410             DCA I    10              /PLACE IN TABLE
2225  2026             ISZ      TEMP2           /DONE?
2226  5220             JMP      .-6             /NO
2227  5454             JMP I    XCOMPR          /YES, NOW CHECK

               /STORAGE TABLE FOR VOLTAGE COMPARISONS
      2270     *.50

2270  0000     STORAG, 0                        /128(10) LOCATIONS
      2400     PAGE

               /ROUTINE TO COMPARE FOR GREATER THAN + OR - 1 LSB DIFFERENCE IN 64 CONVERSIONS

2400  7300     COMPAR, CLA CLL
2401  1165             TAD      C-77
2402  3026             DCA      TEMP2
2403  1053             TAD      XSTOR           /POINTER FOR FIRST WORD
2404  3012             DCA      12
2405  1412             TAD I    12
2406  3227             DCA      TEMPA
2407  7200     COMPR1, CLA
2410  1412             TAD I    12
2411  3232             DCA      TEMPB
2412  1227             TAD      TEMPA
2413  7041             CIA
2414  1232             TAD      TEMPB
2415  7440             SZA                      /SKIP HERE
```

```
2416  5221             JMP     .+3             /AND
2417  7420             SNL                     /HERE IF 0
2420  5222             JMP     .+2
2421  5257             JMP     AOK
2422  7430             SZL
2423  5230             JMP     .+5
2424  7040             CMA
2425  7440             SZA                     /SKIP HERE IF DIFFERENCE =1 LSB
2426  7410             SKP
2427  5257             JMP     AOK
2430  7100             CLL
2431  7010             RAR
2432  7440             SZA                     /SKIP HERE
2433  5237             JMP     .+4             /AND
2434  7420             SNL                     /HERE IF DIFFERENCE =2 LSB
2435  7410             SKP
2436  5257             JMP     AOK
2437  7300             CLA CLL                 /CHECK FOR SPECIAL CASE OF 7777 AND 0
2440  1027             TAD     TEMPA
2441  7440             SZA                     /A=0?
2442  7410             SKP                     /NO
2443  5247             JMP     .+4             /YES
2444  7040             CMA                     /A=7777?
2445  7440             SZA                     /SKIP IF YES
2446  4777'            JMS     ERPT1
2447  1030             TAD     TEMPB           /A =7777 OR 0
2450  7440             SZA                     /B=0?
2451  5253             JMP     .+2             /NO
2452  5257             JMP     AOK
2453  7040             CMA                     /B=7777?
2454  7440             SZA                     /SKIP IF YES
2455  4777'            JMS     ERPT1
2456  5257             JMP     AOK
2457  7300     AOK,    CLA CLL
2460  1030             TAD     TEMPB
2461  3027             DCA     TEMPA
2462  2026             ISZ     TEMP2           /DONE?
2463  5207             JMP     COMPR1          /NO
2464  5776'            JMP     RESCL           /YES, REPEAT TEST

2576  2200
2577  1670
      2600     PAGE

               /LAB8-E SYSTEM CHECK

2600  0000     SYST,   0
2601  4465             JMS I   SETUP
2602  4520             ADCL
2603  7402             HLT
2604  7604             LAS
2605  0377             AND     (700)
2606  1376             TAD     (4240)          /RATE AND ENABLE EXT..
2607  3031             DCA     TEMPC           /SAVE
2610  1031             TAD     TEMPC
```

```
2611  4536          CLSE
2612  7041          CMA
2613  4532          CLFE
2614  7220          CLA
2615  1024          TAD     SW4             /EXT START FOR A-D
2616  3026          DCA     TEMP2
2617  4775'         JMS     MESAGE
2620  4215          AUTMSG
2621  7422          HLT
2622  7604          LAS
2623  0025          AND     SW5
2624  7442          SZA                     /SKIP IF NOT AUTO-INCREMENT
2625  4521          JMS     LST*CHN         /CHECK FOR LAST CHANNEL
2626  7604          LAS
2627  0175          AND     C17
2630  4521          ADLY                    /LOAD CHANNEL
2631  1026          TAD     TEMP2
2632  4526          ADLE                    /LOAD EXT ENABLE BIT IF PRESENT
2633  1026          TAD     TEMP2
2634  7650          SNA CLA                 /SKIP FOR EXT. ENABLE
2635  5245          JMP     .+10
2636  1374    CLKST,TAD     (7201           /-X(MAX)
2637  3027          DCA     TEMP3
2640  4533          CLSA
2641  4531          CLSK
2642  5241          JMP     .-1
2643  7240          CLA CMA
2644  4532          CLFE                    /STOP CLOCK
2645  7200          CLA
2646  7410          SKP
2647  4522          ADST
2650  4524          ADSK
2651  5250          JMP     .-1
2652  4527          ADRS
2653  0176          AND     C17
2654  1032          TAD     *TEMP8
2655  7001          IAC
2656  7440          SZA
2657  5261          JMP     .+2
2660  4521          ADLY
2661  4523          ADRB
2662  4540          DILY
2663  7200          CLA
2664  1027          TAD     *TEMP3
2665  4537          DILX
2666  7001          IAC
2667  3027          DCA     *TEMP3
2670  1027          TAD     *TEMP3
2671  1374          TAD     (7721
2672  7640          SZA CLA                 /SKIP IF -X(MAX)

2673  7410          SKP
2674  5205          JMP     .-CSTP
2675  4536          CLSE
2676  5275          JMP     .-1
```

```
2677  4541            DIAY
2700  1046            TAD     M6
2701  3340            DCA     TEMPX
2702  2347            ISZ     TEMPX
2703  5302            JMP     .-1
2704  5246            JMP     CLKS -7
2705  1031    RESTR,  TAD     TEMP1           /TO RESTART CLOCK
2706  4530            CLOC
2707  7040            CMA
2710  4532            CLSC
2711  7624            LAS
2712  0025            AND     SW5             /A-I MODE
2713  7640            SZA CLA                 /SKIP IF NO
2714  5236            JMP     CLKST
2715  7604            LAS
2716  0175            AND     F17             /TO CHANGE CHANNEL
2717  4521            ADLM
2720  5236            JMP     CLKST           /GO
2721  0000    LSTCHN, 0
2722  7604            LAS
2723  0175            AND     F17
2724  7040            CMA
2725  3030            DCA     TEMP0
2726  2521            ISZ     LSTCHN
2727  2521            ISZ     LSTCHN
2730  7604            LAS
2731  0025            AND     SW5
2732  7650            SNA CLA
2733  5337            JMP     .+4
2734  1024            TAD     SW4
2735  1025            TAD     SW5
2736  3026            DCA     TEMP0
2737  5721            JMP I   LSTCHN
2740  0000    TEMPX,  0


2774  7001
2775  1274
2776  4040
2777  0700
      3000      PAGE
3000  0002      MESS,   2
3001  4777'             JMS     CRLF
3002  7320              CLA CLL
3003  1027              TAD     TEMPA
3004  2376              AND     (7000
3005  7002              BSW
3006  7012              RTR
3007  7010              RAR
3010  1375              TAD     (260
3011  4774'             JMS     PRLP
3012  7320              CLA CLL
3013  1027              TAD     TEMPA
3014  7006              RTL
3015  7024              RAL
```

```
3016  0376        AND      (7000
3017  7002        BSW
3020  7012        RTR
3021  7010        RAR
3022  1375        TAD      (260
3023  4774'       JMS      PRLP
3024  7300        CLA CLL
3025  1027        TAD      TEMPA
3026  7012        RTR
3027  7010        RAR
3030  0373        AND      (7
3031  1375        TAD      (260
3032  4774'       JMS      PRLP
3033  7300        CLA CLL
3034  1027        TAD      TEMPA
3035  0373        AND      (7
3036  1375        TAD      (260
3037  4774'       JMS      PRLP
3040  7300        CLA CLL
3041  4777'       JMS      CRLF
3042  7300        CLA CLL
3043  1030        TAD      TEMPB
3044  0376        AND      (7000
3045  7002        BSW
3046  7010        RAR
3047  7012        RTR
3050  1375        TAD      (260
3051  4774'       JMS      PRLP
3052  7300        CLA CLL
3053  1030        TAD      TEMPB
3054  7006        RTL
3055  7004        RAL
3056  0376        AND      (7000
3057  7002        BSW
3060  7010        RAR
3061  7012        RTR
3062  1375        TAD      (260
3063  4774'       JMS      PRLP
3064  7300        CLA CLL
3065  1030        TAD      TEMPB
3066  7010        RAR
3067  7012        RTR
3070  0373        AND      (7
3071  1375        TAD      (260
3072  4774'       JMS      PRLP
3073  7300        CLA CLL
3074  1030        TAD      TEMPB
3075  0373        AND      (7
3076  1375        TAD      (260
3077  4774'       JMS      PRLP
3100  7300        CLA CLL
3101  4777'       JMS      CRLF
3102  4777'       JMS      CRLF
3103  7300        CLA CLL
3104  [illegible] JMP I    MESS
```

```
3173  7017
3174  1534
3175  0260
3176  7020
3177  1542
      3200        PAGE

                  /CONTROL LOGIC ERROR MESSAGES

3200  3736        EMSG0,  TEXT    "**TEST 0 - DONE FLAG OR INTERRUPT FLAG NOT CLEARED OR SKIP FAILURE**"
3201  2425
3202  2324
3203  4060
3204  1055
3205  4004
3206  1716
3207  0540
3210  0614
3211  0107
3212  4017
3213  2240
3214  2411
3215  1511
3216  1607
3217  4005
3220  2222
3221  1722
3222  4026
3223  1401
3224  0740
3225  1617
3226  2440
3227  0314
3230  0501
3231  2205
3232  2440
3233  1722
3234  4023
3235  1311
3236  2040
3237  0601
3240  1114
3241  2522
3242  0537
3243  3600
3244  3736        EMSG1,  TEXT    "**TEST 1 - DONE FLAG NOT SET THEN CLEARED OR SKIP FAILURE**"
3245  2425
3246  2324
3247  4061
3250  4255
3251  4004
3252  1716
3253  0542
```

```
3254  0614
3255  0107
3256  4016
3257  1724
3260  4023
3261  0524
3262  4024
3263  1025
3264  1640
3265  0314
3266  0501
3267  2205
3270  0440
3271  1722
3272  4023
3273  1311
3274  2040
3275  0601
3276  1114
3277  2522
3300  0537
3301  3600
3302  3736         EMSG2,  TEXT      "**TEST 2 - TIMING ERROR FLAG NOT SET THEN CLEARED OR SKIP FAILURE**"
3303  2405
3304  2324
3305  4062
3306  4055
3307  4024
3310  1115
3311  1116
3312  0740
3313  0522
3314  2217
3315  2240
3316  0614
3317  0107
3320  4016
3321  1724
3322  4023
3323  0524
3324  4024
3325  1025
3326  1640
3327  0314
3330  0501
3331  2205
3332  0440
3333  1722
3334  4023
3335  1311
3336  2042
3337  0621
3340  1114
3341  2522
3342  [illegible]
```

```
3343  3600
3344  3736    EMSG3,  TEXT    "*TEST 3 - UNEXPECTED INTERRUPT OCCURRED*"
3345  2405
3346  2524
3347  4063
3352  4055
3351  4025
3352  1625
3353  3020
3354  2523
3355  2405
3356  0440
3357  1116
3360  2405
3361  2222
3362  2520
3363  2440
3364  1703
3365  2525
3366  2222
3367  0504
3370  3736
3371  0000
3372  3736    EMSG4,  TEXT    "*TEST 4 - ADRB FAILED TO JMP TRANSFER TO AC*"
3373  2405
3374  2524
3375  4064
3376  4055
3377  4021
3400  0422
3401  0240
3402  0601
3403  1114
3404  0504
3405  4024
3406  1740
3407  1221
3410  1540
3411  2422
3412  2116
3413  2326
3414  0522
3415  4024
3416  1740
3417  0103
3420  3736
3421  0000
3422  3736    EMSG5,  TEXT    "*TEST 5 - ADRS FAILED TO JMP TRANSFER TO AC*"
3423  2405
3424  2524
3425  4065
3426  4055
3427  4021
3430  2422
3431  2342
```

```
3432  ØØØ1
3433  1114
3434  1524
3435  4224
3436  1740
3437  1221
344Ø  1240
3441  2422
3442  Ø116
3443  2326
3444  Ø522
3445  4324
3446  174Ø
3447  Ø1Ø3
345Ø  3736
3451  ØØØØ
3452  3736     EMSG6,  TEXT     "**TEST 6 - ENABLE REGISTER NOT PROPERLY LOADED**"
3453  24Ø5
3454  2324
3455  4Ø66
3456  4Ø55
3457  4ØØ5
346Ø  16Ø1
3461  Ø214
3462  Ø54Ø
3463  22Ø5
3464  Ø711
3465  2324
3466  Ø522
3467  4Ø16
347Ø  1724
3471  4Ø2Ø
3472  2217
3473  2ØØ5
3474  2214
3475  314Ø
3476  1417
3477  Ø1Ø4
35ØØ  Ø5Ø4
35Ø1  3736
35Ø2  ØØØØ
35Ø3  3736     EMSG7,  TEXT     "**TEST 7 - FAILED TO GENERATE INTERRUPT WITH DONE FLAG**"
35Ø4  24Ø5
35Ø5  2324
35Ø6  4Ø67
35Ø7  4Ø55
351Ø  4ØØ6
3511  Ø1Ø1
3512  14Ø5
3513  Ø442
3514  Ø417
3515  4ØØ7
3516  Ø516
3517  Ø522
352Ø  Ø1Ø4
```

```
3521  0240
3522  1116
3523  2425
3524  2222
3525  2522
3526  2442
3527  2711
3530  2410
3531  4004
3532  1716
3533  2540
3534  2614
3535  0107
3536  3736
3537  0020
3540  3736    EMSG10, TEXT    "%%TEST 10 = FAILED TO GENERATE INTERRUPT WITH TIMING ERROR FLAG%%"
3541  2405
3542  2524
3543  4061
3544  6040
3545  5540
3546  0601
3547  1114
3550  0504
3551  4024
3552  1740
3553  0705
3554  1605
3555  2201
3556  2405
3557  4011
3560  1624
3561  0522
3562  2225
3563  2024
3564  4027
3565  1124
3566  1040
3567  2411
3570  1511
3571  1607
3572  4005
3573  2222
3574  1722
3575  4026
3576  1421
3577  0737
3600  3600
3601  3736    EMSG11, TEXT    "%%TEST 11 = FAILED TO LOAD AND READ THE ACO AND CLEAR ACO%%"
3602  2405
3603  2524
3604  4061
3605  6140
3606  5540
3607  0601
```

```
3610  1114
3611  0524
3612  4024
3613  1740
3614  1417
3615  0124
3616  4021
3617  1624
3620  4022
3621  0521
3622  0440
3623  1520
3624  3040
3625  2225
3626  0740
3627  0116
3630  0440
3631  0314
3632  0501
3633  2240
3634  0123
3635  3736
3636  0000
3637  3736     EMSG12, TEXT    "**TEST 12 - FAILED TO LOAD AND READ ALL CHANNELS INTO MPX REG**"
3640  2425
3641  2324
3642  4061
3643  6240
3644  5540
3645  0621
3646  1114
3647  0504
3650  4024
3651  1740
3652  1417
3653  0124
3654  4001
3655  1624
3656  4022
3657  0521
3660  0440
3661  0114
3662  1440
3663  0310
3664  0116
3665  1565
3666  1423
3667  4011
3670  1624
3671  1740
3672  1520
3673  3240
3674  2225
3675  0737
3676  3670
```

```
3677  3736    EMSG13, TEXT    "?XTEST 13 - FAILED TO LOAD AND READ ALL CHANNELS IN A SINGLE INCREMENT 400F+"
3700  2425
3701  2524
3702  4061
3703  6540
3704  5540
3705  6601
3706  1114
3707  2504
3710  4024
3711  1740
3712  1417
3713  0124
3714  4001
3715  1624
3716  4022
3717  6501
3720  6440
3721  0114
3722  1440
3723  3310
3724  0116
3725  1625
3726  1423
3727  4011
3730  1640
3731  0125
3732  2417
3733  5511
3734  1603
3735  2205
3736  1505
3737  1624
3740  4015
3741  1704
3742  2537
3743  3600
3744  3736    EMSG14, TEXT    "?XTEST 14 - FAILED TO COMPLETE CONVERSION IN SPECIFIED TIME+"
3745  2425
3746  2524
3747  4061
3750  6440
3751  5540
3752  6601
3753  1114
3754  1504
3755  4024
3756  1740
3757  0317
3760  1520
3761  1425
3762  2425
3763  4063
3764  1716
3765  2605
```

```
3766  2223
3767  1117
3770  1642
3771  1116
3772  4023
3773  2005
3774  7311
3775  0611
3776  7504
3777  4024
4000  1115
4001  0537
4002  3600
4003  3736    EMSG20, TEXT    "**FAILED TO RESOLVE CONVERSIONS TO + 09 = 1 LSB**"
4004  7601
4005  1114
4006  0504
4007  4024
4010  1740
4011  2205
4012  2317
4013  1426
4014  0540
4015  0317
4016  1626
4017  7522
4020  2311
4021  1716
4022  2342
4023  2417
4024  4053
4025  4017
4026  2240
4027  5540
4030  6140
4031  1423
4032  0237
4033  3600
4034  3736    EMSG21, TEXT    "**TWO SUCCESSIVE READS NOT EQUAL**"
4035  2427
4036  1740
4037  7525
4040  7303
4041  0523
4042  2511
4043  2605
4044  4022
4045  7501
4046  1423
4047  4016
4050  1724
4051  1225
4052  2145
4053  .114
4054  3735
```

```
4055  0000
4056  3736      EMSG22, TEXT    "**ERRONEOUS EXTERNAL ENABLE OR TIMING ERROR**"
4057  2522
4060  2217
4061  1625
4062  1725
4063  2340
4064  0530
4065  2405
4066  2216
4067  0114
4070  4025
4071  1621
4072  0214
4073  0540
4074  1722
4075  4024
4076  1115
4077  1116
4100  0740
4101  0522
4102  2217
4103  2237
4104  3600
4105  3736      EMSG23, TEXT    "**MONOTONICITY FAILURE**"
4106  1517
4107  1617
4110  2411
4111  1611
4112  0311
4113  2431
4114  4026
4115  0111
4116  1425
4117  2205
4120  3736
4121  0000
4122  3736      EMSG24, TEXT    "**NOISE IN MULTIPLEXER AND A-D BUFFER**"
4123  1617
4124  1123
4125  0540
4126  1116
4127  4015
4130  2514
4131  2411
4132  2014
4133  0530
4134  0522
4135  4001
4136  1604
4137  4001
4140  5544
4141  4202
4142  2526
4143  2625
```

```
4144  2237
4145  3600
                /END OF LOGIC TEST TYPESTRING
4146  3736      XEND,   TEXT    "←↑END OF LOGIC TEST←↑"
4147  0516
4150  0442
4151  1706
4152  4014
4153  1707
4154  1103
4155  4024
4156  0523
4157  2437
4160  3600
                /HEADER MESSAGE
4161  3736      XLABEL, TEXT    "←↑AD8E A TO D CONVERTER, AM8E MULTIPLEXER DIAGNOSTIC←↑"
4162  0104
4163  7005
4164  4001
4165  4024
4166  1740
4167  0440
4170  0317
4171  1626
4172  0522
4173  2405
4174  2254
4175  4001
4176  1570
4177  0540
4200  1525
4201  1424
4202  1120
4203  1405
4204  3005
4205  2240
4206  0411
4207  0107
4210  1617
4211  2324
4212  1103
4213  3736
4214  0000
4215  3736      AUTMSG, TEXT    "←↑SET SW5 (AUTO-INC), # OF CHANS IN SW8-11, OR SET SW8=11 (SINGLE CHAN)←↑"
4216  2305
4217  2440
4220  2327
4221  6540
4222  5021
4223  2524
4224  1755
4225  1116
4226  0351
4227  5440
4230  4340
```

4231	1786
4232	4003
4233	1001
4234	1623
4235	4211
4236	1640
4237	2327
4240	7055
4241	6161
4242	5440
4243	1722
4244	4023
4245	0524
4246	4023
4247	2770
4250	5561
4251	6140
4252	5023
4253	1116
4254	2714
4255	0540
4256	0310
4257	0116
4260	5137
4261	3600

$

0165	7701
0166	0140
0167	5402
0170	0076
0171	7760
0172	0475
0173	0445
0174	7761
0175	0017
0176	0622
0177	7700

2000	11111100	00000001	11111111	11111111	11111111	11111111	[illegible]	[illegible]
2100	11111111	11111111	11111111	11111111	[illegible]	11111111	[illegible]	[illegible]
2200	11111111	11111111	11111111	11111111	11111111	11111111	[illegible]	11111111
2300	11111111	11111111	11111111	11111111	11111111	11111111	[illegible]	[illegible]
2400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	[illegible]
2500	11111111	11111111	11111111	11111111	10000000	00000000	[illegible]	[illegible]
2600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	[illegible]
2700	11111111	11111111	11111111	11111111	11000000	00000000	00000000	[illegible]
1000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	[illegible]
1100	11111111	11111111	11111111	10000000	00000000	00000000	00000000	[illegible]
1200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	[illegible]
1300	11111111	11111111	11111111	11111111	11111110	00000000	00000000	[illegible]
1400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	[illegible]
1500	11111111	11111111	11111111	11111111	[illegible]	[illegible]	[illegible]	00000000
1600	11111111	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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2600	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2700	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	11111111	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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4000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

4200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4300  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

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
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ADCL	4522	EMSG6	3452	[illegible]	[illegible]	[illegible]	[illegible]
ADLE	4526	EMSGY	3503	[illegible]	[illegible]	[illegible]	[illegible]
ADLX	4521	EOUT	1242	SELECT	[illegible]	[illegible]	[illegible]
ADRB	4523	ERMSG	0145	SETUP	[illegible]	[illegible]	[illegible]
ADRS	4527	ERPT1	1670	START	[illegible]	[illegible]	[illegible]
ADSE	4525	ERPT2	1710	STORAC	[illegible]	[illegible]	[illegible]
ADSK	4524	ERPT3	1732	[illegible]	[illegible]	[illegible]	[illegible]
ADST	4522	ERPT4	1751	SW1	[illegible]	[illegible]	[illegible]
AOK	2407	ERPT5	1756	SW2	[illegible]	[illegible]	[illegible]
AUIMSG	4215	ERR	2454	SW3	[illegible]	[illegible]	[illegible]
AUTO1	0643	ERSWIT	0061	SW4	[illegible]	[illegible]	[illegible]
AUTO2	[illegible]	ERTYP	1226	SW5	[illegible]	[illegible]	[illegible]
BSW	7002	EXIT	1271	SYST	2640	[illegible]	[illegible]
CAF	6007	EXT1	1032	TADDR	1224	[illegible]	[illegible]
CHAN	0062	EXTBL	0052	[illegible]	[illegible]	[illegible]	[illegible]
CHNL	2077	EXTL	1024	TALLY	[illegible]	[illegible]	[illegible]
CHNL1	2120	EXTT2	1066	TEMP0	3036	[illegible]	[illegible]
CLAB	4535	FADDR	1222	TEMPA	0097	[illegible]	[illegible]
CLED	4534	FIVES	0730	[illegible]	[illegible]	[illegible]	[illegible]
CLKST	2636	FSINO	2157	TEMPC	0031	[illegible]	[illegible]
CLOE	4530	GLITCH	2103	TEMPX	2740	[illegible]	[illegible]
CLSA	4533	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CLSK	4531	INITL	0216	[illegible]	[illegible]	[illegible]	[illegible]
CLSE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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CONY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CONVT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
EMSG3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
EMSG4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

ERRORS DETECTED: 2

LINES GENERATED: 40

RUN-TIME: 14 SECONDS

3K CORE USED