

APPENDIX B

MACRO 11 and FORTRAN PROGRAMS

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        .TITLE  CAHN
        .GLOBL  CAHN
        .MCALL  .PRINT

;
ADCSR=177800      ;ANALOG TO DIGITAL CONVERTER CONTROL STATUS REG
ADDATA=177802     ;A TO D CONVERTER DATA BUFFER REG
ADVEC=130         ;A TO D TRAP VECTOR
ADPSW=132        ;A TO D PSW FOR AD DONE INT
ADERR=134        ;A TO D ERROR TRAP
ERPSW=136        ;ERROR INT PSW FOR A TO D ERROR
CLKCSR=170420    ;REAL TIME CLOCK CONTROL STATUS REG
CLKPSB=170422    ;REAL TIME CLOCK PRESET BUFFER
CLKOVT=440       ;REAL TIME CLOCK OVERFLOW TRAP
CLKSTT=444       ;REAL TIME CLOCK SCHMITT TRIGGER TRAP
CAHN:
        TST      (R5)+          ;SKIP ARGUMENT COUNT
        MOV      (R5)+,BUF1     ;ADDRESS OF FIRST BUFFER
        MOV      (R5)+,BUF2     ;ADDRESS OF BUFFER TWO
        MOV      (R5),FLG       ;RUN STATUS FLAG
        SUB      #6,R5          ;RESTORE R5
        MOV      #CLKINH,@#CLKOVT ;CLOCK HANDLER VECTOR
        MOV      #40,@#442      ;CLOCK INTERRUPT PRIORITY
        MOV      #ADINH,@#ADVEC ;A TO D INTERRUPT VECTOR
        MOV      #140,@#ADPSW   ;A TO D PRIORITY
        MOV      #154,@#ADCSR   ;CHA ZERO,GAIN=500
        MOV      #7,@#170446    ;D TO A START SIGNAL
        MOV      #177754,@#CLKPSB ;PRESET CLOCK TO 20
        MOV      #143,@#CLKCSR  ;START CLOCK AT 1K HZ
        RTS      PC

AD:      .ASCII/A TO D VECTOR/
        .EVEN

CLK:     .ASCII/CLOCK VECTOR/
        .EVEN

BUF1:    .BLKW
BUF2:    .BLKW
FLG:     .BLKW
CLKINH:
;        .PRINT  #CLK
        BIC      #200,@#CLKCSR
        RTI

ADINH:
;        .PRINT  #AD
        TSTB     @#ADCSR+1      ;IS ERROR BIT SET?
        BPL      1$            ;NO CONTINUE
        .PRINT  #ADERR
        BIC      #100000,@#ADCSR ;TURN OFF ERROR BIT
1$:      MOV      @#ADDATA,@BUF1 ;RETRIEVE DATA WORD
        INC      @BUF2
        BIC      #200,@#ADCSR   ;TURN OFF DONE BIT
        CMP      @FLG,#1

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$
      BNE      OFF
      RTI
OFF:   DEC      @#CLKCSR
      CLR      @#170446
      RTI
ADEROR: .ASCII/A TO D CONVERSION ERROR...TOO FAST/
DATA:   .BLKW
      .END      CAHN
*
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Cahn Acquisition Program

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$      DIMENSION WEIGHT(5000)
C
C * 1 MICROGRAM = 1.638350 A TO D UNITS
C * 10 MG = 0.010 VOLTS
C * 20 MV FULL SCALE = 32767
      OPEN(UNIT=1, NAME='DY0:CAHN.DAT')
      WRITE(5,123)
123    FORMAT(' PLEASE ENTER SAMPLE WEIGHT IN MILLIGRAMS '$)
      READ(5,125)ACTWT
      ACTWT=ACTWT*1000.
      TIME=0.
      IFLG=1
      J=1
      CALL CAHN(IDAT, INUM, IFLG)
      DO 50 I=1, 4000
      DO 100 IJ=1, 5
      J=J+1
20     CONTINUE
C      IF(INUM.GT.J)GO TO 260
      IF(INUM.LT.J)GO TO 20
      SUM=SUM+IDAT
100    CONTINUE
      WEIGHT(I)=SUM*0.12207404
      SUM=0.
50     CONTINUE
      DO 250 I=4000, 5000
      INUM=0
      J=0
      DO 200 IJ=1, 100
      J=J+1
220    CONTINUE
      IF(INUM.LT.J)GO TO 220
      SUM=SUM+IDAT
200    CONTINUE
      WEIGHT(I)=SUM*6.1037019E-3
      SUM=0.
250    CONTINUE
      GO TO 270
260    CONTINUE
      IFLG=0
      WRITE(5,101)I
101    FORMAT(' SYNC ERROR AT 'I4)
270    CONTINUE
      IFLG=0
      WRITE(1,125)ACTWT
125    FORMAT(G)
      DO 110 I=1, 4000
      TIME=TIME+0.1
      WRITE(1,120)I, WEIGHT(I), TIME
110    CONTINUE

```

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$  
120  FORMAT(I,F12.1,F6.1)  
      DO 300 I=4000,5000  
        TIME=TIME+2.  
        WRITE(1,120)I,WEIGHT(I),TIME  
300  CONTINUE  
      CLOSE(UNIT=1)  
      END
```

RATE.FOR

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      DIMENSION W(2000)
      OPEN (UNIT=1,TYPE='OLD',NAME='DY0:CAHN.DAT')
      READ (1,5)WEIGHT
5      FORMAT(6)
      READ (1,10)((JJ,W(I),T),I=1,2000)
      S=W(1)
      WEIGHT=WEIGHT+W(1)
      DO 200 I=1,2000
      W(I)=(W(I)-S)/WEIGHT*100.
200      CONTINUE
      DO 300 IN=1,2000
      IF(W(IN).GT.0.05)GO TO 350
300      CONTINUE
350      CONTINUE
      CALL AXIS(0.,15.,0.,W(2000-IN),2.,1.)
      CALL YAXIS(20,'WT % NONANE ADSORBED')
      CALL XAXIS(14,'SECONDS ** 1/2')
      CALL MOVEA(0.,0.)
      X=0.
      DO 100 I=IN,2000-IN
      X=X+0.1
      T=SQRT(X)
      CALL DRAWACT,W(I))
10      FORMAT(I,F12.1,F6.1)
100      CONTINUE
      END

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