IDENTIFICATION

PRODUCT CODE: MAINDEC-08-DJADA-C-D

PRODUCT NAME: AD8A A-D CONVERTER AND MULTIPLEXER DIAGNOSTIC

DATE RELEASED: MAY 1976

MAINTAINER: DIAGNOSTIC GROUP

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D. ORIN

TABLE OF CONTENTS

READ THIS DOCUMENT PRIOR TO RUNNING PROGRAM:

1.0 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. THE IOT FOR THE A/D, THE CLOCK, AND THE SCOPE MAY BE CHANGED BY LOADING THE NEW VALUES INTO LOCATIONS FIRST, CLKNOW, AND SCPNOW RESPECTIVELY ON PAGE ZERO.

MODIFIED FOR THE CONSOLE PACKAGE, JAN. 1976, SEE SECTION 8.
THE DIAGNOSTIC ITSELF WAS ALSO MODIFIED. SEE SECTION 9.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-8/E WITH 4K CORE, WITH PROGRAMMER'S FRONT CONSOLE, ASR33 TELETPYE, AD8A A-D CONVERTER, ADJUSTABLE HIGH QUALITY VOLTAGE SOURCE, EDC MODEL MV105G OR EQUIVALENT.

TO RUN WITH THE CONSOLE PACKAGE, 8K IS REQUIRED.

NOTE: TO RUN MONOTINICITY TEST, A FUNCTION GENERATOR CAPABLE OF .1 CPS, TRIANGULAR WAVE OUTPUT MUST BE USED.

2.2 STORAGE

THE DIAGNOSTIC RESIDES IN LOCATIONS 0000-7500,
OF FIELD 0. IF CONSOLE PACKAGE IS ACTIVE, LOCATIONS
5600 THROUGH 7500 OF FIELD 1 ARE USED AS BUFFER
STORAGE AREA FOR THE RESOLUTION ACCURACY TEST.

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-A SYSTEM CHECK ROUTINE.

3.0 LOADING PROCEDURE

THE BINARY LOADER IS USED TO LOAD THE PROGRAM.

3.1 CONTROL SWITCHES

SW0 - SUPPRESS ERROR MESSAGES AND "END LOGIC TEST" MESSAGE.
SW1 - HALT ON ERROR WITH PC DISPLAYED IN AC.
SW2 - EXTERNAL ENABLE TEST: HALTS WITH CONVERTED WORD IN THE AC.
OTHER TESTS: SCOPE LOOP OVERRIDE TO EXIT FROM LOOP ON ERROR AND PERMIT CONTINUANCE OF TEST.
SW3 - LOGIC TEST: SET IF ALL 1'S JUMPER IS INSTALLED.
OTHER TESTS: ENABLES HALT DURING CALIBRATION ROUTINE WITH CONVERTED WORD DISPLAYED IN AC.
SW4 - EXTERNAL ENABLE TEST: SW4 MUST BE SET TO RUN TEST.
LOGIC TEST: FOR PROCESSORS WITH CYCLE TIME OF 1.5 SW4=0, FOR PROCESSORS WITH CYCLE TIME OF 1.2 AND 1.4 SW4=1.
SW5 - ALLOWS OPERATOR TO EXPLICITLY SELECT ANY ONE OF THE LOGIC ROUTINES.
SW6 - ENABLES UNIPOLAR DURING CALIBRATION.

NOTE: IOT FOR A/D, CLOCK, AND SCOPE ARE INITIALIZED TO THE VALUES LOADED INTO FIRST, CLKNOW, AND SCPNOW RESPECTIVELY. THESE ARE LOCATED ON PAGE ZERO.

4.0 USAGE PROCEDURE

SEE SPECIFICATIONS FOR MAXIMUM VOLTAGE INPUTS!!

INSURE THAT TELETYPE IS ON-LINE.

4.1 CONTROL LOGIC TESTS

1. LOAD 200.

2. PLACE NINE BITS OF IOT 6XXX IN SW3-11.

3. PRESS CLEAR THEN CONTINUE.

4. SW4 MUST BE SET (1) IF RUNNING TESTS ON A PROCESSOR WITH CYCLE TIME OF 1.4 AND 1.2. FOR THE 8A AND PROCESSORS WITH CYCLE TIME OF 1.5, SW4 = 0.

5. IF SW5 IS SET (1), SELECT TEST FROM SW7-11.

6. PRESS CONTINUE.

7. AFTER EACH PASS "END OF LOGIC TEST" WILL BE PRINTED.

4.2 IOT SCOPE LOOP

1. LOAD 201.

2. PLACE NINE BITS OF IOT 6XXX IN SW3-11.

3. PRESS CLEAR THEN CONTINUE.

NOTE: NEW IOT MAY BE SELECTED WHILE RUNNING.

4.3 DISPLAY CONVERTED VALUE IN AC.

1. APPLY VOLTAGE TO A-D INPUT CHANNEL OR TO MULTIPLEXER CHANNEL INPUTS.

2. LOAD 202.

3. IF A HALT AFTER CONVERSION IS DESIRED, SELECT SW3.

4. SELECT MPX CHANNEL FROM SW8-11, SELECT CHANNEL 0 IF NO MULTIPLEXER IS AVAILABLE; SELECT SW6 FOR UNIPOLAR IF DESIRED.

5. PRESS CLEAR, THEN CONTINUE; THE CONVERTED VALUE WILL BE OBSERVED IN THE AC.

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.

4.4 EXTERNAL ENABLE WITH REAL TIME CLOCK (DK8EP OR DK8ES), TESTS THAT CONVERSION CAN BE STARTED BY CLOCK.

1. APPLY VOLTAGE TO A-D INPUT CHANNEL.

2. IOT FOR A/D, CLOCK, AND SCOPE MAY BE CHANGED, IF DESIRED.

3. LOAD 203.

4. SELECT SWITCHES 0, 2, 6 AS DESIRED.

5. PRESS CLEAR, THEN CONTINUE. HALT WILL OCCUR.

6. SELECT CHANNEL WITH SW 8-11.

7. PRESS CONTINUE.

8. AFTER EACH PASS THE TTY BELL WILL RING.

9. IF ERROR OCCURS, THE PROGRAM TYPES OUT MESSAGE, THE PC AT THE ERROR LOCATION, TEMPA = IOT OF CURRENT CLOCK AND TEMPB = IOT OF CURRENT A-D.

NOTE: CHANNEL MAY BE CHANGED WHILE RUNNING TEST.

4.5 MONOTINICITY TEST

NOTE1: THIS TEST IS FOR IN-HOUSE USE ONLY AND IS NOT INTENDED FOR USE BY THE CUSTOMER.

NOTE2: RAMP SPEED OF FUNCTION GENERATOR MUST BE SLOWER THAN SLEW RATE OF CONVERTER. SEE ENGINEERING SPECIFICATIONS. (.1 HZ IS A GOOD SETTING).FOR

BIPOLAR THE AMPLITUDE VARIES FROM -2.5V TO +2.5V., FOR UNIPOLAR IT VARIES FROM 0V. TO +5V.

1. CONNECT FUNCTION GENERATOR TO CHNL 0 OR TO AD8A INPUT.
2. LOAD 204.
3. SELECT SW0 AND/OR SW6 IF DESIRED, AND MULTIPLEX CHANNEL FROM SW8-11.
4. PRESS CLEAR, THEN CONTINUE.
5. IF ERROR OCCURS, PROGRAM WILL TYPE OUT MESSAGE, THE PC AT THE ERROR LOCATION, TEMPA = THE NTH WORD, AND TEMPB = N+1ST WORD.
6. IF NO ERROR OCCURS, TTY BELL WILL RING ONCE AND PROGRAM WILL RECYCLE.

4.6 RESOLUTION ACCURACY TEST

1. APPLY A KNOWN VOLTAGE TO A-D CONVERTER INPUT.
2. LOAD 205.
3. SELECT SWS 0, 1, 6 IF DESIRED.
4. SELECT CHANNEL WITH SW8-11, UNIPOLAR OR BIPOLAR WITH SW6.
5. PRESS CLEAR, THEN CONTINUE.
6. IF ERROR OCCURS, PROGRAM WILL TYPEOUT MESSAGE, THE TWO NON-COMPARING WORDS TEMPA AND TEMPB, AND THE PC AT THE ERROR LOCATION ON TTY THEN CONTINUE WITH TEST.
7. IF NO ERROR OCCURS, TTY BELL WILL RING ONCE, THEN PROGRAM WILL RECYCLE. ONE CYCLE BEING 500,000(10) CONVERSIONS.

NOTE: THIS TEST USES A 1000(10) LOCATION BUFFER AREA TO STORE EACH GROUP OF 1000 CONVERSIONS. IF THIS TEST IS RUN WITH CONSOLE PACKAGE NOT ACTIVE, THE BUFFER AREA WILL OVERLAY THE CONSOLE PACKAGE IN FIELD 0, STARTING AT LOC 5600. IF THIS TEST IS RUN WITH CONSOLE PACKAGE ACTIVE, THE BUFFER AREA WILL START AT LOC 5600 IN FIELD 1.

4.7 SUCCESSIVE A-D BUFFER READS TEST

1. APPLY KNOWN VOLTAGE TO AN A-D CHANNEL.
2. LOAD 206.
3. SELECT SW0 IF DESIRED.
4. SELECT CHANNEL FROM SW8-11, SELECT UNIPOLAR(1) OR BIPOLAR(0) WITH SW6.
5. PRESS CLEAR, THEN CONTINUE.

6. IF ERROR OCCURS, PROGRAM WILL TYPE MESSAGE, THE PC AT THE ERROR LOCATION, TEMPA = FIRST READ AND TEMPB = SECOND READ.

7. TO RESTART, PRESS CONTINUE.

8. IF NO ERROR OCCURS, TTY BELL WILL RING ONCE, THEN PROGRAM WILL RECYCLE.

4.8 MULTIPLEXER NOISE TEST

1. LOAD 207.

2. SELECT CHANNEL IN SW8-11 AND APPLY VOLTAGE TO THAT CHANNEL, SELECT UNIPOLAR OR BIPOLAR WITH SW6.

3. SELECT SW0 IF DESIRED.

4. PRESS CLEAR, THEN CONTINUE.

5. IF ERROR OCCURS, PROGRAM WILL TYPE MESSAGE, THE PC AT THE ERROR LOCATION, TEMPA = EXPECTED CONVERTED VALUE AND TEMPB = ACTUAL CONVERTED VALUE.

6. IF NO ERROR OCCURS, TTY BELL WILL RING ONCE AND THE PROGRAM WILL RECYCLE.

4.9 LAB8-A SYSTEM TEST

THE SYSTEM MUST CONTAIN A DK8-EP OPTION AND A VC8-E OPTION WITH A DISPLAY.

1. APPLY A VOLTAGE INPUT TO THE A/D OR MULTIPLEXER.

2. IOT FOR A/D, CLOCK, AND SCOPE MAY BE CHANGED, IF DESIRED.

3. LOAD 210.

4. DEPRESS CLEAR, CONTINUE.

5. PROGRAM WILL HALT.

6. SELECT CLOCK FREQUENCY VIA SW3-5, REFERENCE LAB8-A PROGRAMMING CARD FOR DK8-EP CLOCK RATE.
(1MHZ=6, 100KHZ=5,....100HZ=2).

7. PRESS CONTINUE THEN OBSERVE PRINTOUT:
"SET SW5(AUTO-INC) AND THE NUMBER OF CHNLS IN SW8-11 OR SET SW8-11 (SINGLE CHNL)".

8. IF ALL CHANNELS ARE TO BE DISPLAYED AT THE SAME TIME, SET SW5, THEN SET THE NUMBER OF CHANNELS CONTAINED WITHIN THE SYSTEM INTO SW8-11.
I.E., IF SYSTEM CONTAINS ONE AD8A, SET THE SWITCH REGISTER TO 3110. IF ONLY CHNL FOUR IS TO BE OBSERVED SET THE SWITCH REGISTER TO 0004.

9. CHOOSE UNIPOLAR(1) OR BIPOLAR(0) WITH SW6.

10. DEPRESS CONTINUE AND OBSERVE THE DISPLAY SCOPE. A HORIZONTAL LINE SHOULD BE PRESENT FOR CHANNEL SELECTED. BY VARYING THE INPUT VOLTAGE THE LINE SHOULD MOVE UP OR DOWN. 0V=MID-SCREEN, +V=TOP, -V= BOTTOM. A SWEEP OF THE SCOPE IS GENERATED ON EACH CLOCK OVERFLOW. THUS IT IS A FUNCTION OF THE CLOCK RATE SET IN (6).

5.0 PROGRAM DESCRIPTION

5.1 CONTROL LOGIC TESTS

CONSISTS OF 32 SEPARATE TESTS TO ASSURE THE CONTROL LOGIC IS FUNCTIONING PROPERLY.

5.2 MISCELLANEOUS TESTS

A. IOT SCOPE LOOP TEST - ENABLES IOT TO BE REPEATED FOR TROUBLESHOOTING.

B. EXTERNAL ENABLE TEST - UTILIZES DK8/A REAL TIME CLOCK TO START CONVERSION. NOTE: THIS TEST CAN BE USED ONLY IF DK8/A IS PRESENT IN SYSTEM.

C. DISPLAY CONVERTED VALUE IN AC - USED TO CALIBRATE CONVERTER. (SEE SETUP PROCEDURE OF AD8A).

D. LAB8-A SYSTEM CHECKS - ASSURES RELIABILITY OF SYSTEM AS HOMOGENOUS UNIT.

5.3 ANALOG TESTS

A. SUCCESSIVE READS TESTS - CHECKS FOR NOISE IN A-D BUFFER LOGIC.

B. MONOTINICITY TEST - CHECKS THAT ALL SPECIFIED VALUES CAN BE CONVERTED.

C. RESOLUTION ACCURACY TEST - SAMPLES A KNOWN VOLTAGE 1000 TIMES AND CHECKS THAT RESOLUTION IS WITHIN SPECIFICATION.

D. MULITPLEXER NOISE TEST - CHECKS FOR NOISE IN MPX, ENABLE, AND STATUS REGISTER.

6.0 ERROR REPORTS

6.1 LOGIC ERRORS

MESSAGE WILL BE TYPED OUT ONCE PER ERROR ON TELETYPE STATING NATURE OF FAILURE.

6.2 OTHER ERRORS

MESSAGE WILL BE TYPED OUT ON TELETYPEWRITER STATING NATURE OF FAILURE, THE PC AT THE ERROR LOCATION, AND TEMPA AND TEMPB (TWO WORDS DEFINED UNIQUELY FOR EACH TEST).

7.0 CONSOLE PACKAGE ADDENDUM

7.1 DESCRIPTION

THE CONSOLE PACKAGE HAS BEEN ADDED TO THIS DIAGNOSTIC TO ALLOW THE PROGRAM TO RUN WITH NO HARDWARE SWITCH REGISTER AND TO HAVE COMMUNICATIONS WITH THE DIAGNOSTIC VIA A TERMINAL. THE DIAGNOSTIC CAN BE RUN IN TWO MODES WITH THE CONSOLE PACKAGE . 1) RUNNING WITH THE CONSOLE PACKAGE ACTIVE - THIS ALLOWS THE OPERATOR CONTROL OF THE DIAGNOSTIC THROUGH THE TERMINAL. THE DIAGNOSTIC WILL ASK FOR THE VALUE OF THE PSEUDO SWITCH REGISTER,BEFORE CONTINUING WITH EXECUTION OF THE DIAGNOSTIC. ALL ERRORS AND PASS COMPLETES WILL BE PRINTED AT THE TERMINAL. NO HALTS WILL BE EXECUTED.
2) CONSOLE PACKAGE NOT ACTIVE-THIS WILL RESULT IN THE NORMAL STANDALONE OPERATION OF THE PROGRAM AS DISCRIBED IN SECTIONS 1 THROUGH 9 OF THIS DOCUMENT.

7.2 RESTRICTIONS

1) WHEN RUNNING THE CONSOLE PACKAGE SOME SUBTESTS MAY NOT BE EXECUTED.

2) RUNNING THE CONSOLE PACKAGE REQUIRES THAT THE PSEUDO SWITCH REGISTER BE USED.

3) ONCE RUNNING THE CONSOLE PACKAGE NON-ACTIVE AND NOW DESIRE TO RUN IT ACTIVE, ONE MUST RELOAD THE DIAGNOSTIC AND INITIALIZE FOR AN ACTIVE CONSOLE PACKAGE.

7.3 INITIALIZATION

FOR AN ACTIVE CONSOLE PACKAGE

1.) SET LOCATION 21 BIT0=0 TO INDICATE USE PSEUDO SWITCH REGISTER.

2.) SET LOCATION 21, BITS 7-11 TO MEMORY SIZE. SEE SECTION 8.10. (8K MINIMUM REQUIRED)

3.) SET LOCATION 22 BIT3=1 TO INDICATE CONSOLE PACKAGE ACTIVE.

FOR A NON-ACTIVE CONSOLE PACKAGE

1.) SET LOCATION 21 BIT0=1 TO INDICATE NOT TO USE PSEUDO SWITCH REGISTER, BUT TO USE HARDWARE SWITCHES.

2.) SET LOCATION 22 BIT3=0 TO INDICATE CONSOLE PACKAGE NOT ACTIVE.

7.4 CONTROL CHARACTERS

CONTROL CHARACTERS ARE USED TO GIVE THE OPERATOR THE ABILITY TO PERFORM THE FOLLOWING FUNCTIONS.
NOTE: THE PROGRAM WILL RESPOND TO THE CONTROL CHARACTER IN FIVE (5) SECONDS OR LESS.

CONTROL C

THIS RESTORES THE LOADER (PGS 37 OF FLD 0 & 1) AND STARTS IT AT LOC 7600 OF FLD 0.

CONTROL R

THIS WILL RESTART THE PROGRAM AND REASK THE SWITCH REGISTER QUESTION AS DESCRIBED IN SECTION 8.6.

CONTROL E

THIS WILL CONTINUE THE PROGRAM FROM AN ERROR IF ALLOWED BY THE DIAGNOSTIC OR FROM A WAITING STATEMENT.

CONTROL L

THIS WILL SWITCH THE TERMINAL MESSAGES FROM THE DISPLAY TO A LINE PRINTER. TO RESTORE THE MESSAGES ON THE TERMINAL CONTROL L MUST BE TYPED AGAIN.IF NO PRINTER IS AVAIBLE AND CONTROL L IS TYPED THE RESULT WILL BE THAT THE CONSOLE PACKAGE WILL WAIT FOR CONTROL C OR R. THE CONTROL L WILL OUTPUT TO THE LINE PRINTER AND THE PROGRAM WILL ATTEMPT TO CONTINUE AS IF A CONTROL E WAS TYPED IN.

CONTROL D

THIS WILL ALLOW THE ABILITY TO CHANGE THE SWITCH REGISTER DURING PROGRAM OPERATION. TYPING THIS CHARACTER WILL RESULT IN AN INTERROGATION OF THE SWITCH REGISTER QUESTION AS DESCRIBED IN SECTION 8.6.

CONTROL S

THIS WILL STOP PROGRAM EXECUTION AND WAIT IN A LOOP FOR A CONTINUE. THE ONLY WAY TO CONTINUE WILL BE TO TYPE A CONTROL Q, R OR C . THIS IS A NONPRINTING CHARACTER.

CONTROL Q

THIS IS TO CONTINUE A PROGRAM AFTER A CONTROL S IS TYPED.THIS IS A NONPRINTING CHARACTER.

7.5 WAITING MESSAGE

THE WAITING MESSAGE IS USED TO ALLOW THE OPERATOR TIME
TO MAKE A DECISION AS TO WHAT CONTROL CHARACTER
TO TYPE. THIS MESSAGE MAY APPEAR AT THE END
OF PASS MESSAGE IF THE HALT ON PASS BIT IS SET.THE CONTROL
CHARACTERS MAY NOW BE USED TO PERFORM THE NEEDED FUNCTION.

THE WAITING MESSAGE MAY BE PRINTED AFTER AN ERROR MESSAGE
IF THE HALT ON ERROR BIT IS SET,HERE AGAIN THE CONTROL
CHARACTERS MAY BE USED.
THE WAITING MESSAGE MAY BE PRINTED IF OPERATOR INTERVENTION
IS REQUIRED.

7.6 SWITCH REGISTER MESSAGE

THIS MESSAGE IS USED TO SETUP THE PSEUDO SWITCH REGISTER
BEFORE PROGRAM EXECUTION TAKES PLACE.THE SWITCH REGISTER
IS SETUP WHEN THE FOURTH CHARACTER IS ENTERED OR A CARRIAGE
RETURN IS TYPED

```
**************************************************************
SR=0000 4000
        ----
```

UNDER SCORING INDICATES OPERATOR RESPONSE

7.7 END OF PASS

AN INDICATION WILL BE GIVEN WHEN THE DIAGNOSTIC HAS MADE A
SUCESSFULL PASS. THE PRINT-OUT WILL INDICATE THE DIAGNOSTIC
MAINDEC NUMBER THE WORD PASS AND A FOUR DIGIT PASS NUMBER.
A PASS WILL BE A TIME PERIOD RATHER THAN A PROGRAM PASS
OF THE DIAGNOSTIC, THE TIME PERIOD WILL BE IN THE RANGE OF
ONE (1) TO FIVE (5) MINUTES. IF THE DIAGNOSTIC MAKES A PROGRAM
PASS IN THE 1 TO 5 MINUTE RANGE THEN THE PASS COUNT WILL BE THE
SAME AS THE NUMBER OF PROGRAM PASSES.IF THE PROGRAM MAKES A
PROGRAM PASS IN LESS THEN ONE MINUTE THEN THE PASS COUNT WILL
NOT BE THE SAME AS THE PASS COUNTER THE PASS COUNTER WILL
REFLECT MORE THAN ONE PROGRAM PASS.

IF HALT AT END OF PASS IS SET THEN THE PASS MESSAGE WILL BE
PRINTED AND A WAITING STATEMENT WILL ALSO BE PRINTED.
A CONTROL CHARACTER IS NEEDED TO CONTINUE FROM THIS MESSAGE.
THE FORMAT OF THE END OF PASS MESSAGE IS
****

NAME PASS 0001

****

7.8 ERRORS

THE STANDARD ERROR REPORTS AS DESCRIBED IN SECTION 6
OF THIS DOCUMENT WILL BE USED.

7.9 SWITCH REGISTER SETTINGS

THE STANDARD SWITCH SETTINGS AS DESCRIBED IN SECTION 5
OF THIS DOCUMENT WILL BE USED.

7.10 PARAMETER CONTROL WORDS

THE CONSOLE PACKAGE USES THE LOCATIONS 20 21 22 FOR THE
FOLLOWING PURPOSES.

LOCATION 20
PSEUDO SWITCH REGISTER

LOCATION 21
HARDWARE IDENTIFIER 1

LOCATION 22
HARDWARE IDENTIFIER 2

LOCATION 0021

BIT	OCTAL VALUE	FUNCTION WHEN 0	FUNCTION WHEN 1
0	4000	USE PSEUDO SWITCHES	USE HARDWARE SWITCHES
1	2000	NO OPTION 1	HAS OPTION 1
2	1000	NO OPTION 2	HAS OPTION 2
3	400	NO 8A SIMULATOR	HAS 8A SIMULATOR
4	200	NO OPTION SIMULATOR	HAS OPTION SIMULATOR
5	100	NOT ON 8A XOR	ON 8A XOR
6	40	NOT PDP8-E TYPE CPU	PDP8-E TYPE CPU
7-11		8E MEMORY SIZE EX, 1K=00, 2K=01, 3K=02, 4K=03 8K=07, 12K=13, 16K=17, 20K=23 24K=27, 28K=33, 32K=37	

LOCATION 0022

BIT	OCTAL VALUE	FUNCTION WHEN 0	FUNCTION WHEN 1
0	4000	NOT ON ACT8A LINE	ON ACT 8A LINE
1	2000	NOT ON ACT 8E LINE	ON ACT 8E LINE
2	1000	NOT YET DEFINED	
3	400	DEACTIVE CONSOLE PACKAGE	ACTIVE CONSOLE PACKAGE

7.11 LOCATION CHANGES

THE FOLLOWING LOCATIONS CAN BE CHANGED TO MEET THE SPECIFIC NEED FOR MODIFICATION OF THE DIAGNOSTIC.

5650 IS THE LOCATION FOR THE VALUE OF THE NUMBER OF PROGRAM PASSED NEEDED TO PRINT THE END OF PASS MESSAGE.

6437 IS THE LOCATION SET TO FOUR (4) FILLER CHARACTERS AFTER A CRLF.

8.0 MODIFICATIONS

MODIFICATIONS WERE MADE TO THE DIAGNOSTIC AT THE SAME TIME (REV C) AS THE CONSOLE PKG WAS ADDED. THESE CHANGES ARE NOT RELATED TO THE CONSOLE PKG. EACH LINE OF CODE DELETED WAS EFFECTIVELY DELETED BY THE INSERTION OF THE EXPRESSION /*VB*/ AT THE BEGINNING OF THE LINE. EACH LINE OF CODE INSERTED WILL CONTAIN THE EXPRESSION /VB/.

9.0 LISTING

```
                        /MAINDEC-08-DJADA-C A/D CONVERTER, MULTIPLEXER DIAGNOSTIC
                        /COPYRIGHT 1976, DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS. 01754

                        /C8/    MODIFIED TO RUN WITH CONSOLE PACKAGE JANUARY 1976

                        /IOT DEFINITIONS
          4520  ADCL=   JMS I   XADCL           /CLEAR ALL A/D LOGIC
          4521  ADLM=   JMS I   XADLM           /LOAD MPX REG FROM AC8-11 CLA
          4522  ADST=   JMS I   XADST           /CLEAR FLAGS, START CONVERSION
          4523  ADRB=   JMS I   XADRB           /CLEAR DONE, READ A-D BUFFER INTO AC.
          4524  ADSK=   JMS I   XADSK           /SKIP ON A-D DONE, DO NOT CLEAR FLAG.
          4525  ADSE=   JMS I   XADSE           /SKIP ON TMG ERROR, DO NOT CLEAR FLAG.
          4526  ADLE=   JMS I   XADLE           /LOAD ENAB REG FROM AC 2-6, CLA.
          4527  ADRS=   JMS I   XADRS           /READ STATUS, ENAB,  MPX REG INTO AC.
          4530  CLOE=   JMS I   XCLOE           /AC TO CLOCK ENABLE
          4531  CLSK=   JMS I   XCLSK           /SKIP ON CLOCK OVERFLOW
          4532  CLZE=   JMS I   XCLZE           /ONES IN AC CLEAR CLOCK ENABLE REGISTER
          4533  CLSA=   JMS I   XCLSA           /CLOCK STATUS TO AC, AC ONES CLEAR CLOCK STATUS REGISTER
          4534  CLED=   JMS I   XCLED           /CLOCK ENABLE TO AC
          4535  CLAB=   JMS I   XCLAB           /AC ONES TO CLOCK BUFFER
          4536  DISD=   JMS I   XDISD           /SKIP ON DISPLAY DONE
          4537  DILX=   JMS I   XDILX           /LOAD X
          4540  DILY=   JMS I   XDILY           /LOAD Y
          4541  DIXY=   JMS I   XDIXY           /INTENSIFY
          4542  DILE=   JMS I   XDILE           /LOAD DISPLAY ENABLE FROM AC

          6007  CAF=    6007                    /CLEAR ALL FLAGS

                        /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  UNIPOLAR-BIPOLAR
                        / 7  NOT USED
                        / 8-11  MPX CHANNEL 0-17 OCTAL

                        /STARTING ADDRESS       TEST
                        /
                        /200                    NORMAL START FOR CONTROL LOGIC TESTS
                        /201                    IOT SCOPE LOOP
                        /202                    DISPLAY CONVERTED VALUE IN AC
                        /203                    EXTERNAL ENABLE WITH REAL TIME CLOCK
                        /204                    MONOTINICITY TEST
                        /205                    RESOLUTION ACCURACY TEST
                        /206                    SUCCESSIVE READS TEST
                        /207                    MULTIPLEXER NOISE TEST
                        /210                    LAB8-A SYSTEM TEST

          4553  LAS=JMS I XC8LAS                /C8/
          7402  HLT=7402                        /C8/
```



```
          0000  *0
0000  0000      0
0001  5402      JMP I   RETURN
0002  0000  RETURN, 0
          0005  *5
                BADINT, /*C8*/HLT               /UNEXPECTED INTERRUPT

0005  4475      C8ACTV
0006  4514  C8CALA, C8ERR                       /C8/UNEXPECTED INTERUPT.

0007  5777'     JMP     START
          0010  *10
0010  0000  A10,    0               /AUTO INDEX REG
0011  0000  A11,    0               /AUTO INDEX REG


          0017  *17
0017  2112  MSGPNT, ERMSG

          0020  *20

0020  0000  PSR,    0                       /C8/
0021  4000  HCW1,   4000                    /C8/
0022  0000  HCW2,   0                       /C8/

0023  0000  TWENT,  0
0024  4000  TWENT1, 4000
0025  0000  TWENT2, 0
0026  4000  SW0,    4000            /SWITCH REG 0 INHIBIT TYPEOUT
0027  2000  SW1,    2000            /           1 HALT ON ERROR
0030  1000  SW2,    1000            /           2 SCOPE LOOP OVERRIDE
0031  0400  SW3,    0400            /           3 CALIBRATION TEST HALT, ALL 1'S JUMPER INSTALLED
0032  0200  SW4,    0200            /           4 DETERMINE PROCESSOR CYCLE TIME,EXTERNAL ENABLE
0033  0100  SW5,    0100            /           5 SELECT TEST
0034  0040  SW6,    0040            /           6 UNIPOLAR ENABLE
0035  0000  TEMP0,  0               /STORAGE BUFFER 0
0036  0000  TEMPA,  0               /STORAGE BUFFER A
0037  0000  TEMPB,  0               /               B
0040  0000  TEMPC,  0               /               C
0041  0000  TEMPD,  0               /               D
0042  0000  DELAY,  0               /DELAY BETWEEN 2 CONVERSIONS
0043  0000  CNTR1,  0               /MONOTINICITY COUNTER
0044  0000  TALLY,  0
0045  2236  ERR,    ERTYP           /ERROR REPORT ROUTINE
                /*C8*/XCONVT,   CONVT           /DISPLAY CONVERTED VALUE
                /*C8*/XINSTR,   INSTR           /IOT SCOPE LOOP
                /*C8*/XMONOT,   MONOT           /MONOTINICITY TEST
0046  0207  K207,   207               /BELL CODE
0047  0212  K212,   212               /LINE FEED
0050  0215  K215,   215               /CARRIAGE RETURN
0051  7777  M1,     7777
0052  7776  M2,     7776
0053  7774  M4,     7774
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```
                7772    M6,     7772
                7740    M40,    -40
                1000    K1000,  1000
                0077    K77,    0077
                0040    K40,    40
                0200    K200,   200
                2200    XMOVE,  MOVE
                        /*C8*/EXTBL,    EXTL
                5577    XSTOR,  STORAG-1
                3645    XCOMPR, COMPAR
                        /*C8*/XRESOL,   RESOL
                        /*C8*/XNOISE,   NOISE
                        /*C8*/XGLIT,    GLITCH
                        /*C8*/XSYST,    SYST
                3330    XPRLP,  PRLP
                0240    BLANK,  240
                        /*C8*/CHAR,     260

                0260    CHARA,  260                     /C8/

                7777    ERSWIT, 7777
                0000    CHAN,   0
                2600    TAL,    XTAL
                2676    SELECT, XSELEC
                3347    SETUP,  XSETUP
                        /*C8*/CHNL,     0
                        /*C8*/  1
                        /*C8*/  2
                        /*C8*/  3
                        /*C8*/  4
                        /*C8*/  5
                        /*C8*/  6
                        /*C8*/K7,       7
                        /*C8*/  10
                        /*C8*/  11
                        /*C8*/  12
                        /*C8*/  13
                        /*C8*/  14
                        /*C8*/  15
                        /*C8*/  16
                        /*C8*/  17
                        /*C8*/  0
        4475    C8ACTV= JMS I . /C8/CHECK FOR ACTIVE CONSOLE PACKAGE
0075    3737            ACTVC8

        0102    *102                            /C8/PG 0, LOCS 102 THRU 117 ARE USED BY -
        0120    *120                            /C8/ - THE CONSOLE PACKAGE (C8).


                /IOT LINKS

0120    2400    XADCL,  XXADCL
0121    2406    XADLM,  XXADLM
0122    2414    XADST,  XXADST
0123    2422    XADRB,  XXADRB
```



```
0124    2430    XADSK,  XXADSK
0125    2440    XADSE,  XXADSE
0126    2450    XADLE,  XXADLE
0127    2456    XADRS,  XXADRS
0130    2464    XCLOE,  XXCLOE
0131    2472    XCLSK,  XXCLSK
0132    2502    XCLZE,  XXCLZE
0133    2510    XCLSA,  XXCLSA
0134    2516    XCLED,  XXCLED
0135    2524    XCLAB,  XXCLAB
0136    2532    XDISD,  XXDISD
0137    2542    XDILX,  XXDILX
0140    2550    XDILY,  XXDILY
0141    2556    XDIXY,  XXDIXY
0142    2564    XDILE,  XXDILE
0143    0530    FIRST,  0530                    /FIRST A/D IOT NORM #53
0144    0000    LAST,   0                       /LAST IOT OF A SEQU IOT LIST
0145    0530    NOW,    0530                    /CURRENT DEVICE SELECT CODE BEING USED
0146    0130    CLKNOW, 0130                    /CURRENT CLOCK IOT
0147    0050    SCPNOW, 0050                    /CURRENT SCOPE IOT
0150    0000    CSNOW,  0
0151    0000    ER1LSB, 0               /VB/ERROR COUNTER.
0152    0000    TEMPLB, 0               /VB/STORAGE FOR RESOLUTION DIFFERENCE.


0153    0760    XC8LAS, C8LAS                   /C8/

0154    0000    C8SVSR, 0                       /C8/SR SOMETIMES SAVED HERE.




                0200    *200

0200    4777'           JMS     C8STAR          /C8/NORMAL START.
0201    4777'           JMS     C8STAR          /C8/IOT SCOPE LOOP OPTION.
0202    4777'           JMS     C8STAR          /C8/DISPLAY CONVERTED VALUE OPTION.
0203    4777'           JMS     C8STAR          /C8/EXTERNAL ENABLE TEST.
0204    4777'           JMS     C8STAR          /C8/MONOTINICITY TEST.
0205    4777'           JMS     C8STAR          /C8/ACCURACY TEST.
0206    4777'           JMS     C8STAR          /C8/SUCCESSIVE READS TEST.
0207    4777'           JMS     C8STAR          /C8/MPX NOISE TEST.
0210    4777'           JMS     C8STAR          /C8/LAB8-A SYSTEM CHECK.

                /*C8*/  JMP     START           /NORMAL START
                /*C8*/  JMP I   XINSTR          /IOT SCOPE LOOP OPTION
                /*C8*/  JMP I   XCONVT          /DISPLAY CONVERTED VALUE OPTION
                /*C8*/  JMP I   EXTBL           /EXTERNAL ENABLE TEST
                /*C8*/  JMP I   XMONOT          /MONOTINICITY TEST
                /*C8*/  JMP I   XRESOL          /ACCURACY TEST
                /*C8*/  JMP I   XNOISE          /SUCCESSIVE READS TEST
                /*C8*/  JMP I   XGLIT           /MPX NOISE TEST
```

```
                    /*C8*/  JMP I   XSYST           /LAB8-A SYSTEM CHECK
                    START,  /*C8*/HLT
                    
                            C8ACTV
                    C8CALB, C8INQU                  /C8/
                    
                            LAS
                            AND     SW5             /SELECT SPECIFIC TEST?
                            SZA                     /SKIP IF NO
                            JMS  I  SELECT          /YES
                    
                    
                    /HOUSEKEEPING
                    INITL,  JMS     CLEAN           /RESET TO BASE IOT'S
                            JMS     MESAGE
                            XLABEL
                    INITM,  TAD     (ERMSG-1
                            DCA     MSGPNT          /INITIALIZE ERROR POINTER
                            CAF
                    
                    
                    /TEST 0: CHECKS THAT ENABLE BIT2 CAN BE LOADED AND READ BACK
                    
                            JMS I   SETUP
                    ENA2,   CLA CLL
                            TAD     [1000           /GET BITS AND
                            ADLE                    /LOAD
                            SNA
                            JMP     .+3
                            JMS I   ERR             /AC NOT CLEARED BY ADLE
                            ENA2
                            CMA
                            ADRS                    /READ BACK
                            CIA
                            TAD     [1000           /CHECK FOR ONLY  2 SET
                            SNA
                            JMP     .+5
                            JMS I   ERR             /WRONG BITS
                            ENA2
                            JMP     ENA3-1
                            JMP     ENA2
                            JMS I   TAL             /DONE?
                    
                    
                    /TEST 1: CHECKS THAT ENABLE BIT3 CAN BE LOADED AND READ BACK
                    
                            JMS I   SETUP
                    ENA3,   CLA CLL
                            TAD     [0400           /GET BITS AND
                            ADLE                    /LOAD
                            SNA
                            JMP     .+3
                            JMS I   ERR             /AC NOT CLEARED BY ADLE
                            ENA3
                            CMA
```



```
                            ADRS                    /READ BACK
                            CIA
                            TAD     [0400           /CHECK FOR ONLY 3 SET
                            SNA
                            JMP     .+5
                            JMS I   ERR             /WRONG BITS
                            ENA3
                            JMP     ENA4-1
                            JMP     ENA3
                            JMS I   TAL             /DONE?
                    
                    
                    /TEST 2: CHECKS THAT ENABLE BIT4 CAN BE LOADED AND READ BACK
                    
                            JMS I   SETUP
                    ENA4,   CLA CLL
                            TAD     [0200           /GET BITS AND
                            ADLE                    /LOAD
                            SNA
                            JMP     .+3
                            JMS I   ERR             /AC NOT CLEARED BY ADLE
                            ENA4
                            CMA
                            ADRS                    /READ BACK
                            CIA
                            TAD     [0200           /CHECK FOR ONLY 4 SET
                            SNA
                            JMP     .+5
                            JMS I   ERR             /WRONG BITS
                            ENA4
                            JMP     ENA5-1
                            JMP     ENA4
                            JMS I   TAL             /DONE?
                    
                    
                    /TEST 3: CHECKS THAT ENABLE BIT5 CAN BE LOADED AND READ BACK
                    
                            JMS I   SETUP
                    ENA5,   CLA CLL
                            TAD     [0100           /GET BITS AND
                            ADLE                    /LOAD
                            SNA
                            JMP     .+3
                            JMS I   ERR             /AC NOT CLEARED BY ADLE
                            ENA5
                            CMA
                            ADRS                    /READ BACK
                            CIA
                            TAD     [0100           /CHECK FOR ONLY 5 SET
                            SNA
                            JMP     .+5
                            JMS I   ERR             /WRONG BITS
                            ENA5
                            JMP     ENA6-1
```

```
0337  5317          JMP     ENA5
0340  4472          JMS I   TAL             /DONE ?


                    /TEST 4: CHECKS THAT ENABLE BIT6 CAN BE LOADED AND READ BACK

0341  4474          JMS I   SETUP
0342  7300  ENA6,   CLA CLL
0343  1172          TAD     [40             /GET BITS AND
0344  4526          ADLE                    /LOAD
0345  7450          SNA
0346  5351          JMP     .+3
0347  4445          JMS I   ERR             /AC NOT CLEARED BY ADLE
0350  0342          ENA6
0351  7040          CMA
0352  4527          ADRS                    /READ BACK
0353  7041          CIA
0354  1172          TAD     [40             /CHECK FOR ONLY 6 SET
0355  7450          SNA
0356  5363          JMP     .+5
0357  4445          JMS I   ERR             /WRONG BITS
0360  0342          ENA6
0361  5773'         JMP     MUX8A
0362  5342          JMP     ENA6
0363  4472          JMS I   TAL             /DONE?
0364  5773'         JMP     MUX8A

0373  0400
0374  2111
0375  2322
0376  3000
0377  3400
      0400    PAGE


                    /TEST 5: CHECKS THAT MUX BIT8 CAN BE LOADED AND READ BACK

0400  4474  MUX8A,  JMS I   SETUP
0401  7300  MUX8,   CLA CLL
0402  1171          TAD     [10             /GET BITS AND
0403  4521          ADLM                    /LOAD
0404  7450          SNA
0405  5210          JMP     .+3
0406  4445          JMS I   ERR             /AC NOT CLEARED BY ADLM
0407  0401          MUX8
0410  7040          CMA
0411  4527          ADRS                    /READ BACK
0412  7041          CIA
0413  1171          TAD     [10             /CHECK FOR ONLY 8 SET
0414  7450          SNA
0415  5222          JMP     .+5
0416  4445          JMS I   ERR             /WRONG BITS
0417  0401          MUX8
0420  5223          JMP     MUX9-1
```



```
0421  5201          JMP     MUX8
0422  4472          JMS I   TAL             /DONE?


                    /TEST 6: CHECKS THAT MUX BIT9 CAN BE LOADED AND READ BACK

0423  4474          JMS I   SETUP
0424  7300  MUX9,   CLA CLL
0425  1170          TAD     [4              /GET BITS AND
0426  4521          ADLM                    /LOAD
0427  7450          SNA
0430  5233          JMP     .+3
0431  4445          JMS I   ERR             /AC NOT CLEARED BY ADLM
0432  0424          MUX9
0433  7040          CMA
0434  4527          ADRS                    /READ BACK
0435  7041          CIA
0436  1170          TAD     [4              /CHECK FOR ONLY 9 SET
0437  7450          SNA
0440  5245          JMP     .+5
0441  4445          JMS I   ERR             /WRONG BITS
0442  0424          MUX9
0443  5246          JMP     MUX10-1
0444  5224          JMP     MUX9
0445  4472          JMS I   TAL             /DONE?


                    /TEST 7: CHECKS THAT MUX BIT10 CAN BE LOADED AND READ BACK

0446  4474          JMS I   SETUP
0447  7300  MUX10,  CLA CLL
0450  1167          TAD     [2              /GET BITS AND
0451  4521          ADLM                    /LOAD
0452  7450          SNA
0453  5256          JMP     .+3
0454  4445          JMS I   ERR             /AC NOT CLEARED BY ADLM
0455  0447          MUX10
0456  7040          CMA
0457  4527          ADRS                    /READ BACK
0460  7041          CIA
0461  1167          TAD     [2              /CHECK FOR ONLY 10 SET
0462  7450          SNA
0463  5270          JMP     .+5
0464  4445          JMS I   ERR             /WRONG BITS
0465  0447          MUX10
0466  5271          JMP     MUX11-1
0467  5247          JMP     MUX10
0470  4472          JMS I   TAL             /DONE?


                    /TEST 10: CHECKS THAT MUX BIT11 CAN BE LOADED AND READ BACK

0471  4474          JMS I   SETUP
0472  7301  MUX11,  CLA CLL IAC
```

```
                                ADLM                    /LOAD
                                SNA
                                JMP     .+3
                                JMS I   ERR             /AC NOT CLEARED BY ADLM
                                MUX11
                                CMA
                                ADRS                    /READ BACK
                                CIA
                                IAC                     /CHECK FOR ONLY 11 SET
                                SNA
                                JMP     .+5
                                JMS I   ERR             /WRONG BITS
                                MUX11
                                JMP     TSTJAM-1
                                JMP     MUX11
                                JMS I   TAL             /DONE?

                        /TEST 11: TEST THAT ADCL CLEARS MUX AND ENABLE BITS
                                JMS I   SETUP
                        TSTADC, CLA CMA                 /SET AC=7777
                                ADLM                    /LOAD MUX
                                CLA CMA                 /SET AC=7777
                                ADLE                    /LOAD ENABLES
                                ADCL                    /CLEAR ALL
                                ADRS                    /READ STATUS
                                AND     (1777           /MASK
                                SNA                     /ANY SET?
                                JMP     .+5             /NO, NEXT TEST
                                JMS I   ERR             /YES, ERROR
                                TSTADC
                                JMP     TSTCAF-1        /NEXT TEST
                                JMP     TSTADC          /LOOP ADR,
                                JMS I   TAL             /DONE?

                        /TEST 12: TEST THAT CAF CLEARS MUX AND ENABLE BITS
                                JMS I   SETUP
                        TSTCAF, CLA CMA                 /SET AC=7777
                                ADLM                    /LOAD MUX
                                CLA CMA                 /SET AC=7777
                                ADLE                    /LOAD ENABLES
                                CAF                     /CLEAR ALL
                                ADRS                    /READ STATUS
                                AND     (1777           /MASK
                                SNA                     /ANY SET?
                                JMP     .+5             /NO, NEXT TEST
                                JMS I   ERR             /YES, ERROR
                                TSTCAF
                                JMP     TSTJAM-1        /NEXT TEST
                                JMP     TSTCAF          /LOOP ADR,
                                JMS I   TAL             /DONE?

                        /TEST 13: TEST THAT ADRB JAM TRANSFERS TO AC
                                JMS I   SETUP
                        TSTJAM, CLA CMA                 /AC=7777
```



```
                                ADRB                    /SHOULD CLEAR AC
                                DCA     TEMPA           /SAVE AC
                                NOP
                                ADRB                    /READ WITH AC=0
                                CIA
                                TAD     TEMPA
                                SNA                     /NOT EQUAL ?
                                JMP     .+5
                                JMS I   ERR             /NO=ERROR
                                TSTJAM
                                JMP     TSTDON-1
                                JMP     TSTJAM
                                JMS I   TAL
                                JMP     TSTDON-1
                                PAGE

                        /TEST 14: CHECK TO SET DONE FLAG AND CLEAR DONE FLAG
                                JMS I   SETUP
                        TSTDON, CLA
                                ADST                    /CONVERT, RESULTS NOT NEEDED
                                TAD     [-100
                                DCA     TEMP0
                                ISZ     TEMP0
                                JMP     .-1
                                ADSK
                                SKP
                                JMP     .+4
                                JMS I   ERR             /FLAG NOT SET
                                TSTDON
                                JMP     TSTERR-1
                                ADSK
                                SKP
                                JMP     .+4
                                JMS I   ERR             /ADSK CLEARED DONE IN ERROR
                                TSTDON
                                JMP     TSTERR-1
                                ADCL                    /CLEAR FLAG
                                ADSK                    /CHECK FOR FLAG
                                JMP     .+5             /FLAG CLEARED
                                JMS I   ERR             /FLAG NOT CLEARED
                                TSTDON
                                JMP     TSTERR-1
                                JMP     TSTDON
                                JMS I   TAL

                        /TEST 15: CHECK TO SET TIMING ERROR FLAG AND CLEAR TIMING ERROR FLAG
                                JMS I   SETUP
                        TSTERR, CLA
                                ADST                    /TWO A-D STARTS TO PRODUCE TIMING ERROR
                                ADST
                                ADSE                    /CHECK FOR TIMING ERROR FLAG
                                SKP
```

```
0641  5244          JMP     .+3
0642  4445          JMS I   ERR             /FLAG NOT SET
0643  0634          TSTERR
0644  4525          ADSE
0645  7410          SKP
0646  5252          JMP     .+4
0647  4445          JMS I   ERR
0650  0634          TSTERR
0651  5262          JMP     TSTSR0-1
0652  4520          ADCL                    /CLEAR FLAG
0653  4525          ADSE                    /CHECK FLAG
0654  5261          JMP     .+5
0655  4445          JMS I   ERR             /FLAG NOT CLEARED
0656  0634          TSTERR
0657  5262          JMP     TSTSR0-1
0660  5234          JMP     TSTERR
0661  4472          JMS I   TAL

                /TEST 16: CHECK TO SET DONE FLAG AND READ BACK VIA STATUS REG
0662  4474          JMS I   SETUP
0663  7200  TSTSR0, CLA
0664  4522          ADST                    /CONVERT, RESULTS NOT NEEDED
0665  1166          TAD     [-100
0666  3035          DCA     TEMP0
0667  2035          ISZ     TEMP0
0670  5267          JMP     .-1
0671  4524          ADSK
0672  7410          SKP
0673  5277          JMP     .+4
0674  4445          JMS I   ERR             /FLAG NOT SET
0675  0663          TSTSR0
0676  5307          JMP     TSTSR1-1
0677  4527          ADRS                    /READ STATUS
0700  7510          SPA                     /BIT 0 SET ?
0701  5306          JMP     .+5             /YES
0702  4445          JMS I   ERR             /FLAG FAILED TO READ INTO BIT 0
0703  0663          TSTSR0
0704  5307          JMP     TSTSR1-1        /NEXT TEST
0705  5263          JMP     TSTSR0
0706  4472          JMS I   TAL

                /TEST 17: CHECK TO SET TIMING ERROR FLAG AND READ BACK VIA STATUS REG
0707  4474          JMS I   SETUP
0710  7200  TSTSR1, CLA
0711  4522          ADST                    /TWO A-D STARTS TO PRODUCE TIMING ERROR
0712  4522          ADST
0713  4525          ADSE                    /CHECK FOR TIMING ERROR FLAG
0714  7410          SKP
0715  5321          JMP     .+4
0716  4445          JMS I   ERR             /FLAG NOT SET
0717  0710          TSTSR1
0720  5332          JMP     CLRDON-1
0721  4527          ADRS                    /READ STATUS
0722  0377          AND     (2000           /MASK
```



```
0723  7440          SZA                     /BIT SET ?
0724  5331          JMP     .+5             /YES
0725  4445          JMS I   ERR             /ERROR FLAG FAILED TO READ INTO STATUS REG
0726  0710          TSTSR1
0727  5332          JMP     CLRDON-1        /NEXT TEST
0730  5310          JMP     TSTSR1
0731  4472          JMS I   TAL

                /TEST 20: CHECK TO CLEAR DONE FLAG VIA CAF
0732  4474          JMS I   SETUP
0733  7200  CLRDON, CLA
0734  4522          ADST                    /CONVERT, RESULTS NOT NEEDED
0735  1166          TAD     [-100
0736  3035          DCA     TEMP0
0737  2035          ISZ     TEMP0
0740  5337          JMP     .-1
0741  4524          ADSK
0742  7410          SKP
0743  5347          JMP     .+4
0744  4445          JMS I   ERR             /FLAG NOT SET
0745  0733          CLRDON
0746  5776'         JMP     CLRERR-1
0747  6007          CAF             /CLEAR FLAG
0750  4524          ADSK            /CHECK FOR FLAG
0751  5356          JMP     .+5     /FLAG CLEARED
0752  4445          JMS I   ERR     /FLAG NOT CLEARED
0753  0733          CLRDON
0754  5776'         JMP CLRERR-1
0755  5333          JMP CLRDON
0756  4472          JMS I   TAL
0757  5776'         JMP     CLRERR-1

                /C8/    ********************************************************************
                /C8/
                /C8/    ROUTINE TO READ SWITCH REGISTER.  IF CONSOLE PKG IS ACTIVE
                /C8/    THEN SWITCHES WILL BE READ VIA THE CONSOLE PKG,  OTHERWISE
                /C8/    THE HARDWARE FRONT PANEL SWITCHES WILL BE READ.
0760  0000    C8LAS,  0                       /C8/
0761  7200            CLA                     /C8/
0762  1775'           TAD     C8F             /C8/IS CONSOLE PKG ACTIVE?
0763  7640            SZA CLA                 /C8/SKP IF NO.
0764  5367            JMP     C8SR            /C8/
0765  7604            7604                    /C8/(LAS) AC=HARD SR.
0766  5760            JMP I   C8LAS           /C8/RTN TO CALL+1.
0767  4503    C8SR,   C8CKSW                  /C8/GET SR (PSUEDO OR HARD) VIA CONS. PKG.
0770  5760            JMP I   C8LAS           /C8/RTN TO CALL+1.

                /C8/    ********************************************************************
0775  3432
0776  1000
0777  2000
      1000      PAGE
```

```
                        /TEST 21: CHECK TO  CLEAR TIMING ERROR FLAG VIA CAF
1000  4474              JMS I   SETUP
1001  7200    CLRERR, CLA
1002  4522            ADST                    /TWO A-D STARTS TO PRODUCE TIMING ERROR
1003  4522            ADST
1004  4525            ADSE                    /CHECK FOR TIMING ERROR FLAG
1005  7410            SKP
1006  5211            JMP     .+3
1007  4445            JMS I   ERR             /FLAG NOT SET
1010  1001            CLRERR
1011  6007            CAF                     /CLEAR FLAG
1012  4525            ADSE                    /CHECK FLAG
1013  5220            JMP     .+5
1014  4445            JMS I   ERR             /FLAG NOT CLEARED
1015  1001            CLRERR
1016  5221            JMP     STCLDO-1
1017  5201            JMP     CLRERR
1020  4472            JMS I   TAL

                        /TEST 22: TEST THAT ADST CLEARS DONE

1021  4474              JMS I   SETUP
1022  7200    STCLDO, CLA
1023  4522            ADST                    /CONVERT
1024  4524            ADSK                    /WAIT FOR
1025  5224            JMP     .-1             /DONE
1026  4522            ADST                    /CLEAR FLAGS
1027  4524            ADSK                    /DONE SHOULD CLEAR
1030  5235            JMP     .+5             /DID CLEAR, OK
1031  4445            JMS I   ERR             /DONE DID NOT CLEAR
1032  1022            STCLDO
1033  5236            JMP     STCLER-1        /NEXT TEST
1034  5222            JMP     STCLDO          /LOOP ADR
1035  4472            JMS I   TAL             /DONE?

                        /TEST 23: TEST THAT ADST CLEARS ERROR

1036  4474              JMS I   SETUP
1037  7200    STCLER, CLA
1040  4522            ADST                    /CONVERT
1041  4522            ADST                    /CAUSE ERROR
1042  4524            ADSK
1043  5242            JMP     .-1
1044  4525            ADSE                    /MAKE SURE ERROR IS
1045  5244            JMP     .-1             /SET
1046  4522            ADST                    /CLEAR FLAGS
1047  4525            ADSE                    /SKIP IF ERROR DID NOT CLEAR
1050  5255            JMP     .+5             /IT DID CLEAR
1051  4445            JMS I   ERR             /ERROR FLAG DID NOT CLEAR VIA ADST
1052  1037            STCLER
1053  5777'           JMP     RBCLDO-1        /NEXT TEST
1054  5237            JMP     STCLER          /LOOP ADDRESS
1055  4472            JMS I   TAL             /DONE?
```



```
                        /TEST 24: SET ERROR BY READING A/D BUFFER
1056  4474              JMS I   SETUP
1057  7300    EOCERR, CLA CLL
1060  1376            TAD     (-24            /SET UP COUNTER
1061  3040            DCA     TEMPC           /LOCATION
1062  3037            DCA     TEMPB           /CLEAR COUNTER
1063  4522    EOCER1, ADST                    /START CONVERSION
1064  4523            ADRB                    /READ BUFFER
1065  4523            ADRB
1066  4523            ADRB
1067  4523            ADRB
1070  4523            ADRB
1071  4523            ADRB
1072  4523            ADRB
1073  4523            ADRB
1074  4523            ADRB
1075  4523            ADRB
1076  4523            ADRB
1077  4523            ADRB
1100  4523            ADRB
1101  4523            ADRB
1102  4523            ADRB
1103  4523            ADRB
1104  4523            ADRB
1105  4523            ADRB
1106  4523            ADRB
1107  4523            ADRB
1110  4523            ADRB
1111  4523            ADRB
1112  4523            ADRB
1113  4523            ADRB
1114  4523            ADRB
1115  4523    EOCER2, ADRB
1116  4525            ADSE                    /SKIP IF ERROR
1117  7410            SKP
1120  2037            ISZ     TEMPB           /TIMING ERROR DETECTED
1121  7000            NOP
1122  2040            ISZ     TEMPC           /DONE ?
1123  5263            JMP     EOCER1          /NO
1124  7300            CLA CLL
1125  1037            TAD     TEMPB           /GET NUMBER OF ERROR FLAGS
1126  7440            SZA                     / = 0
1127  5334            JMP     .+5             /NO
1130  4445            JMS I   ERR             /READING A/D BUFFER AND CONVERTING FAILED
1131  1057            EOCERR                  /TO SET ERROR F=F
1132  5775'           JMP     NOERCL-1        /NEXT TEST
1133  5257            JMP     EOCERR          /LOOP
1134  4472            JMS I   TAL             /DONE
1135  5775'           JMP     NOERCL-1
1175  1200
1176  7754
1177  1213
      1200            PAGE
```

```
                        /TEST 25: TEST THAT ERROR DOES NOT SET AFTER ADCL
1200  4474              JMS I   SETUP
1201  4522  NOERCL,     ADST                    /START CONVERSION
1202  4520              ADCL                    /CLEAR ALL
1203  4522              ADST                    /START CONVERSION
1204  4525              ADSE                    /ERROR SHOULD NOT BE SET
1205  5212              JMP     .+5
1206  4445              JMS I   ERR             /ERROR FLAG SET, ADCL (CLR BUSY) FAILED
1207  1201              NOERCL
1210  5213              JMP     RBCLDO-1
1211  5201              JMP     NOERCL
1212  4472              JMS I   TAL             /DONE ?

                        /TEST 26: TEST THAT ADRB CLEARS THE DONE FLAG

1213  4474              JMS I   SETUP
1214  7300  RBCLDO,     CLA CLL
1215  4522              ADST                    /CONVERT
1216  4524              ADSK                    /WAIT FOR DONE
1217  5216              JMP     .-1
1220  4523              ADRB                    /READ BUFFER & CLEAR DONE
1221  4524              ADSK                    /DID DONE CLEAR?
1222  5227              JMP     .+5             /YES,
1223  4445              JMS I   ERR             /NO, ADRB FAILED TO CLEAR DONE FLAG
1224  1214              RBCLDO
1225  5230              JMP     CLADBU-1        /NEXT TEST
1226  5214              JMP     RBCLDO          /LOOP ADDRESS
1227  4472              JMS I   TAL             /DONE?

                        /TEST 27: TEST THAT CAF CLEARS ADB REGISTER (UNIPOLAR)

1230  4474              JMS I   SETUP
1231  4522  CLADBU,     ADST                    /CONVERT
1232  4524              ADSK                    /DONE ?
1233  5232              JMP     .-1
1234  6007              CAF                     /INITIALIZE
1235  7200              CLA
1236  1377              TAD     (40             /GET BIT 6
1237  4526              ADLE                    /SET UNIPOLAR
1240  4523              ADRB                    /READ BUFFER
1241  7041              CIA
1242  1376              TAD     (7000
1243  7450              SNA                     /TEST FOR ZERO
1244  5251              JMP     .+5
1245  4445              JMS I   ERR             /CAF FAILED TO CLEAR ADR BUFFER REGISTER
1246  1231              CLADBU
1247  5252              JMP     CLADBB-1
1250  5231              JMP     CLADBU          /LOOP ADDRESS
1251  4472              JMS I   TAL             /DONE ?


                        /TEST 30: TEST THAT CAF CLEARS ADB REGISTER (BIPOLAR)
```



```
1252  4474              JMS I   SETUP
1253  4522  CLADBB,     ADST                    /CONVERT
1254  4524              ADSK                    /DONE
1255  5254              JMP     .-1
1256  6007              CAF                     /INITIALIZE
1257  4523              ADRB                    /READ DATA
1260  7041              CIA
1261  1376              TAD     (7000
1262  7450              SNA                     /=0
1263  5270              JMP     .+5             /YES
1264  4445              JMS I   ERR             /CAF FAILED TO CLEAR ADR REG.
1265  1253              CLADBB
1266  5271              JMP     ALL1S-1         /NEXT TEST
1267  5253              JMP     CLADBB          /LOOP
1270  4472              JMS I   TAL             /DONE ?

                        /TEST 31: TEST ADB DATA BUFFER VALUE = 1777
                        /EXECUTE ONLY IF SW 3 = 1

1271  4474              JMS I   SETUP
1272  4522  ALL1S,      ADST                    /CONVERT
1273  4524              ADSK                    /DONE
1274  5273              JMP     .-1
1275  4553              LAS                     /GET SWITCHES
1276  0375              AND     (400            /MASK
1277  7450              SNA                     /BIT SET ?
1300  5315              JMP     ALL1SA          /NO, BYPASS THIS TEST
1301  7200              CLA
1302  1377              TAD     (40             /SET BIT 6
1303  4526              ADLE                    /LOAD UNIPOLAR
1304  4523              ADRB                    /READ DATA
1305  7041              CIA
1306  1374              TAD     (6000           /ADD #
1307  7450              SNA                     /EQUAL ?
1310  5315              JMP     .+5             /YES
1311  4445              JMS I   ERR             /NO, OPERATOR SAID ALL 1'S JUMPER WAS INSTALLED
1312  1272              ALL1S                   /BUT THE DATA READ WAS NOT 1777
1313  5316              JMP     TST3-1          /NEXT TEST
1314  5272              JMP     ALL1S           /LOOP
1315  4472  ALL1SA,     JMS I   TAL             /DONE ?


                        /TEST 32: TEST FOR UNEXPECTED INTERRUPT REQUEST

1316  4474              JMS I   SETUP
1317  7200  TST3,       CLA
1320  1165              TAD     [TST3S
1321  3002              DCA     RETURN
1322  1373              TAD     (-10
1323  3036              DCA     TEMPA           /LOAD A COUNTER
1324  6001              ION                     /TURN INT ON
1325  2036              ISZ     TEMPA           /DELAY
1326  5325              JMP     .-1
1327  5333              JMP     .+4
```

```
                                TST3S,  JMS I   ERR             /UNEXPECTED INTERRUPT OCCURRED
                                        TST3
                                        JMP     DONINT-1
                                        IOF                     /TURN INT OFF
                                        SKP
                                        JMP     TST3            /LOOP BACK
                                        JMS I   TAL

                        /TEST 33: GENERATE INTERRUPT WITH A-D DONE FLAG
                                        JMS I   SETUP
                                DONINT, CLA
                                        ADST                    /CONVERT
                                        ADSK                    /DONE?
                                        JMP     .-1             /WAIT
                                        TAD     [DON1
                                        DCA     RETURN          /RETURN POINTER
                                        TAD     K1000
                                        ADLE                    /LOAD INTERRUPT ENABLE
                                        ION
                                        NOP
                                        IOF
                                        JMS I   ERR             /DID NOT INTERRUPT
                                        DONINT
                                        JMP     ERRINT-1
                                DON1,   ADCL                    /CLEAR WORLD
                                        SKP
                                        JMP     DONINT
                                        JMS I   TAL
                                        JMP     ERRINT-1
                                        PAGE

                        /TEST 34: GENERATE INTERRUPT WITH TIMING ERROR FLAG
                                        JMS I   SETUP
                                ERRINT, CLA
                                        TAD     [TMG1
                                        DCA     RETURN
                                        ADST                    /CAUSE ERROR HERE
                                        ADST
                                        ADSK                    /DONE?
                                        JMP     .-1
                                        ADSE                    /TIMING ERROR?
                                        JMP     .-1
                                        CLA CLL
                                        TAD     K1000
                                        RAR
                                        ADLE                    /LOAD INTERRUPT ENABLE
                                        ION                     /INT ON
                                        NOP
```



```
                                        IOF                     /INT OFF
                                        JMS I   ERR             /DID NOT INTERRUPT
                                        ERRINT
                                        JMP     AUTO-1
                                TMG1,   ADCL                    /CLEAR WORLD
                                        SKP
                                        JMP     ERRINT
                                        JMS I   TAL

                        /TEST 35: AUTO-INCREMENT MODE TEST
                                        JMS I   SETUP
                                AUTO,   CLA CLL
                                        TAD     [CHNL-1
                                        DCA     A11
                                        ADCL
                                AUTO1,  CLA
                                        TAD I   A11             /CHANNEL N
                                        DCA     TEMPA
                                        TAD     TEMPA
                                        CMA
                                        DCA     TEMPB
                                        TAD     SW5             /AUTO-INCREMENT BIT
                                        ADLE                    /LOAD ENABLE REG
                                        TAD     TEMPA           /CHANNEL N
                                        ADLM                    /LOAD MPX REG
                                        ADST                    /START CONVERSION
                                        ADSK                    /WAIT FOR
                                        JMP     .-1             /DONE FLAG
                                        ADRS                    /READ STATUS
                                        AND     [17             /MASK OUT ALL BUT MPX REG
                                        DCA     TEMPC
                                        TAD     TEMPA           /CHECK IF CHANNEL 17 INCREMENTED TO 0
                                        TAD     [7761
                                        SZA CLA                 /IF CHANNEL 17 SKIP
                                        TAD     TEMPB           /CHECK FOR CHANNEL N+1
                                        TAD     TEMPC
                                AUTO2,  SNA
                                        JMP     .+4
                                        JMS I   ERR             /WRONG CHANNEL
                                        AUTO
                                        JMP     TST14-1
                                        TAD     TEMPC
                                        SZA                     /LAST CHANNEL?
                                        JMP     AUTO1           /NO
                                        SKP
                                        JMP     AUTO
                                        JMS I   TAL

                        /TEST 36: ROUTINE TO CHECK THAT CONVERSION CAN BE MADE IN 22 MICROSECS
                                        JMS I   SETUP
                                TST14,  CLA CLL
                                        TAD     (-7
```

```
 986    1500  3035            DCA     TEMP0
 987    1501  4520            ADCL                    /CLEAR ALL LOGIC
 988    1502  4522            ADST                    /START CONVERSION
 989    1503  2035            ISZ     TEMP0
 990    1504  5303            JMP     .-1
 991    1505  4524            ADSK                    /CONVERSION MADE IN 22 MICROSECS.?
 992    1506  7410            SKP                     /NO
 993    1507  5314            JMP     .+5             /YES
 994    1510  4445            JMS I   ERR             /TIME OUT ERROR
 995    1511  1476            TST14
 996    1512  5776'           JMP     TIMDIF-1
 997    1513  5276            JMP     TST14
 998    1514  4472            JMS I   TAL
 999    1515  5776'           JMP     TIMDIF-1
1000
1001    1576  1600
1002    1577  7771
              1600    PAGE
1003
1004                  /TEST 37: ENSURE A TIMING DIFFERENCE EXISTS BETWEEN
1005                  /SAMPLING ON CURRENT CHANNEL AND SAMPLING
1006                  /ON ANOTHER CHANNEL
1007
1008    1600  4474            JMS I   SETUP
1009    1601  4553    TIMDIF, LAS
1010    1602  0061            AND     K200                    /CHECK PROCESSOR CYCLE TIME
1011    1603  7650            SNA CLA
1012    1604  5325            JMP     FINISA                  /RETURN TO BEGINNING OF LOGIC TESTS
1013    1605  1777'           TAD     VADST
1014    1606  3227            DCA     COD1
1015    1607  1777'           TAD     VADST
1016    1610  3256            DCA     COD3
1017    1611  1776'           TAD     VADLM
1018    1612  3255            DCA     COD2
1019    1613  4520            ADCL                    /SYNC
1020    1614  4522            ADST                    /CONVERT
1021    1615  3040            DCA     TEMPC           /CLEAR
1022    1616  3041            DCA     TEMPD           /TIMER
1023    1617  4524            ADSK                    /WAIT FOR DONE
1024    1620  5217            JMP     .-1
1025    1621  4520            ADCL
1026    1622  1375            TAD     (TIM1           /GET INTERRUPT RETURN
1027    1623  3002            DCA     RETURN
1028    1624  1056            TAD     K1000           /GET BIT 2
1029    1625  4526            ADLE                    /ENABLE INTERRUPTS
1030    1626  6001            ION
1031    1627  4522    COD1,   ADST                    /CONVERT AND START TIMER
1032    1630  7001    TIML1,  IAC
1033    1631  7001            IAC
1034    1632  7001            IAC
1035    1633  7001            IAC
1036    1634  7001            IAC
1037    1635  7001            IAC
1038    1636  7001            IAC
1039    1637  7001            IAC
```



```
1040    1640  7001            IAC
1041    1641  7001            IAC
1042    1642  5230            JMP     TIML1           /LOOP
1043
1044    1643  4475            C8ACTV
1045    1644  4514    C8CALC, C8ERR                   /C8/DONE INTERUPT FAILED,
1046    1645  7402            HLT                     /DONE INTERRUPT FAILED
1047    1646  3040    TIM1,   DCA     TEMPC
1048    1647  4523            ADRB                    /CLEARS AD DONE FLAG
1049    1650  7300            CLA CLL
1050    1651  1374            TAD     (TIM2           /SET INTERRUPT RETURN
1051    1652  3002            DCA     RETURN
1052    1653  7301            CLA CLL IAC             /AC=1
1053    1654  6001            ION
1054    1655  4521    COD2,   ADLM                    /LOAD MUX
1055    1656  4522    COD3,   ADST                    /CONVERT CH1
1056    1657  7001    TIML2,  IAC
1057    1660  7001            IAC
1058    1661  7001            IAC
1059    1662  7001            IAC
1060    1663  7001            IAC
1061    1664  7001            IAC
1062    1665  7001            IAC
1063    1666  7001            IAC
1064    1667  7001            IAC
1065    1670  7001            IAC
1066    1671  5257            JMP     TIML2           /LOOP
1067
1068    1672  4475            C8ACTV
1069    1673  4514    C8CALD, C8ERR                   /C8/
1070    1674  7402            HLT
1071    1675  3041    TIM2,   DCA     TEMPD
1072    1676  4523            ADRB                    /CLEARS AD DONE FLAG
1073    1677  7300            CLA CLL
1074    1700  1040            TAD     TEMPC           /GET CH0 TIME
1075    1701  7041            CIA                     /NEGATE
1076    1702  1041            TAD     TEMPD           /ADD CH1 TIME
1077    1703  7450            SNA                     /DIFFERENCE?
1078    1704  5312            JMP     TIMERR          /NO, ERROR
1079    1705  7510            SPA                     /CH0 > CH1
1080    1706  5312            JMP     TIMERR          /YES, ERROR
1081    1707  1052            TAD     M2              /WITHIN 2
1082    1710  7500            SMA                     /YES, ERROR
1083    1711  5316            JMP     .+5             /NO
1084    1712  4445    TIMERR, JMS I   ERR             /NO TIME DIFFERENCE
1085    1713  1601            TIMDIF                  /TEST
1086    1714  5317            JMP     FINIS           /NEXT TEST
1087    1715  5201            JMP     TIMDIF          /LOOP
1088    1716  4472            JMS I   TAL             /DONE?
1089
1090    1717  4773'   FINIS,  JMS     NEXTIO          /CHANGE IOT'S
1091    1720  5772'           JMP     INITM           /RESTART IF MORE
1092    1721  4553            LAS
1093    1722  0026            AND     SW0             /SWITCH SET TO DELETE
1094    1723  7640            SZA CLA                 /TYPEOUT OF END LOGIC TEST
```

```
1095    1724  5327            JMP     .+3
1096    1725  4771'   FINISA,  JMS     MESAGE
1097    1726  5417            XEND
1098    1727  4475            C8ACTV
1099    1730  4502            C8PASS
1100    1731  5772'           JMP     INITM           /RETURN TO BEGINNING OF LOGIC TESTS.
1101
1102
1103
1104
1105                    /ROUTINE TO DISPLAY CONVERTED VALUE IN AC.
1106    1732  4770'   CONVT,  JMS     CLEAN           /INITIALIZE IOTS
1107    1733  4520            ADCL                    /CLEAR WORLD
1108    1734  3035            DCA     TEMP0
1109    1735  4553            LAS                     /LOAD CHANNEL
1110
1111    1736  3154            DCA     C8SVSR          /C8/SAVE SR.
1112    1737  1154            TAD     C8SVSR          /C8/
1113
1114    1740  0060            AND     K40
1115    1741  4526            ADLE                    /LOAD UNIPOLAR BIT
1116                  /*C8*/   LAS
1117
1118    1742  1154            TAD     C8SVSR          /C8/
1119
1120    1743  4521            ADLM                    /LOAD MPX REG
1121    1744  4522            ADST                    /CONVERT
1122    1745  4524            ADSK                    /DONE?
1123    1746  5345            JMP     .-1             /WAIT
1124    1747  4523            ADRB                    /READ A-D BUFFER
1125    1750  2035            ISZ     TEMP0           /STALL TO DISPLAY
1126    1751  5350            JMP     .-1             /CONVERTED VALUE
1127    1752  2035            ISZ     TEMP0           /IN AC FOR
1128    1753  5352            JMP     .-1             /33 MILLISECONDS
1129    1754  3040            DCA     TEMPC
1130                  /*C8*/   LAS                     /CHECK IF HALT DESIRED
1131
1132    1755  1154            TAD     C8SVSR          /C8/CHECKIF HALT DESIRED.
1133
1134    1756  0031            AND     SW3
1135    1757  7650            SNA CLA
1136    1760  5365            JMP     .+5
1137    1761  1040            TAD     TEMPC
1138
1139    1762  4475            C8ACTV
1140    1763  4514    C8CALE, C8ERR                   /C8/TYPE 'CONTROL E' IF NOT DONE ADJUSTING.
1141                                                  /C8/THIS IS NOT AN ERROR
1142
1143    1764  7402            HLT                     /PRESS CONTINUE IF NOT DONE ADJUSTING
1144    1765  5332            JMP     CONVT           /LOOP
1145    1770  3000
1146    1771  2322
1147    1772  0222
1148    1773  3016
1149    1774  1675
```



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1150    1775  1646
1151    1776  2407
1152    1777  2415
              2000      PAGE
1153
1154
1155                    /ROUTINE TO CHECK FOR EXTERNAL ENABLE FROM REAL TIME CLOCK
1156    2000  4777'   EXTL,   JMS     CLEAN           /INITIALIZE IOTS
1157    2001  7200            CLA
1158    2002  4474            JMS I   SETUP
1159    2003  1145            TAD     NOW
1160    2004  3037            DCA     TEMPB           /IOT OF CURRENT A/D
1161    2005  1146            TAD     CLKNOW
1162    2006  3036            DCA     TEMPA           /IOT OF CURRENT CLOCK
1163    2007  4520            ADCL                    /CLEAR ALL
1164    2010  4553    EXT1,   LAS
1165    2011  0376            AND     (40             /CHECK UNIPOLAR AND EXT'L ENABLES
1166    2012  1032            TAD     SW4             /LOAD EXTERNAL ENABLE
1167    2013  4526            ADLE                    /LOAD  INTO ADC
1168
1169    2014  4475            C8ACTV
1170    2015  4507    C8CALF, C8SWIT                  /C8/
1171    2016  7402            HLT                     /GET CHANNEL
1172    2017  4553            LAS
1173    2020  0161            AND     [17
1174    2021  4521            ADLM                    /LOAD CHANNEL FROM SW8-11
1175    2022  1375            TAD     (4540           /LOAD CLOCK ENABLE REG
1176    2023  4530            CLOE                    /TRIGGER FROM RTC
1177    2024  7040            CMA
1178    2025  4532            CLZE
1179    2026  4531            CLSK                    /OCCURS ON OVERFLOW
1180    2027  5226            JMP     .-1
1181    2030  4533            CLSA
1182    2031  7240            CLA CMA
1183    2032  4532            CLZE                    /STOP CLOCK
1184    2033  7200            CLA
1185    2034  1374            TAD     (-100
1186    2035  3035            DCA     TEMP0
1187    2036  2035            ISZ     TEMP0           /TIME OUT
1188    2037  5236            JMP     .-1
1189    2040  4524            ADSK
1190    2041  7410            SKP                     /CONVERSION NOT MADE
1191    2042  5246            JMP     OV3
1192    2043  4773'           JMS     ERCOM
1193    2044  4644            EMSG22
1194    2045  7000            NOP
1195    2046  4523    OV3,    ADRB
1196    2047  3041            DCA     TEMPD           /STORE CONVERSION
1197    2050  4553            LAS
1198    2051  0030            AND     SW2             /LOOP?
1199    2052  7650            SNA CLA
1200    2053  5262            JMP     EXTTE           /YES
1201    2054  1041            TAD     TEMPD           /HALT WITH CONVERTED
1202
1203    2055  7421            MQL                     /C8/ALSO IN MQ REG.
```

```
1204    2056  4475            C8ACTV
1205    2057  4514    C8CALG, C8ERR                   /C8/CONVERTED VALUE DISPLAYED IN MQ,
1206    2060  7402            HLT                     /VALUE IN AC,
1207    2061  7000            NOP
1208    2062  7240    EXTTE,  CLA CMA
1209    2063  4532            CLZE                    /CLEAR CLOCK ENABLE REG
1210    2064  7200            CLA
1211    2065  4520            ADCL                    /CLEARS ALL LOGIC
1212    2066  1032            TAD     SW4
1213    2067  4526            ADLE                    /LOAD EXT'L ENABLE INTO ADC
1214    2070  7240            CLA CMA
1215    2071  4535            CLAB                    /SET THEN CLEAR
1216    2072  7200            CLA                     /CLOCK BUFFER TO CHECK
1217    2073  4535            CLAB                    /ERRONEOUS START PULSE FROM CLOCK
1218    2074  1372            TAD     (-6
1219    2075  3040            DCA     TEMPC
1220    2076  2040            ISZ     TEMPC
1221    2077  5276            JMP     .-1
1222    2100  4524            ADSK                    /IF FLAG FOUND REPORT ERROR
1223    2101  5306            JMP     OVERR
1224    2102  4773'           JMS     ERCOM
1225    2103  4644            EMSG22
1226    2104  7000            NOP
1227    2105  4520            ADCL
1228    2106  7200    OVERR,  CLA
1229    2107  1046            TAD     K207
1230    2110  4771'           JMS     PRLP            /RING BELL
1231    2111  5210    OVL,    JMP     EXT1
1232    2112  4334    ERMSG,  EMSG6
1233    2113  4334            EMSG6
1234    2114  4334            EMSG6
1235    2115  4334            EMSG6
1236    2116  4334            EMSG6
1237    2117  4444            EMSG11
1238    2120  4444            EMSG11
1239    2121  4444            EMSG11
1240    2122  4444            EMSG11
1241    2123  5065            EMSG31
1242    2124  5343            EMSG42
1243    2125  4311            EMSG4
1244    2126  4200            EMSG1
1245    2127  4232            EMSG2
1246    2130  4732            EMSG25
1247    2131  4765            EMSG26
1248    2132  5022            EMSG27
1249    2133  5043            EMSG30
1250    2134  5113            EMSG32
1251    2135  5132            EMSG33
1252    2136  5152            EMSG34
1253    2137  5177            EMSG35
1254    2140  5221            EMSG36
1255    2141  5243            EMSG37
1256    2142  5243            EMSG37
1257    2143  5265            EMSG40
1258    2144  4270            EMSG3
```



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1259    2145  4360            EMSG7
1260    2146  4410            EMSG10
1261    2147  4477            EMSG13
1262    2150  4537            EMSG14
1263    2151  5306            EMSG41
1264    2152  0000            0
1265    2171  3330
1266    2172  7772
1267    2173  2713
1268    2174  7700
1269    2175  4540
1270    2176  0040
1271    2177  3000
              2200    PAGE
1272
1273
1274                  /SUBROUTINE TO MOVE VARIABLE LENGTH DATA FIELDS
1275
1276    2200  0000    MOVE,   0
1277    2201  7300            CLA CLL
1278    2202  1600            TAD I   MOVE            /GET "FROM ADDR" AND
1279    2203  3233            DCA     FADDR           /STORE
1280    2204  2200            ISZ     MOVE
1281    2205  1600            TAD I   MOVE            /GET "TO ADDR" AND
1282    2206  3234            DCA     TADDR           /STORE
1283    2207  2200            ISZ     MOVE
1284    2210  1600            TAD I   MOVE            /GET "MOVE COUNT" AND
1285    2211  3235            DCA     MCTR            /STORE
1286    2212  2200            ISZ     MOVE            /SETUP FOR EXIT
1287    2213  1777'   MOVEA,  TAD     C8F             /C8/CONSOLE PKG ACTIVE?
1288    2214  7650            SNA CLA                 /C8/SKP IF YES,
1289    2215  5223            JMP     C8MOVB          /C8/
1290    2216  1200            TAD     MOVE            /C8/IS BUFFER 'STORAG' BEING MOVED?
1291    2217  7041            CIA                     /C8/
1292    2220  1376            TAD     (C8RESO         /C8/
1293    2221  7650            SNA CLA                 /C8/SKP IF NO,
1294    2222  6211            CDF     10              /C8/DF=FIELD 1,
1295                  C8MOVB,                         /C8/
1296
1297    2223  1633            TAD I   FADDR           /GET "FROM" WORD
1298    2224  3634            DCA I   TADDR           /STORE AT "TO" LOCATION
1299
1300    2225  6201            CDF     00              /C8/DF=FLD 0,
1301
1302    2226  2233            ISZ     FADDR           /+1 TO "FROM" ADDR
1303    2227  2234            ISZ     TADDR           /+1 TO "TO" ADDR
1304    2230  2235            ISZ     MCTR            /ALL WORDS MOVED?
1305    2231  5213            JMP     MOVEA           /NO, RETURN
1306    2232  5600            JMP I   MOVE            /YES, EXIT
1307    2233  0003    FADDR,  0
1308    2234  0000    TADDR,  0
1309    2235  0000    MCTR,   0
1310
1311
1312
```

```
1313                    /ERROR TYPEOUT ROUTINE
1314
1315    2236  0000      ERTYP,  0
1316    2237  7200              CLA
1317    2240  1370              TAD     IND
1318    2241  7640              SZA CLA
1319    2242  5270              JMP     EOUT2           /TYPE ERROR MESSAGE ONE TIME ONLY
1320    2243  4553              LAS
1321    2244  0026              AND     SW0             /SUPPRESS TYPEOUT?
1322    2245  7710              SPA CLA
1323    2246  5273              JMP     EOUT1           /YES
1324    2247  1417              TAD I   MSGPNT          /GET POINTER FOR ERROR MESSAGE
1325    2250  3252              DCA     EOUT
1326    2251  4322              JMS     MESAGE
1327    2252  7402      EOUT,   HLT
1328    2253  4322              JMS     MESAGE          /TYPE MESSAGE
1329    2254  5371              TXTPC
1330    2255  1236              TAD     ERTYP           /GET PC
1331    2256  1051              TAD     M1
1332    2257  4775'             JMS     MESS            /PRINT OCTAL PC #
1333    2260  1144              TAD     LAST            /TEST IF ADDITIONAL AD8A'S
1334    2261  7450              SNA
1335    2262  5267              JMP     EOUT3           /NO MORE
1336    2263  4322              JMS     MESAGE
1337    2264  5374              TXTIOT                  /TYPEOUT IOT
1338    2265  1145              TAD     NOW             /GET DEVICE CODE
1339    2266  4775'             JMS     MESS            /TYPE IT
1340    2267  4774'     EOUT3,  JMS     CRLF
1341    2270  7200      EOUT2,  CLA
1342    2271  1370              TAD     IND
1343    2272  7650              SNA CLA
1344    2273  2370      EOUT1,  ISZ     IND
1345    2274  4553              LAS
1346    2275  0027              AND     SW1             /HALT ON ERROR SWITCH ON?
1347    2276  7650              SNA CLA                 /SKIP IF ON
1348    2277  5305              JMP     SCOPE
1349    2300  1236              TAD     ERTYP
1350    2301  1051              TAD     M1
1351
1352    2302  4475              C8ACTV
1353    2303  4514      C8CALH, C8ERR                   /C8/
1354
1355    2304  7402              HLT                     /HALT WITH ERROR P.C. IN AC.
1356    2305  4553      SCOPE,  LAS
1357    2306  0030              AND     SW2             /OVERRIDE LOOP?
1358    2307  7640              SZA CLA
1359    2310  5320              JMP     EXIT1
1360    2311  1636              TAD I   ERTYP           /NO
1361    2312  3317              DCA     EXIT
1362    2313  1017              TAD     MSGPNT
1363    2314  1051              TAD     M1
1364    2315  3017              DCA     MSGPNT
1365    2316  5717              JMP I   EXIT
1366    2317  7402      EXIT,   HLT
1367    2320  2236      EXIT1,  ISZ     ERTYP           /YES
```



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1368    2321  5636              JMP I   ERTYP
1369
1370
1371                    /MESSAGE ROUTINE FOR LOGIC ERRORS
1372
1373    2322  0000      MESAGE, 0
1374    2323  7240              CLA CMA
1375    2324  1722              TAD I   MESAGE
1376    2325  3010              DCA     A10
1377    2326  2322              ISZ     MESAGE
1378    2327  1410              TAD I   A10
1379    2330  3341              DCA     MSRGHT
1380    2331  1341              TAD     MSRGHT
1381    2332  7012              RTR
1382    2333  7012              RTR
1383    2334  7012              RTR
1384    2335  4342              JMS     TYPECH
1385    2336  1341              TAD     MSRGHT
1386    2337  4342              JMS     TYPECH
1387    2340  5527              JMP     MESAGE+5
1388    2341  0000      MSRGHT, 0
1389    2342  0000      TYPECH, 0
1390    2343  0057              AND     K77
1391    2344  7450              SNA
1392    2345  5722              JMP I   MESAGE
1393    2346  1055              TAD     M40
1394    2347  7510              SPA
1395    2350  5353              JMP     .+3
1396    2351  1373              TAD     (240
1397    2352  5366              JMP     MTP
1398    2353  7001              IAC
1399    2354  7440              SZA
1400    2355  5360              JMP     .+3
1401    2356  1050              TAD     K215
1402    2357  5366              JMP     MTP
1403    2360  7001              IAC
1404    2361  7440              SZA
1405    2362  5365              JMP     .+3
1406    2363  1047              TAD     K212
1407    2364  5366              JMP     MTP
1408    2365  1372              TAD     (336
1409    2366  4771'     MTP,    JMS     PRLP
1410    2367  5742              JMP I   TYPECH
1411    2370  0000      IND,    0
1412
1413
1414    2371  3330
1415    2372  0336
1416    2373  0240
1417    2374  3337
1418    2375  3131
1419    2376  3611
1420    2377  3432
              2400      PAGE
1421
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1422
1423
1424                    /IOT SUBROUTINES
1425
1426    2400  0000      XXADCL, 0
1427    2401  6530      VADCL,  6530                    /CLEAR ALL A/D LOGIC
1428    2402  5600              JMP I   XXADCL
1429
1430    2403  4475              C8ACTV
1431    2404  4514      C8CALJ, C8ERR                   /C8/
1432    2405  7402              HLT
1433
1434    2406  0000      XXADLM, 0
1435    2407  6531      VADLM,  6531                    /LOAD MPX REG
1436    2410  5606              JMP I   XXADLM
1437
1438    2411  4475              C8ACTV
1439    2412  4514      C8CALK, C8ERR                   /C8/
1440    2413  7402              HLT
1441
1442    2414  0000      XXADST, 0
1443    2415  6532      VADST,  6532                    /START CONVERSION
1444    2416  5614              JMP I   XXADST
1445
1446    2417  4475              C8ACTV
1447    2420  4514      C8CALL, C8ERR                   /C8/
1448    2421  7402              HLT
1449
1450    2422  0000      XXADRB, 0
1451    2423  6533      VADRB,  6533                    /READ A-D BUFFER
1452    2424  5622              JMP I   XXADRB
1453
1454    2425  4475              C8ACTV
1455    2426  4514      C8CALM, C8ERR                   /C8/
1456    2427  7402              HLT
1457
1458    2430  0000      XXADSK, 0
1459    2431  6534      VADSK,  6534                    /SKIP ON A-D DONE
1460    2432  7410              SKP
1461    2433  2230              ISZ     XXADSK
1462    2434  5630              JMP I   XXADSK
1463
1464    2435  4475              C8ACTV
1465    2436  4514      C8CALN, C8ERR                   /C8/
1466    2437  7402              HLT
1467
1468    2440  0000      XXADSE, 0
1469    2441  6535      VADSE,  6535                    /SKIP ON A/D  TIMING ERROR
1470    2442  7410              SKP
1471    2443  2240              ISZ     XXADSE
1472    2444  5640              JMP I   XXADSE
1473
1474    2445  4475              C8ACTV
1475    2446  4514      C8CALO, C8ERR                   /C8/
1476    2447  7402              HLT
```



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1477
1478    2450  0000      XXADLE, 0
1479    2451  6536      VADLE,  6536                    /LOAD A/D  ENABLE REGISTER
1480    2452  5650              JMP I   XXADLE
1481
1482    2453  4475              C8ACTV
1483    2454  4514      C8CALP, C8ERR                   /C8/
1484    2455  7402              HLT
1485
1486    2456  0000      XXADRS, 0
1487    2457  6537      VADRS,  6537                    /READ A/D  STATUS REGISTER
1488    2460  5656              JMP I   XXADRS
1489
1490    2461  4475              C8ACTV
1491    2462  4514      C8CALQ, C8ERR                   /C8/
1492    2463  7402              HLT
1493
1494    2464  0000      XXCLOE, 0
1495    2465  6132      VCLOE,  6132                    /LOAD CLOCK ENABLE
1496    2466  5664              JMP I   XXCLOE
1497
1498    2467  4475              C8ACTV
1499    2470  4514      C8CALR, C8ERR                   /C8/
1500    2471  7402              HLT
1501
1502    2472  0000      XXCLSK, 0
1503    2473  6131      VCLSK,  6131                    /SKIP ON CLOCK OVERFLOW
1504    2474  7410              SKP
1505    2475  2272              ISZ     XXCLSK
1506    2476  5672              JMP I   XXCLSK
1507
1508    2477  4475              C8ACTV
1509    2500  4514      C8CALS, C8ERR                   /C8/
1510    2501  7402              HLT
1511
1512    2502  0000      XXCLZE, 0
1513    2503  6130      VCLZE,  6130                    /ONES IN AC CLEAR CLOCK ENABLE REG
1514    2504  5702              JMP I   XXCLZE
1515
1516    2505  4475              C8ACTV
1517    2506  4514      C8CALT, C8ERR                   /C8/
1518    2507  7402              HLT
1519
1520    2510  0000      XXCLSA, 0
1521    2511  6135      VCLSA,  6135                    /CLOCK STATUS TO AC, AC ONES CLR CLK STATUS REG
1522    2512  5710              JMP I   XXCLSA
1523
1524    2513  4475              C8ACTV
1525    2514  4514      C8CALU, C8ERR                   /C8/
1526    2515  7402              HLT
1527
1528    2516  0000      XXCLED, 0
1529    2517  6134      VCLED,  6134                    /CLOCK ENABLE TO AC
1530    2520  5716              JMP I   XXCLED
1531
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1532    2521  4475          C8ACTV
1533    2522  4514    C8CALV, C8ERR                   /C8/
1534    2523  7402          HLT
1535
1536    2524  0000    XXCLAB, 0
1537    2525  6133    VCLAB,  6133                    /AC ONES TO CLOCK BUFFER
1538    2526  5724          JMP I   XXCLAB
1539
1540    2527  4475          C8ACTV
1541    2530  4514    C8CALW, C8ERR                   /C8/
1542    2531  7402          HLT
1543
1544
1545    2532  0000    XXDISD, 0
1546    2533  6052    VDISD,  6052                    /SKIP ON DISPLAY DONE
1547    2534  7410          SKP
1548    2535  2332          ISZ     XXDISD
1549    2536  5732          JMP I   XXDISD
1550
1551    2537  4475          C8ACTV
1552    2540  4514    C8CALX, C8ERR                   /C8/
1553    2541  7402          HLT
1554
1555    2542  0000    XXDILX, 0
1556    2543  6053    VDILX,  6053                    /LOAD SCOPE  X-AXIS
1557    2544  5742          JMP I   XXDILX
1558
1559    2545  4475          C8ACTV
1560    2546  4514    C8CALY, C8ERR                   /C8/
1561    2547  7402          HLT
1562
1563    2550  0000    XXDILY, 0
1564    2551  6054    VDILY,  6054                    /LOAD SCOPE Y=AXIS
1565    2552  5750          JMP I   XXDILY
1566
1567    2553  4475          C8ACTV
1568    2554  4514    C8CALZ, C8ERR                   /C8/
1569    2555  7402          HLT
1570
1571    2556  0000    XXDIXY, 0
1572    2557  6055    VDIXY,  6055                    /INTENSIFY SCOPE
1573    2560  5756          JMP I   XXDIXY
1574
1575    2561  4475          C8ACTV
1576    2562  4514    C8CAL0, C8ERR                   /C8/
1577
1578    2563  7402          HLT
1579
1580    2564  0000    XXDILE, 0
1581    2565  6056    VDILE,  6056                    /LOAD ENABLE FROM AC, CLEAR AC
1582    2566  5764          JMP I   XXDILE
1583
1584    2567  4475          C8ACTV
1585    2570  4514    C8CAL1, C8ERR                   /C8/
1586    2571  7402          HLT
```



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1587
1588
1589            2600    PAGE
1590
1591
1592                    /ROUTINE TO CHECK IF TEST COMPLETED ITERATION
1593
1594
1595    2600    0000    XTAL,   0
1596
1597    2601    4553            LAS
1598    2602    0030            AND     SW2             /LOOP OVERRIDE?
1599    2603    7640            SZA CLA
1600    2604    5230            JMP     XTAL1           /YES
1601    2605    4553            LAS
1602    2606    0033            AND     SW5             /TEST SELECTED?
1603    2607    7640            SZA  CLA
1604    2610    5214            JMP     XTAL3
1605    2611    2044            ISZ     TALLY           /DONE WITH TEST?
1606    2612    7410            SKP                     /NO
1607    2613    5230            JMP     XTAL1           /YES
1608    2614    1070    XTAL3,  TAD     ERSWIT          /CHECK FOR ERROR
1609    2615    7640            SZA CLA                 /ERROR THIS PASS?
1610    2616    5224            JMP     XTAL2           /NO
1611    2617    1017            TAD     MSGPNT          /GET MESSAGE POINTER
1612    2620    1051            TAD     M1              /DECREMENT POINTER
1613    2621    3017            DCA     MSGPNT          /RESTORE POINTER
1614    2622    1051            TAD     M1
1615    2623    3070            DCA     ERSWIT          /RESTORE ERROR INDICATOR
1616    2624    1200    XTAL2,  TAD     XTAL            /SET RETURN ADDRESS
1617    2625    1052            TAD     M2
1618    2626    3200            DCA     XTAL            /STORE RETURN ADDRESS
1619    2627    5600            JMP I   XTAL
1620    2630    2017    XTAL1,  ISZ     MSGPNT
1621    2631    5600            JMP I   XTAL
1622                    /POINTER FOR SELECTED TEST OPTION
1623
1624    2632    0225    XTEST,  ENA2=1
1625    2633    0250            ENA3=1
1626    2634    0273            ENA4=1
1627    2635    0316            ENA5=1
1628    2636    0341            ENA6=1
1629    2637    0400            MUX8=1
1630    2640    0423            MUX9=1
1631    2641    0446            MUX10=1
1632    2642    0471            MUX11=1
1633    2643    0513            TSTADC=1
1634    2644    0532            TSTCAF=1
1635    2645    0551            TSTJAM=1
1636    2646    0600            TSTDON=1
1637    2647    0633            TSTERR=1
1638    2650    0662            TSTSR0=1
1639    2651    0707            TSTSR1=1
1640    2652    0732            CLRDON=1
1641    2653    1000            CLRERR=1
```

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1642    2654  1021            STCLDO=1
1643    2655  1036            STCLER=1
1644    2656  1056            EOCERR=1
1645    2657  1200            NOERCL=1
1646    2660  1213            RBCLDO=1
1647    2661  1230            CLADBU=1
1648    2662  1252            CLADBB=1
1649    2663  1271            ALL1S=1
1650    2664  1316            TST3=1
1651    2665  1337            DONINT=1
1652    2666  1400            ERRINT=1
1653    2667  1430            AUTO=1
1654    2670  1475            TST14=1
1655    2671  1600            TIMDIF=1
1656    2672  0000            0
1657    2673  0000            0
1658    2674  0000            0
1659    2675  0000            0
1660
1661                  /ROUTINE TO SELECT SPECIFIC LOGIC TEST SUBROUTINE
1662
1663    2676  0000    XSELEC, 0
1664    2677  4553            LAS                     /GET TEST
1665    2700  0377            AND     (37
1666    2701  3035            DCA     TEMP0
1667    2702  1376            TAD     (XTEST          /BEGIN ADDR, OF TEST LIST
1668    2703  1035            TAD     TEMP0
1669    2704  3312            DCA     JMPLOC
1670    2705  1035            TAD     TEMP0
1671    2706  1375            TAD     (ERMSG          /BEGIN ADDR, OF ERROR MSG, LIST
1672    2707  1051            TAD     M1
1673    2710  3017            DCA     MSGPNT          /MSG, PTR, SET IN AUTO17
1674    2711  5712            JMP I   JMPLOC          /GO DO TEST
1675    2712  0000    JMPLOC, 0
1676
1677
1678
1679                  /ERROR HANDLER FOR OPEN LOOP TESTS
1680
1681    2713  0000    ERCOM,  0
1682    2714  1313            TAD     ERCOM
1683    2715  1051            TAD     M1
1684    2716  3362            DCA     ERPC            /ADDRESS OF ERROR
1685    2717  1713            TAD I   ERCOM           /GET MESSAGE ADDRESS
1686    2720  3326            DCA     MSGADR
1687    2721  2313            ISZ     ERCOM
1688    2722  4553            LAS
1689    2723  7710            SPA CLA                 /INHIBIT TYPEOUT?
1690    2724  5345            JMP     ERCOM1          /YES=SKIP OVER
1691    2725  4774'           JMS     MESAGE
1692    2726  0000    MSGADR, 0                       /ERROR MESSAGE
1693    2727  4773'           JMS     CRLF
1694    2730  4774'           JMS     MESAGE          /PRINT PC =
1695    2731  5371            TXTPC
1696    2732  1362            TAD     ERPC
```



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1697    2733  4772'           JMS     MESS            /PRINT OCTAL PC #
1698    2734  4774'           JMS     MESAGE
1699    2735  5403            TXTA                    /PRINT TEMPA =
1700    2736  1036            TAD     TEMPA
1701    2737  4772'           JMS     MESS            /PRINT TEMPA
1702    2740  4774'           JMS     MESAGE
1703    2741  5411            TXTB                    /PRINT TEMPB =
1704    2742  1037            TAD     TEMPB
1705    2743  4772'           JMS     MESS            /PRINT TEMPB
1706    2744  4773'           JMS     CRLF
1707    2745  4553    ERCOM1, LAS
1708    2746  0027            AND     SW1             /IS HALT=ON=ERROR SWITCH SET?
1709    2747  7650            SNA CLA                 /NO=RETURN
1710    2750  5357            JMP     ERCLR
1711    2751  2313            ISZ     ERCOM           /GET "AFTER HALT"RETURN ADDRESS
1712    2752  1362            TAD     ERPC            /ERROR PC IN AC
1713
1714    2753  7421            MQL                     /C8/(ALSO IN MQ REG.)
1715    2754  4475            C8ACTV
1716    2755  4514    C8CAL2, C8ERR                   /C8/
1717    2756  7402            HLT
1718    2757  7300    ERCLR,  CLA CLL
1719    2760  3362            DCA     ERPC            /CLEAR PC STORE AREA
1720    2761  5713            JMP I   ERCOM           /RETURN
1721    2762  0000    ERPC,   0
1722
1723
1724
1725    2772  3131
1726    2773  3337
1727    2774  2322
1728    2775  2112
1729    2776  2632
1730    2777  0037
              3000    PAGE
1731
1732                  /IOT REINITIALIZER ROUTINE
1733
1734    3000  0000    CLEAN,  0
1735    3001  7300            CLA CLL
1736    3002  1146            TAD     CLKNOW          /GET CLOCK IOT
1737    3003  3150            DCA     CSNOW           /LOAD INTO CURRENT
1738    3004  1377            TAD     (CKIOT-1        /STARTING ADDRESS OF CLOCK  TABLE
1739    3005  4236            JMS     SETCS           /REINITIALIZE CLOCK IOT
1740    3006  1147            TAD     SCPNOW          /GET SCOPE IOT
1741    3007  3150            DCA     CSNOW           /LOAD INTO CURRENT
1742    3010  1376            TAD     (SPIOT-1        /STARTING ADDRESS OF SCOPE  TABLE
1743    3011  4236            JMS     SETCS           /REINITIALIZE SCOPE IOT
1744    3012  1143            TAD     FIRST           /GET A/D  BASE IOT
1745    3013  3145            DCA     NOW             /LOAD INTO CURRENT
1746    3014  4266            JMS     SETIOT          /LOAD THE IOT'S
1747    3015  5600            JMP I   CLEAN           /EXIT
1748
1749
1750    3016  0000    NEXTIO, 0
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1751    3017  7300            CLA CLL
1752    3020  1144            TAD     LAST            /ANY ADDITIONAL IOT'S
1753    3021  7450            SNA
1754    3022  5234            JMP     END             /NO
1755    3023  7041            CIA
1756    3024  1145            TAD     NOW             /GET CURRENT IOT CODE
1757    3025  7650            SNA CLA                 /LAST ONE ?
1758    3026  5234            JMP     END             /YES
1759    3027  1145            TAD     NOW             /GET CURRENT
1760    3030  1375            TAD     (10             /UPDATE TO NEXT CODE
1761    3031  3145            DCA     NOW             /SAVE IT
1762    3032  4266            JMS     SETIOT          /CHANGE TO NEW IOT
1763    3033  7410            SKP
1764    3034  2216    END,    ISZ     NEXTIO          /UPDATE RETURN
1765    3035  5616            JMP I   NEXTIO          /EXIT
1766
1767    3036  0000    SETCS,  0
1768    3037  3010            DCA     A10             /STARTING ADDRESS OF TABLE
1769    3040  1410    SETCS1, TAD I   A10             /GET VALUE
1770    3041  7450            SNA                     /END OF TABLE?
1771    3042  5636            JMP I   SETCS           /YES - RETURN
1772    3043  3035            DCA     TEMP0           /NO
1773    3044  1435            TAD I   TEMP0           /GET CURRENT IOT
1774    3045  0374            AND     (7007           /MASK
1775    3046  1150            TAD     CSNOW           /REINITIALIZE IOT
1776    3047  3435            DCA I   TEMP0           /STORE NEW IOT
1777    3050  5240            JMP     SETCS1
1778    3051  2465    CKIOT,  VCLOE                   /AC TO CLOCK ENABLE
1779    3052  2473            VCLSK                   /SKIP ON CLOCK OVERFLOW
1780    3053  2503            VCLZE                   /ONES IN AC CLEAR CLOCK ENABLE REGISTER
1781    3054  2511            VCLSA                   /CLOCK STATUS TO AC,AC ONES CLEAR CLOCK STATUS REG.
1782    3055  2517            VCLED                   /CLOCK ENABLE TO AC
1783    3056  2525            VCLAB                   /AC ONES TO CLOCK BUFFER
1784    3057  0000            0
1785    3060  2533    SPIOT,  VDISD                   /SKIP ON DISPLAY DONE
1786    3061  2543            VDILX                   /LOAD SCOPE X-AXIS
1787    3062  2551            VDILY                   /LOAD SCOPE Y-AXIS
1788    3063  2557            VDIXY                   /INTENSIFY SCOPE
1789    3064  2565            VDILE                   /LOAD DISPLAY ENABLE FROM AC
1790    3065  0000            0
1791
1792    3066  0000    SETIOT, 0
1793    3067  7340            CLA CLL CMA
1794    3070  7000            NOP
1795    3071  7000            NOP
1796    3072  1373            TAD     (TABIOT         /GET SA OF TABLE
1797    3073  3010            DCA     A10             /SAVE IT
1798    3074  1410    SETIO1, TAD I   A10             /GET A VALUE
1799    3075  7450            SNA                     /DONE ?
1800    3076  5305            JMP     SETIO2
1801    3077  3035            DCA     TEMP0           /SAVE IT
1802    3100  1435            TAD I   TEMP0           /GET CODE
1803    3101  0374            AND     (7007           /MASK
1804    3102  1145            TAD     NOW             /ADD IOT CODE
1805    3103  3435            DCA I   TEMP0           /SAVE IT
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1806    3104  5274            JMP     SETIO1          /LOOP
1807    3105  1372    SETIO2, TAD     (EOCER1         /GET POINTER FOR FORCED ERROR ROUTINE
1808    3106  3010            DCA     A10             /LOAD AUTO-INDEX
1809    3107  1371            TAD     (EOCER1-EOCER2  /GET LENGTH
1810    3110  3035            DCA     TEMP0
1811    3111  1770'   SETIO3, TAD     VADRB           /GET READ BUFFER IOT CODE
1812    3112  3410            DCA I   A10             /SAVE IT
1813    3113  2035            ISZ     TEMP0           /DONE ?
1814    3114  5311            JMP     SETIO3          /NO
1815    3115  5666            JMP I   SETIOT          /EXIT
1816
1817    3116  2401    TABIOT, VADCL                   /CLEAR ALL A/D LOGIC
1818    3117  2407            VADLM                   /LOAD MPX REGISTER,CLA
1819    3120  2415            VADST                   /CLEAR FLAGS,START CONVERSION
1820    3121  2423            VADRB                   /CLEAR DONE, READ A/D BUFFER INTO AC
1821    3122  2431            VADSK                   /SKIP ON A/D DONE
1822    3123  2441            VADSE                   /SKIP ON A/D TIMING ERROR
1823    3124  2451            VADLE                   /LOAD A/D ENABLE REGISTER
1824    3125  2457            VADRS                   /READ STATUS,ENABLE,MPX REGS. INTO AC
1825    3126  0000            0
1826    3127  0000            0
1827    3130  0000            0
1828                    /ROUTINE TO PRINT OCTAL NUMBER
1829    3131  0000    MESS,   0
1830    3132  3356            DCA     MWORD           /SAVE AC
1831    3133  1053            TAD     M4
1832    3134  3357            DCA     MCOUNT          /COUNTER FOR PRINT LOOP
1833    3135  7100            CLL
1834    3136  1356            TAD     MWORD
1835    3137  7004            RAL                     /ROTATE 4 BITS TO LOSE LINK
1836    3140  7410            SKP
1837    3141  1356    MESS1,  TAD     MWORD
1838    3142  7006            RTL
1839    3143  7004            RAL                     /ROTATE NEXT 3 BITS
1840    3144  3356            DCA     MWORD
1841    3145  1356            TAD     MWORD
1842    3146  0767'           AND     K7
1843                    /*C8*/  TAD     CHAR
1844
1845    3147  1067            TAD     CHARA           /C8/
1846
1847    3150  4766'           JMS     PRLP
1848    3151  2357            ISZ     MCOUNT          /FINISHED PRINTING?
1849    3152  5341            JMP     MESS1           /NO-GET NEXT CHARACTER
1850    3153  1066            TAD     BLANK
1851    3154  4465            JMS I   XPRLP           /PRINT BLANK
1852    3155  5731            JMP I   MESS
1853    3156  0000    MWORD,  0
1854    3157  0000    MCOUNT, 0
1855    3166  3330
1856    3167  3531
1857    3170  2423
1858    3171  7746
1859    3172  1063
1860    3173  3116
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1861    3174  7007
1862    3175  0010
1863    3176  3057
1864    3177  3050
              3200    PAGE
1865
1866                  /MONOTINICITY TEST
1867    3200  4777'   MONOT,  JMS     CLEAN           /INITIALIZE IOTS
1868    3201  7300            CLA CLL
1869    3202  1052            TAD     M2
1870    3203  3042            DCA     DELAY
1871    3204  3036            DCA     TEMPA           /CLEAR N AND
1872    3205  3037            DCA     TEMPB           /N+1 CONVERSION STORAGE
1873    3206  4520            ADCL                    /CLEAR ALL LOGIC
1874    3207  4553            LAS
1875    3210  0376            AND     (40             /CHECK UNIPOLAR,BIPOLAR
1876    3211  4526            ADLE
1877    3212  4553            LAS
1878    3213  4521            ADLM                    /LOAD CHANNEL
1879    3214  4522            ADST                    /START CONVERSION
1880    3215  4524            ADSK                    /WAIT FOR DONE
1881    3216  5215            JMP     .-1
1882    3217  4523            ADRB                    /READ A-D BUFFER
1883    3220  3036            DCA     TEMPA           /STORE NTH CONVERSION
1884    3221  2042            ISZ     DELAY           /DELAY BETWEEN 1ST&2ND CONVERSIONS
1885    3222  5221            JMP     .-1
1886    3223  4522    CONT,   ADST                    /START NEXT CONVERSION
1887    3224  4524            ADSK                    /WAIT FOR DONE
1888    3225  5224            JMP     .-1
1889    3226  4523            ADRB                    /READ A-D BUFFER
1890    3227  3037            DCA     TEMPB           /SAVE DATA
1891    3230  1036            TAD     TEMPA           /SUBTRACT
1892    3231  7041            CIA                     /SUCCESSIVE CONVERSIONS
1893    3232  1037            TAD     TEMPB
1894    3233  7510            SPA                     /DIFFERENCE>0?
1895    3234  7041            CIA                     /NO, TAKE ABSOLUTE VALUE
1896    3235  7450            SNA                     /DIFFERENCE 0?
1897    3236  5246            JMP     OK              /YES, OK.
1898    3237  1051            TAD     M1
1899    3240  7650            SNA CLA
1900    3241  5246            JMP     OK
1901    3242  4775'           JMS     ERCOM           /DIFFERENCE>1
1902    3243  4671            EMSG23
1903    3244  7000            NOP
1904    3245  5200            JMP     MONOT           /RETURN LOCATION AFTER HALT
1905    3246  7300    OK,     CLA CLL
1906    3247  1037            TAD     TEMPB           /N+1 CONVERSION BECOMES
1907    3250  3036            DCA     TEMPA           /N
1908    3251  4475            C8ACTV
1909    3252  4515            C8INQU
1910
1911    3253  5223            JMP     CONT            /GET N+1 CONVERSION
1912
1913
1914                  /ROUTINE TO TEST FOR EQUALITY OF TWO SUCCESSIVE ADRB'S.
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1915
1916    3254  4777'   NOISE,  JMS     CLEAN           /INITIALIZE IOTS
1917    3255  7300            CLA CLL
1918    3256  1166            TAD     [-100           /SET TALLY FOR 64 TIMES
1919    3257  3035            DCA     TEMP0
1920    3260  4553            LAS
1921    3261  0376            AND     (40             /CHECK UNIPOLAR ENABLE
1922    3262  4526            ADLE
1923    3263  1030            TAD     SW2             /ENABLE DONE BIT
1924    3264  4521            ADLM                    /LOAD MPX REG
1925    3265  4522    NOISE1, ADST                    /CONVERT
1926    3266  4524            ADSK                    /DONE FLAG?
1927    3267  5266            JMP     .-1             /NO
1928    3270  4523            ADRB                    /YES, READ AD BUFFER
1929    3271  3036            DCA     TEMPA           /STORE
1930    3272  4523            ADRB                    /RE-READ
1931    3273  3037            DCA     TEMPB           /STORE
1932    3274  1036            TAD     TEMPA           /COMPARE FOR EQUALITY
1933    3275  7041            CIA
1934    3276  1037            TAD     TEMPB
1935    3277  7640            SZA CLA                 /TEMPA=TEMPB WITH LINK SET?
1936    3300  5302            JMP     ER10            /NO
1937    3301  5306            JMP     ER11            /YES-O.K.
1938    3302  4775'   ER10,   JMS     ERCOM           /ERROR ROUTINE
1939    3303  4622            EMSG21
1940    3304  5306            JMP     ER11            /RETURN LOCATION IF DO NOT HALT
1941    3305  5254            JMP     NOISE           /RETURN LOCATION IF HALT
1942    3306  7300    ER11,   CLA CLL
1943    3307  2035            ISZ     TEMP0           /CONTINUE
1944    3310  5265            JMP     NOISE1          /YES
1945    3311  4475            C8ACTV
1946    3312  4515            C8INQU
1947    3313  7200            CLA
1948    3314  1046            TAD     K207
1949    3315  4330            JMS     PRLP            /RING BELL
1950    3316  5254            JMP     NOISE           /DO TEST AGAIN
1951
1952                  /SCOPE LOOP FOR IOTS 6XXX.
1953                  INSTR,  /*C8*/HLT
1954
1955    3317  4475            C8ACTV
1956    3320  4507    C8CALI, C8SWIT                  /C8/SELECT IOT FROM SR 3-11.
1957    3321  4553            LAS
1958    3322  0374            AND     (0777           /MASK OUT AC 0-2
1959    3323  1373            TAD     (6000           /CREATE IOT
1960    3324  3325            DCA     .+1
1961    3325  7402            HLT                     /LOCATION OF IOT
1962    3326  7000            NOP                     /POSSIBLE SKIP
1963    3327  5320            JMP     INSTR+1
1964
1965                  /PRINT ROUTINE
1966
1967    3330  0000    PRLP,   0
1968    3331  6046            TLS                     /XMIT CHARACTER
1969    3332  6041            TSF                     /WAIT FOR FLAG
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1970    3333  5332          JMP     .-1
1971    3334  6042          TCF                     /CLEAR FLAG
1972    3335  7200          CLA
1973    3336  5730          JMP I   PRLP            /RETURN
1974
1975                  /CARRIAGE RETURN LINE FEED ROUTINE
1976
1977    3337  0000  CRLF,   0
1978    3340  7240          CLA CMA
1979    3341  0050          AND     K215            /CARRIAGE RETURN CODE
1980    3342  4330          JMS     PRLP            /PRINT ROUTINE
1981    3343  7240          CLA CMA
1982    3344  0047          AND     K212            /LINE FEED CODE
1983    3345  4330          JMS     PRLP            /PRINT ROUTINE
1984    3346  5737          JMP I   CRLF            /RETURN
1985
1986                  /ROUTINE TO CLEAR WORKING BUFFERS PRIOR TO TEST
1987
1988    3347  0000  XSETUP, 0
1989    3350  4462          JMS I   XMOVE           /CLEAR WORK AREA
1990    3351  0035          TEMP0
1991    3352  0036          TEMPA
1992    3353  7773          -5
1993    3354  6002          IOF
1994    3355  6007          CAF
1995    3356  1372          TAD     (BADINT
1996    3357  3002          DCA     RETURN          /BAD INTERRUPT ADDRESS
1997    3360  7040          CMA
1998    3361  3070          DCA     ERSWIT
1999    3362  3764          DCA I   XIND
2000    3363  5747          JMP I   XSETUP
2001    3364  2370  XIND,   IND
2002
2003    3372  0005
2004    3373  6000
2005    3374  0777
2006    3375  2713
2007    3376  0040
2008    3377  3000
              3400  PAGE
2009
2010                  /C8/    ********************************************************************
2011
2012                  /C8/    ROUTINE TO ENSURE THAT THE PROGRAM IS INITIALIZED FOR RUNNING
2013                  /C8/    WITH OR WITHOUT THE CONSOLE PKG REGARDLESS OF THE START ADDRESS.
2014    3400  0000  C8STAR, 0                       /C8/
2015    3401  7200          CLA                     /C8/
2016    3402  1231          TAD     C8IZF           /C8/INIT ALREADY DONE?
2017    3403  7650          SNA CLA                 /C8/SKP IF YES.
2018    3404  4777'         JMS     C8IZ            /C8/GO INITIALIZE.
2019    3405  1200          TAD     C8STAR          /C8/RELATIVE TO THE ADDRESS OF THE CALL, =
2020    3406  1376          TAD     (=201           /C8/ = DISPATCH TO THE PROPER STARTING =
2021    3407  1375          TAD     (C8STAB         /C8/ = ADDRESS THRU TABLE 'C8STAB'.
2022    3410  3216          DCA     XC8STA          /C8/
2023    3411  4475          C8ACTV
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2024    3412  4507  C8STRT, C8SWIT                  /C8/
2025    3413  1616          TAD I   XC8STA          /C8/
2026    3414  3217          DCA     XC8SA           /C8/
2027    3415  5617          JMP I   XC8SA           /C8/
2028    3416  0000  XC8STA, 0                       /C8/
2029    3417  0000  XC8SA,  0                       /C8/
2030    3420  0211  C8STAB, START   /SA 200        /C8/NORMAL START.
2031    3421  3317          INSTR   /SA 201         /C8/IOT SCOPE LOOP OPTION.
2032    3422  1732          CONVT   /SA 202         /C8/DISPLAY CONVERTED VALUE OPTION.
2033    3423  2000          EXTL    /SA 203         /C8/EXTERNAL ENABLE TEST.
2034    3424  3200          MONOT   /SA 204         /C8/MONOTINICITY TEST.
2035    3425  3600          RESOL   /SA 205         /C8/ACCURACY TEST.
2036    3426  3254          NOISE   /SA 206         /C8/SUCCESSIVE READS TEST.
2037    3427  3433          GLITCH  /SA 207         /C8/MPX NOISE TEST.
2038    3430  4000          SYST    /SA 210         /C8/LAB8-A SYSTEM CHECK.
2039
2040    3431  0000  C8IZF,  0                       /C8/IF=7777, INIT HAS BEEN DONE.
2041    3432  0000  C8F,     0                       /C8/IF=7777, CONSOLE PKG IS ACTIVE.
2042
2043                  /C8/    ********************************************************************
2044
2045
2046                  /ROUTINE TO CHECK FOR NOISE IN MULTIPLEXER
2047
2048    3433  4774' GLITCH, JMS     CLEAN           /INITIALIZE IOTS
2049    3434  7300          CLA CLL
2050    3435  1166          TAD     [-100
2051    3436  3035          DCA     TEMP0
2052    3437  4553          LAS
2053    3440  0373          AND     (40             /CHECK UNIPOLAR ENABLE
2054    3441  4526          ADLE
2055    3442  4553          LAS                     /OPERATOR TO SELECT CHANNEL
2056    3443  0161          AND     [17
2057    3444  3040          DCA     TEMPC
2058    3445  1040          TAD     TEMPC
2059    3446  4521          ADLM
2060    3447  4522          ADST
2061    3450  4524          ADSK
2062    3451  5250          JMP     .-1
2063    3452  4523          ADRB
2064    3453  3036          DCA     TEMPA
2065    3454  4304  CHNL1,  JMS     RANCHN          /GET RANDOM CHANNEL
2066    3455  1322          TAD     CHNL
2067    3456  4521          ADLM
2068    3457  4527          ADRS                    /READ ENABLE, STATUS AND MPX
2069    3460  2035          ISZ     TEMP0
2070    3461  5254          JMP     CHNL1
2071    3462  7300          CLA CLL
2072    3463  4523          ADRB
2073    3464  3037          DCA     TEMPB
2074    3465  1036          TAD     TEMPA
2075    3466  7041          CIA
2076    3467  1037          TAD     TEMPB
2077    3470  7640          SZA CLA
2078    3471  5273          JMP     ER40
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2079    3472  5276            JMP     OV2
2080    3473  4772'   ER40,   JMS     ERCOM           /NOISE IN MULTIPLEXER
2081    3474  4706            EMSG24
2082    3475  7000            NOP
2083    3476  7300    OV2,    CLA CLL                 /RETURN ADDR, AFTER HALT
2084    3477  1046            TAD     K207
2085    3500  4771'           JMS     PRLP
2086
2087    3501  4475            C8ACTV
2088    3502  4515            C8INQU
2089
2090    3503  5233            JMP     GLITCH
2091
2092    3504  0000    RANCHN, 0
2093    3505  1320            TAD     FSTNO
2094    3506  7006            RTL
2095    3507  3320            DCA     FSTNO
2096    3510  1320            TAD     FSTNO
2097    3511  1321            TAD     SECNO
2098    3512  7006            RTL
2099    3513  1321            TAD     SECNO
2100    3514  7012            RTR
2101    3515  0161            AND     [17
2102    3516  3322            DCA     CHNL
2103    3517  5704            JMP I   RANCHN
2104    3520  0437    FSTNO,  0437
2105    3521  2525    SECNO,  2525
2106
2107    3522  0000    CHNL,   0                       /C8/
2108    3523  0001            1                       /C8/
2109    3524  0002            2                       /C8/
2110    3525  0003            3                       /C8/
2111    3526  0004            4                       /C8/
2112    3527  0005            5                       /C8/
2113    3530  0006            6                       /C8/
2114    3531  0007    K7,     7                       /C8/
2115    3532  0010            10                      /C8/
2116    3533  0011            11                      /C8/
2117    3534  0012            12                      /C8/
2118    3535  0013            13                      /C8/
2119    3536  0014            14                      /C8/
2120    3537  0015            15                      /C8/
2121    3540  0016            16                      /C8/
2122    3541  0017            17                      /C8/
2123    3542  0000            0                       /C8/
2124
2125
2126
2127    3571  3330
2128    3572  2713
2129    3573  0040
2130    3574  3000
2131    3575  3420
2132    3576  7577
2133    3577  7000
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                3600    PAGE
2134                    /RESOLUTION ACCURACY TEST
2135                    /ROUTINE TO PERFORM 1000(10) CONVERSIONS OF ANY GIVEN VOLTAGE ON SELECTED CHANNEL
2136    3600  4777'     RESOL,  JMS     CLEAN           /INITIALIZE IOTS
2137    3601  4474            JMS I   SETUP
2138    3602  1063            TAD     XSTOR
2139    3603  3011            DCA     A11
2140    3604  3776'           DCA     STORAG
2141    3605  4462            JMS I   XMOVE           /CLEAR WORK AREA
2142    3606  5600            STORAG
2143    3607  5601            STORAG+1
2144    3610  6030            -1750
2145                    C8RESO,                         /C8/
2146
2147    3611  1157            TAD     [-1750
2148    3612  3035            DCA     TEMP0
2149    3613  4520            ADCL
2150    3614  4553            LAS
2151
2152    3615  3154            DCA     C8SVSR          /C8/SAVE SR,
2153    3616  1154            TAD     C8SVSR          /C8/
2154
2155    3617  0375            AND     (40             /CHECK UNIPOLAR ENABLE
2156    3620  4526            ADLE
2157                    /*C8*/ LAS                     /GET CHANNEL
2158
2159    3621  7200            CLA                     /C8/
2160    3622  1154            TAD     C8SVSR          /C8/GET CHANNEL,
2161
2162    3623  0161            AND     [17
2163    3624  3071            DCA     CHAN            /STORE CHANNEL
2164    3625  1071            TAD     CHAN
2165    3626  4521            ADLM                    /LOAD CHANNEL
2166    3627  4522    RESOL1, ADST                    /START CONVERSION
2167    3630  4524            ADSK                    /SKIP ON DONE
2168    3631  5230            JMP     .-1
2169    3632  4523            ADRB                    /READ BUFFER
2170    3633  3036            DCA TEMPA
2171    3634  1774'           TAD     C8F             /C8/
2172    3635  7640            SZA CLA                 /C8/SKP IF NO,
2173    3636  6211            CDF     10              /C8/DF=FIELD 1,
2174
2175
2176    3637  1036            TAD TEMPA
2177    3640  3411            DCA I   A11             /PLACE IN TABLE
2178
2179    3641  6201            CDF     00              /C8/DF=FLD 0,
2180
2181    3642  2035            ISZ     TEMP0           /DONE?
2182    3643  5227            JMP     RESOL1          /NO
2183    3644  5464            JMP I   XCOMPR          /YES, NOW COMPARE CONVERSIONS
2184                    /ROUTINE TO COMPARE FOR GREATER THAN + OR - 1 LSB DIFFERENCE IN 1000(10) CONVERSIONS
2185
2186    3645  7300    COMPAR, CLA CLL
2187    3646  1156            TAD     [-1747
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2188    3647  3035            DCA     TEMP0
2189    3650  1063            TAD     XSTOR           /POINTER FOR FIRST WORD
2190    3651  3011            DCA     A11
2191
2192    3652  7200            CLA                     /C8/CONSOLE PKG ACTIVE?
2193    3653  1774'           TAD     C8F             /C8/
2194    3654  7640            SZA CLA                 /C8/SKP IF NO.
2195    3655  6211            CDF     10              /C8/DF=FIELD 1.
2196    3656  1411            TAD I   A11
2197
2198    3657  6201            CDF     00              /C8/DF=FLD 0.
2199    3660  3036            DCA TEMPA
2200
2201    3661  3151            DCA     ER1LSB          /VB/CLEAR ERROR COUNTER.
2202    3662  7300    COMPR1, CLA CLL
2203
2204    3663  1774'           TAD     C8F             /C8/CONSOLE PKG ACTIVE?
2205    3664  7640            SZA CLA                 /C8/SKP IF NO.
2206    3665  6211            CDF     10              /C8/DF=FIELD 1.
2207
2208    3666  1411            TAD I   A11
2209
2210    3667  6201            CDF     00              /C8/DF=FLD 0.
2211
2212    3670  3037            DCA     TEMPB
2213    3671  1036            TAD     TEMPA
2214    3672  7041            CIA
2215    3673  1037            TAD     TEMPB
2216
2217
2218    3674  3152            DCA     TEMPLB          /VB/SAVE THE DIFFERENCE.
2219    3675  1152            TAD     TEMPLB          /VB/GET THE DIFFERENCE.
2220    3676  7450            SNA                     /VB/
2221    3677  5307            JMP     AOK             /VB/OK, TWO WORDS ARE EQUAL.
2222    3700  1373            TAD     (-1             /VB/
2223    3701  7650            SNA CLA                 /VB/
2224    3702  5307            JMP     AOK             /VB/TWO WORDS ARE LESS THAN + OR - LSB.
2225    3703  1152            TAD     TEMPLB          /VB/GET THE DIFFERENCE.
2226    3704  1372            TAD     (1              /VB/
2227    3705  7640            SZA CLA                 /VB/
2228    3706  5332            JMP     EROV5           /VB/ERROR=TWO WORDS ARE GREATER THAN + OR - LSB.
2229
2230
2231                  /*VB*/  SZA                     /SKIP HERE
2232                  /*VB*/  JMP     .+4             /AND
2233                  /*VB*/  SNL                     /HERE IF =
2234                  /*VB*/  JMP     .+2
2235                  /*VB*/  JMP     AOK
2236                  /*VB*/  SZL
2237                  /*VB*/  JMP     .+5
2238                  /*VB*/  CMA
2239                  /*VB*/  SZA                     /SKIP HERE IF DIFFERENCE +1 LSB
2240                  /*VB*/  SKP
2241                  /*VB*/  JMP     AOK
2242                  /*VB*/  CLL
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2243                  /*VB*/  RAR
2244                  /*VB*/  SZA                     /SKIP HERE
2245                  /*VB*/  JMP     .+4             /AND
2246                  /*VB*/  SNL                     /HERE IF DIFFERENCE =1 LSB
2247                  /*VB*/  SKP
2248                  /*VB*/  JMP     AOK
2249                  /*VB*/  CLA CLL                 /CHECK FOR SPECIAL CASE OF 7777 AND 0
2250                  /*VB*/  TAD     TEMPA
2251                  /*VB*/  SZA                     /A=0?
2252                  /*VB*/  SKP                     /NO
2253                  /*VB*/  JMP     .+4             /YES
2254                  /*VB*/  CMA                     /A=7777?
2255                  /*VB*/  SNA CLA
2256                  /*VB*/  JMP     OV5             /SKIP OVER AND CONTINUE
2257                  /*VB*/  JMS     ERCOM           /ERROR ROUTINE
2258                  /*VB*/  EMSG20
2259                  /*VB*/  NOP                     /RETURN LOCATION IF DO NOT HALT
2260                  /*VB*/  JMP     RESOL           /RETURN LOCATION IF HALT
2261                  /*VB*/OV5,      TAD     TEMPB           /A =7777 OR 0
2262                  /*VB*/  SZA                     /B=0?
2263                  /*VB*/  JMP     .+2             /NO
2264                  /*VB*/  JMP     AOK
2265                  /*VB*/  CMA                     /B=7777?
2266                  /*VB*/  SNA CLA
2267                  /*VB*/  JMP     AOK
2268                  /*VB*/  JMS     ERCOM           /ERROR ROUTINE
2269                  /*VB*/  EMSG20
2270                  /*VB*/  NOP
2271                  /*VB*/  JMP     RESOL
2272    3707  7300    AOK,    CLA CLL
2273    3710  1037            TAD     TEMPB
2274    3711  3036            DCA     TEMPA
2275    3712  2035            ISZ     TEMP0           /DONE?
2276    3713  5262            JMP     COMPR1
2277    3714  4771'           JMS     MESAGE          /VB/PRINT "END OF 1000 CONVERSIONS".
2278    3715  5537            HEAD13                  /VB/
2279    3716  1151            TAD     ER1LSB          /VB/PRINT NO OF + OR - 1 LSB ERRORS.
2280    3717  4770'           JMS     MESS            /VB/
2281    3720  4767'           JMS     CRLF            /VB/
2282
2283    3721  2336            ISZ     FIVHUN
2284    3722  5200            JMP     RESOL
2285    3723  1366            TAD     (-764           /COUNT OF 500(10).
2286    3724  3336            DCA     FIVHUN
2287    3725  4771'           JMS     MESAGE          /VB/PRINT END OF TEST MESSAGE.
2288    3726  5555            HEAD14                  /VB/
2289
2290                  /*VB*/  TAD     K207
2291                  /*VB*/  JMS     PRLP
2292    3727  4475            C8ACTV
2293    3730  4515            C8INQU
2294    3731  5200            JMP     RESOL           /YES, REPEAT TEST
2295    3732  2151    EROV5,  ISZ     ER1LSB          /VB/INCREMENT ERROR COUNTER.
2296    3733  4765'           JMS     ERCOM           /VB/PRINT ERROR MESSAGE.
2297    3734  4571            EMSG20                  /VB/
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2298    3735  5307            JMP     AOK             /V8/
2299
2300    3736  7014    FIVHUN, -764
2301    3737  0000    ACTVC8, 0                       /C8/
2302    3740  3353            DCA ACSV                /SAVE THE AC
2303    3741  7010            RAR                     /GET THE LINK
2304    3742  3354            DCA LKSV                /SAVE IT
2305    3743  1022            TAD     22              /GET HARDWARE CONFIGURATION WORD 2
2306    3744  0364            AND (400                /MASK BIT 3
2307    3745  7650            SNA CLA                 /SKIP IF CONSOLE ACTIVE
2308    3746  2337            ISZ ACTVC8              /BUMP RETURN POINTER
2309    3747  1354            TAD LKSV                /RESTORE THE LINK
2310    3750  7004            RAL
2311    3751  1353            TAD ACSV                /RESTORE THE AC
2312    3752  5737            JMP I ACTVC8            /RETURN
2313    3753  0000    ACSV,   0
2314    3754  0000    LKSV,   0
2315
2316    3764  0400
2317    3765  2713
2318    3766  7014
2319    3767  3337
2320    3770  3131
2321    3771  2322
2322    3772  0001
2323    3773  7777
2324    3774  3432
2325    3775  0040
2326    3776  5600
2327    3777  3000
              4000    PAGE
2328
2329                  /LAB8-A SYSTEM CHECK
2330
2331    4000  0000    SYST,   0
2332    4001  4777'           JMS     CLEAN           /INITIALIZE IOTS
2333    4002  4474            JMS I   SETUP           /CLEAR WORK AREA
2334    4003  4520            ADCL                    /CLEAR ALL LOGIC
2335
2336    4004  4475            C8ACTV
2337    4005  4514    C8CAL3, C8ERR                   /C8/NOT AN ERROR, ALLOWS OPERATOR TO CHANGE SWR
2338    4006  7402            HLT
2339    4007  4553            LAS                     /GET CLOCK FREQUENCY
2340    4010  0376            AND     (700
2341    4011  1375            TAD     (4040           /RATE AND ENABLE EXT'L
2342    4012  3040            DCA     TEMPC           /SAVE
2343    4013  1040            TAD     TEMPC
2344    4014  4530            CLOE                    /START CLOCK
2345    4015  7040            CMA
2346    4016  4532            CLZE
2347    4017  7200            CLA
2348    4020  1032            TAD     SW4             /EXT START FOR A=D
2349    4021  3035            DCA     TEMP0
2350    4022  4774'           JMS     MESAGE          /TYPE OUT TEST INSTRUCTIONS
2351    4023  5472            AUTMSG
```



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2352
2353    4024  4475            C8ACTV
2354    4025  4514    C8CAL4, C8ERR                   /C8/NOT AN ERROR, ALLOWS OPERATOR TO CHANGE SWR
2355    4026  7402            HLT
2356    4027  4553            LAS                     /GET CHANNEL(S)
2357
2358    4030  3154            DCA     C8SVSR          /C8/SAVE SR,
2359    4031  1154            TAD     C8SVSR          /C8/
2360
2361    4032  0033            AND     SW5
2362    4033  7440            SZA                     /SKIP IF NOT AUTO-INCREMENT
2363    4034  4342            JMS     LSTCHN          /CHECK FOR LAST CHANNEL
2364                  /*C8*/   LAS
2365
2366    4035  7200            CLA                     /C8/
2367    4036  1154            TAD     C8SVSR          /C8/
2368
2369    4037  0161            AND     [17
2370    4040  4521            ADLM                    /LOAD CHANNEL
2371    4041  4553            LAS
2372    4042  0034            AND     SW6             /CHECK UNIPOLAR OR BIPOLAR
2373    4043  1035            TAD     TEMP0
2374    4044  4526            ADLE                    /LOAD EXT ENABLE BIT IF PRESENT
2375    4045  1035            TAD     TEMP0
2376    4046  7650            SNA CLA                 /SKIP FOR EXTL ENABLE
2377    4047  5257            JMP     SYST1
2378    4050  1373    CLKST,  TAD     (7001           /-X(MAX) TO RESET SWEEP
2379    4051  3036            DCA     TEMPA           /AND START INITIAL CONVERSION
2380    4052  4533            CLSA                    /FROM REAL
2381    4053  4531            CLSK                    /TIME CLOCK
2382    4054  5253            JMP     .-1
2383    4055  7240            CLA CMA
2384    4056  4532            CLZE                    /STOP CLOCK
2385    4057  7200    SYST1,  CLA
2386    4060  7410            SKP
2387    4061  4522    STCONV, ADST                    /START CONVERSION HERE FOR ALL VALUES
2388    4062  4524            ADSK                    /OTHER THAN -X(MAX)
2389    4063  5262            JMP     .-1
2390    4064  4527            ADRS
2391    4065  0161            AND     [17
2392    4066  1037            TAD     TEMPB
2393    4067  7001            IAC
2394    4070  7440            SZA
2395    4071  5273            JMP     .+2
2396    4072  4521            ADLM
2397    4073  4475            C8ACTV
2398    4074  4515            C8INQU
2399    4075  7300            CLA CLL
2400    4076  4523            ADRB                    /GET Y VALUE
2401    4077  4540            DILY
2402    4100  7200            CLA
2403    4101  1036            TAD     TEMPA
2404    4102  4537            DILX
2405    4103  7001            IAC                     /GET NEXT X VALUE
2406    4104  3036            DCA     TEMPA
```

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2407    4105  1036          TAD     TEMPA
2408    4106  1373          TAD     (7001
2409    4107  7640          SZA CLA                 /SKIP IF +X(MAX)
2410    4110  7410          SKP
2411    4111  5324          JMP     RESTR
2412    4112  4536          DISD
2413    4113  5312          JMP     .-1
2414    4114  4541          DIXY
2415    4115  1053          TAD     M4              /TIME OUT TO ALLOW
2416    4116  3363          DCA     TEMPX           /TRACE TO RETURN TO 1001(X)
2417    4117  2363          ISZ     TEMPX           /AND SETTLE
2418    4120  5317          JMP     .-1
2419
2420    4121  4553          LAS                     /C8/DON'T WANT SR, JUST FUDGE A =
2421    4122  7200          CLA                     /C8/ = CHECK FOR CONTROL CHAR,
2422
2423    4123  5261          JMP     STCONV
2424    4124  1040  RESTR,  TAD     TEMPC           /TO RESTART CLOCK
2425    4125  4530          CLOE
2426    4126  7040          CMA
2427    4127  4532          CLZE
2428                /C8*/   LAS
2429
2430    4130  7200          CLA                     /C8/
2431    4131  1154          TAD     C8SVSR          /C8/
2432
2433    4132  0033          AND     SW5             /A=I MODE
2434    4133  7640          SZA CLA                 /SKIP IF NO
2435    4134  5250          JMP     CLKST
2436                /*C8*/  LAS
2437
2438    4135  7200          CLA                     /C8/
2439    4136  1154          TAD     C8SVSR          /C8/
2440
2441    4137  0161          AND     [17             /TO CHANGE CHANNEL
2442    4140  4521          ADLM
2443    4141  5250          JMP     CLKST           /GO
2444    4142  0000  LSTCHN, 0                       /CHECK FOR LAST CHANNEL
2445                /*C8*/  LAS
2446
2447    4143  7200          CLA                     /C8/
2448    4144  1154          TAD     C8SVSR          /C8/
2449                                        /IF AUTO INCREMENT MODE
2450    4145  0161          AND     [17
2451    4146  7040          CMA
2452    4147  3037          DCA     TEMPB
2453    4150  2342          ISZ     LSTCHN
2454    4151  2342          ISZ     LSTCHN
2455                /*C8*/  LAS
2456
2457    4152  7200          CLA                     /C8/
2458    4153  1154          TAD     C8SVSR          /C8/
2459
2460    4154  0033          AND     SW5
2461    4155  7650          SNA CLA                 /SKIP IF AUTO INCREMENT MODE
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2462    4156  5362          JMP     .+4
2463    4157  1032          TAD     SW4
2464    4160  1033          TAD     SW5
2465    4161  3035          DCA     TEMP0
2466    4162  5742          JMP I   LSTCHN
2467    4163  0000  TEMPX,  0
2468
2469
2470
2471
2472
2473    4173  7001
2474    4174  2322
2475    4175  4040
2476    4176  0700
2477    4177  3000
              4200          PAGE
2478                        /CONTROL LOGIC ERROR MESSAGES
2479
2480    4200  3736  EMSG1,  TEXT    "▲"DONE FLAG NOT SET THEN CLEARED OR SKIP FAILURE▲""
      4201  0417
      4202  1605
      4203  4006
      4204  1401
      4205  0740
      4206  1617
      4207  2440
      4210  2305
      4211  2440
      4212  2410
      4213  0516
      4214  4003
      4215  1405
      4216  0122
      4217  0504
      4220  4017
      4221  2240
      4222  2313
      4223  1120
      4224  4006
      4225  0111
      4226  1425
      4227  2205
      4230  3736
      4231  0000
2481    4232  3736  EMSG2,  TEXT    "▲"TIMING ERROR FLAG NOT SET THEN CLEARED OR SKIP FAILURE▲""
      4233  2411
      4234  1511
      4235  1607
      4236  4005
      4237  2222
      4240  1722
      4241  4006
      4242  1401
      4243  0740
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                4244  1617
                4245  2440
                4246  2305
                4247  2440
                4250  2410
                4251  0516
                4252  4003
                4253  1405
                4254  0122
                4255  0504
                4256  4017
                4257  2240
                4260  2313
                4261  1120
                4262  4006
                4263  0111
                4264  1425
                4265  2205
                4266  3736
                4267  0000
2482            4270  3736    EMSG3,  TEXT    "␣^UNEXPECTED INTERRUPT OCCURRED␣^"
                4271  2516
                4272  0530
                4273  2005
                4274  0324
                4275  0504
                4276  4011
                4277  1624
                4300  0522
                4301  2225
                4302  2024
                4303  4017
                4304  0303
                4305  2522
                4306  2205
                4307  0437
                4310  3600
2483            4311  3736    EMSG4,  TEXT    "␣^ADRB FAILED TO JAM TRANSFER TO AC␣^"
                4312  0104
                4313  2202
                4314  4006
                4315  0111
                4316  1405
                4317  0440
                4320  2417
                4321  4012
                4322  0115
                4323  4024
                4324  2201
                4325  1623
                4326  0605
                4327  2240
                4330  2417
                4331  4001
                4332  0337
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                4333  3600
2484            4334  3736    EMSG6,  TEXT    "␣^ENABLE REGISTER NOT PROPERLY LOADED␣^"
                4335  0516
                4336  0102
                4337  1405
                4340  4022
                4341  0507
                4342  1123
                4343  2405
                4344  2240
                4345  1617
                4346  2440
                4347  2022
                4350  1720
                4351  0522
                4352  1431
                4353  4014
                4354  1701
                4355  0405
                4356  0437
                4357  3600
2485            4360  3736    EMSG7,  TEXT    "␣^FAILED TO GENERATE INTERRUPT WITH DONE FLAG␣^"
                4361  0601
                4362  1114
                4363  0504
                4364  4024
                4365  1740
                4366  0705
                4367  1605
                4370  2201
                4371  2405
                4372  4011
                4373  1624
                4374  0522
                4375  2225
                4376  2024
                4377  4027
                4400  1124
                4401  1040
                4402  0417
                4403  1605
                4404  4006
                4405  1401
                4406  0737
                4407  3600
2486            4410  3736    EMSG10, TEXT    "␣^FAILED TO GENERATE INTERRUPT WITH TIMING ERROR FLAG␣^"
                4411  0601
                4412  1114
                4413  0504
                4414  4024
                4415  1740
                4416  0705
                4417  1605
                4420  2201
                4421  2405
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                4422  4011
                4423  1624
                4424  0522
                4425  2225
                4426  2024
                4427  4027
                4430  1124
                4431  1040
                4432  2411
                4433  1511
                4434  1607
                4435  4005
                4436  2222
                4437  1722
                4440  4006
                4441  1401
                4442  0737
                4443  3600
2487            4444  3736    EMSG11, TEXT    "␣"FAILED TO LOAD AND READ MPX REG BITS AND CLEAR AC␣"
                4445  0601
                4446  1114
                4447  0504
                4450  4024
                4451  1740
                4452  1417
                4453  0104
                4454  4001
                4455  1604
                4456  4022
                4457  0501
                4460  0440
                4461  1520
                4462  3040
                4463  2205
                4464  0740
                4465  0211
                4466  2423
                4467  4001
                4470  1604
                4471  4003
                4472  1405
                4473  0122
                4474  4001
                4475  0337
                4476  3600
2488            4477  3736    EMSG13, TEXT    "␣"FAILED TO LOAD AND READ ALL CHANNELS IN AUTO-INCREMENT MODE␣"
                4500  0601
                4501  1114
                4502  0504
                4503  4024
                4504  1740
                4505  1417
                4506  0104
                4507  4001
                4510  1604
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                4511  4022
                4512  0501
                4513  0440
                4514  0114
                4515  1440
                4516  0310
                4517  0116
                4520  1605
                4521  1423
                4522  4011
                4523  1640
                4524  0125
                4525  2417
                4526  5511
                4527  1603
                4530  2205
                4531  1505
                4532  1624
                4533  4015
                4534  1704
                4535  0537
                4536  3600
2489            4537  3736    EMSG14, TEXT    "␣"FAILED TO COMPLETE CONVERSION IN SPECIFIED TIME␣"
                4540  0601
                4541  1114
                4542  0504
                4543  4024
                4544  1740
                4545  0317
                4546  1520
                4547  1405
                4550  2405
                4551  4003
                4552  1716
                4553  2605
                4554  2223
                4555  1117
                4556  1640
                4557  1116
                4560  4023
                4561  2005
                4562  0311
                4563  0611
                4564  0504
                4565  4024
                4566  1115
                4567  0537
                4570  3600
2490            4571  3736    EMSG20, TEXT    "␣"FAILED TO RESOLVE CONVERSIONS TO + OR - 1 LSB␣"
                4572  0601
                4573  1114
                4574  0504
                4575  4024
                4576  1740
                4577  2205
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                4600  2317
                4601  1426
                4602  0540
                4603  0317
                4604  1626
                4605  0522
                4606  2311
                4607  1716
                4610  2340
                4611  2417
                4612  4053
                4613  4017
                4614  2240
                4615  5540
                4616  6140
                4617  1423
                4620  0237
                4621  3600
 2491           4622  3736    EMSG21, TEXT    "␣^TWO SUCCESSIVE READS NOT EQUAL␣^"
                4623  2427
                4624  1740
                4625  2325
                4626  0303
                4627  0523
                4630  2311
                4631  2605
                4632  4022
                4633  0501
                4634  0423
                4635  4016
                4636  1724
                4637  4005
                4640  2125
                4641  0114
                4642  3736
                4643  0000
 2492           4644  3736    EMSG22, TEXT    "␣^ERRONEOUS EXTERNAL ENABLE FROM CLOCK␣^"
                4645  0522
                4646  2217
                4647  1605
                4650  1725
                4651  2340
                4652  0530
                4653  2405
                4654  2216
                4655  0114
                4656  4005
                4657  1601
                4660  0214
                4661  0540
                4662  0622
                4663  1715
                4664  4003
                4665  1417
                4666  0313
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                4667  3736
                4670  0000
 2493           4671  3736    EMSG23, TEXT    "␣^MONOTINICITY FAILURE␣^"
                4672  1517
                4673  1617
                4674  2411
                4675  1611
                4676  0311
                4677  2431
                4700  4006
                4701  0111
                4702  1425
                4703  2205
                4704  3736
                4705  0000
 2494           4706  3736    EMSG24, TEXT    "␣^NOISE IN MULTIPLEXER AND A-D BUFFER␣^"
                4707  1617
                4710  1123
                4711  0540
                4712  1116
                4713  4015
                4714  2514
                4715  2411
                4716  2014
                4717  0530
                4720  0522
                4721  4001
                4722  1604
                4723  4001
                4724  5504
                4725  4002
                4726  2506
                4727  0605
                4730  2237
                4731  3600
 2495           4732  3736    EMSG25, TEXT    "␣^DONE FLAG FAILED READ BACK IN BIT 0 OF STATUS REG␣^"
                4733  0417
                4734  1605
                4735  4006
                4736  1401
                4737  0740
                4740  0601
                4741  1114
                4742  0504
                4743  4022
                4744  0501
                4745  0440
                4746  0201
                4747  0313
                4750  4011
                4751  1640
                4752  0211
                4753  2440
                4754  6040
                4755  1706
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                4756  4023
                4757  2401
                4760  2425
                4761  2340
                4762  2205
                4763  0737
                4764  3600
 2496           4765  3736    EMSG26, TEXT    "↑"ERROR FLAG FAILED TO READ BACK IN BIT 1 OF STATUS REG↑"
                4766  0522
                4767  2217
                4770  2240
                4771  0614
                4772  0107
                4773  4006
                4774  0111
                4775  1405
                4776  0440
                4777  2417
                5000  4022
                5001  0501
                5002  0440
                5003  0201
                5004  0313
                5005  4011
                5006  1640
                5007  0211
                5010  2440
                5011  6140
                5012  1706
                5013  4023
                5014  2401
                5015  2425
                5016  2340
                5017  2205
                5020  0737
                5021  3600
 2497           5022  3736    EMSG27, TEXT    "↑"CAF FAILED TO CLEAR DONE FLAG↑"
                5023  0301
                5024  0640
                5025  0601
                5026  1114
                5027  0504
                5030  4024
                5031  1740
                5032  0314
                5033  0501
                5034  2240
                5035  0417
                5036  1605
                5037  4006
                5040  1401
                5041  0737
                5042  3600
 2498           5043  3736    EMSG30, TEXT    "↑"CAF FAILED TO CLEAR ERROR FLAG↑"
                5044  0301
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                5045  0640
                5046  0601
                5047  1114
                5050  0504
                5051  4024
                5052  1740
                5053  0314
                5054  0501
                5055  2240
                5056  0522
                5057  2217
                5060  2240
                5061  0614
                5062  0107
                5063  3736
                5064  0000
 2499           5065  3736    EMSG31, TEXT    "↑"ADCL FAILED TO CLEAR MUX OR ENABLE BITS↑"
                5066  0104
                5067  0314
                5070  4006
                5071  0111
                5072  1405
                5073  0440
                5074  2417
                5075  4003
                5076  1405
                5077  0122
                5100  4015
                5101  2530
                5102  4017
                5103  2240
                5104  0516
                5105  0102
                5106  1405
                5107  4002
                5110  1124
                5111  2337
                5112  3600
 2500           5113  3736    EMSG32, TEXT    "↑"ADST FAILED TO CLEAR DONE↑"
                5114  0104
                5115  2324
                5116  4006
                5117  0111
                5120  1405
                5121  0440
                5122  2417
                5123  4003
                5124  1405
                5125  0122
                5126  4004
                5127  1716
                5130  0537
                5131  3600
 2501           5132  3736    EM8G33, TEXT    "↑"ADST FAILED TO CLEAR ERROR↑"
                5133  0104
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                5134  2324
                5135  4006
                5136  0111
                5137  1405
                5140  0440
                5141  2417
                5142  4003
                5143  1405
                5144  0122
                5145  4005
                5146  2222
                5147  1722
                5150  3736
                5151  0000
 2502           5152  3736    EMSG34, TEXT    "␣"ADRB AT EOC FAILED TO SET ERROR FLAG␣"
                5153  0104
                5154  2202
                5155  4001
                5156  2440
                5157  0517
                5160  0340
                5161  0601
                5162  1114
                5163  0504
                5164  4024
                5165  1740
                5166  2305
                5167  2440
                5170  0522
                5171  2217
                5172  2240
                5173  0614
                5174  0107
                5175  3736
                5176  0000
 2503           5177  3736    EMSG35, TEXT    "␣"TIMING ERROR FLAG SET IN ERROR␣"
                5200  2411
                5201  1511
                5202  1607
                5203  4005
                5204  2222
                5205  1722
                5206  4006
                5207  1401
                5210  0740
                5211  2305
                5212  2440
                5213  1116
                5214  4005
                5215  2222
                5216  1722
                5217  3736
                5220  0000
 2504           5221  3736    EMSG36, TEXT    "␣"ADRB FAILED TO CLEAR DONE FLAG␣"
                5222  0104
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                5223  2202
                5224  4006
                5225  0111
                5226  1405
                5227  0440
                5230  2417
                5231  4003
                5232  1405
                5233  0122
                5234  4004
                5235  1716
                5236  0540
                5237  0614
                5240  0107
                5241  3736
                5242  0000
 2505           5243  3736    EMSG37, TEXT    "␣"CAF FAILED TO CLEAR DATA BUFFER␣"
                5244  0301
                5245  0640
                5246  0601
                5247  1114
                5250  0504
                5251  4024
                5252  1740
                5253  0314
                5254  0501
                5255  2240
                5256  0401
                5257  2401
                5260  4002
                5261  2506
                5262  0605
                5263  2237
                5264  3600
 2506           5265  3736    EMSG40, TEXT    "␣"DATA BUFFER NOT EQUAL TO 1777␣"
                5266  0401
                5267  2401
                5270  4002
                5271  2506
                5272  0605
                5273  2240
                5274  1617
                5275  2440
                5276  0521
                5277  2501
                5300  1440
                5301  2417
                5302  4061
                5303  6767
                5304  6737
                5305  3600
 2507           5306  3736    EMSG41, TEXT    "␣"NO CONVERSION TIME DIFFERENCE AFTER CHANGING CHANNELS␣"
                5307  1617
                5310  4003
                5311  1716
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                5312  2605
                5313  2223
                5314  1117
                5315  1640
                5316  2411
                5317  1505
                5320  4004
                5321  1106
                5322  0605
                5323  2205
                5324  1603
                5325  0540
                5326  0106
                5327  2405
                5330  2240
                5331  0310
                5332  0116
                5333  0711
                5334  1607
                5335  4003
                5336  1001
                5337  1616
                5340  0514
                5341  2337
                5342  3600
 2508           5343  3736    EMSG42, TEXT    "↓^CAF FAILED TO CLEAR MUX OR ENABLE BITS↓^"
                5344  0301
                5345  0640
                5346  0601
                5347  1114
                5350  0504
                5351  4024
                5352  1740
                5353  0314
                5354  0501
                5355  2240
                5356  1525
                5357  3040
                5360  1722
                5361  4005
                5362  1601
                5363  0214
                5364  0540
                5365  0211
                5366  2423
                5367  3736
                5370  0000
 2509           5371  2003    TXTPC,  TEXT    "PC = "
                5372  4075
                5373  4000
 2510           5374  4040    TXTIOT, TEXT    "  IOT CODE = "
                5375  1117
                5376  2440
                5377  0317
                5400  0405
```



```
                5401  4075
                5402  4000
 2511           5403  4040    TXTA,   TEXT    "  TEMPA = "
                5404  2405
                5405  1520
                5406  0140
                5407  7540
                5410  0000
 2512           5411  4040    TXTB,   TEXT    "  TEMPB = "
                5412  2405
                5413  1520
                5414  0240
                5415  7540
                5416  0000
 2513                         /END OF LOGIC TEST TYPESTRING
 2514           5417  3736    XEND,   TEXT    "↓^END OF LOGIC TEST↓^"
                5420  0516
                5421  0440
                5422  1706
                5423  4014
                5424  1707
                5425  1103
                5426  4024
                5427  0523
                5430  2437
                5431  3600
 2515                         /HEADER MESSAGE
 2516           5432  3736    XLABEL, TEXT    "↓^AD8A A TO D CONVERTER/MULTIPLEXER DIAGNOSTIC MD-08-DJADA-C↓^"
                5433  0104
                5434  7001
                5435  4001
                5436  4024
                5437  1740
                5440  0440
                5441  0317
                5442  1626
                5443  0522
                5444  2405
                5445  2257
                5446  1525
                5447  1424
                5450  1120
                5451  1405
                5452  3005
                5453  2240
                5454  0411
                5455  0107
                5456  1617
                5457  2324
                5460  1103
                5461  4015
                5462  0455
                5463  6070
                5464  5504
                5465  1201
```

```
          5466  0401
          5467  5503
          5470  3736
          5471  0000
 2517     5472  3736    AUTMSG, TEXT    "▲^SET SW5 (AUTO-INC), # OF CHANS IN SW8-11, OR SET SW8-11 (SINGLE CHAN)▲^"
          5473  2305
          5474  2440
          5475  2327
          5476  6540
          5477  5001
          5500  2524
          5501  1755
          5502  1116
          5503  0351
          5504  5440
          5505  4340
          5506  1706
          5507  4003
          5510  1001
          5511  1623
          5512  4011
          5513  1640
          5514  2327
          5515  7055
          5516  6161
          5517  5440
          5520  1722
          5521  4023
          5522  0524
          5523  4023
          5524  2770
          5525  5561
          5526  6140
          5527  5023
          5530  1116
          5531  0714
          5532  0540
          5533  0310
          5534  0116
          5535  5137
          5536  3600
 2518
 2519     5537  3736    HEAD13, TEXT    "▲^END OF 1000 CONVERSIONS▲^"   /VB/
          5540  0516
          5541  0440
          5542  1706
          5543  4061
          5544  6060
          5545  6040
          5546  0317
          5547  1626
          5550  0522
          5551  2311
          5552  1716
          5553  2337
```



```
          5554  3600
 2520     5555  3736    HEAD14, TEXT    "▲^END OF TEST▲^"       /VB/
          5556  0516
          5557  0440
          5560  1706
          5561  4024
          5562  0523
          5563  2437
          5564  3600
 2521
 2522
 2523
 2524                   /*C8*/PAGE
 2525
 2526          5600     *5600                          /C8/
 2527
 2528                   /TABLE OF CONVERSION VALUES/
 2529     5600  0000    STORAG, 0
 2530
 2531
 2532                   /*C8*/$
 2533
 2534
 2535                   /C8/    THE TABLE OF CONVERSION VALUES (BUFFER 'STORAG' ABOVE) ALWAYS
 2536                   /C8/    RESIDES STARTING AT LOC 5600.  SO DOES THE CONSOLE PACKAGE
 2537                   /C8/    ROUTINES (FOLLOWING).
 2538
 2539                   /C8/    IF THE PROGRAM IS RUN WITHOUT THE CONSOLE PKG ACTIVE THEN
 2540                   /C8/    BUFFER 'STORAG' WILL BE IN FIELD 0. (CONSOLE PKG CODE
 2541                   /C8/    WILL BE LOST.)
 2542
 2543                   /C8/    IF THE PROGRAM IS RUN WITH THE CONSOLE PKG ACTIVE THEN THE
 2544                   /C8/    BUFFER 'STORAG' WILL BE IN FIELD 1.  THE CONSOLE PKG WILL
 2545                   /C8/    RESIDE IN FIELD 0.
 2546
 2547
 2548
 2549
 2550                   /CONSOL SRC =V2=R1= CONSOLE PACKAGE
 2551                   /       REV 1 =DATE NOV.10,1975
 2552                   /1. IN XC8PAS REMOVE  THE CLA WHICH WAS THE FIRST ENTRY IN THE
 2553                   /SUBROUTINE. THE CLA WOULD DESTROY THE AC ON A  CALL TO XC8PAS.
 2554                   /2. CONTROL C (CNTRLC)
 2555                   /PUT A CLEAR THE SOFTWARE FLAG C8SWST BY ADDING A DCA C8SWST
 2556                   /THIS WILL CLEAR THE FLAG TO ALLOW MULTIPLE ENTRIES IN TO
 2557                   /XC8PSW FOR CHANGING THE SWITCH REGISTER.
 2558
 2559
 2560                   /LAS= CALL C8CKSW OR JMS XC8SW
 2561                   /THIS WILL READ THE SWITCH REGISTER FROM THE PLACE SPECIFIED
 2562                   /BY LOCATION 20 BIT 0.
 2563
 2564
 2565                   /THE PROGRAM SHOULD CHECK FOR A CONTROL CHARACTER FROM THE TERMINAL
 2566                   /EVERY FIVE(5) SECONDS OR SOONER.
```

```
2567
2568                    /LOCATIONS THAT NEED TO BE SET UP FOR USING THE CONSOLE PACKAGE.
2569
2570                    /CNTVAL IN XC8PASS    THIS LOCATION DETERMINES THE NUMBER OF
2571                    /PROGRAM COMPLETIONS THAT ARE NEEDED BEFORE THE PASS MESSAGE IS TYPED
2572                    /THE VALUE SHOULD PUT THE PASS MESSAGE OUT IN THE RANGE OF 1 TO 5 MINUTES.
2573                    /THIS SHOULD BE A POSITIVE NUMBER.
2574
2575                    /C8STRT   THIS IS FOUND IN CNTRL ROUTINE CONTROL R PART
2576                    /IT IS THE RETURN WHEN CONTROL R IS ENTERED (RESTART PROGRAM)
2577                    /THE RETURN JUMPS TO XDOSW WHICH CONTAINS C8STRT SO PUT THE LABEL C8STRT
2578                    /WHERE YOU WANT TO RESTART THE PROGRAM.
2579
2580
2581                    /SETUP1 IN XC8ERR    THIS IS THE MASK BIT FOR HALT ON ERROR
2582                    /PLACE THE CORRECT BIT IN THIS LOCATION FOR HALTING ON ERRORS.
2583
2584                    /SETUP2 IN XC8PASS   THIS IS THE MASK FOR HALT AT END OF PASS.
2585
2586                    /THE CALL TABLE IS A CONDITIONAL ASSEMBLY.
2587                    /TO ASSEMBLE THE CALL REMOVE THE / BEFORE CONSOL=0.
2588                    /IN COMBINING THE CONSOL PACKAGE TO A DIAGNOSTIC.
2589                    /THE CALL TABLE IS TO BE AT THE BEGINNING OF A PROGRAM.
2590
2591
2592            0000    CONSOL=0
2593            6661            PSKF=   6661
2594            6662            PCLF=   6662
2595            6663            PSKE=   6663
2596            6664            PSTB=   6664
2597            6665            PSIE=   6665
2598            6004            GTF=    6004
2599            7701            ACL=    7701
2600            6007            CAF=    6007
2601            7421            MQL=    7421
2602            7501            MQA=    7501
2603
2604
2605                    IFDEF CONSOL <
2606
2607
2608            0102    *102
2609
2610            4502            C8PASS= JMS I   .
2611    0102    5600                    XC8PAS          /C8 PASS COMPLETION ROUTINE
2612            4503            C8CKSW= JMS I   .
2613    0103    5660                    XC8SW           /CHECK SW REG SETTING
2614            4504            C8TTYI= JMS I   .
2615    0104    5670                    XC8TTY          /FETCH CONSOL CHAR
2616            4505            C8CNTR= JMS I   .
2617    0105    6000                    XC8CNT          /CHECK FOR CONTROL CHAR
2618            4506            C8PRNT= JMS I   .
2619    0106    5701                    XC8PNT          /C8 PRINT A BUFFER
2620            4507            C8SWIT= JMS I   .
2621    0107    6255                    XC8PSW          /SET UP PSEUDO SW, REG
```



```
2622            4510            C8OCTA= JMS I   .
2623    0110    6400                    XC8OCT          /CONVERT TO ASCII AND PRINT
2624            4511            C8CRLF= JMS I   .
2625    0111    6423                    XC8CRL          /DO A CARRIGE RETUR + LINE FEED
2626            4512            C8ECHO= JMS I   .
2627    0112    6463                    XC8ECH          /CHECK INPUT CHAR
2628            4513            C8TYPE= JMS I   .
2629    0113    6477                    XC8TYP          /C8 PRINT ONE CHAR
2630            4514            C8ERR=  JMS I   .
2631    0114    6607                    XC8ERR          /C8 ERROR  HANDLER
2632            4515            C8INQU= JMS I   .
2633    0115    6235                    XC8INQ          /LOOK FOR OPERATOR INTERVENTION
2634            4516            C8CKPA= JMS I   .
2635    0116    6441                    XC8CKP          /CHECK IF CONTROL CHAR
2636            4517            C8PAUS= JMS I   .
2637    0117    5735                    XC8PAU          /IF CONSOL PACKAGE RETURN CALL PLUS ONE
2638                                                    /IF NOT USING CONSOL REPLACE CALL WITH
2639                                                    /A HLT AND THEN GO TO THE HALT
2640
2641                    /*****************************************************************
2642                            /*20                    /PSEUDO SWITCH REGISTER
2643
2644
2645                            /*21                    /HARDWARE INDICATORS
2646                                                    /4000=USE FRONT PANEL SWITCH REGISTER
2647                                                    /0000=USE THE PSEUDO SWITCH REGISTER LOC.20
2648
2649                            /*22                    /SYSTEM CONFIGURATION
2650                                                    /400=CONSOL PACKAGE SET ACTIVE
2651                                                    /0000=CONSOLE PACKAGE SET DEACTIVE
2652
2653                            /*23                    /RESERVED FOR FUTURE USE
2654                    >
2655            5600    *5600
2656                    /*****************************************************************
2657                    /C8PASS
2658                    /THIS IS CALLED AT THE END OF EACH PROGRAM COMPLETION
2659                    /THE VALUE OF** CNTVAL** WILL BE DETERMINED BY THE TIME IT TAKES
2660                    /THE PROGRAM TO COMPLETE THIS MANY C8PASS TO BE IN THE 1 TO 4 MINUTE
2661                    /RANGE
2662                    /       C8PASS=JMS    XC8PAS
2663                    /EX, OF CALL            C8PASS
2664                            /               HLT             /HALT IF NON CONSOL PACKAGE
2665                    /               JMP     START1          /CONTINUE RUNNING THIS PROGRAM
2666
2667
2668                    /RETURN TO LOCATION CALL PLUS ONE WITH THE AC=0 IF NON CONSOL PACKAGE AND HLT
2669                    /IF CONTINUE TO RUN THEN RETURN TO CALL PLUS2 AC=0
2670                    /THE LOCATION SETUP2 IS THE MASK BIT FOR THE HALT AT END OF PASS
2671                    /CHECK THAT IT IS CORRECT FOR THE CURRENT PROGRAM
2672
2673                    /CALLS USED BY XC8PAS ARE  CHKCLA-XC8CRLF-XC8OCTA-XC8SW-XC8PNT-XC8INQ-
2674
2675
2676    5600    0000    XC8PAS, 0
```

```
2677  5601  4777'          JMS     CHKCLA          /IS WORD 22 BIT 3 ACTIVE CONSOLE?
2678  5602  5211          JMP     DOPACK          /IS CLASSIC
2679  5603  4776'          JMS     C8GET           /GET THE REGISTERS
2680  5604  4260          JMS     XC8SW           /DEACTIVE CONSOL CHECK SR SETTING
2681  5605  0375          AND     (400            /FOR HALT ON END OF C8PASS
2682  5606  7640          SZA CLA                 /1= HALT 0 CONTINUE
2683  5607  5600          JMP I   XC8PAS          /GO TO HALT
2684  5610  5227          JMP     C8BY1           /CONTINUE ON RUNNING PROGRAM
2685  5611  4230  DOPACK, JMS     CKCOUT          /CLASS CHECK C8PASS COUNT
2686  5612  5227          JMP     C8BY1           /C8PASS COUNT NOT DONE REDO PROGRAM
2687  5613  2246          ISZ     PASCNT          /C8PASS COUNT DONE SET C8PASS COUNT
2688  5614  4774'          JMS     XC8CRLF
2689  5615  4301          JMS     XC8PNT          /C8PRNT BUFFER
2690  5616  5651          MESPAS                  /
2691  5617  1246          TAD     PASCNT          /GET NUMBER
2692  5620  4773'          JMS     XC8OCTA         /CONVERT IT TO ASCII
2693  5621  4774'          JMS     XC8CRLF         /DO A CARRIAGE RETURN
2694  5622  4776'          JMS     C8GET           /RESTORE REGISTERS
2695  5623  4260          JMS     XC8SW           /CHECK A HALT AT END OF C8PASS
2696  5624  0375  SETUP2, AND     (400            /MASK BIT
2697  5625  7640          SZA CLA                 /HALT =1 NO SKIP CONTINUE =0
2698  5626  4772'          JMS     XC8INQ          /STOP PROGRAM EXECUTION=LOOK FOR INPUT
2699  5627  5600  C8BY1,  JMP I   XC8PAS
2700  5630  0000  CKCOUT, 0
2701  5631  1247          TAD     DOSET           /CHECK IF SET UP NEEDED
2702  5632  7640          SZA CLA                 /0=SET UP C8PASS COUNT VALUE
2703                                              /1=C8PASS COUNT VALUE OK
2704  5633  5240          JMP     NOSET           /C8PASS COUNT VALUE ON
2705  5634  1250          TAD     CNTVAL          /GET COUNT VALUE FOR THIS PROG
2706  5635  7040          CMA                     /SET TO NEGATIVE
2707  5636  3245          DCA     DOCNT           /STORE IN HERE
2708  5637  2247          ISZ     DOSET           /INDICATE VALUE SET UP
2709  5640  2245  NOSET,  ISZ     DOCNT           /COUNT THE NUMBER OF PASSES
2710  5641  5227          JMP     C8BY1           /EXIT FOR ANOTHER PASS
2711  5642  3247          DCA     DOSET           /SET TO C8PRNT C8PASS
2712  5643  2230          ISZ     CKCOUT          /BUMP RETURN FOR
2713  5644  5630          JMP I   CKCOUT          /C8PASS C8TYPE OUT
2714  5645  0000  DOCNT,  0
2715  5646  0000  PASCNT, 0                       /
2716  5647  0000  DOSET,  0
2717  5650  0000  CNTVAL, 0
2718  5651  0412  MESPAS, TEXT    "DJADAC  PASS "
      5652  0104
      5653  0103
      5654  4040
      5655  2001
      5656  2323
      5657  4000
2719
2720
2721
2722                /*************************************************************************
2723
2724                /C8CKSW
2725
```



```
2726                /THIS ROUTINE CAN BE USED INPLACE OF A READ THE SWITCHES LAS,
2727                /ROUTINE THAT WILL CHECK WHERE TO READ THE
2728                /C8 SWITCHES FROM IE, FROM PANEL OR PSEUDO SWITCH REGISTER
2729                /THE SELECTION IS DETERMINED BY THE STATE OF BIT 0 IN LOCATION 21.
2730
2731                        /C8CKSW=        JMS XC8SW
2732                        /EX.    JMS     XC8SW           /READ THE C8SWIT REGISTER
2733                                                        /RETURN WITH THE CONTENTS OF SWITCH REGISTER
2734
2735                /RETURN TO NEXT LOCATION FOLLOWING CALL WITH THE AC= TO VALUE OF C8SWIT SETTING
2736
2737                /CALLS USED ARE=XC8CKPA=
2738
2739
2740
2741  5660  0000    XC8SW,  0
2742  5661  4771'          JMS     XC8CKPA         /GO CHECK THE IF ANY CONTRL
2743  5662  7000          NOP
2744  5663  1021          TAD     21              /GET WD FOR INDICATOR
2745  5664  7710          SPA CLA                 /CHECK IF FROM PANEL 4000
2746  5665  7614          7614                    /DO LAS AND SKIP GET FROM PANEL WITH LAS
2747  5666  1020          TAD     20              /PSEUDO SWITCH
2748  5667  5660          JMP I   XC8SW           /EXIT WITH STATUS BIT IN AC,
2749
2750
2751                /*************************************************************************
2752
2753                /C8TTYI
2754                /THIS ROUTINE WILL LOOK FOR A INPUT FROM THE TERMINAL
2755                /AND REMOVE ANY PARITY BITS, THEN MAKE IT 8 BIT ASCI.
2756                /       C8TTYI= JMS XC8TTY
2757                /EX.    JMS     XC8TTYI         /READ CHAR FROM THE CONSOL DEVICE
2758                        /                       /RETURN TO CALL PLUS ONE AC CONTAINS THE CHAR
2759
2760
2761                /CALLS USED =NONE= BUT C8CHAR IS OFF PAGE AND IN ROUTINE CALLED XC8ECHO
2762
2763                /
2764                /
2765  5670  0000    XC8TTY, 0
2766  5671  6031          KSF                     /LOOK FOR KEYBOARD FLAG
2767  5672  5271          JMP     .-1
2768  5673  6036          KRB                     /GET CHAR
2769  5674  0370          AND     (177            /MASK FOR 7 BITS
2770  5675  1367          TAD     (200            /ADD THE EIGTH BIT
2771  5676  3766'          DCA     C8CHAR          /STORE IT
2772  5677  1766'          TAD     C8CHAR
2773  5700  5670          JMP I   XC8TTY          /EXIT
2774
2775
2776
2777                /*************************************************************************
2778
2779                /C8PRNT
2780
```

```
                        /THIS ROUTINE WILL TYPE THE CONTENTS OF THE C8 PRINT BUFFER. THE LOCATION
                        /OF THE BUFFER WILL BE IN THE ADDRS FOLLOWING THE CALL.  PRINTING OF THE BUFFER
                        /WILL STOP WHEN A 00 CHAR IS DETECTED. CHARACTERS ARE PACKED 2 PER WORD.

                        /       C8PRNT= JMS XC8PNT


                        /EX.    JMS     XC8PNT                  /C8PRNT THE CONTENTS OF THE FOLLOWING BUFFER
                        /       MESS77                          /LOCATION OF C8PRNT BUFFER

                        /C8PRNT WILL USE THE LOCATION FOLLOWING THE CALL AS THE POINTER FOR THE
                        /C8PRNT ROUTINE.RETURN TO CALL PLUS TWO WITH AC= 0

                        /CALLS USED ARE=XC8TYPE=XC8PNT


 5701  0000   XC8PNT, 0
 5702  7300           CLA CLL
 5703  1701           TAD I   XC8PNT          /GET C8PRNT BUFFERS STARTING LOCATION
 5704  3334           DCA     PTSTOR          /STORE IN PTSTOR
 5705  2301           ISZ     XC8PNT          /BUMP RETURN
 5706  1734   C8D01,  TAD I   PTSTOR          /GET DATA WORD
 5707  0365           AND     (7700           /MASK FOR LEFT BYTE
 5710  7450           SNA                     /CHECK IF 00 TERMINATE
 5711  5701           JMP I   XC8PNT          /EXIT
 5712  7500           SMA                     /IS AC MINUS
 5713  7020           CML                     /MAKE CHAR A 300 AFTER ROTATE
 5714  7001           IAC                     /MAKE CHAR A 200 AFTER ROTATE
 5715  7012           RTR
 5716  7012           RTR
 5717  7012           RTR                     /PUT CHAR IN BITS 4-11 MAKE IT 8 BIT ASCII
 5720  4764'          JMS     XC8TYPE         /C8PRNT IT ON CONSOLE
 5721  1734           TAD I   PTSTOR          /GET DATA WORD
 5722  0363           AND     (0077           /MASK FOR RIGHT BYTE
 5723  7450           SNA                     /CHECK IF 00 TERMINATOR
 5724  5701           JMP I   XC8PNT          //EXIT
 5725  1362           TAD     (3740           /ADD FUDGE FACTOR TO DETERMINE IF 200
 5726  7500           SMA                     /OR 300 IS TO BE ADD TO CHAR
 5727  1361           TAD     (100            /ADD 100
 5730  1360           TAD     (240            /ADD 200
 5731  4764'          JMS     XC8TYPE         /C8TYPE ONLY BITS 4-11
 5732  2334           ISZ     PTSTOR          /BUMP POINTER FOR NEXT WORD
 5733  5306           JMP     C8D01           /DO AGAIN
 5734  0000   PTSTOR, 0                       /STOR FOR C8PRNT BUFFER
                        /*****************************************************************************


                        /C8PAUS
                        /THIS ROUTINE WILL CHECK IF THE CONSOL PACKAGE IS ACTIVE,IF ACTIVE
                        /IT WILL RETURN TO CALL PLUS ONE AC= 0, AND DO THAT INSTRUCTION,
                        /IF THE CONSOL PACKAGE IS NOT ACTIVE THE CALL WILL BE REPLACED
                        /WITH A 7402 HALT AND THEN RETURN TO THE HALT,

                        /       C8PAUS= JMS XC8PAU
```



```
                        /
                        /
                        /EX.            JMS     XC8PAUS         /CHECK IF ON ACTIVE CONSOL IF NOT HALT HERE
                        /               ANYTHING                /RETURN HERE IF ON ACTIVE CONSOL
                        /
                        /

                        /CALLS USED ARE -CHKCLA-


 5735  0000   XC8PAU, 0
 5736  7300           CLA CLL
 5737  4777'          JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
 5740  5346           JMP     C8D03           /GO DO CONSOL PART RETURN CALL +1
 5741  7040           CMA                     /DEACTIVE CONSOLE PACKAGE PUT HLT IN CALL
 5742  1335           TAD     XC8PAU          /GET CORRECT RETURN ADDRS
 5743  3335           DCA     XC8PAU          /SET UP RETURN
 5744  1357           TAD     (7402           /GET CODE FOR HLT
 5745  3735           DCA I   XC8PAU          /PUT HALT IN CALL LOCATION
 5746  5735   C8D03,  JMP I   XC8PAU          /GO TO HALT OR RETURN TO NEXT LOCATION


 5757  7402
 5760  0240
 5761  0100
 5762  3740
 5763  0077
 5764  6477
 5765  7700
 5766  6475
 5767  0200
 5770  0177
 5771  6441
 5772  6235
 5773  6400
 5774  6423
 5775  0400
 5776  6224
 5777  6600
       6000     PAGE
                        /*****************************************************************


                        /C8CNTR
                        /THIS ROUTINE WILL CHECK FOR THE PRESENCE OF CONTROL CHARACTERS
                        /IT WILL CHECK FOR THE FOLLOWING CHAR C=R=Q=L=S
                        /       C8CNTR= JMS XC8CNT


                        /EX.    JMS     XC8CNTR                 /CHECK FOR CONTROL CHARACTER
                        /       JMP     ANYTHING                /LOC FOLLOWING CALL IS FOR CONTINUING THE PROGRAM
                        /       JMP     ANYTHING                /LOC, IS FOR RETURN IF INMODE SET AND NOT CNTRL CHAR
                        /


                        /RETURN IS TO CALL PLUS ONE IF CONTINUE
```

```
                        /RETURN IS TO CALL PLUS TWO IF INMODE SET AND NOT CONTROL CHAR
                        /RETURN IS TO CALL PLUS TWO IF INMODE IS NOT SET AND NO
                        /CONTROL CHAR ..THIS WILL PRINT THE CHARACTER AND A ?
                        /CLEAR THE AC AND RETURN CALL+2.

                        /CALLS USED ARE-CHKCLA-XC8TYPE-XC8CRLF-C8GET-UPAROW-XC8TYI-XC8PSW-
                        /
                        /
                        /
6000  0000    XC8CNT, 0
6001  3777'             DCA     AC8AVE          /SAVE THE AC
6002  4776'             JMS     CHKCLA          /CHECK LOC.22 BIT3 FOR CONSOLE BIT
6003  5206              JMP     .+3             /ON ACTIVE CONSOLE
6004  1777'             TAD     AC8AVE          /DEACTIVE CONSOLEGET AC FOR RETURN
6005  5600              JMP I   XC8CNT          /EXIT NOT ON ACTIVE CONSOLE
6006  6004              GTF
6007  3775'             DCA     FL8AVE
6010  7501              MQA
6011  3774'             DCA     MQ8AVE          /SAVE THE MQ
6012  3255              DCA     INDEXA          /SET DISPLACEMENT INTO TABLE B
6013  1257              TAD     XTABLA          /GET ADDRS OF TABLE A
6014  3256              DCA     GETDAT          /CONTAINS POINTER TO CONTROL CHAR
6015  1656    REDOA,    TAD I   GETDAT          /GET CONTROL CHAR FROM TABLE
6016  7450              SNA                     /CHECK FOR A 0 END OF TABLE
6017  5226              JMP     DONEA           /END OF TABLE NO CONTROL CHAR
6020  1773'             TAD     C8CHAR          /COMPARE CHAR TO CONTROL CHAR
6021  7650              SNA CLA                 /0 IF MATCH
6022  5243              JMP     GOITA           /MATCH
6023  2255              ISZ     INDEXA          /NO MATCH NOT END OF TABLE REDO
6024  2256              ISZ     GETDAT          /BUMP INDEX FOR EXIT WHEN CONTROL FOUND
6025  5215              JMP     REDOA           /BUMP GETDAT FOR COMPARE OF NEXT CNTRL CHAR.
6026  1772'   DONEA,    TAD     INMODE          /CHECK IF PROGRAM EXPECTS CHAR
6027  7640              SZA CLA                 /1=CHAR EXPECTED  0= NO CHAR EXPECTED
6030  5240              JMP     EXITA           /CHAR EXPECTED
6031  1773'             TAD     C8CHAR          /GET CHAR - NOT CONTROL + NOT EXPECTED
6032  4771'             JMS     XC8TYPE         /C8PRNT CHAR
6033  1370              TAD     (277            /GET CODE FOR "?"
6034  4771'             JMS     XC8TYPE
6035  4767'             JMS     XC8CRLF
6036  2200              ISZ     XC8CNT          /BUMP RETURN
6037  5600              JMP I   XC8CNT          /EXIT CALL+2
6040  2200    EXITA,    ISZ     XC8CNT          /BUMP RETURN FOR MAIN PROGRAM CHECK OF CHAR
6041  1773'             TAD     C8CHAR          /PUT CHAR IN AC.
6042  5600              JMP I   XC8CNT          /EXIT
6043  1773'   GOITA,    TAD     C8CHAR          /GET THE CONTENTS OF CHAR
6044  1366              TAD     (100            /ADD 100 TO FORM A GOOD ASCII CHARACTER
6045  3773'             DCA     C8CHAR          /RESTORE COFFECT CHAR
6046  1260              TAD     XTABLB          /GET START OF TABLE B
6047  1255              TAD     INDEXA          /GET NOW FAR INTO TABLE
6050  3254              DCA     GOTOA           /STORE IT
6051  1654              TAD I   GOTOA           /GET THE ROUTINE STARTTING ADDRESS
6052  3254              DCA     GOTOA           /STORE IT IN HERE
6053  5654              JMP I   GOTOA           /GOTO CONTROL CHAR ROUTINE
6054  0000    GOTOA,    0000                    /ADD OF CNTRL ROUTINE TO EXECUTE
6055  0000    INDEXA,   0000                    /DISPLACEMENT INTO CNTRL TABLE
```



```
6056  0000    GETDAT, 0000                    /LOCATION OF ADDRS OF CONTROL CHAR.
6057  6061    XTABLA, TABLA                   /ADDRS OF TABLEA
6060  6071    XTABLB, TABLB                   /ADDRS OF TABLEB
6061  7575    TABLA,  7575                    /CNTRL C BACK TO MONITOR 203
6062  7564            7564                    /CNTRL L SWITCH ERROR PRINTTING DEVICE 214
6063  7557            7557                    /CNTRL Q START DISPLAYING CHAR, AGAIN 221
6064  7556            7556                    /CNTRL R BACK TO BEGINNING OF PROGRAM 222
6065  7555            7555                    /CNTRL S STOP SENDING CHAR TO DISPLAY WAIT FOR CNTRL Q 223
6066  7573            7573                    /CNTRL E CONTINUE WITH PROGRAM 205
6067  7574            7574                    /CONTROL D CHANGE SWITCH REGISTER ON FLY
6070  0000            0000

6071  6147    TABLB,  CNTRLC
6072  6136            CNTRLL
6073  6100            CNTRLQ
6074  6111            CNTRLR
6075  6120            CNTRLS
6076  6144            CNTRLE
6077  6200            CNTRLD
                      /
                      /CONTROL Q
                      /START SENDING CHAR. TO THE DISPLAY
                      /THIS WILL RETURN CONTROL TO CALL THAT WAS SET BY
                      /THE CALL FOR CONTROL S.
                      /
6100  3772'   CNTRLQ, DCA     INMODE          /SET SOFT FLAG FOR UNEXPECTED CHAR
6101  1334             TAD     C8SETS          /CHECK IF CONTROL S TYPED IN
6102  7640             SZA CLA
6103  5306             JMP     BYRETR          /CONTROL S TYPED IN
6104  4765'            JMS     C8GET           /NO CONTROL S TYPED PREVIOUSLY
6105  5600             JMP I   XC8CNTR         /LEAVE VIA CNTR ENTRY ADDRESS
6106  3334   BYRETR, DCA     C8SETS          /CLEAR THE SOFT FLAG
6107  4765'            JMS     C8GET           /RESTORE REGISTERS
6110  5735             JMP I   C8RETR          /EXIT TO ADDRESS SET BY CONTROL S
                      /
                      /
                      /CONTROL R
                      /GO TO THE QUESTION C8SWIT
6111  3764'   CNTRLR, DCA     TTYLPT          /CLEAR THE TYPE FLAG SET TO TTY
6112  3334             DCA     C8SETS          /CLEAR SOFT FLAG FOR CNTRL S
6113  3772'            DCA     INMODE
6114  4763'            JMS     UPAROW          /PRINT THE ^ AND C8CHAR
6115  3762'   C8BY4,   DCA     C8SWST          /CLEAR FLAG FOR CNTRL D OR R
6116  5717             JMP I   XDOSW           /GO TO ADDRS OF C8SWIT
6117  3412    XDOSW,  C8STRT                  /DOSW IS LABEL FOR C8SWIT QUESTION
                      /
                      /
                      /CONTROL S
                      /STOP SENDING CHAR. TO DISPLAY UNTIL A ^Q IS RECEIVED
                      /
                      /
6120  1334    CNTRLS, TAD     C8SETS          /IF1 DO NOT STORE IN C8RETR
6121  7640            SZA CLA
6122  5326            JMP     C8DO7           /DONT SET UP C8RETR
6123  7001            IAC                     /MAKE RETURN CALL PLUS 2
```

```
3000    6124  1200            TAD     XC8CNT          /GET RETURN FOR THIS CALL
3001    6125  3335            DCA     C8RETR          /STORE IT HERE FOR USE BE CNTROL Q
3002    6126  2334    C8DO7,  ISZ     C8SETS          /SET FLAG TO SAVE CALL
3003    6127  4761'           JMS     XC8TTYI                 /LOOK FOR THE INPUT
3004    6130  4765'           JMS     C8GET           /GET REGISTERS
3005    6131  4200            JMS     XC8CNTR                 /CHECK FOR THE CONTROL CHAR
3006    6132  7200            CLA
3007    6133  5320            JMP     CNTRLS          /IF NOT A CNTRL Q R C REASK
3008    6134  0000    C8SETS, 0
3009    6135  0000    C8RETR, 0
3010                    /
3011                    /SWITCH OUTPUT FROM ONE OUTPUT DEVICE TO ANOTHER - THE TWO OUTPUTS ARE THE
3012                    /CONSOLE AND THE PRINTER WITH DEVICE CODE 66.
3013                    /
3014                    /
3015    6136  1764'   CNTRLL, TAD     TTYLPT          /GET PRESENT C8SWIT INDICATOR
3016    6137  7040            CMA                     /COMPLEMENT IT
3017    6140  3764'           DCA     TTYLPT          /STOR NEW C8SWIT
3018    6141  4763'           JMS     UPAROW          /C8PRNT ^ AND CHAR ON NEW DEVICE
3019    6142  4765'           JMS     C8GET           /RESTORE THE REGISTERS
3020    6143  5600            JMP I   XC8CNT          /EXIT
3021                    /
3022                    /CONTROL E
3023                    /CONTINUE RUNNING FROM A INQUIRE OR ERROR
3024                    /
3025                    /
3026    6144  4763'   CNTRLE, JMS     UPAROW          /PRINT THE CONTROL CHAR
3027    6145  4765'           JMS     C8GET           /GET THE REGISTERS
3028    6146  5600            JMP I   XC8CNT          /RETURN TO CALL PLUS ONE
3029                    /
3030
3031                    /CONTROL C
3032                    /RETURN TO MONITOR CONTROL C
3033    6147  3764'   CNTRLC, DCA     TTYLPT          /CLEAR THE LPT FLAG TO PRINT ON DISPLAY
3034    6150  3762'           DCA     C8SWST          /CLEAR THE FLAG FOR MULTIPLE ENTRIES
3035                                                  /INTO C8SWIT
3036    6151  4763'           JMS     UPAROW          /C8PRNT A^ AND LETTER IN CHAR
3037    6152  6203            CDF CIF                 /GO TO 0 FLD
3038    6153  6007            CAF                     /CLEAR THE WORLD
3039    6154  5760            JMP I   (7600           /GO TO DIAGNOSTIC MONITOR
3040                    /*****************************************************************
3041                    /
3042                    /
3043                    /
3044    6160  7600
3045    6161  5670
3046    6162  6344
3047    6163  6215
3048    6164  6521
3049    6165  6224
3050    6166  0100
3051    6167  6423
3052    6170  0277
3053    6171  6477
3054    6172  6476
```



```
3055    6173  6475
3056    6174  6713
3057    6175  6714
3058    6176  6600
3059    6177  6712
              6200      PAGE
3060
3061                    /
3062                            /CONTROL D
3063                            /CHANGE THE SWITCH REGISTER ANYTIME CNTRL D AND RETURN TO
3064                            /THE PROGRAM RUNNING.
3065
3066
3067    6200  4215    CNTRLD, JMS     UPAROW
3068    6201  1213            TAD     C8SETD          /CHECK IF THE RETURN ADDRS IS SAFE
3069    6202  7640            SZA CLA
3070    6203  5207            JMP     C8DO11          /DO NOT CHANGE THE RETURN ADDRS
3071    6204  1777'           TAD     XC8CNT          /GET THE RETURN ADDRS AND SAVE IT
3072    6205  3214            DCA     C8RETD          /SAVE THE RETURN HERE
3073    6206  2213            ISZ     C8SETD          /INDICATE RETURN SAVED DONT DISTROY
3074    6207  4255    C8DO11, JMS     XC8PSW                  /GO CHANGE THE SWITCH REGISTER
3075    6210  3213            DCA     C8SETD          /CLEAR THE FLAG
3076    6211  4224            JMS     C8GET           /RESTORE THE AC MQ LINK ETC
3077    6212  5614            JMP I   C8RETD          /RETURN TO THE PROGRAM
3078                    /
3079    6213  0000    C8SETD, 0
3080    6214  0000    C8RETD, 0
3081
3082
3083
3084                    /THIS WILL TYPE A UP ARROW AND THE CHAR IN C8CHAR.
3085
3086    6215  0000    UPAROW, 0                       /C8PRNT THE "^" AND THE CHAR C8TYPED IN
3087    6216  1376            TAD     (336            /CODE FOR ^
3088    6217  4775'           JMS     XC8TYPE
3089    6220  1774'           TAD     C8CHAR          /C8TYPE THE CHAR
3090    6221  4775'           JMS     XC8TYPE
3091    6222  4773'           JMS     XC8CRLF
3092    6223  5615            JMP I   UPAROW          /EXIT
3093
3094
3095
3096                    /*****************************************************************
3097
3098    6224  0000    C8GET,  0
3099    6225  7200            CLA
3100    6226  1772'           TAD     MQSAVE
3101    6227  7421            MQL                     /RESTORE MQ
3102    6230  1771'           TAD     FLSAVE
3103    6231  7004            RAL                     /RESTORE THE LINK
3104    6232  7200            CLA
3105    6233  1770'           TAD     ACSAVE          /RESTORE THE AC
3106    6234  5624            JMP I   C8GET           /GET THE REGISTERS
3107
3108
```

```
3109
3110                    /**********************************************************************
3111
3112                    /C8INQU
3113                    /C8INQU ROUTINE WILL PRINT A WAITING
3114                    /AND THE PROGRAM IS EXPECTING A CONTROL CHAR INPUT
3115                    /IF CONTINUE FROM CONTROL CHAR RETURN IS CALL PLUS ONE
3116                    /IF NO CONTROL CHAR ENTERED THEN WAITING IS REPRINTED
3117                    /AND PROGRAM WAITS FOR A CONTROL CHAR AGAIN.
3118
3119                    /       C8INQU =        JMS XC8INQ
3120
3121                    /EX.    JMS     XC8INQ                  /C8 WILL PRINT A WAITINGAND WAIT FOR INPUT
3122                    /       DO ANYTHING                     /RETURN IS CALL PLUS ONE AC =0 CONTINUE
3123
3124                    /CALLS USED ARE -CHKCLA-XC8PNT-XC8TYI-C8GET-XC8CNTR-
3125
3126
3127    6235  0000    XC8INQ, 0
3128    6236  4767'           JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
3129    6237  7410            SKP                     /ACTIVE CONSOLE PACKAGE
3130    6240  5635            JMP I   XC8INQ          /NOT CONSOLE LEAVE
3131    6241  4766'           JMS     XC8PNT
3132    6242  6250            WATMES                  /INQUIR WAITTING
3133    6243  4765'           JMS     XC8TTYI         /GET CHARACTER
3134    6244  4224            JMS     C8GET
3135    6245  4777'           JMS     XC8CNTR         /CHECK IF CONTROL CHARACTER
3136    6246  5635            JMP I   XC8INQ          /EXIT AND CONTINUE
3137    6247  5236            JMP     XC8INQ+1        /REASK
3138    6250  2701    WATMES, TEXT    "WAITING "
        6251  1124
        6252  1116
        6253  0740
        6254  0000
3139
3140
3141                    /**********************************************************************
3142
3143                    /C8SWIT
3144
3145                    /ROUTINE WILL CHECK IF CONSOL IS ACTIVE IF IT IS ACTIVE DISPLAY
3146                    /SW QUESTION . IF NOT ACTIVE IT WILL NOT PRINT THE SW QUESTION BUT
3147                    /RETURN TO CALL PLUS ONE AC=0.
3148                    /C8SWIT WILL SET UP THE PSEUDO SWITCH
3149                    /REGISTER WITH THE NEW DATA ENTERED
3150                    /
3151                    /       C8SWIT =        JMS XC8PSW
3152
3153                    /EX.            JMS     XC8PSW          /SET UP PSEUDO C8SWIT REGISTER IF
3154                                                            /ON THE CONSOL PACKAGE, RETURN IS CALL PLUS ONE AC = 0
3155
3156                    /CALLS USED ARE -CHKCLA-XC8PSW-XC8PNT-XC8OCTA-XC8TYPE-
3157
3158
3159    6255  0000    XC8PSW, 0
```



```
3160    6256  4767'           JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
3161    6257  7410            SKP                     /ACTIVE CONSOLE
3162    6260  5655            JMP I   XC8PSW          /DEACTIVE CONSOLE PACKAGE
3163                                                    /RETURN WITHOUT ASKING PSEUDO SWITCH
3164    6261  1344            TAD     C8SWST          /IS THE SOFT FLAG SET FOR SWITCH?
3165    6262  7640            SZA CLA                 /SKIP IF ONE ENTRY AT ATIME OK                  /
3166    6263  5764'           JMP     C8BY4           /SECOND ENTRY WITH OUT A EXIT GO TO SW QUESTION
3167    6264  2344            ISZ     C8SWST          /FIRST ENTRY SET FLAG
3168    6265  4766'   C8RDPS, JMS     XC8PNT          /C8PRNT SR=
3169    6266  6346            MESA
3170    6267  1020            TAD     20              /GET CONTENTS OF SW
3171    6270  4763'           JMS     XC8OCTA         /CONVERT IT TO ASCII
3172    6271  1362            TAD     (40             /GET SPACE
3173    6272  4775'           JMS     XC8TYPE
3174    6273  2761'           ISZ     INMODE          /SET FLAG FOR CHAR EXECTED
3175    6274  4760'           JMS     XC8ECHO         /LOOK FOR INPUT
3176    6275  4314            JMS     TSTCHA          /NOT CONTROL TEST IT IS LEGAL
3177    6276  1774'           TAD     C8CHAR          /STORE NEW CHAR IN SW REG
3178    6277  3020            DCA     20
3179
3180    6300  1357            TAD     (-3             /GET A MINUS 3
3181    6301  3345            DCA     TMPCNT          /STORE IN TEMP COUNT
3182    6302  4760'   GETCH1, JMS     XC8ECHO         /GET NEXT CHAR
3183    6303  4314            JMS     TSTCHA          /CHECK IF CR + GOOD CHAR
3184    6304  1020            TAD     20              /GET C8SWIT REGISTER
3185    6305  7106            RTL CLL                 /ROTATE IT LEFT 3 PLACES
3186    6306  7004            RAL
3187    6307  1774'           TAD     C8CHAR          /GET CHAR + ADD IT TO PREVIOUS CONTENTS
3188    6310  3020            DCA     20              /SAVE NEW CONTENTS
3189    6311  2345            ISZ     TMPCNT          /BUMP COUNT
3190    6312  5302            JMP     GETCH1          /JMP BACK + GET NEXT CHAR
3191    6313  5341            JMP     ENDIT           /END 4 CHAR C8TYPED IN
3192    6314  0000    TSTCHA, 0
3193    6315  7041            CIA                     /CMPL CHAR IN AC
3194    6316  1356            TAD     (215            /TEST IF IT IS A CARRIAGE RETURN
3195    6317  7650            SNA CLA                 /SKIP IN NOT CR,
3196    6320  5341            JMP     ENDIT           /WAS CARRIAGE RETURN
3197    6321  1774'           TAD     C8CHAR          /NOT CR, GET CHAR
3198    6322  1355            TAD     (-260           /CHECK IF IT IS IN RANGE
3199    6323  7710            SPA CLA                 /IF NOT POSITIVE C8ERR CHAR SMALLER THEN 260
3200    6324  5335            JMP     ERR1            /C8ERR = CHAR TOO SMALL
3201    6325  1774'           TAD     C8CHAR          /GET CHAR
3202    6326  1354            TAD     (-270           /GET A -270 + CHECK IF IT IS LARGER THEN 7
3203    6327  7700            SMA CLA                 /SKIP IF LESS THEN 7
3204    6330  5335            JMP     ERR1            /C8ERR ON CHAR NOT IN RANGE
3205    6331  1774'           TAD     C8CHAR          /GET CHAR
3206    6332  0353            AND     (7              /MASK FOR RIGHT BYTE
3207    6333  3774'           DCA     C8CHAR          /STORE IN CHAR
3208                                                    /GET CHAR IN AC
3209    6334  5714            JMP I   TSTCHA          /EXIT
3210    6335  1352    ERR1,   TAD     (277            /C8PRNT
3211    6336  4775'           JMS     XC8TYPE         /?
3212    6337  4773'           JMS     XC8CRLF         /
3213    6340  5265            JMP     C8RDPS          /EXIT + ASK AGAIN
3214    6341  4773'   ENDIT,  JMS     XC8CRLF         /DO A CR LF
```

```
3215    6342  3344            DCA     C8SWST          /CLEAR THE PSW ENTRY FLAG
3216    6343  5655            JMP I   XC8PSW          /EXIT ROUTINE
3217    6344  0000    C8SWST, 0
3218
3219    6345  0000    TMPCNT, 0
3220    6346  2322    MESA,   TEXT    "SR= "
        6347  7540
        6350  0000
3221
3222
3223    6352  0277
3224    6353  0007
3225    6354  7510
3226    6355  7520
3227    6356  0215
3228    6357  7775
3229    6360  6463
3230    6361  6476
3231    6362  0040
3232    6363  6400
3233    6364  6115
3234    6365  5670
3235    6366  5701
3236    6367  6600
3237    6370  6712
3238    6371  6714
3239    6372  6713
3240    6373  6423
3241    6374  6475
3242    6375  6477
3243    6376  0336
3244    6377  6000
              6400    PAGE
3245
3246                  /C8OCTA
3247
3248                  /OCTAL TO ASCII CONVERSION
3249                  /THIS ROUTINE WILL TAKE THE OCTAL NUMBER IN THE AC AND CONVERT IT TO ASCII
3250                  /THE RESULT WILL BE PRINTED ON THE CONSOL TERMINAL
3251                  /       C8OCTA= JMS XC8OCT
3252                  /
3253                  /EX,    JMS     XC8OCTA         /AC CONTAINS NUMBER TO BE CHANGE
3254                  /       RETURN IS TO CALL PLUS ONE AC=0
3255                  /
3256                  /CALLS USED ARE =XC8TYPE=
3257
3258
3259    6400  0000    XC8OCT, 0
3260    6401  7106            CLL RTL
3261    6402  7006            RTL                     /POSITION THE FIRST CHAR FOR PRINTING
3262    6403  3221            DCA     C8TMP1          /SAVE CORRECT POSITIONED WORD HERE
3263    6404  1377            TAD     (-4
3264    6405  3222            DCA     C8CKP           /STORE COUNTER IN HERE
3265    6406  1221    C8D04,  TAD     C8TMP1          /GET FIRST NUMBER
3266    6407  0376            AND     (0007           /MASK
```



```
3267    6410  1375            TAD     (260            /ADD THE PRINT CONSTANT
3268    6411  4277            JMS     XC8TYPE         /TYPE THE NUMBER
3269    6412  1221            TAD     C8TMP1          /
3270    6413  7006            RTL
3271    6414  7004            RAL                     /PUT NEXT NUMBER IN POSITION
3272    6415  3221            DCA     C8TMP1          /STORE IT
3273    6416  2222            ISZ     C8CKP           /DONE YET WITH FOUR NUMBERS
3274    6417  5206            JMP     C8D04           /NOT YET DO MORE
3275    6420  5600            JMP I   XC8OCT          /DONE WITH FOUR
3276    6421  0000    C8TMP1, 0
3277    6422  0000    C8CKP,  0
3278
3279
3280                  /*****************************************************************
3281
3282                  /C8CRLF
3283                  /C8TYPE CR AND LF WITH FILLERS FOLLOWING EACH LF AND CR
3284                  /
3285                  /       C8CRLF= JMS XC8CRL
3286                  /
3287                  /EX,    JMS     XC8CRLF         /C8PRNT A CR AND LF WITH FILL
3288                  /                               /RETURN TO CALL PLUS ONE AC =0
3289                  /CALLS USED ARE =XC8TYPE=
3290
3291
3292    6423  0000    XC8CRLF,0
3293    6424  7300            CLA CLL
3294    6425  1374            TAD     (215            /GET CODE FOR CR
3295    6426  4277            JMS     XC8TYPE
3296    6427  1237            TAD     FILLER
3297    6430  7040            CMA
3298    6431  3240            DCA     FILCNT          /STORE FILLER IN HERE
3299    6432  1373            TAD     (212            /GET CODE FOR LF
3300    6433  4277    C8D02,  JMS     XC8TYPE
3301    6434  2240            ISZ     FILCNT          /CHECK ON FILLER CHAR
3302    6435  5233            JMP     C8D02           /TYPE A NON PRINTING CHAR
3303    6436  5623            JMP I   XC8CRL          /EXIT
3304    6437  0004    FILLER, 0004                    /FILLER SET FOR 4 CHAR
3305    6440  0000    FILCNT, 0                       /COUNTER FOR FILL
3306
3307
3308
3309                  //*********************************************************
3310                  /C8CKPA
3311                  /THIS ROUTINE WILL CHECK IF A CHARACTER WAS ENTERED FROM THE
3312                  /TERMINAL, IFTHE FLAG IS SET AND THE CONSOLE PACKAGE IS
3313                  /ACTIVE A CHECK IS MADE TO DETERMIND IF IT IS A CONTROL CHAR,
3314                  /IF IT WAS A CONTROL CHAR THEN ITS CONTROL FUNCTION IS PERFORMED,
3315                  /IF NOT A CONTROL CHARACTER OR A CONTROL E-D-L-O= IT WILL DO
3316                  /THE CONTROL FUNCTION AND RETURN TO CALL PLUS 2,
3317                  /A NON CONTROL CHARACTER WILL BE PRINTEDAND A "?" IT WILL RETURN TO
3318                  /CALL PLUS 2,
3319                  /IF NO FLAG IS SET OR THE CONSOL IS NOT ACTIVE THE RETURN IS TO
3320                  /CALL PLUS 1,
3321
```

```
                        /       C8CKPA= JMS     XC8CKP

                        /EX,    JMS     XC8CKPA                 /CALL TO CHECK IF CONTROL CHAR SET
                        /       ANYTHING(SKIP)          /RETURN IF NOT FLAG OR NOT CONSOLE ACTIVE
                        /       ANYTHING(JMP EXIT SKIP CHAIN)   /RETURN IF NOT CONTROL OR CONTINUE CONTROL


                        /CALLS USED ARE =XC8TTYI=XC8CNTR=C8GET=


6441  0000    XC8CKP, 0
6442  3772'             DCA     ACSAVE          /SAVE THE AC
6443  6004              GTF                     /SAVE THE FLAGS
6444  3771'             DCA     FLSAVE          /SAVE THE FLAGS
6445  7501              MQA                     /PUT MQ IN AC
6446  3770'             DCA     MQSAVE          /SACE THE MQ
6447  6031              KSF                     /CHECK THE KEYBOARD FLAG
6450  5261              JMP     C8BY3           /EXIT TO CALL PLUS 1
6451  4767'             JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
6452  7410              SKP                     /ACTIVE CONSOLE PACKAGE
6453  5261              JMP     C8BY3           /EXIT TO CALL PLUS 1
6454  4766'             JMS     XC8TTYI         /GET THE CHAR
6455  4765'             JMS     C8GET           /GET THE FLAGS
6456  4764'             JMS     XC8CNTR         /CHECK IF CONTROL  CHAR,
6457  7000              NOP                     /RETURN IF A CONTINUE CHAR,
6460  2241              ISZ     XC8CKP          /BUMP RETURN FOR CALL PLUS 2
6461  4765'   C8BY3,   JMS     C8GET           /GET REGISTERS
6462  5641              JMP I   XC8CKP          /SAY GOOD BY

                        //*****************************************************************

                        /C8ECHO
                        /THIS ROUTINE WILL LOOK FOR A CHAR FROM THE KEYBOARD,  STORE IT IN LOCATION CHAR
                        /CHECK IF IT WAS A CONTROL CHARACTER - SET INMODE - PRINT CHARACTER

                        /       C8ECHO =        JMS XC8ECH
                        /EX,    JMS     XC8ECHO         /LOOK FOR CONSOL CHAR C8PRNT IT
                                                        /RETURN CALL PLUS ONE AC = CHAR C8TYPED IN


                        /CALLS USED ARE =XC8TTYI=XC8CNTR=C8GET=XC8ECH=XC8TTYPE

                        /
6463  0000    XC8ECH, 0
6464  4766'             JMS     XC8TTYI         /WAIT FOR CHAR FROM KEYBOARD
6465  4765'             JMS     C8GET           /RESTORE THE REGISTERS
6466  2276              ISZ     INMODE          /SET INMODE IDENTIFING THIS AS A EXPECTED CHAR
6467  4764'             JMS     XC8CNTR         /GO CHECK IF IT IS A CONTROL CHAR
6470  5663              JMP I   XC8ECH          /WAS A CONTROL CHAR - CONTINUE RUNNING
6471  4277              JMS     XC8TYPE         /NOT A CONTROL CHAR C8PRNT IT
6472  3276              DCA     INMODE          /CLEAR FLAG THAT CHAR EXPECTED
6473  1275              TAD     C8CHAR          /GET CHAR IN AC
6474  5663              JMP I   XC8ECH          /EXIT
6475  0000    C8CHAR, 0
```



```
6476  0000    INMODE, 0

                        /*****************************************************************

                        /C8TYPE
                        /THIS ROUTINE WILL C8PRNT ON THE CONSOLE OR THE LPT WITH DEVICE CODE 66.
                        /
                        /       C8TYPE= JMS XC8TYP

                        /EX,    JMS     XC8TYPE         /C8PRNT THE CHAR IN THE AC.
                                /                       /RETURN CALL PLUS ONE AC =0000
                                                        /DO NOT CLEAR THE LINK IN THIS ROUTINE NEEDED BYC8OCT

                        /CALLS USED ARE =C8HANG=XC8CNTR=XC8PNT=XC8CRLF=XC8INQU=


6477  0000    XC8TYP, 0
6500  3320              DCA     PNTBUF          /STORE CHAR
6501  1321              TAD     TTYLPT          /CHECK 0=TTY 7777=LPT
6502  7640              SZA CLA
6503  5312              JMP     XDOLPT          /DO OUT PUT ON LPT
6504  1320              TAD     PNTBUF
6505  6046              TLS
6506  6041              TSF
6507  5306              JMP     .-1
6510  6042              TCF
6511  5316              JMP     C8BY5
6512  1320    XDOLPT,   TAD     PNTBUF          /GET CHAR
6513  6666              PSTB    PCLF            /C8PRNT IT
6514  4322              JMS     C8HANG          /CHECK KEYBOARD IF HUNG
6515  6662              PCLF                    /CLEAR THE FLAG
6516  7600    C8BY5,    7600                    /CLEAR THE AC
6517  5677              JMP I   XC8TYP          /EXIT
6520  0000    PNTBUF, 0
6521  0000    TTYLPT, 0


6522  0000    C8HANG, 0
6523  7200              CLA             /
6524  1316              TAD     C8BY5           /GET CONSTANT 7600
6525  3320              DCA     PNTBUF          /PNTBUF IS NOW A COUNTER
6526  6661              PSKF                    /SKIP ON PRINTER DONE
6527  7410              SKP                     /NOT DONE YET
6530  5722              JMP I   C8HANG          /SAW FLAG DONE
6531  2345              ISZ     C8CONT          /FIRST COUNTER FAST ONE
6532  5326              JMP     .-4             /CHECK IF FLAG SET YET
6533  2320              ISZ     PNTBUF          /MADE 4096 COUNTS ON FAST COUNTER
6534  5331              JMP     .-3             /KEEP IT UP FOR 5 SEC
6535  1764'             TAD     XC8CNTR         /GET THE RETURN ADDRESS IN CONTROL
6536  3322              DCA     C8HANG          /SAVE IT IN HANG
6537  3321              DCA     TTYLPT          /ALLOW PRINTING ON TTY
6540  4763'             JMS     XC8PNT
6541  6546              MESHANG                 /LPT ERROR
6542  4223              JMS     XC8CRLF
6543  4762'             JMS     XC8INQU         /PRINT WAITING
```

```
3432    6544  5722            JMP I   C8HANG          /CONTINUE TO SAVE ADDRESS
3433    6545  0000    C8CONT, 0                       /COUNTER FOR TIMER
3434    6546  1420    MESHANG,TEXT    "LPT ERROR"
        6547  2440
        6550  0522
        6551  2217
        6552  2200
3435
3436    6562  6235
3437    6563  5701
3438    6564  6000
3439    6565  6224
3440    6566  5670
3441    6567  6600
3442    6570  6713
3443    6571  6714
3444    6572  6712
3445    6573  0212
3446    6574  0215
3447    6575  0260
3448    6576  0007
3449    6577  7774
              6600      PAGE
3450                    /*********************************************************************
3451                    /*********************************************************************
3452
3453                    /THIS ROUTINE WILL CHECK LOCATION 22 THE HARD WARE CONFIG WORD,
3454                    /TO SEE IF THE CONSOLE BIT 3 )400) IS SET IF SET THEN RETURN
3455                    /TO CALL PLUS TWO FO A ACTIVE CONSOLR PACKAGE AC=0
3456                    /IF NOT SET THEN TO CALL PLUS ONE FOR A DEACTIVE CONSOLE PACKAGE.
3457
3458
3459    6600  0000    CHKCLA, 0
3460    6601  7200            CLA
3461    6602  1022            TAD     22              /GET THE COTENTA OF LOCATION 22
3462    6603  0377            AND     (400            /MASK FOR BIT 3 (400
3463    6604  7650            SNA CLA                 /
3464    6605  2200            ISZ     CHKCLA          /ACTIVE CONSOLE PACKAGE RETURN
3465                                                  /CALL PLUS ONE (1) FOR ACTIVE
3466    6606  5600            JMP I   CHKCLA          /DEACTIVE CONSOLE PACKAGE RETURN
3467                                                  /CALL PLUS TWO (2)
3468
3469                    /C8ERR
3470                    /THIS ROUTINE WILL DETERMINE WHAT TO DO WHEN A C8ERR IS ENCOUNTERED
3471                    /WILL CHECK IF CLASSIC SYSTEM, WILL CHECK C8SWIT REGISTERS,
3472                    /       C8ERR=  JMS XC8ERR
3473                    /EX,    JMS     XC8ERR          /GO TO C8ERR CALL IF NOT CONSOL
3474                    /                               /RETURN IS CALL PLUS ONE AC =0000
3475
3476                    /CALLS USED ARE -CHKCLA-XC8CRLF-XC8SW-XC8INQU-XC8PNT-XC8OCTA-
3477
3478
3479    6607  0000    XC8ERR, 0
3480    6610  6002            IOF
3481    6611  3312            DCA     ACSAVE          /SAVE AC
```



```
3482    6612  6004            GTF
3483    6613  3314            DCA     FLSAVE          /SAVE THE FLAGS
3484    6614  7501            MQA
3485    6615  3313            DCA     MQSAVE          /SAVE THE MQ
3486    6616  7340            CLA CLL CMA             /SUBTRACT A 1 FOR TRUE LOCATION
3487    6617  1207            TAD     XC8ERR          /GET RETTURN LOCATION
3488    6620  3311            DCA     PCSAVE          /SAVE ADD OF C8ERR CALL
3489    6621  4200            JMS     CHKCLA          /CHECK LOC,22 BIT 3 CONSOL BIT
3490    6622  7410            SKP                     /ACTIVE CONSOLE PACKAGE
3491    6623  5262            JMP     C8BY2           /NOT CLASSIC SYSTEM
3492    6624  4776'           JMS     C8GET           /RESTORE REGISTERS
3493    6625  4775'           JMS     XC8SW           /CHECK SWITCH REG FOR BIT THAT INDICATES
3494                                                  /NO ERROR MESSAGE
3495    6626  0374    SETUP1, AND     (0000           /MASK FOR BIT FOR NO ERROR PRINTING
3496                                                  /IF THIS ERROR MESSAGE IS TO ALWAYS
3497                                                  /BE PRINTED LEAVE AND VALUE AT 0000
3498    6627  7640            SZA CLA                 /SKIP IF BIT IS 0 PRINT ERROR MESSAGE
3499    6630  5255            JMP     C8DO10          /DO NOT PRINT
3500    6631  4773'           JMS     XC8CRLF
3501    6632  4772'           JMS     XC8PNT
3502    6633  6665            ERRMES                  /PRINT THE ERROR MESSAGE
3503    6634  4772'           JMS     XC8PNT
3504    6635  6675            MESPC                   /PRINT THE PC STSTEMENT
3505    6636  1311            TAD     PCSAVE
3506    6637  4771'           JMS     XC8OCTA         /CONVERT 4 DIGIT PC TO ASCII
3507    6640  4772'           JMS     XC8PNT
3508    6641  6700            MESAC                   /PRINT THE AC MESS
3509    6642  1312            TAD     ACSAVE
3510    6643  4771'           JMS     XC8OCTA
3511    6644  4772'           JMS     XC8PNT
3512    6645  6703            MESMQ                   /PRINT MQ
3513    6646  1313            TAD     MQSAVE
3514    6647  4771'           JMS     XC8OCTA
3515    6650  4772'           JMS     XC8PNT
3516    6651  6706            MESFL                   /PRINT FL
3517    6652  1314            TAD     FLSAVE
3518    6653  4771'           JMS     XC8OCTA
3519    6654  4773'           JMS     XC8CRLF
3520    6655  4776'   C8DO10, JMS     C8GET           /RESTORE REGISTERS
3521    6656  4775'           JMS     XC8SW           /CHECK SWITCH REGISTER
3522    6657  7710            SPA CLA                 /SKIP IF BIT 0 NOT SET
3523    6660  5262            JMP     C8BY2           /LEAVE
3524    6661  4770'           JMS     XC8INQ          /GO TO THE INQUIRE ROUTINE
3525    6662  2207    C8BY2,  ISZ     XC8ERR
3526    6663  4776'           JMS     C8GET           /GET THE REGISTERS
3527    6664  5607            JMP I   XC8ERR
3528    6665  0412    ERRMES, TEXT    "DJADAC  FAILED "
        6666  0104
        6667  0103
        6670  4040
        6671  0601
        6672  1114
        6673  0504
        6674  4000
3529    6675  4040    MESPC,  TEXT    "  PC:"
```

```
                6676  2003
                6677  7200
3530            6700  4040    MESAC,  TEXT    "  AC:"
                6701  0103
                6702  7200
3531            6703  4040    MESMQ,  TEXT    "  MQ:"
                6704  1521
                6705  7200
3532            6706  4040    MESFL,  TEXT    "  FL:"
                6707  0614
                6710  7200
3533            6711  7777    PCSAVE, 7777
3534            6712  7777    ACSAVE, 7777
3535            6713  7777    MQSAVE, 7777
3536            6714  7777    FLSAVE, 7777
3537            6770  6235
3538            6771  6400
3539            6772  5701
3540            6773  6423
3541            6774  0000
3542            6775  5660
3543            6776  6224
3544            6777  0400
                      7000    PAGE                    /C8/
3545
3546                          /C8/    ROUTINE TO INITIALIZE FOR RUNNING EITHER WITH OR WITHOUT
3547                          /C8/    THE CONSOLE PACKAGE.
3548
3549            7000  0000    C8IZ,   0               /C8/
3550            7001  1022            TAD     HCW2    /C8/CONSOLE PKG CALLED FOR?
3551            7002  0377            AND     (400    /C8/
3552            7003  7650            SNA CLA         /C8/SKP IF YES.
3553            7004  5220            JMP     C8IZN   /C8/GO INIT FOR NO CONSOLE PKG.
3554            7005  1021            TAD     HCW1    /C8/IS THERE ENOUGH CORE (8K OR MORE)?
3555            7006  0376            AND     (34     /C8/
3556            7007  7650            SNA CLA         /C8/SKP IF YES.
3557            7010  5216            JMP     C8IZER  /C8/
3558            7011  7040            CMA             /C8/
3559            7012  3775'           DCA     C8F     /C8/SET CONSOLE PKG ACTIVE FLAG.
3560            7013  7040            CMA             /C8/
3561            7014  3774'           DCA     C8IZF   /C8/SET INIT ALREADY DONE FLAG.
3562            7015  5600            JMP I C8IZ      /C8/RTN TO CALL+1.
3563
3564                          /C8/    TO RUN WITHOUT CONSOLE PKG, HCW2, BIT 3 MUST = 0.
3565
3566                          /C8/    TO RUN WITH CONSOLE PKG, HCW2, BIT 3 MUST = 1 -AND-
3567                          /C8/    HCW1, BITS 7-11 MUST INDICATE 8K OR MORE.
3568
3569                          /C8/    MAKE ADJUSTMENTS AND RESTART (AT ANY LEGAL START ADDRESS).
3570
3571                          /C8/    ***WARNING***  AN ATTEMPT TO RUN THE PROGRAM, WITH THE
3572                          /C8/                   CONSOLE PKG, IN 4K WILL RESULT IN UNSPECIFIED
3573                          /C8/                     PROGRAM ACTION.
3574
3575            7016  7402    C8IZER, HLT                     /C8/SEE ABOVE COMMENTARY.
```



```
3576            7017  5216            JMP     C8IZER          /C8/NO CONTINUE.
3577            7020  7040    C8IZN,  CMA                     /C8/
3578            7021  3774'           DCA     C8IZF           /C8/SET 'INIT ALREADY DONE' FLAG.
3579            7022  1373            TAD     (C8TABB-1       /C8/NEGATE ALL CALLS TO THE CONSOLE -
3580            7023  3010            DCA     10              /C8/ - PKG BY REPLACING THEM WITH A
3581            7024  1372    C8IZNA, TAD     (7402           /C8/ - HLT INSTRUCTION.
3582            7025  3410            DCA I   10              /C8/
3583            7026  1010            TAD     10              /C8/ALL CALLS NEGATED?
3584            7027  7041            CMA IAC                 /C8/
3585            7030  1371            TAD     (C8TABE-1       /C8/
3586            7031  7640            SZA CLA                 /C8/SKP IF YES.
3587            7032  5224            JMP     C8IZNA          /C8/
3588            7033  5600            JMP I   C8IZ            /C8/RTN TO CALL+1.
3589
3590            7034  0006    C8TABB, C8CALA          /C8/
3591            7035  0212            C8CALB          /C8/
3592            7036  1644            C8CALC          /C8/
3593            7037  1673            C8CALD          /C8/
3594            7040  1763            C8CALE          /C8/
3595            7041  2015            C8CALF          /C8/
3596            7042  2057            C8CALG          /C8/
3597            7043  2303            C8CALH          /C8/
3598            7044  3320            C8CALI          /C8/
3599            7045  2404            C8CALJ          /C8/
3600            7046  2412            C8CALK          /C8/
3601            7047  2420            C8CALL          /C8/
3602            7050  2426            C8CALM          /C8/
3603            7051  2436            C8CALN          /C8/
3604            7052  2446            C8CALO          /C8/
3605            7053  2454            C8CALP          /C8/
3606            7054  2462            C8CALQ          /C8/
3607            7055  2470            C8CALR          /C8/
3608            7056  2500            C8CALS          /C8/
3609            7057  2506            C8CALT          /C8/
3610            7060  2514            C8CALU          /C8/
3611            7061  2522            C8CALV          /C8/
3612            7062  2530            C8CALW          /C8/
3613            7063  2540            C8CALX          /C8/
3614            7064  2546            C8CALY          /C8/
3615            7065  2554            C8CALZ          /C8/
3616            7066  2562            C8CAL0          /C8/
3617            7067  2570            C8CAL1          /C8/
3618            7070  2755            C8CAL2          /C8/
3619            7071  4005            C8CAL3          /C8/
3620            7072  4025            C8CAL4          /C8/
3621                          C8TABE,                   /C8/
3622
3623                          $$$
3624            7171  7072
3625            7172  7402
3626            7173  7033
3627            7174  3431
3628            7175  3432
3629            7176  0034
3630            7177  0400
```

```
3631    0156  6031
3632    0157  6030
3633    0160  7761
3634    0161  0017
3635    0162  3521
3636    0163  1424
3637    0164  1356
3638    0165  1330
3639    0166  7700
3640    0167  0002
3641    0170  0004
3642    0171  0010
3643    0172  0040
3644    0173  0100
3645    0174  0200
3646    0175  0400
3647    0176  1000
3648    0177  0211
```



```
0000  11100111  11000001  11111111  11111111  11111111  11111111  11111111  11111100
0100  00111111  11111111  11111111  11111111  11111111  11111011  11111111  11111111

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11111111  11111000  00011111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10000011

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10000111


1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111100  00000000  00000000  00000000  00000111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00111111

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111100  00000000  00000000  00000000  00000000  00000000  00000011

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111100  11111111


2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11100000  00000000  01111111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11000000

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00111111


3000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100  11111111  11111111  11111111  11111111  11111111  11111111  00000011  11111111

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  11111111  11111111  11111111  11111111  11111111  11111111  11111000  00111111

3400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3500  11111111  11111111  11111111  11111111  11100000  00000000  00000000  01111111

3600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3700  11111111  11111111  11111111  11111111  11111111  11111000  00001111  11111111
```

```
4000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4100  11111111  11111111  11111111  11111111  11111111  11111111  11110000  00011111

4200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

4400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

4600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111


5000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

5200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

5400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5500  11111111  11111111  11111111  11111111  11111111  11111111  11111000  00000000

5600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5700  11111111  11111111  11111111  11111111  11111110  00000001  11111111  11111111


6000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6100  11111111  11111111  11111111  11111111  11111111  11111000  11111111  11111111

6200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6300  11111111  11111111  11111111  11111111  11111111  10111111  11111111  11111111

6400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6500  11111111  11111111  11111111  11111111  11111111  11100000  00111111  11111111

6600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6700  11111111  11111000  00000000  00000000  00000000  00000000  00000000  11111111


7000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11100000
7100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  01111111

7200
7300

7400
7500

7600
7700
```



```
A10       0010        C8CALR  2470        C8SWST  6344        DOCNT   5645
A11       0011        C8CALS  2500        C8TABB  7034        DON1    1356
ACL       7701        C8CALT  2506        C8TABE  7073        DONEA   6026
ACSAVE    6712        C8CALU  2514        C8TMP1  6421        DONINT  1340
ACSV      3753        C8CALV  2522        C8TTYI  4504        DOPACK  5611
ACTVC8    3737        C8CALW  2530        C8TYPE  4513        DOSET   5647
ADCL      4520        C8CALX  2540        CAF     6007        EMSG1   4200
ADLE      4526        C8CALY  2546        CHAN    0071        EMSG10  4410
ADLM      4521        C8CALZ  2554        CHARA   0067        EMSG11  4444
ADR8      4523        C8CHAR  6475        CHKCLA  6600        EMSG13  4477
ADRS      4527        C8CKP   6422        CHNL    3522        EMSG14  4537
ADSE      4525        C8CKPA  4516        CHNL1   3454        EMSG2   4232
ADSK      4524        C8CKSW  4503        CKCOUT  5630        EMSG20  4571
ADST      4522        C8CNTR  4505        CKIOT   3051        EMSG21  4622
ALL1S     1272        C8CONT  6545        CLAB    4535        EMSG22  4644
ALL1SA    1315        C8CRLF  4511        CLADBB  1253        EMSG23  4671
AOK       3707        C8DO1   5706        CLADBU  1231        EMSG24  4706
AUTMSG    5472        C8DO10  6655        CLEAN   3000        EMSG25  4732
AUTO      1431        C8DO11  6207        CLED    4534        EMSG26  4765
AUTO1     1435        C8DO2   6433        CLKNOW  0146        EMSG27  5022
AUTO2     1462        C8DO3   5746        CLKST   4050        EMSG3   4270
BADINT    0005        C8DO4   6406        CLOE    4530        EMSG30  5043
BLANK     0066        C8DO7   6126        CLRDON  0733        EMSG31  5065
BYRETR    6106        C8ECHO  4512        CLRERR  1001        EMSG32  5113
C8ACTV    4475        C8ERR   4514        CLSA    4533        EMSG33  5132
C8BY1     5627        C8F     3432        CLSK    4531        EMSG34  5152
C8BY2     6662        C8GET   6224        CLZE    4532        EMSG35  5177
C8BY3     6461        C8HANG  6522        CNTR1   0043        EMSG36  5221
C8BY4     6115        C8INQU  4515        CNTRLC  6147        EMSG37  5243
C8BY5     6516        C8IZ    7000        CNTRLD  6200        EMSG4   4311
C8CAL0    2562        C8IZER  7016        CNTRLE  6144        EMSG40  5265
C8CAL1    2570        C8IZF   3431        CNTRLL  6136        EMSG41  5306
C8CAL2    2755        C8IZN   7020        CNTRLQ  6100        EMSG42  5343
C8CAL3    4005        C8IZNA  7024        CNTRLR  6111        EMSG6   4334
C8CAL4    4025        C8LAS   0760        CNTRLS  6120        EMSG7   4360
C8CALA    0006        C8MOVB  2223        CNTVAL  5650        ENA2    0226
C8CALB    0212        C8OCTA  4510        COD1    1627        ENA3    0251
C8CALC    1644        C8PASS  4502        COD2    1655        ENA4    0274
C8CALD    1673        C8PAUS  4517        COD3    1656        ENA5    0317
C8CALE    1763        C8PRNT  4506        COMPAR  3645        ENA6    0342
C8CALF    2015        C8RDP8  6265        COMPR1  3662        END     3034
C8CALG    2057        C8RESO  3611        CONSOL  0000        ENDIT   6341
C8CALH    2303        C8RETD  6214        CONT    3223        EOCER1  1063
C8CALI    3320        C8RETR  6135        CONVT   1732        EOCER2  1115
C8CALJ    2404        C8SETD  6213        CRLF    3337        EOCERR  1057
C8CALK    2412        C8SETS  6134        CSNOW   0150        EOUT    2252
C8CALL    2420        C8SR    0767        DELAY   0042        EOUT1   2273
C8CALM    2426        C8STAB  3420        DILE    4542        EOUT2   2270
C8CALN    2436        C8STAR  3400        DILX    4537        EOUT3   2267
C8CALO    2446        C8STRT  3412        DILY    4540        ER10    3302
C8CALP    2454        C8SVSR  0154        DISD    4536        ER11    3306
C8CALQ    2462        C8SWIT  4507        DIXY    4541        ER1L8B  0151
```

ER40	3473	K7	3531	PCSAVE	6711	TEMPB	0037
ERCLR	2757	K77	0057	PNTBUF	6520	TEMPC	0040
ERCOM	2713	LAS	4553	PRLP	3330	TEMPD	0041
ERCOM1	2745	LAST	0144	PSIE	6665	TEMPLB	0152
ERMSG	2112	LKSV	3754	PSKE	6663	TEMPX	4163
EROV5	3732	LSTCHN	4142	PSKF	6661	TIM1	1646
ERPC	2762	M1	0051	PSR	0020	TIM2	1675
ERR	0045	M2	0052	PSTB	6664	TIMDIF	1601
ERR1	6335	M4	0053	PTSTOR	5734	TIMERR	1712
ERRINT	1401	M40	0055	RANCHN	3504	TIML1	1630
ERRMES	6665	M6	0054	RBCLDO	1214	TIML2	1657
ERSWIT	0070	MCOUNT	3157	REDOA	6015	TMG1	1424
ERTYP	2236	MCTR	2235	RESOL	3600	TMPCNT	6345
EXIT	2317	MESA	6346	RESOL1	3627	TST14	1476
EXIT1	2320	MESAC	6700	RESTR	4124	TST3	1317
EXITA	6040	MESAGE	2322	RETURN	0002	TST38	1330
EXT1	2010	MESFL	6706	SCOPE	2305	TSTADC	0514
EXTL	2000	MESHAN	6546	SCPNOW	0147	TSTCAF	0533
EXTTE	2062	MESMQ	6703	SECNO	3521	TSTCHA	6314
FADDR	2233	MESPAS	5651	SELECT	0073	TSTDON	0601
FILCNT	6440	MESPC	6675	SETCS	3036	TSTERR	0634
FILLER	6437	MESS	3131	SETCS1	3040	TSTJAM	0552
FINIS	1717	MESS1	3141	SETIO1	3074	TSTSR0	0663
FINISA	1725	MONOT	3200	SETIO2	3105	TSTSR1	0710
FIRST	0143	MOVE	2200	SETIO3	3111	TTYLPT	6521
FIVHUN	3736	MOVEA	2213	SETIOT	3066	TWENT	0023
FLSAVE	6714	MQA	7501	SETUP	0074	TWENT1	0024
FSTNO	3520	MQL	7421	SETUP1	6626	TWENT2	0025
GETCH1	6302	MQSAVE	6713	SETUP2	5624	TXTA	5403
GETDAT	6056	MSGADR	2726	SPIOT	3060	TXTB	5411
GLITCH	3433	MSGPNT	0017	START	0211	TXTIOT	5374
GOITA	6043	MSRGHT	2341	STCLDO	1022	TXTPC	5371
GOTOA	6054	MTP	2366	STCLER	1037	TYPECH	2342
GTF	6004	MUX10	0447	STCONV	4061	UPAROW	6215
HCW1	0021	MUX11	0472	STORAG	5600	VADCL	2401
HCW2	0022	MUX8	0401	SW0	0026	VADLE	2451
HEAD13	5537	MUX8A	0400	SW1	0027	VADLM	2407
HEAD14	5555	MUX9	0424	SW2	0030	VADRB	2423
HLT	7402	MWORD	3156	SW3	0031	VADRS	2457
IND	2370	NEXTIO	3016	SW4	0032	VADSE	2441
INDEXA	6055	NOERCL	1201	SW5	0033	VADSK	2431
INITL	0217	NOISE	3254	SW6	0034	VADST	2415
INITM	0222	NOISE1	3265	SYST	4000	VCLAB	2525
INMODE	6476	NOSET	5640	SYST1	4057	VCLED	2517
INSTR	3317	NOW	0145	TABIOT	3116	VCLOE	2465
JMPLOC	2712	OK	3246	TABLA	6061	VCLSA	2511
K1000	0056	OV2	3476	TABLB	6071	VCLSK	2473
K200	0061	OV3	2046	TADDR	2234	VCLZE	2503
K207	0046	OVERR	2106	TAL	0072	VDILE	2565
K212	0047	OVL	2111	TALLY	0044	VDILX	2543
K215	0050	PASCNT	5646	TEMP0	0035	VDILY	2551
K40	0060	PCLF	6662	TEMPA	0036	VDISD	2533

VDIXY	2557	XTAL1	2630
WATMES	6250	XTAL2	2624
XADCL	0120	XTAL3	2614
XADLE	0126	XTEST	2632
XADLM	0121	XXADCL	2400
XADRB	0123	XXADLE	2450
XADRS	0127	XXADLM	2406
XADSE	0125	XXADRB	2422
XADSK	0124	XXADRS	2456
XADST	0122	XXADSE	2440
XC8CKP	6441	XXADSK	2430
XC8CNT	6000	XXADST	2414
XC8CRL	6423	XXCLAB	2524
XC8ECH	6463	XXCLED	2516
XC8ERR	6607	XXCLOE	2464
XC8INQ	6235	XXCLSA	2510
XC8LAS	0153	XXCLSK	2472
XC8OCT	6400	XXCLZE	2502
XC8PAS	5600	XXDILE	2564
XC8PAU	5735	XXDILX	2542
XC8PNT	5701	XXDILY	2550
XC8PSW	6255	XXDISD	2532
XC8SA	3417	XXDIXY	2556
XC8STA	3416		
XC8SW	5660		
XC8TTY	5670		
XC8TYP	6477		
XCLAB	0135		
XCLED	0134		
XCLOE	0130		
XCLSA	0133		
XCLSK	0131		
XCLZE	0132		
XCOMPR	0064		
XDILE	0142		
XDILX	0137		
XDILY	0140		
XDISD	0136		
XDIXY	0141		
XDOLPT	6512		
XDOSW	6117		
XEND	5417		
XIND	3364		
XLABEL	5432		
XMOVE	0062		
XPRLP	0065		
XSELEC	2676		
XSETUP	3347		
XSTOR	0063		
XTABLA	6057		
XTABLB	6060		
XTAL	2600		

ERRORS DETECTED: 0

LINKS GENERATED: 184

RUN-TIME: 20 SECONDS

3K CORE USED


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ACSV        2302  2311  2313#
ACTVCB       154  2301#  2308  2312
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            1227  1873  2149  2334
ADLE          13#   247   270   294   317   341   463   480   807   852   895   928   954  1029
            1115  1167  1213  1876  1922  2054  2156  2374
ADLM           8#   371   394   418   440   461   478   956  1054  1120  1174  1878  1924  2059
            2067  2165  2370  2396  2442
ADRB          10#   495   498   721   722   723   724   725   726   727   728   729   730   731
             732   733   734   735   736   737   738   739   740   741   742   743   744   745
             746   789   808   828   853  1048  1072  1124  1195  1882  1889  1928  1930  2063
            2072  2169  2400
ADRS          14#   253   276   300   323   347   377   400   424   446   465   482   582   602
             960  2068  2390
ADSE          12#   547   552   559   596   664   670   702   705   747   774   923
ADSK          11#   521   527   534   576   621   628   683   686   700   787   790   802   825
             844   890   921   958   991  1023  1122  1189  1222  1880  1887  1926  2061  2167
            2388
ADST           9#   516   545   546   571   594   595   616   662   663   682   685   698   699
             704   720   771   773   786   801   824   843   889   919   920   957   988  1020
            1031  1055  1121  1879  1886  1925  2060  2166  2387
ALL1S        835   843#   859   861  1649
ALL1SA       849   862#
AOK         2221  2224  2272#  2298
AUTMSG      2351  2517#
AUTO         934   943#   971   977  1653
AUTO1        947#  975
AUTO2        968#
BADINT        63#  1995
BLANK        126#  1850
BYRETR      2973  2976#
C8ACTV         65   153#   224  1044  1068  1098  1139  1169  1204  1352  1430  1438  1446  1454
            1464  1474  1482  1490  1498  1508  1516  1524  1532  1540  1551  1559  1567  1575
            1584  1715  1908  1945  2023  2087  2292  2336  2353  2397
C8BY1       2684  2686  2699#  2710
C8BY2       3491  3523  3525#
C8BY3       3341  3344  3350#
C8BY4       2987#  3166
C8BY5       3403  3408#  3416
C8CAL0      1576#  3616
C8CAL1      1585#  3617
C8CAL2      1716#  3618
C8CAL3      2337#  3619
C8CAL4      2354#  3620
C8CALA        66#  3590
C8CALB       225#  3591
C8CALC      1045#  3592
C8CALD      1069#  3593
C8CALE      1140#  3594
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XC8TTY   2615   2765#  2773   3003   3133   3345   3367
XC8TYP   2629   2813   2822   2925   2927   3088   3090   3173   3211   3268   3295   3300   3372   3393#
         3409
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XCLOE      15    170#
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XCLSK      16    171#
XCLZE      17    172#
XCOMPR   120#   2183
XDILE      25    180#
XDILX      22    177#
XDILY      23    178#
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XDIXY      24    179#
XDOLPT   3397   3404#
XDOSW    2988   2989#
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XMOVE     117#  1989   2141
XPRLP     125#  1851
XSELEC    134   1663#
XSETUP    135   1988#  2000
XSTOR     119#  2138   2189
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XTABLB   2937   2947#
XTAL      133   1595#  1616   1618   1619   1621
XTAL1    1600   1607   1620#
XTAL2    1610   1616#
XTAL3    1604   1608#
XTEST    1624#  1667
XXADCL    162   1426#  1428
XXADLE    168   1478#  1480
XXADLM    163   1434#  1436
XXADRB    165   1450#  1452
XXADRS    169   1486#  1488
XXADSE    167   1468#  1471   1472
XXADSK    166   1458#  1461   1462
XXADST    164   1442#  1444
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XXCLSK    171   1502#  1505   1506
XXCLZE    172   1512#  1514
XXDILE    180   1580#  1582
XXDILX    177   1555#  1557
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XXDISD    176   1545#  1548   1549
XXDIXY    179   1571#  1573
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	3205	3207	3241#											
.V6476	2921	2970	2985	3054#	3174	3230#								
.V6477	2813	2822	2864#	2925	2927	3053#	3088	3090	3173	3211	3242#			
.V6521	2983	3015	3017	3033	3048#									
.V6600	2677	2849	2875#	2901	3058#	3128	3160	3236#	3342	3441#				
.V6712	2900	2903	3059#	3105	3237#	3335	3444#							
.V6713	2908	3056#	3100	3239#	3339	3442#								
.V6714	2906	3057#	3102	3238#	3337	3443#								
.V7000	810	830	911#	2018	2133#									
.V7001	2378	2408	2473#											
.V7007	1774	1803	1861#											
.V7014	2285	2318#												
.V7033	3579	3626#												
.V7072	3585	3624#												
.V7402	2854	2859#	3581	3625#										
.V7510	3202	3225#												
.V7520	3198	3226#												
.V7577	2020	2132#												
.V7600	3039	3044#												
.V7700	517	572	617	1185	1268#	1918	2050	2804	2865#	3639#				
.V7746	1809	1858#												
.V7754	717	764#												
.V7761	964	3633#												
.V7770	871	908#												
.V7771	985	1002#												
.V7772	1218	1266#												
.V7774	3263	3449#												
.V7775	3180	3228#												