REORDER
A Program for Gridding Radar Data
Installation and Use Manual for the Unix Version

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Part 1

INTRODUCTION

The program REORDER transforms radar data from radar space to cartesian space or cylindrical (coplane) space. With this release it is possible to generate executables to process not only Universal Format data but also DORADE [Lee 94] data in the tape format or sweep files used and edited by the Solo software package. Also with this release it is possible to produce a netCDF file that can be ingested into the Zebra [Corbet 94] software package.

1.1 Structure of this Manual

This document is divided into two parts. Part 1 is the introductory part you are now reading. It covers the installation process and includes a brief user's guide.

Part 2 contains a complete description of the input control string attributes.

Appendix A has also been included to show an example of the printed output of the program.

1.2 Supported Systems

The Unix version of REORDER was written to be portable to Unix workstations running Berkeley or System V Unix and which have "little endian" byte ordering. However, because of the many differences in operating systems on various machines, RDP currently supports only the following platforms:

```
Architecture      OS              Compilers
------------      --              ---------

SPARC             SunOS 4.1.x     gcc, cc, or acc
```

		and f77
	SunOS 2.x	gcc, cc, or acc and f77
HP Apollo 9000, Model 715/33	HP-UX 9.0	gcc or cc and fort77
SGI Indy	IRIX 5.1.0.1	cc and f77
	IRIX 5.2	gcc or cc and f77

1.3 System Requirements

REORDER requires C and Fortran compilers. It will support compilers listed in the table above, and HP users should note that fort77 is the required compiler. If it is not currently installed on your system, you may install it from the Interworks Contributed Software Library CD-ROM. It is also available via ftp from HP for Interworks members.

REORDER also requires one or more of the following software packages, depending on whether you wish to use the optional NETCDF file generation and/or DORADE format processing capability:

RDSS Libraries 1.004 or 1.005	(required)
RDSS Radar 1.005 software	(optional, depends upon REORDER package)
SOLO 1.2	(optional, required for DORADE data)
NETCDF	(optional, required for NETCDF generation)
CEDRIC	(optional, required if CEDRIC is to be used with REORDER output)

With the exception of NETCDF and CEDRIC which are not supported by RDP, the other packages may be ftp'ed from the same distribution directory where you obtained REORDER. It is assumed that you have already obtained and installed all applicable software packages. If you have not and need information about obtaining one or more of the above packages, please contact one of the names listed at the end of this document for assistance. NETCDF can be ftp'ed via anonymous ftp to `ftp.unidata.ucar.edu`. CEDRIC is available via anonymous ftp to `ftp.ucar.edu`.

1.3.1 RDSS Libraries

This package is required for all REORDER installations and must be installed before any other RDP software packages. REORDER uses the RDSS Libraries for configuration information and access to certain utility routines. You must be using a recent version of the RDSS Libraries package, installed after March, 1994.

1.3.2 RDSS Radar Software routines

REORDER also requires certain routines contained in the RDSS Radar Software. Since many users already have the RDSS Radar Software, the Unix version of REORDER is distributed in two versions: a smaller package consisting only of the REORDER source code (`reoonly.tar.Z`), designed for users who already have the RDSS Radar Software; and a larger package containing REORDER and supporting files (`reorder.tar.Z`), designed for users who do not. Please check your version of the REORDER software to make sure you have the proper version for your configuration.

1.3.3 SOLO

Users who plan to process DORADE data directly will also need Solo, the RDP package for display, analysis and format translation of radar data. Solo is available via ftp; if you do not have the package, please contact one of the names at the end of this document for assistance.

1.3.4 NETCDF

If you wish to generate NETCDF files, you must have NETCDF installed on your system.

1.3.5 CEDRIC

Output datasets produced by REORDER may be edited, manipulated, synthesized, and displayed using the CEDRIC cartesian space processor [Mohr 86]. This version of REORDER produces output files in CEDRIC's "pure" file format (`.ced` files). It should be compatible with the latest version of Sun CEDRIC. If you are running an older version of CEDRIC which requires `.mud` files only, then this version of REORDER is not for you.

1.3.6 Disk space requirements

The REORDER software will occupy up to 5 MB of disk space after installation, depending upon your version. This is in addition to the space required by the RDSS Libraries, so plan accordingly.

1.4 Unpacking the software

The procedure for unpacking the REORDER program is similar to the ones followed during other RDP software installations and depends upon whether you obtained the software on tape or via ftp:

1.4.1 Unpacking a file obtained via ftp

If you are installing the REORDER only package (`reoonly.tar.Z`) move this file to the *rdsshome*/`radar` directory, where *rdsshome* is the home directory you used for the RDSS Libraries Package. Extract the files by typing:

```
% zcat reoonly.tar.Z | tar xvfp -
```

HP users should invoke the following command instead to avoid file permission problems:

```
% zcat reoonly.tar.Z | tar xvf -
```

If you have the larger REORDER package (`reorder.tar.Z`), move this file to the *rdsshome* directory you used for the RDSS Libraries Package. Extract the files by typing:

```
% zcat reorder.tar.Z | tar xvfp -
```

HP users:

```
% zcat reorder.tar.Z | tar xvf -
```

1.4.2 Unpacking a tape

Your tape should contain the version appropriate for your configuration. If you already have the RDSS Radar Software, your tape will contain the REORDER only version. Extract these files by moving to the *rdsshome*/`radar` directory (where *rdsshome* is the home directory you used for the RDSS Libraries Package installation). Place the tape into the drive and type:

% `tar xvfp` *device_name*

In the example, *device_name* is the name of your tape drive. Consult your system administrator if you are unsure of the device name. To be sure that the tape is not automatically rewound after execution of the tar command, type the device name with its no-rewind option, usually an n prefix (or suffix for System V devices). In other words, if your actual device name is `/dev/rst0`, type the following:

```
% tar xvfp /dev/nrst0
```

If you do not have the RDSS Radar Software, then your tape includes the larger REORDER package. Extract these files by moving to the *rdsshome* directory you used for the RDSS Libraries Package, placing the tape into the drive and typing:

% **tar xvfp** *device_name*

Again, *device_name* is the name of the tape drive.

If you are installing additional packages from the tape and are using the Sun 4.1.x operating system or a Solaris System V device with a 'b' in its name, type the following to position the tape to the next file:

% **mt -f** *device_name* **fsf 1**

If your distribution tape does not include additional software packages, type:

% **mt -f** *device_name* **offline**

1.5 Building the software

The steps involved in building the software depend upon which REORDER package you are installing and whether or not you wish to add NETCDF file generation or DORADE data processing capability.

1.5.1 Adding NETCDF file generation

This option is enabled by defining NETCDF in the **site-def.h** configuration file supplied with the RDSS Libraries distribution in the *rdsshome*/**config** subdirectory. This option is turned off by default but may be enabled by editing the **site-def.h** file as follows:

```
# define UseNetCDF YES

# if UseNetCDF
#       define NetCDFIncDir /usr/local/include
#       define NetCDFLibDir /usr/local/lib
# endif
```

Be sure to change the path definitions for NetCDFIncDir and NetCDFLibDir if your NETCDF installation is in a different directory.

1.5.2 Adding DORADE processing capability

Enabling DORADE capability is a two-step process. First, you must edit the `site-def.h` configuration file supplied with the RDSS Libraries distribution in the *rdsshome*/`config` subdirectory to enable the BuildDoradeReorder option. This option is turned off by default but may be enabled by editing the `site-def.h` file as follows:

```
# define BuildDoradeReorder YES
```

Next, you must build the DORADE Fortran libraries included with the Solo distribution. To do this, change to the *rdsshome*/`solo/translate` directory and type the following:

```
% make Makefile
% make install
```

This will build and install the `ddflb.a` library that will be needed by the DORADE version of REORDER.

1.5.3 Building the REORDER only package

The REORDER only package (`reoonly.tar.Z`) creates a reo subdirectory in *rdsshome*/`radar` after unpacking. To start the build, change to the *rdsshome*/`radar/reo` subdirectory and type:

```
% make Makefile
% make install
```

The installation process will only take a few minutes, and the executable file `qreou` will be placed into the directory you specified for executables during the RDSS Libraries and RDSS Radar Software installations. If you have added DORADE format capability, the executable file `qreod` will be be placed into the same directory with `qreou`.

1.5.4 Building REORDER package with supporting files

The full REORDER package (`reorder.tar.Z`) creates a radar subdirectory in the *rdsshome* directory after unpacking. To start the build, change to the *rdsshome*/`radar` subdirectory and type:

```
% make Makefile
% make
```

The installation process will take about 10 or 15 minutes, and the executable file `qreou` will be placed into the directory you specified for executables during the RDSS Libraries installation. If you have added DORADE format capability, the executable file `qreod` will also be placed into the same directory.

1.5.5 Cleaning subdirectories

If space is a premium at your site and the software has installed successfully, you may wish to clean out the files that are no longer needed by typing:

```
% make clean
```

If something should go wrong during the build process, contact one of the names listed at the bottom of this document.

1.6 Running the software

The `qreou` executable is used to process Universal Format Data, and the `qreod` executable is used for DORADE data. Both programs require that the environment variable `SCRATCH` be set to specify the output directory. This variable may be set from the command line, but most users find it convenient to include the variable in a script file. The `runreo` and `runreod` example scripts are included in the `reo` subdirectory to illustrate the typical invokation of `qreou` and `qreod` respectively.

In addition, the program makes use of input control strings to control the program execution and are typically stored in a separate input control string file and are fed into `qreou` or `qreod` in the script file used to start REORDER. These input control strings are explained in greater detail in the `Input to REORDER` section below which you should review before attempting to run the software. You will also find two example files, `runreo.dat` and `runreod.dat` to illustrate sample input control string files for `qreou` and `qreod`.

You may want to copy and modify these scripts and files to reflect your own environment, making sure that all paths for input and output files are correct. If you will be working with Universal Format data, copy and modify the `runreo` and `runreo.dat` files. If you will be working with DORADE data, copy and modify the `runreod` and `runreod.dat` files. Once you are satisfied that the files are set up the way you want them, type `runreo` or `runreod` as appropriate to start the software.

The software will run as a background job. Upon completion, the message STOP will appear on your screen at a shell prompt, and you will find that two files have been placed into the directories you specified. The file whose name contains the suffix `.ced` can be used with CEDRIC; the other file contains the alphanumeric display. If you have added NETCDF capability, a file whose name contains the suffix `.cdf` file will be placed into the directory you specified with the NETCDF input control string.

1.6.1 The Algorithm

REORDER makes one pass through the input data file using Universal Format access software or DORADE access software and creates one volume of gridded data using Cressman, exponential, closest point, or uniform weighting. An (x, y, z) coordinate is attached to each gate and the contribution of each gate to various grid points is calculated based on radius of influence criteria in the grid coordinate system. Data from a particular field are excluded if the delete flag has been set by the access package.

1.6.2 The Grid and Memory Management

Maximum grid size at this time is (500 x 500 x 500). The program has its own cache memory management scheme so the entire grid is not kept in central memory. Each plane is divided into squares containing a number of grid points. The squares are what are shuffled in and out of the cache. The number of grid points in the square is a function of the number of parameters associated with each grid point.

The determination of the total number of grid points possible is a function the number of values that have to cached for each grid point such as the weighted sum, the sum of the weights, etc. for each variable times the number of grid points. The current limitation of 40MB which corresponds to 10 million floating point values. REORDER will print the maximum possible number of grid points possible if you exceed the current limitations.

1.7 Input to REORDER

The input data must be in a Universal Format file, a DORADE tape file image, or DORADE sweep files. Accessing the data requires that data access attributes be present in the input control string described below. The start time and stop time are crucial, as well as the name of the input data file.

The input control string is composed of attributes. An attribute is composed of a name and a series of arguments. A colon separates the name from the arguments, commas separate the arguments, and the attribute is terminated by a semicolon. There can be several attributes on the same line or several lines per attribute. The input software also allows for ignoring attributes by placing a $\wedge$ at the beginning of the attribute. This permits an esoteric or unused attribute to be kept around for future reference but ignored in the current instance of the program and makes the input self documenting. Every attribute must be terminated with a semicolon and even attributes preceeded by a $\wedge$ must be terminated with a semicolon. See Figure 1.1 for an example input control string.

```
INPUT:''20jul86'';
OUTPUT:''20jul86grid'';
RLONGITUDE:-86.8325;    RLATITUDE:34.8486;  RALTITUDE:0.264;
GLONGITUDE:-86.8325;    GLATITUDE:34.8486;  GALTITUDE:0.264;
;
XMIN:0;      XMAX:32;     XSPACING:0.4;    XRADIUS:.4;
YMIN:0;      YMAX:18;     YSPACING:0.4;    YRADIUS:.4;
ZMIN:.2;     ZMAX:7.2;    ZSPACING:1.0;    ZRADIUS:.6;
WEIGHTING FUNCTION: CRESSMAN;   ^THE DEFAULT;
;
DBZFIELD:DZ;    FIELD:VR,VELOC;     FIELD:TI,TIME;
COUNT:VR,VRCOUNT;
;
DISPLAY:DZ,0,2.5;       DISPLAY:VELOC,0,1;    DISPLAY:TIME,80,3.5;
LEVELS:0.3;
;
EXPERIMENT:MIST;    INSTRUMENT:CP4;
START:20-JUL-86,14:20:26;
STOP:20-JUL-86,14:22:44;
quit;
```

Figure 1.1: An example job.

Part 2

INPUT ATTRIBUTES

This part provides a detailed description of all the input control string attributes and the implications of their use. Except for the reserved mnemonic fields, the attribute arguments used are just examples and do not constitute restrictions on the use of a particular attribute.

2.1 Input Data File Specification

`INPUT:"20jul86";`

Specifies the name of the input file. The software assumes that the filename will end in `.tape` for Universal Format; in this example, the file `17jul86.tape` will be used as the input file. Further, the software will expect to find this file in the pathname specified by the environment variable `SCRATCH`. This variable is set by the `runreo` script to point to the directory containing your Universal Format files.

For DORADE data tape images you will need to include the full path name of this file in double quotes.

`DIRECTORY:"/dt/oye";`

Specifies the input is to be sweep files and this is the directory containing DORADE sweep files produced by the Solo software. If the INPUT and DIRECTORY attributes are both present INPUT takes presidence and DIRECTORY will be ignored.

2.2 Output Data File Specification

`OUTPUT:"20jul86grid";`

Specifies the name of the output file which receives the gridded data in the 'pure' format currently used by CEDRIC. This file will also be placed into the directory specified in the environment variable `SCRATCH`.

`NETCDF:"/dt/oye";`

Causes the production of an additional netCDF file with naming conventions and structures that are compatable with the Zebra software package.

2.3 Radar Coordinates

The location of the radar and the location of the grid origin should be specified each time; otherwise both the radar coordinates and the grid origin coordinates become the location of the radar specified on the input tape.

`RLONGITUDE:-86.8325;`

or `RLONGITUDE:-86,-49,-57;` specifies the radar longitude which can be in two forms: degrees as a decimal fraction or degrees, minutes, and seconds.

`RLATITUDE:34.8486;`

or `RLATITUDE:34,50,54.96;` specifies the radar latitude in two forms: degrees as a decimal fraction or degrees, minutes, and seconds.

`RALTITUDE:.245;`

Specifies the radar altitude in km. msl.

2.4 Grid Origin Coordinates

Specification of the grid coordinates is similar to the radar coordinates.

`GLONGITUDE:-86.8325;`

or `GLONGITUDE:-86,-49,-57;` specifies the longitude of the grid origin.

`GLATITUDE:34.8486;`

or `GLATITUDE:34,50,54.96;` specifies the longitude of the grid origin.

`GALTITUDE:.245;`

Specifies the altitude of the grid origin.

`GBASELINE:90;`

Specifies the azimuth of the x-axis of the grid. This attribute is most often used to specify the baseline for `COPLANE` data, but it can also specify a rotation of the cartesian grid.

`COPLANE DATA;`

Specifies that the output grid is to be in cylindrical coordinates rather than Cartesian.

`EARTHRADIUS:6366.8056;`

Specifies the earth radius in km. used in the translation of the coordinates of a gate of radar data to the grid coordinates. The argument shown is the default value contained within the program. Use this attribute only if the default value is not correct.

2.5 Data Grid Specification

`XMINIMUM:-11.1;`

Specifies the x coordinate of the lower left corner of the data grid in km. relative to the grid origin.

`XMAXIMUM:22.2;`

Specifies the x coordinate of the upper right corner of the data grid in km.

`XSPACING:0.5;`

Specifies the distance along the x axis between grid points in km.

`YMINIMUM:-11.1;`

Specifies the y coordinate of the lower left corner of the data grid in km.

`YMAXIMUM:22.2;`

Specifies the y coordinate of the upper right corner of the data grid in km.

`YSPACING:0.5;`

Specifies the distance along the y axis between grid points.

`ZMINIMUM:0.5;`

Specifies the elevation of the lowest level of the data grid in km. For `COPLANE` data this attribute specifies the lowest dihedral angle of the grid in degrees.

`ZMAXIMUM:15.5;`

Specifies the elevation of the highest level of the data grid in km. For `COPLANE` data this attribute specifies the highest dihedral angle of the grid in degrees.

`ZSPACING:0.5;`

Specifies the spacing between levels or elevations of the grid in km. For `COPLANE` data this attribute is the spacing between dihedrals in degrees.

2.6 Radius of Influence

There are three ways to specify the radii of influence for the interpolation. One is fixed distances for each axis in the cartesian grid space. The second is in `COPLANE` space and the third way causes the radius of influence to vary as a function of range.

For cartesian space:

`XRADIUS:0.5;`

This is the radius of influence in km. in the x direction and will be referred to as dX.

`YRADIUS:0.5;`

This is the radius of influence in km. in the y direction and will be referred to as dY.

`ZRADIUS:0.5;`

This is the radius of influence in km. in the z direction and will be referred to as dZ.

For `COPLANE` data:

`XRADIUS:0.5;`

This is the radius of influence in km. in the x direction and will be referred to as dX.

`YRADIUS:0.5;`

This is the radius of influence in km. in the y direction and will be referred to as dY.

`ZRADIUS:1.0;`

This is the radius of influence in degrees of dihedral angle and has the same effect as `ELRADIUS`.

Variable radius of influence:

`AZRADIUS:0.9;`

Specifies the delta-azimuth component of the radius of influence calculation and will be referred to as dA.

`ELRADIUS:0.9;`

Specifies the delta-elevation component of the radius of influence calculation and will be referred to as dE.

`RGRADIUS:1.0;`

Specifies the delta-range component of the radius of influence in km. and will be referred to as dR. The absence of the `RGRADIUS` attribute causes dR to be calculated as $(r * dA)$ the range times the delta azimuth. This causes the number of gates used in the interpolation of a grid point to increase as range away from the radar increases.

For each gate of each beam dX, dY, and dZ are calculated as a function of the AZ, EL, Range, dA, dE, and dR causing the effective radii of influence to increase with range. The formula for this calculation was developed by Jay Miller. The presence of angular radius of influence attributes causes the fixed radius attributes (`XRADIUS`, `YRADIUS` and `ZRADIUS`) to be ignored.

2.7 Weighting Schemes

There are presently four weighting schemes available for use in deriving the grid points. `CRESSMAN` is the default if no weighting function is specified.

```
WEIGHTING FUNCTION:CRESSMAN;

WEIGHTING FUNCTION:EXPONENTIAL,-2.4;

WEIGHTING FUNCTION:UNIFORM;

WEIGHTING FUNCTION:CLOSEST POINT;
```

For `CRESSMAN` and `EXPONENTIAL` two parameters are important, R and r, where R is a function of the radii of influence:

$$R^2 = dX^2 + dY^2 + dZ^2$$

and r^2 is the square of the distance between the gate and the grid point.

For `CRESSMAN` the weight W for a particular gate value is calculated using the equation

$$W = \frac{R^2 - r^2}{R^2 + r^2}$$

and for EXPONENTIAL

$$W = \exp(\frac{-2.4 * r^2}{R^2})$$

where the -2.4 is an attenuation factor that can be specified as the second argument of the WEIGHT FUNCTION attribute. The actual default is -2.302585093 which is the log(0.1).

For CLOSEST POINT, the radius to the last gate used is kept and when the radius to a new gate is smaller the radius and the data value are replaced by the closer one.

For UNIFORM all gates used in the calculation of a grid point are given the same weight of 1.0 and the grid point becomes the average of all the gates within the radius of influence.

2.8 Specification of Source Data Fields

Source data fields are fields that are accessible in the input data file via the access package.

`FIELD:VR,VELOCITY;`

Specifies the gridding of a source data field VR where the first argument is a two character mnemonic identifying an input field and the second optional argument specifies the name given this field in the output file. If the output name is not present the source data field mnemonic will be used. Source data field names are 2 character mnemonics as used in Universal Format and FOF datasets. Output field names can be up to 8 characters. There can be several fields.

`DBZFIELD:DZ,REFLEC;`

Operates similar to the FIELD specification except the input field is assumed to have units of dBZ and is converted to Z before being interpolated and converted back to dBZ after being interpolated.

`UNFOLD:VR,UNFVEL;`

Operates similar to the FIELD specification except before each gate of the specified field is interpolated, it is unfolded [Miller 86]. The algorithm for unfolding uses the first gate encountered for the grid point as a reference velocity and simply adds or subtracts the Nyquist interval if the difference between the current gate value and the reference is greater than the Nyquist velocity.

`KFIELD:VR,KVALUE;`

Operates similar to the UNFOLD attribute except that the output field produced is the number of unfolds or K value [Miller 86]. K will have the integer values (-1,0,1) but K will be weighted just like any other source field and when it is gridded it will become a floating point number in the range (-1.0,1.0).

2.9 Reserved Mnemonic Fields

`FIELD:TI,TIME;`

This attribute produces a time field that is the elapsed time in seconds from the first beam in the input file or from the `REFERENCE TIME` specification.

`FIELD:AZ,AZIMUTHS;`

This produces a field of interpolated azimuths.

`FIELD:EL,ELEVATION;`

This produces a field of interpolated elevations.

`FIELD:RG,RANGES;`

This produces a field of interpolated ranges.

`FIELD:XX,RANDOM;`

Produces a field of interpolated data provided by a special subroutine FSPECL. The default version returns random numbers to be interpolated just like any other input field. It is possible for users to provide their own versions of the routine FSPECL in order to simulate radar sampling of spacial data.

2.10 Output of Gridding Statistics

`COUNT:VR,VRCOUNTS;`

Produces a count of the number of gates used in the calculation of a particular grid point for a particular field where the first argument is the name of the source field and the second argument is the name given this field in the output file.

`OCTANT:VR,VROCT;`

The octant field flags the presence of input data in each of the eight octants surrounding the grid point for a particular field.

`WFACTOR:VR,VRWF;`

Outputs a weight factor that is defined as the sum of the squared weights over the sum of the weights squared for all the gates used in calculating the grid point.

`RADIUS:VR,VRRAD;`

Outputs the radius to the closest gate from the grid point. This can be done for any weighting scheme but is probably most useful when the `CLOSEST POINT` weighting scheme is used.

There are other output parameters that can be generated that are a function of the characteristics of the specified source fields used in gridding.

`QUALITY:VR,QUAL;`

Specifies the output of a quality field [Miller 86], for this example named `QUAL`, that is accumulated during the process of gridding the variable `VR`. This function is defined as the standard deviation normalized by the nyquist velocity squared over 3;

`SDEVIATION:VR,SDEV;`

Outputs standard deviation of all the gate values that went into the gridding of the field VR.

`AVERAGE:VR,AVERG;`

Outputs average of all the values that went into the gridding of the field VR.

`VREFERENCE:VR,VREF;`

Outputs the reference velocity used for `UNFOLD` or `KFIELD`.

2.11 Data Access Attributes

`EXPERIMENT:MIST;`

This attribute is necessary to access the proper dataset for FOF cataloged data.

`INSTRUMENT:CP2;`

This attribute specifies the name of the radar and is used to access the proper dataset for cataloged data. For Universal Format the presence of this attribute will cause the data positioning algorithm to try to match the name provided with the radar name in the Universal Format dataset. This is useful in case there are similar time spans for different radars included in the same data set.

Please note that this name must exactly match the radar name in the UF dataset or the error message "error in catalog access" will be displayed and processing will stop. If you know that only one radar is included in the dataset, it is safest to omit this line.

`START:12-JUL-86,12:13:14;`

Specifies the start date and time of the input dataset. The access package will start at the beginning of the first scan that starts at or after the START time.

`STOP:12-JUL-86,12:16:17;`

Specifies the stop date and time of the input dataset. The access package will stop at the end of the first scan that contains the stop time.

`EXCLUDE:12-JUL-86,12:14:15,12-JUL-86,12:14:25;`

Causes the beams within the time period specified to be excluded from the process. There can be up to eleven exclusions.

`SPANVOLUMES;`

The presence of this attribute causes the program to ignore end of volume indicators in the data set and processes all the data between the start and stop times.

`AIRCRAFT;`

The presence of this attribute indicates moving platform data and causes REORDER to ignore the radar origin information in the input attributes and get the radar location information directly from the data.

`AZIMUTHS:123,234;`

Specification of the azimuth limits in degrees of the data to be used in the gridding. The sector is assumed to start at the first argument and proceed clockwise to the second argument.

`PRF:456,1234;`

Specifies PRF limits for the data. All data outside these limits will be excluded.

`ASCENDING;`

The presence of this attribute causes the program to exclude all beams whose fixed angle is below the previous fixed angle. This option is meant for data where several low level surveilance scans are intersperced within the three dimensional volume scan.

`GATESKIP:2;`

Causes the filtering alogrithm to skip gates (in this example two gates) as it proceeds out the beam computing the contribution of each gate to the influenced grid points.

`GROUND_OUT;`

Causes a calculation of the intersection between the ray and the surface and the deletion of data from one-half the beam width above the calculated surface through the end of the ray. The beam width can be changed with the GND_ECHO_BMWIDTH attribute. This option applies only to aircraft data and only data taken above a sea surface.

`GND_ECHO_BMWIDTH:1.1;`

Permits the user to select a beam width as discussed in GROUND_OUT that is different from the default.

2.12 Output Display Attributes

Output from this program takes the form of a Cedric-type file of gridded data in "pure" format, a table of input scan information, some statistics for the output fields, and an optional alphanumeric display of the interpolated data fields. See Appendix A.

`DISPLAY:UNFVEL,0,1;`

The presence of one or more display attributes will cause alphanumeric displays of the output data to be produced. The first argument selects the output field to be displayed, the second argument assigns a value to the center symbol of the alphanumeric symbol set and the third value specifies the increment between symbols. The symbol set has 51 symbols. The center symbol is a zero. The 25 symbols on the right side of `0` are the upper case letters from `A` to `Y` and the left side are the lower case letters from `y` to `a`. In the above specification the value of the center symbol is indeed zero and a -1 would be represented by a lower case `a` and a $+1$ would be represented by an upper case `A`.

By default the program would produce a display of the selected fields at all levels.

`LEVELS:0.5,4.5,8.5;`

Controls which levels are displayed and in this example specifies displays at three levels, 0.5, 4.5, and 8.5.

`LEVELS:0.5-4.5;`

Specifies displays at all levels at or between 0.5 and 4.5.

2.13 Reference Time

`REFERENCE TIME:11:22:33;`

This is used for the production of the `TIme` field or for `ADVECTION` and produces an elapsed time to a given data value.

2.14 Advection

`ADVECTION:123,5;`

Causes the data is to be advected by a wind of 5 m/s (second argument) at 123 degrees (first argument) based on the elapsed time from the first beam processed or the `REFERENCE TIME`

`ADVECTION:123,5,2.5;`

This is is the form used if the user wishes to advect by different values at different levels. Here the advection at 2.5 km. above the radar (the third argument) is 5 m/s at 123 degrees. Advection can be specified at the number of levels necessary (200). A piecewise linear interpolation is done for levels in between those specified and an extrapolation is done for levels above and below the levels specified.

2.15 Questions

If you have questions or problems with this software, contact:


```
Michele Case
National Center for Atmospheric Research
P.O. Box 3000
Boulder, CO  80307
(303) 497-8756
```


or


```
Dick Oye
National Center for Atmospheric Research
```

P.O. Box 3000
Boulder, CO 80307
(303) 497-8809

If at all possible, please ask questions through electronic mail via the following addresses:

Internet: case@stout.atd.ucar.edu
uucp: ...!ncar!case

or

Internet: oye@stout.atd.ucar.edu
uucp: ...!ncar!oye

Part 3

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Appendix A

Example Output Listing

Contents

```
QREO--Version 1.002      !

   This version of REORDER produces the PURE cedric format

   The sign of the advection vector is rotated 90 degrees
   from the previous version
   and will now for a positive elapsed time,
   move the data in the direction of the azimuth
   angle instead of the opposite direction.

REORDER INPUT FILE=stdin

---------------------- input -----------------------
INPUT: "mist1.uf";
OUTPUT:"mist_grid";
RLONGITUDE:-86.8325;    RLATITUDE:34.8486;  RALTITUDE:0.264;
GLONGITUDE:-86.8325;    GLATITUDE:34.8486;  GALTITUDE:0.264;
;
XMIN:0;      XMAX:32;     XSPACING:0.4;    XRADIUS:.4;
YMIN:0;      YMAX:18;     YSPACING:0.4;    YRADIUS:.4;
ZMIN:.2;     ZMAX:7.2;    ZSPACING:1.0;    ZRADIUS:.6;
WEIGHTING FUNCTION: CRESSMAN;   ^THE DEFAULT;
;
DBZFIELD:DZ;    FIELD:VR,VELOC;     FIELD:TI,TIME;
COUNT:VR,VRCOUNT;
;
DISPLAY:DZ,0,2.5;       DISPLAY:VELOC,0,1;    DISPLAY:TIME,80,3.5;
LEVELS:0.3;
;
EXPERIMENT:MIST;    INSTRUMENT:CP4;
START:20-JUL-86,14:20:26;
STOP:20-JUL-86,14:22:44;
quit;
+++++++++++++++++ input attributes +++++++++++++++++
INPUT:mist1.uf;
OUTPUT:mist_grid;
RLONGITUDE:-86.8325;
RLATITUDE:34.8486;
RALTITUDE:0.264;
GLONGITUDE:-86.8325;
GLATITUDE:34.8486;
GALTITUDE:0.264;
XMIN:0;
XMAX:32;
XSPACING:0.4;
XRADIUS:.4;
YMIN:0;
YMAX:18;
YSPACING:0.4;
YRADIUS:.4;
ZMIN:.2;
ZMAX:7.2;
ZSPACING:1.0;
ZRADIUS:.6;
WEIGHTINGFUNCTION:CRESSMAN;
DBZFIELD:DZ;
FIELD:VR,VELOC;
FIELD:TI,TIME;
COUNT:VR,VRCOUNT;
DISPLAY:DZ,0,2.5;
DISPLAY:VELOC,0,1;
DISPLAY:TIME,80,3.5;
LEVELS:0.3;
EXPERIMENT:MIST;
INSTRUMENT:CP4;
START:20-JUL-86,14:20:26;
STOP:20-JUL-86,14:22:44;
```

```
QUIT;
====================================================
**fields** wtf=1 atn=-.230259e1 nflds=3 wtf=-32768 mnr=-32768 lenbox=7
DZVRTI
DZ      VELOC   TIME    VRCOUNT
ngpps=0 noutf=4 fieldsx
igs=1 qUFAP--true unix VERSION 13-AUG-90 11:00
Real file is '/dt/case/mist1.uf' unit 0
slat=34.849 slon=-86.833 salt=0.264 dlat=34.849 dlon=-86.833 dalt=0.264
dbas=90.000 earthr=.636681e4 srad=.636707e4 drad=.636707e4
i=1 DZ t=2
i=2 VR t=1
i=3 TI t=3
nyq=17.16 rc=73.43 x0=.454747e-12 y0=.320625e-19 z0=0 c...mark loop


SCAN INFO                       FIXED ANGLE INFO                VARYING ANGLE   SPACING INFO          BEAM
 NO. TYPE   TIMES               FIXED      CCW     CW   MEAN      CCW      CW      MIN.  MAX.   MEAN    COUNT
tot=38016 mxcart=797 ncarts=528 mxshlf=528
   1  RHI   14:20:26 14:20:33    44.0    44.08  44.42  44.10      1.0    49.3     0.00  0.92   0.34     144
   2 -RHI   14:20:33 14:20:41    45.9    45.58  45.91  45.89      0.4    47.8     0.00  0.97  -0.31     155
   3  RHI   14:20:41 14:20:49    47.8    46.17  48.20  47.78      0.3    49.2     0.00  0.48   0.31     156
   4 -RHI   14:20:50 14:20:58    49.7    49.33  49.70  49.67      0.4    47.8     0.00  1.02  -0.31     156
   5  RHI   14:20:58 14:21:06    51.6    49.98  52.08  51.52      0.3    49.2     0.00  0.63   0.31     158
   6 -RHI   14:21:06 14:21:14    53.5    53.16  53.48  53.47      0.4    47.8     0.00  0.75  -0.31     155
   7  RHI   14:21:14 14:21:22    55.4    53.83  55.34  55.31      0.3    48.8     0.00  0.53   0.31     155
   8 -RHI   14:21:22 14:21:30    57.3    56.83  57.27  57.22      0.4    48.2     0.00  1.02  -0.31     156
   9  RHI   14:21:31 14:21:39    59.2    57.59  59.66  59.10      0.3    49.2     0.00  0.53   0.31     157
  10 -RHI   14:21:39 14:21:47    61.1    60.73  61.34  61.05      0.3    47.9     0.00  1.06  -0.31     155
  11  RHI   14:21:47 14:21:55    63.0    61.89  63.02  62.98      0.3    49.0     0.00  0.66   0.32     154
  12 -RHI   14:21:55 14:22:03    64.9    64.16  65.17  64.87      0.3    48.6     0.00  1.02  -0.31     158
  13  RHI   14:22:03 14:22:12    66.8    65.72  67.56  66.79      0.3    49.2     0.00  0.48   0.31     158
  14 -RHI   14:22:12 14:22:20    68.7    68.37  68.64  68.64      0.3    47.3     0.00  1.09  -0.31     154
  15  RHI   14:22:20 14:22:28    70.6    69.02  71.03  70.49      0.3    49.3     0.00  0.58   0.31     158
  16 -RHI   14:22:28 14:22:36    72.5    72.11  72.80  72.43      0.4    47.9     0.00  0.70  -0.31     156
  17  RHI   14:22:36 14:22:44    74.4    73.33  74.37  74.33      0.3    49.3     0.00  0.53   0.31     158
total beams input=2643
total beams excluded=0
total gates after exclusions=2024538
total gates thresholded out=0
c...mark
Real cedric file name is /dt/case/mist_grid.ced

  Level   1  0.20 KM.  3726 Grid Points
DZ        Min -.121E+02 Max  .494E+02 Av -.633E-01 Sd  .130E+02  1850 Empty
VELOC     Min -.127E+02 Max  .709E+01 Av  .111E+00 Sd  .174E+01  1806 Empty
TIME      Min  .000E+00 Max  .132E+03 Av  .748E+02 Sd  .844E+02  1806 Empty
VRCOUNT   Min  .100E+01 Max  .158E+05 Av  .220E+03 Sd  .805E+03  1806 Empty

  Level   2  1.20 KM.  3726 Grid Points
DZ        Min -.156E+02 Max  .579E+02 Av  .153E+01 Sd  .135E+02  1828 Empty
VELOC     Min -.636E+01 Max  .529E+01 Av  .465E+00 Sd  .119E+01  1797 Empty
TIME      Min  .000E+00 Max  .135E+03 Av  .742E+02 Sd  .840E+02  1797 Empty
VRCOUNT   Min  .100E+01 Max  .744E+04 Av  .167E+03 Sd  .488E+03  1797 Empty

  Level   3  2.20 KM.  3726 Grid Points
DZ        Min -.218E+02 Max  .563E+02 Av -.649E+00 Sd  .152E+02  1896 Empty
VELOC     Min -.109E+02 Max  .107E+02 Av  .438E+00 Sd  .145E+01  1804 Empty
TIME      Min  .000E+00 Max  .138E+03 Av  .745E+02 Sd  .842E+02  1804 Empty
VRCOUNT   Min  .100E+01 Max  .280E+04 Av  .127E+03 Sd  .289E+03  1804 Empty

  Level   4  3.20 KM.  3726 Grid Points
DZ        Min -.248E+02 Max  .550E+02 Av -.116E+01 Sd  .156E+02  1972 Empty
VELOC     Min -.110E+02 Max  .723E+01 Av -.909E+00 Sd  .204E+01  1816 Empty
TIME      Min  .706E+00 Max  .138E+03 Av  .746E+02 Sd  .843E+02  1816 Empty
VRCOUNT   Min  .100E+01 Max  .142E+04 Av  .107E+03 Sd  .205E+03  1816 Empty
```

```
  Level   5  4.20 KM.  3726 Grid Points
DZ        Min -.208E+02 Max  .537E+02 Av -.147E+01 Sd  .147E+02  1919 Empty
VELOC     Min -.170E+02 Max  .118E+02 Av -.288E+01 Sd  .325E+01  1829 Empty
TIME      Min  .100E+01 Max  .138E+03 Av  .746E+02 Sd  .842E+02  1829 Empty
VRCOUNT   Min  .100E+01 Max  .840E+03 Av  .944E+02 Sd  .159E+03  1829 Empty

  Level   6  5.20 KM.  3726 Grid Points
DZ        Min -.211E+02 Max  .481E+02 Av -.115E+01 Sd  .169E+02  2428 Empty
VELOC     Min -.855E+01 Max  .137E+02 Av -.733E+00 Sd  .208E+01  1843 Empty
TIME      Min  .100E+01 Max  .138E+03 Av  .748E+02 Sd  .843E+02  1843 Empty
VRCOUNT   Min  .100E+01 Max  .579E+03 Av  .849E+02 Sd  .130E+03  1843 Empty

  Level   7  6.20 KM.  3726 Grid Points
DZ        Min -.193E+02 Max  .464E+02 Av -.741E+00 Sd  .172E+02  2485 Empty
VELOC     Min -.145E+02 Max  .898E+01 Av -.248E+00 Sd  .205E+01  1858 Empty
TIME      Min  .109E+01 Max  .138E+03 Av  .749E+02 Sd  .844E+02  1858 Empty
VRCOUNT   Min  .100E+01 Max  .407E+03 Av  .772E+02 Sd  .109E+03  1858 Empty

  Level   8  7.20 KM.  3726 Grid Points
DZ        Min -.180E+02 Max  .442E+02 Av -.119E+01 Sd  .164E+02  2504 Empty
VELOC     Min -.106E+02 Max  .103E+02 Av  .911E-02 Sd  .209E+01  1878 Empty
TIME      Min  .199E+01 Max  .138E+03 Av  .750E+02 Sd  .845E+02  1878 Empty
VRCOUNT   Min  .100E+01 Max  .308E+03 Av  .709E+02 Sd  .947E+02  1878 Empty
c...mark
```

```
1
 FIELD: DZ          INTERVAL BETWEEN SYMBOLS =   2.50
  -62.50    -50.00    -37.50    -25.00    -12.50      0.00     12.50     25.00     37.50     50.00
     |         |         |         |         |         |         |         |         |         |
     y x w v u t s r q p o n m l k j i h g f e d c b a 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y

 DATA FROM  20-JUL-86 14:20:26  TO  20-JUL-86 14:22:44    MIST    CP4/RP    BURGRE
 LEVEL:  1     0.20 KM.
       0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
        |         |         |         |         |         |         |         |         |
   18.0                                           0aabcddddbcbb00accbbcccbbccccccccccc bc
                                                 00acccdddcbbccbbacccccccc ccccccccc cccc
                                                0A0bbcccddcbaccbbcccccccccccc  cc  cccccc
                                               aa00ccccccddcccdcccccccbccc cccc ccccccc
                                              AA0bccccaabcbccddcccdccccbbcc cc  cccc ccc
   16.0                                      a0Aabbcccbaabbbbccdcccddcccccc   cccccc ccc
                                            0aaabbcccaab0aabbcccccdcccccccc cccccccc
                                           baaaabbcaaaaa00bbbccccccccccccc ccccc ccc   cc
                                           babaacc0aaaaabaabbbcdccccddccccccccc  cc ccccc
                                          cbabcccbaaba0acbaabbcbcccdddddcccccc    ccccccb
   14.0                                   B0ccbbcdaaaaaaabcbbaabcbbdccdcccccccccc cccccccbc
                                          00bddccba0a0aaabbbbcccccddccdcccddcc   ccccccbccc
                                         00abcedcba0abbbbcbbccccccddddcddddd ccccccccbcc
                                        caEEbdedcc00bbbddcabcdccccddddcddd dcccccbbbcc cc
                                       aa0EE0ddddccccddcdbbccccdddcddddd cddccccbbbbacbccc
   12.0                               ab0AAA0ccddcccdddccddcbbcddddddddddddcdcbbcbb bbccccc
                                     dbcaa0abcbcddbbdddccbbccddddddddddddccccbac cbbbccccc
                                    edccdddbbcbbbdbbccdcaaadddddddddddddccccd cccccbc cccc
                                   acedcccddddecbddaaccdbCDCddddddddddccbbccdccccccccc ccc
                                  dcceeddcdddeeeeddbaccddBCCdddddddddccbbbbccccccccc    cc
   10.0                          abdddbbddddddcddededcdddda0ddddddcbbcbcccccccccccc  cccccc
                                cbbcccbbbbeeedcccddecceeeeabddddcbbbbdddccccccccc cc ccccc
                               dcbbbcccbbcddeecccddddeeeeedddccba0acddddcdccccdcccc ccccbb
                              babbccccbbbbcdeeeeeed00cebcddbbcccdbaacdccccdcdcccccccccccbb
                             cbaabbbbba0A00bdeeeda0BBAbccdbbbddcccbcccccccccdcccdcccccccc
    8.0                     Aaba0bbbaa0BCCCCacdddaDFFDCCadbbbcddccdcbccccdccdccccccccc
                           caabaabcba0BDFHLMIa0AcBEGIIEDacbbbccccdcccccdddcccccc
                          aabbbbbbcc0BEFNPONKHCB0GJKKIDcccbbbcbcccccdccbcddccc
                         AAabbabcccbBJLPSSQOLIDCHJKKJHCcccbbbbcddccbbcccbbc
                        DB0acbCCbbbaCMQQRSROMIFFJLLKJHDabccccbccccbbbccb
    6.0                bBAb0abCDabb0CNQRRQPOOLHHJKLKIFDacdcccbbbbbba
                      A00BB0ab00bcbaCMQQQRRQOMKHIKLJHCbdcdcbbbbba
                     a00ACBabb00bbb0CMRRRRRPONKHIIHFEAcddccbb
                    da0ABBAabb0AA0aDFOSSRRQQQQQPKGFEbcddd
                   baaaABBAaaa0BBA0EHNRRRRQQPQRPKJGAab
    4.0           0ba00a0A000aaABBBCGLQRQPPQPPQPKK
                 CBBA0abaaaaa0ABBBCBDJOQQPQQQQR
                aACCAbbbaa000AABEFDBBEMOQQQ
               HECBCCCbbba0A0AAAHJHBCDIL
              eJGC0ACB0aaa00000AIKJ0
    2.0      eOPPK0aBCBa0aaa00000
            IGPPOK00CCAaaaaaa
           GHINNHHAaABabdd
          eCIJOPIHBcAD
          LKKKPQFDD
    0.0   KLKMM
        |         |         |         |         |         |         |         |         |
       0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
```

```
1
 FIELD: VELOC       INTERVAL BETWEEN SYMBOLS =   1.00
  -25.00    -20.00    -15.00    -10.00     -5.00      0.00      5.00     10.00     15.00     20.00
     |         |         |         |         |         |         |         |         |         |
     y x w v u t s r q p o n m l k j i h g f e d c b a 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y

 DATA FROM  20-JUL-86 14:20:26  TO  20-JUL-86 14:22:44    MIST    CP4/RP    BURGRE
 LEVEL:  1     0.20 KM.
         0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
          |         |         |         |         |         |         |         |         |
   18.0                                            aa0ba0BA0A00a0ab0aA0aa00abaa0AA00AAa ca
                                                  AaaAabACBaa000AA0a0AAbbbA AA0abAacaGB0aa
                                                 AaaA00a0B00aaa0A0aa0acba0000ABBa00ib0A0a0
                                                0A0a00AA0caAAaaaAaba0cc00CA0ab0BB0 00000BA
                                               A00A0aABAbcb0aaaa00a00afb0CBAbaA0 a000abaaa
   16.0                                       A00000aAB0abbbbda00B0aaB0a0D00bcDBBA00AA0acg
                                             b00A000aAA000abaaaaa00adbaa0CC00ab0BBca0AAA
                                            aaa000a0ab0AAA00aa0bba0Aacaab0DFbbbaCCaa0d  bb
                                            aaAAaaa0A00BAA00aa000a0AA000chca0b00ACA0 b00ab
                                           0adbA0aBA000A0000ab00A00a00a0CAba0cbba0 B000AaA
   14.0                                  000Abc0A0BB000000A000B000abb0aa0AadbcdbmaAA000A00
                                         a0000aa00AA000000A0aAA0bb0aaA0aaabbb0BA0a0ABBa0A0
                                        aa000aaa000AA00AA0AA0Aab00BB00AAAAbabA0a000aBBa0C
                                       aa000000aa00000a0Aa0A00baB0aA0aAA0BAAA0aabBCaaBb a0
                                      baaa000a00a00000000a0Aab0BA0ababaag0000aba0BDAAa0B0a
   12.0                              0aaaa0aaa00a00ab0000aaA0ca0A00abbb0a00AA0AAB0 cb00A0b
                                    aaaaa00aab00a0abb0000aaCaa00baAAABbba0BBA0ACB00bb00c0A
                                   bbaaaaaaa0a00aaa0000aAAAAaa000aAaaAbc00AAB ABA0abc00a0C
                                  ecbaa0aaaa0aa0aaaa00aa0AA00abaAaa0aabaAAB0aaAAAB0caA00b
                                 abbaaaaaaaaaaa000bca00000000a0000bABA00C000aa0BB00a0CA cb
   10.0                         0aaaaabbabbaaa0a00bcaAA00abAB0aaa00ABCbb0A0aaa0BBa0A000bcb
                               baaaaaaaabbbbbAAa00aA00ABB0abaaaaa0B0abba0AB00aAB00ABA0Aaba
                              cbaaaaaaaabbbbb00a000000ACAaabaA000ABB0baAbbAA0b00aaABA0aba0
                             bbbaabbaaaaaabcbaba000aa0aa00a0ABAAAaABA0AAcc0aaba0aaBB00acaB
                            ccbaabbbaaa00abbaaaa0a0000ab0AA000ABAab000A0A0bcbaaa0ACBaabb
    8.0                    cbcbabccbaaaaaaaabbaa000000aba0acbaa000a00BAAAAacc0A00ABCa
                          dcbbbbccbbaaaaaa00bba0000AAA00baacbA0baA000AA000BAaaAB0
                         gdcbabbbcbbaaabbb000a0000AAAAA0baA0aBC0a0000Aaba0BA00
                        dddccccccbccbaabcba0000000AAAAAA0aAAAAA000A00A0aA0
                       cccccccccccdcbabbbaAAAAAAAAAAAB0000A00A0ACA0AB
    6.0               bcccbcdcccccdedcbaaa0BBBBAAAAAAA00AAA00AAAA0aB
                     Babcccddcddbbceeddcb0CEDBBAAAAAAA00ABBBBBBBA
                    00aaabcddcdcbbcefgeeb0CEDCAAAAAAA00aABBB
                   BA00aaabcdbbbabdfhihgc0BDDDCA0AA00A0a0
                  AAAA00a0accaaa0bdghihgdaABDDCBA000A
    4.0          0AAAAAA0A0abba00bdeggffecb0BCCBB
                CAAABAAAAA0A00ABAbcdefggfedb0A
               BAAAAAAA0ABBAAABBA0adeefggf
              0AAAAAAAAAACBAAAA0000bdcc
             A0AABBAAAAABBBBBBA00AA
    2.0     BAAAAAAAAABBBBBCCCBA
           AAAAAABBAAABCBBBB
          000AABBBBBBABBC
         0000AABBBBBC
         0000AAABB
    0.0  0000A
          |         |         |         |         |         |         |         |         |
         0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
```

```
1
 FIELD: TIME        INTERVAL BETWEEN SYMBOLS =   3.50
   -7.50     10.00     27.50     45.00     62.50     80.00     97.50    115.00    132.50    150.00
     |         |         |         |         |         |         |         |         |         |
     y x w v u t s r q p o n m l k j i h g f e d c b a 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y

 DATA FROM  20-JUL-86 14:20:26  TO  20-JUL-86 14:22:44    MIST    CP4/RP    BURGRE
 LEVEL:  1     0.20 KM.
       0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
        |         |         |         |         |         |         |         |         |
   18.0                                           wwwtsssssspnnnnnnnjjjjjjjjjeeeeeeeeee 00
                                                 wwwtsssssspnnnnnnnjjjjjjjj eeeeeeeeee0000
                                                wwwtsssssonnnnnnkjjjjjjjieeeeeeeeeee000000
                                               wwwtsssssonnnnnnjjjjjjjjjeeeeeeeeee 0000000
                                              wwwtsssssonnnnnnjjjjjjjieeeeeeeee 000000000
   16.0                                      wwwtsssssonnnnnkjjjjjjjeeeeeeeeee0000000000
                                            wwwtsssssnnnnnnjjjjjjjjeeeeeeeee00000000000
                                           wwwtssssqnnnnnnjjjjjjjeeeeeeeeee0000000000  DD
                                           wwtssssspnnnnnljjjjjjieeeeeeeeee0000000000 DDDDD
                                          wwtssssspnnnnnkjjjjjjfeeeeeeee0000000000 DDDDDDE
   14.0                                 wwwtssssonnnnmjjjjjjieeeeeeeea0000000000DDDDDDEEE
                                        wwtssssonnnnmjjjjjjfeeeeeeeb0000000000DDDDDDEEEEE
                                       wwtsssronnnnkjjjjjheeeeeeec0000000000DDDDDDEEEEEE
                                      wwtsssronnnnnjjjjjifeeeeeee0000000000DDDDDDEEEEEE II
                                     wwtsssqonnnljjjjjheeeeeeea000000000DDDDDEEEEEEEIIIII
   12.0                             wwtsssqnnnnkjjjjjfeeeeeeb00000000CDDDDDEEEEEE IIIIIII
                                   wwtssspnnnnkjjjjheeeeeeeca0000000CDDDDDEEEEEEIIIIIIIII
                                  wwtssrpnnnmjjjjifeeeeeea0000000CDDDDDEEEEE IIIIIIIIIII
                                 wwtssronnnljjjjheeeeeea0000000CDDDDDEEEEEIIIIIIIIIIIII
                                wwtssronnnkjjjifeeeeeb0000000CDDDDEEEEEEIIIIIIIIIIIII NN
   10.0                        wwtssqonnmjjjjheeeeeca000000CDDDDEEEEEIIIIIIIIIIIIIINNNNNN
                              wwtssqonnljjjjifeeeeda000000CDDDDEEEEGIIIIIIIIIIIIINNNNNNNNN
                             wwtssqonnkjjjhfeeedb000000CDDDDEEEEHIIIIIIIIIIIIINNNNNNNNNNNN
                            wvtssponmkjjigeeeeba0000ACDDDDEEEFIIIIIIIIIIIINNNNNNNNNNNNNN
                           wwtsrpnnljjjhfeeeca0000ACDDDDEEEHIIIIIIIIIIINNNNNNNNNNNNNN
    8.0                   wwtsrpnnkjjigeeeda0000ACDDDEEEFIIIIIIIIIIINNNNNNNNNNNNNNN
                         wvtsronmkjjhfeedba000ACDDDEEEGIIIIIIIIIIMNNNNNNNNNNNNN
                        wvtsqonlkjigeeeba000ACDDDEEFHIIIIIIIIJMNNNNNNNNNNNNN
                       wvtsqonljjhfeeca000ACDDDEEGIIIIIIIIKMNNNNNNNNNNNNN
                      wvtsqomkjigeedba00BCDDDEFHIIIIIIIJMNNNNNNNNNNNN
    6.0              wvtsqomkjhfedba00BCDDDEGHIIIIIIKMNNNNNNNNNNNN
                    wvtspnljigeeca00BCDDEFGIIIIIIKMNNNNNNNNNNNN
                   wvtrpnljhfecb00BCDDEGHIIIIIKMMNNNNNNNNNNN
                  wutrpmkigfdba0BCDDEGHIIIJKLMNNNNNNNNNN
                 wutromjhfdca0BCDEFHHIIJKLMNNNNNNNNN
    4.0         wvtroligeca0BCDEGHIIJKLMNNNNNNNN
               wvtqnkhfdb0BCDFGHIJKLMNNNNNNNN
              wusqmjgdb0BCEFHIJKLMNNNNNNN
             wusplifcaBDEGHJKLMMNNNNNN
            wusokgdaBDFGIKLMMNNNNNN
    2.0    wtrnjeaBDFHJLLMNNNNN
          wtqmgbBEGJKLMNNNN
         wrojdBFIKLMNNNN
        vplfAFIKLNNN
        febCHKMNN
    0.0 ebELN
        |         |         |         |         |         |         |         |         |
       0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
1
 processing finished
 stop
```

```
QREO--Version 1.002      !

   This version of REORDER produces the PURE cedric format

   The sign of the advection vector is rotated 90 degrees
   from the previous version
   and will now for a positive elapsed time,
   move the data in the direction of the azimuth
   angle instead of the opposite direction.

REORDER INPUT FILE=stdin

---------------------- input -----------------------
INPUT: "mist1.uf";
OUTPUT:"mist_grid";
RLONGITUDE:-86.8325;    RLATITUDE:34.8486;  RALTITUDE:0.264;
GLONGITUDE:-86.8325;    GLATITUDE:34.8486;  GALTITUDE:0.264;
;
XMIN:0;      XMAX:32;     XSPACING:0.4;    XRADIUS:.4;
YMIN:0;      YMAX:18;     YSPACING:0.4;    YRADIUS:.4;
ZMIN:.2;     ZMAX:7.2;    ZSPACING:1.0;    ZRADIUS:.6;
WEIGHTING FUNCTION: CRESSMAN;   ^THE DEFAULT;
;
DBZFIELD:DZ;    FIELD:VR,VELOC;     FIELD:TI,TIME;
COUNT:VR,VRCOUNT;
;
DISPLAY:DZ,0,2.5;       DISPLAY:VELOC,0,1;    DISPLAY:TIME,80,3.5;
LEVELS:0.3;
;
EXPERIMENT:MIST;    INSTRUMENT:CP4;
START:20-JUL-86,14:20:26;
STOP:20-JUL-86,14:22:44;
quit;
+++++++++++++++++ input attributes +++++++++++++++++
INPUT:mist1.uf;
OUTPUT:mist_grid;
RLONGITUDE:-86.8325;
RLATITUDE:34.8486;
RALTITUDE:0.264;
GLONGITUDE:-86.8325;
GLATITUDE:34.8486;
GALTITUDE:0.264;
XMIN:0;
XMAX:32;
XSPACING:0.4;
XRADIUS:.4;
YMIN:0;
YMAX:18;
YSPACING:0.4;
YRADIUS:.4;
ZMIN:.2;
ZMAX:7.2;
ZSPACING:1.0;
ZRADIUS:.6;
WEIGHTINGFUNCTION:CRESSMAN;
DBZFIELD:DZ;
FIELD:VR,VELOC;
FIELD:TI,TIME;
COUNT:VR,VRCOUNT;
DISPLAY:DZ,0,2.5;
DISPLAY:VELOC,0,1;
DISPLAY:TIME,80,3.5;
LEVELS:0.3;
EXPERIMENT:MIST;
INSTRUMENT:CP4;
START:20-JUL-86,14:20:26;
STOP:20-JUL-86,14:22:44;
```

```
QUIT;
====================================================
**fields** wtf=1 atn=-.230259e1 nflds=3 wtf=-32768 mnr=-32768 lenbox=7
DZVRTI
DZ      VELOC   TIME    VRCOUNT
ngpps=0 noutf=4 fieldsx
igs=1 qUFAP--true unix VERSION 13-AUG-90 11:00
Real file is '/dt/case/mist1.uf' unit 0
slat=34.849 slon=-86.833 salt=0.264 dlat=34.849 dlon=-86.833 dalt=0.264
dbas=90.000 earthr=.636681e4 srad=.636707e4 drad=.636707e4
i=1 DZ t=2
i=2 VR t=1
i=3 TI t=3
nyq=17.16 rc=73.43 x0=.454747e-12 y0=.320625e-19 z0=0 c...mark loop


SCAN INFO                      FIXED ANGLE INFO               VARYING ANGLE   SPACING INFO          BEAM
 NO. TYPE   TIMES              FIXED      CCW     CW   MEAN      CCW      CW      MIN.  MAX.   MEAN    COUNT
tot=38016 mxcart=797 ncarts=528 mxshlf=528
   1  RHI   14:20:26 14:20:33    44.0    44.08  44.42  44.10      1.0    49.3     0.00  0.92   0.34     144
   2 -RHI   14:20:33 14:20:41    45.9    45.58  45.91  45.89      0.4    47.8     0.00  0.97  -0.31     155
   3  RHI   14:20:41 14:20:49    47.8    46.17  48.20  47.78      0.3    49.2     0.00  0.48   0.31     156
   4 -RHI   14:20:50 14:20:58    49.7    49.33  49.70  49.67      0.4    47.8     0.00  1.02  -0.31     156
   5  RHI   14:20:58 14:21:06    51.6    49.98  52.08  51.52      0.3    49.2     0.00  0.63   0.31     158
   6 -RHI   14:21:06 14:21:14    53.5    53.16  53.48  53.47      0.4    47.8     0.00  0.75  -0.31     155
   7  RHI   14:21:14 14:21:22    55.4    53.83  55.34  55.31      0.3    48.8     0.00  0.53   0.31     155
   8 -RHI   14:21:22 14:21:30    57.3    56.83  57.27  57.22      0.4    48.2     0.00  1.02  -0.31     156
   9  RHI   14:21:31 14:21:39    59.2    57.59  59.66  59.10      0.3    49.2     0.00  0.53   0.31     157
  10 -RHI   14:21:39 14:21:47    61.1    60.73  61.34  61.05      0.3    47.9     0.00  1.06  -0.31     155
  11  RHI   14:21:47 14:21:55    63.0    61.89  63.02  62.98      0.3    49.0     0.00  0.66   0.32     154
  12 -RHI   14:21:55 14:22:03    64.9    64.16  65.17  64.87      0.3    48.6     0.00  1.02  -0.31     158
  13  RHI   14:22:03 14:22:12    66.8    65.72  67.56  66.79      0.3    49.2     0.00  0.48   0.31     158
  14 -RHI   14:22:12 14:22:20    68.7    68.37  68.64  68.64      0.3    47.3     0.00  1.09  -0.31     154
  15  RHI   14:22:20 14:22:28    70.6    69.02  71.03  70.49      0.3    49.3     0.00  0.58   0.31     158
  16 -RHI   14:22:28 14:22:36    72.5    72.11  72.80  72.43      0.4    47.9     0.00  0.70  -0.31     156
  17  RHI   14:22:36 14:22:44    74.4    73.33  74.37  74.33      0.3    49.3     0.00  0.53   0.31     158
total beams input=2643
total beams excluded=0
total gates after exclusions=2024538
total gates thresholded out=0
c...mark
Real cedric file name is /dt/case/mist_grid.ced

  Level   1  0.20 KM.  3726 Grid Points
DZ        Min -.121E+02 Max  .494E+02 Av -.633E-01 Sd  .130E+02  1850 Empty
VELOC     Min -.127E+02 Max  .709E+01 Av  .111E+00 Sd  .174E+01  1806 Empty
TIME      Min  .000E+00 Max  .132E+03 Av  .748E+02 Sd  .844E+02  1806 Empty
VRCOUNT   Min  .100E+01 Max  .158E+05 Av  .220E+03 Sd  .805E+03  1806 Empty

  Level   2  1.20 KM.  3726 Grid Points
DZ        Min -.156E+02 Max  .579E+02 Av  .153E+01 Sd  .135E+02  1828 Empty
VELOC     Min -.636E+01 Max  .529E+01 Av  .465E+00 Sd  .119E+01  1797 Empty
TIME      Min  .000E+00 Max  .135E+03 Av  .742E+02 Sd  .840E+02  1797 Empty
VRCOUNT   Min  .100E+01 Max  .744E+04 Av  .167E+03 Sd  .488E+03  1797 Empty

  Level   3  2.20 KM.  3726 Grid Points
DZ        Min -.218E+02 Max  .563E+02 Av -.649E+00 Sd  .152E+02  1896 Empty
VELOC     Min -.109E+02 Max  .107E+02 Av  .438E+00 Sd  .145E+01  1804 Empty
TIME      Min  .000E+00 Max  .138E+03 Av  .745E+02 Sd  .842E+02  1804 Empty
VRCOUNT   Min  .100E+01 Max  .280E+04 Av  .127E+03 Sd  .289E+03  1804 Empty

  Level   4  3.20 KM.  3726 Grid Points
DZ        Min -.248E+02 Max  .550E+02 Av -.116E+01 Sd  .156E+02  1972 Empty
VELOC     Min -.110E+02 Max  .723E+01 Av -.909E+00 Sd  .204E+01  1816 Empty
TIME      Min  .706E+00 Max  .138E+03 Av  .746E+02 Sd  .843E+02  1816 Empty
VRCOUNT   Min  .100E+01 Max  .142E+04 Av  .107E+03 Sd  .205E+03  1816 Empty
```

```
  Level   5  4.20 KM.  3726 Grid Points
DZ       Min -.208E+02 Max  .537E+02 Av -.147E+01 Sd  .147E+02  1919 Empty
VELOC    Min -.170E+02 Max  .118E+02 Av -.288E+01 Sd  .325E+01  1829 Empty
TIME     Min  .100E+01 Max  .138E+03 Av  .746E+02 Sd  .842E+02  1829 Empty
VRCOUNT  Min  .100E+01 Max  .840E+03 Av  .944E+02 Sd  .159E+03  1829 Empty

  Level   6  5.20 KM.  3726 Grid Points
DZ       Min -.211E+02 Max  .481E+02 Av -.115E+01 Sd  .169E+02  2428 Empty
VELOC    Min -.855E+01 Max  .137E+02 Av -.733E+00 Sd  .208E+01  1843 Empty
TIME     Min  .100E+01 Max  .138E+03 Av  .748E+02 Sd  .843E+02  1843 Empty
VRCOUNT  Min  .100E+01 Max  .579E+03 Av  .849E+02 Sd  .130E+03  1843 Empty

  Level   7  6.20 KM.  3726 Grid Points
DZ       Min -.193E+02 Max  .464E+02 Av -.741E+00 Sd  .172E+02  2485 Empty
VELOC    Min -.145E+02 Max  .898E+01 Av -.248E+00 Sd  .205E+01  1858 Empty
TIME     Min  .109E+01 Max  .138E+03 Av  .749E+02 Sd  .844E+02  1858 Empty
VRCOUNT  Min  .100E+01 Max  .407E+03 Av  .772E+02 Sd  .109E+03  1858 Empty

  Level   8  7.20 KM.  3726 Grid Points
DZ       Min -.180E+02 Max  .442E+02 Av -.119E+01 Sd  .164E+02  2504 Empty
VELOC    Min -.106E+02 Max  .103E+02 Av  .911E-02 Sd  .209E+01  1878 Empty
TIME     Min  .199E+01 Max  .138E+03 Av  .750E+02 Sd  .845E+02  1878 Empty
VRCOUNT  Min  .100E+01 Max  .308E+03 Av  .709E+02 Sd  .947E+02  1878 Empty
c...mark
```

```
1
FIELD: DZ          INTERVAL BETWEEN SYMBOLS =   2.50
 -62.50    -50.00    -37.50    -25.00    -12.50      0.00     12.50     25.00     37.50     50.00
    |         |         |         |         |         |         |         |         |         |
    y x w v u t s r q p o n m l k j i h g f e d c b a 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y

DATA FROM  20-JUL-86 14:20:26  TO  20-JUL-86 14:22:44    MIST    CP4/RP    BURGRE
LEVEL:  1     0.20 KM.
      0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
       |         |         |         |         |         |         |         |         |
  18.0                                           0aabcdddddbcbb00accbbcccbbcccccccccc bc
                                                0acccdddcbbccbbacccccccc ccccccccc cccc
                                               0A0bbcccddcbaccbbcccccccccccc  cc  cccccc
                                              aa00ccccccddcccdcccccccbccc cccc ccccccc
                                             AA0bccccaabcbccddcccdccccbbcc cc  cccc ccc
  16.0                                      a0Aabbcccbaabbbbccdcccddcccccc   cccccc ccc
                                           0aaabbcccaab0aabbcccccccdccccccc cccccccc
                                          baaaabbcaaaaa00bbbccccccccccccc ccccc ccc   cc
                                          babaacc0aaaaabaabbbcdccccddccccccccc  cc ccccc
                                         cbabcccbaaba0acbaabbcbcccdddddcccccc    cccccb
  14.0                                 B0ccbbcdaaaaaaabcbbaabcbbdccdcccccccccc cccccccbc
                                       00bddccba0a0aaabbbbcccccddccdcccddcc   ccccccbccc
                                      00abcedcba0abbbbcbbcccccccddddcddddd ccccccccbcc
                                     caEEbdedcc00bbbddcabcdcccccddddcddd dccccccbbbcc cc
                                    aa0EE0ddddddccccddcdbbccccdddcddddd cddccccbbbbacbccc
  12.0                             ab0AAA0ccddcccdddccddcbbcdddddddddddcdcbbcbb bbccccc
                                  dbcaa0abcbcddbbdddccbbccdddddddddddddccccbac cbbbccccc
                                 edccdddbbcbbbdbbccdcaaaddddddddddddcccccd ccccccbc cccc
                                acedcccddddecbddaaccdbCDCddddddddddccbbccdccccccccc ccc
                               dcceeddcdddeeeeddbaccddBCCddddddddccbbbbcccccccccc    cc
  10.0                        abdddbbddddddcddededcdddda0dddddcbbcbccccccccccc  cccccc
                             cbbcccbbbbeeedcccddecceeeeabddddcbbbbdddcccccccc cc ccccc
                            dcbbbcccbbcddeecccddddeeeeedddccba0acddddcdccccdcccc ccccbb
                           babbccccbbbbcdeeeeeed00cebcddbbcccdbaacdccccdcdcccccccccccbb
                          cbaabbbbba0A00bdeeeda0BBAbccdbbbddcccbcccccccccdcccdcccccccc
   8.0                   Aaba0bbbaa0BCCCCacdddaDFFDCCadbbbcddccdcbccccdccdcccccccccc
                        caabaabcba0BDFHLMIa0AcBEGIIEDacbbbcccccdcccccccdddcccccc
                       aabbbbbbcc0BEFNPONKHCB0GJKKIDcccbbbcbcccccccdccbcddccc
                      AAabbabcccbBJLPSSQOLIDCHJKKJHCcccbbbbcddccbbcccbbc
                     DB0acbCCbbbaCMQQRSROMIFFJLLKJHDabccccbccccbbbccb
   6.0              bBAb0abCDabb0CNQRRQPOOLHHJKLKIFDacdcccbbbbbba
                   A00BB0ab00bcbaCMQQQRRQOMKHIKLJHCbdcdcbbbbba
                  a00ACBabb00bbb0CMRRRRRPONKHIIHFEAcddccbb
                 da0ABBAabb0AA0aDFOSSRRQQQQQPKGFEbcddd
                baaaABBAaaa0BBA0EHNRRRRQQPQRPKJGAab
   4.0         0ba00a0A000aaABBBCGLQRQPPQPPQPKK
              CBBA0abaaaaa0ABBBCBDJOQQPQQQQR
             aACCAbbbaa000AABEFDBBEMOQQQ
            HECBCCCbbba0A0AAAHJHBCDIL
           eJGC0ACB0aaa00000AIKJ0
   2.0    eOPPK0aBCBa0aaa00000
         IGPPOK00CCAaaaaaa
        GHINNHHAaABabdd
       eCIJOPIHBcAD
       LKKKPQFDD
   0.0 KLKMM
       |         |         |         |         |         |         |         |         |
      0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
```

```
1
 FIELD: VELOC       INTERVAL BETWEEN SYMBOLS =   1.00
  -25.00    -20.00    -15.00    -10.00     -5.00      0.00      5.00     10.00     15.00     20.00
     |         |         |         |         |          |         |        |         |         |
     y x w v u t s r q p o n m l k j i h g f e d c b a 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y

 DATA FROM  20-JUL-86 14:20:26  TO  20-JUL-86 14:22:44    MIST    CP4/RP    BURGRE
 LEVEL:  1     0.20 KM.
       0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
        |         |         |         |         |         |         |         |         |
  18.0                                           aa0ba0BA0A00a0ab0aA0aa00abaa0AA00AAa ca
                                                AaaAabACBaa000AA0a0AAbbbA AA0abAacaGB0aa
                                               AaaA00a0B00aaa0A0aa0acba0000ABBa00ib0A0a0
                                              0A0a00AA0caAAaaaAaba0cc00CA0ab0BB0 00000BA
                                             A00A0aABAbcb0aaaa00a00afb0CBAbaA0 a000abaaa
  16.0                                      A00000aAB0abbbbda00B0aaB0a0D00bcDBBA00AA0acg
                                           b00A000aAA000abaaaaa00adbaa0CC00ab0BBca0AAA
                                          aaa000a0ab0AAA00aa0bba0Aacaab0DFbbbaCCaa0d  bb
                                          aaAAaaa0A00BAA00aa000a0AA000chca0b00ACA0 b00ab
                                         0adbA0aBA000A0000ab00A00a00a0CAba0cbba0 B000AaA
  14.0                                 000Abc0A0BB000000A000B000abb0aa0AadbcdbmaAA000A00
                                       a0000aa00AA000000A0aAA0bb0aaA0aaabbb0BA0a0ABBa0A0
                                      aa000aaa000AA00AA0AA0Aab00BB00AAAAbabA0a000aBBa0C
                                     aa000000aa00000a0Aa0A00baB0aA0aAA0BAAA0aabBCaaBb a0
                                    baaa000a00a00000000a0Aab0BA0ababaag0000aba0BDAAa0B0a
  12.0                             0aaaa0aaa00a00ab0000aaA0ca0A00abbb0a00AA0AAB0 cb00A0b
                                  aaaaa00aab00a0abb0000aaCaa00baAAABbba0BBA0ACB00bb00c0A
                                 bbaaaaaaa0a00aaa0000aAAAAaa000aAaaAbc00AAB ABA0abc00a0C
                                ecbaa0aaaa0aa0aaaa00aa0AA00abaAaa0aabaAAB0aaAAAB0caA00b
                               abbaaaaaaaaaaa000bca00000000a0000bABA00C000aa0BB00a0CA cb
  10.0                        0aaaaabbabbaaa0a00bcaAA00abAB0aaa00ABCbb0A0aaa0BBa0A000bcb
                             baaaaaaaabbbbbAAa00aA00ABB0abaaaaa0B0abba0AB00aAB00ABA0Aaba
                            cbaaaaaaaabbbbb00a000000ACAaabaA000ABB0baAbbAA0b00aaABA0aba0
                           bbbaabbaaaaaabcbaba000aa0aa00a0ABAAAaABA0AAcc0aaba0aaBB00acaB
                          ccbaabbbaaa00abbaaaa0a0000ab0AA000ABAab000A0A0bcbaaa0ACBaabb
   8.0                   cbcbabccbaaaaaaaabbaa000000aba0acbaa000a00BAAAAacc0A00ABCa
                        dcbbbbccbbaaaaaa00bba0000AAA00baacbA0baA000AA000BAaaAB0
                       gdcbabbbcbbaaabbb000a0000AAAAA0baA0aBC0a0000Aaba0BA00
                      dddccccccbccbaabcba0000000AAAAAA0aAAAAA000A00A0aA0
                     cccccccccccdcbabbbaAAAAAAAAAAAAB0000A00A0ACA0AB
   6.0              bcccbcdcccccdedcbaaa0BBBBAAAAAAA00AAA00AAAA0aB
                   Babcccddcddbbceeddcb0CEDBBAAAAAAA00ABBBBBBBA
                  00aaabcddcdcbbcefgeeb0CEDCAAAAAAA00aABBB
                 BA00aaabcdbbbabdfhihgc0BDDDCA0AA00A0a0
                AAAA00a0accaaa0bdghihgdaABDDCBA000A
   4.0         0AAAAAA0A0abba00bdeggffecb0BCCBB
              CAAABAAAAA0A00ABAbcdefggfedb0A
             BAAAAAAA0ABBAAABBA0adeefggf
            0AAAAAAAAAACBAAAA0000bdcc
           A0AABBAAAAABBBBBBA00AA
   2.0    BAAAAAAAAAABBBBBCCCBA
         AAAAAABBAAABCBBBB
        000AABBBBBBABBC
       0000AABBBBBC
       0000AAABB
   0.0 0000A
        |         |         |         |         |         |         |         |         |
       0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
```

```
1
 FIELD: TIME        INTERVAL BETWEEN SYMBOLS =   3.50
   -7.50     10.00     27.50     45.00     62.50     80.00     97.50    115.00    132.50    150.00
     |         |         |         |         |         |         |         |         |         |
     y x w v u t s r q p o n m l k j i h g f e d c b a 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y

 DATA FROM  20-JUL-86 14:20:26  TO  20-JUL-86 14:22:44    MIST    CP4/RP    BURGRE
 LEVEL:  1     0.20 KM.
       0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
        |         |         |         |         |         |         |         |         |
   18.0                                           wwwtssssspnnnnnnnjjjjjjjjeeeeeeeeee 00
                                                 wwwtssssspnnnnnnnjjjjjjj eeeeeeeeee0000
                                                wwwtssssonnnnnnkjjjjjjjieeeeeeeeee000000
                                               wwwtssssonnnnnnjjjjjjjjeeeeeeeeee 0000000
                                              wwwtssssonnnnnnjjjjjjjieeeeeeeee 000000000
   16.0                                      wwwtssssonnnnnkjjjjjjjeeeeeeeeee0000000000
                                            wwwtsssssnnnnnnjjjjjjjjeeeeeeeee0000000000
                                           wwwtssssqnnnnnnjjjjjjjeeeeeeeeee000000000  DD
                                           wwtssssspnnnnnljjjjjjieeeeeeeee000000000 DDDDD
                                          wwtssssspnnnnnkjjjjjjfeeeeeeee000000000 DDDDDDE
   14.0                                 wwwtssssonnnnmjjjjjjieeeeeeeea000000000DDDDDDEEE
                                        wwtssssonnnnmjjjjjjfeeeeeeeb000000000DDDDDDEEEEE
                                       wwtsssronnnnkjjjjjheeeeeeec000000000DDDDDDEEEEEE
                                      wwtsssronnnnnjjjjjifeeeeeee000000000DDDDDDEEEEEE II
                                     wwtsssqonnnljjjjjheeeeeeea000000000DDDDDEEEEEEEEIIIII
   12.0                             wwtsssqnnnnkjjjjjfeeeeeeb00000000CDDDDDEEEEEE IIIIIII
                                   wwtssspnnnnkjjjjheeeeeeeca0000000CDDDDDEEEEEEIIIIIIIII
                                  wwtssrpnnnmjjjjifeeeeeea0000000CDDDDDEEEEE IIIIIIIIIII
                                 wwtssronnnljjjjheeeeeeea0000000CDDDDDEEEEEIIIIIIIIIIIII
                                wwtssronnnkjjjifeeeeeb0000000CDDDDEEEEEEIIIIIIIIIIIII NN
   10.0                        wwtssqonnmjjjjheeeeeca000000CDDDDEEEEEIIIIIIIIIIIIIINNNNNN
                              wwtssqonnljjjifeeeeda000000CDDDDEEEEGIIIIIIIIIIIIINNNNNNNNN
                             wwtssqonnkjjjhfeeedb000000CDDDDEEEEHIIIIIIIIIIIIINNNNNNNNNNNN
                            wvtssponmkjjigeeeeba0000ACDDDDEEEFIIIIIIIIIIIINNNNNNNNNNNNNNN
                           wwtsrpnnljjjhfeeeca0000ACDDDDEEEHIIIIIIIIIIINNNNNNNNNNNNNNN
    8.0                   wwtsrpnnkjjigeeeda0000ACDDDEEEFIIIIIIIIIIINNNNNNNNNNNNNNN
                         wvtsronmkjjhfeedba000ACDDDEEEGIIIIIIIIIIMNNNNNNNNNNNNNN
                        wvtsqonlkjigeeeba000ACDDDEEFHIIIIIIIIJMNNNNNNNNNNNNN
                       wvtsqonljjhfeeca000ACDDDEEGIIIIIIIIKMNNNNNNNNNNNN
                      wvtsqomkjigeedba00BCDDDEFHIIIIIIIJMNNNNNNNNNNNN
    6.0              wvtsqomkjhfedba00BCDDDEGHIIIIIIKMNNNNNNNNNNNN
                    wvtspnljigeeca00BCDDEFGIIIIIIKMNNNNNNNNNNNN
                   wvtrpnljhfecb00BCDDEGHIIIIIKMMNNNNNNNNNN
                  wutrpmkigfdba0BCDDEGHIIIJKLMNNNNNNNNNN
                 wutromjhfdca0BCDEFHHIIJKLMNNNNNNNNN
    4.0         wvtroligeca0BCDEGHIIJKLMNNNNNNNN
               wvtqnkhfdb0BCDFGHIJKLMNNNNNNNN
              wusqmjgdb0BCEFHIJKLMNNNNNNN
             wusplifcaBDEGHJKLMMNNNNNN
            wusokgdaBDFGIKLMMNNNNN
    2.0    wtrnjeaBDFHJLLMNNNNN
          wtqmgbBEGJKLMNNNN
         wrojdBFIKLMNNNN
        vplfAFIKLNNN
        febCHKMNN
    0.0 ebELN
        |         |         |         |         |         |         |         |         |
       0.0       4.0       8.0      12.0      16.0      20.0      24.0      28.0      32.0
1
 processing finished
 stop
```