3D Line Grapher Internet Support

An internet Support Client is included to allow technical support and updates. **Only Registered users** can activate this client to ask questions obtain updates and transfer DXF files directly from us. This client works like a chat tool except it is private communications between you and us. Once registered, feel free to drop us a line. We generally will be available Monday-Friday afternoons 3-5PM PST.

The Support Client is very easy to use. Just establish an internet connection. Then click the Connect Button. Watch the status bar at the bottom of the client for information. It will show you your connection status. If the Server is unavailable, you will hear a warning message.

Once connected, type in the top Transmitter Window. Responses from us are seen in the bottom Receiver Window.

Notice the Connect button has changed to a Disconnect Button. Press it to terminate the connection.

> Remember:
> Web updates can be obtained at http://www.smartelectronics.com.

Getting Started

3D Line Grapher™ software was developed as an intuitive graphics viewer for users of two or three dimensional CAD programs Like TurboCAD® and AutoCAD® 3D. Even if you have never used a CAD program, you can create drawing objects with any text editor. As you work in your main drawing editor keep this program open and ready to view your results. In place editing permits rapid changes to any file. 3D Line Grapher software also provides functionality on the back end with a feature set that permits product generation and analysis from your drawings.

Look at Version 1.5 for this feature set and look into Version 2.0 for enhanced features.

The program directory contains examples of ASCII & DXF files to experiment on (cube.txt & cone.dxf). The Freeware version is limited to 1200 points. In general, the shapes you can view with the Freeware version must not be very complex.

File Formats-

ASCII Comma Delimited:
Use Notepad or any text editor to create an ascii file specifying starting and ending points on each file line.

Basic Format:
Xstart, Ystart, Zstart, Xend, Yend, Zend (You are defining a line segment in 3D space)
Example:
1, 1, 0, 5, 5, 5 (This specifies a line starting at point (1,1,0) ending at point (5, 5, 5)

While you may specify multiple points on each file line, it is better practice to include just one starting/ending pair on each file line. This adds to readability.

It is also possible to put just one point one each file line. Thus forming a starting/ending pair across two lines.
Example:
1, 1, 0
5, 5, 5

If you want to define a point instead of a line segment, make the starting/ending pair the same value
Example:
1, 1, 0
1, 1, 0

See the example file cube.txt included with 3D Line Grapher. Make sure you use Auto Rotate to get a good view. Set the slider about half way on the scale.

Coordinate Systems:
To properly use any drawing program you must become familiar with the underlying coordinate representation for your object. This program uses a 3D Cartesian systems in which:

+X is to the right

+Y is up
+Z is into the screen

It really does not matter what system you use in your personal CAD programs as long as you can translate between systems. Since this program allows you to rotate an object, it is a simple matter to translate.

If you are going to use 3D Line Grapher to generate G-Codes make sure you work in World Coordinates. In most cases your DXF file will be an exact representation of object. Problems arise if you scale your object before using 3D Line Grapher. In this case your generated G-Codes will represent a scaled version of the real world object.

DXF Files:
Drawing Interchange (DXF) and Comma Separated Values (CSV) are standard ways to exchange drawing data between editors. 3D Line Grapher reads ASCII based DXF not binary. You must save your drawing as a *.dxf file not *.dwg. If you have used BLOCK definitions within your drawing, they will not be decoded by 3D Line Grapher. You must explode your blocks into basic constituent parts before outputting the DXF file. RULE #1 - Always explode blocks before exporting to DXF.

Always output your DXF file in a full format. Some CAD editors permit partial (entities only) output. This strips away valuable data that will limit the capability of this program.

Here is a list of entities read by 3D Line Grapher:

- Point
- Line
- Polyline
- Arc
- Circle (counterclockwise)
- 3DFace

If your editor uses extended entities, 3D Line Grapher may not be able to read them. In this case break these entities into polylines. Loading a file with many polylines can be time consuming. It is best to use polyline entities only as needed since they consume additional resources.

If you used layers and set color by layer while constructing your drawing object, then drawing objects appear in color while viewing. The default layer is always black.

DXF Layer	Color
0	Black
1	Blue
2	Green
3	Cyan
4	Red
5	Magenta
6	Yellow
7	White
8	Gray

9	Light Blue
10	Light Green
11	Light Cyan
12	Light Red
13	Light Magenta
14	Light Yellow
15	White

Common Definitions-

3D Orientation Window
This is the Orientation Vector Window displaying the object position in 3D space.

Layer Window
This Window displays object and color information. Each layer uses a separate color to aid in G-Code generation and multiple tool changes.

Auto Rotate XYZ
Once you have loaded your file, Auto Rotate allows you to continuously view the object as it moves in all three planes (X,Y,Z).

Information Window
The Status Window will update information about your project as you work on it. Use the SCROLL BARS to view old information.

Jog Image Right / Left
Jog Right moves your object in a direction towards the right of the screen. Note, that the <r> key is equivalent to this button. The< r> key is also continuous when pressed.

Jog Left moves your object in a direction towards the left of the screen. Note, that the <l> key is equivalent to this button. The< l> key is also continuous when pressed.

Jog Image Up / Down
Jog Up moves your object in a direction towards the top of the screen. Note, that the <u> key is equivalent to this button. The <u> key is also continuous when pressed.

Jog Down moves your object in a direction towards the bottom of the screen. Note, that the <d> key is equivalent to this button. The <d> key is also continuous when pressed.

Main View Window
This is the object display window. Your drawing object will appear here after it is read in.

MAX
The maximum X or Y coordinates as read from your drawing. Determines screen extents.

Rotate Around X-Axis
The positive X Axis rotation key will rotate your object in a clockwise direction when looking into the +X direction.

The negative X Axis rotation key will rotate your object in a counterclockwise direction when looking into the +X direction.

Note, that the <LEFT ARROW> key is equivalent to this button. The arrow key is also continuous when pressed. Arrow Keys (Right & Left) provide continuous movement.

Rotate Around Y-Axis
The positive Y Axis rotation key will rotate your object in a clockwise direction when looking into the +Y direction.

The negative Y Axis rotation key will rotate your object in a counterclockwise direction when looking into the +Y direction.

Note, that the <DOWN ARROW> key is equivalent to this button. The arrow key is also continuous when pressed. Note, that the <UP ARROW> key is equivalent to this button. The arrow key is also continuous when pressed. Arrow Keys (Up & Down) provide continuous movement.

Slider Control
Auto Rotation speed is controlled by the slider.

STOP
Stop Auto Rotation. It can be resumed by moving the slider again.

G-Codes
Codes used to control a computer controlled cutting machine.

Installation

This program must be installed/reinstalled from the original compressed file (*.zip) or disks. Use an unzipping program like WinZip (http://www.winzip.com) to extract the compressed files. When the setup program runs, it will automatically update the registry and keep track of each installed file.

3D Line Grapher™ software comes with an uninstall program that removes all files installed during setup.

- Activate the Control Panel and select 'Add/Remove Programs'.
- Mouse click on 3D Line Grapher in the application list.
- Mouse click 'Add/Remove'.
- Follow the instructions.
- There may be some shared files that are not removed. This is OK.

If you upgrade to a newer version of this program, first uninstall the old version and then install the new version. This ensures all files are properly updated and registered. If you fail to uninstall an older version first, the new version may not properly update required files.

Unlock codes are used to turn your Freeware version into a full version without the need to download and install an update. This is very convenient but requires some care. Once you receive your registration codes from us, write them down for future use. Since all registered users receive 3.5" disks, simply write the codes on the label. You MUST input the unlock codes exactly as provided to you. If you uninstall this program and then later reinstall it, you will need these codes.

All files have been fully checked and verified before release. If you have a defective media let us know and it will be replaced within 90 days of purchase. Refer to the License agreement for details.

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Version 1.5 Freeware

The Freeware version is yours to keep. It is limited to the following feature set which includes a 1200 point input limit. If you have large DXF file only 1200 points will be read. A more powerful feature set is available to registered users. Registration ***is inexpensive and provides you with online support and a robust set of tools Register now!***

Here are some of the features included in this freeware release.

DXF Read Capability:
- Polyline
- Line
- Circle
- Arc
- 3D Face
- Point

Enhanced User Interface:
- Toolbar now sets most common commands.
- Increased data formatting speed with auto line correction.

ASCII Read Capability:
- Comma Delimited (X1,Y1,Z1,X2,Y2,Z2) Format.

Color Rendering of Layers:
- Up to 16 Layers Defined by Color.

Orientation Window:
- Fixed and Rotating References.

18 Magnification Levels:
- Positive and negative scaling.

Grids:
- Self scaling grids track during data manipulation.

Auto Rotate Control:
- Speed and XYZ.

Keyboard Accelerators:
- Arrows, +, -, C, V, L, R, U, D

Here are some additional features included in the registered release.

50,000 Points Input Maximum:

Automatic CAD Editing:

Call your CAD Editor from this program.

Independent Z Axis Rotation:

Free Version Upgrade:

Access to product creation.

When you register with us, you will receive your unlock codes.

Main View Window

In this window you will see your drawing object. It can be either a 2D or 3D object. The XY plane is facing you with +Z going into the screen. X values are positive to the right of the origin while Y values are positive above the origin. The drawing object always moves in relation to this fixed XYZ grid. Observe the orientation window for part rotation against the fixed grid.

Information Window

The information window will be constantly updated with data as drawing objects are loaded, rotated and sized. You can scroll up and down in this window to see everything. Older information is always below newer information.

3D Orientation Window

As you move your drawing object in 3D space this window shows the unit vector rotation in relation to the fixed dotted grid. Use it to determine angular rotation "skew" on your object.

Menu Items

Use the menu to execute commands not found via the toolbar or Keyboard. Menu items include opening files, quitting the application, world wide web, system information.

Color & Layer Window

The Color window shows layers and colors for all objects. Colors and layers can only be used with DXF files. Future releases of 3D Line Grapher may permit other files with layers and colors.

Toolbar

The Toolbar contains the most frequently used commands. Be aware that some commands are only available from the Menus or Keyboard. The 3D Line Grapher has the following toolbar functionality.

Open a File
Print
Display Axes
Open CAD Editor
4 - Rotation Commands
4 - Jog Commands
2 - Scale Commands
2 - Reorient / Rescale Commands
Make G-Codes
World Wide Web
Unlock Codes
Help

Auto Rotate

Auto Rotate simulates holding your object in your hand and moving it in a random manner to observe its features.

Rotation of a drawing object around the X,Y,Z Axes in incremental steps with a positive (clockwise) or negative (counterclockwise) direction. The angular step speed may be adjusted via the slider to achieve almost continuous motion.

Status Bar

A status Bar is used to detail information important to program operation. This first section on the Status Bar will show you the main application path and date.

Registration Status

This section on the Status Bar will show you the condition of your software.

Shareware	Full access to Professional features on a limited time basis.
Registered	Full access to Professional features.
Freeware	Full access to standard features.

Keyboard Shortcuts

To accelerate program operation, this software supports keyboard shortcuts. Some functions are available on the ToolBar but others are not. Certain keyboard commands are recursive. For example the arrow keys will continue to rotate the object as long as you press the key. This allows rapid movement of your object. Press... <F1> Context Sensitive Help.

 Rotates your object in a clockwise direction around Y when looking into the +Y direction. Clockwise XZ plane rotation.

 Rotates your object in a counterclockwise direction around Y when looking into the +Y direction. Counterclockwise XZ Plane Rotation.

 Rotates your object in a clockwise direction around X when looking into the +X direction. Clockwise YZ plane rotation.

 Rotates your object in a counterclockwise direction around X when looking into the +X direction. Counterclockwise YZ plane rotation.

PAGE UP Rotates your object in a clockwise direction around Z when looking into the +Z direction. Clockwise XY plane rotation.

PAGE DOWN Rotates your object in a counterclockwise direction around Z when looking into the +Z direction. Counterclockwise XY plane rotation.

 Keypad decrease image magnification.

 Keypad increase image magnification.

V Find and recenter the drawing object without changing any current settings.

C Clear the Main View Window and restore the original drawing object.

U Move your object in a direction towards the top of the screen. Note, that the <u> key is equivalent to the + Jog Up Button. Use this Key for continuous movement.

D Move your object in a direction towards the bottom of the screen. Note, that the <d> key is equivalent to the - Jog Down Button. Use this key for continuous movement.

L Move your object in a direction towards the left of the screen. Note, that the <l> key is equivalent to the - Jog Left Button. Use this key for continuous movement.

R Move your object in a direction towards the right of the screen. Note, that the <r> key is equivalent to the + Jog Right Button. Use this key for continuous movement.

Technical Support

Freeware Users: Support concerning product installation issues only.

Registered Users: Full e-mail support. Full internet support.

Bug reports are always welcome.

Contact: service@smartelectronics.com

Register

Register by going to our web site choosing 3D Line Grapher and filling in the user information.

Registration costs $20 + $4 shipping US funds and can be payed by check or money order. Credit cards will be accepted with a 5% service charge. International customers should pay via an international money order and allow time for shipping.

Registered users receive unlock codes to change the 500 line limitation to 25,000 lines. Unlock codes are sent via e-mail. Registered users are eligible for a FREE upgrade to version 2.0.

The program will be also sent by 3.5" disk once payment is received. If you do not require 3.5" disks please note that in the order form. You will not have to pay the shipping charges.

If you can not use the internet you may register by mail by making checks payable to:

Watershed Electronic Development
2102 East Friess Drive
Phoenix, Arizona 85022

For additional information you may call 602-971-0137 or e-mail service@smartelectronics.com.

Version 2.0

All registered users of V1.5 qualify for a free upgrade to V2.0 when released.

100,000 Point File Input Capacity:

Automatic editing from the toolbar:

ASCII File Editing with Redraw.
CAD editing if registered on your system.

CNC G-Code Generation:

CNC G-Codes allow you to take your design and actually build it. If you ever had the dream of turning your design into a real product, here it is. From your CAD drawing 3D Line Grapher™ software will create a file that can be sent to a machine shop for fabrication. The machine shop will read your G-Codes into a computer controlled milling machine that cuts raw stock material into your drawing specification. We can provide you fabricator contacts if needed.

Selection / Cut:

DXF / ASCII Merge:

File Saving:

Output your data for additional processing.

Menu Items

Opening a File -
Use menu *File* | *Read Data.*

Printing a Drawing -
Use menu *File* | *Print* to print the Main View Window.

Quitting -
Use menu *File* | *Quit* to close the application and return Window resources.

Open Editor -
Use menu Edit | *Open Editor.* Bring up a registered CAD editor to edit current object. Also press <F1> for context sensitive help.

View -
Use menu View|. Sets view options. Also press <F1> for context sensitive help.

Generate -
Use menu Generate | *G-Codes.* Generate codes from current display object. Also press <F1> for context sensitive help.

Getting Help -
Use menu Help | *Contents.* Also press <F1> for context sensitive help.

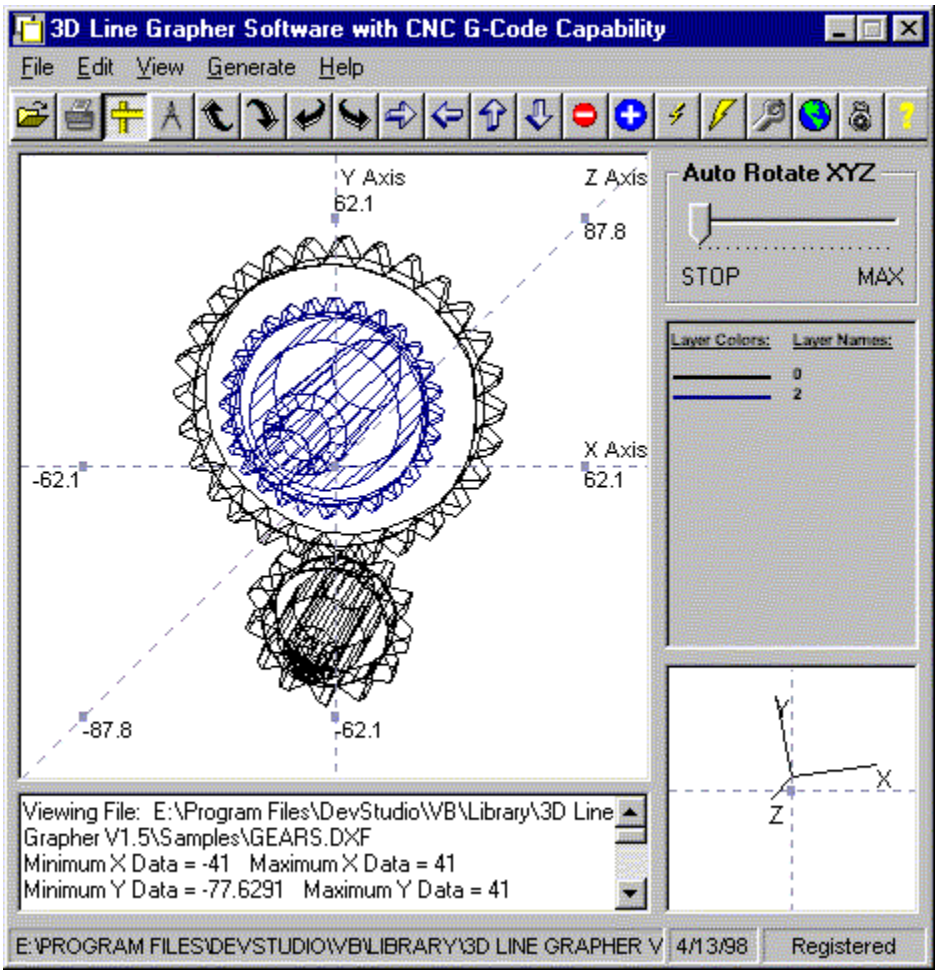
World Wide Web -
Use menu Help | *Web Site.* Connect to our server for updates. Also press <F1> for context sensitive help.

Internet Support -
Use menu Help | *Internet Support and Updates* to connect to our server for technical support.

System Information -
Use menu Help | *About* to get information on your system resources and the 3D Line Grapher program. You must maintain adequate resources to maximize redraw speed.

3D Line Grapher™ Software

Click a spot on the graphic for further information.



Glossary

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

O

Orientation Vectors

origin

U

unit vector

W

world coordinates

Orientation Vectors

The three axes as shown in the 3D Orientation Window.

origin
The zero point for the 3D cartesian axis. It is defined by a red dot.

unit vector

A unit vector is a magnitude 1 line with direction. It is used as the axis to show relative drawing rotation.

world coordinates
Coordinates as actually measured on a physical object.