Warp and Blend Tool Introduction

Visual Suite Manual Blending Instruction

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Current Features

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2. Getting started

I.   Onboarding Screen

Double click the shortcut icon on the desktop to the tool. If you are using the software for the first time, it displays a series of onboarding screens, giving you a visualized explanation on how to use the software and what you can do with it. The onboarding screens are skipped after being used once, and you can get it from File > Help > Onboarding Screen.

On Boarding Screen

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II.   Keyboard shortcuts

This tool is preset with a series of keyboard shortcuts that provide a quick and efficient way to perform an action. You can find the shortcut information at File > Help > Keyboard Shortcuts.
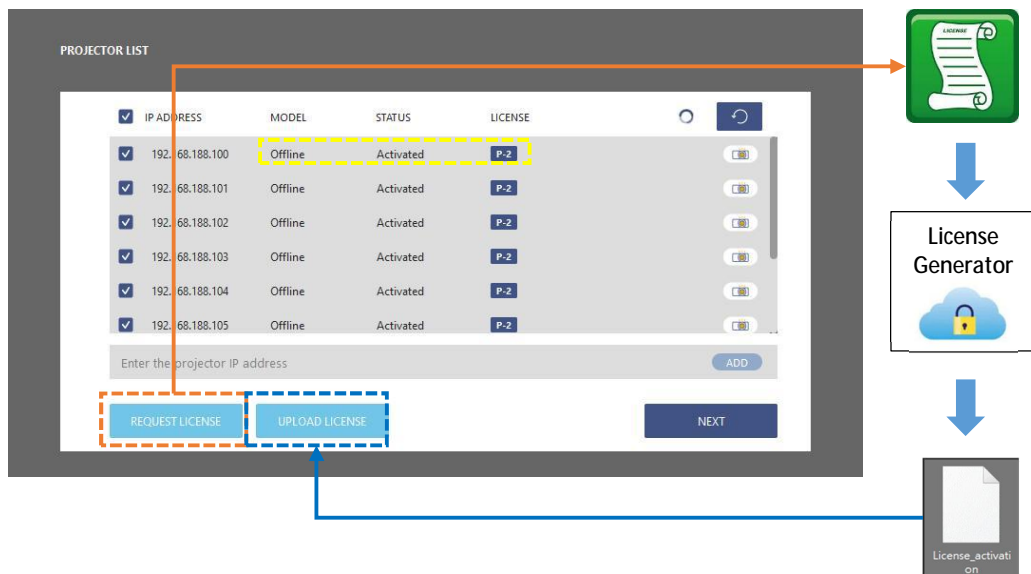
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III.   License Procedure

Start the projector licensing to get the authority for valid use of Visual Suite functions.
Following steps to activate the license in projectors, make reference to below procedure.

1.   Set License at Front Page to start the projector licensing.
2.   The license dialog would automatically searches for the projectors in the same network. This may take few seconds. User can add a projector which not found in projector searching list manually; type in the IP address and click ADD.
3.   Pick up the projectors and click REQUIRE LICENSE for getting the projector and exist license information to complete the procedure of license activation
4.   Click UPLOAD LICENSE to load the valid license files to activate the special function of Visual Suite to access to projectors.
5.   It is successful to activate the license when projector shows activated and License Level in list.

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IV. Welcome Page to start the project

Welcome page to help user start a blending project or apply an existing configuration to the project. The button displayed below will take you to the settings flow when clicked.

Create a New file for manual blending

Open a file from PC

Open a file from Projector

Clear History
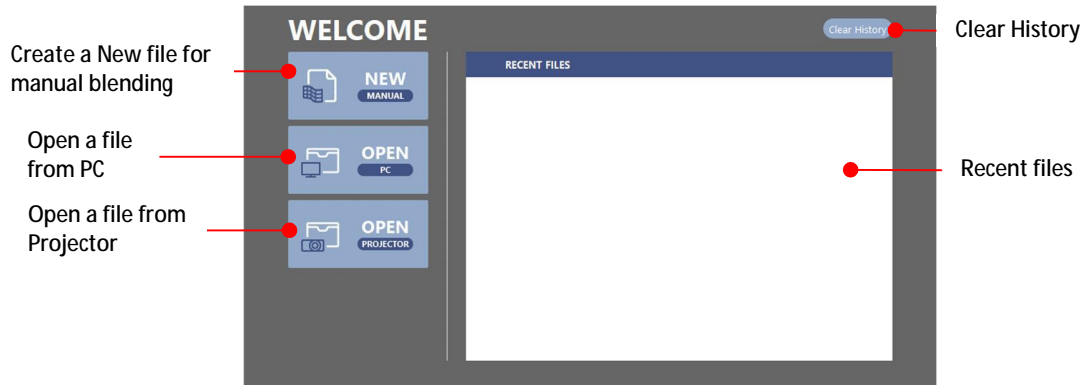
Recent files

The welcome page

1. Creating a new file

After the onboarding screens, the tool redirects to the welcome page, from where you can create a new file or open a previous configuration file. The page also provides a list of recent files. Check the installation position of your projectors, and complete following steps to create a new file.

2. Open pre-existent configuration file from PC

User can save the settings as a configuration file on the computer. By loading the file, the saved settings are applied to the matching projectors.

3. Open configuration file from Projector

The system configuration file is saved to projectors when the setting is done. By loading the file, the saved settings are applied to the matching projectors.

Note: Before loading the file, make sure the required projectors are connected to the same network with the tool.

Complete following steps to open a file from the computer.

1. On the welcome page, click OPEN-PC and select a file from the pop-up windows dialog.
2. The tool starts searching for the projectors required by the file.
3. If the application finds all matching projectors, it applies the saved settings to the projectors and redirects to the main workspace
4. When the application could not find all required projectors, it redirects to the welcome page.
5. Check the projector connection and try again. If the file still fails to load, create a new file instead.
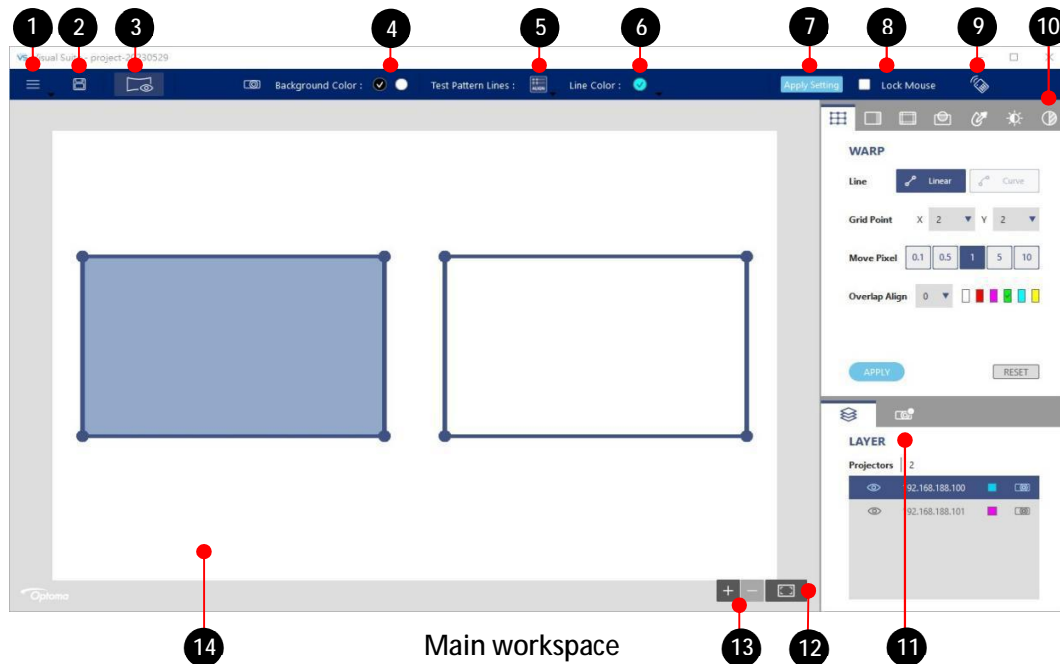
V. Workspace basics

Learn about the basics of the main workspace and shortcuts of tool.

Main workspace

This tool is designed with an intuitionistic and user-friendly interface, allowing the user to effectively perform advanced geometric adjustments on the projected images.

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Main workspace

No.	Function	Description
1	File - New - Open - Projector Memory - Save - Save as - Reset All - Language - Log File - Help - Quit	The file menu contains commands relating to the handling of files. Create a new configuration file. Load the saved file or configuration from Projector. Memory location selection. Save the settings to the current file. Save the settings as a new file. Reset all setting. Language selection, English/Simplified Chinese/Traditional Chinese Save the log file. Provide information of software version, keyboard shortcuts and Onboarding screen and. Exit the application
2	Save	Save the settings to the current file.
3	Preview	Project an image to view the result of current adjustments.
4	Background Color	Set the screen background to black or white
5	Test Pattern Lines	Set up the grid test pattern. - Select 0 to disable the test pattern - Set the number of test pattern lines to 5x5, 10x10 or 20x20. - Select ALIGN to align the lines with the grid points. - Select Contour to draw lines on the projection contour.
6	Line Color	Select a color for the test pattern lines.
7	Apply Setting	Function enable and auto apply for all projectors. - Warp - Blend - Black Level - Mask - Hotspot Reduction
8	Lock Mouse	Lock the operation via mouse
9	Remote Control	Projector Control Items as remote control operation
10	Function tabs	Select a function of image adjustment.
11	Layer	Provide a list of projectors shown on the canvas
12	Fit	Click the button to return the canvas to its original size.
13	Zoom in/out	Click + to zoom in the canvas, and click - to zoom out.
14	Canvas	An editing area to perform image adjustments.

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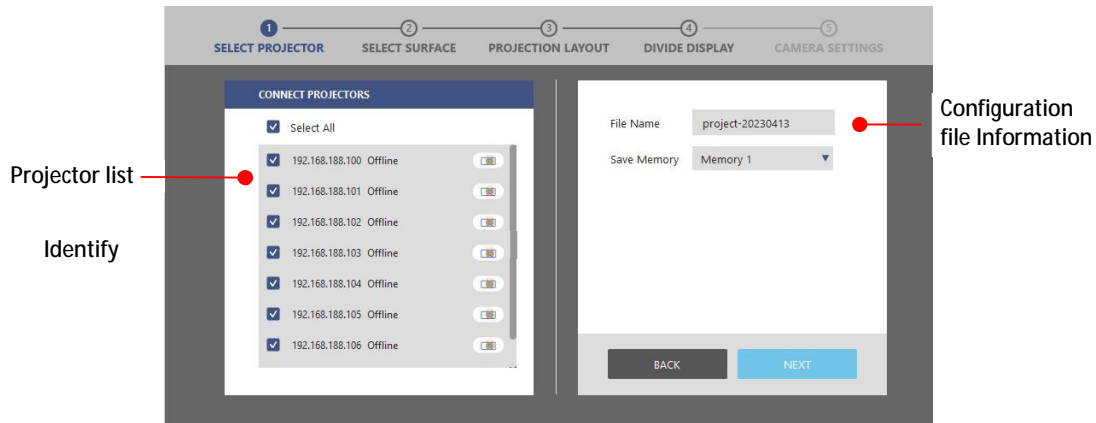
Click on one of the layout frame to select a projector, and the selected frame turns to light pink.

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VI. Setting up the grouping of projectors

The setting goes to the SELECT PROJECTOR page, the list includes the projectors with valid license.


Projector Grouping

1. On the welcome page, click NEW.
2. On the projector list, select the grouping projectors.
3. The Tool automatically searches for the projectors in the same network. This may take few seconds.
4. To locate a projector, click the Identify button ⬜ to project a white test pattern. Click the button again to turn off the test pattern.
5. In the Filename field, type in the project filename and memory location. The file is saved automatically to the default folder of the software.
6. Click File > Save As button in top toolbar to save the file to specified folder.

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3. Setting the Scenario and Layout: GENERAL

The setting goes to SELECT SURFACE page, Select GENERAL surface.
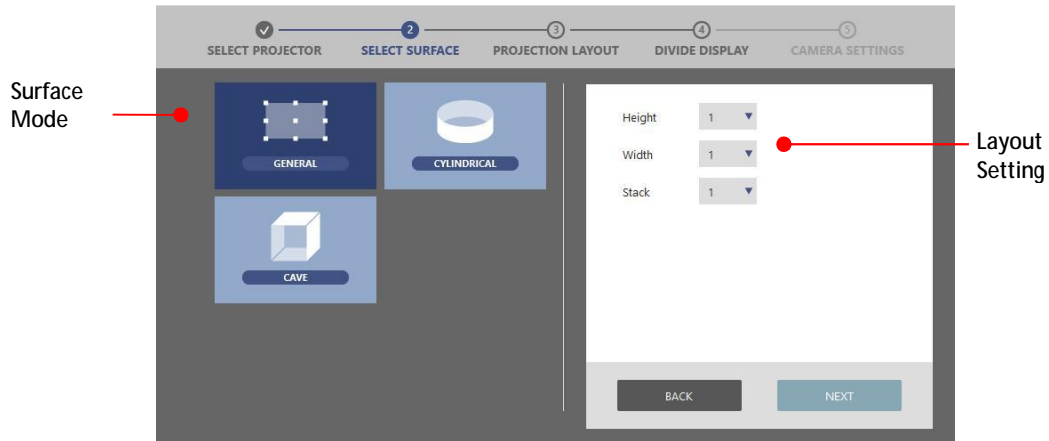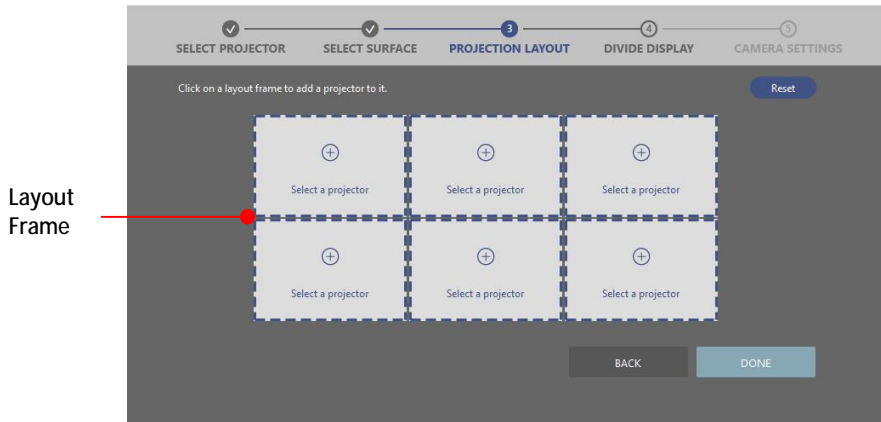
Surface Mode → ← Layout Setting

Scenario Setting

1.   The software supports diverse scenario with different layout, general wallpaper, surround (cylinder) and cave.

2.   Set the numbers of Height, Width and Stack in layout setting fields. The total number of layout projectors must match with the number of grouping projectors.

3.   Click NEXT for the projector mapping.

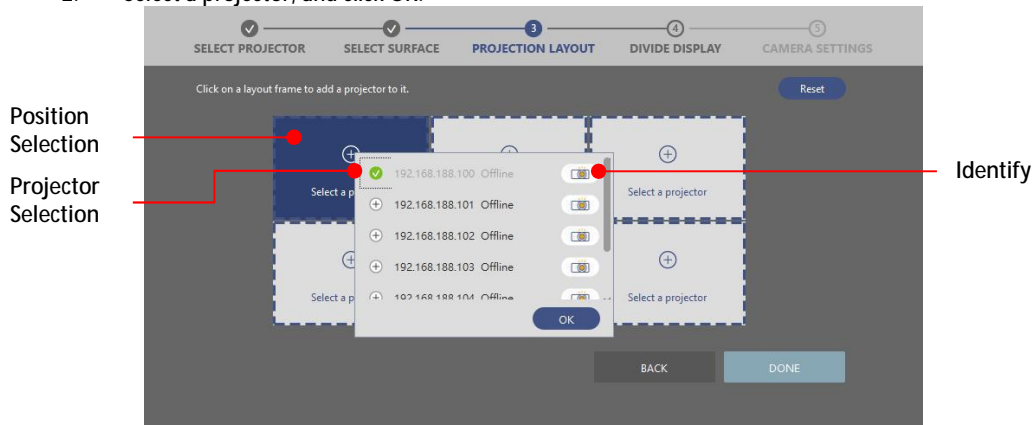# Warp and Blend Tool Introduction

Projectors Mapping

The setting goes to PROJECTION LAYOUT page.

Projector Mapping

1. Click one of the layout frames to select a projector from pop-up projector list for layout mapping.
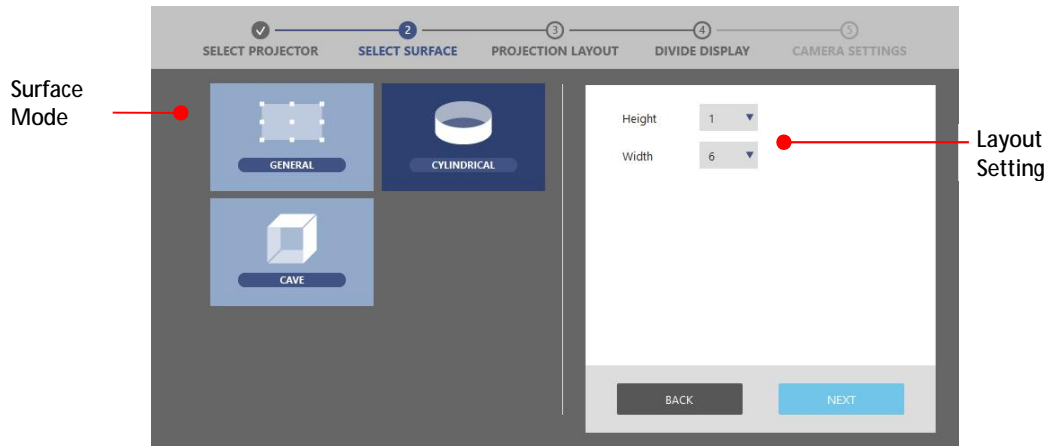2. Select a projector, and click OK.

3. Repeat step a. and b. to select a projector for each layout frame. Make sure that the layout of the projectors are matching with the actual projection position.

4. Click DONE to complete the projector mapping; the step is not able to return, unless redo the previous steps.
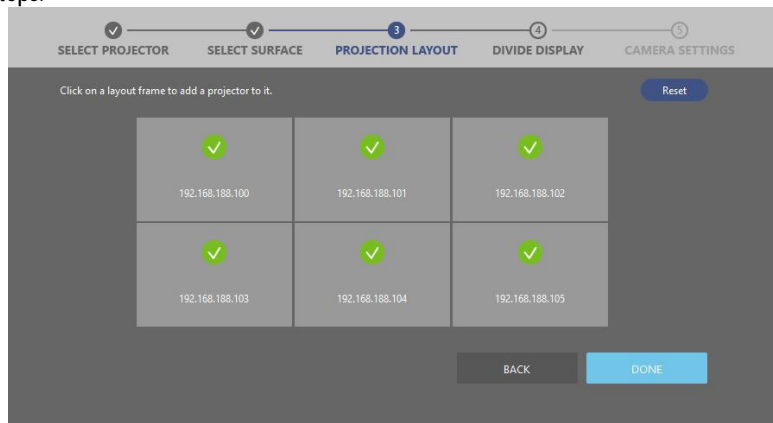
Warp and Blend Tool Introduction

4. Setting the Scenario and Layout: CYLINDRICAL

The setting goes to SELECT SURFACE page, Select CYLINDRICAL surface for surround blending application.

Surface Mode →

Layout Setting

Scenario Setting

1. The software supports diverse scenario with different layout, general wallpaper, surround (cylinder) and cave.

2. Set the numbers of Height, Width in layout setting fields. The total number of layout projectors must match with the number of grouping projectors.

3. Click NEXT for the projector mapping.

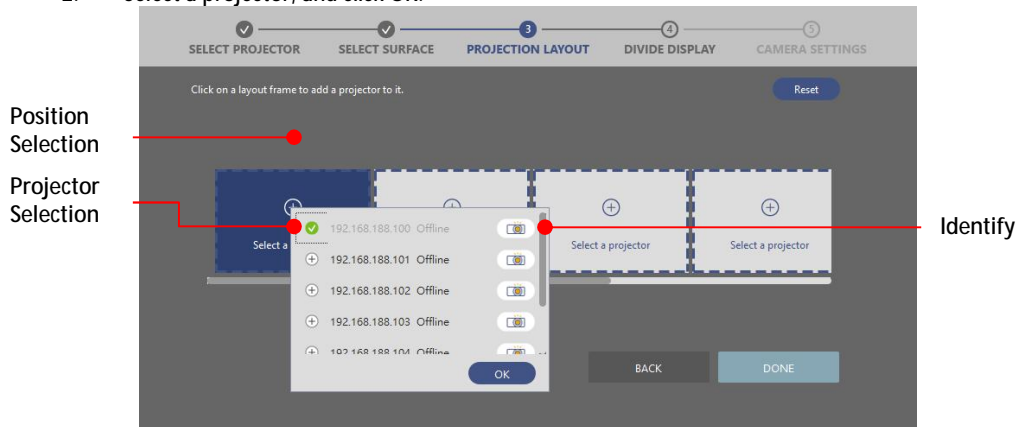# Warp and Blend Tool Introduction

Projectors Mapping

The setting goes to PROJECTION LAYOUT page, at Cylindrical scenario, only support 1xN layout.
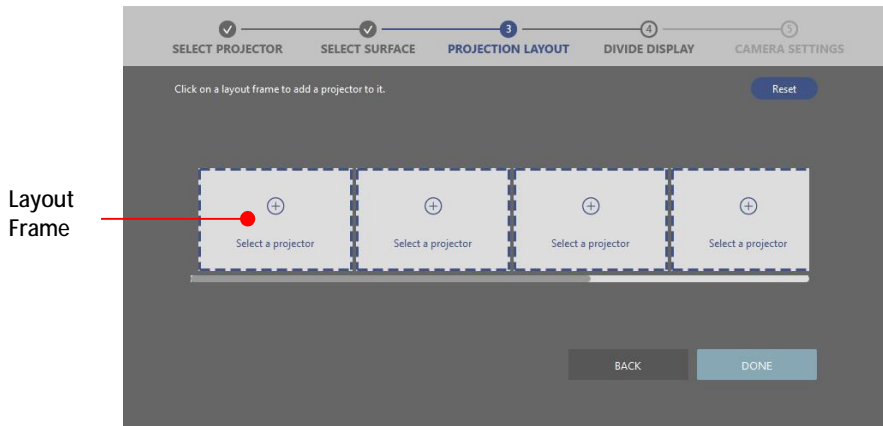

Projector Mapping

1. Click one of the layout frames to select a projector from pop-up projector list for layout mapping.
2. Select a projector, and click OK.

3. Repeat step a. and b. to select a projector for each layout frame. Make sure that the layout of the projectors are matching with the actual projection position.

4. Click DONE to complete the projector mapping; the step is not able to return, unless redo the previous steps.
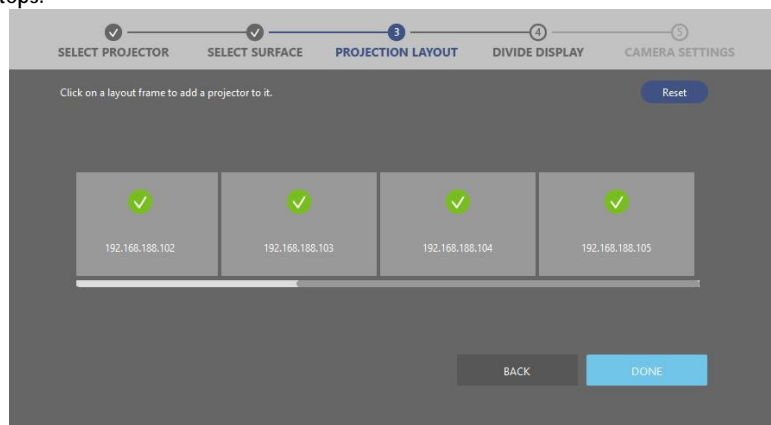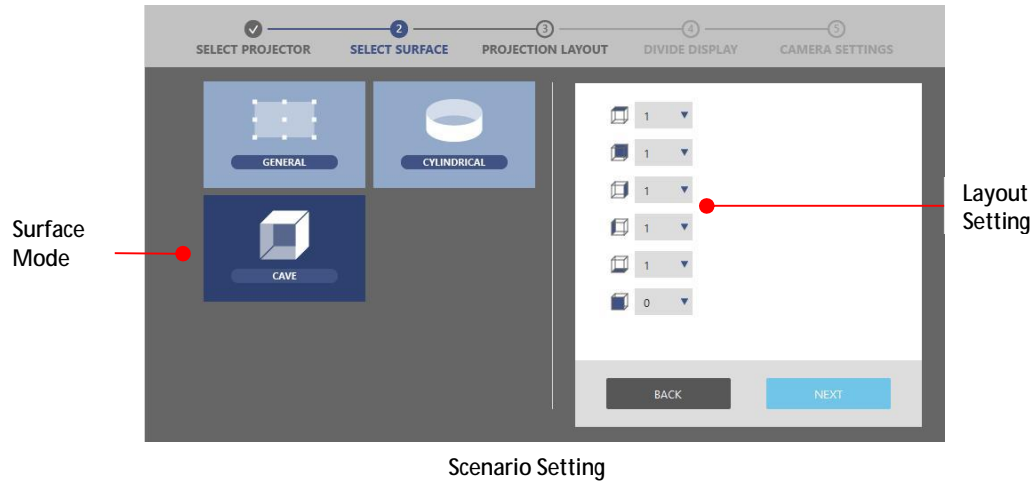

1. Click one of the layout frames to select a display port from graphic card port list for port mapping to image cropping area.

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5. Setting the Scenario and Layout: CAVE

The setting goes to SELECT SURFACE page, Select CAVE surface.

Scenario Setting

1. The software supports diverse scenario with different layout, general wallpaper, surround (cylinder), cave and custom (irregular layout).

2. Set the each side number in layout setting fields. The total number of layout projectors must match with the number of grouping projectors.

3. Click NEXT for the projector mapping.
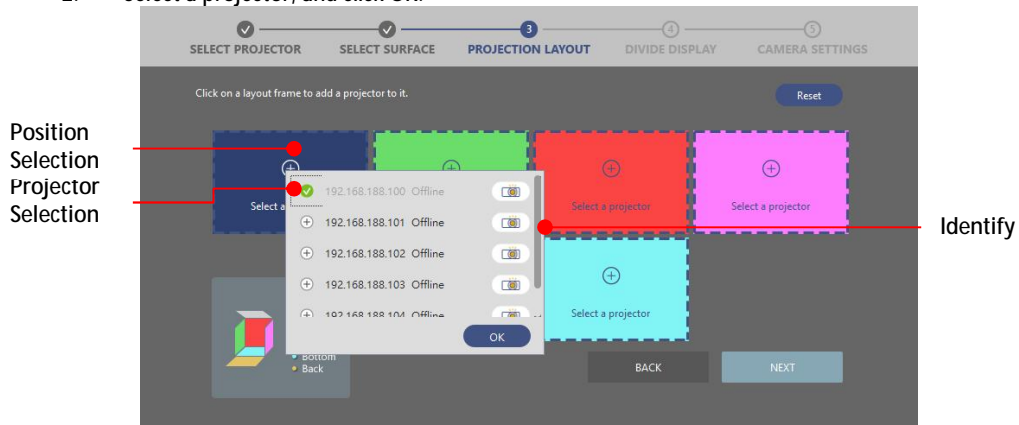
Warp and Blend Tool Introduction

Projectors Mapping

The setting goes to PROJECTION LAYOUT page, at CAVE scenario.

Projector Mapping

1. Click one of the layout frames to select a projector from pop-up projector list for layout mapping.
2. Select a projector, and click OK.

3. Repeat step a. and b. to select a projector for each layout frame. Make sure that the layout of the projectors are matching with the actual projection position.

4. Click DONE to complete the projector mapping; the step is not able to return, unless redo the previous steps.
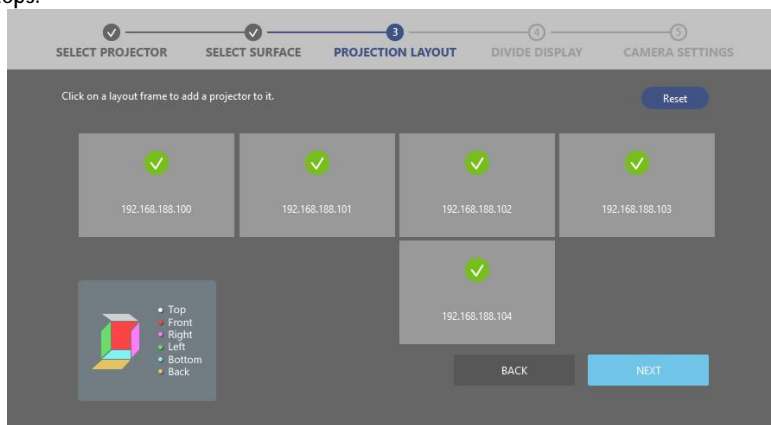
Warp and Blend Tool Introduction

6. Adjusting the images

This tool offers three ways to adjust the images - warping, blending, masking, black level and HSG. To switch between the functions, use the function tabs at the right top corner of the main workspace.
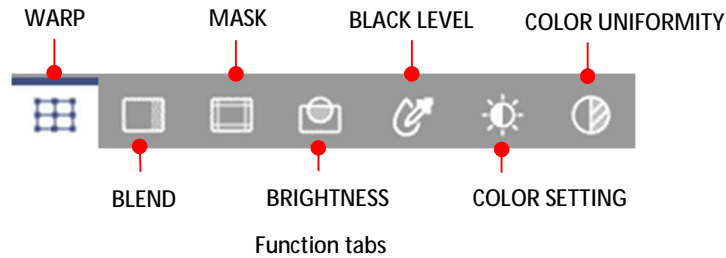
Function tabs

I. Warping the images

Image warping is used to make an image look visually correct when it is projected onto a non-planar screen. Use the settings on the WARP page to change the image shape.
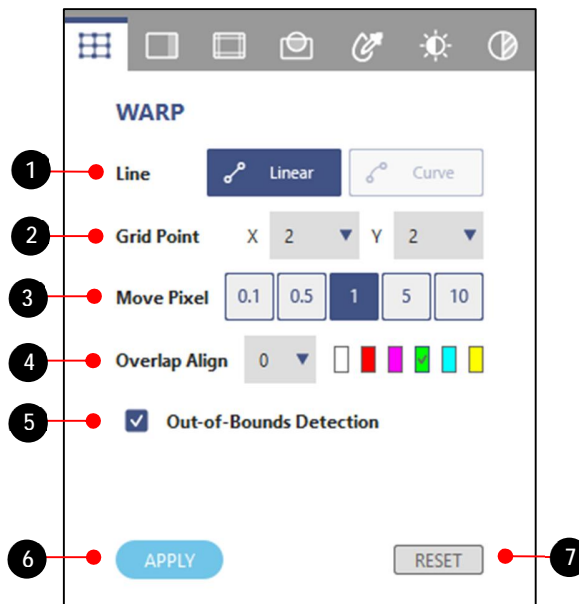
Function tab - WARP

| No.	Function	Description
1	Line - LINEAR - CURVE	Set the line warping style. Moving the point results in the lines changing the shape linearly. Moving the point causes the line shape changes in nonlinear fashion, not available at 2x2 grid points.
2	Grid Point	Set the number of grids on the screen.(support to 65x33)
3	Move Pixel	Set the pixel movement of the control point.
4	Overlap Align	Set the width and color of line for alignment.
5	Out-of-Bounds Detection	A checkbox function to avoid the point movement is too extreme.
6	Apply	Apply the warping adjustment.
7	RESET	Clear the warp settings.

Warp and Blend Tool Introduction

Warping an image

Complete following steps to warp an image.

1. Choose a projector by clicking on its layout frame or choose it from the Layer tab.
2. At the Test Pattern toolbar, select the grid test pattern on projection.
3. At the Line field, select the line warping style from LINEAR or CURVE according to the screen type.
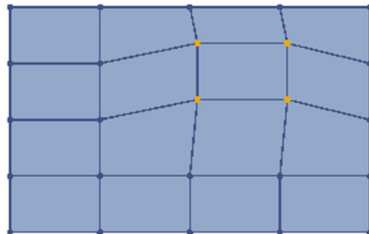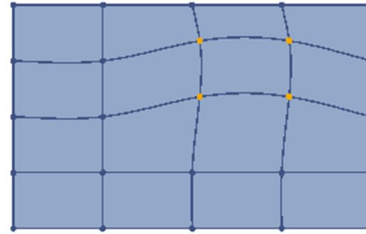

Linear adjustment   Curve adjustment

4. At the Grid Point field, select the number of grids on the screen. Start with a minimal number of grids (2x2) and gradually increase the number when adjusting. If starting with a larger grid number, you will lost the current adjustment when trying to reduce the number.
5. At the Test Pattern toolbar, click the ALIGN button to align the test pattern lines with the grid points.
6. At the Move Pixel field, adjust the slider or enter a value to set the number of pixels that the selected point moves each time. Shortcuts: Press Ctrl + Up arrow to increase the pixels, or Ctrl + Down arrow to decrease the pixels.
7. Select the points you want to move. The chosen ones turn to orange.
8. To warp the image, click and drag the grid points to move them, or use the keyboard arrow keys.
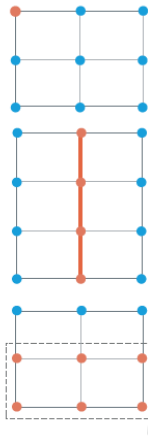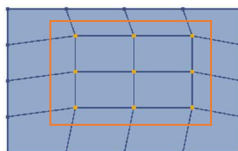

Select a single point
- Click the point or use the **W, A, S, D** keys to select a point

Select all points on a line
- Place the mouse cursor anywhere on the line, and press **Ctrl + V** to choose a vertical line, or **Ctrl + H** for a horizontal line.

Select all points inside a region
- Click and drag the cursor to select a region, and release the mouse to select all the points inside.

Note: To make the warp easier, start with the outer area of the screen, and then move to the center area. As shown in the left image, adjust the red points first, and then move the blue ones.

9. Click Preview to see the warping of projection content, then click Preview again to return to the test pattern.
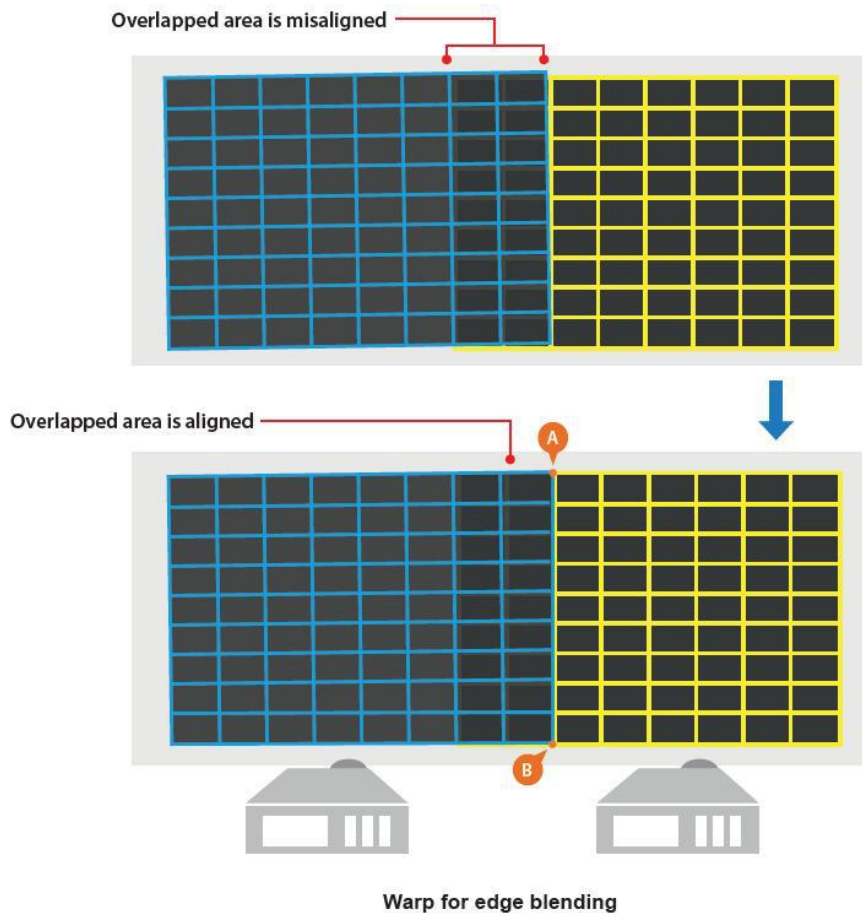
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Warping for image blending

When performing edge blending on two adjacent images, slightly change the shape of the overlapped area helps align the two images more precisely. In the example below, two projectors are placed side by side, and warping the overlapped edges of the images helps achieve a better edge alignment.

1. For better alignment manually, set two test patterns with the same number of grid lines, but different grid line color.
2. Adjust the warp control points for grid line alignment on overlapped area.

For example, point A of left projection is moved down to align the top line of right projection, and point B of right projection is moved down to align the bottom line of left projection.
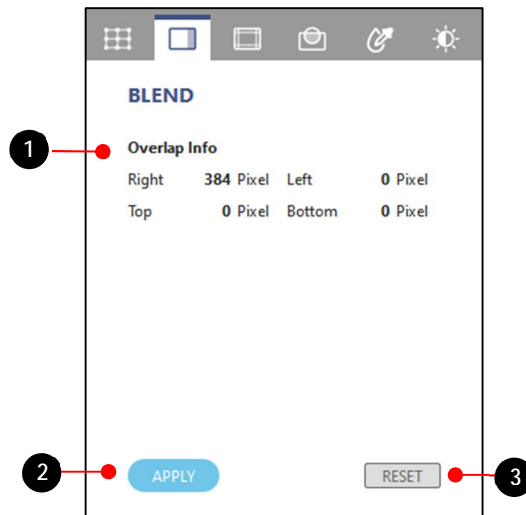

Warp for edge blending

Warp and Blend Tool Introduction

II. Blending the images

Edge Blending

Image blending is an image process to merge two or more partial images to a complete image. Use the settings on the BLENDING page to blend the images.

Function tab - BLEND

No.	Function	Description
1	Overlap Information	Top/Bottom/Left/Right Overlap blending width
2	Apply	Enable the blending data.
3	Reset	Reset blending width to default setting.
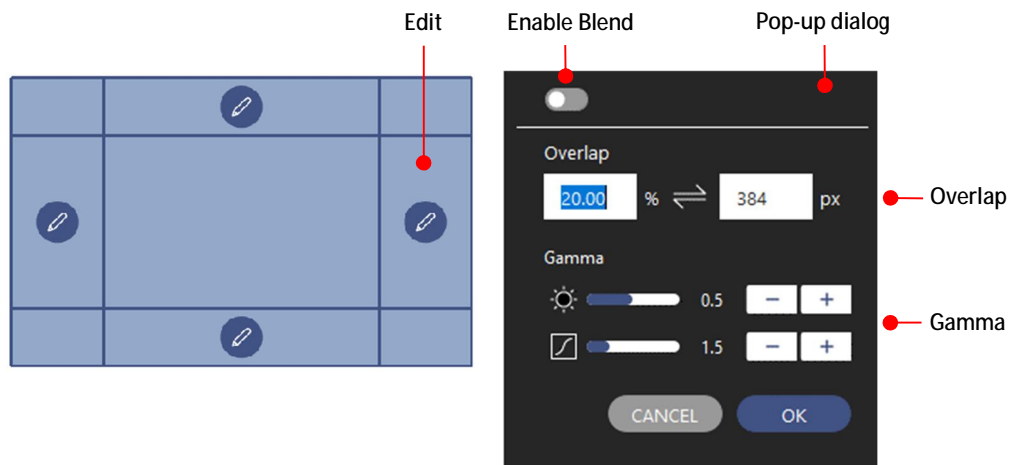
Setup the blend edge

Following steps to complete image blending.
1. Click on layout frame or choose one from the Layer tab.
2. Set the background and grid color of test pattern on toolbar as below,
   - Set the same background color to all projectors.
   - Set the same number of test pattern lines to all projectors.

Warp and Blend Tool Introduction

- Set different line color of test pattern to adjacent projectors.
3. Click the Edit icon on the edge that you want to apply the blending.
4. Set the blending in pop-up dialog as below,
    - Switch on the Enable toggle button to enable the blending effect.
    - At the Overlap field, set the overlap width for blending by image percentage or pixel value. The percentage and pixel value is based on the projection resolution.
    - Adjust the Gamma setting to change the inflection and gradient of gamma curve.
    - Click OK to apply the blending setting to the edge.
5. Enable the blending effect, the selected edge is applied with a gradient effect.
6. Click Preview to see the blending effect on projection content, then click Preview again to return to the test pattern.

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III.   Masking

Masking function allows you to mask out a part of a screen, creating a special visual effect. You can create a mask using the preset patterns, or use an image from external source.

Note: The mask function only accepts external image in BMP/JPEG/PNG format with a color greyscale of 0 (black) or 255 (white).
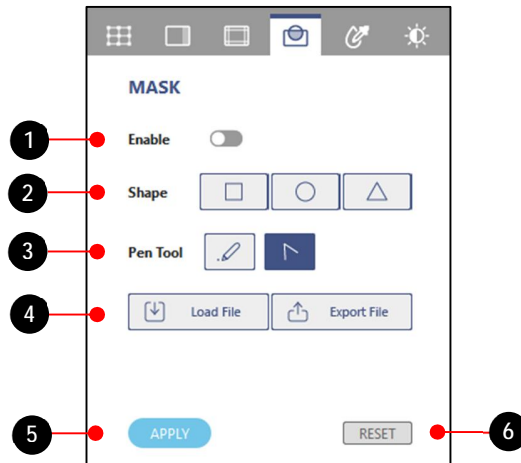

Function tab - MASK

No.	Function	Description
1	Enable Mask	Enable the mask function.
2	Shape	Select a mask shape, Square, Circle and Triangle.
3	Pen Tool	Use pen tool to draw the mask.
4	Load/Export	Load/Export an image to mask the screen.
5	APPLY	Enable and apply mask data.
6	RESET	Clear the mask on the screen.

Creating a new mask

Following steps to create a new mask,

1.   Click on layout frame or choose one from the Layer tab.
2.   Set white background color to all projectors.
3.   Switch on the toggle button 🔵 to enable the mask effect.
4.   At the Shape field, select a shape to adjust the size and position for the mask on the screen. User can right click mouse to reverse the mask area of shape in **"Invert color"** or change the shapes' layers in **"Layer setting"**.

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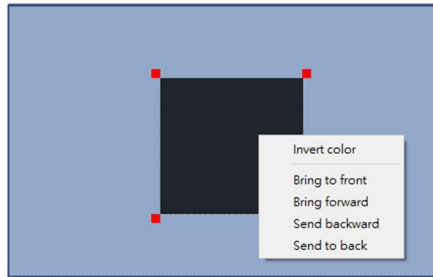
Invert the mask and the layer setting

5. Click and drag the mask shape to move the position.
6. Use the control point on the mask to change the size and shape.
   - Left mouse click and drag one of the adjustment point to adjust the mask shape.
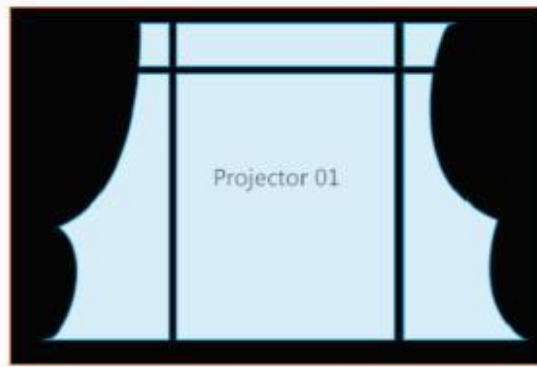   - Right mouse click to rotate the mask shape.
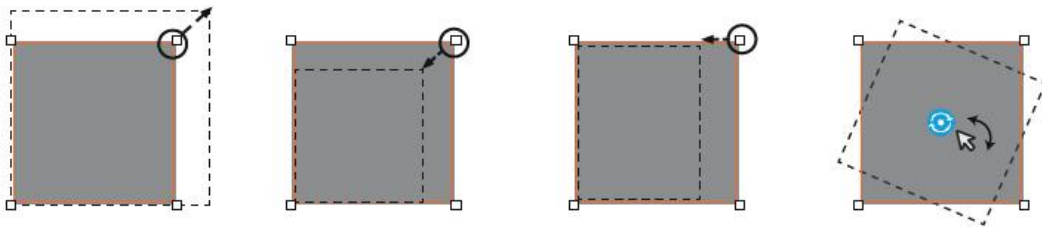
Edit the mask

7. Click Preview to see the mask effect on projection, then click Preview again to return to the test pattern.

Loading a mask

Following steps to load the image file to mask the screen.

1. Load the image file at BMP/JPEG/PNG format with a color greyscale of 0 (black) or 255 (white).

Load a mask pattern

Note: The mask image does not support any modification, such as position moving, resize or rotation.

2. Click Preview to see the mask effect on projection, then click Preview again to return to the test pattern.
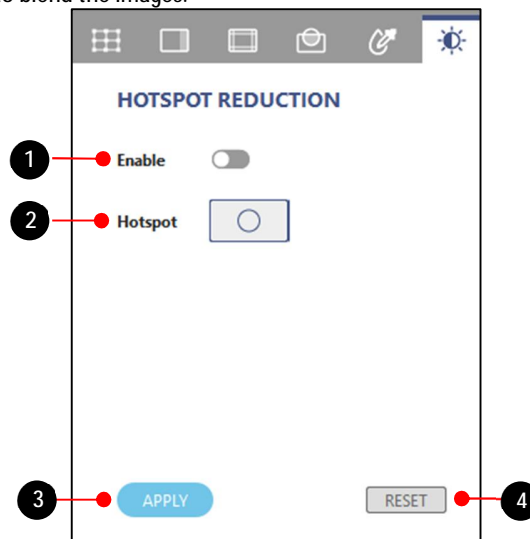
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Preview a mask

IV. Hotspot Reduction

Image blending is an image process to merge two or more partial images to a complete image. Use the settings on the BLENDING page to blend the images.


Function tab - BRIGHTNESS

No.	Function	Description
1	Enable	Enable the brightness effect
2	Brightness Point	Add the brightness point.
3	Apply	Enable and apply brightness data
4	Reset	Clear all brightness effect.

Following steps to complete the brightness effect.

1. Click on layout frame or choose one from the Layer tab.

2. Click on Brightness Point [Hotspot ⬭] to add the brightness effect on projection.

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3.   Adjust the area of brightness effect by dragging the corner control point as below,

Edit Area

Drag

Setup the blend edge
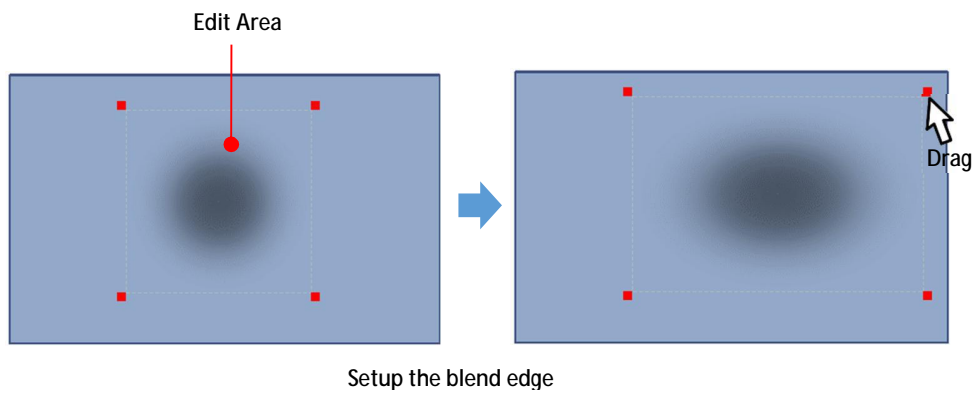
Warp and Blend Tool Introduction

V. Black Level

The black image would be brighter on the most overlap area than the rest area. User can adjust the black level on the rest area to get the uniform black image, but less contrast. Please make reference to below black level effect.

Black Image   **Content**

Ideal

W/O Black Level Effect

W/ Black Level Effect
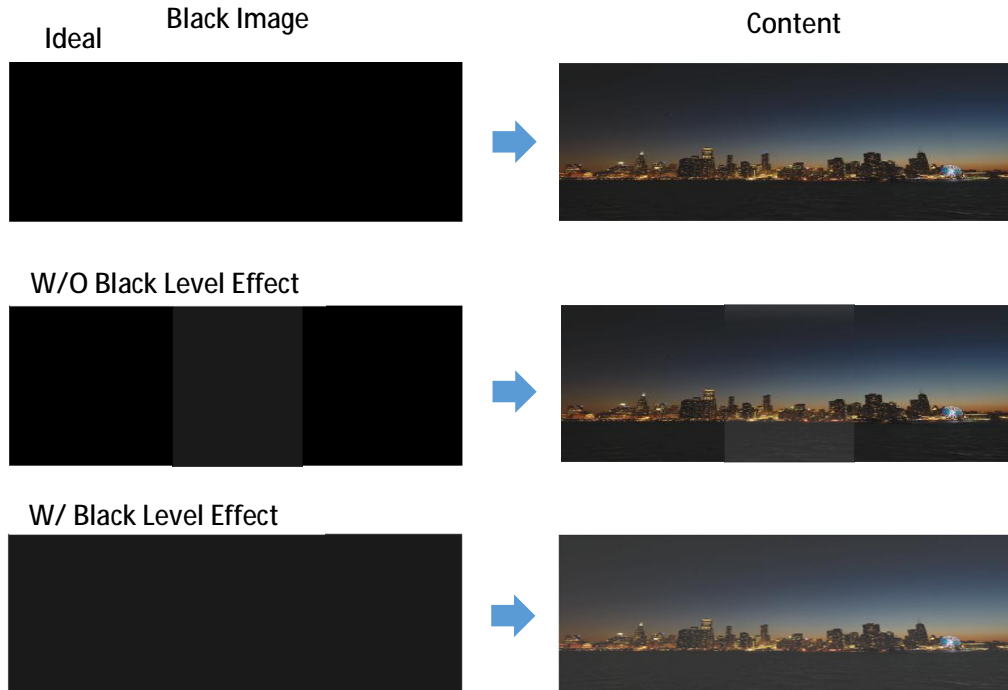
Adjusting the Black Level
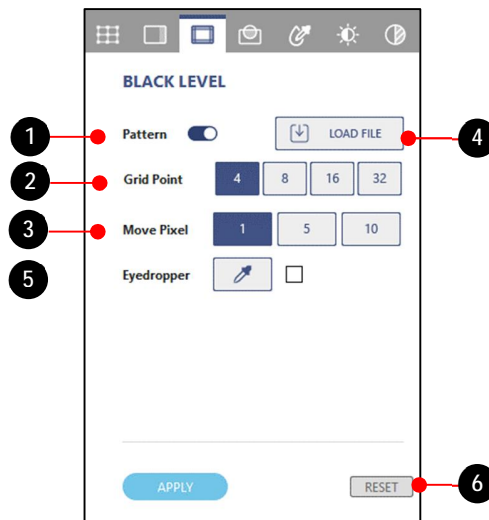
Function tab – BLACK LEVEL

| No.	Function	Description
1	Pattern	Enable the black level effect.
2	Grid Point	The grid points control the adjustment of black level area for better edge alignment of overlap area, up to 32 points for each black level area.

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3	Move Pixel	Set the pixel movement of control point.
4	Load File	Load the black level image file at bmp, png and jpg format.
5	Eyedropper	Eyedropper mode to pick up the black level color.
6	RESET	Reset the black level settings.

rlapped area and the black border to make them look like the same with the overlapped area.
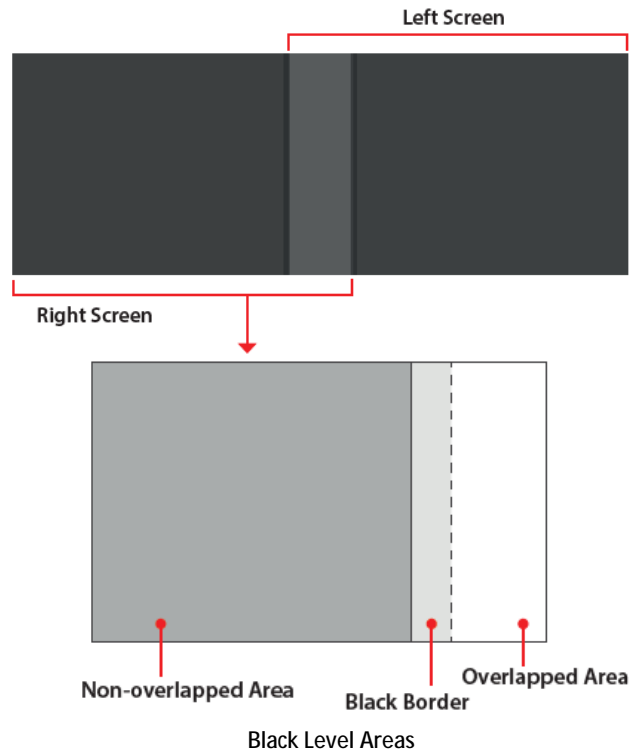
Black Level Areas

Following steps to adjust the black level:

1. Make sure that the black level adjustment is under dark field for good observation of black level variation.
2. Click on layout frame or choose one from the Layer tab. Enable the Pattern of black level on projection.
3. Select the Grid Point value. The grid points control the adjustment of black level area for edge alignment with adjacent overlap area, up to 32 points adjustment for each black level area.
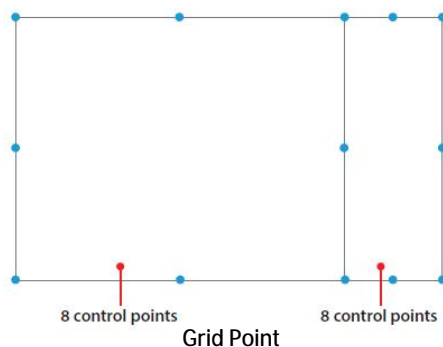

Grid Point

Note: Start with 4 grid point number for the adjustment and increase the points gradually.

4. Set Move Pixel to control the movement for accurate alignment of adjacent black level area, user can set the value accordingly.

Warp and Blend Tool Introduction

5. Select adjustment areas using the control points. You can select two areas to adjust, one for the non-overlapped area, and one for the black border.

    a. Click on the point you want to move.

    b. Drag the selected point to change its position on the canvas, or use the keyboard arrow keys.
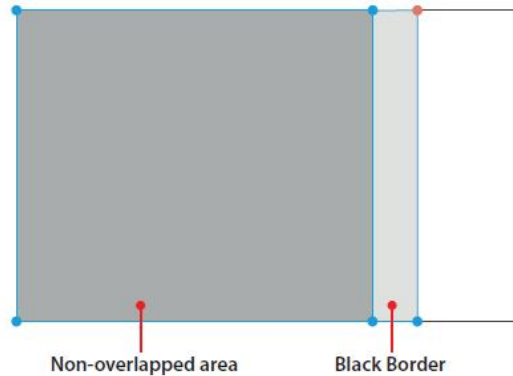
Adjust Areas

6. To adjust the black level color of the selected adjustment area, click on one of the area and adjust the black color in Color Picker dialog.
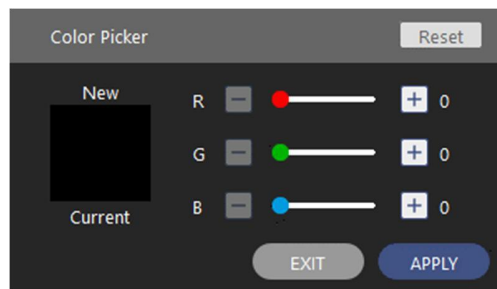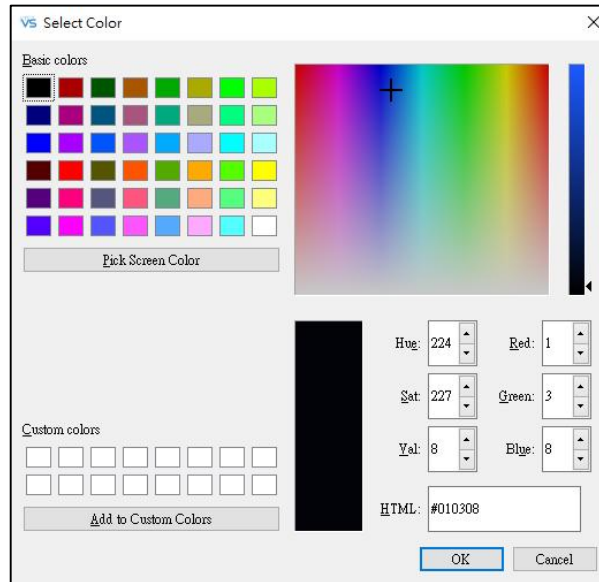

Color Picker

7. Enter the RGB value or drag the slider to set the color of the selected area.

8. Click OK on the Color Picker dialog to apply the value to the selected area.

9. Repeat step 6 to 8 to adjust the color of the adjustment areas until they look like the same with the overlapped area.

Black Level Adjustment

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10.   To adjust the black level color of the selected adjustment area, click on ^{Eyedropper} [icon] □ to enable the eyedropper color palette and adjust the black color in Color Palette dialog.


Color Eyedropper

11.   Enter the RGB value or pick the color from color palette to set the color of the selected area.
12.   Click OK on the Color Palette dialog to apply the value to the selected area.
13.   Repeat step 10 to 12 to adjust the color of the adjustment areas until they look like the same with the overlapped area.

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VI. **HSG Adjustment**

HSG function allow you to adjust HSG setting of the projector.
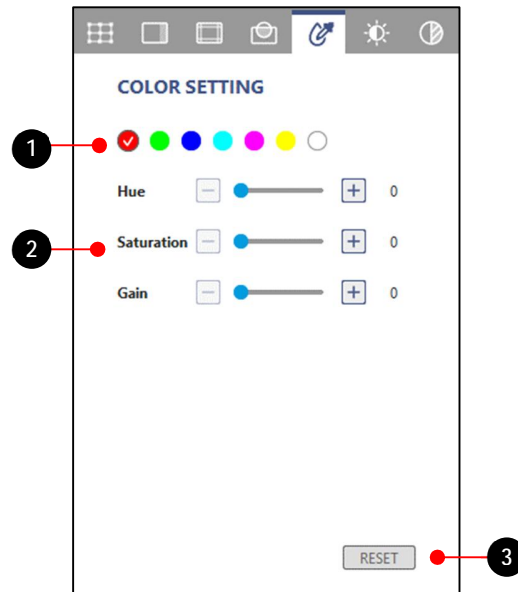
Function tab - HSG

No.	Function	Description
1	Base Color	Pick up a base color to adjust the color parameters.
2	Hue/Saturation/Gain	Adjust HSG value.
3	RESET	Click to reset the HSG value to default setting.

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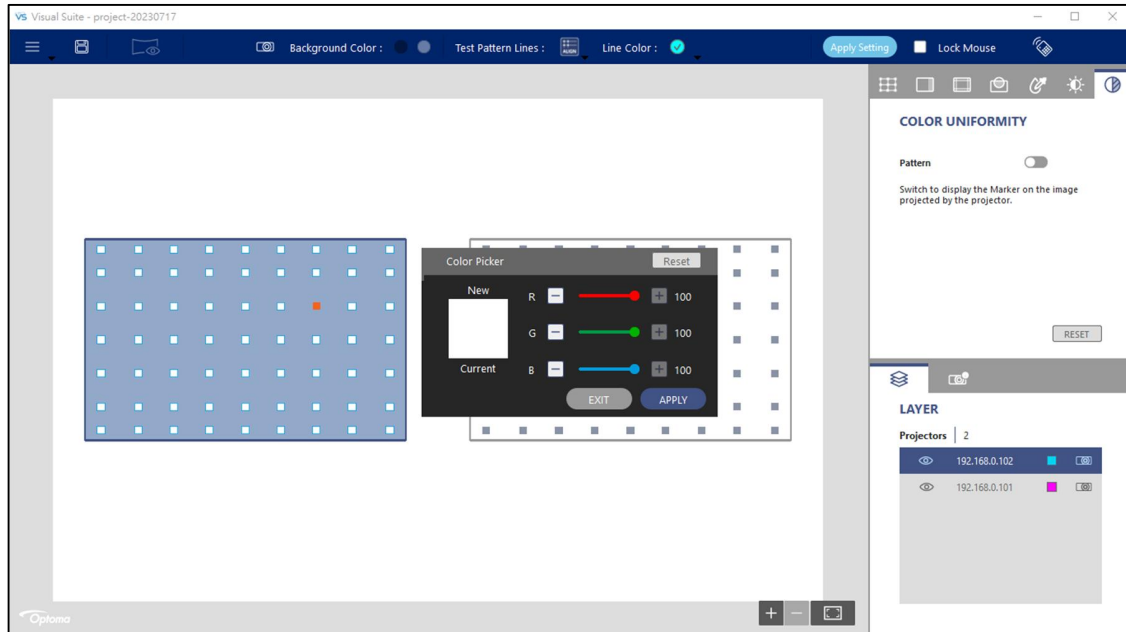
VII. Color Uniformity

Color uniformity is to adjust the uniformity gain of projection image to improve the uniformity performance.
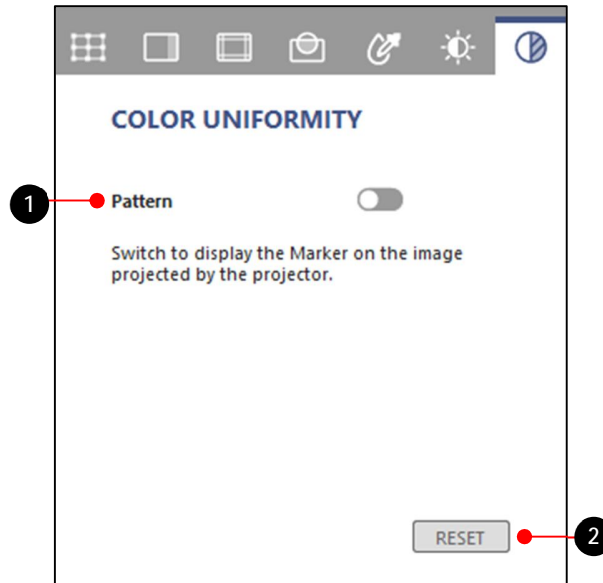
Function tab - Color Uniformity

No.	Function	Description
1	Pattern	Pop-up the color uniformity gain control page, there are 63 (9x7) positions for uniformity gain control.
2	RESET	Click to reset the uniformity gain to project default setting.

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Complete following steps to adjust the color uniformity:

1. Switch to the Color Uniformity function tab. The test pattern automatically changes to the image of Color Uniformity control points.
2. Choose one position and double click to get uniform color display.
3. Click APPLY to set the uniformity gain to projection image.