

CtrlView[®]

User's Guide

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Introduction

CtrlView is an efficient graphical tool, which provides a wide range of converting/decoding features for professional designers, graphic producers and software developers. CtrlView helps you view, convert and print pictures, drawings and 3D models easy and conveniently. It's a smart solution for anyone working with graphic files and using them in a wide variety of documents.

CtrlView features

1. Viewing and converting different types of 2D Raster, 2D Vector and 3D Polygon formats

CtrlView lets you view input files and convert them into output files. Input/output files compatibility is shown in the table:

Input/Output	BMP	JPEG	PCX	PDF	PNG	TIFF	PS	EPS	DXF	CGM	HP-GL	HP-GL/2	IGES	LWO	OBJ	STL	SWF	VRML 2.0	XPM	C/C++	OpenGL
BMP	✓	✓	✓	✓	✓	✓	✓	✓											✓	✓	
GIF	✓	✓	✓	✓	✓	✓	✓	✓											✓	✓	
JPEG	✓	✓	✓	✓	✓	✓	✓	✓											✓	✓	
PCX	✓	✓	✓	✓	✓	✓	✓	✓											✓	✓	
PNG	✓	✓	✓	✓	✓	✓	✓	✓											✓	✓	
TIFF	✓	✓	✓	✓	✓	✓	✓	✓											✓	✓	
XPM	✓	✓	✓	✓	✓	✓	✓	✓											✓	✓	
HP-GL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓		
HP-GL/2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓		
3DS	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓
AC3D	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓
LWO	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓
OBJ	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓
PLS	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓
STL	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓
SURF	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓
VRML 1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓
VRML 2.0	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓

2. Marker tool

This tool allows you to add marks or annotations invisible anywhere but in CtrlView. This method is called steganography.

3. Instant format auto recognition system

You don't have to know the format of the file you want to open. CtrlView opens any file immediately.

4. **Compact and intuitive interface with skins support, based on Zinc Application Framework**

Skins allow you to customize CtrlView working environment for your needs, and make it even more convenient.

5. **OpenGL for 3D objects rendering**

OpenGL usage makes 3D models visualization and transformations faster and smoother.

6. **Separate lens window**

You don't need to switch between windows or modes anymore to see an enlarged part of a picture or a drawing.

7. **Separate file tree window with thumbnails**

You can easily find a picture or a document among hundreds of others looking at thumbnails.

8. **Batch conversion**

A batch of files can be converted to the different format at once.

9. **High quality raster file scaling down**

You can now scale down your images without any deterioration. Print scanned A1 size drawing in TIFF format onto A4 size paper and you will still be able to read it without any problems.

10. **3D models transformations**

You can not only view but also transform a 3D model.

11. **Smooth animated 3D objects rotation**

This innovative feature allows you to supervise the process of object rotation and get different views of object.

12. **Maximum printing quality for 2D vector/3D files**

CtrlView prints 2D vector/3D files with printer resolution.

13. **Binary and text file viewing mode for any graphic format**

You can look into any file without switching between applications. It is a useful feature for debugging graphic file output from other applications.

14. Command line interface for converting and printing

You can print and convert your pictures and drawings without opening an application. Software developers can easily use these program calls in their source code.

15. Raster images to C/C++ source code converting

CtrlView allows inserting different drawings to source C/C++ code instead of saving them in resources or in outer files.

16. 3D polygonal models to OpenGL source code converting

CtrlView can output 3D models into ready to use C++ code that uses OpenGL functions for rendering.

17. Log file, useful for file analysis and error check.

You don't have to look for an error in a document or a picture file. Just examine your log to understand where a problem is.

Interface

CtrlView is a universal tool to work with different file types. CtrlView interface is simple and intuitive. You don't need to know anything about file formats and their extensions, because CtrlView opens files with any extension or without one, automatically recognizes their content and, if possible, displays. CtrlView also gives you a possibility to see what is inside the file either in ASCII text or binary dump form.

Main interface elements of program are:

- Main menu
- Toolbox
- Graphic area
- Status bar

Main menu

CtrlView has following basic menu topics:

- File – open, save, print file operations.
- View – zoom, pan, rotate, fit to page and so on.
- Options – skins customizing, file tree customizing and preferences.
- Help – about, index and log file.

CtrlView has next specific menu options:

- **Mark up** – for 2D raster and 2D vector file formats – hide, show and erase markers.
- **Edit** – for 3D vector file formats – transform and deletes objects.

Toolbox

When you open a file with CtrlView, the toolbox appears on the left side of the screen. You can see examples below:



2D raster formats



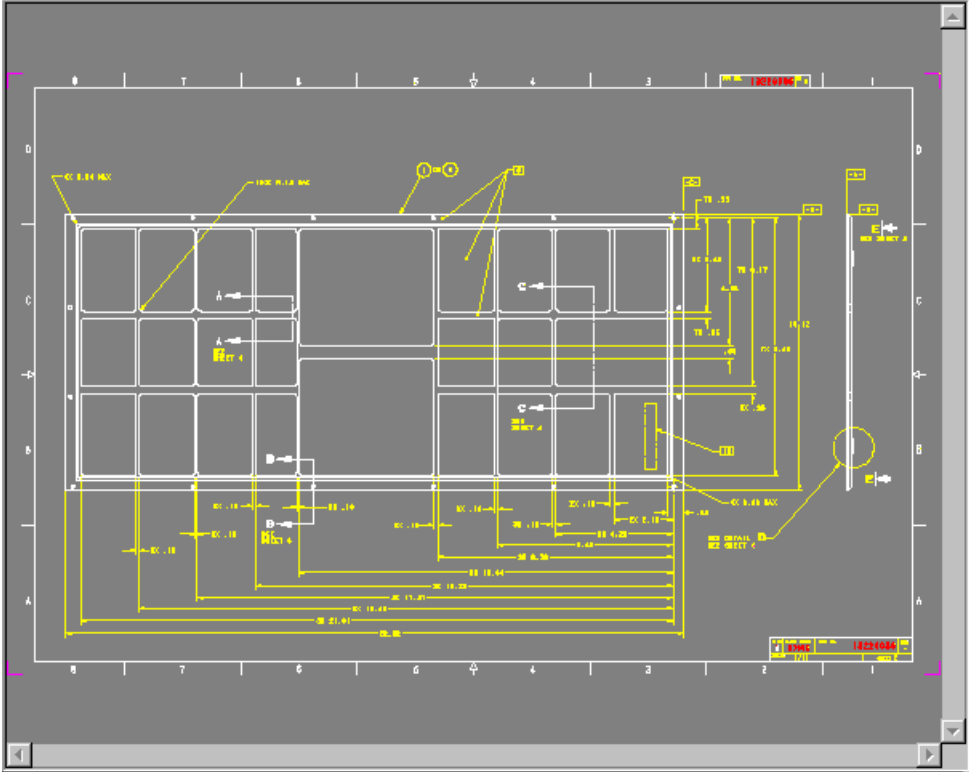
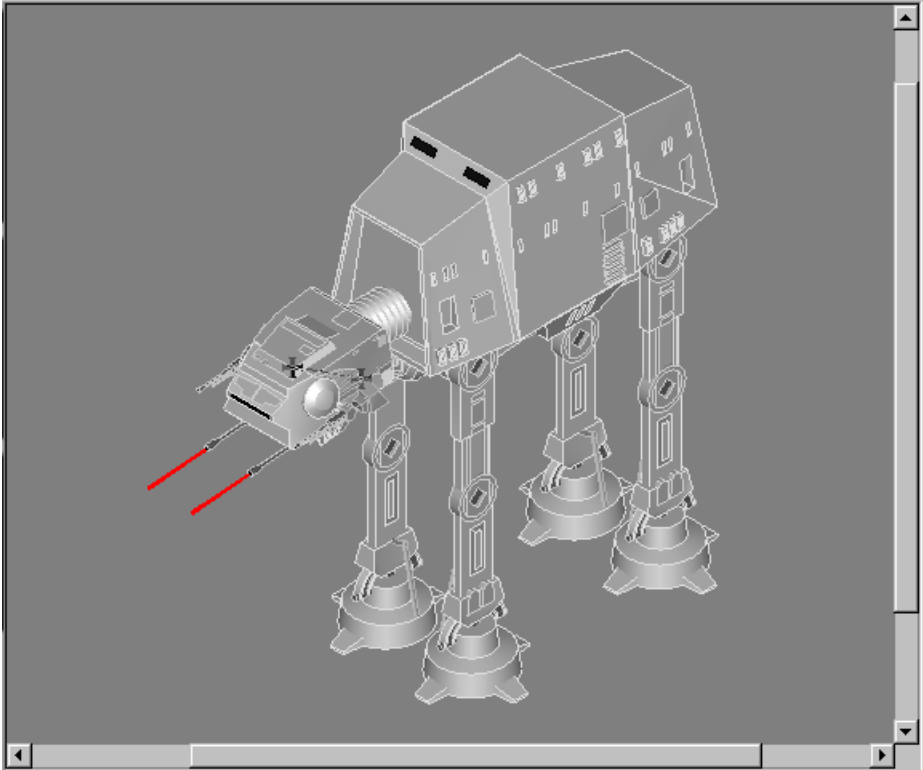
2D vector formats



3D polygon formats

Graphic area

The graphic area is a main interface element where picture is placed. Graphic area is the same for all [supported file types](#). You can see examples below:



Status bar

The status bar at the bottom of the window displays different information for the various file formats.

For 2D raster files status bar displays:

- error/warning indicator;
- pointer coordinates;
- picture number for multi-picture files;
- zoom level;
- drawing rotation angle in degrees.

For 2D vector files status bar displays:

- error/warning indicator;
- pointer coordinates or distance for two selected points, or angle for three selected points;
- page number for multi-page files;
- drawing rotation angle in degrees.

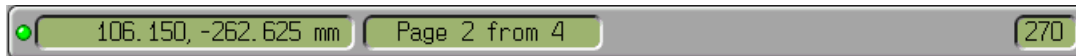
For 3D files status bar displays:

- error/warning indicator;
- pointer coordinates for one selected point or distances for two selected points, or angle for three selected points.

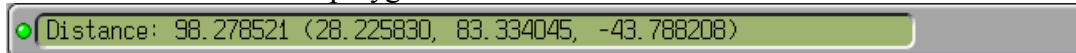
Status bar for 2D raster formats:



Status bar for 2D vector formats:



Status bar for 3D polygon formats:



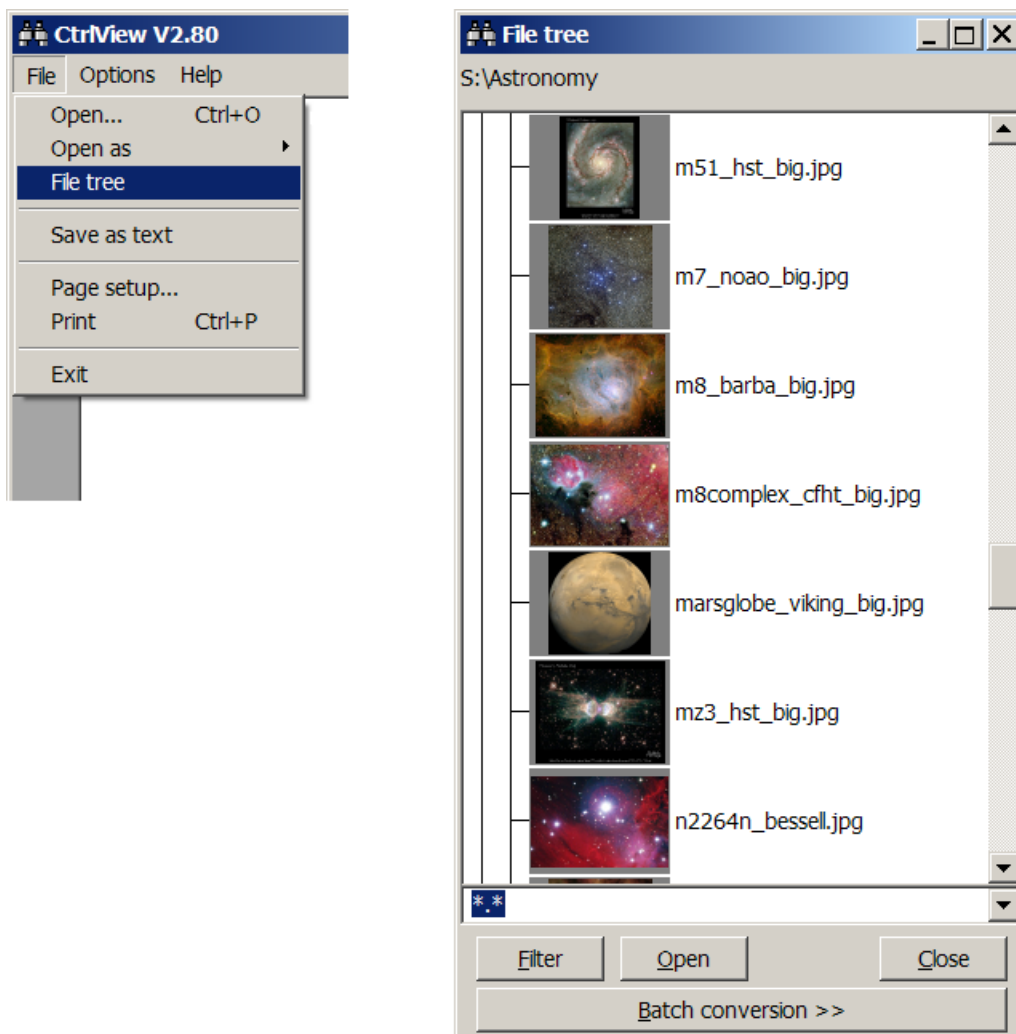
File tree

Using file tree

File search becomes a complicated problem for the large directories. File tree option allows you to simplify search.

To start search:

- Choose **File/File tree**:



File tree displays all the directories and files in the tree-structured form. If there are some files of the supported formats exist, then thumbnails of these files will be shown. If you wish to display only the files of some desired types just enter the filter mask and press **Filter** button. It could make the work of the CtrView faster.

To display full-size picture:

- Select file and click **Open** button, or
- Click right mouse button on file and choose **Open** from popup menu, or
- Double-click left mouse button on file.

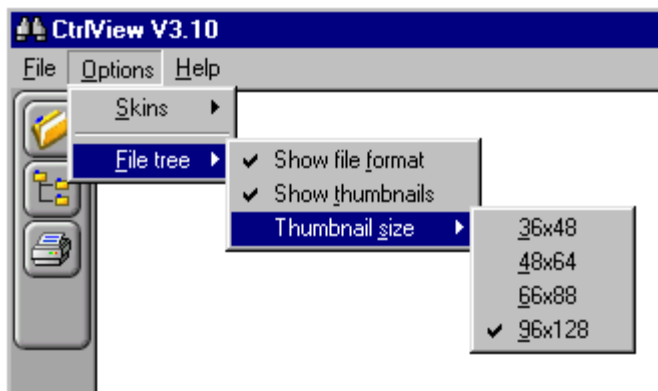
For converting a subset of files in a directory use **Batch conversion**.

Customizing File tree

To change the size of the thumbnails displayed in the File Tree:

- Choose **Options/File tree/Thumbnail size**

You can also turn off format recognition and thumbnail display using corresponding features at the **Options/File tree** menu item.



Keep in mind, that picture's format recognition and thumbnail displaying takes time, so turning these features off can noticeably speed up **File tree** functioning if the number of the pictures in a folder is more than several dozen.

Help Index

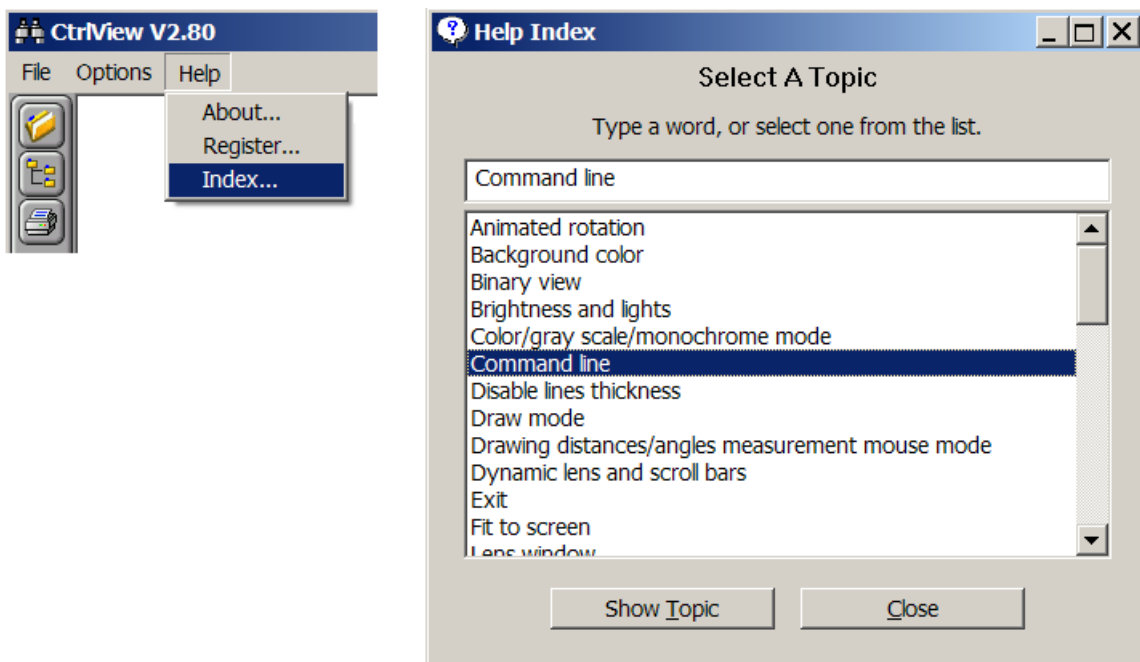
Help Index contains keyword entries followed by links to topics where the entry is discussed.

To find a topic using the Index:

1. Choose **Help/Index**.

Combo box appears.

2. Select a topic in the list using a scroll-bar, or type a word into the edit box.

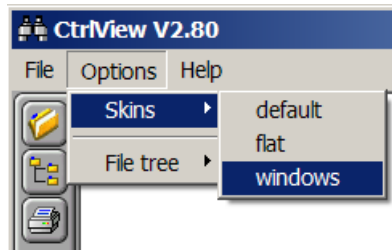


Skins

For individual use you can customize CtrlView working environment by choosing preferable appearance. CtrlView offers three skins to choose:

- **default** – 3D controls with rounded corners
- **flat** – flat controls
- **windows** – standard Windows 3D controls

Use **Options/Skins** menu item to switch between Skins.



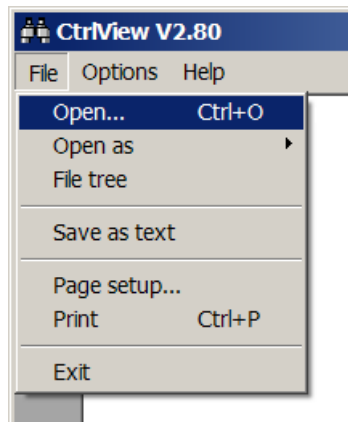
Viewing

Open

To view a file:

1. Choose **File/Open**
2. Select the name of the file you want to open.

Wildcard '*.*' will appear in the **Files of type** box because of the file's format automatic recognition.



If the file of raster format is loaded to CtrlView, it will be displayed in actual pixel size by default. If the file of 2D vector format is loaded to CtrlView, it will be displayed in fit on screen size by default. If the file of 3D format is loaded to CtrlView, it will be displayed in fit on screen size by default or in view defined in file.

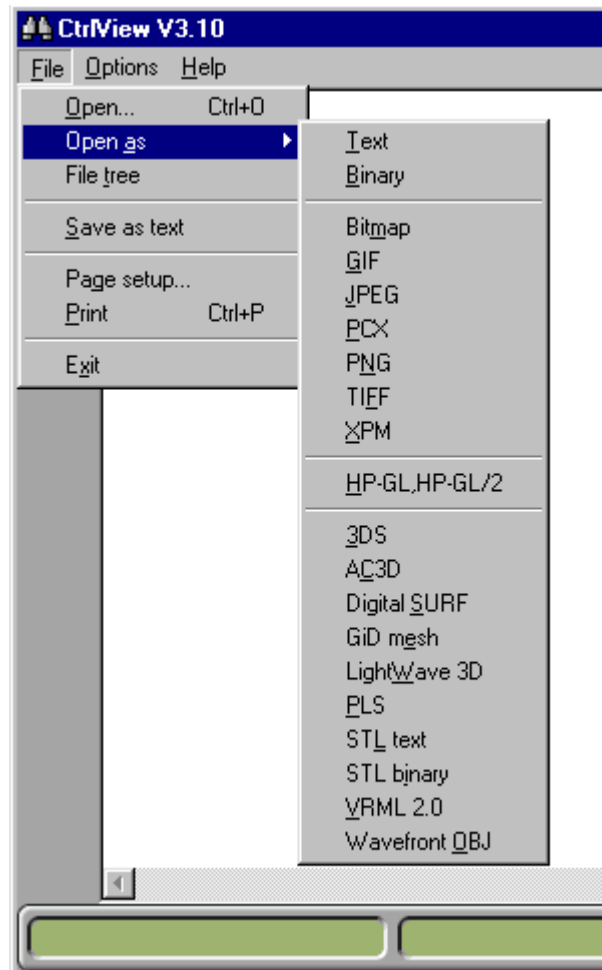
Open as

You may need to specify the format if CtrlView failed to recognize file format or if you want to view the file in a different representation.

To specify the format in which to open a file:

1. Choose **File/Open as**
2. Select the desired file format from the **Open As** menu.

If the file is already loaded to CtrlView, it will be reopened in the selected format.



Supported formats

CtrlView provides viewing and converting of three different types of data representation for computer graphics. They are the following:

- 2D Raster.
- 2D Vector.
- 3D Polygon.

Besides that, CtrlView allows you to view files in binary and ASCII form.

2D Raster formats

Raster images use a grid of colors known as pixels to represent images. Each pixel is assigned a specific location and color value. Most of the raster formats differs by compression type and additional features, such as amount of pictures stored in one file, picture transparency and color support. Raster formats images are the most common electronic medium for continuous-tone images, such as photographs or digital paintings, because they can represent subtle gradations of shades and color.

2D Vector formats

Vector graphics are made up of lines and curves defined by mathematical objects called vectors. Vectors describe an image according to its geometric characteristics. In vector formats drawing method applies such elements as coordinates of the points, segments, ellipses, arcs, and colors to create a drawing. Vector format is usually used for design drawings, schemes and diagrams storage.

3D Polygon formats

3D polygon formats are used to store objects in 3D modeling programs and games. Such files contain object vertexes, planes, surfaces, lights, animation keys, cameras and other information for the object rendering.

Because many render algorithms exist, 3D formats have some difference in their features and sometimes don't support some of the objects described above.

Binary and ASCII forms

First and foremost, CtrlView is a picture viewer/converter. However, when the file is corrupted or has an unknown format, you can view the file in a binary or text form.

Basic commands for all graphic formats

There are two types of viewing commands for the graphic files: general for all graphic formats and specific for each one. Basic commands for raster, vector or 3D files are:

1. Clipboard copy
2. Color filtering
3. Rotation
4. Magnifying and reducing the view
5. Binary view
6. Preferences

Clipboard copy

You can use the **Copy to clipboard** command to copy the picture displayed in the Graphic area of CtrlView and paste it to other Windows applications (such as Word, Power Point, etc). The copied selection remains in the Clipboard until you cut or copy another selection.

To copy a picture displayed to Clipboard:

- Choose **View/Copy to clipboard**, or
- Press Ctrl+C.

Color Filters





This command has three options:

- Monochrome
- Grayscale
- Color.

Color mode is set by default. In **Monochrome** mode the picture is displayed in two colors – black and white; in **Grayscale** the picture is displayed in the shades of gray; in **Color** mode the picture is displayed in full color.


Rotation

To rotate a picture:

- Choose **View/Rotate**, or
- Click the Rotate+90 degrees/Rotate-90 degrees buttons   in the toolbar to rotate clockwise and counterclockwise

This command can be used for 2D raster and 2D vector formats.

To rotate a 3D model:


- Choose **View/Rotate**, or
- Click the Rotate button  in the toolbar

You can view rotation of the 3D Model on 10 degrees step in 6 different directions

Magnifying and reducing the view


You can magnify or reduce your view using various methods.

To magnify the view:

- Choose **View/Zoom ++** to magnify 1.5 times, or
- Click the **Zoom in** button  in the toolbar


When the image has reached its maximum magnification level, the command is dimmed


To reduce the view:

- Choose **View/Zoom --** to reduce 1.5 times, or
- Click the **Zoom out** button  in the toolbar.

When the image reaches its maximum reduction level, the command is dimmed.


To magnify selection:

Make a selection using cursor in zoom window mouse mode  and do one of the following:

- Choose **View/Lens window**, or
- Click the **Open/close lens window** button  in the toolbar.

Selection will appear in the separate lens window.

To change the view to fit the screen:

- Choose **View/Fit on screen**, or
- Click the **Fit on screen** button  in the toolbar to scale zoom level to fit picture in the drawing area.

Following options are available for 2D Raster and 2D Vector formats.

Proportional

To change the graphic area to fit your selection:

For mouse option - Auto zoom

- Make a selection
- Choose **View/Proportional**



For mouse option - Zoom window

- Make a selection
- Magnify the selection
- Choose **View > Proportional**

This option allows you to view in graphic area your selection only.

Viewing history



To walking trough views already seen:

- Choose **View/Previous view** and **View/Next view**, or
- Click the **Previous view**  or **Next view**  buttons in the toolbar.

With this options you can quickly restore a previous view, e.g. undo/redo rotation, zooming and so on.


Viewing pages

To switch between pages in multi-page documents:

- Choose **View/Previous page** and **View/Next page**, or
- Click the **Previous page**  or **Next page**  buttons in the toolbar.

Binary view

To view a file in a binary form:

- Choose **File/Open as/Binary**, or
- Choose **View/Binary**, or
- Click the **Binary view**  button in the toolbar.

To return to the previous view click **Back to previous representation**  button in the options bar.

The file will be opened in binary form by default if CtrlView couldn't recognize the file format.

Preferences

Numerous program settings are stored in CtrlView preferences file. Preferences are different for each format type. Among the settings stored in this file are general display options, mouse options, drawing options and many others.

To change preferences:

- Choose **Options/Preferences**
- Choose the preference set from the menu at the top of the dialog box.
- Make changes and click **Apply** for changes to be applied.

Changed preferences are stored after closing the application down and are available during the future sessions.

2D Raster formats

There are several raster formats used to represent images.

Windows bitmaps (BMP, DIB)

BMP is a standard Windows image format for PC-compatible computers. BMP format supports RGB, Indexed Color, Grayscale, and Bitmap color modes. It can be either Windows or OS/2® format with different bit depth for the image. For 4-bit and 8-bit images in Windows format, RLE compression can be used.

ZSoft PC Paintbrush (PCX)

PCX format is commonly used by IBM PC-compatible computers. Most PC software supports version 5 of PCX format. A standard VGA color palette is used with version 3 files, which do not support custom color palettes.

PCX files are organized into three major sections: the header, the image data, and the color palette. The color palette normally contains entries for 256 colors and is associated with the VGA display adapter. This VGA color palette is only found in later versions of the PCX image file format. The only image compression algorithm currently supported by the PCX specification is a simple byte-wise run-length encoding (RLE) scheme.

GIF

Graphics Interchange Format (GIF) is the file format commonly used to display indexed-color graphics and images in hypertext markup language (HTML) documents over the World Wide Web and other online services. GIF is an LZW-compressed format designed to minimize file size and electronic transfer time. GIF format preserves transparency in indexed-color images; however, it does not support alpha channels.

JPEG

Joint Photographic Experts Group (JPEG) format is commonly used to display photographs and other continuous-tone images in hypertext markup language (HTML) documents over the World Wide Web and other online services. JPEG format supports CMYK, RGB, and Grayscale color modes and does not support alpha channels. Unlike GIF format, JPEG retains all color information in an RGB image but compresses file size by selectively discarding data.

A JPEG image is automatically decompressed when opened. A higher level of compression results in lower image quality, and a lower level of compression results in better

image quality. In most cases, the Maximum quality option produces a result indistinguishable from the original.

PNG

Format was developed as a patent-free alternative to GIF, Portable Network Graphics (PNG) format is used for lossless compression and for display of images on the World Wide Web. Unlike GIF, PNG supports 24-bit images and produces background transparency without jagged edges; however, some Web browsers do not support PNG images. PNG format supports RGB, indexed-color, grayscale, and Bitmap-mode images without alpha channels. PNG preserves transparency in grayscale and RGB images.

TIFF

Tagged-Image File Format (TIFF) is used to exchange files between applications and computer platforms. TIFF is a flexible bitmap image format supported by virtually all paint, image-editing, and page-layout applications. Also, virtually all desktop scanners can produce TIFF images.

TIFF format supports CMYK, RGB, Lab, indexed-color, and grayscale images with alpha channels and Bitmap-mode images without alpha channels. Photoshop can save layers in a TIFF file; however, if you open the file in another application, only the flattened image is visible.

X PixMap Format (XPM)

XPM files are used to store X Window PixMap information to disk. They are capable of storing black and white, grayscale, and color images. XPM stores image data in the form of ASCII text formatted as a standard C character strings array.

For XPM files, LEADTOOLS supports the following bits per pixel: 1, 8, 16, 24 and 32.

Advanced view features for 2D Raster formats

Zoom pyramid



You can quickly switch between zoom percentages from 10% up to 1000% using Zoom pyramid. This tool is effective and easy to use.


To magnify or reduce view to required preset percentage instantly:

- Click Zoom pyramid button in the options bar.

Mouse option for zooming

A mouse can also be used to magnify the pictures you are viewing.

To use mouse for magnifying the view:

- Choose **Options/Preferences/Mouse/Auto zoom**, or
- Click **Auto zoom** mouse option  in toolbar.

Marker



Using these two modes you can add text and marks that visible only in CtrlView. The advantage of this feature is that a user can make marks on the picture and save them in a file. These marks will be invisible when the picture is viewed with another program, as when it is printed.

To show, hide or erase marks:

- Choose **Mark up/Show,Hide,Erase**.

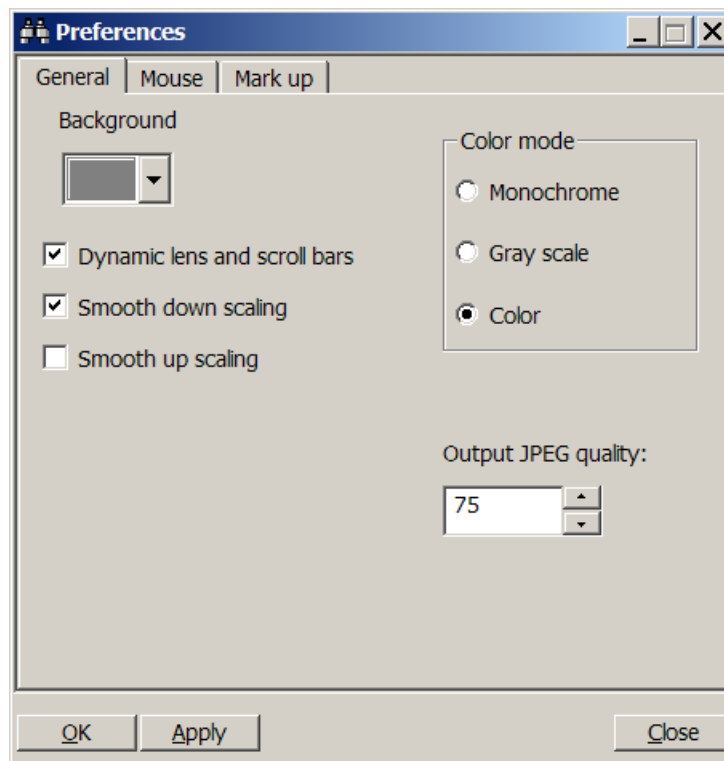
Preferences for 2D Raster formats

To open preferences dialog box:

- Choose **Options/Preferences**.
- Choose **OK** to exit saving changes.
- Choose **Apply** to apply all changes.
- Choose **Cancel** to exit without saving changes.

General Preferences

You can change your working environment as well as image properties.



To change the color of the graphic area background:

- Choose **Background** combo box and select the color.

To synchronize Lens window and drawing area while zoom are or scroll bars are dragged:

- Check the **Dynamic lens and scroll bars** checkbox.

When this checkbox is checked, scrolling of the selection in the graphic area will be mirrored in the Lens window.

If the checkbox is not checked, the picture in the Lens window will be scrolled after the operation finished in the graphic area. This feature is becomes important if your computer is slow.

To magnify and reduce the view with the least loss of quality:

- Check **Smooth down scaling** and **Smooth up scaling** checkboxes.

Smoothing makes pictures look better when scaled, but it slows down the operations. If you need to see separate pixels, uncheck checkboxes to turn filters off.

To define the color mode for the picture:

- Select one of the Color modes: Monochrome, Grayscale, Color.

This set of radio buttons repeats the [Color Filters](#) buttons group.

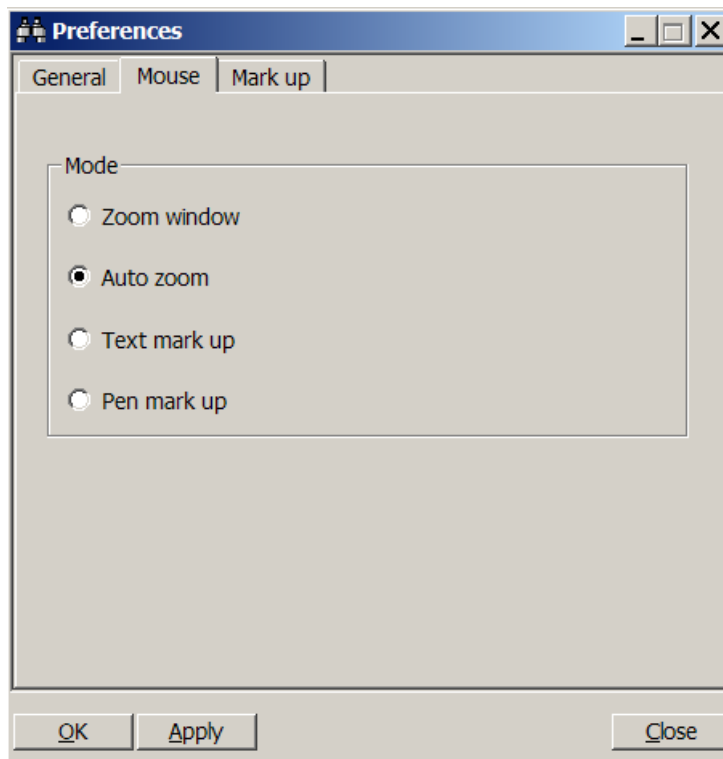
To specify JPEG quality:

- Select the JPEG value in the **Output JPEG quality** range box.


Representing an image in a JPEG format relies on lossy compression, which selectively discards data. The range of the converting quality can be set from 1 to 100. The higher quality of JPEG is, the more the size of the file is, and vice versa. Balance between quality and size is reached at about 55-75%.

Mouse


This section duplicates the mouse mode group in toolbar.




To define zoom area using cursor:

- Check **Zoom window** radio button, or
- Press mouse mode button  in the toolbar.


To magnify selected area immediately after mouse button release:

- Check **Auto zoom** radio button, or
- Press mouse mode button  in the toolbar.

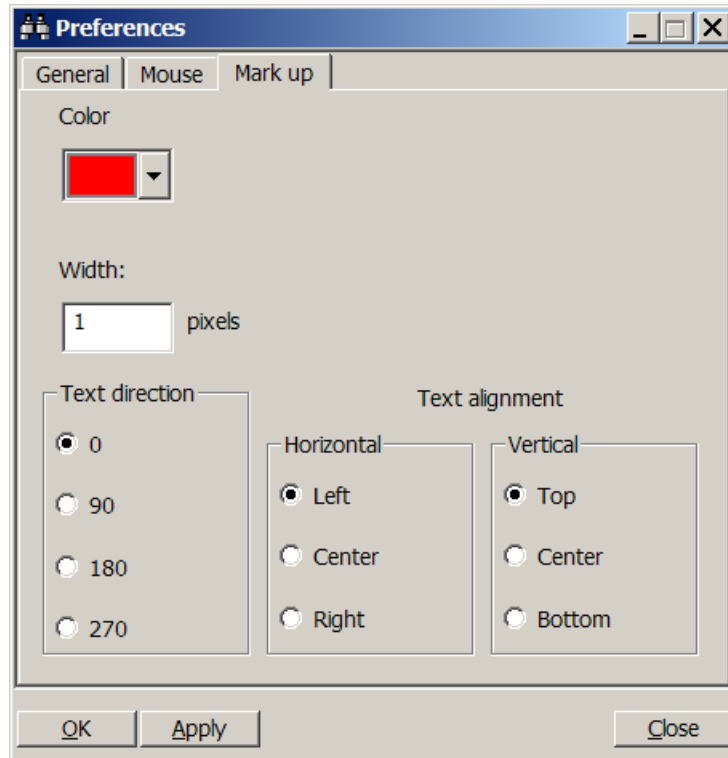
To put text marks on the picture:

- Check **Text mark up** radio button, or
- Press mouse mode button  in the toolbar.

To put pen marks on the picture:

- Check **Pen mark up** radio button, or
- Press mouse mode button  in the toolbar.

Mark up



To select color of the marker and text:

- In the **Color** combo box choose the color.

To define width of the Pen tool line:

- Type value in the **Width** box.

To choose text direction between vertical, horizontal, reverse vertical and reverse horizontal:

- Choose one of the four values: 0, 90, 180 and 270.

To position text relatively to cursor pointer:

- Choose one of the **Text alignment** values.

2D Vector formats

CtrlView works with two 2D Vector formats:

HP-GL

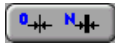
The Hewlett Packard Graphics Language (HP-GL) is an interpreted vector description language for plotters that has been developed by Hewlett Packard (Hewlett Packard, 1984). HP-GL is widely used for plotters and has also been used with some other devices. A drawback of using HPGL however is that there are many versions of the language and so compatibility may be an issue.

HP-GL/2

HP-GL/2 is the standardized version of Hewlett Packard's Graphics Language.

Advanced features for 2D Vector formats

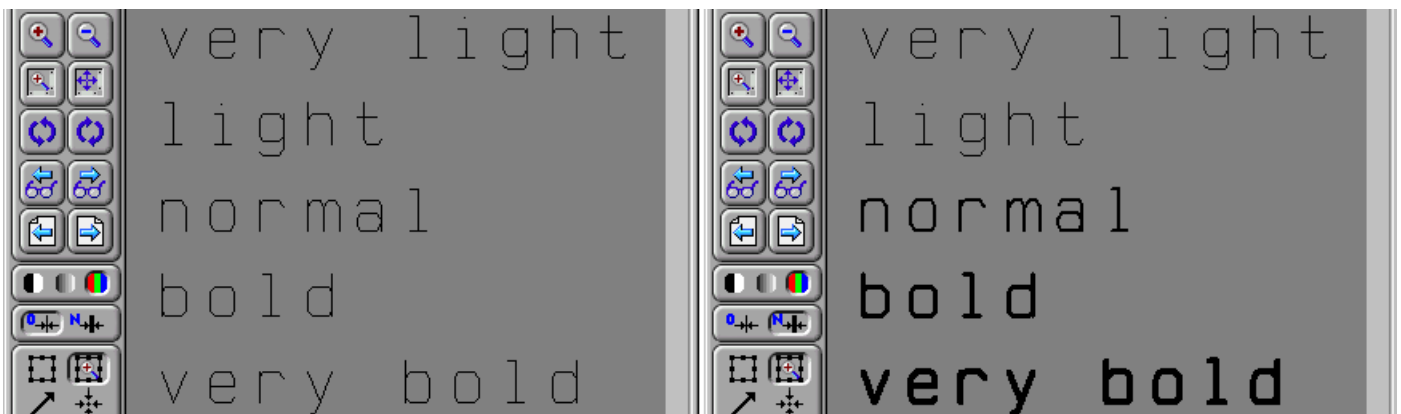
Lines Draw mode



There are two view modes for the vector images in the CtrlView program: **Thin lines** mode and **Normal lines** mode.

When the **Thin lines** mode is on, the width of the lines displayed is always equal to 1 pixel. When the **Normal lines** mode is on, the width of the lines is defined by preferences (for HP-GL) or set in file (HP-GL/2).

You can see the difference on picture:



Mouse mode buttons

To move picture in the direction needed:

- Press Mouse mode Pan button  in the toolbar.

Move the cursor at some point at the picture, press the left mouse button and drag the cursor in the direction needed. After you drop the cursor (release the left button), the picture will be moved to that direction on the distance equal to difference between starting and ending points.

To move desired picture point to the drawing area center:

- Press Mouse mode Center button  in the toolbar.

Move the cursor at some point at the picture and click left mouse button. Picture will be translated so that the point clicked will be in the center of the drawing area.

To find coordinates relatively to a point:

- Press Mouse mode Origin button  in the toolbar.

Click at any point of drawing. Moving the cursor over the picture, you can see the coordinates relative of this point in the Status bar.

To measure the distance between any two points:

- Press Mouse mode Ruler button  in the toolbar.

Move the cursor to the first point, press left mouse button, then move the cursor to the second point and release left mouse button. The value will appear in the Status bar.

To determine coordinates, distance between two drawing points and angle between three drawing points:

- Press Mouse mode button  in the toolbar.

When a point is selected, its coordinates will appear in the Status bar. When two points are selected, the distance between them in pre-selected measuring units will appear in the Status bar. When three points are selected, the angle in pre-selected angle units will appear in the Status bar.

Marker

Using Marker buttons in the toolbar, you can add text and marks that visible only in CtrlView. The advantage of this feature is that a user can make marks on the picture and save them in a file. These marks can be invisible as well as visible (as set in Preferences) when saved drawing is viewed with another program or when it is printed.

To show, hide or erase marks:

- Choose **Mark up/Show,Hide,Erase**.

All marks can be showed, hidden or deleted with the **Mark Up** menu items.



To add marks with segments:

- Press button  in the toolbar.

To add marks in the free scripting mode with the left mouse button pressed:

- Press button  in the toolbar.

To add text marks:

- Press button **T** in the toolbar, enter your text from the keyboard, and click on the picture where you want the text to appear.

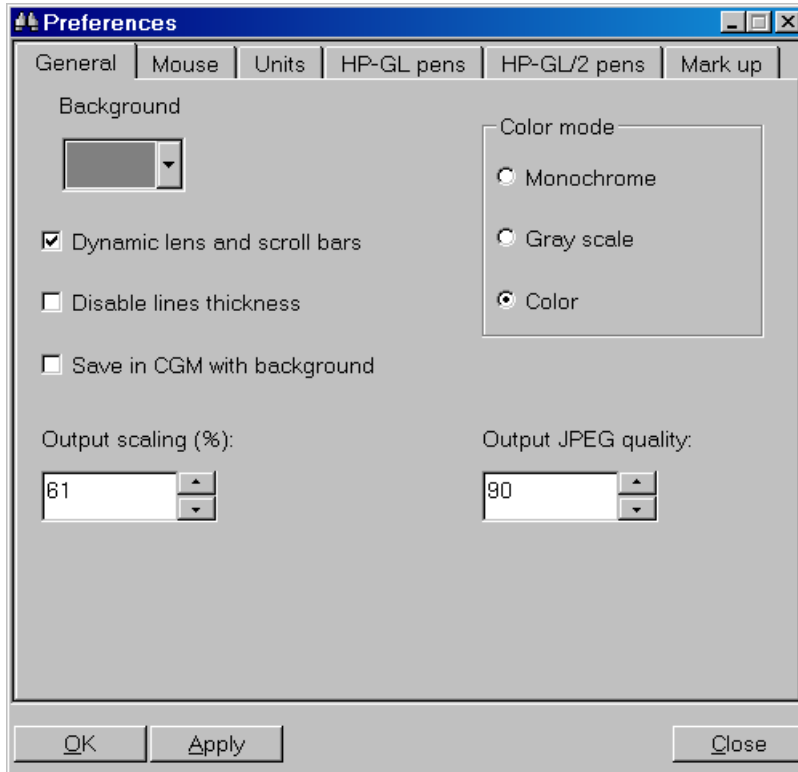
Preferences for 2D Vector formats

To open preferences dialog box:

- Choose **Options/Preferences**.
- Choose **OK** to exit saving changes.
- Choose **Apply** to apply all changes.
- Choose **Cancel** to exit without saving changes.

General Preferences

See [General Preferences for 2D Raster formats](#)



Additional features:

To switch on **Thin lines** mode:

- Check **Disable lines thickness** checkbox.

To save file in Computer Graphics Metafile (CGM) with the background:

- Check **Save in GCM with the background** checkbox.

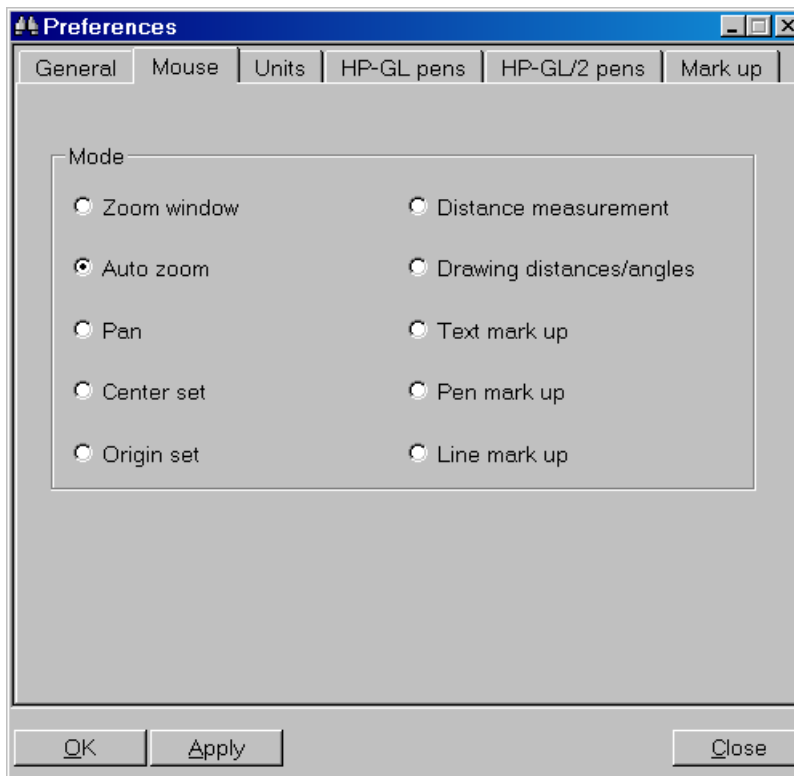
CtrlView allows you to choose whether you want to save a background or not. Note, that saved background can't be adjusted later, but a picture without a background can be later positioned over any background needed.

To define picture's output size:


- Choose scale value between 0% and 100% in the **Output scaling** range box.

Mouse


This section duplicates the mouse mode group in the toolbar.




To move picture in the needed direction:

- Click **Pan** radio button in the Preferences, or
- Press  in [Mouse mode buttons](#) in the toolbar.


To move desired picture point to the drawing area center:

- Click **Center set** radio button in the Preferences, or
- Press  in [Mouse mode buttons](#) in the toolbar.

To find coordinates relatively to a point:

- Click **Origin set** radio button in the Preferences, or
- Press  in [Mouse mode buttons](#) in the toolbar.


To measure the distance between any two points:

- Click **Distance measurement** radio button in the Preferences, or
- Press  in [Mouse mode buttons](#) in the toolbar.


To determine coordinates, distance between two drawing points and angle between three drawing points:

- Click **Drawing distances/angles** radio button in the Preferences, or
- Press  in [Mouse mode buttons](#) in the toolbar.


To add marks with segments:

- Click **Line mark up** radio button in the Preferences, or
- Press  in [Mouse mode buttons](#) in the toolbar.

To add marks in the free scripting mode with the left mouse button pressed:

- Click **Pen mark up** radio button in the Preferences, or
- Press  in [Mouse mode buttons](#) in the toolbar.

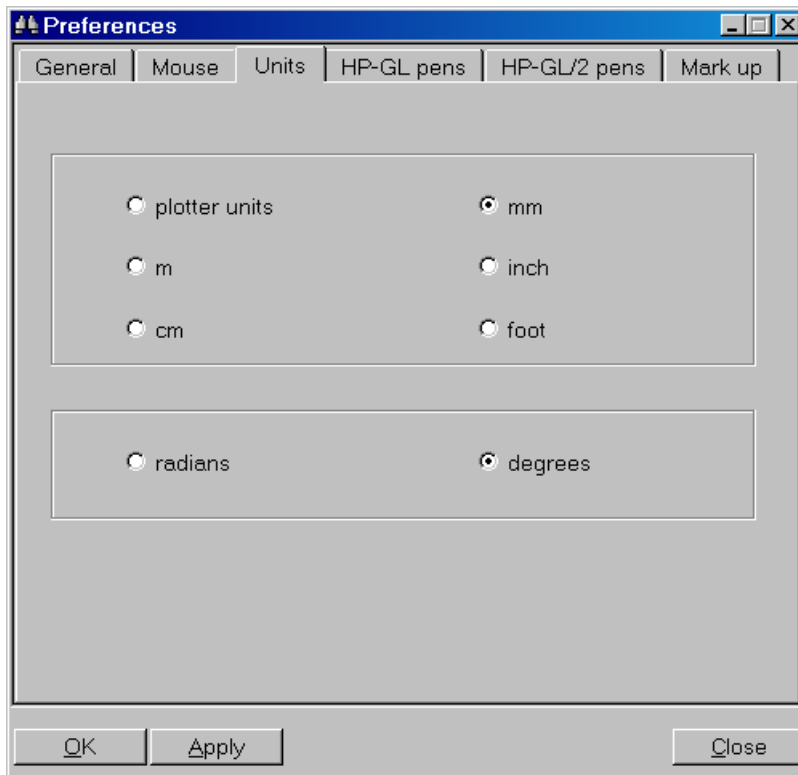
To add text marks:

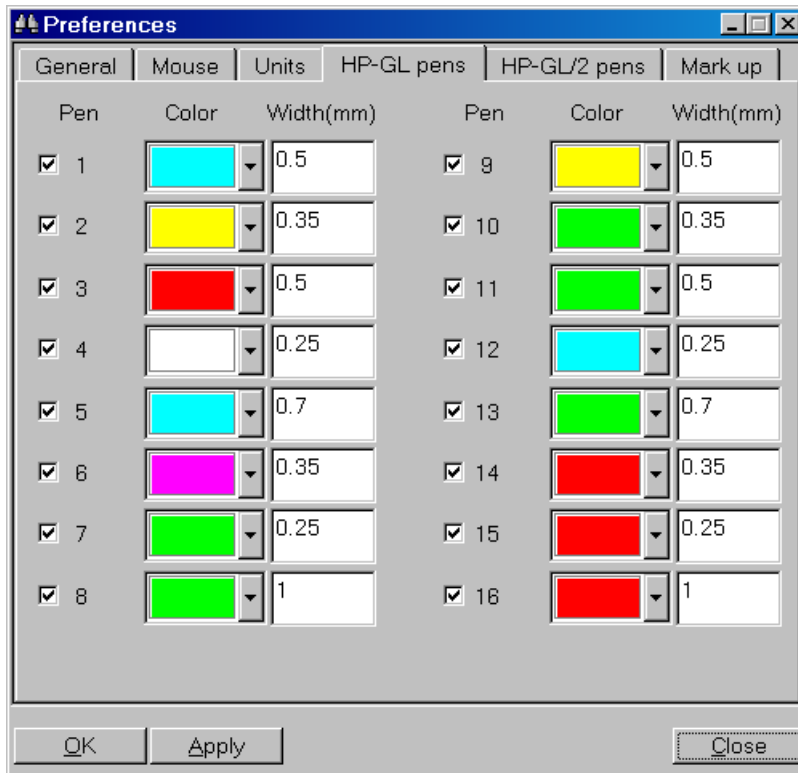
- Click **Text mark up** radio button in the Preferences, or
- Press  in [Mouse mode buttons](#) in the toolbar.

Enter your text from the keyboard and click on the picture where you want the text to appear.

Units

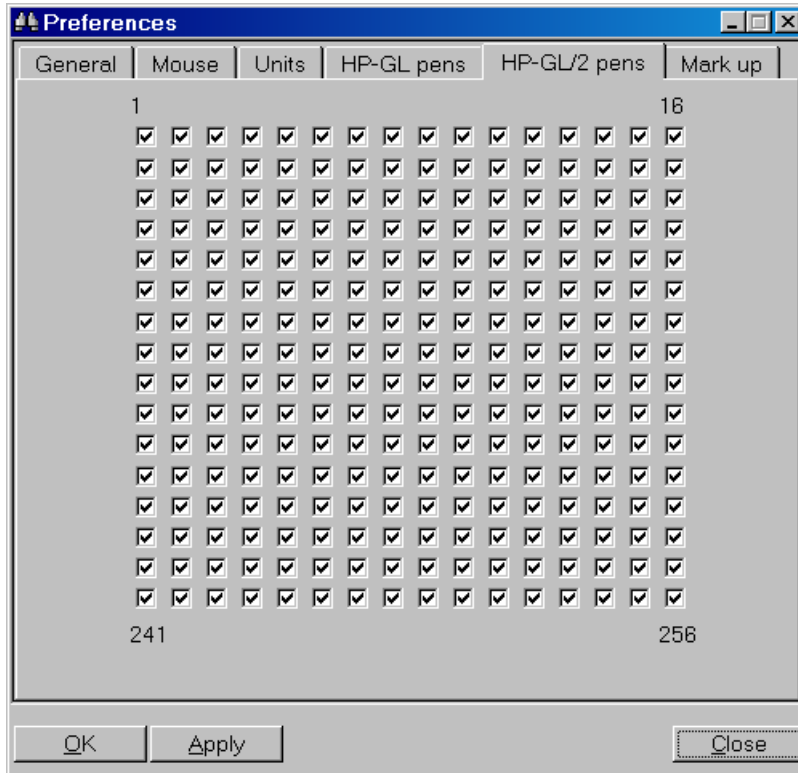
Choose measuring units for the **Ruler** and the **Point's meter** tools using Units dialog.



HP-GL Pens

Choose width and color of the plotter pens using HP-GL pens dialog. You can turn off pens if you need. When the HP-GL format was invented, all plotters had only 8 or 16 pens. That's why there are only 16 parameter groups on the dialog.

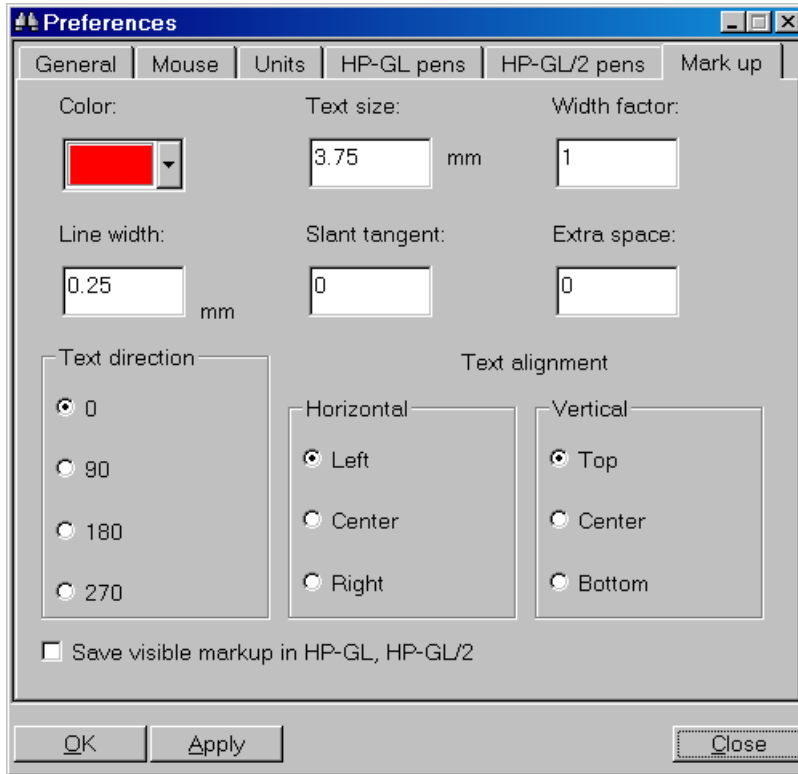
HP-GL/2 Pens



HP-GL/2 format was developed when laser and inkjet plotters already existed. So pens in HP-GL/2 are in effect just graphic attributes settings that are defined inside file. Using this window you can turn on or turn off pens you selected. This tab is suitable for a standard number of 256 pens.

Mark up

Choose marker and text parameters using Mark Up dialog.



Color – the color of the marker.

Width – line width.

Text size – font size.

Text direction – choose between vertical, horizontal, reverse vertical, reverse horizontal.

Text alignment – text position relatively to the cursor.

Width factor – increases or decreases the width of the text marker symbols.

Slant tangent – an angle of symbols inclination. The value should be between - 0.9 and 0.9. Positive means inclination to the right and vice versa.

Extra space – distance between the letters in letter width, where 1 means one letter.

Text direction – choose between vertical, horizontal, reverse vertical, reverse horizontal.

Save visible markup in HP-GL, HP-GL/2 – As a default marks aren't saved to the HP-GL and HP-GL/2 files. To save marks check the box.

3D Polygon formats

About 3D Polygon formats

3D polygon formats are used to store objects in 3D modeling programs and games. 3D files contain object vertexes, planes, surfaces, lights, animation keys, cameras and other information for the object rendering.

Because of many render algorithms existence, 3D formats have some difference in their features and sometimes don't support some of the objects described above.

Autodesk 3D Studio (3DS)

The 3DS file format was the native file format of the old Autodesk "3D Studio R1-R4" software, which was popular up to 1996 until its successor (3DS Max, or 3D Studio MAX) replaced it.

Having been around since the very late 1980's, it has grown to become an industry standard for transferring models between 3D programs, or for storing models for 3D resource catalogs (similar in status to Wavefront OBJ as a model archiving file format).

AC3D

AC3D is designed to make the construction of 3d objects fast and easy to do. It is used to create 3D models for games, rendering ray-traced images, and for scientific and general data visualization.

AC3D runs on a wide range of standard hardware and is available across a number of popular platforms.

Digital SURF

SURF uses standard Starlink NDF (SUN/33) file format. This is a hierarchical format based on HDS (SUN/92) and has native support for variances, quality flags, non-linear axes and arbitrary extensions.

LightWave 3D (LWO)

LWO is a single geometry file format. LWO may be presented in two modes: binary and text. This format supports animation of objects.

Unique abilities of its format are presentation polygons in NURBS, metaballs etc. The biggest advantage of its format is difficult geometry usage possibility. Among disadvantages are insufficient materials possibilities.

Wavefront (OBJ)

Object files define the geometry and other properties for objects for Wavefront's Advanced Visualizer. Object files can be in ASCII format (.obj) or binary format (.mod).

Stereolithographic text (STL)

The .stl or stereolithography format is an ASCII or binary file used in manufacturing. It is a list of the triangular surfaces that describe a computer generated solid model and is a standard input for most rapid prototyping machines and a standard output format from most CAD (computer-aided design) software.

The ASCII STL file usually has a filename extension of ".stla". It contains a description of the surface of a solid that has been decomposed into triangles. The vertices of the triangles should be listed in counterclockwise order, as viewed from outside the surface. A normal vector for the triangle may also be listed.

Stereolithographic binary (STL)

A binary STL file has the following structure:

- An 80 byte ASCII header that can be used as a title.
- A 4 byte unsigned long integer, the number of facets.
- For each facet, a facet record of 50 bytes.

VRML 1.0 (WRL)

The Virtual Reality Modeling Language (VRML) is a language for describing multi-participant interactive simulations (virtual worlds) networked via the global Internet and hyperlinked with the World Wide Web. All aspects of virtual world display, interaction and internetworking can be specified using VRML. It is the intention of its designers that VRML become the standard language for interactive simulation within the World Wide Web.

The first version of VRML allows for the creation of virtual worlds with limited interactive behavior. These worlds can contain objects, which have hyperlinks to other worlds, HTML documents or other valid MIME types. Thus VRML viewers are the perfect companion applications to standard WWW browsers for navigating and visualizing the Web.

VRML 2.0 (WRL)

VRML 2.0 was reviewed by the VRML moderated email discussion group, and later adopted and endorsed by many companies and individuals.

Advanced features for 3D Polygon formats

OpenGL for hardware acceleration


CtrlView renders 3D objects using OpenGL library. If you have a modern video display board with 3D accelerator installed on your PC, 3D objects mapping speed will increase dramatically.

Drawing mode

There are 6 display modes supported:

- Vertexes.
- Mesh.
- Wire frame.
- Outlines.
- Shadow model.
- Outlined shadow model.

To view the object in one of the six modes:

- Select **View/Vertexes, Mesh, Wire frame, Outlines, Shadow model, Outlined shadow model**, or
- 
- Press one of the buttons in the toolbar

Brightness level control

Using this control element you can adjust the brightness of the light source of the object.






More complex light settings are contained in the **Lights** preference dialog.


Orbit

To define coordinate system orientation for the model with mouse:

- Press Mouse mode button  in the toolbar and press the left mouse button in the graphic area. Move mouse to define coordinate system orientation and release mouse button.

Rotate

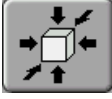
To rotate the object on its axis:

- Select **View/Rotate**, or
- Press Rotate button  in the toolbar.

The object will revolve on one of six axes: OX++, OX--, OY++, OY--, OZ++, OZ--.

Standard views


To switch between standard views:

- Select **View/Standard** views, or
- Press  button in the toolbar.

You can quickly switch between the standard views of the object: from the left, from the right, from above, from bottom, from the front, from behind.


Isometric views

To rotate the object to one of the isometric axis and to rotate the object around the desired axis:

- Press Isometric views button  in the toolbar.

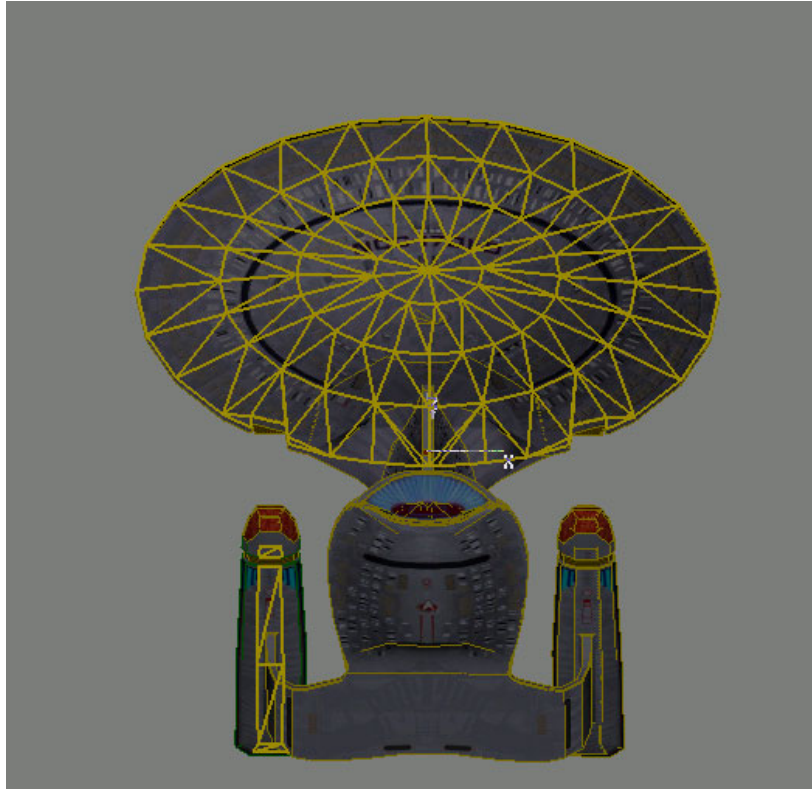
Animated rotation

To rotate object smoothly on its vertical axis:

- Choose **View/Animated rotation**, or
- Press Animated rotation button  in the toolbar.


With this feature the object is smoothly rotated on its vertical axis without any mouse move. You can adjust preferences of the **Animated rotation** in the corresponding submenu.

Parts selecting



Most 3D formats allow storing several objects, which can be sometimes united to one.

To work with selected object:

- Use **View/Select all objects**, **Unselect all objects**, **Hide selected objects**, **Show all objects**, or
- Press  button in the toolbar.

Then click at some point on the screen and you'll see an entity the point clicked corresponds to. To unselect an object just click it once more. You can also make the transformations described above with the selected parts of an object and save them to file,

Measurements


To determine coordinates, distance between two vertices and angle between three vertices:

- Press  mouse mode button.

Functionality of this mode is completely similar to the functionality of the 2D mode, but with mouse 3D coordinates in status bar.

Default view

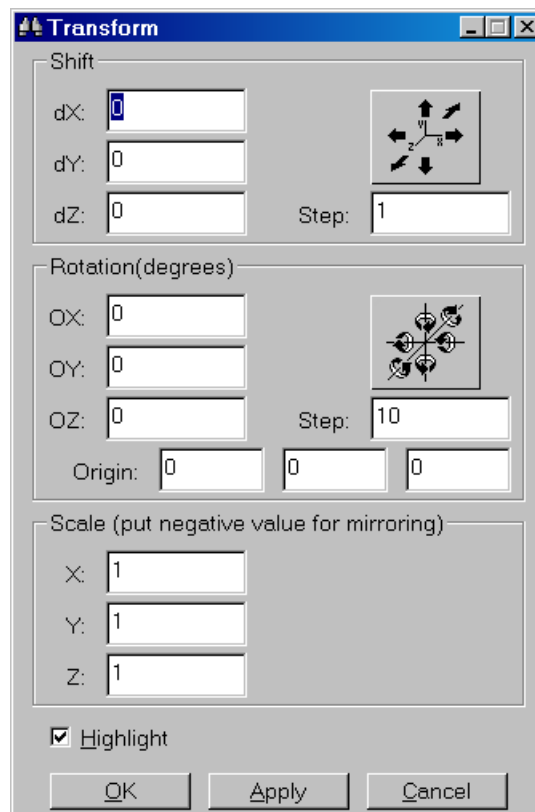
To see default object view:

- Choose **View/Default**, or
- Click **Draw default view** button  in the toolbar.

Edit

To do transformation of the selected objects:

Use **Edit/Transform selected objects**.



Group **Shift** defines [Standard views](#).

Group **Rotation** defines [Rotation](#) and [Orbit](#).

Group **Scale** defines scales by XYZ.

Checkbox **Highlight** defines whether selected objects are highlighted or not.

To delete selected objects:

Use **Edit/Delete selected objects**.

Preferences

Preferences are available from menu item **Options/Preferences**.

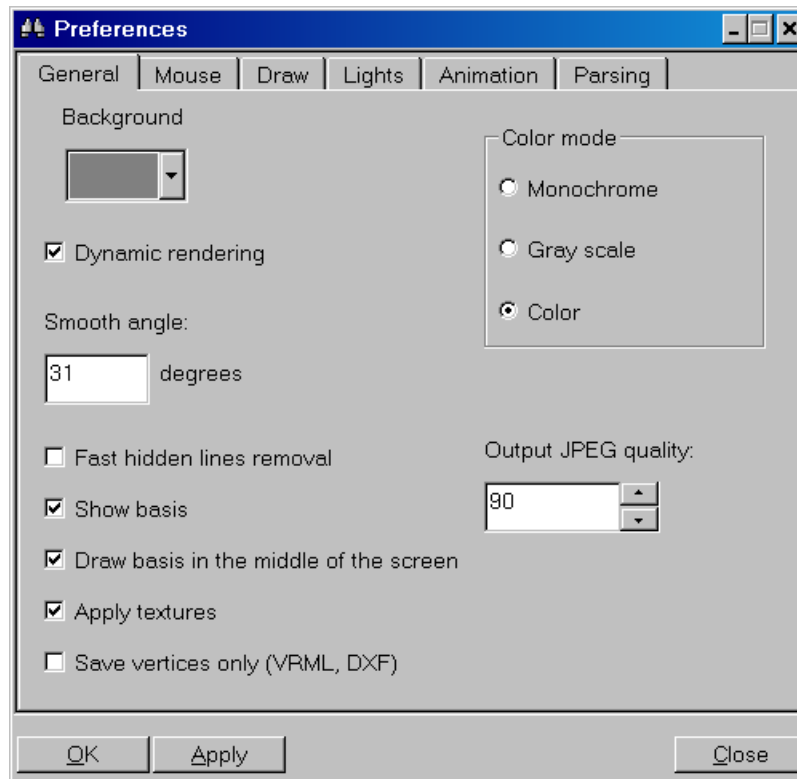
Press **OK** button to exit saving changes.

Press **Apply** button to apply all changes.

Press **Cancel** button to exit without saving changes.

General

You can change your working environment as well as image properties.



To change the color of the graphic area background:

- Choose the color in **Background** combo box.

To make the dynamic rendering possible:

- Check the **Dynamic rendering** checkbox.

The object will be dynamically rendered when the mouse is moved with the left button depressed. In the other way, when the flag isn't checked, the object will be displayed as a number of vertices while the mouse button is depressed and will be completely redrawn when the button released.

To define the angle between the polygons used for normals computation:

- Assign an angle value in the **Smooth angle** box.

If angle is set to zero, the model will appear flat with sharp edges.

To apply fast algorithm for the hidden lines removal:

- Check the **Fast hidden lines removal** checkbox.

To make coordinate system basis visible:

- Check the **Show basis** checkbox.

To make coordinate system basis drawn in the middle of the screen and not at the model origin:

- Check the **Draw basis in the middle of the screen** checkbox.

To apply textures to the object when rendered:

- Check **Apply textures** checkbox.

To save only vertices in DXF or VRML formats:

- Check **Save vertices only (VRML, DXF)** checkbox.

To change the color mode of the working area:

- Click one of the radio buttons in **Color mode**.

This radio buttons group defines color set, to represent an image and repeats the [Color Filters](#) buttons group in the toolbar.

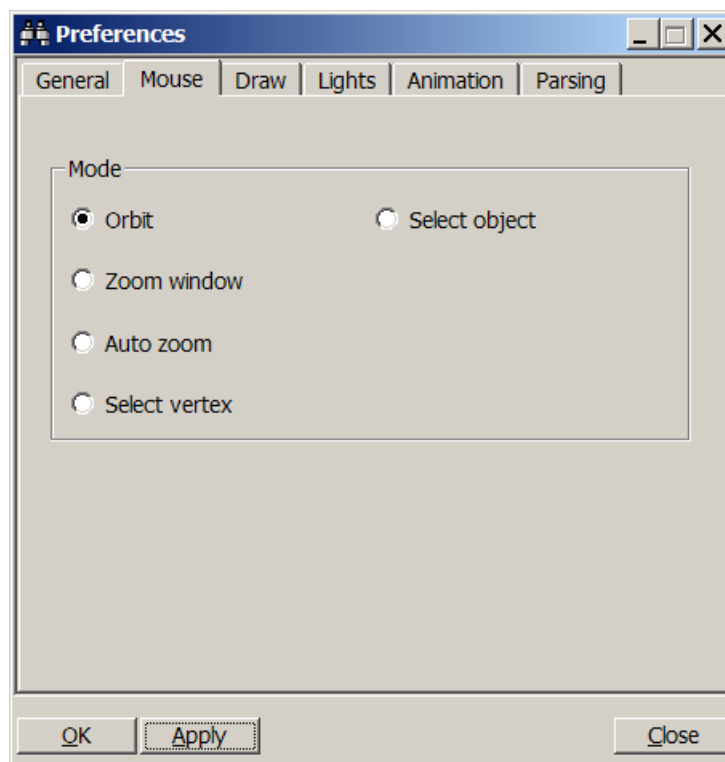
To specify output JPEG quality:

- Select the JPEG value in the **Output JPEG quality** range box.


Representing an image as a JPEG format relies on lossy compression, which selectively discards data. The range of the converting quality can be set from 1 to 100. The higher quality of JPEG is, the more the size of the file is, and vice versa. Balance between quality and size is reached at about 55-75%.

Mouse


This section represents the mouse mode group.



To define coordinate system orientation for the model or zoom in /out with Ctrl or Shift depressed with mouse:

- Click **Orbit** radio button in the Mouse Preferences, or
- Press  button in the toolbar.


To define zoom area:

- Click **Zoom window** radio button in the Mouse Preferences, or
- Press  button in the toolbar.


To magnify selected area immediately after mouse button release:

- Click **Auto zoom** radio button in the Mouse Preferences, or
- Press  button in the toolbar.

To select model vertices:

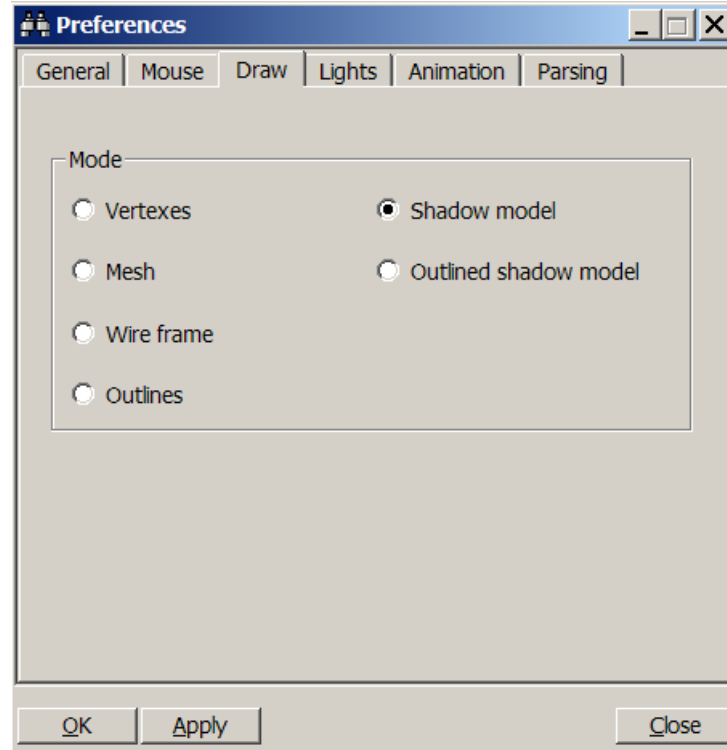
- Click **Select vertex** radio button in the Mouse Preferences, or
- Press  button in the toolbar.

To select parts of the model:

- Click **Select object** button in the Mouse Preferences, or
- Press  button in the toolbar.

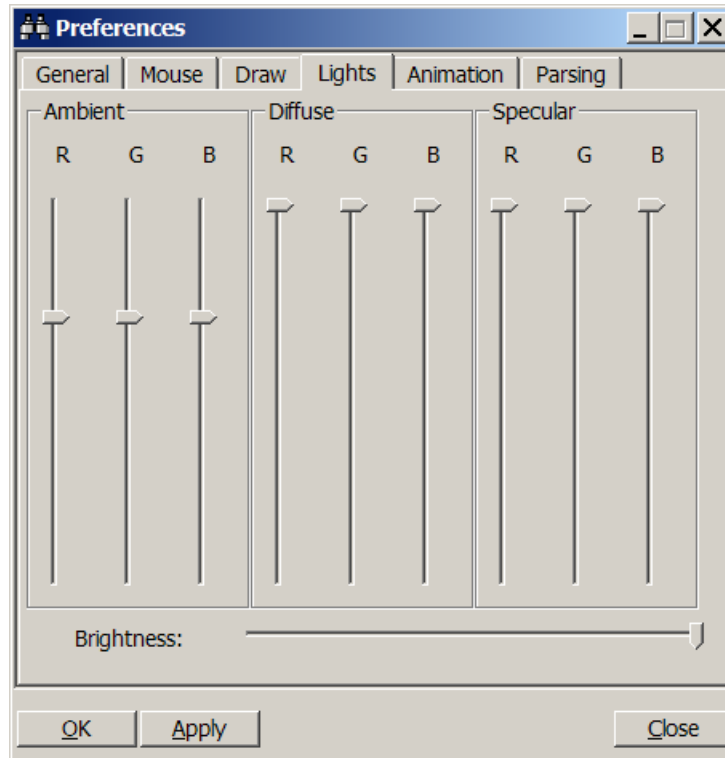
Drawing mode

This section repeats the Drawing mode toolbar buttons group



Lights

This section expands usability of **Brightness Level Control**. As the addition to the brightness level there are three more light components: ambient, diffuse, specular. For each one adjusting of the red, green and blue intensities are allowed.



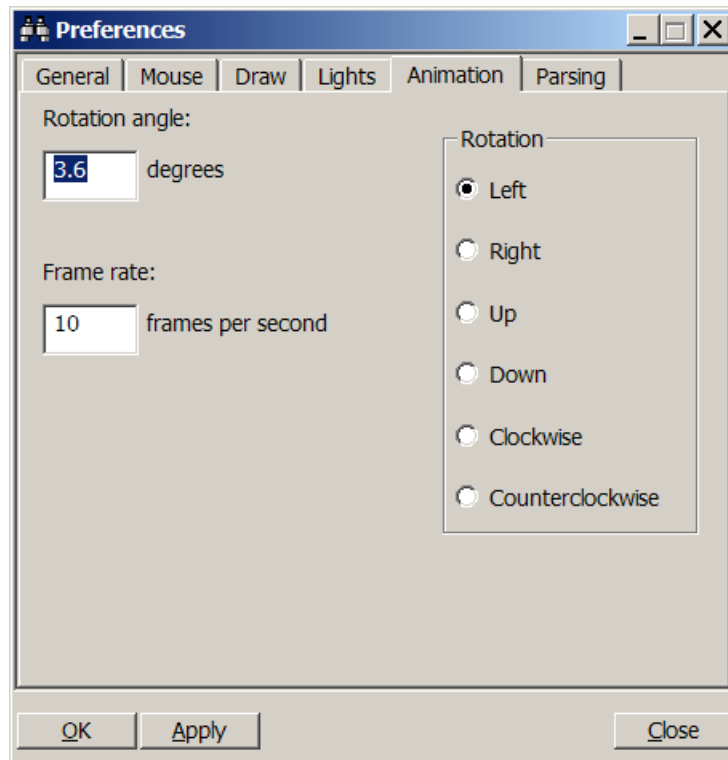
Ambient light source provides balanced illumination for the object. It's designed to show the parts of an object that are not illuminated with a directional light source.

Diffuse light illuminates each object's point depending on the light intensity and angle between light direction and surface.

Specular light source is reflected from each object's point. It's designed for the metallic or plastic luster, and so on.

Animation

This section sets parameters for animated rotation.



To define the angle of rotation step for every frame:

- Enter angle value in degrees to the **Rotation angle** text box.

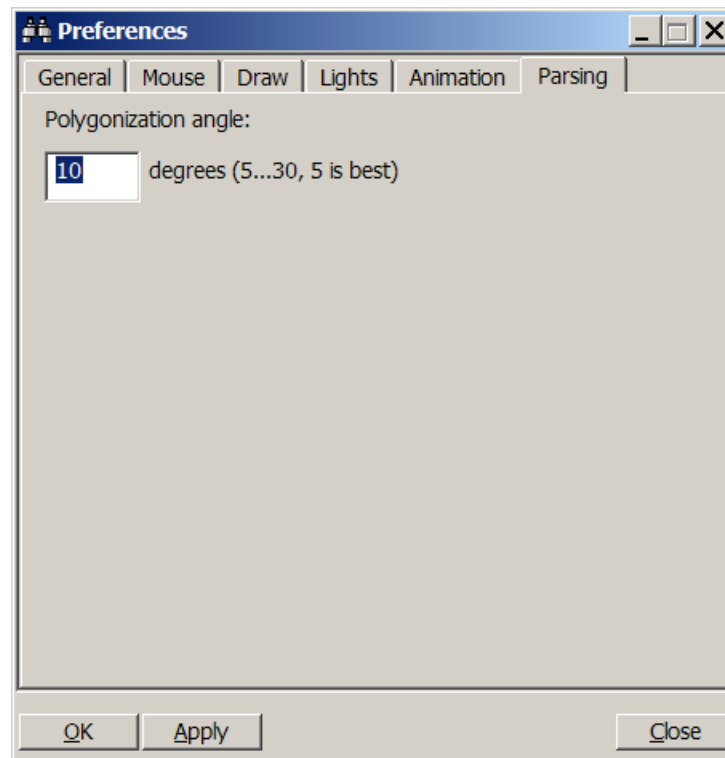
To define the number of frames shown per second:

- Enter the value to the **Frame rate** text box.

To define the direction of rotation:

- Choose one of the directions: left, right, up, down, clockwise and counterclockwise.

Parsing




To define the quality of the picture through the angle between polygon facets:

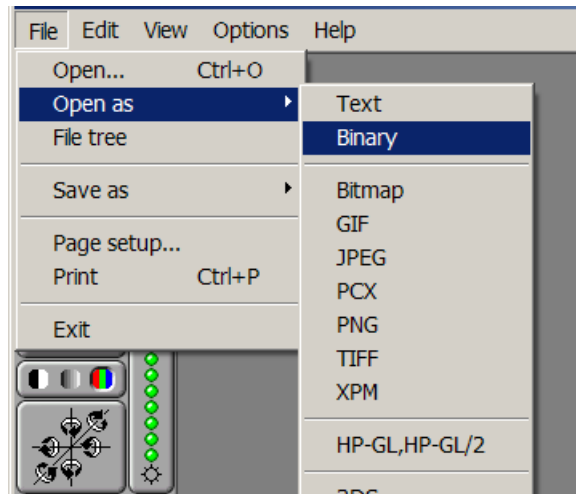
- Enter the value to the **Polygonization angle** text box.

This angle defines quality of real surfaces triangulization and curves representation as polylines. The less is the angle the more polygons/lines includes the object. Angle between connected polygons/lines is guaranteed to be not greater than this value.

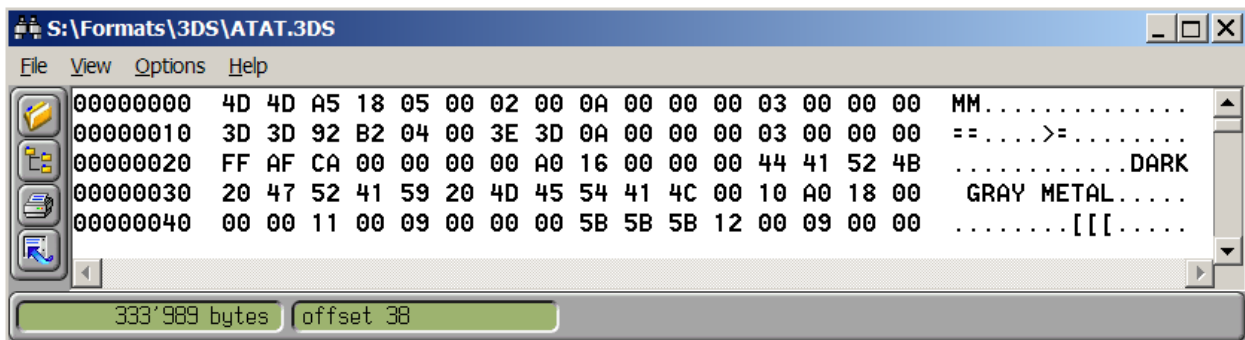
Viewing in Binary form

A file opens in Binary form in two following cases:

1. File format has not been recognized and file includes non-ASCII characters.
2. If it was opened with **File/Open as/Binary** or the **Binary view**  toolbar button.

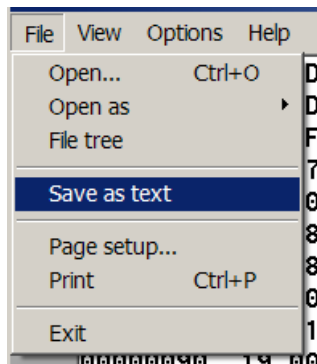


Viewing window in this mode comprises 3 columns: Offset, Hex and ASCII. You can see exact offset of every single byte in status bar just by clicking on this byte in the second or in the third column.



The whole file is not loaded to the CtrlView memory; only a part shown on the screen is loaded. Thus, even files of gigabytes size are opened and navigated promptly.

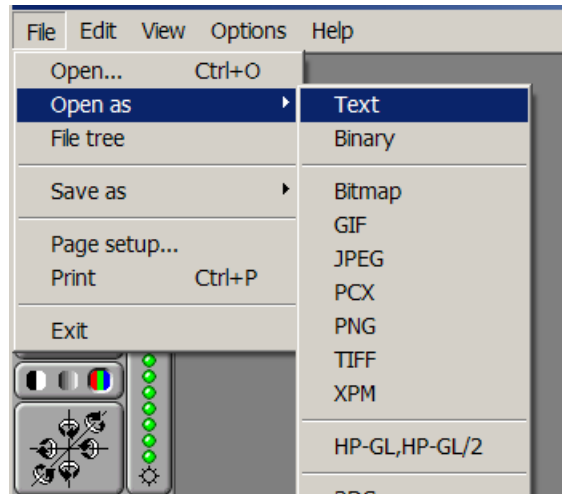
The file can also be saved in the three-column format (Offset, Hex and ASCII) with the **File/Save as text** menu item.



Viewing in ASCII form

If the file contains just text information and is not recognized as any graphic format supported by the CtrlView it automatically opens as an ASCII text. And the size of the file and current cursor position will be displayed at the status bar.

Any file also can be opened in ASCII form by using **File/Open as/Text** menu item.

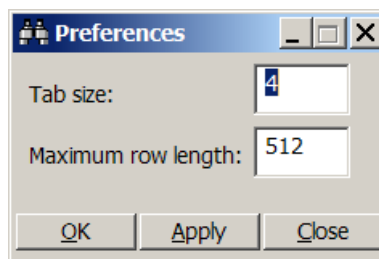


Preferences

Preferences section for the ASCII format contains two following parameters:

Tab size – defines the number of spaces a TAB will be exchanged to.

Maximum row length – defines the maximum string length displayed. When a string is longer than the specified value it will be cut.

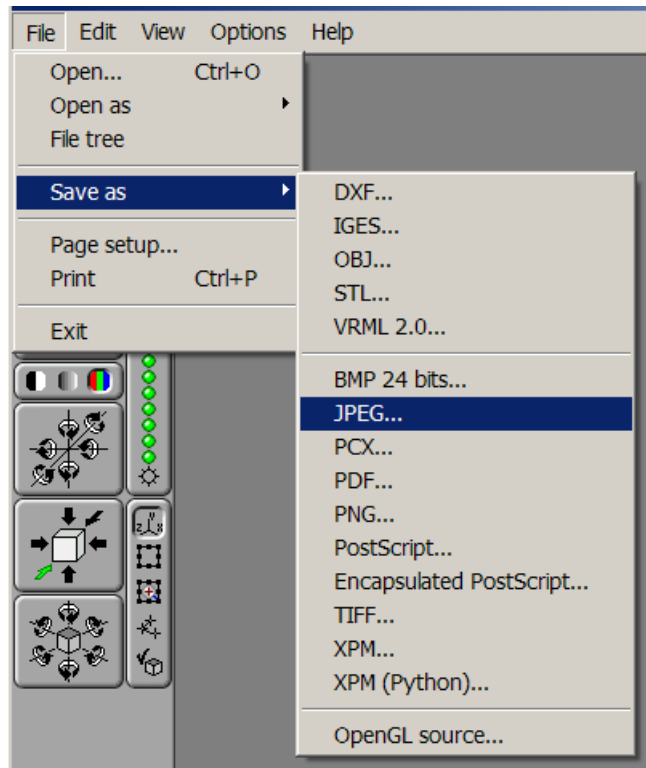


Converting

Save as

To convert the file from one format to the other:

Open file, choose **File/Save as** menu item and choose file format needed.



Command line

Command line is also available in the CtrlView. Command line syntax for batch mode is:

```
ctrlview -p input_name[,format[,view]]
  - prints fit to paper size;
```

```
ctrlview -p1 input_name[,format[,view]]
  - prints 1=1 (pixel to pixel for raster files, mm to mm for HP-GL, has no effect for 3D);
```

```
ctrlview input_name[,format[,x,y,w,h[,rot_angle]]][,view]] output_name,format[,width,height]
  - converts file to the selected format;
```

Supported input format keywords:

bmp,dib	– Windows bitmaps;
gif	– GIF format;
jpg,jpeg	– JPEG format;
pcx	– ZSoft PC Paintbrush;
png	– PNG format;
tiff	– TIFF format;
hpgl	– HP-GL, HP-GL/2;
3ds	– Autodesk 3D Studio;
ac3d	– AC3D Format;
lwo	– LightWave 3D;
obj	– Wavefront;
pls	– PLS format;
stlt	– stereolithography text;
stlb	– stereolithography binary;
surf	– Digital SURF;
vrml	– VRML 1.0, VRML 2.0;
xpm	– the X pixmap format;

Supported output format keywords:

bmp,dib	– Windows bitmaps;
jpg,jpeg	– JPEG format;
pcx	– ZSoft PC Paintbrush;
pdf	– Adobe Portable Document Format;
png	– PNG format;
tiff	– TIFF format;
ps	– PostScript;
eps	– Encapsulated PostScript;
dxg	– Autodesk Drawing eXchange Format;
cgm	– Computer Graphics Metafile;
hpgl	– HP-GL;
hpgl2	– HP-GL/2;
iges	– Initial Graphics Exchange Specification;
lwo	– LightWave 3D;
obj	– Wavefront;
stlt	– stereolithography text;
stlb	– stereolithography binary;
swf	– Macromedia Flash animation;
vrml2	– VRML 2.0;
xpm	– the X pixmap format;

x,y,w,h	– clipping window in relative units (0.0..1.0) from left bottom corner for HP-GL, HP-GL/2 only;
rot_angle	– rotate drawing 90, 180 or 270 degrees counterclockwise for HP-GL, HP-GL/2 only;
view	– 3D model view (iso, front, rear, left, right, top, bottom);
width,height	– in pixels for conversion from 2D vector/3D formats to 2D raster formats. 640x480 by default.

Usage examples:

for 3D files:

```
ctrlview test.3ds test.wrl,vrml2
```

– converts test.3ds (automatic defining of format) to VRML-2.0

```
ctrlview test.3ds,3ds test.iges,iges
```

– converts test.3ds (known in Autodesk 3D Studio format) to IGES

```
ctrlview test.3ds,3ds,iso test.jpg,jpeg
```

– converts test.3ds (known in Autodesk 3D Studio format) isometric view to 640x480 (default) JPEG

```
ctrlview test.3ds,3ds,front test.png,png,1024,768
```

– converts test.3ds (known in Autodesk 3D Studio format) front view to 1024x768 PNG

for 2D vector files:

```
ctrlview a3.plt test.dxf,dxf
```

– converts a3.plt (automatic defining of format) to DXF

```
ctrlview a3.plt,hppl,0.5,0,0.5,0.5 test.ps,eps
```

– converts a3.plt (known in HP-GL format) right bottom corner to Encapsulated PostScript

```
ctrlview a3.plt,hppl,0.75,0.75,0.25,0.25 test.bmp,bmp,640,640
```

– converts a3.plt (known in HP-GL format) right top corner to 640x640 bitmap

```
ctrlview a3.plt,hppl,0,0,1,1,90 test.iges,iges
```

– rotates 90 degrees and converts a3.plt (known in HP-GL format) to IGES

for raster files:

```
ctrlview test.img test.jpg,jpeg
```

– converts test.img (automatic defining of format) to JPEG

```
ctrlview test.bmp,bmp test.tif,tiff
```

– converts test.bmp (bitmap) to TIFF

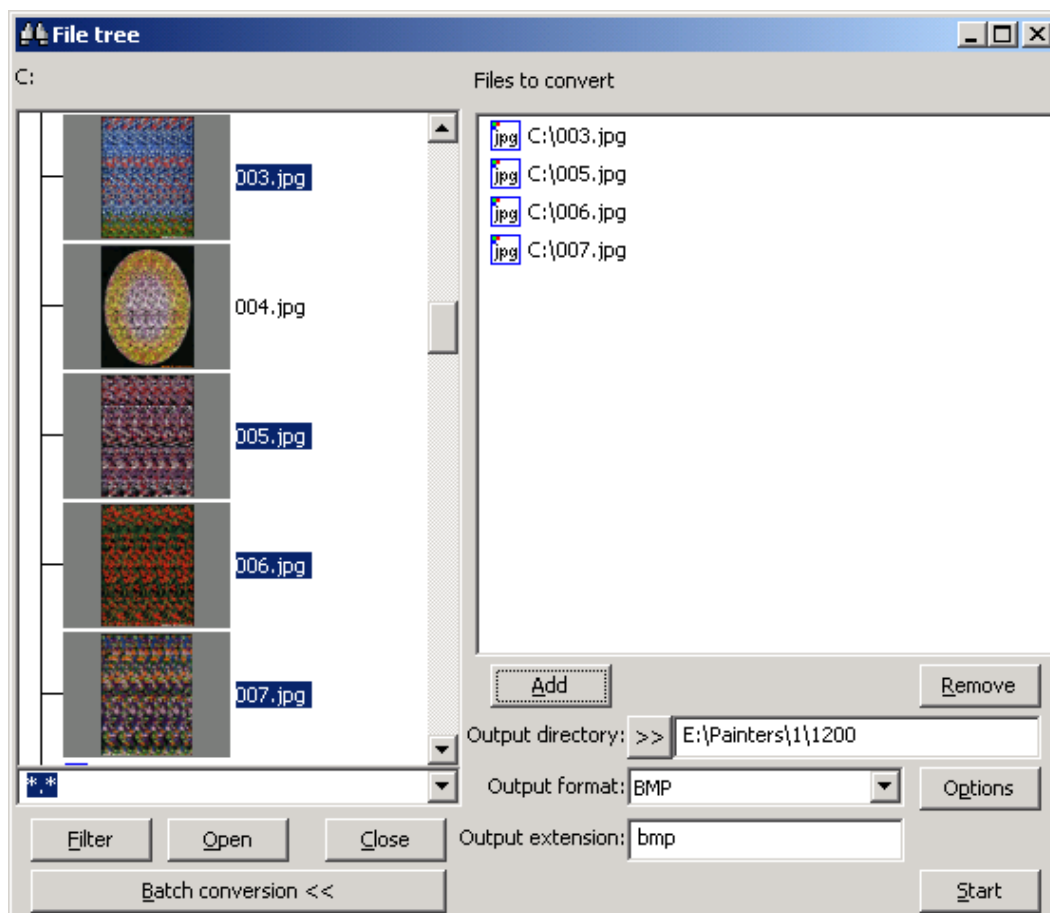
Batch Conversion

To convert a subset of files in the folder:

Select the files you want to convert in **File tree**, click the **Batch Conversion** button, click **Add** button and specify output format, output directory and output extension. All selected files will be converted at once.

You can add files to the convert list from different folders. It is possible to add all files in the folder by selecting folder itself.

To remove some files from the list select them and press the **Remove** button.

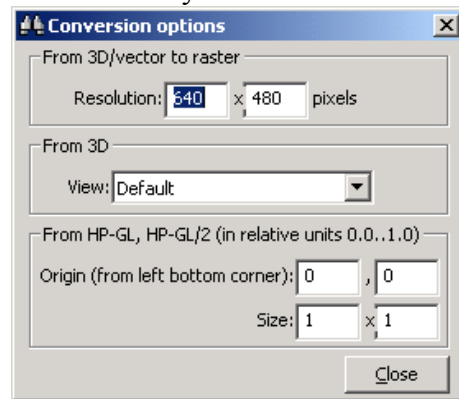


Converting options window defines options of the output file document:

- From 3D/vector to raster defines resolution of the output raster file.
- From 3D defines default view of the output file.
- From HP-GL, HP-GL/2 defines origin coordinates and size of the output file.

Converting

Default Converting options window you can see below.



Batch Conversion

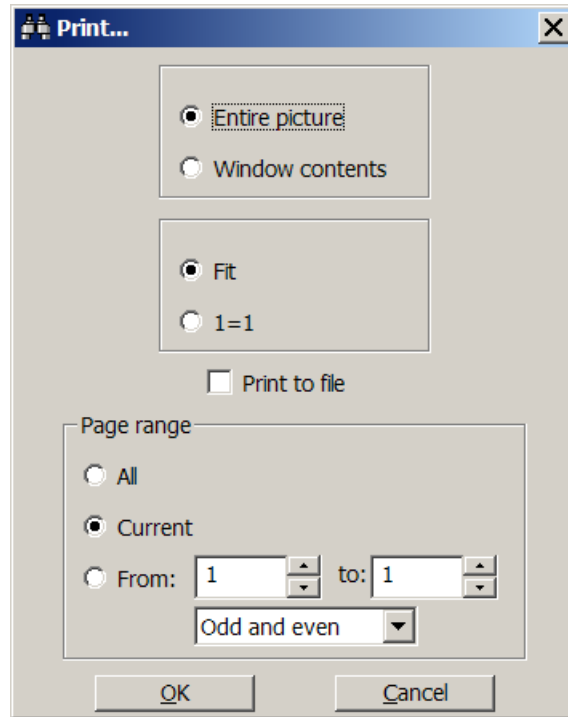
After creating the convert list and selecting an output format, press **Start** button to start conversion.

Printing

Printer options

Printer options are available for all 2D raster, 2D vector and 3D polygon formats. There are differences in options for each format.

Printer options window for 2D raster formats is shown below.



There are 3 groups of options.

In the first one you can choose what to print:

- Entire file – print graphic file only;
- Windows contents – print graphic file with its windows contents.

In the second one you can choose how to print:

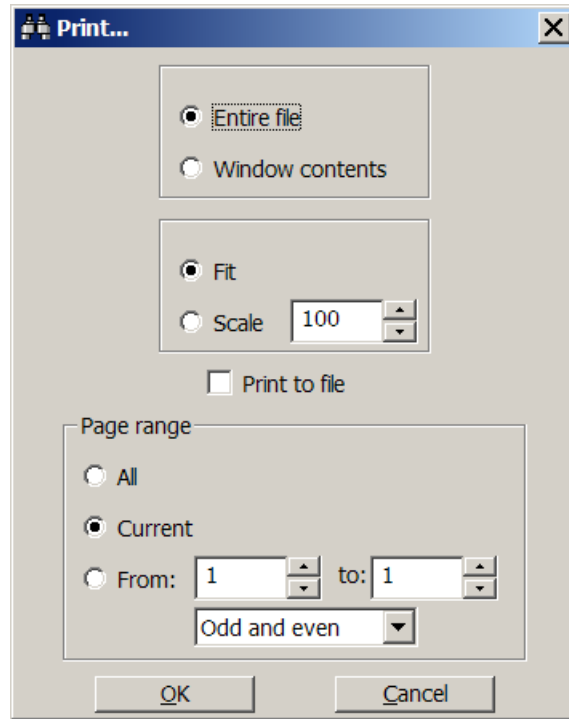
- Fit – print image fitted to screen;
- 1=1 – print image in the scale one picture pixel to one printer pixel;
- Print to file – print image to file.

In the third one you can choose what pages to print:

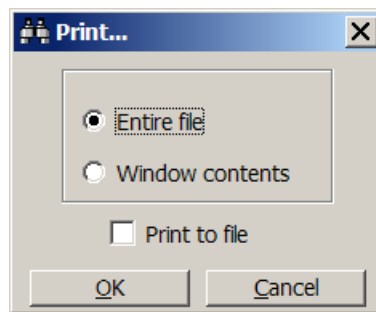
- All – print all images;
- Current – print current image only;

- From ... to ... – print images from number to number;
- Odd and even listbox – print odd and even, odd or even images.

Printer options window for 2D vector formats is shown below. It has the same functionality with the only one difference: in the second group of options you can chose not 1=1 scale but any scale from 1% to 100%.

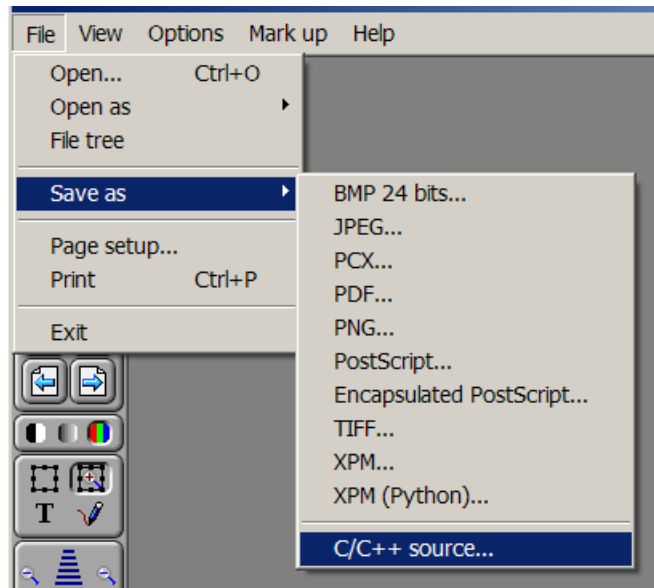


Printer options window for 3D polygon formats is shown below. It has less number of functions but their functionality is the same.



C++/Open GL generated source code usage

To use C/C++ source code generation chose **File/Save as/C/C++ source....**

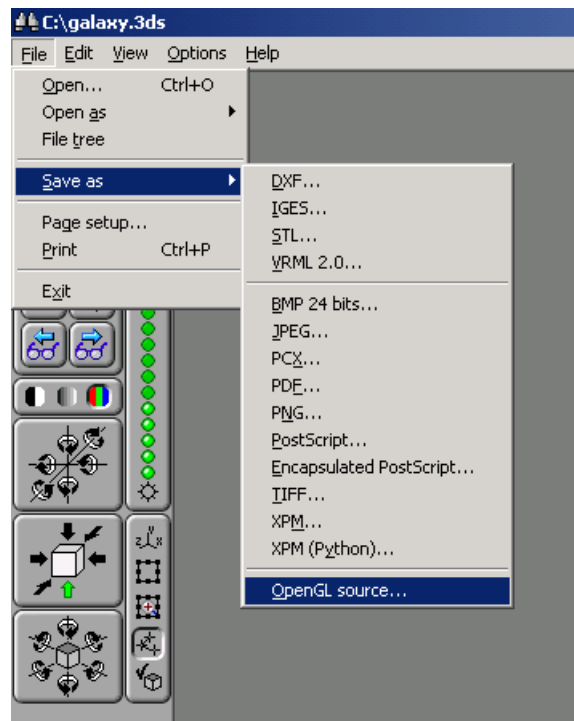


The result for 2D raster images is bitmap array of pixels that you can paste in your program and not to use recourse files. This option is very convenient for little size programs. Example of source code for image is shown below.

```
COLORREF bitmap[16][16] =
{
    {
        RGB( 0, 0, 73), RGB( 0, 0, 86), RGB( 0, 0, 102), RGB( 0, 0, 119),
        .
        .
        .
        RGB( 0, 0, 69), RGB( 0, 0, 66), RGB( 0, 0, 66), RGB( 0, 0, 69)
    }
};
```


C++/Open GL generated source code usage

To use OpenGL source code generation chose **File/Save as/OpenGL source...**



The result for 3D polygon images is OpenGL file that you can paste in your program. This option is very convenient for programs that work with 3D polygon images.

Contact

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To get updates visit website **www.CtrlView.com** .

Your feedback is always welcome! Please contact us by email at **amatveev@ctrlview.com**.