DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Data processing programs for aerial gamma-ray data

by

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DATA PROCESSING PROGRAMS

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ABSTRACT

The U.S. Geological Survey (USGS) uses computer programs to process aerial gamma-ray data; some do editing and data manipulation to allow for corrections. Programs to convert flight-line data to latitude-longitude coordinates are included. Plotting programs include contour plotting, profile plots, and photographic raster plots.

INTRODUCTION

The purpose of this report is to provide a reference listing of programs that can be used to process aerial gamma-ray data. These programs are written in standard FORTRAN 77 and have been installed on a VAX 11/780 computer. The capabilities of this program system include: 1) the ability to take field survey data and convert it to data with x-y coordinates; 2) editing features that permit corrections to the data for background radiation, altitude variations, Compton stripping, instrument drift, and level problems; 3) filtering to smooth the data; 4) the ability to grid the data; and 5) various types of plotting programs. These listings are not intended as a guide to usage of the programs. The programs are listed alphabetically in Appendix 1, by function in Appendix 2, and alphabetically with limited usage information in Appendix 3.

The work on which this report is based was performed in accordance with a work agreement between the U.S. Geological Survey (USGS) and the Saudi Arabian Ministry of Petroleum and Mineral Resources.

STANDARD AIRBORNE FORMAT

The standard airborne format mentioned throughout this report is the name given to the format used to store the data on disk. Each set of aerial survey data is stored in a binary disk file that has the following structure: A header record that contains a sixteen-character title, the maximum number of data points per data record, the number of data channels, an eight-character date, and a number that can represent the time between data points, but is usually set to one. An arbitrary number of data records that contain the line number, a sequence number, the number of data points in the data record, a parameter used to

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indicate a break in the data coordinates (zero or a positive number signals no break, and a negative number signals a break), four double-precision numbers that define the maximum and minimum values of the x-y coordinates for the data record, and the xyz data for each data point. The coordinates are stored as double-precision numbers.

DATA STORAGE

All data for this report are stored in data-file USGS-DF-05-02 (Duval, 1985). No entries were made to the Mineral Occurrence Documentation System (MODS) in connection with this report.

REFERENCES CITED

Duval, J. S., 1985, Supporting data for data processing programs for aerial gamma-ray data: Available from Saudi Arabian Deputy Ministry for Mineral Resources Data-File USGS-DF-05-02.

APPENDIX 1

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APPENDIX 1

This appendix is an alphabetical listing of the programs and includes subroutine and test programs not listed elsewhere.

ADJUST.FOR -- This program will allow you to make corrections to a standard-airborne-format data file. The types of corrections that can be made are multiplication by a factor, base level adjustments, and slope corrections.

AIRBIO.FOR -- This subroutine is designed to handle I/O of aerial survey data stored in the new direct access format. Not very many programs have been converted to the new format.

AIRCHG.FOR -- This program allows you to read or write standard-airborne-format data files on an ASCII tape.

AIRCHK.FOR -- This program allows you to perform some checks on a standard-airborne-format data file. Basic statistics are calculated and a running check is made on the distance between successive data points.

AIRCVT.FOR -- This program will convert standard-airborne-format file to the new direct-access type of file. At present the direct access files are not very useful because few of the applications programs have been converted to use them.

AIRENC.FOR -- This subroutine will change the file type of a standard-airborne-format data file.

AIRHST.FOR -- This program calculates a frequency distribution histogram for specific channels of a standard-airborne-format data file.

AIRMNC.FOR -- This program converts the data in a standard-airborne-format file to a binary xyz file suitable for use with the gridding program "MINC".

AIRXY.FOR -- This program provides you with information about a standard-airborne-format file. The information includes minimum and maximum coordinates and the starting and ending ITS sequence numbers.

APLIMG.FOR -- This program converts data on an Applicon plotter tape to the REMAPP image format for display on the Optronics film writing device. The process used duplicates the Applicon plotting technique such that each raster point is an individual pixel that is either turned full on or full off.

APLREM.FOR -- This program converts an Applicon plotter tape-to REMAPP image
    format by using 4X4 groups of raster points to define a pixel. Using
    this process destroys the text notation on the map.

APPEND.FOR -- This program allows you to merge together standard grid files
    that have equal DX & DY increments and common row and column origins
    (e.g. coordinates are in latitude-longitude).

ASCII.FOR -- This subroutine translates a string of EBCDIC 8-bit characters
    to ASCII characters.

ASCTMP.FOR -- This subroutine translates a string of EBCDIC 8-bit characters
    to ASCII characters.

BITMAN.FOR -- Program to test the functioning of ISBYTE and ILBYTE.

BYTEFLIP.FOR -- This subroutine flips the order of the two bytes located in
    each element of the INTEGER*2 input array.

BYTFUN.FOR -- These are the subroutines ISBYTE and ILBYTE that are patterned
    after the byte loading and storing routines of the Perkin-Elmer 3220 com-
    puter.

CHFILE.FOR -- This program allows you to modify the header record of a stan-
    dard grid file, add a value to the data, or remove mean (grid or boun-
    dary) from the data.

CHRPAT.FOR -- This subroutine defines the ASCII character set on a dot pat-
    tern of 18 rows and 13 columns.

CLASSY.FOR -- This program is used to perform classifications on image files.

CLRSCL.FOR -- This subroutine is intended for use with the program GRDREM and
    puts a color scale in the images created by GRDREM for the case of a
    color contour map.

CODCHK.FOR -- This subroutine is designed to check the character code of a
    stream of characters to ensure that only numbers, plus/minus signs,
    spaces, or periods are in the stream.

COLOR.FOR -- This program was written to make use of the color software for
    the Applicon plotter.

COLORDEF.FOR -- This program is intended to determine how many different
    colors are present in a color image.

CURSE.FOR -- This program tests the subroutine CURSXY.

CURSXY.FOR -- This subroutine allows usage of the cursors on a Tektronix ter-
    minal.

CURVMN.FOR -- This subroutine is used with UTILITY.

DATPRN.FOR -- This program reads and prints information from a standard-

airborne-format data file. Options allow you to print only the header information for each record, header information plus a selected number of data points, or selected time (ITS) segments.

DELTFX.FOR -- This program makes corrections to DELT values of a standard-airborne-format file.

DISKIO.FOR -- This subroutine reads and writes image-type data to a REMAPP format file.

DISPLT.FOR -- This program allows you to plot stacked profiles of data from a standard-airborne-format data file.

DISTPL.FOR -- This is the plotting subroutine used with DISPLT.

DSPEDT.FOR -- This program is a display/editing program that allows you to display and edit standard-airborne-format data files.

DVALIT.FOR -- This program allows you to set limits beyond which the data are considered bad and replace those bad data with DVAL values. DVAL values are used throughout this program system to flag bad or missing data.

EBCASC.FOR -- This program is intended to allow conversion of character codes from EBCDIC to ASCII or vice versa.

EBCDIC.FOR -- This subroutine converts ASCII character code to EBCDIC code.

EDTFIL.FOR -- This program performs editing functions on a standard-airborne-format files and is used primarily to eliminate segments of data, put in coordinate breaks where needed, and renumber flight lines.

ENC.FOR -- Subroutine to construct file names for standard-airborne-format data files.

EQUHST.FOR -- This subroutine calculates a transfer function needed to redistribute a frequency histogram over the full data range. The process is similar to histogram equalization.

EXTRAK.FOR -- This program allows the extraction of specified channels and lines from a standard-airborne-format data file.

FFTFIL.FOR -- This program performs a fast-Fourier filter on standard grid files.

FILTER.FOR -- This program allows the use of a variety of filters on a standard-airborne-format file. Built-in filters include linear averaging and median filters. Arbitrary weighting factors can also be specified.

GERBER.FOR -- This program converts general vector plotting data (produced by the general purpose plotting system) to a tape with the correct format for the Gerber plotter.

GPPS.FOR -- These are subroutines of the general-purpose plotting system.

GRDFLT.FOR -- This program performs a one dimensional filter along rows or columns of a standard grid.

GRDHST.FOR -- This subroutine calculates the histogram and minimum and maximum values for a standard-grid file.

GRDREM.FOR -- This program converts a standard-grid file to a REMAPP image file.

GRDSUBS.FOR -- These are subroutines used with various gridding programs.

GRIDFILL.FOR -- This program will insert a smaller grid into a larger one and can also create a grid filled with DVAL numbers.

GRIDFLIP.FOR -- This program will reverse either rows or columns of a standard-grid file.

GRIDHIST.FOR -- This program will calculate and print the histogram of the data in a standard-grid file.

GRIDMULT.FOR -- This program will multiply and/or add constant values to a standard grid file.

GRIDPLOT.FOR -- This program allow plottong of stacked profiles of rows or columns of a standard-grid file.

GRIDR.FOR -- This subroutine is used with UTILITY.

GRIDROT.FOR -- This program will interchange rows and columns of a standard grid file or reverse the row order.

HPGPPS.FOR -- These subroutines are used with the general purpose plotting system to handle the Hewlett-Packard 7580 plotter.

IMAPCO.FOR -- Color subroutine.

INSERT.FOR -- This program inserts a grid file into another one.

INTPLT.FOR -- This is a printer-plotter that will plot an integer array.

ISIDFX.FOR -- This program will examine and make corrections to the ISID coordinate break indicator used in standard-airborne-format files.

KDATPR.FOR -- This program is the equivalent of DATPRN, but uses the new direct-access disk format.

KSAGRD.FOR -- This program will read an ASCII tape that contains gridded data from the Saudi Arabian cover-rock aerial survey and produces a standard-grid file for use with USGS programs.

LINPAT.FOR -- This program will insert xy-coordinates into a standard-airborne-format file that has been produced with only DVAL coordinates. Normally this program is only useful if you are doing your own aerial surveys.

MAGMRG.FOR -- This program performs a merge of standard grid files in either east-west or north-south directions and allows a spline smoothing over the join between data sets.

MCPLUG.FOR -- Subroutine used with the MINC gridding routine and others.

MEAN.FOR -- This program will calculate mean values and histograms for selected data channels and flight lines for a standard-airborne-format data file.

MEDFLT.FOR -- This subroutine performs median filtering on an array.

MERGE1.FOR -- This program provides some merging capabilities for standard-airborne-format files.

MINC.FOR -- This gridding program uses a minimum curvature algorithm.

MINCSUBS.FOR -- These subroutines are used with MINC.

MNCSUBS.FOR -- These subroutines are used with MINC.

MNPLT.FOR -- This subroutine is used with MEAN for plotting.

NURTAP.FOR -- This program was originally written to read NURE data tapes and produce standard-airborne-format files. Because of its flexibility it can be used for a wide variety of data formats used for aerial survey data.

PACKEM.FOR -- This subroutine packs or unpacks 8-bit or 16-bit REMAPP image data.

PACONT.FOR -- This program will plot flight path maps for a standard-airborne-format data file.

PDATE.FOR -- This subroutine gets and returns the day's date.

PRJDRV.FOR -- This program will allow you to make calculations of the projected xy-coordinates for various latitude-longitude projections.

PRJECT.FOR -- This program projects the latitude-longitude coordinates of a standard-airborne-format file using a variety of different projections.

PRJGRD.FOR -- This program will project a standard-grid file that was gridded in latitude-longitude coordinates.

PRJSUB.FOR -- Projection subroutines.

PRTSTD.FOR -- This program provides a capability to print out portions of a standard-grid file or to make a subset of the file.

PUTIT.FOR -- Subroutine used with some of the programs to write data into the standard-airborne-format files more efficiently.

PWRFIT.FOR -- This program will calculate a power series fit to xy-data using

the least squares method.

QKDRIF.FOR -- This program will make corrections to a standard-airborne-format file on the basis of the ITS time of the measurements and is intended to correct for equipment or other types of drift in the data.

RADCOR.FOR -- This program provides options for making stripping calculations on radiometric data, ratioing channels, making altitude corrections, and multiplying the entire data set by a constant. Because the program was originally designed for radiometric data, some of the options are limited to outputting three channels.

RASPLT.FOR -- This program converts a general vector-plot file to a raster-ized output.

REGRID.FOR -- This program will regrid a standard grid file using the minimum curvature algorithms. The purpose of this program is to adjust scaling when using some of the imaging programs or the color plotting programs.

RELATE.FOR -- This program performs a classification on two image files while using a third to define the classes. The output is an image file.

REMAPL.FOR -- This program converts image files to Applicon format tapes.

ROTATE.FOR -- This program rotates an image file.

SAMPLE.FOR -- This is a sample plotting program.

STASCI.FOR -- This program provides a means to store standard grid files on tape and to restore them to disk.

STRETC.FOR -- This program stretches images.

TAPEIO.FOR -- This subroutine reads or writes tapes using physical read and write utilities.

TAPEMOVE.FOR -- This program allows positioning of tapes that have been appropriately mounted with the logical names ITAPE or OTAPE.

TCCALC.FOR -- This program calculates transfer characteristics to adjust the Optronics to provide the "best" image for viewing by the human eye.

TEKCPY.FOR -- This subroutine is for automatic copying by the Tektronix ter-minal.

TEST.FOR -- This program is used to test programs of various kinds.

TRISTM.FOR -- This program calculates the inverse of the Munsel coordinates to return to the tri-stimulus coordinate system. It is used with REMAPP image files.

TSTAPEIO.FOR -- This program tests the functions of TAPEIO.

TSTCHR.FOR -- This program tests CHRPAT

TXCOPY.FOR -- This is a Tektronix automatic copy routine.

UTILITY.FOR -- This program is primarily a grid editing program.

APPENDIX 2

This appendix lists most of the programs according to their primary function such as data input from tape, archiving data sets on tape, calculating gridded data sets, and so forth. Subroutines and test programs that are shown in the alphabetical listing in Appendix 1 are not included here.

PROGRAMS TO READ DATA FROM TAPE

AIRCHG.FOR -- This program allows you to read or write standard-airborne-format data files on an ASCII tape.

NURTAP.FOR -- This program was originally written to read NURE data tapes and produce standard-airborne-format files. Because of its flexibility, it can be used for a wide variety of data formats used for aerial survey data.

STASCI.FOR -- This program provides a means to store standard-grid files on tape and to restore them to disk.

PROGRAMS TO WRITE DATA TO TAPE

AIRCHG.FOR -- This program allows you to read or write standard-airborne-format data files on an ASCII tape.

STASCI.FOR -- This program provides a means to store standard-grid files on tape and to restore them to disk.

PROGRAMS TO LOOK AT OR RUN CHECKS ON DATA FILES

AIRCHK.FOR -- This program allows you to perform some checks on a standard-airborne-format data file. Basic statistics are calculated as well as a running check on the distance between successive data points.

AIRHST.FOR -- This program calculates a frequency distribution histogram for specific channels of a standard-airborne-format data file.

AIRXY.FOR -- This program provides you with information about a standard-airborne-format file. The information includes minimum and maximum

coordinates and the starting and ending ITS sequence numbers.

DATPRN.FOR -- This program reads and prints information from a standard-airborne-format data file. Options allow you to print only the header information for each record, header information plus a selected number of data points, or selected time (ITS) segments.

GRIDHIST.FOR -- This program will calculate and print the histogram of the data in a standard-grid file.

MEAN.FOR -- This program will calculate mean values and histograms for selected data channels and flight lines for a standard-airborne-format data file.

PRTSTD.FOR -- This program provides a capability to print out portions of a standard-grid file or to make a subset of the file.

PROGRAMS TO EDIT DATA FILES

ADJUST.FOR -- This program will allow you to make corrections to a standard-airborne-format data file. The types of corrections that can be made are multiplication by a factor, base level adjustments, and slope corrections.

CHFILE.FOR -- This program allows you to modify the header record of a standard-grid file, add a value to the data, or remove mean values (grid or boundary) from the data.

DELTFX.FOR -- This program makes corrections to DELT values of a standard-airborne-format file.

DVALIT.FOR -- This program allows you to set limits beyond which the data are considered bad and replace those bad data with DVAL values. DVAL values are used throughout this program system to flag bad or missing data.

DSPEDT.FOR -- This program is a display/editing program that allows you to display and edit standard-airborne-format data files.

EDTFIL.FOR -- This program performs editing functions on a standard-airborne-format files and is used primarily to eliminate segments of data, put in coordinate breaks where needed, and renumber flight lines.

EXTRAK.FOR -- This program allows the extraction of specified channels and lines from a standard-airborne-format data file.

GRIDMULT.FOR -- This program will multiply and/or add constant values to a standard-grid file.

ISIDFX.FOR -- This program will examine and make corrections to the ISID-coordinate-break indicator used in standard-airborne-format files.

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QKDRIF.FOR -- This program will make corrections to a standard-airborne-format file on the basis of the ITS time of the measurements and is intended to correct for equipment or other types of drift in the data.

RADCOR.FOR -- This program provides options for making stripping calculations on radiometric data, ratioing channels, making altitude corrections, and multiplying the entire data set by a constant. Because the program was originally designed for radiometric data, some of the options are limited to outputting three channels.

UTILITY.FOR -- This program is primarily a grid editing program.

PROGRAMS TO FILTER DATA SETS

FFTFIL.FOR -- This program performs a fast-Fourier filter on standard-grid files.

FILTER.FOR -- This program allows you to use a variety of filters on a standard-airborne-format file. Built-in filters include linear averaging and median filters. You can also specify arbitrary weighting factors.

GRDFLT.FOR -- This program performs a one dimensional filter along rows or columns of a standard grid.

PROGRAMS TO PROJECT LATITUDE-LONGITUDE TO X-Y COORDINATES

PRJDRV.FOR -- This program will allow you to make calculations of the projected xy-coordinates for various latitude-longitude projections.

PRJECT.FOR -- This program projects the latitude-longitude coordinates of a standard-airborne-format file using a variety of different projections.

PRJGRD.FOR -- This program will project a standard-grid file that was gridded in latitude-longitude coordinates.

PROGRAMS TO CALCULATE GRID FILES

AIRMNC.FOR -- This program converts the data in a standard-airborne-format file to a binary xyz file suitable for use with the gridding program "MINC".

MINC.FOR -- This is a gridding program that uses a minimum curvature algorithm.

REGRID.FOR -- This program will regrid a standard grid file using the minimum

curvature algorithms. The purpose of this program is to adjust scaling when using some of the imaging programs or the color plotting programs.

PROGRAMS TO PLOT DATA

COLOR.FOR— This program was written to make use of the color software for the Applicon plotter.

DISPLT.FOR—This program allows you to plot stacked profiles of data from a standard-airborne-format data file.

GRIDPLOT.FOR—This program allows plotting of stacked profiles of rows or columns of a standard-grid file.

PACONT.FOR—This program will plot flight path maps for a standard-airborne-format data file.

FORMAT CONVERSION PROGRAMS

APLIMG.FOR—This program converts data on an Applicon plotter tape to the REMAPP image format for dispaly on the Optronics film writing device. The process used duplicates the Applicon plotting technique such that each raster point is an individual pixel that is either turned full on or full off.

APLREM.FOR—This program converts an Applicon plotter tape to REMAPP image format by using 4X4 groups of raster points to define a pixel. Using this process destroys the text notation on the map.

EBCASC.FOR—This program is intended to allow conversion of character codes from EBCDIC to ASCII or vice versa.

GERBER.FOR—This program converts general vector plotting data (produced by the general purpose plotting system) to a tape with the correct format for the Gerber plotter.

GRDREM. FOR—This program converts a standard-grid file to a REMAPP image file.

REMAPL.FOR—This program converts image files to Applicon format tapes.

PROGRAMS TO MERGE OR INSERT DATA SETS

APPEND.FOR -- This program allows you to merge together standard-grid files that have equal DX & DY increments and common row and column origins (e.g. coordinates are in latitude-longitude).

GRIDFILL.FOR -- This program will insert a smaller grid into a larger one and can also create a grid filled with DVAL numbers.

INSERT.FOR -- This program inserts a grid file into another one.

MAGMRG.FOR -- This program performs a merge of standard-grid files in either east-west or north-south directions and allows a spline smoothing over the join between data sets.

MERGE1.FOR -- This program provides some merging capabilities for standard-airborne-format files.

PROGRAMS TO PERFORM IMAGE CLASSIFICATIONS

CLASSY.FOR -- This program is used to perform classifications on image files.

RELATE.FOR -- This program performs a classification on two image files while using a third to define the classes. The output is an image file.

PROGRAMS TO CHANGE DATA ORIENTATIONS

GRIDFLIP.FOR -- This program will reverse either rows or columns of a standard-grid file.

GRIDROT.FOR -- This program will interchange rows and columns of a standard-grid file or reverse the row order.

ROTATE.FOR -- Rotates an image file.

MISCELLANEOUS PROGRAMS

COLORDEF.FOR -- This program is intended to determine how many different colors are present in a color image.

LINPAT.FOR -- This program will insert xy-coordinates into a standard-airborne-format file that has been produced with only DVAL coordinates. Normally this program is only useful if you are doing your own aerial

surveys.

PWRFIT.FOR -- This program will calculate a power series fit to xy-data using the least squares method.

RASPLT.FOR -- This program converts a general-vector-plot file to a raster-ized output.

STRETC.FOR -- Program to stretch images.

TAPEMOVE.FOR -- This program allows positioning of tapes that have been appropriately mounted with the logical names ITAPE or OTAPE.

TCCALC.FOR -- This program calculates transfer characteristics to adjust the Optronics to provide the "best" image for viewing by the human eye.

TRISTM.FOR -- Calculates the inverse of the Munsel coordinates to return to the tri-stimulus coordinate system. Used with REMAPP image files.

APPENDIX 3

APPENDIX 3

This appendix provides an alphbetical listing of the programs with a
limited description of the usage of the programs that usually includes
information about the input data required by the program.


```
C****************** ADJUST *************************************
C***
C***     THIS PROGRAM IS DESIGNED TO MAKE ADJUSTMENTS TO DATA IN
C***     A STANDARD-AIRBORNE-FORMAT FILE.  ADJUSTMENT OPTIONS
C***     INCLUDE MULTIPLICATION BY A FACTOR, BASE ADJUSTMENT ,OR
C***     SLOPE CORRECTIONS.  THE INPUT DATA ARE EXPECTED IN
C***     THE TERMINAL AND CONSIST OF:
C***
C***     IFILE,OFILE - V (UP TO 50 CHARACTERS EACH)
C***
C***     MC - V
C***     MCH(I),M(I) - V
C***     ILINE(I,J),TB1(I,J),TB2(I,J),CON(I,J) - V
C***
C***     NC - V
C***     NCH(I),N(I) - V
C***     JLINE(I,J+1),T1(I,J+1),ADJ(I,J+1),J=1,N(I) - V
C***     IFILE = INPUT FILE NAME
C***
C***     OFILE = OUTPUT FILE NAME
C***
C***
C***     MC = THE NUMBER OF CHANNELS TO WHICH SENSITIVITY CHANGES
C***             ARE TO BE MADE.
C***     MCH(I) = THE ITH CHANNEL NUMBER FOR A SENSITIVITY CHANGE'
C***
C***     M(I) = THE NUMBER OF SENSITIVITY CONSTANTS TO BE USED FOR
C***             CORRECTING CHANNEL MCH(I)
C***
C*** ILINE(I,J) = LINE NUMBER FOR CONSTANT NUMBER J
C***
C***
C***     TB1(I,J) = THE STARTING TIME FOR USE OF CONSTANT J FOR
C***             CHANNEL MCH(I)
C***     TB2(I,J) = THE ENDING TIME
C***
C***     CON(I,J) = THE JTH CONSTANT TO BE USED FOR CHANNEL MCH(I)
C***
C***
C***     NC = THE NUMBER OF CHANNELS WHICH WILL HAVE BASE OR SLOPE
C***             CORRECTIONS APPLIED.
C***
```

```
C***      NCH(I) = THE ITH CHANNEL NUMBER FOR BASE OR SLOPE CHANGES;
C***
C***      N(I) = THE NUMBER OF TIME POINTS FOR THE BASE OR SLOPE
C***              CORRECTIONS.
C***
C***      JLINE(I,J) = LINE NUMBER FOR VALUE NUMBER J
C***
C***      T1(I,J) = THE TIME AT WHICH A BASE OR SLOPE VALUE IS VALID
C***
C***      ADJ(I,J) = THE VALUE AT TIME T1
C***      EXTREME CARE MUST BE TAKEN IN THE USE OF THIS PROGRAM
C***      BECAUSE IT WILL SET VALUES TO THE DEFAULT VALUE UNDER
C***      CERTAIN CONDITIONS SUCH AS WHEN USING A CHANGE IN THE
C***      SENSITIVITY CONSTANTS.  IF THE TIME IS OUTSIDE THE
C***      TIME RANGE SET, THE VALUE IS SET TO THE DEVALUE.  THIS
C***      FACT COULD BE USED FOR SOME LIMITED EDITING PURPOSES
C***      HOWEVER, IT IS NOT RECOMMENDED.
C***
C*******************************************************************


C*********************** AIRBIO ******************************
C***
C*** THIS SUBROUTINE IS DESIGNED TO BE USED FOR I/O OF X-Y
C*** RANGE DATA, X & Y COORDINATES, AND Z-VALUES IN THE NEW
C*** DIRECT ACCESS FORMAT USED WITH GEOPHYSICAL LINE DATA
C***
C*** INPUT PARAMETERS ARE:
C***
C*** R -- X-Y RANGE DATA, R(1)=XMIN, R(2)=XMAX, R(3)=YMIN,
C***        R(4) = YMAX
C***
C*** X -- X-COORDINATES
C***
C*** Y -- Y-COORDINATES
C***
C*** Z -- Z-VALUES
C***
C*** N -- THE NUMBER OF DATA POINTS
C***
C*** NZ -- THE NUMBER OF Z-VALUES (N*NCHN)
C***
C*** IC -- CONTROL CODE, 1=READ, 2=WRITE,
C***                      3=DEFINE X-Y MIN & MAX AND WRITE
C***
C*** NR -- DIRECT ACCESS RECORD NUMBER
C***
C*** LU -- LOGICAL UNIT NUMBER
C***
C*** * -- ERROR RETURN
C***
C*******************************************************************
```

```
C*****************************AIRCHG**************************
C***
C***   THIS PROGRAM IS DESIGNED TO READ STANDARD-AIRBORNE-FORMAT
C***   FILES AND WRITE THEM TO TAPE AND TO READ SUCH FILES FROM
C***   TAPE AND RECREATE THE DISK FILES.
C***
C***   THE INPUT IS PROMPTED FROM THE TERMINAL AND CONSISTS OF:
C***
C***   IFILE = PATHNAME OF THE DISK FILE
C***
C***   ITYPE = CONTROL PARAMETER TO DETERMINE THE TYPE OF OPERATION
C***   ITYPE = 0 THEN WRITE FROM DISK TO TAPE
C***   ITYPE = 1 THEN WRITE FROM TAPE TO DISK
C***
C***
C***   FILENO = FILE NUMBER ON THE TAPE
C***
C***   BLKSIZ = SIZE OF THE BLOCK ON THE TAPE
C***
C***   AFTER THE FIRST FILE YOU CAN CONTINUE TO DO THE SAME TYPE
C***   OF OPERATION BY ENTERING IFILE,FILENO, AND BLKSIZ.
C***   WHEN FINISHED ENTER 'DONE' AND ANY TWO NUMBERS.
C***
C***
C***   MOUNT THE TAPE AS AN UNLABELED ASCII TAPE USING:
C***
C***   MOUNT/FOREIGN/BLOCK=IB/RECORD=IR/DENSITY=N MTA SAV085 ITAPE
C***
C***   WHERE, FOR EXAMPLE, IB=4000,IR=80,N=800
C***
C***********************************************************************


C***************************** AIRCHK **********************
C***
C***   PROGRAM DESIGNED TO CHECK A STANDARD-AIRBORNE-FORMAT
C***   FILE.
C***
C***   THIS PROGRAM READS THE DATA FROM A STANDARD-AIRBORNE-FORMAT
C***   FILE AND FOR EACH RECORD CALCULATES THE FOLLOWING:
C***
C***   VMIN(I) -- CHANNEL MINIMUMS
C***
C***   VMAX(I) -- CHANNEL MAXIMUMS
C***
C***   VMEAN(I) -- CHANNEL MEANS
C***
C***   VSTD(I) -- CHANNEL STANDARD DEVIATIONS
C***
C***   DVMIN(I) -- MINIMUM CHANNEL DERIVATIVES
C***
C***   DVMAX(I) -- MAXIMUM CHANNEL DERIVATIVES
C***
```

```
C***     DMEAN(I) -- MEAN CHANNEL DERIVATIVES
C***
C***     DSTD(I) -- STANDARD DEVIATIONS FOR CHANNEL DERIVATIVES
C***
C***     DXAVG -- AVERAGE DISTANCE BETWEEN DATA POINTS (CURRENT UNITS)
C***
C***     DXMIN -- MINIMUM DISTANCE BETWEEN DATA POINTS
C***
C***     DXMAX -- MAXIMUM DISTANCE BETWEEN DATA POINTS
C***
C***     DXSTD -- STANDARD DEVIATION FOR DISTANCE BETWEEN DATA POINTS
C***
C***     THE PROGRAM ALSO CHECKS FOR COORDINATE BREAKS AND MAKES
C***     SURE THEY ARE PROPERLY IDENTIFIED.
C***
C***     INPUT DATA REQUIRED ARE:
C***
C***     IFILE = THE INPUT FILE NAME
C***
C***     DXLIM = LIMIT USED TO FLAG UNACCEPTABLE COORDINATE BREAKS
C***
C*******************************************************************


C********************** AIRCVT ****************************
C***
C***     THIS PROGRAM IS DESIGNED TO CONVERT STANDARD-AIRBORNE-FORMAT
C***     FILES TO A TYPE OF KEYED FILE THAT WILL ALLOW DIRECT ACCESS.
C***     THE OBJECTIVE OF THE NEW FORMAT IS TO ELIMINATE THE NEED
C***     TO SEARCH THROUGH THE FILE TO FIND A SPECIFIC LINE NUMBER
C***     OR ITS RANGE.
C***
C***     SOME OF THE VARIABLES OF INTEREST ARE:
C***
C***     ID -- 16 CHARACTER IDENTIFICATION FOR THE DATA FILE
C***
C***     NOBM -- THE MAXIMUM NUMBER OF DATA POINTS IN ONE DATA RECORD
C***
C***     NCH -- THE NUMBER OF DATA CHANNELS IN THE FILE
C***
C***     LINE -- THE IDENTIFYING LINE NUMBER FOR A SEQUENCE OF DATA
C***
C***     NL -- THE NUMBER OF LINES IN THE DATA FILE
C***
C***     NR -- THE TOTAL NUMBER OF DATA RECORDS IN THE FILE
C***
C***     DATE -- 8 CHARACTERS GIVING THE DATE THE FILE WAS WRITTEN
C***
C***     DELT -- INCREMENT OF TIME CORRESPONDING TO EACH DATA RECORD
C***
C***     LN(I) -- ARRAY WITH SEQUENCE OF LINE NUMBERS
C***
C***     NPTR(I) -- ARRAY WITH POINTERS INTO THE ITS,ISID,NOB,NREC
```

```
C***                ARRAYS FOR EACH LINE
C***
C***
C***   NRL(I) -- ARRAY CONTAINING THE NUMBER OF RECORDS IN EACH LINE
C***
C***   SRL(I) -- ARRAY CONTAINING THE STARTING RECORD OF EACH LINE
C***
C***
C***   ITS(I) -- ARRAY WITH STARTING SEQUENCE NUMBER FOR EACH
C***             DATA RECORD
C***
C***   NOB(I) -- ARRAY WITH NUMBER OF DATA POINTS IN EACH RECORD
C***
C***   NREC(I) -- SEQUENCE OF RECORD NUMBERS FOR THE DATA RECORDS
C***
C***   ISID(I) -- ARRAY WITH THE LINE BREAK PARAMETER (-1=BREAK)
C***
C***   X(I) -- ARRAY OF X-COORDINATES
C***
C***   Y(I) -- ARRAY OF Y-COORDINATES
C***
C***   Z(I) -- ARRAY OF Z-VALUES STORED SUCH THAT THE VALUE
C***            FOR DATA POINT NUMBER 'I' AND DATA CHANNEL 'J'
C***            IS CALCULATED AS BEING AT POSITION
C***
C***               K = NCH * (I - 1) + J
C***
C***   R(I) -- ARRAY OF MIN & MAX COORDINATES FOR THE DATA RECORD
C***
C*******************************************************************


C************************* AIRENC ***************************
C***
C*** THIS SUBROUTINE IS DESIGNED TO CHANGE THE FILE TYPE INDICATOR
C*** OF A STANDARD-AIRBORNE-FORMAT FILE OF THE GENERAL FORM:
C***
C***       FILE-NAME.23X
C***
C***   WHERE THE FILE-NAME IS ANY LEGAL ALPHANUMERIC FILE NAME,
C***      THE NUMBER IS ANY VALID NUMBER LESS THAN 100, AND THE
C***      CHARACTER REPRESENTED BY X IS A SINGLE ALPHANUMERIC
C***      CHARACTER.
C***
C*******************************************************************


C************************ AIRHIST ***************************
C***
C***     THIS PROGRAM IS DESIGNED TO READ A STANDARD-AIRBORNE-
C***     FORMAT FILE AND CALCULATE A FREQUENCY DISTRIBUTION
C***     FOR A SPECIFIED CHANNEL.
```

```
C***
C***      NOTE: THE AIRBORNE FORMAT IS ASSUMED TO INCLUDE THE
C***      LINE NUMBER.
C***
C***      THE RANGE FROM THE MINIMUM VALUE TO THE MAXIMUM VALUE
C***      IS DIVIDED INTO NINT INTERVALS. THE INTERVAL INTO WHICH
C***      A PARTICULAR VALUE FALLS IS CALCULATED BY
C***
C***      I = IFIX((X - XMIN)/(XMAX - XMIN)*NINT)
C***
C***         THE MAXIMUM NUMBER OF INTERVALS IS 255.
C***
C***         INPUT IS PROMPTED FROM THE TERMINAL.
C***
C***         DFILE = INPUT FILE PATHNAME (50 CHARACTERS MAX)
C***
C***      JCHAN = CHANNEL NUMBER SELECTED
C***
C*******************************************************************


C*************************AIRMNC***********************************
C***
C***         PROGRAM TO READ AIRBORNE FILES AND CREATE X,Y,Z FILES
C***         FOR INPUT TO MINC GRIDDING PROGRAM.
C***
C***   THE USER IS ASKED TO SUPPLY THE FOLLOWING DATA:
C***
C*** FILNAM = FILE NAME OF THE INPUT STANDARD-AIRBORNE-FORMAT
C***          DISK FILE.  THIS MUST BE ENCLOSED IN QUOTES.
C***
C*** FILNM1 = FILE NAME OF THE OUTPUT XYZ DISK FILE WHICH MUST
C***          ALSO BE ENCLOSED IN QUOTES.
C***
C*** NUM = THE NUMBER OF CHANNELS TO BE INCLUDED IN THE OUTPUT
C***       FILE.
C***
C*** N(I), I=1,NUM = CHANNEL NUMBERS OF THE CHANNELS THAT ARE
C***       TO BE SELECTED.  THE ORDER IS ARBITRARY.
C***
C*** ISKIP = PARAMETER USED TO DETERMINE THE INTERVAL BETWEEN
C***       DATA POINTS ALONG THE LINES THAT ARE SELECTED.  THE
C***       SKIPPING INTERVAL APPLYS ONLY WITHIN EACH DATA RECORD.
C***
C*******************************************************************


C************************** AIRXY **************************
C***
C***         THIS PROGRAM IS DESIGNED TO READ A STANDARD-AIRBORNE-
C***         FORMAT FILE AND PRINT OUT INFORMATION ABOUT THE MAXIMUM
C***         AND MINIMUM COORDINATES FOR EACH LINE AND  ALSO THE
```

```
C***        STARTING AND ENDING ITS NUMBERS.
C***
C***        PROGRAM MODIFIED FEB. 5, 1979 TO ALSO PROVIDE
C***        THE MIN AND MAX VALUES OF THE DATA IN THE CHANNELS.
C***
C***        INPUT IS PROMPTED FROM THE TERMINAL.
C***
C***        FILNAM - A FIFTY CHARACTER PATHNAME FOR THE INPUT FILE.
C***
C*******************************************************************


C*********************** APLIMG ****************************
C***
C*** THIS PROGRAM IS DESIGNED TO TAKE AN APPLICON TAPE AND CONVERT
C*** IT TO A REMAPP IMAGE FORMAT.
C***
C***  THE PROCESS USED IS TO DUPLICATE THE PRINTING ACTION OF THE
C***  APPLICON BY TURNING PIXELS EITHER FULL ON OR FULL OFF AS
C***  OPPOSED TO PIXELATION DONE IN APLREM.
C***
C***
C*** THE USER MUST SUPPLY THE NAMES TO BE USED FOR THE OUTPUT
C*** FILES, BUT EVERYTHING ELSE IS AUTOMATIC.
C***
C*******************************************************************


C*********************** APLREM ****************************
C***
C*** THIS PROGRAM IS DESIGNED TO TAKE AN APPLICON TAPE AND CONVERT
C*** IT TO A REMAPP IMAGE FORMAT.
C***
C*** THE USER MUST SUPPLY THE NAMES TO BE USED FOR THE OUTPUT
C*** FILES, BUT EVERYTHING ELSE IS AUTOMATIC.
C***
C*******************************************************************


C*********************** APPEND ****************************
C***    NEVADA DIGITIZED DATA PROGRAM
C***    PROGRAM TO MERGE STANDARD FILES
C***    THAT HAVE EQUAL DX AND DY INCREMENTS
C***    AND COMMON ROW AND COLUMN ORIGINS(E.G. COORDINATES
C***    ARE IN LAT/LON)
C***    DX AND DY ARE ASSUMED TO BE POSITIVE
C***
C*******************************************************************
```

```
C*********************** ASCII *****************************
C***
C***
C***   TRANSLATES A STRING <STRING> OF EBCDIC 8-BIT CHARACTERS OF
C***   LENGTH <LENGTH> TO ASCII
C***
C***   NOTE THAT SINCE THE SOURCE CHARACTER SET IS 8-BIT AND THE
C***   TARGET CHARACTER SET IS 7-BIT THE TRANSLATION IS UNDEFINED
C***   FOR 128 OF THE POSSIBLE SOURCE CHARACTERS. THE TRANSLATION
C***   TABLE <K> HAS OCTAL ZERO IN THESE POSITIONS SO THAT WHEN THIS
C***   SITUATION OCCURS IT CAN BE DETECTED-- WHEN A 0000 ENTRY IN
C***   THE TABLE IS FOUND NO TRANSLATION OCCURS.
C***
C***   THE FOLLOWING DESCRIBES THE TRANSLATION CARRIED OUT BY
C***   THIS SUBROUTINE:
C***
C***
C***    --OUTPUT-----    -----INPUT--------------         MAINFRAME
C***    ASCII    INDEX   HEX  BINARY    CDC***   CHAR    CDC BINARY
C***    -----    -----   ---  ------    --------         ----------
C***
C***    040      64   40   01000000  SPACE            101101
C***    056 .    75        4B  01001011  PERIOD           101111
C***    074 <    76   4C   01001100  LESSTHAN  111010
C***    050 (    77   4D   01001101  (                101001
C***    053 +    78   4E   01001110  +                100101
C***    046 &    80        50  01010000  RIGHT ARROW    110101
C***    044 $    91        5B  01011011  $                101011
C***    052 *    92        5C  01011100  *            100111
C***    051 )    93        5D  01011101  )            101010
C***    073 ;    94        5E  01011110  ;            111111
C***    136      95        5F  01011111  NOT          111110
C***    055 -    96        60  01100000  MINUS -          100110
C***    057 /    97        61  01100001  /            101000
C***    054 ,    107       6B  01101011  ,            101110
C***    076 >    110       6E  01101110  >            111011
C***    077 ?    111       6F  01101111  GT OR EQ         111101
C***    045 %    108       6C  01101100  : COLON          110011
C***    043 #    123       7B  01111011  DOWN ARROW       111001
C***    100 @    124       7C  01111100  LT OR EQ         111100
C***    047 '    125       7D  01111101  NE           110100
C***    075 =    126       7E  01111110  =                101100
C***    042 "    127       7F  01111111  EQUIVALENT       110000
C***    163      162       A2  10100010  ??           110110
C***    164      163       A3  10100011  ??           110111
C***    165      164       A4  10100100  UP ARROW         111000
C***    167      166       A6  10100101  (NONE) 000000
C***    134      74        4A  01001010  [            110001
C***    041 !    90        5A  01011010  ]            110010
C***    101 A    193       C1  11000001  A            000001
C***    102 B    194       C2  11000010  B            000010
C***    103 C    195       C3  11000011  C            000011
C***    104 D    196       C4  11000100  D            000100
C***    105 E    197       C5  11000101  E            000101
```

```
C***      106 F    198    C6       11000110    F·          000110
C***      107 G    199    C7       1-1000111    G          000111
C***      110 H    200    C8       11001000    H          001000
C***      111 I    201    C9       11001001.   I          001001
C***      112 J    209    D1       11010001    J          001010
C***      113 K    210    D2       11010010    K          001011
C***      114 L    211    D3       11010011    L          001100
C***      115 M    212    D4       11010100    M          001101
C***      116 N    213    D5       11010101    N          001110
C***      117 O    214    D6       11010110    O          001111
C***      120 P    215    D7       11010111    P          010000
C***      121 Q    216    D8       11011000    Q          010001
C***      122 R    217    D9       11011001    R          010010
C***      123 S    226    E2       11100010    S          010011
C***     ·124 T    227    E3       11100011    T          010100
C***      125 U    228    E4       11100100    U          010101
C***      126 V    229    E5       11100101    V          010110
C***      127 W    230    E6       11100110    W          010111
C***      130 X    231    E7       11100111    X          011000
C***      131 Y    232    E8       11101000    Y          011001
C***      132 Z    233    E9       11101001    Z          011010
C***      060 0    240    F0       11110000    0          011011
C***      061 1    241    F1       11110001    1          011100
C***      062 2    242    F2       11110010    2          011101
C***      063 3    243    F3       11110011    3          011110
C***      064 4    244    F4       11110100    4          011111
C***      065 5    245    F5       11110101    5          100000
C***      066 6    246    F6       11110110    6          100001
C***      067 7    247    F7       11110111    7          100010
C***      070 8    248    F8       11111000    8          100011
C***      071 9    249    F9       11111001    9          100100
C***      137 .    109    6D       01101101    . underscore
C***      072 :    122    7A       01111010    :
C***      MODS BY R. GODSON FOR MULTICS INPUT
C***
C***************************************************************


C********************** ASCTMP *********************************
C***
C***   THIS SUBROUTINE IS DESIGNED TO CONVERT EBCDIC CODE TO
C***   ASCII CODE.
C***
C***   USAGE: CALL ASCII(STR,L)
C***
C***   WHERE STR IS A STRING VARIABLE OF TOTAL LENGTH "L".
C***
C***   IF ANY EBCDIC CHARACTERS ARE ENCOUNTERED THAT DO NOT
C***   HAVE AN EQUIVALENT ASCII CODE, THEY ARE ASSIGNED A VALUE
C***   OF 255 (HEX FF).
C***
C***   THE FOLLOWING DESCRIBES THE TRANSLATION CARRIED OUT BY
C***   THIS ROUTINE:
```

```
C***
C***    --CHARACTER------------INDEX----HEX INPUT---HEX OUTPUT----
C***
C***        NUL                   0        00          00
C***        SOH                   1        01          01
C***        STX                   2        02          02
C***        ETX                   3        03          03
C***        HT                    5        05          09
C***        DEL                   7        07          7F
C***        VT                   11        0B          0B
C***        FF                   12        0C          0C
C***        CR                   13        0D          0D
C***        SO                   14        0E          0E
C***        SI                   15        0F          0F
C***        DLE                  16        10          10
C***        DC1                  17        11          11
C***        DC2                  18        12          12
C***        BS                   22        16          08
C***        CAN                  24        18          18
C***        EM                   25        19          19
C***        FS                   34        22          1C
C***        LF                   37        25          0A
C***        ETB                  38        26          17
C***        ESC                  39        27          1B
C***        ENQ                  45        2D          05
C***        ACK                  46        2E          06
C***        BEL                  47        2F          07
C***        SYN                  50        32          16
C***        DC4                  60        3C          14
C***        NAK                  61        3D          15
C***        SUB                  63        3F          1A
C***        space                64        40          20
C***        . period             75        4B          2E
C***        < less than          76        4C          3C
C***        ( left parenthesis   77        4D          28
C***        + plus sign          78        4E          2B
C***        ¢ vertical line      79        4F          7C
C***        & ampersand          80        50          26
C***        ! exclaimation point 90        5A          21
C***        $ dollar sign        91        5B          24
C***        * asterisk           92        5C          2A
C***        ) right parenthesis  93        5D          29
C***        ; semicolon          94        5E          3B
C***        horizontal graphics  95        5F          5E
C***        - minus sign         96        60          2D
C***        / slash              97        61          2F
C***        ¢ vertical line     106        6A          7C
C***        , comma             107        6B          2C
C***        % percent sign      108        6C          25
C***        - underscore        109        6D          5F
C***        > greater then sign 110        6E          3E
C***        ? question mark     111        6F          3F
C***          back quote        121        79          60
C***        : colon             122        7A          3A
```

C***	# pound sign	123	7B	23
C***	@ at sign	124	7C	40
C***	' single quote	125	7D	27
C***	= equals sign	126	7E	3D
C***	" double quote	127	7F	22
C***	a	129	81	61
C***	b	130	82	62
C***	c	131	83	63
C***	d	132	84	64
C***	e	133	85	65
C***	f	134	86	66
C***	g	135	87	67
C***	h	136	88	68
C***	i	137	89	69
C***	j	145	91	6A
C***	k	146	92	6B
C***	l	147	93	6C
C***	m	148	94	6D
C***	n	149	95	6E
C***	o	150	96	6F
C***	p	151	97	70
C***	q	152	98	71
C***	r	153	99	72
C***	tilda	161	A1	7E
C***	s	162	A2	73
C***	t	163	A3	74
C***	u	164	A4	75
C***	v	165	A5	76
C***	w	166	A6	77
C***	x	167	A7	78
C***	y	168	A8	79
C***	z	169	A9	79
C***	left curly bracket	192	C0	7B
C***	A	193	C1	41
C***	B	194	C2	42
C***	C	195	C3	43
C***	D	196	C4	44
C***	E	197	C5	45
C***	F	198	C6	46
C***	G	199	C7	47
C***	H	200	C8	48
C***	I	201	C9	49
C***	right curly bracket	208	D0	7D
C***	J	209	D1	4A
C***	K	210	D2	4B
C***	L	211	D3	4C
C***	M	212	D4	4D
C***	N	213	D5	4E
C***	O	214	D6	4F
C***	P	215	D7	50
C***	Q	216	D8	51
C***	R	217	D9	52
C***	back slash	224	E0	5C
C***	S	226	E2	53

```
C***      T                       227        E3        54
C***      U                       228        E4        55
C***      V                       229        E5        56
C***      W                       230        E6        57
C***      X                       231        E7        58
C***      Y                       232        E8        59
C***      Z                       233        E9        5A
C***      0                       240        F0        30
C***      1                       241        F1        31
C***      2                       242        F2        32
C***      3                       243        F3        33
C***      4                       244        F4        34
C***      5                       245        F5        35
C***      6                       246        F6        36
C***      7                       247        F7        37
C***      8                       248        F8        38
C***      9                       249        F9        39
C***
C*** ALL OTHER CHARACTERS ARE GIVEN THE UNDEFINED VALUE OF
C*** 255 (HEX FF).
C***
C**************************************************************


C********************** BITMAN ***********************************
C***
C*** TEST PROGRAM TO TEST FUNCTIONING OF ILBYTE & ISBYTE
C***
C**************************************************************


C*********************** BYTEFLIP *******************************
C***
C*** THIS SUBROUTINE FLIPS THE ORDER OF THE TWO BYTES LOCATED IN
C*** EACH ELEMENT OF THE INTEGER*2 INPUT ARRAY.
C***
C*** USAGE: CALL BYTEFLIP(IDATA,IDIM)
C***
C*** IDATA = INTERGER*2 ARRAY WITH THE BYTES TO BE FLIPPED
C***
C*** IDIM = DIMENSION OF THE ARRAY
C***
C**************************************************************


C********************** ILBYTE & ISBYTE ************************
C***
C*** THESE ARE BYTE STORAGE ROUTINES PATTERNED AFTER THE
C*** BYTE LOAD AND BYTE STORE ROUTINES ON THE PERKIN-ELMER
C*** 3220.
C***
```

```
C***   USAGE: CALL ILBYTE(K,M,N)
C***
C***   WHERE K IS AN INTEGER VARIABLE INTO WHICH THE SPECIFIED
C***   BYTE IS TO BE STORED AT THE LEAST SIGNIFICANT BYTE
C***   (ALL OTHER BYTES IN K ARE SET TO ZERO)
C***
C***   M = AN INTEGER OR INTEGER ARRAY ELEMENT FROM WHICH A BYTE
C***       IS TO BE TAKEN FOR STORAGE IN K
C***
C***   N = THE BYTE NUMBER TO BE STORED IN K.  BYTE NUMBERING
C***       BEGINS AT THE LEFT (MOST SIGNIFICANT BYTE) WITH
C***       ZERO AND INCREASES TO THE RIGHT.  YOU CAN USE
C***       VALUES GREATER THAN 3 AND THE ROUTINE WILL USE
C***       M AS THE STARTING POINT IN MEMORY.  4-BYTE WORDS
C***       ARE ASSUMED.
C***
C***
C***   USAGE: CALL ISBYTE(K,M,N)
C***
C***   WHERE
C***
C***   K = INTEGER WORD (4 BYTES) WHOSE LEAST SIGNIFICANT BYTE
C**        IS TO BE TAKEN FOR STORAGE INTO M.
C***
C***   M = INTEGER OR INTEGER ARRAY ELEMENT INTO WHICH THE BYTE
C***       IS TO BE STORED
C***
C***   N = BYTE NUMBER INTO WHICH THE DATA IS STORED.  THE ABOVE
C***       RESTRICTIONS APPLY
C****
C*********************************************************************


C************************* CHFILE ****************************
C***
C***   THIS PROGRAM ALLOWS YOU TO CHANGE THE HEADER RECORD OF A
C***   STANDARD-GRID FILE, ADD A VALUE TO THE DATA, OR REMOVE MEAN
C***   (GRID OR BOUNDARY) FROM THE DATA.
C***
C***   THE USER IS EXPECTED TO RESPOND TO THE FOLLOWING:
C***
C***   INPUT FILE NAME ? -- FILE NAME OF INPUT GRID FILE
C***                TO TERMINATE EXECUTION ENTER 'EX' OR BLANKS
C***
C***   CHANGE HEADER ? (Y/N)
C***
C***   IF YES, YOU WILL BE ASKED FOR NEW VALUES FOR X0,Y0,DX,DY
C***
C***   CONSTANT TO BE ADDED? (CAN ENTER 0)
C***
C***   REMOVE MEAN ? 0=NO, 1=BOUNDARY, 2=GRID
C***
C***   PUT FLAGGED VALUES ? (Y/N)
```

```
C***
C***    OUTPUT FILE PATHNAME ?
C***
C***    PRINTER OUTPUT ? 0=NO, 6=TERMINAL, 1=DISK
C***
C******************************************************************

C********************** CHRPAT *****************************
C***
C***    THIS SUBROUTINE DEFINES THE ASCII CHARACTER SET ON A
C***    DOT PATTERN OF 18 ROWS AND 13 COLUMNS.  THERE IS ONE
C***    BLANK COLUMN ON THE LEFT OF THE CHARACTER AND TWO
C***    BLANK COLUMNS ON THE RIGHT SIDE.
C***
C***    USAGE: CALL CHRPAT(LCHR,NCHR)
C***    WHERE LCHR IS AN INTEGER ARRAY THAT MUST BE DIMENSIONED
C***    IN THE MAINLINE AS
C***
C***      LCHR(1:18,1:13)
C***
C***    LCHR RETURNS A VALUE OF 255 IF THE DOT POSITION IS
C***    ON AND A VALUE OF ZERO IF IT IS OFF.
C***
C***    NCHR = THE DECIMAL VALUE OF THE ASCII CHARACTER.
C***           CHARACTERS 32-126 HAVE BEEN DEFINED AND 127
C***           IS USED TO DEFINE THE DEGREE SYMBOL.  ALL
C***           OTHER CHARACTERS ARE UNDEFINED AND CAUSE AN
C***           ERROR.
C***
C******************************************************************

C********************** CLASSY *****************************
C***
C***    THIS PROGRAM IS DESIGNED TO CLASSIFY THREE IMAGE FILES
C***    USING CLASSIFICATION SETS THAT DEFINE UPPER AND LOWER
C***    LIMITS FOR EACH OF THE THREE INPUT IMAGE FILES.
C***    THE OUTPUT FILES ARE WRITTEN AS 16-BIT IMAGES AND ARE
C***    INTENDED TO BE TREATED AS HUE,VALUE, AND SATURATION
C***    FILES.  HUE VALUES ARE PLACED IN THE RANGE 0-360.
C***    VALUE NUMBERS ARE PLACED IN THE RANGE 0-441, AND THE
C***    SATURATION DATA ARE IN THE RANGE 0-208.
C***
C***    THE USER CAN SPECIFY AS MANY AS 36 CLASSIFICATION
C***    SETS AND EACH SET WILL BE OUTPUT AS A DISTINCT HUE
C***    WITH APPROPRIATE VALUE AND SATURATION LEVELS TO MAKE
C***    THE COLORS READILY DISTINGUISHABLE.
C***
C***    THE REQUIRED INPUT IS EXPECTED TO BE EITHER ENTERED
C***    INTERACTIVELY OR THE USER CAN CHOOSE TO USE A DISK
C***    FILE.  THE REQUIRED DATA ARE:
```

```
C***
C***    IFILE = FILE NAME  OF THE FIRST INPUT IMAGE
C***          FILE.
C***
C***    SL,NL,PL = STARTING LINE, NUMBER OF LINES, & LINE SKIP
C***          FACTOR FOR IFILE.
C***
C***    SP,NP,PP = STARTING PIXEL, NUMBER OF PIXELS, & PIXEL SKIP
C***          FACTOR FOR IFILE.
C***
C***    JFILE = FILE NAME  OF THE SECOND INPUT IMAGE FILE.
C***
C***    SL,NL,PL = STARTING LINE, NUMBER OF LINES, & LINE SKIP
C***          FACTOR FOR JFILE.
C***
C***    SP,NP,PP = STARTING PIXEL, NUMBER OF PIXELS, & PIXEL SKIP
C***          FACTOR FOR JFILE.
C***
C***    KFILE = FILE NAME  FOR THE THIRD INPUT IMAGE FILE.
C***
C***    SL,NL,PL = STARTING LINE, NUMBER OF LINES, & LINE SKIP
C***            FACTOR FOR KFILE.
C***
C***    SP,NP,PP = STARTING PIXEL, NUMBER OF PIXELS, & PIXEL SKIP
C***          FACTOR FOR KFILE.
C***
C***    HFILE = FILE NAME  OF THE OUTPUT HUE FILE
C***
C***    SFILE = FILE NAME  OF THE OUTPUT SATURATION FILE
C***
C***    VFILE = FILE NAME  OF THE OUTPUT VALUE FILE
C***
C***    NC = THE NUMBER OF CLASSIFICATION SETS TO BE USED
C***
C***    L1,L2,M1,M2,N1,N2 = THE THREE SETS OF LOWER (L1, M1, N1)
C***          AND UPPER (L2, M2, N2) LIMITS FOR EACH OF THE 'NC'
C***          CLASSIFIER SETS
C***
C***    EACH OF THE ABOVE CORRESPONDS TO A SEPARATE LINE IN THE
C***    COMMAND FILE.
C***
C********************************************************************


C*********************** CLRSCL *************************
C***
C***    THIS SUBROUTINE IS INTENDED FOR USE WITH THE PROGRAM GRDREM
C***    AND PUTS A COLOR SCALE IN THE IMAGES BEING CREATED BY GRDREM
C***    FOR THE CASE OF A COLOR CONTOUR MAP.
C***
C***    USAGE: CALL CLRSCL(ICLR)
C***
C***    ICLR = 1, SELECT THE FIRST COLOR WHICH IS
```

```
C***                THE YELLOW COMPONENT
C***          = 2, SELECT THE SECOND COLOR WHICH IS MAGENTA
C***          = 3, SELECT CYAN
C***
C*******************************************************************


C******************** CODCHK *********************************
C***
C***   THIS PROGRAM IS DESIGNED TO CHECK THE CHARACTER CODE OF
C***   OF A STREAM OF CHARACTERS TO ENSURE THAT ONLY NUMBERS,
C***   SPACES, PLUS/MINUS SIGNS, OR PERIODS ARE IN THE STREAM.
C***   ALL OTHER CHARACTERS ARE SET EQUAL TO ASCII ZERO.
C***   THE PROGRAM ALLOWS FOR THE POSSIBILITY THAT THE CHARACTERS
C***   COULD BE EITHER ASCII OR EBCDIC.  IN EITHER CASE THE OUTPUT
C***   CHARACTERS ARE ASCII CHARACTERS.
C***
C*** USAGE: CALL CODCHK(STR,L)
C***
C***   WHERE STR IS A STRING VARIABLE OF TOTAL LENGTH "L".
C***
C**********************************************************************


C********************** COLORDEF *******************************
C***
C***
C***   THIS PROGRAM IS DESIGNED TO DETERMINE HOW MANY DIFFERENT
C***   COLORS ARE PRESENT IN A COLOR IMAGE.  THE PROGRAM REQUIRES
C***   THREE IMAGE FILES THAT CORRESPOND TO THE PRIMARY COLORS.
C***   TO REDUCE THE TOTAL NUMBER OF COLORS, THE DATA ARE SEGMENTED
C***   INTO INTERVALS OF 16 DN VALUES BEFORE THE COLOR COMBINATIONS
C***   ARE CALCULATED.
C***
C***   THE NUMBER OF OCCURRENCES OF EACH COLOR ARE COUNTED AND
C***   A LISTING OF THE COLORS IS PROVIDED.
C***
C**********************************************************************


C********************** CURSE ********************************
C***
C***   THIS PROGRAM TESTS THE SUBROUTINE CURSXY WHICH IS INTENDED
C***   TO ALLOW YOU TO USE THE CURSORS ON THE TEKTRONIX TERMINAL.
C***
C*****************************************************************


C********************** CURSXY *******************************
C***
```

```
C***   THIS PROGRAM IS DESIGNED TO PERFORM TWO FUNCTIONS
C***   ON THE TEKTRONIX PLOTTER TERMINAL 4014
C***
C***   1. READ THE CURRENT POSITION OF THE CURSOR
C***      USAGE: CALL CURSXY(FUNCT,IX,IY,MODE)
C***
C***      FUNCT - A CHARACTER ENTERED BY THE USER
C***      TO INITIATE THE READING OF THE CURSOR
C***
C***      IX= X-POSITION OF CURSOR
C***
C***      IY= Y-POSITION OF CURSOR
C***
C***      MODE = PARAMETER TO CONTROL THE MODE OF DISPLAY OF THE
C***             CURSOR
C***           = 5, IMMEDIATELY RETURN THE CURRENT CURSOR POSITION
C***           = 26, ALLOW CURSOR TO BE MOVED & TYPE A CHARACTER
C***             TO CAUSE THE POSITION TO BE RETURNED
C***
C***   2. CLEAR THE TEKTRONIX SCREEN
C***      USAGE: CALL CURSXY$CLEAR
C***
C*******************************************************************


C************************* CURVMN ******************************
C***
C***   THIS SUBROUTINE IS USED WITH THE PROGRAM UTILITY FOR
C***   EDITING GRID FILES.
C***
C*******************************************************************


C************************* DATPRN ******************************
C***
C***      THIS PROGRAM READS AND PRINTS DATA FROM A STANDARD-
C***      AIRBORNE-FORMAT FILE.
C***
C***      INPUT IS PROMPTED FROM THE TERMINAL.
C***
C***      H - HEADER INFORMATION ONLY WILL BE READ FROM
C***          EACH RECORD OF THE FILE
C***
C***      O - HEADER INFORMATION PLUS THE NUMBER OF OBSERVATIONS
C***          REQUESTED WILL BE READ FROM EACH RECORD OF THE FILE
C***
C***      T - SELECTED TIME SEGMENTS OF THE FILE WILL BE READ
C***
C***      IFILE - V (UP TO 50 CHARACTERS) IS THE INPUT
C***      FILE PATHNAME.
C***
C***      NLINE IS THE NUMBER OF LINES TO BE READ
```

```
C***
C***        NOUT IS THE NUMBER OF OBSERVATIONS TO BE
C***        PRINTED FROM EACH OF THE SPECIFIED LINES.
C***
C***        N(I),I=1,NLINE ARE THE SELECTED LINE NUMBERS.
C***
C***        WHEN IN THE HEADER-INFORMATION-ONLY MODE, YOU
C***        CAN ENTER A LINE NUMBER EQUAL TO -1 AND GET THE
C***        INFORMATION FOR ALL REMAINING LINES AFTER THE
C***        LAST LINE SPECIFIED.
C***
C***        WHEN IN TIME SELECT MODE, ENTER A NEGATIVE LINE
C***        NUMBER TO EXIT FROM THE PROGRAM.
C***
C***        OUTPUT FILENAME - DATPRN.OUT
C***
C********************************************************************


C*******************************DELTFIX*************************
C***
C***        THIS PROGRAM CONVERTS DELT TO MAKE IT COMPATIBLE
C***        WITH OTHER STANDARD-AIRBORNE-FORMAT PROGRAMS.
C***
C********************************************************************



C******************* DISKIO *************************************
C***
C*** THIS SUBROUTINE PERFORMS UNFORMATTED READ & WRITE TO A RANDOM
C*** ACCESS DISK FILE.
C***
C*** USAGE: CALL DISKIO(OPER,LU,IOAREA,FCB)
C***
C*** OPER = INTEGER VARIABLE USED TO DEFINE THE OPERATION
C***           TO BE PERFORMED.
C***        = 0, OPEN A FILE.  IF FCB(1)=0, AN INPUT FILE WILL BE
C***        OPENED.  IF FCB(1)=N AND FCB(2)=M, AN OUTPUT FILE
C***        WITH "M" PIXELS PER SCANLINE AND PACKED "N" BITS PER
C***        PIXEL WILL BE OPENED.
C***
C***        = 3, POINT TO THE FIRST DATA RECORD (SCANLINE #1)
C***
C***        = 4, SKIP FORWARD THE NUMBER OF RECORDS GIVEN BY THE
C***        VALUE OF FCB(1).
C***
C***        = 5, SKIP BACKWARD THE NUMBER OF RECORDS GIVEN BY THE
C***        VALUE OF FCB(1).
C***
C***        = 6,7,8, CLOSE THE FILE SPECIFIED BY LOGICAL UNIT "LU"
C***
C***        = 9, READ THE RECORD SPECIFIED BY THE CURRENT RECORD
```

```
C***          NUMBER GIVEN BY THE VALUE OF FCB(14).  AFTER EACH
C***          READ THE CURRENT RECORD IS INCREMENTED TO POINT TO
C***          THE NEXT RECORD.  THE STARTING PIXEL [FCB(4)], THE
C***          PIXEL SKIP [FCB(6)], AND THE LINE SKIP [FCB(7)] ARE
C***          USED TO WINDOW THE DATA.  IF AN END-OF-FILE CONDITION
C***          OCCURS DURING A READ, A MESSAGE IS SENT TO THE USER
C***          AND FCB(1) IS SET TO -1 AND CONTROL IS RETURNED TO
C***          THE CALLING PROGRAM.
C***
C***        = 10, WRITE A RECORD.  NOTE THAT THE DATA MUST BE
C***          PACKED BEFORE BEING PASSED TO THIS SUBROUTINE.
C***
C***        = 11, POINT TO A SPECIFIED SCANLINE AS THE NEXT RECORD
C***          TO BE READ.  BECAUSE OF THE HEADER RECORD, THIS
C***          NUMBER IS AUTOMATICALLY INCREMENTED BY ONE TO POINT
C***          TO THE CORRECT DATA RECORD.
C***
C*** LU = THE LOGICAL UNIT NUMBER TO BE ASSIGNED TO THE FILE.
C***
C*** IOAREA = ARRAY CONTAINING THE PACKED DATA AS READ FROM DISK
C***          OR TO BE WRITTEN TO DISK.
C***
C*** FCB = FILE CONTROL BLOCK (INTEGERS)
C***
C*** FCB(1) = USED TO PASS PARAMETERS TO THE SUBROUTINE
C***
C*** FCB(2) = NUMBER OF PIXELS PER SCANLINE
C***
C*** FCB(3) = NUMBER OF LINES IN THE FILE
C***
C*** FCB(4) = STARTING PIXEL NUMBER
C***
C*** FCB(5) = STARTING LINE NUMBER
C***
C*** FCB(6) = PIXEL SKIP VALUE
C***
C*** FCB(7) = SCANLINE SKIP VALUE
C***
C*** FCB(8) TO FCB(11) = FILE I.D. IN ASCII
C*** FCB(12) = NUMBER OF WORDS PER DATA RECORD
C***
C*** FCB(13) = NUMBER OF BYTES PER WORD
C***


C*** FCB(14) = CURRENT RECORD NUMBER
C***
C*** FCB(23) = NUMBER OF BYTES PER RECORD
C***
C*** FCB(24) = NUMBER OF RECORDS IN THE FILE
C***
C*** FCB(25) = NUMBER OF BITS PER BYTE
C***
C***********************************************************************
```

```
C***************************** DISPLT *********************i
C***
C***       THIS PROGRAM IS INTENDED TO PROVIDE THE USER WITH
C***       STACKED PROFILES OF DIFFERENT CHANNELS AND/OR
C***       DIFFERENT LINES.  THE INPUT IS PROMPTED FROM
C***       THE TERMINAL.
C***
C***       IF YOU WISH, YOU CAN SET UP A DATA FILE ON THE
C***       DISK.  THE REQUIRED DATA ARE:
C***
C***       LEGEND - UP TO 72 CHARACTERS OF TITLE INFORMATION
C***       TO BE AT THE BOTTOM OF THE PLOT.
C***
C***       FILNAM,FIRSTF,LASTF,TYPE:
C***
C***       FILNAM = PATHNAME OF THE FILE TO BE PLOTTED.
C***
C***       FIRSTF = FIRST FILE TO BE PLOTTED.
C***
C***       LASTF = LAST FILE TO BE PLOTTED.
C***
C***       TYPE = FILE TYPE
C***
C***       FOR EXAMPLE: IF YOU WISH TO PLOT DATA FROM A
C***       SERIES OF STANDARD-AIRBORNE-FORMAT FILES WITH
C***       THE PRIMARY NAME IGLOO  AND FILES 3 THROUGH 7
C***       OF TYPE 'A', THE FILES MUST BE NAMED:
C***
C***       IGLOO.3A IGLOO.4A IGLOO.5A IGLOO.6A IGLOO.7A
C***
C***       NOTE: IF THE FILE ARE LOCATED AT >UDD>PROJ>NAME,
C***       WHEREAS YOU ARE WORKING IN ANOTHER DIRECTORY,
C***       YOU WOULD ENTER:
C***
C***       >UDD>PROJ>NAME>IGLOO 3 7 A
C***
C***       NAMELIST DATA IS REQUIRED NEXT.
C***
C*** &PARMS
C***
C***       LEGEND = PLOT TITLE
C***
C***       SCAL = MAP SCALE TO BE USED FOR THE PLOT
C***
C***       ANGLE = ROTATION ANGLE FOR THE FLIGHT LINES IF
C***       THEY ARE NOT EAST-WEST.
C***
C***       ISEL = AN ARRAY OF INTEGERS USED TO SELECT THE
C***       CHANNELS TO BE PLOTTED.
C***
C***       INC = PLOTTING INCREMENT TO SELECT EVERY INC-TH
C***       VALUE. DEFAULT IS 1 WHICH MEANS THAT EVERY POINT
C***       WILL BE USED TO DRAW THE PLOT CURVE.  VALUES OF
C***       INC THAT ARE GREATER THAN ONE SPEED UP THE
```

```
C***          PLOTTING TIME.
C***
C***          IALL = PARAMETER USED TO SELECT ALL
C***          OR INDIVIDUAL LINES.  DEFAULT IS ALL LINES.
C***          A VALUE OF IALL=0 MEANS THAT LINES WILL BE SELECTED.
C***
C***          JALL = PARAMETER USED TO SELECT ALL
C***          OR INDIVIDUAL CHANNELS.  DEFAULT IS ALL CHANNELS.
C***          A VALUE OF JALL=0 MEANS THAT CHANNELS MUST BE SELECTED.
C***
C***          VBASE = AN ARRAY OF NUMBERS TO BE SUBTRACTED FROM
C***          THE CHANNEL VALUES BEFORE PLOTTING.  THIS HAS THE
C***          EFFECT OF A ZERO OFFSET.
C***
C***          YSCAL = VERTICAL SCALE OF THE PLOT
C***          THE VALUES ENTERED ARE IN DATA UNITS/INCH
C***
C***          IPLOTR = 0, SELECT THE CALCOMP PLOTTER
C***                 = 1 SELECT THE TEKTRONIX PLOTTER
C***                 = 6 SELECT THE VARIAN PLOTTER
C***
C***          SCALOP = 'P' ; PLOT VERSUS POSITION
C***                   'T' ; PLOT VERSUS TIME
C***                   'Q' ; EXIT FROM THE PROGRAM
C***
C***          XBRD,YBRD = THE X AND Y DIMENSIONS IN INCHES OF THE PLOT
C***          AREA.  IF THESE PARAMETERS ARE NOT SPECIFIED, A
C***          DEFAULT SIZE IS ASSUMED.  THE DEFAULT SIZE FOR THE
C***          VARIAN AND CALCOMP PLOTTERS IS 16.5'X16.5'.
C***
C*** & END OF PARMS INPUT
C***
C***          IF SCAL IS NOT SET BY THE USER,
C***          ZERO IS ASSUMED AND HORIZONTAL AND VERTICAL SCALING IS
C***          AUTOMATIC.  IF SCAL IS SET TO A POSITIVE NUMBER, THE
C***          USER IS EXPECTED TO SET ALL HORIZONTAL AND VERTICAL
C***          SCALES.  THE "SCAL" AND "YSCAL" PARAMETERS ALLOW THE
C***          USER TO CHANGE THE HORIZONTAL AND/OR VERTICAL SCALE.
C***          THEY DO NOT ALLOW THE USER TO CHANGE
C***          THE SIZE OF THE INDIVIDUAL PLOT.  THIS CAN BE DONE
C***          ONLY BY CHANGING XBRD AND/OR YBRD.
C***
C***          IF IALL WAS DEFINED AS ZERO, THE NEXT INPUT
C***          EXPECTED WILL BE THE LINE NUMBERS SELECTED.
C***          ENTER ONE LINE NUMBER PER DATA LINE AND MAKE
C***          THE LAST VALUE EQUAL TO 999.
C***
C***          FOR EACH FILE A PARMS LIST WILL BE EXPECTED.
C***          ONCE THE PARMS HAVE BEEN DEFINED, YOU DO NOT
C***          HAVE TO REENTER THEM IF YOU WANT TO USE THE
C***          SAME VALUES. THIS FACT DOES NOT CREATE ANY PROBLEMS
C***          EXCEPT WITH REGARD TO ISEL.  THE PROGRAM COUNTS
C***          THE NUMBER OF NONZERO VALUES IN THE ARRAY ISEL
C***          AND EXPECTS THAT THAT MANY CHANNELS WILL BE PLOTTED.
```

```
C***          THEREFORE IF YOU PLOTTED CHANNELS 1 2 3 4 FROM
C***          ONE FILE BUT YOU ONLY WANT CHANNELS 1 AND 4 FROM
C***          THE NEXT FILE, YOU MUST ENTER
C***
C***          ISEL=1,4,0,0,
C***
C***          AFTER EACH PLOT THE PLOT SYSTEM WILL ASK YOU
C***          IF YOU ARE THROUGH WITH THE TAPE.  BE SURE YOU
C***          GIVE THE CORRECT ANSWER!!!!
C***
C*****************************************************************


C*********************** DISTPL ******************************
C***
C***          THIS SUBROUTINE IS CALLED BY DISPLT.FORTRAN
C***          SUBROUTINE DISTPL DOES THE PLOTTING FOR THE
C***          DISPLT PROGRAM.
C***
C*****************************************************************



C***                     6/7/77
C********************* DSPEDT ******************************
C***
C***     DSPEDT ALLOWS THE USER TO EDIT AND DISPLAY ANY LINE
C***     FROM A FILE, USING THE FOLLOWING FUNCTIONS;
C***
C***     D; DISPLAY THE CURSOR
C***        IN THIS MODE, THE USER CAN POSITION THE CURSOR AT THE
C***        DESIRED DATA POINT.  THE PROGRAM WILL THEN WAIT FOR ONE
C***        OF THE FOLLOWING RESPONSES FROM THE USER;
C***
C***     F OR F; DSPEDT ASKS FOR A NEW FUNCTION.
C***
C***     C OR C; DSPEDT CONTINUES IN CURSOR MODE I.E., THE
C***             CURSOR IS DISPLAYED AGAIN.
C***
C***     ANY OTHER CHARACTER; DSPEDT ASKS FOR EDITING CHANGES
C***                       ON THE CURRENT LINE.  NO MORE THAN
C***                       50 CHANGES PER LINE WILL BE ALLOWED.
C***     NOTE: THE FILE WILL NOT BE EDITED UNTIL THE E FUNCTION IS
C***           USED ONLY THE BUFFER WILL BE CHANGED.
C***
C***     DSPEDT WILL THEN PRINT OUT THE TIME AND CHANNEL VALUES
C***     BEGINNING 2 POSITIONS AHEAD OF THE CURRENT CURSOR
C***     POSITION AND ENDING 2 POSITIONS BEHIND THE CURRENT CURSOR
C***     POSITION AND THEN TAKE THE APPROPRIATE ACTION I.E. F,C,ETC.
C***
C***     N; DSPEDT ASKS FOR A NEW LINE.  THE LINE NUMBERS INPUT
C***        BY THE USER ARE ASSUMED TO BE AN INCREASING SEQUENCE.
C***        IF THIS IS NOT TRUE, DSPEDT WILL PRINT AN ERROR MESSAGE,
```

```
C***      REWIND THE FILE, AND ASK FOR A NEW LINE.
C***
C***  P; DSPEDT PLOTS THE CURRENT CONTENTS OF THE BUFFER.
C***
C***  S; DSPEDT RESCALES THE PLOT.  INPUTTING ZEROS WILL LEAVE
C***     THE SCALE UNCHANGED.
C***
C***  E; EDIT THE FILE.
C***     DSPEDT WILL LIST THE CHANGES MADE TO EACH LINE AND
C***     ASK FOR EDITING CHANGES TO THAT LINE.  INPUTTING ZEROS
C***     FOR THE LINE NUMBER WILL CAUSE ALL CHANGES LISTED OR
C***     ALL CHANGES MADE BY THE USER TO BE EDITED INTO THE FILE.
C***
C***  Q; QUIT
C***           A NEW FILE MAY BE EDITED IF DESIRED.
C***
C***     INPUT IS PROMPTED BY THE TELETYPE.
C***
C***     PROGRAM VARIABLES;
C***
C***       FILNAM - INPUT FILE NAME
C***       OUTNAM - OUTPUT FILE NAME
C***       ICHAN - DESIRED CHANNEL NUMBER
C***
C***       NOTE: IF ICHAN IS SET EQUAL TO EITHER 100 OR 200
C***       YOU CAN DISPLAY THE X OR Y COORDINATES
C***       RESPECTIVELY.
C***       YOU CANNOT EDIT THE COORDINATES!!!!!!!
C***
C***       JLINE - DESIRED LINE NUMBER
C***
C***    NOTE: THE SPOOLER MUST NOT BE ON WHEN RUNNING
C***          THIS PROGRAM BECAUSE IT INTERFERES WITH
C***          I/O TIMING!!!
C***
C***********************************************************************


C********************** DVALIT ***********************************
C***
C***
C***  THIS PROGRAM IS DESIGNED TO TAKE LIMITS ON SPECIFIED
C***  CHANNELS OF A STANDARD-AIRBORNE-FORMAT FILE AND EITHER
C***  SET BOTH THE COORDINATES AND ALL CHANNELS TO DVAL OR SET
C***  ONLY THE SPECIFIED CHANNEL TO DVAL WHEN THE VALUES OF THE
C*** SPECIFIED CHANNEL ARE OUTSIDE THE LIMITS DEFINED.
C***
C***  THE INPUT ARE PROMPTED FROM THE TERMINAL AS FOLLOWS:
C***
C***  ENTER INPUT AND OUTPUT FILE NAMES (IN SINGLE QUOTES)
C***
C*** ARE YOU GOING TO SET COORDINATES AND ALL CHANNELS TO DVAL
C***  WHEN ANY GIVEN CHANNEL IS OUTSIDE ITS LIMITS ? ('Y'/'N')
```

```
C***
C***   HOW MANY CHANNELS TO BE ENTERED?
C***
C***   ENTER CHANNEL NOS AND LOW AND HIGH LIMITS.
C***
C**********************************************************************


C*********************** EBCASC ******************************
C***
C***   THIS PROGRAM IS DESIGNED TO PERFORM ANY OF THE FOLLOWING
C***   FUNCTIONS:
C***
C***   1.= CONVERT AN EBCDIC CODE TAPE TO ASCII CODE
C***
C***   2 = CONVERT AN ASCII CODE TAPE TO EBCDIC CODE
C***
C***   3 = DUPLICATE THE INPUT TAPE WITHOUT ANY CONVERSION
C***       THIS OPTION ALLOWS YOU TO DUPLICATE ANY TYPE OF TAPE.
C***
C***   THE ABOVE STATEMENTS HAVE ONE VERY IMPORTANT CAVEAT WHICH
C***   IS THAT VARIABLE RECORD LENGTHS CANNOT BE HANDLED EXCEPT
C***   FOR A FEW RECORDS AT THE VERY BEGINNING OF THE TAPE FILE.
C***
C***   THE PROGRAM EXPECTS YOU TO MOUNT THE TAPES AS FOLLOWS:
C***
C***   INPUT TAPE: MOUNT/FOREIGN/DENSITY=N MTAX: TAG001 ITAPE
C***
C***   OUTPUT TAPE: MOUNT/FOREIGN/DENSITY=M MTAY: TAG002 OTAPE
C***
C***   THE PROGRAM IS INTERACTIVE AND REQUESTS THE FOLLOWING
C***   INFORMATION:
C***
C***   MODE,IN,NF,OUT,NHDR,IBLK
C***
C***   MODE = MODE OF OPERATION
C***        = 1, CONVERT EBCDIC TO ASCII
C***        = 2, CONVERT ASCII TO EBCDIC
C***        = 3, DUPLICATION ONLY
C***
C***   IN = STARTING FILE NUMBER ON THE INPUT TAPE
C***
C***   NF = NUMBER OF FILES TO BE COPIED -- ALL MUST BE THE
C***        SAME AS RECORDS RECORD SIZES
C***
C***   OUT = STARTING FILE NUMBER ON THE OUTPUT TAPE
C***
C***   NHDR = NUMBER OF HEADER RECORDS ON THE TAPE.  THESE RECORDS
C***          MAY HAVE VARYING RECORD LENGTHS.
C***
C***   IBLK = PHYSICAL RECORD LENGTH OF THE DATA RECORDS
C***
C***   IF NHDR IS GREATER THAN ZERO, THE PROGRAM WILL ALSO REQUEST:
```

```
C***
C***    (JBLK(I(,I=1,NHDR)
C***
C***    JBLK(I) = RECORD LENGTH OF THE ITH HEADER RECORD
C***
C**************************************************************

C******************** EBCDIC *********************************
C***
C***    THIS SUBROUTINE IS DESIGNED TO CONVERT ASCII CODE TO
C***    EBCDIC CODE.
C***
C*** USAGE: CALL EBCDIC(STR,L)
C***
C***    WHERE STR IS A STRING VARIABLE OF TOTAL LENGTH "L".
C***
C***    IF ANY ASCII CHARACTERS ARE ENCOUNTERED THAT DO NOT
C***    HAVE AN EQUIVALENT EBCDIC CODE, THEY ARE ASSIGNED A VALUE
C***    OF 255 (HEX FF).
C***
C***    THE FOLLOWING DESCRIBES THE TRANSLATION CARRIED OUT BY
C***    THIS ROUTINE:
C***
C***    --CHARACTER------------INDEX----HEX INPUT---HEX OUTPUT-------
C***
C***       NUL                    0         00           00
C***       SOH                    1         01           01
C***       STX                    2         02           02
C***       ETX                    3         03           03
C***       EOT                    4         04           37
C***       ENQ                    5         05           2D
C***       ACK                    6         06           2E
C***       BEL                    7         07           2F
C***       BS                     8         08           16
C***       HT                     9         09           05
C***       LF                    10         0A           25
C***       VT                    11         0B           0B
C***       FF                    12         0C           0C
C***       CR                    13         0D           0D
C***       SO                    14         0E           0E
C***       SI                    15         0F           0F
C***       DLE                   16         10           10
C***       DC1                   17         11           11
C***       DC2                   18         12           12
C***       DC4                   20         14           3C
C***       NAK                   21         15           3D
C***       SYN                   22         16           32
C***       ETB                   23         17           26
C***       CAN                   24         18           18
C***       EM                    25         19           19
C***       SUB                   26         1A           3F
C***       ESC                   27         1B           27
```

C***	FS	28	1C	22
C***	RS	30	1E	35
C***	space	32	20	40
C***	! exclamation point	33	21	5A
C***	" double quote	34	22	7F
C***	# pound sign	35	23	7B
C***	$ dollar sign	36	24	5B
C***	% percent sign	37	25	6C
C***	& ampersand sign	38	26	50
C***	' single quote	39	27	7D
C***	(left parenthesis	40	28	4D
C***	) right parenthesis	41	29	5D
C***	* asterisk	42	2A	5C
C***	+ plus sign	43	2B	4E
C***	, comma	44	2C	6B
C***	- minus sign	45	2D	60
C***	. period	46	2E	4B
C***	/ slash	47	2F	61
C***	0	48	30	F0
C***	1	49	31	F1
C***	2	50	32	F2
C***	3	51	33	F3
C***	4	52	34	F4
C***	5	53	35	F5
C***	6	54	36	F6
C***	7	55	37	F7
C***	8	56	38	F8
C***	9	57	39	F9
C***	: colon	58	3A	7A
C***	; semicolon	59	3B	5E
C***	< less than	60	3C	4C
C***	= equals sign	61	3D	7E
C***	> greater then sign	62	3E	6E
C***	? question mark	63	3F	6F
C***	@ at sign	64	40	7C
C***	A	65	41	C1
C***	B	66	42	C2
C***	C	67	43	C3
C***	D	68	44	C4
C***	E	69	45	C5
C***	F	70	46	C6
C***	G	71	47	C7
C***	H	72	48	C8
C***	I	73	49	C9
C***	J	74	4A	D1
C***	K	75	4B	D2
C***	L	76	4C	D3
C***	M	77	4D	D4
C***	N	78	4E	D5
C***	O	79	4F	D6
C***	P	80	50	D7
C***	Q	81	51	D8
C***	R	82	52	D9
C***	S	83	53	E2

```
C***      T                       84      54      E3
C***      U                       85      55      E4
C***      V                       86      56      E5
C***      W                       87      57      E6
C***      X                       88      58      E7
C***      Y                       89      59      E8
C***      Z                       90      5A      E9
C***      [ left bracket          91      5B      AD
C***        back slash            92      5C      E0
C***      ] right bracket         93      5D      BD
C***      horizontal graphics     94      5E      5F
C***      - underscore            95      5F      6D
C***        back quote            96      60      79
C***      a                       97      61      81
C***      b                       98      62      82
C***      c                       99      63      83
C***      d                       100     64      84
C***      e                       101     65      85
C***      f                       102     66      86
C***      g                       103     67      87
C***      h                       104     68      88
C***      i                       105     69      89
C***      j                       106     6A      91
C***      k                       107     6B      92
C***      l                       108     6C      93
C***      m                       109     6D      94
C***      n                       110     6E      95
C***      o                       111     6F      96
C***      p                       112     70      97
C***      q                       113     71      98
C***      r                       114     72      99
C***      s                       115     73      A2
C***      t                       116     74      A3
C***      u                       117     75      A4
C***      v                       118     76      A5
C***      w                       119     77      A6
C***      x                       120     78      A7
C***      y                       121     79      A8
C***      z                       122     7A      A9
C***        left curly bracket    123     7B      C0
C***      & vertical line         124     7C      4F
C***        right curly bracket   125     7D      D0
C***        tilda                 126     7E      A1
C***                              127     7F      07
C***
C***  ALL OTHER CHARACTERS ARE GIVEN THE UNDEFINED VALUE OF
C***  255 (HEX FF).
C***
C*************************************************************************

C******************** EDTFIL *******************************************
C***
```

```
C***        THIS PROGRAM TAKES FILES PRODUCED USING INCRIM
C***        AND ENABLES THE USER TO COMBINE THEM INTO
C***        A NEW FILE.  THE USER CAN SPECIFY THAT A
C***        DIFFERENT LINE NUMBER BE ASSIGNED TO THE DATA
C***        WHEN THEY ARE WRITTEN TO THE NEW FILE. THE START
C***        TIME AND END TIME OF THE BEGINNING AND ENDING
C***        OBSERVATIONS ARE ALSO SPECIFIED.
C***
C***        THE INPUT IS PROMPTED FROM THE TERMINAL AND
C***        IS ENTERED IN A NAMELIST FORMAT.
C***
C***        E.G. IFILE=RD07:TEMP.DAT,NLINE=3,&
C***
C***        PROGRAM VARIABLES ARE:
C***
C***        IFILE - INPUT FILE NAME
C***
C***        OFILE - OUTPUT FILE NAME
C***
C***        NLINE - NEW LINE NUMBER TO BE USED
C***
C***        OLINE - OLD LINE NUMBER
C***
C***        ST - STARTING TIME
C***
C***        ET - ENDING TIME
C***
C***         DATA INPUT IS TERMINATED BY ENTERING IFILE=0
C***
C***        NOTE; THIS PROGRAM DOES NOT RECOGNIZE TIME BREAKS!
C***              EXTRACTING DATA WHICH CONTAIN BREAKS IN TIME WILL
C***              YIELD UNDESIRED RESULTS!
C***
C***            THE TIME SHOULD BE IN INTEGER SECONDS WITH DELT=1.0
C***            AND DECIMAL MINUTES WITH DELT=1/60.
C***
C*************************************************************************


C********************** ENC *************************************
C***
C*** THIS SUBROUTINE IS INTENDED FOR USE WITH PROGRAMS THAT USE
C*** STANDARD-AIRBORNE-FORMAT DATA SETS NAMED IN THE CONVENTIONAL
C*** WAY.
C***
C*** USAGE: CALL ENC(FNAME,NFILE,TYPE,FILNAM)
C***
C*** FNAME = THE GENERAL FILE NAME
C***
C*** NFILE = THE FILE NUMBER
C***
C*** TYPE = FILE TYPE (A SINGLE LETTER -- "O", "A", "B")
C***
```

```
C***    FILNAM = COMPLETE FILE NAME CONSTRUCTED AS FNAME.NFILE TYPE
C***           E.G. FNAME="NEVADA", NFILE=3, TYPE="O" GIVES NEVADA.3O
C***
C***************************************************************


C*********************** EQUHST ******************************
C***
C***    THIS SUBROUTINE IS DESIGNED TO REDISTRIBUTE A FREQUENCY
C***    DISTRIBUTION IN SUCH A WAY AS TO OPTIMIZE THE SPREAD
C***    OF THE DATA OVER THE FULL DATA RANGE WITHOUT LEAVING ANY
C***    GAPS BETWEEN GROUPS OF DATA.
C***
C***    THE ALGORITHM USES THE CUMULATIVE FREQUENCY FUNCTION TO
C***    LOCATE AREAS WITH SIGNIFICANT AMOUNTS OF DATA.  EACH OF
C***    THE RANGES FOUND IS ALLOCATED A PROPORTION OF THE FULL
C***    DATA RANGE BASED UPON THE FRACTION OF THE TOTAL AMOUNT
C***    OF DATA.
C***
C***    AFTER THE HISTOGRAM HAS BEEN REDISTRIBUTED, THIS INFORMATION
C***    IS USED TO DEFINE THE MAPPING OF THE ORIGINAL HISTOGRAM
C***    INTO THE RANGE 0-255.
C***
C***    USAGE: CALL EQUHST(FREQ,NDATA,Z)
C***
C***    WHERE
C***
C***    FREQ = THE ORIGINAL HISTOGRAM (INTEGER NUMBERS)
C***
C***    NDATA = THE NUMBER OF POINTS IN THE HISTOGRAM
C***
C***    Z = THE RETURNED MAPPING DATA (INTEGER NUMBERS)
C***
C***************************************************************


C*********************** EXTRAK ******************************
C***
C***    THIS PROGRAM EXTRACTS SPECIFIED CHANNELS FROM A
C***    STANDARD-AIRBORNE-FORMAT FILE AND WRITES
C***    A NEW FILE .
C***
C***       INPUT IS FROM THE TERMINAL.
C***
C***       LINES(I),I=1,NLINE - V
C***
C***       IFILE - V (UP TO 50 CHARACTERS)
C***       OFILE - V (UP TO 50 CHARACTERS)
C***       NCHAN - V
C***
C***       N(I),I=1,NCHAN - V
C***
```

```
C***        IFILE = INPUT DISK FILE
C***
C***     OFILE = OUTPUT FILE WITH THE
C***             SPECIFIED CHANNELS.
C***     NCHAN = THE NUMBER OF CHANNELS TO BE EXTRACTED FROM RFILE.
C***
C***     N(I) = CHANNEL NUMBERS OF THE CHANNELS TO BE EXTRACTED.
C***
C***     LINES(I) ARE THE LINES TO BE EXTRACTED IN THE GIVEN ORDER
C***
C***        NOTE: IF THE NUMBER OF LINES DESIRED ENTERED IS NEGATIVE
C***        THEN ALL LINE WILL BE OUTPUT TO THE FILE UP TO
C***        THE NUMBER OF LINES EQUAL TO THE ABSOLUTE VALUE OF
C***        THE NUMBER GIVEN.
C***
C***
C***        NOTE: YOU CAN SPECIFY ARTIFICIAL TIMES.
C***
C*****************************************************************


C********************** FFTFIL ******************************
C***
C*** FAST FOURIER FILTERING PROGRAM
C***
C*** THIS PROGRAM ALLOWS YOU TO FILTER STANDARD-GRID FILES.
C***
C*** THE FIRST PARAMETER REQUIRED DEFINES THE TYPE OF FILTERING
C*** TO BE DONE AND MUST BE ONE OF THE FOLLOWING:
C***
C***        1STVER     1ST-VERTICAL DERIVATIVE OF THE INPUT FIELD
C***        2NDVER     2ND-VERTICAL DERIVATIVE OF THE INPUT FIELD
C***        BANPAS     BANDPASS FILTER
C***        STRIKE     DIRECIONAL FILTERING.
C***        NOFILT     NO FILTERING
C*** CARD 2 : INPUT FILE NAME.EXT.
C*** CARD 3 : OUTPUT FILE NAME.EXT.
C*** CARD 4 : TITLE (COL. 1-56).
C*** CARD 6 : $PARMS
C*** CARD 6 : LIST PARAMETERS--EXAMPLE: IOPT1=0,IOPT2=1,DEN=.3,.....
C*** CARD 7 : $END.
C*** THE FOLLOWING QUERIES ARE ASKED AFTER FILTER OPERATION
C*** HAS BEEN COMPLETED. PURPOSE OF QUERIES ARE TO CONTINUE
C*** FILTERING THE INPUT FILE WITH DIFFERENT FILTERS.
C*** QUERY 1 : ADDITIONAL FILTER TO BE APPLIED? (Y OR N) - IF 'Y'
C***           THE PROGRAM ASKS QUERIES 2 THRU 6. IF 'N' THE
C***           PROGRAM STARTS OVER BY ASKING FOR THE COMMAND
C***           FILE.
C*** QUERY 2 : NEW OPERATOR? FORMAT SAME AS IN CARD 1 RESPONSE.
C*** QUERY 3 : NEW OUTPUT FILE NAME.EXT?
C*** QUERY 4 : NEW TITLE?
C*** QUERY 5 : PARAMETER CHANGE? (Y OR N) - IF 'N' THE FILTERING
C***           COMPUTATIONS ARE STARTED. IF 'Y' THE USER ENTERS
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C***             THE PARAMETERS TO BE CHANGED IN A NAMELIST
C***             (EG. &PARMS THETI=-90.,THET2=0.,&)
C***             (NOTE THE FOLLOWING PARAMTERS CANNOT BE CHANGED-
C***             NADD,IOPT2,IDVAL,DDX,DDY,XO,YO).
C*** QUERY 1 IS THEN REPEATED FOR ADDITIONAL FILTER OPERATIONS.
C*** INPUT PARAMETERS:
C*** IOPT1 = 0 NO PRINTED OUTPUT (DEFAULT: IOPT1=0)
C***           6 OUTPUT PRINTED ON TERMINAL
C***          -1 OUTPUT PRINTED ON DISK.
C*** IOPT2 = -1 NO REMOVAL OF MEAN FROM INPUT ARRAY
C***             (DEFAULT IOPT2=-1)
C***           0 REMOVE MEAN USING BOUNDARY VALUES
C***           1 REMOVE MEAN AND SAVE GRID, FILE NAME: CON.GRD.
C*** NADD = NO. OF ROWS OR COLUMNS ADDED TO EACH SIDE OF GRID
C***          TO REDUCE THE EFFECTS OF GIBBS PHENOMENA
C***          (DEFAULT NADD=0).
C*** W1,W2,W3 & W4 - WAVELENGTHS USED IN BANDPASS FILTERING.
C***          (DEFAULT W1=W2=0. W3=W4=1.0E+30 INFINTE WAVELENGTH)
C*** DEN - DENSITY CONTRAST, GM/CC (DEFAULT DEN=1.).
C*** BMAG - MAGNETIZATION CONTRAST, GAMMAS (DEFAULT BMAG=1.).
C*** DEC & XINC - DECLINATION AND INCLINATION OF EARTH''S FIELD
C***               IN DEGREES.  (DEFAULT DEC=0. XINC=90.)
C*** BDEC & BINC - DECLINATION AND INCLINATION OF MAGNETIZATION
C***               VECTOR. (DEFAULT BDEC=0. BINC=90.)
C*** IDVAL = 0 NO FLAGGED GRID POINTS IN INPUT DATA
C***             (DEFAULT IDVAL=0)
C***           1 FLAGGED GRID POINTS IN INPUT DATA
C***          -1 FLAGGED VALUES REMOVED AND LOCATIONS IN
C***             FILE 'FLAG.LOC'.
C*** ICOEF = 1 SAVE FOURIER COEFFICIENTS IN FILE 'FFTFIL.COF' FOR
C***           LATER USE BUT PERFORM DESIGNATED FILTER OPERATION
C***           (NOTE: IF DATA CONTAINS FLAGGED VALUES A FILE
C***           CALLED 'FLAG.LOC' CONTAINING THEIR LOCATIONS IS
C***           ALSO CREATED IN USERS DISK AREA.)
C***         0 FOURIER COEFFICIENTS NOT SAVED (DEFAULT ICOEF=0).
C***        -1 FOURIER COEFFICIENTS IN SEGMENT 'FFTFIL.COF' ARE
C***           USED AS INPUT. NOTE THAT IF FLAGGED VALUES ARE
C***           PRESENT IN THE DATA, SEGMENT 'FLAG.LOC' IS REQUIRED
C***           AND 'IDVAL' MUST BE EQUAL TO -1. IN ADDITION, THE
C***           PARAMETER 'NADD' MUST BE INDENTICAL TO ITS ASSIGNED
C***           VALUE WHEN THE FOURIER COEFFICIENTS WERE SAVED.
C***   Z = CONTINUATION DISTANCE (MUST BE IN GRID UNITS)
C***             (DEFAULT Z=0.)
C***     FOR Z>0 YOU GET DOWNWARD CONTINUATION
c***     FOR Z<0 YOU GET UPWARD CONTINUATION
C*** THET1 & THET2 - ANGLES FROM GEOGRAPHIC NORTH THAT FORM A
C***               PIE-SLICE FILTER FOR DIRECTIONAL FILTERING
C***               (-90.GE.THET1.LE.+90.;THET2.GT.THET1).
C***               (DEFAULT THET1=0. THET2=90.)
C*** ISTR = -1 REJECT TRENDS BETWEEN THET1 AND THET2.
C***        +1 PASS (DEFAULT ISTR=1).
C*** (FOLLOWING PARAMETERS CAN BE USED IF SPACING AND ORIGIN
C*** OF GRID WANT TO BE CHANGED. NOTE THAT THESE CHANGES
C*** ONLY OCCUR IN THE HEADER OF THE OUTPUT FILTERED GRID AND NO
```

```
C*** SUBSET OF THE INPUT GRID IS EXTRACTED).
C*** DDX - NEW GRID SPACING IN X-DIRECTION.
C*** DDY - NEW GRID SPACING IN Y-DIRECTION.
C*** XO - NEW ORIGIN OF ROWS.
C*** YO - NEW ORIGIN OF COLOUMNS. (DEFAULT DDX=DDY=XO=YO=0.)
C***********************************************************************


C***********************************************************************
C***
C*** NEW FILTER PROGRAM  -- PGM=FILTER
C***
C***         THIS PROGRAM IS DESIGNED TO FILTER DATA IN A
C***         STANDARD-AIRBORNE-FORMAT FILE.  THE USER MAY SPECIFY
C***         AS MANY AS FIVE DIFFERENT FILTERS.
C***
C***         THE INPUT IS PROMPTED FROM THE TERMINAL AND CONSISTS OF:
C***
C***         FNAME - INPUT FILE NAME WITHOUT THE EXTENSION.  FOR
C***         EXAMPLE IF THE FILE IS NAMED 'ALPHA.30', FNAME IS
C***         'ALPHA'.
C***
C***         FIRSTF - FIRST FILE NUMBER IN A SEQUENCE OF FILES THAT
C***         HAVE THE SAME FNAME -- E.G. ALPHA.10,ALPHA.20,ALPHA.30,
C***         ETC.  IN THIS CASE, FIRSTF IS EQUAL TO 1.
C***
C***         LASTF - LAST FILE NUMBER IN A SEQUENCE OF FILES THAT
C***         HAVE THE SAME FNAME.
C***
C***         TYPE - FILE TYPE.  THIS REFERS TO THE LETTER IN THE FILE
C***         EXTENSION AND MUST BE EITHER O, A, OR B.  ONE THING THE
C***         USER MUST BE AWARE OF IS THE FACT THAT THE PROGRAM
C***         CREATES THE OUTPUT FILE WITH THE FILTERED DATA USING
C***         THE FNAME, FILE NUMBER, AND A NEW TYPE THAT DEPENDS
C***         UPON THE INPUT FILE TYPE.  TYPES 'O' AND 'B' WILL
C***         PRODUCE AN OUTPUT FILE OF TYPE 'A'.  A TYPE 'A' INPUT
C***         FILE WILL PRODUCE A TYPE 'B' OUTPUT FILE.  BECAUSE OF
C***         THIS FACT, IT IS POSSIBLE TO DESTROY DATA FILES BEFORE
C***         YOU ARE READY TO DO SO.
C***
C***         IN ADDITION TO THE ABOVE INFORMATION, THE PROGRAM WILL
C***         ASK FOR THE FOLLOWING PARAMETERS:
C***         KFLTC,LPA,AND NWT.
C***     ENTRY IS TERMINATED BY ",/" ON THE SAME LINE
C***     OF BY "/" ON A NEW LINE.
C***
C*** KFLTC - AN ARRAY USED TO SELECT THE FILTER TO BE USED
C***         FOR THE VARIOUS CHANNELS OF DATA.  THUS KFLTC(12)=3
C***         SELECTS FILTER NUMBER 3 FOR CHANNEL NUMBER 12.  THERE ARE
C***         SIX POSSIBLE FILTERS THAT CAN BE SELECTED.  THE
C***         PREDEFINED FILTERS ARE SIMPLE MOVING AVERAGES WITH EQUAL
C***         WEIGHTING.  THESE FILTERS USE 5, 10, 15, 20, AND 25
C***         DATA POINTS IN THE MOVING AVERAGES.
```

```
C***        IF A VALUE OF 6 IS GIVEN, A RUNNING MEDIAN FILTER
C***        WILL BE USED AND NWT(6) SHOULD BE SET EQUAL TO AN ODD
C***        NUMBER TO DEFINE THE SIZE OF THE MOVING FILTER.
C***
C***        LPA - LOGICAL VARIABLES THAT ARE USED TO SELECT A HIGH
C***        PASS OPTION FOR THE FILTERS.  THUS LPA(10)=.TRUE.
C***        SELECTS THE HIGH PASS OPTION FOR CHANNEL 10.  THIS
C***        OPTION IS INTENDED TO PROVIDE SOME LOW FREQUENCY
C***        FILTERING.
C***
C***        NWT(J)=N  IF USED, THIS DEFINES THE NUMBER 'N' AS
C***        THE NUMBER OF POINTS TO BE USED FOR FILTER NUMBER 'J'
C***        WHERE J=1, 2, 3, 4, OR 5.  IF THE NUMBER 'N' IS
C***        NEGATIVE, THE FILTER WILL BE A MOVING AVERAGE.  IF 'N'
C***        IS GREATER THAN ZERO, THE PROGRAM WILL ASK FOR FILTER
C***        WEIGHTING FACTORS.  THE USER MUST BE AWARE OF THE
C***        REQUIREMENT THAT THE FILTERS MUST BE SYMMETRIC ABOUT
C***        THE CENTER POINT.  THEREFORE THE NUMBER 'N' IS EQUAL
C***        TO ONE HALF OF THE FILTER POINTS PLUS 1 (I.E. 2*N - 1
C***        IS THE ACTUAL NUMBER OF POINTS THAT WILL BE USED).
C***        THE PROGRAM WILL, HOWEVER, ONLY WANT 'N' WEIGHTING
C***        FACTORS.
C***
C***        IF SOME NONSTANDARD FILTER HAS BEEN SELECTED BY
C***        SETTING NWT(J)=N, THE PROGRAM WILL WANT THE WEIGHTS
C***
C***        WT(J,I),J=1,N - THE WEIGHTING FACTORS FOR FILTER
C***        NUMBER 'I'.
C***
C***
C*******************************************************************


C********************** GERBER ******************************
C***
C*** THIS PROGRAM IS DESIGNED TO CONVERT GENERAL VECTOR DATA
C*** (PRODUCED BY THE GENERAL PURPOSE PLOTTING SYSTEM FOR PLOTTER
C*** #6 EITHER ON TAPE OR DISK) TO A TAPE WITH THE CORRECT FORMAT
C*** FOR THE NCIC GERBER PLOTTER.
C***
C*** IF THE CONVERSION IS TO BE TAPE-TO-TAPE, THE INPUT TAPE MUST
C*** BE MOUNTED AS FOLLOWS:
C***
C*** MOUNT/FOR[/DEN=800] DEV: VOL-ID ITAPE
C***
C*** WHERE DEV: IS THE DEVICE NAME, VOL-ID IS AN ARBITRARY VOLUME
C*** NAME AND ITAPE IS THE REQUIRED LOGICAL NAME FOR THE TAPE.
C*** THE TAPE DENSITY CAN ALSO BE OPTIONALLY SPECIFIED AS
C***  REQUIRED.
C***
C*** THE OUTPUT TAPE MUST BE MOUNTED AS FOLLOWS:
C***
C*** MOUNT/FOR[/DEN=800] DEV: VOL-ID OTAPE
```

```
C***
C***   THE PROGAM PROVIDES COMPLETE FLEXIBILITY WITH REGARD TO
C***   POSITIONING THE TAPES WITH EITHER FORWARD OR BACKWARD FILE
C***   SKIPPING.
C***
C***   USAGE:
C***
C***       1. UPON ENTRY, THE PROGRAM ASKS WHETHER THE CONVERSION IS
C***          TAPE-TO-TAPE OR DISK-TO-TAPE.
C***
C***       2. IF THE CONVERSION IS TO BE TAPE-TO-TAPE, THE PROGRAM
C***          ASKS WHAT THE CURRENT FILE NUMBERS ARE FOR BOTH TAPES.
C***          DISK-TO-TAPE THE PROGRAM ASKS FOR THE INPUT DISK FILE
C***          AND FOR THE CURRENT FILE NUMBER OF THE OUTPUT TAPE.
C***
C***       3. THE USER IS THEN GIVEN THE OPTION TO CHANGE THE TAPE
C***          POSITIONS AND IS ASKED TO ENTER THE NUMBER OF FILES TO
C***          BE SKIPPED.  NEGATIVE NUMBERS INDICATE A BACKWARD FILE
C***          SKIP AND A NUMBER WITH AN ABSOLUTE VALUE GREATER THAN
C***          THE CURRENT FILE NUMBER WILL RESULT IN A REWIND
C***          OPERATION.  THE BACKWARD FILE SKIP ACTUALLY SKIPS THE
C***          SPECIFIED NUMBER OF FILE MARKS AND IS FOLLOWED BY A
C***          FORWARD SKIP TO CORRECTLY POSITION THE TAPE.
C***          FOR EXAMPLE, IF THE TAPE IS CURRENTLY AT FILE 5 AND
C***          YOU WISH IT TO BE AT FILE 3, YOU WOULD SPECIFY A FILE
C***          SKIP OF -3.
C***
C***       4. AFTER THE TAPE POSITIONING, THE DATA ARE READ AND
C***          WRITTEN TO THE OUTPUT TAPE UNTIL AN END-OF-FILE IS
C***          ENCOUNTERED.
C***
C***       5. YOU CAN LOOP WITHIN THE PROGRAM AND REPEAT STEPS 3-4
C***          WITH A NEW INPUT FILE.
C***
C*****************************************************************


C******************** GRDFLT ********************************
C***
C***   THIS PROGRAM IS DESIGNED TO PERFORM A ONE-DIMENSIONAL
C***   FILTER ALONG THE ROWS AND COLUMNS OF A USGS STANDARD-
C***   GRID FILE.
C***
C***   INPUT PARAMETERS ARE IN A NAMELIST:
C***
C***   IFILE = PATHNAME OF THE INPUT FILE
C***
C***   OFILE = PATHNAME OF THE OUTPUT FILE
C***
C***   IFLT = DETERMINES THE FILTER TYPE TO BE USED
C***        = 0, USE A MEDIAN FILTER
C***        = 1, USE USER DEFINED WEIGHTS IN THE FILTER
C***          (DEFAULT = 0)
```

```
C***
C***   NWT = NUMBER OF WEIGHTS/POINTS IN THE FILTER
C***         (DEFAULT = 3)  (MAX VALUE = 21)
C***
C***   WT(I) = WEIGHTS TO BE USED FOR A WEIGHTED FILTER
C***           (DEFAULT VALUES = 1.0)
C***
C***   NSEQ = DETERMINES IN WHICH ORDER THE FILTERING IS DONE
C***        = 1, FILTER THE DATA BY ROWS FIRST
C***        = 2, FILTER THE DATA BY COLUMNS FIRST
C***
C***   OTITLE = 56 CHARACTER TITLE FOR THE OUTPUT GRID FILE
C***
C***   IT IS ASSUMED THAT THE NUMBER OF POINTS IN THE FILTER
C***   IS ODD AND THAT NWT REPRESENTS THE TOTAL NUMBER OF POINTS
C***   IN THE FILTER.  HOWEVER, YOU ARE EXPECTED TO ONLY ENTER
C***   THE CENTER POINT AND ONE SIDE OF THE FILTER WEIGHTS BECAUSE
C***   THE FILTER IS REQUIRED TO BE SYMMETRIC.  THUS IF NWT = 9,
C***   YOU WOULD ONLY ENTER 5 WEIGHTS.
C***
C*******************************************************************


C***************************GRDHST*********************************
C***
C***       SUBROUTINE GRDHST CALCULATES THE HISTOGRAM AND THE
C***       MINIMUM AND MAXIMUM OF A STANDARD-GRID FILE
C***
C***       CALL GRDHST(ICOUNT,IHIST,XMAX,XMIN)
C***
C***            ICOUNT=NUMBER OF ACCEPTED DATA POINTS
C***            IHIST=ARRAY CONTAINING THE HISTOGRAM
C***            XMAX=GRID FILE MAXIMUM
C***            XMIN=GRID FILE MINIMUM
C***
C*******************************************************************


C***************************GRDREM*********************************
C***
C***       PROGRAM GRDREM WILL CONVERT A STANDARD-GRID FILE TO A
C***       REMAPP DISK FILE. THE PROGRAM REQUIRES THE INPUT FILE
C***       NAME AND AN EXPANSION FACTOR. THE EXPANSION FACTOR,IEXP,
C***       DETERMINES THE INCREASE IN THE REMAPP FILE SIZE. AN
C***       EXPANSION FACTOR OF 2 WILL DOUBLE THE NUMBER OF ROWS AND
C***       COLUMNS.  THE ORIGINAL DATA VALUE CONTAINED IN THE GRID
C***       FILE IS USED IN THE EXPANSION AND IS REPEATED IEXP TIMES.
C***       THE DEFAULT IS IEXP=1, I.E. NO EXPANSION.
C***
C*******************************************************************
```

```
C*********************** SPL1K *****************************
C***
C***   SPLINING SUBROUTINE
C***
C**************************************************************


C*********************** GRIDFILL ***************************
C***
C***   THIS PROGRAM IS DESIGNED TO INSERT A SMALLER GRID FILE
C***   INTO A LARGER GRID.  THE PROGRAM CAN ALSO CREATE THE
C***   LARGER GRID FILE.
C***
C***   THERE IS AN OBVIOUS REQUIREMENT THAT THE GRID SETS MUST
C***   HAVE IDENTICAL GRID INTERVALS AND THAT THE GRID POINTS
C***   OF THE SMALLER FILE MUST BE A SUBSET OF THE POINTS IN
C***   THE LARGER FILE.
C***
C***   THE INPUT DATA ARE ENTERED VIA A NAMELIST "PARMS"
C***
C***   INSFIL = PATHNAME OF THE GRID FILE TO BE INSERTED INTO
C***            ANOTHER.
C***          = '0', FORCES AN EXIT FROM THE PROGRAM.
C***
C***   OUTFIL = PATHNAME OF THE OUTPUT FILE INTO WHICH THE
C***            INPUT FILE IS TO BE INSERTED.  IF OUTFIL
C***            DOES NOT ALREADY EXIST, IT WILL BE CREATED.
C***
C***   IF OUTFIL IS TO BE CREATED THE PROGRAM WILL REQUEST THE
C***   INFORMATION NEEDED TO CREATE THE FILE:
C***
C***   TITLE = 56 CHARACTER TITLE TO DESCRIBE THE GRID FILE
C***
C***   NCOL = # OF COLUMNS TO BE IN THE FILE
C***
C***   NROW = # OF ROWS TO BE IN THE FILE
C***
C***   X0 = STARTING X-COORDINATE OF THE DATA SET
C***
C***   DX = GRID INTERVAL IN THE X-DIRECTION
C***
C***   Y0 = STARTING Y-COORDINATE OF THE DATA SET
C***
C***   DY = GRID INTERVAL IN THE Y-DIRECTION
C***
C***   NORMALLY X0 & Y0 WOULD BE THE X-Y COORDINATES OF THE
C***   LOWER LEFT CORNER OF THE GRID.
C***
C**************************************************************


C********************** GRIDFLIP ***************************
```

```
C***
C***  PROGRAM TO REVERSE THE COLUMNS OR ROWS OF A STANDARD FILE
C***    IFLIP = 0 MEANS REVERSE COLUMNS
C***    IFLIP NE 0 MEANS REVERSE ROWS
C***
C*****************************************************************


C********************** GRIDHIST ***************************
C***
C***  THIS PROGRAM IS DESIGNED TO OBTAIN THE HISTOGRAM OF
C***  THE DATA IN A USGS STANDARD-FORMAT GRID FILE AND TO
C***  PROVIDE A PRINTER PLOT OF THE HISTOGRAM.  THE
C***  ORIGINAL HISTOGRAM HAS 2000 POINTS AND THE USER IS
C***  ASKED TO SUPPLY A GROUPING FACTOR WHICH REDUCES THE
C***  NUMBER OF POINTS BY THAT FACTOR.  THE GROUPING FACTOR
C***  MUST BE DIVISIBLE INTO 2000 AND THE PROGRAM MAKES
C***  SURE THAT IT IS.
C***
C***  ALL REQUIRED DATA ARE PROMPTED AND CONSIST OF:
C***
C***  IFILE = INPUT GRID FILE NAME.
C***
C***  IGRP = GROUPING FACTOR
C***
C***  ANS = RESPONSE OF Y/N TO THE QUESTION -- DO YOU WANT
C***        TO DO ANOTHER FILE ?
C***
C*****************************************************************


C********************** GRIDMULT ***************************
C***
C***  THIS PROGRAM MULTIPLIES THE DATA IN A STANDARD-GRID
C***  FILE BY A CONSTANT.
C***
C***  THE PROGRAM PROMPTS THE USER FOR THE FOLLOWING
C***  INFORMATION:
C***
C***  IFILE = THE INPUT FILE PATHNAME
C***
C***  C = THE CONSTANT TO BE USED TO MULTIPLY THE INPUT DATA
C***
C***  A = THE CONSTANT TO BE USED TO ADD TO THE INPUT DATA
C***
C***    PRI = PRIORITY OF MULTIPLICATION
C***        = 0, DEFAULTS TO MULTIPLY BEFORE ADD
C***        <> 0, ADD BEFORE MULTIPLY
C***
C***  NRA = STARTING ROW NUMBER
C***        = 0, DEFAULTS TO BEGINNING OF GRID FILE
C***
```

```
C***   NRB = ENDING ROW NUMBER
C***       = 0, DEFAULTS TO END OF GRID FILE
C***
C***   NCA = STARTING COLUMN NUMBER
C***       = 0, DEFAULTS TO BEGINNING OF ROW
C***
C***   NCB = ENDING COLUMN NUMBER
C***       = 0, DEFAULTS TO END OF ROW
C***
C***   OFILE = THE OUTPUT FILE PATHNAME.
C***
C***
C***   THE PROGRAM LOOPS AND ASKS FOR A NEW INPUT FILE
C***   NAME.  TO EXIT ENTER EITHER "EX" OR BLANKS.
C***
C*********************************************************************


C********************** GRIDPLOT ****************************
C***
C***       THIS PROGRAM IS INTENDED TO PROVIDE THE USER WITH
C***       STACKED PROFILES OF DIFFERENT ROWS OF A STANDARD-
C***       GRID FILE.  THE INPUT IS PROMPTED FROM
C***       THE TERMINAL.
C***
C***       IF YOU WISH, YOU CAN SET UP A DATA FILE ON THE
C***       DISK.  THE REQUIRED DATA ARE:
C***
C***       LEGEND - UP TO 72 CHARACTERS OF TITLE INFORMATION
C***       TO BE AT THE BOTTOM OF THE PLOT.
C***
C***       FILNAM = PATHNAME OF THE FILE TO BE PLOTTED.
C***
C***       NAMELIST DATA IS REQUIRED NEXT.
C***
C*** &PARMS
C***
C***       LEGEND = PLOT TITLE
C***
C***       SCAL = MAP SCALE TO BE USED FOR THE PLOT
C***
C***       INC = PLOTTING INCREMENT TO SELECT EVERY INC-TH
C***       VALUE. DEFAULT IS 1 WHICH MEANS THAT EVERY POINT
C***       WILL BE USED TO DRAW THE PLOT CURVE.  VALUES OF
C***       INC THAT ARE GREATER THAN ONE SPEED UP THE
C***       PLOTTING TIME.
C***
C***       IALL = PARAMETER USED TO SELECT ALL
C***       OR INDIVIDUAL ROWS.  DEFAULT IS TO SELECT ROWS.
C***       A VALUE OF IALL=1 MEANS THAT ALL ROWS WILL BE PLOTTED.
C***
C***       VBASE = A  NUMBER TO BE SUBTRACTED FROM
C***       THE DATA BEFORE PLOTTING.  THIS HAS THE
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C***       EFFECT OF A ZERO OFFSET.
C***
C***       YSCAL = VERTICAL SCALE OF THE PLOT
C***       THE VALUES ENTERED ARE IN DATA UNITS/INCH
C***
C***       IPLOTR = 0, SELECT THE CALCOMP PLOTTER
C***              = 1 SELECT THE TEKTRONIX PLOTTER
C***              = 6 SELECT THE VARIAN PLOTTER
C***
C***       SCALOP = 'P' ; PLOT VERSUS POSITION
C***                'Q' ; EXIT FROM THE PROGRAM
C***
C***       XBRD,YBRD = THE X AND Y DIMENSIONS IN INCHES OF THE PLOT
C***       AREA.  IF THESE PARAMETERS ARE NOT SPECIFIED, A
C***       DEFAULT SIZE IS ASSUMED.  THE DEFAULT SIZE FOR THE
C***       VARIAN AND CALCOMP PLOTTERS IS 16.5'X16.5'.
C***
C*** & END OF PARMS INPUT
C***
C***       IF SCAL IS NOT SET BY THE USER,
C***       ZERO IS ASSUMED AND HORIZONTAL AND VERTICAL SCALING IS
C***       AUTOMATIC.  IF SCAL IS SET TO A POSITIVE NUMBER, THE
C***       USER IS EXPECTED TO SET ALL HORIZONTAL AND VERTICAL
C***       SCALES.  THE SCAL AND YSCAL PARAMETERS ALLOW THE
C***       USER TO CHANGE THE HORIZONTAL AND/OR VERTICAL
C***       SCALE.  THEY DO NOT ALLOW THE USER TO CHANGE
C***       THE SIZE OF THE INDIVIDUAL PLOT.  THIS CAN BE DONE
C***       ONLY BY CHANGING XBRD AND/OR YBRD.
C***
C***       IF IALL WAS DEFINED AS ZERO, THE NEXT INPUT
C***       EXPECTED WILL BE THE LINE NUMBERS SELECTED.
C***       ENTER ONE LINE NUMBER PER DATA LINE AND MAKE
C***       THE LAST VALUE EQUAL TO 999.
C***
C***       FOR EACH FILE A PARMS LIST WILL BE EXPECTED.
C***       ONCE THE PARMS HAVE BEEN DEFINED, YOU DO NOT
C***       HAVE TO REENTER THEM IF YOU WANT TO USE THE
C***       SAME VALUES.
C***       EXCEPT WITH REGARD TO ISEL.  THE PROGRAM COUNTS
C***
C***       AFTER EACH PLOT THE PLOT SYSTEM WILL ASK YOU
C***       IF YOU ARE THROUGH WITH THE TAPE.  BE SURE YOU
C***       GIVE THE CORRECT ANSWER!!!!
C***
C************************************************************************


C********************** GRIDR *********************************
C***
C*** THIS SUBROUTINE IS USED WITH THE PROGRAM UTILITY FOR
C*** EDITING GRID FILES.
C***
C************************************************************************
```

```
C************************ GRIDROT ****************************
C***
C***    THIS PROGRAM WILL INTERCHANGE ROWS & COLUMNS OR REVERSE THE
C***    ROW ORDER OF A STANDARD-GRID FILE.  THE OUTPUT PARAMETERS
C***    ARE SET UP SUCH THAT THE APPLICON SOFTWARE ("COLOR") WILL
C***    RECOGNIZE WHAT HAS BEEN DONE.  THE GRID INTERVALS DX & DY
C***    ARE ASSUMED TO BE NON-ZERO.
C***
C***    INPUT DATA ARE PROMPTED AND ARE:
C***
C***    IFILE = INPUT FILE PATHNAME
C***
C***    OFILE = OUTPUT FILE PATHNAME
C***
C***    ITYPE = PARAMETER TO DETERMINE ACTION TO BE TAKEN
C***          = 0, INTERCHANGE ROWS AND COLUMNS
C***          = 1, REVERSE THE ROW ORDER
C***
C*************************************************************************


C******************** INSERT ****************************
C***
C***THIS PGM INSERTS INFIL INTO THE LARGER STD GRID INFIL2.
C*** OUTPUT FILE IOFIL IS OF IDENTICAL SIZE TO INFIL2.
C***
C*************************************************************************


C************************ INTPLT ****************************
C***
C***    THIS SUBROUTINE PROVIDES A PRINTER PLOT OF AN INTEGER
C***    ARRAY OF DIMENSION N.  IT IS ASSUMED THAT ANY LABELING
C***    HAS BEEN DONE IN THE CALLING PROGRAM.
C***
C***        THE OUTPUT IS ON FILE08.
C*************************************************************************


C******************ISIDFIX****************************
C***
C*** THIS PROGRAM WILL CORRECT THE ISID NUMBERS FOR A STANDARD-
C*** AIRBORNE-FORMAT FILE. THE PROGRAM WILL PROCESS THE ENTIRE
C***  FILE.
C***
C*************************************************************************


C************************ KDATPR ****************************
C***
```

-58-

```
C***        THIS PROGRAM READS AND PRINTS DATA FROM A STANDARD-
C***        AIRBORNE-FORMAT FILE.
C***
C***        INPUT IS PROMPTED FROM THE TERMINAL.
C***
C***        H - HEADER INFORMATION ONLY WILL BE READ FROM
C***            EACH RECORD OF THE FILE
C***
C***        O - HEADER INFORMATION PLUS THE NUMBER OF OBSERVATIONS
C***            REQUESTED WILL BE READ FROM EACH RECORD OF THE FILE
C***
C***        T - SELECTED TIME SEGMENTS OF THE FILE WILL BE READ
C***
C***        IFILE - V (UP TO 50 CHARACTERS) IS THE INPUT
C***        FILE PATHNAME.
C***
C***        NLINE IS THE NUMBER OF LINES TO BE READ
C***
C***        NOUT IS THE NUMBER OF OBSERVATIONS TO BE
C***        PRINTED FROM EACH OF THE SPECIFIED LINES.
C***
C***        N(I),I=1,NLINE ARE THE SELECTED LINE NUMBERS.
C***
C***        WHEN IN THE HEADER-INFORMATION-ONLY MODE, YOU
C***        CAN ENTER A LINE NUMBER EQUAL TO -1 AND GET THE
C***        INFORMATION FOR ALL REMAINING LINES AFTER THE
C***        LAST LINE SPECIFIED.
C***
C***        WHEN IN TIME SELECT MODE, ENTER A NEGATIVE LINE
C***        NUMBER TO EXIT FROM THE PROGRAM.
C***
C***        OUTPUT FILENAME - KDATPR.OUT
C***
C********************************************************************


C********************** KSAGRD ***********************************
C***
C*** THIS PROGRAM IS DESIGNED TO READ AN ASCII TAPE
C*** WHICH CONTAINS GRIDDED DATA FROM THE SAUDI ARABIAN
C*** COVER ROCK SURVEY.
C***
C*** THE USER IS ASKED TO PROVIDE THE FOLLOWING:
C***
C*** TAPE = TAPE UNIT SPECIFIER (M0: OR M1:)
C***
C*** ISIZ = THE TAPE LOGICAL RECORD SIZE
C***
C*** NBLK = THE TAPE BLOCKING FACTOR
C***
C*** FMT = THE FORMAT OF THE DATA RECORDS
C***
C*** NCH = THE NUMBER OF CHANNELS TO BE PROCESSED
```

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C***
C***    N(I) = THE CHANNEL NUMBERS OF THE SELECTED CHANNELS
C***
C***    FNAM(I) = FILE NAMES FOR THE OUTPUT GRID FILES
C***
C***    HDR(I) = 56 CHARACTER TITLES FOR THE GRIDS
C***
C***    X0 = THE STARTING X-COORDINATE
C***
C***    Y0 = THE STARTING Y-COORDINATE
C***
C***    DX = THE X-INCREMENT
C***
C***    DY = THE Y-INCREMENT
C***
C***    NC = THE NUMBER OF COLUMNS TO BE OUTPUT
C***
C***    NR = THE NUMBER OF ROWS TO BE OUTPUT
C***
C****************************************************************


C******************** LINPAT ********************************************
C***
C***        THIS PROGRAM IS DESIGNED TO INSERT X-Y COORDINATES INTO
C***        STANDARD-AIRBORNE-FORMAT FILES USING LATITUDE AND
C***        LONGITUDE DATA FROM DOC POINTS THAT HAVE BEEN PREVIOUSLY
C***        PREPARED USING 'DIGIT'.  SOME INPUT ARE PROMPTED FROM
C***        THE TERMINAL AND CONSIST OF:
C***
C***        FNAME,FIRSTF,LASTF,TYPE
C***
C***        FNAME - THE PRIMARY PART OF THE FILE NAME
C***
C***        FIRSTF - THE NUMBER OF THE FIRST FILE IN A SEQUENCE
C***
C***        LASTF - THE LAST FILE IN THE SEQUENCE
C***
C***        TYPE - THE FILE TYPE WHICH CAN BE EITHER 'O', 'A', OR 'B'.
C***
C***        FOR EXAMPLE IF YOU WISH TO PUT COORDINATES IN A SERIES OF
C***        FILES SEG.1O,SEG.2O,SEG.3O,SEG.4O,SEG.5O, THEN
C***        FNAME IS EQUAL TO 'SEG', FIRSTF IS EQUAL TO '1', LASTF
C***        IS EQUAL TO '5', AND TYPE IS EQUAL TO 'O'.
C***
C***        NOTE: IF THE TYPE IS EITHER 'O' OR 'B', THE PROGRAM WILL
C***        WRITE THE OUTPUT DATA TO FILES WITH THE TYPE 'A';I.E. THE
C***        THE ABOVE EXAMPLE WOULD PRODUCE FILES NAMED SEG.1A,SEG.2A,
C***        SEG.3A,SEG.4A,SEG.5A.
C***        IF THE INPUT TYPE IS 'A', THE PROGRAM WILL PRODUCE OUTPUT
C***        FILES WITH THE TYPE 'B'.
C***
C***        THE USER MUST BE CAREFUL BECAUSE THIS FEATURE OF THE
```

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C***        AIRBORNE PROCESSING PROGRAMS CAN RESULT IN DESTROYING
C***        DATA FILES BEFORE YOU ACTUALLU WANT TO DO SO.
C***
C***        AS SET UP THE USER CAN PROCESS THE SERIES OF FILES USING
C***        SEPARATE FILES FOR THE DOC POINT DATA OR USING ONE
C***        MASTER FILE FOR THE DOC POINT DATA.  THE PROGRAM ASKS
C***        QUESTIONS TO DETERMINE THE TYPE OF FILES TO BE EXPECTED
C***        FOR THE DOC POINT DATA.
C***        IF YOU ARE GOING TO USE A MASTER FILE, THEN EACH GROUP
C***        OF DOC POINTS THAT CORRESPONDS TO A SEPARATE FILE
C***        MUST BE TERMINATED WITH A LINE OF DATA AS FOLLOWS:
C***
C***        99.99 0 0 0 0 0
C***
C***        NOTE: BEFORE YOU CAN USE THE OUTPUT FROM 'DIGIT' YOU MUST
C***        FIRST DO SOME EDITING.
C***        YOU HAVE TO INSERT
C***        A ZERO AT THE BEGINNING OF THE LINES OF DATA AND THEN
C***        PUT A BLANK IN FRONT OF
C***        THE LONGITUDE
C***
C***        THE ZEROS MUST BE INSERTED TO CORRESPOND TO VARIABLES
C***        THAT CAN BE USED TO EXTEND THE LINPATHING BEYOND THE FIRST
C***        OR LAST DOC POINTS.  IF YOU WANT TO EXTEND THE LINE IN
C***        FRONT OF THE FIRST DOC POINT REPLACE THE ZERO WITH
C***        A NEGATIVE NUMBER EXPRESSED IN MINUTES OF TIME.  IF
C***        YOU WISH TO EXTEND THE LINE AFTER THE LAST DOC
C***        REPLACE THE ZERO WITH A POSITIVE NUMBER EXPRESSED IN
C***        MINUTES OF TIME.
C***
C***
C***        LINPATH2
C***
C***        LINEAR PATH PROGRAM WITH SEGMENTED DOC. POINT FACILITY
C***
C***
C***        CODED BY
C***          GERALD IAN EVENDEN
C***          U. S. GEOLOGICAL SURVEY
C***          BRANCH OF REGIONAL GEOPHYSICS
C***          DENVER FEDERAL CENTER
C***          DENVER, COLORADO  80225
C***
C*******************************************************************


C******************* MAGMRG *********************************
C***
C*** THIS PROGRAM ALLOWS YOU TO MERGE TOGETHER STANDARD-FORMAT
C*** GRID FILES IN EITHER NORTH-SOUTH (ALONG COLUMNS) OR
C*** EAST-WEST (ALONG ROWS) DIRECTIONS.  THE PROGRAM DOES REQUIRE
C*** A RECTILINEAR COORDINATE SYSTEM AND, THEREFORE, ONE USUALLY
C*** ONLY MERGES DATA THAT HAVE LATITUDE &
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```
C***    LONGITUDE COORDINATES.
C***
C***    THE FOLLOWING SERIES OF QUESTIONS ARE ASKED:
C***
C***    ENTER DIRECTION FOR SPLINING, 'N-S' OR 'E-W'
C***
C***    ENTER INPUT FILENAME # 1 (WEST/SOUTH)
C***
C***    ENTER INPUT FILENAME # 2 (EAST/NORTH)
C***
C***    ENTER OUTPUT FILENAME
C***
C***    ENTER # OF DATA PTS TO ELIMINATE FROM W(S) GRID
C***          GAP FOR SPLINING (NORMALLY = 0 2), 'X' IF
C***          SECONDARY BOUNDARY > 100 PTS OR JAGGED AND 'D' IF
C***          PTS TO BE ELIMINATED FROM RT DATA EDGE. FORMAT=(2I2,2A1)
C***
C***    ENTER SECONDARY SPLINING PARMS (NORMALLY = 0 2) FORMAT=(2I2)
C***
C***********************************************************************


C************************* MCPLUG *****************************
C***
C***    THIS SUBROUTINE IS USED WITH THE PROGRAM UTILITY FOR
C***    EDITING GRID FILES
C***
C***********************************************************************


C************************* MEAN *****************************
C***
C***
C***    PROGRAM TO COMPUTE MEAN AND STANDARD DEVIATION OF SELECTED
C***    CHANNELS ON SELECTED TIME SEGMENTS OF AN AIRBORNE FILE
C***
C***       YOU CAN SELECT THE OPTION TO EITHER ENTER THE INPUT
C***       DATA FROM THE TERMINAL OR FROM A FILE ON DISK.
C***       FOR MOST INQUIRIES THE RESPONSE IS EXPECTED FROM
C***       THE TERMINAL AND IS PRECEEDED BY A QUESTION.
C***
C***         INPUT DATA THAT ARE NOT PROMPTED FROM THE TERMINAL
C***         ARE EXPECTED IN THE NAMELIST PARMS.
C***
C***         NAMELIST PARMS:
C***
C***         THE TIMES MUST BE IN MINUTES
C***
C***         TS(I) - START TIMES FOR THE SEGMENTS THAT ARE TO BE
C***         AVERAGED.  THESE TIMES ARE EQUAL TO THE 'ITS' NUMBER OF THE
C***         OBSERVATIONS.  YOU MAY ENTER AS MANY AS 100 VALUES.
C***
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C***    TE(I) - END TIMES FOR THE SEGMENTS THAT ARE TO BE AVERAGED.
C***    THESE TIMES ARE EQUAL TO THE 'ITS' NUMBERS OF THE
C***    OBSERVATIONS.  YOU MAY ENTER AS MANY AS 100 VALUES.
C***
C***       ISEL(J) - CHANNEL SELECT NUMBER USED TO SPECIFY THE
C***       CHANNELS THAT ARE TO BE AVERAGED.
C***       NO MORE THAN 20 CHANNELS ARE ALLOWED.
C***
C***       ILINE(I) - LINE NUMBER CORRESPONDING TO EACH AND EVERY
C***       TIME SEGMENT.
C***
C***       COEFF - ALTITUDE ATTENUATION COEFFICIENT THAT CAN BE
C***       USED TO CALCULATE AN AVERAGE VALUE OF THE ALTIMETER
C***       CORRECTION FOR EACH LINE SEGMENT.
C***
C***       REFALT - REFERENCE ALTITUDE TO BE USED FOR THE ALTIMETER
C***       CORRECTION.
C***
C***       NALT - CHANNEL NUMBER OF THE ALTIMETER DATA.
C***
C***       WHEN SPECIFYING THE TIME SEGMENTS, REMEMBER THAT
C***       THE TIMES MAY BE IN REVERSE ORDER FOR SOME LINES
C***       AND INCREASING ORDER FOR OTHERS; HOWEVER, THE PROGRAM
C***       DOES NOT ALLOW OVERLAP IN THE TIME SEGMENTS.
C***
C***       IF YOU ARE PLANNING TO MAKE A LARGE NUMBER OF
C***       CALCULATIONS, USE A DISK FILE TO INPUT THE
C***       NAMELIST PARAMETERS.  YOU CAN CHECK THE NAMELIST
C***       PARAMETERS WITH THE PROGRAM 'TEST-MEAN-DATA'.
C***
C*********************************************************************


C********************** MEDFLT ********************************
C***
C*** MEDIAN FILTERING SUBROUTINE TAKEN FROM:
C***
C*** EVANS, J.R., 1981, FORTRAN COMPUTER PROGRAMS FOR RUNNING
C*** MEDIAN FILTERS AND A GENERAL DESPIKER: U.S. GEOLOGICAL
C*** SURVEY OPEN-FILE REPORT 81-1091, 18 P.
C***
C*** USAGE:CALL MEDFLT(ARRAY,LN,M)
C***
C*** ARRAY = DATA ARRAY WHICH IS BOTH THE INPUT AND OUTPUT
C***         ARRAY; THEREFORE, THE ORIGINAL DATA ARE DESTROYED.
C***
C*** LN = NUMBER OF ELEMENTS IN THE ARRAY
C***
C*** M = SIZE OF THE WINDOW LENGTH (3.LE.M.LE.301).  M MUST BE
C***       AN ODD NUMBER.
C***
C***
C*** ODD-LENGTH, UNWEIGHTED RUNNING-MEDIAN FILTER
```

```
C***   NON-LINEAR -- REMOVES SPIKES OF WIDTH (M-1)/2 OR LESS BUT
C***   LEAVES SHARP EDGES UNAFFECTED (WRT TIME).  OTHERWISE
C***   BEHAVES ABOUT LIKE AN UNWEIGHTED RUNNING MEAN.
C***
C***   EACH POINT IS REPLACED BY THE MEDIAN OF THE NEAREST M POINTS
C***   OF THE ORIGINAL SERIES.
C***
C***   M MUST BE ODD FOR THIS ALGORITHM.
C***
C************************************************************************


C********************** MERGE1 **********************
C***
C***   USGS AIRBORNE SYSTEM - MERGE PROGRAM
C***   PROGRAM TO MERGE THE SAME LINE NUMBERS FROM SEPARATE FILES
C***   OR TO MERGE DIFFERENT LINE NUMBERS FROM SEPARATE FILES
C***   OR TO APPEND ONE FILE TO THE END OF ANOTHER
C***   IT IS ASSUMED LINES IN A FILE ARE IN
C***   IN EITHER AN ASCENDING OR DECENDING ORDER
C***
C***   THE INPUT DATE ARE:
C***
C***   FILNAM = FILE NAME OF THE PRIMARY FILE
C***
C***   FILNM1 = FILE NAME OF THE SECONDARY FILE
C***
C***   IDIR = PARAMETER TO INDICATE LINE DIRECTION OR TYPE OF
C***          MERGE
C***        = X, INDICATES THAT THE DIRECTION OF THE LINES IS E-W
C***        = Y, INDICATES THAT THE DIRECTION OF THE LINES IS N-S
C***        = A, MEANS THE SECONDARY FILE IS TO BE
C***             APPENDED TO THE PRIMARY FILE
C***        = M, MEANS DIFFERENT LINE NUMBERS ARE TO BE
C***             MERGED INTO THE PRIMARY FILE
C***
C***   IORD = PARAMETER TO INDICATE WHETHER THE LINE NUMBERS ARE IN,
C***          AN INCREASING OR DECREASING SEQUENCE
C***        = I, MEANS AN INCREASING SEQUENCE
C***        = D, MEANS A DECREASING SEQUENCE
C***
C***   NLIN = THE NUMBER OF LINE NUMBERS TO BE MERGED
C***
C***   ILINE = LINE NUMBERS OF LINES TO BE MERGED.  THEY MUST BE IN
C***           THE ORDER LINES ARE ON THE FILE- MAXIMUM IN ONE RUN
C***           IS 28
C***
C***   ALL OF THE PARAMTERS ARE IN A NAMELIST AND ARE ENTERED
C***   INDEPENDENTLY IN THE NORMAL NAMELIST ENTER.  FILE NAMES
C***   MUST BE IN SINGLE QUOTES.
C***
C************************************************************************
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```
C********************* MINC *********************************
C***
C***                        APPENDIX B
C***               USGS OPEN-FILE REPORT 81-1224
C***
C***          MINIMUM CURVATURE GRIDDING ROUTINE
C-----------------------------------------------------------------
C***   THIS PROGRAM GENERATES A 2-DIMENSIONAL GRID, EQUALLY
C***   INCREMENTED IN X AND Y, FROM RANDOMLY PLACED DATA POINTS.
C***   THE ALGORITHM (BRIGGS) PRODUCES A SMOOTH GRID BY ITERATIVELY
C***   SOLVING A SET OF DIFFERENCE EQUATIONS WHICH MINIMIZE THE TOTAL
C***   2ND HORIZONTAL DERIVATIVE AND ATTEMPT TO HONOR INPUT DATA.
C***   (REF: I.C. BRIGGS, 1974, GEOPHYSICS, V. 39, NO. 1)
C***
C***   NAMELIST PARAMETERS:
C***   ID      56-CHARACTER TITLE OF OUTPUT GRID
C***   IFILE   INPUT FILE CONTAINING XYZ DATA RECORDS
C***   OFILE   OUTPUT GRID, CONSISTING OF A HEADER RECORD AND
C***           ROW RECORDS
C***   IFMT    INPUT FORMAT: PRESENT IF INPUT IS ASCII
C***   IANOM   SELECTION OF Z ANOMALY
C***   XO      X COORDINATE OF LOWER LEFT CORNER OF GRID
C***   YO      Y COORDINATE OF LOWER LEFT CORNER
C***   DEL     X AND Y INCREMENT (MUST BE POSITIVE)
C***   IDIRX   SET TO 1 WHEN X COORDINATES DECREASE WITH INCREASE·
C***        IN COLUMN, (POSTIVE WEST LONGITUDE FOR INSTANCE.)
C***   NC      NUMBER OF COLUMNS
C***   NR      NUMBER OF ROWS (NC*NR < 1.3E6)
C***   RADIUS  IN HORIZONTAL DATA UNITS, GRID POINTS WITH NO DATA
C***           INSIDE THIS RADIUS HAVE A 'NO DATA' VALUE
C***           INSERTED (DVAL).
C***   NPMIN   NUMBER OF DATA POINTS WITHIN 'RADIUS' DISTANCE
C***             BEFORE GRID POINT CONSIDERED VALID
C***   EPSM    IN Z DATA UNITS, ITERATION CUTOFF
C***   NIM     MAXIMUM ITERATIONS PER BLOCK
C***   LAPOVR  NUMBER OF ROWS OVERLAPPING NEXT BLOCK
C***   SLOPE   A DISTANCE-WEIGHTING RATIO TO DECREASE ALIASING
C***             BY COMBINING ALL DATA IN A SMALL AREA
C***   REGION  SET .NE. 0. TO SAVE REGIONAL GRID
C***   WHOLE   SET .NE. 0. TO SAVE UNRADIUSED GRID
C
C***   PROGRAM BREAKS GRID AREA INTO BLOCKS CONTAINING NO MORE THAN
C***   5000 POINTS.  FOR EACH BLOCK: A TEMPORARY BINARY FILE
C***   CONTAINING THE INPUT DATA IS READ, AN INITIAL GRID IS
C***   INTERPOLATED USING ONE-DIMENSIONAL INTERPOLATION TO FILL
C***   HOLES, DATA POINTS ARE ASSIGNED TO GRID POINTS, AND
C***   ITERATION USING MINIMUM-CURVATURE-DIFFERENCE
C***   EQUATIONS ATTEMPTS TO HONOR THE DATA POINTS.
C***   CONTINUITY BETWEEN BLOCKS IS PROVIDED BY INITIALIZING THE
C***   BLOCK WITH WITH WHATEVER OVERLAP IS AVAILABLE, AND
C***   INSERTING VALUES FROM THE REGIONAL GRID WHERE DATA
C***   ARE SPARSE.
C***
C***                     MIKE WEBRING
```

```
C***                        U.S. GEOLOGICAL SURVEY
C***                        GEOPHYSICS BRANCH
C***                        PO BOX 25046, STOP 964
C***                        DENVER FEDERAL CENTER
C***                        DENVER, COLORADO 80225
C***
C***            MAIN STRUCTURE OCT. 1978, VAX VERSION MARCH 83
C***
C********************************************************************


C************************** MNPLT **************************
C***
C***     THIS SUBROUTINE IS A PLOTTING ROUTINE WRITTEN
C***     FOR MEAN.F10.  THIS ROUTINE PLOTS AN INTEGER ARRAY
C***     AS A HISTOGRAM AND PROVIDES A SEQUENCE NUMBER AND
C***      THE NUMBER OF VALUES AT THAT SEQUENCE NUMBER.  THE
C***     SIGNIFICANCE OF A SEQUENCE NUMBER HAS TO BE
C***     CALCULATED.  THE CONVERSION FACTOR IS SUPPLIED.
C***
C***     USAGE:   CALL MNPLT(ISEL,IFRQ,ZMIN,ZMAX)
C***
C***     ISEL IS THE CHANNEL NUMBER BEING PROCESSED
C***
C***     IFRQ IS THE INTEGER ARRAY TO BE PLOTTED.  THE SIZE OF
C***     THE ARRAY IS SET AT 200 IN THE SUBROUTINE.
C***
C***     ZMIN IS THE MINIMUM VALUE OF THE ORIGINAL DATA CHANNEL
C***
C***     ZMAX IS THE MAXIMUM VALUE OF THE ORIGINAL DATA CHANNEL
C***
C********************************************************************


C*********************** NURE-TAPES ***********************
C***
C***        THIS PROGRAM IS INTENDED TO CONVERT DATA FROM NURE TAPES
C***        TO STANDARD AIRBORNE FORMAT ON DISK.
C***
C***     THE INPUT TAPE MUST BE MOUNTED USING THE FOLLOWING COMMAND:
C***
C***     MOUNT/FOREIGN/RECORD=NR/DENSITY=ID MTAX: TAPEID ITAPE
C***
C***     WHERE NR = THE NUMBER OF BYTES IN THE PHYSICAL TAPE RECORD
C***          ID = THE TAPE DENSITY (800 OR 1600)
C***          MTAX: = THE TAPE UNIT ASSIGNED TO YOU BY THE SYSTEM
C***       TAPEID = AN ARBITRARY TAPE VOLUME IDENTIFICATION
C***        ITAPE = IS A KEYWORD USED TO IDENTIFY THE I/O CHANNEL
C***
C***        THE PROGRAM IS INTERACTIVE AND REQUESTS THE FOLLOWING:
C***
C***
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C***         OFILE - OUTPUT DISK FILE PATHNAME
C***
C***         LABEL - 16 CHARACTER LABEL FOR THE DISK FILE
C***
C***      DATE - CURRENT DATE
C***
C***      ITS - STARTING ITS NUMBER
C***
C***      FMTI - FORMAT OF THE INPUT DATA TAPE
C***
C***      NCH - NUMBER OF OUTPUT CHANNELS
C***
C***      IRAY(I),I=1,NCH - CHANNEL NUMBERS TO BE SELECTED FOR
C***         OUTPUT FROM THE INPUT ARRAY
C***
C***      NX,NY - INDICES TO INDICATE THE INPUT DATA THAT
C***         CORRESPOND TO THE LAT & LONG
C***
C***      MCHR,MINT,MFLT - MCHR = THE NUMBER OF CHARACTER
C***         VARIABLES, MINT = NUMBER OF INTEGERS, AND
C***         MFLT = NUMBER OF FLOATING-POINT VARIABLES
C***
C***      NOTE:  THE EXPECTED SEQUENCE IS CHARACTER VARIABLES
C***         FOLLOWED BY INTEGERS FOLLOWED BY FLOATING-
C***         POINT NUMBERS.  YOU CANNOT MIX THEM !!!
C***
C***      NREF,REFVAL - INDEX AND REFERENCE VALUE FOR ONE OF THE
C***         FLOATING-POINT NUMBERS.  IF THE INDICATED
C***         FLOATING-POINT NUMBER EXCEEDS THE REFERENCE
C***         VALUE AN END OF FLIGHT LINE CONDITION IS
C***         ASSUMED.  BE CAREFUL WITH THIS OR YOU WILL END
C***         UP TRUNCATING LINES.
C***
C***      IREF, IDVAL, ILN - INDEX AND REFERENCE VALUE FOR ONE
C***         OF THE INTEGERS TO BE USED TO SIGNAL END-OF-LINE,
C***         AND INDEX TO DESIGNATE ONE OF THE INTEGERS AS
C***         A LINE NUMBER.  IF ILN IS NONZERO, THEN IT IS
C***         MONITORED AND A NEW LINE IS DEFINED WHENEVER IT
C***         CHANGES.
C***
C***      ICH,ICHR - INDEX (>0) AND REFERENCE CHARACTER STRING
C***         USED TO SIGNAL THE START OF A LINE.  IT IS
C***         GENERALLY EXPECTED THAT YOU WILL USE A MAXIMUM
C***         OF FOUR CHARACTERS.
C***
C***      NSCAN - NUMBER OF SCANS PER RECORD ON INPUT TAPE
C***
C***      NBYTES - NUMBER OF BYTES PER PHYSICAL RECORD ON THE
C***         INPUT TAPE
C***
C***      MBYTE - NUMBER OF BYTES PER LOGICAL RECORD ON THE
C***         INPUT TAPE
C***
C***      NHDR - NUMBER OF HEADER RECORDS ON THE INPUT TAPE
```

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```
C***
C***        THE DATA ARE ASSUMED TO BE ON THE INPUT DATA FILE
C***        IN THE FORM OF SEVERAL INTEGERS FOLLOWED BY FLOATING-
C***        POINT NUMBERS OR AT LEAST NUMBERS THAT CAN BE
C***        STORED AS FLOATING-POINT.  ANY UNWANTED NUMBERS
C***        CAN BE ELIMINATED BY PROPERLY DEFINING THE FORMAT
C***        OF THE INPUT DATA.  THE INPUT FORMAT IS AN INPUT
C***        VARIABLE THAT IS REQUESTED BY THE PROGRAM AS INPUT
C***        FROM THE TERMINAL -- FORMAT MUST BE ENTERED AS
C***
C***        (XXX,YYY,ZZZ)
C***
C***        WHERE XXX, YYY, AND ZZZ ARE FORMAT SPECIFICATIONS.
C***        THE TOTAL NUMBER OF SPECIFICATIONS IS NOT LIMITED
C***        TO THREE.  THE ONLY RESTRICTION IS THAT THE TOTAL
C***        LENGTH OF THE ACTUAL FORMAT CANNOT EXCEED 50
C***        CHARACTERS.
C***
C***        THE PROGRAM WILL ALSO ASK FOR THE NUMBER OF OUTPUT
C***        DATA CHANNELS AND AN ARRAY OF NUMBERS TO CONTROL
C***        THE CORRELATION BETWEEN THE INPUT FLOATING-POINT
C***
C***        THE PROGRAM WILL ASK FOR TWO NUMBERS NX AND NY WHICH
C***        DETERMINE WHICH OF THE INPUT FLOATING-POINT NUMBERS
C***        ARE THE LATITUDE AND LONGITUDE.  NX IS THE NUMBER
C***        CORRESPONDING TO THE LONGITUDE AND NY CORRESPONDS TO
C***        THE LATITUDE.
C***
C***        THE PROGRAM WILL ALSO ASK FOR AN OUTPUT FILE NAME,
C***        A LABEL TO BE USED FOR THE OUTPUT FILE, THE DATE,
C***        AND A STARTING ITS NUMBER.
C***
C***        AND THIS MEANS THAT THE DATA COULD BE IN A JUMBLED
C***        ORDER AS REGARDS X,Y POSITION.  FOR THAT REASON NO
C***        FURTHER PROCESSING SHOULD BE DONE BEFORE USING
C***        EDTFIL TO ORGANIZE THE FILE INTO COHERENT
C***        LINES.
C***        THE PARAMETER MINT IS USED TO CONTROL THE SELECTION OF
C***        THE TYPES OF INPUT AVAILABLE.
C***
C***        MINT = 0 , USE THE VARIABLE FORMAT WITH THE
C***        INPUT DATA CONSISTING OF FIVE FLOATING-POINT NUMBERS, A
C***        DUMMY NUMBER, AND TEN MORE FLOATING-POINT NUMBERS.
C***
C***        MINT > 0 , THE INPUT IS EXPECTED TO HAVE ONE OR MORE
C***        INTEGER NUMBERS FOLLOWED BY ONE OR MORE FLOATING-POINT
C***        NUMBERS.
C***
C***        MINT < 0 , THE INPUT IS EXPECTED TO CONSIST OF ONLY
C***        FLOATING-POINT NUMBERS.
C***
C***        IN PARTICULAR DO NOT USE ANY PROGRAMS SUCH AS FILTER
C***        BECAUSE YOU WILL REALLY FOUL UP THE DATA.
C***
```

```
C**************************************************************

C******************** PACKEM *********************************
C***
C***   THESE ARE SUBROUTINES TO PACK OR UNPACK 8-BIT OR 16-BIT IMAGE
C***   DATA PRIOR TO OUTPUT THROUGH OR INPUT FROM DISKIO.
C***
C***   USAGE: CALL PACK(IOBUF,IFCB)
C***
C***   IOBUF -- ARRAY CONTAINING THE DATA TO BE PACKED.
C***
C***   IFCB -- DISKIO FILE CONTROL BLOCK.  IFCB(25) MUST CONTAIN THE
C***           NUMBER OF BITS PER PIXEL AND IFCB(2) MUST CONTAIN THE
C***           NUMBER OF PIXELS.
C***
C***   FOR UNPACKING: CALL UNPACK(IOBUF,IFCB)
C***
C**************************************************************


C********************** PACONT ********************************
C***
C***   THIS PROGRAM ALLOWS YOU TO PLOT A FLIGHT LINE MAP FOR THE
C***   FLIGHT LINES OF A STANDARD-AIRBORNE-FORMAT DATA SET.
C***
C***
C***   THE FOLLOWING INTERACTION OCCURS:
C***
C***     ENTER THE FOLLOWING DATA:
C***        SCALING FACTOR -- DENOMINATOR OF SCALE,
C***        MIN & MAX LATITUDE (DEGREES) FOR THE PLOT,
C***        MIN & MAX LONGITUDE (DEGREES) FOR THE PLOT,
C***        TIME INTERVAL (ITS) FOR TICKS ALONG FLIGHT LINES,
C***        INTERVAL OF POINTS TO BE PLOTTED,
C***        CONTOUR INTERVAL FOR CONTOUR CUTS,
C***        TICK MARK INTERVAL (DECIMAL DEGREES)
C***
C*** ENTER THE FOLLOWING DATA:
C***        PROJECTION SELECTION -- (1=POLYCONIC, 2=UTM, 3=MERCATOR,
C***              4=LAMBERT, 5,6,7=ALBERS, 8=POLAR STEREOGRAPHIC,
C***              9=TRANSVERSE MERCATOR, 10=LAMBERT,
C***        CENTRAL MERIDIAN & BASE LATITUDE (DEGREES),
C***        PARAMETERS FOR DOC & PATH PLOTTING -- (0=NO, 1=YES),
C***      PARAMETERS FOR LABELING TIME, LINES, TAPES -- (0=NO,
C***      1=YES),
C***      PLOTTER SELECTION -- (1&4=TEKTRONIX, 6=TAPE, 7=HP)
C***
C***     ENTER UP TO 72 CHARACTERS OF TITLE
C***
C***     ENTER UP TO 72 CHARACTERS OF TITLE
C***
```

```
C*** ENTER FILE NAME WITHOUT EXTENSION (IN QUOTES),
C***    FIRSTF,LASTF,TYPE (IN QUOTES), AND AID(ALL,END) (IN QUOTES) .
C***
C*************************************************************************


C********************** PDATE ********************************
C***
C*** THIS SUBROUTINE GETS THE DAY'S DATE AND RETURNS IT IN AN 8
C*** CHARACTER VARIABLE AS MM/DD/YY -- MM=MONTH, DD=DAY, YY=YEAR
C***
C*** USAGE: CALL PDATE(IDT)
C***
C*** IDT -- VARIABLE WITH ROOM FOR EIGHT CHARACTERS
C***
C*************************************************************************



C********************** PROJECT-DRIVER ********************************
C***
C***      THIS IS A DRIVER PROGRAM FOR THE PROJECT SUBROUTINE
C***      INPUT IS PROMPTED FROM THE TELETYPE
C***      THE INPUT VARIABLES ARE;
C***
C***      CM - CENTRAL MERIDIAN IN DEGREES MINUTES AND SECONDS
C***
C***      BASLAT - BASE LATITUDE IN DEGREES MINUTES AND SECONDS
C***
C***      IPR - PROJECTION NUMBER
C***           1        POLYCONIC
C***           2         UTM
C***           3        MERCATOR
C***           4        LAMBERT
C***           5        ALBERS-USA
C***           6        ALBERS-ALASKA
C***           7        ALBERS-HAWAII
C***
C***      XBRDER - X BORDER COORDINATE IN GROUND-INCHES
C***
C***      YBRDER - Y BORDER COORDINATE IN GROUND-INCHES
C***
C***      PIXSIZ - PIXEL SIZE IN GROUND-INCHES
C***
C***      LAT - LATITUDE IN DEGREES, MINUTES, AND SECONDS
C***
C***      LONG - LONGITUDE IN DEGREES, MINUTES, AND SECONDS
C***
C***      THE PROGRAM WILL RETURN THE X AND Y POSITIONS IN TERMS
C***      OF GROUND-INCHES AND THE CORRESPONDING PIXEL-NUMBER AND
C***      SCANLINE.
C***
C***      NOTE; THIS PROGRAM IS WRITTEN IN NEW FORTRAN
```

```
C***
C*****************************************************************

C************************** PRJECT **************************
C***
C***                    *****************
C***                    *               *
C***                    *     USGS       *
C***                    *   AIRBORNE     *
C***                    *    DATA        *
C***                    *  PROCESSING    *
C***                    *   SYSTEM       *
C***                    *               *
C***                    *****************
C***
C***                      MAIN PROGRAM
C***
C***    PROGRAM NAME.. PRJECT
C***
C***                        AIRBORNE PROJECTION PROGRAM
C***
C***    FEBRUARY 1973
C***
C*****************************************************************************

C****************** PRJGRD **************************************
C***
C***
C***    PROGRAM TO MAP A GRID INCREMENTED IN
C***    LAT-LON ONTO A RECTANGULAR COORDINATE SYSTEM.
C***    RESTRICTION ON PROJECTION TYPES: MERIDIANS MUST BE
C***    STRAIGHT LINES, WITH A UNIT OF LATITUDE REPRESENTED
C***    BY A CONSTANT AMOUNT OF Y DISPLACEMENT.
C***    IMPLEMENTED PROJECTIONS ARE: UTM, LAMBERT, AND ALBERS.
C***
C***    THE CENTRAL MERIDIAN AFFECTS THE ROTATION OF THE DATA
C***    AND SHOULD MATCH PUBLISHED MAPS.  FOR INSTANCE
C***    1:250,000 TOPO SHEETS MIGHT BE 1 DEGREE FROM THE CENTER
C***    OF A UTM ZONE, BUT TO PRODUCE A MAP SQUARED ON A PLOT,
C***    PROJECT FROM THE CENTER.  GRIDS THAT WILL BE MERGED
C***    TOGETHER SHOULD BE PROJECTED WITH THE SAME CENTRAL MERIDIAN.
C***
C***      CODED BY MIKE WEBRING
C***      REGIONAL GEOPHYSICS
C***      LAKEWOOD, CO.
C***
C***    SUBROUTINES CALLED ARE:
C***
C***    SETALB, PRJCTL, RIO, SPL1K
C***
```

```
C***************************************************************

C********************** PRJCTL ******************************
C***
C***   PROJECTION SUBROUTINES
C***
C***   USAGE:   CALL PRJCTL(YLAT,XLON,X,Y,CM,SFAC,IPROJT)
C***
C***
C***************************************************************


C********************** PRTSTD ******************************
C***
C*** PROGRAM TO PRINT SELECTED ROWS AND COLUMNS OF A STANDARD-
C*** GRID FILE OR TO CREATE A NEW STANDARD-GRID FILE SUBSET
C***
C*** INPUT IS PROMPTED FROM THE TERMINAL
C***
C*** PROGRAM IS TERMINATED BY ENTERING FOUR ZERO'S FOR
C*** THE STARTING AND ENDING ROW AND COLUMN
C***
C***************************************************************


C********************** PUTIT ******************************
C***
C***   THIS SUBROUTINE IS USED WITH SOME STANDARD-AIRBORNE-FORMAT
C***   PROGRAMS TO OUTPUT DATA TO THE DISK MORE EFFICIENTLY.   IT
C***   RELIES ON THE USE OF DATA CARRIED IN COMMON.
C***
C***************************************************************


C********************** PWRFIT ******************************
C***
C*** THIS PROGRAM CALCULATES A POWER SERIES FIT TO A SET OF
C*** DATA ASSUMING THE FORM:
C***
C***    F(X) = A0 + A1*X + A2*X**2 + ... + AN*X**N
C***
C*** INPUT DATA REQUIRED ARE:
C***
C*** NPTS = THE NUMBER OF DATA POINTS TO BE USED IN THE
C***        CALCULATION
C***
C*** NT = THE NUMBER OF TERMS IN THE POWER SERIES
C***
C*** ILBL = AN 80 CHARACTER LABEL
```

```
C***
C*** YOU CAN USE AS MANY AS 100 DATA POINTS WITH AS MANY AS
C*** 20 TERMS IN THE SERIES.
C***
C****************************************************************

C********************** QKDRIF ****************************
C***
C***       THIS PROGRAM REMOVES LINEARLY TIME-VARYING FUNCTIONS
C***       FROM SPECIFIED DATA CHANNELS IN A STANDARD-AIRBORNE-
C***       FORMAT FILE.  THE PROGRAM EXPECTS A TIME-ORDERED
C***       FILE.
C***
C***       THE INPUT ARE PROMPTED FROM THE TERMINAL
C***       AND CONSIST OF THE FOLLOWING:
C***
C***   FNAME - FILE NAME WITHOUT THE EXTENSION EG,RD07*PLAFIL
C***
C***   FILE NUMBER - NUMBER PART OF THE EXTENSION
C***
C***   FILE TYPE - TYPE=(0,A,B)
C***
C***   ICHN - NUMBER OF CHANNELS TO BE MODIFIED
C***
C***     NSEL(I),I=1,ICHN - CHANNEL NUMBERS SELECTED
C***
C***     TIME,VAL(I),I=1,ICHN - TIME (IN MINUTES) AT WHICH THE
C***           CORRECTION VALUES ARE VALID AND THE CORRECTION
C***           VALUES TO BE SUBTRACTED FROM THE SPECIFIED
C***           CHANNELS.
C***
C***       AS MANY TIME-VALUE COMBINATIONS AS DESIRED CAN BE
C***       ENTERED.  IF THE TIMES SPECIFIED DO NOT COINCIDE WITH
C***       THE BEGINNING AND ENDING TIMES OF THE FILE, THE
C***       PROGRAM AUTOMATICALLY USES THE FIRST AND LAST SPECIFIED
C***       VALUES TO CORRECT THE DATA.
C***
C***   NOTE: INPUT OF TIME AND CORRECTION VALUES
C***         IS TERMINATED BY ENTERING 0'S.
C***
C***   NOTE: THE PROGRAM MAY BE TERMINATED BY ENTERING
C***         A 0 FOR THE FILE NAME WITHOUT EXTENSION.
C***
C****************************************************************

C******************** RADCOR ****************************
C***
C***       THIS PROGRAM DOES ONE OR MORE OF THE FOLLOWING:
C***
C***       1. REMOVE BACKGROUND COUNT RATES FROM SPECIFIED
```

```
C***        CHANNELS.
C***
C***        2. APPLY ALTITUDE CORRECTIONS TO SPECIFIED CHANNELS.
C***
C***        3. APPLY STRIPPING CORRECTIONS TO SPECIFIED
C***        CHANNELS.
C***
C***        4. CALCULATE RATIOS AMONG SPECIFIED CHANNELS.
C***
C***        THESE OPTIONS ARE SELECTED VIA THE ARRAY IOPT(I)
C***        WHERE OPTION I IS SELECTED IF IOPT(I).NE.0.
C***
C***        PROGRAM INPUT CAN BE EITHER FROM THE TERMINAL OR
C***        FROM AN ASCII DISK FILE.  IF INPUT IS FROM THE
C***        TERMINAL, YOU WILL BE PROMPTED.
C***
C***        IF FROM THE DISK, THE VARIABLES REQUIRED ARE:
C***
C***        IOPT(I),I=1,4
C***
C***        IF IOPT(1).NE.0, THE FOLLOWING ARE REQUIRED:
C***
C***        NBCH,(IBCH(I),I=1,NBCH)
C***
C***        BKG(I),I=1,NBCH
C***
C***        WHERE NBCH = NUMBER OF CHANNELS FROM WHICH
C***        BACKGROUND IS TO BE REMOVED.
C***
C***        IBCH(I) = CHANNEL NUMBERS FOR THE CHANNELS TO BE
C***        BACKGROUND CORRECTED.
C***
C***        BKG(I) = BACKGROUND COUNT RATES TO BE REMOVED
C***        FROM THE SPECIFIED CHANNELS.
C***
C***        NOTE: THE CHANNEL NUMBERS CAN BE IN ANY
C***        ORDER PROVIDED THAT THE BACKGROUND VALUES ARE
C***        ENTERED IN THE SAME ORDER.
C***
C***        IF IOPT(2).NE.0, THE PROGRAM WILL WANT
C***        TO KNOW IF YOU PLAN TO USE AN EXPONENTIAL
C***        ATTENUATION EQUATION.  ANSWER YES OR NO.
C***        IF THE ANSWER IS YES, THE FOLLOWING ARE REQUIRED:
C***
C***        NALT,NACH,(IACH(I),I=1,NACH)
C***
C***        REFALT,(XMU(I),I=1,NACH)
C***
C***        WHERE NALT = CHANNEL NUMBER CORRESPONDING TO THE
C***        ALTITUDE.
C***
C***        NACH = NUMBER OF CHANNELS TO BE CORRECTED.
C***
C***        IACH(I) = CHANNEL NUMBERS TO BE CORRECTED.
```

```
C***
C***            REFALT = REFERENCE ALTITUDE TO WHICH THE DATA
C***            ARE TO BE CORRECTED.
C***
C***            XMU(I) = ATTENUATION COEFFICIENTS TO BE USED.
C***
C***            NOTE: THE CHANNEL NUMBERS CAN BE IN ANY ORDER
C***            PROVIDED THAT THE ATTENUATION COEFFICIENTS
C***            ARE IN THE SAME ORDER.
C***
C***            IF THE ANSWER IS NO, THE FOLLOWING ARE REQUIRED:
C***
C***            REFALT,NALT,ALTLIM,NACH,(IACH(I),I=1,NACH)
C***
C***            NCOE(I),(COE(I,J),J=1,NCOE(I))
C***            MUST BE GIVEN FOR EACH CHANNEL TO BE CORRECTED.
C***
C***            WHERE REFALT IS THE REFERENCE ALTITUDE,
C***
C***            NALT IS THE CHANNEL NUMBER OF THE ALTITUDE CHANNEL,
C***
C***            ALTLIM IS AN ALTITUDE LIMIT ABOVE WHICH ALL
C***            DATA ARE SET TO THE DVAL VALUE.
C***
C***            NACH IS THE NUMBER OF CHANNELS TO BE CORRECTED,
C***
C***            IACH(I) ARE THE CHANNEL NUMBERS OF THE DATA TO
C***            BE CORRECTED.
C***
C***            NCOE(I) ARE THE NUMBER OF COEFFICIENTS FOR THE
C***            CHANNEL NUMBER 'I',
C***
C***            COE(I,J) ARE THE COEFFICIENTS OF THE POWER SERIES
C***            FOR CHANNEL 'I'.
C***
C***
C***            NOTE: BECAUSE THE POWER SERIES FIT CAN MISBEHAVE
C***            RATHER SERIOUSLY OUTSIDE THE RANGE OF ALTITUDES
C***            USED FOR THE FIT, YOU MUST BE SURE THAT THE
C***            BEHAVIOUR OF THE SERIES IS GOOD IN THE RANGE OF
C***            VALUES 50 - 850.  IF YOU DO NOT HAVE DATA
C***            UP TO 850 FEET OR DOWN TO 50 FEET FOR THE ALTITUDE
C***            CURVE, THEN INSERT DATA FROM A REASONABLE EXTENSION
C***            OF THE KNOWN CURVE.  OTHERWISE YOU WILL HAVE TO
C***            SET THE VALUE OF 'ALTLIM' TO ENSURE GOOD
C***            BEHAVIOUR OF THE DATA.
C***
C***
C***            IF IOPT(3).NE.0, THE FOLLOWING ARE REQUIRED:
C***
C***            NCOEF,(ISCH(I),I=1,NCOEF)
C***
C***            ((COEF(I,J),J=1,NCOEF),I=1,3)
C***
```

```
C***        WHERE NCOEF = NUMBER OF COEFFICIENTS IN THE
C***        EQUATIONS.
C***
C***        ISCH(I) = CHANNEL NUMBERS CORRESPONDING TO THE
C***        COEFFICIENTS.
C***
C***        COEF(I,J) = COEFFICIENTS TO BE USED IN THE
C***        THREE EQUATIONS.
C***
C***        NOTE: THERE IS NO PROVISION FOR A CONSTANT
C***        COEFFICIENT BECAUSE THE DATA ARE ASSUMED TO
C***        HAVE BEEN CORRECTED FOR ALL SOURCES OF BACKGROUND.
C***
C***        NOTE: THE FIRST THREE OUTPUT CHANNELS WILL
C***        CONTAIN THE RESULTS OF THE STRIPPING CALCULATIONS.
C***
C***        IF IOPT(4).NE.0, THE FOLLOWING ARE REQUIRED:
C***
C***        NRAT,(INUM(I),IDENOM(I),I=1,NRAT)
C***
C***        WHERE NRAT = THE NUMBER OF RATIOS TO BE CALCULATED
C***
C***        INUM(I) = CHANNEL NUMBER OF THE NUMERATOR FOR
C***        RATIO NUMBER I.
C***
C***        IDENOM(I) = CHANNEL NUMBER OF THE DENOMINATOR
C***        FOR RATIO NUMBER I.
C***
C***        NOTE: IF RATIOS ARE CALCULATED, THE RESULTS WILL
C***        BE IN THE CHANNELS FOLLOWING THE RESULTS OF THE
C***        STRIPPING CALCULATIONS.  IF STRIPPING CALCULATIONS
C***        HAVE NOT BEEN CALCULATED, THE RATIOS WILL BE
C***        IN THE FIRST NRAT CHANNELS.
C***
C***        NOTE: THE RATIO VALUES ARE TRUNCATED AT THE VALUE
C***        OF 50 BECAUSE LARGER RATIOS ARE NOT REAL IN
C***        GENERAL.
C***
C***        NOTE: IF STRIPPING RATIOS HAVE BEEN CALCULATED,
C***        THE CHANNEL NUMBERS 1, 2, 3 REFER TO DATA IN THE
C***        OUTPUT FILE.  OTHER CHANNEL NUMBERS REFER TO
C***        CORRECTED DATA IN THE INPUT FILE.  IN OTHER WORDS,
C***        BE CAREFUL WHEN YOU USE THIS OPTION!!
C***
C***        IN ADDITION TO THE ABOVE, THE FOLLOWING DATA
C***        ARE REQUIRED:
C***
C***        ANS1
C***        NALT
C***        ANS2
C***        NTC
C***
C***        WHERE ANS1 = ANSWER TO THE QUESTION - IS THE
C***        ALTITUDE DATA TO BE WRITTEN INTO THE OUTPUT
```

```
C***        FILE? ANSWER YES(Y) OR NO(N).
C***
C***        NALT = CHANNEL NUMBER FOR THE ALTITUDE DATA
C***        (ENTERED ONLY IF ANS1 IS YES)
C***
C***        ANS2 = ANSWER TO THE QUESTION - IS TOTAL COUNT
C***        DATA TO BE WRITTEN INTO THE OUTPUT FILE?
C***        ANSWER YES(Y) OR NO(N).
C***
C***        NTC = CHANNEL NUMBER OF THE TOTAL COUNT DATA
C***        (ENTERED ONLY IF ANS2 IS YES)
C***
C***        ALL OTHER REQUIRED DATA ARE PROMPTED FROM
C***        THE TERMINAL.
C***
C***        NOTE: IT IS IMPORTANT TO REALIZE THAT NOT ALL
C***        COMBINATIONS OF THE OPTIONS ARE COMPATIBLE.
C***        THIS PROGRAM IS PRIMARILY INTENDED TO PERFORM
C***        THE OPTIONS NECESSARY TO CHANGE RAW DATA TO
C***        EQUIVALENT CONCENTRATIONS.  IT IS POSSIBLE
C***        TO DO ONLY BACKGROUND CORRECTIONS OR ONLY
C***        ALTITUDE CORRECTIONS; HOWEVER, THESE POSSIBILITIES
C***        HAVE BEEN INCLUDED MAINLY FOR TEST PURPOSES.
C***        IT IS SUGGESTED THAT YOU TEST ANY PARTICULAR
C***        COMBINATION OF OPTIONS BEFORE PROCESSING A
C***        LARGE DATA SET.
C***
C*************************************************************


C*********************** RASPLT *****************************
C***
C*** THIS PGM READS A DISK FILE OF GENERAL PLOT VECTOR
C*** OUTPUT (16-BIT INTEGERS), REFORMATS IT INTO A FILE OF
C*** UNSORTED PLOT VECTORS, SORTS THEM, RASTERIZES THEM,
C*** & OUTPUTS THE RESULTS AS
C*** 1:  32 16-BIT INTEGERS (500 TOTAL PLOT BITS, PLUS
C***     12 BITS PAD) TO A DISK FILE, WHICH CAN THEN BE
C***     PLOTTED ON THE TEXAS INSTRUMENTS 745 TERMINAL BY
C***     EXECUTING THE PGM TEXPLOT, OR
C*** 2:  132 16-BIT INTEGERS (2112 BITS) TO A DISK FILE OR
C***     MAG TAPE, WHICH CAN THEN BE PLOTTED ON THE VARIAN
C***     ELECTROSTATIC PLOTTER BY EXECUTING THE PGM PLTRS.
C***
C*************************************************************


C******************** REGRID ******************************
C***
C*** THIS PROGRAM REGRIDS A GRID FILE
C***
C**
```

```
C***    PROGRAM REGRID
C***    INPUT IS A GRID WITH A CONSTANT INCREMENT IN X AND Y,
C***    (DX,DY ARE NOT NECESSARILY EQUAL)
C***    OUTPUT IS A GRID WITH A SPECIFIED INCREMENT, AND OPTIONALY
C***    COVERING A SPECIFIED AREA.
C***    THE INTERPOLATER IS A 1-DIMENSIONAL SPLINE APPLIED
C***    FIRST IN THE Y DIRECTION, THEN IN X.  MAXIMUM GRID
C***    DIMENSION 1500X1500.
C***
C***        MIKE WEBRING
C***      REGIONAL GEOPHYSICS, USGS
C***      LAKEWOOD, COLO.
C***
C**********************************************************************


C********************** RELATE ****************************
C***
C***    THIS PROGRAM IS DESIGNED TO TAKE IMAGE FORMAT DATA SETS
C***    AND PERFORM A CLASSIFICATION OF TWO SETS BASED UPON THE THIRD
C***    SET.
C***
C***    THE PROGRAM IS INTENDED TO BE ABLE TO HANDLE EITHER 8-BIT
C***    OR 16-BIT INPUT FILES.
C***
C**********************************************************************


C************************* REMAPL ****************************
C***
C***    THIS PROGRAM TAKES RED, GREEN, AND BLUE IMAGE FILES AND CONVERTS
C***    THEM TO AN APPLICON-FORMAT TAPE SUITABLE FOR DISPLAY ON THE
C***    APPLICON.
C***
C**********************************************************************


C*********************** ROTATE ****************************
C***
C*** ROTATE AN IMAGE TYPE FILE
C***
C***    THE PURPOSE OF THIS PROGRAM IS TO ROTATE AN IMAGE BY
C***    TRANSPOSING THE ROWS AND COLUMNS OF THE IMAGE MATRIX.
C***
C***    THE ORIGINAL IMAGE FILE IS READ INTO CORE STORAGE AND IS
C***    THEN ROTATED AND WRITTEN OUT TO DISK AS A NEW VERSION.
C***
C**********************************************************************
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```
C*********************** STASCI ******************************
C***
C***      THIS PROGRAM IS DESIGNED TO READ A USGS STANDARD AIRBORNE
C***      GRID FILE AND CREATE A FORMATTED EBCDIC TAPE AND TO
C***      READ SUCH A FORMATTED TAPE AND RECREATE THE DISK FILE.
C***      THE INPUT DATA ARE PROMPTED AND CONSIST OF THE FOLLOWING:
C***      IFILE = THE NAME OF THE DISK FILE TO BE EITHER COPIED TO
C***            TAPE OR TO BE CREATED FROM TAPE DATA.
C***      ITYPE = A CONTROL PARAMETER TO CONTROL THE TYPE OF
C***              OPERATION.
C***              IF ITYPE = 0 THEN COPY FROM DISK TO TAPE
C***              IF ITYPE = 1 THEN COPY FROM TAPE TO DISK
C***      TAPENO = I.D. OF THE TAPE VOLUME
C***      FILENO = FILE NUMBER ON THE TAPE
C***      IBLK = SIZE OF THE BLOCK ON THE TAPE IN CHARACTERS
C***
C***      AFTER THE FIRST EXECUTION OF THE PROGRAM YOU CAN
C***      CONTINUE THE SAME TYPE OF OPERATION ON THE SAME TAPE
C***      BY ENTERING IFILE,FILENO, AND IBLK.
C***
C***      TO TERMINATE THE PROGRAM, ENTER 'DONE' FOR THE IFILE
C***      FOLLOWED BY ANY TWO NUMBERS.
C***
C*************************************************************


C*************************** TAPEIO **************************
C***
C*** THIS PROGRAM IS A GENERALIZED TAPE I/O SUBROUTINE.
C***
C*** THE TAPE MUST BE MOUNTED FOR INPUT OR OUTPUT AS FOLLOWS:
C***
C*** INPUT: MOUNT/FOREIGN/RECORD=IR/DENSITY=N MTAX: SAV085 ITAPE
C***
C*** OUTPUT:MOUNT/FOREIGN/RECORD=IR/DENSITY=N MTAX: SAV085 OTAPE
C***
C*** WHERE IR IS THE LOGICAL RECORD SIZE, N IS EITHER
C*** 800 OR 1600, AND MTAX: IS EITHER MTA0: OR MTA1:.
C*** THESE MOUNTS ASSIGN THE LOGICAL NAMES ITAPE AND OTAPE
C*** TO THE DEVICE AND ARE REQUIRED BY THE SUBROUTINE.
C***
C*** NOTE: THIS IS A PHYSICAL I/O ROUTINE AND IT DOES NOT
C***       HANDLE BLOCKING OR UNBLOCKING OF DATA FOR YOU.
C***       YOU MUST DO ANY BLOCKING OPERATIONS THAT ARE NEEDED!
C***
C*** USAGE:  CALL TAPEIO(IOPR,MODE,IBUF,N)
C***
C*** WHERE IOPR = PARAMETER TO DEFINE THE OPERATION DESIRED
C***            = 0, OPEN THE TAPE FOR I/O AND RETURN
C***            = 1, REWIND THE TAPE
C***            = 2,      "      "
C***            = 3,      "      "
C***            = 4, SKIP FORWARD OVER N RECORDS
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C***                    = 5, SKIP BACKWARD OVER N RECORDS
C***                    = 6 AND MODE=1, WRITE A LOGICAL END OF TAPE
C***                         ON TAPE (2 FILE MARKS)
C***                    = 6 AND MODE=0, CLOSE THE TAPE FILE
C***                    = 7, SKIP FORWARD OVER N FILES
C***                    = 8, SKIP BACKWARD OVER N FILES
C***                    = 9, READ A LOGICAL RECORD IN IMAGE FORMAT
C***                    = 10, WRITE A LOGICAL RECORD IN IMAGE FORMAT
C***
C***    MODE = DEFINES WHETHER THE OPERATION IS A READ OR
C***           WRITE OPERATION
C***         = 0, READ OPERATION
C***         = 1, WRITE OPERATION
C***
C***    IBUF = INTEGER ARRAY WHICH DEFINES THE STARTING LOCATION
C***           OF THE DATA TO BE TRANSFERRED.  THIS ARRAY ACTS
C***           BOTH AS SOURCE AND AS ACCEPTOR FOR THE DATA.
C***
C***    N = DEFINES THE NUMBER OF TIMES THAT THE OPERATION IS
C***        TO BE PERFORMED.
C***
C***    IF AN ERROR OCCURS, A NEGATIVE VALUE IS RETURNED IN N.
C***
C***    N = -1, AN END-OF-FILE WAS ENCOUNTERED DURING A READ
C***            OPERATION
C***
C***    N = -2, A FATAL ERROR HAS OCCURRED.
C***
C**************************************************************


C************************ TAPEMOVE ************************
C***
C***    THIS PROGRAM IS DESIGNED TO ALLOW THE USER TO POSITION
C***    A TAPE ANY WAY HE WISHES.
C***
C***    IN ORDER TO USE THIS PROGRAM THE USER MUST MOUNT THE TAPE
C***    AS FOLLOWS:
C***
C***    MOUNT/FOREIGN/REC=IR/BLOCK=IB/DEN=N MTAX: SAV085 ITAPE
C***
C***    OR
C***
C***    MOUNT/FOREIGN/REC=IR/BLOCK=IB/DEN=N MTAX: SAV085 OTAPE
C***
C***    OTHER TAPE MOUNTS MIGHT BE USED AS LONG AS THE FOREIGN
C***    QUALIFER IS USED AND THE LOGICAL NAME IS EQUIVALENCED TO
C***    EITHER ITAPE OR OTAPE.
C***
C***    IR = RECORD LENGTH
C***
C***    IB = BLOCK SIZE
C***
```

```
C***   N = TAPE DENSITY (800, 1600)
C***
C***   MTAX: = THE TAPE UNIT IDENTIFIER
C***
C***   SAV085 = A TAPE VOLUME I.D. WHICH CAN BE ARBITRARY UNLESS AN
C***            OPERATOR WILL MOUNT THE TAPE.
C***
C***   ITAPE = LOGICAL NAME USED FOR INPUT TAPES
C***
C***   OTAPE = LOGICAL NAME USED FOR OUTPUT TAPES
C***
C*****************************************************************


C********************** TCCALC *******************************
C***
C***   TRANSFER CHARACTERISTIC CALCULATION PROGRAM
C***
C*** THIS PROGRAM IS USED TO CALCULATE TRANSFER CHARACTERISTICS
C*** GIVEN THE FOLLOWING DATA:
C***
C*** FD1,DN1,FD2,DN2 - WHERE FD1, DN1 ARE THE FILM DENSITY AND DN
C*** NUMBER FOR THE START OF A LINEAR FUNCTION THAT GOES TO THE
C*** VALUE FD2 AT DN2.  THIS LINEAR FUNCTION IS USED TO CALCULATE
C*** THE DESIRED FILM DENSITY AS A FUNCTION OF THE DENSITY NUMBER
C*** IF DN1 IS NOT EQUAL TO 0 AND/OR DN2 IS NOT EQUAL TO 255,
C*** THE FILM DENSITIES FOR VALUES BELOW DN1 WILL BE SET TO FD1
C*** AND/OR THE VALUES ABOVE DN2 WILL BE SET TO FD2.
C***
C*** A(I), I=1,6 - THE COEFFICIENTS A(I) ARE THE COEFFICIENTS
C***  DETERMINED BY A SIX-TERM POWER-SERIES FIT TO THE GREY
C***  FILM DENSITY VERSUS THE INPUT DN.  THE POWER SERIES FIT
C***  IS DONE USING 'PWRFIT'.
C***
C*** METHOD:  THE FUNCTION DEFINED BY THE POWER SERIES IS USED TO
C***       CALCULATE THE VALUE OF DN THAT GIVES THE DESIRED FILM
C***       DENSITY.  THIS IS DONE USING A SIMPLE ROOT FINDING
C***       PROGRAM CALLED 'BISECT'.
C***
C*****************************************************************


C******************** TRISTM **************************
C***
C***   THIS PROGRAM IS DESIGNED TO INVERT MUNSELL COORDINATES
C***   (HUE, VALUE, & SATURATION) DERIVED USING THE PROGRAM
C***   MUNSEL.
C***
C***   THESE DERIVED VALUES ARE REFERRED TO AS TRISTIMULUS
C***   VALUES.
C***
C***   THE PROGRAM ASSUMES A COLOR ADDITIVE SYSTEM.
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```
C***
C***    COLOR SUBTRACTIVE PRIMARIES     COLOR ADDITIVE PRIMARIES
C***           CYAN ---------------------------- RED
C***           YELLOW -------------------------- BLUE
C***           MAGENTA ------------------------- GREEN
C***
C***    EQUATIONS WERE DERIVED BY DON SAWATZKY AND THE PROGRAM WAS
C***    WRITTEN BY GARY RAINES.
C***
C***    CURRENT VERSION: AUGUST 18, 1982
C***
C***************************************************************


C****************** TSTCHR **********************************
C***
C***    PROGRAM TO TEST SUBROUTINE CHRPAT
C***
C***************************************************************


C********************** UTILITY *********************************
C***
C***     GRID UTILITY PROGRAM
C***
C***    PRIMARILY A GRID EDITING PROGRAM , THE FLOW IS SOMETHING LIKE
C***    THIS:
C***    1)   EXTRACT A SUBSET OF THE GRID TO BE EDITED
C***    2)   EDIT GRID POINTS BY BLANKING OUT AREAS IN ERROR AND
C***         INSERTING CONTROL POINTS, IF NECESSARY.
C***    3)   FILL IN BLANK AREAS USING MINIMUM CURVATURE INTERPOLATION
C***         (THIS REQUIRES A GRID OF LESS THAN 125000 Z VALUES)
C***    4)   MERGE SUBSET
C***
C***    EACH FUNCTION IS INDEPENDENT OF THE OTHERS AND GENERATES FILES
C***    SPECIFIED BY RESPONSES TO QUERIES.
C***
C***    FUNCTIONS:
C***    X       EXTRACT SUBGRID, IF XO YO SPEC IN DATA UNITS THEN
C***            THAT IS OUTPUT IF NOT XO YO ARE COL&ROW NUMBERS OF
C***            ORIGINAL GRID, AND INCRES SET TO 1,THIS MODE
C***            NECCESARY FOR MERGE
C***    M       MERGE SUBSET INTO MASTER ,XO&YO ARE IN GRID UNITS,
C***            NOT D.U.
C***    E       EDIT ROW BY ROW,CAN CHANGE VALUE BY SPEC. COL NUMBER,
C***            ALSO DVAL SEGMENTS OF ROW
C***            TO LEAVE MODE TYPE 0; TO GO TO ANOTHER ROW TYPE -1;
C***            TO LEAVE FUNCTION SPEC ROW NUMBER >NR IN GRID
C***    H       CHANGE TITLE,XO,YO,DX,DY
C***    C       OUTPUT GRID AS BINARY X,Y,Z COORDINATE RECORDS
C***    P       PLUG HOLES IN DATA
C***    L       LOOK AT GRID ROW BY ROW (QUIT BY ENTERING -1)
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C***   S       STOP
C***
C***   A NOTE ABOUT GRID UNITS, 1,1 IS THE COORDINATE OF THE
C***   LOWER LEFT CORNER OF THE MASTER GRID AND THE INCREMENT
C***   IS 1 FOR COLUMNS OR ROWS.  A SUBGRID INCREMENTED IN
C***   GRID UNITS WILL BE IN THE SAME COORDINATE SYSTEM AS
C***   THE MASTER GRID.
C***   TEKTRONIX PLOTS WITH AXIS TICS COINCIDING WITH MESH
C***   LOCATIONS ARE PRODUCED BY SETTING ADELX/Y = 1.
C***
C**********************************************************************
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