DIGITAL PROJECTION

E-Vision Laser WQ120 Series

High Brightness Digital Video Projector

- INSTALLATION AND QUICK-START GUIDE
- CONNECTION GUIDE
- OPERATING GUIDE
- REFERENCE GUIDE

Rev A May 2018
119-656

About This Document

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

Symbols used in this manual

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

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

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

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

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

Product revision

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

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

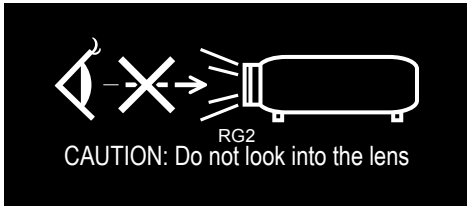
Legal notice

Notes

Laser Information

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

Optical radiation



Caution - possibly hazardous optical radiation emitted from this product. Do not stare at operating light source. May be harmful to eyes. This projector is tested according to IEC/EN62471-5:2015 (Photobiological safety of lamps and lamp systems – Part 5: Image projectors" standard) to be Risk Group 2 (low risk).

Notes

Introduction

Congratulations on your purchase of this Digital Projection product.

Your projector has the following key features:

- Displays WQXGA.
- HDBaseT® for transmission of uncompressed High Definition Video up to 100 m from the source.
- 3G-SDI with loop-through.
- Separate control of screen and source aspect ratio.
- Control via LAN and RS232.
- Motorised lens mount.

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

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DIGITAL PROJECTION

E-Vision Laser WQ120 Series

High Brightness Digital Video Projector

INSTALLATION AND QUICK-START GUIDE

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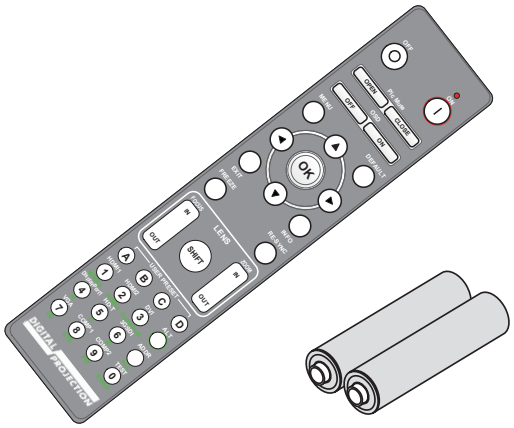
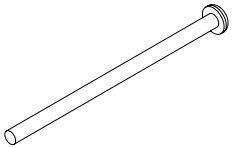
What's In The Box?

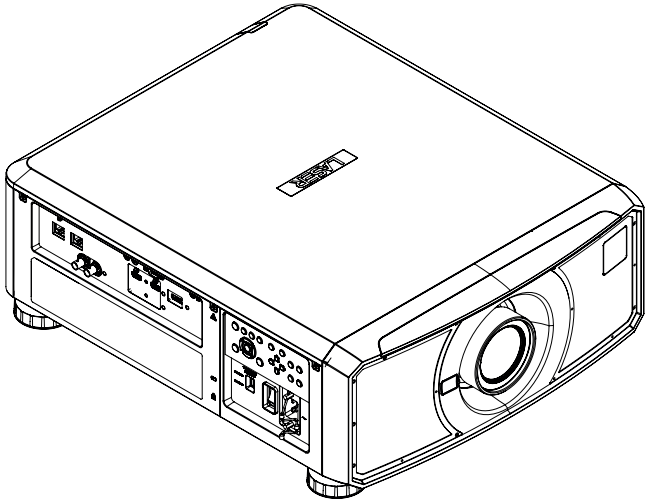


Remote control

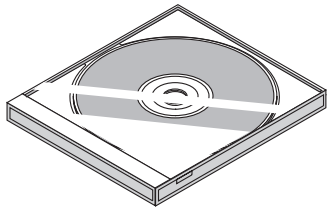
2x AAA batteries



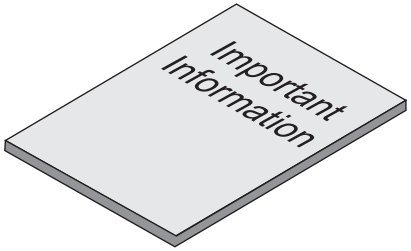
Security screw



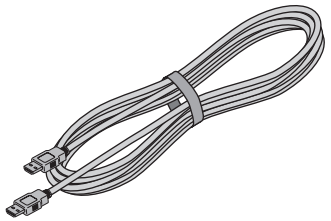
Projector



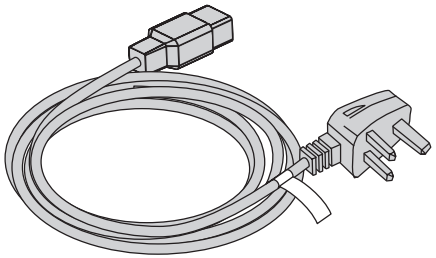
User Manual on disc



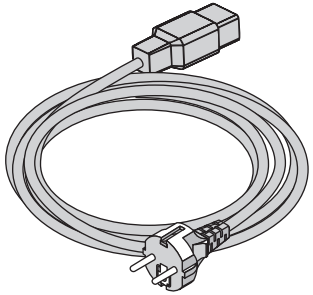
Important Information



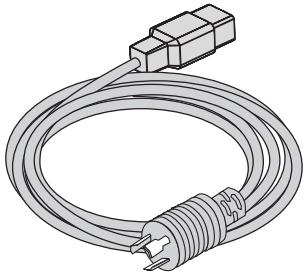
HDMI cable



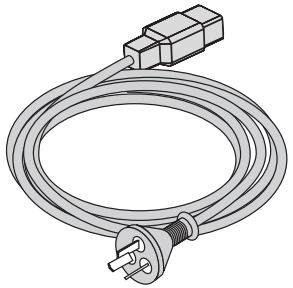
Power cable, United Kingdom



Power cable, Europe



Power cable, North America



Power cable, China

Notes

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

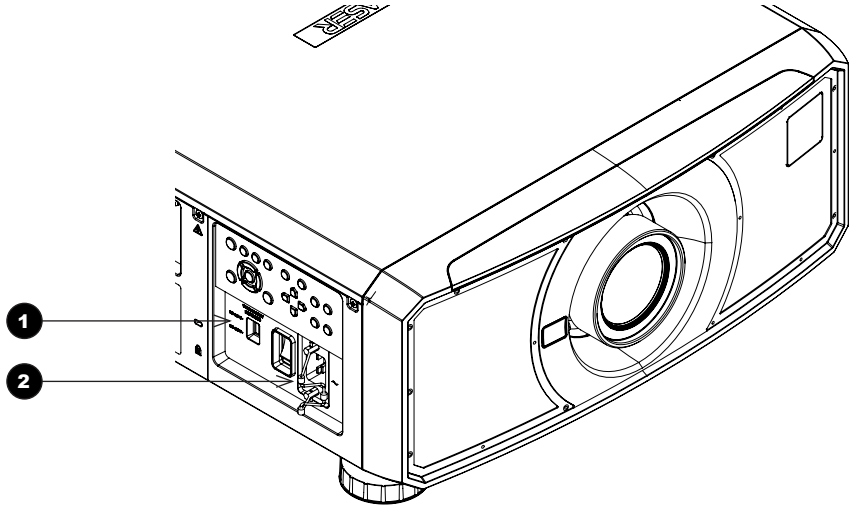
You should save the original box and packing materials, in case you ever need to ship your projector.

The projector is shipped without a lens.

Only one power cable - dependent on the destination territory - will be supplied with the projector.

Connecting The Power Supply

Adjust the ***VOLTAGE SELECT switch*** 1 to the required voltage, then firmly push the mains connector into the ***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~

Notes

Use only the power cable provided.

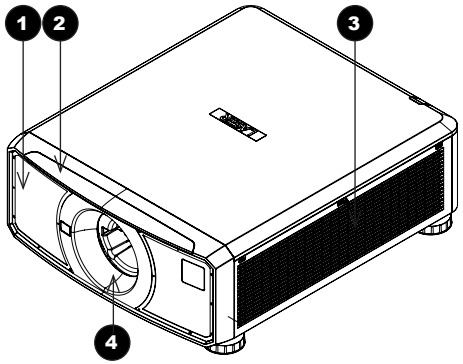
Ensure that the power outlet includes a ground connection as this equipment MUST be earthed.

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

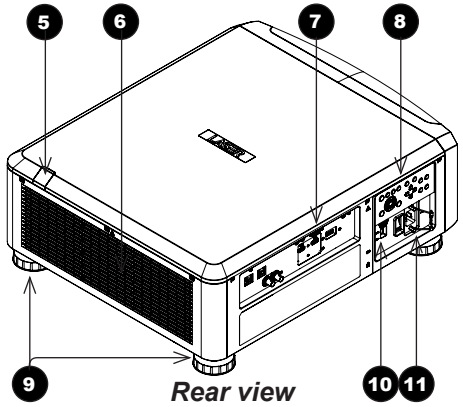
Projector Overview

Front and rear views

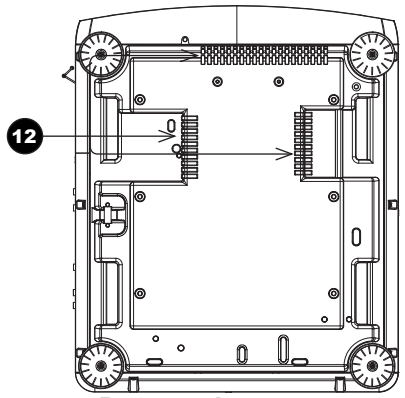
1. Air inlet
2. Front infrared window and indicators
3. Air inlet
4. Lens mount
5. Rear infrared window
6. Air outlet
7. Connections panel
8. Control panel
9. Adjustable feet
10. Voltage selector
11. Mains socket and switch
12. Air inlets



Front view



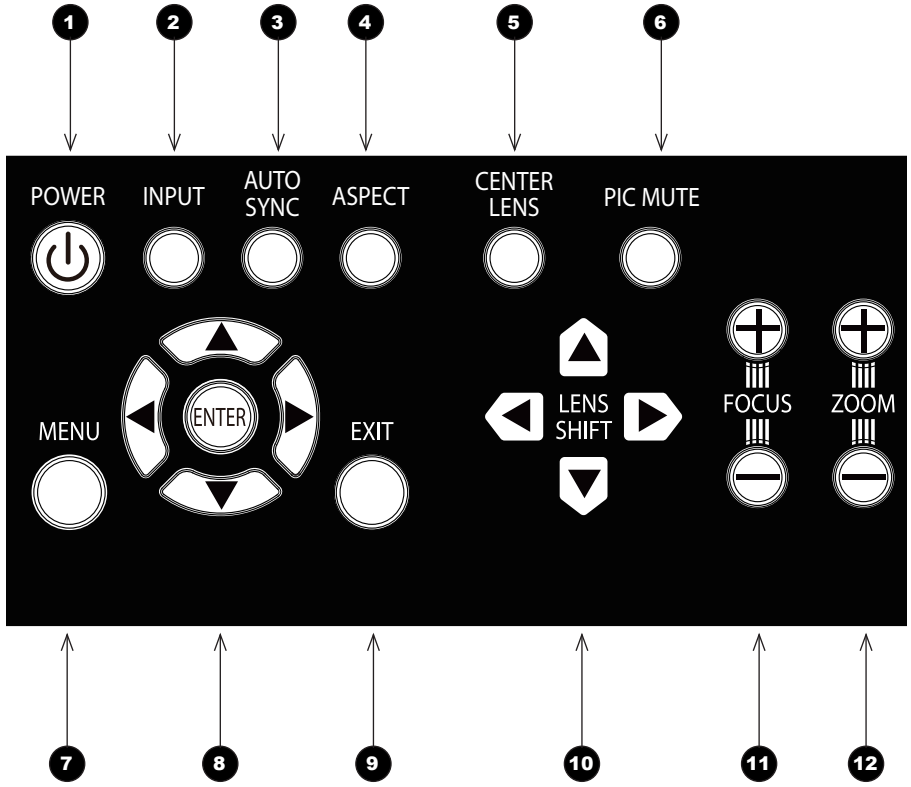
Rear view



Bottom view

Notes

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 OFF, 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**
Each of these buttons moves the lens in the specified direction.

11 **FOCUS plus and minus buttons**
Used to move the focus in and out.

12 **ZOOM plus and minus buttons**
Used to zoom in and out.

Notes

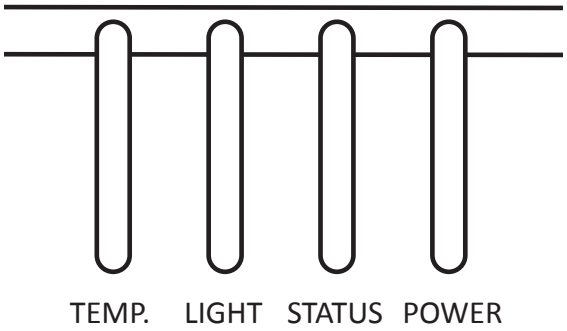
Projector indicators

TEMP. Off = no problem
Flashing red = temperature error

LIGHT Off = light is switched off
Flashing green = light is preparing to switch on
Flashing red (cycles of six flashes) = light module failure
On, red = light module has reached end of life
On, green = light is switched on

STATUS Off = no problem
Flashing red (continuously) = cover error
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
On, red = STANDBY mode
On, green = the projector is switched on



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 black.

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

4 **MENU**
Access the OSD. If the OSD is open, press this button to go back to the previous menu.

5 **Navigation (arrows and OK)**
Navigate through the menus with the arrows, confirm your choice with **OK**.
In lens adjustment modes, the arrows are used to move, zoom or focus the lens. See ***11*** below.
In lens adjustment modes, or when the OSD is not showing, the **OK** button switches between modes: ***Shift Adjustment*** and ***Zoom / Focus Adjustment***.

6 **EXIT**
Go up one level in the OSD. When the top level is reached, press to close the OSD.

7 **FREEZE**
Freeze the current frame.

8 **DEFAULT**
When editing a parameter, press this button to restore the default value.

9 **INFO**
Access information about the projector.

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

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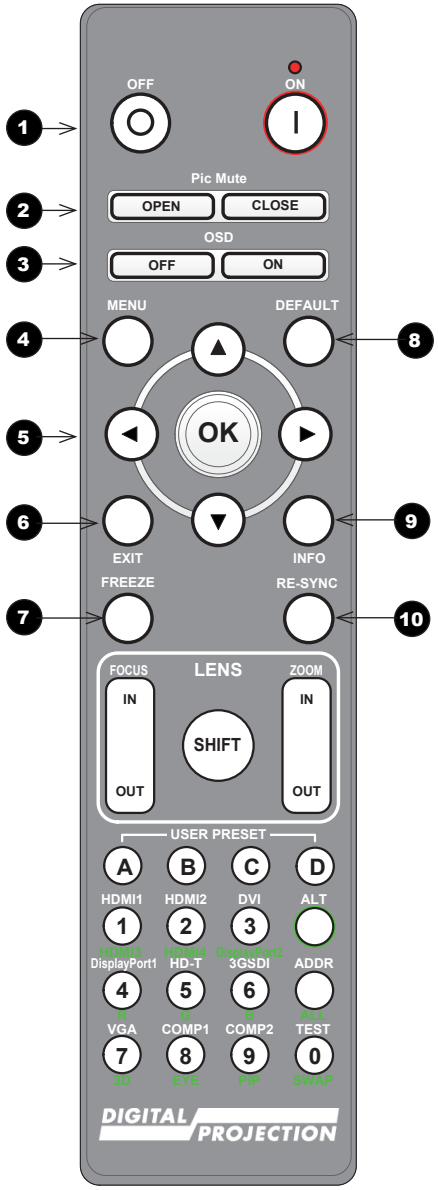

Remote control

Notes

This projector does not use the following options on the remote:

DVI, VGA, COMP 1, COMP 2, HDMI 3, HDMI 4, DISPLAYPORT2, 3D, EYE, PIP and SWAP.

11 **LENS adjustment**
FOCUS IN / OUT: adjust focus.
SHIFT: press and hold this button, then use the Navigation arrow buttons to move the lens.
ZOOM IN / OUT: adjust zoom.

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

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

14 **DVI / DisplayPort2 / Numeric input 3**
There is no DVI or DisplayPort2 input on this projector.

15 **HDMI 2 / HDMI 4 / numeric input 2**
Select the HDMI 2 input.
There is no HDMI 4 input on this projector.

16 **HDMI 1 / HDMI 3 / numeric input 1**
Select the HDMI 1 input.
There is no HDMI 3 input on this projector.

17 **TEST / SWAP / numeric input 0**
Show a test pattern. Press again to show the next test pattern:
...Off, White, Black, Red, Green, Blue.
There is no SWAP function on this projector.

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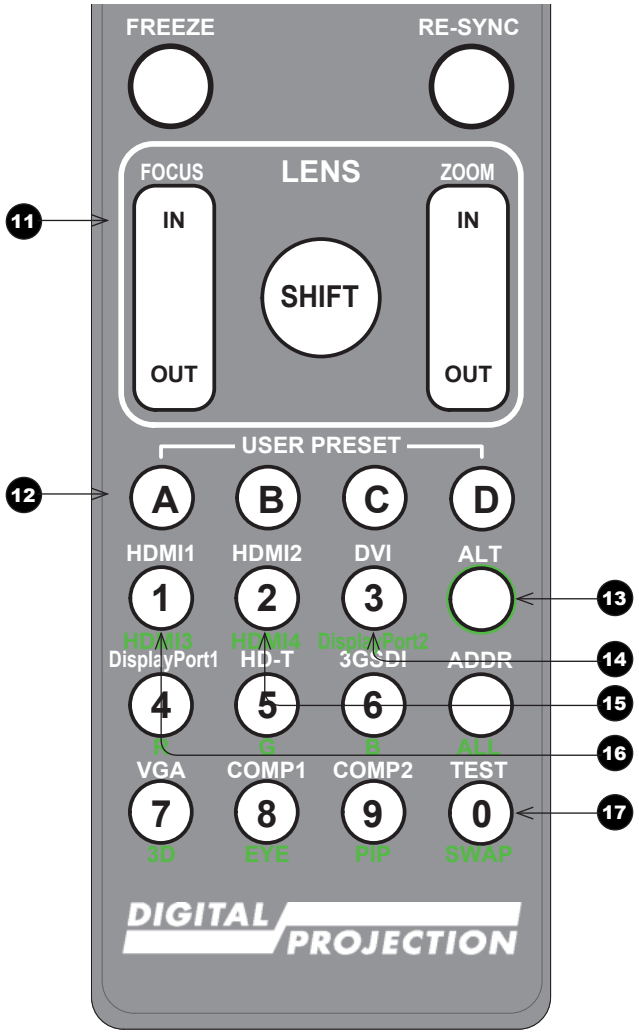


Remote control

Notes

This projector does not use the following options on the remote:

DVI, VGA, COMP 1, COMP 2, HDMI 3, HDMI 4, DISPLAYPORT 2, 3D, EYE. PIP and SWAP.

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

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

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

21 **VGA / 3D / Numeric input 7**
There is no VGA input or 3D function on this projector.

22 **COMP1 / EYE / Numeric input 8**
There is no Component 1 input or EYE function on this projector.

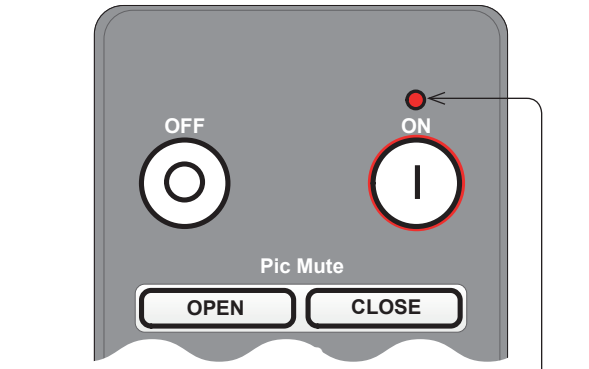
23 **COMP2 / PIP / Numeric input 9**
There is no Component 2 input or PIP function on this projector.

24 **ADDR / ALL (with red indicator at the top)**
Assign and unassign an IR remote address.
To assign an address:

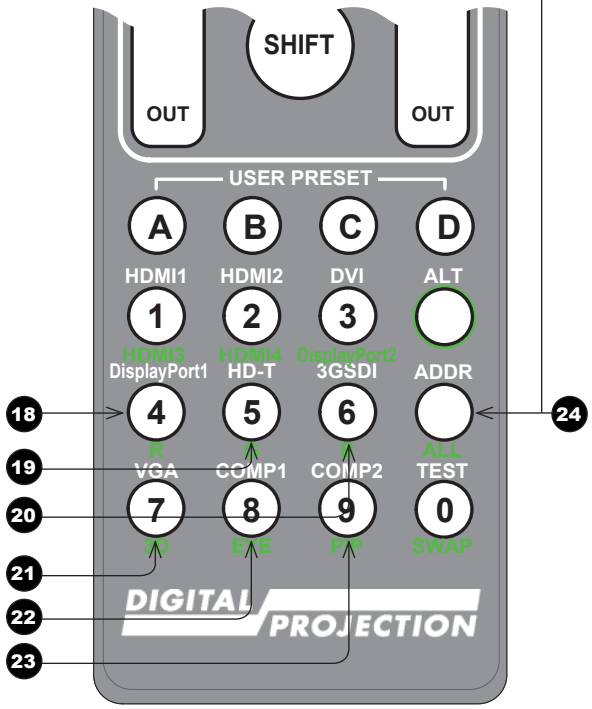
1. Press and hold this button until the indicator starts flashing.
2. Release this button and while the indicator is still flashing, enter a two-digit address using the numeric input buttons. The indicator will flash three times quickly to confirm the change.

To unassign an address and return to the default address 00,

- Press and hold **ALT** and this button simultaneously until the indicator flashes to confirm the change.



Remote control top



Remote control bottom

Notes

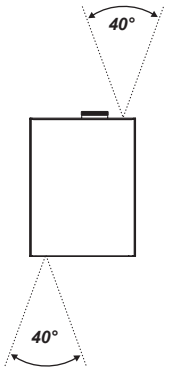
This projector does not use the following options on the remote:

DVI, VGA, COMP 1, COMP 2, HDMI 3, HDMI 4, DISPLAYPORT 2, 3D, EYE. PIP and SWAP.

Infrared reception

The projector has infrared sensors at the front and back.

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



Infrared reception

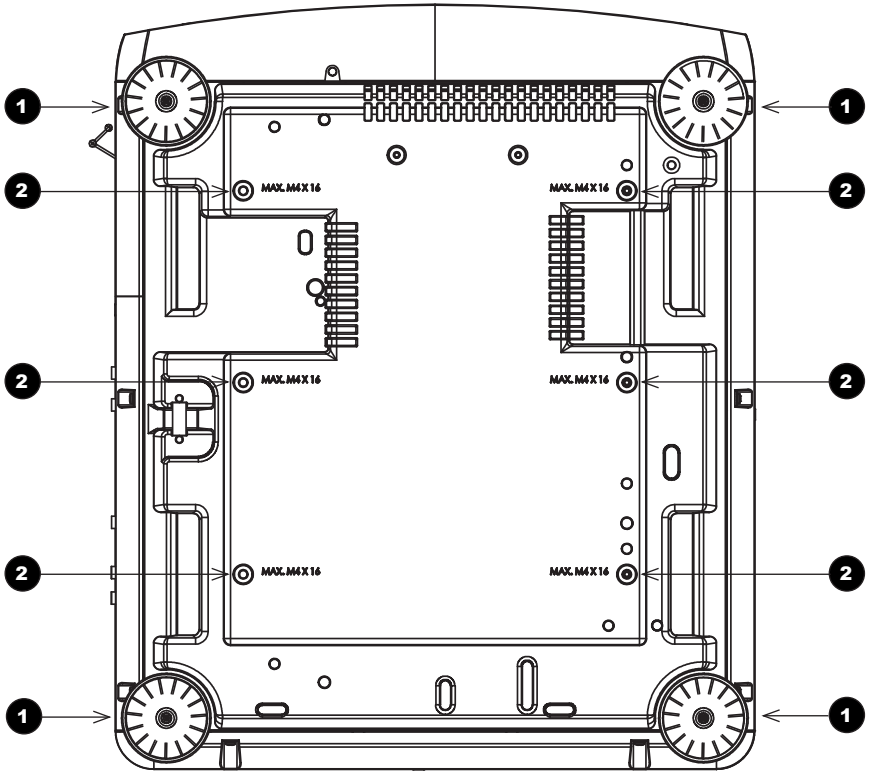
Notes

Positioning The Screen And Projector

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

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

1. **Four adjustable feet**
2. **Six M4 holes for ceiling mount**
   The screws should not penetrate more than 15 mm into the body of the projector.



Notes

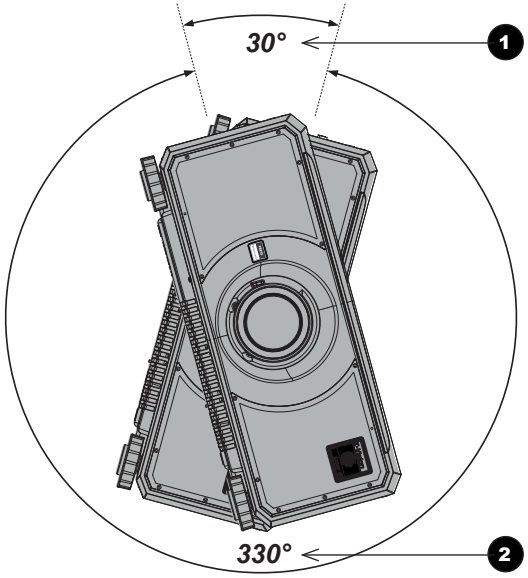
Always allow the projector to cool for 5 minutes before disconnecting the power or moving the projector.

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

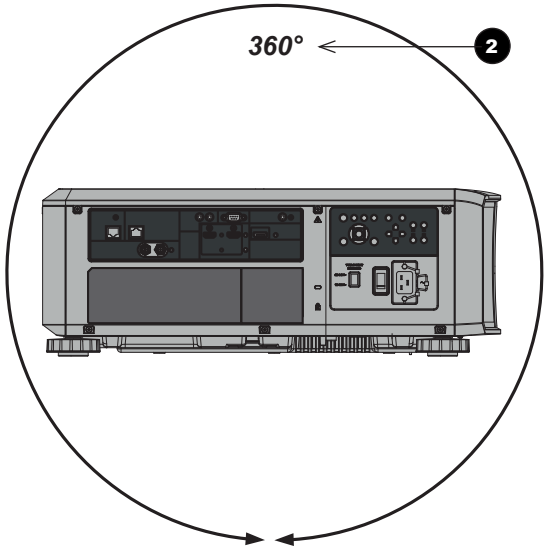
Roll and pitch

The projector can be operated in numerous positions.

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



Roll



Pitch

1 **Recommended positions: inputs side up**

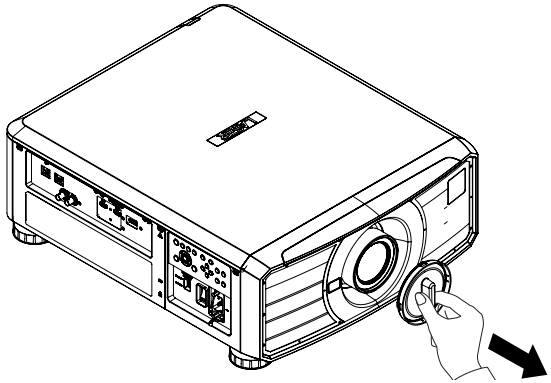
2 **Also possible**

Notes

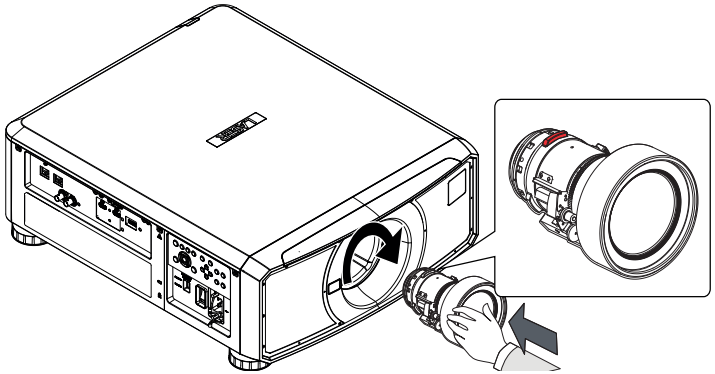
Changing The Lens

Inserting a new lens

1. Remove the front and rear lens caps.

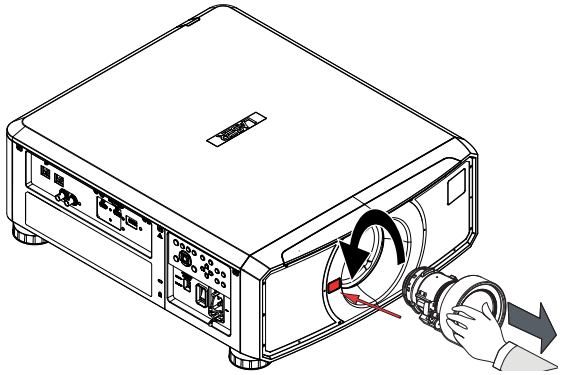


2. Position the lens so that the labels are at the top, and gently insert it all the way into the lens mount.
3. Push the lens in firmly and turn it clockwise until it clicks into place.



Removing the lens

1. Push in the lens release lever, and turn the lens anti-clockwise.
2. Remove the lens.



Notes

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

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

The lens is shipped separately.

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

The projector will not power on without the lens fitted.

Operating The Projector

Switching the projector on

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

   The fans begin working, then the **POWER** indicator begins flashing green. When the flashing stops, the **POWER** and **LIGHT** indicators both light steady green. The projector is 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.

Notes

*See also **Connecting The Power Supply** earlier in this guide.*

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

Use only the power cable provided.

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

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

Selecting an input signal

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

Selecting a test pattern

To display a test pattern:

- Press **TEST** on the remote control.

  Change the test pattern using the **LEFT** ◀ and **RIGHT** ▶ arrow buttons. Test patterns are displayed in the following order:

  White, Black, Red, Green, Blue.

- 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

*For full details of how to use the controls and the menu system, see the **Operating Guide**.*

Adjusting the lens

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

Lens menu

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

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

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

Remote control

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

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

Adjusting the image

Orientation

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

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

Geometry

- Settings such as **Aspect Ratio** and **Overscan** 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

*For full details of how to adjust the lens using the remote control, see **Remote Control** earlier in this guide.*

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DIGITAL PROJECTION

E-Vision Laser WQ120 Series

High Brightness Digital Video Projector

CONNECTION GUIDE

Rev A May 2018

CONTENTS

Signal Inputs

Digital inputs and outputs

1 **HDBaseT**

Receives digital signal from HDBaseT-compliant devices.

2 **3G-SDI in**

3 **3G-SDI out**

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

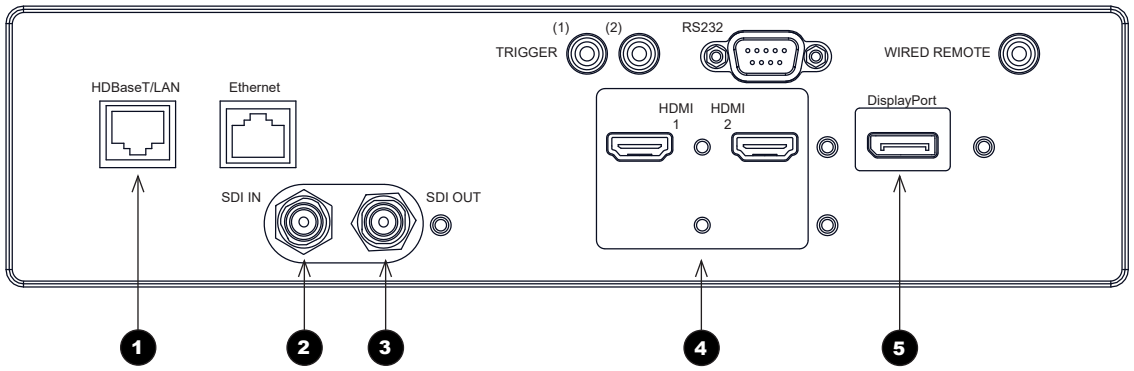
4 **HDMI 1 / HDMI 2**

HDMI 1 and 2 are HDMI 2.0 inputs supporting HDCP 2.2.

Connect an ***HDMI*** cable to the connector.

5 **DisplayPort**

DisplayPort 1.2 input. Connect a DisplayPort cable to the connector.
Supports sources up to WQXGA at 120Hz.



Notes

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

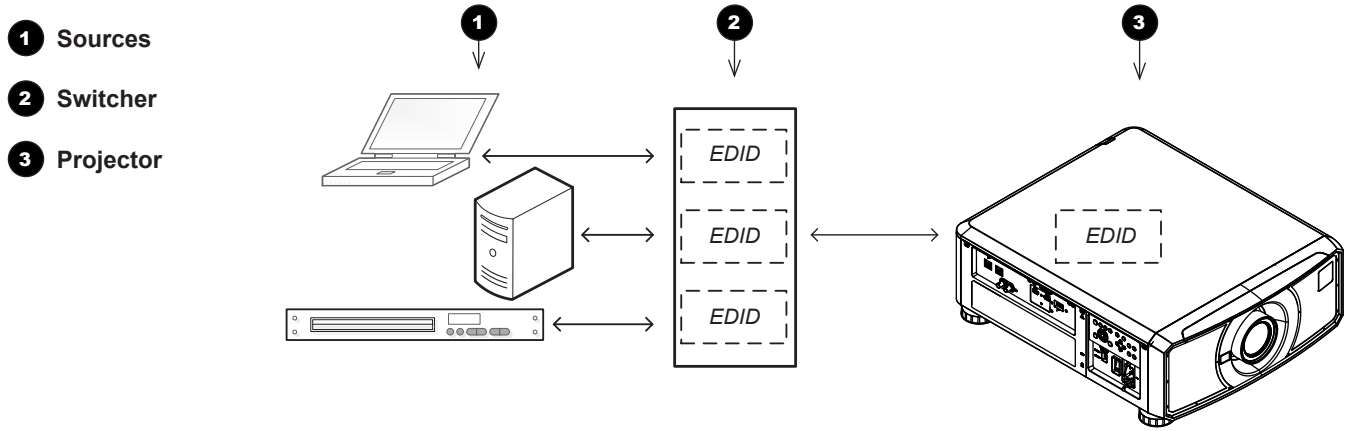
EDID on the DisplayPort, HDMI and HDBaseT inputs

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

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

Using DisplayPort/HDMI/HDBaseT switchers with the projector

When using a DisplayPort/HDMI/HDBaseT source switcher with the projector, it is important to set the switcher so that it passes the projector EDID through to the source devices. If this is not done, the projector may not be able to lock to the source or display the source correctly as its video output timings may not be compatible with those of the projector. Sometimes this is called transparent, pass-through or clone mode. See your switcher's manual for information on how to set this mode.



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

Notes

Control Connections

1 **HDBaseT/LAN**

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

2 **Ethernet**

This dedicated LAN connection can be used if ***HDBaseT/LAN*** is already being used for HDBaseT signal input.

3 **Trigger 1 & Trigger 2**

The Trigger outputs are activated by one of the three following conditions, as set in the **Setup** menu:

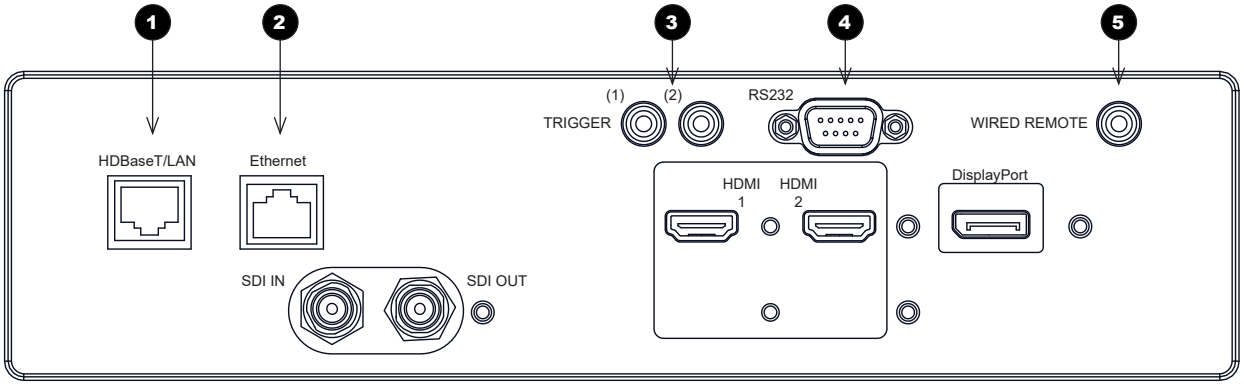
- Screen trigger: can be connected to an electrically operated screen, automatically deploying the screen when the projector starts up, and retracting the screen when the projector shuts down.
- Aspect ratio trigger: can be used to control screen shuttering for different aspect ratios.
- RS232 trigger: can be used to control the screen or screen shuttering on receipt of an RS232 command

4 **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.

5 **Wired Remote**

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



Notes

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

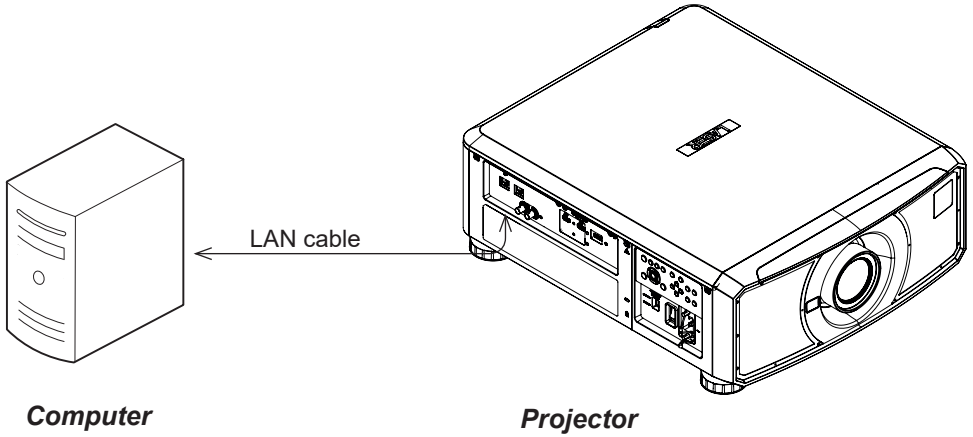
Only one remote connection (RS232 or LAN) should be used at any one time.

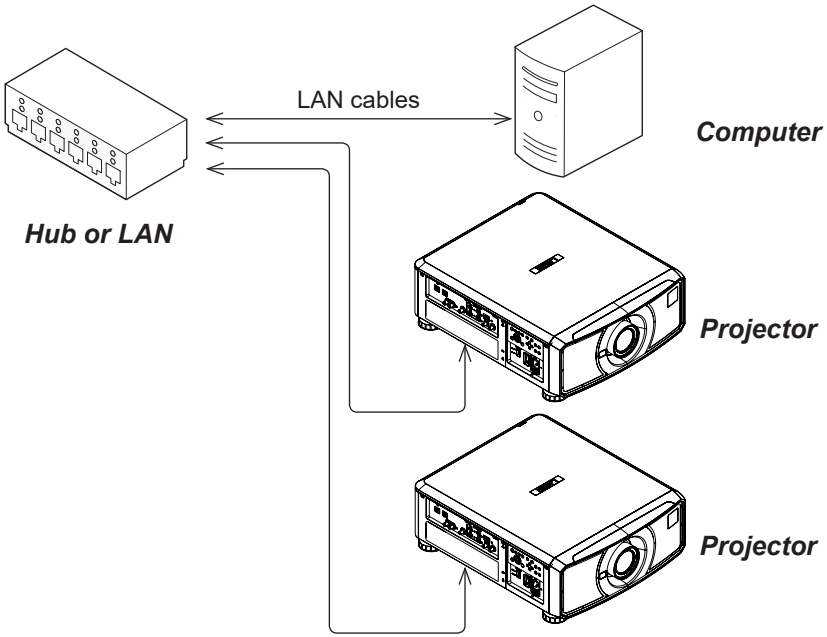
With a LAN connection the projector can serve a web page offering status and projector controls.

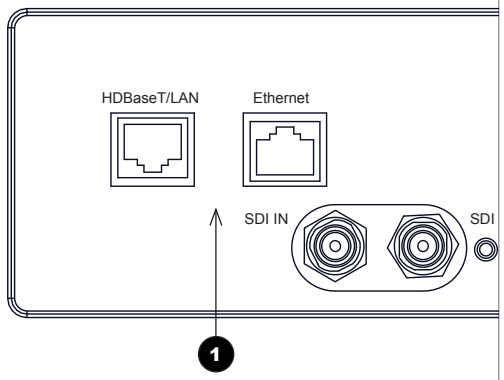
***Projector Controller** is available for download, free of charge, from the Digital Projection website.*

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







1 **LAN or Ethernet**

Notes

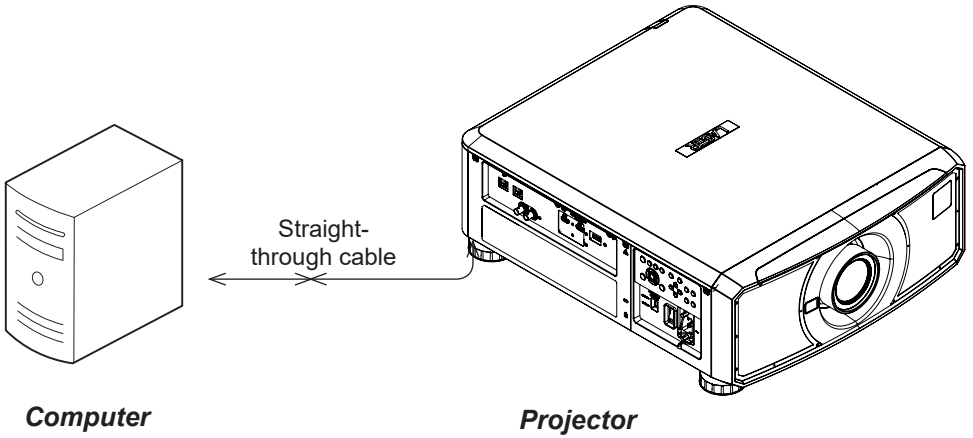
With a LAN connection the projector can serve a web page offering basic projector controls.

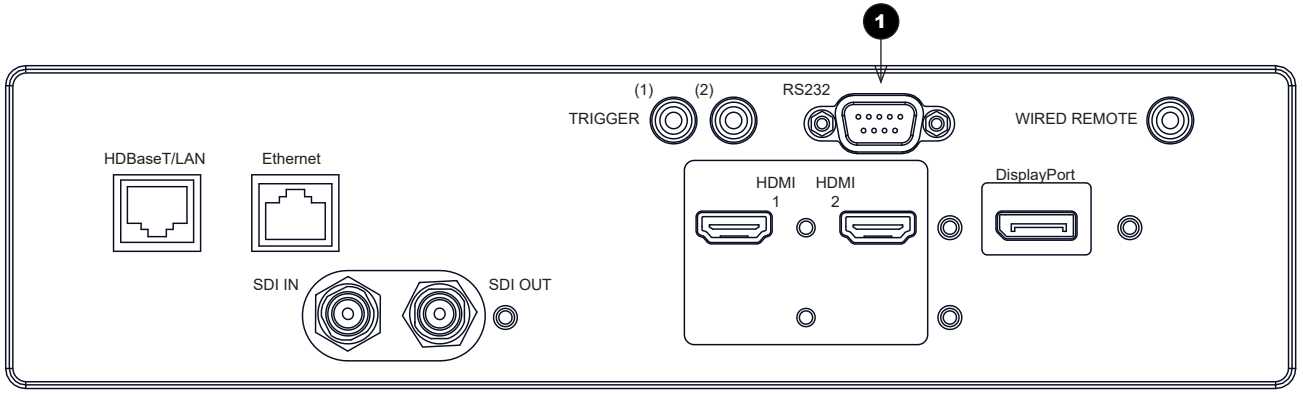
***Projector Controller** is available for download, free of charge, from the Digital Projection website.*

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

RS232 connection example

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





1 **RS232**

Notes

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

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DIGITAL PROJECTION

E-Vision Laser WQ120 Series

High Brightness Digital Video Projector

OPERATING GUIDE

Rev A May 2018

CONTENTS

Using The Menus

Opening the OSD

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

- press the **MENU** button.

The on-screen display (OSD) opens showing the list of available menus.

Opening a menu

Move up and down the list using the **UP**▲ and **DOWN** ▽ arrow buttons. To open a menu,

- press **ENTER** on the control panel or **OK** on the remote control.

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

Exiting menus and closing the OSD

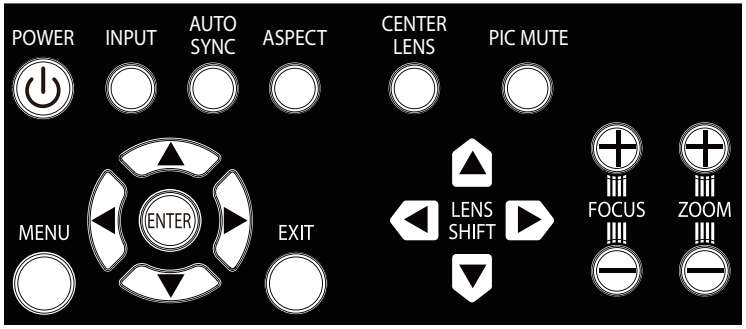
To go back to the previous page,

- press **EXIT**.

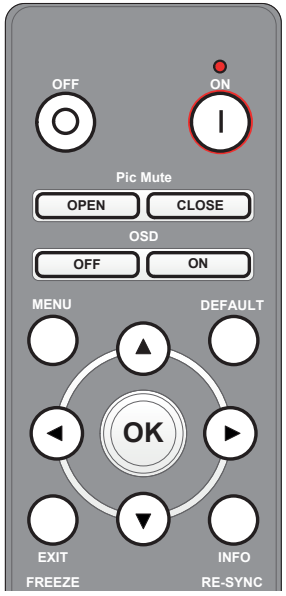
When you reach the top level, pressing **EXIT** will close the OSD.

To close the OSD from any page,

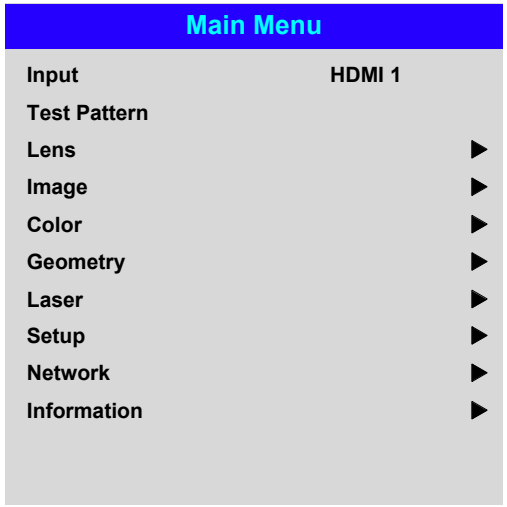
- press **MENU**.



Projector control panel



Remote control



On-screen display (OSD): top level menus

Notes

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).

Accessing sub-menus

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

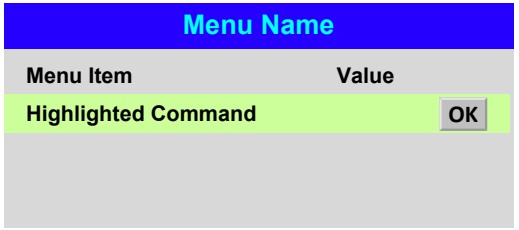
Executing commands

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

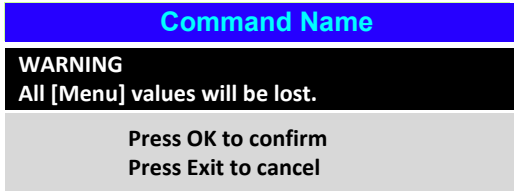
Press **ENTER/OK** to execute the highlighted command.

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

Inside a menu



Highlighted command



Confirmation dialog

Notes

The highlighted item has green background.

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.

Using a slider to set a value

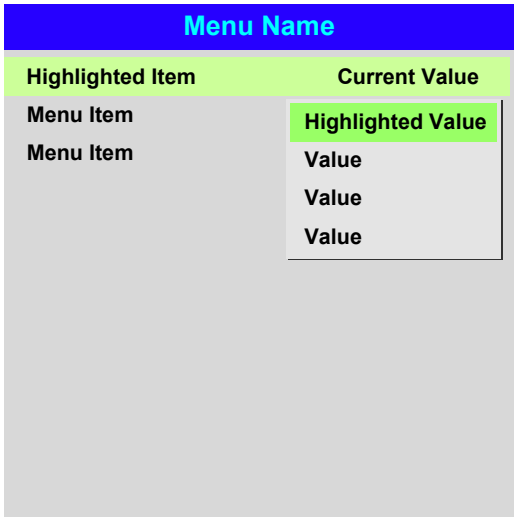
Some parameters open a slider. To set such a parameter:

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

Editing numeric values

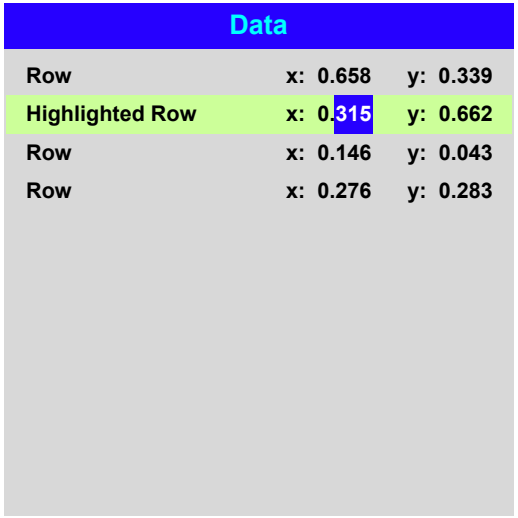
Some parameters take numeric values without using sliders - for example, color matching values or IP addresses.

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.



List of values

Slider



Numeric values

Notes

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

Using The Projector

Main menu

- **Input**
  Press **ENTER/OK** to open the list of available inputs.

  Use the **UP** ▲ and **DOWN** ▼ arrow buttons to select an input from the list, then press **ENTER/OK** to confirm your choice.

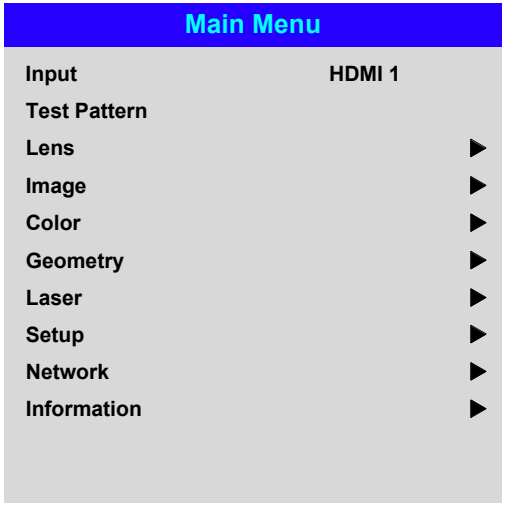
  Press **EXIT** to return to the main menu.

- **Test Pattern**
  Choose from:

  ...Off, White, Black, Red, Green, Blue.

  Use the **LEFT** ◀ and **RIGHT** ▶ arrow buttons to switch between values.

- **Lens, Image**, **Color**, **Geometry**, **Laser**, **Setup**, **Network** and **Information**
  Press **ENTER/OK** to open these menus and access various settings.



Main menu

Notes

*See **Signal Inputs** in the **Connection Guide** for further information about the available inputs and connections.*

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

Lens menu

- **Lens Lock**

  When this feature is **On**, all other **Lens** menu items are disabled.

- **Lens Control**

  Opens a sub-menu, see below.

- **Center Lens**

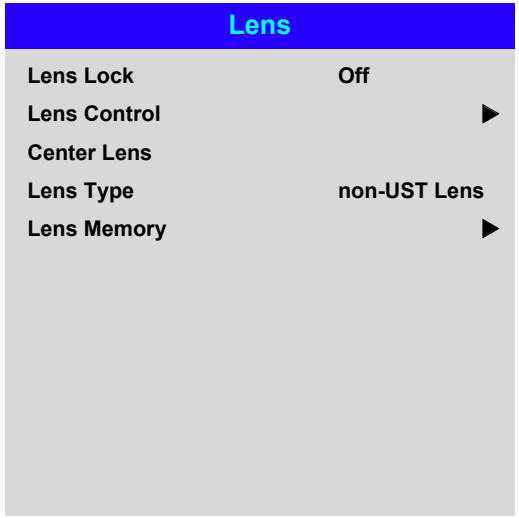
  Centers the lens.

- **Lens Type**

  Choose a UST or a non-UST lens.

- **Lens Memory**

  Opens a sub-menu, see next page.



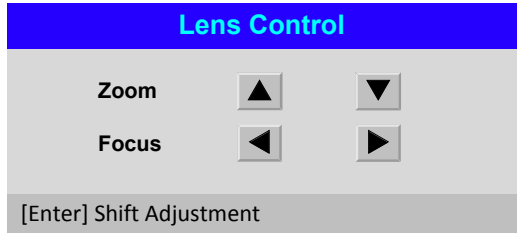
Lens Control

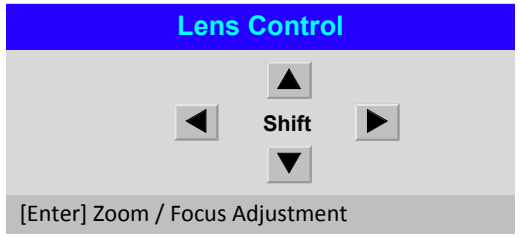
Lens Control settings operate in **Zoom/Focus Adjustment** and **Shift Adjustment** mode. Press **ENTER/OK** to switch between modes.

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

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

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





Notes

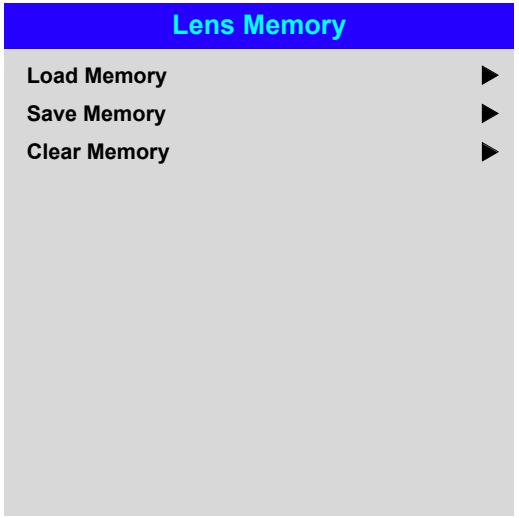
Lens menu continued from previous page

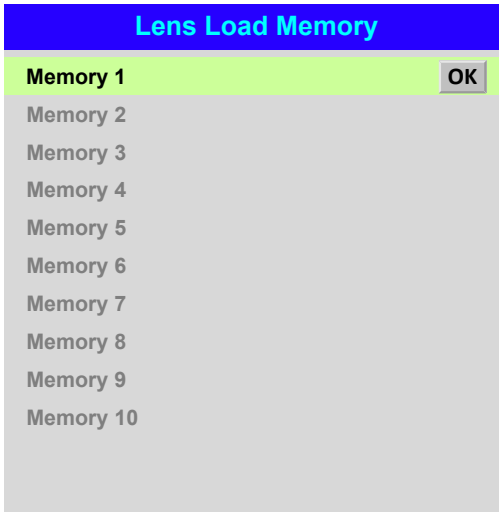
Lens Memory

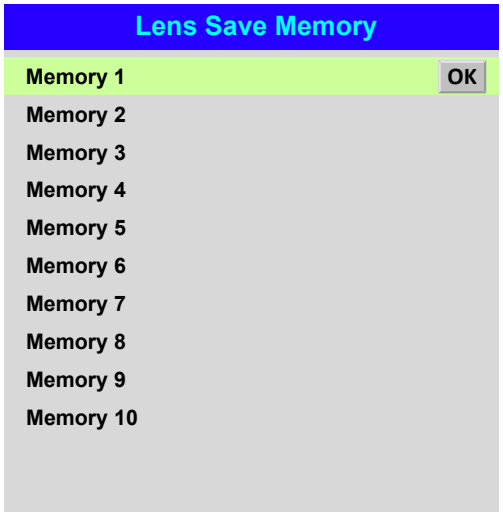
This menu allows you to load, save and delete up to ten lens presets, containing position, zoom, focus and shift adjustment information.

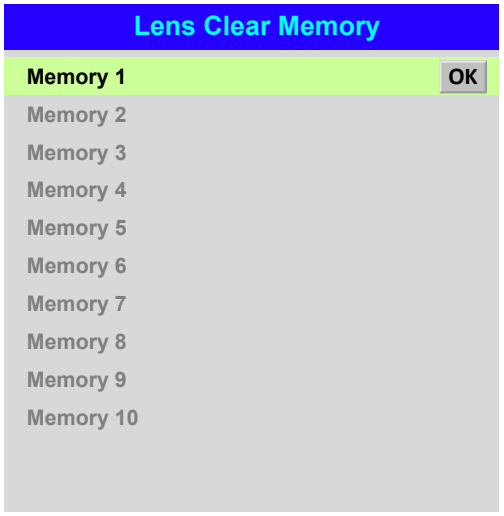
For example, if using different screen sizes and aspect ratios, you can save zoom, focus and positioning for each screen size and aspect ratio in a dedicated preset.

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









Notes

Image menu

- **Smear Reduction**

  This is used to improve the clarity of fast moving image content.
  Set to **On** for fast content.

- **Gamma**

  Choose a de-gamma curve from **1.0**, **1.8**, **2.0**, **2.2**, **2.35**, **2.5**, **S-Curve**, **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.

- **Brightness, Contrast, Saturation, Hue, Sharpness**

  Highlight the setting you wish to edit, and then press **ENTER/OK**, or the **LEFT** ◀ or **RIGHT** ▶ arrow button to open the slider.
  Use the **LEFT** ◀ and **RIGHT** ▶ arrow buttons to adjust the slider.
  Press **EXIT** to close the slider and return to the menu, or **MENU** to close the slider and return to the projected image.

- **Noise Reduction**

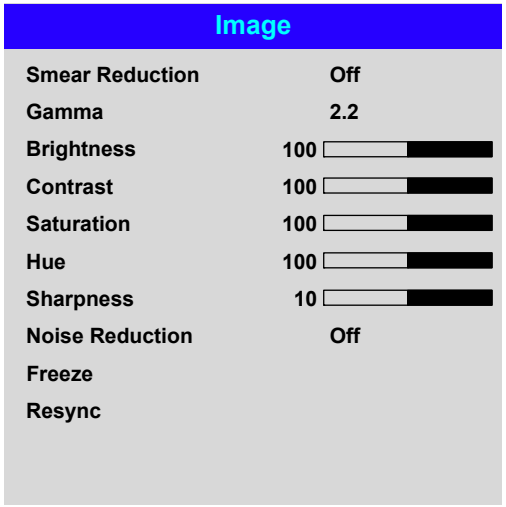
  Choose a level of noise reduction from **Off**, **Low**, **Middle** and **High**.

- **Freeze**

  Freezes the current frame.

- **Resync**

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



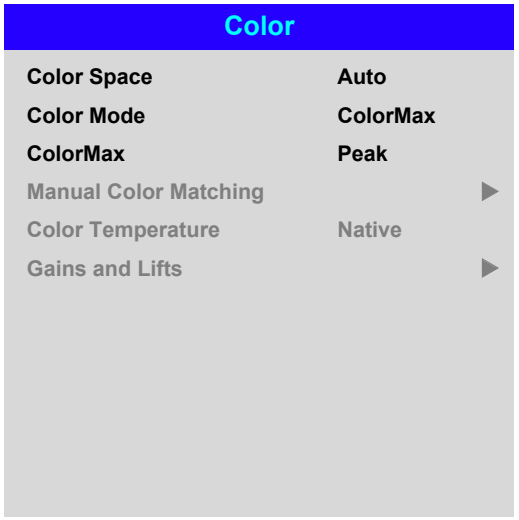
Notes

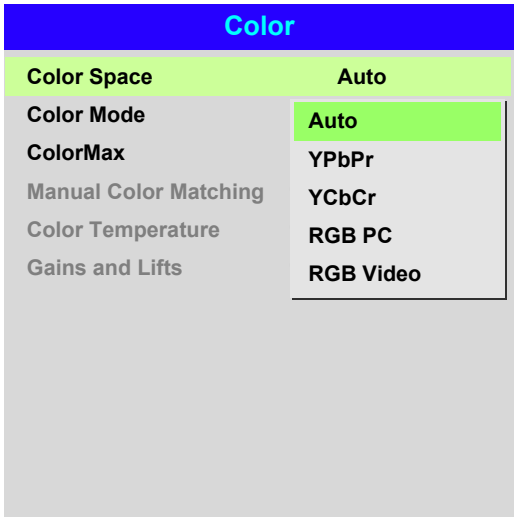
Color menu

Color Space

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

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

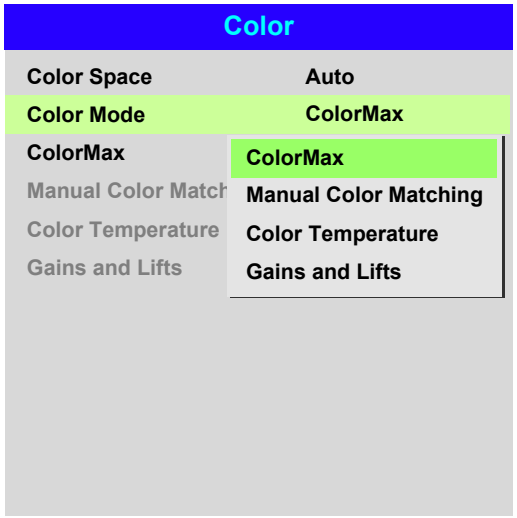




Notes

Color Mode

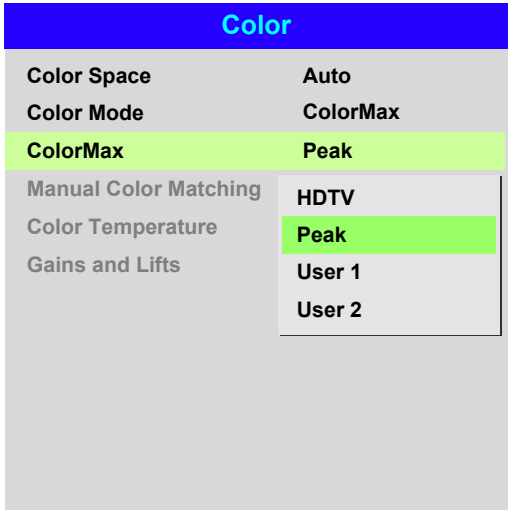
The projector can work in the following color modes: **ColorMax**, **Manual Color Matching**, **Color Temperature** and **Gains and Lifts**.



ColorMax

1. Set **Color Mode** to **ColorMax**.
2. Navigate to the **ColorMax** setting. 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.



Notes

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

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

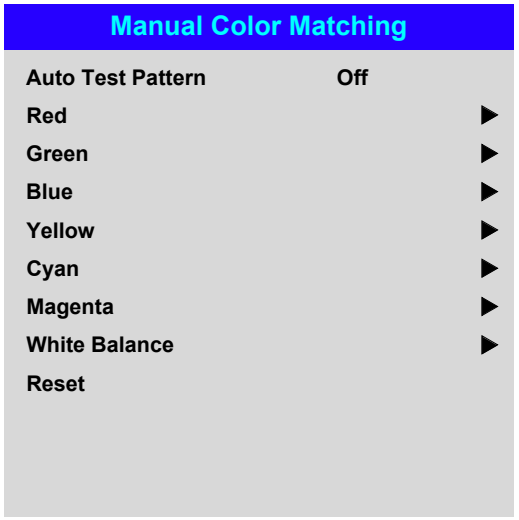
Color menu continued from previous page

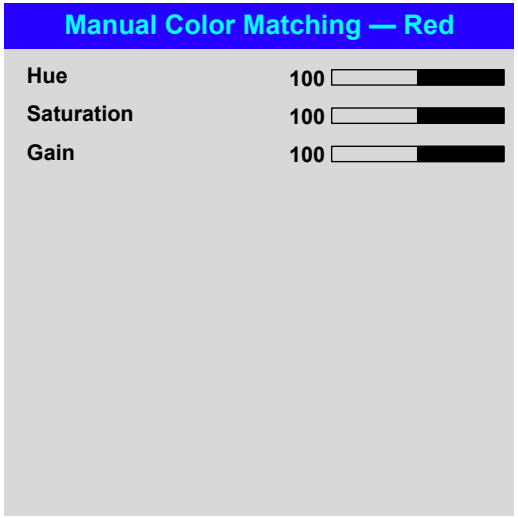
Manual Color Matching

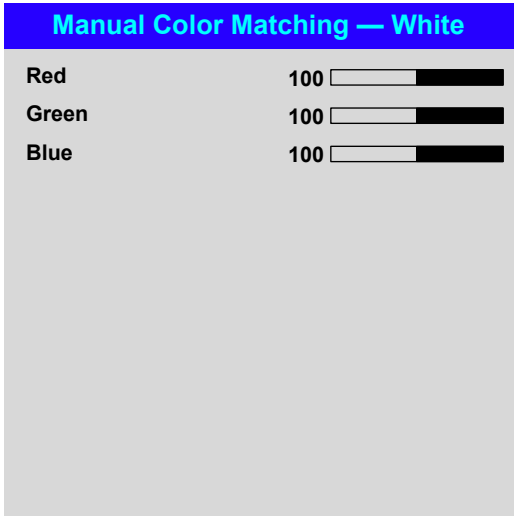
1. Set **Color Mode** to **Manual Color Matching**.
2. Open the **Manual Color Matching** submenu.

   Here you can do the following:

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







Notes

*For more details about the **Hue**, **Saturation** and **Gain** settings, see **Color matching parameters explained** further in this guide.*

Color menu continued from previous page

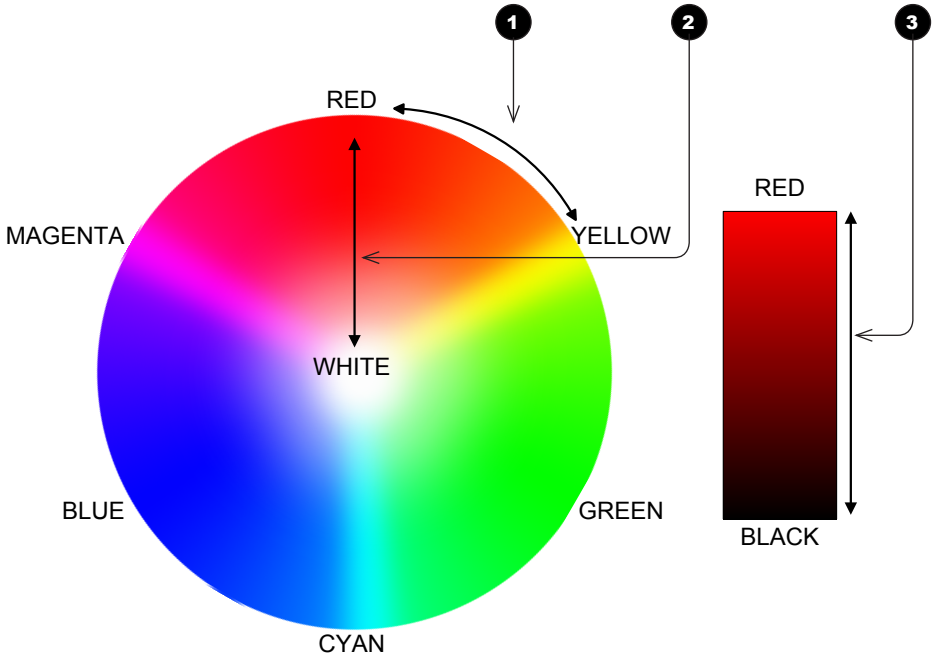
Color matching parameters explained

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

1. **Hue**
   Specifies the position of each color (***red***, ***yellow***, ***green***, ***cyan***, ***blue*** and ***magenta***) relative to its neighboring colors.

2. **Saturation**
   Specifies the level of white in each color (i.e. how “pale” each color is).

3. **Gain**
   Controls the amount of light that goes into each color, i.e. the lowest gain would produce black.

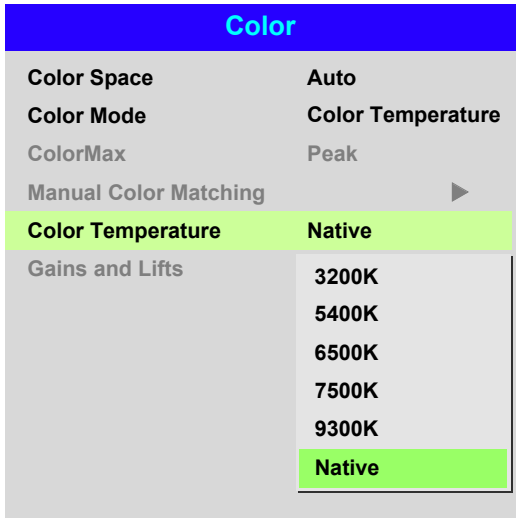


Notes

Color menu continued from previous page

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).



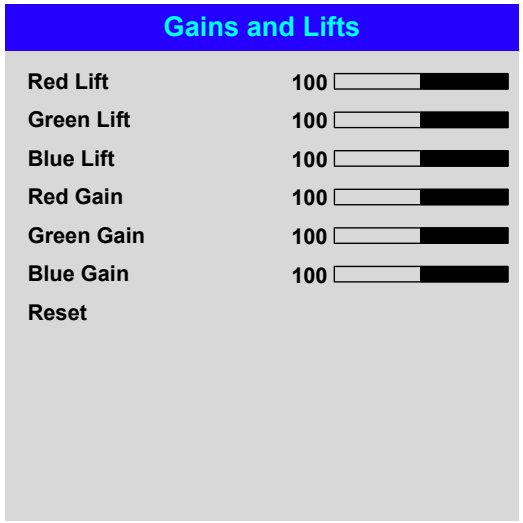
Notes

Color menu continued from previous page

Gains and Lifts

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

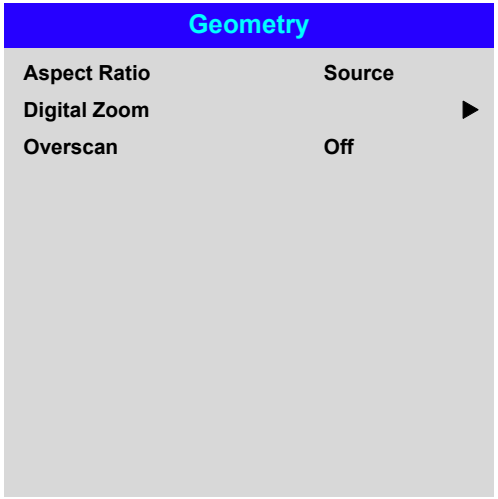
Set the sliders as required.



Notes

Geometry menu

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



Aspect Ratio

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

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

Choose from:

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

Notes

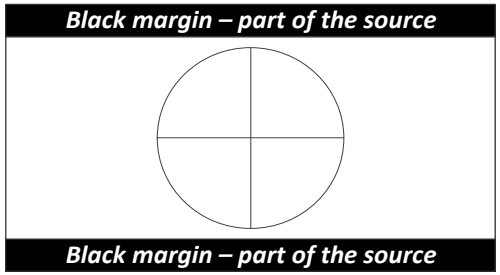
Image scaling and aspect ratio are also influenced by **Setup > Screen Setting**.

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

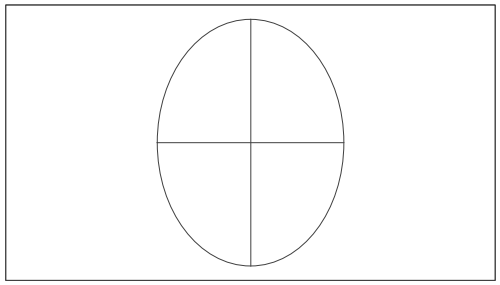
Theaterscope setting

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

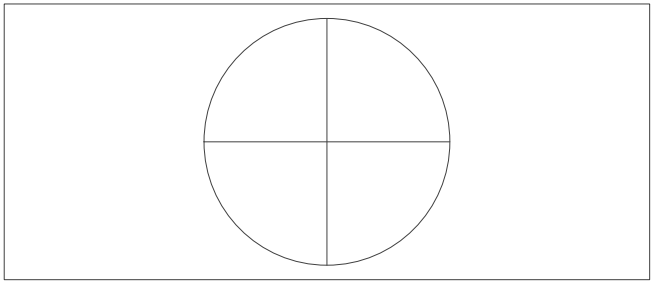
Without an anamorphic lens and without the TheaterScope setting applied, a 16:9 source containing a 2.35:1 image looks like this:



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



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



Notes

TheaterScope is used with an anamorphic lens.

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

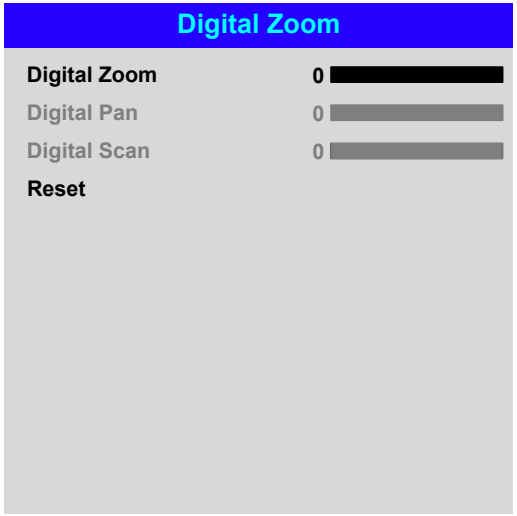
.*Geometry menu continued from previous page*

Digital Zoom

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

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

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



Notes

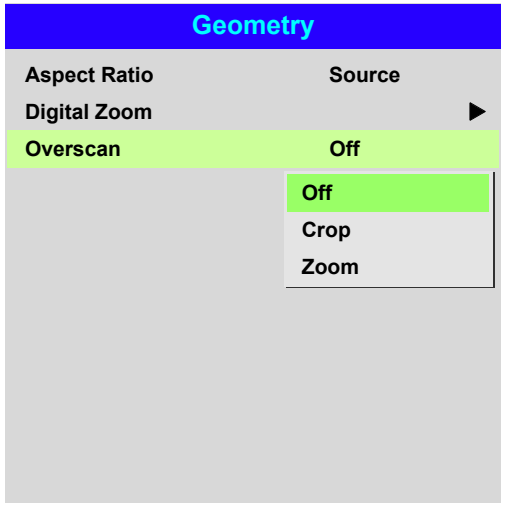
Digital Zoom is a temporary setting and not retained after an input change or power cycle.

Geometry menu continued from previous page

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.



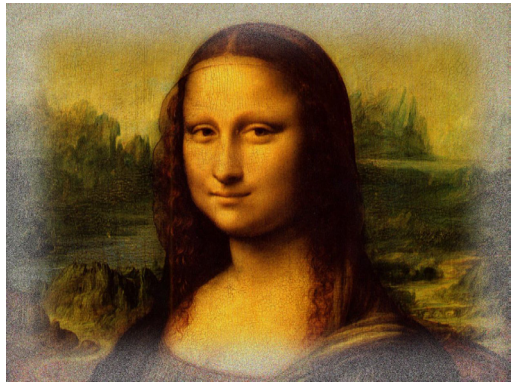
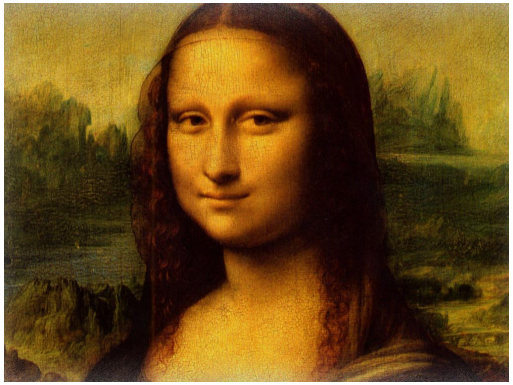


Image with noisy edges



Overscanned image

Notes

Laser menu

- **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.

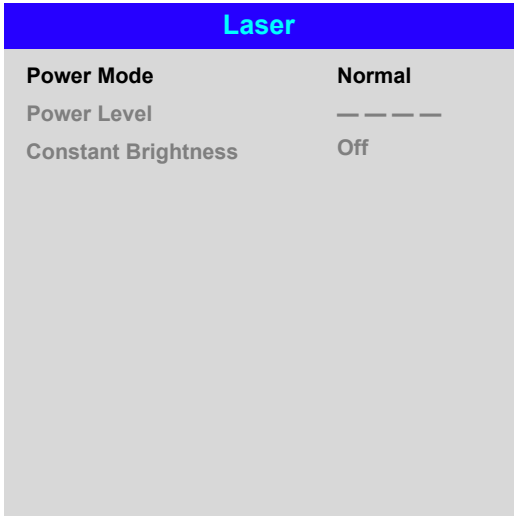
- **Power Level**

  This setting is only available if **Power Mode** is set to **Custom**.

  Choose a value between 35 and 100, ranging from 35% to 100% laser power.

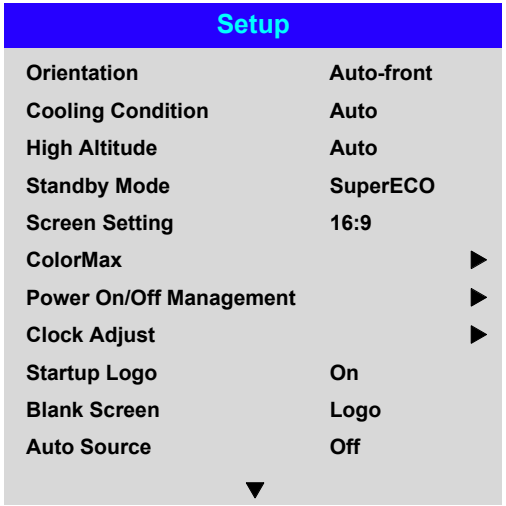
- **Constant Brightness**

  Once a **Custom** brightness has been set, then **Constant Brightness** can be turned **ON**. This setting will maintain the brightness until the maximum laser power has been reached. The lower the power level the longer it will be maintained.



Notes

Setup menu



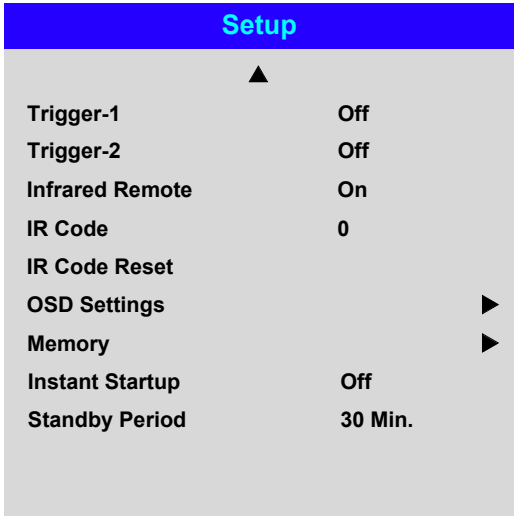
- **Orientation**
  Choose from **Front Tabletop**, **Front Ceiling**, **Rear Tabletop**, **Rear Ceiling** and **Auto-front**.
- **Cooling Condition**
  Choose from **Table**, **Ceiling**, **Freetilt** and **Auto**.
- **High Altitude**
  Choose from **On**, **Auto** and **Quiet**.
- **Standby Mode**
  Choose from **SuperECO**, **ECO** and **Normal**.
  SuperECO uses minimal power and disables power ON via LAN.
  ECO uses a low power setting but enables power ON via Ethernet port only.
  Normal enables power ON via both HDBase-T/LAN and Ethernet ports.
- **Screen Setting**
  Choose from **16:10**, **16:9** and **4:3**.
- **ColorMax**
  Set up user-defined color gamut values.
- **Power On/Off Management**
  Access the submenu to set up automatic projector power on and power off.
- **Clock Adjust**
  Access the submenu to set current date and local time.
- **Startup Logo**
  Set this to **On** if you want the Digital Projection logo to show when the projector is first switched on.
- **Blank Screen**
  Choose from **Logo**, **Black**, **Blue** and **White**.
- **Auto Source**
  If this setting is **On**, the projector will automatically search for an active input source.

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

Notes

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

Setup menu continued from previous page



- **Trigger1** and **Trigger 2**
  Choose from **Screen**, **5:4**, **4:3**, **16:10**, **16:9**, **1.88**, **2.35**, **TheaterScope**, **Source**, **Unscaled** or **RS232** to determine what will cause each trigger output to activate.
- **Infrared Remote**
  Set to **Off** if you wish to disable the remote control.
- **IR Code**
  The projector and the remote control need a matching IR code: a two-digit number between ***00*** and ***99***.

  The default IR code is ***00***. This is also a master code, which, if assigned to a remote, will work regardless of the value assigned to the projector.

  To assign an IR code for the projector:

  1. Select **IR Code**.
  2. Use the **UP** ▲ and **DOWN** ▼ arrow buttons to change the values.

  To assign an IR code for the remote:

  1. Press and hold the **ADDR** button on the remote until the indicator starts flashing.
  2. 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 indicator flashes to confirm the change.
- **OSD Settings**
  Access this submenu to adjust the appearance and position of the on-screen display.
- **Memory**
  Access this submenu to save up to four presets containing custom combinations of image settings, or to recall a saved preset.
- **Instant Startup**
  When **ON** only the Laser will be turned off when the Power off command is given. A subsequent Power On will turn on the laser giving an apparent very fast power on.
- **Standby Period**
  Used with Instant Startup. If Instant Startup in **ON** and the projector is powered down then the projector will go to Standby after the selected “Standby Period” 30 minutes, 60 minutes, 90 minutes.

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

Notes

*If you turn the remote control off, you can only turn it back on again from the control panel or via the **Projector Controller** application.*

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

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

Setup menu continued from previous page

ColorMax

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

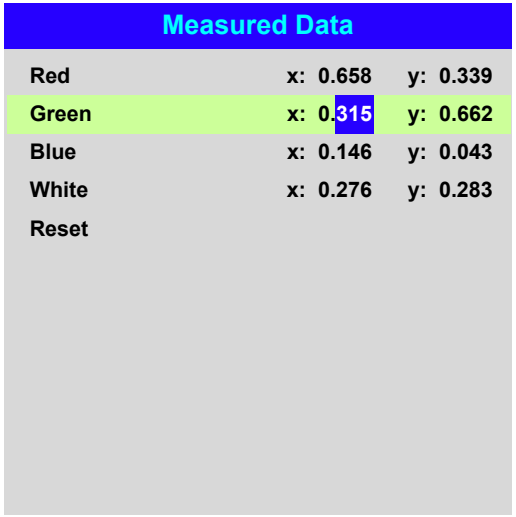
You can enter your own gamut values here, or edit values you have imported using the ***Projector Controller*** software.

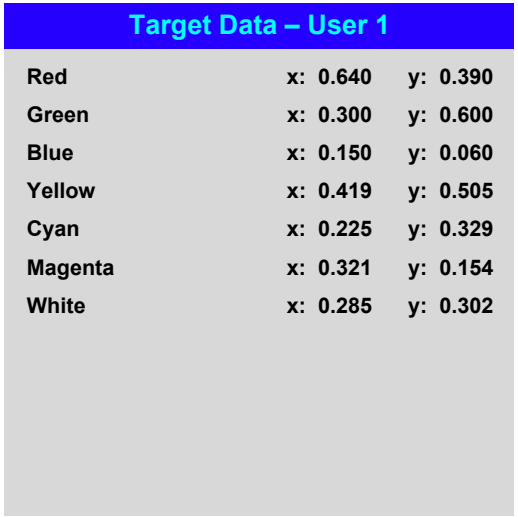
Defining your own colorspace with individual x and y coordinates for each color enables you to match not only the whites but each individual color as well.

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

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.





Notes

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

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

Setup menu continued from previous page

Power On/Off

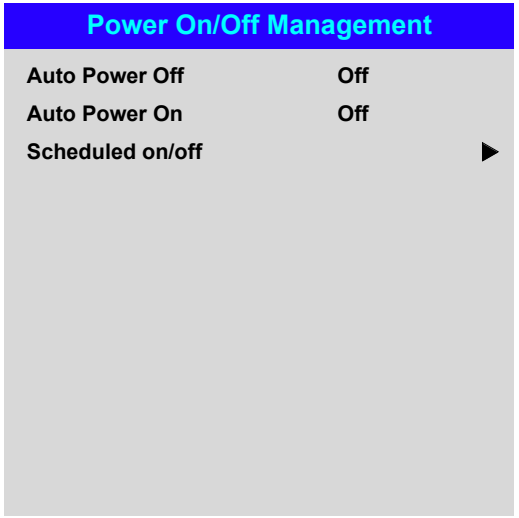
- **Auto Power Off**

  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.

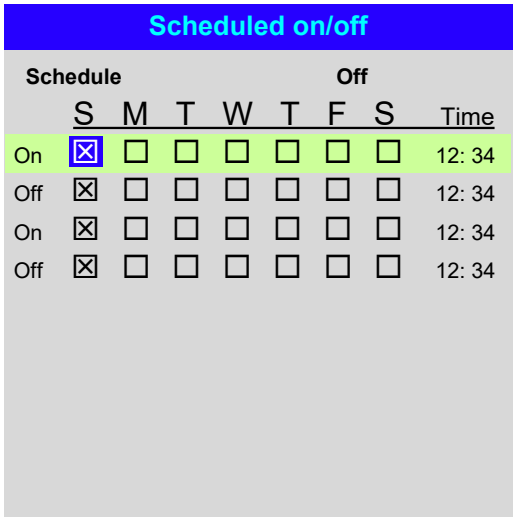
  Set this to **Off** if you want the projector to go into STANDBY mode when the mains is connected. In this case, the projector will not start up until the **POWER** button is pressed on the control panel or the **ON** button is pressed on the remote control.



- **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

Setup menu continued from previous page

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.

Notes

Setup menu continued from previous page

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 — **Gamma**, **Brightness**, **Contrast**, **Saturation**, **Hue**, **Sharpness** and **Noise Reduction**
- From the **Color** menu — **Color Space**, **Color Mode**, **ColorMax**, **Color Temperature**, **RGB Lift** and **RGB Gain**
- From the **Geometry** menu — **Aspect Ratio** and **Overscan**

Memory	
Recall Memory	Default
Save Settings	Preset A

To recall a saved preset:

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

To save a preset:

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

Notes

Presets from one input cannot be applied to another input.

Network menu

- **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.

- **AMX**

  Switch on or off.

Network	
DHCP	Off
IP	192 . 168 . 000 . 100
Subnet Mask	255 . 255 . 255 . 000
Gateway	000 . 000 . 000 . 000
DNS	000 . 000 . 000 . 000
MAC	00: 18: 27: 2d: f2: 06
AMX	Off

Notes

Information menu

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

Information	
Model Name	E-Vision Laser WQ120
Serial Number	X000XXXXX0000
Software Version 1	MD28-VD22-FD09-0.0.356
Software Version 2	STEP_D08-24-17-3120
Software Version 3	2.0.16.0-P503
Active 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

Notes

Information menu continued from previous page

System Status

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

Thermal Status

Thermal Status	
Inlet 1-2 Temp.	24 / 34 (C)
DMD Temp.	38 (C)
LD 1-2 Temp.	49 / 42 (C)
Fan 1-3 Speed	1399 / 1402 / 1391
Fan 4-6 Speed	1410 / 1200 / 1205
Fan 7-9 Speed	1211 / 1407 / 1410
Fan 10-12 Speed	0 / 3005 / 3007
Fan 13-15 Speed	2986 / 2984 / 2984
Fan 16-18 Speed	3020 / NA / NA
Water Pump Speed	3506

Notes

Information menu continued from previous page

Factory Reset

To restore the factory default settings:

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

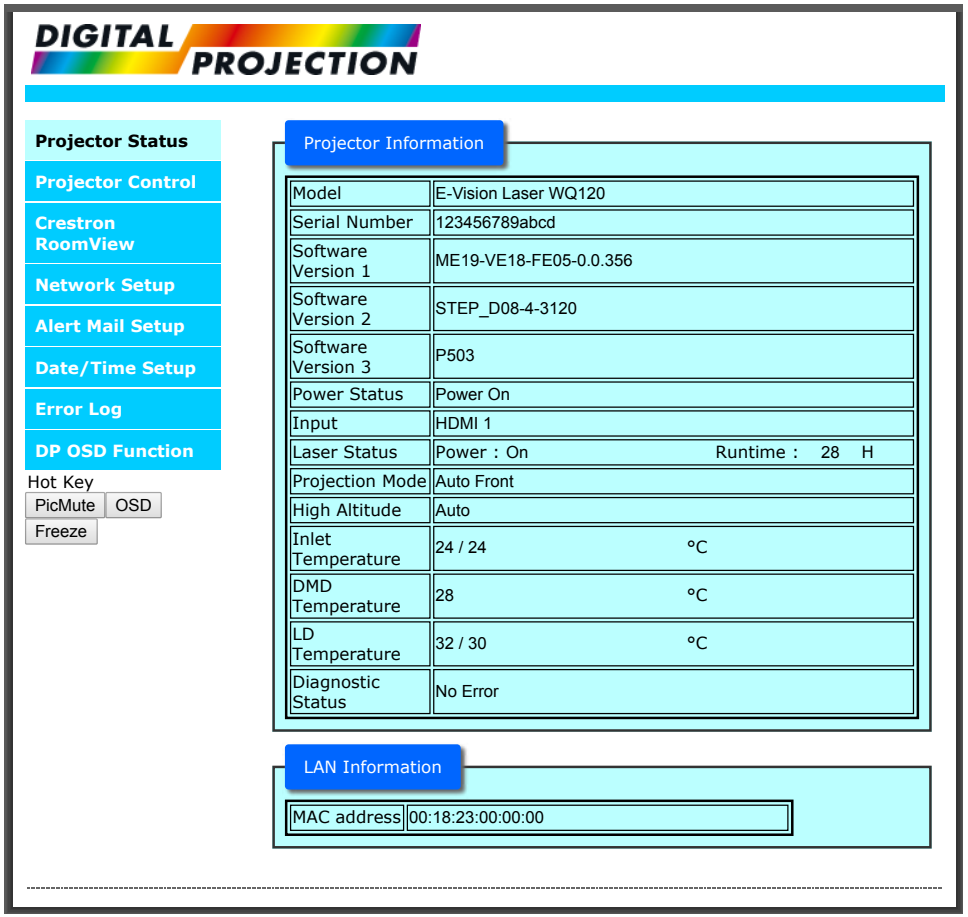
Notes

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

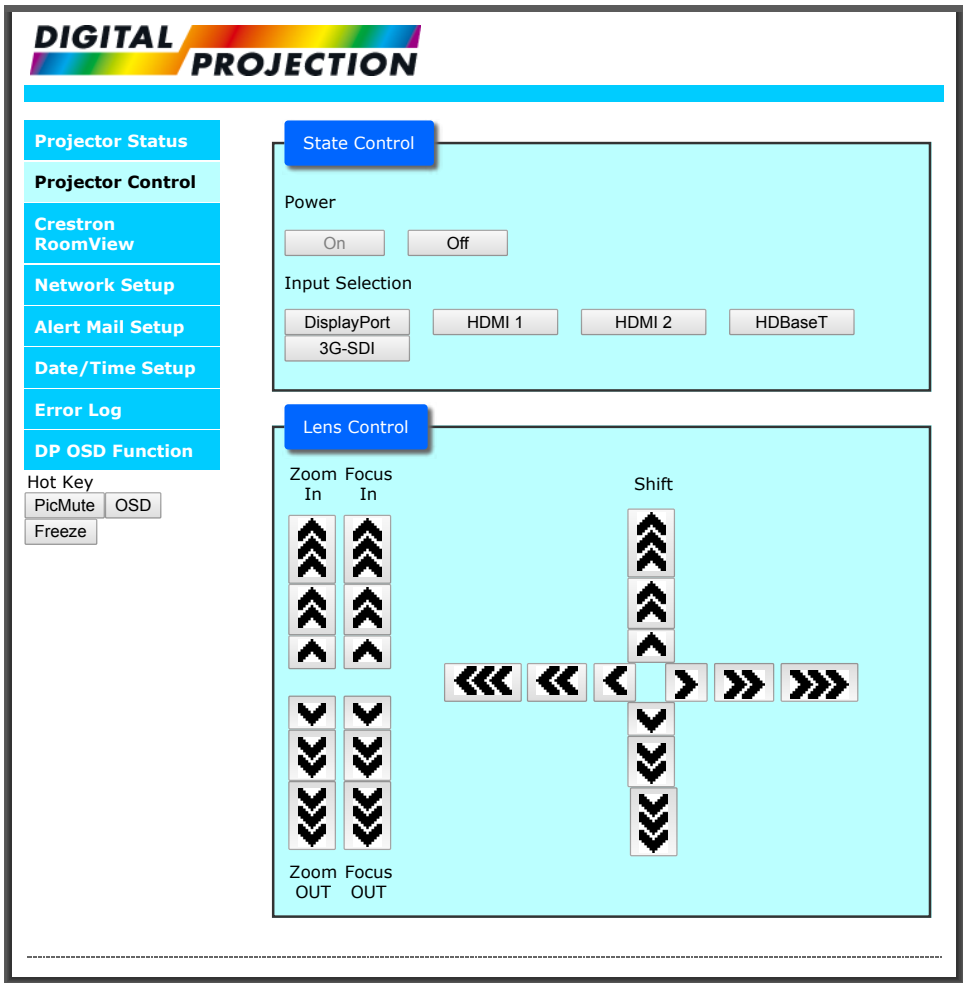
Served Web Pages

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

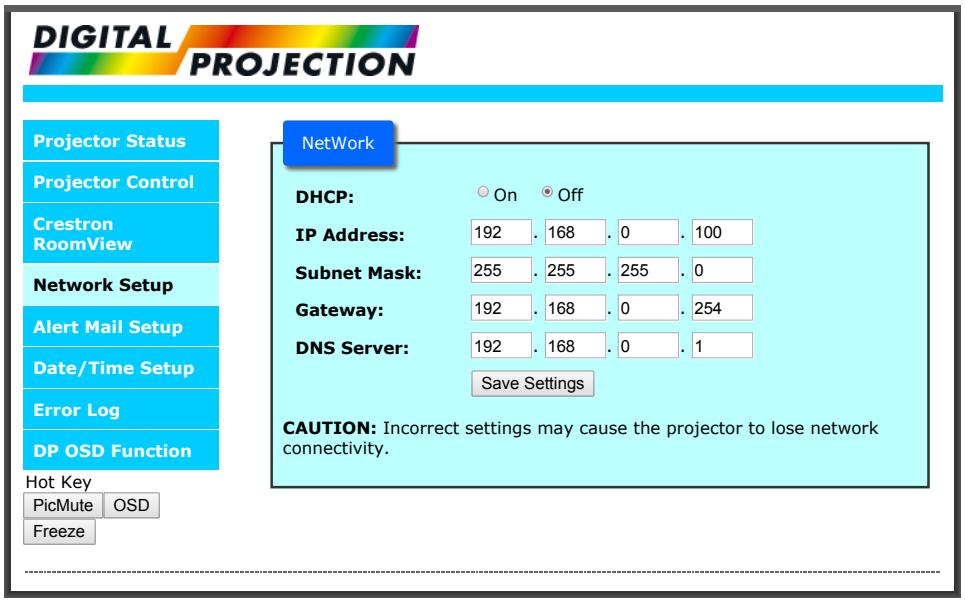
The default IP address is ***192.168.0.100***.



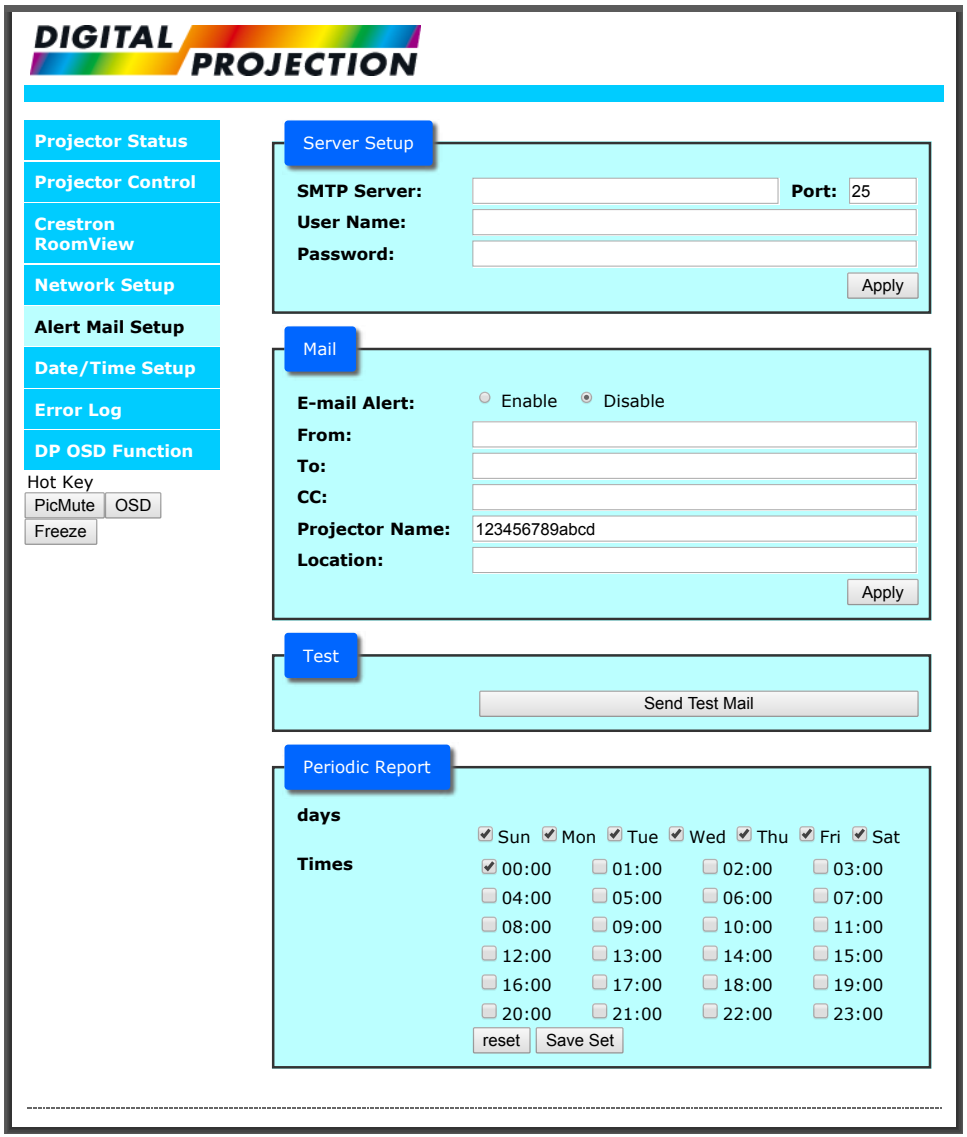
Notes


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

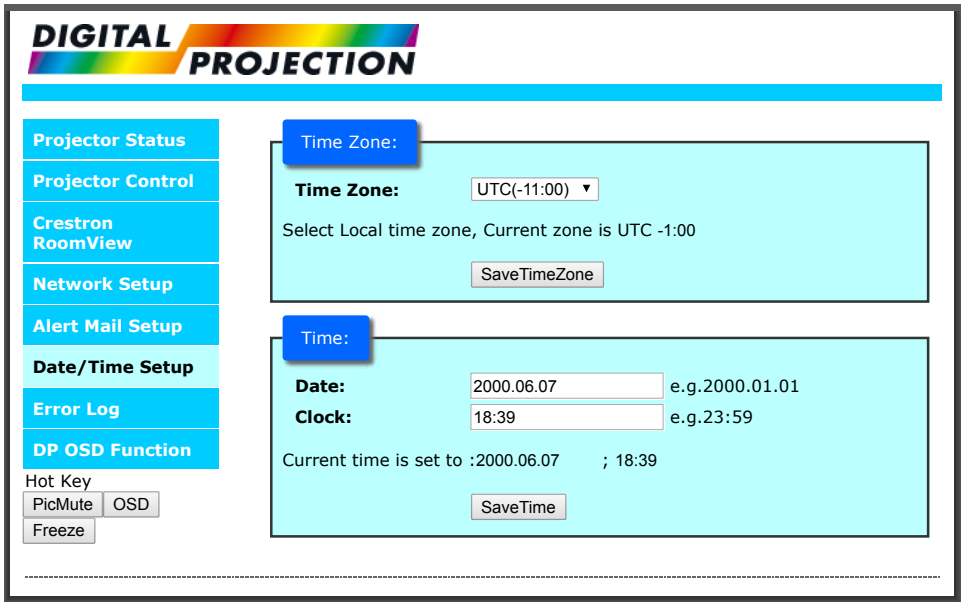
Notes


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

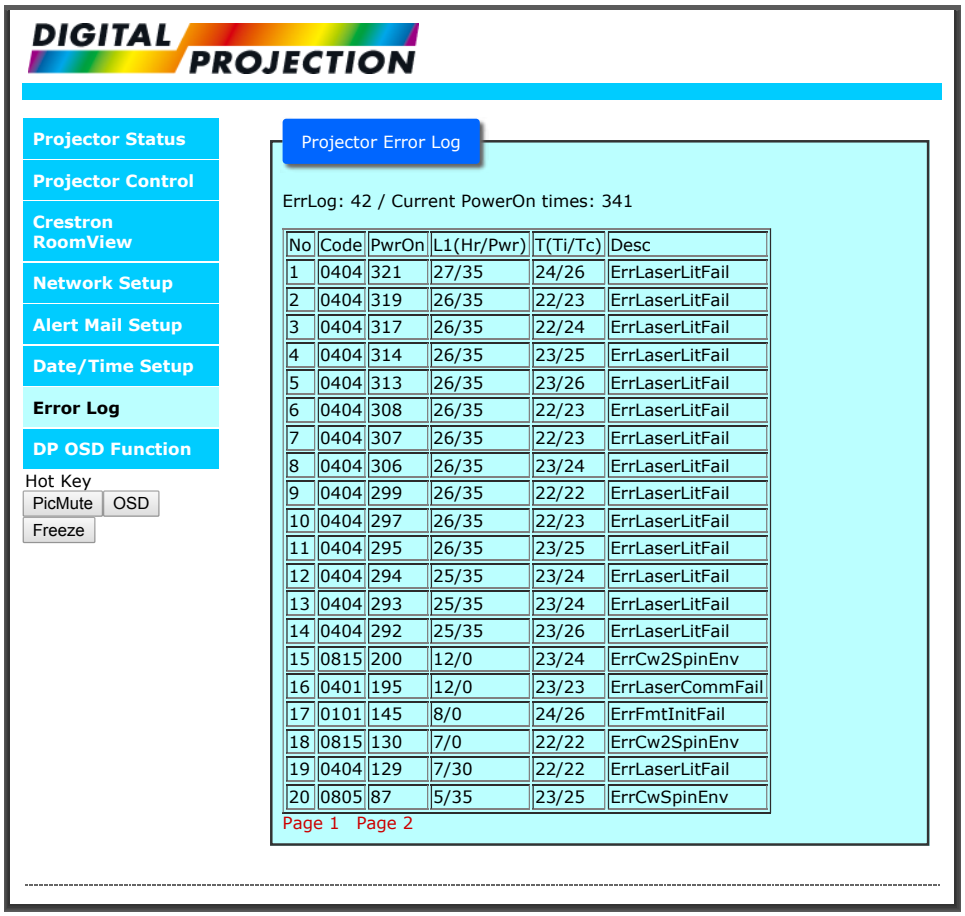
Notes


DIGITAL PROJECTION
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
Server Setup
SMTP Server:
Port: 25
User Name:
Password:
Apply
Mail
E-mail Alert: Enable Disable
From:
To:
CC:
Projector Name: 123456789abcd
Location:
Apply
Test
Send Test Mail
Periodic Report
days
Sun Mon Tue Wed Thu Fri Sat
Times
00:00 01:00 02:00 03:00
04:00 05:00 06:00 07:00
08:00 09:00 10:00 11:00
12:00 13:00 14:00 15:00
16:00 17:00 18:00 19:00
20:00 21:00 22:00 23:00
reset
Save Set

Notes

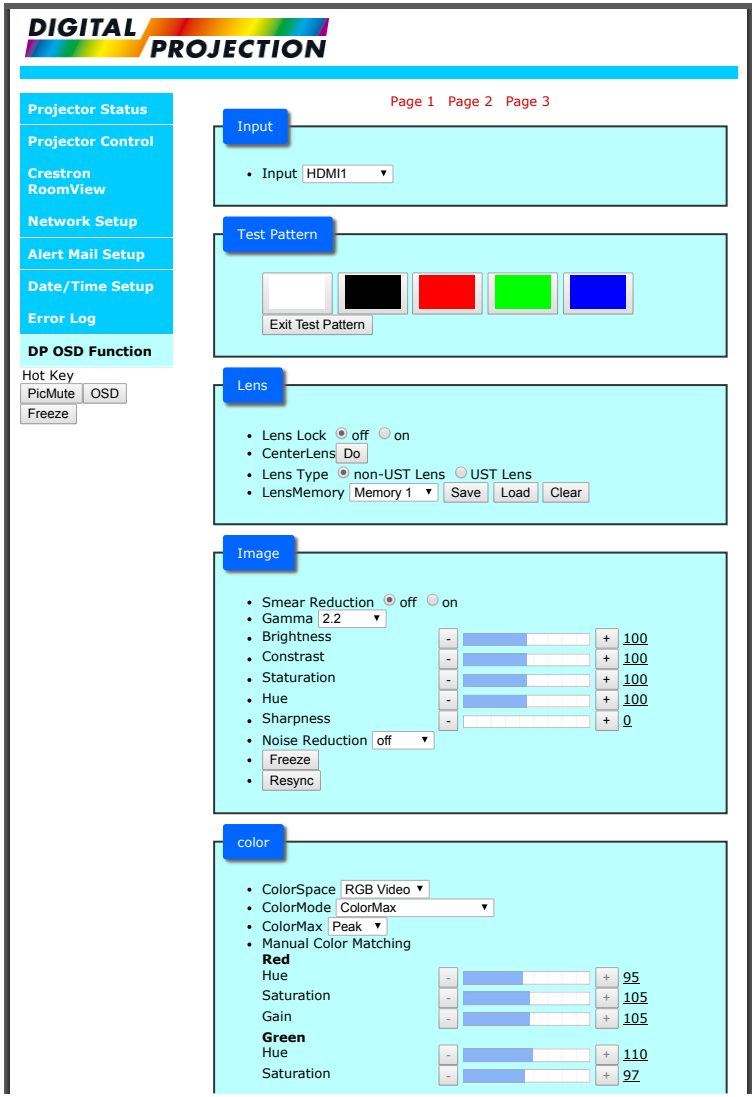

DIGITAL PROJECTION
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
Time Zone:
Time Zone:
UTC(-11:00)
Select Local time zone, Current zone is UTC -1:00
SaveTimeZone
Time:
Date:
2000.06.07
e.g.2000.01.01
Clock:
18:39
e.g.23:59
Current time is set to :2000.06.07 ; 18:39
SaveTime

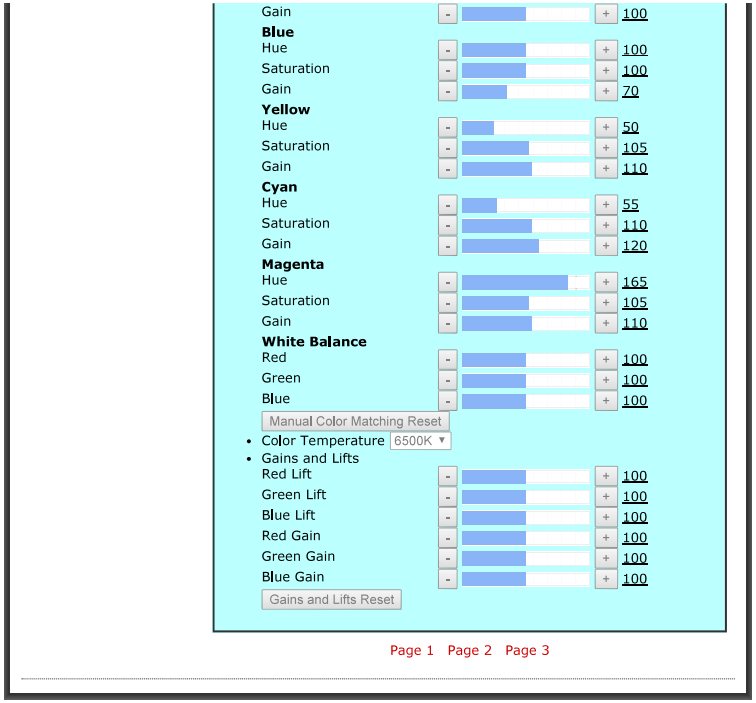
Notes



No	Code	PwrOn	L1(Hr/Pwr)	T(Ti/Tc)	Desc
1	0404	321	27/35	24/26	ErrLaserLitFail
2	0404	319	26/35	22/23	ErrLaserLitFail
3	0404	317	26/35	22/24	ErrLaserLitFail
4	0404	314	26/35	23/25	ErrLaserLitFail
5	0404	313	26/35	23/26	ErrLaserLitFail
6	0404	308	26/35	22/23	ErrLaserLitFail
7	0404	307	26/35	22/23	ErrLaserLitFail
8	0404	306	26/35	23/24	ErrLaserLitFail
9	0404	299	26/35	22/22	ErrLaserLitFail
10	0404	297	26/35	22/23	ErrLaserLitFail
11	0404	295	26/35	23/25	ErrLaserLitFail
12	0404	294	25/35	23/24	ErrLaserLitFail
13	0404	293	25/35	23/24	ErrLaserLitFail
14	0404	292	25/35	23/26	ErrLaserLitFail
15	0815	200	12/0	23/24	ErrCw2SpinEnv
16	0401	195	12/0	23/23	ErrLaserCommFail
17	0101	145	8/0	24/26	ErrFmtInitFail
18	0815	130	7/0	22/22	ErrCw2SpinEnv
19	0404	129	7/30	22/22	ErrLaserLitFail
20	0805	87	5/35	23/25	ErrCwSpinEnv

Notes


DIGITAL PROJECTION
Page 1 Page 2 Page 3
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute OSD
Freeze
Input
Input HDMI1
Test Pattern
Exit Test Pattern
Lens
Lens Lock off on
CenterLens Do
Lens Type non-UST Lens UST Lens
LensMemory Memory 1 Save Load Clear
Image
Smear Reduction off on
Gamma 2.2
Brightness 100
Constrast 100
Staturation 100
Hue 100
Sharpness 0
Noise Reduction off
Freeze
Resync
color
ColorSpace RGB Video
ColorMode ColorMax
ColorMax Peak
Manual Color Matching
Red
Hue 95
Saturation 105
Gain 105
Green
Hue 110
Saturation 97


Gain 100
Blue
Hue 100
Saturation 100
Gain 70
Yellow
Hue 50
Saturation 105
Gain 110
Cyan
Hue 55
Saturation 110
Gain 120
Magenta
Hue 165
Saturation 105
Gain 110
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
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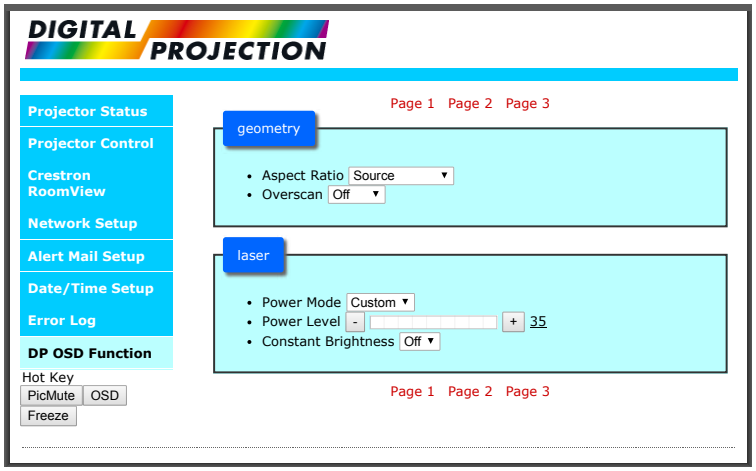
Notes


DIGITAL PROJECTION
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
Page 1 Page 2 Page 3
geometry
Aspect Ratio Source
Overscan Off
laser
Power Mode Custom
Power Level - + 35
Constant Brightness Off
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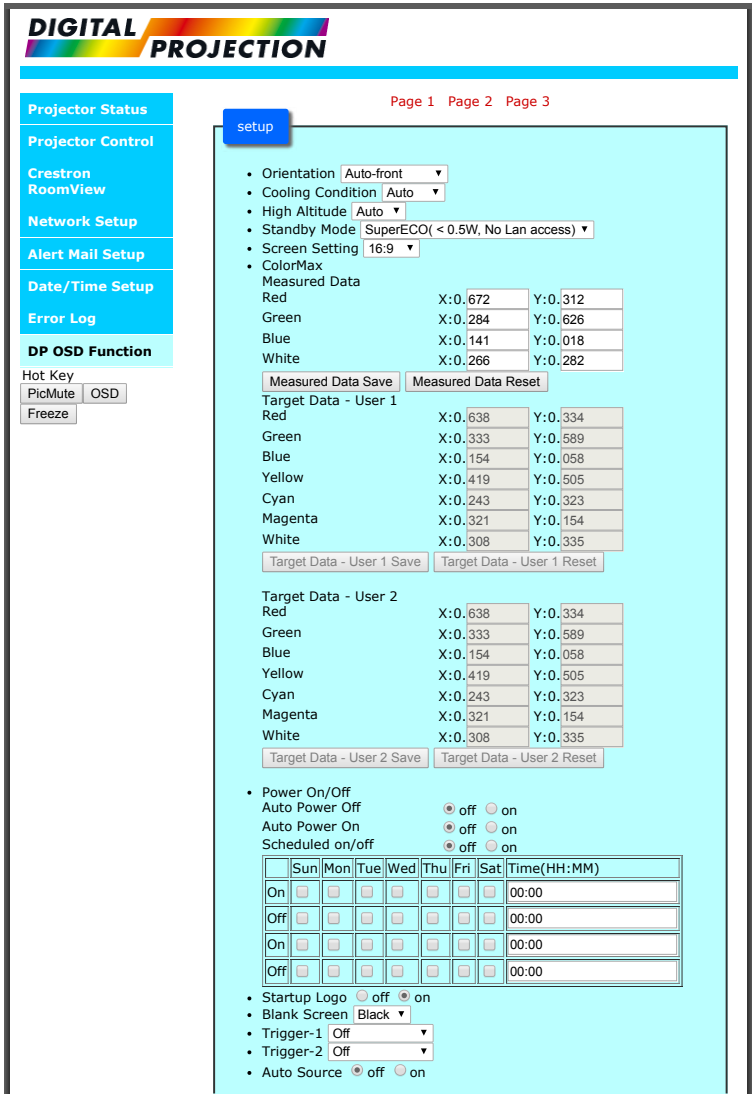
Notes


DIGITAL PROJECTION
Projector Status
Projector Control
Crestron RoomView
Network Setup
Alert Mail Setup
Date/Time Setup
Error Log
DP OSD Function
Hot Key
PicMute
OSD
Freeze
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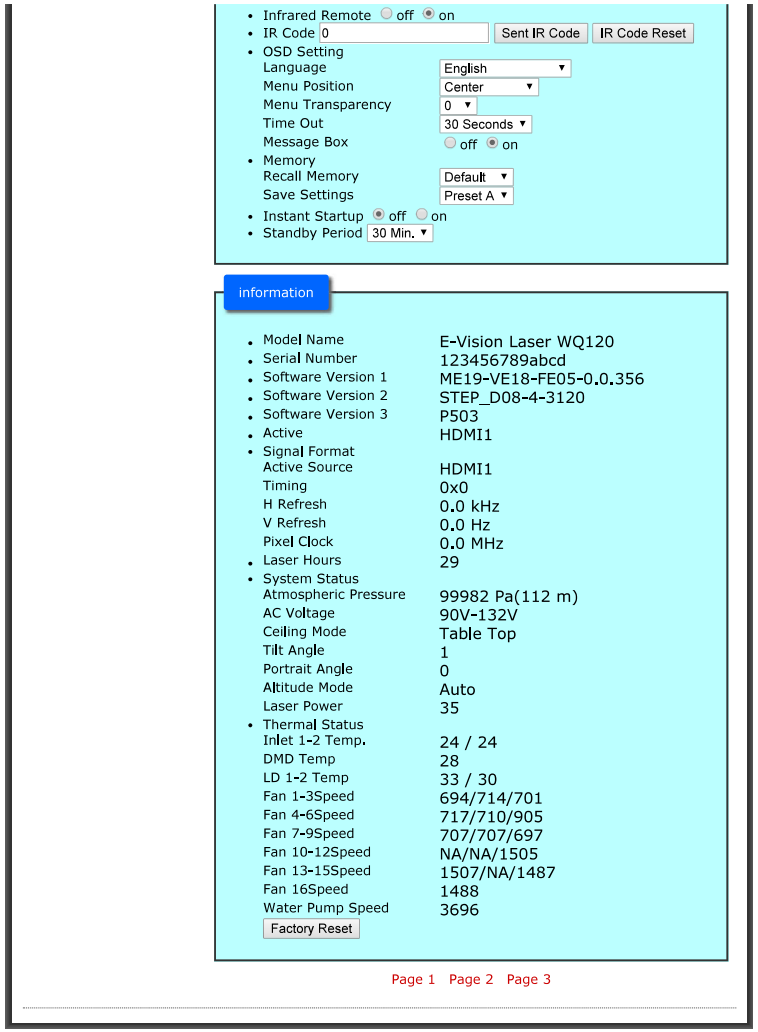
setup
Orientation Auto-front
Cooling Condition Auto
High Altitude Auto
Standby Mode SuperECO(< 0.5W, No Lan access)
Screen Setting 16:9
ColorMax
Measured Data
Red X:0.672 Y:0.312
Green X:0.284 Y:0.626
Blue X:0.141 Y:0.018
White X:0.266 Y:0.282
Measured Data Save
Measured Data Reset
Target Data - User 1
Red X:0.638 Y:0.334
Green X:0.333 Y:0.589
Blue X:0.154 Y:0.058
Yellow X:0.419 Y:0.505
Cyan X:0.243 Y:0.323
Magenta X:0.321 Y:0.154
White X:0.308 Y:0.335
Target Data - User 1 Save
Target Data - User 1 Reset
Target Data - User 2
Red X:0.638 Y:0.334
Green X:0.333 Y:0.589
Blue X:0.154 Y:0.058
Yellow X:0.419 Y:0.505
Cyan X:0.243 Y:0.323
Magenta X:0.321 Y:0.154
White X:0.308 Y:0.335
Target Data - User 2 Save
Target Data - User 2 Reset
Power On/Off
Auto Power Off off on
Auto Power On off on
Scheduled on/off off on
Sun Mon Tue Wed Thu Fri Sat Time(HH:MM)
On 00:00
Off 00:00
On 00:00
Off 00:00
Startup Logo off on
Blank Screen Black
Trigger-1 Off
Trigger-2 Off
Auto Source off on


Infrared Remote off on
IR Code 0
Sent IR Code
IR Code Reset
OSD Setting
Language English
Menu Position Center
Menu Transparency 0
Time Out 30 Seconds
Message Box off on
Memory
Recall Memory Default
Save Settings Preset A
Instant Startup off on
Standby Period 30 Min.
information
Model Name E-Vision Laser WQ120
Serial Number 123456789abcd
Software Version 1 ME19-VE18-FE05-0.0.356
Software Version 2 STEP_D08-4-3120
Software Version 3 P503
Active HDMI1
Signal Format
Active Source HDMI1
Timing 0x0
H Refresh 0.0 kHz
V Refresh 0.0 Hz
Pixel Clock 0.0 MHz
Laser Hours 29
System Status
Atmospheric Pressure 99982 Pa(112 m)
AC Voltage 90V-132V
Ceiling Mode Table Top
Tilt Angle 1
Portrait Angle 0
Altitude Mode Auto
Laser Power 35
Thermal Status
Inlet 1-2 Temp. 24 / 24
DMD Temp 28
LD 1-2 Temp 33 / 30
Fan 1-3Speed 694/714/701
Fan 4-6Speed 717/710/905
Fan 7-9Speed 707/707/697
Fan 10-12Speed NA/NA/1505
Fan 13-15Speed 1507/NA/1487
Fan 16Speed 1488
Water Pump Speed 3696
Factory Reset
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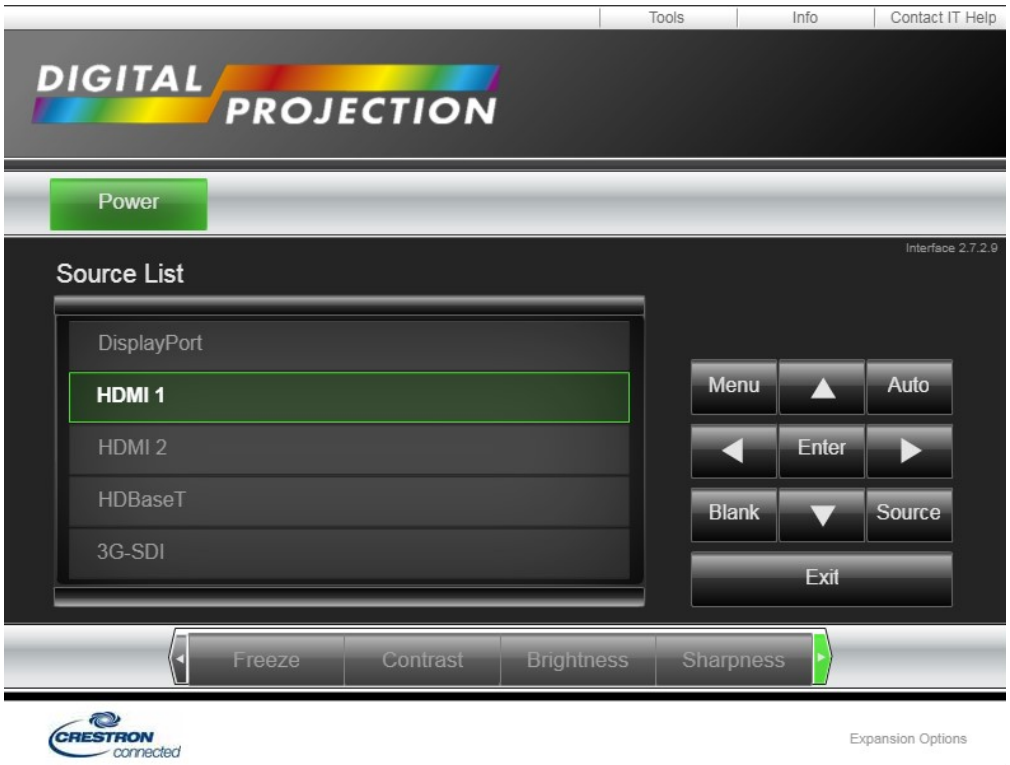
Notes


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

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DIGITAL PROJECTION

E-Vision Laser WQ120 Series

High Brightness Digital Video Projector

Reference Guide

Rev A May 2018

CONTENTS

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 ratios	Focus range	Lens shift
0.79 - 0.99 : 1 zoom	1.02 m - 12.7 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame
1.32 - 1.89 : 1 zoom	1.33 m - 11.73 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame
1.82 - 2.40 : 1 zoom	1.83 m - 14.9 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame
2.34 - 3.90 : 1 zoom	2.36 m - 24.2 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame

To choose a lens, calculate the ***throw ratio*** required.

Notes

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

*The distance between the front of the projector chassis and the outer end of the lens is called **lens extension**. Lens extensions are measured when the lens is focused at infinity, and fully extended.*

Refer to the projector CAD drawings for individual lens extension figures.

*The **0.79 - 0.99 : 1 zoom lens** has an additional feature permitting focus correction for curved screens. The front ring of the lens is a manual control which provides focus curvature adjustment to correct for the different focal distances between center and corner.*

*For information about individual lens part numbers, see **Appendix A** at the end of this document.*

Basic calculation

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

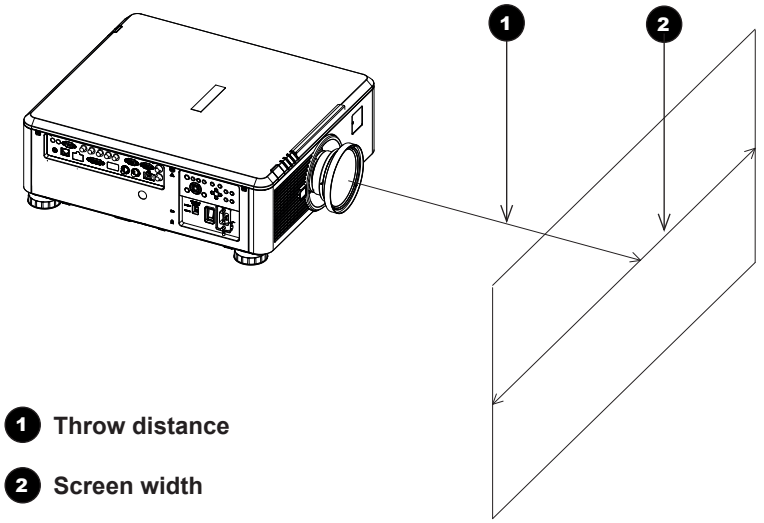
A ***throw ratio*** is the ratio of the throw distance to the screen width:

$$\textit{Throw ratio} = \frac{\textit{Throw distance}}{\textit{Screen width}}$$

1. Use the formula above to obtain the required throw ratio.

2. Match the throw ratio with a lens from the table below:

Throw ratios	Focus range
0.79 - 0.99 : 1 zoom	1.02 m - 12.7 m
1.32 - 1.89 : 1 zoom	1.33 m - 11.73 m
1.82 - 2.40 : 1 zoom	1.83 m - 14.9 m
2.34 - 3.90 : 1 zoom	2.36 m - 24.2 m



1 **Throw distance**

2 **Screen width**

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

Notes

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

*The basic calculation on this page does not take into consideration DMD™ and image size, which could affect the throw ratio. For a more complex and realistic calculation, see **Full lens calculation** in this section.*

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

*For information about individual lens part numbers, see **Appendix A** at the end of this document.*

Basic calculation example

1. **Calculate the throw ratio using the formula.**

   Your screen is ***4.5 m*** wide and you wish to place the projector approximately ***11 m*** from the screen. The throw ratio will then be

   $$\frac{11}{4.5} = \mathbf{2.44}$$

2. **Match the result with the lens table.**

   The lens matching a throw ratio of 2.44 is ***the 2.34 - 3.90 : 1 zoom lens***.

3. **Check whether the lens covers the required throw distance.**

   The focus range quoted for the 2.20 - 3.67 : 1 zoom lens is ***2.36 - 24.2 m***. The required distance of 11 m is within the range.

INFORMATION YOU NEED FOR THIS CALCULATION

- The throw ratio formula:

$$\text{Throw ratio} = \frac{\text{Throw distance}}{\text{Screen width}}$$

- The lens table:

Throw ratios	Focus range
0.79 - 0.99 : 1 zoom	1.02 m - 12.7 m
1.32 - 1.89 : 1 zoom	1.33 m - 11.73 m
1.82 - 2.40 : 1 zoom	1.83 m - 14.9 m
2.34 - 3.90 : 1 zoom	2.36 m - 24.2 m

Notes

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

*The basic calculation on this page does not take into consideration DMD™ and image size, which could affect the throw ratio. For a more complex and realistic calculation, see **Full lens calculation** in this section.*

*For information about individual lens part numbers, see **Appendix A** at the end of this document.*

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)***.

Fig. 1

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.

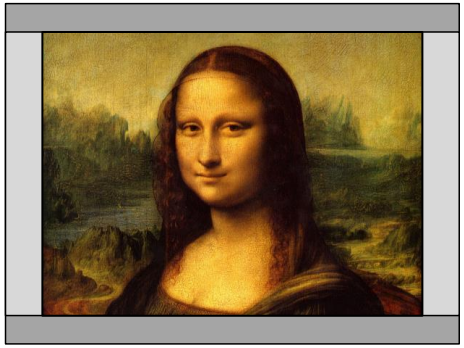


Fig. 2

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.

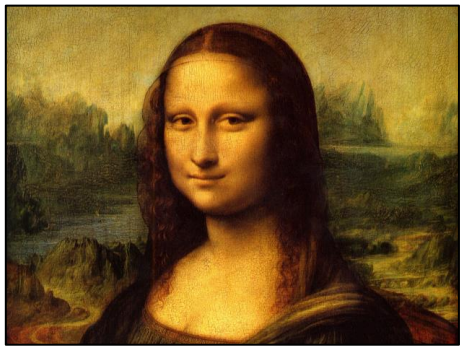


Fig. 3

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.

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:

$$TRC = \frac{1.60\ (DMD™\ aspect\ ratio)}{Source\ aspect\ ratio}$$

TRC table

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

Image Aspect Ratio	WQXGA	TRC
2.35:1 (Scope)	2560 x 1089 pixels	TRC = 1
1.85:1 (Flat)	2560 x 1384 pixels	TRC = 1, not used
1.78:1 (16:9)	2560 x 1440 pixels	TRC = 1, not used
1.66:1 (Vista)	2560 x 1542 pixels	TRC = 1, not used
1.6:1 (16:10)	2560 x 1600 pixels	TRC = 1.0, not used (native aspect ratio)
1.33:1 (4:3)	2128 x 1600 pixels	TRC = 1.20
1.25:1 (5:4)	2000 x 1600 pixels	TRC = 1.28

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 the throw ratio with TRC

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

$$\textit{Throw ratio} = \frac{\textit{Throw distance}}{\textit{Screen width } \mathbf{x\ TRC}}$$

2. Once a throw ratio is established, identify the matching lens from the table:

Throw ratios	Focus range
0.79 - 0.99 : 1 zoom	1.02 m - 12.7 m
1.32 - 1.89 : 1 zoom	1.33 m - 11.73 m
1.82 - 2.40 : 1 zoom	1.83 m - 14.9 m
2.34 - 3.90 : 1 zoom	2.36 m - 24.2 m

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

Notes

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

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

1. Calculate TRC as follows:

   $$TRC = \frac{1.60}{1.33} = 1.20$$

2. Calculate the throw ratio:

   $$\text{Throw ratio} = \frac{11}{4.5 \times 1.20} = \mathbf{2.04}$$

3. Find a match in the lens table.

   The table shows that the matching lens is ***the 1.71 - 2.25 : 1 zoom lens***.

4. Check whether the lens covers the required throw distance.

   The focus range quoted for the 1.71 - 2.25 : 1 zoom lens is ***1.02m - 12.7m***. The required distance of 11 m is within the range.

INFORMATION YOU NEED FOR THESE CALCULATIONS

- The TRC formula

$$TRC = \frac{\text{DMD™ aspect ratio}}{\text{Source aspect ratio}}$$

- The TRC table (to use instead of the formula)

2.35:1 (Scope)	TRC not used
1.85:1 (Flat)	TRC not used
1.78:1 (16:9)	TRC not used
1.66:1 (Vista)	TRC not used
1.6:1 (16:10)	TRC = 1.0 not used (native aspect ratio)
1.33:1 (4:3)	TRC = 1.20
1.25:1 (5:4)	TRC = 1.28

- The throw ratio formula

$$\text{Throw ratio} = \frac{\text{Throw distance}}{\text{Screen width} \times TRC}$$

- The lens table:

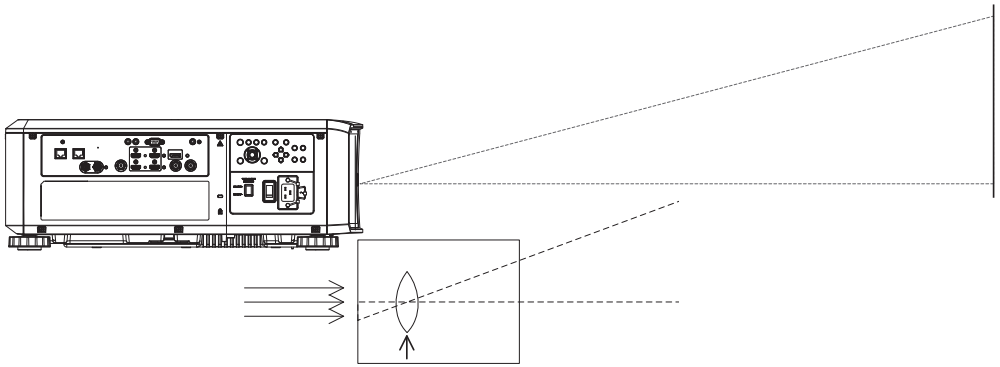
Throw ratios	Focus range
0.79 - 0.99 : 1 zoom	1.02 m - 12.7 m
1.32 - 1.89 : 1 zoom	1.33 m - 11.73 m
1.82 - 2.40 : 1 zoom	1.83 m - 14.9 m
2.34 - 3.90 : 1 zoom	2.36 m - 24.2 m

Notes

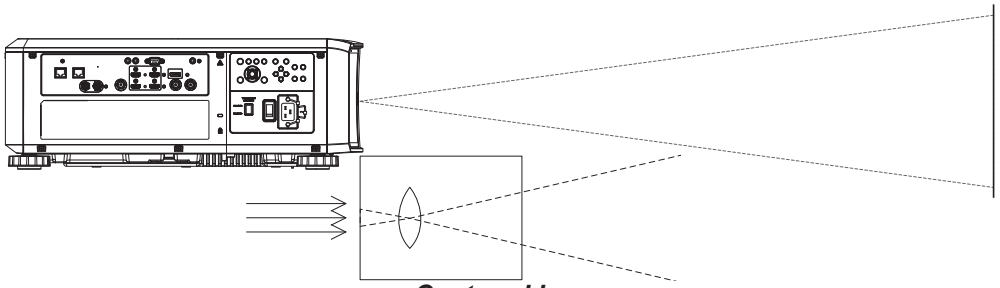
The lens table shown on this page includes High Brightness lenses only. For a full list, see ***Appendix A*** *at the end of this document.*

Positioning The Image

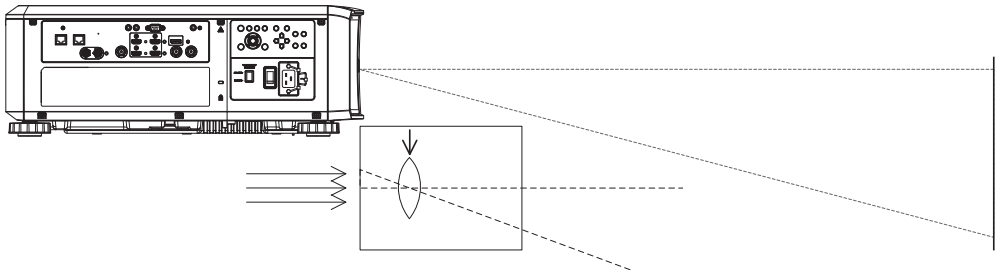
The normal position for the projector is at the centre of the screen. However, you can set the projector above or below the centre, or to one side, and adjust the image using the **Lens shift** feature (known as ***rising and falling front***) to maintain a geometrically correct image.



Shifting the lens up (rising front)



Centered lens

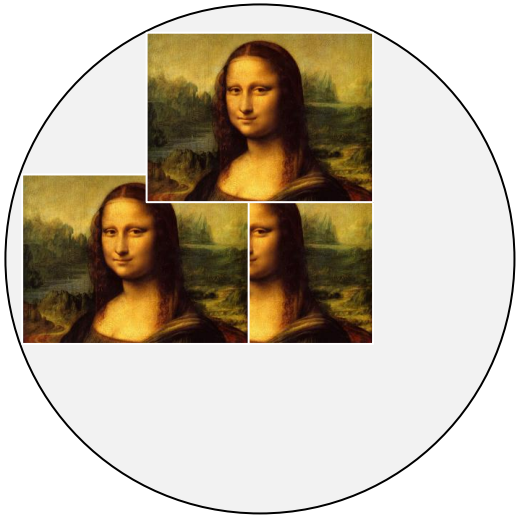


Shifting the lens down (falling front)

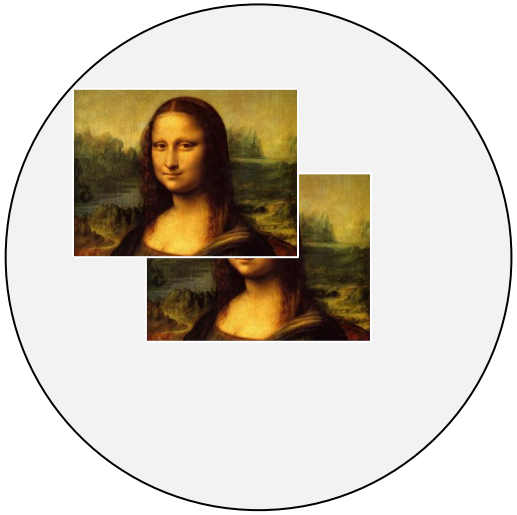
Notes

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 below.



Full horizontal or vertical shift



Combined shift is reduced

Notes

Appendix A: Lens Part Numbers

Throw ratio	High Brightness or High Contrast?	Part number (High Brightness)	Focus range	Lens shift
0.79 - 0.99 : 1 zoom	High Contrast	118-679	1.02 m - 12.7 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame
1.32 - 1.89 : 1 zoom	High Contrast	118-563	1.33 m - 11.73 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame
1.82 - 2.40 : 1 zoom	High Contrast	118-562	1.83 m - 14.9 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame
2.34 - 3.90 : 1 zoom	High Contrast	118-680	2.36 m - 24.2 m	V: 0.5 (U) 0.3 (D) frame H: 0.1 (L) 0.2 (R) frame

Notes

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

*The distance between the front of the projector chassis and the outer end of the lens is called **lens extension**. Lens extensions are measured when the lens is focused at infinity, and fully extended.*

Refer to the projector CAD drawings for individual lens extension figures.

*The **0.79 - 0.99 : 1 zoom lens** has an additional feature permitting focus correction for curved screens. The front ring of the lens is a manual control which provides focus curvature adjustment to correct for the different focal distances between center and corner.*

Appendix B: Supported Signal Input Modes

2D formats

Signal Format	Resolution	Frame Rate (Hz)	DisplayPort	HDMI / HD-BaseT				Output Frame Rate (Hz)
				RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	
PC	640x480	59.94	X	X				60
	640x480	74.99	X	X				60
	640x480	85	X	X				60
	800x600	60.32	X	X				60
	800x600	75	X	X				60
	800x600	85.06	X	X				60
	848x480	47.95	X	X				48
	848x480	59.94	X	X				60
	1024*768	60	X	X				60
	1024*768	75	X	X				60
	1024*768	85	X	X				60
	1280x720	47.95	X	X				48
	1280x1024	60.02	X	X				60
	1280x1024	75.02	X	X				60
	1280x1024	85.02	X	X				60
	1600x1200	60	X	X				60
	1600x1200	120	X	X				120
	1920x1080	47.95	X	X				48
	1680x1050	59.94	X	X				60
	1920x1200 RB	50	X	X				50
	1920x1200 RB	60	X	X				60
	1920x1200 RB	100	X	X				100
	1920x1200 RB	120	X	X				120

Notes

Signal Format	Resolution	Frame Rate (Hz)	DisplayPort	HDMI / HD-BaseT				Output Frame Rate (Hz)
				RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	
PC (continued)	1400X1050	60	X	X				60
	1366 x 768	60	X	X				60
	1440 x 900	60	X	X				60
	1280 x 768	60	X	X				60
	1280 x 800	60	X	X				60
	1280 x 960	60	X	X				60
	2560 x1600	60	X	X	X	X	X	60
	2560 x1600	120	X	X	X	X	X	120
Apple Mac	640x480	66.59	X	X				60
	832x624	74.54	X	X				60
SDTV	1440x480i	60		X	X	X	X	60
	1440x576i	50		X	X	X	X	50
EDTV	480p	59.94	X	X	X	X	X	60
	576p	50	X	X	X	X	X	50
HDTV	1035i	60	X	X	X	X	X	60
	1080i	50	X	X	X	X	X	50
	1080i	59.94	X	X	X	X	X	60
	1080i	60	X	X	X	X	X	60
	720p	50	X	X	X	X	X	60
	720p	59.94	X	X	X	X	X	60
	720p	60	X	X	X	X	X	60
	1080p	23.98	X	X	X	X	X	48

Notes

Signal Format	Resolution	Frame Rate (Hz)	DisplayPort	HDMI / HD-BaseT				Output Frame Rate (Hz)
				RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	
HDTV (continued)	1080p	24	X	X	X	X	X	48
	1080p	25	X	X	X	X	X	60
	1080p	29.97	X	X	X	X	X	60
	1080p	30	X	X	X	X	X	60
	1080p	50	X	X	X	X	X	50
	1080p	59.94	X	X	X	X	X	60
	1080p	60	X	X	X	X	X	60
	2K (2048x1080)	24	X	X	X	X	X	48
	2K (2048x1080)	25	X	X	X	X	X	50
	2K (2048x1080)	30	X	X	X	X	X	60
	2K (2048x1080)	50	X	X	X	X	X	50
	2K (2048x1080)	60	X	X	X	X	X	60
	1080p	100	X	X	X	X	X	100
	1080p	120	X	X	X	X	X	120
	2560x1600	100	X	X	X	X	X	100
	2560x1600	120	X	X	X	X	X	120
PsF formats	1080sf	30						60
	1080sf	25						50

Notes

1

HDBaseT supports 4K 24/25/30Hz 4:2:2 only

2

HDBaseT supports 4K 50/60Hz 4:2:0 only

3

HDMI 1,2 support up to 4:2:2, HDBaseT does not support

SDI formats

Timing	SDI Link mode	Signal Standards	Color Encode	Sampling Structure	Bit Depth	Remark
NTSC	SD	SMPTE 259M-C 270Mbps SD	YCbCr	4:2:2	10	128M
PAL	SD	SMPTE 259M-C 270Mbps SD	YCbCr	4:2:2	10	128M
1035i60	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080i59	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080i60	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080P30	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080P25	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080i50	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080P24	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
720P60	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
720P50	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080Sf25	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080Sf30	HD	SMPTE 292M 1.5Gbps HD	YCbCr	4:2:2	10	128M
1080P50	3G Level A	SMPTE 424M 3Gbps	YCbCr	4:2:2	10	128M
1080P59	3G Level A	SMPTE 424M 3Gbps	YCbCr	4:2:2	10	128M
1080P60	3G Level A	SMPTE 424M 3Gbps	YCbCr	4:2:2	10	128M
1080P50	3G Level B	SMPTE 424M 3Gbps	YCbCr	4:2:2	10	128M
1080P59	3G Level B	SMPTE 424M 3Gbps	YCbCr	4:2:2	10	128M
1080P60	3G Level B	SMPTE 424M 3Gbps	YCbCr	4:2:2	10	128M

Notes

Appendix C: Wiring Details

RS232

9 way D-type connector

1 unused

2 Transmitted Data (TX)

3 Received Data (RX)

4 unused

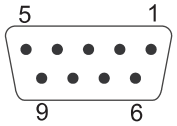
5 Signal Ground

6 unused

7 unused

8 unused

9 unused



RS232:
pin view of female connector

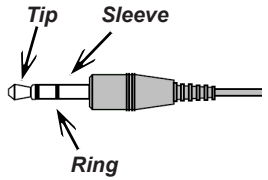
Notes

Trigger 1 & Trigger 2

3.5 mm mini jack

Tip	Trigger
Ring	Not connected
Sleeve	Ground

Output: 12V, 200 mA max

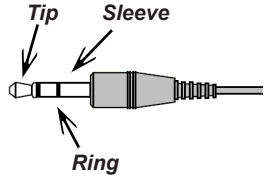


Wired remote control

3.5 mm mini jack

Tip	3V output
Ring	Signal
Sleeve	Ground

Output: 2.85-3.15V, Max. 500 mA



Notes

Appendix D: Glossary Of Terms

Notes

1080p

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

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***.

Blanking (video signal)

The section of the video signal where there is no active video data.

Not to be confused with ***blanking (projection)***.

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

See ***Chrominance***.

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.

Notes

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.

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.

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.

Notes

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***.

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.

Gamma

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

Notes

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***).

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.

LED (Light Emitting Diode)

An electronic component that emits light.

Notes

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.

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.

OSD (on-screen display)

The projector menus allowing you to adjust various settings.

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***.

Notes

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.

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.

Notes

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.

Synchronization

A timing signal used to coordinate an action.

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.

Notes

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:

$$TRC = \frac{\text{DMD™ aspect ratio}}{\text{Source aspect ratio}}$$

TRC is only used in calculations if it is greater than 1.

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.

WUXGA

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

Y

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

YUV

See ***Pr, Pb***.

Notes

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