DIGITAL PROJECTION

Titan Laser 4K-UHD

High Brightness Digital Video Projector

INSTALLATION & QUICK START GUIDE

CONNECTION GUIDE

OPERATING GUIDE

REFERENCE GUIDE

Rev A January 2019

119-713

About this document

Follow the instructions in this manual carefully to ensure safe and long-lasting use of the projector.

Symbols used in this document

Many pages in this document have a dedicated area for notes. The information in that area is accompanied by the following symbols:

WARNING: this symbol indicates that there is a danger of physical injury to yourself and/or damage to the equipment unless the instructions are closely followed.

ELECTRICAL WARNING: this symbol indicates that there is a danger of electrical shock unless the instructions are closely followed.

LASER WARNING: this symbol indicates that there is a potential hazard of eye exposure to laser radiation unless the instructions are closely followed.

NOTE: this symbol indicates that there is some important information that you should read.

Product revision

Because we at Digital Projection continually strive to improve our products, we may change specifications and designs, and add new features without prior notice.

Updates may be available online - visit the Digital Projection website for all latest documents.

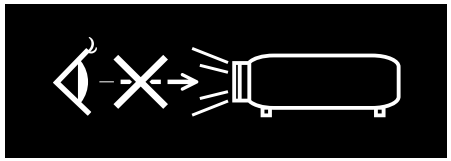
Legal notice

Notes

Laser information

Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Optical radiation

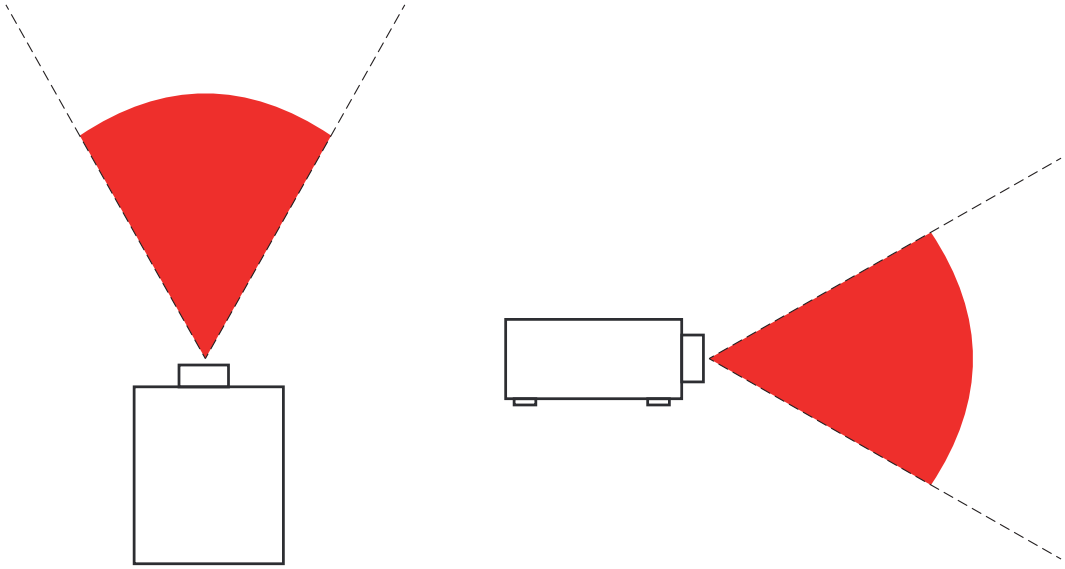


Caution - possibly hazardous optical radiation emitted from this product. Do not stare at operating light source. May be harmful to eyes. This projector is tested according to IEC/EN62471-5:2015 (Photobiological safety of lamps and lamp systems – Part 5: Image projectors" standard) to be Risk Group 3 (high risk).

Notes

Light Hazard Warning

The hazard distance is the distance measured from the projection lens at which the intensity or energy per unit of surface is lower than the applicable exposure limit on the cornea or skin. If the person is within the hazard distance, the beam is considered unsafe for exposure.



Hazard Distance

Light Hazard Distances

LENS	HAZARD DISTANCE
1.16-1.49:1 Super Wide Zoom	5.5m
1.39 - 1.87:1 Wide Zoom	6.5m
1.87 - 2.56:1 Standard Zoom	8.5m
2.56 - 4.16:1 Semi Long Zoom	10.5m
4.16 - 6.96:1 Long Zoom1	14m
6.92 - 10.36:1 Long Zoom2	

Notes

No direct exposure to the beam is permitted, RG3 IEC 62471-5:2015.

Operators should control access to the beam within the hazard distance or install the projector at sufficient height to prevent exposures of spectators' eyes within the hazard distance.

Introduction

Congratulations on your purchase of this Digital Projection product. Your projector has the following key features:

- 4K-UHD projector
- Support for Frame Sequential and Dual Pipe 3D formats.
- HDBaseT® for transmission of uncompressed High Definition Video up to 100 m from the source.
- 3G-SDI with loop-through.
- Edge Blend with black level correction.
- Blanking control for custom input window sizing.
- Cornerstone, Vertical & Horizontal Keystone, Pincushion & Barrel, and Image Rotation.
- Control via LAN and RS232.
- Motorised lens mount.
- Separate control of screen and source aspect ratio.
- Non-linear warp for irregular projection surfaces

A serial number is located on the side of the projector. Record it here:

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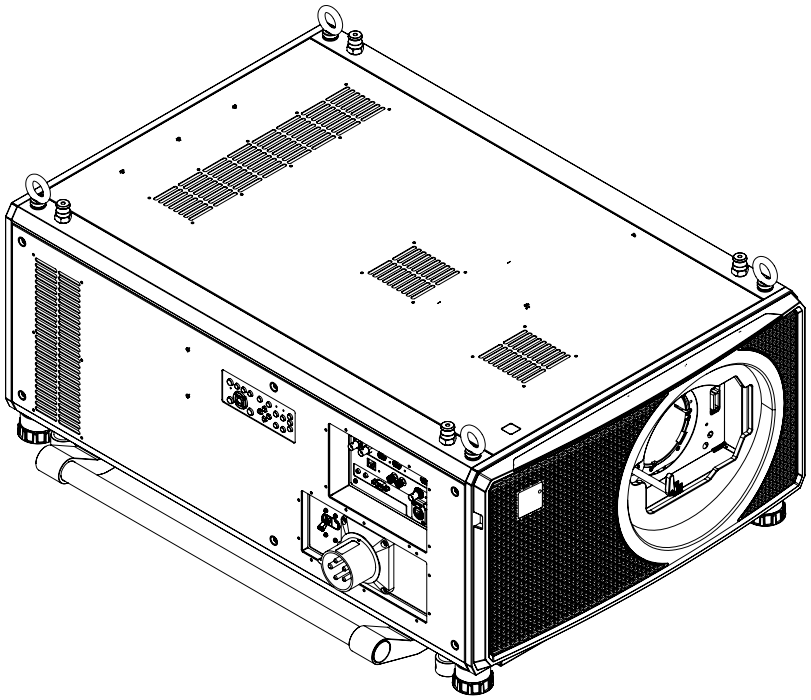
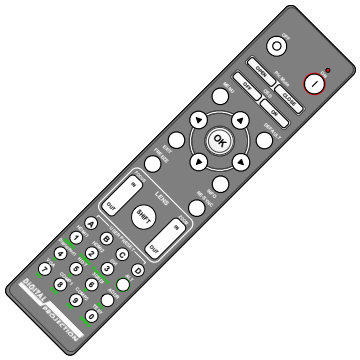
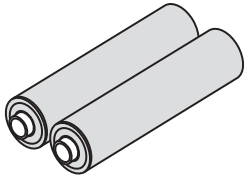
What's in the box?



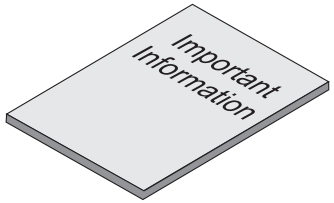
Projector



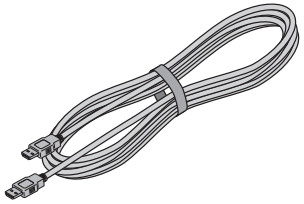
Remote Control



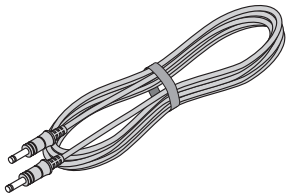
Batteries



Important Information Book



HDMI Cable



Remote Control Cable

Power Cable, UK / RoW

Power Cable, USA

Notes

Make sure your box contains everything listed. If any pieces are missing, contact your dealer.

Only one remote is supplied with the projector.

Save and store the original box and packing materials, in case you ever need to ship your projector.

The projector is shipped without a lens.

Only the appropriate cable for destination territory is supplied with the projector

Do not use the 0.67:1 and 1.12:1 fixed throw lenses with the 4K-UHD projectors

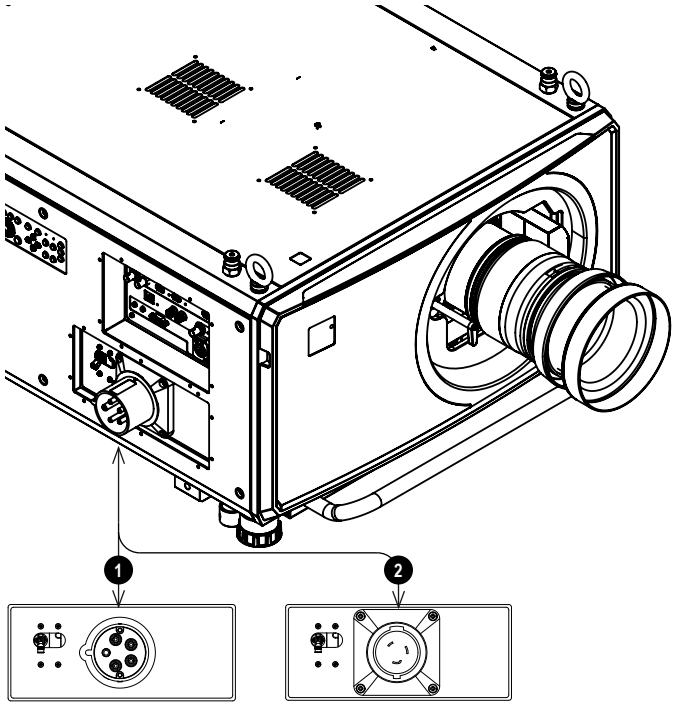
Connecting the power supply

Rest of the World:

1. Firmly push the mains connector into the socket ❶

USA Only

1. Firmly push the mains connector into the socket ❷
2. Rotate the connector 90° clockwise to lock it in place



Notes

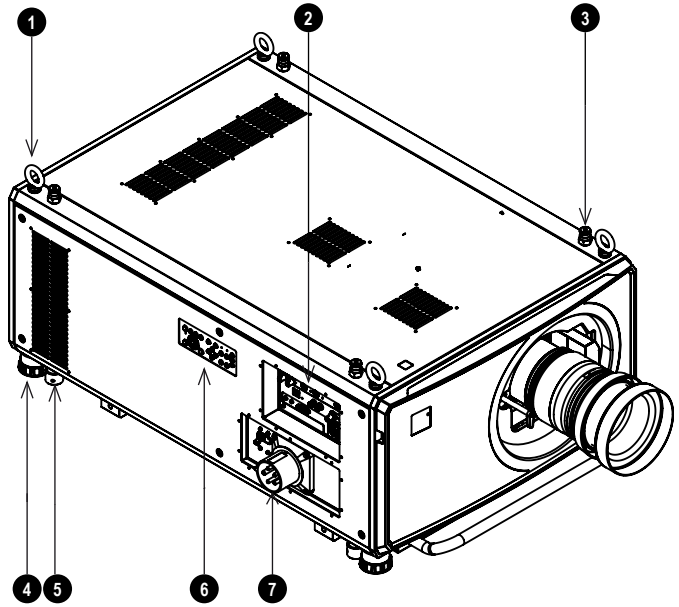
Use only the power cable provided.

Ensure that the power outlet includes a ground connection as this equipment MUST be earthed.

Handle the power cable carefully and avoid sharp bends. Do not use a damaged power cable.

Projector overview

1. Eye bolts (x4)
2. Connections panel
3. Stacking pins (x4)
4. Adjustable feet (x4)
5. Stacking cups (x4)
6. Control panel
7. Mains socket and switch



Front View

Notes

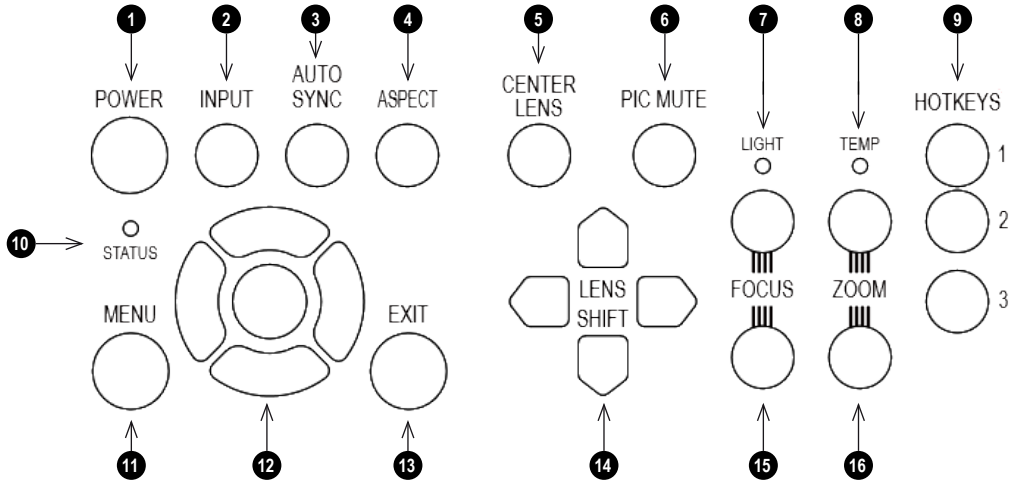
Do not use the 0.67:1 and 1.12:1 fixed throw lenses with the 4K-UHD projectors

Control panel

1. **POWER**
   Switches the projector on and off (STANDBY).
   Indicator:

Off.	The projector is switched off
Flashing green.	The projector is warming up
Flashing blue.	The projector is cooling down
On, red.	Standby mode
On, green.	The projector is switched on.

2. **INPUT**
   Switches to the next input source.
3. **AUTO SYNC**
   Re-synchronises with the current input signal.
4. **ASPECT**
   Changes the aspect ratio.
5. **CENTER LENS**
   Centers the lens.
6. **PIC MUTE**
   Switches the laser off/on or blanks the DMD.
   Indicator:
   Off = the projector is in standby
   On, blue = the projector is on, normal projection
   On, red = the projector is on, picture mute is activated
7. **LIGHT INDICATOR**
   Off = light is switched off
   Flashing red (cycles of single flashes) = failure to light up during power up
   Flashing red (cycles of double flashes) = unexpected light off while running
   On, green = light is switched on
8. **TEMP INDICATOR**
   Off = no problem
   Flashing red = temperature error



Control Panel

Notes

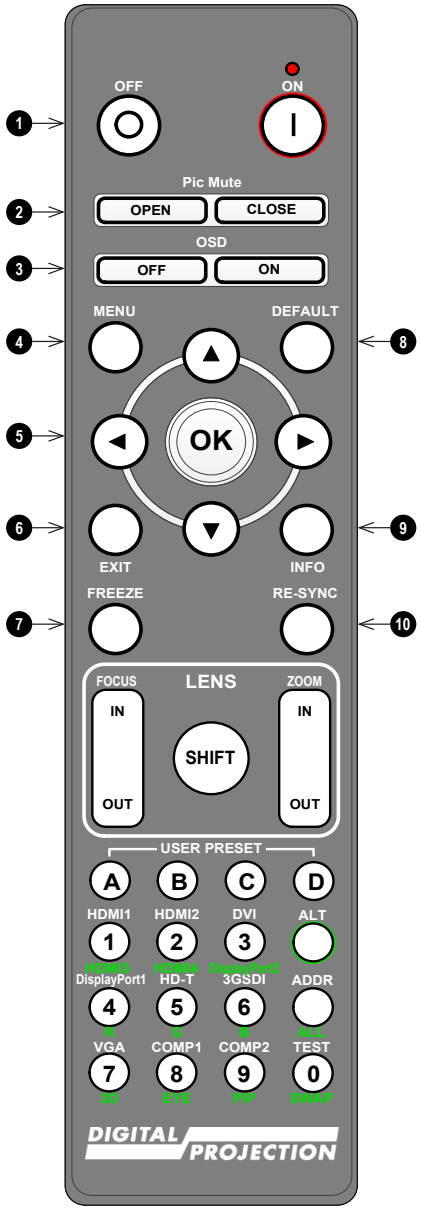
AUTO SYNC and ASPECT do not work when the projector uses HDMI 3 or 4.

9. **HOTKEYS**
   User selectable functions.
   Pre-set functions:
   HOTKEY 1 Information
   HOTKEY 2 Test Pattern
   HOTKEY 3 Lens Memory Load
   Additional options:
   Picture Mode
   Ambient Brightness Correction
   Freeze
   PIP Swap
10. **STATUS**
    Off = no problem
    Flashing red (continuously) = cover error
    Flashing red (cycles of four flashes) = fan error
    On, red = system error
11. **MENU**
    Displays and exits the OSD.
12. **Arrow buttons & ENTER**
    Navigation buttons used to highlight menu entries in the OSD.
    Press ENTER to open or execute the highlighted menu entry.
13. **EXIT**
    Exits the current OSD page and enters the level above.
14. **LENS SHIFT** arrow buttons
    Each of these buttons moves the lens in the specified direction.
15. **FOCUS** plus and minus buttons
    Used to move the focus in and out.
16. **ZOOM** plus and minus buttons
    Used to zoom in and out.

Notes

Remote control

1. **Power ON / OFF**
   Turns power on and off.
2. **Pic Mute OPEN / CLOSE**
   Shows and hides the projected image.
   There are two PIC Mute settings:
   - Laser. When off, the laser is switched off and no image is projected
   - DMD Blanking. When off, the laser remains on and a black image is projected
3. **OSD ON / OFF**
   Enable and disable screen timeout messages and control whether to show the OSD during projection.
4. **MENU**
   Access the OSD. If the OSD is open, press this button to go back to the previous menu.
5. **Navigation (arrows and OK)**
   Navigate through the menus with the arrows, confirm your choice with **OK**.
   In lens adjustment modes, the arrows are used to move, zoom or focus the lens.
   See **11** below. In lens adjustment modes, or when the OSD is not showing, the OK button switches between modes: **Shift Adjustment** and **Zoom / Focus Adjustment**.
6. **EXIT**
   Go up one level in the OSD. When the top level is reached, press to close the OSD.
7. **FREEZE**
   Freeze the current frame.
8. **DEFAULT**
   When editing a parameter, press this button to restore the default value.
9. **INFO**
   Access information about the projector.
10. **RE-SYNC**
    Re-synchronise with the current input signal



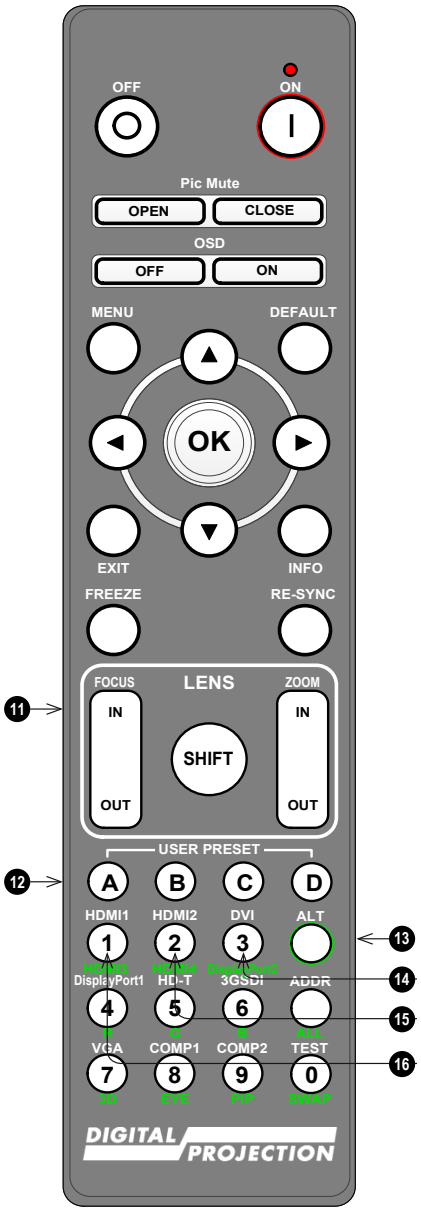
Remote Control

Notes

The PIC Mute setting is defined in the setup menu. See Setup menu on page 78

FREEZE and RE-SYNC are not available when the projector uses input HDMI 3 or 4.

11. **LENS adjustment**
    - **FOCUS IN / OUT**: adjust focus.
    - **SHIFT**: press and hold this button, then use the Navigation arrow buttons to move the lens.
    - **ZOOM IN / OUT**: adjust zoom.
12. **USER PRESET A, B, C, D**
    Load user presets.
13. **ALT**
    Press and hold this button to access alternative functions for all buttons with a green label.
14. **DVI / DisplayPort2 / numeric input 3**
    There is no DVI input on this projector.
    Use with **ALT** to select the DisplayPort 2 input.
15. **HDMI 2 / HDMI 4 / numeric input 2**
    Select the HDMI 1 input.
    Use with **ALT** to select the HDMI 4 input.
16. **HDMI 1 / HDMI 3 / numeric input 1**
    Select the HDMI 1 input.
    Use with **ALT** to select the HDMI 3 input.



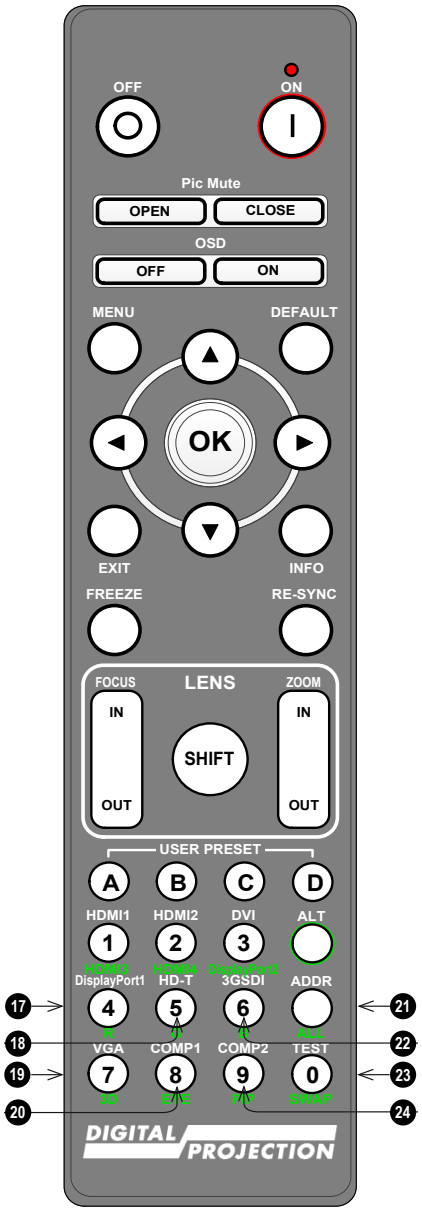
Remote Control

Notes

This projector does not use the following options on the remote: DVI, VGA, COMP 1 and COMP 2.

3D is only available on the HDMI 3 and 4 inputs.

17. **DISPLAYPORT 1 / R / numeric input 4**
    Select DisplayPort 1 input.
18. **HD-T / G / numeric input 5**
    Select the HDBaseT input.
19. **VGA / 3D / numeric input 7**
    There is no VGA input on this projector.
    Use with **ALT** to toggle the 3D Format setting between Off and Auto.
20. **COMP1 / EYE / numeric input 8**
    There is no Component 1 input on this projector.
    Use with **ALT** to switch between left and right eye 3D dominance.
21. **ADDR / ALL (with red indicator at the top)**
    Assign and unassign an IR remote address.
    - **To assign an IR remote address:**
        1. Press and hold this button until the red indicator starts flashing.
        2. Release this button and while the red indicator is still flashing, enter a two-digit address using the numeric input buttons. The indicator will flash three times quickly to confirm the change.
    - **To unassign an address and return to the default address 00:**
        1. Press and hold ALT and this button simultaneously until the red indicator flashes to confirm the change.
22. **3GSDI / B / numeric input 6**
    Select the 3G-SDI input.
23. **COMP2 / PIP / numeric input 9**
    There is no Component 2 input on this projector.
    Use with **ALT** to switch on **Picture In Picture (PIP)** mode.
24. **TEST / SWAP / numeric input 0**
    Show a test pattern. Press again to show the next test pattern: *...Off, White, Black, Red, Green, Blue, CheckerBoard, CrossHatch, V Burst, H Burst, ColourBar, Screen layout.*
    When **PIP** mode is on, use this button with **ALT** to swap the main and sub images.



Remote Control

Notes

This projector does not use the following options on the remote: DVI, VGA, COMP 1 and COMP 2.

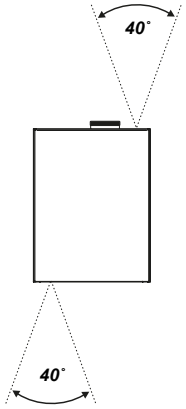
3D is only available on the HDMI 3 and 4 inputs.

PIP is not available when the projector uses input HDMI 3 or 4.

Infrared reception

The projector has infrared sensors at the front and back.

The angle of acceptance is 40°. Make sure that the remote control is within the angle of acceptance when trying to control the projector.



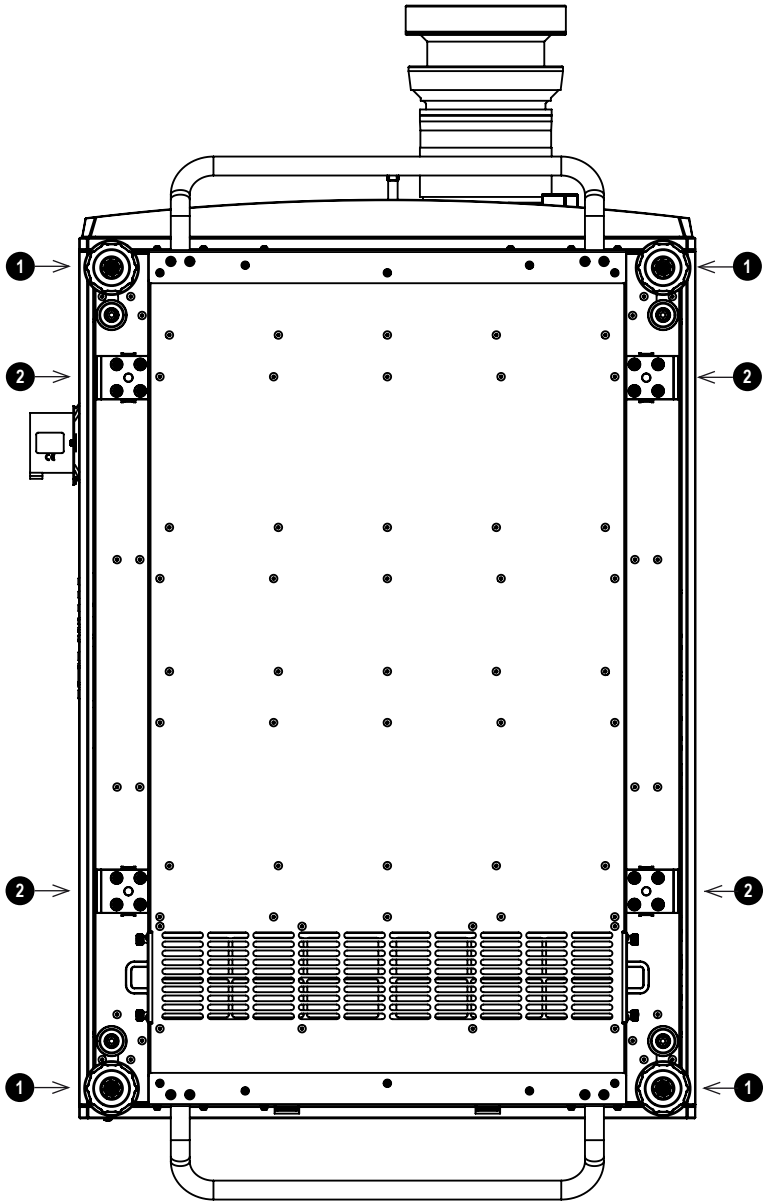
Notes

Positioning the screen and projector

1. Install the screen, ensuring that it is in the best position for viewing by your audience.
2. Mount the projector, ensuring that it is at a suitable distance from the screen for the image to fill the screen. Set the adjustable feet so that the projector is level, and perpendicular to the screen.

The drawing shows the positions of the feet for table mounting, and the fixing holes for ceiling mounting.

1. Four adjustable feet
2. **Four M10 holes for ceiling mount** The screws should not penetrate more than 15 mm into the body of the projector.



Notes

Always allow the projector to cool for 5 minutes before disconnecting the power or moving the projector.

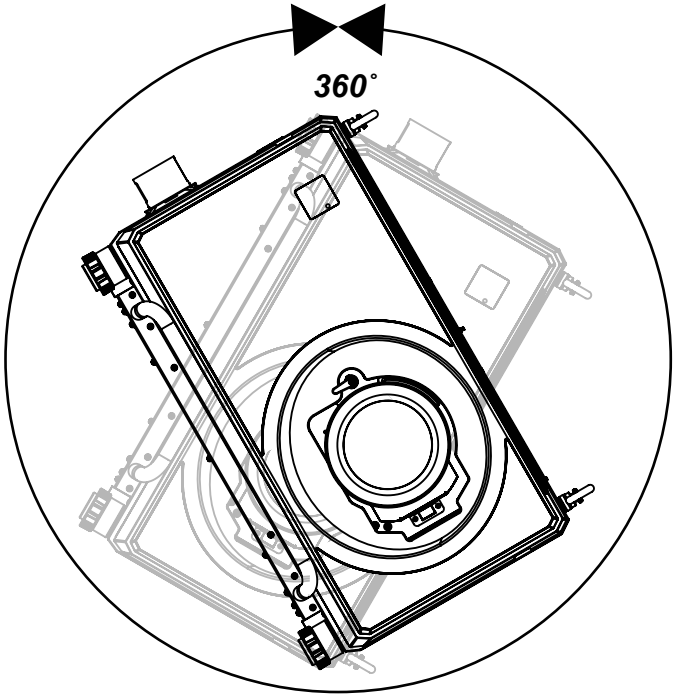
Ensure that there is at least 50 cm (19.7 in) of space between the ventilation outlets and any wall, and 30 cm (11.8 in) on all other sides.

Do not use the threaded holes for the adjustable feet to hang or mount the projector.

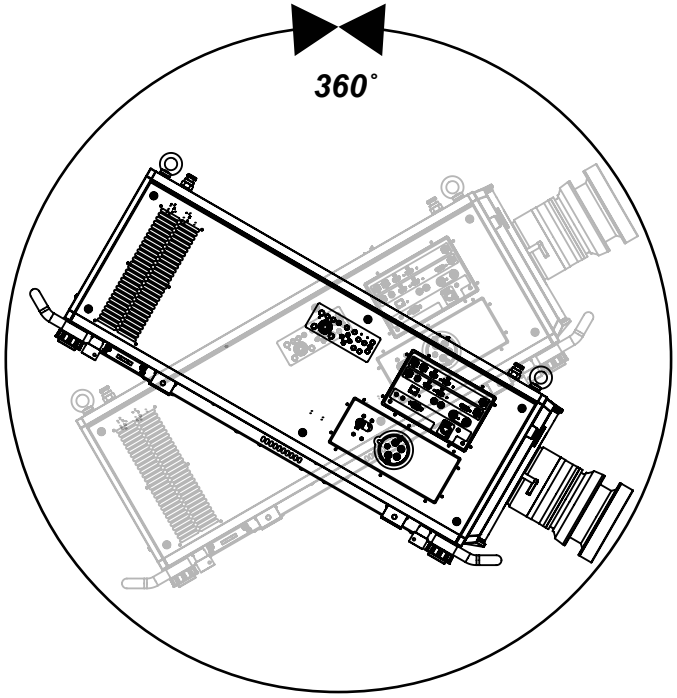
Roll and pitch

The projector can be operated in numerous positions.

In portrait mode, it is recommended to position the projector with inputs facing upward, as shown in the diagram.



Roll



Pitch

Notes

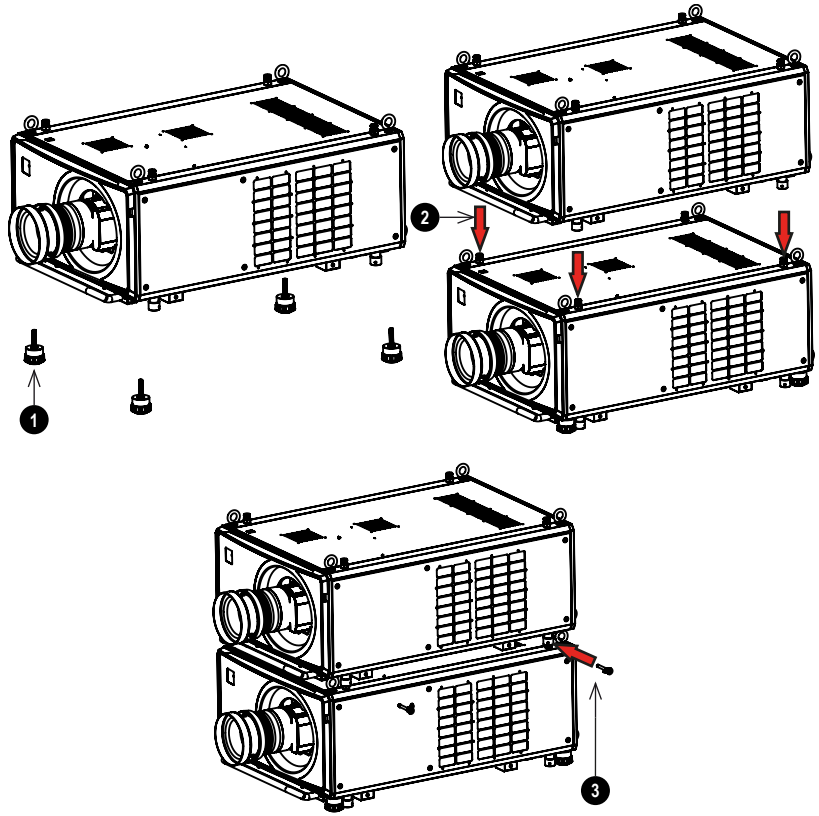
Stacking and rigging

The projector can be stacked using the pin and cups that are located on top and underneath the projector. The pin and cups can also be used to attach a mounting rail. The eye bolts on top of the projector can be used with suspension cables to fly the projector.

Pin and cup stacking

The top of the projector has pins and the bottom of the projector has cups. The pins and cups can connect together and be locked into place with a locking pin.

1. Remove the adjustable feet from the projector that will be stacked on the top. ❶
2. Mount the projector on top of the other projector. Ensure that all four cups are placed over the pins on the bottom projector. ❷
3. Push the locking pins into place on each cup and pin. ❸



Notes

Do not use the threaded holes for the adjustable feet to hang or mount the projector.

Do not use the carry handles to hang or mount the projector.

This system should only be used to stack a maximum two projectors.

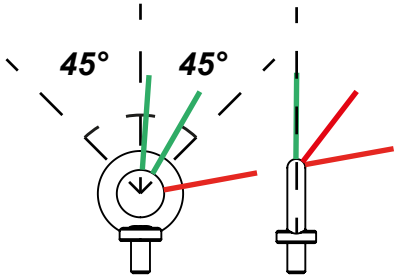
Using the eye bolts

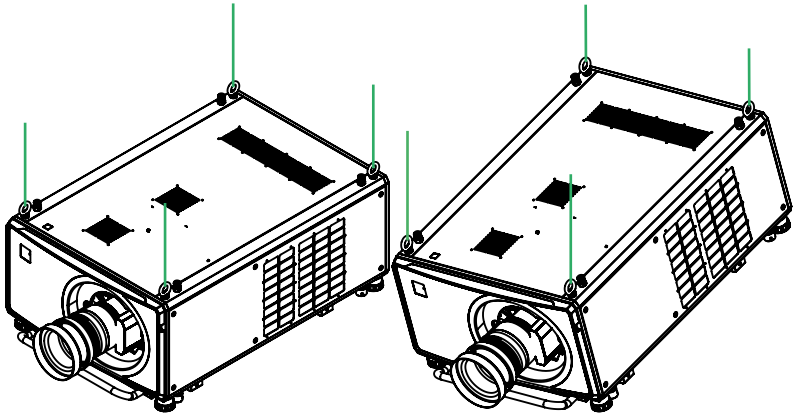
Four eye-bolts are fitted to the top of the projector to enable the flying of the projector using steel wire or chains.

Point-to point connections

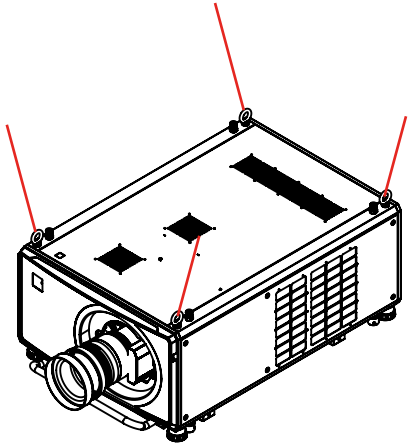
Refer to the following guidelines when connecting one end of a suspension cable directly to an eye-bolt and the other to a suspension point.

- The suspension cables can be connected to the eye-bolts at an angle of up to 45° around the eye ring.
- The suspension cables must not be connected to the eye-bolts at any angle across the eye ring.
- The suspension cable must run vertically up from the projector.





Examples of correct configurations



Example of an incorrect configuration

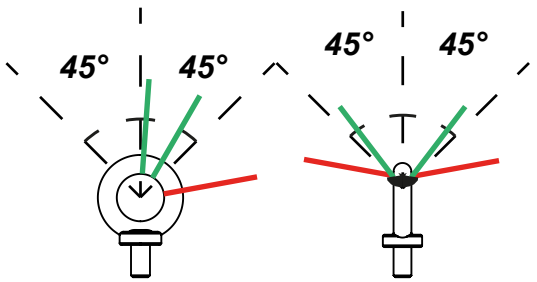
Notes

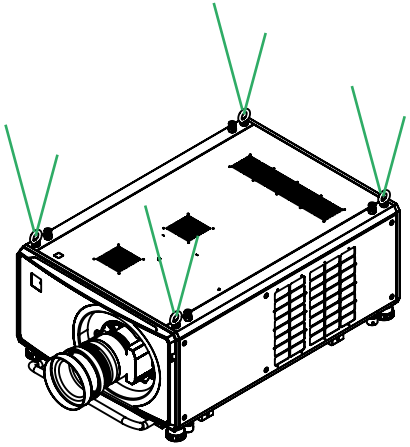
This system should only be used to fly a single projector. Do not stack projectors and fly them together.

Threaded suspension cables

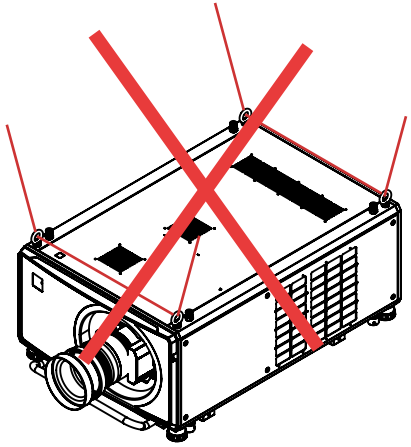
Refer to the following guidelines when threading the suspension cable through the eye-bolts and connecting both ends to suspension points.

- The suspension cable can exit the eye-bolts at an angle of up to 45° around the eye ring.
- The suspension cable can exit the eye-bolts at an angle of up to 45° across the eye ring.
- The suspension cable should not be threaded through 2 or more eye-bolts





Example of a correct configuration



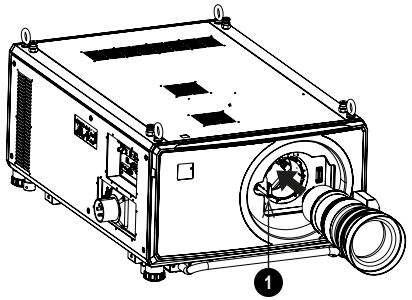
Example of an incorrect configuration

Notes

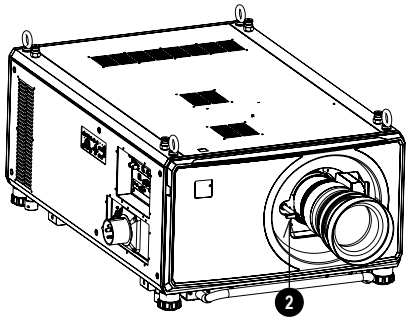
Changing the lens

Inserting a new lens

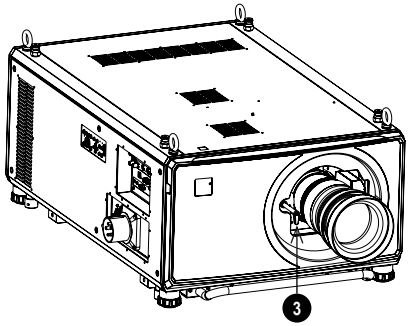
1. Turn the lens release lever clockwise so that it is pointing upwards, to open the lock fully. ❶
2. Remove the rear lens cap from the lens.



3. Insert the lens into the lens aperture, making sure that the plug on the zoom drive mechanism lines up with the socket on the front of the projector, then push the lens in firmly as far as it will go.
4. Turn the lens release lever anti-clockwise to the mid-position. ❷



5. The lens can now be pushed in further. Push the lens in firmly as far as it will go.
6. Turn the lens release lever fully anti-clockwise so that it is pointing downwards, to close the lock fully. ❸



Removing the lens

To remove the lens, reverse the procedure described in Inserting a new lens above:

1. Turn the release lever up to the mid-position, then pull the lens out as far as it will go.
2. Turn the release lever clockwise so it is pointing upwards, then pull the lens out completely.

Notes

Do not use the 0.67:1 and 1.12:1 fixed throw lenses with the 4K-UHD projectors

Before changing the lens, always make sure the projector is switched off and fully disconnected from its power supply.

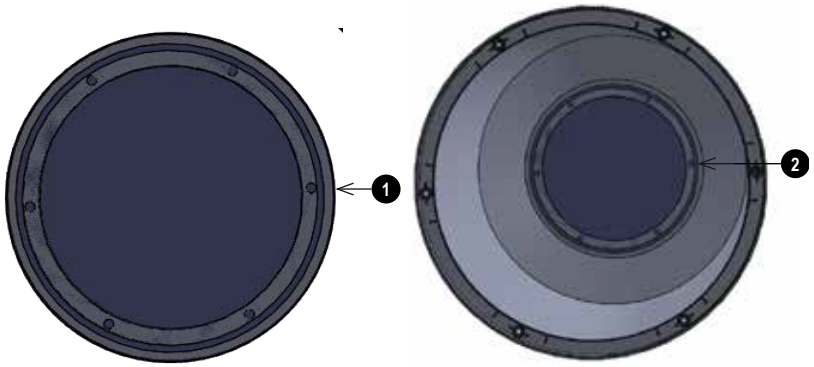
When changing the lens, avoid using excessive force as this may damage the equipment.

The lens is shipped separately.

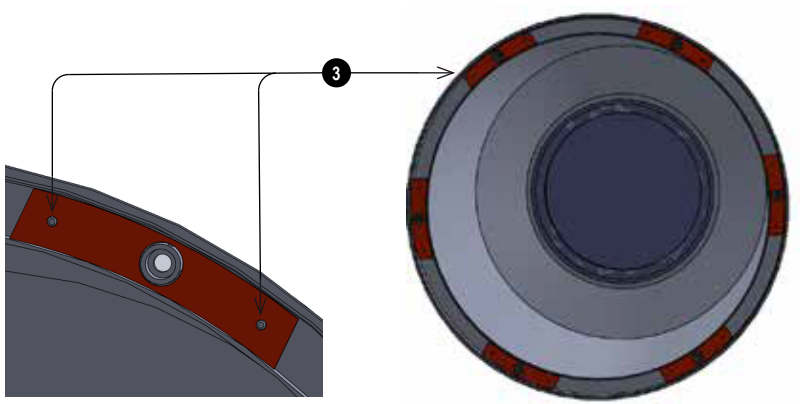
Take care to preserve the original lens packaging and protective caps for future use.

Fitting a lens hood

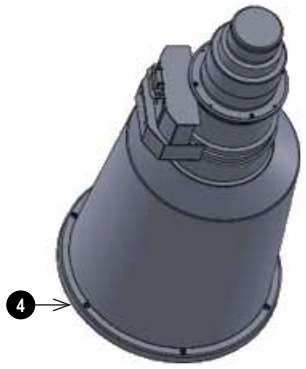
1. Remove the six screws. ❶
2. Remove the lens glass.
3. Place hood over the lens, aligned with the screw holes.
4. Screw in the six screws to secure the hood. ❷



5. Pace the six sponges over the locating pins on the hood. ❸
6. Place the glass and bracket over the hood.



7. Screw in the six screws to secure the glass and bracket to the hood. ❹



Notes

FDA regulations requires that a lens hood is permanently fitted when using the 4.16-6.96:1 lens with the Titan Laser range of projectors in the United States of America. Fitting can be provided by your reseller or System Integrator.

Operating the projector

Switching the projector on

1. Connect the power cable between the mains supply and the projector. (See Connecting the power supply above.) Switch the breaker switch next to the power connector to on.
   The POWER indicator turns red to signal that the projecter is on and in STANDBY mode.
2. Press one of the following buttons:
   - On the remote control, the ON button
   - On the projector control panel, the POWER button.

The POWER indicator begins flashing green as the projector powers up. When the flashing stops, the POWER indicator lights solid green and the Digital Projection logo appears on the screen. The projector is switched on and projecting.

Switching the projector off

1. Press OFF on the remote control or POWER on the control panel, then press again to confirm your choice.
   The POWER indicator on the control panel will start flashing blue, the projected image will turn off and the cooling fans will run for a short time until the POWER indicator goes steady red to indicate that the projector has entered STANDBY mode.
2. If you need to switch the projector off completely, switch the breaker switch next to the power connector to off and then disconnect the power cable from the projector.

Selecting an input signal

1. Connect one or more image sources to the projector.
2. Select the input you want to display:
   - Press one of the input buttons on the remote control.
   - Alternatively, open the On-screen display (OSD) by pressing **MENU**. Highlight **Input** from the main menu, press **ENTER/OK** and then select an input signal using the **UP** and **DOWN** arrow buttons. Press **ENTER/OK** to confirm your choice.

Selecting a test pattern

To display a test pattern:

- Press **TEST** on the remote control.
  Change the test pattern using the **LEFT** and **RIGHT** arrow buttons. The following test patterns are available: *White, Black, Red, Green, Blue, Checkerboard, Crosshatch, V Burst, H Burst, Color Bar, Off.*
- Alternatively, open the OSD by pressing **MENU**. Highlight **Test Patterns** from the main menu, then select a test pattern using the **LEFT** and **RIGHT** arrow buttons.

After the final test pattern, the projector exits test pattern mode and returns to the main image. To view test patterns again, you need to press **TEST** again. If you wish to exit the test patterns before you reach the final one, press **TEST** or **EXIT** at any time.

Notes

See Connecting the power supply on page 13.

The self-test is running when all the LEDs on the control panel are lit.

Use only the power cable provided.

Ensure that the power outlet includes a ground connection as this equipment MUST be earthed.

Handle the power cable carefully and avoid sharp bends. Do not use a damaged power cable.

See Using the menus on page 40 for full details of how to use the controls and the menu system.

Adjusting the lens

The lens can be adjusted using the Lens menu, or using the lens buttons on the remote control.

Lens menu

The **Lens** menu provides access to the **Lens Control** setting and the **Lens Center** command.

Lens Control allows **Zoom**, **Focus** and **Shift** adjustment using the arrow buttons. The setting operates in **Zoom/Focus Adjustment** and **Shift Adjustment** mode.

Press **ENTER/SELECT** to switch between the two modes.

Remote control

Use the remote control to adjust zoom, focus and shift directly, without opening a menu:

- **OK** enters lens control, then switches between Zoom/Focus Adjustment and Shift Adjustment.
- **EXIT** exits lens control and opens the Lens menu.
- **MENU** exits lens control and returns to the main image.
- The arrow buttons adjust zoom, focus and shift as indicated on the screen.

Adjusting the image

Orientation

This can be set from the **Setup** menu.

Highlight **Orientation** and choose from **Front Tabletop**, **Front Ceiling**, **Rear Tabletop**, **Rear Ceiling** and **Auto-front**.

Geometry

Settings such as **Keystone**, **Rotation**, **Pincushion / Barrel** and **Arc** can be set from the **Geometry** menu.

Picture

Settings such as **Gamma**, **Brightness**, **Contrast**, **Saturation**, **Hue** and **Sharpness** can be set from the **Image** menu.

Notes

See Remote control on page 17 for full details of how to adjust the lens using the remote control.

Neither of the settings under Picture are available with the HDMI 3 and 4 inputs.

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DIGITAL PROJECTION

Titan Laser4K-UHD

High Brightness Digital Video Projector

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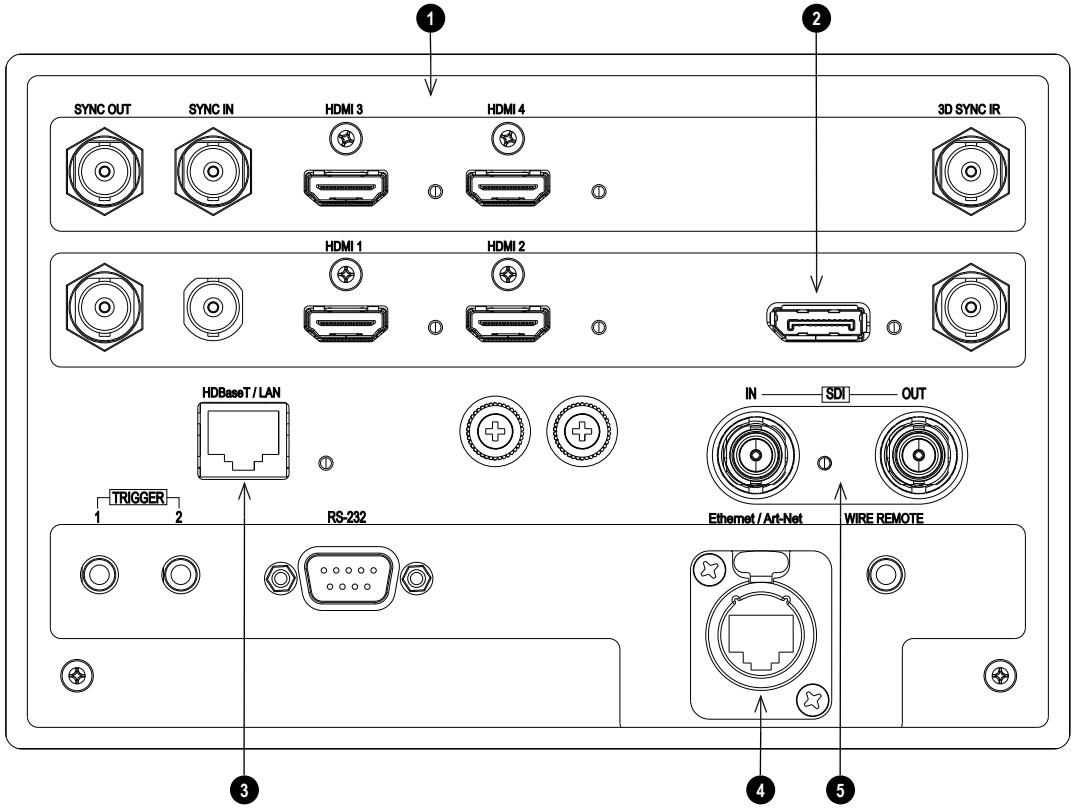
Signal inputs

Digital inputs and outputs

1. **HDMI 1 / HDMI 2 / HDMI 3 / HDMI 4**
   HDMI 1 and 2 are HDMI 2.0 inputs supporting HDCP 2.2.
   HDMI 3 and 4 are HDMI 1.4b inputs supporting **Frame Sequential** and **Dual Pipe** 3D with HDCP 1.4. Connect an **HDMI** cable to the connector.
2. **DisplayPort**
   DisplayPort 1.2 input. Connect a DisplayPort cable to the connector. Supports sources up to 4K-UHD resolution at 60 Hz
3. **HDBaseT/LAN**
   Receives digital signal from HDBaseT-compliant devices with LAN connectivity.
4. **3G-SDI in** and **3G-SDI out**
   Connect a 3G-SDI cable to distribute the 3G-SDI signal to another projector.
5. **Ethernet/ArtNet**
   Provides LAN connectivity via an ethernet or ArtNet cable.



Notes

For simultaneous HDBaseT and LAN connectivity, a third-party distribution product can be utilised to combine HDBaseT video stream with LAN connection for delivery to the projector.

EDID on the DisplayPort, HDMI, and HDbaseT inputs

If you are using a computer graphics card or another source that obeys the EDID protocol, the source will automatically configure itself to suit the capability of the projector.

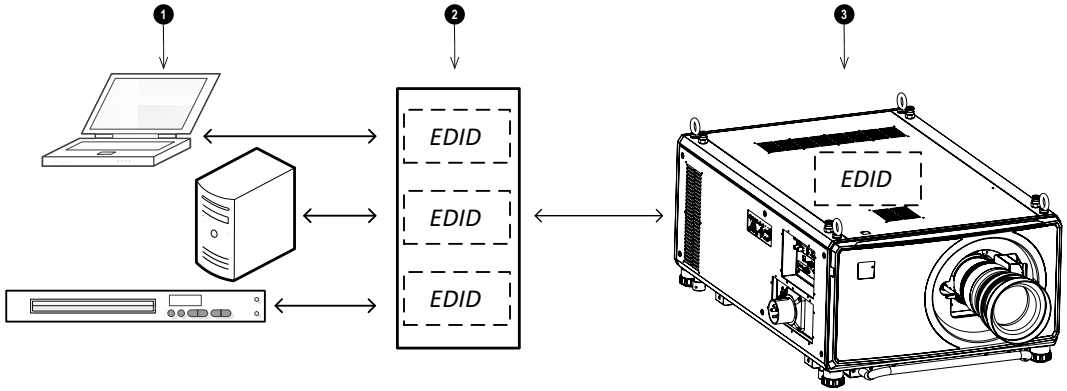
Otherwise refer to the documentation supplied with the source to manually set the resolution to the DMD™ resolution of the projector or the nearest suitable setting. Switch off the source, connect to the projector, then switch the source back on again.

Using DisplayPort/ HDMI/ HDBaseT switchers with the projector

When using a DisplayPort/HDMI/HDBaseT source switcher with the projector, it is important to set the switcher so that it passes the projector EDID through to the source devices.

If this is not done, the projector may not be able to lock to the source or display the source correctly as its video output timings may not be compatible with those of the projector. Sometimes this is called transparent, pass-through or clone mode. See your switcher's manual for information on how to set this mode.

1. Sources
2. Switcher
3. Projector

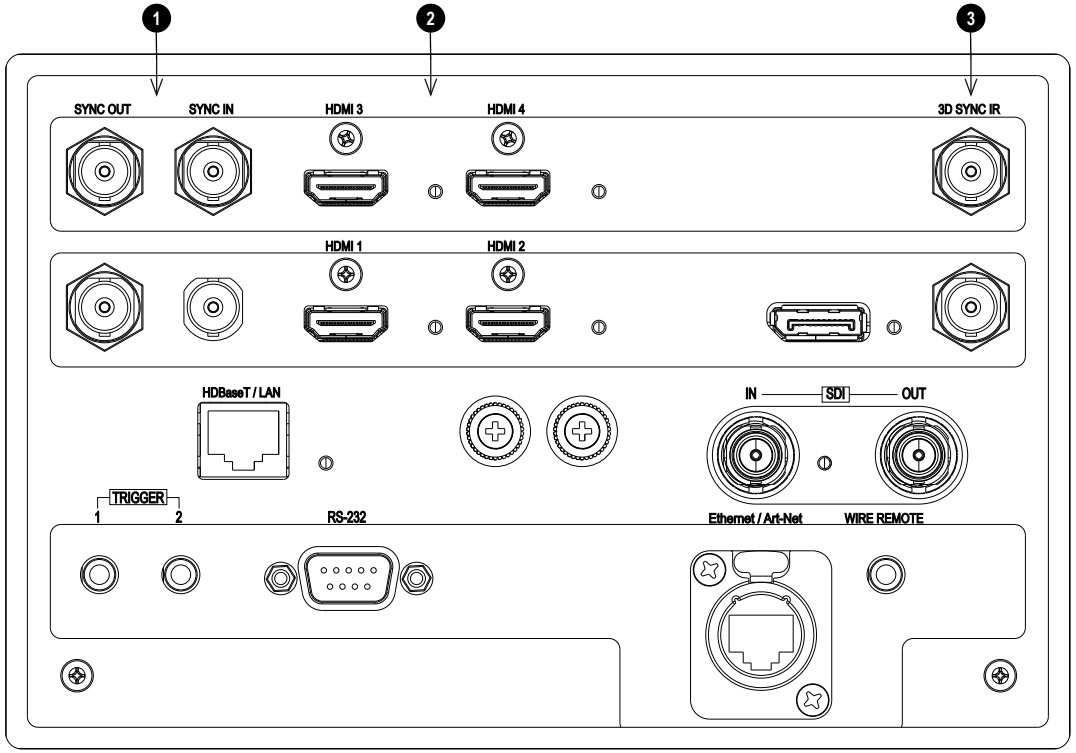


The EDIDs in the switcher should be the same as the one in the projector.

Notes

3D connections

1. **Sync In / Sync Out**
   Sync In is the 3D sync input signal. Connect the 3D sync from your graphics card or server.
   Sync Out is the 3D sync output signal. Enables 3D from multiple projectors.
2. **HDMI 3 / HDMI 4**
   HDMI 3 and 4 are HDMI 1.4b inputs supporting **Frame Sequential** and **Dual Pipe** 3D with HDCP 1.4. Connect an **HDMI** cable to the connector.
3. **3D Sync IR**
   Sync output signal. This is affected by the settings in the 3D menu such as Dark Time and 3D Sync Offset. Connect this to an IR emitter or ZScreen.



Frame sequential 1080p 3D up to 120Hz and WUXGA 3D at 100Hz

1. Connect to HDMI 3 or 4.
2. Set **3D Format** in the **3D** menu to **Frame Sequential**.

Dual Pipe 1080p and WUXGA 3D sources at up to 100 and 120Hz

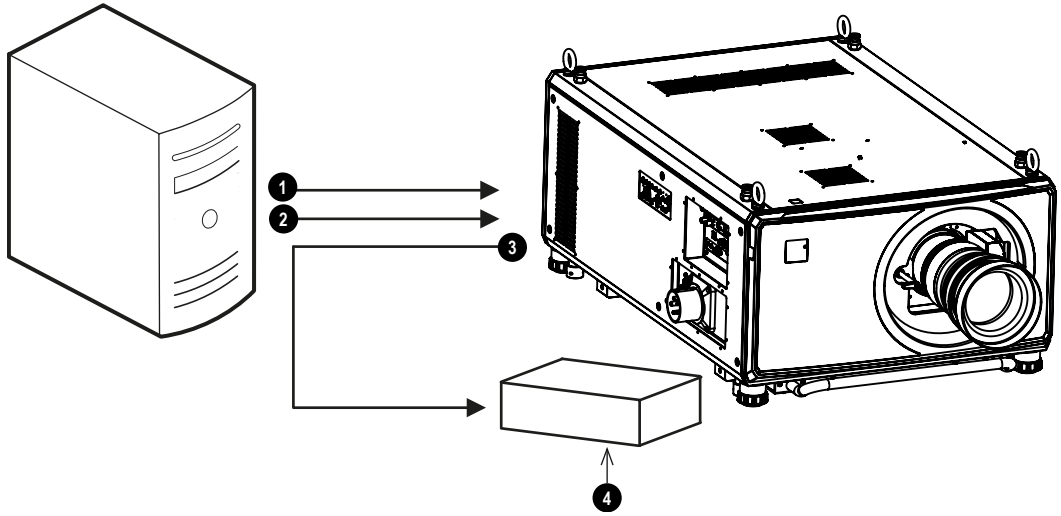
1. Connect the left eye output to the **HDMI 3** socket and the right eye output to the **HDMI 4** socket.
2. Set **3D Format** in the **3D** menu to **Dual-Pipe**.

Notes

See 3D formats on page 119 for a complete list of supported formats and frame rates.

3D Sync

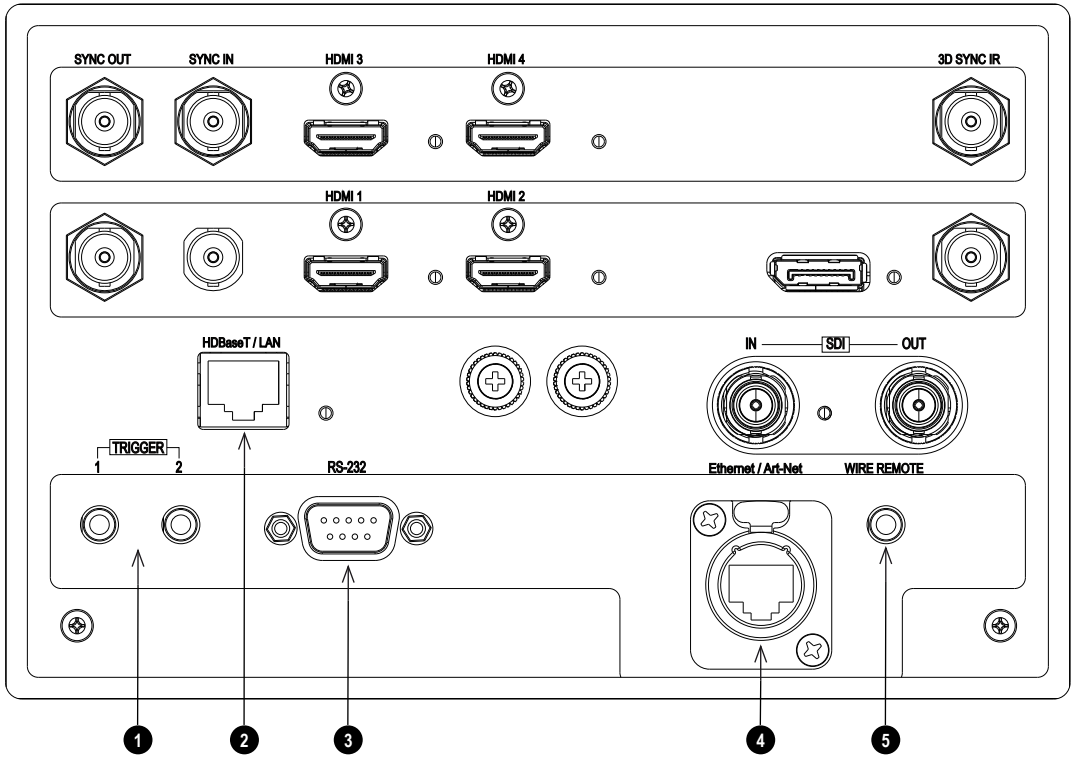
1. 3D Input
2. 3D Sync In
3. 3D Sync IR
4. IR emmitter or Zscreen



Notes

Control connections

1. **Trigger 1 & Trigger 2**
   The Trigger outputs are activated by one of the three following conditions, as set in the **Setup** menu:
   - Screen trigger: can be connected to an electrically operated screen, automatically deploying the screen when the projector starts up, and retracting the screen when the projector shuts down.
   - Aspect ratio trigger: can be used to control screen shuttering for different aspect ratios.
   - RS232 trigger: can be used to control the screen or screen shuttering on receipt of an RS232 command
2. **HDBaseT/LAN**
   The projector's features can be controlled via a LAN connection, using Digital Projection's **Projector Controller** application or a terminal-emulation program.
3. **RS232**
   - All of the projector's features can be controlled via a serial connection, using commands described in the **Protocol Guide**.
   - Use a straight-through cable to connect directly to a computer.



4. **Ethernet/ArtNet**
   This dedicated LAN connection can be used if **HDBaseT/LAN** is already being used for HDBaseT signal input.
5. **Wired Remote**
   The remote control can be connected using a standard 3.5 mm mini jack cable (tip-ring-sleeve, or TRS).

Notes

*For a list of all commands used to control the projector via LAN, see the **Protocol Guide** (available separately).*

Only one remote connection (RS232 or LAN) should be used at any one time.

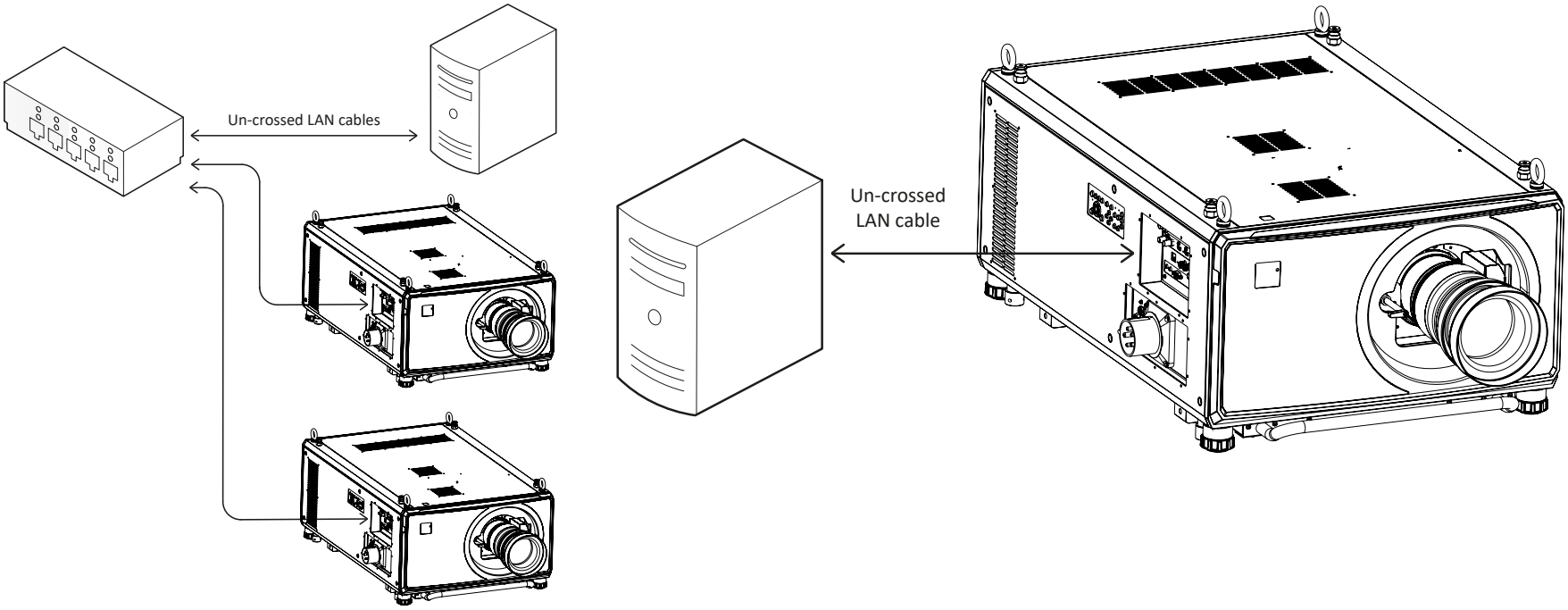
With a LAN connection the projector can serve a web page offering status and projector controls.

***Trigger 1** and **Trigger 2** are not available with HDMI 3 and 4 inputs.*

***Projector Controller** is available for download, free of charge, from the Digital Projection website.*

LAN connection examples

The projector's features can be controlled via a LAN connection, using Digital Projection's **Projector Controller** application or a terminal emulation program.



Notes

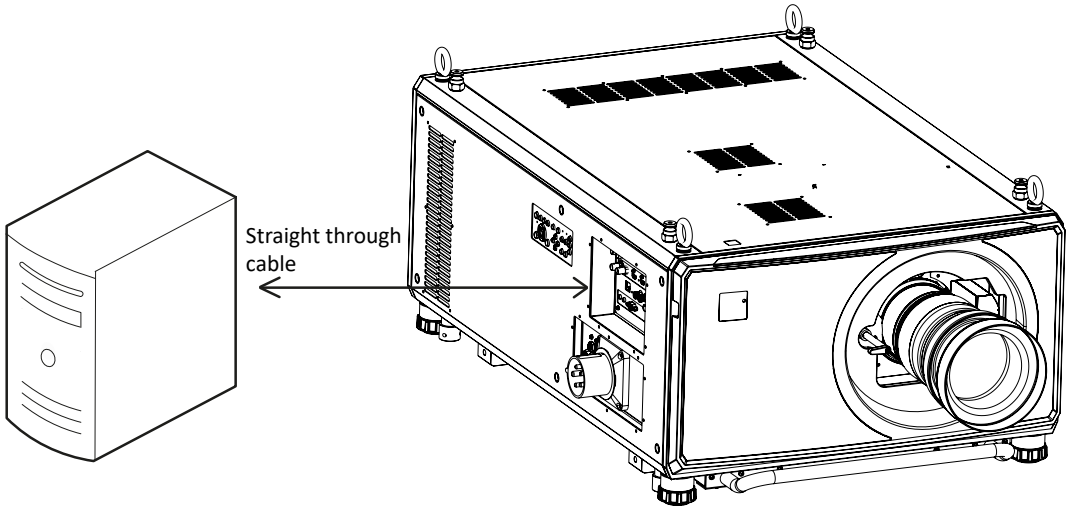
With a LAN connection the projector can serve a web page offering basic projector controls.

***Projector Controller** is available for download, free of charge, from the Digital Projection website.*

For simultaneous HDBaseT and LAN connectivity, a third-party distribution product can be utilised to combine HDBaseT video stream with LAN connection for delivery to the projector.

RS232 connection example

All of the projector's features can be controlled via a serial connection, using commands described in the **Protocol Guide**.



Computer to Projector

Notes

*The **Protocol Guide** is available separately*

DIGITAL PROJECTION

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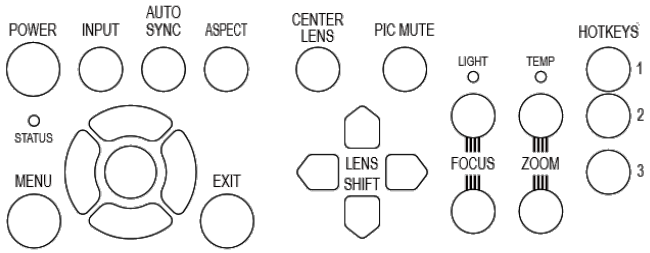
Using the menus

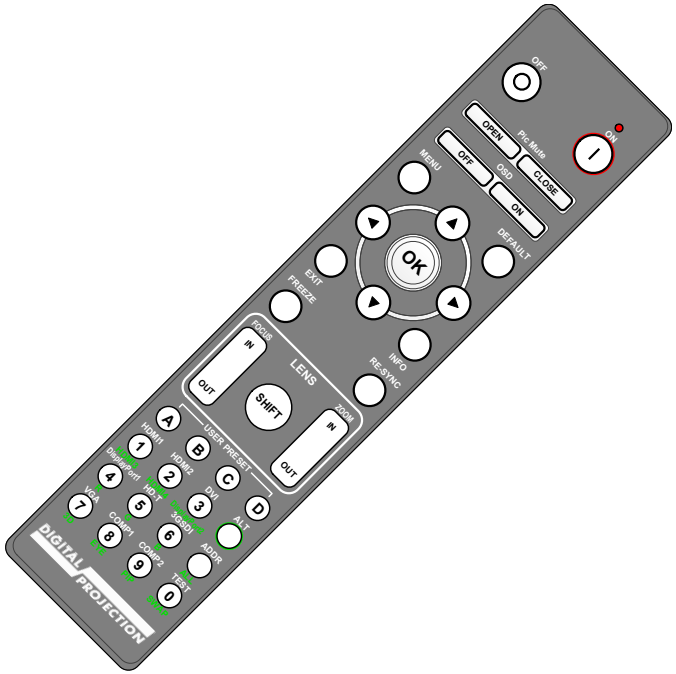
Opening the Menu

Access the various menus using either the projector control panel or the remote control. On either device:

1. Press the **MENU** button. The on-screen display (OSD) opens showing the list of available menus



Projector control panel



Remote control

Opening a submenu

Move up and down the list using the **UP** and **DOWN** arrow buttons.

To open a submenu:

1. Press **ENTER** on the control panel or **OK** on the remote control.

This guide refers to the above two buttons as **ENTER/OK**.

Notes

Exiting menus and closing the OSD

To go back to the previous page:

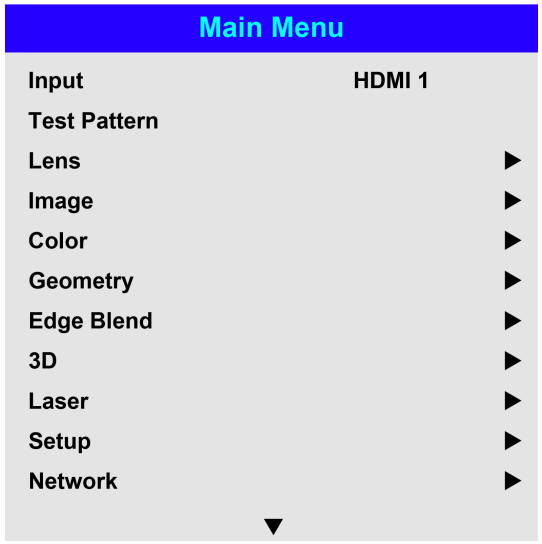
1. Press **EXIT**.

To close the OSD:

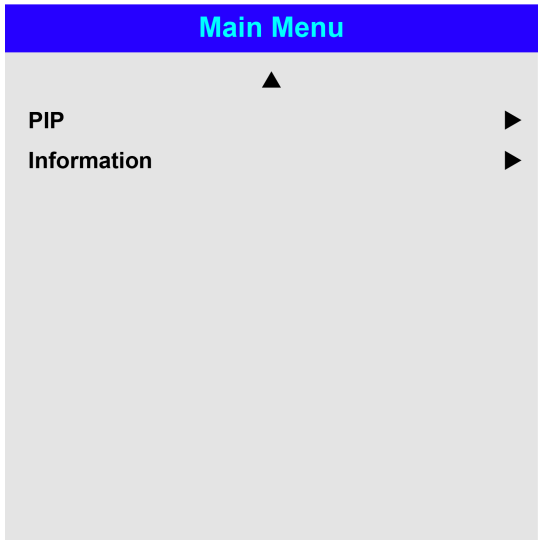
1. Press **MENU**.

Or:

1. Go back to the top level menu
2. Press **EXIT**.



On Screen Display (OSD): Top Level Menu

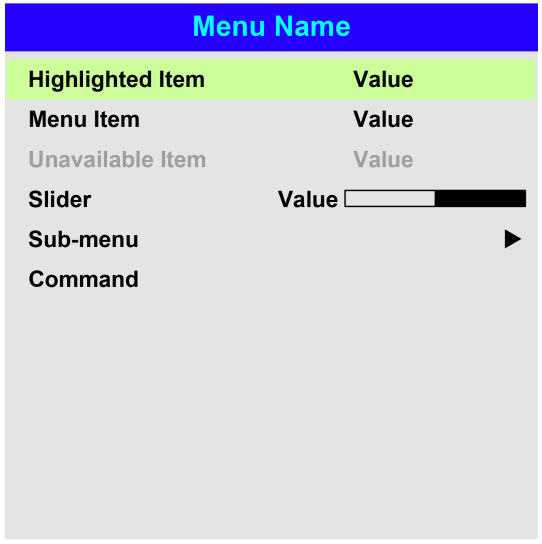


OSD: Top Level Menu continued

Inside a menu

When you open a menu, the page consists of the following elements:

- Title bar at the top shows which menu you have accessed.
- Highlighted item
- Available and unavailable items Unavailable items appear a pale gray color. Whether an item is available may depend on other settings.
- The text or symbol to the right of an item shows whether the item:
  - has a value that can be changed (the current value is shown)
  - opens a sub-menu (an arrow button is displayed)
  - executes a command (the space to the right of the item is blank).



Inside a menu

Notes

The highlighted item has green background.

Accessing sub menus

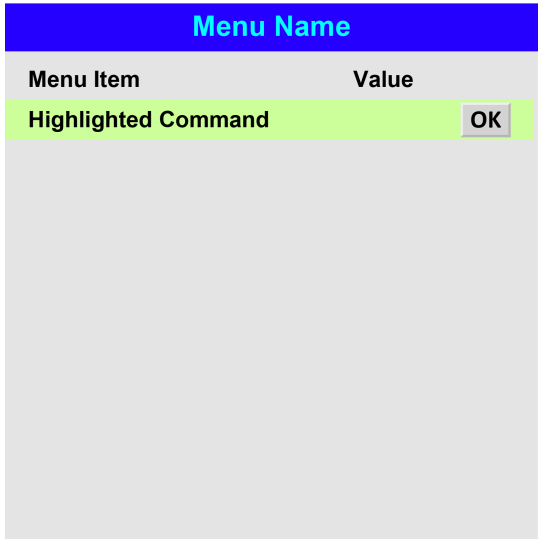
Use the **UP** and **DOWN** arrow buttons to highlight the sub-menu, then press **ENTER/OK**.

Executing commands

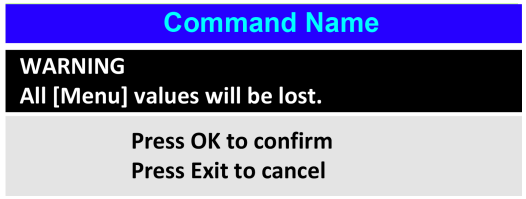
If the item contains a command, highlighting it reveals an **OK** button.

Press **ENTER/OK** to execute the highlighted command.

You may be asked for confirmation. Use the **ENTER/OK** to confirm, or **EXIT** to cancel.



Highlighted command



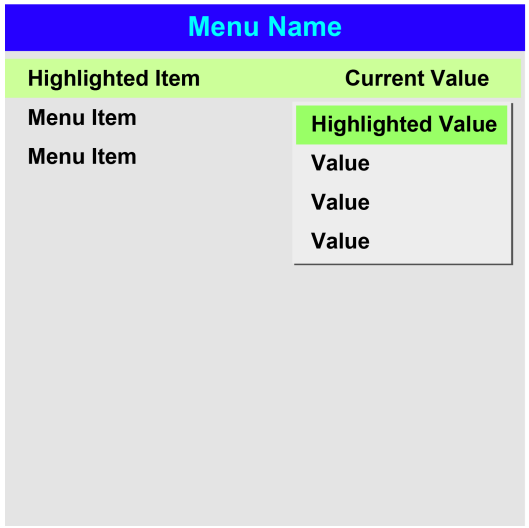
Confirmation dialog

Notes

Editing projector settings

If the highlighted menu item contains a list of values to choose from, you can change the value by doing the following:

1. Highlight the menu item and press **ENTER/OK**.
2. In the list of values that opens, use the **UP** and **DOWN** arrow buttons to highlight a value, then press **ENTER/OK** again to select the highlighted value.



List of values

Using a slider to set a value

Some parameters open a slider. To set such a parameter:

Slider

1. Press the **LEFT** or **RIGHT** arrow button, or **ENTER/OK**. The arrow buttons will open the slider and adjust the value at the same time. **ENTER/OK** will open the slider without altering the initial value.
2. Use the **LEFT** and **RIGHT** arrow buttons to move the slider.
3. When ready, press **EXIT** to exit the slider and return to the menu, or press **MENU** to exit the slider without showing the menu again.

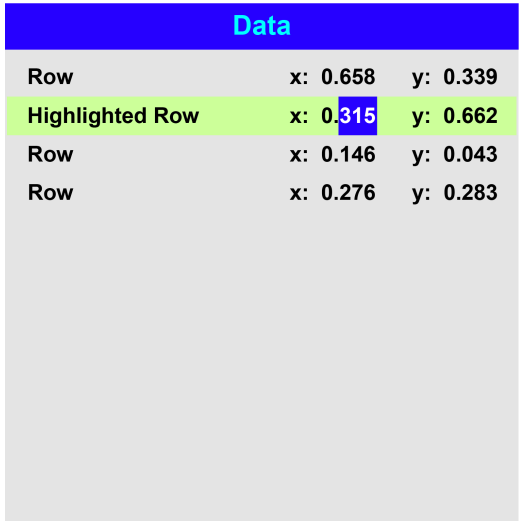
Notes

Some menu items may be unavailable due to settings in other menus. Unavailable menu items appear gray

Editing numeric values

Some parameters take numeric values without using sliders - for example, color matching values or IP addresses.

1. Use the **UP** and **DOWN** arrow buttons to highlight the row containing the numeric field you wish to edit.
2. Press **ENTER/OK** to enter edit mode. A numeric field in edit mode is white text on blue background.
3. In edit mode:
    - Use the **UP** arrow button to increase the numeric value.
    - Use the **DOWN** arrow button to decrease the numeric value.
4. Use the **LEFT** and **RIGHT** arrow buttons to edit the next or previous numeric fields within the same row.
5. Once ready, press **ENTER/OK** to exit edit mode.



Notes

Using the projector

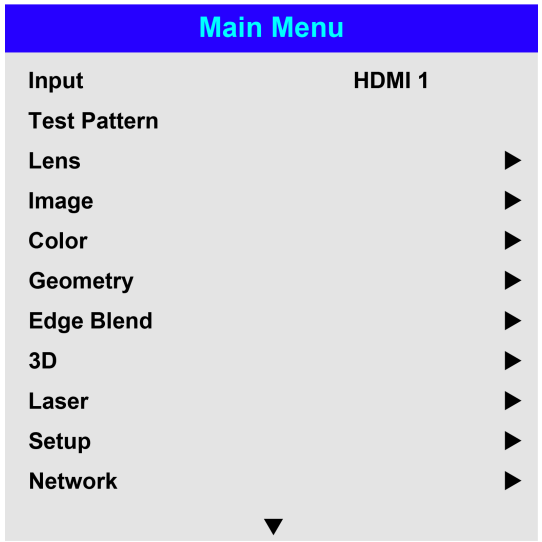
Main menu

- **Input** Press ENTER/OK to open the list of available inputs. Use the **UP** and **DOWN** arrow buttons to select an input from the list, then press **ENTER/OK** to confirm your choice. Press **EXIT** to return to the main menu.
- **Test Pattern** Choose from: *White, Black, Red, Green, Blue, Checkerboard, Crosshatch, V Burst, H Burst, Color Bar, Off.* Use the **LEFT** and **RIGHT** arrow buttons to switch between values.
- *Lens, Image, Color, Geometry, Edge Blend, 3D, Laser, Setup* and *Network.* Press **ENTER/OK** to open these menus and access various settings.

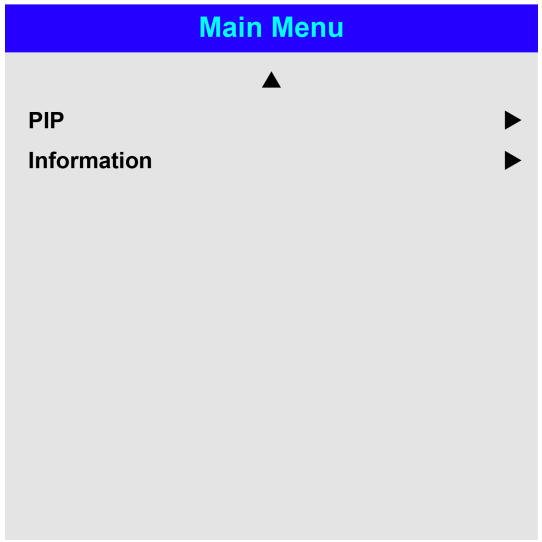
Press the **DOWN** arrow at the bottom of the page to access additional menus:

- **PIP** and **Information** Press **ENTER/OK** to open these menus and access various settings.

Press the **UP** arrow to return to the previous page.



Main menu, page 1



Main menu, page 2

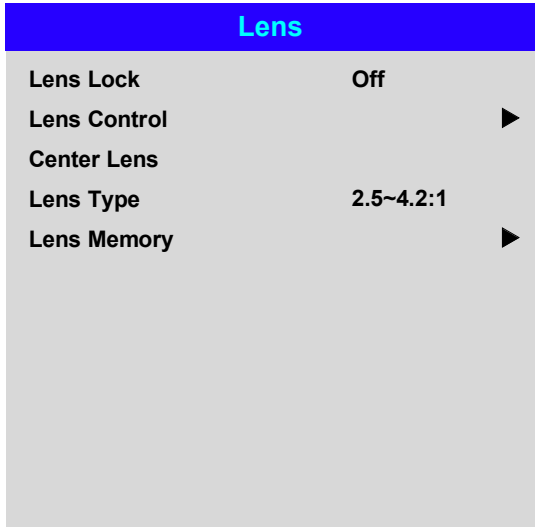
Notes

See Signal inputs on page 32 for information about the available inputs and connections.

*Selecting a test pattern hides the OSD. Press **EXIT** to hide the test pattern, and then press **MENU** to show the OSD*

Lens menu

- **Lens Lock**
  When this feature is On, all other Lens menu items are disabled.
- **Lens Control**
  Opens a sub-menu, see below.
- **Center Lens**
  Centers the lens.
- **Lens Type**
  Choose from *1.4~1.9:1, 1.8~2.6:1, 2.5~4.2:1, 4.1~7.0:1, 0.7:1, 1.1:1, 1.2~1.5:1, 6.9~10.4:1*.
  Select the lens that is installed on the projector.
- **Lens Memory**
  Opens a sub-menu, see next page.



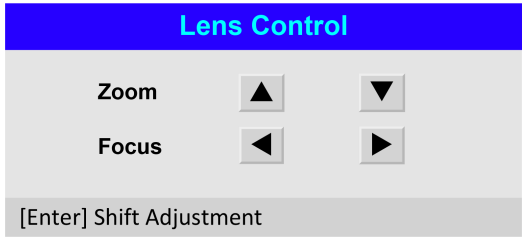
Lens control

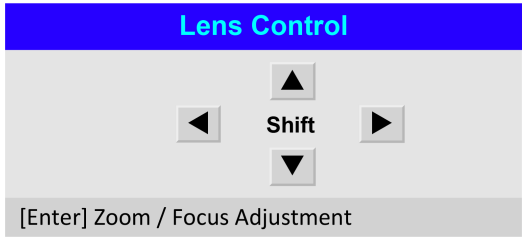
Lens Control settings operate in **Zoom/Focus Adjustment** and **Shift Adjustment** mode. Press **ENTER/OK** to switch between modes.

When in **Zoom/Focus Adjustment** mode:

- Use the **UP** and **DOWN** arrow buttons to adjust **Zoom**.
- Use the **LEFT** and **RIGHT** arrow buttons to adjust **Focus**.

When in **Shift Adjustment** mode, use the arrow buttons to adjust **Shift**.





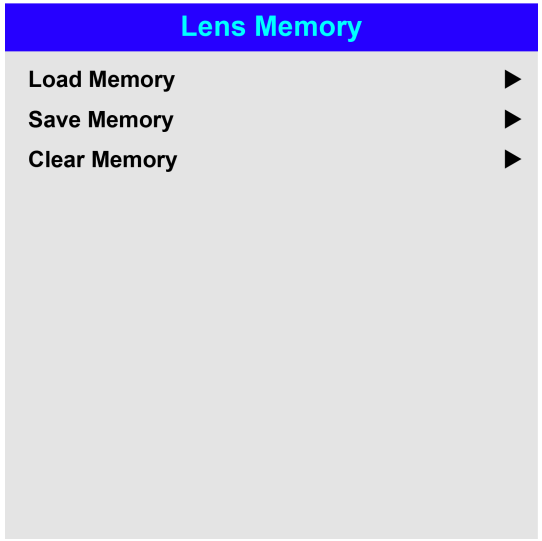
Notes

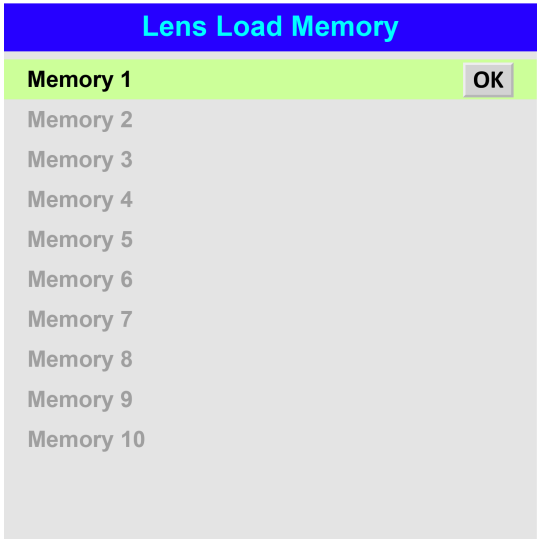
Lens memory

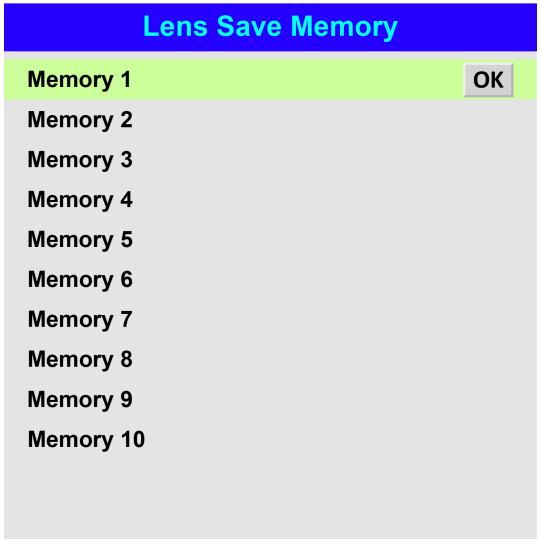
This menu allows you to load, save and delete up to ten lens presets, containing position, zoom, focus and shift adjustment information.

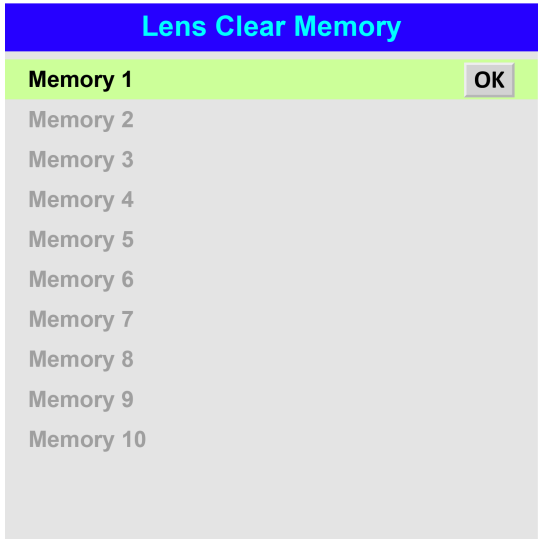
For example, if using different screen sizes and aspect ratios, you can save zoom, focus and positioning for each screen size and aspect ratio in a dedicated preset.

Use **Clear Memory** to delete a memory preset if you need to save a new combination of lens settings in its place. Overwriting a saved memory preset is not possible.







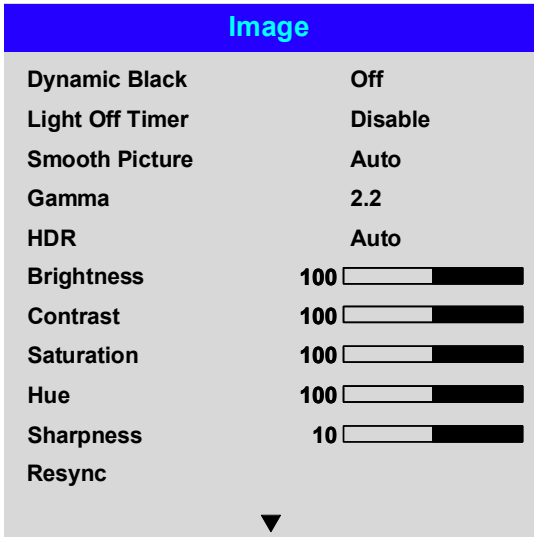


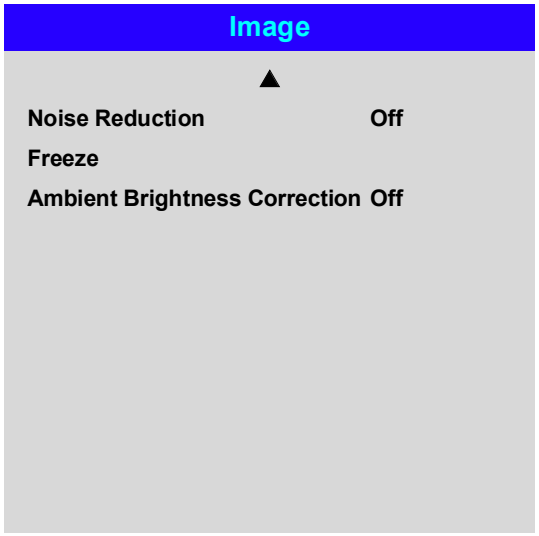
Notes

Image menu

- **Dynamic Black**
  Set to On to allow for increased contrast in darker scenes by modulating the light source.
- **Light Off Timer**
  When **Dynamic Black** is **On**, the **Light Off Timer** will define if laser light source will turn off after a period of time has passed. The options are: **Disable, 0.5, 1.0, 1.5, 2.0, 3.0, 4.0** seconds.
- **Smooth Picture**
  When this feature is **On**, the projector will resize the incoming signal to display in 4K-UHD resolution.
  When **Off** sources will be displayed within WUXGA resolution.
  Auto will display 4K-UHD sources in 4K-UHD resolution with Smooth Picture **On**.
  Lower resolution sources with be display within WUXGA resolution with Smooth Picture **Off**.
  Aspect ratio selection applies for both Smooth Picture **On or** Off.
- **Gamma**
  Choose a de-gamma curve from **1.0, 1.8, 2.0, 2.2, 2.35, 2.5, S-Curve**and **DICOM**.
  Used correctly, the **Gamma** setting can improve contrast while maintaining good details for blacks and whites.
  If excess ambient light washes out the image and it is difficult to see details in dark areas, lower the **Gamma** setting to compensate. This improves contrast while maintaining good details for blacks.
  Conversely, if the image is washed out and unnatural, with excessive detail in black areas, increase the setting.
  DICOM is a simulated DICOM display, which can be used for training applications.

- **HDR**
  Choose from *AUTO, RPQ-500, RPQ500, RPQ1000* and *HDRHLG*.
  HDR (High Dynamic Range) is a new form of gamma developed to create more realistic experience when viewing images delivered using this format, such as scenes with bright sunlight. Unlike traditional gamma HDR is not device or installation independent. HDR content will come with a recommended brightness regardless of screen size. For best results as a guideline the following screens sizes are suggested.





Notes

The following settings are not available with input HDMI 3 or HDMI 4:
Image > *Dynamic Black, Smooth Picture, Brightness, Contrast, Saturation, Hue, Sharpness, Noise Reduction, Freeze, Resync.*
Color > *Color Space.*
Geometry > *Aspect Ratio, Digital Zoom, Overscan.*
Setup > *Screen Setting, Auto Source, Trigger-1, Trigger-2.*
PIP > *all settings.*

Selecting a HDR setting will disable the Gamma setting.
If the HDR setting is Auto, the Gamma setting is only disabled when the image source is HDR

The HDR AUTO setting is only available when the incoming signal is HDR capable

HDR Screen sizes		Screen width (cm)			
Model	**Lumens**	**400 NIT**	**500 NIT**	**1000 NIT**	**4000 NIT**
Titan Laser 4K-UHD	26,000	606.5cm	542.4cm	383.60cm	191.8cm
Titan Laser 4K-UHD	33,000	683.3cm	611.10cm	432.1cm	216.1cm

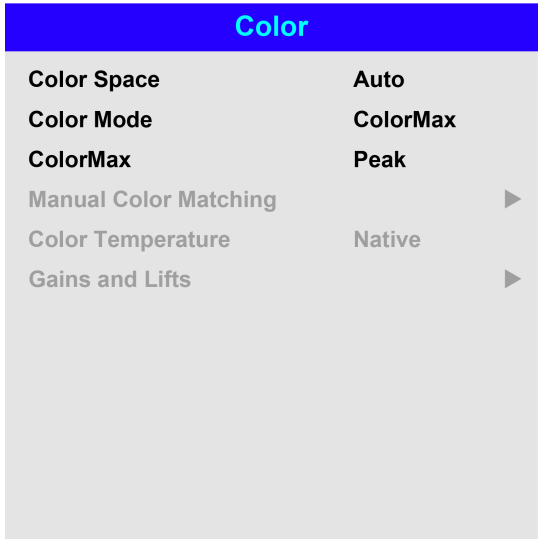
HDR options should only be used with media players and sources equipped with HDR and HDR content.
Perceptual Quantizer (PQ) is the digitizing concept for capture and display and provides metadata to enable the display to understand the coding of the content.
The NIT numbers relate to the brightness of the viewing conditions in NIT. NIT is the unit of brightness measurement for monitors and LED walls that emit light rather than reflect it such as a projection screen. However it is a reference to the brightness you would choose for a given environment.
HDRHLG is High Dynamic Range – hybrid-log-gamma. This is a broadcast version of HDR for live TV and events.

- **Brightness, Contrast, Saturation, Hue, Sharpness**
  Highlight the setting you wish to edit, and then press **ENTER/OK**, or the **LEFT** or **RIGHT** arrow button to open the slider.
  Use the **LEFT** and **RIGHT** arrow buttons to adjust the slider.
  Press **EXIT** to close the slider and return to the menu, or **MENU** to close the slider and return to the projected image.
- **Resync**
  Press **ENTER/OK** to force the projector to resynchronise with the current input
- **Noise Reduction**
  Choose a level of noise reduction from **Off, Low, Middle** and **High**.
- **Freeze**
  Freezes the current frame.
- **Ambient Brightness Correction**
  Choose from; Off, BC1, BC2, BC3, BC4, BC5, BC6
  This adjusts brightness, contrast, saturation, hue and sharpness settings to levels that are pre-configured for different levels of ambient light.

Notes

Brightness, Contrast, Saturation, Hue, Sharpness and Noise Reduction are not available with the HDMI 3 and HDMI4 inputs

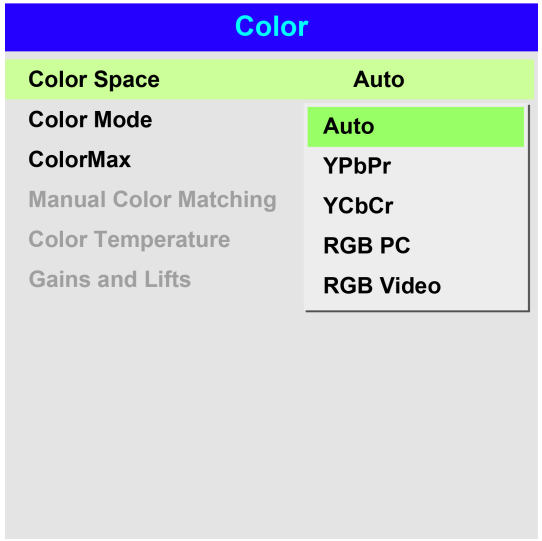
Color menu



Color space

In most cases, the Auto setting determines the correct colorspace to use. If it does not, you can choose a specific colorspace:

Choose from **Auto**, **YPbPr**, **YCbCr**, **RGB PC** and **RGB Video**.

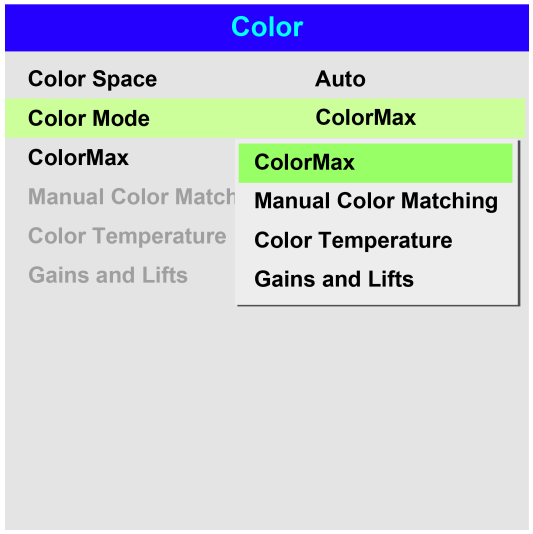


Notes

Color Space *is not available with HDMI 3 or HDMI 4.*

Color mode

The projector can work in the following color modes: **ColorMax, Manual Color Matching, Color Temperature** and **Gains and Lifts**.

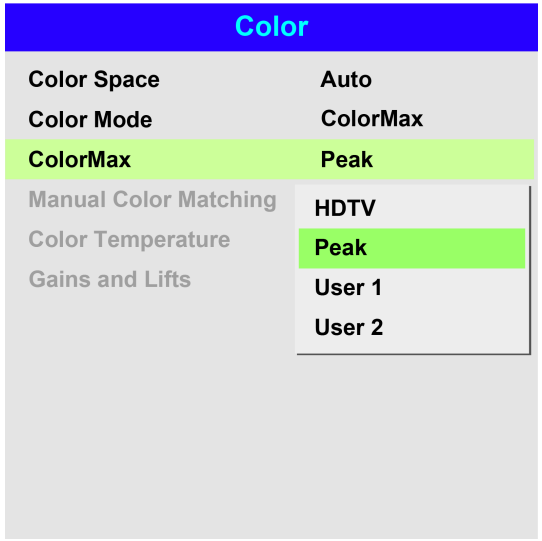


Notes

Only one color mode can be selected at a time. Settings used by the other color modes are disabled.

ColorMax

1. Set **Color Mode** to **ColorMax**.
2. Navigate to the **ColorMax** setting.
3. Choose from **HDTV, Peak, User 1**, **User 2**, 3 Color Matching and 7 Color Matching. **User 1** and **User 2** are user-defined color gamuts set via the **Setup > ColorMax** menu.



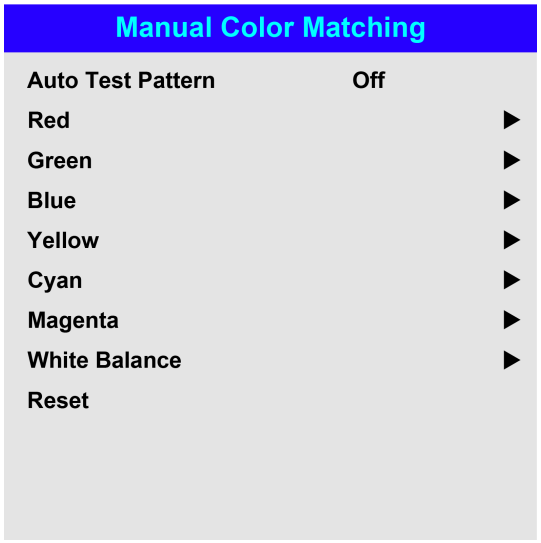
*See Setup menu on page 78 for further information about setting up the **User 1** and **User 2** color gamuts.*

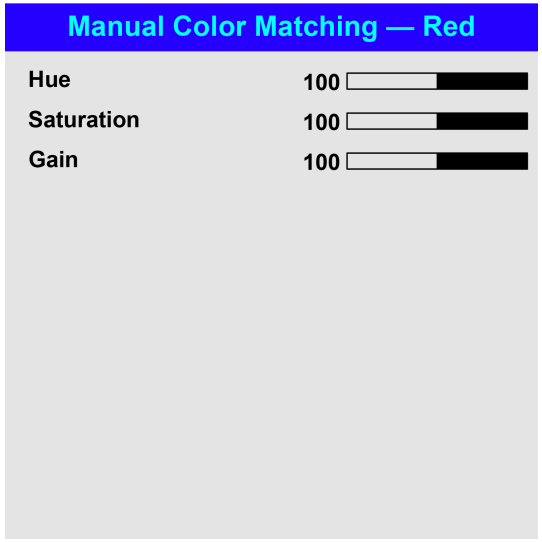
Manual color matching

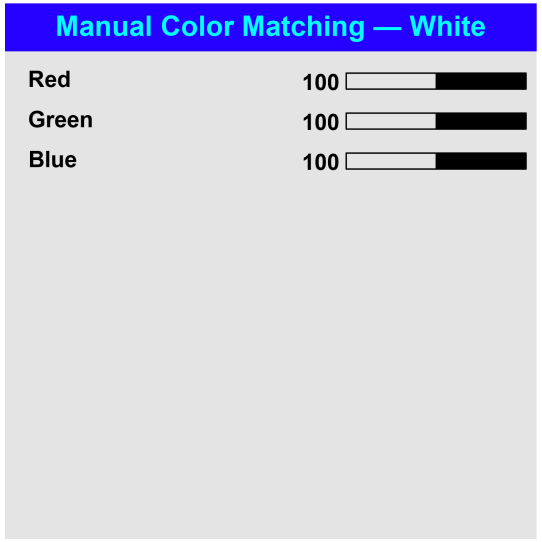
1. Set **Color Mode** to **Manual Color Matching**.
2. Open the **Manual Color Matching** submenu.

Here you can do the following:

- Switch **Auto Test Pattern On** and **Off**.
- Adjust **Hue**, **Saturation and** Gain settings for each individual color to improve the color balance of the projected image.
- Adjust white balance RGB values.
- Reset all values.







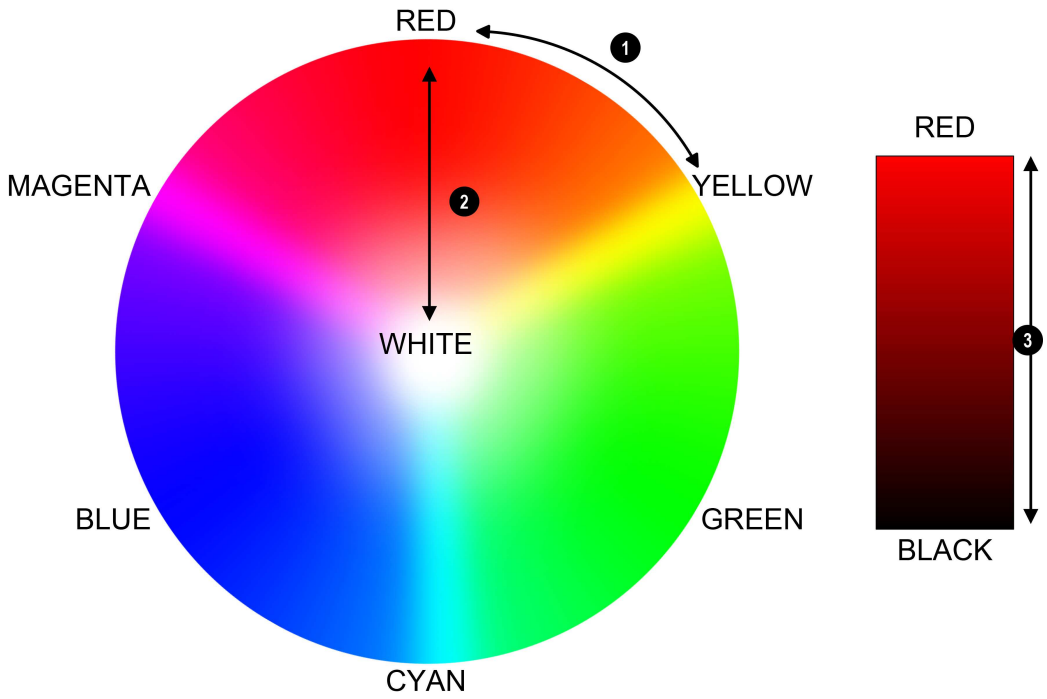
Notes

See Color matching parameters explained on the facing page for more details about the Hue, Saturation and Gain settings.

Color matching parameters explained

The levels of hue, saturation and gain in the Manual Color Matching menu change the color values in the following ways:

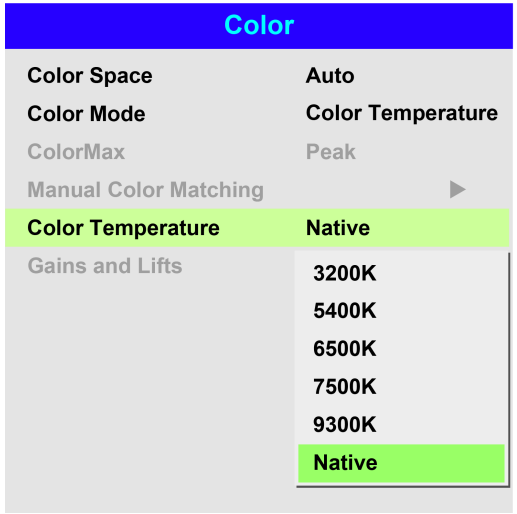
1. **Hue** Specifies the position of each color (red, yellow, green, cyan, blue and magenta) relative to its neighboring colors.
2. **Saturation** Specifies the level of white in each color (i.e. how “pale” each color is).
3. **Gain** Controls the amount of light that goes into each color, i.e. the lowest gain would produce black.



Notes

Color temperature

1. Set **Color Mode** to **Color Temperature**.
2. Navigate to the **Color Temperature** setting. Choose a value from **3200K** (warmer) to **9300K** (cooler) or **Native** (no correction).

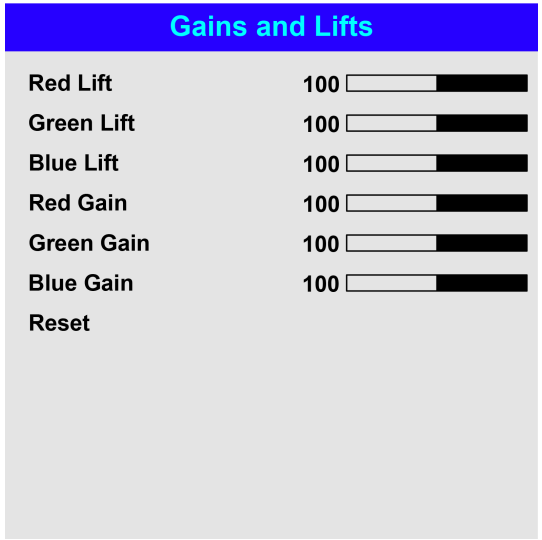


Gains and lifts

1. Set **Color Mode** to **Gains and Lifts**.
2. Open the **Gains and Lifts** submenu.

Lifts allow you to adjust black levels of individual colors, while gains adjust the bright part of the scale.

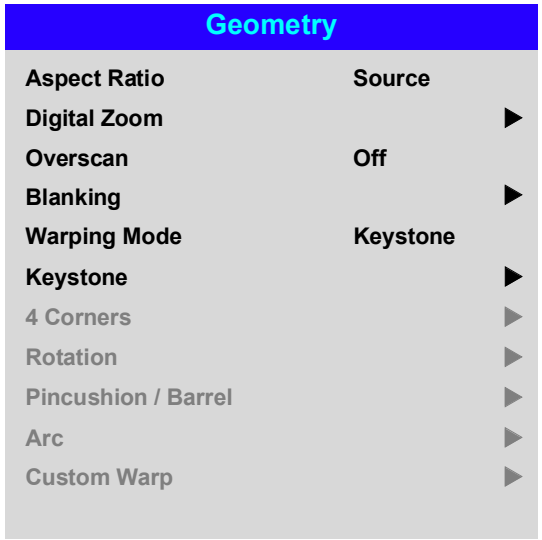
Set the sliders as required



Notes

Geometry menu

This menu allows you to compensate for image distortions caused by an unusual projection angle or irregular screen surface.



Aspect ratio

This feature defines the aspect ratio of the source. Use the **Setup > Screen Setting** to define the screen aspect ratio.

If you choose a preset aspect ratio from here, it will give you the best fit for your selection.

Choose from:

- **5:4**
- **4:3**
- **16:10**
- **16:9**
- **1.88**
- **2.35**
- **TheaterScope**
- **Source**
- **Unscaled**

Notes

__Aspect Ratio, Digital Zoom__ and __Overscan__ are not available with input HDMI 3 or HDMI 4.

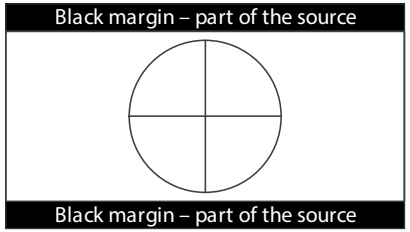
Image scaling and aspect ratio are also influenced by __Setup > Screen Setting__.

See Theaterscope setting on the next page for further information about the __TheaterScope__ aspect ratio.

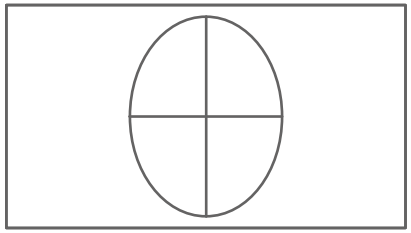
Theaterscope setting

The **TheaterScope** setting is used in combination with an anamorphic lens to restore 2.35: images packed into a 16:9 frame. Such images are projected with black lines at the top and bottom of the 16:9 screen to make up for the difference in aspect ratios.

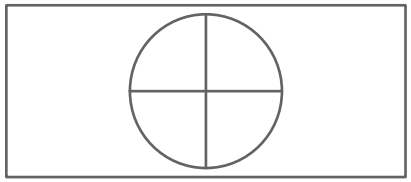
Without an anamorphic lens and without the TheaterScope setting applied, a 16:9 source containing a 2.35:1 image looks like this:



If we change the setting to TheaterScope, the black lines will disappear but the image will stretch vertically to reach the top and bottom of the DMD™:



An anamorphic lens will stretch the image horizontally, restoring the original 2.35 ratio:



Notes

TheaterScope is used with an anamorphic lens.

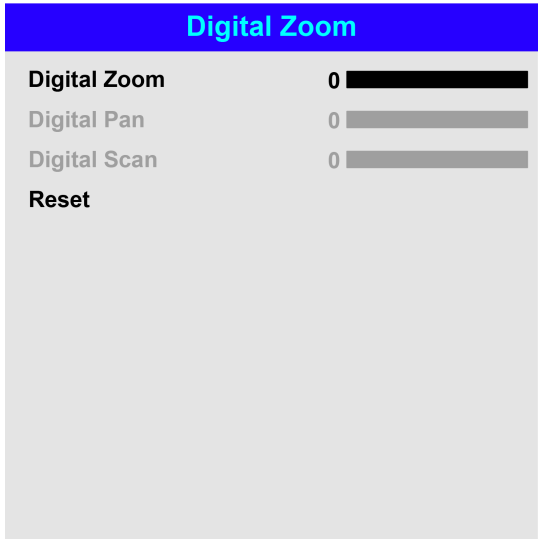
If you use TheaterScope, set your screen aspect ratio to 16:9.

Digital zoom

Digital zooming enlarges a section of the image, while the area outside the enlarged section is cropped out to preserve the overall image size.

- **Digital Zoom** defines the level of zoom that needs to be applied. If **Digital Zoom** is set to 0, then the other settings in the menu will be disabled.
- **Digital Pan** and **Digital Scan** specify the area that is being enlarged:
  - **Digital Pan** adjusts the horizontal coordinates.
  - **Digital Scan** adjusts the vertical coordinates.

The **Reset** command restores the default **Digital Zoom, Digital Pan** and **Digital Scan** values.



Notes

Digital Zoom *is not available with input HDMI 3 or HDMI 4.*

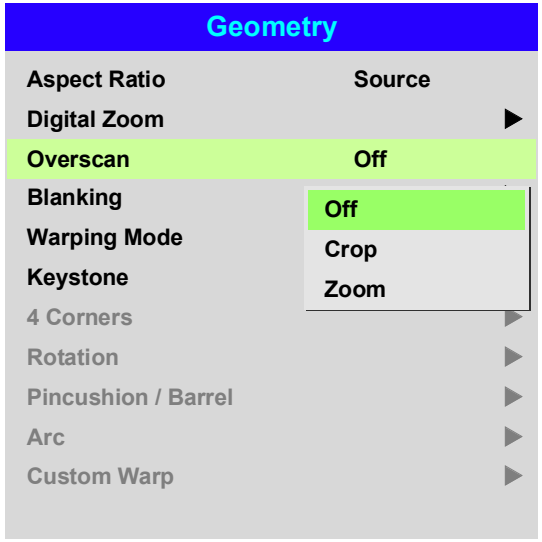
Digital Zoom is a temporary setting and not retained after an input change or power cycle.

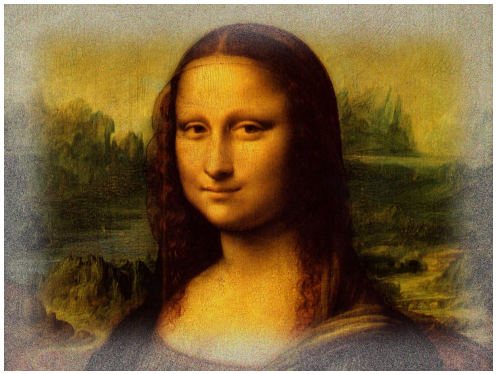
Overscan

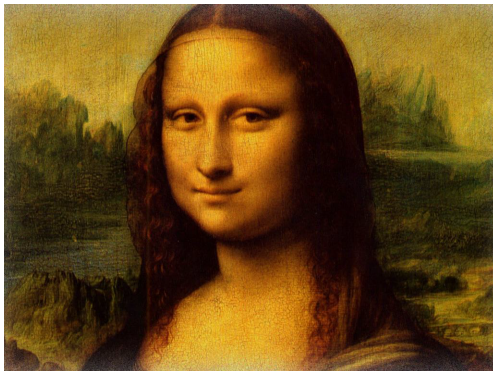
Use this setting to compensate for noisy or badly defined image edges.

Crop removes unwanted artifacts from the edges of your image by cropping the edges.

Zoom increases the size of the image to force the edges off-screen







Notes

***Overscan** is not available with input HDMI 3 or HDMI 4.*

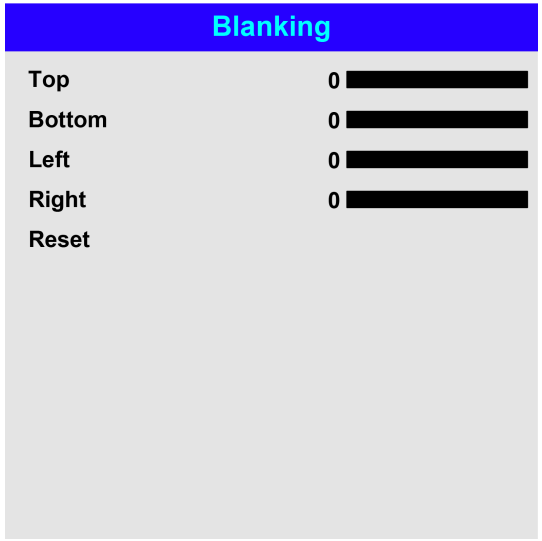
Blanking

Use this feature to:

- fit an odd-sized screen;
- cut off timecode dots in the top line of a picture;
- cut off subtitles, etc.

Select the edge you wish to blank and use the **LEFT** and **RIGHT** arrow buttons to determine the amount of correction.

Use the **Reset** command to restore blanked edges.

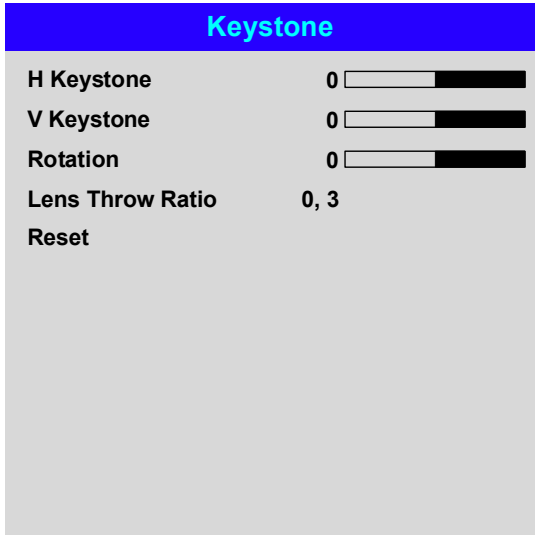


Notes

Keystone

Use this setting to compensate for any distortion caused by the projector being in a different horizontal or vertical plane to the screen.

After correcting for keystone, the aspect ratio of the projected image may be incorrect. This is dependant upon the throw ratio of the lens at its current zoom setting. Adjust the lens throw ratio to compensate for the apsect ratio that results from the zoom setting on the lens.



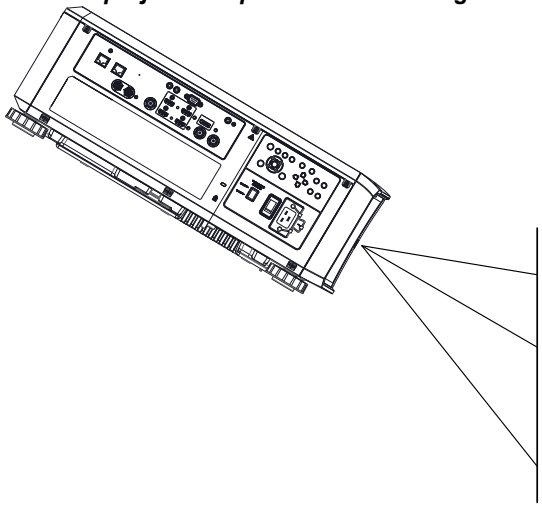
Notes

Max rotation in Keystone is reduced from normal rotation

Make sure that the lens type is set to the correct lens in the lens menu before adjusting the lens throw ratio

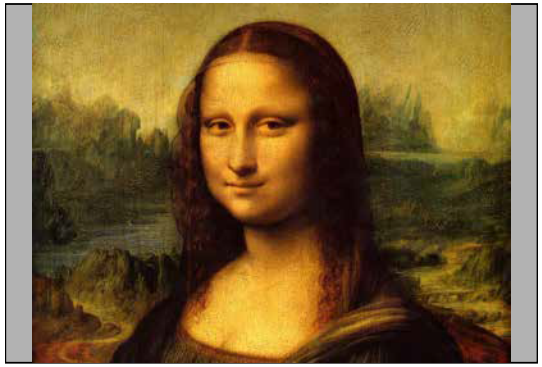
Keystone example

The projector is positioned at an angle

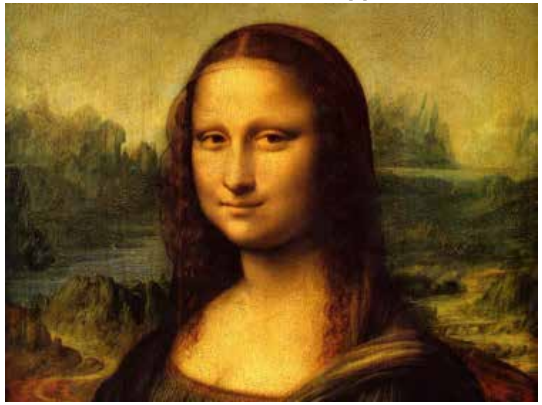


The resulting image is distorted

The image is corrected when Keystone is applied, but the aspect ratio is incorrect



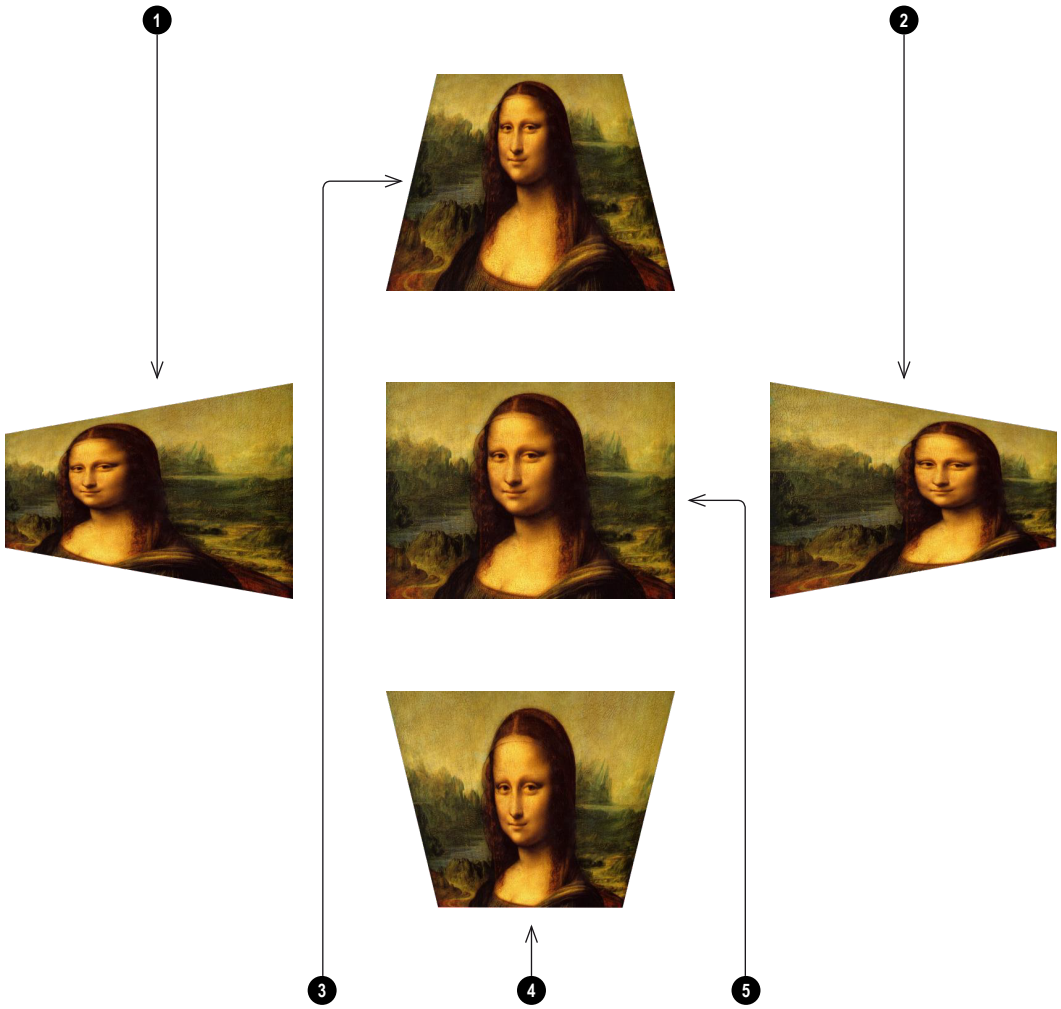
The aspect ratio is corrected when the correct lens throw ratio is applied



Notes

Keystone settings

1. **Projector to the left** The projector is positioned to the left of the screen. To correct, apply a positive **Horizontal Keystone** value using the **RIGHT** arrow button.
2. **Projector to the right** The projector is positioned to the right of the screen. To correct, apply a negative **Horizontal Keystone** value using the **LEFT** arrow button.
3. **Projector high** The projector is positioned above the screen at a downward angle. To correct, apply a negative **Vertical Keystone** value using the **DOWN** arrow button.
4. **Projector low** The projector is positioned below the screen at an upward angle. To correct, apply a positive **Vertical Keystone** value using the **UP** arrow button.
5. **Projector straight** The projector is directly opposite the screen at a right angle both horizontally and vertically. No correction is needed.

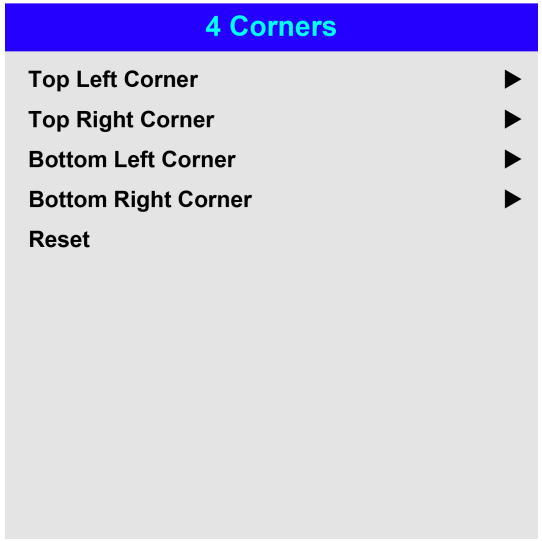


Horizontal and vertical keystone corrections

Notes

4 corners

For each corner, apply horizontal and / or vertical correction as necessary to restore the rectangular shape of the image.

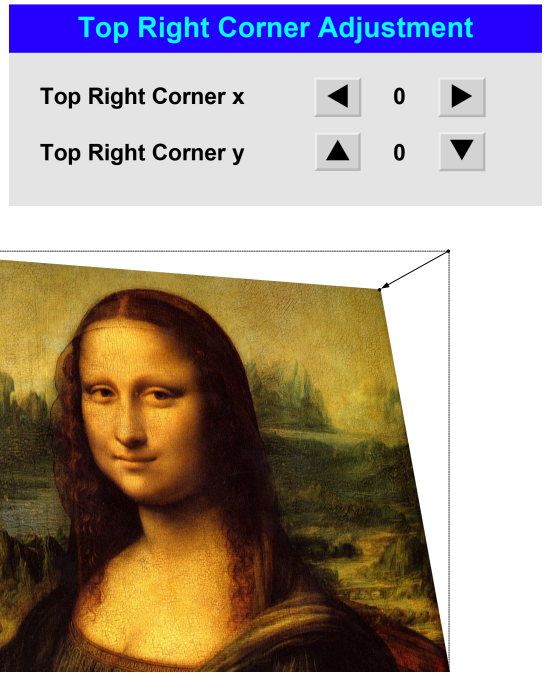


Notes

Corner corrections provide a simple setup for awkward installations and irregular shaped screens that may distort the image. To apply a similar (but less flexible) correction, while preserving the original aspect ratio of the image, use the ***Keystone*** *menu.*

Top right corner example

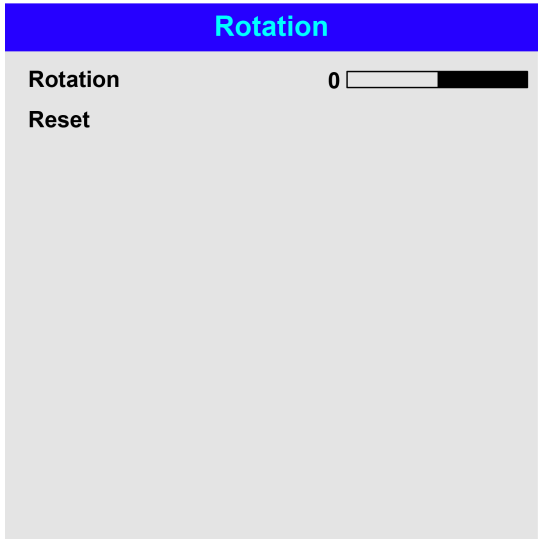
In this illustration, the top right corner requires both horizontal and vertical correction.



Notes

Rotation

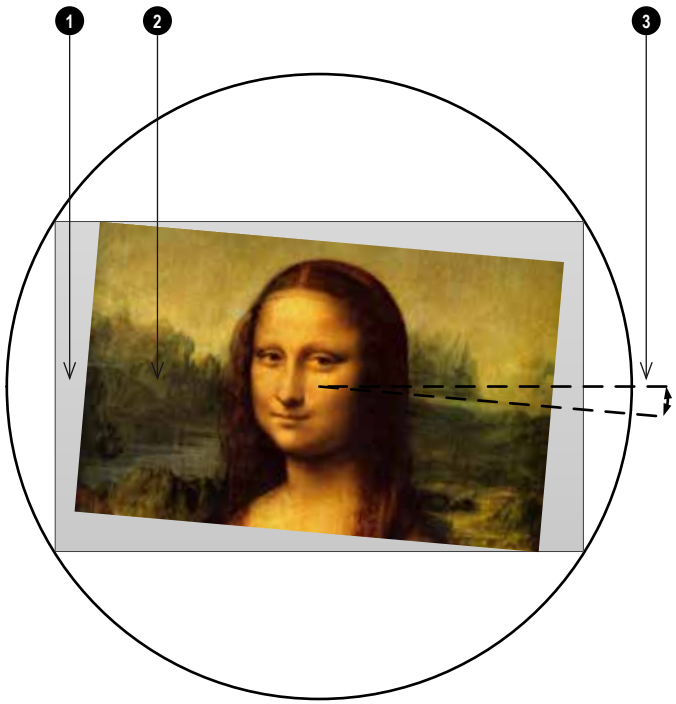
Use this feature for example to correct a mounting error causing the image not to be level with the screen.



Notes

Rotation example

1. **DMD™ area**
   The DMD™ is not rotated. It still covers the area that would be occupied by the image without correction.
2. **Rotated image**
   The image is smaller than the surrounding DMD™ area. It is scaled in order to remain within the DMD™ area.
3. **Angle of rotation**
   Each step on the slider is 0.25° of rotation. In this example the angle is 5°, therefore Rotation value is 20.



Notes

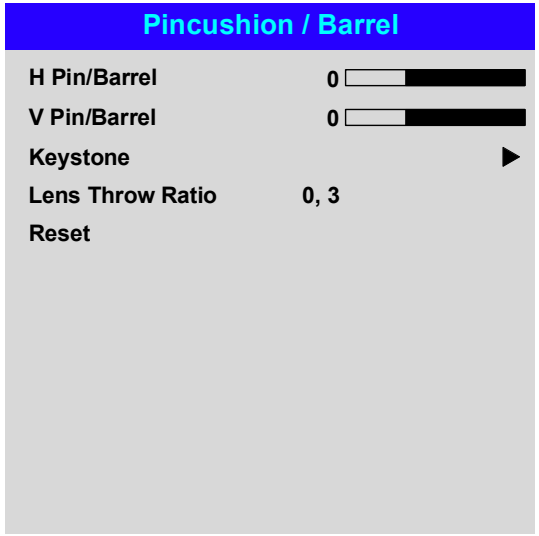
Pincushion / barrel

Pincushion or barrel distortions are the result of poor or incorrect tensioning of the screen or using a surface that is not flat.

Use the **Pincushion / Barrel** control to compensate electronically for such distortions.

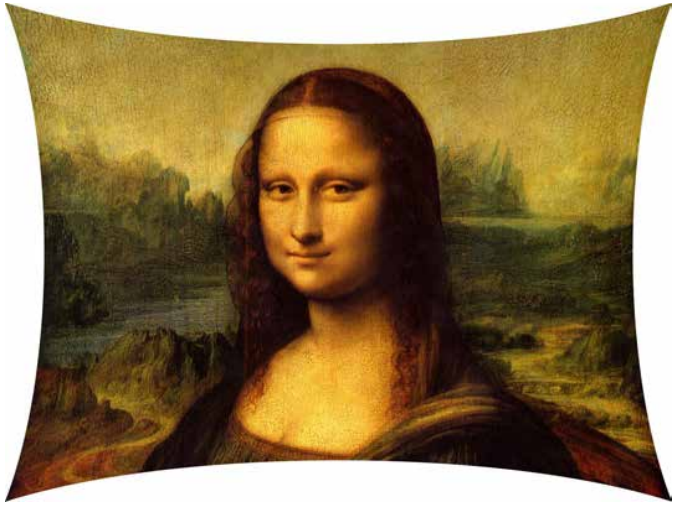
You can also use this menu to make simple panoramic screen corrections without using external processors.

When also correcting for keystone, the aspect ratio of the projected image may be incorrect. This is dependant upon the throw ratio of the lens at its current zoom setting. Adjust the lens throw ratio to compensate for the apsect ratio that results from the zoom setting on the lens.

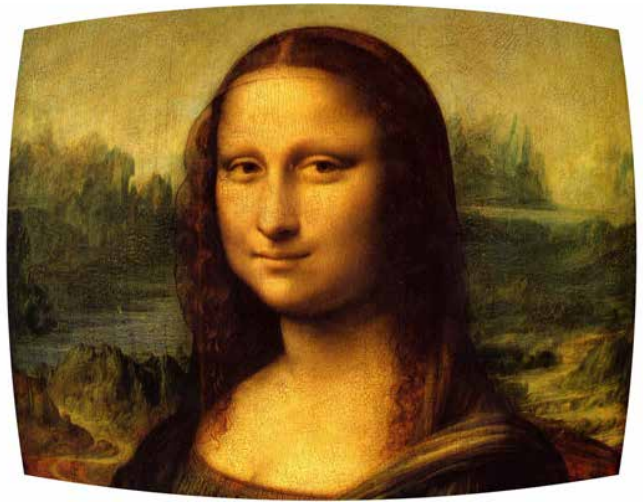


Pincushion/ Barrel example

The illustration shows pincushion and barrel correction applied both horizontally and vertically, in equal measures.



Pincushion



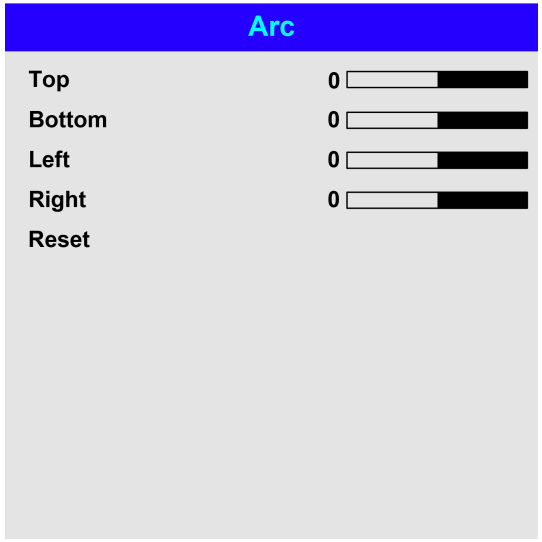
Barrel

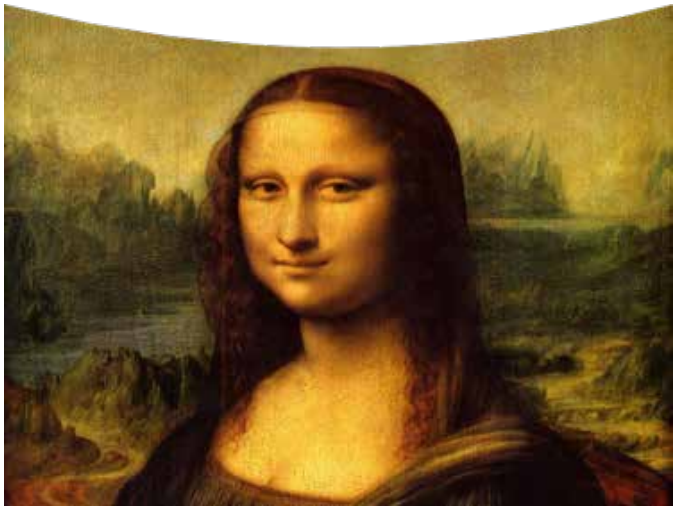
Notes

Make sure that the lens type is set to the correct lens in the lens menu before adjusting the lens throw ratio

Arc

This feature is similar to **Pincushion / Barrel** but allows you to apply curvature to each edge of the image independently so you can have any combination of corrections.





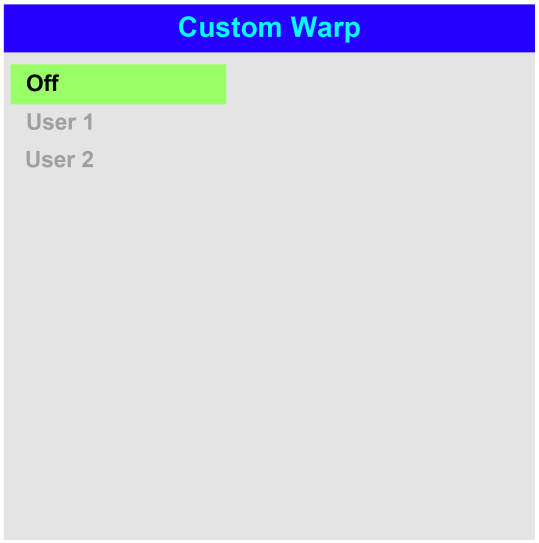
Notes

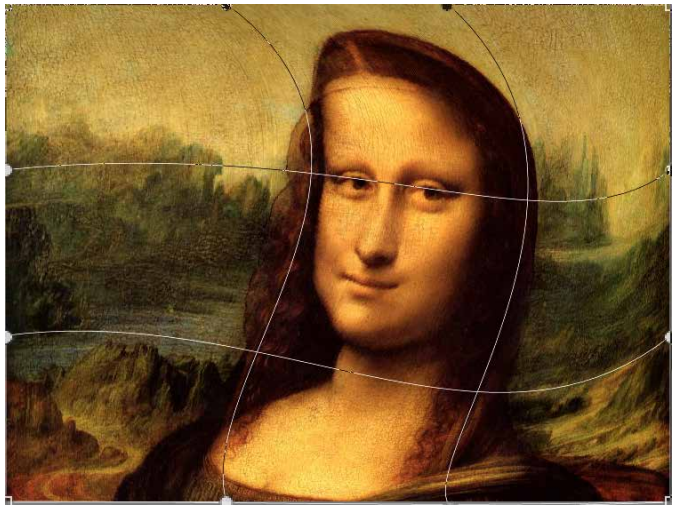
*Please note that a positive **Arc** value on any edge will reduce the image size as the projector needs to maintain the aspect ratio. A negative **Arc** value will not affect the overall image size.*

Custom warp

This feature permits selection of predefined User warp maps. User custom warp maps require the Projector Controller PC application to create the custom warp.

Custom warp maps provide non-linear curvature correction for curved or spherical screens and other irregular shaped surfaces such as building mapping.



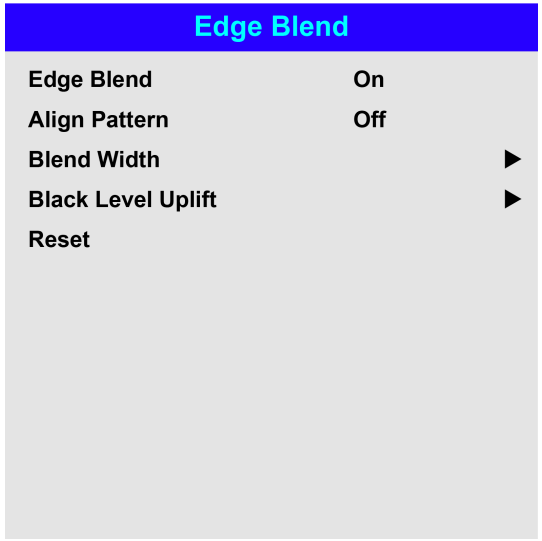


Notes

Edge blend menu

Use this menu to blend together images from an array of two or more projectors. The feature feathers the light output of the projector within the edges that overlap with other projectors in the array: as a result, the overlapping edges are evenly lit and easily blend in with the rest of the image.

- **Edge Blend**
  Enable and disable **Edge Blend**
- **Align Pattern**
  Add markers to the image showing the edges of the blend area and making the overlaps more visible to help adjust the physical position of the projectors in the array.
- **Blend Width**
  Determine the width of the blended regions.
- **Black Level Uplift**
  Adjust black levels to compensate if the blended regions appear brighter than the rest of the image.
- **Reset**
  Reset all **Edge Blend** settings to their factory default values.



Notes

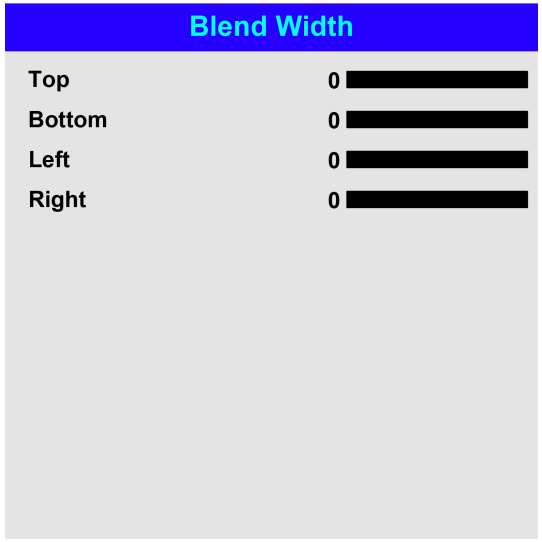
*When **Edge Blend** is set to **Off**, all other edge blend settings are disabled.*

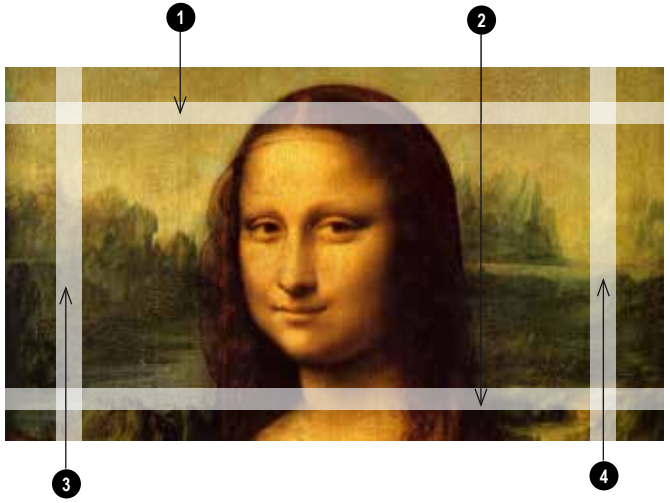
The picture in the blend region needs to be delivered to all overlapping projectors, which may require a special setup of the source.

Blend width

Use the **LEFT** and **RIGHT** arrow buttons to set the width of the blended regions:

1. Top
2. Bottom
3. Left
4. Right





Notes

Black level uplift

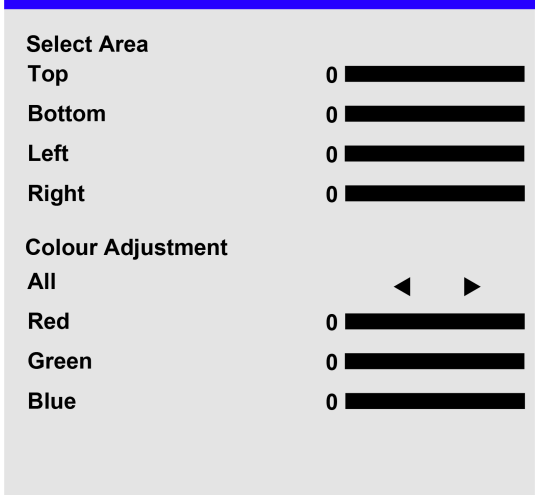
Black in the blended regions appears less dark than in the rest of the image. To compensate for this, use this menu to raise the black levels of the rest of the image:

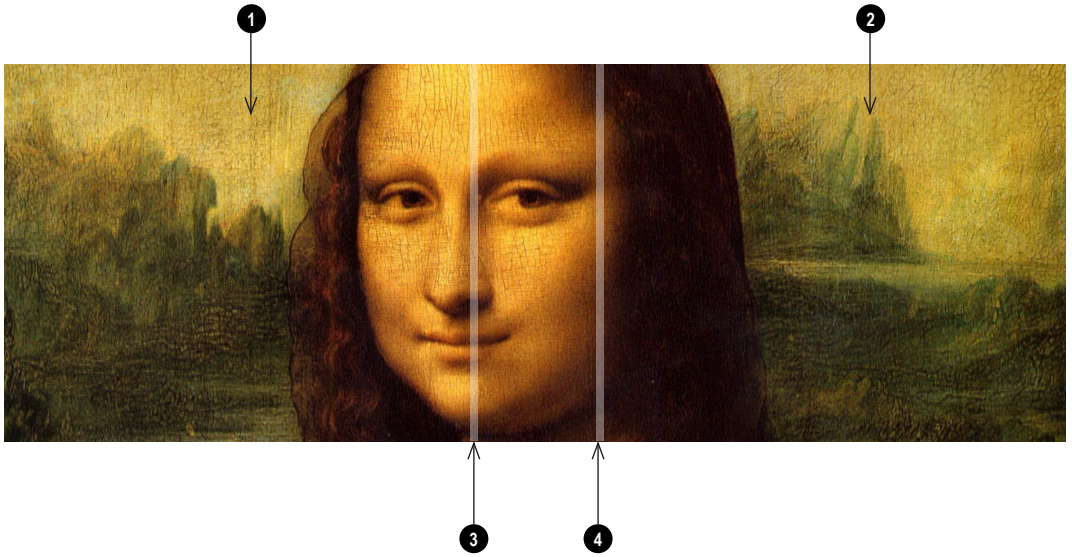
- Set **All** to the required amount of black level correction. This will apply equal correction to the black levels of all colors
- If necessary, use the individual color sliders (**Red**, **Green** and **Blue**) for fine adjustment.

You may experience artifacts at the edges where the blended region of one projector overlaps the ***pond of mirrors*** of its neighbor. In the example below, the blended image comes from ***two projectors***, ❶ and ❷. Both images have black level uplift applied; as a result, ***artifacts*** ❸ and ❹ have emerged at the edges where the black level uplift region of one projector overlaps the pond of mirrors of the other.

To remove the artifacts, you need to slightly reduce the size of the black level uplift region of each projector so it does not overlap the pond of mirrors of the other projector.

- Depending on your array, use **Top**, **Bottom**, **Left** and/or **Right** to reduce the black level uplift size. In the example below, use the **Right** slider of the **projector on the left** ❶ to remove the ***artifact on the right*** ❹ , and the **Left** slider of the ***projector on the right*** ❷ to remove the ***artifact on the left*** ❸.





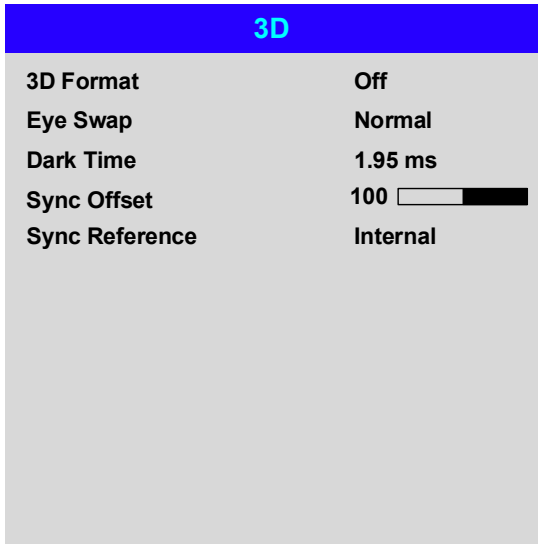
Notes

*Enable **Align Pattern** from the **Edge Blend** menu to see the black level uplift area.*

3D menu

Use this menu to enable, disable and set up 3D input, as follows:

- **3D Format — Off, Dual Pipe** and **Frame Sequential**.
  Frame Sequential is for sources where Left and Right eye images are delivered as alternate frames from a single input. **Dual Pipe** is for sources where Left and Right eye are delivered on separate inputs.
- **Eye Swap — Normal** and **Reverse**.
  (set to **Reverse** if the left- and right-eye images are displayed in the wrong order)
- **Dark Time — 0.65 ms, 1.3 ms** and **1.95 ms**.
  Set to reduce the effect of banding and image overlapping when viewed through 3D glasses.
- **Sync Offset**.
  Use the **LEFT** and **RIGHT** arrow buttons to compensate for image overlapping (ghosting) when viewed through 3D glasses.
- **Sync Reference— External** and **Internal**.
  Select the source of the 3D sync. Internal is referenced to the incoming video. External is for Frame Sequential 3D sources and is supplied by the graphics card or player.



Notes

3D video is only possible on the HDMI 3 and HDMI 4 inputs.

*If **3D Format** is set to **Off**, all other 3D settings will be unavailable.*

See 3D connections on page 34 for more information about supported 3D formats.

The following settings are not available when 3D is on:
***Image >** Smooth Picture, Brightness, Contrast, Saturation, Hue, Sharpness, Noise Reduction, Freeze, Resync.*
***Color >** Color Space.*
***Geometry >** Aspect Ratio, Digital Zoom, Overscan.*
***Setup >** Screen Setting, Auto Source, Trigger-1, Trigger-2.*
***PIP >** all settings.*

Also: See 3D types on the next page and See Some 3D settings explained on page 75

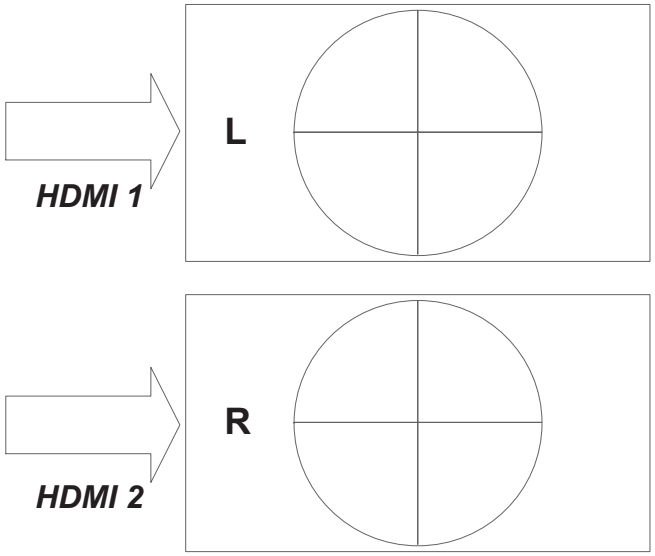
See 3D formats on page 119 for 3D resolutions and frame rates.

3D types

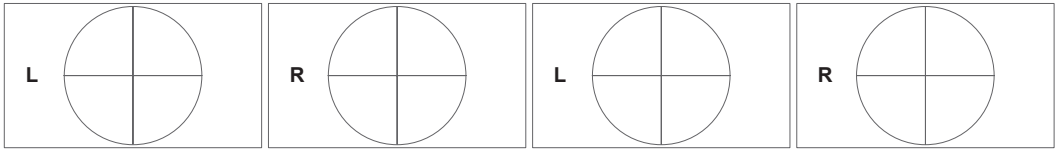
To display a 3D image if is first necessary to select the 3D format. This can either be Frame Sequential or Dual Pipe. These formats are described below:

- **Dual Pipe (LEFT and RIGHT)** The left and right eye images are delivered on two separate HDMI links, which the projector will interleave for 3D display.
- **Frame Sequential** For sequential 3D, an external sync is required to identify left and right frames. If no sync is available from the sequential source, the projector will generate an output sync, but it may then be necessary to manually set the Eye Swap each time the player is started.

Dark Time and **Sync Offset** need to be set only once, to optimize the image for the glasses in use.



Dual Pipe



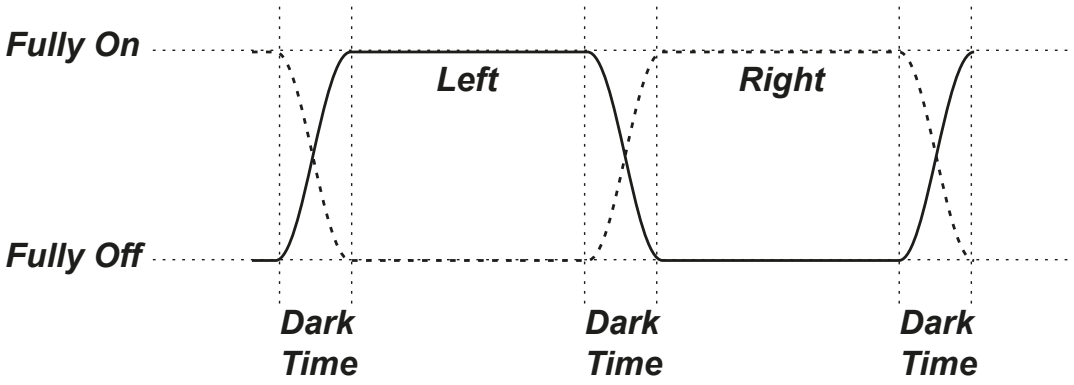
Sequential

Notes

Some 3D settings explained

Dark time

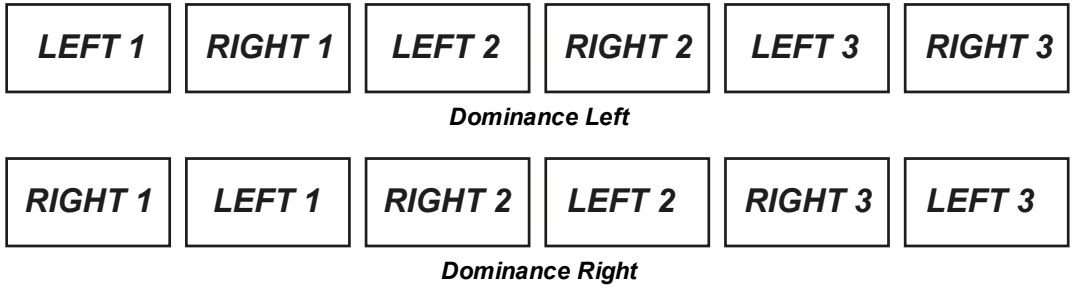
Banding can be caused if the image is displayed before each eye of the 3D switching glasses or ZScreen is not fully open. **Dark Time** allows you to minimize this effect.



Eye swap

The outgoing 3D frames are in pairs - the dominant frame being presented first. You can determine which frame should be the dominant one.

By convention the default setting is **Left**.



Notes

In order to achieve maximum light output and a smooth grayscale, whilst eliminating ghosting, the following procedure is recommended:

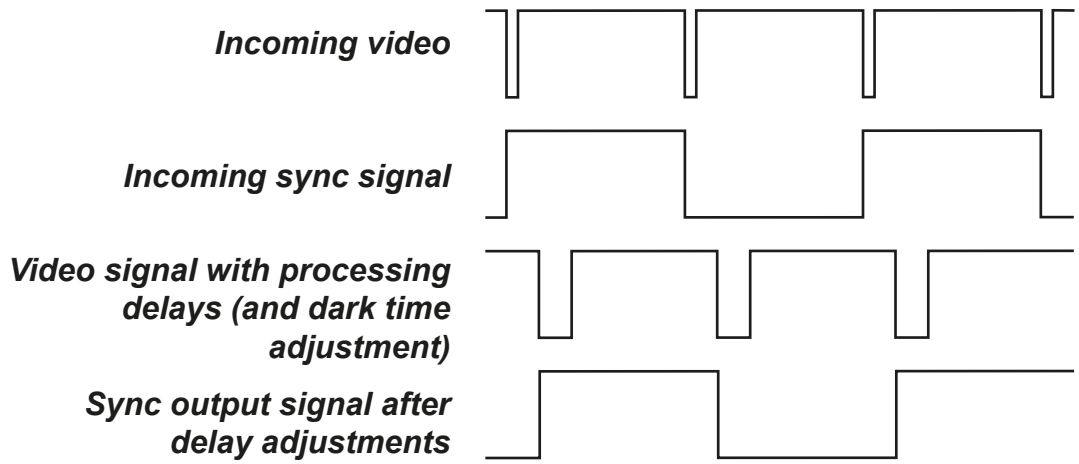
1. *Set* ***Dark Time*** *to a value appropriate to the glasses or ZScreen, say 1.3 ms or 1.95 ms.*

2. *Adjust* ***Sync Offset*** *time to eliminate ghosting and achieve a smooth grayscale.*

3. *Repeat steps 1 and 2 until the best result is obtained.*

Sync offset

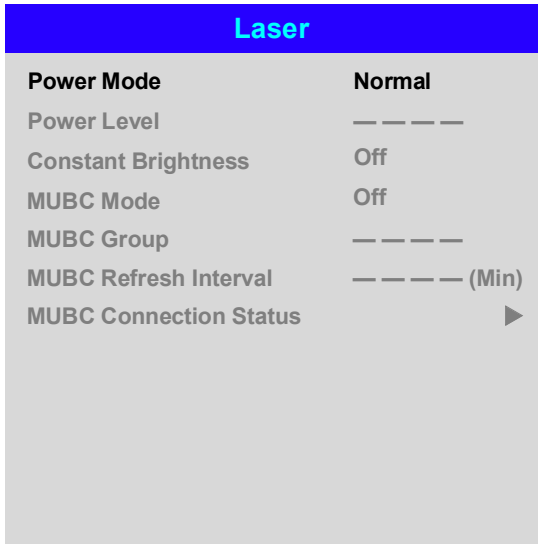
The sync signal from the 3D server will be in phase with the frames generated by its graphics card. However, to compensate for switching delays in the glasses or ZScreen, **Sync Offset** is used to adjust the sync output signal sent to the ZScreen or 3D glasses to minimise overlapping (ghosting in the image when viewed through the 3D glasses.



Notes

Laser menu

- **Power Mode**
  - **Eco** will automatically set the laser power to 70%.
  - **Normal** will set the power to 100%.
  - Set to **Custom** if you wish to adjust the power manually.
- **Power Level**
  This setting is only available if **Power Mode** is set to **Custom**.
  Choose a value between 30 and 100, ranging from 30% to 100% laser power.
- **Constant Brightness**
  Once a **Custom Power Mode** has been set, then Constant Brightness can be turned **ON**.
  This setting will maintain the brightness until the maximum laser power has been reached. The lower the power level the longer it will be maintained.
- **MUBC (Multi Unit Brightness Correction)**.
  MUBC is available when multiple projectors are synced together.
  Over time, the output power of the lasers in the projector will diminish. The output power of the lasers in different projectors may diminish at different rates. When multiple units are synced, this can lead to different units operating at different laser power levels, causing the projected images to display at differing brightnesses.
  MUBC groups multiple projectors together to make sure that the lasers in each projector always operate at the same power level. The power level will automatically adjust to match the lowest power level in the group.



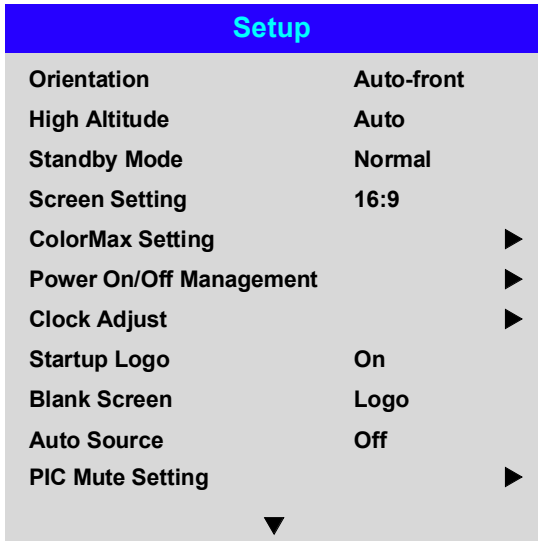
1. **MUBC Mode**
   Choose master or slave. The master projector is the first projector in a group. There is only one master projector in a group. Up to 8 projectors are slaved to the master projector
2. **MUBC Group**
   Choose the group the projector belongs to
3. **MUBC Refresh Interval**
   Sets the time between laser power level updates

- **MUBC Status**
  Open the MUBC Connection Status menu to view the connection information for the projector

Notes

The projector must be connected via LAN same network group as other projectors to allow MUBC

Setup menu



- **Orientation**
  Choose from **Front Tabletop, Front Ceiling, Rear Tabletop, Rear Ceiling** and **Auto-front**.
- **High Altitude**
  Choose from **On, Auto** and **Quiet**.
- **Standby Power**
  Choose from **SuperECO**, **ECO** and **Normal**.
  SuperECO uses minimal power and disables power ON via LAN.
  ECO uses a low power setting but enables power ON via Ethernet port only.
  Normal enables power ON via both HDBase-T/LAN and Ethernet ports.
- **Screen Setting**
  Choose from **16:10, 16:9** and **4:3**.
- **ColorMax Setting**
  Set up user-defined color gamut values.
- **Power On/Off Management**
  Access the submenu to set up automatic projector power on and power off.
- **Clock Adjust**
  Access the submenu to set current date and local time.
- **Startup Logo**
  Choose from **Off**, **Original** and **User**.
  Select original to display the Digital Projection Ltd. logo on startup. Select User to display a custom logo. Use the projector controller application to set the custom logo for the User option.
- **Blank Screen**
  Choose from **Logo, Black, Blue** and **White**.
- **Auto Source**
  If this setting **is** On, the projector will automatically search for an active input source.
- **PIC Mute Setting**
  Access sub menu to set up the picture mute control.

Highlight the **DOWN** arrow at the bottom of the page and press **ENTER/OK** to navigate to the second Setup menu page.

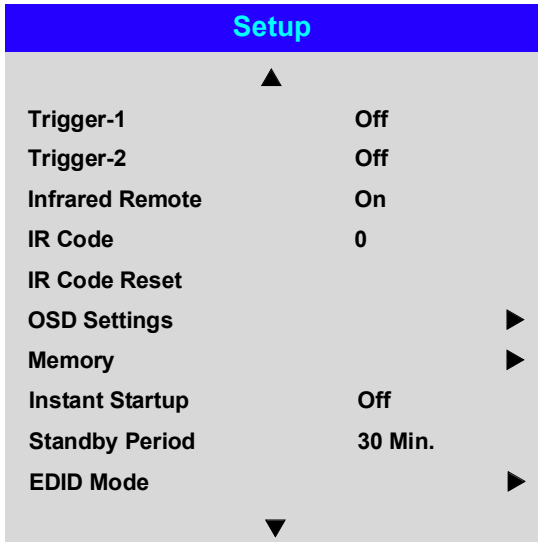
Notes

Auto-front *automatically detects the projector's position and sets Table or Ceiling orientation accordingly.*

Screen Setting *and* ***Auto Source*** *are not available with input HDMI 3 or HDMI 4*

Screen Setting *is automatically set to 16:9 when smooth picture is active*

- **Trigger1** and **Trigger 2**
  Choose from **Screen, 5:4, 4:3, 16:10, 16:9, 1.88, 2.35, TheaterScope, Source, Unscaled** or **RS232** to determine what will cause each trigger output to activate.
- **Infrared Remote**
  Set to **Off** if you wish to disable the remote control.
- **IR Code**
  The projector and the remote control need a matching IR code: a two-digit number between ***00*** and ***99***. The default IR code is ***00***. This is also a master code, which, if assigned to a remote, will work regardless of the value assigned to the projector.
  - **To assign an IR code for the projector:** Select IR code. Use the UP and DOWN arrow buttons to change the values.
  - **To assign an IR code for the remote**, press and hold the **ADDR** button on the remote until the On indicator starts flashing. Release the **ADDR** button and while the indicator is still flashing, enter a two digit address using the numeric input buttons. The indicator will flash three times quickly to confirm the change.
- **IR Code Reset**
  Use this command to unassign an IR code from the projector. This will revert the **IR Code** value to 00. **To unassign an IR code from the remote control**, press and hold **ALT** and **ADDR** simultaneously until the On indicator flashes to confirm the change.
- **OSD Settings**
  Access this submenu to adjust the appearance and position of the on-screen display.
- **Memory**
  Access this submenu to save up to four presets containing custom combinations of image settings, or to recall a saved preset.
- **Instant Startup**
  When **ON** only the Laser will be turned off when the Power off command is given. A subsequent Power On will turn on the laser giving an apparent very fast power on.
- **Standby Period**
  Used with Instant Startup. If Instant Startup in **ON** and the projector is powered down then the projector will go to Standby after the selected “Standby Period” 30 minutes, 60 minutes, 90 minutes.
- **EDID Mode**
  Access this submenu to set the frame rate and display resolution for each input type..



Highlight the **UP** arrow at the top of the page and press **ENTER/OK** to go back to the first **Setup** menu page. Highlight the **DOWN** arrow at the bottom of the page and press **ENTER/OK** to navigate to the third Setup menu page.

Notes

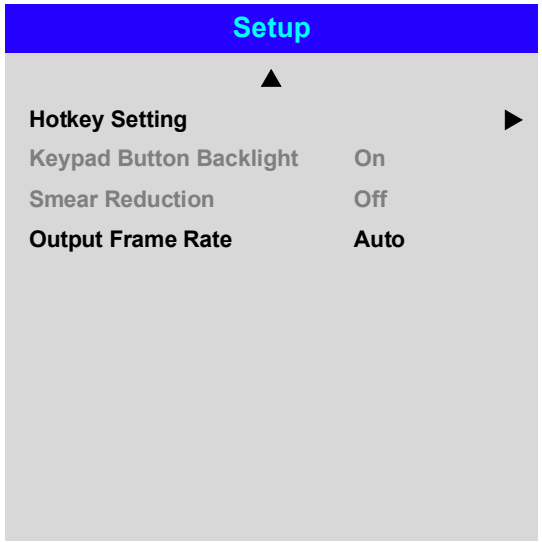
Trigger-1 *and* ***Trigger-2*** *are not available with input HDMI 3 or HDMI 4. If you turn the remote control off, you can only turn it back on again from the control panel or via the* ***Projector Controller*** *application.*

The ***Projector Controller*** *software is available for download from the Digital Projection website, free of charge.*

A wired remote control will also be disabled if ***Infrared Remote*** *is set to* ***Off****.*

- **Hotkey Setting**
  Access this submenu to set the option for each hotkey.
- **Keypad Button Backlight**
  Choose from **On** or **Off**. Select On to switch the keypad backlight on. This will light the keypad controls on the projector.
- **Smear Reduction**
  Choose from **Off, 6ms, 7ms, 8ms, 9ms,** and **10ms**. When projecting footage with a high frame rate, fast moving images may appear as a smear across the display. Select a smear reduction value to reduce this effect.
- **Output Frame Rate**
  Choose from **Auto, 48Hz, 50Hz** and **60Hz**. Select Auto to use the same frame rate as the input signal. When switching between inputs on auto output frame rate, the projector measures the input frame rate before setting the output frame rate. When you know that all input frame rates are the same value, you can set an output frame rate to reduce the time it takes to switch between inputs.

Highlight the **UP** arrow at the top of the page and press **ENTER/OK** to go back to the second **Setup** menu page.



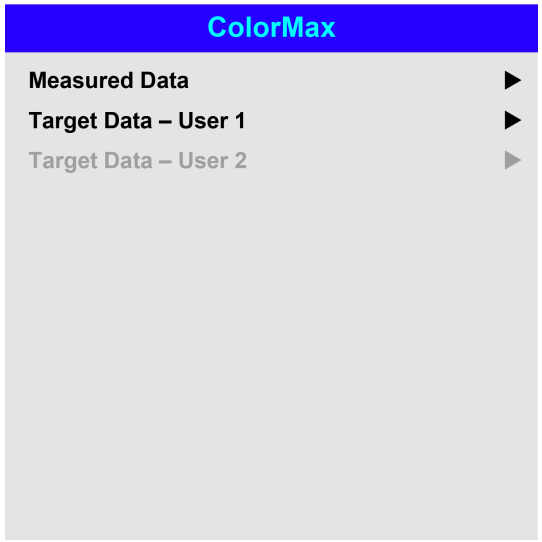
ColorMax

ColorMax permits seven point color matching of red, green, blue, yellow, cyan, magenta and white.

You can enter your own gamut values here, or edit values you have imported using the **Projector Controller** software.

Defining your own colorspace with individual x and y coordinates for each color enables you to match not only the whites but each individual color as well.

Highlight the submenu you wish to open and press **ENTER/OK** to confirm your choice.



Notes

Smear reduction *is not available for 3D input types*

Smear reduction *reduces the brightness of the displayed image*

The ***Projector Controller*** *software is available for download from the Digital Projection website, free of charge.*

This tool is best used in conjunction with a specialized light meter (a photo spectrometer) to measure color parameters within a particular installation. However, the preloaded generic factory default data set is designed to give more than satisfactory results.

Measured data/ target data

1. Use the UP and DOWN arrow buttons to highlight a color, then use the LEFT and RIGHT arrow buttons to navigate to the x or y coordinate.
2. Use the UP and DOWN arrow buttons to increase and decrease the value, respectively.
3. Exit edit mode:
   - press ENTER/OK, if you want to save the edited values.
   - press EXIT, if you do not wish to save the edited values
4. If necessary, highlight another color and repeat the procedure.

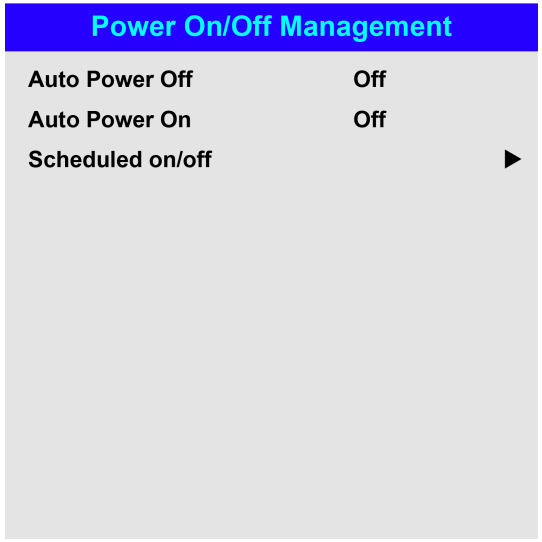
Measured Data		
Red	x: 0.658	y: 0.339
Green	x: 0.315	y: 0.662
Blue	x: 0.146	y: 0.043
White	x: 0.276	y: 0.283
Reset		

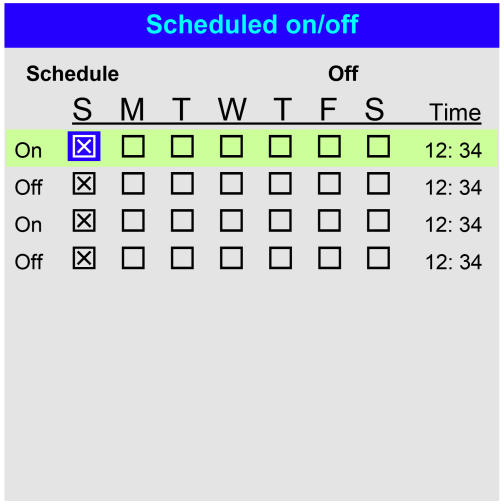
Target Data – User 1		
Red	x: 0.640	y: 0.390
Green	x: 0.300	y: 0.600
Blue	x: 0.150	y: 0.060
Yellow	x: 0.419	y: 0.505
Cyan	x: 0.225	y: 0.329
Magenta	x: 0.321	y: 0.154
White	x: 0.285	y: 0.302

Notes

Power on / off

- **Auto Power Off**
  Set this to On if you want the projector to go into STANDBY mode when no input source is detected for 20 minutes.
- **Auto Power On**
  Set this to **On** if you want the projector to start up immediately when the mains is connected. Set this to **Off** if you want the projector to go into STANDBY mode when the mains is connected. In this case, the projector will not start up until the **POWER** button is pressed on the control panel or the **ON** button is pressed on the remote control.
- **Scheduled on/off**
  Access this submenu to create a weekly schedule for automatic on and off times:
  1. Set a schedule:
     - Use the **UP** and **DOWN** arrow buttons to highlight a row, then press **ENTER/OK** to enable edit mode.
     - Within a row, navigate with the **LEFT** and **RIGHT** arrow buttons. Set values with the **UP** and **DOWN** arrow buttons.
     - To exit edit mode, press **ENTER/OK**. Alternatively, press **EXIT** if you don't want the changes to take effect. Move to another row using the **UP** and **DOWN** arrow buttons.
  2. To enable the schedule, set **Scheduleto** On.





Notes

Clock adjust

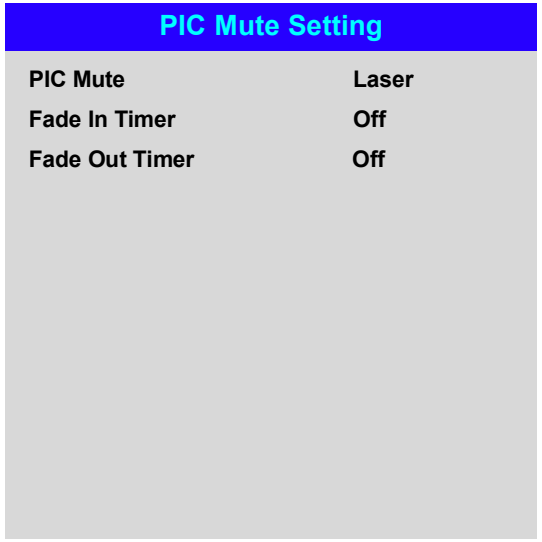
Use this menu to set date (in **dd:MM:yyyy** format), time (in **HH:mm** format) and time zone.

The date and time set here will affect any schedule created within the **Power On/Off** menu.

PIC mute setting

PIC mute allows the projected image to be hidden without turning the projector off.

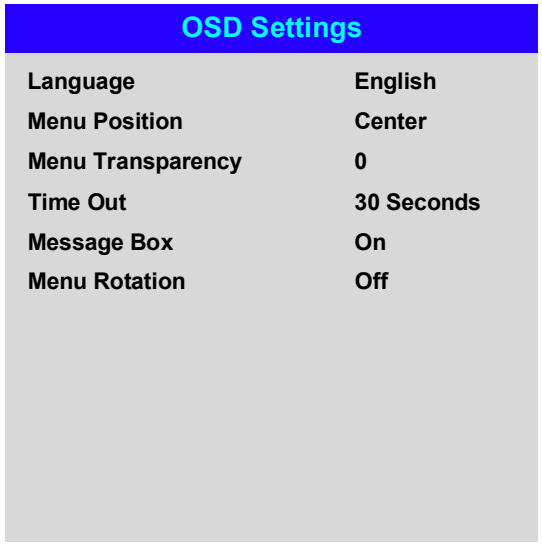
- **PIC Mute**
  Choose from **Laser** and **DMD Blanking**. Select PIC Mute to turn the laser off when the PIC Mute activated. Select DMD Blanking to project a black image when PIC Mute is activated.
- **Fade In Timer**
  Fade out timer is available when PIC Mute is set to Laser. Choose from **Off, 1s, 2s, 3s, 4s,** and **5s**. Select Off to start projecting the image as soon as PIC Mute is deactivated. Select a time to fade the image in when PIC Mute is deactivated.
- **Fade Out Timer**
  Fade in timer is available when PIC Mute is set to Laser. Choose from **Off, 1s, 2s, 3s, 4s,** and **5s**. Select Off to stop projecting the image as soon as PIC Mute is activated. Select a time to fade the image out when PIC Mute is activated.



Notes

OSD settings

- **Language** sets the OSD language.
- **Menu Position** determines where the OSD should appear on the screen when activated.
- **Menu Transparency** sets OSD transparency between 0% (no transparency), 25%, 50% and 75%.
- **Time Out** determines how long the OSD should remain on screen if no buttons are pressed. Choose Always On to disable this feature.
- **Message Box** determines whether projector status messages should appear on the screen.
- **Menu Rotation**Choose from **Off, Clockwise** and **Anticlockwise**. Select a rotation option to rotate the OSD menu when the projector is displaying in portrait.



Memory

The current image settings can be saved as a preset, which you can recall later. The default settings can be recalled at any time as well.

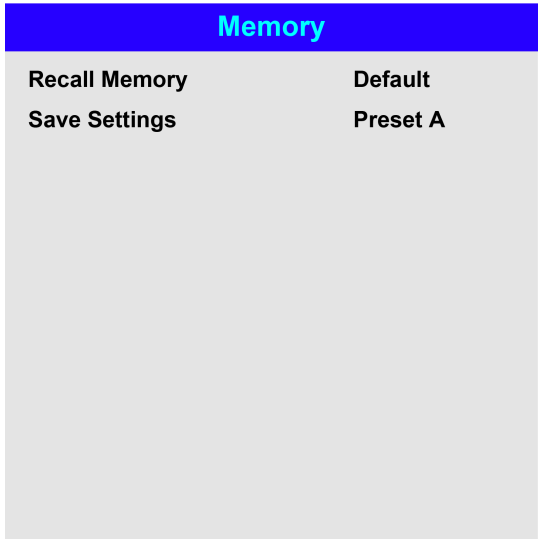
Up to four custom presets can be stored for each input.

To recall a saved preset:

- Select **Recall Memory** and press **ENTER/OK**, then select a preset from **Preset A** to **Preset D**. Select **Default** to load factory default values.

To save a preset:

- Select **Save Settings** and press **ENTER/OK**, then choose from **Preset A**, **Preset B, Preset C** and **Preset D**.



Notes

Presets from one input cannot be applied to another input.

Presets for inputs HDMI 3 and 4 do not contain all the settings normally stored for other inputs.

See memory scheme and memory items on page 125 for information about the parameters that can be saved in a memory preset.

EDID Mode

Each signal input type is available in the menu. Select the appropriate frame rate and display resolution for each input.

EDID Mode	
HDMI 1	4K/60 HDR
HDMI 2	4K/60 HDR
HDMI 3	1920x1200xp60
HDMI 4	1920x1200xp60
DisplayPort	4K/60
HDBaseT	4K/60

Hotkey setting

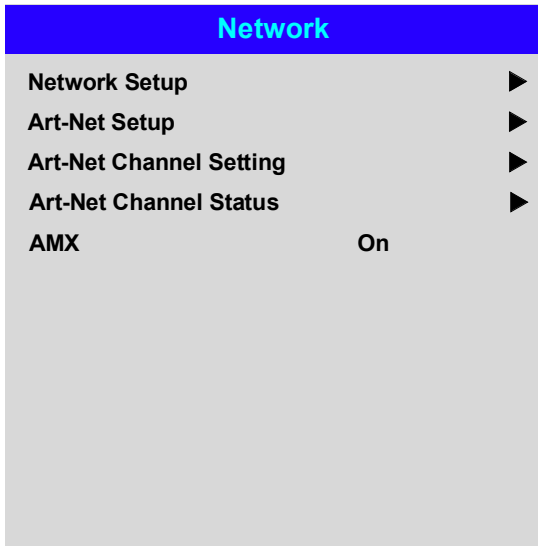
- **Hotkey1Function**
  Choose from **Information, Test Pattern, Lens Memory Load, Ambient Brightness Correction, FREEZE** and **PIP SWAP**. Select the function that you want to assign to hotkey1. This function will be activated when you press hotkey 1 on the control panel.
- **Hotkey2Function**
  Choose from **Information, Test Pattern, Lens Memory Load, Ambient Brightness Correction, FREEZE** and **PIP SWAP**. Select the function that you want to assign to hotkey2. This function will be activated when you press hotkey 2 on the control panel.
- **Hotkey2Function**
  Choose from **Information, Test Pattern, Lens Memory Load, Ambient Brightness Correction, FREEZE** and **PIP SWAP**. Select the function that you want to assign to hotkey3. This function will be activated when you press hotkey 3 on the control panel.

Hotkey Setting	
Hotkey1Function	Information
Hotkey2Function	Test Pattern
Hotkey3Function	Lens Memory Load

Notes

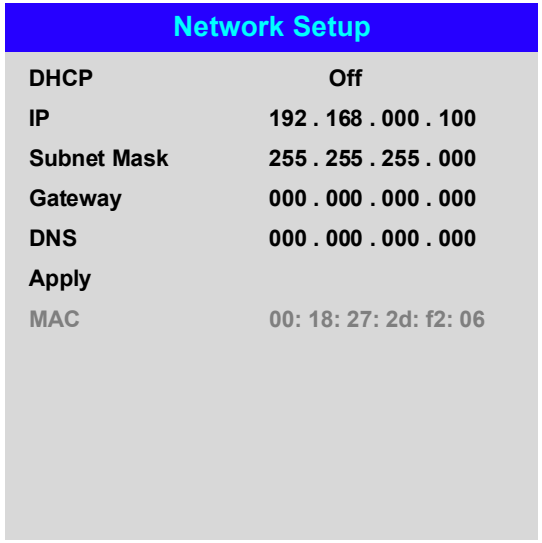
Network menu

- **Network Setup**
  Access this submenu to edit the network settings for the projector
- **Art-Net Setup**
  Access this submenu to edit the Art-Net network settings for the projector
- **Art-Net Channel Setting**
  Access this submenu to set the functions for each Art-Net channel
- **Art-Net Channel Status**
  Access this submenu to view the status of each Art-Net channel
- **AMX** Switch on or off



Network setup

- **DHCP, IP, Subnet Mask, Gateway, DNS**
  Set **DHCP** to **On** if the IP address is to be assigned by a DHCP server, **or** Off if it is to be set here.
  If **DHCPis** On, it will not be possible to edit **IP Address, Subnet Mask, Gateway** or **DNS**.
  If **DHCP** is set to **Off**, edit **IP Address, Subnet Mask, Gateway** and **DNS** as required.
- **Apply**
  Select to apply any changes to the network setup
- **MAC**
  This field is read-only.



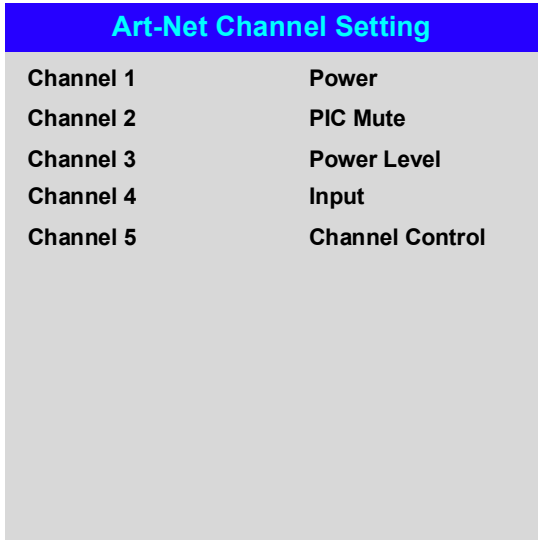
Notes

Art-net setup

- **Art-Net Active**
  Set to **On** to activate art-net DMX electronic light system control via the art-net port.
  Set the **Net, Sub Net, Universe** and **Start Address** for the network.
- **Apply**
  Select to apply any changes to the art-net setup

Art-net channel setting

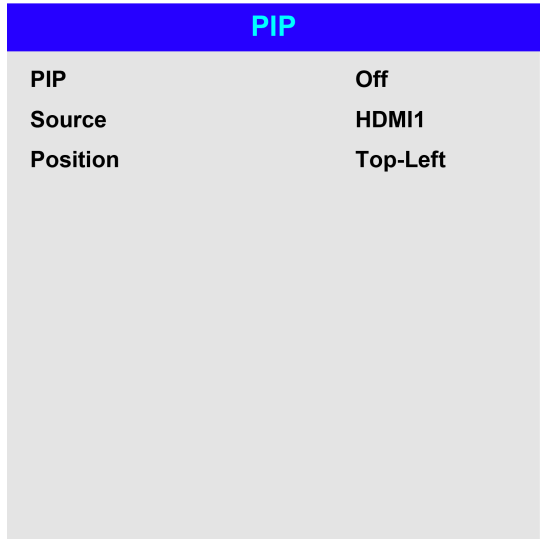
- **Chanel 1-5**
  Choose from **None, Power, PIC Mute, Power Level, Input** and **Channel Control**. Select the projector functions that are associated with each art-net channel.



Notes

PIP menu

- **PIP** Turn PIP on and off.
- **Source** Select an input source for the PIP image. Any combinations are possible between main and PIP input source, as long as one of the inputs is either **DisplayPort** or **3G-SDI**.
- **Position** Set the location of the PIP image on the screen. Choose from **Top-Left, Top-Right, Bottom-Left, Bottom-Right** and **PBP**.



Notes

***PIP** functionality is not available with inputs HDMI 3 and HDMI 4*

Information menu

This menu gives information about software and hardware configuration, input source and laser operating times It also allows you to restore the factory default settings.

Information	
Model Name	Titan Laser 33000 4K-UHD
Serial Number	X000XXXXX0000
Software Version 1	ME20-VE20-2.0.5-20181107
Software Version 2	LE10-29-20-3140
Software Version 3	2.0.32.2-CT03-125
Active/pip Source	HDMI 1 / NA
Signal Format	▶
Laser Hours	2
System Status	▶
Thermal Status	▶
Factory Reset	

Signal format

Signal Format		
Active Source	HDMI 1	
Timing	3840x2160@59.9Hz	
Scanning Frequency	H: 134.8 KHz	V: 59.9 Hz
Pixel Clock	593.80 MHz	
Color Format	YCbCr 4:2:0 8 bit	
HDR Format	No Data	
PIP Source	NA	
Timing	No Source	
Scanning Frequency	H: NA	V: NA
Pixel Clock	NA	
Color Format	NA	

Notes

***PIP Source** items are not available with input HDMI 3 or HDMI 4.*

System status

System Status	
Atmospheric Pressure	100972 Pa (27 m)
AC Voltage	180V – 264V
Altitude Mode	Auto
Laser Power	100
License Key	License Pass, Timeout, Not Expired
Constant Brightness	Off

Thermal status

Thermal Status	
Inlet / DMD Temp.	22 / 30 (C)
LD 1-5 Temp.	20/18/19/20/19 (C)
LD 6-10 Temp.	24/23/22/22/20 (C)
Fan 1-4 Speed	1406/1402/1396/1410
Fan 5-8 Speed	1493/1503/1493/1503
Fan 9-12 Speed	1498/1496/3010/NA
Fan 13-16 Speed	1691/3517/5886/2808
Fan 17-20 Speed	2804/4453/4453/4463
Fan 21-24 Speed	4519/1406/1406/1400
Fan 25-28 Speed	1396/1408/1408/1402
Fan 29 Speed	1396
Water Pump Speed	3412/3388/3412

Notes

Factory reset

To restore the factory default settings:

1. Navigate to **Factory Reset** and press **ENTER/OK**.
2. When prompted, press **ENTER/OK** to confirm your choice, or press **EXIT** to cancel.

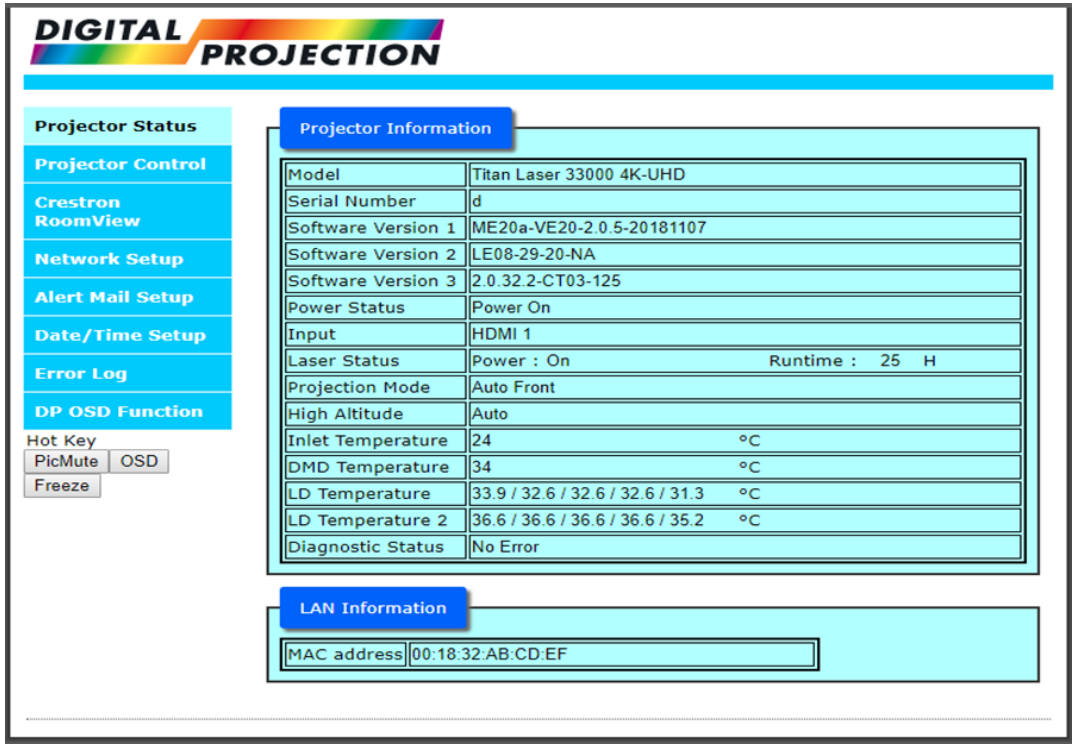
Notes

Factory reset does not reset the Network settings, or High Altitude mode

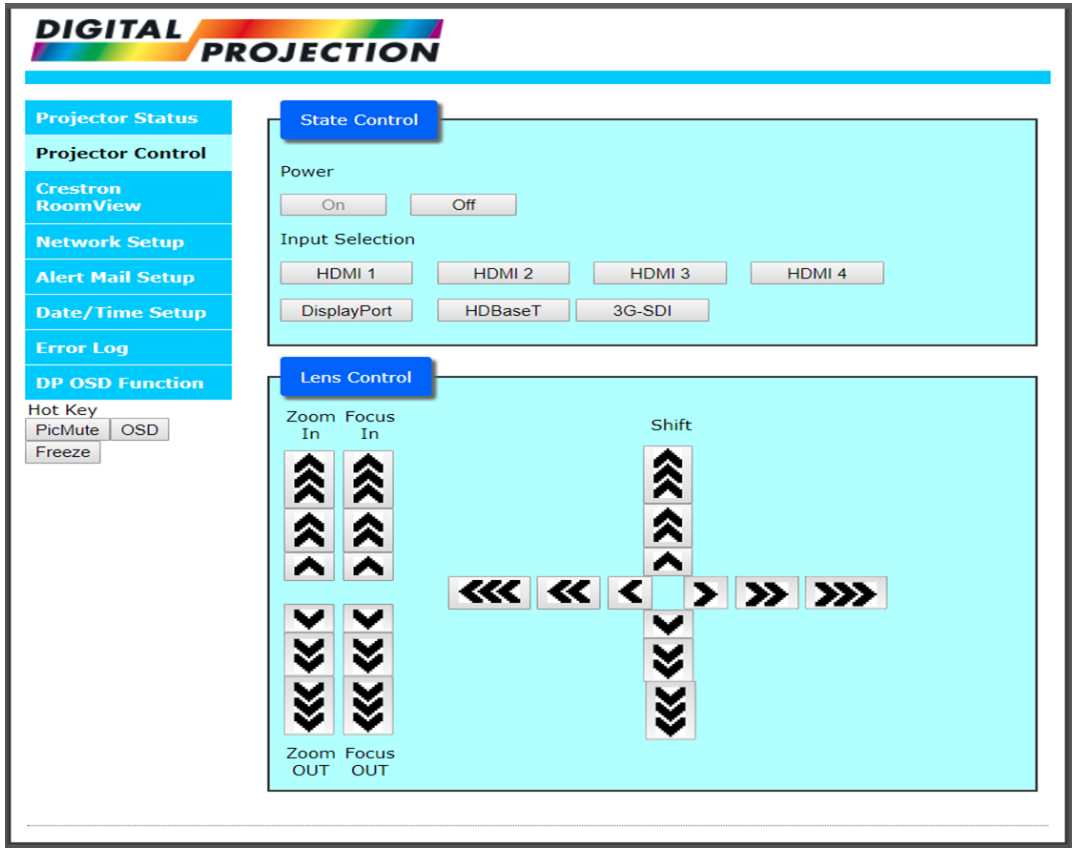
Served web pages

The served web pages allow you to control the projector remotely via LAN.

The default IP address is ***192.168.0.100***.

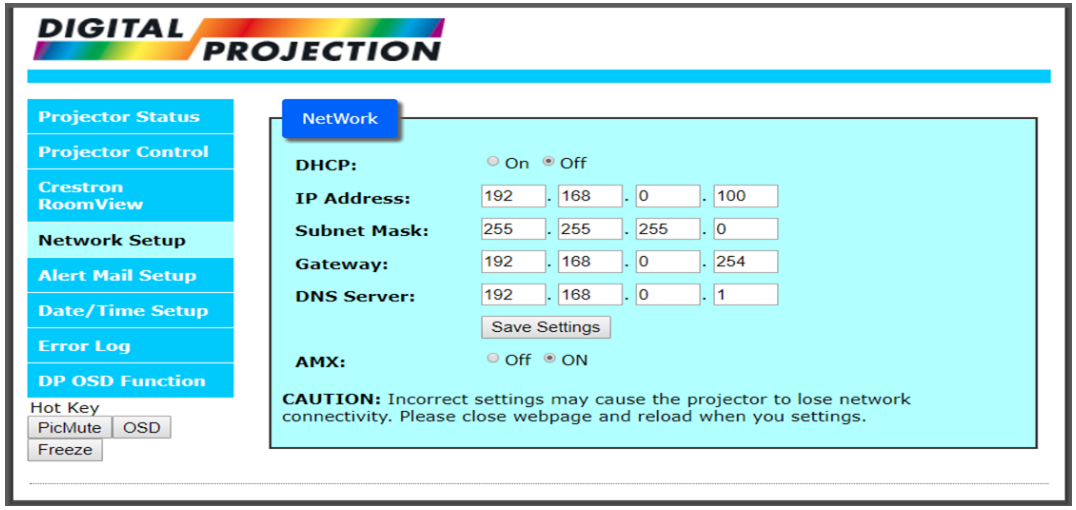


Notes

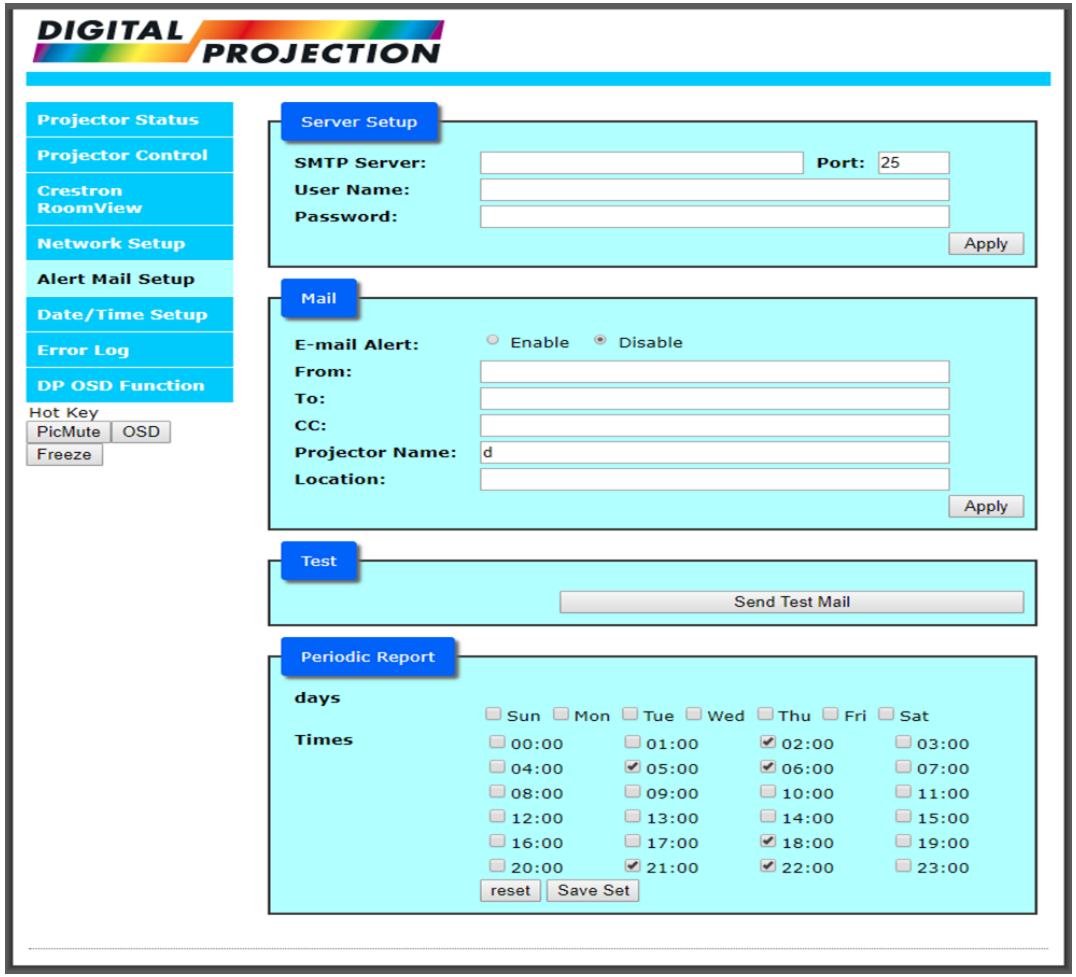

DIGITAL PROJECTION
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
State Control
Power
On
Off
Input Selection
HDMI 1
HDMI 2
HDMI 3
HDMI 4
DisplayPort
HDBaseT
3G-SDI
Lens Control
Zoom In
Focus In
Shift
Zoom OUT
Focus OUT

Notes

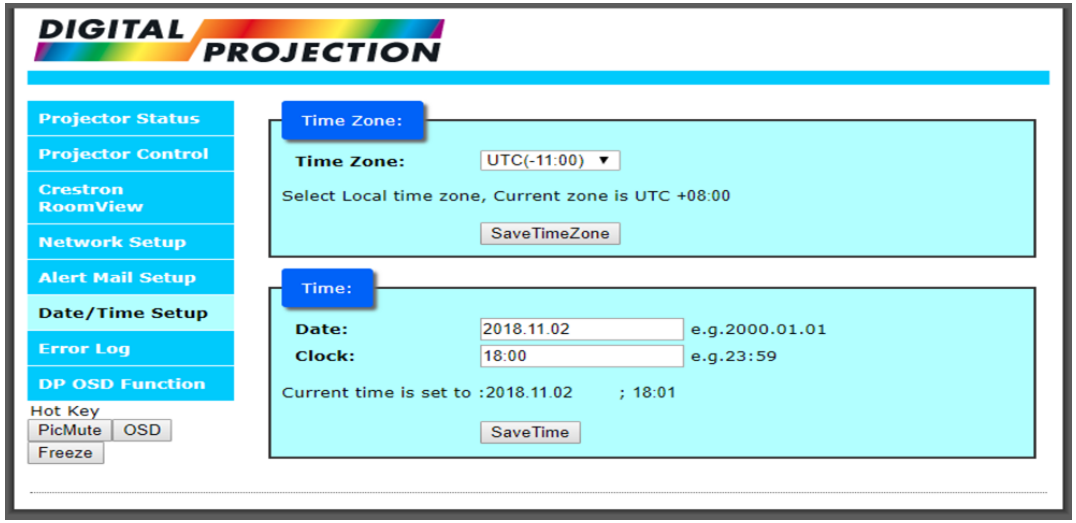

Tools
Info
Contact IT Help
DIGITAL PROJECTION
Power
Interface 2.7.2.9
Source List
DisplayPort
HDMI 1
HDMI 2
HDBaseT
3G-SDI
Menu
Auto
Enter
Blank
Source
Exit
Freeze
Contrast
Brightness
Sharpness
CRESTRON connected
Expansion Options
Back


DIGITAL PROJECTION
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
NetWork
DHCP: On Off
IP Address: 192 . 168 . 0 . 100
Subnet Mask: 255 . 255 . 255 . 0
Gateway: 192 . 168 . 0 . 254
DNS Server: 192 . 168 . 0 . 1
Save Settings
AMX: Off ON
CAUTION: Incorrect settings may cause the projector to lose network connectivity. Please close webpage and reload when you settings.

Notes


DIGITAL PROJECTION
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
Server Setup
SMTP Server:
Port: 25
User Name:
Password:
Apply
Mail
E-mail Alert: Enable Disable
From:
To:
CC:
Projector Name: d
Location:
Apply
Test
Send Test Mail
Periodic Report
days
Sun Mon Tue Wed Thu Fri Sat
Times
00:00 01:00 02:00 03:00
04:00 05:00 06:00 07:00
08:00 09:00 10:00 11:00
12:00 13:00 14:00 15:00
16:00 17:00 18:00 19:00
20:00 21:00 22:00 23:00
reset
Save Set

Notes


DIGITAL PROJECTION
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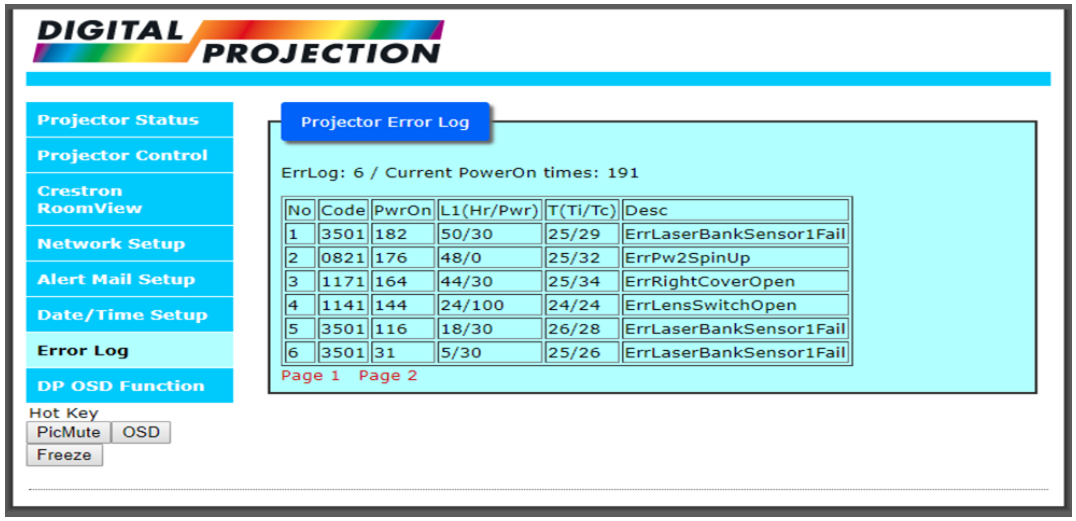
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
Time Zone:
Time Zone:
UTC(-11:00)
Select Local time zone, Current zone is UTC +08:00
SaveTimeZone
Time:
Date:
2018.11.02
e.g.2000.01.01
Clock:
18:00
e.g.23:59
Current time is set to :2018.11.02 ; 18:01
SaveTime


DIGITAL PROJECTION
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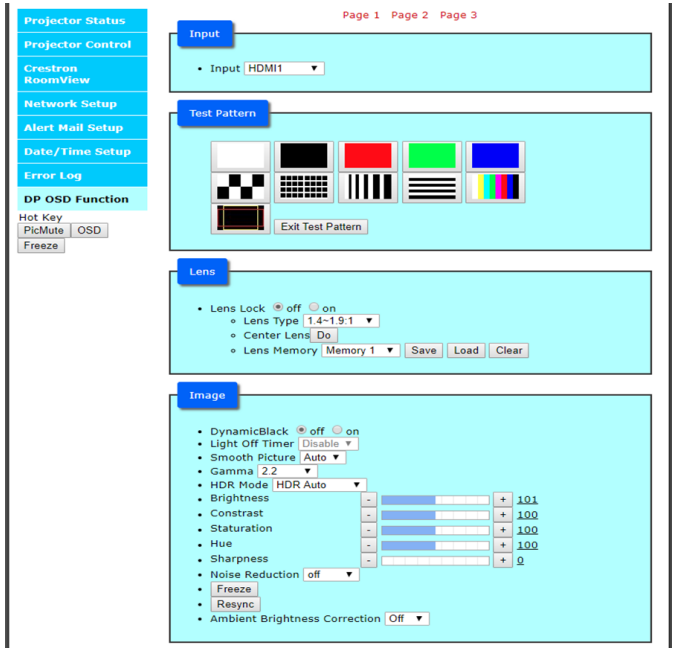
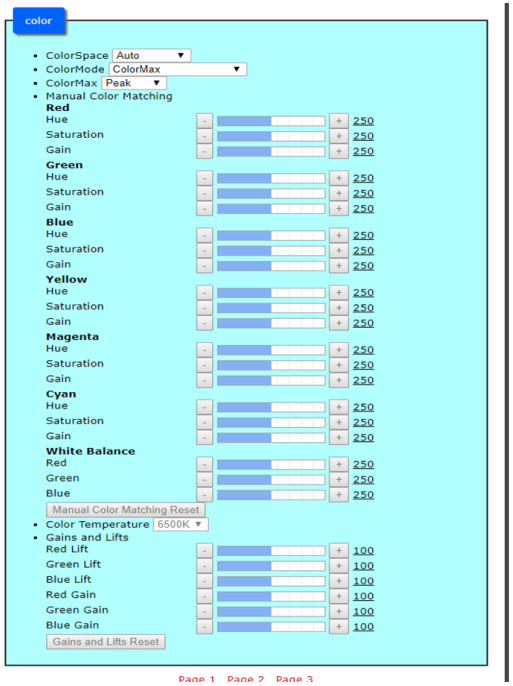
DP OSD Function
Hot Key
PicMute
OSD
Freeze
Projector Error Log
ErrLog: 6 / Current PowerOn times: 191
No Code PwrOn L1(Hr/Pwr) T(Ti/Tc) Desc
1 3501 182 50/30 25/29 ErrLaserBankSensor1Fail
2 0821 176 48/0 25/32 ErrPw2SpinUp
3 1171 164 44/30 25/34 ErrRightCoverOpen
4 1141 144 24/100 24/24 ErrLensSwitchOpen
5 3501 116 18/30 26/28 ErrLaserBankSensor1Fail
6 3501 31 5/30 25/26 ErrLaserBankSensor1Fail
Page 1 Page 2

Notes


Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
Page 1 Page 2 Page 3
Input
Input HDMI1
Test Pattern
Exit Test Pattern
Lens
Lens Lock off on
Lens Type 1.4~1.9:1
Center Lens Do
Lens Memory Memory 1 Save Load Clear
Image
DynamicBlack off on
Light Off Timer Disable
Smooth Picture Auto
Gamma 2.2
HDR Mode HDR Auto
Brightness 101
Constrast 100
Saturation 100
Hue 100
Sharpness 0
Noise Reduction off
Freeze
Resync
Ambient Brightness Correction Off


color
ColorSpace Auto
ColorMode ColorMax
ColorMax Peak
Manual Color Matching
Red
Hue 250
Saturation 250
Gain 250
Green
Hue 250
Saturation 250
Gain 250
Blue
Hue 250
Saturation 250
Gain 250
Yellow
Hue 250
Saturation 250
Gain 250
Magenta
Hue 250
Saturation 250
Gain 250
Cyan
Hue 250
Saturation 250
Gain 250
White Balance
Red 250
Green 250
Blue 250
Manual Color Matching Reset
Color Temperature 6500K
Gains and Lifts
Red Lift 100
Green Lift 100
Blue Lift 100
Red Gain 100
Green Gain 100
Blue Gain 100
Gains and Lifts Reset
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PicMute
OSD
Freeze
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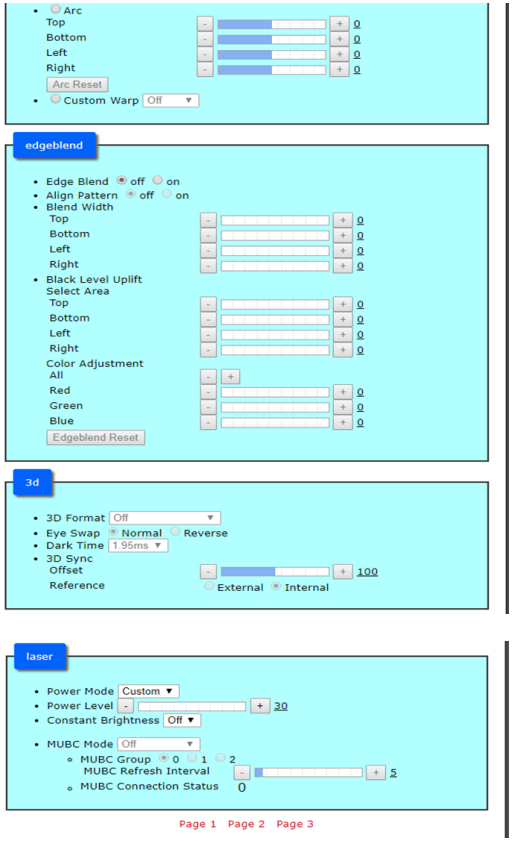
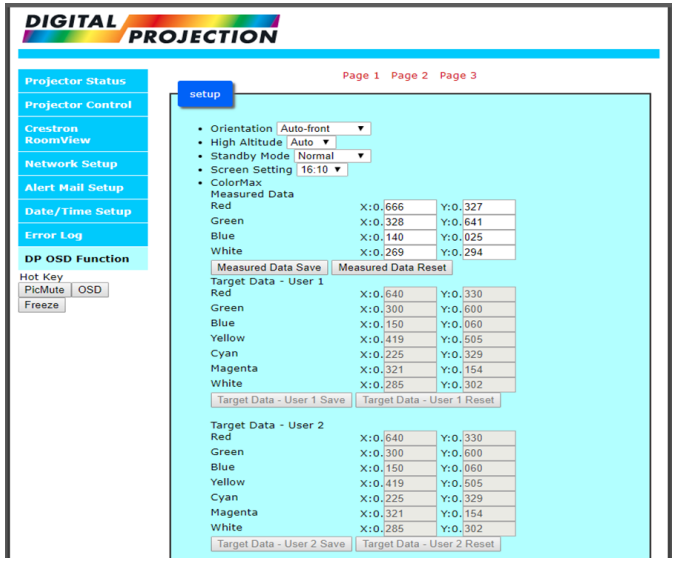
geometry
Aspect Ratio Source
Digital Zoom
Digital Zoom 0%
Digital Pan 0
Digital Scan 0
Digital Zoom Reset
Overscan Off
Blanking
Top 0
Bottom 0
Left 0
Right 0
Blanking Reset
Keystone
H Keystone 360
V Keystone 0
Rotation 0
Lens Throw Ratio 1.4
Keystone Reset
4 Corners
Top Left Corner X 0
Top Left Corner Y 0
Top Right Corner X 0
Top Right Corner Y 0
Bottom Left Corner X 0
Bottom Left Corner Y 0
Bottom Right Corner X 0
Bottom Right Corner Y 0
4 Corners Reset
Rotation 51
Rotation Reset
Pincushion/Barrel
H Pin/Barrel 1
V Pin/Barrel 1
Keystone
H Keystone 1
V Keystone 1
Rotation 1
Lens Throw Ratio 1.5
Pincushion/Barrel Reset


Arc
Top 0
Bottom 0
Left 0
Right 0
Arc Reset
Custom Warp Off
edgeblend
Edge Blend off on
Align Pattern off on
Blend Width
Top 0
Bottom 0
Left 0
Right 0
Black Level Uplift
Select Area
Top 0
Bottom 0
Left 0
Right 0
Color Adjustment
All
Red 0
Green 0
Blue 0
Edgeblend Reset
3d
3D Format Off
Eye Swap Normal Reverse
Dark Time 1.95ms
3D Sync
Offset 100
Reference External Internal
laser
Power Mode Custom
Power Level 30
Constant Brightness Off
MUBC Mode Off
MUBC Group 0 1 2
MUBC Refresh Interval 5
MUBC Connection Status 0
Page 1 Page 2 Page 3

Notes


DIGITAL PROJECTION
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
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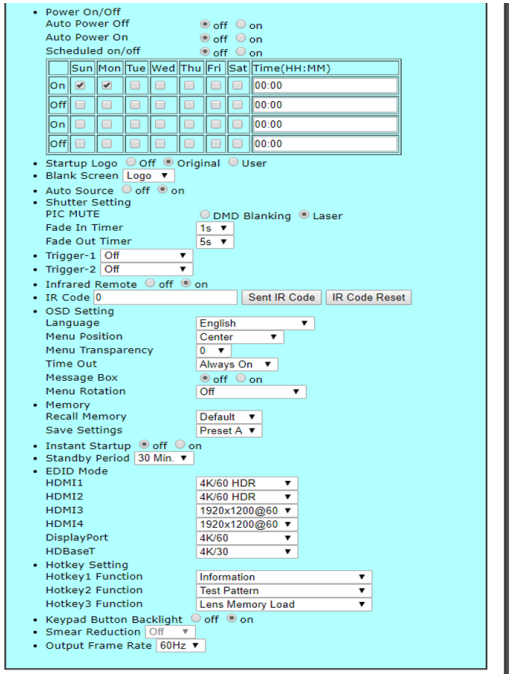
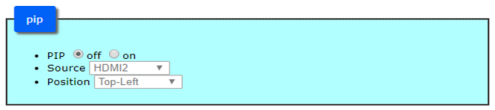
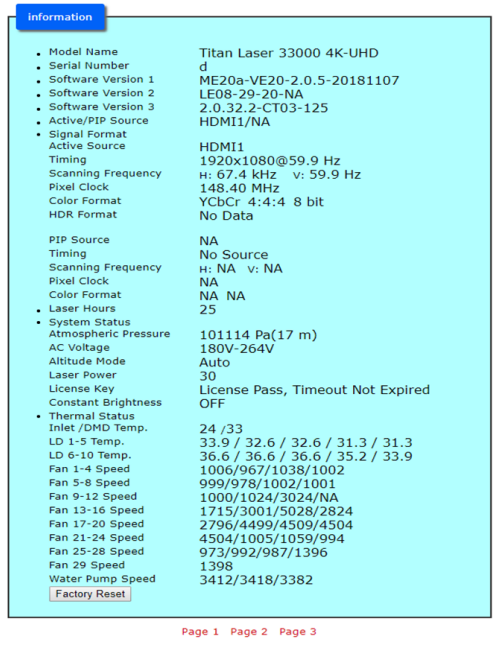
setup
Orientation Auto-front
High Altitude Auto
Standby Mode Normal
Screen Setting 16:10
ColorMax
Measured Data
Red x:0.666 y:0.327
Green x:0.328 y:0.641
Blue x:0.140 y:0.025
White x:0.269 y:0.294
Measured Data Save
Measured Data Reset
Target Data - User 1
Red x:0.640 y:0.330
Green x:0.300 y:0.600
Blue x:0.150 y:0.060
Yellow x:0.419 y:0.505
Cyan x:0.225 y:0.329
Magenta x:0.321 y:0.154
White x:0.285 y:0.302
Target Data - User 1 Save
Target Data - User 1 Reset
Target Data - User 2
Red x:0.640 y:0.330
Green x:0.300 y:0.600
Blue x:0.150 y:0.060
Yellow x:0.419 y:0.505
Cyan x:0.225 y:0.329
Magenta x:0.321 y:0.154
White x:0.285 y:0.302
Target Data - User 2 Save
Target Data - User 2 Reset


Power On/Off
Auto Power Off off on
Auto Power On off on
Scheduled on/off off on
Sun Mon Tue Wed Thu Fri Sat Time(HH:MM)
On 00:00
Off 00:00
On 00:00
Off 00:00
Startup Logo Off Original User
Blank Screen Logo
Auto Source off on
Shutter Setting
PIC MUTE DMD Blanking Laser
Fade In Timer 1s
Fade Out Timer 5s
Trigger-1 Off
Trigger-2 Off
Infrared Remote off on
IR Code 0
Sent IR Code
IR Code Reset
OSD Setting
Language English
Menu Position Center
Menu Transparency 0
Time Out Always On
Message Box off on
Menu Rotation Off
Memory
Recall Memory Default
Save Settings Preset A
Instant Startup off on
Standby Period 30 Min.
EDID Mode
HDMI1 4K/60 HDR
HDMI2 4K/60 HDR
HDMI3 1920x1200@60
HDMI4 1920x1200@60
DisplayPort 4K/60
HDBaseT 4K/30
Hotkey Setting
Hotkey1 Function Information
Hotkey2 Function Test Pattern
Hotkey3 Function Lens Memory Load
Keypad Button Backlight off on
Smear Reduction Off
Output Frame Rate 60Hz

Notes


pip
PIP off on
Source HDMI2
Position Top-Left


information
Model Name Titan Laser 33000 4K-UHD
Serial Number d
Software Version 1 ME20a-VE20-2.0.5-20181107
Software Version 2 LE08-29-20-NA
Software Version 3 2.0.32.2-CT03-125
Active/PIP Source HDMI1/NA
Signal Format
Active Source HDMI1
Timing 1920x1080@59.9 Hz
Scanning Frequency H: 67.4 kHz V: 59.9 Hz
Pixel Clock 148.40 MHz
Color Format YCbCr 4:4:4 8 bit
HDR Format No Data
PIP Source NA
Timing No Source
Scanning Frequency H: NA V: NA
Pixel Clock NA
Color Format NA NA
Laser Hours 25
System Status
Atmospheric Pressure 101114 Pa(17 m)
AC Voltage 180V-264V
Altitude Mode Auto
Laser Power 30
License Key License Pass, Timeout Not Expired
Constant Brightness OFF
Thermal Status
Inlet /DMD Temp. 24 /33
LD 1-5 Temp. 33.9 / 32.6 / 32.6 / 31.3 / 31.3
LD 6-10 Temp. 36.6 / 36.6 / 36.6 / 35.2 / 33.9
Fan 1-4 Speed 1006/967/1038/1002
Fan 5-8 Speed 999/978/1002/1001
Fan 9-12 Speed 1000/1024/3024/NA
Fan 13-16 Speed 1715/3001/5028/2824
Fan 17-20 Speed 2796/4499/4509/4504
Fan 21-24 Speed 4504/1005/1059/994
Fan 25-28 Speed 973/992/987/1396
Fan 29 Speed 1398
Water Pump Speed 3412/3418/3382
Factory Reset
Page 1 Page 2 Page 3

Notes

DIGITAL PROJECTION

Titan Laser4K-UHD

High Brightness Digital Video Projector

REFERENCE GUIDE

Rev A January 2019
119-713

Choosing a lens

A number of lenses are available. Which lens you choose depends on the screen size, image aspect ratio, throw distance and light output.

The following table shows all available lenses in order of their throw ratios:

LENS	PART No	FOCUS RANGE	LENS SHIFT
1.16-1.49:1 Super Wide Zoom	109-236	3m - 15m	V: 0.44 (U) 0.44 (D) frame H: 0.188 (L) 0.188 (R) frame
1.39 - 1.87:1 Wide Zoom	105-610	4m - 24m	V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame
1.87 - 2.56:1 Standard Zoom	105-611	4m - 24m	V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame
2.56 - 4.16:1 Semi Long Zoom	105-612	9.1m - 45m	V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame
4.16 - 6.96:1 Long Zoom1	105-613	12m - 80m	V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame
6.92 - 10.36:1 Long Zoom2	109-235	12m - 80m	V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame

To choose a lens, calculate the ***throw ratio*** required. Allow a tolerance of +/- 2% in the throw ratio calculation.

Notes

See lens part numbers on page 115 for information about individual lens part numbers

See Fitting a lens hood on page 27 for more information about using the right lens and hood

Basic calculation

Identify the required lens by calculating the ***throw ratio***.

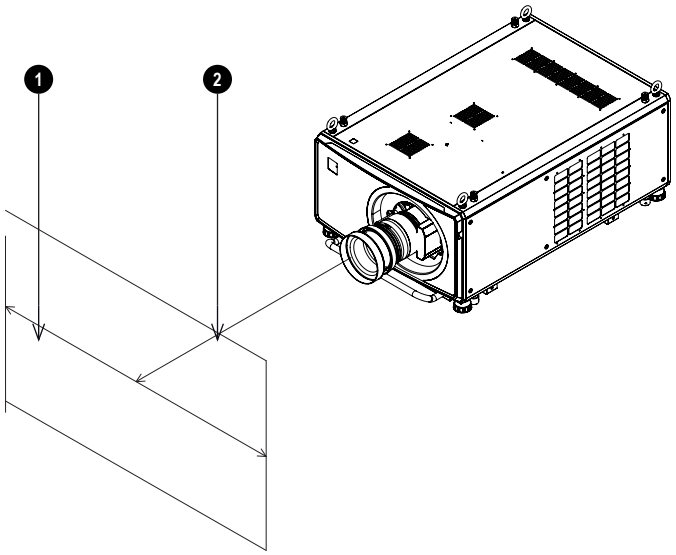
A ***throw ratio*** is the ratio of the throw distance to the screen width:

$$ThrowRatio = ThrowDistance/ScreenWidth$$

1. Use the formula above to obtain the required throw ratio.
2. Allow a tolerance of +/- 2% in the throw ratio calculation and match the throw ratio with a lens from the table below:

Throw ratios	Focus Range
1.16-1.49:1 Super Wide Zoom	3m - 15m
1.39 - 1.87:1 Wide Zoom	4m - 24m
1.87 - 2.56:1 Standard Zoom	4m - 24m
2.56 - 4.16:1 Semi Long Zoom	9.1m - 45m
4.16 - 6.96:1 Long Zoom1	12m - 80m
6.92 - 10.36:1 Long Zoom2	12m - 80m

3. Ensure the required throw distance is within the range covered by the lens.



Notes

The basic calculation on this page does not take into consideration DMD™ and image size, which could affect the throw ratio. See Full lens calculation on page 105 for a more complex and realistic calculation.

When calculating the throw ratio, be sure to use identical measurement units for both the throw distance and the screen width.

See lens part numbers on page 115 for information about individual lens part numbers

See Fitting a lens hood on page 27 for more information about using the right lens and hood

Basic calculation example

1. Calculate the throw ratio using the formula.
   Your screen is ***4.5m*** wide and you wish to place the projector approximately ***11m*** from the screen. The throw ratio will then be
   11 ÷ 4.5 = ***2.44***
2. Match the result with the lens table.
   The lens matching a throw ratio of 2.44 is the ***2.20 - 3.67 : 1 zoom lens***.
3. **Check whether the lens covers the required throw distance.**
   The focus range quoted for the 2.20 - 3.67 : 1 zoom lens is **2.36 - 24.2m**. The required distance of 11m is within the range.

INFORMATION YOU NEED FOR THIS CALCULATION

The throw ratio formula:

$$ThrowRatio = ThrowDistance / ScreenWidth$$

Allow a tolerance of +/- 2% in the throw ratio calculation.

The lens table:

Throw ratios	Focus Range
1.16-1.49:1 Super Wide Zoom	3m - 15m
1.39 - 1.87:1 Wide Zoom	4m - 24m
1.87 - 2.56:1 Standard Zoom	4m - 24m
2.56 - 4.16:1 Semi Long Zoom	9.1m - 45m
4.16 - 6.96:1 Long Zoom1	12m - 80m
6.92 - 10.36:1 Long Zoom2	12m - 80m

Notes

The basic calculation on this page does not take into consideration DMD™ and image size, which could affect the throw ratio. See Full lens calculation on the facing page for a more complex and realistic calculation.

See lens part numbers on page 115 for information about individual lens part numbers.

Full lens calculation

Introducing TRC

The choice of lens will affect the image size and will address discrepancies between the DMD™ resolution and the source.

When an image fills the height of the DMD™ but not the width, it uses less than 100% of the DMD™ surface. A lens chosen using the basic formula may produce an image that is considerably smaller than the actual screen.

To compensate for loss of screen space in such situations, you need to increase the throw ratio using a **Throw Ratio Correction (TRC)**.

Example

Fig. 1 illustrates a 4:3 image within a 16:9 display

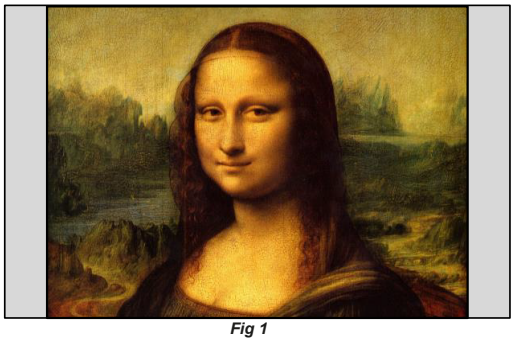


Fig 1

When a 16:9 projector is used for a 4:3 image, the image does not fill the width of the DMD™, creating a **pillarboxing** effect - blank spaces to the left and right.

Fig. 2 shows the same image projected on a 4:3 screen using a standard lens (chosen with the basic calculation).

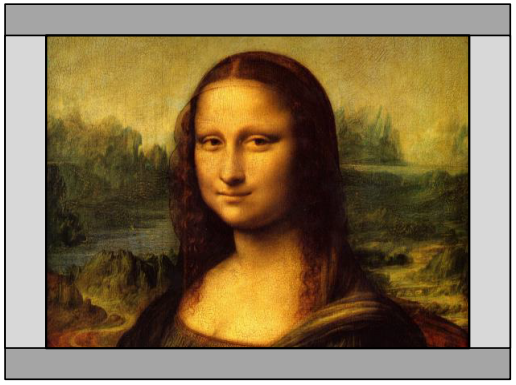


Fig 2

The DMD™ accurately fills the width of the screen; however, the pillarboxing is now part of the projected image and is transferred to the screen.

The DMD™ does not fill the height of the screen, which has caused **letterboxing** - further blank spaces at the top and bottom of the screen.

The image is now surrounded by blank space, which can be removed if the throw ratio is increased.

Fig. 3 shows the image projected on the same screen with a lens chosen using TRC. The increased throw ratio has allowed the 4:3 image to fill the 4:3 screen seamlessly

Fig 3

Notes

TRC can only be applied if greater than 1. If TRC is 1 or less, disregard it and calculate the throw ratio using the basic formula.

Calculating TRC

To calculate TRC, use the following formula:

$$TRC = 1.78(DMD™\ \ AspectRatio)/SourceAspectRatio.$$

TRC table

Alternatively, you can save time by referencing the following table, which shows the TRC value for some popular image formats:

2.35:1 (Scope)	3840 x 1634 pixels	TRC < 1, not used
1.85:1 (Flat)	3840 x 2075 pixels	TRC < 1, not used
1.78:1 (16:9)	3840 x 2160 pixels	TRC = 1, not used (native aspect ratio)
1.6:1 (16:10)	3456 x 2160 pixels	TRC = 1.11
1.33:1 (4:3)	2873 x 2160 pixels	TRC = 1.33
1.25:1 (5:4)	2700 x 2160 pixels	TRC = 1.42

Calculating the throw ratio with TRC

1. For TRC > 1, amend the basic throw ratio formula as follows:
   $$ThrowRatio = ThrowDistance/ScreenWidth * TRC$$
   Allow a tolerance of +/- 2% in the throw ratio calculation.
2. Once a throw ratio is established, identify the matching lens from the table:

Throw ratios	Focus Range
1.16-1.49:1 Super Wide Zoom	3m - 15m
1.39 - 1.87:1 Wide Zoom	4m - 24m
1.87 - 2.56:1 Standard Zoom	4m - 24m
2.56 - 4.16:1 Semi Long Zoom	9.1m - 45m
4.16 - 6.96:1 Long Zoom1	12m - 80m
6.92 - 10.36:1 Long Zoom2	12m - 80m

3. Ensure the required throw distance is within the range of the matching lens.

The lens table shown on this page includes High Brightness lenses only. For a full list, see **Appendix A**.

Notes

TRC can only be applied if greater than 1. If TRC is 1 or less, disregard it and calculate the throw ratio using the basic formula.

TRC can only be applied if greater than 1. If TRC is 1 or less, disregard it and calculate the throw ratio using the basic formula

See Fitting a lens hood on page 27 for more information about using the right lens and hood

Full lens calculation example

Your screen is **4.5m** wide; you wish to place the projector approximately **11m** from the screen. The source is **4:3**.

1. Calculate TRC as follows:
   TRC = 1.78 / 1.33 = 1.33
2. Calculate the throw ratio:
   Throw ratio = 11 / 4.5 x 1.33 = **1.84**
3. Allow a tolerance of +/- 2% in the throw ratio calculation and find a match in the lens table.
   The table shows that the matching lens is **the 2.2 - 3.67 : 1 zoom lensthe 1.39 - 1.87 : 1 zoom lens**.
4. Check whether the lens covers the required throw distance.
   The focus range quoted for the 2.2 - 3.67 : 1 zoom lens is **2.36m - 24.2m**. The required distance of 11 m is within the range.

INFORMATION YOU NEED FOR THESE CALCULATIONS

The TRC formula

$$TRC = DMD^{\text{™}}\ AspectRatio/SourceAspectRatio$$

The TRC table (to use instead of the formula)

2.35:1 (Scope)	TRC not used
1.85:1 (Flat)	TRC not used
1.78:1 (16:9)	TRC not used (native aspect ratio)
1.6:1 (16:10)	TRC = 1.11
1.33:1 (4:3)	TRC = 1.33
1.25:1 (5:4)	TRC = 1.42

The throw ratio formula

$$ThrowRatio = ThrowDistance/ScreenWidth * TRC$$

Allow a tolerance of +/- 2% in the throw ratio calculation.

The lens table:

Throw ratios	**Focus Range**
1.16-1.49:1 Super Wide Zoom	3m - 15m
1.39 - 1.87:1 Wide Zoom	4m - 24m
1.87 - 2.56:1 Standard Zoom	4m - 24m
2.56 - 4.16:1 Semi Long Zoom	9.1m - 45m
4.16 - 6.96:1 Long Zoom1	12m - 80m
6.92 - 10.36:1 Long Zoom2	12m - 80m

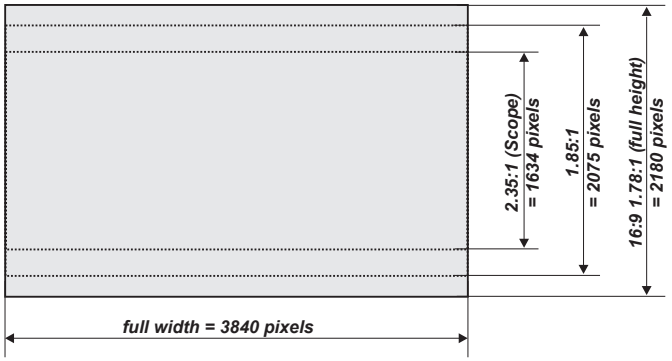
Notes

Screen requirements

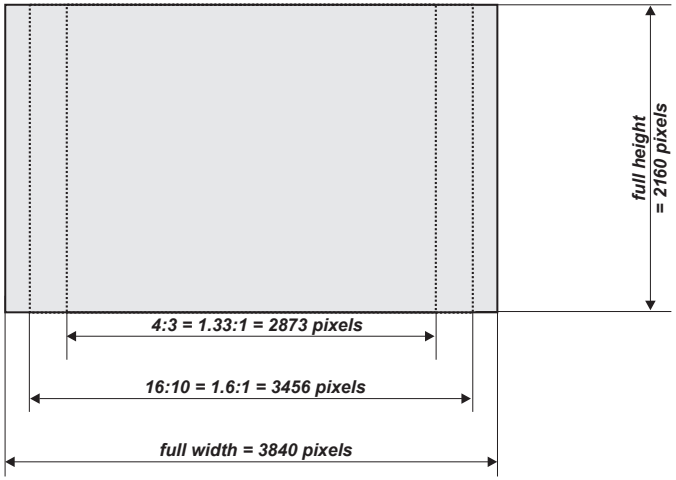
Fitting the image to the display

If the source image supplied to the projector is smaller than the 4K-UHD resolution, the image will not fill the display. The following examples show how a number of common formats may be displayed, depending on your DMD™ resolution.

4K-UHD images displayed full width



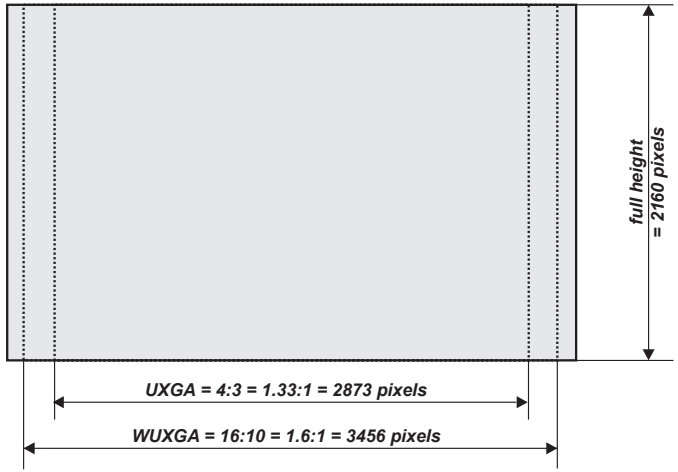
4K-UHD images displayed with a height of 2160 pixels



Notes

These pixel dimensions are correct when Smooth Picture is ON. When Smooth Picture is OFF these values will be based on the full native DMD size of 1920x1200.

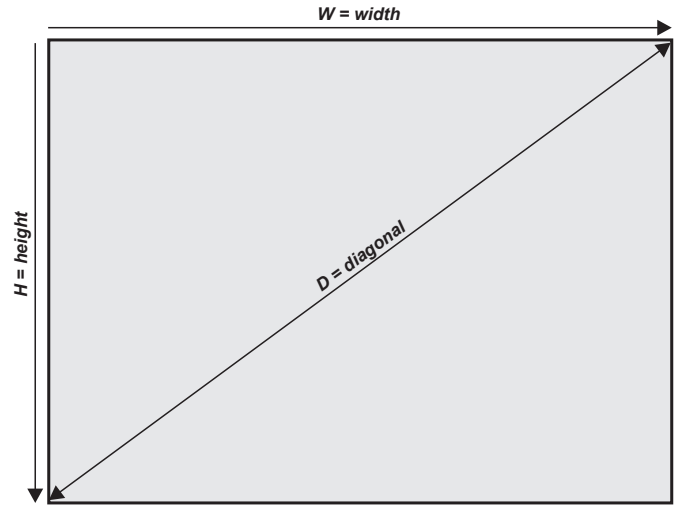
4K-UHD images displayed full height



Diagonal screen sizes

Screen sizes are sometimes specified by their diagonal size (D). When dealing with large screens and projection distances at different aspect ratios, it is more convenient to measure screen width (W) and height (H).

The example calculations below show how to convert diagonal sizes into width and height, at various aspect ratios.



2.35:1 (Scope)
W = D x 0.92 H = D x 0.39

1.85:1
W = D x 0.88 H = D x 0.47

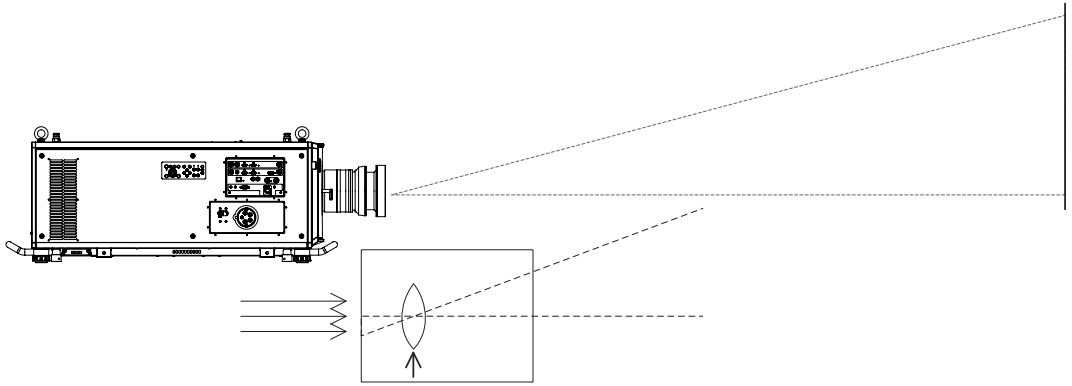
16:9 = 1.78:1 (native aspect ratio for 4K-UHD projectors)
W = D x 0.87 H = D x 0.49

16:10 = 1.6:1
W = D x 0.85 H = D x 0.53

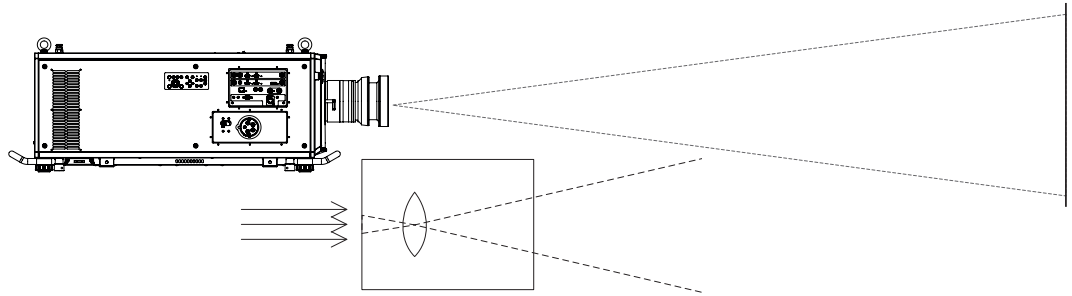
Notes

Positioning the image

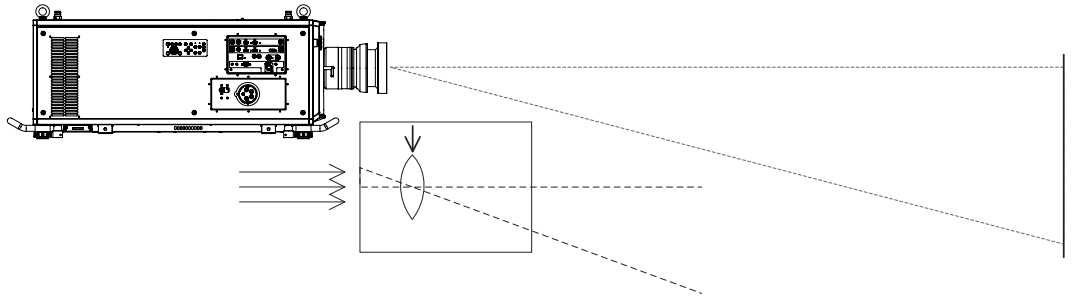
The normal position for the projector is at the centre of the screen. However, you can set the projector above or below the centre, or to one side, and adjust the image using the **Lens shift** feature (known as **rising and falling front**) to maintain a geometrically correct image.



Shifting the lens up (rising front)



Centred Lens



Shifting the lens down (falling front)

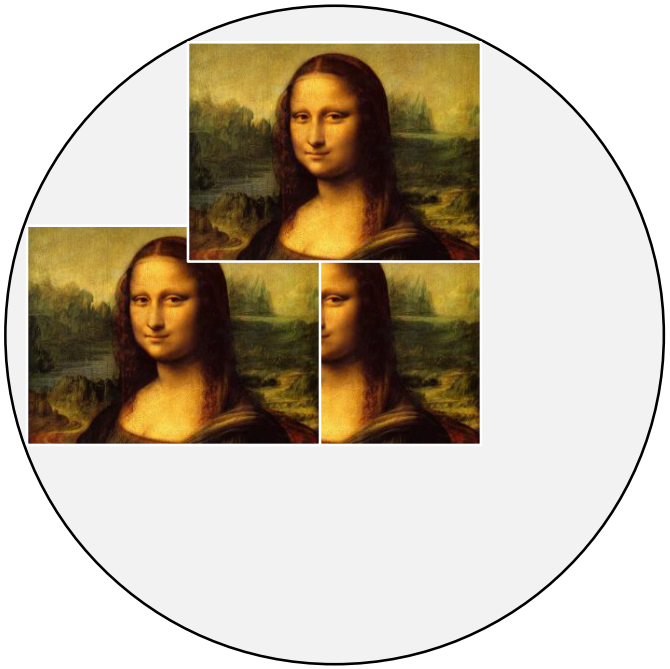
Notes

See Lens control on page 46 for more information on shifting the lens.

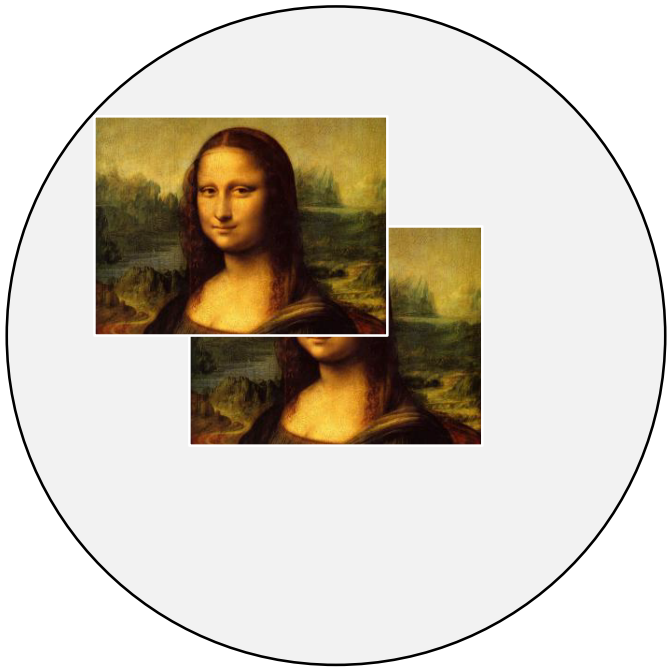
Whenever possible, position the projector so that the lens is centered for the highest quality image

Any single adjustment outside the ranges specified on the following page may result in an unacceptable level of distortion, particularly at the corners of the image, due to the image passing through the periphery of the lens optics.

If the lens is to be shifted in two directions combined, the maximum range without distortion will be somewhat less, as can be seen in the illustrations.



Full horizontal or vertical shift



Combined shift is reduced

Notes

See Lens control on page 46 for more information on shifting the lens.

Aspect ratios explained

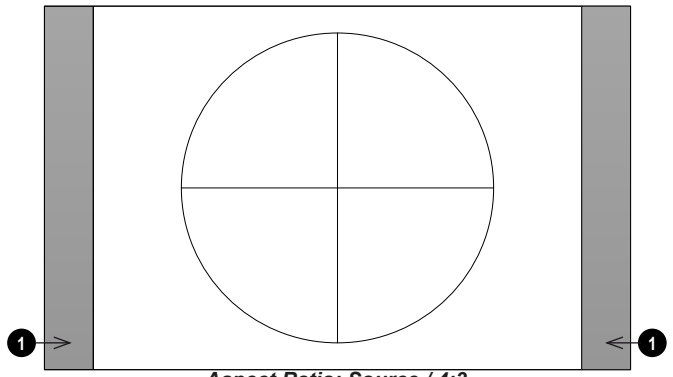
The appearance of a projected image on the screen depends on a combination of the following:

- The display resolution is **4K-UHD** with a 3840 x 2160 resolution, corresponding to an aspect ratio of 16:9
- The aspect ratio of the input signal: usually **4:3**, **16:9** or **16:10**
- The value of the **Aspect Ratio** setting of the projector:
  - **16:9**, **4:3**, **16:10** and **5:4** stretch the image to the selected aspect ratio. **16:9** leaves black bars at the top and bottom of the screen (letterboxing effect); **4:3** and **5:4** leave black bars at the sides of the screen (pillarboxing).
  - **TheaterScope** is a special setting used in combination with an anamorphic lens, an optional accessory. It removes letterboxing from a 2.35:1 source packed into a 16:9 frame.
  - **Source** shows the image with its original aspect ratio, if this does not match the native aspect ratio of the DMD™, then the image will be scaled to either fit the full width or height of the display.

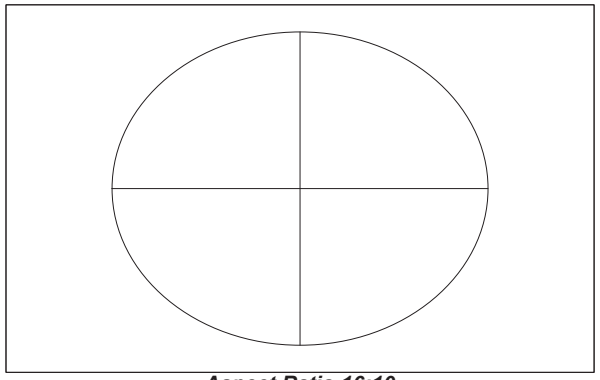
Aspect ratios examples

1. Unused screen areas

Source: 4:3



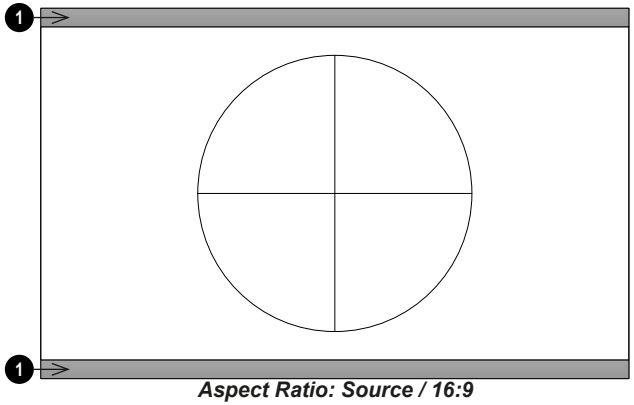
Aspect Ratio: Source / 4:3



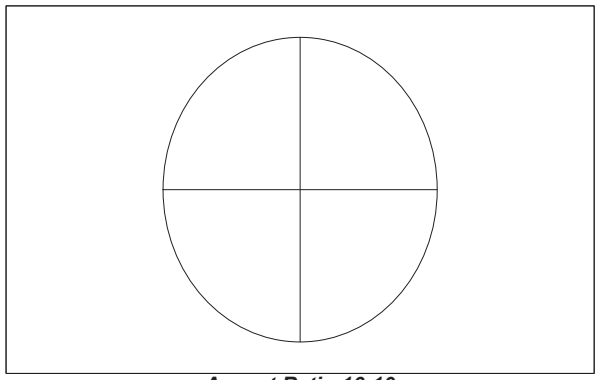
Aspect Ratio 16:10

Notes

Source: 16:9

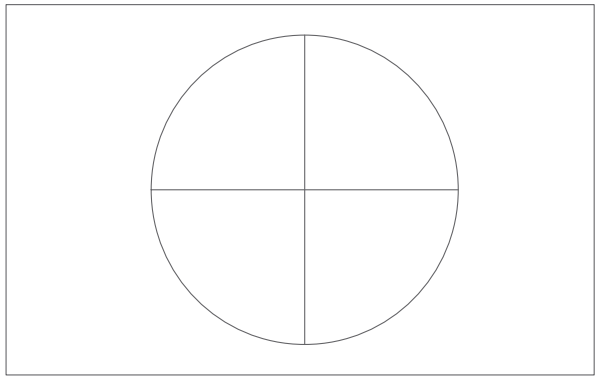


Aspect Ratio: Source / 16:9



Aspect Ratio 16:10

Source: 16:10 (native)



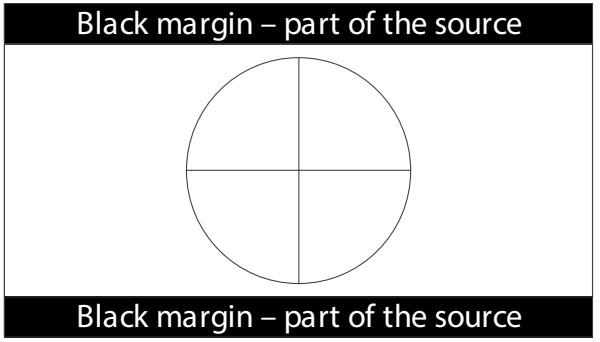
Aspect Ratio: Source / 16:10

Notes

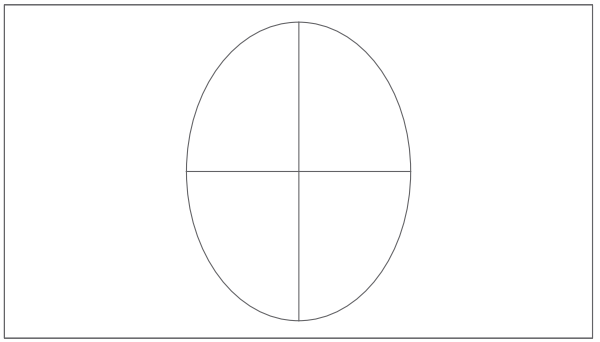
Aspect ratio example: TheatreScope

The TheaterScope setting is used in combination with an anamorphic lens to restore 2.35:1 images packed into a 16:9 frame. Such images are projected with black lines at the top and bottom of the 16:9 screen to make up for the difference in aspect ratios.

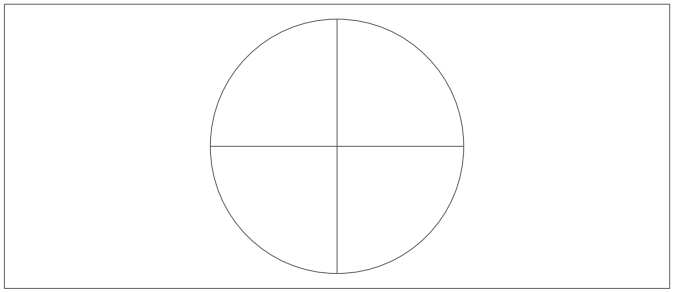
Without an anamorphic lens and without the TheaterScope setting applied, a 16:9 source containing a 2.35:1 image looks like this:



If we change the setting to TheaterScope, the black lines will disappear but the image will stretch vertically to reach the top and bottom of the DMD™:



An anamorphic lens will stretch the image horizontally, restoring the original 2.35 ratio:



Notes

Appendix A: lens part numbers

LENS	PART No	FOCUS RANGE	LENS EXTENSION
1.16-1.49:1 Super Wide Zoom	109-236	3m - 15m	162.5mm
1.39 - 1.87:1 Wide Zoom	105-610	4m - 24m	130.5mm
1.87 - 2.56:1 Standard Zoom	105-611	4m - 24m	95.3 mm
2.56 - 4.16:1 Semi Long Zoom	105-612	9.1m - 45m	88.7mm
4.16 - 6.96:1 long Zoom1	105-613	12m - 80m	55mm
6.92 - 10.36:1 Long Zoom2	109-235	12m - 80m	105mm

Notes

The throw ratios given here apply only when the image fills the width of the DMD™.
For images that do not fill the width of the DMD™, the throw ratio needs to be recalculated using a throw ratio correction (TRC).
For further information, See Choosing a lens on page 102 and See lens part numbers above.

Throw distance calculations are based on the distance from the outer end of the lens, which will vary from lens to lens.

See Fitting a lens hood on page 27 for further information about using the right lens and hood.

Appendix B: supported signal input modes

2D formats

Signal Format	Resolution	Frame Rate (Hz)	Display Port	HDMI 1/2 & HDBaseT				HDMI3/4		Output Frame Rate (Hz)	Remarks
				RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	RGB	YUV 8/10/12-bit		
PC	640 x 480	60	X	X						60	
	640 x 480	75	X	X						60	
	640 x 480	85	X	X						60	
	800 x 600	60	X	X						60	
	800 x 600	75	X	X						60	
	800 x 600	85	X	X						60	
	848 x 480	48	X	X						48	
	848 x 480	60	X	X						60	
	1024 x 768	60	X	X						60	
	1024 x 768	75	X	X						60	
	1024 x 768	85	X	X						60	
	1280 x 720	48	X	X						48	
	1280 x 768	60	X	X						60	
	1280 x 800	60	X	X						60	
	1280 x 960	60	X	X						60	
	1280 x 1024	60	X	X						60	
	1280 x 1024	75	X	X						60	
	1280 x 1024	85	X	X						60	
	1366 x 768	60	X	X						60	
	1440 x 900	60	X	X						60	
	1400 x 1050	60	X	X						60	
	1600 x 1200	60	X	X						60	
	1680 x 1050	60	X	X						60	
	1920 x 1080	48	X	X						48	
	1920 x 1200 RB	50	X	X				X		50	
	1920 x 1200 RB	60	X	X				X		60	
	1920 x 1080	100	X	X *4						50 at 4K display 100 at WUXGA display	*4 HDMI 1,2 support but HDBaseT does not support
	1920 x 1080	120	X	X *4						60 at 4K display 120 at WUXGA display	

Notes

Signal Format	Resolution	Frame Rate (Hz)	Display Port	HDMI 1/2 & HDBaseT				HDMI3/4		Output Frame Rate (Hz)	Remarks
				RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	RGB	YUV 8/10/12-bit		
	1920 x 1200	100	X	X *4						50 at 4K display 100 at WUXGA display	
	1920 x 1200 RB	120	X	X *4						60 at 4K display 120 at WUXGA display	
Apple Mac	640 x 480	67	X	X						60	
	832 x 624	75	X	X						60	
SDTV	480i	59.94								60	
	1440x480i	60.00		X	X	X	X			60	
	1440x576i	50.00		X	X	X	X			50	
	576i	50.00								50	
EDTV	480p	59.94	X	X	X	X	X	X	X	60	
	576p	50.00	X	X	X	X	X	X	X	50	
HDTV	1035i	60.00	X	X	X	X	X			60	
	1080i	50.00	X	X	X	X	X			50	
	1080i	59.94	X	X	X	X	X			60	
	1080i	60.00	X	X	X	X	X			60	
	720p	50.00	X	X	X	X	X	X	X	60	
	720p	59.94	X	X	X	X	X	X	X	60	
	720p	60.00	X	X	X	X	X	X	X	60	
	1080p	23.98	X	X	X	X	X			48	
	1080p	24.00	X	X	X	X	X			48	
	1080p	25.00	X	X	X	X	X			60	
	1080p	29.97	X	X	X	X	X			60	
	1080p	30.00	X	X	X	X	X			60	
	1080p	50.00	X	X	X	X	X	X	X	50	
	1080p	59.94	X	X	X	X	X	X	X	60	
	1080p	60.00	X	X	X	X	X	X	X	60	
	2K (2048x1080)	24	X	X	X	X	X			48	
	2K (2048x1080)	25	X	X	X	X	X			50	
	2K (2048x1080)	30	X	X	X	X	X			60	
	2K (2048x1080)	50	X	X	X	X	X			50	
	2K	60	X	X	X	X	X			60	

Notes

Signal Format	Resolution	Frame Rate (Hz)	Display Port	HDMI 1/2 & HDBaseT				HDMI3/4		Output Frame Rate (Hz)	Remarks
				RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	RGB	YUV 8/10/12-bit		
	(2048x1080)										
	4K-UHD (3840x2160)	24	X	X	X	X*1	X*1			48	
	4K-UHD (3840x2160)	25	X	X	X	X*1	X*1			50	*1 HDBaseT supports 4K 24/25/30Hz 4:2:2 only
	4K-UHD (3840x2160)	30	X	X	X	X*1	X*1			60	
	4K-UHD (3840x2160)	50	X	X(8 bits)	X*2	X*3	X*3			50	*2 HDBaseT supports 4K 50/60Hz 4:2:0 only
	4K-UHD (3840x2160)	60	X	X(8 bits)	X*2	X*3	X*3			60	*3 HDMI 1,2 support up to 4:2:2, HDBaseT does not support

Notes

3D formats

Standard		Resolution	V-Freq (Hz)	V-Total	H-Freq (kHz)	Output Frame Rate (Hz)	Input Source		Remarks
							HDMI3/4	Dual-Pipe HDMI3: Left-eye source HDMI4: Right-eye source	
1080p100	Frame Sequential	1920x1080	100.00	1125.00	112.50	100.00	√		Maintained aspect ratio at 16:9
1080p120	Frame Sequential	1920x1080	120.00	1125.00	135.00	120.00	√		Maintained aspect ratio at 16:9
WUXGA_100_RB	Frame Sequential	1920x1200	100.00	1258.00	125.72	100.00	√		Maintained aspect ratio at 16:10
1080p50	Dual Pipe	1920x1080	50.00	1125.00	56.25	100.00		√	Maintained aspect ratio at 16:9
1080p60	Dual Pipe	1920x1080	60.00	1125.00	67.50	120.00		√	Maintained aspect ratio at 16:9
WUXGA_50_RB	Dual Pipe	1920x1200	50.00	1258	62.86	100.00		√	Maintained aspect ratio at 16:10
WUXGA_60_RB	Dual Pipe	1920x1200	60.00	1125.00	74.04	120.00		√	Maintained aspect ratio at 16:10

SDI formats

Timing	SDI Link Mode	Signal Standards	Color Encode	Sampling Structure	Bit Depth
NTSC	SD	SMPTE 259M-C 270Mbps SD	YCbCr	4:2:2	10
PAL	SD	SMPTE 259M-C 270Mbps SD	YCbCr	4:2:2	10
1035i60	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080i59	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080i60	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080P30	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080P25	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080i50	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080P24	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
720P60	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
720P50	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080Sf25	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080Sf30	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10
1080P50	3G Level A	SMPTE 424M 3Gbps	YCbCr	4:2:2	10
1080P59	3G Level A	SMPTE 424M 3Gbps	YCbCr	4:2:2	10
1080P60	3G Level A	SMPTE 424M 3Gbps	YCbCr	4:2:2	10
1080P50	3G Level B	SMPTE 424M 3Gbps	YCbCr	4:2:2	10

Notes

Timing	SDI Link Mode	Signal Standards	Color Encode	Sampling Structure	Bit Depth
1080P59	3G Level B	SMPTE 424M 3Gbps	YCbCr	4:2:2	10
1080P60	3G Level B	SMPTE 424M 3Gbps	YCbCr	4:2:2	10

Notes

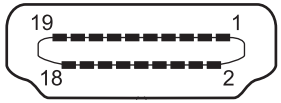
Appendix C: wiring details

Signal inputs and outputs

HDMI 1 and 2

19 way type A connector

1. TMDS Data 2+
2. TMDS Data 2 Shield
3. TMDS Data 2-
4. TMDS Data 1+
5. TMDS Data 1 Shield
6. TMDS Data 1-
7. TMDS Data 0+
8. TMDS Data 0 Shield
9. TMDS Data 0-
10. TMDS Clock+
11. TMDS Clock Shield
12. TMDS Clock-
13. CEC
14. not connected
15. SCL (DDC Clock)
16. SCA (DDC Data)
17. DDC/CEC Ground
18. +5 V Power
19. Hot Plug Detect



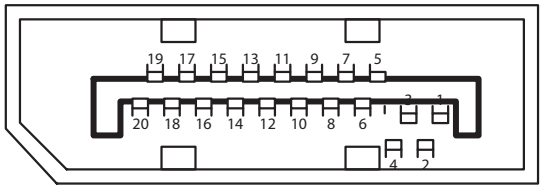
HDMI: pin view of panel connector

Notes

DisplayPort

DisplayPort 1.2

Pin 1	ML_Lane 0 (p)	Lane 0 (positive)
Pin 2	GND	Ground
Pin 3	ML_Lane 0 (n)	Lane 0 (negative)
Pin 4	ML_Lane 1 (p)	Lane 1 (positive)
Pin 5	GND	Ground
Pin 6	ML_Lane 1 (n)	Lane 1 (negative)
Pin 7	ML_Lane 2 (p)	Lane 2 (positive)
Pin 8	GND	Ground
Pin 9	ML_Lane 2 (n)	Lane 2 (negative)
Pin 10	ML_Lane 3 (p)	Lane 3 (positive)
Pin 11	GND	Ground
Pin 12	ML_Lane 3 (n)	Lane 3 (negative)
Pin 13	CONFIG1	Connected to Ground1
Pin 14	CONFIG2	Connected to Ground1
Pin 15	AUX CH (p)	Auxiliary Channel (positive)
Pin 16	GND	Ground
Pin 17	AUX CH (n)	Auxiliary Channel (negative)
Pin 18	Hot Plug	Hot Plug Detect
Pin 19	Return	Return for Power
Pin 20	DP_PWR	Power for connector (3.3 V 500 mA)



DisplayPort: pin view of panel connector

Notes

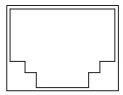
3G-SDI in, 3G-SDI out

75 ohm BNC

3G-SDI connector

HDBaseT input

RJ45 socket.



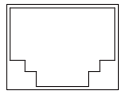
HDBaseT / LAN

Notes

Control connections

LAN

RJ45 socket (Shared with HDBaseT)

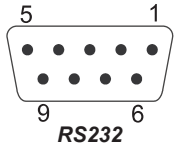


HDBaseT / LAN

RS232

9 way D-type connector

1. unused
2. Transmitted Data (TX)
3. Received Data (RX)
4. unused
5. Signal Ground
6. unused
7. unused
8. unused
9. unused



RS232
pin view of female connector

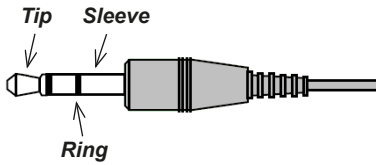
IR input

3.5 mm mini jack

Tip Signal

Ring Not connected

Sleeve Ground



Notes

Only one remote connection (RS232 or LAN) should be used at any one time.

Appendix D: memory scheme and memory items

Below is a summary of the OSD parameters that can be saved in the memory presets.

Item	Global Memory	Per Input Memory (Preset A/B/C/D)	3D input	Remark
Input Select	◎			
Test Pattern				Not Memorized
Lens Lock / Lens Memory	◎			
DB		◎		
Light Off Timer		◎		Available when DB is set at ON
SP		◎	N/A	
Brightness		◎	N/A	
Contrast		◎	N/A	
Gamma		◎		Will apply the general gamma when HDR is not activated.
HDR Mode		◎		Will apply the gamma for HDR when auto detected the HDR signal or manual select the PQ-400/PQ-500/PQ-1000/HLG option.
Saturation		◎	N/A	
Hue		◎	N/A	
Sharpness		◎	N/A	
Noise Reduction		◎	N/A	
Freeze			N/A	Not Memorized
Ambient Brightness Correction	◎		N/A	
Color Space		◎	N/A	
Color Mode		◎		
ColorMax		◎		When Color Mode is selected at ColorMax option.
Manual Color Matching		◎		When non-HDR and the Color Mode is selected at Manual Color Matching option.
		◎		When HDR and the Color Mode is selected at Manual Color Matching option.
Color Temperature		◎		When Color Mode is selected at Color Temperature option.
Red Lift		◎		When Color Mode is selected at Gains and Lifts option.
Green Lift		◎		
Blue Lift		◎		
Red Gain		◎		
Green Gain		◎		
Blue Gain		◎		
Aspect ratio		◎	N/A	

Notes

Item	Global Memory	Per Input Memory (Preset A/B/C/D)	3D input	Remark
Digi Zoom			N/A	
Digi Pan			N/A	Not Memorized and reset to 0 after power cycle
Digi Scan			N/A	
OverScan		◎	N/A	
Warping Mode	◎			
H Keystone	◎			
V Keystone	◎			
Rotation	◎			
Lens Throw Ratio	◎			
H PinBarrel	◎			
V PinBarrel	◎			All Geometry/Edge-Blending settings are global
4Corner	◎			
Blanking	◎			
Arc	◎			
Customer Warp	◎			
Edge Blending	◎			
Black Level	◎			
3D Format		◎		
3D Sync		◎		
3D DarkTime		◎		
3D SyncOffset		◎		
3D SyncReference		◎		
Laser Mode	◎			
Laser Power	◎			
Fan Altitude	◎			
Contrast Brightness	◎			
MUBC	◎			
Orientation	◎			
High Altitude	◎			
Screen Setting	◎		N/A	
Auto Poweroff	◎			
Auto Poweron	◎			
Schedule Setting	◎			
Startup Logo	◎			
Blank Screen	◎			
Trig 1	◎		N/A	
Trig 2	◎		N/A	

Notes

Item	Global Memory	Per Input Memory (Preset A/B/C/D)	3D input	Remark
Auto Source	◎		N/A	
Pic.Mute Setting	◎			
Ir Enable	◎			
Ir Code	◎			
OSD Language	◎			
OSD Menupos	◎			
OSD Trans	◎			
OSD Timer	◎			
Standby Power	◎			
Instant Startup	◎			
Standby Period	◎			
EDID Mode	◎			
Hotkey Setting	◎			
Keypad Blacklight	◎			
Smear Reduction	◎			
Output Frame Rate	◎		N/A	
Lan DHCP	◎			
Lan IP	◎			
Lan Subnet	◎			
Lan Gateway	◎			
Lan DNS	◎			
Lan MAC	◎			
Lan AMX	◎			
Artnet Setting	◎			
PIP Mode	◎		N/A	
PIP Input	◎		N/A	
PIP Position	◎		N/A	

Notes

Appendix E: glossary of terms

Notes

1

1080p
An HDTV resolution which corresponds to 1920 x 1080 pixels (a widescreen aspect ratio of 16:9).

3

3D active glasses
Wireless battery-powered glasses with LCD shutters. Synchronization information is communicated to the glasses by means of an infrared (IR) or radio frequency (RF) emitter which is connected to the Sync Out terminal on the projector. IR or RF pulses are transmitted by the emitter to signal when the left eye and right eye images are being displayed. The glasses incorporate a sensor which detects the emitter's signal and synchronises the left and right eye shutters with the projected image.

3D passive glasses
Passive glasses do not require a power source to work. Light with left-hand polarisation can pass through the left lens and light with righth and polarisation can pass through the right-hand lens. These glasses are used in conjunction with another device which polarizes the image, such as a ZScreen.

A

Adjust lines
A pattern applied to the image where its edge is to be blended with another image. Adjust lines are used to position the projectors in the array during the edge blend process.

Anamorphic lens
A special lens which, when used with the TheaterScope aspect ratio, allows watching 2.35:1 content packed in a 16:9 source.

Aperture
The opening of the lens that determines the angle through which light travels to come into focus.

Aspect ratio
The proportional relationship between the width and the height of the projected image. It is represented by two numbers separated by a colon, indicating the ratio of image width and height respectively: for example, 16:9 or 2.35:1. Not to be confused with resolution.

B

Blanking (projection)
The ability to intentionally turn off, that is, set to black, areas around the edges of the projected image. It is sometimes referred to as “curtains” since it can be used to blank an area of image that literally falls on the curtains at the side of the screen in a movie theater. Usually no image resizing or geometric correction takes place and the “blanked” part of the image is lost. Not to be confused with horizontal and vertical blanking (video signal).

Blanking (video signal)
The section of the video signal where there is no active video data. Not to be confused with blanking (projection).

Blend region
The area of the image that is to overlap with another image in an edge blend setup. Sometimes called overlapping region.

Brightness (electronic control)
A control which adds a fixed intensity value to every pixel in the display, moving the entire range of displayed intensities up or down, and is used to set the black point in the image (see Contrast). In Component Video signals, brightness is the same as luminance.

Brightness (optical)
Describes how ‘bright’ an image that is projected onto a screen appears to an observer.

C

C
Also known as ‘C’, this is the component, or pair of components, of a Component Video signal which describes color difference information.

Chrominance
Also known as ‘C’, this is the component, or pair of components, of a Component Video signal which describes color difference information.

Color difference
In Component Video signals, the difference between specified colors and the luminance component. Color difference is zero for monochrome images.

Color gamut
The spectrum of color available to be displayed.

Color temperature
The position along the black body curve on the chromaticity diagram, normally quoted in Kelvin. It takes into account the preset values for color balance in the service set-up to take up the variations in the prism. The projector allows you to adjust this temperature (i.e. adjust the picture color temperature).

Component video
A three-wire or four-wire video interface that carries the signal split into its basic RGB components or luminance (brightness) and two-colordifference signals (YUV) and synchronization signals.

Notes

Contrast (electronic control)
The adjustment of the white point of the image without affecting the black point. This increases the intensity range of the displayed image.

Contrast (optical)
The intensity difference between the darkest and lightest areas of the screen.

Cr, Cb
Color difference signals used with 'Y' for digital Component Video inputs. They provide information about the signal color. Not to be confused with Pr, Pb.

Crop
Remove part of the projected image. Alternatively, fit an image into a frame with a different aspect ratio by removing part of the image. The image is resized so that either its length or its width equals the length or width of the frame, while the other dimension has moved outside the frame; the excess area is then cut out.

D

Dark time
The time inserted between frames when using 3D active glasses, to avoid ghosting caused by switching time between left and right eye.

DDC (Display Data Channel)
A communications link between the source and projector. DDC is used on the HDMI, DVI and VGA inputs. The link is used by the source to read the EDID stored in the projector.

Deinterlacing
The process of converting interlaced video signals into progressive ones.

DHCP (Dynamic Host Configuration Protocol)
A network protocol that is used to configure network devices so that they can communicate on an IP network, for example by allocating an IP address.

DMD™ (Digital Micromirror Device™)
The optical tool that transforms the electronic signal from the input source into an optical image projected on the screen. The DMD™ of a projector has a fixed resolution, which affects the aspect ratio of the projected image. A Digital Micromirror Device™ (DMD™) consists of moving microscopic mirrors. Each mirror, which acts as a pixel, is suspended between two posts by a thin torsion hinge. It can be tilted to produce either a bright or dark pixel.

E

Edge blend
A method of creating a combined image by blending the adjoining edges of two or more individual images.

Notes

Edge tear
An artifact observed in interlaced video where the screen appears to be split horizontally. Edge tears appear when the video feed is out of sync with the refresh rate of the display device.

EDID (Extended Display Identification Data)
Information stored in the projector that can be read by the source. EDID is used on the HDMI, DVI and VGA inputs, allowing the source to automatically configure to the optimum display settings.

EDTV (Enhanced Definition Television)
A progressive digital television system with a lower resolution than HDTV.

F

Field
In interlaced video, a part of the image frame that is scanned separately. A field is a collection of either all the odd lines or all the even lines within the frame.

Frame
One of the many still images displayed in a sequence to create a moving picture. A frame is made of horizontal lines of pixels. For example, a 1920x1080 frame consists of 1080 lines, each containing 1920 pixels. In analog video frames are scanned one at a time (progressive scanning) or split into fields for each field to be scanned separately (interlaced video).

Frame rate
The number of frames shown per second (fps). In TV and video, a frame rate is the rate at which the display device scans the screen to “draw” the frame.

Frame rate multiplication
To stop low frame rate 3D images from flickering, frame rate multiplication can be used, which increases the displayed frame rate by two or three times

G

Gamma
A nonlinear operation used to code and decode luminance. It originates from the Cathode Ray Tube technology used in legacy television sets.

Ghosting
An artifact in 3D image viewing. Ghosting occurs when an image intended for one eye is partially seen by the other eye. Ghosting can be removed by optimizing the dark time and sync delay.

Notes

H

HDCP (High-bandwidth Digital Content Protection)
An encryption scheme used to protect video content.

HDTV (High Definition Television)
A television system with a higher resolution than SDTV and EDTV. It can be transmitted in various formats, notably 1080p and 720p.

Hertz (Hz)
Cycles per second.

Horizontal Scan Rate
The rate at which the lines of the incoming signal are refreshed. The rate is set by the horizontal synchronization from the source and measured in Hertz.

Hs + Vs
Horizontal and vertical synchronization.

Hue
The graduation (red/green balance) of color (applicable to NTSC).

I

Interlacing
A method of updating the image. The screen is divided in two fields, one containing every odd horizontal line, the other one containing the even lines. The fields are then alternately updated. In analog TV interlacing was commonly used as a way of doubling the refresh rate without consuming extra bandwidth.

Interleaving
The alternation between left and right eye images when displaying 3D.

L

LED (Light Emitting Diode)
An electronic component that emits light.

Letterboxing
Black margins at the top and bottom of the image. Letterboxing appears when a wider image is packed into a narrower frame without changing the original aspect ratio.

Lumen
A photometric unit of radiant power. For projectors, it is normally used to specify the total amount of emitted visible light.

Notes

Luminance
Also known as 'Y', this is the part of a Component Video signal which affects the brightness, i.e. the black and white part.

N

Noise
Electrical interference displayed on the screen.

NTSC (National Television Standards Committee)
The United States standard for television - 525 lines transmitted at 60 interlaced fields per second

O

OSD (on-screen display)
The projector menus allowing you to adjust various settings.

Overlapping region
The area of the image that is to overlap with another image in an edge blend setup. Sometimes called overlapping region.

P

PAL (Phase Alternate Line)
The television system used in the UK, Australia and other countries - 625 lines transmitted at 50 interlaced fields per second.

Pillarboxing
Black margins at the left and right of the image. Pillarboxing appears when a narrower image is packed into a wider frame without changing the aspect ratio.

Pixel
Short for Picture Element. The most basic unit of an image. Pixels are arranged in lines and columns. Each pixel corresponds to a micromirror within the DMD™; resolutions reflect the number of pixels per line by the number of lines. For example, a 1080p projector contains 1080 lines, each consisting of 1920 pixels.

Pond of mirrors
Area around the periphery of the DMD™ containing inactive mirrors. The pond of mirrors may cause artifacts, for example during the edge blending process.

Pr, Pb
Color difference signals used with 'Y' for analog Component Video inputs. They provide information about the signal color. Not to be confused with Cr, Cb.

Notes

Primary colors
Three colors any two of which cannot be mixed to produce the third. In additive color television systems the primary colors are red, green and blue.

Progressive scanning
A method of updating the image in which the lines of each frame are drawn in a sequence, without interlacing.

Pulldown
The process of converting a 24 fps film footage to a video frame rate (25 fps for PAL/SECAM, 30 fps for NTSC) by adding extra frames. DP projectors automatically carry out reverse pulldown whenever possible.

R

Resolution
The number of pixels in an image, usually represented by the number of pixels per line and the number of lines (for example, 1920 x 1200).

RGB (Red, Green and Blue)
An uncompressed Component Video standard.

S

Saturation
The amount of color in an image.

Scope
An aspect ratio of 2.35:1.

SDTV (Standard Definition Television)
An interlaced television system with a lower resolution than HDTV. For PAL and SECAM signals, the resolution is 576i; for NTSC it is 480i.

SECAM (Sequential Color with Memory)
The television system used in France, Russia and some other countries - 625 lines transmitted at 50 interlaced fields per second.

Smooth picture
A feature that can display a higher resolution source than the native resolution of the projector without loosing any pixel data.

SX+
A display resolution of 1400 x 1050 pixels with a 4:3 screen aspect ratio. (Shortened from SXGA+, stands for Super Extended Graphics Array Plus.)

Synchronization
A timing signal used to coordinate an action.

Notes

T

Test pattern
A still image specially prepared for testing a projection system. It may contain various combinations of colors, lines and geometric shapes.

TheaterScope
An aspect ratio used in conjunction with a special anamorphic lens to display 2.35:1 images packed into a 16:9 frame.

Throw distance
The distance between the screen and the projector.

Throw ratio
The ratio of the throw distance to the screen width.

TRC (Throw ratio correction)
A special number used in calculating throw distances and throw ratios when the image does not fill the width of the DMD™. TRC is the ratio of the DMD™ aspect ratio to the image source aspect ratio: TRC = DMD™ aspect ratio / Source aspect ratio TRC is only used in calculations if it is greater than 1.

U

UXGA
A display resolution of 1600 x 1200 pixels with a 4:3 screen aspect ratio. (Stands for Ultra Extended Graphics Array.)

V

Vertical Scan Rate
The rate at which the frames of the incoming signal are refreshed. The rate is set by the vertical synchronization from the source and measured in Hertz.

Vignetting
Optical cropping of the image caused by the components in the projection lens. This can happen if too much offset is applied when positioning the image using the lens mount.

Vista
An aspect ratio of 1.66:1.

W

WUXGA
A display resolution of 1920 x 1200 pixels with a 16:10 screen aspect ratio. (Stands for Widescreen Ultra Extended Graphics Array.)

Notes

Y

Y

This is the luminance input (brightness) from a Component Video signal.

YUV

Color difference signals used with 'Y' for analog Component Video inputs. They provide information about the signal color. Not to be confused with Cr, Cb.

Z

ZScreen

A special kind of light modulator which polarizes the projected image for 3D viewing. It normally requires that images are projected onto a silver screen. The ZScreen is placed between the projector lens and screen. It changes the polarization of the projected light and switches between left- and right-handed circularly polarized light at the field rate.

Notes

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