

C L A R E S



Amazing 3 Dimensional
Graphics

ProAction

3QD
DEVELOPMENTS LTD

APDL

Illusionist

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Contents

Introduction	5	Render menu	24
What is Illusionist?	5	Mini test	24
What illusionist does	5	Wire frame	24
The difference between Illusionist and Render Bender	5	Back hidden	24
What can I use Illusionist for?	5	Screen mode	24
Useful additions	5	Screen off	24
Object definition	6	Multi-task	24
		Closest fit	25
		Anti-aliasing	25
Getting started	8	Environment	25
The icon bar menu	8	Draw picture	25
Prog info	8	See picture	25
File info	8		
Clear all	8	Misc menu	26
Quit	8	Grid	26
Main window	8	Lock	26
		Rot degrees	26
The Edit window	9	Scale NS (Ctrl N)	26
Rotate about West/East axis	9	Scale WE (Ctrl W)	26
Rotate about North/South axis	10	Scale UD (Ctrl U)	26
Rotate about Up/Down axis	10	Scale factor	26
Zoom	10	Object sides	26
Select all	10	Object Map Divisions	26
Join	10		
Scale	10	Save menu	27
Plant cursor	10	Vectors	27
Selector cursor	10	Sweep	27
Polygon maker	11	Picture	27
Mover	11	Daw	27
Panning	11	24bit	27
Edit menu	12	Tutorial	29
Add object	12	The Golden chalice	29
Delete - Ctrl X	12	Nuts to you !	29
Delete Pol	13		
Tiling	17	Appendix A	31
Triangles	17	The converters	31
Update	17	!Old_New	31
Do	18	!New_Old	31
Lamps	18		
Sweep	19		
Designing a Sweep object	19		
Connect	20		
Copy (Ctrl C)	20		
World menu	21		
Observer (Ctrl O)	21		
Target (Ctrl T)	21		
Tilt	21		
X/Y Ratio	21		
View angle	21		
Exposure	21		
Ambience	22		
Environment	22		
Black clear	22		
PicMaps (Ctrl P)	22		
Labels (Ctrl L)	23		
Cursor (Ctrl S)	23		
Enhancer	23		

Introduction

What is Illusionist?

Illusionist is a powerful 3-dimensional graphics package. It allows the user to create wire frame (vector) images, built up by adding together a series of objects, both pre-defined and user defined.

3D computer graphics can be directly associated with the techniques of photography. A photographer finds or creates his scene, puts his camera in the desired position and angle, providing or waiting for the appropriate lighting, then he focuses that light on film.

Computers mimic that process to make synthetic images. The key parts of the process are defining, arranging and illuminating a set of objects, and converting this three dimensional scene to a two dimensional viewing device - the monitor. The difference is that all of these steps take place entirely in a computer.

Instead of using objects, lights and cameras, the rendering process works on an internal representation of an imaginary scene. The passage of light through the scene, its interaction with surfaces and its projection onto the screen are simulated by algorithms that operate on this internal representation.

What illusionist does

Illusionist is a package that enables you to create any object, of any colour and texture, illuminate it with coloured lights or spot lights, and render it in any 256 colour screen mode. A special colour mixing algorithm enables Illusionist to display an infinite number of colours, giving the impression of very expensive graphics hardware.

The difference between Illusionist and Render Bender

Render Bender uses ray tracing to generate the image. This form of rendering produces very realistic images, with shadows and reflections, but it is also very time consuming. Rendering time increases as more polygons are added.

Illusionist uses a more traditional technique of painting the polygons on the screen one at a time. You cannot cast shadows or have mirrored objects, but you can design and render far more complex scenes in a fraction of the time taken to ray trace them.

Once the vector image is created you can then take any sprite or picture file and map it onto any object. In the case of a sphere you can literally wrap it around the sphere. The objects can then be given a texture or surface, varying from matt to metallic.

By adding light sources, different areas of the picture can be highlighted and of course all surface textures are taken into account when the rendering process begins.

The beauty of the package is that because each object is created separately any object in a picture can be moved, rotated or enlarged independently of any other object on screen, thus opening the doors to animation and graphics manipulation. Illusionist also makes use of the Serial Port's Graphics Enhancer card if it is fitted to your computer. This provides better graduated shading in many cases and enhances the image quality.

What can I use Illusionist for?

Illusionist can be used for a variety of projects. You can construct room scenes, pack designs, snooker table, robots, logos, chess sets and, dare we say, optical illusions such as those produced by Escher. Don't forget that the images produced are also artistic and art is a very valid use for Illusionist. The uses are unlimited - the only limit is your imagination !

Useful additions

Because Illusionist can accept sprites for mapping onto objects it is useful to have a library of images that can be used for this purpose. You can have a pre-defined library or you can create your own. This can be done in many ways. You can use painting packages such as Paint or Artisan - save the screens as sprites not as compacted files. All maps must be either mode 12 or mode 13.

Perhaps the most useful addition would be a scanner. This enables you to scan pictures, photographs etc for use as texture maps, but more importantly you can add to the library of real texture maps that are supplied with Illusionist. The supplied maps include wood, marble, brick etc. You can scan almost anything and use it as a texture map. For example, sandpaper, chocolate wrappers, sandstone, wallpaper etc. Colour flatbed scanners make it easy to produce your own texture maps and there are massive resources online for textures on sites such as Pinterest.

Object definition

All objects in a scene are created with flat surfaces (polygons). Using a cube as an example (Figure 1), we have 8 points that are connected to make 6 polygons. After positioning the points in 3D, the top (shaded) 4 sided polygon is created by connecting the points numbered 1,4,8,5. Note that the polygon is created in an anti-clockwise direction, this makes the surface face upwards. Unless otherwise specified, all polygons facing away from the 'observer' are invisible. All the faces of a cube should be facing outward and thus visible, or at least visible if the cube is rotated.

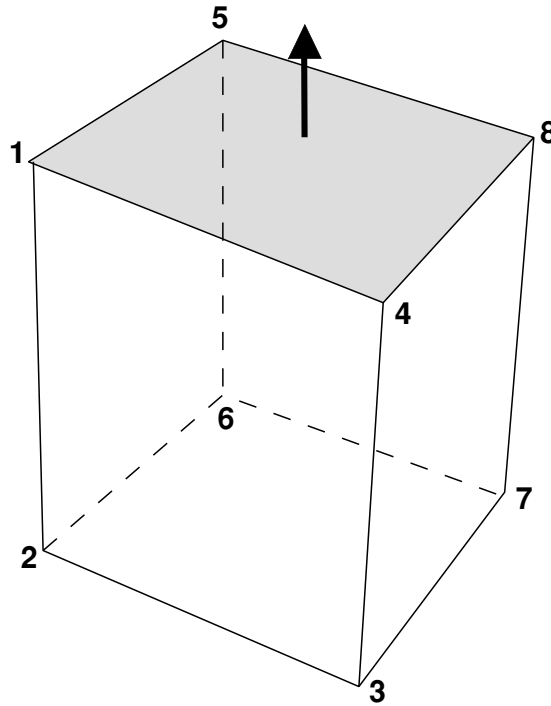


Figure 1

A polygon is a closed figure created from three or more straight sides. Specific forms of polygon are named relative to the number of sides making up the polygon eg triangle, pentagon etc.

In Illusionist these polygons are normally *single faced*. This means that if you view them from one side they are visible but from the other side they are invisible. Normally polygons are drawn facing you so that they are visible. However, you can rotate the polygons and in some instances part or all of the polygon may disappear. In this case you may need to use the option to make polygons *double faced* so that they are always visible.

Curved surfaces must be approximated by using a number of small polygons. The more polygons you use, the smoother the object will be. In Figure 2 the difference between using 6 and 12 lines to form a circle is shown clearly. Instead of using lines in 2 dimensions Illusionist uses polygons in 3 dimensions.

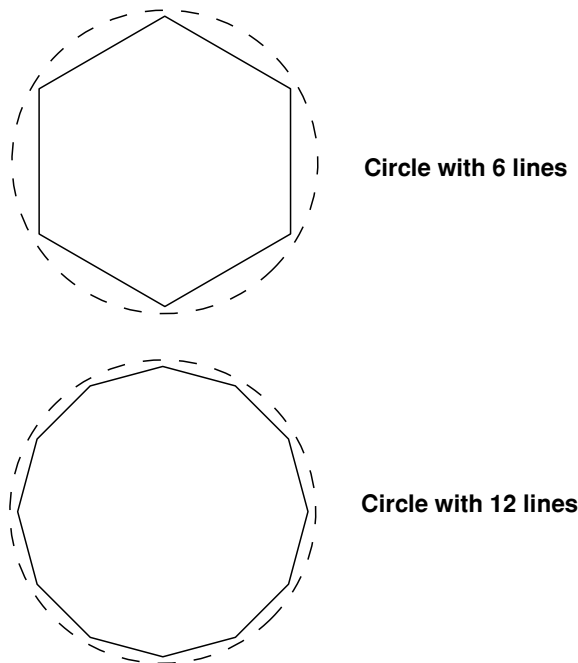


Figure 2

In the case of 'closed' objects such as the cube, pyramid, sphere and torus the polygons face outward. So that if you rotate the object it is always visible as there is always at least one polygon facing you. Other objects such as tube, hemisphere, surface etc have no closed ends so if you rotate the object such that you are looking at the inside of some of the polygons then these polygons are not visible unless they have been made double faced. What shows on screen is an object that, in the case of the tube, appears to be only half a tube. If you change to double faced then it looks like a whole tube because the back polygons are now visible.

Entering the points and polygons of often used objects like spheres would be very time consuming, so Illusionist has a menu of objects that can be created instantly. These include cubes, spheres, cones, and tubes. The smoothness of the curved objects can be altered by altering the number of object sides used. This is done using the Misc.Objt sides menu and the default is 10 sides.

Hint: Do not think of objects as cubes, pyramids, tubes etc but as a series of polygons that are joined together to form these shapes.

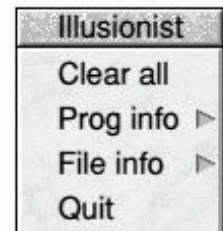
Getting started

This manual assumes that you have a working knowledge of RISC OS. If this is not the case please refer to the user guide supplied with your computer.

To install Illusionist open the zip file you downloaded from www.riscos.com and drag the contents to a suitable folder on your harddisc. To load Illusionist just double click on the !Illusion icon. The Illusionist icon will now appear on the RISC OS iconbar.

The icon bar menu

You access the icon bar menu by pressing **MENU** on the mouse with the pointer over the icon. This displays the icon bar menu:



Prog info

Moving over the arrow displays information regarding the program version number and the author.

File info

Moving over this arrow displays information about the current file. The information provides, filename, modified status, size of file and date of the last changes to the file.

Clear all

Click on this option to clear any data from the program. This action causes the program state to be returned to a known set up.

Quit

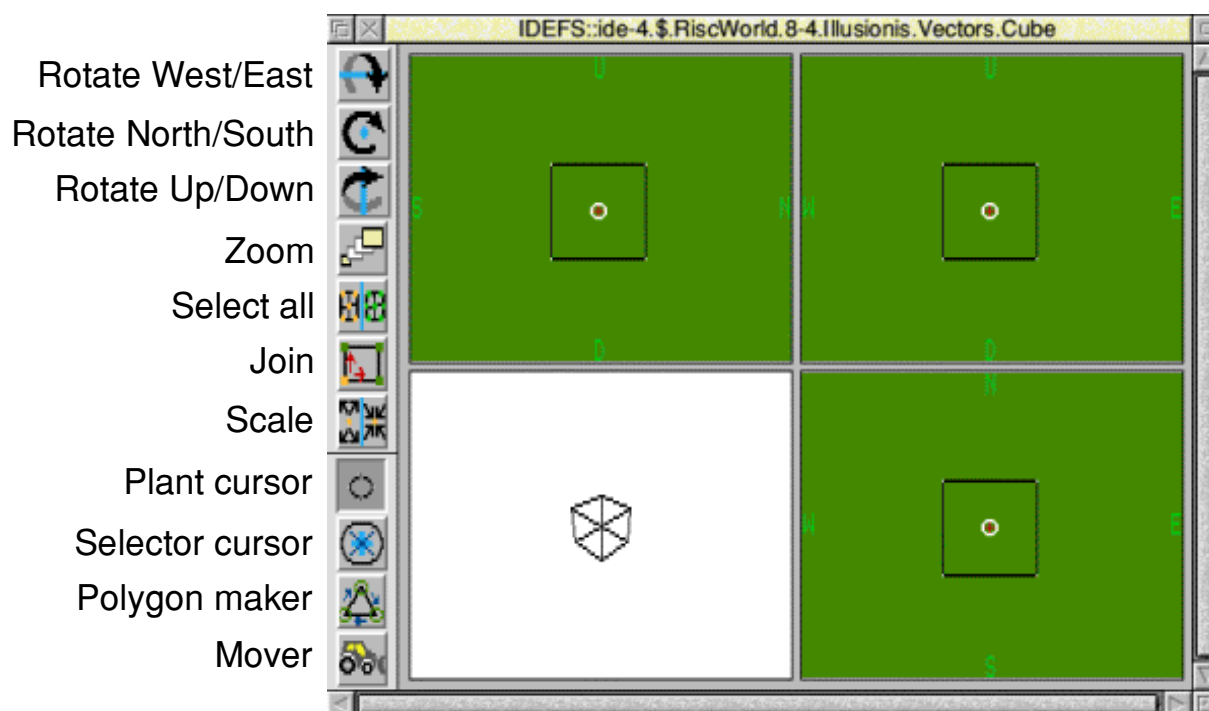
Click on this option to quit the program. You are prompted if a file exists that has not been saved.

Main window

To open the Illusionist main window click on the icon on the icon bar. This opens a main edit window consisting of four smaller window panes.

The Edit window

The edit window consists of four panes. The green panes are the *Design area* and from top left are: side view, front view and top view. The white pane is a *Preview pane* which shows your scene in wireframe format, taking account of the Sens o-server position and target position. The Preview pane is not updated until you click into it.



Down the left hand side of the window is a set of icons that are used to control and manipulate the outline objects or vectors as they are referred to in Illusionist. These are referred to as the *Toolbox*.

You should now open up the **Vectors** directory on your disc and double click on the file **Cube**. This is loaded and the window opened if it is not already open. If a dialogue box appears on screen click on the **Replace** option. You now have a cube on screen in the green panes. Click into the white pane to see the outline object as it will appear.

The icons in the Toolbox are explained below. You might like to try out each function as you read about it. The Cube file that you have loaded has the vector co-ordinate points already selected for this purpose. It is important to remember that before you can do anything with an object you must first select it. Selected points are indicated by the point turning white instead of a light green. Note the white dots at the corners of the cube.



Rotate about West/East axis

This icon rotates the selected points around the WE axis as indicated by the icon. Click on the icon with the Cube file loaded and note how the points rotate but not the object itself. This is for speed so that the screen is not slow in updating. Click in the white preview pane to see the result of the rotation.

SELECT rotates clockwise in the top left pane and **ADJUST** rotates anti-clockwise. The number of degrees of rotation can be altered in the Misc.Rot degrees menu.

To update the green design panes you can click on any of the Toolbox icons except the rotate arrows and the scale option. The preferred method is to click on the Plant icon which is the eighth icon down in the Toolbox or to press the <Space> bar.

Note: Rotation is always about the cursor position and not the centre of the selected objects.



Rotate about North/South axis

This icon rotates the selected points about the NS axis as indicated by the icon. The details are the same as for the rotation about the WE axis above. **SELECT** rotates clockwise in the top right pane and **ADJUST** rotates anti-clockwise.



Rotate about Up/Down axis

This icon rotates the selected points around the UD axis as indicated by the icon. The details are the same as for the rotation about the WE axis above.

SELECT rotates clockwise in the bottom right pane and **ADJUST** rotates anti-clockwise.



Zoom

Click on this icon with **SELECT** to zoom into the scene or with **ADJUST** to zoom out from the scene. Zoom does not alter the size of the objects it just alters your view of them. Zoom applies to the whole scene and not selected objects. The cursor is taken as a reference point and the zoom action first centres the cursor and then zooms in on that point.



Select all

Click on this icon with the mouse **SELECT** button to select all points in a scene. Clicking with **ADJUST** de-selects all points in a scene. There is only one icon but the two objects are there to remind you that you can select and de-select with the one icon.



Join

Clicking on this icon causes all facets touching a selected point to also become selected. For example if only one point on the cube is selected and you click on this icon then all points connected by facet edges, ie all of them, are also selected.

Note: All points in the same position as the selected point(s) are also selected. For example. place two cubes one on top of the other, de-select them and then select a point on the bottom of the bottom cube. Now click on Join and all points on the bottom cube are selected. If you now click on Join again the top cube is also selected as the points where the cubes meet were selected when you first clicked on Join



Scale

This icon scales the currently selected objects. **SELECT** enlarges the objects and **ADJUST** reduces them. The scaling takes place around the centre of the selected objects. In the case of the cube this is about the centre of the cube.

The scale factor can be set in the Misc.Scale fact menu. The default value is 1.25. A value of one results in no scaling taking place. Any value entered below one is rounded up to one. The smallest practical scale factor is 1.0001.

The Misc menu also has three other options dealing with scaling. These enable you to limit the direction of scaling so that objects can be uniformly distorted. Their use is covered in more detail later.



Plant cursor

The Plant or cursor is used to provide a point about which objects are rotated as well as the position that any new objects are placed at. If this icon is selected then the cursor is in its normal state, which has no effect.



Selector cursor

Clicking on this icon enlarges the cursor circle and switches it to point select mode. When the cursor is moved, any points that it passes over are selected and they turn white.

Note: The Selector cursor must be over the same position in all three views and it must move to select points. Points already under the cursor are not selected until you move the cursor. Remember this when you are using a large grid.

You can use the Zoom to zoom out thus enabling the Selector cursor to cover more points at a time.

This is a frequently used tool and you should familiarise yourself with its use.



Polygon maker

This function enables you to make polygons with up to 32 sides. First clear the scene by clicking on Clear all on the icon bar menu. Next select the normal Plant cursor. Move the cursor to your first point in the top left pane and whilst holding down the **SELECT** button press the **ADJUST** button. This plots a point on the screen. Repeat this to plot additional points - we suggest a triangle for your first attempt. Now click on the Polygon maker icon and the cursor changes to a square. Position the square over your first point and whilst holding down the **SELECT** button press the **ADJUST** button. A number 1 appears repeat this for the other points but moving in an anti clockwise direction from point 1. When you have completed all your points return to point 1 and click again with **ADJUST** whilst holding down **SELECT**. Your polygon then appears in the green panes. Click in the white preview pane to draw the outline there.

Note: If there is more than one point inside the square cursor then the point nearest the centre is taken as being the point required.

You do not have to plot the points anti clockwise but if you try the same exercise by plotting the points clockwise you will not be able to see the object in the white preview pane as clockwise instructs the program to draw the side of the polygon facing away from you, which is invisible until you rotate it around so that the polygon face is facing you. The rule is therefore; plotting points anti clockwise plots the polygon face so that it faces you but plotting clockwise plots the polygon face so that it is facing away from you. (Refer back to the Introduction and also see Double faced later).

Note: The above is a simplified explanation but it does not always follow that the points will be seen to go clockwise on the screen. This depends upon the direction the polygon is facing in the edit windows. These rules apply for plotting in all three design panes. Remember that the image seen in the preview pane depends upon the Observer and Target positions. You may need to zoom out to see these positions. The yellow x is the Observer position and the red + is the Target position.

Note: You do not have to plot the points in a strictly clockwise or anti clockwise direction. You can also plot the points and numbers in an irregular fashion to design different shapes. Each number is connected to the next sequential number so you can design quite complex polygon shapes. Also see Sweep described later.



Mover

This icon is used to move the selected points. When you select this icon the cursor changes to a blue spot in a white circle. Any selected points can then be moved simply by moving the Move cursor into the required location either by dragging or clicking at the new cursor location.

This function is a lot more useful than it first appears because it can be used to change the shape of selected objects. For example by selecting just the points on one facet of a cube you can pull the cube into a rectangular shape. If you select just two points on a facet you can create a wedge shape.

Now imagine doing similar things with some of the other objects such as cone, pyramid, surface or torus. You can see just what a powerful tool this option is.

Panning

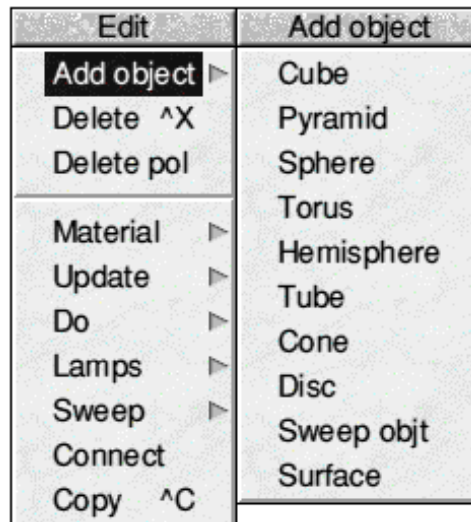
You can pan around the edit panes by clicking with **ADJUST** near the edge of the pane that you wish to pan. Panning causes the objects to move in a direction opposite to the point that you are clicking at. You can also pan diagonally by clicking in the comers.

Edit menu

To bring up the main menu press the **MENU** button on the mouse whilst the pointer is in the Illusionist window. This also has the action of making Illusionist the active program, indicated by the title bar of the Illusionist window turning cream. The main menu looks like this:



The Edit sub menu is a very important one in Illusionist as it is used to add objects and lamps and also to control the materials used for objects.



Add object

This sub menu enables you to add various objects to the scene. An object is always added with its centre at the cursor position. If the *Grid* option has been set then the object is scaled to use the grid size. This results in objects falling within a two by two grid. For example a Cube will be exactly two by two grid units and a pyramid will be two units wide at its base and two units high. If the *Grid Lock* option is on then the objects are locked to the grid intersections.

Sweep object is explained more fully later but basically you can define your own object which is then plotted onto the scene. The other objects are self explanatory apart from *Surface* which plots a flat plane made up of intersecting lines. Any of the points can be selected and distorted so it is easy to generate contour maps.

Example 1:

Click on **Clear all** in the icon bar menu to clear the scene.

Go to the **Edit.Add object** menu and click on **Cube**.

A cube is then plotted at the cursor position.

Try clicking on the **Rotate icons** to see the cube rotating and also click into the white preview pane to see the wireframe image.

Use **Ctrl X** to delete the cube and try plotting pyramid, sphere and torus.

Try rotating these objects.

Now clear the scene again and add a **Tube**.

If you click on **Render.Mini test** you will see that one side of the tube appears to be missing.

Only one side of the polygons making up the object are drawn so as to speed up the process.

At some points of rotation the tube will disappear when rendered.

If you need an object to be complete ie double faced see Example 2 later.

The image in the **Preview pane** shows the whole tube.

Unless you click on the **Back hidden** icon in the Render menu.

The same principle applies to **Cone, Hemisphere, Disc, Surface** and **Sweep objects**.

Delete - Ctrl X

Click on this icon or use **Ctrl X** from the keyboard to delete the selected objects.

Delete Pol

This option deletes the selected polygons. This is used to remove just part of an object. For example a cube is constructed from six polygons - one for each face. You can remove one polygon by selecting the points at each corner and using this option. You then have a cube with one open end, or in other words a box.

Material

This is another important item and it controls the appearance of the objects. It is in this dialogue that you can assign a picture map to be wrapped onto an object.



When you enter this dialogue the currently selected colour is shown in the colour box at the top right of the window. (Note: when using 16 colour modes the colour box only shows the nearest colour from its 16 colours.)

The sliders at the top of the box are used to alter the Red, Green and Blue components of the colour. You can alter the sliders by dragging or by using the arrows on the left of each slider. Note that changes do not take effect on existing objects unless they are selected and unless you click on **Update** in this dialogue. All new objects created take on the current settings in the Material menu.

- **Enviro** - This option controls the amount of environment 'reflectivity' in the selected objects. The higher this slider is set the more the colours of the sky and ground are seen in the object. This is not true reflection but you can achieve effects very close to the real thing. Another way of describing this function is to think of it as setting the degree of mirroring.
- **Textures** - The five buttons Matt, Shiny, Metal, Plastic and Luminous enable you to assign different textures to selected objects.
- **Update** - Click on this icon to update the currently selected objects with the settings in the Material menu. Note that this does not include map coordinates - see later explanation.
- **Fetch** - Click on this icon to fetch the material specifications for the selected object. If more than one object is selected then the details for the first polygon which was designed are fetched. This is useful if you want to match a new object with an existing object.

The three remaining options in this dialogue are rather complicated and it is worthwhile reading the following explanations carefully so that you can get the best out of the program.

- **Single F/Double F** - This stands for single and double faced polygons. Each time you click on this icon it toggles between the two options. To describe this icon it is better to understand more about how the scenes are created.

All objects, including spheres, are made by connecting points with flat surfaces (facets). Each facet is a polygon and a polygon can be single or double faced. The points can be seen highlighted on the three design panes, they are white when selected, otherwise they are green. To save rendering time the facets or polygons are usually plotted only if they face toward you. If you want all facets plotted then you must use the Double F option to instruct Illusionist to make the objects double faced. (See the Introduction to this manual).

Example 2:

Click on **Clear all** in the icon bar menu and then click on **Tube** in the **Edit.**

Add object menu to place a tube in the scene.

If you do a **Mini test** on this you will see that only one side of the tube is visible as the inside of the other side of the tube is facing away from you and is therefore not visible at this angle.

Next, ensuring that the tube is still selected, click on the **Single F** icon to change it to **Double F**.

Then click on the **Update** icon in the **Material** dialogue.

This updates the selected facets with the new material settings, which now include **Double F** for double faced.

Now do another **Mini test** to see that all the facets of the tube are now drawn regardless of their orientation. (See the Introduction to this manual.)

The same logic applies to the other objects in the Add Object menu although in many instances it does not appear to make sense to make objects double faced.

For example it may seem silly to make a sphere double faced as you cannot see the inside. But you can ! If you wrap a map 'onto a sphere and the map has areas of black you can make the black areas transparent so that you can see into the sphere. This is useful for doing things such as lanterns with holes that enable you to see the inside of the lantern. See the Black clear menu item for more details.

- **Normal/Smoothed** - Again this toggles between the two options. Smoothed gives the illusion that objects such as a sphere are made from curved surfaces. In fact, as you know, they are made from polygons. If you have Normal on then each polygon is a constant colour and it is easy to see the individual polygons. If you have Smoothed on then smoothing merges one polygon into another and it is difficult to see the joins.
- **Selecting polygons** - This is not a menu option but it needs to be explained here before you move on to the Map function. You can change the colour of a polygon by selecting all the points, choosing [he colour and clicking on Update.

Example 3:

Load the **Cube** vector file and click on the **Select all** icon so ensure that all points are selected.

Click on **Render.Mini test** to see that you have a grey cube.

Go to the **Edit.Material** window and choose a different colour.

Click on **Update** and then on. **Render.Mini test**.

The cube will now be the colour that you have chosen

Move the cursor off the cube and add a pyramid.

Note that all points on both the cube and pyramid are selected.

Click on the **Select all** icon with **ADJUST** to de-select all points.

Click on the **Selector** icon to get a large circle cursor and position the cursor in all three design panes over the top point of the pyramid to select it.

Next click on the **Join** icon to link all points of the pyramid together.

You can now change the colour of the pyramid without affecting the colour of the cube.

Of course you could have used the **Selector** cursor to select all the points of the pyramid but using the **Join** function ensures that you get all of the points.

The above example deals with changing the colour of a whole object but it is often desirable to change the colour of just one of the polygons or indeed of each polygon in turn to a different colour.

This whole area is fundamental to Illusionist but it is a little complex to explain clearly. Please work through the following exercises to help you understand.

Example 4:

Load the **Cube** vector file and click in the Preview pane, you can see the outline of the cube.

Click on the **Zoom** icon with **ADJUST** to zoom out one step. You can now see both the **Observer** position (yellow cross) and the **Target** position (red plus).

Using the bottom right design pane (plan view) you can see that the **Observer** position is in the **South East** looking via the **Target** position towards **North West**.

To assign a different colour to the top of the cube you must first select the polygon that makes up the top face. You do this by first clicking on the **Select all** icon with **ADJUST** to de-select all points.

Next click on the **Selector** icon so that you get the enlarged circle cursor.

The cursor now has to be aligned in the three design panes.

Position the cursor in the top left pane over the top left point of the cube (**Up/South,**) and in the top right pane over the top right point (**Up/East,**).

Now move the cursor in the bottom right pane over all unselected points.

They should all now be white indicating that the top face is selected.

Go to the **Edit.Material** dialogue.

Choose red as the new colour by setting just the red slider to maximum.

Click on **Update** and then click on **Render.Mini test** to see the result.

The top face should be red and the others grey.

Note that we started in the top two panes with the **South** and **East** points so that we selected the points nearest the Observer position.

Also note that these two panes have an **Up** direction, so ensuring the top points were selected.

Further note that the **Plan view** does not have an Up direction although it is the **Up**, or top, face that we are changing the colour of.

We now want to change the colour of the polygon on the right face as you look at the preview pane.

First we must establish our directions by returning to the bottom right pane to see that we are looking from **South East to North West**.

Therefore the polygon on the right must be **East** and the one on the left must be **South** as in the bottom right pane it is facing South.

To select the correct polygon we first move the **Selector** cursor off the cube and click on the **Select all** icon with **ADJUST** to de-select all the selected points.

Next click on the **Selector** icon to obtain the large circle icon - this should still be selected but if you have been experimenting you may have selected a different function.

Now position the cursor over the **Up/East** point in the top right pane and over the **South/East** point in the bottom right pane.

Now move the cursor in the top left pane to select all four points. You can now use the **Edit.Material** dialogue to select green by dragging the green slider to maximum with blue and red on zero.

Click on **Update** to tell Illusionist to update the polygon with the current settings and then click in **Render.Mini test** to see the result. The right hand polygon should now be green.

Finally we must make the left hand polygon blue. We know it is the **South** polygon so move the **Selector** cursor off the cube again and click on the **Select all** icon with **ADJUST** to de-select the points.

Move the cursor in the bottom right pane over the **South/West** point and the cursor in the top left pane over the **South/Down** point.

Select all the points in the top right pane.

Note that the top right pane does not have a **South** direction but we have specified South in the other two panes.

Now use the **Edit.Material** window to set the colour to blue and click on **Update**. Now when you click on **Render .Mini test** you will see that the left hand polygon is blue.

General guidelines: To select a polygon and alter the settings:

1. Decide which polygon you want to select.
2. Use the two panes that contain the direction in which the polygon faces to select the first point. It doesn't matter which point you choose from the possible choices as long as it is on the relevant side eg If the polygon faces East you can use either East/Up or East/ Down in the top right pane.
3. Use the other pane to select the points of the polygon.
4. Choose you material settings and click on Update.
5. Use Render .Mini test to check the results.

These rules are not hard and fast but should be thought of as a general guideline. For example if you are selecting polygons from a pyramid it may be easier to select the polygon direct from the bottom right pane. With a pyramid you can select any side except the base in this way. To select the base you would select the lower points in the top two panes first and all four comers in the bottom right hand pane, or plan view.

Using the cube again. You might want to select the bottom polygon. We have seen how you can select the top polygon by positioning the Selector cursor over the two top points in the top two panes and selecting the four points in the plan view. To select the bottom polygon you would position the cursors on the two lower points in the top two panes and then select the four points in the bottom right hand pane. To alter the sides of a cube it is probably best to rotate the cube and work on the polygons as they face you so that you can check the result using Mini test.

Selecting polygons on a sphere uses the same principles but it would be impossible to lay out any rules that would make any sense on reading. This is one of those instances when playing is far better. The guidelines given earlier will help you to understand. The main points to remember are that to select a point the cursor must be over the point in all three panes. If you select a point in error you can use the De-Selector option (**Ctrl D**) to erase specific points. The De-Selector cursor is a large circle with a diagonal line passing through it.

It is essential that you understand how this function works if you are to get the best out of Illusionist. For an exercise try placing a double faced tube and colouring some of the polygons a different colour.

- **Map** - This is another complex function that is worth persevering with. Maps must be either Mode 12 (16 colour) or Mode 13 (256 colour) full screen sprites. They are loaded by pressing **Ctrl P** to bring up the Picture maps window. When the window is up you can drop any Mode 12 or Mode 13 screen into the list. All sprites are held internally as a square image consisting of 1024 by 1024 cells. This enables you to rotate a map without distortion.

After loading a picture map you can assign it to a whole object or just the selected polygons in the same way as assigning different colours to polygons. You select a map instead of a colour by clicking on the box to the right of the word Map in the Material window. This toggles through the loaded map numbers. Once a map is chosen click on Update to assign the map to the selected polygons. Now when you render the picture the map is put onto the polygons.

Example 5:

Load the **Cube** file again.

Press **Ctrl P** to bring up the **Picture map** window and drag the file **Mandrill** into the window.

Go to the **Edit.Material** window and click on the **Up arrow** beside **Map** so that the number one appears in the panel.

Click on **Update** and then on **Render.Mini test**.

You will now have the ape picture mapped onto each side of the cube.

Each polygon is mapped with the selected picture map.

Delete the cube and add a sphere to the scene.

Now map the picture onto the sphere in the same way.

This time you will see that the picture is mapped onto the whole object and not onto each polygon.

The same is true of **Sweep** objects where they are treated as one object and have the picture mapped onto the whole object.

Cubes, pyramids and discs have the picture mapped onto each polygon by default. All rotated objects such as the sphere, hemisphere, tube, torus, surface and sweep have the picture mapped onto the whole object. For example if you had a picture of the map of the world you could map it onto the sphere and you would get the earth.

If you prefer you can select just one polygon from these other objects and map the picture onto the individual polygons.

Next to the map number in the Material window is a set of *Map coordinates*. These are used to decide what part of a picture is mapped onto the object or polygon. Remember that all picture maps are converted internally to 1024 by 1024 cells. The coordinates let you specify which part of the picture is mapped onto the polygon

If you want the whole picture mapped onto the polygon then you use the default coordinates: 0,0,1023,0,1023,1023. You only need to give 3 points as the program works out the fourth one for you.

Example 6:

Clear the vectors using the icon bar menu.

Press **Ctrl P** to bring up picture map list and drop the supplied picture map called **Mandrill** into the list.

Using **Edit.Add object** place a cube on the scene.

Go to the **Edit.Material** window and select Map number 1 and click on **Update**.

Now render the whole picture using **Render.Draw picture**.

You will see that the picture of Mandril the ape is shown on all visible sides of the cube in full.

To confirm that all of the picture is used click on Mandril in the **Picture map list**.

Note that the Mandril picture is sideways in the original.

Concentrate on the left hand polygon of the cube and note that the picture is mapped correctly onto this.

The bottom left corner of the polygon correlates to **Point 1** of the **Picture map**.

To take just a section of the image we need to decide the area required and then estimate the coordinates required to get us that area.

For example if we want to take just the centre of the image we could go to **Edit.Material** and alter the numbers in the map coordinates.

First get the **Material window** on screen and press **Ctrl U** to clear the current map coordinates.

Now enter 256,256,768,256,768,768 as the new coordinates and press **Return**.

Coordinates are not entered until you press **Return**.

Click on **Edit.Update.map** co-ords to update the map coordinates.

(Note that this is the only way to update map coordinates as **Update** in the **Material window** specifically excludes updating the map coordinates).

The reason for this is that if **Update** also updated the map coordinates you could easily change coordinates when you hadn't intended to.

This could affect objects such as the sphere as the map would then be placed on each polygon.

Click on **Render.Draw picture** to see the image drawn as above.

In the above example the points are cropping part of the picture so that only the portion shown is used to map onto the polygons.

Hint: If you are finding this difficult to visualise take two sheets of paper and in one cut a large square the same size as the photograph on the front of the manual cover. On the second sheet draw a square the same size as the first square but cut out a square about half its size. At the bottom left corner of the large cut out square and the large drawn square on the other paper mark Point 1 (0,0), at the bottom right mark Point 2 (1023,0) and at the top right mark Point 3 (1023,1023). Now position this over the photograph with Point 1 at the bottom left of the photograph. Now use the other piece of paper with the smaller square and position Point 1 at the bottom left of the photograph. Because you have a smaller square you can only see part of the photograph. If the hole is half the area of the larger hole these coordinates would be 256,256,768,256,768,768. If you want to rotate a map you simply change the starting point for Point 1. For example to rotate the Mandril map so that the ape appears upright you would enter the coordinates 1023,0,1023,1023,0,1023 - try it but don't forget to press <Return> and click on Edit.Update.Map co-ords before drawing the picture.

Tiling

If you use larger coordinates then the map is tiled onto the polygon. For example if you enter coordinates 0,0,2047,0,2047,2047 then you get four maps on each polygon. If you enter 0,0,4095,0,4095,4095 then you get sixteen maps on each polygon.

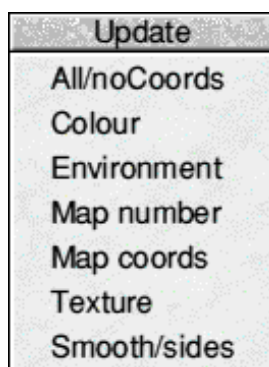
You can alter the coordinates to distort or tilt maps. For example using a cube and the mandril map try 0,0,2047,0,4095,8191. the possible combinations are almost unlimited.

Triangles

Mapping onto a triangle is exactly the same as mapping onto a polygon on a cube. You supply three coordinates as before and the relevant part of the picture is mapped onto the triangle. Note that the image is not squashed into the triangle. The triangle simply provides a window onto the square map.

Update

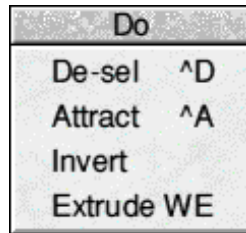
The Update menu is a special form of the Update icon in the Materials menu. It is used to update just the specified item whereas the icon in the Materials menu updates everything, with the exception of map coordinates. The all/no Co-ords option is the same as the Update icon in the Materials menu.



Selecting Map co-ords from this menu is the only way to update the map coordinates entered in the Material menu. Clicking on this item actions the changes as entered in the Material menu.

Do

The Do menu contains four items that do not have logical homes in any other menu.



- **De-sel (Ctrl D)** - This brings up the De-selector cursor which is a circle with a diagonal line through it. If you position the cursor over a point in all three windows then that point is de-selected.
- **Attract (Ctrl A)** - This brings up yet another type of cursor. This one looks like a magnet and it is used to 'attract' selected points thus enabling you to distort objects. You use it by selecting some points, bringing up the Attract cursor and then pressing **ADJUST** whilst holding down **SELECT**. **SELECT** works as normal and moves the cursor around but when you also press **ADJUST** the selected points are 'attracted' to the magnet cursor. The closer a point is to the cursor the faster it is attracted towards it. If the point is more than 3/4 of a view window away from the cursor then it does not move.
The amount of movement is relative to the view window size. To affect more points use the Zoom out option to see more points before using the Attractor. This is an extremely useful function and it was this that enabled us to produce the superb dancing Coke can demo that many of you will have seen.
- **Invert** - This item inverts the face of all selected polygons. Remember that if a polygon is single faced and facing away from you that it is not visible. This option inverts the polygon so that the other side faces you and is therefore visible (or invisible depending on the position before inverting).
This is useful to create a room where all you need to do is place a Cube, position the Observer position inside the cube and the Target outside. If you look at the wireframe after doing this you see nothing but if you click on Invert and then look at the wireframe you are inside the cube.
- **Extrude WE** - This option enables you to extrude selected polygons in a Westward direction. All points on the relevant polygon must be selected.

Example 7:

Clear the scene by clicking on **Clear all** in the icon bar menu.

Next create a triangle polygon as described in the section on the **Polygon maker** on page 14.

When you have done this click on the **Extrude WE** item once.

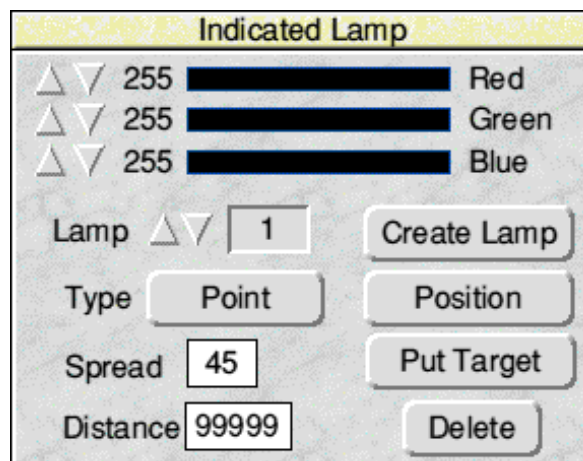
All the points of the polygon are extruded West.

If you do a **Mini test** you can see that the object is a solid wedge shape.

Whilst you can extrude again it does not make sense to do so as you can elongate objects by scaling. Nor does it make sense to extrude 3D objects.

Lamps

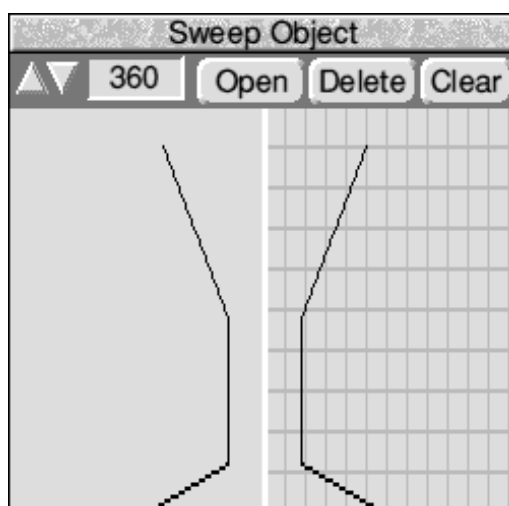
This dialogue controls the lamps, or lights, that are used in a scene. They show on the scene as small grey filled circles with a number beside them. You can have up to 14 lamps in a scene. The colour of the lamp is controlled with the Red, Green and Blue sliders. Any changes take immediate effect.



- **Lamp number** - You can scan the currently defined lamps by clicking on the left and right arrows next to the lamp number. As each lamp is selected its attributes are shown in the box.
- **Create** - To create a new lamp click on the Create icon. The new light has the attributes set in the menu but these can be altered at any time.
- **Type** - There are two types of lamp *Point* and *Spot*. Both are shown as filled grey circles. This icon toggles between the two. Point lights shine in all directions whereas Spot lights have cones of light with any width, or spread, and can be directed at any angle. When a spot light is selected a grey outline circle with a number the same as the lamp appears in the scene - this is the target for the spotlight. It is usually placed at position 0,0,0 but can be altered with the Put target option (see below).
- **Spread** - This is a writable icon and to alter it you click in and edit the numbers. The number gives the spread of the spotlight's cone of light and is given in degrees.
- **Distance** - This is another writable icon and it sets the number of distance units over which the light fades out to nothing. If it is set at 1000 then the intensity of the lamp is full until the object is over 1000 units away. Its intensity is then gradually reduced until, at 2000 units, the intensity is zero. Note that if the distance is set at 100 the intensity fades to zero at 200.
- **Position** - Clicking on this icon causes the currently selected lamp to be placed at the current cursor position.
- **Put target** - Clicking on this icon causes the currently selected spotlight target (a grey outline circle) to be placed at the cursor position. Note that the distance of the target is irrelevant as the target only provides directional information.
- **Delete** - Click on this icon to delete the currently selected lamp.

Sweep

This useful edit window allows the definition of rotated or swept objects. This window is used to define the silhouette of an object, like designing it on a lathe. To demonstrate the results of the sweep function find the supplied Sweeps directory on the disc and drag the Glass file into Illusionist. Now look at the Sweep window again you will find the silhouette of a glass. Now select the menu item Edit.Add object.Sweep Obj which places the glass in the scene with all the other objects. Click on the Clear icon to wipe the glass sweep.



Designing a Sweep object

All points are placed in the right hand side of the window (gridded). The left hand window automatically shows a reflected copy of the right hand side.

- The **SELECT** button places points.
- The **ADJUST** button back-tracks through previous points for editing.
- The **Delete** icon deletes the last or edited point.
- The icon shown as **Open** above toggles between Open and Joined when clicked on. When set to Joined the last point on the sweep is joined to the first (see the Nut example).

- The left hand icon, set at 360 above, defines the number of degrees of rotation that the sweep makes when the object is created. This is demonstrated later. Clicking on the Up and Down arrows increases and decreases this by preset amounts.

Note: When creating a sweep silhouette, place the points in a clockwise direction. This ensures the facets face outward when the object is swept.

Hint: To make sure that a point is in the exact centre vertically move the pointer into the left hand side of the designer and press SELECT. The line never crosses into the left side but it will move as far left as it can go, which is the centre.

Example 8:

Clear the current sweep and load the example sweep file called **Tape**.

Look at the simple design in the weep window and note that the degrees of rotation is set to 1080.

Click on the **Grid** item in the **Misc menu** - a grid should be visible on screen.

Next go to the materials window and set **Red, Shiny, Smoothed** and **Double F**.

Now click on the **Sweep obj** in the **Edit.Add object** menu to create the sweep object.

You will notice from the grid that on each turn of the sweep the points are moved up by one grid unit until the desired 1080 degrees of rotation are completed.

*Try changing the degrees of rotation by clicking with **SELECT** and **ADJUST** and the placing the sweep object again.*

This function is very useful for creating symmetrical objects and when used with the rotation it is very useful for creating curled wire or exotic sculptures!

Connect

This function joins together all selected points that have the same coordinates. this reduces the number of points required and consequently reduces the file size. For example if you put **Grid Lock** on and place two cubes one on top of the other so that the top of one is touching the bottom of the other. You can select all points and then click on **Connect** to join the points on those that are at the same position. If you check the File info box on the icon bar menu before and after you will see that the file size has reduced.

This command also proves useful for the smooth shading function. For example if you put two smooth shaded hemispheres together the shading does not work correctly over both objects unless you connect the points of the two halves together using this function.

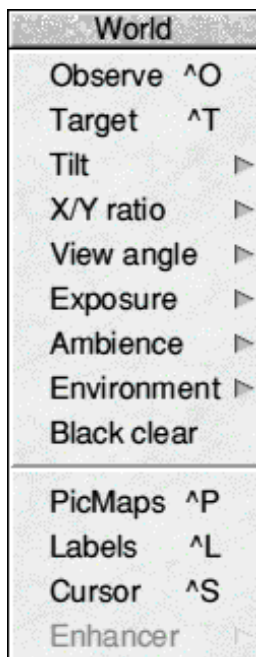
Note that this process may take a little while on complicated scenes.

Copy (Ctrl C)

This function copies all selected polygons. There is no immediately visible effect as the copied object is positioned over the original. The original points are de- selected so you can then move the new object to the desired position using the Mover. Alternatively you can use the rotate icons to rotate the object.

World menu

The World menu deals with settings that control the imaginary world in which the pictures are plotted. All World settings are saved with any vector file.



Observer (Ctrl O)

Clicking on this item or pressing **Ctrl O** causes the Observer position to be moved to the cursor position. The Observer position is where the scene is viewed from and is best thought of as a camera position.

Target (Ctrl T)

Clicking on this item or pressing **Ctrl T** causes the Target position to be moved to the cursor position. This is best thought of as the position that the camera is looking at.

Tilt

This item has a writable icon where you can specify the tilt of the camera (Z axis rotation). The value is entered in degrees.

X/Y Ratio

This is another writable icon which controls the X to Y ratio of the whole scene. It is not dependant on objects being selected. A value of 100 means that the ratio is normal. A value of 50 reduces the X ratio and a value of 150 increases the X ratio. Note that the only place you see this effect is in the wireframe View pane and when rendering the picture. The design panes do not show any distortion.

This function is useful if you are using modes which cause the image to appear out of shape.

View angle

This menu enables you to select the viewing angle from the Observer position that is used when rendering the scene. The angles shown in the menu equate to the following camera lens size; 75 equals a 28mm wide angle lens; 47 equals a standard 50mm lens and 18 equals a 135mm telephoto lens. The final entry enables you to enter your own custom setting.

Exposure

Exposure controls the brightness of a scene. Exposure levels in the scene are adjusted automatically depending upon the number of lamps in a scene. In some cases, especially when using spotlights, the scene may be too dark. This function can be used to brighten the overall image. The normal setting is 256 so to double the brightness of the scene change the value to 512.

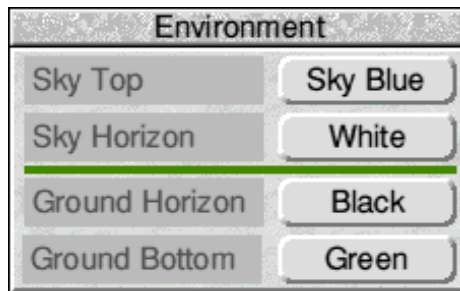
Ambience

Ambience is the setting for ambient light. This is the background light that is reflected off objects in the scene. In real life sunlight may only be shining on the floor of a room but it is reflected off the walls and objects in the room. The light combines to light up the whole room and this is ambient light.

When a real object is lit from one side the other side is not black because it is lit by ambient light, unless it is in deep space. This function provides your scenes with the same ambient light. The default setting is 65 but it can be altered if you wish.

Environment

This window enables you to set the colours used in the world's environment. The colours can be selected by clicking on the icons to toggle through the available colours.



Sky Top is the colour of the sky at its highest point whereas **Sky Horizon** is the colour of the sky from the horizon line. The two colours gradually merge from one to the other. The amount that you see depends upon the viewing position and angle.

Ground Horizon and **Ground Bottom** are similar to the above but are colours for the ground.

Note that the Environment is only drawn if the Render.Environment option is ticked. Also the Enviro slider in the Edit.Material menu is used to control the amount of reflection of the environment onto objects. It is this setting that adds realism to a scene. You can achieve some nice effects by making the Sky and Ground horizon colours the same.

The environment mapping isn't just filling in black areas. It also works with the anti-aliasing routines used in the program.

Black clear

When this option is selected any black on a picture map becomes clear, showing the background through it. This is useful for showing inside an object.

PicMaps (Ctrl P)

Clicking on this icon or pressing **Ctrl P** opens a window listing any loaded picture maps.



A picture map is any Mode 12 or 13 full screen sprite. Picture maps can only be loaded when this window is on screen. To load a map simply drag it onto the list. Its name then appears in the list with a map number against it. For details on the use of maps see the Edit.Material section earlier in this manual. Utilities such as ChangeFSI or Translator can be used to convert images into Mode 12 or 13 screens.

Labels (Ctrl L)

Clicking on this item or pressing **Ctrl L** opens a labels window listing any assigned object labels. A label is created by selecting the object or objects that you want to group so that their points are selected. Then press **Ctrl L** to open the labels window. Next press **MENU** with the pointer in the Label window and using the New label option enter a name. The name then appears in the list.

If you press **MENU** over a label name the other two menu items become available. **Rename** enables you to rename an object and **Delete** deletes that object.

Objects can be selected and de-selected by clicking on the object name in the list using **SELECT** or **ADJUST** respectively. This function is particularly useful when merging vector files together as the object labels are also merged. Try to get into the habit of labelling all your objects as it makes life a lot easier later.

Cursor (Ctrl S)

Click on this item or press **Ctrl S** to open the Cursor position window. This window has three entries for North/South, West/East and Up/Down. As you move the cursor the values are updated. If you want to enter a specific position click over the relevant entry in the Cursor window with **MENU** to gain access to an input box. Enter the required value and press **Return**.

Cursor	
NS	-577
VE	2719
JD	1023

As objects are placed and moved with the various cursors this feature enables you to position objects with great accuracy.

Enhancer

This item is greyed out unless you have a PCATS Graphics enhancer card fitted. If it is fitted then this item can be accessed. It simply allows you to set a Threshold level for the Enhancer board so that you gain the maximum benefit. The threshold level is the level above which new palette colours are selected. When rendering Illusionist finds the closest colour fit for the current palette. The weighted colour distance measured is then compared to the threshold value. If it is larger than the threshold value a new palette colour is created.

A value of zero results in a new colour being created for every colour required. With only 256 colours available at once you will soon run out of palette spaces when rendering complex scenes with lots of different coloured objects.

If you set the value too high, say 1000, you will not use enough of the palette space therefore using the Enhancer inefficiently. The number of palette colours used is displayed when you click on See picture.Full screen.

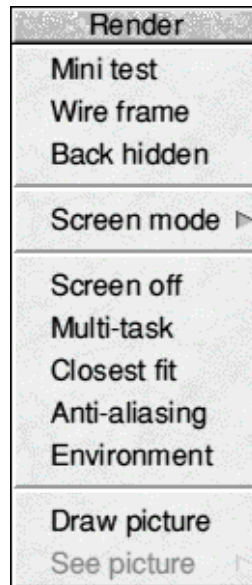
A value of about 250 is a good starting point for most pictures but a little experimentation is needed especially when using lower resolution modes.

When you save a picture either as a compressed picture or as a Clear file the Enhancer palette is also saved with it

The Closest fit option is overridden when an Enhancer is fitted.

Render menu

This menu controls the creation of the picture in all its various forms.



Mini test

Click on this item to see a small rendering of the picture. This enables you to check out colours, environment etc before committing to rendering a full screen.

Wire frame

This item enables you to generate a full screen wire frame image of the scene so that you can check positional information.

Back hidden

When this item is ticked the back surfaces are hidden in the Preview pane and the Wire frame rendering.

Screen mode

This item leads to a sub menu which lets you choose which mode that you would like your picture to be rendered in. Three common modes are provided but you can enter your own mode underneath these. The program checks the mode entered and if it does not recognise it or it is not a 256 colour mode then it reverts back to the last valid mode. Mode 13 is the default mode. When using the PCATS Enhancer you must choose the enhanced modes listed in the back of the Enhancer manual eg 103,115-118.

The final item on this sub-menu, **Cut memory**, clears any picture in memory and re turns the memory back to the system. This is useful if you are using modes that use a lot of memory and you want to load another application or check a picture map.

Screen off

This option turns off the screen whilst rendering a picture. This makes it faster to render the picture as the program can grab all processor time instead of the processor having to update the screen. Whilst a picture is being rendered with the screen off you can press any mouse button to see what progress has been made. In addition the Num Lock light flashes to indicate that the program is still processing. The screen is turned back on when rendering is complete.

To end rendering in this mode press all three mouse buttons together.

Multi-task

To select this option click on it and a tick appears in the menu. When selected the rendering of a picture is done in a window in true multi tasking mode. When the mouse pointer is over the window the hourglass indicates the amount of the picture completed. To stop rendering in this mode click on all three mouse buttons together when the cursor is over the window.

You can close the rendering window using the close icon. Rendering continues and you can bring the window up again by clicking on the Illusionist icon on the icon bar.

Closest fit

To select this option click on it and a tick appears in the menu. When selected the program uses a better weighted, closest fit algorithm for colour matching which produces much better quality pictures. This mode also runs more slowly than with the option disabled.

Anti-aliasing

To select this option click on it and a tick appears in the menu. This technique removes most of the jaggedness in a picture by calculating four intensities per pixel. This takes four times longer to render the image but the results can be very pleasing.

Note that when saving a 24 bit Clear file of 640 * 512 resolution with anti-aliasing on then what is actually saved is a 1280 * 1024 24 bit file. These files are rather large but they can be uploaded onto other systems capable of displaying the full image.

Environment

To select this option click on it and a tick appears in the menu. When ticked the world environment, or background, is also rendered. If it is off then just the objects are drawn in isolation.

Draw picture

Click on this to render the image in full screen size. Whether you can see the rendering or not is dependant upon the settings of the Screen off and Multi-task options described earlier.

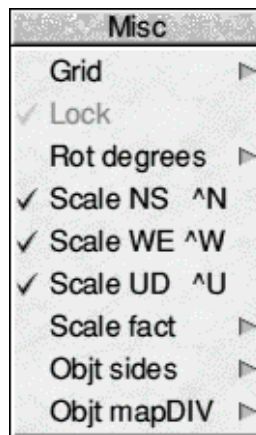
See picture

This option has a sub menu from which you can choose to see the rendered picture in either full screen mode or in a window. Full screen changes to the mode selected for rendering whereas Window stays in the current mode.

The heading of the menu shows the amount of time taken to render the image.

Misc menu

The Misc or Miscellaneous menu contains several items that are not really related to other menus.



Grid

Click on this item to place a grid on screen. A sub menu enables you to alter the size of the grid by entering a different value. When selected a tick appears next to the item.

Lock

When selected a tick appears next to the item in the menu. This menu is greyed out unless the Grid option above is selected, lock is on by default but it can be disabled by clicking on the menu item.

Rot degrees

This stands for degrees of rotation. A writable icon lets you enter the number of degrees to be used for each step when rotating using the three rotation icons in the Toolbox.

Scale NS (Ctrl N)

This item and the two below are normally ticked so that when you use the Scale icon in the Toolbox the selected points are scaled in all directions. If you de-select this option then any scaling leaves the North/South points in their original position. This is useful for creating stretched objects.

Scale WE (Ctrl W)

This item and the two associated ones are normally ticked so that when you use the Scale icon in the Toolbox the selected points are scaled in all directions. If you de-select this option then any scaling leaves the West/East points in their original position. This is useful for creating stretched objects.

Scale UD (Ctrl U)

This item and the two associated ones are normally ticked so that when you use the Scale icon in the Toolbox the selected points are scaled in all directions. If you de-select this option then any scaling leaves the Up/Down points in their original position. This is useful for creating stretched objects.

Scale factor

This item has a writable icon into which you can enter a scale value. This value is the size that an object is scaled to when using the Scale option in the Toolbox. The default is 1.25 but if you changed it to 2 and scaled an object then the object would be twice its original size.

Object sides

This item enables you to specify how many sides an object has. The only objects not affected by this are Cube and Pyramid. The default is 10 but for smoother objects you can increase this value. Note that larger values slow down the re-drawing of the vectors.

Object Map Divisions

This item also has a writable icon and it enables you to decide how many copies of a map are placed on rotated objects such as spheres, tubes, sweeps etc. A setting of two means four picture maps are mapped - two vertical and two horizontal. This setting only takes effect on new objects added, it cannot be applied to an object already in a scene.

Save menu

The Save menu contains five sub menus for saving images in various formats.



Vectors

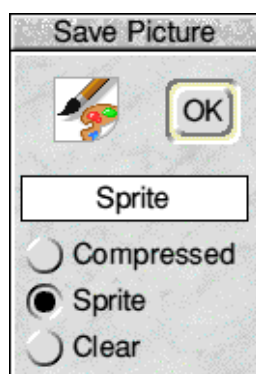
This is the format used to save the design of your image. This includes all of the wire frame information, colours, maps and world - everything that you need to reconstruct your image again but still retain it in an editable format.

Sweep

This option enables you to save out any Sweep designs that you want to keep. Sweeps can be entered into any scene by loading them and then using Edit.Add object.Sweep obj. You can add as many Sweep objects as you like but they have to be added to the scene one at a time.

Picture

This is the option used to save the current rendered image. It gives three options.



- **Compressed** saves as a compressed screen using the XArc module. The filetype of this compressed screen is DE2 which is the same as the original ProArtisan. However, the compression module is different. Two utilities are provided on disc to convert from one to the other and back again. These are explained in the appendices.
- **Sprite** save the picture in standard Sprite format
- **Clear** format is the native mode of a public domain program called *Translator*. A sister program from the same author called *Creator* enables you to convert Clear files into various other formats such as GIFF, TIFF and AIM. This provides a means of converting these files for display and use on other computers.

By default Sprite is selected. Whichever option you choose the icon and default file name will change to reflect your choice.

Daw

This item enables you to save the vectors file as a Draw file. What you in fact get is the same as you get when using the Wireframe option in the Render menu. The resulting Draw file can be printed in Draw or imported into a DTP package. Note that the objects cannot be ungrouped in Draw and it is not intended that you should edit the object in any way.

24bit

This option saves a picture as a 24 bit colour Clear file.

When you use this option a file is written to disc first and then the picture is created in 24 bit format and saved to disc as it is created. Even if you have rendered the picture before, this process is still performed as the image

in memory is not a 24 bit image.

Note that 24 bit images are considerably larger than their normal 8 bit counterparts and you really need a hard disc to use this format. A rough guide to the file size is: X res * Y res * 3. For a mode 21 screen this would be: $640 * 512 * 3 = 983,040$ bytes or 960 Kbytes

The Clear file format is the native mode of a public domain program called Translator. A sister program from the same author called Creator enables you to convert Clear files into various other formats such as GIFF, TIFF and AIM. This provides a means of converting these files for display and use on other computers.

Tutorial

The folders supplied with Illusionist contain various Vector files for you to render and experiment with. You can try adding to them or modifying them. Don't forget to see if there are labels used because if there are then you can select objects and move them easily. You can also merge files together and the labels are copied across too. This chapter contains step by step tutorials for you to try. It is best if you have already read the manual but if you are keen to start then you can try these tutorials first.

The Golden chalice

This tutorial describes how to create a golden chalice:

1. Click **Clear all** on icon bar menu
2. Load the sweep file **Chalice** then go to the sweep window to see its outline.
3. Change **Misc.Objt sides** to 20.
4. Go to the **Materials** window, and using the sliders select 255 red; 180 green; 0 blue; no environment or map is used. You should also have **Metal** and **Single F** selected and you need to click on **Normal** to change it to **Smoothed**.
5. Click **Add object.Sweep objt** keeping the plant cursor on the red target cross.
6. Now select a suitable screen mode and click **Draw picture**.
7. Hey presto! A golden chalice.

If the chalice seems a little small then scale it up with all scale directions ticked.

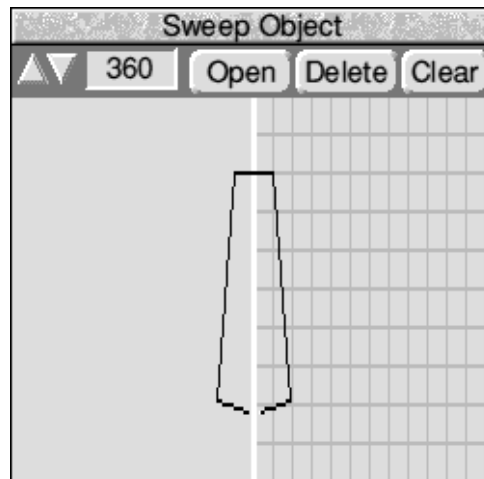
Alternatively, you can delete the points then recreate the object with a large grid size, say 1500.

Try rotating the chalice so that it is lying down, or even adding a table for it to stand on ! You might even like to try designing your own chalice as a sweep object.

Nuts to you !

This tutorial describes how to generate an Acorn, in fact it is the Acorn logo. It is easiest to create the top of the acorn first. It does not matter how many Object sides are used but obviously the greater the number the smoother the result. You want all objects to be double faced so you must click on **Edit.Material.Single F** to change it to **Double F**.

1. Click on **Clear all** in the icon bar menu and reset **Object sides** to 10.
2. Click on **Add object.Hemisphere** to add a hemisphere to the scene
3. Press **Ctrl L** to bring up the label menu and give it a label by pressing **MENU** and entering a name in the **New label** box. Call it **Top**.
4. Go to the **Misc** menu, de-select the **Scale NS** and **Scale WE** items - this allows you to squash the top of the nut into the right shape.
5. Click twice on the **Scale** icon in the Toolbox to change the shape.
6. De-select the points by clicking on the Selector icon with **ADJUST**.
7. Next we must create the bottom of the acorn. Position the cursor so that the small white circle is just touching the base of the hemisphere.
8. Add another hemisphere and give this a new label called **Bottom**.
9. Go to the **Misc.Rot Degrees** menu and change the figure there to 180 - this allows you to rotate the new hemisphere completely upside down.
10. Go to the **Rotate WE** icon and click once - you will see the hemisphere flip and form the bottom of the nut. Press **Space** to update the designer panes.
11. De-select the points as in item 6.
12. Now to create the small tube that forms the stem joining the bottom of the acorn and the tail together. Move the cursor to just below the bottom of the acorn and add a Tube by clicking on **Add object.Tube** and give this a label called **Stem**.
13. Go to the **Misc** menu and make sure the all scale options are selected.
14. Now click seven times with **ADJUST** on the **Scale** icon to reduce the tube to a reasonable size so it does not look out of proportion.
15. De-select **Scale NS** and **Scale WE** in the **Misc** menu and click three times on the **Scale** icon with **SELECT**. Press **Space** to update the design panes. You now need to create the tail of the acorn. This is done using a **Sweep** object.
16. De-select all points as in item 6 and position the cursor immediately below the stem.
17. Go to the **Sweep** designer and create a sweep similar to that shown below and give it a label called **Tail**. Place the Sweep using **Edit.Add object.Sweep objt**



18. Change the **Misc.Rot degrees** figure to 90 degrees.
19. Click once on the **Rotate WE** icon in the Toolbox with **SELECT**.
20. Click **ADJUST** once on the **Rotate UD** icon to rotate the Tail so it is facing the right way. Click in the **Preview** pane to confirm this.
21. De-select **Scale NS** and **Scale UD** and click on the **Scale** icon twice to scale the Tail in the West/East direction.
22. Using the **Edit.Material** window **SELECT** full green with no blue or red. Select **Metal** and click on **Update**.
23. Now click on **Render.Draw picture** to see the results. The results will not be perfect but if you experiment with different shades of green, different light positions and different surface types you will see the range of effects that are possible.

You may need to juggle some of the positions of the objects to achieve the right effect and this is best done using the labels to select the relevant object. A sample picture and vector file of this tutorial, using 20 object sides, is provided on the discs.

Appendix A

The converters

In common with Render Bender II, Illusionist uses Clares latest screen compression module called XARC. The filetype for this is the same as the original ProArtisan filetype DE2. This means that if a program using XARC has been loaded then ProArtisan would not be able to load its own pictures. To overcome this problem we have produced two utilities that convert from old DE2 files to new DE2 files and vice versa. These utilities are called !Old_New and !New_Old.

!Old_New

This application converts old Render Bender files (&D58), ProArtisan files (&DE2) and Sprite files into the new XARC compression format which also has the filetype &DE2. It is preferable to use this new format of file from now on. To run the program double click on the !Old-New icon. A window pops up on screen with the message Drop file here/Select the files that you wish to convert and drop them onto the window. The program converts them and saves them back to the disc using the same name.

Note: In some rare cases the new files may be larger than the old files and a disc full error may be given. You should always work on a copy of your files for this.

!New_Old

This application is the reverse of the above and converts new format files into the original ProArtisan &DE2 format. Only the old format files will work with the current ProArtisan and this utility enables you to take any Mode 15 new format file directly into ProArtisan.

It will not allow you to take screens other than Mode 15 into ProArtisan as there will either be too much information or not enough.

Note: In some rare cases the new files may be larger than the old files and a Disc full error may be given. You should always work on a copy of your files for this reason.

ProArtisan users should see the ReadMe file in the Converters directory on disc for instructions on using the new XARC module with existing copies of ProArtisan.

Here are just a few of the other products you will be able to
download from RISCOS.com free of charge
(You can make a donation to help support future product releases but this is entirely voluntary)



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Other Products list last updated 29/2/26