DPLOT Help Contents

DPLOT is a general purpose X-Y plotting program that allows you to view, manipulate, and produce hard copies of data in a variety of formats.

To learn how to use Help, press F1

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Technical Support

Menu Commands

To get information about individual menu commands

1.   On the toolbar, click the Help button.
      Help button
     The mouse pointer changes to a question mark:
        Help pointer

2.   Click the menu you want, and then click the command name for which you want information. DPLOT displays Help for that menu command.

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See also:
    File Menu Commands
    Edit Menu Commands
    Text Menu Commands
    Options Menu Commands
    Generate Menu Commands
    Info Menu Commands
    View Menu Commands
    Window Menu Commands

Parts of the DPLOT Screen

To get information about parts of the DPLOT screen:

1. On the toolbar, click the Help button.
    Help button
    The mouse pointer changes to a question mark.
    Help pointer

2. Click the part of the screen you want more information about. For general information about the toolbar, click anywhere on the toolbar except on a button. For information about a toolbar button, click the button. DPLOT displays the Help window.

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See also:
   Status bar description
   Toolbar description

Programmer's Reference

View Menu

All
Display the full plot extents, dependent on whether <u>Manual Scaling</u> is in effect.

Zoom In
Allows you to specify the extents of the plot using the mouse. This command is disabled for polar coordinates.
Shortcut: Click   on the toolbar.

Zoom Out
Displays the previous view (before the last Zoom In command) of a plot.
Shortcut: Click   on the toolbar.

Move to Front
Changes the index of the selected curve so that it is the last curve to be plotted.

Send to Back
Changes the index of the selected curve so that it is the first curve to be plotted.

Status Bar
Toggles the display of the status bar at the bottom edge of the window.

Toolbar
Toggles the display of the toolbar. See <u>Toolbar Description</u>

Large Buttons
Toggles the size of the toolbar buttons between the default 24x22 pixels and 32x30 pixels.

Redraw
Redraws the currently active window after canceling a previous redraw with <Escape>.
Shortcut: Click   on the toolbar.

Acceleration (or Velocity/Displacement)
Toggles the view in Data Processing mode for data types that produce multiple plots. This menu command is hidden if Data Processing mode is not in effect.

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See also:
 <u>Data Processing Mode</u>
 <u>Status Bar Description</u>

Window Menu

Cascade
  Displays the open document windows in an overlapped arrangement, with the active document on top.

Tile
  Arranges the open document windows as non-overlapped windows.

Arrange Icons
  Arranges any minimized document window icons in the lower left portion of the DPLOT application window.

Keyboard Shortcuts

The following list summarizes the general pattern in keyboard shortcuts:

- **ENTER** is used to confirm or carry out an action.
- **ESC** is used to cancel an action.
- Function keys (**F1**, **F2**, and so on) are used as shortcuts for common commands and actions.
- **INSERT**, **DELETE**, and **BACKSPACE** are used primarily with editing.
- **TAB**, the arrow keys, **HOME**, **END**, **PAGE UP**, and **PAGE DOWN** are used primarily for moving, selecting, and scrolling.
- **ALT** is generally used for actions related to application windows, such as choosing commands and dialog box options.
- **SHIFT** usually means one of the following:
    - Extend the selection.
    - Perform the opposite action.
    - Go in the opposite direction.
- **CTRL** is used in several keyboard shortcuts. In addition, it can mean one of the following:
    - Perform the same action on a different scale.
    - Perform a slightly different action on the same object.

Keyboard Shortcut Reference

DPLOT has a set of keyboard shortcuts that you can use to carry out commands and select dialog box options directly from the keyboard - by using these shortcut keys, you bypass the menus. With other shortcut keys, you can move, select, and edit large documents more efficiently.

Keys that must be pressed sequentially are shown separated by a comma; keys that must be pressed at the same time are shown separated by a plus sign.

Help keys

To	Press
Switch to Help window	**F1**
Switch to context-sensitive Help	**SHIFT+F1**

Editing

To	Press
Carry out an action	**ENTER**
Cancel an action	**ESC**
Clear the selection	**DELETE**
Copy the active document to the Clipboard	**CTRL+C**
Paste data from the Clipboard	**CTRL+V**

Working with files

To	Press
Create a new document	**CTRL+N**
Save the active document with the Save command on the File menu	**CTRL+S**
Open an existing file	**CTRL+O**
Print the active document	**CTRL+P**
Close the active document	**CTRL+F4**
Quit DPLOT	**ALT+F4**

Working with windows

To	Press
Select the menu bar	**ALT or F10**
Select the DPLOT Control menu	**ALT+SPACEBAR**
Select the document Control menu	**ALT+HYPHEN**
Close the document window	**CTRL+F4**
Switch to the next open document window	**CTRL+F6**
Switch to the previous open document window	**CTRL+SHIFT+F6**
Arrange all open documents as non-overlapped windows	**SHIFT+F4**
Arrange all open documents as overlapped windows with the active document on top.	**SHIFT+F5**
Redraw a document after previously interrupting a painting operation with **ESC**	**F9**

Results Box

You can copy some or all of the text presented by this dialog box to the Clipboard with the Copy button. The selected text may then be pasted into another Windows application that supports Clipboard operations.

Selecting text
By default, all of the text contained in the text box will be copied.. To select a portion of the text, do one of the following:

Press TAB or SHIFT+TAB until the cursor appears in the text box. Using the arrow keys, position the cursor at one end of the text you want to select. Hold down the SHIFT key and use the arrow keys to select text. Press ALT+C to copy the selected text to the clipboard.

Drag across the text you want to select, then click the Copy button.

Technical Support

Bug reports, Comments, etc.

Before reporting any suspected bugs, it is important that you be able to reproduce the circumstances that led to an error ...what other programs are running, how large is the data set, what type of scaling is in effect, etc. **Note:** See the description of known problems and possible solutions in the Known Problems topic before reporting errors.

Please include DPLOT's full version number (select the **About DPLOT** command on the Help menu) in any correspondence.

Attempt to recreate the error by performing the same functions that led to it previously. A full description of the circumstances leading to the error should be addressed to:

USAE Waterways Experiment Station
ATTN: Hyde /SS-R
3909 Halls Ferry Road
Vicksburg, MS 39180

or call **(601) 634-3668** from 7:00AM to 5:00PM Central time, or send e-mail to
hyded@ex1.wes.army.mil.

Comments or suggestions are welcome.

Updates to DPLOT

Updates to DPLOT are available through:

> FTP: **sliris.wes.army.mil** (IP Address 134.164.56.189),
>   UserID=anonymous

 World Wide Web: **http://sliris.wes.army.mil**

DPLOTW.EXE will run on any of Windows 3.1 or later, Windows 95, or Windows NT. DPLOT95.EXE requires Windows 95 or Windows NT v4.0 or later.

Download the file DPLOTW.ZIP or DPLOT95.ZIP to an empty temporary directory on your hard disk. Expand this file using the file decompression utility PKUNZIP.EXE, version 2.04 or later. Start Microsoft Windows, select Run from the Program Manager File menu or the Start button, and type **[d:\path\]setup.exe**, where **[d:\path\]** is the location of the temporary directory where DPLOTW.ZIP or DPLOT95.ZIP was copied to. Once the setup program has finished all of the files in the temporary directory may be safely deleted.

Known Problems

Colors on HP 1600c DeskJet Printer with DPLOT for Windows 3.x

According to the Microsoft KnowledgeBase article Q141516, Updated HP PCL5EMS Drivers for NT:

```
In some cases, when printing to the HP Deskjet 1600c in 24bit
color mode from 16 bit applications, the output received may
not be in color. This does not occur when printing in 8 bit
(256 color) mode or the 3 bit (8 color) mode.  This problem
can be worked around by printing to a lower color mode
setting or, if possible, printing from a 32 bit version of
the application.
```

As stated in the article, upgrading to DPLOT95 should correct any color problems you may be experiencing with the HP 1600c on Windows 95 or Windows NT.

Fill Between Curves

The built-in hatch patterns (horizontal lines, vertical lines, etc.) are not drawn correctly on systems equipped with ATI Mach32 (and possibly other) graphics adapters. The user-defined pattern, however, does work properly.

Generate macro with Windows NT 4.0 Beta

If you are running the Windows 3.1 version of DPLOT (DPLOTW.EXE) on Windows NT 4.0 Beta, attempting to use the Generate macro when Microsoft Excel is NOT already running will cause both DPLOT and the DPLOT Macro Editor to crash. To circumvent this problem, start Microsoft Excel before running any macros containing the Generate command, or obtain a copy of DPLOT95.EXE, which does not exhibit this problem.

Importing metafiles in Microsoft PowerPoint

If you insert a Windows metafile (.WMF) graphic created by DPLOT, (or paste a metafile picture created by DPLOT) into a PowerPoint slide, you will get only an empty frame if any clipping has been performed.

If you double-click this empty text frame, or use the Ungroup command, the image converts to PowerPoint drawing objects. However, the conversion to PowerPoint drawing objects removes clipping information from the picture, so that objects which should have been clipped (not drawn) will be visible. This is particularly noticeable if you have zoomed in on a plot or used the Manual Scale command to plot a subset of the data.

PowerPoint does not use the shared graphics filter (WMFIMP.FLT) for Windows metafiles located in the Windows MSAPPS\GRPHFLT subdirectory. It has its own internal filter. DPLOT metafile pictures display properly in Word for Windows, Excel, and other applications that use the shared filter. The import filter used by PowerPoint does not properly handle clipping regions.

If a portion of a curve extends outside the edges of the plot, you can delete points in PowerPoint by selecting the curve (double-click on it), then press Ctrl+click while pointing to a data point(s) to remove.

Rotated text with HP LaserJet 4/4M

The HP LaserJet 4/4M printer driver, version 31.1.1.8 or earlier, does not place rotated text correctly. The LaserJet 4/4M printer driver, version 31.V1.50, places rotated text correctly but in some cases drops characters from rotated character strings.

To fix either of these problems:

Use the HP LaserJet 3 driver distributed with Windows. Although this solution will fix the problem, output is limited to 300 dpi.

OR

Use the HP LaserJet 4/4M PostScript printer driver. This driver is usually included on 3-1/2" disk with the printer.

OR

Obtain an updated driver (**L4WIN3.EXE**) from Hewlett Packard. Driver updates are available on the World Wide Web at **http://www.hp.com** or from the Hewlett Packard Download Service at (208) 344-1691. If this does not fix the problem, it may be necessary to select "Raster" Graphics Mode and check "Print TrueType as Graphics" in the Print Setup dialog box. Note, however, that these print options result in a much larger printer spool file, and printing speed is considerably slower.

Text in metafiles overlaps the surrounding border
This problem is due to a limitation on the sizes of available fonts. When a metafile is played back in a target application (e.g. a word processor or presentation graphics application), the font sizes originally chosen are scaled to the size of the picture, as is the rectangle surrounding this text. However, while the rectangle can be scaled to any size, the corresponding font size may not be available (Windows selects the closest size available). For best results, select the desired size of the metafile using the Copy Dimensions command **before** copying a plot to the Clipboard or saving as a metafile.

Problems and/or suspected bugs not referenced in this topic should be reported to the author as described in the Technical Support topic.

Edit Menu

Copy Picture
Copies a metafile and a bitmap image to the Clipboard.

Copy Data Values
Copies the data points of a single curve to the Clipboard.

Copy Dimensions
Allows you to change the size of bitmaps and/or metafile pictures that are copied to the Clipboard by the Copy Picture command.

Paste
Creates a new curve using data from the Clipboard.

Paste Link
Creates a new curve using copied data and establishes a link with the source of the data.

Insert Link
Creates a new curve from data in another application, and links the curve to the source of the data.

Add a Constant to X
Adds a constant value to all X coordinates on one or more curves

Add a Constant to Y
Adds a constant value to all Y coordinates on one or more curves.

Decimate Points
Provides three different methods for reducing data.

Edit Data
Edit data values for a new or existing curve.

**Equal Intervals**
Generates a new curve with a constant spacing on the X axis.

Erase Curve
Wipes out all data associated with one or more curves.
Shortcut:
Click   on the toolbar.

Filter
Eliminates noise or otherwise alters a time history record.

Multiply X
Multiplys all X coordinates on one or more curves by a constant. For example, if the data consists of a time-history with time values in seconds, "Multiply X" by 1000 to convert the time values to milliseconds.

Multiply Y
Multiplys all Y coordinates on one or more curves by a constant.

Remove Trend
Removes any trend from the amplitude by subtracting a straight line through the first and last points (i.e. make the first and last amplitudes equal to zero).

Smooth
Smooths a data record using a low-pass filter.

Sort
Sorts the data for a selected curve in ascending abscissa (X) order. Many DPLOT operations are optimized for monotonically increasing values of X.

Swap X,Y

Switches the X and Y values for one or more curves. If the new curve has progressively smaller X values, then the order is automatically reversed so that X increases.

Truncate X

Eliminates all data outside a user-specified range. If no data remains, the curve and all associated data are erased.

Baseline Shift

Performs the same function as Add a constant to Y, but calculates the desired shift and automatically regenerates integrated data in "data processing" mode.

List Editions

Displays a list of all baseline shifts done on a record in "data processing" mode.

Undo Shift

Reverses the previous Baseline Shift performed in "data processing" mode.

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See also

Data Processing Command

Copy Picture command (Edit menu)

Copies a metafile and a bitmap image to the Clipboard. A metafile preserves all of the information content of a plot. The metafile picture can be scaled and rotated without distortion, and individual graphic entities (fonts, for example) may be edited. A metafile is device-independent, so the resolution of the image will be that of the final destination output device. The bitmap image created by DPLOT differs from the normal Windows screen capture in that the image size is fixed at 640x480 (rather than matching the current window size), and the title bar, menu, and window borders are not included in the image.

Shortcut:
        Click   on the toolbar.
        CTRL+C

Output size
If the **Automatic Size** menu command is in effect, DPLOT produces a metafile with default dimensions of 6 inches wide by 4.5 inches high. These dimensions may be changed in the destination application, but you then risk not being able to match font sizes with the intended size. For best results, you should select the Set Physical Size menu option and enter the desired dimensions for the width and height before copying the plot to the Clipboard.

Clipboard format
Many applications that allow you to paste data from the Clipboard will accept a variety of clipboard formats. Microsoft Word, for example, will accept either a bitmap or metafile picture. The target application determines which format to use when the Paste command is selected. Most applications that accept multiple clipboard formats have a Paste Special command in addition to the Paste command. To select a format different than the default, use the Paste Special command in the target application.

Link
In addition to a metafile picture and bitmap DPLOT also copies "link" information to the Clipboard. Any Windows application that supports a "Paste Link" command can be linked to the DPLOT plot, so that changes made to the plot by DPLOT are automatically transferred to the client application. For example, in Microsoft Word select the "Paste Special" command, check the "Paste Link" box, and select "OK". Any subsequent changes to the plot in DPLOT will cause the picture in Word to be automatically updated. Please note that when using the "Paste Link" option it is up to the client application (not DPLOT) to select the desired format (metafile or bitmap). Word, for example, will **always** request an updated metafile picture rather than a bitmap, even if "bitmap" is selected in the "Paste Special" dialog.

See also
        Transferring DPLOT Plots to Other Applications
        Copy Data Values

Copy Data Values command (Edit menu)

Copies the data values of a selected curve to the Clipboard as text. The data may then be imported into a number of Windows applications that support the "Paste" command. To copy the values of multiple curves from DPLOT to another Windows application, repeat the Copy Data Values ... Paste sequence for each curve.

You may also "link" DPLOT data to any application that has a "Paste Link" command. For example, in Microsoft Word select the "Paste Special" command from the Edit menu, check the "Paste Link" box, and select "OK". Any subsequent changes (in DPLOT, not Word) to the data copied to the Clipboard will be automatically reflected in the Word document.

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See also

Copy Picture command

Copy Dimensions command (Edit menu)

Allows you to specify the sizes of bitmaps and/or metafile pictures that are copied to the Clipboard by the Copy Picture command. When DPLOT is first installed, the default bitmap dimensions are 640x480 pixels, and the default metafile picture dimensions are 6.0x4.5 inches.

NOTE: The metafile picture dimensions are only used when the "Automatic Size" option is in effect. If you specify a size by using the Set Physical Size menu command, those dimensions are used for all output devices, including metafile pictures.

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See also
>   Copy Picture command

Paste command (Edit menu)

Creates a new curve with data from the <u>Clipboard.</u> The source of the data may be a word processor, spreadsheet, or any Windows application capable of copying data to the Clipboard, as well as a DOS application running in a window.

Shortcut:
> Click   on the toolbar.
> CTRL+V

Data organization
Data should be organized as X-Y pairs, or X followed by multiple Y values for each X. Each X data value must start on a new line. Values may be separated by spaces, commas, or tabs. No character strings are allowed.

Formats
Data values must not include any currency labels, percent signs, commas separating thousands, or any other special formatting. Many spreadsheet programs will allow you to remove formatting from a selected block of numbers prior to copying the data to the Clipboard. In Microsoft Excel, for example, after selecting the data to copy, press DELETE, select Formats, press ENTER, then CTRL+C to copy the unformatted data to the Clipboard.

Copying data from a DOS application
You may copy data either from a full-screen application or a windowed application. However, when running a full-screen application, you can copy only an image of the contents of the entire screen onto the Clipboard, so you increase the likelihood of copying invalid characters.

To copy selected information onto the Clipboard

1   Click the application's Control-menu box.
        Or press ALT+SPACEBAR to open the Control menu.
2   From the Control menu, choose Edit.
3   From the Edit cascading menu, choose Mark.
4   In your document, select the information you want to copy.
5   Click the application's Control-menu box.
        Or press ALT+SPACEBAR to open the Control menu.
6   From the Control menu, choose Edit.
7   From the Edit cascading menu, choose Copy.

Paste Link command (Edit menu)

Creates a new curve with data from the Clipboard and establishes a link with the source of the data. The source of the data may be any Windows application that 1) acts as a DDE server and 2) supports the Link Clipboard format (including DPLOT). When the source data changes, the pasted data reflects those changes.

Data organization and Format
Data should be organized and formatted as described under the Help topic for the Paste command.

To create a link between a source document and a dependent plot in DPLOT
Both applications must be Microsoft Windows applications.

1   Open the source document in the server application.

2   Select the source data you want to copy into the dependent document in DPLOT. See the documentation for the server application for more information on selecting data.

3   From the Edit menu, choose Copy.

4   Switch to the dependent document window in DPLOT.

5   Select Paste Link from the Edit menu.

If the Paste Link command is unavailable when you select the Edit menu, the other application does not support linking or cannot supply the data in a format that DPLOT can use.

Insert Link command (Edit menu)

Creates a new curve with data from a DDE server application and establishes a link with the server. When the source data changes, the DPLOT plot reflects those changes.

To create a link between a source document and a dependent plot in DPLOT
Both applications must be Microsoft Windows applications.

1   Open the source document in the server application.

2   Switch to the dependent document window in DPLOT.

3   Select Insert Link from the Edit menu.

4   Type the name of the application in the "Application" box (e.g. **Excel** or **WinWord**).

5   Type the name of the DDE topic in the "Topic" box. For most DDE servers, the topic is the name of the source datafile. If the file has not been saved to disk, the topic name may be the caption of the window containing the data (e.g. **Sheet1** in Microsoft Excel or **Document1** in Microsoft Word)

6   Type the name of the data item you want to link to in the "Item" box. Check the documentation of the server application for valid item names. In Microsoft Excel, items should be cell references in R1C1 format (e.g. **R1C1:R100C2** refers to the first 2 columns of 100 rows). In Microsoft Word items must be tagged with a bookmark, and the item is the name of the bookmark.

Data organization and Format
Data should be organized and formatted as described under the Help topic for the Paste command.

metafile

A collection of Windows Graphics Device Interface (GDI) functions that are encoded in a binary form. Some applications may refer to metafiles as the "picture" format.

Edit Data command (Edit menu)

Allows you to edit data for an existing curve or enter data values for a new curve. The maximum number of points that may be edited using this command is currently 1024. If the current number of curves is equal to the maximum number of curves (set with the Resize Arrays command) and the maximum number of points per curve is less than 1024, DPLOT attempts to resize the arrays by incrementing the maximum number of curves so that you may enter values for a new curve.

OK
>Accepts the input and closes the dialog box. If the curve has only 1 data point the curve is eliminated.

Cancel
>Restores previous values and closes the dialog box.

Add
>Adds a data point to the end of the array.

Insert
>Inserts a data point before the point currently highlighted in the list box.

Delete
>Deletes the data point currently highlighted in the list box.

Decimate command (Edit menu)

Provides three different methods for reducing the number of data points in a curve. Since all of the decimation processes are irreversible, DPLOT gives you the option of either replacing or preserving the curve that is operated on. Select the **Replace existing curve** checkbox to replace the original curve with the decimated data. Leave the box unchecked to preserve the original data.

Average Points
> Averages a user-specified number of amplitudes. Peak values may be lost.

Welch Depopulation Scheme
> Preserves only those points that prevent the output record from departing from the original data by more than a user-specified ratio of the range between minimum and maximum input values. Peak value is preserved. Generally has the best performance of the three methods, but may lose detail in low-amplitude regions of the data. Developed by Bob Welch, CEWES-SE-R. Click to see example.
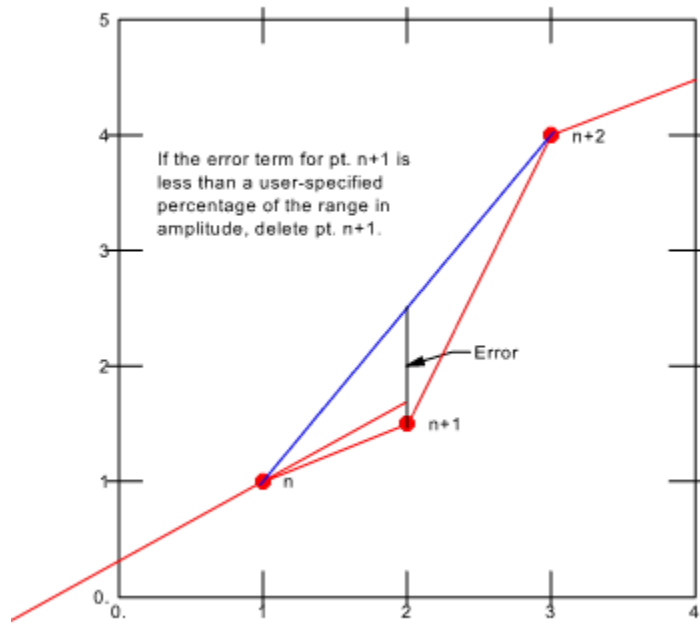
Skip Points
> Preserves every Nth point, where N is user-specified. Peak values may be lost.

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See also
> Resize Arrays

If the error term for pt. n+1 is less than a user-specified percentage of the range in amplitude, delete pt. n+1.

Filter data (Edit menu)

The Filter command provides several methods for digitally filtering time histories. All but one of the filters employed by DPLOT use the following linear filter:

$$y_n = \sum_{k=0}^{M} c_k \, x_{n-k} + \sum_{j=1}^{N} d_j \, y_{n-j}$$

where
x = input amplitudes
y = output amplitudes

Dialog box options for the various filters are described below:

Filter type

    User defined. Values for the C and D arrays are set by the user. This option is not recommended for users unfamiliar with signal processing.

    Frequency rejection (Carleton). Removes the frequency (specified in the Reject frequency box) from a time series using the methods described in WES Miscellaneous Paper N-70-1, Digital Filters for Routine Data Reduction, by H.D. Carleton.

    Frequency rejection (Press). Removes a narrow frequency band from a time series using the procedures described in Numerical Recipes, Cambridge University Press, by W.H. Press, B.P. Flannery, S.A. Teukolsky, and W.T. Vetterling. The frequency to remove is specified in the Reject frequency box. The width of the frequency band to remove is specified in the Bandwidth box.

    Zero frequency rejection. Removes an offset from an oscillating time function using method described in WES MP N-70-1.

    Option *x* low-pass. The four low-pass filters are described in WES MP N-70-1. These filters each use the linear filter equation described above, but make multiple passes using different filter coefficients.

    Random spike removal. The Random spike removal method is the only filtering technique used by DPLOT that does **not** use the linear filter described above. This method is useful for removing single samples with high amplitudes which bear no relation to the true record. DPLOT uses a slightly modified method from that described in WES MP N-70-1. The main condition defining a spike is:

$$1.25 > \frac{y_n - y_{n-1}}{y_n - y_{n+1}} > 0.75$$

The above inequality states that the ratio of the two sides of a spike must be nearly unity. The condition which defines the sizes of spikes to be removed is:

$$\left| y_n - \left(\frac{y_{n-1} + y_{n+1}}{2} \right) \right| > \frac{Range}{10}$$

where Range is the current range in amplitudes for the record. If any sample in a record meets both of the conditions described above, it is considered a spike and replaced with the average of the adjacent values.

Reject frequency
Is used only by the two **Frequency rejection** filters. This box is disabled for all other filters.

Bandwidth
Is used only by the **Frequency rejection (Press)** filter. This box is disabled for all other filters.

Time scale
The time scale is important for each of the **Frequency rejection** filters, since the coefficients C and D are dependent on the sampling frequency of the input.

Two pass
Each of the filtering methods used by DPLOT introduce a small phase shift to the input record. This situation may be corrected by selecting the **Two pass** option, which repeats the filtering operation in time-reversed order.

Replace data
Check this box to replace the existing record with the filtered data. Leave this box unchecked to produce a new curve. This option is disabled in data processing mode (the existing record is always replaced).

Filter coefficients
These controls are disabled for all but the **User defined** filter. The coefficients used by DPLOT for each of the next three filters (frequency rejection and zero frequency rejection) are shown but cannot be edited directly.

Baseline Shift command (Edit menu)

Allows you to specify a new value at a specific time in a record generated from the primary data file in "data processing" mode.

If the **Constant Baseline Shift** checkbox is checked, then the shift is applied to <u>all</u> points in the primary record. Otherwise, you may specify a start time and end time.

The start time **must** be less than the time at which you want the integrated record to match the value you specify.

After altering the primary record, DPLOT will automatically regenerate integrated records and, if the shift is applied to <u>all</u> points, will update the **CBS** display in the title.

DPLOT maintains a list of all shifts applied to the primary record, which can be displayed with the List Editions command.

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See also
      Data Processing

List Editions command (Edit menu)

Displays a list of baseline shifts made to the primary data record in "data processing" mode. Includes shifts made with either the "Add a constant to Y" or "Baseline Shift" commands.

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See also
>   Edit Menu
>   Data Processing

Smooth command (Edit menu)

Smooths the amplitudes for a selected curve.

The abscissas for the selected curve must be monotonically increasing and evenly spaced.

The Smooth command removes any linear trend to the data so that the first and last amplitudes are zero, uses a Fast Fourier Transform to low-pass filter the data, and finally reinserts the linear trend to the amplitudes.

The smoothing window is the number of points over which the data should be smoothed. Zero gives no smoothing at all, while a value approaching half the number of data points will render the data virtually featureless.

The algorithm used by the Smooth command is taken from Numerical Recipes by Press, Flannery, Teukolsky, and Vetterling. This reference includes the following qualification:

> *Data smoothing is probably most justified when it is used simply as a graphical technique, to guide the eye through a forest of data points all with large error bars. In this case, the individual points and their error bars should be plotted on the same graph, and no quantitative claims should be made on the basis of the smoothed curve. Data smoothing is least justified when it is used subjectively to massage the data this way and that, until some feature in the smoothed curve emerges and is pounced on in support of an hypothesis.*

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See also
   Fast Fourier Transform

Equal Intervals command (Edit menu)

Generates a new curve with a constant spacing on the abscissa (X axis). This command is useful for generating evenly spaced data points prior to performing some function that requires this characteristic (FFT for example). It may also be used to generate a smooth curve through widely spaced data points.

This command uses one of four methods for interpolating amplitudes between existing data points. The Linear, Quadratic, and Cubic Interpolation methods use, respectively, 1st, 2nd, and 3rd order polynomials.

Polynomial interpolation uses a finite number (2,3, or 4) of "nearest neighbor" data points to give interpolated values of the input record. In general, the interpolated values do not have continuous first or higher derivatives. That happens because, as X crosses the tabulated input values, the interpolation scheme switches which input data points are used to derive the polynomial interpolating function. If continuous first and second derivatives are important the Cubic Spline method should be used. The cubic spline implemented by DPLOT sets the second derivatives at each end of the input record to zero.
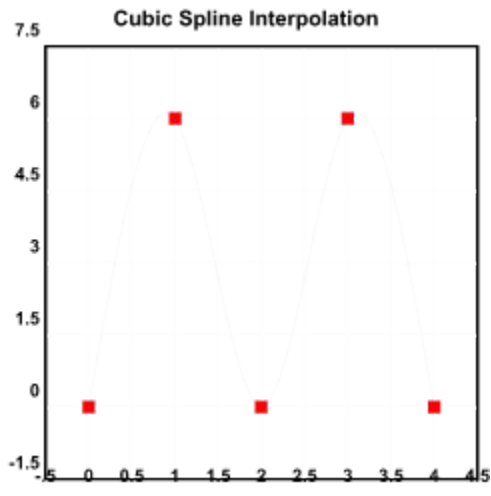
Select the **Replace existing curve** checkbox to replace the original curve with the evenly spaced data. Leave the box unchecked to preserve the original data.

Linear Interpolation

Quadratic Interpolation

Cubic Interpolation

Cubic Spline Interpolation
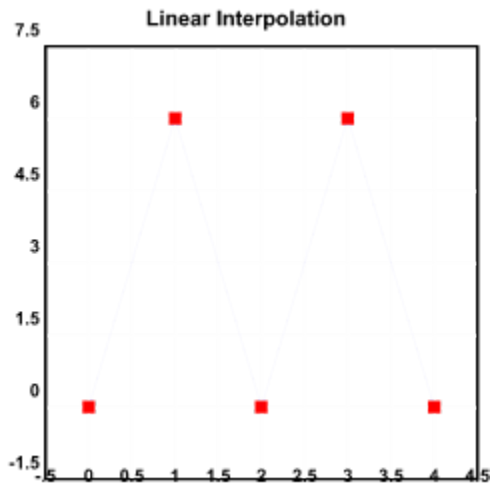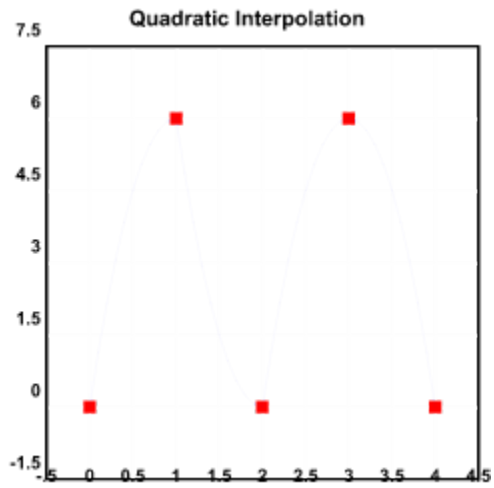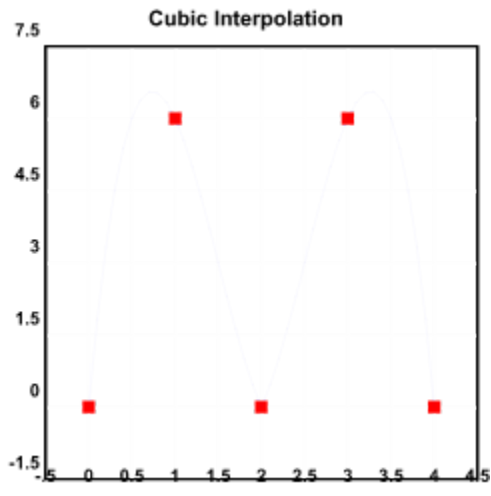
Error Messages

Following is a description of selected error messages displayed by DPLOT, with suggested corrective action.

Clipboard Errors
Unable to open Windows clipboard.
OR
Unable to access clipboard ... try again later.
    Either 1) another application is currently accessing the Clipboard (unlikely), or 2) another application failed to release control of the Clipboard after performing a cut/paste operation (more likely). Try again after a short delay. If this error message is repeated the only solution is to exit and restart Windows.

Data was successfully transferred, but the maximum number of points was exceeded.   DPLOT was unable to copy all of the data from the clipboard.   You may use the File:Resize Arrays command and try again.
    DPLOT reads data from the Clipboard in one pass (for speed), so that it is not known how many data points are on the Clipboard until the points are actually transferred.

Memory Allocation
Insufficient memory for temporary storage.
    Many DPLOT functions require temporary storage for working variables. DPLOT attempts to dynamically allocate memory for these temporary variables, and frees this memory when the function is complete. Under low memory conditions this procedure may fail. Close other active applications, if any, and try again. If no other applications are open, or if closing the applications does not solve the problem, set the array sizes for all current plots to the smallest possible values (maximum number of curves = current number of curves, maximum number of points = maximum number of points in any existing curve) using the Resize Arrays command on the File menu.

There is not sufficient disk space to temporarily store the existing data while resizing the X,Y arrays. See 'Error Messages' in Help.
    It is possible that the addition of new data to an existing plot (either by reading a file or generating new data) would exceed the current array sizes (shown on the status bar and set with the Resize Arrays command). In this case DPLOT attempts to first save the existing data to a temporary file, destroy the arrays, re-allocate the arrays with the new required size, and read the existing data back into memory from the temporary file. If there is not sufficient disk space to store the existing data this operation will fail. However, unlike the condition causing the following error message, DPLOT does successfully restore the existing data. DPLOT uses the drive set with the TEMP environment variable for the location of temporary files. If the TEMP environment variable is not set, DPLOT uses the drive where Windows is located. Set the TEMP environment variable to the drive with the most free disk space (hopefully corresponding to your fastest drive).

Unable to restore arrays. Closing DPLOT. Call (601) 634-3668.
    When attempting to resize the arrays as described above, if DPLOT cannot allocate the arrays with the new required size, it attempts to restore the previous array sizes. Failure of this operation generally indicates serious memory problems (which may or may not have been caused by DPLOT). It is possible that a second active application has consumed some amount of memory between the times that DPLOT destroys the original arrays and attempts to restore these arrays. Whatever the cause, if this condition occurs DPLOT will terminate.

Scaling Errors
Manually entered window coordinates are not consistent with logarithmic scaling.
    One or more of the plot extents set with the Manual Scale command are less than or equal to zero. Change the plot extents using the Manual Scale command on the Options menu.

Manually entered window coordinates are not consistent with a probability scale.
    One or more of the plot extents set with the Manual Scale command are either less than or equal to 0,

or greater than or equal to 100. Change the plot extents using the Manual Scale command on the Options menu.

Acceleration values exceed the limits of a single precision real number.   A tripartite grid is not appropriate.
OR
Deflection values exceed the limits of a single precision real number.   A tripartite grid is not appropriate.
Though the frequency (X) and velocity (Y) values are valid for a logarithmic scale, the associated acceleration or displacement values fall outside the limits of a single precision (4 byte) real number (approximately 1.2E-38 to 3.4E38).

No range for x values. (Xmin = Xmax)
OR
No range for y values. (Ymin = Ymax)
These errors are generally associated with attempting to plot a single data point. At least two data points are required.

File Menu

New
　　Opens a new document window.

Open...
　　Opens a new document window; reads data from a file

Append...
　　Adds data from file to existing document window

Close
　　Closes the currently active document window.

Save
　　Saves the active document's data in a DPLOT file.

Save As...
　　Saves the active document's data.

Get Preferences...
　　Retrieves plot settings from a previously saved file.

Save Preferences...
　　Saves plot settings (line and symbol styles and sizes, scaling, etc.) to a file.

Print...
　　Displays a Print dialog box; prints the current plot

Page Setup...
　　Changes the margins for a hard copy.

Macro...
　　Build and/or run a macro file to perform unattended operations.

Resize Arrays...
　　Changes the maximum number of curves and points per curve.

Exit
　　Quits DPLOT

New command (File menu)

Opens a new document window.

DPLOT attempts to allocate arrays for the X,Y data pairs using the maximum number of curves and points last entered using the Resize Arrays command. If there is not sufficient memory for allocating those arrays, DPLOT presents an error message explaining the problem. You may correct the problem by:

1)   Entering smaller values for either or both of the number of curves and number of points, then selecting OK.
2)   Select Cancel, close one or more document windows, and select New again.

Shortcut:
    Click   on the toolbar.
    CTRL+N

Append command (File menu)

Adds data from a file to the currently active document window. For DPLOT format files the Append command is equivalent to a combination of the Close and Open commands ... all existing data is erased.

The current maximum number of curves (set with the Resize Arrays command) must be greater than the number of existing curves to add new data without erasing old curves.

_____
See also:
    Resize Arrays

Open command (File menu)

Allows you to open a DPLOT file (containing data, strings, and formatting information), or one or more of nine other file formats.

Shortcut:
> Click   on the toolbar.
> CTRL+O

A)   DPLOT file   Contains data for one or more curves, as well as the title, axis labels, legend, and other formatting information.

B)   ASCII file, one data set with arbitrarily spaced points. The   first line should have the number of points (N). Subsequent lines should contain each of the N X,Y data pairs.

> **Example:**
```
5
1. 1.
2. 4.
3. 9.
4. 16.
5. 25.
```
> View

C)   The first line should have the number of points (N); the second line should have the spacing between data points (DX). The Y values may be on the same line separated by one or more spaces, or on separate lines. The first X value is assumed to be 0. (This can be amended by selecting 'Add a constant to X' from the 'Edit' menu.)

> **Example:**
```
6
1.
0. 1. 4. 9. 16. 25.
```
> View

D)   Optionally, the file may include a title line in the first line of the file and axis labels or legend character strings in the line immediately preceding the start of the data.

> **Example:**
```
1.00 1.00 1.00 1.00
2.00 4.00 8.00 16.0
3.00 9.00 27.0 81.0
4.00 16.0 64.0 256.
5.00 25.0 125. 625.
```
> View

If the file consists of a single column of data DPLOT interprets the data as Y values, setting the corresponding X values to the index of the Y value in the file, starting from 0. Otherwise, DPLOT uses the first column of data for the X array and subsequent columns as separate Y arrays.

E)   Unformatted data. Unformatted data files are generally much smaller than their equivalent ASCII files, and read/write operations are generally an order of magnitude faster. DPLOT writes the file as a series of 1024-byte records, with the 1st record containing only the number of data points (4 byte integer), and subsequent records consisting of 128 x,y pairs each. The first four bytes of the first record are the only bytes that are significant, and the remainder should be disregarded. The following lines of code, when compiled with the Ryan/McFarland or Microsoft FORTRAN compilers, will read a file produced by DPLOT in this manner:

```
      integer*4 np
      real*4    x(5000), y(5000)
      open(unit=8,file=fname,
     &      access='DIRECT',recl=1024)
      read(8,rec=1) np
c
c Guard against array overflow:
c
      np = min0(np,5000)
      nrec = int( (np-1)/128) + 1
      do 1 i = 1,nrec
        j1 = (i-1)*128+1
        j2 = min0(np,i*128)
        read(8,rec=i+1)
     &        (x(j),y(j),j=j1,j2)
 1     continue
      close(8)
```

Note that this method will always produce a file size of at least 2048 bytes, regardless of how small the original data set is. If you use the Lahey FORTRAN compiler and you want to read an unformatted file produced by DPLOT, you should compile your program with the /D option, which tells the program not to expect the F77L header. Likewise, if your F77L program produces an unformatted file that you want to read with DPLOT, the program should be compiled with the /D option.

Other FORTRAN compilers may expect different file formats for unformatted data than that described above.

F)   Binary file produced by Pacific Data Model 9820 recorders, DNA/Bendix format. Records produced in DNA field tests generally follow this format. See your instrumentation personnel.

G)   Binary file produced by Pacific Data recorders, WES/ISD **OLD** format. Explosive tests performed at WES and in WES field tests prior to 1993 generally follow this format. See your instrumentation personnel.

H)   Binary file produced by Pacific Data recorders, WES/ISD **NEW** format. Explosive tests performed at WES and in WES field tests starting in 1993 generally follow this format. See your instrumentation personnel.

I)   Nicolet Time Domain files (binary) created with the Nicolet System 400 Digital Oscilloscope.

J)   Hardened Data Acquisition System (HDAS) files. The HDAS is a self-contained transducer/recording system developed by Dr. Ray Franco of the Instrumentation Services Division at WES.

Array sizes
If the current maximum number of points/curve is less than the number required to read the file, DPLOT will attempt to re-allocate the X,Y arrays using the power of 2 greater than or equal to the number of points found in the file, and the number of curves specified in the file. If the re-allocation fails, DPLOT presents an error message and/or reads only the allowable number of points.
If, after successfully reading a file, the allocated number of points/curve is greater than twice the number required, DPLOT re-allocates the X,Y arrays using the power of 2 greater than or equal to the maximum number of points for all curves.

Multiple file selection
For other than DPLOT files, you may read multiple files into the same window. To select multiple files,

hold down the CONTROL key while selecting each of the files to read, or press the SHIFT key to select a range of files.

Separators
For each of the supported ASCII file formats, data values may be separated by one or more spaces or a comma, but **not** a <TAB> character. The last line in the file should include a carriage return/line feed sequence.

Time scale
Input time values for binary files (file types F, G, H, I, and J) are automatically shifted to milliseconds, rather than seconds.
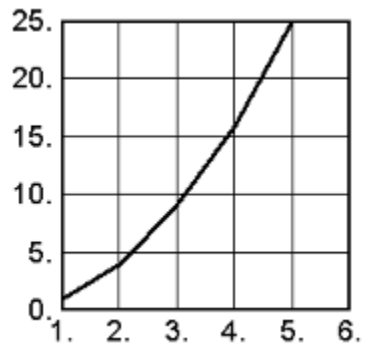
DPLOT File

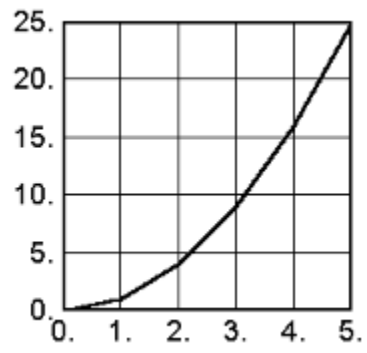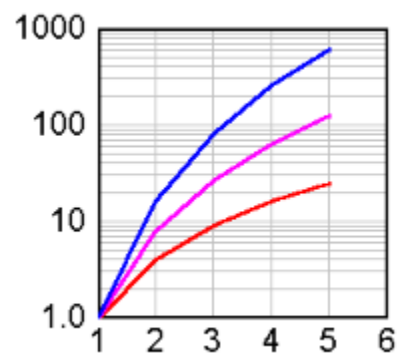A DPLOT file is an ASCII text file containing all of the information DPLOT needs to fully reproduce a finished plot. The first line in the file contains a header that informs DPLOT of the file version. The second line contains a keyword that describes what follows. The general form of a DPLOT file follows:

DPLOT v1.0
keyword
nCurves
do i = 1 to nCurves
   keyword-specific data
   LineStyle(i), SymbolStyle(i)
   Legend(i)
   CurveLabel(i)
end do
Title(1)
Title(2)
XAxisLabel
YAxisLabel
ScalingCode
LegendX, LegendY
Other miscellaneous identifiers

If the maximum number of curves (set with **Resize arrays**) is less than the number of curves specified in the file, DPLOT will automatically adjust the size of the X and Y arrays so that: 1) the maximum number of curves is equal to the number of curves specified in the file; and 2) the maximum number of points is greater than or equal to the maximum number of points for any one curve. This feature may require DPLOT to read the file several times before finding the minimum array sizes.

The file header is a recent addition to the DPLOT file format that assists DPLOT in immediately identifying a file. Older DPLOT files will continue to work with DPLOT.

_____

See also:
    Resize arrays

nCurves
Integer. Number of   data sets, or curves, that follow.

CurveLabel(i)
Character string. Short description of the i'th curve, generally placed near the last data point in the curve.

Legend(i)
Character string. Descriptive text for the i'th curve, where i ranges from 1 to nCurves

LineStyle(i), SymbolStyle(i)
Integers. The line style and symbol style codes for the i'th curve, where i ranges from 1 to nCurves
DPLOT currently supports 6 different line styles and 12 different symbol styles. A value of 0 indicates no lines (or no symbols).

Scaling Code

The low byte of the scaling code indicates what type of scaling the plot should use. Currently supported values are:

1	Linear X, Linear Y
2	Linear X , Logarithmic Y
3	Logarithmic X, Linear Y
4	Logarithmic X, Logarithmic Y
5	Tripartite grid
6	Linear X - Probability Y
7	Grain Size Distribution
8	Polar coordinates
9	Bar chart
10	Logarithmic X, Probability Y
11	Probability X, Linear Y
12	Probability X, Logarithmic Y
13	Probability X, Probability Y

The high byte of the scaling code contains scaling-specific information. Currently, this value is used only for tripartite grids, grain size distributions, and polar coordinates. For all other scale types, this value is reserved for future use and must be 0.

Tripartite grids
The high byte indicates what units to use for the grid. Currently supported values are:

Units Code	Scaling Code	
0	5	Hz, inches/sec, inches, and g's
1	261	Hz, feet/sec, feet, and g's
2	517	Hz, mm/sec, millimeters, and g's
3	773	Hz, cm/sec, centimeters, and g's
4	1029	Hz, meters/sec, meters, and g's
127	32517	User-defined units.

Grain size distributions
The high byte indicates what units the grain sizes are in. Currently supported values are:

Units Code	Scaling Code	
0	7	Millimeters
1	263	Inches
127	32519	User-defined units

Polar coordinates
The high byte indicates what units the angular dimensions are in. Currently supported values are:

Units Code	Scaling Code	
0	8	Radians
1	264	Degrees

A DPLOT file saved with "user-defined" units should also contain the miscellaneous identifier "units".

_____

See also:

      Linear/Log scaling
      Miscellaneous identifiers

LegendX, LegendY
Floating point. The X and Y position of the upper left corner of the legend, expressed as a ratio of the graph's dimensions. (0,0 would place the legend in the upper left corner of the plot, 0.5,0.5 places the upper left corner at the center of the plot).

DPLOT file keywords

Following is a list of all of the keyword identifiers currently supported by DPLOT. For keywords used to generate data (all but "data" and "dx"), DPLOT generates up to the minimum of 200 data points or the maximum number of points (specified with the Resize Arrays command). The spacing between data points is dependent on the type of scaling used. On linear scales, the data will be evenly spaced. On logarithmic scales, the data will appear to be evenly spaced.

data
File consists of data points.
keyword-specific data:
  nPoints(i)
  do j = 1 to nPoints(i)
    x(j,i), y(j,i)
  end do

dx
Data points (Y values only) with constant spacing between x values
keyword-specific data:
  nPoints(i)
  do j = 1 to nPoints(i)
    y(j,i)
  end do
  XStart(i), XStop(i)

poli
Polynomial: $y = C(1) + C(2)x + C(3)x^2 + C(4)x^3 + ...$
keyword-specific data:
  nTerms(i)
  do j = 1 to nTerms(i)
    C(j)
  end do
  XStart(i), XStop(i)

poly
Polynomial: $y = C(1)x^{Z(1)} + C(2)x^{Z(2)} + ...$
keyword-specific data:
  nTerms(i)
  do j = 1 to nTerms(i)
    C(j,i), Z(j,i)
  end do
  XStart(i), XStop(i)

expo
Exponential: $y = exp[C(1)x^{Z(1)} + C(2)x^{Z(2)} + ...]$. Keyword-specific data has the same form as that for "poly".

exp2
Exponential: $y = C(1) + C(2)exp[C(3)x]$
keyword-specific data:
  C(1,i), C(2,i), C(3,i)
  XStart(i), XStop(i)

pl10

Common logarithm: y = C(1)+ C(2)log10(x) + C(3)(log10(x))^2 + ... Keyword-specific data has the same form as that for "poli".

plog
Common logarithm: log10(y) = C(1)+ C(2)*log10(x) + C(3)*(log10(x))^2 + ... Keyword-specific data has the same form as that for "poli".

slog
Semi-log: log10(y) = C(1)x^Z(1) + C(2)x^Z(2) + ... Keyword-specific data has the same form as that for "poly".

In addition, modifiers may be applied to alter the data generated with the keywords listed above (for all but "data").

_____

See also:
    Keyword modifiers

DPLOT file keyword modifiers

Data points generated with any of the DPLOT keywords other than "data" may be modified using one of the methods specified below. Modifiers are applied to all curves in the file, and the modifier keyword must occur before the more general keyword identifier.

invr
Inverse of the function; i.e. $y = 1/y$

plus
Adds a constant to result; i.e. $y = y + A$. Constant A should be located immediately before the XStart and XStop values, and after the constants associated with "mult" if it is used.

mult
A constant times the function to a power; i.e. $y = B * y^C$. Constants B and C should be located immediately before the XStart and XStop values.

log
the common logarithm of the function; i.e. $y = \log10(y)$

logn
the natural logarithm of the function; i.e. $y = \log(y)$

These modifiers may be combined. The order of precedence for a file containing all modifiers is: $y = 1/ (B (\log(y)+A)^C)$

DPLOT file miscellaneous identifiers

Miscellaneous identifiers in a DPLOT file consist of a descriptive keyword followed by associated data, if any. A description of each of the currently supported miscellaneous identifiers follows:

Cal
Followed by the gage calibration value. Used in the title for data processing mode.

DenseGrid
Turns on dense gridline option (Options>Grid Lines or Box>Dense Grid Lines)

Date
If followed by a non-zero integer, date will be displayed in the upper-right corner of the plot.

FilledBars
Causes bar charts to be drawn with solid interiors (default is hollow).

FillRegion
Paints the area between two curves with a pattern. Followed by:
Curve1, Curve2, Style, Color, Hatch
where
    Curve1 = index of first curve.
    Curve2 = index of second curve.
    Style = 0 for solid fill, 2 for a pre-defined pattern, or 3 for a user-defined pattern.
    Color = Blue*65536 + Green*256 + Red, where each of Blue, Green, and Red range from 0 to 255.
    Hatch = index of pre-defined patterns (ignored for *Style* not equal to 2)
        0 = Horizontal lines
        1 = Vertical lines
        2 = 45 degree downward
        3 = 45 degree upward
        4 = Horizontal-Vertical cross-hatch
        5 = 45 degree crosshatch
If *Style* = 3, the next line must contain a string of 8 1-byte hexadecimal values (no separator) describing an 8x8 pixel bitmap.

Example:
```
FillRegion
0001 0002 0003 00000255 0000
AA55AA55AA55
```

Fills the area between curves 1 and 2 with a red user-defined pattern consisting of every other dot turned on.

FontFace
Followed by:
FontIndex
FontFace
where
    FontIndex is the index of the font.
        1 = numbers on the axes,
        2 = first title line
        3 = second title line
        4 = X axis label
        5 = Y axis label

6 = legend or notation
FontFace is the name of the font to use; e.g., `Times New Roman`

Grid Type
Followed by the grid type to use. 0 = Axes only, 1 = Grid, 2 = Box. See Grid Lines or Box.

LegendLineLength
Followed by the length of the line segment to use in the legend, in inches. The default line segment length is 1/2 inch.

LineWidths
Followed by a list of line widths for each curve in the file, in hundredths of inches.

Lname
Followed by the title for the legend, which will be placed at the top of the legend. If no legend is present, "lname" may still be used to display miscellaneous text on the plot.

Manual Scale
Followed by the corner coordinates (in data space) of the plot window:
xlow, ylow, xhigh, yhigh
See: Manual Scaling

Manual Ticks
Followed by the physical width and height of the plot and the number of tick mark intervals in the X and Y directions:
width, height, nXtick, nYtick
See: Set Physical Size

Margins
Followed by the left, top, right, and bottom margins of a hard copy, in inches. See: Page Setup.

MaxLegendRows
Followed by the maximum number of strings to place in a single column of the legend.

Multiple Axes
Followed by an option code and related data:
code
A, B if code = 1
AxisNumber(i),i=1,nplot if code = 2
where
  code = 1 for a second Y axis dependent on the primary Y axis; = 2 for a second, independent Y axis.
  A,B = coefficient for a 1st order polynomial that translates primary Y axis values to second Y axis values.
  AxisNumber(i) = array of numbers associating curves with axes. AxisNumber(1) **must** be 1.
See: Multiple Y Axes

NoLegendFrame
Turns off the default feature of drawing a rectangle around the legend.

NoteV2
Followed by:
X, Y, Flags, TabStop
Note\n
Note (cont.)\n
.
.

Note(cont.)

where

> *X,Y* are the coordinates of the upper-left corner of the note, expressed as a percentage of the width and height of the plot.
> *Flags* consists of a series of style bits that control how the note is drawn:
>> 0x0002 A rectangular frame will be drawn around the note.
>> 0x0004 The note will be opaque... any objects intersecting the note will be invisible.
>> 0x0008 The note is activated by pressing a button.
> *TabStop* is the character spacing between tab positions.

Each line of the note other than the last line should end in the sequence \n. DPLOT replaces \n with a <CR><LF> sequence when reading the note. There **must** be at least one additional line after the last occurrence of \n.

NoteButton
Followed by the text that appears on a button used to activate a note. By default, the button text is "Note".

NumberFormats
Followed by the number format codes for the X and Y axis.

PointSizes
Followed by:
NumFonts
Point(i),i=1,NumFonts

PtLabel
Prints a character string with an arrow directed toward a data point. Followed by:
CurveNum, PointNum, X, Y, Flags
Label
where

> *CurveNum, PointNum* are the curve index and point within the curve associated with the label.
> *X, Y* are the coordinates for the label, in plot space.
> *Flags* consists of a series of style bits describing the appearance of the label:
>> 0x0001 Label consists of the amplitude of the data point.
>> 0x0002 Label will be opaque.
>> 0x0004 A rectangular frame will be drawn around the label.
> *Label* is the character string, ignored if *Flags* & 0x0001 = 0x0001.

SquareLogs
Forces physical distance between log cycles on the X and Y axis to be the same.

SymbolSizes
Followed by a list of symbol heights for each curve in the file, in hundredths of inches.

Title3
Followed by the third title line.

TransparentLegend
Turns off the default feature of hiding any objects that intersect the legend.

Units
For scaling options allowing the use of user-defined units, the constants used to convert input values to values associated with a particular scaling option, and the labels associated with those constants.
Followed by:
A, B

LabelA
LabelB
where
     A, B are the constants defined with the Units. command.
     LabelA, LabelB are 16-byte character strings.

B and *LabelB* are ignored for grain size distribution plots.

wysiwyg
Turns on What You See Is What You Get style if the Set Physical Size command is used.

Y2Axis
Followed by a second Y axis label, to be placed along the right edge of the plot. Not displayed unless the Multiple Y Axes command is in effect.

Stop
Forces DPLOT to stop processing any other information in the file. This command is useful for developers who wish to add their own information to a DPLOT file. DPLOT will always add the line stop to the end of a DPLOT file that it saves.

Save command (File menu)

Use this command to save the active document in the DPLOT file format. When you save a document for the first time, DPLOT displays the Save As dialog box so you can name your document. If you want to change the name, location, or format of an existing document before you save it, choose the Save As command.

Shortcut:
       Click   on the toolbar.
       CTRL+S

Save As command (File menu)

Saves either the entire plot, or a single curve's data.

Note: To save a DPLOT file with its existing name, format, and location, use the Save command.

DPLOT file
Saves all data in addition to the title, axis labels, legend, and other formatting information.

ASCII file
Saves a file with the following form:
nPoints
x(1)   y(1)
x(2)   y(2)
.
.
x(nPoints)   y(nPoints)
DPLOT allows you to specify the number of significant figures (3 - 8) to use when saving the data. If the data consists, for example, of whole numbers ranging from 1 to 100, you will waste disk space by saving more than 3 places. On the other hand, if the data range from 1000. to 1001., specifying 3 places will result in a loss of all of the data's information content.

Unformatted
Saves the data as a series of 1024-byte records. Unformatted data files are generally much smaller than their equivalent ASCII files, and read/write operations are generally an order of magnitude faster. See Open command for more information.

Windows Metafile
Saves the entire plot in the Windows placeable metafile format. Placeable metafiles may be imported into a number of word processors and spreadsheet applications, or may be converted to another file format by many popular graphics conversion programs. DPLOT will **not** read a metafile.

Close command (File menu)

Use this command to close the window containing the active document. DPLOT suggests that you save changes to your document before you close it. If you close a document without saving, you lose all changes made since the last time you saved it. You can also close a document by using the Close command on the document Control menu.

To close all open document windows, use the Close All command (hold down the SHIFT key and select the File menu).

Shortcut:
Double click the document Control menu icon.
CTRL+F4

Print command (File menu)

The **Print** command allows you to alter the current printer setup and/or print the current plot.

Shortcut:
> Click   on the toolbar.
> CTRL+P

The initial printer settings are identical to those set with the **Control Panel:Printers** application. Changes in printer settings are preserved only during the current DPLOT session; DPLOT does not make permanent changes to the **Control Panel** settings, nor does it save printer settings for subsequent DPLOT sessions.

Dialog box Options

> **Multiple**
> Select the "Multiple" button if you want to print multiple documents on the same page. The active document MUST be printed. Placement of other documents on the page is controlled by the order in which the documents are selected for printing. The spacing between documents is controlled by the value entered in the "Space between" box.

Print Quality/Speed Considerations

> **TrueType Fonts**
> If you use TrueType fonts in your plot, it may be necessary to check the "Print TrueType as Graphics" check box in the **Print Setup** or **Print Options** dialog box. Some printer drivers do not handle rotated TrueType text correctly unless it is converted to a graphic before printing.

> **Gray Scale and Color**
> For black and white printers, DPLOT simulates gray scales and colors with a dithered pattern. In order for the curve to be printed as expected, the line widths for the curves must be greater than 0 (a single printer dot). The line width may be changed with the Symbol/Line Styles command under the Options menu. The color associated with each curve may be changed from the Colors menu.

> **Large Data Sets**
> Printing large data sets can take a **VERY LONG** time, depending on what options you have selected. You should consider decimating large data sets before printing. How large is large, you ask?   The following table lists timings for a plot consisting of about 120,000 points. It is not meant as a benchmark of any kind, but should give you a rough idea of the effects of various plotting options. In each case, the timer was stopped when Print Manager was given the print job and control was returned to DPLOT.

Line width, inches	Line Style	Time
1/60	Other than solid	15 minutes
0	Other than solid	2.5 minutes
1/60	Solid	2 minutes
0	Solid	35 seconds

See Known Problems for a description of printing problems along with possible solutions. Problems not referenced in that topic should be referred to the author as described in the Technical Support topic.

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See also:
> Fonts
> Decimate

Page Setup command (File menu)

Displays a dialog box that allows you to specify the margins that will be used when printing a plot.

This command might be useful for:
- Hard copies that will be bound.
- Printing multiple plots on the same page.

The "Default" button resets all margins to 0.0 inches... the full extents of the printer will be used.

Macro command (File menu)

Displays the Macro [dialog box](#)

Macro Name
Type or select the macro you want to run or edit.

Run
Runs the selected macro. The Run button is disabled if an existing macro is not selected.

Edit/Create
Opens a macro-editing window for a new macro whose name you type in the Macro Name box. If you select or type the name of an existing macro in the Macro Name box, clicking this button displays the contents of the selected macro in a macro-editing window for review or editing. This button is disabled if the Macro Name box is empty.

Delete
Deletes the selected macro. This button is disabled if an existing macro is not selected.

Cancel
Closes the dialog box.

_____

See also:
[DPLOT Command Syntax](#)

Resize Arrays command (File menu)

Allows you to change the maximum number of curves that may be plotted, and the maximum number of data points per curve. Re-allocating the X and Y arrays requires first de-allocating those arrays. If one or more curves are currently present DPLOT issues a warning stating that the curve(s) may be destroyed. DPLOT attempts to save the current curve(s) to a temporary file, re-allocate the X and Y arrays, and then read the temporary file to restore the curve(s). This procedure may not be successful, though, if there is insufficient disk space to store the curve(s).

In general, DPLOT will automatically increase the size of the arrays when needed. However, DPLOT will run more efficiently if the array sizes are selected such that they will not need to be increased.

The maximum number of curves may not be greater than 20, but the maximum number of points per curve is limited only by the amount of free memory present on your machine.

Values entered with the Resize Arrays command will be used for the initial array sizes for any new document windows that are subsequently opened.

Shortcut:
Double click the "Max Size:" entry on the status bar.

1, 2, 3, 4 command (File menu)

Use the numbers and names listed at the bottom of the File menu to open one of the documents you recently worked on (DPLOT File Format). Select the number or name that corresponds to the document you want to open.

_____

See also:

Open command

Exit command (File menu)

This menu option causes DPLOT to save default parameters to DPLOTW.INI and exit.

Shortcut:
ALT+F4

Generate Menu

This menu presents several options for generating new data based on one or more currently existing data sets. Each of these commands produces a new curve (preserving the original curves).

Average All Curves
Finds average value at each abscissa for two or more curves.

Compare Curves
Find difference in amplitudes between two curves.

Curve Fit
Least-squares curve fit.

Integrate a Curve
Find area under curve.

Differentiate a Curve
Find slope of a curve.

Lump Two Curves
Add amplitudes of two curves to produce a third curve.

Y=Poly(Y)
Applies a polynomial transformation to the amplitudes of a curve.

FFT
Performs Fast Fourier Transform on a selected curve.

Histogram
Finds the frequency distribution for the amplitudes of a curve.

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See also:
Resize Arrays

Curve Fit command (Generate menu)

Shortcut:
    Click   on the toolbar.

Uses least-squares curve fitting procedures to find the polynomial of a user-specified order that best fits the data. A least-squares curve fit is one in which the sum of the square of the errors between the actual data and the polynomial model are minimized:

DPLOT converts the input curve to a form most likely to achieve a good fit (or at least most likely to avoid scaling errors), depending on the type of scaling currently in effect. The actual form of the output polynomial is:

Correlation coefficient
The correlation coefficient presented by DPLOT is a measure of how well the polynomial fits the data. A correlation coefficient of 1.0 denotes a perfect fit, while a correlation coefficient less than 0.9 should probably be discarded. The correlation coefficient is described mathematically as:

$$Correl = \sqrt{1 - \frac{\sum\limits_{i=1}^{N}[y_i - y(x)]^2}{\sum\limits_{i=1}^{N} y_i^2 - \frac{1}{N}\left(\sum\limits_{i=1}^{N} y_i\right)^2}}$$

Limitations
Attempting to generate a curve fit to a data set with a large number of data points (>1000) will sometimes cause an overflow error. In this case, it might be necessary to first reduce the data using one of the Decimate commands from the Edit menu.

In general, least squares curve fits are very poor predictors of trends in the data outside the limits of the input. Extrapolation outside the limits of the input is not recommended for any but 1st order fits. The figure

shown below illustrates the problem associated with extrapolating outside the limits of the input data. Even though the generated curve fits the input perfectly, values outside the limits of the data are, at best, suspect.
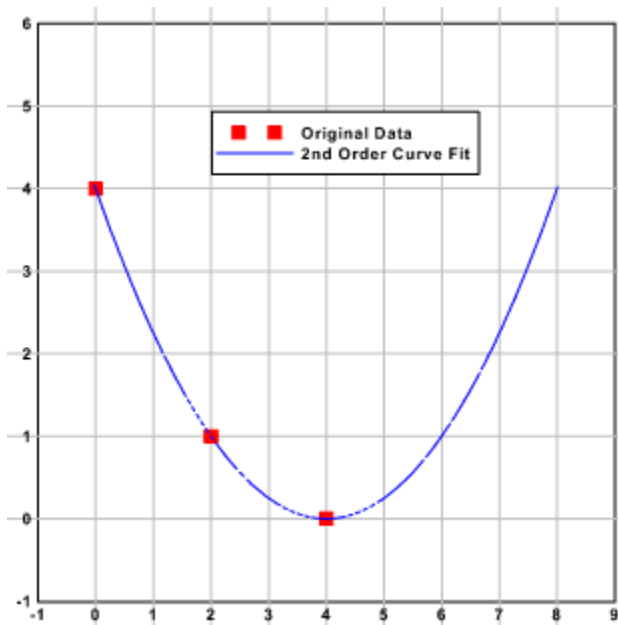
Bear in mind that the least squares procedure operates only on existing data points. A generated curve fit might fit the data points exactly, but produce completely unexpected results between data points. This is particularly true for high order polynomials. As in the figure above, the generated curve in the figure below fits the input data precisely. However, in this case, a 1st or 2nd order fit would produce a much more realistic model of the input data, even though the resulting polynomial would not be perfectly correlated.
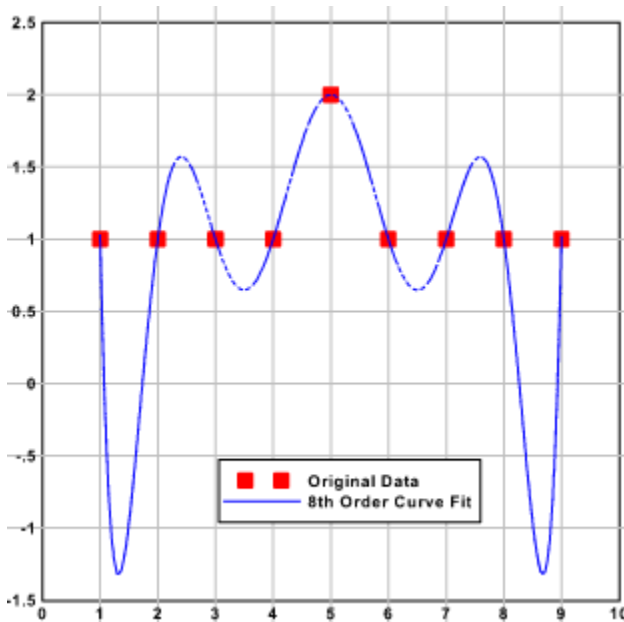
See also:
    [Decimate](#)

Integrate a Curve (Generate menu)

DPLOT finds the area under a curve using the trapezoidal rule:

-

Typical uses for integration include generating an impulse-time history from a pressure-time record, or velocity-time from acceleration-time.

Shortcut:
Click   on the toolbar.

Differentiate a Curve (Generate menu)

Two methods are available for differentiating (finding the derivative of) a curve. Typical uses for differentiating a curve include generating a velocity-time history from a displacement-time record, or pressure-time from impulse-time.

Trapezoidal rule
The trapezoidal rule inverts the process used by the Integrate a Curve command. This is the only method available for differentiating curves that do not have a constant spacing in X.

$$y_{j,2} = 2 \frac{y_{j,1} - y_{j-1,1}}{x_j - x_{j-1}} - y_{j-1,2}$$

Note that, unlike numerical integration using the trapezoidal rule, differentiation is not always a stable process. Small roundoff errors in early time steps are propagated and amplified through the entire record. This is especially critical in records with a large number of data points.

Quadratic interpolation
This method tends to be much more stable than the trapezoidal rule, but requires that the input data have a constant spacing. DPLOT uses a quadratic interpolating function that fits the amplitude at a given time step plus its nearest two neighbors and sets the derivative at this time equal to the slope of the interpolating function. Note that this method does **not** use previously calculated derivatives, so earlier roundoff errors are not carried forward.

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See also:
    Integrate a Curve

FFT command (Generate menu)

Shortcut:
      Click   on the toolbar.

Performs a Fast Fourier Transform (FFT) on a selected data record. The input data must be evenly spaced (have a constant interval). Unlike the other Generate commands, the FFT command creates a new document window for displaying the output, since the input and output records are in different domains.

Given a function of time h(t) with N consecutive sampled values, the FFT implementation used by DPLOT calculates the corresponding function in the frequency domain as:

DPLOT can use either of two FFT algorithms, dependent on the number of points (N) in the input record:

REALFT
Source: "Numerical Recipes" by W.H. Press, B.P. Flannery, S.A. Teukolsky, and W.T. Vetterling, Cambridge University Press, 1986.

REALFT requires that the number of points (N) in the input record be a power of 2.

EZFFTF
Developed by P.N. Swarztrauber, National Center for Atmospheric Research, Boulder, CO. Available on the World Wide Web at the NETLIB Repository, *http://netlib2.cs.utk.edu*.

EZFFTF does NOT have the same limitations on N, but can take significantly longer to compute the transform (see below).

The efficiency of the EZFFTF algorithm is highly dependent on the magnitude of the prime factors of N. For small prime factors, this routine is comparable in performance to the REALFT algorithm. However, for large prime factors, or for N equal to a large prime number, the run time of this routine can be several orders of magnitude longer than that for a comparable N consisting of small prime factors. The following table (based on a Pentium 90 MHz system) illustrates this fact.

N	Prime Factors	FFT Run Time
16384	2^14	0.11 sec
16379	19*431	1.00 sec
16381	prime	97. sec
65536	2^16	0.50 sec
65521	prime	~33 minutes

If N is not a power of 2, you can elect to pad the input record with 0 values out to the next higher power of 2 by selecting the first option in "Adjustment Options" in the "FFT Options" dialog box. This operation will significantly decrease the run time for FFT's on input records with N equal to a large prime.

If N is a power of 2, DPLOT will always use the REALFT routine, regardless of the option selected.

If you are reasonably certain that you will always select the same options for performing an FFT, you can prevent the "FFT Options" dialog box from being displayed by selecting the "Don't show this dialog box..."

check box. If you later decide that you need to change one or more options, exit DPLOT, edit the file DPLOTW.INI (in the Windows directory), and find the line "FFTOption=0xnnnn", where nnnn is a hexadecimal number. Set this value to 0x0001 and start DPLOT.

X axis units
If data processing mode is currently in effect DPLOT assumes that the X values are in units of milliseconds. Otherwise, DPLOT scans the X axis label for the character strings "msec" or "millisec" (any combination of lower and upper case). If found, DPLOT assumes that the X values are milliseconds; otherwise seconds are assumed. The units of time are important only in determining the correct units for the frequency scale. If the assumptions described above are incorrect, then the frequency label for the FFT will be incorrect. For example, if the input is in milliseconds but DPLOT incorrectly assumes seconds, the frequency values will be kilohertz rather than hertz.

Y=Poly(Y) command (Generate menu)

This command applies a polynomial transformation to the amplitudes of a curve. The new curve has the form:

$$Y_{new} = C_0 + C_1 Y_{old} + C_2 Y_{old}^2 + ... + C_n Y_{old}^n$$

Histogram command (Generate menu)

Use the Histogram command to plot the frequency distribution of the amplitudes of a selected record. The Histogram command creates a new document window.

DPLOT initially suggests a sampling interval such that:

$$k = 1 + 3.3 \log_{10} n$$

where
k = number of sampling intervals
n = total number of samples
This is the sampling interval suggested by H.A. Sturges in "The choice of a class interval," *Journal of American Statisticians Association*, vol. 21, 65-66, 1926

Y=f(X) command (Generate menu)

This command allows you to create a curve that consists of data generated by a function Y of X. This feature requires that QBASIC.EXE be in your search path.

After you select "OK", DPLOT generates a BASIC source code file in your temporary directory and launches QBASIC.EXE. The BASIC source code generated by DPLOT writes to a temporary file the values generated by the function that you enter. Data points will be evenly spaced on the X axis between the values specified by "from X=" and "to X=". After the successful completion of the BASIC program, DPLOT reads the X,Y data pairs from this temporary file, then deletes both the temporary file and the BASIC source file.

For example, with the following input:

f(x)	Y=sin(PI*X)
Constants	PI=4.0*ATN(1.0)
from X=	0.0
to X=	2.0
with interval dX=	0.001

DPLOT generates the following BASIC source file:

```
' This source code was generated by DPLOT.
' The file containing this code (C:\TEMP\~DPL2E62.TMP)
' will be erased by DPLOT upon completion.
OPEN "C:\TEMP\~DPL2E67.TMP" FOR OUTPUT AS #1
PRINT "Generating data; please wait"
' Constants
PI=4.0*ATN(1.0)
PRINT #1,        2001
FOR I = 1 TO        2001
X =        0.0000000 +        0.0010000* (I-1)
Y=sin(pi*x)
PRINT #1,X,Y
IF I MOD        100 = 0 THEN PRINT I," POINTS"
NEXT I
CLOSE #1
SYSTEM
```

resulting in the following plot:
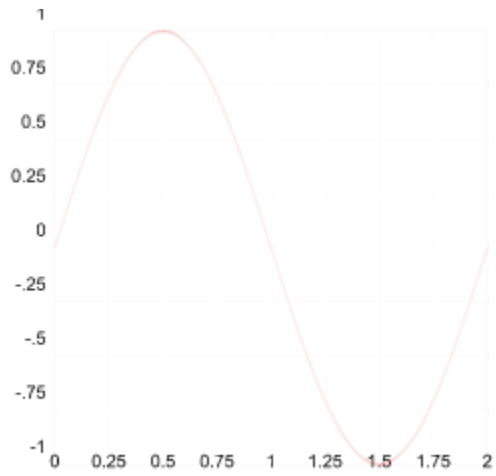
Note: If Windows 95 has been installed on your system, QBASIC.EXE may not be on your hard disk. However, QBASIC.EXE may be found on the original Win95 CD in the \other\oldmsdos directory. If this is the case, you can copy QBASIC.EXE from the Win95 CD to any directory on your hard disk that is in your search path, or to the DPLOT directory.

![Info icon] Info Menu

List peak values

    Displays a dialog box listing minimum and maximum amplitudes and the point at which they occur.

    Shortcut:

            Click   on the toolbar.

Interpolate...

    Reports an interpolated amplitude for each curve at a user-specified abscissa.

Scan X, Y

    Displays data values for a single curve as you scroll through the data.

Find Baseline

    Finds the average amplitude between a user-specified range of points. Useful for performing baseline shifts.

Number of Points

    Reports the number of data points in each curve.

![i](info icon) Interpolate command (Info menu)

Shortcut:
    Click   on the toolbar.

Interpolates between data points and reports an interpolated amplitude at a user-specified abscissa. The method of interpolation is dependent on the type of scaling in use. On a linear scale, linear interpolation is used. On a logarithmic scale, linear interpolation is performed on the logarithms of the data points, and the inverse logarithm of the interpolated value is reported.

Note that you may get wildly different answers between one scaling type and another, particularly if the data points are widely spaced. An example of this apparent discrepancy is illustrated by the following two figures.

Interpolation Example
Linear Scale

X=40, Y=4.54545
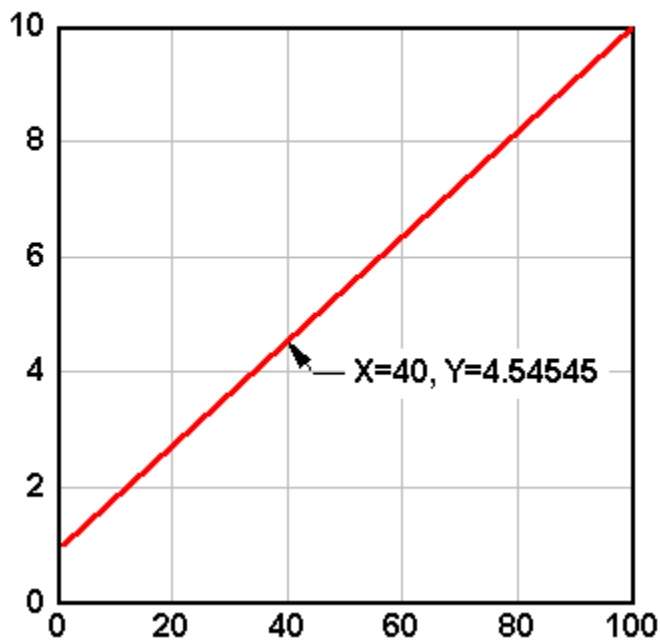
Interpolation Example
Logarithmic Scale

X=40, Y=6.32455
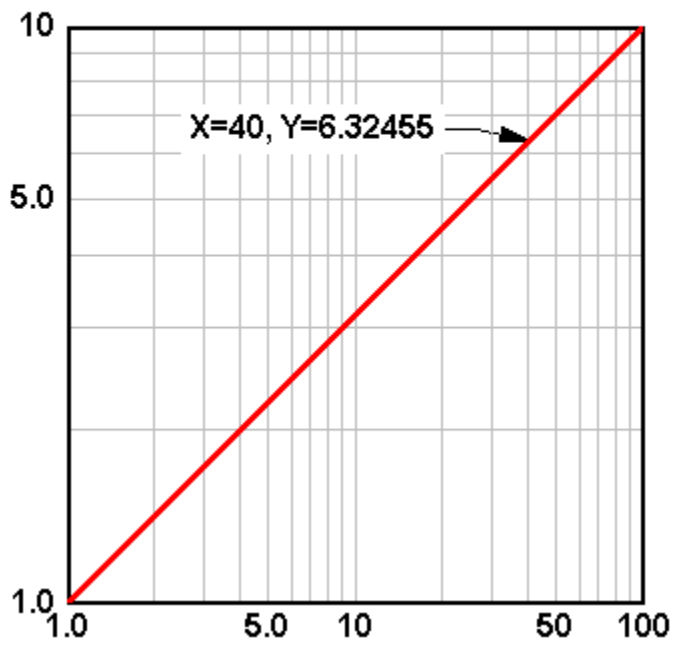
Scan X, Y command (Info menu)

Shortcut:

Click   on the toolbar.

Displays data values for a single curve as you scroll through the data. Unlike many other DPLOT features, this command relies on the abscissa (X) values increasing monotonically; i.e. the data can be represented by a single-valued function. With curves that loop back on themselves (moment-thrust interaction diagrams, for example), you may not be able to scan through all visible points.

The Scan dialog box will report values that lie between the plot window's minimum and maximum X values, including values that lie either above or below the plot window.

Clicking on the scroll bar's right arrow, or pressing the <Right> or <Down> arrow keys, increments the index in the array by the value specified in the **Increment** box. Clicking on the scroll bar's left arrow, or pressing the <Left> or <Up> arrow keys, decrements the index. The increment (initially 1) may be increased or decreased by a factor of 10 by clicking on the spin button arrows.

Clicking on the area to the left or right of the scroll bar "thumb", or pressing the <PgUp> or <PgDn> keys, moves the pointer by 5% of the number of points lying between the first and last points visible on the screen.

It may be necessary to zoom in to an area of interest to force the scroll bar to behave in a useful manner, particularly if the data record contains a very large number of points.

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See also:

View Menu

Specifying a file on the command line

DPLOT may be forced to automatically read and display a file when first started by specifying the full path and name of the file on the command line. From Program Manager, select **File**, then **Run...** , and type:

DPLOTW.EXE [/Fn]=[d:][\path\]filename.ext

where **n** is the file type code, described below. If **/Fn** is omitted, DPLOT attempts to determine the file type with the following assumptions:

If	Then DPLOT assumes the file is:
The first line of the file contains the DPLOT file header (DPLOT v*xx*)	DPLOT file (type 1)
The file contains fixed width columns of data	type 4
The first three characters of the filename are 'TDR', and the extension is '.30'	type 7
The first three characters of the filename are 'TDR', and the extension is **not** '.30'	type 8
The filename extension is '.WFT'	type 9

File type codes

1. DPLOT file
2. ASCII file, one data set with arbitrarily spaced points.
3. ASCII file, one data set with evenly spaced points.
4. ASCII file, fixed width columns with multiple Y values for each X.
5. Unformatted data.
6. Binary file produced by Pacific Data Model 9820 recorders, DNA/Bendix format.
7. Binary file produced by Pacific Data recorders, WES/ISD **OLD** format.
8. Binary file produced by Pacific Data recorders, WES/ISD **NEW** format.
9. Nicolet Time Domain files (binary) created with the Nicolet System 400 Digital Oscilloscope.
10. Hardened Data Acquisition System (HDAS) files.

File types are described in more detail in the description of the Open command command.

_____

See also:
    DPLOT File
    Display/Print DPLOT File from File Manager

Display or print a DPLOT file from File Manager/Explorer

The SETUP program automatically associates files with a .GRF extension with DPLOT.

Windows 3.x
To open a file with a .GRF extension while in File Manager:
- Double-click on the selected filename, or
- Select the filename, then choose Open from the File menu.

To print a file with a .GRF extension while in File Manager, select the filename, then choose Print from the File menu.

To associate files with extensions other than .GRF with DPLOT:
1   Select the name of the file you want to associate with DPLOT.
2   From the File menu, choose Associate.
3   In the Associate dialog box, select DPLOT File.
4   Choose the OK button.

Windows 95/Windows NT 4.0
To open a file with a .GRF extension while in Explorer:
- Double-click on the selected filename, or
- Select the filename, click the right mouse button, then select Open from the menu.

To print a file with a .GRF extension while in Explorer, select the filename, click the right mouse button, then choose Print.

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See also:
DPLOT File
Drag-and-Drop

Drag-and-Drop files from File Manager

You can select a file in the File Manager (or any other drag-drop source), drag it outside of the File Manager's window, and drop it onto DPLOT's window. When you drop files from the File Manager onto DPLOT running either as an icon or in it's normal (restored) state, DPLOT opens the file dropped onto it. DPLOT attempts to determine the file type as described under Specifying a File on the Command Line.
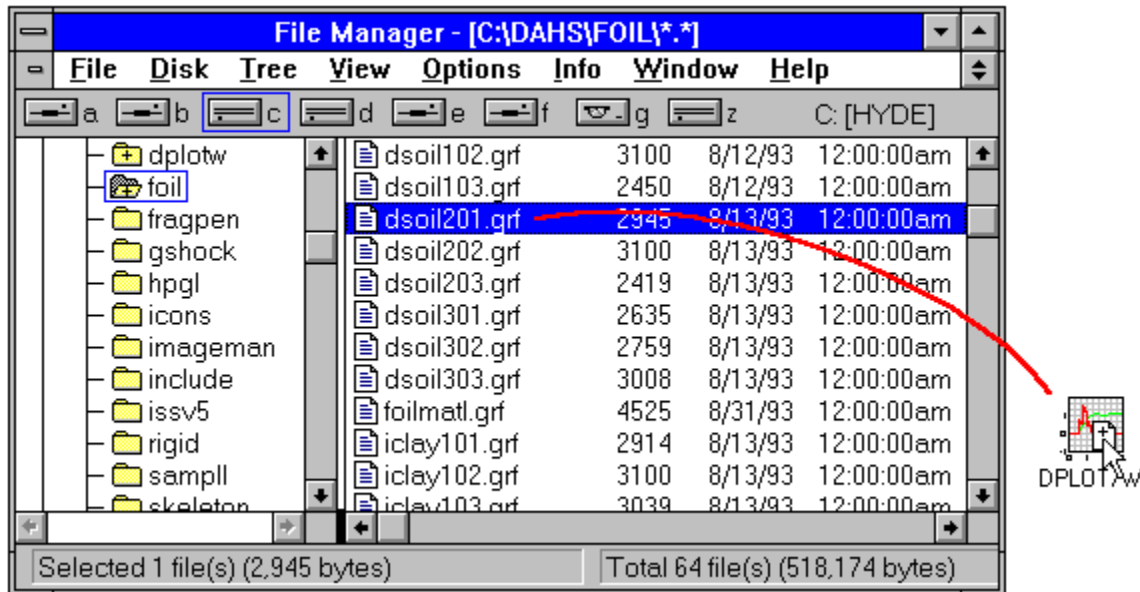
You can select several files at once using the CTRL key and drag them all with the mouse. Each file will be opened in a separate document window within DPLOT.

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See also:
    DPLOT File

Status Bar description

The status bar is displayed at the lower edge of the DPLOT window:

STATUS   **ARRAY SIZE**

STATUS is used to:
- prompt you for an action;
- describe the current procedure;
- describe the screen region pointed to by the mouse;
- display the X,Y coordinates of the mouse pointer in plot space;
- indicate progress during lengthy operations.

ARRAY SIZE indicates the maximum allowable number of curves and the maximum allowable number of points per curve. These values may be adjusted with the **Resize Arrays** command.

See also:
   Resize Arrays

Using WinExec to plot an existing File

The following code fragment (in FORTRAN) demonstrates a method for instructing DPLOT to plot an existing file from within another Windows-based program.

```fortran
        integer*2 hWndDPLOT          ! Handle of DPLOT window
        integer*2 hInstDPLOT         ! Instance handle of DPLOT module
        integer*2 wStatus            ! API return code
        integer*4 hKey               ! Registration database key
        integer*4 dwLength           ! String length
        character szFileName*80      ! Null-terminated string containing
                                     ! name of file to plot.
        character szDPLOT*256        ! Full d:\path\filename.ext
                                     ! of DPLOTW.EXE
        .
        .
        hWndDPLOT=FindWindow('DPLOT/W'c, NULL_POINTER)
        if (hWndDPLOT.eq.0) then
c
c       DPLOT is not currently running. Check user's
c       registration database for location.
c
        wStatus = RegOpenKey( HKEY_CLASSES_ROOT,
     1                        'DPLOTW\shell\open\command'//char(0),
     2                        hKey )

        if( wStatus .eq. ERROR_SUCCESS ) then
c
c           DPLOT's location is in the
c           registration database... now retrieve it.
c
            dwLength=len(szDPLOT)
            wStatus=RegQueryValue( hKey, NULL_POINTER,
     1                             szDPLOT, dwLength )
            wStatus=RegCloseKey( hKey )

        else
c
c           No mention of DPLOT in registration
c           database. Possibly the user has
c           modified and/or deleted the database.
c           Look in DPLOTW.INI for location.
c           If not mentioned there, filename defaults
c           to 'DPLOTW.EXE'in the current directory.
c
            wStatus = GetPrivateProfileString(
     1                        'Files'//char(0),
     2                        'ProgramDir'//char(0),
     3                        char(0),
     4                        szDPLOT,
     5                        len(szDPLOT),
     6                        'DPLOTW.INI'//char(0) )
            szDPLOT(wStatus+1:)='DPLOTW.EXE'//char(0)

        endif
```

```
        else

c        DPLOT IS running. Use API routines to get filespec.

        hInstDPLOT=GetWindowWord(hWndDPLOT,GWW_HINSTANCE)
        wStatus=GetModuleFileName(hInstDPLOT,szDPLOT,
1                               len(szDPLOT))

        endif

        dwLength=index(szDPLOT,char(0))
        wStatus = WinExec(szDPLOT(1:dwLength-1)//' '//
1                     szFileName,SW_SHOWNORMAL)
        if( wStatus .lt. 32 )
1    wStatus=MessageBox(hWnd,'Cannot find DPLOTW.EXE'//char(0),
2                       'MYAPPLICATION'//char(0),
3                       MB_OK .or. MB_ICONEXCLAMATION )
```

Notes:

     (1) Registration database. DPLOT's SETUP routine automatically changes the user's registration database to indicate the location of DPLOTW.EXE. DPLOTW.EXE also checks the entry in the registration database against its location every time it runs, and modifies the database entry if necessary. (This might be necessary if the user has moved DPLOTW.EXE since installing it using SETUP.EXE)

     (2) DPLOTW.INI. DPLOT writes its own location to the [Files] section of DPLOTW.INI at the end of every session. DPLOTW.INI is located in the Windows directory.

     (3) WinExec. DPLOTW.EXE takes a substantial amount of time to load the first time. However, if the user does not close DPLOT, subsequent calls to WinExec are relatively fast.

Executing DPLOT commands from another application

You can send a command or series of commands to DPLOT from another application through a dynamic-data exchange (DDE) conversation, or "channel."   For commercial applications, you should refer to the documentation for the application to determine the method for initiating a conversation with DPLOT and executing commands for another application. Following is a brief demonstration of how to send a command to DPLOT from three different environments.

Visual Basic 3.0
Control.LinkMode = 0
Control.LinkTopic = "DPLOTW|System"
Control.LinkMode = 2
Control.LinkExecute "[FileNew()]"
Control.LinkMode = 0
where *Control* is any label, picture box, or text box.

Microsoft Word macro
channel = DDEInitiate("DPLOTW", "System")
DDEExecute channel, "[FileNew()]"
DDETerminate channel

Microsoft Excel macro
Channel   =INITIATE("DPLOTW","System")
               =EXECUTE(Channel,"[FileNew()]")
               =TERMINATE(Channel)

Following is a list of the commands supported by DPLOT. All commands must be enclosed by square brackets. There should be no spaces in the command string, other than those embedded in character string arguments or used to delineate numeric parameters. Character arguments are always enclosed by double-quotation marks. Command names are not case-sensitive.

About
Activate
AppHide
AppMaximize
AppMinimize
AppRestore
AppShow
AutoScale
AutoSize
AverageAll
BarChartStyle
BaselineShift
Caption
ClearEditFlag
Color
Compare
CopyPicture
CopyText
CurveFit
DataProcess
DenseGridLines
Differentiate
DocHide

Commands may be issued in sequence or appended to each other. For example, the following command string opens and prints a DPLOT file entitled "TEST.GRF" before causing DPLOT to close:

[FileOpen("TEST.GRF")][FilePrint()][FileExit()]

Notes

1) Each DDE conversation has an association with a DPLOT document. This association is established when the conversation is initiated, and may be changed by an Activate, FileOpen, or FileNew command.   If, for whatever reason, either DPLOT or the client application terminates the conversation and the client then establishes a new conversation, this association no longer holds. The client application should re-establish the association with a document with the Activate command, else any commands sent to DPLOT may not operate on the intended document.

2) Character string arguments are always enclosed by double quotation marks. In some environments (Visual Basic, for example), double quotation marks are also used to delineate character string arguments. The following example will always cause a syntax error in Visual Basic:

Control.LinkExecute "[FileOpen("myfile.grf")]"

Instead, use:

q$ = chr$(34)
Control.LinkExecute "[FileOpen(" & q$ & myfile.grf & q$ & ")]"

where 34 is the ASCII code for a double quotation mark.

3) For real time applications, it is strongly suggested that the client application use the ManualScale command to force the plot coordinates to the desired value. Otherwise, DPLOT will continually adjust the plot coordinates to fit the incoming data. If the **ManualScale** command is issued DPLOT keeps the extents of the X axis constant, shifting the plot window to the right when necessary.

4) For linear X, linear Y scales, DPLOT draws individual line segments rather than redrawing the entire plot every time a new data point is added with the XY command. DPLOT will only redraw the plot if the incoming data point lies outside the current plot extents. Although this optimization results in

significantly faster plotting, there are several drawbacks: a) Since points are added one at a time rather than drawing a series of line segments, the pattern for a line style starts over at each point. Rather than using the slower line drawing routines that use a pattern (and would be incorrect anyway), DPLOT uses the faster Windows API routines MoveTo and LineTo with solid lines. b) DPLOT does not create and load the color palette selected by the user. Instead, the colors used to draw the line segments are the closest match of the system colors to the desired colors. Both of these limitations apply only to line segments that are drawn individually. Once the entire plot is redrawn, the lines will be drawn correctly.

      5) DPLOT returns one of 3 values in response to any command. The return codes sent to the DDEML (Dynamic Data Exchange Management Library) are **DDE_FACK**, **DDE_FBUSY**, and **DDE_FNOTPROCESSED**. The various development environments respond to these return codes in different manners, usually by displaying a MessageBox in the case of **DDE_FBUSY** or **DDE_FNOTPROCESSED**. **DDE_FACK** indicates success. **DDE_FBUSY** indicates that DPLOT is currently disabled (possibly because a MessageBox or other modal dialog box is displayed). **DDE_FNOTPROCESSED** indicates that the command was not valid or was unsuccessful for some other reason (exceeding the array sizes, for example). Note that DPLOT **does not** cache incoming commands if it is currently busy... it is up to the client application to re-send the commands later, if necessary. Real time client applications **should not** rely on DPLOT to save incoming data values.

For optimum performance with real time applications
      1) Use the ManualScale command.
      2) Set all line widths to 0 with the LineWidth command.
      3) Set all line styles to solid (*type* = 1) with the LineType command.

The example Visual Basic project VBDPLOT.MAK provides several examples of communicating with DPLOT through dynamic data exchange. The VBDPLOT application is located in the \VB subdirectory below DPLOT.

The Microsoft Word document template DPLOTW.DOT (distributed with DPLOT) contains a macro (DDEDPLOTOpenFiles) that demonstrates how to use the DDEExecute macro command.

Creating and/or running a macro

A macro is a series of DPLOT commands that you can group together to automate certain tasks. Macros are especially useful in performing common operations on a group of files. The macro editing window is shown below:

```
┌──────────────────────────────────────────┐
│ ─           DPLOT/W Macro          ▼ ▲   │
│ File  Edit                                │
│ ┌──────────────────────────────────────┐ │
│ │▶│⋸│■│ │💾│🖨│ │✂│📋│📋│🔍│ │❓│      │ │
│ └──────────────────────────────────────┘ │
│                                           │
│ RedtoYellow                               │
│ ┌────────────────────────────────────┐▲  │
│ │ '                                  │   │
│ │ ' Macro to change DPLOT/W's palette │   │
│ │ ' to a blend from red for curve #1 to │ │
│ │ ' yellow for curve #16              │   │
│ │ '                                  │   │
│ │ ' Postpone redrawing any plots or the window will │ │
│ │ ' flash for each color change:     │   │
│ │ '                                  │   │
│ │ PostponeRedraw()                   │   │
│ │ Color(1,255,0,0)                   │   │
│ │ Color(2,255,17,0)                  │   │
│ │ Color(3,255,34,0)                  │   │
│ │ Color(4,255,51,0)                  │   │
│ │ Color(5,255,68,0)                  │   │
│ │ Color(6,255,85,0)                  │   │
│ │ Color(7,255,102,0)                 │   │
│ │ Color(8,255,119,0)                 │   │
│ │ Color(9,255,136,0)                 │   │
│ │ Color(10,255,153,0)                │   │
│ │ Color(11,255,170,0)                │   │
│ │ Color(12,255,187,0)                │   │
│ │ Color(13,255,204,0)                │▼  │
│ │◄│    │                          │►│    │
│                                           │
│ Shortcut: │none              │  │±│       │
└──────────────────────────────────────────┘
```

The name of the macro currently displayed in the text box is shown at the top of the window.

The text box shows a series of macro commands. Macro commands may be preceded by one or more spaces or tabs. (To enter a tab in the text box, press CTRL+TAB). Each line may contain only one macro command.

Comment lines
Comments may be included in a macro by preceding the text with an apostrophe. DPLOT ignores comments when the macro is run. If the first non-space, non-tab character in a line is an apostrophe, or if the first 3 characters are "REM", the entire line is ignored. End-of-line comments are allowed using a leading apostrophe. Blank lines or lines consisting entirely of spaces and/or tabs are ignored.

Toolbar

▶   Select the Run button to send the macro commands to DPLOT.

 Select the Step button to single-step through a macro, pausing after each command is processed. This feature might be useful for debugging a macro.

 Select the Stop button to terminate macro processing. Note: Most macros are completed in such a short time that the Stop button will usually be ineffective unless you are single-stepping through a macro with the Step button.

 The Save button is used to save the contents of the macro to a file, and to update the contents of DPLOTW.INI, so that DPLOT will be aware of the location and filename for the macro. Filenames are automatically generated by the macro editor, and the macro files are placed in the \MACROS subdirectory below the DPLOT directory.

> It is **not** necessary to save a macro in order to run it from the Macro editor. However, if you want to use the macro in the future, you must save it.

> If you make changes to a macro, the editor will prompt you to save it before opening a new macro or exiting the macro editor.

 Select the Print button to print the contents of the text box to the default printer (set with Control Panel).

 Select the Cut button to remove selected text and put it on the Clipboard.

 Select the Copy button to copy the selected text to the Clipboard.

 The Paste button inserts a copy of the Clipboard contents at the insertion point, replacing the selection (if any) with the text on the Clipboard

 Select the Find button to search the text box for a word or phrase.

 Select the Help button to display Help for the macro command found at the insertion point. If the insertion point is not at a macro command, selecting the Help button (or pressing F1) brings up this Help topic.

The Shortcut list box allows you to select a keystroke combination which will automatically run the macro from within DPLOT. Before saving the macro, the editor checks the selected shortcut against any existing shortcuts for other macros, and displays an error message if a conflict exists.

To copy all or a portion of one macro to another:
- Select the text of the source macro, either by pressing the Shift key in combination with the arrow keys, or by dragging the mouse over the text you want to copy.
- Press Ctrl+C or click on the Copy button.
- If you are using DPLOT for Windows 3.1, close the Macro Editor.
- Switch to DPLOT and select the Macro command from the File menu. Enter a name for a new macro or select an existing macro to edit.
- Click on the Edit/Create button, launching the Macro Editor.
- In the Macro Editor window, move the cursor to the desired location, then press Ctrl+V or click on the Paste button.

The mechanism used to run macro commands is very similar in function to the methods outlined in "Executing DPLOT commands from another application". Both methods use Dynamic Data Exchange (DDE) to send commands to DPLOT. Macros have the following advantages over the "another application" method:
- Macros do not require the user to possess a programming language that supports DDE (such as Visual Basic) or a third party application that allows DDE commands (e.g. Microsoft Word or Microsoft Excel).
- Macros can be activated by shortcut keys.
- Online Help is more readily available for macros.

However, the Visual Basic environment, as well as that of other DDE-aware applications, may provide you with features that are not possible to implement in macros. For example, it is relatively easy to build a Visual Basic application which generates data points and to then send those data values to DPLOT.

For a list of all available macro commands, see DPLOT command syntax.

Note: The format of macros used by this version of DPLOT differs from that of versions prior to 1.1. You can convert old macros to the new format using the utility DPCONV.EXE, found in the \MACROS subdirectory below DPLOT.

DPLOT command syntax

The following list of commands may be used either in macros or by sending the commands to DPLOT via dynamic-data exchange (DDE). Some commands are valid only in macros (noted by **Macros Only**). Commands sent to DPLOT via DDE must be enclosed by square brackets [   ]. Macro commands should NOT include the brackets.

[About()]
>   Displays the About dialog box for DPLOT.

[Activate("*caption*")]
>   Activates the document with the character string ***caption*** in the title bar. Subsequent commands reference this document.

[AppHide()]
>   Hides the DPLOT application window.

[AppMaximize()]
>   Maximizes and activates the DPLOT application window.

[AppMinimize()]
>   Minimizes (reduces to an icon) the DPLOT application window.

[AppRestore()]
>   Restores (to unmaximized or unminimized size) the DPLOT application window.

[AppShow()]
>   Shows (after hiding) the DPLOT application window.

[AutoScale()]
>   Equivalent to the Automatic Plot Scaling command on the Options menu.

[AutoSize()]
>   Equivalent to the Automatic Size command on the Options menu. Also equivalent to the Size command with ***state***=0.

[AverageAll()]
>   Creates a new curve consisting of the average amplitude of all curves in a document

[BarChartStyle(*style*)]
>   Sets style of bar charts to hollow (***style***=0) or filled (***style***=1)

[BaselineShift(*time,value,start,stop*)]
>   In data processing mode, modifies the primary record (pressure in a pressure-time history, acceleration in an acceleration-time history) so that the first integrated record (impulse or velocity, respectively) has an amplitude of ***value*** at ***time****.* Only shifts values of the primary record falling between the ***start*** and ***stop*** times. If ***start*** is a large negative number (< 1.E+19), the shift is applied to all amplitudes (the ***stop*** time is ignored). For more information see the description of the Baseline Shift menu command.

Call *macro*   Macros Only
>   Launches another instance of the macro editor and runs the specified macro. Control is not returned to the caller until the called macro has completed.

[Caption("*caption*")]
>   Sets the caption for the document referenced by the current DDE conversation or macro.

[ClearEditFlag()]
>   Clears an internal flag that indicates whether the document has been edited, so that, when closing the document, DPLOT does not prompt you to save the document. Any subsequent changes to the document will reset the flag.

[Color(*index,r,g,b*)]

Sets the entry in the color palette with ***index*** to the color with red, green, and blue components ***r,g,b***, where ***r,g,*** and ***b*** range from 0 to 255. The color palette maintained by DPLOT contains 16 color specifications. If there are more than 16 curves, the color table is recycled (curve #17 uses color #1, curve #18 uses color #2, etc.) If ***index*** = -1, then ***r,g,b*** are used for all 16 palette entries. For example,

```
[Color(3,255,0,255)]
```
sets the color for the third (and 19th) curve to magenta, and

```
[Color(-1,0,0,0)]
```
sets the color for all curves to black.

[Compare(*Curve1,Curve2*)]

Generates a new curve with amplitudes equal to the amplitudes of ***Curve1*** minus the amplitudes of ***Curve 2***.

[CopyPicture()]

Copies metafile and bitmap representations of the document, as well as the current color palette, to the Windows clipboard.

[CopyText()]

Copies the data values for the curve selected with the SelectCurve command to the Windows clipboard as text, one data pair per line. X and Y values are separated by [TAB] characters.

[CurveFit(*order*)]

Uses least-squares curve fitting procedures to find the ***order'th*** order polynomial that best fits the data values for the curve selected with the SelectCurve command. If successful, the **CurveFit** command generates a new curve using the fitting polynomial. The new curve will have the maximum number of points (set by the **FileArrays** command), equally spaced between the limits of the input curve.. For more information, see the Help topic on the Curve Fit menu command.

[DataProcess(*state,"datatype",format*)]

Turns data processing mode on (***state***=1) or off (***state***=0). If ***state***=1, ***datatype*** is a descriptive term for the data from the table below. ***Datatype*** must include enough characters to uniquely identify the type of data. For example, ***datatype*** for stress or strain measurements must include at least four characters. ***Format*** is 1 for wide plots, square format is used otherwise. ***Datatype*** and ***format*** may be omitted for ***state***=0. For more information, see the Help topic on the Data Processing menu command.

Data Types
Acceleration
Deflection
Pressure
Strain
Stress
Temperature

NOTE: If data processing mode is turned on, new documents will be opened in data processing mode. This may not always be appropriate. Applications for DPLOT written by other developers should always turn data processing mode **off** after closing all documents.

[DenseGridLines(*state*)]

Turns on (***state***=1) or off (***state***=0) dense grid lines. For more information see the Grid Lines or Box menu command.

[Differentiate()]

Differentiates (finds $\partial y/\partial x$) the curve or curves selected with the SelectCurve command. If the ordinate of the curve is evenly spaced, quadratic interpolation is used to find the derivative at each point. Otherwise an inverse of the trapezoidal rule is used. For more information see the Differentiate

menu command.

Directory("*dir*")]   **Macros Only**

Sets the directory for all subsequent FileOpen and FileSaveAs operations. If the filenames used in a FileOpen or FileSaveAs command contain a path specification, this specification overrides the path specified by the Directory command.

[DocHide()]

Hides the document window referenced by the DDE conversation or macro.

[DocMaximize()]

Maximizes and activates the document window referenced by the DDE conversation or macro.

[DocMinimize()]

Minimizes (reduces to an icon) the document window referenced by the DDE conversation or macro.

[DocRestore()]

Restores (to unmaximized or unminimized size) the document window referenced by the DDE conversation or macro.

[DocShow()]

Shows (after hiding) the document window referenced by the DDE conversation or macro.

[EditAddToX(*value)*]

Adds **value** to X. Operates on the curve or curves selected with the SelectCurve command.

[EditAddToY(*value)*]

Adds **value** to Y. Operates on the curve or curves selected with the SelectCurve command.

[EditDecimate(*method,replace,value,start,stop)*]

Decimates data values in the curve or curves selected with the SelectCurve command. **Method** = 0 to average every **value** points, = 1 to discard all but every **value'th** point, or = 2 to use the Welch depopulation scheme with fidelity = **value**. **Replace** = 1 to replace existing data points, = 0 to preserve the original data and produce a new curve. Operates on data points between X = **start** and X = **stop**. To operate on all points in a curve, specify **start, stop** values less than and greater than the extents of the data, respectively.

[EditEqualInts(*replace,interval,method)*]

Generates a new curve with a constant spacing of **interval** on the abscissa (X axis), using linear (**method** = 1), quadratic (**method** = 2), cubic (**method** = 3), or cubic spline (**method** = 4) interpolation. Replaces the existing curve if **replace** is not equal to 0, otherwise generates a new curve. Operates on the curve or curves selected with the SelectCurve command. For more information see the description of the Equal Intervals command.

[EditErase()]

Deletes the curve most recently selected with the SelectCurve command. After the succesful completion of this command the curve selection becomes undefined.

[EditFilter(*"user",twopasses,replace,C0,C1,C2,D1,D2)*] or
[EditFilter(*"bandpass",twopasses,replace,frequency,bandwidth,timeunits*)] or
[EditFilter(*"optionX",twopasses,replace)*]

Applies a digital filter to the curve most recently selected with the SelectCurve command.

USER filter: **C0**, **C1**, **C2**, **D1**, and **D2** are the coefficients of the filter equation to be used (described in the Filter topic).

BANDPASS filter: **frequency** is the frequency to remove from the data record. If **frequency** is equal to 0, the zero frequency rejection filter is used and **bandwidth** and **timeunits** are ignored. If **bandwidth** is less than or equal to 0 (or omitted), DPLOT uses the Carleton method. Otherwise, the Press method is used.

OPTIONX filter: X must be one of 1, 2, 3, or 4 and corresponds to the filters described in the Filter topic.

If *twopasses* is non-zero, then the filter is applied twice, the second time in time-reversed order in an attempt to remove any phase shift induced by the operation. If *replace* is non-zero, then the original data set is replaced by the filtered data. If *replace* is equal to 0, then the original data is preserved.

[EditMultiplyX(*value*)]

Multiplys X by *value*. Operates on the curve or curves selected with the SelectCurve command.

[EditMultiplyY(*value*)]

Multiplys Y by *value*. Operates on the curve or curves selected with the SelectCurve command.

[EditRemoveTrend()]

Removes any linear trend from the curve or curves selected with the SelectCurve command, so that the first and last amplitudes are equal to 0.

[EditSmooth(*replace,window*)]

Smooths the amplitudes of the curve or curves selected with the SelectCurve command. The smoothing *window* is the number of points over which the data should be smoothed. Zero gives no smoothing at all, while a value approaching half the number of data points will render the data virtually featureless. The existing curve will be replaced by the new curve if *replace* = 1, otherwise the existing curve will be preserved. For more information see the Help topic on the Smooth command.

[EditSort()]

Sorts the data for the curve or curves selected with the SelectCurve command in ascending abscissa (X) order.

[EditSwapXY()]

Exchanges the X and Y values for the curve or curves selected with the SelectCurve command.

[EditTruncate(*from,to*)]

Eliminates all data outside the range specified by *from* ≤ X ≤ *to*. Operates on the curve or curves selected with the SelectCurve command.

[FFT()]

Performs a Fast Fourier Transform on the curve selected with the SelectCurve command. The FFT command creates a new document window for displaying the output. For more information, see the Help topic for the FFT menu command.

[FFTMethod(*method*)]

If *method* is equal to 0, DPLOT pads the input record with zeroes out to the next highest power of 2 so that a more efficient FFT algorithm can be used. If *method* is not equal to 0, DPLOT does not modify the input record. Using method ≠ 0 may result in very long run times, depending on the number of points in the input record. For more information, see the Help topic for the FFT menu command.

[FFTPhase(*state*)]

If *state* ≠ 0, DPLOT generates a phase angle plot along with the FFT amplitudes.

[FileAppend(*"filename"*)]

Opens a file, creating one or more new curves in the currently active document. The file type must **not** be a DPLOT file. The FileType command should be issued **before** the **FileAppend** command.

[FileArrays(*maxc,maxp*)]

Sets the maximum number of curves and the maximum number of points per curve. DPLOT will **not** plot more points than *maxp* per curve or create more curves than *maxc*.

[FileClose()]

Closes the document referenced by the current DDE conversation or macro. It is not possible to predict which document will be associated with the DDE conversation or macro after a **FileClose** command. If any subsequent commands are to be executed, they should be preceded by an **Activate**, FileNew, or FileOpen command.

[FileExit()]

Closes DPLOT. Developers should use care in issuing this command, since it is possible that the user

may have opened DPLOT for another purpose before this transaction took place.

[FileMacro()]
   Displays the macro dialog box.

[FileNew()]
   Finds an empty document window. If no empty document window exists, **FileNew** opens a new document window. Subsequent commands in the same DDE conversation or macro reference the newly opened document.

[FileOpen("*filename*")]
   Opens and displays a file in a new or empty document window. If the file type is **not** a DPLOT file, then the FileType command should be issued **before** the **FileOpen** command. Subsequent commands reference the document created by this command.

[FilePageSetup(*top,bottom,left,right*)]
   Sets the printer margins (in inches) for the currently selected document.

[FilePrint()]
   Prints the document using the current default printer settings.

[FileSaveAs(*type,"filename"*)]
   Saves the document to *filename* as:

type	Format
1	DPLOT file
2	ASCII data, selected curve only
5	Unformatted data, selected curve only
4096	Windows metafile

   For more information on the file types see the description of the Save As menu command.

   Macros Only
   If placed in a ForFilesIn... NextFile loop, then only a filename extension, preceded by a dot, is used. The filename used to save the document will be identical to the original filename but with the extension specified. If omitted, an extension dependent on the *type* code is automatically selected:

type	Extension
1	.GRF
2	.ASC
5	.BIN
4096	.WMF

   Example:
```
ForFilesIn("ex*.grf")
   FileSaveAs(4096,"")
   FileSaveAs(1,".new")
   FileClose()
NextFile
```
   Saves all of the files matching the specification "ex*.grf" as Windows metafiles with the filename extension ".wmf", and as DPLOT files with the extension ".new".

[FileType(*n*)]
   Sets the file type code prior to opening a document with the FileOpen command. *n* is one of:

1	DPLOT file
2	ASCII file, one data set with arbitrarily spaced points.
3	ASCII file, one data set with evenly spaced points.
4	ASCII file, fixed width columns with multiple Y values for each X.
5	Unformatted data.
6	Binary file produced by Pacific Data Model 9820 recorders, DNA/Bendix format.
7	Binary file produced by Pacific Data recorders, WES/ISD **OLD** format.
8	Binary file produced by Pacific Data recorders, WES/ISD **NEW** format.

9   Nicolet Time Domain files (binary) created with the Nicolet System 400 Digital Oscilloscope.

10   Hardened Data Acquisition System (HDAS) files.

For more information on file types, see the description of the <u>Open menu command.</u>

[FillBetween(*Curve1,Curve2,Style,R,G,B*)]

Fills the area between *Curve1* and *Curve2* with a hatch pattern of *Style* and color *R,G,B.* Valid values for *Style* are:

-1   Solid
0   Horizontal lines
1   Vertical lines
2   45 degree downward
3   45 degree upward
4   Horizontal-vertical crosshatch
        45 degree crosshatch
5

[FontPoints(*index,points*)]

Sets the size of the *indexed* font to *points*. Font indices used by DPLOT are:

1   Numbers along the axes
2   First title line
3   Second and third title lines
4   X axis label
5   Y axis label(s)
6   Legend and/or note

For more control over the fonts, see the <u>TextFont</u> command

ForFilesIn("*filespec*")   Macros Only

Allows you to loop through one or more operations on several files matching a given file specification. "ForFilesIn" commands must have a matching "NextFile" command, which terminates the loop. "ForFilesIn...NextFIle" loops may not be nested. The following example opens each of the files in the current directory matching the file specification ex*.grf, prints the file, and closes it before operating on the next file matching that specification.

```
ForFilesIn("ex*.grf")
    FilePrint()
    FileClose()
NextFile
```

Alternatively, the ForFilesIn command can read a list of filenames from a text file by placing an "@" symbol before the file specification. For example,

```
ForFilesIn("@file.lst")
    FilePrint()
    FileClose()
NextFile
```

reads a list of filenames from the file FILE.LST, prints and closes each file.

Generate("*formula*",*XStart,XEnd,dX*) Macros Only

Generates X,Y pairs between X = *Xstart* and X=*XEnd* with interval *dX* using the *formula.* This command requires the presence of Microsoft Excel version 5.0 or later on your system. *Formula* should be a function of X, and can be any valid Excel formula (an equal sign is optional). In the following example, DPLOT plots the sine of X from 0. to 10. at an interval of 0.1:

```
Generate("sin(x)",0.0,10.0,0.1)
```

Conditionals are allowed in formulas and have the general syntax:

```
IF(test,iftrue,iffalse)
```

For example,

```
Generate("IF(x<5,x^2,25-(10-x)^2)",0.0,10.0,0.1)
```

plots Y=X^2 from 0 to 5 and Y=25-(10-x)^2 from 5.1 to 10.

Consult the Microsoft Excel documentation for more information on correct formula syntax. In particular, the **Math and Trigonometic Functions** Help topic might be useful.

[GridLines(*style*)]

Controls the appearance of the X and Y axes. *Style*=0 for axes only, =1 for a box around the plot with horizontal and vertical grid lines at each tick mark, =2 for a box around the plot with no grid lines.

[HelpContents()]

Starts Windows Help and displays the Contents topic

[HelpSearch(*"string"*)]

Starts Windows Help and displays the topic found in the keyword list that matches the keyword *string*. If there is no match, displays the Search dialog box.

[Histogram(*interval*)]

Plots the frequency distribution of the amplitudes of the curve selected with the SelectCurve command. The sampling interval is specified by *interval*. This command generates a new document. For more information see the Help topic on the Histogram command.

Macro Example
```
Histogram(100)
Activate("Histogram")
BarChartStyle(1)
```

[InsertLink(*"Application","Topic","Item"*)]

Inserts an active link from a DDE server into the current document. For more information see the Insert Link menu command.

[Integrate()]

Integrates the curve or curves selected with the SelectCurve command. For more information see the Help topic on the Integrate menu command.

[Legend(*curve,"string"*)]

Sets the legend for curve number *curve* to the character string *string*.

[LegendParams(*linelength,maxrows,frame,opaque,x,y*)]

Sets various parameters for the legend. *linelength* is the length of the line segment (in inches) appearing beside each legend string. *maxrows* is the maximum number of legend strings to place in one column. *frame* = 1 to draw a rectangle around the legend, = 0 for no frame. *opaque* =1 to hide all objects intersecting the legend. *x,y* is the location of the upper left corner of the legend, expressed as a percentage of the plot window size (0.0 to 1.0).

[LineType(*curve,type*)]

Sets the line style for curve number *curve* to *type*, where *type* may be 0 (no lines) through 6.

[LineWidth(*curve,width*)]

Sets the width of the line segments used to draw curve number *curve* to *width* 1000'ths of an inch.

[Lump(*Curve1,Curve2*)]

Creates a new curve whose amplitudes are the sum of the amplitudes for *Curve1* and *Curve2*.

[ManualScale(*xlo,ylo,xhi,yhi*)]

Forces the coordinates of the lower left and upper right corners of the plot. By default, DPLOT automatically scales the plot. Recommended for real time applications.

[MultipleYAxes(*type,A,B*)]

Controls the appearance of the Y axis.

type   Description

0	Single Y axis
	Constants **A** and **B** are ignored.

1	Y2=f(Y1)
	A second Y axis is linked to the primary Y axis by the function Y2 = **A** + **B***Y1.

2	Independent Y2
	A second Y axis is independent of the primary Y axis. Constant **A** = 1 to associate the selected curve with the left axis, = 2 to associate the selected curve with the right axis. Curve 1 **must** be associated with the left axis. Constant **B** is ignored.

For more information, see the Help topic on the Multiple Y Axes menu command.

[NoteOptions(*flags*)]
   Changes the appearance of a notation. **Flags** is a combination of:

2	Draw a rectangular frame around the notation.
4	The notation is opaque; objects intersecting the notation will be hidden from view.
8	The notation is activated by a button.

[NotePosition(*x,y*)]
   Controls the position of the notation on the plot. **X,Y** are the coordinates of the upper left corner of the note, expressed as a percentage of the plot size (0.0 to 1.0).

[NoteTabstops(*tab*)]
   Tab is the number of character cells used for tab positioning in a notation.

[NoteText("text")]
   Specifies the text that is displayed in a notation.

[NumberFormat(*axis,style*)]
   Sets the style used to represent numbers along the X axis (**axis**=0) or Y axis (**axis**=1). Valid values for **style** are:

0	default
1	Scientific notation
2	Fractions
3	Dollars and Cents
4	Dollars

[Paste()]
   Pastes the contents of the Clipboard to the active document. The format of the Clipboard contents must match that described under the Paste command (Edit menu) topic.

Pause   **Macros Only**
   Pauses the macro and displays a MessageBox allowing you to continue or abort the macro. This macro command is useful for testing purposes.

[PostponeRedraw()]
   Delays redrawing any changes made to the document. This command may be useful when making many minor changes to a plot that would ordinarily cause the plot to be redrawn. The document will be redrawn after issuing a ViewRedraw command, or after issuing any command that causes the conversation to reference a different document (FileOpen, for example).

NextFile   **Macros Only**
   Terminates a ForFilesIn...NextFile loop.

[Say("*message*")]
   Echos **message** to a sound card if the system is equipped with Monologue for Windows.

[Scale(*code*)]

Sets the scaling code for the plot (linear, logarithmic, etc.). The low byte of **code** should be one of the following:

1	Linear X, Linear Y
2	Linear X , Logarithmic Y
3	Logarithmic X, Linear Y
4	Logarithmic X, Logarithmic Y
5	Tripartite (log-log) scale
6	Linear X - Probability Y
7	Grain Size Distribution
8	Polar coordinates
9	Bar chart

Several scale types allow you to specify a unit system by adding an identifier to the scaling code. See Scaling Code. for more information.

[SelectCurve(*n*)]

Selects the curve to perform subsequent operations on. Default = 1. If curve **n** does not currently exist, DPLOT creates a new curve. If **n** exceeds the maximum number of curves (set with FileArrays) DPLOT attempts to resize the arrays to accommodate a new curve. If **n** is set to -1, then any subsequent command that operates on one or more curves will operate on **all** curves.

[SendKeys("*keys*")]

Sends the keystrokes specified by **keys** to DPLOT, just as if they were typed at the keyboard.

Keys is a key or key sequence, such as "a" for the letter a, or "{enter}{pgup}" for the ENTER key followed by the PAGE UP key.

Note

Use **SendKeys** to operate DPLOT only when there is no alternative, and then use it with caution. In general, the other commands described in this topic provide a better way for other applications to interact with DPLOT because they provide a channel for two-way communication between applications and provide a path for detecting and dealing with errors in DPLOT. You should test even the simplest use of **SendKeys** under a variety of conditions to avoid unpredictable results, data loss, or both.

To specify keys that do not insert a character, use the following codes.

Key	Code
BACKSPACE	`{backspace}` or `{bs}` or `{bksp}`
BREAK	`{break}`
CAPS LOCK	`{capslock}`
CLEAR	`{clear}`
DEL	`{delete}` or `{del}`
DOWN ARROW	`{down}`
END	`{end}`
ENTER	`{enter}` or `~`
ESC	`{escape}` or `{esc}`
HELP	`{help}`
HOME	`{home}`
INS	`{insert}`
LEFT ARROW	`{left}`
NUM LOCK	`{numlock}`
PAGE DOWN	`{pgdn}`
PAGE UP	`{pgup}`
PRINT SCREEN	`{prtsc}`
RIGHT ARROW	`{right}`
TAB	`{tab}`

```
UP ARROW        {up}
F1, F2, F3,...F16  {F1}, {F2}, {F3},...
                {F16}
```

Note

To repeat a character, use the syntax {Character Number}. For example, **[SendKeys("{s 10}")]** repeats the letter s 10 times. Remember to put a space between the key and the number. To repeat a key whose code already includes braces, add a space and a number within the braces, for example: **[SendKeys ("{enter 10}")]**.

To send a key combination that includes SHIFT, ALT, or CTRL, use the following symbols.

To combine with	Precede the key code by
SHIFT	+ (plus sign)
ALT	% (percent sign)
CTRL	^ (caret)

For example, "%{enter}" sends the code for ALT+ENTER. You **cannot** emulate DPLOT's accelerator keys (^C for Copy Picture, for example) with the SendKeys command.

To send a plus sign (+), a percent sign (%), or a caret (^) as literal text, enclose the character in braces. For example, to send a plus sign, use the instruction **[SendKeys("{+}")]**. You can also use braces to send parentheses.

[SetBitmapDims(*wPixels,hPixels*)]

Sets the size of bitmaps copied to the Clipboard by the Copy Picture command.

[SetMetafileDims(*wInches,hInches*)]

Sets the size of metafile pictures copied to the Clipboard by the Copy Picture command.

Shell(*command,nShowState*)] Macros Only

Executes another program. *Command* is the name of the program to execute along with any required arguments or command line switches. If the filename extension is omitted, ".EXE" is assumed. *nShowState* corresponds to the style of the window in which the program is to be executed. If omitted, defaults to 1.

The following table identifies the values for *nShowState* and the resulting style of window:

Value	Window style
1	Normal with focus.
2	Minimized with focus.
3	Maximized with focus.
4	Normal without focus.
6	Minimized without focus.

Note: Macro processing continues as soon as the Shell function returns. You cannot depend on a program started with Shell to be finished executing before the macro commands following the Shell function in your macro are executed.

[ShowCaption(*state*)]

Turns on (*state*=1) or off (*state*=0) the feature of drawing the document caption in the lower right corner of the window or page.

[Size(*state,X,Y,WYSIWYG*)]

For *state* = 0, DPLOT automatically calculates the size of a plot such that it fills as much of the document window as possible; *X*,*Y*, and *WYSIWYG* are ignored. For *state* ≠ 0, X and Y specify the physical size of the plot axes, in inches. If *WYSIWYG* ≠ 0, then DPLOT adjusts the font sizes used in the plot so that the displayed plot is identical (as close as possible) to a printed copy.

[SquareLogCycles(*state*)]

Forces the physical distance between log cycles to be the same on the X and Y axes for **state**=1.

[StartStop(*start,stop*)]
Sets the start and stop times for binary files. The **StartStop** command should be issued before a FileOpen command on a binary file.

[SymbolSize(*curve,size*)]
Sets the height of the symbols used for curve number **curve** to **size** 1000'ths of an inch.

[SymbolType(*curve,type*)]
Sets the symbol type, where **type** may be 0 (no symbols) through 12.

[TextFont(*Index,Points,Weight,Italic,R,G,B,"Face"*)]
Sets various parameters for one of the six fonts used by DPLOT. **Index** should be one of the following:

1	Numbers along the axes
2	First title line
3	Second and third title lines
4	X axis label
5	Y axis label(s)
6	Legend and/or note

Points is the size of the font, where 1 point = 1/72 inch. **Weight** is a number between 100 for "thin" and 900 for "heavy" or 0 for "don't care", in which case Windows picks the font weight. Normal text has a weight of 400, bold text has a weight of 700. Not all font weights are available for all possible fonts... Windows selects the closest weight available. **Italic** is 1 for italics, 0 otherwise. **R,G,B** are the red, green, and blue components used in the font color, ranging from 0 to 255 (**R,G,B** = 0,0,0 corresponds to black). **"Face"** is the font's face name,e.g. "Arial" or "Times New Roman".

[TextNote(*"Note",X,Y,Frame,Opaque,Button,TabStops*)]
Adds a notation to the plot. **Note** is the text of the notation. **X,Y** are the coordinates of the upper left corner of the note, expressed as a percentage of the plot size (0.0 to 1.0). **Frame** = 1 to draw a rectangle around the note. **Opaque** = 1 to hide any objects intersecting the note. **Button** = 1 if the note is "activated" with a button. **TabStops** is the number of character cells used for tab positioning. See the Add/Edit Note command for more information.

[TextPointLabel(*Point,X,Y,Frame,Opaque,"Label"*)]
Attaches a label to a specific data point. The label is attached to the **point'th** data point in the curve most recently selected with the SelectCurve command. **X,Y** are the coordinates of the label in data space. **Frame** = 1 to draw a rectangle around the label. **Opaque** = 1 to hide any objects intersecting the label. See the Help topic on the Label Points command for more information.

[Title1("*string*")]
Sets the first title line to **string**.

[Title2("*string*")]
Sets the second title line to **string**.

[Title3("*string*")]
Sets the third title line to **string**.

[ViewRedraw()]
Forces DPLOT to redraw the plot. For real time applications, DPLOT performs several optimizations that may leave undesirable artifacts on a plot. For example, line segments may intersect the legend and/or other plot features that were intended to be opaque. **ViewRedraw** causes DPLOT to draw the plot correctly.

[ViewStatusBar(*visibility*)]
Shows (**visibility**=1) or hides (**visibility**=0) the status bar.

[ViewToolBar(*visibility,largebuttons*)]

Shows (**visibility**=1) or hides (**visibility**=0) the toolbar, with 24x22 pixel (**largebuttons**=0) or 32x30 pixel (**largebuttons**=1) buttons.

[WindowCascade()]

Overlaps all DPLOT document windows, with the active document on top. Equivalent to the Cascade command on the Window menu.

[WindowTile()]

Displays all DPLOT documents in windows that do not overlap. Equivalent to the Tile command on the Window menu.

[XAxisLabel("*string*")]

Sets the X axis label to *string*.

[XY(*x,y*)]

Adds a data point to the curve selected with the SelectCurve command. If this operation would cause the number of points in the curve to exceed the array sizes, DPLOT returns DDE_FNOTPROCESSED to a DDE client, or causes an error in the DPLOT macro facility.

[YAxisLabel("*string*")]

Sets the Y axis label to *string*.

[Y2AxisLabel("*string*")]

Sets the Y axis label for a second Y axis label to *string*. The label is not displayed unless one of the Multiple Y Axes options is in effect.

Using DDEML to send data directly to DPLOT

Applications may also send data directly to DPLOT (rather than writing to a file) through DDEML. A discussion of those procedures is beyond the scope of this documentation. Developers interested in this subject should contact the author at 601/634-3668.

Getting a bitmap of the currently active DPLOT document

Applications can retrieve a handle to a bitmap of the currently active DPLOT child window using the following instructions (in FORTRAN):

```
hWndDPLOT = FindWindow('DPLOT/W'c, NULL_POINTER )
if( hWndDPLOT .ne. NULL ) then
   iMsg = RegisterWindowMessage('Get Bitmap'c)
   dwStatus = SendMessage(hWndDPLOT,iMsg,0,0)
   if( dwStatus .ne. 0 ) then
      hDC = GetDC(hWnd)
      call DrawBitmap(hDC,pt.x,pt.y,LOWORD(dwStatus))
      wStatus = ReleaseDC(hWnd,hDC)
   endif
else
   call MessageBeep(-1)
endif
```

The handle to the bitmap is returned in the low word of the return value for `SendMessage`.

In the example above, `DrawBitmap` is an application-defined routine that places the bitmap on the client area of the application's window.

Please note that the **calling** application (not DPLOT) is responsible for deleting the bitmap.

Transferring DPLOT plots to other applications

There are currently three methods for transferring DPLOT output to other applications. Each method has advantages and disadvantages.

Copy a bitmap image to the Clipboard.

As with any Windows application, you can copy the contents of DPLOT's window to the Clipboard by pressing `ALT+PRINT SCREEN` (press and hold the <Alt> key, then press the <Print Screen> key). On some keyboards, you may need to use `ALT+GRAY*` instead. This results in a bitmap image being placed on the Clipboard. Bitmap images may be pasted into several popular graphics editing programs and word processors.

There are several disadvantage to using this method:

- The resolution is limited to the resolution of your display.

- Information content is lost, since a bitmap is only a digitized version of the plot.

- A bitmap image of DPLOT's entire window, including title bar, menu, and status bar (if present) will be saved to the Clipboard.

For best results, maximize DPLOT's window and turn off the status bar before copying the window to the Clipboard.

Copy a metafile to the Clipboard.

Select the Copy Picture command (or press `CTRL+C`) to copy a metafile to the Clipboard. A metafile preserves all of the information content of a plot and is much easier to edit than a bitmap. A metafile is device-independent, so the resolution of the image will be that of the final destination output device.

However, a much more limited number of applications can support metafiles than bitmaps, and in some cases the metafile will be automatically converted to a bitmap.

The Copy command also creates a bitmap image and transfers that image to the Clipboard. The bitmap created by the Copy command will not include the windows title bar, menu, or status bar, but the limitations concerning resolution and scalability mentioned above still apply. The bitmap image created by the Copy command has a fixed size of 640x480 pixels.

Create a Hewlett Packard Graphics Language (HPGL) file.

Before running DPLOT, you should make sure that you have an HP Plotter installed as a printer. If not, select **Printers** from **Control Panel** and **Add** an HP Plotter. When printing a DPLOT file, select **Setup** from the "Print" dialog box, and select the HP Plotter as the output device. Select "Print to file" to create an HPGL file. Many word processing applications will import an HPGL file.

At this writing, the HP Plotter driver lacks some of the features of other device drivers. In particular, the plotter driver will not clip around the legend properly.

DPLOT will automatically select the plotter "Stroke" font for all text when printing to a plotter, regardless of font selections that you make.

Transferring DPLOT data to other applications

There are currently two methods for transferring DPLOT data to other applications.

Copy data to the Clipboard.
You can copy the data values of a single curve to the <u>Clipboard,</u> then paste the data in the target application. See <u>Copy Data Values</u> command.

Use target application's DDE features.
If the target application can serve as a Dynamic Data Exchange (DDE) client, you can instruct DPLOT to provide application information and/or data for one or more curves. The following Microsoft Excel formulas may be used to request information from DPLOT:

Formula	Returns
=DPLOTW|System!Topics	**XYPlot**
	System
	Plot title(s), if any
=DPLOTW|System!SysItems	**Topics**
or	**SysItems**
=DPLOTW!System!TopicItemList	**Formats**
	Status
	TopicItemList
	Help
=DPLOTW|System!Formats	**TEXT**
=DPLOTW|System!Status	**Ready** or **Busy**
=DPLOTW|System!Help	**See DPLOTW Help... "Transferring DPLOT data to other applications"**

For formulas that return more than one value, you must first select the desired cells in the worksheet, enter the formula, then press <Ctrl>+<Shift>+<Enter>.

In addition, if one or more plots are currently open, you can use the target application's DDE features to request information about those plots. For example, if there is a plot entitled SQUARES.GRF in DPLOT, then the following Excel formulas can be used to request information about that plot:

Formula	Returns	
=DPLOTW|SQUARES.GRF!TopicItemList	**Formats**	
	NumberOfCurves	
	NumberOfPoints	
	TopicItemList	
	Curve01	
=DPLOTW|SQUARES.GRF!Formats	**TEXT**	
=DPLOTW|SQUARES.GRF! NumberOfCurves	**1**	
=DPLOTW|SQUARES.GRF! NumberOfPoints	**4**	
=DPLOTW|SQUARES.GRF!Curve01	**1**	**1**
	2	**4**
	3	**9**
	4	**16**

The plot title is the text that appears in the caption of the plot window. This string may be "Untitled". If more than one plot has the same title, DPLOT returns information on the first one created.

Data values submitted by DPLOT are separated by <TAB> characters. A <CR><LF> sequence separates X,Y pairs.

Getting Help within DPLOT

Context-sensitive help is available for most DPLOT menu commands and selected regions of the screen. Following is a description of the help-related keys:

Key(s)	Function
F1	Gets Help and displays the Help Index for DPLOT. If the Help window is already open and active, pressing F1 displays the "How to Use Help" topics.
	Pressing F1 while a menu command is highlighted displays a Help topic on the selected command.
SHIFT+F1	Changes the pointer to so you can get Help on a specific command or screen region. You can then choose a command or click the screen region you want to know more about.
Escape	Changes the pointer to the normal .

The Help button on the toolbar toggles context-sensitive help. Double-click the help button to display a Search dialog box to search for help on a specific topic.

Prompt to save a plot

By default, DPLOT will prompt you before exiting to ask whether you want to save the current plot to a DPLOT file if the current plot has been edited in any way. You can defeat this default behavior by editing the DPLOTW.INI file, located in the Windows directory.

- Start Notepad or any ASCII text editor.
- Open DPLOTW.INI
- Look for the "SavePrompt" entry in the [FLAGS] section.
- To defeat the prompt, change the value to 0. To enable the prompt, set the value to 1.
- If the "SavePrompt" entry is not present, enter the line "SavePrompt=0" or "SavePrompt=1" under the [FLAGS] section.
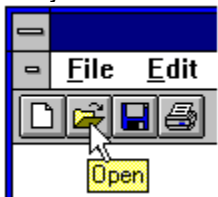
Toolbar description

The toolbar contains buttons that give you quick mouse access to many commands and features in DPLOT. For example, you can open a new document by clicking the New button on the toolbar.

New button

You can display or hide the toolbar by choosing Toolbar from the View menu. You may need to enlarge the DPLOT window to the full width of the screen to see the entire toolbar.

You can see a description of each toolbar button in the status bar. When you point to any button with the mouse, the button description will appear in the status bar. A short description of each toolbar button is also provided in a ToolTip. When you point to a button with the mouse, the button name will appear in a box just below the mouse cursor:

Click on any of the toolbar buttons below to see a detailed description of the corresponding command.

_____

See also:
Moving the toolbar

Moving the Toolbar

You can move the <u>toolbar</u> from its default position at the top of the screen to any location on the screen to better fit your working style and the layout of the document you are working on.

If you move the toolbar anywhere within DPLOT's application area, it becomes a floating toolbar.

To move and resize the toolbar
1. Position the mouse pointer in an empty area on the toolbar, and then <u>drag</u> the toolbar to the location you want.
2. Once you've moved the toolbar from the top of the screen, you can do any of the following:

To	Do this
Move a floating toolbar	Point to the title bar on the toolbar, and then drag the toolbar to a new position.
Resize a floating toolbar	Point to any edge of the toolbar. When the mouse pointer becomes a two-headed arrow, drag until the toolbar is the size you want.
	Two-headed arrows
Return the toolbar to its original position	Drag the title bar to the top of the screen.

Note
You can also create a floating toolbar by double-clicking an empty area on the toolbar, and you can return a floating toolbar to the top of the screen by double-clicking its title bar.

Dialog Box keys

TAB	Moves to the next list box, text box, check box, command button, or group of option buttons.
SHIFT+TAB	Moves to the previous list box, text box, check box, command button, or group of option buttons.
Arrow keys	Move and select within the active list box or group of option buttons.
SPACEBAR	Selects the active check box or chooses the active command button.
Letter key	Moves to the next item beginning with that letter in an active list box.
ALT+Letter key	Selects the item with that underlined letter.
ALT+Backspace	Restores text in a text box to the original character string.
ENTER	Chooses the default command button.
ESC	Cancels the command and closes the dialog box.

Options Menu

Linear/Log Scaling
Change how the data is scaled to device.

Grid Lines or Box
Controls the appearance of the X and Y axes.

Symbol/Line Styles
Change the appearance of a curve.

Automatic Plot Scaling
DPLOT selects extents of the plot.

Manual Scaling
User selects extents of the plot.

Automatic Size
DPLOT selects the size of the plot and the number of tick mark intervals.

Set Physical Size
User selects the physical size of the plot and the number of tick mark intervals.

Square Log Cycles
Toggles state of the appearance of log cycles.

Multiple Axes
Presents several choices for scaling the X and Y axes.

Number Formats
Allows you to change the appearance of numbers.

Colors
Change color palettes used for drawing curves.

Fill Between Curves
Draws a hatched pattern or solid fill between two curves.

Data Processing
Automatically generate integrations and set plotting options.

Linear/Log Scaling (Options menu)

Currently available scaling options are:

- Linear X, Linear Y
- Linear X , Logarithmic Y
- Linear X - Probability Y
- Logarithmic X, Linear Y
- Logarithmic X, Logarithmic Y
- Logarithmic X, Probability Y
- Probability X, Linear Y
- Probability X, Logarithmic Y
- Probability X, Probability Y
- Tripartite (log-log) scale
- Grain Size Distribution
- Polar coordinates
- Bar chart

Tripartite grids
Tripartite grids are generally used to plot shock spectra for a given velocity record or fragility curves for shock-sensitive equipment. Click to see an example. By default, a tripartite grid is set up for a shock spectra plot with X values = Frequency in hertz, Y values = velocity in inches/sec, 45 degree lines = displacement in inches, and 135 degree lines = acceleration in g's. Units may be changed with the Units menu command.

The tripartite grid selection will override the grid type selection made with the Grid Lines or Box. command.

Probability scale
Amplitudes for probability scales must be in the range 0 < y < 100. Values less than 0.01 or greater than 99.99 are clipped. A Cumulative Distribution Function (CDF) for a normally distributed variable will plot as a straight line using "Linear X - Probability Y" scaling.

Grain size distribution
Amplitudes (percent finer values) for "Grain Size Distribution" scaling must be in the range 0 < y < 100, and the abscissa (grain sizes) must consist of positive values. Unlike all other scaling options, this option automatically fills in values for the X and Y axis labels, as well as a second Y axis label located on the right side of the plot. Click to see an example. These labels may be changed, however, with the Title/Axes menu option.

By default, the grain size plot is set up for grain sizes in millimeters. A U.S. Standard Sieve scale will be drawn at the top edge of the plot, and a scale showing the range in size of common engineering materials is drawn below the X axis. These features require that the units of the grain sizes be known. The units may be changed with the Units menu command.

Grain size distribution plots will generally have a better appearance if you force the abscissa (X) to range from 0.001 mm to 1000. mm (or 0.00001 to 100. inches) using the Manual Scaling menu option.

The grid type selection made with Grid Lines or Box is ignored.

Polar coordinates
Both the abscissa (angle) and ordinate (radius) must be greater than or equal to 0.

By default, angles are assumed to be in radians. Angular units may be changed to degrees with the Units menu command. Angles are displayed in degrees regardless of which unit type is in effect.

Several menu options are disabled when viewing data with polar coordinates. In particular, you cannot

use the Zoom command or the Manual Scaling command. In addition, the X and Y axis labels are not used (and so may not be edited) in polar plots.

The grid type selection made with Grid Lines or Box is ignored.

Bar chart
The abscissa must have a constant spacing for bar charts. X values are used as the lower limit of each bar, and the width of the bar is set equal to the spacing between points. The appearance of bar charts (filled or hollow) may be controlled using the Filled Bars command.

_____
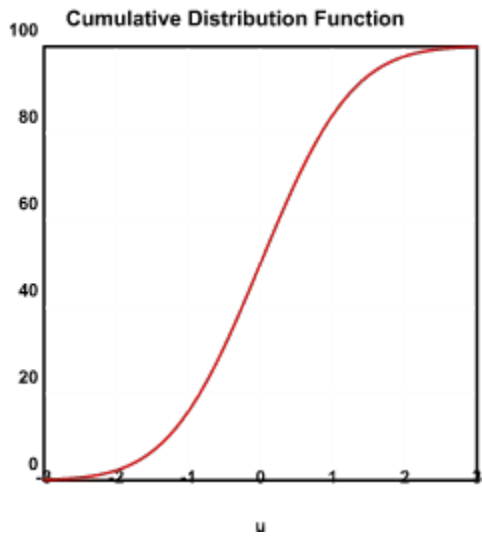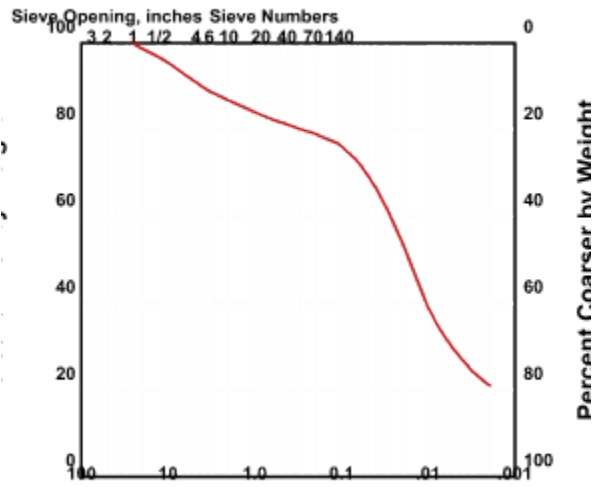
See also:
    Text Menu
    Units

Equipment Vibration Tolerance

Cumulative Distribution Function
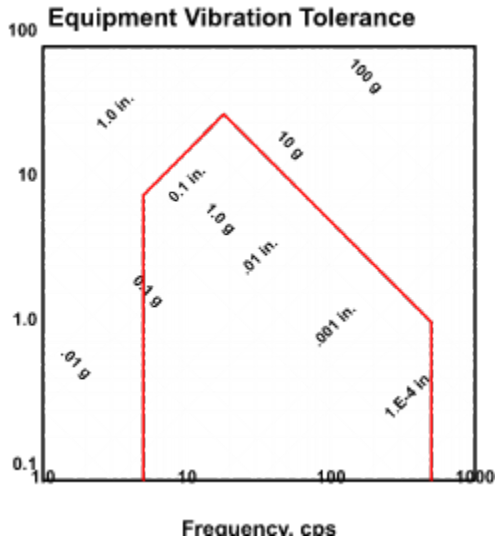
Grain Size Distributions
Foil and Saber-PC/CWE Materials

Sieve Opening, inches Sieve Numbers

Percent Coarser by Weight

Grain Size in Millimeters

Cobbles	Gravel		Sand			Silt or Clay
	C	Fine	C	M	Fine	

Units command (Options > Linear/Log Scaling menu)

The **Units** menu command allows you to change the default appearance of tripartite grids, grain size distribution plots, and polar plots. **NOTE:** Changing units does **NOT** alter the input data in any way. Specifying alternate units informs DPLOT how the input is related to certain aspects of the plot. It is up to you to perform any necessary conversions of the input data so that it matches the specified units. See Edit menu.

Tripartite grids

By default, a tripartite grid is set up for a shock spectra plot with frequency (X) in hertz, velocity (Y) in inches/sec, displacement in inches, and acceleration in g's. This menu option allows you to select from other built-in relationships, or enter conversion factors for your own tripartite grids.

For shock spectra plots, acceleration and displacement values are given by:

In the more general case,

If you select "user-defined" tripartite units, you <u>must</u> enter positive values for the constants A & B. The following table is presented to provide examples of proper values for A and B:

X	Y	45 deg.	135 deg.	A	B
Hertz	inches/sec	inches	in/sec^2	0.1591549	6.2831853
Hertz	inches/sec	inches	g's	0.1591549	1.6273972E-02
Hertz	feet/sec	feet	g's	0.1591549	1.9528766E-01
Hertz	mm/sec	millimeters	g's	0.1591549	6.4070659E-04
Hertz	cm/sec	centimeters	g's	0.1591549	6.4070659E-03
Hertz	meters/sec	meters	g's	0.1591549	6.4070659E-01

Grain size distributions

By default, grain size distribution plots expect grain sizes in millimeters. This menu option allows you to select from other built-in relationships, or enter a conversion factor for user-defined units. If you select "user-defined" units, you <u>must</u> enter a positive value for the conversion factor. The grain size units are used to map U.S. Standard Sieve Openings and/or U.S. Standard Sieve Numbers to the X axis.

Polar coordinates

By default, angles are assumed to be in radians. This menu option allows you to select from either radians or degrees. Regardless of which option is selected, values of the angles will be presented in degrees.

Filled Bars command (Options > Linear/Log Scaling menu)

The **Filled Bars** menu command toggles the appearance of bar charts between filled and hollow bars. By default, a bar chart is drawn with hollow bars using the color associated with a given curve. If the **Filled Bars** option is selected, the bars are filled using the curve's associated color and a black border.

Grid lines or box (Options menu)

Controls the appearance of the X and Y axes.

Axes Only

A single line for each of the X and Y axes, with tick marks at appropriate intervals.

Grid Lines

Draw a box around the plot, with horizontal and vertical grid lines. DPLOT will use gray (r,g,b = 192,192,192) lines for the grid on a color device, unless the nearest color that the output device can produce is equal to the background color. In that case, the grid lines will be black. For black & white devices, the grid lines will be black. The width of the grid lines may be controlled with the Symbol/Line Styles command.

Box Around Curves

Draw a box around the plot, with tick mark intervals at the appropriate intervals.

Dense Grid Lines

If this option is checked, grid lines are drawn with a single pixel or single printer dot width at a smaller interval than normal. These grid lines will always be drawn with this pen width, regardless of the pen width specified by the **Symbol/Line Styles** command. The **Grid Lines** option must be checked for this menu command to have an effect. Use of this option with logarithmic scales may result in the entire background of a plot being painted gray on the display.

Some scaling options take precedence over the grid type selection. See Linear/Log scaling

Symbol/Line Styles command (Options menu)

You may select from six line patterns and/or twelve symbol styles. Symbols are drawn at <u>every</u> data point.

If any line width is set to 0.0 inches, DPLOT uses one unit (one printer dot or one pixel) for that line width. For output to plotters, DPLOT uses a single pen width regardless of the width you specify.

If the symbol size is set to 0.0 inches, DPLOT uses a default symbol height of 1/40 of the height of the output device. To draw solid symbols filled with the color associated with a curve, select the **Fill symbol with curve color** checkbox.

You can quickly set the line width and symbol size for ALL curves to the same values by selecting the **Apply sizes to all curves** checkbox.

Shortcut:
  Click   on the toolbar.

Automatic plot scaling (Options menu)

Using this option, DPLOT selects the coordinates for the plot window so that the entire plot will fit within the window (before any zoom operation is performed).

You do not need to know anything about the data to be plotted when using this option. For this reason this is the default scaling option when DPLOT is started up.

Manual Scaling command (Options menu)

Allows you to select the coordinates of the plot window corners. This might be useful if you are making plots of multiple data sets and want the extents of each plot to be identical. Use of this option may result in portions of the plot being clipped.

The actual coordinates of the corners may not turn out to be exactly the same as those you have specified. However, the corner coordinates will be the same from one plot to the next.

The number of tick mark intervals specified using the Set Physical Size command takes priority over the manually entered coordinates.

This command is disabled for polar coordinates.

Set Physical Size command (Options menu)

Allows you to control the physical size of the plot window and the physical spacing between tick marks.

For example, if you specify a size of 4"w x 3"h and 8 tick intervals on the X axis, 6 intervals on the Y axis, then the interval between tick marks in both the X and Y directions will be 0.5" on a printer. On a display monitor, the size of the plot is mapped to "logical inches". (Since displays are typically viewed from a greater distance than printed material, Windows scales font sizes so that characters with the same height appear roughly the same size whether viewed on a display monitor or a printout.)   The result of this mapping is to provide a plot whose dimensions and font sizes appear to be the same size, whether viewed on the display or a printed copy.

If the specified size exceeds the capabilities of the output device (subtracting the margins set with the Page Setup command), DPLOT adjusts the size to one that will fit, maintaining the aspect ratio between the width and height.

WYSIWYG
"What you see is what you get". If the specified size exceeds the limits of the display, and WYSIWYG is checked, then font sizes will be adjusted along with the size of the plot. This feature causes output to the display to have the same appearance on a display as on printed output. Output may not be identical since specific font sizes may not be available for one or the other device.

This option may result in less than peak performance on a display monitor, since DPLOT must iterate to find the combination of font sizes and actual plot dimensions that will use as much of the display as possible without clipping any portion of the plot. For best results, use TrueType fonts and maximize the window.

Number of tick marks
Although the size of the plot may be controlled, use of this option has no effect on the number of tick mark intervals for logarithmic or probability scales.

For polar coordinates, the number of tick intervals in the Y direction is used as the number of radial tick marks, and the number of tick intervals in the X direction is the number of angular divisions. You can force polar plots to be circular by specifying identical measurements for the width and height.

Zoom
The zoom feature may not work particularly well with this scaling option, since you force the number of tick mark intervals.

_____
See also:
> Fonts
> Page Setup

Square log cycles (Options menu)

This option forces the physical distance between log cycles to be the same on the X and Y axes. It has no meaning for scaling options other than Logarithmic X-Logarithmic Y or Tripartite grids. Set Physical Size takes precedence over this option.

Multiple Axes command (Options menu)

Displays a dialog box that allows you to specify the appearance of the coordinate axes.

Single X axis
    The default condition, and the only valid option for anything other than linear or logarithmic X scales.

X2 = A+B*X1
    A second X axis is linked to the primary X axis by the function X2 = A + B*X1. This option might be useful for displaying output in two different units, for example.

Single Y axis
    The default condition, and the only valid option for anything other than linear or logarithmic Y scales.

Y2 = C+D*Y1
    A second Y axis is linked to the primary Y axis by the function Y2 = C + D*Y1. This option might be useful for displaying output in two different units, for example. Note that the function relating Y2 to Y1 is a relationship between the numbers, not the units, displayed alongside the axes. For example, if the primary Y axis has units of inches, and the second Y axis has units of centimeters, then C=0, D=**2.54** (not 1 cm = 0. +   **0.3937** inches).

Independent Y2
    A second Y axis is independent of the primary Y axis. In this case, you specify which curves are associated with which axis. The first curve in the plot **must** always be associated with the primary Y axis. This option might be useful for plotting, for example, pressure-time histories, with pressure associated with the primary Y axis and impulse associated with the second Y axis.

    Some scaling commands will have no effect on the appearance of data associated with the second Y axis. Manual Scale and other commands related to the appearance of the plot effect **only** data associated with the primary Y axis.

Number Format command (Options menu)

Displays a dialog box that allows you to specify the appearance of numbers on the axes of the plot.

The following table shows some examples using the available number formats.

With this format	This number	Is displayed as
Default	-1.5	-1.5
	0.	0.
	1.5	1.5
Scientific	-1.5	-1.5E+0
	0.	0.E+0
	1.5	1.5E+0
Fractions	-1.5	-1 1/2
	0.	0
	1.5	1 1/2
Dollars and Cents	-1.5	($1.50)
	0.	$0.00
	1.5	$1.50
Dollars	-1.5	($2)
	0.	$0
	1.5	$2
Time	1	01:00:00 AM
	1.5	01:30:00 AM
	13	01:00:00 PM
		or
		13:00:00
Calendar date	1	1/1/1900
	35242	6/26/1996

Fractions
Fractions are displayed to the nearest 1/64th. Fractions smaller than 1/128 are truncated.

Time
Amplitudes must be greater than 0 and less than or equal to 24. Amplitudes outside this range are displayed using the default format. The format used to display times can be changed with Control Panels International (Windows 3.x) or Regional Settings (Windows 95) applets.

Calendar date
DPLOT converts the input Excel serial number (see below) to a calendar date. By default, DPLOT uses the Short Date format specified in Control Panels International (or Regional Settings) applet for formatting the date. You can control how the date is formatted by entering a format string in the Date Format box. Use the letters in the following table to change the date style, and then click Test. The new date style appears beside the Test button.

To display	Use
Numbers with no leading zeros for single-digit days, years, or months.	Lowercase **d** or **y**, or uppercase **M**
Numbers with leading zeros for single-digit days, years, or months.	Lowercase **dd** or **yy**, or uppercase **MM**
Three-letter abbreviations for the day of the week or month.	Lowercase **ddd** or uppercase **MMM**

The full name of the day of the week, year, or month	Lowercase **dddd** or **yyyy**, or uppercase **MMMM**

Excel serial number

DPLOT assumes the amplitudes for a calendar scale are Microsoft Excel for Windows 1900 Date System serial numbers. In this system, serial numbers range from 1 to 65,380, corresponding to the dates January 1, 1900, through December 31, 2078. The following code converts a month, day, and year to the Excel 1900 Date System serial number.

```
if( Year .lt. 1900 .or. Year .gt. 2078 ) then
    SerNum = -1
else
  if( Month .gt. 2 ) then
     SerNum=int(365.25*Year)+int(30.6001*(Month+1))+Day-694037
  else
     SerNum=int(365.25*(Year-1))+int(30.6001*(Month+13))+Day-694037
  endif
endif
```

Colors command (Options menu)

Allows you to specify the colors that will be used for plotting individual records. Two different color palettes are maintained ... one for a display monitor and one for a printer. Each of these palettes may contain up to 16 color specifications. If there are more than 16 curves, the color table is recycled (curve #17 uses color #1, curve #18 uses color #2, etc.)   Color palette entrys are saved to DPLOT's initialization file and are restored in subsequent runs.

Display
Presents the **Select Display Colors** dialog box which may be used to alter the color palette for the display.

>   **Shortcut:**
>   Click   on the toolbar.

Printer: Edit
Presents the **Select Printer Colors** dialog box which may be used to alter the color palette for the printer.

Printer: Black & White
Sets all color palette entries for the printer to black.

Printer: Gray Scale
Creates a gray scale palette for the printer, with values ranging from 0 (black) to 195 (out of 256) for palette entry 16.

Printer: Copy Display
Copies the current display palette to the printer palette. Subsequent changes to the display palette will **not** cause corresponding changes to the printer palette.

Restore Defaults
Destroys your color selections for both the display and printer and restores the default color specifications built into DPLOT. The default colors are:

Index	Display R	G	B	Printer R	G	B
1	255	0	0	0	0	0
2	255	0	85	13	13	13
3	255	0	170	26	26	26
4	255	0	255	39	39	39
5	170	0	255	52	52	52
6	85	0	255	65	65	65
7	0	0	255	78	78	78
8	0	85	255	91	91	91
9	0	170	255	104	104	104
10	0	255	255	117	117	117
11	0	255	85	130	130	130
12	0	255	0	143	143	143
13	170	255	0	156	156	156
14	255	255	0	169	169	169
15	255	170	0	182	182	182
16	255	85	0	195	195	195

To alter the current color specifications:

1   Select either "**Display**" or "**Printer:Edit**" from the "**Colors**" menu.
2   To change the red, green, and/or blue components for a curve's color, click on the appropriate curve index in the boxes under "Curve Index:", or press the <TAB> key until the appropriate box is highlighted, then press <Space>.
3   Change the color for the selected curve index by doing one of:
     •   Enter values ranging from 0 to 255 inclusive in the red, green, and/or blue edit boxes.
     •   Enter values ranging from 0 to 240 in the hue, saturation, and/or luminosity edit boxes.
     •   Drag the cursor in the color refiner box to select a color. Drag the cursor in the luminosity bar to change the brightness of the color.
     A dithered version of the selected color will be displayed in the Color/Solid box, as well as the box for the currently selected curve. The nearest system palette color will be displayed in the right side of the Color/Solid box.
4   Repeat steps 2 - 3 for all palette entrys you wish to change.
5   Click on "OK", or press "Enter".

Not all devices are capable of displaying the exact colors that are selected. With a 16 color display driver, for example, Windows selects the system palette color that is closest to the selected color. You can force the selected colors to match the system palette by pressing ALT+O or by double-clicking on the right side of the Color/Solid box for each curve.

Fill Between Curves command (Options menu)

This command allows you to draw a hatch pattern or solid fill between two curves.

Select the curves to fill between in the 1st Curve and 2nd Curve list boxes. If **None** is selected for either curve, or if the 1st and 2nd curves are the same, the fill operation is not performed.

The color of the fill may be controlled with the Red, Green, and Blue text boxes. Enter a number from 0 to 255 in each of these boxes, or click on the adjacent spin buttons to change these entries. R,G,B = 0,0,0 corresponds to black; 255,255,255 is white.

If the User-defined fill pattern is selected, you may create your own hatch pattern by clicking on any of the grid squares in the 8x8 grid pattern. Clicking on a square toggles its state to and from the background color and the color selected with the R,G,B controls. Unlike the built-in hatch patterns (Horizontal, Vertical, etc.), the background for User-defined patterns **is** drawn on the plot and will obscure any previously drawn information.

Data Processing command (Options menu)

This command allows you to enter a data processing mode in which several operations are automated. The key features of data processing mode are geared towards producing data plots used by the WES Structures Laboratory and may not be appropriate for your use.

Formatting
- Square format:
  Plot width and height are 5.15 inches (about 131 mm).
  Both the X and Y axes have 10 grid intervals.
- Wide format:
  Plot width is 6.15 inches; height is 3.69 inches.
  X axis has 20 grid intervals; Y axis has 12 grid intervals.
- Scaling is linear X, linear Y.
- Pen width is 1 dot or pixel for curves, 0.02 inches for the box around the plot, and 1 dot or pixel for the grid lines.
- All labels use the Arial TrueType font. Normal text is 10pt; the first title line is 18pt; all other text is 14pt.

Units
Input units should correspond to the following table. If the input units do not match the values specified, you should **not** select "Use DPLOT-generated axis labels".

Data type	Input X	Input Y	Output X	Output Y
Unknown	don't care	don't care	same	same
Pressure	Time, msec	Pressure, psi	Time, msec	Pressure, psi
				Impulse, psi-sec
Stress	Time, msec	Stress, psi	Time, msec	Stress, psi
				Impulse, psi-sec
Acceleration	Time, msec	Acceleration, g's	Time, msec	Acceleration, g's
				Velocity, feet/sec
				Displacement, inches
Deflection	Time, msec	Deflection, inches	Time, msec	Deflection, inches
Strain	Time, msec	Strain	Time, msec	Strain
Temperature	Time, msec	Temp., deg. F	Time, msec	Temperature, deg. F

Y axis labels will be the same color as the corresponding curve, regardless of the color chosen with the **Fonts** command.

Menu Commands
Several menu commands are disabled when in data processing mode:
- Erase a curve.
- Swap X,Y.
- Linear/Log scaling.
- Multiple axes.
- Compare curves.
- Curve fit.
- Integrate a curve.
- Lump two curves.

In addition, the decimation commands do **not** generate a new curve ... they replace the curve that is operated on.

Integrations
For records consisting of pressure or stress values, DPLOT automatically generates an impulse record. For acceleration records, DPLOT automatically generates velocity and displacement records.

Editing the primary record in any way (pressure, stress, or acceleration) results in automatic re-generation of the integrated records. **Please note:** The initial amplitude of an integrated record will **always** be zero. Some operations on the primary record may have an undesirable or unexpected effect on integrated records. For example, truncating a pressure record (deleting data before a specified time), may result in shifting the impulse. To view or print a range in time without changing the integrated amplitudes, zoom in to the desired limits or use the Manual Scale command rather than truncating the primary record.

Generated records (impulse, velocity, or displacement) can not be edited directly. Any changes must be made to the primary record.

Acceleration plots
Acceleration is plotted on a separate plot from velocity and displacement. To switch views from acceleration to velocity, select the Velocity/Displacement command on the View menu (or press Shift+TAB). Switching to the velocity plot changes this menu command to "Acceleration".

To save a single curve, the curve must be visible. For example, to save either the velocity or displacement records using the Save As command, switch views if necessary so that the velocity plot is visible.

Array sizes
Since data processing mode relies on DPLOT being able to make very specific assumptions about the content of the curves, you cannot change the maximum number of curves while in data processing mode. Doing so turns data processing mode off.

Text Menu

Title/Axes
Enter or edit title strings and axis labels.

Legend/Labels
Enter or edit curve legend, labels, or legend title.

Label Points
Add, edit, move, or delete labels for specific data points.

Date
Toggle display of the date. The date will be displayed using the Short Date format selected with the Control Panel International application.

Print Caption
Toggle display of the document caption in the lower right corner of the plot. The caption is normally either the filename of the document or the source of the data; e.g. EXCELData.

Add/Edit Note
Enter or edit a notation placed at an arbitrary location on the plot.

Fonts
Change the typeface and/or other attributes for various labels.

Title/Axis Labels

You have clicked on one of the title lines or axis labels.

You may edit these labels in one of two ways:
• Using the **Title/Axes** menu command.

• Pointing to the label with the mouse and double clicking the left mouse button.

Each of these strings is limited to 80 characters. The appearance of these strings may be changed with the **Fonts** menu command.

The third title line may not be edited while in data processing mode, since   this string is continuously updated by DPLOT as you edit the data. If you have selected the **DPLOT-generated labels** option in data processing mode then you are also prevented from editing the X and Y axis labels.

_____
See also:
     Data Processing

Legend

You have clicked on the legend.

You may edit the text of the legend in one of two ways:
- Using the Legend/Labels menu command.
- Double clicking the left mouse button while the mouse pointer points to any part of the legend.

The legend may be moved by clicking the left mouse button while the mouse pointer points to any part of the legend, and dragging the legend to a new location.

The font used in the legend may be changed with the Fonts menu command.

Other features of the legend may be edited with the Legend/Labels menu command.

Legend/Labels command (Text menu)

Enter or edit curve legend, labels, or legend title.

Maximum number of characters
Character strings for the legend are limited to 40 characters. Curve labels are limited to 5 characters, and are placed beside the last data point that is located within the plot window.

Legend title
The legend title will be placed above the legend for each of the individual curves. If no legend is specified for any curve, the legend title may still be used to draw a note on the plot.

Legend line length
Length of the line segment appearing to the left of each legend string. The line is drawn with the same attributes (color, style, and pen width) as the associated curve.

Maximum number of rows
Refers to the maximum number of legend strings that will be placed in a single column. Additional columns will be used if the number of legends exceeds this number.

Frame legend
Check this box to draw a rectangle around the legend.

Opaque
Check this box to hide items that intersect the rectangle bounding the legend.

Shortcut:
Double click on the legend.

Note:
To move the legend, point to the legend and drag to the desired location.

Label Points command (Text menu)

Adds a label to a specific data point. A plot may have up to 20 point labels.

To embed the amplitude of a data point in a label, type **$Y** in the Label field. To embed the abscissa of a data point in a label, type **$X**. When the label is drawn the corresponding numeric values will be substituted for these control codes.

To use only the amplitude of the data point as the label, check the "Use Amplitude Only" box.

To move a label, select the "Move Label" menu command, or point to the label and drag to the desired location.

To edit a label, select the "Edit Label" menu command, or point to the label and double click the left mouse button.

Fonts command (Text menu)

Allows you to change the typeface, color, size, and other attributes of the fonts used to display various labels.

Shortcut:
Click   on the toolbar.

Character size
DPLOT uses the user-specified character size when: 1) the output device is not a display monitor, or 2) DPLOT's window has been maximized. For non-maximized windows, DPLOT proportions the size of characters so that a plot will have the same general appearance as a maximized window. If the WYSIWYG option of the Set Physical Size command is in effect, then fonts are scaled down, if necessary, so that a plot on the display will have the same appearance as a printed copy.

Typeface
By default, DPLOT uses a TrueType Arial font for all text.

Be sure that you have enabled TrueType fonts using the **Fonts** option of **ControlPanel** before running DPLOT. TrueType fonts will generally provide the best performance across multiple output devices, and are the only standard fonts that can be rotated reliably.

If printing to a pen plotter, DPLOT selects the plotter's stick font, regardless of which typeface you have chosen.

Saving font options
On exit from DPLOT, font information is stored in the initialization file **DPLOTW.INI**, found in the Windows directory. If **DPLOTW.INI** is erased or otherwise damaged, DPLOT will use the default TrueType Arial font until you select new fonts. Font point sizes are saved to a DPLOT data file.

Add/Edit Note command (Text menu)

Enter or edit a notation, placed at an arbitrary location on the plot. The notation is limited to 511 characters. Unlike most DPLOT dialogs, pressing ENTER results in a new line in the notation (normally, pressing ENTER is equivalent to clicking on OK). Press CTRL+TAB to embed a TAB character in the note. Press TAB to shift the input focus to another control.

To paste the contents of the Clipboard to the notation, move the cursor to the desired insertion point and press CTRL+V.

To move a notation, point to the bounding rectangle and drag to the desired location.

The font used in the notation is identical to that used in the legend, and may be changed with the Fonts menu command.

Frame note
Check this box to draw a rectangle around the notation.

Opaque
Check this box to hide items that intersect the rectangle bounding the notation.

Button activated
Check this box to display a pushbutton in place of the note. Clicking on the pushbutton displays a popup window containing the note. If this option is selected the note will not be printed or copied to the Clipboard by the Copy Picture command. The text appearing on the note is controlled by the **Button Text** edit box. If this box is left blank the button will contain the word "Note".

Tab Stops at
Enter the number of characters for each tab stop, or click on the arrows until the desired tab spacing is selected. Tab characters may be embedded in the note by typing CTRL+TAB.

Shortcut:
      Double click on an existing note.
      or
      Click   on the toolbar.

Notation

You have clicked on the notation for the active plot.

You may edit the notation text in one of two ways:
- Using the Add/Edit Note menu command.
- Double clicking the left mouse button while the mouse pointer points to any part of the notation.

The notation may be moved by clicking the left mouse button while the mouse pointer points to any part of the notation, and dragging the notation to a new location.

The font used in the notation is identical to that used in the legend, and may be changed with the Fonts menu command.

Client Area

No help here!   Make something up!

Maximize Icon

Click on the maximize icon to enlarge the active window to fill the available space. The application window expands to fill the entire screen. A document window expands to fill the DPLOT window.

Restore Icon

Click on this icon to return the active window to its size and position before you chose the Maximize or Minimize command.

Minimize Icon

Click on the minimize icon to reduce the application window to an icon.

Sizing Border

You can change the size of the application or document window by dragging one or more borders to the position you want.

1   Point to the border or corner of the window you want to move.

2   When the mouse pointer appears as a ⟷, drag the window border or corner until the window is the size you want.

Tip
*   To view Help as you work in an application, you can arrange the Help window and the application window so they appear side by side.

Control Menu

This topic describes the control menu.

Title Bar

Located along the top of a window and contains the name of the application and document.

To move the window, drag the title bar.

Note: You can also move dialog boxes by dragging their title bars.

Scroll bars

Displayed at the right and bottom edges of the DPLOT window. The scroll boxes inside the scroll bars indicate your vertical and horizontal location in DPLOT's output. You can use the mouse to scroll to other parts of DPLOT's output.

Vertical scroll bar
Item   Mouse action

Click to scroll up one line.

Click to scroll up one full window.

Drag to move to an approximate location in the document.

Click to scroll down one full window.

Click to scroll down one line.

Horizontal scroll bar
Use the horizontal scroll bar to move left and right, just as you use the vertical scroll bar to move up and down.

Restore command (Control menu)

Use this command to return the active window to its size and position before you chose the Maximize or Minimize command.

Clicking ⬍ in the upper-right corner of a maximized window is the same as choosing the Restore command.

Shortcuts

Double-click the title bar.

Move command (Control menu)

Use this command to display a four-headed arrow so you can move the active window or dialog box with the arrow keys.

Note: This command is unavailable if you maximize the window.

Size command (Control menu)

Use this command to display a four-headed arrow so you can size the active window with the arrow keys.

Note: This command is unavailable if you maximize the window.

Minimize command (Control menu)

Use this command to reduce the application window to an icon.

Clicking ⬜ in the upper-right corner of the window is the same as choosing the Minimize command.

Maximize command (Control menu)

Use this command to enlarge the active window to fill the available space. The application window expands to fill the entire screen. A document window expands to fill the application window.

Clicking in the upper-right corner of the window is the same as choosing the Maximize command.

Shortcuts

 Double-click the title bar

Next command (document Control menu)

Use this command to switch to the next open document window. DPLOT determines which window by the order in which you opened the windows.

Shortcuts

CTRL+F6

Close command (Control menu)

Use this command to close the active window.

Double-clicking a Control-menu box is the same as choosing the Close command.

Shortcuts

ALT+F4 closes the application window.

CTRL+F4 closes the document window.

Switch To command (Control menu)

Use this command to display a list of all open applications. Use this "Task List" to switch to or close an application on the list.

Shortcut

   CTRL+ESC

Dialog Box Options

Task List
  Select the application you want to switch to or close.

Switch To
  Makes the selected application active.

End Task
  Closes the selected application.

Cancel
  Closes the Task List box.

Cascade
  Arranges open applications so they overlap and you can see each title bar. Note: This option does not affect applications reduced to icons.

Tile
  Arranges open applications into windows that do not overlap. Note: This option does not affect applications reduced to icons.

Arrange Icons
  Arranges the icons of all minimized applications across the bottom of the screen.

drag

To hold down the mouse button while moving the mouse.

dialog box

A box that displays the available command options for you to review or change.

click

To press and release a mouse button in one nonstop motion.

Clipboard

The Clipboard is a temporary storage area for text and graphics that you are copying or moving from one location to another. The Clipboard is a common holding area among Windows applications.

To display the contents of the Clipboard
In the Program Manager Main window, double-click the Clipboard Viewer icon, or the ClipBook Viewer icon in Windows for Workgroups.

Clipboard Viewer icon

ClipBook Viewer icon

To close the Clipboard Viewer, choose Exit from the File menu.

DDE

Dynamic Data Exchange is a mechanism for interprocess communication. DDE is based on the messaging system built into Windows. Two Windows programs carry on a DDE "conversation" by posting messages to each other. These two programs are known as the "client" and the "server." A DDE server is the program that has access to data or features that may be useful to other Windows programs. A DDE client is the program that obtains this data from the server.

DPLOT can act as both a DDE client and a server.

double-click

To rapidly press and release a mouse button without moving the mouse. Double-clicking carries out an action, such as starting an application.

spin button

A spin button is a control you can use with another control to increment and decrement numbers. You can also use it to scroll back and forth through a range of values or a list of items.

How do I ...?

Answers to common questions about DPLOT for Windows.

Data Entry
How do I create a plot from scratch?

How do I import data from another Windows application?

How do I import data from a DOS application?

Printing
How do I print colors and/or gray shades on a B&W printer?

How do I print several documents unattended?

How do I print multiple documents on the same page?

Scaling
How do I specify a tick mark interval?

Miscellaneous
How do I get DPLOT to speak to me?

How do I abort a document repaint in progress?

Windows simulates colors and gray shades on a B&W printer using patterns of black dots. For this feature to work as expected, the width used for a given line or curve must be greater than 1 printer dot. When first installed, DPLOT draws lines with a width of 1 pixel on display monitors and 1 dot on printers. For best results when printing colors or gray shades, the minimum line width used for drawing curves should be about 12 dots, or 0.02 inches on a 600 dpi printer or 0.04 inches on a 300 dpi printer. Line widths used for each curve may be changed with the <u>Symbol/Line Styles</u> command on the Options menu, or by selecting the Symbol/Line Styles tool.

Symbol/Line Styles tool.

Use the Macro command on the File menu to create a macro for printing a series of files unattended. After creating and saving the macro, select the Run button from the Macro dialog box to process the commands. For example, the following macro commands will cause DPLOT to print all DPLOT files in the directory C:\MYDATA:

```
Directory("C:\MYDATA")
FileType(1)
ForFilesIn("*.GRF")
      FilePrint()
NextFile
```

NOTE: DPLOT uses the default printer settings (set with Control Panel) to run macro commands. Changes made to the printer settings within DPLOT will have **no** effect on the printer settings used by macros.

1) Open or create all documents that you want to print on the same page.

2) Select the document to be printed in the upper left corner of the page (click anywhere within the document, or select it from the Window menu)

3) Select the Print command from the File menu.

4) Click the "Multiple" button in the Print dialog box, or press ALT+M.

5) Select the layout for the page: Vertical, Horizontal, or Two Columns.

6) The active document (selected in step 2) is shown selected and grayed, indicating that it must be printed. Placement of other documents on the page is controlled by the order in which the documents are selected. Select other documents by clicking on the corresponding checkbox, or by pressing the corresponding numeric key.

7) Enter the desired spacing between plots in the "Space between" box.

8) Click the "OK" button, or press ENTER.

9) Modify the printer settings if necessary, then click the "OK" button or press ENTER.

To set a specific tick mark interval:

1) Using the Set Physical Size command on the Options menu, enter the number of desired tick mark intervals on the X and Y axes.

2) Using the Manual Scale command on the Options menu, enter the extents for the X and Y axes such that the range in magnitudes divided by the number of intervals is equal to the desired tick mark interval.

The resulting tick mark interval may not be exactly as described above. DPLOT will adjust the extents set with the Manual Scale command such that the tick mark interval is some multiple of 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 6.0, or 8.0 times a power of 10.

For example, if 6 tick mark intervals are specified on an axis using the Set Physical Size command and the extents set with the Manual Scale command are 0.0 to 10.0, DPLOT adjusts the upper extent to 12.0 so that the tick mark interval is 2.0 rather than 1.6667.

DPLOT will echo messages to a sound card if your system is equipped with Monologue for Windows™. Monologue for Windows is bundled with the SoundBlaster™ and other popular sound cards. To take advantage of this feature, start Monologue for Windows and insure that the mode is set to **DDE Server**.
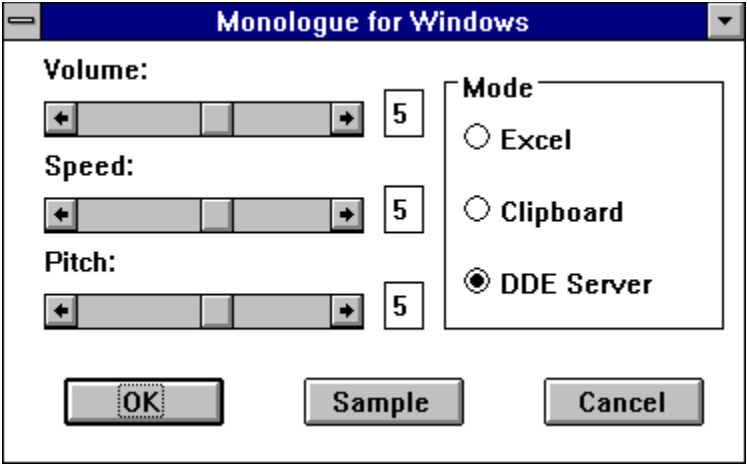
By default, DPLOT automatically redraws a plot any time you edit any portion of the plot that results in a change in appearance. This feature may become tedious when working with large data sets. To cancel a redraw in progress, press <Escape>. You may subsequently force a redraw by selecting the Redraw menu command or pressing F9.

1) Open a new document window if necessary by selecting the New command on the File menu, or by pressing CTRL+N.

2) The current maximum number of curves and maximum number of data points per curve is shown on the right side of the status bar at the lower edge of the DPLOT window. If either of these values is insufficient for the new document, enter new values by selecting the Resize Arrays command on the File Menu or by double-clicking the "Max Size:" area of the status bar.

3) Select the Edit Data command on the Edit menu and enter the X,Y data pairs for the first curve. Repeat this step for all curves.

Three methods are available for importing data from other Windows applications.

The Paste command (Edit menu)

    The Paste command is the method most likely to be supported by another Windows application. Once data is pasted from another application, DPLOT owns the data. Changes to the data in the source application are not reflected in the DPLOT document.

The Paste Link command (Edit menu)

    The Paste Link command establishes a link with the source of the data. Changes to the data made in the source application are reflected in the linked document. Unlike the Insert Link command, this method requires switching to the source application and back to DPLOT.

The Insert Link command (Edit menu)

    The Insert Link command performs roughly the same function as the Paste Link command, except that it does not require switching to the source application to initiate the action.

1) Click the application's Control-menu box or press ALT+SPACEBAR to open the Control menu.

2) From the Control menu, choose Edit.

3) From the Edit cascading menu, choose Mark.

4) Select the information you want to copy.

5) Click the application's Control-menu box or press ALT+SPACEBAR to open the Control menu.

6) From the Control menu, choose Edit.

7) From the Edit cascading menu, choose Copy.

8) Switch to DPLOT.

9) Choose the Paste command from the Edit menu, or press CTRL+V.

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See also

Paste command