DIGITAL PROJECTION

A Delta Associate Company

E-Vision Laser 15000 Series

High Brightness Digital Video Projector

INSTALLATION & QUICK START GUIDE

CONNECTION GUIDE

OPERATING GUIDE

REFERENCE GUIDE

About this document

Notes

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:

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

LIGHT HAZARD WARNING: this symbol indicates that there is a danger of exposure to intensive light that may result in personal injury 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.

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.

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.

Additional Documentation

Updates to this manual may be available online.

Please use the QR code (also located on the projector) to access the latest E-Vision projector user guides and other documentation via the Digital Projection website.

Or visit the products specification page on the Digital Projection website to download the latest user guide and other documentation.

Legal notice

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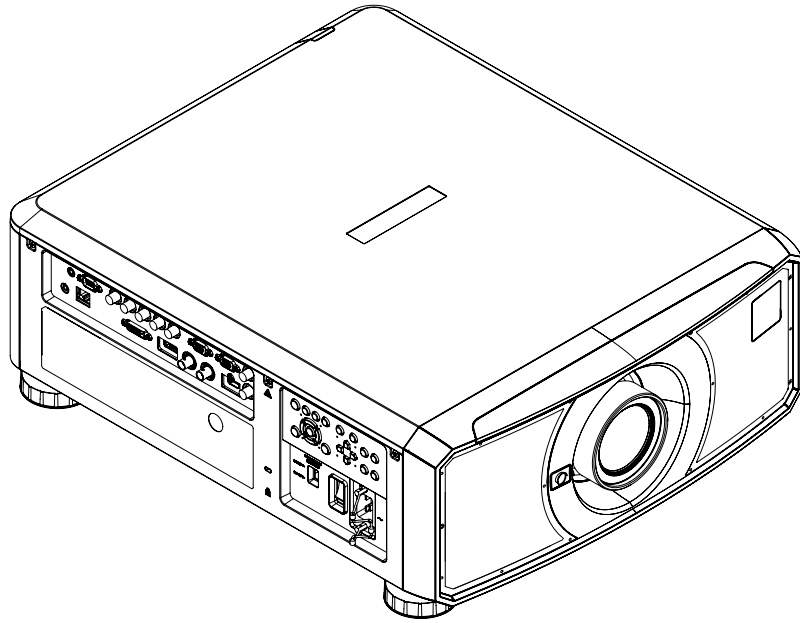
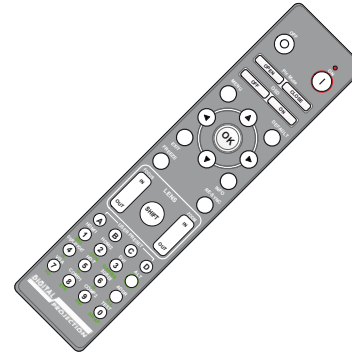Copyright © 2020 Digital Projection All rights reserved.

Third Party Credits

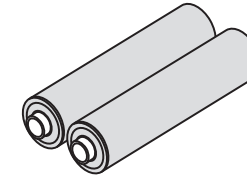Art-Net^{TM} Designed by and Copyright Artistic License Holdings Ltd.
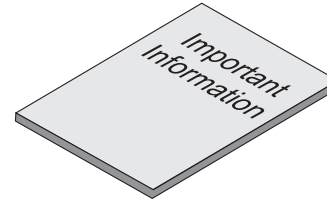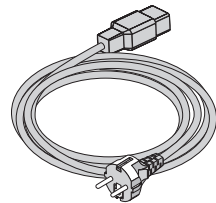
What's in the box?

Remote Control

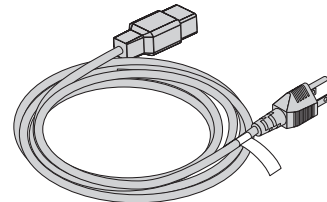*Batteries (2xAAA)*

Projector
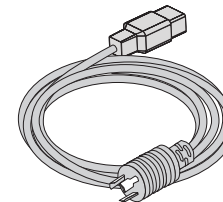
Important Information Book
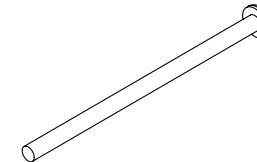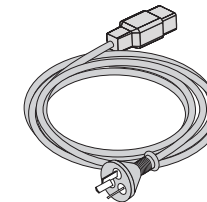
Security Screw
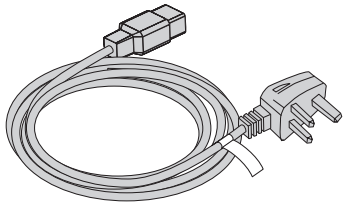
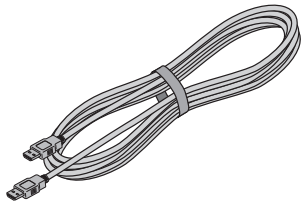*Power Cable, UK*

Power Cable, Europe
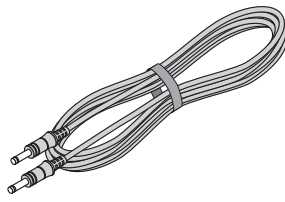
NEMA 5-15P - C19 Power Cable, North America

NEMA L6-20P - C19 Power Cable, North America

Power Cable, China

HDMI Cable

Remote Control Cable

Electrical and Physical Specifications

Mains Voltage	200-240 VAC 8.2A 50/60Hz 100-130 VAC 11.9A 50/60Hz
Operating Temperature	0°C to 35°C (32°F to 95°F), 35°C to 40°C (95°F to 104°F) with reduced light output
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Operating Humidity	10% to 90% non-condensing
Storage Humidity	10% to 90% non-condensing
Dimensions	L:598.3mm (23.55in) X W: 500mm (19.68in) X H 218.5mm (8.6in)
Weight	31 kg (68.34 lb) without lens
Power Consumption	at 110 VAC: 1025 W (Normal mode) at 110 VAC: 990 W (Eco mode) at 110 VAC: 1070 W (High Altitude mode) at 240 VAC: 1570 W (Normal mode) at 240 VAC: 1165 W (Eco mode) at 240 VAC: 1590 W (High Altitude mode)
Standby Power	< 0.5W (Network Off), < 6W (Network On)
Thermal Dissipation	at 110 VAC: 3497 BTU/hr (Normal mode) at 110 VAC: 3378 BTU/hr (Eco mode) at 110 VAC: 3650 BTU/hr (High Altitude mode) at 240 VAC: 5357 BTU/hr (Normal mode) at 240 VAC: 3975 BTU/hr (Eco mode) at 240 VAC: 5425 BTU/hr (High Altitude mode)
Fan Noise	48 dBA Max, 46 dBA Typical (Normal mode) 45 dBA Max, 43 dBA Typical (Eco mode) 59 dBA Max, 57 dBA Typical (High Altitude mode) 48 dBA Max, 46 dBA Typical (High Altitude Quiet mode)

☞ *Specifications are subject to change without notice.*

Optical radiation

CLASS 3R LASER PRODUCT
This Laser Product is designated as Class 3R during all procedures of operation.
LASER LIGHT - AVOID DIRECT EYE EXPOSURE.
Caution - possibly hazardous optical radiation emitted from this product. Direct or scattered light can be hazardous to eyes and skin.
Do not stare at operating light source.
Do not point laser or allow laser light to be directed or reflected toward other people or reflective objects.
There is a potential hazard of eye exposure to laser radiation if the included instructions are not followed.

Caution – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
Non-laser emission. There remains non-laser emission from the projection lens.
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

Notes

Laser information

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

Location of Laser Aperture

1. The laser aperture is located as indicated below.

Be careful not to expose the eye to direct laser light.
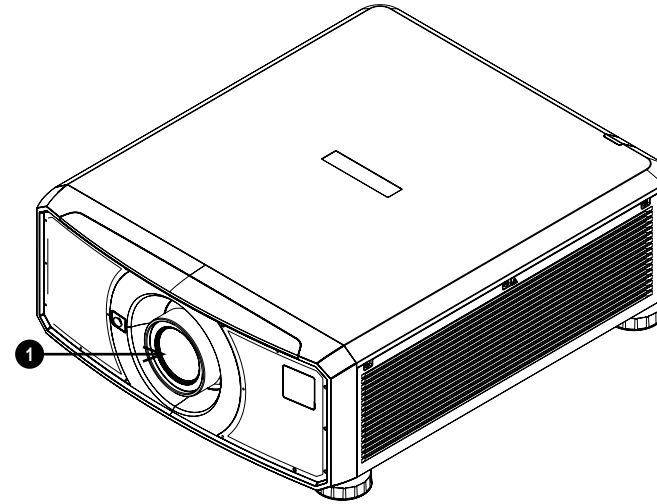
Laser Parameters

Wavelength (Red)	635nm - 647nm
Wavelength (Blue)	450nm - 460nm
Mode of operation	Pulsed, due to frame rate
Pulse duration (Red)	1.6ms
Pulse duration (Blue)	0.87ms
Maximum pulse energy (Red)	0.72mJ
Maximum pulse energy (Blue)	0.45mJ

Notes

Risk Group 3 Laser Hazard Installation Precautions

⚠ **This product is a risk group 3 laser product. It must be installed in a safe place and must be handled by qualified and professionally trained personnel.**

Do not attempt to access the internal hardware of the projector. Do not a attempt to modify or remove the laser module.

Do not operate the projector without its protective covers.

Do not operate the projector without a lens installed.

Please consult with a qualified professional to install or remove the lens.

FDA regulations require that a lens hood is permanently fitted when using the 3.58-5.38:1 lens or the 5.31-8.26:1 lens with the projector in the United States of America. Fitting can be provided by your reseller or System Integrator.

Light Hazard Warning

⚠ **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 area.
When the laser is installed overhead, allow a minimum of 3m between the floor surface and the Risk Group 3 area.

Light Hazard Distance and Hazard Zone

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. ❶

The hazard zone is the area from the projection lens up to the hazard distance that encompasses where the projected beam is considered hazardous. ❷

If the person is within the hazard zone, the beam is considered unsafe for exposure.

The hazard distance for this projector is 3 m.

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 area.

When the laser is installed overhead, allow a minimum of 3m between the floor surface and the Light Hazard Zone.
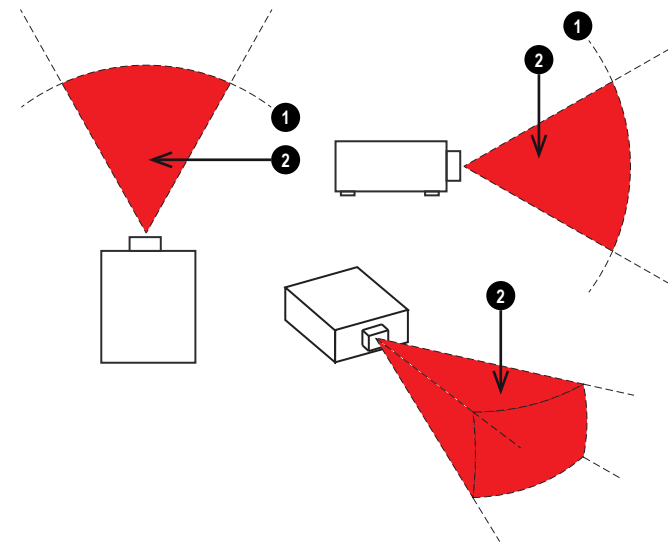
Product Labels

Projector

Manufacturers ID Label

Explanatory Label

Laser Aperture Label

User Guides Label

DO NOT let a laser beam directly enter the projector lens.

Lens Safety Label

Label Locations

1. Location of Explanatory Label with Certification Statement and Risk Statement on the body of the projector.

2. Location of Hazard Warning Symbol and Laser Aperture Label on the body of the projector.

3. Location of Lens Safety Label on the body of the projector.

4. Location of Manufacturer's ID Label, User Guides Label and Explanatory Label with Certification Statement and Risk Statement on the body of the projector.
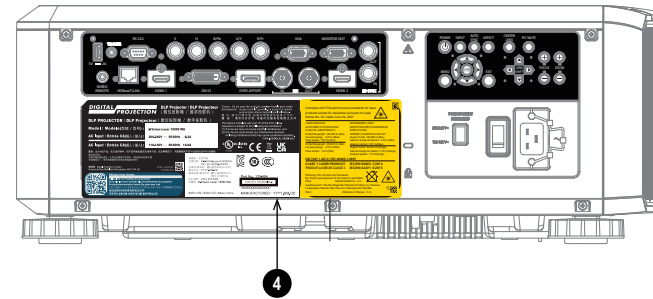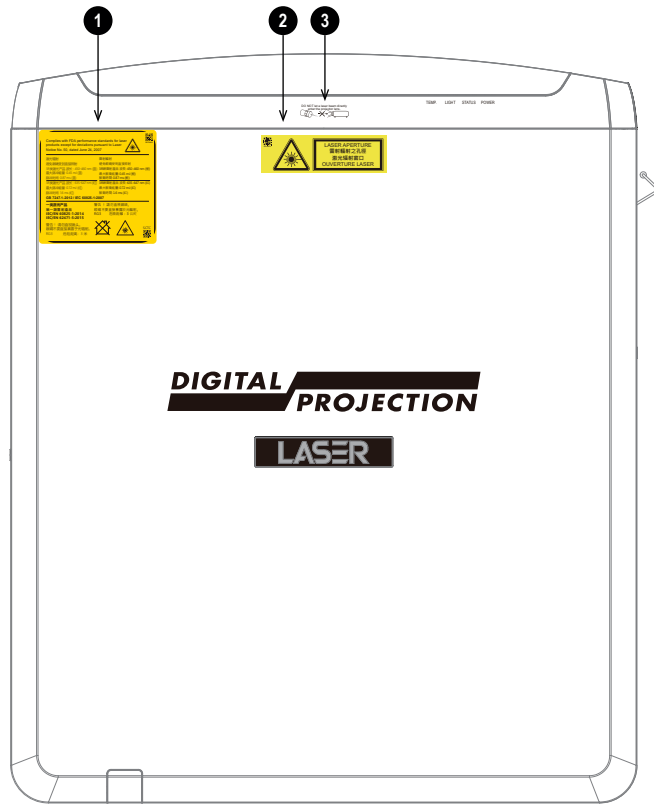
Notes

Interlock Switches

Interlock switches are installed at the main frame, inside the cover. These will power-off the system individually when activated.

1. Will be activated when the projection lens is removed or misplaced.

2. Will be activated when the top cover is removed.
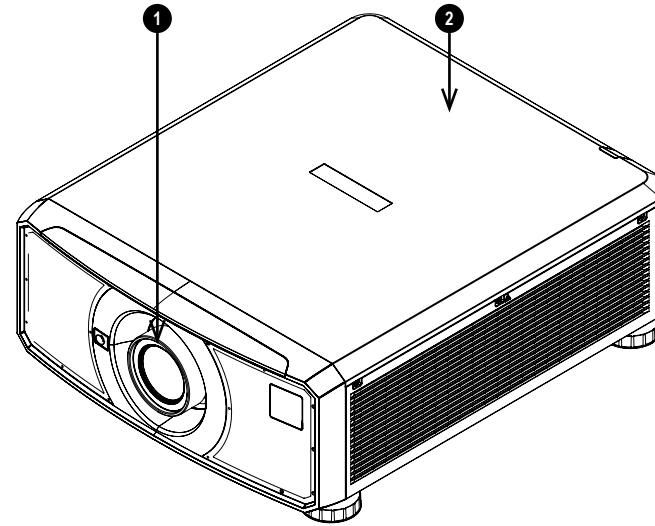
Notes

Introduction

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

- WUXGA native resolution delivering 15,000 ISO lumens.
- Support for Frame Sequential 3D.
- Support for Dual Pipe 3D format.
- 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.
- Red laser assist for enhanced color fidelity.
- 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.

A serial number is located on the side of the projector. Please record it here for future reference:

Notes

Contents

Notes

Notes

Notes

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DIGITAL PROJECTION

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E-Vision Laser 15000 Series

High Brightness Digital Video Projector

INSTALLATION & QUICK START GUIDE

Projector overview

1. Air inlet
2. Front infrared window
3. Lens mount
4. Air inlet
5. Rear infrared window
6. Air outlet
7. Connections panel
8. Control panel
9. Adjustable feet
10. Voltage selector
11. Mains socket and switch
12. Air inlets
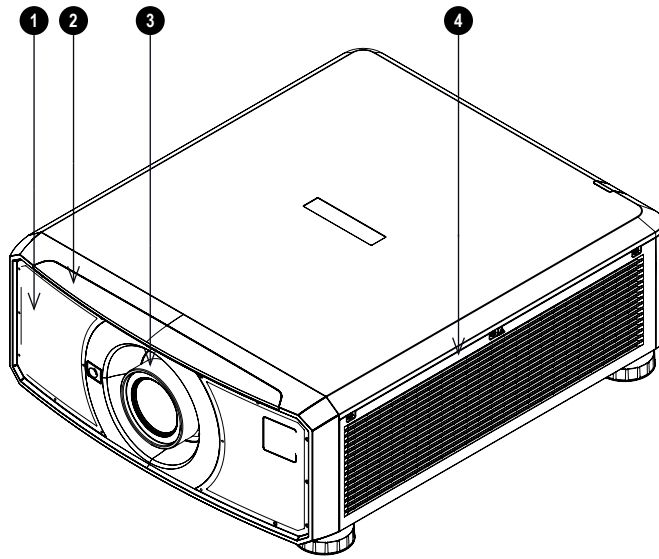
Front View
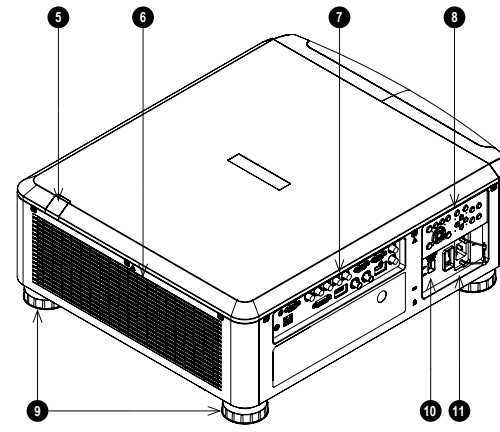
Rear View
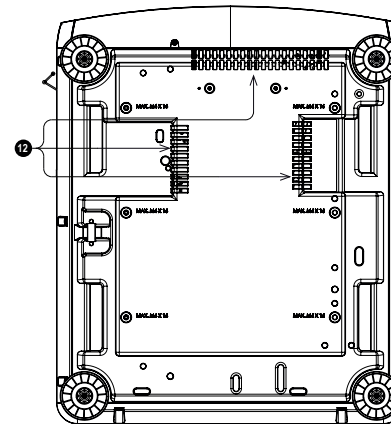
Bottom View

Control panel

1. **POWER**
   Switches the projector on and off (STANDBY).
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** Shows and hides the projected image.
   When muted, the light source is completely switched off and the screen is black.
7. **MENU**
   Displays and exits the OSD.
8. **Arrow buttons & ENTER**
   Navigation buttons used to highlight menu entries in the OSD. Press **ENTER** to open or execute the highlighted menu entry.
9. **EXIT**
   Exits the current OSD page and enters the level above.
10. **LENS SHIFT**
    Arrow buttons move the lens in the specified direction.
11. **FOCUS**
    Plus and minus buttons move the focus in and out.
12. **ZOOM**
    Plus and minus buttons zoom in and out.

Control Panel
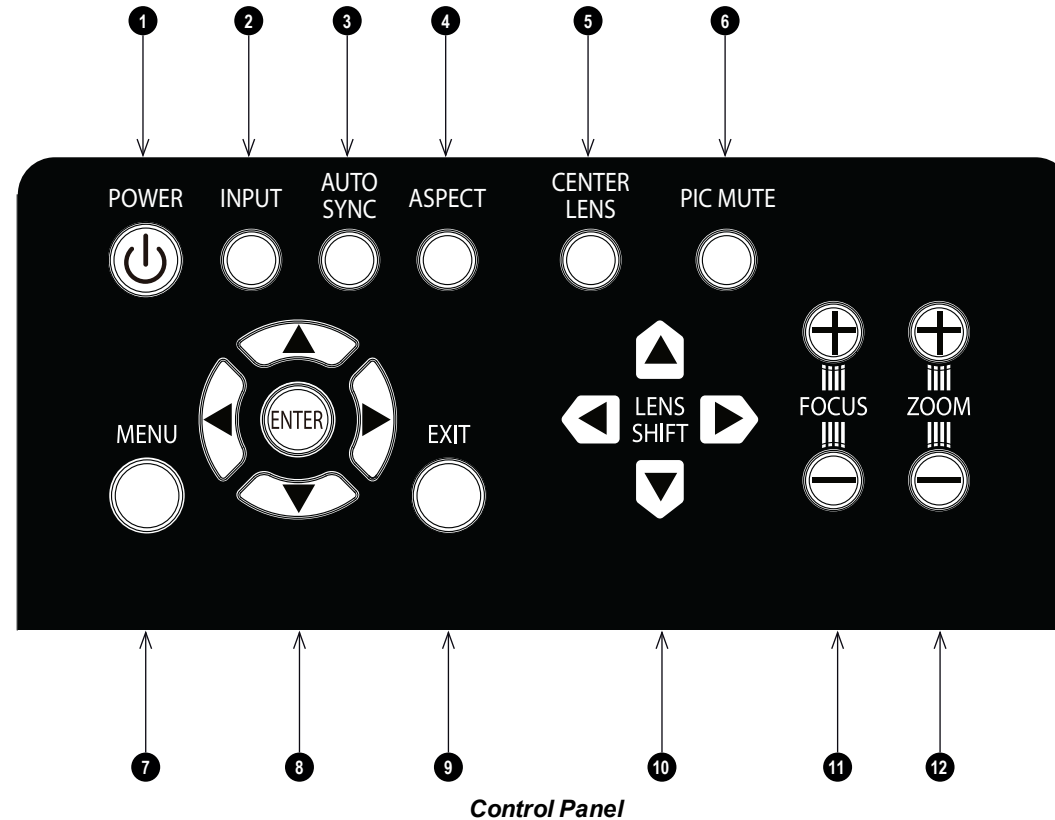
Projector indicators

TEMP.   Off = no problem

Flashing red = temperature error

LIGHT   Off = light is switched off

Flashing green (cycles of single flashes) = shutter is on and light is temporarily off

Flashing red (cycles of single flashes) = light cannot can't be ignited during warm up

Flashing red (cycles of double flashes) = light extinguished during normal operation

On, amber = light is in forced ECO mode at high temperature

On, green = light is switched on

STATUS   Off = no problem

Flashing amber (cycles of double flashes) = request to perform lens calibration

Flashing green (cycles of double flashes) = lens calibration in progress

Flashing red (cycles of single flashes) = cover error

Flashing red (cycles of double flashes) = TEC/color sensor problem

Flashing red (cycles of four flashes) = fan error

On, red = system error

POWER   Off = the projector is switched off

Flashing green = the projector is warming up

Flashing amber = the projector is cooling down to standby mode

Flashing red = the projector is preparing to go into network standby mode

On, red = standby mode, power saving without network control

On, amber = standby mode, power saving with network control

On, green = the projector is switched on
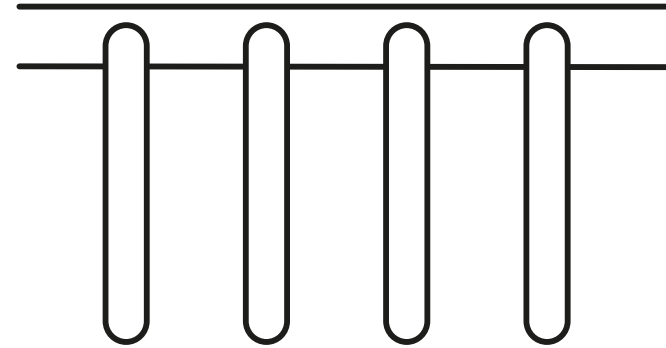
TEMP.   LIGHT   STATUS   POWER

Indicators

Notes

Remote control

1. **Power ON / OFF**
   Turns power on and off.

2. **Pic Mute OPEN / CLOSE**
   Shows and hides the projected image.
   When OFF, the light source is completely switched off and the screen is blank.

3. **OSD ON / OFF**
   Enable and disable screen timeout messages and control whether to show the OSD during projection.

4. **MENU**
   Access the on screen display (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 shift, 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. **DEFAULT**
   When editing a parameter, press this button to restore the default value.

8. **INFO**
   Access information about the projector.
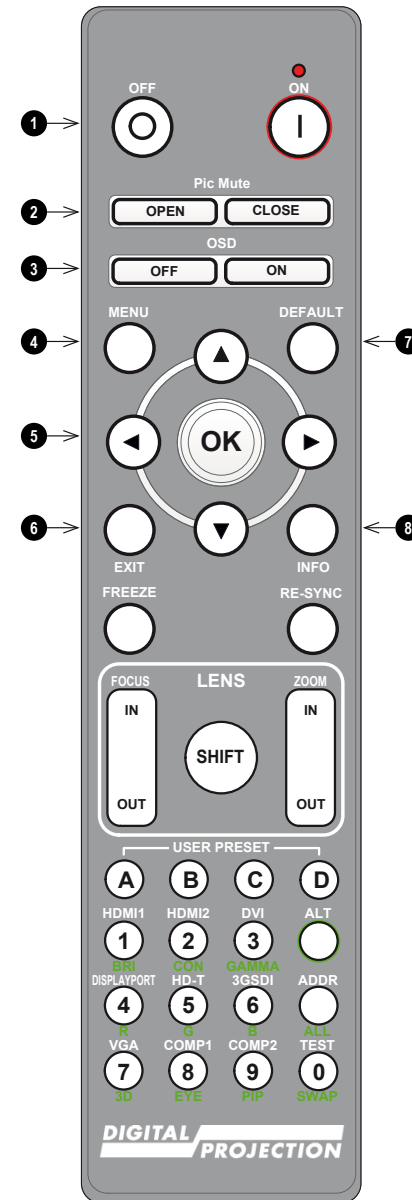
Notes

Remote Control

9. **FREEZE**
   Freeze the current frame.

10. **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.

11. **USER PRESET A, B, C, D**
    Load user presets.

12. **RE-SYNC**
    Re-synchronise with the current input signal

13. **ALT**
    Press and hold this button to access alternative functions for all buttons with a green label.

14. **DVI / GAMMA / numeric input 3**
    Select the DVI input.
    Use with ALT to switch to the next Gamma value:
    ...1.0, 1.8, 2.0, 2.2, 2.35, 2.5...

15. **HDMI 2 / CON / numeric input 2**
    Select the HDMI 2 input.
    Use with ALT to bring up the Contrast control, then adjust the value with the LEFT and RIGHT arrow buttons.

16. **HDMI 1 / BRI / numeric input 1**
    Select the HDMI 1 input.
    Use with ALT to bring up the Brightness control, then adjust the value with the LEFT and RIGHT arrow buttons.
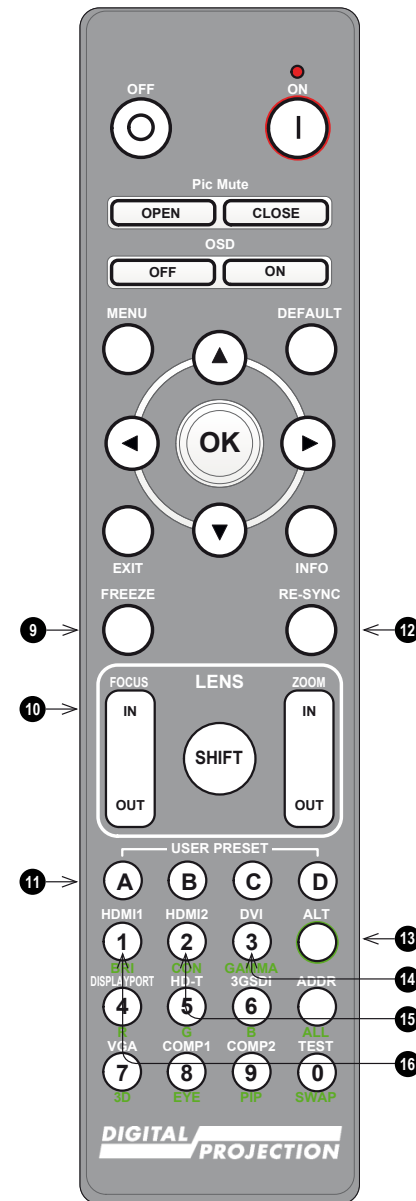
Remote Control

Notes

17. **DISPLAYPORT 1 / R / numeric input 4**
Select DisplayPort 1 input.

18. **HD-T / G / numeric input 5**
Select the HDBaseT input.

19. **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.

20. **3GSDI / B / numeric input 6**
Select the 3G-SDI input.
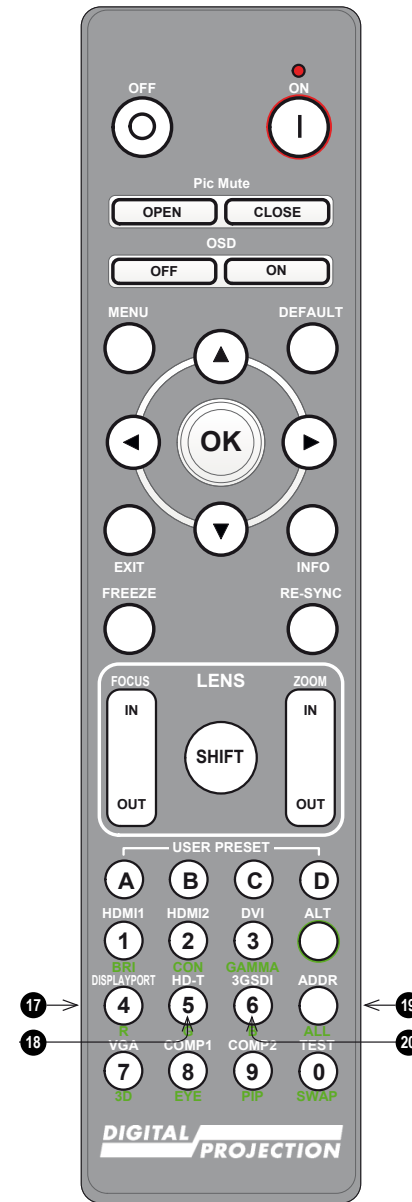
Remote Control

21. **VGA / 3D / numeric input 7**
Select the VGA input.
Use with **ALT** to toggle the 3D Format setting between Off and Auto.

22. **COMP1 / EYE / numeric input 8**
Select the Component 1 input.
Use with **ALT** to switch between left and right eye 3D dominance.

23. **TEST / SWAP / numeric input 0**
Show a test pattern. Press again to show the next test pattern: White, Black, Red, Green, Blue, Checkerboard, White Crosshatch, Red Crosshatch, Green Crosshatch, Blue Crosshatch, Color Bar, Screen Layout, 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.
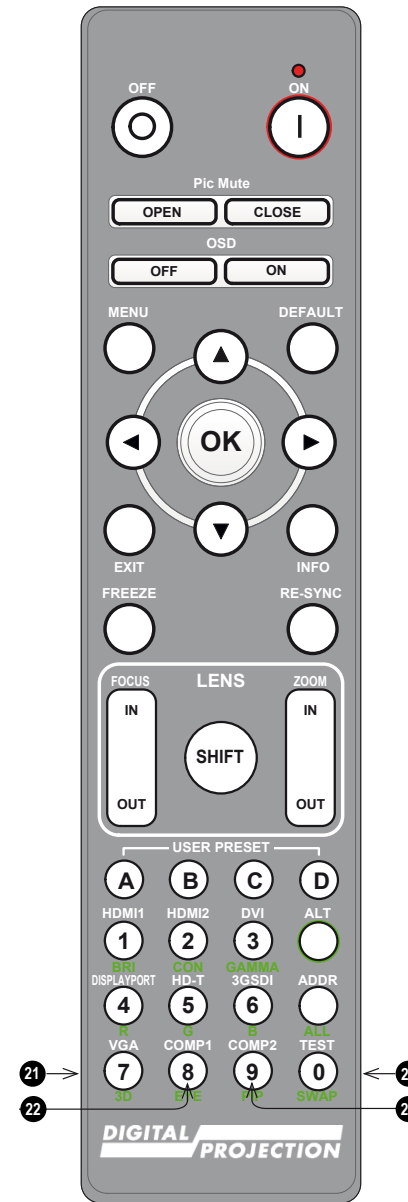
Remote Control

Infrared reception

The projector has infrared sensors at the front and rear.

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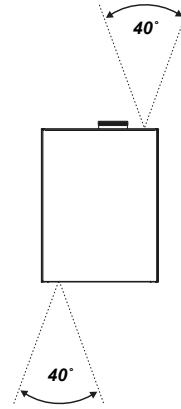
Positioning the screen and projector

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 **1**.

2. **Six M4 holes for ceiling mount 2**. The screws should not penetrate more than 16 mm into the body of the projector.
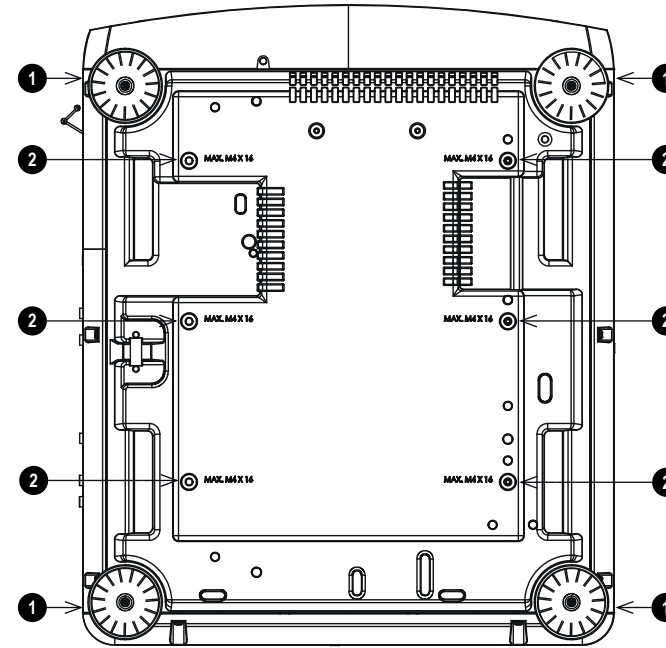
Roll and pitch

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.

1. Recommended positions: inputs side up

2. Also possible.

① ➤ *30˚*

② ➤ *360˚*

② ➤ *330˚*

Roll

Pitch
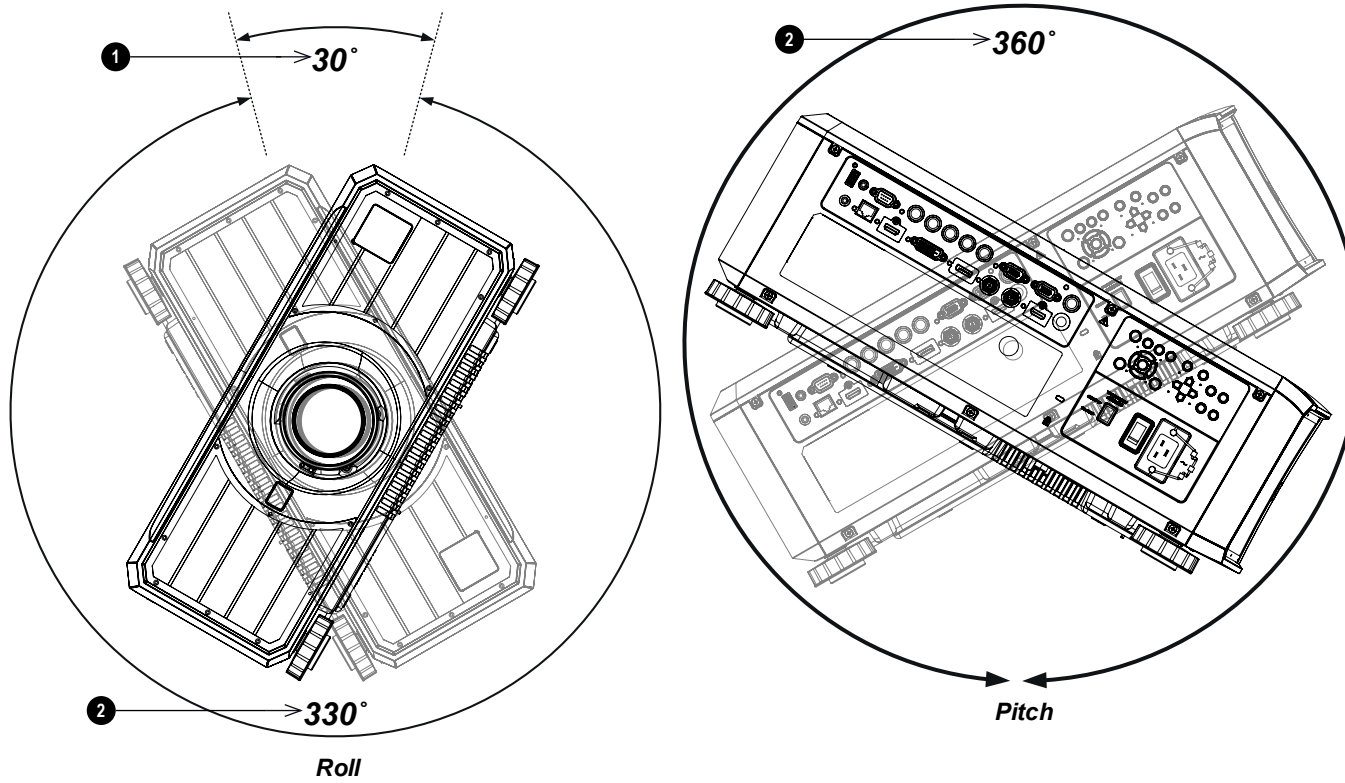
Changing the lens

Inserting a new lens

1. Remove the lens aperture cap from the projector.
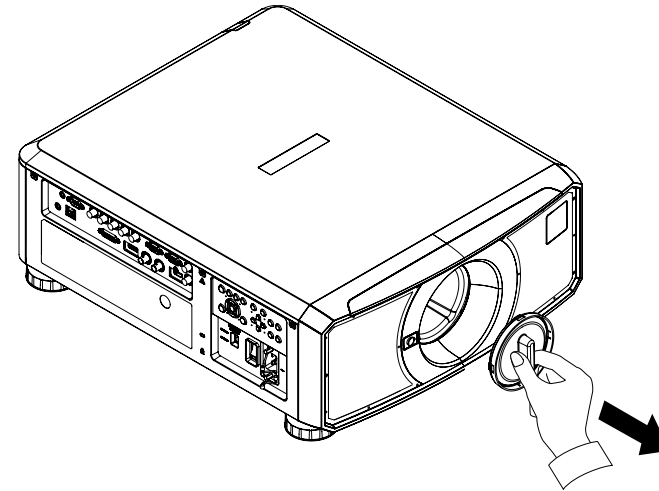
2. Remove the front and rear lens caps from the lens.
3. Position the lens so that the labels are at the top, and gently insert it all the way into the lens mount.
4. Push the lens in firmly and turn it clockwise until it clicks into place.
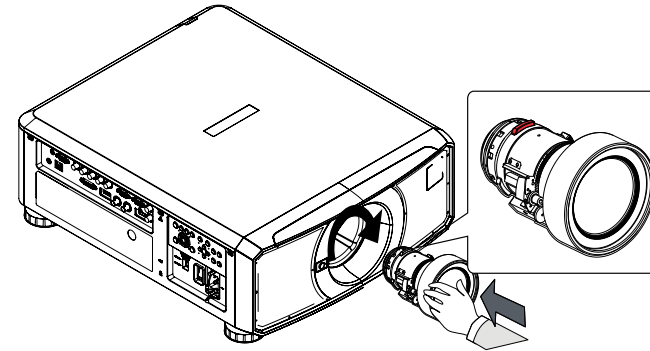
Notes

The projector must be fully turned off prior to attempting a lens change.

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.

FDA regulations require that a lens hood (p/n:121-867) is permanently fitted when using the 3.58 - 5.38 : 1 zoom lens or the 5.31 - 8.26 : 1 zoom lens with the E-Vision Laser 15000 projector in the United States of America. Fitting can be provided by your reseller or System Integrator.

The lens is shipped separately.

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

The projector will not turn on the light source without a lens fitted

Removing the lens

1. Push the lens release button all the way in
2. Turn the lens anti-clockwise until it disengages
3. Slowly remove the lens.
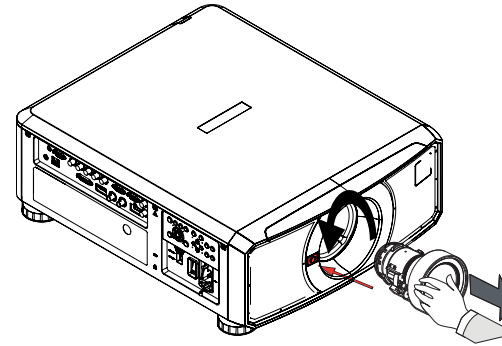
Fitting a lens hood

A lens hood can be fitted to the projector after the lens is inserted.

1. Place the hood over the lens and align the screw holes on the hood with the holes on the bottom of the projector **❶**.

2. Screw in the two M4x16 screws **❷** to secure the hood to the projector.

Connecting the power supply

1. Adjust the VOLTAGE SELECT switch to the required voltage **①**

2. Firmly push the mains connector into the AC In socket **②**

Voltage selection

The VOLTAGE SELECT switch must be set to match the power supply you are using:

Voltage of power supply used	Position of VOLTAGE SELECT switch
AC100-130V outlet	200 240V~ / 100 130V~
AC200-240V (single phase) outlet	200 240V~ / 100 130V~

Operating the projector

Switching the projector on

1. Ensure a lens is fitted. Connect the power cable between the mains supply and the projector.
2. Switch on at the switch next to the power connector.
3. 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 and the fans start working. The flashing stops and the **POWER** and **LIGHT** indicators both light steady green. The projector is now switched on.

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 amber, the system will go out 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 off at the mains power switch next to the power connector 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

The following test patterns are available: White, Black, Red, Green, Blue, Checkerboard, White Crosshatch, Red Crosshatch, Green Crosshatch, Blue Crosshatch, Color Bar, Screen Layout, Off

To display a test pattern:

- Press **TEST** on the remote control.
  Change the test pattern using the **LEFT** and **RIGHT** arrow buttons.
- 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 the previous page.*

⚠ **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 46 for full details of how to use the controls and the menu system.*

Adjusting the lens

You can use the following options to adjust the lens:

- Control panel. See Control panel on page 19
- Remote control. See Remote control on page 21
- On screen display (OSD). See Lens menu on page 52

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

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DIGITAL PROJECTION

A Delta Associate Company

E-Vision Laser 15000 Series

High Brightness Digital Video Projector

CONNECTION GUIDE

Signal inputs

Digital inputs and outputs

1. **USB**
   USB 5 V / 1.5 A output. Connect a USB cable to supply power to an external device.

2. **HDBaseT/LAN**
   Receives digital signal from HDBaseT-compliant devices. Connect an HDBaseT cable.
   Provides LAN connectivity via an ethernet or ArtNet cable.

3. **HDMI I**
   HDMI 1.4b input 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 120. Connect an **HDMI** cable to the connector.

4. **DVI-D**
   This input can receive digital signal from a compatible source. Supports sources up to 1920 x 1200 resolution, 24-60 Hz. Supports HDCP.

5. **3G-SDI in**

6. **3G-SDI out**
   Connect a 3G-SDI cable to distribute the 3G-SDI signal to another projector.

7. **DisplayPort**
   DisplayPort 1.1a input. Connect a DisplayPort cable to the connector. Supports sources up to 1920 x 1200 resolution at 24 - 60 Hz. Supports HDCP.

8. **HDMI II**
   HDMI 1.4b input 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 120. Connect an **HDMI** cable to the connector.
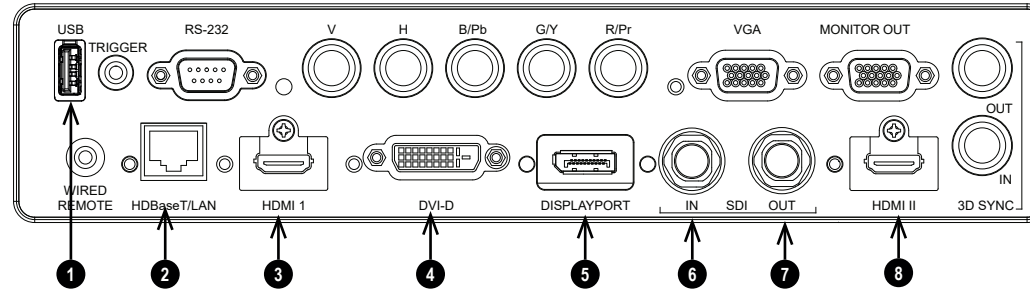
For simultaneous HDBaseT and LAN connectivity, a third-party distribution product can be utilised to combine HDBaseT video stream with LAN connection for delivery to the projector.

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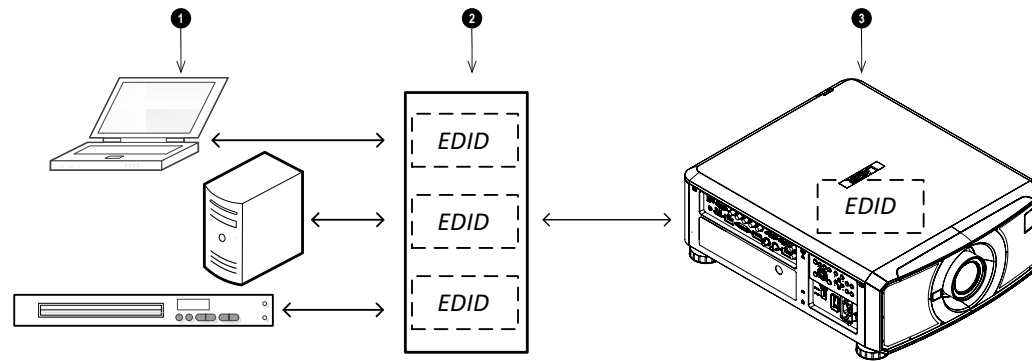
The EDIDs in the switcher should be the same as the one in the projector.

Notes

Analog inputs and outputs

1. Component
   RGBHV, RGsB or RGBS
   Set Color Space in the Color menu to Auto or RGB-Video.
   YPbPr or YCbCr
   Set Color Space in the Color menu to YPbPr or YCbCr.

2. **VGA**
   This input receives analog signals from a computer. When using this input, it is best to use a fully wired VGA cable to connect the source to the projector. This will allow the source to determine the projector's
   capabilities via DDC and show an optimized image. Such cables can be identified as they have a blue connector shell.

3. **Monitor Out**
   Connect an analog monitor (VGA) cable to the 15-pin D-type to output the signal received on the VGA input.
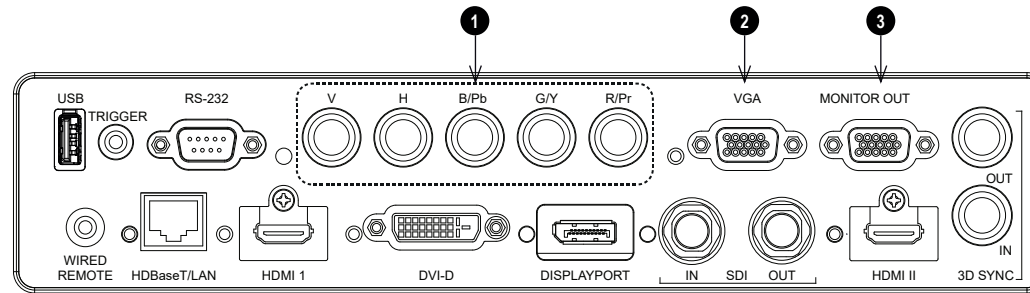
Notes

3D connections

1. **HDBaseT**
   Receives 3D signal from HDBaseT-compliant devices. Connect an HDBaseT cable.

2. **HDMI I / Dual Pipe Left**
   HDMI 1.4b input 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 120. Connect an **HDMI** cable to the connector.

3. **DVI-D**
   Single Link DVI-D input supporting 3D Frame Sequential up to 30Hz per eye. Also supports the domestic Blu-Ray formats. See supported signal input modes on page 120.

4. **DisplayPort**
   DisplayPort 1.1a input supporting **Frame Sequential** 3D source up to 120Hz. Connect a **DisplayPort** cable to the connector.

5. **HDMI II / Dual Pipe Right**
   HDMI 1.4b input 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 120. Connect an **HDMI** cable to the connector.

6. **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. 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.
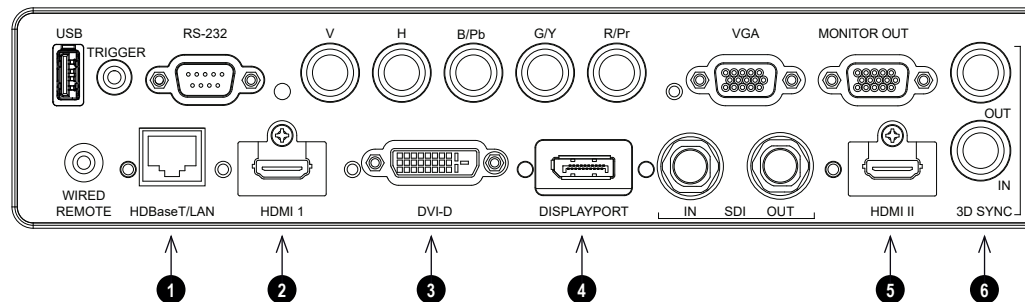
Notes

3D sources up to 60Hz requiring frame doubling and left/right interleaving

1. Connect to one of the following inputs on the connection panel:
   - HDMI I
   - HDMI II
   - HDBaseT
2. Set **3D Format** in the 3D menu to match the format of the incoming signal. Choose from **Auto**, **Side by Side (Half)** and **Top and Bottom**.
   The **Frame Packing** format is automatically detected by the projector.

Dual Pipe 3D

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

3D Sync

1. 3D Input
2. 3D Sync In
3. 3D Sync Out
4. IR emitter or Zscreen
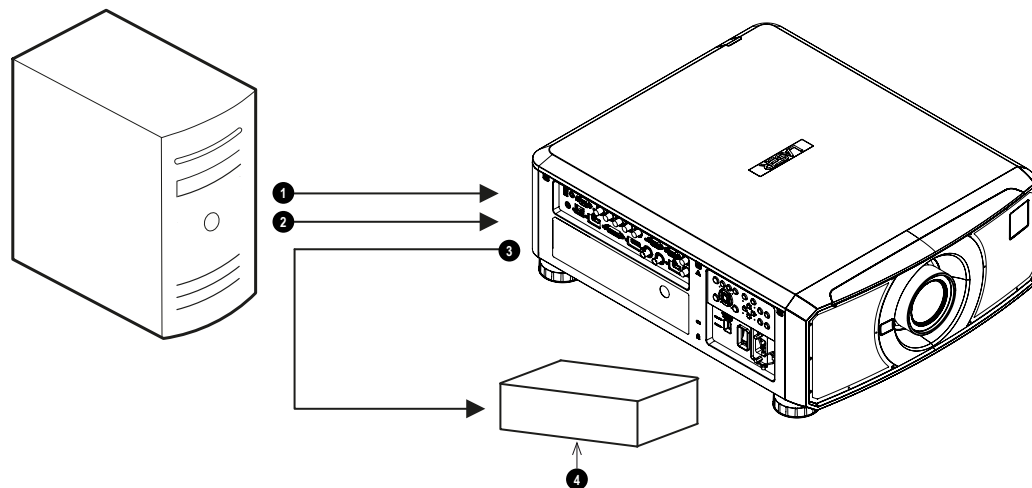
Control connections

1. **Trigger**

   Trigger outputs are defined in the **Setup** menu. Each ouput 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.
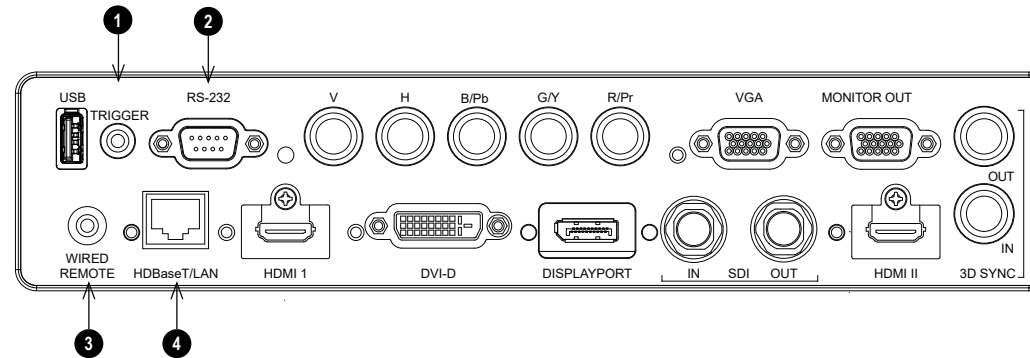
2. **RS232**

   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.

3. **Wired Remote**

   The remote control can be connected using a standard 3.5 mm mini jack cable (tip-ring-sleeve, or TRS).

4. **HDBaseT/LAN**

   The projector's features can be controlled via a HDBase-T or LAN connection, using Digital Projection's **Projector Controller** application or a terminal-emulation program.

Notes

☞ *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.*

☞ ***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.

Un-crossed LAN cables

Un-crossed
LAN cable

RS232 connection example

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

Straight through cable

Computer to Projector

DIGITAL PROJECTION

A Delta Associate Company

E-Vision Laser 15000 Series

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
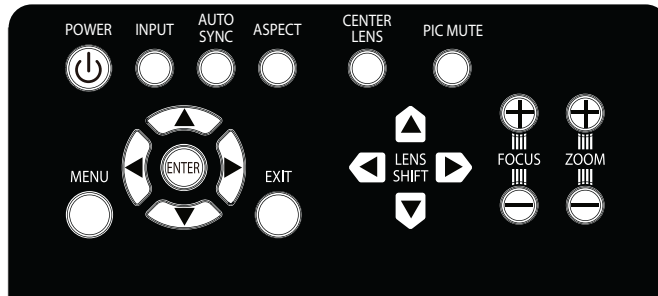
Projector control panel
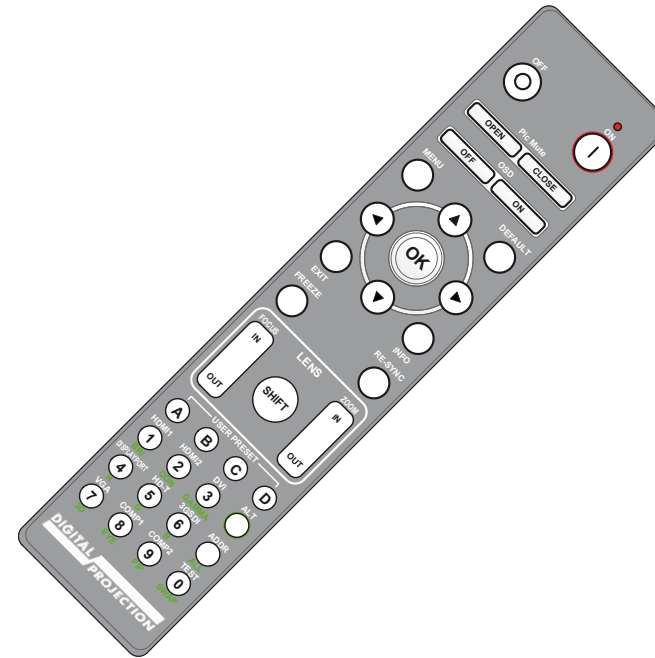
Remote control

Opening a submenu

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

To open a submenu:

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**.

Main Menu	
Input	HDMI 1
Test Pattern	
Lens	▶
Image	▶
Color	▶
Geometry	▶
Edge Blend	▶
3D	▶
Laser	▶
Setup	▶
Network	▶
▼	
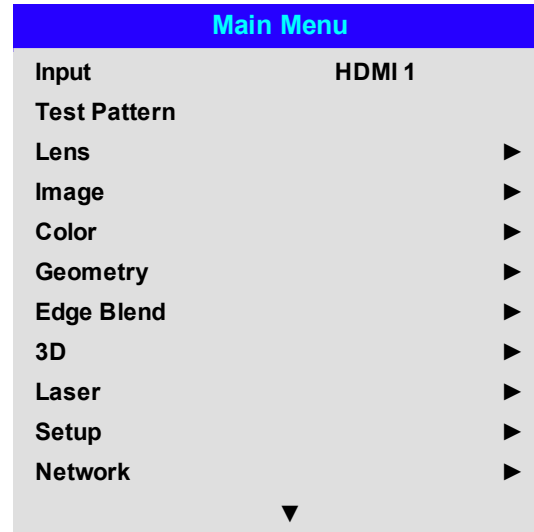
On Screen Display (OSD): Top Level Menu

Main Menu	
▲	
PIP	▶
Information	▶
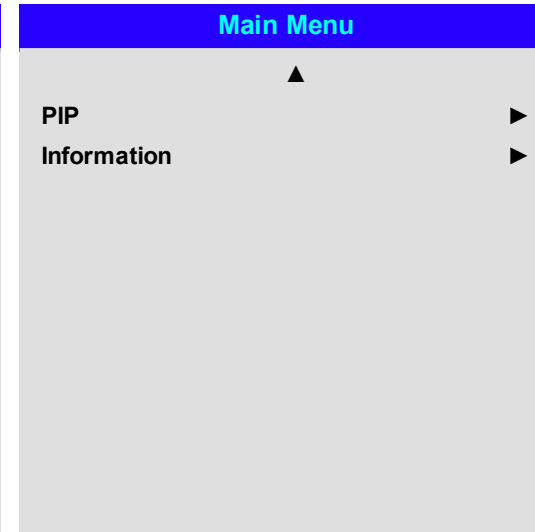
OSD: Top Level Menu Continued

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).

Menu Name	
Highlighted Item	Value
Menu Item	Value
Unavailable Item	Value
Slider	Value ▭▬
Sub-menu	▶
Command	
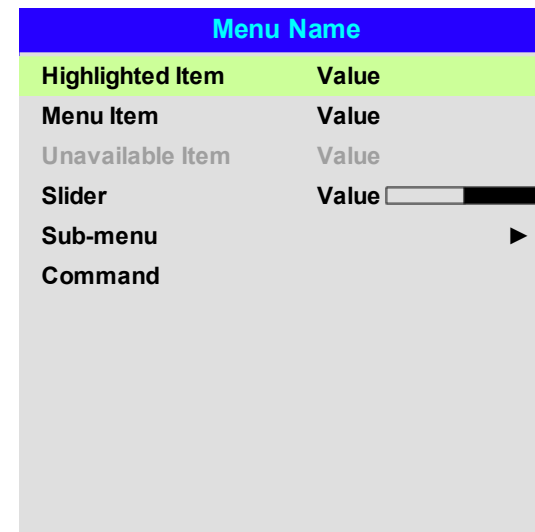
Inside a menu

☞ *The highlighted item has green background.*

Accessing sub menus

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

Executing commands

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

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

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

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 show 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 **RETURN** to exit the slider and return to the menu.

Parameter	**Value** ▭▬

Slider

Editing numeric values

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

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

Notes

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

Using the projector   Digital Projection E-Vision Laser 15000 Series

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**
  White, Black, Red, Green, Blue, Checkerboard, White Crosshatch, Red Crosshatch, Green Crosshatch, Blue Crosshatch, Color Bar, Screen Layout, Off Use the **LEFT** and **RIGHT** arrow buttons to switch between values.
- **Lens, Image, Color, Geometry, Edge Blend, 3D, Laser, Setup, 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, Information.**
  Press **ENTER/OK** to open these menus and access various settings.

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

Main Menu	
Input	HDMI 1
Test Pattern	
Lens	▶
Image	▶
Color	▶
Geometry	▶
Edge Blend	▶
3D	▶
Laser	▶
Setup	▶
Network	▶
▼	
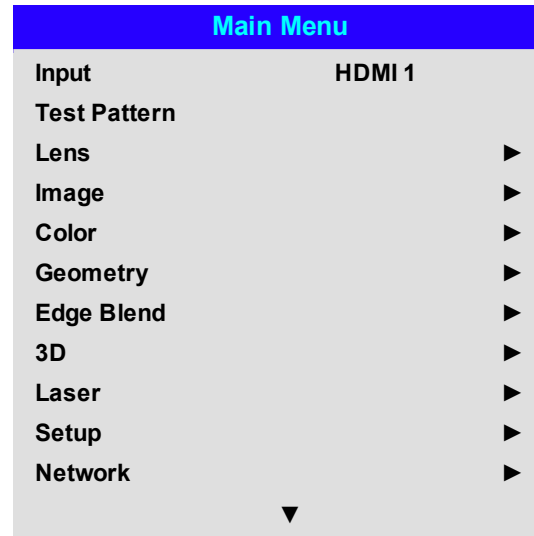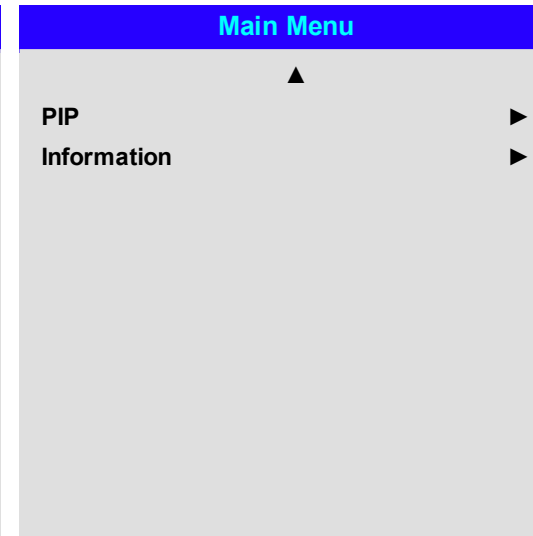
Main Menu, page 1

Main Menu	
▲	
PIP	▶
Information	▶

Main menu, page 2

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 a UST or a non-UST lens.
- **Lens Memory**
  Opens a sub-menu, see next page.

Lens		
Lens Lock	**Off**	
Lens Control		►
Center Lens		
Lens Type	**non-UST Lens**	
Lens Memory		►
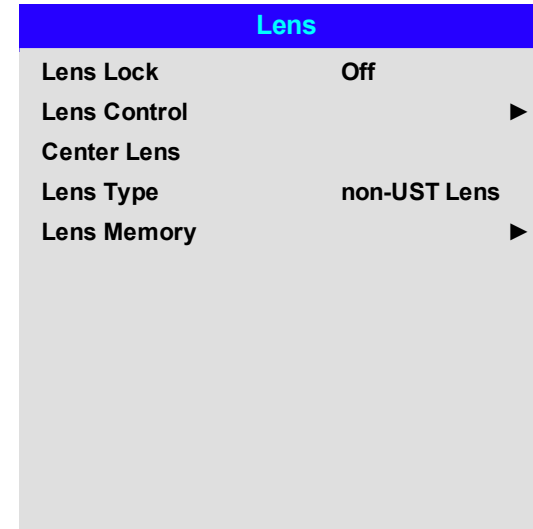
Lens control

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**.

Lens Control		
Zoom	▲	▼
Focus	◄	►

[OK] Shift Adjustment

Lens Control		
	▲	
◄	**Shift**	►
	▼	
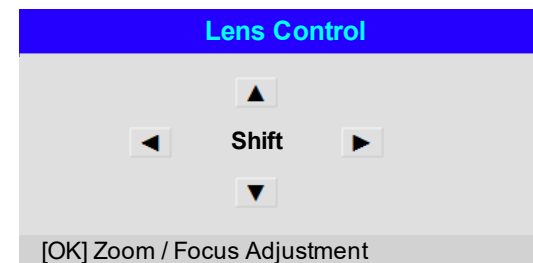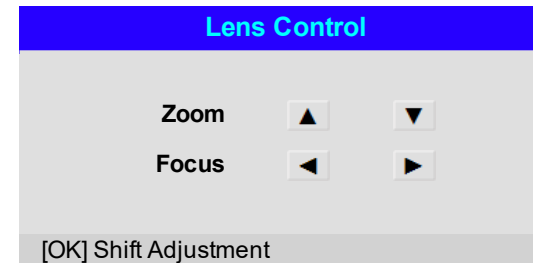
[OK] Zoom / Focus Adjustment

Lens memory

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

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

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

Notes

Lens Memory	
Load Memory	►
Save Memory	►
Clear Memory	►

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

- **Picture Mode**
  Choose from **High Bright**, **Presentation** and **Video**.
  Use a different setting depending the type of input source.
  Press **ENTER/SELECT** to open the list.
  Use the **UP** and **DOWN** arrow buttons to select a picture mode from the list, then press **ENTER/OK** to confirm your choice.
  Press **EXIT** to return to the main menu.

- **Brightness, Contrast, Saturation, Hue, Sharpness, Noise Reduction**
  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.

- **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.
  S-Curve is an enhanced mid-tone gamma.
  DICOM is a simulated DICOM display, which can be used for training applications.

- **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.

- **Position and Phase**
  Open the sub menu to adjust the position and phase settings.

- **Freeze**
  Freezes the current frame.

- **Resync**
  Press **ENTER/OK** to force the projector to resynchronise with the current input

Image	
Picture Mode	High Bright
Brightness	100
Contrast	100
Saturation	100
Hue	100
Sharpness	10
Noise Reduction	0
Gamma	2.2
Dynamic Black	Off
Light Off Timer	– – – –
Position and Phase	▶

Image
▲
Freeze
Resync
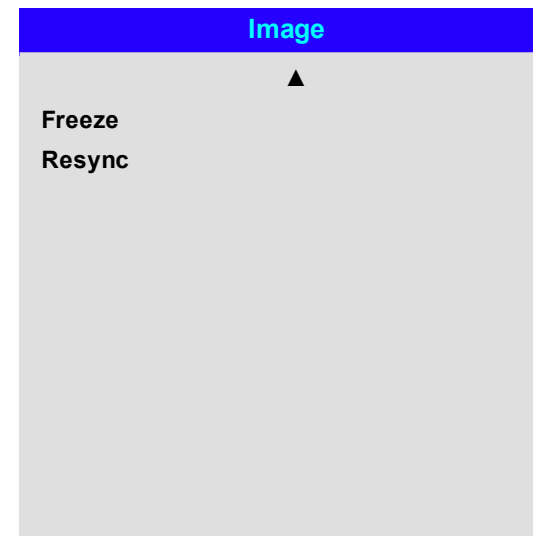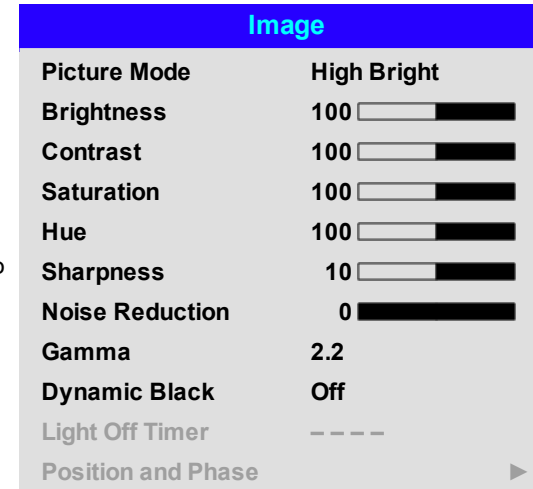
Notes

This product includes a DICOM simulation feature intended for training and other non-medical diagnosis purposes.

Position and Phase

- **V Position, H Position**
  Set the sliders as required.

- **Phase**
  Adjusts the phase of the pixel sampling clock relative to the incoming signal. Adjust the phase if noise is visible.

- **Tracking**
  Adjusts the frequency of the pixel sampling clock. Flicker or vertical banding indicate poor tracking.

- **Sync Level**
  Adjusts the voltage level of the signal detection circuitry. Adjust if the projector loses sync during scenes where the signal drops below black.
  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 exit both the slider and the menu.

Position and Phase	
V Position	100
H Position	100
Phase	100
Tracking	100
Sync Level	100
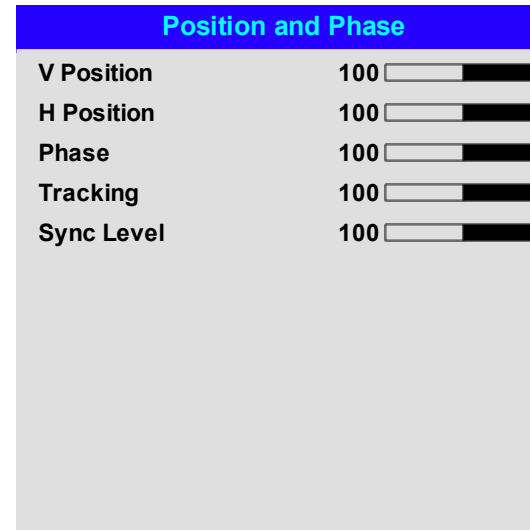
Notes

Some of the settings within the Position and Phase sub-menu, Phase, Tracking and Sync Level, affect only VGA input source. These settings are not available if the projector is using a different source.

Adjust the Phase after adjusting Tracking.

Color

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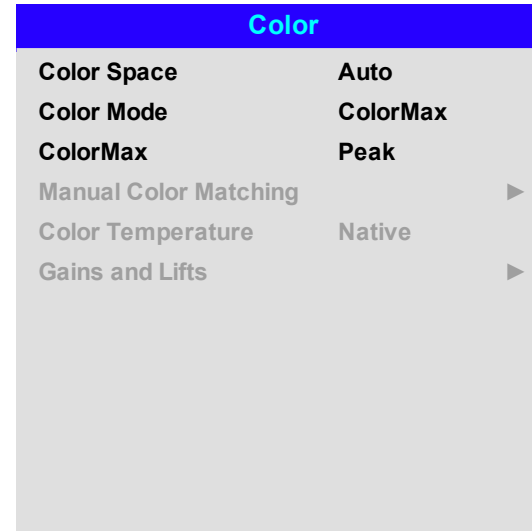
Color Space

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**
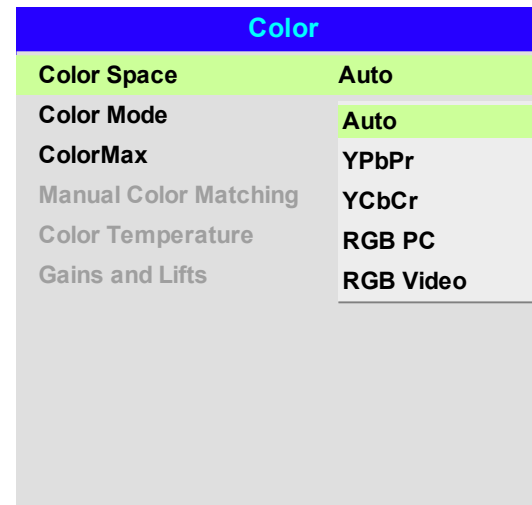
Color Mode

The projector can work in the following color modes:

- **ColorMax**
- **Manual Color Matching**
- **Color Temperature**
- **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**

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

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 Balance	
Red	100
Green	100
Blue	100

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.
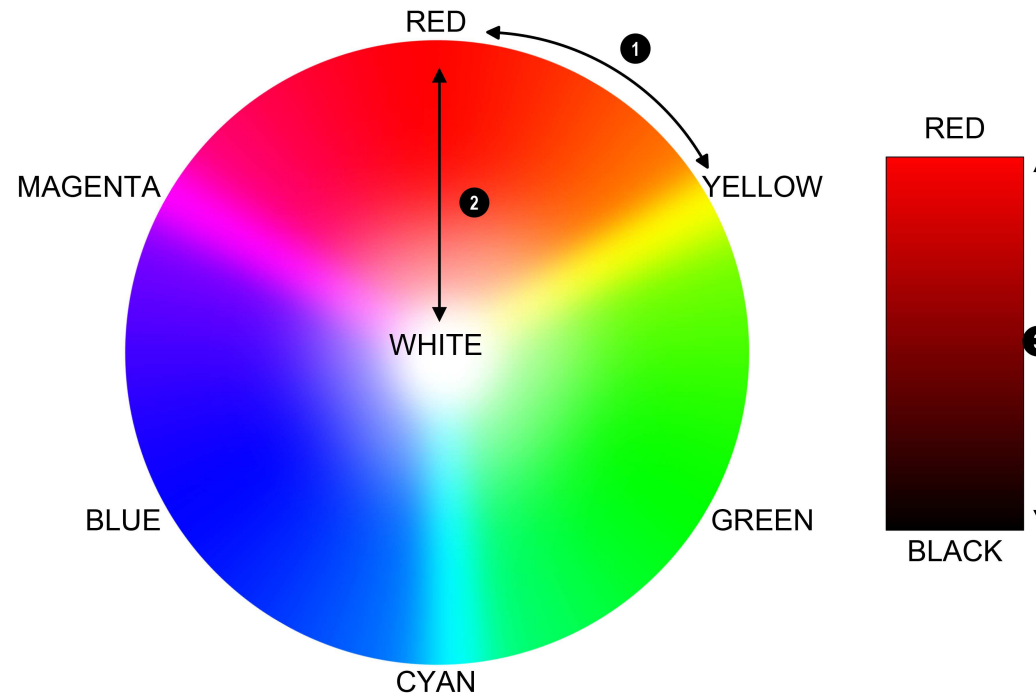
Color Temperature

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
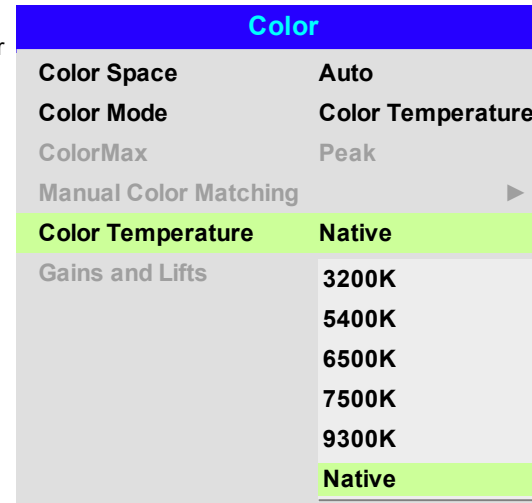
Gains and Lifts

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
Reset	

Geometry

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	▶
Warp Filter	▶

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**

Theaterscope setting

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

Without an anamorphic lens and without the TheaterScope setting applied, a 16:9 source containing a 2.35:1 image looks like this:
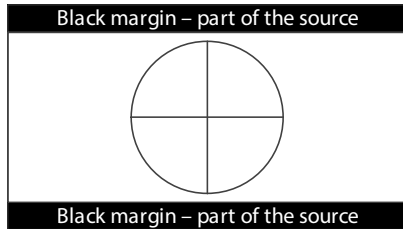
If we change the setting to TheaterScope, the black lines will disappear but the image will stretch vertically to reach the top and bottom of the DMD™:
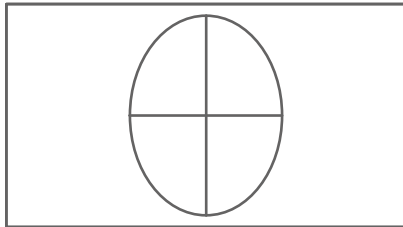
An anamorphic lens will stretch the image horizontally, restoring the original 2.35 ratio:
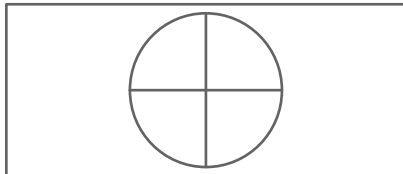
Digital Zoom

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.

Digital Zoom	
Digital Zoom	0
Digital Pan	0
Digital Scan	0
Reset	
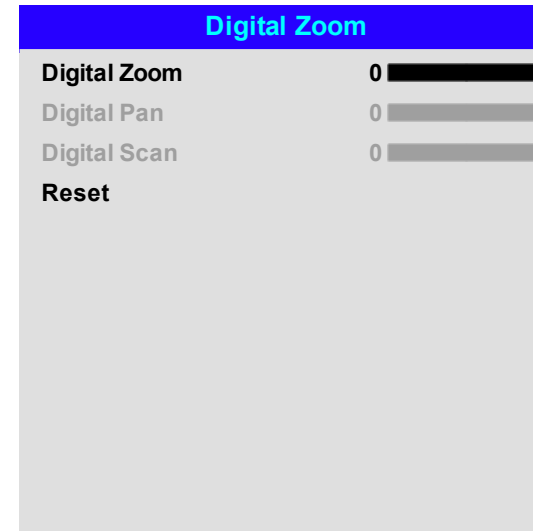
Notes

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		▶
Warp Filter		▶

Notes
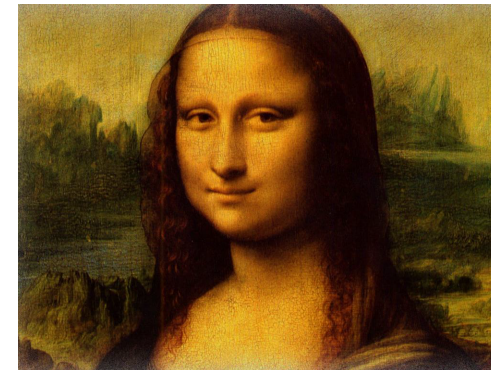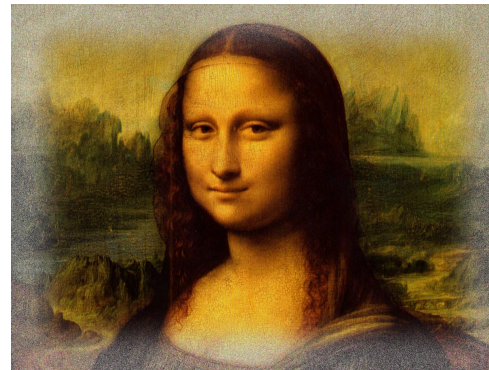
Blanking

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
Bottom	0
Left	0
Right	0
Reset	
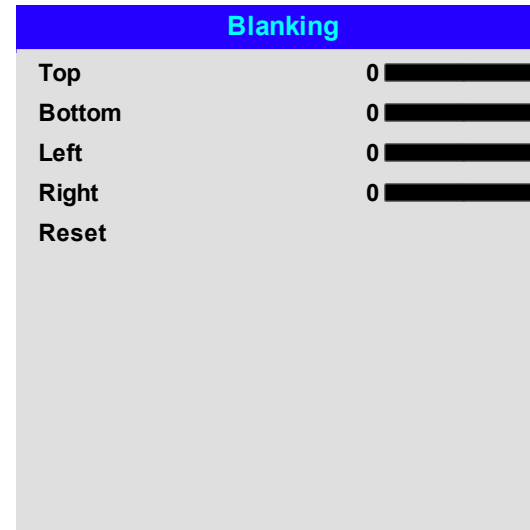
Keystone

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

Keystone	
H Keystone	0
V Keystone	0
Rotation	0
Reset	

The projector is positioned at an angle
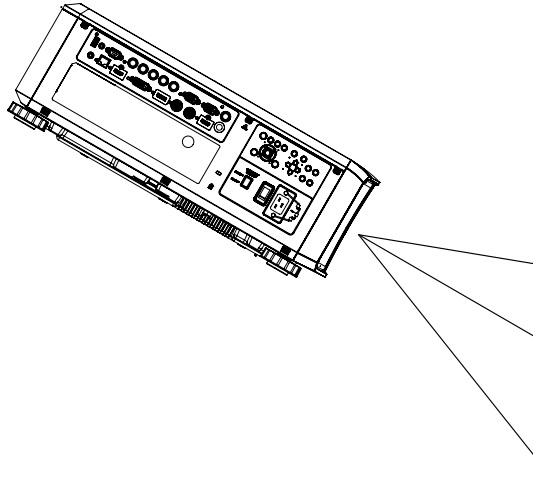
The resulting image is distorted

The image is corrected when Keystone is applied

Notes

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
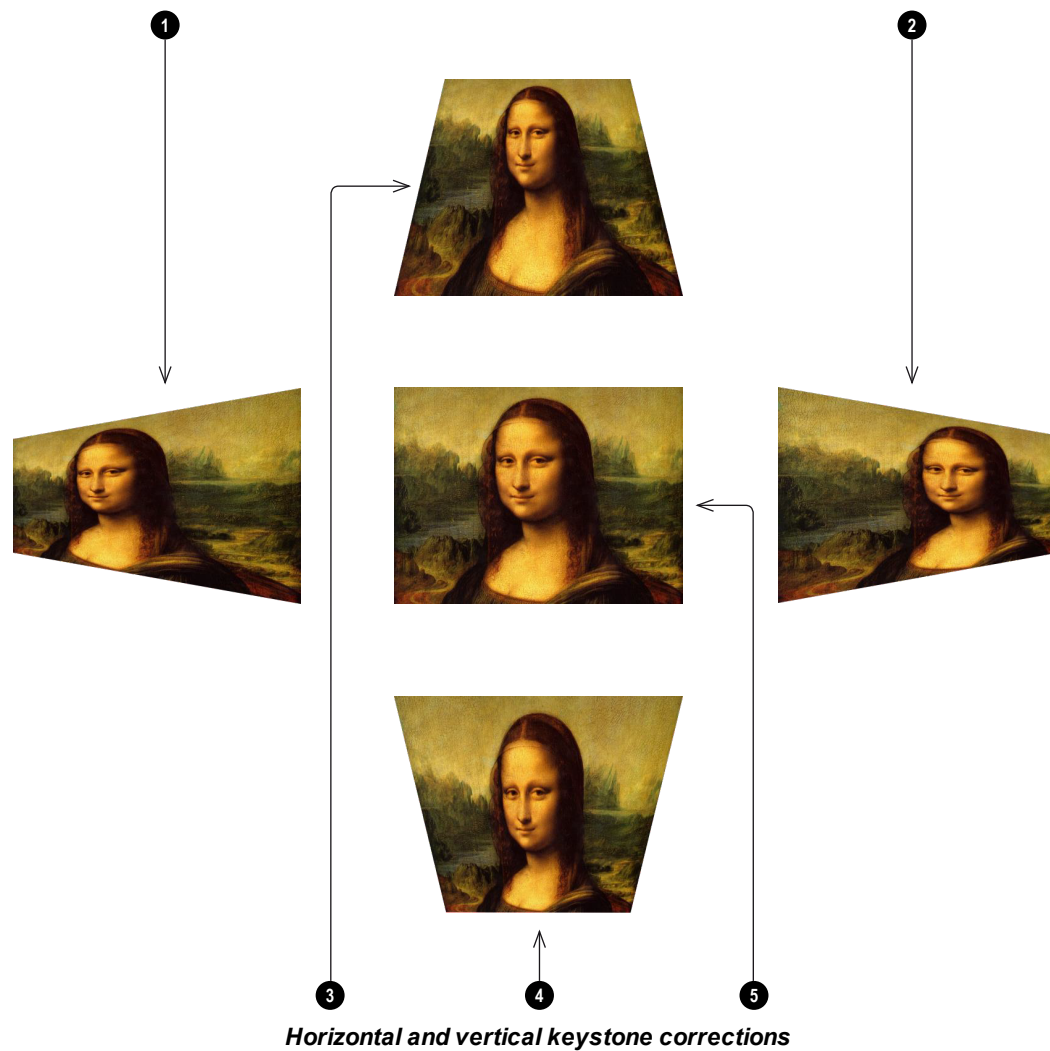
Notes

4 Corners

For each corner, apply horizontal and / or vertical correction as necessary to restore the rectangular shape of the image.
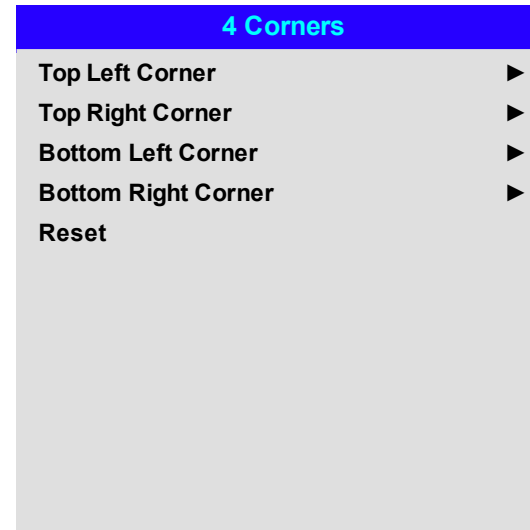
4 Corners	
Top Left Corner	▶
Top Right Corner	▶
Bottom Left Corner	▶
Bottom Right Corner	▶
Reset	

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 ▼
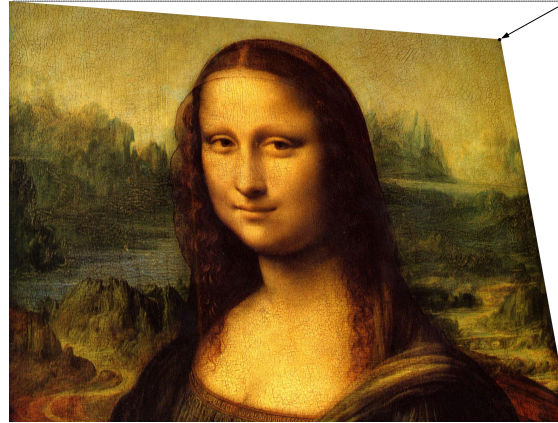
Rotation

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

Rotation
Rotation   0
Reset
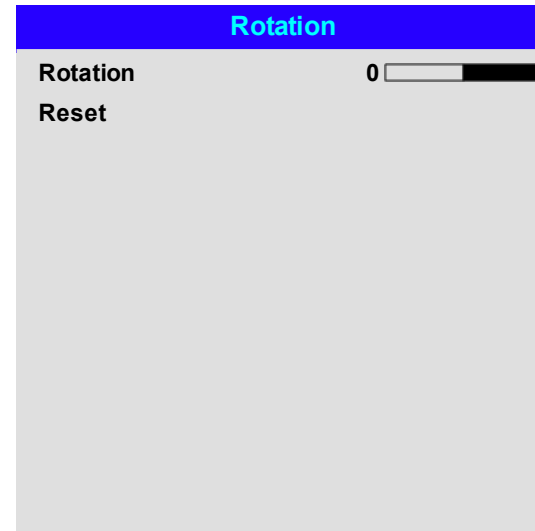
Rotation example

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.
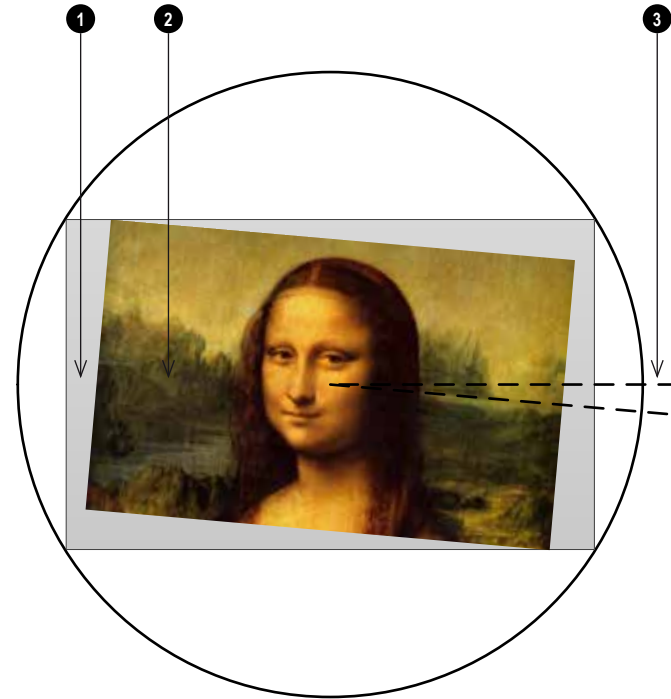
Pincushion / Barrel

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.

Pincushion / Barrel	
H Pin/Barrel	0
V Pin/Barrel	0
Keystone	▶
Reset	
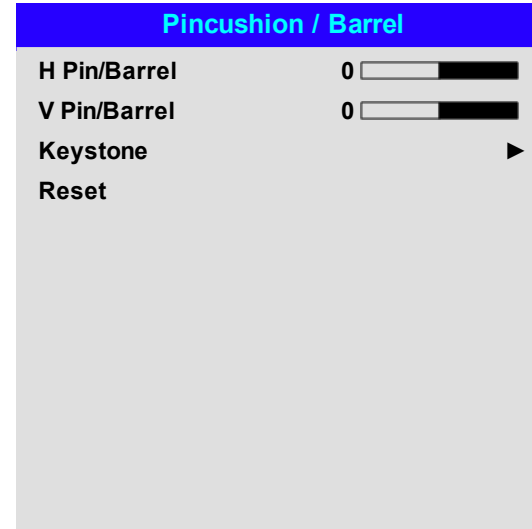
Pincushion/ Barrel example

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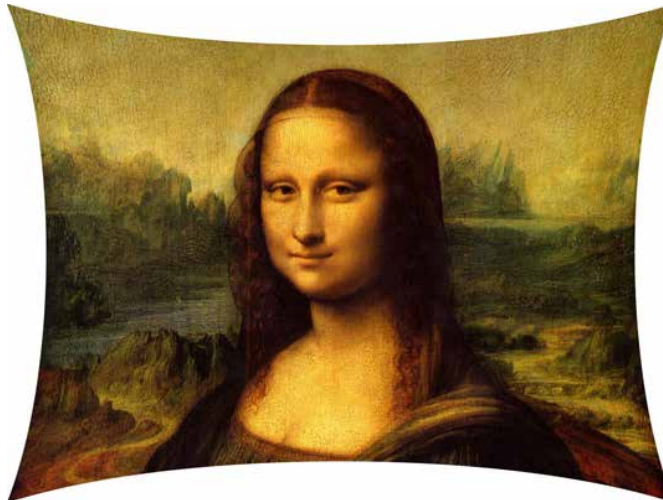
Pincushion
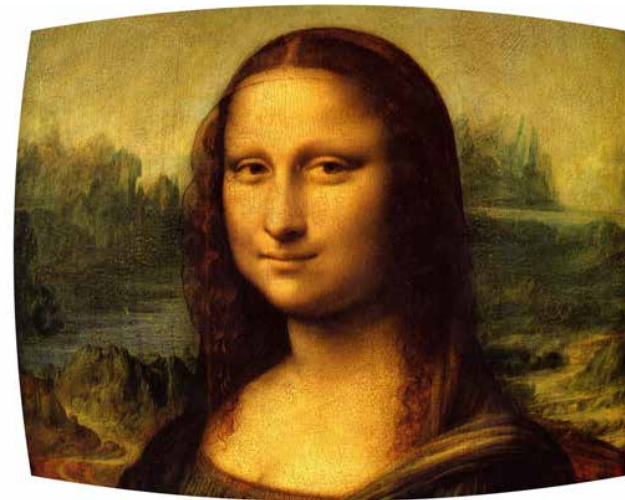
Barrel

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
Bottom	0
Left	0
Right	0
Reset	
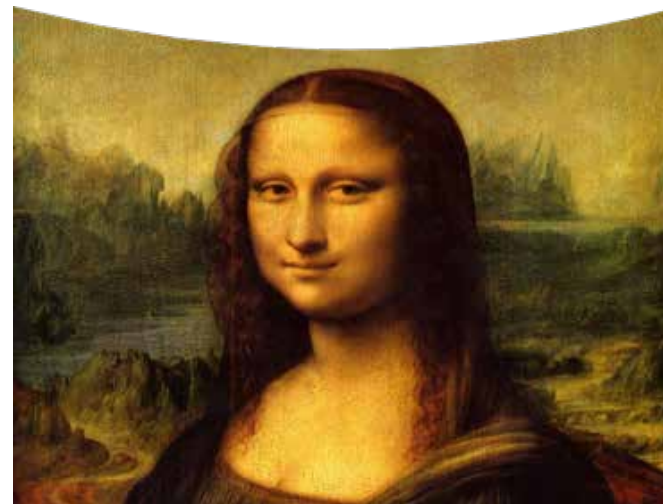
Custom Warp

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.

Custom Warp

Off

User 1

User 2
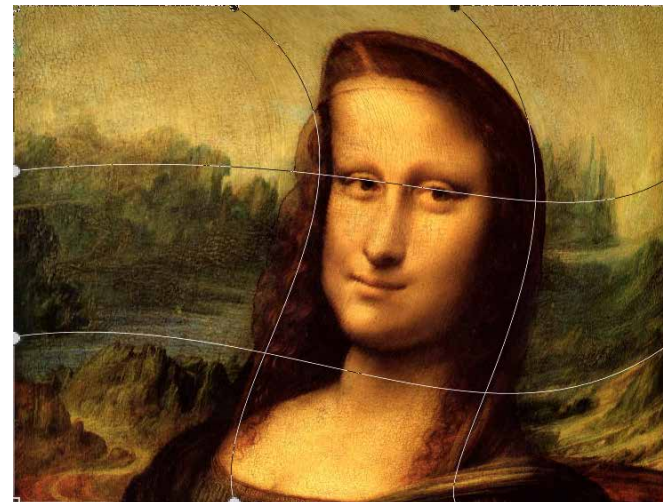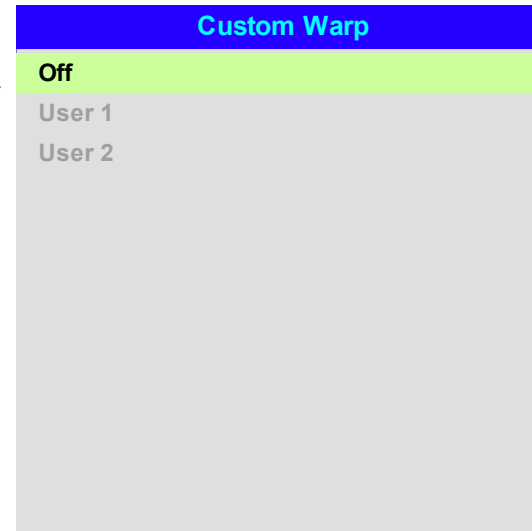
Warp Filter

This feature can be used to enhance the image after a geometry warp correction is applied.

Choose between Auto and Manual modes. In Manual mode you can set both Horizontal and Vertical filters. The filters smooth the geometry / warp correction when set to lower values and edge enhance when set to higher values.

Warp Filter	
Warp Filter	**Auto**
H Warp Filter	0
V Warp Filter	0

Notes

Edge Blend

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		

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
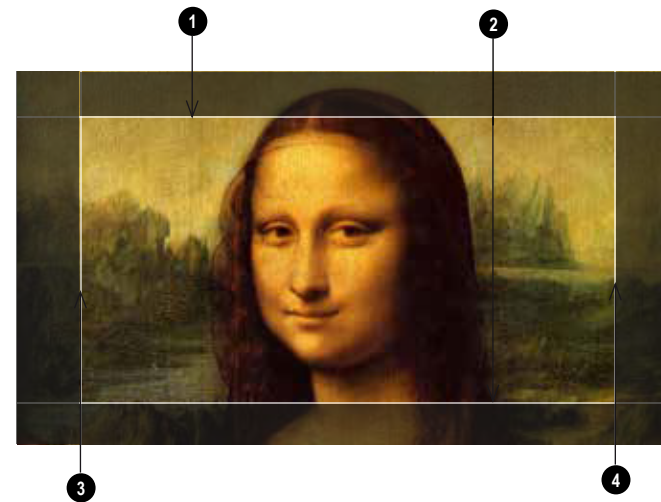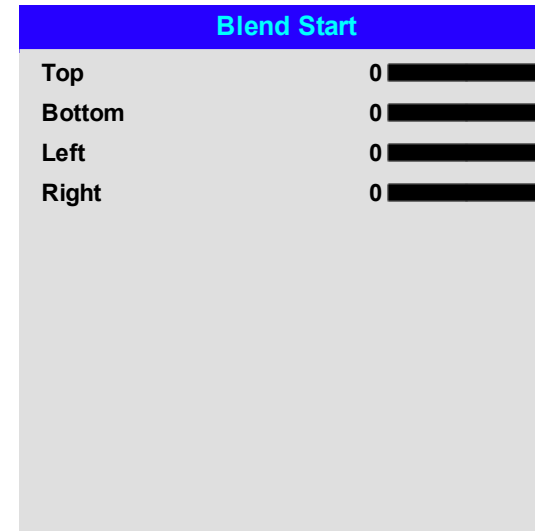
Blend Width

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

1. Top
2. Bottom
3. Left
4. Right
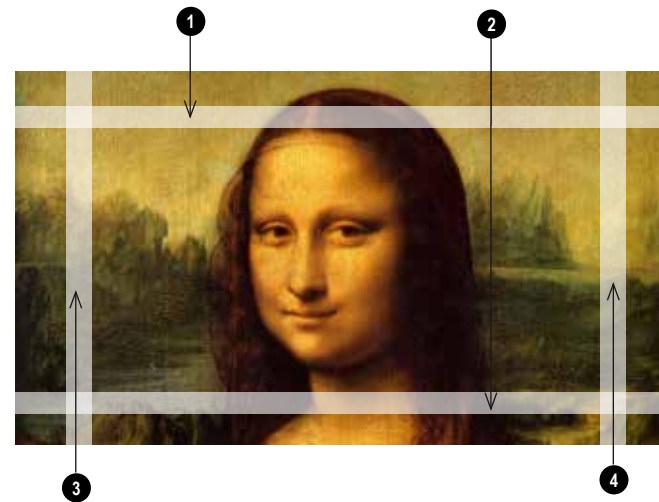
Black Level Uplift

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
Bottom	0
Left	0
Right	0

Color Adjustment

All	◄ ►
Red	0
Green	0
Blue	0

Notes

☞ Enable **Align Pattern** from the **Edge Blend** menu to see the black level uplift area.
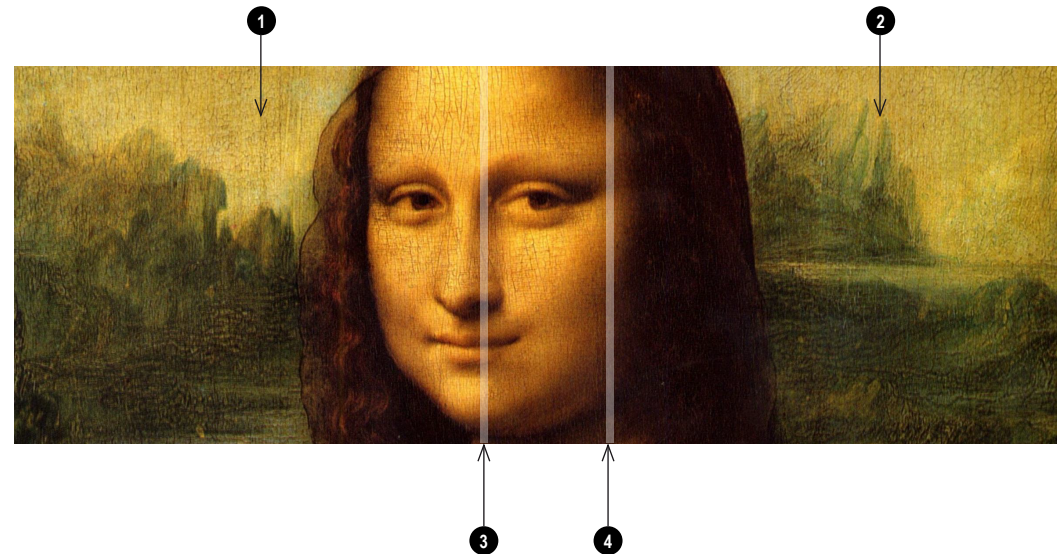
3D

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

- 3D Format
  Off, Auto, Side-by-side (Half), Top and Bottom, 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.
- DLP Link
  Off / On.
  DLP Link On emits a sync pulse for the 3D glasses via the projected image. **DLP Link Off** will send the sync pulse to the sync out connector to use with an external third party emitter.
- 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.

3D Sync

- **Offset**.
  Use the **LEFT** and **RIGHT** arrow buttons to compensate for image overlapping (ghosting) when viewed through 3D glasses.
- **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
DLP Link	Off
Eye Swap	Normal
Dark Time	1.95 ms
3D Sync	
Offset	100
Reference	Internal

Notes

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

☞ *See 3D connections on page 39 for more information about supported 3D formats.*

The following settings are not available when 3D is on:
Test Pattern
☞ ***Image >** Dynamic Black, Light Off Timer.*
***Geometry >** Digital Zoom, Overscan.*
***PIP >** all settings.*

☞ *Also: See 3D types on the next page and See Some 3D settings explained on page 83*

☞ *See 3D formats on page 123 for 3D resolutions and frame rates.*

3D types

To display a 3D image it is first necessary to select the 3D format of the source:

- **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.
- **Frame Packing**
- **Side-By-Side**
- **Top/Bottom**

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

HDMI 1

L

HDMI 2

R

Dual Pipe

L   R   L   R

Sequential
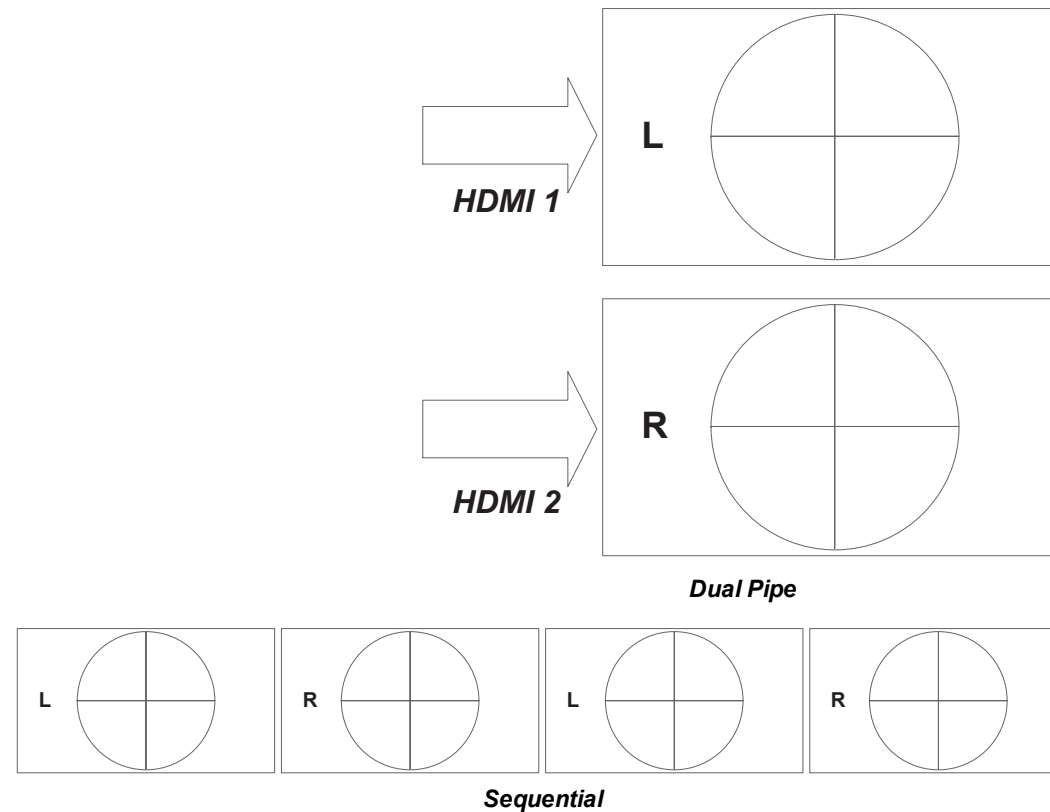
Some 3D settings explained

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.
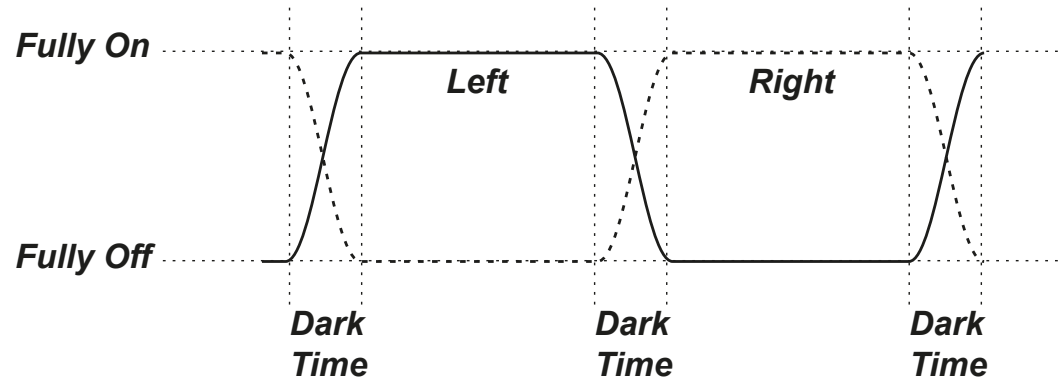
Fully On

Left   *Right*

Fully Off

Dark Time   *Dark Time*   *Dark Time*

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**.

LEFT 1	RIGHT 1	LEFT 2	RIGHT 2	LEFT 3	RIGHT 3

Dominance Left

RIGHT 1	LEFT 1	RIGHT 2	LEFT 2	RIGHT 3	LEFT 3

Dominance Right
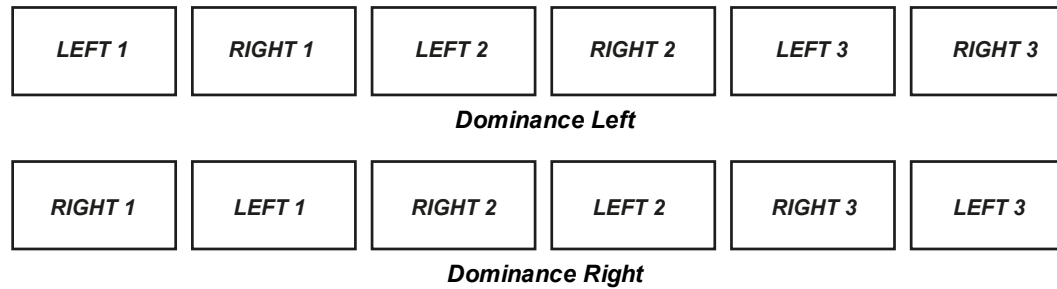
Sync Offset

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).

Incoming video

Incoming sync signal

Video signal with processing delays (and dark time adjustment)
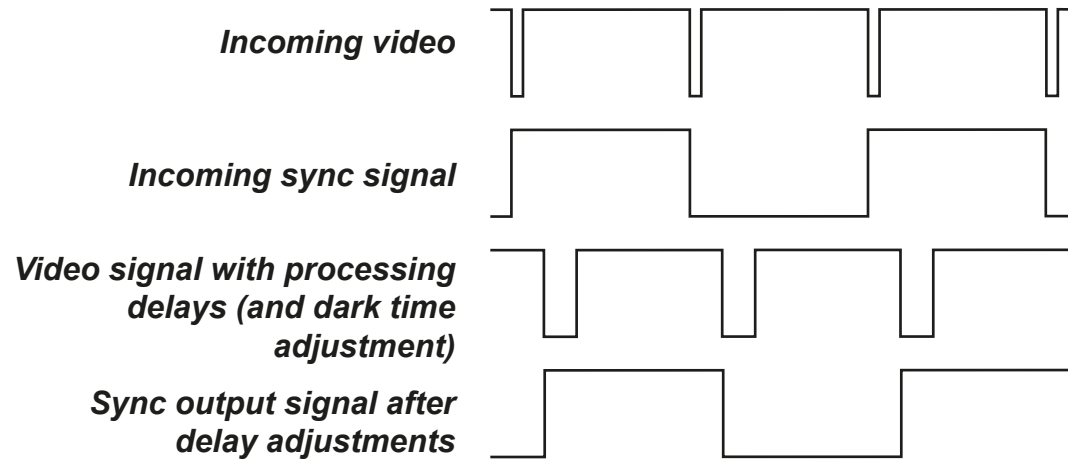
Sync output signal after delay adjustments

Laser

- **Power Mode**
  - **Eco** will automatically set the laser power to 80%.
  - **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 the **Power Mode** has been set to **Custom**, then Constant Brightness can be turned **ON**.
  The Constant Brightness setting will maintain the projectors set brightness until the maximum laser power has been reached (this maximum laser power will decrease overtime). Hence, the lower the set Constant Brightness power level the longer the set brightness output will be maintained.

Laser	
Power Mode	**Normal**
Power Level	– – – –
Constant Brightness	Off

Notes

Setup

- **Orientation**
Choose from **Front Tabletop, Front Ceiling, Rear Tabletop, Rear Ceiling** and **Auto-front**.
- **Cooling Condition**
Choose from **Table, Ceiling, Freetilt** and **Auto**.
- **High Altitude**
Choose from **On, Auto** and **Quiet**.
- **Screen Setting**
Choose from **16:10, 16:9, 4:3** and **2.35:1**.
- **ColorMax Setting**
Set up user-defined color gamut values.
- **Power on/off**
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.
- **Standby Mode**
Choose from **ECO** and **Normal**.
ECO uses minimal power and disables the power ON via HDBase-T/LAN function..
Normal enables the power ON via HDBase-T/LAN function.
- **Startup Logo**
Choose from **Off**, **Original** and **User**.
Select original to display the Digital Projection 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 **Original, Black, Blue, White** and **User**.
- **Auto Source**
If this setting is **On**, the projector will automatically search for an active input source.

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

Setup	
Orientation	Auto-front
Cooling Condition	Auto
High Altitude	Auto
Screen Setting	16:10
ColorMax Setting	►
Power on/off	►
Clock Adjust	►
Standby Mode	Normal
Startup Logo	Original
Blank Screen	Original
Auto Source	Off
▼	

Notes

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

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

- **Trigger-1**
  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 the 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.
- **Image Latency**
  Select **Fast** for improved latency.
  Select **Normal** when image corruption occurs. Image corruption (frame tearing) may occur when a high level of warping is applied to the image and fast latency is selected. See Geometry on page 61 for information about image warping.
- **PIC Mute**
  Choose from **Laser** and **DMD Blanking**. Select Laser to turn the laser off when PIC Mute activated. Select DMD Blanking to project a black image when PIC Mute is activated.
- **No Signal Light Off**
  Choose from **Off**, **5 Min**, **10 Min** and **15 Min**. Choose a time to automatically turn the light source off when no input signal is detected for the duration of the time period. Choose Off to disable.

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

Setup	
▲	
Trigger-1	Off
Trigger-2	Off
Infrared Remote	On
IR Code	0
IR Code Reset	
OSD Settings	▶
Memory	▶
Image Latency	Normal
PIC Mute	Laser
No Signal Light Off	Off

Notes

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

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. You can also set a default color gamut, choose from Peak or REC709.

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.

ColorMax		
Measured Data		▶
Target Data - User1		▶
Target Data - User 2		▶
Default Color Gamut	**Peak**	

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**

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**.

Notes

Power on/off

Auto Power Off	Off
Auto Power On	Off
Scheduled on-off	▶

Scheduled on-off

Schedule						Off	
	S	M	T	W	T	F	S	Time
On	⊠	☐	☐	☐	☐	☐	☐	12:34
Off	⊠	☐	☐	☐	☐	☐	☐	12:34
On	⊠	☐	☐	☐	☐	☐	☐	12:34
Off	⊠	☐	☐	☐	☐	☐	☐	12:34

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**

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.

OSD Settings	
Language	**English**
Menu Position	**Center**
Menu Transparency	**0**
Time Out	**30 Seconds**
Message Box	**On**

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.

The following settings are saved in a preset:

- From the **Image** menu — **Dynamic Black, Gamma, Brightness, Contrast, Saturation, Hue, Sharpness, Noise Reduction**
- From the **Color** menu — **Color Space, Color Mode, ColorMax, Color Temperature, Red Lift, Green Lift, Blue Lift, Red Gain, Green Gain, Blue Gain**
- From the **Geometry** menu — **Aspect Ratio, Overscan**

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**.
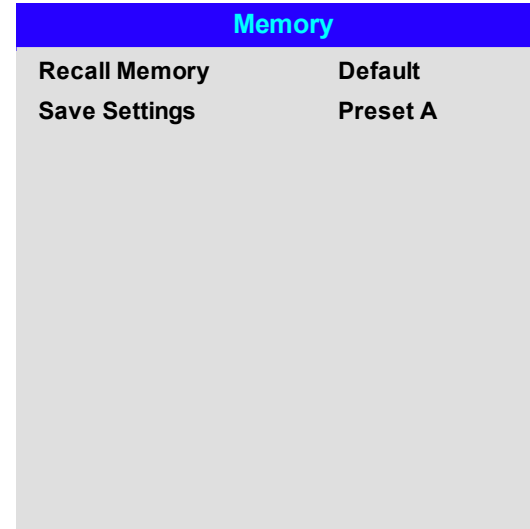
Memory	
Recall Memory	**Default**
Save Settings	**Preset A**

Network

- **Network Mode**
  Choose between **Projector Control** and **Service**.
- **Network Setup**
  Access this submenu to edit the network settings for the projector
- **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.
- **MAC** This field is read-only.
- **Art-Net Setup**
  Access this submenu to edit the Art-Net network settings for the projector
- **Art-Net Channel Setting**
  Access this submenu to set the functions for each Art-Net channel
- **Art-Net Channel Status**
  Access this submenu to view the status of each Art-Net channel
- **AMX** Switch on or off

Network Setup

- **DHCP, IP, Subnet Mask, Gateway, DNS**
  Set **DHCP** to **On** if the IP address is to be assigned by a DHCP server, **or** Off if it is to be set here.
  If **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.
- **MAC**
  This field is read-only.
- **Apply**
  Select to apply any changes to the network setup

Notes

Network	
Network Mode	Projector Control
Network Setup	▶
Art-Net Setup	▶
Art-Net Channel Setting	▶
Art-Net Channel Status	▶
AMX	Off

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
MAC	00: 18: 28: 2d: f2: 06
Apply	

Art-Net Setup

- **Art-Net Enable**
  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 Enable	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

PIP

- **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.

- **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

Information

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	**E-Vision Laser 15000 WU**
Serial Number	**X000XXXXX0000**
Software Version 1	**MD03-SE10-FE09**
Software Version 2	**STEP_D08-24-17-3120**
Active / PIP Source	**HDMI 1**
Signal Format	▶
Laser Hours	**2**
System Status	▶
Thermal Status	▶
Factory Reset	

Signal Format

Signal Format	
Active Source	
Timing	**1080p/60Hz**
H Refresh	**67.500 KHz**
V Refresh	**60.00 Hz**
Pixel Clock	**148.500 MHz**
PIP Source	
Timing	**576p/50Hz**
H Refresh	**31.250 KHz**
V Refresh	**50.00 Hz**
Pixel Clock	**27.0 MHz**

System Status

System Status	
Atmospheric Pressure	98988 Pa (116m)
AC Voltage	160V - 264V
Ceiling Mode	0
Tilt Angle	4 deg
Portrait Angle	0 deg
Altitude Mode	Auto
Laser Power	100%
Constant Brightness	Off

Thermal Status

Thermal Status	
Inlet Temp.	Ti1 = 24 (C)
DMD Temp.	38 (C)
LD Temp.	B2=51 / B3=48 (C)
RLD Temp.	U=40.1 / D=39 (C)
Outside Temp.	22 (C)
Fan 1-3 Speed	1399 / 1402 / 4391
Fan 4-6 Speed	1310 / 1200 / 1205
Fan 7-9 Speed	1211 / 1407 / 1410
Fan 10-12 Speed	NA / 3005 / 3007
Fan 13 - 15 Speed	NA / NA / 2984
Fan 16 Speed	3020
Water Pump Speed	3506

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	E-Vision Laser 15000 WU
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

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**.

A user name and password is required to access the served web pages for the projector via a web browser.

- The default user name is "admin". This cannot be changed.
- The default password is "admin". This can be changed in the password served web page.

☞ *We recommend that you change this default password.*

☞ *If you forget the password, please contact your dealer/integrator for assistance.*

DIGITAL PROJECTION

| Projector Status |
| Projector Control |
| Network Setup |
| Alert Mail Setup |
| Date/Time Setup |
| OSD Function |
| Password |

Projector Information

Model	E-Vision Laser 15000 WU
Serial Number	W031ZNDCY0006
Software Version	ME10-SE03-FE03-LE05-5-R05.05-3140
Power Status	Power On
Input	HDMI 1
Laser Status	Power : On Runtime : 6 H
Projection Mode	Auto-front
High Altitude	Auto
Inlet Temperature	24 °C
DMD Temperature	33 °C
LD Temperature	32 / 33 °C
Diagnostic Status	(No Error)

LAN Information

LAN Software Ver.	R05
MAC address	00:18:23:55:56:8E

Notes

DIGITAL PROJECTION

Projector Status

Projector Control

Network Setup

Alert Mail Setup

Date/Time Setup

OSD Function

Password

Power

| On | | Off |

Picture Mute

| Open | | Close |

Input Selection

| HDMI 1 | | HDMI 2 | | VGA | | COMP |

| DVI-D | | DisplayPort | | HDBaseT | | 3G-SDI |

Lens Control

Zoom   Focus   Shift

                            | Up |

| IN | | IN |

              | Left | | Right |

| OUT | | OUT |

                            | Down |

DIGITAL PROJECTION

| Projector Status |
| Projector Control |
| Network Setup |
| Alert Mail Setup |
| Date/Time Setup |
| OSD Function |
| Password |

DHCP: ○ On   ● Off

IP Address: 192 . 168 . 0 . 100

Subnet Mask: 255 . 255 . 255 . 0

Gateway: 0 . 0 . 0 . 0

DNS Server: 0 . 0 . 0 . 0

Save Settings

CAUTION: Incorrect settings may cause the projector to lose network connectivity.

Crestron Control

IP Address: 0 . 0 . 0 . 0

IP ID: 0

Control Port: 0

Apply

DIGITAL PROJECTION

- Projector Status
- Projector Control
- Network Setup
- Alert Mail Setup
- Date/Time Setup
- OSD Function
- Password

SMTP Server: **Port:** 25

User Name:

Password:

Apply

E-mail Alert: ○ Enable   ⊙ Disable

From:

To:

CC:

Projector Name: 55568E

Location:

Apply

Send Test Mail

DIGITAL PROJECTION

Notes

Projector Status

Projector Control

Network Setup

Alert Mail Setup

Date/Time Setup

OSD Function

Password

Time Zone:

Time Zone: UTC(-11:00) ⌄

Select Local time zone, Current zone is UTC -1:00

SaveTimeZone

Time:

Date: 2027.05.27   e.g.2000.01.01

Clock: 23:12   e.g.23:59

Current time is set to : 2027.05.27   ; 23:12

SaveTime

DIGITAL PROJECTION

Projector Status
Projector Control
Network Setup
Alert Mail Setup
Date/Time Setup
OSD Function
Password

Page 1   Page 2   Page 3

Input

- Input [HDMI 1 ▾]

Test Pattern

[Exit Test Pattern]

Lens

- Lens Lock ◉ Off ○ On
- Center Lens [Do]
- Lens Memory [Memory 1 ▾] [Save] [Load] [Clear]

Image

- Picture Mode [Hight Bright ▾]
- Dynamic Black ◉ Off ○ On
- Light Off Timer [Disable ▾]
- Gamma [2.2 ▾]
- Brightness   [-] [════] [+] 100
- Contrast   [-] [════] [+] 100
- Saturation   [-] [════] [+] 100
- Hue   [-] [════] [+] 100
- Sharpness   [-] [════] [+] 0
- Noise Reduction [-] [════] [+] 0
- [Freeze]
- [Resync]

color

- Color Space [Auto ▾]
- Color Mode [ColorMax ▾]
- Color Max [Peak ▾]
- Manual Color Matching
  Auto Test Pattern ◉ Off ○ On
  Red
  Hue   [-] [════] [+] 100
  Saturation   [-] [════] [+] 100
  Gain   [-] [════] [+] 100
  Green
  Hue   [-] [════] [+] 100
  Saturation   [-] [════] [+] 100
  Gain   [-] [════] [+] 100
  Blue
  Hue   [-] [════] [+] 100
  Saturation   [-] [════] [+] 100
  Gain   [-] [════] [+] 100
  Yellow
  Hue   [-] [════] [+] 100
  Saturation   [-] [════] [+] 100
  Gain   [-] [════] [+] 100
  Cyan
  Hue   [-] [════] [+] 100
  Saturation   [-] [════] [+] 100
  Gain   [-] [════] [+] 100
  Magenta
  Hue   [-] [════] [+] 100
  Saturation   [-] [════] [+] 100
  Gain   [-] [════] [+] 100
  White Balance
  Red   [-] [════] [+] 100
  Green   [-] [════] [+] 100
  Blue   [-] [════] [+] 100
  [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]

Page 1   Page 2   Page 3

Notes

DIGITAL PROJECTION

- Projector Status
- Projector Control
- Network Setup
- Alert Mail Setup
- Date/Time Setup
- OSD Function
- Password

geometry

- Aspect Ratio [Source ▾]
- Digital Zoom
  - Digital Zoom   [-] ▬▬▬ [+] 0%
  - Digital Pan   [-] ▬▬▬ [+] 0
  - Digital Scan   [-] ▬▬▬ [+] 0
  - [Digital Zoom Reset]
- Overscan [Off ▾]
- Blanking
  - Top   [-] ▬▬▬ [+] 0
  - Bottom   [-] ▬▬▬ [+] 0
  - Left   [-] ▬▬▬ [+] 0
  - Right   [-] ▬▬▬ [+] 0
  - [Blanking Reset]
- ○ Keystone
  - H Keystone   [-] ▬▬▬ [+] 0
  - V Keystone   [-] ▬▬▬ [+] 0
  - Rotation   [-] ▬▬▬ [+] 0
  - [Keystone Reset]
- ○ 4 Corners
  - Top Left Corner X   [-] ▬▬▬ [+] 0
  - Top Left Corner Y   [-] ▬▬▬ [+] 0
  - Top Right Corner X   [-] ▬▬▬ [+] 0
  - Top Right Corner Y   [-] ▬▬▬ [+] 0
  - Bottom Left Corner X   [-] ▬▬▬ [+] 0
  - Bottom Left Corner Y   [-] ▬▬▬ [+] 0
  - Bottom Right Corner X   [-] ▬▬▬ [+] 0
  - Bottom Right Corner Y   [-] ▬▬▬ [+] 0
  - [4 Corners Reset]
- ○ Rotation   [-] ▬▬▬ [+] 0
  - [Rotation Reset]
- ○ Pincushion/Barrel
  - H Pin/Barrel   [-] ▬▬▬ [+] 0
  - V Pin/Barrel   [-] ▬▬▬ [+] 0
  - Keystone
  - H Keystone   [-] ▬▬▬ [+] 0
  - V Keystone   [-] ▬▬▬ [+] 0
  - Rotation   [-] ▬▬▬ [+] 0
  - [Pincushion/Barrel Reset]
- ○ Arc
  - Top   [-] ▬▬▬ [+] 0
  - Bottom   [-] ▬▬▬ [+] 0
  - Left   [-] ▬▬▬ [+] 0
  - Right   [-] ▬▬▬ [+] 0
  - [Arc Reset]
- ○ User 1
- ○ User 2
- Warping Grids [Off ▾]
- Custom Masking ◉ Off ○ User 1 ○ User 2
- Warp Filter ○ Manual ◉ Auto
- H Warp Filter   [-] ▬▬▬ [+] 5
- V Warp Filter   [-] ▬▬▬ [+] 5

edgeblend

- Edge Blend ◉ Off ○ On
- Align Pattern ◉ Off ○ On
- Blend Start
  - Top   [-] ▬▬▬ [+] 0
  - Bottom   [-] ▬▬▬ [+] 0
  - Left   [-] ▬▬▬ [+] 0
  - Right   [-] ▬▬▬ [+] 0
- Blend Width
  - Top   [-] ▬▬▬ [+] 0
  - Bottom   [-] ▬▬▬ [+] 0
  - Left   [-] ▬▬▬ [+] 0
  - Right   [-] ▬▬▬ [+] 0
- Black Level Uplift
  - Select Area
  - Top   [-] ▬▬▬ [+] 0
  - Bottom   [-] ▬▬▬ [+] 0
  - Left   [-] ▬▬▬ [+] 0
  - Right   [-] ▬▬▬ [+] 0
  - Color Adjustment
  - All   [-] [+]
  - Red   [-] ▬▬▬ [+] 0
  - Green   [-] ▬▬▬ [+] 0
  - Blue   [-] ▬▬▬ [+] 0
  - [Edgeblend Reset]

3d

- 3D Format ○ Off ◉ Auto ○ Side by Side (Half) ○ Top and Bottom ○ Dual Pipe ○ Frame Sequential
- DLP Link ◉ Off ○ On
- Eye Swap ◉ Normal ○ Reverse
- Dark Time [1.95ms ▾]
- 3D Sync
  - Offset   [-] ▬▬▬ [+] 100
  - Reference   Internal

laser

- Power Mode [Custom ▾]
- Power Level   [-] ▬▬▬ [+] 30
- Constant Brightness [Off ▾]

Notes

DIGITAL PROJECTION

- Projector Status
- Projector Control
- Network Setup
- Alert Mail Setup
- Date/Time Setup
- OSD Function
- Password

setup

- Orientation [Auto-front ▼]
- High Altitude [Auto ▼]
- Standby Mode [Normal ▼]
- Screen Setting
  Screen Format   [16:10 ▼]
  Screen Position   [-] [_____] [+]   0
- ColorMax
  Measured Data
  Red   x:0. 666   y:0. 327   g: 100
  Green   x:0. 302   y:0. 625   g: 443
  Blue   x:0. 142   y:0. 16   g: 21
  White   x:0. 284   y:0. 302   g: 1000
  [Measured Data Save]   [Measured Data Reset]
  Target Data - User 1
  Red   x:0. 640   y:0. 330   g: 1000
  Green   x:0. 300   y:0. 600   g: 1000
  Blue   x:0. 154   y:0. 62   g: 1000
  Yellow   x:0. 419   y:0. 505   g: 1000
  Cyan   x:0. 225   y:0. 329   g: 1000
  Magenta   x:0. 321   y:0. 154   g: 1000
  White   x:0. 313   y:0. 329   g: 1000
  [Target Data - User 1 Save]   [Target Data - User 1 Reset]

  Target Data - User 2
  Red   x:0. 640   y:0. 330   g: 1000
  Green   x:0. 300   y:0. 600   g: 1000
  Blue   x:0. 154   y:0. 62   g: 1000
  Yellow   x:0. 419   y:0. 505   g: 1000
  Cyan   x:0. 225   y:0. 329   g: 1000
  Magenta   x:0. 321   y:0. 154   g: 1000
  White   x:0. 313   y:0. 329   g: 1000
  [Target Data - User 2 Save]   [Target Data - User 2 Reset]

  Default Color Gamut   ● Peak ○ REC709
- Power On/Off
  Auto Power Off   ● Off ○ On
  Auto Power On   ● Off ○ On
  Scheduled On/Off ● Off ○ On

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Time(HH:MM)
On	☐	☐	☐	☐	☐	☐	☐	00:00
Off	☐	☐	☐	☐	☐	☐	☐	00:00
On	☐	☐	☐	☐	☐	☐	☐	00:00
Off	☐	☐	☐	☐	☐	☐	☐	00:00

- Startup Logo   ○ Off ● Original ○ User
- Blank Screen   ● Original ○ Black ○ Blue ○ White ○ User
- Auto Source   ● Off ○ On
- OSD Setting
  Language   [English ▼]
  Menu Position   [Center ▼]
  Menu Transparency [0 ▼]
  Time Out   [30 Seconds ▼]
  Message Box   ○ Off ● On
- Trigger [Off ▼]
- Infrared Remote ○ Off ● On
- IR Code [0]   [Sent IR Code]   [IR Code Reset]
- Memory
  Recall Memory   [Default ▼]
  Save Settings   [Preset A ▼]
- Image Latency   ○ Fast ● Normal
- PIC MUTE [Laser ▼]
- No Signal Light Off [Off ▼]

pip

- PIP   ● Off ○ On
- Source   [HDMI 2 ▼]
- Position [Top-Left ▼]

information

Model Name	E-Vision Laser 15000 WU
Serial Number	W031ZNDCY0006
Software Version 1	ME10-SE03-FE03
Software Version 2	LE05-5-R05.05-3140
Active/PIP Source	HDMI 1/NA
Signal Format	
Active Source	
Timing	1920x1200@60Hz RB
H Refresh	74.038 KHz
V Refresh	59.95 Hz
Pixel Clock	154.000 MHz
PIP Source	
PIP Timing	NA
PIP H Refresh	NA
PIP V Refresh	NA
PIP Pixel Clock	NA
Laser Hours	00007 HRS
System Status	
Atmospheric Pressure	100885 Pa
AC Voltage	160V ~ 264V
Ceiling Mode	0
Tilt Angle	2 deg
Portrait Angle	0 deg
Altitude Mode	SEA
Laser Power	30%
Constant Brightness	Off
Thermal Status	
Inlet Temp.	Ti = 23 °C
DMD Temp	Tc = 33 °C
LD Temp	B2 =34 / B3 =33 °C
RLD Temp	U = 33 / D = 31 °C
Fan 1-4 Speed	1314 / 1303 / 1299 / 1305
Fan 5-8 Speed	1204 / 1189 / 1203 / 1293
Fan 9-12 Speed	1293 / 0 / 4008 / 4008
Fan 13-16 Speed	0 / 0 / 1996 / 1998
Water Pump Speed	3970

[Factory Reset]

Notes

Notes

DIGITAL PROJECTION

| Projector Status |
| Projector Control |
| Network Setup |
| Alert Mail Setup |
| Date/Time Setup |
| OSD Function |
| Password |

Change Password

User Name: admin

Password: •••••

Password(again):   •••••

Apply

DIGITAL PROJECTION

A Delta Associate Company

E-Vision Laser 15000 Series

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:

Throw Ratio	Focus Range	Lens Shift	Part Number
0.377 : 1 fixed (UST)	0.82 m - 2.71 m	Depends on image size, see **UST Lens Installation Guide** (separate document)	117-341
0.75 - 0.93 : 1 zoom	1.02 m - 12.7 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame	115-339
0.76 : 1 fixed	0.81 m - 5.08 m	none	112-499
1.25 - 1.79 : 1 zoom	1.33 m - 11.73 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame	112-500
1.73 - 2.27 : 1 zoom	1.83 m - 14.9 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame	112-501
2.22 - 3.67 : 1 zoom	2.36 m - 24.2 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame	112-502
3.58 - 5.38 : 1 zoom	3.8 m - 35.35 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame	112-503
5.31 - 8.26 : 1 zoom	5.59 m - 54.8 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame	112-504

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

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**:

$$ThrowRatio = ThrowDistance / ScreenWidth$$

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
0.377 : 1 fixed (UST)	0.82 m - 2.71 m
0.75 - 0.93 : 1 zoom	1.02 m - 12.7 m
0.76 : 1 fixed	0.81 m - 5.08 m
1.25 - 1.79 : 1 zoom	1.33 m - 11.73 m
1.73 - 2.27 : 1 zoom	1.83 m - 14.9 m
2.22 - 3.67 : 1 zoom	2.36 m - 24.2 m
3.58 - 5.38 : 1 zoom	3.8 m - 35.35 m
5.31 - 8.26 : 1 zoom	5.59 m - 54.8 m

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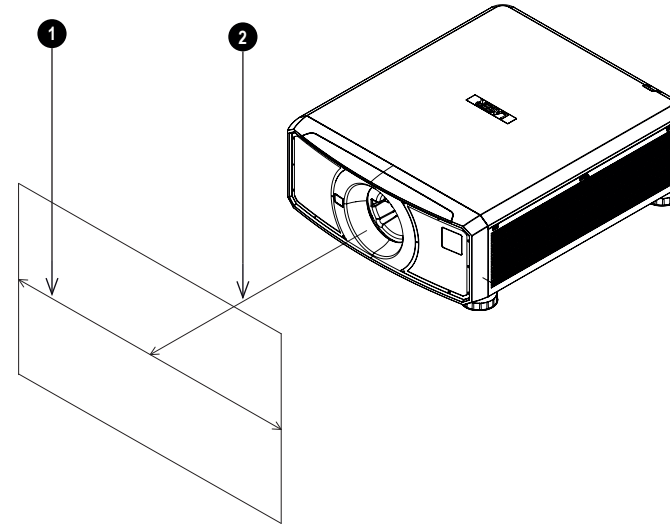
Notes

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 30 for more information about using the right lens and hood

Basic calculation example

1. Calculate the throw ratio using the formula.
   Your screen is **4.5m** wide and you wish to place the projector approximately **11m** from the screen. The throw ratio will then be
   11 ÷ 4.5= 2.44

2. Match the result with the lens table.
   The lens matching a throw ratio of 2.44 is the **2.22 - 3.67 : 1 zoom lens** .

3. **Check whether the lens covers the required throw distance.**
   The focus range quoted for the 2.22 - 3.67 : 1 zoom lens is **2.36 - 24.2m**.The required distance of 11m is within the range.

INFORMATION YOU NEED FOR THIS CALCULATION

The throw ratio formula:

$$ThrowRatio = ThrowDistance/ScreenWidth$$

Allow a tolerance of +/- 3% in the throw ratio calculation.

The lens table:

Throw ratios	Focus range
0.377 : 1 fixed (UST)	0.82 m - 2.71 m
0.75 - 0.93 : 1 zoom	1.02 m - 12.7 m
0.76 : 1 fixed	0.81 m - 5.08 m
1.25 - 1.79 : 1 zoom	1.33 m - 11.73 m
1.73 - 2.27 : 1 zoom	1.83 m - 14.9 m
2.22 - 3.67 : 1 zoom	2.36 m - 24.2 m
3.58 - 5.38 : 1 zoom	3.8 m - 35.35 m
5.31 - 8.26 : 1 zoom	5.59 m - 54.8 m

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.

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
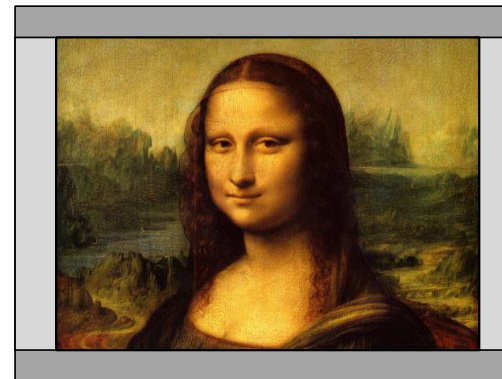
Fig 2

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:

$$TRC = 1.6(DMD^{\text{™}}\ Aspect\ Ratio)/Source\ Aspect\ Ratio.$$

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)	1920 x 817 pixels	TRC < 1, not used
1.85:1 (Flat)	1920 x 1037 pixels	TRC < 1, not used
1.78:1 (16:9)	1920 x 1080 pixels	TRC < 1, not used
1.6:1 (16:10)	1920 x 1200 pixels	TRC < 1, not used (native aspect ratio)
1.33:1 (4:3)	1596 x 1200 pixels	TRC = 1.2
1.25:1 (5:4)	1500 x 1200 pixels	TRC = 1.28

Calculating the throw ratio with TRC

1. For TRC > 1, amend the basic throw ratio formula as follows:

$$Throw\ Ratio = Throw\ Distance/Screen\ Width * TRC$$

   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
0.377 : 1 fixed (UST)	0.82 m - 2.71 m
0.75 - 0.93 : 1 zoom	1.02 m - 12.7 m
0.76 : 1 fixed	0.81 m - 5.08 m
1.25 - 1.79 : 1 zoom	1.33 m - 11.73 m
1.73 - 2.27 : 1 zoom	1.83 m - 14.9 m
2.22 - 3.67 : 1 zoom	2.36 m - 24.2 m
3.58 - 5.38 : 1 zoom	3.8 m - 35.35 m
5.31 - 8.26 : 1 zoom	5.59 m - 54.8 m

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*

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 = 1.6 / 1.33 = 1.2.

2. Calculate the throw ratio:
   Throw ratio = 11 / 4.5 x 1.2 = **2.04**

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 1.73 - 2.27 : 1 zoom lens**.

4. Check whether the lens covers the required throw distance.
   The focus range quoted for the 1.73 - 2.27 : 1 zoom lens is **1.83m - 14.9m**. The required distance of 11 m is within the range.

INFORMATION YOU NEED FOR THESE CALCULATIONS

The TRC formula

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

The TRC table (to use instead of the formula)

2.35:1 (Scope)	TRC < 1, not used
1.85:1 (Flat)	TRC < 1, not used
1.78:1 (16:9)	TRC < 1, not used
1.6:1 (16:10)	TRC < 1, not used (native aspect ratio)
1.33:1 (4:3)	TRC = 1.2
1.25:1 (5:4)	TRC = 1.28

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
0.377 : 1 fixed (UST)	0.82 m - 2.71 m
0.75 - 0.93 : 1 zoom	1.02 m - 12.7 m
0.76 : 1 fixed	0.81 m - 5.08 m
1.25 - 1.79 : 1 zoom	1.33 m - 11.73 m
1.73 - 2.27 : 1 zoom	1.83 m - 14.9 m
2.22 - 3.67 : 1 zoom	2.36 m - 24.2 m
3.58 - 5.38 : 1 zoom	3.8 m - 35.35 m
5.31 - 8.26 : 1 zoom	5.59 m - 54.8 m

Screen requirements

Fitting the image to the display

If the source image supplied to the projector is smaller than the WUXGA 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.

WUXGA images displayed full width

2.35:1 (Scope) = 817 pixels

16:9 1.78:1 = 1080 pixels

16:10 (full height) = 1200 pixels

full width = 1920 pixels
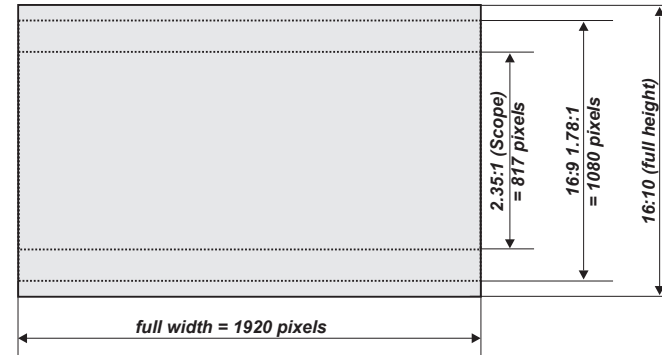
WUXGA images displayed with a height of 1200 pixels

full height = 1200 pixels

4:3 = 1.33:1 = 1596 pixels

16:10 = 1.6:1 = 1920 pixels

full width = 1920 pixels
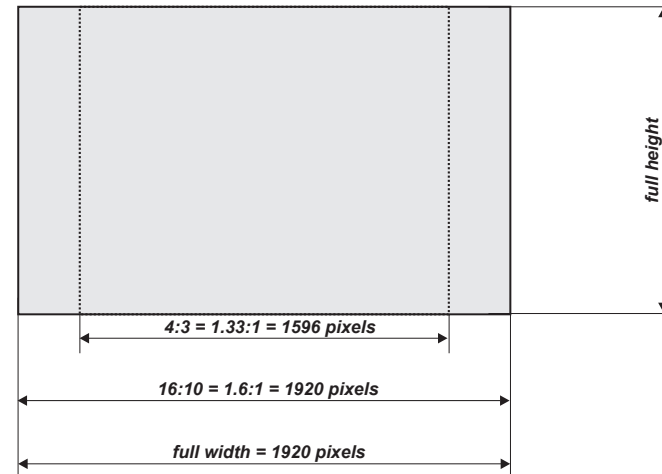
WUXGAimages displayed full height

full height = 1200 pixels

4:3 = 1.33:1 = 1596 pixels
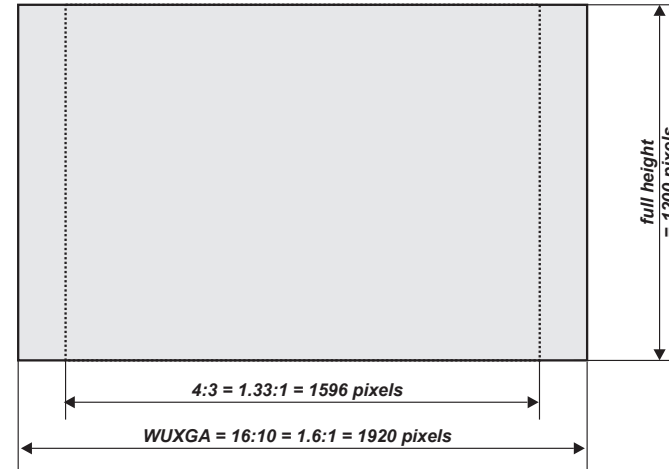
WUXGA = 16:10 = 1.6:1 = 1920 pixels

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
W = D x 0.87 H = D x 0.49

16:10 = 1.6:1 (native aspect ratio for WUXGA projectors)
W = D x 0.85 H = D x 0.53

W = width

H = height

D = diagonal
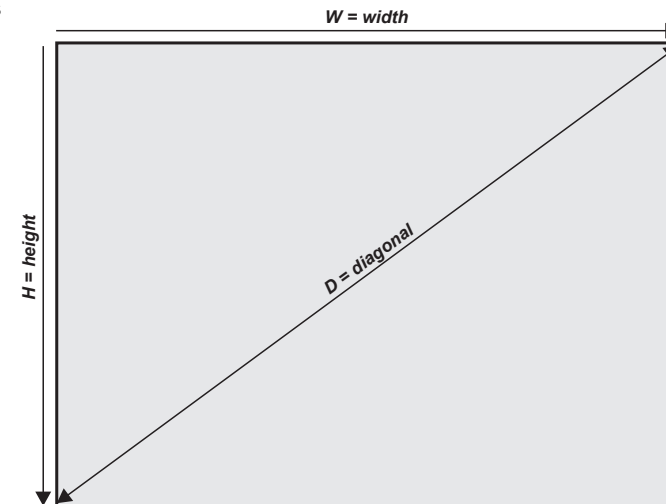
Positioning the image

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.

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.
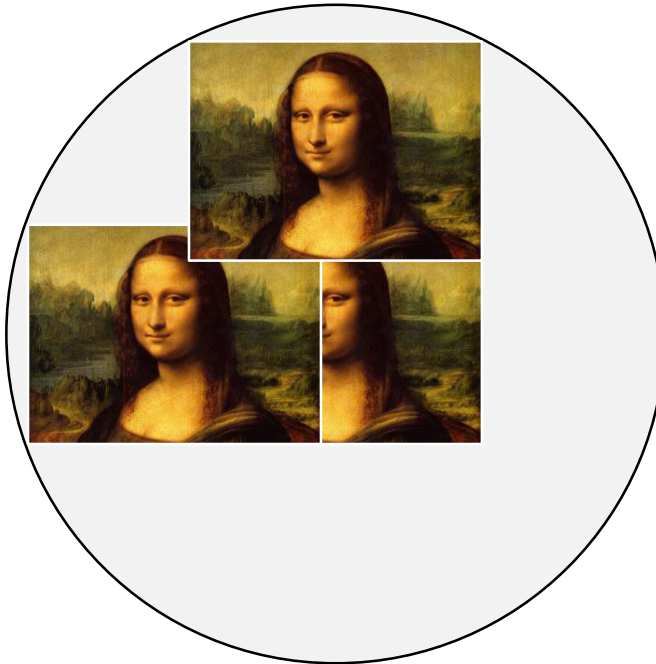
Full horizontal or vertical shift
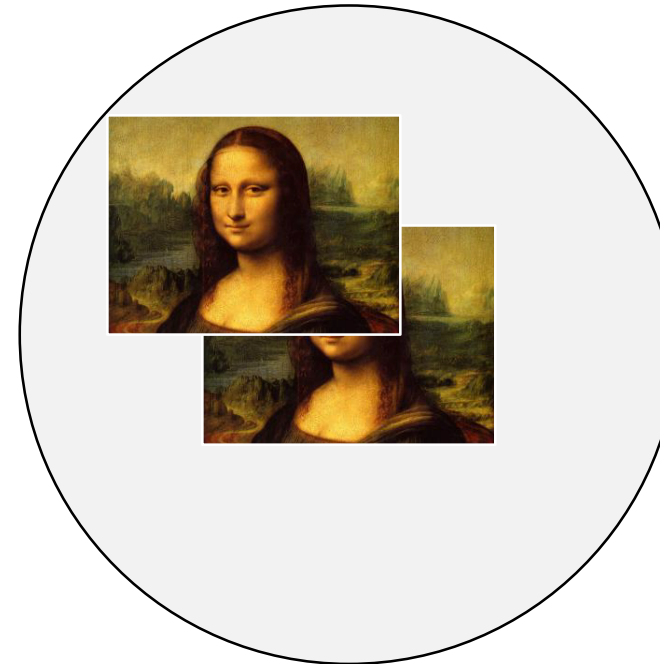
Combined shift is reduced

Aspect ratios explained

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

- The display resolution is **WUXGA** with a 1920 x 1200 resolution, corresponding to an aspect ratio of 16:10
- 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^{TM}, then the image will be scaled to either fit the full width or height of the display.

Aspect ratios examples

1. Unused screen areas

Source: 4:3

Aspect Ratio: Source / 4:3

Aspect Ratio 16:10

Source: 16:9

Aspect Ratio: Source / 16:9

Aspect Ratio 16:10
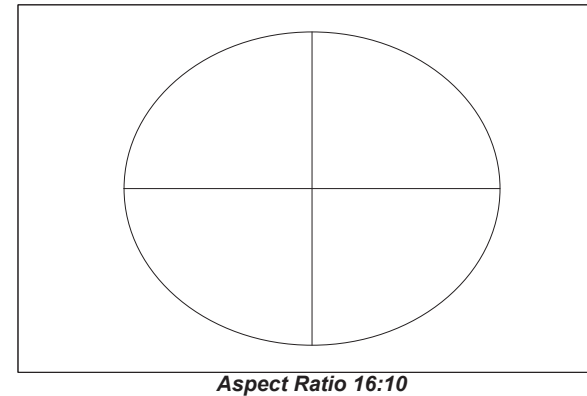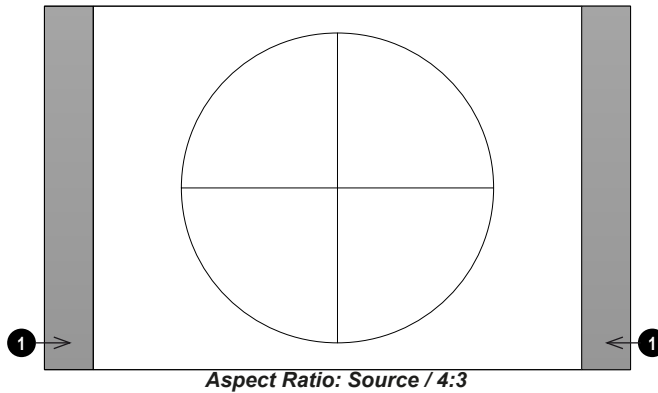
Source: 16:10 (native)
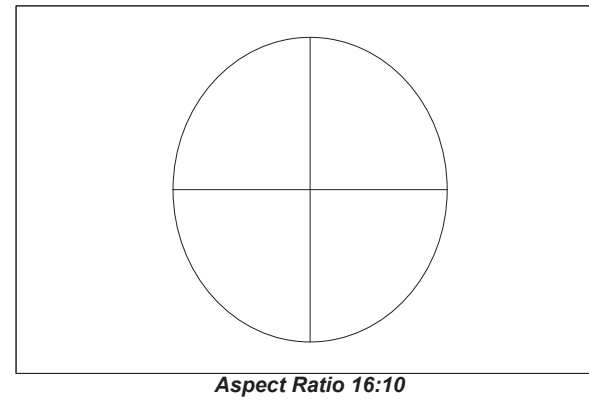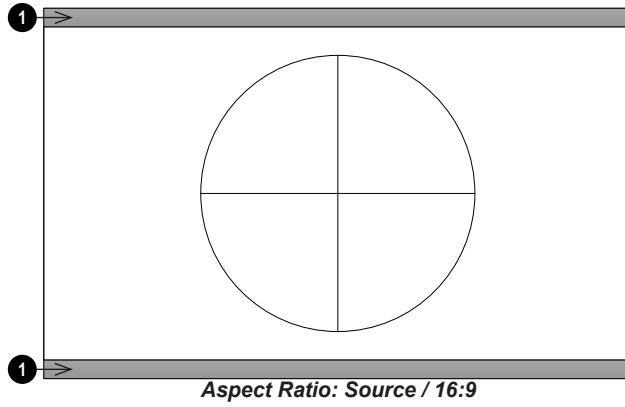
Aspect Ratio: Source / 16:10
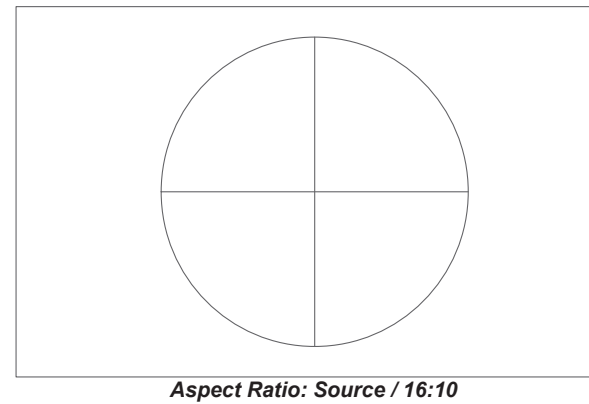
Notes

Aspect ratio example: TheatreScope

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

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

Black margin – part of the source

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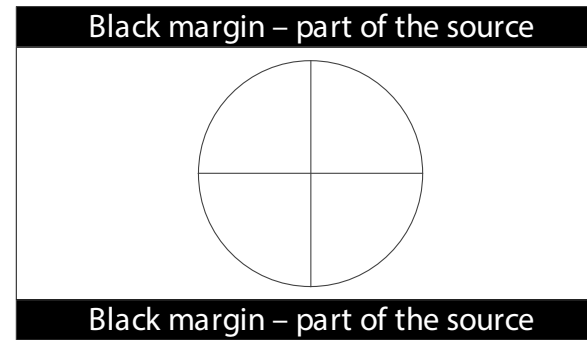
If we change the setting to TheaterScope, the black lines will disappear but the image will stretch vertically to reach the top and bottom of the DMD™:

An anamorphic lens will stretch the image horizontally, restoring the original 2.35 ratio:
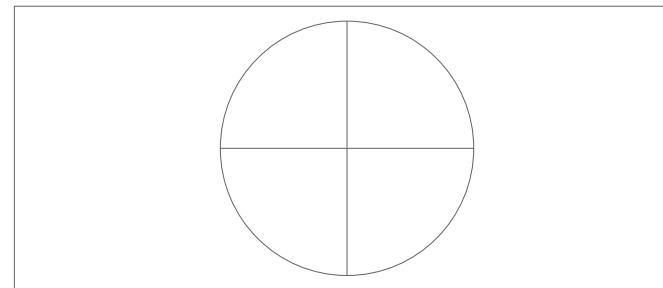
Appendix A: supported signal input modes

2D formats

Signal Format	Resolution	H Freq. (kHz)	Frame Rate (Hz)	PLCK (MHz)	Component / 5BNC	VGA - RGBHV	5BNC - RGBHV	DVI-D	Display Port	HDMI / HDBaseT RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	HD/SDI/3G	Remark
PC	640x480	31.469	59.94	25.175		✓	✓	✓	✓	✓					VESA DMT
	640x480	37.500	74.99	31.500		✓	✓	✓	✓	✓					VESA DMT
	640x480	43.269	85.00	36.000		✓	✓	✓	✓	✓					VESA DMT
	800x600	37.879	60.32	40.000		✓	✓	✓	✓	✓					VESA DMT
	800x600	46.875	75.00	49.500		✓	✓	✓	✓	✓					VESA DMT
	800x600	53.674	85.06	56.250		✓	✓	✓	✓	✓					VESA DMT
	848x480	23.674	47.95	25.000		✓	✓	✓	✓	✓					VESA CVT
	848x480	31.020	60.00	33.750		✓	✓	✓	✓	✓					VESA DMT
	1024x768	48.363	60.00	65.000		✓	✓	✓	✓	✓					VESA DMT
	1024x768	56.476	70.07	75.000		✓	✓	✓	✓	✓					VESA DMT
	1024x768	60.023	75.00	78.750		✓	✓	✓	✓	✓					VESA DMT
	1024x768	68.677	85.00	94.500		✓	✓	✓	✓	✓					VESA DMT
	1152x864	67.500	75.00	108.000		✓	✓	✓	✓	✓					VESA DMT
	1280x720	35.531	47.95	57.987		✓	✓	✓	✓	✓					VESA GTF
	1280x768	47.776	60.00	79.500		✓	✓	✓	✓	✓					VESA DMT
	1280x768	60.289	74.89	102.250		✓	✓	✓	✓	✓					VESA DMT
	1280x768	68.633	84.84	117.500		✓	✓	✓	✓	✓					VESA DMT
	1280x800	49.702	60.00	83.500		✓	✓	✓	✓	✓					VESA DMT
	1280x800	62.795	74.93	106.500		✓	✓	✓	✓	✓					VESA DMT
	1280x960	60.000	60.00	108.000		✓	✓	✓	✓	✓					VESA DMT
	1280x960	85.938	85.00	148.500		✓	✓	✓	✓	✓					VESA DMT
	1280x1024	63.981	60.02	108.000		✓	✓	✓	✓	✓					VESA DMT
	1280x1024	79.976	75.02	135.000		✓	✓	✓	✓	✓					VESA DMT
	1280x1024	91.146	85.02	157.500		✓	✓	✓	✓	✓					VESA DMT
	1366x768	47.712	60.00	85.500		✓	✓	✓	✓	✓					VESA DMT
	1440x900	55.935	59.89	106.500		✓	✓	✓	✓	✓					VESA DMT
	1440x900	70.635	74.98	136.750		✓	✓	✓	✓	✓					VESA DMT
	1400x1050	65.317	60.00	121.750		✓	✓	✓	✓	✓					VESA DMT
	1400x1050	82.278	74.87	156.000		✓	✓	✓	✓	✓					VESA DMT

Signal Format	Resolution	H Freq. (kHz)	Frame Rate (Hz)	PLCK (MHz)	Component / 5BNC	VGA - RGBHV	5BNC - RGBHV	DVI-D	Display Port	HDMI / HDBaseT RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	HD/SDI/3G	Remark
PC	1600x900	55.920	60.00	119.000		✓	✓	✓	✓	✓					VESA GTF
	1600x1200	75.000	60.00	162.000		✓	✓	✓	✓	✓					VESA DMT
	1680x1050	65.290	60.00	146.250		✓	✓	✓	✓	✓					VESA DMT
	1920x1080	53.225	47.95	135.403		✓	✓	✓	✓	✓					VESA CVT
	1920x1200 RB	58.894	47.96	122.500				✓	✓	✓					VESA CVT
	1920x1200	61.816	50.00	158.250		✓	✓	✓	✓	✓					VESA CVT
	1920x1200 RB	74.038	60.00	154.000		✓	✓	✓	✓	✓					VESA CVT
	2048x1152 RB	72.000	60.00	162.000					✓						VESA CVT
	2560x1600 RB	98.713	59.97	268.500					✓						VESA CVT
Apple Mac	640x480	35.000	66.67	30.240	✓	✓	✓	✓	✓	✓					Apple MAC
	832x624	49.720	74.55	57.280	✓	✓	✓	✓	✓	✓					Apple MAC
	1024x768	60.241	74.93	80.000	✓	✓	✓	✓	✓	✓					Apple MAC
	1152x870	68.861	75.06	100.000	✓	✓	✓	✓	✓	✓					Apple MAC
SDTV	480i	15.734	59.94	13.500	✓									✓	
	1440x480i	31.468	60.00	27.000						✓	✓	✓	✓		
	1440x576i	31.250	50.00	27.000						✓	✓	✓	✓		
	576i	15.625	50.00	13.500	✓									✓	
EDTV	480p	31.469	59.94	27.000	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	576p	31.250	50.00	27.000	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Notes

Signal Format	Resolution	H Freq. (kHz)	Frame Rate (Hz)	PLCK (MHz)	Component / 5BNC	VGA - RGBHV	5BNC - RGBHV	DVI-D	Display Port	HDMI / HDBaseT RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	HD/SDI/3G	Remark
HDTV	1035i	33.750	60.00	74.250	✓	✓	✓			✓	✓	✓	✓	✓	
	1080i	28.125	50.00	74.250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080i	33.716	59.94	74.176	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080i	33.750	60.00	74.250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	720p	37.500	50.00	74.250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	720p	44.955	59.94	74.176	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	720p	45.000	60.00	74.250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080p	26.973	23.98	74.176	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080p	27.000	24.00	74.250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080p	28.125	25.00	74.250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080p	33.716	29.97	74.176	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080p	33.750	30.00	74.250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080p	56.250	50.00	148.500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080p	67.433	59.94	148.352	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1080p	67.500	60.00	148.500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PsF formats	1080sf	27.000	24.00	74.250										✓	
	1080sf	28.125	25.00	74.250										✓	
	1080sf	33.750	30.00	74.250										✓	

Notes

3D formats

Standard		Resolution	V-Freq (Hz)	V-Total	H-Freq (kHz)	HDMI1/2 (*1)	DisplayPort / DVI-D (*2)	HB Dual-pipe HDMI (*3)	HB DisplayPort (*3)	Remarks	Output Display Frame Rate
720p50	Frame Packing	1280x720	50.00	1470	37.50	✓				Frame drop at scaler and frame doubling at formatter	100
720p59	Frame Packing	1280x720	59.94	1470	44.96	✓				Frame drop at scaler and frame doubling at formatter	120
720p60	Frame Packing	1280x720	60.00	1470	45.00	✓				Frame drop at scaler and frame doubling at formatter	120
720p50	Top-and-Bottom	1280x720	50.00	750	37.50	✓	✓			Frame drop at scaler and frame doubling at formatter	100
720p59	Top-and-Bottom	1280x720	59.94	750	44.96	✓	✓			Frame drop at scaler and frame doubling at formatter	120
720p60	Top-and-Bottom	1280x720	60.00	750	45.00	✓	✓			Frame drop at scaler and frame doubling at formatter	120
1080p23	Frame Packing	1920x1080	23.98	2205	26.97	✓				Output display frame rate up to 144Hz for 24Hz 3D input	144
1080p24	Frame Packing	1920x1080	24.00	2205	27.00	✓				Output display frame rate up to 144Hz for 24Hz 3D input	144
1080i50	Side-by-Side (Half)	1920x1080	50.00	1125	56.25	✓	✓			Frame drop at scaler and frame doubling at formatter	100
1080i59	Side-by-Side (Half)	1920x1080	59.94	1125	67.43	✓	✓			Frame drop at scaler and frame doubling at formatter	120
1080i60	Side-by-Side (Half)	1920x1080	60.00	1125	67.50	✓	✓			Frame drop at scaler and frame doubling at formatter	120

Notes

Standard		Resolution	V-Freq (Hz)	V-Total	H-Freq (kHz)	HDMI1/2 (*1)	DisplayPort / DVI-D (*2)	HB Dual-pipe HDMI (*3)	HB DisplayPort (*3)	Remarks	Output Display Frame Rate
1080p50	Side-by-Side (Half)	1920x1080	50.00	1125	56.25	✓	✓			Frame drop at scaler and frame doubling at formatter	100
1080p59	Side-by-Side (Half)	1920x1080	59.94	1125	67.43	✓	✓			Frame drop at scaler and frame doubling at formatter	120
1080p60	Side-by-Side (Half)	1920x1080	60.00	1125	67.50	✓	✓			Frame drop at scaler and frame doubling at formatter	120
1080p50	Top-and-Bottom	1920x1080	50.00	1125	56.25	✓	✓			Frame drop at scaler and frame doubling at formatter	100
1080p59	Top-and-Bottom	1920x1080	59.94	1125	67.43	✓	✓			Frame drop at scaler and frame doubling at formatter	120
1080p60	Top-and-Bottom	1920x1080	60.00	1125	67.50	✓	✓			Frame drop at scaler and frame doubling at formatter	100
1080p50	Frame Sequential	1920x1080	50.00	1125	56.25	✓	✓				100
1080p59	Frame Sequential	1920x1080	59.94	1125	67.43	✓	✓				120
1080p60	Frame Sequential	1920x1080	60.00	1125	67.50	✓	✓				120
1080p100	Frame Sequential	1920x1080	100.00	1125	112.50				✓	8-bit / color Frame drop at scaler and frame doubling at formatter	100
1080p120	Frame Sequential	1920x1080	120.00	1125	135.00				✓	8-bit / color Frame drop at scaler and frame doubling at formatter	120

Notes

Standard		Resolution	V-Freq (Hz)	V-Total	H-Freq (kHz)	HDMI1/2 (*1)	DisplayPort / DVI-D (*2)	HB Dual-pipe HDMI (*3)	HB DisplayPort (*3)	Remarks	Output Display Frame Rate
WUXGA_100_RB	Frame Sequential	1920x1200	100.00	1258	125.72				✓	8-bit / color Frame drop at scaler and frame doubling at formatter	100
WUXGA_120_RB	Frame Sequential	1920x1200	120.00	1271	152.40				✓	8-bit / color Frame drop at scaler and frame doubling at formatter	120
1080p23	Dual Pipe	1920x1080	23.98	1125	26.97			✓		Output display frame rate up to 144Hz for 24Hz 3D input	144
1080p24	Dual Pipe	1920x1080	24.00	1125	27.00			✓		Output display frame rate up to 144Hz for 24Hz 3D input	144
1080p25	Dual Pipe	1920x1080	25.00	1125	28.13			✓			100
1080p30	Dual Pipe	1920x1080	30.00	1125	33.75			✓			120
1080p50	Dual Pipe	1920x1080	50.00	1125	56.25			✓		Frame drop at scaler and frame doubling at formatter	100
1080p59	Dual Pipe	1920x1080	59.94	1125	67.43			✓		Frame drop at scaler and frame doubling at formatter	120
1080p60	Dual Pipe	1920x1080	60.00	1125	67.50			✓		Frame drop at scaler and frame doubling at formatter	120
WUXGA_60_RB	Dual Pipe	1920x1200	60.00	1235	74.04			✓		Frame drop at scaler and frame doubling at formatter	120

Notes

Appendix B: wiring details

Signal inputs and outputs

HDMI

19 way type A connector

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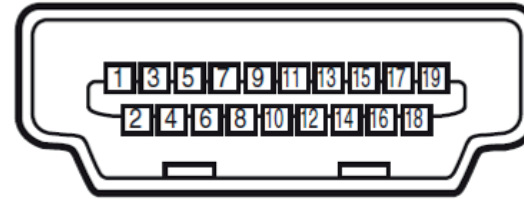
HDMI: pin view of panel connector

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)
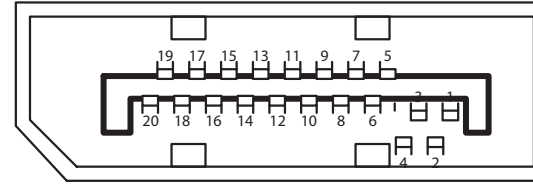
DisplayPort: pin view of panel connector

Notes

3G-SDI in, 3G-SDI out

75 ohm BNC

3G-SDI connector

HDBaseT input

RJ45 socket.

1. DATA 0+
2. DATA 0-
3. DATA 1+
4. DATA 2+
5. DATA 2-
6. DATA 1-
7. DATA 3+
8. DATA 3-
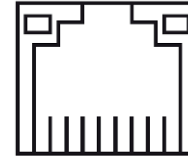
87654321

HDBase-T

Notes

DVI-D input

1. TMDS Data 2+
2. TMDS Data 2-
3. Ground
4. not connected
5. not connected
6. SCL
7. SDA
8. not connected
9. TMDS Data 1-
10. TMDS Data 1+
11. Ground
12. not connected
13. not connected
14. +5 V Power
15. Ground
16. HPD
17. TMDS Data 0-
18. TMDS Data 0+
19. Ground
20. not connected
21. not connected
22. Ground
23. TMDS Clock+
24. TMDS Clock-
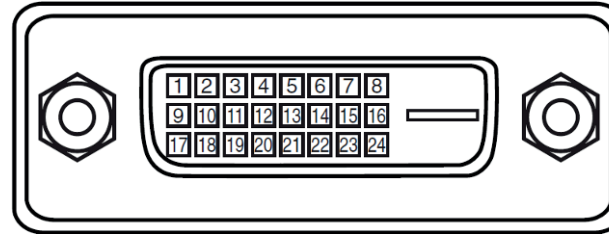
DVI-D: pin view of panel connector

Notes

VGA input

1. Red input
2. Green input
3. Blue input
4. not connected
5. not connected
6. Ground
7. Ground
8. Ground
9. +5 V Power
10. Ground
11. Ground
12. VGA_SDA
13. H-Sync
14. V-Sync
15. VGA_SCL
16. Ground

Control connections

LAN

RJ45 socket

1. TX+
2. TX-
3. TXC
4. Ground
5. Ground
6. RXC
7. RX+
8. RX-
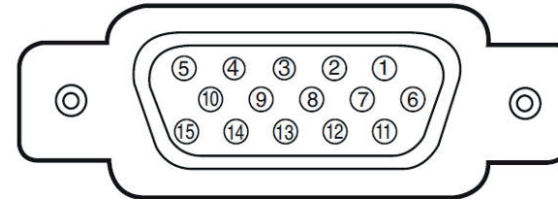
VGA: pin view of panel connector

Only one remote connection
(RS232 or LAN) should be used at
any one time.
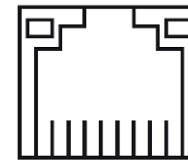
LAN: pin view of panel connector

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RS232

9 way D-type connector

1. not connected
2. Received Data (RX)
3. Transmitted Data (TX)
4. not connected
5. Ground
6. not connected
7. Short with pin8
8. Short with pin7
9. not connected

Trigger

3.5 mm mini jack, Output: 12V, 200 mA max

- **Tip** Signal
- **Sleeve** Ground
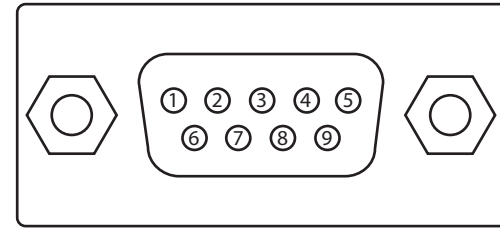
RS232: pin view of panel male connector
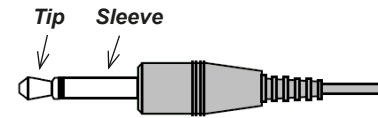
Appendix C: glossary of terms

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.

4

4K-UHD

The 4K-UHD resolution of 3840 × 2160 is the dominant 4K resolution used in the consumer media and display industries. This resolution has an aspect ratio of 16 :9, with 8,294,400 total pixels.

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.

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.

Notes

E

Edge blend

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

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.

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.

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 loosing any pixel data.

SX+

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

Synchronization
A timing signal used to coordinate an action.

T

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

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

Throw distance
The distance between the screen and the projector.

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

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

U

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

V

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

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

Vista
An aspect ratio of 1.66:1.

W

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

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.

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