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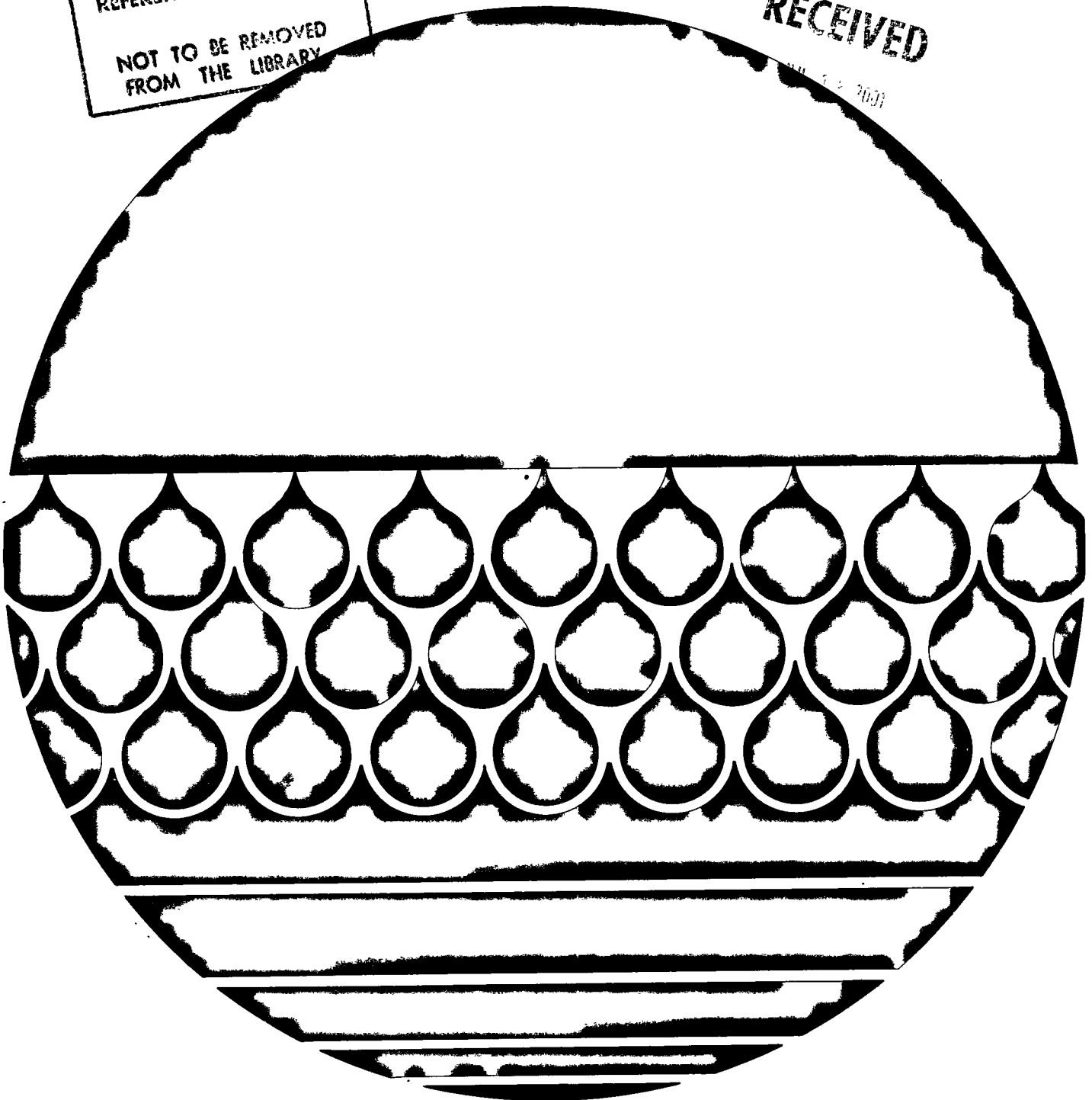
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BEDFORD INSTITUTE OF OCEANOGRAPHY

Dartmouth, Nova Scotia
Canada

BATFISH/CTD DATA ANALYSIS PROGRAMS IN H.P. FORTRAN

by

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ABSTRACT

A set of FORTRAN programs is presented designed for off-line analysis on an HP2100 computer, of data acquired using a *Batfish*/CTD data acquisition system. The data can be processed to give listings of 'raw' or contoured values of pressure, temperature, salinity, and sigma-t. Plots can be made depicting raw data in these parameters for calibration purposes, or versus time, or as data of any one parameter versus any other. As well, a series of *Batfish* up/down cycles can be averaged into an equivalent CTD cast. Plots of any measured parameter can be made as a function of time or of distance, and contours of any other parameter can be superimposed.

SOMMAIRE

On y présente un ensemble de programmes FORTRAN destinés à l'analyse, sur un ordinateur HP 2100, des données acquises par un *Batfish* avec un système de capteurs de conductivité, de température et de profondeur. On peut traiter les données de façon à produire des listes imprimées des valeurs 'brutes' ou les présenter sous forme de courbes de pression, de température, de salinité et de sigma-t. On peut tracer des graphiques représentant les données brutes de ces paramètres à des fins d'étalonnage, en fonction du temps, ou comme données de n'importe quel paramètre particulier par rapport à n'importe quel autre paramètre. On peut également faire la moyenne d'une série de cycles montée-descente du *Batfish* et la transformer en une palanquée conductivité-température-profondeur équivalente. On peut tracer des graphiques de n'importe quel paramètre mesuré en fonction du temps ou de la distance et y superposer les courbes de niveau de n'importe quel autre paramètre.

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1. INTRODUCTION

The *Batfish*/CTD data acquisition system is described in Dessureault (1975) and Bennett (1972). A conventional Guildline CTD (Series 8600 or 8700) is mounted inside a *Batfish* towed body. Analogue voltages from the CTD are transmitted onto the ship along the multiconductor towing cable to a multiplexer which, under computer control, feeds each channel sequentially into a digital voltmeter. The BCD output of the voltmeter is then read by the HP2100 computer, and processed by user programs. These are written in ONCAL interpreter language, which is the only one available with the special machine-language routines needed for efficient and rapid acquisition and on-line contour plotting of *Batfish*/CTD data.

The analysis programs described here were written at a time when the ONCAL interpreter was still experimental, with core and speed limitations, and with limited mag tape facilities. They are faster than the current version of ONCAL (Bennett, 1975a) for off-line data analysis, and have more extensive plotting facilities.

There are also historical ties to a set of FOCAL programs written to do much the same thing on a PDP-8 computer with 4K memory and three DECTape transports, of which (Bennett, 1970) is a partial description.

The set of programs is summarized below:

- MS002: a general purpose listing program for use with raw CTD data
- MS012: a processing program to contour the raw CTD data and store the contoured data on mag tape
- MS022: a general purpose listing program for use with contoured CTD data
- MS032: a processing program used with contoured CTD data to locate and list the endpoints of *Batfish* up/down cycles
- MS042: a processing program used with contoured CTD data, to average a series of *Batfish* up/down cycles into an 'equivalent' CTD cast
- MS053: a general purpose plotting program used to plot contoured CTD data versus distance (or time), with any parameter (P,T,S, σ_t) able to form y-axis
- MS082: a general purpose plotting program used with raw CTD data, to plot any parameter versus any other
- MS101: a plotting program for use with raw CTD data, plotting any parameter versus time for calibration purposes with an expanded, cyclical, y-coordinate axis
- MS111: a general purpose plotting program used with raw CTD data, to plot any parameter versus time
- MS121: a processing program for converting CTD data stored in an obsolete format to one usable by the above programs

MS091: a special purpose program for converting *Batfish* fluorometer/CTD data recorded on a data logger from BCD to binary records.

2. REQUIREMENTS

2.1 Hardware Requirements

The programs were written for use on an HP 2100 system with 16K memory, supporting DOS or DOSM, plus:

teletype (TTY)

2 mag tape transports (only one program needs both) set to 556 bpi

plotter (either Zeta 100 or Calcomp 563)

disc (can be optional with slight modification to programs)

line printer (optional)

high speed paper tape reader

Logical unit numbers corresponding to the above peripherals are in standard BIO format.

2.2 Software Requirements

The programs as described must be run on a disc based system (DOS or DOSM), and are written in HP FORTRAN (instead of FTN IV) to enable easy conversion for running in MTS. This was done so that data analysis at sea need not be dependent on the disc being operational at all times. The conversion entails replacing all CALL EXECs with the corresponding relocatable subroutines (HP RELOCATABLE SUBROUTINES). The number of subprograms in each program has been kept to four or less so that, if operation in MTS is desired, the program can be compiled in one pass.

2.3 Data Formats

2.3.1 Raw CTD Data

The 'raw CTD' data required as input to most of these programs is that written to tape by the ONCAL acquisition programs (Bennett, 1975b). These are binary records of 904 sixteen-bit words, arranged as follows:

<u>word</u>	<u>contents</u>
1	station number
2	cruise label (4 digits - first two are year; last two are cruise number. This is corrected to standard five-digit label on all output listings).

<u>word</u>	<u>contents</u>
3 & 4	taken together to form a 32-bit integer giving the time in seconds.
5	has the value of pressure voltage x 10000.
6	has the value of temperature voltage x 10000.
7	has the value of conductivity voltage x 10000.
8,9,10	a set of numbers similar to words (5,6,7)
...	...
902,903,904	300 such samples of (P,T,C) data

2.3.2 Contoured CTD Data

Contoured CTD data as required by several programs is stored on mag tape (by program MS012), in binary records of 2000 sixteen-bit words consisting of 1000 floating-point numbers. The numbers are arranged in groups of ten, as follows:

<u>word</u>	<u>function</u>
1	pointer to type of contour. Value of 1 = pressure contour, 2 = temperature contour, 3 = salinity, 4 = σ_t . A negative value flags labelling information, which is described below, while a zero value indicates no data has been contoured.
2	time of contour crossing, in seconds.
3	pressure (dbar).
4	temperature (degrees C)
5	salinity (ppt)
6	σ_t
7	presently has a value of -1
8	latitude in degrees (= -1 if no fixes are given)
9	longitude in degrees (= -1 if no fixes are given)
10	distance (km) from the start of the tow (= -1 if no fixes are given)

If word 1 above is negative, then the set of 10 words to which it

belongs contains:

<u>word</u>	<u>contains</u>
1	-(station ID)
2	starting time of tow (in form hhmm.ss)
3	cruise label (four digits, as in records of 'raw' data)
4	pressure offset (volts)
5	temperature offset (volts)
6	conductivity offset (volts),
7	pressure scaling factor (dbar/V)
8	integer part denotes whether the CTD was centered at 33 ppt or 35 ppt. Fractional part x 100 indicates the number of (P,T,C) data sets over which the input data was smoothed.
9	salinity 'cell-constant' (mean error)
10	salinity time-constant correction

The last record of a 'contoured-data' file is, if necessary, end-filled with zeros.

2.3.3 Other Data

All other input data is supplied, in free-field format, through the teletype or the high-speed reader. The latter is needed only during program MS012 and then only if geographic fixes are available. These must be transcribed from the ship's log onto paper tape in ascending order of time, in the following format:

```
time(hhmm)    lat(deg)    lat(min)    long(deg)    long(min)
```

where time is a four-digit number, hh = the hour

mm = the minute

A value of -1 for the time indicates no more fixes are available.

The term, (P,T,S) data set, used in these descriptions refers to one complete sample of pressure, temperature, salinity.

2.4 Corrections to CTD Data

The programs ask for the usual offsets and scaling factors dependent on choice of instruments and their lab calibration. Temperature is corrected for nonlinearity of the old (200 ms response time) temperature sensors,

$$\text{TEMP} = \text{VOLTAGE}/1.E4$$

$$\text{TEMP} = \text{TEMP} + (A+.425E-4*\text{TEMP}) - (\text{T-OFFSET IN DEG})$$

where A is dependent upon the sensor used. In the listings A = -.000591 (CTD s/n 39513, T sensor #39496, as calibrated in spring, 1975).

As well, the conductivity ratio is corrected for the compressibility and thermal expansion of the conductivity cell,

$$C = C*(1.+1.02E-6*P - .32E-6*[T-15.])$$

The salinity and σ_t formulas used here are those derived by Bennett (1975c). The salinity time-constant correction written into the programs corrects the original voltage readings of the CTD as stored during acquisition, before conversion to physical units. It is a simple interpolation of the form

$$C_n^{\text{true}} = C_n + F * (C_{n-1} - C_n)$$

where $F = [(T-C \text{ relative sensor delay time}) + (T-C \text{ sample time delay due to sequential scanning})] / [\text{total sample-interval time}]$
 and T refers to temperature-channel
 C refers to conductivity-channel

Generally, F has the value of

0.9 for data acquired with an HP 3450A DVM (data-set int. = 250 ms)

0.8 for data acquired with a FLUKE DVM (data-set int. = 200 ms)

2.5 Obsolete Formats

Data acquired during DAWSON 73-020 was stored in a slightly different format using a now obsolete digitizer. Conversion to the 1974 format is possible using program MS121. The records are of the same length and type as those in Section 2.3.1, but the contents are different.

<u>word</u>	<u>integer contents</u>
1	ID number
2	hours
3	minutes
4	seconds
5,6,7	three integer numbers on a special scale set up such that

-5 V ~ 0

+5 V ~ 32767

The exact scaling is set up during input of the CTD calibration data (see 4.6.1.3).

<u>word</u>	<u>integer contents</u>
...	...
902,903,904	300 such samples.

Program MS091 converts data acquired using a *Batfish*/fluorometer system interfaced to the Coastal Oceanography data logger, from BCD to binary records. However, the formats are usable only by some experimental ONCAL programs and not the FORTRAN ones described here. They are described in Section 4.6.2.

3. LOADING PROCEDURES

The source programs as listed here can be stored either on paper tape or on disc. They are compiled and run according to standard operating procedures (refer to HP SOFTWARE OPERATING PROCEDURES, or to HP2100 USER'S GUIDE). They can be compiled using either FTN4 or HP-FTN.

4. PROGRAM DESCRIPTION, USAGE, AND LISTINGS

4.1 Listing Program (Raw Data)

4.1.1 Program: MS002

Purpose

Used to list raw CTD data files and provide for a number of options as described below.

Hardware Requirements

HP2100 supporting DOS or DOSM

teletype for parameter input

teletype or line printer for output

one magnetic tape transport for data input (unit 0)

Description

Options available are:

- (1) list the start time and first (P,T,S) data set for each record in the data file;
 - (2) list the start and end of any spikes occurring in the file, a spike is any change between successive data sets that is greater than that specified by the user, or falls outside the range corresponding to the real world;
 - (3) list all raw data (including spikes), and their location in the file. Every data set after the first has the salinity time constant correction included;
 - (4) list all despiked raw data;
 - (5) list the starting time of each record in the file and every hundredth data set;
 - (6) list the file's ID, starting time, and first data set, followed by the number of records within that file.
- options 1 and 6 can be made to operate over a user-specified number of files;
- leaving ssw 15 off during listings gives all (P,T,S) data sets in terms of their physical units; setting it on lists the corresponding voltages;
- setting ssw 0 on aborts any current operation, and repositions the tape to the start of the current file;
- each data set is listed with its location on mag tape. The integer part of this number is the record count, the fractional part gives the data set within the record (1-300).

Operating Instructions

Refer to sample output provided below.

- (1) program is called by typing :PR,MS002
- (2) program lists branches and options available, then pauses at 0001;
- (3) type :GO
- (4) enter 1 to reset the mag tape hardware (unit 0); this rewinds the tape; enter 2 followed by the current file number, if the tape has already been positioned to a file;
- (5) enter the number of files to be skipped. If the mag tape has been previously positioned, enter -1 to position the tape to the start of the current file;
- (6-10) enter CTD calibration data. If there is more than one question/line, enter the corresponding answers on one line;

- (11) if options 1 or 6 are selected, program will also ask for the number of files to be processed;
- (12,13) a 'frame' is one record of raw CTD data being inputted. A negative value causes the program to pause at location 0007 (continuation with :GO is to item (15));
- (14) program continues with listings to logical unit 6 usually until all the data is processed or until an EOF is encountered. It will then branch to (12) for the former, or pause at 0007 for the latter (whereupon typing :GO restarts the program at item (15)). Options 1 or 6, however, will process the required number of files before pausing at 0007;
- (15) enter 1, 2, 3, or 4;
- (16) enter 1 or 2.
- etc.

Sample Printout

- 1) :PR,MS002 / SAMPLE PRINT-OUT (with output to TTY)
- 2) BRANCHES:
 1.RESTART FILE
 2.CONTINUE W NEXT ONE
 3.SKIP FILES
 4.REINITIALIZE
- OPTIONS:
 1.LIST RECORD&TIME
 2.LIST SPIKES ONLY
 3.LIST ALL RAW DATA
 4.LIST DESPIKED RAW DATA
 5.LIST DATA @ 20 SEC
 6.LIST START OF FILE ONLY
- SSW(15)=ON FOR VOLTAGES, =OFF FOR PHYS UNITS
- OPTNS 3&4 INCLUDE SAL T.C.-CORR'N FOR ALL SAMPLES AFTER THE 1ST ONE
- SSW(0) =ON TO ABORT OPERATION, RESTART FILE, =OFF TO NOP.
- SET SSW'S
 MS002 : PAUSE 0001
 MS002 SUSP
- 3) 0:GO
 4) RESET MAGTAPE? YES=1, NO=2 FOLLOWED BY PRESENT FILE #
 2 3
 5) SKIP FILES? TO SKIP BKWD ENTER -(#.TO.SKIP +1)
 -1
- 6) P-SCALING(DBAR/VOLT)?, P-OFFSET(V)?
 666.667 .0046
 7) T-OFFSET(V)?, C-OFFSET(V)?
 -.013 0
 8) S CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?
 0 35
 9) SAL T.C.-CORR'N= .134. ENTER SAME/NEW CORR'N:
 .134
 10) MAX DIFF BETWEEN SUCCEEDING P(M)? T(DEG)? S(PPT)?
 3 1 1
- 11) WHICH OPTION?
 5
 12) START AT FRAME?, SAMPLE?
 1 1
 13) STOP.. FR?, SAM?
 3 202

14) FILE ID 75008.1029 TIME 2020.45

REC	P	T	S	LOC'N
1				
2.5	5.572	33.216		1.001
3.6	5.574	33.172		1.101
12.3	5.563	33.146		1.201
2				
31.5	5.500	33.145		2.001
.078	.9123	-.5690		2.101
66.1	10.687	34.906		2.201
3				
83.5	11.309	35.088		3.001
100.3	11.084	35.089		3.101
119.9	9.837	34.832		3.201

← nb: ssw 15 turned on for this set
numbers are P,T,C voltages

START AT FRAME?, SAMPLE?
-1

15) WHICH BRANCH?

1

16) 1)NEW OFFSETS? 2)SAME ONES?

2

etc WHICH OPTION?

6

PROCESS HOW MANY FILES?

3

START AT FRAME?, SAMPLE?

1 1

STOP.. FR?, SAM?

100 100

FILE 3 ID 75008.1029 TIME 2020.45
REC 1 TIME 2020.45 P,T,S= 2.5 5.572 33.216
EOF: 11 RECORDS

FILE 4 ID 75008.2029 TIME 2033.13
REC 1 TIME 2033.13 P,T,S= 491.3 5.424 34.842
EOF: 6 RECORDS

FILE 5 ID 75008.1030 TIME 2058.15
REC 1 TIME 2058.15 P,T,S= 2.7 5.401 33.090
EOF: 10 RECORDS

17) MS002 : PAUSE 0007
MS002 SUSP

0

Sample output to line printer

FILE	P	T	S	LOC'N
4				
ID				
75008.1029				
TIME				
2020.45				
REC	1	TIME	2020.45	
2.5		5.572	33.216	1.001
3.6		5.574	33.172	1.101
12.3		5.563	33.146	1.201
REC	2	TIME	2021.45	
31.5		5.500	33.145	2.001
48.7		9.253	34.377	2.101
66.1		10.687	34.906	2.201
REC	3	TIME	2022.45	
83.5		11.309	35.088	3.001
100.3		11.084	35.089	3.101
119.9		9.837	34.832	3.201
REC	4	TIME	2023.45	
138.5		8.581	34.692	4.001
155.9		8.559	34.740	4.101
172.4		8.386	34.765	4.201
REC	5	TIME	2024.45	
186.9		8.329	34.750	5.001
203.7		8.195	34.765	5.101
219.7		8.051	34.830	5.201
REC	6	TIME	2025.45	
235.3		7.923	34.838	6.001
251.1		7.695	34.835	6.101
267.3		7.319	34.807	6.201
REC	7	TIME	2026.45	
286.5		7.103	34.816	7.001
306.7		6.595	34.747	7.101
325.3		6.751	34.822	7.201
REC	8	TIME	2027.45	
345.6		6.406	34.823	8.001
364.7		6.120	34.811	8.101
384.9		6.127	34.827	8.201
REC	9	TIME	2028.45	
405.2		6.006	34.836	9.001
423.9		5.822	34.839	9.101
443.7		5.712	34.840	9.201
REC	10	TIME	2029.45	
462.6		5.578	34.833	10.001
482.7		5.464	34.841	10.101
492.2		5.405	34.852	10.201
REC	11	TIME	2030.45	
491.6		5.417	34.842	11.001
491.1		5.419	34.841	11.101
491.6		5.414	34.845	11.201

listings

```

0001 FTN
0002     PROGRAM MS002
0003 C
0004 C V=14 7,11,75
0005 C LISTS ID    TIME, OR SECTIONS OF RECORDS, FROM RAW DATA TAPE
0006 C P,T,C, DATA ONLY
0007 C SET UP FOR DOS/DOSM NOT USING PRINTER.  INPUT: ID ID TM TM
0008 C 10000*PVOLT 10000*TVOLT 10000*CVOLT ..... 904 WRD (FX-PT) BUFR
0009     DIMENSION IX(904),V(3)
0010     COMMON NRIN
0011 C
0012 C INITIALIZE
0013     1 N=7
0014     NWRD=904
0015     KOFST=1
0016     ISPK=1
0017     P=0.
0018     T=0.
0019     S=0.
0020     WRITE(1,1825)
0021     WRITE(1,1002)
0022     WRITE(1,1003)
0023     PAUSE 1
0024     MFL=1
0025     WRITE(1,1001)
0026     READ(1,*)IB,MFL
0027     GO TO (3,5)IB
0028     3 CALL POSIT(N,0,0,1,NEOF,NWRD)
0029 C
0030 C SKIP FILES
0031     5 WRITE(1,1010)
0032     READ(1,*)NF
0033     10 IF(NF)12,13
0034     12 MFL=MFL+1
0035     13 MFL=MFL+NF
0036     15 CALL POSIT(N,NF,0,2,NEOF,NWRD)
0037     20 IB=0
0038     25 GO TO (30,70)KOFST
0039 C
0040 C GET SCALING  OFFSETS FOR CTD USED
0041     30 WRITE(1,1030)
0042     READ(1,*)PSC,P0
0043     PMAX=PSC*(P0+3.05)
0044     P0=P0*PSC
0045     WRITE(1,1035)
0046     READ(1,*)T0,C0
0047     T0=T0*10.
0048     40 WRITE(1,1040)
0049     READ(1,*)SCELL,CENTR
0050     IF(CENTR-35.)50,55,40
0051     50 IF(CENTR-33.)40,60,40
0052     55 CENTR=4.
0053     GO TO 65
0054     60 CENTR=3.7949
0055     65 STC=.134

```

```

0056      WRITE(1,1064)STC
0057      READ(1,*)STC
0058      WRITE(1,1065)
0059      READ(1,*)DP,DT,DS
0060  C
0061  C GET OPTION
0062      70 WRITE(1,1005)
0063      READ(1,*)KOPTN
0064      NDO=1
0065      GO TO (75,100,100,100,100,75)KOPTN
0066      75 WRITE(1,1026)
0067      READ(1,*)NDO
0068      NDO=MFL+NDO-1
0069  C
0070  C ASK FOR LOC'N OF DATA, POSITION TAPE TO START OF DATA
0071      100 WRITE(1,1100)
0072      READ(1,*)IR,IS
0073      IF(-IR)110,845
0074      110 WRITE(1,1110)
0075      READ(1,*)JR,JS
0076      LINE=50.
0077      IF(IB-IR)140,150,120
0078  C
0079  C SKIP RECORDS BKWD
0080      120 L=-(IB-IR+1)
0081      CALL POSIT(N,0,L,2,NEOF,NWRD)
0082      IB=IR-1
0083      140 ISTRT=IR-IB
0084  C
0085  C SKIP RECORDS FWD
0086      142 DO 160 L=1,ISTRT
0087      145 CALL EXEC(1,107B,IX,NWRD)
0088      CALL POSIT(N,0,0,3,NEOF,NWRD)
0089      IB=IB+1
0090      IF(NEOF)320,147
0091      147 GO TO (143,150)IB
0092      148 CALL TIME(TIM0,IX(3),IX(4))
0093      150 IF(ISSW(0))800,160
0094      160 CONTINUE
0095      ISMPL=3
0096      ISTRT=IS*3+2
0097      IEND=902
0098      IF(IB-JR)175,170
0099      170 IEND=JS*3+2
0100      175 IF(KOPTN-5)185,180,185
0101      180 ISMPL=300
0102  C
0103  C GET ID'S
0104      185 XID=FLOAT(IFIX(FLOAT(IX(2))/100.+0.001))
0105      XID=1000.*XID+FLOAT(IX(2))-100.*XID
0106      ID2=IX(1)
0107      INITL=1
0108      ISPK=1
0109      POSN1=0.
0110      POSN2=0.
0111      GO TO (187,187,187,187,187,200)KOPTN
0112      187 WRITE(6,1187)MFL,XID,ID2,TIM0
0113      GO TO (200,200,190,190,200)KOPTN

```

```

0114     190 W=.0001*FLOAT(IX(ISTR+2))
0115 C
0116 COMPUTE TIME
0117     200 CALL TIME(TIM,IX(3),IX(4))
0118 C
0119 C ANALYZE DATA, USING K TO LOOP THROUGH BUFFER
0120     205 KOL=-100
0121         DO 400 K=ISTR, IEND, ISMPL
0122         KEX=1
0123         IF(ISSW(0))800,206
0124     206 IF(LINE-50)222,207
0125     207 LINE=0
0126         GO TO (209,211,213,213,213,215)KOPTN
0127     209 WRITE(6,1209)
0128         GO TO 222
0129     211 WRITE(6,1211)
0130         GO TO 222
0131     213 WRITE(6,1213)
0132         GO TO 222
0133     215 WRITE(6,1215)
0134 C
0135 C GET VOLTAGES
0136     222 V(1)=.0001*FLOAT(IX(K))
0137         V(2)=.0001*FLOAT(IX(K+1))
0138         V(3)=.0001*FLOAT(IX(K+2))
0139         GO TO (228,230,225,225,230,227)KOPTN
0140 C
0141 CORRECT 'S' VOLTAGE FOR ERROR IN SAMPLING RATE FOR OPTNS 1-4
0142 C 1ST 'S' IN SET LISTED IS UNCORRECTED. OPTN 5 USES UNCORR'D DATA
0143     225 C=V(3)+STC*(W-V(3))
0144         GO TO 235
0145     227 ISTR=3000
0146     228 K=IEND
0147     230 C=V(3)
0148 C
0149 C GET P,T,S;CORRECT T FOR 200MSEC T-SENSOR NONLINEARITY,
0150 COND RATIO FOR C-CELL COMPRESSIBILITY THERMAL EXPANSION
0151     235 P1=P
0152         T1=T
0153         S1=S
0154         P=V(1)*PSC
0155         P=P-P0
0156         T=V(2)*10.
0157         T=T+(.425E-4*T-.000591)*T-T0
0158         C=(CENTR+C-C0)*.25
0159         C=C*(1+.102E-6*P-.32E-5*(T-15.))
0160         S=SAL(P,T,C)-SCCELL
0161         XPOSN=FLOAT(IB)+.001*FLOAT((K-2)/3)
0162         SIGT=SIGT(T,S)
0163         IF(IFIX(FLOAT((K-2)/3)/10.+.01)-IFIX(FLCAT(KOL)/10.+.01))
0164             @237,238,237
0165     237 KEX=2
0166     238 KOL=(K-2)/3
0167         GO TO (315,240,320,240,320,400)KOPTN
0168 C
0169 C SEARCH OUT SPIKES. SPIKE=DATA OUT OF RANGE OF SENSOR CAL'N
0170     240 IF(P)300,250
0171     250 IF(PMAX-P)300,255

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```

0172 255 IF(T+2.5)300,260
0173 260 IF(32.5-T)300,265
0174 265 IF(S)300,270
0175 270 IF(44.-S)300,275
0176 275 GO TO (280,285)INITL
0177 280 INITL=2
0178      GO TO 310
0179 285 IF(ABS(P1-P)-DP)290,300
0180 290 IF(ABS(T1-T)-DT)295,300
0181 295 IF(ABS(S1-S)-DS)310,300
0182 C
0183 C IF SPIKES, GO TO STATEMENT 300, IF NOT GO TO 310
0184 300 GO TO (400,360,320,400,320)KOPTN
0185 310 GO TO (400,370,320,320,320)KOPTN
0186 315 IF(ISSW(15))316,318
0187 316 WRITE(6,1316)IB,TIM,(V(L),L=1,3)
0188      GO TO 385
0189 318 WRITE(6,1318)IB,TIM,P,T,S,SIGT
0190      GO TO 385
0191 320 IF(ISSW(15))340,325
0192 325 GO TO (327,329)KEX
0193 327 WRITE(6,1327)P,T,S
0194      GO TO 380
0195 329 WRITE(6,1329)P,T,S,SIGT,XPOSN
0196      GO TO 380
0197 340 GO TO (342,344)KEX
0198 342 WRITE(6,1342)(V(L),L=1,3)
0199      GO TO 380
0200 344 WRITE(6,1344)(V(L),L=1,3),XPOSN
0201      GO TO 380
0202 360 GO TO (365,366)ISPK
0203 365 ISPK=2
0204      POSN1=XPOSN
0205      GO TO 400
0206 366 POSN2=XPOSN-.001
0207      IF(K-5)368,368,400
0208 368 POSN2=FLOAT(IB-1)+.3
0209      GO TO 400
0210 370 GO TO (400,375)ISPK
0211 375 ISPK=1
0212      WRITE(6,1376)POSN1,POSN2
0213      POSN1=0.
0214      POSN2=0.
0215 380 GO TO (400,400,390,390,400,400)KOPTN
0216 385 LINE=LINE+1
0217 390 W=V(3)
0218 400 CONTINUE
0219      GO TO (410,410,410,410,410,142)KOPTN
0220 C
0221 C CHECK TO SEE IF FINISHED, IF NOT, READ IN NEXT BUFFER
0222 410 ISTRT=5
0223      IF(IB-JR+1)430,420,460
0224 420 IEND=JS*3+2
0225 430 IF(ISSW(0))800,440
0226 440 CALL EXEC(1,107B,IX,NWRD)
0227      CALL POSIT(N,0,0,3,NEOF,NWRD)
0228      IB=IB+1
0229      IF(NEOF)450,200

```

```

0230 450 GO TO (820,470,820)KOPTN
0231 460 GO TO (100,470,100)KOPTN
0232 470 GO TO (480,475)ISPK
0233 475 WRITE(6,1376)POSN1,POSN2
0234     ISPK=1
0235 480 IF(NEOF)820,100
0236 C
0237 C LISTING ABORTED. REWIND TAPE TO START OF FILE
0238 800 WRITE(1,1800)
0239     CALL POSIT(N,-1,0,2,NEOF,NWRD)
0240     GO TO 840
0241 C
0242 C EOF
0243 820 IB=IB-1
0244     GO TO (832,832,832,832,832,822)KOPTN
0245 822 LINE=LINE+1
0246     IF(IB)831,831,823
0247 823 IF(ISSW(15))824,826
0248 824 WRITE(1,1824)MFL,IB,XID,ID2,TIM0,(V(K),K=1,3)
0249     GO TO 828
0250 826 WRITE(6,1826)MFL,IB,XID,ID2,TIM0,P,T,S,SIGT
0251 828 IF(NEOF+3)830,834
0252 830 WRITE(1,1829)
0253     CALL RWSTB(N)
0254     PAUSE 6
0255     CALL POSIT(N,0,0,1,NEOF,NWRD)
0256     GO TO (832,832,832,832,832,834)KOPTN
0257 831 WRITE(6,1822)MFL,IB
0258     GO TO 834
0259 832 WRITE(6,1821)IB
0260 834 MFL=MFL+1
0261     GO TO (836,840,840,840,840,836)KOPTN
0262 836 IF(MFL-NDO)838,838,840
0263 838 ISTRT=1
0264     IB=0
0265     GO TO 142
0266 840 PAUSE 7
0267 845 WRITE(1,1830)
0268     READ(1,*)L
0269     WRITE(1,1831)
0270     READ(1,*)KOFST
0271     NF=(NEOF-1)/2-L
0272     GO TO (10,850,5,1)L
0273 850 NF=1
0274     IF(NEOF)20,13
0275 C
0276 1001 FORMAT("RESET MAGTAPE?  YES=1,  NC=2 FOLLOWED BY PRESENT "
0277     @ "FILE =")
0278 1002 FORMAT(///"OPTIONS:"/"1.LIST RECORD TIME"/"2.LIST SPIKES"
0279     1" ONLY"/"3.LIST ALL RAW DATA"/"4.LIST DESPIKED RAW DATA"/
0280     @ "5.LIST DATA @ 20 SEC"/"6.LIST START OF FILE ONLY"/"SSW"
0281     @ "(15)=ON FOR VOLTAGES, =OFF FOR PHYS UNITS"/"OPTNS 3 4 INC"
0282     @ "LUDE SAL T.C.--CORR'N FOR ALL SAMPLES AFTER THE 1ST ONE")
0283 1003 FORMAT(/"SSW(0) =ON TO ABORT OPERATION, RESTART FILE, ="
0284     @ "OFF TO NOP."/"  S E T   S S W 'S ")
0285 1005 FORMAT(/"WHICH OPTION?")
0286 1010 FORMAT("SKIP FILES?  TO SKIP BKWD ENTER -(=.TO.SKIP +1)")
0287 1026 FORMAT("PROCESS HOW MANY FILES?")

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0288 1030 FORMAT(/"P-SCALING(DBAR/VOLT)?, P-OFFSET(V)?")
0289 1035 FORMAT("T-OFFSET(V)?, C-OFFSET(V)?")
0290 1040 FORMAT("S CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?")
0291 1064 FORMAT("SAL T.C.-CORR'N="F5.3". ENTER SAME/NEW CORR'N:")
0292 1065 FORMAT("MAX DIFF BETWEEN SUCCEEDING P(M)? T(DEG)? S(PPT)?")
0293 1100 FORMAT("START AT FRAME?, SAMPLE?")
0294 1110 FORMAT("STOP.. FR?, SAM?")
0295 1187 FORMAT(///" FILE"15" ID"F6.0,I4" TIME"F8.2)
0296 1209 FORMAT(/" REC TIME 'P' 'T' 'S' SIG T")
0297 1211 FORMAT(/" LOC'N TO LOC'N HAVE SPIKES")
0298 1213 FORMAT(/" 'P' 'T' 'S' SIG T LOC'N")
0299 1215 FORMAT(/" FILE REC CRUISE STN TIME 'P' 'T'"
0300 @" 'S' SIG T")
0301 1316 FORMAT(" "I4,F8.2" "F6.4,2(" "F7.4))
0302 1318 FORMAT(" "I4,F8.2" "F6.1" "2(" "F6.3),F6.2)
0303 1327 FORMAT(" "F6.1" "2(" "F6.3))
0304 1329 FORMAT(" "F6.1" "2(" "F6.3),F6.2" "F8.3)
0305 1342 FORMAT(" "F6.4,2(" "F7.4))
0306 1344 FORMAT(" "F6.4,2(" "F7.4)," "F8.3)
0307 1376 FORMAT(" "F8.3" >"F8.3)
0308 1800 FORMAT(/"ABORT ! TAPE REWOUND TO START OF FILE."/" T U RM
0309 @" O F F S S W ")
0310 1821 FORMAT(" EOF:"15" RECORDS"/)
0311 1822 FORMAT(" "I4,15)
0312 1825 FORMAT(///"BRANCHES:"/"1.RESTART FILE"/"2.CONTINUE W NEXT"
0313 @" ONE"/"3.SKIP FILES"/"4.REINITIALIZE")
0314 1824 FORMAT(" "I4,15" "F6.0,I4,F8.2" "F6.4,2(" "F7.4))
0315 1826 FORMAT(" "I4,15" "F6.0,I4,F8.2" "F6.1" "2(" "F6.3),F6.2)
0316 1829 FORMAT("EOT ON UNIT 0: LOAD NEXT TAPE")
0317 1830 FORMAT(/"WHICH BRANCH? ")
0318 1831 FORMAT("1)NEW OFFSETS? 2)SAME ONES?")
0319 END
0320 C
0321 C
0322 FUNCTION SAL(P,T,C)
0323 C
0324 C BENNETT'S VERSION. C IS CONDUCTIVITY RATIO,=C(P,T,S)/C(0DBAR"
0325 C ABOVE ATMOSPHERIC, 15DEG-IPTS68, 35PPT)
0326 C1=C/((1.+((6.166E-15*P-5.4845E-10)*P+1.60836E-5)*P/
0327 @((.3169E-3*T+.030786)*T+1.))*((( (-.804E-10*T+.772633E-8
0328 @)*T-.895439E-6)*T+.112681E-3)*T+.0200464)*T+.676605))
0329 C
0330 SAL=((( (-1.32311*C1+5.93624)*C1-10.61869)*C1+
0331 @12.18802)*C1+28.8567)*C1-.08996+C1*(C1-1.)*((.442E-1
0332 @-.46E-3*T-4.E-3*C1)*T+(1.25E-4-2.9E-6*T)*P)
0333 RETURN
0334 END
0335 C
0336 C
0337 FUNCTION SIGMT(T,S)
0338 SIGMT=((( (-.577E-6*S+.5994E-4)*S+.563E-5*T-.21192E-2)
0339 @*S+((- .96E-6*T+.7674E-4)*T-.37845E-2)*T+.8333893)*S
0340 @+((.7103E-4*T-.90399E-2)*T+.070023)*T-.1323
0341 RETURN
0342 END
0343 C
0344 C
0345 SUBROUTINE TIME(TIM,I,J)

```

```

0346      TIM=0.
0347      IF(J)5,10
0348      5 TIM=65536.
0349      10 TIM=TIM+65536.*FLOAT(I)+FLOAT(J)
0350      IHR=TIM/3600.+0.001
0351      TIM=TIM-3600.*FLOAT(IHR)
0352      IMIN=TIM/60.+0.01
0353      ISEC=TIM-60.*FLOAT(IMIN)
0354      TIM=100.*FLOAT(IHR)+FLOAT(IMIN)+.01*FLOAT(ISEC)
0355      RETURN
0356      END
0357  C
0358  C
0359      SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0360  C
0361  C V=11 6,11,75 FOR USE UNDER DOS
0362  C USED TO CHECK M.T. STATUS AFTER I/O
0363  C N=MT UNIT,NF==FILES TO SKIP,NR== RECORDS TO SKIP,NSEL=OPTION
0364      COMMON NRIN
0365      2 NEOF=1
0366      3 NUNIT=0
0367      NSEL=NBRAN
0368      GO TO (5,5,5,5,5,5,5,4,5,4)N
0369      4 NUNIT=1
0370      5 GO TO (20,50)NSEL
0371      10 WRITE(1,1010)NUNIT
0372      15 PAUSE 1
0373  C
0374  CHECK IF UNIT ON-LINE, THEN REMIND (RESETS IT)
0375      20 IF(LOCAL(N))10,30
0376      30 NEOF=256+N
0377      CALL EXEC(3,NECF)
0378      GO TO 9000
0379  C
0380  C SKIPS RECORDS(NR), FILES(NF). REFER TO REL SUB FOR USAGE
0381      40 CALL PTAPE(N,NF,NR)
0382      NSEL=4
0383  C
0384  CHECKS STATUS OF M.T. UNIT
0385      50 CALL EXEC(13,N,ISTAT,ILOG)
0386      IF(ISTAT)50,60
0387      60 GO TO (9000,40,90,70)NSEL
0388  C
0389  CHECKS FOR EOT AFTER A (BUFFER) WRITE C.
0390      70 IF(IEOT(N))80,9000
0391      80 NEOF=-4
0392      GO TO 9000
0393  C
0394  CHECKS FOR MISCONDITIONS AFTER A (BUFFER) READ C.
0395      90 IF(IEOF(N))100,110
0396      100 NEOF=-2
0397      GO TO 9000
0398      110 IF(IEOT(N))80,120
0399      120 IF(IEOR(N))130,140
0400      130 NSEL=NRIN+1
0401      WRITE(6,1130)NSEL
0402      140 I=IWRDS(N)
0403      IF(I-NWRD)150,9000,150

```

```
0404 150 WRITE(6,1150)NSEL,I
0405 1010 FORMAT("READY TAPE UNIT"13)
0406 1130 FORMAT(" REC"16" TIM/PAR ERR")
0407 1150 FORMAT(" REC"16" TAPE ERR:"16" WORDS XFERRD")
0408 9000 RETURN
0409      END
0410      END$
**** LIST END **
@
```


4.2 Contouring Program

4.2.1 Program MS012

Purpose

To contour raw CTD data, and store the contoured data on mag tape.

Hardware Requirements

HP 2100 supporting DOS or DOSM

teletype for parameter input/output

one mag tape transport (unit 0) for data input

one mag tape transport (unit 1) for data output

one high speed reader for input of geographic coordinates (optional)

Description

Input data is that produced by the ONCAL acquisition programs. It is smoothed, and checked in turn for contour crossings in P,T,S, and σ_t . If any are found, the values of the other parameters are interpolated (simple interpolation) to the time the contour was found. Geographic coordinates, if supplied, are also interpolated for this time, and the distance in kilometres from the start of the tow is computed using the USC&GS Geographic Inverse formula (north and west taken positive). The contoured data is then output to mag tape in buffer lengths of 2000 sixteen-bit words as previously described in Section 2.3.2.

Operating Instructions

Refer to sample printout provided below.

- (1) program is called by :PR,MS012
- (2) program lists branches and options available, then pauses at 0001;
- (3) type :GO
- (4) enter 1 to reset the mag tape hardware (unit 0); this rewinds the tape. Enter 2 followed by the current file number, if the mag tape has already been positioned to a file.
- (5) similar to (4), and resets unit 1;
- (6) enter the number of files to be skipped. If the mag tape has been previously positioned, enter -1 to position the tape to the start of the current file.
- (7-10) enter CTD calibration data. If there is more than one question/line, enter the corresponding answers on one line.
- (11) This is a running mean over 'n' samples, 'n' usually chosen to smooth the data over one second. Any spikes (data falling outside the range

occurring in the real world) are not included in the smoothing. If a continuous series of spikes occurs (over more than 'n' samples), smoothing and contouring is restarted at the next set of good data. The spikes excluded here are those caused by intermittent gross malfunction of the digitization equipment used on some cruises, and would either work correctly, or give totally wrong results.

- (12) enter the sampling rate at which the data was acquired (this is usually 4 or 5 samples/s);
- (13) enter the interval between contours, for P,T,S, and SIGMA T, in the corresponding physical units. (If the data is to be further analyzed using MS053,MS032,MS042, it is advisable to contour pressure at 1 m intervals.)
- (14) enter 1 if no geographical fixes are being supplied, enter 2 if fixes are available. They must be supplied through the high speed reader in ascending order of time, and written in the correct format (see 2.3.3): time(hhmm), lat(deg), lat(min), long(deg), long(min). Values of -1 for time indicates no more fixes are available. Any data recorded before the time of the first fix is assumed to have the same coordinates as that fix. Data recorded after the time of the last fix is given the coordinates of that fix.
- (15) enter the number of files to be processed. If more than one is to be done, items (16) and (17) are not asked; the data addresses are then assumed to be (1,1) for #16, and (3000,300) for #17.
- (16-17) a frame is one record of raw CTD data being inputted. A negative value causes the program to branch to Item (20). A sample is one (P,T,S) data set. There are 300/frame.
- (18) as each file is completed, its ID and length on both input and output tapes is printed. AN EOF is automatically written if any data has been contoured except for the last file to be processed, whereupon the program asks the user whether an EOF is desired.
- (19) program then pauses at 0007. To restart, type :GO
- (20) enter 1, 2, 3, or 4
- (21) enter (1) or (2).

etc.

NOTE: Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample Printout

- 1) :PR,MS012 / SAMPLE PRINT-OUT
- 2) BRANCHES
 1)RESTART FILE
 2)CONTINUE W NEXT ONE
 3)SKIP FILES
 4)REINITIALIZE
 SSW(0)=ON TO ABORT & RESTART FILE
 SET SSW'S!
 MS012 : PAUSE 0001
 MS012 SUSP
- 3) 0:GO
- 4) RESET TAPE#0? Y=1, N=2 FOLLOWED BY PRESENT FILE #
 2 6
- 5) RESET TAPE#1? Y=1, N=2 FOLLOWED BY PRESENT FILE #
 1
- 6) SKIP OUTPUT FILES? TO SKIP BKWD ENTER -(#-TO-SKIP +1)
 13
 SKIP INPUT FILES?
 -4
- 7) P-SCALING(DBAR/VOLT)?, P-OFFSET(VOLT)?
 666.667 .0046
- 8) T-OFFSET(V)?, C-OFFSET(V)?
 -.013 0
- 9) S CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?
 0 35
- 10) SAL T.C.-CORR'N= .134. ENTER SAME/NEW CORR'N:
 .134
- 11) SMOOTH OVER ? SAMPLES?
 5
- 12) ACQUISITION RATE WAS ? SAMPLES/SEC?
 5
- 13) CONTOUR INTERVALS: P?, T?, S?, SIGMA T?
 10 1 .5 .25
- 14) 1)NO FIXES, OR 2)W FIXES(USING PROPER FORMAT)?
 1
- 15) PROCESS ? FILES?
 1
- 16) DATA STARTS FRAME?, SAMPLE?
 1 1
- 17) DATA ENDS FRAME?, SAMPLE?
 11 300
- 18) IN-FILE 3> 11 FRAMES PROCESSED. CRUISE 75008. STN 1029.
 TYPE (1)TO WRITE EOF TO MT#1, (2)OTHERWISE:

1
OUT-FILE 14> 1 RECORDS.
MS012 : PAUSE 0007
MS012 SUSP

19) 0160

20) WHICH BRANCH?

2

21) CHANGE CTD CAL'N DATA(Y=1; N=2 TYPE 1 OR 2)?

2

etc SMOOTH OVER ? SAMPLES?

5

ETC.

Listings

```

0001  FTN
0002      PROGRAM MS012
0003  C
0004  C V=19 6,11,75
0005  CONTOURS P,T,C DATA FROM CTD(ONCAL ACQUISITION)  WRITES IT
0006  C TO M.T.  IN=MT=0..BIN(904 INTGR BUFR):300 <PTC> SETS/BUFR
0007  C STN CRUISE TIME(IN SEC,IS A '32-BIT' INTGR, OCCUPYING 2 WRDS)
0008  C <PTC> <PTC> .. THESE ARE MEASURED VOLTS*10000.  OUT=MT=1, 2000
0009  C WRD BUFR(1000FL-PT ='S):  N TIME(SEC) P T S SIG-T CONC(OR-1)
0010  C LAT(OR -1)  LON TOTL-DIST.  N=CONTOUR-TYPE:  =1>P =2>T =3>S ..
0011  C 1ST 10 ='S IN OUTPUT ARE CAL'N DATA, FLAGGED BY N=-(CRUISE =)
0012  C      DIMENSION IN(904),OUT(1000),D(4),V(4),W(4),R(3),S(3),X(4)
0013  C      @,Y(4)
0014  C      COMMON NRIN
0015  C
0016  C USING STATEMENT F'NS HERE KEEPS MAX = OF SOURCE PROGS/SUBS <6,
0017  C ENABLING ALL COMPILATION TO BE DONE AT SAME TIME UNDER BCS-FTN
0018  C
0019  CALL FOR SAL'TY USES 2 F'NS, AS FF:  SAL'TY= SAL(P,T, Q(P,T,C) )
0020  C BENNETT '72 F'LA. C=CONDUCTIVITY RATIO.  DENOM=42.893MMHO/CM
0021  C=  C(P,T,S) / C(0DBAR,15DEG-IPTS68,35PPT)
0022  C      Q(P,T,C)=C/((1.+((6.166E-15*P-5.4845E-10)*P+1.60836E-5)*P/((
0023  C      @.3169E-3*T+.030786)*T+1.)))*((( (-.804E-10*T+.772633E-8
0024  C      @)*T-.895439E-6)*T+.112681E-3)*T+.0200464)*T+.676605))
0025  C      SAL(P,T,B)=((( (-1.32311*B+5.98624)*B-10.61869)*B+12.18882)
0026  C      @*B+28.8567)*B-.08996+B*(B-1.))*((.0442-.00046*T-.004*B)
0027  C      @*T+(.000125-.29E-5*T)*P)
0028  C
0029  C SIGMA-T=SIGMT(T,S).  BENNETT'72 FITS DATA OF COX ,TILTON TAYLOR
0030  C      SIGMT(T,S)=((( (-.577E-6*S+.5994E-4)*S+.563E-5*T-.21192E-2)
0031  C      @*S+((- .96E-6*T+.7674E-4)*T-.37845E-2)*T+.8333893)*S
0032  C      @+((- .7103E-4*T-.90399E-2)*T+.70023E-1)*T-.13230
0033  C
0034  C INITIALIZE
0035  C      1 IW=904
0036  C      JW=2000
0037  C      MTIN=7
0038  C      MTOUT=8
0039  C      MF=1
0040  C      NDONE=0
0041  C
0042  C R=MIN VALUES(P,T,S) / S=MAX VALUES
0043  C      R(1)=0.
0044  C      R(2)=-2.5
0045  C      R(3)=0.
0046  C      S(2)=31.
0047  C      S(3)=40.
0048  C
0049  C ARRAYS: V=PRESENT RAW DATA (DBR,DEG,PPT) / W=PREVIOUS RAW DATA
0050  C X=PRESENT SMOOTHED-DATA (NAVRG SAMPLES) / Y=PREVIOUS X-ARRAY
0051  C WRITE OPTIONS, RESET MAGTAPES
0052  C      WRITE(1,1003)
0053  C      WRITE(1,1004)
0054  C      PAUSE 1
0055  C      NFOUT=0

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```

0056     NFIN=1
0057     WRITE(1,9002)
0058     READ(1,*)NRIN,NFIN
0059     GO TO (2,3)NRIN
0060     2 CALL POSIT(MTIN,0,0,1,NEOF,IW)
0061     3 WRITE(1,9003)
0062     READ(1,*)NROUT,NFOUT
0063     GO TO (4,5)NROUT
0064     4 CALL POSIT(MTOUT,0,0,1,NEOF,JW)
0065     C
0066     C SKIP INPUT/OUTPUT FILES
0067     5 WRITE(1,1005)
0068     READ(1,*)NSKIP
0069     IF(NSKIP)6,7
0070     6 NFOUT=NFOUT+1
0071     7 NFOUT=NFOUT+NSKIP
0072     CALL POSIT(MTOUT,NSKIP,0,2,NEOF,JW)
0073     NROUT=0
0074     WRITE(1,1007)
0075     READ(1,*)NSKIP
0076     10 IF(NSKIP)12,13
0077     12 NFIN=NFIN+1
0078     13 NFIN=NFIN+NSKIP
0079     15 CALL POSIT(MTIN,NSKIP,0,2,NEOF,IW)
0080     20 NRIN=0
0081     25 GO TO (30,90)MF
0082     C
0083     C ASK CAL'N DATA FOR CTD
0084     30 WRITE(1,1030)
0085     READ(1,*)PS,P0
0086     S(1)=PS*(P0+3.05)
0087     P0=P0*PS
0088     PS=PS*.0001
0089     WRITE(1,1035)
0090     READ(1,*)T0,C0
0091     T0=T0*10.
0092     40 WRITE(1,1040)
0093     READ(1,*)SE,FCEN
0094     IF(FCEN-35.)50,70,40
0095     50 IF(FCEN-33.)40,60,40
0096     60 CE=3.7949
0097     GO TO 75
0098     70 CE=4.
0099     75 TC=.8
0100     WRITE(1,1075)TC
0101     READ(1,*)TC
0102     C
0103     C ASK FOR CONTOURING INFORM.
0104     90 WRITE(1,1090)
0105     READ(1,*)NAVRG
0106     G=1./FLOAT(NAVRG)
0107     H=1.-G
0108     WRITE(1,1091)
0109     READ(1,*)RATE
0110     WRITE(1,1092)
0111     READ(1,*)(D(L),L=1,4)
0112     WRITE(1,1095)
0113     READ(1,*)LF

```

```

0114      92 NDONE=0                26
0115      WRITE(1,1096)
0116      READ(1,*)NDO
0117      IF(NDO-1)850,100,95
0118      95 IREC=1
0119      ISAM=1
0120      JREC=3000
0121      JSAM=300
0122      GO TO 108
0123      C
0124      C POSITION TAPE TO STARTING RECORD
0125      100 WRITE(1,1100)
0126      READ(1,*)IREC,ISAM
0127      IF(-IREC)105,860
0128      105 WRITE(1,1105)
0129      READ(1,*)JREC,JSAM
0130      ISAM=1+NAVRG*(ISAM/NAVRG)
0131      JSAM=NAVRG*(JSAM/NAVRG)
0132      108 IF(NRIN-IREC)115,132,110
0133      C
0134      C SKIP RECORDS BKWD
0135      110 L=-(NRIN-IREC+1)
0136      CALL POSIT(MTIN,0,L,2,NEOF,IW)
0137      NRIN=IREC-1
0138      C
0139      C SKIP RECORDS FWD
0140      115 ISTRT=IREC-NRIN
0141      DO 130 L=1,ISTRT
0142      120 CALL EXEC(1,107B,IN,IW)
0143      CALL POSIT(MTIN,0,0,3,NEOF,IW)
0144      NRIN=NRIN+1
0145      IF(NEOF)820,125
0146      125 IF(ISSW(0))800,130
0147      130 CONTINUE
0148      C
0149      C SET POINTERS TO DATA WITHIN BUFFER
0150      132 WRITE(1,1130)
0151      ISTRT=ISAM
0152      IEND=300
0153      M=11
0154      IF(NRIN-JREC)140,135
0155      135 IEND=JSAM
0156      C
0157      C OUTPUT LABELS
0158      140 OUT(3)=FLOAT(IFIX(FLOAT(IN(2))/100.+0.001))
0159      OUT(3)=(1000.*OUT(3)+FLOAT(IN(2))-100.*OUT(3))
0160      CALL READ(2,TIM0,0.,0.,IN(3),IN(4))
0161      I=TIM0/3600.+0.0001
0162      OUT(2)=TIM0-3600.*FLOAT(I)
0163      K=OUT(2)/60.+0.01
0164      L=OUT(2)-60.*FLOAT(K)+.1
0165      OUT(2)=100.*FLOAT(I)+FLOAT(K)+.01*FLOAT(L)
0166      OUT(4)=P0/(PS*10000.)
0167      OUT(5)=T0*.1
0168      OUT(6)=C0
0169      OUT(9)=SE
0170      OUT(8)=FCEN+.01*FLOAT(NAVRG)
0171      OUT(7)=PS*10000.

```

```

0172      OUT(1)=-IN(1)
0173      OUT(10)=TC
0174      CRU=OUT(3)
0175      STN=-OUT(1)
0176  C
0177  C BEGIN PROCESSING
0178      JF=2
0179      INITL=2
0180      DO 145 K=1,4
0181      Y(K)=0.
0182 145 X(K)=0.
0183      K=ISTR*3+4
0184      VC1=.0001*FLOAT(IN(K))
0185      GO TO (200,165)LF
0186  C
0187  C INITIALIZE LAT LON
0188 165 CALL READ(1,YSEC,YLAT,YLON,0,0)
0189 170 CALL READ(1,XSEC,XLAT,XLON,0,0)
0190      IF(TIM0-YSEC)190,175
0191 175 IF(XSEC)200,180
0192 180 IF(TIM0-XSEC)185,170
0193 185 F=(TIM0-YSEC)/(XSEC-YSEC)
0194      YLAT=F*XLAT+(1.-F)*YLAT
0195      YLON=F*XLON+(1.-F)*YLON
0196      CALL FIX(YLAT,YLON,XLAT,XLON,DIST)
0197 190 YSEC=TIM0
0198      TOTKM=0.
0199      GO TO 200
0200 195 KF=1
0201      GO TO 200
0202 197 ISTR=K+NAVRG
0203  C
0204  C GO THROUGH RECORD
0205 200 I=3*ISTR-1
0206      CALL READ(2,SEC,0.,0.,IN(3),IN(4))
0207      DO 620 K=ISTR,IEND,NAVRG
0208      GO TO (208,213)JF
0209  C
0210  C STEP 'SMOOTHED-DATA' BUFRS
0211 208 DO 210 L=1,4
0212 210 Y(L)=X(L)
0213 213 ISPIK=NAVRG-1
0214      DO 255 L=1,NAVRG
0215  C
0216  COMPUTE PRESENT RAW DATA (P,T,S)
0217      I=I+3
0218      V(1)=PS*FLOAT(IN(I))-P0
0219      V(2)=.001*FLOAT(IN(I+1))
0220      V(2)=V(2)+(4.25E-4*V(2)-.000591)*V(2)-T0
0221      VC=.0001*FLOAT(IN(I+2))
0222      V(3)=(VC+TC*(VC1-VC)-C0+CE)/4.
0223      V(3)=V(3)*(1.+1.02E-6*V(1)-.32E-5*(V(2)-15.))
0224      V(3)=SAL(V(1),V(2),Q(V(1),V(2),V(3)))-SE
0225      VC1=VC
0226  C
0227  C REJECT SPIKES
0228      DO 220 N=1,3
0229      IF(V(N)-R(N))250,215

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0230 215 IF(S(N)-V(N))250,220
0231 220 CONTINUE
0232 GO TO (235,225,235)JF
0233 C
0234 C PREVIOUS SMOOTHED DATA HAD TOO MANY SPIKES; REINITIALIZE
0235 225 JF=3
0236 DO 230 N=1,3
0237 W(N)=V(N)
0238 230 X(N)=V(N)
0239 C
0240 C SMOOTH DATA, CORRECTING FOR SAL TIME CONSTANT. OLD T.C.=
0241 C (.5*(W(3)+V(3))*(1+(.03228-.000456*V(2))*(W(2)-V(2))))
0242 235 DO 237 N=1,3
0243 X(N)=G*V(N)+H*X(N)
0244 237 W(N)=V(N)
0245 245 IF(ISSW(0))540,255
0246 250 ISPIK=ISPIK-1
0247 255 CONTINUE
0248 IF(ISPIK)260,265
0249 260 JF=2
0250 GO TO 616
0251 265 X(4)=SIGMT(X(2),X(3))
0252 C
0253 C DO NOT CONTOUR IF 1ST PASS, OR IF SMOOTHED DATA ALL BAD
0254 270 GO TO (275,615)JF
0255 275 GO TO (365,280)INITL
0256 280 INITL=1
0257 IF(IEND-(K+NAVRG))625,197
0258 C
0259 CHECK SMOOTHED P T S SIG-T IN TURN FOR CONTOUR CROSSINGS
0260 365 DO 614 L=1,4
0261 CALL CONTU(X(L),Y(L),D(L),CON,MOV,NU)
0262 IF(NU-1)613,370
0263 370 DO 612 N=1,NU
0264 380 IF(MOV)400,610,390
0265 390 CON=CON+D(L)
0266 GO TO 410
0267 400 CON=CON-D(L)
0268 410 F=(CON-Y(L))/(X(L)-Y(L))
0269 C
0270 C INTERPOLATE OTHER VALUES AT EACH CONTOUR, STORE IN OUTPUT APRAY
0271 OUT(M)=L
0272 OUT(M+1)=SEC+(FLOAT(K)+FLOAT(NAVRG-1)/2.)/RATE
0273 DO 415 J=2,5
0274 IDIOT=M+J
0275 415 OUT(IDIOT)=F*X(J-1)+(1.-F)*Y(J-1)
0276 DO 420 J=6,9
0277 IDIOT=M+J
0278 420 OUT(IDIOT)=-1.
0279 GO TO (520,425)LF
0280 C
0281 CALCULATE POSITION
0282 425 IF(XSEC)430,435
0283 430 F=0.
0284 GO TO 455
0285 435 IF(OUT(M+1)-XSEC)450,450,440
0286 440 TOTKM=TOTKM+DIST
0287 YSEC=XSEC

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```

0288      YLAT=XLAT
0289      YLON=XLON
0290      CALL READ(1,XSEC,XLAT,XLON,0,0)
0291      IF(XSEC)430,445
0292      445 CALL FIX(YLAT,YLON,XLAT,XLON,DIST)
0293      450 F=(OUT(M+1)-YSEC)/(XSEC-YSEC)
0294      455 OUT(M+7)=F*XLAT+(1.-F)*YLAT
0295      OUT(M+8)=F*XLON+(1.-F)*YLON
0296      OUT(M+9)=TOTKM+F*DIST
0297  C
0298  C UPDATE O/P ARRAY
0299      520 M=M+10
0300      IF(1000-M)580,610
0301      525 JF=5
0302      GO TO 550
0303      530 JF=4
0304      GO TO 550
0305      540 JF=3
0306      550 IF(M-2)590,555
0307      555 IF(OUT(M-10)+CRU)590,590,560
0308      560 DO 570 J=M,1000
0309      570 OUT(J)=0.
0310  C
0311  C WRITE O/P ARRAY TO TAPE
0312      580 CALL EXEC(2,110B,OUT,JW)
0313      CALL POSIT(MTOUT,0,0,4,IDIOT,JW)
0314      NROUT=NROUT+1
0315      M=1
0316      590 GO TO (610,610,800,820,815)JF
0317      600 JF=1
0318      610 IF(ISSW(0))540,612
0319      612 CONTINUE
0320      613 IF(ISSW(0))540,614
0321      614 CONTINUE
0322      GO TO 620
0323      615 JF=1
0324      616 IF(ISSW(0))540,620
0325      620 CONTINUE
0326      625 ISTRT=1
0327      IF(NRIN-JREC+1)640,630,525
0328      630 IEND=JSAM
0329  C
0330  C READ IN NEXT BUFR
0331      640 CALL EXEC(1,107B,IN,IW)
0332      CALL POSIT(MTIN,0,0,3,NEOF,IW)
0333      NRIN=NRIN+1
0334      IF(NEOF)530,200
0335  C
0336  C ABORT LISTING, RETURN TO START OF PRESENT FILES (IN   OUT)
0337      800 WRITE(1,1800)
0338      CALL POSIT(MTIN,-1,0,2,NEOF,IW)
0339      CALL POSIT(MTOUT,-1,0,2,NEOF,JW)
0340      GO TO 850
0341  C
0342  C EOF
0343      815 WRITE(1,1815)NFIN,NRIN,CRU,STN
0344      GO TO 823
0345      820 J=NRIN-1

```

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                                30
0346      WRITE(1,1820)NFIN,J,CRU,STN
0347      823  NDONE=NDONE+1
0348      IF(NDONE-ND0)830,825
0349      825  WRITE(1,1830)
0350      READ(1,*)L
0351      GO TO (830,840)L
0352      830  IF(NROUT-1)839,835
0353      835  ENDFILE MTOUT
0354      CALL POSIT(MTOUT,0,0,4,IDIOT,JW)
0355      NFOUT=NFOUT+1
0356      WRITE(1,1838)NFOUT,NROUT
0357      NROUT=0
0358      GO TO 840
0359      839  WRITE(1,1839)
0360      840  IF(NEOF)846,842
0361      842  IF(NDONE-ND0)844,846
0362      844  CALL POSIT(MTIN,1,0,2,NEOF,IW)
0363      846  NFIN=NFIN+1
0364      NRIN=0
0365      IF(NDONE-ND0)95,850
0366      850  PAUSE 7
0367      860  WRITE(1,1860)
0368      READ(1,*)L
0369      NSKIP=(NEOF-1)/2-L
0370      NDONE=0
0371      WRITE(1,1865)
0372      READ(1,*)MF
0373      GO TO (10,870,5,1)L
0374      870  NSKIP=1
0375      IF(NEOF)20,13
0376  C
0377      1003 FORMAT(///// "BRANCHES"/"1)RESTART FILE"/"2)CONTINUE W NEXT"
0378      @ " ONE"/"3)SKIP FILES"
0379      @/"4)REINITIALIZE"/"SSW(0)=ON TO ABORT  RESTART FILE")
0380      1004 FORMAT(/" S E T   S S W ' S I")
0381      1005 FORMAT(/"SKIP OUTPUT FILES?  TO SKIP BKWD ENTER  -(=-TO-"
0382      @ "SKIP  +1)")
0383      1007 FORMAT("SKIP INPUT FILES?")
0384      1030 FORMAT(/"P-SCALING(DBAR/VOLT)?, P-OFFSET(VOLT)?")
0385      1035 FORMAT("T-OFFSET(V)?, C-OFFSET(V)?")
0386      1040 FORMAT("S CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?")
0387      1075 FORMAT("SAL T.C.-CORR'N="F5.3, ". ENTER SAME/NEW CORR'N:")
0388      1090 FORMAT("SMOOTH OVER ? SAMPLES?")
0389      1091 FORMAT("ACQUISITION RATE WAS ? SAMPLES/SEC?")
0390      1092 FORMAT("CONTOUR INTERVALS: P?, T?, S?, SIGMA T?")
0391      1095 FORMAT("1)NO FIXES, OR 2)W FIXES(USING PROPER FORMAT)?")
0392      1096 FORMAT("PROCESS ? FILES?")
0393      1100 FORMAT("DATA STARTS FRAME?, SAMPLE?")
0394      1105 FORMAT("DATA ENDS FRAME?, SAMPLE?")
0395      1130 FORMAT( /)
0396      1300 FORMAT(/"ABORT: TAPES REWOUND TO START OF PRESENT FILES"
0397      @/" R E S E T S S W ' S I ")
0398      1815 FORMAT("IN-FILE"14,">"14" FRAMES PROCESSED. CRUISE"
0399      @F7.0," STN"F6.0)
0400      1820 FORMAT("IN-FILE"14"> EOF AFTER"14" FRAMES. CRUISE"F7.0,
0401      @ " STN"F6.0)
0402      1830 FORMAT(" TYPE (1)TO WRITE EOF TO MT=1, (2)OTHERWISE:")
0403      1839 FORMAT(" NO CONTOURS PROCESSED.... NO EOF WRITTEN!")

```

```

0404 1838 FORMAT("OUT-FILE"13,">"14" RECORDS.")
0405 1860 FORMAT(/"WHICH BRANCH?")
0406 1865 FORMAT("CHANGE CTD CAL'N DATA(Y=1; N=2 TYPE 1 OR 2)?")
0407 9002 FORMAT(/"RESET INPUT MT? Y=1, N=2 FOLLOWED BY PRESENT FILE #
0408 9003 FORMAT("RESET OUTPUT MT? Y=1, N=2 FOLLOWED BY PRESENT FILE#
0409 END
0410 C
0411 C
0412 SUBROUTINE CONTU(CX,CY,D,CON,MOV,NU)
0413 C
0414 CHECKS FOR CONTOUR CROSSING(S)- GIVEN BY NU. ALSO CORRECTLY PICKS
0415 C NEGATIVE ONES, NO THANKS TO HP
0416 INEW=IFIX(CX/D+.001)
0417 IOLD=IFIX(CY/D+.001)
0418 IF(CX)10,20
0419 10 INEW=INEW-1
0420 20 IF(CY)30,60
0421 30 IOLD=IOLD-1
0422 60 NU=INEW-IOLD
0423 MOV=1SIGN(1,NU)
0424 NU=IABS(NU)
0425 IF(MOV)85,1000,70
0426 70 CON=D*FLOAT(MIN0(IOLD,INEW))
0427 GO TO 1000
0428 85 CON=D*FLOAT(MAX0(IOLD,INEW))
0429 CON=CON+D
0430 1000 RETURN
0431 END
0432 C
0433 C
0434 SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0435 C
0436 C V=9 31,1,75 FOR USE UNDER DOS
0437 C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES RECORDS
0438 COMMON NRIN
0439 2 NEOF=1
0440 3 NUNIT=0
0441 NSEL=NBRAN
0442 GO TO (5,5,5,5,5,5,5,4,5,4)N
0443 4 NUNIT=1
0444 5 GO TO (20,50)NSEL
0445 10 WRITE(1,1010)NUNIT
0446 15 PAUSE 1
0447 C
0448 CHECK IF UNIT ONLINE, THEN REWIND IT (TO RESET HARDWARE)
0449 20 IF(LOCAL(N))10,30
0450 30 NEOF=256+N
0451 CALL EXEC(3,NEOF)
0452 GO TO 9000
0453 C
0454 C SKIPS RECORDS/FILES
0455 40 CALL PTAPE(N,NF,NR)
0456 NSEL=4
0457 C
0458 CHECKS STATUS OF MT UNIT
0459 50 CALL EXEC(13,N,ISTAT,ILOG)
0460 IF(ISTAT)50,60
0461 60 GO TO (9000,40,90,70)NSEL

```

```

0462 C
0463 CHECKS FOR EOT AFTER A (BUFFER)WRITE C.
0464 70 IF(IEOT(N))75,9000
0465 75 WRITE(1,1080)NUNIT
0466 CALL RWSTB(N)
0467 GO TO 15
0468 C
0469 CHECKS FOR MISC AFTER A (BUFFER)READ C.
0470 90 IF(IEOF(N))100,110
0471 100 NEOF=-2
0472 GO TO 9000
0473 110 NSEL=NRIN+1
0474 IF(IEOT(N))75,120
0475 120 IF(IERR(N))130,140
0476 130 WRITE(1,1130)NSEL
0477 140 I=IWRDS(N)
0478 IF(I-NWRD)150,9000,150
0479 150 WRITE(1,1150)NSEL,I
0480 1010 FORMAT("READY TAPE UNIT"13)
0481 1080 FORMAT("EOT ON"13/"LOAD NEXT TAPE")
0482 1130 FORMAT("REC"15": TIM/PAR ERROR")
0483 1150 FORMAT("REC"15": TAPE ERROR>"15" WORDS XFERRED")
0484 9000 RETURN
0485 END
0486 C
0487 C
0488 SUBROUTINE READ(N,TIME,CLAT,CLON,I,J)
0489 C
0490 C IF N=1, READS IN TIME(HHMM.) LAT(DEG) LAT(MIN) LON(DEG) LON(MIN)
0491 C RETURNS TIME(SEC) LAT(DEG) LON(DEG)
0492 C IF N=2, READS IN TIME(SEC) AS A 32-BIT INTEGER, OUTPUTS TIME
0493 C IN FORMAT HHMM.SS
0494 GO TO (5,15)N
0495 5 READ(5,*)TIME,LAT,CLAT,LON,CLON
0496 IF(TIME)99,10
0497 10 IHR=TIME/100.
0498 TIME=TIME-100.*FLOAT(IHR)
0499 TIME=(FLOAT(IHR)*60.+TIME)*60.
0500 CLAT=FLOAT(LAT)+CLAT/60.
0501 CLON=FLOAT(LON)+CLON/60.
0502 GO TO 99
0503 15 TIME=0.
0504 IF(J)20,30
0505 20 TIME=65536.
0506 30 TIME=TIME+65536.*FLOAT(I)+FLOAT(J)
0507 99 RETURN
0508 END
0509 C
0510 C
0511 SUBROUTINE FIX(XLATA,XLONA,XLATB,XLONB,DIS)
0512 C
0513 COMPUTES DISTANCE BETWEEN FIXES. GOOD TO BETTER THAN 100M IN
0514 C DOUBLE PRECISION DOUBLE
0515 G=.6694990305E-2
0516 P=(.3141592654E1)/180.
0517 A=.6378144E7
0518 B=.63567399E5
0519 XLAT1=XLATA*P

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```
0520 XLON1=XLONA*P
0521 XLAT2=XLATB*P
0522 XLON2=XLONB*P
0523 XM=(XLAT1+XLAT2)/2.
0524 X=XLAT2-XLAT1
0525 Y=XLON2-XLON1
0526 X1=SIN(XM)
0527 X2=X/2.
0528 X2=SIN(X2)
0529 Y1=Y/2.
0530 Y1=SIN(Y1)
0531 C=1.-X1*X1
0532 C=SQRT(C)
0533 H=1.-X2*X2
0534 H=SQRT(H)
0535 Y2=1.-Y1*Y1
0536 Y2=SQRT(Y2)
0537 V=1.-G*X1*X1
0538 V=SQRT(V)
0539 R=A*(1.-G)/(V**3)
0540 V=A/V
0541 XJ=2.*X2
0542 XK=2.*Y1
0543 XL=(Y*X1)/H
0544 E=V*XK*C
0545 XN=R*XJ*Y2
0546 XL=SQRT(E*E+XN*XN)
0547 E=XL/(2.*V)
0548 DIS=(XL*XL)/(2000.*V*SIN(E))
0549 RETURN
0550 END
0551 ENDS
```

4.3 Listing Program (Contoured Data)

4.3.1 Program: MS022

Purpose

To list contoured Batfish/CTD data. Contours may be in any or all parameters (pressure, temperature, salinity, and sigma-t). Output may be to either line printer or TTY and is paginated.

Hardware Requirements

HP2100 supporting DOS or DOSM

teletype for parameter input

teletype or line printer for parameter output

mag tape transport (unit 0) for data input

Description

This program lists data contoured by program MS012. The listings may be of all the data processed, or all the contours processed in one parameter (of P, T, S, or SIGMA T), or of only some user-specified contours in any one parameter. Contours are identified by an asterisk. Listings are paginated correctly for both the line printer and TTY. More than one file may be done at one time. CTD calibration data used during contouring is also listed.

Operating Instructions

Refer to sample output provided below.

- (1) program is called by :PR,MS022
- (2) program lists branches and options available, then pauses at 0001;
- (3) type :GO
- (4) enter 1 to reset the mag tape hardware; this rewinds the tape. Enter 2 followed by the current file number, if the mag tape has already been positioned to a file;
- (5) enter the number of files to be skipped. If the mag tape has been previously positioned, enter -1 to position the tape to the start of the current file;
- (6-7) enter desired values;
- (8) enter the number of separate listings to be done for each file. These listings are repeated for each file to be done.
- (9) for each listing, the program will ask for ...

- (10) the starting address (record and sample; each sample having 10 numbers as described in MS012);
- (11) the ending address;
- (12) the option to be listed (refer to #(2) and enter 1, 2, 3, 4, or 5); if Option 5 is chosen, no more questions are asked for that listing;
- (13) specify whether every contour in that parameter is to be listed or only user-specified ones (enter 1 or 2);
- (14) if the answer to #(12) was 1 for pressure and that to #(13) was 2, then the user must enter whether the 'selected contours' are to be from a predetermined list within the program, or to be entered by him (enter 1 or 2, respectively). Otherwise this question is not asked.
- (15) enter how many of the 'selected' contours there are to be;
- (16) list the 'selected' contours, on one line;

Program then proceeds with the listings. If an EOF is encountered before the 'ending address,' the program will end that particular listing and continue to the next. After the last listing for the last file is completed, program will pause at 0007;

- (17) Type :GO
 - (18) in reply to WHICH BRANCH? enter 1, 2, 3, or 4. etc.
- etc.

NOTE: Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample Printout

```

1)  :PR,MS022      /      sample output

2)  CONTOUR OPTION:
    1) PRESSURE(DBAR)
    2) TEMPERATURE(DEG C)
    3) SALINITY(PPT)
    4) SIGMA T
    5) ALL ABOVE CONTOURS, IN SAME ORDER AS PROCESSED

    BRANCHES:
    1.RESTART FILE
    2.CONTINUE W NEXT FILE
    3.SKIP FILES
    4.REINITIALIZE

    SSW(0)=ON ABORTS OPERATION, RETURNS TO START OF FILE

    SET SSW'S!
      MS022 : PAUSE   0000
      MS022 SUSP

3)  0:GO

4)  RESET TAPE#0?  Y=1,  N=2 FOLLOWED BY CURRENT FILE#
    1

5)  SKIP FILES?  TO SKIP BKWD, ENTER -(#-TO-SKIP +1)
    6

6)  OUTPUT IS TO 1)LINE PRINTER, OR  2)TTY? TYPE 1 OR 2
    2

7)  PROCESS HOW MANY FILES?
    1

8)  HOW MANY LISTINGS/FILE?
    3

9)  LISTING  1

10) START AT RECORD? SAMPLE(1-100)?
    1 1

11) END AT RECORD? SAMPLE?
    100 100

12) OPTION?
    5

etc  LISTING  2
    START AT RECORD? SAMPLE(1-100)?
    1 1
    END AT RECORD? SAMPLE?
    1 100
    OPTION?
    2

13) 1)LIST EVERY CONTOUR, OR  2)SELECTED ONES ONLY?
    1

etc  LISTING  3
    START AT RECORD? SAMPLE(1-100)?
    1 1

```

END AT RECORD? SAMPLE?
1 100
OPTION?
1
1)LIST EVERY CONTOUR, OR 2)SELECTED ONES ONLY?
2
14) 1)'STANDARD' DEPTHS, OR 2)OTHERS?
2
15) HOW MANY(>0)?
7
16) LIST THEM (ON SAME LINE):
50 80 100 200 300 400 450

MSO22 sample printout

FILE 7 STN 1029. CRUISE 75008. LIST 1

TIME AT START 2020.45 DATA SMOOTHED OVER 5.
 OFFSETS(VOLT): P .0046 T -.0130 C .0000
 P-SCALING 666.67 DBAR/V CTD CENTERED AT 35PPT
 SAL: CELL-CONST .0000PPT T.C.-CORR'N .134

TIME	DEPTH	TEMP	SAL	SIG-T	REC-SAM
2020.48	3.3	5.569	33.234	26.25*	1.002
2021.20	7.9	5.564	33.233	26.25*	1.003
2021.21	8.1	5.564	33.233	26.25*	1.004
2021.23	10.0*	5.565	33.168	26.20	1.005
2021.34	20.0*	5.545	33.135	26.17	1.006
2021.44	30.0*	5.499	33.139	26.18	1.007
2021.50	34.3	5.640	33.245	26.25*	1.008
2021.51	36.0	6.000*	33.452	26.37	1.009
2021.51	36.3	6.036	33.500*	26.40	1.010
2021.56	39.5	7.000*	33.695	26.43	1.011
2021.56	39.9	7.098	33.799	26.50*	1.012
2021.57	40.0*	7.153	33.837	26.52	1.013
2021.57	40.7	7.557	34.000*	26.59	1.014
2021.58	41.5	8.000*	34.117	26.62	1.015
2022.02	44.7	9.000*	34.366	26.66	1.016
2022.08	50.0*	9.288	34.388	26.63	1.017
2022.13	55.7	9.000*	34.298	26.61	1.018
2022.18	59.2	8.445	34.368	26.75*	1.019
2022.19	60.0*	8.675	34.440	26.77	1.020
2022.20	60.9	9.000*	34.524	26.78	1.021
2022.20	60.7	8.909	34.500*	26.78	1.022
2022.23	63.4	10.000*	34.855	26.88	1.023
2022.26	66.7	10.825	35.000*	26.85	1.024
2022.27	67.4	11.000*	35.064	26.86	1.025
2022.32	70.0*	11.351	35.101	26.83	1.026
2022.42	80.0*	11.099	35.061	26.84	1.027
2022.53	90.0*	11.531	35.172	26.85	1.028
2023.05	100.0*	11.082	35.084	26.86	1.029
2023.06	100.6	11.000*	35.051	26.85	1.030
2023.06	101.3	10.846	35.000*	26.84	1.031
2023.16	110.0*	10.358	34.940	26.88	1.032
2023.17	111.5	10.000*	34.838	26.86	1.033
2023.26	120.0*	9.790	34.853	26.91	1.034
2023.33	126.4	9.000*	34.724	26.94	1.035
2023.34	127.8	9.000*	34.743	26.96	1.036
2023.36	130.0*	8.914	34.710	26.94	1.037
2023.36	129.1	9.000*	34.724	26.94	1.038
2023.47	140.0*	8.608	34.702	26.99	1.039
2023.48	140.0*	8.608	34.701	26.99	1.040
2023.50	140.0*	8.603	34.703	26.99	1.041
2023.54	144.7	8.632	34.724	27.00*	1.042
2024.01	150.0*	8.707	34.749	27.01	1.043
2024.12	160.0*	8.482	34.741	27.04	1.044
2024.23	170.0*	8.390	34.758	27.06	1.045
2024.37	180.0*	8.332	34.764	27.08	1.046
2024.48	190.0*	8.281	34.770	27.09	1.047
2025.01	200.0*	8.098	34.776	27.12	1.048
2025.13	210.0*	8.073	34.795	27.14	1.049
2025.26	220.0*	8.051	34.830	27.17	1.050
2025.39	230.0*	7.994	34.839	27.19	1.051

```
0001 FTN
0002     PROGRAM MS022
0003 C
0004 C V=12 3,12 75 USING DOSM
0005 C LISTS CONTOURS (P;T,S,SIG-T) AS PROCESSED BY THE PR0IN PRGS.
0006     DIMENSION X(1000),IREC(25),ISAM(25),JREC(25),JSAM(25),
0007     @C(25,31),OPTN(24),CALN(10),KY(30)
0008     COMMON NRIN,LINE,LIST
0009 C
0010 C INITIALIZE
0011     1 NWRD=2000
0012     DO 2 J=1,5
0013     2 KY(J)=J
0014     DO 3 J=6,10
0015     3 KY(J)=(J-4)*5
0016     DO 4 J=11,17
0017     4 KY(J)=(J-7)*10
0018     DO 5 J=18,21
0019     5 KY(J)=(J-13)*25
0020     DO 6 J=22,27
0021     6 KY(J)=(J-17)*50
0022     DO 7 J=28,30
0023     7 KY(J)=(J-22)*100
0024     MT=7
0025     NU=0
0026     WRITE(1,1001)
0027     WRITE(1,1002)
0028     WRITE(1,1003)
0029     PAUSE 0
0030 C
0031 C INITIALIZE MAGTAPE
0032     NFIN=1
0033     WRITE(1,1004)
0034     READ(1,*)NRIN,NFIN
0035     GO TO (8,9)NRIN
0036     8 CALL POSIT(MT,0,0,1,NEOF,NWRD)
0037 C
0038 C NSKIP== FILES TO SKIP, NFIN=FILE COUNT, NRIN=RECORD COUNT
0039     9 WRITE(1,1005)
0040     READ(1,*)NSKIP
0041     10 IF(NSKIP)12,13
0042     12 NFIN=NFIN+1
0043     13 NFIN=NFIN+NSKIP
0044     15 CALL POSIT(MT,NSKIP,0,2,NEOF,NWRD)
0045     20 NRIN=0
0046     IF(-NU)100,25
0047 C
0048 C ASK FOR NDO(=FILES TO DO), NU(=LISTINGS/FILE)
0049     25 NDONE=1
0050     WRITE(1,1025)
0051     READ(1,*)LIST
0052     WRITE(1,1030)
0053     READ(1,*)NDO
0054     IF(-NDO)35,855
0055     35 WRITE(1,1035)
0056     READ(1,*)NU
0057     DO 90 I=1,NU
0058     WRITE(1,1032)I
0059 C
```

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0060 C FOR EACH LISTING, ASK START42 STOP OF DATA, CONTOUR TO LIST
0061 C(I,1)=-1.
0062 WRITE(1,1034)
0063 READ(1,*)IREC(1),ISAM(1)
0064 WRITE(1,1036)
0065 READ(1,*)JREC(1),JSAM(1)
0066 WRITE(1,1038)
0067 READ(1,*)OPTN(1)
0068 K=OPTN(1)
0069 GO TO (40,40,40,40,90)K
0070 40 WRITE(1,1040)
0071 READ(1,*)L
0072 GO TO (90,45)L
0073 45 GO TO (50,70)K
0074 50 WRITE(1,1050)
0075 READ(1,*)L
0076 GO TO (55,70)L
0077 55 C(I,1)=30.
0078 DO 60 L=1,30
0079 60 C(I,L+1)=KY(L)
0080 GO TO 90
0081 70 WRITE(1,1070)
0082 READ(1,*)J
0083 IF(-J)75,70
0084 75 C(I,1)=J
0085 WRITE(1,1075)
0086 READ(1,*)(C(I,L+1),L=1,J)
0087 90 CONTINUE
0088 95 DO 97 I=1,10
0089 97 CALN(I)=-1.
0090 C
0091 C BEGIN LISTINGS
0092 100 CALL EXEC(3,1106B,-1)
0093 DO 530 I=1,NU
0094 C
0095 C POSITION MT TO START OF DATA WITHIN FILE
0096 IF(-IREC(1))125,530
0097 125 IF(NRIN-IREC(1))135,142,130
0098 C
0099 C SKIP RECORDS BKWD
0100 130 L=-(NRIN-IREC(1)+1)
0101 CALL POSIT(MT,0,L,2,NEOF,NWRD)
0102 NRIN=IREC(1)-1
0103 135 J=IREC(1)-NRIN
0104 C
0105 C SKIP RECORDS FWD
0106 DO 175 L=1,J
0107 140 CALL EXEC(1,107B,X,NWRD)
0108 CALL POSIT(MT,0,0,3,NEOF,NWRD)
0109 NRIN=NRIN+1
0110 142 IF(NEOF)530,145
0111 145 IF(ISSW(0))800,150
0112 150 IF(X(1))165,175
0113 C
0114 C NEW CALIBRATION DATA
0115 165 CALL CTD(CALN(1),X(1))
0116 175 CONTINUE
0117 C
0118 C SET POINTERS

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```

0119      IOPTN=OPTN(1)+.01
0120      LOOK=C(I,1)+.0001
0121  C
0122  C SET START STOP ADDRESSES IN PRESENT B'FR
0123      ISTRT=ISAM(1)*10-9
0124      IEND=1000
0125      180 IF(NRIN-JREC(1))190,185
0126      185 IEND=JSAM(1)*10
0127  C
0128  C SET LINE COUNT, PRINT CALIBRATION DATA HEADINGS
0129      190 LINE=-1
0130      CALL SKIP
0131      WRITE(6,1430)
0132      CALL SKIP
0133      WRITE(6,1425)NFIN,CALN(1),CALN(3),I
0134      CALL SKIP
0135      WRITE(6,1430)
0136      CALL SKIP
0137      IF(-CALN(1))200,220
0138      197 CALL CTD(CALN(1),X(K))
0139      ISTRT=K+10
0140      200 CALL PRINT(CALN(1))
0141      IF(ISTRT-990)204,208
0142      204 POSN=X(ISTRT+19)
0143      GO TO 210
0144      208 POSN=X(ISTRT-1)
0145      210 IF(-POSN)212,211
0146      211 WRITE(6,1208)
0147      GO TO 216
0148      212 WRITE(6,1212)
0149      216 CALL SKIP
0150      WRITE(6,1430)
0151      CALL SKIP
0152      IF(ISTRT-1000)220,450
0153  C
0154  C BEGIN EXAMINING ARRAY
0155      220 DO 450 K=ISTRT,IEND,10
0156  C
0157  CHECK ON TYPE OF INCOMING DATA
0158      IF(X(K))228,440,245
0159      228 IF(X(K+1)-CALN(2))197,440,197
0160  C
0161  CHECK ON OPTION DESIRED
0162      245 GO TO (250,250,250,250,270)IOPTN
0163  C
0164  CHECK IF CONTOUR TYPE AGREES W REQUESTED OPTION
0165      250 L=X(K)+.01
0166      IF(IOPTN-L)440,255,440
0167  C
0168  CHECK IF SOME OR ALL OF THESE CONTOURS ARE TO BE LISTED
0169      255 IF(C(I,1))270,440,260
0170  C
0171  C SEARCH FOR SPECIFIC ONES WANTED, W JUGGLING TO BYPASS ROUNDING
0172      260 IHAVE=(K+1)+IOPTN
0173      GO TO (262,263)L
0174      262 IHAVE=X(IHAVE)+.1
0175      GO TO 264
0176      263 IHAVE=100.*X(IHAVE)+.1
0177      264 DO 269 J=2,LOOK

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0178      GO TO (265,266)L          42
0179      265 IWANT=C(I,J)+.1
0180      GO TO 267
0181      266 IWANT=100.*C(I,J)+.1
0182      267 IF(IWANT-IHAVE)269,270,269
0183      269 CONTINUE
0184      GO TO 440
0185      C
0186      C CALCULATE TIME
0187      270 TIME=X(K+1)
0188          L=TIME/3600.+ .0001
0189          TIME=TIME-3600.*FLOAT(L)
0190          M=TIME/60.+ .01
0191          N=TIME-60.*FLOAT(M)+.1
0192          TIME=100.*FLOAT(L)+FLOAT(M)+.01*FLOAT(N)
0193      C
0194      C OUTPUT DATA FOR SELECTED CONTOUR
0195          ADRES=FLOAT(NRIN)+.0001*FLOAT(K+10)
0196          M=K+2
0197          N=K+5
0198          L=X(K)+.001
0199          POSN=X(K+9)
0200          IF(POSN)290,350
0201      290 GO TO (310,320,330,340,300)IOPTN
0202      300 GO TO (310,320,330,340)L
0203      310 WRITE(6,1310)TIME,(X(L),L=M,N),ADRES
0204          GO TO 410
0205      320 WRITE(6,1320)TIME,(X(L),L=M,N),ADRES
0206          GO TO 410
0207      330 WRITE(6,1330)TIME,(X(L),L=M,N),ADRES
0208          GO TO 410
0209      340 WRITE(6,1340)TIME,(X(L),L=M,N),ADRES
0210          GO TO 410
0211      350 GO TO (370,380,390,400,360)IOPTN
0212      360 GO TO (370,380,390,400)L
0213      370 WRITE(6,1370)TIME,(X(L),L=M,N),POSN,ADRES
0214          GO TO 410
0215      380 WRITE(6,1380)TIME,(X(M),M=M1,M2),POSN,NRIN,K2
0216          GO TO 410
0217      390 WRITE(6,1390)TIME,(X(M),M=M1,M2),POSN,NRIN,K2
0218          GO TO 410
0219      400 WRITE(6,1400)TIME,(X(M),M=M1,M2),POSN,NRIN,K2
0220      C
0221      C UPDATE LINE COUNT, PAGINATE IF 54 LINES PRINTED
0222      410 CALL SKIP
0223          IF(LINE-58-LIST)440,415
0224      415 WRITE(6,1430)
0225          CALL SKIP
0226          WRITE(6,1425)NFIN,CALN(1),CALN(3),I
0227          CALL SKIP
0228          WRITE(6,1430)
0229          CALL SKIP
0230          IF(-POSN)430,425
0231      425 WRITE(6,1208)
0232          GO TO 435
0233      430 WRITE(6,1212)
0234      435 CALL SKIP
0235          WRITE(6,1430)
0236          CALL SKIP

```

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0237      440 IF(ISSW(0))800,450
0238      450 CONTINUE
0239      455 ISTRT=1
0240 C
0241 C CHECK IF THIS IS LAST RECORD TO BE OUTPUTTED
0242      IF(NRIN-JREC(I)+1)470,460,490
0243      460 IEND=JSAM(I)*10
0244 C
0245 C READ IN NEXT BUF'R
0246      470 CALL EXEC(1,107B,X,NWRD)
0247      CALL POSIT(MT,0,0,3,NEOF,NWRD)
0248      NRIN=NRIN+1
0249      IF(NEOF)490,480
0250      480 IF(ISSW(0))800,220
0251 C
0252 C FILE IS SMALLER THAN SPECIFIED; END CURRENT LISTING
0253      490 IF(LINE-58-LIST)500,530
0254      500 LINE=-LINE
0255      GO TO (504,502)LIST
0256      502 LINE=LINE-2
0257      504 CALL EXEC(3,1106B,LINE)
0258      505 GO TO (530,510)LIST
0259      510 WRITE(6,1105)
0260      530 CONTINUE
0261      GO TO 820
0262 C
0263 C LISTINGS ABORTED. TAPE REWOUND TO START OF PRESENT FILE
0264      800 WRITE(1,1800)
0265      CALL POSIT(MT,-1,0,2,NEOF,NWRD)
0266      GO TO 855
0267 C
0268 C EOF
0269      820 IF(NEOF)825,830
0270      825 M=NRIN-1
0271      WRITE(1,1820)NFIN,M,CALN(1),CALN(3)
0272      GO TO 835
0273      830 WRITE(1,1830)NFIN,NRIN,CALN(1),CALN(3)
0274      835 NDONE=NDONE+1
0275      IF(NEOF)850,840
0276      840 IF(NDONE-ND0)845,855
0277      845 CALL POSIT(MT,1,0,2,NEOF,NWRD)
0278      850 NFIN=NFIN+1
0279      NRIN=0
0280      IF(NDONE-ND0)95,855
0281      855 PAUSE 7
0282      NDONE=0
0283      NU=0
0284      WRITE(1,1855)
0285      READ(1,*)L
0286      NSKIP=(NEOF-1)/2-L
0287      GO TO (10,860,9,1)L
0288      860 NSKIP=1
0289      IF(NEOF)20,13
0290 C
0291      1001 FORMAT(//"CONTOUR OPTION:"/"1) PRESSURE(DBAR)"/"2) TEMP"
0292      @"ERATURE(DEG C)"/"3) SALINITY(PPT)"/"4) SIGMA T"/"5) ALL "
0293      @"ABOVE CONTOURS, IN SAME ORDER AS PROCESSED"//)
0294      1002 FORMAT("BRANCHES:"/"1.RESTART FILE"/"2.CONTINUE W NEXT FILE"
0295      @/"3.SKIP FILES"/"4.REINITIALIZE")

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0296 1003 FORMAT(/"SSW(0)=ON ABORTS OPERATION, RETURNS TO START OF "
0297 @"FILE"/" S E T   S S W ' S I")
0298 1004 FORMAT(/"RESET TAPE=0?  Y=1,  N=2 FOLLOWED BY CURRENT FILE=?
0299 1005 FORMAT(/"SKIP FILES?  TO SKIP BKWD, ENTER -(-TO-SKIP  +1)")
0300 1025 FORMAT("OUTPUT IS TO 1)LINE PRINTER OR 2)TTY? TYPE 1 OR 2")
0301 1030 FORMAT("PROCESS HOW MANY FILES?")
0302 1032 FORMAT(/"LISTING"14)
0303 1034 FORMAT("START AT RECORD? SAMPLE(1-100)?")
0304 1035 FORMAT("HOW MANY LISTINGS/FILE?")
0305 1036 FORMAT("END AT RECORD? SAMPLE?")
0306 1038 FORMAT("OPTION?")
0307 1040 FORMAT("1)LIST EVERY CONTOUR, OR  2)SELECTED ONES ONLY?")
0308 1050 FORMAT("1)'STANDARD' DEPTHS, OR  2)OTHERS?")
0309 1070 FORMAT("HOW MANY(>0)?")
0310 1075 FORMAT("LIST THEM (ON SAME LINE):")
0311 1105 FORMAT(/" .")
0312 1208 FORMAT("    TIME    DEPTH    TEMP    SAL    SIG-T    REC"
0313 @".SAM")
0314 1212 FORMAT("    TIME    DEPTH    TEMP    SAL    SIG-T    DIST"
0315 @"ANCE    REC.SAM")
0316 1310 FORMAT("  "F7.2" "F6.1"* "F7.3"  "F6.3"  "F5.2"    "F8.3)
0317 1320 FORMAT("  "F7.2" "F6.1"  "F7.3"* "F6.3"  "F5.2"    "F8.3)
0318 1330 FORMAT("  "F7.2" "F6.1"  "F7.3"  "F6.3"* "F5.2"    "F8.3)
0319 1340 FORMAT("  "F7.2" "F6.1"  "F7.3"  "F6.3"  "F5.2"*  "F8.3)
0320 1370 FORMAT("  "F7.2" "F6.1"* "F7.3"  "F6.3"  "F5.2"  "2("  "
0321 @F8.3))
0322 1380 FORMAT("  "F7.2" "F6.1"  "F7.3"* "F6.3"  "F5.2"  "2("  "
0323 @F8.3))
0324 1390 FORMAT("  "F7.2" "F6.1"  "F7.3"  "F6.3"* "F5.2"  "2("  "
0325 @F8.3))
0326 1400 FORMAT("  "F7.2" "F6.1"  "F7.3"  "F6.3"  "F5.2"* "2("  "
0327 @F8.3))
0328 1425 FORMAT(" FILE"14"    STN"F6.0"    CRUISE"F7.0"    LIST"14)
0329 1430 FORMAT(" ")
0330 1800 FORMAT("ABORT! TAPE REWOUND TO START OF FILE."// " R E S E T"
0331 @"S S W !")
0332 1820 FORMAT("EOF-"14": "14" RECORDS.  STN"F6.0"    CRUISE"F7.0)
0333 1830 FORMAT("FILE"14", "14" RECORDS DONE.  STN"F6.0" CRUISE"F7.0)
0334 1855 FORMAT("WHICH BRANCH?")
0335 END
0336 C
0337 C
0338 SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0339 C
0340 C V=10 6.75 FOR USE UNDER DOS/DOSM
0341 C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES RECORDS
0342 COMMON NRIN,LINE,LIST
0343 2 NEOF=1
0344 3 NUNIT=0
0345 NSEL=NBRAN
0346 GO TO (5,5,5,5,5,5,5,4,5,4)N
0347 4 NUNIT=1
0348 5 GO TO (20,50)NSEL
0349 10 WRITE(1,1010)NUNIT
0350 15 PAUSE 1
0351 C
0352 CHECK IF UNIT ONLINE, THEN REWIND IT (RESETS HARDWARE)
0353 20 IF(LOCAL(N))10,30
0354 30 NEOF=256+N

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```
0355     CALL EXEC(3,NEOF)
0356     GO TO 9000
0357   C
0358   C SKIPS RECORDS/FILES
0359     40 CALL PTAPE(N,NF,NR)
0360     NSEL=4
0361   C
0362   CHECK STATUS OF MT UNIT
0363     50 CALL EXEC(13,N,ISTAT,ILOG)
0364     IF(ISTAT)50,60
0365     60 GO TO (9000,40,90,70)NSEL
0366   C
0367   CHECK FOR EOT AFTER A (BUFR)WRITE COMMAND
0368     70 IF(IEOT(N))80,9000
0369     80 WRITE(1,1080)NUNIT
0370     CALL RWSTB(N)
0371     GO TO 15
0372   C
0373   CHECK FOR MISC AFTER A (BUFFER) READ C.
0374     90 IF(IEOF(N))100,110
0375     100 NEOF=-2
0376     GO TO 9000
0377     110 NSEL=NRIN+1
0378     IF(IEOT(N))80,120
0379     120 IF(IERR(N))130,140
0380     130 GO TO (132,135)LIST
0381     132 WRITE(1,1130)NSEL
0382     135 WRITE(6,1130)NSEL
0383     CALL SKIP
0384     140 I=IWRDS(N)
0385     IF(I-NWRD)150,9000,150
0386     150 GO TO (152,155)LIST
0387     152 WRITE(1,1150)NSEL,I
0388     155 WRITE(6,1150)NSEL,I
0389     CALL SKIP
0390     1010 FORMAT("READY TAPE UNIT"13)
0391     1080 FORMAT("EOT ON "13/"LOAD NEXT TAPE")
0392     1130 FORMAT(" REC"15": TIM/PAR ERR")
0393     1150 FORMAT(" REC"15": TAPE ERR>"15" WORDS XFERRD")
0394     9000 RETURN
0395     END
0396   C
0397   C
0398     SUBROUTINE CTD(CALN,Y)
0399   C
0400   C READS IN CTD CALIBRATION DATA
0401     DIMENSION CALN(10),Y(10)
0402     COMMON NRIN,LINE,LIST
0403     DO 20 I=1,10
0404     20 CALN(I)=Y(I)
0405     CALN(1)=-CALN(1)
0406     99 RETURN
0407     END
0408   C
0409   C
0410     SUBROUTINE PRINT(CALN)
0411   C
0412   C LISTS CTD CALIBRATION DATA
0413     DIMENSION CALN(10)
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0414      COMMON NRIN,LINE,LIST
0415      WRITE(6,1010)
0416      CALL SKIP
0417      ICE=IFIX(CALN(8))
0418      SM=(CALN(8)-FLOAT(ICE))*100.
0419      WRITE(6,1020)CALN(2),SM
0420      CALL SKIP
0421      WRITE(6,1022)(CALN(I),I=4,6)
0422      CALL SKIP
0423      WRITE(6,1024)CALN(7),ICE
0424      CALL SKIP
0425      WRITE(6,1026)(CALN(I),I=9,10)
0426      CALL SKIP
0427      WRITE(6,1010)
0428      CALL SKIP
0429      C
0430      1010 FORMAT(" ")
0431      1020 FORMAT(" TIME AT START"F8.2"          DATA SMOOTHED OVER "F2.0)
0432      1022 FORMAT(" OFFSETS(VOLT):  P "F6.4"    T "F6.4"    C "F6.4)
0433      1024 FORMAT(" P-SCALING"F7.2" DBAR/V    CTD CENTERED AT"13"PPT")
0434      1026 FORMAT(" SAL:    CELL-CONST "F6.4"PPT    T.C.-CORR'N "F5.3)
0435      RETURN
0436      END
0437      C
0438      C
0439      SUBROUTINE SKIP
0440      C
0441      C LINE COUNTING ROUTINE. PAGINATES PAGES. TTY HAS 60 LINES,
0442      C L.P. HAS 59.
0443      COMMON NRIN,LINE,LIST
0444      LINE=LINE-1
0445      IF(LINE)10,99
0446      10 GO TO (30,20)LIST
0447      20 CALL EXEC(3,1106B,-2)
0448      WRITE(1,1021)
0449      CALL EXEC(3,1106B,-2)
0450      30 LINE=58+LIST
0451      1021 FORMAT(" .")
0452      99 RETURN
0453      END
0454      ENDS

```

4.4 Processing Programs

4.4.1 Program: MS032

Purpose

To locate the pressure end-points of *Batfish* up/down cycles and list (paginated) the corresponding values of T, S, σ_t , time, geographical location (if supplied previously), and mag tape location.

Hardware Requirements

HP2100 supporting DOS or DOSM

teletype for parameter input

teletype or line printer for parameter output

mag tape transport (unit \emptyset) for data input

Description

The program uses contoured data from Program MS012. The depth resolution depends on which contour interval for pressure was specified during contouring (preferably 1 m). The program successively compares the differences between adjacent depth (pressure) contours. When a change in sign occurs (indicating a change in direction) that value of depth is compared to succeeding ones. A change in direction maintained over DELTA meters (line 13 of program listing, currently set to 5 m) signals the end of an up/down trace. Data tabulated under ENDPTS indicates, to the left of the decimal point, the depth at the start of the trace; and to the right, the depth at the end. Listed under LOCNS are the locations occupied by the data on mag tape. The integer parts of the numbers indicate records, the fractional parts indicate contour set (1-100). Listings are paginated. More than one file may be done at one time.

Operating Instructions

Refer to sample printout provided below.

- (1) program is called by :PR,MS032
- (2) program lists branches available, then pauses at $\emptyset\emptyset\emptyset\emptyset$
- (3) type :GO
- (4) enter 1 to reset the mag tape hardware; this rewinds the tape.
enter 2 followed by the current file number, if the mag tape has already been positioned to a file.
- (5) enter the number of files to be skipped. If the mag tape has been previously positioned, enter -1 to position the tape to the start of the current file.
- (6-7) enter desired values.

- (8) enter the starting address (record, then sample).
- (9) enter the ending address.
- (11-12) after listings are completed, enter :GO then reply to WHICH BRANCH?
with 1, 2, 3, or 4.

NOTE: Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample Printout

- (1) :PR,MS032
- (2) BRANCHES:
 1 RESTART FILE
 2 CONTINUE WITH NEXT FILE
 3 SKIP FILES
 4 RE-INITIALIZE
 SSW(0) = ON ABORTS OPERATION, RETURNS TO START OF FILE
 SET SSW!
 MS032: PAUSE 0000
 MS022 SUSP
- (3) @:GO
- (4) RESET TAPE NUMBER 0? Y=1, N=2 FOLLOWED BY CURRENT FILE NUMBER
 1
- (5) SKIP FILES? TO SKIP BACKWARD, ENTER -(#-RO-SKIP +1)
 0
- (6) OUTPUT IS TO (1) LINE PRINTER, OR (2) TTY? Type 1 or 2
 2
- (7) PROCESS HOW MANY FILES?
 1
- (8) START AT RECORD? SAMPLE(1-100)?
 1 1
- (9) END AT RECORD? SAMPLE?
 10 100
- (10) "Data is listed here. See sample on next page."
- (11) @:GO
- (12) WHICH BRANCH?
 1

etc.

Sample Listing Similar to MS03: Listing

ID 1010 TURNAROUND DEPTHS OF BATFISH SECTION (P CONTOURED EVERY 1M)

TRACE	ENDPTS	.TIME..	LATITUDE	LONGITUDE	DISTANCE	STORED AT	LOCNS
1	1.064	1356.23	48 49.2	68 47.8	.060	1.001	-2.012
2	64.013	1401.01	48 48.9	68 47.4	.778	2.013	-2.097
3	13.019	1401.59	48 48.8	68 47.3	.949	2.098	-3.014
4	19.002	1402.18	48 48.8	68 47.3	1.006	3.015	-3.068
5	2.112	1405.02	48 48.6	68 47.1	1.491	3.078	-5.043
6	112.024	1414.43	48 47.8	68 46.3	3.212	5.044	-6.051
7	24.105	1417.56	48 47.3	68 45.8	4.292	6.053	-7.056
8	105.002	1419.18	48 47.1	68 45.6	4.772	7.057	-9.034
9	2.113	1422.05	48 46.7	68 45.2	5.749	9.036	-10.092
10	113.004	1423.52	48 46.4	68 44.9	6.375	10.093	-12.044
11	4.117	1425.47	48 46.1	68 44.6	7.048	12.046	-14.006
12	117.003	1427.41	48 45.8	68 44.4	7.715	14.012	-15.085
13	3.119	1429.47	48 45.4	68 44.0	8.452	15.086	-17.053
14	119.002	1431.42	48 45.2	68 43.7	9.082	17.054	-19.024
15	2.125	1433.43	48 44.9	68 43.4	9.739	19.028	-21.001
16	125.002	1435.46	48 44.6	68 43.0	10.407	21.002	-22.079
17	2.183	1437.48	48 44.4	68 42.6	11.070	22.083	-25.020
18	183.003	1441.03	48 43.9	68 42.1	12.129	25.021	-27.052
19	3.184	1443.57	48 43.5	68 41.6	13.074	27.058	-29.091
20	184.002	1447.14	48 43.1	68 41.0	14.194	29.092	-32.028
21	2.186	1450.22	48 42.7	68 40.3	15.285	32.032	-34.071
22	186.002	1453.43	48 42.2	68 39.7	16.452	34.073	-37.029
23	2.188	1456.58	48 41.8	68 39.0	17.584	37.030	-39.073
24	188.002	1500.21	48 41.4	68 38.4	18.700	39.074	-42.031
25	2.189	1503.30	48 41.1	68 38.1	19.244	42.035	-44.080
26	189.002	1506.54	48 40.9	68 37.8	19.831	44.081	-47.035
27	2.190	1510.05	48 40.7	68 37.5	20.380	47.039	-49.086
28	190.002	1513.35	48 40.4	68 37.2	20.984	49.087	-52.038
29	2.191	1516.47	48 40.2	68 36.9	21.537	52.044	-54.089
30	191.002	1520.16	48 39.9	68 36.6	22.138	54.090	-57.042
31	2.184	1523.41	48 39.7	68 36.3	22.727	57.048	-59.083
32	184.002	1526.53	48 39.4	68 36.1	23.280	59.084	-62.027
33	2.155	1530.06	48 39.2	68 35.8	23.854	62.030	-64.033
34	155.002	1532.38	48 38.8	68 35.2	24.767	64.034	-66.063
35	2.015	1536.34	48 38.3	68 34.4	26.183	66.064	-67.027

```

0001 FTN
0002 PROGRAM MS032
0003 C
0004 C V#1 4,8,75
0005 C LOCATES & LISTS ENDPOINTS OF BATFISH UP/DOWN CYCLES
0006 C DEPTH RESOLUTION DETERMINED DURING CONTOURING PROGRAM
0007 DIMENSION X(1000),P(7),Y(7),QL(7),QR(7),PHOLD(7),CALN(10)
0008 COMMON NRIN,LINE,LIST
0009 C
0010 C INITIALIZE
0011 1 NWRD=2000
0012 MT=7
0013 DELTA=5.
0014 WRITE(1,1002)
0015 WRITE(1,1003)
0016 PAUSE 0
0017 C
0018 C INITIALIZE MAGTAPE
0019 NFIN=1
0020 WRITE(1,1004)
0021 READ(1,*)NFIN,NFIN
0022 GO TO (3,5)NRIN
0023 3 CALL POSIT(MT,0,0,1,NEOF,NWRD)
0024 C
0025 C NSKIP== FILES TO SKIP, NFIN=FILE COUNT, NRIN=RECORD COUNT
0026 5 WRITE(1,1005)
0027 READ(1,*)NSKIP
0028 10 IF(NSKIP)12,13
0029 12 NFIN=NFIN+1
0030 13 NFIN=NFIN+NSKIP
0031 15 CALL POSIT(MT,NSKIP,0,2,NEOF,NWRD)
0032 20 NRIN=0
0033 C
0034 C ASK FOR NDO(#FILES TO DO), NU(#LISTINGS/FILE)
0035 25 NDONE=1
0036 WRITE(1,1025)
0037 READ(1,*)LIST
0038 WRITE(1,1030)
0039 READ(1,*)NDO
0040 IF(1-NDO)30,35,855
0041 30 IREC=1
0042 ISAM=1
0043 JREC=3000
0044 JSAM=100
0045 GO TO 90
0046 35 WRITE(1,1034)
0047 READ(1,*)IREC,ISAM
0048 IF(-IREC)40,855
0049 40 WRITE(1,1036)
0050 READ(1,*)JREC,JSAM
0051 90 DO 95 I=1,10
0052 95 CALN(I)=-1.
0053 C
0054 C POSITION TAPE TO FIRST RECORD TO BE DONE
0055 100 L=J
0056 IF(NRIN-IREC)135,142,130
0057 C SKIP RECORDS BKWD
0058 130 L=- (NRIN-IREC+1)
0059 CALL POSIT(MT,0,L,2,NEOF,NWRD)

```



```

0060      NRIN=IREC-1
0061 C
0062      135 J=IREC-NRIN
0063 C
0064 C SKIP RECORDS FWD
0065      DO 175 L=1,J
0066      140 CALL EXEC(1,107B,X,NWRD)
0067      CALL POSIT(MT,0,0,3,JE0F,NWRD)
0068      NRIN=NRIN+1
0069      142 IF(NEOF)530,145
0070      145 IF(ISSW(0))800,150
0071      150 IF(X(1))165,175
0072 C
0073 C NEW CALIBRATION DATA
0074      165 CALL CTD(CALN(1),X(1))
0075      175 CONTINUE
0076 C
0077 C SET START/STOP ADDRESSES WITHIN BUF'R
0078      ISTRT=ISAM*10-9
0079      IEND=1000
0080      IF(NRIN-JREC)185,180
0081      180 IEND=JSAM*10
0082      185 INIT=2
0083 C
0084 C SET LINE COUNT, PRINT CALIBRATION DATA HEADINGS
0085      190 LINE=-1
0086      CALL EXEC(3,1106B,-1)
0087      CALL SKIP
0088      WRITE(6,1430)
0089      CALL SKIP
0090      WRITE(6,1425)NFIN,CALN(1),CALN(3),I
0091      CALL SKIP
0092      WRITE(6,1430)
0093      CALL SKIP
0094      IF(-CALN(1))200,220
0095      195 CALL CTD(CALN(1),X(K))
0096      ISTRT=K+10
0097      200 CALL PRINT(CALN(1))
0098      IF(ISTRT-990)203,206
0099      203 POSN=X(ISTRT+19)
0100      GO TO 209
0101      206 POSN=X(ISTRT-1)
0102      209 IF(-POSN)215,212
0103      212 WRITE(6,1212)
0104      GO TO 218
0105      215 WRITE(6,1215)
0106      218 CALL SKIP
0107      WRITE(6,1430)
0108      CALL SKIP
0109      IF(ISTRT-1000)220,450
0110 C
0111 C BEGIN EXAMINING ARRAY
0112      220 DO 450 K=ISTRT,IEND,10
0113 C
0114 CHECK ON TYPE OF INCOMING DATA
0115      IF(X(K))230,440,245
0116      230 IF(X(K+1)-CALN(2))195,440,195
0117 C
0118 C REJECT IF NOT DEPTH CONTOUR

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```

0119      245 IF(1-IFIX(X(K)+.01))440,250,440
0120      250 GO TO (305,260)INIT
0121      C
0122      C SET UP INITIAL VALUES  ARRAYS ARE:
0123      C P=PRESENT DATA / Y=PREVIOUS DATA / QL=DATA AT START OF CYCLE
0124      C QR=DATA AT END OF CYCLE / PHOLD=DATA AT START OF NEXT CYCLE
0125      260 INIT=1
0126          L=1
0127          P(1)=X(K+1)
0128          P(2)=X(K+2)
0129          P(3)=X(K+7)
0130          P(4)=X(K+8)
0131          P(5)=X(K+9)
0132          P(6)=FLOAT(NRIN)
0133          P(7)=.1*FLOAT(K+10)
0134          DO 270 I=1,7
0135              QL(I)=P(I)
0136      270 QR(I)=P(I)
0137          NCYCL=0
0138      C STEP TO NEXT DEPTH CONTOUR. FORM DIFFERENCE. ENTER CORRECT LOOP
0139      305 DO 310 I=1,7
0140      310 Y(I)=P(I)
0141          P(1)=X(K+1)
0142          P(2)=X(K+2)
0143          P(3)=X(K+7)
0144          P(4)=X(K+8)
0145          P(5)=X(K+9)
0146          P(6)=FLOAT(NRIN)
0147          P(7)=(FLOAT(K+10))*0.1
0148          NDIF=FLOAT(IFIX(2.*P(2)+.1))-FLOAT(IFIX(2.*Y(2)+.1))
0149          GO TO (320,335,350)L
0150      C
0151      C INITIAL LOOP
0152      320 IF(NDIF)325,440,330
0153      325 L=2
0154          GO TO 440
0155      330 L=3
0156          GO TO 440
0157      C
0158      C SURFACING
0159      335 IF(NDIF)355,355,340
0160      340 IF(P(2)-QR(2)-DELTA)440,440,345
0161      345 L=3
0162          GO TO 375
0163      C
0164      C DIVING
0165      350 IF(NDIF)365,355,355
0166      355 DO 360 I=1,7
0167          QR(I)=Y(I)
0168      360 PHOLD(I)=P(I)
0169          GO TO 440
0170      365 IF(QR(2)-DELTA-P(2))440,440,370
0171      370 L=2
0172      C
0173      CALCULATE TIME
0174      375 NCYCL=NCYCL+1
0175          NH=QL(1)/3600.+0.0001
0176          TIM=QL(1)-3600.*FLOAT(NH)
0177          M=TIM/60.+0.001

```

```

0178      TIM=TIM-60.*FLOAT(M)
0179      TIM=FLOAT(NH)*100.+FLOAT(M)+TIM*.01
0180  C
0181  C LIST INFORMATION ABOUT ENDPOINT
0182      ENDPT=QL(2)+QR(2)*.001
0183      FRL=QL(6)+QL(7)*.001
0184      FRR=- (QR(6)+QR(7)*.001)
0185      IF(QL(5))380,385
0186      380 WRITE(6,1380)NCYCL,ENDPT,TIM,FRL,FRR
0187      GO TO 390
0188      385 LAT=QL(3)+.00001
0189      QL(3)=(QL(3)-FLOAT(LAT))*60.
0190      LON=QL(4)+.00001
0191      QL(4)=(QL(4)-FLOAT(LON))*60.
0192      WRITE(6,1386)NCYCL,ENDPT,TIM,LAT,QL(3),LON,QL(4),QL(5),
0193      @FRL,FRR
0194      390 DO 395 I=1,7
0195      395 QL(I)=PHOLD(I)
0196  C
0197  C UPDATE LINE COUNT, PAGINATE IF 54 LINES PRINTED
0198      410 CALL SKIP
0199      IF(LINE-58-LIST)440,415
0200      415 WRITE(6,1430)
0201      CALL SKIP
0202      WRITE(6,1425)NFIN,CALN(1),CALN(3),I
0203      CALL SKIP
0204      WRITE(6,1430)
0205      CALL SKIP
0206      IF(-POSN)430,425
0207      425 WRITE(6,1212)
0208      GO TO 435
0209      430 WRITE(6,1215)
0210      435 CALL SKIP
0211      WRITE(6,1430)
0212      CALL SKIP
0213      440 IF(ISSW(0))800,450
0214      450 CONTINUE
0215      455 ISTRT=1
0216  C
0217  C CHECK IF THIS IS LAST RECORD TO BE OUTPUTTED
0218      IF(NRIN-JREC+1)470,460,490
0219      460 IEND=JSAM*10
0220  C
0221  C READ IN NEXT BUF'R
0222      470 CALL EXEC(1,107B,X,NWRD)
0223      CALL POSIT(MT,0,0,3,NEOF,NWRD)
0224      NRIN=NRIN+1
0225      IF(NEOF)490,480
0226      480 IF(ISSW(0))800,220
0227  C
0228  C FILE IS SMALLER THAN SPECIFIED; END CURRENT LISTING
0229      490 IF(LINE-58-LIST)500,820
0230      500 LINE=-LINE
0231      GO TO (504,502)LIST
0232      502 LINE=LINE-2
0233      504 CALL EXEC(3,1106B,LINE)
0234      505 GO TO (820,510)LIST
0235      510 WRITE(6,1105)
0236      GO TO 820

```

```

0237 C
0238 C LISTINGS ABORTED. TAPE REWOUND TO START OF PRESENT FILE
0239 800 WRITE(1,1800)
0240 CALL POSIT(MT,-1,0,2,NEOF,NWRD)
0241 GO TO 855
0242 C
0243 C EOF
0244 820 IF(NEOF)825,830
0245 825 M=NRIN-1
0246 WRITE(1,1820)NFIN,M,CALN(1),CALN(3)
0247 GO TO 835
0248 830 WRITE(1,1830)NFIN,NRIN,CALN(1),CALN(3)
0249 835 NDONE=NDONE+1
0250 IF(NEOF)850,840
0251 840 IF(NDONE-NDO)845,855
0252 845 CALL POSIT(MT,1,0,2,NEOF,NWRD)
0253 850 NFIN=NFIN+1
0254 NRIN=0
0255 IF(NDONE-NDO)90,855
0256 855 PAUSE 7
0257 NDONE=0
0258 NU=0
0259 WRITE(1,1855)
0260 READ(1,*)L
0261 NSKIP=(NEOF-1)/2-L
0262 GO TO (10,860,5,1)L
0263 860 NSKIP=1
0264 IF(NEOF)20,13
0265 C
0266 1002 FORMAT("BRANCHES:"/"1.RESTART FILE"/"2.CONTINUE W NEXT FILE"
0267 @/"3.SKIP FILES"/"4.REINITIALIZE")
0268 1003 FORMAT(/"SSW(0)=ON ABORTS OPERATION, RETURNS TO START OF "
0269 @"FILE"/" S E T S S W ' S I")
0270 1004 FORMAT(/"RESET TAPE=0? Y=1, N=2 FOLLOWED BY CURRENT FILE=7
0271 1005 FORMAT(/"SKIP FILES? TO SKIP BKWD, ENTER -(=-TO-SKIP +1)")
0272 1025 FORMAT("OUTPUT IS TO 1)LINE PRINTER OR 2)TTY? TYPE 1 OR 2")
0273 1030 FORMAT("PROCESS HOW MANY FILES?")
0274 1034 FORMAT("START AT RECORD? SAMPLE(1-100)?")
0275 1036 FORMAT("END AT RECORD? SAMPLE?")
0276 1105 FORMAT(/" .")
0277 1215 FORMAT(" CYCLE ENDPTS .TIME.. LATITUDE LONGITUDE "
0278 @"DISTANCE STORED AT LOCNS")
0279 1212 FORMAT(" CYCLE ENDPTS .TIME.. STORED AT LOCNS")
0280 1380 FORMAT(" "I4" "F8.3" "F8.2" "2F8.3)
0281 1386 FORMAT(" "I4" "F8.3" "F8.2,2(" "I4,F5.1)," "F9.3,
0282 @" "2F8.3)
0283 1425 FORMAT(" FILE"I4" STN"F6.0" CRUISE"F7.0" LIST"I4)
0284 1430 FORMAT(" ")
0285 1800 FORMAT("ABORT! TAPE REWOUND TO START OF FILE."/" R E S E T"
0286 @"S S W I")
0287 1820 FORMAT("EOF-"I4":"I4" RECORDS. STN"F6.0" CRUISE"F7.0)
0288 1830 FORMAT("FILE"I4", "I4" RECORDS DONE. STN"F6.0" CRUISE"F7.0)
0289 1855 FORMAT("WHICH BRANCH?")
0290 END
0291 C
0292 C
0293 SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0294 C
0295 C V=9 31,1,75 FOR USE UNDER DOS/DOSM

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0296 C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES RECORDS
0297 COMMON NRIN,LINE,LIST
0298 2 NEOF=1
0299 3 NUNIT=0
0300 NSEL=NBRAN
0301 GO TO (5,5,5,5,5,5,5,4,5,4)N
0302 4 NUNIT=1
0303 5 GO TO (20,50)NSEL
0304 10 WRITE(1,1010)NUNIT
0305 15 PAUSE 1
0306 C
0307 CHECK IF UNIT ONLINE, THEN REWIND IT (RESETS HARDWARE)
0308 20 IF(LOCAL(N))10,30
0309 30 NEOF=256+N
0310 CALL EXEC(3,NEOF)
0311 GO TO 9000
0312 C
0313 C SKIPS RECORDS/FILES
0314 40 CALL PTAPE(N,NF,NR)
0315 NSEL=4
0316 C
0317 CHECK STATUS OF MT UNIT
0318 50 CALL EXEC(13,N,ISTAT,ILOG)
0319 IF(ISTAT)50,60
0320 60 GO TO (9000,40,90,70)NSEL
0321 C
0322 CHECK FOR EOT AFTER A (BUFR)WRITE COMMAND
0323 70 IF(IEOT(N))80,9000
0324 80 WRITE(1,1080)NUNIT
0325 CALL RWSTB(N)
0326 GO TO 15
0327 C
0328 CHECK FOR MISC AFTER A (BUFFER) READ C.
0329 90 IF(IEOF(N))100,110
0330 100 NEOF=-2
0331 GO TO 9000
0332 110 NSEL=NRIN+1
0333 IF(IEOT(N))80,120
0334 120 IF(IEERR(N))130,140
0335 130 GO TO (132,135)LIST
0336 132 WRITE(1,1130)NSEL
0337 135 WRITE(6,1130)NSEL
0338 CALL SKIP
0339 140 I=IWRDS(N)
0340 IF(I-NWRD)150,9000,150
0341 150 GO TO (152,155)LIST
0342 152 WRITE(1,1150)NSEL,I
0343 155 WRITE(6,1150)NSEL,I
0344 CALL SKIP
0345 1010 FORMAT("READY TAPE UNIT"13)
0346 1080 FORMAT("EOT ON "13/"LOAD NEXT TAPE")
0347 1130 FORMAT(" REC"15": TIM/PAR ERR")
0348 1150 FORMAT(" REC"15": TAPE ERR>"15" WORDS XFERRERD")
0349 9000 RETURN
0350 END
0351 C
0352 C
0353 SUBROUTINE CTD(CALN,Y)
0354 C

```

```

0355 C READS IN CTD CALIBRATION DATA
0356     DIMENSION CALN(10),Y(10)
0357     COMMON NRIN,LINE,LIST
0358     DO 20 I=1,10
0359     20 CALN(I)=Y(I)
0360     CALN(1)=-CALN(1)
0361     99 RETURN
0362     END
0363 C
0364 C
0365     SUBROUTINE PRINT(CALN)
0366 C
0367 C LISTS CTD CALIBRATION DATA
0368     DIMENSION CALN(10)
0369     COMMON NRIN,LINE,LIST
0370     WRITE(6,1010)
0371     CALL SKIP
0372     ICE=IFIX(CALN(8))
0373     SM=(CALN(8)-FLOAT(ICE))*100.
0374     WRITE(6,1020)CALN(2),SM
0375     CALL SKIP
0376     WRITE(6,1022)(CALN(I),I=4,6)
0377     CALL SKIP
0378     WRITE(6,1024)CALN(7),ICE
0379     CALL SKIP
0380     WRITE(6,1026)(CALN(I),I=9,10)
0381     CALL SKIP
0382     WRITE(6,1010)
0383     CALL SKIP
0384 C
0385     1010 FORMAT(" ")
0386     1020 FORMAT(" TIME AT START"F8.2" DATA SMOOTHED OVER "F2.0)
0387     1022 FORMAT(" OFFSETS(VOLT): P "F6.4" T "F6.4" C "F6.4)
0388     1024 FORMAT(" P-SCALING"F7.2" DBAR/V CTD CENTERED AT"13"PPT")
0389     1026 FORMAT(" SAL: CELL-CONST "F6.4"PPT T.C.-CORR'N "F5.3)
0390     RETURN
0391     END
0392 C
0393 C
0394     SUBROUTINE SKIP
0395 C
0396 C LINE COUNTING ROUTINE. PAGINATES PAGES. TTY HAS 60 LINES,
0397 C L.P. HAS 59.
0398     COMMON NRIN,LINE,LIST
0399     LINE=LINE-1
0400     IF(LINE)10,99
0401     10 GO TO (30,20)LIST
0402     20 CALL EXEC(3,1106B,-2)
0403     WRITE(1,1021)
0404     CALL EXEC(3,1106B,-2)
0405     30 LINE=58+LIST
0406     1021 FORMAT(" ")
0407     99 RETURN
0408     END
0409     ENDS

```

4.4.2 Program: MS042Purpose

To compress a user-specified section of a *Batfish* data-file into an 'equivalent STD cast' using simple averaging, and produce paginated listings of the result.

Hardware Requirements

HP 2100 supporting DOS or DOSM

teletype for parameter input/output

line printer or teletype for data output

mag tape transport (unit #0) for data input

Description

Contoured data is required for input, depth preferably contoured at 1 m intervals (program looks at depth contours only). Maximum depth for the listings is user-selectable up to 420 m. Output is paginated, and consists of the number of samples found for each depth, the depth, and the average values for T, S, and σ_t .

Operating Instructions

Refer to sample printout provided below.

- (1) Program is called by entering :PR,MS042
- (2) Program lists branches available, then pauses at 0000.
- (3) Type :GO
- (4) Enter 1 to reset the mag tape hardware/ this rewinds the tape; or enter 2 followed by the current file number, if the mag tape has already been positioned to a file.
- (5-8)) Enter desired values.
- (9-11) For each listing specified in Item 8, enter the starting address (record then sample), and the ending address.
- (12) Program proceeds with the listings. After the last one is done, it will pause at 0007.
- (13) Type :GO
- (14) Reply with 1, 2, 3, or 4.

etc.

NOTE: Setting ssw 0 on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample Printout

- (1) :PR, MS042
- (2) BRANCHES:
 1 RESTART FILE
 2 CONTINUE WITH NEXT FILE
 3 SKIP FILES
 4 RE-INITIALIZE
 SSW(0) = ON ABORTS OPERATION, RETURNS TO START OF FILE
 SET SSW's!
 MS042: PAUSE 0000
 MS042 SUSP
- (3) @:GO
- (4) RESET TAPE #0? Y=1, N=2 FOLLOWED BY CURRENT FILE NUMBER
 1
- (5) SKIP FILES? TO SKIP BACKWARD, ENTER -(#-TO-SKIP +1)
 0
- (6) OUTPUT IS TO (1) LINE PRINTER, OR (2) TTY? Type 1 or 2
 1
- (7) PROCESS HOW MANY FILES?
 1
- (8) HOW MANY LISTINGS/FILE?
 1
- (9) LISTING 1
- (10) START AT RECORD? SAMPLE(1-100)?
 1 1
- (11) END AT RECORD? SAMPLE?
 100 100
- (12) 'LISTINGS'
 MS042: PAUSE 0007
 MS042 SUSP
- (13) @:GO
- (14) WHICH BRANCH?
 1
- etc,


```
0001 FTN
0002 PROGRAM MS042
0003 C
0004 C V#1 5,8,75
0005 C MERGES A USER-SPECIFIED SECTION OF A BATFISH DATA-FILE, INTO
0006 C AN 'EQUIVALENT STD CAST' USING SIMPLE AVERAGING. USES THE
0007 C 'CONTOURED DATA' FORMAT AS INPUT (DEPTH CONTOURS SHOULD BE AT
0008 C 1M INTERVALS FOR BEST RESULTS)
0009 DIMENSION X(1000),SUM(3,420),NUMBR(420),IREC(25),ISAM(25),
0010 @JREC(25),JSAM(25),CALN(10),MS(25)
0011 COMMON NRIN,LINE,LIST
0012 C
0013 C INITIALIZE
0014 1 NWRD=2000
0015 MT=7
0016 NU=0
0017 MAX=420
0018 WRITE(1,1002)
0019 WRITE(1,1003)
0020 PAUSE 0
0021 C
0022 C INITIALIZE MAGTAPE
0023 NFIN=1
0024 WRITE(1,1004)
0025 READ(1,*)NRIN,NFIN
0026 GO TO (3,5)NRIN
0027 3 CALL POSIT(MT,0,0,1,NEOF,NWRD)
0028 C
0029 C NSKIP== FILES TO SKIP, NFIN=FILE COUNT, NRIN=RECORD COUNT
0030 5 WRITE(1,1005)
0031 READ(1,*)NSKIP
0032 10 IF(NSKIP)12,13
0033 12 NFIN=NFIN+1
0034 13 NFIN=NFIN+NSKIP
0035 15 CALL POSIT(MT,NSKIP,0,2,NEOF,NWRD)
0036 20 NRIN=0
0037 IF(-NU)95,25
0038 C
0039 C ASK FOR NDO(#FILES TO DO), NU(#LISTINGS/FILE)
0040 25 NDONE=1
0041 WRITE(1,1024)MAX
0042 READ(1,*)MAX
0043 WRITE(1,1025)
0044 READ(1,*)LIST
0045 WRITE(1,1030)
0046 READ(1,*)NDO
0047 IF(-NDO)35,855
0048 35 WRITE(1,1035)
0049 READ(1,*)NU
0050 C
0051 C FOR EACH LISTING, ASK START/STOP OF DATA, $ CONTOUR TO LIST
0052 DO 90 I=1,NU
0053 WRITE(1,1032)I
0054 WRITE(1,1034)
0055 READ(1,*)IREC(I),ISAM(I)
0056 IF(-IREC(I))37,95
0057 37 WRITE(1,1036)
0058 READ(1,*)JREC(I),JSAM(I)
0059 90 CONTINUE
```

```

0060      95 DO 97 I=1,10
0061      97 CALN(I)=-1.
0062      C
0063      C BEGIN LISTINGS
0064      100 DO 530 I=1,NU
0065      C
0066      C POSITION MT TO START OF DATA WITHIN FILE
0067      IF(-IREC(I))125,530
0068      125 L=J
0069      IF(NRIN-IREC(I))135,142,130
0070      C SKIP RECORDS BKWD
0071      130 L=-(NRIN-IREC(I)+1)
0072      CALL POSIT(MT,0,L,2,NEOF,NWRD)
0073      NRIN=IREC(I)-1
0074      C
0075      135 J=IREC(I)-NRIN
0076      C
0077      C SKIP RECORDS FWD
0078      DO 175 L=1,J
0079      140 CALL EXEC(1,107B,X,NWRD)
0080      CALL POSIT(MT,0,0,3,NEOF,NWRD)
0081      NRIN=NRIN+1
0082      142 IF(NEOF)530,145
0083      145 IF(ISSW(0))800,150
0084      150 IF(X(1))165,175
0085      C
0086      C NEW CALIBRATION DATA
0087      165 CALL CTD(CALN(1),X(1))
0088      175 CONTINUE
0089      C
0090      C RESET STORAGE ARRAY
0091      DO 177 L=1,420
0092      NUMBR(L)=0
0093      DO 177 J=1,3
0094      SUM(J,L)=0.
0095      177 CONTINUE
0096      C
0097      C SET START STOP ADRESSES IN PRESENT B'FR
0098      ISTRT=ISAM(1)*10-9
0099      IEND=1000
0100      180 IF(NRIN-JREC(1))190,185
0101      185 IEND=JSAM(1)*10
0102      C
0103      C SET LINE COUNT, PRINT CALIBRATION DATA HEADINGS
0104      190 LINE=-1
0105      CALL EXEC(3,1106B,-1)
0106      CALL SKIP
0107      WRITE(6,1430)
0108      CALL SKIP
0109      WRITE(6,1425)NFIN,CALN(1),CALN(3),I
0110      CALL SKIP
0111      WRITE(6,1430)
0112      CALL SKIP
0113      IF(-CALN(1))200,220
0114      195 CALL CTD(CALN(1),X(K))
0115      ISTRT=K+10
0116      200 CALL PRINT(CALN(1))
0117      IF(ISTRT-1000)220,270
0118      C

```

```

0119 C BEGIN EXAMINING ARRAY
0120 220 DO 270 K=ISTRT,IEND,10
0121 C
0122 CHECK ON TYPE OF INCOMING DATA
0123 IF(X(K))230,260,245
0124 230 IF(X(K+1)-CALN(2))195,260,195
0125 C
0126 C LOOK FOR PRESSURE CONTOURS ONLY
0127 245 IF(1-IFIX(X(K)+.01))260,250,260
0128 C
0129 C UPDATE SUM OF VALUES IN EACH PARAMETER & IN CORR. COUNT
0130 250 LEVEL=X(K+2)+.1
0131 NUMBR(LEVEL)=NUMBR(LEVEL)+1
0132 DO 255 J=1,3
0133 L=K+J+2
0134 255 SUM(J,LEVEL)=SUM(J,LEVEL)+X(L)
0135 260 IF(ISSW(0))800,270
0136 270 CONTINUE
0137 ISTRT=1
0138 C
0139 CHECK IF THIS IS THE LAST RECORD TO BE INPUTTED
0140 IF(NRIN-JREC(I)+1)280,275,300
0141 275 IEND=JSAM(I)*10
0142 C
0143 C READ IN NEXT BUF'R
0144 280 CALL EXEC(1,107B,X,NWRD)
0145 CALL POSIT(MT,0,0,3,NEOF,NWRD)
0146 NRIN=NRIN+1
0147 IF(NEOF)300,285
0148 285 IF(ISSW(0))800,220
0149 C
0150 C END OF DATA. LIST TITLES, FORM & LIST AVERAGES
0151 300 BEGIN=FLOAT(IREC(I))+.001*FLOAT(ISAM(I))
0152 END=FLOAT(JREC(I))+.001*FLOAT(JSAM(I))
0153 IF(NEOF)302,305
0154 302 END=FLOAT(NRIN-1)+.3
0155 305 WRITE(6,1305)BEGIN,END
0156 CALL SKIP
0157 WRITE(6,1306)
0158 CALL SKIP
0159 310 DO 450 K=1,MAX
0160 XNUM=NUMBR(K)
0161 DO 315 J=1,3
0162 315 SUM(J,K)=SUM(J,K)/XNUM
0163 P=K
0164 IF(-NUMBR(K))330,440
0165 330 WRITE(6,1330)NUMBR(K),P,(SUM(J,K),J=1,3)
0166 C
0167 C UPDATE LINE COUNT, PAGINATE IF 54 LINES PRINTED
0168 IF(LINE-58-LIST)440,415
0169 415 WRITE(6,1430)
0170 CALL SKIP
0171 WRITE(6,1425)NFIN,CALN(1),CALN(3),I
0172 CALL SKIP
0173 WRITE(6,1430)
0174 CALL SKIP
0175 WRITE(6,1305)BEGIN,END
0176 CALL SKIP
0177 WRITE(6,1306)

```

```

0178      CALL SKIP
0179      440 IF(ISSW(0))800,450
0180      450 CONTINUE
0181      C
0182      C END CURRENT LISTING
0183      490 IF(LINE-58-LIST)500,530
0184      500 LINE=-LINE
0185      GO TO (504,502)LIST
0186      502 LINE=LINE-2
0187      504 CALL EXEC(3,1106B,LINE)
0188      505 GO TO (530,510)LIST
0189      510 WRITE(6,1105)
0190      530 CONTINUE
0191      GO TO 820
0192      C
0193      C LISTINGS ABORTED. TAPE REWOUND TO START OF PRESENT FILE
0194      800 WRITE(1,1800)
0195      CALL POSIT(MT,-1,0,2,NEOF,NWRD)
0196      GO TO 855
0197      C
0198      C EOF
0199      820 IF(NEOF)825,830
0200      825 M=NRIN-1
0201      WRITE(1,1820)NFIN,M,CALN(1),CALN(3)
0202      GO TO 835
0203      830 WRITE(1,1830)NFIN,NRIN,CALN(1),CALN(3)
0204      835 NDONE=NDONE+1
0205      IF(NEOF)850,840
0206      840 IF(NDONE-NDO)845,855
0207      845 CALL POSIT(MT,1,0,2,NEOF,NWRD)
0208      850 NFIN=NFIN+1
0209      NRIN=0
0210      IF(NDONE-NDO)95,855
0211      855 PAUSE 7
0212      NDONE=0
0213      NU=0
0214      WRITE(1,1855)
0215      READ(1,*)L
0216      NSKIP=(NEOF-1)/2-L
0217      GO TO (10,860,5,1)L
0218      860 NSKIP=1
0219      IF(NEOF)20,13
0220      C
0221      1002 FORMAT("BRANCHES:"/"1.RESTART FILE"/"2.CONTINUE W NEXT FILE"
0222      @/"3.SKIP FILES"/"4.REINITIALIZE")
0223      1003 FORMAT(/"SSW(0)=ON ABORTS OPERATION, RETURNS TO START OF "
0224      @"FILE"/" S E T   S S W ' S I")
0225      1004 FORMAT(/"RESET TAPE=0?  Y=1,  N=2 FOLLOWED BY CURRENT FILE=7
0226      1005 FORMAT(/"SKIP FILES?  TO SKIP BKWD, ENTER -(-TO-SKIP  +1)")
0227      1024 FORMAT("CURRENT MAX DEPTH="F4.0".  ENTER SAME/NEW VALUE"
0228      @"( <420M);")
0229      1025 FORMAT("OUTPUT IS TO 1)LINE PRINTER OR 2)TTY? TYPE 1 OR 2")
0230      1030 FORMAT("PROCESS HOW MANY FILES?")
0231      1032 FORMAT(/"LISTING"i4)
0232      1034 FORMAT("START AT RECORD? SAMPLE(1-100)?")
0233      1035 FORMAT("HOW MANY LISTINGS/FILE?")
0234      1036 FORMAT("END AT RECORD? SAMPLE?")
0235      1105 FORMAT(/" .")
0236      1210 FORMAT()

```

```

0237 1305 FORMAT(" EQUIVALENT STD CAST. MT LOC'NS (FRAME.SAMPLE"
0238 0"): "F9.3" -->"F9.3)
0239 1306 FORMAT(" SAMPLES 'P' 'T' 'S' 'SIG T'")
0240 1330 FORMAT(" "I4" "F7.2" "2(F7.3" "),F6.2)
0241 1425 FORMAT(" FILE"I4" STN"F6.0" CRUISE"F7.0" LIST"I4)
0242 1430 FORMAT(" ")
0243 1800 FORMAT("ABORT! TAPE REWOUND TO START OF FILE."// " R E S E T"
0244 0"S S W I")
0245 1820 FORMAT("EOF-"I4": "I4" RECORDS. STN"F6.0" CRUISE"F7.0)
0246 1830 FORMAT("FILE"I4", "I4" RECORDS DONE. STN"F6.0" CRUISE"F7.0)
0247 1855 FORMAT("WHICH BRANCH?")
0248 END
0249 C
0250 C
0251 SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0252 C
0253 C V=9 31,1,75 FOR USE UNDER DOS/DOSM
0254 C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES RECORDS
0255 COMMON NRIN,LINE,LIST
0256 2 NEOF=1
0257 3 NUNIT=0
0258 NSEL=NBRAN
0259 GO TO (5,5,5,5,5,5,5,4,5,4)N
0260 4 NUNIT=1
0261 5 GO TO (20,50)NSEL
0262 10 WRITE(1,1010)NUNIT
0263 15 PAUSE 1
0264 C
0265 CHECK IF UNIT ONLINE, THEN REWIND IT (RESETS HARDWARE)
0266 20 IF(LOCAL(N))10,30
0267 30 NEOF=256+N
0268 CALL EXEC(3,NEOF)
0269 GO TO 9000
0270 C
0271 C SKIPS RECORDS/FILES
0272 40 CALL PTAPE(N,NF,NR)
0273 NSEL=4
0274 C
0275 CHECK STATUS OF MT UNIT
0276 50 CALL EXEC(13,N,ISTAT,ILOG)
0277 IF(ISTAT)50,60
0278 60 GO TO (9000,40,90,70)NSEL
0279 C
0280 CHECK FOR EOT AFTER A (BUFR)WRITE COMMAND
0281 70 IF(IEOT(N))80,9000
0282 80 WRITE(1,1080)NUNIT
0283 CALL RWSTB(N)
0284 GO TO 15
0285 C
0286 CHECK FOR MISC AFTER A (BUFFER) READ C.
0287 90 IF(IEOF(N))100,110
0288 100 NEOF=-2
0289 GO TO 9000
0290 110 NSEL=NRIN+1
0291 IF(IEOT(N))80,120
0292 120 IF(IERR(N))130,140
0293 130 GO TO (132,135)LIST
0294 132 WRITE(1,1130)NSEL
0295 135 WRITE(6,1130)NSEL

```

```

0296      CALL SKIP
0297      140 I=IWRDS(N)
0298      IF(I-NWRD)150,9000,150
0299      150 GO TO (152,155)LIST
0300      152 WRITE(1,1150)NSEL,I
0301      155 WRITE(6,1150)NSEL,I
0302      CALL SKIP
0303      1010 FORMAT("READY TAPE UNIT"13)
0304      1080 FORMAT("EOT ON "13/"LOAD NEXT TAPE")
0305      1130 FORMAT(" REC"15": TIM/PAR ERR")
0306      1150 FORMAT(" REC"15": TAPE ERR>"15" WORDS XFERRED")
0307      9000 RETURN
0308      END
0309      C
0310      C
0311      SUBROUTINE CTD(CALN,Y)
0312      C
0313      C READS IN CTD CALIBRATION DATA
0314      DIMENSION CALN(10),Y(10)
0315      COMMON NRIN,LINE,LIST
0316      DO 20 I=1,10
0317      20 CALN(I)=Y(I)
0318      CALN(1)=-CALN(1)
0319      99 RETURN
0320      END
0321      C
0322      C
0323      SUBROUTINE PRINT(CALN)
0324      C
0325      C LISTS CTD CALIBRATION DATA
0326      DIMENSION CALN(10)
0327      COMMON NRIN,LINE,LIST
0328      WRITE(6,1010)
0329      CALL SKIP
0330      ICE=IFIX(CALN(8))
0331      SM=(CALN(8)-FLOAT(ICE))*100.
0332      WRITE(6,1020)CALN(2),SM
0333      CALL SKIP
0334      WRITE(6,1022)(CALN(I),I=4,6)
0335      CALL SKIP
0336      WRITE(6,1024)CALN(7),ICE
0337      CALL SKIP
0338      WRITE(6,1026)(CALN(I),I=9,10)
0339      CALL SKIP
0340      WRITE(6,1010)
0341      CALL SKIP
0342      C
0343      1010 FORMAT(" ")
0344      1020 FORMAT(" TIME AT START"F8.2"          DATA SMOOTHED OVER "F2.0)
0345      1022 FORMAT(" OFFSETS(VOLT):  P "F6.4"    T "F6.4"    C "F6.4)
0346      1024 FORMAT(" P-SCALING"F7.2" DBAR/V    CTD CENTERED AT"13"PPT")
0347      1026 FORMAT(" SAL:    CELL-CONST "F6.4"PPT    T.C.-CORR'N "F5.3)
0348      RETURN
0349      END
0350      C
0351      C
0352      SUBROUTINE SKIP
0353      C
0354      C LINE COUNTING ROUTINE. PAGINATES PAGES. TTY HAS 60 LINES,

```

```
0355 C L.P. HAS 59.
0356     COMMON NRIN,LINE,LIST
0357     LINE=LINE-1
0358     IF(LINE)10,99
0359     10 GO TO (30,20)LIST
0360     20 CALL EXEC(3,1106B,-2)
0361     WRITE(1,1021)
0362     CALL EXEC(3,1106B,-2)
0363     30 LINE=58+LIST
0364     1021 FORMAT(" .")
0365     99 RETURN
0366     END
0367     ENDS
**** LIST END **
@
```

4.5 Plotting Programs

4.5.1 Program: MS053

Purpose

To plot contoured *Batfish* data. Plots may be made with time or distance, or both, for the x-coordinate, and with any parameter (pressure, temperature, salinity, sigma t) for the y-coordinate. Plots are paginated and axes are labelled.

Hardware Requirements

HP2100 supporting DOS or DOSM

teletype for parameter input

mag tape transport (unit 0) for data input

plotter (Calcomp 563 or Zeta 100) for data output

Description

Contoured CTD data is used for input. Contour crossings are plotted superimposed on the path of the fish. The crossings are not joined as it is felt that this should be left for the user to interpret. The program makes three passes through the data, on the assumption that the plot is to use three differently coloured pens to differentiate contours. Labels, axes, and the path of the fish versus the y-coordinate are plotted during the first pass, and the plot is paginated into 8.5-inch sections. Maximum size of y-axis is determined by choice of plotter.

If geographical coordinates were not supplied during contouring (MS012), two x-axes are drawn - one of time in hours as recorded during the tow, and the other of distance in kilometres relative to the start of the tow, based on a user-specified mean ship speed. If geographic coordinates are available (this is checked automatically by the program), only one axis is drawn - that of distance (km).

Operating Instructions

Refer to sample printout provided below.

- (1) Program is called by :PR,MS053
- (2) Program lists branches available, other information, and pauses at 0001.
- (3) Type :GO
- (4) Enter 1 to reset the mag tape hardware; this rewinds the tape; enter 2 followed by the current file number, if the tape has been previously positioned.

- (5) Enter 1 or 2. Program automatically sets maximum y-axis size, and corrects for different plotter resolutions.
- (6) Enter the number of files to be skipped. If the mag tape has been previously positioned, enter -1 to position the tape to the start of the current file.
- (7-9) These three entries determine the x-axis (km/inch) scaling. A vertical exaggeration of 200:1 usually gives the best visual display.
- (10) Enter size. Maximum allowed size is determined by the program in line (5).
- (11) Enter 1, 2, 3, or 4 for P, T, S, σt , respectively.
- (12) Enter values. Minimum/maximum values, and number-of-units/(large division) are in physical units for that parameter. Each large division is subdivided into 10 smaller ones.
- (13-15) Enter the number of contours to be plotted during each pass, then list them. These are repeated for passes 2 and 3.
- (16) Enter the starting address. The format of 'contour set' is described in Program MS012.
- (17) Enter the ending address. An EOF encountered before this address during plotting is treated as an 'ending address;' the mag tape and plotter are then repositioned for the next pass.
- (18) Plotting takes place. Refer to sample plot to see the format.
Note: (19-22) are not indicated on sample printout.
- (19) At the end of each pass, program types CHANGE PEN and pauses at 0007.
Type :GO when ready.
- (20) Program pauses at 0007 when finished. Type :GO, and reply to
- (21) WHICH BRANCH? with 1, 2, 3, or 4.
- (22) Reply to NEW(1) or SAME(2) PLOTTER SCALING VALUES? with 1 or 2.

etc.

NOTE: Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample Printout

```

1  :PR,MS051 / sample print-out

2  BRANCHES:
    1)RESTART FILE
    2)CONTINUE W NEXT ONE
    3)SKIP FILES(FWD OR BKWD)
    4)REINITIALIZE

    SSW(0)=ON TO ABORT PLOT, RESTART FILE

    SUGGESTED COLOURS: PASS 1=BLUE, 2=RED, 3=GREEN

    PARAMETERS:
    1.P
    2.T
    3.S
    4.SIGMA T

    SET SSW!
    MS051 : PAUSE 0001
    MS051 SUSP

3  0:GO
4  RESET MAGTAPE? Y=1, N=2 FOLLOWED BY PRESENT FILE #
    2 13
5  USING 1)CALCOMP, OR 2)ZETA... TYPE 1 OR 2:
    2
6  SKIP FILES? TO SKIP BKWD ENTER -(#.TO.SKIP +1)
    -1

7  MAX DEPTH(M)?
    250
8  X:Y RATIO=200:1. ENTER SAME/NEW VALUE:
    200
9  AVE. SPEED(M/S)?
    5.14848
10 Y-AXIS NOW= 10IN. ENTER SAME/NEW SIZE:
    10
11 CONTOUR WHICH PARAMETER?
    2
12 & WHICH ONE WILL FORM Y-AXIS? MIN VALUE? MAX-V? # UNITS/(LRG-DIV)?
    1 0 250 50

13 ENTER THE NUMBER OF CONTOURS TO BE PLOTTED:
14 PASS 1 HOW MANY?
    4
15 LIST THEM:
    4 7 10 13
    PASS 2 HOW MANY?
etc 4
    LIST THEM:
    5 8 11 14
etc 4
    PASS 3 HOW MANY?
    4
    LIST THEM:
    3 6 9 12
16 START AT RECORD? CONTOUR SET(1-100)?
    1 1
17 STOP AT REC? SET?
    118 100

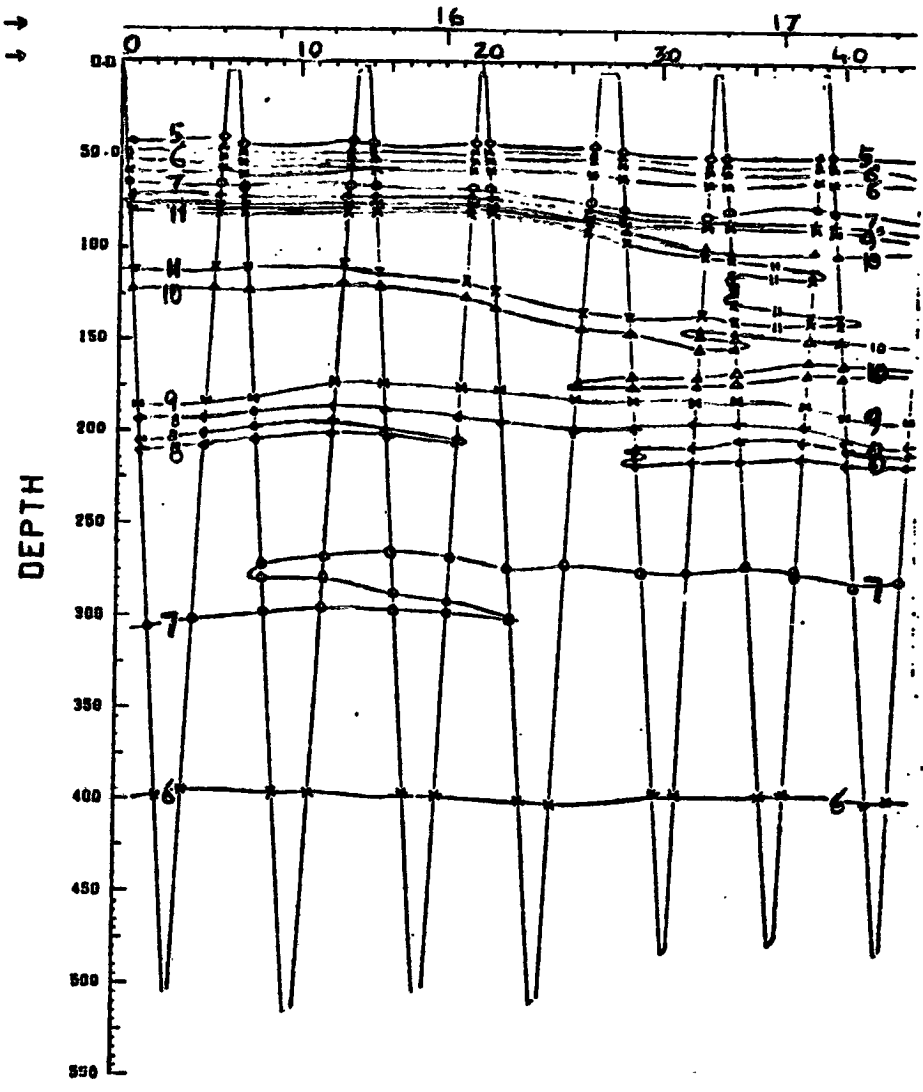
```

BATFISH TOW 75008 1054

TIME 1501.37 AV SPEED 5.15 M/S

SYMBOL	TEMP CONTOUR
B	4.0
L	7.0
U	10.0
E	13.0
R	5.0
D	8.0
V	11.0
S	14.0
Z	3.0
M	6.0
W	9.0
W	12.0

HR →
KM →



```

0001 FTN
0002 PROGRAM MS053
0003 C
0004 C V=14 5,12,75
0005 C PLOTS CONTOURED BATFISH DATA W/O GEOGRAPHIC COORD'S. USES
0006 C 'MEAN SHIP SPEED' TO CALCULATE DISTANCE FROM START OF TOW
0007 C INPUT: U=0, 1000FL-PT ='S AS PUT OUT BY PROGRAM MS012
0008 DIMENSION DA(1000),NC(3),C(3,25),NYM(3,25)
0009 COMMON NRIN,C,NC,NYM
0010 C
0011 C INITIALIZE: MT=MAGTAPE INPUT=0 NWRD=INPUT BUF'R WORD SIZE
0012 1 MT=7
0013 NWRD=2000
0014 INFO=1
0015 NCOLR=1
0016 C
0017 C SET UP PLOTTING SYMBOLS FOR CONTOURS
0018 DO 2 I=1,25,5
0019 DO 2 J=1,5
0020 L=J-1
0021 DO 2 K=1,3
0022 IDIOT=I+L
0023 2 NYM(K,IDIOT)=L+5*(K-1)
0024 NYM(3,4)=0
0025 NYM(3,9)=0
0026 WRITE(1,1825)
0027 WRITE(1,1102)
0028 WRITE(1,1000)
0029 PAUSE 1
0030 WRITE(1,1001)
0031 NFIN=1
0032 READ(1,*)NRIN,NFIN
0033 GO TO (3,4)NRIN
0034 C
0035 C INITIALIZE MAGTAPE PLOTTER
0036 3 CALL POSIT(MT,0,0,1,NEOF,NWRD)
0037 NFIN=1
0038 4 CALL PLTLU(9)
0039 C
0040 C SET PLOTTER SCALING FACTOR
0041 WRITE(1,1002)
0042 READ(1,*)D
0043 CALL FACT(D)
0044 C
0045 C NFIN=FILE COUNT/ NRIN=REC. COUNT/ NSKIP==FILES TO SKIP
0046 5 WRITE(1,1010)
0047 READ(1,*)NSKIP
0048 10 IF(NSKIP)12,13
0049 12 NFIN=NFIN+1
0050 13 NFIN=NFIN+NSKIP
0051 15 CALL POSIT(MT,NSKIP,0,2,NEOF,NWRD)
0052 20 NRIN=0
0053 25 GO TO (30,100)INFO
0054 C
0055 C GET PLOTTING INFO.

```

```

0056      30 WRITE(1,1030)
0057          READ(1,*)DM
0058          R=200.
0059          WRITE(1,1031)
0060          READ(1,*)R
0061          WRITE(1,1033)
0062          READ(1,*)SP
0063          YSIZE=0.
0064          YA=10.
0065          WRITE(1,1034)
0066          READ(1,*)YA
0067          D=39.2-D*10.2-(D-1.)*8.7
0068          IF(D-YA)40,45
0069      40 YA=D
0070      45 WRITE(1,1045)
0071          READ(1,*)M
0072          WRITE(1,1050)
0073          READ(1,*)NY,YMIN,YMAX,YLRG
0074      C
0075      COMPUTE PLOTTER SCALING
0076          NY=NY+1
0077          YS=-(YA-YSIZE)/(YMAX-YMIN)
0078          YSML=YS*YLRG/10.
0079          YSTEP=.01/YS
0080          XSKM=((YA/DM)/R)*1000.
0081      C
0082      C X-SCALING FACTOR IS IN IN/HR. INCOMING DATA MUST BE DIVIDED BY
0083      C 3600 (SEC/3600=HRS)
0084          XSHR=XSKM*SP*(3600./1000.)
0085          BIGHR=1.
0086          BIGKM=10.
0087          SMLHR=XSHR*BIGHR/6.
0088          SMLKM=-XSKM*BIGKM/10.
0089          STEPH=-.01/XSHR
0090          STEPK=.01/XSKM
0091      100 GO TO (102,135)NCOLR
0092      C
0093      C GET CONTOURING INFO
0094      102 WRITE(1,1103)
0095      104 DO 110 I=1,3
0096          NC(I)=-1
0097      106 WRITE(1,1106)I
0098          READ(1,*)NC(I)
0099          IF(NC(I))106,110,108
0100      108 WRITE(1,1108)
0101          L=NC(I)
0102          READ(1,*)(C(I,J),J=1,L)
0103      110 CONTINUE
0104      C
0105      C ASK FOR LOC'N OF DATA POSITION TAPE TO IT
0106      125 WRITE(1,1125)
0107          READ(1,*)IREC,ISET
0108          IF(-IREC)130,830
0109      130 WRITE(1,1130)
0110          READ(1,*)JREC,JSET
0111      135 L=ISTRN
0112      C      IF(NRIN-IREC)145,155,140
0113      C SKIP RECORDS BKWD

```

```

0114      140 L=NRIN-IREC+1
0115          CALL POSIT(MT,0,L,2,NEOF,NWRD)
0116          NRIN=IREC-1
0117      145 ISTRT=IREC-NRIN
0118      C
0119      C SKIP RECORDS FWD
0120          DO 170 L=1,ISTRT
0121      150 CALL EXEC(1,107B,DA,NWRD)
0122          CALL POSIT(MT,0,0,3,NEOF,NWRD)
0123          NRIN=NRIN+1
0124          IF(NEOF)820,155
0125      155 IF(ISSW(0))800,160
0126      160 IF(DA(1))165,170
0127      165 STN=-DA(1)
0128          CRU=DA(3)
0129          TIME=DA(2)
0130      170 CONTINUE
0131      C
0132      C GET START/STOP ADDRESSES WITHIN BUF'R, DEFINE PLOTTER ORIGIN
0133          ISTRT=ISET*10-9
0134          IEND=1000
0135          IF(IREC-JREC)180,175
0136      175 IEND=JSET*10-9
0137      180 GO TO (190,210)NCOLR
0138      C
0139      C GET START-TIME OF TOW; DEFINE PLOTTER ORIGIN
0140      190 IHR=TIME/100.+0.00001
0141          TIM0=TIME-100.*FLOAT(IHR)
0142          IMIN=TIM0+.001
0143          ISEC=(TIM0-FLOAT(IMIN))*100.+0.1
0144          TIM0=(FLOAT(IHR)*60.+FLOAT(IMIN))*60.+FLOAT(ISEC)
0145          CALL WHERE(X,Y)
0146          CALL PLOT(X,Y,-3)
0147          X=0.
0148          Y=0.
0149          CALL PLABL(X,Y,CRU,STN,YA,SP,M,NY,TIME)
0150          X=9.
0151          Y=.1
0152          CALL PLOT(X,Y,-3)
0153      C
0154      C INITIALIZE AXIS-VARIABLES
0155      210 XA=-8.5
0156          XF=-6.
0157          IP=3
0158          HRMIN=TIM0/3600.-7.95/XSHR
0159          XKMIN=0.-7.95/XSKM
0160          IF(-NC(NCOLR))220,821
0161      C
0162      C ANALYZE DATA, USING K TO LOOP THROUGH BUFFER
0163      220 DO 440 K=ISTRT,IEND,10
0164          IF(ISSW(0))800,224
0165      224 IF(DA(K))228,440,235
0166      228 IF(DA(K+1)-TIME)232,440,232
0167      232 STN=-DA(1)
0168          CRU=DA(3)
0169          WRITE(1,1232)NFIN,NRIN,STN,DA(K+1)
0170          GO TO 440
0171      C

```

```

0172 C N=TYPE OF CONTOUR, L=CONTOUR ADDRESS WITHIN BUFR
0173   235 N=IFIX(DA(K)+.01)
0174     L=K+1+N
0175     I=1
0176 C
0177 C SELECT DESIRED CONTOUR TYPE
0178   240 IF(N-M)270,250,270
0179 C
0180 C SELECT ONLY THOSE CONTOURS IN CORRECT COLOUR GROUP FOR THIS PASS
0181   250 IDIOT=NC(NCOLR)
0182   260 DO 265 J=1,IDIOT
0183     NDUMB=IFIX(100.*DA(L)+.01)-IFIX(100.*C(NCOLR,J)+.01)
0184     IF(NDUMB)265,290,265
0185   265 CONTINUE
0186 C
0187 C PLOT ALL DEPTH CONTOURS TO SHOW TRACK OF FISH (1ST PASS ONLY)
0188   270 GO TO (280,440)NCOLR
0189   280 GO TO (300,440)N
0190   290 I=2
0191 C
0192 C GET (X,Y) COORDS; STEP PAGE /OR PLOT AXES AS NECESSARY
0193   300 IDIOT=NY+K
0194     Y=YA+YS*(DA(IDIOT)-YMIN)
0195     IF(Y-YSIZE)320,310
0196   310 IF(YA-Y)320,330
0197   320 IP=3
0198     GO TO 440
0199   330 IF(DA(K+9)+.5)334,332
0200   332 X=XSKM*DA(K+9)+.55*(XA/8.5)
0201     GO TO 336
0202   334 X=XSHR*((DA(K+1)-TIM0)/3600.)+.55*(XA/8.5)
0203   336 IF(XF-X)340,370
0204 C
0205 C STEP PLOT TO NEW PAGE
0206   340 XA=XA+8.5
0207     XF=XA+7.95
0208     XSIZE=XA+7.95
0209     GO TO (350,360)NCOLR
0210 C
0211 C DRAW AXES (2 AXES IF PLOTTING VS TIME, 1 AXIS IF VS DISTANCE)
0212   350 CALL PLOT(XA,YSIZE,3)
0213     CALL YAXIS(XA,YA,YMIN,YMAX,YSTEP,YLRG,YSML,YS,YSIZE)
0214     CALL PLOT(XA,YA,3)
0215     XKMIN=XKMIN+7.95/XSKM
0216     CALL XAXIS(XA,YA,XKMIN,STEPK,BIGKM,SMLKM,XSKM,XSIZE,1.,1)
0217     IF(DA(K+9)+.5)354,360
0218   354 Y=YA+.35
0219     CALL PLOT(XSIZE,Y,3)
0220     HRMIN=HRMIN+7.95/XSHR
0221     HRMAX=HRMIN+7.95/XSHR
0222     CALL XAXIS(XSIZE,Y,HRMAX,STEPH,BIGHR,SMLHR,XSHR,XA,-1.,1)
0223     CALL PLOT(XA,YA,3)
0224   360 IP=3
0225     GO TO 300
0226   370 GO TO (380,375)NCOLR
0227   375 IP=3
0228   380 CALL PLOT(X,Y,IP)
0229     IP=2

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0230          GO TO (440,400)I
0231 C
0232 C PLOT SYMBOL FOR CONTOUR
0233     400 T=0.
0234         I=N YM(NCOLR,J)
0235         IF(I-6)410,420,410
0236     410 IF(I-12)430,420,430
0237     420 T=90.
0238     430 CALL SYMB(X,Y,.07,I,T,-2)
0239         CALL PLOT(X,Y,3)
0240     440 CONTINUE
0241 C
0242 C READ NEXT RECORD; END PLOT IF DATA EXHAUSTED
0243     ISTRT=1
0244     IF(NRIN-JREC+1)480,470,821
0245     470 IEND=JSET*10-9
0246     480 CALL EXEC(1,107B,DA,NWRD)
0247         CALL POSIT(MT,0,2,3,NEOF,NWRD)
0248         NRIN=NRIN+1
0249         IF(NEOF)820,220
0250 C
0251 C LISTING ABORTED. REWIND TAPE TO START OF FILE
0252     800 WRITE(1,1800)
0253         CALL POSIT(MT,-1,0,2,NEOF,NWRD)
0254         GO TO 825
0255 C
0256 C EOF
0257     820 NRIN=NRIN-1
0258         WRITE(1,1821)NFIN,NRIN
0259         NFIN=NFIN+1
0260 C
0261 C REPEAT IF THERE'S MORE VARIABLES TO PLOT. END OTHERWISE
0262     821 IF(NCOLR-3)822,825,825
0263     822 CALL PLOT(0.,YA,3)
0264         WRITE(1,1822)
0265         PAUSE 6
0266         NCOLR=NCOLR+1
0267         L=1
0268         INFO=2
0269         GO TO 835
0270     825 NCOLR=1
0271         XF=XF+.05
0272         CALL PLOT(XF,Y0,-3)
0273         CALL PLOT(0.,-.45,3)
0274         PAUSE 7
0275     830 WRITE(1,1830)
0276         READ(1,*)L
0277         WRITE(1,1831)
0278         READ(1,*)INFO
0279     835 NSKIP=(NEOF-1)/2-L
0280         GO TO (10,840,5,1)L
0281     340 NSKIP=1
0282         IF(NEOF)20,13
0283 C
0284     1000 FORMAT(//"PARAMETERS:"/"1.P"/"2.T"/"3.S"/"4.SIGMA T"//
0285         @" S E T   S S W !")
0286     1001 FORMAT("RESET MAGTAPE? Y=1, N=2 FOLLOWED BY PRESENT FILE =?"
0287     1002 FORMAT("USING 1)CALCOMP, OR 2)ZETA... TYPE 1 OR 2:")

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0288 1010 FORMAT("SKIP FILES? TO SKIP BKWD ENTER -(= TO SKIP +1)")
0289 1030 FORMAT("/"MAX DEPTH(M)?")
0290 1031 FORMAT("X:Y RATIO=200:1. ENTER SAME/NEW VALUE:")
0291 1033 FORMAT("AVE. SPEED(M/S)?")
0292 1034 FORMAT("Y-AXIS NOW= 10IN. ENTER SAME/NEW SIZE:")
0293 1045 FORMAT("CONTOUR WHICH PARAMETER?")
0294 1050 FORMAT(" WHICH ONE WILL FORM Y-AXIS? M I N VALUE? MAX"
0295 @"-V? = UNITS/(LEG-DIV)?")
0296 1102 FORMAT("SUGGESTED COLOURS: PASS 1=BLUE, 2=RED, 3=GREEN"/)
0297 1103 FORMAT("/"ENTER THE NUMBER OF CONTOURS TO BE PLOTTED:")
0298 1106 FORMAT("PASS"12" HOW MANY?")
0299 1108 FORMAT("LIST THEM:")
0300 1125 FORMAT("START AT RECORD? CONTOUR SET(1-100)?")
0301 1130 FORMAT("STOP AT REC? SET?")
0302 1232 FORMAT("FILE"14"> REC"14". NEW LABEL: STN"F6.0" TIME"F8.2)
0303 1800 FORMAT("/"ABORT ! TAPE REWOUND TO START OF FILE"/" R E S E T
0304 @"S S W !")
0305 1821 FORMAT("EOF FILE"14,">"14" RECORDS")
0306 1822 FORMAT("/"CHANGE PEN")
0307 1825 FORMAT(///"BRANCHES:"/"1)RESTART FILE"/"2)CONTINUE W NEXT ON
0308 @/"3)SKIP FILES(FWD OR BKWD)"/"4)REINITIALIZE"/"SSW(0)=ON TO
0309 @" ABORT PLOT, RESTART FILE"/)
0310 1830 FORMAT("/"WHICH BRANCH?")
0311 1831 FORMAT("1)NEW, OR 2)SAME PLOTTER SCALING VALUES?")
0312 END
0313 C
0314 C
0315 SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0316 C
0317 C V=9 31,1,75 FOR USE UNDER DOS
0318 C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES RECORDS
0319 C N=MT UNIT, NF==FILES TO SKIP, NR==RECORDS TO SKIP, NSEL=OPTION
0320 COMMON NRIN,C,NC,NYM
0321 2 NEOF=1
0322 3 NUNIT=0
0323 NSEL=NBRAN
0324 GO TO (5,5,5,5,5,5,5,4,5,4)N
0325 4 NUNIT=1
0326 5 GO TO (20,50)NSEL
0327 10 WRITE(1,1010)NUNIT
0328 15 PAUSE 1
0329 C
0330 CHECKIF UNIT ONLINE, THEN REWIND IT(RESETS HARDWARE)
0331 20 IF(LOCAL(N))10,30
0332 30 NEOF=256+N
0333 CALL EXEC(3,NEOF)
0334 GO TO 9000
0335 C
0336 C SKIPS RECORDS/FILES
0337 40 CALL PTAPE(N,NF,NR)
0338 NSEL=4
0339 C
0340 CHECKS STATUS OF MT UNIT
0341 50 CALL EXEC(13,N,ISTAT,ILOG)
0342 IF(ISTAT)50,60
0343 60 GO TO (9000,40,90,70)NSEL
0344 C
0345 CHECKS FOR EOT AFTER A (BUFFER)WRITE C.

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0346      70 IF(IEOT(N))80,9000
0347      80 WRITE(1,1080)NUNIT
0348          CALL RWSTB(N)
0349          GO TO 15
0350  C
0351 CHECKS FOR MISC AFTER A (BUFFER)READ C.
0352      90 IF(IEOF(N))100,110
0353      100 NEOF=-2
0354          GO TO 9000
0355      110 NSEL=NRIN+1
0356          IF(IEOT(N))80,120
0357      120 IF(IERR(N))130,140
0358      130 WRITE(1,1130)NSEL
0359      140 I=IWRDS(N)
0360          IF(I-NWRD)150,9000,150
0361      150 WRITE(1,1150)NSEL,I
0362      1010 FORMAT("READY TAPE UNIT"13)
0363      1080 FORMAT("EOT ON"13/"LOAD NEXT TAPE")
0364      1130 FORMAT("REC"15": TIM/PAR ERROR")
0365      1150 FORMAT("REC"15": TAPE ERROR>"15" WORDS XFERRED")
0366      9000 RETURN
0367      END
0368  C
0369  C
0370          SUBROUTINE YAXIS(XA,YA,VMIN,VMAX,VINCR,DVLRG,SML,SCALE,SIZE)
0371  C
0372  C PLOTS Y-AXIS SIMILIAR TO 'XAXIS'
0373      J=10
0374      DVSML=SML
0375      CALL XAXIS(XA,YA,VMAX,VINCR,DVLRG,VALUE,SCALE,SIZE,1.,2)
0376      START=YA+(VALUE-VMIN)*SCALE
0377      GO TO 55
0378      30 CALL PLOT(XA,YSIZE,2)
0379      Y=START
0380      CALL PLOT(XA,Y,3)
0381      DVSML=-DVSML
0382      J=0
0383      40 Y=Y+DVSML
0384      J=J+1
0385          IF((SIZE-.002)-Y)50,30
0386      50 IF(Y-YA)60,60,100
0387      55 Y=START
0388      60 CALL PLOT(XA,Y,2)
0389      TIK=.05+XA
0390          IF(J-5)90,64,66
0391      64 TIK=.1+XA
0392      GO TO 90
0393      66 IF(J-10)90,70
0394      70 TIK=.15+XA
0395      J=0
0396      VALUE=VMIN+(Y-YA)/SCALE
0397      P=Y-.04
0398      D=XA-.4
0399      CALL PLOT(D,P,3)
0400          IF(VALUE-99.9)80,80,75
0401      75 CALL NUMB(D,P,.1,VALUE,0.,-1)
0402      GO TO 85
0403      80 CALL NUMB(D,P,.1,VALUE,0.,1)

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0404      85 CALL PLOT(XA,Y,3)
0405      90 CALL PLOT(TIK,Y,2)
0406      CALL PLOT(XA,Y,2)
0407      GO TO 40
0408      100 Y=YA
0409      CALL PLOT(XA,Y,2)
0410      CALL PLOT(XA,Y,3)
0411      RETURN
0412      END
0413      C
0414      C
0415      SUBROUTINE XAXIS(XA,YA,VMIN,VINCR,DVLRG,SML,SCALE,SIZE,Z,N)
0416      C
0417      C N=1, SCALES   DRAWS X-AXIS: Z=+1 FOR KM-AXIS, Z=-1 FOR HR-AXIS
0418      C =2, COMPUTES STARTING VALUE FOR YAXIS,   RETURNS TO OTHER SUBR
0419      XS=SCALE
0420      IF(Z)2,4
0421      2 J=6
0422      XS=-XS
0423      GO TO 6
0424      4 J=10
0425      6 DVSML=SML
0426      VALUE=VMIN-2.*VINCR
0427      C
0428      C START AT MIN VALUE. FIND VALUE AT 1ST MAJOR DIV BY SUCC ADD*N
0429      10 VALUE=VALUE+VINCR
0430      VNEXT=VALUE+VINCR
0431      IVAL=(VALUE+VINCR/10.)/DVLRG
0432      INEXT=(VNEXT+VINCR/10.)/DVLRG
0433      IF(VNEXT)12,13
0434      12 INEXT=INEXT-1
0435      13 IF(VALUE)14,15
0436      14 IVAL=IVAL-1
0437      15 IF(ABS(FLOAT(INEXT)-FLOAT(IVAL))-.5)10,20
0438      20 GO TO (55,25)N
0439      25 SML=DVLRG*FLOAT(IVAL)
0440      GO TO 900
0441      C
0442      CHANGE DIRECTION OF TRAVEL
0443      30 CALL PLOT(XA,YA,2)
0444      X=START
0445      CALL PLOT(X,YA,3)
0446      DVSML=-DVSML
0447      J=0
0448      C
0449      C STEP TO NEXT DIV
0450      40 X=X+DVSML
0451      J=J+1
0452      C
0453      C IF X-COORD<0, RETURN TO 1ST MAJOR DIV   DRAW REMAINING PART
0454      IF(Z*(X-XA))30,50
0455      C
0456      CHECK IF X-COORD IS PAST END OF SCALE
0457      50 IF(Z*(X-SIZE-Z*.002))60,60,100
0458      C
0459      C GET COORD FOR 1ST MAJOR DIV   PLOT DOWNWARDS
0460      55 IF(Z)57,58
0461      57 START=DVLRG*FLOAT(IVAL)

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0462      GO TO 59
0463      58 START=DVLRG*FLOAT(INEXT)
0464      59 START=XA+XS*(START-VMIN)* Z
0465      X=START
0466      60 CALL PLOT(X, YA, 2)
0467      TIK=YA-.05
0468      IF(J-3-IFIX(Z+Z*.1)-1)90,64,66
0469      64 TIK=YA-.1
0470      GO TO 90
0471      66 IF(J-6-2*IFIX(Z+Z*.1)-2)90,70
0472      70 TIK=YA-.15
0473      J=0
0474      P=X
0475      D=YA+.05
0476      C
0477      COMPUTE PLOT VALUE CORR. TO MAJOR DIV
0478      VALUE=VMIN+ Z*(X-XA) /XS
0479      CALL PLOT(P, D, 3)
0480      CALL NUMB(P, D, .1, VALUE, 0., -1)
0481      CALL PLOT(X, YA, 3)
0482      C
0483      C PLOT DIV
0484      90 CALL PLOT(X, TIK, 2)
0485      CALL PLOT(X, YA, 2)
0486      GO TO 40
0487      100 X=SIZE
0488      CALL PLOT(X, YA, 2)
0489      CALL PLOT(X, YA, 3)
0490      900 RETURN
0491      END
0492      C
0493      C
0494      SUBROUTINE PLABL(X, Y, CRU, STN, YA, SP, NCON, NY, TIME)
0495      C
0496      C LABELS PLOT OF BATFISH TOW
0497      DIMENSION LA(6), LB(3), LC(4), LD(4), LG(2), LBL(4, 3), C(3, 25), NCB
0498      @NYM(3, 25), L(3), LK(2)
0499      COMMON NRIN, C, NC, NYM
0500      C
0501      C ALL LABELS IN ASCII BECAUSE FTN2 DOESN'T ACCEPT 2H@@ FORMAT
0502      C LA=BATFISH TOW*LB=SYMBOL*LC=CONTOUR*LE=KM*LF=HR*LD=AV SPEED*
0503      C LG= M/S*LH=-*LBL: 1=DEPTH, 2=TEMP, 3=SAL, 4=SIG T*LK=TIME
0504      LA(1)=41101B
0505      LA(2)=52106B
0506      LA(3)=44523B
0507      LA(4)=44040B
0508      LA(5)=52117B
0509      LA(6)=53440B
0510      LB(1)=51531B
0511      LB(2)=46502B
0512      LB(3)=47514B
0513      LC(1)=41517B
0514      LC(2)=47124B
0515      LC(3)=47525B
0516      LC(4)=51040B
0517      LD(1)=40526B
0518      LD(2)=20123B
0519      LD(3)=50105B

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0520      LD(4)=42504B
0521      LE=45515B
0522      LF=44122B
0523      LG(1)=20115B
0524      LG(2)=27523B
0525      LH=20
0526      LK(1)=052111B
0527      LK(2)=046505B
0528      LBL(1,1)=42105B
0529      LBL(1,2)=50124B
0530      LBL(1,3)=44040B
0531      LBL(2,1)=52105B
0532      LBL(2,2)=46520B
0533      LBL(2,3)=20040B
0534      LBL(3,1)=51501B
0535      LBL(3,2)=46040B
0536      LBL(3,3)=20040B
0537      LBL(4,1)=51511B
0538      LBL(4,2)=43455B
0539      LBL(4,3)=52040B
0540      CALL SYMB(1.,9.5.,.21,LA,0.,12)
0541      CALL NUMB(3.75,9.5.,.21,CRU,0.,-1)
0542      CALL NUMB(5.2,9.5.,.21,STN,0.,-1)
0543      CALL SYMB(7.5,10.4.,.14,LF,0.,2)
0544      CALL SYMB(7.92,10.4.,.14,LH,0.,-1)
0545      CALL SYMB(7.92,10.05.,.14,LH,0.,-1)
0546      CALL SYMB(7.5,10.05.,.14,LE,0.,2)
0547      CALL SYMB(6.81,8.5.,.14,LG,0.,4)
0548      CALL NUMB(6.25,8.5.,.14,SP,0.,2)
0549      CALL SYMB(5.,8.5.,.14,LD,0.,8)
0550      CALL SYMB(1.,8.5.,.14,LK,0.,4)
0551      CALL NUMB(2.25,8.5.,.14,TIME,0.,2)
0552      CALL SYMB(1.,8.,.14,LB,0.,6)
0553      DO 20 I=1,3
0554      20 L(I)=LEL(NCON,I)
0555      CALL SYMB(2.5,8.,.14,L,0.,6)
0556      CALL SYMB(3.2,8.,.14,LC,0.,8)
0557      Y=7.57
0558      DO 45 J=1,3
0559      IDIOT=NC(J)
0560      IF(IDIOT)45,45,25
0561      25 DO 40 I=1,IDIOT
0562      CALL SYMB(1.5,Y.,.14,NYM(J,I),0.,-1)
0563      Y=Y-.07
0564      CALL NUMB(3.,Y.,.14,C(J,I),0.,1)
0565      40 Y=Y-.2
0566      45 Y=Y-.25
0567      Y=YA/2.
0568      IDIOT=NY-1
0569      DO 50 I=1,3
0570      50 L(I)=LEL(IDIOT,I)
0571      CALL SYMB(8.25,Y.,.21,L,90.,5)
0572      RETURN
0573      END
0574      ENDS

```

4.5.2 Program: MS082

Purpose

To plot raw CTD data. Parameters to be plotted on either axis can be any one of pressure, temperature, salinity, or σ_t .

Hardware Requirements

HP2100 supporting DOS or DOSM

teletype for parameter input/output

mag tape transport (unit 0) for data input

plotter (Calcomp 563 or Zeta 100) for data output

Description

Maximum size for the y-axis is determined by the choice of plotter. Indicators of 100 m, 200, etc., are superimposed on the trace. Any one of P, T, S, or σ_t can be chosen for either axis. Scaling is automatically done from minimum/maximum values entered by the user.

Operating Instructions

Refer to sample printout provided in 4.5.2.5.

- (1) Program is called by typing :PR,MS082
- (2) Program lists branches, parameters, and ssw options, then pauses at 001.
- (3) Type :GO
- (4) Enter 1 to reset the mag tape hardware, this rewinds the tape; enter 2 followed by the current file number, if the tape has been previously positioned.
- (5) Enter 1 or 2. Program sets maximum y-axis size available, and corrects for different plotter resolutions.
- (6) Enter the number of files to be skipped. If the mag tape has been previously positioned enter -1 to position the tape to the start of the current file.
- (7-10) Enter CTD calibration data. If there is more than one question/line, enter the corresponding answers on one line.
- (11) Enter maximum differences between successive samples, on one line. Differences between successive samples larger than this are considered spikes.
- (12-13) Enter starting address, ending address. A negative value for starting frame causes a branch to pause 0007 (line 18 below).

- (14-17) Enter 1, 2, 3, or 4 for the type of parameter to be plotted on the y-axis, followed on the next line by its minimum and maximum value (in physical units), size of axis in inches, and the number of physical units per large division. Repeat for x-axis values. Plotting then begins; see sample provided. 'ST' on the plot indicates where the plotting started.
- (18) When finished, program pauses at 0007. Type :GO
- (19) Enter 1, 2, 3, or 4.
- (20) Enter 1 or 2.
- (21) Enter 1 or 2.
- (22) Enter 1, 2, or 3.

etc.

NOTE: Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample Printout

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1  :PR,MS082

2  BRANCHES:
    1)RESTART FILE
    2)CONTINUE W NEXT ONE
    3)SKIP FILES(FWD OR BKWD)
    4)REINITIALIZE

    SSW(0)=ON TO ABORT PLOT,RESTART FILE
    SSW(15)=OFF TO PLOT ALL RAW DATA/ =ON TO PLOT DESPIKED DATA

    BEST ZETA GRAPH SIZE=7.95X10.5 IN

    PARAMETERS:
    1)P
    2)T
    3)S
    4)SIGMA T

    SET SSW'SI
      MS082 : PAUSE    0001
      MS082 SUSP

3  0:GO

4  RESET TAPE#0? Y=1, N=2 FOLLOWED BY PRESENT FILE#
    1

5  USING 1)CALCOMP, OR 2)ZETA... TYPE 1 OR 2:
    2

6  SKIP FILES?
    3

7  P: SCALING(DBAR/VOLT)?, OFFSET(V)?
    666.667 .0046

8  T-OFFSET(V)?, C-OFFSET(V)?
    -.013 0

9  SAL CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?
    0 35

10 SAL T.C.-CORR'N= .134 ENTER SAME/NEW CORR'N:
    .134

11 MAX DIFF BETWEEN SUCCESSIVE SAMPLES OF:
    P(M)?, T(DEG)?, S(PPT)?, SIG-T?
    4 2 1 1

12 START.. FRAME?, SAMPLE?
    1 1

13 STOP.. FR?, SAM?
    11 300

14 Y-AXIS:
    PARAMETER ? (TYPE 1,2,3, OR 4)
    2

15 MIN VALUE(PHYS-UNIT)? MAX(SAME)? AXIS-SIZE(IN)? #-UNITS/(LRG-DIV)?
    5 12 10 1

16 X-AXIS:
    PARAMETER (1,2,3, OR,4) ?
    3

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17/ MIN-V? MAX-V? AXIS-SIZE? # UNITS/(LRG-DIV)?
    33 35.5 7.9 .5
    MS082 : PAUSE    0007
18  MS082 SUSP

    0:GO

19  WHICH BRANCH?
    1
20  1)NEW, OR 2)SAME CTD CAL'N?
    2
21  1)NEW, OR 2)SAME PLOTTER SCALING?
    1
22  1 DO NOT PLOT AXES
    2 PLOT AXES W/O LABELS
    3 ' ' ' W ' '
    TYPE 1,2, OR 3:
    3
etc  START.. FRAME?, SAMPLE?
    1 1
    STOP.. FR?, SAM?
    11 300

Y-AXIS:
PARAMETER ? (TYPE 1,2,3, OR 4)
2
MIN VALUE(PHYS-UNIT)? MAX(SAME)? AXIS-SIZE(IN)? #-UNITS/(LRG-DIV)?
5 12 10 1

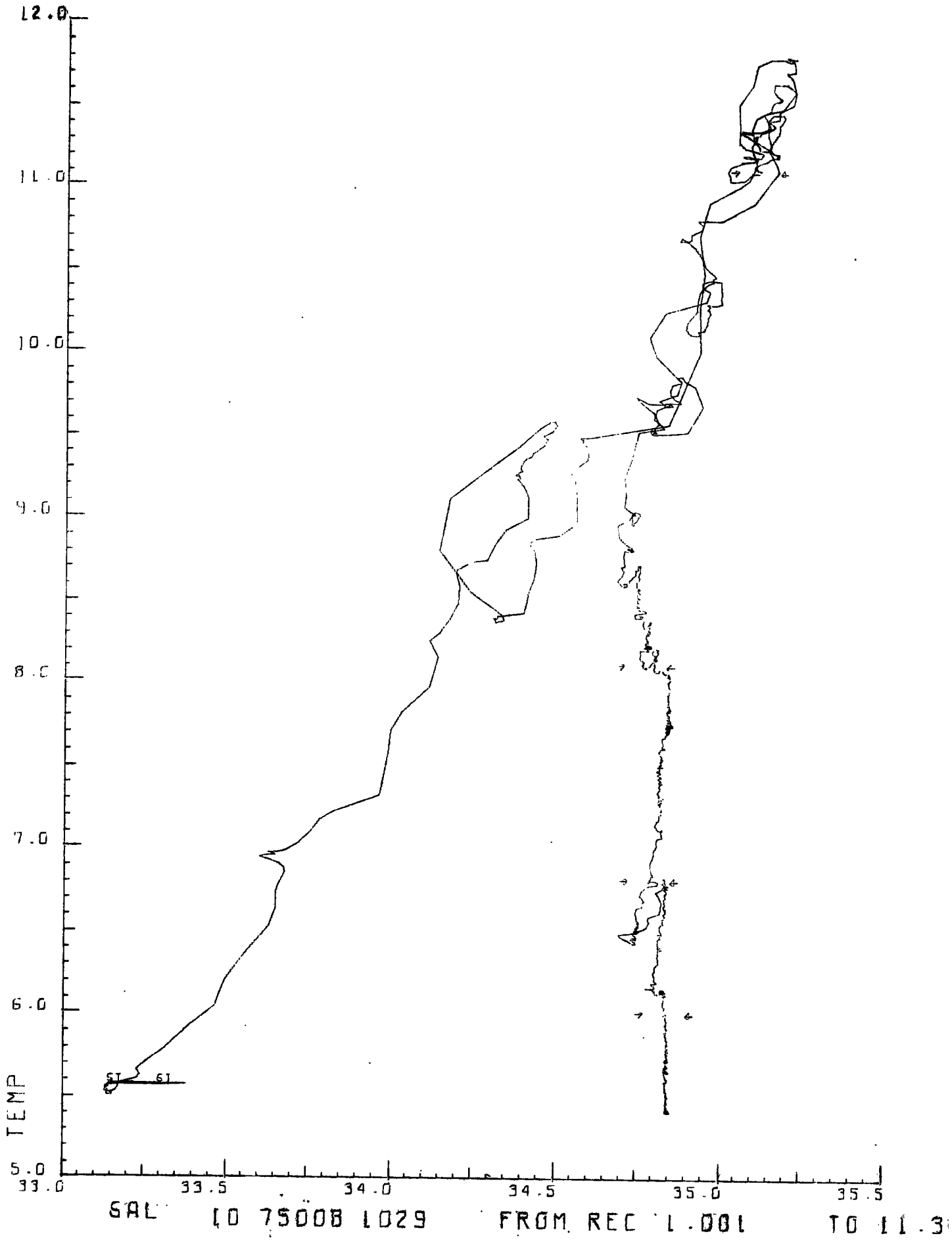
X-AXIS:
PARAMETER (1,2,3, OR,4) ?
1
MIN-V? MAX-V? AXIS-SIZE? # UNITS/(LRG-DIV)?
0 500 7.9 50
    MS082 : PAUSE    0007
    MS082 SUSP

    0:GO

WHICH BRANCH?
1
1)NEW, OR 2)SAME CTD CAL'N?
2
1)NEW, OR 2)SAME PLOTTER SCALING?
1
1 DO NOT PLOT AXES
2 PLOT AXES W/O LABELS
3 ' ' ' W ' '
TYPE 1,2, OR 3:
3
START.. FRAME?, SAMPLE?
1 1
STOP.. FR?, SAM?
11 300

Y-AXIS:
PARAMETER ? (TYPE 1,2,3, OR 4)
1
MIN VALUE(PHYS-UNIT)? MAX(SAME)? AXIS-SIZE(IN)? #-UNITS/(LRG-DIV)?
0 500 10 50

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0001 FTN
0002     PROGRAM MS032
0003 C
0004 C V=7 4,10,75
0005 C PLOTS ANY PARAMETER AGAINST ANY OTHER (P,T,S,SIGMA-T)
0006 C INPUT IS ON UNIT=0; FORMAT DESCRIBED IN PROGRAM PR012
0007 C USING STATEMENT F'NS KEEPS MAX= OF SOURCE PROGS <6, WHICH ENABLES
0008 COMPILATION AT ONE TIME UNDER BCS-FTN
0009     DIMENSION IN(904),V(3),R(4),RMAX(4),RMIN(4),U(4),DEL(4)
0010     COMMON NRIN
0011 C
0012 CALL FOR SALINITY=SAL(P,T,Q(P,T,C)). BENNETT'72-SEE PR012
0013     Q(P,T,C)=C/(((1.+((.6166E-14*P-.54845E-9)*P+.160836E-4)*P/((
0014     @.3169E-3*T+.030786)*T+1.)))*(((((-.804E-10*T+.772633E-8
0015     @)*T-.895439E-6)*T+.112681E-3)*T+.0200464)*T+.676605))
0016     SAL(P,T,B)=(((((-1.32311*B+5.98624)*B-10.61869)*B+12.18882)
0017     @*B+28.8567)*B-.08996+B*(B-1.))*((.0442-.00046*T-.004*B)
0018     @*T+(.000125-.29E-5*T)*P)
0019 C
0020 C SIGMA-T=SIGMT(T,S). BENNETT'72-SEE PR012
0021     SIGMT(T,S)=(((((-.577E-6*S+.5994E-4)*S+.563E-5*T-.21192E-2)
0022     @*S+((-.96E-6*T+.7674E-4)*T-.37845E-2)*T+.8333893)*S
0023     @+((.7103E-4*T-.90399E-2)*T+.70023E-1)*T-.13230
0024 C
0025 C INITIALIZE: MT=MAGTAPE INPUT=0 NWRD=INPUT BUF'R WORD SIZE
0026 C KOFST,KPLOT,KLBL=POINTERS. IN=INPUT ='S. V=VOLTAGES. R=REAL
0027 C RMAX=MAX-R.V. RMIN=MIN R.V. DEL=SPIKE SIZES. U=PREVIOUS-R
0028     1 MT=7
0029     NWRD=904
0030     KOFST=1
0031     KPLOT=1
0032     KLBL=3
0033     DE=100.
0034     DO 2 I=1,4
0035     R(I)=0.
0036     2 RMIN(I)=0.
0037     RMIN(2)=-2.5
0038     RMAX(2)=32.5
0039     RMAX(3)=41.
0040     RMAX(4)=35.
0041     WRITE(1,1825)
0042     WRITE(1,1000)
0043     PAUSE 1
0044 C
0045 C INITIALIZE MAGTAPE PLOTTER
0046     NFIN=1
0047     WRITE(1,1001)
0048     READ(1,*)NRIN,NFIN
0049     GO TO (3,4)NRIN
0050     3 CALL POSIT(MT,0,0,1,NEOF,NWRD)
0051     4 CALL PLTLU(9)
0052 C
0053 C SET PLOTTER SCALING FACTOR
0054     WRITE(1,1002)
0055     READ(1,*)BRAND

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0056      CALL FACT(BRAND)
0057 C : NFIN=FILE COUNT NRIN=RECORD COUNT, NSKIP==FILES TO SKIP
0058      5 WRITE(1,1010)
0059      READ(1,*)NSKIP
0060      10 IF(NSKIP)12,13
0061      12 NFIN=NFIN+1
0062      13 NFIN=NFIN+NSKIP
0063      15 CALL POSIT(MT,NSKIP,0,2,NEOF,NWRD)
0064      20 NRIN=0
0065      25 GO TO (30,100)KOFST
0066 C
0067 C GET SCALING OFFSETS FOR CTD
0068      30 WRITE(1,1030)
0069      READ(1,*)PSC,P0
0070      RMAX(1)=PSC*(P0+3.05)
0071      P0=P0*PSC
0072      WRITE(1,1035)
0073      READ(1,*)T0,C0
0074      T0=T0*10.
0075      40 WRITE(1,1040)
0076      READ(1,*)SCELL,CENTR
0077      IF(CENTR-35.)50,55,40
0078      50 IF(CENTR-33.)40,60,40
0079      55 CENTR=4.
0080      GO TO 65
0081      60 CENTR=3.7949
0082      65 STC=.9
0083      WRITE(1,1064)STC
0084      READ(1,*)STC
0085      WRITE(1,1065)
0086      READ(1,*)(DEL(L),L=1,4)
0087 C
0088 C ASK FOR LOC'N OF DATA, POSITION TAPE TO START OF DATA
0089      100 WRITE(1,1100)
0090      READ(1,*)IREC,ISAM
0091      IF(-IREC)110,830
0092      110 WRITE(1,1110)
0093      READ(1,*)JREC,JSAM
0094      IF(NRIN-IREC)140,162,120
0095 C
0096 C SKIP RECORDS BKWD
0097      120 L=-(NRIN-IREC+1)
0098      CALL POSIT(MT,0,L,2,NEOF,NWRD)
0099      NRIN=IREC-1
0100      140 ISTRT=IREC-NRIN
0101 C
0102 C SKIP RECORDS FWD
0103      DO 160 L=1,ISTRT
0104      145 CALL EXEC(1,107B,IN,NWRD)
0105      CALL POSIT(MT,0,0,3,NEOF,NWRD)
0106      NRIN=NRIN+1
0107      IF(NEOF)820,150
0108      150 IF(ISSW(0))800,160
0109      160 CONTINUE
0110 C
0111 C GET START/STOP ADDRESSES WITHIN BUF'R, DEFINE PLOTTER ORIGIN
0112      162 ISMPL=13.*.25
0113      ISTRT=ISAM*3+2

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0114      IEND=902
0115      IF(NRIN-JREC)175,170
0116      170 IEND=JSAM*3+2
0117      C
0118      C DEFINE PLOTTER ORIGIN/ ASK FOR SCALING
0119      175 CALL WHERE(X,Y)
0120      CALL PLOT(X,Y,-3)
0121      GO TO (177,185)KPLOT
0122      C
0123      C ASK PLOTTER SCALING
0124      177 WRITE(1,1176)
0125      READ(1,*)NY
0126      WRITE(1,1177)
0127      READ(1,*)YMIN,YMAX,YSIZE,YLRG
0128      CRU=39.2-BRAND*10.2-(BRAND-1.)*8.8
0129      IF(CRU-YSIZE)178,182
0130      178 YSIZE=CRU
0131      182 WRITE(1,1178)
0132      READ(1,*)NX
0133      WRITE(1,1179)
0134      READ(1,*)XMIN,XMAX,XSIZE,XLRG
0135      YSCAL=YSIZE/(YMAX-YMIN)
0136      YSTEP=.01/YSCAL
0137      YSML=-YSCAL*YLRG*.1
0138      XSCAL=XSIZE/(XMAX-XMIN)
0139      XSTEP=.01/XSCAL
0140      XSML=-XSCAL*XLRG*.1
0141      C
0142      C BEGIN PLOTTING
0143      185 IF(ISSW(0))800,187
0144      187 CALL PLOT(.5,.45,-3)
0145      X=0.
0146      Y=0.
0147      GO TO (210,195,190)KLBL
0148      C
0149      C PLOT AXIS LABELS
0150      190 CRU=FLOAT(IFIX(FLOAT(IN(2))/100.+0.001))
0151      CRU=1000.*CRU+FLOAT(IN(2))-100.*CRU
0152      STN=FLOAT(IN(1))
0153      V(1)=FLOAT(IREC)+.001*FLOAT(ISAM)
0154      V(2)=FLOAT(JREC)+.001*FLOAT(JSAM)
0155      CALL LABEL(X,Y,CRU,STN,V(1),V(2),XSIZE,YSIZE,NX,NY)
0156      C
0157      C PLOT X-AXIS
0158      195 CALL XAXIS(X,Y,XMIN,XSTEP,XLRG,XSML,XSCAL,XSIZE)
0159      CALL PLOT(0.,0.,3)
0160      C
0161      C PLOT Y-AXIS
0162      CALL YAXIS(X,Y,YMIN,YSSTEP,YLRG,YSML,YSCAL,YSIZE)
0163      210 INITL=2
0164      IPEN=3
0165      SOLD=.0001*FLOAT(IN(ISTR+2))
0166      C
0167      C ANALYZE DATA, USING K TO LOOP THRU BUF'R
0168      220 DO 400 K=ISTR,IEND,ISMPL
0169      IF(ISSW(0))800,222
0170      C
0171      C GET VOLTAGES

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0172      222 V(1)=.0001*FLOAT(IN(K))
0173          V(2)=.0001*FLOAT(IN(K+1))
0174      C
0175      C INSERT TIME CONST CORR*N
0176      225 V(3)=.0001*FLOAT(IN(K+2))
0177          X=V(3)
0178          V(3)=V(3)+STC*(SOLD-V(3))
0179          SOLD=X
0180      C
0181      C GET P,T,S; CORRECT T FOR NONLINEARITY OF 200MSEC T-SENSORS, AND
0182      COND RATIO FOR COMPRESSIBILITY & THERMAL EXPANSION OF C-CELL
0183          GO TO (235,240)INITL
0184      235 DO 237 I=1,4
0185          237 U(1)=R(1)
0186          240 R(1)=PSC*V(1)-P0
0187              R(2)=10.*V(2)
0188              R(2)=R(2)+(.425E-4*R(2)-.000591)*R(2)-T0
0189              R(3)=(CENTR+V(3)-C0)*.25
0190              R(3)=R(3)*(1+.102E-6*R(1)-.32E-5*(R(2)-15.))
0191              R(3)=SAL(R(1),R(2),Q(R(1),R(2),R(3)))-SCELL
0192              R(4)=SIGMT(R(2),R(3))
0193              IF(ISSW(15))250,320
0194      C
0195      C SEARCH OUT SPIKES(DATA OUT OF RANGE OF SENSOR CAL*N)
0196          250 DO 275 I=1,4
0197              260 IF(R(I)-RMIN(I))370,265
0198              265 IF(RMAX(I)-R(I))370,270
0199              270 GO TO (272,275)INITL
0200          272 IF(ABS(U(1)-R(1))-DEL(I))275,370
0201          275 CONTINUE
0202          320 X=(R(NX)-XMIN)*XSCAL
0203              Y=(R(NY)-YMIN)*YSCAL
0204              IF(X)370,325
0205          325 IF(XSIZE-X)370,330
0206          330 IF(Y)370,335
0207          335 IF(YSIZE-Y)370,340
0208          340 GO TO (350,345)INITL
0209      C
0210      C 1ST TIME AROUND: LBL6=ST      N100= - SYMBOL FOR EVERY 100 M.
0211          345 INITL=1
0212              U(1)=R(1)
0213              NDE=6
0214              D=X-.2
0215              CALL PLOT(D,Y,3)
0216              LBL6=51524B
0217              CALL SYMB(D,Y,.07,LBL6,0.,2)
0218              D=X+.2
0219              CALL SYMB(D,Y,.07,LBL6,0.,2)
0220              CALL PLOT(X,Y,3)
0221      C
0222      C PLOT VALUE. CHECK FOR 100M INTVLS
0223          350 CALL PLOT(X,Y,IPEN)
0224              IPEN=2
0225              IF(IFIX(U(1)/DE)-IFIX((R(1)+.01)/DE))360,400,360
0226          360 D=X+.2
0227              CALL PLOT(D,Y,3)
0228              CALL SYMB(D,Y,.07,NDE,90.,-1)
0229              D=X-.2

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0230      CALL SYMB(D,Y,.07,NDE,270.,-1)
0231      CALL PLOT(X,Y,3)
0232      GO TO 400
0233      370 IPEN=3
0234      400 CONTINUE
0235 C
0236 CHECK TO SEE IF FINISHED, IF NOT READ IN NEXT BUF'R
0237      410 ISTRT=5
0238          IF(NRIN-JREC+1)430,420,415
0239      415 D=8.5*FLOAT(IFIX(XSIZE/8.5))+8.
0240      CALL PLOT(D,-.45,-3)
0241      PAUSE 5
0242      WRITE(1,1832)
0243      READ(1,*)KPLOT
0244          IF(KPLOT)830,830,416
0245      416 WRITE(1,1833)
0246      READ(1,*)KLBL
0247          IF(KLBL)830,830,100
0248      420 IEND=JSAM*3+2
0249      430 IF(ISSW(0))800,440
0250      440 CALL EXEC(1,107B,IN,NWRD)
0251      CALL POSIT(MT,0,0,3,NEOF,NWRD)
0252      NRIN=NRIN+1
0253      IF(NEOF)820,220
0254 C
0255 C LISTING ABORTED. REWIND TAPE TO START OF FILE
0256      800 WRITE(1,1800)
0257      CALL POSIT(MT,-1,0,2,NEOF,NWRD)
0258      GO TO 821
0259 C
0260 C EOF
0261      820 NRIN=NRIN-1
0262      WRITE(1,1821)NFIN,NRIN
0263      NFIN=NFIN+1
0264      D=8.5*FLOAT(IFIX(XSIZE/8.5))+8.
0265      821 CALL PLOT(D,-.45,-3)
0266      PAUSE 7
0267      830 WRITE(1,1830)
0268      READ(1,*)L
0269      WRITE(1,1831)
0270      READ(1,*)KOFST
0271      WRITE(1,1832)
0272      READ(1,*)KPLOT
0273      WRITE(1,1833)
0274      READ(1,*)KLBL
0275      NSKIP=(NEOF-1)/2-L
0276      GO TO (10,840,5,1)L
0277      840 NSKIP=1
0278      IF(NEOF)20,13
0279 C
0280      1000 FORMAT(///"PARAMETERS:"/"1)P"/"2)T"/"3)S"/"4)SIGMA T"//
0281          @" S E T   S S W ' S!")
0282      1001 FORMAT("/RESET TAPE=0? Y=1, N=2 FOLLOWED BY PRESENT FILE=")
0283      1002 FORMAT("USING 1)CALCOMP, OR 2)ZETA... TYPE 1 OR 2:")
0284      1010 FORMAT("SKIP FILES? TO SKIP BKWD ENTER -(= TO SKIP +1)")
0285      1030 FORMAT("P: SCALING(DBAR/VOLT)?, OFFSET(V)?")
0286      1035 FORMAT("T-OFFSET(V)?, C-OFFSET(V)?")
0287      1040 FORMAT("SAL CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?")

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0288 1064 FORMAT("SAL T.C.-CORR'N="F5.3," ENTER SAME/NEW CORR'N:")
0289 1065 FORMAT("MAX DIFF BETWEEN SUCCESSIVE SAMPLES OF:"/"P(M)?, "
0290 @"T(DEG)?, S(PPT)?, SIG-T?")
0291 1100 FORMAT("START.. FRAME?, SAMPLE?")
0292 1110 FORMAT("STOP.. FR?, SAM?")
0293 1176 FORMAT("/" Y -AXIS:"/"PARAMETER ? (TYPE 1,2,3, OR 4)")
0294 1177 FORMAT("MIN VALUE(PHYS-UNIT)? MAX(SAME)? AXIS-SIZE(IN)? "
0295 @""=-UNITS/(LRG-DIV)?")
0296 1178 FORMAT("/" X -AXIS:"/"PARAMETER (1,2,3, OR,4) ?")
0297 1179 FORMAT("MIN-V? MAX-V? AXIS-SIZE? = UNITS/(LRG-DIV)?")
0298 1180 FORMAT("1)PLOT AXES? 2)NO AXES?")
0299 1800 FORMAT("/"ABORT! TAPE REWOUND TO START OF FILE"/"
0300 @" R E S E T S S W!")
0301 1821 FORMAT("EOF-"17, "."17" RECORDS")
0302 1825 FORMAT(///"BRANCHES:"/"1)RESTART FILE"/"2)CONTINUE W NEXT"
0303 @" ONE"/"3)SKIP FILES"/"4)REINITIALIZE"/"SSW(0)=ON TO"
0304 @" ABORT PLOT,RESTART FILE"/"SSW(15)=OFF TO PLOT ALL RAW"
0305 @" DATA/ =ON TO PLOT DESPIKED DATA")
0306 1830 FORMAT("/"WHICH BRANCH?")
0307 1831 FORMAT("1)NEW, OR 2)SAME CTD CAL'N?")
0308 1832 FORMAT("1)NEW, OR 2)SAME PLOTTER SCALING?")
0309 1833 FORMAT("1 DO NOT PLOT AXES"/"2 PLOT AXES W/O LABELS"/"3 ""
0310 @" ' W '"/"TYPE 1,2, OR 3:")
0311 END
0312 C
0313 C
0314 SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0315 C
0316 C V=9 31,1,75 FOR USE UNDER DOS
0317 C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES RECORDS
0318 C N=MT UNIT, NF==FILES TO SKIP, NR==RECORDS TO SKIP, NSEL=OPTION
0319 COMMON NRIN
0320 2 NEOF=1
0321 3 NUNIT=0
0322 NSEL=NBRAN
0323 GO TO (5,5,5,5,5,5,5,4,5,4)N
0324 4 NUNIT=1
0325 5 GO TO (20,50)NSEL
0326 10 WRITE(1,1010)NUNIT
0327 15 PAUSE 1
0328 C
0329 CHECKIF UNIT ONLINE, THEN REWIND IT(RESETS POINTERS)
0330 20 IF(LOCAL(N))10,30
0331 30 NEOF=256+N
0332 CALL EXEC(3,NEOF)
0333 GO TO 9000
0334 C
0335 C SKIPS RECORDS/FILES
0336 40 CALL PTAPE(N,NF,NR)
0337 NSEL=4
0338 C
0339 CHECKS STATUS OF MT UNIT
0340 50 CALL EXEC(13,N,ISTAT,ILOG)
0341 IF(ISTAT)50,60
0342 60 GO TO (9000,40,90,70)NSEL
0343 C
0344 CHECKS FOR EOT AFTER A (BUFFER)WRITE C.
0345 70 IF(IEOT(N))80,9000

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0346      80 WRITE(1,1080)NUNIT
0347      CALL RWSTB(N)
0348      GO TO 15
0349  C
0350 CHECKS FOR MISC AFTER A (BUFFER)READ C.
0351      90 IF(IEOF(N))100,110
0352      100 NEOF=-2
0353      GO TO 9000
0354      110 NSEL=NRIN+1
0355      IF(IEOT(N))80,120
0356      120 IF(IEOT(N))130,140
0357      130 WRITE(1,1130)NSEL
0358      140 I=IWRDS(N)
0359      IF(I-NWRD)150,9000,150
0360      150 WRITE(1,1150)NSEL,I
0361      1010 FORMAT("READY TAPE UNIT"13)
0362      1080 FORMAT("EOT ON"13/"LOAD NEXT TAPE")
0363      1130 FORMAT("REC"15": TIM/PAR ERROR")
0364      1150 FORMAT("REC"15": TAPE ERROR>"15" WORDS XFERRED")
0365      9000 RETURN
0366      END
0367  C
0368  C
0369      SUBROUTINE XAXIS(XA,YA,VMIN,VINCR,DVLRG,SML,SCALE,SIZE)
0370  C
0371  C SCALES   DRAWS X-AXIS
0372      J=10
0373      DVSML=SML
0374  C
0375  C START AT MIN VALUE. FIND VALUE AT 1ST MAJOR DIV BY SUCC ADD*N
0376      VALUE=VMIN-2.*VINCR
0377      10 VALUE=VALUE+VINCR
0378      VNEXT=VALUE+VINCR
0379      IVAL=(VALUE+VINCR/10.)/DVLRG
0380      INEX=(VNEXT+VINCR/10.)/DVLRG
0381      IF(VNEXT)12,13
0382      12 INEX=INEX-1
0383      13 IF(VALUE)14,15
0384      14 IVAL=IVAL-1
0385      15 IF(ABS(FLOAT(INEX)-FLOAT(IVAL))-.5)10,55
0386  C
0387 CHANGE DIRECTION OF TRAVEL
0388      30 X=START
0389      CALL PLOT(XA,YA,2)
0390      CALL PLOT(X,YA,3)
0391      DVSML=-DVSML
0392      J=0
0393  C
0394  C STEP TO NEXT DIV
0395      40 X=X+DVSML
0396      J=J+1
0397  C
0398  C IF X-COORD<0, RETURN TO 1ST MAJOR DIV,   DRAW REMAINING X-AXIS
0399      IF(X)30,50
0400  C
0401 CHECK IF X-COORD IS PAST END OF SCALE
0402      50 IF(X-SIZE-.002)60,60,100
0403  C

```

```

0404 C GET COORD FOR 1ST MAJOR DIV PLOT DOWNWARDS
0405 55 START=(DVLRG*FLOAT(INEX)-VMIN)*SCALE
0406 X=START
0407 60 CALL PLOT(X,YA,2)
0408 TIK=.05
0409 IF(J-5)90,64,66
0410 64 TIK=.1
0411 GO TO 90
0412 66 IF(J-10)90,70
0413 70 TIK=.15
0414 J=0
0415 P=X-.34
0416 C
0417 COMPUTE PLOT VALUE CORR. TO MAJOR DIV
0418 VALUE=VMIN+(X-XA)/SCALE
0419 CALL PLOT(P,-.14,3)
0420 IF(VALUE-99.9)80,80,75
0421 75 P=P+.1
0422 CALL NUMB(P,-.14,.1,VALUE,0.,-1)
0423 GO TO 85
0424 80 CALL NUMB(P,-.14,.1,VALUE,0.,1)
0425 85 CALL PLOT(X,YA,3)
0426 C
0427 C PLOT DIV
0428 90 CALL PLOT(X,TIK,2)
0429 CALL PLOT(X,YA,2)
0430 GO TO 40
0431 100 X=SIZE
0432 CALL PLOT(X,YA,2)
0433 CALL PLOT(X,YA,3)
0434 RETURN
0435 END
0436 C
0437 C
0438 SUBROUTINE YAXIS(XA,YA,VMIN,VINCR,DVLRG,SML,SCALE,SIZE)
0439 C
0440 C SCALES PLOTS Y-AXIS, SIMILIARLY TO 'XAXIS'
0441 J=10
0442 DVSML=SML
0443 VALUE=VMIN-2.*VINCR
0444 10 VALUE=VALUE+VINCR
0445 VNEXT=VALUE+VINCR
0446 IVAL=(VALUE+VINCR/10.)/DVLRG
0447 INEX=(VNEXT+VINCR/10.)/DVLRG
0448 IF(VNEXT)12,13
0449 12 INEX=INEX-1
0450 13 IF(VALUE)14,15
0451 14 IVAL=IVAL-1
0452 15 IF(ABS(FLOAT(INEX)-FLOAT(IVAL))-.5)10,55
0453 30 Y=START
0454 CALL PLOT(XA,YA,2)
0455 CALL PLOT(XA,Y,3)
0456 DVSML=-DVSML
0457 J=0
0458 40 Y=Y+DVSML
0459 J=J+1
0460 IF(Y)30,50
0461 50 IF(Y-SIZE-.002)60,60,100

```

```

0462      55 START=(DVLRG*FLOAT(INEX)-VMIN)*SCALE
0463      Y=START
0464      60 CALL PLOT(XA,Y,2)
0465      TIK=.05
0466      IF(J-5)90,64,66
0467      64 TIK=.1
0468      GO TO 90
0469      66 IF(J-10)90,70
0470      70 TIK=.15
0471      J=0
0472      VALUE=VMIN+(Y-YA)/SCALE
0473      CALL PLOT(-.4,Y,3)
0474      IF(VALUE-99.9)80,80,75
0475      75 CALL NUMB(-.4,Y,.1,VALUE,0.,-1)
0476      GO TO 85
0477      80 CALL NUMB(-.4,Y,.1,VALUE,0.,1)
0478      85 CALL PLOT(XA,Y,3)
0479      90 CALL PLOT(TIK,Y,2)
0480      CALL PLOT(XA,Y,2)
0481      GO TO 40
0482      100 Y=SIZE
0483      CALL PLOT(XA,Y,2)
0484      CALL PLOT(XA,Y,3)
0485      RETURN
0486      END
0487      C
0488      C
0489      SUBROUTINE LABEL(X,Y,XID,STN,ST,EN,XSIZE,YSIZE,NX,NY)
0490      C
0491      C DRAWS ALL REQUIRED AXES LABELS
0492      DIMENSION LBL(4,3),LBL4(4),L(3)
0493      C
0494      C AXIS LABELS: 1=DEPTH 2=TEMP 3=SAL 4=SIG T
0495      LBL(1,1)=42105B
0496      LBL(1,2)=50124B
0497      LBL(1,3)=44040B
0498      LBL(2,1)=52105B
0499      LBL(2,2)=46520B
0500      LBL(2,3)=20040B
0501      LBL(3,1)=51501B
0502      LBL(3,2)=46040B
0503      LBL(3,3)=20040B
0504      LBL(4,1)=51511B
0505      LBL(4,2)=43455B
0506      LBL(4,3)=52040B
0507      C
0508      C LBL4=FROM REC/ LBL5=TO/ LBL3=ID IN ASCII, FOR FTN (NOT FTN4)
0509      LBL4(1)=43122B
0510      LBL4(2)=47515B
0511      LBL4(3)=20122B
0512      LBL4(4)=42503B
0513      LBL5=52117B
0514      LBL3=44504B
0515      C
0516      C PLOT X-AXIS LABEL
0517      A=X+.4
0518      B=-.35
0519      DO 10 I=1,3

```

```
0520      10 L(I)=LBL(NX,I)
0521          CALL SYMB(A,B,.14,L,0.,6)
0522          CALL SYMB(1.2,-.4,.14,LBL3,0.,2)
0523          CALL NUMB(1.6,-.4,.14,XID,0.,-1)
0524          CALL NUMB(2.4,-.4,.14,STN,0.,-1)
0525          CALL SYMB(3.5,-.4,.14,LBL4,0.,8)
0526          CALL NUMB(4.8,-.4,.14,ST,0.,3)
0527          CALL SYMB(6.1,-.4,.14,LBL5,0.,2)
0528          CALL NUMB(6.5,-.4,.14,EN,0.,3)
0529          B=Y+.3
0530          DO 30 I=1,3
0531      30 L(I)=LBL(NY,I)
0532          CALL SYMB(-.3,B,.14,L,90.,6)
0533          CALL PLOT(X,Y,3)
0534          RETURN
0535          END
0536          ENDS
**** LIST END **
@
```

4.5.3 Program: MS101

Purpose

To plot raw *Batfish*/CTD data versus time using fixed scaling such that the plot is suitable for CTD calibration. Up to four parameters (pressure, temperature, salinity, and sigma t) may be plotted at one time.

Hardware Requirements

HP2100 supporting DOS or DOSM

teletype for parameter input/output

mag tape transport for data input (unit 0)

plotter (Calcomp 563 or Zeta 100) for data output

Description

A cyclical plot is used to enable the scales to be highly expanded without exceeding the plotter boundaries, i.e., if a parameter being plotted runs off the top of the plot, it re-enters at the bottom. Thus temperature can be scaled at 0.1 deg/inch, salinity at 0.1 ppt/inch, sigma t at 0.1 units/inch. Pressure scaling is also high resolution, but depends on the range of transducer used (it is computed after the CTD calibration data is inputted). The y-axis is 10.5 inches long, with increments every one inch, and with a 0.5 inch overlap. The plot is paginated; the y-axes auto-ranging with the values of the corresponding parameters. Any number of parameters up to 4 can be plotted, the program pausing in between plots to permit change of pen. On the y-axis, values for the first parameter plotted are given every inch. Values for the remaining parameters are given for the major divisions straddling the point at which the plot crosses the y-axis. The x-axis coordinate is the frame count. If acquisition was done at a rate of 5 samples/second, then one frame = 1 minute's data (for a rate of 4/s, 1 frame = 75 s).

Operating Instructions

Refer to sample printout provided below.

- (1) Program is called by typing :PR,MS101
- (2) Program lists branches and parameters available.
- (3) Type :GO
- (4) Enter 1 to reset the mag tape hardware, this rewinds the tape; enter 2 followed by the current file number, if the tape has been previously positioned.
- (5) Enter 1 or 2. Program corrects for different plotter resolutions.
- (6) Enter the number of files to be skipped. If the mag tape has been previously positioned, enter -1 to position the tape to the start of the current file.

- (7-10) Enter CTD calibration data (F.S. means full scale). If there is more than one question/line, enter the corresponding answers on one line.
- (11) Enter maximum differences allowed between successive samples. Differences larger than this are considered to be spikes.
- (12) Enter the number of parameters to be plotted.
- (13) List these parameters.
- (14) Enter starting and ending frames.
- (15) Enter the scaling desired.
- (16) Plotting begins, with a pause in between plots to allow for changing of the pen. When finished, program pauses at 0007.
- (17) Reply to WHICH BRANCH? with 1, 2, 3, or 4.
- (18) Reply to NEW(1) or SAME(2) CTD CALIBRATION? with a 1 or 2.
- etc.

NOTE Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample Printout

```

1  :PR,MS101 / SAMPLE PRINT-OUT

2  BRANCHES
   1)RESTART FILE
   2)CONTINUE W NEXT ONE
   3)SKIP FILES
   4)REINITIALIZE

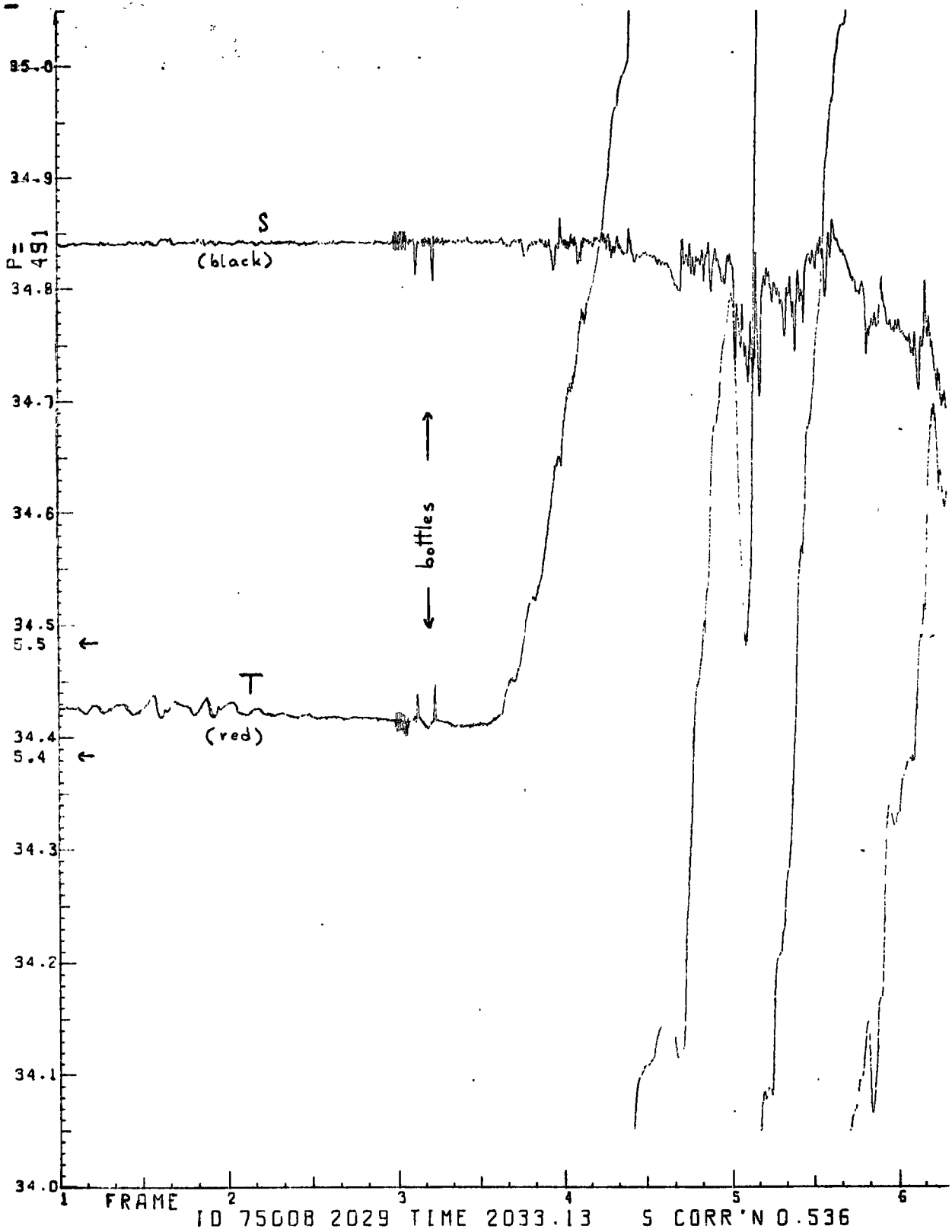
   SSW(0)=ON TO ABORT PLOT,RESTART FILE
   SSW(15)=OFF TO PLOT RAW DATA/ =ON TO PLOT DESPIKED DATA

   PARAMETERS:
   1)P
   2)T
   3)S
   4)SIGMA T

   SET SSW'S!
   MS101 : PAUSE 0001
   MS101 SUSP

3  0:GO
4  RESET TAPE? Y=1, N=2 FOLLOWED BY PRESENT FILE #
   1
5  USING 1)CALCOMP, OR 2)ZETA... TYPE 1 OR 2:
   2
6  SKIP FILES? TO SKIP BKWD ENTER -(#.TO.SKIP +1)
   8
7  P: SCALING (DBAR/VOLT)? OFFSET(V)?
   666.7 .0046
8  1-OFFSET(V)?, C-OFFSET(V)?
   -.013 0
9  SAL CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?
   0 35
10 SAL T.C.-CORR'N= .134. ENTER SAME/NEW CORR'N:
   .134
11 MAX DIFF BETWEEN SUCCESSIVE SAMPLES OF:
   P(M)?, T(DEG)?, S(PPT)?, SIG-T?
   5 2 1 1
12 PLOT HOW MANY PARAMETERS?
   2
13 LIST THEM (ON SAME LINE):
   3 2
14 START FRAME#? STOP FRAME#?
   1 100
15 X-AXIS: # OF SAMPLES/INCH?
   200

```




```

0001 FTN
0002 PROGRAM MS101
0003 C
0004 C V=17 9,12,75
0005 C PLOTS RAW DATA VS TIME, WITH RESOLUTION NEEDED FOR CTD
0006 CALIBRATION. 1IN=.1DEG,.1PPT. CIRCULAR PLOT, WITH Y-AXIS
0007 C AUTOMATICALLY CORRECTING FOR ANY CHANGE IN VALUES
0008 C INPUT IS ON UNIT=0
0009 C USING STATEMENT F'NS KEEPS MAX= OF SOURCE PROGS <6, WHICH ENABLES
0010 COMPILATION AT ONE TIME UNDER BCS-FTN
0011 DIMENSION IN(904),V(3),R(4),RMAX(4),RMIN(4),U(4),DEL(4)
0012 @,NV(4),LBL(3),LTIM(2),LB(4)
0013 COMMON NRIN
0014 C
0015 CALL FOR SALINITY=SAL(P,T,Q(P,T,C)). BENNETT'72-SEE PR012
0016 Q(P,T,C)=C/((1.+((6.166E-15*P-5.4845E-10)*P+1.60836E-5)*P/((
0017 @3.169E-4*T+3.0786E-2)*T+1.)))*((( (-.804E-10*T+.772633E-8
0018 @)*T-.895439E-6)*T+.112681E-3)*T+.0200464)*T+.676605))
0019 SAL(P,T,B)=((( (-1.32311*B+5.98624)*B-10.61869)*B+12.18882)
0020 @*B+28.8567)*B-.08996+B*(B-1.))*((.442E-1-.46E-3*T-4.E-3*B)
0021 @*T+(1.25E-4-2.9E-6*T)*P)
0022 C
0023 C SIGMA-T=SIGMT(T,S). BENNETT'72-SEE PR012
0024 SIGMT(T,S)=((( (-.577E-6*S+.5994E-4)*S+.563E-5*T-.21192E-2)
0025 @*S+((- .96E-6*T+.7674E-4)*T-.37345E-2)*T+.8333393)*S
0026 @+((.7103E-4*T-.90399E-2)*T+.70023E-1)*T-.13230
0027 C
0028 C INITIALIZE: MT=MAGTAPE INPUT=0 NWRD=INPUT BUF'R WORD SIZE
0029 C KOFST,KPLOT,KLBL=POINTERS. IN=INPUT ='S. V=VOLTAGES. R=REAL
0030 C RMAX=MAX-R.V. RMIN=MIN R.V. DEL=SPIKE SIZES. U=PREVIOUS-R
0031 1 MT=7
0032 NWRD=904
0033 KOFST=1
0034 NDONE=1
0035 C
0036 C ID=ID, LTIM=TIME, LBL=FRAME ..ASCII CODING, FOR FTN2 LABELLING
0037 C LB= S CORR'N, DE= ' P= '
0038 ID=44504B
0039 LTIM(1)=52111B
0040 LTIM(2)=46505B
0041 LBL(1)=43122B
0042 LBL(2)=40515B
0043 LBL(3)=42440B
0044 LB(1)=51440B
0045 LB(2)=41517B
0046 LB(3)=51122B
0047 LB(4)=23516B
0048 DE=50075B
0049 DO 2 I=1,4
0050 R(I)=0.
0051 2 RMIN(I)=0.
0052 RMIN(2)=-2.5
0053 RMAX(2)=32.5
0054 RMAX(3)=41.
0055 RMAX(4)=35.

```

```

0056     WRITE(1,1825)
0057     WRITE(1,1000)
0058     PAUSE 1
0059     WRITE(1,1001)
0060     NFIN=1
0061     READ(1,*)NRIN,NFIN
0062     GO TO (3,4)NRIN
0063     C
0064     C INITIALIZE MAGTAPE PLOTTER
0065         3 CALL POSIT(MT,0,1,NEOF,NWRD)
0066         NFIN=1
0067         4 CALL PLTLU(9)
0068     C
0069     C SET PLOTTER SCALING FACTOR
0070         WRITE(1,1002)
0071         READ(1,*)D
0072         CALL FACT(D)
0073     C
0074     C NFIN=FILE COUNT NRIN=RECORD COUNT, NSKIP==FILES TO SKIP
0075         5 WRITE(1,1010)
0076         READ(1,*)NSKIP
0077         10 IF(NSKIP)12,13
0078         12 NFIN=NFIN+1
0079         13 NFIN=NFIN+NSKIP
0080         15 CALL POSIT(MT,NSKIP,0,2,NEOF,NWRD)
0081         20 NRIN=0
0082         25 GO TO (30,100)KOFST
0083     C
0084     C GET SCALING OFFSETS FOR CTD
0085         30 WRITE(1,1030)
0086         READ(1,*)PSC,P0
0087         RMAX(1)=PSC*(P0+.05)
0088         P0=P0*PSC
0089         WRITE(1,1035)
0090         READ(1,*)T0,C0
0091         T0=T0*10.
0092         40 WRITE(1,1040)
0093         READ(1,*)SCELL,CENTR
0094         IF(CENTR-35.)50,55,40
0095         50 IF(CENTR-33.)40,60,40
0096         55 CENTR=4.
0097         GO TO 65
0098         60 CENTR=3.7949
0099         65 STC= .8
0100         WRITE(1,1064)STC
0101         READ(1,*)STC
0102         WRITE(1,1065)
0103         READ(1,*)(DEL(L),L=1,4)
0104     C
0105     C ASK FOR LOC'N OF DATA, POSITION TAPE TO START OF DATA
0106         100 GO TO (102,115)NDONE
0107         102 WRITE(1,1102)
0108         READ(1,*)NDO
0109         WRITE(1,1103)
0110         READ(1,*)(NV(L),L=1,NDO)
0111         WRITE(1,1100)
0112         READ(1,*)IREC,JREC
0113         IF(-IREC)115,830

```

```

0114 115 IF(NRIN-IREC)140,162,120
0115 C
0116 C SKIP RECORDS BKWD
0117 120 L=-(NRIN-IREC+1)
0118 CALL POSIT(MT,0,L,2,NEOF,NWRD)
0119 NRIN=IREC-1
0120 140 ISTRT=IREC-NRIN
0121 C
0122 C SKIP RECORDS FWD
0123 DO 160 L=1,ISTRT
0124 145 CALL EXEC(1,107B,IN,NWRD)
0125 CALL POSIT(MT,0,0,3,NEOF,NWRD)
0126 NRIN=NRIN+1
0127 IF(NEOF)820,150
0128 150 IF(ISSW(0))800,160
0129 160 CONTINUE
0130 C
0131 C GET START/STOP ADRESSES WITHIN BUF'R
0132 162 ISMPL=3
0133 ISTRT=5
0134 IEND=902
0135 GO TO (165,185)NDONE
0136 C
0137 C DEFINE PLOTTER ORIGIN, SET UP X-AXIS VARIABLES. S=PHYS-UN
0138 C LRG,MIN,STEP=PHYS-UN SML,SIZE=INCHES
0139 165 CALL WHERE(X,Y)
0140 CALL PLOT(X,Y,-3)
0141 WRITE(1,1067)
0142 READ(1,*)XS
0143 XS=1./XS
0144 XSFR=XS*300.
0145 XSTEP=.01/XSFR
0146 XLRG=1.
0147 XSML=(-XSFR*XLRG)/6.
0148 XMIN=FLOAT(NRIN)-7.95/XSFR
0149 X=.5
0150 Y=.45
0151 CALL PLOT(X,Y,-3)
0152 C
0153 C GET ID'S, RECOMPUTE ID1 INTO STANDARD FORMAT
0154 XID1=FLOAT(IFIX(FLOAT(IN(2))/100.+001))
0155 XID1=1000.*XID1+FLOAT(IN(2))-100.*XID1
0156 XID2=FLOAT(IN(1))
0157 C
0158 C GET TIME INTO FORMAT HHMM.SS
0159 TIM=0.
0160 IF(IN(4))170,175
0161 170 TIM=65536.
0162 175 TIM=TIM+65536.*FLOAT(IN(3))+FLOAT(IN(4))
0163 IHR=TIM/3600.+0001
0164 TIM=TIM-3600.*FLOAT(IHR)
0165 IMIN=TIM/60.+01
0166 ISEC=TIM-60.*FLOAT(IMIN)
0167 TIM=100.*FLOAT(IHR)+FLOAT(IMIN)+.01*FLOAT(ISEC)
0168 C
0169 C LABEL PLOT
0170 180 Y=-.35
0171 CALL SYMB(1.2,Y,.14,ID,0.,2)

```

```

0172 CALL NUMB(1.6,Y,.14,XID1,0.,-1)
0173 CALL NUMB(2.4,Y,.14,XID2,0.,-1)
0174 CALL SYMB(3.1,Y,.14,LTIM,0.,4)
0175 CALL NUMB(3.8,Y,.14,TIM,0.,2)
0176 CALL SYMB(5.2,Y,.14,LB,0.,8)
0177 CALL NUMB(6.4,Y,.14,STC,0.,3)
0178 Y=-.2
0179 CALL SYMB(.4,Y,.14,LBL,0.,6)
0180 C SET UP Y-AXIS VARIABLES
0181 185 NOW=NV(NDONE)
0182 ZSTEP=1.
0183 YS=10.
0184 GO TO (190,203)NOW
0185 190 YS=PSC*.1
0186 IF(YS-FLOAT(IFIX(YS+.01)))195,200
0187 195 YS=25.*(FLOAT(IFIX(YS/25+.00001))+2.)
0188 200 YS=1./YS
0189 ZSTEP=10./YS
0190 203 YLRG=1./YS
0191 YSML=-YLRG*YS*.1
0192 YSTEP=.01/YS
0193 YSIZE=10.5
0194 YA=0.
0195 XA=-8.5
0196 XF=-6.
0197 INITL=2
0198 W=.0001*FLOAT(IN(ISTRT+2))
0199 GO TO 220
0200 205 INITL=1
0201 ZERO=FLOAT(IFIX(R(NOW)/ZSTEP))*ZSTEP
0202 X=0.
0203 C
0204 C ANALYZE DATA, USING K TO LOOP THROUGH BUFFER
0205 220 DO 400 K=ISTRT,IEND,ISMPL
0206 IF(ISSW(0))800,225
0207 C GET VOLTAGES
0208 225 V(1)=.0001*FLOAT(IN(K))
0209 V(2)=.0001*FLOAT(IN(K+1))
0210 V(3)=.0001*FLOAT(IN(K+2))
0211 CORRECT COND. VOLTAGE FOR APPROPRIATE TIME CONSTS
0212 C=V(3)+STC*(W-V(3))
0213 W=V(3)
0214 C GET P,T,S;CORRECT T FOR NONLINEARITY OF 200MSEC T-SENSOR,
0215 COND RATIO FOR COMPRESSIBILITY THERMAL EXPANSION OF C-CELL
0216 230 DO 235 I=1,4
0217 235 U(I)=R(I)
0218 R(1)=V(1)*PSC-P0
0219 R(2)=V(2)*10.
0220 R(2)=R(2)+(.425E-4*R(2)-.000591)*R(2)-T0
0221 R(3)=(CENTR+C-C0)/4.
0222 R(3)=R(3)*(1+.102E-6*R(1)-.32E-5*(R(2)-15.))
0223 R(3)=SAL(R(1),R(2),Q(R(1),R(2),R(3)))-SCELL
0224 R(4)=SIGMT(R(2),R(3))
0225 C SEARCH OUT SPIKES
0226 240 DO 255 I=1,4
0227 IF(R(I)-RMIN(I))315,245
0228 245 IF(RMAX(I)-R(I))315,247
0229 247 GO TO (250,255)INITL

```

```

0230 250 IF(ABS(U(1)-R(1))-DEL(1))255,315
0231 255 CONTINUE
0232 GO TO (270,205)INITL
0233 C
0234 C VALUE TOO LOW. RESCALE GRAPH W LOWER VALUES (MOVES TRACE UPWARD)
0235 260 ZERO=ZERO-ZSTEP
0236 CALL PLOT(X,YA,2)
0237 D=YA+10.
0238 CALL PLOT(X,D,3)
0239 GO TO 270
0240 C
0241 C
0242 C VALUE TOO HIGH. RESCALE GRAPH UPWARD (MOVES PLOT DOWNWARD)
0243 265 ZERO=ZERO+1.
0244 D=YA+10.5
0245 CALL PLOT(X,D,2)
0246 D=YA+.5
0247 CALL PLOT(X,D,3)
0248 270 Y=R(NOW)-ZERO
0249 IF(-Y)275,260
0250 275 IF(1.05-Y)265,280
0251 280 Y=Y*YS
0252 285 X=XSFR*(FLOAT(NRIN-IREC)+(FLOAT(K)-5.)/900.+.55*(XA/8.5)
0253 IF(XF-X)290,320
0254 C
0255 C END OF PAGE. STEP TO NEXT PAGE DRAW AXES
0256 290 XA=XA+8.5
0257 XSIZE=XA+7.95
0258 XMIN=XMIN+7.95/XSFR
0259 GO TO (295,300)NDONE
0260 295 CALL PLOT(XA,YA,3)
0261 CALL YAXIS(XA,YA,ZERO,YSTEP,YLRG,YSML,YS,YSIZE)
0262 X=XA-.3
0263 Y=FLOAT(IFIX(Y))+.2
0264 CALL SYMB(X,Y,.14,DE,90.,2)
0265 X=XA-.1
0266 CALL NUMB(X,Y,.14,R(1),90.,-1)
0267 CALL PLOT(XA,YA,3)
0268 CALL XAXIS(XA,YA,XMIN,XSTEP,XLRG,XSML,XSFR,XSIZE)
0269 GO TO 310
0270 C
0271 C PUT IN DEPTH VALUE ALONGSIDE START OF PLOT
0272 300 X=XA-.4
0273 D=FLOAT(IFIX(Y))
0274 Y=D-.15*FLOAT(NDONE-1)-.05
0275 D=(D-YA)/YS+ZERO
0276 IF(D-99.9)304,304,302
0277 302 CALL NUMB(X,Y,.1,D,0.,-1)
0278 GO TO 306
0279 304 CALL NUMB(X,Y,.1,D,0.,1)
0280 306 Y=Y+1.
0281 D=D+YLRG
0282 IF (D-99.9)309,309,307
0283 307 CALL NUMB(X,Y,.1,D,0.,-1)
0284 GO TO 310
0285 309 CALL NUMB(X,Y,.1,D,0.,1)
0286 310 XF=XA+7.95
0287 IP=3

```

```

0288      GO TO 270
0289      315 IP=3
0290      320 CALL PLOT(X,Y,IP)
0291      IP=2
0292      400 CONTINUE
0293      C
0294      CHECK TO SEE IF FINISHED, IF NOT READ IN NEXT BUF'R
0295      410 ISTRT=5
0296      IF(NRIN-JREC+1)430,430,821
0297      430 IF(ISSW(0))800,440
0298      440 CALL EXEC(1,107B,IN,NWRD)
0299      CALL POSIT(MT,0,0,3,NEOF,NWRD)
0300      NRIN=NRIN+1
0301      IF(NEOF)820,220
0302      C
0303      C LISTING ABORTED. REWIND TAPE TO START OF FILE
0304      800 WRITE(1,1800)
0305      CALL POSIT(MT,-1,0,2,NEOF,NWRD)
0306      GO TO 825
0307      C
0308      C EOF
0309      820 NRIN=NRIN-1
0310      WRITE(1,1821)NFIN,NRIN
0311      NFIN=NFIN+1
0312      C
0313      C REPEAT IF THERE'S MORE VARIABLES TO PLOT. END OTHERWISE
0314      821 IF(NDONE-ND0)822,825,825
0315      822 CALL PLOT(-.5,-.45,3)
0316      WRITE(1,1822)
0317      PAUSE 6
0318      NDONE=NDONE+1
0319      L=1
0320      KOFST=2
0321      GO TO 835
0322      825 NDONE=1
0323      XF=XF+.05
0324      CALL PLOT(XF,YA,-3)
0325      CALL PLOT(0,-.45,-3)
0326      PAUSE 7
0327      830 WRITE(1,1830)
0328      READ(1,*)L
0329      WRITE(1,1831)
0330      READ(1,*)KOFST
0331      835 NSKIP=(NEOF-1)/2-L
0332      GO TO (10,840,5,1)L
0333      840 NSKIP=1
0334      IF(NEOF)20,13
0335      C
0336      1000 FORMAT(//"PARAMETERS:"/"1)P"/"2)T"/"3)S"/"4)SIGMA T"//
0337      @ " S E T   S S W ' S ! " )
0338      1001 FORMAT("RESET TAPE? Y=1, N=2 FOLLOWED BY PRESENT FILE =")
0339      1002 FORMAT("USING 1)CALCOMP, OR 2)ZETA... TYPE 1 OR 2:")
0340      1010 FORMAT("SKIP FILES? TO SKIP BKWD ENTER -(=.TO.SKIP +1)")
0341      1030 FORMAT("P: SCALING(DBAR/VOLT)? OFFSET(V)?")
0342      1035 FORMAT("T-OFFSET(V)?, C-OFFSET(V)?")
0343      1040 FORMAT("SAL CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?")
0344      1064 FORMAT("SAL T.C.-CORR'N="F5.3". ENTER SAME/NEW CORR'N:")
0345      1065 FORMAT("MAX DIFF BETWEEN SUCCESSIVE SAMPLES OF:"/"P(M)?, "

```

```

0346      @"T(DEG)?, S(PPT)?, SIG-T?"
0347      1067 FORMAT("X-AXIS:  = OF SAMPLES/INCH?")
0348      1100 FORMAT("START FRAME=?  STOP FRAME=?")
0349      1102 FORMAT("PLOT HOW MANY PARAMETERS?")
0350      1103 FORMAT("LIST THEM (ON SAME LINE):")
0351      1800 FORMAT(/"ABORT. TAPE REWOUND TO START OF FILE."/"RESET SSW")
0352      1821 FORMAT("EOF FILE"14,">"14" RECORDS")
0353      1822 FORMAT(/"CHANGE PEN")
0354      1825 FORMAT(///"BRANCHES"/"1)RESTART FILE"/"2)CONTINUE W NEXT ONE
0355      @/"3)SKIP FILES"/"4)REINITIALIZE"/"SSW(0)=ON TO"
0356      @" ABORT PLOT,RESTART FILE"/"SSW(15)=OFF TO PLOT RAW DATA/ "
0357      @"=ON TO PLOT DESPIKED DATA")
0358      1830 FORMAT(/"WHICH BRANCH?")
0359      1831 FORMAT("1)NEW,  OR 2)SAME CTD CAL'N?")
0360      END
0361      C
0362      C
0363      SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0364      C
0365      C V=9 31,1,75 FOR USE UNDER DOS
0366      C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES  RECORDS
0367      C N=MT UNIT, NF==FILES TO SKIP, NR==RECORDS TO SKIP, NSEL=OPTION
0368      COMMON NRIN
0369      2 NEOF=1
0370      3 NUNIT=0
0371      NSEL=NBRAN
0372      GO TO (5,5,5,5,5,5,5,4,5,4)N
0373      4 NUNIT=1
0374      5 GO TO (20,50)NSEL
0375      10 WRITE(1,1010)NUNIT
0376      15 PAUSE 1
0377      C
0378      CHECKIF UNIT ONLINE, THEN REWIND IT(RESETS POINTERS)
0379      20 IF(LOCAL(N))10,30
0380      30 NEOF=256+N
0381      CALL EXEC(3,NEOF)
0382      GO TO 9000
0383      C
0384      C SKIPS RECORDS/FILES
0385      40 CALL PTAPE(N,NF,NR)
0386      NSEL=4
0387      C
0388      CHECKS STATUS OF MT UNIT
0389      50 CALL EXEC(13,N,ISTAT,ILOG)
0390      IF(ISTAT)50,60
0391      60 GO TO (9000,40,90,70)NSEL
0392      C
0393      CHECKS FOR EOT AFTER A (BUFFER)WRITE C.
0394      70 IF(IEOT(N))80,9000
0395      80 WRITE(1,1080)NUNIT
0396      CALL RWSTB(N)
0397      GO TO 15
0398      C
0399      CHECKS FOR MISC AFTER A (BUFFER)READ C.
0400      90 IF(IEOF(N))100,110
0401      100 NEOF=-2
0402      GO TO 9000
0403      110 NSEL=NRIN+1

```

```

0404      IF(IEOT(N))80,120
0405      120 IF(IERR(N))130,140
0406      130 WRITE(1,1130)NSEL
0407      140 I=IWRDS(N)
0408      IF(I-NWRD)150,9000,150
0409      150 WRITE(1,1150)NSEL,I
0410      1010 FORMAT("READY TAPE UNIT"13)
0411      1080 FORMAT("EOT ON"13/"LOAD NEXT TAPE")
0412      1130 FORMAT("REC"15": TIM/PAR ERROR")
0413      1150 FORMAT("REC"15": TAPE ERROR>"15" WORDS XFERRED")
0414      9000 RETURN
0415      END
0416      C
0417      C
0418      SUBROUTINE XAXIS(XA,YA,VMIN,VINCR,DVLRG,SML,SCALE,SIZE)
0419      C
0420      C SCALES   DRAWS X-AXIS
0421      J=6
0422      DVSML=SML
0423      VALUE=VMIN-2.*VINCR
0424      C
0425      C START AT MIN VALUE. FIND VALUE AT 1ST MAJOR DIV BY SUCC ADD'N
0426      10 VALUE=VALUE+VINCR
0427      VNEXT=VALUE+VINCR
0428      IVAL=(VALUE+VINCR/10.)/DVLRG
0429      INEXT=(VNEXT+VINCR/10.)/DVLRG
0430      IF(VNEXT)12,13
0431      12 INEXT=INEXT-1
0432      13 IF(VALUE)14,15
0433      14 IVAL=IVAL-1
0434      15 IF(ABS(FLOAT(INEXT)-FLOAT(IVAL))-0.5)10,55
0435      C
0436      CHANGE DIRECTION OF TRAVEL
0437      30 CALL PLOT(XA,YA,2)
0438      X=START
0439      CALL PLOT(X,YA,3)
0440      DVSML=-DVSML
0441      J=0
0442      C
0443      C STEP TO NEXT DIV
0444      40 X=X+DVSML
0445      J=J+1
0446      C
0447      C IF X-COORD<0, RETURN TO 1ST MAJOR DIV   DRAW REMAINING X-AXIS
0448      IF(X-XA)30,50
0449      C
0450      CHECK IF X-COORD IS PAST END OF SCALE
0451      50 IF(X-SIZE-0.002)60,60,100
0452      C
0453      C GET COORD FOR 1ST MAJOR DIV   PLOT DOWNWARDS
0454      55 START=X+SCALE*(DVLRG*FLOAT(INEXT)-VMIN)
0455      X=START
0456      60 CALL PLOT(X,YA,2)
0457      TIK=0.05+YA
0458      IF(J-3)90,64,66
0459      64 TIK=0.1+YA
0460      GO TO 90
0461      66 IF(J-6)90,70

```



```

0462      70 TIK=.15+YA
0463      J=0
0464      P=X
0465      D=YA-.14
0466      C
0467      COMPUTE PLOT VALUE CORR. TO MAJOR DIV
0468      VALUE=VMIN+(X-XA)/SCALE
0469      CALL PLOT(P,D,3)
0470      CALL NUMB(P,D,.1,VALUE,0.,-1)
0471      CALL PLOT(X,YA,3)
0472      C
0473      C PLOT DIV
0474      90 CALL PLOT(X,TIK,2)
0475      CALL PLOT(X,YA,2)
0476      GO TO 40
0477      100 X=SIZE
0478      CALL PLOT(X,YA,2)
0479      CALL PLOT(X,YA,3)
0480      RETURN
0481      END
0482      C
0483      C
0484      SUBROUTINE YAXIS(XA,YA,VMIN,VINCR,DVLRG,SML,SCALE,SIZE)
0485      C
0486      C SCALES PLOTS Y-AXIS, SIMILIAR TO SUBR. 'XAXIS'
0487      J=10
0488      DVSMML=SML
0489      VALUE=VMIN-2.*VINCR
0490      10 VALUE=VALUE+VINCR
0491      VNEXT=VALUE+VINCR
0492      IVAL=(VALUE+VINCR/10.)/DVLRG
0493      INEXT=(VNEXT+VINCR/10.)/DVLRG
0494      IF(VNEXT)12,13
0495      12 INEXT=INEXT-1
0496      13 IF(VALUE)14,15
0497      14 IVAL=IVAL-1
0498      15 IF(ABS(FLOAT(INEXT)-FLOAT(IVAL))-.5)10,55
0499      30 CALL PLOT(XA,YA,2)
0500      Y=START
0501      CALL PLOT(XA,Y,3)
0502      DVSMML=-DVSMML
0503      J=0
0504      40 Y=Y+DVSMML
0505      J=J+1
0506      IF(Y-YA)30,50
0507      50 IF(Y-SIZE-.002)60,60,100
0508      55 START=YA+(DVLRG*FLOAT(INEXT)-VMIN)*SCALE
0509      Y=START
0510      60 CALL PLOT(XA,Y,2)
0511      TIK=.05+XA
0512      IF(J-5)90,64,66
0513      64 TIK=.1+XA
0514      GO TO 90
0515      66 IF(J-10)90,70
0516      70 TIK=.15+XA
0517      J=0
0518      VALUE=VMIN+(Y-YA)/SCALE
0519      P=Y-.04

```

```
0520      D=XA-.4
0521      CALL PLOT(D,P,3)
0522      IF(VALUE-99.9)80,80,75
0523      75 CALL NUMB(D,P,.1,VALUE,0.,-1)
0524      GO TO 85
0525      80 CALL NUMB(D,P,.1,VALUE,0.,1)
0526      85 CALL PLOT(XA,Y,3)
0527      90 CALL PLOT(TIK,Y,2)
0528      CALL PLOT(XA,Y,2)
0529      GO TO 40
0530      100 Y=SIZE
0531      CALL PLOT(XA,Y,2)
0532      CALL PLOT(XA,Y,3)
0533      RETURN
0534      END
0535      END$
**** LIST END **
@
```

4.5.4 Program: MS111Purpose

To plot raw *Batfish*/CTD data versus time with scaling specified by the user. Up to four parameters (P, T, S, sigma t) can be plotted at one time. Separate axes are drawn, properly scaled, for each parameter. The size of the y-axis is preset to 10.2 inches (see line 106 of listing). Horizontal coordinate is actually the input data frame count; if the data were acquired at 5 samples/second (1974 format), then 1 frame = 1 minute's data. Plot is cyclical (i.e., data disappearing at the bottom of the plot re-appears at the top), and is paginated into 8.5 inch sections.

Hardware Requirements

HP2100 supporting DOS or DOSM

teletype for parameter input/output

mag tape transport (unit 0) for data input

plotter (Calcomp 563 or Zeta 100) for data output

Operating Instructions

Refer to sample printout and plot provided below.

- (1) Program is called by :PR,MS111
- (2) Program lists branches and parameters available, and pauses at 0001.
- (3) Type :GO
- (4) Enter 1 to reset the mag tape hardware, this rewinds the tape; enter 2 followed by the current file number, if the tape has been previously positioned.
- (5) Enter 1 or 2. Program corrects for different plotter resolutions, and computes maximum allowed y-axis size.
- (6) Enter the number of files to be skipped. If the mag tape has been previously positioned, enter -1 to position the tape to the start of the current file.
- (7-10) Enter CTD calibration data (F.S. means full scale). If there is more than one question/line, enter the corresponding answers on one line.
- (11) Enter maximum differences allowed between successive samples. Differences larger than these are considered to be spikes.
- (12) Enter the x-axis scaling desired (200 suggested).
- (13) Enter the number of parameters to be plotted. Each parameter is drawn during a different pass, the x-axis being drawn during the first pass. Entries are straightforward, and in physical units.

- (14) Enter the starting frame and last frame of the data to be done. Program then begins plotting, treating any unexpected EOFs as a 'stop frame#,' and continuing with the next pass (program pauses at 0007 after each pass to enable change of pen. Type :GO).
- (15) When finished program pauses at 0007. Type :GO .
- (16) Reply to WHICH BRANCH? with 1, 2, 3, or 4.
- (17) Reply to (1)NEW or (2)SAME CTD CALIBRATION? with 1 or 2.

etc.

NOTE Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample Printout

```

1      *PR,MS111      /      SAMPLE PLOT

2      BRANCHES
      1)RESTART FILE
      2)CONTINUE W NEXT ONE
      3)SKIP FILES
      4)REINITIALIZE

      SSW(0)=ON TO ABORT PLOT,RESTART FILE
      SSW(15)=OFF TO PLOT RAW DATA/ =ON TO PLOT DESPIKED DATA

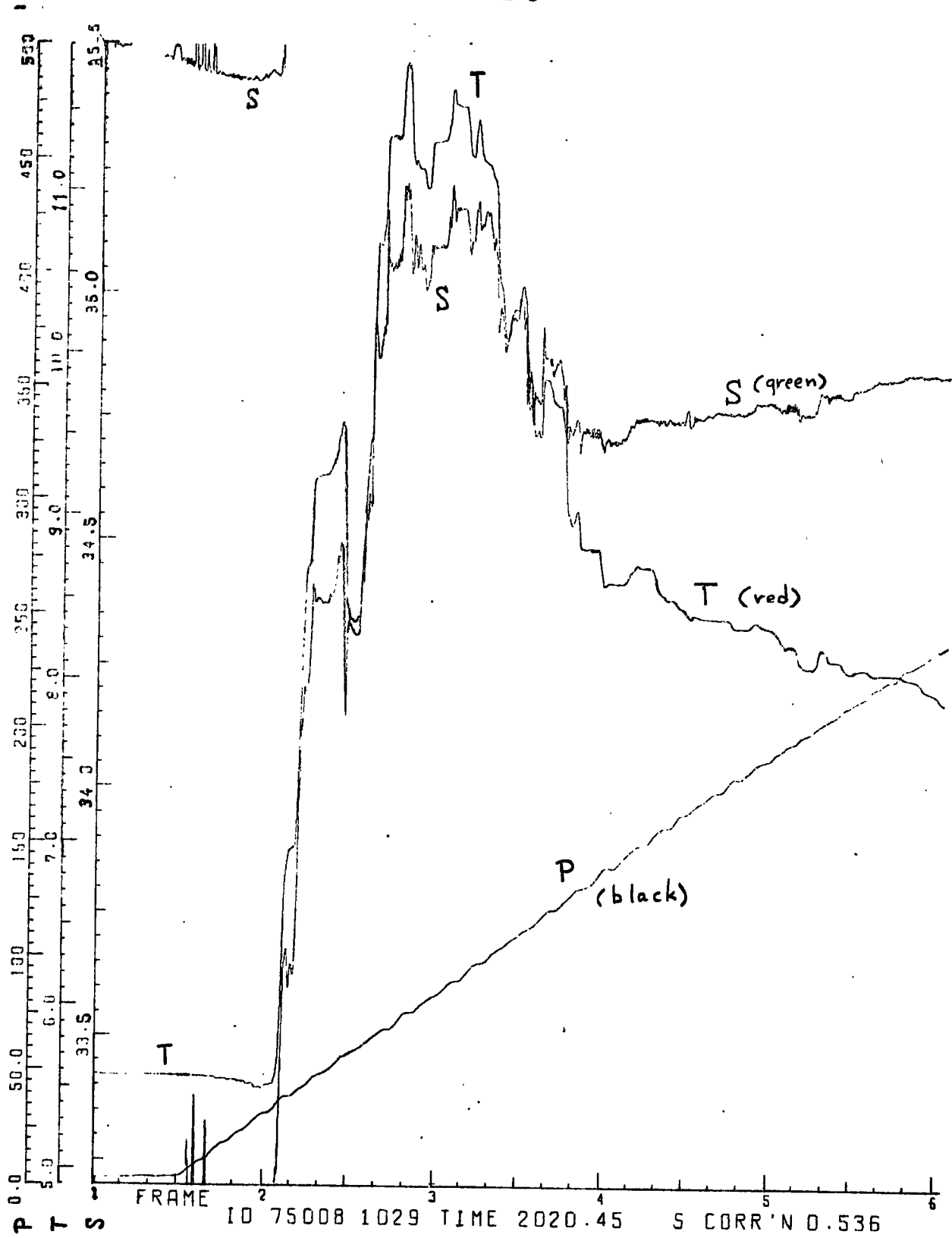
      PARAMETERS:
      1P
      2T
      3S
      4SIGMA T

      SET SSW'S!
      MS111 : PAUSE    0001
      MS111 SUSP

3      0:GO
4      RESET MAGTAPE? Y=1, N=2 FOLLOWED BY PRESENT FILE #
      2 4
5      USING 1)CALCOMP, OR 2)ZETA... TYPE 1 OR 2:
      2
6      SKIP FILES? TO SKIP BKWD ENTER -(#.TO.SKIP +1)
      -1
7      P: SCALING(DBAR/VOL1)?      OFFSET(V)?
      666.6 .0046
8      T-OFFSET(V)?, C-OFFSET(V)?
      -.013 0
9      SAL CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?
      0 35
10     SAL T.C.-CORR'N= .134. ENTER SAME/NEW CORR'N:
      .134
11     MAX DIFF BETWEEN SUCCESSIVE SAMPLES OF:
      P(M)?, T(DEG)?, S(PPT)?, SIG-T?
      5 2 1 1
12     X-AXIS: # OF SAMPLES/INCH?
      200
13     PLOT HOW MANY PARAMETERS?
      3
      FOR EACH 'PASS #:' TYPE IN (ON SAME LINE):
      PARAMETER(1,2,3, OR 4) TO DO, MIN-VALUE(PHYS-UNITS), MAX-V,
      # UNITS/(LRG-DIV).
14     PASS 1:
      1 0 500 50
      PASS 2:
etc     2 4.9 11.9 1
      PASS 3:
      3 33.2 35.5 .5
15     START FRAME#? STOP FRAME#?
      1 20
      EOF FILE 4> 11 RECORDS. CRUISE 75008 STN1029.

      CHANGE PEN
16     MS111 : PAUSE    0006
      MS111 SUSP

```



P T S
FRAME ID 75008 1029 TIME 2020.45 S CORR'N 0.536

```

0001 FTN
0002 PROGRAM NS111
0003 C
0004 C V=5 7,11,75
0005 C PLOTS RAW DATA VS TIME. S SIGMA-T CORR'D FOR TIME CONSTS.
0006 C INPUT IS ON UNIT=0; FORMAT DESCRIBED IN PROGRAM PR012
0007 C USING STATEMENT F'NS KEEPS MAX= OF SOURCE PROGS <6, WHICH ENABLES
0008 COMPILATION AT ONE TIME UNDER BCS-FTN
0009 DIMENSION IN(904),V(3),R(4),RMAX(4),RMIN(4),U(4),DEL(4)
0010 @,NV(4),LBL(3),LTIM(2),LB(4),ZMIN(4),ZMAX(4),ZLRG(4)
0011 COMMON NRIN
0012 C
0013 CALL FOR SALINITY=SAL(P,T,Q(P,T,C)). BENNETT'72-SEE PR012
0014 Q(P,T,C)=C/((1.+((6.166E-15*P-5.4845E-10)*P+1.60336E-5)*P/((
0015 @.3169E-3*T+.030786)*T+1.))*((( (-.804E-10*T+.772633E-8
0016 @)*T-.895439E-6)*T+.112681E-3)*T+.0200464)*T+.676505))
0017 SAL(P,T,B)=((( (-1.32311*B+5.93624)*B-10.61869)*B+12.18882)
0018 @*B+28.8567)*B-.08996+B*(B-1.)*((.0442-.00046*T-.204*B)
0019 @*T+(.000125-.29E-5*T)*P)
0020 C
0021 C SIGMA-T=SIGMT(T,S). BENNETT'72-SEE PR012
0022 SIGMT(T,S)=((( (-.577E-6*S+.5994E-4)*S+.563E-5*T-.21192E-2)
0023 @*S+((- .96E-6*T+.7674E-4)*T-.37845E-2)*T+.3333393)*S
0024 @+((.7103E-4*T-.90399E-2)*T+.70023E-1)*T-.13230
0025 C
0026 C INITIALIZE: MT=MAGTAPE INPUT=0 NWRD=INPUT BUF'R WORD SIZE
0027 C KOFST,KPLOT,KLBL=POINTERS. IN=INPUT ='S. V=VOLTAGES. R=REAL
0028 C RMAX=MAX-R.V. RMIN=MIN R.V. DEL=SPIKE SIZES. U=PREVIOUS-R
0029 1 MT=7
0030 NWRD=904
0031 KOFST=1
0032 NDONE=1
0033 C
0034 C ID=ID, LTIM=TIME, LBL=FRAME ..ASCII CODING, FOR FTN2 LABELLING
0035 C LB=S CORR'N
0036 ID=44504B
0037 LTIM(1)=52111B
0038 LTIM(2)=46505B
0039 LBL(1)=43122B
0040 LBL(2)=40515B
0041 LBL(3)=42440B
0042 LB(1)=51440B
0043 LB(2)=41517B
0044 LB(3)=51122B
0045 LB(4)=23516B
0046 DE=50075B
0047 DO 2 I=1,4
0048 R(I)=0.
0049 2 RMIN(1)=0.
0050 RMIN(2)=-2.5
0051 RMAX(2)=32.5
0052 RMAX(3)=41.
0053 RMAX(4)=35.
0054 WRITE(1,1825)
0055 WRITE(1,1000)

```

```

0056      PAUSE 1
0057      WRITE(1,1001)
0058      NFIN=1
0059      READ(1,*)NRIN,NFIN
0060      GO TO (3,4)NRIN
0061      C
0062      C INITIALIZE MAGTAPE PLOTTER
0063          3 CALL POSIT(MT,0,0,1,NEOF,NWRD)
0064          NFIN=1
0065          4 CALL PLTLU(9)
0066      C
0067      C SET PLOTTER SCALING FACTOR
0068          WRITE(1,1002)
0069          READ(1,*)BRAND
0070          CALL FACT(BRAND)
0071      C
0072      C SKIP FILES: NFIN=FILE COUNT NRIN=RECORD COUNT, NSKIP==FILES TO B
0073          5 WRITE(1,1010)
0074          READ(1,*)NSKIP
0075          10 IF(NSKIP)12,13
0076          12 NFIN=NFIN+1
0077          13 NFIN=NFIN+NSKIP
0078          15 CALL POSIT(MT,NSKIP,0,2,NEOF,NWRD)
0079          20 NRIN=0
0080          25 GO TO (30,100)KOFST
0081      C
0082      C GET SCALING OFFSETS FOR CTD
0083          30 WRITE(1,1030)
0084          READ(1,*)PSC,P0
0085          RMAX(1)=PSC*(P0+3.05)
0086          P0=P0*PSC
0087          WRITE(1,1035)
0088          READ(1,*)T0,C0
0089          T0=T0*10.
0090          40 WRITE(1,1040)
0091          READ(1,*)SCELL,CENTR
0092          IF(CENTR-35.)50,55,40
0093          50 IF(CENTR-33.)40,60,40
0094          55 CENTR=4.
0095          GO TO 65
0096          60 CENTR=3.7949
0097          65 STC=.8
0098          WRITE(1,1064)STC
0099          READ(1,*)STC
0100          WRITE(1,1065)
0101          READ(1,*)(DEL(L),L=1,4)
0102      C
0103      C ASK FOR LOC'N OF DATA, POSITION TAPE TO START OF DATA
0104          100 GO TO (102,115)NDONE
0105          102 WRITE(1,1067)
0106          READ(1,*)XS
0107          YSIZE=10.2
0108          WRITE(1,1102)
0109          READ(1,*)NDO
0110          WRITE(1,1103)
0111          DO 105 K=1,NDO
0112          WRITE(1,1104)K
0113          READ(1,*)NV(K),ZMIN(K),ZMAX(K),ZLRG(K)

```



```

0114 105 CONTINUE
0115 WRITE(1,1100)
0116 READ(1,*)IREC,JREC
0117 IF(-IREC)115,830
0118 115 XFILL=.3*FLOAT(NDO-1)
0119 IF(NRIN-IREC)140,162,120
0120 C
0121 C SKIP RECORDS BKWD
0122 120 L--(NRIN-IREC+1)
0123 CALL POSIT(MT,0,L,2,NEOF,NWRD)
0124 NRIN=IREC-1
0125 140 ISTRT=IREC-NRIN
0126 C
0127 C SKIP RECORDS FWD
0128 DO 160 L=1,ISTRT
0129 145 CALL EXEC(1,107B,IN,NWRD)
0130 CALL POSIT(MT,0,0,3,NEOF,NWRD)
0131 NRIN=NRIN+1
0132 IF(NEOF)820,150
0133 150 IF(ISSW(0))800,160
0134 160 CONTINUE
0135 162 GO TO (165,170)NDONE
0136 C
0137 C DEFINE PLOTTER ORIGIN
0138 165 CALL WHERE(X,Y)
0139 CALL PLOT(X,Y,-3)
0140 C
0141 C GET START/STOP ADDRESSES WITHIN BUFFER
0142 170 ISMPL=3
0143 ISTRT=5
0144 IEND=902
0145 INITL=2
0146 C
0147 C SET UP PLOT VARIABLES: LRG,MIN,STEP=(PHYS UNIT) SML,SIZE=(IN)
0148 C S..=(IN/PHYS-UN)
0149 NOW=NV(NDONE)
0150 YMAX=ZMAX(NDONE)
0151 YMIN=ZMIN(NDONE)
0152 YLRG=ZLRG(NDONE)
0153 YS=YSIZE/(YMAX-YMIN)
0154 YSML=-YLRG*YS*.1
0155 YSTEP=.01/YS
0156 YA=0.
0157 XA=XFILL-0.5
0158 XF=-6.
0159 GO TO (175,195)NDONE
0160 175 XS=1./XS
0161 XSFR=XS*300.
0162 XSTEP=.01/XSFR
0163 XLRG=1.
0164 XSML=(-XSFR*XLRG)/6.
0165 XMIN=FLOAT(NRIN)-(0.2-XFILL)/XSFR
0166 X=.25
0167 Y=.45
0168 CALL PLOT(X,Y,-3)
0169 C
0170 C GET ID'S
0171 XIDI=FLOAT(IFIX(FLOAT(IN(2))/100.+0.001))

```

```

0172      XID1=1000.*XID1+FLOAT(IN(2))-100.*XID1
0173      XID2=FLOAT(IN(1))
0174      C
0175      C GET TIME
0176      TIM=0.
0177      IF(IN(4))180,185
0178      180 TIM=65536.
0179      185 TIM=TIM+65536.*FLOAT(IN(3))+FLOAT(IN(4))
0180      IHR=TIM/3600.+0.0001
0181      TIM=TIM-3600.*FLOAT(IHR)
0182      IMIN=TIM/60.+0.01
0183      ISEC=TIM-60.*FLOAT(IMIN)
0184      TIM=100.*FLOAT(IHR)+FLOAT(IMIN)+.01*FLOAT(ISEC)
0185      W=.0001*FLOAT(IN(ISTR+2))
0186      C
0187      C LABEL PLOT
0188      190 X=1.2+XFILL
0189      Y=YA-.35
0190      CALL SYMB(X,Y,.14,1D,0.,2)
0191      X=X+.4
0192      CALL NUMB(X,Y,.14,XID1,0.,-1)
0193      X=X+.8
0194      CALL NUMB(X,Y,.14,XID2,0.,-1)
0195      X=3.1+XFILL
0196      CALL SYMB(X,Y,.14,LTIM,0.,4)
0197      X=X+.7
0198      CALL NUMB(X,Y,.14,TIM,0.,2)
0199      X=5.2+XFILL
0200      CALL SYMB(X,Y,.14,LB,0.,8)
0201      X=6.4+XFILL
0202      CALL NUMB(X,Y,.14,STC,0.,3)
0203      X=.4+XFILL
0204      Y=YA-.2
0205      CALL SYMB(X,Y,.14,LBL,0.,6)
0206      GO TO 220
0207      195 INITL=1
0208      IP=3
0209      ZERO=YMIN
0210      X=0.
0211      C
0212      C ANALYZE DATA, USING K TO LOOP THROUGH BUFFER
0213      220 DO 400 K=ISTR, IEND, ISMPL
0214      IF(ISSW(0))800,225
0215      C
0216      C GET VOLTAGES
0217      225 V(1)=.0001*FLOAT(IN(K))
0218      V(2)=.0001*FLOAT(IN(K+1))
0219      V(3)=.0001*FLOAT(IN(K+2))
0220      C
0221      CORRECT COND. VOLTAGE FOR APPROPRIATE TIME CONSTS
0222      C=V(3)+STC*(W-V(3))
0223      W=V(3)
0224      GO TO (230,237)INITL
0225      C
0226      C GET P,T,S;CORRECT T FOR 200MSEC T-SENSOR NONLINEARITY, AND
0227      COND RATIO FOR C-CELL COMPRESSIBILITY AND THERMAL EXPANSION
0228      230 DO 235 I=1,4
0229      235 U(I)=R(I)

```

```

0230 237 R(1)=PSC*V(1)-P0
0231 R(2)=10.*V(2)
0232 R(2)=R(2)+(.425E-4*R(2)-.000591)*R(2)-T0
0233 R(3)=(CENTR+C-C0)/4.
0234 R(3)=R(3)*(1.+1.02E-6*R(1)-.32E-5*(R(2)-15.))
0235 R(3)=SAL(R(1),R(2),Q(R(1),R(2),R(3)))-SCCELL
0236 R(4)=SIGMT(R(2),R(3))
0237 GO TO (238,195)INITL
0238 238 IF(ISSW(15))240,255
0239 C
0240 C SEARCH OUT SPIKES
0241 240 DO 255 I=1,4
0242 IF(R(I)-RMIN(I))315,245
0243 245 IF(RMAX(I)-R(I))315,250
0244 250 IF(ABS(U(I)-R(I))-DEL(I))255,315
0245 255 CONTINUE
0246 GO TO 270
0247 C Y-VALUE BELOW MINIMUM; RESCALE AXIS 1 CYCLE DOWN; MOVE PEN UP
0248 260 ZERO=ZERO-(YMAX-ZERO)
0249 YMAX=YMIN
0250 YMIN=ZERO
0251 CALL PLOT(X,YA,2)
0252 D=YA+YSIZE
0253 CALL PLOT(X,D,3)
0254 GO TO 270
0255 C
0256 C Y-VALUE ABOVE MAX; RSCALE Y-AXIS 1 CYCLE UP; MOVE PEN DOWN
0257 265 ZERO=YMAX
0258 YMAX=YMAX+(YMAX-YMIN)
0259 YMIN=ZERO
0260 D=YA+YSIZE
0261 CALL PLOT(X,D,2)
0262 D=YA
0263 CALL PLOT(X,D,3)
0264 C
0265 270 IF(ISSW(0))800,272
0266 272 Y=R(NOW)-ZERO
0267 IF(-Y)275,260
0268 275 IF(YMAX-(Y+ZERO))265,280
0269 280 Y=Y*YS
0270 C
0271 CGET X-COORD; IS IT PAST END OF PAGE; PAGINATE IF SO AND STEP COUNTS
0272 285 X=XSFR*(FLOAT(NRIN-IREC)+FLOAT(K-5)/900.)+XFILL
0273 @+(.3+XFILL)*(XA-XFILL)/8.5
0274 IF(XF-X)290,320
0275 290 XA=XA+8.5
0276 XSIZE=XA+8.2-XFILL
0277 295 X=XA+.3*FLOAT(NDONE-ND0)
0278 XMIN=XMIN+(8.2-XFILL)/XSFR
0279 CALL PLOT(X,YA,3)
0280 C
0281 C PLOT AXES, PUTTING Y-AXIS IN PROPER PLACE(DEPENDS ON PASS)
0282 CALL YAXIS(X,YA,ZERO,YSTEP,YLRG,YSML,YS,YSIZE)
0283 GO TO (300,310)NDONE
0284 300 CALL PLOT(XA,YA,3)
0285 CALL XAXIS(XA,YA,XMIN,XSTEP,XLRG,XSML,XSFR,XSIZE)
0286 310 XF=XA+8.2-XFILL
0287 IP=3

```

```

0288      GO TO 270
0289      315 IP=3
0290      320 CALL PLOT(X,Y,IP)
0291      IP=2
0292      400 CONTINUE
0293      C
0294      CHECK TO SEE IF FINISHED, IF NOT READ IN NEXT BUF'R
0295      410 ISTRT=5
0296      IF(NRIN-JREC+1)430,430,821
0297      430 IF(ISSW(0))800,440
0298      440 CALL EXEC(1,107B,IN,NWRD)
0299      CALL POSIT(MT,0,0,3,NEOF,NWRD)
0300      NRIN=NRIN+1
0301      IF(NEOF)820,220
0302      C
0303      C LISTING ABORTED. REWIND TAPE TO START OF FILE
0304      800 WRITE(1,1800)
0305      CALL POSIT(MT,-1,0,2,NEOF,NWRD)
0306      GO TO 825
0307      C
0308      C EOF
0309      820 NRIN=NRIN-1
0310      WRITE(1,1821)NFIN,NRIN,XID1,XID2
0311      NFIN=NFIN+1
0312      821 IF(NDONE-ND0)822,825,825
0313      822 CALL PLOT(-.25,-.45,3)
0314      WRITE(1,1822)
0315      PAUSE 6
0316      NDONE=NDONE+1
0317      L=1
0318      KOFST=2
0319      GO TO 835
0320      825 NDONE=1
0321      XF=XF+.05+XFILL
0322      CALL PLOT(XF,YA,-3)
0323      CALL PLOT(0.,-.45,-3)3)
0324      PAUSE 7
0325      830 WRITE(1,1830)
0326      READ(1,*)L
0327      WRITE(1,1831)
0328      READ(1,*)KOFST
0329      835 NSKIP=(NEOF-1)/2-L
0330      GO TO (10,840,5,1)L
0331      840 NSKIP=1
0332      IF(NEOF)20,13
0333      C
0334      1000 FORMAT(//"PARAMETERS:"/"1P"/"2T"/"3S"/"4SIGMA T"//
0335      @" S E T   S S W' S !")
0336      1001 FORMAT("RESET MAGTAPE? Y=1, N=2 FOLLOWED BY PRESENT FILE =")
0337      1002 FORMAT("USING 1)CALCOMP, OR 2)ZETA... TYPE 1 OR 2:")
0338      1010 FORMAT("SKIP FILES? TO SKIP BKWD ENTER -(#.TO.SKIP +1)")
0339      1030 FORMAT("P: SCALING(DBAR/VOLT)? OFFSET(VOLT)?")
0340      1035 FORMAT("T-OFFSET(V)?, C-OFFSET(V)?")
0341      1040 FORMAT("SAL CELL-CONSTANT(PPT)?, CENTERED AT(PPT)?")
0342      1064 FORMAT("SAL T.C.-CORR'N="F5.3". ENTER SAME/NEW CORR'N:")
0343      1065 FORMAT("MAX DIFF BETWEEN SUCCESSIVE SAMPLES OF:"/"P(M)?, "
0344      @"T(DEG)?, S(PPT)?, SIG-T?")
0345      1067 FORMAT("X-AXIS:  = OF SAMPLES/INCH?")

```

```

0346 1100 FORMAT("START FRAME=?      S T O P  FRAME=?")
0347 1102 FORMAT("PLOT HOW MANY PARAMETERS?")
0348 1103 FORMAT("FOR EACH 'PASS =:' TYPE IN (ON SAME LINE):"/"PARA"
0349 @"METER(1,2,3, OR 4) TO DO, MIN-VALUE(PHYS-UNITS), MAX-V, "
0350 @/"= UNITS/(LRG-DIV).")
0351 1104 FORMAT("PASS"13":")
0352 1800 FORMAT(/"ABORT. TAPE REWOUND TO START OF FILE."/"RESET SSW")
0353 1821 FORMAT("EOF FILE"14,">"14" RECORDS. CRUISE "F5.0," STN"F5.0)
0354 1822 FORMAT(/"CHANGE PEN")
0355 1825 FORMAT(///"BRANCHES"/"1)RESTART FILE"/"2)CONTINUE W NEXT ONE
0356 @/"3)SKIP FILES"/"4)REINITIALIZE"/"SSW(0)=ON TO"
0357 @" ABORT PLOT,RESTART FILE"/"SSW(15)=OFF TO PLOT RAW DATA/ "
0358 @"=ON TO PLOT DESPIKED DATA")
0359 1830 FORMAT(/"WHICH BRANCH?")
0360 1831 FORMAT("1)NEW, OR 2)SAME CTD CAL'N?")
0361     END
0362 C
0363 C
0364     SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0365 C
0366 C V=9 31,1,75 FOR USE UNDER DOS
0367 C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES RECORDS
0368 C N=MT UNIT, NF==FILES TO SKIP, NR==RECORDS TO SKIP, NSEL=OPTION
0369     COMMON NRIN
0370     2 NEOF=1
0371     3 NUNIT=0
0372     NSEL=NBRAN
0373     GO TO (5,5,5,5,5,5,5,4,5,4)N
0374     4 NUNIT=1
0375     5 GO TO (20,50)NSEL
0376     10 WRITE(1,1010)NUNIT
0377     15 PAUSE 1
0378 C
0379 CHECKIF UNIT ONLINE, THEN REWIND IT(RESETS POINTERS)
0380     20 IF(LOCAL(N))10,30
0381     30 NEOF=256+N
0382     CALL EXEC(3,NEOF)
0383     GO TO 9000
0384 C
0385 C SKIPS RECORDS/FILES
0386     40 CALL PTAPE(N,NF,NR)
0387     NSEL=4
0388 C
0389 CHECKS STATUS OF MT UNIT
0390     50 CALL EXEC(13,N,ISTAT,ILOG)
0391     IF(ISTAT)50,60
0392     60 GO TO (9000,40,90,70)NSEL
0393 C
0394 CHECKS FOR EOT AFTER A (BUFFER)WRITE C.
0395     70 IF(IEOT(N))80,9000
0396     80 WRITE(1,1080)NUNIT
0397     CALL RWSTB(N)
0398     GO TO 15
0399 C
0400 CHECKS FOR MISC AFTER A (BUFFER)READ C.
0401     90 IF(IEOF(N))100,110
0402     100 NEOF=-2
0403     GO TO 9000

```

```

0404 110 NSEL=NRIN+1
0405      IF(IEOT(N))80,120
0406 120 IF(IEERR(N))130,140
0407 130 WRITE(1,1130)NSEL
0408 140 I=IWRDS(N)
0409      IF(I-NWRD)150,9000,150
0410 150 WRITE(1,1150)NSEL,I
0411 1010 FORMAT("READY TAPE UNIT"13)
0412 1080 FORMAT("EOT ON"13/"LOAD NEXT TAPE")
0413 1130 FORMAT("REC"15": TIM/PAR ERROR")
0414 1150 FORMAT("REC"15": TAPE ERROR>"15" WORDS XFERRD")
0415 9000 RETURN
0416      END
0417 C
0418 C
0419      SUBROUTINE XAXIS(XA,YA,VMIN,VINCR,DVLRG,SML,SCALE,SIZE)
0420 C
0421 C SCALES  DRAWS X-AXIS
0422      J=6
0423      DVSML=SML
0424      VALUE=VMIN-2.*VINCR
0425 C
0426 C START AT MIN VALUE. FIND VALUE AT 1ST MAJOR DIV BY SUCC ADD'N
0427 10 VALUE=VALUE+VINCR
0428      VNEXT=VALUE+VINCR
0429      IVAL=(VALUE+VINCR/10.)/DVLRG
0430      INEXT=(VNEXT+VINCR/10.)/DVLRG
0431      IF(VNEXT)12,13
0432 12 INEXT=INEXT-1
0433 13 IF(VALUE)14,15
0434 14 IVAL=IVAL-1
0435 15 IF(ABS(FLOAT(INEXT)-FLOAT(IVAL))-0.5)10,55
0436 C
0437 CHANGE DIRECTION OF TRAVEL
0438 30 CALL PLOT(XA,YA,2)
0439      X=START
0440      CALL PLOT(X,YA,3)
0441      DVSML=-DVSML
0442      J=0
0443 C
0444 C STEP TO NEXT DIV
0445 40 X=X+DVSML
0446      J=J+1
0447 C
0448 C IF X-COORD<0, RETURN TO 1ST MAJOR DIV  DRAW REMAINING X-AXIS
0449      IF(X-XA)30,50
0450 C
0451 CHECK IF X-COORD IS PAST END OF SCALE
0452 50 IF(X-SIZE-.002)60,60,100
0453 C
0454 C GET COORD FOR 1ST MAJOR DIV  PLOT DOWNWARDS
0455 55 START=X+SCALE*(DVLRG*FLOAT(INEXT)-VMIN)
0456      X=START
0457 60 CALL PLOT(X,YA,2)
0458      TIK=.05+YA
0459      IF(J-3)90,64,66
0460 64 TIK=.1+YA
0461      GO TO 90

```

```

0462      66 IF(J-6)90,70
0463      70 TIK=.15+YA
0464          J=0
0465          P=X
0466          D=YA-.14
0467      C
0468      COMPUTE      PLOT VALUE CORR. TO MAJOR DIV
0469          VALUE=VMIN+(X-XA)/SCALE
0470          CALL PLOT(P,D,3)
0471          CALL NUMB(P,D,.1,VALUE,0.,-1)
0472          CALL PLOT(X,YA,3)
0473      C
0474      C PLOT DIV
0475          90 CALL PLOT(X,TIK,2)
0476          CALL PLOT(X,YA,2)
0477          GO TO 40
0478          100 X=SIZE
0479          CALL PLOT(X,YA,2)
0480          CALL PLOT(X,YA,3)
0481          RETURN
0482          END
0483      C
0484      C
0485          SUBROUTINE YAXIS(XA,YA,VMIN,VINCR,DVLRG,SML,SCALE,SIZE)
0486      C
0487      C SCALES      PLOTS Y-AXIS, SIMILIAR TO SUBR. 'XAXIS'
0488          J=10
0489          DVSML=SML
0490          VALUE=VMIN-2.*VINCR
0491          10 VALUE=VALUE+VINCR
0492          VNEXT=VALUE+VINCR
0493          IVAL=(VALUE+VINCR/10.)/DVLRG
0494          INEXT=(VNEXT+VINCR/10.)/DVLRG
0495          IF(VNEXT)12,13
0496          12 INEXT=INEXT-1
0497          13 IF(VALUE)14,15
0498          14 IVAL=IVAL-1
0499          15 IF(ABS(FLOAT(INEXT)-FLOAT(IVAL))-.5)10,55
0500          30 CALL PLOT(XA,YA,2)
0501          Y=START
0502          CALL PLOT(XA,Y,3)
0503          DVSML=-DVSML
0504          J=0
0505          40 Y=Y+DVSML
0506          J=J+1
0507          IF(Y-YA)30,50
0508          50 IF(Y-SIZE-.002)60,60,100
0509          55 START=YA+(DVLRG*FLOAT(INEXT)-VMIN)*SCALE
0510          Y=START
0511          60 CALL PLOT(XA,Y,2)
0512          TIK=.05+XA
0513          IF(J-5)90,64,66
0514          64 TIK=.1+XA
0515          GO TO 90
0516          66 IF(J-10)90,70
0517          70 TIK=.15+XA
0518          J=0
0519          VALUE=VMIN+(Y-YA)/SCALE

```

```
0520      P=Y-.2
0521      D=XA-.05
0522      CALL PLOT(D,P,3)
0523      IF(VALUE-99.9)80,80,75
0524      75 CALL NUMB(D,P,.1,VALUE,90.,-1)
0525      GO TO 85
0526      80 CALL NUMB(D,P,.1,VALUE,90.,1)
0527      85 CALL PLOT(XA,Y,3)
0528      90 CALL PLOT(TIK,Y,2)
0529      CALL PLOT(XA,Y,2)
0530      GO TO 40
0531      100 Y=SIZE
0532      CALL PLOT(XA,Y,2)
0533      CALL PLOT(XA,Y,3)
0534      RETURN
0535      END
0536      ENDS
```


4.6 Format Conversion Program

4.6.1 Program: MS121

Purpose

To convert *Batfish*/CTD data acquired on *Dawson* Cruise 73-020 into a format usable by this set of programs. The obsolete format is described in Section 2.5.

Hardware Requirements

HP2100 supporting DOS or DOSM

teletype for parameter input

mag tape transport (unit 0) for data input

mag tape transport (unit 1) for data output

Description

Digitizer and CTD calibration must be typed in.

Digitizer Calibration

from	Scaling/volt			Offset for zero-volts		
	P	T	C	P	T	C
19/6/73	16335	2191	16328	3278.8577	10487.62	3278.657
1/7/73	16337	2190	16328	3278.53561	10498.567	3278.43531

Operating Instructions

The program is called by typing :PR,MS121 and types out detailed operating instructions in the manner of the previous programs.

NOTE Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

```

0001  FTN
0002      PROGRAM MS121
0003  C
0004  C V#2 10,12,75
0005  CONVERTS COASTAL OCEANOGRAPHY DATA ACQUIRED DURING CRUISE 73020
0006  C USING OBSOLETE DIGITIZER, TO FORMAT COMPATIBLE FOR PROCESSING
0007  C BY THE OTHER ANALYSIS PROGRAMS
0008      DIMENSION IN(904)
0009      COMMON PSC,TSC,CSC,POF,TOF,COF,NRIN
0010  C
0011  C INITIALIZE
0012      1 NWORD=904
0013      MTIN=7
0014      MTOUT=8
0015      KOFST=1
0016      WRITE(1,1003)
0017      PAUSE 1
0018      NFOUT=0
0019      NFIN=1
0020      WRITE(1,9002)
0021      READ(1,*)NRIN,NFIN
0022      GO TO (2,3)NRIN
0023      2 CALL POSIT(MTIN,0,0,1,NEOF,NWORD)
0024      3 WRITE(1,9003)
0025      READ(1,*)NROUT,NFOUT
0026      GO TO (4,5)NROUT
0027      4 CALL POSIT(MTOUT,0,0,1,NEOF,NWORD)
0028  C
0029  C SKIP INPUT/OUTPUT FILES
0030      5 WRITE(1,1005)
0031      READ(1,*)NSKIP
0032      IF(NSKIP)6,7
0033      6 NFOUT=NFOUT+1
0034      7 NFOUT=NFOUT+NSKIP
0035      CALL POSIT(MTOUT,NSKIP,0,2,NEOF,NWORD)
0036      NROUT=0
0037      WRITE(1,1007)
0038      READ(1,*)NSKIP
0039      10 IF(NSKIP)12,13
0040      12 NFIN=NFIN+1
0041      13 NFIN=NFIN+NSKIP
0042      15 CALL POSIT(MTIN,NSKIP,0,2,NEOF,NWORD)
0043      20 NRIN=0
0044      25 GO TO (30,90)KOFST
0045  C
0046  CALIBRATION(DIGITIZER) DATA
0047      30 WRITE(1,1030)
0048      READ(1,*)PSC
0049      WRITE(1,1032)
0050      READ(1,*)TSC
0051      WRITE(1,1034)
0052      READ(1,*)CSC
0053      WRITE(1,1036)
0054      READ(1,*)POF
0055      WRITE(1,1038)

```

```

0056     READ(1,*)TOF
0057     WRITE(1,1040)
0058     READ(1,*)COF
0059  C
0060     90  NDONE=0
0061     WRITE(6,1091)
0062     WRITE(1,1090)
0063     READ(1,*)NDO
0064     WRITE(1,1092)
0065     READ(1,*)IID
0066     IF(NDO-1)860,95
0067  C
0068     95  INITL=1
0069     GO TO (98,100)IID
0070     98  INITL=2
0071  C
0072  C READ IN BUFFER
0073     100 CALL EXEC(1,107B,IN,NWORD)
0074     CALL POSIT(MTIN,0,0,3,NEOF,NWORD)
0075     NRIN=NRIN+1
0076     IF(NEOF)820,110
0077     110 IF(ISSW(0))800,120
0078  C
0079  CONVERT ID'S    TIME
0080     120 H=IN(2)
0081     XM=IN(3)
0082     S=IN(4)
0083     IN(2)=7320
0084     SEC=S+60.*(XM+60.*H)
0085     IN(3)=SEC/65536.
0086     XJ=SEC-65536.*FLOAT(IN(3))-65536.
0087     IF(XJ+32768.)130,140
0088     130 XJ=XJ+65536.
0089     140 IN(4)=XJ
0090  C
0091     GO TO (160,150)INITL
0092     150 INITL=1
0093     WRITE(1,1150)IN(1)
0094     READ(1,*)ID
0095  C
0096     160 GO TO (170,180)IID
0097     170 IN(1)=ID
0098     GO TO 200
0099     180 ID=IN(1)
0100  C
0101  CONVERT (P,T,C) DATA SETS FROM FUNNY NUMBERS TO VOLTAGES*10000
0102     200 DO 220 K=5,903,3
0103     IF(ISSW(0))800,210
0104     210 IN(K)=$((FLOAT(IN(K))-POF)/PSC)*10000.+1
0105     IN(K+1)=$((FLOAT(IN(K+1))-TOF)/TSC)*10000.+1
0106     IN(K+2)=$((FLOAT(IN(K+2))-COF)/CSC)*10000.+1
0107     220 CONTINUE
0108  C
0109  C OUTPUT CONVERTED DATA TO TAPE =1
0110     250 CALL EXEC(2,110B,IN,NWORD)
0111     CALL POSIT(MTOUT,0,0,4,NEOF,NWORD)
0112     NROUT=NROUT+1
0113     GO TO 100

```

```

0114 C
0115 C ABORT
0116 800 WRITE(1,1800)
0117 CALL POSIT(MTIN,-1,0,2,IDIOT,NWORD)
0118 CALL POSIT(MTOUT,-1,0,2,IDIOT,NWORD)
0119 GO TO 850
0120 C
0121 C EOF FOUND ON INPUT
0122 820 ENDFILE MTOUT
0123 NRIN=NRIN-1
0124 SEC=SEC-FLOAT(NRIN)*60.+60.
0125 IH=SEC/3600.+0.000001
0126 M=(SEC-3600.*FLOAT(IH))/60.+0.00001
0127 SEC=SEC-3600.*FLOAT(IH)-60.*FLOAT(M)
0128 NFOUT=NFOUT+1
0129 WRITE(6,1820)NFIN,NRIN,NFOUT,NROUT,ID,IH,M,SEC
0130 NFIN=NFIN+1
0131 NDONE=NDONE+1
0132 NRIN=0
0133 NROUT=0
0134 IF(NDONE-ND0)95,850
0135 850 PAUSE 7
0136 860 WRITE(1,1860)
0137 READ(1,*)L
0138 NSKIP=(NEOF-1)/2-L
0139 NDONE=0
0140 WRITE(1,1865)
0141 READ(1,*)KOFST
0142 GO TO (10,870,5,1)L
0143 870 NSKIP=1
0144 IF(NEOF)20,13
0145 C
0146 1003 FORMAT(//"BRANCHES"/"1 RESTART FILE"/"2 CONTINUE W NEXT ONE"
0147 @/"3 SKIP FILES"/"4 REINITIALIZE"/"SET SSW'!")
0148 1005 FORMAT(/"SKIP OUTPUT FILES? TO SKIP BKWD ENTER -(=-TO-"
0149 @/"SKIP +1)")
0150 1007 FORMAT("SKIP INPUT FILES?")
0151 1030 FORMAT(/"DIGITIZER CALN:"/"SCALING/VOLT.."/"P ?")
0152 1032 FORMAT("T ?")
0153 1034 FORMAT("C ?")
0154 1036 FORMAT(/"OFFSET FOR 'ZERO-VOLTS':"/"P ?")
0155 1038 FORMAT("T ?")
0156 1040 FORMAT("C ?")
0157 1091 FORMAT(/)
0158 1090 FORMAT("PROCESS ? FILES?")
0159 1092 FORMAT("ID: ENTER 1(CHANGE) OR 2(NO CHANGE):")
0160 1150 FORMAT("ID= "I6" OK?")
0161 1800 FORMAT(/"ABORT! TAPES REWOUND TO START OF PRESENT FILES"
0162 @/"RESET SSW'!!")
0163 1820 FORMAT("IN"i4"F "i4"R, OUT"i4"F "i4"R. ID"i6" TIME"2I3.F4.0)
0164 1860 FORMAT(/"BRANCH TO?")
0165 1865 FORMAT("CALN DATA: ENTER 1(TO CHANGE) OR 2(NO CHANGE):")
0166 9002 FORMAT(/"RESET TAPE=0? Y=1, N=2 FOLLOWED BY PRESENT FILE =")
0167 9003 FORMAT("RESET TAPE=1? Y=1, N=2 FOLLOWED BY PRESENT FILE =")
0168 END
0169 C
0170 C
0171 SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)

```

```

0172 C
0173 C V=9 31,1,75 FOR USE UNDER DOS
0174 C USED TO CHECK M.T. STATUS AFTER I/O, AND TO SKIP FILES RECORDS
0175 COMMON PSC,TSC,CSC,POF,TOF,COF,NRIN
0176 2 NEOF=1
0177 3 NUNIT=0
0178 NSEL=NBRAN
0179 GO TO (5,5,5,5,5,5,5,4,5,4)N
0180 4 NUNIT=1
0181 5 GO TO (20,50)NSEL
0182 10 WRITE(1,1010)NUNIT
0183 15 PAUSE 1
0184 C
0185 CHECK IF UNIT ONLINE, THEN REWIND IT (TO RESET HARDWARE)
0186 20 IF(LOCAL(N))10,30
0187 30 NEOF=256+N
0188 CALL EXEC(3,NEOF)
0189 GO TO 9000
0190 C
0191 C SKIPS RECORDS/FILES
0192 40 CALL PTAPE(N,NF,NR)
0193 NSEL=4
0194 C
0195 CHECKS STATUS OF MT UNIT
0196 50 CALL EXEC(13,N,ISTAT,ILOG)
0197 IF(ISTAT)50,60
0198 60 GO TO (9000,40,90,70)NSEL
0199 C
0200 CHECKS FOR EOT AFTER A (BUFFER)WRITE C.
0201 70 IF(IEOT(N))75,9000
0202 75 WRITE(1,1080)NUNIT
0203 CALL RWSTB(N)
0204 GO TO 15
0205 C
0206 CHECKS FOR MISC AFTER A (BUFFER)READ C.
0207 90 IF(IEOF(N))100,110
0208 100 NEOF=-2
0209 GO TO 9000
0210 110 NSEL=NRIN+1
0211 IF(IEOT(N))75,120
0212 120 IF(IERR(N))130,140
0213 130 WRITE(6,1130)NSEL
0214 140 I=IWRDS(N)
0215 IF(I-NWRD)150,9000,150
0216 150 WRITE(6,1150)NSEL,I
0217 1010 FORMAT("READY TAPE UNIT"13)
0218 1080 FORMAT("EOT ON"13/"LOAD NEXT TAPE")
0219 1130 FORMAT("REC"15": TIM/PAR ERROR")
0220 1150 FORMAT("REC"15": TAPE ERROR>"15" WORDS XFERRERD")
0221 9000 RETURN
0222 END
0223 ENDS

```

4.6.2 Program: MS091Purpose

Special purpose program used to convert Batfish fluorometer/CTD data recorded in BCD on Coastal Oceanography's data logging system, into binary records readable by some experimental ONCAL analysis programs, not by the other FORTRAN programs in this note.

Hardware Requirements

HP2100 suporting DOS or DOSM

teletype for parameter input/output

mag tape transport (unit 0) for data input

mag tape transport (unit 1) for data output

Description

FORTTRAN is used because of its greater speed (relative to ONCAL) in converting BCD to binary. Data formats used are incompatible with the other FORTRAN programs described in this note.

Input: During acquisition data was written to tape as BCD records of 3080 sixteen-bit computer words, representing 770 numbers. The acquisition format was:

<u>Number</u>	<u>Contents</u>
1	ID
2	time
3-10	W ₁ T C P F W ₂ W ₃ W ₄ (data set 1)
...	...
763-770	... (data set 96)

Each number had eight digits (i.e., eight BCD characters), which were packed 2 digits/16-bit word. The digits had the following meaning:

digit

- 1 = channel number
- 2 = $\begin{cases} 1 & \text{for positive voltage} \\ 2 & \text{for negative voltage} \end{cases}$
- 3-8 = $|(\text{channel voltage})| \times 10000$

Fluorometer/CTD data occupied the positions indicated by (T,C,P,F); the remaining words in the data set indicated by the W_i.

The acquisition rate was 2 datasets/second.

Output: Output data consists of binary records of 772 sixteen-bit integers:

<u>word</u>	<u>contents</u>
1-2	ID (the original eight-digit number split into two 4-digit numbers)
3-4	time, as one floating point word in format HHMM.SS
5-12	V ₁ T C P F V ₂ V ₃ V ₄ (dataset 1)
...	...
765-772	(dataset 96)

where each word in the dataset is the (channel voltage) x 10000 corresponding to the input format.

Operating Instructions

Program is called by typing :PR,MS091. The mag tapes are rewound to load point and simple operating instructions are typed. These are indicated by the arrows in the sample output which follows.

NOTE Setting ssw ϕ on aborts any current operation, and repositions the tape to the start of the current file; program pauses at 0007.

Sample output

→ :PR,MS091

BRANCHES:

- 1.RESTART FILE
- 2.CONTINUE V NEXT ONE
- 3.SKIP FILES (TO SKIP BKWD, TYPE: -('#-TO-SKIP' +1))
- 4.REINITIALIZE

ID & 'IN' VALUES ARE 8-DIGIT #'S: SPACES=0'S

SKIP OUTPUT FILES?

→ 0

SKIP INPUT FILES?

→ 0

PROCESS HOW MANY FILES?

→ 14

FILE 1, REC 1: ID 7730 706, TIME 5 0 29
 IN: T: 71015048, C: 82003876, P: 9100 609, F: 1001363
 OUT: 1.5048 - .3876 .0609 .1363
 RECORD 31 TIM/PAR ERROR
 RECORD 32 TAPE ERROR, READ 1426.
 FMT ERR 5 MS091
 EOF ON 0

INPUT FILE 1: 33 RECORDS DONE
 OUTPUT FILE 1: 33 RECORDS

FILE 2, REC 1: ID 7730 709, TIME 15 5 28
 IN: T: 71014505, C: 82004029, P: 9100 511, F: 1001811
 OUT: 1.4505 - .4029 .0511 .1811
 RECORD 5 TIM/PAR ERROR
 RECORD 33 TAPE ERROR, READ 3088.
 EOF ON 0

INPUT FILE 2: 34 RECORDS DONE
 OUTPUT FILE 2: 34 RECORDS

FILE 3, REC 1: ID 7730 710, TIME 15 46 30
 IN: T: 71011874, C: 82005798, P: 9100 690, F: 1001787
 OUT: 1.1874 - .5798 .0690 .1787
 RECORD 44 TAPE ERROR, READ 4560.
 EOF ON 0

INPUT FILE 3: 45 RECORDS DONE
 OUTPUT FILE 3: 45 RECORDS


```

0001 FTN
0002 PROGRAM MS091
0003 C V#5 8,4,75
0004 C TRANSLATES DATA FROM DATA LOGGER TAPE (BCD) TO BINARY DATA ON 2NDTAPE
0005 C INPUT(U#0)..BCD; TIME ID <# T# C# P# F# # # #> ...
0006 C OUTPUT(U#1)..BIN(INTGR); ID ID TIME1 TIME2 <# T C P F # # #> ...
0007 C <..> ARE MEASURED VOLTAGES*10000 CORRESPONDING TO INPUT CHNLS.
0008 C 'TIME1 TIME2' IS EQUIVALENT TO A FL-PT # GIVING TIME IN SEC.
0009 C 1 BUFR=772#'S =96 <SETS>, ACQUIRED AT 2 SETS/SEC.
0010 C OUTPUT(U#1)..BIN(INTGR); ID ID TIME1 TIME2 <# T C P F # # #> ...
0011 C ACQUISITION FORMAT WAS 770 #'S/ARRAY, EACH HAD 8 DIGITS (IE,
0012 C 8 BCD CHARACTERS (TOT=6160)), PACKED 2 CHAR / 16BIT WORD
0013 C FORMAT: TIME, ID, #, 'T', 'C', 'P', 'F', #, #, #, ETC
0014 C DIMENSION IN(3080), IY(1540), IOUT(772), V(4)
0015 C COMMON NRIN, KWORD
0016 C EQUIVALENCE (TIME, IOUT(3))
0017 C INITIALIZE
0018 C 1 IWORD=3080
0019 C JWORD=6160
0020 C KWORD=JWORD
0021 C NWORD=772
0022 C MTIN=7
0023 C MTOUT=8
0024 C WRITE(1,1870)
0025 C RESET MAGTAPES
0026 C CALL POSIT(MTIN,0,0,1,NEOF,JWORD)
0027 C NFIN=1
0028 C CALL POSIT(MTOUT,0,0,1,NEOF,NWORD)
0029 C NFOUT=0
0030 C SKIP OUTPUT FILES
0031 C 5 WRITE(1,1005)
0032 C READ(1,*)NSKIP
0033 C IF(NSKIP)6,7
0034 C 6 NFOUT=NFOUT+1
0035 C 7 NFOUT=NFOUT+NSKIP
0036 C CALL POSIT(MTOUT,NSKIP,0,2,NEOF,NWORD)
0037 C NROUT=0
0038 C SKIP INPUT FILES
0039 C WRITE(1,1007)
0040 C READ(1,*)NSKIP
0041 C 10 IF(NSKIP)12,13
0042 C 12 NFIN=NFIN+1
0043 C 13 NFIN=NFIN+NSKIP
0044 C 15 CALL POSIT(MTIN,NSKIP,0,2,NEOF,JWORD)
0045 C 20 NRIN=0
0046 C ASK MISC & GET START/STOP ADRESSES
0047 C 25 WRITE(1,1025)
0048 C 30 READ(1,*)NUM
0049 C NUM=NFIN+NUM-1
0050 C IF(NUM=NFIN)30,50,40
0051 C 40 IREC=1
0052 C JREC=3000
0053 C GO TO 60
0054 C 50 WRITE(1,1050)
0055 C READ(1,*)IREC,JREC
0056 C IF(-IREC)60,820
0057 C SKIP RECORDS
0058 C 60 INIT=1
0059 C IF(NRIN-IREC)75,85,70
0060 C SKIP BKWD

```

```

0061      70 L=NRIN=IREC+1
0062      CALL POSIT(MTIN,0,L,2,NEOF,JWORD)
0063      NRIN=IREC-1
0064      C
0065      C SKIP FWD
0066      75 J=IREC-NRIN
0067      80 DO 95 L=1,J
0068      C READ IN 6160 CHARACTER ARRAY (BCD)
0069      85 CALL EXEC(1,7B,IN,-JWORD)
0070      CALL POSIT(MTIN,0,0,3,NEOF,JWORD)
0071      NRIN=NRIN+1
0072      IF(NEOF)820,90
0073      90 IF(ISSW(0))800,95
0074      95 CONTINUE
0075      CONVERT FROM BCD TO BINARY & PUT INTO Y-ARRAY
0076      100 CALL CODE
0077      READ(IN,1100)IY
0078      C ONE 8-DIGIT INPUT BCD # SHOULD BE SPLIT INTO TWO IY #'S (BIN)
0079      C RESHUFFLE #'S TO GET RID OF CHNL LABELS & PUT IN '-1' VALUES
0080      K=4
0081      115 DO 140 J=5,1540,2
0082      IF(ISSW(0))800,120
0083      120 ISIGN=1
0084      K=K+1
0085      IOUT(K)=IY(J)
0086      IOUT(K)=IOUT(K)-1000*(IFIX(.001*FLOAT(IOUT(K))))
0087      L=.01*FLOAT(IOUT(K))
0088      IF(L=2)140,130
0089      130 ISIGN=-1
0090      140 IOUT(K)=ISIGN*((IOUT(K)-L*100)*10000+IY(J+1))
0091      C GET TIME> HR MIN SEC
0092      K=IY(1)
0093      L=IFIX(.01*FLOAT(IY(2)))
0094      J=IY(2)-L*100
0095      IOUT(1)=IY(3)
0096      IOUT(2)=IY(4)
0097      TIME=FLOAT(J)+60.*(FLOAT(L)+60.*FLOAT(K))
0098      C LIST FIRST T,C,P,F DATA
0099      GO TO (145,150)INIT
0100      145 INIT=2
0101      C GET VOLTAGES
0102      DO 147 N=1,4
0103      147 V(N)=.0001*FLOAT(IOUT(N+5))
0104      WRITE(1,1140)NFIN,NRIN,IOUT(1),IOUT(2),K,L,J,(IY(J),J=7,14),
0105      @(V(J),J=1,4)
0106      CHECK IF THIS IS LAST RECORD IN FILE (BY SEEING IF BUFR WAS FULL
0107      C IF SO, ENSURE THAT START OF NEXT FILE IS LISTED.. ALTHOUGH NO
0108      C EOF IS PUT ONTO OUTPUT TAPE. (SOME FILES HAVE NO EOF)
0109      150 IF(KWORD=JWORD)155,160
0110      155 INIT=1
0111      C OUTPUT BINARY DATA
0112      160 CALL EXEC(2,110B,IOUT,NWORD)
0113      CALL POSIT(MTOUT,0,0,4,NEOF,NWORD)
0114      NROUT=NROUT+1
0115      CHECK IF FINISHED
0116      IF(NRIN=JREC)180,50
0117      C READ IN NEXT INPUT BUFFER
0118      180 CALL EXEC(1,7B,IN,-JWORD)
0119      CALL POSIT(MTIN,0,0,3,NEOF,JWORD)
0120      NRIN=NRIN+1

```

```

0121         IF(NEOF)820,190
0122     190 IF(ISSW(0))800,100
0123 C SSW=0 ON: ABORT, REWIND TAPES TO START OF PRESENT FILES
0124     800 WRITE(1,1800)
0125         CALL POSIT(MTIN,-1,0,2,NEOF,JWORD)
0126         CALL POSIT(MTOUT,-1,0,2,NEOF,NWORD)
0127         GO TO 850
0128 C EOF
0129     820 J=NRIN-1
0130         WRITE(1,1820)NFIN,J
0131         IF(NFIN=NUM)822,825
0132     822 IF(NEOF)824,823
0133     823 CALL POSIT(MTIN,1,0,2,NEOF,JWORD)
0134     824 NFIN=NFIN+1
0135         NRIN=0
0136     825 IF(NROUT-1)840,835
0137     830 WRITE(1,1830)
0138         READ(1,*)L
0139         GO TO (825,840)L
0140     835 ENDFILE MTOUT
0141         CALL POSIT(MTOUT,0,0,4,NEOF,NWORD)
0142         L=NFOUT+1
0143         WRITE(1,1835)L,NROUT
0144         NROUT=0
0145         NFOUT=NFOUT+1
0146     840 IF(NFIN=NUM)60,60,850
0147     850 PAUSE 7
0148     860 WRITE(1,1860)
0149         READ(1,*)L
0150         NSKIP=(NEOF-1)/2-L
0151         GO TO (10,870,5,1)L
0152     870 NSKIP=1
0153         IF(NEOF)20,13
0154     1005 FORMAT(// "SKIP OUTPUT FILES?")
0155     1007 FURMAT("SKIP INPUT FILES?")
0156     1025 FORMAT("PROCESS HOW MANY FILES?")
0157     1050 FORMAT("START AT RECORD? ...,STOP AT?")
0158     1100 FORMAT(I4)
0159     1140 FORMAT(/ "FILE" I4, REC" I4,": ID "2I4", TIME"3I3/
0160         @ " IN: T: "2I4", C: "2I4", P: "2I4", F: "2I4/
0161         @ "OUT: "4(" F7.4))
0162     1800 FORMAT("ABORT. TAPES REWOUND TO START OF FILES"//
0163         @ " @ @ TURN OFF SSW @ @ ")
0164     1820 FORMAT(/ " INPUT FILE" I4": " I4" RECORDS DONE")
0165     1830 FORMAT("TYPE '1' FOR EOF MARK (WRITTEN ONLY IF THERE IS OUTPUT"
0166         @ " DATA)"/ "'2' OTHERWISE")
0167     1835 FORMAT("OUTPUT FILE" I4": " I4" RECORDS"//)
0168     1860 FORMAT(/ "WHICH BRANCH?")
0169     1870 FORMAT(// "BRANCHES:"/"1.RESTART FILE"/"2.CONTINUE W NEXT ONE"/
0170         @ "3.SKIP FILES (TO SKIP BKWD, TYPE: -( '#-TO-SKIP' +1) )"
0171         @ /"4.REINITIALIZE"// "ID & 'IN' VALUES ARE 0-DIGIT #'S: SPACES=0'S"
0172         END
0173         SUBROUTINE POSIT(N,NF,NR,NBRAN,NEOF,NWRD)
0174 C V#9 31,1,75 FOR DOS
0175 C USED TO CHECK M.T. STATUS AFTER I/O
0176 C N=MT UNIT/NF=#FILES TO SKIP/NR=#RECORDS TO SKIP/NBRAN=OPTION
0177     COMMON NRIN,KWORD
0178     2 NEOF=1
0179     3 NUNIT=0
0180     NSEL=NBRAN

```

```

0181      GO TO (5,5,5,5,5,5,5,4,5,4)N
0182      4 NUNIT=1
0183      5 GO TO (20,50)NSEL
0184      10 WRITE(1,1010)NUNIT
0185      15 PAUSE 1
0186      CHECK IF UNIT ON=LINE, THEN REWIND (RESET)
0187      20 IF(LOCAL(N))10,30
0188      30 NEOF=256*N
0189      CALL EXEC(3,NEOF)
0190      GO TO 9000
0191      C SKIPS RECORDS (NR), & FILES(NF)
0192      40 CALL PTAPE(N,NF,NR)
0193      NSEL=4
0194      CHECKS STATUS OF M.T. UNIT
0195      50 CALL EXEC(13,N,ISTAT,ILOG)
0196      IF(ISTAT)50,60
0197      60 GO TO (9000,40,90,70)NSEL
0198      CHECKS FOR EOT
0199      70 IF(IEOT(N))80,9000
0200      80 WRITE(1,1080)NUNIT
0201      CALL RWSTB(N)
0202      GO TO 15
0203      CHECKS FOR MISC
0204      90 IF(IEOF(N))100,110
0205      100 WRITE(1,1100)NUNIT
0206      NEOF=-2
0207      GO TO 9000
0208      110 IF(IEOT(N))80,120
0209      120 IF(IEERR(N))130,140
0210      130 WRITE(1,1130)NRIN
0211      140 KWORD=IWRDS(N)
0212      IF(KWORD=NWRD)150,9000,150
0213      150 WRITE(1,1150)NRIN,KWORD
0214      1010 FORMAT("READY TAPE UNIT"13)
0215      1080 FORMAT("EOT ON"13/"LOAD NEXT TAPE")
0216      1100 FORMAT("EOF ON"13)
0217      1130 FORMAT("RECORD"15"   TIM/PAR ERROR")
0218      1150 FORMAT("RECORD"15"   TAPE ERROR, READ"16".")
0219      9000 RETURN
0220      END
0221      ENDS
**** LIST END ****

```

5. Upcoming Programs

In addition to some more plotting (e.g. contour surfaces versus geographical coordinates) and some statistical programs, this entire set is now being modified to accommodate data from additional sensors, specifically a Variosens fluorometer used together with a prototype digital CTD (Herman, 1975).

6. ACKNOWLEDGEMENTS

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MISCELLANEOUS HP Operating Manuals:

HP SOFTWARE OPERATING PROCEDURES

HP FORTRAN Manual

HP FORTRAN IV Manual

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