

Patchwork Explorer 2023 X6

USER MANUAL



TABLE OF CONTENTS

Introduction	5
Products	6
Compatible Files	6
Loading an Individual Product	6
Multi-KDR	7
Loading Multiple Products Simultaneously	7
Loading Multiple Products in Separate Viewports	7
Loading Multiple Products in a Single Viewport	8
Tools	9
View Manager	9
Navigation	9
Viewport Configuration	10
Settings	12
General	12
Display	13
Stereo	14
Visualization Settings	15
Rendering	16
Animation	17
Linking Viewports	17
Editors	19
Product Manager	19
List of Products in a Viewport	19
Render Options	20
Properties Tab	20
Master Properties Tab	20
Cameras Tab	21
Configuration Tab	21
Animation Tab	22
Stereo (Editor)	22
Real-Time Sun (Editor)	22
Sun Settings Box	23
Shadow Settings Box	25
North Setting Box	26
Position Box	26
Manual Tab	27
Date, Time and Location Tab	27
Extracted from Environment Tab	27
Clipping Planes (Editor)	27
General Settings for Clipping Planes	28
Settings for the Selected Plane	29
Creating a Contour	29
Additional Display Options	29
Measuring Tool	30

Snapshot (Editor)	31
Dimensions Zone	31
Rendering Engine Window	31
Files Zone	31
Compression	32
Layered Image Options	32
Snapshot Zone	33
Internal Render Info Zone	33
Videos (Editor)	33
Dimensions Zone	34
Files Zone	34
Rendering Engine Window	34
Snapshot Zone	35
Internal Render Info Zone	35
Frame Output Zone	35
Camera Path Zone	35
Rotor Type	35
Kam File Type	36
Bookmark Animator Type	36
Bookmark	37
VR Object Editor	38
Dimensions Zone	39
Files Zone	39
Rendering Engine Window	40
Snapshot Zone	40
Internal Render Info Zone	40
Preview Frame Zone	40
Camera Path Zone	40
VR Object Settings	41
Cubic VR Panorama Editor	41
Dimensions Zone	41
Files Zone	41
Rendering Engine Window	42
Snapshot Zone	42
Internal Render Info Zone	43
Favorite cameras	44

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The Libav library under Lesser General Public License (LGPL 2.1) and its source code can [be downloaded here](#).

This documentation is provided with the software Patchwork Explorer. It does not, however, constitute a contractual agreement with regard to the features and functionality of the software.

INTRODUCTION

The software Patchwork Explorer offers an interactive presentation of 3D Digital Aspect Mockups created with the Patchwork 3D authoring software, as well as the exploration of product configurations. This program is designed to be simple and requires no knowledge of 3D rendering.



NOTE

Patchwork Explorer is available in several editions Enterprise, Premium and Community tailored to your needs.

Patchwork Explorer Community is a full software and free to use for non-commercial use.

Patchwork Explorer Premium, for its part, is intended for commercial use. You must acquire a Patchwork Explorer Premium license to use it.



NOTE

Note that Premium and Community editions have their own unique file version. These two editions can work together. On the other hand, a file created and/or exported from Patchwork 3D Enterprise cannot be opened or read with Patchwork Explorer Premium or Community.

Thanks to Patchwork Explorer you can:

- View your products in 3D.
Patchwork Explorer provides a 3D visualization space called a “Viewport” that allows you to interactively inspect a product’s design. Tools such as the real-time sun contribute to the creation of an ultra-realistic appearance.
- Compare different 3D products or different configurations of a single product.
Several [viewport configurations \[10\]](#) are available for viewing products side by side. This approach allows several elements in a range of products to be compared at the same time. The ability to [link viewports \[17\]](#) is included to facilitate comparisons in 3D.
- Manage your 3D layouts: set up a layout and save your set-ups.

[Load several products in the same Viewport \[8\]](#), specify the position of your products and their [configuration \[21\]](#), and determine the rendering. When you’ve finished preparing a layout, Patchwork Explorer allows you to [save them as a .kpl file format \[20\]](#) which can be reloaded at any time.

PRODUCTS

Compatible Files

Patchwork Explorer is compatible with the KDR file format.

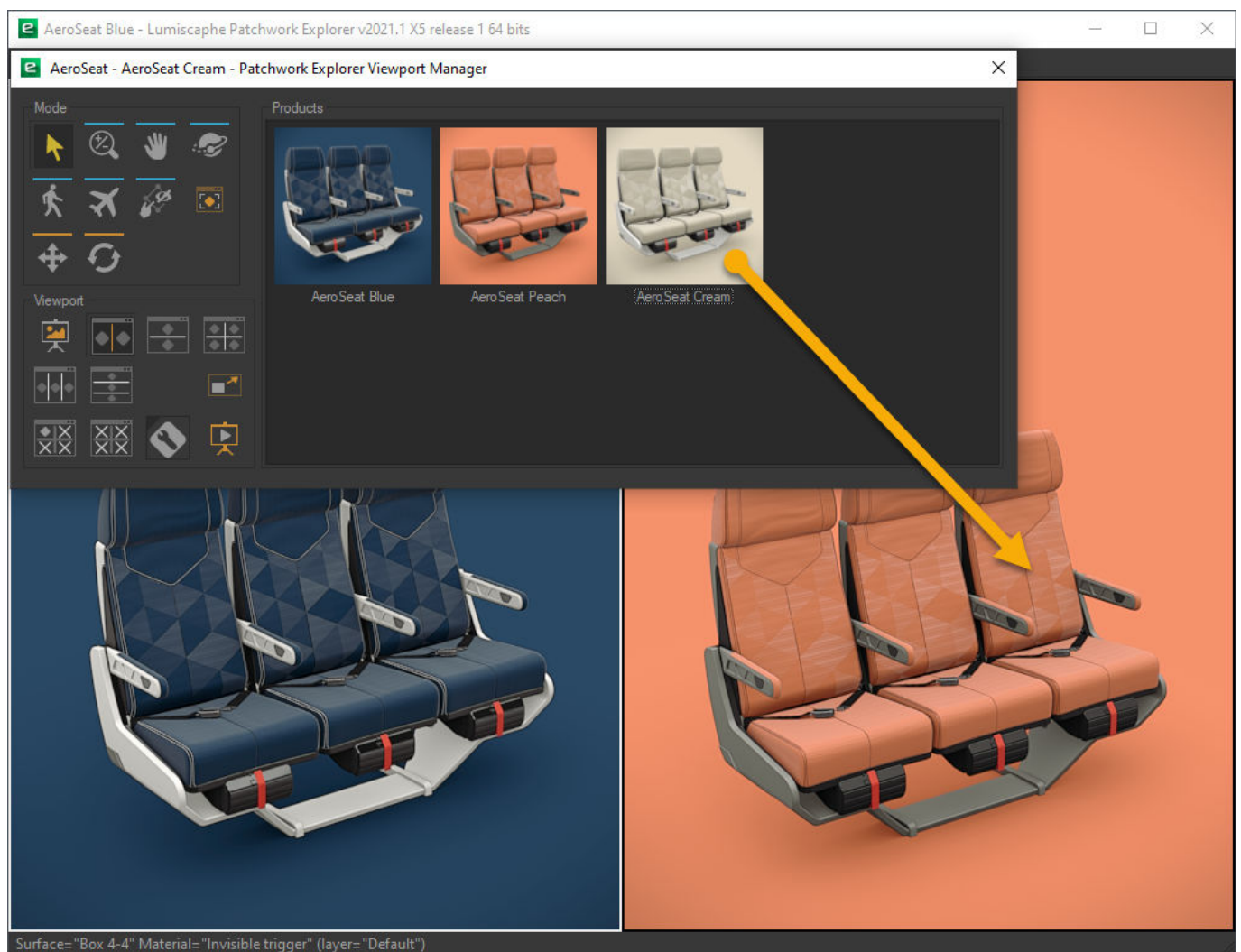
Loading an Individual Product

Access: **File** menu > **Open**

Begin by importing a file. Once a file is opened, the floating window **Viewport Manager** is displayed on the screen. This window contains thumbnail views of the products in your file.

To load a product, drag and drop its thumbnail onto a viewport. You can also load a product in the active viewport by double clicking the thumbnail.

Access: **View Manager** window > Drag and drop



Drag and drop a product onto a viewport. (Enterprise edition)

Once a product has been loaded, it is possible to hide individual surfaces. Right-click within the viewport and choose **Click to hide**. This activates the **Click to hide** mode. When a surface is clicked, it is hidden. To restore the visibility of hidden surfaces, right-click within the viewport and choose **Show all**. To exit **Click to hide** mode, right-click within the viewport and choose **Click to hide** again.

Multi-KDR

Opening several KDR files is possible thanks to the "multi-KDR" mode in Patchwork Explorer.

With the "multi-KDR" mode, you can add products from other databases to the list of products available in the **Viewport Manager**.

When the "multi-KDR" mode is deactivated, the list of products available in the **View Manager** is limited to the products in your KDR file. Once the "multi-KDR" mode is activated, you can add products from other databases to this list.

This gives you the possibility to stage together or compare side by side products found in different KDR files.

To add products from a different database, return to the **File** menu to open a new database. Products in this new database will be added to the list of products available in the **Viewport Manager**.

Loading Multiple Products Simultaneously

Patchwork Explorer is designed to explore multiple products and multiple databases at the same time. You can either load different products in separate viewports in order to compare them or load multiple products in the same viewport to create a layout.

The products are available in the **Viewport Manager** [9] as soon as a database is opened. You can also add products from other databases thanks to the multi-KDR mode.

Loading Multiple Products in Separate Viewports

Access: **View Manager** window > Drag and drop

When launched, Patchwork Explorer shows a single viewport. However, up to four viewports and several viewport distributions are available. In order to load multiple products, each in its own viewport, change your viewport configuration. Refer to the chapter **Viewport Configuration** [10] for more information.

Drag and drop the product that you want to load onto the desired viewport. You can also load a product in the active viewport by double-clicking.



TIP

If the viewport already contains a product, a drag-and-drop or a double click will replace the product currently loaded in the viewport with the product you are loading. An alert prevents you from accidentally replacing the products in a viewport if more than one product is already loaded in that viewport.

You can link viewports (see the chapter on **Linking Viewports** [17]) to synchronize the manipulation of the products in the linked viewports.

Loading Multiple Products in a Single Viewport

Access: *Viewport Manager* window > **Ctrl** + Drag and Drop

To load multiple products in the same viewport, begin by loading the first product normally (drag-and-drop or double-click). This product will become the main product or the “master” product. The “master” product is the product with the environment attributes and post-processing that you want to apply to your scene. Regardless of the order in which you load your products, you are free to modify the “master” product at any time in the [Product Manager \[19\]](#).

Load multiple products by holding down the **Ctrl** key while dragging and dropping the subsequent products onto the viewport. You can load multiple instances of a single product, multiple products from a single file, or products from various databases if you have opened multiple databases.

Additional products will be placed at the point onto which they are dropped. You can place a product on the reference grid's plane, or on a surface of another product in the layout. If the cursor points to another product's surface when you drop the product you are adding, the new product will be placed on that surface. In this case, the new product's pivot will be oriented so that its Y-axis ("up") is aligned with the surface's normal. Pivot placement and orientation, as well as the recalculation of surface normals, must be set in Patchwork 3D Enterprise or Patchwork 3D Engineering prior to exporting the products.

The position and the orientation of the products in a layout can be modified once the product has been loaded. To do this, use the translation and rotation gizmos. These gizmos are available:

- in the [Navigation box \[9\]](#) of the *Viewport Manager*,
- in the *Viewport* menu,
- in the *Transformation* box of the [Properties tab \[20\]](#) in the *Product Manager*.



TIP

Don't forget to save the layout of the scene that you're creating. **Ctrl+S** will save the layout as a .kpl file.

TOOLS

View Manager

Access: **Editors** menu > **Viewport Manager**

keyboard shortcut: **M**

The floating **Viewport Manager** window appears when a KDR file is opened.

This window includes the list of products contained in the imported database, as well as the functions relative to the products, the organization of the viewports, and the position of the point of observation.

Navigation

Access: **Viewport Manager** window






Mode menu









To display even the smallest details of a product, Patchwork Explorer includes a range of navigational tools. These tools are available in the **Viewport Manager** or in the **Mode** menu in the main window.

The product is always observed from a freely-defined point of view. These tools will help you position this observational point as efficiently and precisely as possible.

The look-at point determines the direction in which the camera is directed. The observational point designates the location of the camera in the scene.

The available navigational tools are listed in the following table:

Icon	Tool	Description
	Select	A product in the scene can be selected by clicking on it. The corners of a box enclosing the selected product appear. This indicates which product is included in the selection.
	Zoom	The look-at point remains fixed and the observational point shifts along the direction of observation.
	Pan	The observer moves laterally along the observation plane.
	Orbit	The observational point revolves around a fixed look-at point.
	Fly Mode	The look-at point and the observational point both advance in the direction of observation.

Icon	Tool	Description
	Walk Mode	The look-at point and the observational point both advance in the direction of observation, but the observational point remains at a fixed altitude.
	Translation gizmo	The product (or group of selected products) can be positioned by direct manipulation of the translation gizmo.
	Rotation gizmo	The product (or group of selected products) can be oriented by direct manipulation of the rotation gizmo.
	Focal	This mode reproduces the setting of the focal length of a camera.
	Roll	The product turns with regard to the center of the screen.
	Zoom to fit	The observational point is positioned in order to show the entirety of the product while preserving the direction of observation.
	Collisions	The camera's ability to pass through all surfaces in a scene is blocked when this option is activated. To observe the effects of this option, use fly mode or walk mode .
	Prevent Collisions with Transparent Surfaces	The camera's ability to pass through transparent surfaces only is activated. (Available only if Collisions is activated.)



NOTE

Keyboard shortcuts allow quick access to the first three navigational modes:

- **Zoom:** **Ctrl + Shift** + Middle Mouse Button / move the mouse
- **Pan :** Hold down the mouse wheel / move the mouse
- **Orbit:** **Ctrl** + Middle Mouse Button / move the mouse

Use **Ctrl+Space** to place the viewport's look-at point at the position indicated by the mouse pointer.






Use **Shift+Space** to set the depth of field and bring the surface under the mouse pointer into focus.

Viewport Configuration

Access: **Viewport Manager** window

Viewport menu > **Viewport Layout**

The main function of Patchwork Explorer is the comparison of different versions of your products. Patchwork Explorer provides the tools that allow the main viewport to be divided into several viewports, all while preserving the real-time interactivity of each viewport.

Icon	Option	Description
	Maximize Active Viewport	Displays the active viewport in 1x1. Rediscover the products and configurations in the other viewports by clicking a second time on this button. This function can also be found in the Viewport menu.
	Clear Inactive Viewports	Displays the active viewport in 1x1 and deletes the products and configurations in the other viewports. This function can also be found in the Viewport menu.
	Clear All Viewports	Closes the products and configurations in all of the viewports. This function can also be found in the Viewport menu.
	Product Manager	Displays the Product Manager (see Product Manager [19]). This option is also available from the Viewport menu.
	Live Mode	This option, which is also available in the Viewport menu, will function if your database contains triggered animations. The animations and triggers must be previously defined in Patchwork 3D Enterprise or Patchwork 3D Engineering. Activate this mode, then click on the triggers in your product.



TIP

To exit **Live Mode**, press the **Esc** key.

SETTINGS

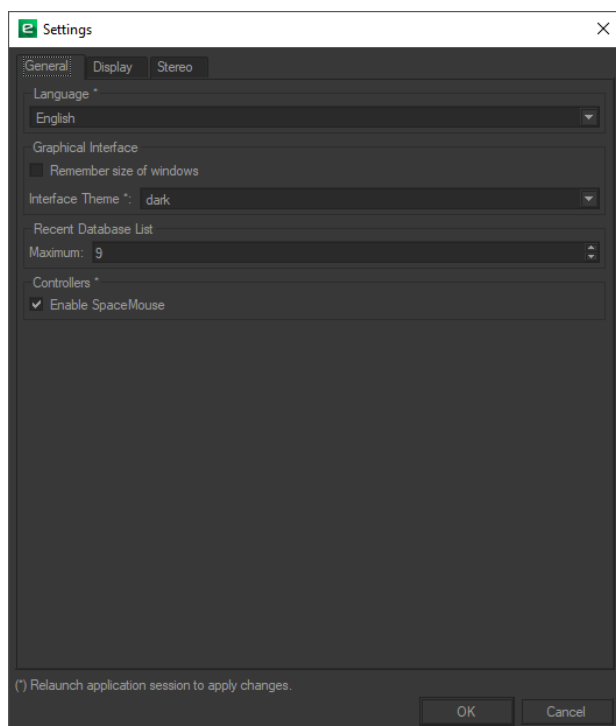
Access: **File** menu > **Settings**

You can establish and modify the rules of operation for Patchwork Explorer in the **Settings** window.

The software settings are grouped into three tabs: **General**, **Display**, and **Stereo**.

General

The **General** tab includes options that set the presentation of the interface.



The *General* tab of *Settings*.

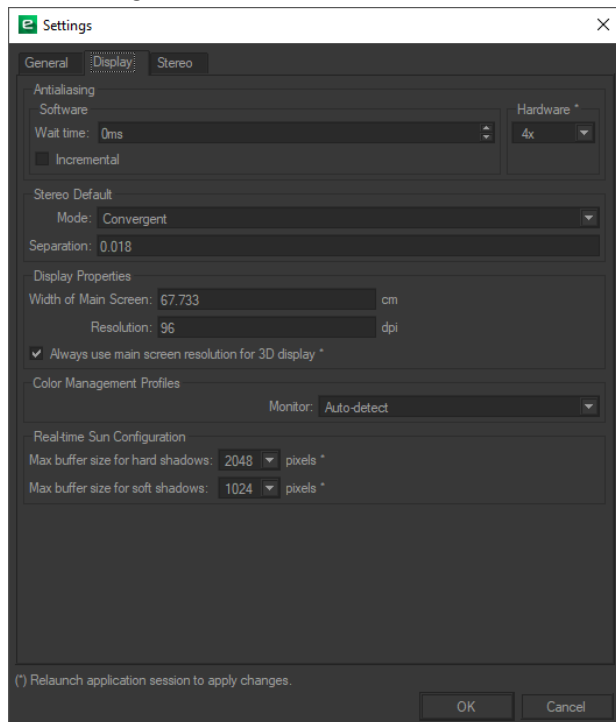
Choose a language from the drop-down menu in the first zone. The software is available in French and English. To apply the modification of this setting, restart the program.

The **Graphical Interface** zone allows you to **Remember size of windows** and to select your **Theme**. The theme options are **dark** (default) and **cartoon**. To apply the modification of this setting, restart the program.

In the **Recent Database List**, enter the maximum number of databases that you wish to be able to open from the **File > Recent** submenu. This maximum number can be anything from 0 to 99.

The final zone, **Controllers**, concerns the mouse. It contains a single option, **Enable Space Mouse**. To apply the modification of the setting, restart the program.

Display



The Display tab of Settings.

The zone **Antialiasing** sets the behavior of the antialiasing system of the software that removes the aliasing effects on the images.

The **Wait Time** field provides the delay at the end of which the antialiasing is applied, counting from the moment when there is no more user activity in the software.

When the **Incremental** checkbox is ticked, the different phases of the antialiasing are visible on the screen. When this checkbox is left empty, Patchwork Explorer runs all of the antialiasing calculations before showing the result.

Depending on your graphics card, it is also possible to activate hardware antialiasing, with a variety of settings (deactivated, 2x, 4x, 8x, 16x, 32x, 64x).

In the **Mesh Optimization** zone, the option **Store meshes in graphics card** sets the means of preparing the rendering. When this option is activated, the graphics card's memory is used whenever possible. This option improves the speed of rendering for databases. This option is activated by default.

The zone **Default Stereo Values** sets the default values for the Stereo Editor. For additional options concerning stereo, see the information on the [Stereo \[14\]](#) tab.

In the **Display Properties** zone, verify the dimensions of your screen in order to display the post-processing and other 2D effects on a 1:1 scale.

The option **Always Use Main Screen Resolution for 3D Display**, which is selected by default, restricts the dimensions of 3D viewports to the dimensions of your main screen. This limitation is useful when the screen used for set-up and the screen used for demonstration do not use the same resolution, which is the case, for example, when you use a laptop to manage a separate presentation screen.

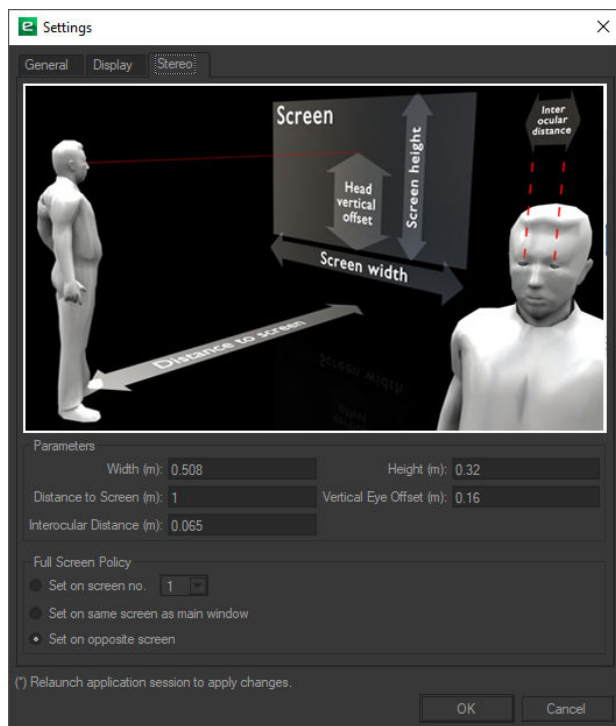
The **Color Management Profile** is detected automatically by default. In this zone, you can also provide a specific value chosen from the drop-down list.

The zone **Real-Time Sun Configuration** sets the maximum size of the buffers for shadows generated by the real-time sun. Provide the maximum values in pixels. A higher value will cause slower rendering. To apply the modification of this setting, restart the program.

For other real-time sun parameters, refer to the chapter.

Stereo

In the **Stereo** tab, you have control over the settings for viewing your product in 3D.



The Stereo tab of Settings.

The **Parameters** zone concerns the measurements associated with the screen, the user, and their relative positions. The values provided by default are modifiable. You can adjust:





- The **Width** of the screen in meters,
- The **Height** of the screen in meters,
- The **Distance to Screen** in meters (position of the user),
- The **Vertical Eye Offset** in meters (position of the user's eyes with regard to the bottom border of the screen),
- The **Interocular Distance** of the user in meters.


The choice of options in the zone **Full Screen Policy** determines which screen is used for display in full screen mode in the case of the use of multiple screens.

VISUALIZATION SETTINGS

Access: **Visualization** menu

Patchwork Explorer offers options to personalize the display in the active viewport.

Icon	Option	Description
	Mirror Effect	Enables or disables the mirror effect, if your database contains one, in the active viewport. This effect can be set up in the post-processing options in Patchwork 3D Enterprise or Patchwork 3D Engineering.
	Software Antialiasing	Enables or disables Patchwork Explorer's antialiasing. This option does not impact the hardware antialiasing settings defined in the Display tab of the Settings editor.
	Full Screen Mode	Shows the active viewport in full screen.
	Grid	Enables or disables the display of the grid in the active viewport.
	Axis Orientation	Enables or disables the display of the X, Y, and Z-axis orientation indicator in the active viewport.

Icon	Option	Description
	Show Statistics	<p>Enables or disables the display of the rendering statistics in the active viewport. This option displays data related to rendering delays, the number of surfaces, summits, and triangles processed, and the GPU memory used.</p> <p>The consumption of GPU memory is displayed as a gauge for the following elements:</p> <ul style="list-style-type: none"> • The images and videos used as textures and rendered in the active viewport, • The meshes rendered in the active viewport, • The textures used to calculate relief (bumpmaps) that are rendered in the active viewport, • The lighting environments rendered in the active viewport, • The lightmaps calculated in Shaper and used during the rendering in the active viewport, • Other: other sources of GPU memory consumption, including database resources that are not used in the active viewport, other open software, and the memory reserved by the graphics card's driver, • Free: unused GPU memory. <p>The following data is provided when the display of the statistics is enabled:</p> <ul style="list-style-type: none"> • fps (frames per second), • Image Preparation time, • Image Render time, • Image Finalization time, • Number of Surfaces rendered, • Number of Vertices rendered, • Number of Triangles rendered.

Rendering

Access: **Viewport** menu > **Render by Type**

Viewport menu > **Render**

You can restrict the rendering to one or several types of materials through the menu **Viewport > Render Type**. In this submenu, the types of materials are indicated with a checkmark if they are rendered. By default, all of the types of materials are selected. To deactivate the rendering of a type of material, select it from the list. The modifications are shown on the product in the active viewport.

The elements available in the menu **Viewport > Render** allow you to access different rendering modes. By default, Patchwork Explorer calculates your image in **Material** mode. However, you have the choice among the modes **Wireframe**, **Fill**, **UV**, **Lightmap**, **Material**, and **Mix**.

Animation

Access: **Mode** menu > **Live Mode**

The option **Live Mode** switches the interface of Patchwork Explorer to a mode in which animations based on keyboard or mouse shortcuts can be read. Opening a car door, for example, might be triggered by clicking directly on it.

This mode is operational when your database includes animations with triggers. Animations and triggers must be previously defined in Patchwork 3D Enterprise or Patchwork 3D Engineering.



TIP

To exit **Live Mode**, press the **Esc** key.

Linking Viewports

Access: **Viewport** menu > **Link**

To facilitate the comparison of products shown in different viewports, Patchwork Explorer employs a method of synchronization of multiple viewports (interactive comparison). If this linking method is active, the observational point in the inactive viewports will be updated to correspond to any modifications to the observational point in the active viewport.

You can choose from different link modes:

Icon	Mode	Description
	None	The observational point is never updated.
	All	The observational point is always updated in all viewports.
	Model	The observational point is updated in viewports with the same model. All of the products based on the same model are updated to be viewed from the same position.
	Link Interactively	This option allows the observational point to be dynamically and instantaneously synchronized in accordance with the chosen link mode.

For complex scenes, this interactive synchronization hinders the fluidity of movement. When the **Link Interactively** option is deactivated, the synchronization takes effect once the interactive phase of modification has ended.



NOTE

The default link settings use the **Model** mode and the **Link Interactively** option is deactivated.

EDITORS

Access: **Editors** menu

Capture editors configure the settings needed to generate still images or videos. These editors export files in the standard image or video formats.

The interface has four capture editors: the **Capture Editor** fixed, the **Video Editor**, the **VR Object Editor**, and the **Cubic VR Panorama Editor**.

Product Manager



Access: **Editors** menu > **Product Manager**

The **Product Manager** is the basic construction tool for creating layouts. Using it, you can set up products, establish their configuration, and determine their position in the active viewport.

List of Products in a Viewport

The **Product Manager** displays the products present in the active viewport at the top of the editor. In this zone, there are several buttons:

Icon	Function	Description
	Add Group	Creates a new product group. Products listed in this zone can be added to the group by drag-and-drop.
	Delete Group	Deletes the selected group.
	Set as Master	Defines the selected product as the one that provides the environment and post-processes for the active viewport.
	Load Layout	Opens a set of products that have been previously set up and saved.
	Save Layout	Saves the current set of products.
	Delete Product	Deletes the selected product from the list and from the active viewport.

The  icon indicates that the product or the group is visible. The  icon indicates that it is hidden. Click on the icon to change the visibility state.

In the **Product** zone, the name of the currently selected product is shown. You can rename the product by typing directly in this field. This is particularly helpful when working with a layout containing multiple examples of a single product.

The checkbox to the left activates or deactivates the visibility of this product in the viewport. To the right, if the product is the “Master” in the viewport, this state is indicated.

Render Options

Below the product tabs is the **Render** zone. In the **Render** zone, you can enable or disable the options to:

Option	Description
Use Enhanced Transparency	Enhanced transparency provides improved rendering for transparent surfaces, particularly for complex transparent surfaces, intersecting transparent surfaces, and transparent surfaces that surround other surfaces. Rather than using surfaces' bounding boxes to determine their distance from the viewpoint, enhanced transparency utilizes pixel-by-pixel analysis to determine the order in which the surfaces must be rendered. Using enhanced transparency increases the consumption of GPU memory and reduces the number of images per second. This option applies to the entire scene.
Place Dropped Products Under Cursor	If your software version contains the "Layout" option, you can add products to the scene by drag-and-drop. Keep this option checked in order to place new products at the location of the cursor when you release the mouse button to drop them. If this option is not enabled, dropped products will be placed at the 3D world's origin.

Properties Tab

The **Properties** tab contains the parameters regarding the product and its position in the viewport.

The **Transformation** zone allows for the specification of the coordinates in the world frame of reference for the selected product or model's position (TX, TY, and TZ) and orientation (RX, RY, and RZ). The position coordinates are expressed in meters and the orientation coordinates in degrees. Enter the numerical values or click on the gizmo icons to modify your product's position and orientation.

A final parameter, **Rebuild dynamic environments**, sets the conditions that control the automatic updating of local environments when the displayed configuration is modified. The product displayed must contain dynamic local environments for this parameter to have an effect.

Condition	Description
Never	Never allow dynamic updating of local environments when configuration changes are made. If rendering fluidity is more important than photorealism, use this option to avoid the slight delay in recalculation for larger or complex scenes.
Product only	Allow dynamic updating of local environments when configuration changes are made to the product containing dynamic local environments. If your software version contains the option "Layout" and you are viewing a multi-product scene, configuration changes affecting other products in the scene will not cause dynamic updating.
In layout	If your software version contains the option "Layout" and you are viewing a multi-product scene, allow dynamic updating of local environments when configuration changes are made to any product in the scene.

Master Properties Tab

The **Master Properties** tab contains the parameters regarding the product display options. If your software version contains the "Layout" option and you are viewing a multi-product scene, the options concern the "Master" product that imposes certain parameters on the scene.

Option	Description
Use background	Display the background of the current camera sensor. If you are viewing a multi-product scene, this applies to the "Master" camera sensor only.
Use Overlay	Display the overlay of the current camera sensor. If you are viewing a multi-product scene, this applies to the "Master" camera sensor only.
Use Post-Processing	Display the post-processing blend of the current camera sensor. If you are viewing a multi-product scene, this applies to the "Master" camera sensor only.
Show Global Environment	Use the global lighting environment of the current product. If you are viewing a multi-product scene, the "Master" global environment will be used for all products.
Show Surface using Environment Material	This option is used to show or hide surfaces using the environment material in the "Master" product, such as a skydome. These surfaces are visible by default but can be hidden by unchecking this option.

Cameras Tab

If favorite cameras were defined in your product, you will find them in the **Cameras** tab.

The cameras are shown in the **Camera** box. Click on the name of a camera to call it up in the viewport. This will also apply the background, post-processing effects, and overlay, if any are associated with the camera's sensor. Prevent the background, post-processing effects or overlay from being displayed in the **Master Properties** tab.

The name of the current camera is displayed in the upper left-hand corner of the viewport. Right-click on the name of the camera to open a context menu listing the cameras of the "Master" product. Select a new camera from this list to change the current camera.



TIP

The four favorite cameras are also available in the **Product** menu.



NOTE

You can place multiple products in the same viewport. In this case, only the camera sensors for the "Master" product are used. Calling up cameras for other products loads the camera position and orientation only.

Configuration Tab

Patchwork Explorer takes advantage of product configuration if it is present in the imported KDR file. The software thus offers the ability to easily explore all of the possible product combinations.





Configuration settings are displayed when the active product has configurable elements. To change the product configuration, modify these settings using the checkboxes and the drop-down lists.

Display of multiple product configurations is also possible for configurable products. See [Loading Multiple Products Simultaneously \[7\]](#). You can also place a configurable product multiple times in a viewport and configure each of these products independently. You can thus compose your scene with several variations of the same product or compare these product variations in separate viewports.

Animation Tab

If animations have been defined for your product, the **Animation** tab will be present.

Manage the playback of the animation with the following tools:

Option	Description
Timeline	From the drop-down list, select the preset animation timeline you want to play.
Timeline Scrollbar	Positions the rectangular cursor at any point on the bar to display the corresponding animation state. For increased precision, you can also provide the time in seconds in the field to the right of the slider.
	Places the cursor at the beginning of the animation.
	Initiates the animation playback from the cursor's current position or pauses the playback if the animation is currently playing.
	Places the cursor at the end of the animation.
	Activates or deactivates looped playback.

Stereo (Editor)

Access: menu **Editors** > **Stereo**

The stereo editor offers quick access to the stereo settings. The default values are defined in the **Stereo Default** box of the **Display [13]** tab of the **Settings** window.

To modify the stereo display settings, stereo vision must be activated from **Visualization** > **Activate Stereo Vision**.

To find additional stereo settings, go to **File** > **Settings** > **Stereo [14]** tab.

Real-Time Sun (Editor)

Accessible in: **Editors** >  **Real-Time Sun**

Real-Time Sun is an editor used to set up and display a sun that can be modified in real time in your products.



Example of real-time sun usage.

This editor is composed of four boxes: **Sun Settings**, **Shadow Settings**, **North Setting**, and **Position**.

Sun Settings Box

The **Sun Settings** box provides a set of adjustable parameters for creating a real-time sun.

Parameter	Description
On	Check the On box to activate the real-time sun in your product.
Color	Click on the Color box to open the color chooser and pick the color to assign to the sun.

Parameter	Description
-----------	-------------

Intensity Enter in this field the value of the desired intensity of the sun. This value must be positive. Unlike the sun type lightings available in the **Shaper** module, intensity is adjusted according to the sun altitude.



Example of sun intensity variation.



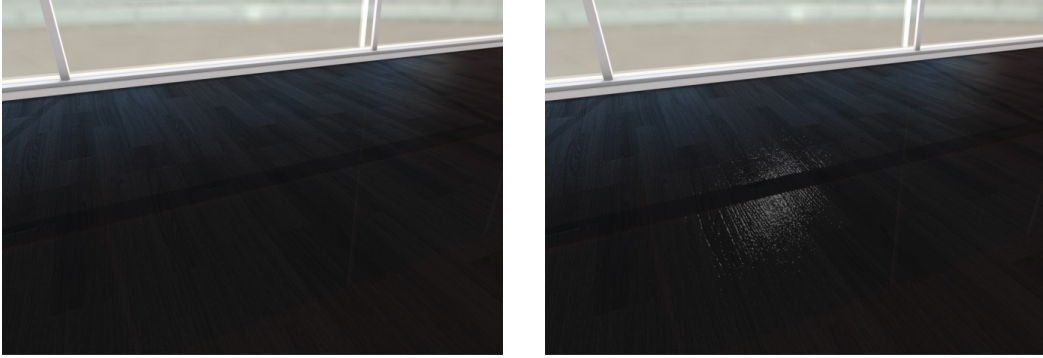
NOTE

Real-time sun lighting is added linearly to the existing lightmaps in the model. If your model has very bright lightmaps, the effects of the sun will not be as visible.

Shadow intensity By default, no light intensity is added to areas which are not sunlit. However, by entering a value in the **Shadow intensity** field, you can apply an additional light intensity in these shadow areas. The value entered must be positive. The value 0 corresponds to a realistic effect.



Example of shadow intensity variation.

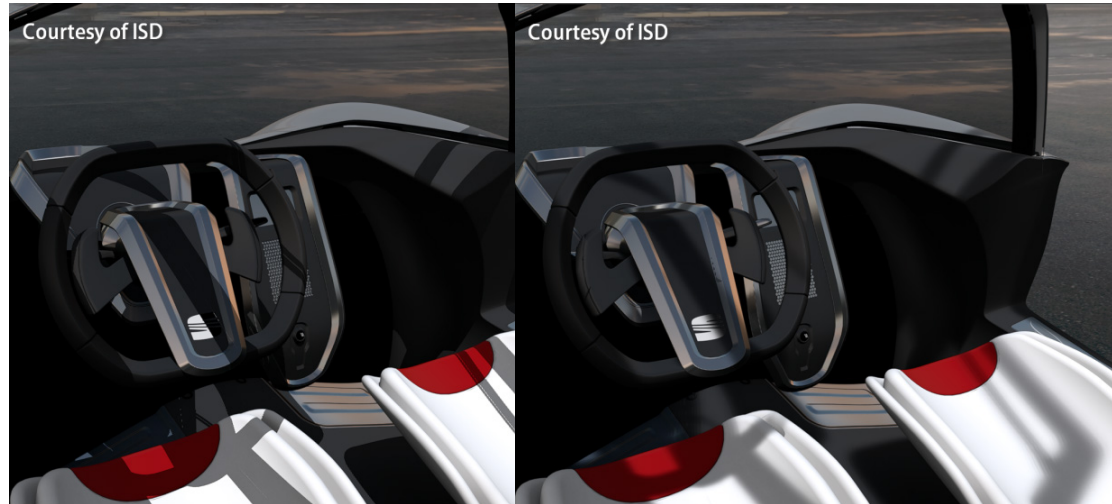
Parameter	Description
Lightmap modulator	Adding a real-time sun to the lightmap of a product can produce an intensity of a lightmap that is too strong. If this is the case, you can modify the intensity of the lightmap. The field Lightmap modulator is used to set a modulation coefficient for the intensity of the lighting calculated in the Shaper module. The value of this coefficient must be between 0 and 1. The value 0 assigns a null intensity to the lightmap. The value 1 corresponds to the assignment of the lightmap as it is calculated in the Shaper module.
Specular	<p>Tick this check box to display the sun's specular reflection on your product. Enter its intensity in the corresponding field.</p> <div>  </div> <p><i>Example of a scene without and with the sun's specular reflection.</i></p>

Shadow Settings Box

Parameters specific to shadows are included in this box.

Setting	Description
Shadows in mirrors	Tick this check box to display shadows on reflective surfaces. The activation of this option extends the rendering time.
Shadow quality	Select the quality of shadows to display from the drop-down menu. The higher the selected quality is, the longer the rendering time will be.

Setting	Description
Shadow smoothness	Select the width for the blur effect on shadow edges from this drop-down menu. The more the shadows are smoothed, the longer the rendering time will be.

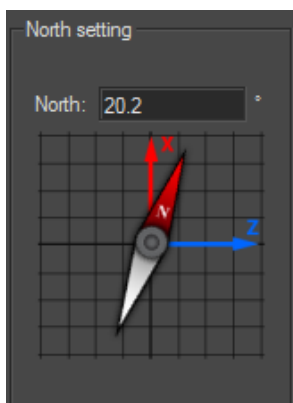


Examples of different smoothness in shadows.

North Setting Box

The **North Setting** box is used to set up the north relative to the reference axis of the database. There are three ways to set up the north direction:

- By entering a value between 0 and 360° for the angle between the X axis and the North arrow of the compass,
- By clicking on the compass while holding the left button of the mouse, and dragging it to the desired position,
- By clicking on the grid to define the orientation of the compass.



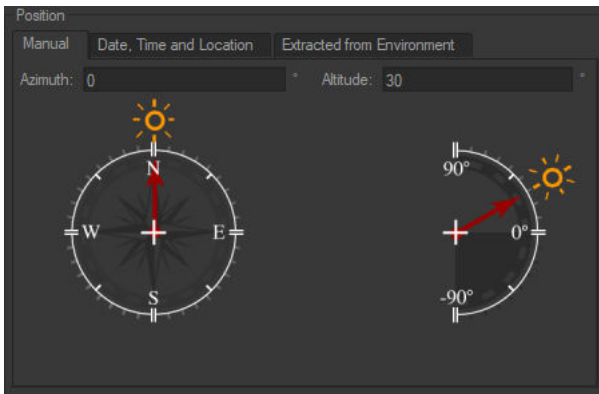
Positioning the compass at a 20.2° angle between the x axis and the compass.

Position Box

The Position box consists of three tabs, one for each sun positioning mode.

Manual Tab

This tab proposes to position the sun by entering a value for the **Azimuth** and the **Altitude**, or directly with the widgets by clicking or moving the sun to the desired position.



The Manual tab.

Azimuth is the angle in the horizontal plane between the sun direction and the north.

Altitude is the angle between the sun direction and its projection onto the horizontal plane.

Date, Time and Location Tab

This tab allows the sun to be located so as to mimic its position in the sky at a given date and time for a specific location. To do this, select or enter the date and time of your choice in the corresponding data field. Then provide the time zone with the drop-down menu. Areas of the world in darkness are updated on the map.

To activate the shift for daylight saving time, check the **Daylight savings** box and enter the value in minutes of the desired shift. This is only active on days when daylight saving time is applicable (from the last Sunday of March to the last Sunday of October).

Next, specify your location of choice:

- By entering values for latitude and longitude in the data fields – the **City** field then displays **User-defined**,
- By selecting a city in the **City** drop-down menu, or
- By clicking directly on a point on the map – the **City** field also displays **User-defined**.

Extracted from Environment Tab

Select this tab to position the sun at the point defined as the brightest point in the product environment. This point must be previously established in Patchwork 3D Enterprise or Patchwork 3D Engineering. (Refer to the documentation of Patchwork 3D Enterprise or Patchwork 3D Engineering. This operation is described in the chapter on the **Environment's Brightest Point** box of the **Product Environments Properties** tab of the **Product Environments** editor.)

Clipping Planes (Editor)



NOTE

This feature requires a specific license option and may not be available in your software version.

Accessible in: **Editors > Clipping planes**

Clipping Planes is an editor that allows you to section the object of the scene in a pre-designated plane in order to see its interior.

Active clipping planes are visible in all open viewports and will clip through all products.



NOTE

Clipping planes are positioned in the world. Consequently, modifying the position of a geometry in the world will not move the plane. The position at which the plane clips the element will be modified.

General Settings for Clipping Planes

The **General Options** zone provides render settings with the **Face Elimination Policy** function, which allows you to show or to hide the backfaces of the surfaces.

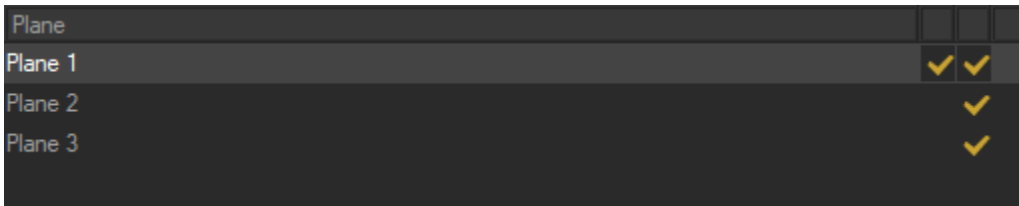
In the **Face Elimination Policy** drop-down list, the option **Surfaces** displays backfaces according to the settings provided in the **Surface Properties** in **Shaper**.

The **Show Gizmo** option displays a translation gizmo that can be manipulated to quickly move the plane of the active section.



The **Tags** section can be used to prevent surfaces from being clipped by the plane. Use the button to open a list of tags; select the tag that marks the surfaces that should not be clipped. Tags are assigned to surfaces using the **Tag Manager** in **Shaper**.

Patchwork 3D Design allows the management and display of several Clipping planes simultaneously. Each plane is listed separately, followed by indicators for the clipping plane's state (enabled or disabled), the visibility of its contour, and the visibility of its grid. Clicking on the indicators modifies the state of the associated property.



Settings for the Selected Plane

The **Enabled** function in the **Clipping Plane** zone must be checked to view the clipping plane.

The **Clipping Plane** zone provides the planar equation used to define the clipping plane. You can modify it by providing new numerical values.

Alternatively, you can choose a cross-section plane in the **Select the Plane** zone:

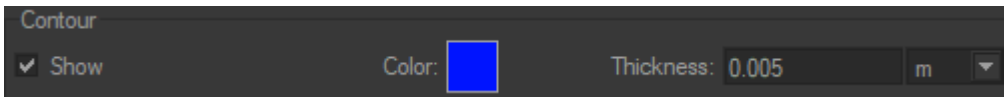
- Select the desired cross-section plane in the drop-down list.
- Via the function **Pick Plane**, you can perform a cross-section starting with a plane directly selected in the active viewport, using the eyedropper tool, or alternatively a precise cross-section point by checking the **Position** option.



NOTE

The cross sections are represented automatically in the interactive view each time the eyedropper tool is used.

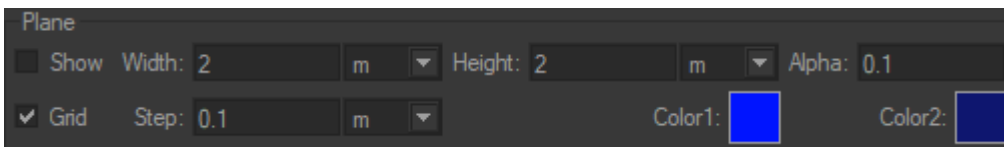
Creating a Contour



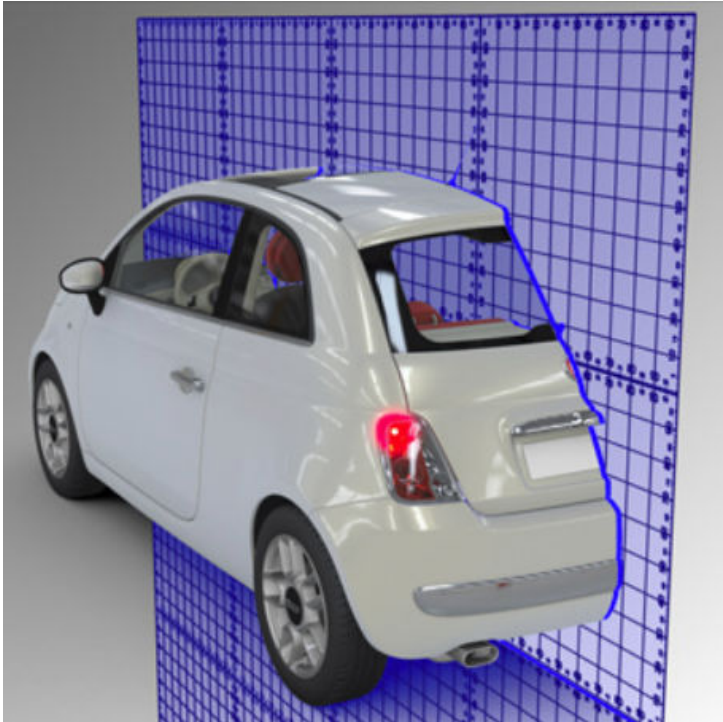
The contour of the clipped surface edges can be visually represented by enabling the **Show** option within the **Contour** zone. The color of the contour can be modified by clicking on the colored square to open the color selector. You can also modify the thickness of the line by entering a numerical value, or by using the up and down arrows of the keyboard.

Additional Display Options

The **Plane** box proposes a set of display options for the active cross-section plane.



Thus the display of a plane can be activated (**Plane** zone > **Show** checkbox) and the value of its transparency (**Alpha** field), size (**Width** and **Height** fields), orientation, and Color of its representation (**Color1** and **Color2**) can all be modified. Alternatively, just a metric Grid is displayed (**Grid** and **Step** options).



Measuring Tool

Available in: **Shaper** or **Matter: Editors > Advanced > Measuring tool>**

The Measuring Tool shows the distance between two points that you have chosen. This distance between these two points may thus be represented visually in the active view.



TIP

The **Show the gizmos** option must be checked to use the eyedroppers.

- Click on the green eyedropper and select your starting point in the viewing window.
- Click on the yellow eyedropper and designate the end point in the scene.

The result is displayed in the **Distance** field of the **Measure** zone at the bottom of the editor.



TIP

The distance is represented visually.

The **Enable Depth Test** function allows you to show the gizmos measuring the distance between measuring points in the scene without them being obscured by surfaces. Uncheck this parameter to display the points and the measurement above all the surfaces.

Snapshot (Editor)

Access: **Editors** menu > **Snapshot Image**

From the **Snapshot Editor**, you can modify the rendering settings and render a view of a product to an image file. This editor uses the material abilities of the interactive viewport to calculate an image whose size can be significantly larger than the screen resolution. The maximum size of the image depends only on your computer's memory.


Once the desired settings have been indicated, the **Render** button initiates the creation of the image file.

Dimensions Zone

The dimensions and resolution for the image to be rendered are provided in the **Dimensions** zone.

The **Format** drop-down list provides access to the most common sizes and formats. Some, such as **User Defined** or **User Defined in Units** allow the dimensions to be provided directly as values. By default, the format **Defined by view** is proposed.



The  button next to the **Resolution** box is a shortcut to standard resolutions expressed in dpi (dots per inch). If the resolution is provided in units other than dpi, the chosen standard resolution will be converted to the selected units.

In the **Orientation** zone, select one of the radio buttons for **Portrait** or **Landscape**. This choice is not available if you have selected one of the predefined formats: **Defined by Viewport**, **Defined by Product**, or **Fill Viewport**.

Rendering Engine Window

The **Configure** button in the **Rendering Engine** zone opens the **OpenGL Parameters** window.

Choose whether or not to apply:

- **Antialiasing**,
- **mipmaps**,
- **Mirror Reflections**,
- **Transparent Background**.

Choose the level of **Super Sampling** from the drop-down list.

Use the slider to define the level of **Specular Anisotropic Filtering**.

Click on **OK** to save your changes.

Files Zone

The **Files** zone contains the controls for creating an image file.

In this zone you can set:

- The output directory where the image file will be saved, as well as the name of the file and its extension,

- Whether to **Open File Selector** or not when rendering. When **Open File Selector** is selected, clicking on the **Render** button will show the dialogue box offering the choice of file name and type. This option is selected by default.

To change the format of the file to be created, change the extension of the file name. The following file formats are supported for image output:

- .jpg
- .png
- .bmp
- .tif
- .exr
- .hdf
- .psd
- Whether to **Confirm Overwrite** or not when rendering. When **Confirm Overwrite** is selected, if a file with an identical name is detected, a confirmation will be asked before replacing it with the file being created. This option is selected by default.
- The **configuration of the compression** according to the file type,
- The **configuration of the layered export** for .psd files.



TIP

Images with an alpha layer must be saved as .png files to keep their transparency. In these cases, the format PNG is automatically proposed by default.

Compression

Click the **Configure Compression** button to open the **Compression** window.

The compression can be adjusted for each file format for export. For each format, the higher the value is, the better the quality will be.

- **JPEG**: slide the cursor to define the compression.
- **PNG**: slide the cursor to define the compression. Tick the **Export as 16 bits** checkbox if you want to activate this option.
- **Image Compression for Animations**: slide the cursor to define the compression.
- **Image Compression for VR Objects and Cubic VR Panoramas**: slide the cursor to define the compression.

Layered Image Options

Click on the **Configure Layered Export** to open the **Layered Image Options** window. The settings defined in this window apply to images exported as .psd files only.

You can choose to export a layer for each of the following options:

- **Composable Image** containing three layers: a background, a multiplicative layer, and a layer of the product's opaque surfaces,
- **Composited Image**,

- **G-Buffer**,
- **Wireframe**,
- **Z-Buffer**,
- **Lightmaps**.

By default, only the **Composable Image** option is selected.

Snapshot Zone

The checkbox **Show Info** in the **Snapshot** zone provides the ability to display, along the bottom border of the active viewport, a summary of the dimensions settings of the snapshot.

Internal Render Info Zone

The **Internal Render Info** zone summarizes various settings. The applicable elements from among following information are displayed:

- **Width** of the image in pixels,
- **Height** of the image in pixels,
- **Pass**, the number of passes to render the image,
- **Sampling**,
- **Memory**.

Videos (Editor)

Access: **Editors** menu > **Snapshot Video**

The Video Editor exports a sequence of frames as a video file.

Starting from an initial observational point and a predefined animation scenario, the Video Editor calculates a frame for each stage of the camera's animation path.

These various frames are assembled in a standard animation file using an AVI (Audio Video Interleave) format, or alternatively saved individually as a sequence of images as .jpg, .png, .bmp, .tif, .exr, .hdf, or .psd files.

Once the desired settings have been specified, the **Render** button launches the generation of the video file.



TIP

During rendering, a dialogue box is displayed to show the progression of the creation of the video file. The **Viewer** button at the bottom of this dialogue box opens a frame viewing window.

At any time, you can pause the progression by clicking the **Pause** button, or cancel it by clicking the **Cancel** button. If you have paused the rendering, start it again by clicking on **Resume**.

Dimensions Zone

The dimensions of the animation to be rendered are filled out in the **Dimensions** box.

The **Format** drop-down lists the most common sizes and formats. Some, such as **User-Defined**, allow you to directly set the dimension values. By default, the format **Defined by Viewport** is proposed.

Files Zone

The **Files** zone contains the controls for creating a video file.

In this zone you can set:

- The output directory where the image file will be saved, as well as the name of the file and its extension,
- Whether to **Open File Selector** or not when rendering. When **Open File Selector** is selected, clicking on the **Render** button will show the dialogue box offering the choice of file name and type. This option is selected by default.

To change the format of the file to be created, change the extension of the file name. The following file formats are supported for image output:

- .avi
- .png
- .jpg
- .bmp
- .tif
- Whether to **Confirm Overwrite** or not when rendering. When **Confirm Overwrite** is selected, if a file with an identical name is detected, a confirmation will be asked before replacing it with the file being created. This option is selected by default.
- Whether to **Skip Existing Images** or not,
- The configuration of the Codec according to the file type,
- The configuration of the compression.

Rendering Engine Window

The **Configure** button in the **Rendering Engine** zone opens the **OpenGL Parameters** window.

Choose whether or not to apply:

- **Antialiasing**,
- **mipmaps**,
- **Mirror Reflections**,
- **Transparent Background**.

Choose the level of **Super Sampling** from the drop-down list.

Use the slider to define the level of **Specular Anisotropic Filtering**.

Click on **OK** to save your changes.

Snapshot Zone

The checkbox **Show Info** in the **Snapshot** zone provides the ability to display, along the bottom border of the active viewport, a summary of the dimensions settings of the snapshot.

If ticked, the **Viewer** checkbox in the same zone sets the image viewing window to open automatically during rendering.

Internal Render Info Zone

The **Internal Render Info** zone summarizes various settings. The applicable elements from among following information are displayed:

- **Width** of the image in pixels,
- **Height** of the image in pixels,
- **Pass**, the number of passes to render the image,
- **Sampling**,
- **Memory**.

Frame Output Zone

You have the option to render only a portion of the timeline range by providing the numbers of the desired frames:

- **Current Frame**,
- **All Frames**,
- A **Range** of frames.

It is also possible to indicate the initial number for the index appended to the filename of each frame in the Output Filename zone. By default, the value of this option is "0."

Camera Path Zone

Rotor Type

A **Rotor** type camera path makes the camera orbit an object. The selection of this type of camera path displays the **Rotor** zone below the **Camera Path** zone.

The rotor creates a vertical axis of rotation on the Y axis. The product in the viewport rotates around this axis in accordance with the parameters that you provide:





Setting	Definition
Frame rate	The number of frames per second.
Loop	The preview of the animation plays in a loop.
Real Time	The preview of the animation is in real time.
Center	The position of the camera in height and in distance from the Y axis can be reset. The camera is initially positioned by default. Use the navigation tools to modify the viewport camera position, then click on the button Center to use the new camera position and to define the current viewport view as the rotor's initial position.
Duration	The duration of the animation in seconds.

Setting	Definition
Ping Pong	<p>The definition of the width of the arc of the camera path. You can:</p> <ul style="list-style-type: none"> • Have the camera cover an arc with a back-and-forth motion by ticking the Ping Pong checkbox. Then supply the width of the camera's arc in degrees. • Have the camera complete a full rotation by leaving the Ping Pong checkbox unchecked.

Kam File Type

If you have selected **Kam File** as your camera path, the scene will be animated according to an existing animation path, which might have been created, for example, by the export of a **bookmark animation** [36] as a .kam file. The **Kam Files** options are displayed in the **Camera Animations** editor.

In the box **File** you have access to the tools to:

Icon	Function
	Import Kam File
	Update Kam File
	Export Kam Animation
	Delete Kam Animation

In the **Parameters** zone, the **Filename** and the number of **Frames** are displayed for your information.

You can also choose to **Flip Fov Aspect** (switch between horizontal and vertical “field of view” values) or to **Ignore Fov Value** supplied by the .kam file.

Bookmark Animator Type

The **Bookmark Animator** type allows you to define a camera path passing by one or more animation bookmarks that you set up in the animator. You establish the order of the bookmarks, the time spent at each point, and the type of animation used to move from one point to another.







NOTE

The animation bookmarks and the favorite cameras set up in Patchwork 3D Enterprise or Patchwork 3D Engineering are separate types of camera position bookmarks that should not be confused.

To create an animation, start with the **Animation** zone. You can create multiple paths or “animations.” To create a new animate or add a first animation, use the buttons:

Icon	Function
	New Bookmark Animation







Icon	Function
	<i>Duplicate Bookmarks Animation</i>
	<i>Import Bookmark Animation</i>
	<i>Export Bookmark Animation</i>
	<i>Delete Bookmark Animation</i>

The **Time Parameters** zone concerns the global duration of the animation. Define the pauses between bookmarks and the duration of each bookmark. The **Total Time** of the animation is calculated based on this information.

Tick the **Close Path** checkbox to animate the transition between the last and the first bookmarks when the animation playback is looped. This option is checked by default.

The **Bookmark Sequence** zone summarizes the animation bookmarks according to their order in your animation list. It also provides the information concerning each bookmark as a step in the animation.

This zone offers multiple buttons to modify the list of bookmarks:

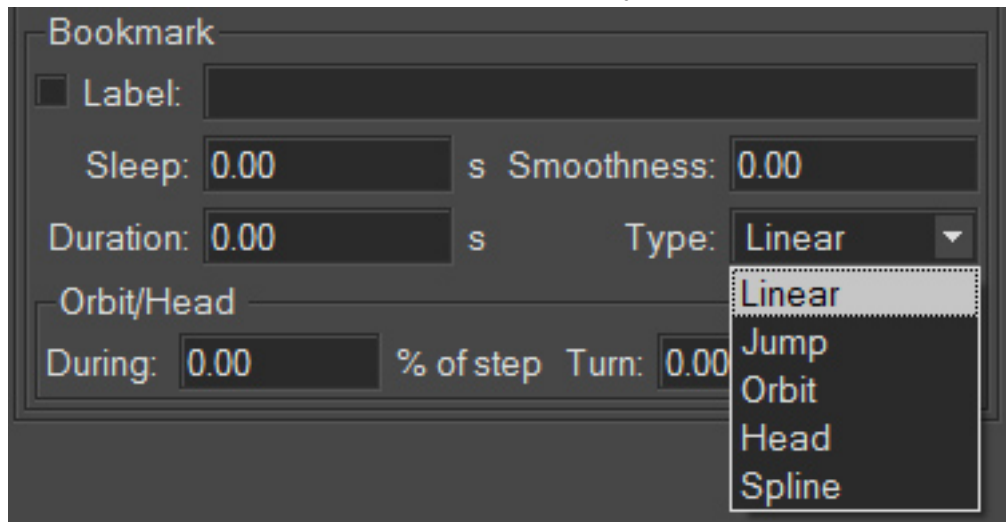
Icon	Function	Description
	<i>New Animation Bookmark</i>	Adds the current viewport's view of the product to your list as a new animation bookmark.
	<i>Update Animation Bookmark</i>	Replaces the selected bookmark with the current view of the product.
	<i>Duplicate Animation Bookmark</i>	Creates a bookmark identical to the selected bookmark and adds it to the end of the list.
	<i>Move Bookmark Up in List</i>	Moves the selected bookmark to position it higher in the list.
	<i>Move Bookmark Down in List</i>	Moves the selected bookmark to position it lower in the list.
	<i>Delete Animation Bookmark</i>	Removes the bookmark from the list. Its settings will not be saved.

Bookmark

The **Bookmark** zone concerns the set-up of the selected bookmark:

Parameter	Description
Checkbox	Includes the bookmark in the animation (checked) or excludes it (unchecked).
Label	Allows you to set or modify the name of the bookmark.
Sleep	Defines the duration of the pause of the bookmarked image.
Duration	Defines the duration of the animated transition to the next bookmark.
Smoothness	Sets the fluidity of the camera behavior.

Parameter	Description
Type	<p>Type of path:</p> <ul style="list-style-type: none"> • Linear: sets a straight path (the rotation parameter fields are grayed out), • Jump: moves from one stage to the next with no transition, • Orbit: sets a circular path (the rotation parameter fields are accessible), • Head: pivots the camera (the rotation parameter fields are accessible), • Spline: smooths the transitions when the camera moves from bookmark to bookmark.
Orbit/Head	<p>Provides rotation parameters, which are modifiable if you have selected Orbit or Head as the type):</p> <ul style="list-style-type: none"> • During... of step: percentage of the step dedicated to the rotation, • turn...times: number of 360-degree turns to carry out.

**TIP**

Several types of paths can be set up in the Bookmark zone.

VR Object Editor

Access: **Editors** menu > **Snapshot VR Object**

The **VR Object Editor** produces a 3D image of the product. In this 3D image, the camera is stationary. The object is posed on a plane that turns at regular intervals of time. This allows you to view the object from every angle, with the ability to examine every detail.

Once the desired settings have been indicated, the **Render** button initiates the creation of the image files that constitute the VR object.

**TIP**

During rendering, a dialogue box is displayed to show the progression of the creation of the VR object files. At any time, you can pause the progression by clicking the **Pause** button, or cancel it by clicking on the **Cancel** button. If you have paused the rendering, start it again by clicking on **Resume**.

The **Viewer** button at the bottom of this dialog box opens a window for viewing captures.

Dimensions Zone

The dimensions of the animation to be rendered are filled out in the **Dimensions** box.

The **Format** drop-down lists the most common sizes and formats. Some, such as **User-Defined**, allow you to directly set the dimension values. By default, the format **Defined by Viewport** is proposed.

Files Zone

The **Files** zone contains the controls for creating a VR Object.

In this zone you can set:

- The output directory where the image file will be saved, as well as the name of the file and its extension,
- Whether to **Open File Selector** or not when rendering. When **Open File Selector** is selected, clicking on the **Render** button will show the dialogue box offering the choice of file name and type. This option is selected by default.

**TIP**

VR objects are saved in the Snapshots directory by default.

To change the format of the file to be created, change the extension of the file name. The following file formats are supported for image output:

- .jpg
- .png
- .bmp
- .tif
- .exr
- .hdr
- .psd
- Whether to **Confirm Overwrite** or not when rendering. When **Confirm Overwrite** is selected, if a file with an identical name is detected, a confirmation will be asked before replacing it with the file being created. This option is selected by default.
- The configuration of the compression. Slide the **Image compression for VR Objects and Cubic VR Panoramas** to define the compression. A higher value will yield a better quality.

Rendering Engine Window

The **Configure** button in the **Rendering Engine** zone opens the **OpenGL Parameters** window.

Choose whether or not to apply:

- **Antialiasing**,
- **mipmaps**,
- **Mirror Reflections**,
- **Transparent Background**.

Choose the level of **Super Sampling** from the drop-down list.

Use the slider to define the level of **Specular Anisotropic Filtering**.

Click on **OK** to save your changes.

Snapshot Zone

If ticked, the **Viewer** checkbox in the same zone sets the image viewing window to open automatically during rendering.

Internal Render Info Zone

The **Internal Render Info** zone summarizes various settings. The applicable elements from among following information are displayed:

- **Width** of the image in pixels,
- **Height** of the image in pixels,
- The number of **Frames** to render,
- **Pass**, the number of passes to render the image,
- **Sampling**,
- **Memory**.

Preview Frame Zone

The **Preview Frame** zone allows you to preview each frame of the camera's path around the object by moving the slider along the bar.

This preview allows you to check the point of observation. By default, the product is observed with a very large field of view. You can modify the point of observation at any time, either in the active viewport or with the tools in the **Camera Path [40]** zone. To apply a modification to the point of observation, click the **Acquire** button in the **Camera Path** zone.

Camera Path Zone

The **Camera Path Zone** defines the camera's position and its path.

To create a VR object, a series of images is generated, in which each image is taken from a point on a circle around a central point. **Center** values are used to position this central point relative to the origin of the coordinate system. The **Radius** value establishes the distance between the camera and this central point.

The value **FovY** in degrees provides the vertical field of view.

If you have made changes, click on the **Acquire** button in order to validate and apply these settings.

VR Object Settings

The VR object settings establish:

Setting	Description
Pan Range	Frames can be created either for a complete circle on a horizontal plane (the checkbox Complete Loop is ticked by default) or for a limited arc only. In this latter case, you must supply the angles between which your product will be observed.
Tilt Range	Frames can be created to form a circle on a horizontal plane around the camera path's central point or to form a sphere or portion of a sphere around this same point. In these latter cases, you must supply the angles between which your product can be viewed. By default, the camera angles cover a full sphere. The viewing angles range from -90 degrees (the negative Y axis) to +90 degrees (the positive Y axis).
Number of Frames	Frames can be created closer together or farther apart along the camera path. Pan provides the number of frames along the circle on the horizontal plane. Tilt provides the number of frames between the top and bottom angles, if you have defined a vertical plane.

Cubic VR Panorama Editor

Access: **Editors** menu > **Snapshot Cubic VR Panorama**

Cubic VR Panorama produces a 3D image of the product in a 3D space. It creates a cubic viewing space that gives the observer the impression to be in the product's 3D space.

Once the desired settings have been indicated, the **Render** button initiates the creation of the image files that constitute the cubic VR panorama.



TIP

During rendering, a dialogue box is displayed to show the progression of the creation of the video file. At any time, you can pause the progression by clicking the **Pause** button, or cancel it by clicking on the **Cancel** button. If you have paused the rendering, start it again by clicking on **Resume**.

The **Viewer** button at the bottom of this dialogue box opens a frame viewing window.

Dimensions Zone

The dimensions in pixels of the cubic VR panorama to be rendered are provided in the **Dimensions** zone.

Files Zone

The **Files** zone contains the controls for creating a VR Object.

In this zone you can set:

- The output directory where the image file will be saved, as well as the name of the file and its extension,

- Whether to **Open File Selector** or not when rendering. When **Open File Selector** is selected, clicking on the **Render** button will show the dialogue box offering the choice of file name and type. This option is selected by default.

**TIP**

VR objects are saved in the Snapshots directory by default.

To change the format of the file to be created, change the extension of the file name. The following file formats are supported for image output:

- .jpg
- .png
- .bmp
- .tif
- .exr
- .hdr
- .psd
- Whether to **Confirm Overwrite** or not when rendering. When **Confirm Overwrite** is selected, if a file with an identical name is detected, a confirmation will be asked before replacing it with the file being created. This option is selected by default.
- The configuration of the compression. Slide the **Image compression for VR Objects and Cubic VR Panoramas** to define the compression. A higher value will yield a better quality.

Rendering Engine Window

The **Configure** button in the **Rendering Engine** zone opens the **OpenGL Parameters** window.

Choose whether or not to apply:

- **Antialiasing**,
- **mipmaps**,
- **Mirror Reflections**,
- **Transparent Background**.

Choose the level of **Super Sampling** from the drop-down list.

Use the slider to define the level of **Specular Anisotropic Filtering**.

Click on **OK** to save your changes.

Snapshot Zone

If ticked, the **Viewer** checkbox in the in the **Snapshot** zone sets the image viewing window to open automatically during rendering.

Click on **Background** to open the color selector. The selected color will be used as a background in the rendering.

Internal Render Info Zone

The ***Internal Render Info*** zone summarizes various settings. The applicable elements from among following information are displayed:

- ***Width*** of the image in pixels,
- ***Height*** of the image in pixels,
- ***Pass***, the number of passes to render the image,
- ***Sampling***,
- ***Memory***.

FAVORITE CAMERAS

Access: **Product** menu > **Restore favorite camera...**

Favorite cameras established in Patchwork 3D Enterprise or Patchwork 3D Engineering are available in Patchwork Explorer. The **Restore favorite camera...** options load the camera settings in the active viewport.

Favorite cameras are also used in the **Cameras [21]** tab of the **Product Manager** editor.