



Render Bender

3D Design, Animation and Ray Tracing for RISC OS

ProAction

3QD
DEVELOPMENTS LTD

APDL

Render Bender

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Overview

Render Bender is the generic name for this package which consists of four applications. These are:

- **Illuminator** - a graphical front end to Render Bender which enables you to create Render Bender files using a graphics program similar to Draw.
- **Render Bender** itself which is the Ray 'racing part of the package. This is now fully RISC OS compliant. It takes a file from Illuminator and generates a raw traced image.
- **Animator** - is an application that takes a sequence of screens, usually Render Bender but optionally any screens saved as sprites or using Clares screen compressor module, and delta compresses them to produce an animated sequence.
- **Converter** - converts a compressed screen into a sprite file and also enables you to extract individual screens from an animation file.

This whole package is a powerful 3D animation system that enables you to construct scenes using three dimensional objects and advanced ray tracing algorithms. Unlike the original Render Bender you no longer need to be a mathematical whizz kid. You can now use Illuminator to place objects on a scene much the same as Draw is used to create an image.

Illuminator enables you to create a series of frames manually or you can give it a start point followed by an end point and tell it to generate the frames in between.

Having created your outline frames using Illuminator you transfer the file to Render Bender where it is ray traced.

What is Ray Tracing ?

It sounds complicated but it is in fact very simple. If you create a ray traced picture, each pixel on the screen takes all relevant light sources and reflections into account. The resulting picture is absolutely correct according to the laws of physics and optics. All shadows, reflections and refractions are correctly calculated even if light is reflected off several surfaces. The picture that you create is just as it would appear if you created the scene using real objects and light sources.

Once the screens have been generated with Render Bender you can animate them using Animator to produce startling animated sequences.

If like me you hate reading manuals please do try to experiment but be warned. you will have to return to this manual as some things need explaining so that you get the best out of this package.

You might like to try producing an animation before reading this manual. To do this go to Appendix A and follow the instructions.

This manual is broken down into sections dealing with each of the applications in turn. They are dealt with in the order required to ultimately generate an animation, starting with Illuminator.

Illuminator

Illuminator

To run Illuminator double click on the !Illumin icon. This loads the Illuminator icon, a green sphere, onto the icon bar.

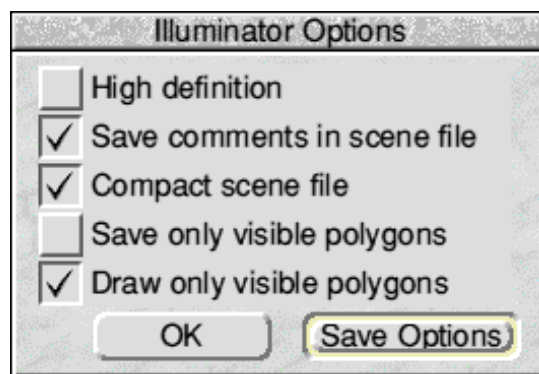
The icon bar menu

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

- **Info** - Moving over the arrow displays information regarding the program version number and the author.
- **Options - Ctrl-O** - Moving over the arrow opens a window that enables you to set various global options.
- **Clear scene** - This option clears the current scene, prompting if you have not saved it.
- **Quit** - This quits the program, again prompting if a file has not been saved.

The Options window

This is accessed from the icon bar menu.



- **High definition - Ctrl-H** - If this box is selected all cone and tube objects are constructed from 20 polygons. If it is not selected (**Ctrl-L**) then only 10 polygons are used so the objects will not be as smooth. The disc has 4 polygons (10 points) in low definition and 10 polygons (20 points) in high definition. Note that high definition objects take longer to ray trace. You can change from high to low definition at any time so it is possible to mix high and low definition objects in the same scene.
- **Save comments in Scene file** - if this is selected then comments are saved with the scene file. Comments are things such as the names of grouped objects or sweeps. If you want to look at the file and understand what is going on then you should have this option on. This makes the Scene file larger.
- **Compact scene file** - this reduces the size of the file by using one or two characters instead of full names for things such as colour, eg :White is replaced by :W.
- **Save only visible polygons** - if selected this cuts down the size of the file. It is a little slower saving the scene file as it checks all frames to see if the polygons are visible in any frame and discards those that never appear. The only problem with this is if you are using mirrored objects. In this case some polygons may only have been visible as reflections in the mirrored objects but with this option selected they will not appear at all. If you are not using mirrored objects then this option is worth using as it makes the Scene file smaller and also speeds up ray tracing.
- **Draw only visible polygons** - this affects only the wire frame option and if selected the program will not draw polygons that face away from the viewing position.
Note: Polygons only have one side and if viewed from the other side they are invisible. This enables us to speed up the ray tracing by not tracing areas that are rarely seen. If you need a polygon visible from two sides than you should place two back to back.
- **OK** - actions the changes for this session with the program.

Save options - saves the settings to disc so that they are used whenever the program is run. It also saves the current status of the program such as which views are shown, which functions selected and so on.

Using Illuminator

To open the Illuminator window click on the icon on the icon bar. This opens a window onto which you create your scene. The title bar shows a filename, <Untitled> if you have not given a name. View direction. Frame number and whether high or low definition is used for the cone, tube and disc objects.

Toolbox

Attached to the left of the view window is a tool panel which provides objects for use in creating a scene. The first six are fairly self explanatory being sphere, cube, pyramid, disc, cone and tube. Try clicking on them and then banding a box in the window. The point that you click at is where the objects centre will be. If you want to move the centre of the object click or the new position with ADJUST Press SELECT to position the object; The objects look two dimensional at first because they are positioned in line with your viewing position. Try clicking on the solid cube icon to turn on the solid option instead of wire



All objects except the sphere can be ungrouped down to their component par.-. For example a pyramid is constructed of four three sided polygons for the uprights and one four sided polygon for the base.

Moving and Rotating

To select an object click on the Select icon (the arrow) in the tool panel and click on one of the objects you have just placed to select it. The object turns grey. You can now drag the object around the screen. If you want to select more than one object click on subsequent objects with **ADJUST**. Moving one object then moves the others as well. To de-select an object click on it with **SELECT** whilst holding down the **Shift** key.

You can also select objects by holding down the mouse **SELECT** button and pulling the outline box over any objects that you want to select. This is called a *select box*. You do not need to fully enclose the object as the banded box only needs to intersect any pan of the object for it to be selected.

The two odd looking icons in the fourth row down are **Outline** and **Sweep**. These are both explained in detail later.

The next icon is **Text** and this enables you to enter text into a Scene using the fonts supplied with the package. This is also explained in detail later.

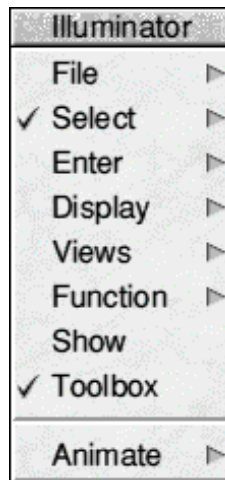
The next two icons let you toggle between **Wireframe** and **Solid** modes. In solid mode the objects are not always correctly sorted and in some cases the display will be incorrect, eg if one object penetrates another you may still be able to see all of the penetrating object. It was not considered appropriate to add lots of extra code to overcome this as it would have slowed down the display considerably. However, when ray traced all objects appear correctly.

The final group of four icons are **Direction** icons and they show the absolute directions in the current window. As you open up other View windows you will notice that the direction icons show different axis and different

directions. These icons are not selectable they are simply a reminder of the absolute direction so that you can ensure that objects are correctly manipulated.

The Main Menu

To bring up the main menu press the **MENU** button of the mouse whilst the pointer is in the illuminator window. This pops up the following Menu.

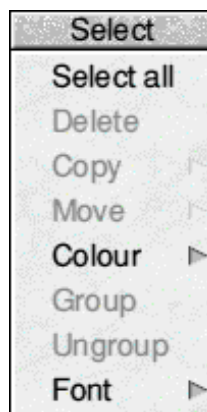


File

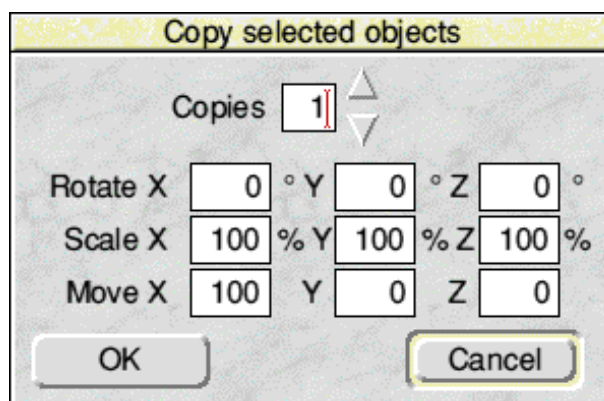
The File sub menu enables you to save an Illuminator file or a Render Bender Scene file. The About file item provides information about the file such as the number of objects. Note that most of the objects provided are groups of objects. For example adding a Pyramid adds five objects to the scene.

Select

This option is ticked in the main menu if you have chosen the Select icon in the Toolbox and leads to the following sub menu.

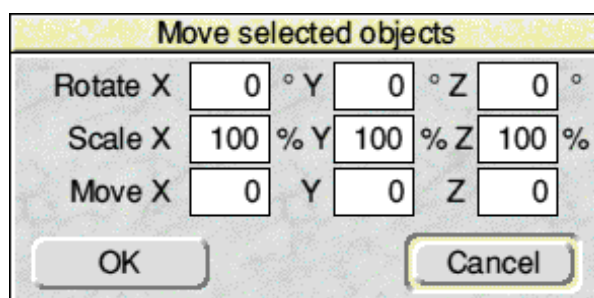


- **Select all** - Clicking on this option selects all objects in the current scene as if you had individually selected them using **ADJUST**. When they are all selected the objects are treated as a group and can be manipulated as a group.
- **Delete - Ctrl-X** - This option deletes the selected object or objects from the scene. You are not prompted and the delete cannot be undone. If no objects are selected this option is greyed out.
- **Copy - Ctrl-C** - This option enables you to copy selected objects. When you move over the arrow to the right of this option a window opens with parameters that you can set for copying the object or objects.



The first item, **Copies**, enables you to select the number of copies. **Rotate** allows you to set the number of degrees for X, Y and Z rotation. **Scale** allows you to scale the copies in either of the three directions X, Y and Z. You can also set an offset position from the original with the **Move** option. If no objects are selected this option is greyed out.

- **Move - Ctrl-V** - This option is similar to the above Copy option except that it moves the object to a new location and also rotates the object if you have requested it to. There is no option to select the number of copies as this is not relevant for a move.



The reasons for using this option instead of just dragging the object are varied. You may have a very complicated object that takes a long time to redraw as it passes over other objects. You can use this option to move instantly to the new location. For similar reasons you can use this option to rotate an object without it redrawing at all intermediate points. In this case do not set any values for the Move X, Y & Z. Finally you may want to use this option to accurately position or rotate objects.

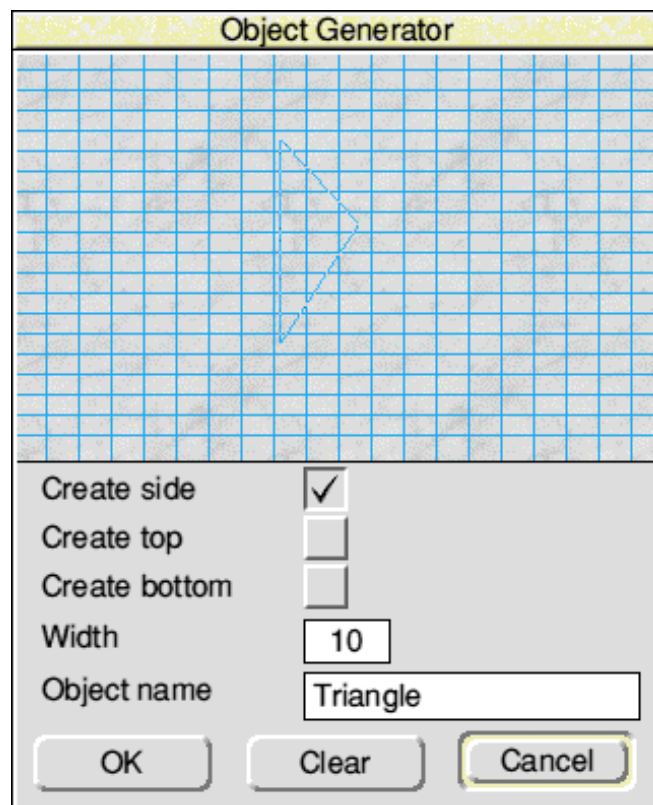
- **Colour** - The Colour submenu contains all the colours and attributes that Render Bender can handle. If an object is selected this sets its colour. Note that the ticks are on the defaults not the colour of the selected object. The colour you select in this submenu is then used for new objects as they are created. Most of the options above the dotted line are self explanatory except for **Bulb**. This creates an object that is brilliant white no matter what colour of light is falling on it. The options below the dotted line provide different textures for the object - try them out to see the different effects. You always need to have ticked, one option from above the dotted line and one from below.
Note: Only the colour options can be seen in Illuminator, the other effects are only visible once the image has been ray traced in Render Bender.
- **Group - Ctrl-G** - This option groups all selected objects together into one larger object. When you select this option a window pops up. Here you can assign a name to the group which is included in the Scene file for reference. You can also decide if rotation and scaling of the group is allowed. The centre of a group is calculated as the centre of all the objects in that group. If you want to have a different centre point use **ADJUST** to select the group at the point that you wish to be the centre. This is useful if you want to rotate around a particular point. The **Show** option is useful to see the way the centre point changes. Note that the **SELECT** button is still used to drag the group. If no objects are selected this option is greyed out.

- **Ungroup - Ctrl-U** - This enables you to ungroup a selection. If you have a group of objects which are themselves a group of objects then the ungroup can be performed to a progressively lower level until you cannot go any further. An example would be a series of pyramids grouped together. You can ungroup the pyramids and then ungroup the sides of each pyramid. This also applies to text where you can ungroup the words and then the individual letters.
Note: If you are going to use group or ungroup you should do so before adding any animation data. Although the animation will still work it is slowed considerably if you use group or ungroup after animation data has been added.
- **Font** - This menu enables you to choose the font that you wish to use. Using a font is described later. There are three fonts supplied with Illuminator.

Enter

This sub-menu duplicates the options supplied on the **Toolbox** panel. The ticked object is the one that is applied if you enter a new object. The first six objects, sphere, cube, pyramid, disc, cone and tube, have been dealt with earlier.

Outline - This option is a little complex but it is worth understanding at this stage. Click on the icon on the **Toolbox** and band a box on the scene window. When you press **SELECT** a designer window opens. You can now design a shape on the grid and select if you want to generate the **Sides**, **Top surface** (facing toward you) or **Bottom surface** (facing away from you). You can also enter the **Width** of the object and give it a name. The name has no meaning but it is included in the Scene file which makes it easier to understand and edit later.



To draw an object click with **SELECT** to place the first point and a line follows the mouse pointer. You place subsequent points by clicking **SELECT** again. To finish an object press **ADJUST** - this links the last point to the first point automatically. To place the object in the Scene click on **OK**.

If you draw the object in a clockwise direction the surfaces facing away from the centre, or outward, are generated. However, if you draw the object counter clockwise then the surfaces facing inwards are generated. This is useful if you want to position the viewpoint inside an object. Remember, only one side of an object is drawn by default and in the case of Outlines this is either the inside or the outside.

Once an object has been drawn you can edit the points by clicking on them with **ADJUST** and dragging the point as required. Take care when creating objects with **Top** and **Bottom** surfaces as the program does not add points to the created object. If you have a shape that has 10 coordinates on top and just 2 coordinates on the bottom very strange results can occur.

Example 1: Try drawing a triangle by plotting the first, second and third points with **SELECT** and pressing **ADJUST**. This automatically closes the triangle by linking up to the first point. Leave the default options ticked so that it is showing *Create side* only.

Now look at your *Front view* window and you will see that a triangle has appeared. Go to the *Function* menu and click on *Rotate Y*. Now click on the *Select* option in the *Toolbox* and select the triangle by clicking on it. You can now drag the triangle and it is rotated around the *Y* axis. You may need to drag, let go and go back for another drag. You will notice that at some points the object disappears. You should also notice that what you have created is a strip that follows the path of the first two sides that you have drawn. The width of the strip is controlled by the *Width* option in the *Outline designer*.

Do the same thing again but this time select just *Create top* - you de-select *Create side* by clicking on the option icon. This time you have a flat triangle, which can be rotated as before. It will also disappear at some points. *Create bottom* on its own produces a similar effect to *Create top* except that it is not visible unless you use the *Hack* view from the *Views* menu.

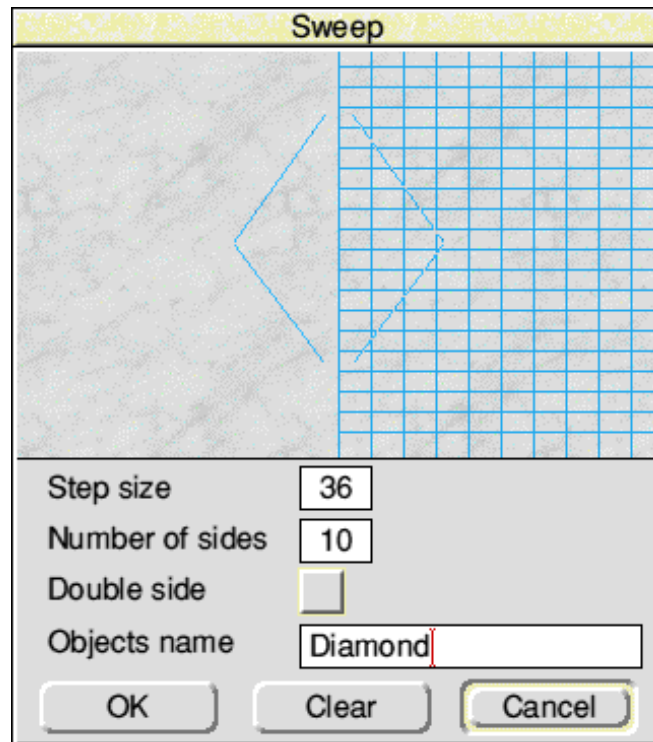
Try the same thing again but with *Create side* and *Create top* selected. When you rotate this about the *Y* axis you will note that at one extreme of rotation you appear to have a solid object but at the other you only have two sides of the triangle. This is because you have only specified sides and top and when the non existent bottom 'comes into view' there is nothing there.

Finally, do the same again but with all three option icons selected. This time the triangle appears solid whichever way you rotate it.

Width - this option controls the width of the sides used in the **Outline**. The range is from 1 to 99.

When you have grasped the idea of this function try doing some more complex objects and see if you can follow the logic. This is a very powerful function and once understood it is very useful.

Sweep - This is another extremely useful option once understood. To place a **Sweep** object band a box as with the **Outline** and upon pressing **SELECT** a designer window appears. This time the grid only covers the right half of the window because *Illuminator* draws the other half automatically for you to ensure that the object is symmetrical. The rule for Sweeps is that if your design is drawn from top to bottom then the outside surface is generated. If the design is drawn bottom to top then the inside surface is generated. You can generate both surfaces by setting the **Double sided** option on.



Example 2: Try banding our old friend the triangle starting and finishing on the left most grid line (the axis) - you use *ADJUST* to terminate a design. You will notice that another triangle is added to the left hand side. This shape looks pretty boring but once you have clicked on *OK* a pleasing diamond shape is drawn on screen.

What you have drawn is the shape of one side of the object. The *Step size* controls the size of each side in degrees and *Number of sides* controls how many sides are drawn. The default settings are 36 and 10. You will perhaps have already noticed that $36 * 10$ equals 360 degrees so in this case the object has sides all around. However, if you change the *Step size* to something below 36 and leave the number of sides at 10 you will see that the object does not have sides all around. All of this is best seen from the *Top view*.

Try drawing a series of about 5 zig zag lines starting and ending on the axis line. You now see that complex shapes can be defined very easily. Next try the same shapes but not starting on the axis line. In these cases the top of the shape is open.

Double side - This option allows you to define the object so that it has an inside surface. If you define two open topped objects, one with **Double side** on and one without, and then rotate them about the X axis you will see that one has an inside and the other doesn't - all you see is the background colour.

In a double sided object the inside is one group and the outside is another. This means that you can ungroup an object and select the inside and outside independently. This enables you to assign different attributes; for example a different colour for the inside.

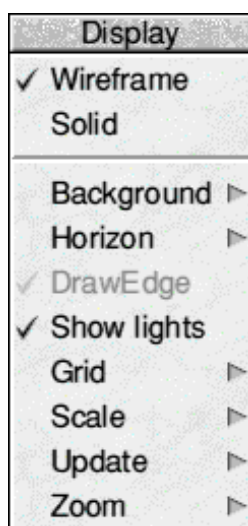
Text - This option enables you to add text to a scene using the font selected in the **Select.Font** menu. The box that you band defines the size of the font. When you press **SELECT** an input window opens where you can type your text. The maximum number of characters is 254 but it would be silly to use this many as they would be very small and it will take a long time to redraw the screen. Remember that text can be progressively ungrouped until you have the individual components of the letters as separate objects.

Lights - The three bottom icons are only found in this menu and not on the Toolbox. They provide lighting for the Scene. You must have at least one light in each Scene otherwise it will not be accepted by Render Bender. The maximum number of lights in a Scene is four.

- **Beamlight** - To place a Beamlight select it and then click on the Scene window where you want to place the Beamlight source. A filled circle is placed at this point with a number to its right. The number indicates the light number. A smaller outline circle is placed near the filled circle. This is the target and should be moved to indicate where the light is to shine. This also has the same number attached.
- **Spotlight** - A spotlight and its target are placed in the same way as a Beamlight. It looks similar except for the two small lines protruding from the circle. This represents the aperture, which can be altered By selecting **Height in the Function** menu, then selecting the **Spotlight** and moving the mouse. You will note that the aperture lines move as the mouse moves. The aperture lines do not point in the direction of the target they simply show the width of the aperture or beam.
- **Pointlight** - This icon looks like a light bulb when placed. The main difference here is that there is no target object as the light always radiates in all directions.

Display

The first two entries on this sub menu duplicate the two entries in the **Toolbox** panel. Namely **Wireframe** and **Solid**.

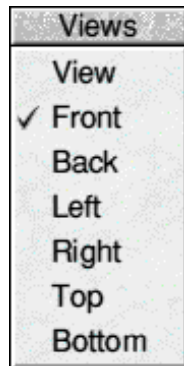


- **Background and Horizon** - This option lets you select the colour of the **Background** and **Horizon** line for the display window. It does not effect the colours used in the scene when it is ray traced.
- **Draw edge** - This toggles on and off the edge which can be drawn around objects to show the edges of each facet of an object.
- **Show Lights** - This option lets you remove the lights from the display once they are correctly set. The lights remain active but are not displayed.
- **Grid** - This leads to a sub menu where you can set various options relating to a grid on the **View** screens. **Show** puts a grid on screen. **Lock** makes any objects created or moved lock on to the nearest grid point even if the grid is not on screen. **Colour** lets you choose the colour for the grid and **Size** lets you choose the size of the grid. The numbers are an arbitrary value but you will soon be able to judge the required sizes.
- **Scale** - This option is provided in case any users have old Render Bender scene files with very large numbers for the object sizes. Applying a **Scale factor** reduces all objects by the chosen scale factor. In Render Bender the size given to objects is irrelevant as it is the relative sizes of the objects, view position and lens that matter. In practice most users will never use this option.

- **Update** - This function disables the redraw in the various **View** windows. If you have a complicated scene it can take a long time to redraw the objects in the View windows. Using this option you can bring up the **Render Bender View** window, select an object in the other view windows and then move it around. The only window that is updated is the **Render Bender View**, so you can try things much more quickly. Only when the screen is forced to perform a redraw or you click on the **Display.Update** option are the objects updated in the other View windows. You can also disable the update in the **Render Bender View** but it is then not easy to see what is happening.
- **Zoom**- Zoom should not be confused with the **Scale** option. Zoom is purely a display option that enables you to zoom into or out from a scene. This enables you to work in detail on a small area.

Views

This sub menu has seven options the first, **View**, being perhaps the most important. This shows the view of the scene as it will appear when ray traced in Render Bender using the appropriate lens setting. By default you are always shown the **Front** view but this can be changed to any of the views below it. Or used in conjunction with it. When you **SELECT** any of these options another window opens showing the scene from that viewpoint. You can use this window to add, move or edit objects as if you are using the Front view. This is extremely useful in positioning objects correctly, especially if your animation includes movement of the viewing position.

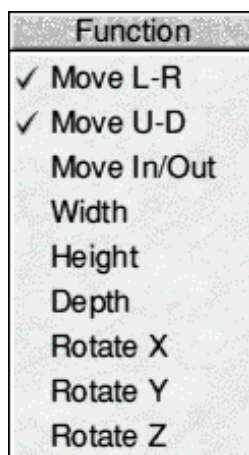


Note that each View has some of its own attributes so that you can have different zoom factors, wireframe or solid, Toolbox or not. Attributes that are specific to the view are:

- Wireframe/Solid
- Draw edge
- Grid
- Update
- Zoom
- Toolbox

Function

This sub menu provides the tools for moving and rotating objects. The default option is **Move L-R** and **Move U-D** this enables you to move selected objects in the X & Y planes within the window i.e. left/right and up/down. **Move In/Out** lets you move the object on the Z axis in the current window. The quickest way to select both **Move L-R** and **Move U-D** is to click on the Select icon in the **Toolbox**.



This option must be used whilst taking note of the direction icons in the **Toolbox**. The selected directions apply to the movement in the window. Normally you will not use the **Move In/Out** function.. If you want to move an object further away from you, simply select the **Top** or **Bottom View** and move the selected object on the Y axis. The direction icons in the **Top View** show that Z+ is up and Z- down but you are only moving the mouse pointer in the Y direction - unfortunately mice only work in 2D.

Example 3: Place a small sphere in the middle of the **Front view** window. When selected you can move it in the X and Y directions indicated in the **Toolbox**. Now bring up the **Top view** and move the sphere as before. It appears to be doing exactly the same but you will notice that the direction icons now show the Z and X axis. You can see this more clearly if you have the **Render Bender View** window visible. Moving up and down in the **Top view** causes the sphere to move in and out of the **View** window. Similarly the **Left** and **Right** views have the Y and Z directions shown in the **Toolbox**.

Why then do we provide the function to **Move In/Out** ? In some instances it may not be convenient to use another view or the object may be obscured. It may even have zero thickness such as a tube or disc and cannot be selected from some angles. To overcome these problems you can use the **Move In/Out** function. In this case the object that you are moving does not appear to change in the operative window but it does in the **Render Bender View** window or in other views.

Example 4: Place a sphere as before and open the **Render Bender View**. Select the **Move L-R** and **Move In/Out** functions. Select the sphere on the **Front view** and move it left and right - it moves left and right in the **Render Bender View** window. However if you move the object up and down it doesn't move on the **Front view** but it gets larger or smaller on the **Render Bender View**. Note that you can repeatedly drag the sphere in the up or down direction, release it and drag again. This causes the sphere in the **Render Bender View** window to get progressively larger or smaller.

Width, Height & Depth - These three options enable you to alter the width, height and depth of an object. These relate to the X, Y & Z directions. All alterations are carried out by selecting the object, choosing what you want to alter and then dragging the mouse pointer up or down. All of these alterations are done by dragging the mouse in the Y direction only.

Rotate X, Y & Z - These three functions enable you to rotate an object or group about the specified axis.

Example 5: Clear Illuminator of any scenes by pressing **MENU** over the icon bar icon and clicking on **Clear scene**. Now choose and place a pyramid with its centre at the observer position and the base line on the horizon line. Click on the **Select** icon and select the pyramid (it turns grey). Next choose **Rotate X** from the **Function** menu and drag any part of the pyramid in the X or Y direction. You will see the pyramid rotate about the X axis.

Now choose **Rotate Y** and do the same. This time the pyramid appears to spin as if it was suspended from its apex by a piece of string. Try **Rotate Z** and you will see that it rotates in a clockwise or anti clockwise direction. Try looking at some other views whilst doing these exercises.

Show

This option pops up a window containing information on the cursor position, the selected object position and the selected object size.

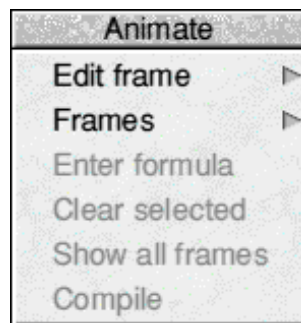
You can also use this option to accurately position an object in the scene. To do this Select the object from the **Toolbox** and then enter the X,Y,Z position and the X,Y,Z size of the object. When this is done click on the **Add object** button. Alternatively you can start an object off by selecting it and clicking on the scene with **SELECT** to position the object centre. If you then edit the X,Y,Z values for position and size you will see the object alter as you press **Return** to enter each value.

Toolbox

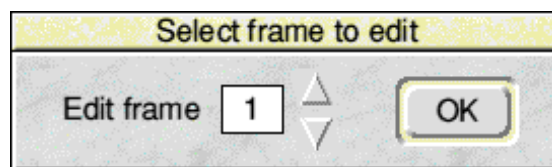
This option toggles the Toolbox at the side of the window on and off.

Animate

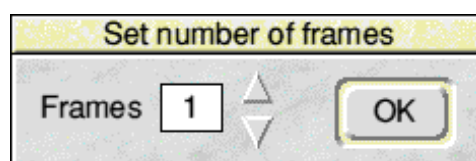
This sub menu is very important and you should take the time to understand the functions.



Edit frame - This option lets you choose which frame to edit. You can alter the frame number with the arrows or by typing the number in. You cannot edit a frame number higher than the number of frames that you have defined - see below.



Frames - Set number of frames This option has a similar window to the above but this lets you choose how many frames are in your sequence or animation. When you click on OK the number of frames is changed in the title bar of the main window. This information also indicates the current frame using # in front of the number eg 'Frame #2 of 10'.



Enter formula - Click on this option to bring up a menu in which you can enter formulae. This innocent looking window provides you with an extremely powerful tool. The formulae are applied to whichever object or objects are selected. You can apply different formulae to different sets of objects. A typical formula might look like

```
300*COSRAD (FRAME*18) .
```

The formula is an offset to the current data for the object and is applied from the first frame. This means that moving an object's position in Frame #1 results in the object being moved in all subsequent frames but if you move an object in say Frame #5 then only that frame is affected, all subsequent frames revert to the offset from Frame #1.

The formula can be applied to X,Y and Z position as well as X,Y and Z rotation. A reserved variable called **FRAME** is used to return the frame number from 0 to (number of frames -1). For example if you position a sphere at 0,0,0 and you want to move it in the X axis using 10 frames you can enter **FRAME*100**. This gives X positions of 0 for frame 1, 100 for frame 2 up to 900 for frame 10. The **FRAME** variable runs from 0 to (Frames-1) so that the first position is always as shown in the first frame. If you do not want this you can add 1 to the FRAME variable eg (FRAME+1)*100. Formulae can be created using the following:

COS, SIN, TAN, RAD and MOD

The first three require their parameters to be in Radians (RAD). You can do this by using a formula such as

```
SIN(RAD (FRAME*36)) *500 or SINRAD (FRAME*36) *500
```

RAD can be used in conjunction with the other three functions to convert their arguments into radians.

Example 6: Clear any scene from Illuminator and position a sphere in the bottom left of the Front view window after opening the window to full size. Go to *Animate.Frames* and set the number of frames to 20. Click on the *Select* icon and select the sphere. Now go to the *Animate.Enter formula* menu and enter the following:

```
X Position: -1800+FRAME*80
Y Position: SINRAD (FRAME*36) *150
```

Now click on **Show all frames** and you will see the sphere follows a sine wave. See the explanation below for **Show all frames**.

Clear selected - This option is used to clear the animation data for objects. This allows you to clear formulae for example. It has two different uses. If you are in Frame #1 all the frames are cleared of animation data for the selected object(s). If you are in any other frame then only the animation data for that frame is cleared. This enables you to fine tune the position of objects in any frame.

Show all frames - This is an extremely useful option. It takes account of any **Formula** or **Compilation** and draws the animated positions of the selected object(s) all on one screen. For example if you are moving a sphere from the left of the window to the right in ten steps then ten spheres are drawn at the relative position for each frame. This enables you to accurately see the animation path that will be followed by the object(s). The window is redrawn normally as soon as you click into it.

Compile - This option provides an **Inbetween** function. It compiles animation data for frames that have none. For example you could move a sphere in ten steps by placing the sphere at the left in **Frame #1** and at the right in **Frame #10**. Click on **Compile** and the program calculates the position for each frame. You can then view the movement by using the **Show all frames** option above.

As well as simple movements as detailed above you could for example position **Frame #1** on the bottom left, **Frame #5** at the top and middle and **Frame #10** on the bottom right. Clicking on **Compile** creates the information required. Try this and look at the path shown when you select **Show all frames**.

Editing a scene

Most of the points below have already been covered but this section pulls all the relevant material together so that you have a reference point for editing

To edit the scene you first have to change to **Select mode**, this can be done either by selecting the pointer in the **Toolbox** window or the **Select** entry in the main menu. When you have changed to **Select mode** you can select object(s) either by clicking with **SELECT** or by dragging a select box. If you click on an object it is selected, if there is more than one object at the point that you click the program chooses one object and selects it. If it wasn't the object that you wanted you can double-click with **SELECT** until the correct object is selected. If you want to select multiple objects click on subsequent objects with **ADJUST**. If you use a select box (press the **SELECT** button and move the mouse to band a box and then release **SELECT**) all objects that fall wholly or partly inside the select box are selected.

To edit an object first select the object you want to edit and then select what you want to do in the Function menu. To move an object(which may be a single object or a group of objects) you select **Move L-R**, **Move U-D** or **Move In/Out** and then drag it into position. Rotation and sizing is done in the same way. You point to a selected object and drag until you get the desired rotation or size.

These options must be used whilst taking note of the direction icons in the **Toolbox**. The selected directions apply to the movement in the window. Normally you will not use the **Move In/Out** function. If you want to move an object further away from you you simply select the **Top** or **Bottom View** and move the selected object on the Y axis. The direction icon in the **Top View** show that Z+ is up and Z- down but you are only moving the mouse pointer in the Y direction - unfortunately mice work only in the X and Y planes.

Example 7; *Place a small sphere in the middle of the Front view window. When selected you can move it in the X and Y direction. indicated in the Toolbox. Now bring up the Top view and move the sphere as before. It appears to be doing exactly the same but you will notice that the direction icons now show the Z and X axis. You can see this more clearly if you have the Render Bender View window visible. Moving up and down in the Top view causes the sphere to move in and out of the View window. Similarly the Left and Right views have the Y and Z directions shown in the Toolbox.*

Editing the lights

The lights are as follows:

- **Beamlight** - drawn as white filled circle with four lines around it.
- **Spotlight** - is drawn as a white filled circle with two lines that show the aperture of the light. Both the Beamlight and Spotlight have targets that control the direction the light shines in.
- **Pointlight** - is drawn as a white filled circle with a little box under it supposed to look like a light bulb.

If you add a **Spotlight** or a **Beamlight** you should notice a number to the lower right of the light and also a small circle beneath them which also has a number with it. The small circle is the target for the light direction and the number is there so you can see which light 'owns' which target. To change the direction the light shines in you just select and move the target just as any other object. You can also change the aperture of the spotlight using the **Height** option in the **Function** menu. The two lines below the light alter to show the aperture or beam of the spotlight. Note that the aperture does not point towards the **Spotlight** target, the lines simply show the width of the beam.

Editing the Observer position

There is one strange object which is always in the scene, it is a circle with an x in it. This is the **Observers position**. This can be selected, moved and/or animated just as any other object. The Observer position has its own target - a small circle like other targets but, instead of a number, it has a small 'o' (observer). The **Observer target** can be edited as any other object.

Whilst the **Observer position** can be seen in the front and back views by default you will need to use the **Display.Zoom** function to zoom out to 1:8 in order to see both the Observer position and Observer target in the other view windows.

It is worth spending some time experimenting with the observer position as it enables you to look at the scenes from different perspectives. You can move both the **Observer position** and the **Observer target**. To see the effect of moving the observer position you should have the **Render Bender View** window on screen. By moving the **Observer position** you can zoom into an object and even 'fly' around it.

Note: Lights, targets and the View position can not be Grouped.

Saving and Transferring scenes

Once a scene has been created, with or without animation data, you can save it either as an **Illuminator** file or as a **Render Bender Scene** file. **Render Bender Scene** files should only be saved when you are ready to ray trace the scene. Although you can re-load a **Render Bender Scene** file into **Illuminator** you lose all information regarding animation and grouped objects. **Illuminator** Files retain all of this information and can generate **Scene** files quickly. To preserve your disc space it is best to save just the **Illuminator** files and generate the **Scene** files as required.

Note: Illuminator files cannot be loaded into Render Bender directly.

You can drag **Scene** files directly from **Illuminator** into **Render Bender** if you have it loaded onto the icon bar.

Render Bender

To run Render Bender catalogue the program disc and double click on the !Render icon. This loads the Render Bender icon, a red sphere, onto the icon bar.

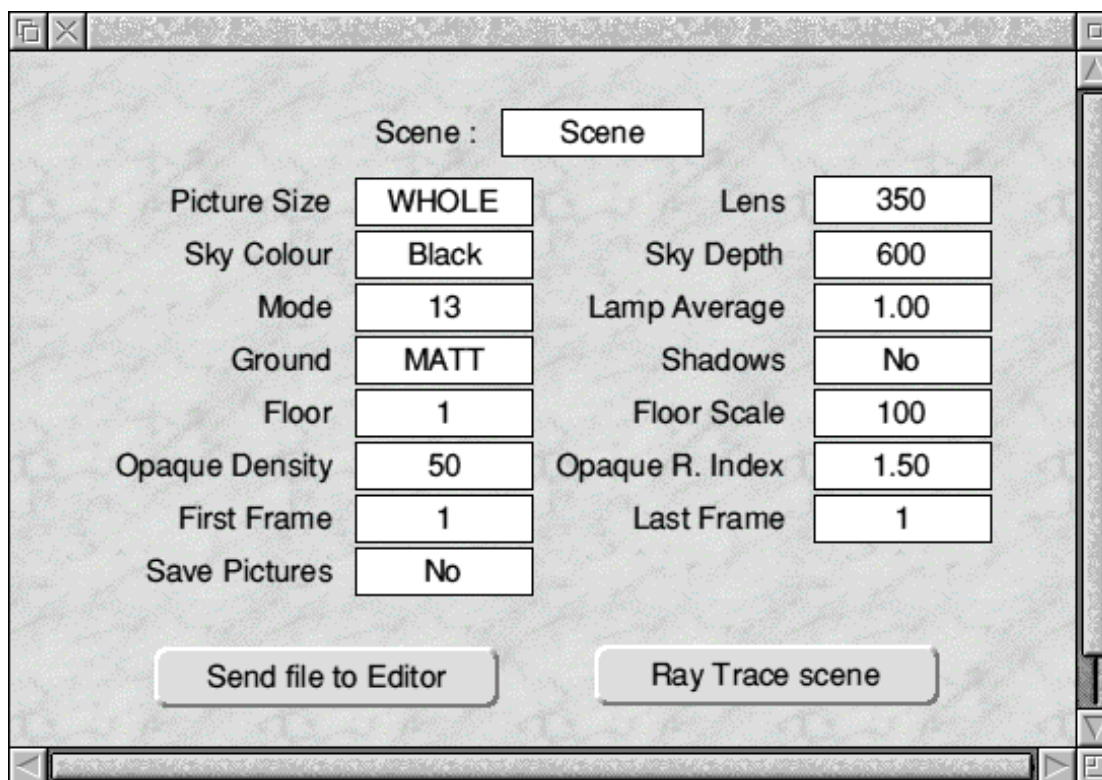
The icon bar menu

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

- **Info** - Moving over the arrow displays information regarding the program version number and the authors.
- **Save setup** - Click on this option to save the current settings as the default settings. This saves such things as picture size, shadows, mode etc. It saves everything except the values in **First frame** and **Last frame**.
- **Quit** - This quits the program, prompting if a file has not been saved.

Using Render Bender

To open the Render Bender window click on the icon on the icon bar. This opens a window containing various writable icons and two large action icons at the bottom. We will list what each of the icons in this window do.



Scene

This is the name of the currently loaded Scene. This will either be the leaf name of the file loaded from disc or the name given to the file transferred direct from Illuminator. To alter the name click into the icon and edit as normal. Filenames must be a maximum of eight characters and the program strips any extra characters.

Picture Size

(Range 1/1024 to Whole)

This icon toggles through various sizes available for tracing, from whole down to 1/1024th. The smaller sizes enable you to perform a quick test on a scene to see if it is what you expected. Using ADJUST steps backwards through the list whilst Select moves forward.

Lens

(Range 100 to 9999)

This icon enables you to change the focal length of the imaginary lens used to view the scene. It is like changing from a wide angle lens to a telephoto lens. To edit the value click into the icon. The larger the lens the closer to the scene you appear to be. Use of the lens means that you can define a scene and then zoom into a small part of that scene whilst still retaining all of the reflections and refractions from the whole scene.

Sky Colour

This icon also toggles through its various options. You can choose from fourteen colours which are then used as the colour of the sky. ADJUST again moves through the list in reverse order.

Sky Depth

(Range 1 to 9999)

This icon enables you to specify the rate at which the sky colour fades from the selected colour to black. The lower the value, the larger the area of initial sky colour. As you use higher values more colour changes are introduced until you end up with a small strip of the initial colour and a larger area of black. All colours fade to black with intermediate steps of progressively darker colours.

Even if the viewing position used in a scene does not make the sky visible it is still taken into account for reflections etc.

Mode

This is a writable icon and it is used to select what mode the pictures are drawn in. Note that you do not have to be in that mode at the time. When you click into the icon you can edit the Mode number. Enter the required mode and press <Return>. If the mode number is unrecognised or it is not a 256 colour mode then the program beeps and the previous value is written back.

You can use new modes defined in separate modules but the module must be present when you select the mode and also when you try to show the pictures in the new mode.

Lamp Average

(Range 0.01 to 3)

This icon is only of use when you are using more than one light source in a scene. The **Lamp Average** is used internally to calculate the light intensity.

The **Lamp Average** biases the exposure. This is useful if, for example, you have a scene with two spotlights whose beams do not interact - that is you have two pools of light.

$$\text{Intensity} = (\text{Light_Sources} * \text{Lamp_Average})$$

The way the program handles this internally is to add together the intensities of all the pixels in a scene and then divide the result by the figure arrived at by multiplying the lamp average by the number of light sources. This may be a little clearer from the formula:

Intensity has a range of 0 to 1 with 0 being black and 1 being brilliant white. Therefore to make full use of the available colours you should always try and get the above formula to give a value of 1.

With two light sources and a value of one for the Lamp Average the maximum intensity of each lamp is:

$$\frac{1}{(2*1)} \text{ which is } 0.5$$

Setting the Lamp Average to 0.5 in the formula results in:

$$\frac{1}{(2*0.5)} \text{ which is } 1.0$$

A result of 1 means that the picture takes full advantage of the available colours.

Ground

This icon toggles between **Matt** and **Shiny** ground. The effect of this option is quite subtle. If you have a light source shining onto a **Matt** ground the amount of light reflected from the ground is virtually nil. However, if you choose **Shiny** ground then much more light is reflected resulting in the light source being visible on the ground.

The best analogy is to think of a spotlight in a room shining onto a polished floor. In this case the light is visible on the floor but if you were to place a rug or mat on the floor you can no longer see the light reflected.

Do not confuse **Shiny** with **Mirror** which are both used within Render Bender. Mirror surfaces show reflections of objects around them whilst shiny objects only reflect light. This gives highlights to a scene and makes it more realistic.

Shadows

This icon enables you to specify whether you want shadows to be included in a scene or not. Clicking on the icon toggles between **Yes** and **No**. If you have shadows off the picture is traced faster and we recommend that you have shadows off when proofing a picture and only set shadows on when you are ready to do your final pictures.

Floor

This icon enables you to select a floor design. This icon simply toggles between the fourteen options from 1 to 14. To see the design and colours you need to use the **Floor** option in the menu. This is described later.

You can also use a sprite as a floor pattern by dragging the sprite file into the Render Bender window. If the sprite file has more than one sprite then the first sprite is used. When toggling through the floors the word **Sprite** appears after floor 14. This is then used as the floor pattern.

Due to the way Render Bender works internally the sprite is converted to Mode 9 and uses the palette from Render Bender. As this is totally different from the Desktop palette you may find odd things happening to the colours. To assist you we provide a palette file called **RRFloorPal**. If you load this palette into Paint, Artisan 2 or any other art package prior to designing your sprite you can design the sprite in exactly the format that it will appear in on the ray traced picture.

Floor Scale

(Range 1 to 99999)

This icon is used to select the scale used to produce the floor of the picture. The floor is created using your selected pattern or sprite. The scale defines the repeat rate of the floor pattern. The smaller the number, the smaller the pattern will be and so the pattern will be repeated more often for a given floor area.

Opaque Density

(Range 1 to 99999)

This icon enables you to specify the degree to which glass objects transmit light. Although the term Opaque is used, a setting of one results in the objects being almost completely transparent whilst a setting of 99999 results in the object being completely opaque. The higher the **Opaque Density**, the less light the objects allow to pass through them.

Opaque R.Index

(Range 0.001 to 3)

This icon is an abbreviation for **Opaque Refractive Index**. It enables you to alter the refractive index of glass

objects.

The refractive index indicates how the light is refracted or 'bent' as it passes through the object. A refractive index of 1 results in light passing straight through without any deviation. Glass has a refractive index of 1.5 and you should use this unless you want to achieve particular results.

Values for the refractive index that are less than 1 result in the light being reflected inwards towards the centre of the object whilst values greater than 1 result in the light being reflected outward.

Example 8: Load the supplied Scene file called *GlassBall* and ray trace the image using the settings in the file. Note how the ball appears ghostly but the pattern is hardly distorted at all.

Now alter the *Opaque Refractive Index* to 3 and ray trace the image again. You will now see that the floor is very distorted and that the floor pattern is shown very large in the ball. This is because the light has been bent outward.

Next change the *Opaque Refractive Index* to 0.5 and trace the scene again. Note how the floor pattern appears much smaller in the ball due to the distortion caused by the light being bent inwards. Finally try changing the value to 0.1 and tracing again

First Frame

If you have more than one frame defined this writable icon enables you to set the frame number that you want traced. Initially it is set to 1.

When ray tracing a new set of frames always enter the first and last screen, even if you do not think they will all fit on the disc. If they are not all saved to disc you can then insert a new disc and click on **Ray Trace Scene** again. The program automatically alters the value of **First** to be the next picture in the sequence. You continue this process until you have ray traced all of the pictures.

Last Frame

This is similar to **First Frame** except you are defining the last frame in a sequence to be ray traced. If you change **First** to a number other than 1 then **Last** is also changed to the same value unless the value in **Last** is higher than the value in **First**.

Save Pictures

This icon toggles between **Yes** and **No**. If it is set to **No** then no frames are saved to disc. If it is set to **Yes** then the frames are saved to disc in the directory which is set using the **Directory** option in the main menu. The files take the name of the file shown in the **Scene** icon and each frame has a number added to it automatically.

Send File to Editor

Clicking on this icon sends the current Scene file to **Edit** as long as **Edit** has been seen by the system. If **Edit** has not been seen then an error informs you of this fact. You must then load **Edit** before clicking on this icon again. In fact any text editor can be used as Render Bender looks for whatever editor is normally invoked when you double click on a text file. If you have substituted another editor which uses this command then that editor is used instead. If the editor you are using does not have **Edit** in its filename you must change the **RenderEdit** variable in the !Run file inside !Render to the use the new name.

Ray Trace Scene

Clicking on this icon starts the ray tracing. First the file is compiled and then ray tracing begins. Using the main menu you can select whether ray tracing is done in multi tasking mode or in **Fast** mode. See details later.

If you have the **Save Pictures** option set to Yes then each image is saved to disc after it is traced. The program automatically moves on to the next frame, compiles the information and traces that frame. The full pathname for saving the picture is taken from the **Directory.Pictures** entry in the main menu.

If you are using floppy discs and your disc becomes full the tracing stops and the program changes the value in **First Frame** to the last completed frame. You can then insert a new disc and carry on from that frame. Do not forget to change the Directory name in the main menu otherwise the program will try to save to the original directory only to find that it is not present.

The Main Menu

To access the main menu press the middle mouse button (**MENU**) whilst the pointer is in the Render Bender window. This pops up the main menu



Miscellaneous (Misc)

This menu has two sub menus:

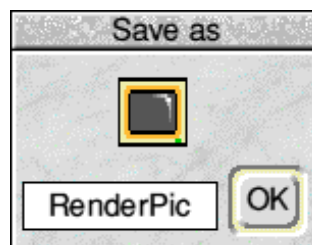
Info - provides information about the program version and authors.

File - provides information about the current file.

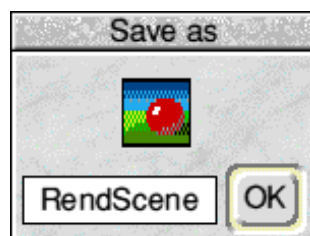
Save

This menu also has two sub menus:

- **Picture** - enables you to save the current Render Bender picture in compressed format. Saving is achieved the same as for any RISC OS application by dragging the save icon into a directory display or by entering a full pathname and clicking on **OK**. Once saved the full pathname is shown in the Save dialogue box. If the pathname is different to that set up in the **Directory** option you are asked if you wish to make the new path name the default for pictures.



- **Scene** - enables you to save the current Render Bender Scene in the normal RISC OS manner.



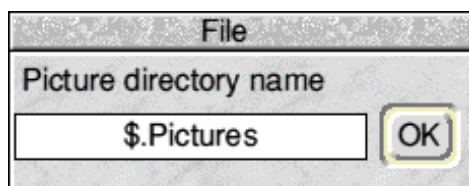
Directory

This menu is similar to the Save menu and has two sub menus. In this case the sub menus enable you to set a directory path for both **Picture files** and **Scene files**. You can also have the relevant directory folders available on the icon bar by clicking on either **Picture** or **Scene** within the **Directory** sub menu. This places a tick against the menu item and places a directory folder on the icon bar. To open the directory display click on the folder on the icon bar.

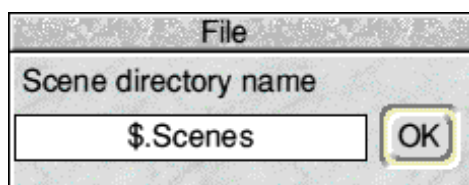
When the directory folder is on the icon bar you can alter the directory path by dropping a new directory onto the old one on the icon bar. Alternatively you can enter a new pathname in the Directory sub menu and press **Return** or click on **OK**. If you do this the new directory path is stored and used next time you run the program. If you drag a new directory onto the folder on the icon bar this is only used for the current session unless you go into the **Directory** sub menu and click on **OK**. It is then made the default directory. The current directory is stored as the default if you use the **Save setup** option.

Note; You should always use different directories for **Scene** files and **Picture** files. The suggested names are **Scenes** and **Pictures**. **Picture** files always take the **Scene** name and have a number attached e.g. **Scene1**, **Scene2** etc. When you use **Animator** later the animation file takes the **Picture** names without the number i.e. it has the same name as the Scene file. If they are both in the same directory the **Scene** file will be overwritten. If you change the name of a Picture file remember that you must also change all other pictures in the sequence to the same name plus the relevant number.

Picture - enables you to set a directory path for saving pictures. This path is used when saving a sequence of screens to disc after setting the **Save Pictures** option to **Yes**.



Scene - enables you to set a directory path for scenes. This is used when the Scenes directory is displayed on the icon bar.



Size

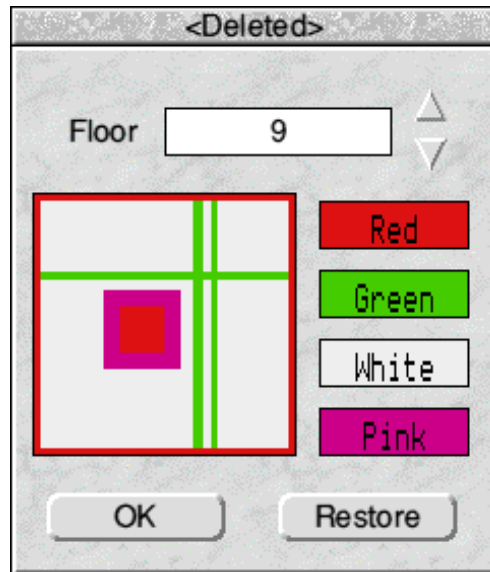
This function duplicates the **Picture Size** option on the main window. The current setting is shown by a tick.

Sky Colour

This duplicates the option in the main window except that the colours are presented as a list. The selected option is ticked. To choose another colour simply click on it.

Floor

This function is also duplicated on the main window but the menu item provides additional information and functions. The floor number can be altered using the up and down arrows. The main area shows the selected floor pattern, which is not editable.



You can use a sprite as a floor pattern by dragging it into the Render Bender window. The sprite then shows after floor fourteen. Due to the way Render Bender works internally the sprite is converted to Mode 9 and uses the palette from Render Bender. As this is totally different from the Desktop palette you may find odd things happening to the colours. To assist you, we provide a palette file called **RHFloorPal**. If you load this palette into Paint or your art package prior to designing your sprite you can design the sprite in exactly the format that it will appear in on the ray traced picture.

To the right of the pattern are four boxes which show the current colours assigned to the pattern. In some cases the third and fourth boxes show a series of lines. This means that they have no colour assigned in this pattern. You can change the colours by clicking on them to toggle the colours. Any changes take immediate effect in the pattern. You cannot change the colours in a sprite File.

Click on **OK** to finish your editing and enter the current design as the floor pattern. If you want to return to the original colours click on **Restore**.

Trace

This menu has two options **Normal** and **Fast**. **Normal** causes the screens to be ray traced in a multi tasking window and in the background. To cancel tracing click on the **Cancel** button in the small tracing window.

Fast takes over the whole computer and switches to a special mode. Whilst tracing, a figure is shown which indicates the number of lines that have been traced. If you are tracing a series of frames the time taken for the last frame is also displayed. The Fast mode is considerably faster and if you are leaving the computer to trace a series of pictures then this is the mode that you should use.

The **Num Lock** light on the numeric keypad flashes at the end of each line to indicate that something is happening. This means that you can turn off your monitor when images are going to take a long time to trace. To abort tracing in fast mode hold down the **Num Lock** key until the desktop returns. You may have to hold the key down for some time if you are tracing a complex image in a high resolution mode as the key is only checked at the end of each line.

Picture

This menu has two options. **Show** and **Clear**. If there is no current picture this option is greyed out. Show shows the current picture in a window. If you have not traced a full screen then part of the window may appear black as the size of the window is controlled by **Picture Size**. Clear simply clears the current image, prompting before doing so.

Helpful Hints

Always store your **Scenes** and **Pictures** in their own directories and store animation files in the **Pictures** directory.

When testing a scene use a small screen size sufficient to see the detail that you require and if possible use Fast mode. Also leave **Shadows off** and use Mode 13. When you are achieving the required effect set **Picture Size** to **Whole**, **Shadows** to **Yes** and set the required Mode. If you are creating an animation it may be worth creating it in a smaller size before trying it out full size.

If you have a 1 megabyte computer you need to be careful if you want to use multi sync modes. You will have to save the files from Illuminator to disc, quit Illuminator, load Render Bender and then load your scene file. All of these provisos are subject to the si/e and complexity of your scene file.

Hint: If Render Bender will draw the screen at 111024th of a screen then it will be able to draw the full screen image as well.

Animator

This is the third program in the suite and it enables you to create animations from a numbered sequence of Render Bender images. You can also use it to create animations with numbered sprite files, **ProArtisan** files and Illusionist files. The new Render Bender picture files are filetype &DE2, which is the same as ProArtisan and Illusionist. The ProArtisan files are an old format of &DE2 but they are still understood.

To run Animator double click on the !Animator icon. This loads the Animator icon onto the icon bar.

Note; Animator uses shared resources with Render Bender and so Render Bender must have been seen by the system in order to run Animator. If Render Bender hasn't been seen Animator reports an error and asks where Render Bender is. You do not have to run Render Bender just catalogue a disc or directory with it on.

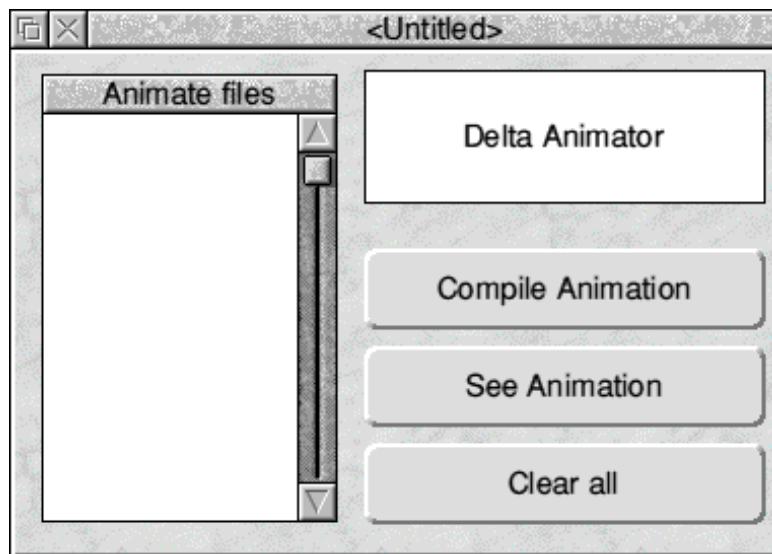
The icon bar menu

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

- **Info** - Moving over the arrow displays information regarding the program version number and the author.
- **Quit** - This quits the program, prompting if a file has not been saved.

Using Animator

To open the Animator window click on the icon on the icon bar. To create an animation from Render Bender files open the **Pictures** directory display and drag just one of the files into the **Animator** window. **Animator** then finds all scenes with the same name and displays their numbers in the small **Animate Files** window. The window title bar shows the name of the current picture files minus the numbers.



The **Animate Files** window shows just the number of the picture files that it knows about. These numbers can be edited to add or delete numbers or to put them in a different order. The Insert key can be used to insert additional numbers into a list.

Animator always adds the lowest frame to the end of the list as this ensures a smooth return to the starting point. In many cases you may also want to re-trace the steps. For example if you have a pendulum swinging from left to right and back again there is no point in ray tracing the swing from right to left as this is just the reverse of left to right. In this case you add the numbers to the originals but in reverse order e.g. 1231 would become 123321. Note that frame 3 is repeated in this case. This pauses the image slightly at the top of the swing and matches the pause caused by frame 1 wrapping around at the end to join the first frame again.

Compile Animation

When you have set up the required sequence of numbers click on **Compile Animation**. The main window closes and a small window titled **Delta Compressing** opens and shows the progress of the compaction. The resulting file is a compressed animation file.

Once an animation has been compiled clicking on this icon again causes the new frames to be added to the animation. If you want to replace the original animation you must use the **Clear animation** option first. This feature is useful where you have too many files to fit on a floppy disc or in one disc directory.

For example you might have a fifty frame animation but can only fit 26 frames on each disc. You would first load the frames off Disc A and then remove the number 1 from the end of the list in the **Animate files** window. You would then compile the animation for the first 26 frames. Once this is done you would copy **Frame 1** onto Disc B and load the files as normal. Clicking on **Compile Animation** will add the new frames to the existing animation. Clicking on **See Animation** will show the complete 50 frame animation.

See Animation

Click on this button to see the animation. When viewing an animation you can press and hold the Select button on the mouse to speed up the animation. Adjust does the opposite and slows the animation. To abort a full screen animation press the **MENU** button on the mouse.

Clear All

Clicking on this button clears the current animation from memory - prompting you if the file has not been saved. You must use this option if you have an animation in memory and you want to load new files.

The Main menu

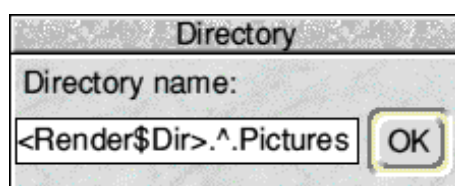
To bring up the main menu press **MENU** on the mouse whilst the pointer is over the Animator window.

- **Info** - This provides information on the application version number and author.
- **Save** - This option is a standard save box and enables you to save the animation file. This file must always be stored with **File 1** of any animation. For example if your pictures are called **Scene1**, **Scene2**, **Scene3** etc. then when you save your animation file Scene it must be in the same directory as **Scene1**. The animation file automatically takes its path name from the pictures.



If you change the name of the animation file you must also change the name of Scene one. For example if you change the name of your animation to **Demo** instead of **Scene** then you must change **Scene1** to **Demo1**. This is necessary because the animation file only contains changes from the first picture and does not contain full pictures itself. Any areas of the picture that are the same in the current frame and the previous frame are not saved. This is how the program achieves such good compaction.

- **Directory** - This is the same as the **Directory** option in Render Bender. If you click on the Directory entry in the menu a tick appears and a directory folder appears on the icon bar. Clicking on this folder opens the relevant directory. The path name of the directory can be changed either by typing in a new name in the **Directory** sub menu and clicking on **OK** or by dragging a new directory onto the folder on the icon bar.



If you click on **OK** in the **Directory** sub menu the new directory path is stored and used next time you run the program. If you drag a new directory onto the folder on the icon bar this is only used for the current session unless you go into the Directory sub menu and click on OK. It is then made the default directory.

- **Show** - This option has two choices **Window** and **Full screen**. **Window** shows the animation in a window whilst **Full screen** takes over the whole screen. Animations will always run faster in Full screen mode. To abort a Full screen animation press the **MENU** button on the mouse. Don't forget that you can use Select to speed up an animation and **ADJUST** to slow it down.
- **Save application** - This option has two sub menus. **Window** saves the current animation as a stand alone application that runs in a window on the desktop. **Full screen** saves the current animation as a stand alone application that will take over the whole screen. To run the animation just double click on it as if it was a normal application. As long as you have enough memory and the relevant screen mode is available for the **Full screen** option then the animation will run.

Viewing Animations

To view previously saved animations drop the **Animate** file into Animator and click on **See Animation**. Ensure that the first frame of the animation is in the same directory as the animation file.

Animating other files

Animator recognises Render Bender files. Sprites, ProArtisan files and Illusionist files.

To animate files you must first number the files in sequence. The files are then treated in exactly the same way as Render Bender files. Your files must appear as Pic1, Pic2, Pic3 etc.

Note; All files in an animation must be the same screen mode otherwise you can expect problems. It is also possible to mix sprite and compressed files from ProArtisan, Render Bender and Illusionist as long as they are all the same mode. All files must be created with the new compression module if you wish to create stand alone animations. A utility is supplied on disc to convert old format files and sprites into the new format suitable for use with Animator.

Converter

This is the fourth program in the suite and it enables you to convert **Render Bender**, **ProArtisan** and **Illusionist** files into sprite files. The new Render Bender picture files are filetype &DE2, which is the same as ProArtisan and Illusionist. The ProArtisan files are an old format of &DE2 but they are still understood.

You can also convert animation files back into the individual screens, either as sprites or as compressed **Picture files**.

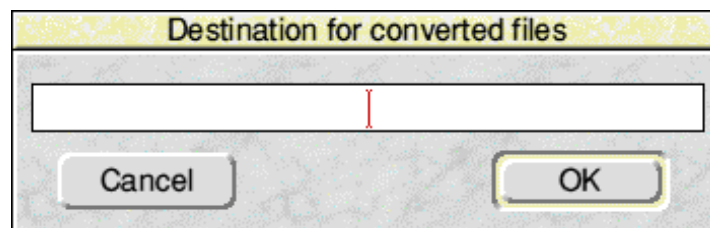
To run Converter double click on the [Converter icon. This loads the Converter icon onto the icon bar.

Note; Converter uses shared resources with Render Bender and so Render Bender must have been seen by the system in order to run Converter. If Render Bender hasn't been seen Converter reports an error and asks where Render Bender is. You do not have to run Render Bender - just catalogue a disc or directory with it on.

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:

- **Info** - Moving over the arrow displays information regarding the program version number and the author.
- **Destination** - Normally when you convert a file you get the usual RISC OS save window which you can drag to the location that you want the file to be saved to. But when converting a large number of files or an animation this can get very tedious. By setting a destination path you tell the program where to put the converted files.



Setting the destination can be done either by clicking on the **Destination** entry in the menu and typing the path name into the window which pops up or by dragging the destination directory onto the **Converter** icon on the icon bar. In both cases you get a window titled **Destination for converted files**. This shows the path that will be used for saving files.

To 'unset' the destination when it is already set, select the Destination option in the icon bar menu then click on Cancel in the Destination window.

- **Quit** - This quits the program, prompting if a file has not been saved.

Using Converter

To convert files you just drag them onto the Converter icon. The file is converted and a Sprite save window opens up. You can then rename the sprite and drag the file to a directory display.

If you have set a **Destination** directory you can select and drag more than one file into the converter. In this case the files are converted and saved to the new directory automatically. **Warning:** If the destination directory is the same as the source directory the original files are overwritten as the same name is used.

De-compressing an animation file

If you want to decompress an animation file (by decompressing an animation you get all the original frames back!) there are some restriction:

1. The first frame of the animation must be in the same directory as the animation file.
2. The Destination directory must be set.

To decompress the screens simply drag the animation file onto the Converter icon - the program does the rest.

When decompressing an animation file you can choose if you want to create **Sprite** files or **Picture** files. A dialogue box pops up to prompt your choice.

!Old_New

This is another application supplied on the disc. Its purpose is to convert old Render Bender files (&U58), ProArtisan files (&DE2) and Sprite files into the new compression format which also has the filetype &DE2. It is preferable to use this new format of file when using Animator.

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 will be given. You should always work on a copy of your files for this reason.

!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 will be given. You should always work on a copy of your files for this reason.

A tutorial

This tutorial is designed to take you through the various steps in creating an animation from an Illuminator file supplied on disc. You should be able to use this tutorial without reference to the rest of the manual as it is designed for those who cannot wait and want to see what the program will do. A knowledge of RISC OS is assumed.

1. Load Illuminator by double clicking on the '.Illumin icon on disc.
2. Load the file called Bird from the IllFiles directory on the program disc.
3. Choose Select mode by clicking on the icon in the Toolbox.
4. Click on the neck of the Bird to select the group of objects.
5. Click on the Animate.Show all frames menu item and note how the movement of the group is shown on screen in the window. Click in the window to clear the overlaid data.
6. Use the File.Save scene menu item to save the Scene file to disc. Put it in a directory called Scenes on a new disc and call the file Bird.
7. Delete Illuminator from the icon bar and load Render Bender by double clicking on the '.Render icon.
8. Load the Bird Scene file into Render Bender.
9. Set the following attributes:
 - Picture size = 1/4
 - Sky colour = Sky blue
 - Mode = 13
 - Ground = Matt
 - Floor = 7
 - Opaque Density = 1200
 - First frame = 1
 - Save Pictures = No
 - Lens = 400
 - Sky Depth = 100
 - Lamp Average =1.0
 - Shadows = No
 - Floor Scale = 500
 - Opaque R. Index =1.5
 - Last Frame = 1
10. Ensure that Trace mode is set to Fast in the Render Bender menu.
11. Now click on the Ray Trace Scene button and wait. You will see a number appear on the screen to indicate how many lines have been completed. For a full Mode 13 screen this will be 256 lines but for a quarter screen it will be 128. A quarter screen is half the vertical and half the horizontal resolution.
12. When the tracing is finished the display is shown on screen in a window.
13. Create a Pictures directory on your new disc and save the picture to disc using the filename Test.
14. You are asked if you want to use the new path for saving pictures. Click on OK to use the new path.
15. Now alter Save Pictures to Yes and Last Frame to 10
16. Click on Ray Trace Scene again and the program will draw each frame and save it to disc automatically. You can go and mow the lawn or have a relaxing cup of coffee whilst this goes on.
17. When all the files have been saved quit Render Bender and load Animator by clicking on the !Animator icon.
18. Drag one of the numbered Bird files from the Pictures directory onto the Animator icon. The numbers 1 to 10 are listed with an additional 1 at the end.

19. Edit the list of numbers to have two 10's followed by 9,8,7,6,5,4,3,2,1.
20. Click on Compile Animation and wait a few moments.
21. When complete click on the See Animation button to view the animation. The Select button on the mouse speeds up the animation and Adjust slows it down. Menu aborts the animation.
22. Click on menu to bring up the Animator menu and click on Show.Full screen before clicking on See Animation again.
23. Go to the Save Application option and save out the animation either as a windowed or full screen version.

Congratulations, you now have your first animation using the new Render Bender package and wasn't it easy !

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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Some of the products shown above might not be available immediately.
Not all products will run on all versions of RISC OS, check the product information page for details.

Other Products list last updated 29/2/26