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PCGRIDDS32 FORWARD

Welcome to PCGRIDDS32, the Microsoft Windows 32-bit version of the original Personal Computer based Grided Interactive Display and Diagnostic System (PCGRIDDS). It is intended as a forecaster's tool for providing interactive access to high resolution meteorological information in support of domestic forecasting and international aviation using the Microsoft WINDOWS computer environment.

This release is a major step forward for the PCGRIDDS program. It offers 32-bit programming power to an already very capable and powerful system. PCGRIDDS32 retains the original PCGRIDDS look-and-feel while adding the ability to process much larger GRIB data sets, more flexible display capability and increased processing speed. There have been very few restrictions and numerous improvements over the 16-bit DOS version of PCGRIDDS and many others are in the plans. These differences are covered in the Introduction section of this document.

PCGRIDDS32 is an interim product to bridge the gap between the DOS and Windows environment. A future version will be a full MS Windows point-and-click GUI (WINGRIDDS?) and possibly a Linux version as well (LINGRIDDS?)

You are encouraged to explore the new capabilities of the software and your comments on the operation of the system and your suggested enhancements to the basic set of menu-mode display and product options are always welcome. The best way to learn about PCGRIDDS32 as a tool in addressing your forecasting problems is quite simply to try it.

Good luck and enjoy.

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**Introduction**

PCGRIDDS32, a 32-bit Personal Computer based GRidded Interactive Display and Diagnostic System, is a software package that allows the user to view meteorologically significant fields of gridded analysis and numerical weather prediction model output. The fields are displayed in either contour or vector format, whichever is appropriate for a particular field. This package also allows the user to extract a variety of information from meteorological diagnostic parameters computed from the gridded data fields.

The flexibility of PCGRIDDS32 allows the package to meet the needs of users with a wide range of skills and requirements. The novice can quickly learn to display a wide variety of predefined products using the PCGRIDDS32 Menu system. More advanced users can develop specialized products to meet their individual needs using the programmable PCGRIDDS32 Command language, including the creation of customized menu options to meet specific user needs.

This documentation guides users through installation and the basic concepts of operating PCGRIDDS32 through its menu system. It then proceeds with a discussion of topics useful for the more advanced user or system administrator. Additional ONLINE HELP is available while using PCGRIDDS32. All users should read the first four sections carefully:

A. Introduction  
B. Installation of PCGRIDDS32  
C. Sample PCGRIDDS32 Applications Session  
D. Using PCGRIDDS32

The remaining sections can be selected according to the user’s needs and interests.

---

**Before Installation**

**System Requirements and Preparation**

---

**Hardware Recommendations**

- **AMD Athlon/Intel PENTIUM processor or greater running MS Windows 95 or greater.**

- **VGA graphics adapter**  
  Microsoft Windows compatible VGA or better color monitor.

- **16MB or greater memory**  
  This amount of memory is the minimum required to run PCGRIDDS32. As with any Microsoft Windows installation, the more memory, the better.

- **PostScript printer**  
  As stated before, PCGRIDDS32 has no printing capability at this time. When it is included, it will use the default Windows printer. Any Ink or Laser printer will work. Dot matrix printers will not work.

---

**System Setup**

PCGRIDDS32 runs Microsoft Windows 95 or later. The system configuration necessary to run
PCGRIDDS32 is described in this section.

Networks

- **Installation**
  The PCGRIDDS32 software is designed for installation on a standalone PC.

- **Data**
  The data displayed within PCGRIDDS32 may be located on a network drive. The complete path (drive and directory) to the data must be specified in the file, USER\PCGMODE.DAT. Refer to ‘PCGRIDDS32 Configuration’ in section L (Customizing PCGRIDDS) for additional information.

--- Memory Requirements

PCGRIDDS32 requires a minimum of 3MB of memory. The ingest programs that convert data from GRIB to PCGRIDDS32 format require about 3MB each of memory. Check the available memory for running programs.

Installation of PCGRIDDS32

- **New Installation of PCGRIDDS32**

  Before you start the installation, read and check the following information.

  1. The PCGRIDDS32 software must be installed on a hard drive which is located on a standalone PC.

  2. If necessary, the installation will create the following directories: \PCGRIDDS32. If the directories already exist, it will write over any files in these directories. Before installation save any important files in these directories and remove the directories.

  3. The PCGRIDDS32 installation consists of unzipping a compressed file. This compressed file is a self-extracting executable file.

- **Internet Access to PCGRIDDS32 Software and Documentation**

  At this time, PCGRIDDS32 software and documentation is not available at the NWS web site or through FTP file transfer.
-- Install PCGRIDDS32 from your hard drive

Once the transfer of the PCGRIDDS32 files to your local system is complete, you can install PCGRIDDS32 from your hard drive.

1. Copy the PCGRIDDS32 installation ZIP file to a temporary directory of the hard drive you wish PCGRIDDS32 to execute from.

2. Uncompress the PCGRIDDS32 installation ZIP file with the Winzip or other ZIP file decompression program. Uncompress the files from the Root directory. The PCGRIDDS32 directory will be created as part of the unzip process.

3. Once the installation is complete, you may delete the PCGRIDDS32 installation ZIP file.

4. Change directory to \PCGRIDDS32. Find the P32.BAT file. With the mouse, highlight the file and drag the file to the desktop. Create a ‘Shortcut’ to the desktop for this file. Rename the icon from ‘P32’ to ‘PCGRIDDS32’. This way, you may do a quick-start of PCGRIDDS32 just by double-clicking the desktop icon. Feel free to choose an icon which pleases you.

NOTE: If the directory used for data displayed by PCGRIDDS is not stored in the directory C:\PCGRIDDS32\GRIDDATA directory, you MUST modify entry 2 in the file USER\PCGMODE.DAT. Refer to the section ‘PCGRIDDS32 Configuration’ or the internal documentation in the file for additional information.

Install PCGRIDDS32 Program Files from Compact Disk

The following procedure describes the installation of the PCGRIDDS32 software from compact disk (CD):

1. Place CD in your CD drive.

2. Uncompress the PCGRIDDS32 installation ZIP file with the Winzip or other ZIP file decompression program. Uncompress the files from the Root directory. The PCGRIDDS32 directory will be created as part of the unzip process.

3. Change directory to \PCGRIDDS32. Find the P32.BAT file. With the mouse, highlight the file and drag the file to the desktop. Create a ‘Shortcut’ to the desktop for this file. Rename the icon from ‘P32’ to ‘PCGRIDDS32’. This way, you may do a quick-start of PCGRIDDS32 just by double-clicking the desktop icon. Feel free to choose an icon which pleases you.

NOTE: If the data displayed by PCGRIDDS is not stored in the directory C:\PCGRIDDS32\GRIDDATA directory, you MUST modify entry 2 in the file USER\PCGMODE.DAT. Refer to the section ‘PCGRIDDS32 Configuration’ or the internal documentation in the file for additional information.
-- Directory Structure

Below is a diagram of the directory structure required to run PCGRIDDS32. All directories must be present in order to run PCGRIDDS32.

```
PCGRIDDS32 ── DATA
    ── ANIMATION
    ── GRIDDATA
    ── HELP
    ── MACROS
    ── MAPFIL
    ── PRTFIL
    ── USER
    ── BATCH
    ── GRIB
      ── NWS
      ── MOS
      ── USER
      ── WAFS
        ── OCTANTI
        ── OCTANTJ
        ── OCTANTK
        ── OCTANTL
        ── OCTANTM
        ── OCTANTN
        ── OCTANTO
        ── OCTANTP
```

PCGRIDDS32  The main PCGRIDDS32 directory contains the temporary and status files written by PCGRIDDS32 and the program files used to run the PCGRIDDS32 system.
Your system administrator may modify the .PCG file to meet the needs of your environment. If an error occurs during the execution of PCGRIDDS32, files, such as M.OUT, GRIB2PCG32.OUT and NGRB2PCG32.OUT may provide information about the source of the problem.

GRIDDATA  The GRIDDATA directory is the default directory where the gridded meteorological data are stored.
Gridded data files can be added or deleted.

MACROS  The MACROS directory contains the currently active command files (xxxx.CMD) used to display PCGRIDDS products, the text file for the 'Product Category' menu (CMDMENU.LST), and the text files for the 'Product List' menus (CMDMENU.##).
PCGRIDDS32 is delivered with a default set of macros. You are encouraged to develop customized command files and menus to meet the special requirements of your environment (refer to 'Defining Products').

HELP  The HELP directory contains files used to supply ONLINE HELP for PCGRIDDS32.
PCGRIDDS32 is delivered with a default set of HELP files. If any customized macros are added to a 'Product List' menu, it is strongly recommended that a corresponding HELP file should also be added to the HELP directory.
USER

The USER directory contains files that control defaults for and the appearance of product displays, menu displays, and printed output. Other files provide PCGRIDDSS with information about your computing environment.

These files can be modified to meet your requirements (refer to ‘Customizing PCGRIDDSS32’).

DATA

The DATA directory contains supporting data files used by PCGRIDDSS32 to display items such as forms, messages, and maps. This directory does not contain gridded data files.

The contents of these files are crucial to the operation of PCGRIDDSS32 and should be modified only by the system administrator.

ANIMATION

The ANIMATION directory contains all of the file which are created and used every time an animation command is executed within PCGRIDDSS32.

PRTFIL

The PRTFIL directory contains files used for printing. Files with the extension .SVG contain products saved by the user for printing and restoring to the screen.

The files, !A.SVG and A.SVG, are dummy files used by PCGRIDDSS32 and should not be deleted. Files that begin with ‘!’ are used for delayed printing and should be managed through PCGRIDDSS32. All other .SVG files may be deleted by the user when they are no longer needed.

MAPFIL

In order to display a map on the screen, PCGRIDDSS32 must transform latitude/longitude based line segment coordinates (found, for example, in the file C:\PCGRIDDSS32\DATA\WORLD.MAP) to the current map projection on the screen. This is a time consuming process. To increase the efficiency of PCGRIDDSS32, display maps can be saved. The MAPFIL directory contains the saved display maps (QCONTMP.###, QCONLTLN.###) and the list (MAP.LST) of and index (MAP.IDX) to the names of the saved display maps.

Your system administrator can save frequently accessed display maps by using the SVMP command. Files in this directory are controlled by PCGRIDDSS32 and should not be modified by any user.

BATCH

The BATCH directory contains batch files that control printing, and setting system files for PCGRIDDSS32.

These files are crucial to the operation of PCGRIDDSS32 and its applications. The system administrator can modify the files SAVGRI, AUTOIN, FTPGRI, PRINTPS, PRINTDL, and PRINTHP (refer to ‘Customizing the Ingest Process’ and ‘Batch Files for Printing’). Except for translation, the remaining files should not be modified.

GRIB

The GRIB directory contains files that control the selection and processing of GRIB data that is converted to PCGRIDDSS32 format. Within it are located the sub-directories NWS, WAWS and USER. Under the WAWS directory are a subdirectory for each WAWS Octant, I-P.

Files in this directory are crucial to the operation of the ingest process and should not be modified by any user.

NWS

Non-WAWS GRIB data files that will be converted to PCGRIDDSS32 format are stored in the C:\PCGRIDDSS32\GRIB\NWS directory.

At this time, files in this directory are provided by the user using other transfer methods separate from PCGRIDDSS32.
MOS  Non-WAFS MOS GRIB data files that will be converted to PCGRIDDS32 format are stored in the C:\PCGRIDDS32\GRIB\MOS directory.

At this time, files in this directory are provided by the user using other transfer methods separate from PCGRIDDS32.

WAFS  WAFS GRIB data files that will be converted to PCGRIDDS32 format are stored in the C:\PCGRIDDS32\GRIB\WAFT\OCTANT* directory where the '*' stands for the Octant letter it represents. The user should place all 'J' Octant GRIB files in the C:\PCGRIDDS32\GRIB\WAFT\OCTANTJ directory and so on.

At this time, files in this directory are provided by the user using other transfer methods separate from PCGRIDDS32.

USER  The USER directory contains files that control the menu displays, options, and processes related to the conversion of data from GRIB to PCGRIDDS format.

These files can be modified by the system administrator to meet your requirements (refer to ‘Customizing the Ingest Process’).
PCGRIDDS to PCGRIDDS32 Differences

This is PCGRIDDS32, a Microsoft Windows 32-bit implementation of the DOS-based PCGRIDDS written by Dr. Ralph Petersen and Jackie Lord. Dr. Petersen was gracious enough to give me the code and allow me to create PCGRIDDS32. PCGRIDDS32 is a 32-bit program, however, it is not a full Windows, ‘point-and-click’ GUI program. The Windows GUI version is in the planning (WINGRIDDS) and is several years away. PCGRIDDS32 is an intermediate step to the Win-GUI final product. With that in mind, there have been a few features in the DOS PCGRIDDS that I have had to remove or have not been able to implement. They are:

1. Access to the DOS prompt – Now that PCGRIDDS32 is in a Windows environment, there is no need to call DOS from within PCGRIDDS32. Now, when PCGRIDDS32 is executing, just ALT-TAB to switch to the Windows environment to go to explorer, the Command Prompt or any other program. PCGRIDDS32 is still active on the Task Bar.
2. Forms – PCGRIDDS had a utility to modify the layout and color of forms used in the program. In PCGRIDDS32, the forms are fixed in their layout and color and can not be modified.

I have tried to make PCGRIDDS32 a faithful copy of PCGRIDDS in the look-and-feel, however, there was one function which had to be implemented in a different way. That is:

1. ESC Key – The ESC key was used in PCGRIDDS while in the Menu Mode to back out of menus or cancel menu operations. In PCGRIDDS32, the F12 Function key has replaced the ESC. PCGRIDDS32 is running in a special “Standard Graphics/Fullscreen” graphics mode so the program takes up the whole screen area with no Windows-style border. If the ESC key is pressed, the program is shifted from the Fullscreen mode to the “Standard Graphics/Quickwin” mode that shows the Windows-style border around the perimeter of the screen. If in Quickwin mode, the way to return to Fullscreen mode is to depress ALT-Enter. PCGRIDDS32 will run fine in Quickwin mode however, the PCGRIDDS32 screen area in Quickwin mode is shifted down the height of the border across the top and the bottom area is lost that amount plus the thickness of the border across the bottom of the screen. That means the color bar information is lost as well as the green information bar in the Menu mode.

***** NOTICE ***** The mouse is visible in PCGRIDDS32 but is never used so it is recommended just move it to the side of the screen, out of the way. If one of the mouse buttons is depressed while PCGRIDDS32 is running, it will have the same effects as pressing the ESC key mentioned above. However, the mouse button/ESC key issue does have one useful function. If PCGRIDDS32 should ever hang execution and will not respond to normal keyboard entry, pressing the ESC key or mouse button should kick PCGRIDDS32 into the Quickwin mode revealing the “X” in the upper right corner. Clicking this with the mouse will kill the execution of PCGRIDDS32.
Enough of the bad stuff. Here is a rundown of all the improvements:

1. Screen Resolution – PCGRIDDS32 will operate at whatever screen resolution Windows is running in when PCGRIDDS32 is started. If you should change the screen resolution while PCGRIDDS32 is running, it will stay at the previous setting until PCGRIDDS32 is terminated and restarted. FYI – PCGRIDDS32 looks ‘fine’ in 1280x1024!!

2. MAPTYPE.DAT – This file is now obsolete and is no longer needed for PCGRIDDS32 to open and display PCG files. NGRB2PCG32 includes a copy of the GRIB GDS (Grid Description Section) and calculates grid projection from that data.

3. Mercator Grids – PCGRIDDS32 now is able to handle Mercator grid projections.

4. Map Background - The geopolitical map background display method has been improved. When you open a new PCG file, the map is created then and stored as a Bit-mapped file for use whenever a parameter is plotted on the screen. Speed is improved dramatically – especially on slower machines.

This is also true for the TIME and CROSS Sections. When an area is selected, the background is pre-drawn and stored so the numerous commands previously needed to draw that background every time you wish to plot a parameter is no longer needed. The background is automatically drawn.

5. PCGRIDDS32 is Y2K enabled

6. There is no more WAFS or NWS mode of PCGRIDDS32. That was implemented in PCGRIDDS to handle the ingesting of WAFS or NWS GRIB files in the same directory (Grib/Final). With the rewriting of NGRB2PCG32 for NWS GRIB and GRIB2PCG32 for WAFS GRIB, they handle their files in separate directories (Grib/NWS for NGRB2PCG32 and Grib/WAFS/* for GRIB2PCG32). The NWS and WAFS GRIB ingest menu has been combined into one menu. Within the Grib/WAFS directory, there are eight subdirectories; one for each octant you wish to ingest. The WAFS GRIB ingestion process has been simplified. All preprocessing has been incorporated into GRIB2PCG32 so all that is needed is to select the global area you wish to ingest then convert the GRIB files to the PCGRIDDS32 file. Both the NWS and WAFS ingest process will select and ingest all the parameters and all the times of the files you download. The selection options that were in PCGRIDDS has been removed.

7. Thickness (THCK) as well as Thermal Wind (TWND) are no longer fixed to 1000 – 500 mb layers. THCK and TWND will now calculate using whatever the PCGRIDDS32 Layers are set to.

Any new diagnostic commands are covered in the Release Notes and in the ‘Diagnostic Functions’ section of the manual.
This will explain the program GRIB2PCG32 in reference to the DOS version, GRIB2PCG and list the changes and improvements to the program.

GRIB2PCG32 is the GRIB file ingest utility for PCGRIDDS32. The DOS version, GRIB2PCG had several drawbacks that were:

1. Limited GRIB file size ingest capability.
2. Limited PCGRIDDS file size (1499 records).
3. 8.3 DOS file name restriction on GRIB file and PCGRIDDS file.
4. Required entering grid parameters into MAPTYPE.DAT and GRIBSPEC.DAT files.
5. Required a separate pre-processing be done to inventory the GRIB files.
6. Required the GRIB file names be listed in GRIBCOPY.DAT before NGRB2PCG could ingest them.

In GRIB2PCG32, all of these limitations were removed. GRIB2PCG32 has these capabilities and improvements;

1. GRIB2PCG will create a PCGRIDDS32 file of up to 1,000,000 records or the 4 Gb OS limit...whichever comes first!
2. GRIB file names can be up to 80 characters long.
3. The PCGRIDDS32 file name convention has been changed. For example, the DOS version created a PCGRIDDS file with the name AVN06JAN.12Z that showed January, 6, 12Z model run of the AVN without showing any information concerning which octants were ingested. With GRIB2PCG32, the convention is now JA060312.AVN* where the characters to the right of the '.' show the three letter name of the model run and all octants included in the ingest such as JA060312.AVN-IJKLMNOP. The 'AVN' is obtained from the file GRIBMODL.DAT and the grid number is obtained from the new file GRID.DAT which associates the grid number with a unique alphanumeric character similar to what was done in GRIBSPEC.DAT however, no GRIB parameters are required now (see below).
4. MAPTYPE.DAT and GRIBSPEC.DAT are now obsolete and are not needed/included in GRIB2PCG32 or PCGRIDDS32. All grid information is obtained from the GRIB GDS (Grid Description Section).
5. GRIB2PCG32 now gets the GRIB file name information directly through OS System Calls and the batch file 'front-end' where a DIR command was called to build GRIBCOPY.DAT is no longer needed. GRIB2PCG32 can be executed directly.
6. GRIB2PCG32 is Y2K enabled and is designed to incorporate the upcoming GRIB II standard.
7. GRIB2PCG is faster than the DOS version.

GRIB2PCG32 generated files are not compatible with the DOS version and cannot be displayed on the DOS PCGRIDDS.
NGRB2PCG to NGRB2PCG32 Differences

This will explain the program NGRB2PCG32 in reference to the DOS version, NGRB2PCG and list the changes and improvements to the program.

NGRB2PCG32 is the GRIB file ingest utility for PCGRIDDS32. The DOS version, NGRB2PCG had several drawbacks that were:

7. Limited GRIB file size ingest capability.
8. Limited PCGRIDDS file size (1499 records).
9. 8.3 DOS file name restriction on GRIB file and PCGRIDDS file.
10. Required entering grid parameters into MAPTYPE.DAT and GRIBSPEC.DAT files.
11. No Mercator projection capability.
12. Required the GRIB file names be listed in GRIBCOPY.DAT before NGRB2PCG could ingest them.
13. Had a bug where Lat/Lon grids were shifted 90 degrees to the east.

In NGRB2PCG32, all of these limitations were removed. NGRB2PCG32 has these capabilities and improvements;

8. Ingest GRIB size of up to 2,500,000 grid points. The largest grid in NWS inventory is 1,509,285 points (AWIP Grid #227 5km Lambert over US).
9. NGRB2PCG will create a PCGRIDDS32 file of up to 1,000,000 records or the 4 Gb OS limit…whichever comes first!
10. GRIB file names can be up to 80 characters long.
11. The PCGRIDDS32 file name convention has been changed. For example, the DOS version created a PCGRIDDS file with the name AU050100.AV3 that showed August 5, 2001, 00Z model run of the AVN on grid# 003. With NGRB2PCG32, the convention is now AU050100.AVN003 where the six characters to the right of the ‘.’ show the three letter name of the model run and the three digit grid number. The ‘AVN’ is obtained from the file GRIBMODL.DAT and the grid number is obtained from the new file GRID.DAT which associates the grid number with a unique alphanumeric character similar to what was done in GRIBSPEC.DAT however, no GRIB parameters are required now (see below).
12. MAPTYPE.DAT and GRIBSPEC.DAT are now obsolete and are not needed/included in NGRB2PCG32 or PCGRIDDS32. All grid information is obtained from the GRIB GDS (Grid Description Section).
13. NGRB2PCG32 can now ingest Lat/Lon, Mercator, Polar Stereographic and Lambert grid projections.
14. NGRB2PCG32 now gets the GRIB file name information directly through OS System Calls and the batch file 'front-end' where a DIR command was called to build GRIBCOPY.DAT is no longer needed. NGRB2PCG32 can be executed directly.
15. NGRB2PCG32 is Y2K enabled and is designed to incorporate the upcoming GRIB II standard.
16. NGRB2PCG is faster than the DOS version.

NGRB2PCG32 generated files are not compatible with the DOS version and cannot be displayed on the DOS PCGRIDDSS.
PCGRIDDS32 Applications

-- Display the PCGRIDDS32 Applications menu (Fig.21).

1. **Type:**  `CD \PCGRIDDS32`
   Changes to the PCGRIDDS32 directory.

2. **Press:**  `[P32][Enter]`
   Displays the ‘PCGRIDDS32 Applications’ menu.

---

### Fig.21

<table>
<thead>
<tr>
<th>PCGRIDDS32 Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ingest GRIB Data</td>
</tr>
<tr>
<td>2. Run PCGRIDDS32</td>
</tr>
<tr>
<td>X. Exit to DOS</td>
</tr>
</tbody>
</table>

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Your choice? (1-2 or X to exit)

---

-- Menu options

1. **Ingest GRIB Data**
   Convert data in GRIB format to a form that PCGRIDDS32 can read (refer to ‘Ingesting GRIB Data’).

2. **Run PCGRIDDS32**
   Begin a PCGRIDDS32 session (refer to ‘Using PCGRIDDS32’).

X. **Exit PCGRIDDS32**
   Return to Windows after completing a PCGRIDDS32 session or applications.
Ingesting GRIB Data

As the name implies, PCGRIDDSS32 works off of GRIB model data. However, PCGRIDDSS32 cannot work with the GRIB data directly. It must convert the GRIB data to PCGRIDDSS32 rapid-access format before any data can be displayed. This process is referred to as ingesting GRIB data and this is where the GRIB ingest utilities are used. The use of these utilities will be covered in separate sections below.

Due to changes in the directory structure of the NCEP/NWS FTP Servers, PCGRIDDSS32 can no longer transfer GRIB files from the NWS to the PCGRIDDSS32 host PC. The user must do this function manually using other, third-party FTP applications. This may be fixed in future versions.

The PCGRIDDSS-format files created with these new GRIB ingest utilities are not compatible with the DOS versions. A new version, PCG Version 2, has been created to allow for larger data sets as well as including the Grid Navigation information so the files MAPTYPE.DAT and GRIDTYPE.DAT are no longer needed in association with these new files. However, if you still wish to display the older, PCG Version 1 (DOS) versions of PCG files, due to the lack of grid navigation information embedded within the file, the MAPTYPE.DAT file from the DOS PCGRIDDSS program which created those files will have to be copied to \PCGRIDDSS32\DATA directory so PCGRIDDSS32 may obtain the grid navigation information and display the Version 1 files correctly.

The PCG Version 2 files have a different naming convention from PCG Version 1 files. The Version 1 files had a name format such as for WAFS: WAF27APR.00Z where:

- WAF - WAFS grid
- 27 - Day of the month
- APR - Month
- 00Z - Hour of Model run

or for NWS-type files: JN089500.E48 where:

- JN - Month
- 08 - Day of the month
- 95 - Year
- 00 - Hour of Model run
- E48 - Three alphanumeric representation for grid projection from MAPTYPE.DAT file.

The PCG Version 2 files have a different, and much more descriptive naming convention. WAFS, NWS and NWS MOS files still have their differences. A WAFS file would have a name such as: MAR150312.AVN-JKLI where:

- MAR - Month
- 15 - Day of month
- 03 - Year (last two digits)
- 12 - Hour of Model run
- AVN - 3-letter Model name
- JKLI - Octants included in GRIB ingest
Or for NWS-type files: NOV070312.ETA211 where:

NOV - Month
07 - Day of the Month
03 - Year (last two digits)
12 - Hour of Model run
ETA - 3-letter Model name
211 - Grid Projection Number

Or for NWS MOS-type files: NOV070312.ETAMOS211 where:

NOV - Month
07 - Day of the Month
03 - Year (last two digits)
12 - Hour of Model run
ETA - 3-letter Model name
MOS - Signifying MOS-type data
211 - Grid Projection Number

-- Types of GRIB data
Several types of GRIB data are available to the PCGRIDDS32 user: WAFS (global data), NWS and NWS - MOS. Because the data are structured differently, the ingest procedures for the data types are different. The selected ingest procedure which is displayed in the title of the ‘Ingest GRIB Data’ menu must match the data type that is ingested.

WAFS
Data for global grids (WAFS data) are subdivided into octets (I,J,K,L,M,N,O,P). This data must be preprocessed to create an inventory and list of model runs available for conversion from GRIB to PCGRIDDS32 format. Only one model run may be converted to PCGRIDDS32 format in a single ingest session. WAFS GRIB data is preprocessed and converted to PCGRIDDS32 format using the utility GRIB2PCG32.EXE. If any problems or errors occur while using GRIB2PCG32, please refer to the file GRIB2PCG32.OUT.

NWS
Data for the entire grid are stored together as a single group in NWS GRIB data files. No pre-processing of NWS GRIB data is necessary before the data are converted to PCGRIDDS32 format. Multiple model runs may be converted from GRIB to PCGRIDDS32 format in a single ingest session. The conversion utility is called NGRB2PCG32.EXE. If any problems or errors occur while using NGRB2PCG32, please refer to the file NGRB2PCG32.OUT.

MOS
Data for the entire grid are stored together as a single group in MOS GRIB data files. No pre-processing of MOS GRIB data is necessary before the data are converted to PCGRIDDS32 format. However, the data parameters for a MOS file are different than a NWS file so a different ingest utility is required. Where the GRIBPARM.DAT file is used in the NWS ingest process, a new file, MOSGRIBPARM.DAT is required to process MOS GRIB files. Multiple model runs may be converted from GRIB to PCGRIDDS32 format in a single ingest session. The conversion utility is called NMOSGRB2PCG32.EXE. If any
problems or errors occur while using NMOSGRB2PCG32, please refer to the file NMOSGRB2PCG32.OUT.

-- Selecting the method used to process GRIB data

The procedure used to convert GRIB data to PCGRIDDS32 format differs for NWS, NWS-MOS and WAFS data. The selected procedure **MUST** match the type of GRIB data that you process. When ingesting and converting GRIB files to PCG files, when using NWS GRIB, the user must use the **INGEST NWS** menu selections and vice-versa for **WAFS**.
WAHS GRIB Data Ingest

The following steps show you how to manually convert WAFS data encoded using a GRidded Binary format (GRIB) to PCGRIDDS32 format. The instructions assume you are using the sample WAFS data set provided with the program. After you have completed the example, read the documentation in detail to get a better understanding of the software and to answer your questions.

WAHS GRIB data can be ingested in a manual mode or automatic mode. The following instructions show the steps for manual WAHS GRIB ingest. At the end of these instructions, the automatic method is explained.

-- Starting the manual ingest process

Use the following steps to display the ‘Ingest WAHS GRIB Data’ menu. Selecting options from this menu prepares your GRIB data for ingest and begins the ingest process.

1. From the desktop, double-click the icon PCGRIDDS32
   The ‘PCGRIDDS32 Applications’ menu is displayed on the screen (Fig.1).

2. Type: 1
   Selects choice #1 (Ingest GRIB Data) from the Applications menu. Displays the ‘Ingest GRIB Data’ menu (Fig.15).

   ![Fig.15]

   ┌─────────────────────────────────────────────────────────────┐
   │ │
   │ ╔═══════════════════════════════════════════════════════╗
   │ │
   │ │ Save GRIB Data
   │ │ 1. Save GRIB Data
   │ │
   │ │ Ingest WAHS GRIB Data
   │ │ 2. Delete WAHS GRIB Data
   │ │ 3. Select WAHS area for Gridded Data Set
   │ │ 4. Convert WAHS GRIB Data to PCGRIDDS32 Format
   │ │
   │ │ Ingest NWS GRIB Data
   │ │ 5. Delete NWS GRIB Data
   │ │ 6. Interpolate GRIB to new Grid Projection
   │ │ 7. Convert NWS GRIB Data to PCGRIDDS32 Format
   │ │ 8. Convert MOS GRIB Data to PCGRIDDS32 Format
   │ │ X. Return to Main Menu
   │ │
   │ │ Your Choice? (1-8 or X to Return)
   │ │
   │ └─────────────────────────────────────────────────────────────┘

-- Save GRIB Data

Use the following optional steps to archive GRIB data files from previous forecasts, if desired, before you acquire new data:

1. Type: 1
Selects choice #1 (Save GRIB Data) from the ‘Ingest WAFS GRIB Data’ menu.

2. Type the directory where you want the GRIB data saved.
   You must specify the complete path of an empty directory. Press [ESC] if you want to stop the copy process at this point.

3. Press: [Enter]
   Begins the copy process.

   If the directory you specify does not exist, you are given an option to create the directory. Press [Y] to create the directory or [N] to quit the copy process.

   If the directory you specify is not empty, you are given an option to delete all the files in the directory. Press [Y] to delete the files or [N] to quit the copy process.

If the default copy procedure does not meet the needs of your environment, your system administrator can modify the batch file C:\PCGRIDDS32\BATCH\SAVGRIB.BAT (refer to ‘Customizing the WAFS Ingest Process’).

-- Delete GRIB Data
GRIB data from the previous forecast cycle should be deleted before you acquire GRIB data for a new forecast cycle. This will avoid mixing data from different model forecasts and speed up the conversion to PCGRIDDS32 format because the programs that perform these conversions may process files for ALL the forecast model dates that are present.

To delete GRIB data, type: 2
   Selects choice #2 (Delete GRIB Data) from the ‘Ingest WAFS GRIB Data’ menu.

   You are asked to verify that you want to delete all the files in the GRIB/WAFS/* directory. Press [Y] to begin deleting files. Press [N] to stop the deletion process.

-- Converting WAFS Data from GRIB to PCGRIDDS32 format
An important step must be taken to describe the area included in the PCGRIDDS32 data set and begin the conversion. You can perform this action by selecting one or more of the following entries from the ‘Ingest WAFS GRIB Data’ menu.

3. Select area for gridded data set.
4. Convert GRIB data to PCGRIDDS32 format.

   Steps 3 & 4 are required the first time you convert GRIB data to PCGRIDDS32 format. The values you set are saved for subsequent conversions. If you use the same parameters for future conversions, only step 4 (Convert GRIB data to PCGRIDDS32 format) is required. To change parameters, select only the options you want revised. The remaining parameters are defined from the values saved from the previous conversion. These conversion steps are described in the following sections. A summary of the conversion process is contained in the file GRIB2PCG32.OUT.
If you initially decide to convert part of your GRIB data to PCGRIDDS32 format, you may convert additional data at a later time.

As long as the new GRIB data you select covers the same area and was produced from the same model run as the initial data, the ingest program adds new variables to the existing file without reprocessing or overwriting the variables currently in the file.

If you select a new area but the GRIB data are from the same model run, then the ingest program produces a new file with the same name, but modifies the last letter of the extension. For example, if the initial PCGRIDDS32 file is WAF28APR.00Z, the next files are named WAF28APR.00Y, WAF28APR.00X (up to a total of 10 files).

If the GRIB data are from a different model run, then a new PCGRIDDS32 file is produced and named according to the model run. For example, if the last file produced is WAF28APR.00Z, then the first file from the next model run is named WAF28APR.12Z.

-- Select Area for Gridded Data Set
The surface of the earth is divided into eight areas (octants) identified by the labels I,J,K,L,M,N,O,P. You must specify the area that is covered by the gridded data set you are creating from the GRIB data. If you do not select a new area, then the area you selected for the last gridded data set is used. Only those GRIB data octants within the selected area are included in the PCGRIDDS32 data set.

The menu displayed on the screen lists the areas available for the conversion process. The required octants are listed for each entry. GRIB data for all octants required by the selected area must be placed in the GRIB/WAFS/OCTANT* directory where the "*" denotes the Octant letter. If any required octants are missing for a field, GRIB data for that field will not be converted to PCGRIDDS32 format.

The location of each octant is described below:

<table>
<thead>
<tr>
<th>Octant</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0-90N</td>
<td>30W-60E</td>
</tr>
<tr>
<td>J</td>
<td>0-90N</td>
<td>60E-150E</td>
</tr>
<tr>
<td>K</td>
<td>0-90N</td>
<td>150E-120W</td>
</tr>
<tr>
<td>L</td>
<td>0-90N</td>
<td>120W-30W</td>
</tr>
<tr>
<td>M</td>
<td>0-90S</td>
<td>30W-60E</td>
</tr>
<tr>
<td>N</td>
<td>0-90S</td>
<td>60E-150E</td>
</tr>
<tr>
<td>O</td>
<td>0-90S</td>
<td>150E-120W</td>
</tr>
<tr>
<td>P</td>
<td>0-90S</td>
<td>120W-30W</td>
</tr>
</tbody>
</table>
Use the following steps to select an area for the gridded data set:

1. Type: 3
   Selects choice #3 (Select WAFS Area for Gridded Data Set) from the ‘Ingest WAFS GRIB Data’ menu. Displays a menu listing the available areas. A sample menu is shown in Fig.17. Your system administrator can modify this menu to meet the needs of your environment (refer to ‘Customizing the WAFS Ingest Process’).

2. Select an area.
   **To select an entry with the highlight**
   Position the highlight to the desired choice and press [Enter].
   
   **To select an entry by letter**
   Each line of the menu begins with a label (A.1, B.1, etc.) where the letter indicates the sequence of the line on the current page and the number shows the current menu page number. For example, C.1 refers to line 3 on the first page of the menu. You may select an entry on the current page by typing the letter of that entry.

**Fig.17**

The information contained in the Select Area for Gridded Data Set is explained in the ‘Customizing WAFS GRIB Ingest’ in the Customizing the PCGRIDD32 System section.
-- Convert WAFS GRIB Data to PCGRIDDS32 Format

After your GRIB data are stored in the GRIB\WAFS/Octant* directories, you are ready to preprocess the GRIB data to produce an inventory and list of model runs to be included in the gridded data set and convert your GRIB data to PCGRIDDS32 format. The WAFS GRIB preprocessing used to be a separate utility in PCGRIDDSS. In PCGRIDDS32, that function has been incorporated within the GRIB2PCG32 ingest utility.

Use the following steps to proceed with the conversion process:

1. Type: 4
   Selects choice #4 (Convert WAFS GRIB data to PCGRIDDS32 Format) from the ‘Ingest WAFS GRIB Data’ menu. GRIB data are preprocessed and inventoried before they are converted to PCGRIDDS32 format. This procedure may require a significant amount of time if you are processing a large quantity of data. Control returns to the ‘Ingest WAFS GRIB Data’ menu when the conversion process is completed. The data are now ready to be used in a PCGRIDDS32 session.

After the conversion is complete, the data files in PCGRIDDS32 format are placed in the directory, C:\PCGRIDDS32\GRIDDATA, and are available for display by PCGRIDDS32 (refer to ‘Sample PCGRIDDS Applications Session’).

Note: All GRIB files are left unchanged after the PCGRIDDS32 file is created.

Once the WAFS GRIB ingest is complete,

4. Type: X
   Selects choice #X (Return to Main Menu). Returns to the ‘PCGRIDDS32 Applications’ menu. You can now type 2 to begin a PCGRIDDS32 session and use the data set you created or you can type X to exit.

--Starting the automatic ingest process

The WAFS GRIB ingest process can be performed through a batch file for automatic execution. Within the batch file, GRIB2PCG32.EXE routine can be called from the command line with an Octets definition file listed in \PCGRIDDS32\GRIB as a command argument. See the example below:

GRIB2PCG32 OCTETS.PL2

This command string will execute the GRIB2PCG32 utility and it will ingest octets P & L.
**NWS GRIB Data Ingest**

The following steps show you how to convert NWS data encoded using a GRidded Binary format (GRIB) to PCGRIDDS32 format. The instructions assume you are using the sample NWS data set provided. After you have completed the example, read the documentation in detail to get a better understanding of the software and to answer your questions.

**Sample data set contents**

The sample NWS data set contains:

ETC model fields (24 hour forecast)

**Start a session.**

1. **Type:** `CD \PCGRIDDS32`
   
   Changes to the PCGRIDDS32 directory.

2. **Press:** `[P32][Enter]`
   
   Displays the ‘PCGRIDDS32 Applications’ menu.

3. **Type:** `1`
   
   Selects choice #1 (Ingest GRIB Data) from the Applications menu. Displays the ‘Ingest GRIB Data’ menu (Fig.15).

**Fig.15**

<table>
<thead>
<tr>
<th>Save GRIB Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Save GRIB Data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingest WAFS GRIB Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Delete WAFS GRIB Data</td>
</tr>
<tr>
<td>3. Select WAFS area for Gridded Data Set</td>
</tr>
<tr>
<td>4. Convert WAFS GRIB Data to PCGRIDDS32 Format</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingest NWS GRIB Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Delete NWS GRIB Data</td>
</tr>
<tr>
<td>6. Interpolate GRIB to new Grid Projection</td>
</tr>
<tr>
<td>7. Convert NWS GRIB Data to PCGRIDDS32 Format</td>
</tr>
<tr>
<td>8. Convert MOS GRIB Data to PCGRIDDS32 Format</td>
</tr>
<tr>
<td>X. Return to Main Menu</td>
</tr>
</tbody>
</table>

Your Choice? (1-8 or X to Return)
Save GRIB Data
Use the following optional steps to archive Final GRIB data files from previous forecasts, if desired, before you acquire new data:

1. Type: 2
   Selects choice #2 (Save GRIB Data) from the ‘Ingest NWS GRIB Data’ menu.

2. Type the directory where you want the GRIB data saved.
   You must specify the complete path of an empty directory. Press [ESC] if you want to stop the copy process at this point.

3. Press: [Enter]
   Begins the copy process.

If the directory you specify does not exist, you are given an option to create the directory. Press [Y] to create the directory or [N] to quit the copy process.

If the directory you specify is not empty, you are given an option to delete all the files in the directory. Press [Y] to delete the files or [N] to quit the copy process.

If the default copy procedure does not meet the needs of your environment, your system administrator can modify the batch file C:\PCGRIDDS32\BATCH\SAVGRIB.BAT (refer to ‘Customizing the NWS Ingest Process’).

Delete existing GRIB data.
Use the following optional steps to delete Final GRIB data files from previous forecasts, if desired, before you acquire new data:

1. Type: 5
   Selects choice #5 (Delete Existing NWS GRIB Data).

2. Type: Y
   Answers ‘yes’ when asked if you want to delete all the files in the GRIB\NWS directory. Type N if you want to exit this process without deleting files.

3. Press: [Enter]
   Clears the screen and returns to the ‘Ingest NWS GRIB Data’ menu.

Function #6 is reserved for future expansion.
Convert NWS GRIB data to PCGRIDDS32 format.

1. **Type:** 7
   Selects choice #7 (Convert NWS GRIB data to PCGRIDDS32 Format). Converts NWS GRIB data to PCGRIDDS32 format and places the data in the `PCGRIDDS32\GRIDDATA` directory. This procedure may require a significant amount of time if you are processing a large quantity of data. Returns to the ‘Ingest NWS GRIB Data’ menu when the conversion process is completed. The data are now ready to be used in a PCGRIDDS32 session (refer to ‘Sample PCGRIDDS32 Applications Session (NWS)’).

2. **Type:** X
   Selects choice #X (Return to Main Menu). Returns to the ‘PCGRIDDS32 Applications’ menu. You can now type 2 to begin a PCGRIDDS32 session and use the data set you created or you can type X to exit to Windows.

Convert MOS GRIB data to PCGRIDDS32 format.

1. **Type:** 8
   Selects choice #8 (Convert MOS GRIB data to PCGRIDDS32 Format). Converts MOS GRIB data to PCGRIDDS32 format and places the data in the `PCGRIDDS32\GRIDDATA` directory. This procedure may require a significant amount of time if you are processing a large quantity of data. Returns to the ‘Ingest NWS GRIB Data’ menu when the conversion process is completed. The data are now ready to be used in a PCGRIDDS32 session (refer to ‘Sample PCGRIDDS32 Applications Session (NWS)’).

2. **Type:** X
   Selects choice #X (Return to Main Menu). Returns to the ‘PCGRIDDS32 Applications’ menu. You can now type 2 to begin a PCGRIDDS32 session and use the data set you created or you can type X to exit to Windows.
Using PCGRIDDS32

This section provides background information on PCGRIDDS32, including detailed descriptions of how to use many options available when working in the Menu Mode. It should be noted, there is no longer a WAFS version and NWS version of PCGRIDDS32 modes. PCGRIDDS32 now processes and displays WAFS as well as NWS interchangeably. Therefore, there is no need to switch back and forth as was the case in DOS PCGRIDDS.

-- Modes of Operation

PCGRIDDS32 has three modes of operation.

**Menu Mode**  
In *Menu Mode* you perform tasks such as displaying products, retrieving data, and modifying parameters by *selecting* choices from *predefined* options.

**Command Mode**  
In *Command Mode* you display fields and the full variety of diagnostic calculations by *entering* PCGRIDDS32 commands directly from the keyboard.

**Automatic Mode**  
In *Automatic Mode* you display fields and the full variety of diagnostic calculations by starting PCGRIDDS32, loading up to 20 data files and executing a single command macro from a batch file.

During the execution of PCGRIDDS32, you can switch between the two operating modes. To switch from *Menu Mode* to *Command Mode*, select the ‘Command’ entry from the main menu. To switch from *Command Mode* to *Menu Mode*, type **MENU** (or M) at the prompt.
PCGRIDDSS32 Menu Mode

The following discussions describe the operation of PCGRIDDSS32 in *Menu Mode*.

**NOTE:** The default operating mode for your PCGRIDDSS32 system is controlled by the value of 'PCGRIDDSS32 startup mode' in the file `C:\PCGRIDDSS32\USER\PCGMODE.DAT`. When PCGRIDDSS32 is installed, the default operating mode is 'Menu'. You can set the default to either *Menu Mode* or *Command Mode* (refer to 'Customizing PCGRIDDSS32' for more detailed instructions).

-- Starting PCGRIDDSS32

Use the following steps to initiate a PCGRIDDSS32 session in *Menu Mode*:

1. From the desktop, double-click the icon **PCGRIDDSS32**
   The ‘PCGRIDDSS32 Applications’ menu is displayed on the screen (Fig.1).

2. Type: 2
   Selects choice #2 (Run PCGRIDDSS32) from the Applications menu. Displays the PCGRIDDSS32 logo and begins the session.

![Fig.1](image.png)

When you enter PCGRIDDSS32 you are automatically positioned to select a gridded forecast data file. Move the mouse cursor out of the way – the mouse is not used in PCGRIDDSS32. You must select a forecast file before you perform any other task within PCGRIDDSS32.
-- Main Menu
The main menu for PCGRIDDS32 is displayed horizontally on line 2 (top) of the screen (Fig.2).

Fig.2

This menu contains 6 options.

File
Select, change, or list the contents of a forecast data file.

Products
Display predefined PCGRIDDS32 products.

Specs
Define the forecast hour and vertical level specifications.

Display
Change to or define one of the following display modes: Plan view, Cross-section, Time-section.

Command
Switch from Menu Mode to Command Mode to create customized products interactively.

Exit
Exit PCGRIDDS32. Files are closed. Settings return to default.

-- Function Keys
A function key description line is displayed on the first line of the screen above the main menu.
The function key line shows the function keys that are allowed for the current process, followed by
a one word description of their action. The contents of this line changes depending on the current location within the menu system.

When **ONLINE HELP** is available for a particular menu, the [F1] key is displayed at the beginning of the function key line (refer to ‘Online Help’).

**Note:** The [F12] key is often labeled ‘Quit’ in the function key line. This key allows you to quit the current process, but it does not let you inadvertently exit your PCGRIDDS32 session. The only way to exit your PCGRIDDS32 session is to select ‘Exit’ from the main menu.

**-- Grid Information**
A grid information line is displayed at the bottom of the screen. This line shows the current settings that are used for data selection. When you begin PCGRIDDS32, these values are set to the default values found in `C:\PCGRIDDS32\USER\INITGRID.SPC` (refer to ‘Customizing PCGRIDDS32’).

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>Pressure level, Isentropic level or Height level</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAYER</td>
<td>A grid layer consisting of 2 levels; used for level differences, etc.</td>
</tr>
<tr>
<td>FHR</td>
<td>Forecast hour</td>
</tr>
<tr>
<td>FHRS</td>
<td>Pair of forecast hours (Time range) used for time differences, etc.</td>
</tr>
<tr>
<td>MODEL</td>
<td>A 4 character forecast model identification name followed by the forecast model date</td>
</tr>
<tr>
<td>m/#</td>
<td>Current display mode (m) and grid data-thinning factor (#). The character ‘m’ can have one of three values: P (Plan view), T (Time-section), X (Cross-section). The character # can have a power of two value: 1, 2, 4, 8, A(16), B(32), etc.</td>
</tr>
</tbody>
</table>

**-- Using Menus**

**To move the highlight**
Use the arrow keys to move the highlight across or down the screen one position at a time. Use [HOME], [END], [PageUp], and [PageDown] to move the highlight to the top, bottom of the current screen or between screens.

**Note:** Some menus require multiple screens for complete display. Use the [PageDown] key to move from one screen to the next. Use the [PageUp] key to go back either to the beginning of the menu (‘Frst Page’) or to the previous page (‘Prev Page’). The function key line indicates the action of the [PageUp] key.

**To exit a menu**
To exit a menu without making a selection and return to the previous menu, press [F12]. The [F12] key can only be used to exit menus. You cannot use it to exit PCGRIDDS32.
**To make a selection**

For all menus, you can make a selection by moving the highlight to the desired choice and pressing **[ENTER]**.

Some menus within PCGRIDDS32 have the first character of the menu text highlighted. This means that you can make a selection by typing the first character **without** pressing **[Enter]**.

**To move between menus**

You can go to the next menu by making a selection as described above. You can return to the previous menu by pressing **[F12]**.

The menu that appears when you make a selection from the main menu is called a primary menu. At this point you can use the left/right arrow keys to move sequentially among the other primary menus without moving up to the main menu. For example, if you are at the 'Specs' menu, you can use the right arrow to move directly to the 'Display' menu.

When you make a selection from a primary menu, either an action is processed or a secondary menu or form is displayed.
-- File Menu

When you enter PCGRIDDS32, you are automatically positioned to select a gridded forecast data file from the menu shown in Fig.3. You can return to this menu at any time by selecting 'File' followed by 'Select new forecast file'.

Fig.3

When you select 'File' from the main menu, a 'pull-down' menu (Fig.3) with the following choices is displayed.

Select new forecast file
Selects a new forecast data file from the list of files in the current gridded data directory.

When you select this option, a list of available forecast data files is displayed on the screen. To select a new forecast data file:

1. Position the cursor to the desired file.
   By default the files are listed in alphabetical order by name.

2. Press: [Enter]
   Selects the file. A list of the gridded data available for the current forecast hour is displayed on the screen.
3. Press: [F12]
   Erases the screen. Returns to the ‘File’ menu.

The current gridded data directory is specified in the file
\texttt{C:\PCGRIDDS32\USER\PCGMODE.DAT} (refer to ‘Customizing PCGRIDDS32’). The
default value for this directory is \texttt{C:\PCGRIDDS32\GRIDDATA}.

Selecting a new forecast data file must be the first action you perform in PCGRIDDS.
No other actions (except exiting) are allowed until you select a file. You can select
only one file at a time. Each file you select is added to the list of up to 20 files
available for access by PCGRIDDS32. However, you can use only one file at a time.
The last file you select will be the active forecast data file unless you change it with
choice #2 (Change forecast file).
Change forecast file
Changes the active forecast data file to one of the files displayed in the list of previously selected forecast files (Fig.4). Files are added to this list each time you select a new forecast file (choice #1). Only one file may be active at a time. Data for products are obtained from the active file.

When you select this option, a list of previously selected forecast data files is displayed on the screen. To change the active forecast data file:

1. Position the cursor to the desired file.
   The currently active forecast data file is marked with an asterisk.

2. Press: [Enter]
   Makes the file active. A list of the gridded data available for the current forecast hour is displayed on the screen.

3. Press: [F12]
   Erases the screen. Returns to the ‘File’ menu.

Fig.4
List forecast file contents

Lists the gridded data available in the active forecast data file at the currently selected forecast hour shown at the bottom of the screen (Fig.5).

The information displayed at the beginning of the listing includes: the filename (JUL030312.ETA211), the forecast model name (MODEL=ETA8), the model date (FROM 2002/04/28/00), the currently selected forecast hour (FHR=12), the level (LEVEL=250), the layer (LAYER=1000/500), and the time range (FHRS=00/24).

Data fields are identified by a 4 character description followed by a 4 character level. For example, TEMP 250 corresponds to the TEMPerature grid at 250 hPa and PRESTROP corresponds to the PRESsure grid at the TROPopause.

--- Specs Menu

The ‘Specs’ option controls the setting of time and level specifications.

**Note:** The time parameters should be set before the level parameters so that all of the levels available for the currently selected forecast hour are displayed when you select the vertical levels.
When you select 'Specs' from the main menu, a ‘pull-down’ menu (Fig.6) with the choices, ‘Forecast hour’ and ‘Vertical level’, is displayed.

**Forecast hour**
When you choose this option, the current forecast hour and time range are displayed in a form (Fig.6) along with a list of the forecast times available in the currently active gridded data set.

You can modify the forecast time parameters by entering the integer times or selecting values from the list of available forecast hours (refer to ‘Using forms’ discussed later).

**To enter a value**
1. Position the cursor to the desired field (Forecast hour, Time range start or end).
2. Type the number (refer to ‘Using forms’ discussed later).

**To select a value from the list**
1. Position the cursor to the desired field.
2. Press [F9] to activate the lookup menu.

3. Move the highlight to the desired hour.

4. Press [Enter] to select that hour.

After you have completed all your revisions press [Enter] to save the values you have set.

**Vertical level**

With this option, the current level and layer values are displayed in a form (Fig.7) along with the list of levels which are available at the currently specified forecast time for the active gridded data set.

![Fig.7](image-url)

You can modify these parameters by entering values or selecting them from the list of levels displayed next to the form. Since levels are listed only for the current forecast hour and may vary from one forecast time to another, you should select the time values (choice #1) before you select the levels.
To enter a value

1. Position the cursor to the desired field (refer to ‘Using forms’ discussed next).
2. Type the number.

To select a value from the list

1. Position the cursor to the desired field.
2. Press [F9] to activate the lookup menu.
3. Move the highlight to the desired level.
4. Press [Enter] to select that level.

After you have completed all your revisions press [Enter] to save the values you have set.

-- Using Forms

A form is a screen of text and areas, called fields, where you can enter information.

To move the cursor
You can use the arrow keys to move the cursor one character at a time within and between the individual form fields. To move the cursor between fields use [Tab].

To clear fields
To clear (remove the currently displayed values) all the fields within a form press [F5]. To clear a single field, move the cursor to that field and press [F6].

To enter data
To enter data in a field, position the cursor to the field and type the value. Blanks may not be entered in numeric fields. To change the values in a field, use [F6] to clear the field and then type the new value. An alternative method is to type over the old value using leading zeros to erase unwanted digits. For example, to replace 4567 with 25, enter 0025.

You must right justify values within a field. PCGRIDDS32 will not perform that process automatically.

To save changes
You MUST press [Enter] to save the changes you set on the form. If you press [F12] to exit a form, all the changes you made to the form are lost.
-- Display Menu

The 'Display' option controls the setting and definition of the display mode. When you select 'Display' from the main menu, a 'pull-down' menu (Fig.8) appears on the screen with the following choices.

**Plan view**
Data are displayed over a horizontal area determined by a central latitude and longitude and a north/south distance in degrees.

**Cross-section**
Data are displayed at multiple pressure levels along a vertical cross-section path which is defined between a left latitude and longitude point and a right latitude and longitude point.

**Time-section**
The vertical structure of data is displayed for a specified time period and multiple pressure levels at a particular point which is defined by a latitude and longitude.

Fig.8
Change the active display mode
The active display mode is identified with an asterisk next to the appropriate menu choice. To change the active display mode, move the highlight to the desired mode and press [F2]. The asterisk moves to the new display mode indicating that the change was performed.

Note: A display mode must be defined before you can make it active.
Define The Plane View Mode

After moving the highlight to the desired mode and pressing [Enter], the current latitude and longitude parameters that define the selected display mode are displayed in a form (Fig.9). You can use one of three methods to modify these parameters.

To enter a value (Fig.9)

1. Position the cursor to the desired field.
   Refer to ‘Using forms’ for a discussion of cursor movement.

2. Type the value of the desired latitude or longitude in degrees.
   Degrees may be expressed as a positive integer value or as a positive real value with a maximum of two decimal places.

3. When direction is required, type one of the following characters to indicate the appropriate hemisphere: N, S, W, E.

4. Press [Enter].
   Saves the values you set.
To select an entry from the lookup table (Fig.10)

1. Press [F9].
   Activates the lookup menu. A list of display mode definitions is shown on the screen.

2. Move the highlight to the desired definition.
   Remember the table may contain multiple pages.

3. Press [Enter].
   Selects the definition. The parameters saved for the selected definition are entered into the form.

4. Press [Enter].
   Saves the values you set.

---

Fig.10

Define the center latitude, center longitude and the north-south display distance:

Center Latitude: 45°  Center Longitude: 110°

North-South display distance (degrees): 10

To display the entire grid, press [F5][Enter].

LEVEL= 850  LAYER=1000/ 500  FHR= 0  PRBS= 0/24  MODEL=RUN3  4 NOV 2004 P/1
To select an entry from the station id list (Fig.11)

1. Press [F11].
   Activates selection by station identifier (id). A request for one or more station id's appears on the screen.

2. Type a 3 or 4 character station id in the field.

3. Press [Enter].
   Retrieves the parameters for the station id and enters them into the form.

4. **When** you are using the station id list to define a **plan view**, you **must** type in the N-S display distance manually if you want it changed from the current setting.

5. Press [Enter].
   Saves the values you set.

---

Fig.11

![Plan View][1]

---

Type Station ID:  

---

LEVEL= 850 LAYER=1000/ 500 PHR= 0 PHS= 0/ 24 MODEL=WOSE 15 MAR 2003 F/1

---

45
For all three display modes, remember that you must press [Enter] to save the values you have set. PCGRIDDS32 will define the new display mode and make it active. After this process is completed, a map is displayed on the screen showing the current plan view definition. The position of the cross-section line and the time-section point are indicated on the map if they are defined and lie within the map area.

Define The Cross Section Mode
After moving the highlight to the desired mode and pressing [Enter], the current latitude and longitude parameters that define the selected display mode are displayed in a form (Fig.12). You can use one of three methods to modify these parameters.

To enter a value (Fig.12)

1. Position the cursor to the desired field.
   Refer to ‘Using forms’ for a discussion of cursor movement.

2. Type the value of the desired latitude or longitude in degrees.
   Degrees may be expressed as a positive integer value or as a positive real value with a maximum of two decimal places.

3. When direction is required, type one of the following characters to indicate the appropriate hemisphere: N, S, W, E.

4. Enter ‘U’ to display the Preset pressure levels listed the INITGRID.SPC file or enter ‘A’ to display all pressure levels in the current data file or enter ‘I’ to calculate data on Isentropic levels or enter ‘H’ to calculate data on height levels in feet or meters or enter ‘X’ to use a user defined file which is entered next.

5. Enter the 4-letter file name which contains the user defined pressure levels.

6. Press [Enter].
   Saves the values you set.
To select an entry from the lookup table (Fig.13)

1. Press [F9].
   Activates the lookup menu. A list of display mode definitions is shown on the screen.

2. Move the highlight to the desired definition.
   Remember the table may contain multiple pages.

3. Press [Enter].
   Selects the definition. The parameters saved for the selected definition are entered into the form.

4. Press [Enter].
   Saves the values you set.
To select an entry from the station id list (Fig.14)

1. Press [F11].
   Activates selection by station identifier (id). A request for one or more station id's appears on the screen.

2. Type a 3 or 4 character station id in the field.
   If there is a second field, position the cursor to the next field using the [Tab] key and type a second station id.

3. Press [Enter].
   Retrieves the parameters for the station id and enters them into the form.

4. Press [Enter].
   Saves the values you set.
You can define cross-section lines and time-section points that fall outside the plan view display area but within the area covered by the currently active gridded data set. However, they are not displayed on the plan view map.

If both ends of the cross-section line or the time-section point fall outside the area covered by the currently active gridded data set, then the definition points for that display mode are canceled and you are returned to the plan view display mode.
Define The Time Section Mode
After moving the highlight to the desired mode and pressing [Enter], the current latitude and longitude parameters that define the selected display mode are displayed in a form (Fig.15). You can use one of three methods to modify these parameters.

To enter a value (Fig.15)

1. Position the cursor to the desired field.
   Refer to 'Using forms' for a discussion of cursor movement.

2. Type the value of the desired latitude or longitude in degrees.
   Degrees may be expressed as a positive integer value or as a positive real value with a maximum of two decimal places.

3. When direction is required, type one of the following characters to indicate the appropriate hemisphere: N, S, W, E.

4. Enter 'U' to display the Preset pressure levels listed the INITGRID.SPC file or enter 'A' to display all pressure levels in the current data file or enter 'I' to calculate data on Isentropic levels or enter 'H' to calculate data on height levels in feet or meters or enter 'X' to use a user defined file which is entered next.

5. Enter the 4-letter file name which contains the user defined pressure levels.

6. Enter 'U' to display the Preset forecast hours listed the INITGRID.SPC file or enter 'A' to display all forecast hours in the current data file or enter 'X' to use a user defined file which is entered next.

7. Enter the 4-letter file name which contains the user defined forecast hours.

8. Press [Enter].
   Saves the values you set.
To select an entry from the lookup table (Fig.16)

1. **Press [F9].**
  
   Activates the lookup menu. A list of display mode definitions is shown on the screen.

2. **Move the highlight to the desired definition.**
   
   Remember the table may contain multiple pages.

3. **Press [Enter].**
   
   Selects the definition. The parameters saved for the selected definition are entered into the form.

4. **Press [Enter].**
   
   Saves the values you set.
To select an entry from the station id list (Fig.17)

1. Press [F11].
   Activates selection by station identifier (id). A request for one or more station id's appears on the screen.

2. Type a 3 or 4 character station id in the field.

3. Press [Enter].
   Retrieves the parameters for the station id and enters them into the form.

4. Press [Enter].
   Saves the values you set.
Note: You can define cross-section lines and time-section points that fall outside the plan view display area but within the area covered by the currently active gridded data set. However, they are not displayed on the plan view map.

If both ends of the cross-section line or the time-section point fall outside the area covered by the currently active gridded data set, then the definition points for that display mode are canceled and you are returned to the plan view display mode.

Change Display Lookup Tables
One method of defining a display mode is to select an entry from the lookup table (described earlier). You can customize the display lookup table to meet the needs of your environment.

Saving new definitions

1. Fill in the form fields with latitude and longitude values that define the desired location or area.
   It is not necessary to have PCGRIDDS32 process these values.

2. Press [F10]
   Activate and display the lookup menu.
3. Press [F8] 
   This is the function key labeled 'Insert'. A prompt requesting you to enter a lookup identifier is displayed on the screen.

4. Type a descriptive lookup identifier in the field. 
   A helpful convention is to identify large areas with names alone and differentiate progressively smaller areas by enclosing the names in parentheses, brackets, and braces (curly brackets).

5. Press [Enter] 
   Record the lookup identifier in the table. The new identifier is placed in the table in alphabetical order.

6. Press [F12] 
   Repeat the process for a new lookup table entry or perform another task.

Deleting existing definitions

1. Press [F10] 
   Activate and display the lookup menu.

2. Position the highlight to the definition you want to delete.

3. Press [F7] 
   This is the function key labeled 'Delete'. The selected definition is deleted from the lookup table.

4. Repeat steps 2-3 until you have removed all the unwanted definitions.

5. Press [F12] 
   Exit the lookup menu.

Save a display map

To increase the efficiency of PCGRIDDS32, your system administrator can use the SVMP command to Save frequently used display Maps. This command also allows you to print a list of currently saved display maps and to delete a saved display map.

1. Select the plan view display. 
   This procedure is described in the previous sections.

2. Select 'Command' from the main menu. 
   Switch to Command Mode.

3. At the prompt type: SVMP 
   A list of the currently saved maps is displayed on the screen.

4. You can now perform one of the following operations.
   a. Save the currently defined display map. 
      Press [F8] 
      This is the function key labeled ‘Insert’.

   b. Print a list of the currently saved display maps.
Press [F3]  
This is the function key labeled ‘PRNT’.

c. Delete a saved display map.  
Position the highlight to the entry you want to delete.  

Press [F7]  
This is the function key labeled ‘Delete’.

5. Press [ESC]  
Quit SVMP.

6. Type: **MENU**  
Return to *Menu Mode*.

When you enter **SVMP**, the following information describing saved display maps is listed on the screen:

1. **File Id**  
The three digit identification number of the saved display map. The file id is the extension of the saved map display filename and is used internally by PCGRIDDS32.

2. **Map area definition**  
Center latitude, center longitude, N/S distance. These values are determined when you define the display mode.

3. **Projection**  
The map projection used in the gridded data set when the display map was saved. The values for this field are ‘LTLN’ (latitude longitude), ‘NPST’ (north polar stereographic), ‘MERC’ (mercator), and ‘NLCC’ (north Lambert conic conformal).

4. **Reference longitude**  
The ‘vertical’ reference longitude used for polar stereographic and Lambert conic conformal projections.

5. **Map base**  
The name of the map base file that contains the map line segments in latitude/longitude coordinates.

**PCGRIDDS32** automatically checks the list of saved maps each time a display map is changed. It determines if it can use a saved display map by comparing items 2-5 for the saved display map with the description of the currently active gridded data set. If *all* of these items match, the saved display map is used.
-- Product Menus

This option controls the display of PCGRIDDS32 products. A product is a display generated by executing a series of PCGRIDDS32 commands contained in a macro file (refer to 'Defining Products'). When you select this option, the 'Product Category' menu is displayed (Fig.18). When you select a choice from the 'Product Category' menu, the corresponding 'Product List' menu is displayed (Fig.19).

Product Category

This menu displays a list of product categories that are available in your version of PCGRIDDS32 and is similar to the 'Table of Contents' of a book. Each category contains a group of related products that belong to it. Both the product categories and the actual products in each category can be modified by your system administrator to meet the needs of your environment (refer to 'Defining Products').

To select a product category with the highlight
Position the highlight to the desired choice and press [Enter]. After a category is selected, a list of products available in that category is displayed.

To select a product category by letter
You may select a category shown on the current page by typing the letter of that category. To view additional choices on succeeding pages press [PageDown]. After a category is selected, a list of products available under that category is displayed.
Note that each line of the menu begins with a label (A.1, B.1, etc.). The letter is used to indicate the sequence of the line on the current page and the number is the current menu page number. For example, C.1 refers to line 3 on the first page of the menu.

Multiple menu pages
Some product menus require multiple screens for complete display. You can press [PageDown] to move forward from one screen to the next. You cannot page backwards through the menu. However, by pressing [PageUp], you can reposition to the start of the menu.

To switch to Command Mode
If you wish to switch directly to Command Mode, press [F9]. To return to Menu Mode, type MENU at the prompt.

Interactive work menu
This is a special menu which can be used to display a series of customized products for lectures, briefings and discussions. You can change this menu interactively by selecting entries from the various ‘Product List’ menus. Once you create an interactive work menu, the contents are saved until you change them. Refer to the ‘Product List’ section for a description of the procedure used to create an interactive work menu.

Before you create or modify the interactive work menu for the first time, your system administrator should check both of the following items.

1. You must make an entry in the file MACROS\CMDMENU.LST for the interactive work menu. The default entry, ‘Custom Interactive Briefing’ is located at line 17 of CMDMENU.LST. However, you may change the text and location to meet your needs.

2. The name of the file that holds the interactive work menu entries must be entered on line 16 (Entry 16) of USER\PCGMODE.DAT. The file name has the form CMDMENU.### where ### is the line number of the interactive work menu entry in CMDMENU.LST. For example, if the interactive work menu is located on line 17 of CMDMENU.LST, the name of the interactive work menu file is CMDMENU.017.
Product List

The 'Product List' menu contains a description of the products that are available for the product category you selected. The name of the product category you chose from the 'Product Category' menu is shown at the top of the menu. When you select a product, the results are displayed on the screen.

Selections from the 'Product List' menu are made using the same procedures as for the 'Product Category' menu.

To select a product with the highlight
Position the highlight to the desired choice and press [Enter].

To select a product by letter
Each line of the menu begins with a label (A.1, B.1, etc.) where the letter indicates the sequence of the line on the current page and the number shows the current menu page number. For example, C.1 refers to line 3 on the first page of the menu. You may select a product on the current page by typing the letter of that product.
Multiple menu pages
Some product menus use multiple screens to display the complete list of product options. You can press [PageDown] to move forward from one screen to the next. You cannot page backwards through the menu. However, by pressing [PageUp], you can reposition to the start of the menu.

Product overlays
Two or more product displays can be overlaid using the [F2] key (Overlay). After the display of the first product is completed, position the highlight to the product you wish to overlay using the up/down arrow keys and press [F2].

Note: When using overlays you cannot use the first letter selection method. You may overlay products only when the Print Option is 'No print' (N) or 'Immediate print' (I) as described later.

Stepping through product displays for successive times
Special characters are provided which allow you to step through displays of products at sequentially increasing or decreasing forecast hours.

[>] Displays the current product at the next time.
[<] Displays the current product at the previous time.
[^] Redisplays the current product at the current forecast hour.

The forecast hours selected by the time looping characters depend on the 'Initial time-looping values' set in the file C:\PCGRIDDS32\USER\PCGMODE.DAT. The beginning and ending forecast hours define the range for the looping while the hour increment determines the interval between the selected forecast hours.

Example: The beginning and ending forecast hours are set to 12 and 24 with an increment of 6. The currently selected product is displayed at forecast hour 18. The table below shows the sequence of keys pressed and the forecast hour at which the product is displayed.

<table>
<thead>
<tr>
<th>Key sequence</th>
<th>Forecast hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>[^]</td>
<td>18</td>
</tr>
<tr>
<td>[&lt;]</td>
<td>12</td>
</tr>
<tr>
<td>[&gt;]</td>
<td>18</td>
</tr>
<tr>
<td>[&gt;]</td>
<td>24</td>
</tr>
<tr>
<td>[&gt;]</td>
<td>12</td>
</tr>
<tr>
<td>[^]</td>
<td>12</td>
</tr>
</tbody>
</table>
The initial reference time is the forecast hour at which the current product was first selected (18). Pressing [*] redisplays the product at the selected time. The remaining times are incremented or decremented by the value set for the time looping increment. If the time is incremented past the ending forecast hour, then the time is reset to the beginning forecast hour for time looping. Likewise, if the time is decremented past the beginning forecast hour, then the time is reset to the ending forecast hour. Each time [<] or [>] is pressed, the current forecast hour is reset as indicated in the grid information line at the bottom of the screen.

To obtain product help
Detailed descriptions of many of the products can also be accessed. You can display HELP for an individual product, if it is available, by positioning the highlight to the product and pressing [F1]. No general HELP is available for the 'Product List' menu.

Switch to Command Mode
You can switch directly to Command Mode at any time, by pressing [F9]. Once in Command Mode, you can return to Menu Mode by typing MENU at the prompt.

Print Options
The command to print the screen is PRNT.

-- Command Mode Option
This option allows you to switch from Menu Mode to Command Mode. You are still within the PCGRIDDS32 system and all your settings are intact. Four character PCGRIDDS32 commands must be entered to start and control all processes (refer to Appendix C). Using this mode allows the greatest flexibility, but also requires the greatest understanding of PCGRIDDS32. Enter MENU at the prompt to return to Menu Mode.

-- Quick Access to PCGRIDDS32
After your data are converted from GRIB into PCGRIDDS32 format (refer to ‘Ingesting GRIB Data’) and your system is configured to run PCGRIDDS32, you can bypass the PCGRIDDS32 Applications menu and access PCGRIDDS32 directly.

1. Change directory to \PCGRIDDS32
   Changes to the PCGRIDDS32 directory.

2. Double click on the file PCG32.BAT or Type: PCG32 at the command prompt.
   The PCGRIDDS32 logo is displayed on the screen.
Defining Products

A product is a display produced by executing a sequence of PCGRIDDS32 commands that are stored in an ASCII formatted file. These files which are called macros or command files are placed in the MACROS directory. Macro filenames are composed of a 4 character macro name followed by the extension CMD (for example, DWPD.CMD). You can execute a macro from both Command Mode and Menu Mode.

-- Command Mode execution

To execute macros
To execute a macro from Command Mode enter the name of the macro followed by [.].

DWPD.

The above entry erases the screen and produces a display of DeW Point Depression.

To overlay macros
A macro can be overlayed on the display produced by a previous command or macro. To overlay a macro enter the name of the macro followed by [:] (colon key).

TEMP
DWPD:

The above sequence of commands erases the screen, displays TEMPerature, and overlays temperature with DeW Point Depression.

Frequently used macro
The name !!!!!.CMD is reserved for a frequently used macro. This file is created by copying an existing macro or using a text editor to enter a set of frequently used PCGRIDDS32 commands. To execute this macro from Command Mode press [.](period key).

-- Menu Mode execution

To display products
A product is generated by executing a series of PCGRIDDS32 commands contained in a macro file. The results are displayed on the screen.

1. Select 'Products' from the main menu.
   The 'Product Category' menu appears which shows you a list of product categories that are available.

2. To select a category, position the highlight to the desired choice and press [Enter] or type the letter of the category.
   After a category is selected, the 'Product List' menu appears which shows you the first page of a list of products available under the selected category.
3. Select a specific product in the same manner as a category.
   The 4 letters that appear to the left of the product description are the name of the macro which is
   executed to create the desired product.

To overlay two or more products

1. Select the first product.

2. When the display of the first product is complete, position the highlight to the product you wish to overlay and press [F2].

   **Note:** You CANNOT use the first letter selection method when you overlay. You may overlay products only when the 'Print Option' is 'No print' (N) or 'Immediate print' (I). You cannot overlay when the 'Print Option' is 'Save print' (S) or 'Delay print' (D). Refer to 'Printing' for a description of print options.

Default products

PCGRIDDS32 is delivered with a default set of menus and products. You are encouraged to develop additional products to meet the needs of your environment. The command lines required to display a product must be stored in a macro file. You must then add to and/or modify the menu system before you can display new products in Menu Mode. Remember to include the associated HELP files. These procedures are discussed in the following sections.

-- Overlay data from different files

Overlaying is the term used to refer to the simultaneous display of multiple data fields. Data from different files can be overlaid on the same plot providing the following conditions are met:

1. The data must be on the same grid projection, though not necessarily from the same model.
2. The initial and final grid points used in any data subsetting must be the same. This means that the areas selected during the ingest process must be identical.

If the above conditions are not met, a message is displayed indicating that the files are of a different size or type. If this condition occurs when a file is opened, the current plot is cleared from the screen and the available fields for the current forecast hour are displayed.

-- Product directories

The product menus and the macro files used by PCGRIDDS32 are stored in the product directory PCGRIDDS32\MACROS. The MACROS directory is the active directory from which PCGRIDDS32 references files.

-- Product menus

The product menus are stored in ASCII formatted files which are located in the C:\PCGRIDDS32\MACROS directory and may be modified by your system administrator. The 'Product Category' menu is similar to the 'Table of Contents' in a book. It provides a list of product categories. When you select an entry from the 'Product Category' menu, a list of the available products in that category is displayed ('Product List' menu).
Product Category file

Name: The entries for the ‘Product Category’ menu are stored in the file, CMDMENU.LST.

Format: This file can be modified using a standard text editor. Each line in the file defines a specific product category. A maximum of 72 characters can be entered on a line. The lines are displayed sequentially in groups of 18 lines per screen. The file can contain a maximum of 10 screens of data (180 categories).

PCGRIDDs automatically ‘numbers’ the order of appearance for each entry on the menu page. All other characters displayed for the entry lines must be contained in the menu file. All lines in the menu must contain text. If you wish to leave an empty line for clarity, add dashes as shown in the example below.

Supply a dummy ‘Product List’ file that contains a line of blanks. For the example below, the file CMDMENU.012 is a dummy file (refer to Appendix A).

The file contents for the first screen of the default ‘Product Category’ menu are listed below. A complete listing is contained in Appendix A.

............. Begin file CMDMENU.LST .................

BASIC  PCGRIDDs SETUP
SURFACE MAPS
UPPER AIR MAPS
STABILITY INDICES AND MISC.
PLOT PREDEFINED MAPS FOR SELECTED TIME AND LEVEL
EXPERIMENTAL QPF MAPS
CHOOSE NEW MAP FOR DISPLAYS
OVERVIEW OF ENTIRE FORECAST CYCLE
DETAILED OVERVIEW OF A SINGLE TIME

BUILD YOUR OWN MAPS
CUSTOM INTERACTIVE BRIEFING
BOUNDARY LAYER PRODUCTS (RH, wind, etc...)
"ANY LEVEL" PRODUCTS (ie. choose level you want) (RH, wind, etc...)
LAYER PRODUCTS (Q vectors, Potential Vorticity, Mean RH, etc...)
RAIN/SNOW PRODUCTS (Critical Thickness, Estimated Snowfall, etc...)
ISENTROPIC PRODUCTS (Isentropic Lift, Potential Vorticity, etc...)
CONVECTIVE/SEVERE WEATHER (CAPE, Estimated Storm Motion, LI, etc...)
HEAVY PRECIPITATION PRODUCTS (Precipitable Water, etc...)
WINTER TYPE PRECIPITATION - MENU 1 [MUST SPECIFY VALID FX HOUR]
WINTER TYPE PRECIPITATION - MENU 2 [MUST SPECIFY VALID FX HOUR]
WINTER TYPE PRECIPITATION - MENU 3 [MUST SPECIFY VALID FX HOUR]
SEVERE CONVECTION - MENU 1 [MUST SPECIFY VALID FX HOUR]
SEVERE CONVECTION - MENU 2 [MUST SPECIFY VALID FX HOUR]
SEVERE CONVECTION - MENU 3 [MUST SPECIFY VALID FX HOUR]
SEVERE CONVECTION - MENU 4 [MUST SPECIFY VALID FX HOUR]
QPF - MENU 1 [MUST SPECIFY VALID FX HOUR]
QPF - MENU 2 [MUST SPECIFY VALID FX HOUR]
MAPS SURFACE ANALYSIS [MUST SPECIFY VALID FX HOUR]

----

WAFS - Display ICAO Upper-Air MAPS
Set WAFS Map Display Areas
WAFS - WIND/TEMPERATURE Charts for Americas

----
Product List file

**Name**
All the files for the 'Product List' menus have the name **CMDMENU**. The line number of the entry in the 'Product Category' file (**CMDMENU.LST**) determines the extension of the file (**CMDMENU.###**) that provides the information for the corresponding 'Product List' menu. For example, if you select the entry 'SURFACE MAPS' which is on line 1 of the 'Product Category' file, the product list contained in the file, **CMDMENU.001**, is displayed.

**Format**
This file can be modified using a standard text editor. Each line in the file describes a specific product. The lines are displayed sequentially in groups of 17 lines per screen. The file can contain a maximum of 10 screens of data (170 products).

A maximum of 72 characters can be entered on a line. The first 4 characters of each line in a 'Product List' file must be the name of the macro file that corresponds to the selected entry. For example, if you select the entry, 'Mean Sea-level Pressure and 1000-500mb Thickness' from **CMDMENU.001** (listed below), the macro file, **SFTH.CMD**, is executed.

PCGRIDDSS32 automatically 'numbers' the order of appearance for each entry on the menu page. All other characters displayed for the entry lines must be contained in the menu file. In the example below, some entries are left blank for clarity. If the user selects a blank entry, PCGRIDDSS32 will beep and return to the menu.

The contents for the first screen of the default 'Product List' file, **CMDMENU.001**, are listed below. Complete listings of all the default 'Product List' files are contained in Appendix A.

```
............. Begin file CMDMENU.002 ................................

***** SURFACE MAPS *****
SFTH Mean Sea-level Pressure and 1000-500mb Thickness   (Set TIME first)
10TH 1000 mb Height and Winds, 1000-500mb Thickness     (Set TIME first)
10TE 1000 mb Height, Dew Point and Winds                 (Set TIME first)
NSTM NGM MSL Pressure, S982 Temperatures and Winds      (Set TIME first)
NSTD NGM MSL Pressure, S982 Dew Points and Winds         (Set TIME first)
NSTE NGM MSL Pressure, S982 Equiv. Pot. Temp. and Winds  (Set TIME first)
ESTM ETA MSL Pressure, B015 Temperature and Winds       (Set TIME first)
ESTD ETA MSL Pressure, B015 Dew Points and Winds         (Set TIME first)
ESTE ETA MSL Pressure, B015 Equiv. Pot. Temp. and Winds  (Set TIME first)
THPW MSL Pressure, 1000-500mb Thickness, Precip. Water  (Set TIME first)
PCPP 12 hour Total and Convective Model Precipitation   (Set TIME first)
P24L Loop 24 Hour Precipitation Totals for Model cycle(Reset TIME after)

SFIL Change Active File   (Must have multiple files open)
SFHR ** Set TIME ** (Forecast Hour: F00,F12,F24,F36,F48,...)
............. End page CMDMENU.002 ..................................```
MACRO files

MACRO files contain a sequence of PCGRIDDS32 command lines that are executed in series and can be used as shorthand notations for frequently used command sequences or to produce specific graphical products. The command lines may contain a maximum of 16 PCGRIDDS32 commands and aliases in upper or lower case letters (refer to ‘User Defined Alias Commands’), but they cannot reference another macro.

Note: The commands within a command line are processed from right to left. Refer to the files HELP.DAT, HLPC.DAT, and HLPG.DAT in the HELP directory (or Appendices B, C, and D) for a more detailed description of the full set of PCGRIDDS32 commands.

The following parameters can be set from within a macro: forecast hour, time range, vertical level, and layer. If the macro is run from Command Mode, these settings will remain in effect after the completion of the macro. If the macro is run from Menu Mode, the settings normally remain in effect only for the duration of the macro. At the end of the macro, the settings return to the values they had before the macro was started. If you want the settings defined in a macro to remain in effect after the completion of the macro, you must add the PMSV command to the beginning of the macro.

When a macro is executed, the results from processing the requested command lines are displayed in sequence with a prompt to press [Enter] between displays when needed. Below is listed a sample macro file which requires you to press [Enter] after each command line. This sample file sets the display to PLAN view, requests the user to press [Enter], then reads the WIND data, converts the Vector wind to KNoTs (VKNT), and plots the resulting vectors as wind BARBs.

```
PLAN
BARB VKNT WIND
```

If you want to eliminate the prompt to press [Enter] after each command line, use the LOOP and ENDL (END Loop) commands. All command lines between these commands are then executed without a request to press [Enter]. The command file listed below only pauses for you to press [Enter] after the ENDL command.

```
LOOP
PLAN
BARB VKNT WIND
ENDL
```

Listed below is an example of a macro file (WTMP.CMD) that displays wind as barbs and temperature contours as dashed lines. An explanation is included after every line to describe the action of each command in the line.

```
LOOP
-- LOOP
```

Note: Within a macro, either an & or a / can be used to indicate that two sets of data will be overlaid on the same display.
PLAN
-- PLAN Set screen to PLAN view

LNDF
-- LNDF Do Not print DeFault Labels

LTX1 WIND / TEMPERATURE Contours
-- LTX1 Display the Label TeXt following this command on line 1 of the plot.

LTM1 LLN1
-- LLN1 Display the Label, forecast LeNgth, on line 1 of the plot.
-- LTM1 Display the Label, TiMe, on line 1 of the plot.
-- The label on line 1 has the order: text, forecast length, time.

LFL2 LFD2
-- LFL2 Display the Label, Flight Level, on line 2 of the plot.
-- LFD2 Display the Label, Forecast model Date, on line 2 of the plot.
-- The label on line 2 has the order: level, date.

LFO3 LMN3
-- LFO3 Display the Label, Forecast model Origination, on line 3 of the plot.
-- LMN3 Display the Label, forecast Model Name, on line 3 of the plot.
-- The label on line 3 has the order: origination, name.

CLR2 DASH CIN2 TEMP&CLR7 BARB VKNT WIND
-- WIND Get the WIND field from the gridded data file.
-- VKNT Convert units for Vector wind data to KNoTs.
-- BARB Plot wind as BARBs.
-- CLR7 Use data-display CoLoR 7 for the barbs.
-- & End plot 1 and prepare to overlay next plot.
-- TEMP Get the TEMPerature field from the gridded data file.
-- CIN2 Set Contour INterval to 2 units (degrees)
-- DASH Use DASHed lines for contours.
-- CLR2 Use data-display CoLRr 2 for the contour lines.

ENDL
-- ENDL Reinstate the need to press [Enter] after each command line. This command is optional if it is the last command in the macro.

Listed below is an example of a macro file (IC24.CMD) that sets the flight level to 240, displays wind as barbs and displays temperature values at the grid points. An explanation is included after every line to describe the action of each command in the line.

LOOP
-- LOOP The prompt to press [Enter] is suppressed until the ENDL command is executed or the of file is encountered.

PLAN
-- PLAN Set screen to PLAN view
LNDF
  -- LNDF  Do Not print Default Labels

LTX1 WIND / TEMPERATURE
  -- LTX1 Display the Label TeXt following this command on line 1 of the plot.

LTM1 LLN1
  -- LLN1 Display the Label, forecast Length, on line 1 of the plot.
  -- LTM1 Display the Label, Time, on line 1 of the plot.
  -- The label on line 1 has the order: text, forecast length, time.

LFD2 LFL2
  -- LFL2 Display the Label, Flight Level, on line 2 of the plot.
  -- LFD2 Display the Label, Forecast model Date, on line 2 of the plot.
  -- The label on line 2 has the order: level, date.

LMN3 LFO3
  -- LFO3 Display the Label, Forecast model Origination, on line 3 of the plot.
  -- LMN3 Display the Label, forecast Model Name, on line 3 of the plot.
  -- The label on line 3 has the order: origination, name.

CLR7 BARB VKNT WIND SLVL 400
  -- SLVL 400 Set the pressure Level to 400 hPa
  -- WIND Get WIND data from the gridded data file.
  -- VKNT Convert units for Vector wind data to KNoTs.
  -- BARB Plot wind as BARBs.
  -- CLR7 Use data-display CoLoR 7 for the barbs.

PPLS DAT+ SCL0 SSUM TEMP RGTN 0 MLTN 0 VCMP LAST CLR2&
  -- This command line overlays temperature data plots on the previous wind display.
  Temperature values are expressed as unscaled whole integers and unsigned values are negative. The digits are plotted above the grid point, but only at grid points where the V component of the wind is positive (‘southerly’) to prevent the wind barbs from overwriting the temperature data.
  -- & Overlay the following plot on current display.
  -- CLR2 Use data-display CoLoR 2.
  -- LAST Retrieve the previous fields (WIND) already stored in memory. This operation is faster than retrieving data from the gridded data file.
  -- VCMP Get the V Component of the wind field that is stored in memory.
  -- MLTN 0 Set all values Less Than 0 as missing data (10**31).
  -- RGTN 0 Replace all values Greater Than 0 with 0. This produces a field of zeros and missing values.
  -- TEMP Get the TEMPerature field from the gridded data file.
  -- SSUM SUM the previous two Scalar fields. This produces a field of temperature values and missing values. The missing values are located at grid points where the V component of the wind is less than 0.
  -- SCL0 Rounds displays to whole integer numbers.
  -- DAT+ Plot DATa values above (+) the grid point.
  -- PPLS Plot PLuS signs. Unsigned numbers are negative. Plus signs are plotted before positive numbers.
PPLS DAT- SCL0 SSUM TEMP RLTN 0 MGTN 0 VGRD CLR2&
-- This command line overlays the remaining temperature data on the previous
display. Temperature values are expressed as unscaled whole integers and
unsigned values are negative. The digits are plotted below the grid point, but
only at grid points where the V component of the wind is negative ('northerly') to
prevent the wind barbs from overwriting the temperature data.
-- & Overlay the following plot on current display.
-- CLR2 Use data-display CoLoR 2.
-- VGRD Retrieve the the V component of the wind from the GRiDded data file.
The wind field is no longer available in memory as it was in the
previous command line.
-- MGTN 0 Replace all values Greater Than 0 as missing data points.
-- RLTN 0 Replace all values Less Than 0 with 0. This produces a field of zeros
and missing values.
-- TEMP Get the TEMPerature field from the gridded data file.
-- SSUM SUM the previous two Scalar fields. This produces a field of
temperature values and missing values. The missing values are
located at grid points where the V component of the wind is greater
than 0.
-- SCL0 Rounds displays to whole integer numbers.
-- DAT-Plot DATa values below (-) the grid point.
-- PPLS Plot PLuS signs. Unsigned numbers are negative. Plus signs are
plotted before positive numbers.

ENDL
-- ENDL Reinstate the need to press [Enter] after each command line. This
command is optional if it is the last command in the macro.

-- Macro Help
PCGRIDDS has a provision for providing HELP about individual macros in both Menu Mode and
Command Mode.

To access HELP for a particular macro in Menu Mode, display the 'Product List' menu that
contains an entry for the macro (refer to 'Menu Mode Execution'). Position the highlight to the
desired menu and press [F1]. The contents of the HELP file is displayed on the screen.

You can use one of two methods to access macro HELP in Command Mode. Access the HELP
menu by typing HELP[Enter] on the command line. After the menu is displayed, type the four
character macro name to display the HELP text. To obtain EXTENDED HELP directly from the
command line, type HLPX followed by the four character macro name.

Macro HELP files are located in the HELP directory. The filename is composed of the 4 character
macro name followed by the extension, HLP. For example, DWPD.HLP is the HELP filename for
the macro, DWPD.CMD. Refer to 'Menu Help File Format' in the 'Online Help' section for a
description of the HELP file structure.
Default labels

Plots are automatically labelled with a default label format. Sample default labels for a temperature plot are shown below.

Plan view

\[
\text{WAFG= 250:LYR=1000/ 500 :FHR= 12:FHRS= 0/ 24::FIL1=WAF28APR.00Z}
\]
\[
\text{95/ 4/28/ 0--TEMP}
\]
\[
\text{V:10/2003--N/X/MN/SD= -56.49 -42.85 -48.43 3.17}
\]

The plan view label displays the following information:

Line 1
- WAFG: Forecast model name
- LVL= 250: Pressure level
- LYR=1000/ 500: Pressure layer
- FHR= 12: Forecast hour
- FHRS= 0/ 24: Time range
- FIL1=WAF28APR.00Z: Last active forecast data file

Line 2
- 95/ 4/28/ 0: Last active forecast model date (yy/mm/dd/hh)
- TEMP: Command line that produced the display

Line 3
- V:10/2003: PCGRIDDS32 version
- N/X/MN/SD: Statistics line key: minimum/maximum/mean/standard deviation
- -56.49, -42.85, -48.43, 3.17: Maximum, minimum, mean, standard deviation

Time-section (TSCT)

\[
\text{WAFG:Lat/Lon 35S/ 59W=> 36/ 0 :FHR= 12:FHRS= 0/ 24::FIL1=WAF28APR.00Z}
\]
\[
\text{95/ 4/28/ 0--TEMP}
\]

The time-section label displays the following information when TSCT is used to define the time-section point:

Line 1
- WAFG: Forecast model name
- Lat/Lon 35S/ 59W: Latitude and longitude coordinates of the time-section point
- => 36/ 0: Hour range over which the time-section is displayed
- FHR= 12: Forecast hour (used for plan and cross-section)
- FHRS= 0/ 24: Time range (used for plan and cross-section)
- FIL1=WAF28APR.00Z: Last active active forecast data file

Line 2
- 95/ 4/28/ 0: Last active forecast model date (yy/mm/dd/hh)
- TEMP: Command line that produced the display
**Time-section (TSTN)**

```
WAFG: BOS@42N/ 71W => 48/ 0 :FHR= 12 :FHRS= 0/ 24 :FIL1=WAF28APR.00Z
95/ 4/28/ 0 -- TEMP
```

The time-section label displays the following information when **TSTN** is used to define the time-section point:

**Line 1**

- **WAFG**: Forecast model name
- **BOS**: Station located at the time section point
- **@42N/ 71W**: Latitude and longitude coordinates of the time-section point
- **=> 48/ 0**: Hour range over which the time-section is displayed
- **FHR= 12**: Forecast hour (used for plan and cross-section)
- **FHRS= 0/ 24**: Time range (used for plan and cross-section)
- **FIL1=WAF28APR.00Z**: Last active active forecast data file

**Line 2**

- **95/ 4/28/ 0**: Last active forecast model date (yy/mm/dd/hh)
- **TEMP**: Command line that produced the display

**Cross-section (XSCT)**

```
WAFG: Lat/Lon 53N/ 14E => 28N/ 77E :FHR= 12 :FHRS= 0/ 24 :FIL1=WAF28APR.00Z
95/ 4/28/ 0 -- TEMP
```

The cross-section label displays the following information when **XSCT** is used to define the cross-section line:

**Line 1**

- **WAFG**: Forecast model name
- **Lat/Lon 53N/ 14E**: Left latitude and longitude coordinates of the cross-section line
- **=> 28N/ 77E**: Right latitude and longitude coordinates of the cross-section line
- **FHR= 12**: Forecast hour
- **FHRS= 0/ 24**: Time range
- **FIL1=WAF28APR.00Z**: Last active active forecast data file

**Line 2**

- **95/ 4/28/ 0**: Last active forecast model date (yy/mm/dd/hh)
- **TEMP**: Command line that produced the display
The cross-section label displays the following information when XSTN is used to define the cross-section line:

**Line 1**
- **WAFG**: Forecast model name
- **ORD**: Station located at left end of cross-section line
- **> BOS**: Station located at right end of cross-section line
- **@42N/ 88W**: Left latitude and longitude coordinates of the cross-section line
- **=>42N/ 71W**: Right latitude and longitude coordinates of the cross-section line
- **FHR= 12**: Forecast hour
- **FHRS= 0/ 24**: Time range
- **FIL1=WAF28APR.00Z**: Last active active forecast data file

**Line 2**
- **95/ 4/28/ 0**: Last active forecast model date (yy/mm/dd/hh)
- **TEMP**: Command line that produced the display

### Custom labels
You can produce custom labels using the PCGRIDD32 label commands.

### Output commands
Eleven of the label commands are 4 character output commands. The first three characters identify the command. The fourth character, indicated schematically by the symbol #, specifies the line number within the total label message. For example, if the entire label contains 3 lines, then LPL2 specifies that the label for pressure level is on line 2. Listed below are the eleven possible output commands, the type of information displayed, and a sample of the output format.

**LTM#** TiMe and TiMe range
- **VT 12 UTC FRI 28 APR 1995**
- **VT 12 UTC TUE 7 JUN 1994-00 UTC MON 6 JUN 1994**

**LPL#** Pressure Level and Pressure Layer
- **LEVEL=250**
- **LAYER=1000/500**

**LFL#** Flight Level and Flight Layer
- **FL 340 (250 hPa)**
- **FL LAYER 050-180**

**LDN#** Data file Name
- **FILE=WAF28APR.00Z**

**LFD#** Forecast model Date
- **From 12 UTC 22 MAR 1991**
Label message lines
The symbol # in all the above commands indicates the line number within the total
label message. The total number of lines in a label message depends on the value of
the maximum line number specified in the label commands for a plot. If the commands
LFL1 LFO3 LTM1 are issued, then the total message will contain three lines with line
2 blank.

Line 1 VT 12 UTC FRI 28 APR 1995 FL 340 (250 hPa)
Line 2
Line 3 DOC/NOAA/NWS WAFC-WASHINGTON

Command entry
LTX# must be entered on a single line followed by its associated text. It cannot be
combined with any other commands. The remaining nine commands can be entered
on separate lines or combined on one or more lines. All label commands for a plot
must be entered before the command line that actually produces the display.

Note: The first label command on a line must start in the leftmost column.

Examples I, II, and III produce the same results: a pressure level label on line 1 and a
time label on line 2. Example IV is incorrect because the label command, LPL2, is
issued after the plot command line (TEMP).

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPL1</td>
<td>LPL2</td>
<td>LTM2</td>
<td>LTM2</td>
<td>LPL1</td>
</tr>
<tr>
<td>TEMP</td>
<td>TEMP</td>
<td>TEMP</td>
<td>TEMP</td>
<td>LPL2</td>
</tr>
</tbody>
</table>

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Label construction
Label commands are combined to produce message lines. The labels for a line are displayed in the order that the commands are processed. If multiple commands are on one line, they are processed starting with the rightmost command. LTX# is the exception in that the specified text will always be left justified within the message line. A maximum of 132 characters can be output on one line of a printed copy, but only the first 78 characters are displayed on the screen.

A sample command sequence and its corresponding message lines are shown below.

Commands: LTM1 LPL2 LLN2
LTX2 TEMPERATURE TEMP

Label: VT 12 UTC FRI 28 APR 1995
TEMPERATURE 12H FORECAST LEVEL=250

Note: The forecast length precedes the pressure level in the label because the commands are processed from right to left.

Default labels
The initial setting for each plot is to display default labels. This condition is always restored at the start of a new display after all overlays are completed.

Default labels can be combined only with the LTX# and LWT# label commands. If any other label commands are used, default labels are automatically turned off for the current plot. Default labels are restored for the next plot regardless of whether it is a new display or an overlay, unless the LNDF command is used.

LNDF (No DeFault labels) This command turns off the default labels. No labels are produced unless you enter label commands. This condition will remain in effect for all overlays except menu overlays using the [F2] key. The default label state is restored when all overlays are completed. The LNDF command is useful when overlaying multiple data fields. If label commands are entered when the first data field is displayed, the LNDF command prevents the display of default labels for the remaining overlays.

LDEF (DEFault labels) This command turns on the default labels. If LNDF was used to turn off the default labels, you can use the LDEF command to turn on the default labels before all overlays are completed. It will remain in effect until the another LNDF command is issued.

Label processing
The control label commands (LNDF, LDEF, LWT#) and the LTX# command are processed for all command sequences that produce a display. The remaining output label commands are only processed for command sequences that generate a display from gridded data fields. If gridded data fields are not displayed, output label commands are ignored and no label of any kind except text is displayed for the current plot. For example, if you are in time-section mode, the command LFO1 HOUR does
not produce labels because hour lines are generated internally and not from a gridded data field. Similarly, if you are in plan view, the command LFO1 LATT does not produce labels because latitude lines are not produced from a gridded data field. However, the command LFO1 TEMP does produce labels because TEMP is a gridded data field. The following examples illustrate these rules.

Example 1
Commands: LNDF Turn off default labels.
LTM1 Command is not processed because LATT does not use gridded data.
LATT Display latitude lines.
TEMP& Overlay temperature contours on latitude lines.
Label: No labels

Example 2
Commands: LATT Display latitude lines. Default labels are produced.
LNDF Turn off default labels.
LTM1 Display time label on line 1 of the label message.
TEMP& Overlay temperature contours on latitude lines.
Label: VT 12 UTC FRI 28 APR 1995
95/ 4/28/ 0--LATT
V:10/2003--N/X/MN/SD= -28.75 -56.25 -42.50 8.29

Example 3
Commands: LNDF Turn off default labels.
LATT Display latitude lines.
LTM1 Display time label on line 1 of the label message.
TEMP& Overlay temperature contours on latitude lines.
Label: VT 12 UTC FRI 28 APR 1995

Label display
Labels are automatically displayed on the screen after a data field is processed. All previous labels are rewritten on the screen with the display of each overlay. This prevents contour lines from writing over the label text. By default a set of label message lines starts on line 1, the line following the command line on the screen.

For printed output the label message lines are written consecutively at the bottom of the page immediately below the plot. The number of label lines you can print depends on the maximum number of lines reserved for labels. The default value is 6. You can revise this value by modifying the file PCGMODE.DAT (Refer to 'Customizing PCGRIDDS32').

LWT# (begin WriTe) This command specifies the line number of the screen to start WriTing the current label set. If this command is not used then the label set starts at line 1. This command has no effect on the label position for printed plots.
Overlays

Overlaying is the term used to refer to the simultaneous display of multiple data fields. If an overlay is composed of two plots with identical time and level specifications and user labels are requested for both plots, only one set of labels will be displayed. This applies to all label commands except LTX#. The text associated with an LTX# command will always be displayed. The example below illustrates the overlay restrictions.

**Note:** The pressure level label is not displayed because it is requested for plot 2 and labels are suppressed for overlays with the same time and level specifications.

**Commands:**
- LTM1: Display time on line 1
- LTX2 WIND: Display text on line 2
- WIND: Display wind data
- LPL3: Display pressure level on line 3
- LTX4 TEMPERATURE: Display text on line 4
- TEMP&: Overlay temperature contours

**Label:**
- VT 12 UTC FRI 28 APR 1995
- WIND
- TEMPERATURE

Overlays produced by using the REST command (refer to 'Print Commands' in 'Printing') to display saved graphics are treated as separate displays for label purposes. This means that user labels for both the restored graphics and the first overlay are displayed. Menu overlays produced using [F2] also fall into this category. The previous example was modified slightly to illustrate this concept.

**Note:** The pressure level label is now displayed because the overlay was used in conjunction with the REST command.

**Commands:**
- SAVE PLT1: Save graphics in file PLT1.SVG
- LTM1: Display time on line 1
- LTX2 WIND: Display text on line 2
- WIND: Display wind data
- ENDS: Stop saving graphics
- ERAS: Erase screen
- REST PLT1: Restore graphics in file PLT1.SVG
- LPL3: Display pressure level on line 3
- LTX4 TEMPERATURE: Display text on line 4
- TEMP&: Overlay temperature contours

**Label:**
- VT 12 UTC FRI 28 APR 1995
- WIND
- LEVEL= 250
- TEMPERATURE
Annotation of screen displays
Default labels and those produced by label commands are displayed both on the screen and on printer output. The TXT# command can write text annotation only to the screen.

TXT# (screen Text) This command must be entered on a single line followed by its associated text. It cannot be combined with any other commands. The # symbol indicates the line on the screen to which the text is written. Text written with the TXT command will never be output to the printer nor can it be displayed with the REST command. This command is processed and output immediately. It should be issued AFTER the data field is displayed.
**PCGRIDDS32 Command Mode**

The following discussions describe the operation of PCGRIDDS32 in *Command Mode*.

**NOTE:** The default operating mode for your PCGRIDDS32 system is controlled by the value of 'PCGRIDDS32 startup mode' in the file C:\PCGRIDDS32\USER\PCGMODE.DAT. When PCGRIDDS32 is installed, the default operating mode is *Menu*. You can set the default to either *Menu Mode* or *Command Mode* (refer to 'Customizing PCGRIDDS32' for more detailed instructions).

---

**-- Starting PCGRIDDS32**

Use the following steps to initiate a PCGRIDDS32 session in *Command Mode*:

1. From the desktop, double-click the icon **PCGRIDDS32**
   The ‘PCGRIDDS32 Applications’ menu is displayed on the screen (Fig.1).

3. Type: **2**
   Selects choice #2 (Run PCGRIDDS32) from the Applications menu. Displays the PCGRIDDS32 logo and begins the session.

**Fig.1**

```
PCGRIDDS32 Applications

1. Ingest GRIB Data
2. Run PCGRIDDS32
X. Exit pcgridds32

Version 3/2005                            MARCH 2005
```

A listing of the file, C:\PCGRIDDS32\HELP\HELP.DAT, which provides an online *Command Mode* tutorial (refer to >Online Help<), is supplied below.

Command Mode requests are input as series of FOUR LETTER INSTRUCTIONS separated by Spaces or Delimiters, followed by the Enter key.

A maximum of 16 commands can be entered on 1 line as indicated by the following guiding template line which is displayed at the top of the screen.

```
?______________________________
```

**NOTE:** With few exceptions, a line of commands is processed in order from RIGHT to LEFT,
so the last command entered on a line is the first to appear.

Additional information on the use of individual commands can be obtained by typing **HLPC** [ HeLP for Commands ] or by using the Command Help option on the Help Menu. At any time, you can switch to a menu mode of operations by
**- To Begin -

Before any displays can be generated, a data file must be opened.

In Command Mode, PCGRIDDS32 begins by requesting the name of a data file.

The file opening process reads and displays a list of fields available from that data set and then initializes a number of Variables used to specify data levels and forecast hours.

It also establishes a map background for a user specified default portion of the grid area.

The OPEN command can make up to 20 data files available for access.

The LIST command will list the current grid information variables and the contents of the currently active data set.

The FILS command lists the files already opened and their access codes. Once opened, access can change from one file to another using the FIL# command, where # is number in order of when the file was opened.

**- Initial Default values -

The default Flag Variable values are:

A Forecast Hour (FHOR) -- Default = 12

A four letter Grid Level (LEVL) -- Default = 850

A pair of Forecast Hours (FHRS) consisting of -- Default = 00/24
[See FHR1 and FHR2 later -- Used for time differences, etc.]

A grid layer (LAYR) consisting of two levels -- Default = 1000 500
[See LVL1 and LVL2 later -- Used for level differences, etc.]

The default values can be customized by the user by modifying the file USER\INITGRID.SPC, in which the initial values of the six variable parameters LEVL LVL1 LVL2 FHOR FHR1 FHR2 are specified.

**- Changing Flag Variable Values - Level/Layer Specification

The LeVeL/LaYeR defaults can be Set by typing SLVL or SLYR followed by the four character specifications in the next input positions. For example,

SLVL 1000 - Changes default level to 1000 mb,
SLVL  MSL  - Changes default level to mean sea level,
SLVL  S896  - Changes default level to the Sigma level centered at 896 mb,
SLVL  I300  - Changes default level to the 300K Isentropic level,
SLVL  H150  - Changes default level to the 15,000 ft Height level,
SLYR  850  300  - Changes layer bottom and top default levels (in order)
                      to 850 and 300 mb.

For convenience, the LeVeL can also be specified by simply typing the desired
level as part of the command line to the right of the desired field, e.g.,
reading from RIGHT to LEFT, the command sequence  TEMP 850  will first set
the level to 850 mb and then read, decode and contour the temperature field.

**- Changing Flag Variable Values - Time Specification

The time defaults can be changed by typing  FHOR  [or SFHR]  or  FHRS  [or SFHS]
and answering a free-format prompt.

Alternatively, the time defaults can be changed by typing  SFHR  or  SFHS
followed by the desired hour in the next 4 character command line locations.
For example,

SFHR  12  - Changes the time default to a 12 hour Forecast,
SFHR  -1  - Changes the time default to the ANALysis,
SFHR  00  - Changes the time default to the 00 h initialized fields,
SHFS  12  24  - Changes the time pair defaults to the 12 and 24 h Forecasts.

For convenience,  SFHR  can also be omitted from the command string if desired,
typing instead only  ANAL, F00, F12, F24, F36  or  F48  for those specific times,
e.g., reading from RIGHT to LEFT, the command sequence  TEMP 850 F24  will
first set the forecast hour to 24 hours, then set the level to 850 mb and
lastly read and contour the temperature field.

**- Specifying the Display Area

The display area can be changed by typing  AREA  at the LEFT end of the command
line, followed a new central latitude and longitude (given by degrees followed
immediately by the letters N/S or E/W to indicate hemisphere) and
North-to-South display distance in degrees. For example, the command sequence
AREA 40N 20E 20  will provide a display over southern Europe, extending
roughly from 30 to 50 N.

If no hemisphere indicator is included, positive values are used to represent
Northern and Western hemispheric locations. -- If no lat/lon information is
included, a prompt will appear showing location at the center of the grid.

The Entire grid area can be displayed by entering  AREA  followed by 3 zeros,
e.g.,  AREA 0 0 0. The initial display  AREA  used in each PCGRIDDS32 session can
be specified in a file  INITMAP.CRD.
The Area can also be defined centered at a STatioN location using the ASTN command followed by a 3 or 4 character station identifier and a North-to-South display distance. If no N-to-S distance is included, a value of 30 is used. This default can be changed using NS##, where ## is the N-to-S distance.

**- Command Structures -- Displaying Primary Data Fields -

Once a file has been opened, data can be displayed by typing a series of requests on the command line. In general, a command line is read by the program from RIGHT TO LEFT to request grids and perform various functions. Results of the last (left most) operations are then displayed automatically.

To display any of the grids stored in the gridded data set, simply type the 4 letter NAME of the grid followed by [Enter]. (Again, a list of the available grids will be shown by typing LIST.) For example,

HGHT - will clear the screen & display contours of the 850 mb HeiGHT field
TEMP - will clear the screen & display contours of the 850 mb TEMPerature

A listing of the parameters possibly included in the gridded data sets follows:

**- Primary Gridded Data Fields:
HGHT > Geopotential HeiGHT (meters)
PRES > Pressure (mb)
TEMP > TEMPerature (degree C)
THTA > Potential Temperature - THeTA(degree K)
MIXR > MIXing Ratio (g/kg)
RELH > Relative Humidity (%)
DWPT > DeW Point Temperature (degree C)
TMPK > TeMPerature (degrees K)
TMPF > TeMPerature (degrees F)
THTE > Equivalent Potential Temperature - THeTa/E (degree K)
WIND > Total WIND vector (m/sec)
WSPD > Total Wind Speed (m/sec)
WDDF > Packed value of Wind Direction/speed (tens of degrees and m/sec)
WDRC > Wind DiReCtion (degrees)
BWND > WiND Barbs (m/sec)
BKNT > Wind Barbs (KNoTs)
PMSL > Mean Sea Level Pressure fields, provided without resetting LEVeL
   Note: If mean sea level pressure (GRIB ID=002) is not available, then an attempt is made to retrieve the RUC Reduction, the Eta Model Reduction, and the Standard Atmosphere Reduction, in that order.
TPCP > Total Precipitation fields, provided without resetting LEVeL (mm)
CPCP > Convective Precipitation fields, provided without resetting LEVeL (mm)
TPCI > Total Precipitation fields, provided without resetting LEVeL (in)
CPCI > Convective Precipitation fields, provided without resetting LEVeL (in)

NOTE: TPCx/CPCx attempt to retrieve a 12 hour accumulation. If this is not possible, then they try to obtain the longest accumulation (6,3,2,1) available.

LIFT > Pre-calculated LIFTed Index, provided without resetting LEVeL
PWAT > Precipitable Water fields, provided without resetting LEVeL

THCK > Generates Thickness fields determined by LVL1/LVL2 settings
THWN > Generates Thermal Wind determined by LVL1/LVL2 settings

**- Automatically derived parameters -
In addition to displays of LISTed forecast fields already in the data file, a number of derived parameters and functions can also be requested and calculated automatically as the data are being read from the computer. For example, a request of THTA will automatically calculate and display the potential temperature (THeTA) field. Some of the automatically calculated derived parameters include:

THTA (Potential Temperature)
SDEF (Saturation Deficit)
MIXR (Mixing Ratio)
SMIX (Saturation Mixing Ratio)

GEOS (Geostrophic Wind - vector)
AGEO (Ageostrophic Wind - vector)

LNDX > Provides Lifted Index calculated between LVL1 and LVL2
PLCL > Calculates the Pressure of the LCL from LEVeL data
PDEF > Calculates the Pressure lift needed for saturation form the LCL

See the Appendix or the Online Command Help for more commands and detailed explanations.

**- Overlaying displays on a single command line -
Command requests can also be presented in strings, with & (or /) as a command delimiter to indicate field overlays. For example,

RELH& - will overlay the RELative Humidity analysis on the previously requested fields in a second color, according to the sequence of colors on the color bar at the bottom of the screen.

TEMP&HGHT - will display contours of HeiGHTs at 850 mb and the 850 mb TEMPerature field in different colors on the same map.

NOTE: All command requests are processed from right to left (a la Reverse Polish Notation). As such, the command TEMP&HGHT will produce a Height field first, followed by a temperature field in a second color.

Data from different files can be overlaid under the following conditions:
1. The data must be on the same grid projection (models can differ)
2. The initial and final grid points used in any data subsetting must be the same (i.e., identical areas must be selected during the ingest process).
If these conditions are not met, a message is displayed indicating the files are a different size or type. The current plot is cleared; processing stops.

**- Changing Contour Intervals -

The Contour INTerval will be calculated automatically based on the variability of the field by default. Specific Contour INTerval requests can be specified in several ways. By typing CINT to the left of a field requested for display, the maximum and minimum of the field will be written on the screen and a prompt for a desired contour interval will appear. For example,

CINT HGHT - will read the height field and ask the user for a desired contour interval (to be input in free format, with a 0 input requesting an automatically calculated 'reasonable' interval.

NOTE: A contour interval specification normally is only in effect for one plot. To keep a contour specifications from one plot to another, type CISV
The contour interval specification mode can be returned to the single plot convention by typing CINX. For example,

HGHT CINX&DWPT&TEMP CISV CIN5 - will read the TEMPerature and DeWPoint field and display them with a 5 degree contour and then reset to automatic contour determination and overlay the HeiGHT contours.

**- Simplified Contour Interval selection -

Any contour interval can also be requested without the additional user prompt by including any of the following commands to the left or right of the desired field:

- **CIN5** - contour intervals of 5 units
- **CIN#** - contour intervals of # units
- **C10** - contour intervals of 10 units
- **C#0** - contour intervals of #0 units
- **C100** - contour intervals of 100 units
- **C#00** - contour intervals of #00 units
- **CI.2** - contour intervals of .2 units
- **C#.** - contour intervals of .# units
- **C2+3** - contour intervals of 2000 (10**2) units
- **C#+$** - contour intervals of #*10**$ units
- **C2-3** - contour intervals of .002 (10**-2) units
- **C#$-$** - contour intervals of #*10**-$ units
For example, the command line -
HGHT CI60 SLVL 500&PRES CIN4 SLVL MSL - will display the Mean Sea Level
PRESsure field contoured at 4 mb
intervals and the 500mb HeiGHTs
contoured at 60m intervals.

**- Changing Contour Colors / Dashed Contours
The Contour / Wind display colors will be assigned automatically in sequence
according to the template shown at the bottom of the screen. The default color
can be overridden by using the CLR# command,

where CLR1 refers to the first color on the template,
CLR2 refers to the second color on the template, . . .
CLA refers to the tenth color on the template, . . .
CLRH refers to the first dashed color on the template, . . .
CLRX refers to the first dotted color on the template.

Dashed contours can also be produced by including DASH in the command line.
DASH is only in effect for one plot and must be reset for additional displays.

The commands DNEG and DPOS can be used to dash either the Negative or
Positive contours in a data field.

** - Single Line Contour Plot –
PCGRIDDS32 can plot single-line scalar plots. For example, if you wish to plot the 5700 dm height
contour on the 500 mb level, enter the following commands:

HGHT 500&SLIN 5700

The new command, SLIN ####, is Single LINe followed by a four digit value of the contour you
wish to plot. This is valuable for creating “spaghetti plots” of the same contour from different model
runs or comparing different times or making a single contour stand out from the others like the
freeze line. The SLIN command is valid for only that one plot and must be called every time it is
needed.

**- Plotting Digital Grid Values at Data Points / Scaling Output
Digital values of the gridded data can also be requested as follows:
DATA > Sets display mode to plot data values at grid points.
DATT > Sets display mode to plot data values above grid points.
DATB > Sets display mode to plot data values below grid points.
DATO > Sets display mode to plot data values high Over grid points.
DATU > Sets display mode to plot data values low Under grid points.

Data Displays and Contour Labels can be requested to display specific digits
using the following Scaling and Modulo commands:

SCL0 - Display only signed digits greater than or equal to 10**0 (1)
**- Wind Displays -**

Vector displays will be generated automatically for vector quantities, or when two grids are queued for plotting. Again, 4 letter commands can be used to change the mode of display to either arrows {AROW}, barbs {BARB, m/s} or streamlines {STRM}. Winds can be displayed on pressure, height or isentropic levels.

Several wind options are available. These include:

- **WIND** to display the gridded total wind data,
- **GEOS** to display the geostrophic wind, and
- **AGEO** to display the ageostrophic wind.

For example,

**WIND&HGHT** - displays contour of the height field with wind arrows overlaid

A number of shorthand alias requests are also available, including

- **WKNT** > Retrieves the total wind Vector in knots.
- **WMPH** > Retrieves the total wind Vector in mph.
- **WKPH** > Retrieves the total wind Vector in kph.
- **BKNT** > Retrieves the total wind Vector in knots and sets display as wind barb.
- **BMPH** > Retrieves the total wind Vector in mph and sets display as wind barb.
- **BKPH** > Retrieves the total wind Vector in kph and sets display as wind barb

**- Changing Wind Arrow Length or Displaying Wind Barbs -**

The contour interval specification also acts as means for changing the length of arrows used in wind displays. Normally, the lengths of wind arrows are scaled so that the arrow representing the largest wind speed in a display is set to be equal to the distance between two adjacent grid points. Adjustments in the length can be made using the "CI" commands, where the requested "contour interval" specifies the speed to be plotted as a one grid interval length arrow. For example,

**WIND CI10** - will produce wind arrows in which the length of a 10 m/s wind is one grid spacing unit.

Winds can also be displayed as Barbs by typing **BARB**.

Winds can also be displayed as Streamlines by typing **STRM**.

To return the wind display to Arrows type **AROW**.
**Use of Layers or Multiple time periods**

Layer and/or time manipulation of PRIMARY DATA VARIABLES can be triggered by inserting keywords to the right of the desired variable. Options include:

- LDIF (Layer Difference)
- LAVE (Layer Average)
- LTOT (Layer Sum or Total)
- TDIF (Time Difference)
- TAVE (Time Average)
- TTND (Time Tendency - TDIF/time)
- TTOT (Time Sum or Total)

**NOTE:** These commands MUST be positioned to the RIGHT of the variable name and can ONLY be used with PRIMARY VARIABLES.

For example, the sequence of commands

SLYR 1000 500 - will calculate the DIFFERENCE in HGHT between the top and bottom levels defined by the SLYR command, in this case producing a 1000 to 500 mb thickness field, and

SFRS F00 F24 - will calculate and display the difference in the HGHT fields between the initial conditions and the 24 h forecast.

Entries in the SLYR or LVL# may be in either pressure or isentropic levels.

For example, the command line

SLYR 750 400 - will set the layer limits to 750 and 400 mb
SLYR I300 I320 – will set the layer limits to the isentropic layers of 300K and 320K.

Calculations using either the top or bottom levels of the layer defined by SLYR and/or the beginning or end times of a forecast period defined by FHRS can be requested without explicitly resetting the level or time defaults by inserting the following keywords to the right of the desired variable:

- LVL1 (First level of LAYR)
- LVL2 (Second level of LAYR)
- FHR1 (First time of FHRS)
- FHR2 (Second time of FHRS)

For example, the command line

HGHT LDIF&HGHT LVL2&HGHT LVL1 CI60 SLYR 1000 500 - will set the layer limits at 1000 and 500 mb and then produce contours of the 1000 and 500 mb HGHTs, followed by the 1000-500 mb thickness, all contoured with 60 m intervals.
NOTE: Once a layer or time period is set, it continues in effect for the remainder of that plot request unless overturned by another entry.

** Animation **

PCGRIDDS32 has the ability to animate both PLAN and CROS screen plots. This is accomplished in one of three ways. If PCGRIDDS32 is in Command-line Mode and you wish to animate the 500 mb heights through the full forecast length of the model run, you enter:

HGHT 500 & ANIM

The command for animation is ANIM and must be the most right command on the line. This command will cycle through every forecast hour in the active model file. The following are other animate commands:

ANMA – ANimate Macro
ANFA – ANimate Forecast hours

Command Macros can now be animated as well. The command ANMA (Animate Macro) must be before any LOOP command and there must be only one LOOP/ENDL set in the macro.

If you wish to compare two or more model runs which may have different time steps or you wish to only animate specific time steps, it is easiest to create a Macro but the function can be done from the Command line if the total commands are less than 16. Use the following example to use only the 00h, 12h, and 24h time steps out of the 00h, 06h, 12h, 18h and 24h time steps available:

From the Command line:

ENDA&ENDL&HGHT 500&SFHR 24&LOOP&ENDL&HGHT 500&SFHR 12&LOOP&EN DL&HGHT 500&SFHR 00&LOOP&ANFA

Or in a Macro:

ANFA
LOOP
SFHR 00
HGHT 500
ENDL
LOOP
SFHR 12
HGHT 500
ENDL
LOOP
SFHR 24
HGHT 500
ENDL
EN DA
If you notice, the first Macro command is **ANFA** and the plots are made up of repeating the **LOOP/ENDL** command with the last Macro command being **ENDA** which is ENDAmination creation. When the **ANFA** command is executed, PCGRIDDS32 proceeds through the forecast hours and "builds" the animation frames. Once it has cycled through all the forecast hours, it will begin to loop through the animation cycle with a preset delay between frames and with a longer delay between cycles to show the end of the cycle. There are five commands which the operator can enter while the animation is cycling; the **[UP-ARROW]** key speeds up the loop speed and **[DN-ARROW]** slows down the loop speed. The animation cycle can also be switched from a free-run mode to a step-mode at any time by pressing the **[F]** key to step forward one frame or press the **[B]** key to step back one frame. The animation cycle will stay in the step mode till the **[L]** key places it back in loop mode. The animation cycle is terminated by pressing the **[S]** key. At the end of the animation sequence, all of the bitmap files in the ANIMATION directory are deleted.

**- Specify a Cross Section Path**

Cross-section displays can display data on isentropic surfaces and constant height surfaces as well as pressure surfaces. The isentropic levels are predefined from 270K-400K every 10k. The height surfaces can be displayed in either feet or meters. This selection is made on line 3 in the file **PCGMODE.DAT**. The vertical range for CROS sections in height mode is 500 ft to 65,000 ft in 5,000 ft increments or 2000 meters to 24,000 meters in 2,000 meter increments. These are fixed in software.

The user can use pressure and forecast hour data in the file **USERINITGRID.SPC**, which is the default settings or the user can utilize all the model pressure levels or use the commands **XLVL** (followed by file name) to use predefined pressure levels. Cross-section displays for pressure surfaces can be established by typing **XSCT**, displays for Isentropic surfaces can be established by typing **XSCI** and displays for height surfaces can be established by typing **XSCH**. They are followed by the left display latitude and longitude and the right latitude and longitude. (If no lat/lon information is included, a prompt will appear.) Two formats can be used, either latitudes and longitudes followed IMMEDIATELY (no spaces between) by 1 character hemisphere indicators (e.g., 40S for 40 degrees South latitude) or signed numeric values, where positive values indicate Northern and Western Hemispheres.

Cross-sections can also be defined between two Station locations using the Command **XSTN** for pressure levels, **XSTI** for Isentropic levels or **XSTH** for Height levels followed by two 3 or 4 letter station identifiers. Once a cross-section has been defined, the base map can be redrawn with the cross section path shown as a dotted line using either the **MAP** command (to overlay a map on the existing product) or the **EMAP** command to erase the screen before drawing the map.

To set up a cross section using all model levels, these commands are executed:

```
ALVL
XSCT  55.00   80.00  25.00   80.00
```

To set up a cross section using XLVL with the file name ‘505m’, these commands are executed:
The look of the Cross section display is created by a series of commands executed from the files USERXCROSSSECTION.DAT for cross sections. This file can be customized by the user to change the look of the display. If these files are not found while attempting to build a CROS section, the program will default to the current operational CROS display.

The following commands are what are included in the USERXCROSSSECTION.DAT file:

NLBL XLTN CLRY&
NCLB NLBL PRES CLRY&
XLBB SCL0 NLBL CLRF LAST&
XLBB SCL0 NLBL ALAT CLRF&
XLBB SCL0 NLBL DATT ALON CLRF&

To remove the cross section path, type either XSTN 9999 or XSCT 9999.

Defining a cross section path also initiates the cross section display mode. Display modes can be switched from cross section to plan view by typing PLAN, and from plan view to the previously established cross section by typing CROS.

**- Cross Section Wind displays**

Cross-sectional wind displays can be modified to provide rotated, cross-section relative wind representations by typing XREL to the left of the desired wind type. Individual cross-sectional relative components can be displayed using TANG and NORM for contour of the tangential and normal wind components and VTNG and VNRM for vector component displays.

Vertical circulations displays of the tangential component of the wind and the vertical velocity are produced by typing VCRC followed by a wind type.

A number of shorthand notation aliases are available for cross-sectional wind displays, including:

WNDX to display the total wind rotated relative to the cross section
GEOX to display the geostrophic wind rotated relative to the cross section
AGEO to display the ageostrophic wind rotated relative to the cross section
WCRC to display vertical/tangential circulations of total wind
GCRC to display vertical/tangential circulations of geostrophic wind
ACRC to display vertical/tangential circulations of ageostrophic wind

**- Specify a Time Section Point**

Time-section displays can display data on isentropic surfaces and constant height surfaces as well as pressure surfaces. The isentropic levels are predefined from 270K-400K every 10k. The height surfaces can be displayed in either feet or meters. This selection is made on line 3 in the file PCGMODE.DAT. The vertical range for
TIME sections in height mode is 500 ft to 65,000 ft in 5,000 ft increments or 2000 meters to 24,000 meters in 2,000 meter increments. These are fixed in software. The user can use pressure and forecast hour data in the file USER\INITGRID.SPC, which is the default settings or the user can utilize all the model pressure/forecast hours or use the commands XLVL and THRS (followed by file names) to use predefined pressure levels and forecast hours respectively. Time-section displays can be established for pressure surfaces by typing TSCT, for Isentropic surfaces by typing TSCI and for Height surfaces by typing TSCH. They are followed by the display latitude and longitude. (If no lat/lon information is included, a prompt will appear.) Two formats can be used, either latitudes and longitudes followed IMMEDIATELY (no spaces between) by 1 character hemisphere indicators (e.g., 40S for 40 degrees South latitude) or signed numeric values, where positive values indicate Northern and Western Hemispheres.

Time-sections can also be defined for a Station location using the TSTN command followed by a 3 or 4 letter station identifier. Once a time-section has been defined, the base map can be redrawn with the time section point shown as a dotted line using either the MAP command (to overlay a map on the existing product) or the EMAP command to erase the screen before drawing the map.

To set up a time section using all model levels, these commands are executed:

ALVL
TSCT 55.00 80.00 25.00 80.00

To set up a time section using XLVL with the file name ‘505m’, these commands are executed:

XLVL 505m
TSCT 55.00 80.00 25.00 80.00

To set up a time section using all model levels and all forecast hours, these commands are executed:

ATIM
ALVL
TSCT 42.37 71.03

To remove the time section point, type either TSTN 9999 or TSCT 9999.

Defining a time section also initiates the time section display mode. Display modes can be switched from time section to plan view by typing PLAN, and from plan view to the established time section by typing TIME.

The look of the Time section display is created by a series of commands executed from the file USER\TIMESECTION.DAT for time sections. This file can be customized by the user to change the look of the display. If this file is not found while attempting to build a TIME section, to program will default to the current operational TIME display. The following commands are what are in the included in the USER\TIMESECTION.DAT file:

NCLB NLBL PRES CLRY&
XLBL SCL0 NLBL CLRF LAST&
XLBB SCL0 NLBL HOUR CLRF&
NLBL HOUR CLRY&
**- PRINTING -**
PCGRIDDS32 prints to the default system printer. This printer can be either local or networked and can print in either Portrait or Landscape mode. The command **PRNT** will print the current screen contents automatically to the Windows default printer and no Print Dialog is displayed. If you wish to make any modifications to the Windows printer setup, it must be done outside of PCGRIDDS32. There are no other print modes in PCGRIDDS32 as there were in the DOS PCGRIDDDS. Print copies seem to look the best at 800x600 video mode. Special thanks goes out to Dave Ballinger for his programming contribution for this function.

**- Diagnostic Functions - Background and Philosophy -**
The ability to calculate and combine a variety of quantities derived from the grid point data greatly enhances the diagnostic capabilities of the system. The diagnostics are expressed in functional form, in that a function name is followed by an ordered set of arguments, optionally enclosed in parentheses or brackets and separated by commas.

As an illustration, advection is expressed as the function **ADVT** followed by a Scalar quantity and a Wind Type. As such, the Temperature Advection field should be thought of as "ADVecTion of the TEMPerature by the Total WIND" and correspondingly requested using the sequence **ADVT(TEMP,WIND)**. Similarly, the ageostrophic component of the Moisture Advection is expressed as "ADVecTion of the MIXing Ratio by the AGEOstrophic wind" and requested by **ADVT(MIXR,AGEO)**. Here, both the Mixing Ratio and Ageostrophic Wind are derived automatically.

Functional calls can also be chained together. For example, Vorticity Advection is thought of as "Advection of the Vorticity of the Total Wind by the Total Wind." As such, the functional request becomes **ADVT[VORT(WIND),WIND]**.

For clarity, either parentheses - ( and ) - or brackets - [ and ] - can, as an option, be used to group the function arguments.

**- Available Diagnostic Functions -**
See the Appendix or the Command Help option for full listing of available commands.

Some frequently used functions available, include:

- **SSUM** [Followed by 2 Scalars] > Calculates Scalar grid sum
- **SAVR** [Followed by 2 Scalars] > Calculates Scalar grid average
- **SDIF** [Followed by 2 Scalars] > Calculates Scalar grid difference
- **STND** [Followed by 2 Scalars] > Calculates Scalar grid time tendency
- **SMLT** [Followed by 2 Scalars] > Multiplies two Scalar fields
- **SDVD** [Followed by 2 Scalars] > Divides two Scalar fields
- **SADC** [Followed by a 4 digit value] > Sum of Scalar & specified constant
- **SSBC** [Followed by a 4 digit value] > Difference of Scalar & specified constant
- **SMLC** [Followed by a 4 digit value] > Multiplies Scalar by specified constant
- **SDVC** [Followed by a 4 digit value] > Divides Scalar by specified constant
INVS [Followed by a Scalar] > Finds INVerSe of a Scalar
INV1 [Followed by a Scalar] > Finds INVerse of a Scalar with max. of 1
ABSV [Followed by Scalar] > Calculates ABSolute Value of Scalar grid
SINE [Followed by Scalar] > Calculates the SINE of Scalar grid (e.g., WDRC)
COSN [Followed by Scalar] > Calculates the COSiNe of Scalar grid (e.g., WDRC)
TNGT [Followed by Scalar] > Calculates the TaNGenT of Scalar grid (e.g., WDRC)
SNEG [Followed by Scalar] > Finds the NEGative of a Scalar grid

DSDX [Followed by Scalar] > Calculates X gradient of Scalar
DSDY [Followed by Scalar] > Calculates Y gradient of Scalar
MGRD [Followed by a Scalar] > Magnitude of the GRaDient of a Scalar field
GRAD [Followed by a Scalar] > Finds the GRADient of a Scalar field
NGRD [Followed by a Scalar] > Finds the Negative GRaDient of a Scalar field
MGRD [Followed by a Scalar] > Magnitude of the GRaDient of a Scalar field

VADC [Followed by a 4 digit value] > Sum of Vector & specified constant
VSBC [Followed by a 4 digit value] > Difference of Vector & specified constant
VMLC [Followed by a 4 digit value] > Multiplies Vector by specified constant
VDVC [Followed by a 4 digit value] > Divides Vector by specified constant
VNEG [Followed by Vector] > Finds the NEGative of a Vector field
VSUM [Followed by 2 Vectors] > Calculates the Vector sum
VAVR [Followed by 2 Vectors] > Calculates the Vector average
VDIF [Followed by 2 Vectors] > Calculates the Vector difference
VTND [Followed by 2 Vectors] > Calculates the Vector time tendency
VMLT [Followed by 2 Vectors] > Multiplies two Vectors by components
DOTP [Followed by 2 Vectors] > Calculates the DOT Product of 2 Vectors
CRSP [Followed by 2 Vectors] > Calculates the CRoSs Product of two Vectors
VDVD [Followed by 2 Vectors] > Divides two Vectors by components

VKNT [Followed by a Vector] > Converts a Vector from m/s to KNoTs
VMPH [Followed by a Vector] > Converts a Vector from m/s to MPH
VKPH [Followed by a Vector] > Converts a Vector from m/s to KPH
MAGN [Followed by a Vector] > Calculates MAGNitude of a Vector
SKNT [Followed by a Scalar] > Converts a MAGNitude of a Vector
SKMPH [Followed by a Scalar] > Converts a Scalar (e.g., WSPD) from m/s to MPH
SKPH [Followed by a Scalar] > Converts a Scalar (e.g., WSPD) from m/s to KPH

ISAL > Computes the Isallobaric Wind
INAD > Computes the Inertial Advective Wind
JCBN [Followed by 2 Scalars] > Computes the Jacobian determinate of two scalars
FRTG [Followed by wind Vector] > Computes Frontogenesis of the wind
DFCP [Followed by a vector] > Calculate the Deformation components
(T X COMP, Y COMP) of any vector
FVCT > Calculates F (Normal wind) Vectors
QVCT > Calculates Q (Geostrophic wind) Vectors
THTS > Calculates Saturated Theta-e

ADV [Followed by Vector] > Calculates advection
DFVRG [Followed by a Vector] > Calculates divergence
FLUX [Followed by a Scalar & a Vector] > Produces a flux Vector
SDVR [Followed by Scalar and Vector] > Calculates flux divergence
RVRT [Followed by a Vector] > Calculates relative vorticity
VORT [Followed by a Vector] > Calculates absolute vorticity
IPVO > Isentropic Potential Vorticity calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to Theta levels.
IPVA > Isentropic Potential Vorticity Advection calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to Theta levels.
PVT A > Isobaric Potential Vorticity (Theta) calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVTE > Isobaric Potential Vorticity (Theta-E) calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVTS > Isobaric Potential Vorticity (Theta-S) calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVAA > Isobaric Potential Vorticity (Theta) Advection calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVEA > Isobaric Potential Vorticity (Theta-E) Advection calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVSA > Isobaric Potential Vorticity (Theta-S) Advection calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.

SMTH > Applies a binomial smoother to the active Scalar gridded data
VSMT > Applies a binomial smoother to the active Vector gridded data

ZPOS > Sets all positive values to zero
ZNEG > Sets all negative values to zero
RLTN [Followed by a 4 digit value] > Replaces values Less Than with that value
RGTN [Followed by a 4 digit value] > Replaces values Greater Than with value

**- Diagnostic Functions - Cross Section Specific:
XREL [Followed by Vector] > Rotates Vector from earth to cross sector relative
TANG [Followed by Vector] > Finds cross-section relative tangential component
VTNG [Followed by Vector] > Plots cross-section relative tangential component
VCRC [Followed by Vector] > Plots VTNG & VVEL
VCR2 [Followed by Vector] > Plots VTNG & VVEL scaled by 2
VCR5 [Followed by Vector] > Plots VTNG & VVEL scaled by 5
NORM [Followed by Vector] > Finds cross-section relative normal component
VNRM [Followed by Vector] > Plots cross-section relative normal component

**- Examples of Diagnostic Functions -
Some sample diagnostic command sequences include:

MAGN(WIND) - will calculate and display isotachs of the MAGNitude of the total WIND.
SDIF(MIXR,SMIX) - will produce the difference between the true and Saturation MIXing Ratios --- the saturation deficit.
ADVT[TEMP,WIND] - will produce the TEMPerature ADvecTion field using the total WIND, - Note brackets/parens are interchangeable.
ADVT TEMP GEOS - will produce the TEMPerature ADvecTion field using the GEOStrophic wind, - Note brackets can be omitted
ADVT(PRES,WIND) S982 - will set the default level to the bottom sigma level of the NGM and calculate the ADvecTion of PRESsure on a sigma surface by the WIND, a measure of the orographic vertical motion,
**- Shorthand specifications and Commonly Used Diagnostic Functions -**
For simplicity, frequently used sequences of commands can be grouped together and given a 4 character ALIAS name. These alias names can be used in exactly the same fashion as all other PCGRIDDS32 commands, with the difference that they are completely user defined in the file USER\ALIAS.DAT.

Some predefined systems aliased diagnostic commands include,

- **WSPD** > Generates isotachs for the Total wind
- **WVRT** > Generates vorticity of the Total wind
- **GVRT** > Generates vorticity of the Geostrophic wind
- **THCK | TKNS** > Generates Thickness fields on levels defined by LVL1/LVL2
- **THWN | TWND** > Generates Thermal Wind on levels defined by LVL1/LVL2

**- Saving and Restoring Pre-Generated Graphics**
Plots can be saved for rapid redisplay by typing the command SAVE followed by a space and a 4-character file name (the qualifier .SVG will also be added automatically). All plot commands are saved until the command ENDS is used. To restore the saved plot file, either type REST followed by the file name (again without the .SVG qualifier) or type the file name followed by a semicolon. The results will be displayed over whatever is on the screen already, so be sure to erase the existing graphics using ERAS if you do not want the graphics overlaid on the existing screen display. The .SVG files can also be used to produce hard-copy on HP laser printers.

For example, the sequence of commands -
```
SAVE 500Z
VORT WIND&HGT SLVL 500
ENDS
ERAS
REST 500Z
```
- will create a .SVG file labeled 500Z.SVG, generate contours of the 500 mb Height and Vorticity fields and save the plotting commands, close the .SVG file, erase the screen and then restore graphics.

The screen contents can be saved to a BMP-format file. The command SAVS followed by a space and a 4-character file name (the qualifier .BMP will be added automatically) will save the contents of the screen.
**- Repeating previous commands**

A list of the previous 21 commands input from the keyboard is given by entering the command CMD. This command ERASES the screen. Individual commands can be examined without erasing the screen by using the command CMD#, where # is the order number of the previous command, e.g., CMD2 will list the 2nd previous command. For commands 10 through 21, the letters A through L are used.

A previous command can be repeated by using the command RPT#, where again # refers to the order number of the previous command. The command results can be overlaid on the existing graphics by including a & after the command. As such, RPTB& will overlay the 11th previous command on the existing graphics.

A historical record of all commands used in a particular session is stored in the file COMMAND.OUT. Reference to particularly complicated commands from this file can simplify writing the command files to be described next.

**-Calculating Convection and Shear Parameters**

PCGRIDDS32 can now directly calculate numerous convection and wind shear parameters. PCGRIDDS32 also has new flag commands to control the way the convection and shear parameters are calculated. Below are the new control flags for convection:

- **VTMP** – Virtual Temperature Correction
  All convection parameters are calculated without virtual temperature correction by default. This flag enables that correction.
- **SBSI** – Surface-Based Lifted Parcel Selected
- **MLSI** – Mean-Layer Lifted Parcel Selected
- **MUSI** – Most Unstable Lifted Parcel Selected
- **USSI** – User-Selected Lifted Parcel Selected

If no Lifted Parcel method is selected, Surface-Based Lifted Parcel is default.

Examples –

To calculate CAPE with virtual temperature correction and using the Mean-Layer Lifted Parcel, enter:
CPOS VTMP MLSI

PCGRIDDS32 can also calculate various wind shear and supercell wind-motion parameters. There is a new control flag for shear calculations:

- ****KM – Defines the Lower/Upper bounding levels in Kilometers
  The first * (0-9) defines the lower level to use and the second * (0-9) defines the upper level to use. Therefore, a command 14KM defines the 1km to 4km layer.

The wind shear Vector/Scalar diagnostics can be calculated on Pressure, Isentropic or Height layers defined with the SLYR command or with the **KM flag:

Examples –

To calculate the total shear between the isentropic layers I320 and I350, enter:
TSHR & SLYR I320 I350
To calculate the right-moving storm-relative helicity through the 0-3km layer, enter:

SRHR 03KM

*****************************************************************************************
*****************************************************************************************

The calculations of shear and convection parameters may not exactly match what other programs calculate due to the variations in near surface/boundary-layer data used to calculate the parameters. Some calculations are very sensitive to the lower layer data. However, the results you get with PCGRIDDS32 should be very close to other programs’ calculations. Remember – the accuracy of the product is only as good as the data used in the calculation. The less vertical data which is available, the less accurate the solution.

**- COMMAND {MACRO} FILES -
A command file is simply a sequence of command lines to be executed in series, and can be used as shorthand notations for frequently used or particularly complicated command sequences or to produce pre-defined products.

Pre-specified sequences of command lines can be written into an ASCII file using any word processor. The Command File can be given any 4 letter NAME and must be followed by the qualifier ".CMD". To execute the Command File, type the file NAME at the BEGINNING of a command line, followed IMMEDIATELY by a period. The requested command lines will be displayed in sequence, with a prompt to press [Enter] displayed between command lines.

Loops can also be set up by including the word LOOP alone at the beginning of any line of the Command File. Loops are ended by including the command line ENDL. User prompts at the end of each command line are NOT given while in LOOP mode. Pauses between looped command lines can be included by adding the commands 1SEC, 3SEC, 5SEC, 7SEC, or 9SEC, depending on the number of seconds desired.

Annotation can also be added to any line on the screen using the TXT# command. For example, 'TXT3 This is line 3' will write the text on the third line of the screen.
**- Sample COMMAND FILE -
A sample Command File containing -

WIND&TEMP CIN5&HGHT CI60 SLVL 850 F00
LOOP
WIND&TEMP CIN5&HGHT CI60 F12
WIND&TEMP CIN5&HGHT CI60 F24 5SEC
WIND&TEMP CIN5&HGHT CI60 F36 5SEC
WIND&TEMP CIN5&HGHT CI60 F48 5SEC
ENDL

- will display the initial 850 mb heights, temperatures and winds, request
  the user to press [Enter], and then display a loop of the 12, 24, 36,
  and 48 h forecasts, pausing 5 seconds between each completed graphic.

---

PCGRIDDS32 Automatic Mode

The following discussions describe the operation of PCGRIDDS32 in *Automatic Mode*.

PCGRIDDS32 can be run in an automatic mode. Within a batch file or if you are at a Windows
Command prompt, you can enter PCGRIDDS32 followed by a listing of up to 20 PCG Data files
followed by a single Command Macro file name. PCGRIDDS32 will startup, load all the data files
in the order they were listed and will execute the command macro file and will then quit. This
process is useful for generating PCGRIDDS32 graphics (a screen save operation) without
needing to have a user do it by hand. The screen save commands (SAVS) must be included in
the command macro and the command macros cannot require any user intervention or the
system will pause waiting for the user to enter the required data.

-- Automatic Starting PCGRIDDS32
Use the following example to initiate a PCGRIDDS32 session in *Automatic Mode*:

1. From the MS command line within the PCGRIDDS32 directory or within a batch file, enter:
   c:\PCGRIDDS32> PCGRIDDS32 JL030312.ETA211 TEST.CMD

   All commands are separated by spaces and the last entry **MUST** be the name of a
   single command macro file name with the .CMD extention.

---

Online Help

-- Menu Mode
The [F1] key is used to access ONLINE HELP when you are in *Menu Mode*.
When HELP is available for a particular screen, F1 is displayed on the top line
of the screen (function key line). The HELP text that is displayed describes the
current menu or form, available options, and function keys.
The 'Product List' menu is an exception. No general HELP is provided. Instead, you can display HELP for an individual product if it is available. To display HELP for a product, position the highlight to the product and press [F1].

Once HELP is selected, you can press [PageDown] to move forward through the text. You cannot page backwards through the text. However, when you press [PageUp], you are positioned at the start of the text. Use the [ESC] key to exit HELP.

-- Command Mode
HELP in Command Mode provides information about the use of individual PCGRIDDS32 commands. To access the 'HELP' menu (Fig.28), type HELP or [?] on the command line followed by [Enter].

![Fig.28](image_url)

To select an option, type the option value at the prompt. The option, NAME, refers to a four character PCGRIDDS32 command. Once HELP is selected, you can press [Enter] to move forward through the text. You cannot page backwards through the text. Press [X] [Enter] to exit the HELP option.

A description of the options available in the Command Mode HELP menu follows:

1. **COMMAND MODE TUTORIAL** provides basic instructions for operating PCGRIDDS32 in Command Mode (refer to Appendix B).
2. **COMMAND FUNCTION SUMMARY** provides a one line description of all the PCGRIDDS32 commands. The commands are grouped by functional categories, for example, Level specification or Diagnostic functions (refer to Appendix C).
3. **ALPHABETICAL COMMAND SUMMARY** displays the same information as option 2 except that the commands are arranged in alphabetical order.
4. **LISTING OF BASIC GRID FIELDS** provides a one line description...
of commands that directly retrieve data stored in the gridded data file (refer to Appendix D).

5. **ALPHABETICAL LIST OF BASIC GRIDS** displays the same information as option 4 except that the basic grid field commands are arranged in alphabetical order.

6. **HELP FOR SPECIFIC NAMED COMMAND** -- Type a four character PCGRIDDS32 command to display EXTENDED HELP for that command.

7. **RETURN TO PCGRIDDS32** -- Press [X] [Enter] to exit the ‘HELP’ menu and return to PCGRIDDS32 in Command Mode.

To obtain **EXTENDED HELP** from the command line, type **HLPX** followed by a four character PCGRIDDS32 command or product on the command line. This displays a description of the command that is contained in its associated HELP file (**xxxx.HLP**) if it is available. For example, to obtain an extended description of the **LIST** command, type: **HLPX LIST**

If less detailed HELP is desired, **QUICK HELP** is available directly from the command line. Type **HELP** or [?] followed by a four character PCGRIDDS32 command on the command line. This displays a one line description of that command without disrupting the current screen display.

**Note:** A blank must precede the PCGRIDDS32 command name. For example, to obtain a description of the **LIST** command, type: **? LIST**

--- Help Files

Text for **ONLINE HELP** is stored in ASCII files located in the HELP directory. These files can be viewed, modified, or supplemented using a standard text editor. They can also be printed if a hard copy is desired.

The general **HELP** files for **Menu Mode** and the **HELP** files for **Command Mode** are provided as part of the PCGRIDDS software. A standard set of product (macro) HELP files is also included. If you add custom macros to the product set, you should also provide the corresponding HELP files. Refer to the 'Defining Products' section for a discussion of macros.

Types of HELP files:

**Menu**

These files provide the **ONLINE HELP** for menus and forms in PCGRIDDS32.

**Name**

The filename consists of a 5-8 character name defined in the PCGRIDDS32 program followed by the extension HLP. The name of the HELP file **must** be a minimum of 5 characters to prevent confusion between product and menu HELP files. The name of the HELP file should be written at the end of the help text. This allows the system administrator to determine the HELP file associated with a given menu.

**Format**

The maximum number of characters per line is 78.
Product These files provide the EXTENDED HELP for products, commands, and aliases.

Name The name of the file must be xxxx.HLP where xxxx is the four character PCGRIDDS32 command or product name.

Format The maximum number of characters per line is 78. All lines must end with 'hard' carriage returns.

Command These files provide GENERAL HELP and QUICK HELP in Command Mode.

Names --- HELP.DAT This file provides basic instructions and a tutorial for operating PCGRIDDS32 in Command Mode.
--- HLPC.DAT This file provides a one line description of PCGRIDDS32 commands and aliases.
--- HLPG.DAT This file provides a one line description of the basic gridded data fields.

Format The maximum number of characters per line is 78. All lines must end with a ‘hard’ carriage return.

The characters **- at the beginning of a line indicate the start of a new page. A line beginning with % indicates the end of the file.

The files, HLPC.DAT and HLPG.DAT contain one line descriptions of commands or gridded data fields. Each line must begin with the 4 character name of the command or data field that is described.
Customizing the PCGRIDDS32 System

Customizing WAFS GRIB Ingest

The WAFS GRIB ingest process requires the user to select the Octant(s) area of the globe which covers the surface area the user is interested in viewing. The user is expected to have downloaded the similar GRIB data which coincides with the Octant coverage which was selected. This is Option 3 in the Ingest GRIB Data Menu.

-- Areas for Gridded Data Set

The menu which contains the list of areas used for the gridded data set is stored in the ASCII formatted file, C:\PCGRIDDS32\GRIB\USER\OCTETS.MNU.

This file can be modified using a standard text editor. Each line in the file describes the latitude/longitude boundaries of an area. The lines are displayed sequentially in groups of 17 lines per screen. The file can contain a maximum of 10 screens of data (170 entries). A maximum of 72 characters can be entered on a line. The first 3 characters of each line in the menu refer to the extension of a file, C:\PCGRIDDS32\GRIB\OCTETS.xxx, that contains parameters which define the selected area for PCGRIDDS. For example if you select the entry, ‘WSW - GRIDDED DATA for SOUTHERN HEMISPHERE Centered on Western Hemisphere’, the area is described in the file OCTETS.WSW. All the OCTET files referenced in the default menu are provided with PCGRIDDS.

PCGRIDDS32 automatically ‘numbers’ the order of appearance for each entry on the menu page. All other characters displayed for the entry lines must be contained in the menu file. In the example below, some entries are left blank for clarity. If the user selects a blank entry, PCGRIDDS32 will beep and return to the menu.

The default menu file is shown below. It contains the areas that can be formed from the octets available to PCGRIDDS32. Depending on the needs of your environment, you can display the entire set of areas or select a subset.

............... Begin file OCTETS.MNU.........................

*** WAFS AREA SELECTION MENU ***

*** WAFS AREA SELECTION MENU ***

** GRIB data for ALL required octants must be in GRIB\WAFS\OCTANT#

--- Global Coverage ---

WFG - GLOBE Centered on Greenwich (Octants=OPMNKLJ)
WFD - GLOBE Centered on the Date Line (Octants=MNOPKLJ)
WFW - GLOBE Centered on the Western Hemisphere (Octants=NOPMJKLI)
WFE - GLOBE Centered on the Eastern Hemisphere (Octants=PMNOLJK)

--- Hemisphere Coverage ---

WNG - NORTHERN HEMISPHERE Centered on Greenwich (Octants=KLIJ)
WND - NORTHERN HEMISPHERE Centered on the Date Line (Octants=IJKLM)
WNW - NORTHERN HEMISPHERE Centered on Western Hemisphere (Octants=JKL)
WNE - NORTHERN HEMISPHERE Centered on Eastern Hemisphere (Octants=LIJK)
WSG - SOUTHERN HEMISPHERE Centered on Greenwich (Octants=OPMN)
WSD - SOUTHERN HEMISPHERE Centered on the Date Line (Octants=MNOP)
WSW - SOUTHERN HEMISPHERE Centered on Western Hemisphere (Octants=NOPM)
WSE - SOUTHERN HEMISPHERE Centered on Eastern Hemisphere (Octants=PMNO)

--- Selected Areas ---

PL2 - The Caribbean and the Americas (Octants=PL)
OK4 - The Pacific and the Americas (Octants=OPKL)
MI4 - Europe, Africa and Western Asia (Octants=MNIJ)

---***-- Northern Hemispheric Areas --***--

WI1 - AREA between 30W to 60E and 0N to 90N (Octants=I)
WI2 - AREA between 30W to 150E and 0N to 90N (Octants=IJ)
WI3 - AREA between 30W to 120W and 0N to 90N (Octants=IJK)
WI4 - AREA between 30W to 30W and 0N to 90N (Octants=IJKL)
WJ1 - AREA between 60E to 150E and 0N to 90N (Octants=J)
WJ2 - AREA between 60E to 120W and 0N to 90N (Octants=JK)
WJ3 - AREA between 60E to 30W and 0N to 90N (Octants=JKL)
WJ4 - AREA between 60E to 60E and 0N to 90N (Octants=JKL)
WK1 - AREA between 150E to 120W and 0N to 90N (Octants=K)
WK2 - AREA between 150E to 30W and 0N to 90N (Octants=KL)
WK3 - AREA between 150E to 60E and 0N to 90N (Octants=KLI)
WK4 - AREA between 150E to 150E and 0N to 90N (Octants=KLIJ)
WL1 - AREA between 120W to 30W and 0N to 90N (Octants=L)
WL2 - AREA between 120W to 60E and 0N to 90N (Octants=LI)
WL3 - AREA between 120W to 150E and 0N to 90N (Octants=LIJ)
WL4 - AREA between 120W to 120W and 0N to 90N (Octants=LIJK)

---***-- Southern Hemispheric Areas --***--

WM1 - AREA between 30W to 60E and 90S to 0N (Octants=M)
WM2 - AREA between 30W to 150E and 90S to 0N (Octants=MN)
WM3 - AREA between 30W to 120W and 90S to 0N (Octants=MNO)
WM4 - AREA between 30W to 30W and 90S to 0N (Octants=MNOP)
WN1 - AREA between 60E to 150E and 90S to 0N (Octants=N)
WN2 - AREA between 60E to 120W and 90S to 0N (Octants=NO)
WN3 - AREA between 60E to 30W and 90S to 0N (Octants=NOP)
WN4 - AREA between 60E to 60E and 90S to 0N (Octants=NOPM)
WO1 - AREA between 150E to 120W and 90S to 0N (Octants=O)
WO2 - AREA between 150E to 30W and 90S to 0N (Octants=OP)
WO3 - AREA between 150E to 60E and 90S to 0N (Octants=OPM)
WO4 - AREA between 150E to 150E and 90S to 0N (Octants=OPMN)
WP1 - AREA between 120W to 30W and 90S to 0N (Octants=P)
WP2 - AREA between 120W to 60E and 90S to 0N (Octants=PM)
WP3 - AREA between 120W to 150E and 90S to 0N (Octants=PMN)
WP4 - AREA between 120W to 120W and 90S to 0N (Octants=PMNO)

---***-- Rectangular Pole-to-Pole Areas --***--

MI2 - AREA between 30W to 60E and 90S to 90N (Octants=MI)
MI4 - AREA between 30W to 150E and 90S to 90N (Octants=MNIJ)
MI6 - AREA between 30W to 120W and 90S to 90N (Octants=MNOIJK)
MI8 - AREA between 30W to 30W and 90S to 90N (Octants=MNOPIJKL)
NJ2 - AREA between 60E to 150E and 90S to 90N (Octants=NJ)
NJ4 - AREA between 60E to 120W and 90S to 90N (Octants=NOJK)
NJ6 - AREA between 60E to 30W and 90S to 90N (Octants=NOPJL)
NJ8 - AREA between 60E to 60E and 90S to 90N (Octants=NOPMJKLI)
OK2 - AREA between 150E to 120W and 90S to 90N (Octants=OK)
Customizing PCGRIDDS32

You can customize the basic operation of PCGRIDDS32 by modifying the files in the C:\PCGRIDDS32\USER directory. Unless otherwise specified, all files discussed in this section reside in the C:\PCGRIDDS32\USER directory. Many files contain internal documentation that describes each item and its range of acceptable values. It is IMPERATIVE that you make the data entries at the specified line and column of the file.

Note: The documented files identify a line number and an entry number for each data entry. The line position of an entry should not be changed except in very special cases. If for any reason the line position of a data entry is changed, the change in the input line number must be recorded by your system administrator in C:\PCGRIDDS32\DATA\FILTBL.DAT. The entry numbers indicate the order in which the line numbers are recorded in this file.

-- PCGRIDDS32 Configuration

The file, PCGMODE.DAT, contains the most basic information about the requirements of your PCGRIDDS32 environment. This includes the default operating mode (Menu or Command), the location of the gridded data files, the default name of the map base file, and printing specifications. Refer to the file itself for a description of each item and its acceptable values. A sample file is shown below.
................. Begin file PCGMODE.DAT .................
'MENU'
'C:\PCGRIDDS32\GRIDDATA' 'C:\PCGRIDDS32\GRIDDATA'
'FEET'
'WORLD'
'<' '^' '>'
12 30 6
'C:\PCGRIDDS32\PRTFIL\'
'SCRN'
1.0
'BLKW'
'LT'
'L'
8
6
'LPT1'
'CMDMENU.017'
'EXT'
**************** File structure documentation ***********************
LINE 1 (Entry 1)  PCGRIDDS32 startup mode
ENTER:  'MENU' or 'CMD.' (Use single quotes)
'MENU'= PCGRIDDS32 will start up in MENU mode
'CMND'= PCGRIDDS32 will start up in COMMAND mode

LINE 2 (Entry 2)  Source and destination directories for forecast data
ENTER:  SOURCE DIRECTORY (1) for forecast data displayed by PCGRIDDS32 followed by DESTINATION DIRECTORY (2) for forecast data converted from GRIB to PCGRIDDS format. (Use single quotes)
Entries on the line have the format:
'd:\xxxxxxxx\yyyyyyyy' 'd:\xxxxxxxx\yyyyyyyy'
Where d is the drive letter, xxxxxxxx is the directory, and yyyyyyyy is the subdirectory that contains the forecast data.
The path name can contain a maximum of 20 characters.
The directory and subdirectory names are optional.
Separate SOURCE DIRECTORY (1) from DESTINATION DIRECTORY (2) by one or more spaces.
NOTE: Entries for the two directories may have the same value. If the DESTINATION DIRECTORY (2) is omitted, then the SOURCE DIRECTORY (1) is used.

LINE 3 (ENTRY 11)  Height Scale
ENTER:  '****'= This entry is for the HEIGHT displays to display height data in meters or feet
LINE 4 (Entry 3)  Map base file name
ENTER: 'xxxxxxxx'  (Use single quotes)
Where xxxxxxxx is the name (1-8 characters) of the map base file. Do not include the directory or the file extension. The file must be in the directory 'DATA' and have the extension 'MAP'. The name entered on line 4 will be the default value used when PCGRIDDS32 is started. It can be changed during the execution of PCGRIDDS with the 'BSMP' command. If you wish to use the new high resolution map files, which would be listed in the MAPFILE.DAT, you must enter 'OTHER' on Line 4.

Line 5 (Entry 15)  Time looping control characters
ENTER: 'b' 'c' 'f'  (USE SINGLE QUOTES)
'b' is the backward time loop character; default='<'
'c' is the current time loop character; default='^'
'f' is the forward time loop character; default='>'
The above control characters should be changed only if the default character is not on the keyboard. Most ASCII characters (34<code<256) can be used except for ?(63), .(46), :(58), &(38), and \(92).

LINE 6 (Entry 13)  Initial time looping values
ENTER: b# e# d#
b# is the beginning forecast hour
e# is the ending forecast hour
d# is the hour increment

LINE 7 (Entry 15)  Print Save Directory (max 60 characters)
LINE 8 (Entry 4)   Type of print output
*** Used for printing within PCGRIDDS and 'Delayed PostScript Print'; does NOT apply to 'HP Compatible Print' ***
ENTER: 'POST' or 'SCRN'  (Use single quotes)
'POST' = Print output will be sent to a PostScript printer
'SCRN' = A screen dump will be sent to the printer. It will not work on a PostScript printer unless the printer is set to automatically detect and switch modes.
Note: If you use this setting, you must add the 'GRAPHICS' command to your AUTOEXEC.BAT file.

LINE 9 (Entry 5)   Aspect ratio adjustment -- Keeps the proportions of the printed plot the same as on the screen
*** Used if Entry 4='SCRN' or with PRSC command ***
ENTER: Y_FACTOR of the printer for screen dump
Y_FACTOR = .75 (X_UNADJ/Y_UNADJ)
X_UNADJ, Y_UNADJ are the X,Y dimensions of the box surrounding a plot that is produced using A Y_FACTOR=1.0

LINE 10 (Entry 6)  Color capability of PostScript printer
*** Used ONLY if Entry 4='POST'; does NOT apply to 'HP Compatible Print' ***
ENTER: 'BLKW', 'COLR' or 'NOPS' (Use single quotes)
'BLKW' = Black and white PostScript printer
'COLR' = Color PostScript printer
'NOPS' = No PostScript printer

LINE 11 (Entry 7) Paper Size
*** Used ONLY if Entry 4='POST'; does NOT apply to 'HP Compatible Print' ***
Enter: 'LT', 'LG' or 'A4' (Use single quotes)
'LT' = Paper size is letter (8.5in x 11in)
'LG' = Paper size is legal (8.5in x 14in)
'A4' = Paper size is A4 (210mm x 297mm)

LINE 12 (Entry 8) Paper Orientation
*** Used ONLY if Entry 4='POST'; does NOT apply to 'HP Compatible Print' ***
Enter: 'P' or 'L' (Use single quotes)
'P' = Print plot in portrait mode
'L' = Print plot in landscape mode

LINE 13 (Entry 9) Text size for plot labels
*** Used ONLY if Entry 4='POST'; does NOT apply to 'HP Compatible Print' ***
Enter an integer number to indicate the text size used for the labels written underneath the plot. The recommended value is 8 points.

LINE 14 (Entry 10) Number of label lines printed
*** Used ONLY if Entry 4='POST'; does NOT apply to 'HP Compatible Print' ***
Enter an integer number to indicate the maximum number of text lines allowed underneath the plot. For text size=8 and letter size paper in landscape mode, the recommended value is 6. The number of lines specified by this parameter can sometimes affect the size of the plot. The maximum number of text lines and the text size determine the proportion of the available paper height that must be used for labels. The remainder is available to use for the plot.

LINE 15 (Entry 12) Printer port
*** Used to load the DOS PRINT command for 'Delayed PostScript Print' with standalone printers ***
Enter: 'LPT#' or 'COM#' (Use single quotes)
'LPT#' = The parallel [LPT] port where the printer is attached.
# is the id number of the specific port, for example, 'LPT1' or 'LPT2'. The default port is LPT1.
'COM#' = the serial [COM] port where the printer is attached.
# is the id number of the specific port, for example, 'COM1' or 'COM2'.

LINE 16 (Entry 16) Interactive work menu file
ENTER: 'CMDMENU.xxx' (Use single quotes)
where xxx is the extension of the command menu file where user selected interactive work menu entries are saved. The extension is the number of the line in the file CMDMENU.LST that contains the entry for the interactive work menu. The value of xxx may range from '001' to '099'.

105
LINE 17 (Entry 17) Sort order for list of forecast data filenames in
Menu mode
ENTER: 'NAM' or 'EXT' (Use single quotes)
'NAM'= Sort by filename, then by extension
'EXT'= Sort by extension, then by filename

................. End file PCGMODE.DAT ..............................

-- Model Origination and Flight Levels for Labels
The file, PCGLBL.USR, provides information that PCGRIDDS32 uses to customize the labels
which describe output from the products (refer to 'Defining Products'). The file contains the model
and plot origination for the LFO# label command. It also contains a corresponding list of pressure
levels (hPa) and flight levels for the LFL# label command. Refer to the file for a description of
each item and its acceptable values. A sample file is shown below.

............... Begin file PCGLBL.USR ..............................
'DOC/NOAA/NWS    WAFC-WASHINGTON'
LINE 1 (Entry 1) MODEL AND PLOT ORIGINATION
THE TEXT IS DISPLAYED IN THE PLOT LABEL WHEN THE LFO# COMMAND IS USED. THE TEXT MUST BE ENCLOSED IN QUOTES.
*********************************************************************
850,700,500,400,300,250,200,150,100, 70,  -1,-1,-1,-1,-1
050,100,180,240,300,340,390,450,530,450,  -1,-1,-1,-1,-1
LINE 7 (Entry 2) LIST OF PRESSURE LEVELS (UNITS=hPa).
LINE 8 (Entry 3) LIST OF FLIGHT LEVELS THAT CORRESPOND TO THE PRESSURE LEVELS
IN LINE 7.
THE TEXT IS DISPLAYED IN THE PLOT LABEL WHEN THE LFL# COMMAND IS USED. EACH VALUE MUST BE SEPARATED BY A
COMMA. VALUES FOR ALL 15 LEVELS MUST BE ENTERED. A
VALUE OF -1 INDICATES THAT NO VALUE IS DEFINED FOR THAT
POSITION. ALL THE UNDEFINED POSITIONS MUST BE AT THE
END OF THE LIST AND MUST CONTAIN -1.

............... End file PCGLBL.USR ..............................

-- Initial Pressure Levels and Forecast Hours
When PCGRIDDS32 starts, the level and time specifications are set to the default values defined
in the file INITGRID.SPC.

Line 1 Pressure level, vertical layer, forecast hour, and time range are defined on line 1 of the
file. Each of the 6 fields has a length of 4 characters.

Line 2 The pressure levels used for time-section and cross-section plots are defined on line 2
of the file. A maximum of 19 pressure levels can be entered. The number of pressure
levels entered (field 1) has a length of 2 characters and can have a value between 1
and 19. Each of the pressure level fields has a length of 4 characters. The number of
pressure level fields you actually enter must agree with the number of levels you
specify in field 1.
Line 3  The forecast hours used for time-section plots are defined on line 3 of the file. A total of 19 forecast hours MUST be entered. If you wish to define fewer hours, the remaining values must be set to zero. The number of hours defined (field 1) has a length of 2 characters. Each of the hour values (fields 2-20) has a length of 4 characters. The increment between selected hour fields (field 21) has a length of 2 characters. This increment determines which of the defined hour fields will actually be used by PCGRIDDS32 for time-section plots. Refer to 'Changing Forecast Hours for Time-section Plots' for a discussion of the effect these values have on the plot display.

Each line of the file must begin in column 1. Values must be right justified within their field. There are no spaces between the fields. Numerical values are expressed as integers with no decimal point.

Below is a sample INITGRID.SPC file. The lines are formatted as described above.

```
2501000 500  12   0 24
101000 850 700 500 400 300 250 200 150 100
13 36 33 30 27 24 21 18 15 12  09  06  03  00  00  00  00  00  00  00  00  00  00  00  2
```

This second example contains the same data as the previous sample file, but with the field positions indicated below each line for clarity. The lines are grouped into pairs. The first line is the file entry. The second line indicates the field positions for reference, but is not actually entered into the file.

```
2501000 500  12   0 24
111122223333444455556666
101000 850 700 500 400 300 250 200 150 100
1122223333444455556666677778888999900001111
13 36 33 30 27 24 21 18 15 12  09  06  03  00  00  00  00  00  00  00  00  00  00  00  2
1122223333444455556666677778888999900001111222233334444555566666777788889999000011
```

This example defines the following initial specifications:

- **Pressure level:** 250 hPa
- **Vertical layer:** 1000 hPa-500 hPa
- **Forecast hour:** 12
- **Time range:** 0-24
- **10 Pressure levels:** 1000 850 700 500 400 300 250 200 150 100
- **13 Forecast hours:** 36 33 30 27 24 21 18 15 12 09 06 03 00

The field increment of 2 selects 7 hours: 36 30 24 18 12 6 0
-- Changing Width of a Cross-section Plot
By default, cross-sections are displayed in proportion to the vertical height. As a result, very narrow cross-sections may cover a small portion of the screen width. To control the width of the cross-section display while the program is in execution, you can use one of the following commands:

- **XNRO** Displays the cross-section in proportion to vertical height
- **XWID** Displays the cross-section in proportion to the vertical height

Both of these commands must be entered in PLAN view.

-- Changing Pressure Levels for Cross-section and Time-section Plots
PCGRIDDS32 initializes the pressure levels used for cross-section and time-section plots from the default set of values defined in the file **INITGRID.SPC**. The information specified in this file includes the number of levels defined and the level values. To change this default set of levels while the program is in execution, you can use the command 'XLVL xxxx', where xxxx is a 4 character file name (xxxx.LVL). Once a set of pressure levels is defined, it will remain in effect until a new set is defined with the 'XLVL' command.

**MAND.LVL** is a sample file that defines the values of the pressure levels used for time-section and cross-section plots using only mandatory pressure levels. The number of pressure levels entered and the value of each level are entered on line 1 of the file starting in column 1. A maximum of 19 pressure levels can be defined. The number of pressure levels entered (field 1) has a length of 2 characters while each of the pressure level fields has a length of 4 characters. The actual number of pressure level fields you enter must agree with the number of levels you specify in field 1. The values must be right justified within the field. There are no additional spaces between the fields. Numerical values are expressed as integers without decimal points.

In the example shown below, the first line is the actual file entry. The second line indicates the field positions for clarity, but is not actually entered into the file.

```
101000 850 700 500 400 300 250 200 150 100
1122233344445555666677778888999900001111
```

This example defines 10 pressure levels: 1000 850 700 500 400 300 250 200 150 100.

-- Changing Forecast Hours for Time-section Plots
PCGRIDDS32 initializes the forecast hours used to generate time-section plots with the default set of values defined in the file **INITGRID.SPC**. The information specified in this file includes the number of hours defined, the hour values and the time increment. The time increment determines which of the defined hour fields will actually be used by PCGRIDDS32 for time-section plots. You can use the command 'THRS xxxx', where xxxx is a 4 character file name (xxxx.HRS), to change the default set of hours while the program is executing. Once a set of hours is defined, it will remain in effect until a new set is defined with the 'THRS' command. The time increment is defined in the .HRS file, but it can be changed independently with the 'TINC ####' command, where #### is the time increment.

**36HR.HRS** is a sample file that defines the forecast hours used for time-section plots. The number of hours defined, the hour values and the time increment are entered on line 1 of the file

```
101000 850 700 500 400 300 250 200 150 100
1122233344445555666677778888999900001111
```

This example defines 10 forecast hours: 1000 850 700 500 400 300 250 200 150 100.
A total of 19 forecast hours MUST be entered. If you wish to define fewer hours, the remaining values must be set to zero. The number of hours defined (field 1) has a length of 2 characters. Each of the hour values (fields 2-20) has a length of 4 characters. The increment between selected hour fields (field 21) has a length of 2 characters. The values must be right justified within the field. There are no spaces between the fields. Numerical values are expressed as integers.

In the example shown below, the first line is the actual file entry. The second line indicates the field positions for clarity, but is not actually entered into the file. All the data must be entered on the first line of the file.

```
13  36  33  30  27  24  21  18  15  12  09  06  03  00  00  00  00  00  2
11222333444455556666677778888999900001111222233334444555566666777788889999000011
```

This example defines 13 times: 36 33 30 27 24 21 18 15 12 09 06 03 00. The time increment of 2 selects 7 times (36 30 24 18 12 09 06) that are actually used to create displays.

Note that the number of times defined is also used to control the width of the time-section screen displays. The time-section plot is scaled so that up to 19 times can be displayed across the full width of the screen. If you define fewer times, the display is centered but covers less of the screen width, as illustrated in the following examples.

**Example 1:** This file entry defines only 4 times (30,24,18,12). The time increment of 1 specifies all four hours for data selection. The data for hours 30,24,18,12 are displayed from the top to the bottom of the screen, but only across the center 4/19 of the horizontal screen width.

```
04  30  24  18  12  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  1
11222333444455556666677778888999900001111222233334444555566666777788889999000011
```

**Example 2:** This file entry defines 7 times (30,27,24,21,18,15,12). The time increment of 2 specifies only four of the times (30, 24,18,12) for data selection. The data used to create the displays come from the same hours as example 1 (30,24,18,12), but are now displayed across 7/19 of the screen because more hours were defined.

```
07  30  27  24  21  18  15  12  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  2
11222333444455556666677778888999900001111222233334444555566666777788889999000011
```

**Example 3:** This file entry defines 10 times (30,28,26,24,22,20,18,16,14,12). The time increment of 3 still specifies the same hours for data selection as Example 1 (30,24,18,12), but now the data are displayed across 10/19 of the screen.

```
10  30  28  26  24  22  20  18  16  14  12  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  3
11222333444455556666677778888999900001111222233334444555566666777788889999000011
```
-- Station Id List

The list of station id’s used to define a display mode (refer to ‘Display Menu’) is contained in the file, C:\PCGRIDDS32\DATA\STNID.DAT. If necessary, your system administrator can add additional station id’s to the end of the file. The following items must be entered for each station you add:

    Station id  3 or 4 character id; a 3 character id must be contain a leading blank (e.g., _ADS). Use uppercase letters.
    Latitude   Real number of the form ###.## (e.g., _35.23); North latitudes are positive; South latitudes are negative.
    Longitude  Real number of the form ####.## (e.g., -101.70); East longitudes are positive; West longitudes are negative.

It is imperative that new entries be aligned with the current values in the file.

-- User Defined Alias Commands

PCGRIDDS32 performs computations using internally defined basic commands and combinations of these basic commands called alias commands. An alias command can be defined in terms of basic PCGRIDDS32 commands and other alias commands. It is useful to define alias commands when you repeatedly execute a group of PCGRIDDS32 commands or if you want to create a 4-letter command that is more appropriate to an international user.

Basic systems alias commands are defined in the file, C:\PCGRIDDS32\DATA\ALIAS.DAT, and SHOULD NOT BE MODIFIED. You can expand the number of available alias commands by making an entry in the file, ALIAS.USR, in the C:\PCGRIDDS32\USER directory. The format of the entry is

    xxxx=aaaa bbbb cccc ... oooo

where 'xxxx' is the 4 character alias and 'aaaa bbbb cccc ... oooo' is the series of PCGRIDDS32 and other alias commands that define the new alias. All entries must be in uppercase and have the exact format specified above. The definition may contain a maximum of 15 commands/aliases and must be entered on one line of the file starting in column 1. An alias definition must not reference a macro (refer to ‘Defining Products’). It can, however, be used in a macro. An alias command must not duplicate a PCGRIDDS32 command name or system alias. Once an alias is entered into ALIAS.USR, it can be used like any PCGRIDDS32 command.

A sample alias command that plots the vector wind as barbs is shown below.

    WNDB=BARB WIND

Alias commands can also be used to translate PCGRIDDS32 commands for international users.

    VENT=WIND   (French)
    VNTO=WIND   (Spanish/Portuguese)
-- GRIB Specifications for Data Ingest

The ingest process requires information relating GRIB identification values to convert model, grid, level, and parameter identifiers to the corresponding PCGRIDDS32 identifiers. Lists of these relationships are provided by the following set of files which reside in the GRIB directory. For most users, the default values contained in these files are sufficient. However, they may be modified if a required relationship was omitted.

GRIBMODL.DAT

This file is composed of entries containing a GRIB model value and its corresponding PCGRIDDS32 character model identifier. The GRIB model value is expressed as 3 numeric characters beginning in column 1. This is followed by the PCGRIDDS32 model id which consists of 3 alphanumeric characters beginning in column 5.

The PCGRIDDS32 model identifier has the following functions.

1. The model id followed by a 1 character grid id forms the 4 character PCGRIDDS32 model name which is used to reference information in the green area at the bottom of the screen while in Menu mode.

2. The first 2 characters of the PCGRIDDS32 model id followed by a 1 character grid id form the 3 character extension of the NWS and WAWS data file name.

Note: Some models, analyses, and/or forecasts from the same model run may be assigned different GRIB model values. To collate this data into a single PCGRIDDS32 data set, these different GRIB model values are given the same PCGRIDDS32 model identifier.

GRIBSPEC.DAT

This file is obsolete in PCGRIDDS32 and is no longer used.

GRID.DAT

This file is composed of entries relating a GRIB grid identification value to a corresponding PCGRIDDS32 grid identifier. The PCGRIDDS32 grid identifier is used in conjunction with the PCGRIDDS32 model identifier as described above.

A portion of GRID.DAT is listed below. The first line indicates the field positions for clarity, but is not actually entered into the file. Note that there can be multiple entries for some GRIB grid identifiers. When this situation occurs, the first entry in the file for a given GRIB grid identifier is processed and the remaining entries (included only for historical purposes) are ignored.

```
111 2 33333333333333333333333333333333
212 4 AWIPS 40KM FULL GRID
212 4 AWIPS 40KM SUBSETTED GRID
211 8 AWIPS 80KM FULL GRID
211 8 AWIPS 80KM SUBSETTED GRID
  6 L LFM GRIDS
101 G NGM 'OLD' C-GRID
104 S NGM SUPER C-GRID
105 C NGM '83' C-GRID
201 H AWIPS NORTH HEMISPHERIC GRID
```
A sample entry (line 2 in the above sample file) and a description of each field in the entry is shown in the following table. Optional fields must be blank filled if they are not used.

<table>
<thead>
<tr>
<th>Example</th>
<th>Field</th>
<th>Description</th>
<th>Start column</th>
<th>Number of characters</th>
<th>Character type</th>
</tr>
</thead>
<tbody>
<tr>
<td>212</td>
<td>1</td>
<td>GRIB grid identification number</td>
<td>1</td>
<td>3</td>
<td>Numeric</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>PCGRIDDS32 grid identifier</td>
<td>5</td>
<td>1</td>
<td>Text</td>
</tr>
<tr>
<td>AWIPS 40KM</td>
<td>3</td>
<td>Grid description-optional</td>
<td>20</td>
<td>N/A</td>
<td>Text</td>
</tr>
</tbody>
</table>

**GRIBPARM.DAT and MOSGRIBPARM.DAT**

These files are composed of entries relating GRIB parameter identifiers to corresponding PCGRIDDS32 parameter names. The PCGRIDDS32 parameter name followed by the PCGRIDDS32 level identifier is then used to form the 8 character PCGRIDDS32 field name (e.g., TEMPB015). GRIBPARM.DAT is used for WAFS and NWS general GRIB file processing and MOSGRIBPARM.DAT is only used for MOS GRIB processing due to the different parameters which pertain to MOS data.

A portion of **GRIBPARM.DAT** is listed below. The first line indicates the field positions for clarity, but is not actually included in the file. The MOSGRIBPARM.DAT layout is similar.

```
111 2222 3333 444 55555555555555555555555
001 PRES       -2 PRESSURE
002 PRES  MSL  -2 MEAN SEA LEVEL PRESSURE
003 PTND       -2 PRESSURE TENDENCY
007 HGHT       HEIGHT - GEOPOTENTIAL
008 GHGT       HEIGHT - GEOMETRIC
010 OZON       TOTAL OZONE
011 TEMP       TEMPERATURE
```
A sample entry (line 2 in the above example) and a description of each field in the entry is shown in the following table. Optional fields must be blank filled if they are not used. The level override is used to set a standard level when there are potentially conflicting levels in the GRIB message. If a level override is given, that value is used in place of the PCGRIDDS32 level identifier. The ‘power of 10’ scale factor is used to convert the data from the units used in the GRIB message to those desired for PCGRIDDS32. It is the user’s responsibility to assure that the final scaled value is within the floating point range of -3.4E+38 to +3.4E+38.

<table>
<thead>
<tr>
<th>Example</th>
<th>Field</th>
<th>Description</th>
<th>Start column</th>
<th>Number of characters</th>
<th>Character type</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>1</td>
<td>GRIB parameter identifier</td>
<td>1</td>
<td>3</td>
<td>Numeric</td>
</tr>
<tr>
<td>PRES</td>
<td>2</td>
<td>PCGRIDDS parameter name</td>
<td>5</td>
<td>4</td>
<td>Alphanumeric</td>
</tr>
<tr>
<td>MSL</td>
<td>3</td>
<td>Level override (optional)</td>
<td>10</td>
<td>4</td>
<td>Alphanumeric</td>
</tr>
<tr>
<td>-2</td>
<td>4</td>
<td>Power of ten scale factor (optional)</td>
<td>15</td>
<td>3</td>
<td>Signed integer</td>
</tr>
<tr>
<td>MEAN SEA LEVEL PRESSURE</td>
<td>5</td>
<td>Parameter description (optional)</td>
<td>19</td>
<td>N/A</td>
<td>Text</td>
</tr>
</tbody>
</table>

**GRIBLEVL.DAT**

This file is composed of entries containing a numeric GRIB level value and its corresponding PCGRIDDS32 character level identifier. Only information for special levels is contained in this file. PCGRIDDS32 identifiers for other levels are described in the section ‘Variables for Gridded Data Set’. The PCGRIDDS32 parameter name followed by the PCGRIDDS32 level identifier form the 8 character PCGRIDDS32 field name.

The GRIB level value is expressed as 3 numeric characters beginning in column 1. This is followed by the PCGRIDDS32 level id which consists of 4 alphanumeric characters beginning in column 5. No PCGRIDDS32 level id can begin with zero except for the currently used values of 0000, 0DEG, 0DGX.

-- Map Type Specifications

The **MAPTYPE.DAT** file is obsolete in PCGRIDDS32 and is not required for the processing of the PCG Version 2 data files. **HOWEVER** – If you wish to display PCG Version 1 data files created with the DOS versions of PCGRIDDS, you **MUST** copy the MAPTYPE.DAT file from your PCGRIDDS program into PCGRIDDS32 for PCGRIDDS32 to accurately display the Version 1 files. Please refer to the DOS PCGRIDDS documentation concerning the explanation of the MAPTYPE.DAT file fields.
Menu Colors

Menu colors within PCGRIDDS32 are fixed and can not be changed.

-- Streamline Setup Parameters

When PCGRIDDS32 is commanded to plot winds in Streamline mode, it reads the file: USER/STREAMLN.DAT. PCGRIDDS32 reads the parameters within this file to determine the way the streamlines will look. Below is a printout of the file STREAMLN.DAT along with the definitions of the parameters. The user is free to modify this file to adjust the streamline display. It is recommended that if the user wishes to modify this file, they make a backup copy in case their modifications render the display unusable and it is needed to return to the default settings.

STREAMLN.DAT

1.00 Filter to thin streamlines
1.50 Filter to thin streamline arrows
0.50 Controls stopping of streamline when near another streamline
0.67 Controls stopping of streamline when wind speed is small
0.33 Controls pre-scaling of vectors
0.25 Controls size of streamline arrow head

-- Background Map Selection

New to PCGRIDDS32, there are many new high resolution map files with a variety of different features which can be used. A new file has been created in the \PCGRIDDS32\USER directory called MAPFILE.DAT. The names of the new map files which the user wishes to display are listed in this file. The PCGMODE.DAT file must be modified to enable the use of the new map files. Line 4 is the Map Base File name and must be modified. See the example below:

............... Begin file PCGMODE.DAT .......................
'MENU'
'C:\PCGRIDDS32\GRIDDATA' 'C:\PCGRIDDS32\GRIDDATA'
'FEET'
'OTHER'
'<' '^' '>'
12 30 6
'C:\PCGRIDDS32\PRTFIL\'
'SCRN'
1.0
'BLKW'
'LT'
'L'
8
6
'LPT1'
'CMDMENU.017'
'EXT'
*************** File structure documentation ******************

<<<<< entries 1-3 snipped >>>>>
LINE 4 (Entry 3)  Map base file name  
ENTER: 'xxxxxxxx' (Use single quotes)  
Where xxxxxxxx is the name (1-8 characters) of the map base file. Do not include the directory or the file extension. The file must be in the directory 'DATA' and have the extension 'MAP'. The name entered on line 4 will be the default value used when PCGRIDDS32 is started. It can be changed during the execution of PCGRIDDS with the 'BSMP' command. If you wish to use the new high resolution map files, which would be listed in the MAPFILE.DAT, you must enter 'OTHER' on Line 4.

There are 3-4 original maps which may be listed in the PCGMODE.DAT line 4. They are ALASKA.MAP, USA.MAP, WORLD.MAP and some users have WORLD2.MAP. In order to use the new map files, line 4 **MUST** have the word OTHER with single quotes (" "). In the MAPFILE.DAT, you list the new map file names you wish to display. You can list multiple files for display. Below is a list of the new map files and what they display:

AFRICABOUND – Africa boundaries and lakes  
AFRICARIVER – Africa rivers  
ASIABOUND – Asia, Australia and Pacific Islands boundaries  
ASIARIVER – Asia and Australia rivers  
COUNTY – US Counties  
COUNTY2 – US Counties  
EUROPEBOUND – Europe boundaries and lakes  
EUROPERIVER – Europe lakes  
HRWO – Hi-Resolution World Outlines  
HRWOB – Hi-Resolution World Outlines  
HRUSS – Hi-Resolution US Streams  
LRUSR – Lo-Resolution US Rivers  
MRUSR – Med-Resolution US Rivers  
NOAM1-BDY – US-Canada border  
NOAM2-CIV – North America Outer Boundaries & Lakes  
NOAM3-STATE – North America State Boundaries  
NOAM4-RIV – North America Rivers  
NOAM – North and Central America Borders and boundaries  
NARR – North America Rural Roads  
NAIH – North America Interstate Highways  
NASH – North America State Highways  
NASR – North America State Roads  
SOUTHAMBOUND – South and Central America Boundaries and Lakes  
SOUTHAMRIVER – South and Central America Rivers  
STATES – US Hi Resolution State Boundaries
Appendix A: Command Function Summary

A listing of the file, C:\PCGRIDDS32\HELP\HLPC.DAT, which provides a Command Function Summary for online help in Command Mode (refer to Online Help), is supplied below.

**- PCGRIDDS32 --- COMMAND SUMMARY

General Commands: -- |NAME| indicates an alternative name --
 -- [....] describes additional information needed
 -- Ch. is an abbreviation for Character
 -- ! following command name indicates system alias

HELP > Provide general HELP and elementary Tutorials
HELP |HLPC [Followed by command name]| > Provides specific command HELP
HLPX [Followed by command name] > Provides EXtended command HeLP, if available
DOS |DIR !| > Returns to DOS for one command, such as DIR
ERAS |ERSN!,ERSC!| > ERASes current screen display
MENU |M | > Changes from Command mode to MENU mode for user input
CMND > Changes from Menu mode to CoMmaND mode for user input
EXIT |X QUIT Q STOP S END or E| > Terminates the program

**- Gridded Data File Manipulation Commands:
LIST |L | > Lists contents of the currently active file
OPEN [Optional Name] > Opens another grid file [A total of 20 can be opened]
FILS |LFIL,LFI=!| > Lists the files already OPENed and currently active file
SFIL > Interactively resets active grid file
FIL1 > Changes active grided data file to first file opened
FIL2 > Changes active grided data file to second file opened
...
FIL9 > Changes active grided data file to ninth file opened
FILA > Changes active grided data file to tenth file opened
...
FILK > Changes active grided data file to twentieth file opened
FI-# > Changes active grided data file to #th file earlier on list
FI+# > Changes active grided data file to #th file later on list

**- Setting Forecast Time Specifications for data requests:
FHOR |SFHR| > Requests input of Forecast HOuR
FHRS |SFHS| > Requests input of PAIR OF Forecast HOuRs
SFHR [Followed by 1 integer time] > Changes default forecast time
SFHS [Followed by 2 integer times] > Change default fcst time pair
ANAL |F-1 , F-1| > Sets Forecast Hour to use analysis grids
GUES [F-3 , F-3] > Sets Forecast Hour to use analysis guess grids
GES6 [F-6 , F-6] > Sets Forecast Hour to use analysis 6 h guess grids
F### | F##| > Sets Forecast Hour to use ### hour forecast grids
**- Setting Level/Layer specifications for data requests:
SLVL [Followed by one 4 chtr level] > Specifies LeVeL for data selection

#### > |###| {3 or 4 digit integer} > Sets Level to numerical value ####
S### > Sets Level to Sigma level centered at ### mb
S### |S982,S943,S969,S844,S844| > Sets Level to bottom 5 sigma level of NGM
###M |0M, 2M, 10M| > Sets Level to ### Meters above ground (height<100m)
M### > Sets Level to ### hectometers above ground (height>=100m)
###Z > Sets Level to ### Meters above mean sea level (height<100m)
Z### > Sets Level to ### hectometers above mean sea level (height>=100m)
###U > Sets Level to ### centimeters below land surface (depth<1000cm)
U### > Sets Level to ### meters below land surface (depth>=1000cm)
B### > Sets Level to "Boundary" layer centered at ### mb above ground
I### > Sets Level to ### degree (K) Isentropic surface
L### > Sets Level to Flight Level ###
H### > Sets Level to ### feet or meters above sea level (x10)
MSL > Sets Level to Mean Sea Level
TROP > Sets Level to TROPopause
MAXW |WMAX!| > Sets Level to MAXimum Wind level
SFC |0000| > Sets Level to the Earth SurFaCe

**- Level/Layer specifications:
SLYR |LAY=!,LAYR| [Followed by two 4 Ch. levels] > Change data LaYeR specs.

LV+# > Increments LeVel to next # higher level
SVLV > SaVes current LeVel specification
SVLY > SaVes current LaYer specification
RSLV > ReStores saved LeVel specification
RSLY > ReStores saved LaYer specification
LV-# > Increments LeVel to next # lower level

LS+# > Changes LeVel to # higher than current LVL (useful in XSCT processing)
LS-# > Changes LeVel to # lower than current LVL (useful in XSCT processing)
LVL0 > Return to originally defined LVL after completing LS+# or LS-# commands

LY+# > Changes LaYer Top (LVL2) to # higher than LVL
LY-# > Changes LaYer Bottom (LVL1) to # lower than LVL
**- Output specifications:
AROW |VCTR!| > Sets display mode to plot winds as arrows (Default)
BARB > Sets display mode to plot winds as Barbs (m/s)
STRM > Sets display mode to plot winds IN STReaMline like presentation

DASH > Sets display mode to plot DASHed lines for this plot only
DOTS > Sets display mode to plot DOTTed lines for this plot only
DDSH > Sets display mode to plot DOTTED/DASHED dashed lines for this plot only
LDSH > Sets display mode to plot Long DaSHed lines for this plot only
DPOS > Dash POSitive contours
DNEG > Dash NEGative contours

DATA > Sets display mode to plot DATa values At grid points - no contours
DAT+ > Sets display mode to plot DATa values slightly above grid points
DAT- > Sets display mode to plot DATa values slightly below grid points
DATT > Sets display mode to plot DATa values on Top of grid points
DATB > Sets display mode to plot DATa values Below grid points
DATO > Sets display mode to plot DATa values Over grid points - Above DATT
DATU > Sets display mode to plot DATa values Under grid points - Below DATB
PMNS > Plots - in front of all negative numbers; positive numbers unsigned
PPLS > Plots + in front of all positive numbers; negative numbers unsigned

**- Output specifications:
HILO > Plots H or L above data at local maximum/minimum (with contours)
HIIS > Plots H above data at local maximum (with contours)
HIID > Plots H above data at local maximum (without contours)
LOWS > Plots L above data at local minimum (with contours)
LOWD > Plots L above data at local minimum (without contours)

MXMN > Plots X or N above data at local maximum/minimum (with contours)
MAXS > Plots X above data at local maximum (with contours)
MAXD > Plots X above data at local maximum (without contours)
MINS > Plots N above data at local minimum (with contours)
MIND > Plots N above data at local minimum (without contours)

BOXS!> Plots boxes at grid points below the surface
BOX# > Plots a box at each grid point; # indicates box size

**- Output specifications:
SCL# > Display labels with signed digits greater than or equal to 10**#
SCL0 > Display labels with signed digits greater than or equal to 10**0 (1)
SCL1 > Display labels with signed digits greater than or equal to 10**1 (10)
SC-# > Display labels with signed digits greater than or equal to 10**-#
SC-1 > Display labels with signed digits greater than or equal to 10**-1 (.1)

MOD# > Display labels using Modulo of SCALED display value and 10**#

STON > Stops display of grid statistics at top of screen
STOF > Starts display of grid statistics at top of screen
CNSM [KSMO, KSM=!] [Followed by integer] > Sets CoNtour SMoothing (Default=1)

CNUM [Followed by integer] > Changes maximum number of contours to display

#DGT > Plot maximum of # digits on contour labels / data plots (default 4)

**- Layer/Time interval manipulations >>> For data in gridded data set <<<

LAVE | LAVR!| > Calculate Layer AVErage of variables to LEFT in Command line
LSUM | LADD!| > Calculate Layer SUM of variables to LEFT in Command line
LDIF > Calculate Layer DIfference of variables to LEFT in Command line
LVL1 | LYM1, LYM1=!| > Gets data from bottom of Layer for variables to LEFT
LVL2 | LYM2, LYM2=!| > Gets data from top of Layer for variables to LEFT
LEVL > Overrides LVL1 and LVL2 and gets data from original level

TAVE > Calculate Time AVErage of variables at LEFT using times FHR1 and FHR2
TTOT > Calculates Time TOTal of variables at LEFT using times FHR1 and FHR2
TDIF > Calculate Time DIfference of variables at LEFT between FHR1 and FHR2
TTND > Calculate Time TeNDency of variables at LEFT between FHR1 and FHR2

**- Layer/Time interval manipulations >>> For data in gridded data set <<<

>>> For data grids or computed functions -- Appears right of last & <<<

LYSM > Calculates LaYer SuM of functions to RIGHT - One plot per line
LYAV > Calculates LaYer AVerage of functions to RIGHT - One plot per line
LYDF > Calculates LaYer DiFference of functions to RIGHT - One plot per line

TMSM > Calculates TiMe SuM of functions to RIGHT - One plot per line
TMAV > Calculates TiMe AVerage of functions to RIGHT - One plot per line
TMDF > Calculates TiMe DiFference of functions to RIGHT - One plot per line
TMTN > Calculates TiMe TeNdency of functions to RIGHT - One plot per line
HRLLY | PRHR | > Converts diagnostic command results from /sec to /hour
DALY | PRDY | > Converts diagnostic command results from /sec to /day

**- Special Gridded Data Requests:

MIXR > Calculates Mixing Ratio from available data fields
SPFH > calculates Specific Humidity from available data fields
RELH > Calculates Relative Humidity from available data fields
SMIX > Calculates Saturation Mixing Ratio from available data fields
SDEF > Calculates Mixing Ratio Saturation Deficit from available data fields
DWPT | DWPC!| Calculates DeW Point Temperature from available data fields (C)
DWPK!> Calculates DeW Point Temperature from available data fields (K)
DWPF!> Calculates DeW Point Temperature from available data fields (F)
PRES > Calculates Pressure from available data fields
TEMP | TMPC!| > Calculates temperature in degrees C
TMPK | TMPA!| > Calculates temperature in degrees K
TMPF!> Calculates temperature in degrees F
THTA > Calculates Potential Temperature from available data fields (K)
THTE > Calculates Equivalent Potential Temperature from data fields (K)
THTS > Calculates Saturated Equivalent Potential Temperature from data fields (K)
THCK | TKNS!| > Generates Thickness fields
SVPR > Saturated Vapor Pressure
VAPR > Vapor Pressure
LVAP > Latent heat of vaporization
WBTP > Wet-Bulb Temperature
WBPT > Wet-Bulb Theta
SWPT > Saturated Wet-Bulb Theta-e
CPDF > Condensation Pressure Deficit
DPDP > Dew Point Depression

WIND > Retrieves the total wind Vector in m/s
WKNT!> Retrieves the total wind Vector in knots
WMPHI!> Retrieves the total wind Vector in mph
WKPH!> Retrieves the total wind Vector in kph
BWND!|WNDB!| > Retrieves the total wind Vector in m/s for display as wind barb
BKNT!> Retrieves the total wind Vector in knots and sets display as wind barb
BMPH!> Retrieves the total wind Vector in mph and sets display as wind barb
BKPH!> Retrieves the total wind Vector in kph and sets display as wind barb
WNDA!> Retrieves the total wind Vector in m/s and sets display as wind arrow
GEOS > Generates the Geostrophic wind Vector
AGEO!> Generates the Ageostrophic wind Vector
TWND |THWN!| > Generates Thermal Wind
ISAL > Computes the Isallobaric Wind
INAD > Computes the Inertial Advective Wind
JCBN [Followed by 2 Scalars] > Computes the Jacobian determinate of two scalars
FRTG [Followed by wind Vector] > Computes Frontogenesis of the wind
FVCT > Calculates F (Normal wind) Vectors
QVCT > Calculates Q (Geostrophic wind) Vectors

SPED![Followed by wind Vector] > Calculates magnitude of wind Vector (m/s)
SPKT![Followed by wind Vector] > Calculates magnitude of wind Vector (knots)
SPML![Followed by wind Vector] > Calculates magnitude of wind Vector (mph)
SPKM![Followed by wind Vector] > Calculates magnitude of wind Vector (kph)
DRCT [Followed by a Vector] > Contours values of DiReCTion of a Vector
DDFF [Followed by Vector] > Displays packed value of Vector Direction/speed
DDDD [Followed by a Vector] > Displays values of DiReCTion of a Vector
WSPD!> Generates isotachs for Total wind (m/s)
WSPK!> Provides total Wind SPEed in Knots
WDDDF!> Displays packed value of Total Wind Direction/speed (m/s)
WDRC!> Contours value of Total Wind Direction (degrees)
WDDD!> Displays value of Total Wind Direction (degrees)
XCMP |UCMP [Followed by vector]] > Returns grid relative X CoMPonent of vector
YCMP |VCMP [Followed by vector]] > Returns grid relative Y CoMPonent of vector

LIFT |LIFX,LIFB| > Provides Lifted Index fields without resetting LEVeL
TTHE > Temperature of a parcel lifted from the bottom to the top of LAYeR
CNVT > Temperature needed for parcel from surface to lift freely to LEVeL

TPCP > Provides Total Precipitation fields without resetting LEVeL (cm)
CPCP > Provides Convective Precipitation fields without resetting LEVeL (cm)
LPCP > Provides Large-Scale Precipitation fields without resetting LEVeL (cm)
TPCI!> Provides Total Precipitation fields without resetting LEVeL (in)
CPCI!> Provides Convective Precipitation fields without resetting LEVeL (in)
LPCI!!> Provides Large-Scale Precipitation fields without resetting LEVeL (in)

PMSL > Provides Mean Sea Level Pressure fields without resetting LEVeL
Note: If mean sea level pressure (GRIB ID=002) is not available, then an attempt is made to retrieve the RUC Reduction, the Eta Model Reduction, and the Standard Atmosphere Reduction, in that order.

PMSS > Provides MSL Pressure fields (Std. atm. reduction) -- No LEVeL reset
PMSR > Provides MSL Pressure fields (RUC reduction) -- No LEVeL reset
PMSE > Provides MSL Pressure fields (ETA model reduction) -- No LEVeL reset
MMSL > MSL pressure for RUC (MPAS) surface analysis using MAPS reduction
NMSL > MSL pressure for RUC (MPAS) surface analysis using NMC reduction
PSFC > Provides Surface Pressure fields without resetting LEVeL
PWAT > Provides Precipitable Water fields without resetting LEVeL (mm)
PWAI!> Provides Precipitable Water fields without resetting LEVeL (in)
WVRT!> Generates vorticity of the Total wind
GVRT!> Generates vorticity of the Geostrophic wind
AVRT!> Calculates the absolute VoRTicity of Ageostrophic wind

WDVR!> Calculates DiVeRgence of the total Wind field
WSHD!> Calculates SHearing Deformation of total Wind
GSHD!> Calculates SHearing Deformation of Geostrophic Wind
ASHD!> Calculates SHearing Deformation of Ageostrophic Wind
WSTD!> Calculates STretching Deformation of total Wind
GSTD!> Calculates STretching Deformation of Geostrophic Wind
ASTD!> Calculates STretching Deformation of Ageostrophic Wind
TADV!> Generates Temperature Advection using the Total wind
QADV!> Generates Mixing Ratio Advection using the Total wind
PADV!> Generates Pressure Advection using the Total wind
STAB |STBL!| > Computes static stability in a layer
IMAS > Calculates Isentropic MASs (inverse static stability) in any layer
LNDX > Calculates 'Lifted Index' between LVL1 and LVL2
TLCL > Calculates the Temperature at the LCL from LEVeL data
PLCL > Calculates the Pressure of the LCL from LEVeL data
PDEF!> Calculates the Pressure DEFicit (lift) needed for saturation the LCL

INRI!> Calculates the INverse of the RiChardson number
IGRI!> Calculates the Inverse of the Geostrophic RiChardson number

FFFF |F! |> Provides coriolis parameter at each grid point
DMAP |MFT,R,MAPF!|> Provides map factor at each grid point
ALAT |LATT!,LAT! ,LATII!|> Latitude
ALON |LONG!,LON! |> Longitude
EDIR > DIRection of rotation from map standard North/South Earth longitude
CSLT > Cosine of Latitude
MSG0 > Produces grid with 1's at points with data and 0's at points without
MSG1 > Produces grid with 0's at points with data and 1's at points without
MSNG!> Produces grid with missing value flags at points without data
ZERO > Provides scalar grid of all zeros (Used to display wind components)
GMIN > Produces scalar Grid with values of MiNimum of last grid
GMAX > Produces scalar Grid with values of MAXimum of last grid
GMEN > Produces scalar Grid with values of MEaN of last grid
GSDV > Produces scalar Grid with values of Standard Deviation of last grid
SCPY > Produces a CoPY of a Scalar field
VCPY > Produces a CoPY of a Vector field
SSWP > SWaPs locations of last 2 Scalar fields in memory
VSWP > SWaPs locations of last 2 Vector fields in memory
DUMP > Prints grid point values in file `GRIDS.OUT`

**- Diagnostic Functions:

SSUM [Followed by 2 Scalars] > Calculates Scalar grid sum
SAVR [Followed by 2 Scalars] > Calculates Scalar grid average
SDIF [Followed by 2 Scalars] > Calculates Scalar grid difference
STND [Followed by 2 Scalars] > Calculates Scalar grid time tendency
SMLT [Followed by 2 Scalars] > Multiplies two Scalar fields
SDVD [Followed by 2 Scalars] > Divides two Scalar fields
SADC [Followed by a 4 digit value] > Sum of Scalar & specified constant
SSBC [Followed by a 4 digit value] > Difference of Scalar & specified constant
SMLC [Followed by a 4 digit value] > Multiplies Scalar by specified constant
SDVC [Followed by a 4 digit value] > Divides Scalar by specified constant
INVS [Followed by a Scalar] > Finds INVerSe of a Scalar
INV1 [Followed by a Scalar] > Finds INVerse of a Scalar with maximum of 1

ABSV [Followed by Scalar] > Calculates ABSolute Value of Scalar grid
SNEG! [Followed by Scalar] > Finds the NEGative of a Scalar grid

**- Diagnostic Functions:

SINE [Followed by Scalar] > Calculates the SINE of Scalar grid (e.g., WDRC)
COSN [Followed by Scalar] > Calculates the COSiNe of Scalar grid (e.g., WDRC)
TNGT [Followed by Scalar] > Calculates the TaNGenT of Scalar grid (e.g., WDRC)
ASIN [Followed by Scalar] > Calculates the ARC SINe of Scalar grid
ACOS [Followed by Scalar] > Calculates the ARC COSine of Scalar grid
ATAN [Followed by Scalar] > Calculates the ARC TANgenT of Scalar grid
ALOG [Followed by Scalar] > Calculates the LOG (Base e) of Scalar grid
LG10 [Followed by Scalar] > Calculates the LOG (Base 10) of Scalar grid
EXPP [Followed by Scalar] > Calculates the EXPonent (Base e) of Scalar grid
EX10 [Followed by Scalar] > Calculates the EXponent (Base 10) of Scalar grid
SQRT [Followed by scalar] > Return square root of absolute value of scalars
SKNT! [Followed by Scalar] > Converts Scalar from m/s to KNoTs
SMPH! [Followed by Scalar] > Converts Scalar from m/s to Miles Per Hour
SKPH! [Followed by Scalar] > Converts Scalar from m/s to Kilometers Per Hour
M2F=! [Followed by Scalar] > Converts Scalar from meters to feet
CM2I! [Followed by Scalar] > Converts Scalar from centimeters to inches

DSDX [Followed by Scalar] > Calculates X gradient of Scalar
DSDY [Followed by Scalar] > Calculates Y gradient of Scalar
GRAD [Followed by a Scalar] > Finds the GRaDient of a Scalar field
MGRD! [Followed by a Scalar] > Magnitude of the GRaDient of a Scalar field
NGRD! [Followed by a Scalar] > Finds the Negative GRaDient of a Scalar field
DVDX [Followed by Vector] > Calculates X gradients of a Vector
DVDY [Followed by Vector] > Calculates Y gradients of a Vector
VADC [Followed by a 4 digit value] > Sum of Vector & specified constant
VSBC [Followed by a 4 digit value] > Difference of Vector & specified constant
VMLC [Followed by a 4 digit value] > Multiplies Vector by specified constant
VDVC [Followed by a 4 digit value] > Divides Vector by specified constant
VNEG! [Followed by Vector] > Finds the NEGative of a Vector field
VSUM [Followed by 2 Vectors] > Calculates the Vector sum
VAVR [Followed by 2 Vectors] > Calculates the Vector average
VDIF [Followed by 2 Vectors] > Calculates the Vector difference
VTND [Followed by 2 Vectors] > Calculates the Vector time tendency
VMLT [Followed by 2 Vectors] > Multiplies two Vectors by components
DOTP [Followed by 2 Vectors] > Calculates the DOT Product of 2 Vectors
CRSP [Followed by 2 Vectors] > Calculates the CRoSS Product of two Vectors
VDVD [Followed by 2 Vectors] > Divides two Vectors by components

VKNT! [Followed by a Vector] > Converts a Vector from m/s to KNoTs
VMPH! [Followed by a Vector] > Converts a Vector from m/s to MPH
VKPH! [Followed by a Vector] > Converts a Vector from m/s to KPH
MAGN [MSPC!] [Followed by a Vector] > Calculates MAGNitude of a Vector
KNOT! [Followed by a Scalar] > Converts a Scalar (e.g., WSPD) from m/s to KNOTs
MLPH! [Followed by a Scalar] > Converts a Scalar (e.g., WSPD) from m/s to MPH
KMPH! [Followed by a Scalar] > Converts a Scalar (e.g., WSPD) from m/s to KPH

ADVT [Followed by Scalar and Vector] > Calculates advection
d DVRG [Followed by a Vector] > Calculates divergence
FLUX [Followed by a Scalar & a Vector] > Produces a flux Vector
SDVR! [Followed by Scalar and Vector] > Calculates flux divergence
RVRT [Followed by a Vector] > Calculates relative vorticity
VORT! [Followed by a Vector] > Calculates absolute vorticity
IPVO > Isentropic Potential Vorticity calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to Theta levels.
IPVA > Isentropic Potential Vorticity Advection calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to Theta levels.
PVTA > Isobaric Potential Vorticity (Theta) calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVTE > Isobaric Potential Vorticity (Theta-E) calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVTS > Isobaric Potential Vorticity (Theta-S) calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVAA > Isobaric Potential Vorticity (Theta) Advection calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVEA > Isobaric Potential Vorticity (Theta-E) Advection calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
PVSA > Isobaric Potential Vorticity (Theta-S) Advection calculated between LVL1 and LVL2 when LVL1 and LVL2 are set to pressure levels.
SHDF [Followed by vector] > Calculates SHearing DeFormation
STDF [Followed by vector] > Calculates STretching DeFormation
WGEO [Followed by scalar field] > Calculates Geostrophic Wind from Scalar field

DFCP [Followed by a vector] > Calculate the Deformation components
(X COMP, Y COMP) of any vector
SMTH > Applies a binomial SMooTHer to the active scale data field
SMT# > Applies a binomial SMooTHer # times to the active scalar data field
SMOO > Applies a light SMOOther to the active scalar data field
VSMT > Applies a binomial sMooTHer to the active Vector field
VSM# > Applies a binomial sMooTHer # times to the active Vector field
RLTN [Followed by a 4 digit value] > Replaces values Less Than with that value
RGTN [Followed by a 4 digit value] > Replaces values Greater Than with value
MLTN [Followed by a 4 digit value] > Replaces values Less Than as Missing
MGTN [Followed by a 4 digit value] > Replaces values Greater Than as Missing
MSKS! [Followed by a field] > Replaces values below the surface as missing
SMAX > Finds the MAXimum at each grid point of two Scalar fields
SMIN > Finds the MINimum at each grid point of two Scalar fields
ZNEG > Sets all NEGative values to Zero
ZPOS > Sets all POSitive values to Zero

**- Diagnostic Functions - Convection Control Flags

VTMP > Virtual Temperature Correction
  All convection parameters are calculated without virtual temperature correction by default. This
  flag enables that correction.
SBSI > Surface-Based Lifted Parcel Selected
MLSI > Mean-Layer Lifted Parcel Selected
MUSI > Most Unstable Lifted Parcel Selected
USSI > User-Selected Lifted Parcel Selected
If no Lifted Parcel method is selected, Surface-Based Lifted Parcel is default.

**- Diagnostic Functions - Convection Parameters

CPOS [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Convective Positive Energy (CAPE)
CNEG [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Convective Negative Energy (CiNH)
PLPL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Pressure Lifted Parcel Level
TLPL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Temperature Lifted Parcel Level
DLPL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Dew point Lifted Parcel Level
HLPL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Height Lifted Parcel Level
THLP [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Theta Lifted Parcel Level
TELP [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Theta-e Lifted Parcel Level
PLCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Pressure Lifted Condensation Level
TLCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Temperature p Lifted Condensation Level
MLCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Mixing ratio Lifted Condensation Level
HLCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Height Lifted Condensation Level
THLC [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Theta Lifted Condensation Level
TELC [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Theta-e Lifted Condensation Level
PLFC [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Pressure Level of Free Convection
TLFC [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Temperature Level of Free Convection
DLFC [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Dew point Level of Free Convection
HLFC [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Height Level of Free Convection
THLF [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Theta Level of Free Convection
TELF [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Theta-e Level of Free Convection
PCCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Pressure Convective Condensation Level
TCCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Temperature Convective Condensation Level
DCCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Dew point Convective Condensation Level
HCCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Height Convective Condensation Level
THCC [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Theta Convective Condensation Level
TECC [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Theta-e Convective Condensation Level
PEQL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Pressure Equilibrium Level
TEQL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Temperature Equilibrium Level
DEQL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Dew point Equilibrium Level
HEQL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Height Equilibrium Level
MPCL [(VTMP)(SBSI,MLSI,MUSI,USSI)] > Height Max Parcel Level
PWBZ > Pressure Wet-Bulb Zero Level
TWBZ > Temperature Wet-Bulb Zero Level
HWBZ > Height Wet-Bulb Zero Level
CNPR > Condensation Pressure Ratio
CNPD > Condensation Pressure Deficit
WBTF > Wet-Bulb Temperature degrees F
WBTC > Wet-Bulb Temperature degrees C
WBTK > Wet-Bulb Temperature degrees K

**- Diagnostic Functions - Shear Control Flags

**KM – Defines the Lower/Upper bounding levels in Kilometers
The first * (0-9) defines the lower level to use and the second * (0-9) defines the upper level to use. Therefore, a command 14KM defines the 1km to 4km layer.

**- Diagnostic Functions - Shear Parameters

UAVG (Scalar) > U-average wind through layer
VAVG (Scalar) > V-average wind through layer
WAVG (Vector) > Average Wind through layer
BLKS (Scalar) > Bulk Shear
BRCH (Scalar) > Bulk Richardson Number
TCHS (Scalar) > Total Cumulative Shear through layer
USHR (Scalar) > U-Shear between layer
VSHR (Scalar) > V-Shear between layer
TSHR (Vector) > Total Wind Shear between layer

The following supercell specific diagnostics are controlled with only the **KM flag except where noted. If the flag is omitted, 03KM is assumed. All calculations use the Bunkers Method algorithm.

RMSU (Scalar) > Supercell U-component, Right-moving (06KM)
RMSV (Scalar) > Supercell V-Component, Right-moving (06KM)
RMSS (Vector) > Supercell Motion, Right-moving (06KM)
RMSP (Scalar) > Supercell Speed, Right-moving (06KM)
RMDR (Scalar) > Supercell Direction, Right-moving (06KM)
LMSU (Scalar) > Supercell V-Component, Left-moving (06KM)
LMSV (Scalar) > Supercell V-Component, Left-moving (06KM)
LMSS (Vector) > Supercell Motion, Left-moving (06KM)
LMSP (Scalar) > Supercell Speed, Left-moving (06KM)
LMDR (Scalar) > Supercell Direction, Left-moving (06KM)
SRHR (Scalar) > Storm-Relative Helicity, Right-moving
SRHL (Scalar) > Storm-Relative Helicity, Left-moving
SRWR (Vector) > Storm-Relative Mean Wind, Right-moving
SRWL (Vector) > Storm-Relative Mean Wind, Left-moving
**- Diagnostic Functions - Cross/Time Section Specific:
XREL [Followed by Vector] > Rotates Vector from GRID to Cross Sector relative
EREL [Followed by Vector] > Rotates Vector from GRID to Earth relative (TSCT)
TANG [Followed by Vector] > Finds cross-section relative tangential component
VTNG [Followed by Vector] > Plots cross-section relative tangential component
VCRC [Followed by Vector] > Plots VTNG & VVEL
VCR2 [Followed by Vector] > Plots VTNG & VVEL scaled by 2
VCR5 [Followed by Vector] > Plots VTNG & VVEL scaled by 5
NORM [Followed by Vector] > Finds cross-section relative normal component
VNRM [Followed by Vector] > Plots cross-section relative normal component
DIST > Calculates DISTance from left end of cross section
MSFC!> Calculates constant Momentum SurFaCe (M-Surfaces)
WNDX!> Displays the total wind rotated relative to the cross section
GEOX!> Displays the geostrophic wind rotated relative to the cross section
AGEX!> Displays the ageostrophic wind rotated relative to the cross section
WCRC!> Displays vertical/tangential circulations of total wind
GCRC!> Displays vertical/tangential circulations of geostrophic wind
ACRC!> Displays vertical/tangential circulations of ageostrophic wind

**- Contour Specification:
CINT > Displays Max and Min of field and requests user input
CISV > Sets mode where specified contour interval is retained for future plots
CINX > Returns to mode in which program selects contour interval for each plot
CIN# > Sets Contour Internal to # units
CIN1 > Sets Contour Interval to 1 unit
CIN2 > Sets Contour Interval to 2 units
...
C#0 > Sets Contour Interval to # of tens of units
C10 > Sets Contour Interval to 10 units
C20 > Sets Contour Interval to 11 units
...
C#00 > Sets Contour Interval to # hundreds of units
C100 > Sets Contour Interval to 100 units
C200 > Sets Contour Interval to 200 units
C#++ > Sets Contour Interval to #*10**# units == C2+3 -> 2*10**3 = 2000
C1+3 > Sets Contour Interval to 1000 units --> 10**3
C2+3 > Sets Contour Interval to 2000 units --> 2*10**3
...
C# |C#-1| > Sets Contour Interval to .# units -->#*10**-1
C1 |C1-1| > Sets Contour Interval to .1 units
C2 |C2-1| > Sets Contour Interval to .2 units
...
C#++ > Sets Contour Interval to #*10**# units == C2-3 -> 2*10**3 = .002
C2-2 > Sets Contour Interval to .02 units
C5-3 > Sets Contour Interval to .005 units

GRTN [Followed by a 4 digit value] > Displays contours greater than the value
LSTN [Followed by a 4 digit value] > Displays contours less than the value
GT## [GT00!] > Displays contours greater than the value ##
LT## [LT00!] > Displays contours less than the value ##
GTNE [Followed by a 4 digit value] > Displays contours greater than or equal to the value
LTHE [Followed by a 4 digit value] > Displays contours less than or equal to the value

**- Graphical Display Setup Commands:
AREA [Optionally followed by center Lat/Lon&N-S Lat.Dist.] > Specify Map area
XSCT [Followed by left and right Lat/Lon pairs] > Defines Cross-Section path
TSCT [Followed by Lat/Lon] > Defines Time-Section location
ASTN [Followed by center Station ID and N-S Lat.Dist.] > Specify Map area
XSTN [Followed by left and right Station IDs] > Defines Cross-Section path
TSTN [Followed by Station ID] > Defines Time-Section location
XSCI [Followed by left and right Lat/Lon pairs] > Defines Isentropic Cross-Section path
XSTI [Followed by left and right Station IDs] > Defines Isentropic Cross-Section path
XSCH [Followed by left and right Lat/Lon pairs] > Defines Height Surfaces Cross-Section path
XSTH [Followed by left and right Station IDs] > Defines Height Surfaces Cross-Section path
TSCI [Followed by Lat/Lon] > Defines Isentropic Time-Section location
TSTI [Followed by Station ID] > Defines Isentropic Time-Section location
TSCH [Followed by Lat/Lon] > Defines Height Surfaces Time-Section location
TSTH [Followed by Station ID] > Defines Height Surfaces Time-Section location
NS## > Sets default North-to-South distance for ASTN to ## degrees
XWID > Display Cross-Section across full width of screen--Set in PLAN view
XNRO > Display Cross-Section in proportion to vertical height--Set in PLAN
ALVL > Use all available pressure levels in Cross or Time section
ATIM > Use all available forecast hours in Time section

XLVL [Followed by 4 Ch. name] > Reads file ----.LVL to define TSCT/XSCT levels
THRS [Followed by 4 Ch. name] > Reads file ----.LVL to define TSCT hours
TINC [Followed by integer] > Changes time increments for time section
THN# > THiN computation grid to use every #th grid point-CAN OVERFLOW PROGRAM
THNO > Display current display mode and grid thinning factor
FULG > Displays grid data at full grid resolution
NRMG > Displays grid data at normal thinning

**- Graphics Commands:
PLAN > Re-activates PLAN view display
CROS > Re-activates CROSSs-sectional display
TIME > Re-activates TIME-sectional display
XLBL > Plots values of left most column of cross/time section along left side
XLBB > Plots values of bottom row of cross/time section along bottom
XLTN > Calculates Latitude locations along a cross section
XLNT > Calculates Longitude locations along a cross section
HOUR > Places forecast hour into time section array
NCLB > Draws contours without labels for current request only
NLBL > Prevents plot label (top of screen) from being overwritten
SAVE [Followed by 4 Chtr NAME] > SAVEs graphics commands to file NAME
ENDS > Stops SAVEing graphics commands
SAVM > SAVes graphics commands for delayed print (Menu mode only)
ENDM > Stops SAVEing graphics commands (Menu mode only)
REST [Followed by 4 Chtr NAME] > RESTores graphics in file NAME
;  [____;, ;" preceeded by 4 Chtr NAME] > RESTores graphics in file NAME
SAVS [Followed by 4 Chtr NAME] > SAVes Screen contents to BMP file NAME

PRSC||BKWT| > Converts screen colors for printing using 'PRint SCreen' key
POPT > List current print option and select a new print option
PRNT [Followed by optional 4 Ch. name] > Print specified or default .SVG file
LSVG > List files containing a set of saved graphics commands

MAP > Redraws map background with no data
EMAP > Erases screen and draws map background with no data

SVMP > Save, list, or delete map plot files

BSMP |BASM!| > Defines a new file containing base map geography information

& |or / | > Overlays output on previous graphics
OLAY |CNTR!| > Overlays output on previous graphics -- First command in a line

CLR1 > Override default and use color 1 in pallette (Solid)
CLR2 > Override default and use color 2 in pallette (Solid)
...
CLR9 > Override default and use color 9 in pallette (Solid)
CLRA > Override default and use color 10 in pallette (Solid)
...
CLRG > Override default and use color 16 in pallette (BLACK - ERASES LINES)
---
CLRH > Override default and use color 1 in pallette (Dashed)
CLRI > Override default and use color 2 in pallette (Dashed)
...
CLRX > Override default and use color 14 in pallette (Dotted)
CLRY > Override default and use color 15 in pallette (Dotted)
CLRZ > Override default and use color 16 in pallette (Dotted)

SCLR > Save current CoLoR order from pallette
RCLR > Return to saved CoLoR order on pallette

BKG1 > Use color 1 in pallette as background for plot on screen
BKG2 > Use color 2 in pallette as background for plot on screen
...
BKG9 > Use color 9 in pallette as background for plot on screen
BKGA > Use color 10 in pallette as background for plot on screen
...
BKGG > Use color 16 in pallette as background for plot on screen
---
BKGH > Use color 1 in pallette as background for plot on screen
BKGI > Use color 2 in pallette as background for plot on screen
...
BKGX > Use color 14 in pallette as background for plot on screen
BKGY > Use color 15 in pallette as background for plot on screen
BKGZ > Use color 16 in pallette as background for plot on screen

ANIM > Animates a display of data using all forcast hours (PLAN or CROSS).
    Must be first command.
ENDA > Ends the Animation build process.

**- Command Manipulations:
CMDS [LCMD] > Lists the previous 21 commands lines

CMD1 > Lists last Command given (without erasing screen)
CMD2 > Lists 2nd previous Command given (without erasing screen)
...
CMD9 > Lists 9th previous Command given (without erasing screen)
CMDA > Lists 10th previous Command given (without erasing screen)
...
CMDL > Lists 21st previous Command given

RPT1 > Repeats last command given
RPT2 > Repeats 2nd previous command given
...
RPT9 > Repeats 9th previous command given
RPTA > Repeats 10th previous command given
...
RPTL > Repeats 21st previous command given

**- Special COMMAND FILE (.CMD Files) Commands:
. (Preceeded by 4 Ch. Name) > Executes Named command (script) file
: (Preceeded by 4 Ch. Name) > Overlays Named command file on existing plot

LOOP > All following commands will be executed without keyboard prompts
ENDL > Ends LOOP in .CMD file

#SEC > Wait # seconds before executing next request
1SEC > Wait 1 second before executing next request
2SEC > Wait 2 seconds before executing next request
...
9SEC > Wait 9 seconds before executing next request

^ > Repeat last macro for current time
< > Repeat last macro for time equals current time - increment set by DELT
> > Repeat last macro for time equals current time + increment set by DELT
BEGT [Followed by integer] > Set begin limit of time sequence for macro repeat
ENDT [Followed by integer] > Set end limit of time sequence for macro repeat
DELT [Followed by integer] > Set increment of time sequence for macro repeat

PMSV > Save parameters (e.g., LVL) in macro as permanent settings {Menu mode}

**- Special LABELING Commands:
TXT# [Followed by line of text] > Writes Text on line # from top of screen
TXT1 |TEXT,TUTR| > Writes text on TOP line of screen
TXT2 > Writes text on 2nd line of screen

... LTM# > Write forecast hour or Time range on line sequence # of Label set
LPL# > Write Pressure Level or layer on line sequence # of Label set
LFL# > Write Flight Level or layer on line sequence # of Label set
LDN# > Write Data file Name on line sequence # of Label set
LFD# > Write Forecast model Date on line sequence # of Label set
LMN# > Write forecast Model Name on line sequence # of Label set
LFO# > Write Forecast model Origination on line sequence # of Label set
LLN# > Write forecast Length on line sequence # of Label set
LLL# > Write Latitude/Longitude on line sequence # of Label set (tsct/xsct)
LSN# > Write Station identifier on line sequence # of Label set (tsct/xsct)
LTX# [Followed by line of text] > Write Text on line sequence # of Label set
LNDF > Stop display of Default Labels (applies to current plot and overlays)
LDEF > Start display of Default Labels (applies to current plot and overlays)
LWT# > Begin Writing current Label set on line # from top of screen

**- --- To String Commands from One Line to the Next ---

CONT {LEFTMOST position} > Save fields for next command line, without plotting

LAST |LSTS!,LSTV!,LST#| {RIGHTMOST command} > Returns data to work array
  -- NOTE:  LSTS |LST1,KEPS!| retrieves last 1 Scalar array only --
  -- NOTE:  LSTV |LST2,KEPV!| retrieves last 2 scalar arrays (Vector) only
  -- NOTE:  LST# retrieve last # scalar arrays back to work array --

** NOTE: LAST, etc. should be used ONLY for redisplay in XSCT or TSCT
** NOTE: LSTS, LSTV can NOT be used in COMMAND (.CMD) files
** NOTE: LAST is not needed if CONT was in previous line --
Appendix B: Listing of Basic Grid Fields

A listing of the file, C:\PCGRIDDS32\HELP\HLPG.DAT, which provides a >Listing of Basic Grid Fields< for online help in Command Mode (refer to >Online Help=), is supplied below.

**- PCGRIDDS --- BASIC GRIDDED DATA FIELDS

HELP > Provide general HELP and elementary Tutorials
HLPC |HELP [Followed by command name]| > Provides specific command help

****** Basic ICAO-Required Fields ******

TEMP > TEMPerature (degree C)
WIND > WIND (m/s)
WKNT > Wind (KNoTs)

UGRD > West-to East Wind Component (m/s)
VGRD > South-to-North Wind COMPONENT (m/s)

HGHT > HeiGHT (Geopotential Meters)
MAXW |WMAX!| > Data from MAXimum Wind level
TROP > Data From TROPopause level

**- Additional Meteorological Fields ******

HGHT > Geopoptential HeiGHT (meters)
PRES > Pressure (mb)
MIXR > MIXing Ratio (g/kg)
VVEL > Vertical VELocity (Microbars/sec)

PMSL > Mean sea level Pressure fields, obtained without reseting LEVeL

   Note: If mean sea level pressure (GRIB ID=002) is not available, then an attempt is made to retrieve the RUC Reduction, the Eta Model Reduction, and the Standard Atmosphere Reduction, in that order.

PRSS > Mean sea level PReSsure (Std. atm. reduction) -- Set level first
PRSR > Mean sea level PReSsure (Ruc reduction) -- Set level first
PRSE > Mean sea level PReSsure (Eta model reduction) -- Set level first

TPCP > Total Precipitation fields, obtained without reseting LEVeL (cm)
CPCP > Convective Precipitation fields, obtained without reseting LEVeL (cm)

TPCI > Total Precipitation fields, obtained without reseting LEVeL (in)
CPCI > Convective Precipitation fields, obtained without reseting LEVeL (in)

   NOTE: TPCx/CPCx attempt to retrieve a 12 hour accumulation. If this
is not possible, then they try to obtain the longest accumulation (6,3,2,1) available.

TPC# > Total Precipitation fields in cm (#=hour accumulation)--no level reset
CPC# > Convective Precipitation field in cm(#=hour accumulation)-no level reset

**- ****** Automatically Derived Scalar Parameters ******

THTA > Potential Temperature - THeTA(degree K)
RELH > Relative Humidity (%)
DWPT > DeW Point Temperature (degree C)
TMPK > TeMPerature (degrees K)
TMPF > TeMPerature (degrees F)
THTE > Equivalent Potential Temperature - THeTa/E (degree K)

***** Automatically Derived Vector Parameters *****

GEOS > GEOStrophic wind vector (m/sec)
WSPD > Total Wind Speed (m/sec)
WDDF > Packed value of Wind Direction/speed (tens of degrees and m/sec)
WDRC > Wind DiRction (degrees)
BWND > WiND Barbs (m/sec)
BKNT > Wind Barbs (KNoTs)

**- ****** Isobaric Level Specifications ******

100 > 100 hPA level data --> FL-530  (ICAO-Required)
150 > 150 hPa level data --> FL-450  (ICAO-Required)
200 > 200 hPa level data --> FL-390  (ICAO-Required)
250 > 250 hPa level data --> FL-350  (ICAO-Required)
300 > 300 hPa level data --> FL-300  (ICAO-Required)
400 > 400 hPa level data --> FL-240  (ICAO-Required)
500 > 500 hPa level data --> FL-180  (ICAO-Required)
700 > 700 hPa level data --> FL-100  (ICAO-Required)
850 > 850 hPa level data --> FL-050  (ICAO-Required)
1000 > 1000 hPa level data

**- ****** Special Level Specifications ******

TROP > TROpopause level data  (ICAO-Required)
MAXW |WMAX!| > MAXimum Wind level data  (ICAO-Required)
SFC > Earth's SurFaCe data
MSL > Mean Sea Level data
CBAS > Cloud BASe level data
CTOP > Cloud TOP level data
0DEG > First freezing level above ground
CLVL > Adiabatic Condensation LeVeL data (parcel lifted from surface)
0DGX > Top freezing level
LCDB > Low ClouD Bottom level data
LCDT > Low ClouD Top level data
LCDL > Low ClouD Layer data
MCDB > Middle ClouD Bottom level data
MCDT > Middle ClouD Top level data
MCDL > Middle ClouD Layer data
HCDB > High ClouD Bottom level data
HCDT > High ClouD Top level data
HCDL > High ClouD Layer data

NOTE: No special level can begin with 0 except 0DEG, 0DGX, 0000

**- ***** Additional Level/Layer Specifications *****

###Z > Height above mean sea level in m (<100m)
Z### > Height above mean sea level in hm (>=100m)

###M > Height above ground in m (<100m)
M### > Height above ground in hm (>=100m)

###U > Depth below land surface in cm (<1000cm)
U### > Depth below land surface in m (>=1000cm)

S### > Sigma level number
H### > Height above sea level (x10)
I### > Isentropic level in degrees K
B### > Boundary layer in hPa (mb) above surface at the center

**- ***** Time Specifications *****

F06 > 6 hour forecast data
F12 > 12 hour forecast data (ICAO-Required)
F18 > 18 hour forecast data (ICAO-Required)
F24 > 24 hour forecast data (ICAO-Required)
F30 > 30 hour forecast data (ICAO-Required)
F36 > 36 hour forecast data

**- ***** Special Optional Gridded Data Fields *****

LIFT > LIFTed Index, obtained without reseting LEVeL
PWAT > Precipitable Water fields, obtained without reseting LEVeL (mm)
PWA1 > Precipitable Water fields, obtained without reseting LEVeL (in)

THCK > Generates Thickness fields between LVL1 and LVL2
THWN > Generates Thermal Wind between LVL1 and LVL2
**- ***** Other Parameters commonly in GRIB data sets: *****

TEMP > TEMPerature (degree C)
WIND > WIND (m/s)
WKNT > Wind (KnoTs)
PRES > PRESSure (mb, .1hPa)
PTND > Pressure TeNDency (mb/hr, .1hPa/hr)
HGHT > geopotential HeiGHT (m)
GHGT > Geometric HeiGhT (m)
OZON > Total OZONe
TEMP > TEMPerature (degree C)
VTMP > Virtual TeMPerature (degree K)
THTA > potential temperature [TheTA] (degree K)
THTE > equivalent potential temperature [TheTa-E] (degree K)
DWPT > DeWPoinT temperature (degree C)
DPTD > DeWPoint temperature Depression (degree C)
WNDD > WiND Direction (degree)
WNFF > WIND SPEED (m/sec)
UGRD > GRiD relative U wind component (m/sec)
VGRD > GRiD relative V wind component (m/sec)
SFTN > Stream FuNcTion (m**2/sec)
PSYM > montgomery stream function [PSYM] (m**2/sec**2)
VVEL > Vertical VELocity (micro-bars/sec)
VTCY > absolute VorTiCitY (1/sec)
SPFH > SPeciFic Humidity (g/g)
RELH > RELative Humidity (%)
MIXR > MIXing Ratio (g/g)
PWAT > Precipitable WATer (cm)
VCRS > Vapor pressure (mb, .1hPa)
DEF. > Saturation DEFicit (mb, .1hPa)
PCRT > PreCipitation RaTe (cm/sec)
TPCP > Total PreCiPitation (cm)
LPCP > Large-scale (stable) PreCiPitation (cm)
CPCP > Convective PreCiPitation (cm)
SWAT > WATer equivalent Snow depth (cm)
SNDP > Snow DePth (cm)
TCLD > Total Cloud percent (%)
CCLD > Convective ClouD percent (%)
LCLD > Low CLouD percent (%)
MCLD > Middle ClouD percent (%)
HCLD > High CLouD percent (%)
CH2O > Cloud water [H2O] (cm)
PCON > CONdensation Pressure (mb, .1hPa)
WTMP > Water TeMPerature (degree K)
TSOL > SOiL Temperature (degree K)
SWEL > significant SWELI wave height (m)
SWVR > net Short WaVe Radiation at surface (W/m**2)
LWVR > net Long WaVe Radiation at surface (W/m**2)
PRSS > mean sea level Pressure - Standard atmosphere reduction (mb, .1hPa)
PRSR > mean sea level Pressure - RUC reduction (mb, .1hPa)

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PRSE > mean sea level Pressure - Eta reduction (mb, .1hPa)

LIFT > "Surface " LiFTed index (degree K)
LFTX > "best" LiFTed index (degree K)
LFTB > "Boundary layer" LiFTed index (degree K)
KNDX > K iNDeX (degree K)
SWET > SWEet index (degree K)

HQDV > Horizontal moisture [Q] DiVergence (g/g/sec)
VSSH > Vertical wind Speed Shear (1/sec)
PTN3 > 3 hour interval Pressure TeNdency (mb/sec)
CRAN > Categorical RaiN (1/0 = Yes/No)
CZRN > Categorical freeZing RaiN (1/0 =Yes/No)
CPEL > Categorical ice PELlets (1/0 = Yes/No)
CSNO > Categorical SNOw (1/0 = Yes/No)
CWTR > Cloud WaTeR (cm)
CINH > Convective INHibition (J/kg)
CAPE > Convective Available Potential Energy (J/kg)
TKEN > Turbulent KENetic energy (J/kg)
THTV > Virtual potential temperature [TheTa-V] (degree K)
HLCY > storm relative HeLiCitY

POPP > Probability Of PreciPitation (%)
POZP > Probability Of froZen Precipitation (%)
POFP > Probability Of Freezing Precipitation (%)
USTM > U-component of STorM relative motion (m/sec)
VSTM > V-component of STorM relative motion (m/sec)
PSNC > Percent SNow Cover (%)