PCGRIDDS32 ®

User's Guide

Version: 3.3 04/04/2007

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PCGRIDDS32 FORWARD

Welcome to PCGRIDDS32, the Microsoft Windows 32-bit version of the original Personal Computer based Gridded 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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PCGRIDDS32 Internet Home Page: http://home.comcast.net/~jkrob/
PCGRIDDS32 User Support Forum: http://www.weathergraphics.com/forum
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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
```
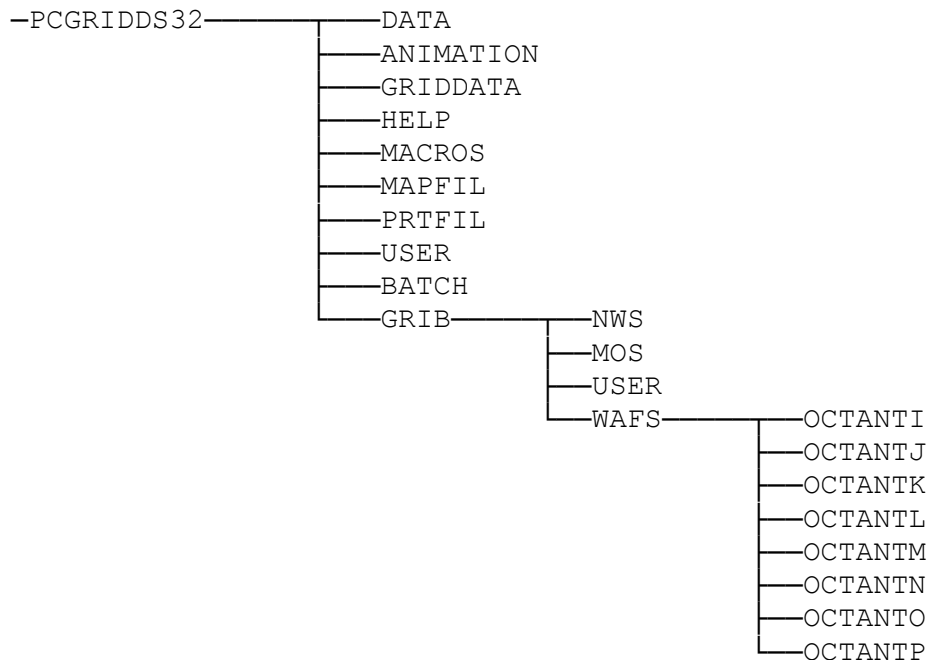
PCGRIDDS32   The main **PCGRIDDS32** directory contains the temporary and status files written by PCGRIDDS32 and the program files used to run the PCGRIDDS32 system.

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 PCGRIDDS with information about your computing environment.
> These files can be modified to meet your requirements (refer to '*Customizing PCGRIDDS32*').

DATA   The **DATA** directory contains supporting data files used by PCGRIDDS32 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 PCGRIDDS32 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 PCGRIDDS32.

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 PCGRIDDS32 and should not be deleted. Files that begin with '**!**' are used for delayed printing and should be managed through PCGRIDDS32. 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, PCGRIDDS32 must transform latitude/longitude based line segment coordinates (found, for example, in the file **C:\PCGRIDDS32\DATA\WORLD.MAP**) to the current map projection on the screen. This is a time consuming process. To increase the efficiency of PCGRIDDS32, 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 PCGRIDDS32 and should not be modified by any user.

BATCH   The **BATCH** directory contains batch files that control printing, and setting system files for PCGRIDDS32.
> These files are crucial to the operation of PCGRIDDS32 and its applications. The system administrator can modify the files **SAVGRIB**, **AUTOIN**, **FTPGRIB**, **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 PCGRIDDS32 format. Within it are located the sub-directories **NWS, WAFS** and **USER**. Under the **WAFS** directory are a subdirectory for each WAFS 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-WAFS GRIB data files that will be converted to PCGRIDDS32 format are stored in the **C:\PCGRIDDS32\GRIB\NWS** directory.
> At this time, files in this directory are provided by the user using other transfer methods separate from PCGRIDDS32.

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\WAFS\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\WAFS\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 parimeter 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.

GRIB2PCG to GRIB2PCG32 Differences

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 PCGRIDDS.

PCGRIDDS32 Applications

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

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

2. Press: **[P32][Enter]**
        Displays the '*PCGRIDD32S Applications*' menu.

Fig.21

```
                    PCGRIDDS32 Applications

    1.  Ingest GRIB Data
    2.  Run PCGRIDDS32
    X.  Exit to DOS


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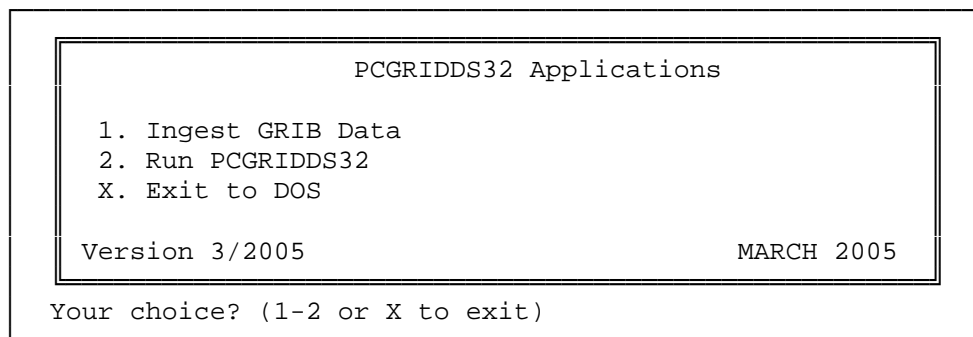
-- Menu options

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, PCGRIDDS32 works off of GRIB model data. However, PCGRIDDS32 cannot work with the GRIB data directly. It must convert the GRIB data to PCGRIDDS32 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, PCGRIDDS32 can no longer transfer GRIB files from the NWS to the PCGRIDDS32 host PC. The user must do this function manually using other, third-party FTP applications. This may be fixed in future versions.

The PCGRIDDS-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 PCGRIDDS program which created those files will have to be copied to \PCGRIDDS32\DATA directory so PCGRIDDS32 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 <u>MUST</u> 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**.

WAFS 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.

WAFS GRIB data can be ingested in a manual mode or automatic mode. The following instructions show the steps for manual WAFS 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 WAFS 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 WAFS GRIB Data

 2. Delete WAFS GRIB Data
 3. Select WAFS area for Gridded Data Set
 4. Convert WAFS 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:

Octant	Latitude	Longitude
I	0-90N	30W- 60E
J	0-90N	60E-150E
K	0-90N	150E-120W
L	0-90N	120W- 30W
M	0-90S	30W- 60E
N	0-90S	60E-150E
O	0-90S	150E-120W
P	0-90S	120W- 30W

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


```
Select C:\PCGRID~1\IGAREA.EXE                                    _ ⧉ ✕

 F1Help  ESCQuit  ENTERSelect  PgUpFrst Page  PgDnNxt Page      █

┌ Select Area for Gridded Data Set ═══════════════════════════════════
│A.1                    *** WAFS AREA SELECTION MENU ***
│B.1
│C.1  *** GRIB data for ALL required octants must be in GRIB\WAFS\OCTANT#
│D.1
│E.1                      --- Global Coverage ---
│F.1 WFG - GLOBE Centered on Greenwich                    (Octants=OPMNKLIJ)
│G.1 WFD - GLOBE Centered on the Date Line                (Octants=MNOPIJKL)
│H.1 WFW - GLOBE Centered on the Western Hemisphere       (Octants=NOPMJKLI)
│I.1 WFE - GLOBE Centered on the Eastern Hemisphere       (Octants=PMNOLIJK)
│J.1                      --- Hemisphere Coverage ---
│K.1 WNG - NORTHERN HEMISPHERE Centered on Greenwich         (Octants=KLIJ)
│L.1 WND - NORTHERN HEMISPHERE Centered on the Date Line     (Octants=IJKL)
│M.1 WNW - NORTHERN HEMISPHERE Centered on Western Hemisphere (Octants=JKLI)
│N.1 WNE - NORTHERN HEMISPHERE Centered on Eastern Hemisphere (Octants=LIJK)
│O.1 WSG - SOUTHERN HEMISPHERE Centered on Greenwich         (Octants=OPMN)
│P.1 WSD - SOUTHERN HEMISPHERE Centered on the Date Line     (Octants=MNOP)
│Q.1 WSW - SOUTHERN HEMISPHERE Centered on Western Hemisphere (Octants=NOPM)
│R.1 WSE - SOUTHERN HEMISPHERE Centered on Eastern Hemisphere (Octants=PMNO)
```

The information contained in the `Select Area for Gridded Data Set` is explained in the '*Customizing WAFS GRIB Ingest*' in the Customizing the PCGRIDDS32 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 PCGRIDDS. 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:

       ETA 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

```
                         Save GRIB Data

  1. Save GRIB Data

                      Ingest WAFS GRIB Data

  2. Delete WAFS GRIB Data
  3. Select WAFS area for Gridded Data Set
  4. Convert WAFS 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 Final GRIB data files from previous forecasts, if desired, <u>before</u> 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, <u>before</u> 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.

PCGRIDDS32 Menu Mode

The following discussions describe the operation of PCGRIDDS32 in *Menu 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 *Menu 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

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 Your choice? (1-2 or X to exit)
```
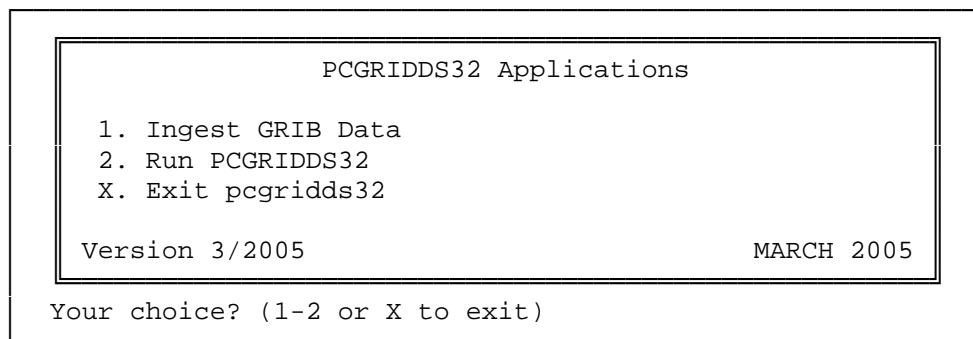
When you enter PCGRIDDS32 you are automatically positioned to select a gridded forecast data file. Move the mouse curser out of the way – the mouse is not used in PCGRIDDS32. You must select a forecast file before you perform any other task within PCGRIDDS32.

-- Main Menu
   The main menu for PCGRIDDS32 is displayed horizontally on line 2 (top) of the screen (Fig.2).

Fig.2

```
F1Help  ENTERSelect
File  Products  Specs  Display  Command  Exit
```



```
LEVEL= 850 LAYER=1000/ 500 FHR=  0 FHRS=  0/ 24 MODEL=
```
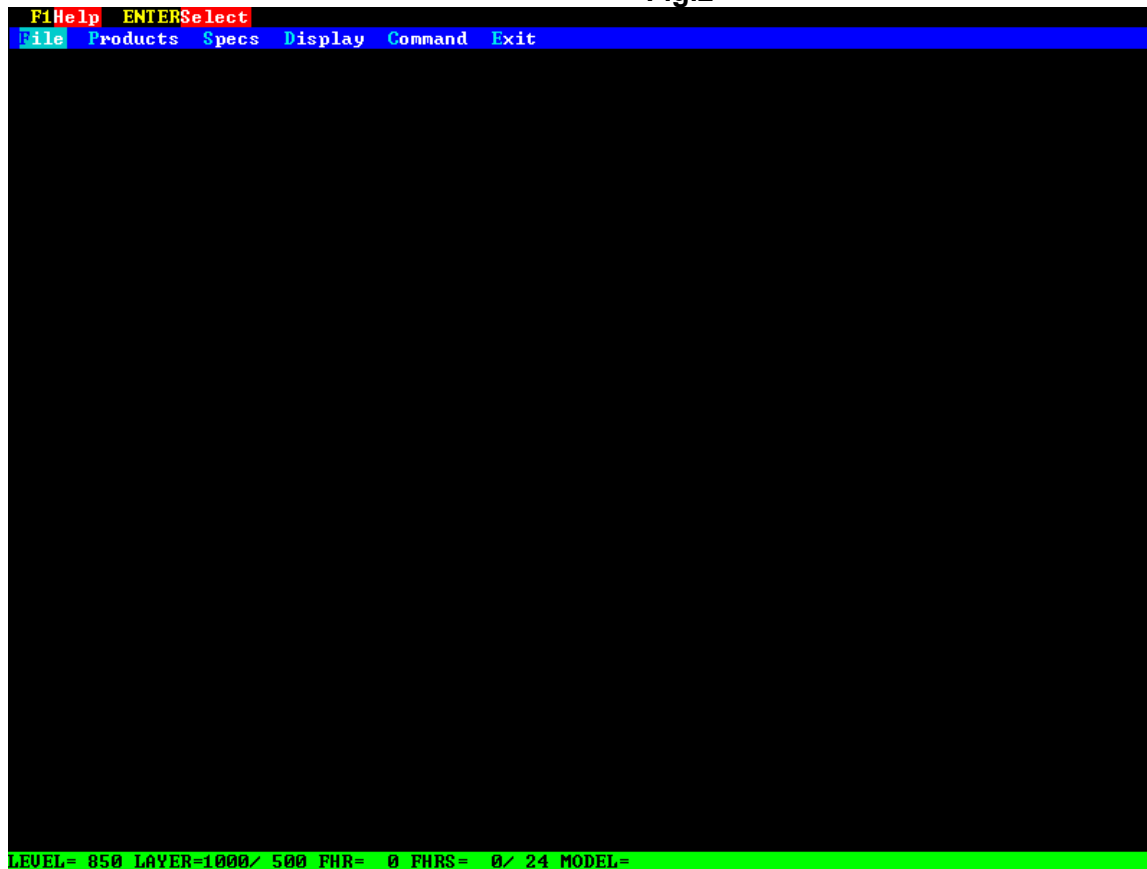
   This menu contains 6 options.

File	Select, change, or list the contents of a forecast data <u>file</u>.
Products	Display predefined PCGRIDDS32 <u>products</u>.
Specs	Define the forecast hour and vertical level <u>specifications</u>.
Display	Change to or define one of the following <u>display</u> modes: Plan view, Cross-section, Time-section.
Command	Switch from *Menu Mode* to <u>*Command*</u> *Mode* to create customized products interactively.
Exit	<u>Exit</u> 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*').

LEVEL   Pressure level, Isentropic level or Height level

LAYER   A grid layer consisting of 2 levels; used for level differences, etc.

FHR   Forecast hour

FHRS   Pair of forecast hours (Time range) used for time differences, etc.

MODEL   A 4 character forecast model identification name followed by the forecast model date

m/#   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.

-- 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 <u>without</u> 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
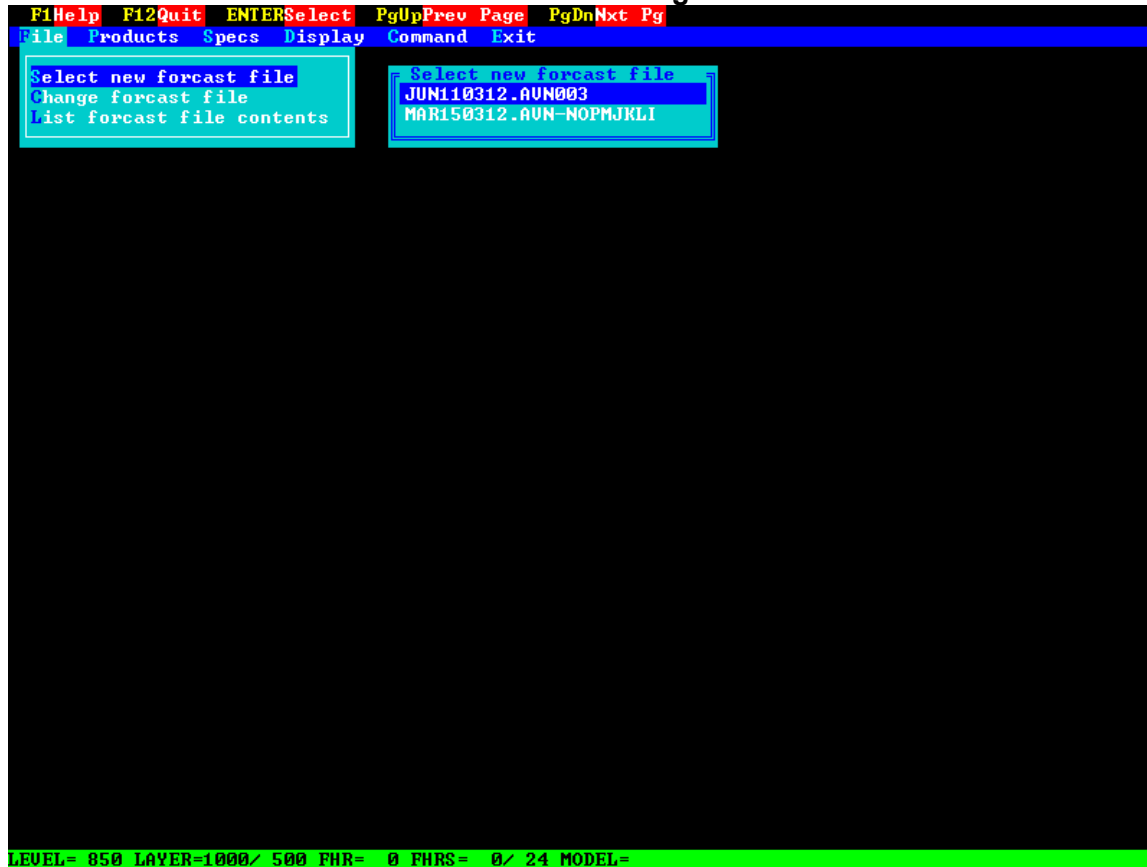
When you select '*File*' from the main menu, a 'pull-down' menu (Fig.3) with the following choices is displayed.

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
C:\PCGRIDDS32\USER\PCGMODE.DAT (refer to '*Customizing PCGRIDDS32*'). The
default value for this directory is **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.

Fig.5


```
F12Quit  PgUpFrst Page  PgDnNxt Page
File  Products  Specs  Display  Command  Exit

Select new forcast file
Change forcast file
List forcast file contents

  V:PCG-32 BETA--GRID FILE 1 <FIL1> --> MAR150312.AVN-NOPMJKLI
  MODEL=WAFW FROM 2003/03/15/12    LISTING FOR FHR=  0
  PARAMETERS SET TO:   LEVEL= 850   LAYER=1000/ 500   FHRS=  0/ 24
  PRES SFC ALAT SFC ALON SFC FFFF SFC DMAP SFC EDIR SFC CSLT SFC PRESMAXW
  HGHTMAXW TEMPMAXW UGRDMAXW UGRDMAXW PRESTROP HGHTTROP TEMPTROP UGRDTROP
  UGRDTROP HGHT  70 TEMP  70 UGRD  70 UGRD  70 HGHT 100 TEMP 100 UGRD 100
  UGRD 100 HGHT 150 TEMP 150 UGRD 150 UGRD 150 HGHT 200 TEMP 200 UGRD 200
  UGRD 200 HGHT 300 TEMP 300 UGRD 300 UGRD 300 VVEL 300 RELH 300 HGHT 400
  TEMP 400 UGRD 400 UGRD 400 VVEL 400 RELH 400 HGHT 600 TEMP 600 UGRD 600
  UGRD 600 VVEL 600 RELH 600 TEMP 700 UGRD 700 UGRD 700 VVEL 700 TEMP1000
  UGRD1000 UGRD1000 RELH1000 TEMPB015 UGRDB015 UGRDB015 RELHB015 VVEL 500
  VTCY 500 RELH 500 VVEL 850 RELH 850 RELH  2M

>>>>- Full resolution forecast data used

LEVEL= 850 LAYER=1000/ 500 FHR=  0 FHRS=  0/ 24 MODEL=WAFW  15 MAR 2003 P/1
```

-- 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 leve*l', 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.

Fig.6

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


```
F1Help  F12Quit  ENTERSet  F6Clr Field   F9Lookup
File  Products  Specs  Display  Command  Exit
              Forcast Hour
              Vertical Level


                                              TIMES
                                                0
    Define the forcast hour and time range by entering or
    selecting the values from the list of available forecast hours.

    Forcast hour (FHR):      0

    Time range (FHRS):  Start   0   End  24
```

LEVEL= 850 LAYER=1000/ 500 FHR= 0 FHRS= 0/ 24 MODEL=AVN3   4 NOV 2004 P/1

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.

Fig.9

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

```
F1Help  F12Quit  ENTERSelect  F7Delete  F8Insert  PgUpPrev Page  PgDnNxt Page
File   Products  Specs  Display  Command  Exit

                        *Plan View                     ┌ Lookup ═══
                         Cross Section                  AWIPS Grid 211
                         Time Section                   Great Plains
                                                        Gulf Coast
                                                        Mid-Atlantic
                                                        New England
    Define the center latitude, center longitude        Pacific Nor-West
    and the north-south display distance:               South-Central
                                                        South-West
                                                        Upper Mid-West
    Center Latitude:    45 N  Center Longitude:  110 W   <ALB>
                                                        <DCA>
                                                        <DFW>
                                                        <JAN>
    North-South display distance (degrees):    10        <MKC>
                                                        <MSP>
                                                        <PHX>
    To display the entire grid, press [F5][Enter].       <SEA>

LEVEL= 850 LAYER=1000/ 500 FHR=  0 FHRS=  0/ 24 MODEL=AVN3   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

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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.

Fig.12

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.

Fig.13


```
F1Help  F12Quit  ENTERSelect  F7Delete  F8Insert  PgUpPrev Page  PgDnNxt Page
File  Products  Specs  Display  Command  Exit

                      *Plan View              ┌ Lookup ═══════
                       Cross Section          │INL-ELP
                       Time Section           │INL-PHX
                                              │INL-TLH
                                              │< 80 West>
    ┌────────────────────────────────┐        │< 90 West>
    │Define the latitude and longitude for    │(100 West>
    │the cross section path:          │        │(110 West>
    │                                 │        │(120 West>
    │ Left:   Latitude  45 N  Longitude 130 W  │(~30 North>
    │                                 │        │(~40 North>
    │ Right:  Latitude  45 N  Longitude  60 W  │(~50 North>
    │Enter [U] Preset Pressure Levels │        └──────────────
    │Enter [A] All Model Pressure Levels    U
    │Enter [I] Isentropic Levels      │
    │Enter [H] Height Levels          │
    │Enter [X] User Defined Levels (CMD: XLVL)
    │Enter 4 Letter File Name for User       505M
    │Defined Levels (****.LVL)        │
    │To cancle the cross section path,│
    │Press [F5][ENTER].               │
    └────────────────────────────────┘

LEVEL= 850 LAYER=1000/ 500 FHR=  0 FHRS=  0/ 24 MODEL=WAFW  15 MAR 2003 P/1
```

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.

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Fig.14


```
F12Quit  ENTERSave  F5Clr Form  F6Clr Field
File  Products  Specs  Display  Command  Exit
                        *Plan View
                         Cross Section
                         Time Section

    Define the latitude and longitude for
    the cross section path:

    Left:   Latitude   45 N   Longitude   130 W

    Right:  Latitude   45 N   Longitude    60 W

    Enter [U] Preset Pressure Levels
    Enter [A] All Model Pressure Levels          U
    Enter [I] Isentropic Levels
    Enter [H] Height Levels
    Enter [X] User Defined Levels (CMD: XLVL)

    Enter 4 Letter File Name for User        505M
    Defined Levels (****.LVL)

    To cancle the cross section path,
    Press [F5][ENTER].


    Type left and right Station IDs:




LEVEL= 850 LAYER=1000/ 500 FHR=  0 FHRS=  0/ 24 MODEL=WAFW  15 MAR 2003 P/1
```

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.

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.

Fig.15

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.

Fig.16

```
F1Help  F12Quit  ENTERSelect  F7Delete  F8Insert  PgUpPrev Page  PgDnNxt Page
File  Products  Specs  Display  Command  Exit
                                *Plan View              Lookup
                                 Cross Section          BOS
                                 Time Section           DEN
                                                        ORD

     Define the latitude and longitude for
     the time section point:

     Latitude:  42.37 N    Longitude:    71.03 W


     Enter [U] Preset Pressure Levels
     Enter [A] All Model Pressure Levels          U
     Enter [I] Isentropic Levels
     Enter [H] Height Levels
     Enter [X] User Defined Levels (CMD: XLUL)

     Enter 4 Letter File Name for User
     Defined Levels (****.LVL)            505M

     Enter [U] Preset Forcast Times
     Enter [A] All Model Forcast Times            U
     Enter [X] User Defined Times (CMD: THRS)

     Enter 4 Letter File Name for User
     Defined Times (****.HRS)             36HR

     To cancel the time section point,
     press [F5][Enter].




LEVEL= 850 LAYER=1000/ 500 FHR=  0 FHRS=  0/ 24 MODEL=WAFW  15 MAR 2003 P/1
```

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.

Fig.17

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 <u>both</u> 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.

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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'*).

Fig.18

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.

Fig.19

```
 F1Help  F12Category  ENTERSelect  F2Overlay  F3Printopt  F9Command
 File  Products  Specs  Display  Command  Exit

 SURFACE MAPS
 A.                   *****  SURFACE MAPS  *****
 B.  SFTH Mean Sea-level Pressure and 1000-500mb Thickness    <Set TIME first>
 C.  10TH 1000 mb Height and Winds, 1000-500mb Thickness      <Set TIME first>
 D.  10TD 1000 mb Height, Dew Point and Wind                  <Set TIME first>
 E.  10TE 1000 mb Height, Equiv. Pot. Temp., and  Winds       <Set TIME first>
 F.  NSTM NGM MSL Pressure, S982 Temperatures and Winds       <Set TIME first>
 G.  NSTD NGM MSL Pressure, S982 Dew Points and Winds         <Set TIME first>
 H.  NSTE NGM MSL Pressure, S982 Equiv. Pot. Temp. and Winds  <Set TIME first>
 I.  ESTM ETA MSL Pressure, B015 Temperature and Winds        <Set TIME first>
 J.  ESTD ETA MSL Pressure  B015 Dew Points and Winds         <Set TIME first>
 K.  ESTE ETA MSL Pressure, B015 Equiv. Pot. Temp. and Winds  <Set TIME first>
 L.  THPW MSL Pressure, 1000-500mb Thickness, Precip. Water   <Set TIME first>
 M.  PCPP 12 hour Total and Convective Model Precipitation    <Set TIME first>
 N.  P24L Loop 24 Hour Precipitation Totals for Model cycle<Reset TIME after>
 O.
 P.  SFIL Change Active File          <Must have multiple files open>
 Q.  SFHR ** Set TIME  ** <Forecast Hour: F00,F12,F24,F36,F48,...>

 LEVEL= 850 LAYER=1000/ 500 FHR=  0 FHRS=  0/ 24 MODEL=AVN3    4 NOV 2004 P/1
```

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.

Key sequence	Forecast hour
[^]	18
[<]	12
[>]	18
[>]	24
[>]	12
[^]	12

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.

<u>Defining Products</u>

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 <u>must</u> 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 INDICIES 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.

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 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)
10TD 1000 mb Height, Dew Point and Wind                 (Set TIME first)
10TE 1000 mb Height, Equiv. Pot. Temp., 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 <u>*right to left*</u>. 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]** <u>after</u> 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.

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.

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

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.

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.

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 <u>each</u> 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 <u>above</u> 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 <u>below</u> 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 <u>each</u> 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.

-- Plot Labels

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

Plan view
```
WAFG= 250:LYR=1000/ 500 :FHR= 12:FHRS=  0/ 24::FIL1=WAF28APR.00Z
95/ 4/28/ 0--TEMP
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	<u>Last</u> active forecast data file

Line 2

95/ 4/28/ 0	<u>Last</u> 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	Maximum data value
-42.85	Minimum data value
-48.43	Mean
3.17	Standard deviation

Time-section (TSCT)
```
WAFG:Lat/Lon 35S/ 59W=> 36/  0 :FHR= 12:FHRS=  0/ 24::FIL1=WAF28APR.00Z
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	<u>Last</u> active active forecast data file

Line 2

95/ 4/28/ 0	<u>Last</u> 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

Cross-section (XSTN)

```
WAFG: ORD> BOS@42N/ 88W=>42N/ 71W :FHR= 12:FHRS=  0/ 24::FIL1=WAF28APR.00Z
95/ 4/28/ 0--TEMP
```

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	<u>Last</u> active active forecast data file

Line 2

95/ 4/28/ 0	<u>Last</u> active forecast model date (yy/mm/dd/hh)
TEMP	Command line that produced the display

Custom labels

You can produce custom labels using the PCGRIDDS32 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
```

LMN#   forecast Model Name
```
        WAFG
```

LFO#   Forecast model Origination (text in file PCGLBL.USR)
```
        DOC/NOAA/NWS    WAFC-WASHINGTON
```

LLN#   forecast LeNgth
```
        12H FORECAST
```

LLL#Latitude and Longitude (time-section and cross-section only)
```
        LAT/LON: 35S/ 59W
        LAT/LON: 53N/ 14E=>28N/ 77E
```

LSN#   StatioN identifier (time-section and cross-section only)
```
        STNID:  BOS
        STNID:  ORD=> BOS
```

LTX#user TeXt
```
        WIND/TEMPERATURE
```

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).

I	II	III	IV
--------------	--------------	--------	--------
LPL1 LTM2	LTM2 LPL1	LPL1	LPL1
TEMP	TEMP	LTM2	TEMP
		TEMP	LPL2

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

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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

  Your choice? (1-2 or X to exit)
```
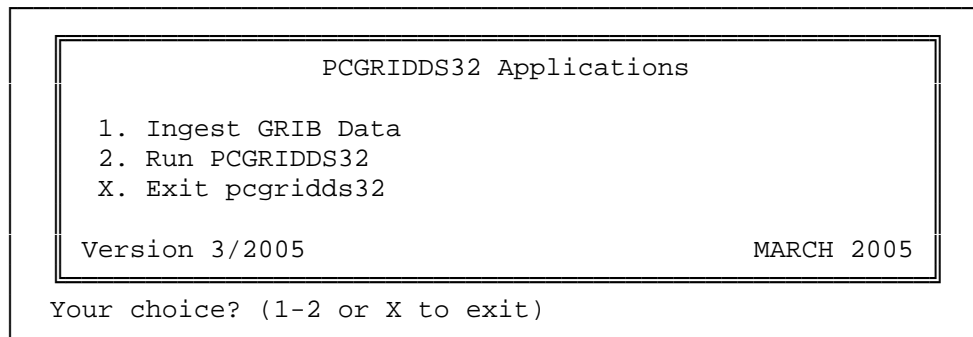
A listing of the file, **C:\PCGRIDDS32\HELP\HELP.DAT**, which provides an online *Command Mode* tutorial (refer to >*Online Help*=), is supplied below.

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

typing **MENU**.

****- 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: **TPC**x/**CPC**x 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 **LIST**ed 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.

**- <u>Overlaying displays on a single command line -</u>
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
CI10	- contour intervals of 10 units
CI#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
CI.#	- 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, . . .
         CLRA 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)

SCL1 - Display only signed digits greater than or equal to 10**1 (10)
SCL# - Display only signed digits greater than or equal to 10**#
SC-1 - Display only signed digits greater than or equal to 10**-1 (.1)
SC-# - Display only signed digits greater than or equal to 10**-#

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

****- Wind Displays -**

Vector displays will be generated automatically for vector quantities, or when two grids area 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
HGHT LDIF   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
HGHT TDIF   in the HeiGHT 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 HeiGHTs, 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&
ENDL&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
ENDA

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 ENDAnimation 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 **USER\INITGRID.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:

XLVL 505m
XSCT 55.00   80.00 25.00   80.00

The look of the Cross section display is created by a series of commands executed from the files **USER\CROSSSECTION.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, to program will default to the current operational CROS display.

The following commands are what are in the included in the **USER\CROSSSECTION.DAT** file:

NLBL XLTN CLRY&
NCLB NLBL PRES CLRY&
XLBL 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 PCGRIDDS. 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 AGEOstropic 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 Scalar (e.g., WSPD) from m/s to KNOTs
SMPH [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
               (X COMP, Y COMP) of any vector
FVCT > Calculates F (Normal wind) Vectors
QVCT > Calculates Q (Geostrophic wind) Vectors
THTS > Calculates Saturated Theta-e

ADVT [Followed by Scalar and Vector] > Calculates advection
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.

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/parends 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,

DVRG[WIND] - will calculate and display the DiVeRGence of the total WIND,
SDVR(MIXR,WIND) - will contour the Scalar flux DiVeRgence of the MIXing Ratio
using the total WIND, etc.

****- 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 defines by LVL1/LVL2
THWN |TWND| > Generates Thermal Wind on levels defines by LVL1/LVL2

TADV > Generates Temperature Advection using the Total wind
QADV > Generates Mixing Ratio Advection using the Total wind

****-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&HGHT SLVL 500
ENDS
ERAS
REST 500Z   [This command line could alternatively be input as 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 **CMDS**. 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


```
*******************************************************************************

******* NOTICE – NOTICE – NOTICE – NOTICE – NOTICE – NOTICE ********

*******************************************************************************
```

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

```
              PCGRIDDS32  --  HELP MENU


   OPTIONS    ----     INPUT DESIRED OPTION


   1               COMMAND MODE TUTORIAL
   2               COMMAND FUNCTION SUMMARY
   3               ALPHABETICAL COMMAND SUMMARY
   4               LISTING OF BASIC GRID FIELDS
   5               ALPHABETICAL LIST OF BASIC GRIDS
   NAME            HELP FOR SPECIFIC NAMED COMMAND
   X               RETURN TO PCGRIDDS



 OPTION?
```


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

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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 <u>must</u> 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.

All lines must end with 'hard' carriage returns.

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.

CommandThese 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=OPMNKLIJ)
WFD - GLOBE Centered on the Date Line             (Octants=MNOPIJKL)
WFW - GLOBE Centered on the Western Hemisphere    (Octants=NOPMJKLI)
WFE - GLOBE Centered on the Eastern Hemisphere    (Octants=PMNOLIJK)
                        --- Hemisphere Coverage ---
WNG - NORTHERN HEMISPHERE Centered on Greenwich       (Octants=KLIJ)
WND - NORTHERN HEMISPHERE Centered on the Date Line   (Octants=IJKL)
WNW - NORTHERN HEMISPHERE Centered on Western Hemisphere (Octants=JKLI)
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=JKLI)
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=NOPJKL)
NJ8 - AREA between  60E to  60E and 90S to 90N          (Octants=NOPMJKLI)
OK2 - AREA between 150E to 120W and 90S to 90N          (Octants=OK)
```

```
OK4 - AREA between 150E to  30W and 90S to 90N        (Octants=OPKL)
OK6 - AREA between 150E to  60E and 90S to 90N        (Octants=OPMKLI)
OK8 - AREA between 150E to 150E and 90S to 90N        (Octants=OPMNKLIJ)
PL2 - AREA between 120W to  30W and 90S to 90N        (Octants=PL)
PL4 - AREA between 120W to  60E and 90S to 90N        (Octants=PMLI)
PL6 - AREA between 120W to 150E and 90S to 90N        (Octants=PMNLIJ)
PL8 - AREA between 120W to 120W and 90S to 90N        (Octants=PMNOLIJK)
................. End file OCTETS.MNU...........................
```

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 <u>line position</u> of an
> entry <u>should not be changed</u> 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'.
```

```
        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 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
111122222333344445555 6666
101000 850 700 500 400 300 250 200 150 100
1122223333444455556666777788889999900001111
13   36   33   30   27   24   21   18   15   12   09   06   03   00   00   00   00   00   00   00 2
11222233334444555566667777888899990000111122223333444455556666777788889999000011
```

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
112222333344445555666677778888999900001111
```

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

starting in column 1. 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  00  00 2
1122223333344445555566667777888899990000111122223333344445555566667777888899990000011
```

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 6 0) 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 1
1122223333344445555566667777888899990000111122223333344445555566667777888899990000011
```

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 2
1122223333344445555566667777888899990000111122223333344445555566667777888899990000011
```

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 3
1122223333344445555566667777888899990000111122223333344445555566667777888899990000011
```

-- 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 <u>must</u> 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 WAFS 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              3333333333333333333333333333333333
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.

Example	Field	Description	Start column	Number of characters	Character type
212	1	GRIB grid identification number	1	3	Numeric
4	2	PCGRIDDS32 grid identifier	5	1	Text
AWIPS 40KM SUBSETTED GRID	3	Grid description-optional	20	N/A	Text

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 555555555555555555555555
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.

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

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 explaination 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.

STREAMLIN.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 >>>>>>
```

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```
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 origional 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 boarder
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

FOO |INIT| > Sets Forecast Hour to use initialized grids
F12 | F12| > Sets Forecast Hour to use 12 hour forecast grids
F24 | F24| > Sets Forecast Hour to use 24 hour forecast grids
F36 | F36| > Sets Forecast Hour to use 36 hour forecast grids
F48 | F48| > Sets Forecast Hour to use 48 hour forecast grids
FHR1 > Gets data from first time of FHRS time pair for commands to left
FHR2 > Gets data from second time of FHRS time pair for commands to left

**- 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,S896,S844,S784| > 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 |LYR1,LY1=!| > Gets data from bottom of Layer for variables to LEFT
LVL2 |LYR2,LY2=!| > Gets data from top of Layer for variables to LEFT
LEVL > Overrides LVL1 and LVL2 and gets data from original level

TAVE > Calculate Time AVEerage 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
HRLY |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
WMPH!> 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
WDDF!> 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 reseting 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 reseting LEVeL (cm)
CPCP > Provides Convective Precipitation fields without reseting LEVeL (cm)
LPCP > Provides Large-Scale Precipitation fields without reseting LEVeL (cm)

TPCI!> Provides Total Precipitation fields without reseting LEVeL (in)
CPCI!> Provides Convective Precipitation fields without reseting LEVeL (in)
LPCI!> Provides Large-Scale Precipitation fields without reseting LEVeL (in)

PMSL > Provides Mean Sea Level Pressure fields 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.
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 anaylsis using MAPS reduction
NMSL > MSL pressure for RUC (MPAS) surface anaylsis using NMC reduction
PSFC > Provides Surface Pressure fields without reseting LEVeL
PWAT > Provides Precipitable Water fields without reseting LEVeL (mm)
PWAI!> Provides Precipitable Water fields without reseting 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 |MFTR!,MAPF!|> Provides map factor at each grid point
ALAT |LATT!,LAT! ,LATI!|> 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
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 vy Vector] > Plots VTNG & VVEL
VCR2 [Followed vy Vector] > Plots VTNG & VVEL scaled by 2
VCR5 [Followed vy 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
...
CI#0 > Sets Contour Interval to # of tens of units
CI10 > Sets Contour Interval to 10 units
CI20 > 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
...

CI.# |C#-1| > Sets Contour Interval to .# units -->#*10**-1
CI.1 |C1-1| > Sets Contour Interval to .1 units
CI.2 |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
THN0 > 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 CROSs-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 (without erasing screen)

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 (eg, 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 comand 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)
PWAI > 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 SWELl 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)

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 (%)