



WinPLOT v1.3 Contents:

The Contents lists Help topics available for WinPLOT.



About:



Installation & Registration:



Data File Format



Operation:



Automated Operation:



Signal Processing:

To learn how to use Help, press F1 or choose Using Help from the Help menu

Use File Print Topic from the Help menu to print the currently selected help topic.



WinPLOT - About

WinPLOT Features:

Interactive operation including Zoom-Pan-Scroll along with point-by-point analysis.
Cartesian, Polar and LOG scales with up to 16 signals by 32000 samples.
Customizable line/symbol color, size, type and font with postscript quality printer output.
Batch file and DDE automatic operation for use with data acquisition systems or your own programs.
Basic signal processing including: spectral analysis, integration, differentiation and various statistics.
Easy to use inexpensive system with examples and on-line help.

Focus:

WinPLOT was written out of a need for a simple yet effective 2-D data display and analysis tool for engineers and scientists. WinPLOT combines some of the best features from an assortment of other more expensive and complicated products into a package that is easy to use and at a very affordable cost. On the other hand, WinPLOT is not intended for business type presentation or high end graphic visualization systems and thus does not support fancy 3-D pie charts or surface-contour graphics etc. WinPLOT is however designed to be controlled from an external program or process which allows you freedom to choose your data processing environment.

Shareware:

WinPLOT is a shareware product and thus you are encouraged to copy and distribute this program. You may not however alter the contents of any file or distribute known passwords. You are encouraged to use this product for a trial period and see if it suits you needs. If you find this program worth the reasonable cost then you should register it so that it can continue to be improved. Your feedback - registration or otherwise - is greatly appreciated.

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See Also:

[Version - Features](#)
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Version - Features:

Version	Date	Major Additions/improvements
1.3	9/13/94	Main window can now display axis labeling. Added adjustable font support Added interactive signal marker capabilities. Added Triangle and Diamond symbol markers Added adjustable maximum number of grid line. Added adjustable number of display digits. Signal units can now be displayed in the legend Fixed out-of-bounds drawing upon zoom Fixed Polar plotting problems
1.2	8/18/94	New 3-D style user interface. Added full DDE control capability Includes example program and source code. Added interactive menu control keywords: OPEN, SAVE, RESTORE, EXIT REDRAW, RESCALE, AUTO, ACTIVE Added PRINT keyword setup and control functionality. Added SYMBOL keywords to the data file: POINT, LINE, COLOR Added SAMPLE keyword to define X axis Added new options screen for custom editors and color settings. Added floating (right-mouse) zoom-pan-scale menu. Fixed zero threshold and crossing in printout Added browsing index and icons to help file
1.1	6/10/94	Added DDE Paste Link functionality. More general data input file format. Statistics is now based on currently displayed points (zoom-in mode) Added multi display naming and positioning capabilities Added DISPLAY and OPERATION functions to data header. Display overlap repaint now operates correctly. Display precision has been increased to 12 digits. Numerous minor fixes and improvements.
1.0	12/6/93	Fixed printer setup dialog issues.
0.9	11/1/93	Replaced installation software to not require VBRUN300 in source directory Fixed possible file load error
0.8	10/1/93	Relaxed shareware restrictions Fixed interactive operation Improved performance of plotting by 30% Settings for Active and Symbol size are now saved Added data header editing capabilities Added data statistics window. Added Signal Processing: Spectrum, Integration, Differentiation Added signal generator selection application
0.7	5/1/93	First public release

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Installing & Registering WinPLOT

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Installation:

This program requires Microsoft Windows 3.0 or above running standard or enhanced mode to operate.

Automatic installation:

WinPLOT can be automatically installed by running the SETUP program on the WinPLOT disk:

From the Program Manager: <File> <Run>

A:SETUP or B:SETUP

Manual installation:

Copy the uncompressed files to any existing directory.

(Note: it is best not to copy the files directly into your DOS or Windows directories)

```
COPY a:\*.* c:\winplot\
```

Then move the following files to your windows system directory.

```
COPY a:\vbrun300.dll      c:\windows\system\  
COPY a:\grid.vbx        c:\windows\system\  
COPY a:\threed.vbx     c:\windows\system\  
COPY a:\cmmdl.g.dll    c:\windows\system\  
COPY a:\cmdialog.vbx   c:\windows\system\  

```

Then from any existing window group in the Program Manager press:
menu <File> item <New> option <Item> button <Browse> then select WINPLOT.EXE

See Also:

[WinPLOT Files](#)
[Registration](#)

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WinPLOT Files

WinPLOT files: (files copied to your directory of choice)

WINPLOT.HLP	66 Kb	The help document you are reading
WINPLOT.EXE	200 Kb	The Win PLOT Visual Basic program
DATA_EXL.XLS		Excel data set (Input to EXCEL)
DATA_EXL.CSV		Text file data set (Output from EXCEL)
DATA_FFT.BAS*		BASIC source code example for FFT
DATA_FFT.CSV		Text file data set (Output from .BAS file)
DATA_GEN.BAS*		BASIC source code example for generating signals.
DATA_LST.EXE		A small program used to select .BAS & .CSV signal files
DDE_DEMO.FRM**		A example DDE control demonstration program source
DDE_DEMO.EXE		A example DDE control demonstration program

*note: these files require a BASIC development system such as MS QBASIC included with MS DOS 5.0.

**note: Requires a VB environment for operation

System required file: (copied to your system directory if they don't already exist)

Note: these files are supplied from Microsoft or other third party vendors.

VBRUN300.DLL	395 Kb	Required to run Visual Basic (3.0) programs.
COMMdlg.DLL	89 Kb	Required for common dialog functions.
CMDIALOG.VBX	19 Kb	Required for common dialog functions.
GRID.VBX	45 Kb	Required Visual Basic eXtension for grids.
THREED.VBX	65 Kb	Required Visual Basic eXtension 3-D controls.

Install files: (these files can remain on your the installation disk)

SETUP.EXE	The installation program
SETUPKIT.DLL	required for the install program
VER.DLL	required for the install program

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WinPLOT Data File Format:

Data File Format Examples

WinPLOT data Header: Standard

WinPLOT data Header: Special

DADiSP compatibility

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Data File Format Examples:

Data for WinPLOT can be imported from an ASCII file in a row-column format. At the top of the data file is the data header. This data header is very important and is the key to efficient WinPLOT utilization. (See WinPLOT Data header) Below the DATA keyword starts the actual data. Each row (line) is one set of data points while each column defines each signal. Each column is separated by either comma (ASCII 44), tab (ASCII 9) or a series of spaces (ASCII 32) and each line is separated by a carriage return - line feed (ASCII 13 - 10).

Example: Simple file with 2 signals (1st being X-axis) and data 4 samples.

ASCII Text File: (space character separation)

```

comment  This is a test of a ASCII data set  <-- comment line (spaces allowed)
signals  range          altitude             <-- define Y names
units    miles         feet                <-- define Y units
samples  time          sec                 <-- define X name, unit
DATA                                          <-- required if header included
1        23.123        9.99e-099
2        224.005       8.80e-088
3        625.701       7.00e-077
4        1026.409      6.00e-006

```

Note: At a minimum you must leave space for the sign and a space to separate the numbers. (2 spaces)

Note: Earlier versions of WinPLOT parsed only the first line and required that all other rows be bound (column wise) by the first row. This was done for speed so that each line would not have to be parsed. Current versions of WinPLOT parse and check each line. This extra parsing will however cause slower file loading.

ASCII Text File: (comma or tab character separation)

If the columns are separated by commas or tabs then the file is said to be a comma or tab delimited file. These file formats are very common and can be produced by almost any application. If the columns are separated by commas it is said to be a Comma Separated Values (.CSV) file. An advantage of delimited files are that blank or default values can be properly handled. In WinPLOT for example, a blank starting column is allowed in the data for descriptive purposes but is ignored during import. See the Excel data file section for an example.

```

DATA                                     or   DATA
2.00,23.123,999999<crLf>                2.00<tab>23.123<tab>999999<crLf>
-1.20,25.7,7000<crLf>                    -1.20<tab>25.7<tab>7000<crLf>
2.3e4,26.4,6666<crLf>                    2.34e4<tab>26.4<tab>6666<crLf>

```

Return To: [Data File Format](#)



MathCAD

Data can be imported from MathCAD using the WRITEPRN command. Note that the PRNCOLWIDTH must be greater than the PRNPRECISION so that the data columns are right justified. Thus to include the sign (1), the exponent (5) and space (1):

$\text{PRNCOLWIDTH} \geq \text{PRNPRECISION} + 7$

PRNCOLWIDTH and PRNPRECISION are Built-In Variables available under the Math menu.

Return To: [Data File Format](#)



MATLAB

Data can be imported from MATLAB using the SAVE command.

```
save file variable /ascii           for 8-digit ASCII output  
save file variable /ascii /double  for 16-digit ASCII output
```

where *file* is the output file name and *variable* is the MATLAB variable to be output.

Return To: [Data File Format](#)



EXCEL

Data is imported from EXCEL as a CSV (Comma-Separated Values) file using File Save As. An example of an EXCEL (v. 3.0) file for use in WinPLOT is contained in the file DATAEXCL.XLS. Note that if the first column is blank it will be ignored automatically.

Below is an example of an EXCEL .CSV file: (Note comma place holders and blank first column.)

```
COMMENT,This is an example of an EXCEL data set,,
DATASET,Data Set 1,,
DATE,2/18/93,,
TIME,1:23:45.6789,,
PLOT_TYPE,rectangular,,
OPERATION,,,
SET_Y,-0.3,1.1,
DISPLAY,50,50,400,600
SIGNALS,X,Y1:Sin(X)/X,y2:-diff(Y)
UNITS,sec,feet,feet/sec
```

```
DATA,,,
,-6.2832,2.30E-06,-2.30E-06
,-5.8832,-6.62E-02,6.62E-02
,-5.4832,-0.13083,6.46E-02
,-5.0832,-0.18336,5.25E-02
,-4.6832,-0.21344,3.01E-02
,-4.2832,-0.2123,-1.14E-03
...
```

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Custom Applications

If you have an application that is not compatible with WinPLOT's data format we can either add its format to WinPLOT (if there are a number of requests for a particular format) or write a simple conversion program for you. In order for us to work on a compatibility mode or conversion routine we will need the following:

- 1) Document describing the Application and its file format
- 2) Some known and documented sample files on a floppy disk
- 3) Completed registration and questionnaire forms

[Questionnaire Form](#)

[Registration Form](#)

Return To: [Data File Format](#)



Signal Generation

Signals can be generated easily using BASIC such as QBASIC which is included with MS DOS 5.0.

```
Open "C:\WINPLOT\DATA.CSV" For Output As #1 ' Open your output file
Print #1, "COMMENT, This is a BASIC generated file"
Print #1, "SIGNALS, sin(3x), cos(x), x/10, sqr(x)/2"
Print #1, "DATA"
For x = -1.5 To 5 Step .01 ' Define X range and resolution
  Print #1, x; ", "; ' output X axis
  Print #1, Sin(3 * x); ", "; ' Y1
  Print #1, .5 * Cos(x); ", "; ' Y2
  Print #1, x / 10; ", "; ' Y3
  Print #1, Sqr(Abs(x)) / 2 ' Y4 Note:last signal has no
'; ", "; '
Next x
Close #1
```

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WinPLOT Data Header

One of the most important items to consider using WinPLOT is the data header of the import file. The data header can be used to specify all important aspects of your signal drawing and analysis. WinPLOT has two basic modes of file import operation -user specified X-axis values or a sample based generated X-axis.

Keyword	Example-Item(s)	Default-Item(s)	Description
COMMENT	This is a comment	-none-	General comment (spaces allowed)
DATE	11/10/62	(today)	Date stamp
TIME	10:50:00	(now)	Time stamp
DATASET	Test# 107-A	current file name	Data/Test set name (no '.' char allowed)
PLOT_TYPE	polar, noaxis	last saved settings	Set plot type, axis, grid, legend
OPERATION	spectrum	-none-	Data Operations before plotting
SET_X	0, 6.28	autoscaling	Set X axis start, end and type.
SET_Y	-10, 10, log	autoscaling	Set Y axis start, end and type
SIGNAL[S]	Range, Pressure...	signal_1,signal_2...	Define signal names
UNIT[S]Miles, PSI,...	-none-		Define signal units.
SAMPLE[S]	Time,sec,200 samples	samples,sec, count	Define sample (X-axis) name, units,
INTERVAL*	0.01,5 X-axis)	1,0	Sample interval, offset (auto generated
SYMB_POINT	cross, circle, point ...	last saved settings	Define signal symbol point type
SYMB_LINE	solid, dot, dash, ...	last saved settings	Define signal line type
SYMB_COLOR	red, blue, green , ...	last saved settings	Define signal color
DISPLAY	0,0,300,500	last saved settings	Display Top,Left,Height,Width in pixels
PRINT	3,5,s	last saved settings	Print height, width, solid lines,
information ...			
DATA	exit**	-none-	Keyword DATA required for the header

* If the INTERVAL keyword is present then WinPLOT will automatically generate the X-axis (sample). If this keyword is not present then WinPLOT will use the first data column as the X-axis.

** The EXIT command item will cause WinPLOT to close itself (Exit) after performing specified actions. This is typically only used with the PRINT function to allow end-to-end command line operation.

See Also

[Keyword Notes](#)

[Special Control Keywords](#)

[ASCII File Format Examples](#)

Return To: [Data File Format](#)



Keyword Notes

NOTES:

Keywords must start in the first column.

Keywords and items are not case sensitive.

Keywords are not order dependent except for keyword DATA just before first line of data.

Blank lines are allowed before the DATA keyword.

Lines can be commented out with the following characters: <;> <,> <> <tab>

Keyword Items are order dependent.

Not specifying a keyword or item causes the default to be used.

Keywords and items can be separated by commas, tabs or spaces.

Commas and tabs can be used as place holders - spaces cannot

Do not use spaces or commas in individual item names, except for the COMMENT and DATASET line.

Do not mix spaces and commas or tabs on the same line since a comma or tab has higher priority than a space.

Do not use the '=' character except for the first delimiter. For example: SET_X=-1.3,6.28

Correct Examples:

```
SET_X=0.3 , 6.28 , log
```

```
SET_X 0.3 6.28
```

Incorrect Examples:

```
SET_X 0.3 , 6.28    <-- comma has higher priority than a space
```

```
SET_X= log         <-- LOG item must be 3rd position - use commas to delimit
```

See Also

[WinPLOT Data Header](#)

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Special Control keywords

Special Control Keywords:

The following keywords are special control functions which are typically only used in the automated control. Most of these keywords provide functionality that is normally provided through the menu. Most of these control keywords are unnecessary during standard file load WinPLOT operation because they occur as part of the process.

Keyword	Example-Item	Default-Item	Description
OPEN	data_exl.csv	-none-	allows file to be loaded via DDE
EXIT	-none-	-none-	terminates WinPLOT
RESET	-none-	-none-	Resets and clears
SAVE	-none-	-none-	Saves current settings
RESTORE	-none-	-none-	Restores last saved setting
REDRAW	-none-	-none-	Forces redraw
RESCALE	-none-	-none-	Rescale X and Y axis
AUTO	on/off	current setting	Set Auto Redraw option on/off
ACTIVE	on/off	current setting	Set interactive option on/off
MARKER	64,1	1,1	Sets the display marker to the Sample, Signal

See Also

[Automated Control:](#)
[WinPLOT Data Header](#)

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File Compatibility with DADiSP:

The DADiSP data file format is based on a sample based input, thus, the X-axis (signal) is generated during import. WinPLOT can support both a user specified X-axis or a sample based X-axis. The keyword INTERVAL tells WinPLOT that the X-axis is to be sample generated.

Supported

COMMENT	General comment
DATE	Date stamp
TIME	Time stamp
DATASET	Data set name - shown in WinPLOT title bar
SIGNAL[S]	Define signal names.
VERT_UNITS	Define the Y-axis signal units. (See keyword UNITS)
HORZ_UNITS	Defines the X-axis for sample based unit. (See keyword SAMPLE)
INTERVAL	If this line exists then WinPLOT will add a X sample based signal (0) WinPLOT also will support an offset value if one is specified.
DATA	Required if header is included

Not Supported = ignored by WinPLOT

VERSION	Version numbers are not used
FILE_TYPE	File type is currently always ASCII
DATA_TYPE	Data import type only for BINARY files
SAMPLE_RATE	Use INTERVAL (INTERVAL=1/SAMPLE_RATE)
CHAN_NAME	Use SIGNAL keyword
STORAGE_MODE	Storage mode is always INTERLACED
NUM_SIGS	The number of signals is determined automatically
NUM_SAMPS	The number of samples is determined automatically (See keyword SAMPLE)

New - WinPLOT only

SET_X	Set X axis start, end and type.
SET_Y	Set Y axis start, end and type
PRINT	Cause a automatic printout
SYMB_POINT	Define signal symbol point type
SYMB_LINE	Define signal line type
SYMB_COLOR	Define signal color
PLOT_TYPE	Set plot type
OPERATION	Data operations
DISPLAY	Position and size of current display
SAMPLES	Define X-axis: name, units, and # samples (See HORT_UNITS)
UNITS	Define Y-axis units (See VERT_UNITS)
Menu Items	All menu command related keywords

Example of a DADiSP and WinPLOT compatible file:

```

SIGNAL      sin5 sin8
VERT_UNITS  5sin 8sin
HORZ_UNITS  sec
NUM_SIGS    2          <- WinPLOT will ignore this line - counting automatically
INTERVAL    0.025
DATA
  .7071068 , .9510565
  1 , .5877852
...

```

Return To: [Data File Format](#)



WinPLOT Operation:

Below is the WinPLOT menu layout. Many operations are also available via the keyboard or mouse (See [Active keyboard & Mouse operation](#))

File:	Data:	Type:	Display:
<u>O</u> pen File... (F2)	<u>E</u> dit File ... (F3)	<u>R</u> ectangular ±	<u>R</u> edraw (F5)
<u>N</u> ew Session	<u>P</u> aste Link ± (F4)	<u>H</u> isto Bar ±	<u>R</u> escale (F6)
<u>P</u> rint Plot ...	<u>S</u> tatistics ...	<u>P</u> olar Angle ±	<u>A</u> uto Redraw (F7) ±
<u>S</u> ave Settings	<u>H</u> ead (F11) ...	<u>X</u> Log ±	<u>A</u> ctive (F8) ±
<u>R</u> estore Settings	<u>S</u> pectrum	<u>Y</u> Log ±	<u>B</u> reak Points »
<u>O</u> ptions ...	<u>I</u> ntegrate		<u>S</u> kip Points »
<u>E</u> xit	<u>D</u> ifferentiate		<u>S</u> ymbols... (F9)
			<u>A</u> xis ±
	Right Mouse		<u>G</u> rid ±
	<u>Z</u> oom In		<u>L</u> egend ±
	<u>P</u> an Out		<u>M</u> aximize
	<u>R</u> escale		<u>M</u> inimize
	<u>S</u> et Marker		
	<u>C</u> lose		

± = toggle (on/off)

... = opens screen

» = menu options

(Fx) = F function keys (note F1=Help)

Note: Most operations can be aborted by pressing the period key "."
Some operations may not be apparent until after redrawing (F5)

See Also:

[Running \(Starting\) WinPLOT](#)



Running WinPLOT

WinPLOT is run (started) by simply double clicking on the WinPLOT icon. Alternatively you can pass WinPLOT a data file to load from the command line:

```
WINPLOT filename caption
```

Where `WINPLOT` is the WINPLOT.EXE application and `filename` is the file to load - including path if necessary and `caption` is the caption title that will become part of the application title. Note that either parameter is optional but must be in the order shown. This feature allows multiple WinPLOT instance operation and control. To utilize this option under the Windows File Manager you should use File Associate under the Windows Program Manager. This will allow you to invoke WinPLOT for particular data file extensions.

Note: The filename must have a period '.' character in it while the caption must not have a '!'. The caption must be surrounded by single quote characters as shown.

NOTE: When you first run WinPLOT it will initialize itself with your operation system which will generate a unique 3 digit installation number. To register your copy see the Registration section

Keywords: -none-

Save/Restore: -none-

Return to: Operation



Loading a Data File:

File Open: (F2)

Use <File> <Open> to access the data file import screen. To help in selecting your files there are filter options that can be selected. The first two filter options are *.CSV and *.TXT. The third filter option is variable (custom) and is set to the current data file extension. You can change the current custom filter by double clicking on it. If there is no current custom filter it will be labeled '*.*???'.

The screen is always redrawn after the file is loaded regardless of the state of the Auto Redraw setting.

Abort Loading

During a file load you can stop the process by pressing the period key "."

Keywords: -none-

DDE Control: OPEN

Save/Restore: Last valid File Name

Return to: Operation



DDE Paste Link:

Paste Link: (F4)

DDE works in the same way a regular file would except the data is transferred via the computers clipboard directly from the data source application. The added benefit of using DDE is that WinPLOT will automatically respond to any changes to this linked data.

From the data source application select the area/report for output (DDE) and then select <Edit><Copy>. If the application is DDE compatible, this will place a data message in the clipboard. Then from WinPLOT select <Data><Paste Link>

The simplest example of a DDE compatible application is EXCEL. You can use the DATA_EXL.XLS file provided for an example.

Note that the DDE link with WinPLOT is 'Automatic' if the display Auto Redraw is on. In this mode any change to the data at the source will cause WinPLOT to respond by redrawing the display. To stop WinPLOT from constantly redrawing set the display Auto Redraw off.

To terminate the link simply select <Data> <Paste Link> again or close the connecting application.

Note: DDE data sets are limited to 64k of data and they will be slower loading than a file.

Keywords: AUTO

Save/Restore: -none-

Return to: Operation



Editing a Data File:

Edit File: (F3)

This will open the current file and place it into the Windows Write application. Make sure when you save the file you don't change its output format from 'Text Files (*.txt)'. If you have made changes to the file you must then reload (F2) the file to view the results.

If the 'data file' is via a DDE Paste Link connection you can still view a data snapshot but all changes should, of course, be made at the DDE data source.

Keywords: -none-

Save/Restore: -none-

Return to: Operation



Printing:

WinPLOT uses the print drivers available under Windows, thus the printout will be at the highest possible resolution or your printer. Select the width and height of your plot area - the titles and scaling numbers etc. will be outside of this area. Note that the current page orientation and size is displayed in the status box.

Solid Lines	Allows a wider solid line to be printed so it stands out from the grid. Use symbols to differentiate your signals in this case.
Information	Allows data set information to be printed below the plot
Center Plot	Center the plot otherwise defaulted to the upper left corner.
Form Dump	Does a Screen Dump of the WinPLOT application to the printer.

Keywords: PRINT

Save/Restore: All print related items

Return to: [Operation](#)



Save & Restore settings:

The Save Settings menu item will save the following current settings:

- Path, file, file extension
- Active mode on/off
- Auto-redraw on/off
- Plot type
- X, Y log/lin
- Axis on/off
- Polar Axis on/off**
- Grid on/off
- Max # of grid lines**
- Legend on/off
- Symbol & line size, style, type and color
- Display location and size
- Display Break Point division**
- Printout size and style
- Editor name and options**
- Screen and grid colors**
- Font name and size**

The Restore Settings will restore the above settings to their last saved values.

NOTE: All items (except those marked with **) will be superseded if they are specified in the data file header. (Default data header items do not override current settings.)

The following items are not saved and are thus cleared and defaulted for each file load.

Item	Default
COMMENT	-none-
DATE	Today
TIME	Now
DATASET	FileName.Ext
SET_X,Y	MAX and MIN values
SIGNALS	Signal_1, Signal_2, ...
SAMPLES	samples
UNITS	-none-
INTERVAL	1, offset=0
OPERATION	off
PRINT	off
EXIT	off

Keywords: SAVE, RESTORE, RESET

Save/Restore: See Above

Return to: Operation



Options:

Below are all the options that are available under the Options screen. Options are adjustable items that are saved during a Save Settings but do not have dynamic Keyword control capability.

Command Line (Text Box)

This option allows you to specify an editor of your choice when selecting the Data Edit File from the menu. Note: Your editor must be able to accept the file name from the command line.

For Example: WRITE.EXE
or
NOTEPAD.EXE

The send keys is optional unless you need to send keystrokes to your editor after it has started. Special keyboard commands need to be enclosed in {} for example: {ENTER} or {F5} and the following are special control keys: %=Alt, ^=Control, +=Shift

For example: The WRITE application requires a n key to be sent to bypass a file conversion question.

Grid Color (Combo Box)

Specify the grid color

Background Color (Combo Box)

Specify the plot background color

Note: These background colors are set to be not as dark as the same color for the signal to insure that the signal can always be visible even if its color is the same as that of the background.

Signal & Marker Bold (Check Box)

These options will draw the objects in a thicker (bold) manner. Note that however, all lines will appear as solid lines only - this is a function of the Windows API.

Legend Units (Check Box)

Determines whether the legend signal names will also display their units.

Polar Axis (Check Box)

Determines whether the polar plot will have degrees displayed along the radial axis.

Marker Key (Text Box)

These options allow you to specify which key is used for marker interaction. Below is a list of possible key IDs - any code is possible but don't enter a key which is already used by other functions.

Key	# Code
Enter	13
Key pad 5	12
Pause	19

Num Lock	144
Scroll Lock	145

Font Name & Size (Combo Box)

This controls the font name and font size used universally by the system - including the printout. After changing the font size make sure the fontname is still acceptable by reselecting it again. If this font-size combination an error message will be given.

Display Digits (Text Box)

This controls the number of digits that are displayed before rounding. You can go as low as 5 but the number of digits in your data must stay below this for proper operation. Above 14 digits is beyond single precision and is of no use. A good range of numbers is between 9 and 14. Note that the axis labeling has 2 digits less than the number of display digits.

Max # of Grid Lines (Text Box)

This controls the maximum number of grid lines that will appear on either the X or Y axis in linear axis scaling modes.

Keywords: -none-

Save/Restore: Last set/saved

Return to: [Operation](#)



Multiple WinPLOT sessions:

To view multiple data sets simply run another session of WinPLOT. Type menu <File><New Session>. Windows supports as many instances of any program until system resources run out.

The first instance if WinPLOT is labeled: WinPLOT - 1

The next instance is labeled: WinPLOT - 2
and so on ...

If you specify a caption title the application title will become: WinPLOT - *Your Title Here*

If you do not specify a title, alter you load a data file the title will become: WinPLOT - *filename.ext*

Note: Unregistered WinPLOT users will get a instance label of: WinPLOT - unregistered

Keywords: -none-

Save/Restore: -none-

Return to: Operation



Data Information:

Information (Statistics) on the current data set (view) is displayed. Note that the information is based on the current 'X' range of samples displayed.

current data file
of signals
of samples

--- for each signal ---

Max.

Average

Min

Zero crossings if available

Local extreme if available

Keywords: -none-

Save/Restore: -none-

Return to: Operation



Data Header Edit:

The data header editor allow you to edit various signal information:

Comment:
Dataset Name
Date &Time

For each signal: Signal Name Units

Keywords: COMMENT, DATASET, DATE, TIME, SIGNALS, UNITS, SAMPLE

Save/Restore: -none-

Return to: [Operation](#)



Manual Redraw:

Display Manual Redraw: (F5)

Forces a redrawing of the display.

This function is necessary if the Auto Redraw option is turned off.

Aborting Plotting

During drawing you can stop further drawing by pressing the period key "."

Keywords: REDRAW

Save/Restore: -none-

Return to: Operation



Rescale:

Display Rescale to fit: (F6)

Forces a automatic rescale of the display axis to encompass the entire domain and range of the data.

Alternatively the plot area can be scaled in other ways:

- 1) Specify the X or Y values in the data header.
- 2) Manually change the X or Y values in the plot. (^ ~ key)
- 3) Use the mouse to select the area to view (Zooming).
- 4) Use the keyboard to Zoom-in or Pan-out about various areas.
- 5) Use the right mouse button menu on the current point.

Note: When using the right mouse rescale option the plot will rescale to the currently selected signal set.

Keywords: SET_X, SET_Y, RESCALE

Save/Restore: -none-

Return to: Operation



Auto Redraw

Display Auto Redraw: (F7)

Setting Auto Redraw on will insure that the display is always up-to-date with any changes.

The following changes will force a redrawing of the display:

- 1) Changing the data
- 2) Changing the plot type or axis
- 3) Changing the symbols or grid options
- 4) Changing the size of the display

Turning off the Auto Redraw option can be used to save considerable time if you have a very large data set and you are making multiple changes to the display. This also effects the way the screen handles graphic persistence. If Auto Redraw is off then the plot can be overdrawn by overlapping screens. Interactive operation is considerably faster if Auto Redraw is turned off.

This option works in conjunction with the display Break Points options.

Keywords: AUTO

Save/Restore: last set/saved

Return to: Operation



Symbols:

Data point Symbols, Line styles, and Colors: (F9)

The data points can be seen by setting their symbol types. Available symbol types are:

Symbol:	#cmds
Point .	1
Square #	1
Circle o	1
Triangle ^	3
Diamond >	4
Cross +	2
Mark x	2
-none-	0

Note: The physical size of the symbol depends on the physical size of the X-axis, however, the relative symbol sizes can be selected as small, medium or large. Drawing symbols takes processing time - the Diamond symbol is the worst since it takes four drawing commands to construct. For very large data sets you might consider turning off the symbols for speed.

Keyword: SYMB_POINT

The lines can be differentiated by line styles. Available line types are:

Solid	_____
Dash	-----
Dot
Dash_Dot	- . - . - .
Dash_Dot_Dot	- .. - .. -
-none-	

Note that if the data points are sufficiently close to each other then the line will appear as a solid line.

Keyword: SYMB_LINE

The symbol and line colors can be selected. Available colors are:

- Black
- Blue
- Brown
- Green
- Orange
- Red
- Purple
- Yellow
- White
- Gray

Keyword: SYMB_COLOR

Save/Restore: last set/saved

Note: This screen can also be activated by pressing the right mouse button over the legend.

Return to: [Operation](#)



Skipping Data Points:

You can select this option if your data is over sampled or if you want to speed up your plots.

Keywords: -none-

Save/Restore: -none-

Return to: Operation



Display Break Points:

The Display Break Points set the number of divisions each plot is broken into for display refresh purposes. During a display break the user also can issue a cancel operation by pressing the period '.' key.

Options	Speed	Comment
Full Line	fastest	Only one break per plot
10 Breaks	fast	10 breaks per plot
20 breaks	moderate	20 breaks per plot
All points	slow	breaks at each point

Note: If the display Auto Redraw option is off the display shows all the points being drawn and there is not as much speed penalty.

Keywords: -none-

Save/Restore: last set/saved

Return to: Operation



Display Axis & Grid:(F11)

The grid and axis markings are automatically scaled based on the range of the values and the plot type. Note that WinPLOT will automatically adjust the axis labeling based on the available grid position, font size and plot size combinations.

Linear:

The spacing will automatically adjusted the nearest integer or fractional number and will offset from the 0,0 origin. The maximum number of grid lines can be set via the Max # of Grid Lines on the options screen.

Log:

WinPLOT will always display 10 lines per decade for a log scale. Note that there is a limit of 10 decades for Log scaling.

Polar:

For a POLAR plot the angular displacement(θ) is marked in 10° divisions while the magnitude (r) is displayed as either Linear or Log scaling as shown above. If the polar axis option is selected the radial degrees will be marked in 30 degree increments.

Keyword/Item: PLOT_TYPE=,,[GRID][NOGRID]

Save/Restore: last set/saved

Return to: Operation



Log Scaling:

WinPLOT can scale the axis in a logarithmic scale

There is a limit of 10 decades over which the data must be scaled.

If the data is scaled to 0 or a negative number then WinPLOT will choose a positive number (one of the axis) and then display 10 decades. A warning message will be displayed if this occurs.

Keyword/Item: SET_X, SET_Y = ,,[LOG][LIN]

Save/Restore: last set/saved

Return to: [Operation](#)



Display Legend:

You can turn off the display of the legend with this option. The legend will appear upper right of your plot area and can be moved (dragged) out of the way of a signal if necessary. (Note that the plot must be Active to move the Legend.) During printing the legend will appear outside of your plot starting at the upper right corner. The signal units can be also be displayed by selecting the Legend Units from the option screen.

Keyword/Item: PLOT_TYPE=,,,[LEGEND][NOLEGEND]

Save/Restore: last set/saved

Return to: Operation



Display Active: (F8)

NOTE: To use interactive investigation of the data points, the Display must be Active.
For key operation the plot must have the focus. To set the focus simply click on the plot area.
For standard file input the plot will automatically have the focus after drawing, however, in DDE mode the focus will remain with the data source.

Operation	key	mouse
Next signal set	<Up arrow>	left click close to signal set
Previous signal set	<Down arrow>	left click close to signal set
Previous data point	<left arrow>	move mouse to the left
Next data point	<right arrow>	move mouse to the right
Previous (#samp/10)	<Page Up>	move mouse to the left
Next (#samp/10)	<Page Down>	move mouse to the right
First data point	<Home>	move mouse to the left
Last data point	<End>	move mouse to the right
Zoom in about current point** across area	<Insert>	right mouse click -or- drag mouse
Pan back form current point**	<Delete>	right mouse click
Display X & Y axis input	<`>	right mouse click next to axis corner
Set marker	<programmable option>	right mouse click

** Note: These operation will only become visible if WinPLOT is in Auto Redraw (F7) mode.

Keywords: ACTIVE

Save/Restore: last set/saved

Return to: Operation



Signal Markers

The marker function allows you to measure the relative difference between any two data points.

Start the operation by placing the marker on the desired fixed reference point and then press (Right mouse) <Set Marker> or the appropriate key. As you move the current marker about, WinPLOT will display a line between the two signal points and the status will show the X and Y difference (current point - fixed marker point) between the two points. To remove the marker function simply select the Set Marker function again.

Note: The marker hot key can be set to any available key in the [Options](#) screen.
The display must be [Active](#) for this option.

Keywords: MARKER

Save/Restore: marker key

Return to: [Operation](#)



Display Minimize and Maximize:

This allows you to Minimize or Maximize your display.

The term minimize with WinPLOT refers to the smallest possible window size that can be provided without screen object overlap.

To iconify WinPLOT use the standard Windows control box function.

Keywords: DISPLAY

Save/Restore: last set/saved

Return to: [Operation](#)



Plot Types:

There are essentially three different ways to view data in WinPLOT:

1. Rectangular:

A rectangular is a standard Cartesian X,Y plot

2. Histogram:

A histogram is a stick (bar) chart. x,h

3. Polar:

A polar plot is a amplitude (r) angle (θ) display. The "X" (θ) data must be between 0 (0 deg) and 2π (360 deg) or the plot will wrap around itself.

The X or Y axis data can be viewed as a linear or logarithmic format. Note that in POLAR you cannot select a Y-log option. Also a negative value to be displayed in a LOG format will generate an error condition. When the Plot type is manually changed the data will be automatically [Rescaled](#)

Keywords: PLOT_TYPE=[RECT][HIST][POLAR]

Save/Restore: last set/saved

Return to: [Operation](#)



Limitations:

Currently only 16 signals per instance can be defined.

Currently only 32767 points per signal can be used.

Log scale is limited to 10 decades.

Signals & Unit names are cut after 12 characters.

Currently single precision is being used, thus a Max. range of data is $\approx \pm 3E\pm 38$

NOTE: An unregistered copy of WinPLOT is limited to 2 signals at 200 samples and cannot support DDE control operation

Return to: [Installation & Registration](#)

See Also

[Known Anomalies](#)

[Warranty](#)



Known Anomalies:

When installing WinPLOT under Norton Desktop, a DDE error may occur after initial installation. Simply select close connection when the error prompt occurs.

During extreme zoom conditions where only a few signal points are visible on the display the signal can travel outside the selected axis.

The polar Y-axis LOG function returns incorrect results.

Return to: [Installation & Registration](#)

See Also

[Limitations](#)

[Warranty](#)



Features to be added at a later date:

PLOT .WMF exporting:

Direct support for Windows Meta Files to allow vector based drawings to be used by other windows applications.

Binary data files:

Binary data files offer significantly better data file compression and speed. However, the binary data files must be carefully generated for proper operation and extra keywords must be added. Note also that binary files are not directly transferable across different computer systems where ASCII files are.

Context sensitive on-line Help:

The current on-line help is not contextually connected to the program

A 32 bit version of the program to operate native under Windows NT 3.5 (Daytona) and Windows 4.0 (Chicago).

Return to: [Installation & Registration](#)

See Also

[Warranty](#)



Automated Control:

WinPLOT is designed operate as a standalone application or it can be automatically controlled by other applications. This feature allows WinPLOT to be used as a graphics display and signal analysis tool for Automated Test Equipment (ATE).

There are four basic approaches to sending data and control to WinPLOT.

Method:

- 1) [Command line operation](#)
- 2) [DDE Paste Link Data](#)
- 3) [Send Keys commands](#)
- 4) [DDE Data and Control](#)

Requires:

(nothing)
Most any application that supports Cut & Paste Link.
Some sort of macro recorder or application
Programming language/application that supports DDE

See: [Dynamic Data Exchange & WinPLOT](#)

Return to: [Contents:](#)



Command line operation

As discussed in other sections WinPLOT can be activated and passed a data file parameter and a title parameter.(see [Running WinPLOT](#)) This allows basic end-to-end one pass operation of WinPLOT.

The following is a summary of data file Keywords that are most involved in controlling WinPLOT. (See [WinPLOT data header](#) and [Special Control Keywords](#) for a list of all the Keywords.

- PLOT_TYPE This instructs WinPLOT to plot data in a prescribed format
Format: [RECTangular][HISTogram][POLAR], [[NOAXIS], [[NOGRID], [[NOLEGEND]
Default: Rectangular, Axis, Grid, Legend
- OPERATION This instructs WinPLOT to perform a data operation before plotting
Format: [SPECTrum][INTEGRate][DIFFerentiate]
Default: no operation
- DISPLAY This instructs WinPLOT to display itself in a specified region on the screen.
Format: Top,Left,Height,Width (in pixels starting from the Upper Left corner)
Note: The Height and Width are optional
Default: Current display position and size
Entering DISPLAY=MAX will force the display to be full screen.
Entering DISPLAY=X,Y,MIN will force the display smallest possible screen at X,Y
Entering DISPLAY=ICON will force the display to become iconified.
- PRINT This instructs WinPLOT to generate a printout to the current print device.
Format: Height, Width, Solid Lines, Information, Form dump, Center
- DATA EXIT This instructs WinPLOT to terminate operation after completing all requested functions.
This would typically only be used with the PRINT command to allow end-to-end command line operation.

Note: A default does not override a current setting

Return to: [Automated Control](#)



DDE Paste Link

In this mode WinPLOT acts as a DDE destination and is controlled by the linking application. This operation is provided by using the <Data> <Paste Link> menu selection.

For details See: [DDE Paste Link](#)

Return to: [Automated Control](#)



Send Key Control

You could use send key operation by setting the keyboard focus to WinPLOT and then issuing key combination commands. This method of control is unreliable and inefficient but can be used with some success. (For better results use the [DDE Automation Control](#) capabilities in the following section.)

Return to: [Automated Control](#)



Dynamic Data Exchange & WinPLOT

Dynamic Data Exchange (DDE) is a method of Inter Process Communication (IPC) that is widely supported by Windows applications.

The terminology used with DDE is similar to client - server but the terminology used is source and destination respectively: A client (destination) request a DDE server (channel source) application (WinPLOT) to open a DDE channel.

A channel, or conversation (link), is defined by what is called the LinkTopic which is composed of two parts: the Source Application followed by the running title with the | character separating them. For WinPLOT the source application is always WinPLOT and the running title (instance) is what the WinPLOT title bar is displaying for that instance.

Example: WinPLOT|DDE Test

Note: the instance title can be issued during startup. [See WinPLOT startup](#)

The conversation is about one or more Items called LinkItems
The LinkItem for WinPLOT is always DDEData

Although WinPLOT only has one DDE item it responds to two events:

LinkPoke	Send data to WinPLOT
LineExecute	Send a command to WinPLOT

See the included DDE_DEMO.FRM code example for an example.

Return to: [Automated Control](#)



DDE Control

As is similar to the Paste Link function, WinPLOT can accept Dynamic Data Exchange (DDE) source connections as well as standard file as an input. Whether you are using a data file or DDE based connection the basic data format remains the same. The advantage of DDE control is that you can interactively control all aspects of WinPLOT from your program.

Below lists the basic steps involved in performing DDE control:

1) Establish a DDE link connection with WinPLOT

See: [About Dynamic Data Exchange & WinPLOT](#)

2) Load a data file with basic header info by using the LinkPoke DDE command.

Note:

A data load command will always automatically cause a reset and redraw to occur.
The file must include data Keywords INTERVAL and DATA if used - these keywords cannot be used as commands!

For the list of standard data header keywords see: [WinPLOT Data Header](#)

3) Send control keyword commands (LinkExecute)

Note:

Link execute commands can only be issued after a link poke with data is issued.
Link execute operations are order dependent - operation occur as they are listed.

For the list of special control keywords see: [Special Control keywords](#)

Multiple control operations can be issued on a data file

4) Terminate the connection by issuing the EXIT command to WinPLOT.

For an actual demonstration of this functionality see the included DDE_DEMO.FRM file. This file is a VB form but saved in text format so that you can view it. The DDE_DEMO.EXE program is the same file in a compiled format that will function with a unregistered copy of WinPLOT.

General Notes:

Data must change to cause a update event.
The marker can only be used if the display is active
The connection link name is the caption text at startup

Return to: [Automated Control](#)



Digital Signal Processing:

Any signal analysis or processing by a computer is by definition Digital Signal Processing (DSP).

WinPLOT can perform the following signal operations:

<u>Spectrum</u>	Determine the frequency content of a signal
<u>Integration</u>	Determine the accumulated amount of a signal.
<u>Differentiation</u>	Determine the rate of change of a signal.

Keywords: OPERATION

Save/Restore: -none-



Spectrum:

WinPLOT will transform each signal to its spectral content. The "spectrum" is defined as the real part (magnitude) of the first half of the complex frequency transform.

WinPLOT uses the standard Cooley-Tukey Fast Fourier Transform (FFT) which requires that the number of samples (N) be a power of 2. ($N=2^M$: ...64, 128, 256, 512, 1024 etc.). Therefore, the sample size (length) will be trimmed to the next lower power of 2.

In general it is assumed that all sampling is based on equally spaced (time) sample points. It is also very important to use an appropriate sample rate for accurate spectral analysis.

An "S" will be appended to the signal name.

Related Keyword/Item: operation=SPEC

Related DDE Operation: LinkPoke

Return to: [Operation](#)

See Also

[Spectral Analysis](#)

[Digital Signal Processing](#)



Spectral Analysis

When using the FFT it is very important to understand the relationship of the signal that is being sampled, the sample rate and the length of the observation.

See the DATA_FFT.BAS and DATA_FFT.CSV files for the following examples

- 1) The sample rate (frequency) must be at least twice as fast as the signal you are sampling.
(Nyquist sampling rate)

Example:

If you wish to observe signals that are up to 20 Hz then the sample rate must be at least 40 Hz.

- 2) The frequency resolution of the transform is: (number of samples)/(sample rate)

Example:

If the sample frequency is 40 Hz and there are 128 samples then the number of hertz per sample is: $(40 \text{ Hz}) / (128 \text{ samples}) = 0.3125 \text{ Hz/sample}$

It is important to note that if the signal does not land directly on a multiple of the frequency sample then the transformed signal will "bleed" across adjacent filters causing sidelobes.

Example:

$(5 \text{ Hz}) / (0.3125 \text{ Hz/sample}) = 16$ or will "land" directly on the 17th sample (1st being 0-DC) while

$(8 \text{ Hz}) / (0.3125 \text{ Hz/sample}) = 25.6$ and thus "lands" between two samples and will cause "sidelobes".

- 3) There is a minimum length (number of samples) required to resolve two adjacent signals

Example: (From the example above)

$8\text{Hz} - 5\text{Hz} = 3\text{Hz}$ resolution. Thus to "see between" these signals you will need a resolution of 1.5Hz. Therefor the number of samples must be $(40 \text{ samples/sec}) / (1.5 \text{ Hz}) = 26.66$ or 32 samples

See Also

[Digital Signal Processing Spectrum](#)



Integration:

WinPLOT will integrate each signal using the Simpson integration algorithm.

Note that the that when integrating on the first four points or the last point if an even point the function will use the appropriate methods of the trapezoidal rule. As a result, if insufficient sampling is done then appreciable errors can result at the end points.

An "i" will be appended to the signal name.

Related Keyword/Item: operation=INTEG

Related DDE Operation: LinkPoke

Return to: [Operation](#)

See Also

[Differentiation](#)

[Digital Signal Processing](#)



Differentiation:

WinPLOT will differentiate each signal using a seventh-order central difference formula.

The points $n=1,2,3$ and $n=N-2,N-1,N$ are differentiated using a fourth-order approximation. As a result, the end points can have considerable errors.

A "d" will be appended to the signal name.

Related Keyword/Item: operation=DIFF

Related DDE Operation: LinkPoke

Return to: [Operation](#)

See Also

[Integration](#)

[Digital Signal Processing](#)



Reasons For Registration

- 1) 24 to 48 hour technical response via CompuServe/E-Mail
(A postal mail response will take longer)
- 2) The product becomes fully functional and does not display advertising.
DDE Control automation.
Allows over 2 signals and 200 samples.
Title bar no longer displays unregistered.
The about box does not automatically pop-up.
- 3) If you use WinPLOT you are required to by law.
See: [Warranty & Agreement](#)
- 6) Because you want to see continued improvements and new features.
See: [Questionnaire Form](#)
[Future features](#)
- 7) You want to customize WinPLOT to work with your application/system.
See: [Custom Applicaitons](#)
- 8) You get 25 Copy license and personalized disk with registration option #2. (\$1.60/copy !)
Notification and discounts to any updates

See: [Registration Instructions](#)
[Registration Form](#)



Registration Instructions:

In order to keep costs down, we do not provide on-line phone support. If you have specific questions, problems or would like to see new features, please mail us a letter or contact us via CompuServe at 75330,746 or other E-mail. (Via Internet: 75330.746@compuserve.com) We guarantee 24 to 48 hour response to questions Monday through Friday. Because WinPLOT is distributed (marketed) as shareware - try before you buy - there are no refunds provided. If your purchase is defective (i.e. media failure, wrong password # etc.) In Touch Software will make every effort to correct the situation.

Registration Option 1: Protected - Installation password - No disk provided - Single Installation

After sending in the [registration form](#) you will receive a 4 digit password code that will properly activate your copy of WinPLOT. To activate your installation go to the About section and enter your 4 digit number in place of the four X's (:XXXX) and then press the 'Register' button. NOTE: If you inadvertently enter the wrong password number and press 'Register' you must then exit WinPLOT and repeat the process. After password activation is complete, no further passwords or reminder screens will show. If you inadvertently delete Windows and WinPLOT (i.e. a hard disk crash) you can write to us and receive a new password if required.

NOTE: It is absolutely essential that the version # and Installation # are correct as shown on your WinPLOT About screen in order for your password to be correct.

Registration Option 2: Not protected - No password required - Disk provided - 25 Copy license

After sending in the [registration form](#) you are provided a personalized disk which is not installation protected. This disk will allow up to 25 active copies (installations) for use by the registered individual or company. Note that this copy is not for distribution to the general public and cannot be used for resale purposes without prior written permission.

See Also

[Registration form](#)

[Questionnaire form](#)

[Reasons For Registration](#)



WinPLOT v1.3 Registration Form:

Mail this form to:

In Touch Software
27934 Redwood Glen Rd.
Valencia, CA 91354

Name: _____

CompuServe ID _____, _____ or other E-mail address
(optional)

Company: _____ << Used for Option 2 labeling

Address: _____

City: _____ State: ____ Country _____ Zip: _____

Payment Method 1: Check or Money order Enclosed (Payable to *In Touch Software* in US funds)

Payment Method 2: Visa MasterCard

Card # _____ - _____ - _____ - _____ Exp. Date _____

Signature: _____

Registration Option 1: Protected - Installation password - No disk provided - Single Installation

New owner: \$10

Registered owner upgrade: \$5

WinPLOT Version #: ____ . ____ (should be 1.3)

WinPLOT Installation #: _____ :XXXX

Registration Option 2: Not protected - No password required - Disk provided - 25 copy license

Disk size: (high density) 5.25" 3.5"

New owner: \$40

Registered owner upgrade: \$15

California residents add 8.25% sales tax

Shipping and Handling Option 1: Code \$2 Option 2: Disk \$5

Total enclosed: _____



WinPLOT 1.2 Questionnaire: (Optional)

General Information:

How did you receive WinPLOT: (CompuServe, CD ROM, From a friend etc.)

Would you like to receive notice of significant upgrades to WinPLOT:

What computer system/speed do you use: (386/25, 486/66 etc.)

What operating system are you using: (OS/2, Windows NT, Windows 4, etc.)

WinPLOT:

What do you like the best:

What do you like the least:

What applications do you use with WinPLOT or would like to see better integrated:

What specifically do you use WinPLOT for:

What would you like to see added, improved or expanded:

What other applications provide better or similar features:

Bugs, Comments or Suggestions:

The Help System:

Was the help system clear, correct and helpful:

What sections needed more explanation or examples:

The Data Samples Included:

Were the example data files / demos adequate:



Warranty & Agreement:

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See Also

[Registration Instructions](#)

