AD 633721

RADC-TR- 66-67, Volume II
Final Report

ORBIT DIFFERENTIAL CORRECTION - TRACKING PROGRAM

Volume II - Preprocessor for the Differential Correction Program

George E. Townsend

TECHNICAL REPORT NO. RADC-TR-66-67
April 1966

CLEARINGHOUSE
FOR FEDERAL SCIENTIFIC AND
TECHNICAL INFORMATION

Hardcopy	Microfiche		
$6.00	$1.25	238 pp	as

ARCHIVE COPY

Code 1

Distribution of This Document is Unlimited

Rome Air Development Center
Research and Technology Division
Air Force Systems Command
Griffiss Air Force Base, New York

When US Government drawings, specifications, or other data are used for any purpose other than a definitely related government procurement operation, the government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded, by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacturer, use, or sell any patented invention that may in any way be related thereto.

Do not return this copy. Retain or destroy.

ORBIT DIFFERENTIAL CORRECTION – TRACKING PROGRAM

Volume II – Preprocessor for the Differential Correction Program

George E. Townsend

Distribution of This Document is Unlimited

AFLC, GAFB, N.Y., 18 May 66-102

FOREWORD

The Space and Informations Systems Division (SID) of North American Aviation, Inc. (NAA) under Contract AF 30(602)-3628 with the Rome Air Development Center (RADC) of the United States Air Force agreed to perform a ten month study designed to develop digital computer techniques in two areas of interest to the RADC tracking facility. First, a differential correction geocentric orbit computation program was to be prepared for reducing observed data which will operate in a near optimum manner at the RADC computer center. And second, a computational logic which could be utilized in the tracking process for driving the tracking antennae in an open loop mode was to be prepared. This second program would employ general perturbations theory in the definition of the predicted trajectory.

This report was prepared as partial documentation of the first task. The contents present the program logic and FORTRAN listings for a data handling preliminary processor to be utilized in conjunction with the differential corrections program (DCP) described in a previous volume (SID 65-1203-1). This preprocessor is designed to accomplish two functions, one of which is required in the main program. The first function involves the sorting of the data and the arrangement in a chronological format. This operation provides a convenient means of incorporating data from several stations and assures that recursive form of the data filter employed in the DCP will perform as desired. The second function provided is a preliminary smoothing and editing of the raw data. This operation is accomplished by fitting the raw data acquired over a short interval of time to a parabolic arc in the sense of least squares for the purpose of eliminating random scatter. The smoothed data are edited by recording only the mid point of the segment on a magnetic tape along with all of the information necessary to identify it. This latter step is performed in the interest of computational efficiency with particular thought given to optimizing the program for the RADC facility.

This contract has been managed at NAA S&ID by Mr. J. A. Hill and directed by Mr. G. E. Townsend. Mr. Townsend also conceptually designed the rationale for the preprocessor and assisted in its preparation. The formal logic for the program in addition to its development and checkout are the products of Mr. C. C. DeBilzan.

The assistance offered by RADC personnel under the direction of Mr. Gordon Negus (Program Manager) is gratefully acknowledged.

ABSTRACT

The Preprocessor for the Differential Corrections Geocentric Orbit Computations Program (FS4-305A) is a data handling routine required in the reduction of satellite observations, and the computation of the associated trajectories. This program reads a specially generated magnetic tape containing coordinate data observations from a series of tracking stations. The data is smoothed, using least squares criteria, and then ordered. Primary ordering is time and secondary ordering is by station. Output includes a magnetic tape which is required as input for the Differential Corrections Geocentric Orbit Computations Program (FS4-305).

BLANK PAGE

TABLE OF CONTENTS

ABSTRACT iii

FOREWORD ii

INTRODUCTION 1

SUMMARY OF PROGRAM CHARACTERISTICS 3

METHOD 5

ROUTINE	MAIN	7
SUBROUTINE	PRESET	12
SUBROUTINE	REED	16
FUNCTION	NBLANK	23
SUBROUTINE	PRINTI	26
SUBROUTINE	PROCESS	30
FUNCTION	NOPT	52
SUBROUTINE	PRINTR	55
SUBROUTINE	CHRONT	58
SUBROUTINE	FIT	64
SUBROUTINE	SMOOTH	89
SUBROUTINE	MATMPY	94
SUBROUTINE	MATINV	98
SUBROUTINE	CHOOSE	103
SUBROUTINE	TRANSP	106
SUBROUTINE	GSORT	109
SUBROUTINE	CHANGE	114
SUBROUTINE	TWTF	123
SUBROUTINE	BESSEL	126
FUNCTION	ANGMOD	129
FUNCTION	CXA	133
FUNCTION	CXAPLB	136
SUBROUTINE	PRINTS	139

PROGRAM OPERATION 145

INPUT DATA 145
INPUT TAPE 147
VARIABLE DIMENSIONS 149
STORAGE LIMITATIONS 150

PROGRAM OUTPUT 151

OUTPUT TAPE 151

APPENDIX A - SUBROUTINE DATAPE 153

APPENDIX B - SAMPLE PROBLEM 163

FIGURES

Number		Page
1	Steps Required to Transmit Data from Tracking Stations to FS4-305	2
2	Input Data Sheet	146
3	Input Tape Format	148
4	Output Tape Format	152

APPENDIX

1-B	First Raw Data File. Doppler Reading vs Time	165
2-B	First Raw Data File. Azimuth vs Time	166
3-B	First Raw Data File. Elevation vs Time	167
4-B	Second Raw Data File. Doppler Reading vs Time	168
5-B	Second Raw Data File. Azimuth vs Time	169
6-B	Second Raw Data File. Elevation vs Time	170
7-B	Input Data	172

INTRODUCTION

FS4-305A is a special purpose, FORTRAN IV, IBM 7094 program which was written and checked using the standard North American Aviation monitor system (NAASYS-version 13). The primary function of this program is to act as the interface between the tracking stations and the Differential Corrections Geocentric Orbit Computations Program (FS4-305). As illustrated in figure 1, this function is executed by performing a preliminary smoothing of the data to eliminate random scatter and reduce the magnitude of the processing task (by eliminating some of the data) and by arranging the data in the format expected by FS4-305. The arrangement involves the construction of a seven word record for each smoothed set of observations, identifying the time, the station, the type of data and the observation vector. This data is presented on a magnetic tape, chronologically.

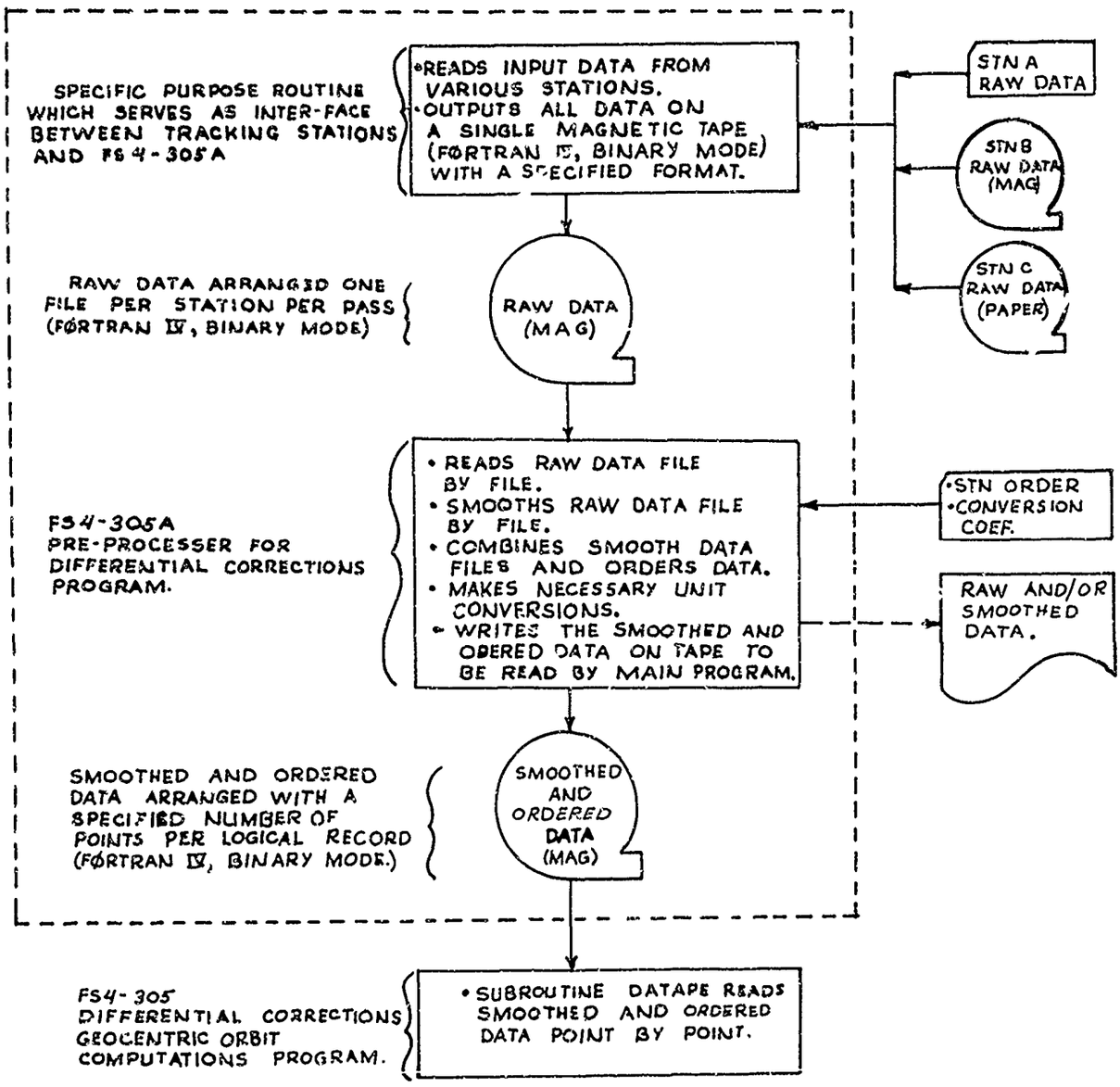
The data will be read from this tape in the differential corrections program (DCP) described in SID 65-1201-1 by subroutine DATAPE. This routine is the sole link between the preprocessor and the DCP, and as such it assures complete consistency between the two programs. Accordingly, its design and operation are discussed in this document and in the documentation of the DCP.

It was anticipated that the amount of data being processed may, at times, require storage capabilities exceeding core. Further, it was recognized that the dimensions of certain key arrays within the program are dependent upon the type of data being processed. Therefore, provision has been made for auxiliary tape storage (mechanized by the program only if required) and variable dimensioning has been utilized. Proper adjustment of array dimensions, either through knowledge of certain key parameters beforehand or with the aid of diagnostics written under program control, assures that the auxiliary tape storage mode will usually not generally require mechanization.

Though the program was developed on the IBM 7094 it was also designed to be operated on CDC equipment (specifically the CDC 1604) and other systems possessing FORTRAN capabilities but not utilizing NAASYS. Consequently, to minimize possible system incompatabilities, a "straight forward" approach was utilized in both setting up the program logic and coding. Although this philosophy precluded the use of machine language routines, it is believed that the programs efficiency has not been appreciably impaired. Further, operation on new systems such as the IBM 360 is assured.

FIGURE 1

STEPS REQUIRED TO TRANSMIT DATA FROM TRACKING STATIONS TO FS4-305. (DIFFERENTIAL CORRECTIONS GEOCENTRIC ORBIT COMPUTATIONS PROGRAM).



SUMMARY OF PROGRAM CHARACTERISTICS

This data handling routine has been designed to assure complete consistancy between the differential corrections program and the sources of the observation data. For this reason, before proceding with the discussion of the logical structure of the routine, it is singularly instructive to outline the requirements imposed on the output of the preprocessor and some of the features which are desired of it during its operation. An itemization of such features is presented below:

- Output is a magnetic tape required as input to FS4-305.
- Output tape contains a series of points, each point consisting of seven words indicating time, station, data type, and up to three coordinates.
- Input requirements include a specially generated magnetic tape containing coordinate data from tracking stations recorded at about one second intervals.*
  - a. coordinate data may be any combination of the following types.
    1. Range
    2. Range rate
    3. Azimuth, elevation
    4. Range, range rate
    5. Range, azimuth, elevation
    6. Range rate, azimuth, elevation
- Up to ten separate tracking stations permitted (single satellite).
- Other than exceeding data storage capabilities, no limit on number of passes per station.
- Smooths data using least squares criteria.
- Orders data. Primary ordering is time, secondary ordering is station.
- Observational sphere of influence of adjacent stations may overlap. i.e. More than one station may record observations at the same time.
- FØRTRAN IV (IBSYS-version 5, NAASYS-version 13).
- Variable dimensions.
- CØMMØN not used.
- Raw and/or smooth data print options.
- Auxiliary tape storage mechanized by program if required.

* If $\Delta t >> 1$ subroutine FIT should be reviewed and fewer than 20 data points smoothed at a time.

- Requires special tapes be mounted.

- Required logical magnetic tape units:
  - tape 5, System input
  - tape 6, System output
  - tape 8, System open. Used for inputting raw data observations from tracking stations.
  - tape 9, System open. Used for:
    1.) temporary data storage.
    2.) inputting smoothed and ordered data.

- Due to the general nature and flexability of the program, the maximum number of raw data points that may be processed is difficult to estimate. Generally, the upper limit will be reached if the number of smoothed data points exceeds the dimension of the STN array.

- Requires approximately $13465_8 = 5941_{10}$ locations excluding locations required for STN,A,AA arrays and I/Ø buffers.

- Loading and execution time for the sample problem was less than 2 minutes on the IBM 7094.

METHOD

FS4-305A reads a specially generated magnetic tape containing observations of a Satellite from a series of tracking stations. The data is smoothed using least squares criteria and chronologically ordered. After making the required unit transformations, the data is output on magnetic tape in the format required by the main program, FS4-305. Provision is made for optional printout of the raw and/or smoothed data.

This function is executed by mechanizing the following routines:

PRESET	presets input data
REED	reads input data
NBLANK	tests for blank input data fields
PRINTI	prints input data
PRØCES	program driver, storage allocation, tape mechanization
NØPT	number of raw data points per file
PRINTR	prints raw data
CHRØNT	sequences data chronologically
FIT	sets up data for smoothing
SMØØTH	smooths data
MATMPY	matrix multiply
MATINV	matrix inversion
CHØØSE	check for singular matrix
TRANSP	matrix transposition
GSØRT	orders data
CHANGE	unit conversion
TWTF	converts time to days
BESSEL	refers time to the epoch of 1950.0
ANGMØD	insures angles are positive, mod 360 degrees
CXA	converts degrees to radians
CXAPLB	converts doppler reading to range rate
PRINTS	prints smooth data

The following pages outline nomenclature, method and other pertinent details for each subroutine. An appreciation for the complete program logic may be gained by referring to the flow diagrams of the program driver routine PROCES. Details concerning the required input tape may be found in the section concerning program operation whereas the output tape is described in the program output section. A description of the routine required to read the output tape (SUBROUTINE DATAPE) is enclosed as appendix I. (This routine is the interface between FS4-305A and FS4-305. It is an integral portion of FS4-305).

MAIN routine

Purpose:	Main routine	
Deck Name:	MAIN	
Subroutines Required:	PRESET	(presets input data)
	REED	(reads input data)
	PRINTI	(prints input data)
	PRØCES	(program driver)
Functions Required:	None	
Approximate Deck Length:	$166_8 = 118_{10}$	excluding locations required for STN,A, and AA arrays.

Method:

After setting the variable dimensions, input data is initialized, read in, and printed. Control is then transferred to SUBRØUTINE PRØCES which serves as the driver program.

See the sample problem and "Program Operation" section for assistance in setting the variable dimensions MAXSTN, MAXA, and MAXAA.

```
C *** FS4-305A ***          *** MAIN ROUTINE ***                    MAIN0010
C                                                                   MAIN0020
C                                **********                         MAIN0030
C                                 FS4-305A                          MAIN0040
C                                                                   MAIN0050
C                              PREPROCESSOR                         MAIN0060
C                                FOR THE                            MAIN0070
C                   DIFFERENTIAL CORRECTIONS GEOCENTRIC ORBIT       MAIN0080
C                             COMPUTATIONS PROGRAM                  MAIN0090
C                                **********                         MAIN0100
C                                                                   MAIN0110
C          FS4-305A READS A SPECIALLY GENERATED MAGNETIC TAPE CONTAIN-  MAIN0120
C     ING COORDINATE OBSERVATIONS FROM A SERIES OF TRACKING STATIONS.  MAIN0130
C     THE DATA IS SMOOTHED USING LEAST SQUARES CRITERIA AND CHRONO-    MAIN0140
C     LOGICALLY ORDERED.  AFTER PERFORMING THE REQUIRED UNIT TRANSFOR- MAIN0150
C     MATIONS, THE DATA IS OUTPUT ON MAGNETIC TAPE IN THE FORMAT       MAIN0160
C     REQUIRED BY THE MAIN PROGRAM, FS4-305.  PROVISION IS MADE FOR    MAIN0170
C     OPTIONAL PRINTOUT OF THE RAW AND/OR SMOOTHED DATA.               MAIN0180
C                                                                      MAIN0190
C                                **********                            MAIN0200
C                                                                      MAIN0210
C     METHOD,                                                          MAIN0220
C                                                                      MAIN0230
C          AFTER SETTING OF THE VARIABLE DIMENSIONS, INPUT DATA IS     MAIN0240
C     INITIALIZED, READ IN, AND PRINTED.  CONTROL IS THEN TRANSFERRED  MAIN0250
C     TO SUBROUTINE PROCES WHICH SERVES AS THE DRIVER PROGRAM.         MAIN0260
C                                                                      MAIN0270
C                                                                      MAIN0280
C     VARIBLE DIMENSIONS,                                              MAIN0290
C                                                                      MAIN0300
C          TO ASSIST IN SETTING THE VARIABLE DIMENSIONS MAXSTN,MAXA,   MAIN0310
C     AND MAXAA, A BRIEF SUMMARY OF PERTAINENT CHARACTERISTICS OF THE  MAIN0320
C     STN, A, AND AA ARRAYS FOLLOWS.                                   MAIN0330
C          NOTE, 'MECH' IMPLIES AUX TAPE STORAGE IS MECHANIZED.        MAIN0340
C                'NO-MECH' IMPLIES AUX TAPE STORAGE IS NOT MECHANIZED. MAIN0350
C                                                                      MAIN0360
```

```
C     STN(6,MAXSTN)                                                     MAIN0370
C                                                                       MAIN0380
C         STORAGE, RAW DATA                    ,SINGLE FILE             MAIN0390
C                                                                       MAIN0400
C         STORAGE, SMOOTHED DATA               , ALL FILES  , MECH      MAIN0410
C                                                                       MAIN0420
C         STORAGE, SMOOTHED AND ORDERED DATA, ALL FILES  , MECH         MAIN0430
C                                                                       MAIN0440
C     A(6,MAXA)                                                         MAIN0450
C                                                                       MAIN0460
C         STORAGE, SMOOTHED DATA                                        MAIN0470
C                                                                       MAIN0480
C         STORAGE, SMOOTHED AND ORDERED DATA, ALL FILES  ,  NO-MECH     MAIN0490
C                                                                       MAIN0500
C         LOADED FROM AA (FILE BY FILE)                                 MAIN0510
C                                                                       MAIN0520
C         IF NUMBER OF SMOOTHED POINTS EXCEEDS MAXA, AUX TAPE STORAGE   MAIN0530
C         IS MECHANIZED BY THE PROGRAM.                                 MAIN0540
C                                                                       MAIN0550
C         TRANSFERS SMOOTHED POINTS FROM AUXILIARY STORAGE TAPE TO      MAIN0560
C         STN ARRAY FOR SORTING.  MECH                                  MAIN0570
C                                                                       MAIN0580
C     AA(4,MAXAA)                                                       MAIN0590
C                                                                       MAIN0600
C         STORAGE, SMOOTHED DATA               , SINGLE FILE            MAIN0610
C                                                                       MAIN0620
C                                                                       MAIN0630
C                                                                       MAIN0640
      DIMENSION  STN(6,1000)  ,A(6,100)    ,AA(4,50)                    MAIN0650
     2           ,STNAME(10)   ,C(4,10)                                 MAIN0660
C                                                                       MAIN0670
C                                                                       MAIN0680
C                                   SET VARIABLE DIMENSIONS.            MAIN0690
    5 MAXSTN = 1000                                                     MAIN0700
   10 MAXA   = 100                                                      MAIN0710
   15 MAXAA  = 50                                                       MAIN0720
C                                   INITIALIZE INPUT DATA.              MAIN0730
```

```
   20 CALL PRESET(PR,PS,STNAME,C,XJDREF)                                MAIN0740
C                                   READ INPUT DATA.                    MAIN0750    5
   25 CALL REED(STNAME,C,PR,PS)                                         MAIN0760
C                                   PRINT INPUT DATA.                   MAIN0770    7
   30 CALL PRINTE(STNAME,C,PR,PS)                                       MAIN0780
C                                   TRANSFER CONTROL TO PROGRAM         MAIN0790
C                                   DRIVER ROUTINE.                     MAIN0800
C                                                                       MAIN0810    9
   35 CALL PROCES(STNAME,MAXSTN,MAXA,MAXAA,STN,A,AA,XJDREF,PR,PS,C)     MAIN0820   11
      RETURN                                                            MAIN0830
      END                                                               MAIN0840
```

FS305A 10/01/64

MAIN STORAGE MAP

MAIN PROGRAM

DIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
STN	00001	R	A	13561	R	AA	14711	R
STNAME	15221	R	C	15233	R			

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
MAXSTN	15303	I	MAXA	15304	I	MAXAA	15305	I
PR	15306	R	PS	15307	R	XJDREF	15310	R

ENTRY POINTS

..... SECTION 3

SUBROUTINES CALLED

PRESET	SECTION	4	REED	SECTION	5	PRINTI	SECTION	6
PROCES	SECTION	7	SYSLOC	SECTION	8			

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	15320	10	2A	15322	15	3A	15324
20	4A	15326	25	6A	15336	30	8A	15345
35	10A	15354						

DECK LENGTH IN OCTAL IS 15407.

Subroutine PRESET

Purpose: Presets input data and certain program constants.

Deck Name: PRSET

Calling Sequence: CALL PRESET (PR, PS, STNAME, C, XJDREF)

Input/Output:

I/O	FØRTRAN Name	Dimension	Description	Preset Value
O	PR	———	Raw data print flag non zero, print zero, no print	print
O	PS	———	Smooth data print flag non zero, print zero, no print	print
O	STNAME	10	Station sorting order	one
O	C	4, 10	Conversion coefficients C(1, J) C(2, J) C(3, J) C(4, J)	Range-no conversion Range rate - No conversion Azimuth, elevation degrees to radians
O	XJDREF	———	Program reference Julian date (zero hour U.T.) (this reference will be altered in BESSEL to refer time to the epoch of 1950.0, J.D. 2433282.423)	(33281.5) *

Subroutines Required: None

* Note that the leading characters "24" have been omitted from all Julian dates for the sake of numerical significance.

Functions Required: None

Approximate Deck Length: $122_8 = 82_{10}$

```
C *** FS4-305A ***          *** SUBROUTINE PRESET ***                PRST0010
C                                                                     PRST0020
C     PURPOSE,                                                        PRST0030
C         PRESETS INPUT DATA AND PROGRAM CONSTANTS.                   PRST0040
C                                                                     PRST0050
      SUBROUTINE PRESET(PR,PS,STNAME,C,XJDREF)                        PRST0060
C                                                                     PRST0070
      DIMENSION  STNAME(10),C(4,10)                                   PRST0080
C                                                                     PRST0090
C                                       SET FLAGS TO PRINT RAW AND    PRST0100
C                                       SMOOTH DATA.                  PRST0110
    5 PR = 1                                                          PRST0120
   10 PS = 1                                                          PRST0130
C                                       SET STATION SORTING ORDER.    PRST0140
   15 DO 20  I=1,10                                                   PRST0150
   20 STNAME(I) = 1.0                                                 PRST0160
C                                       SET CONVERSION COEFFICENTS.   PRST0170
   25 DO 50  I=1,10                                                   PRST0180
C                                       RANGE                         PRST0190
   30 C(1,I) = 1.0                                                    PRST0200
C                                       DOPPLER READING TO RANGE RATE. PRST0210
   35 C(2,I) = 1.0                                                    PRST0220
   40 C(3,I) = 0.0                                                    PRST0230
C                                       DEGREES TO RADIANS.           PRST0240
   45 C(4,I) = 3.14159265/180.                                        PRST0250
   50 CONTINUE                                                        PRST0260
C                                       PROGRAM REFERENCE DATE.       PRST0270
C                                       ( JANUARY 0, 1950 )           PRST0280
   55 XJDREF = 33281.5                                                PRST0290
   60 RETURN                                                          PRST0300
      END                                                             PRST0310
```

STORAGE MAP

SUBROUTINE PRESET

ENTRY POINTS

PRESET	SECTION	3

SUBROUTINES CALLED

E.1	SECTION	4	E.2	SECTION	5	E.3	SECTION	6
E.4	SECTION	7	CC.1	SECTION	8	CC.2	SECTION	9
CC.3	SECTION	10	CC.4	SECTION	11	SYSLOC	SECTION	12

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	00011	10	2A	00021	15	3A	00031
20	7A	00032	25	11A	00036	50	23A	00050
30	15A	00040	35	17A	00042	40	19A	00044
45	21A	00045	55	26A	00053	60	27A	00055

DECK LENGTH IN OCTAL IS 00122.

Subroutine REED

Purpose: Special purpose input routine. As applied to this program, subroutine REED performs the function of inputting conversion coefficients and numbers required in the ordering of the raw data files (see "Program Operation"). These operations are essential to insure compatability between this program and the Differential Corrections Program.

Deck Name: RD

Calling Sequence: CALL REED (STNAME, C, PR, PS)

Input/Output:

I/O	FØRTRAN Name	Dimensions	Description
0	STNAME	10	STNAME(J) indicates the sorting order of the J-th station. Ordering must be consistent with the ordering of stations in the differential corrections program.
0	C	4, 10	Coefficients required for unit conversions of the observed data. Units must be compatible with those employed in the differential corrections program (Km, Km/sec, rad)
0	PR	---	Raw data print indicator
0	PS	---	Smooth data print indicator

Subroutine Required: None

Functions Required: NBLANK (tests for blank input data)

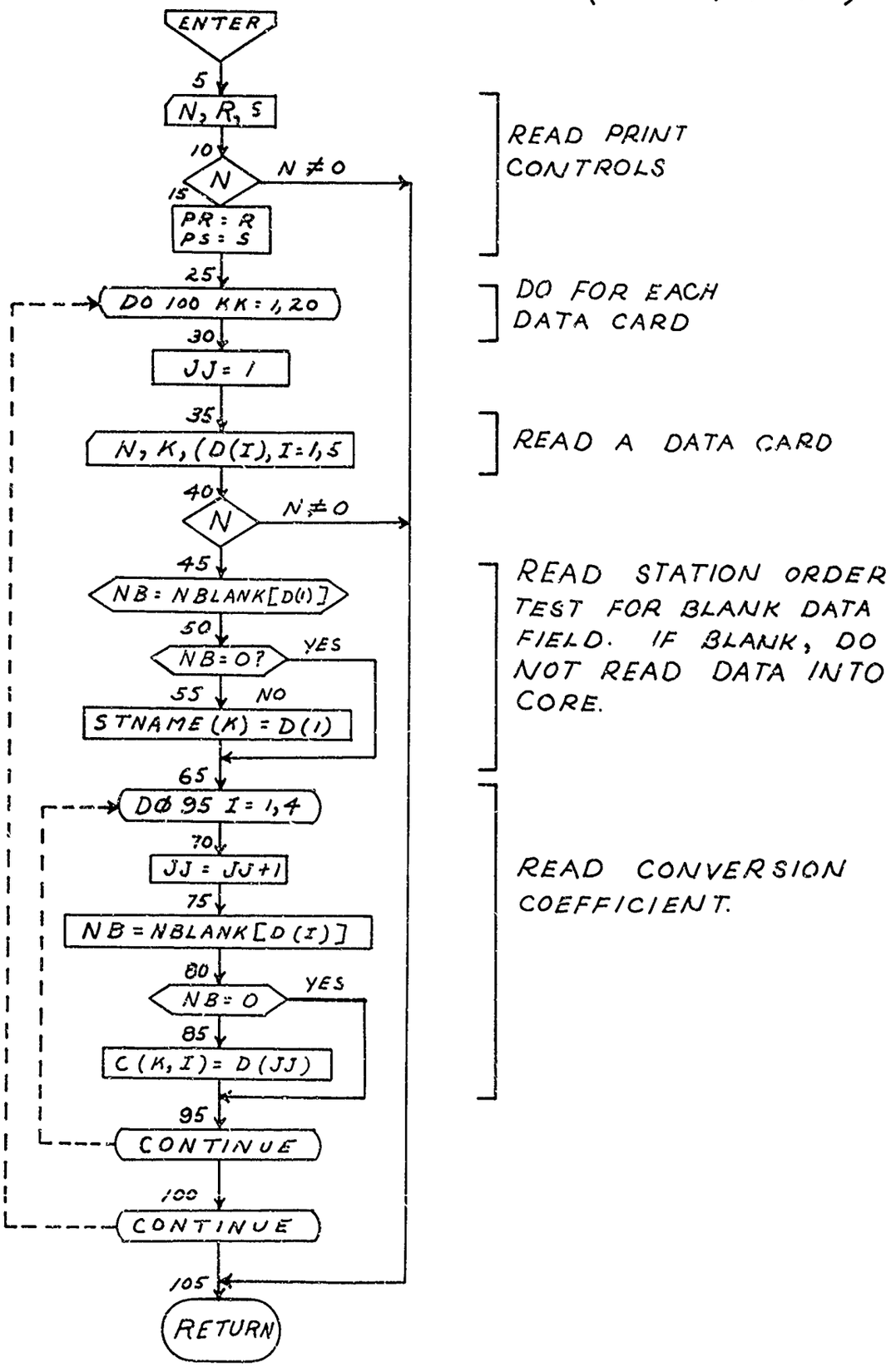
Approximate Deck Length: $222_8 = 146_{10}$

Restrictions: It has been assumed that a blank field is assigned the value -0.0. Consequently, when inputting data, a zero should be designated 0.0

Method:

Prior to entering, all input data has been preset at nominal values by subroutine PRESET. This routine provides the facility for reading a variable number of pieces of data into the program, replacing the preset values. If the preset value is desired, the corresponding input data field is left blank. Specific details concerning the input format and instructions may be found in the "Program Operation" section.

SUBROUTINE REED (STNAME, C, PR, PS)



```
C *** FS4-305A ***          *** SUBROUTINE REED ***                    REED0010
C                                                                      REED0020
C     PURPOSE,                                                         REED0030
C                                                                      REED0040
C                 READS INPUT DATA                                     REED0050
C                                                                      REED0060
C     METHOD,                                                          REED0070
C                                                                      REED0080
C                 PRIOR TO ENTERING, ALL INPUT DATA HAS BEEN PRESET AT REED0090
C                 NOMINAL VALUES BY SUBROUTINE PRESET.  THIS ROUTINE   REED0100
C                 PROVIDES THE FACILITY FOR READING A VARIABLE NUMBER  REED0110
C                 OF PIECES OF DATA INTO THE PROGRAM, REPLACING THE    REED0120
C                 PRESET VALUES.  IF THE PRESET VALUE IS DESIRED, THE  REED0130
C                 CORRESPONDING INPUT DATA FIELD IS LEFT BLANK.        REED0140
C                 SPECIFIC DETAILS CONCERNING THE INPUT FORMAT AND     REED0150
C                 INSTRUCTIONS MAY BE FOUND IN THE 'PROGRAM OPERATION' REED0160
C                 SECTION OF THE PROGRAM DOCUMENTION.                  REED0170
C                                                                      REED0180
C     RESTRICTIONS,                                                    REED0190
C                                                                      REED0200
C                 COMPUTER SUSTEM MUST ASSIGN THE VALUE '-0.' TO A     REED0210
C                 BLANK INPUT DATA FIELD.                              REED0220
C                                                                      REED0230
C     NOMENCLATURE,                                                    REED0240
C                                                                      REED0250
C         STNAME ,STNAME(J) INDICATES THE SORTING ORDER OF THE J-TH    REED0260
C                 STATION.                                             REED0270
C         C      ,COEFFICIENTS REQUIRED FOR UNIT CONVERSION.           REED0280
C         PR     ,RAW DATA PRINT INDICATOR.                            REED0290
C         PS     ,SMOOTH DATA PRINT INDICATOR.                         REED0300
C                                                                      REED0310
C                                                                      REED0320
      SUBROUTINE REED(STNAME,C,PR,PS)                                  REED0330
C                                                                      REED0340
      DIMENSION  STNAME(10) ,C(4,10) ,D(5)                             REED0350
C                                                                      REED0360
```

```
C                                   READ PRINT CONTROLS.          REED0370
    5 READ(5,1000)  N,R,S                                         REED0380
C                                   N EQUAL TO NON-ZERO INDICATES REED0390
C                                   NO MORE DATA                  REED0400   1
   10 IF( N.NE.0 )  GO TO 105                                     REED0410
   15 PR = R                                                      REED0420
   20 PS = S                                                      REED0430
C                                   DO FOR EACH DATA CARD.        REED0440
   25 DO 100  KK=1,20                                             REED0450
   30 JJ = 1                                                      REED0460
   35 READ (5,1005)  N,K,(D(I),I=1,5)                             REED0470  13
   40 IF( N.NE.0 )  GO TO 105                                     REED0480
C                                   TEST FOR BLANK DATA FIELD.  IF REED0490
C                                   BLANK, DO NOT READ DATA INTO  REED0500
C                                   CORE OVER STORED VALVE.       REED0510
   45 NB = NBLANK(D(1))                                           REED0520  24
   50 IF( NB.EQ.0 )  GO TO 60                                     REED0530
   55 STNAME(K) = D(1)                                            REED0540
   60 CONTINUE                                                    REED0550
C                                   READ CONVERSION COEFFICIENTS. REED0560
   65 DO 95  I=1,4                                                REED0570
   70 JJ = JJ + 1                                                 REED0580
   75 NB = NBLANK(D(JJ))                                          REED0590  36
   80 IF( NB.EQ.0 )  GO TO 90                                     REED0600
   85 C(K,I) = D(JJ)                                              REED0610
   90 CONTINUE                                                    REED0620
   95 CONTINUE                                                    REED0630
C                                                                 REED0640
  100 CONTINUE                                                    REED0650
  105 RETURN                                                      REED0660
 1000 FORMAT(I1,2I2)                                              REED0670
 1005 FORMAT(I1,9X,I2,3E12.8)                                     REED0680
      END                                                         REED0690
```

STØRAGE MAP

SUBRØUTINE REED

DIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
D	00001	R						

UNDIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
N	00006	I	R	00007	R	S	00010	R
KK	00011	I	JJ	00012	I	K	00013	I
NB	00014	I						

ENTRY PØINTS

REED	SECTIØN	3

SUBRØUTINES CALLED

.FRDD.	SECTIØN	4	NBLANK	SECTIØN	5	.UNØ5.	SECTIØN	6
.FRTN.	SECTIØN	7	.FCNV.	SECTIØN	8	SYSLØC	SECTIØN	9

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	1A	00032	1000	FØRMAT	00025	10	3A	00046
105	50A	00162	15	6A	00052	20	7A	00054
25	8A	00056	100	47A	00160	30	12A	00061
35	13A	00063	1005	FØRMAT	00027	40	20A	00102
45	23A	00106	50	25A	00113	60	30A	00124
55	28A	00117	65	31A	00124	95	45A	00155

STORAGE MAP

70	34A	00131	75	35A	00134	80	38A	00144
90	44A	00155	85	41A	00150			

DECK LENGTH IN OCTAL IS 00222.

Function NBLANK

Purpose: Tests for blank input data.

Deck Name: NBLNK

Calling Sequence: NB=NBLANK (D)

Input/Output:

I/O	FØRTRAN Name	Dimensions	Description
I	D	———	Variable to be tested
O	NB	———	blank indicator: 0, D was a blank 1, D was not a blank

Subroutine Required: None

Functions Required: None

Approximate Deck Length: $50_8 = 40_{10}$

Restrictions: System must assign the value -0.0 to a blank input data field. Zero should be input as 0.0.

```
C *** FS4-305A ***          *** FUNCTION NBLANK ***                    NBLK0010
C                                                                      NBLK0020
C     PURPOSE,                                                         NBLK0030
C                                                                      NBLK0040
C         TESTS FOR BLANK INPUT DATA FIELDS.                           NBLK0050
C                                                                      NBLK0060
C     RESTRICTIONS,                                                    NBLK0070
C                                                                      NBLK0080
C         SYSTEM MUST ASSIGN THE VALUE -0.0 TO A BLANK INPUT DATA      NBLK0090
C         FIELD.  ZERO SHOULD BE INPUT AS 0.0 .                        NBLK0100
C                                                                      NBLK0110
      FUNCTION NBLANK(D)                                               NBLK0120
C                                                                      NBLK0130
    5 IF( D.NE.0.0 ) GO TO 25                                          NBLK0140
   10 IF( SIGN(2.0,D).GT.0.) GO TO 25                                  NBLK0150
C                                   D WAS A BLANK.                     NBLK0160
   15 NBLANK = 0                                                       NBLK0170
   20 GO TO 30                                                         NBLK0180
C                                   D WAS NOT A BLANK.                 NBLK0190
   25 NBLANK = 1                                                       NBLK0200
   30 RETURN                                                           NBLK0210
   35 END                                                              NBLK0220
```

FS305A 10/01/64

NBLNK STORAGE MAP

FUNCTION NBLANK TYPE I

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
F.0000	00001	I						

ENTRY POINTS

NBLANK SECTION 3

SUBROUTINES CALLED

SYSLOC SECTION 4

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	00010	25	9A	00025	10	4A	00014
15	7A	00023	20	8A	00024	30	10A	00027

DECK LENGTH IN OCTAL IS 00050.

Subroutine PRINTI

Purpose: Prints input data

Deck Name: PRINTI

Calling Sequence: CALL PRINTI (STNAME, C, PR, PS)

Input/Output:

I/O	FORTRAN Name	Dimensions	Description
I	STNAME	10	STNAME (J) indicates the sorting order of the J-th station. Ordering must be consistent with the ordering of stations in the differential corrections program.
I	C	4, 10	Coefficients required for unit conversions
I	PR	----	Raw data print indicator
I	PS	----	Smooth data print indicator

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $306_8 = 198_{10}$

```
C *** FS4-305A ***          *** SUBROUTINE PRINTI ***                    PNTIN010
C                                                                        PNTIN020
C     PURPOSE,                                                           PNTIN030
C                                                                        PNTIN040
C        PRINTS INPUT DATA                                               PNTIN050
C                                                                        PNTIN060
C     NOMENCLATURE,                                                      PNTIN070
C                                                                        PNTIN080
C        STNAME , STNAME(J) INDICATES THE SORTING ORDER OF THE           PNTIN090
C                 J-TH STATION.                                          PNTIN100
C              C , COEFFICIENTS REQUIRED FOR UNIT CONVERSIONS.           PNTIN110
C             PR , RAW DATA PRINT INDICATOR                              PNTIN120
C             PS , SMOOTH DATA PRINT INDICATOR                           PNTIN130
C                                                                        PNTIN140
      SUBROUTINE PRINTI(STNAME,C,PR,PS)                                  PNTIN150
C                                                                        PNTIN160
      DIMENSION  STNAME(10) ,C(4,10) ,NORDER(10)                         PNTIN170
C                                                                        PNTIN180
    5 NPR = PR                                                           PNTIN190
   10 NPS = PS                                                           PNTIN200
   15 DO 20  K=1,10                                                      PNTIN210
   20 NORDER(K) = STNAME(K)                                              PNTIN220
   25 WRITE(6,100)  NPR,NPS                                              PNTIN230   12
   30 DO 40  J=1,10                                                      PNTIN240
   35 WRITE(6,105)  J,NORDER(J),(C(I,J),I=1,4)                           PNTIN250   17
   40 CONTINUE                                                           PNTIN260
   45 RETURN                                                             PNTIN270
C                                                                        PNTIN280
  100 FORMAT(1H1, 47X,10HINPUT DATA /1H0, 48X, 8HFS4-305A /1H , 46X,12HPPNTIN290
     2REPROCESSOR /1H , 48X, 7HFOR THE /1H , 34X,41HDIFFERENTIAL CORRECTPNTIN300
     3IONS GEOCENTRIC ORBIT  /1H , 44X, 20HCOMPUTATIONS PROGRAM         PNTIN310
     4//////1H , 43X, 16HPRINT INDICATORS / 1H ,32X,16HRAW DATA PRINT = PNTIN320
     5 ,I2, 3X, 19HSMOOTH DATA PRINT =                                  PNTIN330
     6 ,I2 /1H-, 7X,  7HSTATION, 2X,  7HSORTING, 27X, 23HCONVERSION COEFPNTIN340
     7FICIENTS  /1H , 17X, 5HORDER,11X,5HRANGE, 18X, 10HRANGE RATE, 18X,PNTIN350
     8 5HAZ,EL /1H , 33X, 6HC(1,K), 11X,  6HC(2,K), 11X,6HC(3,K), 11X,  PNTIN360
```

```
      9 6HC(4,K)     )                                                  PNTIN370
C                                                                       PNTIN380
  105 FORMAT(1H , 9X,I2,7X,I2,5X, 4E17.8 )                              PNTIN390
C                                                                       PNTIN400
      END                                                               PNTIN410
```

SUBROUTINE PRINTI

DIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
NORDER	00001	I						

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
NPR	00013	I	NPS	00014	I	J	00015	I

ENTRY POINTS

PRINTI	SECTION	3

SUBROUTINES CALLED

.FWRD.	SECTION	4	.UNO6.	SECTION	5	.FFIL.	SECTION	6
.FCNV.	SECTION	7	CC.1	SECTION	8	CC.2	SECTION	9
CC.3	SECTION	10	CC.4	SECTION	11	SYSLOC	SECTION	12

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	00164	10	2A	00171	15	3A	00176
20	7A	00177	25	12A	00206	100	FORMAT	00025
30	13A	00220	40	23A	00247	35	17A	00223
105	FORMAT	00157	45	26A	00251			

DECK LENGTH IN OCTAL IS 00306.

Subroutine PRØCES

Purpose: Serves as the program driver routine, allocates the various data storage requirements and mechanizes the required tape drives.

Deck Name: PRS

Calling Sequence: CALL PRØCES(STNAME,MAXSTN,MAXA,MAXAA,STN,A,AA,XJDREF, PR, PS, C)

Input/Output:

I/O	FØRTRAN Name	Dimensions	Description
I	STNAME	10	STNAME(J) indicates the order in which the J-th station is to be sorted.
I	MAXSTN	_____	Dimension of STN array
I	MAXA	_____	Dimension of A array
I	MAXAA	_____	Dimension of AA array
I-O	STN	6,MAXSTN	STN(I,J) refers to the I-th element (coordinate) of the J-th point. Used for storage of: a.) raw data points (single file) b.) smoothed points (all files) if auxiliary tape storage is mechanized. c.) smoothed and sorted points (all files) if auxiliary tape storage is required.
I	A	6,MAXA	A(I,J) refers to the I-th element (coordinate) of the J-th point. Used for storage of: a.) smoothed points b.) smoothed and sorted points (all files) if auxillary storage is not mechanized.

I/O	FØRTRAN Name	Dimensions	Description
I	AA	4, MAXAA	AA(I, J) refers to the I-th element (coordinate) of the J-th point. Used for storage of a single file of smoothed points.
I	XJDREF	---	Julian date used for program reference. Times associated with the output data are in days from XJDREF. See subroutine BESSEL for Besselian correction. Not to be confused with XDREF, a Julian date used as a reference when data is sequenced chronologically.
I	PR	---	Raw data print indicator.
I	PS	---	Smooth data print indicator.
I	C	4, 10	Coefficients required for unit conversions

Subroutines Required:

PRINTR	(prints raw data)
CHRØNT	(sequences data chronologically)
FIT	(smooths raw data)
GSØRT	(orders smooth data)
CHANGE	(converts units)
PRINTS	(prints smoothed and sorted data)

Functions Required: NØPT (determines number of points per raw data file)

Approximate Deck Length: $2454_8 = 1324_{10}$

Error Indicators: Numerous error tests and diagnostics are incorporated within this routine.

Required Logical Magnetic Tape Units:

Tape 5, System input

Tape 6, System output

Tape 8, System open. Used for inputting raw data observations from tracking stations.

Tape 9, System open. Used for:
1.) temporary data storage (if required)
2.) outputting smoothed and sorted data

Method:

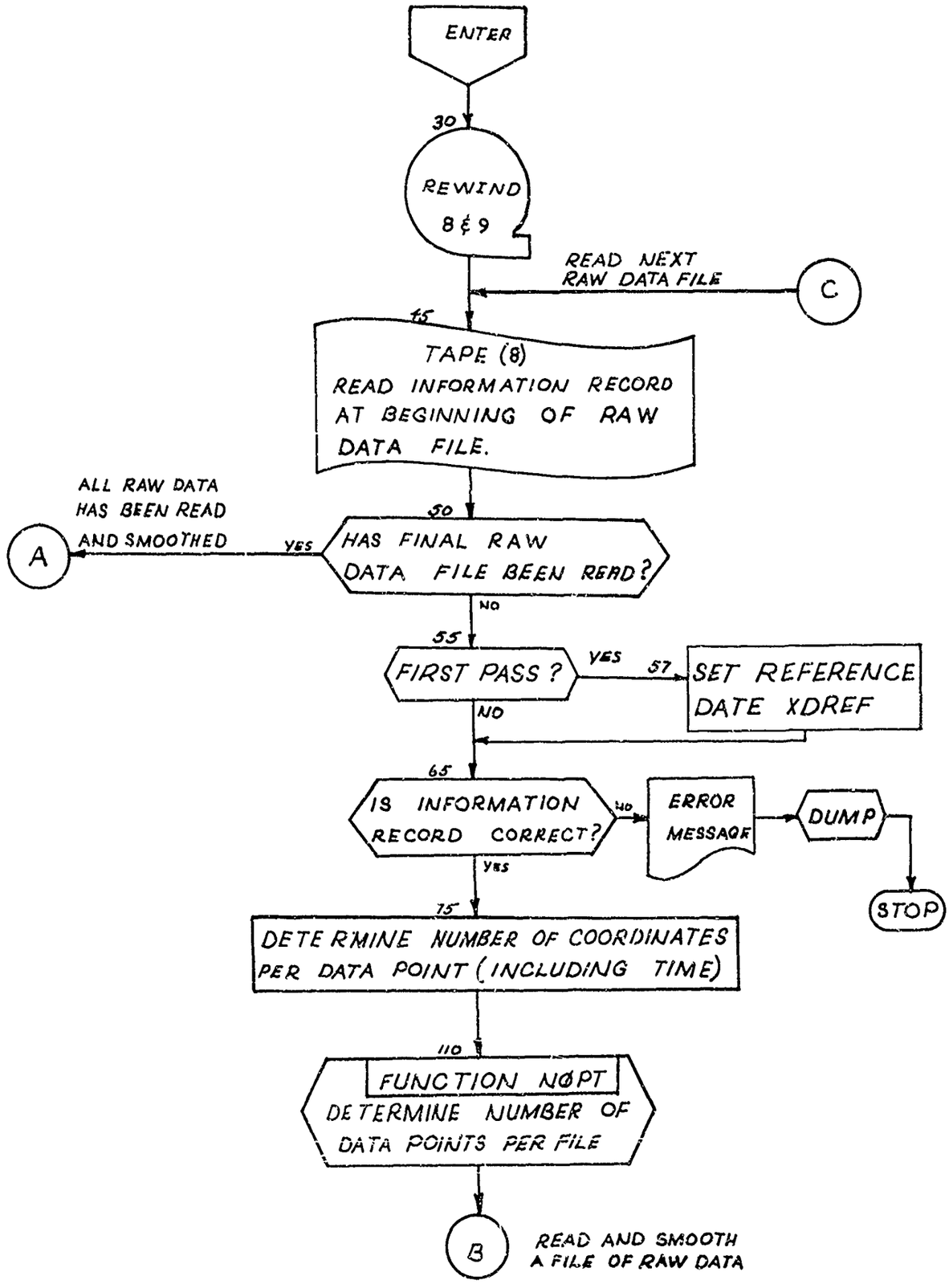
Prior to entering Subroutine PROCESS, all required input data has been read into the program. A specially generated magnetic tape containing coordinate data from the various tracking stations has been mounted on logical tape unit 8, and logical tape unit 9 is prepared to receive the program output. Specific details concerning the format of these tapes may be found in the "Program Operation" section.

A single physical file (i.e., data from one pass of the satellite as observed by any one station) of raw data is read from logical tape unit 8 into the STN array and, after passing through a bookkeeping region, is chronologically ordered. Control is then transferred to Subroutine FIT where the data is smoothed in an unweighted, least squares mode. The smoothed data, corresponding to the raw data file contained within STN, is returned from the smoothing routines in the AA array. This array (AA) is reused for temporary storage of the smoothed data for each file being processed. Finally, the data within AA is transferred to the A array and the procedure is repeated for each file being processed.

After all raw data files have been read into the program and smoothed, the data is then ordered using either of the following methods. If the auxiliary tape storage mode were mechanized, the smoothed data has been stored on logical tape 9. This data is read into the STN array and ordered by Subroutine GSORT. Primary ordering is time, secondary ordering is by tracking station. If the auxiliary storage mode were not mechanized, the data to be ordered is in the A array.

After the data has been smoothed and ordered, it is partitioned into logical output tape record size, necessary unit conversions are performed, and the data is output (binary mode) on tape 9. The O array corresponds to a logical output data record.

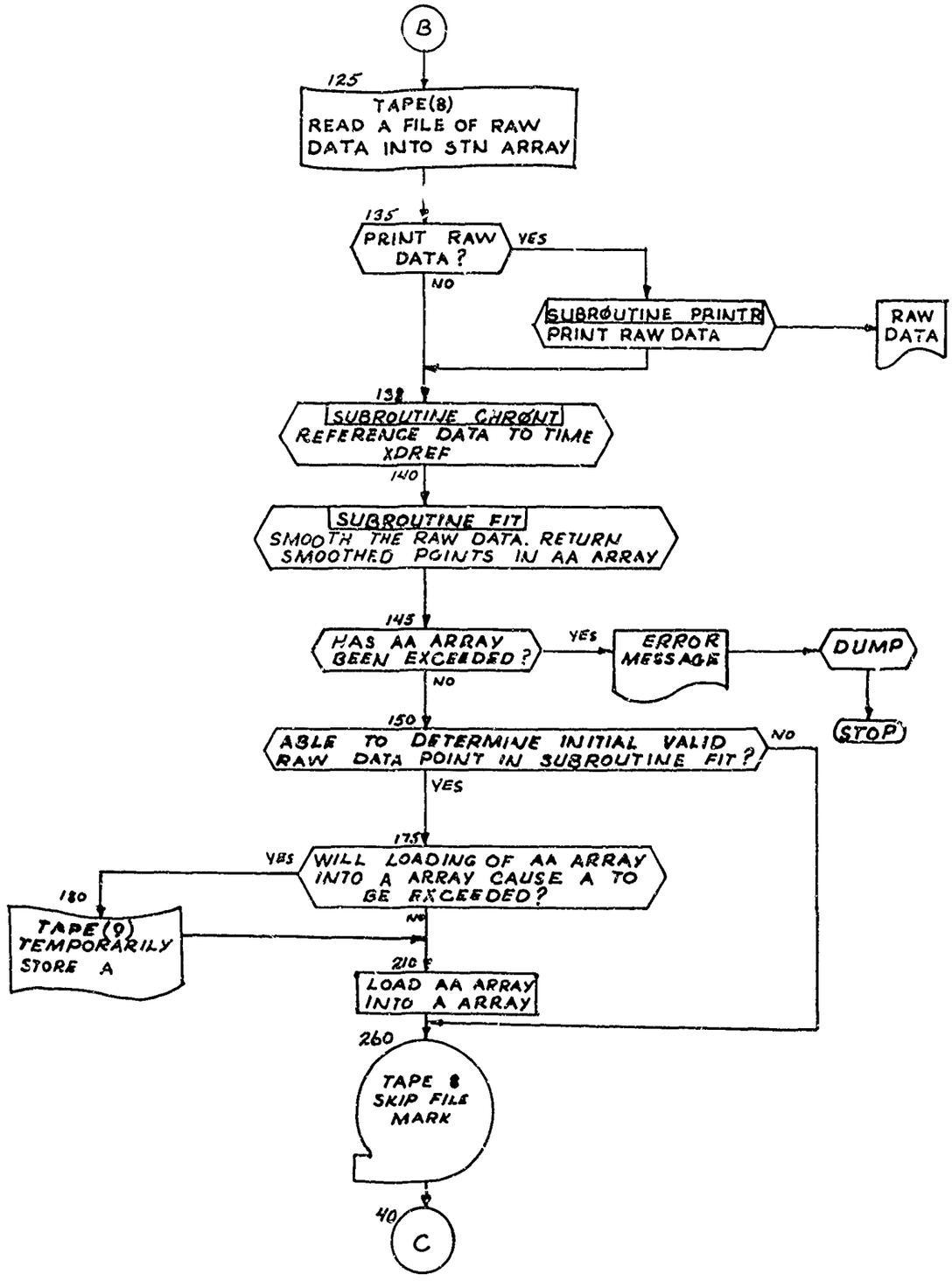
SUBRØUTINE PROCES



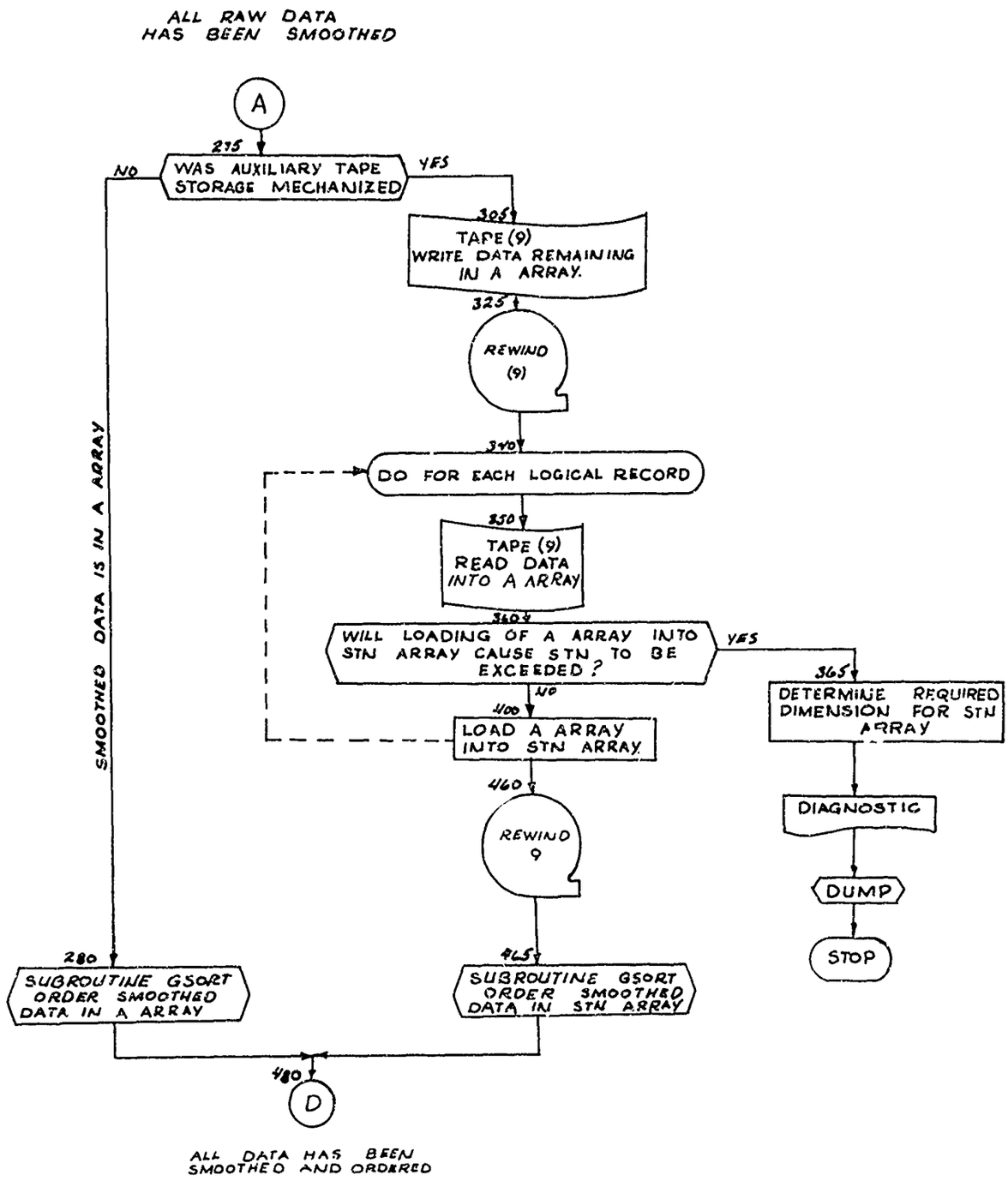
BLANK PAGE

SUBROUTINE PROCES (CONT.)

READ AND SMOOTH
A FILE OF RAW DATA

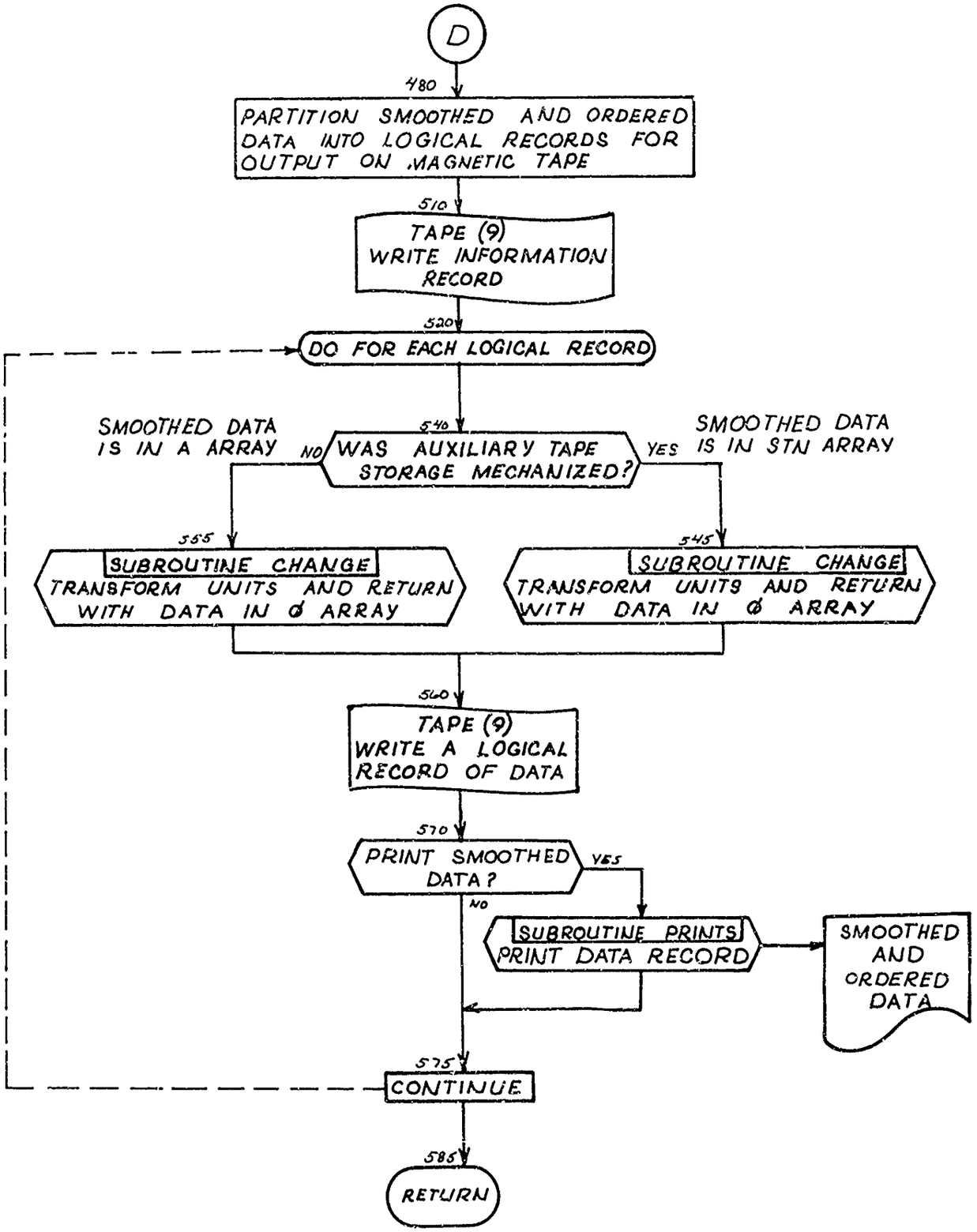


READ NEXT RAW DATA
FILE


ALL RAW DATA HAS BEEN SMOOTHED
A
235
WAS AUXILIARY TAPE STORAGE MECHANIZED
NO
YES
305
TAPE (9) WRITE DATA REMAINING IN A ARRAY.
325
REWIND (9)
340
DO FOR EACH LOGICAL RECORD
350
TAPE (9) READ DATA INTO A ARRAY
360
WILL LOADING OF A ARRAY INTO STN ARRAY CAUSE STN TO BE EXCEEDED ?
YES
NO
365
DETERMINE REQUIRED DIMENSION FOR STN ARRAY
400
LOAD A ARRAY INTO STN ARRAY
460
REWIND 9
DIAGNOSTIC
DUMP
STOP
SMOOTHED DATA IS IN A ARRAY
280
SUBROUTINE GSORT ORDER SMOOTHED DATA IN A ARRAY
465
SUBROUTINE GSORT ORDER SMOOTHED DATA IN STN ARRAY
480
D
ALL DATA HAS BEEN SMOOTHED AND ORDERED

SUBROUTINE PROCES (CONT)

ALL RAW DATA HAS BEEN SMOOTHED AND ORDERED



```
C *** FS4-305A ***          *** SUBROUTINE PROCES ***                    PRS00020
C                                                                        PRS00030
C     PURPOSE                                                            PRS00040
C                                                                        PRS00050
C         SERVES AS THE PROGRAM DRIVER ROUTINE, ALLOCATES THE VARIOUS    PRS00060
C         DATA STORAGE REQUIREMENTS AND MECHANIZES THE REQUIRED TAPE     PRS00070
C         DRIVES.                                                        PRS00080
C                                                                        PRS00090
C     INPUT DATA TAPE,                                                   PRS00100
C                                                                        PRS00110
C         THE INPUT TAPE CONTAINING THE RAW COORDINATE DATA HAS THE      PRS00120
C     FOLLOWING FORMAT AND CHARACTERISTICS.                              PRS00130
C                                                                        PRS00140
C         FORTRAN IV - BINARY MODE, MULTI-FILE.                          PRS00145
C                                                                        PRS00148
C         RAW DATA ARRANGED ONE FILE PER STATION PER PASS.               PRS00150
C                                                                        PRS00160
C         EACH FILE CONTAINS TWO LOGICAL RECORDS.                        PRS00170
C                                                                        PRS00180
C         THE FIRST LOGICAL RECORD CONSISTS OF FOUR WORDS,               PRS00190
C                                                                        PRS00200
C            NSTN  , NUMBER INDICATING STATION FROM WHICH DATA WAS       PRS00210
C                    RECIEVED.  ZERO INDICATES THERE ARE NO MORE         PRS00220
C                    STATIONS ON TAPE.                                   PRS00230
C            NTYPE , INDICATES DATA TYPE,                                PRS00240
C                    1, R                                                PRS00250
C                    2, RDOT                                             PRS00260
C                    3, A,E                                              PRS00270
C                    4, R,RDOT                                           PRS00280
C                    5, R,A,E                                            PRS00290
C                    6, RDOT,A,E                                         PRS00300
C            NNUM  , TOTAL NUMBER OF WORDS PER FILE.                     PRS00310
C            XJDATA, JULIAN DATE (ZERO HOUR ) CORRESPONDING TO THE       PRS00320
C                    FIRST PIECE OF DATA WITHIN THE SECOND               PRS00330
C                    LOGICAL RECORD.  THE LEADING CHARACTERS (24) HAVE   PRS00340
C                    BEEN OMITTED FROM ALL JULIAN DATES.                 PRS00350
```

```
C                                                                       PRS00360
C        THE SECOND LOGICAL RECORD CONTAINS THE LOGICALLY PACKED TIME   PRS00370
C        AND COORDINATE DATA.  I.E.  TXYZTXYZTXYZ ...                   PRS00380
C                                                                       PRS00390
C     OUTPUT DATA TAPE,                                                 PRS00400
C                                                                       PRS00410
C        THE OUTPUT TAPE CONTAINING THE SMOOTHED AND ORDERED DATA HAS   PRS00420
C        THE FOLLOWING CHARACTERISTICS.                                 PRS00430
C                                                                       PRS00440
C        FORTRAN IV - BINARY MODE, SINGLE FILE.                         PRS00450
C                                                                       PRS00460
C        FIRST LOGICAL RECORD CONTAINS THE FOLLOWING INFORMATION,       PRS00470
C                                                                       PRS00480
C           XJDREF, PROGRAM REFERENCE JULIAN DATE.  ( 1950.0 )          PRS00490
C                                                                       PRS00500
C           NGPS  , TOTAL NUMBER OF LOGICAL RECORDS ON THE TAPE         PRS00510
C                   (EXCLUDES INFORMATION RECORD).                      PRS00520
C                                                                       PRS00530
C           NPERGP, NUMBER OF POINTS PER LOGICAL RECORD (EXCLUDING      PRS00540
C                   FINAL DATA RECORD).  A POINT IS DEFINED TO BE THE   PRS00550
C                   ORDERED SET OF WORDS TW,TF,NSTN,NTYPE,X,Y,Z .       PRS00560
C                                                                       PRS00570
C           NPREM , NUMBER OF POINTS IN FINAL RECORD                    PRS00580
C                                                                       PRS00590
C        THE REMAINING LOGICAL RECORDS CONTAIN THE DATA ARRANGED        PRS00600
C     NPERGP = XMODS POINTS PER LOGICALRECORD.  PRIMARY DATA ORDER IS   PRS00610
C     CHRONOLOGICAL , SECONDARY ORDERING IS BY STATION.  THE DATA POINT PRS00620
C     CONSISTS OF SEVEN WORDS,                                          PRS00630
C                                                                       PRS00640
C           TW    , TIME. INTEGER DAYS FROM XJDREF.                     PRS00650
C           TF    , TIME. FRACTIONAL DAY.                               PRS00660
C           NSTN  , STATION FROM WHICH DATA WAS RECEIVED.               PRS00670
C           NTYPE , TYPE OF DATA. SEE ITYPE IN SUBROUTINE DATAPE.       PRS00680
C           X,Y,Z , COORDINATES AS INDICATED BY NTYPE.                  PRS00690
C                                                                       PRS00700
C        NOTE.                                                          PRS00705
C           THE VALUE OF XJDREF PRINTED ON THE TAPE IS THE JULIAN       PRS00710
```

```
C         DATE CORRESPONDING TO 1950.0 (2433281.5 , ZERO HOUR UNIVERSAL PRS00715
C         TIME).  HOWEVER, TW IS WITH RESPECT TO THE BESSELIAN DATE     PRS00720
C         1950.0.  THIS LATTER DATE CORRESPONDS TO THE JULIAN           PRS00725
C         DATE 2433282.423.                                             PRS00730
C                                                                       PRS00740
C                                                                       PRS00750
      SUBROUTINE PROCES(STNAME,MAXSTN,MAXA,MAXAA,STN,A,AA,XJDREF,PR,PS  PRS00760
     2                  ,C)                                             PRS00765
C                                                                       PRS00770
      DIMENSION  STN(6,MAXSTN)    ,A(6,MAXA)       ,AA(4,MAXAA)         PRS00780
     2          ,STNAME(10)       ,NPAUX(20)       ,C(4,10)             PRS00790
     3          ,O(7,37)                                                PRS00795
C                                                                       PRS00800
C                                                                       PRS00801
C                                 **************                        PRS00802
C                                 * INITIALIZE *                        PRS00803
C                                 **************                        PRS00804
C                                                                       PRS00805
C                                       XMODS IS THE NUMBER OF WORDS PER PRS00810
C                                       LOGICAL OUTPUT DATA RECORD.     PRS00820
C                                       DIMENSION O ARRAY O(7,MODS)     PRS00825
      NOAVG = 0                                                         PRS00828
    5 MODS = 37                                                         PRS00830
   10 XMODS = MODS                                                      PRS00840
   15 IFIRST = 0                                                        PRS00850
   20 NTEMP = 0                                                         PRS00860
   25 NAE = 0                                                           PRS00870
C                                       TAPE 8 CONTAINS THE RAW DATA.   PRS00880
C                                       TAPE 9 IS USED, IF REQUIRED, FOR PRS00890
C                                       TEMPORARY STORAGE DURING        PRS00900
C                                       EXECUTION OF THE ROUTINE.  UPON PRS00910
C                                       TERMINATION, THE SMOOTHED AND   PRS00920
C                                       ORDERED DATA IS OUTPUT ON TAPE 9.PRS00930
   30 REWIND  8                                                         PRS00940    7
   35 REWIND  9                                                         PRS00950
C                                                                       PRS00960
C          ******************************************                   PRS00961
```

```
C                 * READ AND SMOOTH RAW DATA (FILE BY FILE) *                PRS00962
C                 ******************************************                 PRS00963
C                                                                            PRS00964     8
   40 JJ = 0                                                                 PRS00970
C                                       READ INFO RECORD FOR A DATA FILE.PRS00980
   45 READ (8)  NSTN,NTYPE,NNUM,XJDATA                                       PRS00990
C                                       NSTN EQUALS ZERO INDICATES LAST    PRS01000
C                                       RAW DATA FILE HAS BEEN READ.       PRS01010     10
   50 IF( NSTN.EQ.0 )  GO TO 270                                             PRS01020
C                                       IF FIRST PASS, SET REFERENCE       PRS01030
C                                       DATE FOR SEQUENCING TIME.          PRS01040
C                                                                          PRS01050
   55 IF( IFIRST.NE.0 )  GO TO 65                                            PRS01060
   57 IFIRST = 1                                                             PRS01062
   59 XDREF = XJDATA - 50.0                                                  PRS01064
   60 DELT = XDREF - XJDREF                                                  PRS01066
C                                       TEST INFO RECD FOR ERROR.          PRS01080
C                                                                          PRS01090
   65 IF( (NSTN.LT.1).OR.(NSTN.GT.11)) GO TO 601                             PRS01100
   70 IF((NTYPE.LT.1).OR.(NTYPE.GT.6)) GO TO 602                             PRS01110
C                                                                          PRS01120
C                                       DETERMINE NUMBER OF COORDINATES    PRS01130
C                                       PER DATA POINT (EXCLUDING TIME).   PRS01140
   75 GO TO (80,80,90,90,100,100),NTYPE                                      PRS01150
   80 IFI = 1                                                                PRS01160
   85 GO TO 105                                                              PRS01170
   90 IFI = 2                                                                PRS01180
   95 GO TO 105                                                              PRS01190
  100 IFI = 3                                                                PRS01200
  105 CONTINUE                                                               PRS01210
C                                       DETERMINE NUMBER OF DATA POINTS    PRS01220
C                                       PER FILE.                          PRS01230
  110 NP = NOPT(IFI,NNUM)                                                    PRS01240
C                                       ERROR TEST. IF NP.GT.MAXSTN, RE-   PRS01250
C                                       DIMENSIONING OF STN IS REQUIRED.   PRS01260
C                                       I.E.  INCREASE MAXSTN TO NP.       PRS01270
C                                                                          PRS01280     37
```

```
  115 IF((NP.LT.1).OR.(NP.GT.MAXSTN))  GO TO 603                        PRS01290
C                                                                       PRS01300
C                                      READ A FILE OF RAW DATA.         PRS01310
  120 JE = IFI + 1                                                      PRS01320
  125 READ (8)  ((STN(J,I),J=1,JE),I=1,NP)                              PRS01330
C                                                                       PRS01340
C                                      PRINT RAW DATA FILE.             PRS01350     42
  130 NPR = PR                                                          PRS01360
  135 IF(NPR.NE.0)  CALL PRINTR(STN,NSTN,NTYPE,NNUM,XJDATA,NP)          PRS01370
C                                                                       PRS01380
C                                      REFERENCE TIME TO XDREF          PRS01384
C                                                                       PRS01385     55
  138 CALL CHRONT(STN,MAXSTN,NP,XDREF,XJDATA)                           PRS01386
C                                                                       PRS01387
C                                      SMOOTH THE RAW DATA.  RETURN THE PRS01390
C                                      SMOOTHED DATA IN AA ARRAY.       PRS01400
C                                                                       PRS01410     58
  140 CALL FIT(STN,NP,IFI,AA,NPAA,MAXSTN,MAXAA,NTYPE,NOAVG)             PRS01420
C                                                                       PRS01430
C                                      ERROR TEST.  IF NPAA.GT.MAXAA,   PRS01440
C                                      REDIMENSIONING OF AA IS REQUIRED.PRS01450
C                                      I.E. INCREASE MAXAA TO NPAA.     PRS01460     60
  145 IF( NPAA.GT.MAXAA )  GO TO 604                                    PRS01470
C                                      ERROR TEST.  IF NOAVG.NE.0 , AN  PRS01480
C                                      INITIAL VALID POINT COULD NOT    PRS01490
C                                      BE DETERMINED IN SUB FIT.        PRS01500
C                                      WRITE DIAGNOSTIC AND READ NEXT   PRS01505
C                                      RAW DATA FILE.                   PRS01506
  150 IF(NOAVG.NE.0)  GO TO 650                                         PRS01510
C                                      SET SORTING ORDER AND TYPE.      PRS01520
  155 STNID = STNAME(NSTN)                                              PRS01530
  160 TYPE = NTYPE                                                      PRS01540
C                                      AA IS REUSED FOR TEMP STORAGE OF PRS01550
C                                      THE SMOOTHED DATA FOR EACH FILE  PRS01560
C                                      BEING PROCESSED.  THIS DATA WILL PRS01570
C                                      NOW BE STORED CONSECUTIVLY IN    PRS01580
C                                      THE A ARRAY.  IF THE A ARRAY     PRS01590
```

```
C                                       SHOULD BE EXCEEDED, STORAGE IS   PRS01600
C                                       ON TAPE                          PRS01610
C                                                                        PRS01620
C                                       SET INDICATORS FOR LOADING A .   PRS01630
  165 NAB = NAE + 1                                                      PRS01640
  170 NAE = NAB + NPAA - 1                                               PRS01650
C                                       IF NAE.LT.MAXA, TAPE STORAGE IS  PRS01660
C                                       NOT REQUIRED.                    PRS01670
  175 IF(NAE.LT.MAXA)  GO TO 210                                         PRS01680
C                                       A ARRAY WILL BE EXCEEDED.  MECH- PRS01690
C                                       ANIZE TEMPORARY TAPE STORAGE.    PRS01700
  180 NTEMP = NTEMP + 1                                                  PRS01710
  185 JEND = NAB - 1                                                     PRS01720
  190 NPAUX(NTEMP) = JEND                                                PRS01730
  195 WRITE (9)  ((A(J,I),J=1,6),I=1,JEND)                               PRS01740    79
  200 NAB = 1                                                            PRS01750
  205 NAE = NPAA                                                         PRS01760
C                                       LOAD AA INTO A.                  PRS01770
  210 CONTINUE                                                           PRS01780
  215 DO 255  I=NAB,NAE                                                  PRS01790
  220 JJ = JJ + 1                                                        PRS01800
  225 A(1,I) = AA(1,JJ)                                                  PRS01810
  230 A(2,I) = STNID                                                     PRS01820
  235 A(3,I) = TYPE                                                      PRS01830
  240 A(4,I) = AA(2,JJ)                                                  PRS01840
  245 A(5,I) = AA(3,JJ)                                                  PRS01850
  250 A(6,I) = AA(4,JJ)                                                  PRS01860
  255 CONTINUE                                                           PRS01870
C                                       SKIP FILE MARK ON RAW DATA TAPE  PRS01880
C                                       AND READ RAW DATA FROM NEXT      PRS01890
C                                       STATION.                         PRS01900
  260 DUMY = FILE(8,1)                                                   PRS01910    117
  265 GO TO 40                                                           PRS01920
C                                                                        PRS01930
C                                                                        PRS01940
C           ***************************************************          PRS01950
C           * ALL RAW DATA HAS BEEN READ IN AND SMOOTHED.    *          PRS01951
```

```
C              * THE SMOOTHED DATA IS ORDERED IN THE FOLLOW-   *        PRS01952
C              * ING SECTION.                                   *        PRS01953
C              *************************************************        PRS01954
C                                                                       PRS01955
C                                                                       PRS01960
C                                      IF NTEMP IS NON-ZERO, SMOOTHED   PRS01970
C                                      DATA HAS BEEN STORED ON TAPE.    PRS01980
  270 CONTINUE                                                          PRS01990
  275 IF(NTEMP.NE.0)  GO TO 305                                         PRS02000
C                                      ORDER SMOOTHED DATA IN A ARRAY.  PRS02010
  280 NAEONE = NAE - 1                                                  PRS02020
  285 CALL GSORT(A,NAE,6,2,-NAEONE)                                     PRS02030    125
  290 CALL GSORT(A,NAE,6,1,-NAEONE)                                     PRS02040    127
  295 NPASUM = NAE                                                      PRS02050
  300 GO TO 480                                                         PRS02060
C                                                                       PRS02070
C                                      DATA WAS TEMPORARILY STORED ON   PRS02080
C                                      TAPE                             PRS02090
  305 CONTINUE                                                          PRS02100
C                                      WRITE DATA REMAINING IN A        PRS02110
  310 NTEMP = NTEMP + 1                                                 PRS02120
  315 NPAUX(NTEMP) = NAE                                                PRS02130
  320 WRITE (9) ((A(J,I),J=1,6),I=1,NAE)                                PRS02140    134
  325 REWIND 9                                                          PRS02150    144
  330 WRITE(6,1000)                                                     PRS02160
C                                      READ SMOOTHED POINTS INTO A      PRS02170
C                                      ARRAY.  LOAD STN ARRAY FROM A.   PRS02180    145
  335 NPASUM = 0                                                        PRS02190
  340 DO 450  II=1,NTEMP                                                PRS02200
  345 NPAX = NPAUX(II)                                                  PRS02210
  350 READ (9)  ((A(J,I),J=1,6),I=1,NPAX)                               PRS02220    153
  355 NPASUM = NPASUM + NPAX                                            PRS02230
C                                      IF LOADING A ARRAY INTO STN WILL PRS02240
C                                      CAUSE STN TO BE EXCEEDED,        PRS02250
C                                      TERMINATE EXECUTION .            PRS02260
  360 IF( NPASUM.LT.MAXSTN ) GO TO 400                                  PRS02270
C                                      ERROR EXIT.  TOTAL NUMBER OF     PRS02280
```

```
C                                       SMOOTHED POINTS EXCEEDS MAXSTN.  PRS02290
C                                       DETERMINE REQUIRED DIMENSION.    PRS02300
  365 IF(II.EQ.NTEMP)  GO TO 606                                         PRS02310
  370 IIDUM = II + 1                                                     PRS02320
  375 DO 390  JJJ=IDUM,NTEMP                                             PRS02330
  380 NPAXX = NPAUX(JJJ)                                                 PRS02340
  385 NPASUM = NPASUM + NPAXX                                            PRS02350
  390 CONTINUE                                                           PRS02360
  395 GO TO 606                                                          PRS02370
C                                       LOAD STN ARRAY FROM AA ARRAY.    PRS02380
  400 CONTINUE                                                           PRS02390
  405 NF = NPASUM                                                        PRS02400
  410 NS = NPASUM - NPAX + 1                                             PRS02410
  415 IIK = 0                                                            PRS02420
  420 DO 445  III = NS,NF                                                PRS02430
  425 IIK = IIK + 1                                                      PRS02440
  430 DO 440  IIJ = 1,6                                                  PRS02450
  435 STN(IIJ,III) = A(IIJ,IIK)                                          PRS02460
  440 CONTINUE                                                           PRS02470
  445 CONTINUE                                                           PRS02480
  450 CONTINUE                                                           PRS02490
C                                       ORDER THE SMOOTHED DATA.         PRS02500
  455 CONTINUE                                                           PRS02510
  460 REWIND 9                                                           PRS02520    200
  465 NAEONE = NPASUM - 1                                                PRS02530
  470 CALL GSORT(STN,NPASUM,6,2,-NAEONE)                                 PRS02540    203
  475 CALL GSORT(STN,NPASUM,6,1,-NAEONE)                                 PRS02550
C                                                                        PRS02560
C                                                                        PRS02570
C              ***********************************************           PRS02571
C              * ALL DATA HAS BEEN SMOOTHED AND ORDERED.       *         PRS02572
C              * MAKE NECESSARY UNIT CONVERSIONS AND WRITE     *         PRS02573
C              * OUTPUT TAPE.                                  *         PRS02574
C              ***********************************************           PRS02575
C                                                                        PRS02576
C                                       SET INDICATORS WHICH WILL        PRS02580
C                                       PARTITION DATA INTO LOGICAL      PRS02590
```

```
C                                       RECORD SIZE.                    PRS02600    205
  480 CONTINUE                                                          PRS02610
  485 XNPAS = NPASUM                                                    PRS02620
  490 NINGPS = XNPAS/XMODS                                              PRS02630
  495 NPREM = AMOD(XNPAS,XMODS)                                         PRS02640
  500 NGPS = NINGPS + 1                                                 PRS02650
  505 NPERGP = XMODS                                                    PRS02660
C                                       WRITE INFORMATION RECORD.       PRS02670
C                                                                       PRS02672
  510 WRITE (9)  XJDREF,NGPS,NPERGP,NPREM                               PRS02680
C                                                                       PRS02690    212
  515 MODSUM = 0                                                        PRS02700
C                                       DO FOR EACH RECORD.             PRS02710
  520 DO 575  I=1,NGPS                                                  PRS02720
  525 IF(I.EQ.NGPS)  NPERGP=NPREM                                       PRS02730
  530 MSTART = MODSUM + 1                                               PRS02740
  535 MODSUM = MODSUM + NPERGP                                          PRS02750
C                                       CONVERT UNITS.                  PRS02760
  540 IF(NTEMP.EQ.0) GO TO 555                                          PRS02770
  545 CALL CHANGE(STN,MSTART,MODSUM,DELT,C,0)                           PRS02780    227
  550 GO TO 560                                                         PRS02790
  555 CALL CHANGE(A,MSTART,MODSUM,DELT,C,0)                             PRS02800
C                                                                       PRS02805
C                                       WRITE A LOGICAL DATA RECORD.    PRS02810
C                                                                       PRS02815    230
  560 WRITE (9) ((O(I,J),I=1,7),J=1,NPERGP)                             PRS02820
C                                                                       PRS02825
C                                       PRINT SMOOTHED DATA.            PRS02830    231
  565 NS = PS                                                           PRS02840
  570 IF( NS.NE.0 ) CALL PRINTS(0,NPERGP)                               PRS02850    242
  575 CONTINUE                                                          PRS02860
C                                                                       PRS02870
  580 REWIND 9                                                          PRS02880    247
  585 RETURN                                                            PRS02890
C                                                                       PRS02900
C                              **************                           PRS02910
C                              * ERROR EXIT *                           PRS02911
```

```
C                                   **************                          PRS02912
  601 NER = 1                                                               PRS02920
      GO TO 610                                                             PRS02930
  602 NER = 2                                                               PRS02940
      GO TO 610                                                             PRS02950
  603 NER = 3                                                               PRS02960
      GO TO 610                                                             PRS02970
  604 NER = 4                                                               PRS02980
      GO TO 610                                                             PRS02990
  606 NER = 6                                                               PRS03020
  610 CONTINUE                                                              PRS03030
  615 WRITE(6,1020)                                                         PRS03040    259
  620 GO TO (621,622,623,624,625,626), NER                                  PRS03050
  621 WRITE(6,1021)  NSTN                                                   PRS03060    261
      GO TO 640                                                             PRS03070
  622 WRITE(6,1022)  NTYPE                                                  PRS03080    263
      GO TO 640                                                             PRS03090
  623 WRITE(6,1023)  MAXSTN,NP                                              PRS03100    265
      GO TO 640                                                             PRS03110
  624 WRITE(6,1024)  MAXAA,NPAA                                             PRS03120    267
      GO TO 640                                                             PRS03130
  625 CONTINUE                                                              PRS03140
      GO TO 640                                                             PRS03150
  626 WRITE(6,1026)  MAXSTN,NPASUM                                          PRS03160    271
  640 WRITE(6,1040)                                                         PRS03170    272
  645 CALL DUMP                                                             PRS03180    274
      RETURN                                                                PRS03190
C                                                                           PRS03200
C                                                                           PRS03210
  650 WRITE(6,1050)                                                         PRS03212    276
  651 GO TO 260                                                             PRS03213
C                                                                           PRS03214
C                                                                           PRS03215
 1000 FORMAT(1H0,5X,42HAUXILIARY TAPE STORAGE HAS BEEN MECHANIZED )         PRS03220
 1020 FORMAT(1H1,40H***** ERROR PRINT FROM SUBROUTINE PROCES )              PRS03230
 1021 FORMAT(1H ,6X,59HSTATION IDENTIFICATION READ FROM RAW DATA TAPE ISPRS03240
    2 INCORRECT  /1H ,6X,6HNSTN =,I5 )                                      PRS03250
```

```
1022 FORMAT(1H ,6X,54HNON-PERMISSABLE DATA TYPE READ FROM FROM RAW DATAPRS03260
    2 TAPE /1H ,6X, 7HNTYPE =,I5)                                      PRS03270
1023 FORMAT(1H ,6X,59HNUMBER OF RAW DATA POINTS PER FILE EXCEEDS PROGRAPRS03280
    2M CAPACITY /1H ,6X,33HPRESENT DIMENSION OF STN ARRAY IS, I6 /1H , PRS03290
    3 6X,18HINCREASE MAXSTN TO, I6  )                                  PRS03300
1024 FORMAT(1H ,6X,50HNUMBER OF SMOOTHED POINTS EXCEEDS PROGRAM CAPACITPRS03310
    2Y /1H ,6X,32HPRESENT DIMENSION OF AA ARRAY IS,I6 /1H ,6X,17HINCREAPRS03320
    3SE MAXAA TO,I6 )                                                  PRS03330
1026 FORMAT(1H ,6X,61HTOTAL NUMBER OF SMOOTHED POINTS EXCEEDS CAPACITY PRS03360
    2OF STN ARRAY /1H ,6X,27HPRESENT DIMENSION OF STN IS,I6  /1H ,6X,  PRS03370
    318HINCREASE MAXSTN TO,I6 )                                        PRS03380
1040 FORMAT(1H ,6X,32HEXECUTION TERMINATED WITH A DUMP )               PRS03390
1050 FORMAT(1H1,50H***** DIAGNOSTIC PRINT FROM FROM SUBROUTINE PROCES /PRS03391
    2 1H ,6X, 80HAN INITIAL VALID DATA POINT COULD NOT BE DETERMINED USPRS03392
    3ING THE ADJUSTMENT OPTION.  / 1H ,6X,45HDISCARD RAW DATA FILE AND PRS03393
    4CONTINUE EXECUTION.  )                                            PRS03394
C                                                                      PRS03400
      END                                                              PRS03410
```

FS305A 09/28/85
PRS

STØRAGE MAP

SUBRØUTINE PRØCES

DIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
NPAUX	00001	I	Ø	00025	R			

UNDIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
NØAVG	00430	I	MØDS	00431	I	XMØDS	00432	R
IFIRST	00433	I	NTEMP	00434	I	NAE	00435	I
JJ	00436	I	NSTN	00437	I	NTYPE	00440	I
NNUM	00441	I	XJØATA	00442	R	XDREF	00443	R
DELT	00444	R	IFI	00445	I	NP	00446	I
JE	00447	I	J	00450	I	I	00451	I
NPR	00452	I	NPAA	00453	I	STNID	00454	R
TYPE	00455	R	NAB	00456	I	JEND	00457	I
DUMY	00460	R	NAEØNE	00461	I	NPASUM	00462	I
II	00463	I	NPAX	00464	I	IIDUM	00465	I
IDUM	00466	I	NPAXX	00467	I	NF	00470	I
NS	00471	I	IIK	00472	I	III	00473	I
XNPAS	00474	R	NINGPS	00475	I	NPREM	00476	I
NGPS	00477	I	NPERGP	00500	I	MØDSUM	00501	I
MSTART	00502	I	NER	00503	I			

ENTRY PØINTS

PRØCES SECTIØN 3

SUBRØUTINES CALLED

.FRWT. SECTIØN 4 .FRDB. SECTIØN 5 NØPT SECTIØN 6

FS305A
PRS

09/28/85

STØRAGE MAP

PRINTR	SECTIØN	7	CHRØNT	SECTIØN	8	FIT	SECTIØN	9
.FWRB.	SECTIØN	10	FILE	SECTIØN	11	GSØRT	SECTIØN	12
.FWRD.	SECTIØN	13	CHANGE	SECTIØN	14	PRINTS	SECTIØN	15
DUMP	SECTIØN	16	.FXEM.	SECTIØN	17	.UNØ8.	SECTIØN	18
.UNØ9.	SECTIØN	19	.FRLR.	SECTIØN	20	.FBLT.	SECTIØN	21
.FBDT.	SECTIØN	22	.FWLR.	SECTIØN	23	.UNØ6.	SECTIØN	24
.FFIL.	SECTIØN	25	.FCNV.	SECTIØN	26	E.1	SECTIØN	27
E.2	SECTIØN	28	E.3	SECTIØN	29	E.4	SECTIØN	30
CC.1	SECTIØN	31	CC.2	SECTIØN	32	CC.3	SECTIØN	33
CC.4	SECTIØN	34	SYSLØC	SECTIØN	35			

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	2A	01004	10	3A	01006	15	4A	01016
20	5A	01017	25	6A	01020	30	7A	01021
35	8A	01025	40	9A	01031	45	10A	01032
50	14A	01047	270	119A	01445	55	17A	01053
65	23A	01067	57	20A	01057	59	21A	01061
60	22A	01064	601	249A	02152	70	26A	01100
602	251A	02155	75	29A	01111	80	30A	01124
90	32A	01127	100	34A	01132	85	31A	01126
105	35A	01134	95	33A	01131	110	36A	01134
115	38A	01142	603	253A	02160	120	41A	01153
125	42A	01156	130	52A	01210	135	53A	01215
138	57A	01232	140	59A	01242	145	61A	01256
604	255A	02163	150	64A	01263	650	276A	02306
155	67A	01267	160	69A	01271	165	70A	01301
170	71A	01304	175	72A	01310	210	91A	01361
180	75A	01315	185	76A	01320	190	77A	01324
195	79A	01326	200	89A	01355	205	90A	01357
215	92A	01361	255	113A	01433	220	96A	01370
225	97A	01373	230	100A	01402	235	102A	01404
240	104A	01406	245	107A	01415	250	110A	01424
260	116A	01436	265	118A	01444	275	120A	01445
305	130A	01503	280	123A	01451	285	124A	01454

FS305A
PRS

09/28/85

STØRAGE MAP

290	126A	01466	295	128A	01500	300	129A	01502
480	206A	01743	310	131A	01503	315	132A	01506
320	134A	01511	325	144A	01540	330	145A	01544
1000	FØRMAT	00530	335	146A	01552	340	147A	01553
450	196A	01706	345	151A	01564	350	153A	01566
355	161A	01615	360	162A	01620	400	178A	01645
365	165A	01625	606	257A	02166	370	168A	01631
375	169A	01634	390	175A	01642	380	172A	01635
385	174A	01637	395	177A	01644	405	179A	01645
410	180A	01647	415	181A	01653	420	182A	01654
445	194A	01704	425	185A	01662	430	186A	01665
440	192A	01702	435	189A	01700	455	199A	01710
460	200A	01710	465	201A	01714	470	202A	01717
475	204A	01731	485	207A	01743	490	208A	01753
495	209A	01762	500	210A	02001	505	211A	02004
510	212A	02011	515	213A	02026	520	214A	02027
575	244A	02143	525	218A	02035	530	221A	02042
535	222A	02045	540	223A	02050	555	229A	02066
545	226A	02054	550	228A	02065	560	231A	02077
565	239A	02126	570	240A	02133	580	247A	02145
585	248A	02151	610	258A	02170	615	259A	02170
1020	FØRMAT	00542	620	260A	02176	621	261A	02211
622	263A	02222	623	265A	02233	624	267A	02246
625	269A	02261	626	271A	02262	1021	FØRMAT	00553
640	272A	02274	1022	FØRMAT	00573	1023	FØRMAT	00612
1024	FØRMAT	00645	1026	FØRMAT	00675	1040	FØRMAT	00727
645	273A	02302	1050	FØRMAT	00737	651	277A	02314

DECK LENGTH IN OCTAL IS 02454.

Function NØPT

Purpose: Determines the number of points per raw data file.

Deck Name: NPT

Calling Sequence: NP=NØPT(IFI,NNUM)

Input/Output:

I/O	FØRTRAN Name	Dimensions	Descriptions
I	IFI	———	Number of coordinates, per point, excluding time.
I	NNUM	———	Total number of words per raw data file.
O	NP	———	Number of data points per file.

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $234_8 = 156_{10}$

Error Indicators: If NP is non-integer, an error message is printed and execution is terminated with a dump.

```
C *** FS4-305A ***          *** FUNCTION NOPT ***                          NPT00030
C                                                                          NPT00040
C     PURPOSE,                                                             NPT00050
C                                                                          NPT00060
C         DETERMINES THE NUMBER OF POINTS PER RAW DATA FILE.               NPT00070
C                                                                          NPT00080
C     NOMENCLATURE,                                                        NPT00090
C                                                                          NPT00100
C         IFI    , NUMBER OF COORDINATES PER POINT (EXCLUDING TIME).       NPT00110
C         NNUM   , TOTAL NUMBER OF WORDS PER RAW DATA FILE.                NPT00120
C         NP     , NUMBER OF DATA POINTS PER FILE.                         NPT00130
C         NWINFO, NUMBER OF WORDS IN INFORMATION RECORD.                   NPT00140
C                                                                          NPT00150
      FUNCTION NOPT(IFI,NNUM)                                              NPT00160
C                                                                          NPT00170
    5 NWINFO = 4                                                           NPT00180
   10 XIFI = IFI + 1                                                       NPT00190
   15 XNW = NWINFO                                                         NPT00200
   20 XNNUM = NNUM                                                         NPT00210
   25 XNP = (XNNUM - XNW)/XIFI                                             NPT00220
   30 NP = XNP                                                             NPT00230
C                                   INSURE THAT NP WASN'T FRACTIONAL.      NPT00240
   35 XXNP = NP                                                            NPT00250
   40 DIF = ABS(XNP - XXNP)                                                NPT00260
   45 IF(DIF.LT..05)  GO TO 60                                             NPT00270
   50 WRITE(6,1000)  XNP,XXNP,NNUM                                         NPT00280   12
   55 CALL DUMP                                                            NPT00290   14
   60 NOPT = NP                                                            NPT00300
   65 RETURN                                                               NPT00310
C                                                                          NPT00320
 1000 FORMAT(1H1,36H***** ERROR PRINT FROM FUNCTION NOPT /1H ,6X,47HSOMENPT00330
     2THING MAY BE WRONG WITH RAW DATA INPUT TAPE  /1H ,6X,48HNUMBER OF NPT00340
     3POINTS PER RAW DATA FILE IS FRACTIONAL  /1H ,6X, 5HXNP =  E17.8,5XNPT00350
     4, 6HXXNP = E17.8,5X, 6HNNUM = I9  /1H ,6X,35HEXECUTION TERMINATED NPT00360
     5WITH CORE DUMP  )                                                    NPT00370
      END                                                                  NPT00380
```

STORAGE MAP

FUNCTION NOPT TYPE I

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
F.0000	00001	I	NWINFO	00002	I	XIFI	00003	R
XNW	00004	R	XNNUM	00005	R	XNP	00006	R
NP	00007	I.	XXNP	00010	R	DIF	00011	R

ENTRY POINTS

NOPT SECTION 3

SUBROUTINES CALLED

.FWRD.	SECTION	4	DUMP	SECTION	5	.UNO6.	SECTION	6
.FFIL.	SECTION	7	.FCNV.	SECTION	8	E.1	SECTION	9
E.2	SECTION	10	E.3	SECTION	11	E.4	SECTION	12
CC.1	SECTION	13	CC.2	SECTION	14	CC.3	SECTION	15
CC.4	SECTION	16	SYSLOC	SECTION	17			

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	00101	10	2A	00103	15	3A	00114
20	4A	00124	25	5A	00134	30	6A	00140
35	7A	00145	40	8A	00155	45	9A	00163
60	15A	00207	50	12A	00170	1000	FORMAT	00023
55	13A	00204	65	16A	00211			

DECK LENGTH IN OCTAL IS 00234.

Subroutine PRINTR

Purpose: Prints a raw data file.

Deck Name: PRNTR

Calling Sequence: CALL PRINTR(STN,NSTN,NTYPE,NNUM,XJDATA,NP)

Input/Output:

I/O	FØRTRAN Name	Dimension	Description
I	STN	6,1*	Raw data array to be printed
I	NSTN	———	Indicates station from which data was received
I	NTYPE	———	Indicates data type
I	NNUM	———	Total number of words per raw data file
I	XJDATA	———	Julian date (zero-hour U.T.) corresponding to the first data point within the file.
I	NP	———	Number of points per raw data file.

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $260_8 = 178_{10}$

* Dummy dimension

```
C *** FS4-305A ***          *** SUBROUTINE PRINTR ***                PNTR0010
C                                                                     PNTR0020
C     PURPOSE,                                                        PNTR0030
C         THIS SUBROUTINE PRINTS A RAW DATA FILE.                     PNTR0040
C                                                                     PNTR0050
C                                                                     PNTR0060
      SUBROUTINE PRINTR(STN,NSTN,NTYPE,NNUM,XJDATA,NP)                PNTR0070
C                                                                     PNTR0080
      DIMENSION  STN(6,1)                                             PNTR0090
C                                                                     PNTR0100
      DATA  NFILE / 0 /                                               PNTR0110
    5 NPOINT = 0                                                      PNTR0120
   10 NFILE = NFILE + 1                                               PNTR0130
   15 K = 0                                                           PNTR0140
   20 WRITE (6,200)  NFILE                                            PNTR0150    4
   25 WRITE (6,205)  NSTN,NTYPE,NNUM,XJDATA,NP                        PNTR0160    5
   30 WRITE (6,210)                                                   PNTR0170    6
   35 DO 75  I=1,NP                                                   PNTR0180
   40 NPOINT = NPOINT + 1                                             PNTR0190
   45 K = K + 1                                                       PNTR0200
   50 IF( K.LE.37)  GO TO 70                                          PNTR0210
   55 WRITE (6,200)  NFILE                                            PNTR0220   16
   60 WRITE (6,210)                                                   PNTR0230   17
   65 K = 0                                                           PNTR0240
   70 WRITE (6,215)  NPOINT, (STN(JJ,I),JJ=1,4)                       PNTR0250   19
   75 CONTINUE                                                        PNTR0260
   80 RETURN                                                          PNTR0270
C                                                                     PNTR0280
  200 FORMAT(1H1,38X,21H*** RAW DATA FILE NO.,I3, 4H *** )            PNTR0290
  205 FORMAT(1H0,13HSTATION NO. =,I3,2X,11HDATA TYPE =,I2,2X,21HNO. OF WPNTR0300
     2ORDS / FILE =,I6,2X,13HJULIAN DATE =,F8.1,2X,12HNO. POINTS =,I5 ) PNTR0310
  210 FORMAT(1H0, 11X,3HNO., 11X,4HTIME, 17X,1HX,19X,1HY,19X,1HZ )    PNTR0320
  215 FORMAT(1H ,8X,I5,4E20.8 )                                       PNTR0330
C                                                                     PNTR0340
      END                                                             PNTR0350
```

FS305A 10/01/64

PRNTR STORAGE MAP

SUBROUTINE PRINTR

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
NPOINT	00001	I	NFILE	00002	I	K	00003	I
I	00004	I						

ENTRY POINTS

PRINTR SECTION 3

SUBROUTINES CALLED

.FWRD.	SECTION	4	.UNO6.	SECTION	5	.FFIL.	SECTION	6
.FCNV.	SECTION	7	SYSLOC	SECTION	8			

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	00071	10	2A	00072	15	3A	00075
20	4A	00076	200	FORMAT	00017	25	5A	00106
205	FORMAT	00027	30	6A	00126	210	FORMAT	00054
35	7A	00134	75	24A	00216	40	11A	00142
45	12A	00145	50	13A	00150	70	19A	00174
55	16A	00155	60	17A	00165	65	18A	00173
215	FORMAT	00065	80	27A	00220			

DECK LENGTH IN OCTAL IS 00260.

Subroutine CHRØNT

Purpose: Sequences data chronologically in seconds from the reference date XDREF.

Deck Name: CHRT

Calling Sequence: CALL CHRØNT (STN,MAXSTN,NP,XDREF,XJDATA)

Input/Output:

I/O	FØRTRAN Name	Dimensions	Description
I-O	STN	6,MAXSTN	Data array containing a single file of raw data. STN(1,J) designates the time associated with the J-th point.
I	MAXSTN	_____	Dimension of STN.
I	NP	_____	Number of points within the raw data file being processed.
I	XDREF	------	Reference date used for sequencing time. Value is 50 days less than XJDATA of the first raw data file processed. (This relatively short time interval assures that no loss of significance will occur when times differ by more than one second of time)
I	XJDATA	-----	Julian date (zero hour U.T.) of the first point within the raw data file being processed.

Subroutine Required: None

Functions Required: None

Approximate Deck Length: $123_8 = 83_{10}$

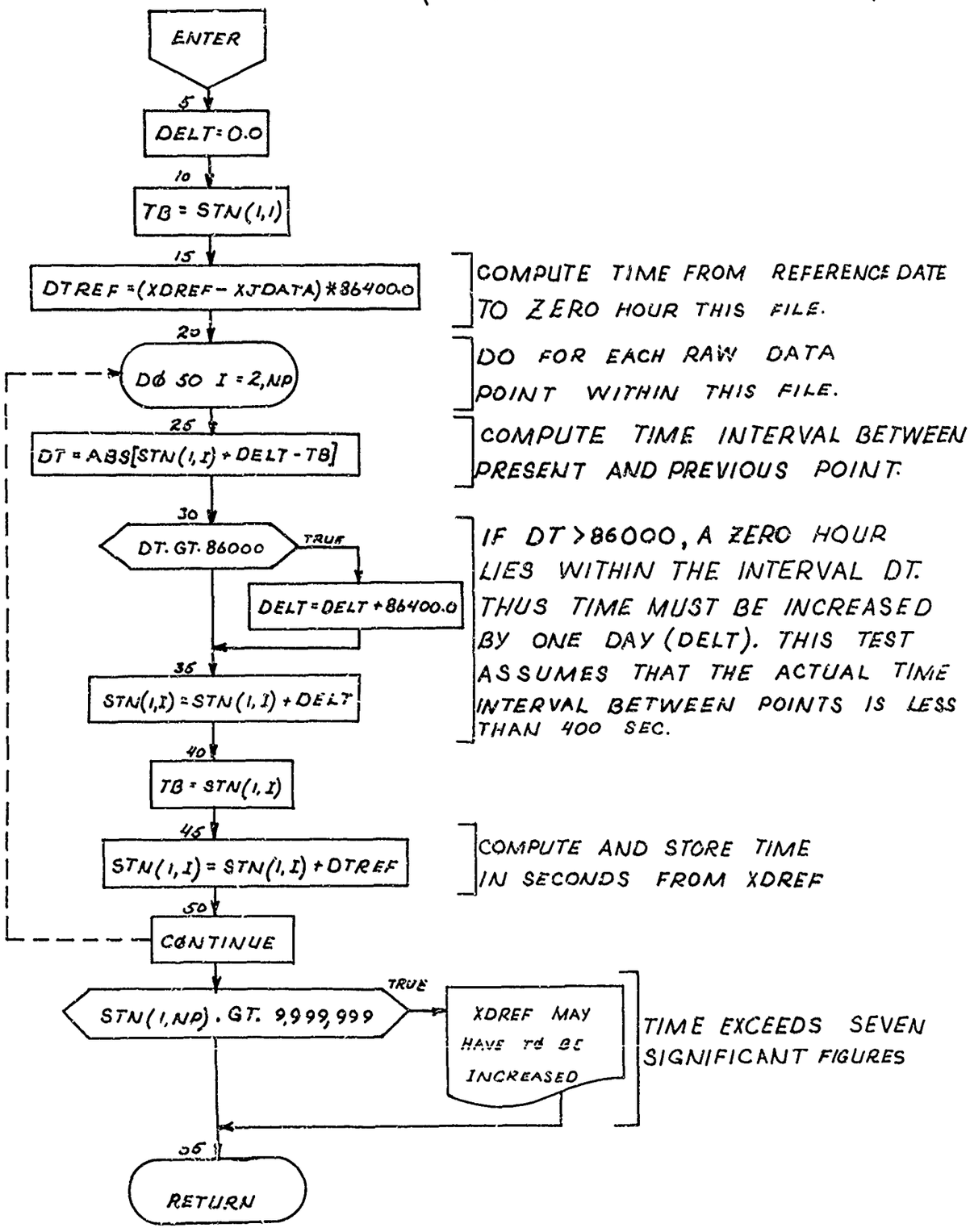
Restrictions:	Time interval between successive raw data points must be less than 400 sec.
Error Indicators:	If time in seconds exceeds seven significant figures, a diagnostic is printed and execution continues.

Method:

Prior to entering SUBRØUTINE CHRØNT, the chronological order of the data is mod 86400 seconds. The smoothing routine requires that each raw data file be chronologically monotonic (the mod sequencing would introduce discontinuities), and the sorting routine requires that the time for all raw data files be with respect to the same date. These requirements are met by selecting a reference Julian date (XDREF) 50 days prior to the date of the first raw data file processed and adjusting the chronological ordering of all raw data files to seconds from XDREF.

It should be noted that although XDREF is completely arbitrary with respect to the analysis (if a succeeding raw data file should happen to contain data with times prior to XDREF, the resulting negative time values would not affect either the smoothing or sorting), the computer system constrains the number of significant figures. Consequently, if time exceeds seven significant figures (9,999,999 sec), a diagnostic message, stating that XDREF may have to be increased, is printed.

SUBRØUTINE CHRØNT (STN, MAXSTN, NP, XDREF, XJDATA)



```
C *** FS4-305A ***          *** SUBROUTINE CHRONT ***                    CHRT0010
C                                                                        CHRT0020
C     PURPOSE,                                                           CHRT0030
C                                                                        CHRT0040
C         REFERENCES TIME TO THE DATE XDREF.                             CHRT0050
C                                                                        CHRT0060
C     RESTRICTIONS,                                                      CHRT0070
C                                                                        CHRT0080
C         TIME INTERVAL BETWEEN SUCESSIVE RAW DATA POINTS MUST BE LESS   CHRT0090
C         THEN 400 SEC..                                                 CHRT0100
C                                                                        CHRT0110
C                                                                        CHRT0120
      SUBROUTINE CHRONT(STN,MAXSTN,NP,XDREF,XJDATA )                     CHRT0130
C                                                                        CHRT0140
      DIMENSION  STN(6,MAXSTN)                                           CHRT0150
C                                                                        CHRT0160
    5 DELT = 0.0                                                         CHRT0170
   10 TB = STN(1,1)                                                      CHRT0180
C                                   COMPUTE TIME FROM REFERENCE DATE     CHRT0190
C                                   TO ZERO HOUR THIS FILE.              CHRT0200
   15 DTREF = (XJDATA - XDREF)*86400.0                                   CHRT0210
C                                   DO FOR EACH RAW DATA POINT           CHRT0220
C                                   WITHIN THE FILE.                     CHRT0230
   20 DO 50  I=1,NP                                                      CHRT0240
C                                   COMPUTE TIME INTERVAL BETWEEN        CHRT0250
C                                   PRESENT AND PREVIOUS POINT.          CHRT0260
   25 DT = ABS(STN(1,I) + DELT - TB)                                     CHRT0270
C                                   IF DT.GT.86000, A ZERO HOUR LIES     CHRT0280
C                                   WITHIN THE INTERVAL DT.  THUS,       CHRT0290
C                                   TIME MUST BE INCREASED BY ONE        CHRT0300
C                                   DAY.  THIS TEST ASSUMES THAT THE     CHRT0310
C                                   ACTUAL TIME INTERVAL BETWEEN         CHRT0320
C                                   POINTS IS LESS THEN 400 SECS.        CHRT0330
   30 IF(DT.GT.86000.0) DELT = DELT + 86400.0                            CHRT0340
   35 STN(1,I) = STN(1,I) + DELT                                         CHRT0350
   40 TB = STN(1,I)                                                      CHRT0360
```

```
C                                        COMPUTE AND STORE TIME IN SECS   CHRT0370
C                                        FROM XDREF.                      CHRT0380
   45 STN(I,I) = STN(I,I) + DTREF                                         CHRT0390
   50 CONTINUE                                                            CHRT0400
   55 RETURN                                                              CHRT0410
      END                                                                 CHRT0420
```

STORAGE MAP

SUBROUTINE CHRONT

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
DELT	00001	R	TB	00002	R	DTREF	00003	R
DT	00004	R						

ENTRY POINTS

CHRONT SECTION 3

SUBROUTINES CALLED

SYSLOC SECTION 4

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	00014	10	2A	00015	15	3A	00017
20	4A	00024	50	21A	00057	25	8A	00031
30	10A	00040	35	13A	00047	40	16A	00052
45	18A	00054	55	24A	00062			

DECK LENGTH IN OCTAL IS 00123.

Subroutine FIT

Purpose: Sets up the raw data for the smoothing routines. Also includes an option for discarding or adjusting raw data not satisfying a specified criteria. FIT is predicated on the assumption that the data are recorded at intervals of approximately one second. If the time interval is much, much larger than one second, FIT should be reviewed and fewer than the presently considered 20 data points processed.

Deck Name: FITT

Calling Sequence: CALL FIT (STN,NP,IFI,AA,NPAA,MAXSTN,MAXAA,NTYPE,NOAVG)

Input/Output:

I/O	FORTRAN Name	Dimension	Description
I	STN	6,MAXSTN	Data array containing a single file of raw data. STN(J,I) refers to the J-th element of the I-th data point. J code. 1, time in seconds 2, X coordinate * 3, Y coordinate 4, Z coordinate 5, not used 6, not used
I	NP	_____	Number of data points within the STN array.

* X, Y, Z refer to as many as three general pieces of observed data. As used in the differential corrections program, these data can be:

1) Range
2) Doppler
3) Azimuth, elevation
4) Range, doppler
5) Range, azimuth, elevation
6) Doppler, azimuth, elevation

I/O	FØRTRAN Name	Dimension	Description
I	IFI	———	Number of coordinates per point within the STN array.
O	AA	4,MAXAA	Data array containing the smoothed points corresponding to a single raw data file. AA(J,I) refers to the J-th element of the I-th smooth data point. J code same as STN above.
O	NPAA	———	Number of smoothed points in AA
I	MAXSTN	———	Dimension of STN
I	MAXAA	———	Dimension of AA
I	NTYPE	———	Indicates type of data. See SUBRØUTINE PRØCES and footnote.
I	NØAVG	———	Error flag. Non-zero value indicates that an initial valid point was not determined.

Subroutines Required: SMØØTH (smooths a raw data segment)

Functions Required: None

Approximate Deck Length: $1374_8 = 764_{10}$

Nomenclature:

FØRTRAN Name	Dimension	Description
D	80	Transfers a segment of valid raw data points from the STN array to the smoothing routines. Storage is allotted by: D(NT), time coordinate - first valid raw data point D(NT+1), time coordinate - second point ⋮ ⋮ D(NX), X coordinate - first point.

FØRTRAN Name	Dimension	Description
		D(NX+1), X coordinate - second point. ⋮ ⋮ D(NY), Y coordinate - first point ⋮ ⋮ D(NZ), Z coordinate - first point
ERRSIG	———	Tolerance used with adjustment option.
IADJST	———	Adjustment option flag. Non-zero value mechanizes adjustment option.
II	———	D array counter
IØVER	———	Error indicator mechanized if the number of smoothed data points exceeds the dimension of the AA array (MAXAA).
JJ	———	AA array counter
KØUNT	———	Index, within STN, of point being tested.
LASTKT	———	Index, within STN, of last valid point tested.
MX	———	Index, within STN, of coordinate to be adjusted.
MY,MZ	———	Index, within STN, of remaining coordinates.
NT,NX,NY,NZ	———	Index, within D array, of initial storage location of T,X,Y,Z.
NØMØRE	———	Flag. Non-zero value indicates no more raw data in file.
XAVG	———	Average value of 40 coordinates immediately following coordinate being tested. Used in determining the first valid point.

FØRTRAN Name	Dimension	Description
XGØØD	------	Value of valid coordinate.
XMAYB	------	Value of coordinate being tested.

Error Indicators: If, using the adjustment option, an initial valid point can not be determined using the averaging procedure, control is transferred back to SUBRØUTINE PRØCES, an error message is printed, and the next raw data file is read into the program.

If the number of smoothed points exceeds the dimensions of the AA array (NPAA> MAXAA), the first MAXAA points are loaded, an appropriate diagnostic is printed, and execution continues.

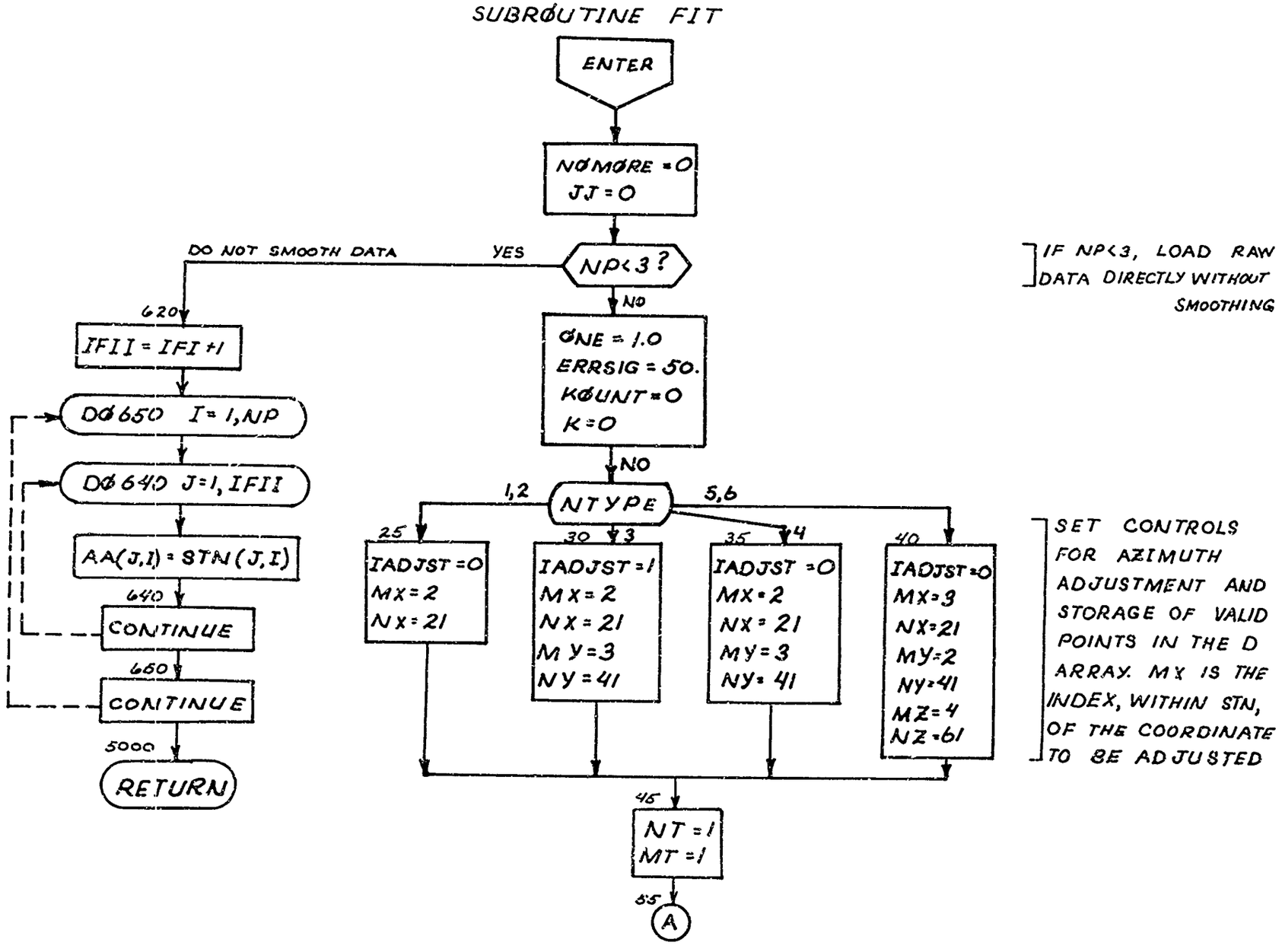
Method:

Prior to calling SUBRØUTINE FIT, a file of raw data observations from a single tracking station has been read into the STN array and has been chronologically adjusted (seconds from the reference date XDREF). This routine then partitions the raw data into segments and, after optional preliminary data adjustments, smooths each segment. When all raw data within the file has been smoothed, control is returned to SUBRØUTINE PRØCES with the smoothed data in the AA array.

Examination of the raw data utilized in the sample problem disclosed random irregularities of azimuth observations being recorded 360 degrees out of phase, especially prevalent for angles approaching 360 degrees (e.g., $+354^{\circ}$ recorded as -6°). Consequently, an option has been included which adjusts these values before smoothing. A single raw observation is compared with the last valid point determined, and, if the result is not within a specified tolerance (ERRSIG), the observation being tested is adjusted by 360 degrees. The adjusted value is again compared and, if still not within tolerance, is considered invalid and discarded. The next raw observation is then tested and the procedure is repeated until the above criteria have been met. The point is then considered valid and stored in the D array. After the required number of points have been loaded into D, the raw data segment is smoothed and the resulting point is stored in AA. This procedure is repeated until the raw data file has been exhausted. The initial valid point required to start the adjusting operation is determined by sequentially comparing an observation with the average value of the 40 points immediately succeeding it until the tolerance criteria is met.

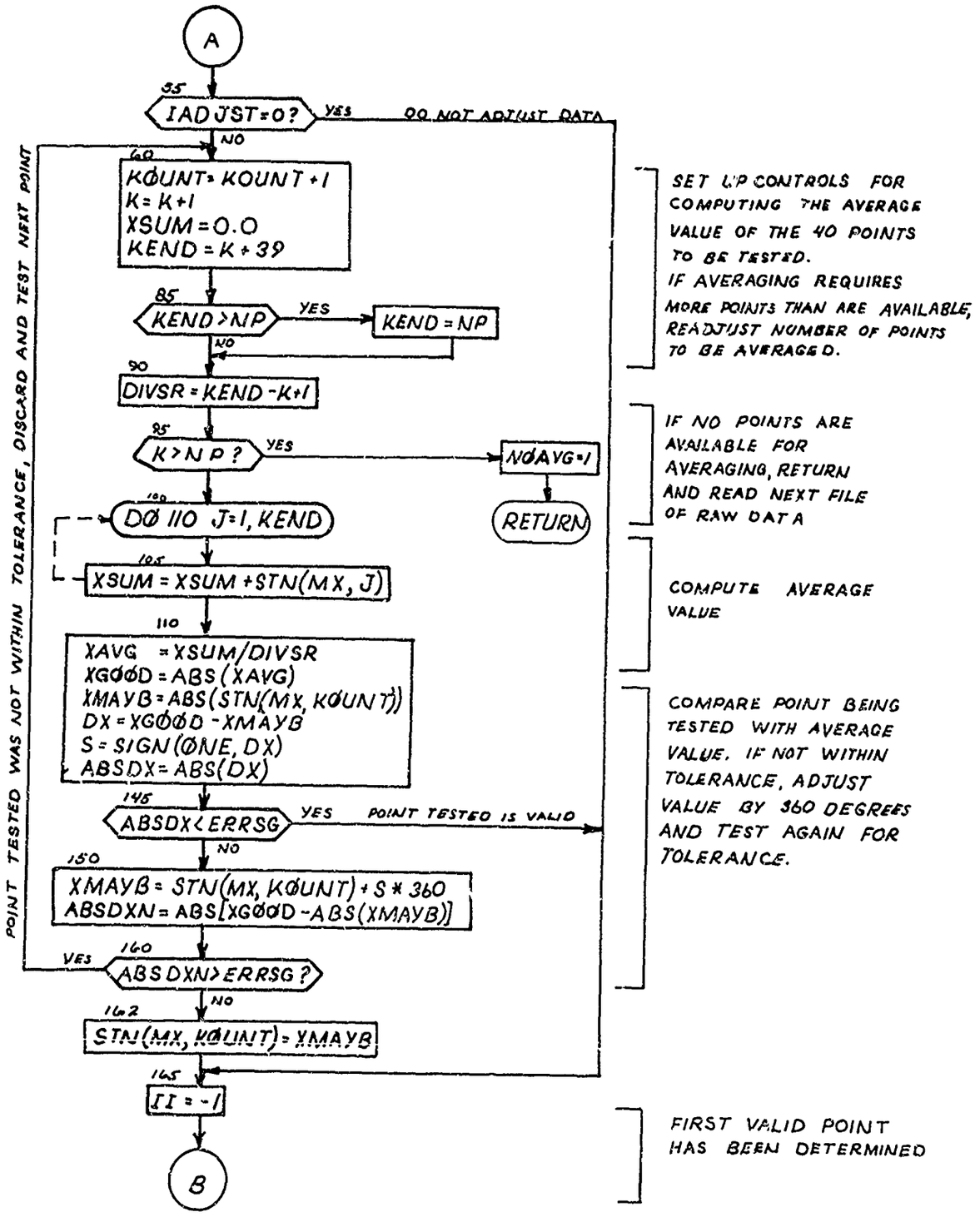
Controls within the routine are set for azimuth adjustment. By resetting NX equal to the appropriate index within the STN array, and adjusting the tolerance (ERRSIG) if required, any of the observed coordinates may be adjusted. To demechanize the adjustment option, set IADJST=0.

Since the time interval between raw data observations is assumed to be of the order of one second, the 20 points smoothed corresponds to a very short time interval. Consequently, if data are not collected in this mode, smoothing criteria should be adjusted.


SUBRØUTINE FIT
ENTER
NØMØRE = 0
JJ = 0
NP<3 ?
DO NOT SMOOTH DATA
YES
NO
IF NP<3, LOAD RAW DATA DIRECTLY WITHOUT SMOOTHING
620
IFII = IFI + 1
DØ 650 I = 1, NP
DØ 640 J = 1, IFII
AA(J,I) = STN(J,I)
640
CONTINUE
650
CONTINUE
5000
RETURN
ØNE = 1.0
ERRSIG = 50.
KØUNT = 0
K = 0
NO
NTYPE
1,2
3
4
5,6
25
IADJST = 0
MX = 2
NX = 21
30
IADJST = 1
MX = 2
NX = 21
MY = 3
NY = 41
35
IADJST = 0
MX = 2
NX = 21
MY = 3
NY = 41
40
IADJST = 0
MX = 3
NX = 21
MY = 2
NY = 41
MZ = 4
NZ = 61
SET CONTROLS FOR AZIMUTH ADJUSTMENT AND STORAGE OF VALID POINTS IN THE D ARRAY. MX IS THE INDEX, WITHIN STN, OF THE COORDINATE TO BE ADJUSTED
45
NT = 1
MT = 1
55
A

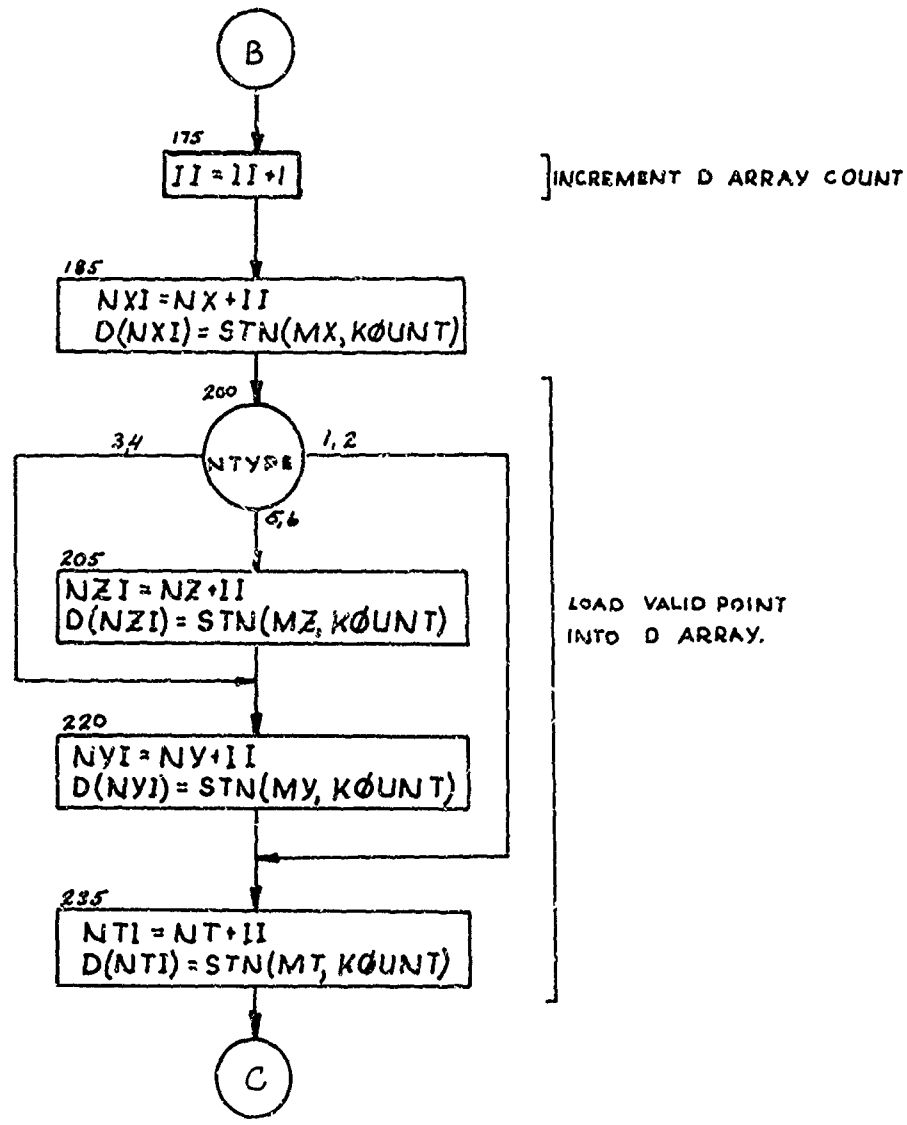
SUBROUTINE FIT (CONT.)

THE FIRST VALID RAW DATA POINT IS DETERMINED WITHIN THIS SECTION



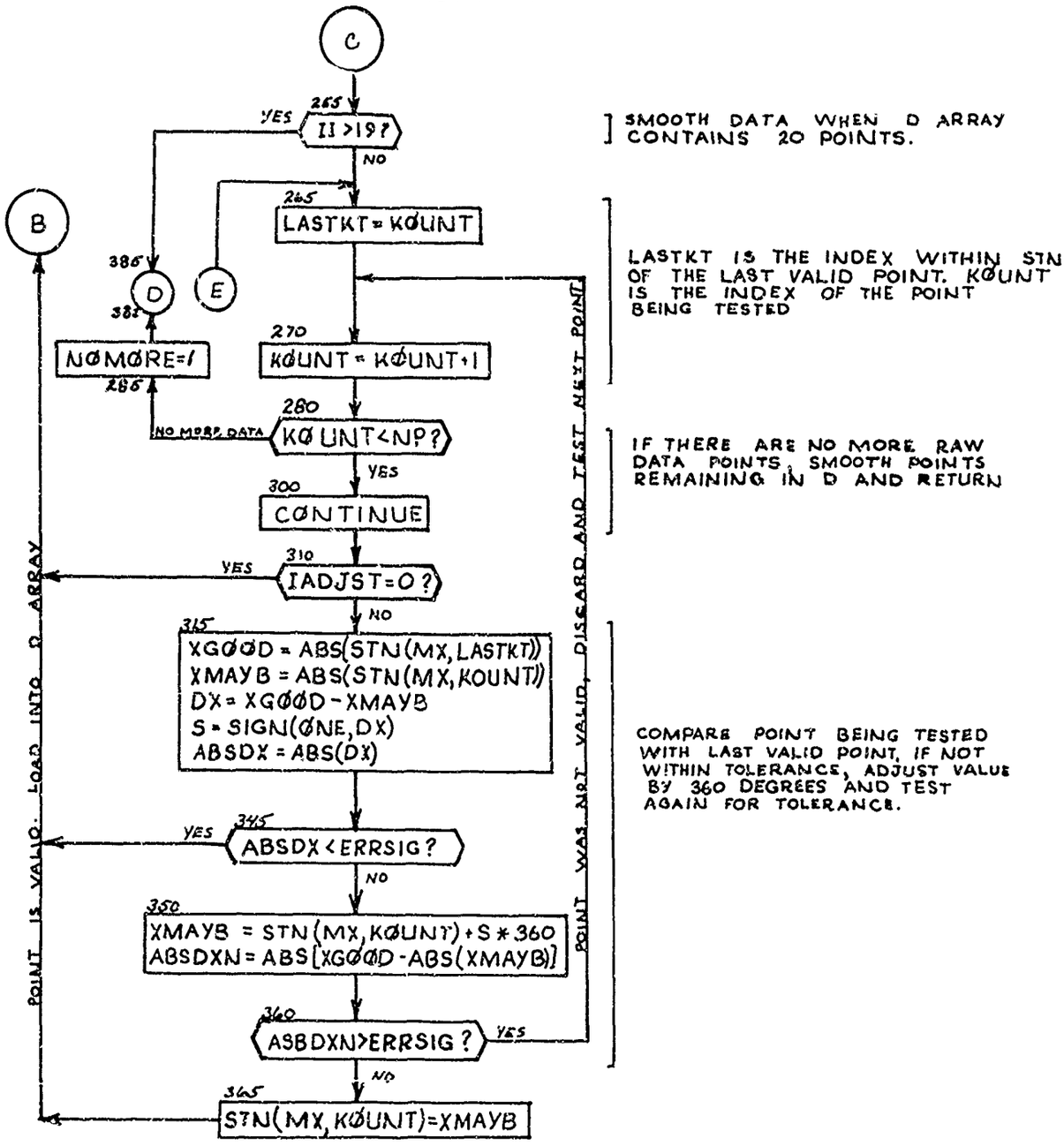
SUBROUTINE FIT (CONT.)

THIS SECTION LOADS THE D ARRAY WITH VALID POINTS

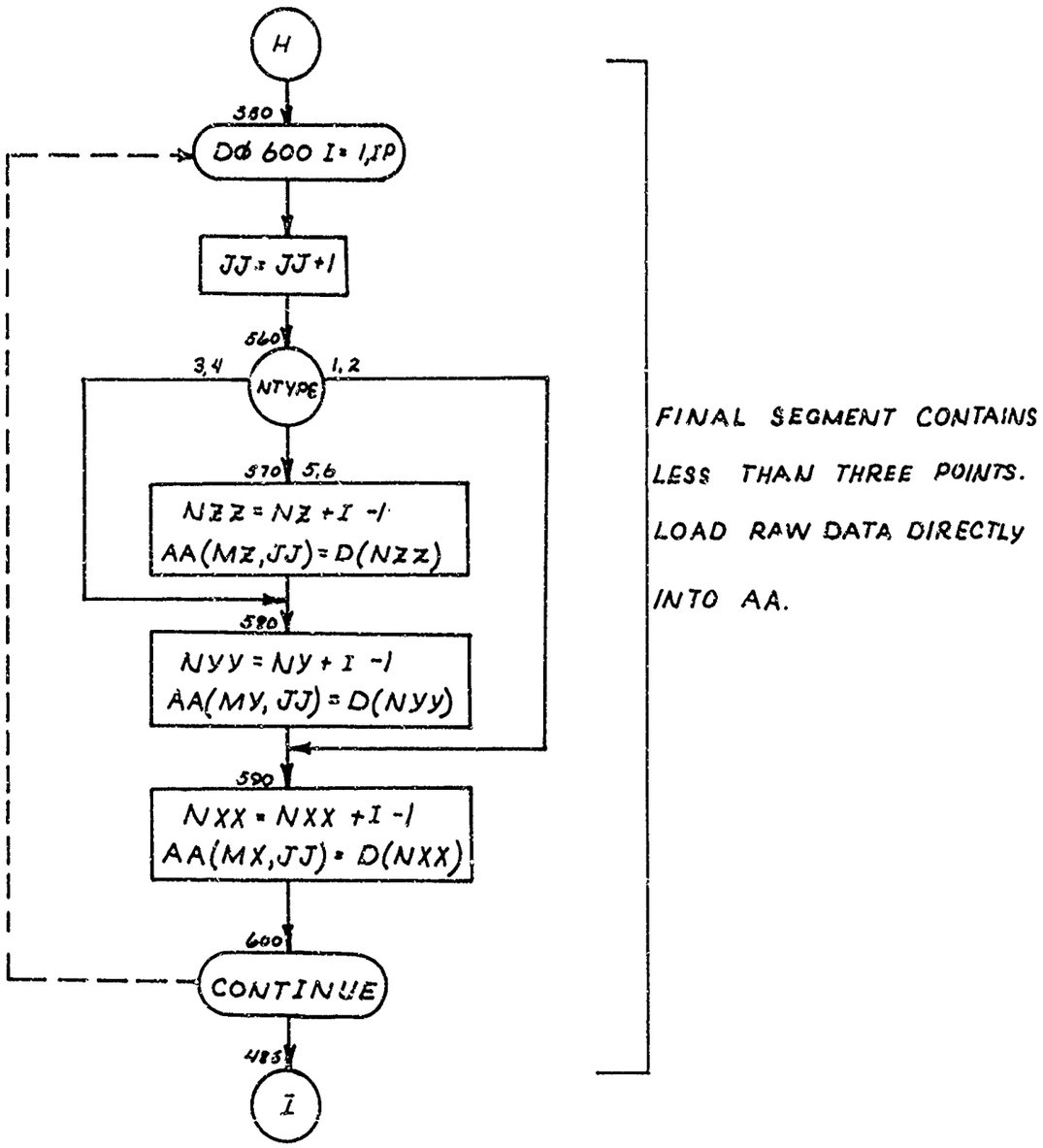


SUBROUTINE FIT (CONT.)

THIS SECTION SEGMENTS THE RAW DATA FOR INPUT TO THE SMOOTHING ROUTINES AND, IF DESIRED, MAKES REQUIRED RAW DATA ADJUSTMENTS.

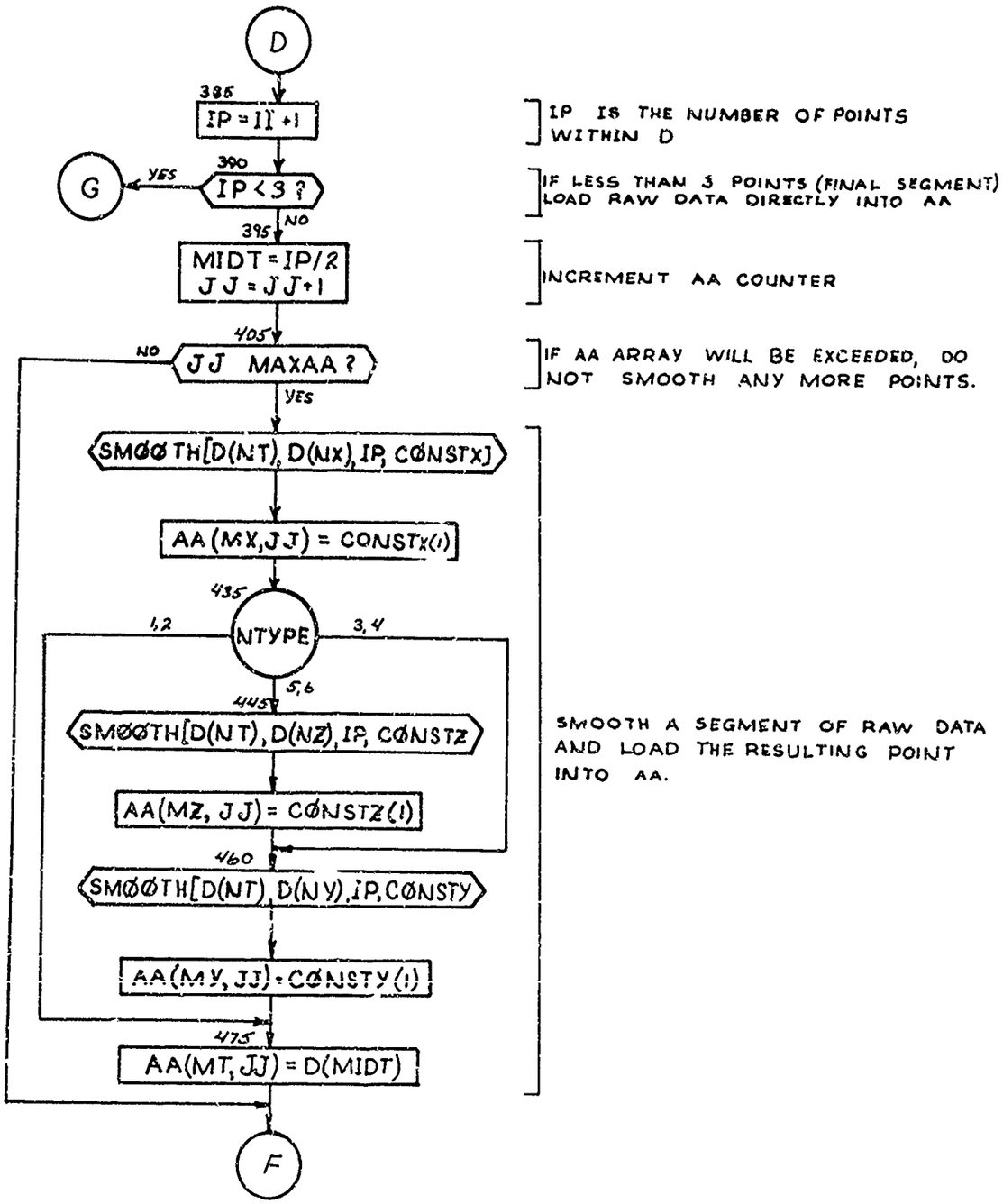


SUBROUTINE FIT (CONT.)

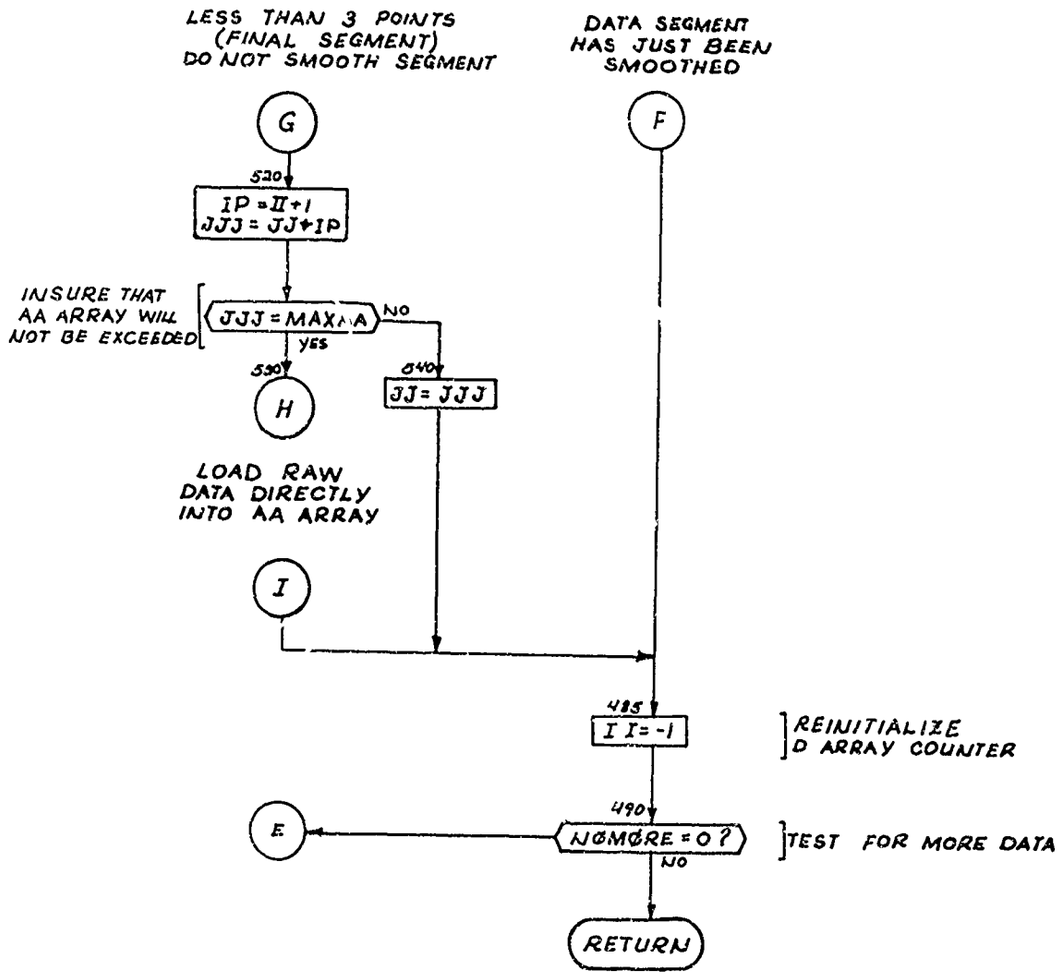


SUBRØUTINE FIT (CØNT.)

THE PRIMARY FUNCTION OF THIS SECTION IS TO SMOOTH THE RAW DATA SEGMENT CONTAINED WITHIN THE D ARRAY AND LOAD THE RESULTS IN AA.



SUBROUTINE FIT (CONT.)



```
C                                                                       FIT00010
C *** FS4-305A ***          *** SUBROUTINE FIT ***                      FIT00020
C     PURPOSE,                                                          FIT00030
C                                                                       FIT00040
C         SETS UP RAW DATA FOR THE SMOOTHING ROUTINES.  ALSO INCLUDES   FIT00050
C     AN OPTION FOR DISCARDING OR ADJUSTING RAW DATA NOT SATISFING A    FIT00060
C     SPECIFIED CRITERIA.                                               FIT00070
C                                                                       FIT00080
C     METHOD,                                                           FIT00090
C                                                                       FIT00100
C         PRIOR TO CALLING SUBROUTINE FIT, A FILE OF RAW DATA OBSER-    FIT00110
C     VATIONS FROM A SINGLE TRACKING STATION HAS BEEN READ INTO THE     FIT00120
C     STN ARRAY AND HAS BEEN CHRONOLOGICALLY ADJUSTED (SECONDS FROM THE FIT00130
C     REFERENCE DATE XDREF).  THIS ROUTINE THEN PARTITIONS THE RAW DATA FIT00140
C     INTO SEGMENTS AND, AFTER OPTIONAL PRELIMINARY DATA ADJUSTMENTS,   FIT00150
C     SMOOTHS EACH SEGMENT.  WHEN ALL DATA WITHIN THE FILE HAS BEEN     FIT00160
C     SMOOTHED, CONTROL IS RETURNED TO SUBROUTINE PROCES WITH THE       FIT00170
C     SMOOTHED DATA CONTAINED WITHIN THE AA ARRAY.                      FIT00180
C                                                                       FIT00190
C     RAW DATA ADJUSTMENT OPTION.                                       FIT00200
C                                                                       FIT00210
C         EXAMINATION OF THE RAW DATA UTILIZED IN THE SAMPLE PROBLEM    FIT00220
C     DISCLOSED RANDOM IRREGULARITIES OF AZIMUTH OBSERVATIONS BEING     FIT00230
C     RECORDED 360 DEGREES OUT OF PHASE, ESPECIALLY PREVALENT FOR ANGLESFIT00240
C     APPROACHING 360 DEGREES.  E.G. +354 DEG RECORDED AS -6 DEG.       FIT00250
C         CONSEQUENTLY, AN OPTION HAS BEEN INCLUDED WHICH ADJUSTS THESE FIT00260
C     VALUES BEFORE SMOOTHING.  A SINGLE OBSERVATION IS COMPARED WITH   FIT00270
C     THE LAST VALID POINT DETERMINED, AND, IF THE RESULT IS NOT WITHIN FIT00280
C     A SPECIFIED TOLERANCE (ERRSIG), THE OBSERVATION BEING TESTED IS   FIT00290
C     ADJUSTED BY 360 DEGREES.  THE ADJUSTED VALUE IS AGAIN COMPARED    FIT00300
C     AND, IF STILL NOT WITHIN TOLERANCE, IS CONSIDERED INVALID AND     FIT00310
C     DISCARDED.  THE NEXT RAW OBSERVATION IS THEN TESTED AND THE PRO-  FIT00320
C     CEDURE IS REPEATED UNTIL THE ABOVE CRITERIA HAVE BEEN MET.  THE   FIT00330
C     POINT IS THEN CONSIDERED VALID AND STORED IN THE D ARRAY.         FIT00340
C         THE INITIAL VALID POINT REQUIRED TO START THE ADJUSTMENT      FIT00350
C     OPERATION IS DETERMINED BY SEQUENTIALLY COMPARING AN OBSERVATION  FIT00360
```

```
C     WITH THE AVERAGE VALUE OF THE 40 POINTS IMMEDIATELY SUCCEEDING IT FIT00370
C     UNTILL THE TOLERANCE CRITERIA IS MET.                             FIT00380
C         CONTROLS WITHIN THE ROUTINE ARE SET FOR AZIMUTH ADJUSTMENT.   FIT00390
C     BY RESETTING NX EQUAL TO THE APPROPIATE INDEX WITHIN THE STN      FIT00400
C     ARRAY, AND ADJUSTING THE TOLERANCE (ERRSIG), ANY OF THE OBSERVED  FIT00410
C     COORDINATES MAY BE ADJUSTED.  TO DEMECHANIZE THE ADJUSTMENT       FIT00420
C     OPTION, SET IADJST=0                                              FIT00430
C                                                                       FIT00440
C                                                                       FIT00450
      SUBROUTINE FIT(STN,NP,IFI,AA,NPAA,MAXSTN,MAXAA,NTYPE,NOAVG)       FIT00460
C                                                                       FIT00470
      DIMENSION  D(80),STN(6,MAXSTN),AA(4,MAXAA)                        FIT00480
     2 ,CONSTX(3),CONSTY(3),CONSTZ(3)                                   FIT00490
C                                                                       FIT00500
C                 ***********************************************       FIT00510
C                 *  SET UP REQUIRED CONTROLS AND INITIALIZATION *      FIT00520
C                 ***********************************************       FIT00530
C                                                                       FIT00540
      NOMORE = 0                                                        FIT00550
      JJ = 0                                                            FIT00560
C                                                                       FIT00570
C                                     IF LESS THEN THREE RAW DATA       FIT00580
C                                     POINTS, LOAD RAW DATA DIRECTLY    FIT00590
C                                     INTO AA ARRAY WITHOUT SMOOTHING.  FIT00600
    5 IF( NP.LE.3 )  GO TO 620                                          FIT00610
      ONE = 1.0                                                         FIT00620
C                                     INITIALIZE INDICATORS.  ERRSIG ISFIT00630
C                                     THE TOLERANCE USED WITH THE       FIT00640
C                                     ADJUSTMENT OPTION.                FIT00650
   10 ERRSIG = 50.0                                                     FIT00660
   15 KOUNT = 0                                                         FIT00670
      K = 0                                                             FIT00680
C                                     SET CONTROLS FOR AZIMUTH ADJUST-  FIT00690
C                                     MENT AND STORAGE OF VALID POINTS  FIT00700
C                                     IN THE D ARRAY.  MX IS THE INDEX  FIT00710
C                                     ,WITHIN STN, OF THE COORDINATE    FIT00720
C                                     TO BE ADJUSTED.                   FIT00730
```

```
   20 GO TO (25,25,30,35,40,40), NTYPE                                  FIT00740
   25 IADJST = 0                                                        FIT00750
      MX = 2                                                            FIT00760
      NX = 21                                                           FIT00770
      GO TO 45                                                          FIT00780
   30 IADJST = 1                                                        FIT00790
      MX = 2                                                            FIT00800
      NX = 21                                                           FIT00810
      MY = 3                                                            FIT00820
      NY = 41                                                           FIT00830
      GO TO 45                                                          FIT00840
   35 IADJST = 0                                                        FIT00850
      MX = 2                                                            FIT00860
      NX = 21                                                           FIT00870
      MY = 3                                                            FIT00880
      NY = 41                                                           FIT00890
      GO TO 45                                                          FIT00900
   40 IADJST = 1                                                        FIT00910
      MX = 3                                                            FIT00920
      NX = 21                                                           FIT00930
      MY = 2                                                            FIT00940
      NY = 41                                                           FIT00950
      MZ = 4                                                            FIT00960
      NZ = 61                                                           FIT00970
   45 CONTINUE                                                          FIT00980
   50 NT = 1                                                            FIT00990
      MT = 1                                                            FIT01000
C                  ************************************                 FIT01010
C                  * THE FIRST VALID RAW DATA POINT    *               FIT01020
C                  * IS DETERMINED WITHIN THIS SECTION *               FIT01030
C                  ************************************                 FIT01040
C                                                                       FIT01050
C                                     IF IAJST.EQ.0 , DO NOT ADJUST     FIT01060
C                                     DATA.                             FIT01070
   55 IF( IADJST.EQ.0 )  GO TO 165                                      FIT01080
C                                     SETUP CONTROLS FOR COMPUTING THE  FIT01090
C                                     AVERAGE VALUE OF THE 40 POINTS    FIT01100
```

```
C                                       TO BE TESTED.                   FIT01110
   60 CONTINUE                                                          FIT01120
   65 KOUNT = KOUNT + 1                                                 FIT01130
   70 K = K + 1                                                         FIT01140
   75 XSUM = C.C                                                        FIT01150
   80 KEND = K + 39                                                     FIT01160
C                                       IF AVERAGING REQUIRES MORE POINTSFIT01170
C                                       THEN ARE AVAILABLE, READJUST    FIT01180
C                                       NUMBER OF POINTS TO BE AVERAGED. FIT01190
   85 IF( KEND.GT.NP )  KEND=NP                                         FIT01200
   90 DIVSR = KEND - K + 1                                              FIT01210
C                                       IF NO POINTS ARE AVAILABLE FOR  FIT01220
C                                       AVERAGING, RETURN AND READ NEXT FIT01230
C                                       RAW DATA FILE.                  FIT01240
   95 IF(K.LE.NP)  GO TO 100                                            FIT01250
   96 NOAVG = 1                                                         FIT01260
   97 GO TO 5000                                                        FIT01270
C                                       COMPUTE AVERAGE VALUE OF KEND   FIT01280
C                                       POINTS SUCCEEDING POINT BEING   FIT01290
C                                       TESTED                          FIT01300
  100 DO 110  J=K,KEND                                                  FIT01310
  105 XSUM = XSUM + STN(MX,J)                                           FIT01320
  110 CONTINUE                                                          FIT01330
  115 XAVG = XSUM/DIVSR                                                 FIT01340
C                                       COMPARE POINT BEING TESTED WITH FIT01350
C                                       AVERAGE VALUE.  IF NOT WITHIN   FIT01360
C                                       TOLERANCE, ADJUST BY 360 DEGREES FIT01370
C                                       AND TEST AGAIN FOR TOLERANCE.   FIT01380
  120 XGOOD = ABS(XAVG)                                                 FIT01390
  125 XMAYB = ABS(STN(MX,KOUNT))                                        FIT01400
  130 DX = XGOOD - XMAYB                                                FIT01410
  135 S = SIGN(ONE,DX)                                                  FIT01420
  140 ABSDX = ABS(DX)                                                   FIT01430
C                                       IF TRUE, POINT TESTED WAS VALID. FIT01440
  145 IF( ABSDX.LT.ERRSIG )  GO TO 165                                  FIT01450
  150 XMAYB = STN(MX,KOUNT) + S*360.0                                   FIT01460
  155 ABSDXN = ABS(XGOOD - ABS(XMAYB))                                  FIT01470
```

```
C                                       IF TRUE, POINT TESTED WAS        FIT01480
C                                       INVALID.  DISCARD AND TEST NEXT  FIT01490
C                                       POINT.                           FIT01500
  160 IF( ABSDXN.GT.ERRSIG ) GO TO 60                                    FIT01510
C                                       STORE ADJUSTED VALUE.            FIT01520
  162 STN(MX,KOUNT) = XMAYB                                              FIT01530
C                                       FIRST VALID POINT HAS BEEN       FIT01540
C                                       DETERMINED.                      FIT01550
C                                                                        FIT01560
C                 ***********************************                    FIT01570
C                 * THIS SECTION LOADS THE D ARRAY *                    FIT01580
C                 * WITH VALID POINTS              *                    FIT01590
C                 ***********************************                    FIT01600
C                                                                        FIT01610
  165 CONTINUE                                                           FIT01620
  170 II = -1                                                            FIT01630
C                                       INCREMENT D ARRAY COUNTER        FIT01640
  175 CONTINUE                                                           FIT01650
  180 II = II + 1                                                        FIT01660
C                                       LOAD VALID POINT                 FIT01670
  185 NXI = NX + II                                                      FIT01680
  190 D(NXI) = STN(MX,KOUNT)                                             FIT01690
  195 CONTINUE                                                           FIT01700
  200 GO TO (235,235,220,220,205,205), NTYPE                             FIT01710
  205 CONTINUE                                                           FIT01720
  210 NZI = NZ + II                                                      FIT01730
  215 D(NZI) = STN(MZ,KOUNT)                                             FIT01740
  220 CONTINUE                                                           FIT01750
  225 NYI = NY + II                                                      FIT01760
  230 D(NYI) = STN(MY,KOUNT)                                             FIT01770
  235 CONTINUE                                                           FIT01780
  240 NTI = NT + II                                                      FIT01790
  245 D(NTI) = STN(MT,KOUNT)                                             FIT01800
C                                                                        FIT01810
C                 ***********************************                    FIT01820
C                 * THIS SECTION SEGMENTS THE RAW DATA FOR *            FIT01830
C                 * INPUT TO THE SMOOTHING ROUTINES AND, IF *           FIT01840
```

```
C                    * DESIRED, MAKES REQUIRED RAW DATA          *      FIT01850
C                    * ADJUSTMENTS                                *      FIT01860
C                    ********************************************       FIT01870
C                                                                       FIT01880
  250 CONTINUE                                                          FIT01890
C                                        SMOOTH A RAW DATA SEGMENT WHEN FIT01900
C                                        THE D ARRAY CONTAINS 20 POINTS. FIT01910
  255 IF( II.GE.19 )  GO TO 385                                         FIT01920
  260 CONTINUE                                                          FIT01930
C                                        LASTKT IS THE INDEX, WITHIN STN, FIT01940
C                                        OF THE LAST VALID POINT.  KOUNT FIT01950
C                                        IS THE INDEX OF THE POINT BEING FIT01960
C                                        TESTED.                        FIT01970
  265 LASTKT = KOUNT                                                    FIT01980
  270 CONTINUE                                                          FIT01990
  275 KOUNT = KOUNT + 1                                                 FIT02000
C                                        IF THERE ARE NO MORE RAW DATA  FIT02010
C                                        POINTS, SMOOTH THE POINTS RE-  FIT02020
C                                        MAINING IN D AND RETURN.       FIT02030
  280 IF( KOUNT.LE.NP )  GO TO 300                                      FIT02040
  285 NOMORE = 1                                                        FIT02050
  290 GO TO 385                                                         FIT02060
  300 CONTINUE                                                          FIT02070
  310 IF( IADJST.EQ.0 )  GO TO 175                                      FIT02080
  315 CONTINUE                                                          FIT02090
C                                        COMPARE POINT BEING TESTED WITH FIT02100
C                                        LAST VALID POINT.  IF NOT      FIT02110
C                                        WITHIN TOLERANCE, ADJUST VALUE FIT02120
C                                        BY 360 DEGREES AND TEST AGAIN  FIT02130
C                                        FOR TOLERANCE                  FIT02140
  320 XGOOD = ABS(STN(MX,LASTKT))                                       FIT02150
  325 XMAYB = ABS(STN(MX,KOUNT))                                        FIT02160
  330 DX = XGOOD - XMAYB                                                FIT02170
  335 S = SIGN(ONE,DX)                                                  FIT02180
  340 ABSDX = ABS(DX)                                                   FIT02190
C                                        POINT IS VALID. LOAD INTO D .  FIT02200
  345 IF( ABSDX.LT.ERRSIG )  GO TO 175                                  FIT02210
```

```
C                                       ADJUST POINT AND TEST AGAIN.      FIT02220
  350 XMAYB = STN(MX,KOUNT) + S*360.0                                     FIT02230
  355 ABSDXN = ABS(XGOOD - ABS(XMAYB))                                    FIT02240
C                                       IF TRUE, POINT WAS NOT VALID.     FIT02250
C                                       DISCARD AND TEST NEXT POINT.      FIT02260
  360 IF( ABSDXN.GT.ERRSIG )  GO TO 270                                   FIT02270
C                                       POINT IS VALID. LOAD INTO D .     FIT02280
  365 STN(MX,KOUNT) = XMAYB                                               FIT02290
  380 GO TO 175                                                           FIT02300
C                                                                         FIT02310
C                 ******************************************              FIT02320
C                 *  THE PRIMARY FUNCTION OF THIS SECTION IS  *          FIT02330
C                 *  TO SMOOTH THE RAW DATA SEGMENT CONTAINED *          FIT02340
C                 *  WITHIN THE D ARRAY AND LOAD THE RESULTS  *          FIT02350
C                 *  IN AA                                    *          FIT02360
C                 ******************************************              FIT02370
C                                                                         FIT02380
C                                       IP IS THE NUMBER OF POINTS IN D.  FIT02390
  385 CONTINUE                                                            FIT02400
      IP = II + 1                                                         FIT02410
C                                       IF LESS THEN 3 POINTS (FINAL      FIT02420
C                                       SEGMENT), LOAD RAW DATA DIRECTLY  FIT02430
C                                       IN AA.                            FIT02440
  390 IF( IP.LE.3 )  GO TO 520                                            FIT02450
C                                       SET MIDPOINT.                     FIT02460
  395 MIDT = IP/2                                                         FIT02470
C                                       INCREMENT AA COUNTER.             FIT02480
  400 JJ = JJ + 1                                                         FIT02490
C                                       IF AA ARRAY WILL BE EXCEEDED, DO  FIT02500
C                                       NOT SMOOTH ANY MORE POINTS.       FIT02510
C                                       ALTHOUGH NO MORE POINTS WILL BE   FIT02520
C                                       LOADED INTO AA, EXECUTION         FIT02530
C                                       CONTINUES TO DETERMINE THE        FIT02540
C                                       REQUIRED DIMENSION.  IMMEDIATLY   FIT02550
C                                       AFTER RETURNING TO THE CALLING    FIT02560
C                                       ROUTINE (SUBROUTINE PROCES),      FIT02570
C                                       A DIAGNOSTIC WILL BE PRINTED      FIT02580
```

```
C                                       AND EXECUTION WILL BE TERMINATED.FIT02590
C                                                                        FIT02600
  405 IF( JJ.GT.MAXAA )  GO TO 485                                       FIT02610
C                                       SMOOTH A RAW DATA SEGMENT AND    FIT02620
C                                       LOAD THE RESULTING POINT INTO AA.FIT02630
  420 CONTINUE                                                           FIT02640
  425 CALL SMOOTH(D(NT),D(NX),IP,CONSTX)                                 FIT02650   155
  430 AA(MX,JJ) = CONSTX(1)                                              FIT02660
  435 CONTINUE                                                           FIT02670
  440 GO TO (475,475,460,460,445,445), NTYPE                             FIT02680
  445 CONTINUE                                                           FIT02690
  450 CALL SMOOTH(D(NT),D(NZ),IP,CONSTZ)                                 FIT02700   164
  455 AA(MZ,JJ) = CONSTZ(1)                                              FIT02710
  460 CONTINUE                                                           FIT02720
  465 CALL SMOOTH(D(NT),D(NY),IP,CONSTY)                                 FIT02730   171
  470 AA(MY,JJ) = CONSTY(1)                                              FIT02740
  475 CONTINUE                                                           FIT02750
  480 AA(MT,JJ) = D(MIDT)                                                FIT02760
C                                                                        FIT02770
C                 ***********************************************        FIT02780
C                 *  AT THIS POINT IN THE PROGRAM, A RAW DATA *        FIT02790
C                 *  SEGMENT HAS EITHER BEEN SMOOTHED OR IT   *        FIT02800
C                 *  HAS BEEN ESTABLISHED THAT SMOOTHING IS   *        FIT02810
C                 *  NOT REQUIRED.  DEPENDING UPON THE ABOVE, *        FIT02820
C                 *  THIS SECTION DIRECTS CONTROL TO THE      *        FIT02830
C                 *  APPROPIATE SECTION.                      $         FIT02840
C                 ***********************************************        FIT02850
C                                                                        FIT02860
C                                       RESET D ARRAY COUNTER.           FIT02870
  485 II = -1                                                            FIT02880
  490 CONTINUE                                                           FIT02890
C                                       IF TRUE, PROCES NEXT RAW DATA    FIT02900
C                                       SEGMENT.                         FIT02910
  500 IF( NOMORE.EQ.0 )  GO TO 265                                       FIT02920
C                                       RETURN                           FIT02930
      GO TO 5000                                                         FIT02940
C                                       ENTRY IF LESS THEN 3 POINTS      FIT02950
```

```
C                                       (FINAL SEGMENT).  LOAD RAW        FIT02960
C                                       DATA DIRECTLY INTO AA IF AA       FIT02970
C                                       DIMENSION WILL NOT BE EXCEEDED.   FIT02980
  520 CONTINUE                                                            FIT02990
      IP = II + 1                                                         FIT03000
      JJJ = JJ + IP                                                       FIT03010
C                                       IF TRUE LOAD RAW DATA INTO AA.    FIT03020
      IF( JJJ.LT.MAXAA )  GO TO 550                                       FIT03030
C                                       AA IS FULL. DO NOT LOAD.          FIT03040
  540 JJ=JJJ                                                              FIT03050
      GO TO 485                                                           FIT03060
C                                       LOAD RAW DATA DIRECTLY INTO AA.   FIT03070
  550 DO 600  I=1,IP                                                      FIT03080
      JJ = JJ+1                                                           FIT03090
  560 GO TO (590,590,580,580,570,570), NTYPE                              FIT03100
  570 NZZ = NZ + I  - 1                                                   FIT03110
      AA(MZ,JJ) = D(NZZ)                                                  FIT03120
  580 NYY = NY + I  - 1                                                   FIT03130
      AA(MY,JJ) = D(NYY)                                                  FIT03140
  590 NXX = NX  +  I - 1                                                  FIT03150
      AA(MX,JJ) = D(NXX)                                                  FIT03160
      NTT = NT  +  I - 1                                                  FIT03170
      AA(MT,JJ) = D(NTT)                                                  FIT03180
  600 CONTINUE                                                            FIT03190
      GO TO 485                                                           FIT03200
C                                       TOTAL NUMBER OF RAW DATA POINTS   FIT03210
C                                       IN DATA FILE WAS LESS THEN THREE. FIT03220
C                                       LOAD RAW DATA DIRECTLY INTO AA.   FIT03230
  620 IFII = IFI + 1                                                      FIT03240
  630 DO 650  I=1,NP                                                      FIT03250
      DO 640  J=1,IFII                                                    FIT03260
      AA(J,I) = STN(J,I)                                                  FIT03270
  640 CONTINUE                                                            FIT03280
  650 CONTINUE                                                            FIT03290
      GO TO 5000                                                          FIT03300
 5000 CONTINUE                                                            FIT03310
      NPAA = JJ                                                           FIT03320
```

```
      RETURN                                                            FIT03330
      END                                                               FIT03340
```

STORAGE MAP

SUBROUTINE FIT

DIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
D	00001	R	CONSTX	00121	R	CONSTY	00124	R
CONSTZ	00127	R						

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
NOMORE	00132	I	JJ	00133	I	ONE	00134	R
ERRSIG	00135	R	KOUNT	00136	I	K	00137	I
IADJST	00140	I	MX	00141	I	NX	00142	I
MY	00143	I	NY	00144	I	MZ	00145	I
NZ	00146	I	NT	00147	I	MT	00150	I
XSUM	00151	R	KEND	00152	I	DIVSR	00153	R
XAVG	00154	R	XGOOD	00155	R	XMAYB	00156	R
DX	00157	R	S	00160	R	ABSDX	00161	R
ABSDXN	00162	R	II	00163	I	NXI	00164	I
NZI	00165	I	NYI	00166	I	NTI	00167	I
LASTKT	00170	I	IP	00171	I	MIDT	00172	I
JJJ	00173	I	I	00174	I	NZZ	00175	I
NYY	00176	I	NXX	00177	I	NTT	00200	I
IFIT	00201	I						

ENTRY POINTS

FIT SECTION 3

SUBROUTINES CALLED

SMOOTH SECTION 4 .FXEM. SECTION 5 E.I SECTION 6

FS305A 10/01/64

FITT

STØRAGE MAP

E.2	SECTIØN	7	E.3	SECTIØN	8	E.4	SECTIØN	9
CC.1	SECTIØN	10	CC.2	SECTIØN	11	CC.3	SECTIØN	12
CC.4	SECTIØN	13	SYSLØC	SECTIØN	14			

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	3A	00231	620	216A	01216	10	6A	00240
15	7A	00242	20	9A	00244	25	10A	00257
30	14A	00265	35	20A	00300	40	26A	00312
45	33A	00330	50	34A	00330	55	36A	00334
165	80A	00501	60	39A	00340	65	40A	00340
70	41A	00343	75	42A	00346	80	43A	00347
85	44A	00352	90	47A	00360	95	48A	00372
100	53A	00402	96	51A	00377	97	52A	00401
5000	231A	01254	110	59A	00417	105	57A	00414
115	62A	00424	120	63A	00427	125	64A	00432
130	66A	00437	135	67A	00442	140	68A	00446
145	69A	00451	150	72A	00456	155	74A	00462
160	75A	00472	162	78A	00477	170	81A	00501
175	82A	00503	180	83A	00505	185	84A	00510
190	85A	00513	195	88A	00516	200	89A	00516
235	100A	00555	220	95A	00543	205	90A	00531
210	91A	00535	215	92A	00540	225	96A	00547
230	97A	00552	240	101A	00561	245	102A	00564
250	105A	00567	255	106A	00567	385	142A	00700
260	109A	00574	265	110A	00574	270	111A	00576
275	112A	00576	280	113A	00601	300	118A	00611
285	116A	00606	290	117A	00610	310	119A	00617
315	122A	00623	320	123A	00623	325	125A	00630
330	127A	00635	335	128A	00640	340	129A	00644
345	130A	00647	350	133A	00654	355	135A	00660
360	136A	00670	365	139A	00675	380	141A	00677
390	143A	00705	520	184A	01055	395	146A	00712
400	147A	00717	405	148A	00722	485	178A	01046
420	151A	00733	425	152A	00733	430	156A	00750

FS305A 10/01/64

FITT STORAGE MAP

435	158A	00752	440	159A	00752	475	174A	01037
460	167A	01012	445	160A	00765	450	161A	00773
455	165A	01010	465	168A	01020	470	172A	01035
480	175A	01044	490	179A	01050	500	180A	01050
550	192A	01073	540	190A	01070	600	212A	01213
560	196A	01104	590	205A	01155	580	201A	01136
570	197A	01117	630	217A	01221	650	227A	01251
640	225A	01247						

DECK LENGTH IN OCTAL IS 01374.

Subroutine SMØØTH

Purpose: Smooths data to obtain the best fit (in the sense of unweighted least squares) to the polynomial $Y=A+BX+CX^2$

Deck Name: SMØØ

Calling Sequence: CALL SMØØTH(X,Y,N,CØNST)

Input/Output:

I/O	FØRTRAN Name	Dimensions	Description
I	Y	20	Observed data
I	X	20	Values of the independent variable (time) corresponding to the observed Y.
I	N	———	Number of elements within X and Y
O	CØNST	3	Unknown constants to be determined. CØNST(1) → A CØNST(2) → B CØNST(3) → C

Subroutines Required: MATMPY (matrix multiplication)
MTINV (matrix inverse)
TRANSP (matrix transposition)

Functions Required: None

Approximate Deck Length: $473_8 = 315_{10}$

Restrictions: $N \geqslant 3$

Formulation:

The problem to be addressed is as follows:

"A series of J observations (J > I, I=degrees of freedom of function) has been made over some interval of time (or another independent variable) of a linear

function in the unknowns of the problem, and an optimum estimate of the unknown parameters in the least squares sense is to be constructed." From this statement of the problem

$$\vec{y} = M\vec{x} + \vec{\eta} \tag{1}$$

where

$$\vec{y} = \begin{Bmatrix} y_1 \\ \cdot \\ \cdot \\ \cdot \\ y_j \end{Bmatrix} = \text{J-vector of observations}$$

M = J by I array of numbers relating the unknown parameters of the problem and the observations.

$$\vec{x} = \begin{Bmatrix} x_1 \\ x_2 \\ \cdot \\ \cdot \\ x_i \end{Bmatrix} = \text{I-vector of unknown parameters}$$

$$\vec{\eta} = \vec{y}_{TRUE} - \vec{y}_{OBSERVED}$$

$$\vec{y} - M\vec{x}$$

At this point in the development, a scalar function of $\vec{\eta}$ must be constructed which can serve as the comparison function for various "curve fits" and which, when minimized will yield the "optimum" solution in the desired sense. This function, in its simplest form, is

$$F = \sum_{i=1}^{J} \Delta y_i^2 = \eta^T \eta \tag{2}$$

However, since the various observations of y may be made with different precision, it is desirable to provide the capability for weighting the data inversely as the square of the variance in the observation.

i.e.

$$F = \sum_{i=1} \left(\frac{\Delta y_i}{\sigma_i}\right)^2 = \eta^T V^{-1} \eta$$

where

$$V^{-1} = \begin{bmatrix} 1/\sigma_1^2 & 0 & 0 \\ 0 & 1/\sigma_2^2 & 0 \\ 0 & 0 & 1/\sigma_3^2 \end{bmatrix} = \text{symmetric}$$

This second form will be utilized in the discussions which follow.

Substituting from the definition of $\vec{\eta}$ into that for F yields

$$F = \{\vec{y} - M\vec{x}\}^T V^{-1} \{\vec{y} - M\vec{x}\}$$
$$= \vec{y}^T V^{-1} \vec{y} - \vec{x}^T M^T V^{-1} \vec{y} - \vec{y}^T V^{-1} M \vec{x} + \vec{x}^T M^T V^{-1} M \vec{x}$$

Which when partially differentiated with respect to $\vec{x}$ (or $\vec{x}^T$) and equated to zero yields

$$0 = -\vec{y}^T V^{-1} M + \vec{x}^T M^T V^{-1} M$$

or

$$\vec{x}_{WLS}^T = \vec{y}^T V^{-1} M (M^T V^{-1} M)^{-1}$$
$$\vec{x}_{WLS} = (M^T V^{-1} M)^{-1} M^T V^{-1} \vec{y} \qquad (3)$$

This solution, of course, contains the case where the data are unweighted (i.e., V^{-1} = the identity matrix).

$$\vec{x}_{LS} = (M^T M)^{-1} M^T \vec{y} \qquad (4)$$

This formulation, applied to the raw data, performs a preliminary smoothing which assures more rapid convergence of the differential corrections solution in the main program and simultaneously reduces the amount of data to be processed. This step is accomplished by noting that the true trajectory is nearly elliptical (i.e. a second order curve) and may be represented to a good degree, over a short time interval, by a parabola of unknown coefficients. i.e.,

$$y = a + bx + cx^2$$

$$y = \begin{bmatrix} 1 & x_1 & x_1^2 \\ 1 & x_2 & x_2^2 \\ 1 & x_3 & x_3^2 \\ \vdots & \vdots & \vdots \\ 1 & x_M & x_M^2 \end{bmatrix} \begin{Bmatrix} a \\ b \\ c \end{Bmatrix} \equiv [M] \{A\}$$

Consequently, if a series of observations (say over a 20 second segment of the trajectory) are utilized as successive values of y_i and if the corresponding values of t_i are utilized as the components of $\vec{x}$, the unweighted least squares solution for the constants $\{A\}$ may be obtained by equation (4). However, it is noted that since the values of t_i may be large and differ in one of the final digits (e.g., data recorded in universal time at one second intervals could have values of t like 86300,86301,$\cdots$) the columns of M will appear to be nearly linear dependent. This fact could result in severe numerical problems. Thus, it is suggested that the values of x_i be equal to $t_i - t_{midpoint}$ (where $t_{midpoint}$ is the value of t_i at the tenth point in the segment begin processed) to assure the maximum degree of significance in the computations.

```
C *** FS4-305A ***          *** SUBRØUTINE SMØØTH ***                    SMTH0010
C                                                                         SMTH0020
C                                                                         SMTH0030
C     THIS RØUTINE SMØØTHS DATA (X) TØ ØBTAIN THE BEST FIT (IN THE        SMTH0040
C              SENSE ØF UNWEIGHTED LEAST SQUARES ) TØ THE PØLYNØMIAL      SMTH0050
C              Y = A + BX + CX2                                           SMTH0060
C     WHERE Y= ØBSERVED DATA AND X IS THE ARGUMENT                        SMTH0070
C              A,B,C  = UNKNØWN CØNSTANTS CØNTAINED IN ARRAY CØNST        SMTH0080
C     NØTE ** THE DIMENSIØN ØF X AND Y MUST BE LESS THAN 100              SMTH0090
C                                                                         SMTH0100
C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * SMTH0110
C                                                                         SMTH0120
      SUBRØUTINE SMØØTH( X,Y,N,CØNST )                                    SMTH0130
      DIMENSIØN A( 20,3),B(3, 20),C(3,3),D(3,3),E(3, 20),CØNST(3),        SMTH0140
     1          X(20),Y(20)                                               SMTH0150
C                                                                         SMTH0160
C                                                                         SMTH0170
      J=N/2                                                               SMTH0180
      DØ 1 I=1,N                                                          SMTH0190
      XX=X(I)-X(J)                                                        SMTH0200
      B(1,I) = 1.                                                         SMTH0210
      B(2,I) = XX                                                         SMTH0220
    1 B(3,I) = XX**2                                                      SMTH0230
      M=3                                                                 SMTH0240
      CALL TRANSP(B,M,N,A)                                                SMTH0250   15
      CALL MATMPY(B,M,N,A,N,M,C)                                          SMTH0260   17
      CALL MTINV(C,D,M)                                                   SMTH0270   19
      CALL MATMPY(D,M,M,B,M,N,E)                                          SMTH0280   21
      CALL MATMPY(E,M,N,Y,N,1,CØNST)                                      SMTH0290   23
      RETURN                                                              SMTH0300
      END                                                                 SMTH0310
```

FS305A 10/01/64

SMOO STORAGE MAP

SUBROUTINE SMOOTH

DIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
A	00001	R	B	00075	R	C	00171	R
D	00202	R	E	00213	R			

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
J	00307	I	XX	00310	R	M	00311	I

ENTRY POINTS

SMOOTH SECTION 3

SUBROUTINES CALLED

TRANSP	SECTION	4	MATMPY	SECTION	5	MTINV	SECTION	6
SYSLOC	SECTION	7						

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
I	10A	00345						

DECK LENGTH IN OCTAL IS 00473.

Subroutine MATMPY
(matrix multiplication)

Purpose: MATMPY is designed to multiply any two conformable single precision matrices (with less than 70 elements each) to obtain the single precision product. All operations interior to the routine are performed in double precision to control roundoff and loss of significance. (The size limitation for this routine is a direct result of the establishment of several temporary storage arrays in the routine. The logic will admit any size matrices).

Deck Name: MXPY

Calling Sequence: CALL MATMPY (C, I, K, D, K, J, CD)

Input/Output:

I/O	FORTRAN Name	Math Name	Dimension	Common/ Argument	Definition
I	C	C	I (rows) K (columns)	Arg	Array of numbers to be used in the premultiplication of D by C
I	D	D	K (rows) J (columns)	Arg	Array of numbers to be premulti-plied by the matrix C
I	CD	CD	I (rows) J (columns)	Arg	Product array

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $1307_8 = 711_{10}$

2

```
C *** FS4-305A ***          *** SUBROUTINE MATMPY ***                    MXPY0010
C                                                                        MXPY0020
      SUBROUTINE MATMPY(C,I,K,D,KK,J,CD )                                MXPY0030
      DIMENSION C(1), D(1), CD(1)                                        MXPY0040
      DOUBLE PRECISION A( 70),B( 70),AB( 70)                             MXPY0050
C                                                                        MXPY0060
C     THE MATRIX A HAS I ROWS AND K COLUMNS                              MXPY0070
C                                                                        MXPY0080
C     THE MATRIX B HAS K ROWS AND J COLUMNS                              MXPY0090
C                                                                        MXPY0100
C     THE PRODUCT AB HAS I ROWS AND J COLUMNS                            MXPY0110
C                                                                        MXPY0120
C     NA, NB, NAB  ARE THE MAXIMUM NUMBER OF ROWS GIVEN IN THE DIMENSIONMXPY0130
C                  STATEMENT IN THE MAIN PROGRAM FOR MATRICES A, B, AND MXPY0140
C                  AB, RESPECTIVELY                                      MXPY0150
C                                                                        MXPY0160
C                                                                        MXPY0170
C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * MXPY0180
C                                                                        MXPY0190
      XSUBF(NROWS, I, J) = NROWS*(J-1) + I                               MXPY0200
C                                                                        MXPY0210
C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * MXPY0220
C                                                                        MXPY0230
      DO 1 L =1,I                                                        MXPY0240
      DO 1 M =1,K                                                        MXPY0250
      NUMB = XSUBF(I,L,M)                                                MXPY0260
    1 A(NUMB) = C(NUMB)                                                  MXPY0270
      DO 2 L =1,K                                                        MXPY0280
      DO 2 M =1,J                                                        MXPY0290
      NUMB = XSUBF(K,L,M)                                                MXPY0300
    2 B(NUMB) = D(NUMB)                                                  MXPY0310
C                                                                        MXPY0320
C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * MXPY0330
C                                                                        MXPY0340
      NA  = I                                                            MXPY0350
      NB  = K                                                            MXPY0360
```

```
      NAB = I                                                           MXPY0370
      DØ  10  L=1, I                                                    MXPY0380
      DØ  10  M=1, J                                                    MXPY0390
      IAB = XSUBF(NAB, L, M)                                            MXPY0400
      AB(IAB) = 0.0                                                     MXPY0410
      DØ  10  N=1, K                                                    MXPY0420
      IA = XSUBF(NA, L, N)                                              MXPY0430
      IB = XSUBF(NB, N, M)                                              MXPY0440
C                                                                       MXPY0450
   10 AB(IAB)= AB(IAB) + A(IA)*B(IB)                                    MXPY0460
C                                                                       MXPY0470
C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * MXPY0480
C                                                                       MXPY0490
      DØ 20 L =1,I                                                      MXPY0500
      DØ 20 M =1,J                                                      MXPY0510
      NUMB = XSUBF(I,L,M)                                               MXPY0520
   20 CD(NUMB) = AB(NUMB)                                               MXPY0530
      RETURN                                                            MXPY0540
      END                                                               MXPY0550
```

SUBRØUTINE MATMPY

DIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
A	00001	D	B	00215	D	AB	00431	D

UNDIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
L	00645	I	M	00646	I	NUMB	00647	I
NA	00650	I	NB	00651	I	NAB	00652	I
IAB	00653	I	N	00654	I	IA	00655	I
IB	00656	I						

ENTRY PØINTS

MATMPY SECTIØN 3

SUBRØUTINES CALLED

E.1	SECTIØN	4	E.2	SECTIØN	5	E.3	SECTIØN	6
E.4	SECTIØN	7	CC.1	SECTIØN	8	CC.2	SECTIØN	9
CC.3	SECTIØN	10	CC.4	SECTIØN	11	SYSLØC	SECTIØN	12

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
1	9A	00741	2	20A	01007	10	39A	01134
20	53A	01207						

SDECK LENGTH IN ØCTAL IS 01307.

Subroutine MTINV
(matrix inverse)

Purpose: MTINV computes the inverse of a nonsingular square array (of up to 36 elements) using the theorem which states that if a sequency of row operations will reduce a matrix to the identity matrix, then the same series of operations performed on the identity matrix will produce the inverse. (Error control is maintained internal to the routine with double precision arithmetic though input and output are single precision. This double precision capability is directly responsible for the restrictions on the size of the matrices. No logic restrictions are involved).

Deck Name: INV

Calling Sequence: CALL MTINV (B, ES, N)

Input/Output:

I/O	FORTRAN Name	Math Name	Dimension	Common/ Argument	Definition
I	B	B	N X N	Arg	The N X N array of numbers to be inverted. (single precision)
O	ES	B^{-1}	N X N	Arg	The N X N inverse of B (single precision)
I	N	N	1	Arg	The dimension of B

Subroutines Required: CHOOSE (Check for singular B)

Functions Required: None

Approximate Deck Length: $744_8 = 484_{10}$

```
C *** FS4-305A ***          *** SUBROUTINE MATINV ***                INV00010
C                                                                     INV00020
C     COMPUTES THE INVERSE ,E, OF AN N BY N MATRIX ,B, USING THE      INV00030
C     FOLLOWING THEOREM. IF A SEQUENCE OF ROW OPERATIONS WILL REDUCE A INV00040
C     MATRIX TO THE IDENTITY MATRIX, THEN THE SAME SEQUENCE OF        INV00050
C     OPERATIONS WILL REDUCE THE IDENTITY MATRIX TO THE INVERSE.      INV00060
C-    -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -    INV00070
C     NOTE ** BOTH MATRICES MUST BE DIMENSIONED N BY N IN THE MAIN    INV00080
C     PROGRAM .(THERE IS NO MAXIMUM VALUE FOR N ).                    INV00090
C                                                                     INV00100
      SUBROUTINE MTINV(B,ES,N )                                       INV00110
C                                                                     INV00120
      N=N                                                             INV00130
      DIMENSION B(N,N),ES(N,N)                                        INV00140
      DOUBLE PRECISION A(6,6),AMM,E(6,6),AIM,SCALE,SUM                INV00150
C-    -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -    INV00160
C                           SCALE MATRIX TO REDUCE POSSIBLE LOSS OF   INV00170
C                           SIGNIFICANCE AND EQUATE TO A              INV00180
      SUM = 0.                                                        INV00190
      DO 1 I=1,N                                                      INV00200
      DO 1 J=1,N                                                      INV00210
    1 SUM = SUM + B(I,J)                                              INV00220
      X=N*N .                                                         INV00230
      SCALE = (SUM/ X)                                                INV00240
      DO 2 I=1,N                                                      INV00250
      DO 2 J=1,N                                                      INV00260
    2 A(I,J) = B(I,J) / SCALE                                         INV00270
C-    -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -    INV00280
C                           SET E EQUAL TO THE IDENTITY MATRIX        INV00290
      DO 5 I=1,N                                                      INV00300
      DO 5 J=1,N                                                      INV00310
      IF (J-I) 6,7,6                                                  INV00320
    7 E(I,J) = 1.D0                                                   INV00330
      GO TO 5                                                         INV00340
    6 E(I,J) = 0.D0                                                   INV00350
    5 CONTINUE                                                        INV00360
```

```
C-  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  INV00370
      DO 80 M=1,N                                            INV00380
      CALL CHOOSE (A,E,M,N)                                  INV00390    42
      AMM = A(M,M)                                           INV00400
C                        REDUCE A(M,M) TO 1 BY DIVIDING ROW M BY A(M,M).INV00410
C                        PERFORM THE SAME OPERATION ON E.   INV00420
      DO 20 J=1,N                                            INV00430
          A(M,J)  = A(M,J)/AMM                               INV00440
   20     E(M,J)  = E(M,J)/AMM                               INV00450
C-  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  INV00460
C            REDUCE ALL ELEMENTS IN COLUMN M, EXCEPT A(M,M), TO ZERO.  INV00470
      DO 72 I=1,N                                            INV00480
          IF (I-M) 25, 72, 25                                INV00490
   25     AIM     = A(I,M)                                   INV00500
C                      SUBTRACT ROWS                        INV00510
      DO 70 J=1,N                                            INV00520
                A(I,J)  = A(I,J) - AIM*A(M,J)                INV00530
   70           E(I,J)  = E(I,J) - AIM*E(M,J)                INV00540
   72     CONTINUE                                           INV00550
   80 CONTINUE                                               INV00560
C-  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  INV00570
C                          RESCALE THE INVERSE AND CONVERT TO SINGLE  INV00580
C                          PRECISION                         INV00590
      DO 85 I=1,N                                            INV00600
      DO 85 J=1,N                                            INV00610
   85 ES(I,J) = E(I,J)/SCALE                                 INV00620
C-  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  INV00630
      RETURN                                                 INV00640
      END                                                    INV00650
```

FS305A 10/01/64

INV

STORAGE MAP

SUBROUTINE MTINV

DIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
A	00001	D	E	00111	D			

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
AMM	00221	D	AIM	00223	D	SCALE	00225	D
SUM	00227	D	I	00231	I	!	00232	I
X	00233	R	M	00234	I			

ENTRY POINTS

MTINV	SECTION	3

SUBROUTINES CALLED

CHOOSE	SECTION	4	E.1	SECTION	5	E.2	SECTION	6
E.3	SECTION	7	E.4	SECTION	8	CC.1	SECTION	9
CC.2	SECTION	10	CC.3	SECTION	11	CC.4	SECTION	12
SYSLOC	SECTION	13						

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
1	8A	00276	2	18A	00354	5	35A	00421
6	33A	00417	7	30A	00414	80	70A	00570
20	49A	00470	72	68A	00565	25	56A	00530
70	63A	00554	85	78A	00621			

DECK LENGTH IN OCTAL IS 00744.

Subroutine CHOOSE

Purpose: CHOOSE is utilized in conjunction with MTINV to determine if the matrix (of order less than 6) is sufficiently non-singular to allow the inverse to be constructed without excessive numerical difficulty.

Deck Name: CHSE

Calling Sequence: CALL CHOOSE (A, E, M, N)

Input/Output:

I/O	FORTRAN Name	Math Name	Dimension	Common/ Argument	Definition
I	A	A	N X N	Arg	The array of numbers which is being reduced to the identity matrix
I/O	E	E	N X N	Arg	The inverse being constructed from A
I	M	-	1	Arg	A row counter for the operations being performed on A
I	N	-	1	Arg	Order of the square array A

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $271_8 = 185_{10}$

```
C *** FS4-305A ***          *** SUBROUTINE CHOOSE ***                CHOS0010
C                                                                     CHOS0020
                 SUBROUTINE CHOOSE(A,E,M,N)                           CHOS0030
C     IF THE DIAGONAL ELEMENT,A(M,M), OF THE MATRIX TO BE INVERTED IS CHOS0040
C   ZERO, THE ROW WITH THE MAXIMAL ELEMENT IS CHOSEN AND INTERCHANGED CHOS0050
C   WITH ROW M.                                                       CHOS0060
      N=N                                                             CHOS0070
      DOUBLE PRECISION A(6,6),E(6,6),EMAX,ABSEL,B                     CHOS0080
      IF (M - N ) 10 ,5 ,10                                           CHOS0090
    5 IF (ABS (A( N,N )) - .1D-30)40,40,70                            CHOS0100
   10   EMAX    =  ABS (A(M,M))                                       CHOS0110
        IROW    =  M                                                  CHOS0120
        M1      =  M + 1                                              CHOS0130
        DO 30 I=  M1,N                                                CHOS0140
          ABSEL=  ABS (A(I,M))                                        CHOS0150
          IF(EMAX-ABSEL) 20, 30, 30                                   CHOS0160
   20     EMAX =  ABSEL                                               CHOS0170
          IROW =  I                                                   CHOS0180
   30     CONTINUE                                                    CHOS0190
        IF(EMAX - .1D-30)40, 50, 50                                   CHOS0200
   40   WRITE (6,45)                                                  CHOS0210   21
   45   FORMAT(28HOSINGULAR MATRIX, NO INVERSE)                       CHOS0220
      RETURN                                                          CHOS0230
   50 DO 60 I=1,N                                                     CHOS0240
          B          =  A(M,I)                                        CHOS0250
          A(M,I)     =  A(IROW,I)                                     CHOS0260
          A(IROW,I)  =  B                                             CHOS0270
          B          =  E(M,I)                                        CHOS0280
          E(M,I)     =  E(IROW,I)                                     CHOS0290
   60     E(IROW,I)  =  B                                             CHOS0300
   70 RETURN                                                          CHOS0310
      END                                                             CHOS0320
```

STORAGE MAP

SUBROUTINE CHOOSE

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
EMAX	00001	D	ABSEL	00003	D	B	00005	D
IROW	00007	I	M1	00010	I	I	00011	I

ENTRY POINTS

CHOOSE	SECTION	3

SUBROUTINES CALLED

.FWRD.	SECTION	4	.UNO6.	SECTION	5	.FFIL.	SECTION	6
.FCNV.	SECTION	7	SYSLOC	SECTION	8			

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
10	7A	00055	5	4A	00041	40	21A	00136
70	37A	00215	30	17A	00127	20	16A	00123
50	22A	00145	45	FORMAT	00026	60	33A	00210

DECK LENGTH IN OCTAL IS 00271.

Subroutine TRANSP
(matrix transposition)

Purpose: TRANSP constructs the transpose of an arbitrary array of numbers

Deck Name: TRSP

Calling Sequence: CALL TRANSP (A, N, M, B)

Input/Output:

I/O	FORTRAN Name	Math Name	Dimension	Common/ Argument	Definition
I	A	A	N (rows) M (columns)	Arg	Array to be transposed
O	B	A^T	M (rows) N (columns)	Arg	The array containing the transpose

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $137_8 = 95_{10}$

```
C *** FS4-305A ***          *** SUBROUTINE TRANSP ***          TRAN0010
C                                                              TRAN0020
      SUBROUTINE TRANSP(A,N,M,B)                               TRAN0030
      DIMENSION A(N,M),B(M,N)                                  TRAN0040
      DO 1 I=1,N                                               TRAN0050
      DO 1 J=1,M                                               TRAN0060
    1 B(J,I) = A(I,J)                                          TRAN0070
      RETURN                                                   TRAN0080
      END                                                      TRAN0090
```

STORAGE MAP

SUBROUTINE TRANSP

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
I	00001	I						

ENTRY POINTS

TRANSP SECTION 3

SUBROUTINES CALLED

SYSLOC SECTION 4

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
I	7A	00037						

DECK LENGTH IN OCTAL IS 00137.

Subroutine GSØRT

Purpose: Sorts the smoothed data. Primary ordering is time, secondary ordering is by station.

Deck Name: NAOI

Calling Sequence: CALL GSØRT (NA,N,M,K,L)

Input/Output:

I/O	FØRTRAN Name	Description
I/O	NA	First element of data array to be sorted.
I	N	Number of groups (points)
I	M	Number of elements in each group (point)
I	K	Element number in the group on which to sort. $K \leq M$
I	L	Number of passes. Positive value, sort from maximun to minimum value. Negative value, sort from minimum to maximum value. For a complete sort of N items, L=N-1.

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $367_8 = 247_{10}$

Restrictions: The data is considered to be a one dimensional array composed of multiple, equal lengthed data blocks, each block consisting of consecutive elements. Consequently, if a specified element is to be sorted in a multi-dimensioned array, the proper ordering of the indices is unique.

e.g. Assume the second element is to be ordered in a 2 by N array, then the input array must be of the form A(2,N), not A(N,2)

```
C                                                                       NA010010
C                                                                       NA010020
C     ROUTINE TO SORT DATA BY GROUPS WHERE THE DATA CONSIDERED TO BE A  NA010025
C     ONE DIMENSIONAL ARRAY AND IS COMPOSED OF MULTIPLE, CONSECUTIVE,   NA010030
C     EQUAL-LENGHED BLOCKS OF DATA, I.E., A POINT ON A TRAJECTORY.      NA010035
C                                                                       NA010040
C     NOMENCLATURE                                                      NA010045
C       A  -  THE FIRST PIECE OF DATA IN THE ONE DIMENSIONAL ARRAY.     NA010050
C       N  -  NUMBER OF GROUPS (POINTS).  N GREATER THAN OR EQUAL 2     NA010055
C       M  -  NUMBER OF ITEMS IN EACH GROUP.                            NA010060
C       K  -  ITEM NUMBER IN THE GROUP ON WHICH TO GROUP SORT.  K LESS  NA010065
C             THAN OR EQUAL M.                                          NA010070
C       L  -  NUMBER OF TIMES (PASSES) THE SORT IS TO OCCUR.  IF L IS   NA010075
C     PLUS (+), THE SORT IS DONE FROM MAX TO MIN VALUE (DECREASING MAG- NA010080
C     NITUDE SEQUENCE.  IF L IS MINUS (-), THE SORT IS DONE FROM MIN TO NA010085
C     MAX VALUE.  L LESS THAN OR EQUAL N-1.                             NA010090
C                                                                       NA010095
      SUBROUTINE GSORT ( NA, N, M, K, L)                                NA010100
C                                                                       NA010105
      DIMENSION NA(1)                                                   NA010110
C                                                                       NA010115
C     TEST ABSOLUTE L LESS THAN N                                       NA010120
      LL = L                                                            NA010125
      IF ( IABS(L) - N ) 16, 17, 17                                     NA010130
   17 IF (L) 18, 7, 19                                                  NA010135
   18 LL= I-N                                                           NA010140
      GO TO 16                                                          NA010145
   19 LL= N-I                                                           NA010150
   16 I = M * (N-1) + K                                                 NA010155
      DO 6 IL = 1,LL                                                    NA010160
      IS = M * (IL-1) + K                                               NA010165
      IN = IS + M                                                       NA010170
      DO 4 IM = IN , I , M                                              NA010175
      IF (LL) 2, 7, 1                                                   NA010180
C                                                                       NA010185
      MAX TO MIN (DECREASING)                                           NA010190
```

```
    1 IF(NA(IS)-NA(IM))  3, 8, 4                                    NA010195
C                                                                   NA010200
C     MIN TO MAX (INCREASING)                                       NA010205
    2 IF(NA(IS) -NA(IM))  4, 8, 3                                   NA010210
    8 IA= M-1                                                       NA010215
      IB = IS + M - K                                               NA010220
      DO 14 IG = 1,IA                                               NA010225
      IC = IS + IG                                                  NA010230
      IF (IC -IB) 10, 10, 9                                         NA010235
    9 IC = IC -M                                                    NA010240
   10 ID = IC + IM - IS                                             NA010245
      IF (LL)12, 7, 11                                              NA010250
   11 IF(NA(IC)- NA(ID))  3, 14, 4                                  NA010255
   12 IF (NA(IC)- NA(ID)) 4, 14, 3                                  NA010260
   14 CONTINUE                                                      NA010265
C                                                                   NA010270
    3 IS = IM                                                       NA010275
    4 CONTINUE                                                      NA010280
C                                                                   NA010285
C     TEST IF DATA EXCHANGE REQUIRED                                NA010290
      IF (IS - IN + M) 15, 6, 15                                    NA010295
C                                                                   NA010300
C     EXCHANGE DATA MOVE                                            NA010305
   15 IS = IS - K                                                   NA010310
      IM = M * (IL -1)                                              NA010315
      DO 5  IMM = 1,M                                               NA010320
      J = IS + IMM                                                  NA010325
      IN = IM + IMM                                                 NA010330
      NS = NA ( J)                                                  NA010335
      NA ( J) = NA ( IN)                                            NA010340
    5 NA ( IN) = NS                                                 NA010345
    6 CONTINUE                                                      NA010350
    7 RETURN                                                        NA010355
      END                                                           NA010360
```

FS305A 10/01/64

NA01

STORAGE MAP

SUBROUTINE GSORT

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
LL	00001	I	I	00002	I	IL	00003	I
IS	00004	I	IN	00005	I	IM	00006	I
IA	00007	I	IB	00010	I	IG	00011	I
IC	00012	I	ID	00013	I	IMM	00014	I
J	00015	I	NS	00016	I			

ENTRY POINTS

GSORT SECTION 3

SUBROUTINES CALLED

SYSLOC SECTION 4

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
16	9A	00044	17	4A	00032	18	6A	00035
7	69A	00274	19	8A	00041	6	66A	00272
4	49A	00221	2	23A	00121	1	19A	00111
3	48A	00217	8	27A	00131	14	46A	00215
10	35A	00160	9	34A	00155	12	42A	00202
11	38A	00167	15	52A	00227	5	63A	00263

DECK LENGTH IN OCTAL IS 00367.

Subroutine CHANGE

Purpose: Transforms units of the smoothed and ordered output data

Deck Name: CHANG

Calling Sequence: CALL CHANGE (B,MSTART,MØDSUM,DELT,C,Ø)

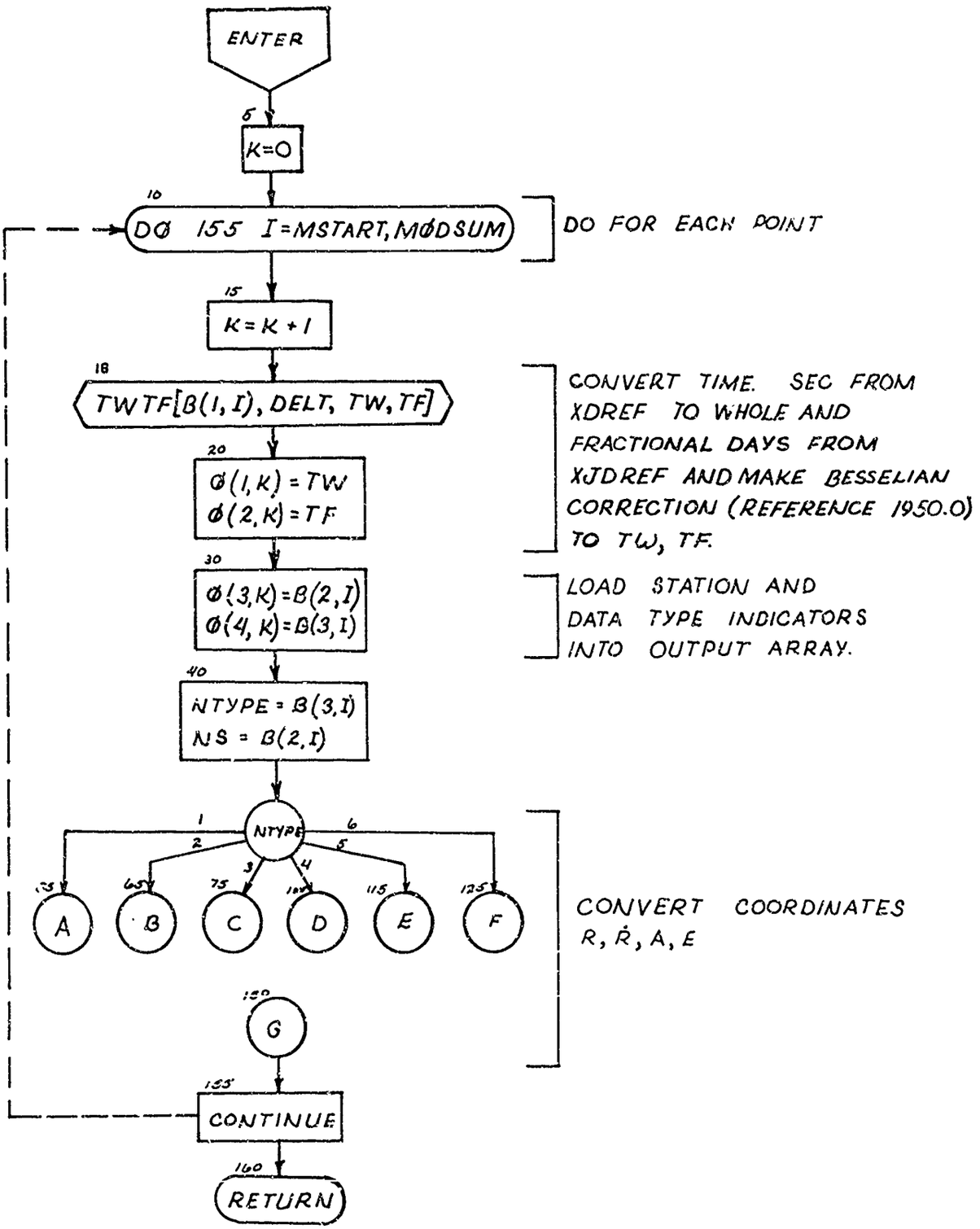
Input/Output:

I/O	FØRTRAN Name	Dimensions	Description
I	B	6,1*	Data array to be converted. Cooresponds to either STN or A array in SUBRØUTINE PRØCES
I	MSTART	———	Location of first point in B array to be converted.
I	MØDSUM	———	Location of final point in B array to be converted.
I	DELT	———	Difference between program reference date and reference date used for sequencing time.
I	C	4,10	Coefficients required for coord. transformations (Km, Km/sec, rad)
O	Ø	7,1*	Output data array containing smoothed, sorted, and transformed data. Cooresponds to a single logical record on the output tape to be read by the main program. (FS4-507)

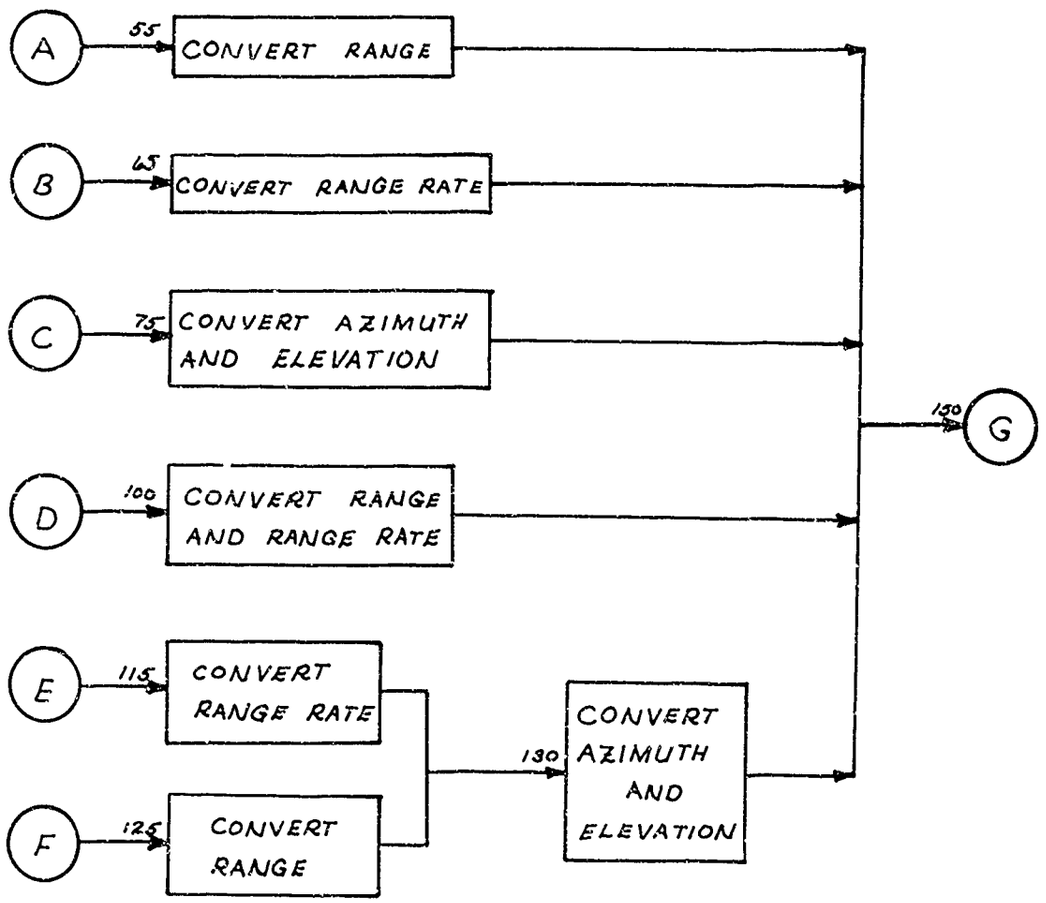
* Dummy dimensioned

Subroutines Required:	TWTF	(transforms time from sec to days)
Functions Required:	ANGMØD	(insures that angular measurements are positive, mod 360 deg)
	CXA	(transformation of form D=C•A. Used for converting azimuth and elevation from degrees to radians)
	CXAPLB	(transformation of form D=C•A+B. Used for converting doppler reading to range rate.)
Approximate Deck Length:	$656_8 = 430_{10}$	
Error Messages:	None	

SUBROUTINE CHANGE (B, MSTART, MØDSUM, DELT, Ø, C)



SUBROUTINE CHANGE (CONT.)



```
C *** FS4-305A ***          *** SUBROUTINE CHANGE ***                    CHNG0010
C                                                                        CHNG0020
C     PURPOSE,                                                           CHNG0030
C                                                                        CHNG0040
C                 TRANSFORMS UNITS OF THE SMOOTHED AND ORDERED DATA.     CHNG0050
C                                                                        CHNG0060
C     NOMENCLATURE,                                                      CHNG0070
C                                                                        CHNG0080
C         B      , DATA ARRAY TO BE CONVERTED.  CORRESPONDS TO EITHER    CHNG0090
C                  STN OR A ARRAY IN SUBROUTINE PROCES.                  CHNG0100
C         MSTART, FIRST LOCATION IN B ARRAY TO BE CONVERTED.             CHNG0110
C         MODSUM, FINAL LOCATION IN B ARRAY TO BE CONVERTED.             CHNG0120
C         DELT   , DIFFERENCE BETWEEN PROGRAM REFERENCE DATE AND         CHNG0130
C                  REFERENCE DATE USED FOR SEQUENCING TIME.              CHNG0140
C         C      , COEFFICIENTS REQUIRED FOR COORDINATE TRANSFORMATIONS. CHNG0150
C         O      , OUTPUT DATA ARRAY CONTAINING SMOOTHED, SORTED, AND    CHNG0160
C                  TRANSFORMED DATA.  CORRESPONDS TO A SINGLE LOGICAL    CHNG0170
C                  RECORD ON THE OUTPUT TAPE TO BE READ BY THE MAIN      CHNG0180
C                  PROGRAM. (FS4-507)                                    CHNG0190
C                                                                        CHNG0200
      SUBROUTINE CHANGE(B,MSTART,MODSUM,DELT,C,O)                        CHNG0210
C                                                                        CHNG0220
      DIMENSION  B(6,1), C(4,10),O(7,1)                                  CHNG0230
C                                                                        CHNG0240
    5 K = 0                                                              CHNG0250
C                                       DO FOR EACH POINT.               CHNG0260
   10 DO 155 I=MSTART,MODSUM                                             CHNG0270
   15 K = K + 1                                                          CHNG0280
C                                       CONVERT TIME. (SEC FROM XDREF)   CHNG0290
C                                       TO (WHOLE AND FRACIONAL DAYS     CHNG0300
C                                       FROM XJDREF).  CORRECT TW AND    CHNG0310
C                                       TF FOR BESSELIAN CALENDAR        CHNG0312
C                                       REFERENCE.                       CHNG0314
   18 CALL TWTF(B(1,I),DELT,TW,TF)                                       CHNG0320
   20 O(1,K) = TW                                                        CHNG0330
   25 O(2,K) = TF                                                        CHNG0340
```

```
C                                       LOAD STATION AND DATA TYPE        CHNG0350
C                                       INDICATORS INTO OUTPUT ARRAY.     CHNG0360
   30 O(3,K) = B(2,I)                                                     CHNG0370
   35 O(4,K) = B(3,I)                                                     CHNG0380
   40 NS     = B(2,I)                                                     CHNG0390
   45 NTYPE  = B(3,I)                                                     CHNG0400
C                                       CONVERT COORDINATES. FUNCTIONS    CHNG0410
C                                       ARE,                              CHNG0420
C                                           CXA    ,  DEG TO RAD          CHNG0430
C                                           CXAPLB,  DOPPLER TO RDOT      CHNG0440
C                                           ANGMOD,  ANGLES MOD 360       CHNG0450
C                                                                         CHNG0460
   50 GO TO (55,65,75,100,115,125), NTYPE                                 CHNG0470
C                                                                         CHNG0480
C                                       CONVERT  RANGE                    CHNG0490
   55 O(5,K) = CXA(C(1,NS),B(4,I))                                        CHNG0500    27
   60 GO TO 150                                                           CHNG0510
C                                       CONVERT  RANGE RATE               CHNG0520
   65 O(5,K) = CXAPLB(C(2,NS),B(4,I),C(3,NS))                             CHNG0530    33
   70 GO TO 150                                                           CHNG0540
C                                       CONVERT  AZIMUTH,ELEVATION        CHNG0550
   75 O(5,K) = ANGMOD(B(4,I))                                             CHNG0560    40
   80 O(5,K) = CXA(C(4,NS),O(5,K))                                        CHNG0570    43
   85 O(6,K) = ANGMOD(B(5,I))                                             CHNG0580    49
   90 O(6,K) = CXA(C(4,NS),O(6,K))                                        CHNG0590    52
   95 GO TO 150                                                           CHNG0600
C                                       CONVERT RANGE, RANGE RATE         CHNG0610
  100 O(5,K) = CXA(C(1,NS),B(4,I))                                        CHNG0620    59
  105 O(6,K) = CXAPLB(C(2,NS),B(5,I),C(3,NS))                             CHNG0630    64
  110 GO TO 150                                                           CHNG0640
C                                       CONVERT RANGE,AZIMUTH,ELEVATION   CHNG0650
  115 O(5,K) = CXA(C(1,NS),B(4,I))                                        CHNG0660    71
  120 GO TO 130                                                           CHNG0670
C                                       CONVERT RANGE RATE, AZ, ELEV      CHNG0680
  125 O(5,K) = CXAPLB(C(2,NS),B(4,I),C(3,NS))                             CHNG0690    77
  130 O(6,K) = ANGMOD(B(5,I))                                             CHNG0700    83
  135 O(6,K) = CXA(C(4,NS),O(6,K))                                        CHNG0710    86
```

```
140 G(7,K) = ANGMOD(B(6,I))                                  CHNG0720   92
145 G(7,K) = CXA(C(4,NS),G(7,K))                             CHNG0730   95
150 CONTINUE                                                 CHNG0740
155 CONTINUE                                                 CHNG0750
160 RETURN                                                   CHNG0760
    END                                                      CHNG0770
```

SUBRØUTINE CHANGE

UNDIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
K	00001	I	TW	00002	R	TF	00003	R
NS	00004	I	NTYPE	00005	I			

ENTRY PØINTS

CHANGE	SECTIØN	3

SUBRØUTINES CALLED

TWTF	SECTIØN	4	CXA	SECTIØN	5	CXAPLB	SECTIØN	6
ANGMØD	SECTIØN	7	.FXEM.	SECTIØN	8	CC.1	SECTIØN	9
CC.2	SECTIØN	10	CC.3	SECTIØN	11	CC.4	SECTIØN	12
SYSLØC	SECTIØN	13						

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	1A	00017	10	2A	00020	155	100A	00515
15	6A	00027	18	7A	00032	20	10A	00044
25	12A	00053	30	14A	00062	35	17A	00071
40	20A	00100	45	22A	00105	50	24A	00112
55	25A	00125	65	31A	00151	75	38A	00200
100	57A	00275	115	69A	00347	125	75A	00373
60	30A	00150	150	99A	00515	70	37A	00177
80	42A	00215	85	47A	00236	90	51A	00253
95	56A	00274	105	62A	00320	110	68A	00346
120	74A	00372	130	81A	00421	135	85A	00436
140	90A	00457	145	94A	00474	160	103A	00520

FS305A 09/28/85
CHANG STØRAGE MAP

122

DECK LENGTH IN ØCTAL IS 00656.

Subroutine TWTF

Purpose: Converts chronological time (sec) as referenced to XDREF into days relative to 1950.0 (JD 2433282.423) and divides the resulting time into whole and fractional parts.

Deck Name: TWTFR

Calling Sequence: CALL TWTF (T, DELT, TW, TF)

Input/Output:

I/O	FØRTRAN Name	Dimensions	Description
I	T	---	Time in seconds from reference date Used in chronological data sequencing (XDREF in SUBRØUTINE PRØCES)
I	DELT	---	Difference between program reference date and reference date used for sequencing data, i.e. DELT=XDREF-XJDREF
O	TW	---	Integer number of days from 1950.0 (JD 2433282.423)
O	TF	---	Fractional number of days defining epoch

Subroutines Required: BESSEL (Besselian calendar correction)

Functions Required: None

Approximate Deck Length: $114_8 = 76_{10}$

Error Messages: None

```
C *** FS4-305A ***          *** SUBROUTINE TWTF ***                    TWTF0010
C                                                                      TWTF0020
C     PURPOSE,                                                         TWTF0030
C                                                                      TWTF0040
C         TRANSFORMS TIME FROM SECONDS WITH RESPECT TO XDREF TO DAYS   TWTF0050
C         WITH RESPECT TO XJDREF.                                      TWTF0060
C                                                                      TWTF0070
C     NOMENCLATURE,                                                    TWTF0080
C                                                                      TWTF0090
C         T    , TIME IN SECONDS FROM REFERENCE DATE USED IN CHRONO-   TWTF0100
C                LOGICAL DATA SEQUENCING. (XDREF IN SUB PROCES)        TWTF0110
C         DELT , DIFFERENCE BETWEEN PROGRAM REFERENCE DATE AND         TWTF0120
C                REFERENCE DATE USED FOR SEQUENCING DATA.              TWTF0130
C                  I.E.  DELT = XDREF - XJDREF                         TWTF0140
C         TW   , INTEGER NUMBER OF DAYS FROM THE PROGRAM REFERENCE     TWTF0150
C                                  DATE.  CORRECTED FOR BESSELIAN      TWTF0160
C                                  CALENDAR REFERENCE.                 TWTF0165
C         TF   , FRACTIONAL DAY.                                       TWTF0170
C                                                                      TWTF0180
      SUBROUTINE TWTF( T,DELT,TW,TF )                                  TWTF0190
C                                                                      TWTF0200
    5 TD = T/86400.0                                                   TWTF0210
   10 NTD = TD                                                         TWTF0220
   15 XNTD = NTD                                                       TWTF0230
   20 TF = TD - XNTD                                                   TWTF0240
   25 TW = DELT + XNTD                                                 TWTF0250
   30 IF(TF.GE.0.) GO TO 45                                            TWTF0260
   35 TW = TW - 1.0                                                    TWTF0270
   40 TF = 1.0 + TF                                                    TWTF0280
   45 CALL BESSEL(TW,TF)                                               TWTF0290    12
   50 RETURN                                                           TWTF0300
      END                                                              TWTF0310
```

FS305A 09/28/85
TWTFR

STØRAGE MAP

SUBRØUTINE TWTF

UNDIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
TD	00001	R	NTD	00002	I	XNTD	00003	R

ENTRY PØINTS

TWTF	SECTIØN	3

SUBRØUTINES CALLED

BESSEL	SECTIØN	4	E.1	SECTIØN	5	E.2	SECTIØN	6
E.3	SECTIØN	7	E.4	SECTIØN	8	CC.1	SECTIØN	9
CC.2	SECTIØN	10	CC.3	SECTIØN	11	CC.4	SECTIØN	12
SYSLØC	SECTIØN	13						

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	1A	00012	10	2A	00015	15	3A	00022
20	4A	00032	25	5A	00035	30	6A	00040
45	11A	00053	35	9A	00045	40	10A	00050
50	13A	00060						

DECK LENGTH IN ØCTAL IS 00114.

Subroutine BESSEL

Purpose: Special purpose routine which converts time from a reference date of JD 2433281.5 to that relative to JD 2433282.423

Deck Name: BES

Calling Sequence: CALL BESSEL (TW, TF)

Input Output:

I/O	FØRTRAN Name	Dimensions	Description
I/O	TW	---	Input: integer XJDREF. (XJDREF = Julian Date Jan. 0, 1950, 2433281.5) Output: integer days from 1950.0. (1950.0 corresponds to Julian Date 2433282.423)
I/O	TF	---	Fractional day

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $55_8 = 45_{10}$

Error Messages: None

```
C *** FS4-305A ***          *** SUBROUTINE BESSEL ***                    BES00020
C                                                                        BES00030
C     PURPOSE,                                                           BES00040
C                                                                        BES00050
C         FOR THE PROGRAM REFERENCE DATE 1950.0, THIS ROUTINE CORRECTS   BES00060
C         TW AND TF TO CORRESPOND WITH THE BESSELIAN CALENDAR.           BES00070
C            I.E.                                                        BES00080
C               XJDREF = JULIAN DATE 1950.0 = 2433281.5                  BES00090
C               BESSELIAN 1950.0 CORRESPONDS TO J.D. 2433282.423         BES00100
C                                                                        BES00110
      SUBROUTINE BESSEL(TW,TF)                                           BES00120
C                                                                        BES00130
    5 IF(TF.GE.0.923)  GO TO 25                                          BES00140
   10 TW = TW - 1.                                                       BES00150
   15 TF = TF + 0.077                                                    BES00160
   20 GO TO 30                                                           BES00170
   25 TF = TF - 0.923                                                    BES00180
   30 RETURN                                                             BES00190
      END                                                                BES00200
```

FS305A 09/28/85
BES

STØRAGE MAP

SUBRØUTINE BESSEL

ENTRY PØINTS

BESSEL SECTIØN 3

SUBRØUTINES CALLED

SYSLØC SECTIØN 4

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	1A	00010	25	7A	00024	10	4A	00015
15	5A	00020	20	6A	00023	30	8A	00027

DECK LFNGTH IN ØCTAL IS 00055.

Function ANGMØD

Purpose: Insures that angular measurements are positive, mod 360 deg.. i.e. $0° \leq B < 360°$

Deck Name: AMD

Calling Sequence: B=ANGMØD(A)

Input/Output:

I/Ø	FØRTRAN Name	Dimensions	Description
I	A	——	Angle to be made mod 360
Ø	B	——	Amod360 *

Subroutines Required: None

Functions Required: None

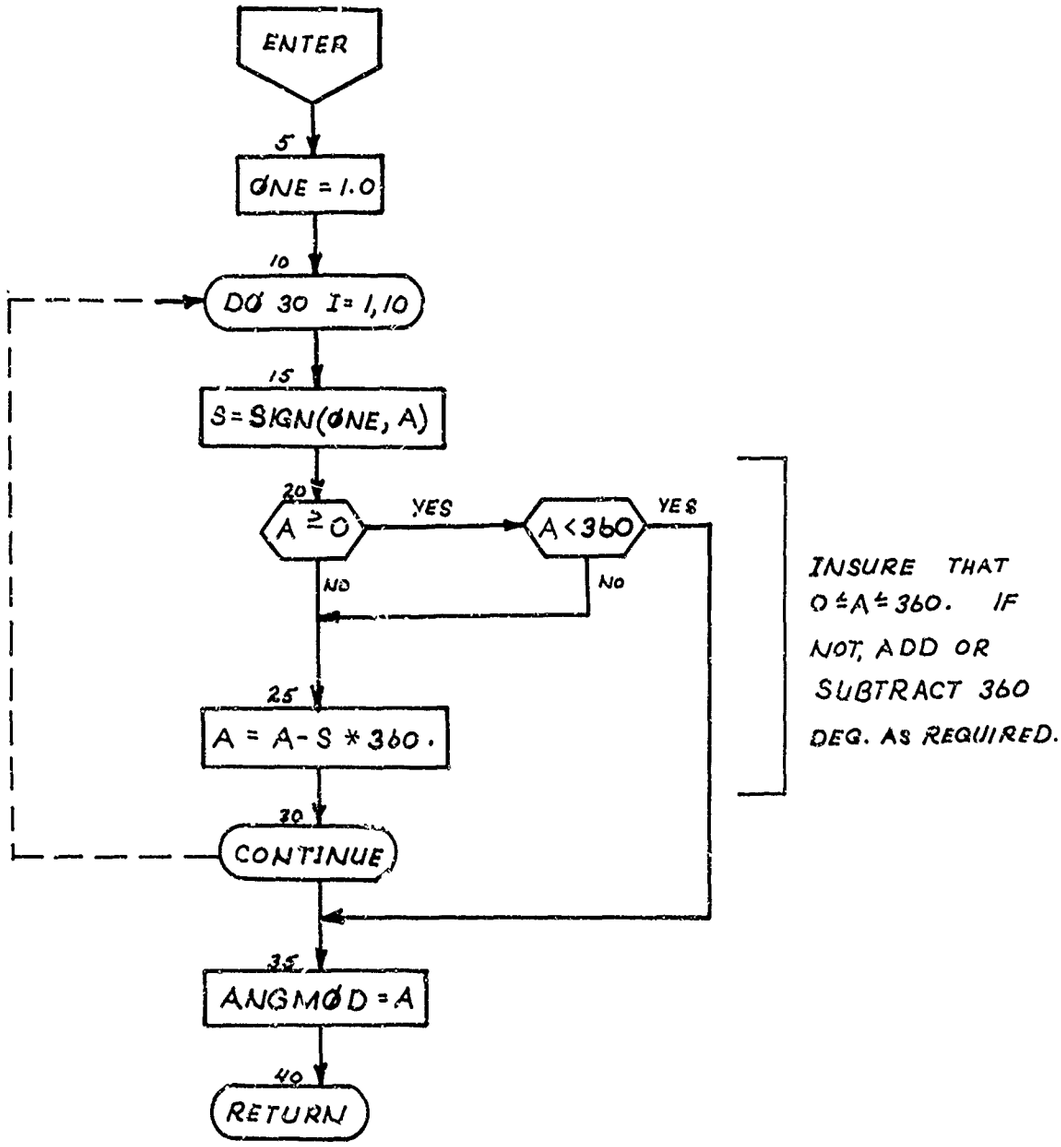
Approximate Deck Length: $75_8 = 61_{10}$

Error Messages: None

Restrictions: $-3600 < A < 3960$ (Range of A may be increased by increasing the upper index limit of the DØ loop)

* $A\bmod 360 = A - \left\langle \frac{A}{360} \right\rangle \cdot 360$ where $\langle\ \rangle$ represents the integral part of the quotient.

FUNCTIØN ANGMØD (A)



```
C *** FS4-305 ***            *** FUNCTION ANGMOD ***                    AMD00010
C                                                                       AMD00020
C     PURPOSE                                                           AMD00030
C                                                                       AMD00040
C                INSURES THAT ANGULAR MEASUREMENTS ARE POSITIVE,        AMD00050
C                MOD 360 DEGRESS.                                       AMD00060
C                                                                       AMD00070
      FUNCTION ANGMOD(A)                                                AMD00080
C                                                                       AMD00090
    5 ONE = 1.0                                                         AMD00100
C                                   INSURE THAT A IS BETWEEN 0 AND      AMD00110
C                                   360 DEGREES.  IF NOT, ADD OR        AMD00120
C                                   SUBTRACT 360 DEGREES AS REQUIRED.AMD00130
   10 DO 30  I=1,10                                                     AMD00140
   15 S = SIGN(ONE,A)                                                   AMD00150
   20 IF((A.GE.0.).OR.(A.LT.360.0))  GO TO 35                           AMD00160
   25 A = A - S*360.0                                                   AMD00170
   30 CONTINUE                                                          AMD00180
   35 ANGMOD = A                                                        AMD00190
   40 RETURN                                                            AMD00200
      END                                                               AMD00210
```

FS305A 10/01/64

AMD

STØRAGE MAP

FUNCTIØN ANGMØD TYPE R

UNDIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
F.0000	00001	R	ØNE	00002	R	I	00003	I
S	00004	R						

ENTRY PØINTS

ANGMØD SECTIØN 3

SUBRØUTINES CALLED

SYSLØC SECTIØN 4

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	1A	00013	10	2A	00015	30	11A	00042
15	6A	00020	20	7A	00024	35	14A	00044
25	10A	00035	40	15A	00046			

DECK LENGTH IN ØCTAL IS 00075.

Function CXA

Purpose: Transformation of form D=C•A. Used for converting azimuth and elevation from any arbitrary measure.

Deck Name: CA

Calling Sequence: D=CXA(C,A)

Input/Output:

I/Ø	FØRTRAN Name	Dimensions	Description
I	A	____	Variable to be transformed
I	C	____	Conversion coefficient
Ø	D	____	C•A

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $33_8 = 27_{10}$

Error Messages: None

```
C *** FS4-305A ***          *** FUNCTION CXA ***                    CXA00010
C                                                                   CXA00020
C     PURPOSE,                                                      CXA00030
C                                                                   CXA00040
C         TRANSFORMATION OF FORM D=C*A.  USED FOR CONVERTING AZIMUTH CXA00050
C         AND ELEVATION FROM DEGREES TO RADIANS.                    CXA00060
C                                                                   CXA00070
C     NOMENCLATURE,                                                 CXA00080
C                                                                   CXA00090
C         A , VARIABLE TO BE TRANSFORMED                            CXA00100
C         C , CONVERSION COEFFICIENT                                CXA00110
C                                                                   CXA00120
      FUNCTION CXA(C,A)                                             CXA00130
C                                                                   CXA00140
    5 CXA = C*A                                                     CXA00150
                                                                    CXA00160
   10 RETURN                                                        CXA00170
      END                                                           CXA00180
```

FS305A 10/01/64

CA

STØRAGE MAP

FUNCTIØN CXA TYPE R

UNDIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
F.0000	0.0001	R						

ENTRY PØINTS

CXA SECTIØN 3

SUBRØUTINES CALLED

SYSLØC SECTIØN 4

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	1A	00006	10	2A	00011			

DECK LENGTH IN OCTAL IS 00033.

Function CXAPLB

Purpose: Transformation of form D=C·A+B. Used for converting doppler reading to range rate (Km/sec).

Deck Name: CAB

Calling Sequence: D=CXAPLB(C,A,B)

Input/Output:

I/O	FØRTRAN Name	Dimension	Description
I	A	_____	Variable to be converted
I	B	_____	Conversion coefficient
I	C	_____	Conversion coefficient
O	D	_____	D=C·A+B

Subroutines Required: None

Functions Required: None

Approximate Deck Length: $36_8 = 30_{10}$

Error Messages: None

```
C *** FS4-305A ***          *** FUNCTION CXAPLB ***                    CAB00010
C                                                                      CAB00020
C     PURPOSE,                                                         CAB00030
C                                                                      CAB00040
C         TRANSFORMATION OF FORM  D=C*A+B.  USED FOR CONVERTING DOPPLER CAB00050
C         READING TO RANGE RATE.                                       CAB00060
C                                                                      CAB00070
C     NOMENCLATURE,                                                    CAB00080
C                                                                      CAB00090
C         A , VARIABLE TO BE CONVERTED.                                CAB00100
C         B , CONVERSION COFFFICIENT                                   CAB00110
C         C , CONVERSION COEFFICIENT                                   CAB00120
C                                                                      CAB00130
      FUNCTION CXAPLB(C,A,B)                                           CAB00140
C                                                                      CAB00150
    5 CXAPLB = C*A + B                                                 CAB00160
C                                                                      CAB00170
   10 RETURN                                                           CAB00180
      END                                                              CAB00190
```

FS305A
CAB

10/01/64

STORAGE MAP

FUNCTION CXAPLB TYPE R

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
F.0000	00001	R						

ENTRY POINTS

CXAPLB SECTION 3

SUBROUTINES CALLED

SYSLOC SECTION 4

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	00006	10	2A	00012			

DECK LENGTH IN OCTAL IS 00036.

SUBROUTINE PRINTS

Purpose: Prints the logical record of smoothed and ordered data being written on the output magnetic tape.

Deck Name: PRNTS

Calling Sequence: CALL PRINTS (Ø,NPERGP,XJDREF)

Input/Output:

I/O	FØRTRAN Name	Dimensions	Descriptions
I/O	Ø	7,1*	Array containing the smoothed and sorted data to be printed. Ø(J,I) refers to the J-th component of the I-th data point. J index code: 1, integer days from J.D. 2433282.423 2, fractional day (U.T.) 3, station name indicator 4, data type indicator 5, X coordinate ** 6, Y coordinate 7, Z coordinate
I	NPERGP	———	Number of points within the Ø array.
I/O	XJDREF	———	Program reference Julian date.

Subroutine Required: None

Functions Required: None

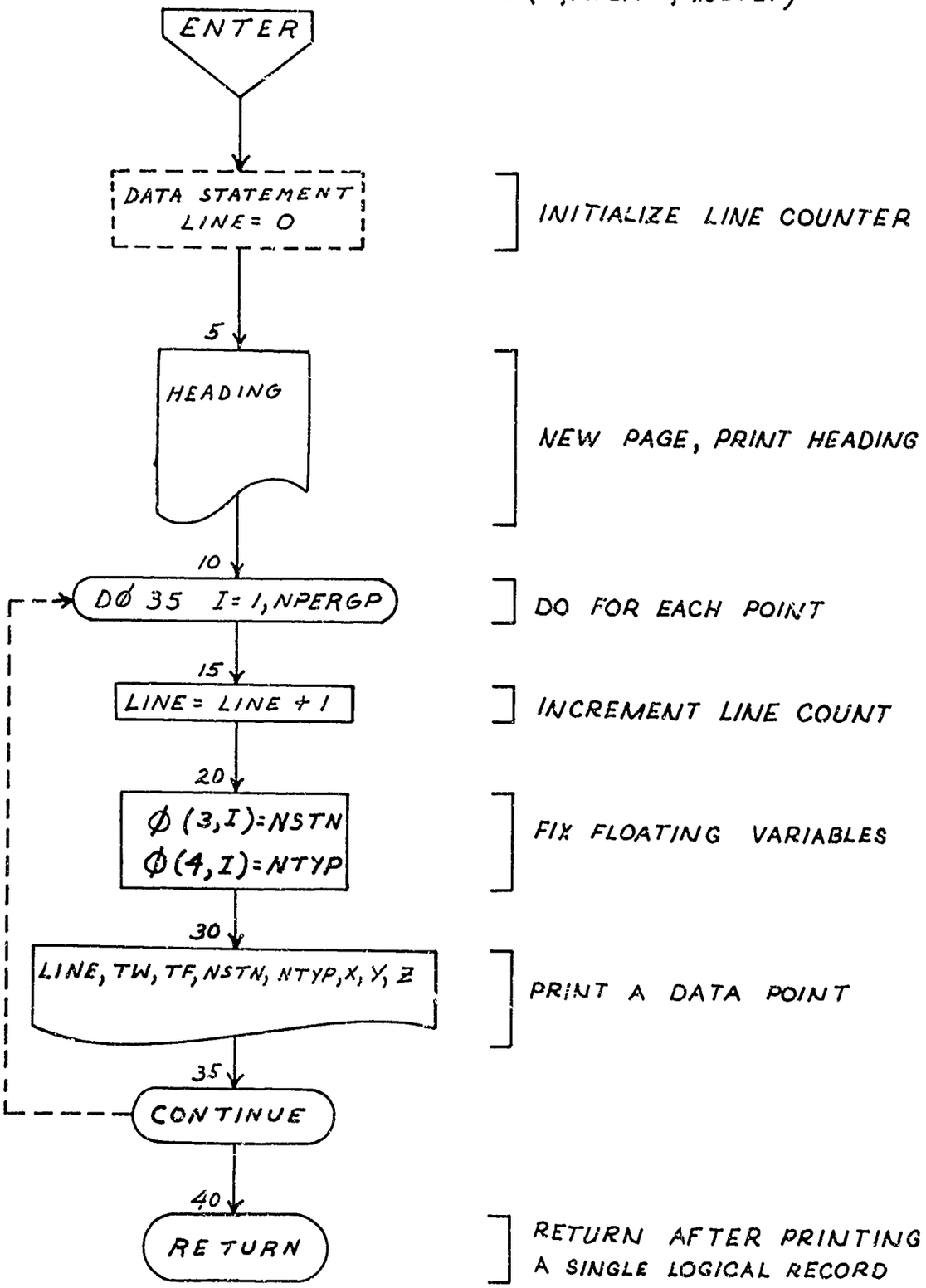
* Dummy Dimension: See SUBRØUTINE PRØCES

** X, Y, Z are dummy variables used to describe the observed data (not rectangular coordinates)

Restrictions: Advantage was taken of the fact that the logical record size being written on the output magnetic tape happens to correspond to a printed page. Consequently, if XMØDS is changed in SUBRØUTINE PRØCES, headings will not necessarily be printed in the proper order.

Approximate Deck Length: $224_8 = 148_{10}$

SUBRØUTINE PRINTS (Ø, NPERGP, XJDREF)



```
C *** FS4-305A ***          *** SUBROUTINE PRINTS ***                    PRNS0010
C                                                                         PRNS0020
C     PURPOSE,                                                            PRNS0030
C          PRINTS A LOGICAL RECORD OF SMOOTHED AND SORTED DATA.           PRNS0040
C                                                                         PRNS0050
C     NOMENCLATURE,                                                       PRNS0060
C          O(J,I)  ,,OUTPUT DATA, I-TH POINT.  I=1,NPERGP                 PRNS0070
C                J=1 , INTEGER DAYS FROM PROGRAM REFERFCE DATE.           PRNS0080
C                J=2 , FRACTIONAL DAY                                     PRNS0090
C                J=3 , STATION NAME                                       PRNS0100
C                J=4 , TYPE OF DATA                                       PRNS0110
C                J=5 , X COORDINATE                                       PRNS0120
C                J=6 , Y COORDINATE                                       PRNS0130
C                J=7 , Z COORDINATE                                       PRNS0140
C          NPERGP  , NUMBER OF POINTS TO BE PRINTED.                      PRNS0150
C                                                                         PRNS0160
C                                                                         PRNS0170
      SUBROUTINE PRINTS( O,NPERGP )                                       PRNS0180
C                                                                         PRNS0190
      DIMENSION  O(7,1)                                                   PRNS0200
C                                                                         PRNS0210
C                                       INITIALIZE LINE COUNTER.          PRNS0220
      DATA  LINE /0/                                                      PRNS0230
C                                                                         PRNS0240
C                                       NEW PAGE, PRINT HEADING.          PRNS0250
    5 WRITE(6,100)                                                        PRNS0260
C                                       DO FOR EACH POINT.                PRNS0270    1
   10 DO 35  I=1,NPERGP                                                   PRNS0280
C                                       INCREMENT LINE COUNT.             PRNS0290
   15 LINE = LINE + 1                                                     PRNS0300
C                                       FIX FLOATING VARIABLES.           PRNS0310
   20 NSTN = O(3,I)                                                       PRNS0320
   25 NTYP = O(4,I)                                                       PRNS0330
C                                       PRINT A DATA POINT.               PRNS0340
C                                                                         PRNS0350
   30 WRITE(6,105)  LINE,O(1,I),O(2,I),NSTN,NTYP ,(O(J,I),J=5,7)          PRNS0360    11
```

```
   35 CONTINUE                                                          PRNS0370
C                                       RETURN AFTER PRINTING A SINGLE  PRNS0380
C                                       LOGICAL RECORD.                 PRNS0390
   40 RETURN                                                            PRNS0400
C                                                                       PRNS0410
  100 FORMAT(1H1, 36X, 32H*** SMOOTHED AND SORTED DATA ***, 5X, 29HREFERPRNS0420
     2ENCE DATE IS 2433282.423  /1H0, 4HLINE, 5X, 25HTIME (DAYS FROM REFPRNS0430
     3 DATE), 7X, 10HSTN   TYPE, 7X,1HX, 17X, 1HY, 16X, 1HZ  /1H ,1X, 2HPRNS0440
     4NO, 8X, 5HWHOLE, 12X, 4HFRAC /1H )                                PRNS0450
  105 FORMAT(1H , I4, E17.8, E18.8, 2I4, E19.8, 2E18.8)                 PRNS0460
      END                                                               PRNS0470
```

FS305A 10/01/64

PRNTS STØRAGE MAP

SUBRØUTINE PRINTS

UNDIMENSIØNED PRØGRAM VARIABLES

SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE	SYMBØL	LØCATIØN	TYPE
I	00001	I	LINE	00002	I	NSTN	00003	I
NTYP	00004	I						

ENTRY PØINTS

PRINTS	SECTIØN	3

SUBRØUTINES CALLED

.FWRD.	SECTIØN	4	.UN06.	SECTIØN	5	.FFIL.	SECTIØN	6
.FCNV.	SECTIØN	7	CC.1	SECTIØN	8	CC.2	SECTIØN	9
CC.3	SECTIØN	10	CC.4	SECTIØN	11	SYSLØC	SECTIØN	12

EFN IFN CØRRESPØNDENCE

EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN	EFN	IFN	LØCATIØN
5	1A	00073	100	FØRMAT	00015	10	2A	00101
35	18A	00157	15	6A	00110	20	7A	00113
25	9A	00120	30	11A	00125	105	FØRMAT	00063
40	21A	00162						

DECK LENGTH IN ØCTAL IS 00224.

PROGRAM OPERATION

This section describes the general requirements for program operation. For a more detailed discussion, see the sample problem (Appendix B).

Input Data

Input data to the program are entered on FØRTRAN 10 digit decimal data sheets. Although other data sheets are acceptable, the latter is suggested because its format precludes the possibilities of input errors. (See Figure 2)

Columns 2-3 and 4-5 of the first data card are reserved for inter indicators which control the printing of raw (PR) and smoothes (PS) data respectively. To demechanize the print options, insert zero. The first column of this card must contain a blank unless this is also the final card (i.e. using preset data exclusively).

The remaining cards, excluding the final card, are utilized for inputting the following information (one station per card).

Column	Symbol	Description
1	N	Blank (indicates data follows on this card)
11-12	K	Integer identifying the station for which the remaining data on the card applies. Same value as NSTN on the input data tape. $1 \leq K \leq 10$
13-24	STNAME(K)	Order in which the Kth station is to be sorted. This number must be consistent with the orderin employed in the differential corrections program.

The remaining fields are reserved for conversion coefficients.

25-36	C(1,K)	Range conversion ($R=C_1R$; to Km)
37-48 49-60	C(2,K) C(3,K)	Range rate conversion ($\dot{R}=C_2\dot{R} + C_3$; to Km/sec)
61-72	C(4,K)	Azimuth and elevation conversion ($A=C_4A$; to rad)

The final card contains an integer (non-zero, non-blank) in column 1. The remaining fields are blank. This card indicates that all data have been entered.

FORTRAN FIXED 10 DIGIT DECIMAL DATA

DECK NO. FS4-305A PROGRAMMER J. DOE DATE - PAGE 1 of 1 JOB NO. 1234-56

NUMBER	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH
N PR PS		FIGURE 2 - INPUT DATA SHEET
		N = BLANK ⇒ DATA FOLLOWS ON THIS CARD
		PR = RAW DATA PRINT INDICATOR
	73 80	PS = SMOOTH DATA PRINT INDICATOR
	DATA 1	
N K		K STATION IDENTIFICATION
STNAME(K)		STATION ORDER — INPUT DATA
C(1,K)		RANGE CONVERSION — ONE STATION
C(2,K)		RANGE RATE — PER CARD
C(3,K)	73 80	CONVERSION
C(4,K)	DATA 2	AZIMUTH, ELEVATION CONVERSION
N		LAST CARD - N = NON-BLANK
	73 80	
	DATA 3	
	73 80	

SID 65-1203-2

It should be noted that, although the first and final card are necessary for normal operation, only those data cards for which stations are specified are required. Further, the above locations are all preset within the program (see SUBRØUTINE PRESET). If the preset value is desired, the field is left blank.

Input Tape

The program requires that tracking station observations be input on a magnetic tape with the following format and specifications (see Figure 3).

1. FØRTRAN IV, binary mode, multi-file tape.

2. Data arranged one physical file per station per pass.

3. Two logical records per file.

   A. First logical record - 4 word information record containing the following:

      NSTN — indicator which identifies the station from which data was received. $1 \leq NSTN \leq 10$

      NTYPE — indicates data type*

      1 = range
      2 = range rate
      3 = azimuth, elevation
      4 = range, range rate
      5 = range, azimuth, elevation
      6 = range rate, azimuth, elevation

      NNUM — total number of words per file (including information record)

      XJDATA — Julian Date (zero hour U.T.) corresponding to the first piece of data within second logical record. The leading characters "24" have been omitted from all Julian Dates for the sake of numerical significance.

   B. Second logical record - logically packed time and coordinate data. Each raw data file must be chronologically sequenced. However, the sequence does not have to be monotonic increasing, e.g., the observations from a single station for a single pass (single raw data file) may be ordered in universal time 84901, 84902, ... 86400, 1, 2, 3 ... .

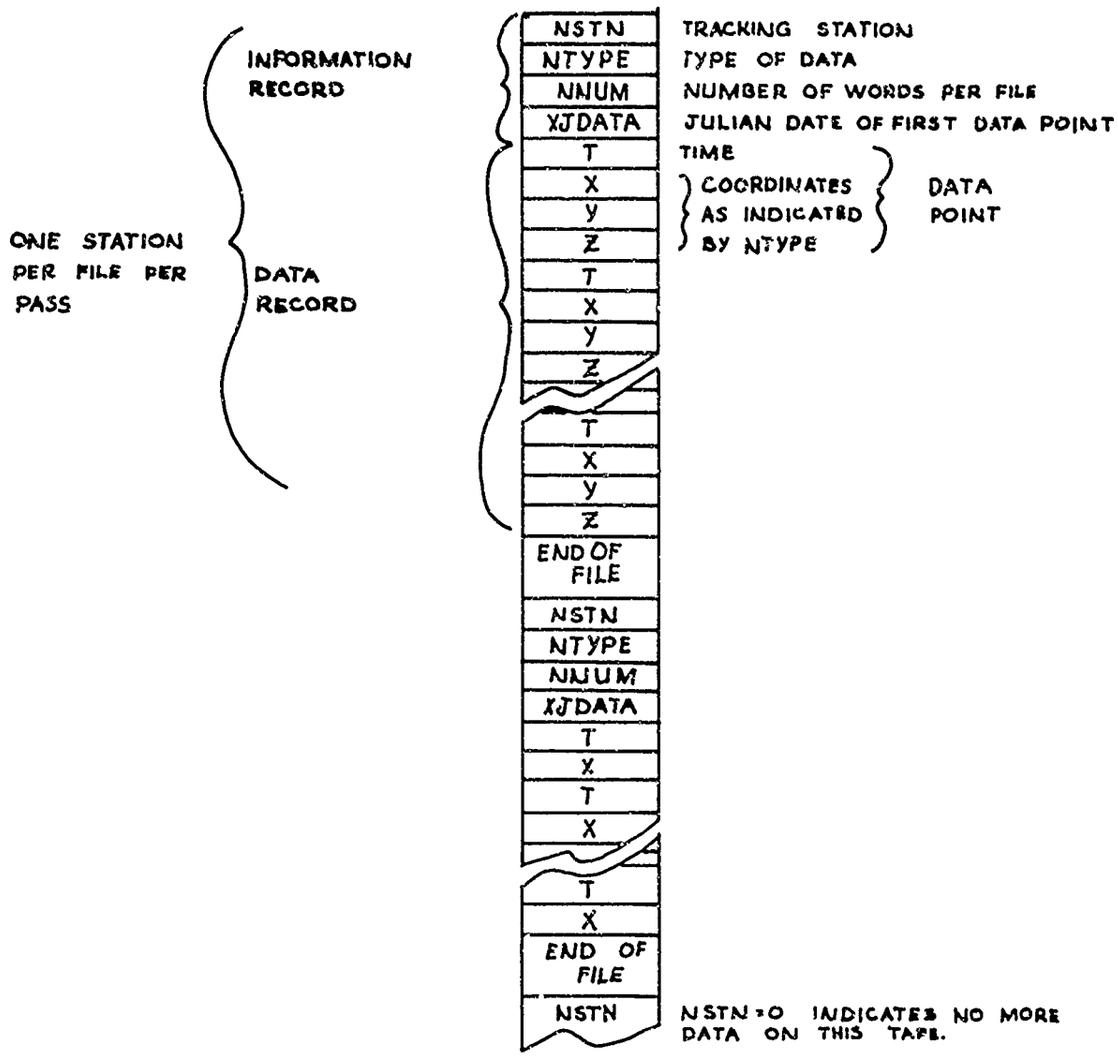
4. Input tape is mounted on logical tape drive 8.

5. End of tape is indicated by an information record containing zero's immediately after the final physical file containing data.

* If azimuth and elevation are recorded, the coordinate system must be topocentric with respect to the plumb line.

FIGURE 3

INPUT TAPE FORMAT
RAW DATA.



- FORTRAN IV
- BINARY MODE
- MULTI-PHYSICAL FILES
- LOGICALLY PACKED TIME AND COORDINATE DATA

Variable Dimensions

Although auxiliary, intermediate tape storage is available, maximum program efficiency and optimum core storage utilization may be achieved by proper adjustment of certain key array dimensions in the MAIN routine. To facilitate the determination of the optimum set of dimensions, the principle storage functions of these arrays are summarized below.

Array Name	Auxiliary Tape Storage Mechanized	Auxiliary Tape Storage Not Mechanized	Remarks
STN(6,MAXSTN)	raw data (single file) smoothed data (all files) smoothed and ordered data (all files)	raw data (single file)	
A(6,MAXA)	smoothed data (at least single file)	smoothed data (all files) smoothed and ordered data (all files)	loaded from AA (file by file) if the number of smoothed points exceeds MAXA, auxiliary tape storage is mechanized by the program if auxiliary tape is mechanized, transfers data from tape to STN array for ordering
AA(4,MAXAA)	smoothed data (single file)	smoothed data (single file)	transfers data from smoothing routines to A. (file by file)

If an array should be underdimensioned, during execution the program will usually stop loading when the array is filled, compute the proper dimension, print an appropriate diagnostic, and either continue execution without loading the remaining data or terminate execution with a core dump.

Storage Limitations

Assuming that optimum core storage has been allocated by proper adjustment of the STN, A, and AA arrays, there are two upper constraints on the amount of data thay may be processed.

1. The amount of raw data per station per pass (one physical file on the input data tape) exceeds the capacity of the STN array. This problem is easily corrected by partitioning the data into smaller files, i.e. the input data tape is arranged one physical file per fractional pass.

2. The amount of smoothed data exceeds the capacity of the STN array. This is highly unlikely but could occur if an excessive number of physical files are read in at one time. In the program's present form, smoothed data are read into the STN array from temporary tape storage (the auxiliary tape mode would have been automatically mechanized) until the number of smoothed points equals the dimension of the STN array. The required dimension for STN is then computed (it may be possible to readjust dimensions) and a diagnostic is printed. The data in STN are then ordered by the sorting routines and execution continues as normal. The excess data still on the tape are not utilized.

The latter problem may be corrected by:

a. decreasing the amount of raw data per computer run. Two disadvantages of this method of operation are: it may not be advisable to separate the raw data if adjacent stations have overlapping spheres of influence, or it may be necessary to arrange the raw data files in chronological order on the input tape. For example, since each run's data would be sorted separately, the chronological ordering of the final output tape may not be correct.

b. decreasing the number of smoothed points by increasing the ratio of raw to smoothed points. Presently, a segment of 20 raw data points is smoothed to produce a single smoothed point.

It is anticipated that future versions of this program will include an option where a filtering process would selectively discard the surplus number of smoothed data points.

PROGRAM OUTPUT

Primary output consists of a magnetic tape which is read by SUBRØUTINE DATAPE in the program (FS4-305). Optional printout of the raw and/or smoothed data is also available **(non-zero values for PR and PS) as explained** in the PROGRAM OPERATION section.

Output tape

Outlined below is a summary of the format and specifications of the output tape (See Figure 4).

1. FØRTRAN IV, binary mode, single file.

2. Data arranged by logical records.
   A. First logical record - 4 word information record containing the following.

XJDREF	JD 33282.423 (Jan 0 1950)
NGPS	Total number of logical records on the tape (excludes information record).
NPERGP	Number of points* per logical record (excluding final data record).
NPREM	Number of points in final record.

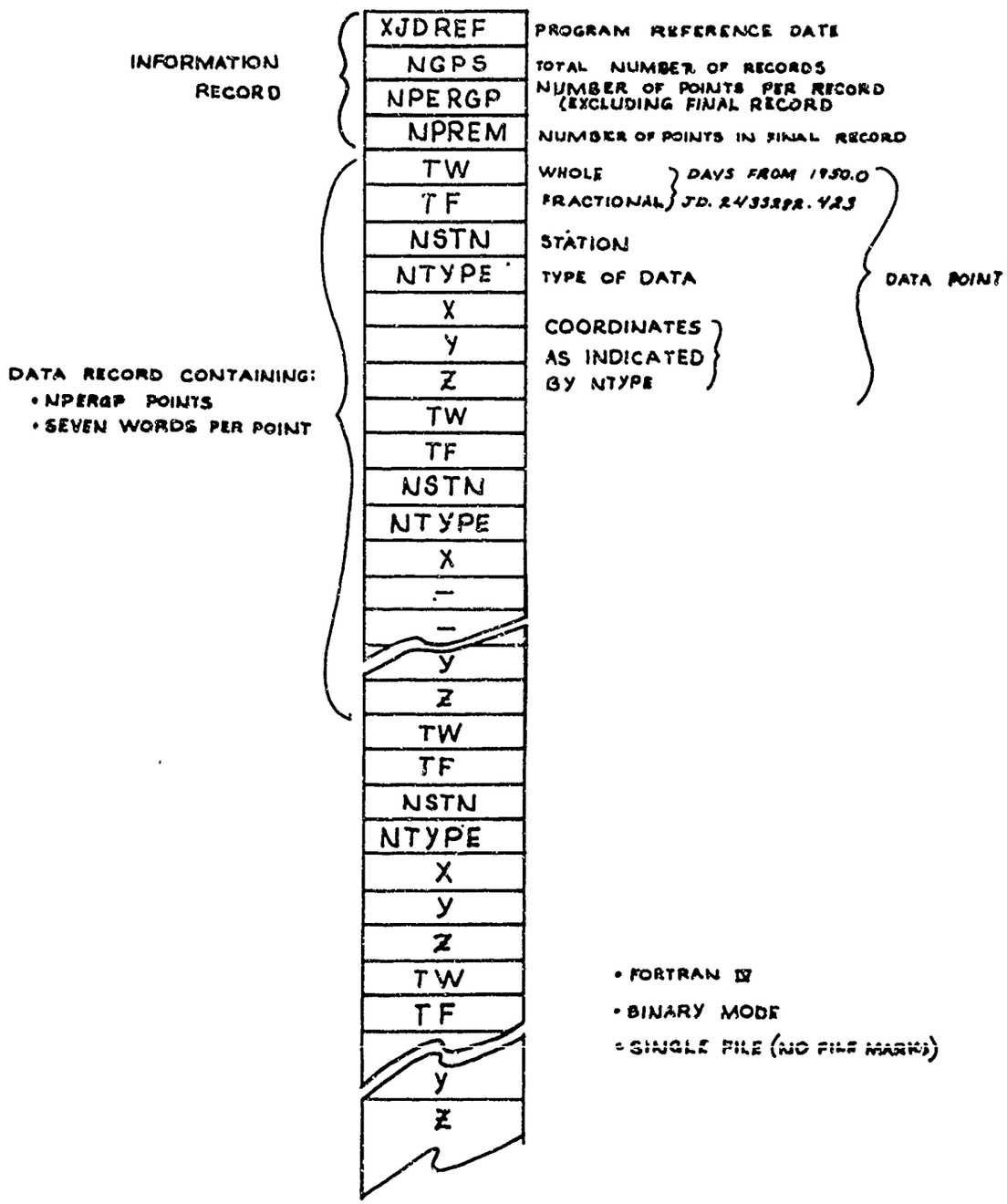
   B. Remaining records - Data records containing,

TW	Time. Integer days from 1950.0 or JD 2433282.423
TF	Time. Fractional day. (U. T.)
NSTN	Station from which data was received.
NTYPE	Type of data. See ITYPE in SUBRØUTINE DATAPE.
X,Y,Z	Components of the observation vector.

* A point is defined to be the ordered set of words TW,TF,NSTN,NTYPE,X,Y,Z

FIGURE 4

FS4-305 A
OUTPUT TAPE FORMAT
SMOOTHED AND ORDERED DATA



APPENDIX A

The enclosed routine (SUBROUTINE DATAPE) reads the magnetic tape generated by the preprocessor program FS4-305A. Details concerning the magnetic tapes format and specifications may be found in the PROGRAM OUTPUT section of the FS4-305A write-up. This routine is an integral portion of the operation of the differential corrections program FS4-305 and is also documented along with the routines of the Data Filter Group of that document.

Subroutine DATAPE

Purpose: Reads a specially generated magnetic tape containing smoothed and ordered coordinate data.

Deck Name: DAPE

Calling Sequence: CALL DATAPE (TW,TF,ISTN,ITYPE,ØDATA,KØUNT)

Input/Output:

I/O	FØRTRAN Name	Dimension	Description
O	TW	———	Time. Integer days from 1950.0 (JD 2433282.423)
O	TF	———	Time. Fractional days.
O	ISTN	———	Station from which data was received.
O	ITYPE	———	Indicates type of data in ØDATA. Code: * 1, Range 2, Range Rate 3, Azimuth, Elevation 4, Range, Range rate 5, Range, Azimuth, Elevation 6, Range rate, Azimuth, Elevation
O	ØDATA	3	Coordinate data.
I/O	KØUNT	———	Control indicator. Code: 1, Do not return next point (INPUT) 2, Return next point (INPUT) 3, No more data points on tape (OUTPUT)

* If azimuth and elevation are recorded, the coordinate system must be topocentric with respect to the plumb line.

Subroutines Required: None

Functions Required: None

Approximate Storage Required: 666_8

Restrictions: Requires that the input data tape generated by FS4-305A be mounted on logical tape 9.

Nomenclature:

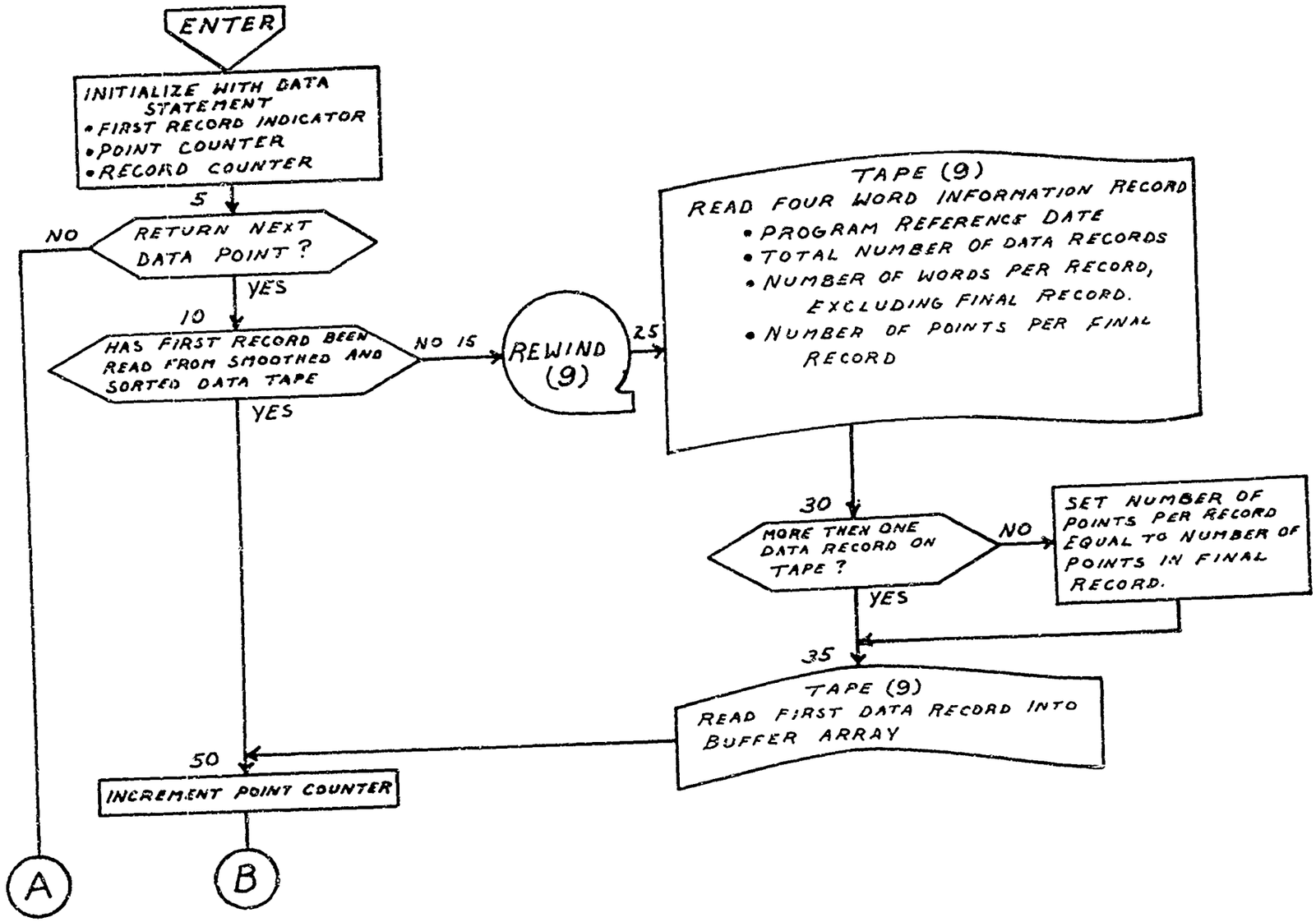
FØRTRAN Name	Dimensions	Description
A	7,36	Buffer array containing a single logical tape record.
IFIRST	———	First pass indicator
IGP	———	Logical record counter, IGP=1,NGPS
NGPS	———	Number of logical data records on tape.
NPERGP	———	Number of points per logical record, excluding final record.
NPREM	———	Number of points per final record.
NPØINT	———	Buffer array point index, NPØINT=1, (NPERGP or NPREM)
XJDREF	———	Program reference Julian date.**

Method:

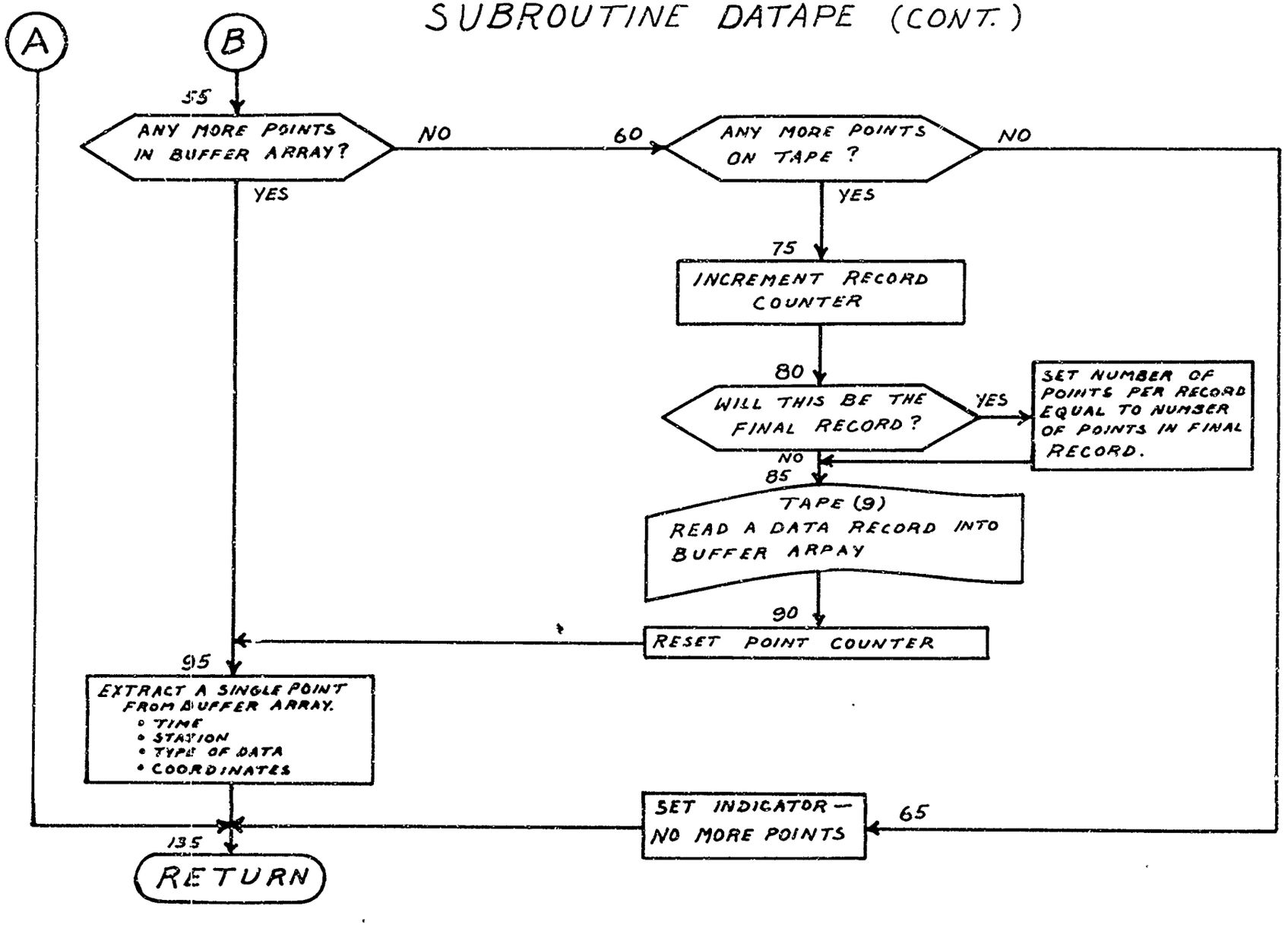
The first CALL statement to this subroutine mechanizes the input data tape. An information record containing the program reference date, number of logical records, and number of data points* per record is read into the program. The first logical data record is then read into the buffer array A and, after extracting the first data point from the buffer, control is returned to the calling routine. Subsequent CALL statements extract single points sequentially from the buffer. After the final point within the buffer has been extracted, the next logical record is read in and the procedure is repeated until all data has been read from the tape.

*A data point is defined as the ordered set TW,TF,ISTN,ITYPE,ØDATA.
**JD (24) 33282.423

SUBROUTINE DATAPE



SUBROUTINE DATAPE (CONT.)



```
C*** FS4-305 ***            *** SUBROUTINE DATAPE ***                    DAPE0020
C                                                                        DAPE0030
C     PURPOSE,                                                           DAPE0040
C                                                                        DAPE0050
C         READS A SPECIALLY GENERATED MAGNETIC TAPE CONTAINING SMOOTHED  DAPE0060
C         AND ORDERED COORDINATE DATA.                                   DAPE0070
C                                                                        DAPE0080
C     ARGUMENT DEFINITIONS,                                              DAPE0090
C                                                                        DAPE0100
C         TW   , TIME. INTEGER DAYS FROM PROGRAM REFERENCE DATE.         DAPE0110
C         TF   , TIME. FRACTIONAL DAY.                                   00000120
C         ISTN , STATION FROM WHICH DATA WAS RECIEVED.                   00000130
C         ITYPE, INDICATES TYPE OF DATA IN ODATA.                        00000140
C                  1, RANGE                                              00000150
C                  2, RANGE RATE                                         00000160
C                  3, AZIMUTH,ELEVATION                                  00000170
C                  4, RANGE,RANGE RATE                                   00000180
C                  5, RANGE,AZIMUTH,ELEVATION                            00000190
C                  6, RANGE RATE,AZIMUTH,ELEVATION                       00000200
C         ODATA, COORDINATE DATA.                                        00000210
C         KOUNT, CONTROL INDICATOR.                                      00000220
C                  1, DO NOT RETURN NEXT POINT.   (INPUT)                00000230
C                  2, RETURN NEXT POINT           (INPUT)                00000240
C                  3, NO MORE DATA POINTS ON TAPE.(OUTPUT)               00000250
C                                                                        00000260
C     METHOD,                                                            00000270
C                                                                        00000280
C         LOGICAL DATA RECORDS ARE READ FROM TAPE INTO THE BUFFER        00000290
C         ARRAY A. SINGLE DATA POINTS ARE THEN SEQUENTLY EXTRACTED       00000300
C         FROM THE BUFFER BY EACH CALL DATAPE.                           00000310
C                                                                        00000320
C     RESTRICTIONS,                                                      00000330
C                                                                        00000340
C         REQUIRES THAT THE INPUT DATA TAPE GENERATED BY FS4-305A BE     00000350
C         MOUNTED ON LOGICAL TAPE DRIVE UNIT 9.                          00000360
C                                                                        00000370
```

```
      SUBROUTINE DATAPE(TW,TF,ISTN,ITYPE,ODATA,KOUNT)                   00000380
C                                                                       00000390
      DIMENSION  A(7,36) , ODATA(3)                                     00000400
C                                                                       00000410
      DATA  IFIRST, NPOINT, IGP / 3*0 /                                 00000420
C                                                                       00000430
C                                                                       00000440
    5 IF(  KOUNT.EQ.1 ) GO TO 135                                       00000450
   10 IF( IFIRST.NE.0 ) GO TO 50                                        00000460
C                                       FIRST PASS, READ INFORMATION    00000470
C                                       AND FIRST DATA RECORD.          00000480
   15 REWIND 9                                                          00000490   7
   20 IFIRST = 1                                                        00000500
   25 READ (9)  XJDREF,NGPS,NPERGP,NPREM                                00000510   9
   30 IF(NGPS.EQ.1)  NPERGP = NPREM                                     00000520
   35 NEND = NPERGP                                                     00000530
   40 READ (9) ((A(J,I),J=1,7),I=1,NEND)                                00000540  17
   45 IGP = 1                                                           00000550
C                                       INCREMENT BUFFER POINT COUNT.   00000560
   50 NPOINT = NPOINT + 1                                               00000570
C                                       IF FINAL POINT HAS BEEN EXTRACTED00000580
C                                       FROM THE BUFFER, READ NEXT RECD. 00000590
   55 IF( NPOINT.LE.NEND ) GO TO 95                                     00000600
C                                       READ NEXT LOGICAL RECORD.  IF NO 00000610
C                                       MORE DATA, SET KOUNT EQUAL TO 3 00000620
C                                       AND RETURN.                     00000630
   60 IF( IGP.NE.NGPS ) GO TO 75                                        00000640
   65 KOUNT = 3                                                         00000650
   70 GO TO 135                                                         00000660
C                                                                       00000670
   75 IGP = IGP + 1                                                     00000680
   80 IF( IGP.EQ.NGPS ) NEND = NPREM                                    00000690
   85 READ (9) ((A(J,I),J=1,7),I=1,NEND)                                00000700  41
   90 NPOINT = 1                                                        00000710
C                                       EXTRACT POINT FROM BUFFER.      00000720
   95 TW       = A(1,NPOINT)                                            00000730
  100 TF       = A(2,NPOINT)                                            00000740
```

```
105 ISTN     = A(3,NPOINT)                                  00000750
110 ITYPE    = A(4,NPOINT)                                  00000760
115 ODATA(1) = A(5,NPOINT)                                  00000770
120 ODATA(2) = A(6,NPOINT)                                  00000780
125 ODATA(3) = A(7,NPOINT)                                  00000790
135 CONTINUE                                                00000800
140 RETURN                                                  00000810
    END                                                     00000820
```

STORAGE MAP

SUBROUTINE DATAPE

DIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
A	00001	R						

UNDIMENSIONED PROGRAM VARIABLES

SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE	SYMBOL	LOCATION	TYPE
IFIRST	00375	I	XIDREF	00376	R	NGPS	00377	I
NPERGP	00400	I	NPREM	00401	I	NEND	00402	I
I	00403	I	IGP	00404	I	NPOINT	00405	I

ENTRY POINTS

DATAPE SECTION 3

SUBROUTINES CALLED

.FRWT.	SECTION	4	.FRDB.	SECTION	5	.UN09.	SECTION	6
.FRLR.	SECTION	7	.FBLT.	SECTION	8	.FBDT.	SECTION	9
CC.1	SECTION	10	CC.2	SECTION	11	CC.3	SECTION	12
CC.4	SECTION	13	SYSLOC	SECTION	14			

EFN IFN CORRESPONDENCE

EFN	IFN	LOCATION	EFN	IFN	LOCATION	EFN	IFN	LOCATION
5	1A	00417	135	66A	00621	10	4A	00423
50	28A	00512	15	7A	00427	20	8A	00433
25	9A	00435	30	13A	00452	35	16A	00457
40	17A	00461	45	27A	00510	55	29A	00515

162

DAPE STORAGE MAP

95	52A	00572	60	32A	00522	75	37A	00531
65	35A	00526	70	36A	00530	80	38A	00534
85	41A	00541	90	51A	00570	100	54A	00577
105	56A	00601	110	58A	00606	115	60A	00613
120	62A	00615	125	64A	00617	140	67A	00621

DECK LENGTH IN OCTAL IS 00664.

APPENDIX B

SAMPLE PROBLEM

Input Tape

Input data for the sample problem consists of two paper tapes (generated by a Packard-Bell 250 Computer) containing the following observations for the ECHO II satellite passes 6069 and 6070: elevation and azimuth in degrees, doppler reading in kilo-cycles, a lock-on indicator, and universal time in seconds. Since the IBM 7094 computing system utilized does not have a paper tape input capability, a short IBM 1401 program was written to transfer the data directly to magnetic tape with the format shown in Figure 3 (one physical file per pass). The leading information record for each data file contains the following indicators.

SYMBOL	DESCRIPTION	PASS 6069	PASS 6070
NSTN	Code indicating the tracking station recording the data	1	1
NTYPE	Code indicating the type of data (range rate, azimuth, elevation)	6	6
NNUM	Total number of words per file. This was determined by the 1401 program.	3564	3392
XJDATA	Julian date (zero hour U.T.) of the first observation for each file. (arbitrarily selected for the sample problem.)	38850.5	38850.5

A third file containing NSTN equal to zero indicates to the program that all data has been read from the tape.

Graphical representation of the raw data is presented in Figures 1-B through 6-B. The same data has been printed out in the sample problem output (raw data files 1 and 2). Examination of Figure 5-B will disclose random irregularities of azimuth observations being recorded 360 degrees out of phase, especially prevalent for angles approaching 360 degrees (e.g., $+354^{\circ}$ recorded as -6°.) These points are adjusted in subroutine FIT immediately prior to smoothing the data segment.

This figure also serves to illustrate a data format which is not acceptable to the program. Although the data is generally sequenced chronologically, a few random errors in time values were generated by the tracking stations (e.g., raw data point No. 245, raw data file No. 2, sample program output, Page).

It is the user's responsibility to insure that the time data are recorded and sequenced properly. The tracking errors in the second raw data file of the sample problem were not corrected. The smoothing routine (see Subroutine FIT) processes segments of 20 consecutive points (time is not explicitly utilized) and assigns the time value associated with the midpoint of the segments to the resulting smoothed point. Since the erroneous time values did not occur at segment midpoints, the program was not affected.

Execution time for the sample problem was 1 minute and 18 seconds.

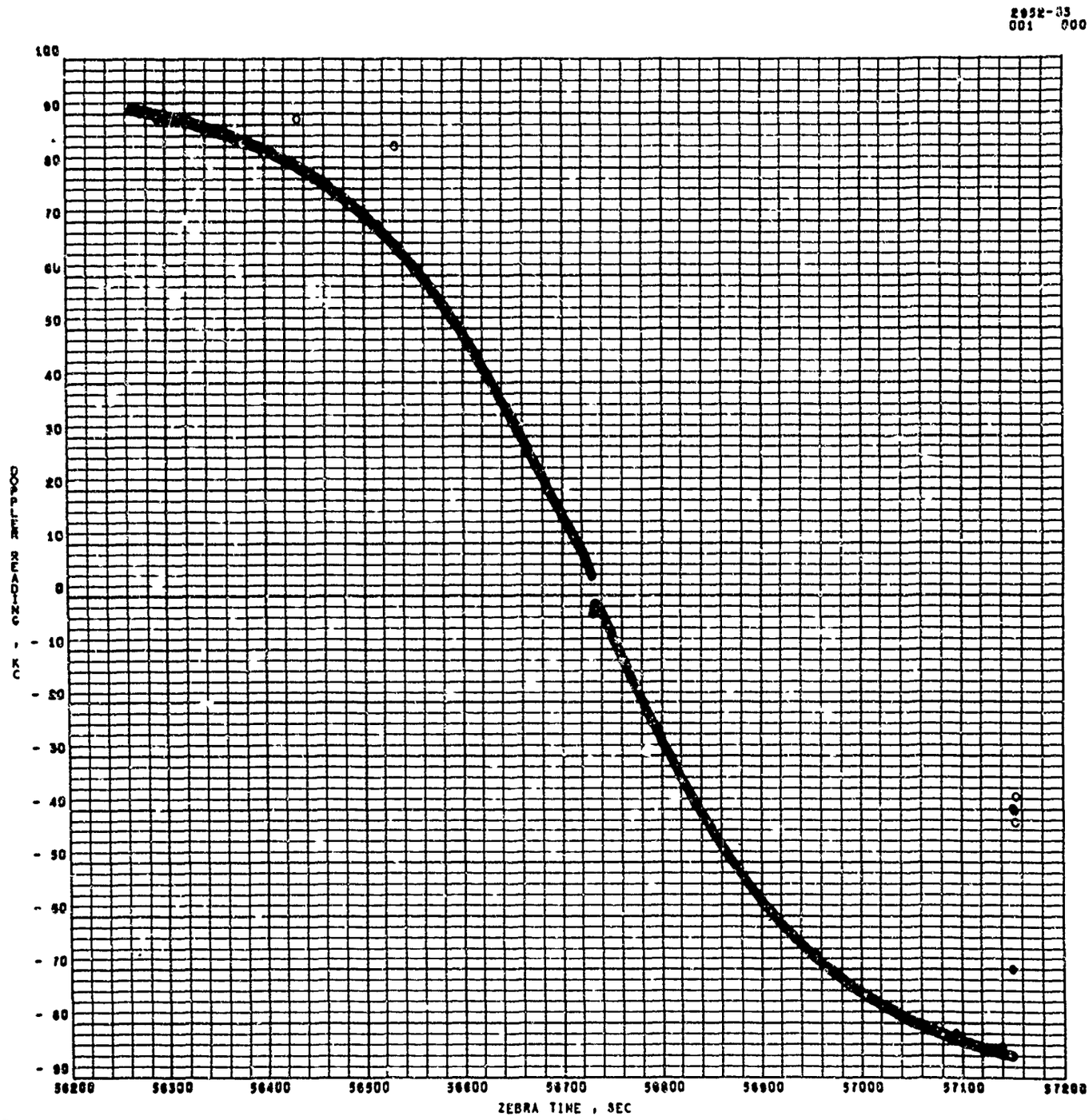


Figure 1-B First Raw Data File. Doppler Reading vs Time (Echo II, pass 6069)

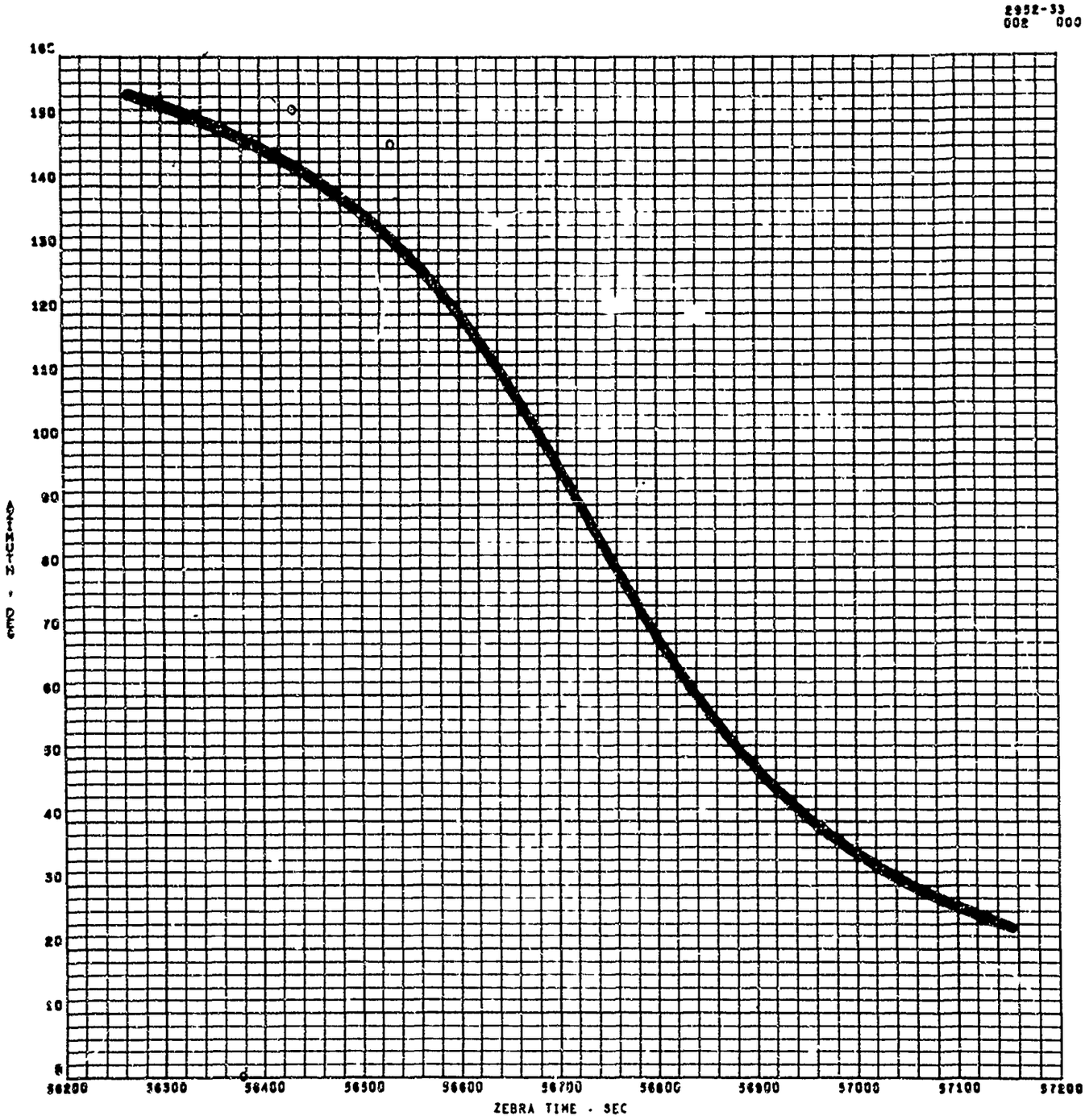


Figure 2-B First Raw Data File. Azimuth vs Time (Echo II, pass 6069)

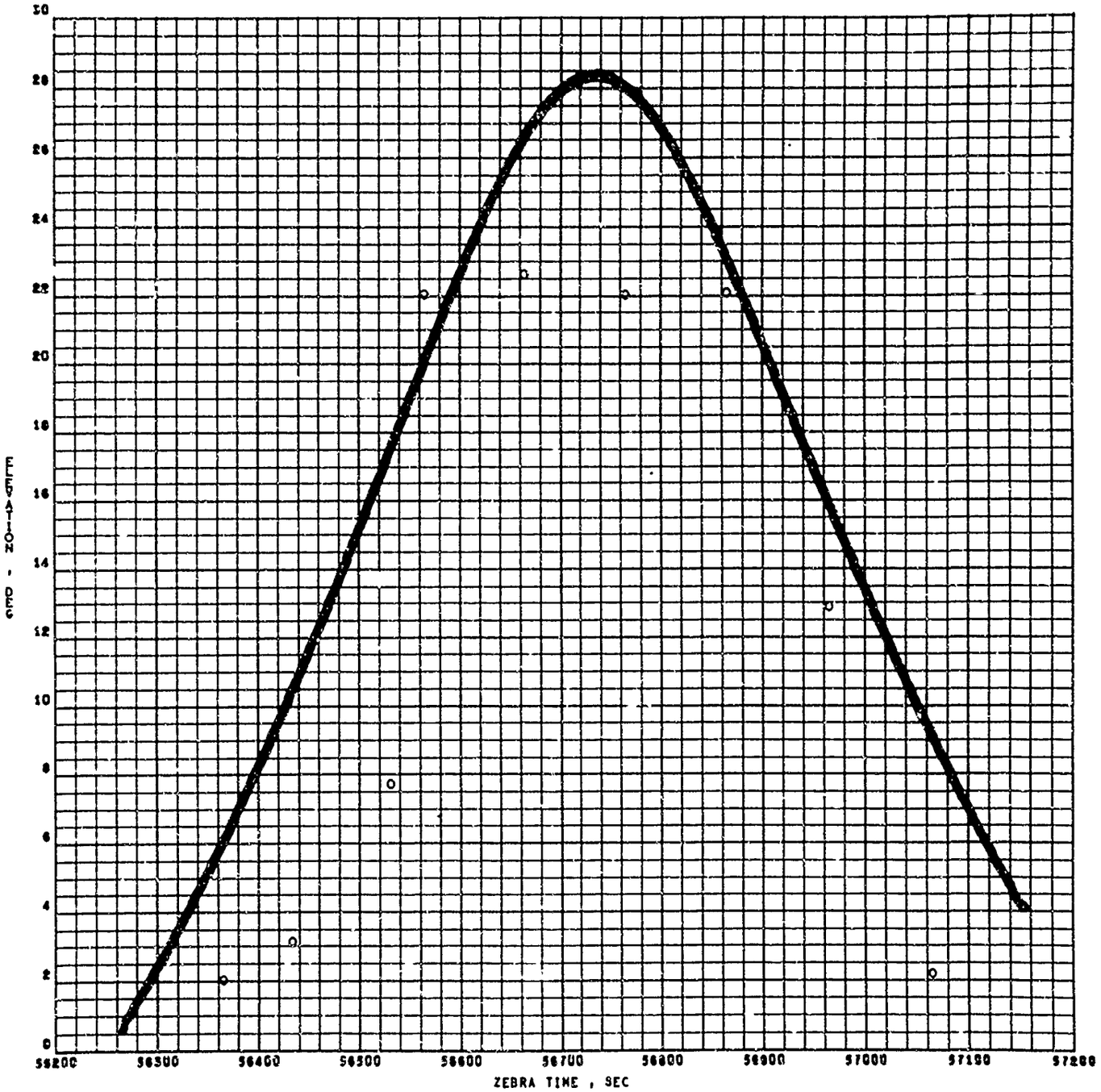


Figure 3-B. First Raw Data File. Elevation vs Time (Echo II, pass 6069)

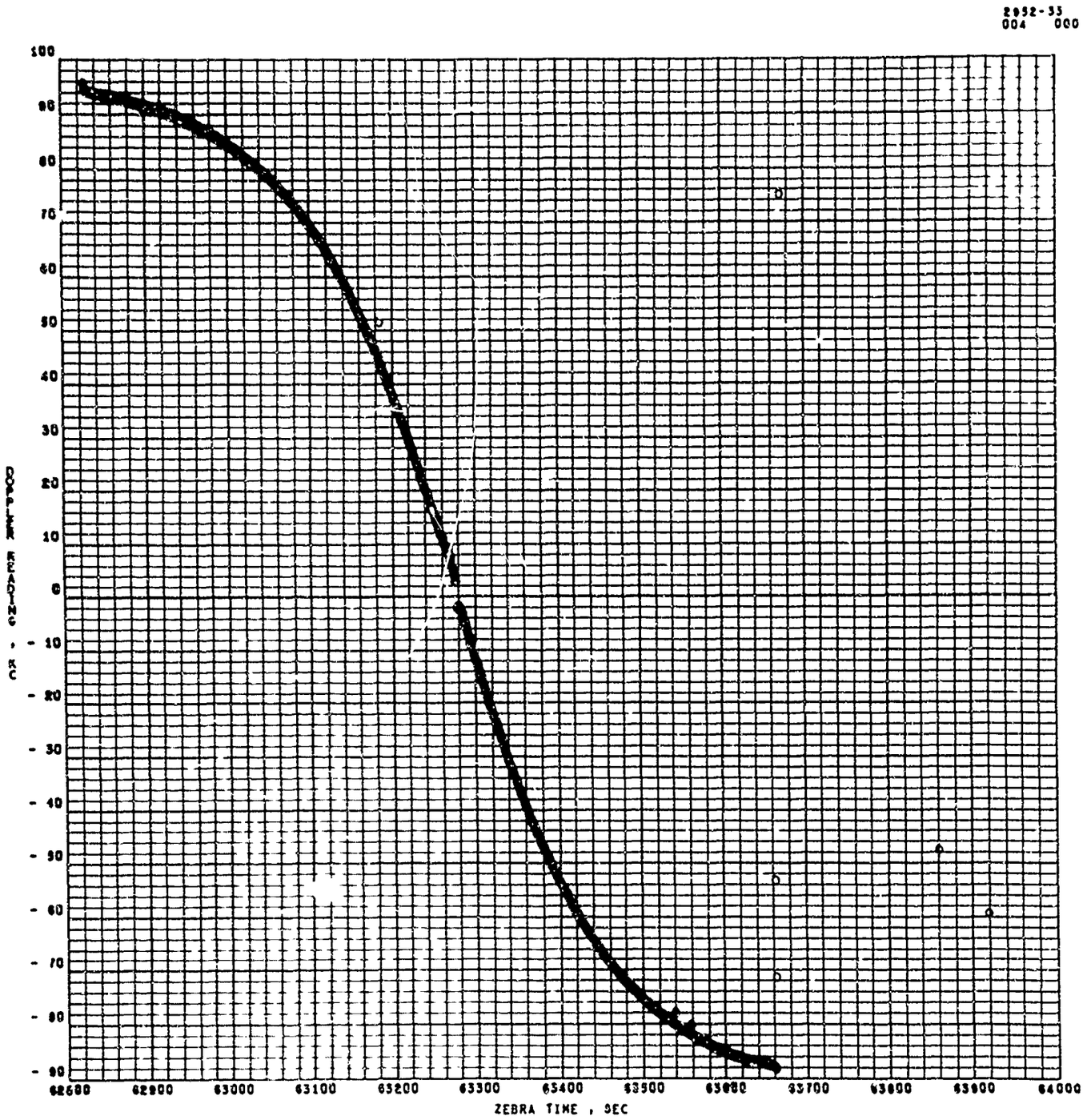


Figure 4-B Second Raw Data File. Doppler Reading vs Time (Echo II, pass 6070)

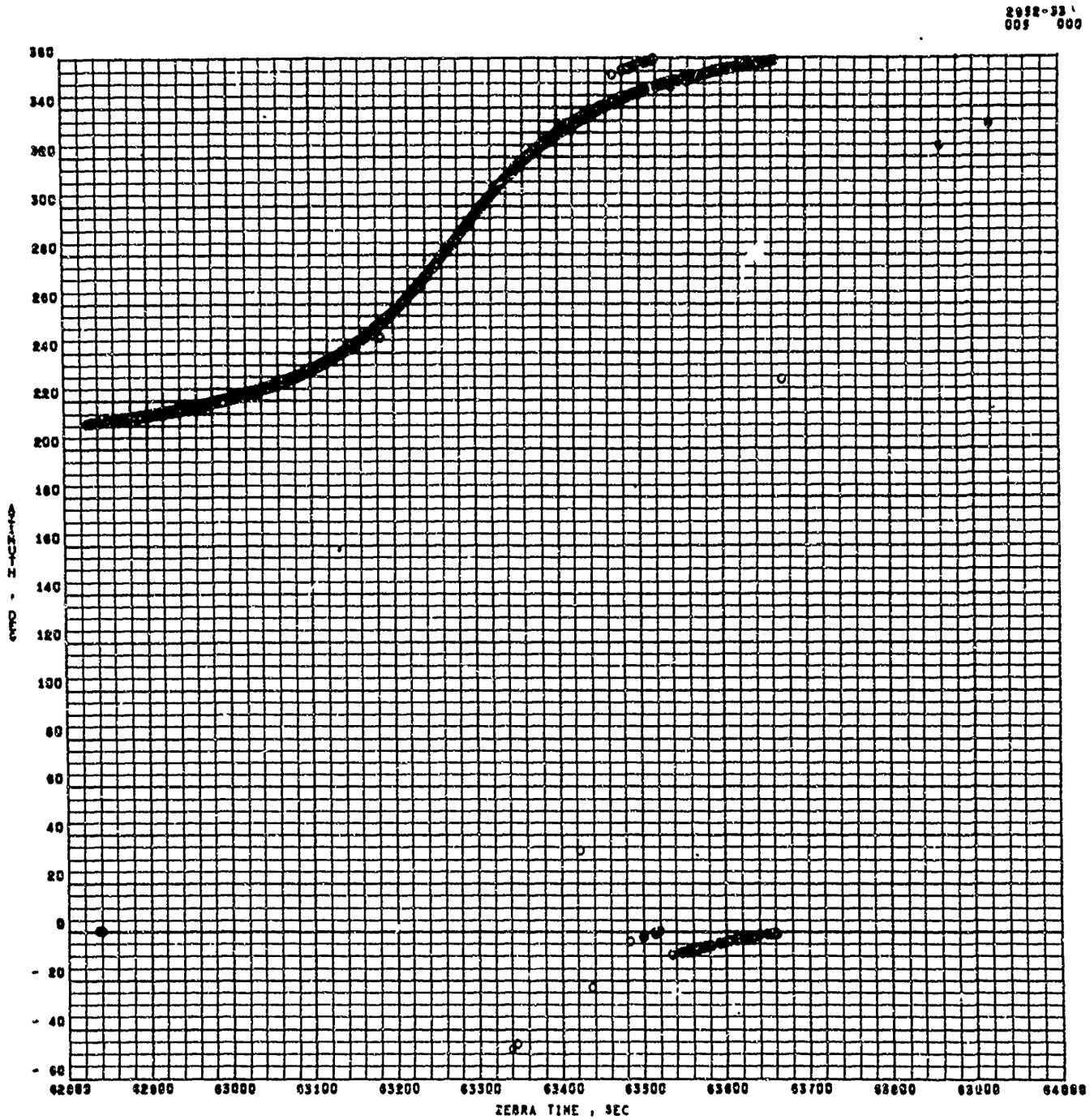


Figure 5-B. Second Raw Data File. Azimuth vs Time (Echo II, pass 6070)

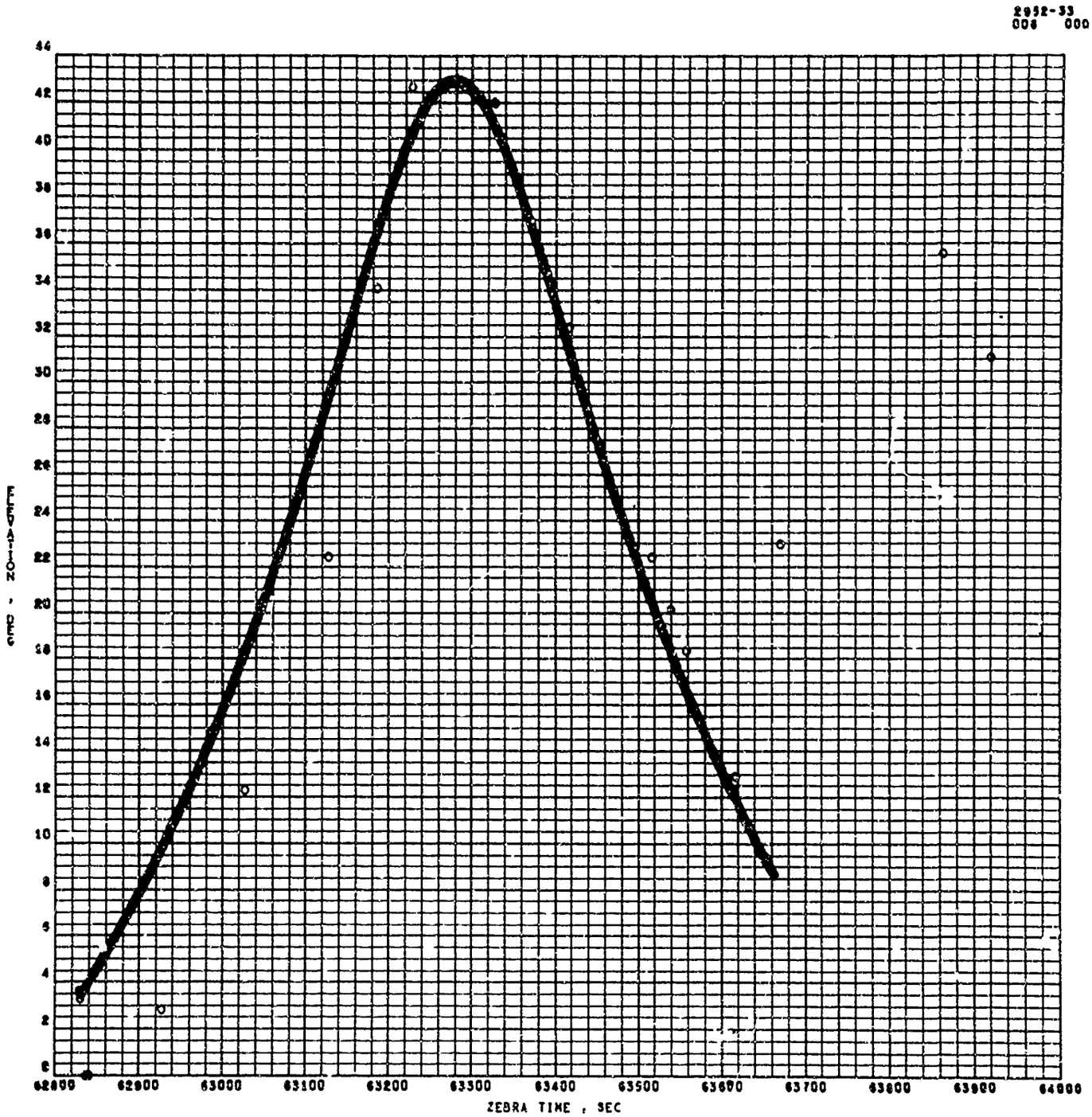


Figure 6-B. Second Raw Data File. Elevation vs Time (Echo II, pass 6070)

Input Data

Since the preset values were utilized exclusively in the sample problem, no input data was required. This sample serves to demonstrate the operation of the preprocessor. However, the data tape generated is not suitable for direct application to the differential corrections program (FS4-305) because a unit conversion was employed in conjunction with the doppler data, and because of the assumed date of the passes. The deck setup consisted of the $ DATA control card followed immediately with a "6" card (non-zero value in column 1 indicates end of data.) However, for illustrative purposes, Figure 7-B has been included to show how the data deck could have been set up to achieve identical results.

Variable Dimensions

The required values for the variable dimensions were determined by the procedure outlined below. (See "Variable Dimensions" and "Storage Limitations" in the "Program Operation" section.)

AA(4,MAXAA): This array must be large enough to hold the smoothed points corresponding to a single raw data file. The largest raw data file contains 3564 words. The number of words per information record is 4, and there are 4 words per data point (time, doppler reading, azimuth, elevation.) Thus, the number of raw data points per file is (3564-4)/4 = 890. Now the smoothing routine reduces 20 raw data points to a single smoothed point. Therefore, since 890/20≈45, MAXAA was dimensioned by 50.

A(6,MAXA): The primary purpose of this array is to receive the smoothed data from the AA array. Since MAXAA was set to 50 and there are two files of data, MAXA was set to 2 X 50 = 100. If there had been storage limitations, MAXA could have been reduced (the smoothed points would then be temporarily stored on tape.) However, this array must be large enough to hold the smoothed points corresponding to a single raw data file.

STN (6,MAXSTN): The usual criterion for dimensioning this array is number of raw data points per file. The sample problem has MAXSTN = 1000.

FORTRAN FIXED 10 DIGIT DECIMAL DATA

DECK NO. DATA PROGRAMMER J. DOE DATE _____ PAGE 1 of 1 JOB NO. _____

	NUMBER	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH
1	1 1		FIGURE 7-B, INPUT DATA
13			
25			Raw and Smooth Data Print
37			Indicators Set For Printing.
49		73 80	
61		DATA 1	
1	1		Station Identification
13	1 0		Station Sorting Order
25	1 0		Don't Convert Range Units
37	1 0		Don't Convert Range Rate
49	0 0	73 80	
61	0 0 1 7 4 5 3 2 9 2	DATA 2	Azimuth and Elevation, Degrees Radians
1	6		
13			
25			Last Card
37			
49		73 80	
61		DATA 3	
1			
13			
25			
37			
49		73 80	
61			

SID 65-1203-2

Form 1-4-C-17 Rev. 7-58 (Vellum)

Output

Primary output is the magnetic tape to be input into the main program (FS4-305). Printed output includes the following.

Input Data:

The input data is printed out on the first page. Note that the printout for the enclosed sample problem contains the values preset by the program.

Raw Data:

By setting the raw data print indicator equal to a non-zero value, each raw data file will be printed out immediately prior to being smoothed.

Smoothed Data:

By setting the smoothed data print indicator equal to a non-zero value, each logical record of the output data will be printed immediately after being written on the output tape.

```
$IBLDR MAIN                                    100164    042342    MAIN0000
$IBLDR PRSET                                   100164    042342    PRSE0000
$IBLDR RD                                      100164    042342    RD  0000
$IBLDR NBLNK                                   100164    042342    NBLN0000
$IBLDR PRNTI                                   100164    042342    PRNT0000
$IBLDR NPT                                     100164    042342    NPT 0000
$IBLDR PRNTR                                   100164    042342    PRNT0000
$IBLDR CHRT                                    100164    042342    CHRT0000
$IBLDR FITT                                    100164    042342    FITT0000
$IBLDR SMOO                                    100164    042342    SMOO0000
$IBLDR MXPY                                    100164    042342    MXPY0000
$IBLDR INV                                     100164    042342    INV 0000
$IBLDR CHSE                                    100164    042342    CHSE0000
$IBLDR TRSP                                    100164    042342    TRSP0000
$IBLDR NA01                                    100164    042342    NA010000
$IBLDR AMD                                     100164    042342    AMD 0000
$IBLDR CA                                      100164    042524    CA  0000
$IBLDR CAB                                     100164    042524    CAB 0000
$IBLDR PRNTS                                   100164    042524    PRNT0000
BEGIN LOADING          FS305A IBLDR VER 5                18-00-30

$SETUP 08      B027L,DISK,,,5
LEVEL=2   NOT IB LOADER CONTROL CARD. CARD IGNORED.
```

```
                    * MEMORY MAP *

SYSTEM                                  00000 THRU  03765
FILE BLOCK ORIGIN                       03766
FILES        1.     UNIT05
             2.     UNIT06
             3.     UNIT08
             4.     UNIT09
FILE LIST ORIGIN                        04046
PRE-EXECUTION INITIALIZATION            04056
CALL ON OBJECT PROGRAM                  04107
OBJECT PROGRAM                          04114 THRU  54271

      DECK  ORIGIN       CONTROL SECTIONS  (/NAME/=NON 0 LENGTH, (LOC)=DELETED, *=NOT REFERENCED)

  1. .DBGTX  52055      /.TBSTR/ 52055    /.RDICT/ 52057    /.IBDBT/ 52061    /.IBD45/ 52065
                        /.IBD01/ 52065    /.IBD02/ 52065    /.IBD03/ 52065    /.IBD04/ 52065
                        /.IBD06/ 52065    /.IBD10/ 52065    /.IBD12/ 52065    /.IBD14/ 52065
                        /.IBD18/ 52065    /.IBD20/ 52065    /.IBD22/ 52065    /.IBD23/ 52065
                        /.IBD27/ 52065    /.IBD28/ 52065    /.IBD32/ 52065    /.IBD33/ 52065
                        /.IBD35/ 52065    /.IBD39/ 52065    /.IBD41/ 52065    /.IBD44/ 52065
                        /.IBD48/ 52065    /.IBD49/ 52065    /.IBD51/ 52065    /.IBD64/ 52065
                        /.IBD66/ 52065    /.IBD68/ 52065    /.IBD69/ 52065    /.IBDAA/ 52065
                        /.IBDAB/ 52065    /.IBDAC/ 52065    /.IBDAD/ 52065    /.IBDAG/ 52065
                        /.IBDSB/ 52065    /.IBDAH/ 52065     .IBDB7  52066    /.IBDB5/ 52066
                        /.IBDB6/ 52150     .IBDB2  52232     .IBDB3  52232 *   .IBDB4  52232 *
                        /.IBDB1/ 52232
  2. PRS     04114       EVEN    04115     PROCES  06441
  3. CHANG   06571       CHANGE  07321
  4. TWTFR   07447       TWTF    07532
  5. BES     07563       BESSEL  07615
  6. MAIN    07640       EVEN    07641     ......  25236 *
  7. PRSET   25250       EVEN    25251     PRESET  25331
  8. RD      25373       REED    25560
  9. NBLNK   25615       NBLANK  25650
 10. PRNTI   25665       PRINTI  26141
 11. NPT     26173       NOPT    26410
```

12.	PRNTR	26427	PRINTR	26652							
13.	CHRT	26707	CHRØNT	26774							
14.	FITT	27032	EVEN	27033	FIT	30325					
15.	SMØØ	30427	SMØØTH	31062							
16.	MXPY	31122	EVEN	31123	MATMPY	32353					
17.	INV	32432	EVEN	32433	MTINV	33334					
18.	CHSE	33377	CHØØSE	33617							
19.	TRSP	33670	EVEN	33671	TRANSP	34005					
20.	NAØ1	34030	EVEN	34031	GSØRT	34330					
21.	AMD	34420	EVEN	34421	ANGMØD	34473					
22.	C'	34516	EVEN	34517	CXA	34534					
23.	CAB	34552	EVEN	34553	CXAPLB	34571					
24.	PRNTS	34611	PRINTS	34776							
25.	.LXCØN	35035	.LXSTR	35035	.LXSTP	35042	.LXØUT	35124	.LXERR	35135	
			IBEXIT	35141	.LXRTN	35141	IBEXIT	(35141)	.LXCAL	35144	*
			.DBCLS	35332	.LXARG	35460	.LØ	35477	.CLSE	35505	
			.LFBL	35506	.LUNB	35507	.DFØUT	35510	CTES..	35512	*
			FTC..	35513 *	SMR1.V	35514 *	.ØPNFQ	35660 *	.CLØFQ	35661	*
			SC.SWT	35662							
26.	.IØDEF	35665	.DEFIN	35665	.ATTAC	35671 *	.CLØSE	35673	.ØPEN	35675	
			.READ	35677	.WRITE	35701	.BSR	35711 *	.READR	35721	*
			.RELES	35723 *	.LAREA	35734 *	.LFBLK	35752	.LTSX	35755	*
			.AREA1	35767	.LUNBL	35775 *	.ENTRY	36001	.GØA	36032	
			.GØ	36036	.DERR	36052	.NØPXI	36056	.CØMXI	36060	
			.EX34	36102							
27.	.IØCSF	36107									
28.	.LXSL	41417	.LXSEL	41417	.LXSCL	41420	.LXTST	41423 *	.LXØVL	41471	*
			.LXRCT	41502 *	.LXIND	41641	.LXDIS	41647	.LXFLG	41650	*
			.LTCH	41655							
29.	.FPTRP	41675	.FFPT.	41675 *	.FPØUT	42031	.FPARG	42041	/.CØUNT/	42043	*
			ØVFLØW	42114 *							
30.	.IBDBI	52267	.IBDBT	(52061)	.IBDB1	(52232)	.IBDB2	(52232)	.IBDB5	(52066)	
			.IBDB6	(52150)	.DSTRS	52340	/.IBDAB/	(52065)	/.IBD01/	(52065)	
			/.IBDAA/	(52065)	/.IBD02/	(52065)	/.IBD04/	(52065)	/.IBD03/	(52065)	
			/.IBDAC/	(52065)	/.IBD10/	(52065)	/.IBD06/	(52065)	/.IBDAD/	(52065)	
			/.IBD12/	(52065)	/.IBD14/	(52065)	/.IBD18/	(52065)	/.IBD20/	(52065)	
			/.IBD22/	(52065)	/.IBD23/	(52065)	/.IBD27/	(52065)	/.IBD28/	(52065)	

			/.IBD33/	(52065)	/.IBD35/	(52065)	/.IBD32/	(52065)	/.IBD39/	(52065)		
			/.IBD41/	(52065)	/.IBDAH/	(52065)	/.IBD44/	(52065)	/.IBD45/	(52065)		
			/.IBD48/	(52065)	/.IBD49/	(52065)	/.IBD51/	(52065)	/.IBDAF/	52700	*	
			/.IBD64/	(52065)	/.IBD66/	(52065)	/.IBD65/	53517	*	/.IBD67/	53715	*
			/.IBD69/	(52065)	/.IBD88/	53756	*	/.IBD68/	(52065)	/.IBDSB/	(52065)	
			/.IBDAE/	53761	*	/.IBDAG/	(52065)	.LSTR	54216	.IBDB7	(52066)	
31.	.DSTRN	52233	.TBSTR	(52055)		.RDICT	(52057)					
32.	.ERAS.	42121	E.1	42121		E.2	42122	E.3	42123	E.4	42124	
33.	.XCC.	42125	CC.1	42125		CC.2	42126	CC.3	42127	CC.4	42130	
34.	XIT	42131	EXIT	42131		.EXIT.	42131	*				
35.	FXEM	42132	.FXEM.	42132		.FXØUT	42465	.FXARG	42473	/.ØPTW./	42547	*
36.	FØUT	42561	.FØUT.	42561								
37.	FCNV	43123	.FCØN.	43123		N1A.	43150	.FCNV.	43154	.ENDFS	43173	
			.CNVSW	43175		.FDX1	43201	.FDX2	43202	.DBC	43204	
			.DBC8	43325		.DBC9	43330	.DBC10	43335	.DBC20	43363	
			.DDSW	43373		.DDFIX	43402	.FIXSW	43410	.DDBC	43465	
			EVEN	43721		.DDRS1	43740	.DDRS2	43742	* .D1	43745	
			.D2	43747		.FERR2	44034	* .ANPT	44070	.ØNPT	44105	
			.LNTP	44161		.AØUT	44230	.DFLT	44250	.FLT	44406	
			.DEXPN	44500		.FXD	44501	.HØUT	44632	.INTG	44703	
			.LØUT	45024		.ØØUT	45046	.XCF	45101	.TEST	45606	*
			.KØUNT	45611		.LIST	45614	.DØNE	45625	.ØUTBF	45672	
			EVEN	45671		.BUF	45720	.QSTØ	45721	.WIDTH	45722	
			.GAIN	45723		.GAIN1	45724	.FBDBF	45734	EVEN	45745	
			.DDDFL	45760		.DDFLG	45761	.MQD	45762	.PEX	45763	
			.FEXP	45764		.DIG	45765					
38.	FIØB	46005	.FIØB.	46005		.FCNT	46106	.FBLT.	46204	.FBDT.	46224	
			.FRLR.	46250		.FRLR.	(46250)	.FWLR.	46314	.FWLR.	(46314)	
			.FBIBF	46354		.FRITE	46450					
39.	FIØS	46457	.FIØS.	46457		.FSEL.	46645	.FILR.	46651	* .FRTB.	46660	
			.FRTD.	46665		.FILL.	46673	CNTL..	46676	* .FCLS	46720	*
			.FØPN	46724	*	REØF	46730	* REØF.Q	46737	* .TØUT.	47073	
			.REED	47103	*	.BIN	47104	* .FCT	47105	.FCKSZ	47107	
			SEØF.Q	47130	*							
40.	FIØH	47206	.FIØH.	47206		.FFIL.	47775	.FRTN.	50022			
41.	FWRD	50207	.FWRD.	50207								
42.	FWRB	50233	.FWRB.	50233								

```
     FS305A  IBLDR                                                    09/28/85

 43. FRDD     50257        .FRDD.   50257
 44. FRDB     50305        .FRDB.   50305
 45. UN05     50331        .UN05.   50331
 46. UN06     50332        .UN06.   50332      .BUFSZ  50333
 47. UN08     50336        .UN08.   50336
 48. UN09     50337        .UN09.   50337
 49. FRWT     50340        .FRWT.   50340
 50. FDMP     50447        DUMP     50447      PDUMP   50451 *
 51. FILE.Q   51705        FILE     51705

I/O BUFFERS                          54272 THRU  77003

UNUSED CORE                          77004 THRU  77040
BEGIN EXECUTION    32                                        18-01-01
```

INPUT DATA

FS4-305A
PREPROCESSOR
FOR THE
DIFFERENTIAL CORRECTIONS GEOCENTRIC ORBIT
COMPUTATIONS PROGRAM

PRINT INDICATORS
RAW DATA PRINT = 1 SMOOTH DATA PRINT = 1

STATION	SORTING ORDER	CONVERSION COEFFICIENTS RANGE C(1,K)	RANGE RATE C(2,K)	RANGE RATE C(3,K)	AZ,EL C(4,K)
1	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
2	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
3	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
4	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
5	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
6	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
7	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
8	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
9	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01
10	1	0.10000000E 01	0.10000000E 01	0.00000000E-38	0.17453292E-01

*** RAW DATA FILE NO. 1 ***

STATION NO. = 1 DATA TYPE = 6 NO. OF WORDS / FILE = 3564 JULIAN DATE = 38850.5 NO. POINTS = 890

NO.	TIME	X	Y	Z
1	0.56266000E 05	0.90780000E 02	0.15424930E 03	0.60129999E 00
2	0.56267000E 05	0.90929999E 02	0.15425200E 03	0.69069999E 00
3	0.56268000E 05	0.90940000E 02	0.15430000E 03	0.84299999E 00
4	0.56269000E 05	0.90910000E 02	0.15430690E 03	0.91580000E 00
5	0.56270000E 05	0.90759999E 02	0.15425610E 03	0.93770000E 00
6	0.56271000E 05	0.90540000E 02	0.15420530E 03	0.97629999E 00
7	0.56272000E 05	0.90650000E 02	0.15415190E 03	0.10010000E 01
8	0.56273000E 05	0.90610000E 02	0.15409130E 03	0.10422000E 01
9	0.56274000E 05	0.90599999E 02	0.15402690E 03	0.11260000E 01
10	0.56275000E 05	0.90270000E 02	0.15394850E 03	0.11506000E 01
11	0.56276000E 05	0.90410000E 02	0.15388260E 03	0.12014000E 01
12	0.56277000E 05	0.90509999E 02	0.15382080E 03	0.12673000E 01
13	0.56278000E 05	0.90469999E 02	0.15377420E 03	0.13044000E 01
14	0.56279000E 05	0.90429999E 02	0.15373020E 03	0.13525000E 01
15	0.56280000E 05	0.90360000E 02	0.15368630E 03	0.14158000E 01
16	0.56281000E 05	0.90360000E 02	0.15364230E 03	0.14583000E 01
17	0.56282000E 05	0.90000000E 02	0.15359840E 03	0.15215000E 01
18	0.56283000E 05	0.90080000E 02	0.15354610E 03	0.15503000E 01
19	0.56284000E 05	0.90240000E 02	0.15349950E 03	0.15889000E 01
20	0.56285000E 05	0.90219999E 02	0.15345140E 03	0.16548000E 01
21	0.56286000E 05	0.90120000E 02	0.15340480E 03	0.16987000E 01
22	0.56287000E 05	0.90059999E 02	0.15334840E 03	0.17480000E 01
23	0.56288000E 05	0.90040000E 02	0.15330030E 03	0.17852000E 01
24	0.56289000E 05	0.90020000E 02	0.15323730E 03	0.18374000E 01
25	0.56290000E 05	0.89959999E 02	0.15317530E 03	0.18745000E 01
26	0.56291000E 05	0.89919999E 02	0.15311500E 03	0.19458000E 01
27	0.56292000E 05	0.89259999E 02	0.15305050E 03	0.19844000E 01
28	0.56293000E 05	0.89799999E 02	0.15300660E 03	0.20503000E 01
29	0.56294000E 05	0.89790000E 02	0.15296120E 03	0.20996000E 01
30	0.56295000E 05	0.89750000E 02	0.15291870E 03	0.21670000E 01
31	0.56296000E 05	0.89719999E 02	0.15286230E 03	0.21902000E 01
32	0.56297000E 05	0.89669999E 02	0.15281570E 03	0.22480000E 01
33	0.56298000E 05	0.89730000E 02	0.15276340E 03	0.22988000E 01
34	0.56299000E 05	0.89639999E 02	0.15270170E 03	0.23606000E 01
35	0.56300000E 05	0.89620000E 02	0.15265090E 03	0.24060000E 01
36	0.56301000E 05	0.89530000E 02	0.15259860E 03	0.24485000E 01
37	0.56302000E 05	0.89480000E 02	0.15254220E 03	0.24910000E 01

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
38	0.56303000E 05	0.89500000E 02	0.15247090E 03	0.25637000E 01
39	0.56304000E 05	0.89309999E 02	0.15242290E 03	0.26216000E 01
40	0.56305000E 05	0.89459999E 02	0.15236940E 03	0.26655000E 01
41	0.56306000E 05	0.89290000E 02	0.15231840E 03	0.27080000E 01
42	0.56307000E 05	0.89339999E 02	0.15226490E 03	0.27603000E 01
43	0.56308000E 05	0.89129999E 02	0.15219630E 03	0.28042000E 01
44	0.56309000E 05	0.89129999E 02	0.15214820E 03	0.28879000E 01
45	0.56310000E 05	0.88980000E 02	0.15210420E 03	0.29539000E 01
46	0.56311000E 05	0.88969999E 02	0.15205470E 03	0.29785000E 01
47	0.56312000E 05	0.88959999E 02	0.15199170E 03	0.30293000E 01
48	0.56313000E 05	0.89049999E 02	0.15193530E 03	0.30815000E 01
49	0.56434000E 05	0.88959999E 02	0.15187620E 03	0.31282000E 01
50	0.56315000E 05	0.88900000E 02	0.15182130E 03	0.31750000E 01
51	0.56316000E 05	0.88830000E 02	0.15176900E 03	0.32380000E 01
52	0.56317000E 05	0.88830000E 02	0.15170310E 03	0.32861000E 01
53	0.56318000E 05	0.88759999E 02	0.15163040E 03	0.33547000E 01
54	0.56319000E 05	0.88629999E 02	0.15156590E 03	0.34028000E 01
55	0.56320000E 05	0.88559999E 02	0.15152050E 03	0.34551000E 01
56	0.56321000E 05	0.88589999E 02	0.15148070E 03	0.35046000E 01
57	0.56322000E 05	0.88559999E 02	0.15141060E 03	0.35498000E 01
58	0.56323000E 05	0.88330000E 02	0.15135570E 03	0.36309000E 01
59	0.56324000E 05	0.88450000E 02	0.15130080E 03	0.36804000E 01
60	0.56325000E 05	0.88349999E 02	0.15123220E 03	0.37283000E 01
61	0.56326000E 05	0.88309999E 02	0.15116630E 03	0.37847000E 01
62	0.56327000E 05	0.88309999E 02	0.15111130E 03	0.38547000E 01
63	0.56328000E 05	0.88160000E 02	0.15105220E 03	0.39014000E 01
64	0.56329000E 05	0.88150000E 02	0.15099460E 03	0.39480000E 01
65	0.56330000E 05	0.88000000E 02	0.15094650E 03	0.40305000E 01
66	0.56331000E 05	0.88000000E 02	0.15087380E 03	0.40510000E 01
67	0.56332000E 05	0.87950000E 02	0.15082030E 03	0.41389000E 01
68	0.56333000E 05	0.87900000E 02	0.15075290E 03	0.41870000E 01
69	0.56334000E 05	0.87879999E 02	0.15068020E 03	0.42255999E 01
70	0.56335000E 05	0.87790000E 02	0.15061690E 03	0.42969000E 01
71	0.56336000E 05	0.87740000E 02	0.15056350E 03	0.43559999E 01
72	0.56337000E 05	0.87719999E 02	0.15051540E 03	0.44082000E 01
73	0.56338000E 05	0.87669999E 02	0.15046310E 03	0.44741000E 01
74	0.56339000E 05	0.87559999E 02	0.15040410E 03	0.45317000E 01
75	0.56340000E 05	0.87480000E 02	0.15034370E 03	0.45771000E 01

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
76	0.56341000E 05	0.87419999E 02	0.15028050E 03	0.46458000E 01
77	0.56342000E 05	0.87389999E 02	0.15020510E 03	0.46924000E 01
78	0.56343000E 05	0.87250000E 02	0.15013350E 03	0.47390000E 01
79	0.56344000E 05	0.87290000E 02	0.15006620E 03	0.47981000E 01
80	0.56345000E 05	0.87169999E 02	0.15000590E 03	0.48708000E 01
81	0.56346000E 05	0.87139999E 02	0.14994140E 03	0.49329000E 01
82	0.56347000E 05	0.87049999E 02	0.14988500E 03	0.49795000E 01
83	0.56348000E 05	0.87059999E 02	0.14981640E 03	0.50398000E 01
84	0.56349000E 05	0.86969999E 02	0.14974630E 03	0.50906000E 01
85	0.56350000E 05	0.86959999E 02	0.14967630E 03	0.51538000E 01
86	0.56351000E 05	0.86860000E 02	0.14961300E 03	0.51964999E 01
87	0.56352000E 05	0.86860000E 02	0.14955810E 03	0.52625000E 01
88	0.56353000E 05	0.86790000E 02	0.14948680E 03	0.53322999E 01
89	0.56354000E 05	0.86750000E 02	0.14942210E 03	0.53954999E 01
90	0.56355000E 05	0.86589999E 02	0.14935770E 03	0.54586999E 01
91	0.56356000E 05	0.86520000E 02	0.14929170E 03	0.54985000E 01
92	0.56357000E 05	0.86469999E 02	0.14922020E 03	0.55481000E 01
93	0.56358000E 05	0.86400000E 02	0.14914890E 03	0.56179000E 01
94	0.56359000E 05	0.86339999E 02	0.14907200E 03	0.56838000E 01
95	0.56360000E 05	0.86290000E 02	0.14900880E 03	0.57429000E 01
96	0.56361000E 05	0.86219999E 02	0.14894970E 03	0.58062000E 01
97	0.56362000E 05	0.86110000E 02	0.14889060E 03	0.58557000E 01
98	0.56363000E 05	0.86080000E 02	0.14882470E 03	0.59187000E 01
99	0.56364000E 05	0.86000000E 02	0.14876290E 03	0.59845999E 01
100	0.56365000E 05	0.85990000E 02	0.14868070E 03	0.20342000E 01
101	0.56366000E 05	0.85969999E 02	0.14859400E 03	0.61001000E 01
102	0.56367000E 05	0.85839999E 02	0.14852540E 03	0.61812000E 01
103	0.56368000E 05	0.85709999E 02	0.14845530E 03	0.62085000E 01
104	0.56369000E 05	0.85660000E 02	0.14839770E 03	0.62909999E 01
105	0.56370000E 05	0.85650000E 02	0.14832500E 03	0.63362000E 01
106	0.56371000E 05	0.85530000E 02	0.14825490E 03	0.64008999E 01
107	0.56372000E 05	0.85459999E 02	0.14816550E 03	0.64653000E 01
108	0.56373000E 05	0.85379999E 02	0.14811060E 03	0.65176000E 01
109	0.56374000E 05	0.85309999E 02	0.14804880E 03	0.66012999E 01
110	0.56375000E 05	0.85200000E 02	0.14798020E 03	0.66438000E 01
111	0.56376000E 05	0.85179999E 02	0.14791020E 03	0.67085000E 01
112	0.56377000E 05	0.85120000E 02	0.14781400E 03	0.67771000E 01
113	0.56378000E 05	0.85059999E 02	0.00000000E-38	0.68225000E 01

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
114	0.56379000E 05	0.84919999E 02	0.14768510E 03	0.69089000E 01
115	0.56380000E 05	0.84910000E 02	0.14759990E 03	0.69502000E 01
116	0.56381000E 05	0.84879999E 02	0.14751460E 03	0.70203000E 01
117	0.56382000E 05	0.84750000E 02	0.14745430E 03	0.70681000E 01
118	0.56383000E 05	0.84690000E 02	0.14740480E 03	0.71560000E 01
119	0.56384000E 05	0.84570000E 02	0.14732790E 03	0.71973000E 01
120	0.56385000E 05	0.84530000E 02	0.14724980E 03	0.72578000E 01
121	0.56386000E 05	0.84419999E 02	0.14717140E 03	0.73237000E 01
122	0.56387000E 05	0.84320000E 02	0.14709720E 03	0.73950000E 01
123	0.56388000E 05	0.84270000E 02	0.14702440E 03	0.74608999E 01
124	0.56389000E 05	0.84219999E 02	0.14692820E 03	0.75242000E 01
125	0.56390000E 05	0.84120000E 02	0.14685960E 03	0.75696000E 01
126	0.56391000E 05	0.84049999E 02	0.14679370E 03	0.76533000E 01
127	0.56532000E 05	0.83969999E 02	0.14671830E 03	0.77219000E 01
128	0.56393000E 05	0.83919999E 02	0.14661520E 03	0.77617000E 01
129	0.56394000E 05	0.83830000E 02	0.14653420E 03	0.78303000E 01
130	0.56395000E 05	0.83719999E 02	0.14645870E 03	0.78799000E 01
131	0.56396000E 05	0.83400000E 02	0.14638310E 03	0.79622000E 01
132	0.56397000E 05	0.83549999E 02	0.14632130E 03	0.80253999E 01
133	0.56398000E 05	0.83459999E 02	0.14625950E 03	0.80749999E 01
134	0.56399000E 05	0.83400000E 02	0.14613040E 03	0.81421000E 01
135	0.56400000E 05	0.83320000E 02	0.14605350E 03	0.82106999E 01
136	0.56401000E 05	0.83169999E 02	0.14599580E 03	0.82686000E 01
137	0.56402000E 05	0.83160000E 02	0.14593140E 03	0.83385999E 01
138	0.56403000E 05	0.83040000E 02	0.14586250E 03	0.84058000E 01
139	0.56404000E 05	0.82889999E 02	0.14578300E 03	0.84647999E 01
140	0.56405000E 05	0.82820000E 02	0.14570460E 03	0.85402999E 01
141	0.56406000E 05	0.82790000E 02	0.14562380E 03	0.85967000E 01
142	0.56407000E 05	0.82780000E 02	0.14552760E 03	0.86694000E 01
143	0.56408000E 05	0.82650000E 02	0.14540940E 03	0.87106999E 01
144	0.56409000E 05	0.82570000E 02	0.14532300E 03	0.87959000E 01
145	0.56410000E 05	0.82429999E 02	0.14525560E 03	0.88604000E 01
146	0.56411000E 05	0.82309999E 02	0.14517460E 03	0.89099000E 01
147	0.56412000E 05	0.82240000E 02	0.14508130E 03	0.89784999E 01
148	0.56413000E 05	0.82120000E 02	0.14500150E 03	0.90623000E 01
149	0.56414000E 05	0.82030000E 02	0.14493290E 03	0.91240000E 01
150	0.56415000E 05	0.81950000E 02	0.14484230E 03	0.91747999E 01
151	0.56416000E 05	0.81919999E 02	0.14475440E 03	0.92434000E 01

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
190	0.56455000E 05	0.77679999E 02	0.14113840E 03	0.11895300E 02
191	0.56456000E 05	0.77549999E 02	0.14101900E 03	0.11943400E 02
192	0.56457000E 05	0.77419999E 02	0.14091190E 03	0.12047900E 02
193	0.56458000E 05	0.77349999E 02	0.14081570E 03	0.12098600E 02
194	0.56459000E 05	0.77200000E 02	0.14070730E 03	0.12182400E 02
195	0.56460000E 05	0.77000000E 02	0.14063450E 03	0.12252400E 02
196	0.56461000E 05	0.76860000E 02	0.14053710E 03	0.12314200E 02
197	0.56462000E 05	0.76799999E 02	0.14040380E 03	0.12397900E 02
198	0.56463000E 05	0.76629999E 02	0.14030080E 03	0.12451400E 02
199	0.56464000E 05	0.76490000E 02	0.14022390E 03	0.12529800E 02
200	0.56465000E 05	0.76320000E 02	0.14011820E 03	0.12599200E 02
201	0.56466000E 05	0.76219999E 02	0.13996970E 03	0.12668500E 02
202	0.56467000E 05	0.76059999E 02	0.13985180E 03	0.12753700E 02
203	0.56468000E 05	0.75940000E 02	0.13976250E 03	0.12815400E 02
204	0.56469000E 05	0.75750000E 02	0.13966210E 03	0.12882800E 02
205	0.56470000E 05	0.75629999E 02	0.13954540E 03	0.12948700E 02
206	0.56471000E 05	0.75500000E 02	0.13943020E 03	0.13042000E 02
207	0.56472000E 05	0.75320000E 02	0.13933810E 03	0.13084700E 02
208	0.56473000E 05	0.75190000E 02	0.13925290E 03	0.13168500E 02
209	0.56474000E 05	0.75049999E 02	0.13915280E 03	0.13234400E 02
210	0.56475000E 05	0.75070000E 02	0.13905250E 03	0.13320800E 02
211	0.56476000E 05	0.74809999E 02	0.13890550E 03	0.13370400E 02
212	0.56477000E 05	0.74669999E 02	0.13877930E 03	0.13456800E 02
213	0.56478000E 05	0.74520000E 02	0.13867750E 03	0.13524200E 02
214	0.56479000E 05	0.74379999E 02	0.13856350E 03	0.13592800E 02
215	0.56480000E 05	0.74270000E 02	0.13844260E 03	0.13673800E 02
216	0.56481000E 05	0.74099999E 02	0.13832740E 03	0.13747800E 02
217	0.56482000E 05	0.73980000E 02	0.13822170E 03	0.13830300E 02
218	0.56483000E 05	0.73830000E 02	0.13809400E 03	0.13896900E 02
219	0.56484000E 05	0.73690000E 02	0.13799100E 03	0.13958000E 02
220	0.56485000E 05	0.73540000E 02	0.13788790E 03	0.14030800E 02
221	0.56486000E 05	0.73349999E 02	0.13778080E 03	0.14111800E 02
222	0.56487000E 05	0.73230000E 02	0.13765720E 03	0.14161400E 02
223	0.56488000E 05	0.73120000E 02	0.13752270E 03	0.14267100E 02
224	0.56489000E 05	0.72910000E 02	0.13741700E 03	0.14339800E 02
225	0.56490000E 05	0.72790000E 02	0.13730570E 03	0.14400100E 02
226	0.56491000E 05	0.72620000E 02	0.13719850E 03	0.14486800E 02
227	0.56492000E 05	0.72419999E 02	0.13707350E 03	0.14551300E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
152	0.56417000E 05	0.81730000E 02	0.14466800E 03	0.93245000E 01
153	0.56418000E 05	0.81669999E 02	0.14459110E 03	0.93684000E 01
154	0.56419000E 05	0.81559999E 02	0.14449760E 03	0.94535999E 01
155	0.56420000E 05	0.81530000E 02	0.14440970E 03	0.95222000E 01
156	0.56421000E 05	0.81389999E 02	0.14433420E 03	0.95730000E 01
157	0.56422000E 05	0.81290000E 02	0.14423240E 03	0.96514000E 01
158	0.56423000E 05	0.81190000E 02	0.14415840E 03	0.96968000E 01
159	0.56424000E 05	0.81049999E 02	0.14408420E 03	0.97831999E 01
160	0.56425000E 05	0.80950000E 02	0.14398120E 03	0.98340000E 01
161	0.56426000E 05	0.80870000E 02	0.14385890E 03	0.98987000E 01
162	0.56427000E 05	0.80780000E 02	0.14376420E 03	0.99809999E 01
163	0.56428000E 05	0.80709999E 02	0.14369560E 03	0.10046900E 02
164	0.56429000E 05	0.80589999E 02	0.14362960E 03	0.10115500E 02
165	0.56430000E 05	0.80490000E 02	0.14352930E 03	0.10163600E 02
166	0.56431000E 05	0.80379999E 02	0.14342360E 03	0.10232200E 02
167	0.56432000E 05	0.80299999E 02	0.14330960E 03	0.10317400E 02
168	0.56433000E 05	0.80129999E 02	0.14323410E 03	0.10383300E 02
169	0.56434000E 05	0.80070000E 02	0.14317500E 03	0.10449200E 02
170	0.56435000E 05	0.79940000E 02	0.14308300E 03	0.10491900E 02
171	0.56436000E 05	0.79820000E 02	0.14296630E 03	0.10557900E 02
172	0.56437000E 05	0.79740000E 02	0.14284280E 03	0.10666300E 02
173	0.56438000E 05	0.79599999E 02	0.14276590E 03	0.10711700E 02
174	0.56439000E 05	0.79509999E 02	0.14269850E 03	0.10777600E 02
175	0.56440000E 05	0.79429999E 02	0.14260520E 03	0.10862500E 02
176	0.56441000E 05	0.79320000E 02	0.14252000E 03	0.10927200E 02
177	0.56442000E 05	0.79240000E 02	0.14241280E 03	0.10975300E 02
178	0.56443000E 05	0.79049999E 02	0.14232640E 03	0.11063200E 02
179	0.56444000E 05	0.78940000E 02	0.14224000E 03	0.11123500E 02
180	0.56445000E 05	0.78879999E 02	0.14211770E 03	0.11199000E 02
181	0.56446000E 05	0.78700000E 02	0.14203520E 03	0.11277300E 02
182	0.56447000E 05	0.78629999E 02	0.14193770E 03	0.11344700E 02
183	0.56448000E 05	0.78559999E 02	0.14182790E 03	0.11394000E 02
184	0.56449000E 05	0.78349999E 02	0.14171800E 03	0.11480700E 02
185	0.56450000E 05	0.78200000E 02	0.14160670E 03	0.11521700E 02
186	0.56451000E 05	0.78190000E 02	0.14150100E 03	0.11615200E 02
187	0.56452000E 05	0.78030000E 02	0.14142550E 03	0.11696300E 02
188	0.56453000E 05	0.77879999E 02	0.14134720E 03	0.11747100E 02
189	0.56454000E 05	0.77809999E 02	0.14124980E 03	0.11836200E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
228	0.56493000E 05	0.72299999E 02	0.13695950E 03	0.14617200E 02
229	0.56494000E 05	0.72200000E 02	0.13682370E 03	0.14685800E 02
230	0.56495000E 05	0.72000000E 02	0.13665890E 03	0.14793000E 02
231	0.56496000E 05	0.71879999E 02	0.13654760E 03	0.14845200E 02
232	0.56497000E 05	0.71709999E 02	0.13643920E 03	0.14924800E 02
233	0.56498000E 05	0.71549999E 02	0.13631270E 03	0.14990700E 02
234	0.56499000E 05	0.71360000E 02	0.13618090E 03	0.15082800E 02
235	0.56500000E 05	0.71200000E 02	0.13604760E 03	0.15144500E 02
236	0.56501000E 05	0.71049999E 02	0.13593650E 03	0.15232400E 02
237	0.56502000E 05	0.70849999E 02	0.13583350E 03	0.15283200E 02
238	0.56503000E 05	0.70740000E 02	0.13569070E 03	0.15364300E 02
239	0.56504000E 05	0.70549999E 02	0.13554520E 03	0.15437000E 02
240	0.56505000E 05	0.70339999E 02	0.13543380E 03	0.15522200E 02
241	0.56506000E 05	0.70200000E 02	0.13532960E 03	0.15590800E 02
242	0.56507000E 05	0.70020000E 02	0.13519480E 03	0.15655500E 02
243	0.56508000E 05	0.69860000E 02	0.13504250E 03	0.15724100E 02
244	0.56509000E 05	0.69690000E 02	0.13492020E 03	0.15827100E 02
245	0.56510000E 05	0.69530000E 02	0.13478420E 03	0.15875200E 02
246	0.56511000E 05	0.69330000E 02	0.13467040E 03	0.15964400E 02
247	0.56512000E 05	0.69160000E 02	0.13452610E 03	0.16026100E 02
248	0.56513000E 05	0.69000000E 02	0.13437650E 03	0.16114000E 02
249	0.56514000E 05	0.68860000E 02	0.13425980E 03	0.16182900E 02
250	0.56515000E 05	0.68660000E 02	0.13414840E 03	0.16269300E 02
251	0.56516000E 05	0.68500000E 02	0.13401510E 03	0.16357200E 02
252	0.56517000E 05	0.68339999E 02	0.13385600E 03	0.16418900E 02
253	0.56518000E 05	0.68190000E 02	0.13372410E 03	0.16484900E 02
254	0.56519000E 05	0.67929999E 02	0.13360060E 03	0.16575400E 02
255	0.56520000E 05	0.67759999E 02	0.13348240E 03	0.16642800E 02
256	0.56521000E 05	0.67559999E 02	0.13336010E 03	0.16707300E 02
257	0.56522000E 05	0.67389999E 02	0.13321870E 03	0.16778800E 02
258	0.56523000E 05	0.67099999E 02	0.13308130E 03	0.16859900E 02
259	0.56524000E 05	0.67000000E 02	0.13294820E 03	0.16929900E 02
260	0.56525000E 05	0.66860000E 02	0.13278340E 03	0.16995800E 02
261	0.56526000E 05	0.66660000E 02	0.13260620E 03	0.17104200E 02
262	0.56527000E 05	0.66480000E 02	0.13247710E 03	0.17149700E 02
263	0.56528000E 05	0.66290000E 02	0.13231230E 03	0.17258100E 02
264	0.56529000E 05	0.66070000E 02	0.13218600E 03	0.17319800E 02
265	0.56530000E 05	0.65860000E 02	0.13204470E 03	0.17411900E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
266	0.56531000E 05	0.65639999E 02	0.13191280E 03	0.17460000E 02
267	0.56532000E 05	0.65459999E 02	0.13175610E 03	0.17525900E 02
268	0.56533000E 05	0.65259999E 02	0.13160640E 03	0.17612300E 02
269	0.56534000E 05	0.64990000E 02	0.13145680E 03	0.17702900E 02
270	0.56535000E 05	0.64860000E 02	0.13131810E 03	0.17762000E 02
271	0.56536000E 05	0.64580000E 02	0.13118360E 03	0.17848600E 02
272	0.56537000E 05	0.64410000E 02	0.13103780E 03	0.17919900E 02
273	0.56538000E 05	0.64219999E 02	0.13087300E 03	0.17988500E 02
274	0.56539000E 05	0.63980000E 02	0.13072340E 03	0.18066900E 02
275	0.56540000E 05	0.63830000E 02	0.13058740E 03	0.18158900E 02
276	0.56541000E 05	0.63620000E 02	0.13042680E 03	0.18220700E 02
277	0.56542000E 05	0.63450000E 02	0.13028270E 03	0.18296100E 02
278	0.56543000E 05	0.63170000E 02	0.13011650E 03	0.18376000E 02
279	0.56544000E 05	0.62960000E 02	0.12997920E 03	0.18450000E 02
280	0.56545000E 05	0.62780000E 02	0.12981840E 03	0.18532500E 02
281	0.56546000E 05	0.62530000E 02	0.12967020E 03	0.18596900E 02
282	0.56547000E 05	0.62310000E 02	0.12951640E 03	0.18683600E 02
283	0.56548000E 05	0.62180000E 02	0.12935420E 03	0.18756300E 02
284	0.56549000E 05	0.61960000E 02	0.12920190E 03	0.18819600E 02
285	0.56550000E 05	0.61770000E 02	0.12903300E 03	0.18903300E 02
286	0.56551000E 05	0.61510000E 02	0.12885720E 03	0.18993900E 02
287	0.56552000E 05	0.61260000E 02	0.12871170E 03	0.19062500E 02
288	0.56553000E 05	0.61010000E 02	0.12858520E 03	0.19131100E 02
289	0.56554000E 05	0.60800000E 02	0.12839160E 03	0.19197000E 02
290	0.56555000E 05	0.60550000E 02	0.12822270E 03	0.19298800E 02
291	0.56556000E 05	0.60330000E 02	0.12805370E 03	0.19350800E 02
292	0.56557000E 05	0.60130000E 02	0.12789990E 03	0.19438700E 02
293	0.56558000E 05	0.59880000E 02	0.12774610E 03	0.19521200E 02
294	0.56559000E 05	0.59680000E 02	0.12758130E 03	0.19569300E 02
295	0.56560000E 05	0.59450000E 02	0.12743580E 03	0.19679200E 02
296	0.56561000E 05	0.59210000E 02	0.12728470E 03	0.19723100E 02
297	0.56562000E 05	0.58950000E 02	0.12704980E 03	0.19826200E 02
298	0.56563000E 05	0.58720000E 02	0.12691800E 03	0.19892100E 02
299	0.56564000E 05	0.58460000E 02	0.12674220E 03	0.19982700E 02
300	0.56565000E 05	0.58200000E 02	0.12658150E 03	0.22048200E 02
301	0.56566000E 05	0.57970000E 02	0.12643870E 03	0.20094000E 02
302	0.56567000E 05	0.57760000E 02	0.12628640E 03	0.20205100E 02
303	0.56568000E 05	0.57490000E 02	0.12606520E 03	0.20268300E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
304	0.56569000E 05	0.57260000E 02	0.12587040E 03	0.20330100E 02
305	0.56570000E 05	0.57000000E 02	0.12571510E 03	0.20420700E 02
306	0.56571000E 05	0.56750000E 02	0.12553520E 03	0.20489500E 02
307	0.56572000E 05	0.56520000E 02	0.12536620E 03	0.20573200E 02
308	0.56573000E 05	0.56270000E 02	0.12518210E 03	0.20663800E 02
309	0.56574000E 05	0.56030000E 02	0.12500240E 03	0.20709200E 02
310	0.56575000E 05	0.55780000E 02	0.12484450E 03	0.20817600E 02
311	0.56576000E 05	0.55530000E 02	0.12466190E 03	0.20865700E 02
312	0.56577000E 05	0.55250000E 02	0.12447900E 03	0.20949500E 02
313	0.56578000E 05	0.55020000E 02	0.12432400E 03	0.21018100E 02
314	0.56579000E 05	0.54780000E 02	0.12415500E 03	0.21103300E 02
315	0.56580000E 05	0.54520000E 02	0.12398190E 03	0.21171900E 02
316	0.56581000E 05	0.54290000E 02	0.12381030E 03	0.21235100E 02
317	0.56582000E 05	0.54000000E 02	0.12360420E 03	0.21305200E 02
318	0.56583000E 05	0.53740000E 02	0.12342430E 03	0.21384800E 02
319	0.56584000E 05	0.53460000E 02	0.12318680E 03	0.21456300E 02
320	0.56585000E 05	0.53170000E 02	0.12301510E 03	0.21540000E 02
321	0.56586000E 05	0.52880000E 02	0.12283670E 03	0.21608600E 02
322	0.56587000E 05	0.52640000E 02	0.12266770E 03	0.21671900E 02
323	0.56588000E 05	0.52310000E 02	0.12244800E 03	0.21761000E 02
324	0.56589000E 05	0.52040000E 02	0.12228050E 03	0.21831100E 02
325	0.56590000E 05	0.51770000E 02	0.12208400E 03	0.21892800E 02
326	0.56591000E 05	0.51530000E 02	0.12187400E 03	0.21961700E 02
327	0.56592000E 05	0.51240000E 02	0.12169950E 03	0.22050800E 02
328	0.56593000E 05	0.50980000E 02	0.12152510E 03	0.22115500E 02
329	0.56594000E 05	0.50690000E 02	0.12132740E 03	0.22181400E 02
330	0.56595000E 05	0.50480000E 02	0.12112550E 03	0.22247300E 02
331	0.56596000E 05	0.50150000E 02	0.12094140E 03	0.22333700E 02
332	0.56597000E 05	0.49880000E 02	0.12072730E 03	0.22420200E 02
333	0.56598000E 05	0.49560000E 02	0.12054050E 03	0.22464100E 02
334	0.56599000E 05	0.49290000E 02	0.12032350E 03	0.22549300E 02
335	0.56600000E 05	0.48990000E 02	0.12014090E 03	0.22622100E 02
336	0.56601000E 05	0.48700000E 02	0.11995680E 03	0.22704600E 02
337	0.56602000E 05	0.48420000E 02	0.11973710E 03	0.22749800E 02
338	0.56603000E 05	0.48090000E 02	0.11954080E 03	0.22814500E 02
339	0.56604000E 05	0.47840000E 02	0.11935400E 03	0.22903600E 02
340	0.56605000E 05	0.47560000E 02	0.11912060E 03	0.22976300E 02
341	0.56606000E 05	0.47290000E 02	0.11892550E 03	0.23028600E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
342	0.56607000E 05	0.46990000E 02	0.11872630E 03	0.23120600E 02
343	0.56608000E 05	0.46700000E 02	0.11852440E 03	0.23186500E 02
344	0.56609000E 05	0.46350000E 02	0.11834740E 03	0.23258100E 02
345	0.56610000E 05	0.46070000E 02	0.11815920E 03	0.23319800E 02
346	0.56611000E 05	0.45760000E 02	0.11795310E 03	0.23392600E 02
347	0.56612000E 05	0.45450000E 02	0.11770460E 03	0.23459700E 02
348	0.56613000E 05	0.45110000E 02	0.11747530E 03	0.23542200E 02
349	0.56614000E 05	0.44820000E 02	0.11729130E 03	0.23606700E 02
350	0.56615000E 05	0.44510000E 02	0.11707420E 03	0.23657500E 02
351	0.56616000E 05	0.44210000E 02	0.11684640E 03	0.23723400E 02
352	0.56617000E 05	0.43900000E 02	0.11664720E 03	0.23805900E 02
353	0.56618000E 05	0.43610000E 02	0.11641650E 03	0.23874500E 02
354	0.56619000E 05	0.43260000E 02	0.11622290E 03	0.23943100E 02
355	0.56620000E 05	0.42960000E 02	0.11605400E 03	0.24022900E 02
356	0.56621000E 05	0.42590000E 02	0.11583150E 03	0.24049100E 02
357	0.56622000E 05	0.42310000E 02	0.11560500E 03	0.24134000E 02
358	0.56623000E 05	0.42030000E 02	0.11535640E 03	0.24198700E 02
359	0.56624000E 05	0.41720000E 02	0.11512430E 03	0.24265900E 02
360	0.56625000E 05	0.41390000E 02	0.11490990E 03	0.24355200E 02
361	0.56626000E 05	0.41080000E 02	0.11469580E 03	0.24397700E 02
362	0.56627000E 05	0.40780000E 02	0.11446660E 03	0.24441700E 02
363	0.56628000E 05	0.40420000E 02	0.11424270E 03	0.24529500E 02
364	0.56629000E 05	0.40090000E 02	0.11402420E 03	0.24595500E 02
365	0.56630000E 05	0.39760000E 02	0.11381840E 03	0.24645000E 02
366	0.56631000E 05	0.39390000E 02	0.11357100E 03	0.24728800E 02
367	0.56632000E 05	0.39100000E 02	0.11336380E 03	0.24771200E 02
368	0.56633000E 05	0.38790000E 02	0.11311380E 03	0.24841300E 02
369	0.56634000E 05	0.38460000E 02	0.11289670E 03	0.24901900E 02
370	0.56635000E 05	0.38180000E 02	0.11268530E 03	0.24951200E 02
371	0.56636000E 05	0.37900000E 02	0.11242850E 03	0.25039100E 02
372	0.56637000E 05	0.37580000E 02	0.11221830E 03	0.25077600E 02
373	0.56638000E 05	0.37200000E 02	0.11198490E 03	0.25142100E 02
374	0.56639000E 05	0.36840000E 02	0.11174320E 03	0.25214800E 02
375	0.56640000E 05	0.36510000E 02	0.11152610E 03	0.25257600E 02
376	0.56641000E 05	0.36170000E 02	0.11128860E 03	0.25326200E 02
377	0.56642000E 05	0.35940000E 02	0.11105930E 03	0.25370100E 02
378	0.56643000E 05	0.35560000E 02	0.11079830E 03	0.25411400E 02
379	0.56644000E 05	0.35220000E 02	0.11057860E 03	0.25474400E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
418	0.56683000E 05	0.21210000E 02	0.10081180E 03	0.27370800E 02
419	0.56684000E 05	0.20870000E 02	0.10053980E 03	0.27412100E 02
420	0.56685000E 05	0.20520000E 02	0.10028590E 03	0.27451900E 02
421	0.56686000E 05	0.20100000E 02	0.10002910E 03	0.27494600E 02
422	0.56687000E 05	0.19720000E 02	0.99761200E 02	0.27520800E 02
423	0.56688000E 05	0.19410000E 02	0.99492200E 02	0.27545400E 02
424	0.56689000E 05	0.18990000E 02	0.99240700E 02	0.27594700E 02
425	0.56690000E 05	0.18620000E 02	0.98952399E 02	0.27625000E 02
426	0.56691000E 05	0.18230000E 02	0.98690200E 02	0.27655300E 02
427	0.56692000E 05	0.17970000E 02	0.98424999E 02	0.27675800E 02
428	0.56693000E 05	0.17690000E 02	0.98161400E 02	0.27714400E 02
429	0.56694000E 05	0.17290000E 02	0.97911400E 02	0.27741700E 02
430	0.56695000E 05	0.16990000E 02	0.97662800E 02	0.27783000E 02
431	0.56696000E 05	0.16620000E 02	0.97374499E 02	0.27807600E 02
432	0.56697000E 05	0.16300000E 02	0.97087399E 02	0.27847400E 02
433	0.56698000E 05	0.15940000E 02	0.96837399E 02	0.27866700E 02
434	0.56699000E 05	0.15700000E 02	0.96535399E 02	0.27872300E 02
435	0.56700000E 05	0.15340000E 02	0.96260699E 02	0.27917500E 02
436	0.56701000E 05	0.15020000E 02	0.95984599E 02	0.27934100E 02
437	0.56702000E 05	0.14680000E 02	0.95734900E 02	0.27956100E 02
438	0.56703000E 05	0.14350000E 02	0.95432599E 02	0.27982200E 02
439	0.56704000E 05	0.14000000E 02	0.95182599E 02	0.28005400E 02
440	0.56705000E 05	0.13620000E 02	0.94910899E 02	0.28046600E 02
441	0.56706000E 05	0.13290000E 02	0.94622299E 02	0.28052000E 02
442	0.56707000E 05	0.12950000E 02	0.94351800E 02	0.28070100E 02
443	0.56708000E 05	0.12570000E 02	0.94075899E 02	0.28071300E 02
444	0.56709000E 05	0.12130000E 02	0.93820299E 02	0.28134500E 02
445	0.56710000E 05	0.11760000E 02	0.93536099E 02	0.28133100E 02
446	0.56711000E 05	0.11310000E 02	0.93250500E 02	0.28153800E 02
447	0.56712000E 05	0.11090000E 02	0.93003200E 02	0.28178500E 02
448	0.56713000E 05	0.10690000E 02	0.92713599E 02	0.28155000E 02
449	0.56714000E 05	0.10320000E 02	0.92440200E 02	0.28218300E 02
450	0.56715000E 05	0.99399999E 01	0.92173800E 02	0.28225100E 02
451	0.56716000E 05	0.97199999E 01	0.91882600E 02	0.28225100E 02
452	0.56717000E 05	0.95000000E 01	0.91613500E 02	0.28219700E 02
453	0.56718000E 05	0.92900000E 01	0.91334700E 02	0.28247100E 02
454	0.56719000E 05	0.90000000E 01	0.91042199E 02	0.28262200E 02
455	0.56720000E 05	0.86099999E 01	0.90777100E 02	0.28284200E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
380	0.56645000E 05	0.34830000E 02	0.11033690E 03	0.25523900E 02
381	0.56646000E 05	0.34500000E 02	0.11010350E 03	0.25544400E 02
382	0.56647000E 05	0.34190000E 02	0.10987280E 03	0.25628200E 02
383	0.56648000E 05	0.33840000E 02	0.10962550E 03	0.25761500E 02
384	0.56649000E 05	0.33540000E 02	0.10940190E 03	0.25779300E 02
385	0.56650000E 05	0.33210000E 02	0.10918330E 03	0.25832800E 02
386	0.56651000E 05	0.32820000E 02	0.10891280E 03	0.25898700E 02
387	0.56652000E 05	0.32540000E 02	0.10866280E 03	0.25938700E 02
388	0.56653000E 05	0.32190000E 02	0.10841310E 03	0.26008500E 02
389	0.56654000E 05	0.31870000E 02	0.10818510E 03	0.26069100E 02
390	0.56655000E 05	0.31390000E 02	0.10793360E 03	0.26110400E 02
391	0.56656000E 05	0.31000000E 02	0.10768240E 03	0.26159700E 02
392	0.56657000E 05	0.30630000E 02	0.10744340E 03	0.26206300E 02
393	0.56658000E 05	0.30310000E 02	0.10720850E 03	0.26264200E 02
394	0.56659000E 05	0.29930000E 02	0.10694900E 03	0.26332800E 02
395	0.56660000E 05	0.29600000E 02	0.10670730E 03	0.26375200E 02
396	0.56661000E 05	0.29250000E 02	0.10649580E 03	0.26422100E 02
397	0.56662000E 05	0.28870000E 02	0.10620480E 03	0.26464600E 02
398	0.56663000E 05	0.28550000E 02	0.10596020E 03	0.26505900E 02
399	0.56664000E 05	0.28190000E 02	0.10569950E 03	0.26556600E 02
400	0.56665000E 05	0.27810000E 02	0.10546580E 03	0.22615200E 02
401	0.56666000E 05	0.27420000E 02	0.10523510E 03	0.26662400E 02
402	0.56667000E 05	0.27100000E 02	0.10495510E 03	0.26702100E 02
403	0.56668000E 05	0.26760000E 02	0.10468730E 03	0.26752900E 02
404	0.56669000E 05	0.26340000E 02	0.10443990E 03	0.26816200E 02
405	0.56670000E 05	0.26020000E 02	0.10419140E 03	0.26835400E 02
406	0.56671000E 05	0.25610000E 02	0.10391670E 03	0.26887500E 02
407	0.56672000E 05	0.25290000E 02	0.10367650E 03	0.26924600E 02
408	0.56673000E 05	0.24930000E 02	0.10340870E 03	0.26974100E 02
409	0.56674000E 05	0.24510000E 02	0.10316850E 03	0.27016600E 02
410	0.56675000E 05	0.24150000E 02	0.10289500E 03	0.27055200E 02
411	0.56676000E 05	0.23900000E 02	0.10263130E 03	0.27104500E 02
412	0.56677000E 05	0.23460000E 02	0.10238010E 03	0.27145800E 02
413	0.56678000E 05	0.23020000E 02	0.10213160E 03	0.27188200E 02
414	0.56679000E 05	0.22780000E 02	0.10191870E 03	0.27232200E 02
415	0.56680000E 05	0.22290000E 02	0.10165360E 03	0.27254200E 02
416	0.56681000E 05	0.21950000E 02	0.10132540E 03	0.27299600E 02
417	0.56682000E 05	0.21580000E 02	0.10106860E 03	0.27324200E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
456	0.56721000E 05	0.83599999E 01	0.90514899E 02	0.28288300E 02
457	0.56722000E 05	0.78200000E 01	0.90238799E 02	0.28286900E 02
458	0.56723000E 05	0.71300000E 01	0.89926999E 02	0.28291000E 02
459	0.56724000E 05	0.68699999E 01	0.89673100E 02	0.28313000E 02
460	0.56725000E 05	0.63600000E 01	0.89384800E 02	0.28330800E 02
461	0.56726000E 05	0.58000000E 01	0.89110100E 02	0.28328100E 02
462	0.56727000E 05	0.53900000E 01	0.88854500E 02	0.28333700E 02
463	0.56728000E 05	0.48400000E 01	0.88553699E 02	0.28359600E 02
464	0.56729000E 05	0.43200000E 01	0.88295699E 02	0.28352800E 02
465	0.56730000E 05	0.37800000E 01	0.88011499E 02	0.28355700E 02
466	0.56731000E 05	-0.32900000E 01	0.87731199E 02	0.28352800E 02
467	0.56732000E 05	-0.28200000E 01	0.87469000E 02	0.28351600E 02
468	0.56733000E 05	-0.19800000E 01	0.87159900E 02	0.28355700E 02
469	0.56734000E 05	-0.15900000E 01	0.86889400E 02	0.28358400E 02
470	0.56735000E 05	-0.16200000E 01	0.86624299E 02	0.28373500E 02
471	0.56736000E 05	-0.18100000E 01	0.86338599E 02	0.28374800E 02
472	0.56737000E 05	-0.20200000E 01	0.86081800E 02	0.28359600E 02
473	0.56738000E 05	-0.22200000E 01	0.85789300E 02	0.28354200E 02
474	0.56739000E 05	-0.26000000E 01	0.85505099E 02	0.28350100E 02
475	0.56740000E 05	-0.30200000E 01	0.85226299E 02	0.28359600E 02
476	0.56741000E 05	-0.34500000E 01	0.84981899E 02	0.28352800E 02
477	0.56742000E 05	-0.38500000E 01	0.84665999E 02	0.28352800E 02
478	0.56743000E 05	-0.42500000E 01	0.84395499E 02	0.28335000E 02
479	0.56744000E 05	-0.46700000E 01	0.84120799E 02	0.28332300E 02
480	0.56745000E 05	-0.50900000E 01	0.83853000E 02	0.28315700E 02
481	0.56746000E 05	-0.55100000E 01	0.83604500E 02	0.28332300E 02
482	0.56747000E 05	-0.59200000E 01	0.83310499E 02	0.28328100E 02
483	0.56748000E 05	-0.63000000E 01	0.83040000E 02	0.28306200E 02
484	0.56749000E 05	-0.67600000E 01	0.82762699E 02	0.28291000E 02
485	0.56750000E 05	-0.71500000E 01	0.82467299E 02	0.28292500E 02
486	0.56751000E 05	-0.75400000E 01	0.82198199E 02	0.28271700E 02
487	0.56752000E 05	-0.79800000E 01	0.81917999E 02	0.28264900E 02
488	0.56753000E 05	-0.83599999E 01	0.81646199E 02	0.28240200E 02
489	0.56754000E 05	-0.87800000E 01	0.81375700E 02	0.28183800E 02
490	0.56755000E 05	-0.91899999E 01	0.81099600E 02	0.28199000E 02
491	0.56756000E 05	-0.96199999E 01	0.80815399E 02	0.28196300E 02
492	0.56757000E 05	-0.10000000E 02	0.80546100E 02	0.28179900E 02
493	0.56758000E 05	-0.10410000E 02	0.80264600E 02	0.28159200E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
494	0.56759000E 05	-0.10860000E 02	0.80018800E 02	0.28136000E 02
495	0.56760000E 05	-0.11260000E 02	0.79726299E 02	0.28130400E 02
496	0.56761000E 05	-0.11650000E 02	0.79464100E 02	0.28112500E 02
497	0.56762000E 05	-0.12060000E 02	0.79176999E 02	0.28086400E 02
498	0.56763000E 05	-0.12460000E 02	0.78913300E 02	0.28067100E 02
499	0.56764000E 05	-0.12850000E 02	0.78638700E 02	0.28042500E 02
500	0.56765000E 05	-0.13260000E 02	0.78384500E 02	0.22023200E 02
501	0.56766000E 05	-0.13670000E 02	0.78127700E 02	0.28000000E 02
502	0.56767000E 05	-0.14060000E 02	0.77839399E 02	0.27983400E 02
503	0.56768000E 05	-0.14450000E 02	0.77567400E 02	0.27958700E 02
504	0.56769000E 05	-0.14850000E 02	0.77296900E 02	0.27910600E 02
505	0.56770000E 05	-0.15230000E 02	0.77034699E 02	0.27898200E 02
506	0.56771000E 05	-0.15660000E 02	0.76769500E 02	0.27869400E 02
507	0.56772000E 05	-0.16050000E 02	0.76499000E 02	0.27854200E 02
508	0.56773000E 05	-0.16410000E 02	0.76261499E 02	0.27824200E 02
509	0.56774000E 05	-0.16820000E 02	0.75997800E 02	0.27784400E 02
510	0.56775000E 05	-0.17250000E 02	0.75716299E 02	0.27765100E 02
511	0.56776000E 05	-0.17650000E 02	0.75445800E 02	0.27741700E 02
512	0.56777000E 05	-0.18030000E 02	0.75167000E 02	0.27717000E 02
513	0.56778000E 05	-0.18430000E 02	0.74907499E 02	0.27674600E 02
514	0.56779000E 05	-0.18820000E 02	0.74657499E 02	0.27653800E 02
515	0.56780000E 05	-0.19220000E 02	0.74397900E 02	0.27605700E 02
516	0.56781000E 05	-0.19610000E 02	0.74110800E 02	0.27568600E 02
517	0.56782000E 05	-0.19980000E 02	0.73848599E 02	0.27541300E 02
518	0.56783000E 05	-0.20360000E 02	0.73606899E 02	0.27517800E 02
519	0.56784000E 05	-0.20750000E 02	0.73341800E 02	0.27457500E 02
520	0.56785000E 05	-0.21130000E 02	0.73043900E 02	0.27450700E 02
521	0.56786000E 05	-0.21530000E 02	0.72818600E 02	0.27413600E 02
522	0.56787000E 05	-0.21910000E 02	0.72559099E 02	0.27348900E 02
523	0.56788000E 05	-0.22290000E 02	0.72283000E 02	0.27340800E 02
524	0.56789000E 05	-0.22690000E 02	0.72035899E 02	0.27281700E 02
525	0.56790000E 05	-0.23050000E 02	0.71751699E 02	0.27261000E 02
526	0.56791000E 05	-0.23450000E 02	0.71499000E 02	0.27215800E 02
527	0.56792000E 05	-0.23830000E 02	0.71251699E 02	0.27189700E 02
528	0.56793000E 05	-0.24220000E 02	0.71008499E 02	0.27148400E 02
529	0.56794000E 05	-0.24580000E 02	0.70742200E 02	0.27081300E 02
530	0.56795000E 05	-0.24960000E 02	0.70489499E 02	0.27053700E 02
531	0.56796000E 05	-0.25320000E 02	0.70257600E 02	0.26993400E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
532	0.56797000E 05	-0.25710000E 02	0.69999299E 02	0.26991900E 02
533	0.56798000E 05	-0.26060000E 02	0.69741199E 02	0.26926000E 02
534	0.56799000E 05	-0.26420000E 02	0.69467799E 02	0.26865500E 02
535	0.56800000E 05	-0.26830000E 02	0.69226100E 02	0.26842300E 02
536	0.56801000E 05	-0.27160000E 02	0.68977500E 02	0.26816200E 02
537	0.56802000E 05	-0.27560000E 02	0.68734400E 02	0.26755600E 02
538	0.56803000E 05	-0.27910000E 02	0.68474899E 02	0.26707800E 02
539	0.56804000E 05	-0.28250000E 02	0.68241500E 02	0.26658200E 02
540	0.56805000E 05	-0.28630000E 02	0.67973599E 02	0.26618400E 02
541	0.56806000E 05	-0.28980000E 02	0.67744399E 02	0.26571800E 02
542	0.56807000E 05	-0.29330000E 02	0.67508100E 02	0.26530500E 02
543	0.56808000E 05	-0.29720000E 02	0.67262199E 02	0.26467300E 02
544	0.56809000E 05	-0.30060000E 02	0.67009500E 02	0.26400100E 02
545	0.56810000E 05	-0.30430000E 02	0.66756800E 02	0.26376700E 02
546	0.56811000E 05	-0.30800000E 02	0.66519300E 02	0.26306600E 02
547	0.56812000E 05	-0.31170000E 02	0.66281699E 02	0.26266800E 02
548	0.56813000E 05	-0.31550000E 02	0.66048300E 02	0.26221400E 02
549	0.56814000E 05	-0.31930000E 02	0.65802500E 02	0.26154300E 02
550	0.56815000E 05	-0.32240000E 02	0.65574499E 02	0.26118400E 02
551	0.56816000E 05	-0.32600000E 02	0.65336900E 02	0.26091100E 02
552	0.56817000E 05	-0.32940000E 02	0.65117200E 02	0.26008500E 02
553	0.56818000E 05	-0.33270000E 02	0.64879600E 02	0.25957800E 02
554	0.56819000E 05	-0.33640000E 02	0.64609099E 02	0.25911100E 02
555	0.56820000E 05	-0.33980000E 02	0.64361799E 02	0.25845200E 02
556	0.56821000E 05	-0.34310000E 02	0.64138200E 02	0.25804000E 02
557	0.56822000E 05	-0.34680000E 02	0.63922400E 02	0.25757300E 02
558	0.56823000E 05	-0.35010000E 02	0.63689000E 02	0.25717500E 02
559	0.56824000E 05	-0.35330000E 02	0.63473400E 02	0.25631100E 02
560	0.56825000E 05	-0.35680000E 02	0.63237300E 02	0.25566400E 02
561	0.56826000E 05	-0.36010000E 02	0.62961200E 02	0.25499300E 02
562	0.56827000E 05	-0.36320000E 02	0.62757800E 02	0.25449700E 02
563	0.56828000E 05	-0.36690000E 02	0.62510700E 02	0.25390600E 02
564	0.56829000E 05	-0.37030000E 02	0.62289600E 02	0.25344000E 02
565	0.56830000E 05	-0.37400000E 02	0.62085000E 02	0.25295900E 02
566	0.56831000E 05	-0.37720000E 02	0.61840600E 02	0.25187500E 02
567	0.56832000E 05	-0.38040000E 02	0.61611300E 02	0.25164100E 02
568	0.56833000E 05	-0.38360000E 02	0.61408000E 02	0.25129600E 02
569	0.56834000E 05	-0.38710000E 02	0.61181400E 02	0.25077600E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
570	0.56835000E 05	-0.39020000E 02	0.60987800E 02	0.24995100E 02
571	0.56836000E 05	-0.39320000E 02	0.60780300E 02	0.24951200E 02
572	0.56837000E 05	-0.39670000E 02	0.60502900E 02	0.24884000E 02
573	0.56838000E 05	-0.39970000E 02	0.60291500E 02	0.24822000E 02
574	0.56839000E 05	-0.40300000E 02	0.60082800E 02	0.24749300E 02
575	0.56840000E 05	-0.40610000E 02	0.59879400E 02	0.24709500E 02
576	0.56841000E 05	-0.40940000E 02	0.59646000E 02	0.24620400E 02
577	0.56842000E 05	-0.41220000E 02	0.59408400E 02	0.24579100E 02
578	0.56843000E 05	-0.41550000E 02	0.59206500E 02	0.24511700E 02
579	0.56844000E 05	-0.41850000E 02	0.59006100E 02	0.24463600E 02
580	0.56845000E 05	-0.42150000E 02	0.58795900E 02	0.24379900E 02
581	0.56846000E 05	-0.42470000E 02	0.58535200E 02	0.24329100E 02
582	0.56847000E 05	-0.42780000E 02	0.58340100E 02	0.24264600E 02
583	0.56848000E 05	-0.43060000E 02	0.58156000E 02	0.24205600E 02
584	0.56849000E 05	-0.43350000E 02	0.57952900E 02	0.24118900E 02
585	0.56850000E 05	-0.43660000E 02	0.57715100E 02	0.24073700E 02
586	0.56851000E 05	-0.44000000E 02	0.57503700E 02	0.24003700E 02
587	0.56852000E 05	-0.44270000E 02	0.57308600E 02	0.23957000E 02
588	0.56853000E 05	-0.44570000E 02	0.57093000E 02	0.23889600E 02
589	0.56854000E 05	-0.44900000E 02	0.56874800E 02	0.23827900E 02
590	0.56855000E 05	-0.45180000E 02	0.56683800E 02	0.23738500E 02
591	0.56856000E 05	-0.45500000E 02	0.56517600E 02	0.23694600E 02
592	0.56857000E 05	-0.45820000E 02	0.56275900E 02	0.23630100E 02
593	0.56858000E 05	-0.46100000E 02	0.56071300E 02	0.23564200E 02
594	0.56859000E 05	-0.46390000E 02	0.55877700E 02	0.23472200E 02
595	0.56860000E 05	-0.46680000E 02	0.55673100E 02	0.23428200E 02
596	0.56861000E 05	-0.46990000E 02	0.55470000E 02	0.23347200E 02
597	0.56862000E 05	-0.47250000E 02	0.55265100E 02	0.23274400E 02
598	0.56863000E 05	-0.47540000E 02	0.55057900E 02	0.23230500E 02
599	0.56864000E 05	-0.47830000E 02	0.54876700E 02	0.23145300E 02
600	0.56865000E 05	-0.48110000E 02	0.54687000E 02	0.22079200E 02
601	0.56866000E 05	-0.48390000E 02	0.54463100E 02	0.23017600E 02
602	0.56867000E 05	-0.48690000E 02	0.54283400E 02	0.22932400E 02
603	0.56868000E 05	-0.48940000E 02	0.54091100E 02	0.22862500E 02
604	0.56869000E 05	-0.49240000E 02	0.53886500E 02	0.22815700E 02
605	0.56870000E 05	-0.49530000E 02	0.53701200E 02	0.22730700E 02
606	0.56871000E 05	-0.49780000E 02	0.53497800E 02	0.22633100E 02
607	0.56872000E 05	-0.50040000E 02	0.53315200E 02	0.22572800E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
608	0.56873000E 05	-0.50300000E 02	0.53128400E 02	0.22513700E 02
609	0.56874000E 05	-0.50600000E 02	0.52939000E 02	0.22446300E 02
610	0.56875000E 05	-0.50860000E 02	0.52739700E 02	0.22397000E 02
611	0.56876000E 05	-0.51110000E 02	0.52579100E 02	0.22310300E 02
612	0.56877000E 05	-0.51400000E 02	0.52371800E 02	0.22245800E 02
613	0.56878000E 05	-0.51630000E 02	0.52197[illegible]00E 02	0.22184100E 02
614	0.56879000E 05	-0.51890000E 02	0.52047600E 02	0.22109900E 02
615	0.56880000E 05	-0.52160000E 02	0.51851300E 02	0.22028800E 02
616	0.56881000E 05	-0.52400000E 02	0.51645300E 02	0.21984900E 02
617	0.56882000E 05	-0.52650000E 02	0.51401200E 02	0.21918900E 02
618	0.56883000E 05	-0.52950000E 02	0.51288100E 02	0.21824200E 02
619	0.56884000E 05	-0.53170000E 02	0.51095900E 02	0.21758300E 02
620	0.56885000E 05	-0.53420000E 02	0.50911900E 02	0.21677200E 02
621	0.56886000E 05	-0.53680000E 02	0.50760700E 02	0.21612800E 02
622	0.56887000E 05	-0.53930000E 02	0.50601600E 02	0.21546900E 02
623	0.56888000E 05	-0.54160000E 02	0.50416300E 02	0.21459000E 02
624	0.56889000E 05	-0.54420000E 02	0.50222400E 02	0.21372300E 02
625	0.56890000E 05	-0.54680000E 02	0.50013700E 02	0.21321500E 02
626	0.56891000E 05	-0.54940000E 02	0.49868200E 02	0.21261200E 02
627	0.56892000E 05	-0.55170000E 02	0.49696500E 02	0.21188500E 02
628	0.56893000E 05	-0.55410000E 02	0.49538600E 02	0.21122600E 02
629	0.56894000E 05	-0.55670000E 02	0.49350600E 02	0.21037400E 02
630	0.56895000E 05	-0.55900000E 02	0.49176000E 02	0.20954800E 02
631	0.56896000E 05	-0.56150000E 02	0.49002900E 02	0.20905500E 02
632	0.56897000E 05	-0.56290000E 02	0.48843700E 02	0.20820300E 02
633	0.56898000E 05	-0.56600000E 02	0.48680400E 02	0.20754400E 02
634	0.56899000E 05	-0.56840000E 02	0.48470200E 02	0.20688500E 02
635	0.56900000E 05	-0.57050000E 02	0.48323200E 02	0.20599400E 02
636	0.56901000E 05	-0.57290000E 02	0.48173600E 02	0.20536100E 02
637	0.56902000E 05	-0.57550000E 02	0.48014200E 02	0.20445600E 02
638	0.56903000E 05	-0.57750000E 02	0.47846700E 02	0.20358900E 02
639	0.56904000E 05	-0.57980000E 02	0.47637900E 02	0.20313700E 02
640	0.56905000E 05	-0.58190000E 02	0.47484100E 02	0.20268300E 02
641	0.56906000E 05	-0.58410000E 02	0.47337200E 02	0.20141800E 02
642	0.56907000E 05	-0.58650000E 02	0.47172400E 02	0.20088400E 02
643	0.56908000E 05	-0.58860000E 02	0.47015900E 02	0.20029300E 02
644	0.56909000E 05	-0.59070000E 02	0.46845700E 02	0.19959200E 02
645	0.56910000E 05	-0.59290000E 02	0.46689000E 02	0.19893300E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
646	0.56911000E 05	-0.59520000E 02	0.46547600E 02	0.19802700E 02
647	0.56912000E 05	-0.59720000E 02	0.46395300E 02	0.19745100E 02
648	0.56913000E 05	-0.59950000E 02	0.46191900E 02	0.19697000E 02
649	0.56914000E 05	-0.60160000E 02	0.46051800E 02	0.19588600E 02
650	0.56915000E 05	-0.60400000E 02	0.45911900E 02	0.19525400E 02
651	0.56916000E 05	-0.60620000E 02	0.45741500E 02	0.19434800E 02
652	0.56917000E 05	-0.60840000E 02	0.45587600E 02	0.19389400E 02
653	0.56918000E 05	-0.61040000E 02	0.45427000E 02	0.19323500E 02
654	0.56919000E 05	-0.61250000E 02	0.45274700E 02	0.19235600E 02
655	0.56920000E 05	-0.61460000E 02	0.45139900E 02	0.19168200E 02
656	0.56921000E 05	-0.61670000E 02	0.44968300E 02	0.19087200E 02
657	0.56922000E 05	-0.61870000E 02	0.44835200E 02	0.19014400E 02
658	0.56923000E 05	-0.62050000E 02	0.44689500E 02	0.18932100E 02
659	0.56924000E 05	-0.62250000E 02	0.44545400E 02	0.18863500E 02
660	0.56925000E 05	-0.62460000E 02	0.44373800E 02	.18748000E 02
661	0.56926000E 05	-0.62660000E 02	0.44233600E 02	0.18709700E 02
662	0.56927000E 05	-0.62820000E 02	0.44104500E 02	0.18625700E 02
663	0.56928000E 05	-0.63040000E 02	0.43964400E 02	0.18579100E 02
664	0.56929000E 05	-0.63260000E 02	0.43769500E 02	0.18507800E 02
665	0.56930000E 05	-0.63430000E 02	0.43634800E 02	0.18397900E 02
666	0.56931000E 05	-0.63630000E 02	0.43483900E 02	0.18333300E 02
667	0.56932000E 05	-0.63810000E 02	0.43345000E 02	0.18252200E 02
668	0.56933000E 05	-0.63960000E 02	0.43242200E 02	0.18205600E 02
669	0.56934000E 05	-0.64179999E 02	0.43119900E 02	0.18132800E 02
670	0.56935000E 05	-0.64379999E 02	0.42993400E 02	0.18051800E 02
671	0.56936000E 05	-0.64559999E 02	0.42810800E 02	0.17959700E 02
672	0.56937000E 05	-0.64759999E 02	0.42628200E 02	0.17917200E 02
673	0.56938000E 05	-0.64950000E 02	0.42514200E 02	0.17848600E 02
674	0.56939000E 05	-0.65099999E 02	0.42396200E 02	0.17766100E 02
675	0.56940000E 05	-0.65290000E 02	0.42238300E 02	0.17679700E 02
676	0.56941000E 05	-0.65480000E 02	0.42094000E 02	0.17611100E 02
677	0.56942000E 05	-0.65650000E 02	0.41970500E 02	0.17545200E 02
678	0.56943000E 05	-0.65839999E 02	0.41848100E 02	0.17461200E 02
679	0.56944000E 05	-0.66020000E 02	0.41676500E 02	0.17394000E 02
680	0.56945000E 05	-0.66190000E 02	0.41525400E 02	0.17322500E 02
681	0.56946000E 05	-0.66389999E 02	0.41419700E 02	0.17236100E 02
682	0.56947000E 05	-0.66530000E 02	0.41325000E 02	0.17175500E 02
683	0.56948000E 05	-0.66750000E 02	0.41197300E 02	0.17106900E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
684	0.56949000E 05	-0.66919999E 02	0.41044900E 02	0.17039800E 02
685	0.56950000E 05	-0.67049999E 02	0.40903300E 02	0.16969700E 02
686	0.56951000E 05	-0.67259999E 02	0.40789300E 02	0.16902300E 02
687	0.56952000E 05	-0.67360000E 02	0.40654800E 02	0.16815900E 02
688	0.56953000E 05	-0.67610000E 02	0.40529800E 02	0.16770500E 02
689	0.56954000E 05	-0.67790000E 02	0.40402100E 02	0.16666300E 02
690	0.56955000E 05	-0.67070000E 02	0.40272900E 02	0.16601600E 02
691	0.56956000E 05	-0.68089999E 02	0.40160400E 02	0.16557600E 02
692	0.56957000E 05	-0.68240000E 02	0.40016100E 02	0.16471200E 02
693	0.56958000E 05	-0.68400000E 02	0.39867900E 02	0.16403800E 02
694	0.56959000E 05	-0.68580000E 02	0.39745600E 02	0.16331100E 02
695	0.56960000E 05	-0.68730000E 02	0.39620600E 02	0.16245800E 02
696	0.56961000E 05	-0.68889999E 02	0.39435300E 02	0.16186800E 02
697	0.56962000E 05	-0.69049999E 02	0.39335000E 02	0.16096200E 02
698	0.56963000E 05	-0.69209999E 02	0.39218300E 02	0.16037100E 02
699	0.56964000E 05	-0.69379999E 02	0.39115200E 02	0.15941200E 02
700	0.56965000E 05	-0.69509999E 02	0.38965600E 02	0.12898200E 02
701	0.56966000E 05	-0.69669999E 02	0.38851600E 02	0.15807900E 02
702	0.56967000E 05	-0.69820000E 02	0.38748800E 02	0.15744600E 02
703	0.56968000E 05	-0.69969999E 02	0.38637500E 02	0.15674600E 02
704	0.56969000E 05	-0.70139999E 02	0.38497300E 02	0.15606000E 02
705	0.56970000E 05	-0.70240000E 02	0.38394300E 02	0.15519500E 02
706	0.56971000E 05	-0.70429999E 02	0.38298300E 02	0.15454800E 02
707	0.56972000E 05	-0.70589999E 02	0.38156700E 02	0.15388900E 02
708	0.56973000E 05	-0.70650000E 02	0.38042700E 02	0.15321800E 02
709	0.56974000E 05	-0.70879999E 02	0.37934300E 02	0.15239300E 02
710	0.56975000E 05	-0.71030000E 02	0.37816200E 02	0.15192600E 02
711	0.56976000E 05	-0.71169999E 02	0.37680200E 02	0.15102100E 02
712	0.56977000E 05	-0.71309999E 02	0.37538800E 02	0.15022200E 02
713	0.56978000E 05	-0.71469999E 02	0.37430400E 02	0.14953600E 02
714	0.56979000E 05	-0.71620000E 02	0.37313500E 02	0.14907000E 02
715	0.56980000E 05	-0.71770000E 02	0.37198200E 02	0.14821800E 02
716	0.56981000E 05	-0.71900000E 02	0.37089800E 02	0.14754600E 02
717	0.56982000E 05	-0.71940000E 02	0.37005900E 02	0.14684600E 02
718	0.56983000E 05	-0.72169999E 02	0.36886500E 02	0.14580100E 02
719	0.56984000E 05	-0.72290000E 02	0.36750500E 02	0.14538800E 02
720	0.56985000E 05	-0.72429999E 02	0.36644800E 02	0.14463400E 02
721	0.56986000E 05	-0.72580000E 02	0.36521200E 02	0.14403100E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
722	0.56987000E 05	-0.72730000E 02	0.36427700E 02	0.14337200E 02
723	0.56988000E 05	-0.72740000E 02	0.36331800E 02	0.14249300E 02
724	0.56989000E 05	-0.72959999E 02	0.36243900E 02	0.14208000E 02
725	0.56990000E 05	-0.73110000E 02	0.36143600E 02	0.14140600E 02
726	0.56991000E 05	-0.73219999E 02	0.36017100E 02	0.14029500E 02
727	0.56992000E 05	-0.73360000E 02	0.35862100E 02	0.13984100E 02
728	0.56993000E 05	-0.73490000E 02	0.35748000E 02	0.13894800E 02
729	0.56994000E 05	-0.73599999E 02	0.35661600E 02	0.13835700E 02
730	0.56995000E 05	-0.73750000E 02	0.35573700E 02	0.13769800E 02
731	0.56996000E 05	-0.73929999E 02	0.35451400E 02	0.13681900E 02
732	0.56997000E 05	-0.74070000E 02	0.35333300E 02	0.13636700E 02
733	0.56998000E 05	-0.74139999E 02	0.35246800E 02	0.13570800E 02
734	0.56999000E 05	-0.74259999E 02	0.35157500E 02	0.13499300E 02
735	0.57000000E 05	-0.74419999E 02	0.35065400E 02	0.13437500E 02
736	0.57001000E 05	-0.74450000E 02	0.34962400E 02	0.13348400E 02
737	0.57002000E 05	-0.74669999E 02	0.34856700E 02	0.13278300E 02
738	0.57003000E 05	-0.74820000E 02	0.34746800E 02	0.13217800E 02
739	0.57004000E 05	-0.74950000E 02	0.34649400E 02	0.13168500E 02
740	0.57005000E 05	-0.74940000E 02	0.34547900E 02	0.13085900E 02
741	0.57006000E 05	-0.75000000E 02	0.34449000E 02	0.13015900E 02
742	0.57007000E 05	-0.75290000E 02	0.34344500E 02	0.12948700E 02
743	0.57008000E 05	-0.75250000E 02	0.34251200E 02	0.12889600E 02
744	0.57009000E 05	-0.75450000E 02	0.34161900E 02	0.12822300E 02
745	0.57010000E 05	-0.75700000E 02	0.34056200E 02	0.12729000E 02
746	0.57011000E 05	-0.75730000E 02	0.33905000E 02	0.12667200E 02
747	0.57012000E 05	-0.75669999E 02	0.33796600E 02	0.12604000E 02
748	0.57013000E 05	-0.75879999E 02	0.33722400E 02	0.12535400E 02
749	0.57014000E 05	-0.75990000E 02	0.33633100E 02	0.12470700E 02
750	0.57015000E 05	-0.76020000E 02	0.33542500E 02	0.12407500E 02
751	0.57016000E 05	-0.76400000E 02	0.33451900E 02	0.12341600E 02
752	0.57017000E 05	-0.76400000E 02	0.33368200E 02	0.12267600E 02
753	0.57018000E 05	-0.76400000E 02	0.33270500E 02	0.12201700E 02
754	0.57019000E 05	-0.76679999E 02	0.33160600E 02	0.12137000E 02
755	0.57020000E 05	-0.76620000E 02	0.33043900E 02	0.12069800E 02
756	0.57021000E 05	-0.76849999E 02	0.32937000E 02	0.12009300E 02
757	0.57022000E 05	-0.77000000E 02	0.32860100E 02	0.11962600E 02
758	0.57023000E 05	-0.76950000E 02	0.32788600E 02	0.11896700E 02
759	0.57024000E 05	-0.77120000E 02	0.32704800E 02	0.11789600E 02

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
760	0.57025000E 05	-0.77250000E 02	0.32615500E 02	0.11722400E 02
761	0.57026000E 05	-0.77379999E 02	0.32470000E 02	0.11677000E 02
762	0.57027000E 05	-0.77429999E 02	0.32369600E 02	0.11587600E 02
763	0.57028000E 05	-0.77419999E 02	0.32288800E 02	0.11565700E 02
764	0.57029000E 05	-0.77599999E 02	0.32209000E 02	0.11477800E 02
765	0.57030000E 05	-0.77700000E 02	0.32135000E 02	0.11392800E 02
766	0.57031000E 05	-0.77790000E 02	0.32069100E 02	0.11326900E 02
767	0.57032000E 05	-0.77870000E 02	0.31970200E 02	0.11281500E 02
768	0.57033000E 05	-0.77980000E 02	0.31882300E 02	0.11195100E 02
769	0.57034000E 05	-0.78049999E 02	0.31751700E 02	0.11145500E 02
770	0.57035000E 05	-0.78219999E 02	0.31661100E 02	0.11081100E 02
771	0.57036000E 05	-0.78320000E 02	0.31564200E 02	0.11013700E 02
772	0.57037000E 05	-0.78400000E 02	0.31490700E 02	0.10931400E 02
773	0.57038000E 05	-0.78509999E 02	0.31419400E 02	0.10884500E 02
774	0.57039000E 05	-0.78599999E 02	0.31360400E 02	0.10840600E 02
775	0.57040000E 05	-0.78740000E 02	0.31293000E 02	0.10751500E 02
776	0.57041000E 05	-0.78870000E 02	0.31157200E 02	0.10663600E 02
777	0.57042000E 05	-0.78969999E 02	0.31034900E 02	0.10603000E 02
778	0.57043000E 05	-0.79059999E 02	0.30963400E 02	0.10556400E 02
779	0.57044000E 05	-0.79139999E 02	0.30905800E 02	0.10512500E 02
780	0.57045000E 05	-0.79230000E 02	0.30831500E 02	0.10404100E 02
781	0.57046000E 05	-0.79330000E 02	0.30732700E 02	0.10361300E 02
782	0.57047000E 05	-0.79450000E 02	0.30624300E 02	0.10313200E 02
783	0.57048000E 05	-0.79530000E 02	0.30558300E 02	0.10248800E 02
784	0.57049000E 05	-0.79599999E 02	0.30487100E 02	0.10160900E 02
785	0.57050000E 05	-0.79719999E 02	0.30410200E 02	0.10118400E 02
786	0.57051000E 05	-0.79809999E 02	0.30342800E 02	0.10051000E 02
787	0.57052000E 05	-0.79900000E 02	0.30264400E 02	0.99657999E 01
788	0.57053000E 05	-0.79940000E 02	0.30173800E 02	0.98987000E 01
789	0.57054000E 05	-0.80030000E 02	0.30099600E 02	0.98367000E 01
790	0.57055000E 05	-0.80129999E 02	0.30009000E 02	0.97831999E 01
791	0.57056000E 05	-0.80200000E 02	0.29936300E 02	0.97419000E 01
792	0.57057000E 05	-0.80299999E 02	0.29855200E 02	0.96362000E 01
793	0.57058000E 05	-0.80389999E 02	0.29783900E 02	0.96073999E 01
794	0.57059000E 05	-0.80480000E 02	0.29667000E 02	0.95441999E 01
795	0.57060000E 05	-0.80570000E 02	0.29584700E 02	0.94797000E 01
796	0.57061000E 05	-0.80629999E 02	0.29509300E 02	0.94096999E 01
797	0.57062000E 05	-0.80709999E 02	0.29437700E 02	0.93285999E 01

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
798	0.57063000E 05	-0.80799999E 02	0.29376000E 02	0.92873999E 01
799	0.57064000E 05	-0.80530000E 02	0.29300500E 02	0.92379999E 01
800	0.57065000E 05	-0.80980000E 02	0.29233200E 02	0.21702000E 01
801	0.57066000E 05	-0.81020000E 02	0.29154800E 02	0.90827999E 01
802	0.57067000E 05	-0.81129999E 02	0.29073700E 02	0.90237000E 01
803	0.57068000E 05	-0.81169999E 02	0.28998300E 02	0.89728999E 01
804	0.57069000E 05	-0.81290000E 02	0.28919900E 02	0.89262999E 01
805	0.57070000E 05	-0.81349999E 02	0.28851300E 02	0.88864999E 01
806	0.57071000E 05	-0.81429999E 02	0.28778600E 02	0.88012999E 01
807	0.57072000E 05	-0.81500000E 02	0.28693400E 02	0.87079999E 01
808	0.57073000E 05	-0.81339999E 02	0.28613800E 02	0.86501000E 01
809	0.57074000E 05	-0.81639999E 02	0.28538300E 02	0.86022999E 01
810	0.57075000E 05	-0.81740000E 02	0.28460000E 02	0.85114999E 01
811	0.57076000E 05	-0.81799999E 02	0.28383100E 02	0.84894999E 01
812	0.57077000E 05	-0.81889999E 02	0.28289800E 02	0.84083999E 01
813	0.57078000E 05	-0.81929999E 02	0.28222400E 02	0.83549999E 01
814	0.57079000E 05	-0.82000000E 02	0.28163300E 02	0.82946999E 01
815	0.57080000E 05	-0.82099999E 02	0.28101600E 02	0.82313999E 01
816	0.57081000E 05	-0.82150000E 02	0.28035600E 02	0.81818999E 01
817	0.57082000E 05	-0.82250000E 02	0.27953100E 02	0.80955000E 01
818	0.57083000E 05	-0.82259999E 02	0.27883300E 02	0.80568999E 01
819	0.57084000E 05	-0.82379999E 02	0.27806400E 02	0.79690000E 01
820	0.57085000E 05	-0.82459999E 02	0.27715600E 02	0.79417000E 01
821	0.57086000E 05	-0.82540000E 02	0.27623500E 02	0.78742999E 01
822	0.57087000E 05	-0.82580000E 02	0.27570100E 02	0.78275999E 01
823	0.57088000E 05	-0.82620000E 02	0.27512500E 02	0.77617000E 01
824	0.57089000E 05	-0.82740000E 02	0.27447800E 02	0.76806999E 01
825	0.57090000E 05	-0.82740000E 02	0.27383300E 02	0.76299000E 01
826	0.57091000E 05	-0.82830000E 02	0.27320100E 02	0.75667000E 01
827	0.57092000E 05	-0.82900000E 02	0.27255600E 02	0.75037000E 01
828	0.57093000E 05	-0.82980000E 02	0.27184100E 02	0.74583000E 01
829	0.57094000E 05	-0.82059999E 02	0.27111300E 02	0.73882000E 01
830	0.57095000E 05	-0.82950000E 02	0.27027600E 02	0.73237000E 01
831	0.57096000E 05	-0.83020000E 02	0.26957500E 02	0.72798000E 01
832	0.57097000E 05	-0.83150000E 02	0.26898400E 02	0.72000000E 01
833	0.57098000E 05	-0.83169999E 02	0.26825700E 02	0.71533000E 01
834	0.57099000E 05	-0.83339999E 02	0.26761200E 02	0.70874000E 01
835	0.57100000E 05	-0.83330000E 02	0.26704800E 02	0.70203000E 01

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
836	0.57101000E 05	-0.83480000E 02	0.26634800E 02	0.69748999E 01
837	0.57102000E 05	-0.83580000E 02	0.26566200E 02	0.69268000E 01
838	0.57103000E 05	-0.83599999E 02	0.26488000E 02	0.68444999E 01
839	0.57104000E 05	-0.83700000E 02	0.26423300E 02	0.67976000E 01
840	0.57105000E 05	-0.83780000E 02	0.26357400E 02	0.67153000E 01
841	0.57106000E 05	-0.83839999E 02	0.26305200E 02	0.66877000E 01
842	0.57107000E 05	-0.83870000E 02	0.26244900E 02	0.66233000E 01
843	0.57108000E 05	-0.83719999E 02	0.26185800E 02	0.65820000E 01
844	0.57109000E 05	-0.83980000E 02	0.26119900E 02	0.65120000E 01
845	0.57110000E 05	-0.84040000E 02	0.26054000E 02	0.64517000E 01
846	0.57111000E 05	-0.84110000E 02	0.25981200E 02	0.64036000E 01
847	0.57112000E 05	-0.84150000E 02	0.25913800E 02	0.63335000E 01
848	0.57113000E 05	-0.84219999E 02	0.25852100E 02	0.62551000E 01
849	0.57114000E 05	-0.84299999E 02	0.25790300E 02	0.62112000E 01
850	0.57115000E 05	-0.84320000E 02	0.25731200E 02	0.61604000E 01
851	0.57116000E 05	-0.84379999E 02	0.25673600E 02	0.60974000E 01
852	0.57117000E 05	-0.84469999E 02	0.25609100E 02	0.60326999E 01
853	0.57118000E 05	-0.84389999E 02	0.25547100E 02	0.59694999E 01
854	0.57119000E 05	-0.84620000E 02	0.25486800E 02	0.59229000E 01
855	0.57120000E 05	-0.84669999E 02	0.25419400E 02	0.58721000E 01
856	0.57121000E 05	-0.84730000E 02	0.25350800E 02	0.58103000E 01
857	0.57122000E 05	-0.84799999E 02	0.25272500E 02	0.57664000E 01
858	0.57123000E 05	-0.84839999E 02	0.25203900E 02	0.57058000E 01
859	0.57124000E 05	-0.84889999E 02	0.25140600E 02	0.56399000E 01
860	0.57125000E 05	-0.84929999E 02	0.25087200E 02	0.55879000E 01
861	0.57126000E 05	-0.85000000E 02	0.25025400E 02	0.55300000E 01
862	0.57127000E 05	-0.85020000E 02	0.24970500E 02	0.54640999E 01
863	0.57128000E 05	-0.85120000E 02	0.24933300E 02	0.54367999E 01
864	0.57129000E 05	-0.84990000E 02	0.24882600E 02	0.53530000E 01
865	0.57130000E 05	-0.85179999E 02	0.24827600E 02	0.53076000E 01
866	0.57131000E 05	-0.85270000E 02	0.24764400E 02	0.52610000E 01
867	0.57132000E 05	-0.85290000E 02	0.24701200E 02	0.51964999E 01
868	0.57133000E 05	-0.85339999E 02	0.24642300E 02	0.51565000E 01
869	0.57134000E 05	-0.85400000E 02	0.24581800E 02	0.50879000E 01
870	0.57135000E 05	-0.85469999E 02	0.24498000E 02	0.50371000E 01
871	0.57136000E 05	-0.85509999E 02	0.24445800E 02	0.49727000E 01
872	0.57137000E 05	-0.85530000E 02	0.24401900E 02	0.49313999E 01
873	0.57138000E 05	-0.85610000E 02	0.24355200E 02	0.48889000E 01

*** RAW DATA FILE NO. 1 ***

NO.	TIME	X	Y	Z
874	0.57139000E 05	-0.85629999E 02	0.24296100E 02	0.48049000E 01
875	0.57140000E 05	-0.84429999E 02	0.24239700E 02	0.47776000E 01
876	0.57141000E 05	-0.85679999E 02	0.24179400E 02	0.47556000E 01
877	0.57142000E 05	-0.85770000E 02	0.24116200E 02	0.46278999E 01
878	0.57143000E 05	-0.85809999E 02	0.24064000E 02	0.45813000E 01
879	0.57144000E 05	-0.85860000E 02	0.24010500E 02	0.45386000E 01
880	0.57145000E 05	-0.85910000E 02	0.23950200E 02	0.44714000E 01
881	0.57146000E 05	-0.85900000E 02	0.23884300E 02	0.44260000E 01
882	0.57147000E 05	-0.85980000E 02	0.23832000E 02	0.43778999E 01
883	0.57148000E 05	-0.85990000E 02	0.23778300E 02	0.43135000E 01
884	0.57149000E 05	-0.86099999E 02	0.23724900E 02	0.42722000E 01
885	0.57150000E 05	-0.86099999E 02	0.23680900E 02	0.42336000E 01
886	0.57151000E 05	-0.69950000E 02	0.23628700E 02	0.41858000E 01
887	0.57152000E 05	-0.39940000E 02	0.23575200E 02	0.41677000E 01
888	0.57153000E 05	-0.40180000E 02	0.23512000E 02	0.41623999E 01
889	0.57154000E 05	-0.42470000E 02	0.23443400E 02	0.41377000E 01
890	0.57155000E 05	-0.37640000E 02	0.23366500E 02	0.41184000E 01

*** RAW DATA FILE NO. 2 ***

STATION NO. = 1 DATA TYPE = 6 NO. OF WORDS / FILE = 3392 JULIAN DATE = 38850.5 NO. POINTS = 847

NO.	TIME	X	Y	Z
1	0.62828000E 05	0.95919999E 02	0.21107200E 03	0.35964000E 01
2	0.62829000E 05	0.94549999E 02	0.21102930E 03	0.35293000E 01
3	0.62830000E 05	0.94540000E 02	0.21095800E 03	0.32849000E 01
4	0.62831000E 05	0.94450000E 02	0.21095240E 03	0.34346000E 01
5	0.62832000E 05	0.94330000E 02	0.21098950E 03	0.35251000E 01
6	0.62833000E 05	0.94309999E 02	0.21101980E 03	0.35745000E 01
7	0.62834000E 05	0.94290000E 02	0.21109520E 03	0.36392000E 01
8	0.62835000E 05	0.94200000E 02	0.21115310E 03	0.37024000E 01
9	0.62836000E 05	0.94150000E 02	0.00000000E-38	0.00000000E-38
10	0.62837000E 05	0.93980000E 02	0.21124780E 03	0.38162000E 01
11	0.62838000E 05	0.94089999E 02	0.00000000E-38	0.00000000E-38
12	0.62839000E 05	0.94070000E 02	0.21134250E 03	0.39180000E 01
13	0.62840000E 05	0.93820000E 02	0.00000000E-38	0.00000000E-38
14	0.62841000E 05	0.93950000E 02	0.00000000E-38	0.00000000E-38
15	0.62842000E 05	0.93929999E 02	0.21146750E 03	0.41184000E 01
16	0.62843000E 05	0.93879999E 02	0.21150730E 03	0.41665000E 01
17	0.62844000E 05	0.93900000E 02	0.21154030E 03	0.42336000E 01
18	0.62845000E 05	0.93910000E 02	0.21156910E 03	0.42737000E 01
19	0.62846000E 05	0.93849999E 02	0.21160470E 03	0.43396000E 01
20	0.62847000E 05	0.93799999E 02	0.21165700E 03	0.44082000E 01
21	0.62848000E 05	0.93799999E 02	0.21170650E 03	0.44919000E 01
22	0.62849000E 05	0.93790000E 02	0.21176150E 03	0.45605000E 01
23	0.62850000E 05	0.93700000E 02	0.21179980E 03	0.45840000E 01
24	0.62851000E 05	0.93690000E 02	0.21183690E 03	0.46483999E 01
25	0.62852000E 05	0.93669999E 02	0.21186990E 03	0.47075000E 01
26	0.62853000E 05	0.93459999E 02	0.21192070E 03	0.47761000E 01
27	0.62854000E 05	0.93610000E 02	0.21196870E 03	0.48200999E 01
28	0.62855000E 05	0.93549999E 02	0.21197970E 03	0.48875000E 01
29	0.62856000E 05	0.93520000E 02	0.21203320E 03	0.49753000E 01
30	0.62857000E 05	0.93500000E 02	0.21208540E 03	0.50413000E 01
31	0.62858000E 05	0.93459999E 02	0.21214600E 03	0.50894000E 01
32	0.62859000E 05	0.93410000E 02	0.21219680E 03	0.51345000E 01
33	0.62860000E 05	0.93400000E 02	0.21223780E 03	0.51745999E 01
34	0.62861000E 05	0.92790000E 02	0.21228880E 03	0.52568000E 01
35	0.62862000E 05	0.93290000E 02	0.21234640E 03	0.53322999E 01
36	0.62863000E 05	0.93400000E 02	0.21238770E 03	0.53982000E 01
37	0.62864000E 05	0.93230000E 02	0.21242600E 03	0.54629000E 01

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
38	0.62865000E 05	0.93240000E 02	0.21245900E 03	0.55042000E 01
39	0.62866000E 05	0.93200000E 02	0.21249760E 03	0.55700999E 01
40	0.62867000E 05	0.93169999E 02	0.21254960E 03	0.56372000E 01
41	0.62868000E 05	0.93000000E 02	0.21259640E 03	0.56989999E 01
42	0.62869000E 05	0.93049999E 02	0.21265530E 03	0.57937000E 01
43	0.62870000E 05	0.93049999E 02	0.21269920E 03	0.58281000E 01
44	0.62871000E 05	0.93089999E 02	0.21272120E 03	0.58982000E 01
45	0.62872000E 05	0.92969999E 02	0.21277760E 03	0.59668000E 01
46	0.62873000E 05	0.92959999E 02	0.21282710E 03	0.60300000E 01
47	0.62874000E 05	0.92889999E 02	0.21289160E 03	0.61012999E 01
48	0.62875000E 05	0.92889999E 02	0.21291890E 03	0.61576999E 01
49	0.62876000E 05	0.92830000E 02	0.21296440E 03	0.62524000E 01
50	0.62877000E 05	0.92639999E 02	0.21302200E 03	0.62909999E 01
51	0.62878000E 05	0.92700000E 02	0.21307840E 03	0.63582000E 01
52	0.62879000E 05	0.92660000E 02	0.21313750E 03	0.64529000E 01
53	0.62880000E 05	0.92660000E 02	0.21319510E 03	0.65188000E 01
54	0.62881000E 05	0.92580000E 02	0.21323630E 03	0.65531999E 01
55	0.62882000E 05	0.92530000E 02	0.21328300E 03	0.66191000E 01
56	0.62883000E 05	0.92530000E 02	0.21332280E 03	0.66877000E 01
57	0.62884000E 05	0.92459999E 02	0.21336670E 03	0.67744000E 01
58	0.62885000E 05	0.92349999E 02	0.21342990E 03	0.68237000E 01
59	0.62886000E 05	0.92339999E 02	0.21346440E 03	0.68635000E 01
60	0.62887000E 05	0.92309999E 02	0.21349440E 03	0.69583000E 01
61	0.62888000E 05	0.92240000E 02	0.21355620E 03	0.70366000E 01
62	0.62889000E 05	0.92240000E 02	0.21362500E 03	0.70889000E 01
63	0.62890000E 05	0.92020000E 02	0.21367850E 03	0.71506000E 01
64	0.62891000E 05	0.92169999E 02	0.21373750E 03	0.72219000E 01
65	0.62892000E 05	0.92139999E 02	0.21377880E 03	0.72839000E 01
66	0.62893000E 05	0.92099999E 02	0.21383500E 03	0.73704000E 01
67	0.62894000E 05	0.92000000E 02	0.21388450E 03	0.74363000E 01
68	0.62895000E 05	0.92009999E 02	0.21393380E 03	0.74980000E 01
69	0.62896000E 05	0.91780000E 02	0.21398070E 03	0.75723000E 01
70	0.62897000E 05	0.91889999E 02	0.21403420E 03	0.76339999E 01
71	0.62898000E 05	0.91820000E 02	0.21408500E 03	0.77178000E 01
72	0.62899000E 05	0.91820000E 02	0.21413160E 03	0.77492999E 01
73	0.62900000E 05	0.91730000E 02	0.21418650E 03	0.78538000E 01
74	0.62901000E 05	0.91690000E 02	0.21424710E 03	0.79031000E 01
75	0.62902000E 05	0.91639999E 02	0.21430320E 03	0.79651000E 01

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
76	0.62903000E 05	0.91610000E 02	0.21434860E 03	0.80309999E 01
77	0.62904000E 05	0.91610000E 02	0.21440620E 03	0.81215999E 01
78	0.62905000E 05	0.91490000E 02	0.21445170E 03	0.81791999E 01
79	0.62906000E 05	0.91389999E 02	0.21447900E 03	0.82686000E 01
80	0.62907000E 05	0.91410000E 02	0.21454790E 03	0.83356999E 01
81	0.62908000E 05	0.91230000E 02	0.21461790E 03	0.84058000E 01
82	0.62909000E 05	0.91349999E 02	0.21467680E 03	0.84730999E 01
83	0.62910000E 05	0.91219999E 02	0.21474410E 03	0.85402999E 01
84	0.62911000E 05	0.91200000E 02	0.21478810E 03	0.86062000E 01
85	0.62912000E 05	0.91110000E 02	0.21483470E 03	0.86913999E 01
86	0.62913000E 05	0.91080000E 02	0.21490210E 03	0.87751000E 01
87	0.62914000E 05	0.91040000E 02	0.21493510E 03	0.88190999E 01
88	0.62915000E 05	0.90980000E 02	0.21500370E 03	0.89058000E 01
89	0.62916000E 05	0.90919999E 02	0.21505590E 03	0.89577999E 01
90	0.62917000E 05	0.90910000E 02	0.21510400E 03	0.90497999E 01
91	0.62918000E 05	0.90860000E 02	0.21518210E 03	0.91077000E 01
92	0.62919000E 05	0.90940000E 02	0.21522610E 03	0.91774999E 01
93	0.62920000E 05	0.90740000E 02	0.21529200E 03	0.92804999E 01
94	0.62921000E 05	0.90610000E 02	0.21536350E 03	0.93285999E 01
95	0.62922000E 05	0.90660000E 02	0.21542680E 03	0.94123999E 01
96	0.62923000E 05	0.90490000E 02	0.21547610E 03	0.94823999E 01
97	0.62924000E 05	0.90559999E 02	0.21553930E 03	0.95497999E 01
98	0.62925000E 05	0.90419999E 02	0.21557370E 03	0.96089000E 01
99	0.62926000E 05	0.90389999E 02	0.21561470E 03	0.97213999E 01
100	0.62927000E 05	0.90299999E 02	0.21571090E 03	0.27902000E 01
101	0.62928000E 05	0.90250000E 02	0.21577000E 03	0.98354000E 01
102	0.62929000E 05	0.90209999E 02	0.21580440E 03	0.99218999E 01
103	0.62930000E 05	0.90129999E 02	0.21586890E 03	0.10004400E 02
104	0.62931000E 05	0.90080000E 02	0.21594430E 03	0.10074500E 02
105	0.62932000E 05	0.90030000E 02	0.21601710E 03	0.10141600E 02
106	0.62933000E 05	0.89980000E 02	0.21606520E 03	0.10209000E 02
107	0.62934000E 05	0.89929999E 02	0.21610380E 03	0.10298100E 02
108	0.62935000E 05	0.89849999E 02	0.21619020E 03	0.10380600E 02
109	0.62936000E 05	0.89849999E 02	0.21625490E 03	0.10429900E 02
110	0.62937000E 05	0.89750000E 02	0.21629880E 03	0.10556400E 02
111	0.62938000E 05	0.89709999E 02	0.21637960E 03	0.10622300E 02
112	0.62939000E 05	0.89620000E 02	0.21646360E 03	0.10686800E 02
113	0.62940000E 05	0.89589999E 02	0.21652250E 03	0.10736300E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
114	0.62941000E 05	0.89570000E 02	0.21659670E 03	0.10843500E 02
115	0.62942000E 05	0.89629999E 02	0.21665430E 03	0.10905300E 02
116	0.62943000E 05	0.89290000E 02	0.21671630E 03	0.10995800E 02
117	0.62944000E 05	0.89270000E 02	0.21677660E 03	0.11083700E 02
118	0.62945000E 05	0.89259999E 02	0.21682060E 03	0.11129200E 02
119	0.62946000E 05	0.89129999E 02	0.21689480E 03	0.11237500E 02
120	0.62947000E 05	0.89139999E 02	0.21698120E 03	0.11299300E 02
121	0.62948000E 05	0.88980000E 02	0.21701830E 03	0.11367900E 02
122	0.62949000E 05	0.88980000E 02	0.21708010E 03	0.11453100E 02
123	0.62950000E 05	0.88839999E 02	0.21716380E 03	0.11528600E 02
124	0.62951000E 05	0.88740000E 02	0.21723120E 03	0.11616500E 02
125	0.62952000E 05	0.88879999E 02	0.21727780E 03	0.11675500E 02
126	0.62953000E 05	0.88599999E 02	0.21735210E 03	0.11792200E 02
127	0.62954000E 05	0.88719999E 02	0.21741380E 03	0.11852800E 02
128	0.62955000E 05	0.88530000E 02	0.21747970E 03	0.11924100E 02
129	0.62956000E 05	0.88410000E 02	0.21756760E 03	0.12025900E 02
130	0.62957000E 05	0.88520000E 02	0.21763770E 03	0.12094500E 02
131	0.62958000E 05	0.88250000E 02	0.21771190E 03	0.12178200E 02
132	0.62959000E 05	0.88230000E 02	0.21775850E 03	0.12252400E 02
133	0.62960000E 05	0.88360000E 02	0.21782450E 03	0.12314200E 02
134	0.62961000E 05	0.88040000E 02	0.21790140E 03	0.12419900E 02
135	0.62962000E 05	0.88129999E 02	0.21799460E 03	0.12492700E 02
136	0.62963000E 05	0.88000000E 02	0.21805660E 03	0.12561300E 02
137	0.62964000E 05	0.87969999E 02	0.21809910E 03	0.12642300E 02
138	0.62965000E 05	0.87780000E 02	0.21817870E 03	0.12733200E 02
139	0.62966000E 05	0.87780000E 02	0.21827340E 03	0.12822300E 02
140	0.62967000E 05	0.87700000E 02	0.21834230E 03	0.12903300E 02
141	0.62968000E 05	0.87580000E 02	0.21840820E 03	0.12969200E 02
142	0.62969000E 05	0.87480000E 02	0.21845210E 03	0.13081800E 02
143	0.62970000E 05	0.87379999E 02	0.21855100E 03	0.13147700E 02
144	0.62971000E 05	0.87299999E 02	0.21862920E 03	0.13241200E 02
145	0.62972000E 05	0.87250000E 02	0.21872530E 03	0.13322300E 02
146	0.62973000E 05	0.87179999E 02	0.21880220E 03	0.13396200E 02
147	0.62974000E 05	0.87120000E 02	0.21888600E 03	0.13496600E 02
148	0.62975000E 05	0.87080000E 02	0.21895190E 03	0.13546100E 02
149	0.62976000E 05	0.86969999E 02	0.21902470E 03	0.13659900E 02
150	0.62977000E 05	0.86839999E 02	0.21910420E 03	0.13739700E 02
151	0.62978000E 05	0.86809999E 02	0.21915920E 03	0.13805700E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
152	0.62979000E 05	0.86660000E 02	0.21924170E 03	0.13920900E 02
153	0.62980000E 05	0.86639999E 02	0.21929390E 03	0.13984100E 02
154	0.62981000E 05	0.86540000E 02	0.21936110E 03	0.14077400E 02
155	0.62982000E 05	0.86389999E 02	0.21946140E 03	0.14187300E 02
156	0.62983000E 05	0.86290000E 02	0.21955470E 03	0.14223100E 02
157	0.62984000E 05	0.86219999E 02	0.21965090E 03	0.14341100E 02
158	0.62985000E 05	0.86139999E 02	0.21973880E 03	0.14422100E 02
159	0.62986000E 05	0.86040000E 02	0.21981980E 03	0.14511500E 02
160	0.62987000E 05	0.85919999E 02	0.21989260E 03	0.14599400E 02
161	0.62988000E 05	0.85879999E 02	0.21994070E 03	0.14683100E 02
162	0.62989000E 05	0.85759999E 02	0.21999830E 03	0.14776600E 02
163	0.62990000E 05	0.85679999E 02	0.22009860E 03	0.14846400E 02
164	0.62991000E 05	0.85570000E 02	0.22016990E 03	0.14930400E 02
165	0.62992000E 05	0.85480000E 02	0.22026760E 03	0.15056600E 02
166	0.62993000E 05	0.85400000E 02	0.22035400E 03	0.15125200E 02
167	0.62994000E 05	0.85299999E 02	0.22042970E 03	0.15213100E 02
168	0.62995000E 05	0.85209999E 02	0.22052710E 03	0.15321800E 02
169	0.62996000E 05	0.85129999E 02	0.22060250E 03	0.15372600E 02
170	0.62997000E 05	0.85049999E 02	0.22067940E 03	0.15479700E 02
171	0.62998000E 05	0.84959999E 02	0.22076460E 03	0.15568800E 02
172	0.62999000E 05	0.84849999E 02	0.22084720E 03	0.15659400E 02
173	0.63000000E 05	0.84780000E 02	0.22093770E 03	0.15741900E 02
174	0.63001000E 05	0.84599999E 02	0.22101050E 03	0.15849100E 02
175	0.63002000E 05	0.84509999E 02	0.22111470E 03	0.15915000E 02
176	0.63003000E 05	0.84400000E 02	0.22120000E 03	0.16049600E 02
177	0.63004000E 05	0.84290000E 02	0.22130440E 03	0.16114000E 02
178	0.63005000E 05	0.84200000E 02	0.22140040E 03	0.16208700E 02
179	0.63006000E 05	0.84080000E 02	0.22148830E 03	0.16295400E 02
180	0.63007000E 05	0.83980000E 02	0.22154470E 03	0.16383300E 02
181	0.63008000E 05	0.83910000E 02	0.22163820E 03	0.16468500E 02
182	0.63009000E 05	0.83770000E 02	0.22174240E 03	0.16594700E 02
183	0.63010000E 05	0.83690000E 02	0.22181790E 03	0.16686800E 02
184	0.63011000E 05	0.83559999E 02	0.22191820E 03	0.16736100E 02
185	0.63012000E 05	0.83469999E 02	0.22201860E 03	0.16858400E 02
186	0.63013000E 05	0.83330000E 02	0.22212550E 03	0.16946300E 02
187	0.63014000E 05	0.83209999E 02	0.22223540E 03	0.17057600E 02
188	0.63015000E 05	0.83120000E 02	0.22232320E 03	0.17123500E 02
189	0.63016000E 05	0.83000000E 02	0.22237130E 03	0.17216800E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
190	0.63017000E 05	0.82900000E 02	0.22247170E 03	0.17319800E 02
191	0.63018000E 05	0.82780000E 02	0.22258300E 03	0.17429700E 02
192	0.63019000E 05	0.82669999E 02	0.22270920E 03	0.17517600E 02
193	0.63020000E 05	0.82530000E 02	0.22277930E 03	0.17591800E 02
194	0.63021000E 05	0.82419999E 02	0.22287260E 03	0.17719500E 02
195	0.63022000E 05	0.82290000E 02	0.22297290E 03	0.17786900E 02
196	0.63023000E 05	0.82169999E 02	0.22306760E 03	0.17895300E 02
197	0.63024000E 05	0.82040000E 02	0.22317480E 03	0.17987300E 02
198	0.63025000E 05	0.81929999E 02	0.22326270E 03	0.18088900E 02
199	0.63026000E 05	0.81780000E 02	0.22336300E 03	0.18185100E 02
200	0.63027000E 05	0.81669999E 02	0.22347830E 03	0.12288200E 02
201	0.63028000E 05	0.81559999E 02	0.22359230E 03	0.18358200E 02
202	0.63029000E 05	0.81429999E 02	0.22368160E 03	0.18488500E 02
203	0.63030000E 05	0.81290000E 02	0.22377640E 03	0.18575000E 02
204	0.63031000E 05	0.81169999E 02	0.22387380E 03	0.18667000E 02
205	0.63032000E 05	0.81089999E 02	0.22399050E 03	0.18796100E 02
206	0.63033000E 05	0.80929999E 02	0.22408670E 03	0.18867400E 02
207	0.63034000E 05	0.80860000E 02	0.22418820E 03	0.18970500E 02
208	0.63035000E 05	0.80690000E 02	0.22429130E 03	0.19061300E 02
209	0.63036000E 05	0.80559999E 02	0.22440940E 03	0.19175000E 02
210	0.63037000E 05	0.80379999E 02	0.22451510E 03	0.19275400E 02
211	0.63038000E 05	0.80270000E 02	0.22462500E 03	0.19370100E 02
212	0.63039000E 05	0.80169999E 02	0.22472240E 03	0.19460700E 02
213	0.63040000E 05	0.80030000E 02	0.22482420E 03	0.19583000E 02
214	0.63041000E 05	0.79889999E 02	0.22496000E 03	0.19697000E 02
215	0.63042000E 05	0.79750000E 02	0.22505880E 03	0.19780800E 02
216	0.63043000E 05	0.79650000E 02	0.22517160E 03	0.19890600E 02
217	0.63044000E 05	0.79480000E 02	0.22528420E 03	0.19985400E 02
218	0.63045000E 05	0.79410000E 02	0.22538450E 03	0.20075900E 02
219	0.63046000E 05	0.79200000E 02	0.22550240E 03	0.20184600E 02
220	0.63047000E 05	0.79059999E 02	0.22561110E 03	0.20295700E 02
221	0.63048000E 05	0.78879999E 02	0.22572360E 03	0.20379600E 02
222	0.63049000E 05	0.78740000E 02	0.22584450E 03	0.20492200E 02
223	0.63050000E 05	0.78580000E 02	0.22596390E 03	0.20593800E 02
224	0.63051000E 05	0.78520000E 02	0.22607370E 03	0.20703600E 02
225	0.63052000E 05	0.78250000E 02	0.22619870E 03	0.20820300E 02
226	0.63053000E 05	0.78139999E 02	0.22630030E 03	0.20904100E 02
227	0.63054000E 05	0.78070000E 02	0.22643210E 03	0.21013900E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
228	0.63055000E 05	0.77980000E 02	0.22654200E 03	0.21122600E 02
229	0.63056000E 05	0.77740000E 02	0.22666700E 03	0.21218500E 02
230	0.63057000E 05	0.77570000E 02	0.22679080E 03	0.21325700E 02
231	0.63058000E 05	0.77400000E 02	0.22690060E 03	0.21435500E 02
232	0.63059000E 05	0.77209999E 02	0.22702830E 03	0.21541300E 02
233	0.63060000E 05	0.77049999E 02	0.22715720E 03	0.21651100E 02
234	0.63061000E 05	0.76889999E 02	0.22727540E 03	0.21741900E 02
235	0.63062000E 05	0.76750000E 02	0.22739890E 03	0.21876500E 02
236	0.63063000E 05	0.76549999E 02	0.22754590E 03	0.21982200E 02
237	0.63064000E 05	0.76400000E 02	0.22765450E 03	0.22089400E 02
238	0.63065000E 05	0.76259999E 02	0.22777390E 03	0.22182600E 02
239	0.63066000E 05	0.76099999E 02	0.22790990E 03	0.22309100E 02
240	0.63067000E 05	0.75910000E 02	0.22803220E 03	0.22402300E 02
241	0.63068000E 05	0.75820000E 02	0.22816110E 03	0.22505400E 02
242	0.63069000E 05	0.75610000E 02	0.22829300E 03	0.22616700E 02
243	0.63070000E 05	0.75549999E 02	0.22842630E 03	0.22726600E 02
244	0.63071000E 05	0.75290000E 02	0.22855660E 03	0.22841800E 02
245	0.63672000E 05	0.75120000E 02	0.22868990E 03	0.22949000E 02
246	0.63073000E 05	0.74969999E 02	0.22882710E 03	0.23057400E 02
247	0.63074000E 05	0.74820000E 02	0.22895510E 03	0.23164600E 02
248	0.63075000E 05	0.74580000E 02	0.22909640E 03	0.23281300E 02
249	0.63076000E 05	0.74400000E 02	0.22924460E 03	0.23393800E 02
250	0.63077000E 05	0.74240000E 02	0.22937650E 03	0.23502400E 02
251	0.63078000E 05	0.74030000E 02	0.22951120E 03	0.23628700E 02
252	0.63079000E 05	0.73849999E 02	0.22966210E 03	0.23723400E 02
253	0.63080000E 05	0.73589999E 02	0.22979390E 03	0.23854000E 02
254	0.63081000E 05	0.73400000E 02	0.22992580E 03	0.23941900E 02
255	0.63082000E 05	0.73200000E 02	0.23007960E 03	0.24051800E 02
256	0.63083000E 05	0.73040000E 02	0.23021140E 03	0.24201400E 02
257	0.63084000E 05	0.72849999E 02	0.23036130E 03	0.24308600E 02
258	0.63085000E 05	0.72700000E 02	0.23051510E 03	0.24396500E 02
259	0.63086000E 05	0.72490000E 02	0.23064140E 03	0.24531000E 02
260	0.63087000E 05	0.72250000E 02	0.23079520E 03	0.24636700E 02
261	0.63088000E 05	0.72070000E 02	0.23095170E 03	0.24752200E 02
262	0.63089000E 05	0.71860000E 02	0.23110280E 03	0.24860600E 02
263	0.63090000E 05	0.71679999E 02	0.23125510E 03	0.24973100E 02
264	0.63091000E 05	0.71469999E 02	0.23139530E 03	0.25105000E 02
265	0.63092000E 05	0.71259999E 02	0.23154640E 03	0.25195600E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
266	0.63093000E 05	0.71070000E 02	0.23170560E 03	0.25319300E 02
267	0.63094000E 05	0.70870000E 02	0.23186910E 03	0.25434600E 02
268	0.63095000E 05	0.70669999E 02	0.23200630E 03	0.25563700E 02
269	0.63096000E 05	0.70450000E 02	0.23215750E 03	0.25669400E 02
270	0.63097000E 05	0.70230000E 02	0.23233890E 03	0.25801300E 02
271	0.63098000E 05	0.70020000E 02	0.23248020E 03	0.25911100E 02
272	0.63099000E 05	0.69790000E 02	0.23266280E 03	0.26004600E 02
273	0.63100000E 05	0.69559999E 02	0.23283180E 03	0.26154300E 02
274	0.63101000E 05	0.69360000E 02	0.23299240E 03	0.26246300E 02
275	0.63102000E 05	0.69150000E 02	0.23311890E 03	0.26356200E 02
276	0.63103000E 05	0.68910000E 02	0.23328490E 03	0.26491900E 02
277	0.63104000E 05	0.68709999E 02	0.23346220E 03	0.26600600E 02
278	0.63105000E 05	0.68459999E 02	0.23363110E 03	0.26733600E 02
279	0.63106000E 05	0.68240000E 02	0.23380270E 03	0.26857400E 02
280	0.63107000E 05	0.68049999E 02	0.23397970E 03	0.26967300E 02
281	0.63108000E 05	0.67809999E 02	0.23414060E 03	0.27078400E 02
282	0.63109000E 05	0.67559999E 02	0.23430250E 03	0.27214400E 02
283	0.63110000E 05	0.67339999E 02	0.23448660E 03	0.27320100E 02
284	0.63111000E 05	0.67080000E 02	0.23464990E 03	0.27432900E 02
285	0.63112000E 05	0.66879999E 02	0.23481880E 03	0.27559100E 02
286	0.63113000E 05	0.66639999E 02	0.23499760E 03	0.27605100E 02
287	0.63114000E 05	0.66379999E 02	0.23518140E 03	0.27803500E 02
288	0.63115000E 05	0.66150000E 02	0.23535720E 03	0.27913300E 02
289	0.63116000E 05	0.65910000E 02	0.23553590E 03	0.28043900E 02
290	0.63117000E 05	0.65679999E 02	0.23571700E 03	0.28161900E 02
291	0.63118000E 05	0.65400000E 02	0.23589010E 03	0.28291000E 02
292	0.63119000E 05	0.65169999E 02	0.23607420E 03	0.28399700E 02
293	0.63120000E 05	0.64900000E 02	0.23626640E 03	0.28525900E 02
294	0.63121000E 05	0.64629999E 02	0.23644630E 03	0.28644000E 02
295	0.63122000E 05	0.64379999E 02	0.23664260E 03	0.28774400E 02
296	0.63123000E 05	0.64080000E 02	0.23685130E 03	0.28903600E 02
297	0.63124000E 05	0.63860000E 02	0.23702290E 03	0.29018800E 02
298	0.63125000E 05	0.63580000E 02	0.23722490E 03	0.29145300E 02
299	0.63126000E 05	0.63340000E 02	0.23742820E 03	0.29257800E 02
300	0.63127000E 05	0.63040000E 02	0.23760400E 03	0.22385200E 02
301	0.63128000E 05	0.62850000E 02	0.23780030E 03	0.29516100E 02
302	0.63129000E 05	0.62540000E 02	0.23800490E 03	0.29627200E 02
303	0.63130000E 05	0.62240000E 02	0.23819170E 03	0.29757800E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
342	0.63169000E 05	0.50020000E 02	0.24716750E 03	0.34571000E 02
343	0.63170000E 05	0.49730000E 02	0.24743260E 03	0.34691900E 02
344	0.63171000E 05	0.49360000E 02	0.24769630E 03	0.34812700E 02
345	0.63172000E 05	0.49060000E 02	0.24796000E 03	0.34925500E 02
346	0.63173000E 05	0.48620000E 02	0.24822900E 03	0.35054400E 02
347	0.63174000E 05	0.48230000E 02	0.24851340E 03	0.35164300E 02
348	0.63175000E 05	0.47850000E 02	0.24878250E 03	0.35279800E 02
349	0.63176000E 05	0.47490000E 02	0.24905860E 03	0.35412800E 02
350	0.63177000E 05	0.47110000E 02	0.24933470E 03	0.35535200E 02
351	0.63178000E 05	0.46720000E 02	0.24961470E 03	0.35653300E 02
352	0.63179000E 05	0.46340000E 02	0.24990310E 03	0.35764400E 02
353	0.63180000E 05	0.45990000E 02	0.25018070E 03	0.35889400E 02
354	0.63181000E 05	0.45610000E 02	0.25046630E 03	0.36022700E 02
355	0.63182000E 05	0.45190000E 02	0.25075590E 03	0.36129900E 02
356	0.63183000E 05	0.44880000E 02	0.25104150E 03	0.36238300E 02
357	0.63184000E 05	0.44460000E 02	0.25134370E 03	0.36374300E 02
358	0.63185000E 05	0.44060000E 02	0.25164040E 03	0.36459500E 02
359	0.63186000E 05	0.43680000E 02	0.25193430E 03	0.36591300E 02
360	0.63187000E 05	0.43260000E 02	0.25221850E 03	0.36708000E 02
361	0.63188000E 05	0.42840000E 02	0.25252470E 03	0.36819100E 02
362	0.63189000E 05	0.42490000E 02	0.25284200E 03	0.36929000E 02
363	0.63190000E 05	0.42030000E 02	0.25312350E 03	0.37052700E 02
364	0.63191000E 05	0.41700000E 02	0.25343120E 03	0.37155800E 02
365	0.63192000E 05	0.41220000E 02	0.25374410E 03	0.37277800E 02
366	0.63193000E 05	0.40920000E 02	0.25404490E 03	0.37387700E 02
367	0.63194000E 05	0.40470000E 02	0.25436650E 03	0.37499000E 02
368	0.63195000E 05	0.40090000E 02	0.25467260E 03	0.37608900E 02
369	0.63196000E 05	0.39710000E 02	0.25498970E 03	0.37720000E 02
370	0.63197000E 05	0.39260000E 02	0.25531130E 03	0.37825900E 02
371	0.63198000E 05	0.38810000E 02	0.25563260E 03	0.37939700E 02
372	0.63199000E 05	0.38490000E 02	0.25594850E 03	0.38046900E 02
373	0.63200000E 05	0.38020000E 02	0.25627100E 03	0.38152600E 02
374	0.63201000E 05	0.37620000E 02	0.25660060E 03	0.38261200E 02
375	0.63202000E 05	0.37180000E 02	0.25692480E 03	0.38371100E 02
376	0.63203000E 05	0.36790000E 02	0.25725850E 03	0.38479500E 02
377	0.63204000E 05	0.36270000E 02	0.25760030E 03	0.38589400E 02
378	0.63205000E 05	0.35860000E 02	0.25793140E 03	0.38686800E 02
379	0.63206000E 05	0.35450000E 02	0.25827050E 03	0.38789800E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
304	0.63131000E 05	0.62000000E 02	0.23838260E 03	0.29867700E 02
305	0.63132000E 05	0.61720000E 02	0.23859130E 03	0.30006300E 02
306	0.63133000E 05	0.61460000E 02	0.23879880E 03	0.30113500E 02
307	0.63134000E 05	0.61170000E 02	0.23900880E 03	0.30241200E 02
308	0.63135000E 05	0.60880000E 02	0.23920390E 03	0.30375700E 02
309	0.63136000E 05	0.60600000E 02	0.23940840E 03	0.30488300E 02
310	0.63137000E 05	0.60290000E 02	0.23962550E 03	0.30613300E 02
311	0.63138000E 05	0.60000000E 02	0.23982450E 03	0.30749300E 02
312	0.63139000E 05	0.59720000E 02	0.24003880E 03	0.30863300E 02
313	0.63140000E 05	0.59410000E 02	0.24025440E 03	0.30993700E 02
314	0.63141000E 05	0.59140000E 02	0.24046870E 03	0.31102300E 02
315	0.63142000E 05	0.58880000E 02	0.24068970E 03	0.31230000E 02
316	0.63143000E 05	0.58580000E 02	0.24090530E 03	0.31363000E 02
317	0.63144000E 05	0.58290000E 02	0.24111960E 03	0.31478500E 02
318	0.63145000E 05	0.57950000E 02	0.24134200E 03	0.31606200E 02
319	0.63146000E 05	0.57650000E 02	0.24158370E 03	0.31740700E 02
320	0.63147000E 05	0.57320000E 02	0.24179390E 03	0.31852100E 02
321	0.63148000E 05	0.57040000E 02	0.24201780E 03	0.31975600E 02
322	0.63149000E 05	0.56750000E 02	0.24224290E 03	0.32091100E 02
323	0.63150000E 05	0.56420000E 02	0.24247630E 03	0.32225600E 02
324	0.63151000E 05	0.56140000E 02	0.24271800E 03	0.32349100E 02
325	0.63152000E 05	0.55880000E 02	0.24294600E 03	0.32481000E 02
326	0.63153000E 05	0.55510000E 02	0.24317410E 03	0.32596400E 02
327	0.63154000E 05	0.55180000E 02	0.24341020E 03	0.32722700E 02
328	0.63155000E 05	0.54790000E 02	0.24365330E 03	0.32854500E 02
329	0.63156000E 05	0.54480000E 02	0.24389360E 03	0.32973900E 02
330	0.63157000E 05	0.54170000E 02	0.24412570E 03	0.33100300E 02
331	0.63158000E 05	0.53840000E 02	0.24436740E 03	0.33211700E 02
332	0.63159000E 05	0.53490000E 02	0.24461870E 03	0.33344700E 02
333	0.63160000E 05	0.53180000E 02	0.24486450E 03	0.33473900E 02
334	0.63161000E 05	0.52850000E 02	0.24510620E 03	0.33589100E 02
335	0.63162000E 05	0.52510000E 02	0.24536720E 03	0.33711400E 02
336	0.63163000E 05	0.52180000E 02	0.24560690E 03	0.33830800E 02
337	0.63164000E 05	0.51840000E 02	0.24586990E 03	0.33966800E 02
338	0.63185000E 05	0.51540000E 02	0.24612790E 03	0.34089100E 02
339	0.63166000E 05	0.51170000E 02	0.24638620E 03	0.34201700E 02
340	0.63167000E 05	0.50790000E 02	0.24663890E 03	0.34329300E 02
341	0.63168000E 05	0.50420000E 02	0.24692310E 03	0.34444800E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
380	0.63207000E 05	0.35000000E 02	0.25860420E 03	0.38883300E 02
381	0.63208000E 05	0.34610000E 02	0.25893800E 03	0.38993200E 02
382	0.63209000E 05	0.34120000E 02	0.25928540E 03	0.39098900E 02
383	0.63210000E 05	0.33800000E 02	0.25962890E 03	0.39192100E 02
384	0.63211000E 05	0.33350000E 02	0.25997340E 03	0.39296600E 02
385	0.63212000E 05	0.32910000E 02	0.26032100E 03	0.39384500E 02
386	0.63213000E 05	0.32410000E 02	0.26066550E 03	0.39473900E 02
387	0.63214000E 05	0.31960000E 02	0.26103640E 03	0.39585000E 02
388	0.63215000E 05	0.31560000E 02	0.26138110E 03	0.39675500E 02
389	0.63216000E 05	0.31110000E 02	0.26173540E 03	0.39780000E 02
390	0.63217000E 05	0.30720000E 02	0.26209940E 03	0.39863800E 02
391	0.63218000E 05	0.30220000E 02	0.26245630E 03	0.39953100E 02
392	0.63219000E 05	0.29800000E 02	0.26281760E 03	0.40042200E 02
393	0.63220000E 05	0.29320000E 02	0.26317460E 03	0.40135700E 02
394	0.63221000E 05	0.28880000E 02	0.26354810E 03	0.40223600E 02
395	0.63222000E 05	0.28390000E 02	0.26391630E 03	0.40311500E 02
396	0.63223000E 05	0.27990000E 02	0.26427730E 03	0.40399400E 02
397	0.63224000E 05	0.27540000E 02	0.26465920E 03	0.40488500E 02
398	0.63225000E 05	0.27000000E 02	0.26503420E 03	0.40571000E 02
399	0.63226000E 05	0.26570000E 02	0.26539380E 03	0.40654800E 02
400	0.63227000E 05	0.26090000E 02	0.26577290E 03	0.42726200E 02
401	0.63228000E 05	0.25560000E 02	0.26615870E 03	0.40815400E 02
402	0.63229000E 05	0.25170000E 02	0.26653780E 03	0.40896500E 02
403	0.63230000E 05	0.24770000E 02	0.26691670E 03	0.40969200E 02
404	0.63231000E 05	0.24450000E 02	0.26729590E 03	0.41054400E 02
405	0.63232000E 05	0.24010000E 02	0.26768460E 03	0.41125700E 02
406	0.63233000E 05	0.23180000E 02	0.26808690E 03	0.41205600E 02
407	0.63234000E 05	0.22670000E 02	0.26847830E 03	0.41274200E 02
408	0.63235000E 05	0.22260000E 02	0.26886010E 03	0.41349600E 02
409	0.63236000E 05	0.21910000E 02	0.26924190E 03	0.41411400E 02
410	0.63237000E 05	0.21520000E 02	0.26965230E 03	0.41484400E 02
411	0.63238000E 05	0.21120000E 02	0.27004660E 03	0.41557100E 02
412	0.63239000E 05	0.20680000E 02	0.27044070E 03	0.41629900E 02
413	0.63240000E 05	0.20210000E 02	0.27083500E 03	0.41680700E 02
414	0.63241000E 05	0.19750000E 02	0.27122900E 03	0.41737100E 02
415	0.63242000E 05	0.19350000E 02	0.27163550E 03	0.41803000E 02
416	0.63243000E 05	0.18970000E 02	0.27202690E 03	0.41871600E 02
417	0.63244000E 05	0.18540000E 02	0.27243750E 03	0.41929200E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
418	0.63245000E 05	0.18070000E 02	0.27284400E 03	0.41981400E 02
419	0.63246000E 05	0.17630000E 02	0.27325200E 03	0.42041700E 02
420	0.63247000E 05	0.17200000E 02	0.27366380E 03	0.42092500E 02
421	0.63248000E 05	0.16890000E 02	0.27406880E 03	0.42153100E 02
422	0.63249000E 05	0.16400000E 02	0.27447660E 03	0.42202400E 02
423	0.63250000E 05	0.16090000E 02	0.27489700E 03	0.42239500E 02
424	0.63251000E 05	0.15610000E 02	0.27530080E 03	0.42286400E 02
425	0.63252000E 05	0.15190000E 02	0.27572090E 03	0.42348100E 02
426	0.63253000E 05	0.14800000E 02	0.27613040E 03	0.42390600E 02
427	0.63254000E 05	0.14210000E 02	0.27654790E 03	0.42438700E 02
428	0.63255000E 05	0.13660000E 02	0.27696660E 03	0.42478500E 02
429	0.63256000E 05	0.13150000E 02	0.27739230E 03	0.42522500E 02
430	0.63257000E 05	0.12580000E 02	0.27780980E 03	0.42550000E 02
431	0.63258000E 05	0.12000000E 02	0.27822730E 03	0.42572000E 02
432	0.63259000E 05	0.11660000E 02	0.27863920E 03	0.42616000E 02
433	0.63260000E 05	0.11390000E 02	0.27906490E 03	0.42661100E 02
434	0.63261000E 05	0.11000000E 02	0.27948930E 03	0.42681900E 02
435	0.63262000E 05	0.10670000E 02	0.27991240E 03	0.42703900E 02
436	0.63263000E 05	0.10030000E 02	0.28034350E 03	0.42749000E 02
437	0.63264000E 05	0.94499999E 01	0.28077050E 03	0.42790300E 02
438	0.63265000E 05	0.92099999E 01	0.28118800E 03	0.42808100E 02
439	0.63266000E 05	0.90400000E 01	0.28160960E 03	0.42813700E 02
440	0.63267000E 05	0.86600000E 01	0.28203540E 03	0.42835700E 02
441	0.63268000E 05	0.79899999E 01	0.28246800E 03	0.42852100E 02
442	0.63269000E 05	0.77100000E 01	0.28289230E 03	0.42882300E 02
443	0.63270000E 05	0.72500000E 01	0.28332080E 03	0.42900100E 02
444	0.63271000E 05	0.64800000E 01	0.28374100E 03	0.42922100E 02
445	0.63272000E 05	0.54100000E 01	0.28418460E 03	0.42918000E 02
446	0.63273000E 05	0.53099999E 01	0.28461990E 03	0.42942600E 02
447	0.63274000E 05	0.47100000E 01	0.28507320E 03	0.42948200E 02
448	0.63275000E 05	0.38200000E 01	0.28548780E 03	0.42945600E 02
449	0.63276000E 05	0.28100000E 01	0.28589720E 03	0.42966100E 02
450	0.63277000E 05	0.29100000E 01	0.28631050E 03	0.42963400E 02
451	0.63278000E 05	-0.22000000E 01	0.28674320E 03	0.42963400E 02
452	0.63279000E 05	-0.18400000E 01	0.28717290E 03	0.42963400E 02
453	0.63280000E 05	-0.18300000E 01	0.28761380E 03	0.42963400E 02
454	0.63281000E 05	-0.18800000E 01	0.28803390E 03	0.42963400E 02
455	0.63282000E 05	-0.24100000E 01	0.28846390E 03	0.42949500E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
456	0.63283000E 05	-0.30200000E 01	0.28888940E 03	0.42948200E 02
457	0.63284000E 05	-0.31500000E 01	0.28931790E 03	0.42941400E 02
458	0.63285000E 05	-0.38800000E 01	0.28974370E 03	0.42944100E 02
459	0.63286000E 05	-0.45599999E 01	0.29017090E 03	0.42931600E 02
460	0.63287000E 05	-0.46900000E 01	0.29059380E 03	0.42902800E 02
461	0.63288000E 05	-0.54200000E 01	0.29102080E 03	0.42900100E 02
462	0.63289000E 05	-0.61100000E 01	0.29144920E 03	0.42874000E 02
463	0.63290000E 05	-0.62300000E 01	0.29188180E 03	0.42839600E 02
464	0.63291000E 05	-0.69800000E 01	0.29229130E 03	0.42843800E 02
465	0.63292000E 05	-0.76500000E 01	0.29271830E 03	0.42810800E 02
466	0.63293000E 05	-0.77800000E 01	0.29314670E 03	0.42799800E 02
467	0.63294000E 05	-0.86099999E 01	0.29356840E 03	0.42765600E 02
468	0.63295000E 05	-0.90899999E 01	0.29399000E 03	0.42728500E 02
469	0.63296000E 05	-0.93800000E 01	0.29440870E 03	0.42711900E 02
470	0.63297000E 05	-0.10230000E 02	0.29483300E 03	0.42662600E 02
471	0.63298000E 05	-0.10470000E 02	0.29525460E 03	0.42641800E 02
472	0.63299000E 05	-0.10970000E 02	0.29566410E 03	0.42597900E 02
473	0.63300000E 05	-0.11760000E 02	0.29608540E 03	0.42550000E 02
474	0.63301000E 05	-0.12010000E 02	0.29650850E 03	0.42528100E 02
475	0.63302000E 05	-0.12750000E 02	0.29691500E 03	0.42504600E 02
476	0.63303000E 05	-0.13080000E 02	0.29734350E 03	0.42442900E 02
477	0.63304000E 05	-0.13560000E 02	0.29774850E 03	0.42415300E 02
478	0.63305000E 05	-0.14090000E 02	0.29815500E 03	0.42364500E 02
479	0.63306000E 05	-0.14600000E 02	0.29856840E 03	0.42312300E 02
480	0.63307000E 05	-0.15070000E 02	0.29898190E 03	0.42284900E 02
481	0.63308000E 05	-0.15610000E 02	0.29938130E 03	0.42221700E 02
482	0.63309000E 05	-0.16090000E 02	0.29981130E 03	0.42180400E 02
483	0.63310000E 05	-0.16590000E 02	0.30019430E 03	0.42128400E 02
484	0.63311000E 05	-0.17080000E 02	0.30059810E 03	0.42067900E 02
485	0.63312000E 05	-0.17600000E 02	0.30100340E 03	0.42017100E 02
486	0.63313000E 05	-0.18080000E 02	0.30140430E 03	0.41959500E 02
487	0.63314000E 05	-0.18580000E 02	0.30181490E 03	0.41907200E 02
488	0.63315000E 05	-0.19020000E 02	0.30220630E 03	0.41842800E 02
489	0.63316000E 05	-0.19580000E 02	0.30261280E 03	0.41797400E 02
490	0.63317000E 05	-0.20080000E 02	0.30300290E 03	0.41731400E 02
491	0.63318000E 05	-0.20540000E 02	0.30339140E 03	0.41646200E 02
492	0.63319000E 05	-0.20990000E 02	0.30378980E 03	0.41603800E 02
493	0.63320000E 05	-0.21470000E 02	0.30417850E 03	0.41535200E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
494	0.63321000E 05	-0.21940000E 02	0.30456690E 03	0.41454100E 02
495	0.63322000E 05	-0.22450000E 02	0.30495290E 03	0.41388200E 02
496	0.63323000E 05	-0.22920000E 02	0.30533740E 03	0.41322300E 02
497	0.63324000E 05	-0.23390000E 02	0.30572750E 03	0.41249500E 02
498	0.63325000E 05	-0.23840000E 02	0.30611740E 03	0.41169700E 02
499	0.63326000E 05	-0.24330000E 02	0.30648680E 03	0.41096900E 02
500	0.63327000E 05	-0.24750000E 02	0.30686450E 03	0.42015200E 02
501	0.63328000E 05	-0.25220000E 02	0.30725050E 03	0.40950000E 02
502	0.63329000E 05	-0.25640000E 02	0.30761160E 03	0.40870400E 02
503	0.63330000E 05	-0.26150000E 02	0.30798360E 03	0.40793500E 02
504	0.63331000E 05	-0.26660000E 02	0.30836280E 03	0.40708300E 02
505	0.63332000E 05	-0.27030000E 02	0.30872120E 03	0.40634300E 02
506	0.63333000E 05	-0.27600000E 02	0.30909740E 03	0.40553200E 02
507	0.63334000E 05	-0.27920000E 02	0.30946290E 03	0.40466600E 02
508	0.63335000E 05	-0.28410000E 02	0.30982400E 03	0.40374800E 02
509	0.63336000E 05	-0.28910000E 02	0.31020020E 03	0.40286900E 02
510	0.63337000E 05	-0.29400000E 02	0.31055180E 03	0.40215300E 02
511	0.63338000E 05	-0.29740000E 02	0.31091020E 03	0.40115000E 02
512	0.63339000E 05	-0.30290000E 02	-0.48725800E 02	0.40041000E 02
513	0.63340000E 05	-0.30700000E 02	0.31162720E 03	0.39939200E 02
514	0.63341000E 05	-0.31170000E 02	0.31197050E 03	0.39889900E 02
515	0.63342000E 05	-0.31550000E 02	0.31232320E 03	0.39763400E 02
516	0.63343000E 05	-0.31980000E 02	0.31266530E 03	0.39672900E 02
517	0.63344000E 05	-0.32430000E 02	0.31302100E 03	0.39578100E 02
518	0.63345000E 05	-0.33000000E 02	0.31336840E 03	0.39491700E 02
519	0.63346000E 05	-0.33300000E 02	-0.46275900E 02	0.39380400E 02
520	0.63347000E 05	-0.33820000E 02	0.31406320E 03	0.39314500E 02
521	0.63348000E 05	-0.34180000E 02	0.31438870E 03	0.39189500E 02
522	0.63349000E 05	-0.34650000E 02	0.31472530E 03	0.39108400E 02
523	0.63350000E 05	-0.35070000E 02	0.31505620E 03	0.38990500E 02
524	0.63351000E 05	-0.35550000E 02	0.31538310E 03	0.38902600E 02
525	0.63352000E 05	-0.35960000E 02	0.31573730E 03	0.38792700E 02
526	0.63353000E 05	-0.36420000E 02	0.31604910E 03	0.38699200E 02
527	0.63354000E 05	-0.36800000E 02	0.31637870E 03	0.38592000E 02
528	0.63355000E 05	-0.37220000E 02	0.31669040E 03	0.38504200E 02
529	0.63356000E 05	-0.37620000E 02	0.31701440E 03	0.38391600E 02
530	0.63357000E 05	-0.38030000E 02	0.31733720E 03	0.38291300E 02
531	0.63358000E 05	-0.38420000E 02	0.31765160E 03	0.38177500E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
532	0.63359000E 05	-0.38860000E 02	0.31797020E 03	0.38088100E 02
533	0.63360000E 05	-0.39250000E 02	0.31828610E 03	0.37996100E 02
534	0.63361000E 05	-0.39660000E 02	0.31859110E 03	0.37871100E 02
535	0.63362000E 05	-0.40010000E 02	0.31890820E 03	0.37762700E 02
536	0.63363000E 05	-0.40450000E 02	0.31921730E 03	0.37651400E 02
537	0.63364000E 05	-0.40880000E 02	0.31951540E 03	0.37560800E 02
538	0.63365000E 05	-0.41240000E 02	0.31982840E 03	0.37441400E 02
539	0.63366000E 05	-0.41640000E 02	0.32013600E 03	0.37336900E 02
540	0.63367000E 05	-0.42010000E 02	0.32042580E 03	0.37214600E 02
541	0.63368000E 05	-0.42400000E 02	0.32072780E 03	0.37104700E 02
542	0.63369000E 05	-0.42800000E 02	0.32102440E 03	0.37007300E 02
543	0.63370000E 05	-0.43200000E 02	0.32132810E 03	0.36885000E 02
544	0.63371000E 05	-0.43560000E 02	0.32160820E 03	0.36775100E 02
545	0.63372000E 05	-0.43920000E 02	0.32189650E 03	0.36681900E 02
546	0.63373000E 05	-0.44300000E 02	0.32219870E 03	0.36572000E 02
547	0.63374000E 05	-0.44670000E 02	0.32247340E 03	0.36442900E 02
548	0.63375000E 05	-0.45040000E 02	0.32276030E 03	0.36327600E 02
549	0.63376000E 05	-0.45420000E 02	0.32304050E 03	0.36216300E 02
550	0.63377000E 05	-0.45770000E 02	0.32332470E 03	0.36120100E 02
551	0.63378000E 05	-0.46090000E 02	0.32359130E 03	0.35984100E 02
552	0.63379000E 05	-0.46490000E 02	0.32387700E 03	0.35870400E 02
553	0.63380000E 05	-0.46840000E 02	0.32416110E 03	0.35754900E 02
554	0.63381000E 05	-0.47190000E 02	0.32444120E 03	0.35631300E 02
555	0.63862000E 05	-0.47540000E 02	0.32470090E 03	0.35537800E 02
556	0.63383000E 05	-0.47850000E 02	0.32496580E 03	0.35387000E 02
557	0.63384000E 05	-0.48210000E 02	0.32522270E 03	0.35303000E 02
558	0.63385000E 05	-0.48570000E 02	0.32549730E 03	0.35183600E 02
559	0.63386000E 05	-0.48960000E 02	0.32577050E 03	0.35060100E 02
560	0.63387000E 05	-0.49270000E 02	0.32600950E 03	0.34951400E 02
561	0.63388000E 05	-0.49630000E 02	0.32627590E 03	0.34833500E 02
562	0.63389000E 05	-0.49950000E 02	0.32653420E 03	0.34722200E 02
563	0.63390000E 05	-0.50290000E 02	0.32680320E 03	0.34599900E 02
564	0.63391000E 05	-0.50630000E 02	0.32705320E 03	0.34486100E 02
565	0.63392000E 05	-0.50930000E 02	0.32730470E 03	0.34356900E 02
566	0.63393000E 05	-0.51290000E 02	0.32754490E 03	0.34242900E 02
567	0.63394000E 05	-0.51570000E 02	0.32779760E 03	0.34116500E 02
568	0.63395000E 05	-0.51940000E 02	0.32804880E 03	0.34005400E 02
569	0.63396000E 05	-0.52250000E 02	0.32829740E 03	0.33881800E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
570	0.63397000E 05	-0.52610000E 02	0.32855420E 03	0.33777300E 02
571	0.63398000E 05	-0.52920000E 02	0.32877390E 03	0.33652300E 02
572	0.63399000E 05	-0.53200000E 02	0.32901860E 03	0.33537100E 02
573	0.63400000E 05	-0.53550000E 02	0.32927250E 03	0.33439500E 02
574	0.63401000E 05	-0.53800000E 02	0.32950200E 03	0.33288600E 02
575	0.63402000E 05	-0.54120000E 02	0.32972970E 03	0.33186800E 02
576	0.63403000E 05	-0.54340000E 02	0.32998390E 03	0.33052200E 02
577	0.63404000E 05	-0.54610000E 02	0.33021190E 03	0.32950700E 02
578	0.63405000E 05	-0.54920000E 02	0.33042330E 03	0.32816200E 02
579	0.63406000E 05	-0.55110000E 02	0.33064720E 03	0.32700700E 02
580	0.63407000E 05	-0.55460000E 02	0.33087380E 03	0.32590800E 02
581	0.63408000E 05	-0.55840000E 02	0.33110300E 03	0.32460400E 02
582	0.63409000E 05	-0.56090000E 02	0.33133370E 03	0.32349100E 02
583	0.63410000E 05	-0.56360000E 02	0.33154390E 03	0.32218800E 02
584	0.63411000E 05	-0.56680000E 02	0.33176900E 03	0.32107400E 02
585	0.63412000E 05	-0.57010000E 02	0.33198610E 03	0.32001700E 02
586	0.63413000E 05	-0.57330000E 02	0.33220850E 03	0.31865700E 02
587	0.63414000E 05	-0.57610000E 02	0.33241720E 03	0.31736600E 02
588	0.63415000E 05	-0.57900000E 02	0.33263700E 03	0.31626700E 02
589	0.63416000E 05	-0.58190000E 02	0.33284030E 03	0.31497800E 02
590	0.63417000E 05	-0.58510000E 02	0.33305440E 03	0.31385000E 02
591	0.63418000E 05	-0.58770000E 02	0.33327030E 03	0.31273900E 02
592	0.63419000E 05	-0.59060000E 02	0.33346920E 03	0.31166700E 02
593	0.63420000E 05	-0.59350000E 02	0.33367380E 03	0.31030800E 02
594	0.63421000E 05	-0.59640000E 02	0.33388550E 03	0.30920900E 02
595	0.63422000E 05	-0.59880000E 02	0.33409280E 03	0.30798600E 02
596	0.63413000E 05	-0.57330000E 02	0.33220850E 03	0.31865700E 02
597	0.63414000E 05	-0.57610000E 02	0.33241720E 03	0.31736600E 02
598	0.63415000E 05	-0.57900000E 02	0.33263700E 03	0.31626700E 02
599	0.63416000E 05	-0.58190000E 02	0.33284030E 03	0.31497800E 02
600	0.63417000E 05	-0.58510000E 02	0.33305440E 03	0.32385200E 02
601	0.63418000E 05	-0.58770000E 02	0.33327030E 03	0.31273900E 02
602	0.63419000E 05	-0.59060000E 02	0.33346920E 03	0.31166700E 02
603	0.63920000E 05	-0.59350000E 02	0.33367380E 03	0.31030800E 02
604	0.63421000E 05	-0.59640000E 02	0.33388550E 03	0.30920900E 02
605	0.63422000E 05	-0.59880000E 02	0.33409280E 03	0.30798600E 02
606	0.63423000E 05	-0.60120000E 02	0.33308300E 02	0.30666700E 02
607	0.63424000E 05	0.60430000E 02	0.33450200E 03	0.30573500E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
608	0.63425000E 05	-0.60660000E 02	0.33471340E 03	0.30439000E 02
609	0.63426000E 05	-0.60920000E 02	0.33488530E 03	0.30314000E 02
610	0.63427000E 05	-0.61170000E 02	0.33507590E 03	0.30198500E 02
611	0.63428000E 05	-0.61420000E 02	0.33529030E 03	0.30092800E 02
612	0.63429000E 05	-0.61700000E 02	0.33547560E 03	0.29962400E 02
613	0.63430000E 05	-0.61960000E 02	0.33568020E 03	0.29868900E 02
614	0.63431000E 05	-0.62170000E 02	0.33588350E 03	0.29718000E 02
615	0.63432000E 05	-0.62450000E 02	0.33604270E 03	0.29624500E 02
616	0.63433000E 05	-0.62720000E 02	0.33624050E 03	0.29495400E 02
617	0.63434000E 05	-0.62960000E 02	0.33642040E 03	0.29366500E 02
618	0.63435000E 05	-0.63180000E 02	0.33660860E 03	0.29256600E 02
619	0.63436000E 05	-0.63400000E 02	-0.23204600E 02	0.29142600E 02
620	0.63437000E 05	-0.63630000E 02	0.33697530E 03	0.29031200E 02
621	0.63438000E 05	-0.63890000E 02	0.33715800E 03	0.28900900E 02
622	0.63439000E 05	-0.64110000E 02	0.33733230E 03	0.28795200E 02
623	0.63440000E 05	-0.64349999E 02	0.33751220E 03	0.28681200E 02
624	0.63441000E 05	-0.64580000E 02	0.33769630E 03	0.28572500E 02
625	0.63442000E 05	-0.64839999E 02	0.33787740E 03	0.28438000E 02
626	0.63443000E 05	-0.65020000E 02	0.33805320E 03	0.28311800E 02
627	0.63444000E 05	-0.65219999E 02	0.33821260E 03	0.28218300E 02
628	0.63445000E 05	-0.65490000E 02	0.33838990E 03	0.28111100E 02
629	0.63446000E 05	-0.65709999E 02	0.33857370E 03	0.27979200E 02
630	0.63447000E 05	-0.65940000E 02	0.33873850E 03	0.27873500E 02
631	0.63448000E 05	-0.66139999E 02	0.33889650E 03	0.27744400E 02
632	0.63449000E 05	-0.66389999E 02	0.33907640E 03	0.27647000E 02
633	0.63450000E 05	-0.66599999E 02	0.33924390E 03	0.27517800E 02
634	0.63451000E 05	-0.66809999E 02	0.33941550E 03	0.27431400E 02
635	0.63452000E 05	-0.67009999E 02	0.33957350E 03	0.27299600E 02
636	0.63453000E 05	-0.67209999E 02	0.33972730E 03	0.27169200E 02
637	0.63454000E 05	-0.67450000E 02	0.33990040E 03	0.27078400E 02
638	0.63455000E 05	-0.67639999E 02	0.34006370E 03	0.26952100E 02
639	0.63456000E 05	-0.67849999E 02	0.34022850E 03	0.26858600E 02
640	0.63457000E 05	-0.68040000E 02	0.34037960E 03	0.26728300E 02
641	0.63458000E 05	-0.68209999E 02	0.34055130E 03	0.26622600E 02
642	0.63459000E 05	-0.68429999E 02	0.34072290E 03	0.26488000E 02
643	0.63460000E 05	-0.68639999E 02	0.34086300E 03	0.26404100E 02
644	0.63461000E 05	-0.68830000E 02	0.34100320E 03	0.26271000E 02
645	0.63462000E 05	-0.68969999E 02	0.34117330E 03	0.26184300E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
646	0.63463000E 05	-0.69200000E 02	0.34131760E 03	0.26052500E 02
647	0.63464000E 05	-0.69360000E 02	0.34146610E 03	0.25935800E 02
648	0.63465000E 05	-0.69530000E 02	0.34161990E 03	0.25832800E 02
649	0.63466000E 05	-0.69780000E 02	0.34177490E 03	0.25721700E 02
650	0.63467000E 05	-0.69980000E 02	0.34191500E 03	0.25613000E 02
651	0.63468000E 05	-0.70179999E 02	0.35331880E 03	0.25473100E 02
652	0.63469000E 05	-0.70360000E 02	0.34221170E 03	0.25405800E 02
653	0.63470000E 05	-0.70549999E 02	0.34237230E 03	0.25282200E 02
654	0.63471000E 05	-0.70730000E 02	0.34252610E 03	0.25187500E 02
655	0.63472000E 05	-0.70919999E 02	0.34265110E 03	0.25055700E 02
656	0.63473000E 05	-0.71080000E 02	0.34278710E 03	0.24970500E 02
657	0.63474000E 05	-0.71259999E 02	0.34293820E 03	0.24844000E 02
658	0.63475000E 05	-0.71450000E 02	0.34307810E 03	0.24746600E 02
659	0.63476000E 05	-0.71629999E 02	0.34322780E 03	0.24639400E 02
660	0.63477000E 05	-0.71790000E 02	0.34337480E 03	0.24533700E 02
661	0.63478000E 05	-0.71959999E 02	0.34349290E 03	0.24396500E 02
662	0.63479000E 05	-0.72099999E 02	0.34362330E 03	0.24329100E 02
663	0.63480000E 05	-0.72290000E 02	0.35504100E 03	0.24197300E 02
664	0.63481000E 05	-0.72450000E 02	0.34394600E 03	0.24109400E 02
665	0.63482000E 05	-0.72660000E 02	0.34404910E 03	0.24003700E 02
666	0.63483000E 05	-0.72780000E 02	-0.45828000E 01	0.23893800E 02
667	0.63484000E 05	-0.72940000E 02	0.34430050E 03	0.23781200E 02
668	0.63485000E 05	-0.73129999E 02	0.35568090E 03	0.23672600E 02
669	0.63486000E 05	-0.73290000E 02	0.34458330E 03	0.23568400E 02
670	0.63487000E 05	-0.73410000E 02	0.35595140E 03	0.23432400E 02
671	0.63488000E 05	-0.73580000E 02	0.34482230E 03	0.23365000E 02
672	0.63489000E 05	-0.73719999E 02	0.35620260E 03	0.23256600E 02
673	0.63490000E 05	-0.73799999E 02	0.35633450E 03	0.23145300E 02
674	0.63491000E 05	-0.74030000E 02	0.35646630E 03	0.23032700E 02
675	0.63492000E 05	-0.74190000E 02	0.34533720E 03	0.22949000E 02
676	0.63493000E 05	-0.74240000E 02	0.34545950E 03	0.22835000E 02
677	0.63494000E 05	-0.74540000E 02	0.34559550E 03	0.22710000E 02
678	0.63495000E 05	-0.74709999E 02	0.35697730E 03	0.22638700E 02
679	0.63496000E 05	-0.74820000E 02	0.34585080E 03	0.22508100E 02
680	0.63497000E 05	-0.74929999E 02	0.34596070E 03	0.22424300E 02
681	0.63498000E 05	-0.75070000E 02	0.34608570E 03	0.22307600E 02
682	0.63499000E 05	-0.75230000E 02	-0.25518000E 01	0.22221200E 02
683	0.63500000E 05	-0.75339999E 02	0.34632200E 03	0.22114000E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
684	0.63501000E 05	-0.75520000E 02	-0.22881000E 01	0.22031500E 02
685	0.63502000E 05	-0.75639999E 02	0.34656490E 03	0.21891600E 02
686	0.63503000E 05	-0.75790000E 02	0.34667630E 03	0.21802200E 02
687	0.63504000E 05	-0.75950000E 02	0.34678880E 03	0.21714400E 02
688	0.63505000E 05	-0.76120000E 02	0.34691530E 03	0.21611300E 02
689	0.63506000E 05	-0.76200000E 02	0.34702510E 03	0.21497300E 02
690	0.63507000E 05	-0.76330000E 02	0.35838890E 03	0.21432900E 02
691	0.63508000E 05	-0.76490000E 02	0.35850980E 03	0.21305200E 02
692	0.63509000E 05	-0.76660000E 02	0.34740410E 03	0.21218500E 02
693	0.63510000E 05	-0.76759999E 02	0.35875560E 03	0.21107400E 02
694	0.63511000E 05	-0.76889999E 02	0.35886690E 03	0.21015400E 02
695	0.63512000E 05	-0.77009999E 02	0.35896020E 03	0.20927500E 02
696	0.63513000E 05	-0.77099999E 02	-0.93260000E 00	0.20797100E 02
697	0.63514000E 05	-0.77309999E 02	-0.80350000E 00	0.20707800E 02
698	0.63515000E 05	-0.77459999E 02	-0.70609999E 00	0.20599400E 02
699	0.63516000E 05	-0.77580000E 02	0.35939430E 03	0.20532000E 02
700	0.63517000E 05	-0.77709999E 02	0.35950560E 03	0.22418200E 02
701	0.63518000E 05	-0.77839999E 02	0.35962350E 03	0.20334200E 02
702	0.63519000E 05	-0.77940000E 02	0.35974850E 03	0.20222900E 02
703	0.63540000E 05	-0.78059999E 02	0.34858790E 03	0.20132300E 02
704	0.63521000E 05	-0.78139999E 02	-0.67399999E-01	0.20023900E 02
705	0.63522000E 05	-0.78250000E 02	0.34878420E 03	0.19937300E 02
706	0.63523000E 05	-0.78360000E 02	0.34889280E 03	0.19848100E 02
707	0.63524000E 05	-0.78400000E 02	0.34900660E 03	0.19741000E 02
708	0.63525000E 05	-0.78540000E 02	0.34909590E 03	0.19658400E 02
709	0.63526000E 05	-0.78650000E 02	0.34923050E 03	0.19547400E 02
710	0.63527000E 05	-0.78709999E 02	0.34931840E 03	0.19459500E 02
711	0.63528000E 05	-0.78910000E 02	0.34940360E 03	0.19370100E 02
712	0.63529000E 05	-0.78990000E 02	0.34951900E 03	0.19257600E 02
713	0.63530000E 05	-0.79070000E 02	0.34960690E 03	0.19175000E 02
714	0.63531000E 05	-0.79219999E 02	0.34970580E 03	0.19085900E 02
715	0.63532000E 05	-0.79299999E 02	0.34980860E 03	0.18951400E 02
716	0.63533000E 05	-0.79469999E 02	0.34992140E 03	0.18908700E 02
717	0.63534000E 05	-0.79589999E 02	0.35000630E 03	0.18814000E 02
718	0.63535000E 05	-0.79709999E 02	-0.98906000E 01	0.18704100E 02
719	0.63536000E 05	-0.79790000E 02	0.35020290E 03	0.18618900E 02
720	0.63537000E 05	-0.79929999E 02	0.35029760E 03	0.18532500E 02
721	0.63538000E 05	-0.80070000E 02	0.35039790E 03	0.18440400E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
722	0.63559000E 05	-0.80169999E 02	0.35048970E 03	0.18333300E 02
723	0.63540000E 05	-0.80290000E 02	0.35058470E 03	0.18252200E 02
724	0.63541000E 05	-0.80400000E 02	0.35069170E 03	0.18157500E 02
725	0.63542000E 05	-0.80509999E 02	0.35079050E 03	0.18068400E 02
726	0.63543000E 05	-0.80629999E 02	0.35090330E 03	0.17980500E 02
727	0.63544000E 05	-0.80709999E 02	0.35099240E 03	0.17899400E 02
728	0.63545000E 05	-0.80830000E 02	0.35108300E 03	0.17789600E 02
729	0.63546000E 05	-0.80919999E 02	-0.88290999E 01	0.17719500E 02
730	0.63547000E 05	-0.81009999E 02	0.35124100E 03	0.17631600E 02
731	0.63548000E 05	-0.81080000E 02	-0.86602000E 01	0.17497100E 02
732	0.63549000E 05	-0.81209999E 02	0.35141260E 03	0.17432400E 02
733	0.63550000E 05	-0.81290000E 02	-0.84828999E 01	0.17367900E 02
734	0.63551000E 05	-0.81389999E 02	-0.83729999E 01	0.17255400E 02
735	0.63552000E 05	-0.81410000E 02	0.35169290E 03	0.17168700E 02
736	0.63553000E 05	-0.81469999E 02	0.35178080E 03	0.17082300E 02
737	0.63554000E 05	-0.81540000E 02	0.35186450E 03	0.16990200E 02
738	0.63555000E 05	-0.81730000E 02	-0.80380999E 01	0.16911900E 02
739	0.63556000E 05	-0.81809999E 02	-0.79583000E 01	0.16824000E 02
740	0.63557000E 05	-0.81919999E 02	-0.78787000E 01	0.16712900E 02
741	0.63558000E 05	-0.82020000E 02	0.35221070E 03	0.16648200E 02
742	0.63559000E 05	-0.82020000E 02	0.35232180E 03	0.16538300E 02
743	0.63560000E 05	-0.82150000E 02	0.35240430E 03	0.16469700E 02
744	0.63561000E 05	-0.82270000E 02	-0.75380999E 01	0.16398400E 02
745	0.63562000E 05	-0.82349999E 02	-0.74281999E 01	0.16295400E 02
746	0.63563000E 05	-0.82459999E 02	-0.73418000E 01	0.16199200E 02
747	0.63564000E 05	-0.82559999E 02	-0.72854000E 01	0.16137500E 02
748	0.63565000E 05	-0.82620000E 02	0.35279000E 03	0.16045400E 02
749	0.63566000E 05	-0.82730000E 02	-0.71001000E 01	0.15960200E 02
750	0.63567000E 05	-0.82830000E 02	0.35298510E 03	0.15871100E 02
751	0.63568000E 05	-0.82900000E 02	-0.69558000E 01	0.15784400E 02
752	0.63569000E 05	-0.83000000E 02	-0.68735000E 01	0.15717300E 02
753	0.63570000E 05	-0.83080000E 02	0.35322140E 03	0.15615500E 02
754	0.63571000E 05	-0.83150000E 02	-0.66867999E 01	0.15524900E 02
755	0.63572000E 05	-0.83240000E 02	-0.66372000E 01	0.15454800E 02
756	0.63573000E 05	-0.83309999E 02	-0.65630000E 01	0.15371100E 02
757	0.63574000E 05	-0.83400000E 02	0.35351930E 03	0.15284700E 02
758	0.63575000E 05	-0.83500000E 02	-0.63750000E 01	0.15192600E 02
759	0.63576000E 05	-0.83520000E 02	-0.62871000E 01	0.15126700E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
760	0.63577000E 05	-0.83580000E 02	0.35378560E 03	0.15019500E 02
761	0.63578000E 05	-0.83629999E 02	-0.61580000E 01	0.14950900E 02
762	0.63579000E 05	-0.83759999E 02	-0.60784000E 01	0.14887700E 02
763	0.63580000E 05	-0.83830000E 02	0.35399580E 03	0.14779300E 02
764	0.63581000E 05	-0.83910000E 02	0.35407130E 03	0.14707800E 02
765	0.63582000E 05	-0.83990000E 02	-0.58242000E 01	0.14622800E 02
766	0.63583000E 05	-0.84080000E 02	-0.57582999E 01	0.14529300E 02
767	0.63584000E 05	-0.84160000E 02	0.35429100E 03	0.14441400E 02
768	0.63585000E 05	-0.84219999E 02	0.35437770E 03	0.14401600E 02
769	0.63586000E 05	-0.84299999E 02	0.35446000E 03	0.14272500E 02
770	0.63587000E 05	-0.84400000E 02	0.35453980E 03	0.14221700E 02
771	0.63588000E 05	-0.84490000E 02	0.35460420E 03	0.14142100E 02
772	0.63589000E 05	-0.84549999E 02	0.35466460E 03	0.14029500E 02
773	0.63590000E 05	-0.84589999E 02	0.35475810E 03	0.13984100E 02
774	0.63591000E 05	-0.84750000E 02	0.35483500E 03	0.13878400E 02
775	0.63592000E 05	-0.84820000E 02	-0.50771000E 01	0.13830300E 02
776	0.63593000E 05	-0.84969999E 02	-0.50112000E 01	0.13725800E 02
777	0.63594000E 05	-0.84629999E 02	0.35505620E 03	0.13672400E 02
778	0.63595000E 05	-0.84839999E 02	0.35510960E 03	0.13546100E 02
779	0.63596000E 05	-0.84919999E 02	-0.48381000E 01	0.13520000E 02
780	0.63597000E 05	-0.85099999E 02	0.35524290E 03	0.13412800E 02
781	0.63598000E 05	-0.85070000E 02	0.35533620E 03	0.13352300E 02
782	0.63599000E 05	-0.85020000E 02	0.35539380E 03	0.13257600E 02
783	0.63600000E 05	-0.85230000E 02	0.35544190E 03	0.13197300E 02
784	0.63601000E 05	-0.85339999E 02	0.35554490E 03	0.13110600E 02
785	0.63602000E 05	-0.85400000E 02	0.35563840E 03	0.13018800E 02
786	0.63603000E 05	-0.85530000E 02	-0.42916999E 01	0.12954100E 02
787	0.63604000E 05	-0.85599999E 02	0.35572750E 03	0.12860800E 02
788	0.63605000E 05	-0.85650000E 02	-0.42244000E 01	0.12796100E 02
789	0.63606000E 05	-0.85719999E 02	0.35585520E 03	0.12727500E 02
790	0.63607000E 05	-0.85809999E 02	0.35595700E 03	0.12665800E 02
791	0.63608000E 05	-0.85860000E 02	0.35602690E 03	0.12557400E 02
792	0.63609000E 05	-0.85879999E 02	0.35607080E 03	0.12470700E 02
793	0.63610000E 05	-0.85990000E 02	0.35613280E 03	0.12403600E 02
794	0.63611000E 05	-0.86000000E 02	-0.37849000E 01	0.12338900E 02
795	0.63612000E 05	-0.86000000E 02	-0.37012000E 01	0.12267600E 02
796	0.63613000E 05	-0.86020000E 02	-0.36394000E 01	0.12179700E 02
797	0.63614000E 05	-0.86049999E 02	0.35639770E 03	0.12120600E 02

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
798	0.63615000E 05	-0.86190000E 02	-0.35447000E 01	0.12024400E 02
799	0.63616000E 05	-0.86099999E 02	0.35653520E 03	0.11984600E 02
800	0.63617000E 05	-0.86200000E 02	0.35661620E 03	0.12894200E 02
801	0.63618000E 05	-0.86290000E 02	0.35666550E 03	0.11814200E 02
802	0.63619000E 05	-0.86339999E 02	0.35673000E 03	0.11722400E 02
803	0.63620000E 05	-0.86400000E 02	-0.32041000E 01	0.11675500E 02
804	0.63621000E 05	-0.86429999E 02	-0.31436000E 01	0.11590600E 02
805	0.63622000E 05	-0.86559999E 02	-0.30845000E 01	0.11521700E 02
806	0.63623000E 05	-0.86559999E 02	-0.30132000E 01	0.11460000E 02
807	0.63624000E 05	-0.86629999E 02	-0.29404000E 01	0.11387200E 02
808	0.63625000E 05	-0.86639999E 02	-0.28674000E 01	0.11306200E 02
809	0.63626000E 05	-0.86679999E 02	-0.28359000E 01	0.11233400E 02
810	0.63627000E 05	-0.86740000E 02	0.35724780E 03	0.11167500E 02
811	0.63628000E 05	-0.86730000E 02	0.35730830E 03	0.11063200E 02
812	0.63629000E 05	-0.86780000E 02	-0.26492000E 01	0.11023200E 02
813	0.63630000E 05	-0.86809999E 02	0.35740840E 03	0.10931400E 02
814	0.63631000E 05	-0.86849999E 02	0.35748950E 03	0.10881800E 02
815	0.63632000E 05	-0.86870000E 02	0.35755540E 03	0.10774700E 02
816	0.63633000E 05	-0.86889999E 02	-0.23911000E 01	0.10711700E 02
817	0.63634000E 05	-0.86950000E 02	0.35767900E 03	0.10663600E 02
818	0.63635000E 05	-0.86959999E 02	0.35770390E 03	0.10578400E 02
819	0.63636000E 05	-0.87030000E 02	-0.22373000E 01	0.10516600E 02
820	0.63637000E 05	-0.87020000E 02	0.35782470E 03	0.10442400E 02
821	0.63638000E 05	-0.87009999E 02	0.35789870E 03	0.10379200E 02
822	0.63639000E 05	-0.87030000E 02	0.35793580E 03	0.10290000E 02
823	0.63640000E 05	-0.87009999E 02	0.35799900E 03	0.10222700E 02
824	0.63641000E 05	-0.86919999E 02	-0.19585000E 01	0.10158200E 02
825	0.63642000E 05	-0.87169999E 02	0.35811840E 03	0.10052500E 02
826	0.63643000E 05	-0.87219999E 02	0.35818430E 03	0.10027600E 02
827	0.63644000E 05	-0.87250000E 02	0.35825320E 03	0.99207000E 01
828	0.63645000E 05	-0.87339999E 02	0.35831620E 03	0.98766999E 01
829	0.63646000E 05	-0.87349999E 02	0.35836840E 03	0.98066000E 01
830	0.63647000E 05	-0.87339999E 02	0.35839870E 03	0.97228999E 01
831	0.63648000E 05	-0.87389999E 02	0.35846310E 03	0.96596999E 01
832	0.63649000E 05	-0.87429999E 02	0.35853170E 03	0.95911000E 01
833	0.63650000E 05	-0.87500000E 02	-0.14104000E 01	0.95194999E 01
834	0.63651000E 05	-0.87490000E 02	0.35861430E 03	0.94631000E 01
835	0.63652000E 05	-0.87480000E 02	0.35868290E 03	0.94110999E 01

*** RAW DATA FILE NO. 2 ***

NO.	TIME	X	Y	Z
836	0.63653000E 05	-0.87580000E 02	-0.12539000E 01	0.93024999E 01
837	0.63654000E 05	-0.87589999E 02	0.35880250E 03	0.92614999E 01
838	0.63655000E 05	-0.87620000E 02	-0.11440000E 01	0.91694000E 01
839	0.63656000E 05	-0.87660000E 02	0.35889040E 03	0.91377000E 01
840	0.63657000E 05	-0.87719999E 02	-0.10728000E 01	0.90608000E 01
841	0.63658000E 05	-0.87790000E 02	-0.10122000E 01	0.89784999E 01
842	0.63659000E 05	-0.87650000E 02	0.35905910E 03	0.89276999E 01
843	0.63660000E 05	-0.87980000E 02	0.35913750E 03	0.88440000E 01
844	0.63661000E 05	-0.88150000E 02	-0.78709999E 00	0.88026999E 01
845	0.63662000E 05	-0.88320000E 02	-0.73220000E 00	0.87064999E 01
846	0.63663000E 05	-0.71330000E 02	0.35934080E 03	0.86666999E 01
847	0.63664000E 05	-0.53090000E 02	0.35941770E 03	0.86421000E 01

*** SMOOTHED AND SORTED DATA *** REFERENCE DATE IS 2433282.423

LINE NO	TIME (DAYS FROM REF DATE) WHOLE	FRAC	STN	TYPE	X	Y	Z
1	0.55680000E 04	0.72833095E 00	1	6	0.90504566E 02	0.26872828E 01	0.20425821E-01
2	0.55680000E 04	0.72856221E 00	1	6	0.89710058E 02	0.26688222E 01	0.37454992E-01
3	0.55680000E 04	0.72879396E 00	1	6	0.88836674E 02	0.26493268E 01	0.55964532E-01
4	0.55680000E 04	0.72902522E 00	1	6	0.87795044E 02	0.26290999E 01	0.75002537E-01
5	0.55680000E 04	0.72925649E 00	1	6	0.86621446E 02	0.26066799E 01	0.99500827E-01
6	0.55680000E 04	0.72948823E 00	1	6	0.85244430E 02	0.25825330E 01	0.11606178E 00
7	0.55680000E 04	0.72973142E 00	1	6	0.83590078E 02	0.25546699E 01	0.13919396E 00
8	0.55680000E 04	0.72996268E 00	1	6	0.81860461E 02	0.25264645E 01	0.16143650E 00
9	0.55680000E 04	0.73019443E 00	1	6	0.79844893E 02	0.24952877E 01	0.18459263E 00
10	0.55680000E 04	0.73042569E 00	1	6	0.77549356E 02	0.24613850E 01	0.20883031E 00
11	0.55680000E 04	0.73065696E 00	1	6	0.74813559E 02	0.24243608E 01	0.23355949E 00
12	0.55680000E 04	0.73088870E 00	1	6	0.71853028E 02	0.23834638E 01	0.25918020E 00
13	0.55680000E 04	0.73111997E 00	1	6	0.68486510E 02	0.23388626E 01	0.28519266E 00
14	0.55680000E 04	0.73135171E 00	1	6	0.64625585E 02	0.22894213E 01	0.31143585E 00
15	0.55680000E 04	0.73158298E 00	1	6	0.60358025E 02	0.22352178E 01	0.33689002E 00
16	0.55680000E 04	0.73181472E 00	1	6	0.55532375E 02	0.21759135E 01	0.36429026E 00
17	0.55680000E 04	0.73204599E 00	1	6	0.50138033E 02	0.21106404E 01	0.38977196E 00
18	0.55680000E 04	0.73227773E 00	1	6	0.44199864E 02	0.20397825E 01	0.41424827E 00
19	0.55680000E 04	0.73250899E 00	1	6	0.37844323E 02	0.19625130E 01	0.43683926E 00
20	0.55680000E 04	0.73274074E 00	1	6	0.31054048E 02	0.18795772E 01	0.45874583E 00
21	0.55680000E 04	0.73297200E 00	1	6	0.23810988E 02	0.17915598E 01	0.47298807E 00
22	0.55680000E 04	0.73320327E 00	1	6	0.16644131E 02	0.16992926E 01	0.48529039E 00
23	0.55680000E 04	0.73343501E 00	1	6	0.98371276E 01	0.16037577E 01	0.49264040E 00
24	0.55680000E 04	0.73366628E 00	1	6	-0.23424661E 01	0.15069346E 01	0.49501662E 00
25	0.55680000E 04	0.73389802E 00	1	6	-0.96078945E 01	0.14105670E 01	0.49512570E 00
26	0.55680000E 04	0.73412929E 00	1	6	-0.17634808E 02	0.13168007E 01	0.48406605E 00
27	0.55680000E 04	0.73436103E 00	1	6	-0.25330131E 02	0.12258931E 01	0.47147912E 00
28	0.55680000E 04	0.73459230E 00	1	6	-0.32595969E 02	0.11402631E 01	0.45496891E 00
29	0.55680000E 04	0.73482404E 00	1	6	-0.39343871E 02	0.10602043E 01	0.43529824E 00
30	0.55680000E 04	0.73505531E 00	1	6	-0.45496447E 02	0.98582218E 00	0.41395061E 00
31	0.55680000E 04	0.73528657E 00	1	6	-0.51115210E 02	0.91750274E 00	0.38947085E 00
32	0.55680000E 04	0.73551831E 00	1	6	-0.56128661E 02	0.85532306E 00	0.36470627E 00
33	0.55680000E 04	0.73574958E 00	1	6	-0.60609920E 02	0.79839661E 00	0.33960551E 00
34	0.55680000E 04	0.73598132E 00	1	6	-0.64539863E 02	0.74709015E 00	0.31380090E 00
35	0.55680000E 04	0.73621259E 00	1	6	-0.67993220E 02	0.70046206E 00	0.29026785E 00
36	0.55680000E 04	0.73644433E 00	1	6	-0.71164660E 02	0.65765198E 00	0.26361281E 00
37	0.55680000E 04	0.73667560E 00	1	6	-0.73901912E 02	0.61888137E 00	0.23909131E 00

*** SMOOTHED AND SORTED DATA *** REFERENCE DATE IS 2433282.423

LINE NO	TIME (DAYS FROM REF DATE) WHOLE	FRAC	STN	TYPE	X	Y	Z
38	0.55680000E 04	0.73690734E 00	1	6	-0.76245927E 02	0.58365852E 00	0.21534868E 00
39	0.55680000E 04	0.73713861E 00	1	6	-0.78306423E 02	0.55149680E 00	0.19217172E 00
40	0.55680000E 04	0.73737035E 00	1	6	-0.80217021E 02	0.52235375E 00	0.17329871E 00
41	0.55680000E 04	0.73760162E 00	1	6	-0.81774228E 02	0.49548570E 00	0.14792131E 00
42	0.55680000E 04	0.73783288E 00	1	6	-0.82996604E 02	0.47070984E 00	0.12684373E 00
43	0.55680000E 04	0.73806462E 00	1	6	-0.84399130E 02	0.44799975E 00	0.10639759E 00
44	0.55680000E 04	0.73829589E 00	1	6	-0.85387720E 02	0.42698200E 00	0.87028390E-01
45	0.55680000E 04	0.73845802E 00	1	6	-0.72688773E 02	0.41334472E 00	0.73844971E-01
46	0.55680000E 04	0.80430303E 00	1	6	0.93952644E 02	0.36879234E 01	0.68141044E-01
47	0.55680000E 04	0.80455766E 00	1	6	0.93296333E 02	0.37050498E 01	0.91884011E-01
48	0.55680000E 04	0.80478892E 00	1	6	0.92576596E 02	0.37214870E 01	0.11456151E 00
49	0.55680000E 04	0.80502067E 00	1	6	0.91684130E 02	0.37391792E 01	0.13802219E 00
50	0.55680000E 04	0.80525193E 00	1	6	0.90686833E 02	0.37585957E 01	0.15660167E 00
51	0.55680000E 04	0.80548368E 00	1	6	0.89530562E 02	0.37800339E 01	0.18916610E 00
52	0.55680000E 04	0.80571494E 00	1	6	0.88142735E 02	0.38032022E 01	0.21659140E 00
53	0.55680000E 04	0.80594669E 00	1	6	0.86509584E 02	0.38292372E 01	0.24571758E 00
54	0.55680000E 04	0.80617795E 00	1	6	0.84627265E 02	0.38576693E 01	0.27647246E 00
55	0.55680000E 04	0.80640969E 00	1	6	0.82414382E 02	0.38899242E 01	0.30356655E 00
56	0.55680000E 04	0.80664096E 00	1	6	0.79893909E 02	0.39260563E 01	0.34344385E 00
57	0.55680000E 04	0.80687223E 00	1	6	0.76907141E 02	0.39667443E 01	0.37973947E 00
58	0.55680000E 04	0.80710397E 00	1	6	0.73421373E 02	0.40134529E 01	0.41825419E 00
59	0.55680000E 04	0.80733524E 00	1	6	0.69363897E 02	0.40661716E 01	0.45826306E 00
60	0.55680000E 04	0.80756698E 00	1	6	0.64636822E 02	0.41269673E 01	0.49376080E 00
61	0.55680000E 04	0.80779824E 00	1	6	0.59143755E 02	0.41969821E 01	0.54299333E 00
62	0.55680000E 04	0.80802999E 00	1	6	0.52426705E 02	0.42834609E 01	0.58864356E 00
63	0.55680000E 04	0.80826125E 00	1	6	0.45596447E 02	0.43715267E 01	0.62847699E 00
64	0.55680000E 04	0.80849300E 00	1	6	0.37594157E 02	0.44785511E 01	0.66781979E 00
65	0.55680000E 04	0.80872426E 00	1	6	0.28856624E 02	0.45997659E 01	0.70386115E 00
66	0.55680000E 04	0.80895600E 00	1	6	0.19764007E 02	0.47339211E 01	0.72862723E 00
67	0.55680000E 04	0.80918727E 00	1	6	0.10925124E 02	0.48780512E 01	0.74500312E 00
68	0.55680000E 04	0.80941854E 00	1	6	-0.18980037E 01	0.50271513E 01	0.74983507E 00
69	0.55680000E 04	0.80965028E 00	1	6	-0.12091786E 02	0.51749880E 01	0.74226864E 00
70	0.55680000E 04	0.80988155E 00	1	6	-0.21959109E 02	0.53157348E 01	0.72451431E 00
71	0.55680000E 04	0.81011329E 00	1	6	-0.31137939E 02	0.54450395E 01	0.69566454E 00
72	0.55680000E 04	0.81034455E 00	1	6	-0.39649951E 02	0.55605329E 01	0.66102118E 00
73	0.55680000E 04	0.81057630E 00	1	6	-0.47179079E 02	0.56620598E 01	0.62189668E 00
74	0.55680000E 04	0.81080756E 00	1	6	-0.53780875E 02	0.57508808E 01	0.58119434E 00

*** SMOOTHED AND SORTED DATA *** REFERENCE DATE IS 2433282.423

LINE NO	TIME (DAYS FROM REF DATE) WHOLE	FRAC	STN	TYPE	X	Y	Z
75	0.55680000E 04	0.81103931E 00	1	6	-0.59630349E 02	0.58274212E 01	0.54065303E 00
76	0.55680000E 04	0.81116662E 00	1	6	-0.62442022E 02	0.58652011E 01	0.51683889E 00
77	0.55680000E 04	0.81139789E 00	1	6	-0.67020359E 02	0.59266866E 01	0.47645788E 00
78	0.55680000E 04	0.81162915E 00	1	6	-0.70909618E 02	0.59959255E 01	0.43748305E 00
79	0.55680000E 04	0.81186090E 00	1	6	-0.74184423E 02	0.61105297E 01	0.40029512E 00
80	0.55680000E 04	0.81209216E 00	1	6	-0.77119188E 02	0.62233642E 01	0.36594907E 00
81	0.55680000E 04	0.81232391E 00	1	6	-0.79443770E 02	0.61067525E 01	0.33008937E 00
82	0.55680000E 04	0.81255517E 00	1	6	-0.81439246E 02	0.61381950E 01	0.29965510E 00
83	0.55680000E 04	0.81278691E 00	1	6	-0.83230548E 02	0.61675484E 01	0.26967902E 00
84	0.55680000E 04	0.81301818E 00	1	6	-0.84727254E 02	0.61941656E 01	0.24111215E 00
85	0.55680000E 04	0.81324992E 00	1	6	-0.86006434E 02	0.62182121E 01	0.21525281E 00
86	0.55680000E 04	0.81348119E 00	1	6	-0.86879555E 02	0.62402966E 01	0.18843286E 00
87	0.55680000E 04	0.81371293E 00	1	6	-0.87490288E 02	0.62601355E 01	0.16388562E 00
88	0.55680000E 04	0.81384025E 00	1	6	-0.71330000E 02	0.62716800E 01	0.15126245E 00
89	0.55680000E 04	0.81385169E 00	1	6	-0.53090000E 02	0.62730221E 01	0.15083310E 00

UNCLASSIFIED
Security Classification

DOCUMENT CONTROL DATA - R&D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY *(Corporate author)* North American Aviation, Inc. Space and Information Systems Division Downey, California	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b GROUP N/A

3. REPORT TITLE
Orbit Differential Correction - Tracking Program
Preprocessor for the Differential Correction Program

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*
Final Report

5. AUTHOR(S) *(Last name, first name, initial)*
Townsend, George E.

6. REPORT DATE April 1966	7a. TOTAL NO. OF PAGES 238	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO. AF30(602)-3638 b. PROJECT NO. 4519 c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) SID 65-1203-1, -2, -3 9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)* RADC-TR-66-67, Volume II of III Volumes	

10. AVAILABILITY/LIMITATION NOTICES
Distribution of this document is unlimited

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Rome Air Development Center (EMCRR) Griffiss Air Force Base, New York, 13440

13. ABSTRACT

This document presents the formulation, computational logic and coding information developed for the purpose of effecting the definition of geocentric satellite orbits. The rationale for this process is constructed around the recursive minimum variance data filter developed by R.E. Kalman and a specially prepared magnetic tape generated in the preprocessor (SID 65 1203-2).

The trajectory portion of the program is formulated in the Encke manner and includes perturbing accelerations resulting from the first 3 harmonics of the Earth's potential function, atmospheric drag, solar radiation pressure, and solar and lunar gravitation. These accelerations are integrated via an uncorrected Gauss-Jackson routine started with a fourth order Runge-Kutta process.

DD FORM 1 JAN 64 1473

UNCLASSIFIED
Security Classification

UNCLASSIFIED

Security Classification

14. KEY WORDS	LINK A ROLE	LINK A WT	LINK B ROLE	LINK B WT	LINK C ROLE	LINK C WT
Orbit analysis, orbit differential correction, satellite tracking program						

INSTRUCTIONS

1. ORIGINATING ACTIVITY. Enter the name and address of the contractor, subcontractor, grantee, Department of Defense activity or other organization *(corporate author)* issuing the report.

2a. REPORT SECURITY CLASSIFICATION: Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with appropriate security regulations.

2b. GROUP: Automatic downgrading is specified in DoD Directive 5200.10 and Armed Forces Industrial Manual. Enter the group number. Also, when applicable, show that optional markings have been used for Group 3 and Group 4 as authorized.

3. REPORT TITLE: Enter the complete report title in all capital letters. Titles in all cases should be unclassified. If a meaningful title cannot be selected without classification, show title classification in all capitals in parenthesis immediately following the title.

4. DESCRIPTIVE NOTES: If appropriate, enter the type of report, e.g., interim, progress, summary, annual, or final. Give the inclusive dates when a specific reporting period is covered.

5. AUTHOR(S): Enter the name(s) of author(s) as shown on or in the report. Enter last name, first name, middle initial. If military, show rank and branch of service. The name of the principal author is an absolute minimum requirement.

6. REPORT DATE: Enter the date of the report as day, month, year; or month, year. If more than one date appears on the report, use date of publication.

7a. TOTAL NUMBER OF PAGES: The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.

7b. NUMBER OF REFERENCES: Enter the total number of references cited in the report.

8a. CONTRACT OR GRANT NUMBER. If appropriate, enter the applicable number of the contract or grant under which the report was written.

8b, 8c, & 8d. PROJECT NUMBER: Enter the appropriate military department identification, such as project number, subproject number, system numbers, task number, etc.

9a. ORIGINATOR'S REPORT NUMBER(S). Enter the official report number by which the document will be identified and controlled by the originating activity. This number must be unique to this report.

9b. OTHER REPORT NUMBER(S): If the report has been assigned any other report numbers *(either by the originator or by the sponsor)*, also enter this number(s).

10. AVAILABILITY/LIMITATION NOTICES: Enter any limitations on further dissemination of the report, other than those imposed by security classification, using standard statements such as:

(1) "Qualified requesters may obtain copies of this report from DDC."

(2) "Foreign announcement and dissemination of this report by DDC is not authorized."

(3) "U. S. Government agencies may obtain copies of this report directly from DDC. Other qualified DDC users shall request through _____."

(4) "U. S. military agencies may obtain copies of this report directly from DDC. Other qualified users shall request through _____."

(5) "All distribution of this report is controlled. Qualified DDC users shall request through _____."

If the report has been furnished to the Office of Technical Services, Department of Commerce, for sale to the public, indicate this fact and enter the price, if known.

11. SUPPLEMENTARY NOTES: Use for additional explanatory notes.

12. SPONSORING MILITARY ACTIVITY: Enter the name of the departmental project office or laboratory sponsoring *(paying for)* the research and development. Include address.

13. ABSTRACT: Enter an abstract giving a brief and factual summary of the document indicative of the report, even though it may also appear elsewhere in the body of the technical report. If additional space is required, a continuation sheet shall be attached.

It is highly desirable that the abstract of classified reports be unclassified. Each paragraph of the abstract shall end with an indication of the military security classification of the information in the paragraph, represented as *(TS)*, *(S)*, *(C)*, or *(U)*.

There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.

14. KEY WORDS: Key words are technically meaningful terms or short phrases that characterize a report and may be used as index entries for cataloging the report. Key words must be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location, may be used as key words but will be followed by an indication of technical context. The assignment of links, rules, and weights is optional.

UNCLASSIFIED

Security Classification