AD-A170 884 ANALOG TO DIGITAL CONVERSION AND VERIFICATION PROGRAMS FOR A VAX 11/780(U) NAVAL UNDERWATER SYSTEMS CENTER NEW LONDON CT NEW LONDON LAB P MACIEJEWSKI 21 NOV 86 1/1

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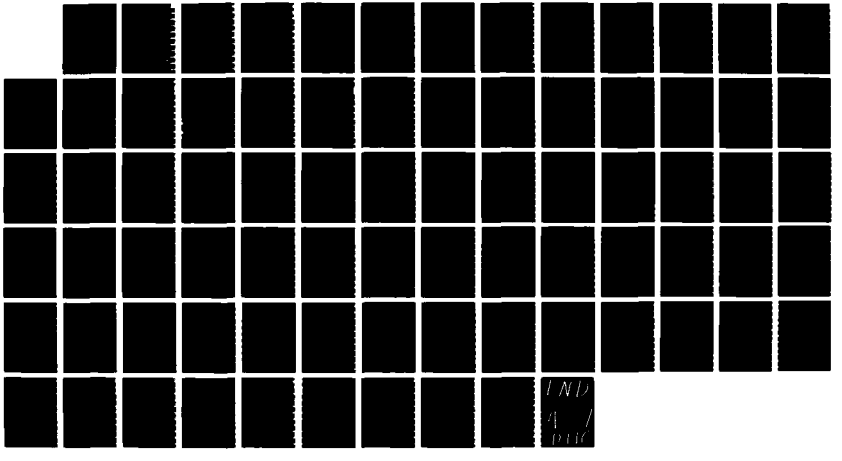

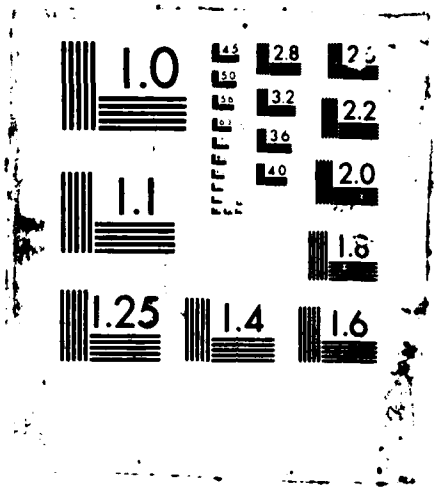
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TM NO. 861214

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NAVAL UNDERWATER SYSTEMS CENTER
NEW LONDON LABORATORY
NEW LONDON, CONNECTICUT 06320

Technical Memorandum

ANALOG TO DIGITAL CONVERSION AND VERIFICATION PROGRAMS FOR A VAX 11/780

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ABSTRACT

A procedure for digitizing data on a Vax 11/780 computer using VAX FORTRAN programs and VMS system service routines was developed. Brief descriptions and source listings of the programs are enclosed. In addition, several auxiliary programs used for verifying the procedure are also enclosed.

ADMINISTRATIVE INFORMATION

This work was supported under NUSC Project No. B69025, Broadband Bearing-Time Processing, P. D. Herstein, Principal Investigator. Funding was provided under Program Element No. 62711 through Naval Air Development Center, R. Fosko, Program Manager.

ACKNOWLEDGMENT

Appreciation is gratefully extended to Dave Potter, Code 3332, who provided much of the original analog to digital code, answered many questions and reviewed this document.

INTRODUCTION

Digitizing analog tapes is a necessary part of many data analysis projects. A FORTRAN program for digitizing data on a Vax 11/780 computer using VMS system service routines is described as well as several additional verification programs.

HARDWARE

For each experiment the hardware setup will vary slightly. Appendix A shows the hardware our experiment used. This included a Vax 11/780 computer with one LPA11-K, 12 bit, 16 channel analog to digital (A/D) converter in dedicated mode. The digital tape drive was a TU78, 9 track, 6250 bpi drive. (Slower speed tape drives were not able to keep up with our particular application.)

The A/D converter was triggered by an external Schmidt trigger. For this particular application, we sampled the data at 2.5 kHz. If the internal clock is desired, the source code would have to be altered.

A final digitized data sample is a 16 bit word (I*2 data type), accurate to 12 bits and ranging from -5 to +5 volts. Real data are scaled by

```
REAL_DATA=FLOAT(I*2_DATA)/409.5 - 5.
```

PROCESSING PROCEDURE

For the application described, 24 channels of analog data were digitized. Since the computer had one 16 channel A/D, it was necessary to process the data in two passes of 14 channels each. The second pass repeated 4 channels; these were used for alignment. Disk/tape constraints forced each run to be digitized in four parts, an end alignment was necessary. The method used for alignment is described in TM NO. 861118, "RECAT - REDUNDANT CHANNEL ALIGNMENT TECHNIQUE", BY W. HAUCK. The procedure for digitizing one tape follows.

A. Log onto the computer.
B. Mount the analog tape and check all hardware settings.
C. Mount the digital tape.
D. ALLOCATE MFA0: (HIGH SPEED TAPE DRIVE)

E. Activate A2D.COM
   1. Initialize the magnetic tape
   2. Assign the appropriate output data disk
   3. Enter the digitizing setup via "ENTERHEAD" program
   4. Assign and mount the magnetic tape
   5. Alter the user priority to 28 (VERY HIGH!!)
   6. Perform the digitizing task via "A2D" program
   7. Set the priority back to 4 (NORMAL)
   8. Copy the recat files for alignment (both passes and ends) from tape to disk via "SAVRECAT" program
   9. Copy the quick check files to disk via "READDT" progam
   10. Dismount the magtape and deallocate the drive
   11. Label the tape

```
| TAPEID   RUN __   PASS __ |
| 9 TRK    START __:__:__   |
| 6250     STOP  __:__:__   |
| FOR      _____ BUFFERS    |
|___________________________|
```

   12. Run the quick check plot program, "QUPL" to verify the data looks okay.

F. Repeat B-E as needed
G. Logoff when done

This procedure is repeated for one run worth of data (4 parts, 2 passes of each). The "RECAT" program will calculate the the alignment values. The data is then downsampled and or filtered and later merged, depending on your desires.

PROGRAM DESCRIPTIONS

A. ENTERHEAD.FOR - The operator enters all identification information when this program is run. That information is stored in a data file for retrieval by the actual digitizing program. This method of entering was selected because the probability of repeating a digitizing session is very high.

Routines called are LISTHEAD.FOR.

B. A2D.FOR - Performs the digitizing task. The identification information entered by ENTERHEAD is written to the first record of each tape. It is followed by records containing the digitized data. The digitized records are 14,000 bytes long consisting of 7000 samples. (500 samples/channel x 14 channels) Within each record the order of the samples is: sample 1, chan 1-14, sample 2, chan 1-14, ... sample 500, chan 1-14. The final record is

followed by two end of file markers to signify end of tape.

The record size chosen was based on the sample rate and the number of channels. Users should establish a reasonable record size for writing to tape.

Routines called are GETHEAD and LISTHEAD.

NOTE: When digitizing, the user must have a real time priority; 28 or 30 seems to be sufficient. Ask the system manager for the ALTPRI privilege.

C. SAVRECAT.FOR - Reads a tape made by A2D and extracts the channels chosen for alignment. The first 500 records and the last 50 records are written to disk. RECAT, as described in TM NO. 861118 uses these files for alignment procedures.

Routines called are LISTHEAD.

D. READDT.FOR - Reads a digitized tape and separates all channels into separate files. Each record contains 500 samples of A/D channels 1-14.

Routines called are LISTHEAD.

E. QUPL.FOR - Plots the first 4 records of digitized tape, 1 channel/plot and 4 channels/page.

Routines called are PLCHAN and plotting routines from the library QPLOT or GRAFX.

F. DOWNSAMP.FOR - Reads a digitized tape, downsamples it, changes the record sizes if desired and saves it on disk. Alignment procedures, appending, throwing away and saving data are completed. The disk file consists of one header identification record followed by records containing 1024 words from A/D chan 1, 1024 words from A/D chan 2, ... 1024 words from A/D chan 14.

Routines called are LISTHEAD.

G. MERGEMT.FOR - Reads the disk files created by "DOWNSAMP" for one run, passes 1 and 2 and merges each record. The final tape contains all 24 analog channels, redundant channels are discarded. The final tape format is:

One header identification record 14000 bytes long
Records (49152 bytes) of 1024 samples from channel 1
1024 samples from channel 2
.
.
.
1024 samples from channel 24

Routines called are LISTHEAD.

H. READMT.FOR - Reads a merged tape and writes the data out to disk, one channel per file. Records consist of 1024 samples each.

Routines called are ASSMT, RBLOCKMT, and LISTHEAD.

REFERENCES

[1] LPA11-K FORTRAN USER'S REFERENCE GUIDE, prepared by Digital Equipment Corporation, 1979.

[2] LPA11-K LABORATORY PERIPHERAL ACCELERATOR USER'S GUIDE, prepared by Digital Equipment Corporation, April 1978.

[3] VAX/VMS I/O USER'S REFERENCE MANUAL: PART I, prepared by Digital Equipment Corporation, July 1985, Version 4.2

APPENDIX TABLE

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APPENDIX B - LISTING OF A2D.COM
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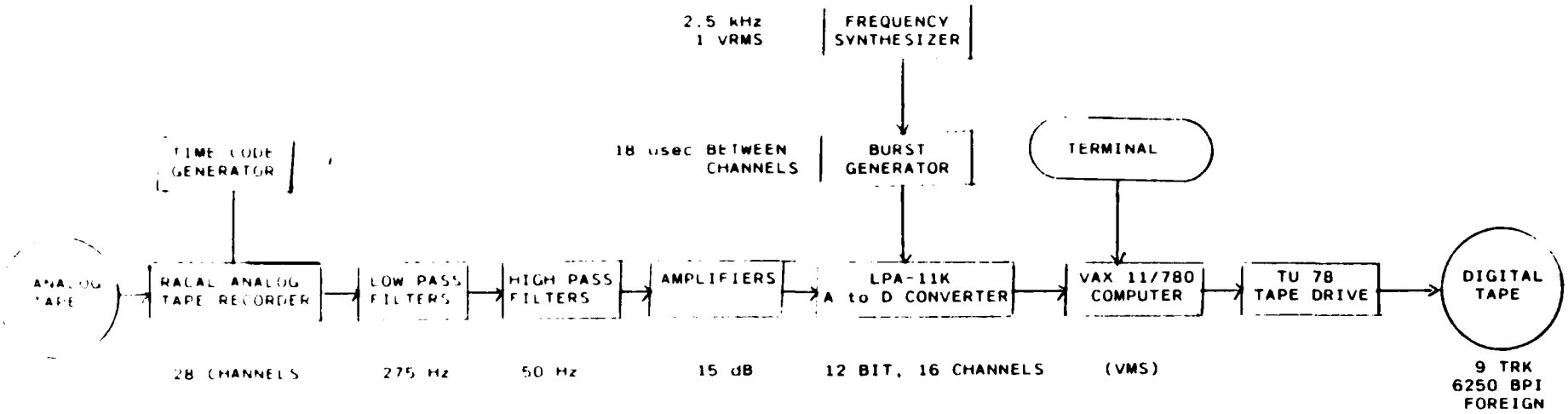
APPENDIX A

HARDWARE SETUP

DIGITIZING HARDWARE SETUP



APPENDIX B

LISTING OF A2D.COM

```
_DRB0:[MACIE.TM]A2D.COM;30

$!  A2D.COM   COMMAND STREAM FOR DIGITIZING 14 A/D CHANNELS.
$!---------------------------------------------------------------
$! SET VERIFY
$    IF P1 .EQS. "" THEN -
$    INQUIRE P1 "DO YOU WANT TO INITIALIZE THE TAPE? (Y/N)"
$    IF F$STRING(P1) .EQS. "N" THEN GOTO SETDISK
$!
$    IF P2 .EQS. "" THEN
$    INQUIRE P2 "ENTER TAPE LABEL?  (R__P_)"
$    ALLOCATE MFA0:
$    INITIALIZE/DENSITY=6250 MFA0: 'P2'
$!
$ SETDISK:
$    IF P3 .EQS. "" THEN INQUIRE P3 "IS DATA GOING TO DISK 0 OR 1?"
$    IF F$STRING(P3) .EQS. "0" THEN SET DEF DRB0:[A2D.DATA]
$    IF F$STRING(P3) .EQS. "1" THEN SET DEF DRB1:[A2D.DATA]
$!
$ SETUP:
$    IF P4 .EQS. "" THEN -
$    INQUIRE P4 "HAVE YOU ENTERED THE DIGITIZING SETUP? (Y/N)"
$    IF F$STRING(P4) .EQS. "Y" THEN GOTO MTAPE
$    ASSIGN/USER SYS$COMMAND SYS$INPUT
$    RUN DRB0:[A2D.DIGIT]ENTERHEAD        !ENTER HEADER INFORMATION
$!
$ MTAPE:
$    IF P5 .EQS. "" THEN -
$    INQUIRE P5 "DID YOU  ASSIGN AND MOUNT THE MAGTAPE? (Y/N)"
$    IF F$STRING(P5) .EQS. "Y" THEN GOTO DIGIT
$    ASSIGN MFA0: MAG_TAPE
$    MOUNT/FOR/DENS=6250 MFA0:
$!
$ DIGIT:
$    SET PROC/PRIV=PSWAPM                 !SET UP PRIVILEGES/PRIORITY
$    SET PROC/PRIV=ALTPRI
$    SET PROC/PRIO=30
$    ASSIGN/USER SYS$COMMAND SYS$INPUT
$    RUN DRB0:[A2D.DIGIT]A2D              !PERFORM DIGITIZING
$    SET PROC/PRIO=4                      !SET PRIORITY BACK DOWN
$!
$    IF P6 .EQS. "" THEN -
$    INQUIRE P6 "DO YOU WANT TO COPY THE RECAT FILES TO DISK? (Y/N)"
$    IF F$STRING(P6) .EQS. "N" THEN GOTO QUPL
$    ASSIGN/USER SYS$COMMAND SYS$INPUT
$    RUN DRB0:[A2D.DIGIT]SAVRECAT                 !COPY THE RECAT FILES
$!
$ QUPL:
$    INQUIRE P7 "DO YOU WANT TO COPY THE QUICK CHECK FILES TO DISK? (Y/N)"
$    IF F$STRING(P7) .EQS. "N" THEN GOTO MTDISM
$    SET DEF DRB1:[A2D.QUPL]
$    ASSIGN/USER SYS$COMMAND SYS$INPUT
$    RUN DRB0:[A2D.DIGIT]READT
$    WRITE SYS$OUTPUT "YOU NEED TO RUN DRB0:QUPL.COM TO MAKE PLOTS"
$!
$ MTDISM:                                 !DISMOUNT THE TAPE
$    IF P8 .EQS. "" THEN -
$    INQUIRE P8 "DO YOU WANT TO DISMOUNT THE TAPE? (Y/N)"
$    IF F$STRING(P8) .EQS. "Y" THEN DISMOUNT MFA0:
$!
```

```
_DRB0:[MACIE.TM]A2D.COM;30

$ DONE:
$ WRITE SYS$OUTPUT "DIGITIZING PROCEDURE COMPLETE"
$ EXIT
```

APPENDIX C

LISTINGS OF
ENTERHEAD.FOR
LISTHEAD.FOR

```
_DRB0:[MACIE.TM]ENTERHEAD.FOR;13

C       ENTERHEAD.FOR   HAS THE OPERATOR ENTER THE HEADER INFORMATION
C                       AND SAVE IT IN A DATA FILE.
C-------------------------------------------------------------------
C       HEADB(1-2)      HEADI2(1)       ANALOG TAPE NUMBER
C       HEADB(3)        HEADI2(2)       PASS NUMBER (1,2 OR 3)
C       HEADB(4)           "            NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)        HEADI2(3)       DIGITIZING MONTH
C       HEADB(6)           "            DIGITIZING DAY
C       HEADB(7)        HEADI2(4)       DIGITIZING YEAR
C       HEADB(8)           "            EXPERIMENT TIME CODE START HOUR
C       HEADB(9)        HEADI2(5)       EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)          "            EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)    HEADI2(6-15)    EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)       HEADI2(16)      ANALOG CHANNEL IN POSITION 1
C       HEADB(32)          "            ANALOG CHANNEL IN POSITION 2
C       HEADB(33)       HEADI2(17)      ANALOG CHANNEL IN POSITION 3
C       HEADB(34)          "            ANALOG CHANNEL IN POSITION 4
C       HEADB(35)       HEADI2(18)      ANALOG CHANNEL IN POSITION 5
C       HEADB(36)          "            ANALOG CHANNEL IN POSITION 6
C       HEADB(37)       HEADI2(19)      ANALOG CHANNEL IN POSITION 7
C       HEADB(38)          "            ANALOG CHANNEL IN POSITION 8
C       HEADB(39)       HEADI2(20)      ANALOG CHANNEL IN POSITION 9
C       HEADB(40)          "            ANALOG CHANNEL IN POSITION 10
C       HEADB(41)       HEADI2(21)      ANALOG CHANNEL IN POSITION 11
C       HEADB(42)          "            ANALOG CHANNEL IN POSITION 12
C       HEADB(43)       HEADI2(22)      ANALOG CHANNEL IN POSITION 13
C       HEADB(44)          "            ANALOG CHANNEL IN POSITION 14
C       HEADB(45)       HEADI2(23)      ANALOG CHANNEL IN POSITION 15
C       HEADB(46)          "            ANALOG CHANNEL IN POSITION 16
C       HEADB(47)       HEADI2(24)      ANALOG CHANNEL IN POSITION 17
C       HEADB(48)          "            ANALOG CHANNEL IN POSITION 18
C       HEADB(49)       HEADI2(25)      ANALOG CHANNEL IN POSITION 19
C       HEADB(50)          "            ANALOG CHANNEL IN POSITION 20
C       HEADB(51)       HEADI2(26)      ANALOG CHANNEL IN POSITION 21
C       HEADB(52)          "            ANALOG CHANNEL IN POSITION 22
C       HEADB(53)       HEADI2(27)      ANALOG CHANNEL IN POSITION 23
C       HEADB(54)          "            ANALOG CHANNEL IN POSITION 24
C       HEADB(55)       HEADI2(28)      RUN IDENTIFICATION NUMBER
C       HEADB(56)          "                    "
C       HEADB(57-60)    HEADFP(15)      SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-------------------------------------------------------------------
C
        PARAMETER NCHN=14                   !NUMBER OF A/D CHANNELS
        PARAMETER NBYTES=NCHN*500*2         !NUMBER OF BYTES PER RECORD
        PARAMETER NI2=NBYTES/2              !NUMBER OF I*2 WORDS
        PARAMETER NI4=NBYTES/4              !NUMBER OF I*4 WORDS OR FLOATING PT
C
        CHARACTER*1 ANS
        BYTE HEADB(NBYTES),ITITLE(20),FILNAM(11)
        INTEGER*2 HEADI2(NI2)
        INTEGER*4 HEADI4(NI4)
        REAL HEADFP(NI4)
        EQUIVALENCE (HEADB(11),ITITLE)
        EQUIVALENCE (HEADB,HEADI2,HEADI4,HEADFP)
        DATA HEADI4/NI4*0/
C
C-------------------------------------------------------------------
```

_DRB0:[MACIE.TM]ENTERHEAD.FOR;13

```
C
C-----ASK THE OPERATOR FOR ALL HEADER INFO
C
100     CONTINUE
        PRINT 1
1       FORMAT(X/X,'ENTER ANALOG TAPE NUMBER: ',$)
        READ *, HEADI2(1)
C
        PRINT 13
13      FORMAT(X/X,'ENTER RUN IDENTIFICATION NUMBER: ',$)
        READ *, HEADI2(28)
C
        PRINT 2
2       FORMAT(X/X,'ENTER DATA TAPE PASS NUMBER (1 OR 2)? ',$)
        READ *, HEADB(3)
C
C       PRINT 11
C11     FORMAT(X/X,'ENTER NUMBER OF CHANNELS/HYDROPHONES : ',$)
C       READ *, HEADB(4)
        HEADB(4)=14
        NCHAN=HEADB(4)
C
        PRINT 3
3       FORMAT(X/X,'ENTER DIGITIZING DATE:  MONTH ',$)
        READ *, HEADB(5)
        PRINT 4
4       FORMAT(X/X,'                        DAY ',$)
        READ *, HEADB(6)
        PRINT 5
5       FORMAT(X/X,'                        YEAR ',$)
        READ *, HEADB(7)
C
        PRINT 6
6       FORMAT(X/X,'ENTER START TIME CODE:  HOUR ',$)
        READ *, HEADB(8)
        PRINT 7
7       FORMAT(X/X,'                        MINUTES ',$)
        READ *, HEADB(9)
        PRINT 8
8       FORMAT(X/X,'                        SECONDS ',$)
        READ *, HEADB(10)
C
        DO I=11,30
          HEADB(I)=' '
        END DO
        PRINT 9
9       FORMAT(X/X,'ENTER 20 CHARACTER EVENT DESCRIPTION: ',$)
        READ 10, NC,(ITITLE(I),I=1,NC)
10      FORMAT(Q,20A1)
        DO I=1,NC
          HEADB(10+I)=ITITLE(I)
        END DO
C
        DO I=1,NCHAN
          PRINT 12, I
12        FORMAT(X/X,'ENTER ANALOG CHANNEL FOR A/D CHANNEL ',I2,' : ',$)
          READ *, HEADB(I+30)
        END DO
```

_DRB0:[MACIE.TM]ENTERHEAD.FOR;13

```
C
      HEADFP(15)=1./2500./4.  !SAMPLE RATE 2.5 KHZ AT 1/4 SPEED
C
C-----SAVE THE INPUTS IN A DATA FILE
C
      ENCODE(10,14,FILNAM) HEADI2(28),HEADB(3)
14    FORMAT('R',I2,'P',I1,'H.DAT')
      FILNAM(11)=0
      PRINT 16
      PRINT 15, (FILNAM(I),I=1,10)
15    FORMAT(X,'DATA WILL BE SAVED IN FILE: ',10A1)
      PRINT 16
      CALL LISTHEAD(HEADB,HEADI2,HEADI4)
      PRINT 16
16    FORMAT(X,80('-'))
      PRINT 17
17    FORMAT(X/X,'DOES THIS DATA LOOK CORRECT? (Y/N) ',$)
      READ 18, ANS
18    FORMAT(A1)
      IF(ANS.EQ.'N') GO TO 100
      OPEN(UNIT=10,NAME=FILNAM,STATUS='NEW',FORM='UNFORMATTED')
      WRITE(10) HEADB
      CLOSE(UNIT=10)
C
      CALL EXIT
      END
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
C       LISTHEAD.FOR    LISTS OUT THE HEADER INFORMATION FOR A
C                       SPECIFIED TAPE.
C-------------------------------------------------------------------------
C       HEADB(1-2)      HEADI2(1)       ANALOG TAPE NUMBER
C       HEADB(3)        HEADI2(2)       PASS NUMBER (1,2 OR 3)
C       HEADB(4)           "            NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)        HEADI2(3)       DIGITIZING MONTH
C       HEADB(6)           "            DIGITIZING DAY
C       HEADB(7)        HEADI2(4)       DIGITIZING YEAR
C       HEADB(8)           "            EXPERIMENT TIME CODE START HOUR
C       HEADB(9)        HEADI2(5)       EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)          "            EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)    HEADI2(6-15)    EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)       HEADI2(16)      ANALOG CHANNEL IN POSITION 1
C       HEADB(32)          "            ANALOG CHANNEL IN POSITION 2
C       HEADB(33)       HEADI2(17)      ANALOG CHANNEL IN POSITION 3
C       HEADB(34)          "            ANALOG CHANNEL IN POSITION 4
C       HEADB(35)       HEADI2(18)      ANALOG CHANNEL IN POSITION 5
C       HEADB(36)          "            ANALOG CHANNEL IN POSITION 6
C       HEADB(37)       HEADI2(19)      ANALOG CHANNEL IN POSITION 7
C       HEADB(38)          "            ANALOG CHANNEL IN POSITION 8
C       HEADB(39)       HEADI2(20)      ANALOG CHANNEL IN POSITION 9
C       HEADB(40)          "            ANALOG CHANNEL IN POSITION 10
C       HEADB(41)       HEADI2(21)      ANALOG CHANNEL IN POSITION 11
C       HEADB(42)          "            ANALOG CHANNEL IN POSITION 12
C       HEADB(43)       HEADI2(22)      ANALOG CHANNEL IN POSITION 13
C       HEADB(44)          "            ANALOG CHANNEL IN POSITION 14
C       HEADB(45)       HEADI2(23)      ANALOG CHANNEL IN POSITION 15
C       HEADB(46)          "            ANALOG CHANNEL IN POSITION 16
C       HEADB(47)       HEADI2(24)      ANALOG CHANNEL IN POSITION 17
C       HEADB(48)          "            ANALOG CHANNEL IN POSITION 18
C       HEADB(49)       HEADI2(25)      ANALOG CHANNEL IN POSITION 19
C       HEADB(50)          "            ANALOG CHANNEL IN POSITION 20
C       HEADB(51)       HEADI2(26)      ANALOG CHANNEL IN POSITION 21
C       HEADB(52)          "            ANALOG CHANNEL IN POSITION 22
C       HEADB(53)       HEADI2(27)      ANALOG CHANNEL IN POSITION 23
C       HEADB(54)          "            ANALOG CHANNEL IN POSITION 24
C       HEADB(55)       HEADI2(28)      RUN IDENTIFICATION NUMBER
C       HEADB(56)          "                    "
C       HEADB(57-60)    HEADFP(15)      SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-------------------------------------------------------------------------
        SUBROUTINE LISTHEAD(HEADB,HEADI2,HEADI4)
C-------------------------------------------------------------------------
C
        BYTE HEADB(1)
        INTEGER*2 HEADI2(1)
        INTEGER*4 HEADI4(1)
C
C-----PRINT OUT THE ALL HEADER INFO
C
        PRINT 1, (HEADB(I),I=11,30)
1       FORMAT(X,' *** EVENT DESCRIPTION: ',20A1,' ***')
C
        PRINT 2, HEADI2(1)
2       FORMAT(X/X,'         ANALOG TAPE NUMBER: ',4X,I4)
C
        PRINT 3, HEADI2(28)
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
3       FORMAT(X,' RUN IDENTIFICATION NUMBER: ',6X,I2)
C
        PRINT 4, HEADB(3)
4       FORMAT(X,'                PASS NUMBER: ',7X,I1)
C
        PRINT 5, HEADB(8),HEADB(9),HEADB(10)
5       FORMAT(X,'           START TIME CODE: ',I2,':',I2,':',I2)
C
        PRINT 6, HEADB(5),HEADB(6),HEADB(7)
6       FORMAT(X,'                      DATE: ',I2,'/',I2,'/'I2)
C
        NCHAN=HEADB(4)
C
        PRINT 7
7       FORMAT(X/X,' POSITION : CHANNEL     POSITION : CHANNEL',
     1         X/X,' ------------------     ------------------')
        NHALF=NCHAN/2
        DO I=1,NHALF
          K=I+NHALF
          PRINT 8, I,HEADB(I+30),K,HEADB(K+30)
8         FORMAT(X,4X,I2,3X,' : ',3X,I2,2X,5X,3X,I2,3X,' : ',3X,I2)
        END DO
C
        RETURN
        END
```

APPENDIX D

LISTINGS OF
A2D.FOR
GETHEAD.FOR
LISTHEAD.FOR

_DRB0:[MACIE.TM]A2D.FOR;2

```
C       A2D.FOR  ANALOG TO DIGITAL DIGITIZING PROGRAM
C-------------------------------------------------------------------------
C
C       THIS PROGRAM IS CALLED VIA THE A2D COMMAND ROUTINE.
C       EACH TAPE TO BE DIGITIZED WILL REQUIRE TWO PASSES AT 1/4 SPEED.
C       THE FIRST PASS WILL DIGITIZE 14 DATA CHANNELS 1-12, AND 14-15
C       THE SECOND PASS WILL DIGITIZE 14 DATA CHANNELS, 16-25 AND
C       REPEAT CHANNELS 2, 4, 10 AND 14.  THE REPEATS WILL BE USED FOR
C       TAPE ALIGNMENT.  MAKE SURE THE HARDWARE IS SET UP ACCORDINGLY.
C
C       TO DIGITIZE:
C       1) LOG ON TO VAX
C       2) SET UP THE DIGITIZING HARDWARE
C       3) MOUNT A TAPE WITH A WRITE RING ON MFA0:
C       4) EXECUTE THE A2D.COM COMMAND FILE, THIS WILL:
C          A.  INITIALIZE THE TAPE
C          B.  SET THE OUTPUT DIRECTORY/DISK
C          C.  ASK FOR HEADER INFORMATION
C          D.  ASSIGN AND MOUNT THE TAPE
C          E.  SETUP THE HIGH SPEED TAPE DRIVE
C          F.  ASSIGN THE NECESSARY PRIVILEGES
C          G.  UP THE PROCESS PRIORITY TO 28
C          H.  EXECUTE THE DIGITIZING PROGRAM, ***"A2D"***
C          I.  LOWER THE PROCESS PRIORITY BACK TO 4
C          J.  COPY THE RECAT DATA TO DISK
C          K.  COPY THE QUICK CHECK PLOT DATA TO DISK
C          L.  DISMOUNT THE TAPE
C       5) CHECK THE QUICK CHECK PLOTS
C       6) REPEAT 2-5
C-------------------------------------------------------------------------
C
        PARAMETER NADC=14                   !NUMBER OF A/D CHANNELS USED
        PARAMETER NBSIZE=500                !NUMBER OF WORDS IN ONE BUFFER/CHANNEL
        PARAMETER NRECSIZE=NADC*NBSIZE*2
C
        BYTE HEADB(NRECSIZE)
        INTEGER*2 HEADI2(NRECSIZE/2)
        INTEGER*2 BUFFER(NADC,NBSIZE,3),IOSB(4),IOSBMT(4)
        INTEGER*4 HEADI4(NRECSIZE/4)
        INTEGER*4 IBUF(50),DWELL,SYS$ADJWSL,SYS$LCKPAG,INADR(2),IRETADR(2)
        1,SYS$QIOW,IOSB4(2),WRINORET,WEOFNORET,RUNNO
        DIMENSION HEADFP(NRECSIZE/4)
        EQUIVALENCE (HEADB,HEADI2,HEADI4,HEADFP)
        CHARACTER*1 IGO
C
        COMMON /COMM1/ IBUF      !COMMONS FOR LONGWORD ALLIGNMENT
        COMMON /COMM2/ BUFFER
C
        EQUIVALENCE (IOSB,IBUF),(IOSBMT,IOSB4)
C
C-----SET UP I/O CODES FOR NO RETRY DUE TO REAL-TIME PROCESSING
C
        EXTERNAL IO$_WRITELBLK,IO$_REWIND,IO$_WRITEOF
        EXTERNAL IO$_SKIPFILE,IO$M_INHRETRY
        WRINORET=%LOC(IO$_WRITELBLK)+%LOC(IO$M_INHRETRY) ! '8020'X
        WEOFNORET=%LOC(IO$_WRITEOF)+%LOC(IO$M_INHRETRY) ! '8028'X
C
C-----GET PROGRAM SAMPLING SPECIFICATIONS
```

_DRB0:[MACIE.TM]A2D.FOR;2

```
C
        PRINT *, 'HOW MANY BUFFERS DO YOU WANT TO FILL?'
        READ *, NBUF
C       NBUF=450          ! NUMBER OF BUFFERS TO FILL
        ICHN=0            ! START WITH CHANNEL 0
        NCHN=NADC         ! NUMBER OF CHANNELS
        LBUF=NADC*NBSIZE  ! SIZE OF EACH BUFFER IN WORDS (I*2)
        LBUF2=LBUF*2      ! SIZE OF EACH BUFFER IN BYTES
        IPRSET=-1         ! DOES NOT MATTER, NOT USED (-1 TO -32768)
        MODE=512          ! SAMPLING OPTION - EXTERNAL SCHMIDT TRIGGER
        IRATE=-1          ! CLOCK RATE DIRECT COUPLED SCHMIDT TRIGGER 1
        DWELL=1           ! CLOCK OVERFLOWS BETWEEN SAMPLES
        IEFN=0            ! DEFAULT TO EVENT FLAG 22
        LDELAY=0          ! IGNORED IN DEDICATED MODE
        ITYPE=2           ! DEDICATED A/D MODE
        NUM=0             ! FOR LOGICAL NAME LPA11$0
        INC=1             ! CHANNEL INCREMENT
C
C-----GET THE HEADER INFORMATION FOR THIS TAPE
C
        PRINT *, 'ENTER RUN IDENTIFICATION NUMBER'
        READ *, RUNNO
        PRINT *, 'ENTER PASS NUMBER (1 OR 2)'
        READ *, IPASS
        CALL GETHEAD(RUNNO,IPASS,LBUF2,HEADB)
        CALL LISTHEAD(HEADB,HEADI2,HEADI4)
C
C-----ASSIGN THE TAPE TO LOGICAL NAME MAG_TAPE AND REWIND
C
        CALL SYS$ASSIGN('MAG_TAPE',ICHAN,,)
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_REWIND,IOSBMT,,,,,,,,)
        IF(IOSBMT(1).EQ.'1A4'X) STOP 'TAPE DRIVE IS OFFLINE'
        IF(.NOT.IRETCODE) THEN
          WRITE(6,150) 7,(IOSBMT(I),I=1,4)
          STOP 'MAG_TAPE REWIND ERROR'
        ENDIF
C
C-----SKIP FILES IF REQUESTED
C
1       PRINT *, 'HOW MANY FILES DO YOU WANT TO SKIP?'
        READ *, NSKIP
        IF(NSKIP.LT.0) THEN
          PRINT *, 'YOU MUST ONLY GO IN THE FORWARD DIRECTION'
          PRINT *, 'THE NUMBER OF FILES MUST BE POSITIVE'
          GOTO 1
        END IF
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPFILE,IOSB,,,%VAL(NSKIP),,,,,)
        IF (.NOT.IRETCODE) STOP 'SKIP FILE ERROR'
        IF(IOSB(2).NE.NSKIP) THEN
          PRINT *,'PROBLEM SKIPPING ',NSKIP, ' FILES'
          PRINT *, IOSB
          STOP 'SKIPPING FILE ERROR'
        END IF
C
C-----DUMP THE HEADER TO TAPE
C
        NREC=1            !RECORD 1 IS HEADER
C
```

_DRB0:[MACIE.TM]A2D.FOR;2

```
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),%VAL(WRINORET),IOSBMT
        1,,,HEADB,%VAL(LBUF2),,,,)
C       WRITE(6,150) 7,(IOSBMT(I),I=1,4)
        IF(IOSBMT(1).EQ.'1A4'X) STOP 'TAPE DRIVE IS OFFLINE'
        IF(.NOT.IRETCODE) STOP 'ERROR MAGTAPE DUMPING HEADER'
C
C-----ADJUST WORKING SET SIZE AND LOCK BUFFER AREA PAGES INTO MEMORY
C
        IRETCODE=SYS$ADJWSL(%VAL(200),ILIMIT)    !ADJUST PAGE COUNT
        IF(IRETCODE.NE.1) THEN
          WRITE(6,123) IRETCODE,ILIMIT
123       FORMAT(' RETCODE,NEW LIMIT:',2I8)
          STOP 'ERROR ADJUSTING WORKING SET SIZE'
        ENDIF
C
        INADR(1)=%LOC(BUFFER(1,1,1))             !START ADDRESS
        INADR(2)=%LOC(BUFFER(NADC,NBSIZE,3))     !STOP ADDRESS
        IRETCODE=SYS$LCKPAG(INADR,IRETADR,)  -   !LOCK PAGES INTO MEMORY
        IF(IRETCODE.NE.1) THEN
          WRITE(6,124) INADR,IRETADR,IRETCODE,INADR(2)-INADR(1)+2
124       FORMAT(' INADR,IRETADR,IRETCODE FOR BUFFER',/,4O12,Z6,I6)
          STOP 'ERROR LOCKING PAGES INTO MEMORY'
        ENDIF
C
C-----LOAD MICROCODE FOR MULTIREQUEST MODE
C
        CALL LPA$LOADMC(ITYPE,NUM,IND,IERROR)
        IF(IND.EQ.1) GO TO 20
C
C       LIKELY ERROR IS THAT LOADER IS NOT RUNNING.  TO RUN LOADER
C       @[SYSMGR]LPA11STRT
C
        WRITE(6,10) IND
10      FORMAT(' ERROR LOADING MICROCODE, VAX/VMS ERROR CODE=',Z12,' (HEX)')
        STOP
C
C-----DETERMINE SAMPLING RATES AND START THE CLOCK
C
20      CALL LPA$CLOCKA(IRATE,IPRSET,IND,NUM)
        IF(IND.EQ.1) GO TO 40
        WRITE(6,30) IND
30      FORMAT(' ERROR STARTING CLOCK, VAX/VMS ERROR CODE=',Z12,' (HEX)')
        STOP
C
C-----SET IBUF ARRAY FOR SWEEPS, DEFINE THE 3 INPUT BUFFERS
C
40      CALL LPA$SETIBF(IBUF,IND,,BUFFER(1,1,1),BUFFER(1,1,2)
        1,BUFFER(1,1,3))
        IF(IND.EQ.1) GO TO 50
        STOP ' ERROR SETTING UP IBUF ARRAY FOR SWEEPS, LPA$SETIBF'
C
C-----RELEASE ALL THE BUFFERS
C
50      CALL LPA$RLSBUF(IBUF,IND,0,1,2)
        IF(IND.EQ.1) GO TO 60
        STOP ' ERROR RELEASING BUFFER, LPA$RLSBUF'
C
C-----SET CHANNEL INFORMATION FOR SWEEPS, IFLAG RESERVED
```

_DRB0:[MACIE.TM]A2D.FOR;2

```
C
60      CALL LPA$SETADC(IBUF,IFLAG,ICHN,NCHN,INC,IND)
        IF(IND.EQ.1) GO TO 70
        STOP ' ERROR SETTING CHANNEL INFORMATION, LPA$SETADC'
C
C----GET READY TO DIGITIZE
C
70      WRITE(6,80) HEADB(8),HEADB(9),HEADB(10)
80      FORMAT(' START ANALOG TAPE, HIT RETURN AT ',I2,':',I2,':',I2,$)
        READ 1001, IGO
1001    FORMAT(A1)
C
C-----START THE A/D SWEEPS
C
        CALL LPA$ADSWP(IBUF,LBUF,NBUF,MODE,DWELL,,LDELAY,ICHN,NCHN,IND)
        IF(IND.EQ.1) GO TO 100
        WRITE(6,90) IND
90      FORMAT(' ERROR STARTING SWEEP, VAX/VMS ERROR CODE=',Z12,' (HEX)')
        STOP
C
C-----WAIT FOR NEXT BUFFER TO COMPLETE
C
100     WRITE(6,110) 7 ! TURN ON SAMPLING PULSES AT THE TONE
110     FORMAT(1X,A)
C
120     IBUFNO=LPA$IWTBUF(IBUF,)
        IF(IBUFNO.GE.0) GO TO 140
        WRITE(6,130) 7,7,7,IBUFNO,NREC,IOSB,7,7,7
130     FORMAT(1X,3A1,'ERROR FROM LPA$IWTBUF - IBUFNO=',I5,' REC',I5
        1,/,' ISOB (HEX)',4Z12,3A1)
        STOP 'IBUFNO < 0'
C
C-----DUMP THIS BUFFER TO TAPE
C
140     CONTINUE
        NREC=NREC+1                !INCREMENT RECORD NUMBER
C       PRINT *, NREC
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),%VAL(WRINORET),IOSBMT
        1,,,BUFFER(1,1,1+IBUFNO),%VAL(LBUF2),,,,)
        IF(.NOT.IRETCODE) STOP 'MAG TAPE ERROR'
        IF(IOSBMT(1).NE.1) THEN
          WRITE(6,150) 7,(IOSBMT(I),I=1,4)
150       FORMAT(X,A1,'PROBLEM WRITING TO TAPE , IOSB ',4(Z6))
          WRITE(6,160) NREC,IBUFNO
160       FORMAT(X,'RECORD ',I5,' BUFFER NUMBER ',I2)
        ENDIF
        IF(NREC.GT.NBUF) GO TO 180
C
C-----RELEASE THIS BUFFER FOR A/D TO REFILL, GO GET NEXT ONE
C
        CALL LPA$RLSBUF(IBUF,IND,IBUFNO)
        IF(IND.NE.1) STOP 'LPA$RLSBUF'
        GO TO 120
C
C-----COME HERE AT END OF A CUT AND STOP IN-PROGRESS SWEEP
C
180     CALL LPA$STPSWP(IBUF,1,IND)
        IF(IND.EQ.1) GO TO 200
```

_DRB0:[MACIE.TM]A2D.FOR;2

```
        WRITE(6,190) IND
190     FORMAT(' ERROR STOPPING SWEEP, VAX/VMS ERROR CODE=',Z12,' (HEX)')
C
C----DIGITIZING COMPLETE, PUT TWO END OF FILES ON MAGTAPE
C
200     WRITE(6,210)7,7,7,7
210     FORMAT(' END OF RUN',4A1)
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_WRITEOF,IOSBMT,,,,,,,)
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_WRITEOF,IOSBMT,,,,,,,)
C
        CALL EXIT
        END
```

_DRB0:[MACIE.TM]GETHEAD.FOR;5

```
C       GETHEAD.FOR     GETS OUT THE HEADER INFORMATION FOR A SPECIFIED TAPE.
C-------------------------------------------------------------------------
C       HEADB(1-2)      HEADI2(1)       ANALOG TAPE NUMBER
C       HEADB(3)        HEADI2(2)       PASS NUMBER (1,2 OR 3)
C       HEADB(4)            "           NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)        HEADI2(3)       DIGITIZING MONTH
C       HEADB(6)            "           DIGITIZING DAY
C       HEADB(7)        HEADI2(4)       DIGITIZING YEAR
C       HEADB(8)            "           EXPERIMENT TIME CODE START HOUR
C       HEADB(9)        HEADI2(5)       EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)           "           EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)    HEADI2(6-15)    EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)       HEADI2(16)      ANALOG CHANNEL IN POSITION 1
C       HEADB(32)           "           ANALOG CHANNEL IN POSITION 2
C       HEADB(33)       HEADI2(17)      ANALOG CHANNEL IN POSITION 3
C       HEADB(34)           "           ANALOG CHANNEL IN POSITION 4
C       HEADB(35)       HEADI2(18)      ANALOG CHANNEL IN POSITION 5
C       HEADB(36)           "           ANALOG CHANNEL IN POSITION 6
C       HEADB(37)       HEADI2(19)      ANALOG CHANNEL IN POSITION 7
C       HEADB(38)           "           ANALOG CHANNEL IN POSITION 8
C       HEADB(39)       HEADI2(20)      ANALOG CHANNEL IN POSITION 9
C       HEADB(40)           "           ANALOG CHANNEL IN POSITION 10
C       HEADB(41)       HEADI2(21)      ANALOG CHANNEL IN POSITION 11
C       HEADB(42)           "           ANALOG CHANNEL IN POSITION 12
C       HEADB(43)       HEADI2(22)      ANALOG CHANNEL IN POSITION 13
C       HEADB(44)           "           ANALOG CHANNEL IN POSITION 14
C       HEADB(45)       HEADI2(23)      ANALOG CHANNEL IN POSITION 15
C       HEADB(46)           "           ANALOG CHANNEL IN POSITION 16
C       HEADB(47)       HEADI2(24)      ANALOG CHANNEL IN POSITION 17
C       HEADB(48)           "           ANALOG CHANNEL IN POSITION 18
C       HEADB(49)       HEADI2(25)      ANALOG CHANNEL IN POSITION 19
C       HEADB(50)           "           ANALOG CHANNEL IN POSITION 20
C       HEADB(51)       HEADI2(26)      ANALOG CHANNEL IN POSITION 21
C       HEADB(52)           "           ANALOG CHANNEL IN POSITION 22
C       HEADB(53)       HEADI2(27)      ANALOG CHANNEL IN POSITION 23
C       HEADB(54)           "           ANALOG CHANNEL IN POSITION 24
C       HEADB(55)       HEADI2(28)      RUN IDENTIFICATION NUMBER
C       HEADB(56)           "
C       HEADB(57-60)    HEADFP(15)      SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-------------------------------------------------------------------------
        SUBROUTINE GETHEAD(RUNNO,IPASS,NBYTES,HEADB)
C-------------------------------------------------------------------------
C
        BYTE HEADB(1),FILNAM(11)
        INTEGER RUNNO
C
C-----OPEN THE FILE AND READ IN THE HEADER
C
        ENCODE(10,4,FILNAM) RUNNO,IPASS
4       FORMAT('R',I2,'P',I1,'H.DAT')
        FILNAM(11)=0
        PRINT 5, (FILNAM(I),I=1,10)
5       FORMAT(X/X,'HEADER FILE: ',10A1//40('-'),/)
        OPEN(UNIT=10,NAME=FILNAM,STATUS='OLD',FORM='UNFORMATTED',READONLY)
        READ(10) (HEADB(I),I=1,NBYTES)
        CLOSE(UNIT=10)
C
```

DRB0:[MACIE.TM]GETHEAD.FOR;5

```
      RETURN
      END
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
C       LISTHEAD.FOR    LISTS OUT THE HEADER INFORMATION FOR A
C                       SPECIFIED TAPE.
C-----------------------------------------------------------------------
C       HEADB(1-2)      HEADI2(1)       ANALOG TAPE NUMBER
C       HEADB(3)        HEADI2(2)       PASS NUMBER (1,2 OR 3)
C       HEADB(4)           "            NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)        HEADI2(3)       DIGITIZING MONTH
C       HEADB(6)           "            DIGITIZING DAY
C       HEADB(7)        HEADI2(4)       DIGITIZING YEAR
C       HEADB(8)           "            EXPERIMENT TIME CODE START HOUR
C       HEADB(9)        HEADI2(5)       EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)          "            EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)    HEADI2(6-15)    EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)       HEADI2(16)      ANALOG CHANNEL IN POSITION 1
C       HEADB(32)          "            ANALOG CHANNEL IN POSITION 2
C       HEADB(33)       HEADI2(17)      ANALOG CHANNEL IN POSITION 3
C       HEADB(34)          "            ANALOG CHANNEL IN POSITION 4
C       HEADB(35)       HEADI2(18)      ANALOG CHANNEL IN POSITION 5
C       HEADB(36)          "            ANALOG CHANNEL IN POSITION 6
C       HEADB(37)       HEADI2(19)      ANALOG CHANNEL IN POSITION 7
C       HEADB(38)          "            ANALOG CHANNEL IN POSITION 8
C       HEADB(39)       HEADI2(20)      ANALOG CHANNEL IN POSITION 9
C       HEADB(40)          "            ANALOG CHANNEL IN POSITION 10
C       HEADB(41)       HEADI2(21)      ANALOG CHANNEL IN POSITION 11
C       HEADB(42)          "            ANALOG CHANNEL IN POSITION 12
C       HEADB(43)       HEADI2(22)      ANALOG CHANNEL IN POSITION 13
C       HEADB(44)          "            ANALOG CHANNEL IN POSITION 14
C       HEADB(45)       HEADI2(23)      ANALOG CHANNEL IN POSITION 15
C       HEADB(46)          "            ANALOG CHANNEL IN POSITION 16
C       HEADB(47)       HEADI2(24)      ANALOG CHANNEL IN POSITION 17
C       HEADB(48)          "            ANALOG CHANNEL IN POSITION 18
C       HEADB(49)       HEADI2(25)      ANALOG CHANNEL IN POSITION 19
C       HEADB(50)          "            ANALOG CHANNEL IN POSITION 20
C       HEADB(51)       HEADI2(26)      ANALOG CHANNEL IN POSITION 21
C       HEADB(52)          "            ANALOG CHANNEL IN POSITION 22
C       HEADB(53)       HEADI2(27)      ANALOG CHANNEL IN POSITION 23
C       HEADB(54)          "            ANALOG CHANNEL IN POSITION 24
C       HEADB(55)       HEADI2(28)      RUN IDENTIFICATION NUMBER
C       HEADB(56)          "                    "
C       HEADB(57-60)    HEADFP(15)      SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-----------------------------------------------------------------------
        SUBROUTINE LISTHEAD(HEADB,HEADI2,HEADI4)
C-----------------------------------------------------------------------
C
        BYTE HEADB(1)
        INTEGER*2 HEADI2(1)
        INTEGER*4 HEADI4(1)
C
C-----PRINT OUT THE ALL HEADER INFO
C
        PRINT 1, (HEADB(I),I=11,30)
1       FORMAT(X,' *** EVENT DESCRIPTION: ',20A1,' ***')
C
        PRINT 2, HEADI2(1)
2       FORMAT(X/X,'         ANALOG TAPE NUMBER: ',4X,I4)
C
        PRINT 3, HEADI2(28)
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
3       FORMAT(X,' RUN IDENTIFICATION NUMBER: ',6X,I2)
C
        PRINT 4, HEADB(3)
4       FORMAT(X,'                PASS NUMBER: ',7X,I1)
C
        PRINT 5, HEADB(8),HEADB(9),HEADB(10)
5       FORMAT(X,'           START TIME CODE: ',I2,':',I2,':',I2)
C
        PRINT 6, HEADB(5),HEADB(6),HEADB(7)
6       FORMAT(X,'                      DATE: ',I2,'/',I2,'/'I2)
C
        NCHAN=HEADB(4)
C
        PRINT 7
7       FORMAT(X/X,' POSITION : CHANNEL      POSITION : CHANNEL',
     1         X/X,' ------------------      ------------------')
        NHALF=NCHAN/2
        DO I=1,NHALF
          K=I+NHALF
          PRINT 8, I,HEADB(I+30),K,HEADB(K+30)
8         FORMAT(X,4X,I2,3X,' : ',3X,I2,2X,5X,3X,I2,3X,' : ',3X,I2)
        END DO
C
        RETURN
        END
```

APPENDIX E

LISTINGS OF
SAVRECAT.FOR
LISTHEAD.FOR

_DRB0:[MACIE.TM]SAVRECAT.FOR;3

```
C       SAVRECAT.FOR  READS A FOREIGN MAG_TAPE MADE BY THE A2D PROGRAM.
C                     IT COPIES AND SEPARATES THE REDUNDANT CHANNELS
C                     (2,4,10,13) BEGINNING AND ENDING RECORDS TO A
C                      DISK FILE.  FILENAMES:  R__P_C__B.DAT  500 BUFFERS
C                                              R__P_C__E.DAT   50 BUFFERS
C-------------------------------------------------------------------------
C
        PARAMETER NA2DCH=14      !NUMBER OF CHANNELS
        PARAMETER NSIZE=500      !NUMBER OF WORDS/CHANNEL IN A RECORD
        PARAMETER NDIM=NA2DCH*NSIZE*2
C
        BYTE FILNAM(14),HEADB(NDIM)
        INTEGER*2 HEADI2(NDIM/2)
        INTEGER*2 BUF1(NA2DCH,NSIZE),BUF2(NSIZE,NA2DCH),IOSB(4)
        INTEGER*4 ICHAN,IRETCODE,SYS$QIOW,RUNNO,PASS
        INTEGER*4 HEADI4(NDIM/4)
        DIMENSION IRCH(4)
        EXTERNAL IO$_READLBLK,IO$_REWIND,IO$_SKIPFILE,IO$_SKIPRECORD
        EQUIVALENCE (HEADB,HEADI2,HEADI4)
        DATA IRCH/2,4,10,13/             !REDUNDANT CHANNELS
C
        NCHAN=NA2DCH                     !NUMBER OF CHANNELS
        NWORDS=NCHAN*NSIZE               !NUMBER OF I*2 WORDS/BLOCK
        NBYTES=NWORDS*2                  !NUMBER OF BYTES/BLOCK
C
C-----FIND OUT WHAT RUN WE ARE PROCESSING
C
        PRINT *, 'ENTER RUN IDENTIFICATION NUMBER'
        READ *, RUNNO
        PRINT *, 'ENTER PASS NUMBER'
        READ *, PASS
        IGROUP=RUNNO-(RUNNO/10*10)
        PRINT *, 'PROCESSING GROUP ',IGROUP
C
C-----ASSIGN THE 9 TRACK TAPE DRIVE (6250) AND MAKE SURE IT IS REWOUND
C
        CALL SYS$ASSIGN('MAG_TAPE',ICHAN,,)
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_REWIND,IOSB,,,,,,,,)
        IF (.NOT.IRETCODE) STOP 'REWIND ERROR'
C
C-----SKIP FILES IF REQUESTED
C
1       PRINT *, 'HOW MANY FILES DO YOU WANT TO SKIP?'
        READ *, NSKIP
        IF(NSKIP.LT.0) THEN
          PRINT *, 'YOU MUST ONLY GO IN THE FORWARD DIRECTION'
          PRINT *, 'THE NUMBER OF FILES MUST BE POSITIVE'
          GOTO 1
        END IF
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPFILE,IOSB,,,%VAL(NSKIP),,,,,)
        IF (.NOT.IRETCODE) STOP 'SKIP FILE ERROR'
        IF(IOSB(2).NE.NSKIP) THEN
          PRINT *,'PROBLEM SKIPPING ',NSKIP, ' FILES'
          PRINT *, IOSB
          STOP 'SKIPPING FILE ERROR'
        END IF
C
C-----READ IN THE HEADER AND PRINT OUT
```

_DRB0:[MACIE.TM]SAVRECAT.FOR;3

```
C
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_READLBLK,IOSB,,,
     1                    HEADB,%VAL(NBYTES),,,,)
        IF (.NOT.IRETCODE) STOP 'READING HEADER ERROR'
        IF(IOSB(2).NE.NBYTES) STOP 'WRONG NUMBER OF BYTES READ FOR HEADER'
        CALL LISTHEAD(HEADB,HEADI2,HEADI4)
C
C-----OPEN OUTPUT FILES, CHANNELS WILL SEPERATED INTO R__P_C__B.DAT
C
        DO K=1,4
          I=IRCH(K)
          IUNIT=I+10
          ENCODE(13,10,FILNAM) RUNNO,PASS,I
10        FORMAT('R',I2,'P',I1,'C',I2,'B.DAT')
          FILNAM(14)=0
          OPEN(UNIT=IUNIT,STATUS='NEW',FILE=FILNAM,FORM='UNFORMATTED')
          PRINT 20, IUNIT,(FILNAM(J),J=1,13)
20        FORMAT (2X,'OUTPUT UNIT= ',I5,2X,'FILE ',13A1,' 500 BUFFERS')
        END DO
C
C-----READ THE DATA IN
C
        NRECORDS=500                        !WE WANT 500 BEGINNING RECORDS
        DO NR=1,NRECORDS
C
          IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_READLBLK,IOSB,,,
     1                      BUF1,%VAL(NBYTES),,,,)
          IF (.NOT.IRETCODE) STOP 'ERROR READING DATA RECORD'
          IF(IOSB(1).EQ.'0870'X) THEN
            PRINT *, 'AT EOF IN RECORD ',NR
          ENDIF
          IF(IOSB(2).NE.NBYTES) STOP 'WRONG NUMBER OF BYTES READ FOR DATA'
C
C-----SEPERATE OUT EACH CHANNEL AND SAVE IT ON DISK
C
          DO K=1,4                          !SWAP ORDER OF DATA
            I=IRCH(K)
            DO J=1,NSIZE
              BUF2(J,I)=BUF1(I,J)
            END DO
            IUNIT=10+I                      !OUTPUT UNITS 14-26
            WRITE(IUNIT) (BUF2(J,I),J=1,NSIZE)
          END DO
        END DO
C
        DO K=1,4
          IUNIT=IRCH(K)+10
          CLOSE(UNIT=IUNIT)
        END DO
C
C-----SKIP RECORDS TO END OF TAPE  (FOR GROUPS 1-3 ONLY, 4 TOTAL)
C
        IF(IGROUP.EQ.4) CALL EXIT
        IF(PASS.EQ.1) THEN
          NSKIP=9250              !WE RECORDED 9800 FOR PASS 1
        ELSE
          NSKIP=9370              !WE RECORDED 9920 FOR PASS 2
        ENDIF
```

_DRB0:[MACIE.TM]SAVRECAT.FOR;3

```
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPRECORD,IOSB,,,%VAL(NSKIP),,,,,)
        IF (.NOT.IRETCODE) THEN
          PRINT 600, (IOSB(I),I=1,4)
600       FORMAT(2X,'IOSB ',4Z8.8)
          STOP 'SKIP RECORD ERROR'
        ENDIF
        IF(IOSB(2).NE.NSKIP) THEN
          PRINT *,'PROBLEM SKIPPING ',NSKIP, ' RECORDS'
          PRINT *, IOSB
          STOP 'SKIPPING RECORD ERROR'
        END IF
C
C-----OPEN OUTPUT FILES, CHANNELS WILL SEPERATED INTO R__P_C__E.DAT
C
        DO K=1,4
          I=IRCH(K)
          IUNIT=I+10
          ENCODE(13,30,FILNAM) RUNNO,PASS,I
30        FORMAT('R',I2,'P',I1,'C',I2,'E.DAT')
          FILNAM(14)=0
          OPEN(UNIT=IUNIT,STATUS='NEW',FILE=FILNAM,FORM='UNFORMATTED')
          PRINT 40, IUNIT,(FILNAM(J),J=1,13)
40        FORMAT (2X,'OUTPUT UNIT= ',I5,2X,'FILE ',13A1,' 50 BUFFERS')
        END DO
C
C-----READ THE DATA IN
C
        DO NR=1,51                !WE WANT 50 BUFFERS, MAKE SURE AT EOF
C
          IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_READLBLK,IOSB,,,
     1                      BUF1,%VAL(NBYTES),,,,)
          IF (.NOT.IRETCODE) STOP 'ERROR READING DATA RECORD'
          IF(IOSB(1).EQ.'0870'X) THEN
            PRINT *, 'AT EOF IN RECORD ',NR
            GO TO 2
          ENDIF
          IF(IOSB(2).NE.NBYTES) STOP 'WRONG NUMBER OF BYTES READ FOR DATA'
C
C-----SEPERATE OUT EACH CHANNEL AND SAVE IT ON DISK
C
          DO K=1,4                          !SWAP ORDER OF DATA
            I=IRCH(K)
            DO J=1,NSIZE
              BUF2(J,I)=BUF1(I,J)
            END DO
            IUNIT=10+I                      !OUTPUT UNITS 14-26
            WRITE(IUNIT) (BUF2(J,I),J=1,NSIZE)
          END DO
        END DO
C
C-----CLOSE THE FILES
C
2       DO K=1,4
          IUNIT=IRCH(K)+10
          CLOSE(UNIT=IUNIT)
        END DO
        PRINT *, 'RECAT FILES HAVE BEEN SAVED'
        CALL EXIT
```

_DRB0:[MACIE.TM]SAVRECAT.FOR;3

```
        END
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
C       LISTHEAD.FOR     LISTS OUT THE HEADER INFORMATION FOR A
C                        SPECIFIED TAPE.
C-------------------------------------------------------------------------
C       HEADB(1-2)       HEADI2(1)        ANALOG TAPE NUMBER
C       HEADB(3)         HEADI2(2)        PASS NUMBER (1,2 OR 3)
C       HEADB(4)            "             NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)         HEADI2(3)        DIGITIZING MONTH
C       HEADB(6)            "             DIGITIZING DAY
C       HEADB(7)         HEADI2(4)        DIGITIZING YEAR
C       HEADB(8)            "             EXPERIMENT TIME CODE START HOUR
C       HEADB(9)         HEADI2(5)        EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)           "             EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)     HEADI2(6-15)     EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)        HEADI2(16)       ANALOG CHANNEL IN POSITION 1
C       HEADB(32)           "             ANALOG CHANNEL IN POSITION 2
C       HEADB(33)        HEADI2(17)       ANALOG CHANNEL IN POSITION 3
C       HEADB(34)           "             ANALOG CHANNEL IN POSITION 4
C       HEADB(35)        HEADI2(18)       ANALOG CHANNEL IN POSITION 5
C       HEADB(36)           "             ANALOG CHANNEL IN POSITION 6
C       HEADB(37)        HEADI2(19)       ANALOG CHANNEL IN POSITION 7
C       HEADB(38)           "             ANALOG CHANNEL IN POSITION 8
C       HEADB(39)        HEADI2(20)       ANALOG CHANNEL IN POSITION 9
C       HEADB(40)           "             ANALOG CHANNEL IN POSITION 10
C       HEADB(41)        HEADI2(21)       ANALOG CHANNEL IN POSITION 11
C       HEADB(42)           "             ANALOG CHANNEL IN POSITION 12
C       HEADB(43)        HEADI2(22)       ANALOG CHANNEL IN POSITION 13
C       HEADB(44)           "             ANALOG CHANNEL IN POSITION 14
C       HEADB(45)        HEADI2(23)       ANALOG CHANNEL IN POSITION 15
C       HEADB(46)           "             ANALOG CHANNEL IN POSITION 16
C       HEADB(47)        HEADI2(24)       ANALOG CHANNEL IN POSITION 17
C       HEADB(48)           "             ANALOG CHANNEL IN POSITION 18
C       HEADB(49)        HEADI2(25)       ANALOG CHANNEL IN POSITION 19
C       HEADB(50)           "             ANALOG CHANNEL IN POSITION 20
C       HEADB(51)        HEADI2(26)       ANALOG CHANNEL IN POSITION 21
C       HEADB(52)           "             ANALOG CHANNEL IN POSITION 22
C       HEADB(53)        HEADI2(27)       ANALOG CHANNEL IN POSITION 23
C       HEADB(54)           "             ANALOG CHANNEL IN POSITION 24
C       HEADB(55)        HEADI2(28)       RUN IDENTIFICATION NUMBER
C       HEADB(56)           "                    "
C       HEADB(57-60)     HEADFP(15)       SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-------------------------------------------------------------------------
        SUBROUTINE LISTHEAD(HEADB,HEADI2,HEADI4)
C-------------------------------------------------------------------------
C
        BYTE HEADB(1)
        INTEGER*2 HEADI2(1)
        INTEGER*4 HEADI4(1)
C
C-----PRINT OUT THE ALL HEADER INFO
C
        PRINT 1, (HEADB(I),I=11,30)
1       FORMAT(X,' *** EVENT DESCRIPTION: ',20A1,' ***')
C
        PRINT 2, HEADI2(1)
2       FORMAT(X/X,'         ANALOG TAPE NUMBER: ',4X,I4)
C
        PRINT 3, HEADI2(28)
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
3       FORMAT(X,' RUN IDENTIFICATION NUMBER: ',6X,I2)
C
        PRINT 4, HEADB(3)
4       FORMAT(X,'                PASS NUMBER: ',7X,I1)
C
        PRINT 5, HEADB(8),HEADB(9),HEADB(10)
5       FORMAT(X,'           START TIME CODE: ',I2,':',I2,':',I2)
C
        PRINT 6, HEADB(5),HEADB(6),HEADB(7)
6       FORMAT(X,'                      DATE: ',I2,'/',I2,'/'I2)
C
        NCHAN=HEADB(4)
C
        PRINT 7
7       FORMAT(X/X,' POSITION : CHANNEL      POSITION : CHANNEL',
     1         X/X,' ------------------      ------------------')
        NHALF=NCHAN/2
        DO I=1,NHALF
          K=I+NHALF
          PRINT 8, I,HEADB(I+30),K,HEADB(K+30)
8         FORMAT(X,4X,I2,3X,' : ',3X,I2,2X,5X,3X,I2,3X,' : ',3X,I2)
        END DO
C
        RETURN
        END
```

APPENDIX F

LISTINGS OF
READDT.FOR
LISTHEAD.FOR

_DRB0:[MACIE.TM]READDT.FOR;31

```
C       READDT.FOR    READS A FOREIGN MAG_TAPE MADE BY THE A2D PROGRAM
C                     COPIES AND SEPARATES THE DIFFERENT CHANNELS INTO
C                     DIFFERENT FILES.  THIS VERSION IS FOR 14 CHANNELS.
C-------------------------------------------------------------------------
C
        PARAMETER NA2DCH=14      !NUMBER OF CHANNELS
        PARAMETER NSIZE=500      !NUMBER OF WORDS/CHANNEL IN A RECORD
        PARAMETER NDIM=NA2DCH*NSIZE*2
C
        BYTE FILNAM(13),HEADB(NDIM)
        INTEGER*2 HEADI2(NDIM/2)
        INTEGER*2 BUF1(NA2DCH,NSIZE),BUF2(NSIZE,NA2DCH),IOSB(4)
        INTEGER*4 ICHAN,IRETCODE,SYS$QIOW,RUNNO,PASS
        INTEGER*4 HEADI4(NDIM/4)
        EXTERNAL IO$_READLBLK,IO$_REWIND,IO$_SKIPFILE
        EQUIVALENCE (HEADB,HEADI2,HEADI4)
C
        NCHAN=NA2DCH                        !NUMBER OF CHANNELS
        NWORDS=NCHAN*NSIZE                  !NUMBER OF I*2 WORDS/BLOCK
        NBYTES=NWORDS*2                     !NUMBER OF BYTES/BLOCK
C
C-----FIND OUT WHAT RUN WE ARE PROCESSING
C
        PRINT *, 'ENTER RUN IDENTIFICATION NUMBER'
        READ *, RUNNO
        PRINT *, 'ENTER PASS NUMBER'
        READ *, PASS
C
C-----OPEN OUTPUT FILES, CHANNELS WILL SEPERATED INTO R__P_C__.DAT
C
        DO I=1,NCHAN
          IUNIT=I+10
          ICHAN=I
          ENCODE(12,10,FILNAM) RUNNO,PASS,ICHAN
10        FORMAT('R',I2,'P',I1,'C',I2,'.DAT')
          FILNAM(13)=0
          OPEN(UNIT=IUNIT,STATUS='NEW',FILE=FILNAM,FORM='UNFORMATTED')
          PRINT 20, IUNIT,(FILNAM(J),J=1,12)
20        FORMAT (2X,'OUTPUT UNIT= ',I5,2X,'FILE '12A1)
        END DO
C
C-----ASSIGN THE 9 TRACK TAPE DRIVE (6250) AND MAKE SURE IT IS REWOUND
C
        CALL SYS$ASSIGN('MAG_TAPE',ICHAN,,)
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_REWIND,IOSB,,,,,,,,)
        IF (.NOT.IRETCODE) STOP 'REWIND ERROR'
C
C-----SKIP FILES IF REQUESTED
C
1       PRINT *, 'HOW MANY FILES DO YOU WANT TO SKIP?'
        READ *, NSKIP
        IF(NSKIP.LT.0) THEN
          PRINT *, 'YOU MUST ONLY GO IN THE FORWARD DIRECTION'
          PRINT *, 'THE NUMBER OF FILES MUST BE POSITIVE'
          GOTO 1
        END IF
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPFILE,IOSB,,,%VAL(NSKIP),,,,,)
        IF (.NOT.IRETCODE) STOP 'SKIP FILE ERROR'
```

_DRB0:[MACIE.TM]READDT.FOR;31

```
        IF(IOSB(2).NE.NSKIP) THEN
          PRINT *,'PROBLEM SKIPPING ',NSKIP, ' FILES'
          PRINT *, IOSB
          STOP 'SKIPPING FILE ERROR'
        END IF
C
C-----READ IN THE HEADER AND PRINT OUT
C
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_READLBLK,IOSB,,,
     1                    HEADB,%VAL(NBYTES),,,,)
        IF (.NOT.IRETCODE) STOP 'READING HEADER ERROR'
        IF(IOSB(2).NE.NBYTES) STOP 'WRONG NUMBER OF BYTES READ FOR HEADER'
        CALL LISTHEAD(HEADB,HEADI2,HEADI4)
C
C-----READ THE DATA IN
C
        PRINT *, 'HOW MANY RECORDS DO YOU WANT TO READ?'
        READ *, NRECORDS
C
        DO NR=1,NRECORDS
C
          IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_READLBLK,IOSB,,,
     1                      BUF1,%VAL(NBYTES),,,,)
          IF (.NOT.IRETCODE) STOP 'ERROR READING DATA RECORD'
          IF(IOSB(1).EQ.'0870'X) THEN
            PRINT *, 'AT EOF IN RECORD ',NR
          ENDIF
          IF(IOSB(2).NE.NBYTES) STOP 'WRONG NUMBER OF BYTES READ FOR DATA'
C
C-----SEPERATE OUT EACH CHANNEL AND SAVE IT ON DISK
C
          DO I=1,NCHAN                      !SWAP ORDER OF DATA
            DO J=1,NSIZE
              BUF2(J,I)=BUF1(I,J)
            END DO
          END DO
          DO I=1,NCHAN
            IUNIT=10+I                      !OUTPUT UNITS 14-26
            WRITE(IUNIT) (BUF2(J,I),J=1,NSIZE)
          END DO
        END DO
C
C-----CLOSE THE FILE
C
         DO I=1,NCHAN
            IUNIT=10+I                      !OUTPUT UNITS 14-26
            CLOSE(IUNIT)
          END DO
C
        CALL EXIT
        END
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
C       LISTHEAD.FOR    LISTS OUT THE HEADER INFORMATION FOR A
C                       SPECIFIED TAPE.
C-----------------------------------------------------------------------
C       HEADB(1-2)      HEADI2(1)       ANALOG TAPE NUMBER
C       HEADB(3)        HEADI2(2)       PASS NUMBER (1,2 OR 3)
C       HEADB(4)           "            NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)        HEADI2(3)       DIGITIZING MONTH
C       HEADB(6)           "            DIGITIZING DAY
C       HEADB(7)        HEADI2(4)       DIGITIZING YEAR
C       HEADB(8)           "            EXPERIMENT TIME CODE START HOUR
C       HEADB(9)        HEADI2(5)       EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)          "            EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)    HEADI2(6-15)    EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)       HEADI2(16)      ANALOG CHANNEL IN POSITION 1
C       HEADB(32)          "            ANALOG CHANNEL IN POSITION 2
C       HEADB(33)       HEADI2(17)      ANALOG CHANNEL IN POSITION 3
C       HEADB(34)          "            ANALOG CHANNEL IN POSITION 4
C       HEADB(35)       HEADI2(18)      ANALOG CHANNEL IN POSITION 5
C       HEADB(36)          "            ANALOG CHANNEL IN POSITION 6
C       HEADB(37)       HEADI2(19)      ANALOG CHANNEL IN POSITION 7
C       HEADB(38)          "            ANALOG CHANNEL IN POSITION 8
C       HEADB(39)       HEADI2(20)      ANALOG CHANNEL IN POSITION 9
C       HEADB(40)          "            ANALOG CHANNEL IN POSITION 10
C       HEADB(41)       HEADI2(21)      ANALOG CHANNEL IN POSITION 11
C       HEADB(42)          "            ANALOG CHANNEL IN POSITION 12
C       HEADB(43)       HEADI2(22)      ANALOG CHANNEL IN POSITION 13
C       HEADB(44)          "            ANALOG CHANNEL IN POSITION 14
C       HEADB(45)       HEADI2(23)      ANALOG CHANNEL IN POSITION 15
C       HEADB(46)          "            ANALOG CHANNEL IN POSITION 16
C       HEADB(47)       HEADI2(24)      ANALOG CHANNEL IN POSITION 17
C       HEADB(48)          "            ANALOG CHANNEL IN POSITION 18
C       HEADB(49)       HEADI2(25)      ANALOG CHANNEL IN POSITION 19
C       HEADB(50)          "            ANALOG CHANNEL IN POSITION 20
C       HEADB(51)       HEADI2(26)      ANALOG CHANNEL IN POSITION 21
C       HEADB(52)          "            ANALOG CHANNEL IN POSITION 22
C       HEADB(53)       HEADI2(27)      ANALOG CHANNEL IN POSITION 23
C       HEADB(54)          "            ANALOG CHANNEL IN POSITION 24
C       HEADB(55)       HEADI2(28)      RUN IDENTIFICATION NUMBER
C       HEADB(56)          "                    "
C       HEADB(57-60)    HEADFP(15)      SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-----------------------------------------------------------------------
        SUBROUTINE LISTHEAD(HEADB,HEADI2,HEADI4)
C-----------------------------------------------------------------------
C
        BYTE HEADB(1)
        INTEGER*2 HEADI2(1)
        INTEGER*4 HEADI4(1)
C
C-----PRINT OUT THE ALL HEADER INFO
C
        PRINT 1, (HEADB(I),I=11,30)
1       FORMAT(X,' *** EVENT DESCRIPTION: ',20A1,' ***')
C
        PRINT 2, HEADI2(1)
2       FORMAT(X/X,'         ANALOG TAPE NUMBER: ',4X,I4)
C
        PRINT 3, HEADI2(28)
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
3       FORMAT(X,' RUN IDENTIFICATION NUMBER: ',6X,I2)
C
        PRINT 4, HEADB(3)
4       FORMAT(X,'                PASS NUMBER: ',7X,I1)
C
        PRINT 5, HEADB(8),HEADB(9),HEADB(10)
5       FORMAT(X,'           START TIME CODE: ',I2,':',I2,':',I2)
C
        PRINT 6, HEADB(5),HEADB(6),HEADB(7)
6       FORMAT(X,'                      DATE: ',I2,'/',I2,'/'I2)
C
        NCHAN=HEADB(4)
C
        PRINT 7
7       FORMAT(X/X,' POSITION : CHANNEL     POSITION : CHANNEL',
     1         X/X,' ------------------     ------------------')
        NHALF=NCHAN/2
        DO I=1,NHALF
          K=I+NHALF
          PRINT 8, I,HEADB(I+30),K,HEADB(K+30)
8         FORMAT(X,4X,I2,3X,' : ',3X,I2,2X,5X,3X,I2,3X,' : ',3X,I2)
        END DO
C
        RETURN
        END
```

APPENDIX G

LISTINGS OF
QUPL.COM
QUPL.FOR
PLCHAN.FOR

_DRB0:[MACIE.TM]QUPL.COM;8

```
$!  QUPL.COM   COMMAND STREAM FOR QUICK PLOT CHECK OF 1ST 4 RECORDS
$!             OF ALL 14 A/D CHANNELS.
$!-------------------------------------------------------------------
$! SET VERIFY
$   IF P1 .EQS. "" THEN INQUIRE P1 "RUN NUMBER? "
$!
$   IF P2 .EQS. "" THEN INQUIRE P2 "PASS NUMBER? "
$!
$   IF P3 .EQS. "" THEN -
$   INQUIRE P3 "ARE YOU RUNNING ON THE TEKTRONICS? (Y/N)"
$!
$   SET DEF DRB1:[A2D.QUPL]
$   OPEN/WRITE QUPL QUPL.IN
$   WRITE QUPL P1
$   WRITE QUPL P2
$   WRITE QUPL "0.,.2"
$   WRITE QUPL "0.,.2,.05"
$!
$   IF F$STRING(P3) .EQS. "N" THEN GOTO TEKT
$   WRITE QUPL 2
$   WRITE QUPL 2
$   WRITE QUPL 2
$   WRITE QUPL 2
$   GOTO MAKEPLOT
$!
$ TEKT:
$   WRITE QUPL 1
$   WRITE QUPL 1
$   WRITE QUPL 1
$   WRITE QUPL 1
$!
$ MAKEPLOT:
$   CLOSE QUPL
$   ASSIGN/USER_MODE QUPL.IN FOR$READ
$   RUN DRB0:[A2D.DIGIT]QUPL    !SEND THE PLOT TO THE DISK
$   DELETE QUPL.IN;*
$!
$ DONE:
$   WRITE SYS$OUTPUT "PLOTTING COMPLETE"
$ EXIT
```

_DRB0:[MACIE.TM]QUPL.FOR;11

```
C       QUPL.FOR    PERFORMS A QUICKLOOK PLOT OF DIGITIZED DATA THAT
C                   HAS BEEN COPIED FROM TAPE TO DISK.  IT IS PLOTTED
C                   ONE CHAN/PLOT AND 4 CHANNELS/PAGE.  RIGHT NOW
C                   IT PLOTS THE FIRST 4 RECORDS OF 500 PTS.
C                   ALL CHANNELS ARE PLOTTED. 1-4, 5-8, 9-12, 13+14
C-----------------------------------------------------------------------
C
        PARAMETER NDIM=4096,NSIZE=500
        BYTE FILNAM(13)
        INTEGER*2 BUFFER(NSIZE)
        INTEGER CHANNO,RUNNO,PASSNO,ICHAN(4)
        REAL X(NDIM),Y(NDIM)
        COMMON ISTART,ISTOP,TMIN,TMAX,TDEL
        NCHAN=14
        NREC=4
C
C-----FIND OUT WHAT RUN WE ARE PROCESSING
C
        PRINT *, 'ENTER RUN IDENTIFICATION NUMBER'
        READ *,RUNNO
        PRINT *, 'ENTER PASS NUMBER'
        READ *, PASSNO
        PRINT *, 'RUN ',RUNNO,', PASS ',PASSNO
C
C-----GET OPERATORS REQUESTED PLOT BOUNDS
C
        DELTAT=1./2500./4.                !SAMPLE INTERVAL
        NPTS=FLOAT(NREC)*NSIZE
        TIMMAX=FLOAT(NPTS)*DELTAT
        PRINT *, ' '
        PRINT *, 'DATA RANGE IS 0 THRU',TIMMAX,' (SEC), DELTA=',DELTAT,' (SEC)'
        PRINT *, 'INPUT DESIRED DATA MIN AND MAX IN SECONDS'
        READ *, DMIN,DMAX
        PRINT *, ' '
        PRINT *, 'INPUT PLOT TIME AXIS MIN, MAX AND LABEL INCREMENT IN SECONDS'
        READ *, TMIN,TMAX,TDEL
        PRINT *, ' '
C
C-----MAKE UP TIME AXIS, GET START AND STOP
C
        DO 1 IS=1,NPTS                                    !TIME AXIS
        X(IS)=FLOAT(IS-1)*DELTAT
1       CONTINUE
C
        DO 2 I=1,NPTS                                     !START SAMPLE
        IF(X(I).GE.TMIN) THEN
          ISTART=I
          GO TO 3
        ENDIF
2       CONTINUE
3       CONTINUE
C
        DO 4 I=NPTS,1,-1                                  !STOP SAMPLE
        IF(X(I).LE.TMAX) THEN
          ISTOP=I
          GO TO 5
        ENDIF
4       CONTINUE
```

_DRB0:[MACIE.TM]QUPL.FOR;11

```
5       CONTINUE
C
C-----OPEN THE FILES, NAMING CONVENTION R__P_C__.DAT
C
        IPLOT=1
        DO K=1,NCHAN
          CHANNO=K
          IUNIT=10
          ENCODE(12,10,FILNAM) RUNNO,PASSNO,CHANNO
10        FORMAT('R',I2,'P',I1,'C',I2,'.DAT')
          FILNAM(13)=0
          OPEN(UNIT=IUNIT,STATUS='OLD',FILE=FILNAM,FORM='UNFORMATTED')
C
C-----READ IN THE DATA
C
          N=0
          DO NREC=1,4
            READ(IUNIT,END=999) (BUFFER(I),I=1,NSIZE)
            DO I=1,NSIZE
              N=N+1
              A=BUFFER(I)
              Y(N)=A/409.5-5
            END DO
          END DO
          CALL CLOSE(IUNIT)
C
C-----PLOT THE DATA
C
          ILAST=0
          IF(K.EQ.14) ILAST=1
          IF(IPLOT.EQ.4) ILAST=1
          CALL PLCHAN(ILAST,IPLOT,RUNNO,PASSNO,CHANNO,N,X,Y)
          IPLOT=IPLOT+1
          IF(IPLOT.EQ.5) IPLOT=1
        END DO
C
999     CALL EXIT
        END
```

_DRB0:[MACIE.TM]PLCHAN.FOR;14

```
C       PLCHAN.FOR   PLOTS ONE CHAN OF DATA (4/PG)
C-----------------------------------------------------------------------
        SUBROUTINE PLCHAN(ILAST,IPLOT,IRUN,IPASS,ICHAN,NPT,X,Y)
C-----------------------------------------------------------------------
C
        COMMON ISTART,ISTOP,TMIN,TMAX,TDEL
        REAL X(1),Y(1)
        CHARACTER*31 TITLAB
        IF(IPLOT.EQ.4) ILAST=1
C
C-----SET UP X AXIS
C
        XMIN=TMIN                                       !X AXIS MINIMUM
        XMAX=TMAX                                       !X AXIS MAXIMUM
        XRANGE=XMAX-XMIN                                !X AXIS RANGE
        NX=XRANGE/TDEL                                  !X AXIS # INCREMENTS
        XDEL=TDEL                                       !X AXIS LABEL INCREMENT
        XSPACE=8000.                                    !X AXIS SPACE
        XMID=XSPACE/2.                                  !X AXIS MIDPOINT
        XSTART=1500.                                    !X AXIS START POINT
C
C-----SET UP THE Y AXIS
C
        YMIN=-5.                                        !Y AXIS MINIMUM
        YMAX=5.                                         !Y AXIS MAXIMUM
        YRANGE=YMAX-YMIN                                !Y AXIS RANGE
        NY=2                                            !Y AXIS # INCREMENTS
        YDEL=YRANGE/FLOAT(NY)                           !Y AXIS LABEL INCREMENTS
        YSPACE=1200.                                    !Y AXIS SPACE
        YMID=YSPACE/2.                                  !Y AXIS MIDPOINT
        YSTART=7600.-(YSPACE+400.)*FLOAT(IPLOT)         !Y AXIS START POINT
C
C-----INITIALIZE THE PLOTTTING
C
        IF(IPLOT.EQ.1) THEN
          PRINT *, 'PLOT TO IPF FILE ONLY(1)/TO TERMINAL ONLY(2)/BOTH?(3)'
          READ *, IOPTION
          CALL BFIL(IOPTION)
          CALL BJOB                                     !INITIALIZES A JOB
          CALL BFRM(1)                                  !WANT 11X8.5
        ENDIF
C
C-----SET DATA SPACE AND GRID
C
        CALL SWRKS(XSTART,YSTART,XSPACE,YSPACE,0.) !SET UP WORK SPACE
        CALL DRECG(NX,NY*2,0,0,-100.,-100.)       !MAKE RECTANGULAR GRID
        CALL SDATP(XMIN,YMIN,XRANGE,YRANGE)       !SET UP DATA SPACE
C
C-----WRITE TITLE ON PLOT
C
        IF(IPLOT.EQ.1) THEN
          CALL SSPC(300.,300.)                          !SET CHARACTER SIZE
          CALL SJST(0,0)                                !LT,BOTTOM JUSTIFY
          TITLAB='**EXPERIMENT TITLE**'//CHAR(0)
          CALL LSTRG(TITLAB,950.,1600.)                 !WRITE TITLE
          TITLAB='RUN     - PASS '//CHAR(0)
          CALL LSTRG(TITLAB,1700.,1300.)                !WRITE TITLE
          CALL LNUMI(IRUN,2900.,1300.)                  !WRITE RUN ID NUMBER
```

_DRB0:[MACIE.TM]PLCHAN.FOR;14

```
          CALL LNUMI(IPASS,5900.,1300.)          !WRITE PASS NUMBER
        ENDIF
C
C-----WRITE CHAN NUMBER ON PLOT
C
        CALL SSPC(300.,300.)                     !SET CHARACTER SIZE
        CALL SJST(0,0)                           !LT,BOTTOM JUSTIFY
        TITLAB='CHAN'//CHAR(0)
        CALL LSTRG(TITLAB,8100.,650.)            !WRITE CHAN
        CALL SJST(1,1)                           !CENTER JUSTIFY
        CALL LNUMI(ICHAN,8700.,400.)             !WRITE CHAN NUMBER
C
C-----LABEL THE X AXIS
C
        IF(ILAST.EQ.1) THEN
          CALL SSPC(300.,300.)                   !SET CHARACTER SIZE
          CALL SJST(1,1)                         !CENTER JUSTIFY
          XSPINC=XSPACE/FLOAT(NX)                !Y SPACE INCREMENT
          XVAL=0.                                !INITIAL X SPACE
          VALUE=XMIN                             !INITIAL X VALUE
          DO 6 I=1,NX+1
          IVALUE=VALUE*1000                      !WANT MILLESEC LABEL
          CALL LNUMI(IVALUE,XVAL,-350.)          !WRITE X LABEL
          VALUE=VALUE+XDEL                       !GET NEXT X VALUE
          XVAL=XVAL+XSPINC                       !GET NEXT X SPACE
6         CONTINUE
          TITLAB='TIME 1/4 SPEED (MSEC)'//CHAR(0)
          CALL LSTRG(TITLAB,XMID,-750.)          !MAKE X AXIS LABEL
          TITLAB='VOLTAGE (VOLTS) '//CHAR(0)
          CALL SJST(1,1)                         !CENTER JUSTIFY
          CALL SROT(0.,90.)                      !ROTATE 90
          YVAL=(7600.-YSTART)/2.                 !FIGURE OUT CENTER
          CALL LSTRG(TITLAB,-1250.,YVAL)         !MAKE Y AXIS LABEL
          CALL SROT(0.,0.)                       !ROTATE BACK
        ENDIF
C
C-----LABEL THE Y AXIS
C
        CALL SSPC(300.,300.)                     !SET CHARACTER SIZE
        CALL SJST(2,1)                           !RT, CENTER JUSTIFY
        YSPINC=YSPACE/FLOAT(NY)                  !Y SPACE INCREMENT
        YVAL=0.                                  !INITIAL Y SPACE
        VALUE=YMIN                               !INITIAL Y VALUE
        DO 7 I=1,NY+1
        ID=VALUE                                 !GET INTEGER LABEL
        CALL LNUMI(ID,-100.,YVAL)                !WRITE Y INTEGER LABEL
        VALUE=VALUE+YDEL                         !GET NEXT Y VALUE
        YVAL=YVAL+YSPINC                         !GET NEXT Y SPACE
7       CONTINUE
C
C-----PLOT THE DATA
C
        CALL SWRKS(XSTART,YSTART,XSPACE,YSPACE,0.) !SET UP WORK SPACE
        CALL SDATP(XMIN,YMIN,XRANGE,YRANGE)        !SET UP DATA SPACE
        N=ISTOP-ISTART+1
        CALL DRECP(N,X(ISTART),Y(ISTART),0,0,0)    !PLOT DATA POINTS
C
C----CLOSE PLOTTING IF DONE
```

_DRB0:[MACIE.TM]PLCHAN.FOR;14

```
C
        IF(ILAST.EQ.1) THEN
          CALL EFRM
          CALL EJOB
          CALL EFIL
        ENDIF
C
        RETURN
        END
```

APPENDIX H

LISTINGS OF
DOWNSAMP.FOR
LISTHEAD.FOR

_DRB0:[MACIE.TM]DOWNSAMP.FOR;58

```
C       DOWNSAMP.FOR  READS A FOREIGN MAG_TAPE MADE BY THE A2D PROGRAM.
C                     IT THEN DOWN SAMPLES AND WRITES ALL CHANNELS TO
C                     A DATA FILE FOR FUTURE MERGING.  ALL LEFT OVER DATA
C                     FOR A GROUP IS SAVED AND LATER APPENDED TO THE
C                     FOLLOWING GROUP.  FOR PASS 2, THE GARBAGE DATA DUE
C                     TO ALIGNMENT IS THROWN AWAY.
C-----------------------------------------------------------------------
C
        PARAMETER NA2DCH=14      !NUMBER OF CHANNELS
        PARAMETER NISIZE=500     !NUMBER OF WORDS/CHANNEL IN AN INPUT RECORD
        PARAMETER NOSIZE=1024    !NUMBER OF WORDS/CHANNEL IN AN OUTPUT RECORD
C
        PARAMETER NDIM=NA2DCH*NISIZE*2
C
        BYTE FILNAM(10),HEADB(NDIM)
        INTEGER*2 IOSB(4),HEADI2(NDIM/2)
        INTEGER*2 BUF1(NA2DCH,NISIZE),BUF2(NOSIZE,NA2DCH)
        INTEGER*4 ICHAN,IRETCODE,SYS$QIOW,RUNNO,PASS,HEADI4(NDIM/4)
        DIMENSION HEADFP(NDIM/4)
        EXTERNAL IO$_READLBLK,IO$_REWIND,IO$_SKIPFILE,IO$_SKIPRECORD
        EQUIVALENCE (HEADB,HEADI2,HEADI4,HEADFP)
C
        NCHAN=NA2DCH                          !NUMBER OF CHANNELS
        NWORDS=NCHAN*NISIZE                   !NUMBER OF I*2 WORDS/BLOCK
        NBYTES=NWORDS*2                       !NUMBER OF BYTES/BLOCK
        NOUT=NOSIZE                           !SAMPLES IN OUTPUT BUFFER/CHAN
C
C-----FIND OUT WHAT WE ARE PROCESSING
C
        PRINT *, 'ENTER RUN IDENTIFICATION NUMBER'
        READ *, RUNNO
C
        PRINT *, 'ENTER PASS NUMBER'
        READ *, PASS
        IGROUP=RUNNO-(RUNNO/10*10)
C
1       PRINT *, 'ENTER DOWN SAMPLE INCREMENT, SAVE EVERY?'
        READ *, IPICK
        IF(IPICK.LT.0) GO TO 1
C
C2      PRINT *, 'ENTER NUMBER OF RECORDS TO LOOK AT?'
C       READ *, NRECMAX
C       IF(NRECMAX.LT.0) GO TO 2
C       NSAMPMAX=NRECMAX*NISIZE
2       PRINT *, 'ENTER MAXIMUM NUMBER OF SAMPLES?'
        READ *, NSAMPMAX
C
3       PRINT *, 'ENTER RECAT START SAMPLE NUMBER?'
        READ *, IRECAT
        IF(IRECAT.LT.1) GO TO 3
        ISTARTREC=IRECAT/NISIZE                  !START RECORD
        ISTARTSAMP=IRECAT-ISTARTREC*NISIZE       !START SAMPLE
C
C-----CHECK ON PASS AND GROUP, SETUP ACCORDINGLY
C
        IF(PASS.EQ.1) THEN                       !PASS 1
          IF(IGROUP.EQ.1) THEN
            N=0                                  !OUTPUT BUFFER COUNTER
```

_DRB0:[MACIE.TM]DOWNSAMP.FOR;58

```
            NSAMPLES=1                                  !NUMBER OF SAMPLES
          ELSE
            IOLDRUN=RUNNO-1
            ENCODE(9,10,FILNAM) IOLDRUN,PASS            !GET THE DATA TO APPEND
10          FORMAT('R',I2,'P',I1,'.EXT')
            FILNAM(10)=0
            OPEN(UNIT=10,STATUS='OLD',FILE=FILNAM,FORM='UNFORMATTED')
            READ(10) NEXTST,NSIZE,LASTIPICK
            READ(10) NLEFT,((BUF2(I,J),I=1,NLEFT),J=1,NA2DCH)
            CLOSE(UNIT=10)
            ISTARTSAMP=ISTARTSAMP+NEXTST-1              !START SAMPLE
            N=NLEFT                                     !OUTPUT BUFFER COUNTER
            NSAMPLES=NLEFT*IPICK+IPICK                  !NUMBER OF SAMPLES
            IF(NSIZE.NE.NOSIZE) STOP 'OUTPUT BUFFER MISMATCH'
            IF(LASTIPICK.NE.IPICK) STOP 'DOWNSAMPLE INCREMENT MISMATCH'
          ENDIF
        ENDIF
C
        IF(PASS.EQ.2) THEN                              !PASS 2
C
          IF(IGROUP.EQ.1) THEN
            N=0                                         !OUTPUT BUFFER COUNTER
            NSAMPLES=1                                  !NUMBER OF SAMPLES
          ELSE
            IOLDRUN=RUNNO-1
            ENCODE(9,10,FILNAM) IOLDRUN,PASS            !GET THE DATA TO APPEND
            FILNAM(10)=0
            OPEN(UNIT=10,STATUS='OLD',FILE=FILNAM,FORM='UNFORMATTED')
            READ(10) NEXTST,NSIZE,LASTIPICK
            READ(10) NLEFT,((BUF2(I,J),I=1,NLEFT),J=1,NA2DCH)
            CLOSE(UNIT=10)
            ISTARTSAMP=ISTARTSAMP+NEXTST-1              !START SAMPLE
            N=NLEFT                                     !OUTPUT BUFFER COUNTER
            NSAMPLES=NLEFT*IPICK+IPICK                  !NUMBER OF SAMPLES
            IF(NSIZE.NE.NOSIZE) STOP 'OUTPUT BUFFER MISMATCH'
            IF(LASTIPICK.NE.IPICK) STOP 'DOWNSAMPLE INCREMENT MISMATCH'
          ENDIF
        ENDIF
        NSAMPMAX=NSAMPMAX+NSAMPLES-1
        PRINT *, 'LEFT OVER SAMPLES ',NSAMPLES
        PRINT *, 'NUMBER OF RECORDS TO PROCESS ',NRECMAX
        PRINT *, 'FINAL MAXIMUM NUMBER OF SAMPLES ',NSAMPMAX
C
C
C-----ASSIGN THE 9 TRACK TAPE DRIVE (6250) AND MAKE SURE IT IS REWOUND
C
        CALL SYS$ASSIGN('MAG_TAPE',ICHAN,,)
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_REWIND,IOSB,,,,,,,)
        IF (.NOT.IRETCODE) STOP 'REWIND ERROR'
C
C-----SKIP FILES IF REQUESTED
C
4       PRINT *, 'HOW MANY FILES DO YOU WANT TO SKIP?'
        READ *, NSKIP
        IF(NSKIP.LT.0) THEN
          PRINT *, 'YOU MUST ONLY GO IN THE FORWARD DIRECTION'
          PRINT *, 'THE NUMBER OF FILES MUST BE POSITIVE'
          GOTO 4
```

_DRB0:[MACIE.TM]DOWNSAMP.FOR;58

```
        END IF
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPFILE,IOSB,,,%VAL(NSKIP),,,,,)
        IF (.NOT.IRETCODE) STOP 'SKIP FILE ERROR'
        IF(IOSB(2).NE.NSKIP) THEN
          PRINT 20, (IOSB(I),I=1,4)
20        FORMAT(2X,'IOSB ',4(Z4.4,X))
          STOP 'SKIPPING FILE ERROR'
        END IF
C
C-----READ IN THE HEADER AND PRINT OUT
C
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_READLBLK,IOSB,,,
     1                    HEADB,%VAL(NBYTES),,,,)
        IF (.NOT.IRETCODE) STOP 'READING HEADER ERROR'
        IF(IOSB(2).NE.NBYTES) THEN
          PRINT 20, (IOSB(I),I=1,4)
          STOP 'WRONG NUMBER OF BYTES READ FOR HEADER'
        ENDIF
        CALL LISTHEAD(HEADB,HEADI2,HEADI4)
        HEADFP(15)=HEADFP(15)*FLOAT(IPICK)      !UPDATE SAMPLE INTERVAL
C
C-----SKIP THE APPROPRIATE NUMBER OF RECORDS
C
        NSKIP=ISTARTREC
        IF(NSKIP.GT.0) THEN
          IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPRECORD,IOSB,,,
        1                   %VAL(NSKIP),,,,,)
          IF (.NOT.IRETCODE) STOP 'SKIP RECORD ERROR'
          IF(IOSB(2).NE.NSKIP) THEN
            PRINT 20, (IOSB(I),I=1,4)
            STOP 'SKIPPING RECORD ERROR'
          END IF
        END IF
        NRECIN=NSKIP                        !NUMBER OF INPUT RECORDS (TOTAL)
        NRECOUT=0                           !NUMBER OF OUTPUT RECORDS
        ISAVE=ISTARTSAMP                    !NEXT POINT IN BUFFER TO SAVE
        IF(ISAVE.GT.NISIZE) STOP 'STARTING POINT > RECORD SIZE'
C
C-----OPEN THE OUTPUT FILE, R__P_.DAT
C
        ENCODE(9,30,FILNAM) RUNNO,PASS
30      FORMAT('R',I2,'P',I1,'.DAT')
        FILNAM(10)=0
        OPEN(UNIT=11,STATUS='NEW',FILE=FILNAM,FORM='UNFORMATTED')
        PRINT 40, (FILNAM(J),J=1,9)
40      FORMAT (2X,'OUTPUT FILE: ',9A1)
        WRITE(11) (HEADB(I),I=1,NBYTES)
C
C-----READ THE DATA IN A RECORD AT A TIME, LOOK FOR THE EOF
C
5       CONTINUE
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_READLBLK,IOSB,,,
     1                    BUF1,%VAL(NBYTES),,,,)
        IF (.NOT.IRETCODE) STOP 'ERROR READING DATA RECORD'
        IF(IOSB(1).EQ.'0870'X) THEN
          PRINT *, 'AT EOF'
          NSAMPLEFT=IPICK*N+IPICK-ISAVE
          GO TO 7
```

_DRB0:[MACIE.TM]DOWNSAMP.FOR;58

```
        ENDIF
        IF(IOSB(2).NE.NBYTES) THEN
          PRINT 20, (IOSB(I),I=1,4)
          PRINT *,'PROBLEM SKIPPING ',NSKIP, ' RECORDS'
          STOP 'WRONG NUMBER OF BYTES READ FOR DATA'
        ENDIF
        NRECIN=NRECIN+1
C
C-----EXTRACT THE DATA POINTS I WANT TO SAVE AND DUMP FULL BUFFERS
C
6       CONTINUE
        N=N+1
        DO J=1,NA2DCH
          BUF2(N,J)=BUF1(J,ISAVE)
        END DO
        IF(N.EQ.NOUT) THEN
          WRITE(11) ((BUF2(I,J),I=1,NOUT),J=1,NA2DCH)
          NRECOUT=NRECOUT+1
          N=0
        ENDIF
        ISAVE=ISAVE+IPICK
        NSAMPLES=NSAMPLES+IPICK
        IF(NSAMPLES.GT.NSAMPMAX) THEN
          ISAVE=NSAMPLES-NSAMPMAX
          NSAMPLEFT=N*IPICK+(IPICK-ISAVE)
          NSAMPLES=NSAMPMAX
          GO TO 7
        ENDIF
        IF(ISAVE.LE.NISIZE) GO TO 6
        ISAVE=ISAVE-NISIZE
        GO TO 5
C
C-----AT EOF FILE, CLOSE FILES
C
7       CONTINUE
        CLOSE(UNIT=10)
        CLOSE(UNIT=11)
        NLEFT=N
C
C-----SAVE THE EXTRA DATA FOR APPENDING TO THE FRONT OF THE NEXT GROUP
C
        ENCODE(9,50,FILNAM) RUNNO,PASS
50      FORMAT('R',I2,'P',I1,'.EXT')
        FILNAM(10)=0
        OPEN(UNIT=10,STATUS='NEW',FILE=FILNAM,FORM='UNFORMATTED')
        WRITE(10) ISAVE,NOUT,IPICK                !NEXT START, SIZE, INC
        WRITE(10) NLEFT,((BUF2(I,J),I=1,NLEFT),J=1,NA2DCH)
        CLOSE(UNIT=10)
C
C----PRINT THE BOOK KEEPING INFORMATION
C
        PRINT *, 'READ IN ',NRECIN,' RECORDS  (SKIPPED ',NSKIP,')'
        PRINT *, 'WROTE OUT ',NRECOUT,' RECORDS'
        PRINT *, 'BUFFER SIZES ARE: IN= 500, OUT= ',NOUT
        PRINT *, 'NUMBER OF SAMPLES LOOKED AT: ',NSAMPLES
        PRINT 60, (FILNAM(I),I=',9)
60      FORMAT(2X/2X'EXTRA FILE: ',9A1)
        PRINT *, 'NEXT START OFFSET IS: ',ISAVE
```

_DRB0:[MACIE.TM]DOWNSAMP.FOR;58

```
      PRINT *, 'NUMBER OF LEFT OVER POINTS TO BE APPENDED: ',NLEFT
      PRINT *, ' '
      PRINT *, 'NUMBER OF LEFT OVER SAMPLES: ',NSAMPLEFT
      PRINT *, ' '
      PRINT *, '***DOWNSAMPLE PROGRAM COMPLETE ***'
      CALL EXIT
      END
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
C       LISTHEAD.FOR    LISTS OUT THE HEADER INFORMATION FOR A
C                       SPECIFIED TAPE.
C-------------------------------------------------------------------------
C       HEADB(1-2)      HEADI2(1)       ANALOG TAPE NUMBER
C       HEADB(3)        HEADI2(2)       PASS NUMBER (1,2 OR 3)
C       HEADB(4)           "            NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)        HEADI2(3)       DIGITIZING MONTH
C       HEADB(6)           "            DIGITIZING DAY
C       HEADB(7)        HEADI2(4)       DIGITIZING YEAR
C       HEADB(8)           "            EXPERIMENT TIME CODE START HOUR
C       HEADB(9)        HEADI2(5)       EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)          "            EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)    HEADI2(6-15)    EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)       HEADI2(16)      ANALOG CHANNEL IN POSITION 1
C       HEADB(32)          "            ANALOG CHANNEL IN POSITION 2
C       HEADB(33)       HEADI2(17)      ANALOG CHANNEL IN POSITION 3
C       HEADB(34)          "            ANALOG CHANNEL IN POSITION 4
C       HEADB(35)       HEADI2(18)      ANALOG CHANNEL IN POSITION 5
C       HEADB(36)          "            ANALOG CHANNEL IN POSITION 6
C       HEADB(37)       HEADI2(19)      ANALOG CHANNEL IN POSITION 7
C       HEADB(38)          "            ANALOG CHANNEL IN POSITION 8
C       HEADB(39)       HEADI2(20)      ANALOG CHANNEL IN POSITION 9
C       HEADB(40)          "            ANALOG CHANNEL IN POSITION 10
C       HEADB(41)       HEADI2(21)      ANALOG CHANNEL IN POSITION 11
C       HEADB(42)          "            ANALOG CHANNEL IN POSITION 12
C       HEADB(43)       HEADI2(22)      ANALOG CHANNEL IN POSITION 13
C       HEADB(44)          "            ANALOG CHANNEL IN POSITION 14
C       HEADB(45)       HEADI2(23)      ANALOG CHANNEL IN POSITION 15
C       HEADB(46)          "            ANALOG CHANNEL IN POSITION 16
C       HEADB(47)       HEADI2(24)      ANALOG CHANNEL IN POSITION 17
C       HEADB(48)          "            ANALOG CHANNEL IN POSITION 18
C       HEADB(49)       HEADI2(25)      ANALOG CHANNEL IN POSITION 19
C       HEADB(50)          "            ANALOG CHANNEL IN POSITION 20
C       HEADB(51)       HEADI2(26)      ANALOG CHANNEL IN POSITION 21
C       HEADB(52)          "            ANALOG CHANNEL IN POSITION 22
C       HEADB(53)       HEADI2(27)      ANALOG CHANNEL IN POSITION 23
C       HEADB(54)          "            ANALOG CHANNEL IN POSITION 24
C       HEADB(55)       HEADI2(28)      RUN IDENTIFICATION NUMBER
C       HEADB(56)          "                        "
C       HEADB(57-60)    HEADFP(15)      SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-------------------------------------------------------------------------
        SUBROUTINE LISTHEAD(HEADB,HEADI2,HEADI4)
C-------------------------------------------------------------------------
C
        BYTE HEADB(1)
        INTEGER*2 HEADI2(1)
        INTEGER*4 HEADI4(1)
C
C-----PRINT OUT THE ALL HEADER INFO
C
        PRINT 1, (HEADB(I),I=11,30)
1       FORMAT(X,' *** EVENT DESCRIPTION: ',20A1,' ***')
C
        PRINT 2, HEADI2(1)
2       FORMAT(X/X,'         ANALOG TAPE NUMBER: ',4X,I4)
C
        PRINT 3, HEADI2(28)
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
3       FORMAT(X,' RUN IDENTIFICATION NUMBER: ',6X,I2)
C
        PRINT 4, HEADB(3)
4       FORMAT(X,'                PASS NUMBER: ',7X,I1)
C
        PRINT 5, HEADB(8),HEADB(9),HEADB(10)
5       FORMAT(X,'           START TIME CODE: ',I2,':',I2,':',I2)
C
        PRINT 6, HEADB(5),HEADB(6),HEADB(7)
6       FORMAT(X,'                      DATE: ',I2,'/',I2,'/'I2)
C
        NCHAN=HEADB(4)
C
        PRINT 7
7       FORMAT(X/X,' POSITION : CHANNEL     POSITION : CHANNEL',
     1         X/X,' ------------------     ------------------')
        NHALF=NCHAN/2
        DO I=1,NHALF
          K=I+NHALF
          PRINT 8, I,HEADB(I+30),K,HEADB(K+30)
8         FORMAT(X,4X,I2,3X,' : ',3X,I2,2X,5X,3X,I2,3X,' : ',3X,I2)
        END DO
C
        RETURN
        END
```

APPENDIX I

MERGEMT.FOR
LISTHEAD.FOR

_DRB0:[MACIE.TM]MERGEMT.FOR;36

```
C       MERGEMT.FOR  MERGES TOGETHER DIGITIZED DATA FROM PASSES 1 AND 2 AND
C                    WRITES THESE TO TAPE.  REDUNDANT CHANNELS ARE DISCARDED.
C                    A FOREIGN MAGTAPE IS PRODUCED WITH ONE IDENTIFICATION
C                    HEADER RECORD FOLLOWED BY DATA RECORDS, 1024*24 WORDS LONG.
C                    THE DATA ORDER IS 1024 SAMPLES FOR EACH CHANNEL 1-24.
C                    THE A/D TAPE CHANNEL FOR EACH POSITION IS FOUND IN
C                    THE HEADER, THE ORDER IS 1,2,3,4,5,6,7,8,9,10,11,12,
C                    14,15,16,17,18,19,20,21,22,23,24,25 (NO 13).
C-----------------------------------------------------------------------
C       1) LOG ON TO VAX
C       2) MOUNT A TAPE WITH A WRITE RING ON MFA0:
C       3) EXECUTE THE MERGEMT.COM COMMAND FILE, THIS WILL:
C          A.  INITIALIZE THAT TAPE TO 6250 BPI  (NAME R__)
C          B.  OPEN THE TWO DOWNSAMPLED FILES FOR PASSES 1 AND 2
C          C.  READ AND MERGE THE TWO HEADER RECORDS
C          D.  WRITE THE NEW HEADER RECORD TO TAPE
C          E.  FOR ALL DATA RECORDS:  READ AND MERGE ALL DATA RECORDS
C                                     AND WRITE THEM TO TAPE
C          F.  MAKE SURE BOTH FILES AT THE SAME POINT
C          G.  CLOSE ALL FILES
C          H.  WRITE EOF MARKINGS ON OUTPUT TAPE
C          I.  DISMOUNT THE TAPE
C-----------------------------------------------------------------------
        PARAMETER NADC=24                !NUMBER OF FINAL A/D CHANNELS USED
        PARAMETER NBSIZE=1024            !NUMBER OF WORDS IN ONE BUFFER/CHANNEL
        PARAMETER NDIM=14*500*2,NDIM2=NDIM/2,NDIM4=NDIM/4
C
        BYTE HBP1(NDIM),HBP2(NDIM),HBM(NDIM),FILNAM(10),EVENTDESC(20)
        INTEGER*2 IOSBMT(4)
        INTEGER*2 HI2P1(NDIM2),HI2P2(NDIM2),HI2M(NDIM2)
        INTEGER*2 BUFP1(NBSIZE,14),BUFP2(NBSIZE,14),BUFM(NBSIZE,24)
        INTEGER*4 HI4P1(NDIM4),HI4P2(NDIM4),HI4M(NDIM4)
        INTEGER*4 SYS$QIOW,WRINORET,WEOFNORET,RUNNO
        DIMENSION HFPP1(NDIM4),HFPP2(NDIM4),HFPM(NDIM4)
        EQUIVALENCE (HBP1,HI2P1,HI4P1,HFPP1),(HBP2,HI2P2,HI4P2,HFPP2)
        EQUIVALENCE (HBM,HI2M,HI4M,HFPM)
        EQUIVALENCE (BUFP1,BUFM),(BUFP2,BUFM(1,15))
C
C-----SET UP I/O CODES FOR MAGTAPE
C
        EXTERNAL IO$_WRITELBLK,IO$_REWIND,IO$_WRITEOF,IO$_SKIPFILE
        NPT=NBSIZE
C
C-----GET THE RUN IDENTIFICATION INFORMATION
C
        PRINT *, 'ENTER RUN IDENTIFICATION NUMBER'
        READ *, RUNNO
C
C-----OPEN THE FILES AND GET THE HEADERS
C
        ENCODE(9,10,FILNAM),RUNNO
10      FORMAT('R',I2,'P1.FIL')
        FILNAM(10)=0
        OPEN(UNIT=11,STATUS='OLD',FILE=FILNAM,FORM='UNFORMATTED')
        READ(11) HBP1
        CALL LISTHEAD(HBP1,HI2P1,HI4P1)
C
        ENCODE(9,20,FILNAM),RUNNO
```

_DRB0:[MACIE.TM]MERGEMT.FOR;36

```
20      FORMAT('R',I2,'P2.FIL')
        FILNAM(10)=0
        OPEN(UNIT=12,STATUS='OLD',FILE=FILNAM,FORM='UNFORMATTED')
        READ(12) HBP2
        CALL LISTHEAD(HBP2,HI2P2,HI4P2)
C
C-----FORM THE NEW HEADER
C
        IF(HI2P1(28).NE.HI2P2(28)) STOP 'DIFFERENT RUNS'
        IF(HBP1(3).NE.1) STOP 'FIRST FILE IS NOT PASS 1'
        IF(HBP2(3).NE.2) STOP 'SECOND FILE IS NOT PASS 2'
        IF(HBP1(61).NE.1) STOP 'FIRST FILE IS NOT FILTERED'
        IF(HBP2(61).NE.1) STOP 'SECOND FILE IS NOT FILTERED'
        DO I=1,60
          HI2M(I)=HI2P1(I)
        END DO
        IF(HI2P1(1).NE.HI2P2(1)) THEN
          PRINT *, 'TAPE NUMBERS DO NOT MATCH, ENTER TAPE NUMBER:'
          READ *, HI2M(1)
        ENDIF
        HBM(3)=3          !MERGED CASE IS PASS 3
        HBM(4)=24         !ALL 24 CHANNELS
        PRINT *, 'ENTER MERGING DATE:  MONTH,DAY'
        READ *, HBM(5),HBM(6)
        ENCODE(20,30,EVENTDESC) RUNNO
30      FORMAT(2X,'  RUN ',I2)
        DO I=1,20
          HBM(I+10)=EVENTDESC(I)
        END DO
        N=45
        DO I=1,14
          IF(I.EQ.2.OR.I.EQ.4.OR.I.EQ.10.OR.I.EQ.13) GO TO 1
          HBM(N)=HBP2(I+30)
          N=N+1
1         CONTINUE
        END DO
        CALL LISTHEAD(HBM,HI2M,HI4M)
C
C-----ASSIGN THE TAPE TO LOGICAL NAME MAG_TAPE AND REWIND
C
        CALL SYS$ASSIGN('MAG_TAPE',ICHAN,,)
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_REWIND,IOSBMT,,,,,,,)
        IF(.NOT.IRETCODE) THEN
        IF(IOSBMT(1).EQ.'1A4'X) STOP 'TAPE DRIVE IS OFFLINE'
          PRINT 40, (IOSBMT(I),I=1,4)
40        FORMAT(2X,'IOSB: ',4(X,Z4.4))
          STOP 'MAG_TAPE REWIND ERROR'
        ENDIF
C
C-----SKIP FILES IF REQUESTED
C
2       PRINT *, 'HOW MANY FILES DO YOU WANT TO SKIP?'
        READ *, NSKIP
        IF(NSKIP.LT.0) THEN
          PRINT *, 'YOU MUST ONLY GO IN THE FORWARD DIRECTION'
          PRINT *, 'THE NUMBER OF FILES MUST BE POSITIVE'
          GOTO 2
        END IF
```

_DRB0:[MACIE.TM]MERGEMT.FOR;36

```
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPFILE,IOSBMT,,,%VAL(NSKIP),,,,,)
        IF (.NOT.IRETCODE) STOP 'SKIP FILE ERROR'
        IF(IOSBMT(2).NE.NSKIP) THEN
          PRINT 40, (IOSBMT(I),I=1,4)
          PRINT *,'PROBLEM SKIPPING ',NSKIP, ' FILES'
          STOP 'SKIPPING FILE ERROR'
        END IF
C
C-----DUMP THE HEADER TO TAPE
C
        NBYTES=NDIM
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_WRITELBLK,IOSBMT,
     1                    ,,HBM,%VAL(NBYTES),,,,)
        IF(.NOT.IRETCODE) STOP 'ERROR MAGTAPE DUMPING HEADER'
        NREC=1          !RECORD 1 IS HEADER
        PRINT *, 'DUMPED HEADER IN ',NREC
C
C-----READ IN DATA FOR EACH PASS, SHIFT DOWN PASS 2 NEW CHANNELS
C
        NBYTES=NPT*24*2                    !TOTAL #BYTES PER RECORD
3       READ(11,END=4) ((BUFP1(I,J),I=1,NPT),J=1,14)
        READ(12,END=7) ((BUFP2(I,J),I=1,NPT),J=1,14)
        N=15
        DO J=1,14
          IF(J.NE.2.AND.J.NE.4.AND.J.NE.10.AND.J.NE.13) THEN
            DO I=1,NPT
              BUFM(I,N)=BUFP2(I,J)
            END DO
            N=N+1
          ENDIF
        END DO
C
C-----DUMP THIS BUFFER TO TAPE
C
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_WRITELBLK,IOSBMT,
     1                    ,,BUFM,%VAL(NBYTES),,,,)
        IF(.NOT.IRETCODE) THEN
          PRINT *, IRETCODE
          STOP 'MAG TAPE WRITE ERROR'
        ENDIF
        IF(IOSBMT(1).NE.1) THEN
          PRINT 40,(IOSBMT(I),I=1,4)
        ENDIF
        NREC=NREC+1              !INCREMENT RECORD NUMBER
        PRINT *, 'DUMPED RECORD ',NREC,NBYTES
        IF(IOSBMT(1).EQ.'0878'X) PRINT *, 'SENSED EOT MARKER AT ',NREC
        GO TO 3
C
C-----AT EOF CHECK THE OTHER FILE
C
4       CONTINUE
        PRINT *, 'AT EOF FOR PASS 1 FILE'
        NLEFT=0
5       READ(12,END=6) ((BUFP2(I,J),I=1,NPT),J=1,14)
        NLEFT=NLEFT+1
        GO TO 5
6       CONTINUE
        PRINT *, 'AT EOF FOR PASS 2 FILE'
```

_DRB0:[MACIE.TM]MERGEMT.FOR;36

```
        IF(NLEFT.NE.0) PRINT *, 'READ ',NLEFT,' MORE RECORDS'
        GO TO 11
C
7       CONTINUE
        PRINT *, 'AT EOF FOR PASS 2 FILE'
        NLEFT=1
8       READ(11,END=9) ((BUFP2(I,J),I=1,NPT),J=1,14)
        NLEFT=NLEFT+1
        GO TO 8
9       CONTINUE
        PRINT *, 'AT EOF FOR PASS 1 FILE'
        IF(NLEFT.NE.0) PRINT *, 'READ ',NLEFT,' MORE RECORDS'
C
C-----WRITE TWO EOF MARKERS ON TAPE
C
11      CONTINUE
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_WRITEOF,IOSBMT,,,,,,,,)
        IRETCODE=SYS$QIOW(,%VAL(ICHAN),IO$_WRITEOF,IOSBMT,,,,,,,,)
C
        CALL EXIT
        END
```

```
C       LISTHEAD.FOR     LISTS OUT THE HEADER INFORMATION FOR A
C                        SPECIFIED TAPE.
C-----------------------------------------------------------------------
C       HEADB(1-2)       HEADI2(1)        ANALOG TAPE NUMBER
C       HEADB(3)         HEADI2(2)        PASS NUMBER (1,2 OR 3)
C       HEADB(4)           "              NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)         HEADI2(3)        DIGITIZING MONTH
C       HEADB(6)           "              DIGITIZING DAY
C       HEADB(7)         HEADI2(4)        DIGITIZING YEAR
C       HEADB(8)           "              EXPERIMENT TIME CODE START HOUR
C       HEADB(9)         HEADI2(5)        EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)          "              EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)     HEADI2(6-15)     EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)        HEADI2(16)       ANALOG CHANNEL IN POSITION 1
C       HEADB(32)          "              ANALOG CHANNEL IN POSITION 2
C       HEADB(33)        HEADI2(17)       ANALOG CHANNEL IN POSITION 3
C       HEADB(34)          "              ANALOG CHANNEL IN POSITION 4
C       HEADB(35)        HEADI2(18)       ANALOG CHANNEL IN POSITION 5
C       HEADB(36)          "              ANALOG CHANNEL IN POSITION 6
C       HEADB(37)        HEADI2(19)       ANALOG CHANNEL IN POSITION 7
C       HEADB(38)          "              ANALOG CHANNEL IN POSITION 8
C       HEADB(39)        HEADI2(20)       ANALOG CHANNEL IN POSITION 9
C       HEADB(40)          "              ANALOG CHANNEL IN POSITION 10
C       HEADB(41)        HEADI2(21)       ANALOG CHANNEL IN POSITION 11
C       HEADB(42)          "              ANALOG CHANNEL IN POSITION 12
C       HEADB(43)        HEADI2(22)       ANALOG CHANNEL IN POSITION 13
C       HEADB(44)          "              ANALOG CHANNEL IN POSITION 14
C       HEADB(45)        HEADI2(23)       ANALOG CHANNEL IN POSITION 15
C       HEADB(46)          "              ANALOG CHANNEL IN POSITION 16
C       HEADB(47)        HEADI2(24)       ANALOG CHANNEL IN POSITION 17
C       HEADB(48)          "              ANALOG CHANNEL IN POSITION 18
C       HEADB(49)        HEADI2(25)       ANALOG CHANNEL IN POSITION 19
C       HEADB(50)          "              ANALOG CHANNEL IN POSITION 20
C       HEADB(51)        HEADI2(26)       ANALOG CHANNEL IN POSITION 21
C       HEADB(52)          "              ANALOG CHANNEL IN POSITION 22
C       HEADB(53)        HEADI2(27)       ANALOG CHANNEL IN POSITION 23
C       HEADB(54)          "              ANALOG CHANNEL IN POSITION 24
C       HEADB(55)        HEADI2(28)       RUN IDENTIFICATION NUMBER
C       HEADB(56)          "                      "
C       HEADB(57-60)     HEADFP(15)       SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-----------------------------------------------------------------------
        SUBROUTINE LISTHEAD(HEADB,HEADI2,HEADI4)
C-----------------------------------------------------------------------
C
        BYTE HEADB(1)
        INTEGER*2 HEADI2(1)
        INTEGER*4 HEADI4(1)
C
C-----PRINT OUT THE ALL HEADER INFO
C
        PRINT 1, (HEADB(I),I=11,30)
1       FORMAT(X,' *** EVENT DESCRIPTION: ',20A1,' ***')
C
        PRINT 2, HEADI2(1)
2       FORMAT(X/X,'         ANALOG TAPE NUMBER: ',4X,I4)
C
        PRINT 3, HEADI2(28)
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
3       FORMAT(X,' RUN IDENTIFICATION NUMBER: ',6X,I2)
C
        PRINT 4, HEADB(3)
4       FORMAT(X,'                PASS NUMBER: ',7X,I1)
C
        PRINT 5, HEADB(8),HEADB(9),HEADB(10)
5       FORMAT(X,'           START TIME CODE: ',I2,':',I2,':',I2)
C
        PRINT 6, HEADB(5),HEADB(6),HEADB(7)
6       FORMAT(X,'                      DATE: ',I2,'/',I2,'/'I2)
C
        NCHAN=HEADB(4)
C
        PRINT 7
7       FORMAT(X/X,' POSITION : CHANNEL     POSITION : CHANNEL',
     1         X/X,' ------------------     ------------------')
        NHALF=NCHAN/2
        DO I=1,NHALF
          K=I+NHALF
          PRINT 8, I,HEADB(I+30),K,HEADB(K+30)
8         FORMAT(X,4X,I2,3X,' : ',3X,I2,2X,5X,3X,I2,3X,' : ',3X,I2)
        END DO
C
        RETURN
        END
```

APPENDIX J

READMT.FOR
ASSMT.FOR
RBLOCKMT.FOR
LISTHEAD.FOR

_DRB0:[MACIE.TM]READMT.FOR;23

```
C       READMT.FOR    READS A FOREIGN MERGED DIGITIZED MAGNETIC TAPE.
C                     THE FIRST RECORD CONTAINS HEADER IDENTIFICATION.
C                     THE DATA IS GROUPED IN RECORDS OF 1024 PTS EACH
C                     FOR ALL 24 CHANNELS (1-25, NO 13).  THE FINAL DATA
C                     IS WRITTEN TO DISK IN SEPARATE FILES FOR EACH CHANNEL.
C-------------------------------------------------------------------------
C
        PARAMETER NA2DCH=24      !NUMBER OF CHANNELS
        PARAMETER NSIZE=1024     !NUMBER OF WORDS/CHANNEL IN A RECORD
        PARAMETER NDIM=14*500*2
C
        BYTE FILNAM(13),HEADB(NDIM),BUFFER(32768)
        INTEGER*2 HEADI2(NDIM/2),I2BUF(NSIZE,24),IOSB(4)
        INTEGER*4 ICHAN,CHANNO,RUNNO,HEADI4(NDIM/4)
        DIMENSION IFLG(24),ISAVE(24)
        EQUIVALENCE (HEADB,HEADI2,HEADI4),(BUFFER,I2BUF)
        EQUIVALENCE (HEADI4(15),SAMP_INT)
C
        NCHAN=NA2DCH                        !NUMBER OF CHANNELS
        NWORDS=NCHAN*NSIZE                  !NUMBER OF I*2 WORDS/BLOCK
        NBYTES=NWORDS*2                     !NUMBER OF BYTES/BLOCK
C
C-----FIND OUT WHAT WE ARE RETREIVEING
C
        PRINT *, 'ENTER RUN IDENTIFICATION NUMBER'
        READ *, RUNNO
        PRINT *, 'HOW MANY CHANNELS DO YOU WANT TO SAVE? (-1=ALL)'
        READ *, NSAVE
        IF(NSAVE.EQ.-1) THEN
          NSAVE=24
          N=1
          DO I=1,24
            ISAVE(I)=N
            N=N+1
            IF(N.EQ.13) N=N+1
          END DO
        ELSE
          PRINT *, 'ENTER ANALOG CHANNEL NUMBERS'
          READ *, (ISAVE(I),I=1,NSAVE)
        ENDIF
        PRINT *, 'HOW MANY RECORDS DO YOU WANT TO READ?'
        READ *, NRECORDS
C
C----ASSIGN THE MAGTAPE
C
        IFILE=1
        CALL ASSMT(ICHAN,IFILE)
C
C-----READ IN THE HEADER AND PRINT OUT
C
        CALL RBLOCKMT(ICHAN,NPTS,HEADI2,ISTAT)
        IF(ISTAT.EQ.2) STOP 'AT EOF'
        IF(ISTAT.EQ.1) STOP 'TAPE READ ERROR'
        IF(NPTS.NE.NDIM/2) STOP 'WRONG NUMBER OF BYTES READ FOR HEADER'
        CALL LISTHEAD(HEADB,HEADI2,HEADI4)
C
C-----OPEN OUTPUT FILES, CHANNELS WILL SEPERATED INTO R__C__.DAT
C
```

_DRB0:[MACIE.TM]READMT.FOR;23

```
          DO I=1,NCHAN
            CHANNO=HEADB(30+I)
            IUNIT=10+I
            IFLG(I)=0
            DO J=1,NSAVE
              IF(ISAVE(J).EQ.CHANNO) IFLG(I)=1
            END DO
            IF(IFLG(I).EQ.1) THEN
              ENCODE(12,10,FILNAM) RUNNO,CHANNO
10            FORMAT('R',I2,'C',I2,'.DAT')
              FILNAM(13)=0
              OPEN(UNIT=IUNIT,STATUS='NEW',FILE=FILNAM,FORM='UNFORMATTED')
              PRINT 20, IUNIT,(FILNAM(J),J=1,12)
20            FORMAT (2X,'OUTPUT UNIT= ',I5,2X,'FILE '12A1)
              WRITE(IUNIT) RUNNO,CHANNO,NWORDS,NRECORDS,SAMP_INT
             ENDIF
          END DO
C
C-----READ THE DATA IN
C
          DO NR=1,NRECORDS
            CALL RBLOCKMT(ICHAN,NPTS,BUFFER,ISTAT)
            IF(ISTAT.EQ.2) STOP 'AT EOF'
            IF(ISTAT.EQ.1) STOP 'TAPE READ ERROR'
            IF(NPTS.NE.NWORDS) STOP 'WRONG NUMBER OF I*2 READ IN'
            DO I=1,NCHAN
              IF(IFLG(I).EQ.1) THEN
                IUNIT=10+I                          !OUTPUT UNITS 11-35
                WRITE(IUNIT) (I2BUF(J,I),J=1,NSIZE)
              ENDIF
            END DO
          END DO
C
C-----CLOSE THE FILE
C
           DO I=1,NCHAN
              IUNIT=10+I                    !OUTPUT UNITS 11-35
              CLOSE(IUNIT)
            END DO
C
          CALL EXIT
          END
```

_DRB0:[MACIE.TM]ASSMT.FOR;3

```
C       ASSMT.FOR  ASSIGNS A CHANNEL FOR THE MAGNETIC TAPE DRIVE.
C                  IT MUST BE EXTERNALLY ASSIGNED TO THE LOGICAL
C                  NAME MAG_TAPE.  THE TAPE IS REWOUND AND THE
C                  REQUESTED NUMBER OF FILES IS SKIPPED.
C
C       PARAMETERS:
C                 ICHAN = MAGTAPE INPUT CHANNEL NUMBER
C                 IFILE = MAGTAPE INPUT FILE NUMBER
C-----------------------------------------------------------------
        SUBROUTINE ASSMT(ICHAN,IFILE)
C-----------------------------------------------------------------
C
        EXTERNAL IO$_REWIND,IO$_SKIPFILE
        INTEGER*2 IOSB(4),EOF,EOT
        INTEGER*4 SYS$ASSIGN,SYS$QIOW,ICHAN,IRET
C
        EOF='0870'X      !END OF FILE
        EOT='0878'X      !END OF TAPE
        NORMAL='0001'X   !NORMAL
C
C-----ASSIGN THE 9 TRACK TAPE DRIVE "MAG_TAPE" AND ASSIGN THE CHANNEL
C
        IRET=SYS$ASSIGN('MAG_TAPE',ICHAN,,)
        IF(.NOT.IRET) STOP 'ASSIGN ERROR'
C
C-----REWIND THE TAPE
C
        IRET=SYS$QIOW(,%VAL(ICHAN),IO$_REWIND,IOSB,,,,,,,,)
        IF(.NOT.IRET) STOP 'REWIND ERROR'
        IF(IOSB(1).NE.NORMAL) STOP 'REWIND ERROR'
        NFILE=1                          !PRESENT FILE NUMBER
C
C-----SKIP THE REQUESTED NUMBER OF FILES
C
        NSKIP=IFILE-1                    !NUMBER OF FILES TO SKIP
        IF(NSKIP.NE.0) THEN
          IF(NSKIP.LT.0) NSKIP=NSKIP-1
          IRET=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPFILE,IOSB,,,%VAL(NSKIP),,,,,)
          IF(.NOT.IRET) STOP 'SKIPFILE ERROR'
          IF(IOSB(1).NE.NORMAL.AND.IOSB(1).NE.EOF) STOP 'SKIPFILE ERROR'
          IF(IOSB(2).NE.ABS(NSKIP)) STOP 'SKIPFILE ERROR'
          NFILE=NFILE+NSKIP              !NEW FILE NUMBER
          IF(NSKIP.LT.0) THEN
            IRET=SYS$QIOW(,%VAL(ICHAN),IO$_SKIPFILE,IOSB,,,%VAL(1),,,,,)
            IF(.NOT.IRET) STOP 'SKIPFILE ERROR'
            IF(IOSB(1).NE.NORMAL.AND.IOSB(1).NE.EOF) STOP 'SKIPFILE ERROR'
            IF(IOSB(2).NE.1) STOP 'SKIPFILE ERROR'
            NFILE=NFILE+1                !NEW FILE NUMBER
          ENDIF
        ENDIF
C
        IFILE=NFILE                      !PRESENT MAGTAPE INPUT FILE NUMBER
C
        RETURN
        END
```

_DRB0:[MACIE.TM]RBLOCKMT.FOR;16

```
C       RBLOCKMT.FOR   READS A BLOCK OF DATA FROM A MAGNETIC TAPE.
C
C       PARAMETERS:
C               ICHAN  = CHANNEL ASSIGNED TO THE MAG_TAPE UNIT
C               NWORDS = NUMBER OF I*2 DATA POINTS READ
C               I2BUF  = BUFFER TO RECEIVE DATA
C               ISTAT  = RETURN STATUS (0=OK, 1=ERROR, 2=EOF)
C-----------------------------------------------------------------------
        SUBROUTINE RBLOCKMT(ICHAN,NWORDS,I2BUF,ISTAT)
C-----------------------------------------------------------------------
C
        EXTERNAL IO$_READLBLK
        INTEGER*4 SYS$QIOW,ICHAN,IRET
C
        INTEGER*2 I2BUF(1),IOSB(4),NORMAL,EOF,EOT,BUFFER(32768)
C
        EOF='0870'X      !END OF FILE
        EOT='0878'X      !END OF TAPE
        NORMAL='0001'X   !NORMAL
        ISTAT=0          !ASSUME OK
C
C-----READ IN ONE BLOCK OF DATA
C
        IRET=SYS$QIOW(,%VAL(ICHAN),IO$_READLBLK,IOSB,,,
     1                BUFFER,%VAL(65535),,,,)
C
        IF(.NOT.IRET) THEN
          PRINT *, 'IRETURN CODE = ',IRET
          PRINT 100, (IOSB(I),I=1,4)
          STOP 'READING DATA ERROR'
        ENDIF
C
        NWORDS=0
        CALL MVBITS(IOSB(2),0,16,NWORDS,0)
        NWORDS=NWORDS/2
        IF(IOSB(1).NE.NORMAL) THEN
          IF(IOSB(1).EQ.EOF) THEN
              ISTAT=2
              GO TO 200
          ENDIF
          IF(IOSB(1).EQ.EOT) THEN
            PRINT *, 'EOT REACHED'
            GO TO 200
          ENDIF
C
          ISTAT=1                                    !PROBLEM
          PRINT *, 'PROBLEM WITH MAGTAPE'
          PRINT 100, (IOSB(I),I=1,4)
100       FORMAT(2X,4(Z4.4,2X))
          GO TO 200
        ENDIF
C
200     CONTINUE
        IF(NWORDS.NE.0) THEN
          DO I=1,NWORDS
            I2BUF(I)=BUFFER(I)
          END DO
        ENDIF
```

_DRB0:[MACIE.TM]RBLOCKMT.FOR;16

```
        RETURN
        END
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
C       LISTHEAD.FOR    LISTS OUT THE HEADER INFORMATION FOR A
C                       SPECIFIED TAPE.
C-----------------------------------------------------------------------
C       HEADB(1-2)      HEADI2(1)       ANALOG TAPE NUMBER
C       HEADB(3)        HEADI2(2)       PASS NUMBER (1,2 OR 3)
C       HEADB(4)           "            NUMBER OF CHANNELS 14 OR 24
C       HEADB(5)        HEADI2(3)       DIGITIZING MONTH
C       HEADB(6)           "            DIGITIZING DAY
C       HEADB(7)        HEADI2(4)       DIGITIZING YEAR
C       HEADB(8)           "            EXPERIMENT TIME CODE START HOUR
C       HEADB(9)        HEADI2(5)       EXPERIMENT TIME CODE START MINUTE
C       HEADB(10)          "            EXPERIMENT TIME CODE START SECONDS
C       HEADB(11-30)    HEADI2(6-15)    EVENT NAME (20 CHAR MAXIMUM)
C       HEADB(31)       HEADI2(16)      ANALOG CHANNEL IN POSITION 1
C       HEADB(32)          "            ANALOG CHANNEL IN POSITION 2
C       HEADB(33)       HEADI2(17)      ANALOG CHANNEL IN POSITION 3
C       HEADB(34)          "            ANALOG CHANNEL IN POSITION 4
C       HEADB(35)       HEADI2(18)      ANALOG CHANNEL IN POSITION 5
C       HEADB(36)          "            ANALOG CHANNEL IN POSITION 6
C       HEADB(37)       HEADI2(19)      ANALOG CHANNEL IN POSITION 7
C       HEADB(38)          "            ANALOG CHANNEL IN POSITION 8
C       HEADB(39)       HEADI2(20)      ANALOG CHANNEL IN POSITION 9
C       HEADB(40)          "            ANALOG CHANNEL IN POSITION 10
C       HEADB(41)       HEADI2(21)      ANALOG CHANNEL IN POSITION 11
C       HEADB(42)          "            ANALOG CHANNEL IN POSITION 12
C       HEADB(43)       HEADI2(22)      ANALOG CHANNEL IN POSITION 13
C       HEADB(44)          "            ANALOG CHANNEL IN POSITION 14
C       HEADB(45)       HEADI2(23)      ANALOG CHANNEL IN POSITION 15
C       HEADB(46)          "            ANALOG CHANNEL IN POSITION 16
C       HEADB(47)       HEADI2(24)      ANALOG CHANNEL IN POSITION 17
C       HEADB(48)          "            ANALOG CHANNEL IN POSITION 18
C       HEADB(49)       HEADI2(25)      ANALOG CHANNEL IN POSITION 19
C       HEADB(50)          "            ANALOG CHANNEL IN POSITION 20
C       HEADB(51)       HEADI2(26)      ANALOG CHANNEL IN POSITION 21
C       HEADB(52)          "            ANALOG CHANNEL IN POSITION 22
C       HEADB(53)       HEADI2(27)      ANALOG CHANNEL IN POSITION 23
C       HEADB(54)          "            ANALOG CHANNEL IN POSITION 24
C       HEADB(55)       HEADI2(28)      RUN IDENTIFICATION NUMBER
C       HEADB(56)          "                    "
C       HEADB(57-60)    HEADFP(15)      SAMPLE RATE (2.5 KHZ=.0004SEC)
C
C-----------------------------------------------------------------------
        SUBROUTINE LISTHEAD(HEADB,HEADI2,HEADI4)
C-----------------------------------------------------------------------
C
        BYTE HEADB(1)
        INTEGER*2 HEADI2(1)
        INTEGER*4 HEADI4(1)
C
C-----PRINT OUT THE ALL HEADER INFO
C
        PRINT 1, (HEADB(I),I=11,30)
1       FORMAT(X,' *** EVENT DESCRIPTION: ',20A1,' ***')
C
        PRINT 2, HEADI2(1)
2       FORMAT(X/X,'         ANALOG TAPE NUMBER: ',4X,I4)
C
        PRINT 3, HEADI2(28)
```

_DRB0:[MACIE.TM]LISTHEAD.FOR;11

```
3       FORMAT(X,' RUN IDENTIFICATION NUMBER: ',6X,I2)
C
        PRINT 4, HEADB(3)
4       FORMAT(X,'                PASS NUMBER: ',7X,I1)
C
        PRINT 5, HEADB(8),HEADB(9),HEADB(10)
5       FORMAT(X,'           START TIME CODE: ',I2,':',I2,':',I2)
C
        PRINT 6, HEADB(5),HEADB(6),HEADB(7)
6       FORMAT(X,'                      DATE: ',I2,'/',I2,'/'I2)
C
        NCHAN=HEADB(4)
C
        PRINT 7
7       FORMAT(X/X,' POSITION : CHANNEL     POSITION : CHANNEL',
     1         X/X,' ------------------     ------------------')
        NHALF=NCHAN/2
        DO I=1,NHALF
          K=I+NHALF
          PRINT 8, I,HEADB(I+30),K,HEADB(K+30)
8         FORMAT(X,4X,I2,3X,' : ',3X,I2,2X,5X,3X,I2,3X,' : ',3X,I2)
        END DO
C
        RETURN
        END
```

APPENDIX K

SAMPLE DIGITIZING SESSION

_DRB0:[MACIE.TM]SAMPLE.RUN;1

APPENDIX K - SAMPLE DIGITIZING SESSION

```
Username:
Password:
        Welcome to VAX/VMS version V4.1 on node V331
    Last interactive login on Wednesday, 18-JUN-1986 09:20
    Last non-interactive login on Monday, 9-JUN-1986 13:19

$ ALLOC MFA0:
%DCL-I-ALLOC, _MFA0: allocated

$ A2D
DO YOU WANT TO INITIALIZE THE TAPE? (Y/N) Y
ENTER TAPE LABEL? (R__P_):  R61PL
%DCL-I-ALLOC, _MFA0: allocated
IS DATA GOING TO DISK 0 OR 1?:  1
HAVE YOU ENTERED THE DIGITIZING SETUP? (Y/N) N

ENTER ANALOG TAPE NUMBER:  5

ENTER RUN IDENTIFICATION NUMBER:  61

ENTER DATA TAPE PASS NUMBER (1 OR 2)?  1

ENTER DIGITIZING DATE:  MONTH   6

                        DAY     19

                        YEAR    86

ENTER START TIME CODE:  HOUR    6

                        MINUTES 41

                        SECONDS 30

ENTER 20 CHARACTER EVENT DESCRIPTION:  RUN 61 PASS 1

ENTER ANALOG CHANNEL FOR A/D CHANNEL  1 :  1

ENTER ANALOG CHANNEL FOR A/D CHANNEL  2 :  2

ENTER ANALOG CHANNEL FOR A/D CHANNEL  3 :  3

ENTER ANALOG CHANNEL FOR A/D CHANNEL  4 :  4

ENTER ANALOG CHANNEL FOR A/D CHANNEL  5 :  5

ENTER ANALOG CHANNEL FOR A/D CHANNEL  6 :  6

ENTER ANALOG CHANNEL FOR A/D CHANNEL  7 :  7

ENTER ANALOG CHANNEL FOR A/D CHANNEL  8 :  8

ENTER ANALOG CHANNEL FOR A/D CHANNEL  9 :  9
```

```
_DRB0:[MACIE.TM]SAMPLE.RUN;1

ENTER ANALOG CHANNEL FOR A/D CHANNEL 10 :  10

ENTER ANALOG CHANNEL FOR A/D CHANNEL 11 :  11

ENTER ANALOG CHANNEL FOR A/D CHANNEL 12 :  12

ENTER ANALOG CHANNEL FOR A/D CHANNEL 13 :  14

ENTER ANALOG CHANNEL FOR A/D CHANNEL 14 :  15

------------------------------------------------------------------------
DATA WILL BE SAVED IN FILE: R61P1H.DAT
------------------------------------------------------------------------
 *** EVENT DESCRIPTION: RUN 61 PASS 1        ***

        ANALOG TAPE NUMBER:        5
 RUN IDENTIFICATION NUMBER:       61
               PASS NUMBER:        1
           START TIME CODE: 6:41:30
                      DATE: 6/19/86

 POSTION : CHANNEL       POSTION : CHANNEL
 -----------------       -----------------
    1    :     1            8    :     8
    2    :     2            9    :     9
    3    :     3           10    :    10
    4    :     4           11    :    11
    5    :     5           12    :    12
    6    :     6           13    :    14
    7    :     7           14    :    15
------------------------------------------------------------------------

DOES THIS DATA LOOK CORRECT? (Y/N)  Y
DID YOU ASSIGN AND MOUNT THE MAGTAPE? (Y/N)
%DCL-I-SUPERSEDE, previous value of MAG_TAPE has been superseded
%MOUNT-I-MOUNTED, R61P1 mounted on _MFA0:
HOW MANY BUFFERS DO YOU WANT TO FILL?
9300
ENTER RUN IDENTIFICATION NUMBER
 61
ENTER PASS NUMBER (1 OR 2)
 1

HEADER FILE:  R61P1H.DAT

----------------------------------------
 *** EVENT DESCRIPTION: RUN 61 PASS 1        ***

        ANALOG TAPE NUMBER:        5
 RUN IDENTIFICATION NUMBER:       61
               PASS NUMBER:        1
           START TIME CODE: 6:41:30
                      DATE: 6/19/86

 POSTION : CHANNEL       POSTION : CHANNEL
 -----------------       -----------------
    1    :     1            8    :     8
```

```
_DRB0:[MACIE.TM]SAMPLE.RUN;1

     2    :      2            9    :     9
     3    :      3           10    :    10
     4    :      4           11    :    11
     5    :      5           12    :    12
     6    :      6           13    :    14
     7    :      7           14    :    15
HOW MANY FILES DO YOU WANT TO SKIP?
 0
START ANALOG TAPE, HIT RETURN AT 6:41:30

END OF RUN

DO YOU WANT TO COPY THE RECAT FILES TO DISK? (Y/N)  Y

ENTER RUN IDENTIFICATION NUMBER
 61
ENTER PASS NUMBER
 1
PROCESSING GROUP 1
HOW MANY FILES DO YOU WANT TO SKIP?
 0
 *** EVENT DESCRIPTION: RUN 61 PASS 1       ***

        ANALOG TAPE NUMBER:       5
 RUN IDENTIFICATION NUMBER:      61
             PASS NUMBER:       1
          START TIME CODE: 6:41:30
                     DATE: 6/19/86

 POSTION : CHANNEL       POSTION : CHANNEL
 ----------------        ----------------
    1    :     1            8    :     8
    2    :     2            9    :     9
    3    :     3           10    :    10
    4    :     4           11    :    11
    5    :     5           12    :    12
    6    :     6           13    :    14
    7    :     7           14    :    15
OUTPUT UNIT =   12  FILE R61P1C 2B.DAT 500 BUFFERS
OUTPUT UNIT =   14  FILE R61P1C 4B.DAT 500 BUFFERS
OUTPUT UNIT =   20  FILE R61P1C10B.DAT 500 BUFFERS
OUTPUT UNIT =   23  FILE R61P1C13B.DAT 500 BUFFERS
OUTPUT UNIT =   12  FILE R61P1C 2E.DAT 50 BUFFERS
OUTPUT UNIT =   14  FILE R61P1C 4E.DAT 50 BUFFERS
OUTPUT UNIT =   20  FILE R61P1C10E.DAT 50 BUFFERS
OUTPUT UNIT =   23  FILE R61P1C13E.DAT 50 BUFFERS
AT EOF IN RECORD       51
RECAT FILES HAVE BEEN SAVED
DO YOU WANT TO COPY QUICK CHECK FILES TO DISK? (Y/N):
ENTER RUN IDENTIFICATION NUMBER
 61
ENTER PASS NUMBER
 1
OUTPUT UNIT=    11  FILE R61P1C 1.DAT
OUTPUT UNIT=    12  FILE R61P1C 2.DAT
OUTPUT UNIT=    13  FILE R61P1C 3.DAT
OUTPUT UNIT=    14  FILE R61P1C 4.DAT
OUTPUT UNIT=    15  FILE R61P1C 5.DAT
```

```
_DRB0:[MACIE.TM]SAMPLE.RUN;1

OUTPUT UNIT=     16  FILE R61P1C 6.DAT
OUTPUT UNIT=     17  FILE R61P1C 7.DAT
OUTPUT UNIT=     18  FILE R61P1C 8.DAT
OUTPUT UNIT=     19  FILE R61P1C 9.DAT
OUTPUT UNIT=     20  FILE R61P1C10.DAT
OUTPUT UNIT=     21  FILE R61P1C11.DAT
OUTPUT UNIT=     22  FILE R61P1C12.DAT
OUTPUT UNIT=     23  FILE R61P1C13.DAT
OUTPUT UNIT=     24  FILE R61P1C14.DAT

HOW MANY FILES DO YOU WANT TO SKIP?
0
 *** EVENT DESCRIPTION: RUN 61 PASS 1        ***

        ANALOG TAPE NUMBER:        5
 RUN IDENTIFICATION NUMBER:       61
               PASS NUMBER:        1
          START TIME CODE: 6:41:30
                     DATE: 6/19/86

 POSTION : CHANNEL       POSTION : CHANNEL
 ----------------        ----------------
    1    :     1           8    :     8
    2    :     2           9    :     9
    3    :     3          10    :    10
    4    :     4          11    :    11
    5    :     5          12    :    12
    6    :     6          13    :    14
    7    :     7          14    :    15
HOW MANY RECORDS DO YOU WANT TO READ?
5
YOU NEED TO RUN DRB0:QUPL.COM TO MAKE PLOTS
DO YOU WANT TO DISMOUNT THE TAPE? (Y/N):  Y
DIGITIZING PROCEDURE COMPLETE
$LO

NOW GO TO A TEKTRONIX TERMINAL AND PERFORM THE FOLLOWING

Username:
Password:
        Welcome to VAX/VMS version V4.1 on node V331
    Last interactive login on Wednesday, 18-JUN-1986 12:33
    Last non-interactive login on Monday, 9-JUN-1986 13:19

$ QUPL
RUN NUMBER? :  61
PASS NUMBER? :  1
ARE YOU RUNNING ON THE TEKTRONICS? (Y/N):  Y


PLOTTING COMPLETE
$ DEL R61P1*.DAT;*
$ LO
```

APPENDIX L

COMMON ERRORS
POSSIBLE REASONS

It is very common to get tape/system errors when digitizing data. The digitizing program will print out error messages in the form:

```
PROBLEM WRITING TO TAPE, IOSB 8C 0 5C0 0
RECORD 5854 BUFFER NUMBER 2
ERROR FROM LPA$IWTBUF - IBUFNO -1 REC 5856
IOSB (HEX) 334 0 A3C0 EFD8
```

The first "IOSB" code, 8C is the error condition you should be concerned with. Here are a few common errors and actions to be taken. Please refer to the Digital Equipment reference manuals for more detail.

CODE	ERROR CODE	MEANING	ACTION TO BE TAKEN
334	SS$_DEVREQERR	The program could not perform it's function in a timely manner. When you needed control someone else had it.	Try you run over. If the system is very busy and 334 keeps occuring in a short period of time, QUIT, GO HOME!!! TRY AGAIN LATER.
8C	SS$_DRVERR	Magtape drive error. This program inhibits all tape correction retries.	Set tape aside and mark with record number. Use a new tape. RERUN. The tape is good for other applications.
1A4	SS$_MEDOFL	Tape drive is offline	Go press the "ON LINE" button on digital drive in the computer room.
1F4	SS$_PARITY	Tape parity error.	Set tape aside and mark. Use a new tape. RERUN. Tape may not be good.

Please note when digitizing it is critical that all things run in a smooth timely manner. Because all tape retries are inhibited and because you are usually sharing the system with other users, it is very common to have errors occur. Unfortunately, when digitizing the user cannot not tolerate any problems and a session must be restarted. Please expect this. In order to minimize problems, it is best to run when the system is not busy.

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ANALOG TO DIGITAL CONVERSION AND VERIFICATION PROGRAMS
FOR A VAX 11/780
P. Maciejewski
Environmental Acoustic Research and Analysis Branch
Surface Ship Sonar Department
TM No. 861214
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