



A Delta Associate Company

Titan Laser 4K-UHD

High Brightness Digital Video Projector

INSTALLATION & QUICK START GUIDE

CONNECTION GUIDE

OPERATING GUIDE

REFERENCE GUIDE



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. Please visit the Digital Projection website for all latest documents.

Legal notice

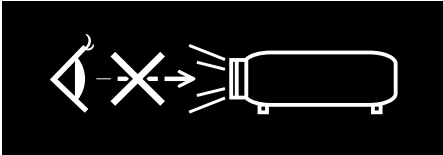
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Notes

Laser information

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

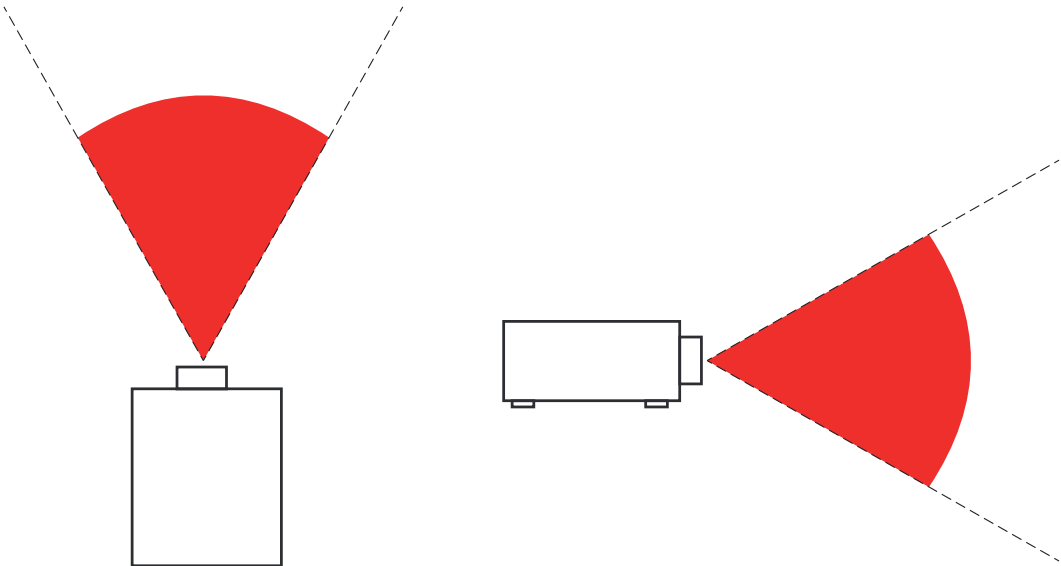
Optical radiation

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) and is 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

This manual describes both the Titan Laser 33000 4K-UHD Series and Titan Laser 26000 4K-UHD.

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

- 4K-UHD projector.
- Displays 4K-UHD with smooth picture processing.
- Displays WUXGA with smooth picture off.
- 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:

Notes

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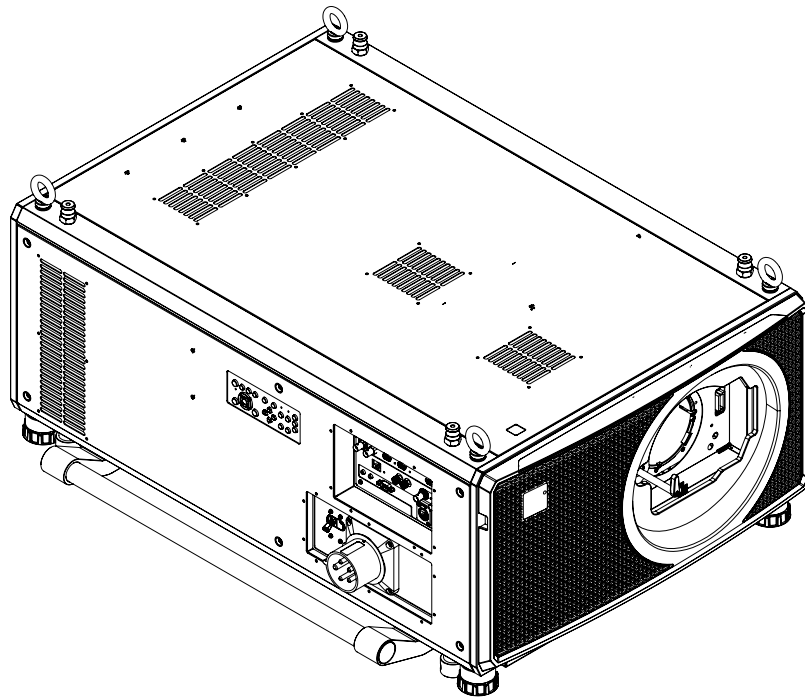
Titan Laser4K-UHD

High Brightness Digital Video Projector

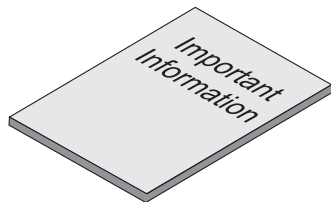
INSTALLATION & QUICK START GUIDE



What's in the box?



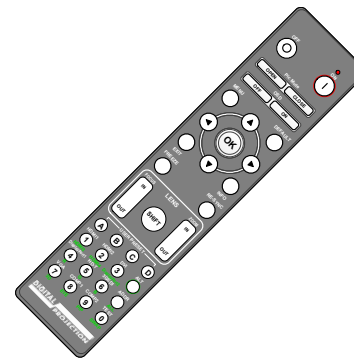
Projector



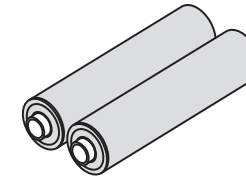
Important Information Book



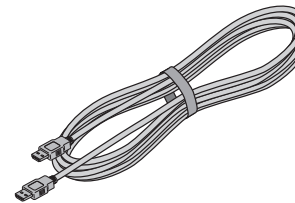
Lens Stabilizing Bracket



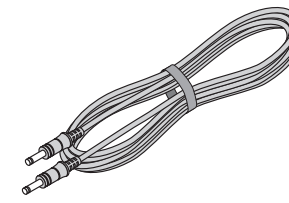
Remote Control



Batteries



HDMI Cable



Remote Control Cable





Power Cable, UK / RoW





Power Cable, USA only


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 Super Wide fixed throw and 1.12 : 1 Wide Fixed throw lenses with the 4K-UHD projectors**

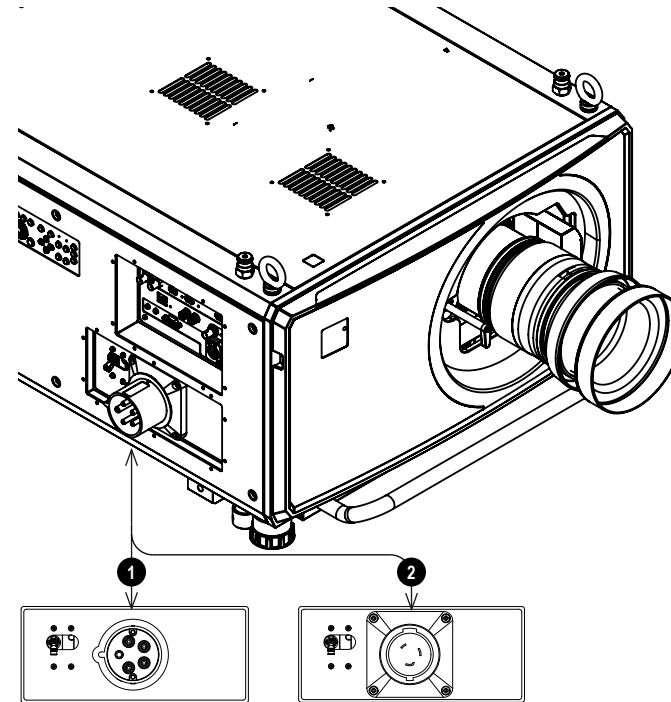
Connecting the power supply

Rest of the World:

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

USA Only

1. Firmly push the mains connector into the socket **2**
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.



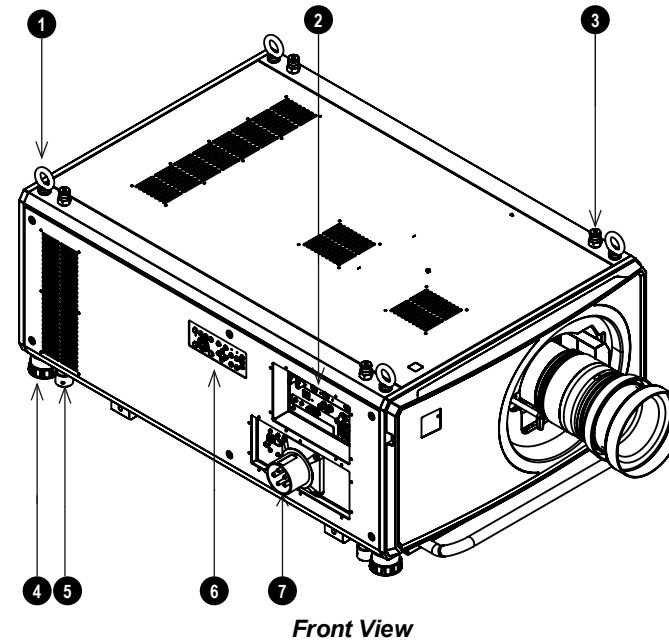
The USA model can operate at 110V or 200V. Voltage selection is automatic, but the projector must be powered off before switching power outlets.



Light output power is reduced to approx 30% when using the USA model and operating on 110V.

Projector overview

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



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

9. HOTKEYS

User selectable functions.

Pre-set functions:

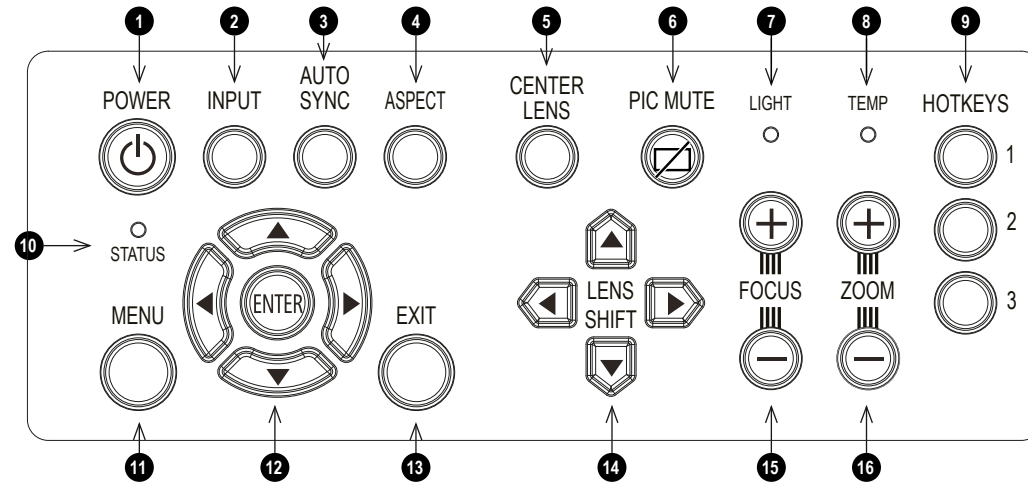
HOTKEY 1 Information

HOTKEY 2 Test Pattern

HOTKEY 3 Lens Memory Load

Additional options: Picture Mode, Ambient Brightness Correction, Freeze, PIP Swap.

HOTKEY 3 is used when a lens adapter is installed. Whilst in standby mode, press and hold HOTKEY 3 for five seconds to run center lens before installing the lens.



Control Panel

Notes



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

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 move the lens in the specified direction.

15. FOCUS

Plus and minus buttons move the focus in and out.

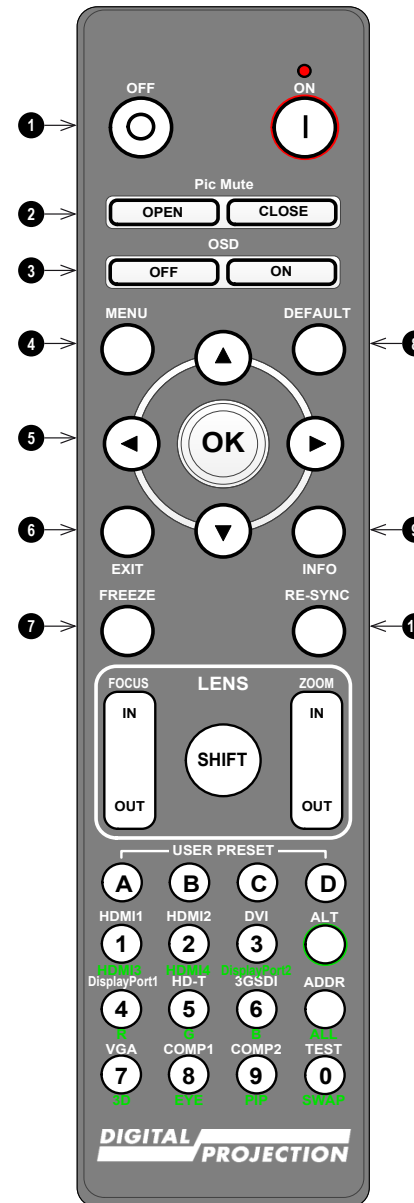
16. ZOOM

Plus and minus buttons 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 83

 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**

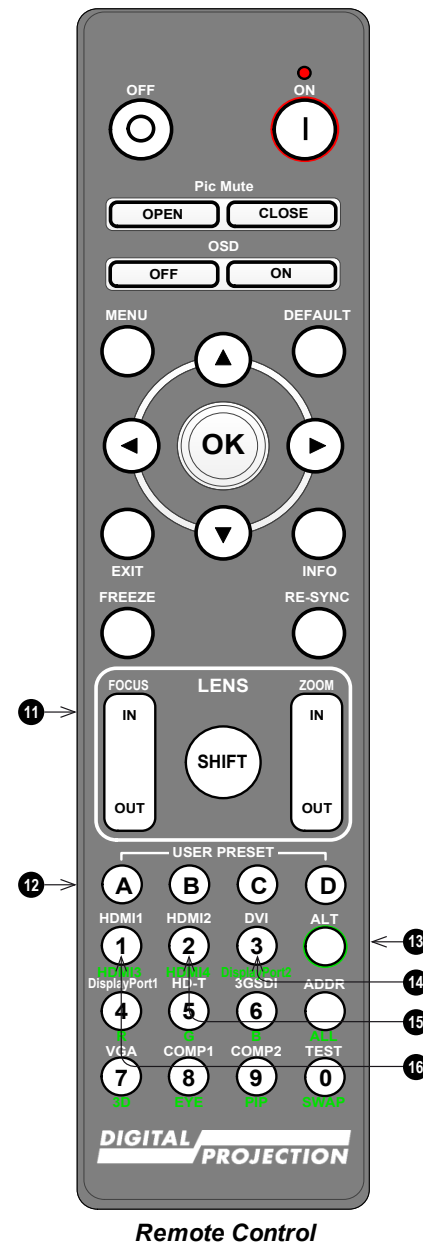
There is no DVI input on this projector.
Use with **ALT** to select the DisplayPort 2 input.

15. **HDMI 2 / HDMI 4 / numeric input 2**

Select the HDMI 2 input.
Use with **ALT** to select the HDMI 4 input. There is no HDMI 4 input on this projector

16. **HDMI 1 / HDMI 3 / numeric input 1**

Select the HDMI 1 input.
Use with **ALT** to select the HDMI 3 input. There is no HDMI input on this projector



Remote Control

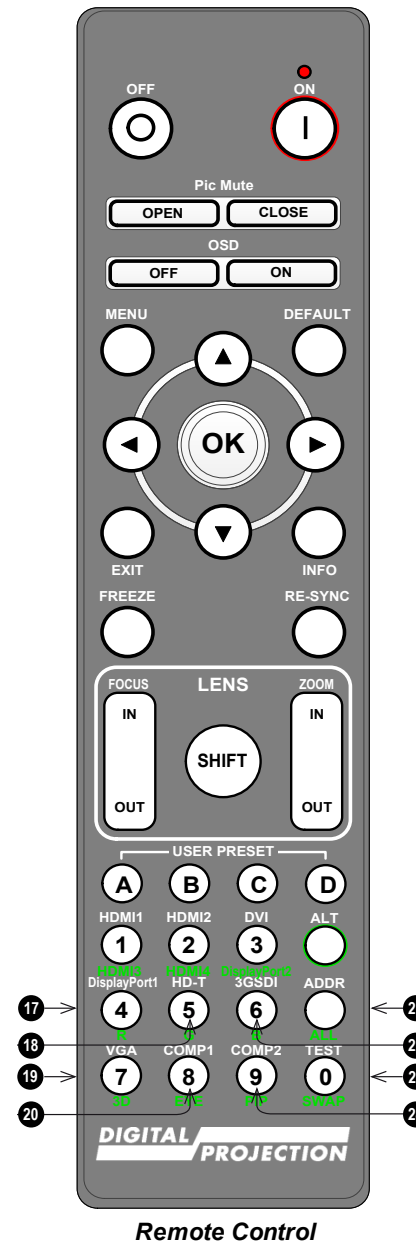
Notes

If focus cannot be achieved using the focus in / out feature, press Shift & 7 to adjust for far focus, or Shift & 8 to adjust for near focus.




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. **TEST / SWAP / numeric input 0**
Show a test pattern. Press again to show the next test pattern: *White, Black, Red, Green, Blue, Checkerboard, Crosshatch, V Burst, H Burst, Color Bar, Off..*
When **PIP** mode is on, use this button with **ALT** to swap the main and sub images.
24. **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.



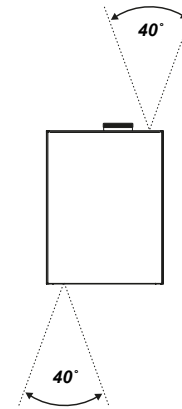
Notes

-  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.



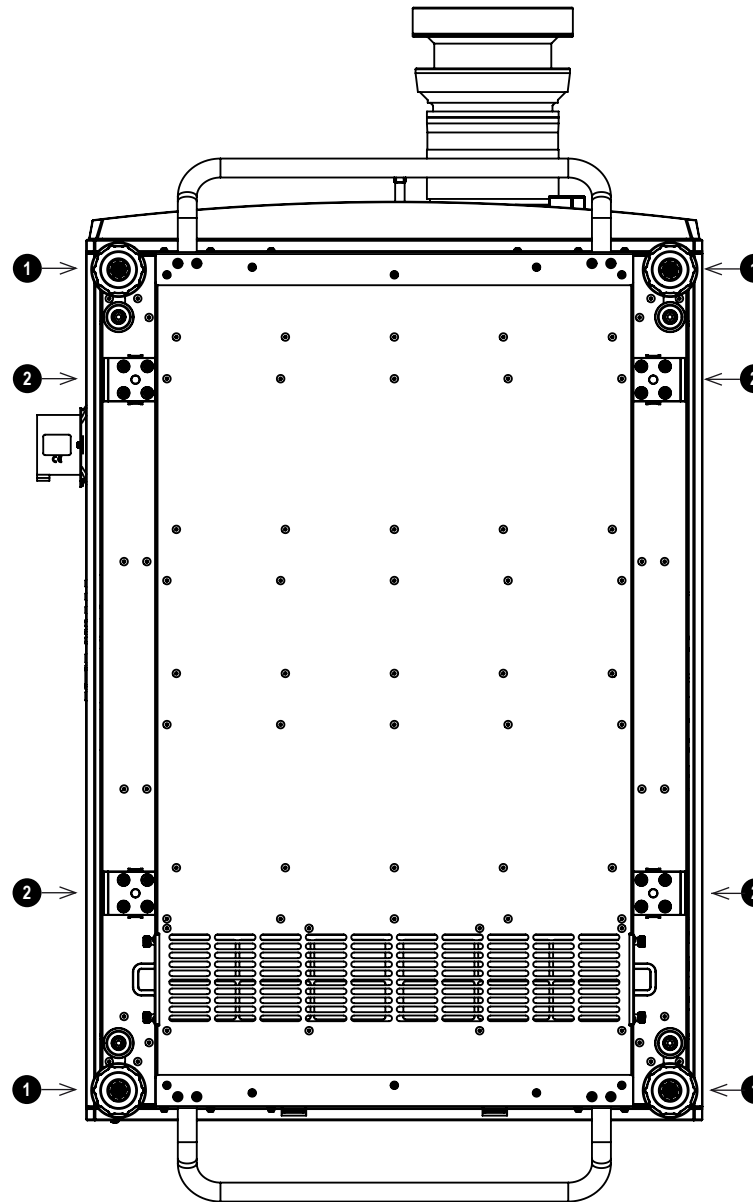
Notes

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.

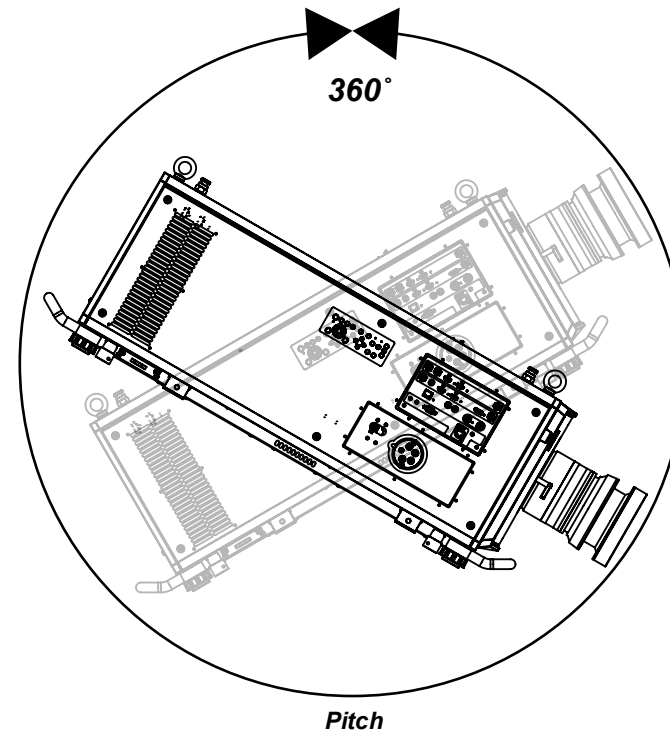
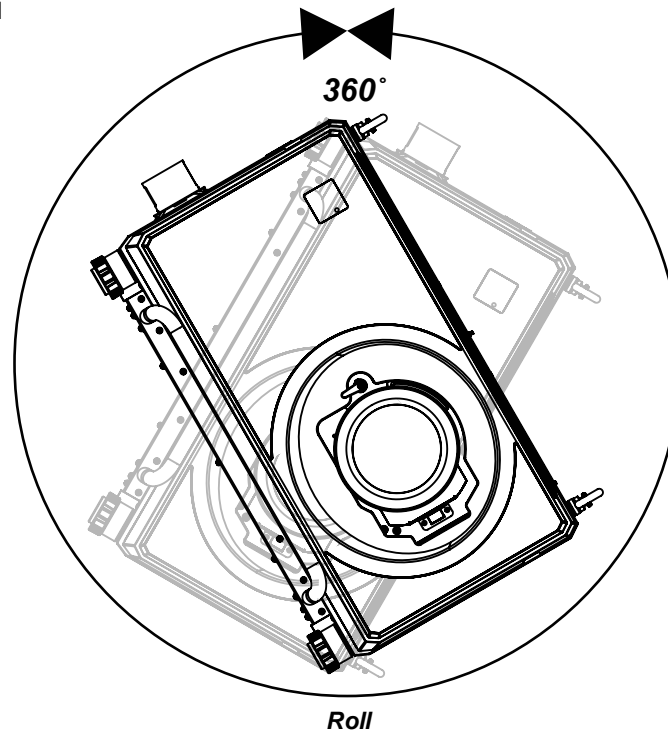


Do not use the threaded holes for the adjustable feet to hang or mount the projector.

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.



Notes

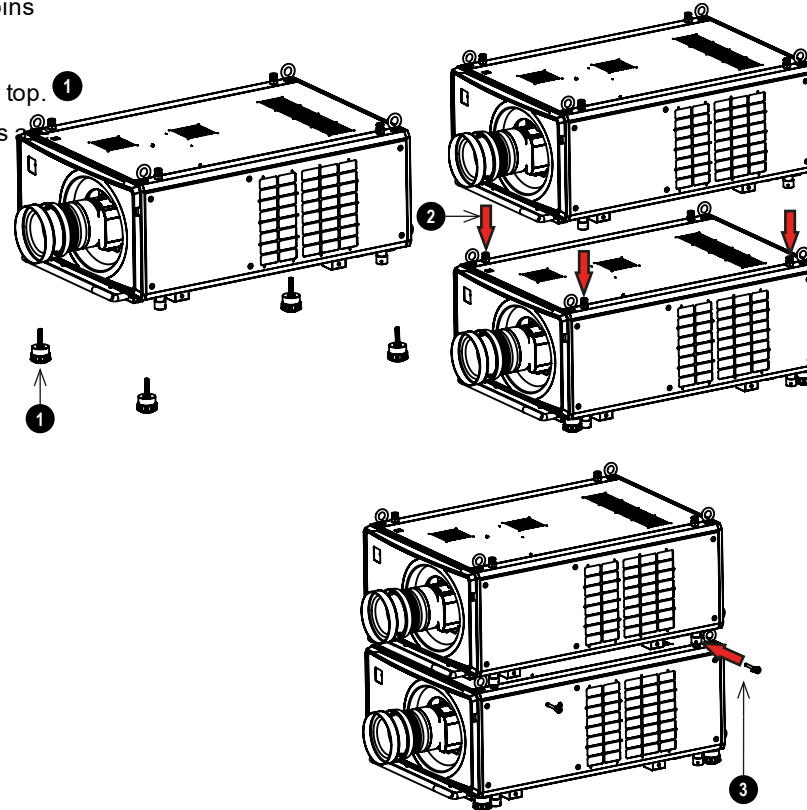
Stacking and rigging

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.
2. Mount the projector on top of the other projector. Ensure that all four cups placed over the pins on the bottom projector.
3. Push the locking pins into place on each cup and pin.



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.

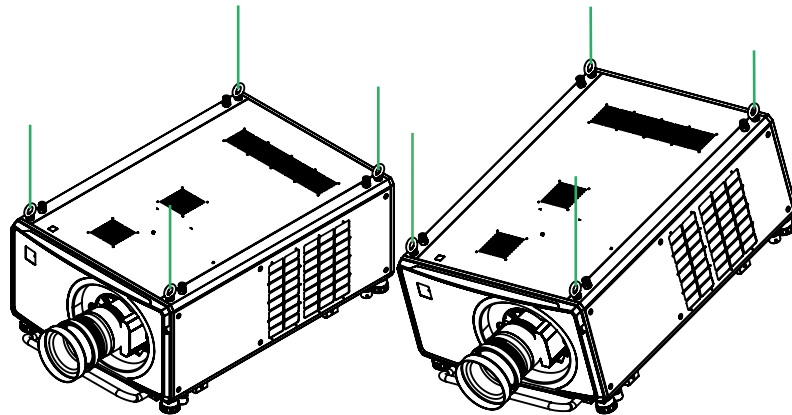
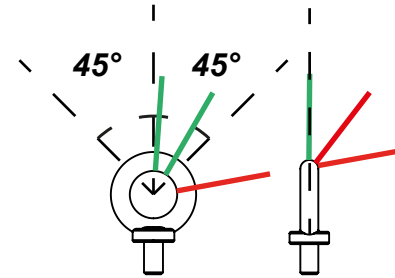
Using the eye bolts

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

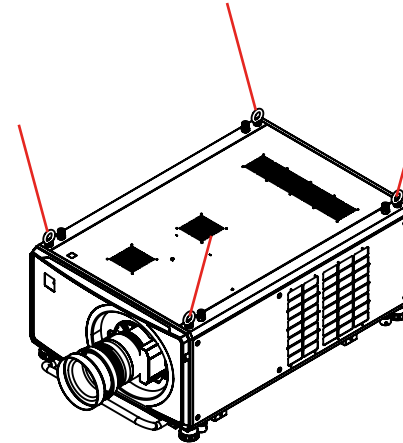
Point-to-point connections

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

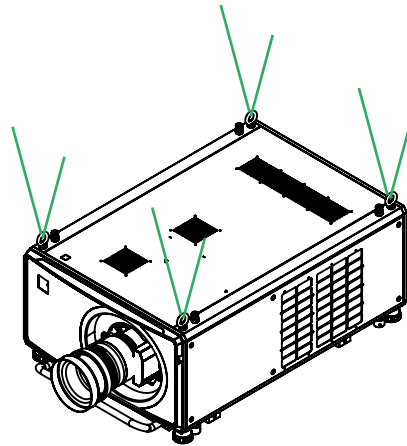
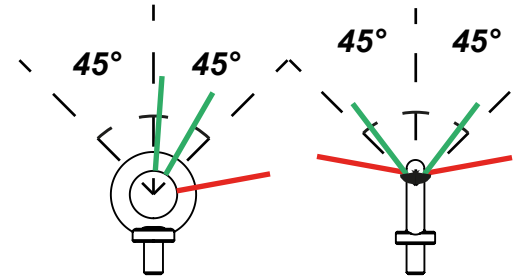
Notes

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

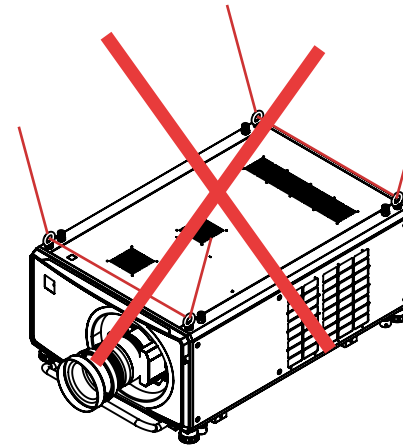
Threaded suspension cables

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



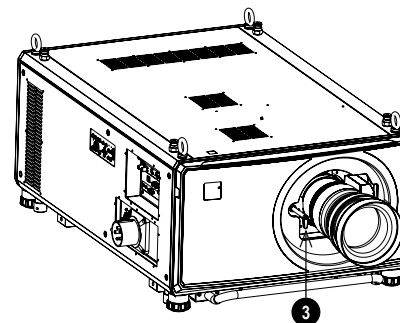
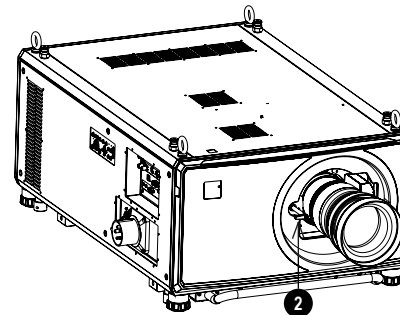
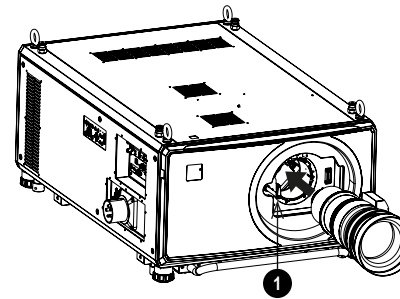
Example of an incorrect configuration

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. **1**
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. **2**
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. **3**



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 Super Wide 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.



Avoid touching the surface of the lens as this may result in image impairment.



The lens is shipped separately.



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



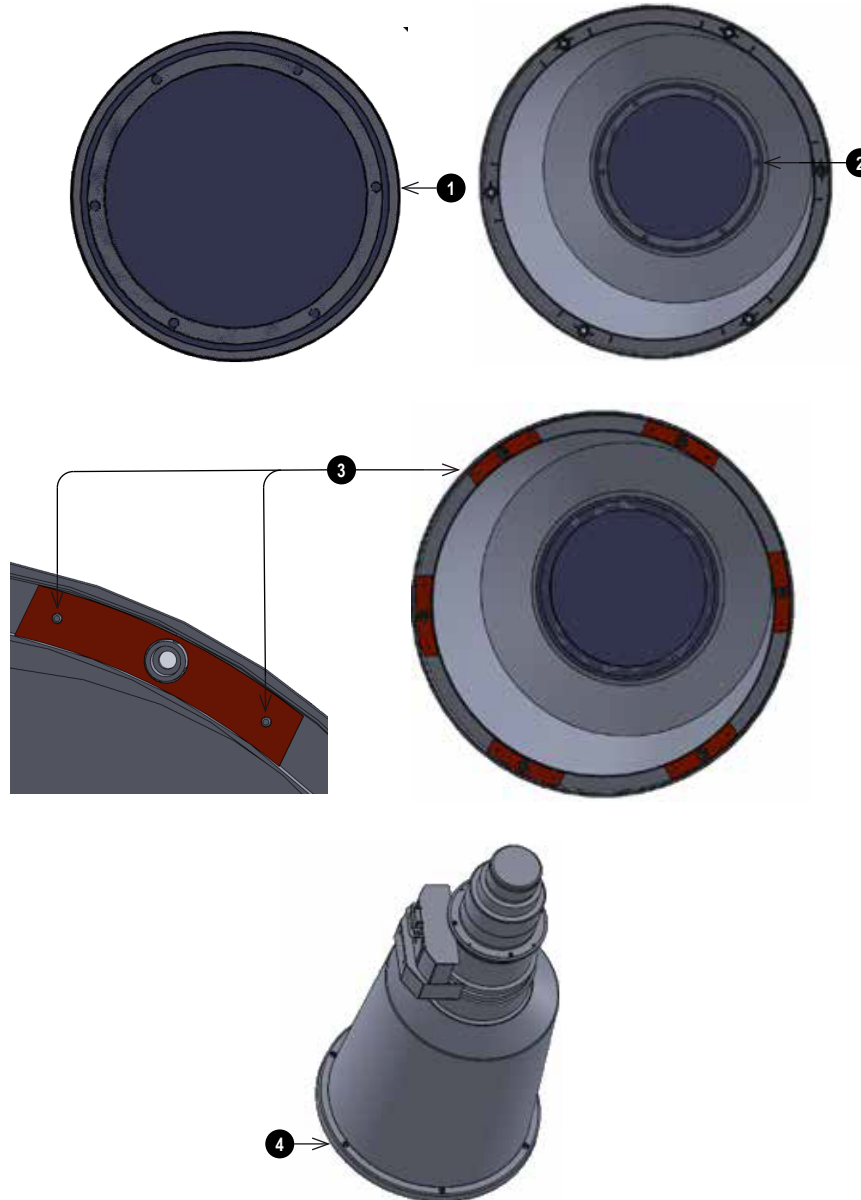
An adapter is available for certain third party lenses. Please see your local dealer for further information



HOTKEY 3 is used when a lens adapter is installed. Whilst in standby mode, press and hold HOTKEY 3 for five seconds to run center lens before installing the lens.

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. Place 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

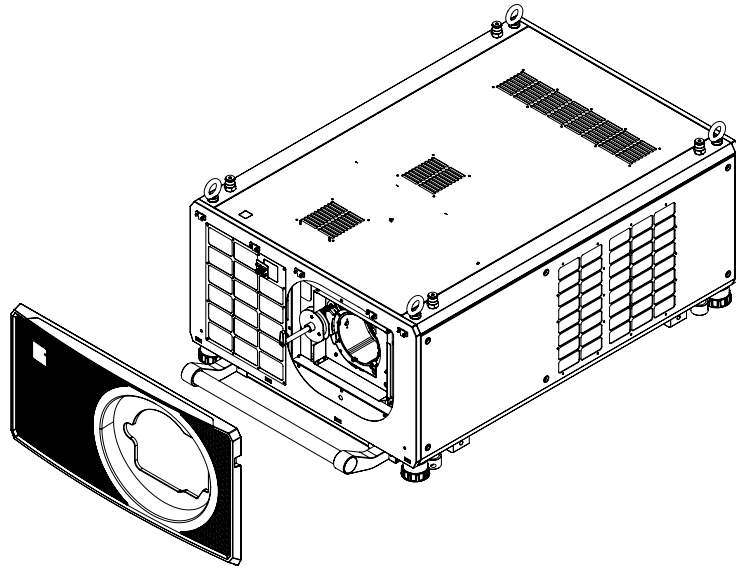


Notes

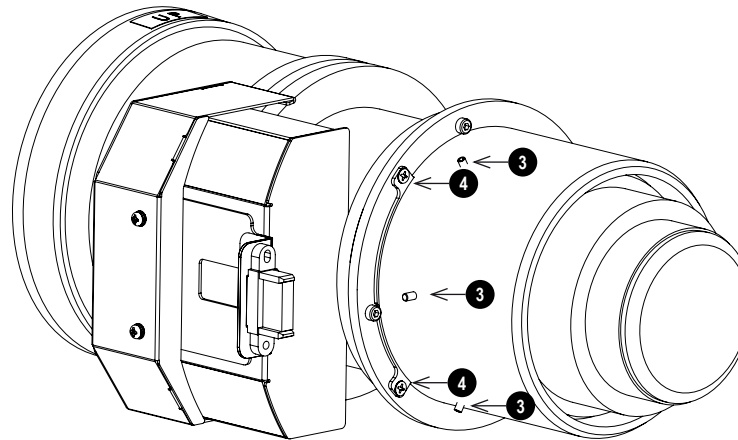
FDA regulations requires that a lens hood is permanently fitted when using the 4.16 - 6.96:1 Long Zoom1 lens with the Titan Laser range of projectors in the United States of America. Fitting can be provided by your reseller or System Integrator.

Fitting a lens stabilizing bracket


1. Remove the cover from the front of the projector
2. Remove the lens mount and lens




3. Remove the three M3 set screws from the lens collar
4. Remove the two M3 screws from the fixed lens bracket
5. Remove the lens collar from the lens mount

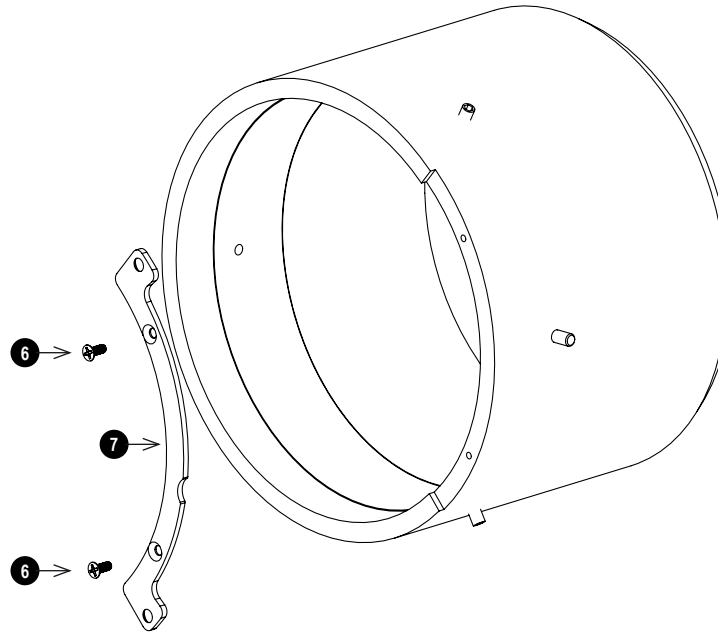


Notes

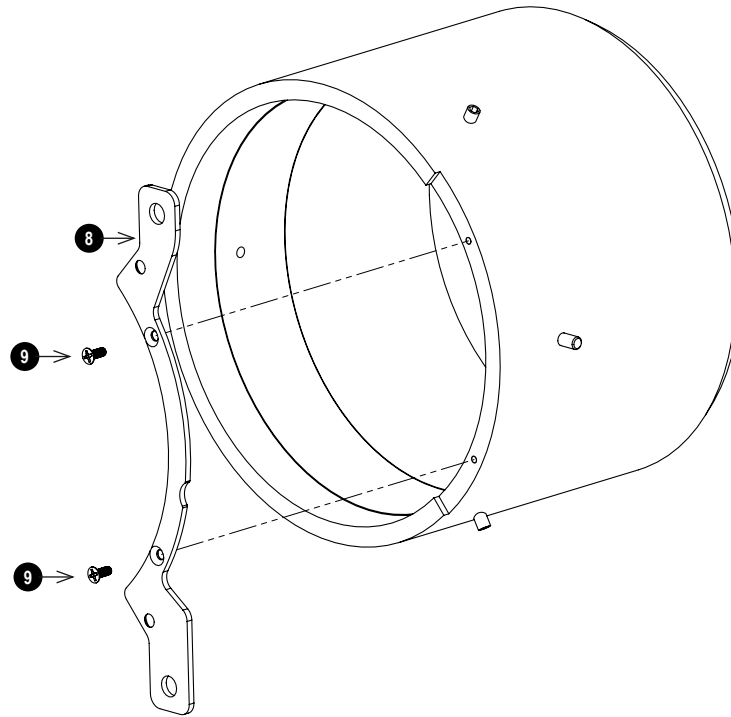
 In some applications and projector orientations, it may be necessary to fit the stabilizing bracket to the lens mount.

 The lens stabilizing bracket can only be fitted to models built from April 2019.

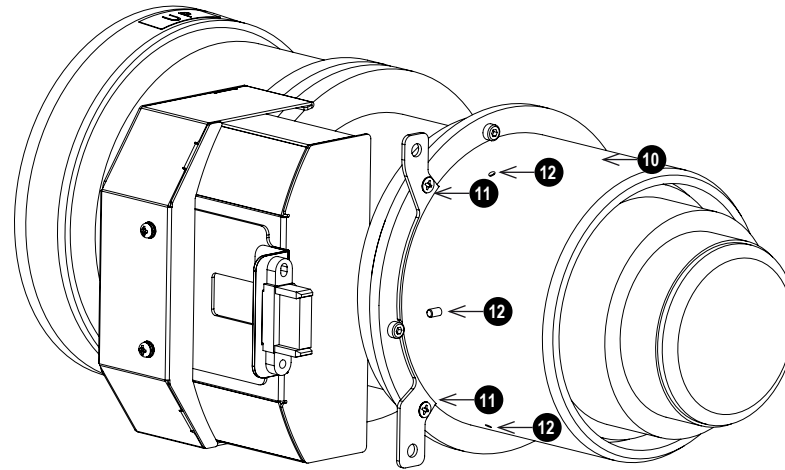
6. Remove the two M2 screws from the fixed lens bracket
7. Remove the fixed lens bracket

**Notes**

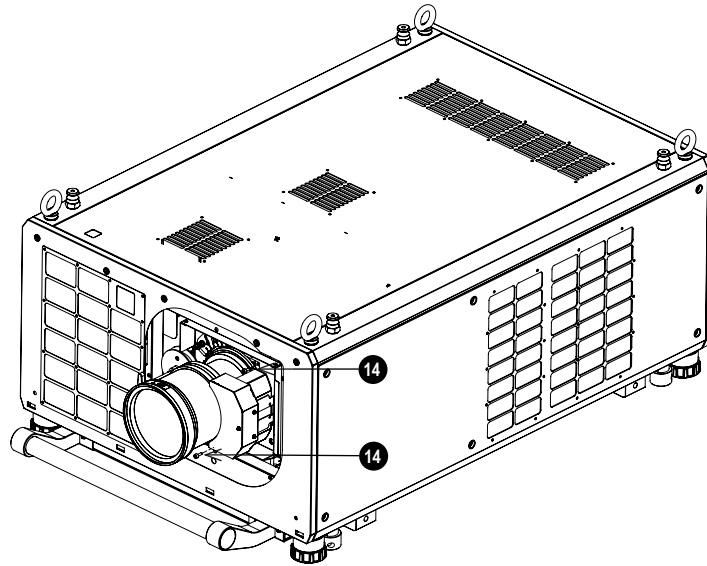
8. Place the stabilizing bracket on to the lens collar
9. Screw in the two M2 screws to fix the stabilizing bracket to the lens collar



10. Place the lens collar on to the lens
11. Screw in the two M3 screws to fix the lens collar to the lens
12. Screw in the three M3 set screws to the lens collar

**Notes**

13. Place the lens into the projector
14. Screw the two fixing screws into the lens stabilizing bracket
15. Place the cover over the front of the projector

**Notes**

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 projector 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 44 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** adjustments 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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A Delta Associate Company

Titan Laser4K-UHD

High Brightness Digital Video Projector

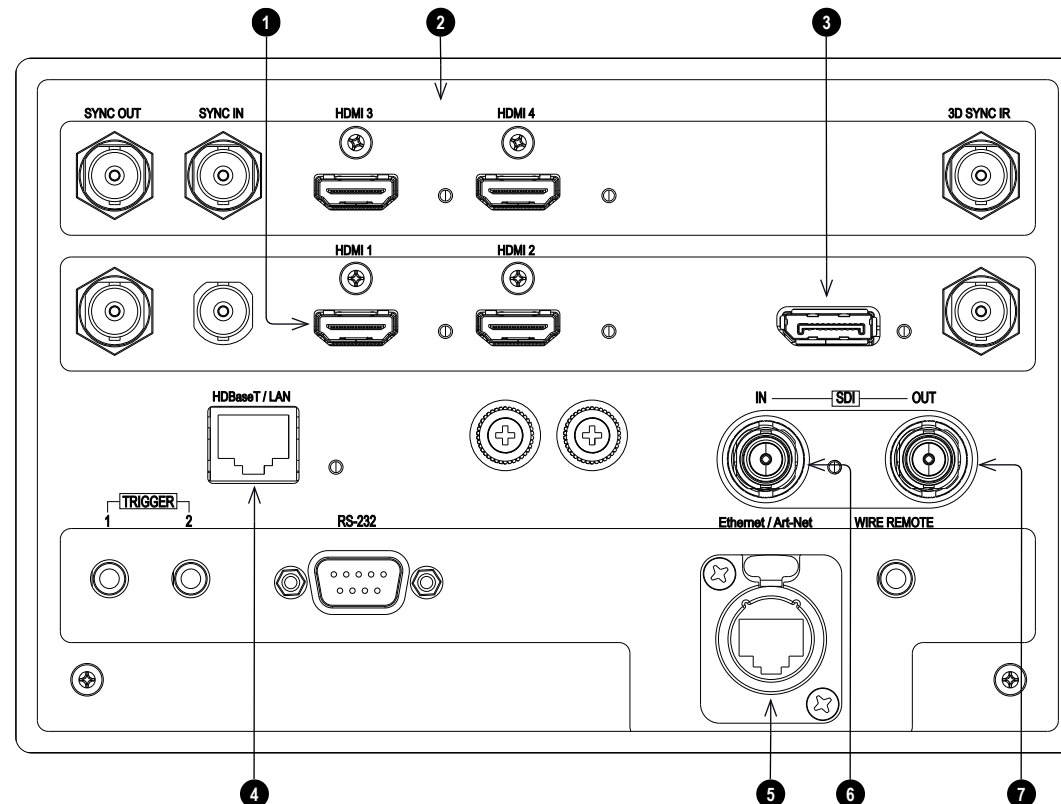
CONNECTION GUIDE



Signal inputs

Digital inputs and outputs

1. **HDMI 1 / HDMI 2**
HDMI 2.0 inputs supporting HDCP 2.2. Connect an **HDMI** cable to the connector.
2. **HDMI 3 / HDMI 4**
HDMI 1.4b inputs supporting **Frame Sequential** and **Dual Pipe 3D** with HDCP 1.4. Also supports the domestic Blu-Ray formats. See supported signal input modes on page 121. Connect an **HDMI** cable to the connector.
3. **DisplayPort**
DisplayPort 1.2 input. Connect a DisplayPort cable to the connector. Supports sources up to 4K-UHD resolution at 60 Hz and WQXGA at 120Hz.
4. **HDBaseT/LAN**
Receives digital signal from HDBaseT-compliant devices. Connect an HDBaseT cable.
5. **Ethernet/ArtNet**
Provides LAN connectivity via an ethernet or ArtNet cable.
6. **3G-SDI in**
Connect a 3G-SDI cable to distribute the 3G-SDI signal to another projector.
7. **3G-SDI out**
Connect a 3G-SDI cable to distribute the 3G-SDI signal to another projector.



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.

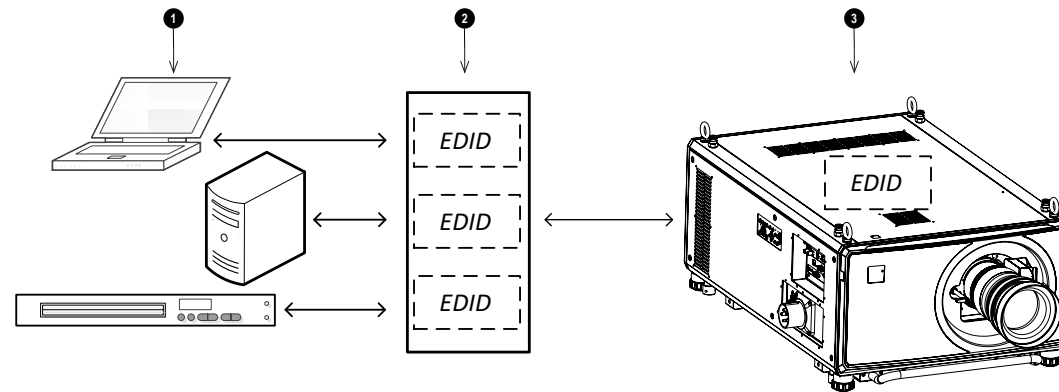
Otherwise refer to the documentation supplied with the source to manually set the resolution to the DMD™ resolution of the projector or the nearest suitable setting. Switch off the source, connect to the projector, then switch the source back on again.

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.

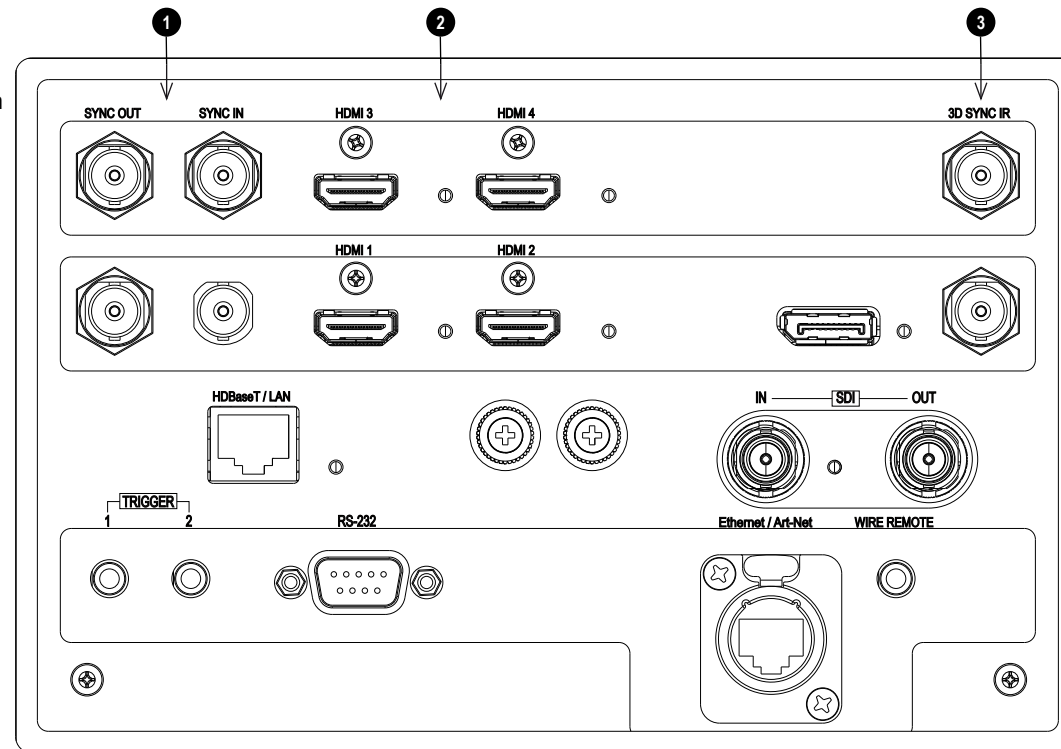
Sync Out is the 3D sync output signal. Enables 3D from multiple projectors.

2. HDMI 3 / HDMI 4

HDMI 1.4b inputs supporting **Frame Sequential** and **Dual Pipe** 3D with HDCP 1.4. Also supports the domestic Blu-Ray formats. See supported signal input modes on page 121. Connect an **HDMI** cable to the connector.

3. 3D Sync IR

Sync output signal. This is affected by settings in the 3D menu such as Dark Time and 3D Sync Offset. Connect this to an IR emitter or ZScreen.



Notes

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**.

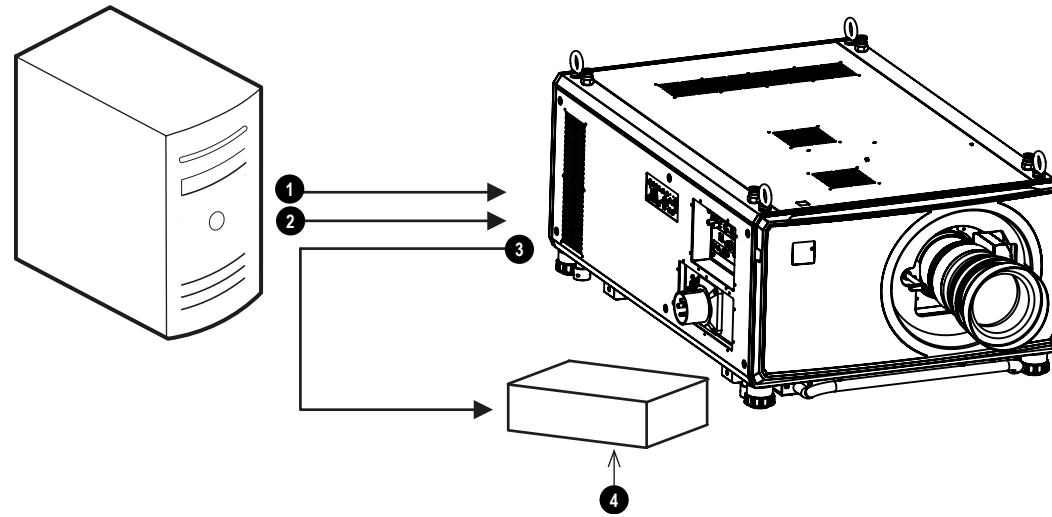
Dual Pipe 1080p and WUXGA 3D sources at up to 100 and 120Hz

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**.

See 3D formats on page 124 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 emitter or Zscreen



Notes

Control connections

1. Trigger 1 & Trigger 2

The Trigger outputs are defined in the **Setup** menu. Each output can be triggered by one of the following conditions:

- **Screen trigger.** A trigger output can be used to control an electrically operated screen. The screen will be automatically deployed when the projector starts up and retracted when the projector shuts down.
- **Aspect ratio trigger.** A trigger output can be used to control screen shuttering for different aspect ratios.
- **RS232 trigger.** A trigger output 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

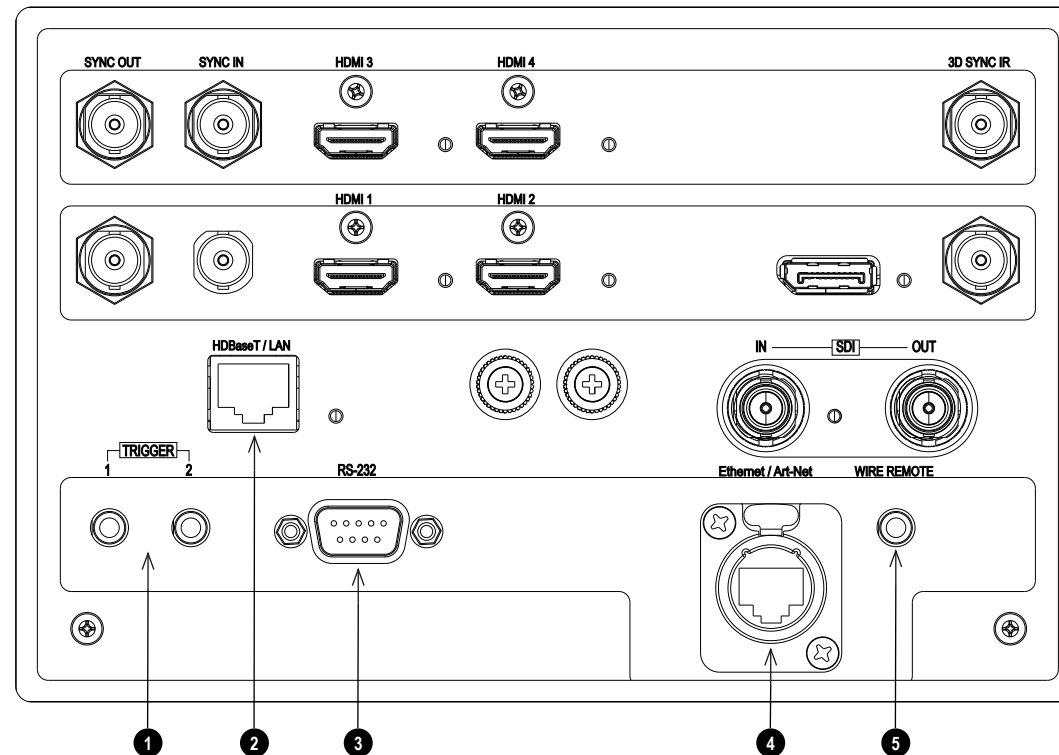
All of the projector's features can be controlled via a serial connection, using commands described in the **Protocol Guide**. Use a straight-through cable to connect directly to a computer.

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.

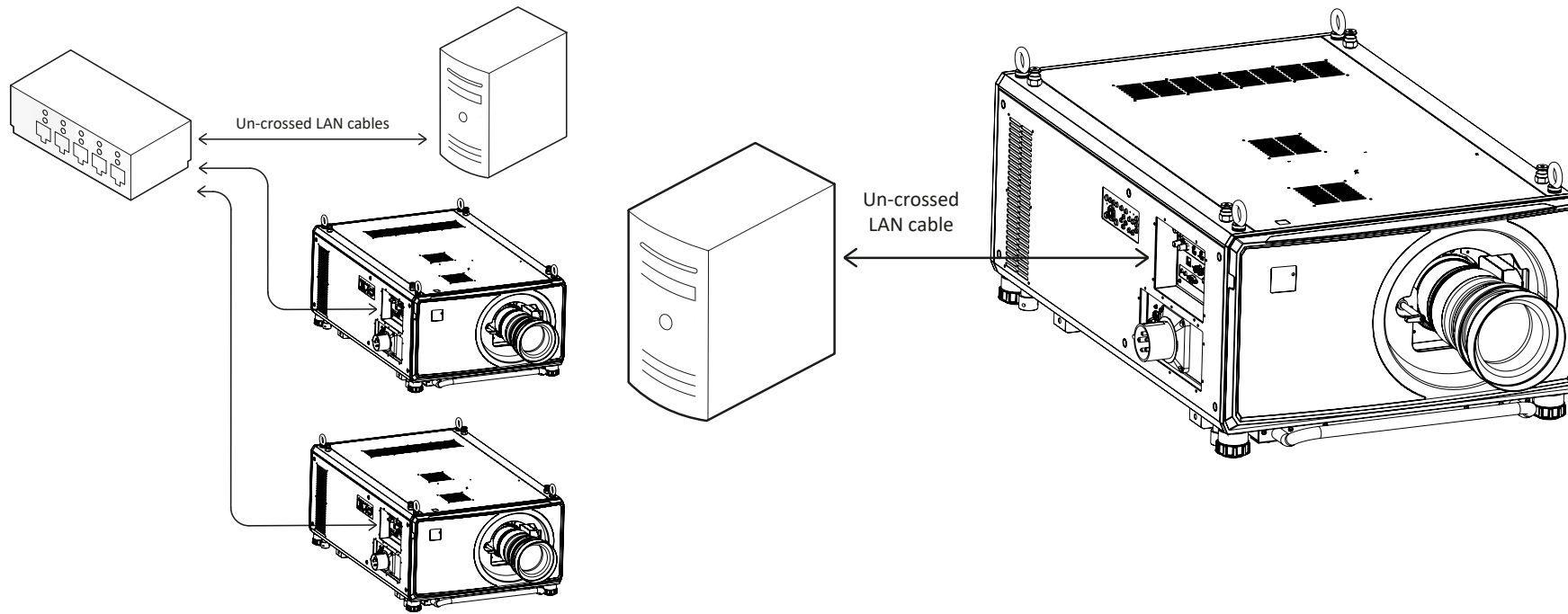
With a LAN connection the projector can serve a web page offering status and projector controls.

***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

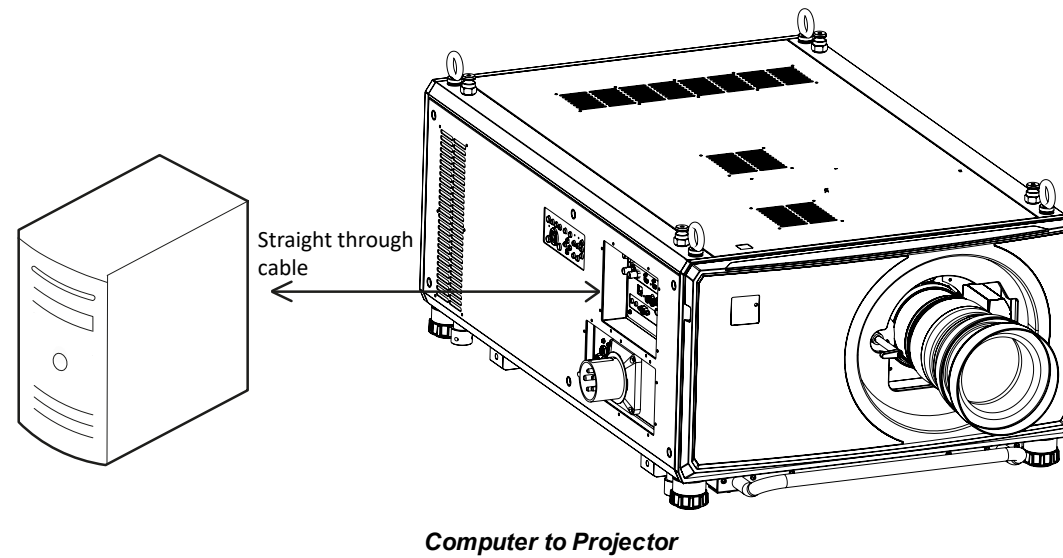
With a LAN connection the projector can serve a web page offering basic projector controls.

***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**.



Notes



The **Protocol Guide** is available separately



A Delta Associate Company

Titan Laser4K-UHD

High Brightness Digital Video Projector

OPERATING GUIDE

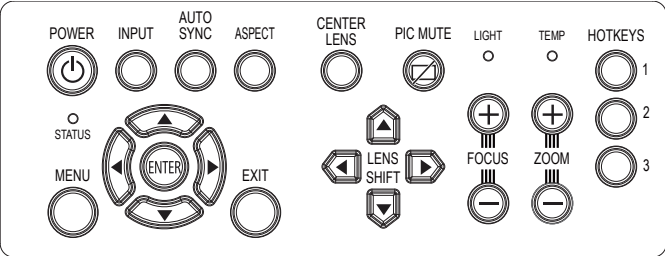


Using the menus

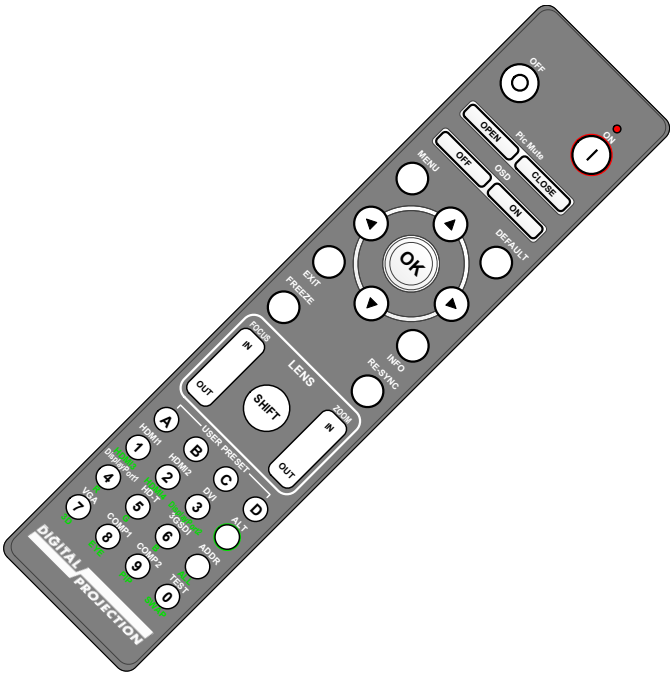
Opening the Menu

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:

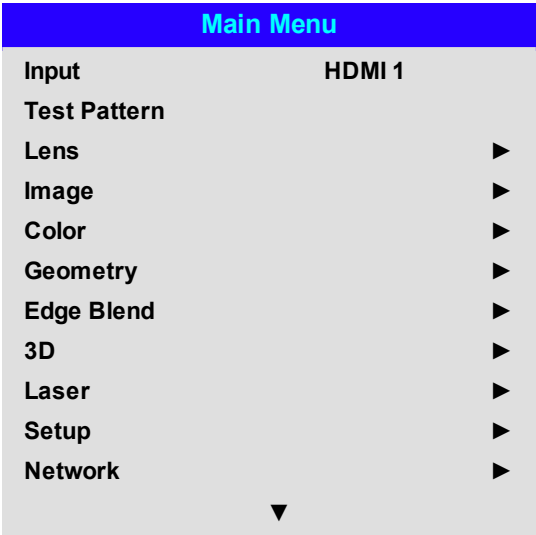
- 1. Press **EXIT**.

To close the OSD:

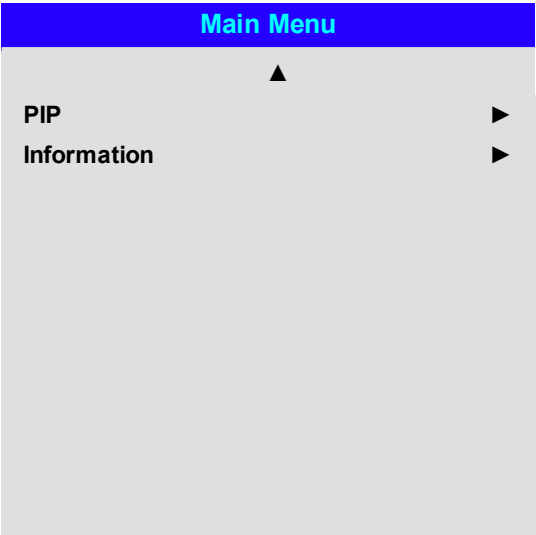
- 1. Press **MENU**.

Or:

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



On Screen Display (OSD): Top Level Menu

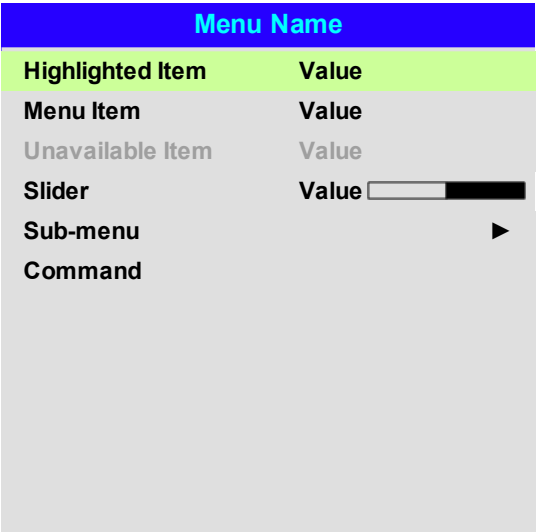


OSD: Top Level Menu Continued


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

 The highlighted item has green background.

Notes

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.

| Menu Name | |
|---------------------|-------|
| Menu Item | Value |
| Highlighted Command | OK |
| | |

Highlighted Command

| Command Name |
|---|
| Warning All [Menu] values will be lost. |
| Press OK to confirm Press Exit to cancel |

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.

Menu Name

Highlighted Item

Current Value

Menu Item

Highlighted Value

Menu Item

Value

Value

Value

List of Values

Using a slider to set a value

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

- 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.

Parameter

Value

Slider

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.

| Data | |
|-----------------|-------------------|
| Row | x: 0.658 y: 0.339 |
| Highlighted Row | x: 0.315 y: 0.662 |
| Row | x: 0.146 y: 0.043 |
| Row | x: 0.276 y: 0.283 |

Notes

Using the projector

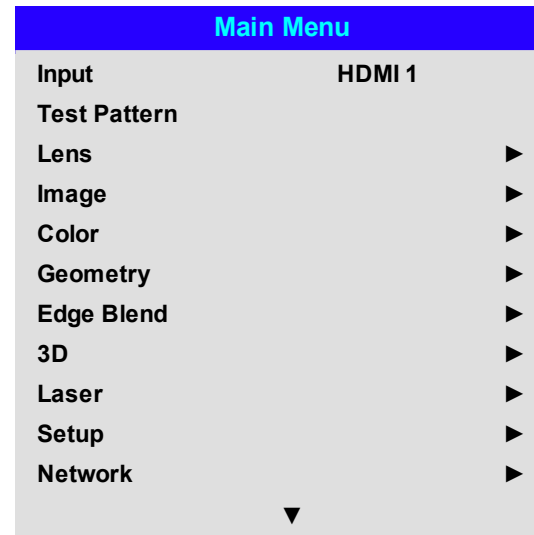
Main menu

- **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.

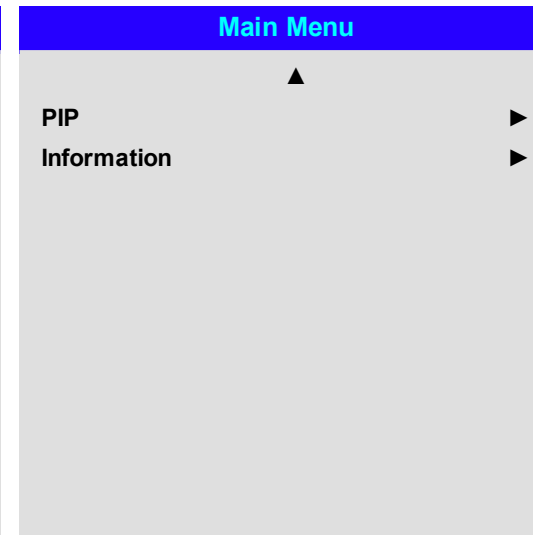
Press the **DOWN** arrow at the bottom of the page to access additional menus:

- **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

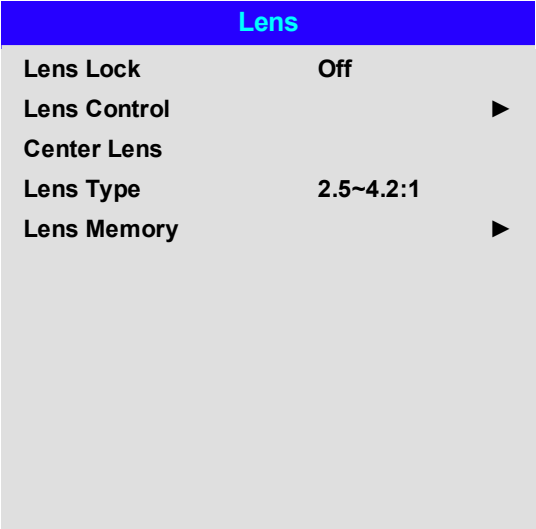
Notes

 See *Signal inputs* on page 36 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.



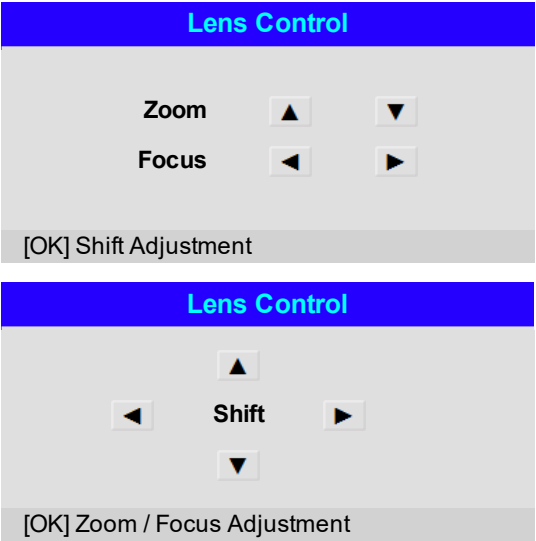
Lens control

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

 If focus cannot be achieved using the focus feature, press Shift & 7 on the remote control to adjust for far focus, or Shift & 8 to adjust for near focus.

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.

Lens Memory

- Load Memory ►
- Save Memory ►
- Clear Memory ►

Notes

Lens Load Memory

- Memory 1 OK
- Memory 2
- Memory 3
- Memory 4
- Memory 5
- Memory 6
- Memory 7
- Memory 8
- Memory 9
- Memory 10

Lens Save Memory

- Memory 1 OK
- Memory 2
- Memory 3
- Memory 4
- Memory 5
- Memory 6
- Memory 7
- Memory 8
- Memory 9
- Memory 10

Lens Clear Memory

- Memory 1 OK
- Memory 2
- Memory 3
- Memory 4
- Memory 5
- Memory 6
- Memory 7
- Memory 8
- Memory 9
- Memory 10

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 will be displayed 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.

Image

| | |
|-----------------|----------|
| Light Off Timer | Disabled |
| Dynamic Black | Off |
| Smooth Picture | Auto |
| Gamma | 2.2 |
| HDR | Auto |
| Brightness | 100 |
| Contrast | 100 |
| Saturation | 100 |
| Hue | 100 |
| Sharpness | 10 |
| Resync | |

Image

| | |
|-------------------------------|-----|
| Noise Reduction | Off |
| Freeze | |
| Ambient Brightness Correction | Off |

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 HDMI 4 inputs

Color menu

| Color | |
|-----------------------|----------|
| Color Space | Auto |
| Color Mode | ColorMax |
| ColorMax | Peak |
| Manual Color Matching | ▶ |
| Color Temperature | Native |
| Gains and Lifts | ▶ |

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**.

| Color | |
|-----------------------|-----------|
| Color Space | Auto |
| Color Mode | Auto |
| ColorMax | YPbPr |
| Manual Color Matching | YCbCr |
| Color Temperature | RGB PC |
| Gains and Lifts | RGB Video |



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

Notes

Color mode

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

| Color | |
|-----------------------|-----------------------|
| Color Space | Auto |
| Color Mode | ColorMax |
| ColorMax | ColorMax |
| Manual Color Matching | Manual Color Matching |
| Color Temperature | Color Temperature |
| Gains and Lifts | 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** and **User 2**. **User 1** and **User 2** are user-defined color gamuts set via the **Setup > ColorMax** menu.

| Color | |
|-----------------------|----------|
| Color Space | Auto |
| Color Mode | ColorMax |
| ColorMax | Peak |
| Manual Color Matching | HDTV |
| Color Temperature | Peak |
| Gains and Lifts | User 1 |
| | User 2 |



See Setup menu on page 83 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.

Manual Color Matching

Auto Test Pattern

Off

Red

Green

Blue

Yellow

Cyan

Magenta

White Balance

Reset

Manual Color Matching - Red

Hue

100

Saturation

100

Gain

100

Manual Color Matching - White

Red

100

Green

100

Blue

100

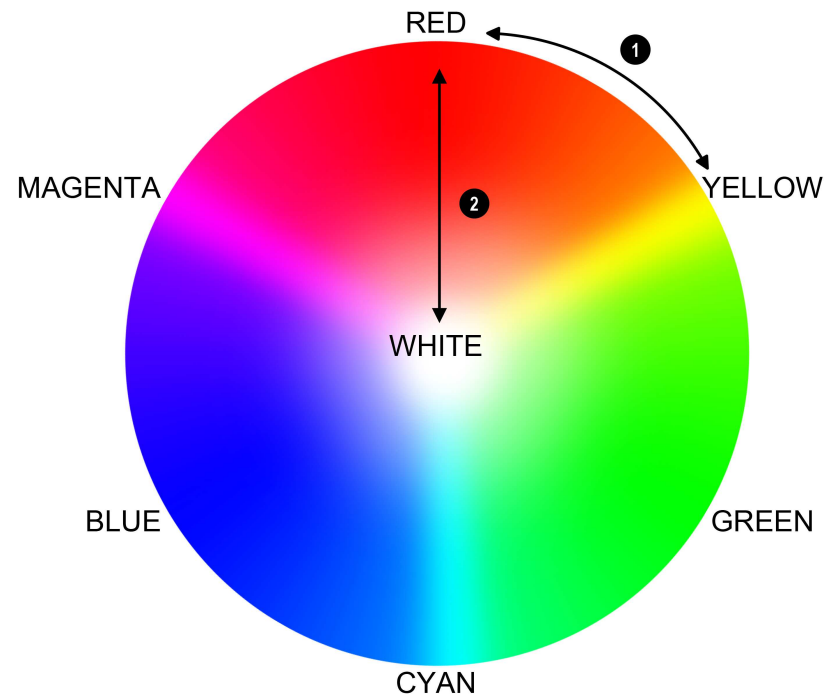
Notes

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).

| Color | |
|-----------------------|-------------------|
| Color Space | Auto |
| Color Mode | Color Temperature |
| ColorMax | Peak |
| Manual Color Matching | ▶ |
| Color Temperature | Native |
| Gains and Lifts | 3200K |
| | 5400K |
| | 6500K |
| | 7500K |
| | 9300K |
| | Native |

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

| Gains and Lifts | |
|-----------------|---|
| Red Lift | 100  |
| Green Lift | 100  |
| Blue Lift | 100  |
| Red Gain | 100  |
| Green Gain | 100  |
| Blue Gain | 100  |


Notes


Geometry menu

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

| Geometry | |
|---------------------|----------|
| Aspect Ratio | Source |
| Digital Zoom | ▶ |
| Overscan | Off |
| Blanking | ▶ |
| Warping Mode | Keystone |
| Keystone | ▶ |
| 4 Corners | ▶ |
| Rotation | ▶ |
| Pincushion / Barrel | ▶ |
| Arc | ▶ |
| Custom Warp | ▶ |

Notes

 **Aspect Ratio, Digital Zoom and Overscan** are not available with input HDMI 3 or HDMI 4.

 Select a **Warping Mode** to activate it. Access its submenu to adjust the warping mode settings.


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

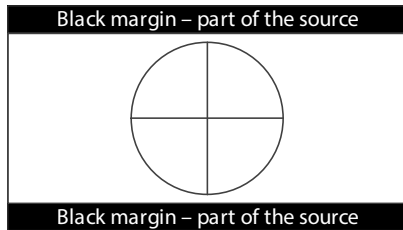
 Image scaling and aspect ratio are also influenced by **Setup > Screen Setting**.

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

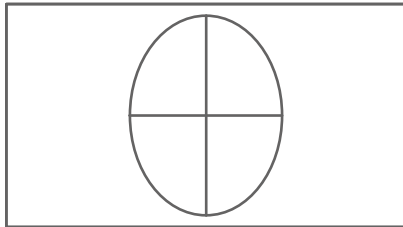
Theaterscope setting

The **TheaterScope** setting is used in combination with an anamorphic lens to restore 2.35:1 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.

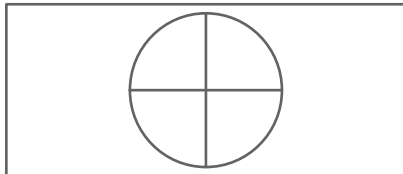
Without an anamorphic lens and without the TheaterScope setting applied, a 16:9 source containing a 2.35:1 image looks like this:



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



TheaterScope is used with an anamorphic lens.



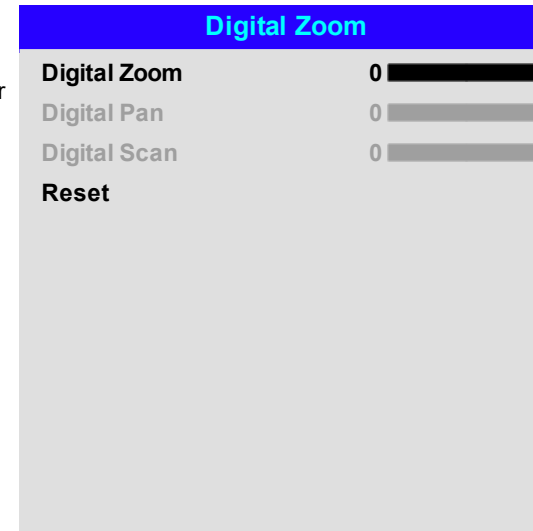
If you use TheaterScope, set your screen aspect ratio to 16:9.

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.

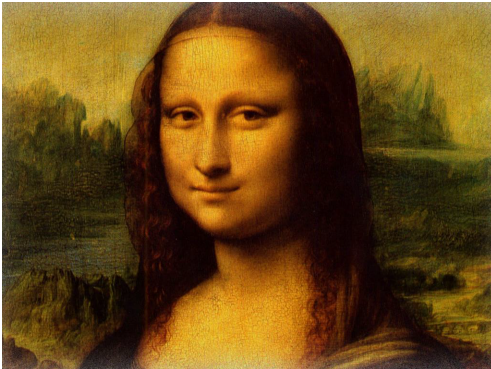
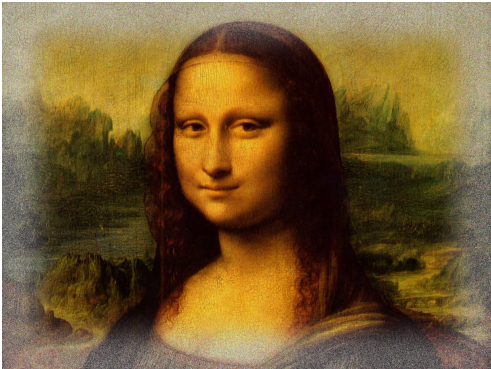
Crop removes unwanted artifacts from the edges of your image by cropping the edges.

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

| Geometry | |
|---------------------|--------|
| Aspect Ratio | Source |
| Digital Zoom | ▶ |
| Overscan | Off |
| Blanking | Off |
| Warping Mode | Crop |
| Keystone | Zoom |
| 4 Corners | |
| Rotation | ▶ |
| Pincushion / Barrel | ▶ |
| Arc | ▶ |
| Custom Warp | ▶ |



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.

| Blanking | |
|----------|------------------------|
| Top | 0 <input type="text"/> |
| Bottom | 0 <input type="text"/> |
| Left | 0 <input type="text"/> |
| Right | 0 <input type="text"/> |
| Reset | |

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 dependent upon the throw ratio of the lens at its current zoom setting. Adjust the lens throw ratio to compensate for the aspect ratio that results from the zoom setting on the lens.

Keystone

| | | |
|------------------|------|-------------|
| H Keystone | 0 | <div></div> |
| V Keystone | 0 | <div></div> |
| Rotation | 0 | <div></div> |
| Lens Throw Ratio | 0, 3 | |
| Reset | | |

Notes

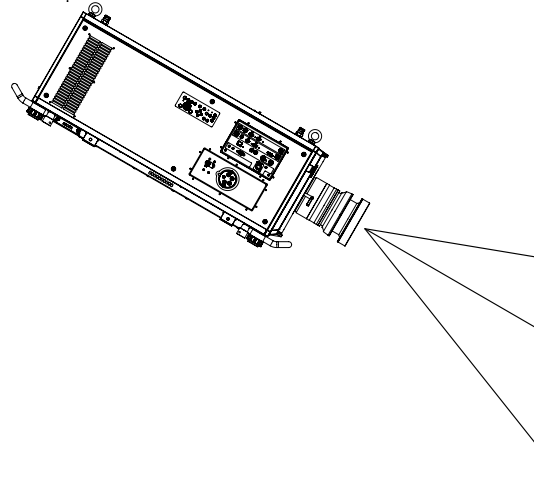
- 

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



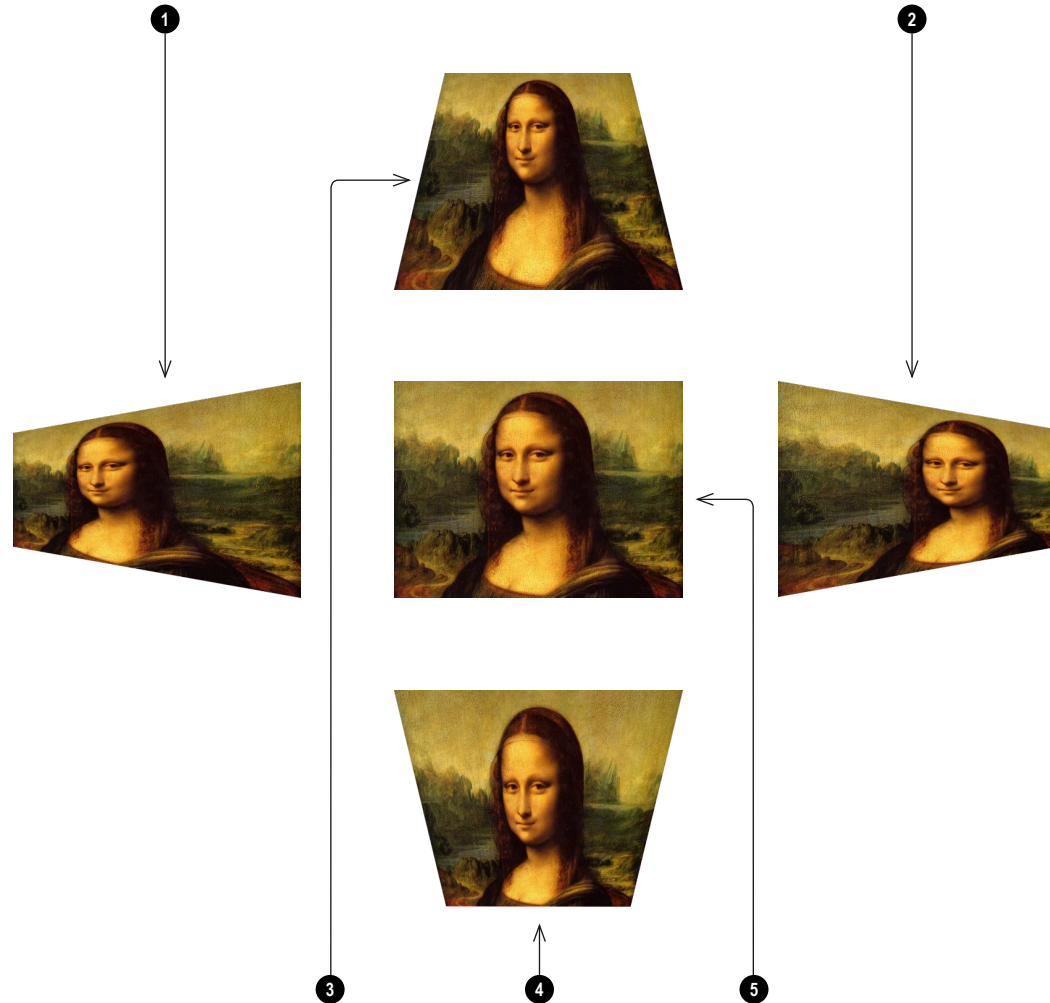
The aspect ratio is corrected when the correct lens throw ratio is applied



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.

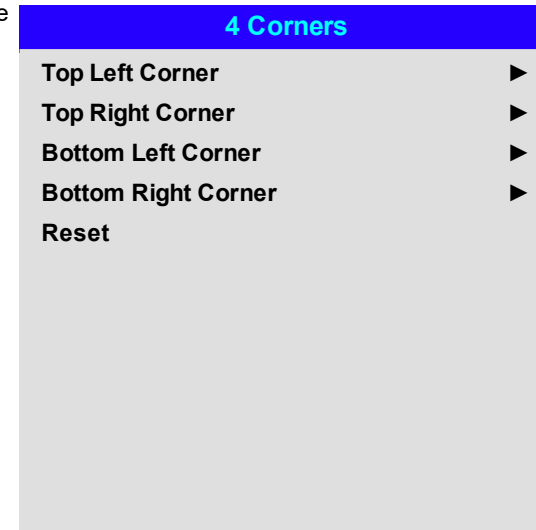


Horizontal and vertical keystone corrections

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.*

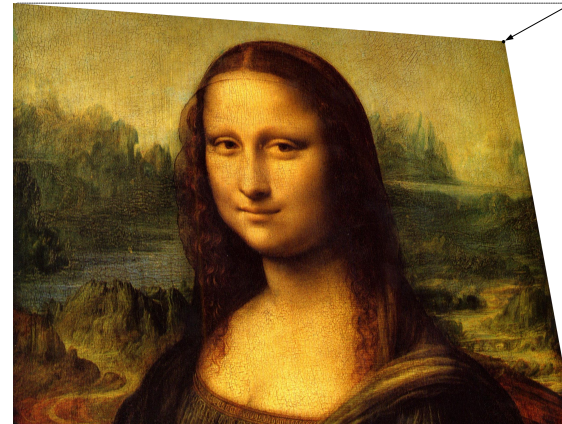
Top right corner example

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

Top Right Corner Adjustment

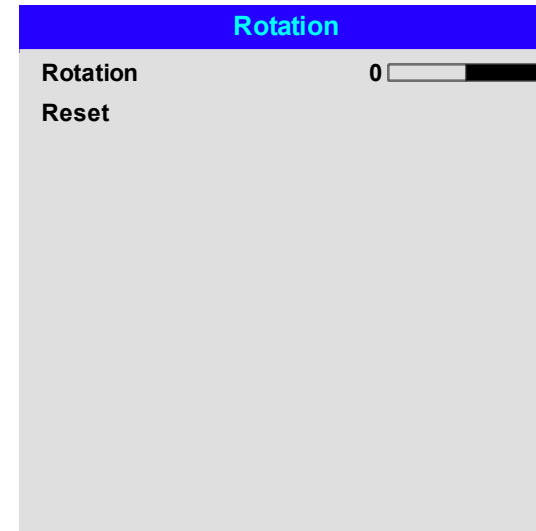
Top Right Corner x ◀ 0 ▶

Top Right Corner y ▲ 0 ▼

**Notes**

Rotation

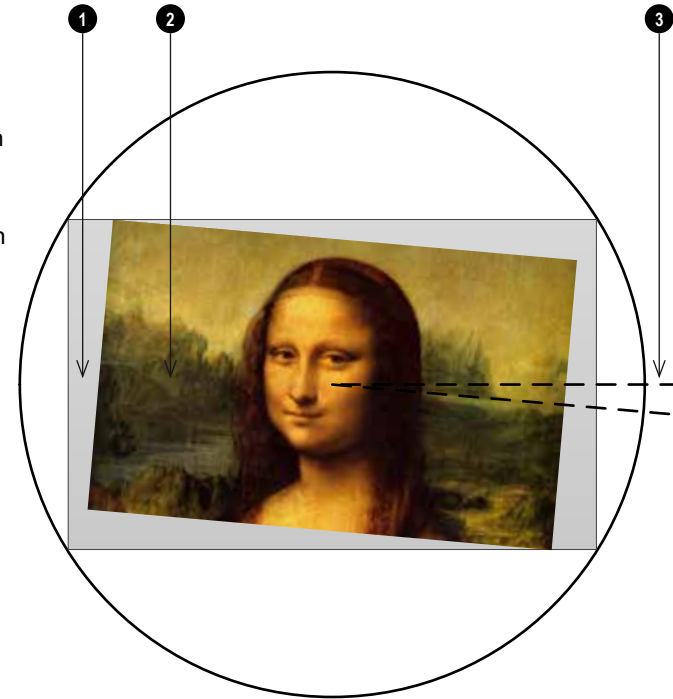
Use this feature for example to correct a mounting error causing the image not to be level with the screen.



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 dependent upon the throw ratio of the lens at its current zoom setting. Adjust the lens throw ratio to compensate for the aspect ratio that results from the zoom setting on the lens.

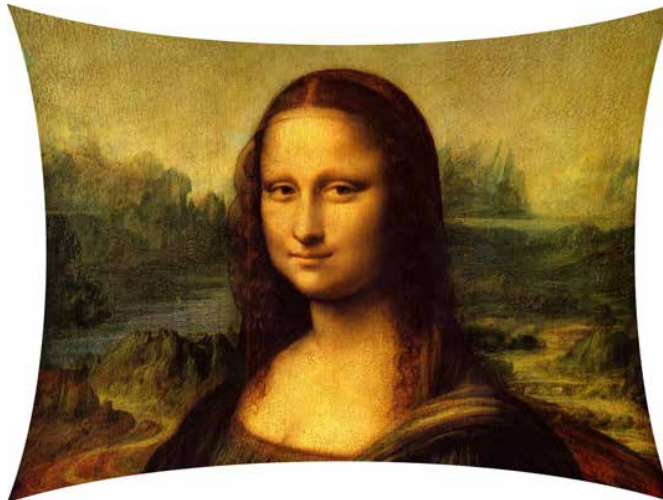
| Pincushion / Barrel | |
|---------------------|----------------------------------|
| H Pin/Barrel | 0 <input type="range"/> |
| V Pin/Barrel | 0 <input type="range"/> |
| Keystone | <input type="button" value="▶"/> |
| Lens Throw Ratio | , 3 |
| Reset | |

Notes

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

Pincushion/ Barrel example

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



Pincushion



Barrel

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.

Arc

| | | |
|--------|---|-------------|
| Top | 0 | <div></div> |
| Bottom | 0 | <div></div> |
| Left | 0 | <div></div> |
| Right | 0 | <div></div> |
| Reset | | |



Notes

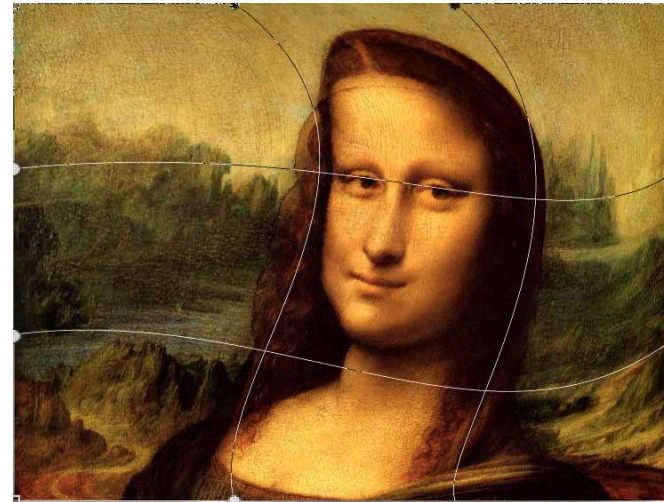
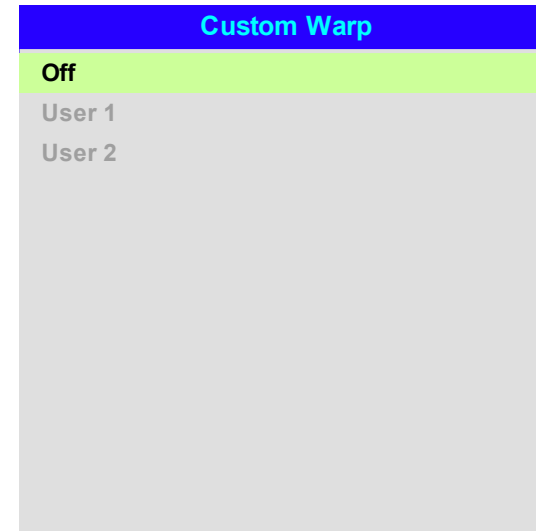
Please note that a positive **Arc** value on any edge will reduce the image size as the projector needs to maintain the aspect ratio. A negative **Arc** value will not affect the overall image size.



Custom warp

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

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 Start**
Determine the start point of the blended regions. top, bottom, left right
- **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.

| Edge Blend | |
|--------------------|-----|
| Edge Blend | On |
| Align Pattern | Off |
| Blend Start | ▶ |
| Blend Width | ▶ |
| Black Level Uplift | ▶ |
| Reset | |

Notes

- 

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

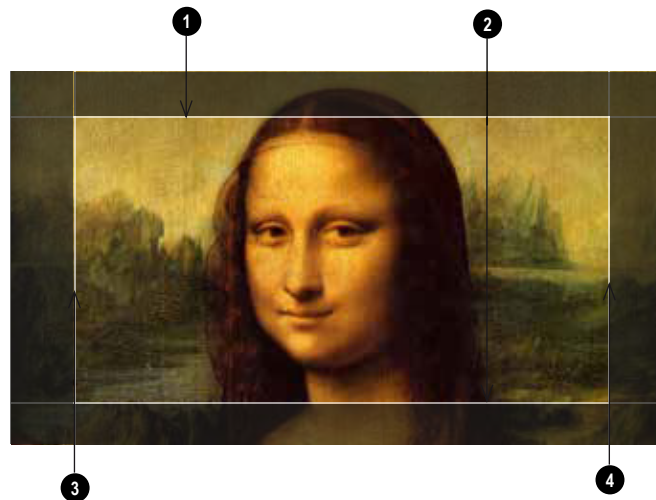
The picture in the blend region needs to be delivered to all overlapping projectors, which may require a special setup of the source.

Blend start

Use the blend start options to deactivate pixels at the edge of the image and set the start point for the blended region. Use the **LEFT** and **RIGHT** arrow buttons to set the start point of the blended regions:

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

| Blend Start | |
|-------------|------------------------|
| Top | 0 <input type="text"/> |
| Bottom | 0 <input type="text"/> |
| Left | 0 <input type="text"/> |
| Right | 0 <input type="text"/> |



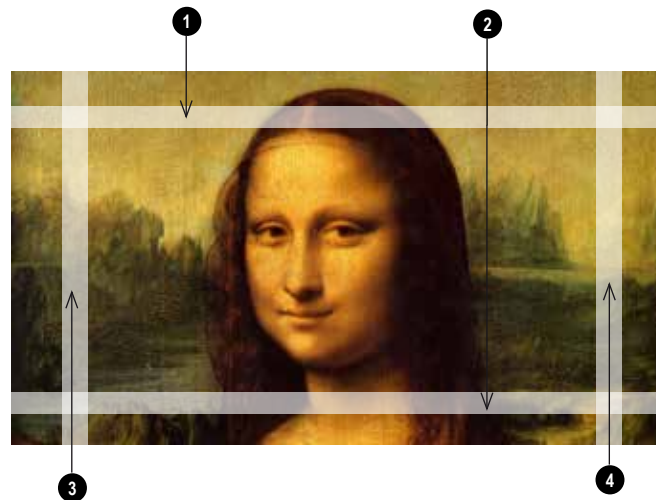
Notes

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

| Blend Width | |
|-------------|------------------------|
| Top | 0 <input type="text"/> |
| Bottom | 0 <input type="text"/> |
| Left | 0 <input type="text"/> |
| Right | 0 <input type="text"/> |



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*, ① and ②. Both images have black level uplift applied; as a result, *artifacts* ③ and ④ 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.

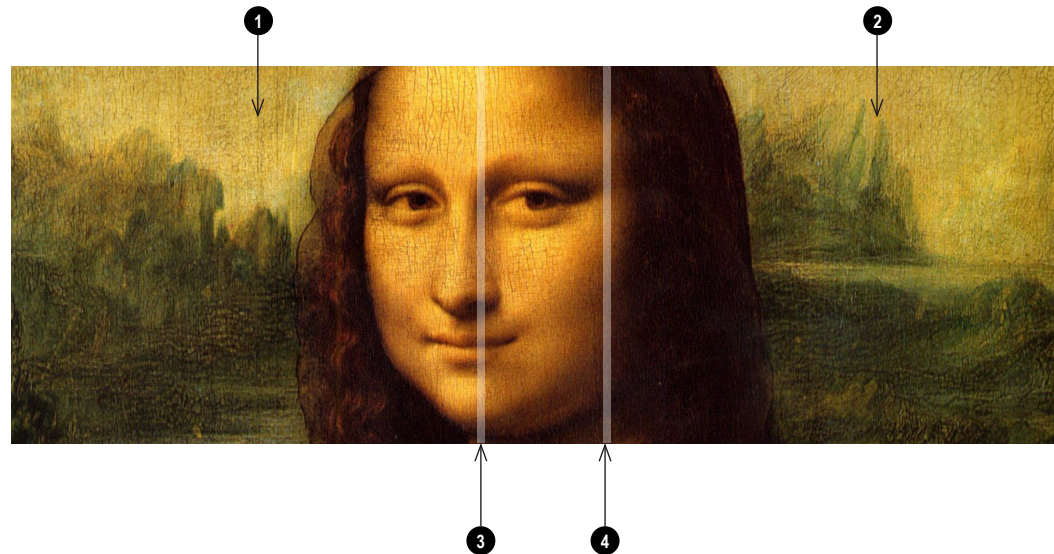
- Depending on your array, use **Top**, **Bottom**, **Left** and/or **Right** to reduce the black level uplift size. In the example below, use the **Right** slider of the *projector on the left* ① to remove the *artifact on the right* ④, and the **Left** slider of the *projector on the right* ② to remove the *artifact on the left* ③.

Black Level Uplift

| | |
|-------------------------|---|
| Select Area | |
| Top | 0 <input style="width: 100px;" type="range"/> |
| Bottom | 0 <input style="width: 100px;" type="range"/> |
| Left | 0 <input style="width: 100px;" type="range"/> |
| Right | 0 <input style="width: 100px;" type="range"/> |
| Color Adjustment | |
| All | ◀ ▶ <input style="width: 100px;" type="range"/> |
| Red | 0 <input style="width: 100px;" type="range"/> |
| Green | 0 <input style="width: 100px;" type="range"/> |
| Blue | 0 <input style="width: 100px;" type="range"/> |

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.

| 3D | |
|----------------|-----------------|
| 3D Format | Auto |
| Eye Swap | Normal |
| Dark Time | 1.95 ms |
| Sync Offset | 100 <div></div> |
| Sync Reference | Internal |

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 38 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 facing page and See Some 3D settings explained on page 80
- 

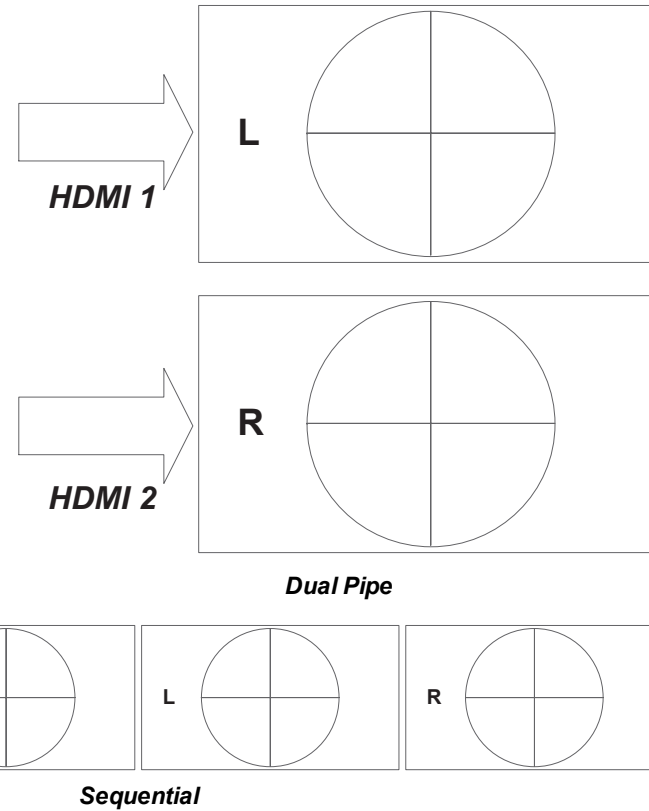
See 3D formats on page 124 for 3D resolutions and frame rates.

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.

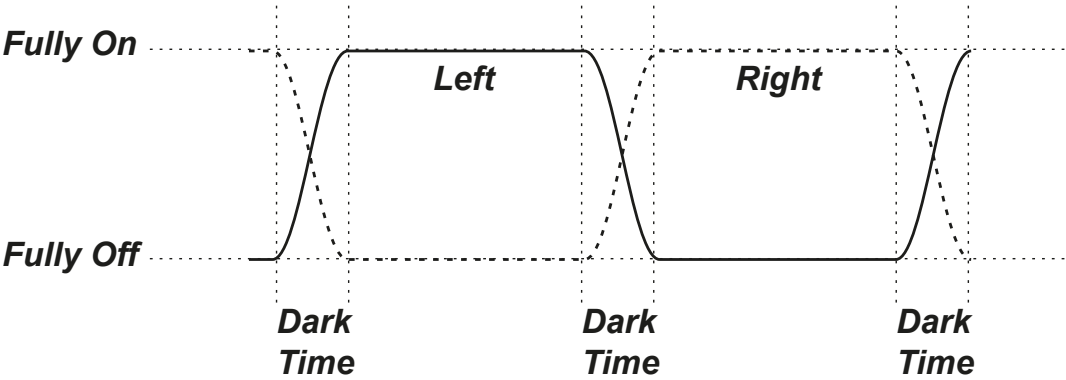


Notes

Some 3D settings explained

Dark time

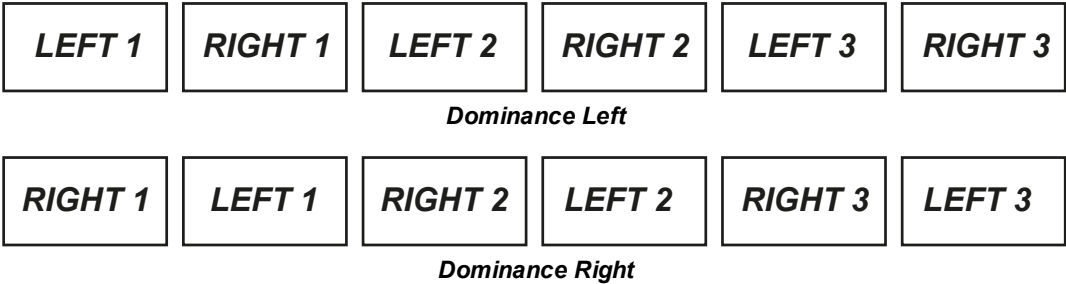
Banding can be caused if the image is displayed before each eye of the 3D switching glasses or ZScreen is not fully open. **Dark Time** allows you to minimize this effect.



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

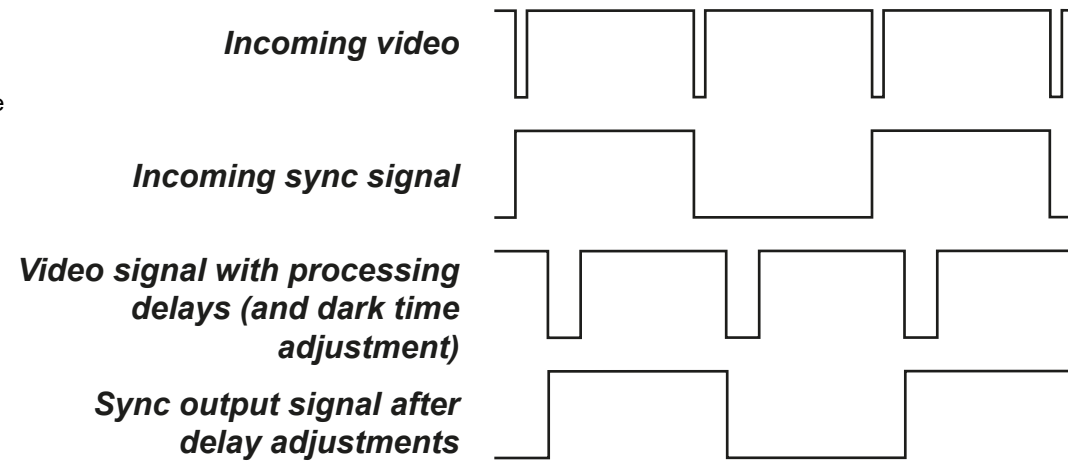
In order to achieve maximum light output and a smooth grayscale, whilst eliminating ghosting, the following procedure is recommended:

- 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 synchronised.
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 synchronised, 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

| Laser | |
|------------------------|------------|
| Power Mode | Normal |
| Power Level | ---- |
| Constant Brightness | Off |
| MUBC Mode | Off |
| MUBC Group | ---- |
| MUBC Refresh Interval | ---- (Min) |
| MUBC Connection Status | ▶ |

Notes



The projector must be connected via LAN to the 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 Mode**
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 custom logo upload tool 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.


| Setup | |
|-------------------------|------------|
| Orientation | Auto-front |
| High Altitude | Auto |
| Standby Mode | Normal |
| Screen Setting | 16:9 |
| ColorMax Setting | ▶ |
| Power on/off Management | ▶ |
| Clock Adjust | ▶ |
| Startup Logo | Original |
| Blank Screen | Logo |
| Auto Source | Off |
| PIC Mute Setting | ▶ |
| ▼ | |

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

 **Custom Logo.** Please request the Custom Logo Upload Tool from your local Digital Projection Service provider to upload a custom logo.


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

- **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.

| Setup | | |
|-----------------|---------|---|
| | ▲ | |
| Trigger-1 | Off | |
| Trigger-2 | Off | |
| Infrared Remote | On | |
| IR Code | 0 | |
| IR Code Reset | | |
| OSD Settings | | ► |
| Memory | | ► |
| Instant Startup | Off | |
| Standby Period | 30 Min. | |
| EDID Mode | | ► |
| | ▼ | |


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.

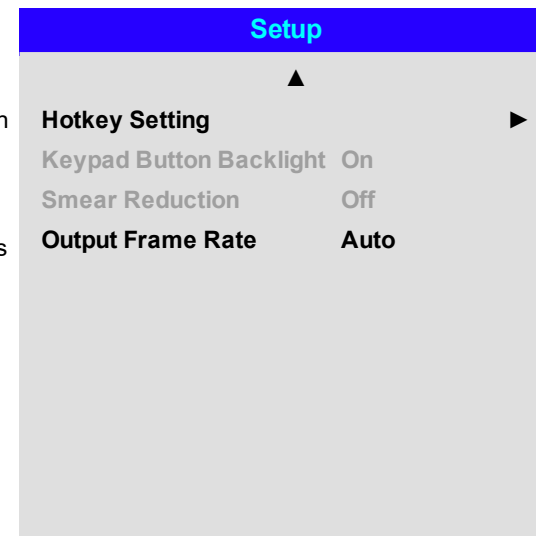
- **Smear Reduction**

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.



Notes



Smear reduction is not available for 3D input types



Smear reduction reduces the brightness of the displayed image

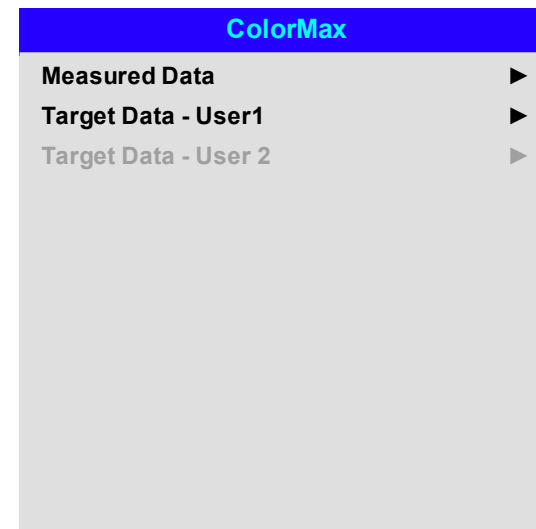
ColorMax

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.



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 - User1 | | |
|---------------------|----------|----------|
| 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 Schedule to **On**.

| Power on/off Management | |
|-------------------------|-----|
| Auto Power Off | Off |
| Auto Power On | Off |
| Scheduled on-off | ▶ |

| Scheduled on-off | | | | | | | | |
|------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------|
| | Schedule | | | | | | Off | Time |
| | S | M | T | W | T | F | S | |
| On | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 12:34 |
| Off | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 12:34 |
| On | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 12:34 |
| Off | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 12:34 |

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.

| Clock Adjust | |
|-------------------|------------|
| Date (dd:MM:yyyy) | 30:11:2017 |
| Time (HH:mm) | 16:00 |
| Time Zone | UTC 00 |

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.

| PIC Mute Setting | |
|------------------|-------|
| PIC Mute | Laser |
| Fade In Timer | Off |
| Fade Out Timer | Off |

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.

OSD Settings

| | |
|--------------------------|-------------------|
| Language | English |
| Menu Position | Center |
| Menu Transparency | 0 |
| Time Out | 30 Seconds |
| Message Box | On |
| Menu Rotation | Off |

Notes

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**.

Memory

| | |
|----------------------|-----------------|
| Recall Memory | Default |
| Save Settings | Preset A |



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 130 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.
- Hotkey3Function**
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.

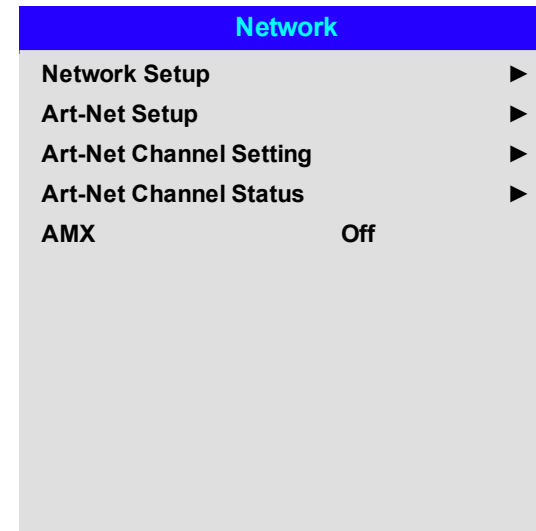
| Hotkey Setting | |
|-----------------|------------------|
| Hotkey1Function | Information |
| Hotkey2Function | Test Pattern |
| Hotkey3Function | Lens Memory Load |

Notes

 *HOTKEY 3 is used when a lens adapter is installed. Whilst in standby mode, press and hold HOTKEY 3 for five seconds to run center lens before installing the lens.*

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



Notes

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 **DHCP** is **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.

| Network Setup | |
|---------------|------------------------|
| DHCP | Off |
| IP | 192 . 168 . 000 . 10 |
| Subnet Mask | 255 . 255 . 255 . 000 |
| Gateway | 000 . 000 . 000 . 000 |
| DNS | 000 . 000 . 000 . 000 |
| Apply | |
| MAC | 00: 18: 28: 2d: f2: 06 |

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 Setup | |
|----------------|---------|
| Art-Net Active | Off |
| Net | — — — — |
| Sub Net | — — — — |
| Universe | — — — — |
| Start Address | — — — — |
| Apply | |

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.

| Art-Net Channel Setting | |
|-------------------------|-----------------|
| Channel 1 | Power |
| Channel 2 | PIC Mute |
| Channel 3 | Power Level |
| Channel 4 | Input |
| Channel 5 | Channel Control |

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**.

| PIP | |
|----------|----------|
| PIP | Off |
| Source | HDMI1 |
| Position | Top-Left |

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 | MD03-SE10-FE09 |
| Software Version 2 | STEP_D08-24-17-3120 |
| Software Version 3 | 2.0.16.0-P503 |
| Active / PIP Source | HDMI 1 |
| Signal Format | ▶ |
| Laser Hours | 2 |
| System Status | ▶ |
| Thermal Status | ▶ |
| Factory Reset | |

Signal format

| Signal Format | |
|--------------------|------------------------|
| Active Source | HDMI 1 |
| Timing | 3580x2160@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 |



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

Notes

System status**System Status**

| | |
|----------------------|---------------------------------------|
| Atmospheric Pressure | 98988 Pa (116m) |
| AC Voltage | 180V - 264V |
| Altitude Mode | Auto |
| Laser Power | 100% |
| License Key | License Pass, Timeout, Not Expired |
| Constant Brightness | Off |

Notes**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 20-24 Speed | 4519/1406/1406/1400 |
| Fan 24-28 Speed | 1396/1408/1408/1402 |
| Fan 29 Speed | 1396 |
| Water Pump Speed | 3412/3388/3412 |


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.

| Information | |
|--|--------------------------|
| Model Name | Titan Laser 33000 4K-UHD |
| Serial Number | X000XXXXX0000 |
| Software Version 1 | MD03-SE10-FE09 |
| Factory Reset | |
| Warning All user settings will be lost | |
| Press OK to confirm Press Exit to cancel | |
| Thermal Status | ► |
| Factory Reset | OK |

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

Projector Information

| | | | |
|--------------------|-------------------------------------|--------------|---|
| Model | 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 | | |
| Power Status | Power On | | |
| Input | HDMI 1 | | |
| Laser Status | Power : On | Runtime : 25 | H |
| Projection Mode | Auto Front | | |
| High Altitude | Auto | | |
| Inlet Temperature | 24 | °C | |
| DMD Temperature | 34 | °C | |
| LD Temperature | 33.9 / 32.6 / 32.6 / 32.6 / 31.3 °C | | |
| LD Temperature 2 | 36.6 / 36.6 / 36.6 / 36.6 / 35.2 °C | | |
| Diagnostic Status | No Error | | |

LAN Information

| | |
|-------------|-------------------|
| MAC address | 00:18:32:AB:CD:EF |
|-------------|-------------------|

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

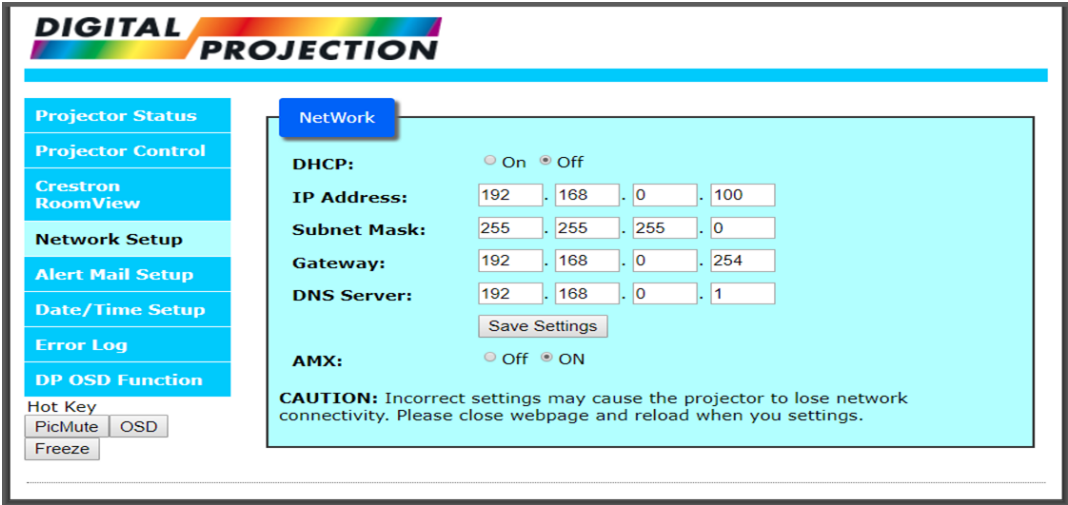
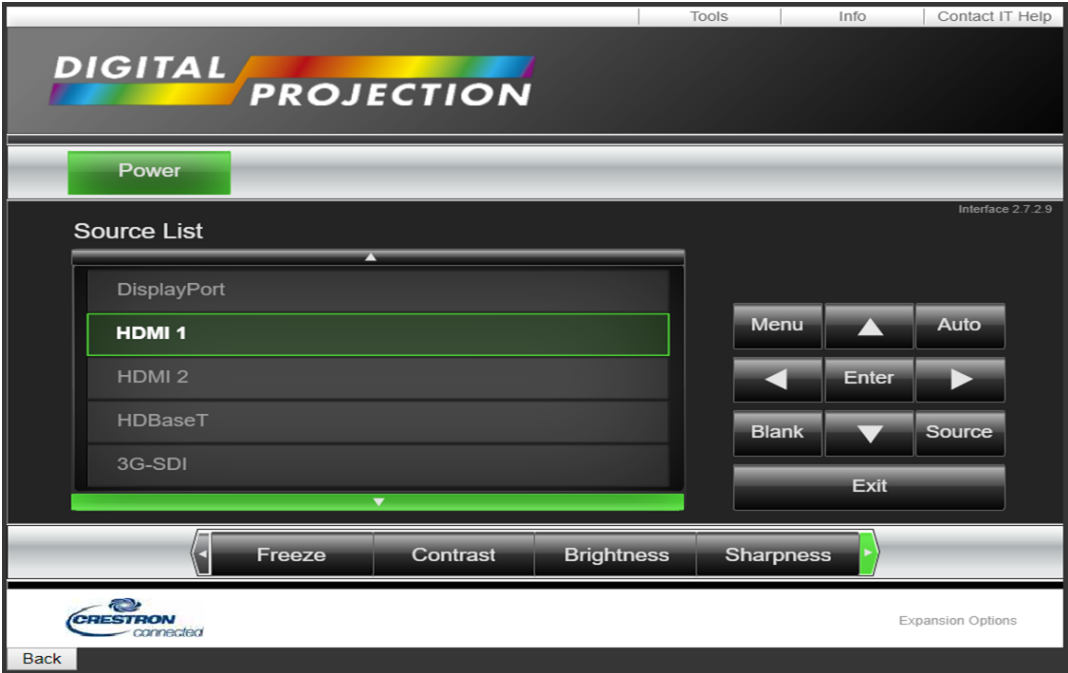
Lens Control

Zoom In Focus In Shift
Zoom OUT Focus OUT

The image shows a web-based OSD interface for a Digital Projection projector. It features a sidebar with navigation links: Projector Status, Projector Control, Crestron RoomView, Network Setup, Alert Mail Setup, Date/Time Setup, Error Log, and DP OSD Function. The main area is divided into three sections: State Control, Lens Control, and Hot Key. The State Control section includes Power (On/Off) and Input Selection (HDMI 1-4, DisplayPort, HDBaseT, 3G-SDI). The Lens Control section includes Zoom In/Out and Focus In/Out controls, along with a central Shift key and directional arrows. The Hot Key section includes PicMute, OSD, and Freeze buttons.

Notes

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

| | | | |
|--------------------------------|---|---|--------------------------------|
| <input type="checkbox"/> 00:00 | <input type="checkbox"/> 01:00 | <input checked="" type="checkbox"/> 02:00 | <input type="checkbox"/> 03:00 |
| <input type="checkbox"/> 04:00 | <input checked="" type="checkbox"/> 05:00 | <input checked="" type="checkbox"/> 06:00 | <input type="checkbox"/> 07:00 |
| <input type="checkbox"/> 08:00 | <input type="checkbox"/> 09:00 | <input type="checkbox"/> 10:00 | <input type="checkbox"/> 11:00 |
| <input type="checkbox"/> 12:00 | <input type="checkbox"/> 13:00 | <input type="checkbox"/> 14:00 | <input type="checkbox"/> 15:00 |
| <input type="checkbox"/> 16:00 | <input type="checkbox"/> 17:00 | <input checked="" type="checkbox"/> 18:00 | <input type="checkbox"/> 19:00 |
| <input type="checkbox"/> 20:00 | <input checked="" type="checkbox"/> 21:00 | <input checked="" type="checkbox"/> 22:00 | <input type="checkbox"/> 23:00 |

reset Save Set

Notes

Notes

DIGITALPROJECTION

Projector Status

Projector Control

Crestron RoomView

Network Setup

Alert Mail Setup

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

DIGITALPROJECTION

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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 |

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Input

- Input HDMI1

Test Pattern



Lens

- Lens Lock ☒ off ☐ on
 - Lens Type 1.4-1.9:1
 - Center Lens Do
 - Lens Memory Memory 1

Image

- DynamicBlack ☒ off ☐ on
- Light Off Timer Disable
- Smooth Picture Auto
- Gamma 2.2
- HDR Mode HDR Auto
- Brightness

-

+

101
- Contrast

-

+

100
- Staturation

-

+

100
- Hue

-

+

100
- Sharpness

-

+

0
- Noise Reduction off
-
-
- 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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Freeze

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geometry

Aspect RatioSource

Digital Zoom

Digital Pan

Digital Scan

Digital Zoom Reset

OverscanOff

Blanking

Top

Bottom

Left

Right

Blanking Reset

Keystone

H Keystone

V Keystone

Rotation

Lens Throw Ratio

Keystone Reset

4 Corners

Top Left Corner X

Top Left Corner Y

Top Right Corner X

Top Right Corner Y

Bottom Left Corner X

Bottom Left Corner Y

Bottom Right Corner X

Bottom Right Corner Y

4 Corners Reset

Rotation

Rotation Reset

Pincushion/Barrel

H Pin/Barrel

V Pin/Barrel

Keystone

H Keystone

V Keystone

Rotation

Lens Throw Ratio

Pincushion/Barrel Reset

Arc

Top

Bottom

Left

Right

Arc Reset

Custom WarpOff

edgeblend

Edge Blendoffon

Align Patternoffon

Blend Width

Top

Bottom

Left

Right

Black Level Uplift

Select Area

Top

Bottom

Left

Right

Color Adjustment

All

Red

Green

Blue

Edgeblend Reset

3d

3D FormatOff

Eye SwapNormalReverse

Dark Time1.95ms

3D Sync

Offset

Reference

ExternalInternal

laser

Power ModeCustom

Power Level

Constant BrightnessOff

MUBC ModeOff

MUBC Group012

MUBC Refresh Interval

MUBC Connection Status0

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DIGITAL PROJECTION

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Error Log

DP OSD Function

Hot Key

setup

- Orientation
- High Altitude
- Standby Mode
- Screen Setting
- 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 |

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 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 |

- Power On/Off ☐ off ☐ on
- Auto Power Off ☐ off ☐ on
- Auto Power On ☐ off ☐ on
- Scheduled on/off

| | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Time(HH:MM) |
|-----|-------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
| On | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 00:00 |
| Off | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 00:00 |
| On | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 00:00 |
| Off | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 00:00 |

- Startup Logo ☐ Off ☒ Original ☐ User
- Blank Screen Logo
- Auto Source ☐ off ☒ on
- Shutter Setting ☐ DMD Blanking ☒ Laser
- PIC MUTE
- Fade In Timer
- Fade Out Timer
- Trigger-1
- Trigger-2
- Infrared Remote ☐ off ☒ on
- IR Code 0
- OSD Setting
- Language
- Menu Position
- Menu Transparency
- Time Out
- Message Box ☒ off ☐ on
- Menu Rotation
- Memory
- Recall Memory
- Save Settings
- Instant Startup ☒ off ☐ on
- Standby Period
- EDID Mode
- HDMI1
- HDMI2
- HDMI3
- HDMI4
- DisplayPort
- HDBaseT
- Hotkey Setting
- Hotkey1 Function
- Hotkey2 Function
- Hotkey3 Function
- Keypad Button Backlight ☐ off ☒ on
- Smear Reduction ☐ Off ☒ on
- Output Frame Rate

Notes

pip

- PIP ☒ off ☐ on
- Source HDMI2
- Position Top-Left

information

- Model NameTitan Laser 33000 4K-UHD
- Serial Numberd
- Software Version 1ME20a-VE20-2.0.5-20181107
- Software Version 2LE08-29-20-NA
- Software Version 32.0.32.2-CT03-125
- Active/PIP SourceHDMI1/NA
- Signal Format
 - Active SourceHDMI1
 - Timing1920x1080@59.9 Hz
 - Scanning FrequencyH: 67.4 kHz V: 59.9 Hz
 - Pixel Clock148.40 MHz
 - Color FormatYCbCr 4:4:4 8 bit
 - HDR FormatNo Data
- PIP SourceNA
- TimingNo Source
- Scanning FrequencyH: NA V: NA
- Pixel ClockNA
- Color FormatNA NA
- Laser Hours25
- System Status
 - Atmospheric Pressure101114 Pa(17 m)
 - AC Voltage180V-264V
 - Altitude ModeAuto
 - Laser Power30
 - License KeyLicense Pass, Timeout Not Expired
 - Constant BrightnessOFF
- 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 Speed1006/967/1038/1002
 - Fan 5-8 Speed999/978/1002/1001
 - Fan 9-12 Speed1000/1024/3024/NA
 - Fan 13-16 Speed1715/3001/5028/2824
 - Fan 17-20 Speed2796/4499/4509/4504
 - Fan 21-24 Speed4504/1005/1059/994
 - Fan 25-28 Speed973/992/987/1396
 - Fan 29 Speed1398
 - Water Pump Speed3412/3418/3382

Factory Reset

Notes



A Delta Associate Company

Titan Laser4K-UHD

High Brightness Digital Video Projector

REFERENCE GUIDE



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 | Focus Range | Lens Shift | Lens Extension | Part No |
|------------------------------|--------------|--|----------------|---------|
| 1.16-1.49:1 Super Wide Zoom | 3 m - 15 m | V: 0.44 (U) 0.44 (D) frame H: 0.188 (L) 0.188 (R) frame | 162.5mm | 109-236 |
| 1.39 - 1.87:1 Wide Zoom | 4 m - 24 m | V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame | 130.5mm | 105-610 |
| 1.87 - 2.56:1 Standard Zoom | 4 m - 24 m | V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame | 95.3 mm | 105-611 |
| 2.56 - 4.16:1 Semi Long Zoom | 9.1 m - 45 m | V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame | 88.7mm | 105-612 |
| 4.16 - 6.96:1 Long Zoom1 | 12 m - 80 m | V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame | 55mm | 105-613 |
| 6.92 - 10.36:1 Long Zoom2 | 12 m - 80 m | V: 0.629 (U) 0.5 (D) frame H: 0.188 (L) 0.188 (R) frame | 105mm | 109-235 |

To choose a lens, calculate the **throw ratio** required. Allow a tolerance of +/- 3% in the throw ratio calculation.

Notes



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**.

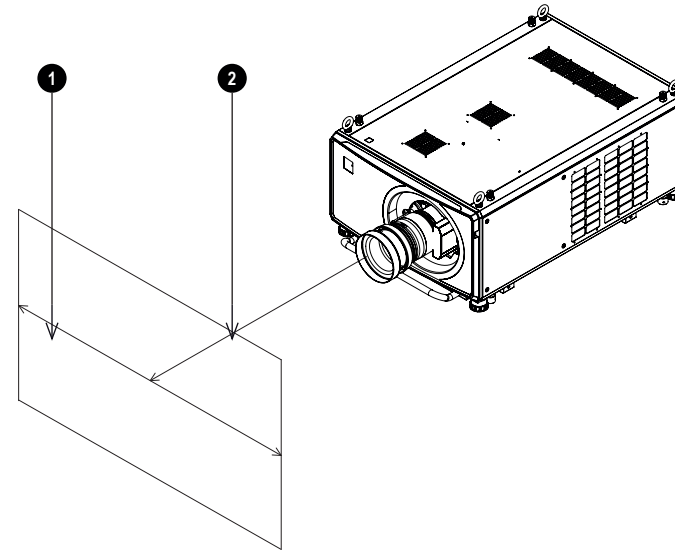
A **throw ratio** is the ratio of the throw distance **2** to the screen width **1**:

$$\text{ThrowRatio} = \text{ThrowDistance} / \text{ScreenWidth}$$

1. Use the formula above to obtain the required throw ratio.
2. Allow a tolerance of +/- 3% 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 111 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 Choosing a lens on the previous page 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
 $11 \div 4.5 = \mathbf{2.44}$
- 2. Match the result with the lens table.
The lens matching a throw ratio of 2.44 is the **1.87 - 2.56:1 Standard Zoom lens**.
- 3. **Check whether the lens covers the required throw distance.**
The focus range quoted for the 1.87 - 2.56:1 Standard Zoom lens is **4 - 24m**. 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 +/- 3% 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 Choosing a lens on page 108 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

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).

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 1

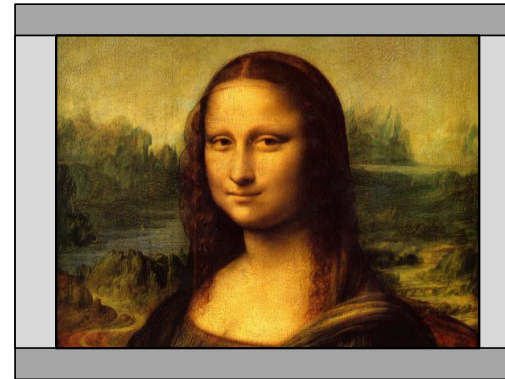



Fig 2



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:

$TRC = 1.78(DMD^{TM} \text{ AspectRatio}) / SourceAspectRatio.$

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 +/- 3% 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.


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:
 $TRC = 1.78 / 1.33 = 1.34$.
2. Calculate the throw ratio:
 $Throw\ ratio = 11 / 4.5 \times 1.34 = 1.82$
3. Allow a tolerance of +/- 3% in the throw ratio calculation and find a match in the lens table.
 The table shows that the matching lens is **the 1.39 - 1.87:1 Wide Zoom lens**.
4. Check whether the lens covers the required throw distance.
 The focus range quoted for the 1.39 - 1.87:1 Wide Zoom lens is **4m - 24m**. The required distance of 11 m is within the range.

INFORMATION YOU NEED FOR THESE CALCULATIONS

The TRC formula

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

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 +/- 3% 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 |

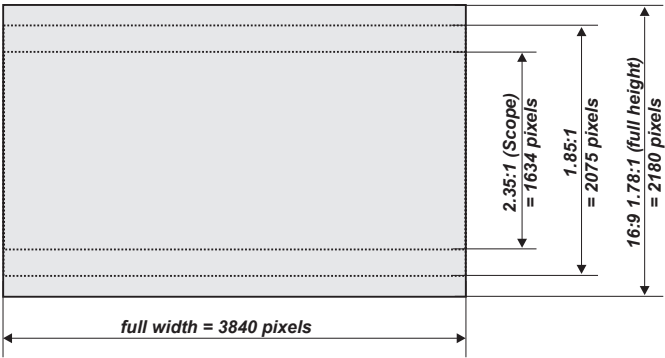
Notes

Screen requirements

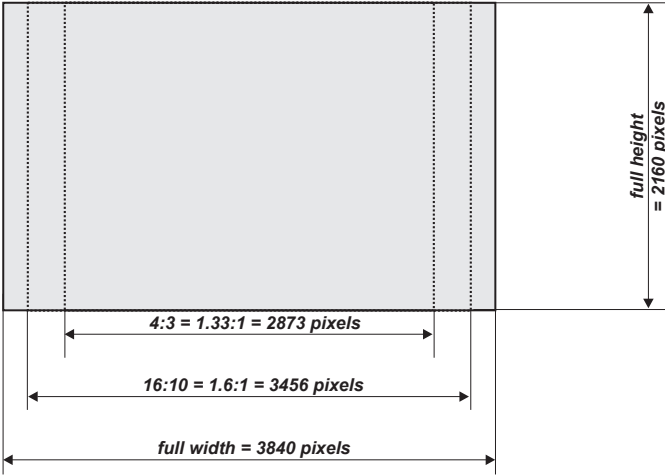
Fitting the image to the display

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

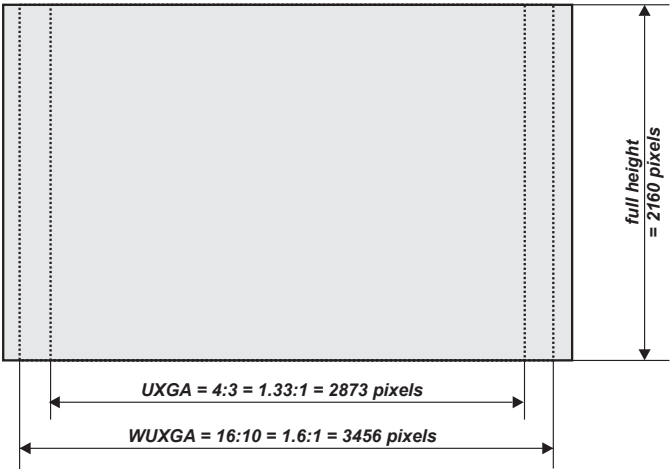


4K-UHD images displayed with a height of 2160 pixels



Notes

4K-UHD images displayed full height



Notes

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).

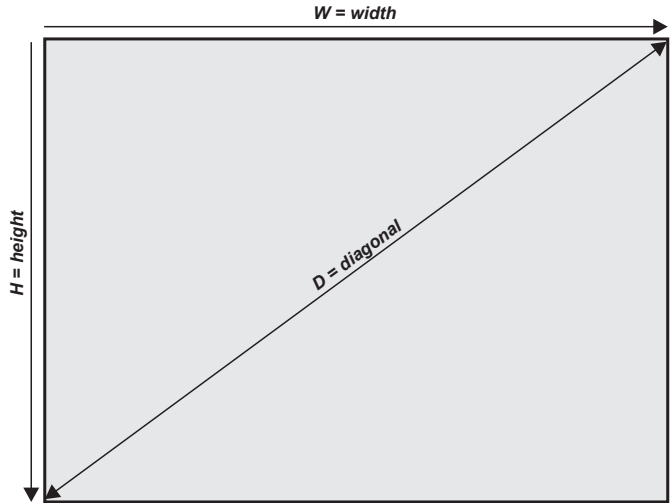
The example calculations below show how to convert diagonal sizes into width and height, at various aspect ratios.

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

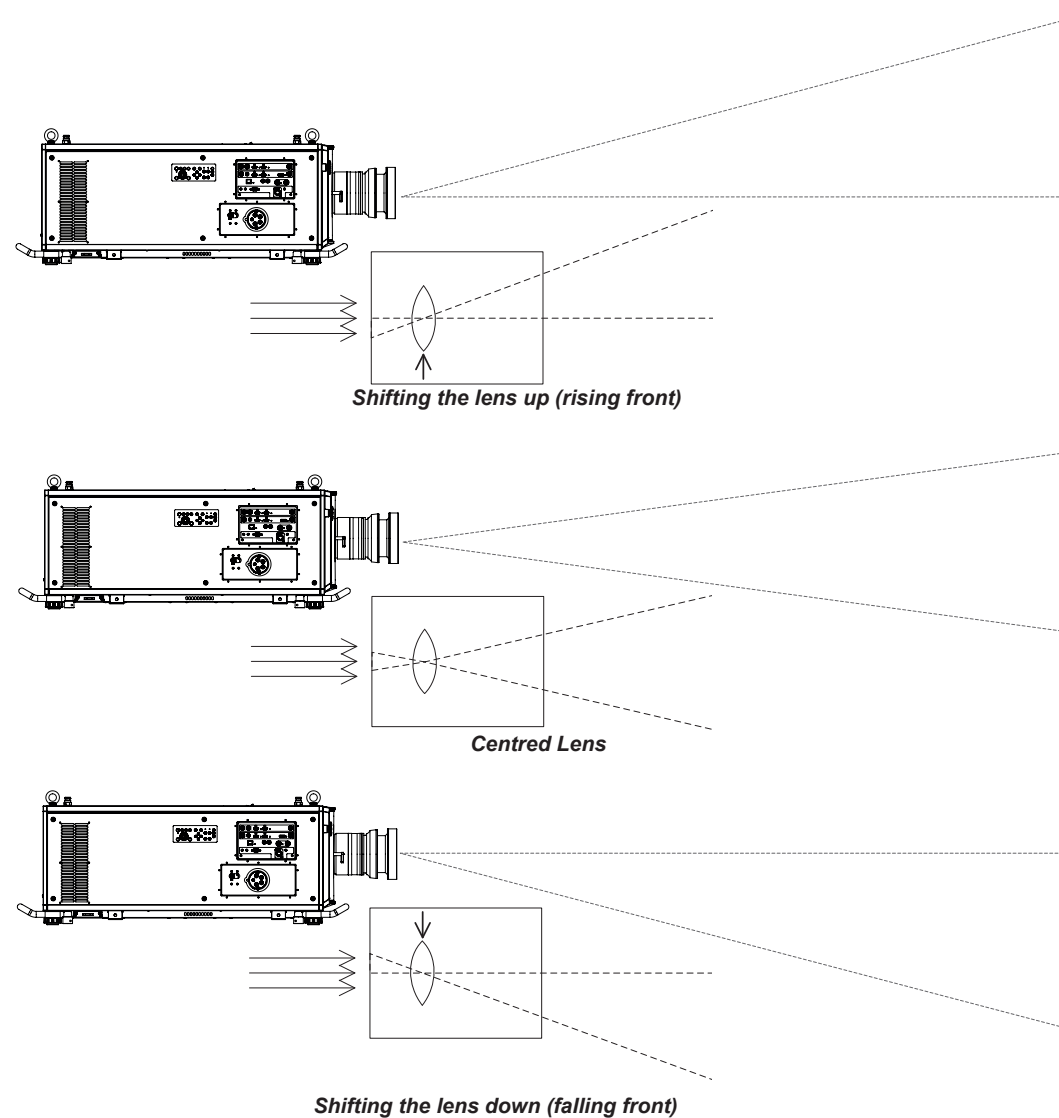
16:9 = 1.78:1 (native aspect ratio for 4K-UHD projectors)
W = D x 0.87 H = D x 0.49

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





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.



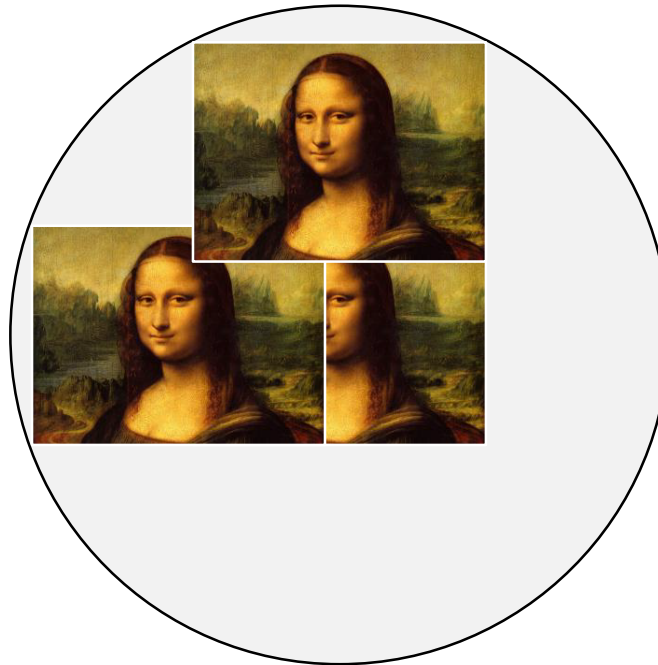
Notes

 See **Lens control** on page 50 for more information on shifting the lens.

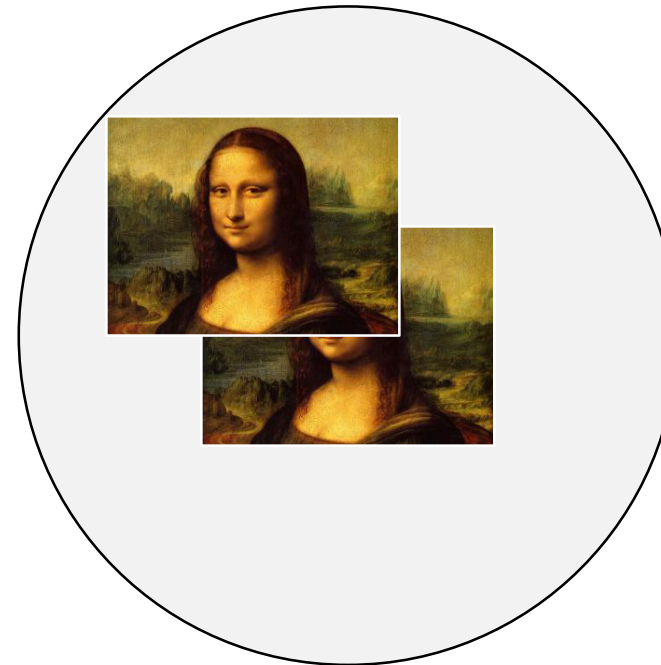
 Whenever possible, position the projector so that the lens is centered for the highest quality image

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 50 for more information on shifting the lens.

Aspect ratios explained

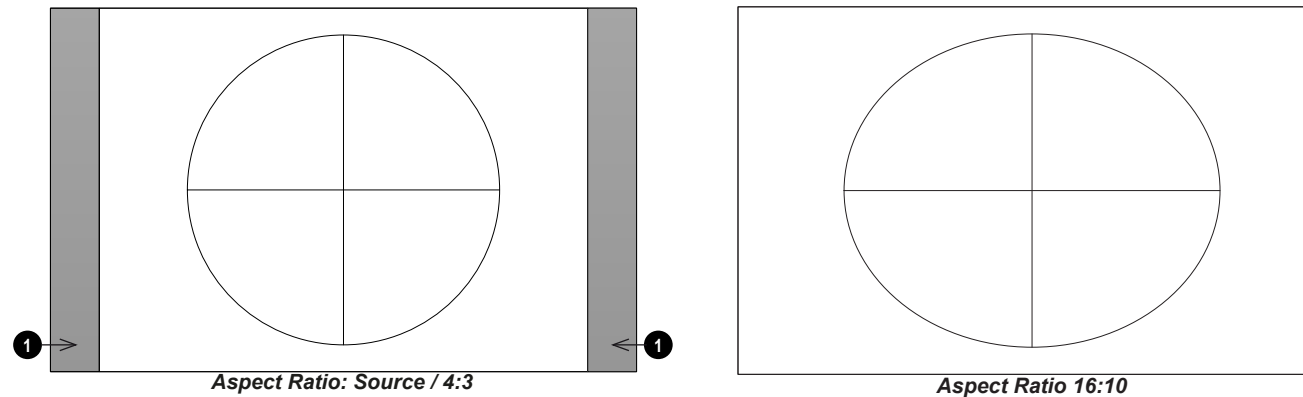
The appearance of a projected image on the screen depends on a combination of the following:

- 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

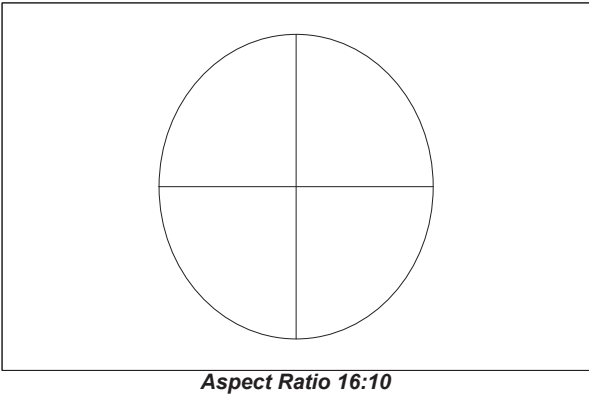
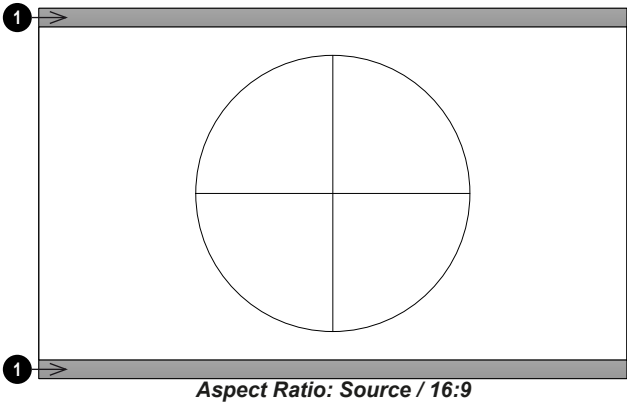
1. Unused screen areas

Source: 4:3

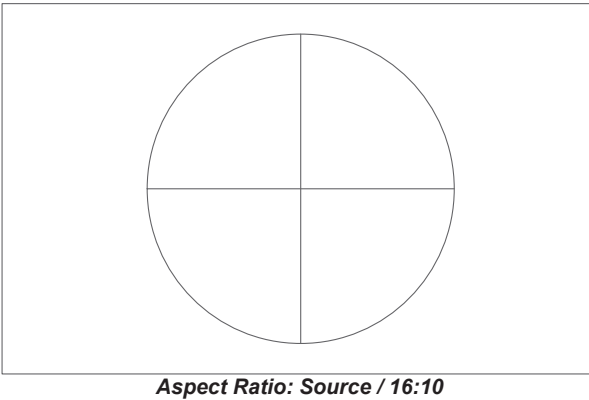


Notes

Source: 16:9



Source: 16:10 (native)

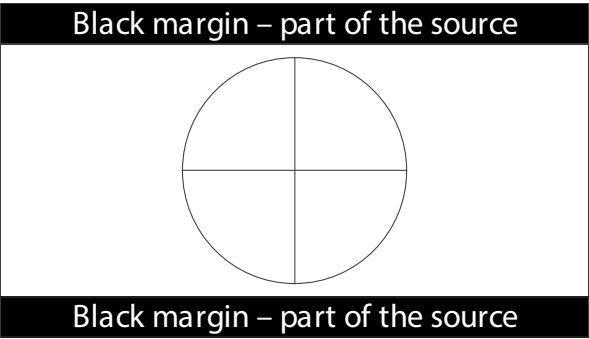


Notes

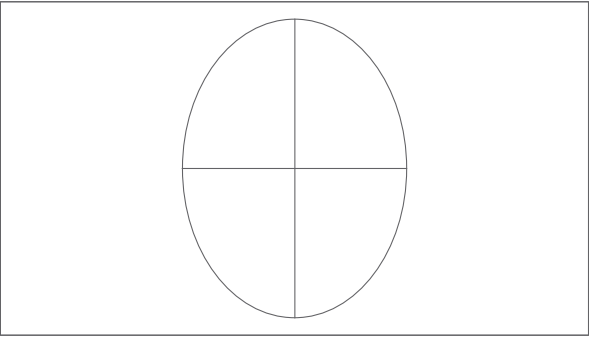
Aspect ratio example: TheatreScope

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.

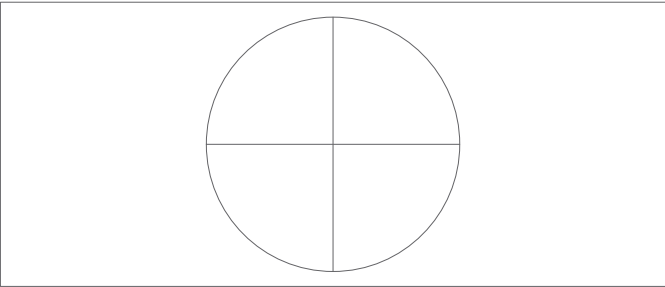
Without an anamorphic lens and without the TheaterScope setting applied, a 16:9 source containing a 2.35:1 image looks like this:



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: 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 | ✓ | ✓ | | | | | | 60 | |
| | 640 x 480 | 75 | ✓ | ✓ | | | | | | 60 | |
| | 640 x 480 | 85 | ✓ | ✓ | | | | | | 60 | |
| | 800 x 600 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 800 x 600 | 75 | ✓ | ✓ | | | | | | 60 | |
| | 800 x 600 | 85 | ✓ | ✓ | | | | | | 60 | |
| | 848 x 480 | 48 | ✓ | ✓ | | | | | | 48 | |
| | 848 x 480 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1024 x 768 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1024 x 768 | 75 | ✓ | ✓ | | | | | | 60 | |
| | 1024 x 768 | 85 | ✓ | ✓ | | | | | | 60 | |
| | 1280 x 720 | 48 | ✓ | ✓ | | | | | | 48 | |
| | 1280 x 768 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1280 x 800 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1280 x 960 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1280 x 1024 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1280 x 1024 | 75 | ✓ | ✓ | | | | | | 60 | |
| | 1280 x 1024 | 85 | ✓ | ✓ | | | | | | 60 | |
| | 1366 x 768 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1440 x 900 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1400 x 1050 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1600 x 1200 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1680 x 1050 | 60 | ✓ | ✓ | | | | | | 60 | |
| | 1920 x 1080 | 48 | ✓ | ✓ | | | | | | 48 | |
| | 1920 x 1200 RB | 50 | ✓ | ✓ | | | | ✓ | | 50 | |
| | 1920 x 1200 RB | 60 | ✓ | ✓ | | | | ✓ | | 60 | |

Notes

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

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

3D formats

| Standard | | Resolution | V-Freq (Hz) | V-Total | H Freq. (kHz) | Output Frame Rate (Hz) | Input Source | | Remarks |
|--------------|------------------|------------|----------------|---------|------------------|---------------------------|--------------|----------------------|----------------------------------|
| | | | | | | | HDMI3/4 | Dual-pipe HDMI 3 / 4 | |
| 1080p100 | Frame Sequential | 1920x1080 | 100.00 | 1125.00 | 112.50 | 100.00 | ✓ | | Maintained aspect ratio in 16:9 |
| 1080p120 | Frame Sequential | 1920x1080 | 120.00 | 1125.00 | 135.00 | 120.00 | ✓ | | Maintained aspect ratio in 16:9 |
| WUXGA_100_RB | Frame Sequential | 1920x1200 | 100.00 | 1258.00 | 125.72 | 100.00 | ✓ | | Maintained aspect ratio in 16:10 |
| 1080p50 | Dual Pipe | 1920x1080 | 50.00 | 1125.00 | 56.25 | 100.00 | | ✓ | Maintained aspect ratio in 16:9 |
| 1080p60 | Dual Pipe | 1920x1080 | 60.00 | 1125.00 | 67.50 | 120.00 | | ✓ | Maintained aspect ratio in 16:9 |
| WUXGA_50_RB | Dual Pipe | 1920x1200 | 50.00 | 1258 | 62.86 | 100.00 | | ✓ | Maintained aspect ratio in 16:10 |
| WUXGA_60_RB | Dual Pipe | 1920x1200 | 60.00 | 1125.00 | 74.04 | 120.00 | | ✓ | Maintained aspect ratio in 16:10 |

Notes

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 |
| 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 B: 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



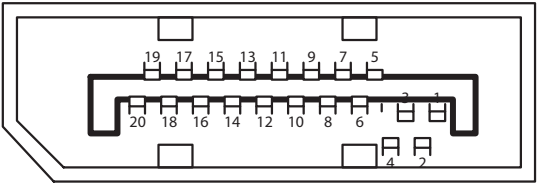
HDMI: pin view of panel connector

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

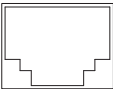
75 ohm BNC



3G-SDI connector

HDBaseT input

RJ45 socket.



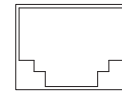
HDBaseT / LAN

Notes

Control connections

LAN

RJ45 socket (Shared with HDBaseT)

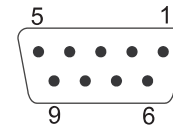


HDBaseT / LAN

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

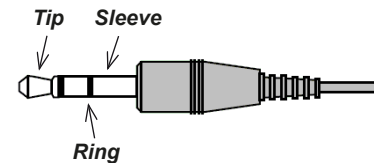
IR input

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 C: 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 | Notes |
|---------------------|---------------|-----------------------------------|----------|--|-------|
| Digi Zoom | | | N/A | Not Memorized and reset to 0 after power cycle | |
| Digi Pan | | | N/A | | |
| Digi Scan | | | N/A | | |
| OverScan | | ⊙ | N/A | | |
| Warping Mode | ⊙ | | | All Geometry/Edge-Blending settings are global | |
| H Keystone | ⊙ | | | | |
| V Keystone | ⊙ | | | | |
| Rotation | ⊙ | | | | |
| Lens Throw Ratio | ⊙ | | | | |
| H PinBarrel | ⊙ | | | | |
| V PinBarrel | ⊙ | | | | |
| 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 Power off | ⊙ | | | | |
| Auto Power on | ⊙ | | | | |
| Schedule Setting | ⊙ | | | | |
| Startup Logo | ⊙ | | | | |
| Blank Screen | ⊙ | | | | |
| Trig 1 | ⊙ | | N/A | | |
| Trig 2 | ⊙ | | N/A | | |

| Item | Global Memory | Per Input Memory (Preset A/B/C/D) | 3D input | Remark | Notes |
|-------------------|---------------|-----------------------------------|----------|--------|-------|
| 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 Backlight | ⊙ | | | | |
| 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 | | |

Appendix D: 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 right hand 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-color difference 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

| | 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. | |

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 losing 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: $TRC = \text{DMD}^{\text{TM}} \text{ aspect ratio} / \text{Source aspect ratio}$ 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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