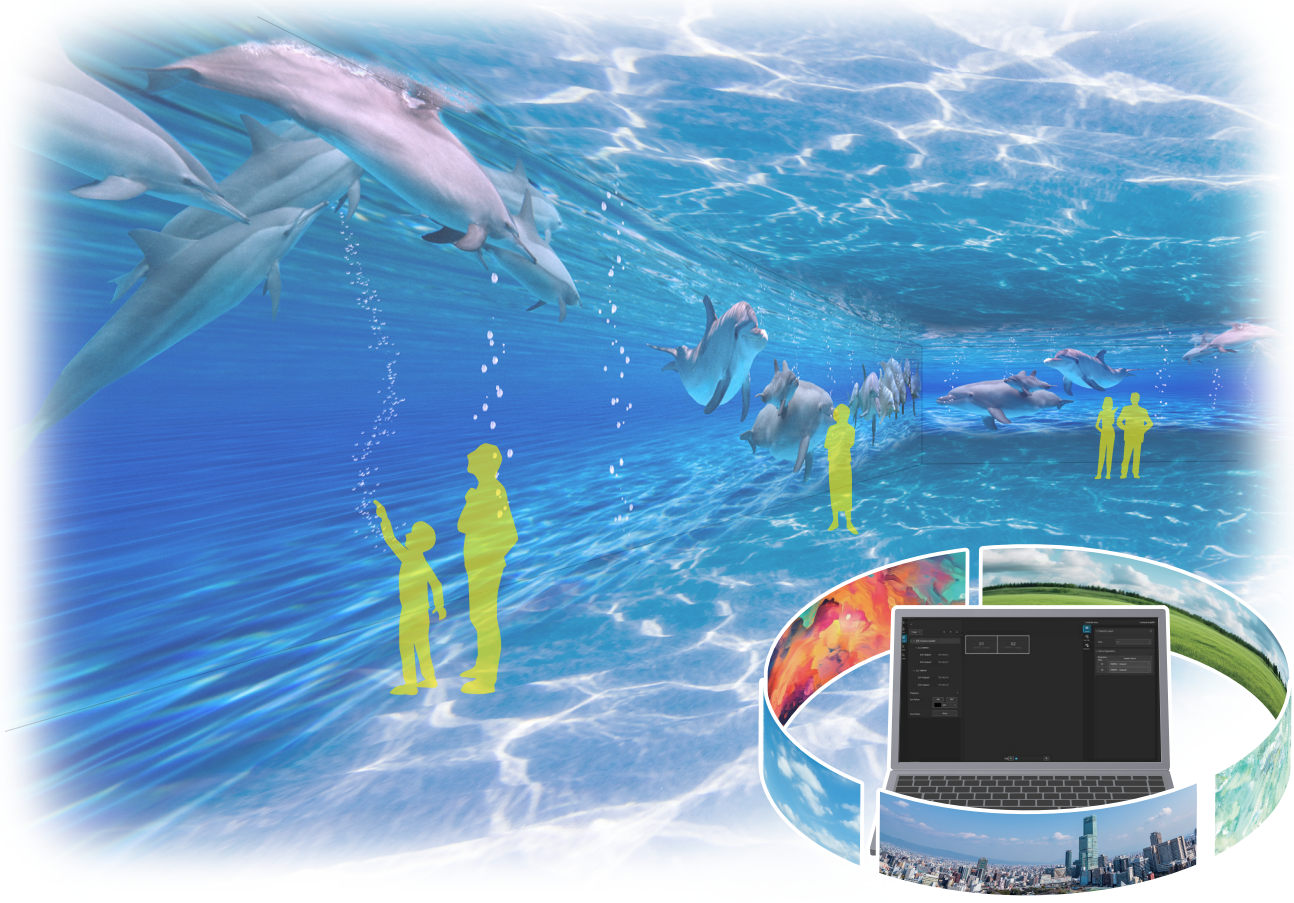
Panasonic

Operating Instructions

Installation and Adjustment

Visual Software Suite

Windows



Read before use
This manual describes the Installation and Adjustment function of Visual Software Suite.

Thank you for purchasing this Panasonic product.

■ Before using this software, please read the instructions carefully.

DPQP1600WA/X1(E)

Contents

When Controlling Media Processors

Precautions and Disclaimers

- This software (Visual Software Suite) makes use of the following software.
  (1) Software developed independently by Panasonic Projector & Display Corporation
  (2) The Independent JPEG Group's JPEG software
  - This software is based in part on the work of the Independent JPEG Group.
  (3) Software owned by a third party and licensed to Panasonic Projector & Display Corporation
  (4) Software licensed under GNU LIBRARY GENERAL PUBLIC LICENSE Version 2.0 (LGPL V2.0)
  (5) Software licensed under GNU LESSER GENERAL PUBLIC LICENSE Version 2.1 (LGPL V2.1)
  (6) Open-source software other than software licensed under the terms and conditions of LGPL V2.0 or LGPL V2.1

  Software categorized as (4) to (6) above is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY, including without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
  For details, refer to the license terms and conditions for the respective open-source software.
  The open-source software licenses can be checked in this software.
  For at least three (3) years from the release of this software, Panasonic Projector & Display Corporation will give to any third party who contacts us at the contact information provided below, for a charge no more than our cost of physically performing source code distribution, a complete machine-readable copy of the corresponding source code covered under LGPL V2.0, LGPL V2.1, or other license with the obligation to do so, as well as the respective copyright notice thereof.
  Contact Information: oss-cd-request@gg.jp.panasonic.com

- The illustrations and display examples used in this manual may differ from the actual product.

- Reference pages
  Reference pages in this manual are indicated as (➡ page 00).

- Media processor and media processor board manufactured by Panasonic Projector & Display Corporation are both referred to as “media processor” in this manual.

- The “file selection screen” of the operation procedure in this manual uses the standard function of the OS.

- Panasonic Projector & Display Corporation cannot be held liable for damages arising from the corruption or loss of the data of a projector, media processor, or other connected device. Please note that you are strongly recommended to save the setting information saved to the device also on your computer.

What You Can Do with “Visual Software Suite”

You can make the following advanced screen adjustments, including geometry correction, by using the Installation and Adjustment function of Visual Software Suite.

■ Auto screen adjustment

This function enables geometry correction, edge blending, black level, and other adjustments with a simple procedure using a camera.

Note

- To use the auto screen adjustment function, prepare a camera separately.
  ➡ “When Controlling Projectors” (page 9)
  ➡ “When Controlling Media Processors” (page 76)

■ Geometry correction

When images are projected onto a screen surface that is not perfectly flat (such as the wall of a building) or onto a screen surface at an angle, they become distorted. This function corrects the images to counter the shape of the screen surface when projecting images in these kinds of special environments.

■ Content splitting

This function enables constructing a screen by arranging a multiple number of projectors connected via a media processor in a free layout, and then arranging the content images to be projected onto it while viewing the actual projected images.

■ Edge blending

This function corrects the brightness to make the joins between images less visible when images projected from a multiple number of projectors are combined to form a single image. When the projectors are connected via a media processor, this function can support a wide variety of shapes for the image joins between projectors that are created by the free layout of projectors.

■ Black level adjustment

This function allows making the appearance of black uniform by adjusting the brightness and coloring of the black parts in the projected image of each projector when images projected from a multiple number of projectors are combined to form a single image.

■ Uniformity

When unevenness in luminance and colors in images projected from projectors becomes noticeable, this function can remove that unevenness and make the brightness within the images uniform.

■ Color matching

This function allows adjusting individual images to reduce color variation and make them uniform when images projected from a multiple number of projectors are combined to form a single image.

■ Masking

This function makes it possible to mask certain parts of the projected images so as to project only the required parts.

Preparation

Connections and Setup

When Controlling Projectors

■ Compatible projectors

For details on the models that are compatible with this software, check the information found on the software download page after logging in to PASS on the following website.
https://docs.connect.panasonic.com/projector/pass

■ Connecting a projector and computer

Use a LAN cable to connect a projector and computer.
The maximum number of projectors that can be connected is 99.

When Controlling Media Processors

■ Preparing a projector connected via a media processor

When you will use a media processor board manufactured by Panasonic Projector & Display Corporation, install it into a slot in the projector.
When using a media processor manufactured by Panasonic Projector & Display Corporation, connect it to the projector using an HDMI cable.
The maximum number of projectors that can project images via a media processor is 99.

■ Connecting a media processor and computer

Connect a media processor and computer using a LAN cable.
The maximum number of media processors that can be connected is 99.

Note

- When connecting using a hub or similar device, whether you can use either a straight cable or crossover cable or both cables differs depending on the system configuration. Please consult your network administrator for details.

When Controlling Projectors | When Controlling Media Processors

■ Setting the Computer

Network Setup

- Set the IP address, subnet mask, and default gateway according to the operating environment.
  (Please consult your network administrator for details.)
- If “use of automatic script” is checked for your web browser, please uncheck.
- If “Use of Proxy server in LAN” is checked for your web browser, please uncheck, or set the projector IP address to “Exceptions” in the detailed proxy settings.

■ Setting the projector and media processor

Network Setup

- Set the IP address, subnet mask, and default gateway according to your operating environment.
  (Please consult your network administrator for details.)
  Set DHCP to OFF and set a fixed IP address, making sure that the entered IP address is not used by any other device on the network.
  If the entered IP address is used by another device, the projector or media processor cannot be set.
- For models that can be set, enable both Web Control and Command Control.
- For models in which the Web port number can be set, set the port number to “80”.

Note

- For details on the setting procedure of the projectors or media processors, check the manuals of the projectors or media processors you are using.
- If prompted to set a user name and password for the account in the Web control screen of the media processor, complete those settings.
- If prompted to set an administrator account on the startup screen or Web control screen of a projector, complete those settings.
- This software identifies a projector or media processor using its configured IP address. If DHCP is set to ON in the network settings of a projector or media processor in a network environment that uses a DHCP server or similar device, the DHCP server may change the IP address allocated to the projector or media processor, making it impossible to connect using this software.
  Please ensure the server does not change the IP address by, for example, setting the DHCP server so as to fix the IP address allocated to the projector or media processor. (Please consult your network administrator for details.)

Screen Configuration

When performing installation and adjustment for projecting images via a projector or media processor in this software, click [On-site] in the main menu to display the [On-site] screen.

[On-site] screen

Main menu
Select functions and configure the application settings.

List view
Add or delete content areas, projector, media processors, and cameras.

Control view
Control a projector or media processor.

Main view
Perform operation intuitively with a mouse, keyboard, or other device.

Adjust menu
Display the menus that can be used according to the selected projector or media processor.

Adjust view
Change the settings according to the selected projector or media processor.

Note

- Right-clicking within the List view, main view, or other view allows you to operate functions according to the view.

Auto Screen Adjustment

This allows automatic adjustment of geometry correction, edge blending, color matching, and black level to the shape of the screen through use of an externally connected camera.
After performing Auto Screen Adjustment, you can perform further detailed adjustment and correction manually.

Note

- To use the auto screen adjustment function, prepare a camera separately.

Preparing auto screen adjustment

■ Projector connection

Use a LAN cable to connect a projector and computer.

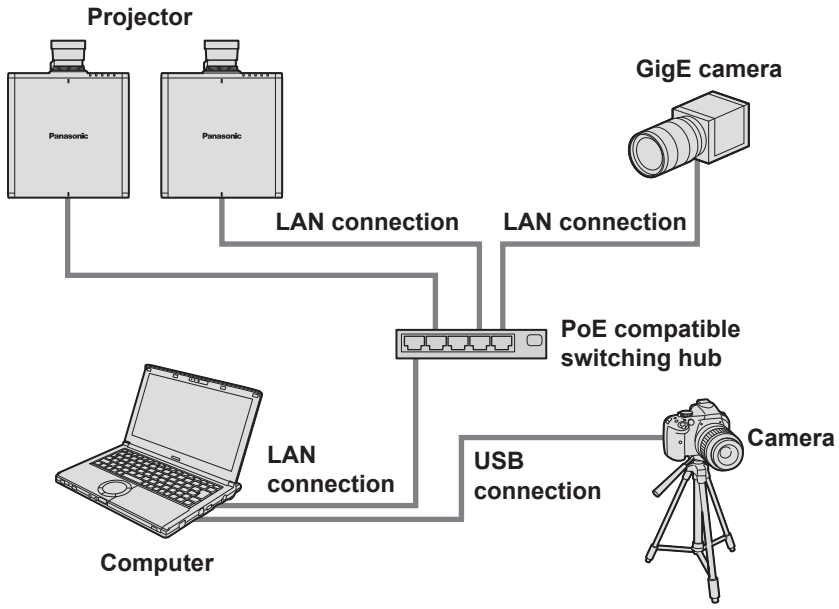
■ Camera connection

Depending on the camera to be used, connect to the computer directly using a USB cable or connect to it via a network using a LAN cable.

- For details on compatible cameras, check the information found on the software download page after logging in to PASS on the following website.
  https://docs.connect.panasonic.com/projector/pass

■ Connection example

Example of connecting the camera with a USB cable or LAN cable



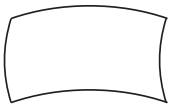
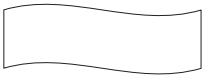
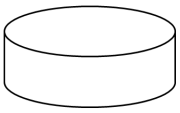
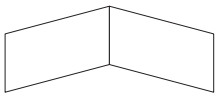
Note

- Positioning the camera so that it faces the screen directly and performing adjustments will obtain more optimal adjustment results. Adjustment is possible when the camera is facing the screen at an angle, but adjustment may fail or distortion may remain in images after adjustment if the angle is too large.
- In cases such as the following, adjustment using multiple cameras (up to 6) is possible.
  - Projector layout configuration is 5 or more projectors in the vertical or horizontal direction.
  - When the entire screen does not fit within the capture range of one camera

  In this case, arrange multiple cameras vertically or horizontally according to the projector layout configuration so that the capture ranges of adjacent cameras and the projection area of at least one projector overlap.
- When using a GigE camera, the switching hub must support PoE and Gigabit Ethernet. Furthermore, use a LAN cable of Cat5e (category 5e) or higher.

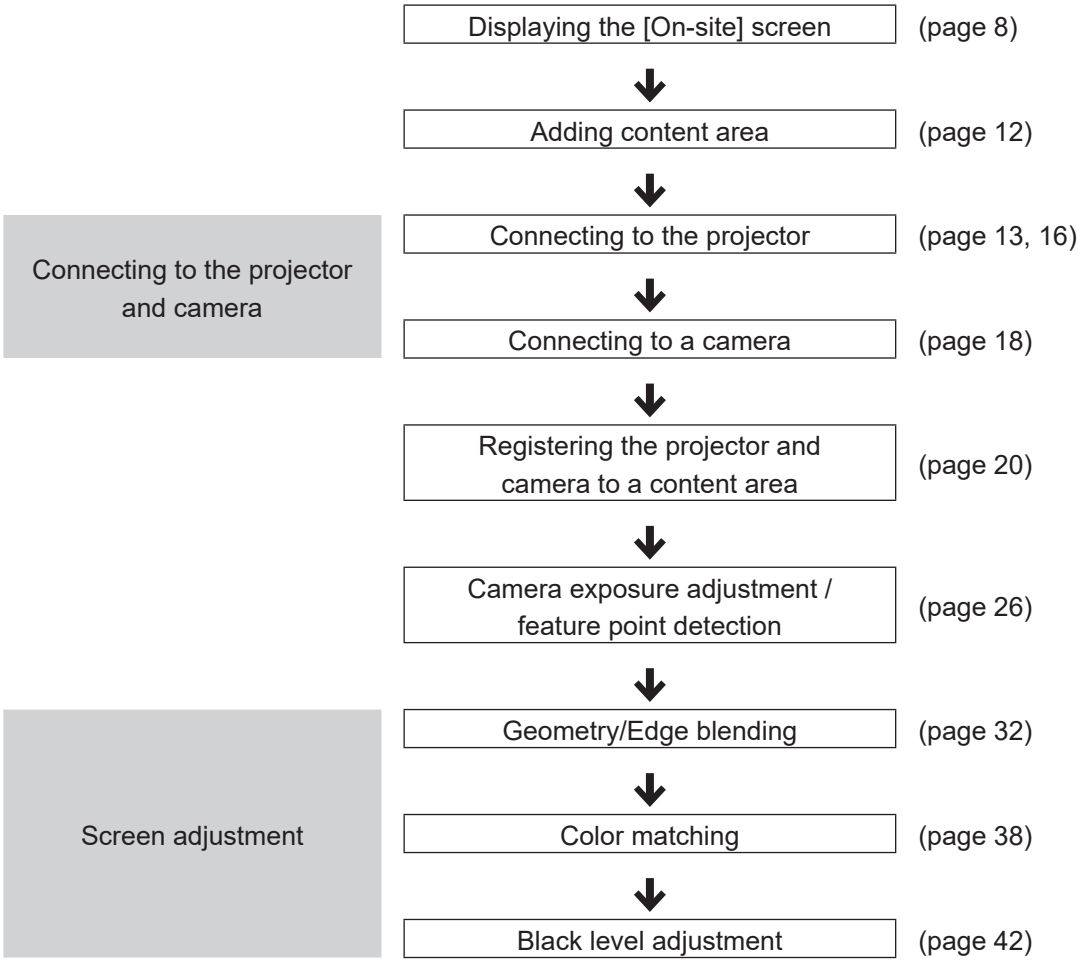
Compatible screens for auto screen adjustment

Auto screen adjustment may not be performed properly depending on the shape of the screen. If adjustment is not performed properly, perform adjustments manually.

Compatible screens	Non-compatible screens
● **Flat**  ● **Curved screen**  Curved in one direction  Curved in two directions ● **Curve changes smoothly**  S-curve  Variable curve type ● **360-degree curved screen** 	● **Folded**  Folded screen type * Individual adjustments for each side are possible

Flow of auto screen adjustment

Perform auto screen adjustment with the following steps. First add a content area with “Contents Area(Projector)” on the On-site screen and register the projector and camera that are the target for adjustment to that content area, then make image adjustments with the camera.



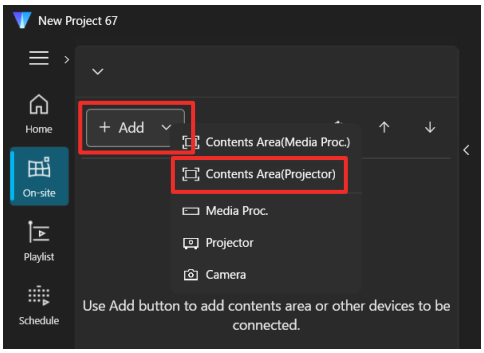
■ “Content area” and “projection area”

“Content area” and “projection area” are concepts within this software. “Content area” corresponds to the entire screen for projecting a single content image in the actual environment. Furthermore, “projection area” corresponds to the projection screen of each individual projector that makes up the screen in the actual environment.

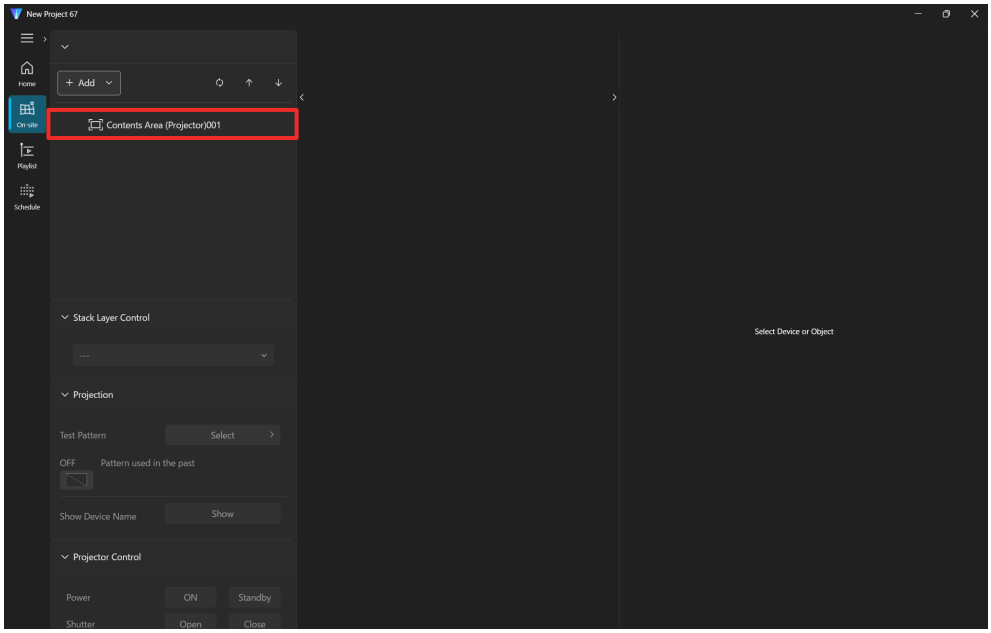
Content area settings

Add a new content area with the following procedure.

1 Click the [Add] button in the List view, and select [Contents Area(Projector)].



The new content area is added to the List view.



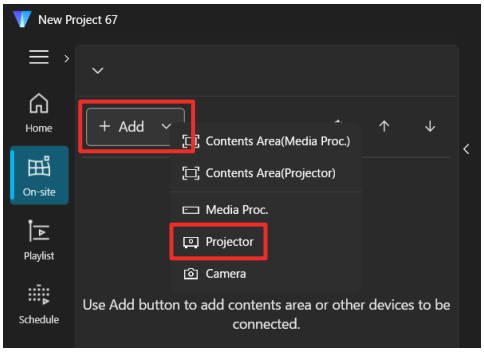
Connecting a projector and camera

Connect to a projector and camera with the following procedure.
For connecting with a projector, there is the method of searching on the network and connecting and the method of connecting using a connection information file.

Connecting to a projector (method of searching on the network)

Search for a projector on the same network, and then connect to it.

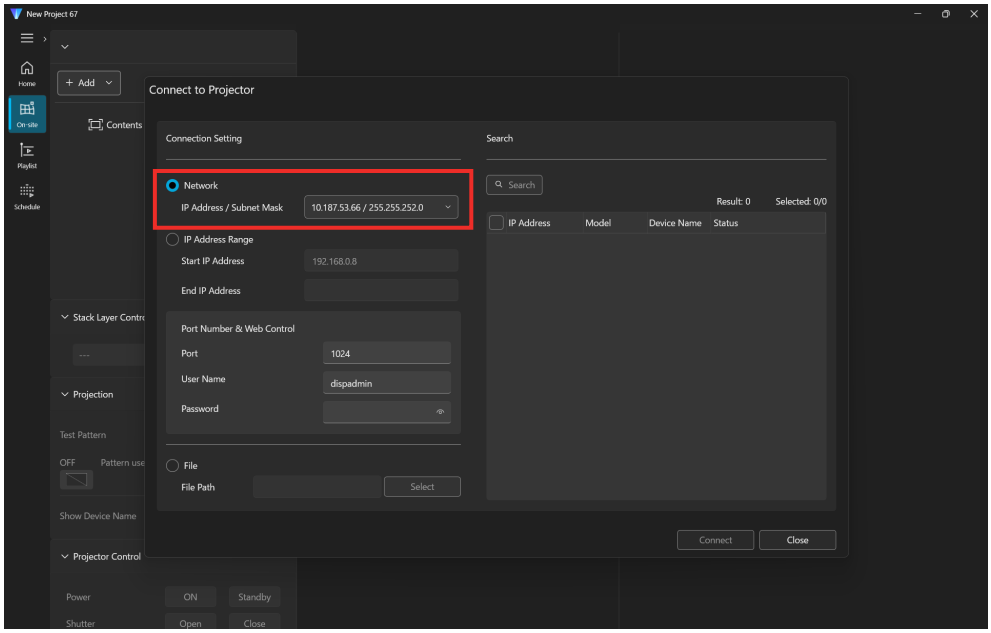
1 Click the [Add] button in the List view, and select [Projector].



The [Connect to Projector] screen is displayed.

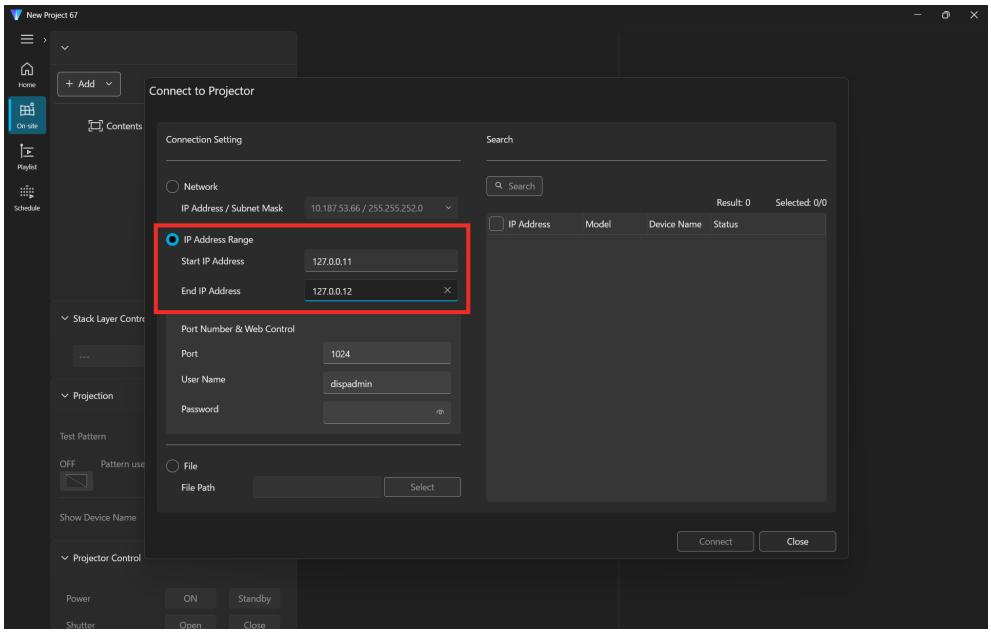
2 Select the range to search for IP addresses on the same network.

To search the entire range of IP addresses, select [Network].

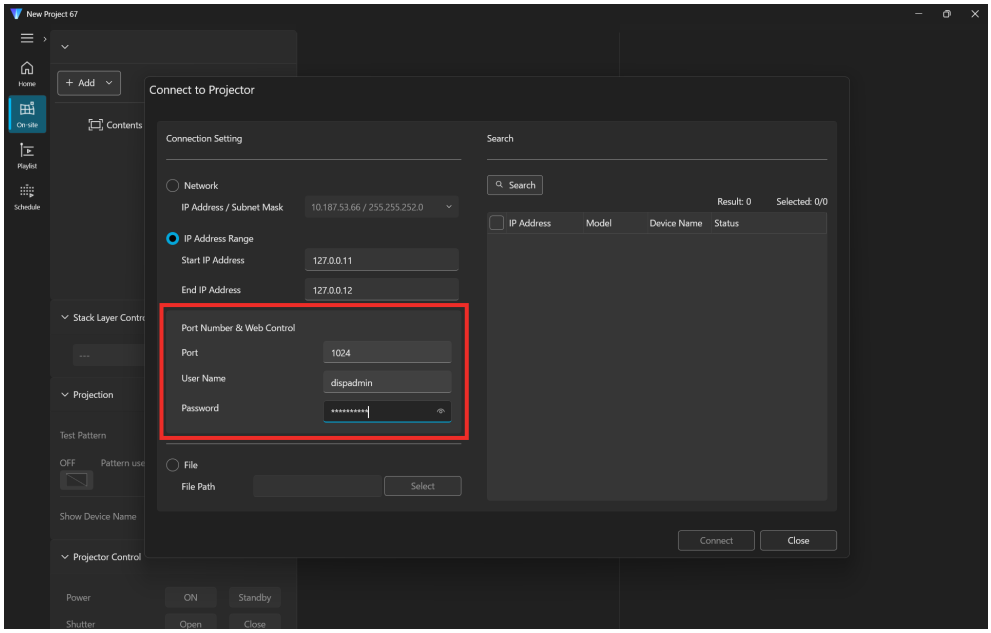


- [IP Address / Subnet Mask]: Select the IP address and subnet mask of your computer in a list.

To specify the IP address range to search, select [IP Address Range].



3 Enter the items required to connect with the projector.

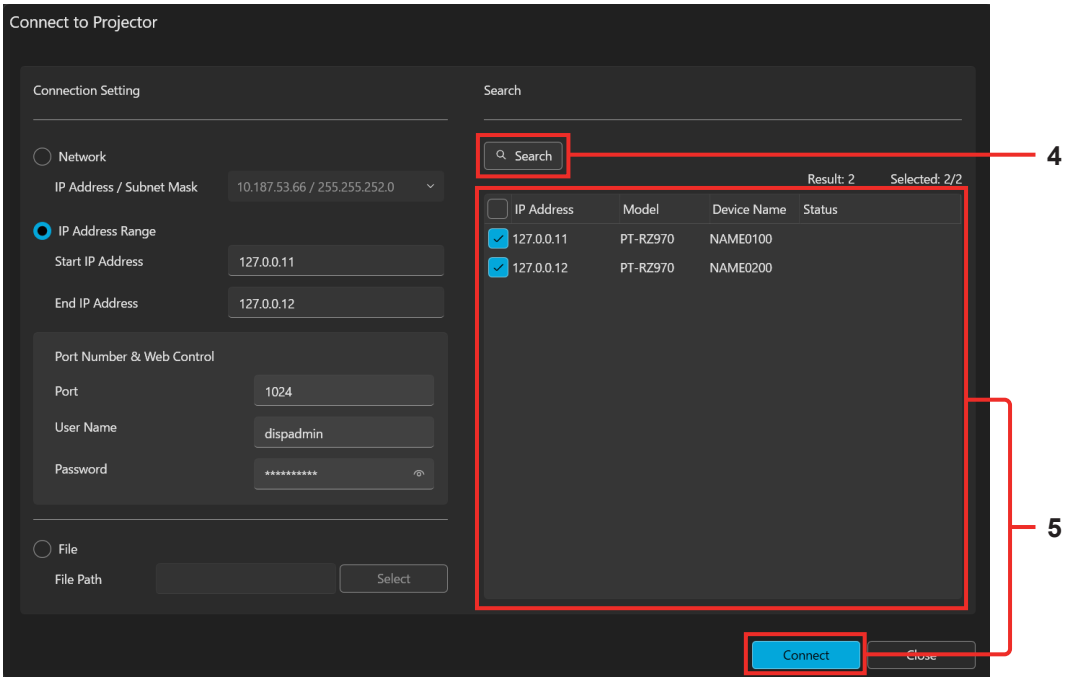


- [Port]: Set here the number of the port that is to be connected to the projector.
- [User Name]: Enter the name of a user with administrator privileges for the projector to be connected.
- [Password]: Enter the password of a user with administrator privileges for the projector to be connected.

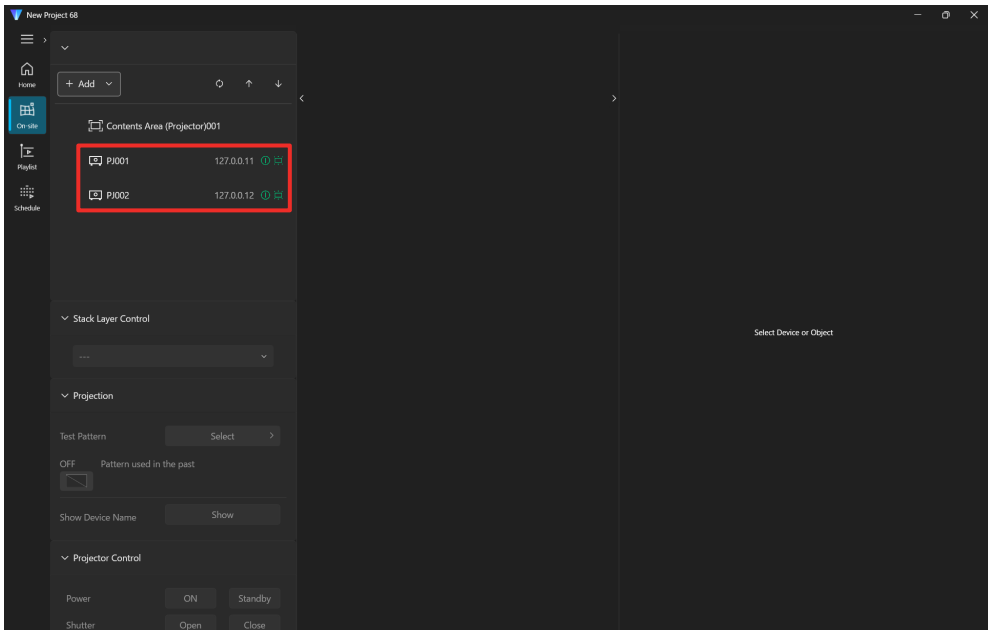
4 **Click the [Search] button.**

A search for projectors begins. When the search completes, the found projectors are displayed in a list.

5 **Select the projector to be connected, and click the [Connect] button.**



The connected projector is displayed in the List view.



Note

- In network, multiple IP addresses and subnet masks are displayed in the list if your computer has multiple network interface cards. Select the address that is connected to the same network as the projector to be connected from the list.
- Enter the user name and password of an account with administrator privileges for the accessing the projector to be connected.
- When a projector displayed in the List view is selected, [Property] is displayed in the Adjust menu, and you can change the settings of the projector in the Adjust view.
- An IP address / subnet mask search may not be supported depending on the projector model. In that case, use an IP address range specification search.

Connecting to a projector (method using a connection information file)

Specify the following file containing the connection information for the projector, and then connect to the projector in accordance with the information in that file.

- File containing projector connection information that was created in Geometry Manager Pro (extension: prjc)
- Projector registration information file (extension: csv)

Note

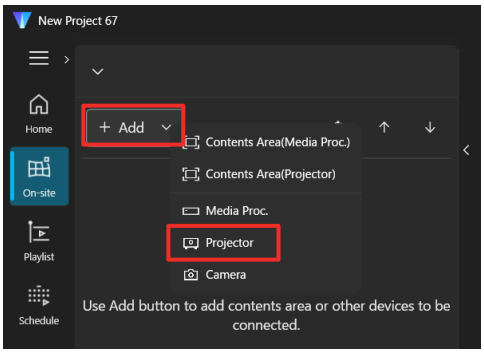
- A projector registration information file is a CSV file in which the information set for each projector (IP address, port number, user name, and password) is described on each line. Create the information of the projectors to register to this software as a CSV file.

  Example)

  IP address, Port number, User name, Password, Password (re-enter for confirmation)

  192.168.0.8,Port number 1,User name1,Password1,Password1
  192.168.0.9,Port number 2,User name2,Password2,Password2

1 Click the [Add] button in the List view, and select [Projector].



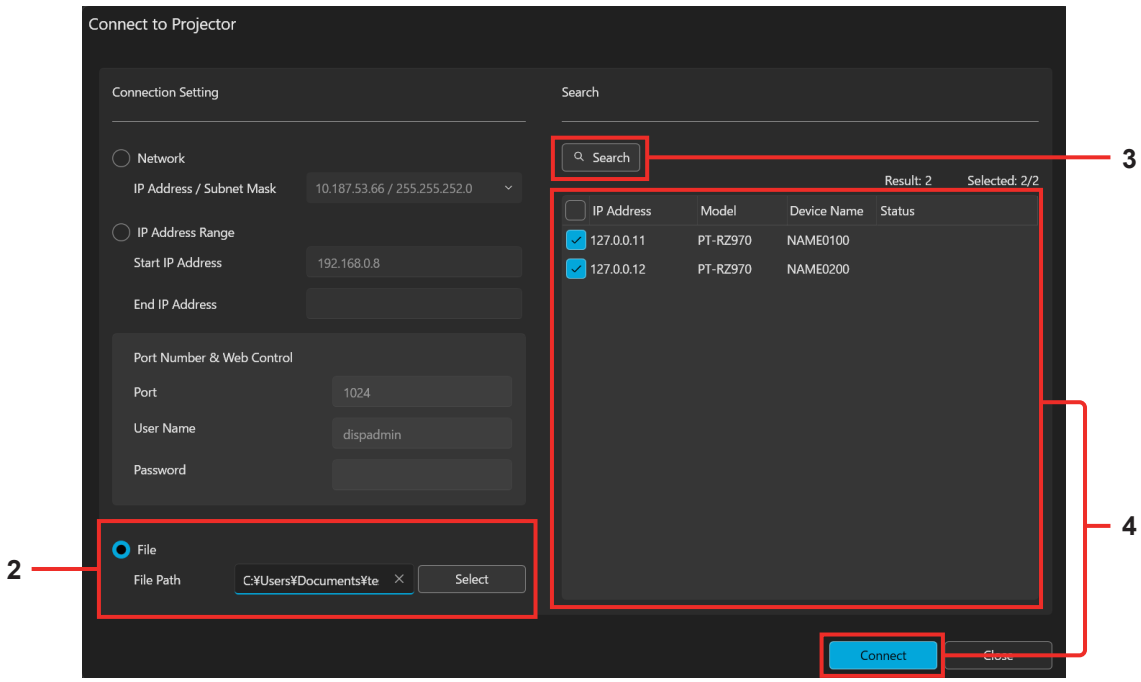
The [Connect to Projector] screen is displayed.

2 Select [File], and click the [Select] button.

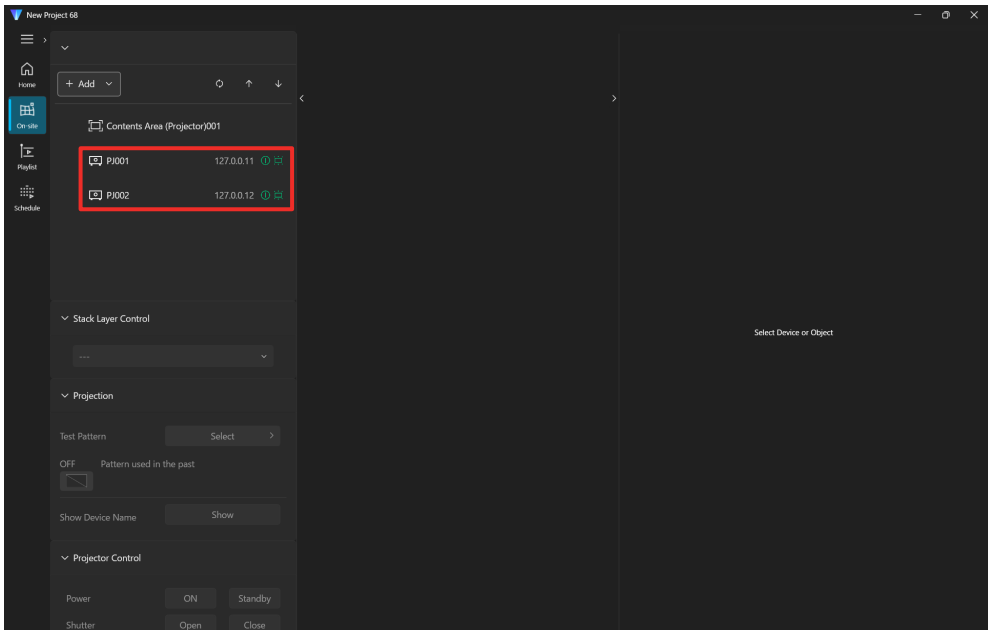
The file selection screen is displayed.
When a connection information file is selected, the location and name of the file is displayed in [File Path].

3 Click the [Search] button.

4 Select the projector to be connected, and click the [Connect] button.



The connected project is displayed in the List view.



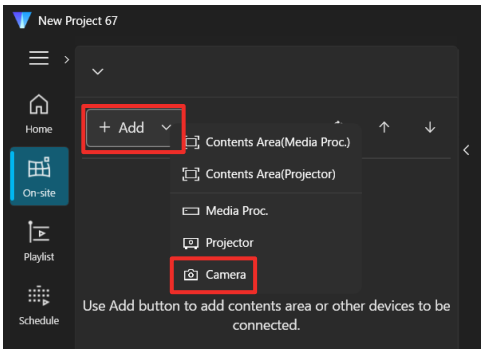
Note

- When a projector displayed in the List view is selected, [Property] is displayed in the Adjust menu, and you can change the settings of the projector in the Adjust view.

Connecting to a camera

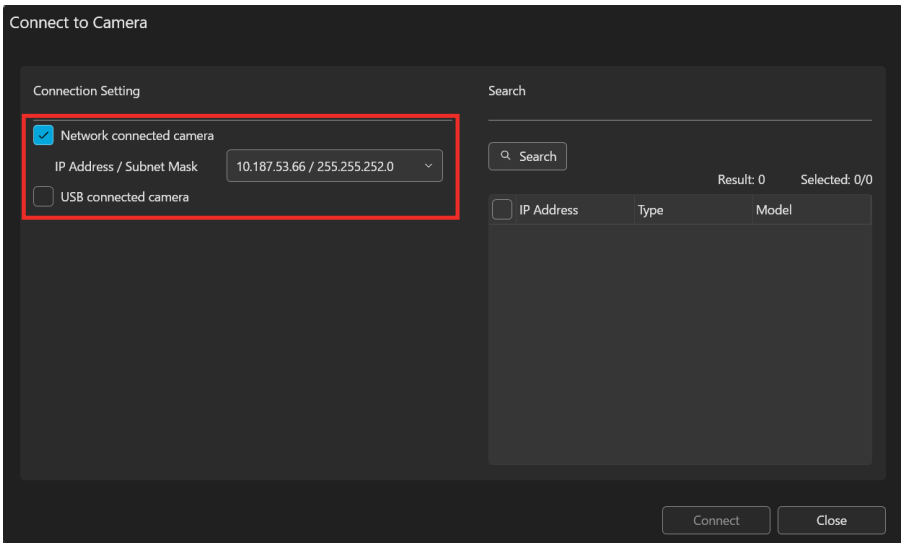
Connect to the camera to use for auto screen adjustment.

1 Click the [Add] button in the List view, and select [Camera].



The [Connect to Camera] screen is displayed.

2 Specify the type of camera to be connected.



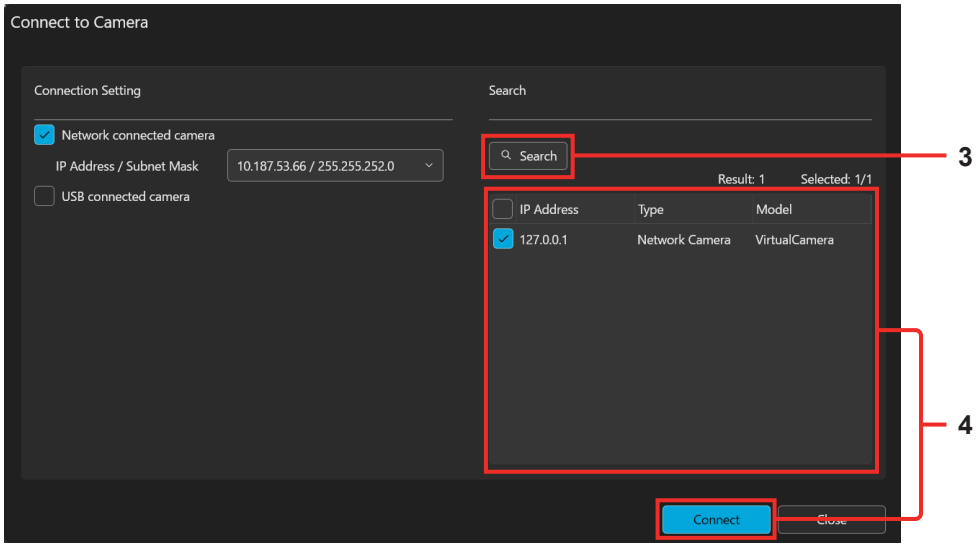
Specify one or both of the following as the type of connection between the camera to be searched for and the computer.

- [Network connected camera]: Place a check mark in this checkbox to search for a camera within the same network as your computer. [IP Address / Subnet Mask] displays the IP address and subnet mask of your computer in a list.
- [USB connected camera]: Place a check mark in this checkbox to search for a camera connected by USB to your computer.

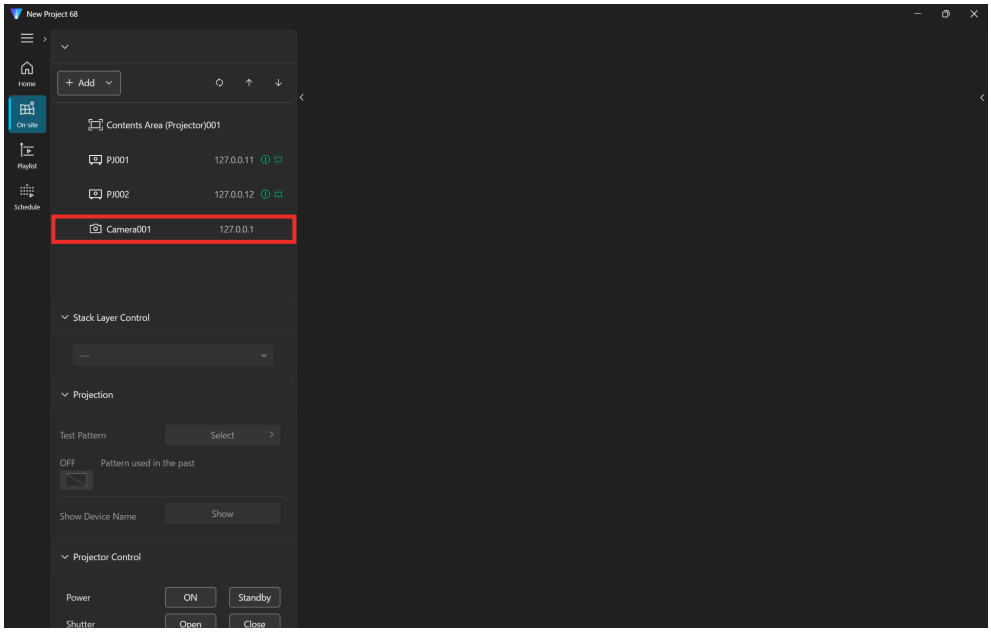
3 **Click the [Search] button.**

A search for cameras begins. When the search completes, the found cameras are displayed in a list.

4 **Select the camera to be connected, and click the [Connect] button.**



The connected camera is displayed in the List view.



Note

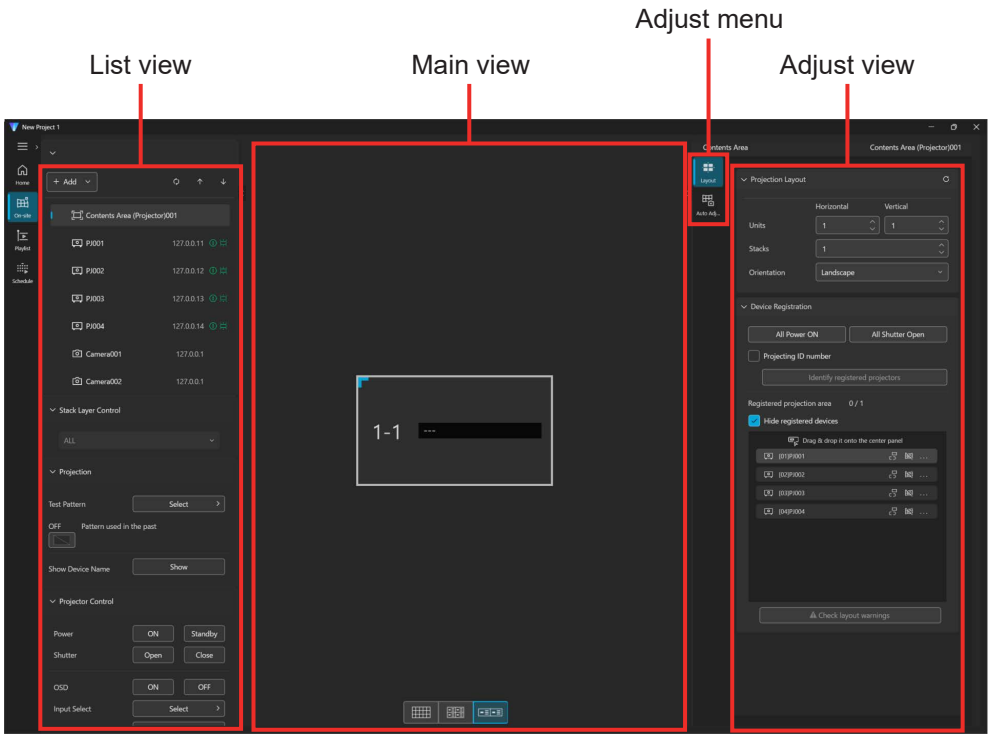
- When a camera displayed in the List view is selected, [Property] is displayed in the Adjust menu, and you can change the settings of the camera in the Adjust view.

Registering the projector and camera to a content area

Register the connected projector and camera to a content area.

Projector layout and arrangement

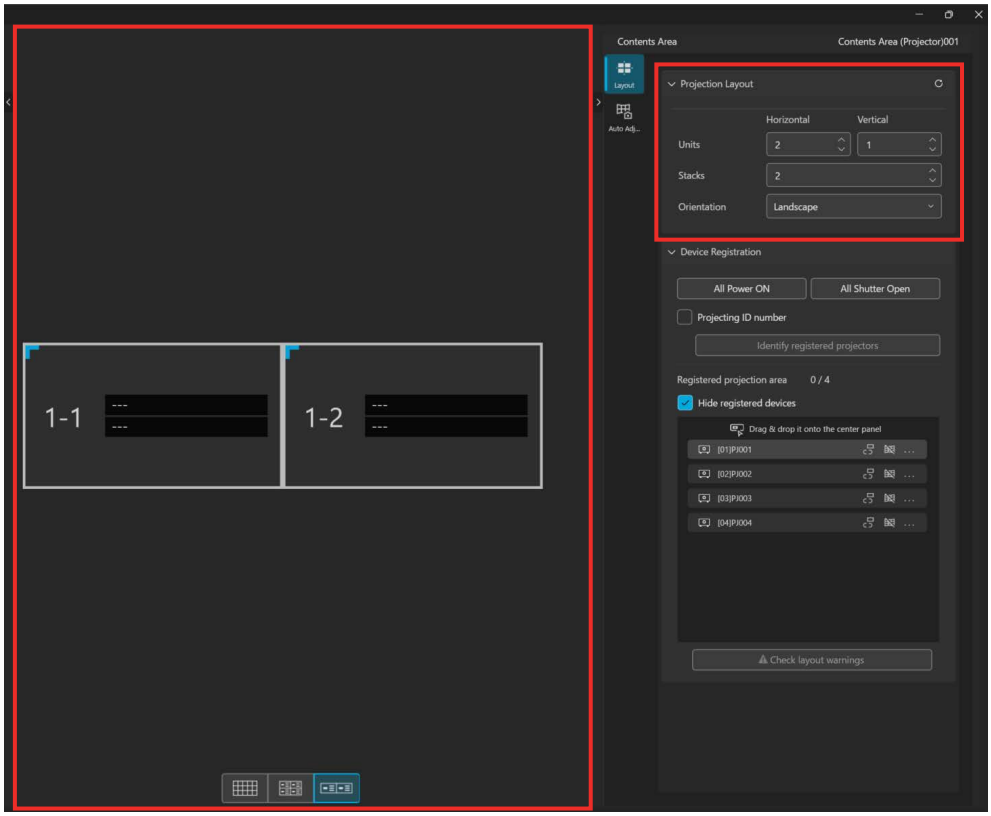
Register the projection layout of projectors that make up the content area, and a projector to each projection area.



1 Click the [Add] button in the List view, and select [Contents Area(Projector)].

 [Layout] is selected in the Adjust menu, and the [Projection Layout] area and [Device Registration] area are displayed in the Adjust view.

2 Determine the projection configuration in the [Projection Layout] area of the Adjust view.



- [Units (Horizontal/Vertical)]/[Stacks]: Set each item based on the installation layout of projectors.
  - Up to 99 projectors can be set.
  - In the case of 1 camera, you can select up to 4 projectors horizontally, up to 4 projectors for vertically, and up to 6 projectors stacked.
  - You can set 5 or more projectors either horizontally or vertically by using multiple cameras. The relationship between the number of projectors and the number of cameras is as follows.

Number of projectors	1 to 4	3 to 7	4 to 10	5 to 13	6 to 16	7 to 19
Number of cameras	1	2	3	4	5	6

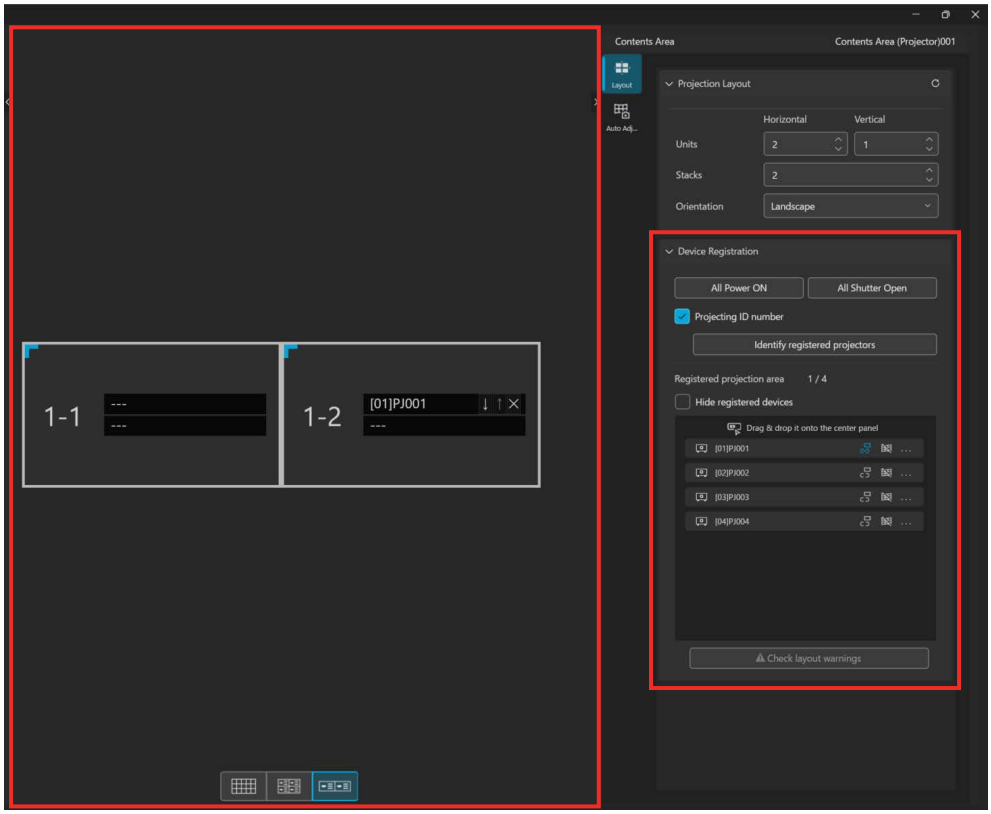
  - In the case of a 360-degree curved screen, there needs to be 5 or more projectors and 3 or more cameras arranged vertically or horizontally.

Number of projectors	5 to 9	5 to 12	5 to 15	6 to 18
Number of cameras	3	4	5	6

- Specify the installation orientation of the projectors at the installation site. For example, when projecting with the projector oriented vertically by tilting it 90 degrees clockwise when facing the screen, select [Portrait (Clockwise)].
- When the [Units (Horizontal/Vertical)], [Stacks], and [Orientation] settings are changed, the layout display in the main view is updated in conjunction.

3 Register a projector to each projection area in the [Device Registration] area of the Adjust view.

The connected projectors are listed in the projector list of [Device Registration]. A projector can be registered to a projection area by dragging it from the projector list and dropping it in the layout display area in the main view.



Set each item of the [Device Registration] area as follows and register the projectors.

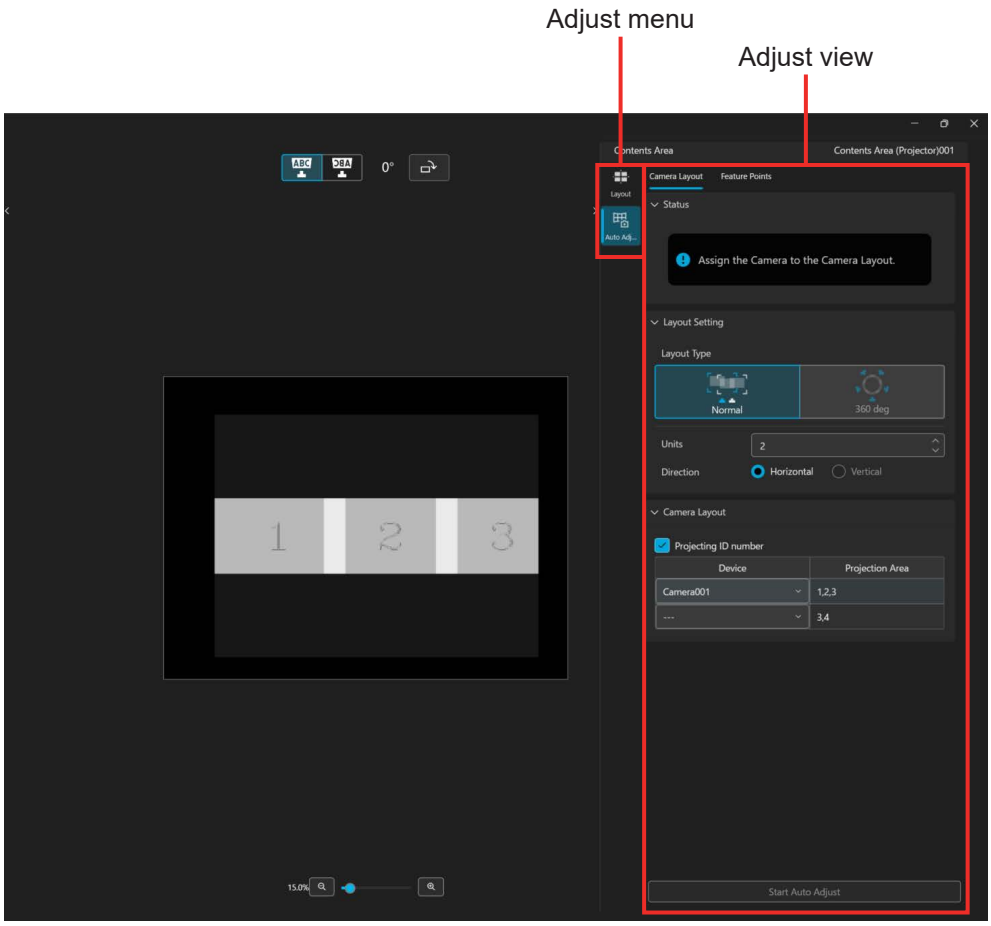
- [All Power ON]: If there are projectors in the standby state, you can turn the power on with this button.
- [All Shutter Open]: If there are projectors with closed shutter, you can open the shutter with this button.
- If you place a check mark in the [Projecting ID number] checkbox and then select a projector in the projector list, the identification number is projected from the projector. Drag the projector in the projector list and drop it in the corresponding projection area of the layout display area in the main view so that it matches the projected position. When the projector is registered, the projector name is displayed in the box of the corresponding projection area.
- If [Stacks] is 2 or more, you can specify the stack level of the registered projector. Switch the level with the [↓] and [↑] buttons beside the projector name displayed in the projection area.
- Repeat the above operations to register projectors to all projection areas.

Note

- If the identification number is difficult to distinguish because geometry correction and edge blending are applied, click ··· displayed on the row of the projector in the projector list and then click [Geometry OFF].
- When the display is switched to [Layout] of the Adjust menu, the [Projecting ID number] checkbox is cleared to suppress the projection of unnecessary test patterns.
- There are 3 display modes for layout display in main view. Select a display mode that facilitates easy operation in accordance with the number of units set.
- If projectors of different models coexist, you may not be able to perform auto screen adjustment or use some functions.
  - When a DLP projector and LCD projector coexist, auto screen adjustment is not possible.
  - When models with different resolutions coexist, geometry correction, edge blending, and black level adjustments are not possible. Only color matching can be used.
- For some models, black level adjustment cannot be used because unit function restrictions apply.

Arranging cameras and assigning capture ranges

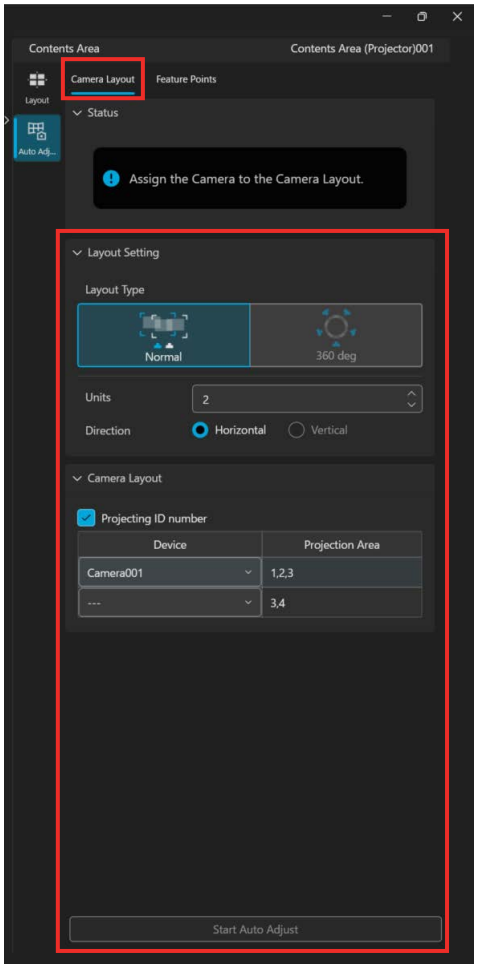
Register the connected cameras to a content area. When registering multiple cameras, set the capture range of each camera.



1 Click [Auto Adjust] in the Adjust menu.

The [Camera Layout] tab and [Feature Points] tab are displayed at the top of the Adjust view. [Status] area, [Layout Setting] area, and [Camera Layout] area are displayed on the [Camera Layout] tab.
When the [Camera Layout] tab is selected, the [Coverage Assignment] screen is displayed simultaneously.

2 Set the layout of cameras in the [Layout Setting] area on the [Camera Layout] tab.

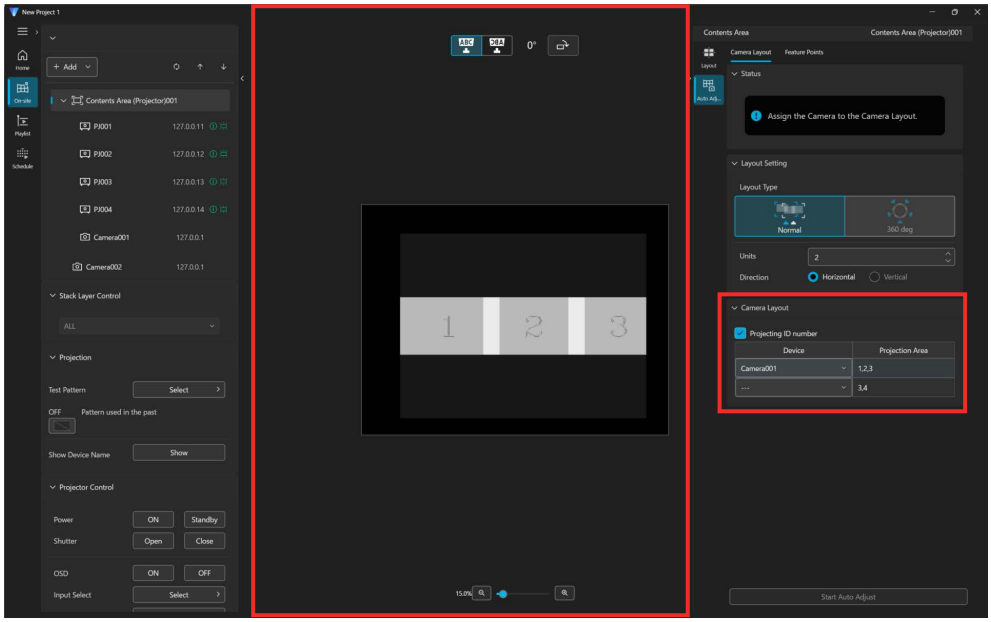


- [Layout Type]: Select [360 deg] in the case of a 360-degree curved screen, and [Normal] in the case of a screen other than that.
- [Units]: Set the number of cameras to be used. The number of cameras that can be selected varies depending on the projector layout configuration and camera layout type.
  ➡ Relationship between number of projectors and number of cameras (page 21)
- [Direction]: Set the direction to arrange the cameras.

Note

- There are items that cannot be changed depending on the conditions of the projector layout configuration.

3 Select a camera and set the range of the projection area to capture in the [Camera Layout] area.



- If you place a check mark in the [Projecting ID number] checkbox, the identification number corresponding to the number of the projection area is projected from the projector.
- In the camera layout list, a list with the same number of rows as the number of cameras shown in [Units] is displayed. Selecting [Device] of the list displays the captured images of the connected cameras in the main view. Perform operation as follows depending on the placement direction of the projection layout.
  - When the placement direction is horizontal, place the cameras from the left side camera to right side camera while checking the images displayed in the main view so that they are arranged in order from the top of the list.
  - When the placement direction is vertical, place the cameras from the top camera to bottom camera while checking the images displayed in the main view so that they are arranged in order from the top of the list.
- In the [Coverage Assignment] screen, check that the target range of the projection area fits in the captured image. If it does not fit, change the actual camera position or the projection area range. The projection area range can be changed by dragging the range change handle.

[Coverage Assignment] screen

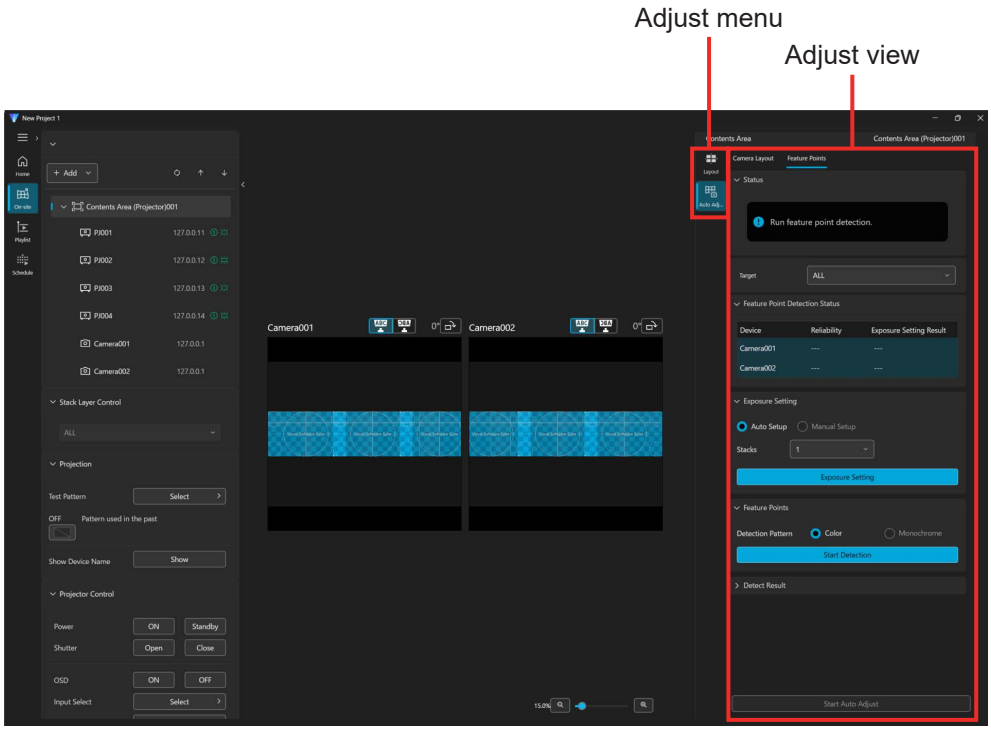
Note

- One projector's worth of overlap is required for images captured with cameras that are side by side.
- When the captured image displayed in the main view appears rotated or flipped due to the installation position or angle of the camera, you can make adjustments so that it appears correctly using the buttons at the top.

When all of the projectors and cameras are set correctly, the “Run feature point detection.” message is displayed in the status area. Go to setting the camera exposure and detecting the feature points.

Setting camera exposure and detecting feature points

Detect the feature points to use for Auto Screen Adjustment.



1 Click the [Feature Points] tab in the Adjust view.

[Status] area, [Target], [Feature Point Detection Status] area, [Exposure Setting] area, [Feature Points] area, and [Detect Result] area are displayed.
[Target] is set to [ALL] by default, and operation is perform for all cameras. Captured images corresponding to the number of cameras are displayed simultaneously in the main view.

2 Configure the camera automatic exposure settings from the [Exposure Setting] area.

- [Auto Setup / Manual Setup]: Select whether to configure the exposure settings automatically or manually. If [Target] is set to [ALL], manual setup cannot be selected.
- [Stacks]: When the projector layout is a stack configuration of 2 or more layers, you can specify the stack layers of projectors to be used for exposure setup.
- [Exposure Setting]: Click this button to start exposure setup. The result is displayed in the automatic exposure setting result field in the [Feature Point Detection Status] area, and the result of capture with the set exposure values is displayed in the main view.

Note

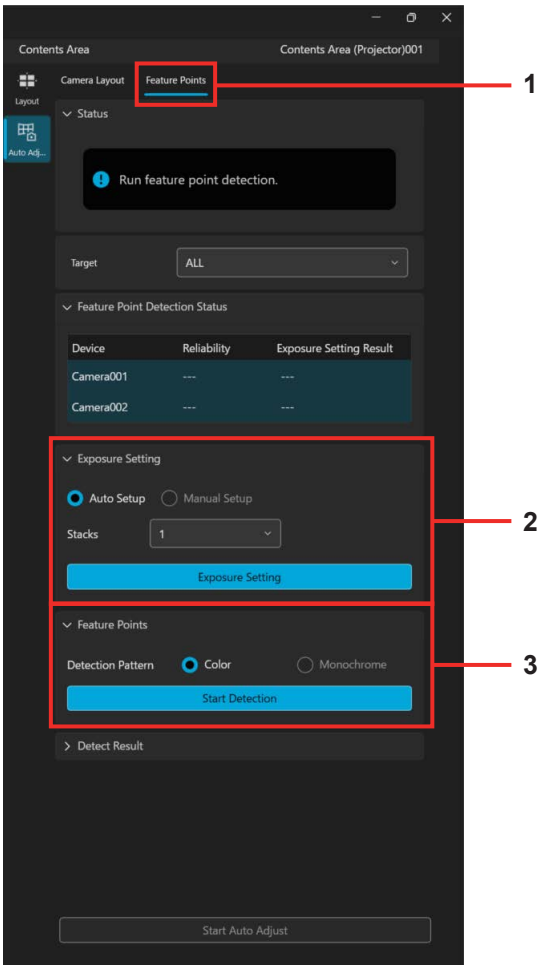
- If the registration of projectors and cameras to the content area is not complete, the [Exposure Setting] button cannot be clicked.
- If the automatic exposure setting result is indicated as “Failed”, adjust the target camera lens aperture and perform [Exposure Setting] in [Manual Setup].

3 Perform feature point detection from the [Feature Points] area.

- [Target]: Check that this is set to [ALL].
- [Detection Pattern]: Select the pattern to project for detecting the feature points.
  - [Color]: Pattern recommended for a diffusion type white matte screen. Normally, select this.
  - [Monochrome]: Pattern recommended when using a screen with a narrow viewing angle such as a silver screen or when the camera cannot be placed in front of the screen.
- [Start Detection]: Click this button to start detection. When the process completes, the feature point detection result is displayed in the [Feature Point Detection Status] area and [Detect Result] area. Check the result and perform the process again if necessary.

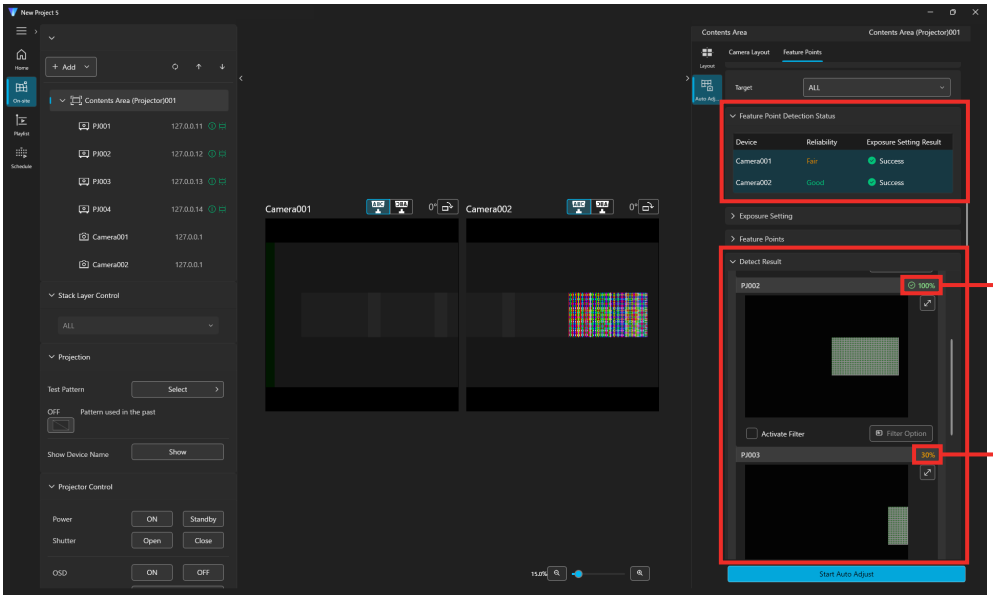
Note

- [Monochrome] may not be supported depending on the model. [Monochrome] can be selected only when it is supported by all of the projectors linked to the content area.



Checking the feature point detection result judgment

After the feature points have been detected, you can check whether a sufficient detection result was obtained.



1 Check the indication in [Reliability] of the [Feature Point Detection Status] area.

Indication	Description
---	Camera is not registered or no feature point detection history
Error	There is a projector for which feature point detection failed
Poor	Feature point detection rate is less than 10%
Fair	Feature point detection rate is 10% or more but less than 50%
Good	Feature point detection rate is 50% or more

The feature point detection rate is displayed for each projector in the [Detect Result] area.

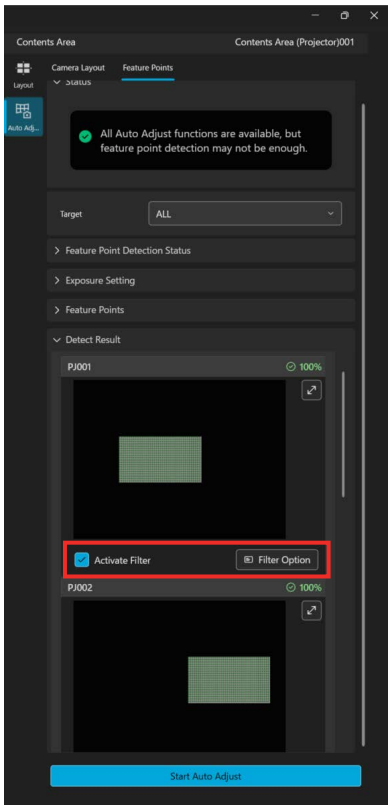
Note

- If there is a camera for which the indication in [Reliability] is “Poor” or “Fair”, automatic adjustment cannot start.
  Detection may have failed because the image projected from the projector significantly protruded outside the screen or was not within the capture range of the camera. If necessary, reinstall the projectors and cameras, and perform feature point detection again.

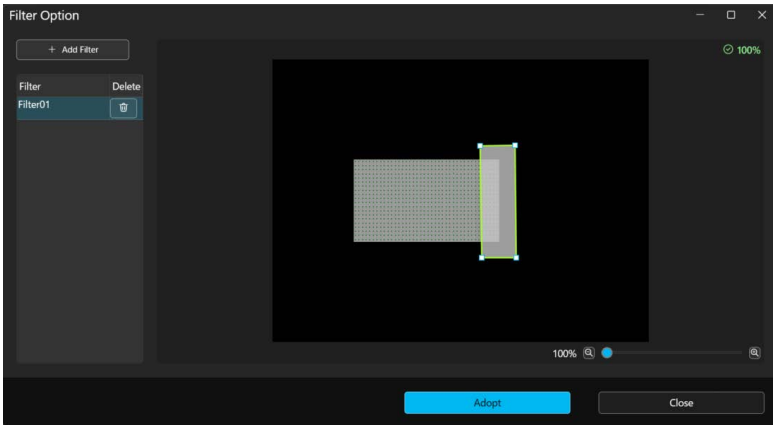
Filter option

Some of the green detection points on camera images may be positioned outside of the screen. If that happens, you may be able to obtain a better automatic adjustment result by using the filter option and setting the filter to the position of the detection points you want to exclude that are outside of the screen.

To use the filter option, place a check mark in the [Activate Filter] checkbox, then click [Filter option].



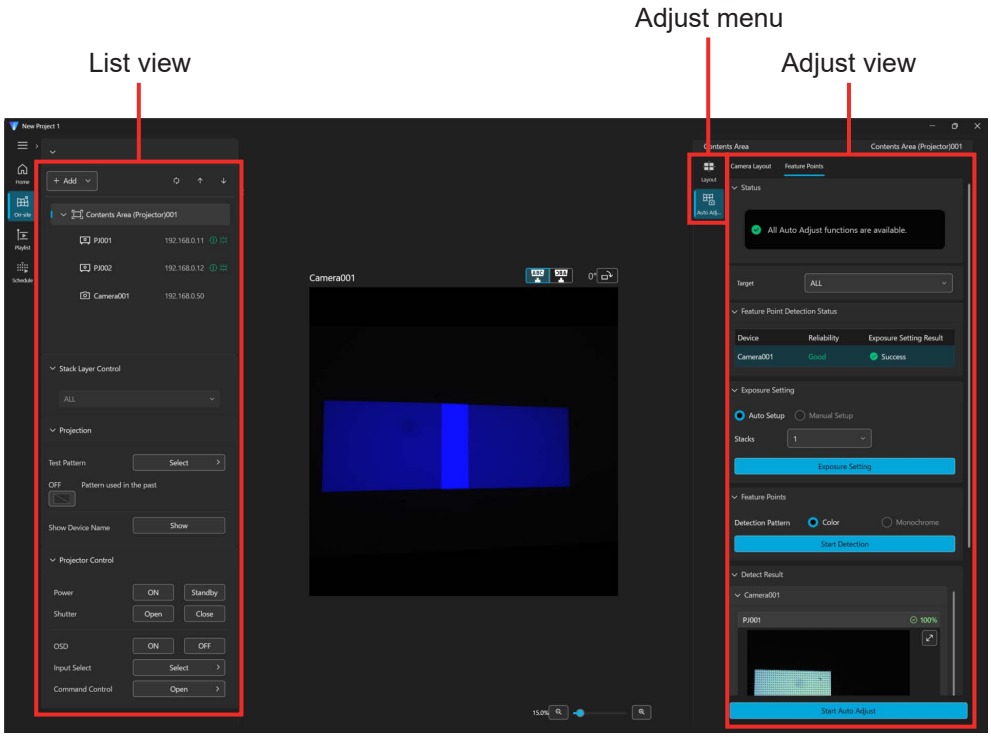
If you click the [Add Filter] button, the rectangular filter is added. If you place the filter on the detection points that are outside of the screen and click [Adopt], feature point detection is recalculated and the detection result is displayed.



Next, adjust the screen using the feature points obtained by detection.

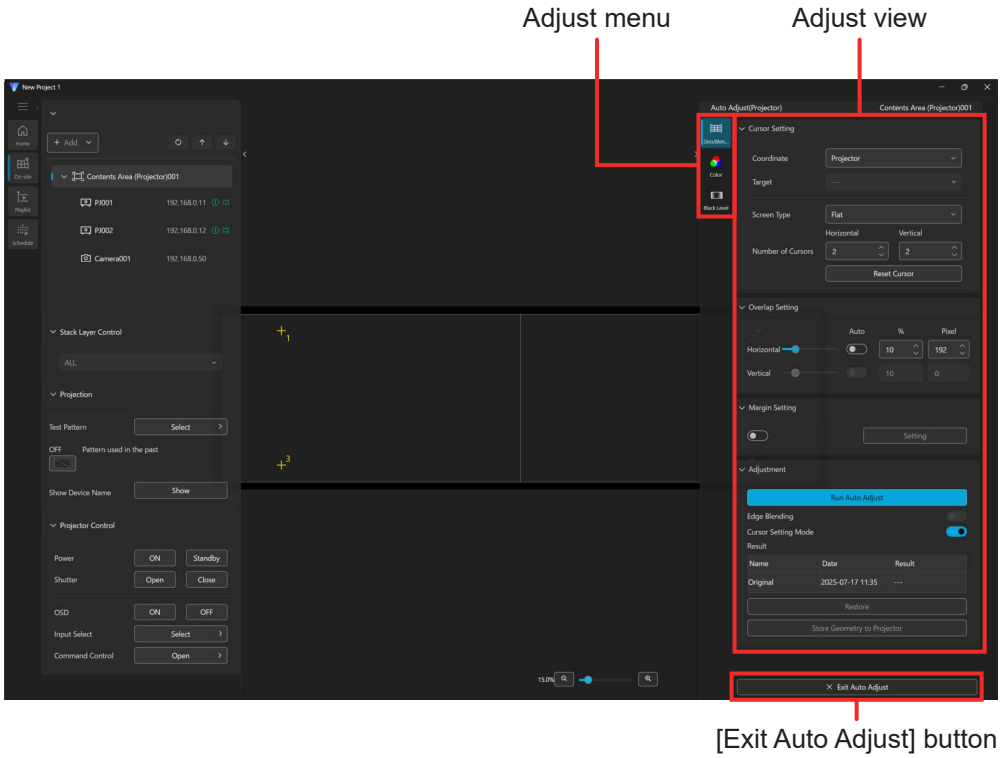
Performing screen adjustment

Perform screen adjustment when feature point detection is finished.



1 Click the [Start Auto Adjust] button in the Adjust view.

Displays the [Auto Adjust(Projector)] screen.



[Auto Adjust(Projector)] screen

Adjust menu

- [Geo/Blending]: Geometry correction / edge blending (➡ page 32)
- [Color]: Color matching (➡ page 38)
- [Black Level]: Black level adjustment (➡ page 42)

Adjust view

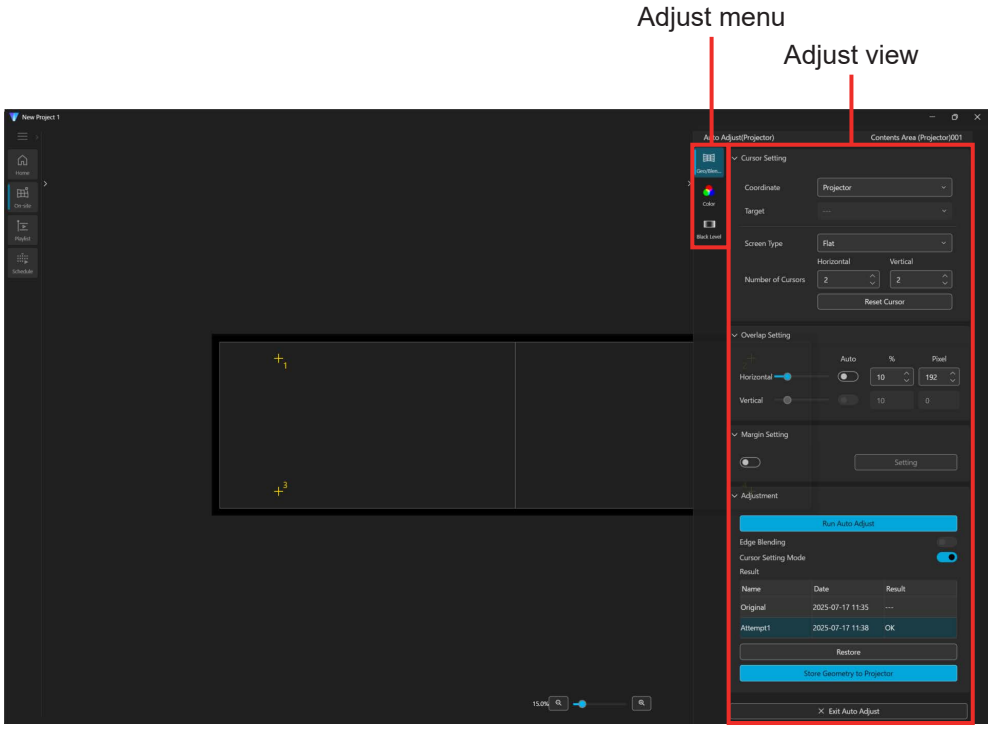
The setting items for the screen adjustment area are displayed in accordance with the button clicked in the Adjust menu.

[Exit Auto Adjust] button

Click this button to close the [Auto Adjust(Projector)] screen.

Geometry/edge blending

Adjust the geometry correction and the edge blending.



1 **Click [Geo/Blending] in the Adjust menu.**

[Cursor Setting] area, [Overlap Setting] area, [Margin Setting] area and [Adjustment] area are displayed in the Adjust view.

2 **Make the following adjustments in the Adjust view.**

- [Cursor Setting] area: Arrange the cursors according the screen shape to be projected.
  ➡ “Settings in [Cursor Setting]” (page 34)
- [Overlap Setting] area: Configure the settings for the area to overlap horizontally and vertically (edge blending).
  ➡ “Settings in [Overlap Setting]” (page 36)
- [Margin Setting] area: Configure the settings of the margin areas if, for example, there are margins in the content image to be projected.
  ➡ “Settings in [Margin Setting]” (page 36)

3 **After making adjustments in each area, click the [Run Auto Adjust] button.**

Automatic adjustment of the geometry correction and edge blending is performed, and the result is sent to the projector.

Note

- At this point in time, the geometry correction data is not saved to the memory of the projector. To save it, go to step 5.

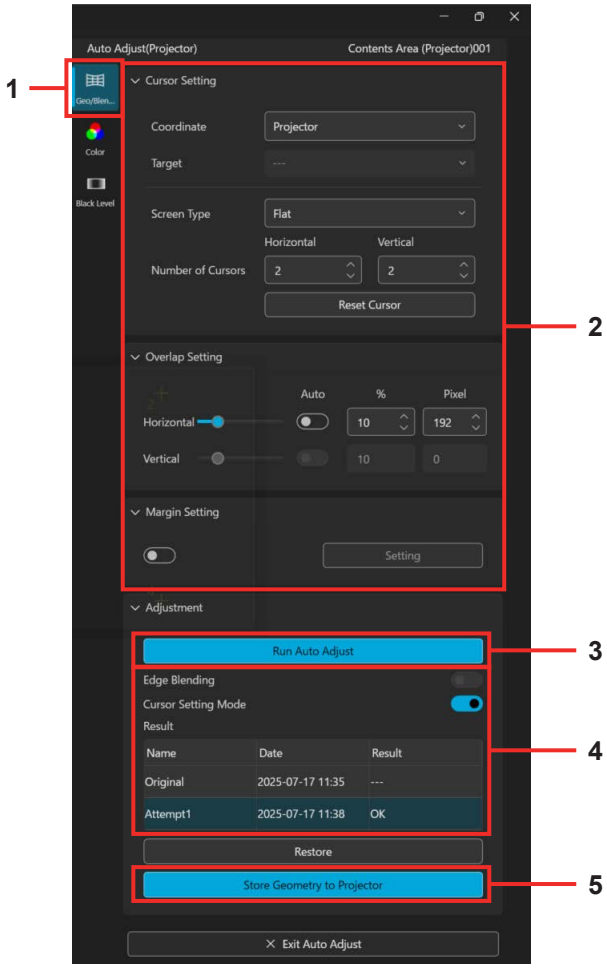
4 Check the images after auto adjustment in the [Adjustment] area, and perform automatic adjustment again if necessary.

Select [Test Pattern] in the List view or input a test pattern signal that has been prepared in advance to the projector to check the projected image for any misalignment or distortion.

- [Edge Blending]: The projected image without edge blending applied can be checked by disabling this item. The projected image with edge blending applied can be checked by enabling this item.
- [Cursor Setting Mode] switch: If you are not satisfied with the result, enable this item and correct the adjustment values of each area, then perform automatic adjustment again (repeat steps 2 to 3).
- [Result]: The execution result of automatic adjustment of the geometry correction and edge blending is displayed as history. If you click history and then click the [Restore] button, the execution result of that time is sent to the projector and the cursor settings are recalled.

5 When the desired adjustment result is achieved, click the [Store Geometry to Projector] button.

When the dialog box to select the location to save the data of geometry correction appears, select from [PC-1], [PC-2], and [PC-3] and click the [Save] button.



■ Settings in [Cursor Setting]

1 Select the setting method of the screen in [Coordinate] and [Target].

- [Coordinate]: Select [Projector] to check the cursor positions in the actual screen or [Camera] to check them in a screen on an image captured by the camera. When [Camera] is selected, the items of [Target] can be selected.
- [Target]: When using multiple cameras, there is the method to check each one in the image captured by each camera, and the method to check in a large image created by stitching each of the images into one.
  If you select a camera name from the list, the captured images of that camera are displayed in the main view.
  If you select [Stitched Image] from the list, a stitched image is displayed in the main view.

Note

- If [Target] is set to a single camera when using multiple cameras, [Screen Type] and [Number of Cursors] described later cannot be changed because the positions of all cursors cannot be checked. If they need to be changed, switch [Stitched Image] or [Coordinate] to [Projector].

2 Select the shape of the screen in [Screen Type].

Select the screen type that matches the shape of the screen.

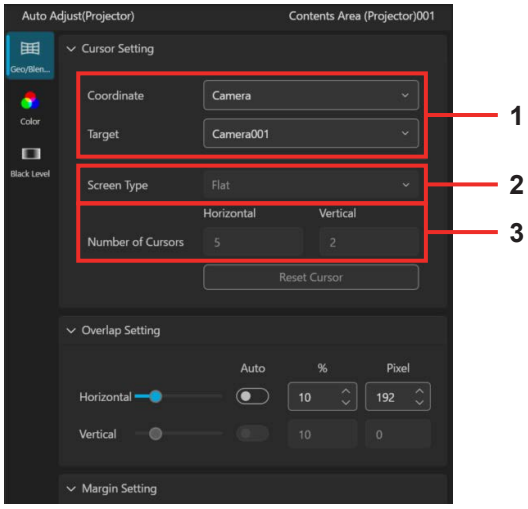
- [Flat]: Flat screen
- [Horizontal Curve]: Screen that is curved in the horizontal direction
- [Vertical Curve]: Screen that is curved in the vertical direction
- [H-V Curve]: Screen that is curved in the horizontal and vertical directions

3 Specify the number of cursors in [Number of Cursors].

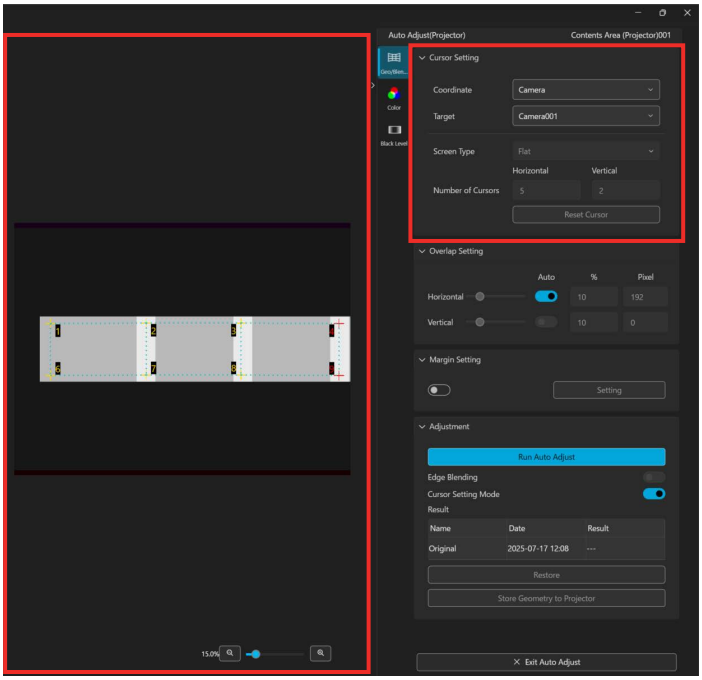
The number of cursors that can be set is a total of 300, with 2 or more per edge.

Note

- The number of cursors calculated from the number of projectors and layout information is set automatically immediately after the [Cursor Setting] area of the Adjust view is displayed. This value is merely supposed to serve as a guide. Change it to match the shape or curvature of the actual screen.



4 Position the cursors on the screen displayed in the main view according to the shape of the actual screen.



Note

- The amount of geometric correction is calculated based on the assumption that the actual spacing between the placed cursors is uniform. Therefore, ensure that the cursors are arranged so that there are no significant differences in spacing between them. If there are parts with extremely different spacing, you may not be able to obtain the intended adjustment results. It is recommended to measure and mark in advance to ensure that the cursors are evenly spaced when placed.

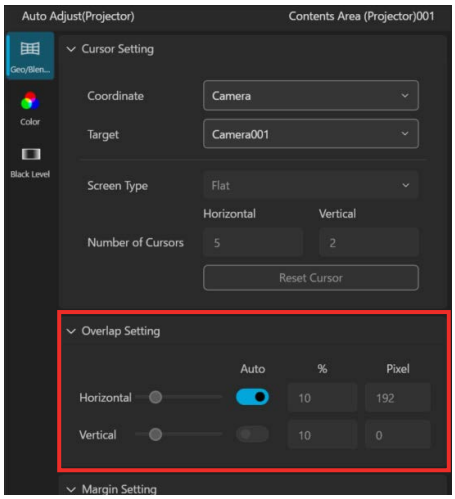
Cursor layout operations

- Position each cursor by dragging them or by using the arrow keys on the keyboard. When using the keyboard, pressing an arrow key while a cursor is selected moves the cursor 8 dots, pressing an arrow key while holding the Ctrl key moves the cursor 1 dot, and pressing an arrow key while holding the Alt key moves the cursor 64 dots.
- A cursor can be selected by clicking it.
- You can select the next cursor by pressing the Tab key, or the previous cursor by pressing the Tab key while holding the Shift key.
- You can also select cursors using the number keys on the keyboard.
- To return all cursors to their original positions, click [Reset Cursor].
- The upper limit for the number of cursors displayed on the screen is 100. The cursors change color in units of 100. At that time, the cursor number is indicated using a maximum of two digits, with any 100th/200th/300th cursor number displayed as “0”.

Cursor	Color	Cursor number display
1 to 100	Yellow	1, 2, 3, ……99, 0
101 to 200	Cyan	
201 to 300	Magenta	

When you want to switch the display to a different color cursor, enter the corresponding cursor number with the keyboard number keys. For example, if you want to display a cyan cursor during the display of a yellow cursor, enter any number within the range of 101 to 200. Furthermore, while the 100th cursor is selected, you can display a different color cursor by pressing the tab key to select the 101st cursor.

■ Settings in [Overlap Setting]



- [Horizontal]: Set for the area to overlap in the horizontal direction.
- [Vertical]: Set for the area to overlap in the vertical direction.
- Enter numerical values in the [%] or [Pixel] fields. When either numerical value is changed, the other numerical value is changed in conjunction. The values can also be set using the slide bars.
- To set the area to overlap automatically, enable the [Auto] toggle button. When auto adjustment is run, the set values are displayed in the [%] and [Pixel] fields.

■ Settings in [Margin Setting]

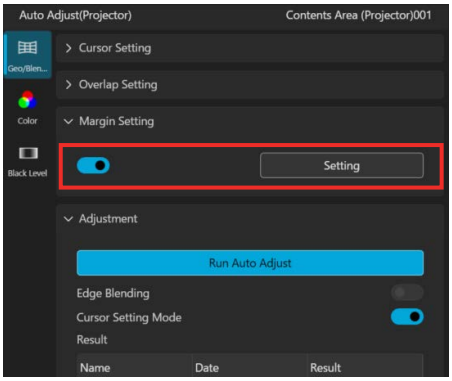
Set the [Margin Setting] area if, for example, the content to be projected has margins. Configuring the margin settings makes it easier to position the cursors when configuring screen settings.

Note

- Setting of straight margins is possible. Setting of curved margins is not possible.

1 Enable [Margin Setting], and click the [Setting] button.

Set the state of the toggle button to  .



When you click the [Setting] button, the [Margin Setting] screen is displayed.

2 **Select the margin adjustment unit in [Scale].**

Select the adjustment unit for configuring the margin settings. When [Pixel] is selected, you need to enter the overall size of the content video to be projected.

3 **Specify the margin size for each edge.**

Enter the ratio (as a percentage) relative to the overall size of the content video to be projected (including the margin areas), or enter the number of pixels (in pixels). However, the margins that can be set are up to a total of 60% per edge.

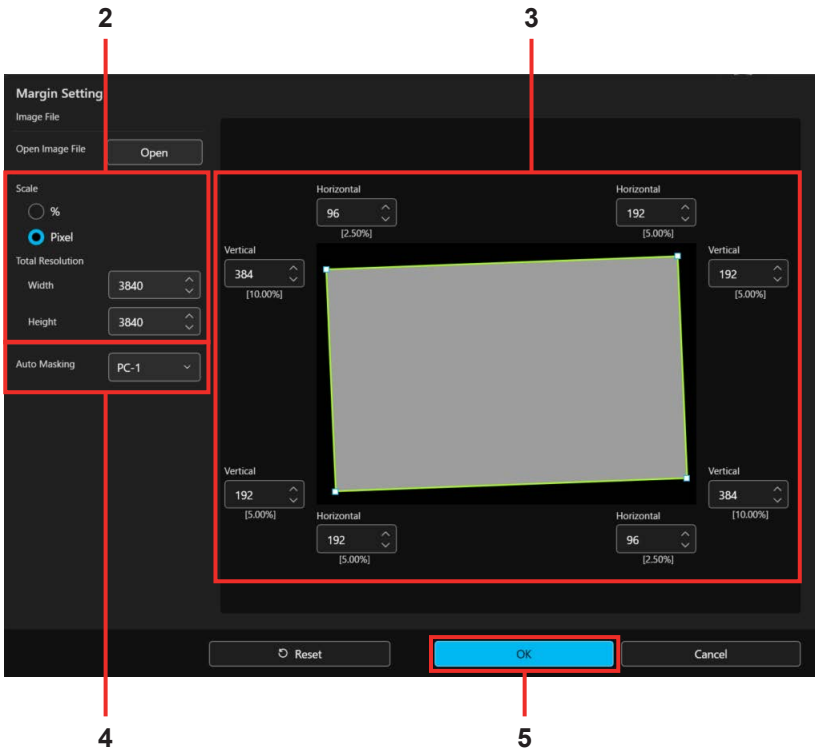
Note

- If you click the [Reset] button, the set margin sizes are restored to the initial values (0% for each edge).
- Click [Open] of [Open Image File] to read an image file for reference (extension: bmp, jpg, jpeg or png).

4 **Select whether or not to perform auto masking together with the set margins in [Auto Masking].**

- [OFF]: Auto masking is not performed.
- [PC-1 / PC-2 / PC-3]: Auto masking is enabled and saved for the specified location.

5 **After setting of the margins is finished, click the [OK] button to close the [Margin Setting] screen.**

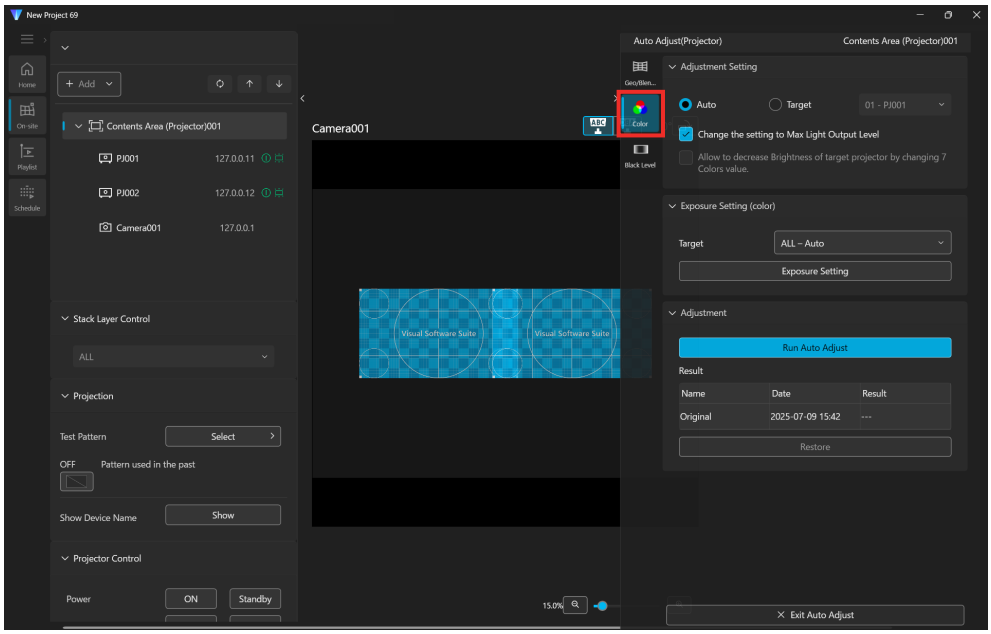


Color matching

When joining the projection screens of multiple projectors, this function performs adjustments automatically to make the differences in the color of the screen join parts less noticeable.

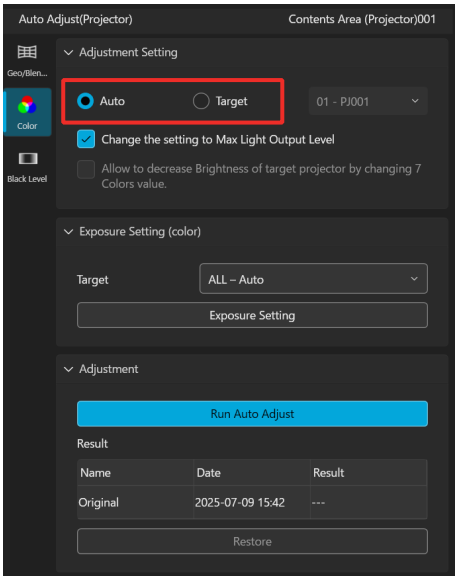
1 Click [Color] in the Adjust menu.

[Adjustment Setting] area, [Exposure Setting (color)] area and [Adjustment] area are displayed in the Adjust view.

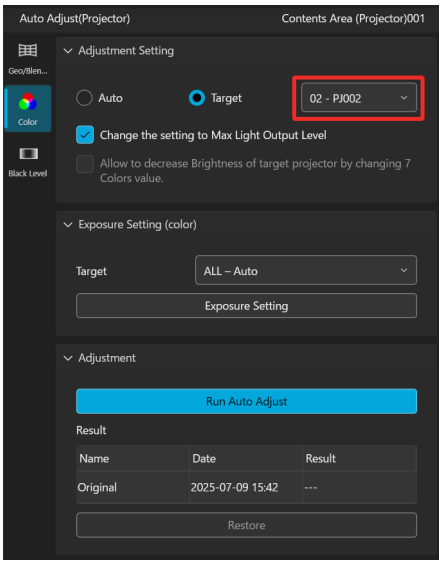


2 Configure the settings in the [Adjustment Setting] area.

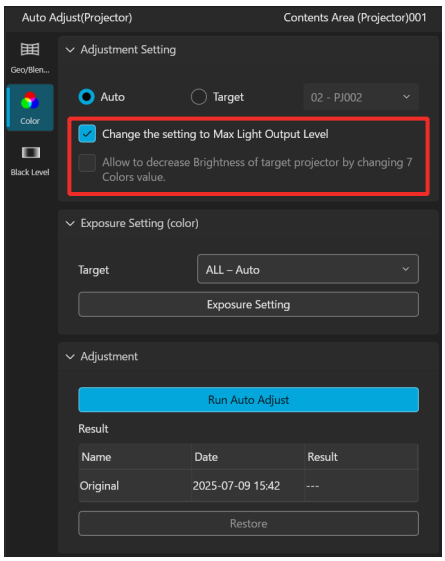
① Select [Auto] to perform the optimal adjustment for the entire screen, and [Target] to set the projector that is to be the target (standard).



② If [Target] is selected, select the projector that is to be the target.

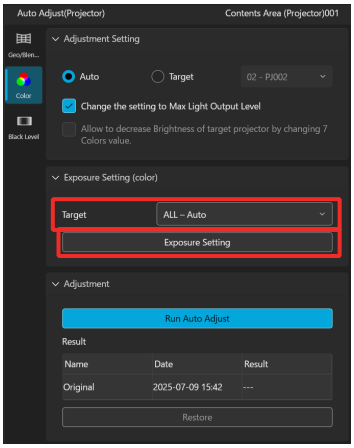


③ For the setting with a check box, adjustment can be made without changing that setting by clearing the check box.

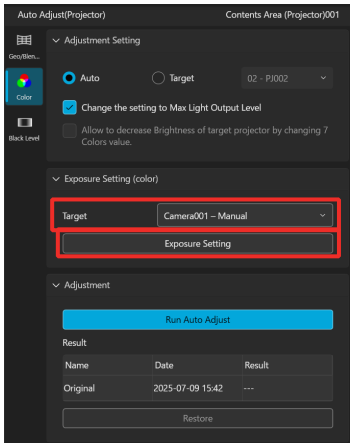


3 If necessary, configure the exposure settings.

① To configure the exposure settings of all cameras automatically, select [ALL – Auto] in [Target] and click the [Exposure Setting] button.

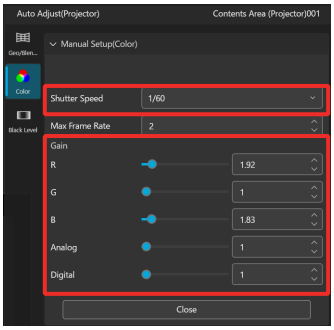


② To configure the exposure settings of each camera manually, select the camera you want to adjust in [Target] and click the [Exposure Setting] button.

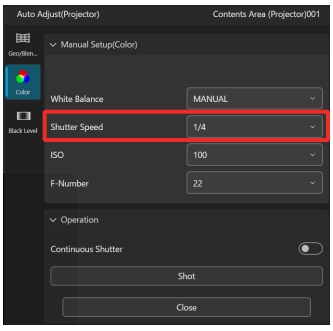


Depending on the camera used, one of the following screens is displayed and you can set the exposure.

For camera with network connection

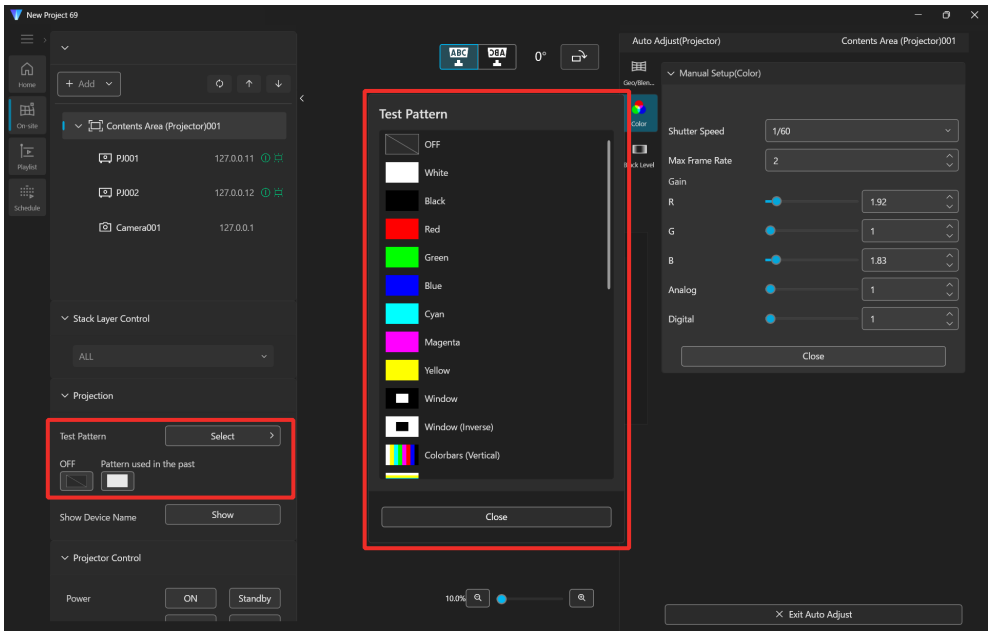


For camera with USB connection



- [Shutter Speed]: Specify the shutter speed for the camera.
- [Gain]: Specify the gain for the camera. This can be set only for a camera with a LAN connection.

To configure the exposure settings manually, switch the projector test pattern in the screen displayed by clicking [Test Pattern] or by clicking [Pattern used in the past] in the List view as necessary.

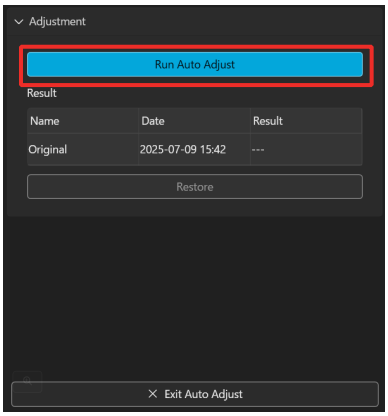


- [Test Pattern]: Displays a list of the test patterns. Select any test pattern to switch the test pattern of all projectors linked to the content area.
- [OFF]: Turns off the projection of the test pattern of all projectors linked to the content area.
- [Pattern used in the past]: Displays the test pattern used most recently. The selected test pattern is projected from all projectors linked to the content area.

③ When configuring the exposure settings manually is finished, click the [Close] button to close the [Manual Setup(Color)] screen.

4 Click the [Start Auto Adjust] button.

Automatic adjustment of the color matching begins. When adjustment finishes, the adjustment result is displayed in [Result].



Note

- If you click the [Start Auto Adjust] button to run automatic adjustment of the color matching, those results are displayed in [Result] in order. Clicking a past adjustment result in [Result] and then clicking the [Restore] button allows you to return to the last adjustment result.

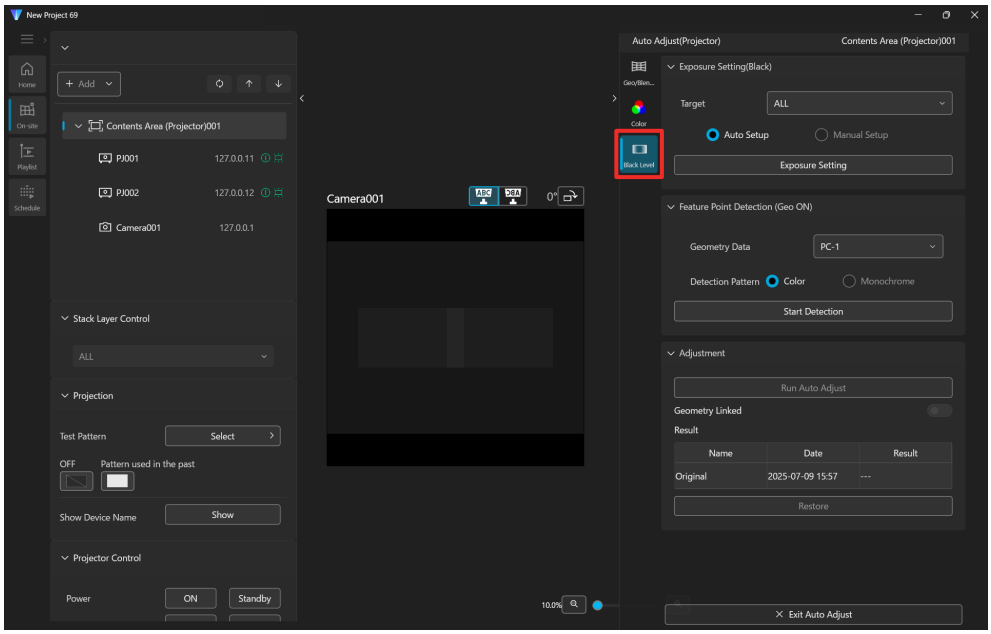
5 Click the [Exit Auto Adjust] button.

Black level adjustment

When joining the projection screens of multiple projectors, this function performs adjustments automatically to make the differences in the black level of the screen join parts less noticeable.

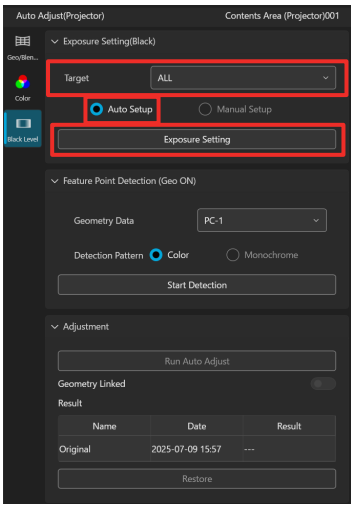
1 Click [Black Level] in the Adjust menu.

[Exposure Setting(Black)] area, [Feature Point Detection (Geo ON)] area and [Adjustment] area are displayed in the Adjust view.

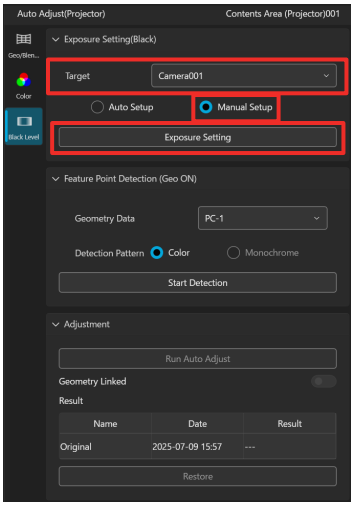


2 If necessary, perform exposure adjustment.

① Specify the target in [Target], then select [Auto Setup] and click the [Exposure Setting] button.
To configure the exposure settings of all cameras automatically, select [ALL] in [Target].
To configure the exposure settings for a specific camera automatically, select the camera you want to adjust in [Target].

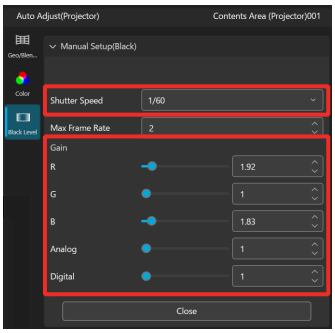


② When configuring the exposure settings of each camera manually, select the camera you want to adjust in [Target], select [Manual Setup], and click the [Exposure Setting] button.

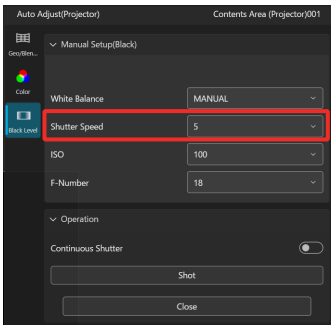


Depending on the camera used, one of the following screens is displayed and you can set the exposure.

For camera with network connection



For camera with USB connection



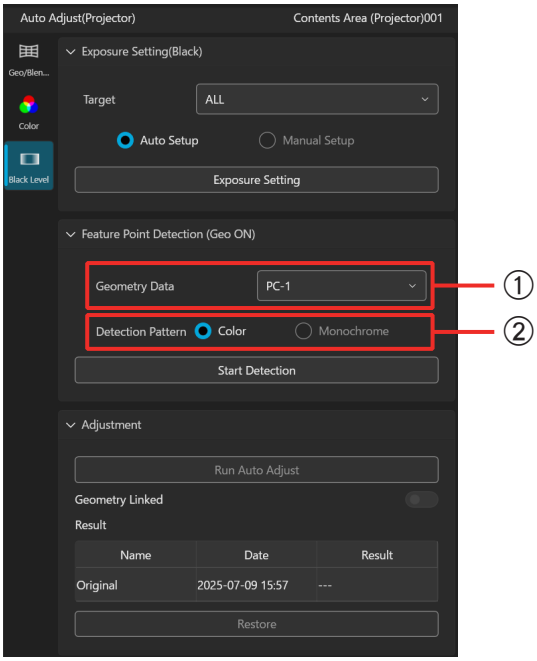
- [Shutter Speed]: Specify the shutter speed for the camera.
- [Gain]: Specify the gain for the camera. This can be set only for a camera with a LAN connection.

③ When configuring the exposure settings manually is finished, click the [Close] button to close the [Manual Setup(Black)] screen.

3 Perform feature point detection.

① Select [Geometry Data] that will actually be used.

② Select the detection pattern that matches the screen characteristics or camera layout from [Detection Pattern].

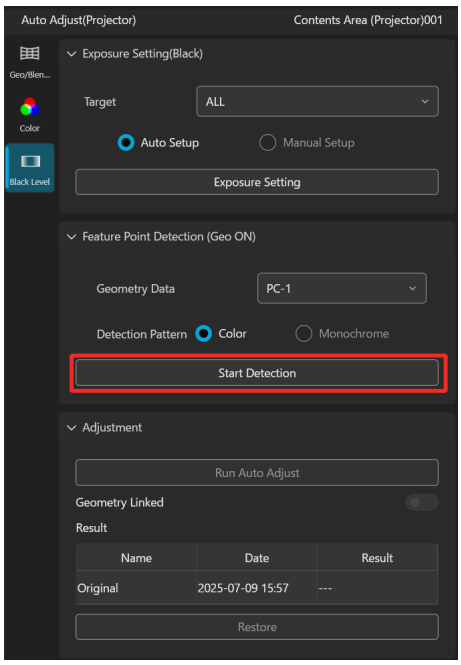


- [Color]: Pattern recommended for a diffusion type white matte screen. Normally, select this.
- [Monochrome]: Pattern recommended when using a screen with a narrow viewing angle such as a silver screen or when the camera cannot be placed in front of the screen.

Note

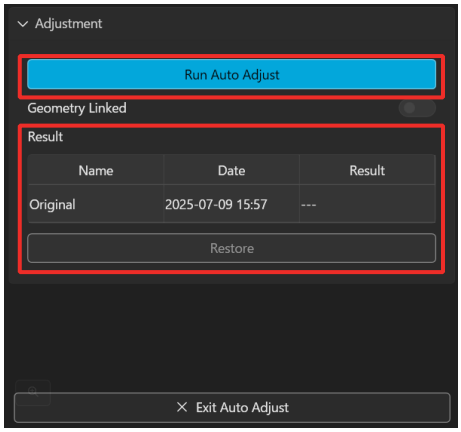
- [Monochrome] may not be supported depending on the model. [Monochrome] can be selected only when it is supported by all of the projectors linked to the content area.

③ Click the [Start Detection] button.

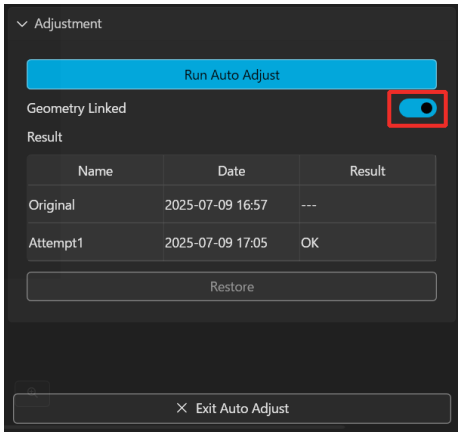


4 Click the [Start Auto Adjust] button.

① Automatic adjustment of the black level begins. When adjustment finishes, the adjustment result is displayed in [Result].



② For a model that allows you to specify the range of black level adjustment, you can switch the correction range of black level adjustment with the [Geometry Linked] toggle button to check the adjustment result.



- [Geometry Linked] : Switches to the state with black level adjustment performed only inside the video display area after geometry correction.
- [Geometry Linked] : Switches to the state with black level adjustment performed in an area also including outside the video display area.

If a model that does not allow you to specify the area of black level adjustment is included, it does not support this function.

Note

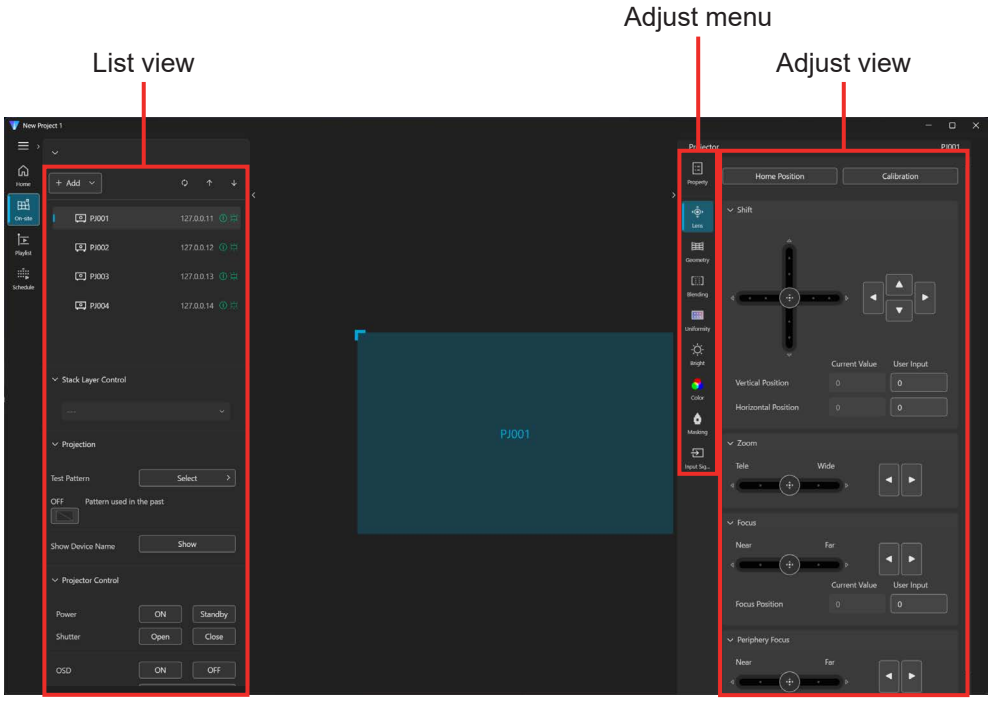
- When the projector layout has 2 or more projectors both horizontally and vertically, the adjustment result may become inappropriate if you switch [Geometry Linked] to  .
- If you click the [Start Auto Adjust] button to run black level adjustment multiple times, those results are displayed in [Result] in order. Clicking a past adjustment result in [Result] and then clicking the [Restore] button allows you to return to the last adjustment result.

5 Click the [Exit Auto Adjust] button.

Manual Adjust

Lens settings

Configure the lens settings so that the projected images will fit in the screen surface.



1 **Click the projector you want to adjust in the List view.**

2 **Click**  **[Lens] in the Adjust menu.**

Each of the [Home Position] and [Calibration] buttons and each of the [Shift], [Zoom], [Focus], and [Periphery Focus] areas are displayed in the Adjust view.

Note

- The [Periphery Focus] area is displayed only when a compatible model and compatible lens are combined.

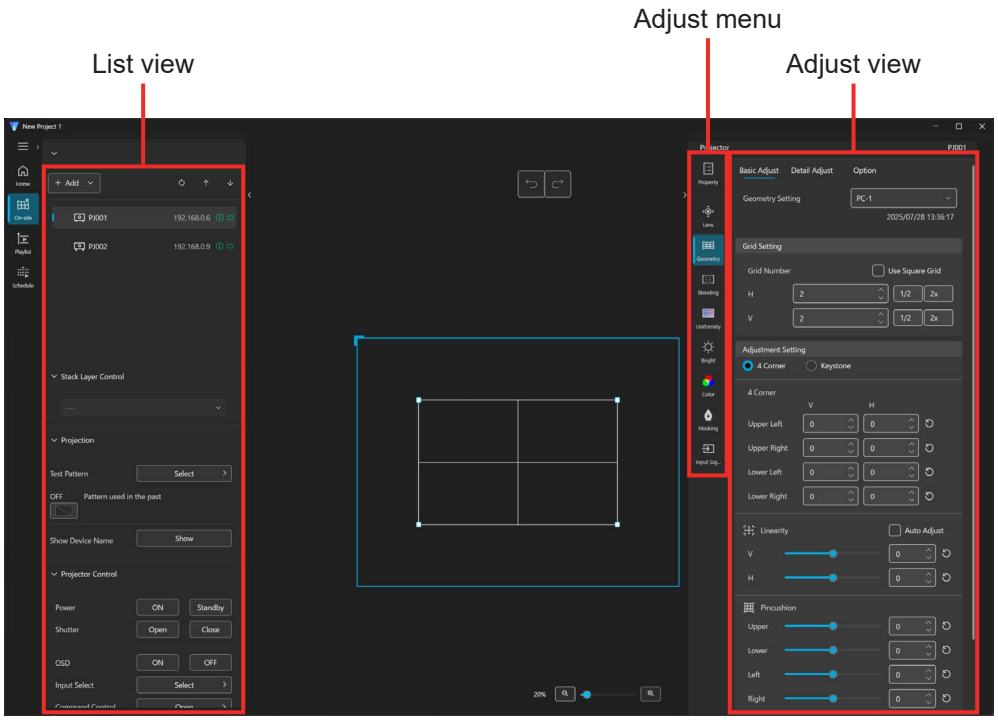
3 **Return the lens position to the home position or perform lens calibration if necessary.**

4 **Set each of the [Shift], [Zoom], [Focus], and [Periphery Focus] areas.**

Set the position of the lens by slider bar or button operation.

Geometry correction

Project test patterns, input signals, and grids onto the screen surface to correct the parts of the image that look unnatural.
The image can be made to look more natural by changing the number of grids and control points and making corrections.
Use the mouse to make rough adjustments, and use the cursor keys on the keyboard or input numerical values to make fine adjustments.



1 Click the output of the projector you want to adjust in the List view.

2 Click [Geometry] in the Adjust menu.

[Grid Setting] area and [Adjustment Setting] area are displayed in the Adjust view.

3 **Switch [Geometry Setting].**

The selected data is read from the projector and reflected in the main view.

4 **Set each item in the [Grid Setting] area.**

You can set the number of control points horizontally and vertically. The setting state can be checked in the main view.

If you place a check mark in [Use Square Grid], the combinations that can be set are limited.

If you click the [1/2] button or [2x] button, the numbers of control points are halved or doubled from the current settings.

5 **Adjust the image with the control points.**

Adjust the control points displayed in the main view on one of the following tabs.

[Basic Adjust] tab: Adjust the control points using a predetermined correction pattern. ➡ “Basic adjustment” (page 50)

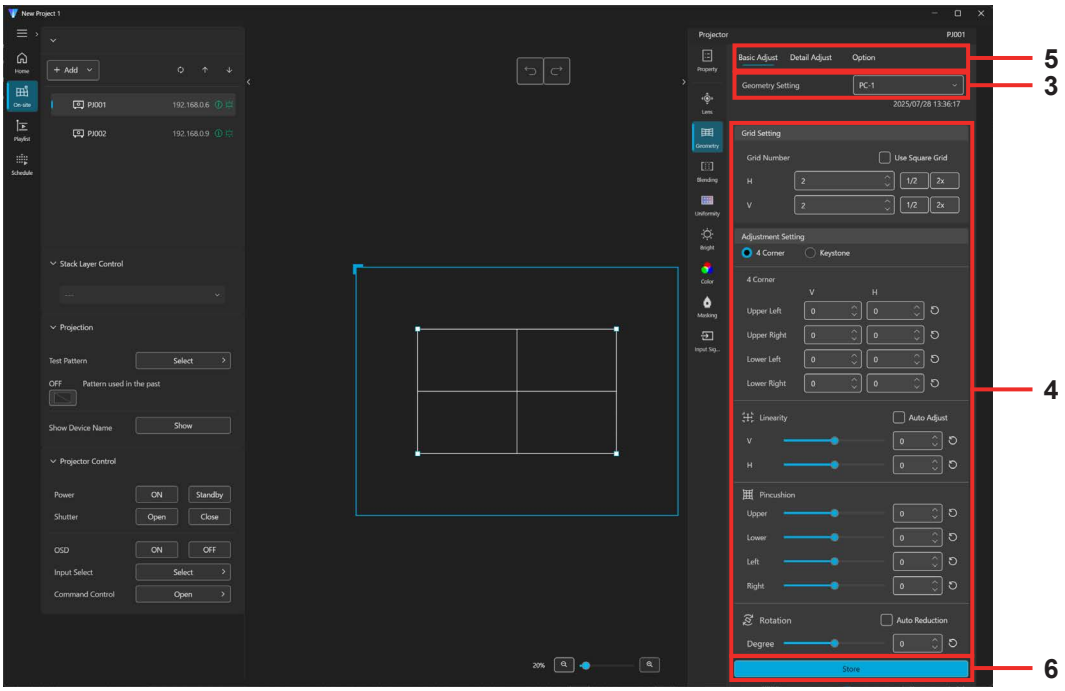
[Detail Adjust] tab: Adjust the control points as desired. ➡ “Detail adjustment” (page 53)

Note

- You can configure detailed settings for the display of control points on the [Option] tab. ➡ “Options” (page 55)

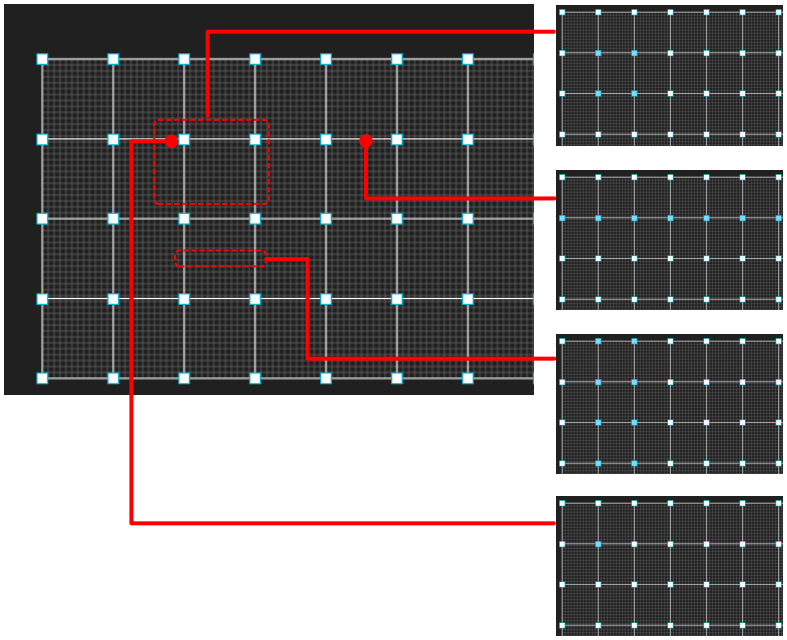
6 **Click the [Save] button.**

You can save the geometry correction data for which adjustment is complete to a projector. When the dialog box to select the save location appears, specify the save location and click the [OK] button.



Selecting a control point

Drag the control points to move them. The control points cannot be moved by selecting the lines.



Multiple control points can be selected by dragging and enclosing the points where the grids intersect.

The control points can be selected using lines by clicking the space between one point where the grids intersect and another such point.

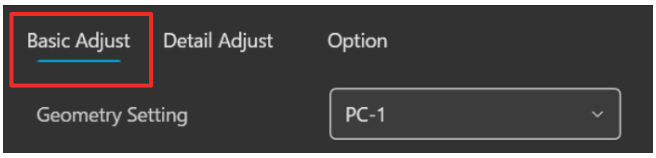
The control points can be selected using multiple lines by dragging and enclosing the spaces between one point where the grids intersect and another such point.

When a point where the grids intersect is clicked, it can be selected as a single control point.

Another control point can be selected while keeping the currently selected control point selected by clicking (or dragging) while holding down the Ctrl key.
To move the selection to the adjacent control point, press the Tab key or Shift + Tab keys while one control point is selected, or press the cursor key while holding down the Shift key.
To cancel the selection of the control point, click anywhere other than the grid with the mouse.

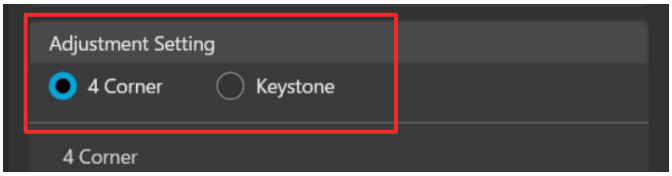
Basic adjustment

1 Click the [Basic Adjust] tab.



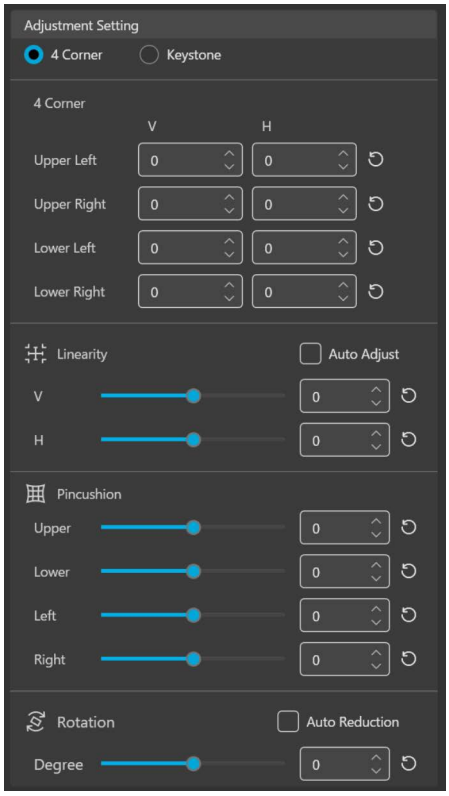
2 Select the correction pattern.

Select either [4 Corner] or [Keystone].



■ 4 Corner

Set the positions of the four corners of the image.



[Upper Left]/[Lower Left]/[Upper Right]/[Lower Right]
Set the horizontal and vertical positions of the upper left, lower left, upper right, and lower right.

[Linearity]
Set the linearity in the horizontal and vertical directions.
If a check mark is placed in [Auto Adjust], the linearity values are determined automatically from the positions of the upper, lower, left, right, and four-corner points. In this case, the values cannot be set.

[Pincushion]
Set the pincushion independently for upper, lower, left, and right.

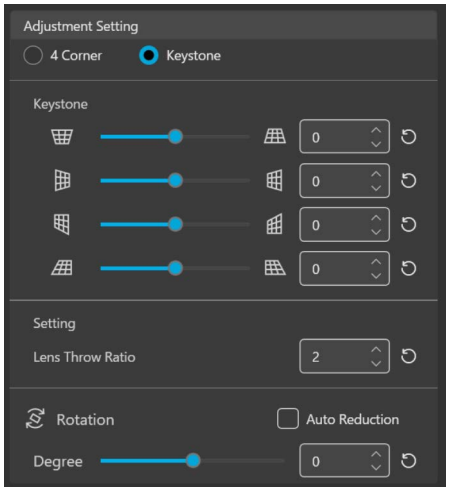
[Rotation]
Set the rotational angle of the image in [Degree].
If a check mark is placed in the [Auto Reduction] checkbox, the image is reduced to a size at which it can be projected when it exceeds the projection area.

Note

- If you click displayed for each adjustment item, the changed setting value is reset.
- The [Undo] and [Redo] operations can be performed from the toolbar of the main view.
  ➡ “Toolbar Undo/Redo” (page 54)

■ Keystone

Make corrections using a keystone as the reference.



[Keystone]

Displays the setting items for vertical, horizontal, vertical balance, and horizontal balance in order from the top of the setting items. Adjust the correction pattern for each of them.

[Setting]

Sets [Lens Throw Ratio].

[Rotation]

Set the rotational angle of the image in [Degree].

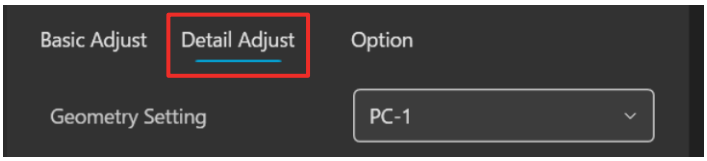
If a check mark is placed in the [Auto Reduction] checkbox, the image is reduced to a size at which it can be projected when it exceeds the projection area.

Note

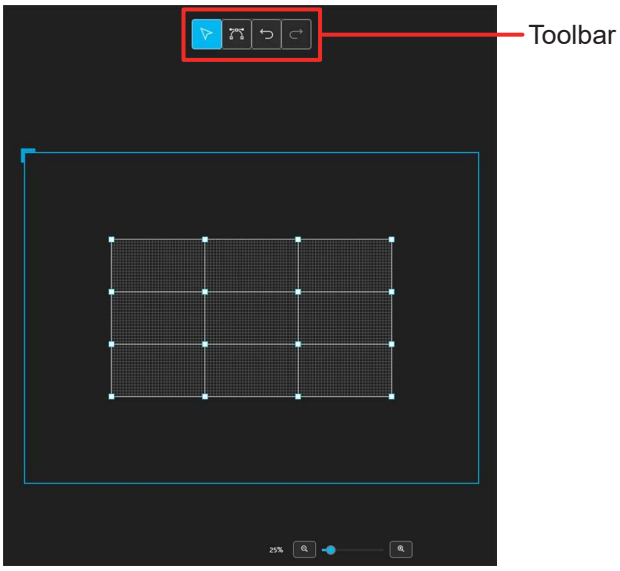
- If you click ↺ displayed for each adjustment item, the changed setting value is reset.
- The [Undo] and [Redo] operations can be performed from the toolbar of the main view.
  ➡ “Toolbar Undo/Redo” (page 54)

Detail adjustment

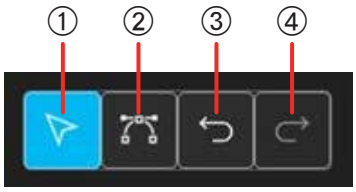
1 **Click the [Detail Adjust] tab.**



2 **Switch the mode on the toolbar of the main view.**



Toolbar



Click to perform the following operations.

① Select and move a control point.

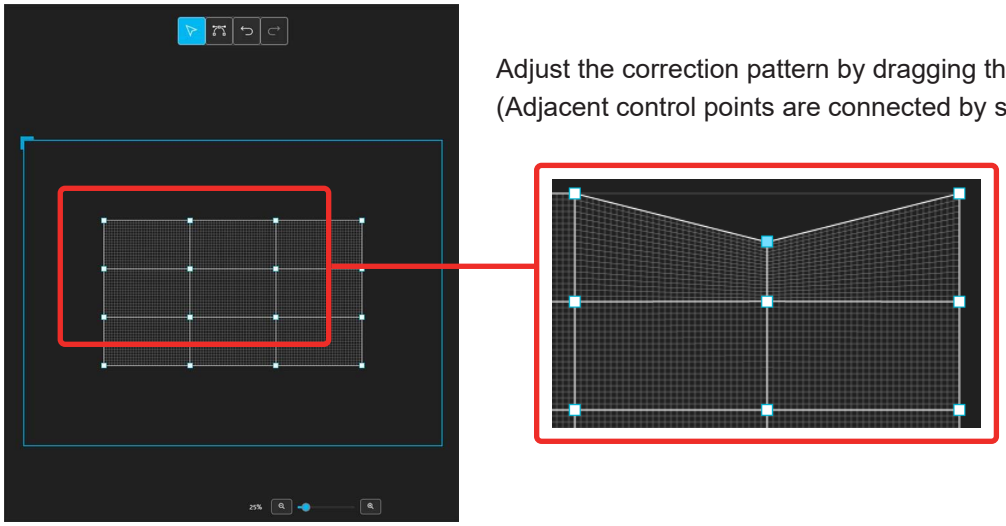
② Curve the edges around control points.

③ Undo: Discard the last editing operation and return to the state before it was performed. ➡ “Toolbar Undo/Redo” (page 54)

④ Redo: Return to the setting before the undo operation was performed. ➡ “Toolbar Undo/Redo” (page 54)

■ Grid mode

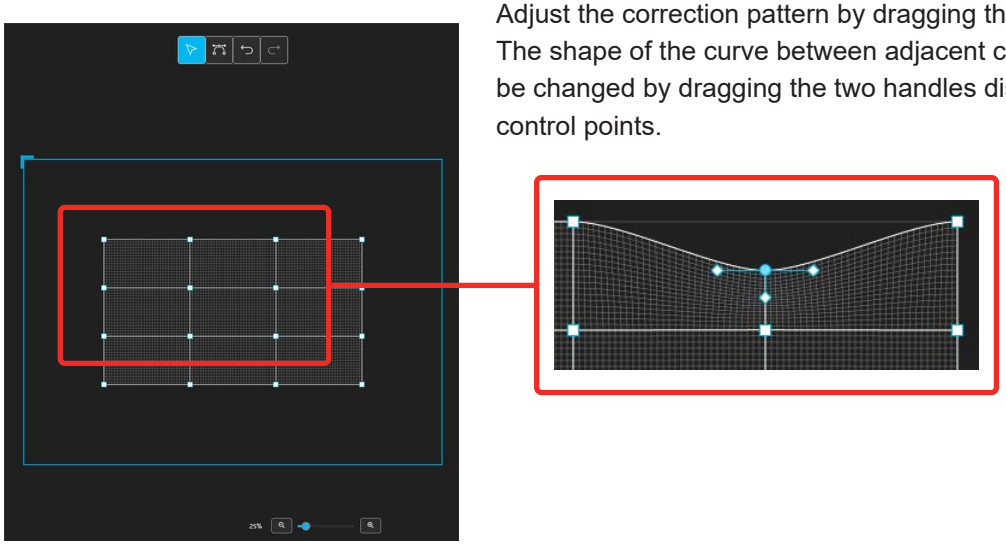
Make corrections by connecting between control points with straight lines.



Adjust the correction pattern by dragging the control points.
(Adjacent control points are connected by straight lines.)

■ Bezier curve mode

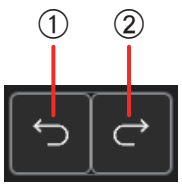
Make corrections by connecting between control points with smooth curves.



Adjust the correction pattern by dragging the control points.
The shape of the curve between adjacent control points can be changed by dragging the two handles displayed at the control points.

Toolbar Undo/Redo

In basic adjustment and detail adjustment, you can perform the [Undo] and [Redo] operations from the toolbar of the main view.



① Undo: Discard the last editing operation and return to the state before it was performed.
The operation can also be performed by using the keyboard shortcut “Ctrl” + “Z”.

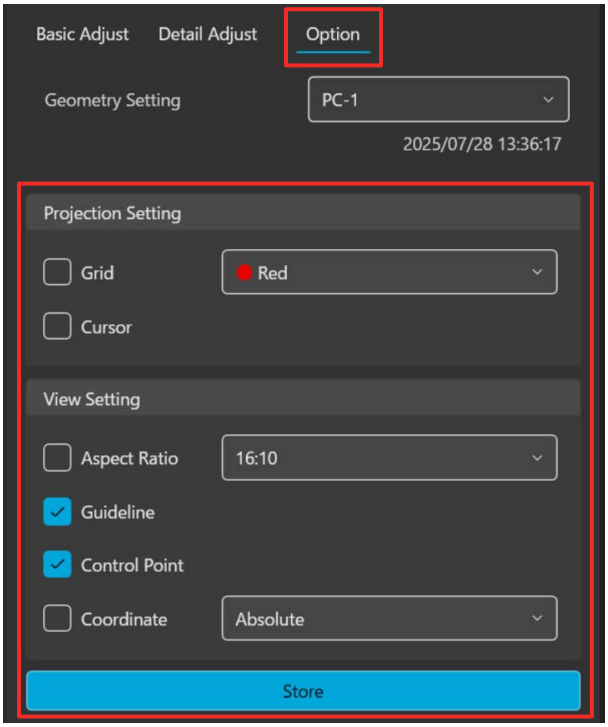
② Redo: Return to the setting before the undo operation was performed.
The operation can also be performed by using the keyboard shortcut “Ctrl” + “Y”.

Note

- When you go to an adjustment function other than geometry correction or when you switch the selection of a device registered in the List view, the history of editing operations is cleared.

Options

The [Option] tab allows you to configure settings related to the projected image and main view display.



[Projection Setting]

Configure settings for projected images.

- [Grid]: Specify whether to display a grid on projected images. The color of the grid can also be specified.
- [Display Cursor]: Specify whether to display an arrow to indicate the position of the selected control point on projected images.

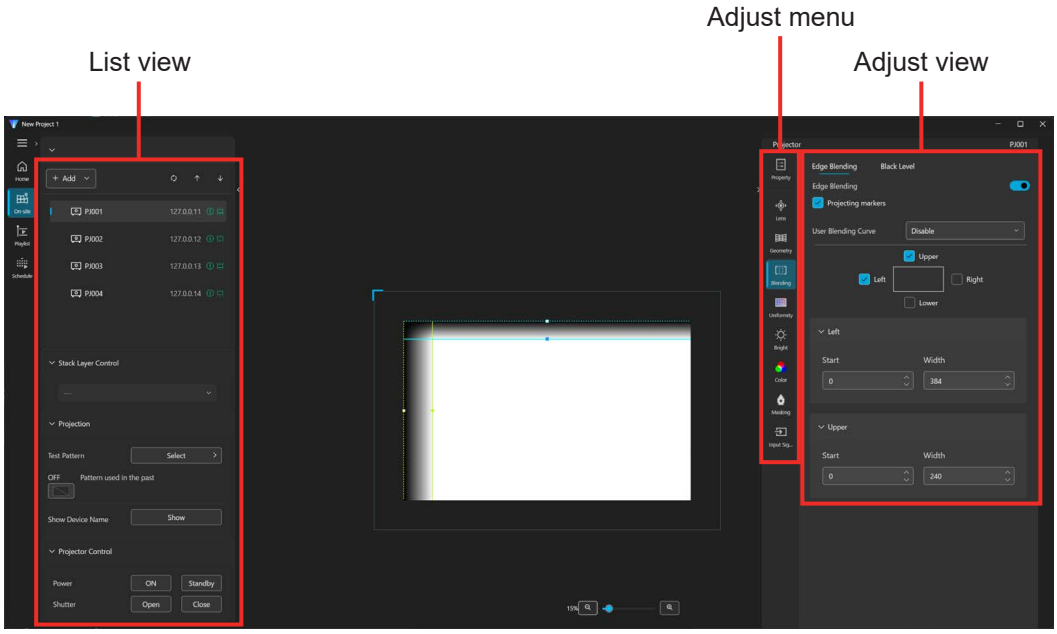
[View Setting]

Configure settings for main view display.

- [Aspect Ratio]: Set this when you want to perform geometry correction using the aspect ratio of the projected image.
- [Guideline]: Specify whether to display the guidelines in the main view.
- [Control Point]: Specify whether to display control points in the main view.
- [Coordinate]: Specify whether to display the coordinates of each control point. If you placed a check mark in the checkbox, select the display mode.
  - When [Absolute] is selected, the coordinates are displayed beside each control point treating the upper left control point as the origin.
  - When [Relative] is selected, the coordinates are displayed beside each control point treating the initial position of the selected grid control point as the origin.

Edge blending

The screen joins can be corrected when constructing a multi-screen by joining the projection screens of multiple projectors. Set the necessary joins at the top, bottom, left, and right of each projector by determining the start lines and width.



1 Click the projector you want to adjust in the List view.

2 Click [Blending] in the Adjust menu.

[Edge Blending] tab and [Black Level] tab are displayed in the Adjust view.

3 **Click the [Edge Blending] tab.**

4 **Enable [Edge Blending].**

Set the state of the toggle button to  .

5 **When setting the gamma curve of areas overlapped using edge blending (joins), select [Gamma] or [Curve] in [User Blending Curve] depending on the selected model.**

- If [Gamma] is selected, set a common gamma value for all of the edges to apply edge blending.
- If [Curve] is selected, set a gamma value for each edge to apply edge blending.

6 **Place check marks in the checkboxes for the edges (left edge / upper edge / right edge / lower edge) to apply edge blending, and then set the start line and width.**

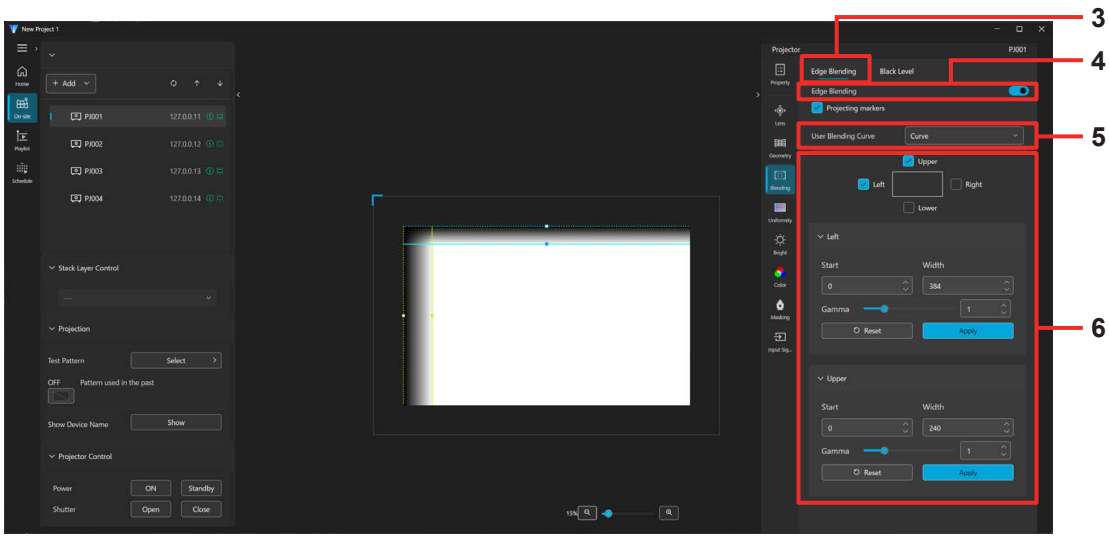
For example, when applying edge blending to the upper edge, place a check mark in the [Upper] checkbox and then set the following items displayed below [Upper].

- [Start]: Set the starting position for edge blending.
- [Width]: Set the width for edge blending. The end position of edge blending is determined according to the width specified here.

When also applying edge blending to other edges, set it in the same way.

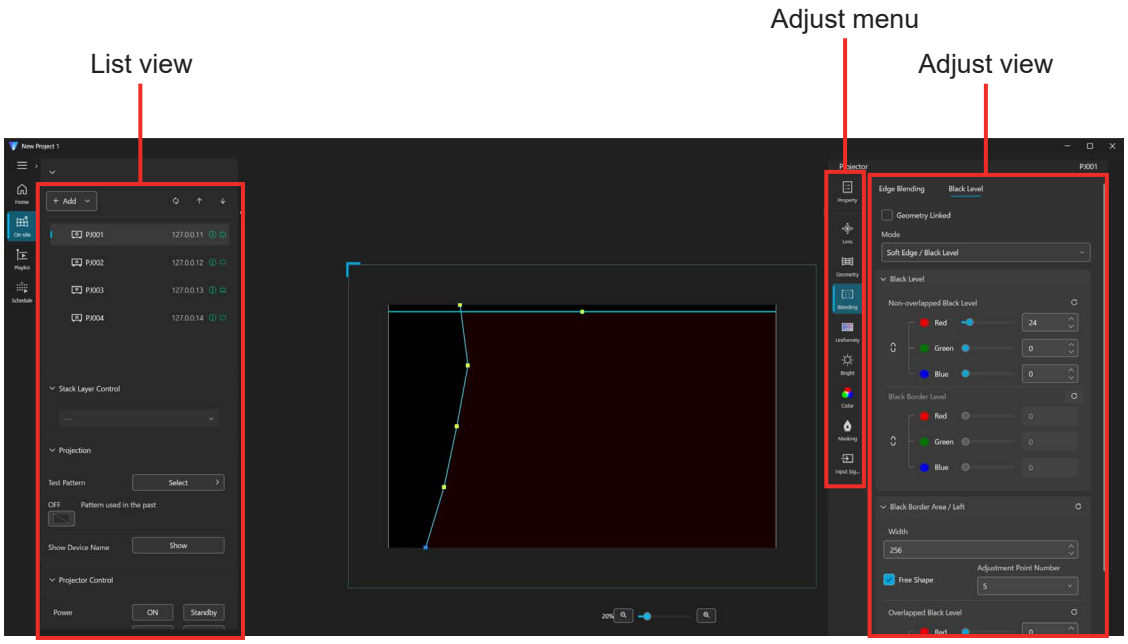
Note

- If you place a check mark in the [Projecting markers] checkbox, the start line and width for the edges to apply edge blending are displayed on the projected image.



Black level adjustment

If an image that is completely black is projected when a multi-screen has been constructed by joining the projection screens of multiple projectors, a screen join part may become brighter than other parts or differences in the brightness of black may be visible between projectors. By adjusting the black level, you can change the brightness level and coloring when black is projected onto any area of the projection screen of the projector, making the difference in black level less noticeable.



1 **Click the projector you want to adjust in the List view.**

2 **Click**  **[Blending] in the Adjust menu.**

[Edge Blending] tab and [Black Level] tab are displayed in the Adjust view.

3 **Click the [Black Level] tab.**

4 **Configure the settings for black level adjustment.**

- Select whether or not to link black level adjustment with geometry correction.
  To unlink from geometry correction, clear the check mark from the [Geometry Linked] checkbox. In this case, black level adjustment is performed for the entire area of the projected image.
  To link with geometry correction, place a check mark in the [Geometry Linked] checkbox. In this case, black level adjustment is performed within the area after geometry correction.
- Select the black level adjustment mode in [Mode].
  Select whether to perform black level adjustment and edge blending simultaneously or perform only black level adjustment.
- Configure the settings of the [Black Level] area.
  Set non-overlapped black level and black border level with RGB values.

Note

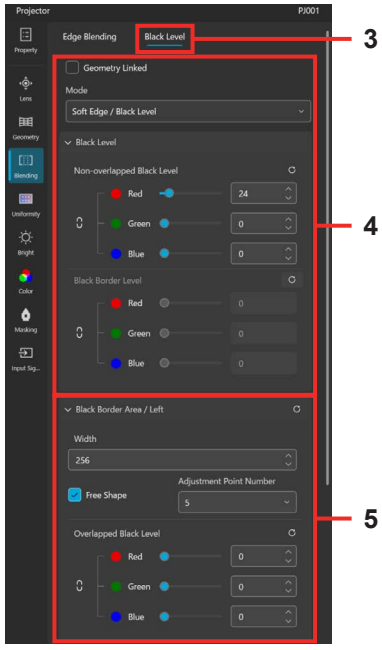
- If you click displayed for each adjustment item, the changed setting value is reset.
- Make the adjustments while the solid black pattern is projected from the projector as necessary. If you click [Test Pattern] in the List view and then select [Black] in the displayed screen, a solid black test pattern is projected.

5 **Configure the settings of the black border level shape and overlapped black level in the [Black Border Area] area for the edges to apply edge blending.**

Set the shape of the black border area in [Black Border Area Width] and [Keystone Area] or [Black Border Area Width] and [Free Shape], and set the overlapped black level with RGB values.

Note

- If you click displayed for each adjustment item, the changed setting value is reset.

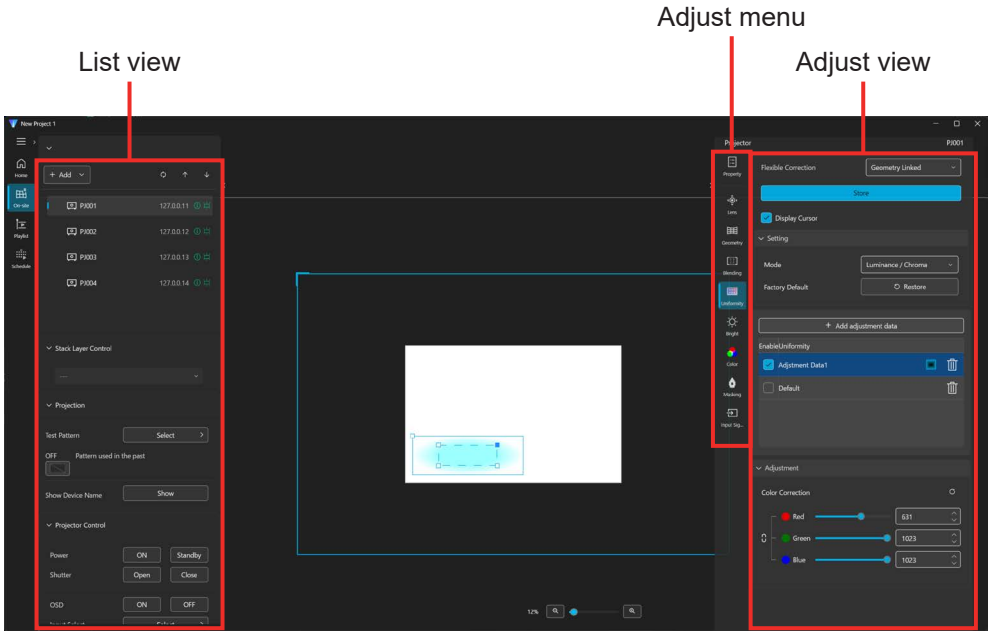


Uniformity

You can remove unevenness in colors and luminance and make the brightness within the images uniform. There are two correction methods depending on the projector model.

When DLP™ projector

Flexible correction can be made by specifying ranges for the localized unevenness in colors and luminance in the image.



1 **Click the projector you want to adjust in the List view.**

2 **Click**  **[Uniformity] in the Adjust menu.**

3 **Enable [Flexible Correction].**

Select whether or not to link with geometry correction.

- [Geometry Linked]: When geometry correction is performed, the correction area of uniformity is linked with the shape of that projected image.
- [Geometry Unlinked]: When geometry correction is performed, the correction area of uniformity is not linked with the shape of that projected image.

4 **Select the correction mode.**

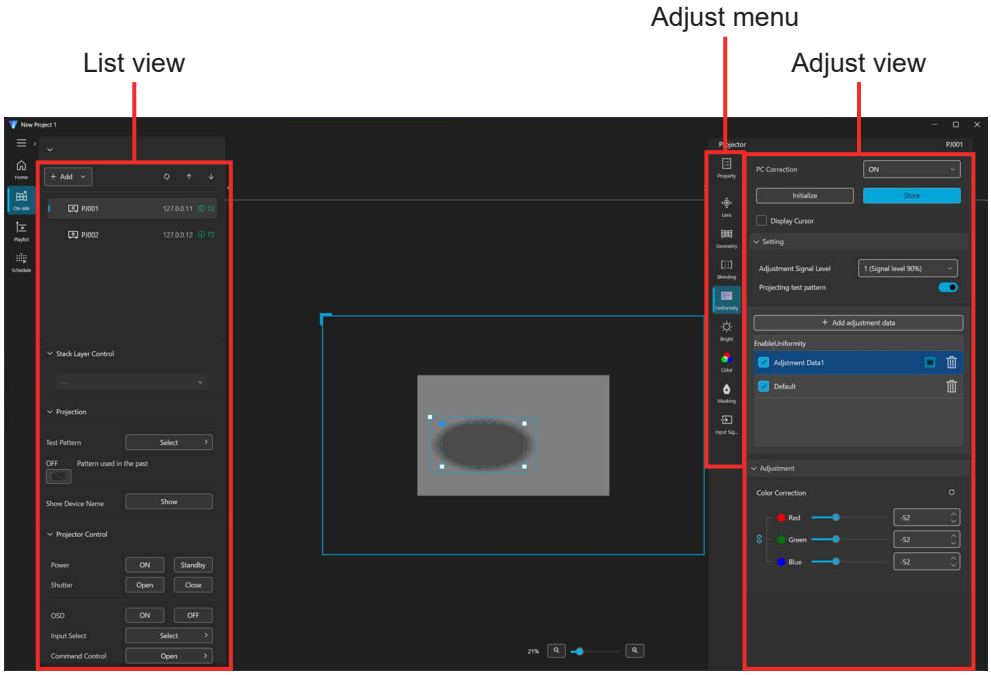
- [Chroma Only]: Adjusts color unevenness. Select this when giving priority to the brightness of the entire projected image.
- [Luminance / Chroma]: Adjusts the unevenness in colors and luminance.

5 **Add adjustment data in the Adjust view and set the area to adjust in the main view, and then set the correction values displayed in the Adjust view with RGB values.**

6 **Repeat step 5 until correction is complete, and then click the [Save] button.**

When LCD projector

PC correction can be made by specifying ranges for the localized unevenness in colors and luminance in the image.



1 **Click the projector you want to adjust in the List view.**

2 **Click**  **[Uniformity] in the Adjust menu, and then configure the settings.**

3 **Select the signal level to adjust in the [Setting] area.**

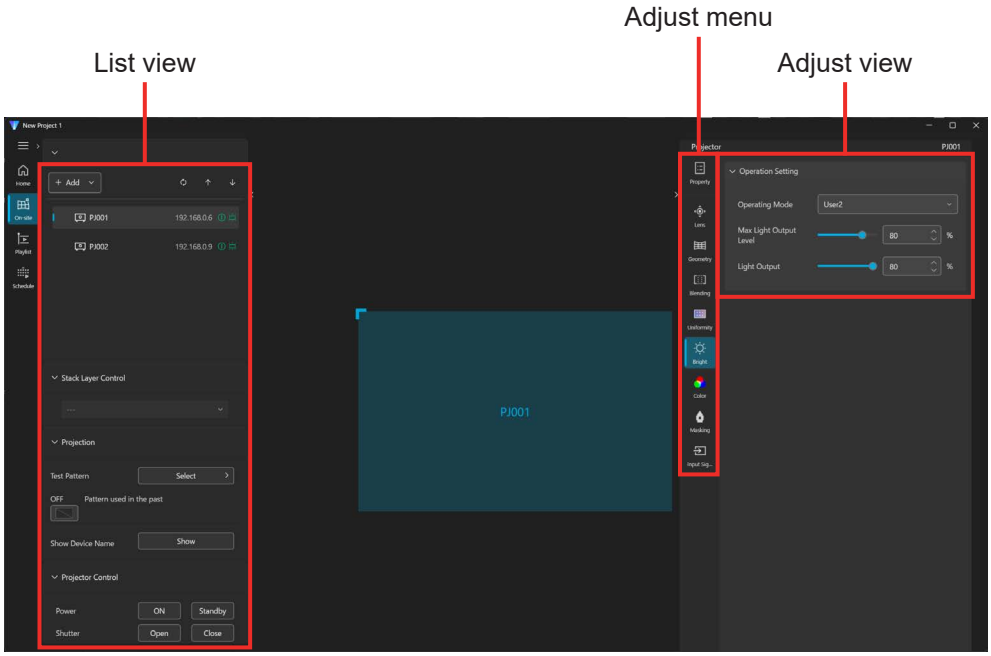
If you enable [Projecting test pattern], a test pattern of the signal level is projected according to the selection of [Adjustment Signal Level].

4 **Add adjustment data in the Adjust view and set the area to adjust in the main view, and then set the correction values displayed in the Adjust view with RGB values.**

5 **Repeat steps 3 to 4 until correction is complete, and then click the [Save] button.**

Brightness adjustment

When constructing a single image using multiple projectors, the brightness (luminance) of the images projected from the projectors may not match. If this is the case, you can match the luminance by adjusting each projector.



1 Click the projector you want to adjust in the List view.

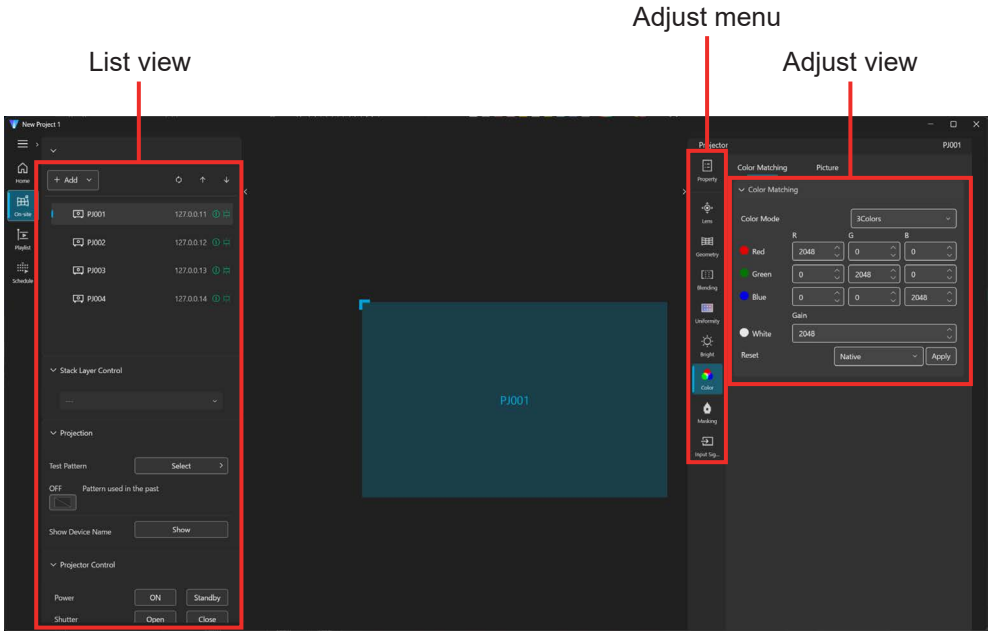
2 Click [Bright] in the Adjust menu.

■ Operation Settings

Set the operating mode, maximum light output level, and light output of the projector.

Color adjustment

When constructing a single image using multiple projectors, the coloring of the images projected from the projectors may not match. To adjust the image from each projector to match coloring, make the adjustments of “Color Matching” and “Picture”.



1 **Click the projector you want to adjust in the List view.**

2 **Click**  **[Color] in the Adjust menu.**

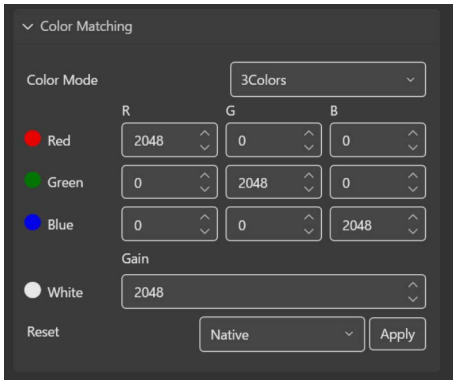
[Color Matching] tab and [Picture] tab are displayed in the Adjust view.

3 **Click the [Color Matching] tab.**

4 **Select [3Colors], [7Colors], [Measured] or [709Mode] in [Picture Mode] depending on the adjustment you want to make.**

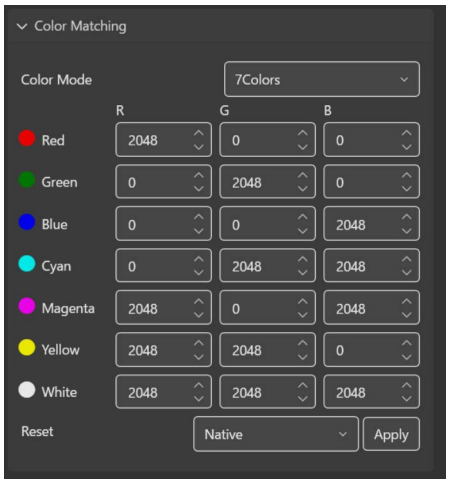
You can adjust the values for each color to compensate for color variations.

■ 3Colors



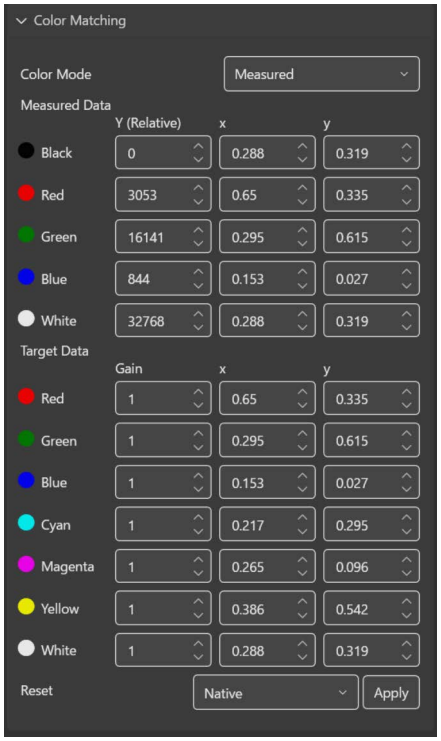
- [Red]/[Green]/[Blue]: Adjust the colors by changing the values of [R], [G], and [B] for each color.
- [White]: Change the brightness of the three colors at the same time by changing the [Gain] value.
- [Reset]: Reset the setting values to the values of the selected mode.

■ 7Colors



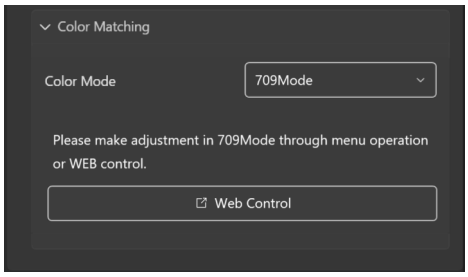
- [Red]/[Green]/[Blue]/[Cyan]/[Magenta]/[Yellow]/[White]: Adjust the colors by changing the values of [R], [G], and [B] for each color.
- [Reset]: Reset the setting values to the values of the selected mode.

■ Measured



- [Measured Data]: [Black]/[Red]/[Green]/[Blue]/[White]: Adjust the colors by changing the values of Y (relative value), x, and y for each color.
- [Target Data]: [Red]/[Green]/[Blue]/[Cyan]/[Magenta]/[Yellow]/[White]: Adjust the colors by changing the values of gain, x, and y for each color.
- [Reset]: Reset the setting values to the values of the selected mode.

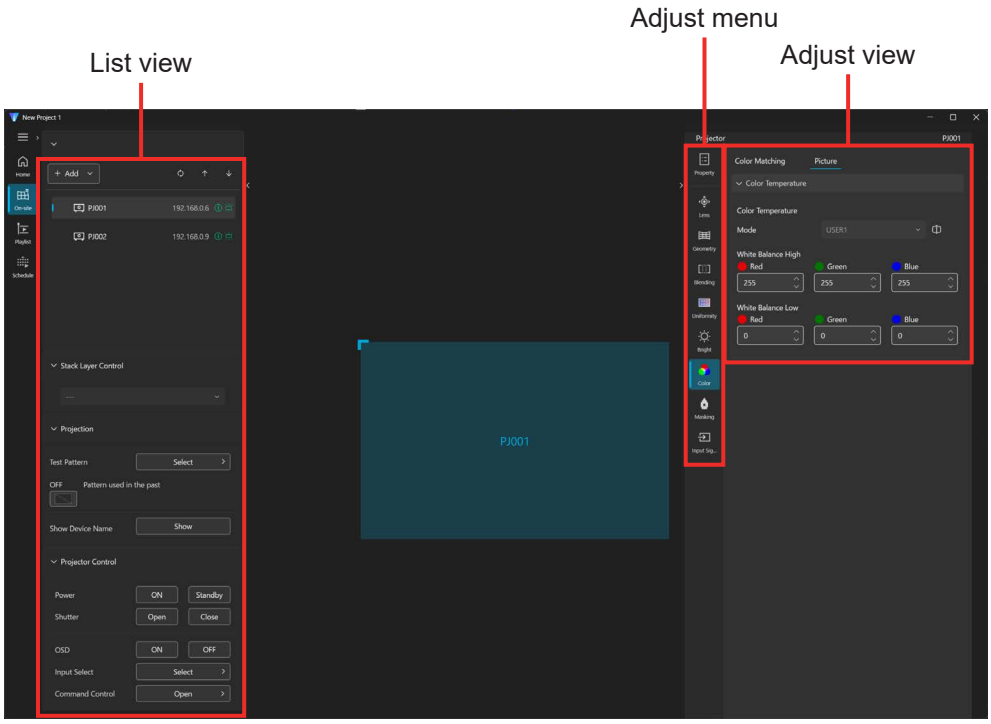
■ 709Mode



Start the Web control function and make adjustments.

Picture

Configure the settings for the color temperature and white balance of images.



1 **Click the projector you want to adjust in the List view.**

2 **Click**  **[Color] in the Adjust menu.**

[Color Matching] tab and [Picture] tab are displayed in the Adjust view.

3 **Click the [Image] tab.**

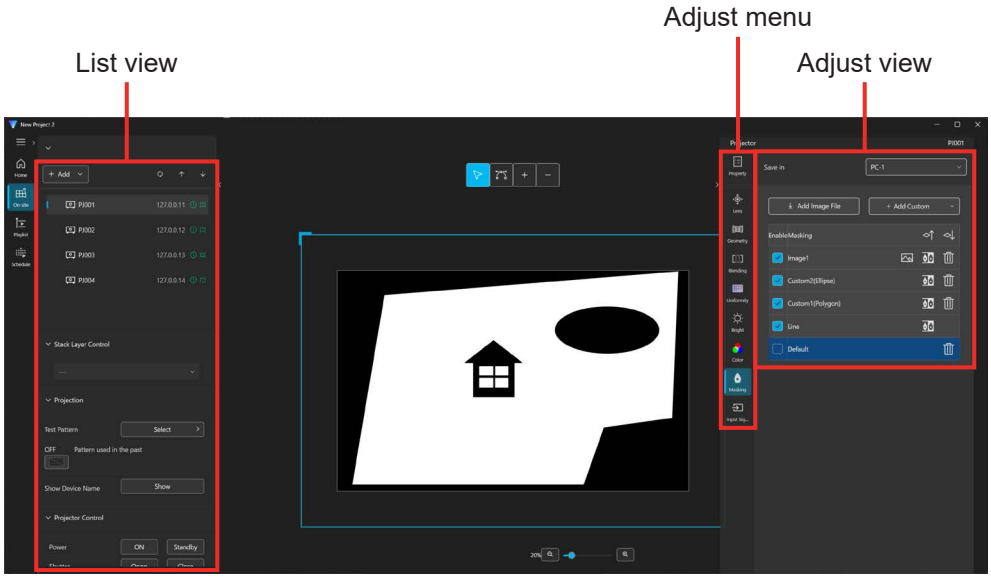
4 **Set the color temperature.**

When [Custom] is selected for the color temperature, specifying a numerical value in 100K increments is possible.

When [USER], [USER1], or [USER2] is selected for the color temperature, setting of the white balance is possible. Make adjustments by changing the RGB values of the white balance high or low.

Masking

This function makes it possible to mask certain parts of the projected images so as to project only the required parts.



1 **Click the projector you want to adjust in the List view.**

2 **Click [Masking] in the Adjust menu.**

The masking area list is displayed in the Adjust view.

3 **Select [Save in].**

The data of the masking area is read from the save location set for [Save in] in the projector selected in the List view, and reflected in the main view.

4 **Specify the masking area.**

[Line] is added to the masking area list in advance. You can specify the masking area by moving the operation points on the four edges – upper, lower, left, and right – of the projected image.

➡ “Line masking” (page 68)

You can add the following masking areas as necessary.

- [Add Custom]: Add a polygon or ellipse masking area.
  ➡ “Custom masking” (page 69)
- [Add Image File]: Add an image file as a masking area.
  ➡ “Image file masking” (page 72)

The data of the specified masking area is transferred and saved to the save location set for [Save in] in the projector.

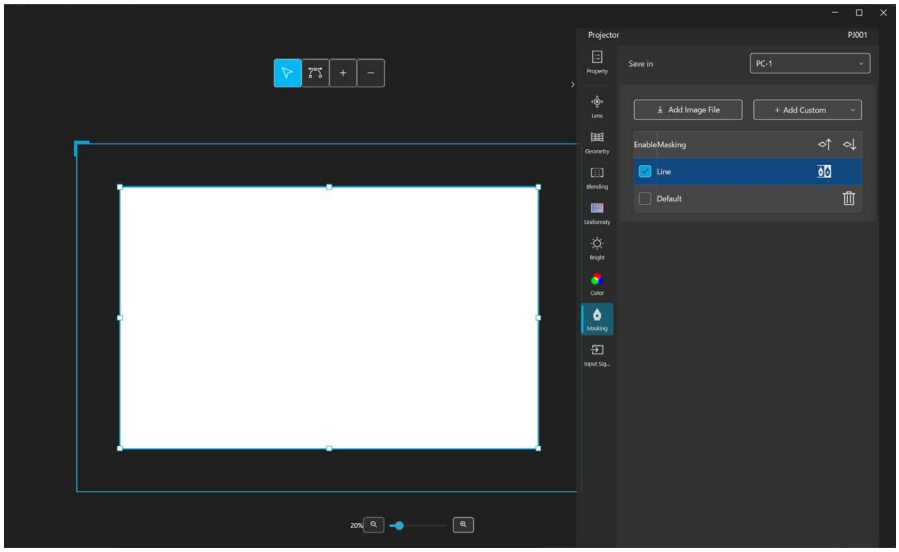
Note

- In the following cases, [Default] is added to the masking area. [Default] can be enabled/disabled and deleted.
  - When correction data has been obtained from the projector.

Line masking

You can specify the masking area by moving the operation points on the four edges – upper, lower, left, and right – of the projected image.

1 Place a check mark in the [Line] checkbox of the masking area list.

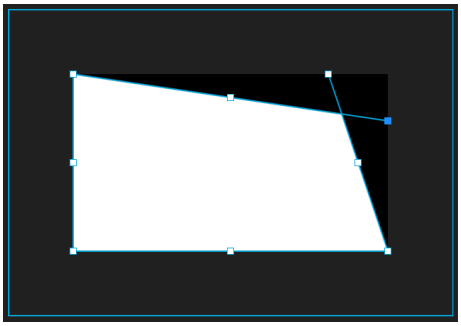


2 Set the masking area by dragging the total of twelve control points located on the four corners and at the center of the four edges of the preview image.

The control points at the four corner vertices of the preview image can be moved to the desired positions by dragging them.

Dragging the control points at the center of the four edges of the preview image enables parallel movement while maintaining the inclination of the edges.

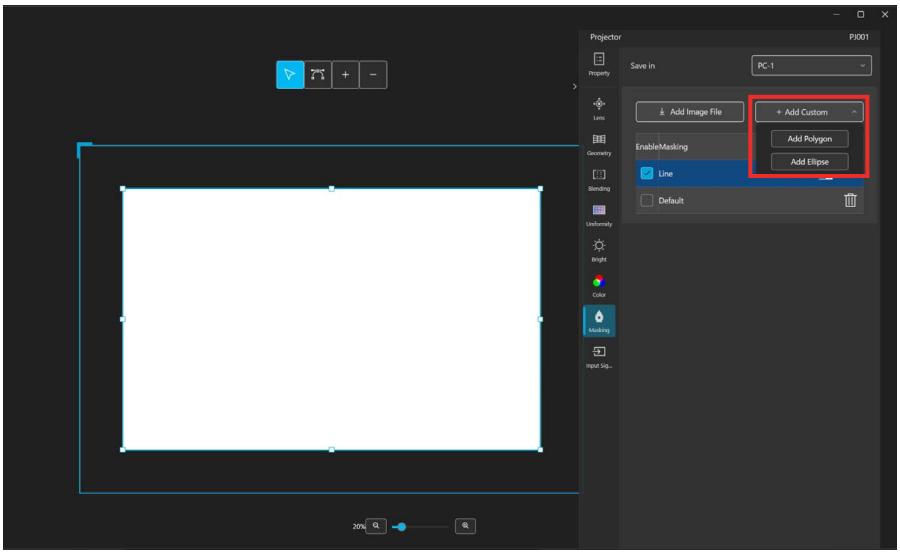
For example, if you move the three points of the upper edge right end, right edge top end, and left edge midpoint of the masking area (black part), the result will be as follows.



Custom masking

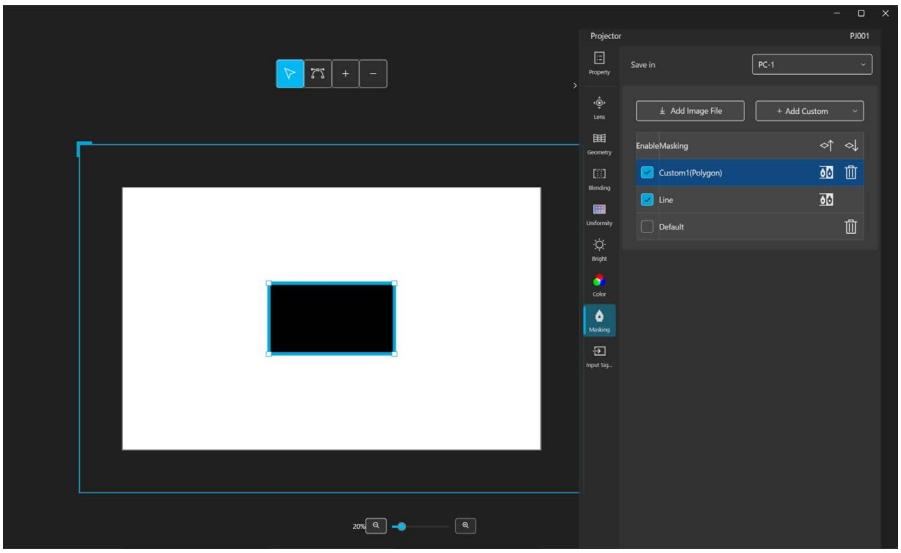
After performing line masking, you can add a polygon or ellipse masking area.

1 Click the [Add Custom] button, and select the shape of the masking area to add in the displayed menu.

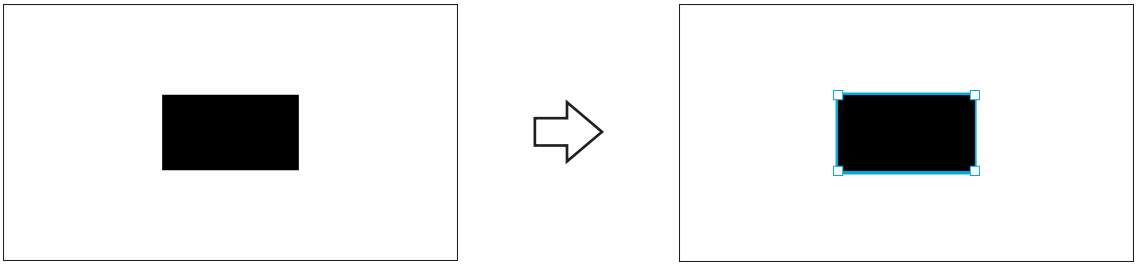


When adding a polygon masking area, select [Add Polygon].
When adding an ellipse masking area, select [Add Ellipse].

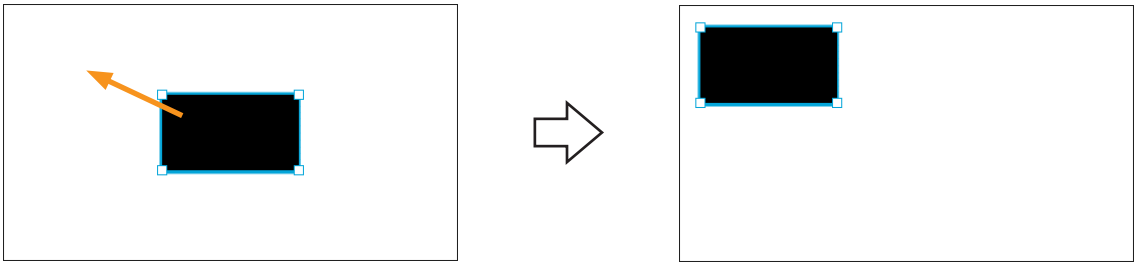
Operations when a polygon masking area has been added



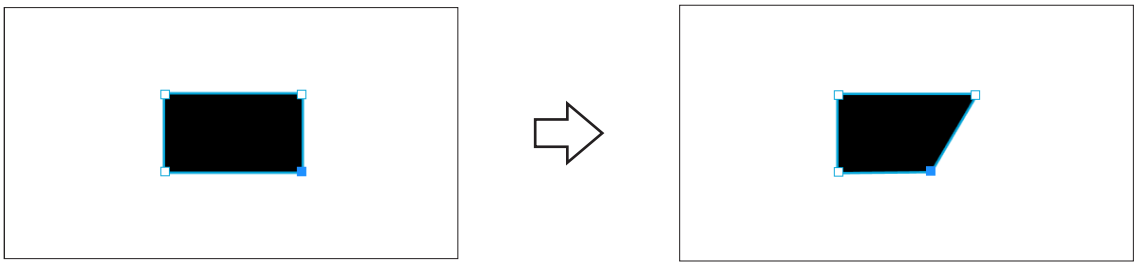
If you select [Add Polygon], a rectangular masking area is added to the center of the projected image. When you click to select the masking area, control points are displayed at the four corner vertices of the masking area.



You can drag the masking area, or press the cursor keys to move it up, down, left, or right.



If you click a control point, that control point turns light blue. You can change the shape of the masking area by dragging the light blue control point or pressing the cursor keys.

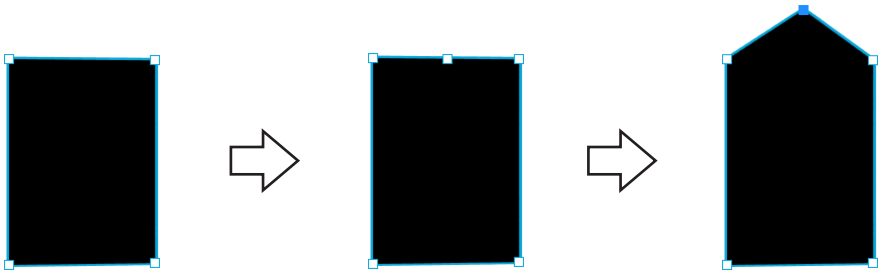


Note

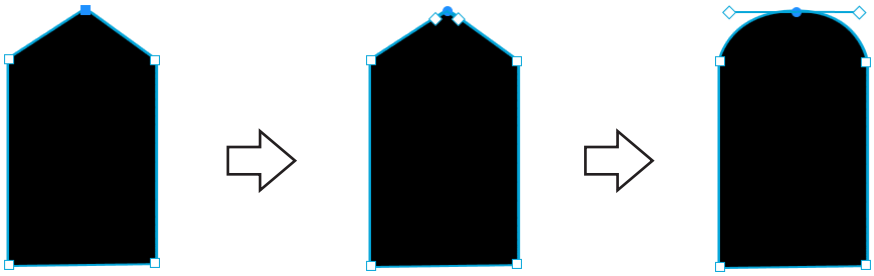
- Each press of a cursor key moves the control point by 1 pixel. Pressing the cursor key while holding down the Alt key moves it in increments of 4 pixels.

If you click ＋ on the toolbar and then click any position on an edge of the masking area, a control point is added to that position.

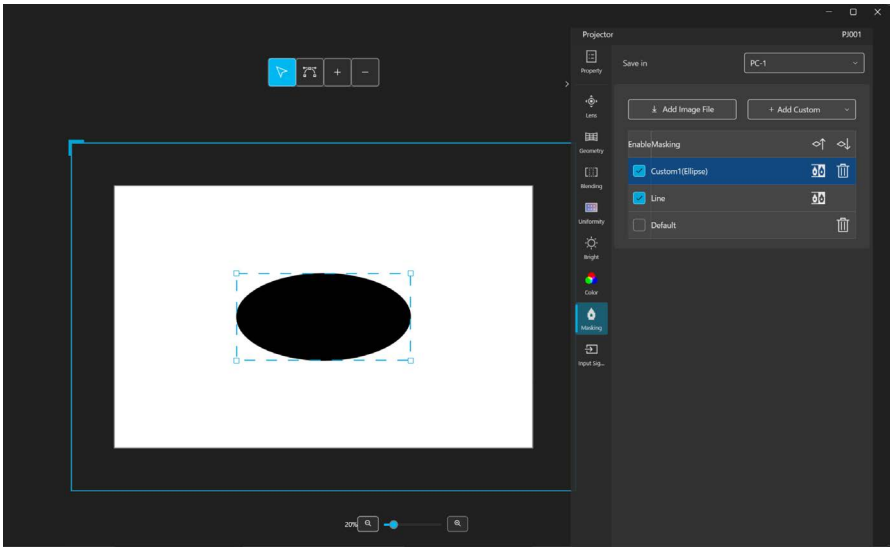
To delete an added control point, click － on the toolbar and then click the control point to be deleted.



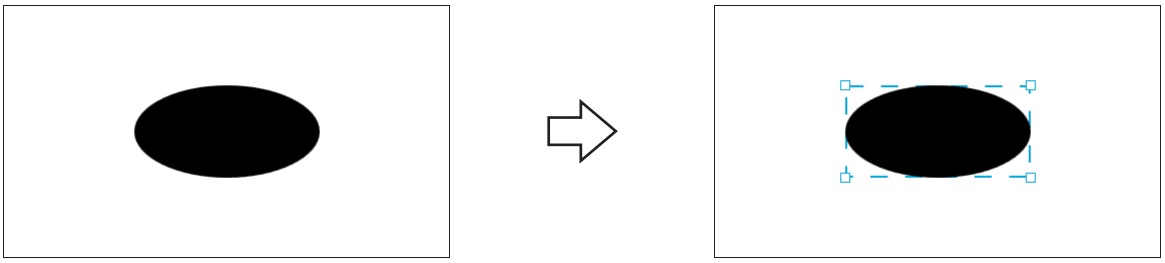
If you click on the toolbar and then click a control point of the masking area, the two line segments from that control point to the adjacent control points curve. Two handles are display at the clicked control point, and the bulge state of the curve and the position of the vertex can be changed by dragging the handles.
To disable the curve, right-click the control point selected when the line segments were curved and click [Disable Bezier Curve] in the displayed menu. The curved line segments are returned to straight lines.



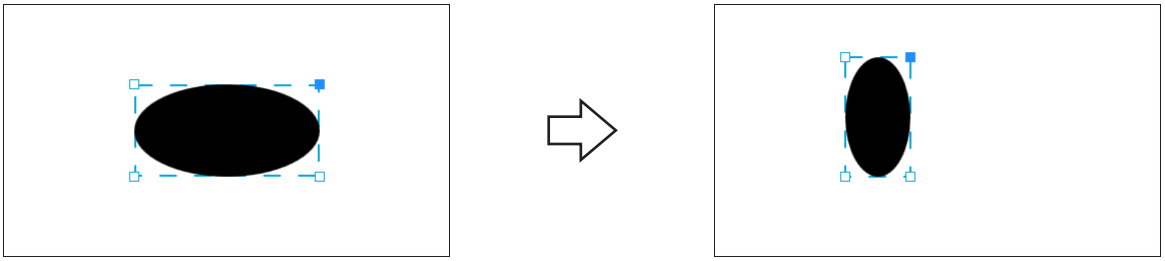
Operations when an ellipse masking area has been added



You can click in the area with the mouse and then move, transform, or otherwise modify the masking area with the mouse or cursor keys.
When you click to select inside an elliptical masking area, four control points are displayed.



You can change the shape of the ellipse by dragging a control point or pressing the cursor keys.



Note

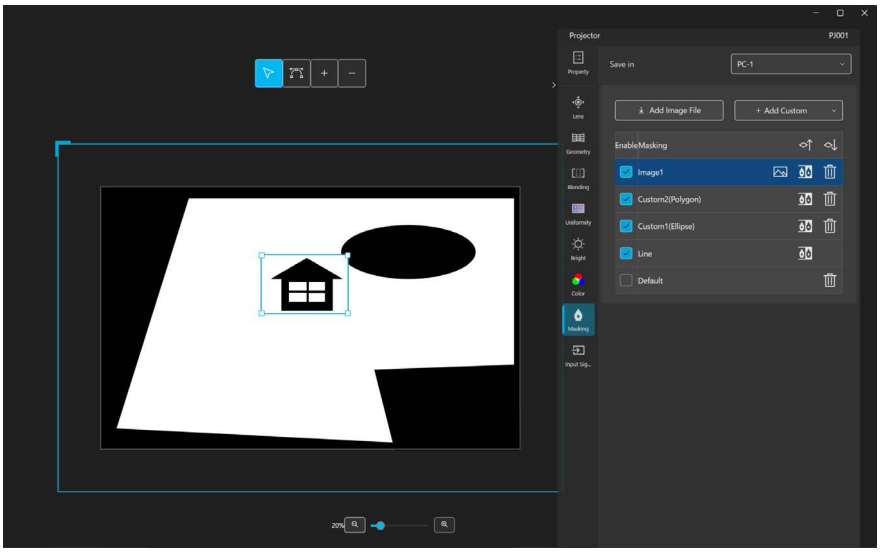
- Each press of a cursor key moves the control point by 1 pixel. Pressing the cursor key while holding down the Alt key moves it in increments of 4 pixels.

Image file masking

After performing line masking, you can overlay an image file (extension: bmp) on the projected image as a masking area. The shape of the added masking area can be freely modified.

1 Click the [Add Image File] button, and specify an image file in the displayed screen.

The specified image file is read, and displayed as a masking area at the center of the projected image in the preview image.



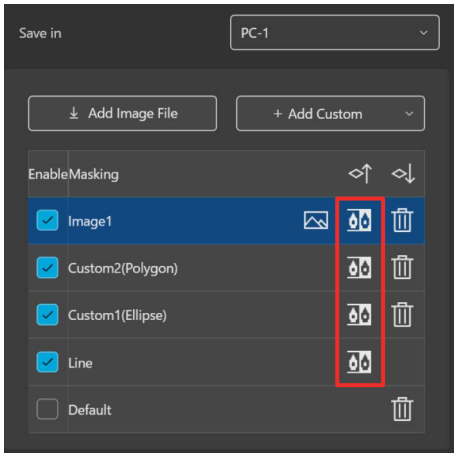
If the preview image is specified as a masking area, you can move, enlarge, or reduce it in the same way as an added polygon or ellipse masking area with custom masking.

➡ “Custom masking” (page 69)

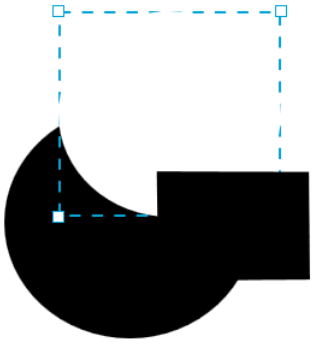
Operations of the masking area list

■ Flip

Clicking  of the masking area in the masking area list changes the area to one where the projected image of the masking area is transmitted without being masked.

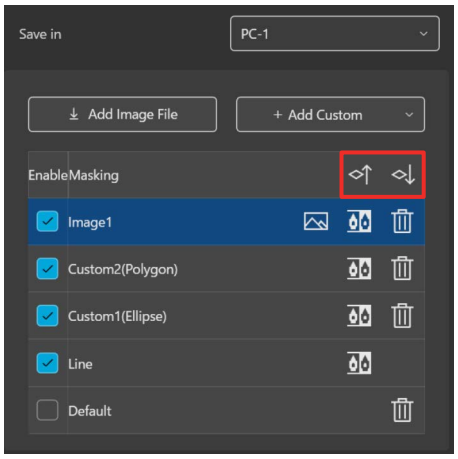


The shape of a masking area can be changed by overlaying a transmitted area on another masking area. For example, you can create a masking area that is like a crescent moon with a rectangle on it by placing a large circular masking area and then placing a flipped small circular area, and then additionally placing a rectangular masking area on them.



■ Specifying the display hierarchical order of the masking area

Click the masking area in the masking area list you want to reposition in the hierarchy and then move it up or down in the list with one of the following buttons.



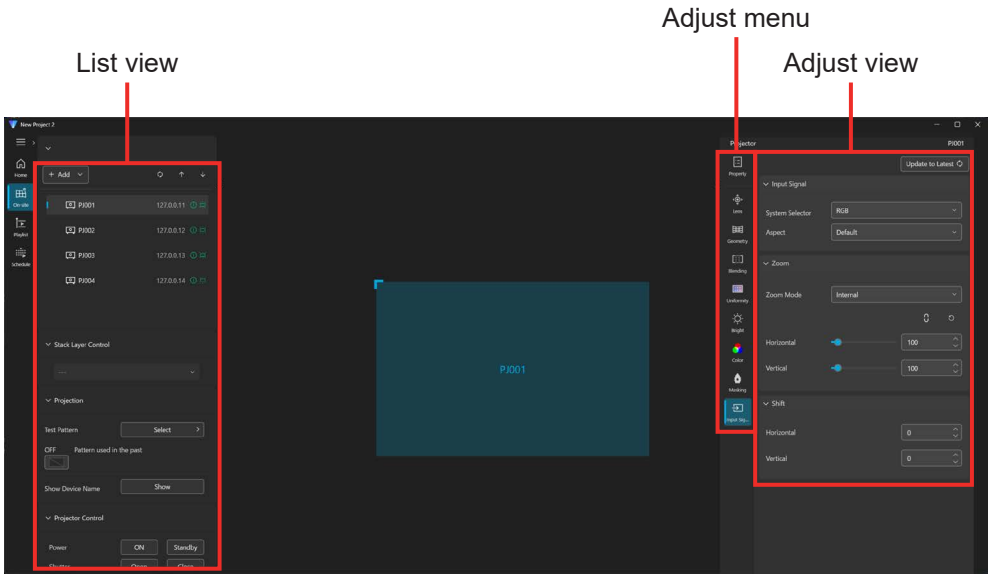
: Moves the masking area up in the list.

: Moves the masking area down in the list.

The masking area at the top of the list is displayed at the front, and the masking area at the bottom of the list is displayed at the back. The positions of [Line] and [Default] cannot be moved up or down.

Input Signals

Projectors normally identify the input signals automatically, but if unstable signals have been input, you can configure the settings for signal input of the projector and the position and size settings for images in the projection area.



1 Click the projector you want to adjust in the List view.

2 Click [Input Signal] in the Adjust menu.

[Input Signal] area, [Zoom] area and [Shift] area are displayed in the Adjust view.

Input Signal Setting

■ System Selector

Select the system format that matches the input signal.

Projection Setting

Set the position and size of images in the projection area.

■ Aspect

Select the video aspect ratio.

■ Zoom

Set the zoom ratio of images. The zoom in the aspect area or the entire display area can be selected by selecting the zoom mode.

■ Shift

Set the horizontal and vertical positions of images.

Auto Screen Adjustment

This allows automatic adjustment of geometry correction, edge blending, and black level to the shape of the screen through use of an externally connected camera.
After performing Auto Screen Adjustment, you can perform further detailed adjustment and correction manually.

Note

- To use the auto screen adjustment function, prepare a camera separately.

Preparing auto screen adjustment

■ Media processor connection

Connecting a media processor and computer using a LAN cable.

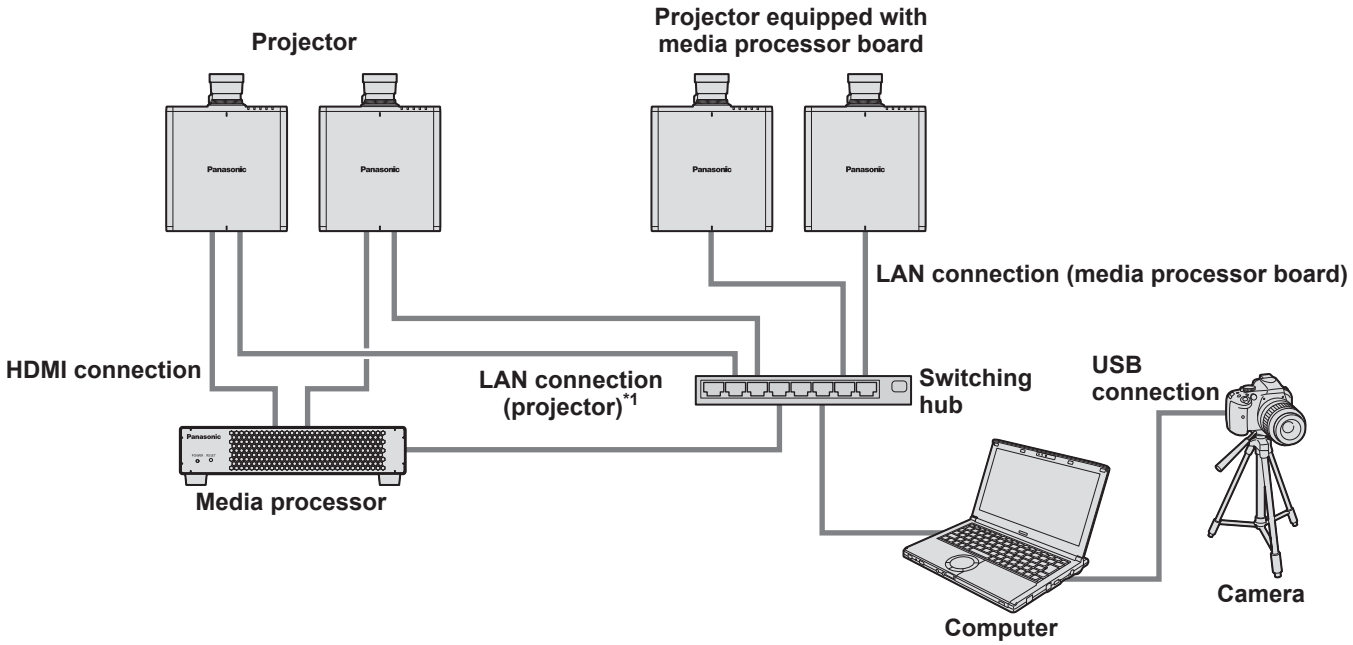
■ Camera connection

Depending on the camera to be used, connect to the computer directly using a USB cable or connect to it via a network using a LAN cable.

- For details on compatible cameras, check the information found on the software download page after logging in to PASS on the following website.
  https://docs.connect.panasonic.com/projector/pass

■ Connection example

Example of connecting the camera with a USB cable



*1 When it is necessary to separately control a projector directly from a computer, connect the LAN port of the projector unit to the network.

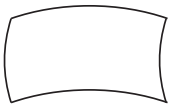
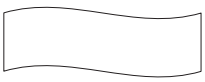
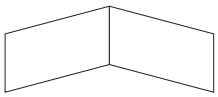
Note

- Positioning the camera so that it faces the screen directly and performing adjustments will obtain more optimal adjustment results. Adjustment is possible when the camera is facing the screen at an angle, but adjustment may fail or distortion may remain in images after adjustment if the angle is too large.
- In cases such as the following, adjustment using multiple cameras (up to 6) is possible.
  - Projector layout configuration is 5 or more projectors in the vertical or horizontal direction.
  - When the entire screen does not fit within the capture range of one camera

  In this case, arrange multiple cameras vertically or horizontally according to the projector layout configuration so that the capture ranges of adjacent cameras and the projection area of at least one projector overlap.
- Connecting the projectors to be used via a LAN allows you to easily operate the necessary settings with one click when performing auto screen adjustment.

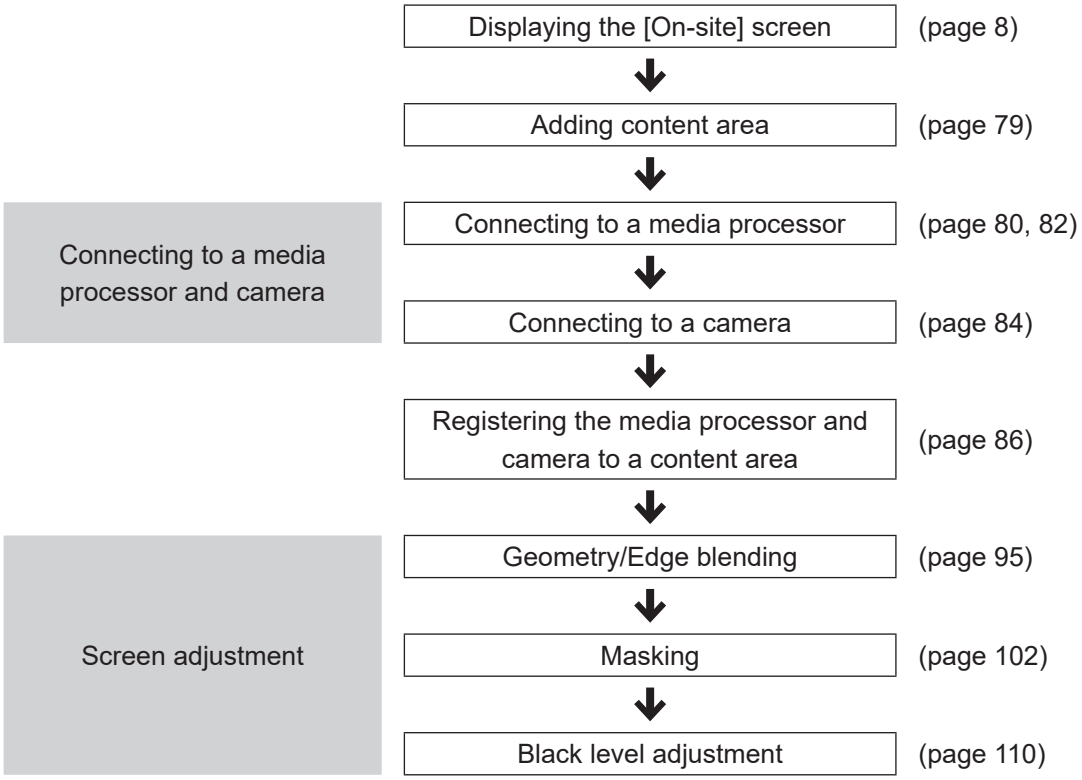
Compatible screens for auto screen adjustment

Auto screen adjustment may not be performed properly depending on the shape of the screen. If adjustment is not performed properly, perform adjustments manually.

Compatible screens	Non-compatible screens
● **Flat**  ● **Curved screen**  Curved in one direction  Curved in two directions ● **Curve changes smoothly**  S-curve  Variable curve type	● **Folded**  Folded screen type * Individual adjustments for each side are possible

Flow of auto screen adjustment

Perform auto screen adjustment with the following steps. First add a content area with “Contents Area(Media Proc.)” on the On-site screen and register the media processor and camera that are the target for adjustment to that content area, then make image adjustments with the camera.



■ “Content area” and “projection area”

“Content area” and “projection area” are concepts within this software. “Content area” corresponds to the entire screen for projecting a single content image in the actual environment. Furthermore, “projection area” corresponds to the projection screen of each individual projector that makes up the screen in the actual environment.

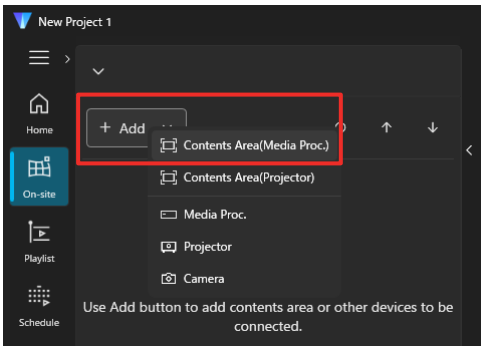
Note

- You can also manually project into the “content area” without using a camera.
  ➡ “Manual Adjust - Contents area” (page 121)

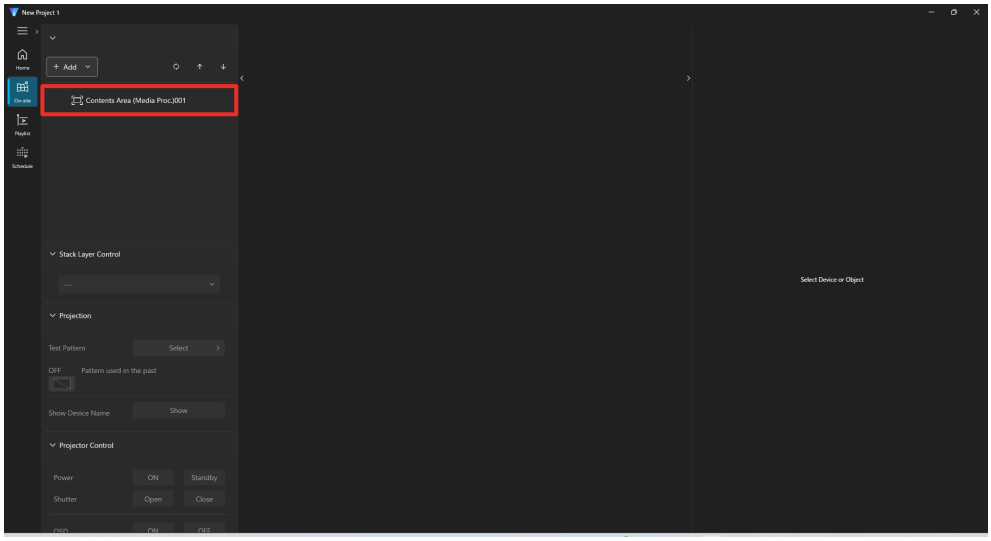
Content area settings

Add a new content area with the following procedure.

1 Click the [Add] button in the List view, and select [Contents Area(Media Proc.)].



The new content area is added to the List view.



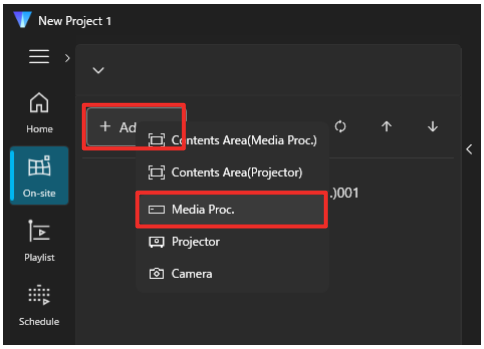
Connecting a media processor and camera

Connect to a media processor and camera with the following procedure.
For connecting with a media processor, there is the method of searching on the network and connecting and the method of connecting using a connection information file.

Connecting to a media processor (method of searching on the network)

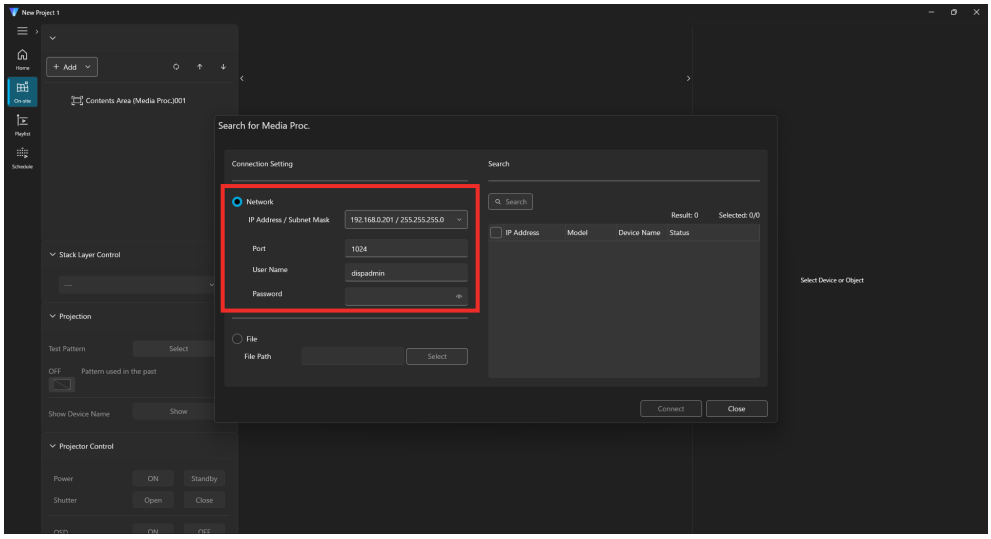
Search for a media processor on the same network, and then connect to it.

1 Click the [Add] button in the List view, and select [Media Proc.].



The [Search for Media Proc.] screen is displayed.

2 Select [Network], and enter the items required to connect with the media processor.

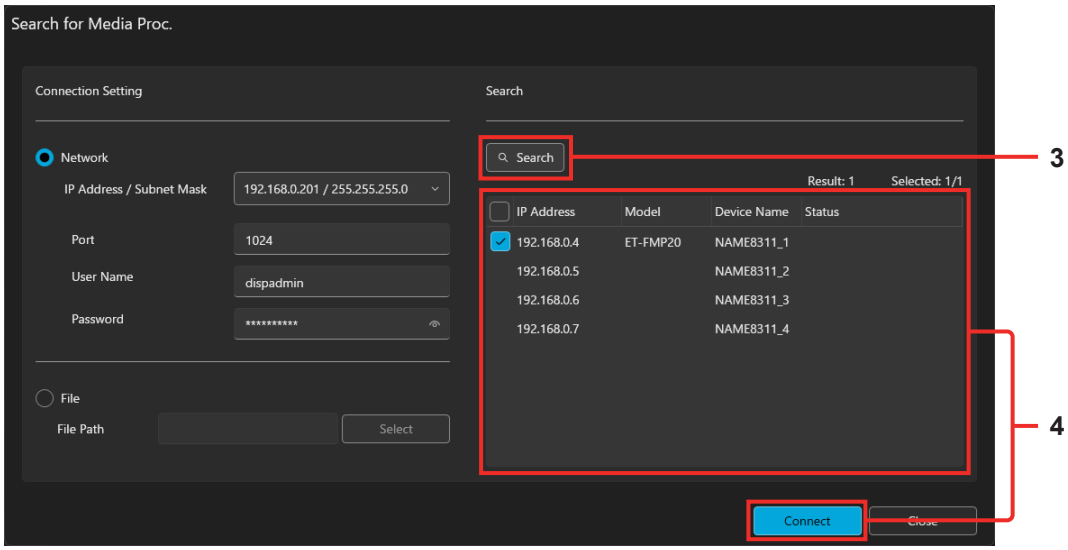


- [IP Address / Subnet Mask]: Select the IP address and subnet mask of your computer in a list.
- [Port]: Set the number of the port that is to be connected to the media processor.
- [User Name]: Enter the user name for Web control of the media processor to be connected.
- [Password]: Enter the password for Web control of the media processor to be connected.

3 **Click the [Search] button.**

A search for media processors begins. When the search completes, the found media processors are displayed in a list.

4 **Select the media processor to be connected, and click the [Connect] button.**



The connected media processor is displayed in the List view.

Note

- In network, multiple IP addresses and subnet masks are displayed in the list if your computer has multiple network interface cards. Select the address that is connected to the same network as the media processor to be connected from the list.
- Enter the user name and password of the account for accessing the media processor or the account with administrator privileges for the media processor to be connected.
- When a media processor displayed in the List view is selected, [Property] is displayed in the Adjust menu, and you can change the settings of the media processor in the Adjust view.

Connecting to a media processor (method using a connection information file)

Specify the following file containing the connection information for the media processor, and then connect to the media processor in accordance with the information in that file.

- File containing media processor connection information that was created in Geometry Manager Pro for FMP series (extension: prjc)
- Media processor registration information file (extension: csv)

Note

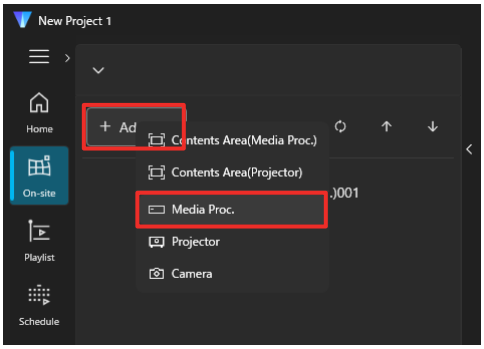
- A media processor registration information file is a CSV file in which the information set for each media processor (IP address, user name, and password) is described on each line. Create the information of the media processors to register to this software as a CSV file.

Example)

IP address, User name, Password, Password (re-enter for confirmation)

```
192.168.0.8,User name1,Password1,Password1
192.168.0.9,User name2,Password2,Password2
```

1 Click the [Add] button in the List view, and select [Media Proc.].



The [Search for Media Proc.] screen is displayed.

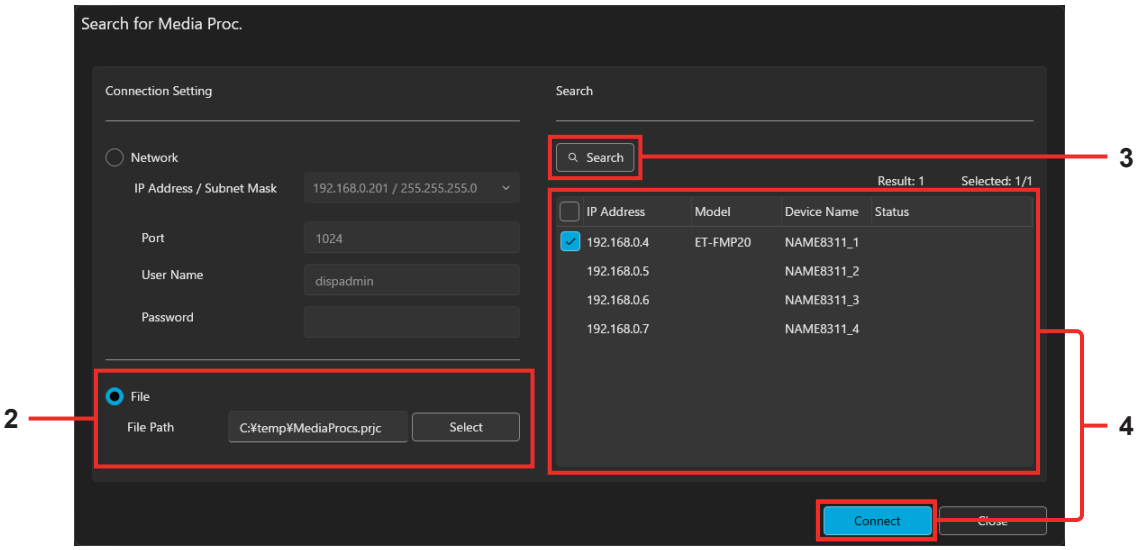
2 Select [File], and click the [Select] button.

The file selection screen is displayed.

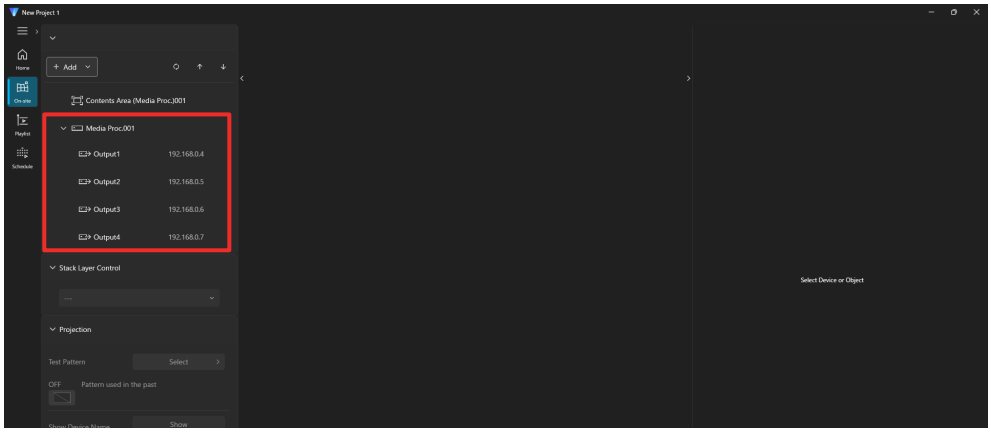
When a connection information file is selected, the location and name of the file is displayed in [File Path].

3 Click the [Search] button.

4 Select the media processor to be connected, and click the [Connect] button.



The connected media processor is displayed in the List view.



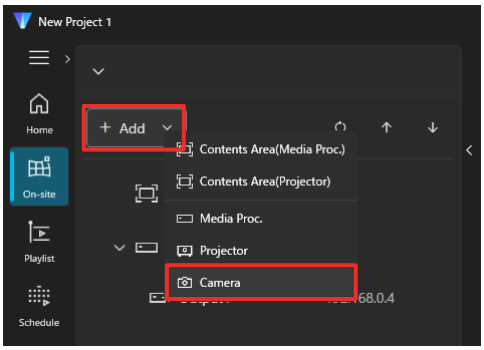
Note

- When a media processor displayed in the List view is selected, [Property] is displayed in the Adjust menu, and you can change the settings of the media processor in the Adjust view.

Connecting to a camera

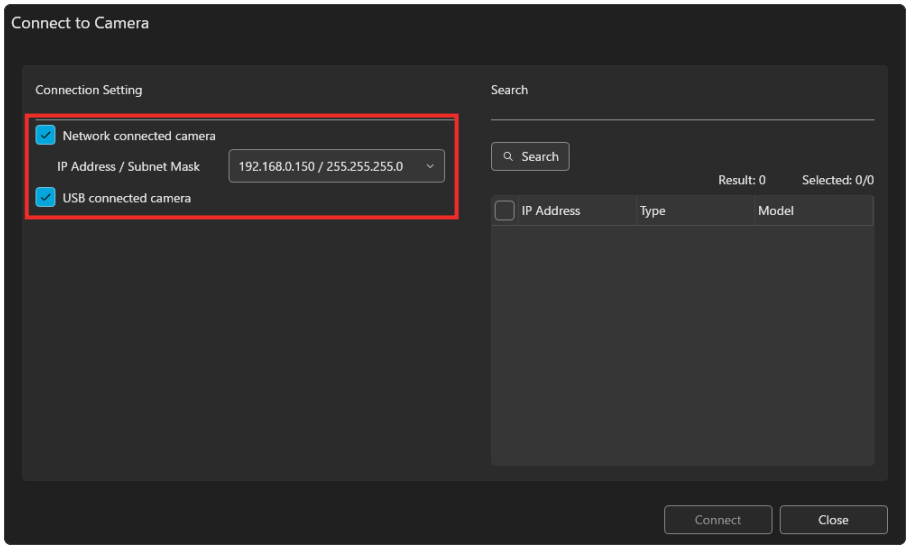
Connect to the camera to use for auto screen adjustment.

1 Click the [Add] button in the List view, and select [Camera].



The [Connect to Camera] screen is displayed.

2 Specify the type of camera to be connected.



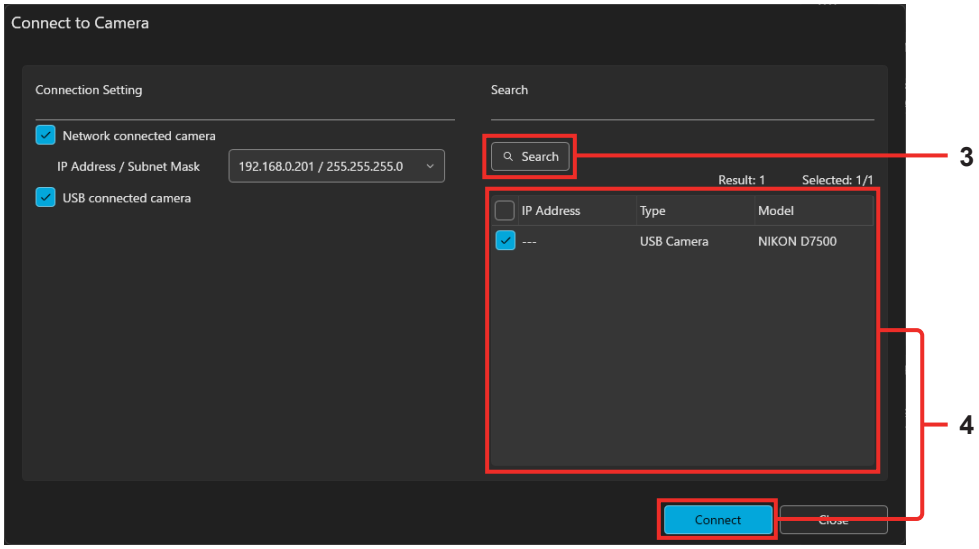
Specify one or both of the following as the type of connection between the camera to be searched for and the computer.

- [Network connected camera]: Place a check mark in this checkbox to search for a camera within the same network as your computer. [IP Address / Subnet Mask] displays the IP address and subnet mask of your computer in a list.
- [USB connected camera]: Place a check mark in this checkbox to search for a camera connected by USB to your computer.

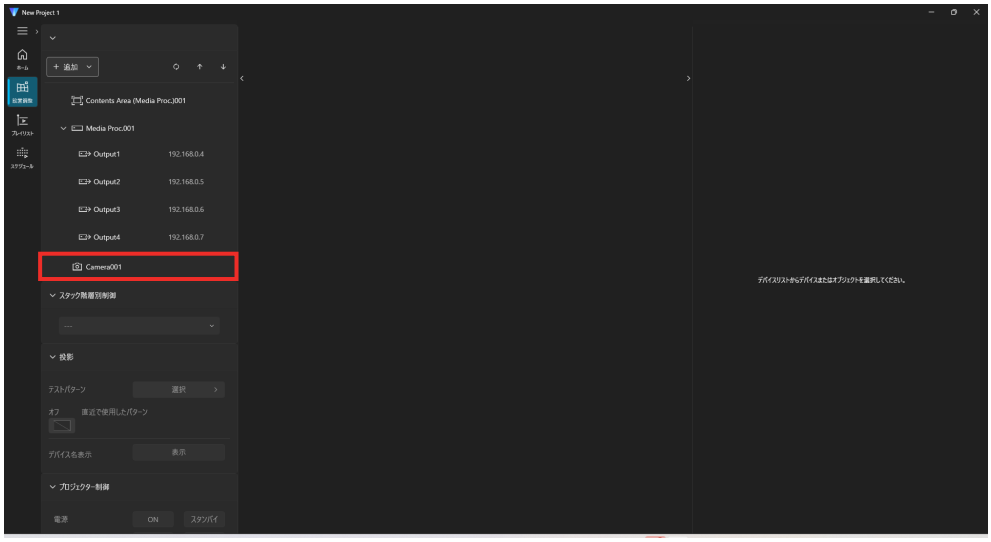
3 **Click the [Search] button.**

A search for cameras begins. When the search completes, the found cameras are displayed in a list.

4 **Select the camera to be connected, and click the [Connect] button.**



The connected camera is displayed in the List view.

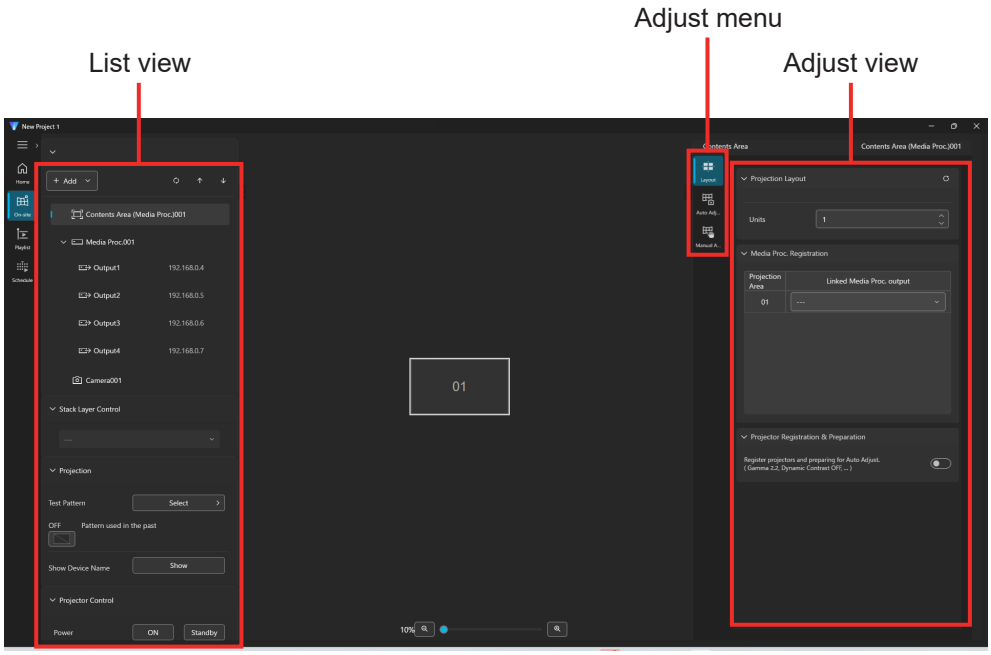


Note

- When a camera displayed in the List view is selected, [Property] is displayed in the Adjust menu, and you can change the settings of the camera in the Adjust view.

Registering the media processor and camera to a content area

Register the connected media processor and camera to a content area.

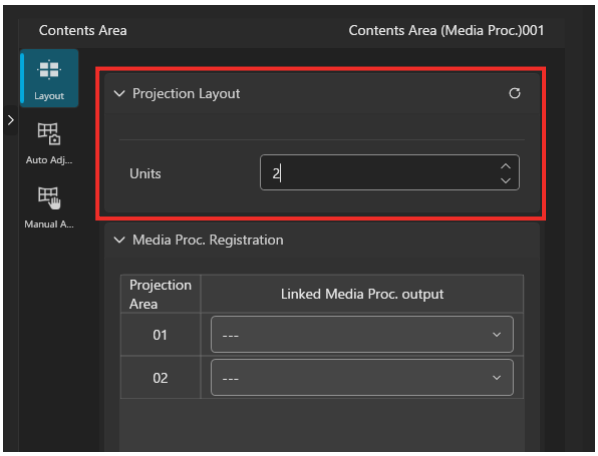


1 **Click [Contents Area(Media Proc.)] in the List view.**

2 **Click [Layout] in the Adjust menu.**

[Projection Layout] area and [Media Proc. Registration] area are displayed in the Adjust view.

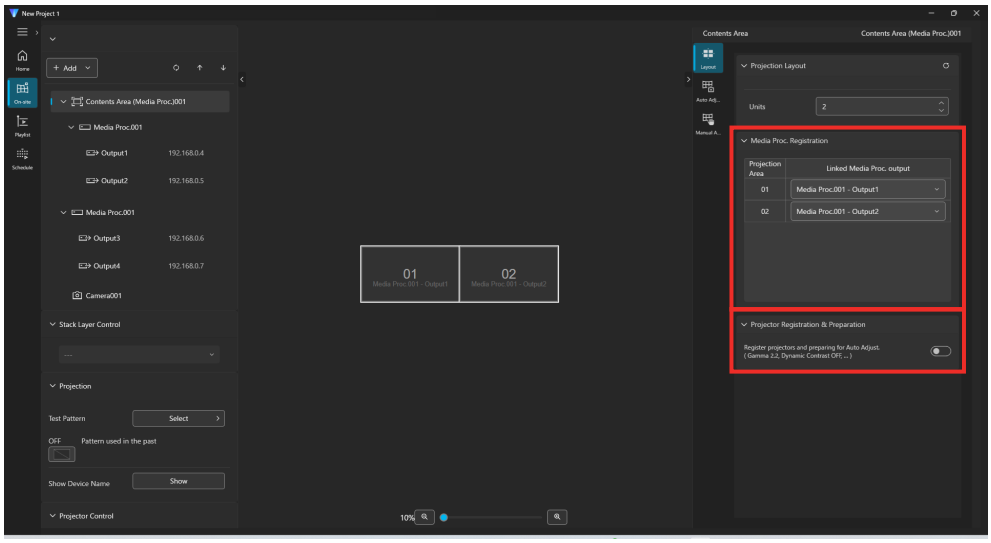
3 **Configure the layout settings in the [Projection Layout] area of the Adjust view.**



- [Units]: Specify the number of outputs of the media processor to be used.

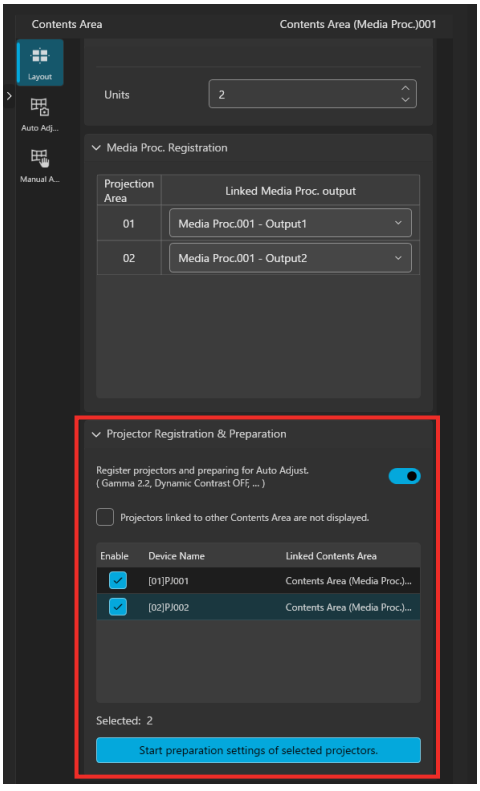
4 Register the output destination of the media processor in the [Media Proc. Registration] area of the Adjust view.

Assign an output of the media processor to each frame (projection area) in the content area.



Note

- Connecting the projectors to be used via a LAN and registering them in a content area allows you to easily operate the necessary settings with one click when performing auto screen adjustment.
- The procedures to register projectors in a content area and configure the automatic adjustment preparation settings are as follows.
  - Establish a network connection to projectors manufactured by Panasonic Projector & Display Corporation to project the output images of the media processor.
    ➡ “Connecting a projector and camera” in “When Controlling Projectors” (page 13)
  - If you enable the toggle button of [Register projectors and preparing for Auto Adjust] in the [Projector Registration & Preparation] area of the Adjust view, a list of the connected projectors is displayed. Add check marks to the checkboxes of the projectors to project the output images of the registered media processor in the content area.
- If you click the [Start preparation settings of selected projectors.] button, the preparation settings are configured for the projectors with check marks in the list.



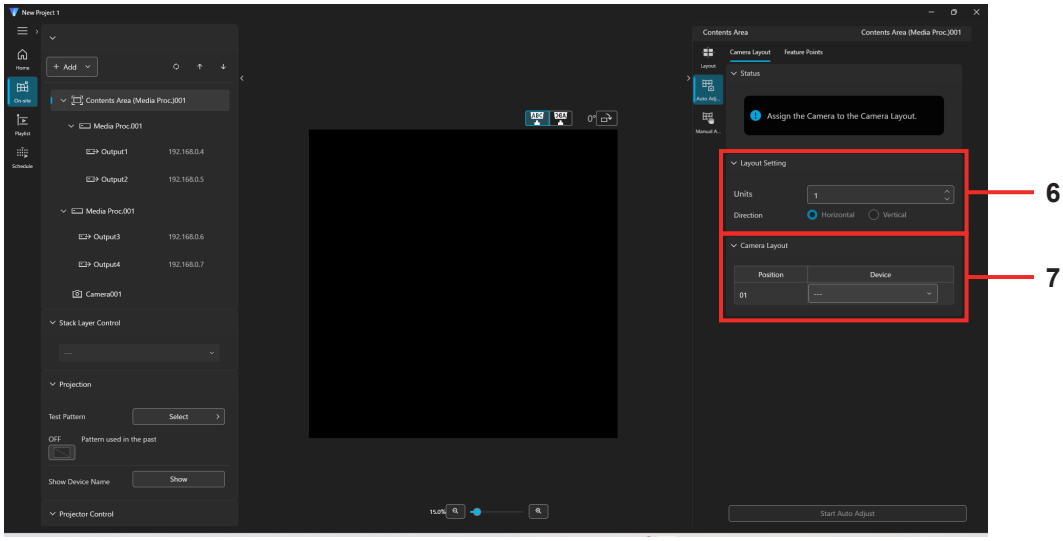
5 **Click [Auto Adjust] in the Adjust menu.**

[Status] area, [Layout Setting] area, and [Camera Layout] are displayed in the Adjust view.

6 **Set the layout of the cameras in the [Layout Setting] area.**

- [Units]: Set the number of cameras to be used.
- [Direction]: Set the direction to arrange the camera capture ranges (horizontal or vertical).

7 **Select the connected camera in the [Camera Layout] area.**



In [Camera Layout], a list with the same number of rows as the number of cameras shown in [Units] is displayed. The screen and camera capture range can be mapped by selecting a camera in [Device] of the list. Perform operation as follows depending on the placement direction of the camera layout.

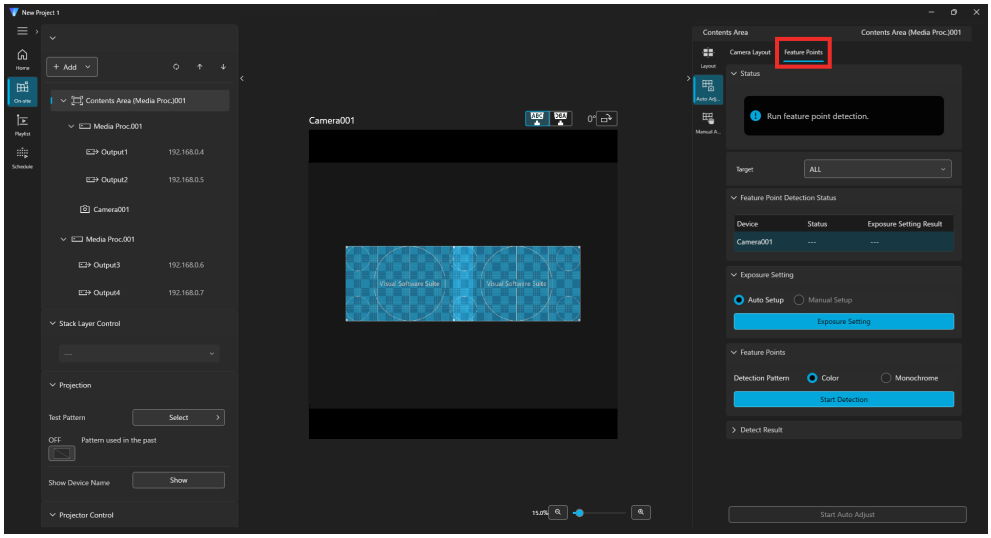
- When the placement direction is horizontal, assign the cameras in number order from the left of the screen. In [Device] of “01” in the list, select the camera that captures the leftmost position when facing the screen, then subsequently select [Device] in order going toward the right.
- When the placement direction is vertical, assign the cameras in number order from the top of the screen. In [Device] of “01” in the list, select the camera that captures the topmost position of the screen, then subsequently select [Device] in order going toward the bottom.

Note

- Up to six cameras can be registered in one content area. When two or more cameras are registered, only the geometry correction and edge blending screen adjustments can be performed.
- When the captured image displayed in the main view appears rotated or flipped due to the installation position or angle of the camera, you can make adjustments so that it appears correctly using the buttons at the top.

8 Click the [Feature Points] tab in the Adjust view.

[Status] area, [Target], [Feature Point Detection Status] area, [Exposure Setting] area, [Feature Points] area, and [Detect Result] area are displayed in the Adjust view.



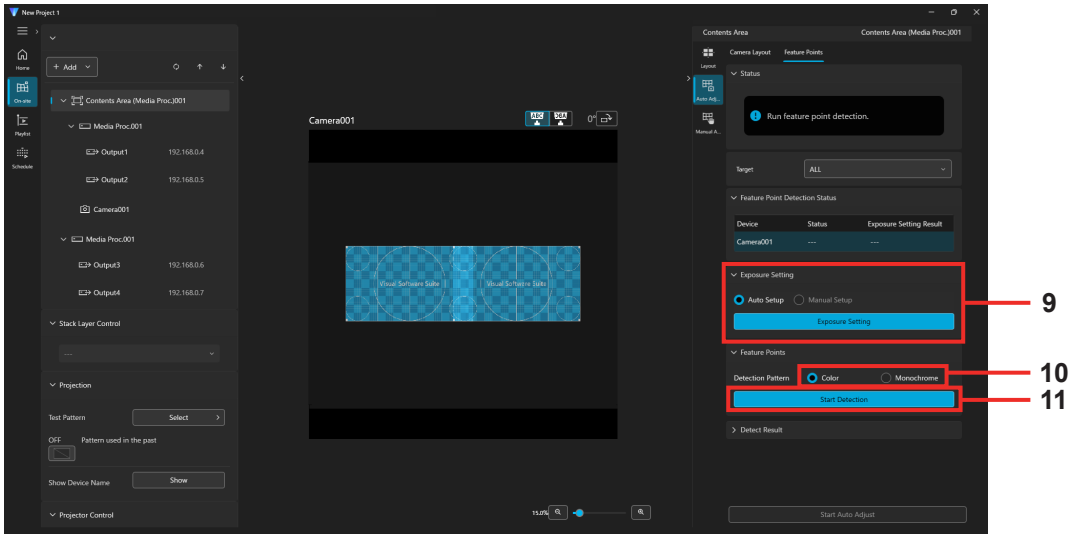
9 **Configure the camera automatic exposure settings from the [Exposure Setting] area.**

- [Auto Setup / Manual Setup]: Select whether to configure the exposure settings automatically or manually. If [Target] is set to [ALL], manual setup cannot be selected.
- [Exposure Setting] button: Click this button to start exposure setup. When the process completes, the result is displayed in the automatic exposure setting result field in the [Feature Point Detection Status] area, and the result of capture with the set exposure values is displayed in the main view.

10 **Select the pattern to project for detecting the feature points in [Detection Pattern] of the [Feature Points] area.**

- [Color]: Pattern recommended for a diffusion type white matte screen. Normally, select this.
- [Monochrome]: Pattern recommended when using a screen with a narrow viewing angle such as a silver screen or when the camera cannot be placed in front of the screen.

11 **Click the [Start Detection] button.**



When the process completes, the feature point detection result is displayed in the [Feature Point Detection Status] area and [Detect Result] area.

12 **Check the indication in [Status] of the [Feature Point Detection Status] area.**

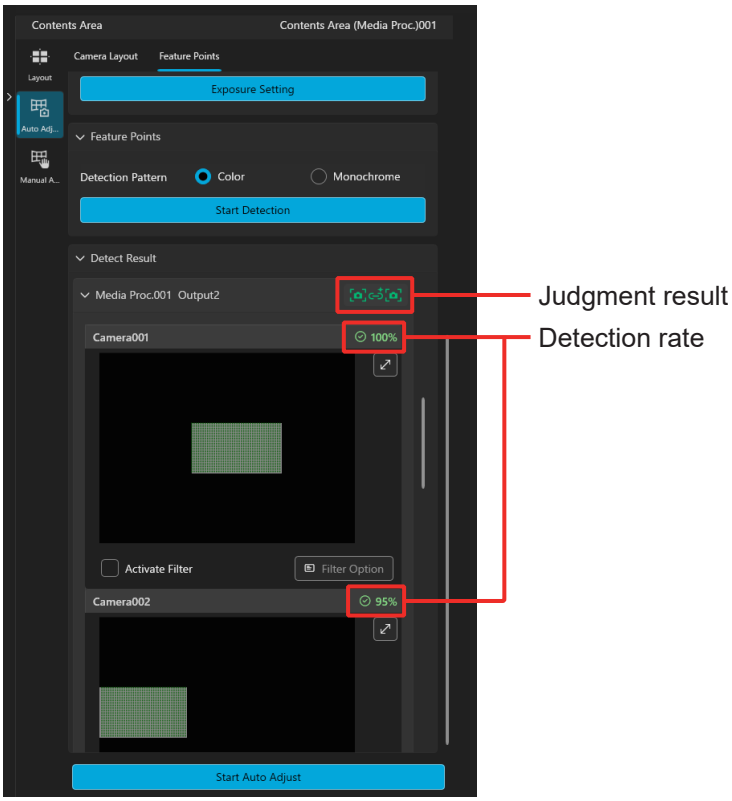
Indication	Description
---	Camera is not registered or no feature point detection history
End	Feature point detection is completed
Error	There is a projector for which feature point detection failed

Note

- If there is a camera for which the indication in [Status] is “Error”, automatic adjustment cannot start. Detection may have failed because the camera exposure settings are configured inappropriately. If necessary, reconfigure the camera exposure settings or perform auto exposure adjustment, and then perform feature point detection again.

Checking the camera image and detection rate of each media processor sensor output

In the [Detect Result] area, you can check the feature point detection result of each media processor output from the image and detection rate of each camera.



When adjustment using multiple cameras is performed, a judgment result of the common media processor output included in both capture ranges of two adjacent cameras is indicated by one of the following icons.

When captured with an adequate detection rate by both of two adjacent cameras

When captured by both of two adjacent cameras, but the detection rate of one or both of them is low

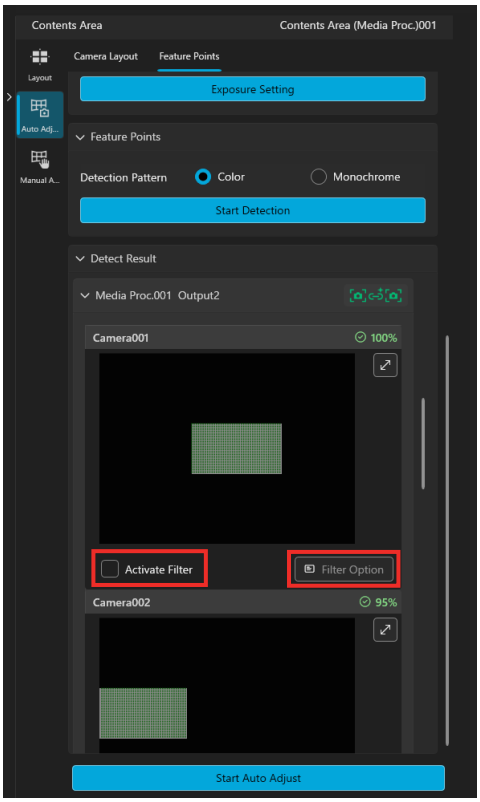
Note

- If the number of media processor outputs with the icon displayed is fewer than the number obtained by subtracting one from the number of cameras, automatic adjustment cannot be performed. In this case, rearrange the cameras.
- If is displayed, automatic adjustment can be performed, but distortion may remain in images after adjustment.
  In this case, rearrange the cameras to ensure an adequate detection rate is obtained.
- When rearranging the cameras, arrange multiple cameras vertically or horizontally according to the projector layout configuration so that the capture ranges of adjacent cameras and the projection area of at least one projector overlap.
- If there is media processor output with the detection rates of the cameras all less than 10% included, automatic adjustment cannot be performed. Detection may have failed because the image projected from the projector significantly protruded outside the screen or was not within the capture range of the camera. If necessary, reinstall the projectors and cameras, or perform feature point detection again.

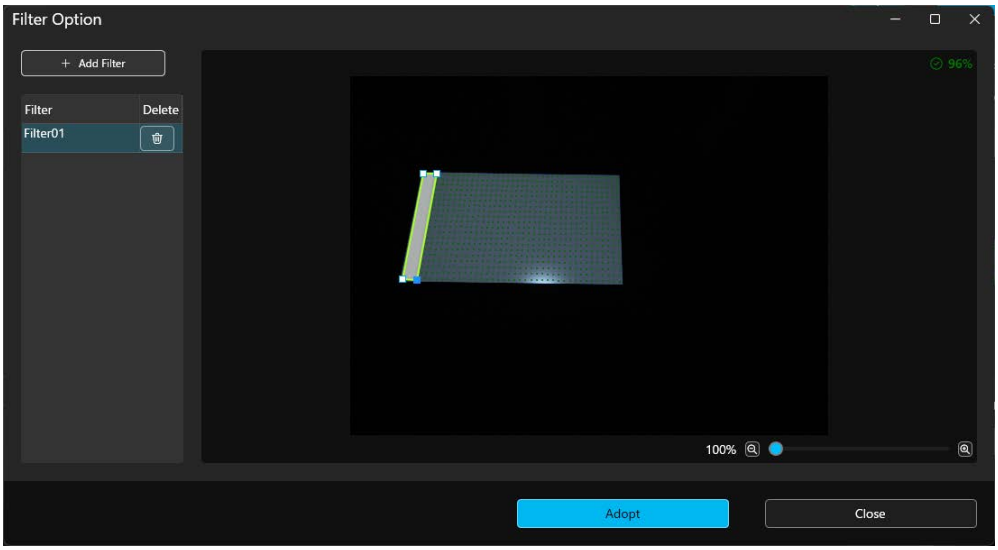
Filter option

Some of the green detection points on camera images may be positioned outside of the screen. If that happens, you may be able to obtain a better automatic adjustment result by using the filter option and setting the filter to the position of the detection points you want to exclude that are outside of the screen.

To use the filter option, place a check mark in the [Activate Filter] checkbox, then click [Filter option].



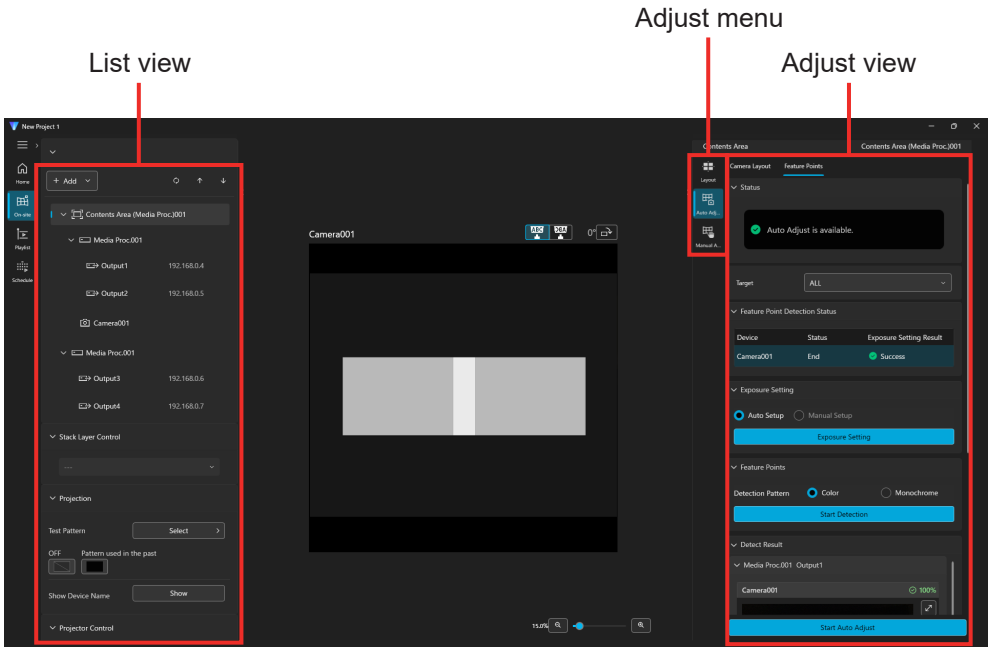
If you click the [Add Filter] button, the rectangular filter is added. If you place the filter on the detection points that are outside of the screen and click [Adopt], feature point detection is recalculated and the detection result is displayed.



Next, adjust the screen using the feature points obtained by detection.

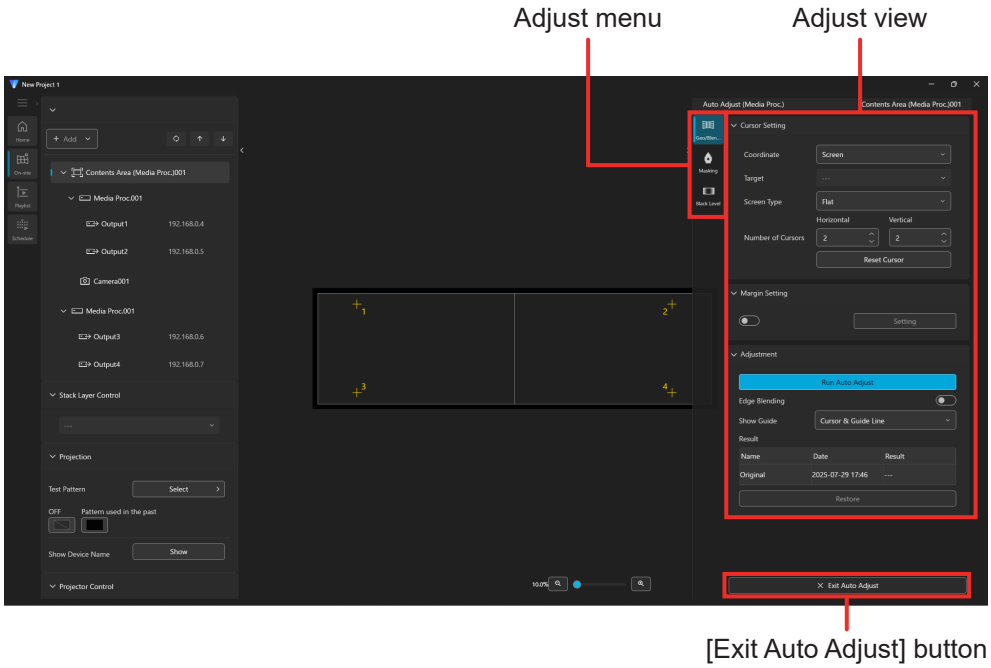
Performing screen adjustment

Perform screen adjustment when feature point detection is finished.



1 Click the [Start Auto Adjust] button in the Adjust view.

The [Auto Adjust (Media Proc.)] screen is displayed.



[Auto Adjust (Media Proc.)] screen

Adjust menu

- [Geo/Blending]: Geometry/Edge Blending (➡ page 95)
- [Masking]: Masking (➡ page 102)
- [Black Level]: Black level adjustment (➡ page 110)

Note

- If two or more cameras are registered in the content area, only [Geo/Blending] can be selected.

Adjust view

The setting items for the screen adjustment area are displayed in accordance with the button clicked in the Adjust menu.

[Exit Auto Adjust] button

Click this button to close the [Auto Adjust (Media Proc.)] screen.

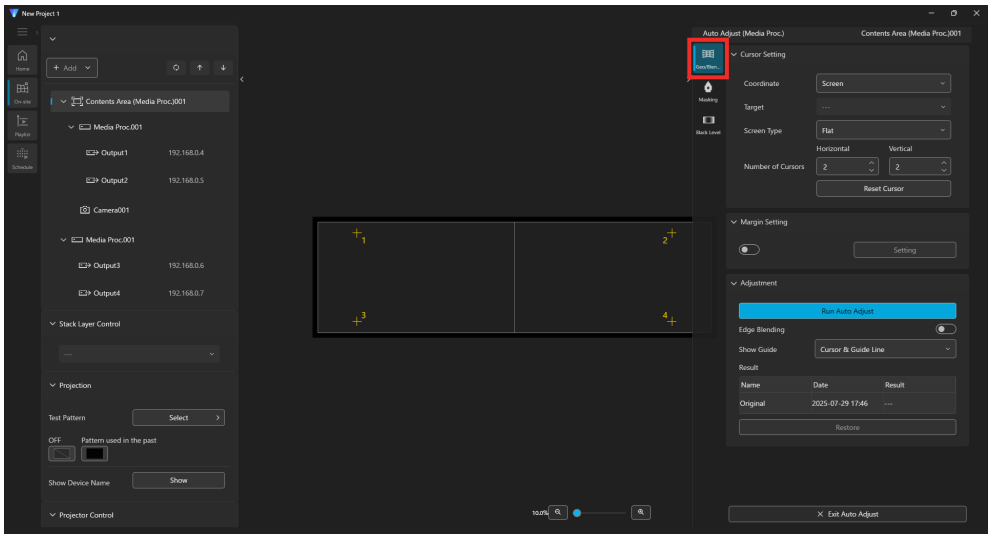
Geometry/edge blending

Adjust the geometry and the edge blending. Display the [Auto Adjust (Media Proc.)] screen and then perform the following operation.

➡ “Performing screen adjustment” (page 93)

1 Click [Geo/Blending] in the Adjust menu.

[Cursor Setting] area, [Margin Setting] area and [Adjustment] area are displayed in the Adjust view.



2 Make the following adjustments in the Adjust view.

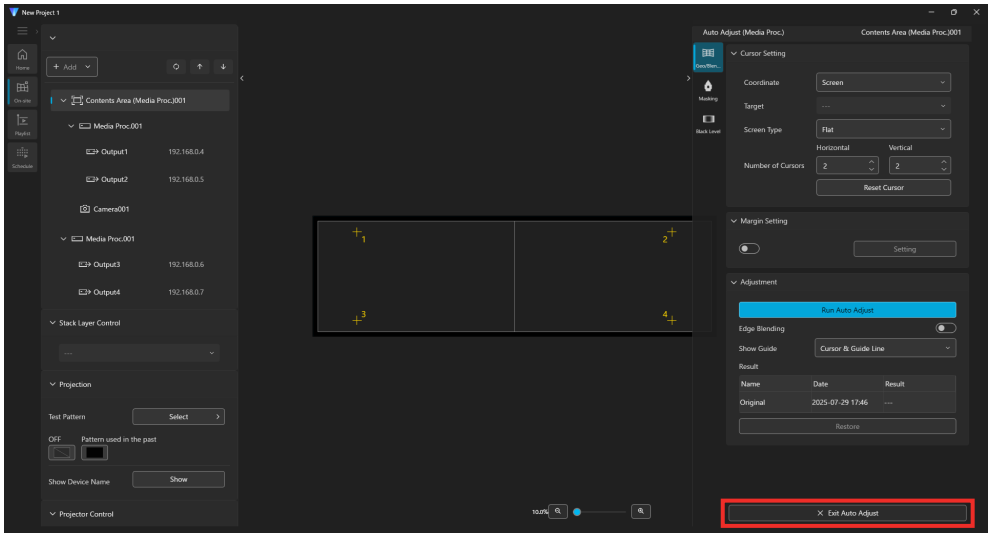
- [Cursor Setting] area: Adjust the image to be projected.
  ➡ “Settings in [Cursor Setting]” (page 97)
- [Margin Setting] area: Configure the settings in the margin area.
  ➡ “Settings in [Margin Setting]” (page 99)
- [Adjustment] area: Configure the option settings for adjustment.
  ➡ “Settings in [Adjustment].” (page 101)

3 After making adjustments in each area, click the [Run Auto Adjust] button.

Automatic adjustment of the geometry and edge blending is performed.

4 Check the image after automatic adjustment, and repeat steps 2 to 3 if you want to perform adjustment again.

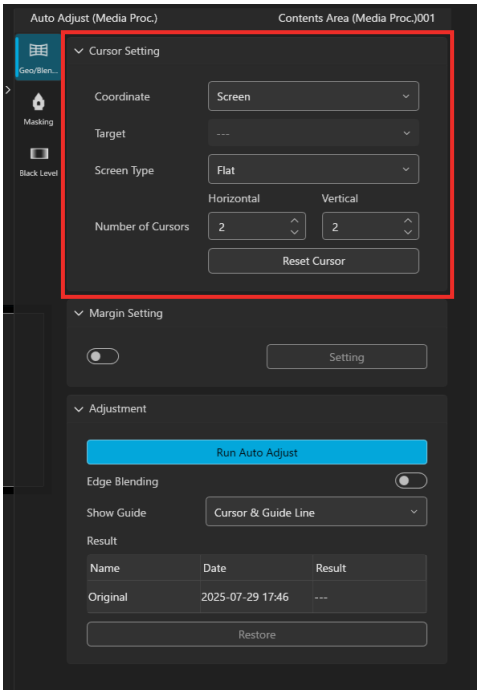
5 Click the [Exit Auto Adjust] button.



Note

- The execution result of automatic adjustment of the geometry and edge blending is displayed as history in [Result]. If you click history and then click the [Restore] button, the execution result of that time is recalled.

■ Settings in [Cursor Setting]



1 Select the setting method of the screen in [Coordinate].

Select one of the following options.

- [Screen]: Configure the screen settings using an actually projected image as the reference.
- [Camera]: Configure the screen settings while checking the camera image in the main view. If two or more cameras are registered in the content area, select the camera for which to configure the cursor settings in [Target].

Note

- If [Coordinate] is set to [Camera] when using multiple cameras, [Screen Type] and [Number of Cursors] in the next procedure cannot be changed because the positions of all cursors cannot be checked. If they need to be changed, set [Coordinate] to [Screen].

2 Select the shape of the screen in [Screen Type].

Select the screen type that matches the shape of the screen. Set the number of cursors according to the shape or curvature of the screen.

- [Flat]: Flat screen
- [Horizontal Curve]: Screen that is curved in the horizontal direction
- [Vertical Curve]: Screen that is curved in the vertical direction
- [H-V Curve]: Screen that is curved in the horizontal and vertical directions

Note

- The number of cursors calculated from the number of projectors and layout information is set automatically immediately after the [Cursor Setting] area of the Adjust view is displayed. This value is merely supposed to serve as a guide. Change it to match the shape or curvature of the actual screen.

3 **Specify the number of cursors in [Number of Cursors].**

The number of cursors on the screen is calculated automatically based on the number of projectors and layout information. This number is merely supposed to serve as a guide. Change the number of cursors to match the shape or curvature of the actual screen.

The number of cursors that can be set is a total of 300, with 2 or more per edge.

4 **Position the cursors on the screen displayed in the main view according to the shape of the actual screen.**

Note

- Take care not to create large differences in spacing between cursors in the placement on the actual screen. If there are parts with extremely different spacing, you may not be able to obtain the intended adjustment results.

Cursor layout operations

- Position each cursor by dragging them or by using the arrow keys on the keyboard. When using the keyboard, pressing an arrow key while a cursor is selected moves the cursor 8 dots, pressing an arrow key while holding the Ctrl key moves the cursor 1 dot, and pressing an arrow key while holding the Alt key moves the cursor 64 dots.
- You can select the next cursor by pressing the Tab key, or the previous cursor by pressing the Tab key while holding the Shift key.
- You can also select cursors using the number keys on the keyboard.
- To return all cursors to their original positions, click [Reset Cursor].
- The upper limit for the number of cursors displayed on the screen is 100. The cursors change color in units of 100. At that time, the cursor number is indicated using a maximum of two digits, with any 100th/200th/300th cursor number displayed as “0”.

Cursor	Color	Cursor number display
1 to 100	Yellow	1, 2, 3, ……99, 0
101 to 200	Cyan	
201 to 300	Magenta	

When you want to switch the display to a different color cursor, enter the corresponding cursor number with the keyboard number keys. For example, if you want to display a cyan cursor during the display of a yellow cursor, enter any number within the range of 101 to 200. Furthermore, while the 100th cursor is selected, you can display a different color cursor by pressing the tab key to select the 101st cursor.

■ Settings in [Margin Setting]

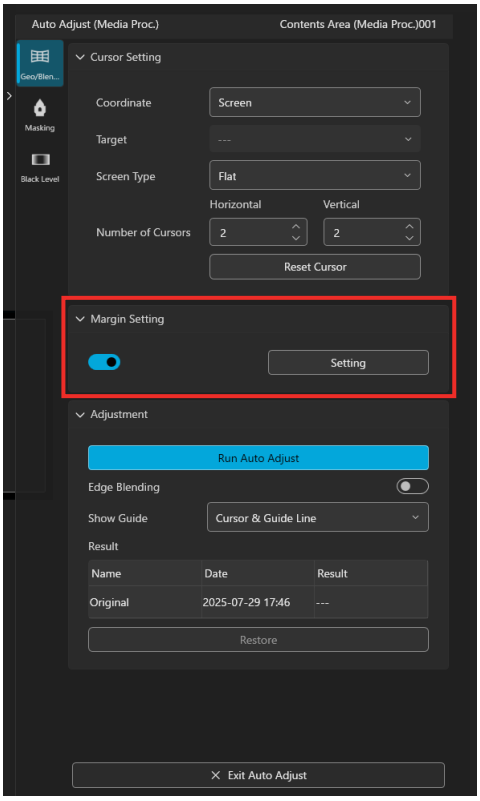
Set the [Margin Setting] area if, for example, the content to be projected has margins.
Configuring the margin settings makes it easier to position the cursors when configuring screen settings.

Note

- Setting of straight margins is possible. Setting of curved margins is not possible.

1 Enable [Margin Setting], and click the [Setting] button.

Set the state of the toggle button to  .



When you click the [Setting] button, the [Margin Setting] screen is displayed.

2 **Select the margin adjustment unit in [Scale].**

Select the adjustment unit for configuring the margin settings. When [Pixel] is selected, you need to enter the overall size of the content video to be projected.

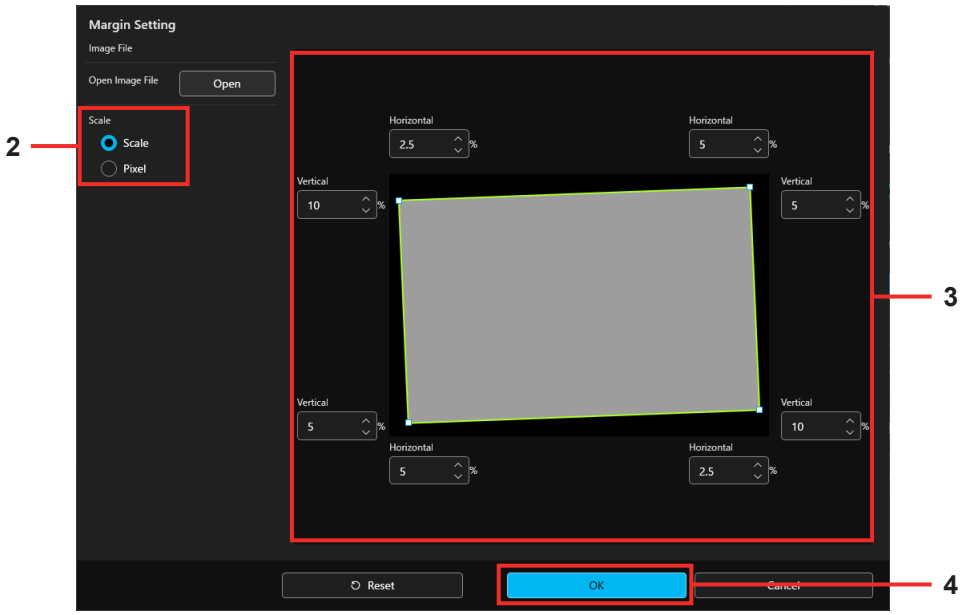
3 **Specify the margin size for each edge.**

Enter the ratio (as a percentage) relative to the overall size of the content video to be projected (including the margin areas), or enter the number of pixels (in pixels). However, the margins that can be set are up to a total of 60% per edge.

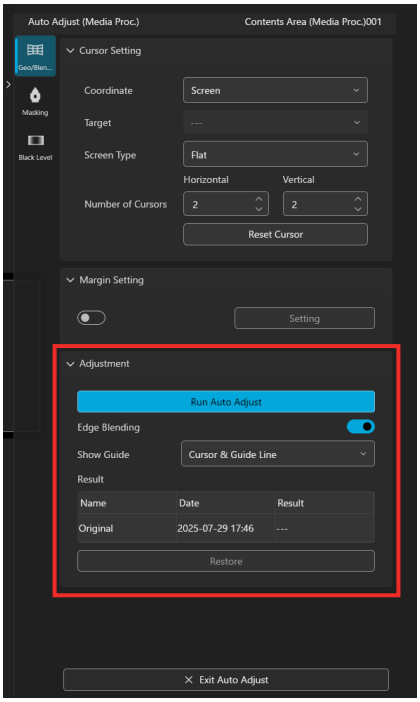
Note

- If you click the [Reset] button, the set margin sizes are restored to the initial values (0% for each edge).
- Click [Open] of [Open Image File] to read an image file for reference (extension: bmp, jpg, jpeg or png).

4 **After setting of the margins is finished, click the [OK] button to close the [Margin Setting] screen.**



■ Settings in [Adjustment].



[Edge Blending]

The projected image with edge blending applied can be checked by enabling this item. The projected image without edge blending applied can be checked by disabling this item.

[Show Guide]

Specify whether to display the guide on the screen.

- [Cursor & Guide Line]: Displays the guideline and cursor as the projected image.
- [Cursor]: Displays a cursor superimposed on any pattern selected by the user or the content being played.
- [OFF]: Does not display the guideline and cursor.

Note

- [Show Guide] can be selected only when the settings are configured in screen coordinates.

Masking

You can set a masking area as an overlay on the projected image. Display the [Auto Adjust (Media Proc.)] screen and then perform operation as follows.

➡ “Performing screen adjustment” (page 93)

1 Click [Masking] in the Adjust menu.

The masking setting area and [Adjustment] area are displayed in the Adjust view.

2 Add a masking area.

You can add the following masking areas as necessary.

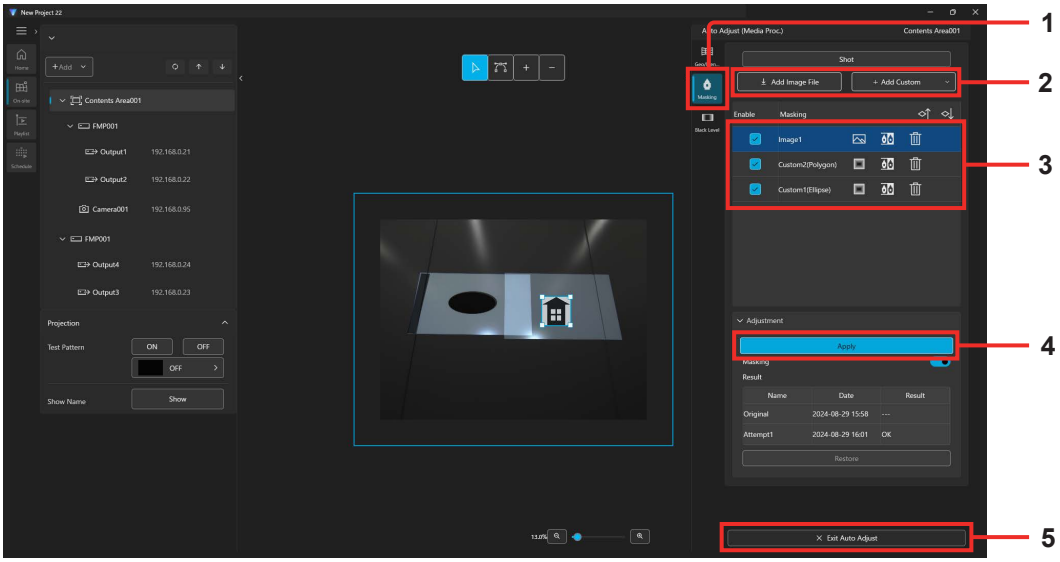
- [Add Custom]: Add a polygon or ellipse masking area. ➡ “Custom masking” (page 104)
- [Add Image File]: Add an image file as a masking area. ➡ “Image file masking” (page 106)

3 When multiple masking areas are added, specify the overlay order.

4 Click the [Apply] button.

The set masking area is projected from the media processor.

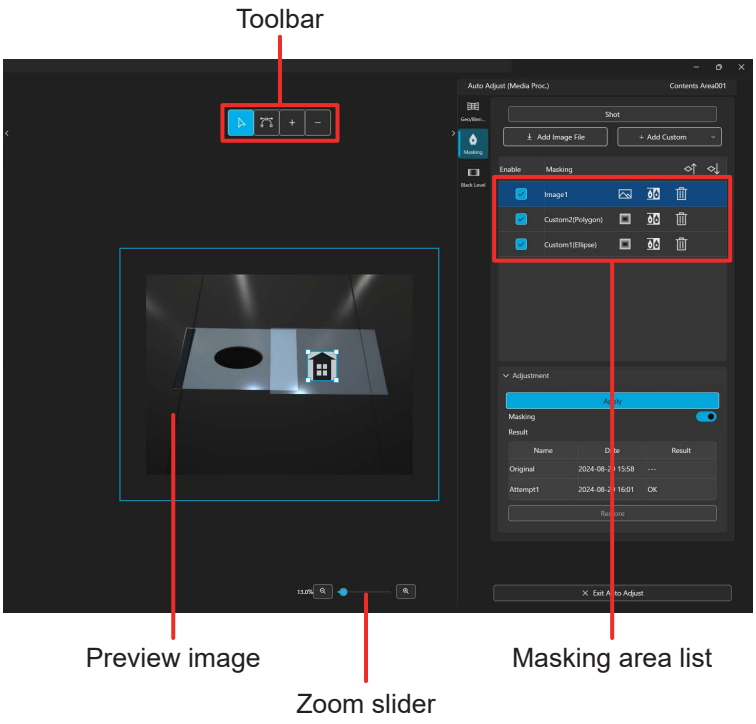
5 After masking adjustment is finished, click the [Exit Auto Adjust] button.



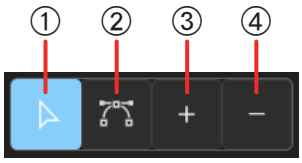
Note

- If you click the [Apply] button to execute the masking settings multiple times, those results are displayed in [Result] in order. Selecting a past adjustment result in [Result] and then clicking the [Restore] button allows you to return to the last adjustment result.
- You can check the projected state without a masking area displayed by disabling [Masking].
- If you click the [Shot] button, the image displayed in the main view is updated to the image from the media processor.

■ Main view when setting the masking area



Toolbar



Click to perform the following operations.

① Select the masking area itself or its control points.

② Curve each edge of the masking area.

③ Add a control point.

④ Delete the selected control point.

Preview image

Displays a preview of a rectangle indicating the projected image and the masking area.

Zoom slider

Zooms in or zooms out the preview image.

Masking area list

Displays the masking areas added to the main view in a list.

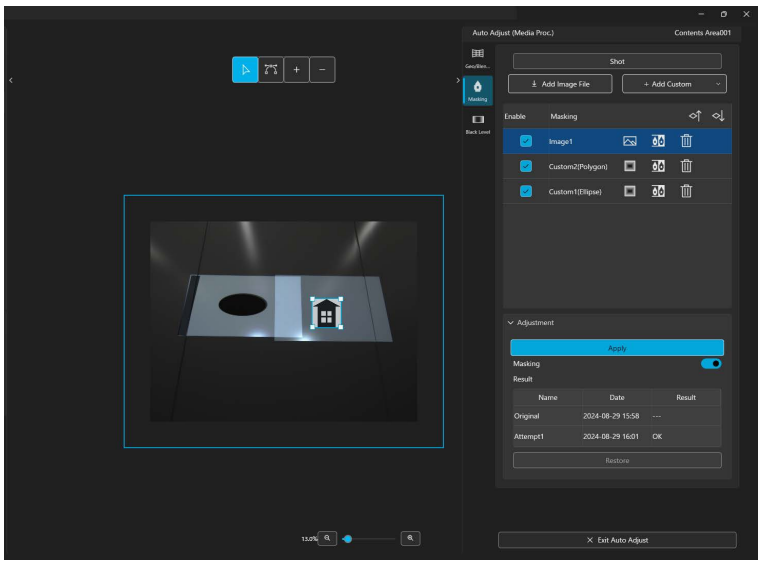
■ Custom masking

You can add a polygon or ellipse masking area as an overlay on the projected image. The shape of the added masking area can be freely modified.

Click the [Add Custom] button, and select the shape of the masking area to add in the displayed menu.

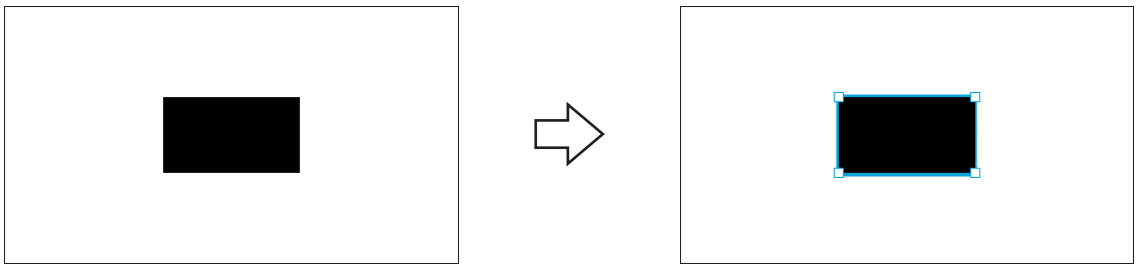
- When adding a polygon masking area, select [Add Polygon].
- When adding an ellipse masking area, select [Add Ellipse].

The added masking area is displayed at the center of the projected image in the preview image.

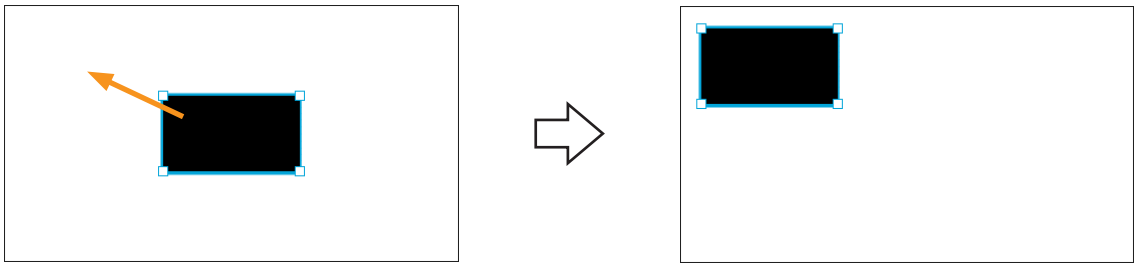


Polygon masking area operations

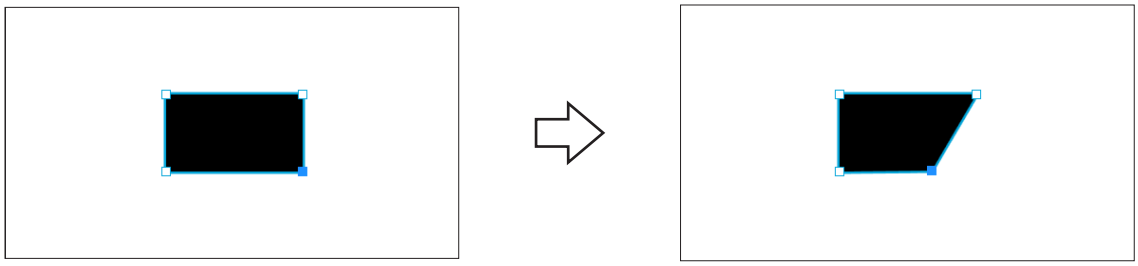
If you click [Add Polygon], a rectangular masking area is added to the center of the projected image. When you click to select the masking area, control points are displayed at the four corner vertices of the masking area.



You can drag the masking area, or press the cursor keys to move it up, down, left, or right.



If you click a control point, that control point turns light blue. You can change the shape of the masking area by dragging the light blue control point or pressing the cursor keys.

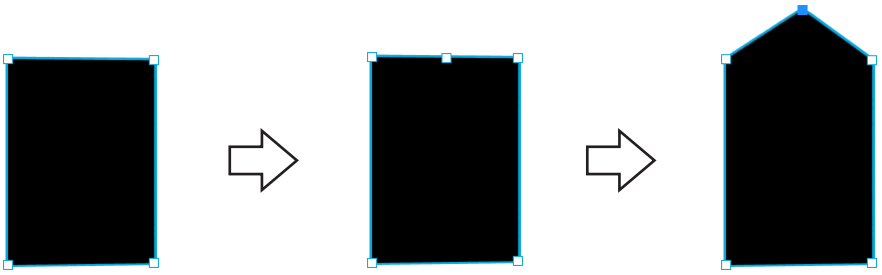


Note

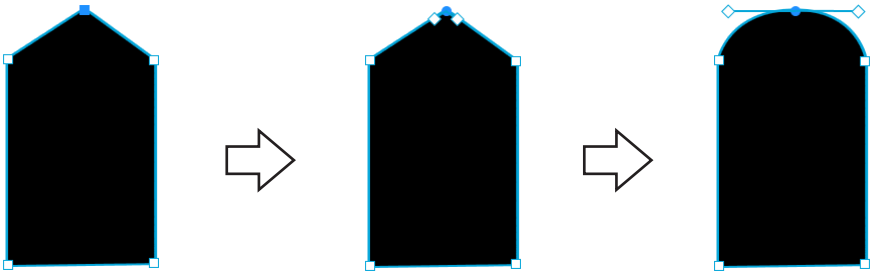
- Each press of a cursor key moves the control point by 1 pixel. Pressing the cursor key while holding down the Alt key moves it in increments of 4 pixels.

If you click on the toolbar and then click any position on an edge of the masking area, a control point is added to that position.

To delete an added control point, click on the toolbar and then click the control point to be deleted.



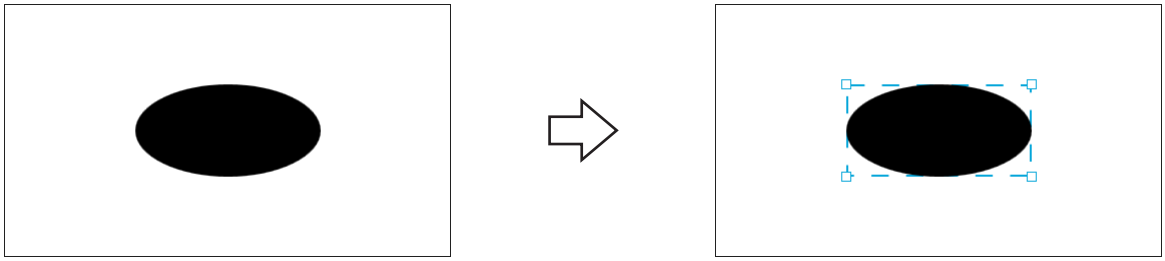
If you click on the toolbar and then click a control point of the masking area, the two line segments from that control point to the adjacent control points curve. Two handles are display at the clicked control point, and the bulge state of the curve and the position of the vertex can be changed by dragging the handles.
To disable the curve, right-click the control point selected when the line segments were curved and click [Disable Bezier Curve] in the displayed menu. The curved line segments are returned to straight lines.



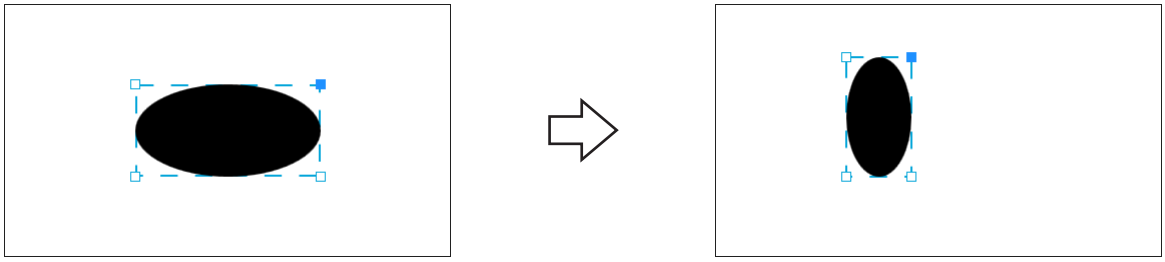
Ellipse masking area operations

You can click in the area with the mouse and then move, transform, or otherwise modify the masking area with the mouse or cursor keys.

When you click to select inside an elliptical masking area, four control points are displayed.



You can change the shape of the ellipse by dragging a control point or pressing the cursor keys.



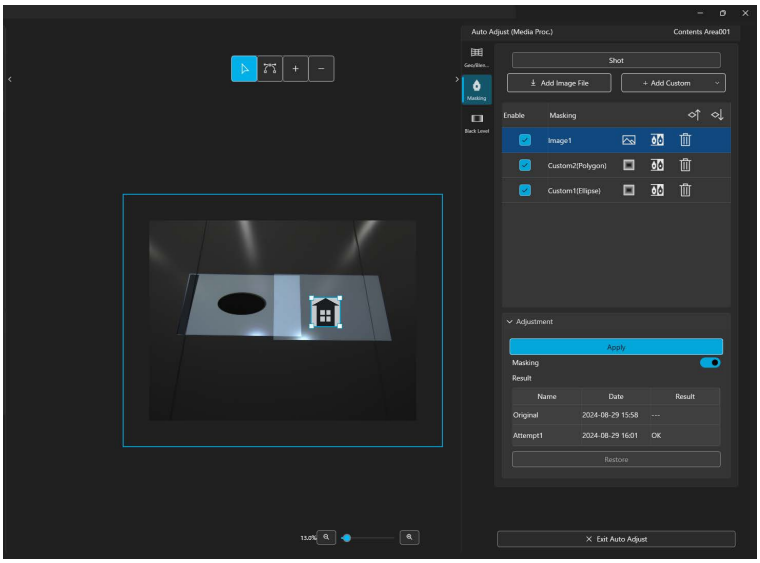
Note

- Each press of a cursor key moves the control point by 1 pixel. Pressing the cursor key while holding down the Alt key moves it in increments of 4 pixels.

■ Image file masking

You can overlay an image file (extension: bmp, dib, or png) on the projected image as a masking area. The shape of the added masking area can be freely modified.

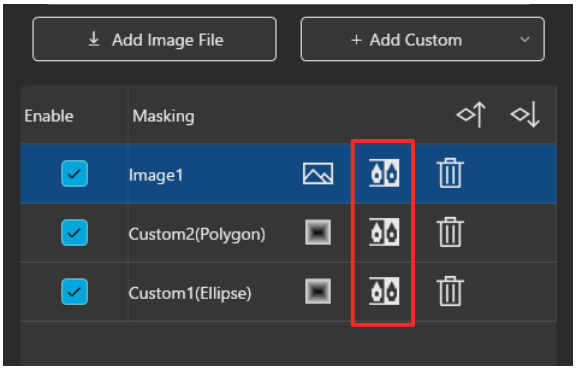
Click the [Add Image File] button, and specify an image file in the displayed screen. The specified image file is read, and displayed as a masking area at the center of the projected image in the preview image.



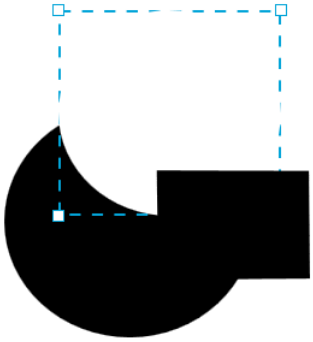
If the preview image is specified as a masking area, you can move, enlarge, or reduce it in the same way as an added ellipse masking area. ➡ “Custom masking” (page 104)

■ Flip

Clicking  of the masking area in the masking area list changes the area to one where the projected image of the masking area is transmitted without being masked.

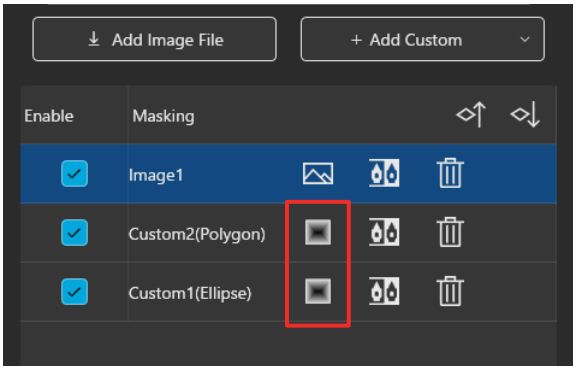


The shape of a masking area can be changed by overlaying a transmitted area on another masking area. For example, you can create a masking area that is like a crescent moon with a rectangle on it by placing a large circular masking area and then placing a flipped small circular area, and then additionally placing a rectangular masking area on them.



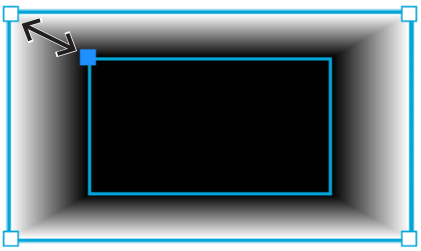
■ Gradation

Clicking of the masking area in the masking area list applies processing to increase the transmittance from the center part toward the periphery of the masking area. This is effective for a polygon or ellipse masking area.



Two frames, an inner frame and outer frame, are displayed in a masking area with gradation processing enabled. Moving or transforming of a masking area is performed within the inner frame. In this case, when transforming the masking area, move the vertex at the top-left corner of the frame.

When polygon masking area



When ellipse masking area

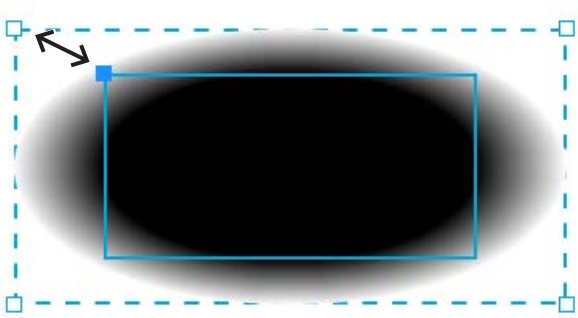
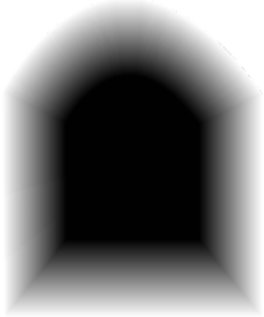
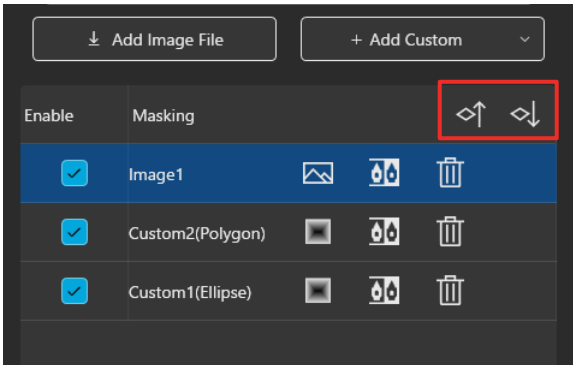


Image of masking area applied to projected image



■ Specifying the display hierarchical order of the masking area

Click a masking area in the masking area list and then reposition it in the list with one of the following buttons.



- : Moves the masking area up in the list.
- : Moves the masking area down in the list.

The masking area at the top of the list is displayed at the front, and the masking area at the bottom of the list is displayed at the back.

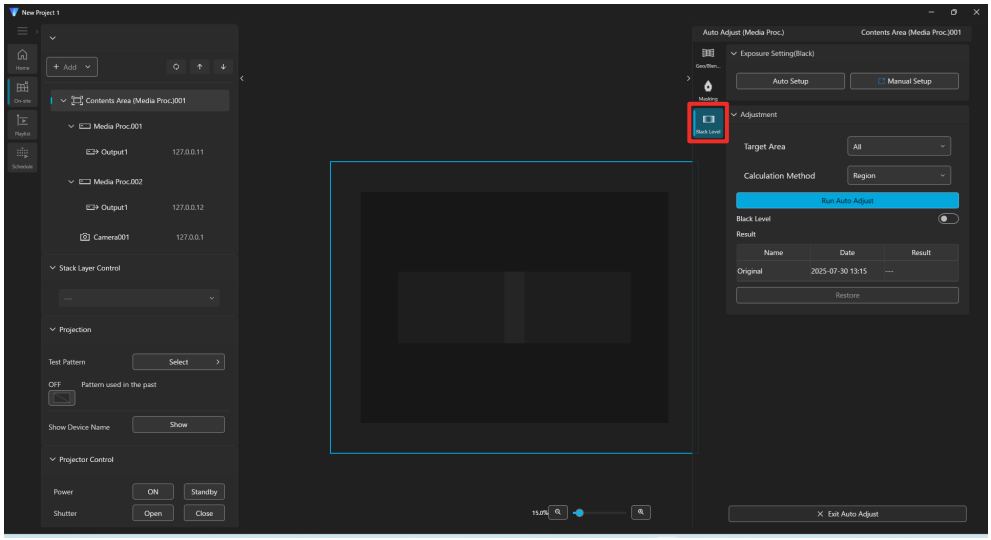
Black level adjustment

When joining the projection screens of multiple projectors, this function performs adjustments automatically to make the differences in the black level of the screen join parts less noticeable. Display the [Auto Adjust (Media Proc.)] screen and then perform operation as follows.

➡ “Performing screen adjustment” (page 93)

1 Click [Black Level] in the Adjust menu.

[Exposure Setting(Black)] area and [Adjustment] area are displayed in the Adjust view.

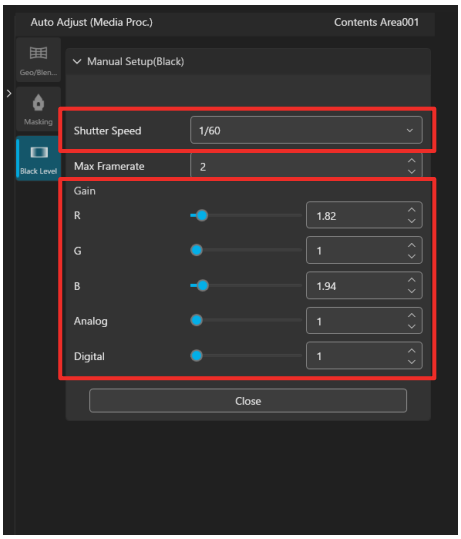


2 Perform exposure adjustment.

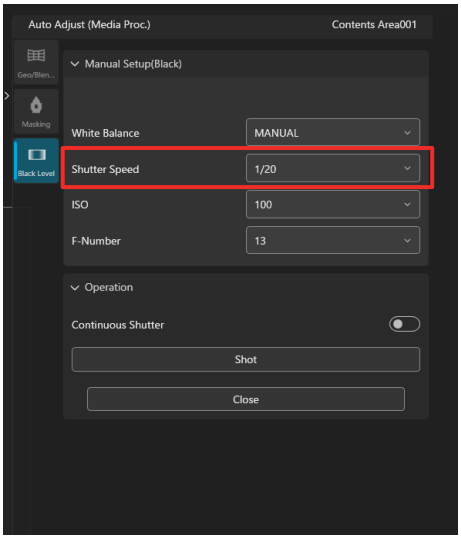
To perform exposure adjustment of the camera automatically, click the [Auto Setup] button.

To perform exposure adjustment of the camera manually, click the [Manual Setup] button. Depending on the camera used, one of the following screens is displayed and you can adjust the exposure.

For camera with network connection



When camera with USB connection



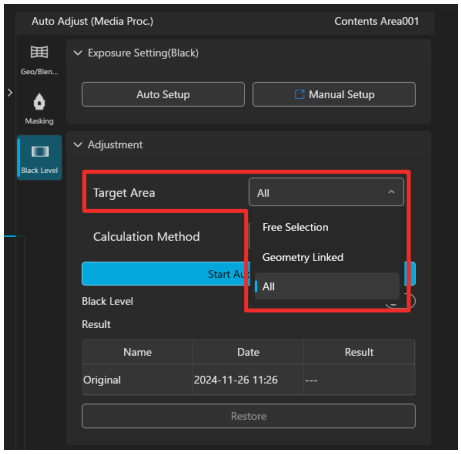
- [Shutter Speed]: Specify the shutter speed for the camera.
- [Gain]: Specify the gain for the camera. This can be set only for a camera with a LAN connection.

When manual exposure adjustment is finished, click the [Close] button to close the [Manual Setup(Black)] screen.

3 Select [Target Area].

Select the adjustment target area for the black level.

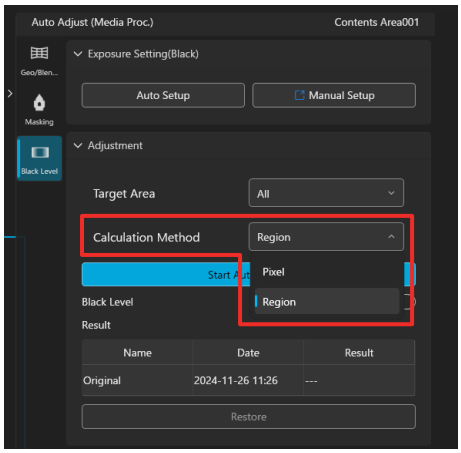
- [Free Selection]: Sets only the range specified with a polygon as the adjustment target area.
- [Geometry Linked]: Sets the same range as the adjustment range for geometry (edge blending) as the adjustment target area.
- [All]: Sets all of the range as the adjustment target area.



4 Select [Calculation Method].

Select the calculation method for the black level correction.

- [Pixel]: Adjusts the black level for each pixel. Using this calculation method is recommended for adjusting the black level for a screen that is not flat.
- [Region]: Divides the parts of the black level adjustment target area that actually require black level adjustment by projector, and adjusts the black level for each of those divided parts.



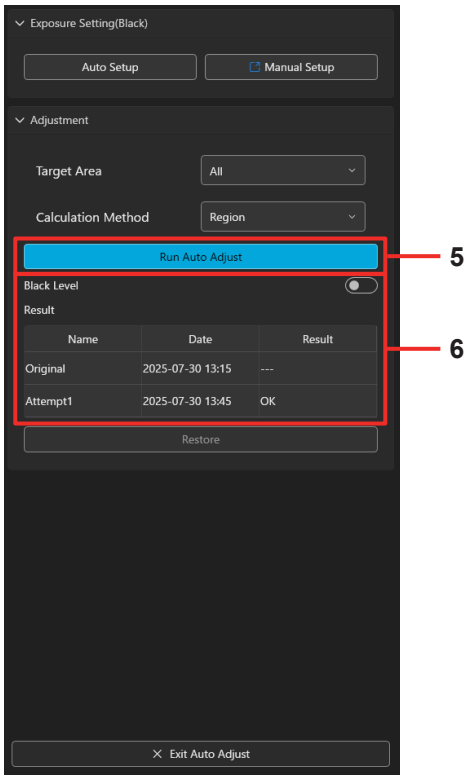
5 **Click the [Run Auto Adjust] button.**

Automatic adjustment of the black level begins. When adjustment finishes, the adjustment result is displayed in [Result].

6 **To check the projected image with black correction applied, enable [Black Level].**

Set the state of the toggle button to .

When [Black Level] is disabled, you can check the projected image without black level correction applied.



Note

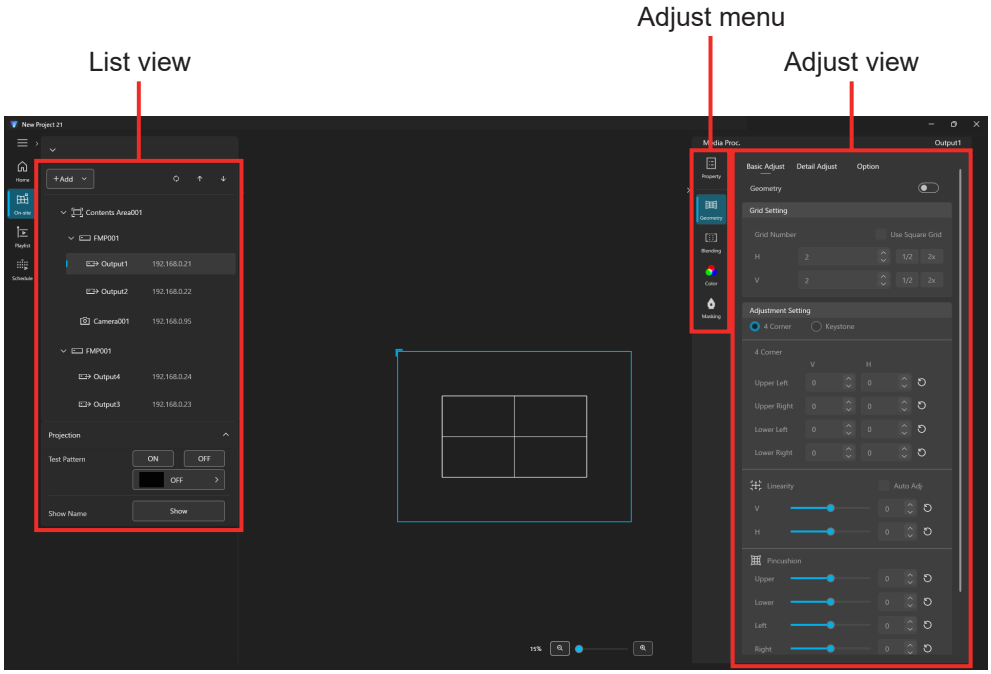
- If [Region] is selected in [Calculation Method], the region division result can be inherited as a custom polygon and the brightness shift result can be inherited as [Solid Paint] for manual adjustment. However, since the area division results will be reproduced by changing it to a shape that is easy to manually adjust using multiple straight lines or Bézier curves as a custom polygon, it may not be a perfect match to the result of automatic adjustment. To restore the result of automatic adjustment, select the content area, enter the Black Level Adjustment menu of automatic adjustment, and perform the restore operation from the result list.
- If you click the [Run Auto Adjust] button to run black level adjustment multiple times, those results are displayed in [Result] in order. Clicking a past adjustment result in [Result] and then clicking the [Restore] button allows you to return to the last adjustment result.
- You may not be able to obtain adequate adjustment results due to the impact of external lighting, such as when the surroundings are too bright or the brightness has changed. In such cases, perform exposure adjustment again. ➡ Step 2 of “Black level adjustment” (page 134)

7 **Click the [Exit Auto Adjust] button.**

Manual Adjust

Geometry correction

Project test patterns and grids onto the screen surface to correct the parts of the image that look unnatural.
The image can be made to look more natural by changing the number of grids and control points and making corrections.
Use the mouse to make rough adjustments, and use the cursor keys on the keyboard or input numerical values to make fine adjustments.



1 **Click the output of the media processor you want to adjust in the List view.**

2 **Click**  **[Geometry] in the Adjust menu.**

[Grid Setting] area and [Adjustment Setting] area are displayed in the Adjust view.

3 **Enable [Geometry].**

Set the state of the toggle button to .

4 **Set each item in the [Grid Setting] area.**

You can set the number of control points horizontally and vertically. The setting state can be checked in the main view.

If you place a check mark in [Use Square Grid], the combinations that can be set are limited.

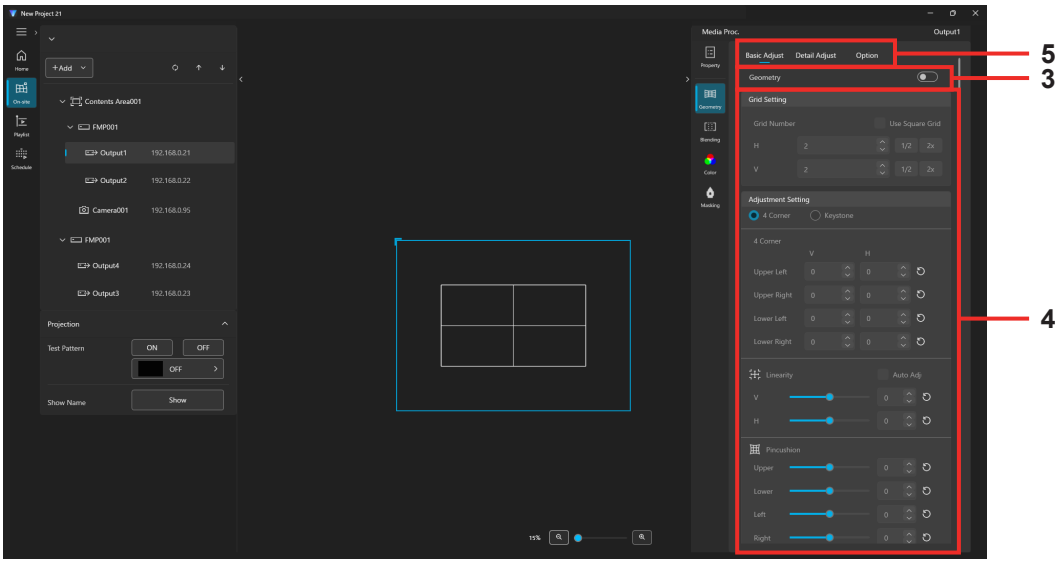
If you click the [1/2] button or [2x] button, the numbers of control points are halved or doubled from the current settings.

5 **Adjust the image with the control points.**

Adjust the control points displayed in the main view on one of the following tabs.

[Basic Adjust] tab: Adjust the control points using a predetermined correction pattern. ➡ “Basic adjustment” (page 115)

[Detail Adjust] tab: Adjust the control points as desired. ➡ “Detail adjustment” (page 118)

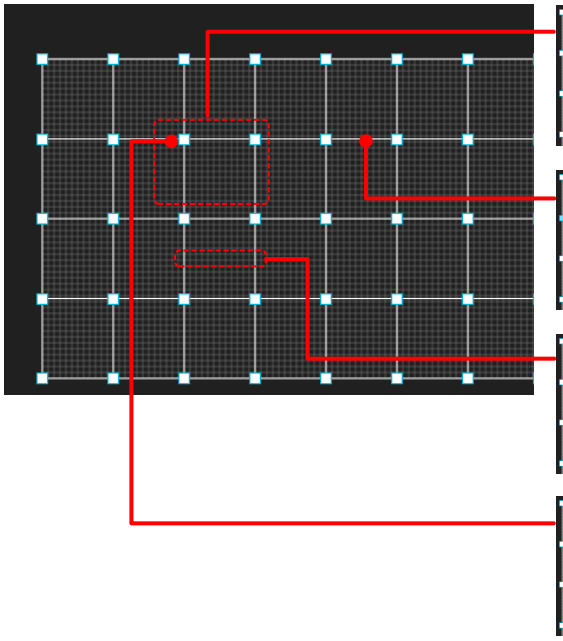


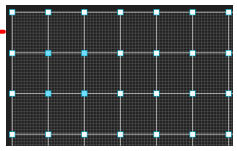
Note

- You can configure detailed settings for the display of test patterns and control points on the [Option] tab. ➡ “Options” (page 120)

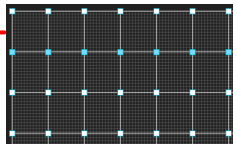
Selecting a control point

Drag the control points to move them. The control points cannot be moved by selecting the lines.

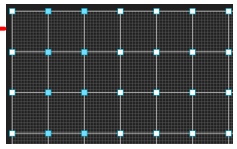




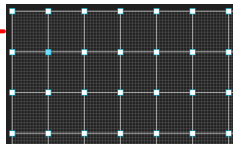
Multiple control points can be selected by dragging and enclosing the points where the grids intersect.



The control points can be selected using lines by clicking the space between one point where the grids intersect and another such point.



The control points can be selected using multiple lines by dragging and enclosing the spaces between one point where the grids intersect and another such point.

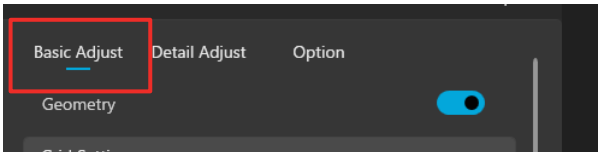


When a point where the grids intersect is clicked, it can be selected as a single control point.

Another control point can be selected while keeping the currently selected control point selected by clicking (or dragging) while holding down the Ctrl key.
To move the selection to the adjacent control point, press the Tab key or Shift + Tab keys while one control point is selected, or press the cursor key while holding down the Shift key.
To cancel the selection of the control point, click anywhere other than the grid with the mouse.

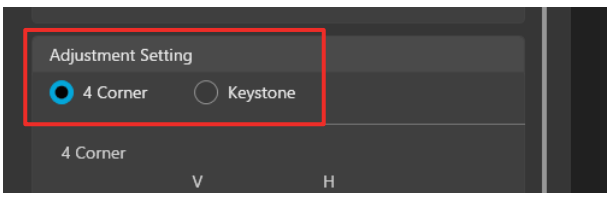
Basic adjustment

1 Click the [Basic Adjust] tab.



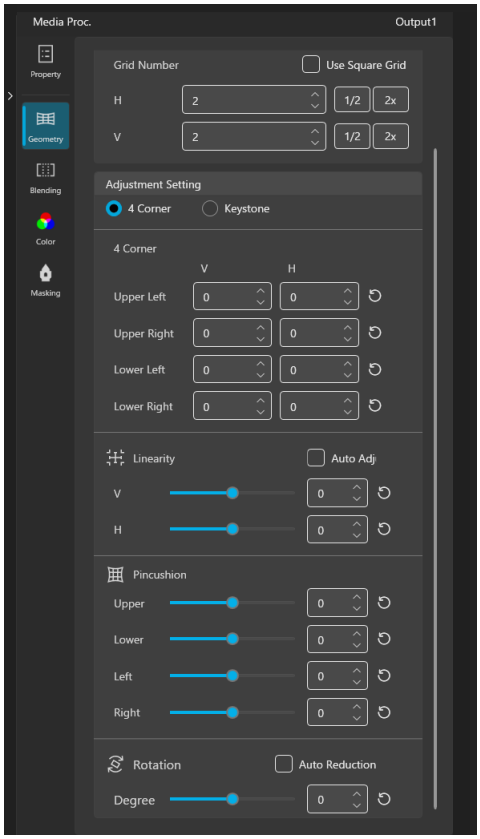
2 Select the correction pattern.

Select either [4 Corner] or [Keystone].



■ 4 Corner

Set the positions of the four corners of the image.



[Upper Left]/[Lower Left]/[Upper Right]/[Lower Right]

Set the horizontal and vertical positions of the upper left, lower left, upper right, and lower right.

[Linearity]

Set the linearity in the horizontal and vertical directions.

If a check mark is placed in [Auto Adjust], the linearity values are determined automatically from the positions of the upper, lower, left, right, and four-corner points. In this case, the values cannot be set.

[Pincushion]

Set the pincushion independently for upper, lower, left, and right.

[Rotation]

Set the rotational angle of the image in [Degree].

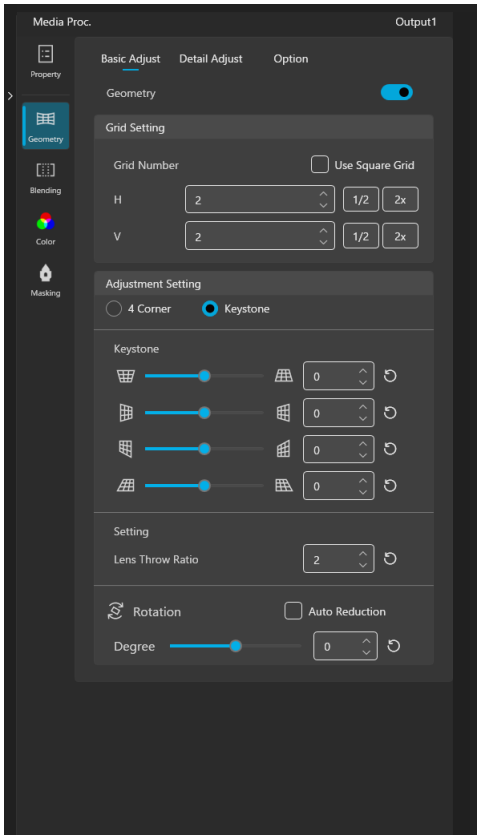
If a check mark is placed in the [Auto Reduction] checkbox, the image is reduced to a size at which it can be projected when it exceeds the projection area.

Note

- If you click displayed for each adjustment item, the changed setting value is reset.
- The [Undo] and [Redo] operations can be performed from the toolbar of the main view.
  ➡ “Toolbar Undo/Redo” (page 119)

■ Keystone

Make corrections using a keystone as the reference.



[Keystone]

Displays the setting items for vertical, horizontal, vertical balance, and horizontal balance in order from the top of the setting items. Adjust the correction pattern for each of them.

[Setting]

Sets [Lens Throw Ratio].

[Rotation]

Set the rotational angle of the image in [Degree].

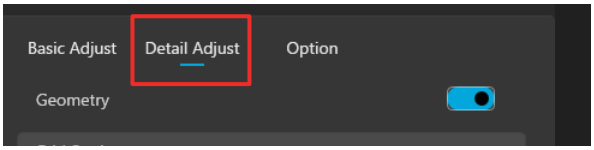
If a check mark is placed in the [Auto Reduction] checkbox, the image is reduced to a size at which it can be projected when it exceeds the projection area.

Note

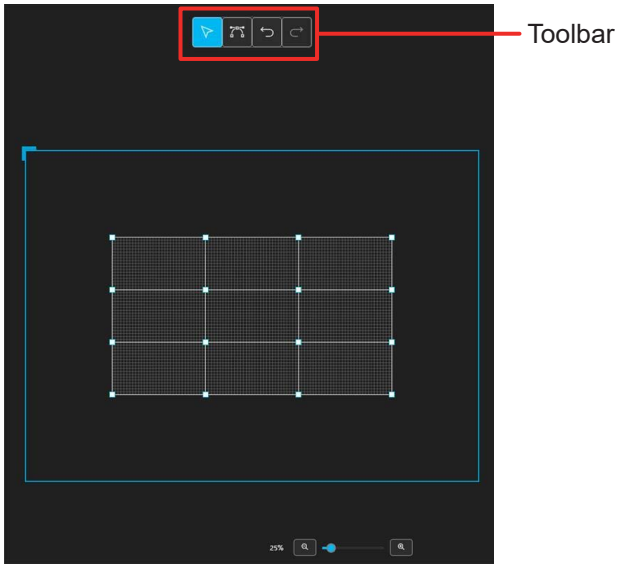
- If you click displayed for each adjustment item, the changed setting value is reset.
- The [Undo] and [Redo] operations can be performed from the toolbar of the main view.
  ➡ “Toolbar Undo/Redo” (page 119)

Detail adjustment

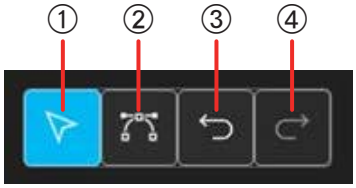
1 **Click the [Detail Adjust] tab.**



2 **Switch the mode on the toolbar of the main view.**



Toolbar



Click to perform the following operations.

① Select and move a control point.

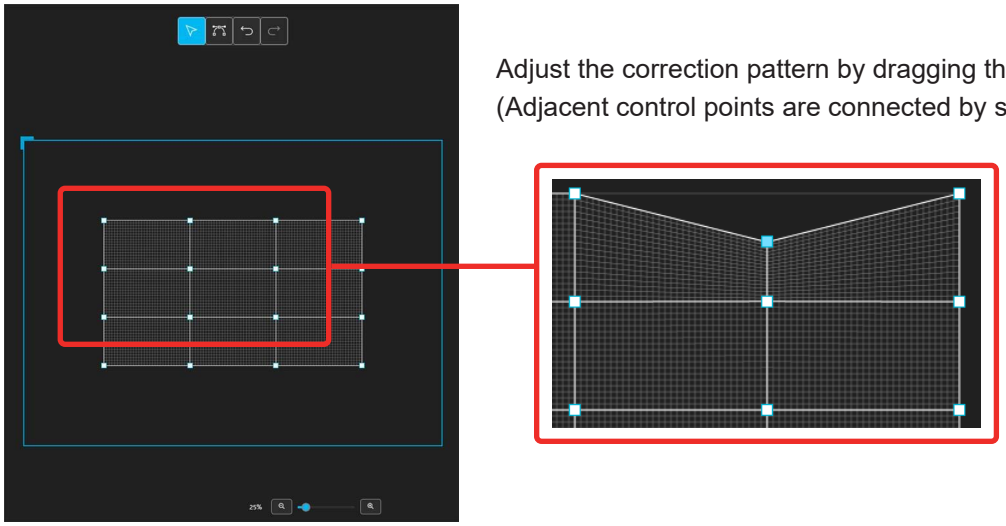
② Curve the edges around control points.

③ Undo: Discard the last editing operation and return to the state before it was performed.
➡ “Toolbar Undo/Redo” (page 119)

④ Redo: Return to the setting before the undo operation was performed. ➡ “Toolbar Undo/Redo” (page 119)

■ Grid mode

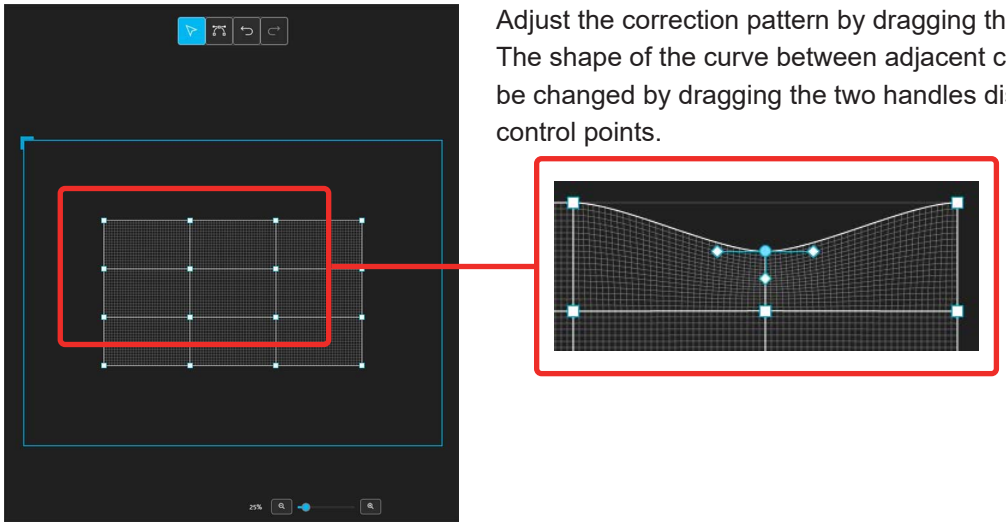
Make corrections by connecting between control points with straight lines.



Adjust the correction pattern by dragging the control points.
(Adjacent control points are connected by straight lines.)

■ Bezier curve mode

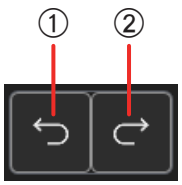
Make corrections by connecting between control points with smooth curves.



Adjust the correction pattern by dragging the control points.
The shape of the curve between adjacent control points can be changed by dragging the two handles displayed at the control points.

Toolbar Undo/Redo

In basic adjustment and detail adjustment, you can perform the [Undo] and [Redo] operations from the toolbar of the main view.



① Undo: Discard the last editing operation and return to the state before it was performed.
The operation can also be performed by using the keyboard shortcut “Ctrl” + “Z”.

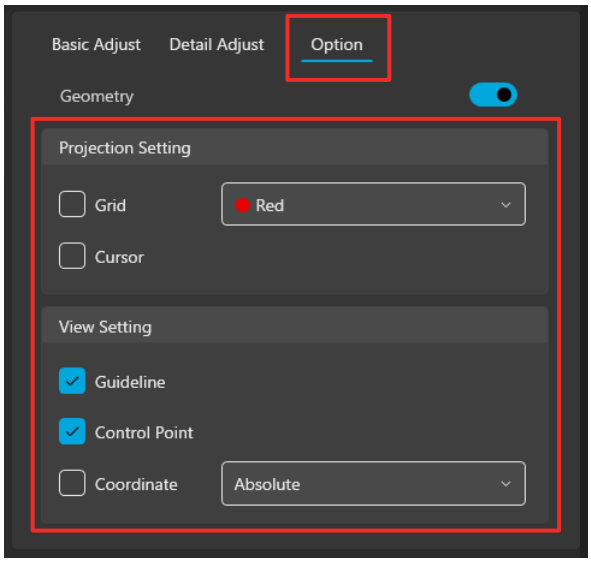
② Redo: Return to the setting before the undo operation was performed.
The operation can also be performed by using the keyboard shortcut “Ctrl” + “Y”.

Note

- When you go to an adjustment function other than geometry correction or when you switch the selection of a device registered in the List view, the history of editing operations is cleared.

Options

The [Option] tab allows you to configure settings related to the projected image and main view display.



[Projection Setting]

Configure settings for projected images.

- [Grid]: Specify whether to display a grid on projected images. The color of the grid can also be specified.
- [Cursor]: Specify whether to display an arrow to indicate the position of the selected control point on projected images.

[View Setting]

Configure settings for main view display.

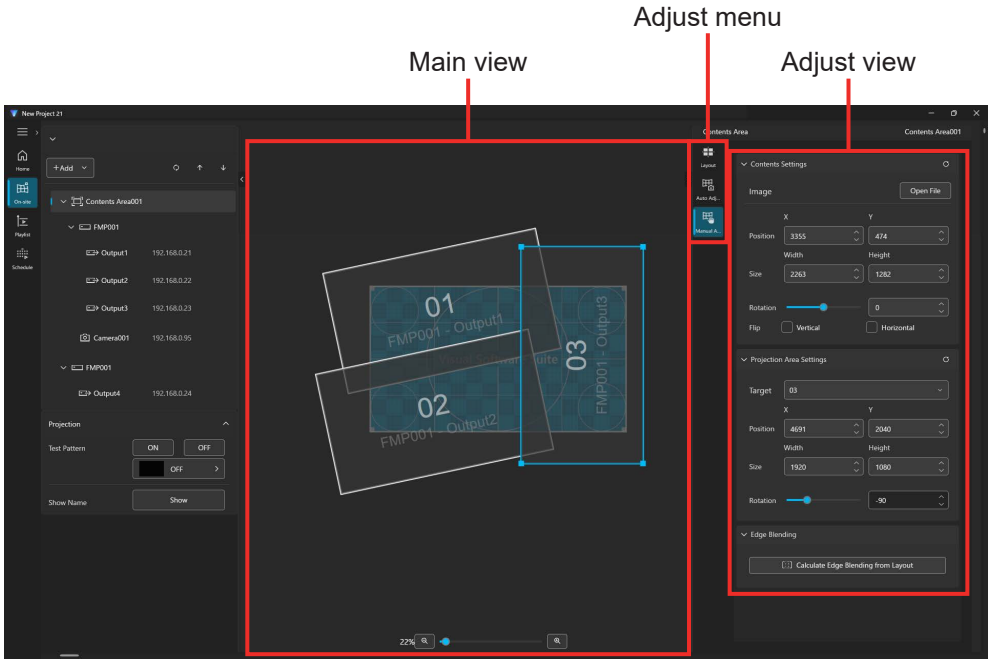
- [Guideline]: Specify whether to display the guidelines in the main view.
- [Control Point]: Specify whether to display control points in the main view.
- [Coordinate]: Specify whether to display the coordinates of each control point. If you placed a check mark in the checkbox, select the display mode.
  - When [Absolute] is selected, the coordinates are displayed beside each control point treating the upper left control point as the origin.
  - When [Relative] is selected, the coordinates are displayed beside each control point treating the initial position of the selected grid control point as the origin.

Contents area

One content image can be projected onto a screen made up the projection screens of multiple projectors via a media processor.
This section describes how to create a content area and set the placement of the projection screen of each projector.

Content splitting

To match the projection screen of each projector to the layout on the actual screen, you can freely arrange the projection screens as projection areas in the main view. Overlay a content area while transforming it in each placed projection area, and make adjustments so that projection on the screen becomes as intended.



1 Perform the “Content area settings” to “Registering the media processor and camera to a content area” procedures of auto screen adjustment.

➡ “Flow of auto screen adjustment” (page 78)

Note

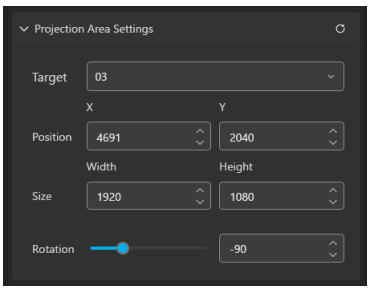
- A camera cannot be used in manual adjustment of content areas.

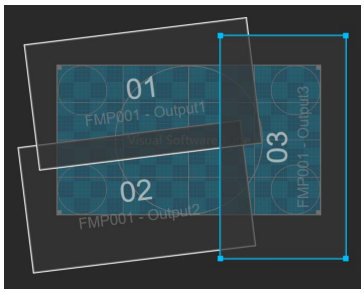
2 Click [Manual Adjust] in the Adjust menu.

[Contents Settings] area, [Projection Area Settings] area and [Edge Blending] area are displayed in the Adjust view.

3 Configure the projection range (projection area) of each projector in the Adjust view and main view to match actual screen projection.

Operations in the [Projection Area Settings] area of the Adjust view





With the settings shown on the left, display will be as shown above in the main view.

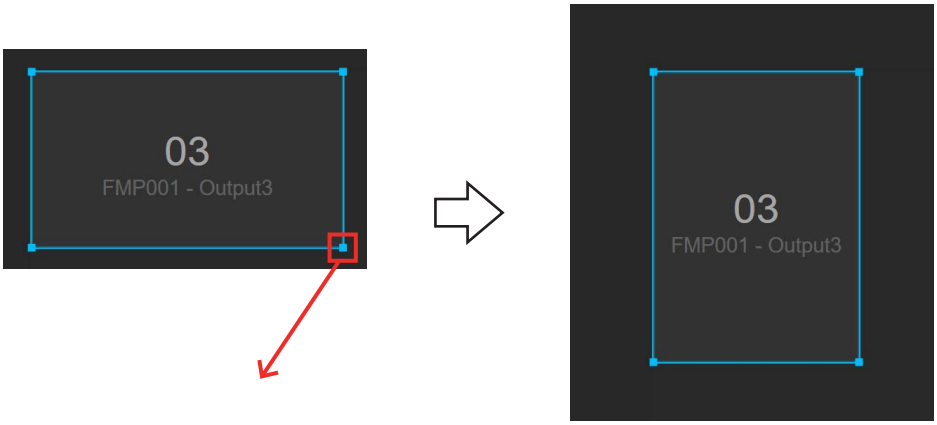
- [Target]: Select the projection area to be set.
- [Position]: Specify the position of the projection area by entering the coordinates (horizontal direction: X, vertical direction: Y) of the upper left vertex of the area treating the vicinity of the upper left of the main view as the origin.
- [Size]: When enlarging or reducing the projection area, set the number of pixels in the horizontal and vertical directions. Change the size treating the upper left vertex of the area as the fixed point. Even if the area is rotated, this upper left vertex remains a fixed point and does not change.
- [Rotation]: Rotate the projection area treating the center of that rectangle as the axis.

Operations in the Main view

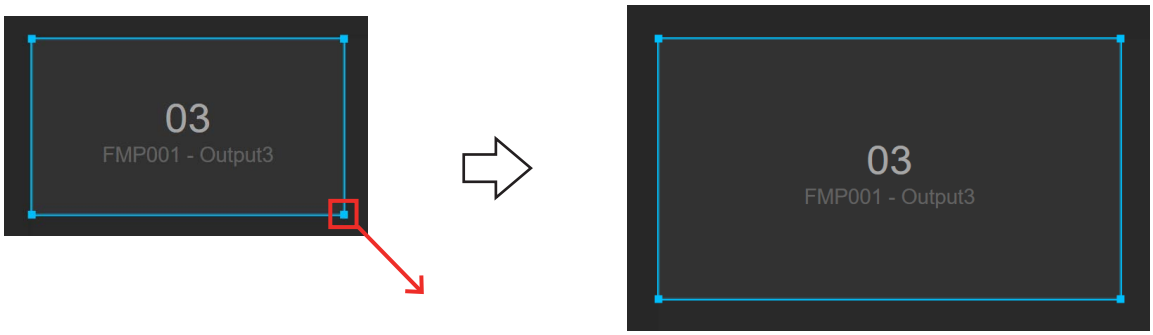
If you select the output of the media processor corresponding to the projection area to be operated in the List view or click in the area with the mouse, the frame of the projection area will turn blue and control points will be displayed at the four corners.

The position can be changed by clicking inside the projection area and then dragging.
The projection area can be enlarged, reduced, or transformed by dragging a control point as follows.

- Dragging a control point enlarges and reduces while transforming the length and width of the rectangle.

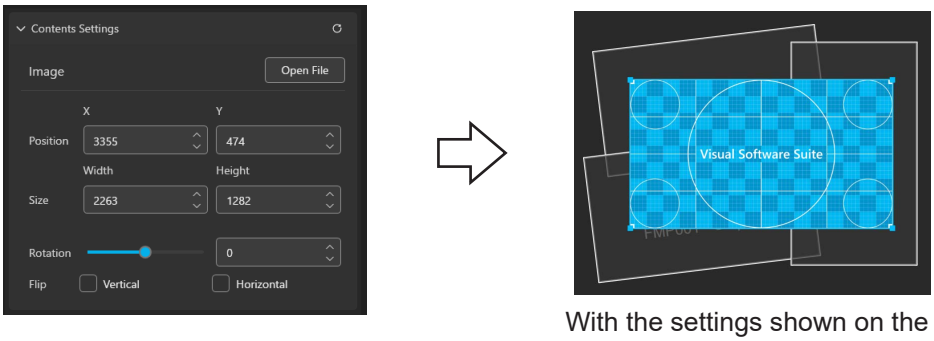


- Dragging a control point while pressing the Shift key enlarges or reduces while maintaining the aspect ratio of the rectangle.



4 Overlay a content area in the main view while transforming it, and make adjustments in the Adjust view so that projection of the content on the screen becomes as intended.

Operations in the [Contents Settings] area of the Adjust view



With the settings shown on the left, display will be as shown above in the main view.

- [Image]: Change the content image screen in the main view to any image file. Click [Open File], and specify an image file in the displayed screen.

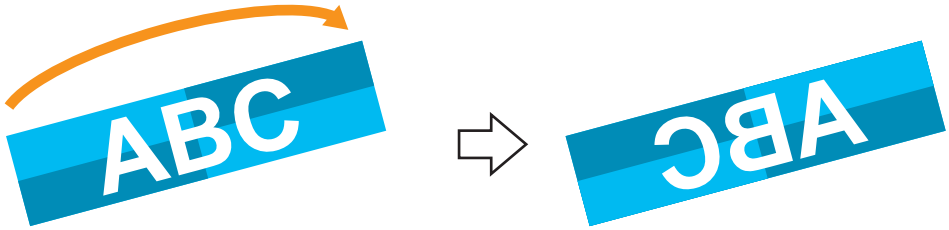
Specifications of supported image data:

Image format	Maximum number of pixels	Other functions	Extension
JPEG	Total number of pixels: 18 million (long side 7 680 or less)	Image format: baseline only Animation: Unsupported Color space: YUV420/YUV422/YUV444	jpg jpeg
Bitmap		Number of bits: 1bit, 4bit, 8bit, 24bit Run-length encoding: Unsupported Bit fields: Unsupported Top to bottom: Unsupported Transparent: Unsupported	bmp
png		Number of bits: 24bit, 32bit Transparent: Unsupported	png

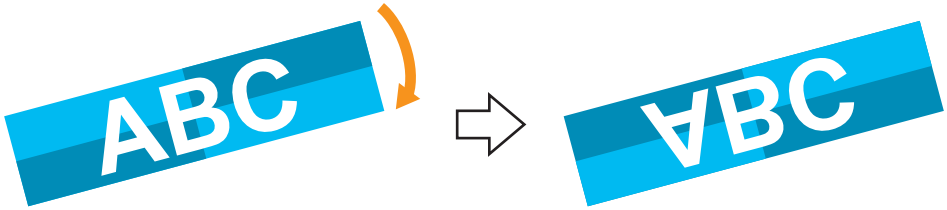
- [Position]: Specify the position of the content image screen by entering the coordinates (horizontal direction: X, vertical direction: Y) of the top left vertex of the screen treating the top left corner of the editing screen as the origin.
- [Size]: When enlarging or reducing the projection screen of the content image screen, set the number of pixels in the horizontal and vertical directions. Change the size treating the top left vertex of the screen in the upright position as the fixed point. Even if the screen is flipped or rotated, this top left vertex remains a fixed point and does not change.
- [Rotation]: Rotate the content image screen treating the center of that rectangle as the axis.

- [Flip]: Flip the image displayed in the content image screen. Place a check mark in either or both of [Horizontal] and [Vertical] to specify horizontal or/and vertical. When the content image screen is displayed rotated, it will be flipped in the horizontal or vertical direction of when there is no rotation.

  When a check mark is placed in [Horizontal]



  When a check mark is placed in [Vertical]



Note

- If you click ↺, the changed setting value is reset.

Operations in the Main view

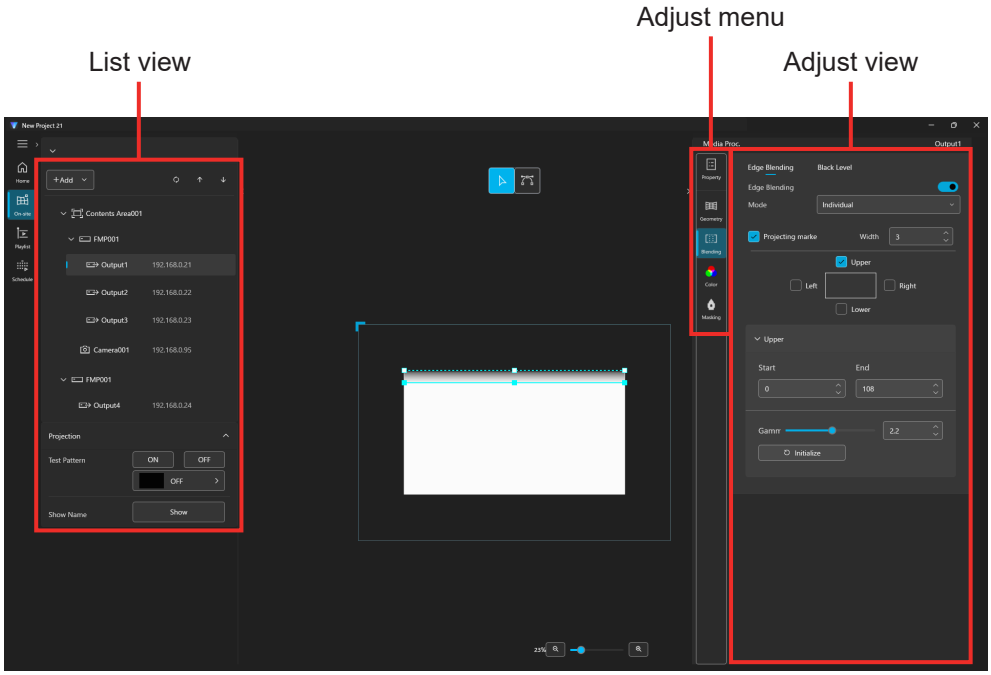
Change and adjust the position and shape of the content area using the same procedure as the operation for the projection area in “Operations in the Main view” in step 3.

Edge blending

The screen joins can be corrected when constructing a multi-screen by joining the projection screens of multiple projectors that are connected via a media processor. Perform the operation in either individual mode or content area mode depending on the way in which multiple projectors are arranged.

Individual mode

Use this mode when constructing a multi-screen by arranging multiple projectors aligned in either the vertical or horizontal direction or in both directions. Set the necessary joins at the top, bottom, left, and right of each projector by determining the start lines and end lines.



1 Click the output of the media processor you want to adjust in the List view.

2 Click [Blending] in the Adjust menu.

[Edge Blending] tab and [Black Level] tab are displayed in the Adjust view.

3 **Click the [Edge Blending] tab.**

4 **Enable [Edge Blending].**

Set the state of the toggle button to  .

5 **Select [Individual] in [Mode].**

6 **Place check marks in the checkboxes for the edges (left edge / upper edge / right edge / lower edge) to apply edge blending, and then set the start line and end line.**

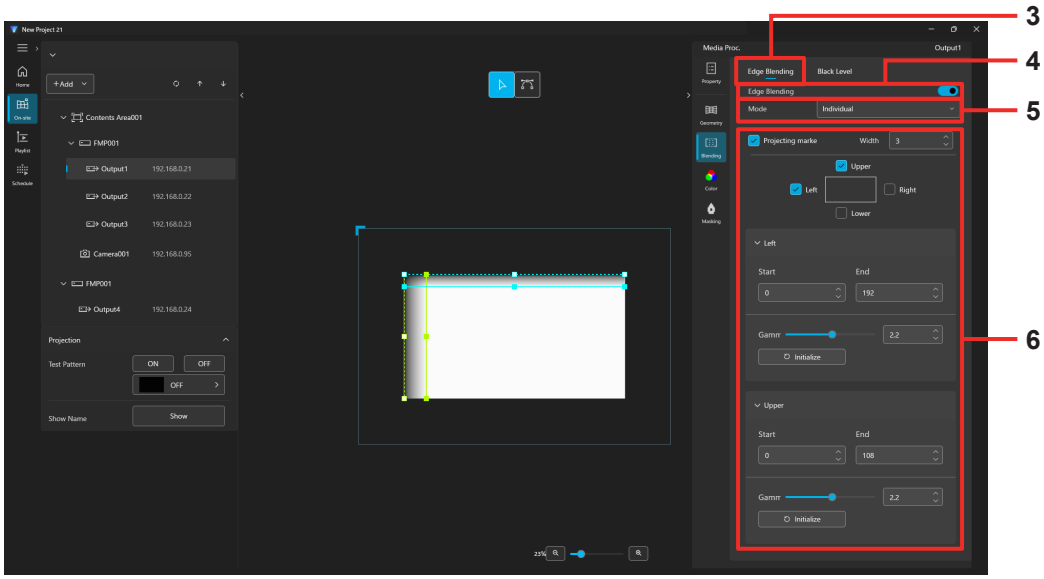
For example, when applying edge blending to the upper edge, place a check mark in the [Upper] checkbox and then set the following items displayed below [Upper].

- [Start]: Set the starting position for edge blending.
- [End]: Set the ending position for edge blending.
- [Gamma]: Set the gamma value to apply to edge blending.
- [Initialize]: Reset the changed setting value.

When also applying edge blending to other edges, set it in the same way.

Note

- If you place a check mark in the [Projecting markers] checkbox, the start line and end line for the edges to apply edge blending are displayed on the projected image. You can change the width of the marker lines in [Width].



Contents area mode

Automatically calculate the blend area from the layout information (set on the [Contents Area] tab) set with a function compatible with the free layout of projectors.

1 Perform the “Content area settings” to “Registering the media processor and camera to a content area” procedures of auto screen adjustment.

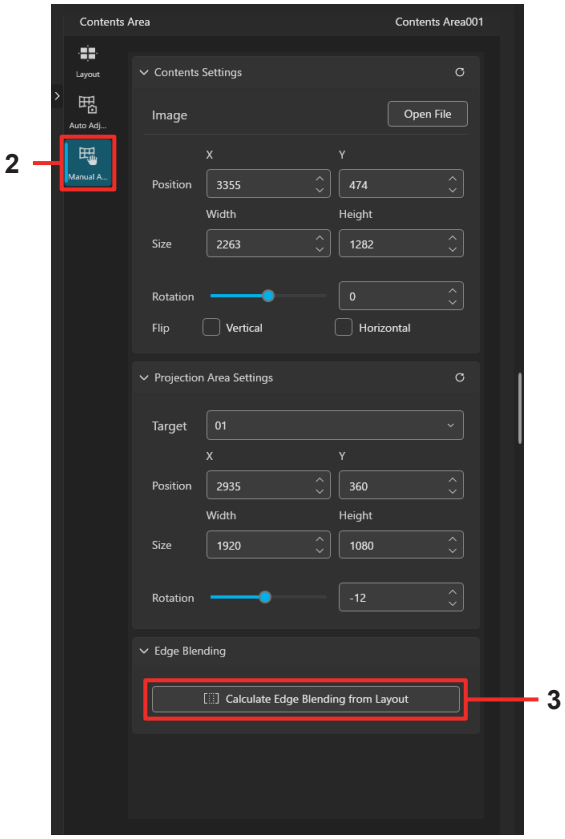
➡ “Flow of auto screen adjustment” (page 78)

2 Click [Manual Adjust] in the Adjust menu.

[Contents Settings] area, [Projection Area Settings] area and [Edge Blending] area are displayed in the Adjust view.

3 Click the [Calculate Edge Blending from Layout] button after setting the content area.

➡ “Content splitting” (page 121)



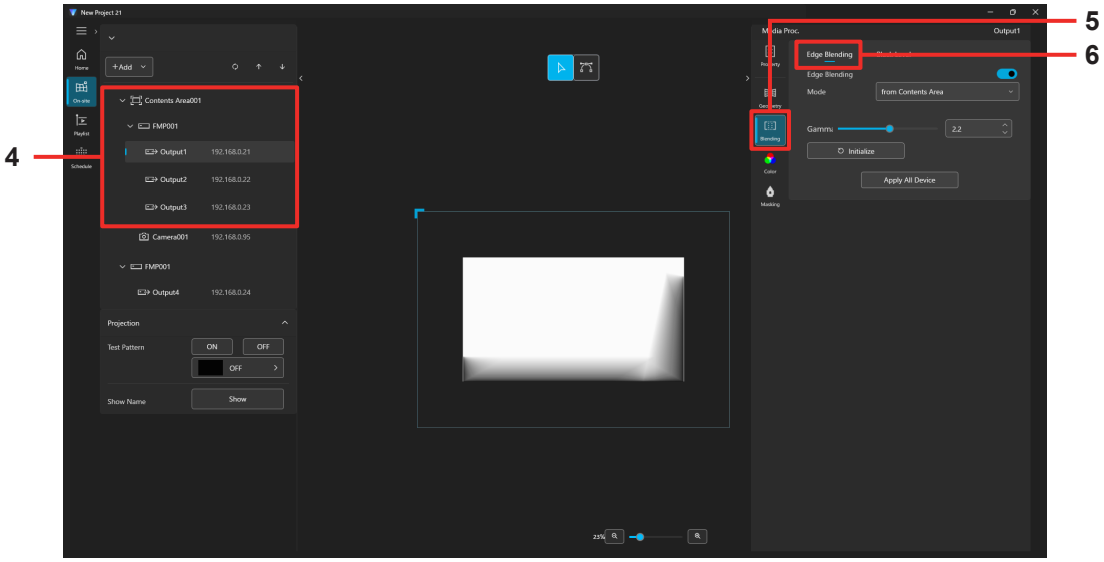
Calculation of edge blending is performed based on the layout information of the projection area set in the content area.

When calculation finishes, that result is reflected in the main view. You can finely adjust the gamma value to apply to edge blending in subsequent operation.

4 **Click the output of the media processor you want to adjust in the List view.**

5 **Click [Blending] in the Adjust menu.**

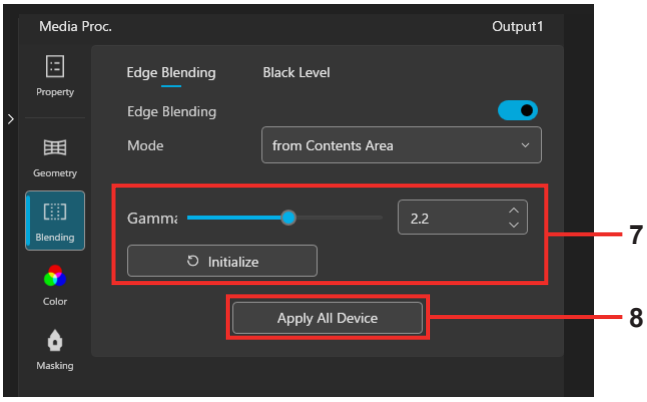
6 **Click the [Edge Blending] tab.**



7 **Set the gamma value to apply to edge blending in [Gamma] as necessary.**

If you click [Initialize] after changing the gamma setting value, the changed setting value is reset.

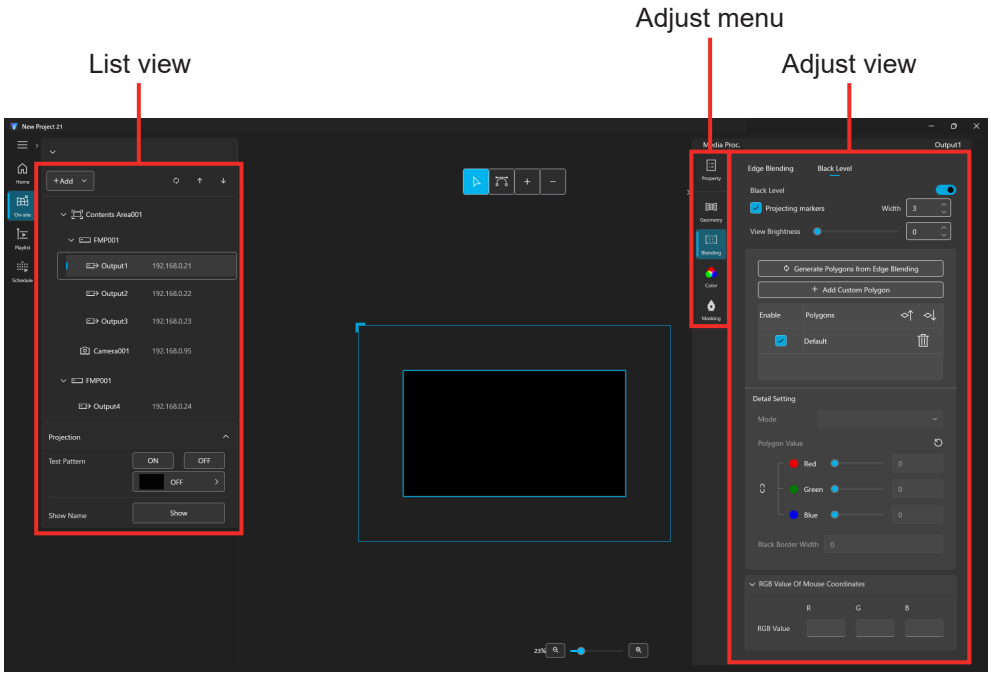
8 **To apply the setting to not only the output of the selected processor but to also all outputs registered to the content area, click the [Apply All Device] button.**



The set gamma value is reflected in the edge blending of the outputs of all media processors linked to the content area.

Black level adjustment

If an image that is completely black is projected when a multi-screen has been constructed by joining the projection screens of multiple projectors, a screen join part may become brighter than other parts or differences in the brightness of black may be visible between projectors. By adjusting the black level, you can change the brightness level and coloring when black is projected onto any area of the projection screen of the projector, making the difference in black level less noticeable.



1 **Click the output of the media processor you want to adjust in the List view.**

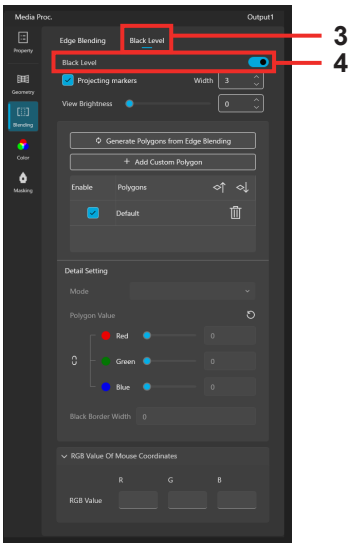
2 **Click [Blending] in the Adjust menu.**

[Edge Blending] tab and [Black Level] tab are displayed in the Adjust view.

3 **Click the [Black Level] tab.**

4 **Enable the settings of [Black Level].**

Set the state of the toggle button to .



5 **Add a black level adjustment area.**

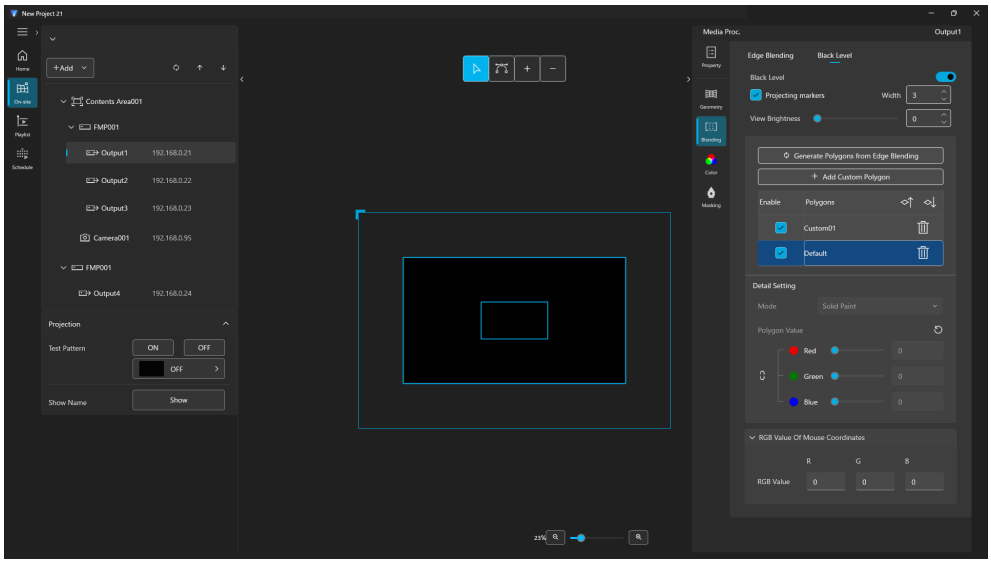
➡ “Adding a black level adjustment area” (page 130)

6 **Perform black level adjustment for the added black level adjustment area.**

➡ “Black level adjustment” (page 134)

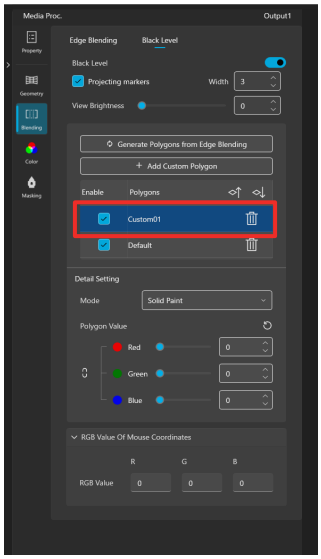
Adding a black level adjustment area

Overlay a black level adjustment area on a part for which to adjust the black level in the projected image.



■ Adding a black level adjustment area

If you click the [Add Custom Polygon] button in the Adjust view, a rectangular black level adjustment area is added to the center of the projected image. The black level adjustment area added with this operation is added with the [Custom <Sequence Number>] name to the black level adjustment list.

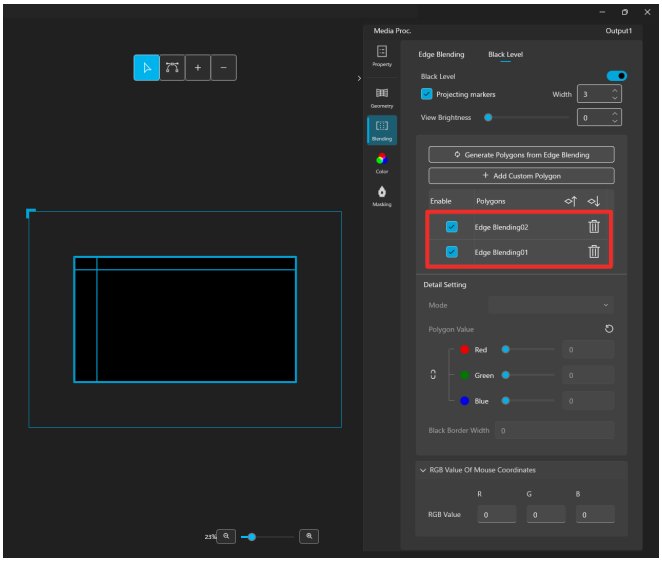


Note

- In the following cases, [Default] is added to the black level adjustment list. [Default] can be enabled/disabled and deleted.
  - When a black level adjustment setting file has been read
  - When correction data has been obtained from the media processor

■ Automatically generating a black level adjustment area based on the edge blending information

If you click the [Generate Polygons from Edge Blending] button in the Adjust view, a black level adjustment area with multiple polygons is generated automatically based on the edge blending information. The black level adjustment area added with this operation is added with the [Edge Blending <Sequence Number>] name to the black level adjustment list.

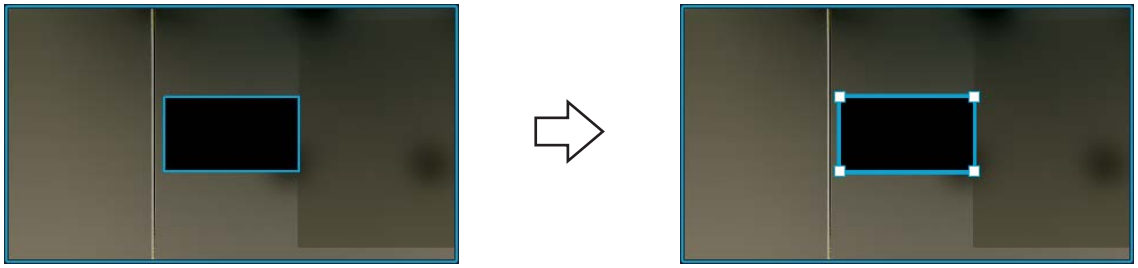


■ Adding a black level adjustment area obtained in auto screen adjustment

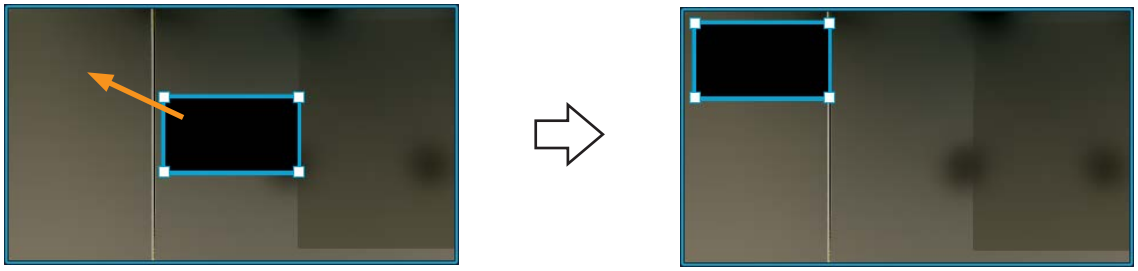
When auto screen adjustment is performed, the black level adjustment area obtained at that time is displayed with the [Default] name in the black level adjustment list.

■ Black level adjustment operations

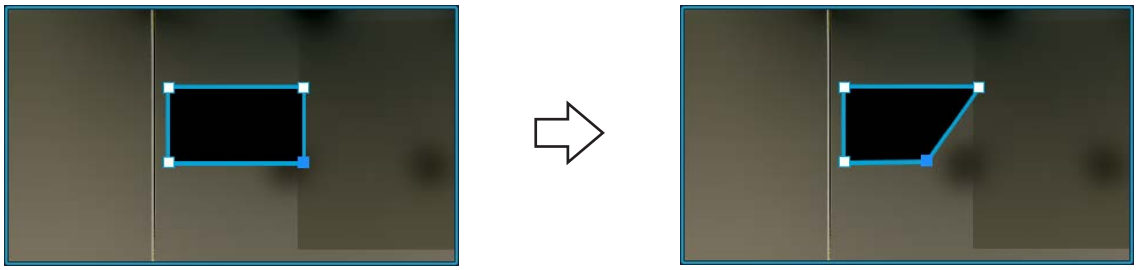
When you click to select the black level adjustment area, control points are displayed at the four corner vertices of the black level adjustment area.



You can drag the black level adjustment area, or press the cursor keys to move it up, down, left, or right.



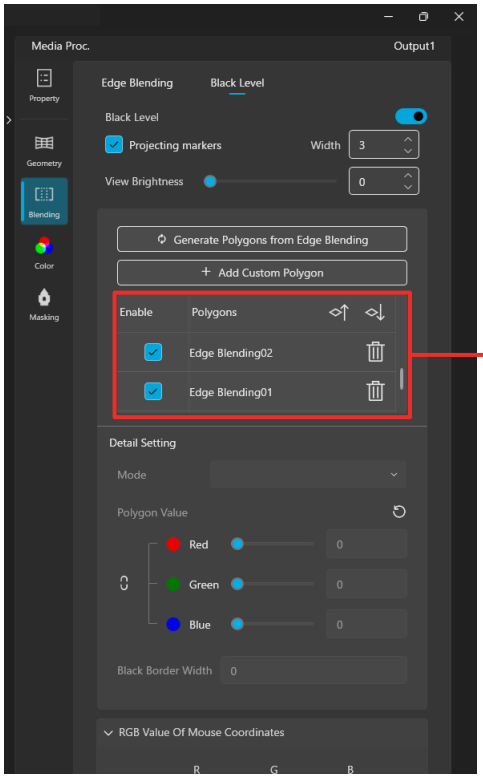
If you click a control point, that control point turns light blue. You can change the shape of the black level adjustment area by dragging the light blue control point or pressing the cursor keys.



Note

- Each press of a cursor key moves the control point by 1 pixel. Pressing the cursor key while holding down the Alt key moves it in increments of 4 pixels.

■ Black level adjustment area list



Black level adjustment area list

The added black level adjustment areas are displayed in a list. Only black level adjustment areas with a check mark in the [Enable] checkbox are displayed in the main view.

To delete an unnecessary black level adjustment area, click it and then click  .

Note

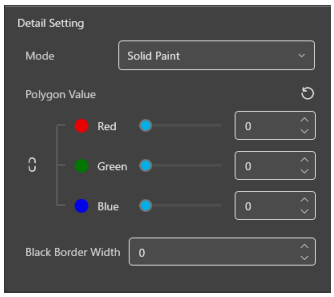
- If you place a check mark in the [Projecting markers] checkbox, an outline of a black level adjustment area with a check mark placed in [Enable] in the black level adjustment area list is displayed on the projected image.
- You can change the brightness of a black level adjustment area of the main view in [View Brightness].

Black level adjustment

Perform adjustment of the black level adjustment area in the [Detail Setting] area.
Select [Solid Paint], [Brightness Shift], or [Filtering] in [Mode] depending on the adjustment you want to make, and then make the adjustment.
When the black level adjustment has been performed automatically, you can also make fine adjustments in each [Mode] after that adjustment. However, if [Calculation Method] was set to [Pixel] when black level adjustment was performed automatically, we recommend not making the adjustment of [Solid Paint] of [Mode].

■ Solid Paint

Solid paint the inside of the polygon by specifying the R, G, and B values.

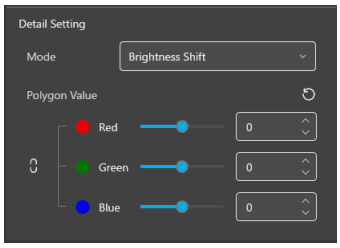


Note

- [Black Border Width] is enabled only when the type of polygon is [Edge Blending].
- If you click , the changed setting value is reset.
- If you click to set , the R, G, and B values can be controlled uniformly.

■ Brightness Shift

You can change the brightness of the R, G, and B values for inside the polygon according to a set difference value.



Note

- If you click , the changed setting value is reset.
- If you click to set , the R, G, and B values can be controlled uniformly.

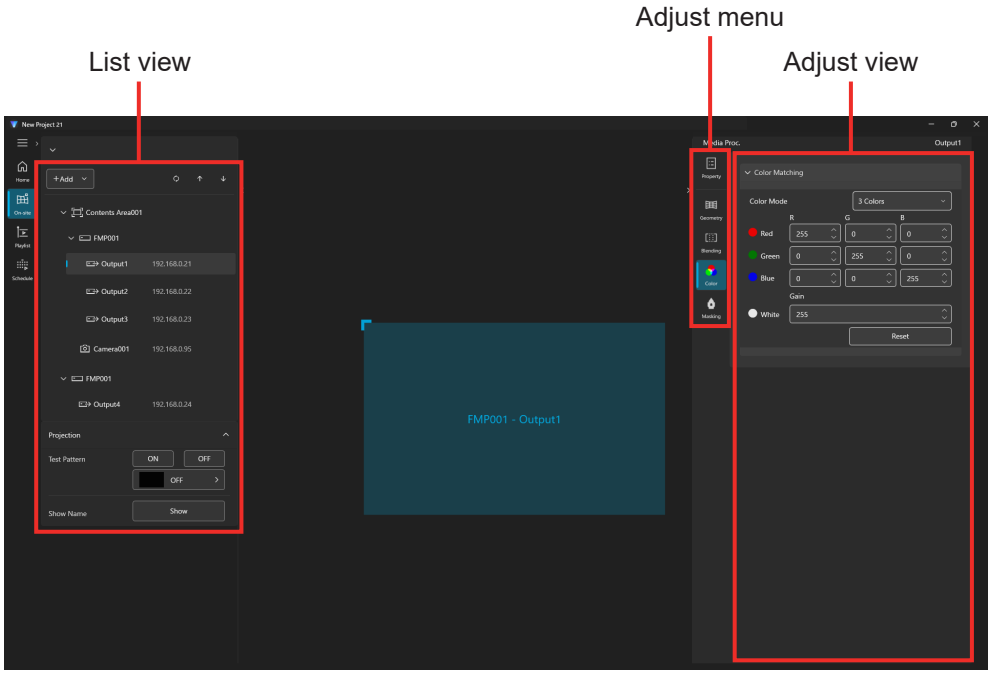
■ Filtering

You can perform blur processing inside the polygon.

- [Method]: Select the type of blur processing ([Blur] or [Median]). To not apply blur processing, select [OFF].
- [Strength]: Set the strength of processing.

Color matching

When constructing a single image using multiple projectors connected to a media processor, the coloring of the images projected from the projectors may not match. If this is the case, you can match the coloring by adjusting the images from the media processor that are input to the projectors.



1 **Click the output of the media processor you want to adjust in the List view.**

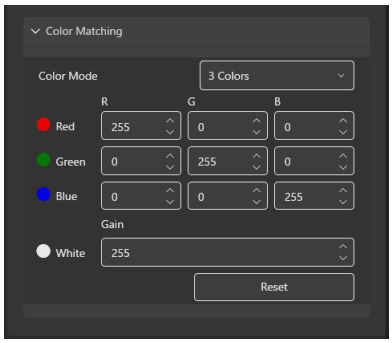
2 **Click [Color] in the Adjust menu.**

[Color Matching] area is displayed in the Adjust view.

3 **Select [3 Colors] or [7 colors] in [Color Mode] depending on the adjustment you want to make.**

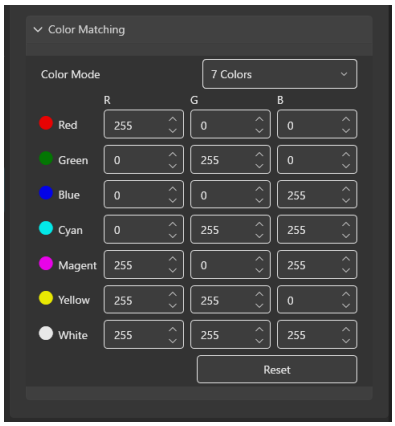
You can adjust the values for each color to compensate for color variations.

■ 3 Colors



- [Red]/[Green]/[Blue]: Adjust the colors by changing the values of [R], [G], and [B] for each color.
- [White]: Change the brightness of the three colors at the same time by changing the [Gain] value.
- [Reset]: Reset the change setting values.

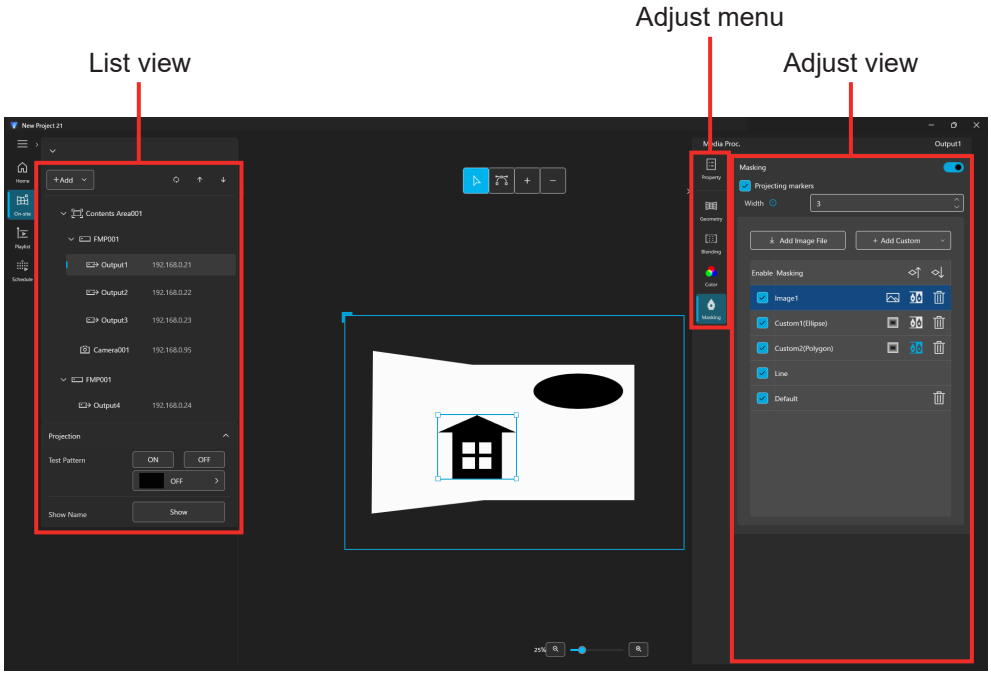
■ 7 Colors



- [Red]/[Green]/[Blue]/[Cyan]/[Magenta]/[Yellow]/[White]: Adjust the colors by changing the values of [R], [G], and [B] for each color.
- [Reset]: Reset the change setting values.

Masking

This function makes it possible to mask certain parts of the projected images so as to project only the required parts.



1 **Click the output of the media processor you want to adjust in the List view.**

2 **Click**  **[Masking] in the Adjust menu.**

[Masking] area is displayed in the Adjust view.

3 **Enable the settings of [Masking].**

Set the state of the toggle button to  .

4 **Specify the masking area.**

[Line] is added to the masking area list in advance. You can specify the masking area by moving the operation points on the four edges – upper, lower, left, and right – of the projected image.

➡ “Line masking” (page 138)

You can add the following masking areas as necessary.

- [Add Custom]: Add a polygon or ellipse masking area.
  ➡ “Custom masking” (page 139)
- [Add Image File]: Add an image file as a masking area.
  ➡ “Image file masking” (page 142)

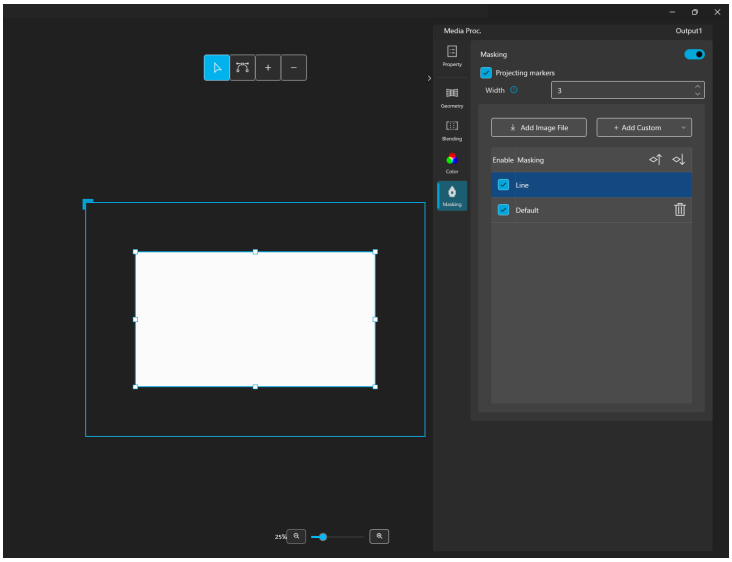
Note

- If you place a check mark in the [Projecting markers] checkbox, an outline of a masking area with a check mark placed in [Enable] in the masking area list is displayed on the projected image.
- In the following cases, [Default] is added to the masking area. [Default] can be enabled/disabled and deleted.
  - When a masking setting file has been read
  - When correction data has been obtained from the media processor
  - When masking is set in camera automatic adjustment

Line masking

You can specify the masking area by moving the operation points on the four edges – upper, lower, left, and right – of the projected image according to the camera image.

1 Place a check mark in the [Line] checkbox of the masking area list.

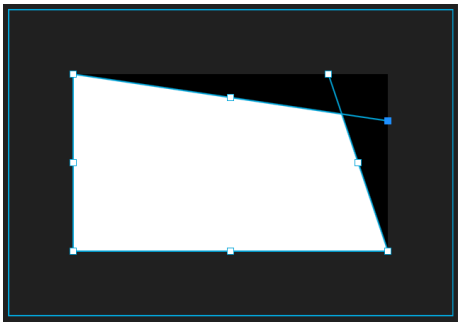


2 Set the masking area by dragging the total of eight control points located on the four corners and at the center of the four edges of the preview image.

The control points at the four corner vertices of the preview image can be moved to the desired positions by dragging them.

Dragging the control points at the center of the four edges of the preview image enables parallel movement while maintaining the inclination of the edges.

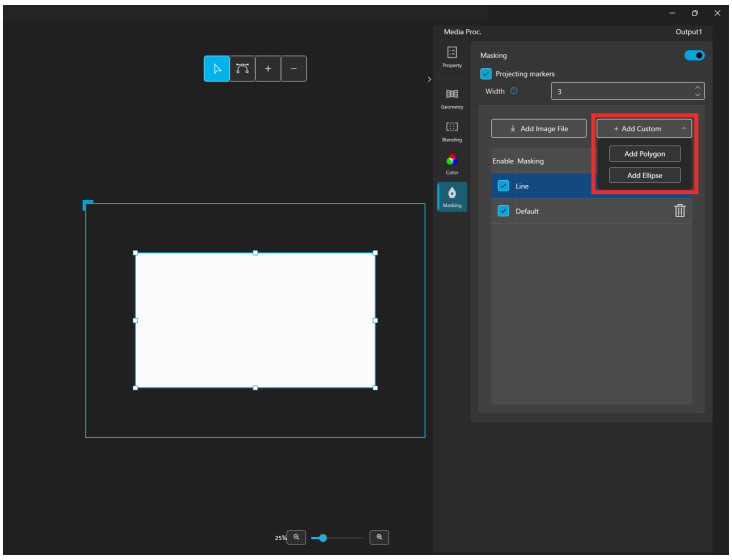
For example, if you move the three points of the upper edge right end, right edge top end, and left edge midpoint of the masking area (black part), the result will be as follows.



Custom masking

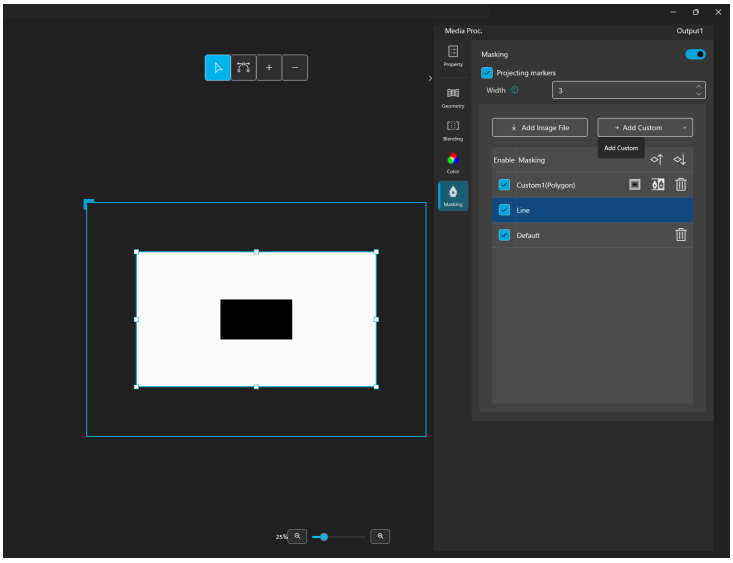
After performing line masking, you can add a polygon or ellipse masking area.

1 Click the [Add Custom] button, and select the shape of the masking area to add in the displayed menu.

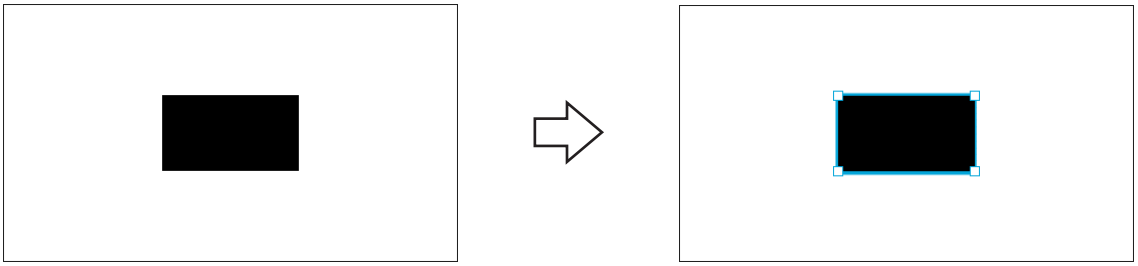


When adding a polygon masking area, select [Add Polygon].
When adding an ellipse masking area, select [Add Ellipse].

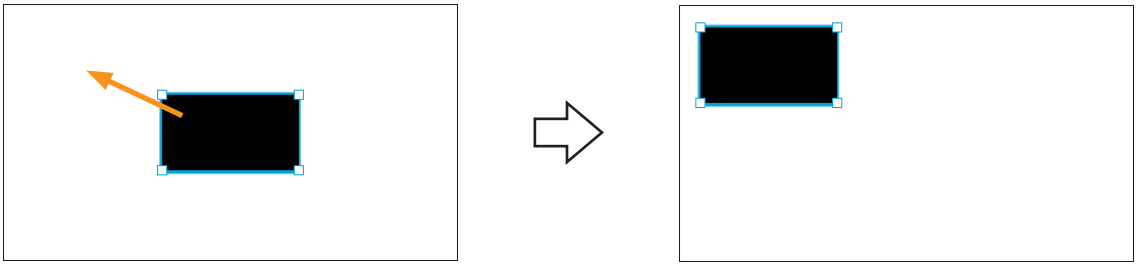
Operations when a polygon masking area has been added



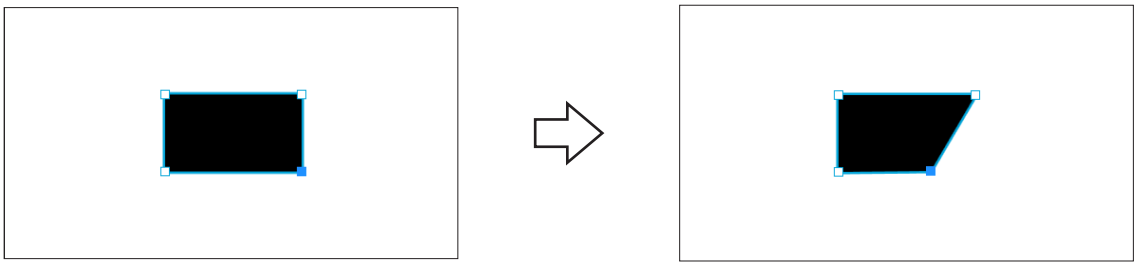
If you select [Add Polygon], a rectangular masking area is added to the center of the projected image. When you click to select the masking area, control points are displayed at the four corner vertices of the masking area.



You can drag the masking area, or press the cursor keys to move it up, down, left, or right.



If you click a control point, that control point turns light blue. You can change the shape of the masking area by dragging the light blue control point or pressing the cursor keys.

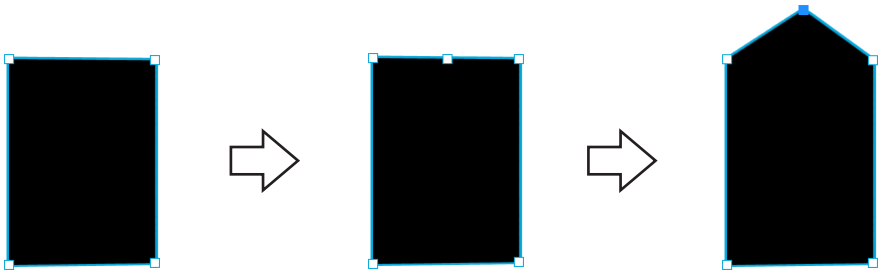


Note

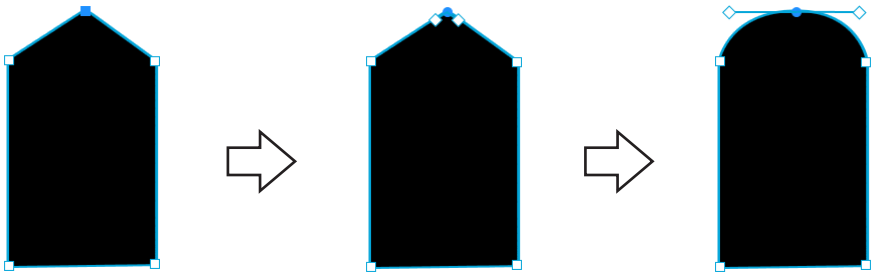
- Each press of a cursor key moves the control point by 1 pixel. Pressing the cursor key while holding down the Alt key moves it in increments of 4 pixels.

If you click ＋ on the toolbar and then click any position on an edge of the masking area, a control point is added to that position.

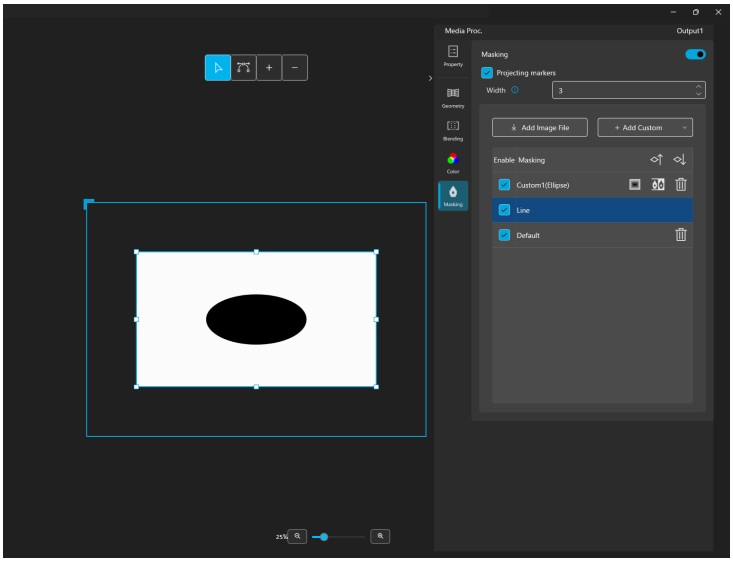
To delete an added control point, click － on the toolbar and then click the control point to be deleted.



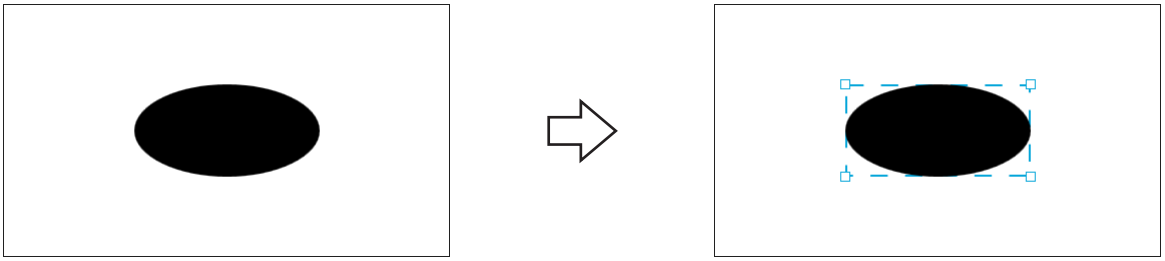
If you click on the toolbar and then click a control point of the masking area, the two line segments from that control point to the adjacent control points curve. Two handles are display at the clicked control point, and the bulge state of the curve and the position of the vertex can be changed by dragging the handles.
To disable the curve, right-click the control point selected when the line segments were curved and click [Disable Bezier Curve] in the displayed menu. The curved line segments are returned to straight lines.



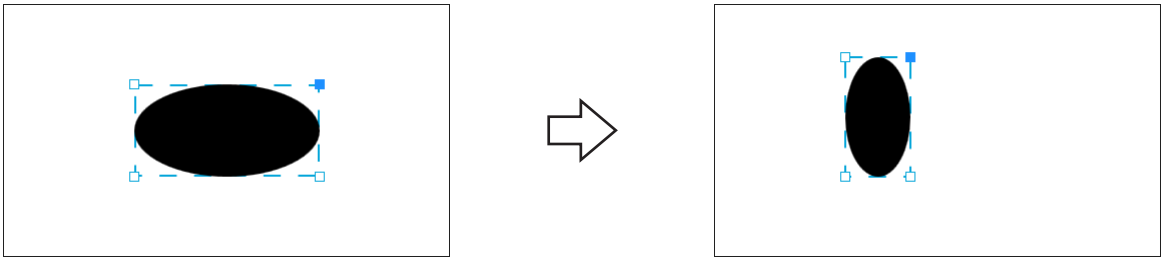
Operations when an ellipse masking area has been added



You can click in the area with the mouse and then move, transform, or otherwise modify the masking area with the mouse or cursor keys.
When you click to select inside an elliptical masking area, four control points are displayed.



You can change the shape of the ellipse by dragging a control point or pressing the cursor keys.



Note

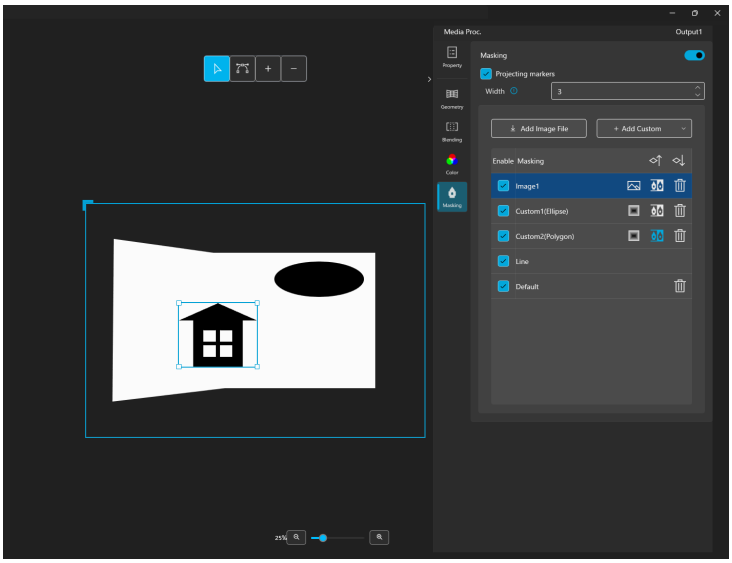
- Each press of a cursor key moves the control point by 1 pixel. Pressing the cursor key while holding down the Alt key moves it in increments of 4 pixels.

Image file masking

After performing line masking, you can overlay an image file (extension: bmp, dib, or png) on the projected image as a masking area. The shape of the added masking area can be freely modified.

1 Click the [Add Image File] button, and specify an image file in the displayed screen.

The specified image file is read, and displayed as a masking area at the center of the projected image in the preview image.



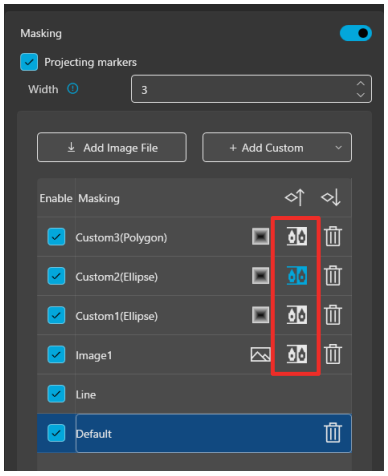
If the preview image is specified as a masking area, you can move, enlarge, or reduce it in the same way as an added polygon or ellipse masking area with custom masking.

➡ “Custom masking” (page 139)

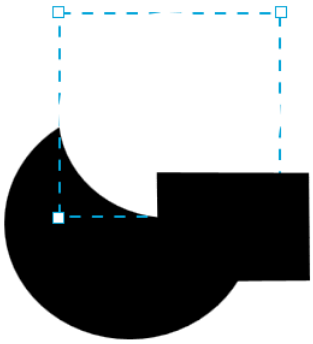
Operations of the masking area list

■ Flip

Clicking  of the masking area in the masking area list changes the area to one where the projected image of the masking area is transmitted without being masked.

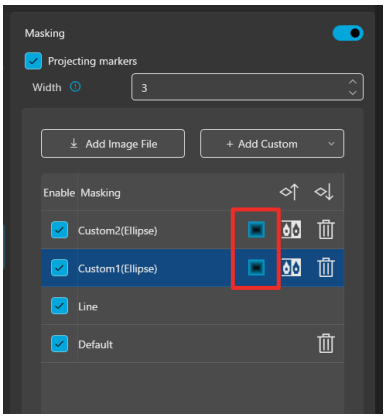


The shape of a masking area can be changed by overlaying a transmitted area on another masking area. For example, you can create a masking area that is like a crescent moon with a rectangle on it by placing a large circular masking area and then placing a flipped small circular area, and then additionally placing a rectangular masking area on them.



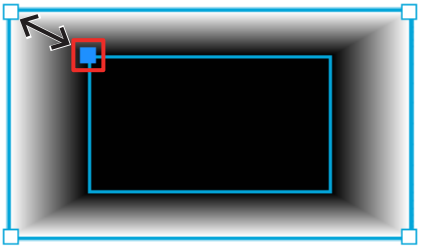
■ Gradation

Clicking  of the masking area in the masking area list applies processing to increase the transmittance from the center part toward the periphery of the masking area. This is effective for a polygon or ellipse masking area.

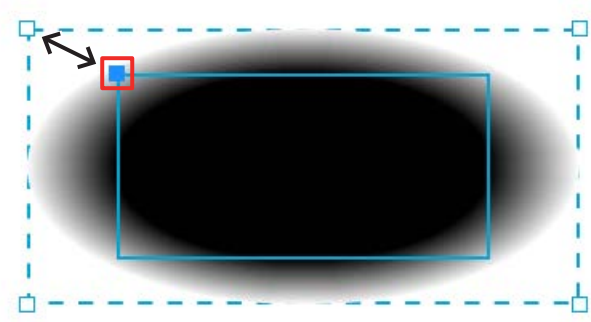


For a masking area with gradient processing enabled, an inner frame to indicate the start point of gradation processing is displayed in addition to an outer frame (end point of gradation processing) to indicate the control points of the masking area.
To enlarge or reduce the gradation part, move the vertex at the upper-left corner of the inner frame.

When polygon masking area

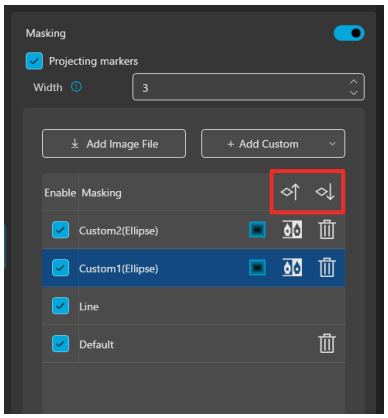


When ellipse masking area



■ Specifying the display hierarchical order of the masking area

Click the masking area in the masking area list you want to reposition in the hierarchy and then move it up or down in the list with one of the following buttons.



: Moves the masking area up in the list.

: Moves the masking area down in the list.

The masking area at the top of the list is displayed at the front, and the masking area at the bottom of the list is displayed at the back.

Frequently Asked Questions

Review the following points.

The software does not operate properly
● The software requires .NET 8.0 to be installed in the computer to be used. Download it from the Microsoft website if it is not installed. ● This software may not operate properly when it is used with an account that does not have administrator rights. If this happens, log in to Windows using an account with administrator rights, and then use the software.

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