DIGITAL PROJECTION
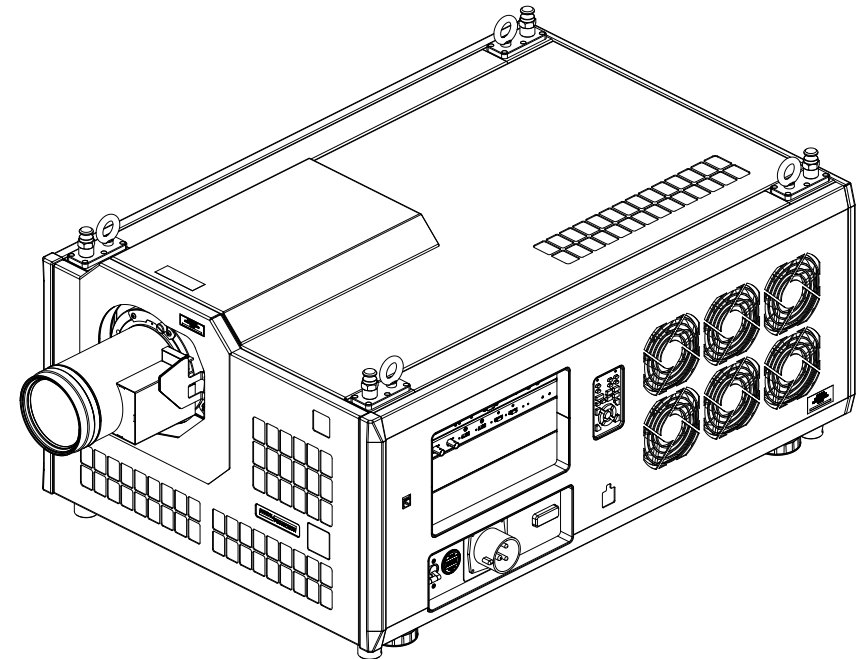
INSIGHT Dual Laser 4K Series
High Brightness Digital Video Projector

▸ INSTALLATION AND QUICK-START GUIDE

▸ CONNECTION GUIDE

▸ OPERATING GUIDE

▸ REFERENCE GUIDE

About This Document

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

Symbols used in this 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.**

⚠ **LIGHT HAZARD WARNING: this symbol indicates that there is a danger of exposure to intensive light that may result in personal injury unless the instructions are closely followed.**

☞ *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.

Legal notice

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Digital Projection disclaims any proprietary interest in trademarks and trade names other than its own.

Laser Information

DIGITAL PROJECTION

$C\epsilon$

MODEL 型号	
Part No. 零部件号	
Serial No. 序列号	
Power 电源	200-240VAC 50/60Hz 20A

WARNING   Isolate mains before removing cover.
注意   打开前先切断主电源

To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture.
请勿将投影机置于雨中或潮湿环境中以降低起火或电击风险

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference. (2) This device must accept any interference recieved, including interference that may cause undesired operation.

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser notice No.50, Dated June 24, 2007	Laser Radiation Avoid direct eye exposure Class 3R Laser product Wave length : 455-470nm Max output : 330mW IEC/EN 60825-1:2007	Rayonnement Laser Évitez d'exposer directement les yeux Produit Laser de classe 3R Longueur d'onde : 455-470nm Sortie maximale : 330mW IEC/EN 60825-1:2007	激光辐射 请勿直视光束 3R 类激光产品 波长 : 455-470nm 最大输出 : 330mW IEC/EN 60825-1:2007

Risk Group 3 Warning! Do not look into the beam. No direct eye exposure to the beam is permitted. RG3 IEC EN 62471-5:2015 Hazard Distance : Refer to Manual	Groupe de Risque 3 Attention! Ne pas regarder dans le faisceau. Pas d'exposition directe des yeux au faisceau est autorisée. RG3 IEC EN 62471-5:2015 Distance de danger : Se reporter au manuel

Digital Projection Limited 英国缔佳有限公司	Greenside Way, Manchester, UK, M24 1XX 英国 曼彻斯特 格林赛得路	Made in UK 英国制造	Name of Product : Projector 产品名称:投影机	For Office Use	IDL 118-790B

The outlined section of the product label above provides information about the laser light sources used within the projector.

Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
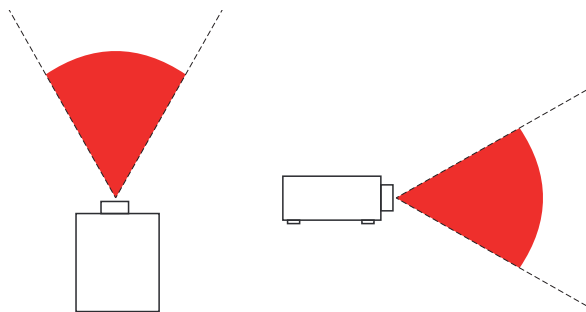
Risk Group 3 Information

Light hazard warning

⚠️ **Failure to comply with the following may result in serious injury:**

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

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

The hazard distance *(Fig. 1)* is the distance measured from the projection lens at which the intensity or energy per unit of surface is lower than the applicable exposure limit on the cornea or skin. If the person is within the hazard distance, the beam is considered unsafe for exposure.

The table below shows hazard distances for the different lenses used with the projector:

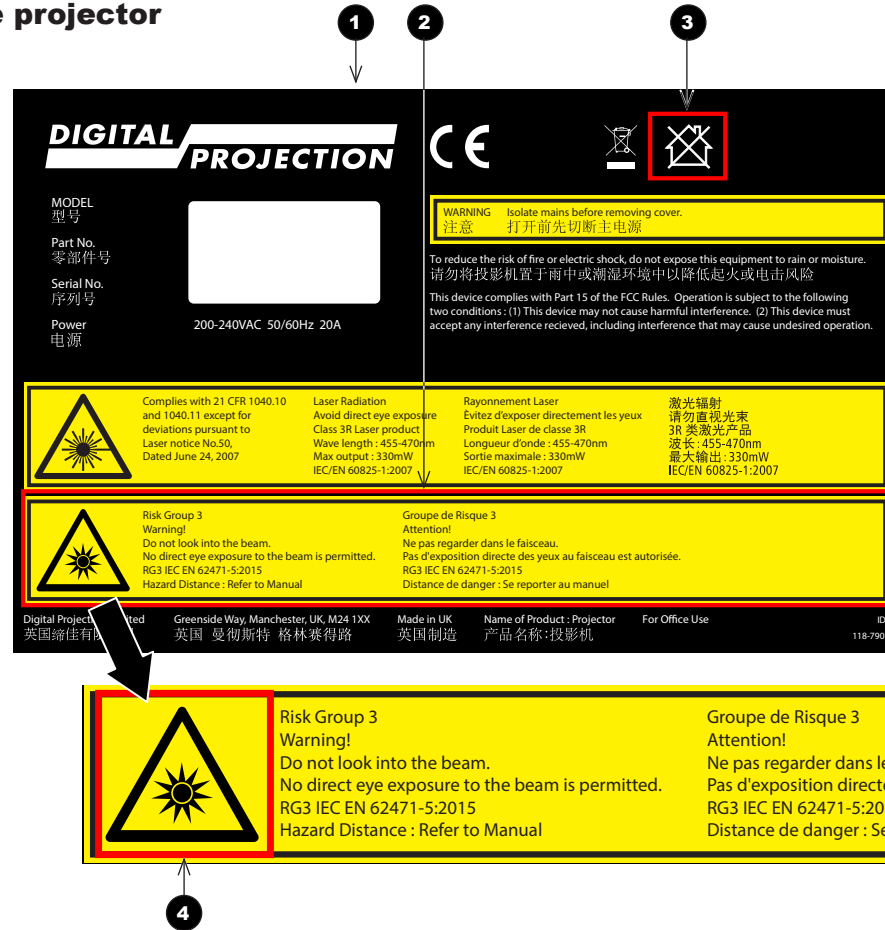| Projection Lens	Part Number	Hazard Distance
0.93 fixed	117-310	4.5 m
1.13 - 1.72 : 1 zoom	115-627	6.2 m
1.65 - 2.60 : 1 zoom	115-630	8.0 m
2.53 - 4.98 : 1 zoom	115-632	9.0 m

Fig. 1: hazard distance

Light hazard labels on the body of the projector

Light hazard labelling is part of the product label.

1 Product label

2 Risk Group 3 label

3 Not For Home Use logo

4 Hazard Warning symbol

DIGITAL PROJECTION

CE

MODEL
型号

Part No.
零部件号

Serial No.
序列号

Power
电源   200-240VAC 50/60Hz 20A

WARNING   Isolate mains before removing cover.
注意   打开前先切断主电源

To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture.
请勿将投影机置于雨中或潮湿环境中以降低起火或电击风险

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference. (2) This device must accept any interference recieved, including interference that may cause undesired operation.

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser notice No.50, Dated June 24, 2007

Laser Radiation
Avoid direct eye exposure
Class 3R Laser product
Wave length : 455-470nm
Max output : 330mW
IEC/EN 60825-1:2007

Rayonnement Laser
Èvitez d'exposer directement les yeux
Produit Laser de classe 3R
Longueur d'onde : 455-470nm
Sortie maximale : 330mW
IEC/EN 60825-1:2007

激光辐射
请勿直视光束
3R 类激光产品
波长 : 455-470nm
最大输出 : 330mW
IEC/EN 60825-1:2007

Risk Group 3
Warning!
Do not look into the beam.
No direct eye exposure to the beam is permitted.
RG3 IEC EN 62471-5:2015
Hazard Distance : Refer to Manual

Groupe de Risque 3
Attention!
Ne pas regarder dans le faisceau.
Pas d'exposition directe des yeux au faisceau est autorisée.
RG3 IEC EN 62471-5:2015
Distance de danger : Se reporter au manuel

Digital Projection Limited
英国缔佳有限

Greenside Way, Manchester, UK, M24 1XX
英国 曼彻斯特 格林赛得路

Made in UK
英国制造

Name of Product : Projector
产品名称:投影机

For Office Use

IDL
118-790B

Risk Group 3
Warning!
Do not look into the beam.
No direct eye exposure to the beam is permitted.
RG3 IEC EN 62471-5:2015
Hazard Distance : Refer to Manual

Groupe de Risque 3
Attention!
Ne pas regarder dans le f
Pas d'exposition directe d
RG3 IEC EN 62471-5:2015
Distance de danger : Se r

Introduction

Congratulations on your purchase of this Digital Projection product.

Your projector has the following key features:

- 4K resolution up to 60 fps via single DisplayPort input.
- Dual laser light source for long-life low-maintenance operation.
- Dual Pipe input capability (2 x DisplayPort 1.2).
- Full 4K 3D display capability.
- Scaling of HDMI 1.4 formats to 4K resolution.
- Blanking control for custom input window sizing.
- Built-in web served control application.
- Control via LAN and RS232.
- Motorised lens mount.

A serial number is located on the product label. Record it here:

CONTENTS

CONTENTS (continued)

DIGITAL PROJECTION

INSIGHT Dual Laser 4K Series
High Brightness Digital Video Projector

▶ INSTALLATION AND QUICK-START GUIDE

IN THIS GUIDE

Connecting The Power Supply

Firmly push the mains connector into the *socket* **1**, then press the *ON/OFF switch* **2**.

A digital meter shows the value of the connected line voltage.
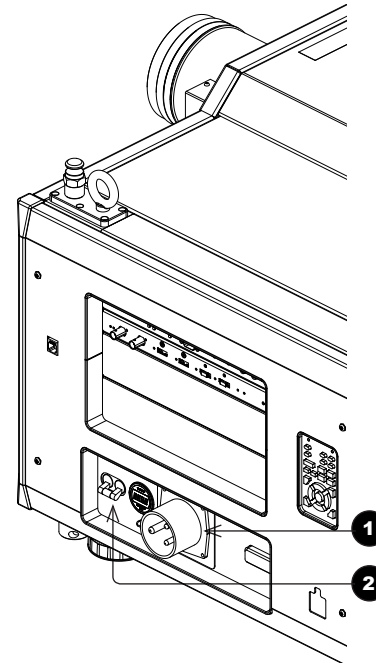
Notes

⚠ **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   **Front IR window**

2   **Inputs**

3   **Air inlet**
An identical air inlet is located at the bottom of the projector, right below this one.

4   **Lens**

5   **Air inlets**

6   **Mains plug with switch and voltage meter**

7   **Keypad**

8   **Interlock LED status window**

9   **Air outlet**

10   **Top stacking point**
There are four top stacking points: one in each corner.

11   **Lifting ring**
There are four lifting rings: one in each corner.

12   **Rear IR window**

13   **Air inlet**

14   **Air inlet**

15   **Air outlet**

16   **Adjustable foot**
There are four adjustable feet: one in each corner.

17   **Bottom stacking point**
There are four bottom stacking points: one in each corner.

Front view

Rear view
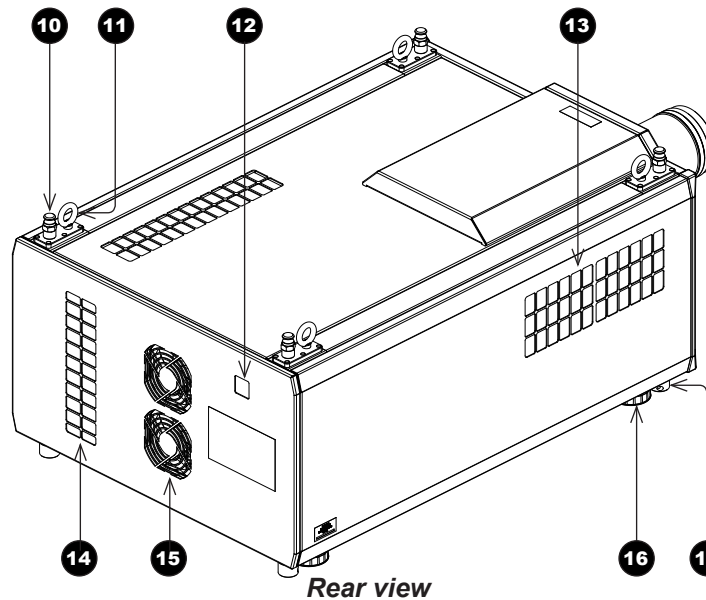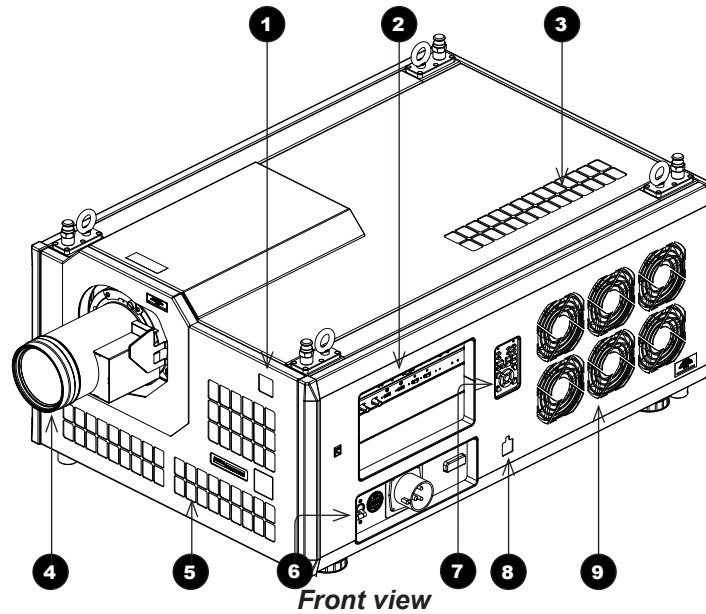
Notes

☞ *The air inlet at the bottom of the projector can be seen in the illustration at the beginning of **Positioning The Screen And Projector** further in this guide.*

Keypad

1 **POWER ON/OFF (with indicator)**

2 **FOCUS**
Use with the arrow keys to adjust focus.
Press to enter FOCUS ADJUSTMENT mode, then press an arrow key to focus the image.
To exit FOCUS ADJUSTMENT mode, press **EXIT** or wait 10 seconds.

3 **SHIFT**
Use with the arrow keys to move the projected image.
Press to enter SHIFT ADJUSTMENT mode, then press an arrow key to move the image.
To exit SHIFT ADJUSTMENT mode, press **EXIT** or wait 10 seconds.

4 **ZOOM**
Use with the arrow keys to zoom the image in or out.
Press to enter ZOOM ADJUSTMENT mode, then press an arrow key to zoom the image.
To exit ZOOM ADJUSTMENT mode, press **EXIT** or wait 10 seconds.

5 **Arrow keys**
Use with **FOCUS**, **SHIFT** and **ZOOM** to make adjustments.

6 **EXIT**
Use to exit lens adjustment modes.

7 **SHUTTER OPEN/CLOSE (with indicator)**

8 **RPY**
Press, then press **RIGHT** to calibrate zoom.
Press, then press **LEFT** to calibrate focus.

9 **INPUT +**
Switches to the next available input source. Cycle through the inputs in the following order:
...HDMI A, HDMI B, DisplayPort A, DisplayPort B...

10 **INPUT –**
Switches to the previous available input source. Cycle through the inputs in the following order:
...DisplayPort B, DisplayPort A, HDMI B, HDMI A...
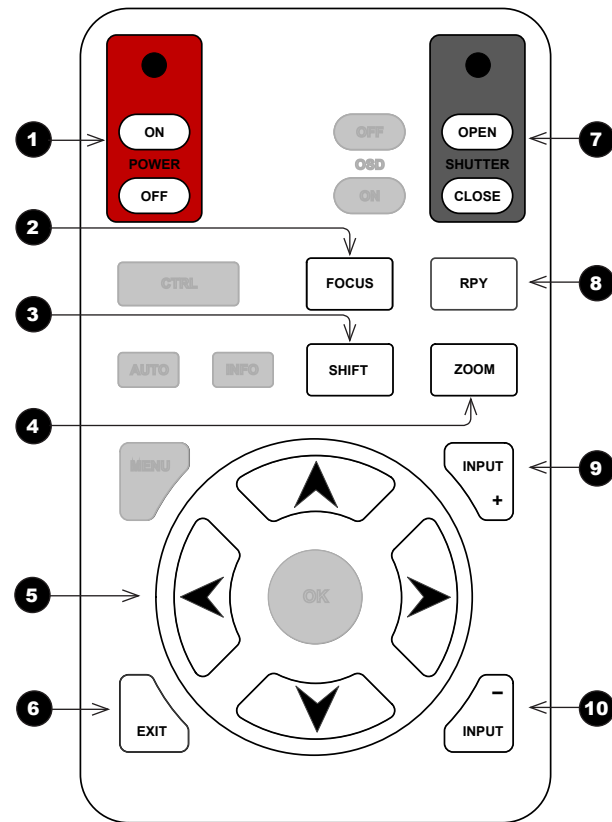
Notes

☞ *See Entering alphanumeric values in the Operating Guide.*

Keypad indicators

1   **POWER**

Behavior		Meaning
Off	⚪	The projector is switched off.
On (amber)	🟡	The projector is in Standby mode.
On (green)	🟢	The projector is switched on (Normal mode).

2   **SHUTTER**

Behavior		Meaning
On (amber)	🟡	The shutter is closed.
On (green)	🟢	The shutter is open.
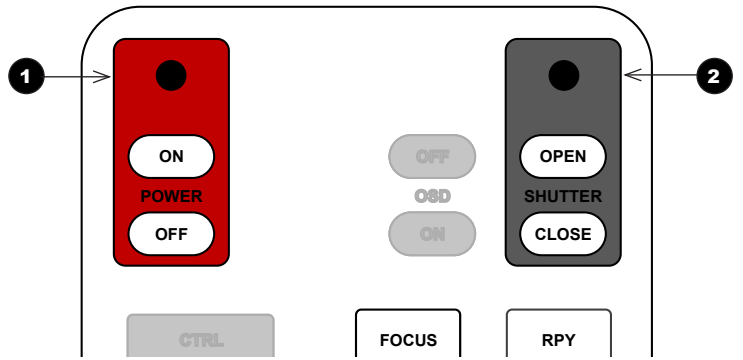
Notes

Laser status lights
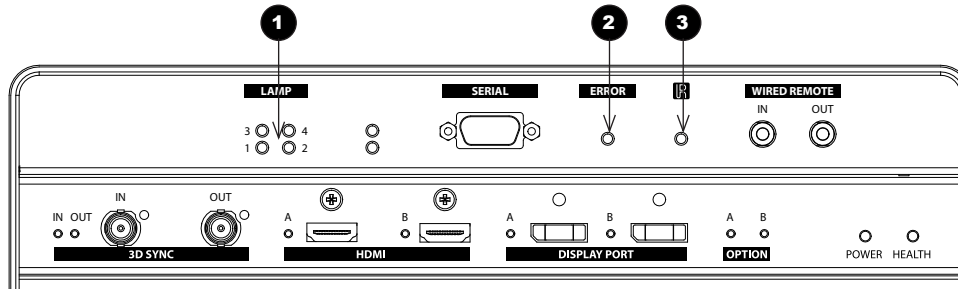
1   Lamp 1 and 2 indicators
These indicators correspond to the two laser light sources within the projector.
(Lamp 3 and 4 remain switched off.)

Behavior		Meaning
Off	⬤	The laser light source is switched off.
On (green)	🟢	The laser light source is switched on (100%).
On (amber)	🟡	The laser light source is switched on (30-99%).
Flashing (red)	🔴	Light Source Error

2   Error indicator

Behavior		Meaning
On (red)	🔴	Error
Flashing	🔴	Error

3   Infrared indicator

Behavior		Meaning
Flashing (blue)	🔵	The projector is receiving input from the remote control.

Interlock LED status window indicators

The **interlock LED status window** (1) shows whether an interlock switch has been activated.

Each LED signals a problem with closing or attaching the following:

	Lens
	Front cover
	Left cover
	Top cover
	Right cover
	Rear cover
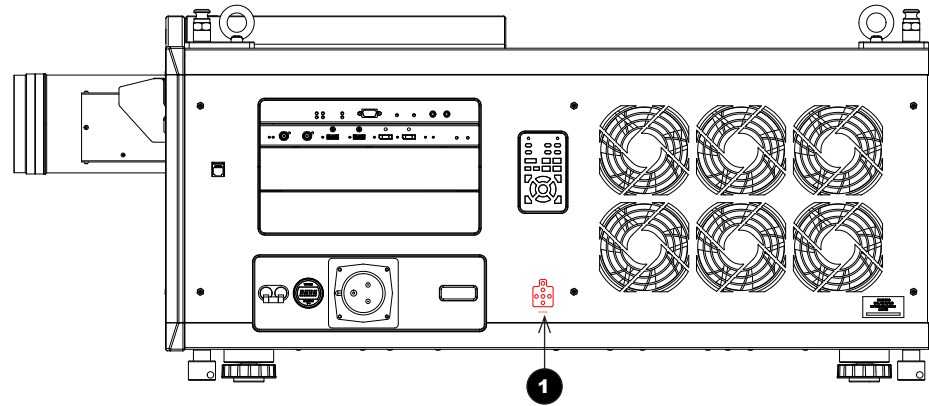
☞ *The exact location of each interlock switch can be found in the **Important Information** document.*

Remote control

The remote control is shipped with no battery fitted. Remove the back cover and insert the supplied cells while observing the correct cell polarity.

1 **Transmit indicator**
Flashes when the remote sends a signal to the projector. Lights solidly when the projector is in FOCUS, ZOOM or SHIFT ADJUSTMENT mode.

2 **Power ON / OFF**

3 **Shutter OPEN / CLOSE**

4 **MENU**
Display / exit the OSD.

5 **Arrow keys and OK**
Use the arrow keys to navigate through the menus, confirm your choice with **OK**. When the OSD is not showing, use the arrows to focus, zoom and shift the lens.

6 **EXIT**
Exit lens adjustment modes or exit the OSD.

7 **FOCUS**
Press for FOCUS ADJUSTMENT mode, use the arrows to make the adjustment.

8 **CAL**
Press and hold this key, then press **FOCUS** or **ZOOM** to calibrate focus or zoom respectively.

9 **ZOOM**
Press to enter ZOOM ADJUSTMENT mode, then use the arrow keys to make the adjustment.

10 **SHIFT**
Press to enter SHIFT ADJUSTMENT mode, then use the arrow keys to make the adjustment.
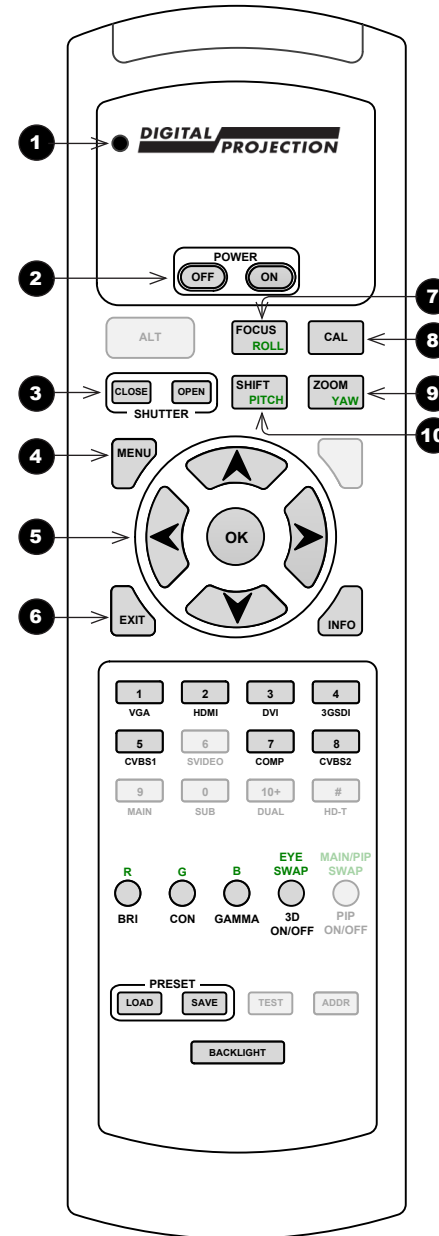
Notes

☞ *Not all keys are used on this projector. The unused keys are grayed out.*

☞ *You can use the remote control wirelessly or with a standard TRS cable connected to the Wired Remote In connector.*

☞ *When a new lens is fitted, a calibration procedure must be carried out.*

☞ *When adjusting focus or zoom, UP and LEFT will focus/zoom in, DOWN and RIGHT will zoom out. When adjusting shift, each arrow key moves the image in the corresponding direction.*

☞ *When you enter FOCUS, ZOOM or SHIFT ADJUSTMENT mode, all other remote control functions become unavailable. To cancel an adjustment mode, either press **EXIT** or wait ten seconds.*

Remote control continued

11 Number keys for input selection and lens presets
Select input source. Press:
1 for HDMI A, **2** for HDMI B, **3** for DisplayPort A, **4** for DisplayPort B, **7** for Dual Pipe LR and **8** for Dual Pipe EW.

Use numbers **1** to **5** with the **PRESET** keys to load and save lens presets. (See **15** below.)

12 GAMMA
Access the gamma control.

13 BRI
Access the brightness control.

14 CON
Access the contrast control.

15 PRESET keys
Press and hold **LOAD** or **SAVE**, then press a number key **1** to **5** to load or save a lens preset.

16 Remote control backlight ON / OFF
Make the remote control keys glow in the dark, or switch this feature off.

17 INFO
Press to display the IP address of the projector.

18 3D ON/OFF
Enable and disable 3D.

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 drawings below shows the feet for table mounting, and the fixing holes for ceiling mounting. Also shown is one of four rings each located in the top corners. These can be used for lifting a single projector.

1   **Four stacking points**

2   **Four adjustable feet**

3   **Four M10 holes for ceiling mount**
The screws should not penetrate more than 18 mm into the body of the projector.

4   **Stacking point at the top of the projector**

5   **Lifting ring (for handling a single projector)**
The rings can be removed to reveal M10 x 18 deep holes for ceiling mounting.

Bottom view of the projector   *Top corner (detail)*
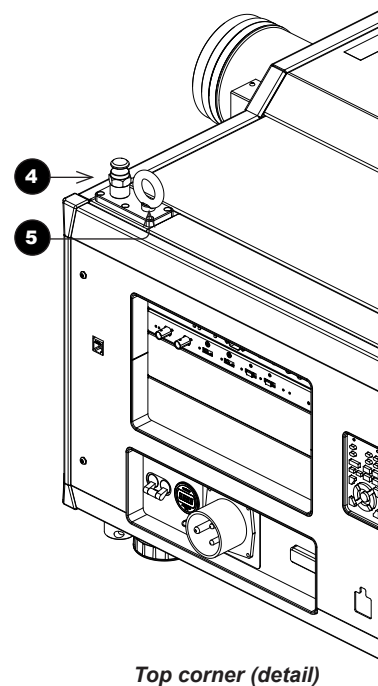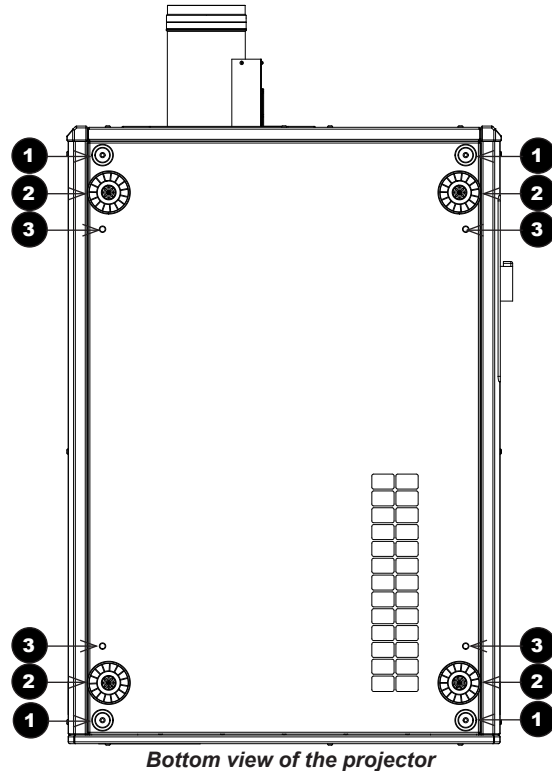
Notes

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

⚠ **Ensure that there is at least 30 cm (12 in) of space between the ventilation outlets and any wall, and 10 cm (4 in) on all other sides.**

Tilt

The projector can be operated in numerous positions.

It is recommended to position the projector in portrait mode with inputs facing upward, as shown in the diagram:

Roll   *Pitch*
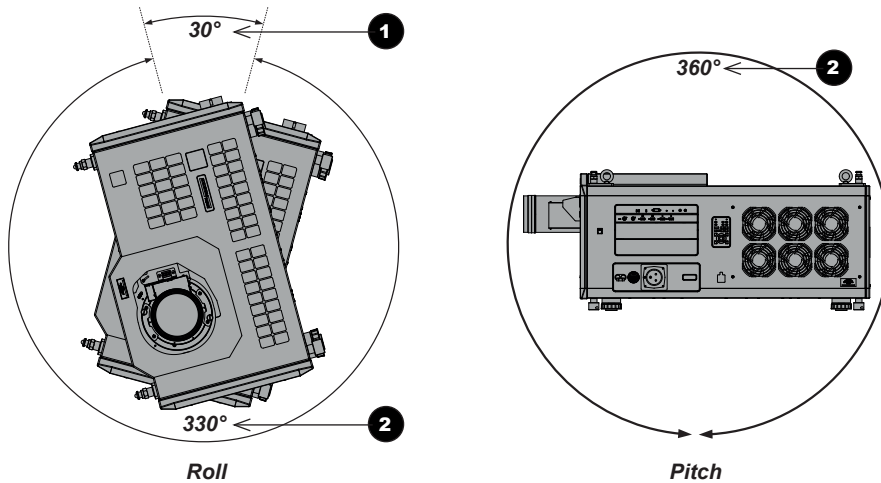
1   **Recommended positions, inputs side up**

2   **Also possible**

Essential Maintenance

Fitting the lens

1. Insert the lens into the mount.
    Engage the three *locating studs* **1** into the corresponding
    slots **2** on the mount.

2. *Rotate the lens clockwise* **3** until the studs slide all the way
    into the slots.

3. Tighten the two *fixing screws* **4** on the lens collar.
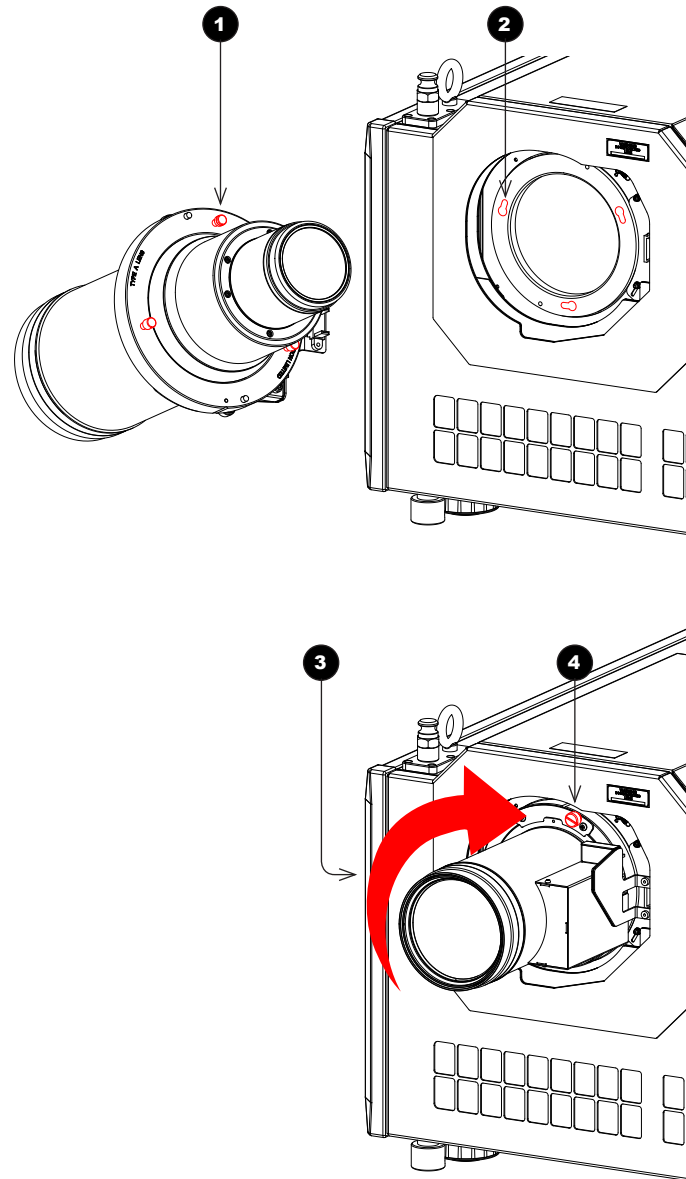
To remove the lens, reverse the above procedure.

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.**

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

☞ *The projector will not power on without the lens fitted.*

☞ *Before turning on the projector, please ensure the protective caps are removed from the front and rear of the lens.*

⚠️ **The two fixing screws must be tightened to at least a torque of 0.5 N-m using a screwdriver. Loose screws might lead to the lens falling off.**

☞ *When a new lens is fitted, a calibration procedure must be carried out. For more information, see **Calibrating zoom and focus** further in this guide.*

Replacing the filters

1. Loosen the six captive screws, then remove the front/side *panel* **1**.
2. Replace the *filters* **2**.
3. Reattach the panel and tighten the screws.
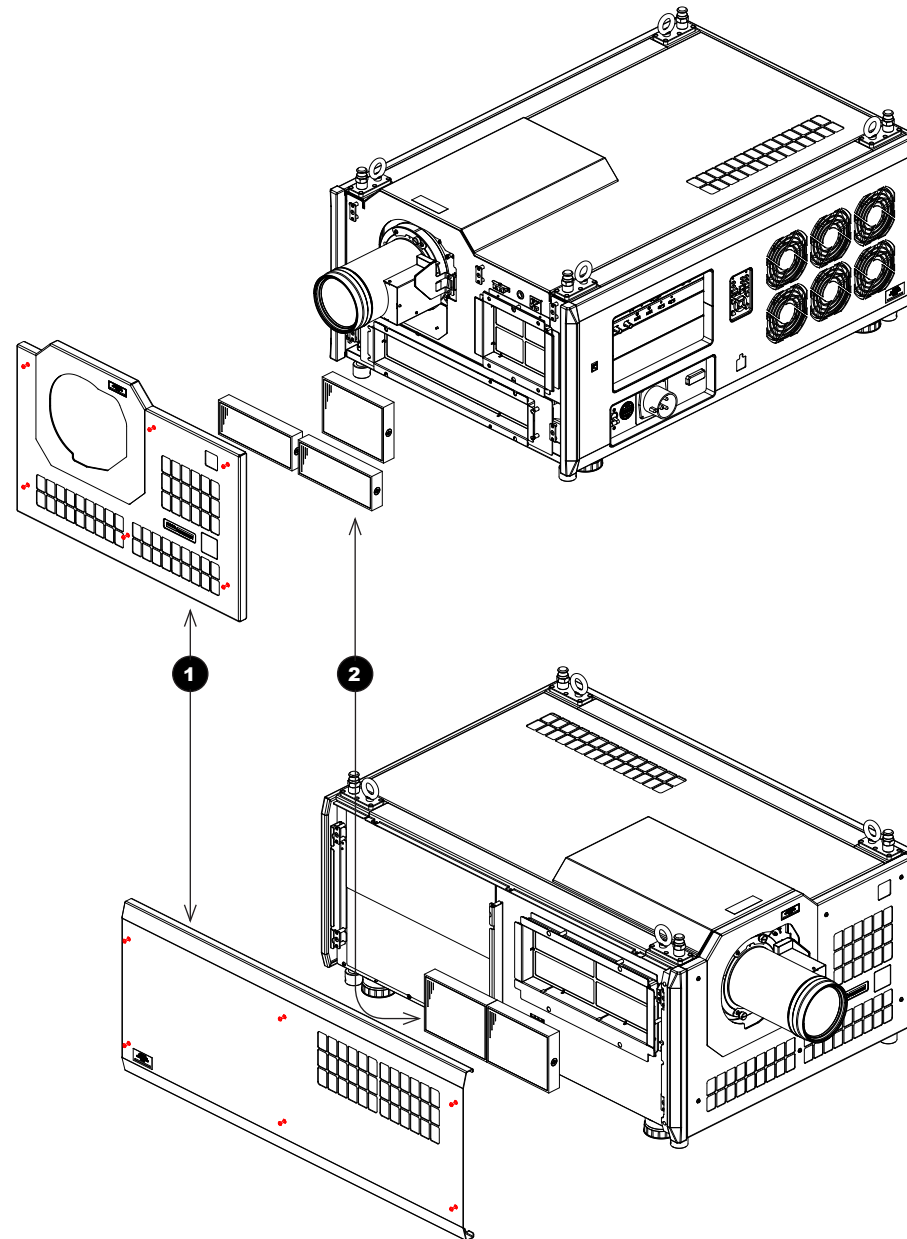
Notes

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

⚠ **When changing the filters, avoid using excessive force as this may damage the equipment.**

☞ *Filters should be replaced as necessary upon visual inspection and in accordance with operating environment.*

Monitoring the cooling liquid levels

The cooling reservoirs inside the projector require topping up after approximately eighteen months.

Please contact your dealer to arrange the service.

Notes

Operating The Projector

Switching the projector on

1. Connect the power cable between the mains supply and the *socket* ❶. Switch on at the *ON/OFF switch* ❷.

2. Wait until the self-test has completed and the standby indicator on the projector keypad shows amber. The light source will be off and the projector will be in STANDBY mode.

3. Press **ON** on the remote control or the control panel and hold for three seconds, to switch the projector ON. The power indicator on the control panel will show green, the light source will light and the shutter will open.

Switching the projector off

1. Press **OFF** on the remote control or the keypad, and hold for three seconds. The power indicator on the keypad will show amber, the light source will go out and the cooling fans will run for a short time until the projector enters 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.*

⚡ **Do not turn off the projector from the power switch or disconnect the power cord while the projector is working or cooling down.**

⚡ **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

The last selected input remains active until a new input is selected. To select a new input:

1. Connect one or more image sources to the projector.

2. Select the input you want to display in one of the following ways:

   - Press one of the input buttons on the remote control (**1**, **2**, **3** or **4**).

   - 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.

   - On the keypad, press **INPUT +** or **INPUT -** to switch to the next or previous input in the list.

Calibrating zoom and focus

Each time a new lens is fitted into the projector, a calibration procedure must be carried out.

Calibrate using the OSD

1. Open the **Lens** menu, then select **Lens Calibrate**.

2. Inside the **Lens Calibrate** menu, start the **Calibrate Focus** command. When focus has been calibrated, start **Calibrate Zoom**.

3. Select **Back** to exit the menu.

Calibrate using the remote control

Press and hold **CAL**, then press **FOCUS** to calibrate focus. When ready, press and hold **CAL** again, then press **ZOOM** to calibrate zoom.

Calibrate using the keypad

Press **RPY**, then press **LEFT** to calibrate focus. When ready, press **RPY** again, then press **RIGHT** to calibrate zoom.

Adjusting the lens

The lens can be adjusted using the lens buttons on the keypad or remote control.

On either device, press **FOCUS**, **ZOOM** or **SHIFT**, then use the arrow keys to adjust the lens.

Notes

Adjusting the image

Orientation

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

Choose from **Upper Left**, **Upper Middle**, **Upper Right**, **Mid Left**, **Mid Middle**, **Mid Right**, **Lower Left**, **Lower Middle** and **Lower Right**.

Picture

Settings such as **Gamma**, **Brightness** and **Contrast** can be set from the **Image** menu.Adjusting the lens

1. Press **MENU**.

2. Press the **LEFT** or **RIGHT** button to cycle through the list of menus until **Configuration** appears on the LCD screen. The list of menus is as follows:

   - **Title Select**
   - **Configuration**
   - **(Title Setup)**
   - **Information**
   - **...**

3. Press **DOWN** to enter the **Configuration** menu, then press the **LEFT** or **RIGHT** button to cycle through configuration submenus until you reach **Lens Control**.

   Lens controls are accessed in two modes - **Lens Position** and **Focus Zoom**. Press **ENTER** to switch between the two modes.

   - In **Lens Position** mode, use the arrow buttons to shift the lens in the desired direction.
   - In **Focus Zoom** mode, use:
     - **UP** and **DOWN** to change the focus,
     - **LEFT** and **RIGHT** to change the zoom.
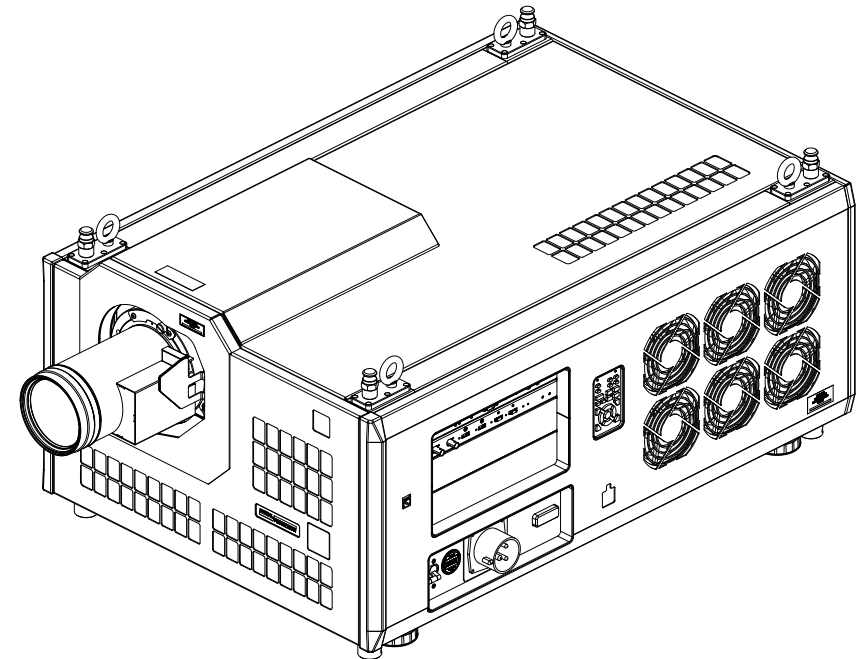
DIGITAL PROJECTION

INSIGHT Dual Laser 4K Series
High Brightness Digital Video Projector

▶ CONNECTION GUIDE

IN THIS GUIDE

Signal Inputs

The following inputs are available on the connections panel:

1   **HDMI A**

       HDMI 1.4

2   **HDMI B**

       HDMI 1.4

3   **DisplayPort A**

       DisplayPort 1.2

4   **DisplayPort B**

       DisplayPort 1.2
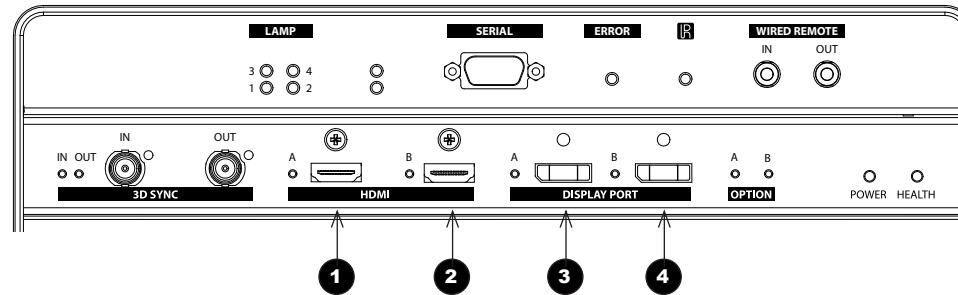
Notes

3D Sync

1   **3D Sync In**

Sync input signal
Connect the 3D sync from your
graphics card or server.

2   **3D Sync Out**

Sync output signal
Connect this to your IR emitter or
ZScreen.
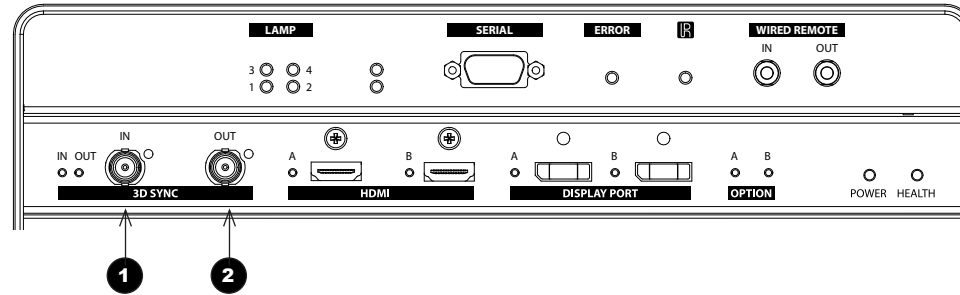
Indicators on the connections panel

Main connections panel
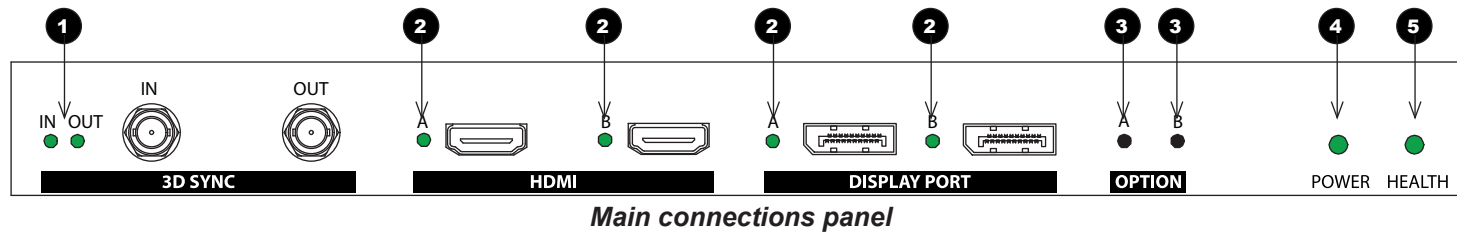
1   **3D Sync In / Out**

These indicators light solid green if 3D sync is present.

2   **HDMI 1 / HDMI 2 / DisplayPort 1 / DisplayPort 2**

Each of these indicators lights a solid green color if the adjacent input is in use.
If the input is selected but the source is not present, the indicator flashes green.

3   **Option A / Option B**

These indicators are not used.

4   **Power**

This indicator lights a solid green color if the projector is switched on.

5   **Health**

This indicator flashes amber, then green, during boot up.
When the projector is switched on and fully functional, the indicator lights solid green.

EDID on the HDMI and DisplayPort 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 projector.

Otherwise please 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 HDMI/DisplayPort switchers with the projector

When using an HDMI/DisplayPort 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.

Additionally, sources which use HDCP encryption may not display properly when connected to the projector via a switcher. Refer to the switcher's manual for more information.

1 **Sources**

2 **Switcher**
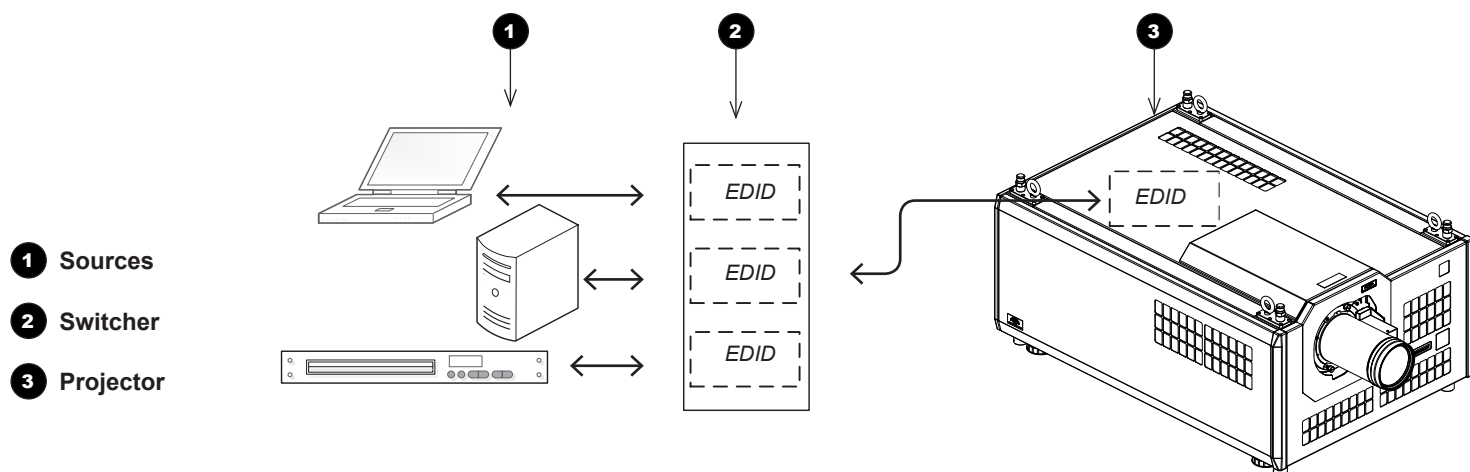
3 **Projector**

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

Control Connections

1   **LAN port (LAN)**

Use this port when controlling the projector in LAN connection from a PC.

2   **PC control terminal (RS-232)**

Use this terminal when controlling the projector in serial connection from a PC.
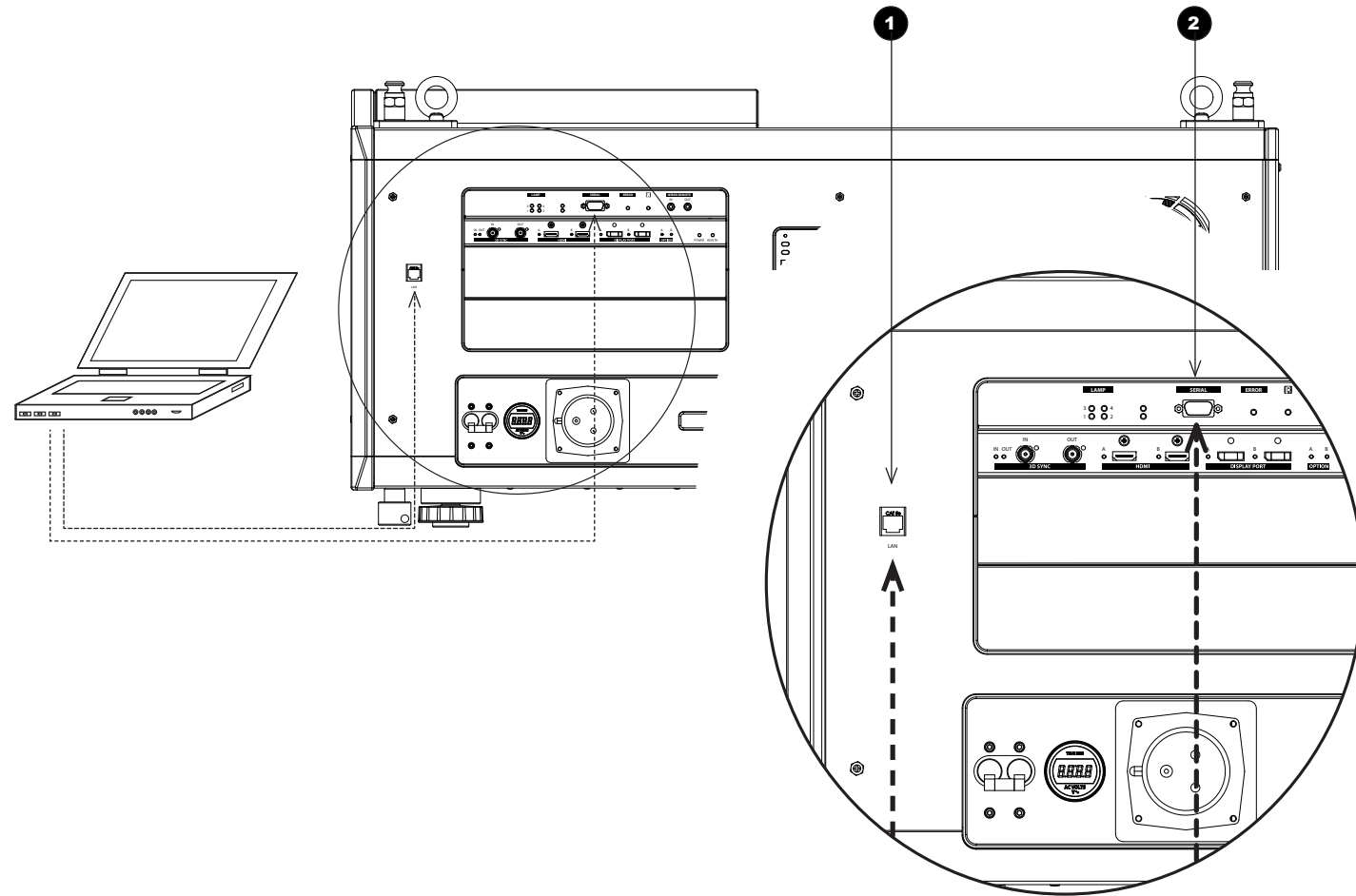
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INSIGHT Dual Laser 4K Series

High Brightness Digital Video Projector

▶ OPERATING GUIDE

IN THIS GUIDE

Main Menu

- **Input**

  Select an input source from the drop-down list:

  HDMI A, *HDMI B*, *DisplayPort A*, *DisplayPort B*, *Dual Pipe LR*, *Dual Pipe EW*

- **Lens**

  Adjust lens zoom and focus, calibrate a new lens, use lens presets.

- **Image**, **Color**, **Geometry**

  Open these menus to access various picture and screen settings.

- **Laser**

  View laser information and adjust power.

- **3D**

  This menu is currently unavailable.

- **Network**

  Access network settings.

- **OSD**

  Control the appearance of on-screen menus.

- **System**

  Access system settings.

- **Information**

  View your current configuration.

- **Help**

  This menu is currently unavailable.

MAIN MENU

Input	HDMI A
Lens	▶
Image	▶
Color	▶
Geometry	▶
Laser	▶
3D	▶
Network	▶
OSD	▶
System	▶
Information	▶
Help	▶

MAIN MENU

Input	HDMI A
	HDMI B
Lens	Display Port A
	Display Port B
Image	Dual Pipe LR
Color	Dual Pipe EW
Geometry	▶
Laser	▶
3D	▶
Network	▶
OSD	▶
System	▶
Information	▶
Help	▶
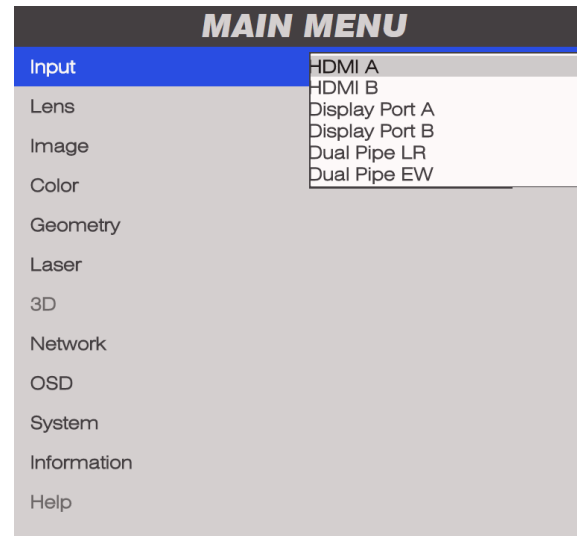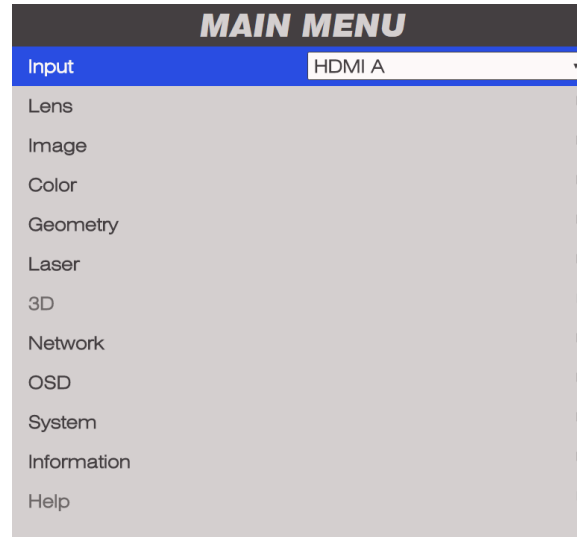
Notes

Lens Menu

- **Lens Calibrate** and **Lens Presets**

  Open these submenus to access additional lens settings.

- **Move Center**

  Select to center the lens.

- **Main Menu**

  Return to the **Main** menu.

LENS	
Lens Calibrate	▶
Lens Presets	▶
Move Center	OK
Main Menu	▶

Lens Calibrate

Each time a new lens is fitted into the projector, a calibration procedure must be carried out using these commands.

Before you use a newly fitted lens, select **Calibrate Focus** and **Calibrate Zoom** in turn and wait until the projector establishes minimum and maximum travel distances. Select one command and allow at least 60 seconds for the calibration to take place, then select the other command.

Select **Back** to return to the previous menu.

LENS CALIBRATE	
Calibrate Focus	OK
Calibrate Zoom	OK
Back	▶
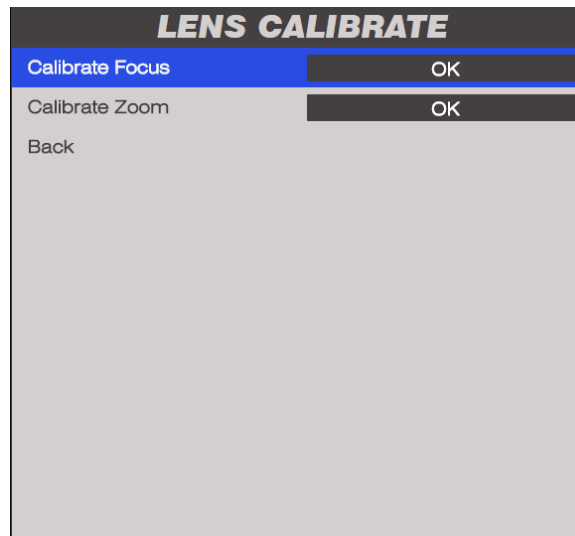
Notes

Lens Presets

This menu allows you to recall and save up to five 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

- Navigate to the command you wish to activate and press **OK**.

    A *recall* command will adjust the lens according to the information contained within the preset.

    A *save* command will save the current lens information into the selected slot.

- Select **Back** to return to the previous menu.

LENS PRESETS

Recall Preset 1	OK
Recall Preset 2	OK
Recall Preset 3	OK
Recall Preset 4	OK
Recall Preset 5	OK
Save Preset 1	OK
Save Preset 2	OK
Save Preset 3	OK
Save Preset 4	OK
Save Preset 5	OK
Back	▸

Notes

☞ *Saving a preset overwrites all data previously saved within the same slot.*

Image Menu

- **Brightness**, **Contrast**, **Gamma**

  Set the slider as required to improve the quality of the image.

- **Main Menu**

  Return to the **Main** menu.
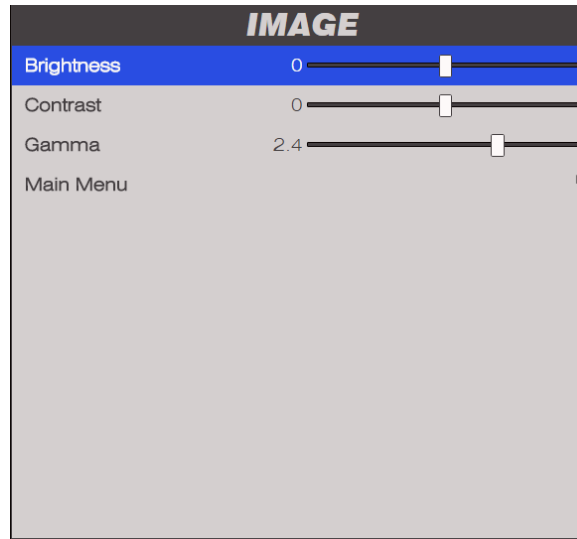
IMAGE

Brightness	0
Contrast	0
Gamma	2.4
Main Menu	▸

Notes

Color Menu

- **Lift** and **Gain** sliders

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

  Set as required.

- **Color Preset**

  Choose from the drop-down:

  User, Peak, REC 709, REC 601, 3200K, 5400K, 6500K, 8000K, 9000K.

- **Color Coefficient**

  This feature is currently not supported.

- **Main Menu**

  Return to the **Main** menu.

COLOR	
Red Lift	0
Green Lift	0
Blue Lift	0
Red Gain	0
Green Gain	0
Blue Gain	0
Color Preset	User
Color Coefficient	User
Main Menu	▶
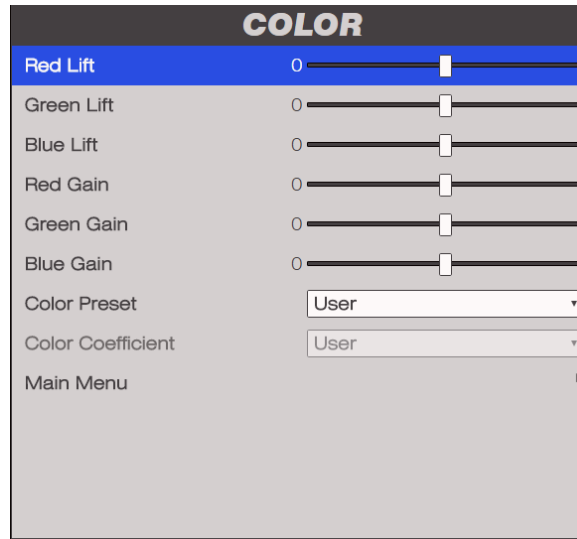
Geometry Menu

- **Scaler Enabled**

  This feature unlocks functionality accessible via the web served OSD.

  If this feature is enabled, the web served OSD allows you to open a *Scaler Points* editor window, where you can set bespoke screen sizes and screen aspect ratios.

- **Main Menu**

  Return to the **Main** menu.

GEOMETRY

Scaler Enabled
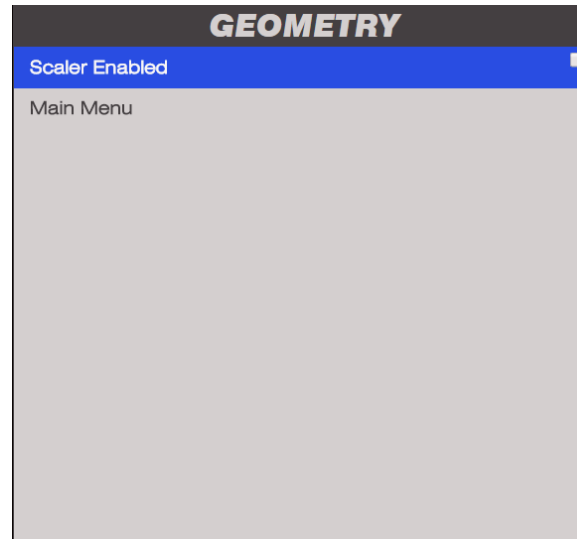
Main Menu

Laser Menu

- **Laser Mode**

    This feature is currently not supported.

- **Laser Power**

    Select a value between 30 and 100%.

- **Laser 1 Hours**, **Laser 1 Starts**, **Laser 2 Hours**, **Laser 2 Starts**

    These items provide information only.

- **Main Menu**

    Return to the **Main** menu.

LASER	
Laser Mode	All ▾
Laser Power	**100**
Laser 1 Hours	3:54
Laser 1 Starts	18
Laser 2 Hours	3:54
Laser 2 Starts	18
Main Menu	▸
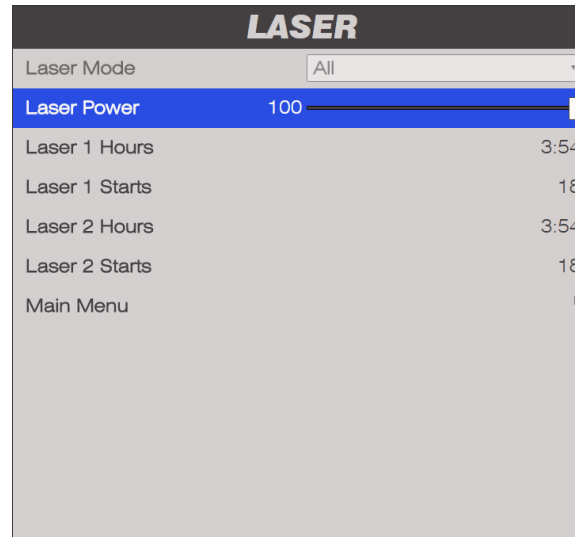
Notes

Network Menu

- **Enable DHCP**, **Network Address**, **Subnet Mask**

  Select **Enable DHCP** if the **Network Address** and **Subnet Mask** are to be assigned by a DHCP server.

  Deselect **Enable DHCP** to enter **Network Address** and **Subnet Mask** manually.

- **Router Version**

  This item provides information only.

- **Main Menu**

  Return to the **Main** menu.

NETWORK	
Enable DHCP	☑
Network Address	172.021.112.006
Subnet Mask	255.255.252.000
Router Version	2.0
Main Menu	▶

NETWORK	
Enable DHCP	☐
Network Address	172.021.112.007
Subnet Mask	255.255.252.000
Router Version	2.0
Main Menu	▶
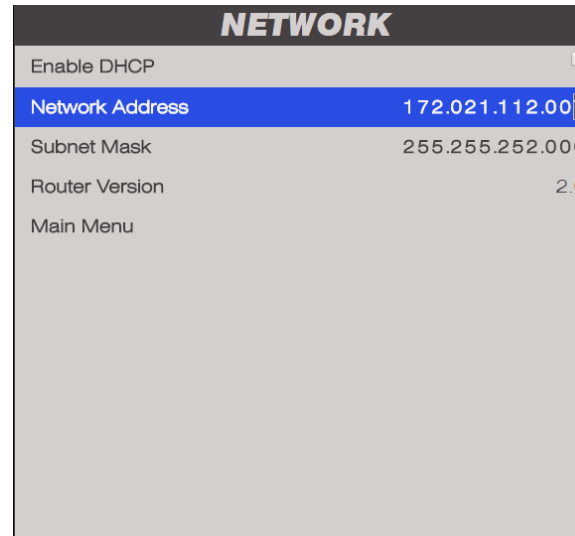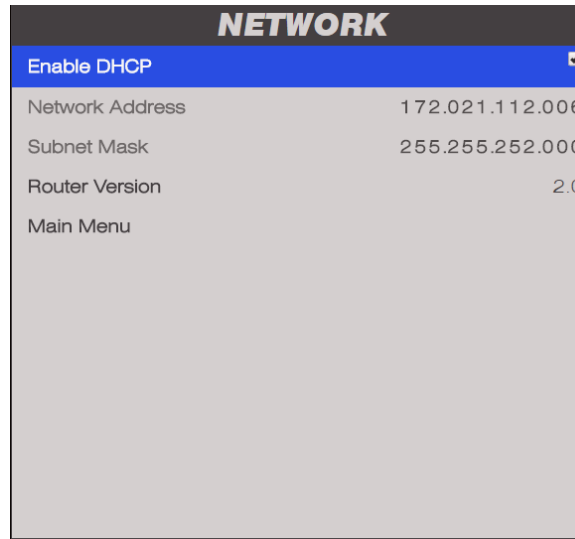
OSD Menu

- **Position**

  Determine where the OSD should appear on the screen when activated.

- **Language**

  Set the OSD language.

- **Timeout**

  Determine how long the OSD should stay on the screen if no buttons are pressed.

- **Confirmation Prompts**

  Clear this check box if you do not wish to encounter confirmation prompts in the OSD.

- **Source Change**

  Clear this check box if you do not wish to see an on-screen message every time the input source changes.

- **Zoom**

  Select this check box to double the OSD screen size.

- **OSD Software**

  This item provides information only.

- **Web Served OSD**

  Open the submenu.

- **Main Menu**

  Return to the **Main** menu.

Web Served OSD

This submenu introduces a passcode to enter in your browser before you can access the web served OSD.

To see the IP address of the web served OSD, press the INFO button on the remote control or keypad.

- Select **PIN Enabled** to enable the feature.

- Edit the passcode using **PIN Number** or return the factory default number using **PIN Reset**.

- Select **Back** to return to the previous menu.

OSD	
Position	Upper Left
Language	English UK
Timeout	0
Confirmation Prompts	✔
Source Change	✔
Zoom	☐
OSD Software	0.7.6
Web Served OSD	▶
Main Menu	▶

WEB SERVED OSD	
PIN Enabled	✔
PIN Number	1 2 3 4
PIN Reset	OK
Back	▶
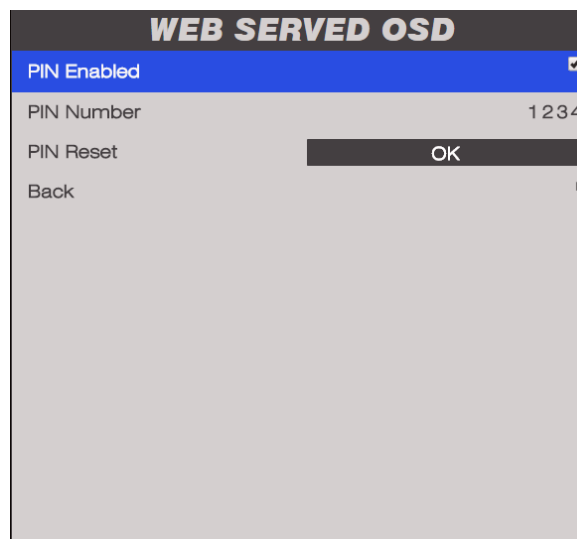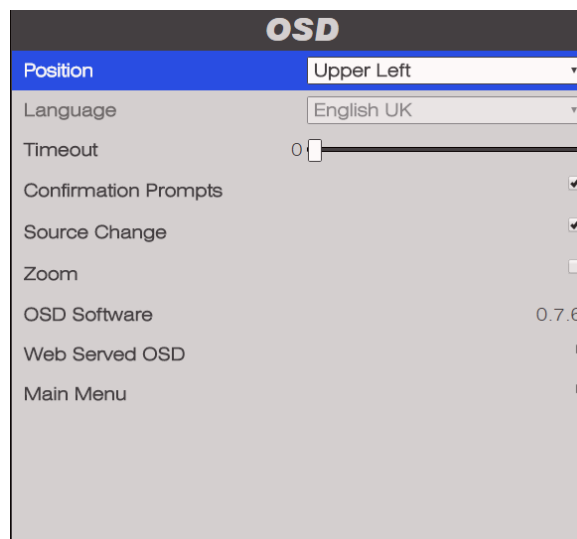
Web Served OSD

The web served OSD mirrors and enhances the functionality of the OSD found on the projector. This section explains how to access it and shows some of the enhanced functions.

Access the web served OSD

1. Find the IP address of the projector. This can be done in a number of ways:

   - By navigating to the OSD **Network** menu.

   - By pressing **INFO** on the keypad or remote.

   - By using *Projector Controller* to discover the projector.

2. Enter the IP address in your web browser. The *MAIN MENU* page will load.

← → C	ⓘ 172.21.112.130	Q ☆ ⋮

MAIN MENU

Input	▶
Lens	▶
Image	▶
Color	▶
Geometry	▶
Laser	▶
3D	▶
OSD	▶
System	▶
Information	▶
Help	▶
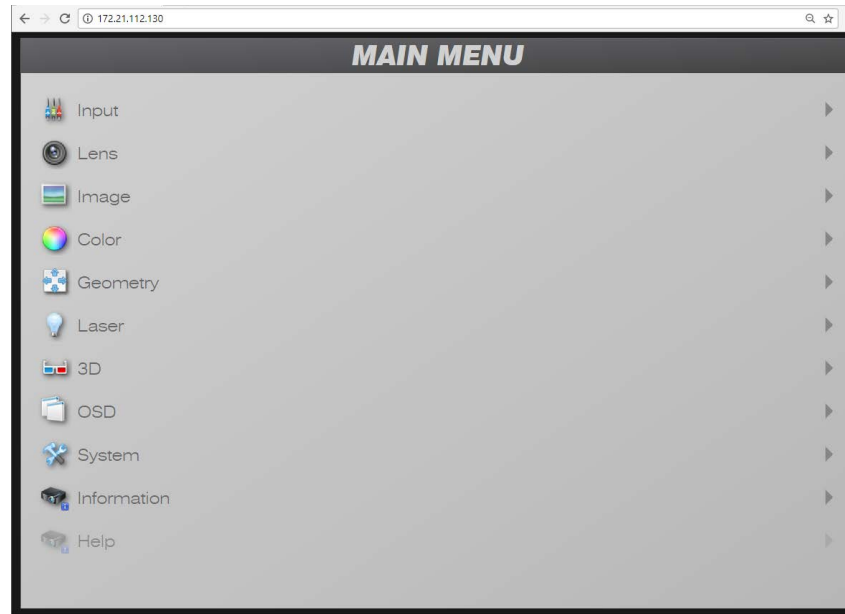
Notes

Examples of enhanced functionality on the web served OSD

Gamut Editor
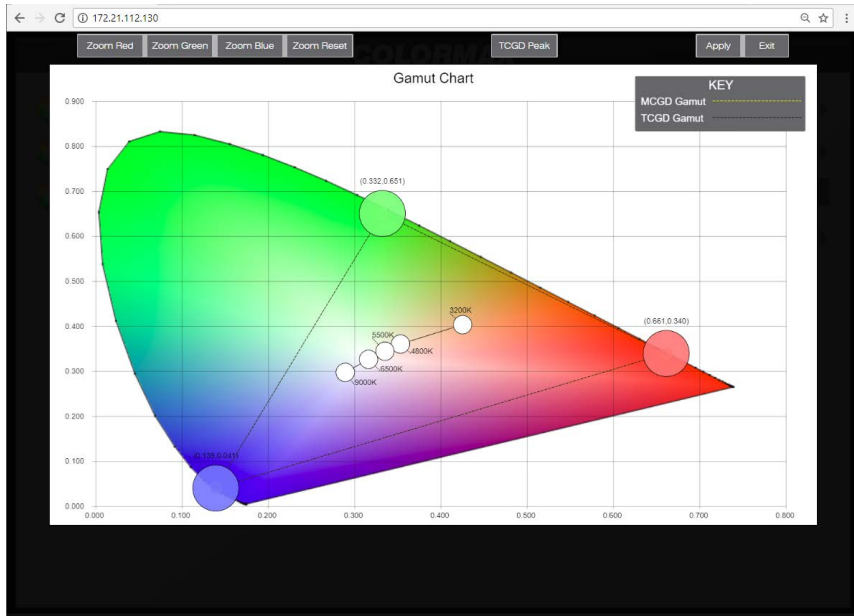
Blanking Editor and Scaling Editor
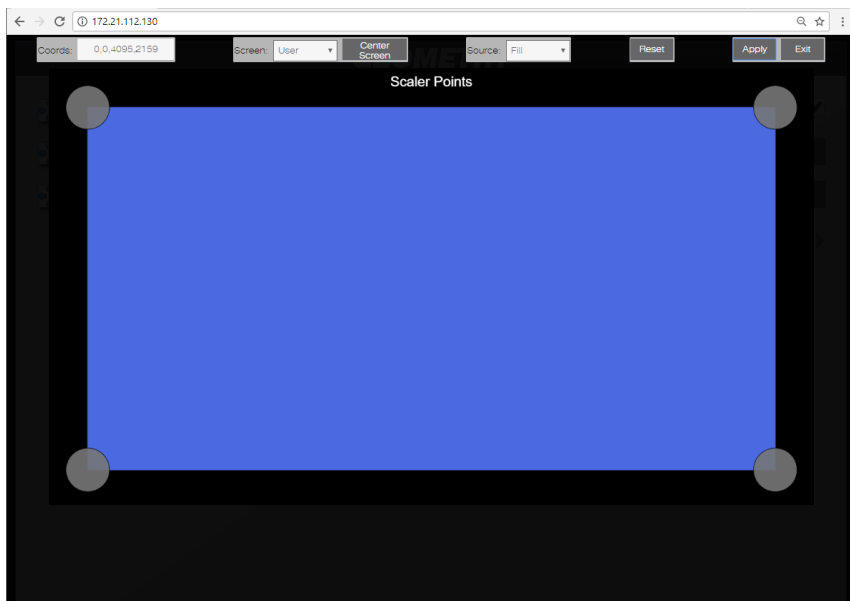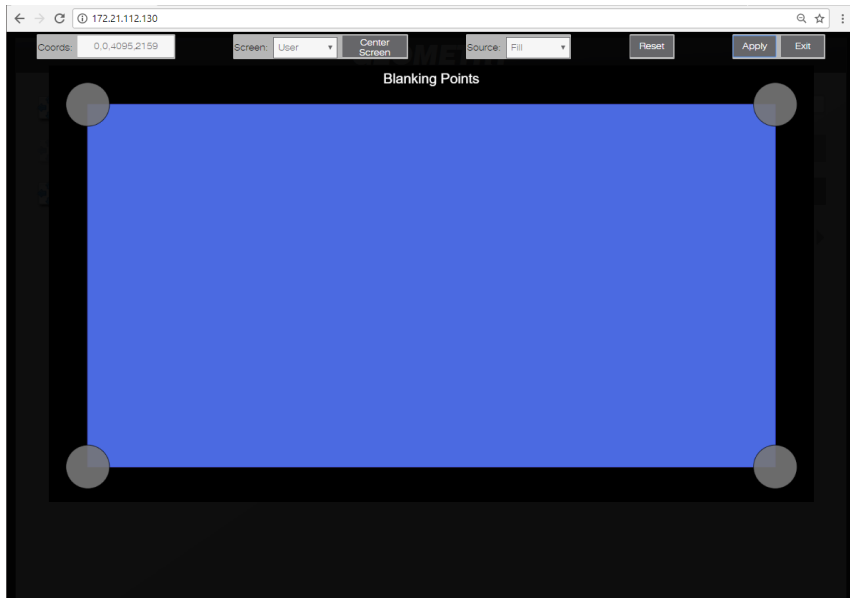
System Menu

- **Orientation**

  Choose from **Desktop Front**, **Ceiling Front**, **Desktop Rear** and **Ceiling Rear**.

- **Factory Reset**

  Restore factory default settings.

  Press **OK** when asked to confirm.

- **Main Menu**

  Return to the **Main** menu.

SYSTEM	
Orientation	Desktop Front ▾
Factory Reset	OK
Main Menu	▸
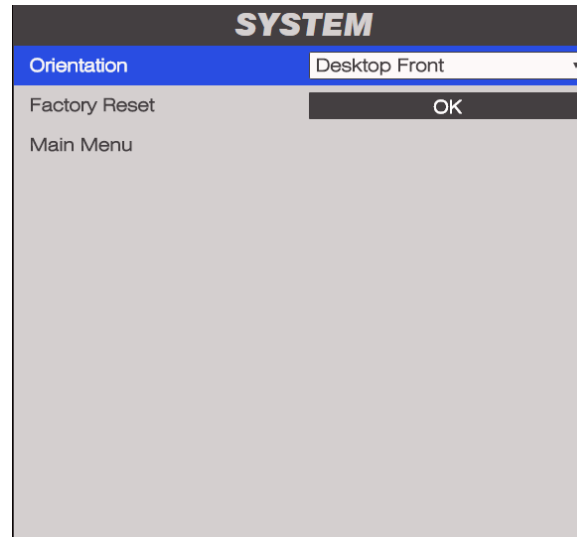
Notes

Information Menu

This menu gives information about laser operating times, network configuration, OSD software and hardware, system information such as model name and firmware version, and video configuration.

Open a submenu to see related information.

- **Main Menu**

    Return to the **Main** menu.

INFORMATION	
Laser Information	▶
Network Information	▶
OSD Information	▶
System Information	▶
Temperature Information	▶
Video Information	▶
Main Menu	▶
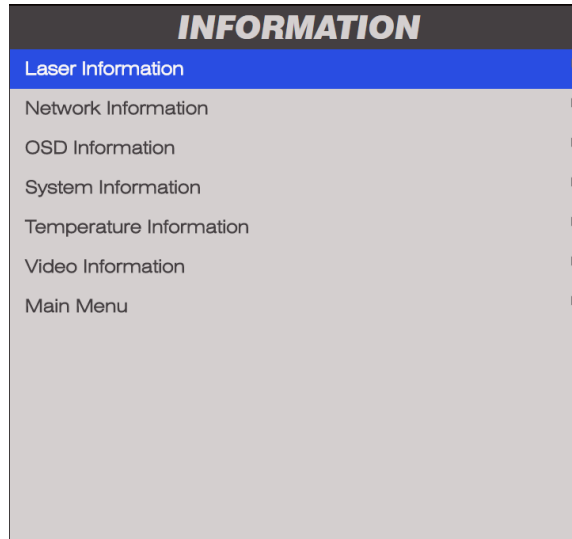
Notes

Laser Information

LASER INFORMATION	
Laser 1 Serial	0000
Laser 1 Starts	18
Laser 1 Hours	3:57
Laser 1 Temp	45
Laser 2 Serial	0000
Laser 2 Starts	18
Laser 2 Hours	3:57
Laser 2 Temp	44
Back	▸

Network Information

NETWORK INFORMATION

Enable DHCP	ON
Network Address	172.21.112.6
Subnet Mask	255.255.252.0
Router Version	2.0
Back	▶

Notes

OSD Information

OSD INFORMATION

OSD Software	0.7.6
OSD Hardware	▶
Back	▶

OSD Hardware

OSD HARDWARE

Board Type	0
Slot ID	224
Edition	31
Artwork	1
Mod State	251
Back	▶
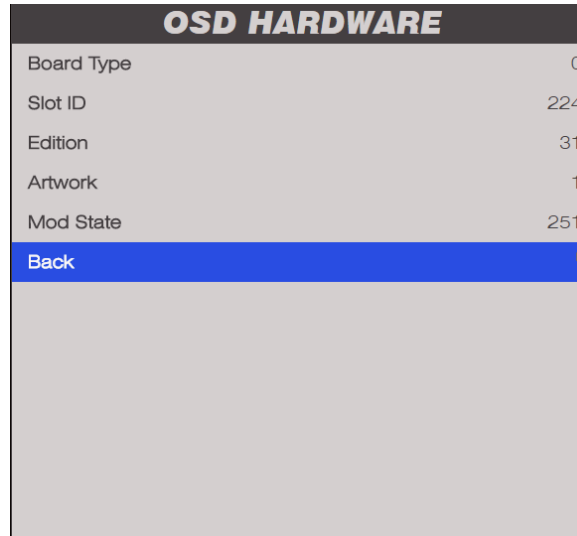
System Information

UDP logs

SYSTEM INFORMATION	
Model	Insight 4k Quad
Name	Insight 4k Quad DP11768
Serial No.	DP11768
Control Software	Version 75.00-Dev
Firmware	14
Factory ROM	3
Hardware	67
Lens Mount	MM_D01
UDP Logs	VIEW
Back	▶

Temperature Information

TEMPERATURE INFORMATION	
Laser 1 Temp	45°C
Laser 2 Temp	44°C
Inlet Temp	28°C
Back	▶

Video Information

VIDEO INFORMATION	
Video Software	35.0(1)
Video Board ID	ICP60 Rev C (2C)
Video Board Serial	00-0B-B9-06-54-F0
Sequences	10(25443)
Back	▸

DIGITAL PROJECTION

INSIGHT Dual Laser 4K Series
High Brightness Digital Video Projector

▶ REFERENCE GUIDE

IN THIS GUIDE

The DMD™

A DMD™ (Digital Micromirror Device™) is a true digital light modulator which utilises an array of approximately 8.8 million moving aluminium mirrors, with each one representing a pixel in the final projected image. The outermost micromirrors in the array remain inactive (*pond of mirrors*) and are not used in constructing the image.

1 **Casing**

2 **Light shield**

3 **Pond of mirrors**

4 **Array**

DMD™
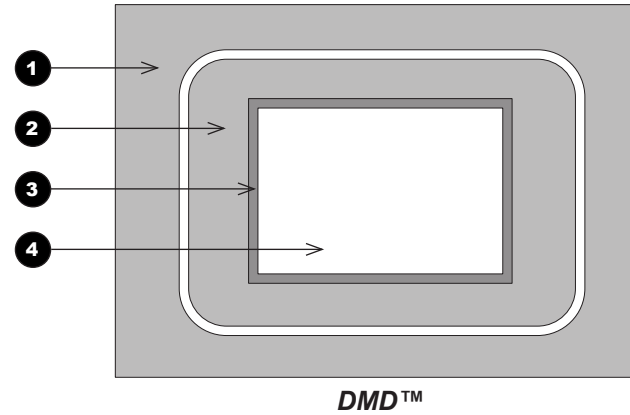
Each mirror element is suspended over address electrodes by a torsion hinge between two posts.

1 **Support posts**

2 **Mirror element**

3 **Torsion hinges**

4 **Offset address electrode**

Mirror element with tilt mechanism
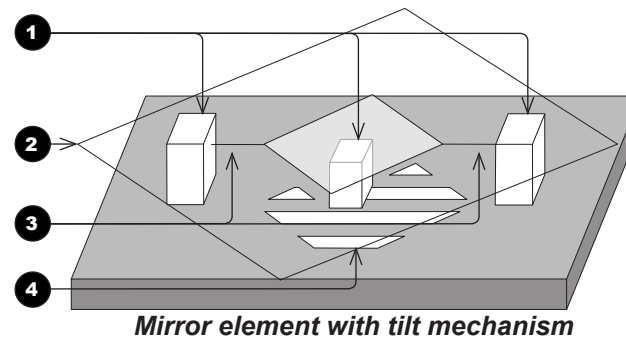
Depending on the voltage polarity applied, each mirror will either tilt to the left to produce a bright pixel or to the right for a dark pixel. When light is applied to the complete DMD™, only the light redirected from a mirror tilting to the left is projected.

1 **Projection lens**

2 **Incoming light from the illumination module**

3 **Mirror element tilted to the right**

4 **Mirror element tilted to the left**

5 **Reflected light, left tilt**

6 **Light dump**

7 **Reflected light, right tilt**

Light flow
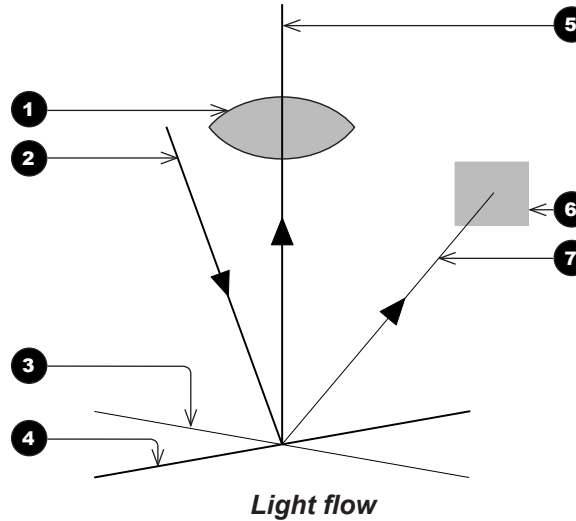
The projector optically filters white light from the illumination module into its constituent red, green and blue. Each color illuminates a separate DMD™ whose modulated output is then recombined with the other two to form the projected full color image.

1 **Illumination module**

2 **Optical filtering of light into red, green and blue**

3 **Projection lens**

4 **DMD™ devices**

5 **Full color image displayed on screen**

white light　　　RGB light

RGB

blue light　　green light　　red light

B　　　G　　　R
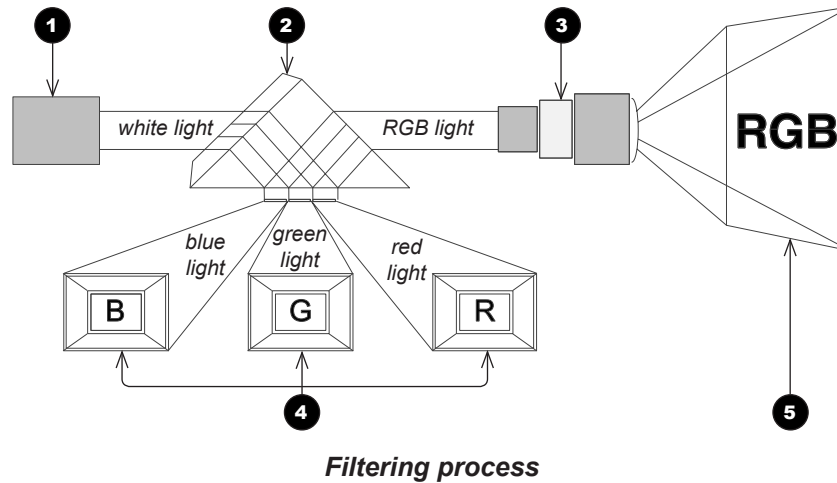
Filtering process

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	Lens extension (±2%)	Throw distance range
0.93 : 1 fixed lens	257 mm (10.1 in)	0.5 m - 40 m (1.6 ft - 130 ft)
1.13 - 1.72 : 1 zoom lens	225 mm (8.9 in)	2.5 m - 40+ m (8.2 ft - 130+ ft) at 1.13:1 0.5 m - 40+ m (1.6 ft - 130+ ft) at 1.72:1
1.65 - 2.60 : 1 zoom lens	195 mm (7.7 in)	3.5 m - 40+ m (11.5 ft - 130+ ft) at 1.65:1 1.0 m - 40+ m (3.3 ft - 130+ ft) at 2.60:1
2.53 - 4.98 : 1 zoom lens	195 mm (7.7 in)	1.5 m - 40+ m (4.9 ft - 130+ ft) at 2.53:1 4.5 m - 40+ m (14.8 ft - 130+ ft) at 4.98:1

To choose a lens, either calculate the **throw ratio** required, or use the **lens charts** provided at the end of this guide.

Notes

☞ *INSIGHT 4K zoom lenses are capable of covering throw distances greater than forty metres.*

☞ *The minimum throw of the zoom lenses changes depending on the throw ratio used.*

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

☞ *To choose a lens using lens charts, go to Appendix B at the end of this document.*

Screen Requirements

Fitting the image to the DMD™

The projector supports 4K and Ultra HD formats and is able to achieve 2K and 1080p via frame doubling.

2K and frame doubled 1080p will not utilize the full width of the DMD™, resulting in pillarboxing, as shown in the illustration.

true 4K (also pixel doubled 2K) = 4096 pixels

UHD (also pixel doubled 1080p) = 3840 pixels
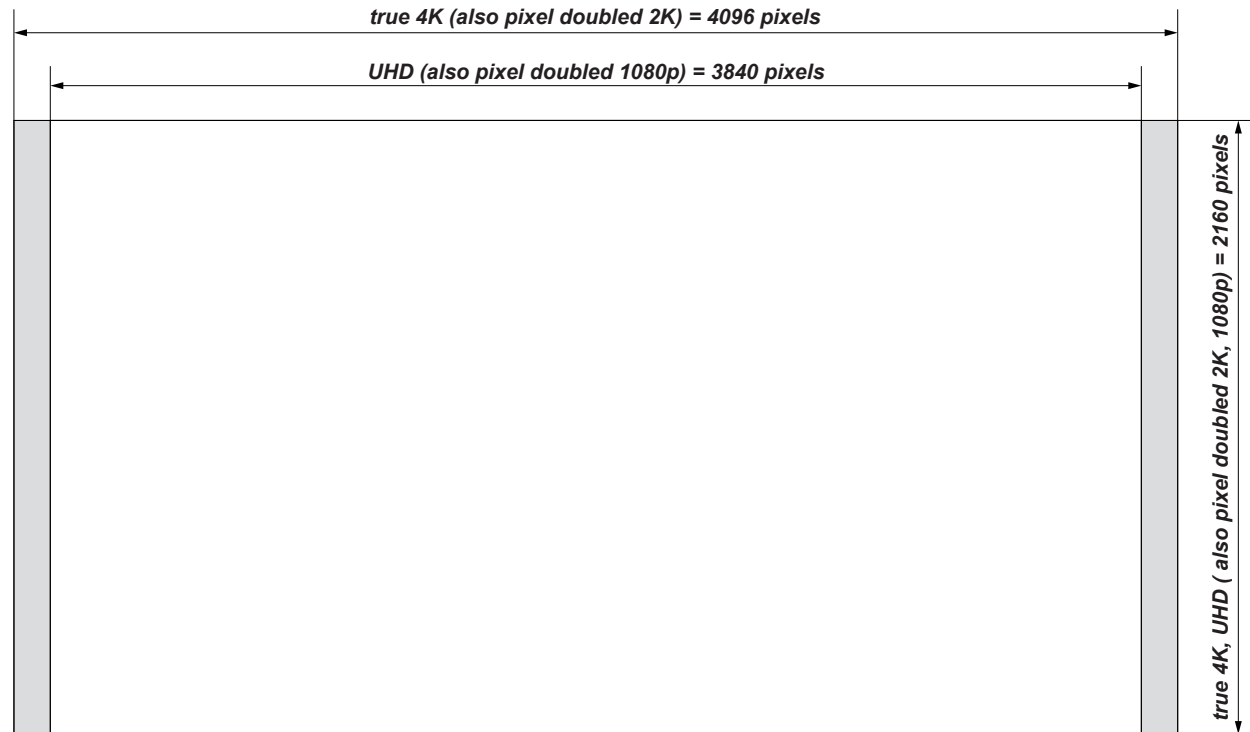
true 4K, UHD (also pixel doubled 2K, 1080p) = 2160 pixels

Diagonal screen sizes

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

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

TRUE 4K (approximately 1.9 : 1)
W = D x 0.88   *H* = D x 0.47

UHD (approximately 1.78 : 1)
W = D x 0.87   *H* = D x 0.49

W = width

H = height

D = diagonal
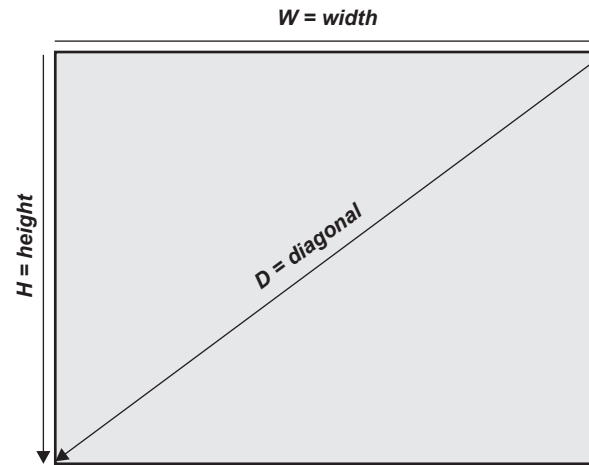
Fitting the image to the screen

It is important that your screen is of sufficient height and width to display images at all the aspect ratios you are planning to use.

Use the conversion chart to check that you are able to display the full image on your screen. If you have insufficient height or width, you will have to reduce the overall image size in order to display the full image on your screen.

1 **4K / 2K (1.9:1)**

W = H x 1.9, H = W x 0.53

2 **UHD / 1080p (16:9 = 1.78:1)**
W = H x 1.78, H = W x 0.56
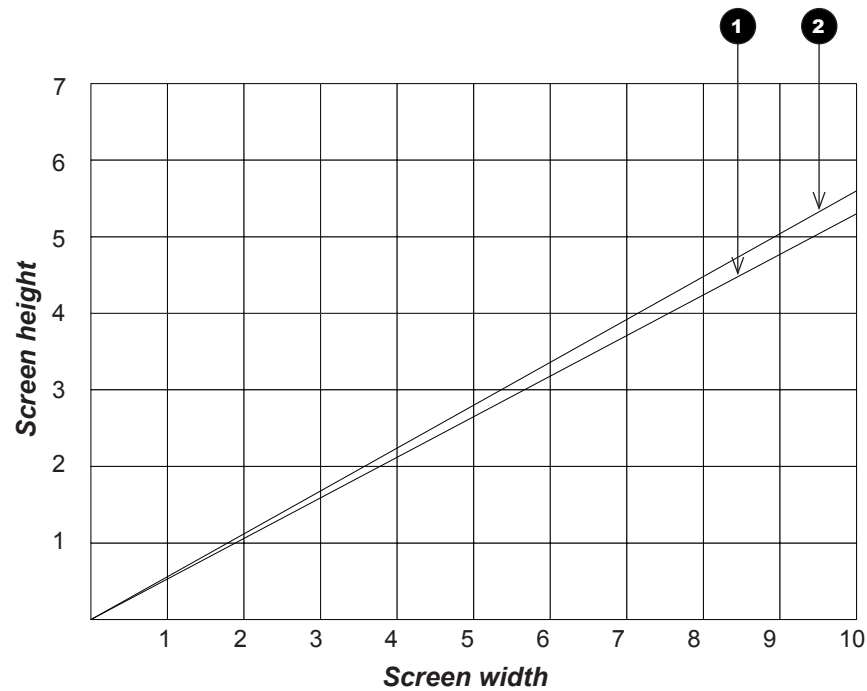
Notes

Positioning the screen and projector

For optimum viewing, the screen should be a flat surface perpendicular to the floor. The bottom of the screen should be 1.2 m (4 feet) above the floor and the front row of the audience should not have to look up more than 30° to see the top of the screen.

The distance between the front row of the audience and the screen should be at least twice the screen height and the distance between the back row and the screen should be a maximum of 8 times the screen height. The screen viewing area should be within a 60° range from the face of the screen.
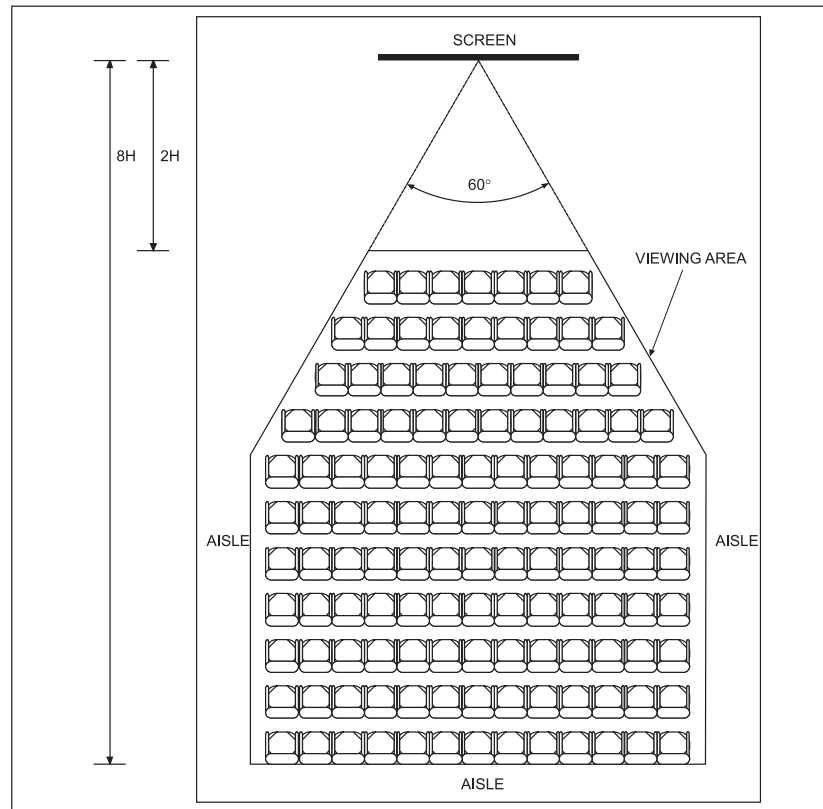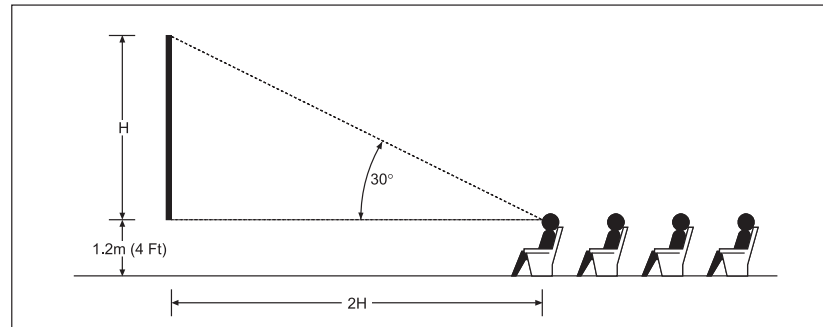
Notes

The projector should be installed as close to the power outlet as possible.

The power connection should be easily accessible, so that it can be disconnected in an emergency.

Ensure that there is at least 30 cm (12 in) of space between the ventilation outlets and any wall, and 10 cm (4 in) on all other sides.

Do not install the projector close to anything that might be affected by its operational heat, for instance, polystyrene ceiling tiles, curtains etc.

The image can be flipped for rear projection and displayed without the need for extra mirrors or equipment.

However, you must ensure that there is sufficient distance behind the screen for the projector to be correctly located.

Rear installation is generally more complicated and advice should be sought from your local dealer before attempting it.

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.
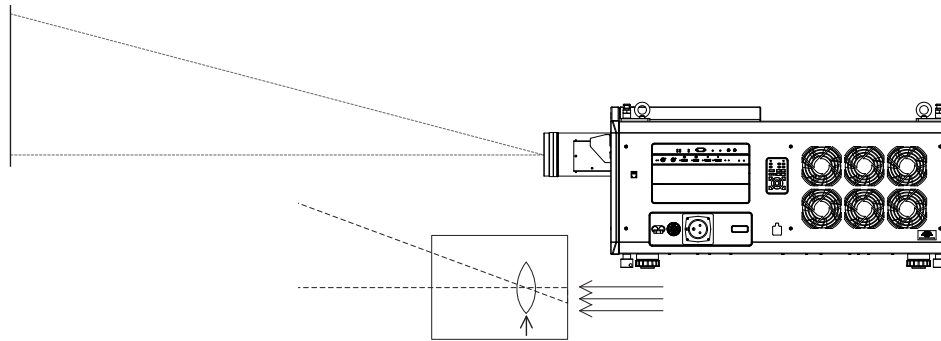
Shifting the lens up (rising front)

Centered lens

👉 *Whenever possible, position the projector so that the lens is centered for the highest quality image.*
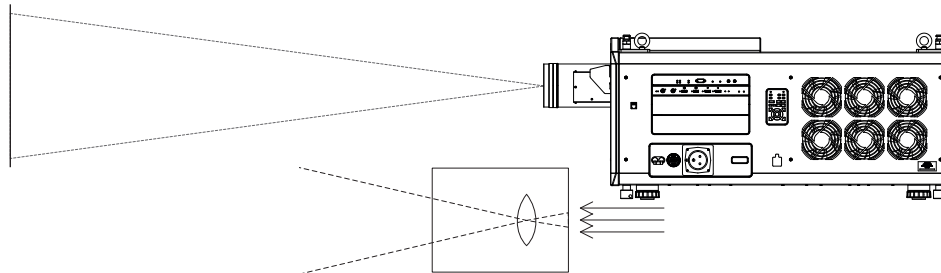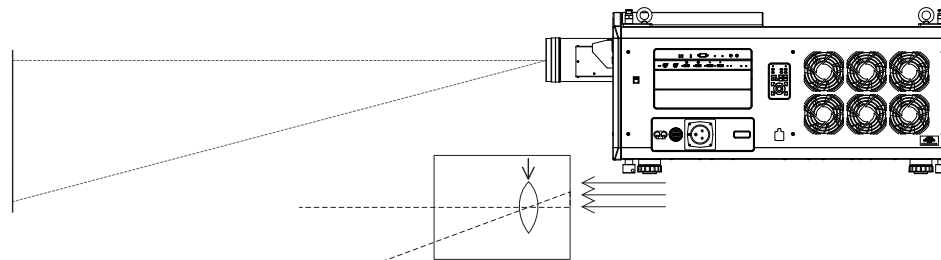
Shifting the lens down (falling front)

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.
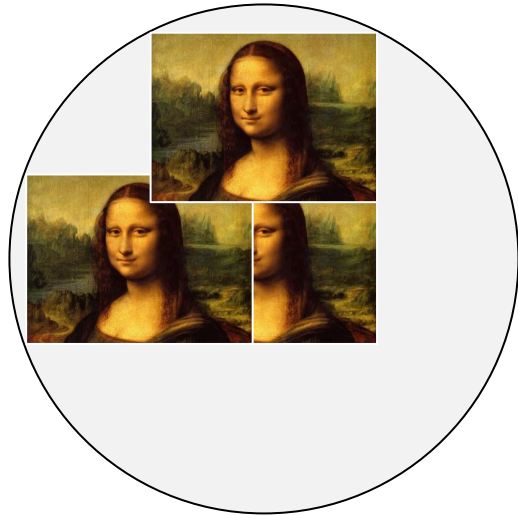
Full horizontal or vertical shift
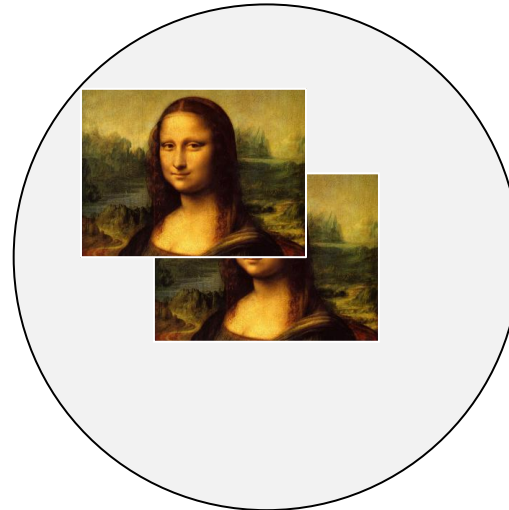
Combined shift is reduced

Maximum offset range

The maximum offset range available is dependent on which lens is used. Shifting the lens beyond its undistorted limits may be physically possible, however you may experience excessive vignetting or distortion.

		vertical (frame)	horizontal (frame)
0.93 : 1 fixed		±0.210	±0.080
1.13 - 1.72 : 1 zoom	at 1.13:1	0.340 U 0.190 D	0.085 L 0.100 R
	at 1.72:1	0.500 U 0.190 D	0.150 L 0.180 R
1.65 - 2.60 : 1 zoom	at 1.65:1	0.400 U 0.210 D	0.130 L 0.130 R
	at 2.60:1	0.500 U 0.200 D	0.150 L 0.190 R
2.53-4.98 :1 zoom	at 2.53:1	0.375 U 0.200 D	0.130 L 0.130 R
	at 4.98:1	0.500 U 0.195 D	0.165 L 0.165 R

Aspect Ratios Explained

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

- the DMD™ resolution, which is **4K** with a 4096 x 2160 resolution, corresponding to an aspect ratio of 256:135, or approximately 1.9:1.

- the aspect ratio of the input signal, which is **1.9:1** for 4K and 2K images, or **1.78:1** for UHD or 1080p images.

2K and 1080p are automatically scaled by the projector to fill the height of the DMD™.

The 4K and 2K resolutions have a slightly wider aspect ratio. UHD and scaled 1080p do not fill the width of the DMD™, so they appear centered, with pillarboxing at the sides, as shown in the illustration.
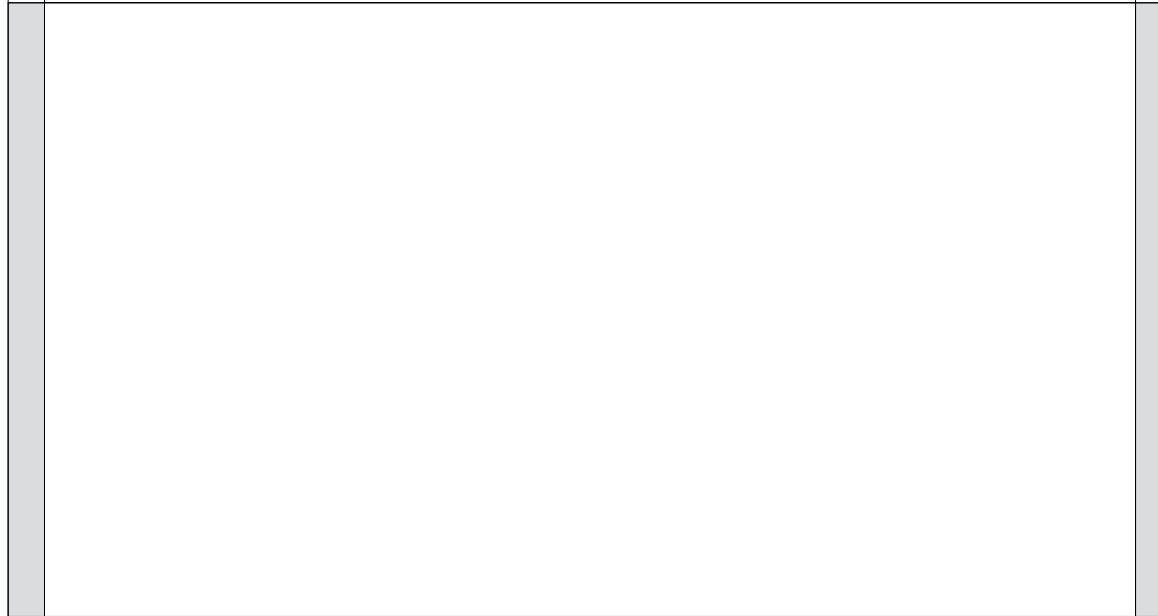
Pillarboxing on UHD and 1080p images

Appendix A: Lens Part Numbers

Lens	Part No.	Focus Range	Lens Shift	Lens extension
0.93:1 fixed	117-310	0.5 m - 40+ m	Vert: 0.210 (U) 0.210 (D) frame, Hor: 0.08 (L) 0.08 (R)	257 mm
1.13 - 1.72:1 zoom	115-627	*At 1.13:1 zoom:* 2.5 m - 100+ m	*At 1.13:1 zoom:* Vert: 0.340 (U) 0.190 (D) frame, Hor: 0.09 (L) 0.09 (R) frame	225 mm
		At 1.72:1 zoom: 0.5 m - 100+ m	*At 1.72:1 zoom:* Vert: 0.500 (U) 0.190 (D) frame, Hor: 0.16 (L) 0.16 (R) frame	
1.65 - 2.60:1 zoom	115-630	*At 1.65:1 zoom:* 3.5 m - 100+ m	*At 1.65:1 zoom:* Vert: 0.400 (U) 0.200 (D) frame, Hor: 0.13 (L) 0.13 (R) frame	195 mm
		At 2.60:1 zoom: 1.0 m - 100+ m	*At 2.60:1 zoom:* Vert: 0.500 (U) 0.200 (D) frame, Hor: 0.17 (L) 0.17 (R) frame	
2.53 - 4.98:1 zoom	115-632	*At 2.53:1 zoom:* 1.5 m - 100+ m	*At 2.53:1 zoom:* Vert: 0.375 (U) 0.200 (D) frame, Hor: 0.13 (L) 0.13 (R) frame	195 mm
		At 4.98:1 zoom: 4.5 m - 100+ m	*At 4.98:1 zoom:* Vert: 0.500 (U) 0.195 (D) frame, Hor: 0.16 (L) 0.16 (R) frame	

Notes

Appendix B: Lens Charts

How to use the lens charts

The lens charts on the following pages provide a quick guide to the type of lens needed for a particular projector.

To use the lens charts, you need the following information:

- The distance between the projector and the screen (throw distance)

- The maximum width of your screen

In the chart, find the point where the throw distance corresponds to the screen width, as shown in the example below.

1 Throw distance

2 Screen width
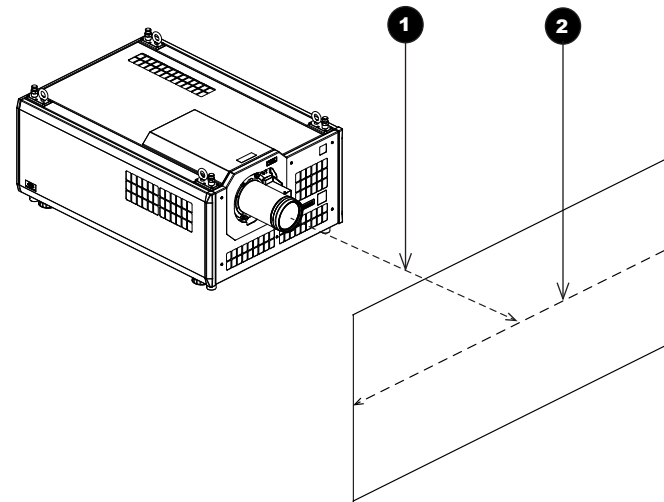
Example

For a projector with

- throw distance 30 m, and

- screen width 9 m,

the correct lens would be *number* **4** in the chart.
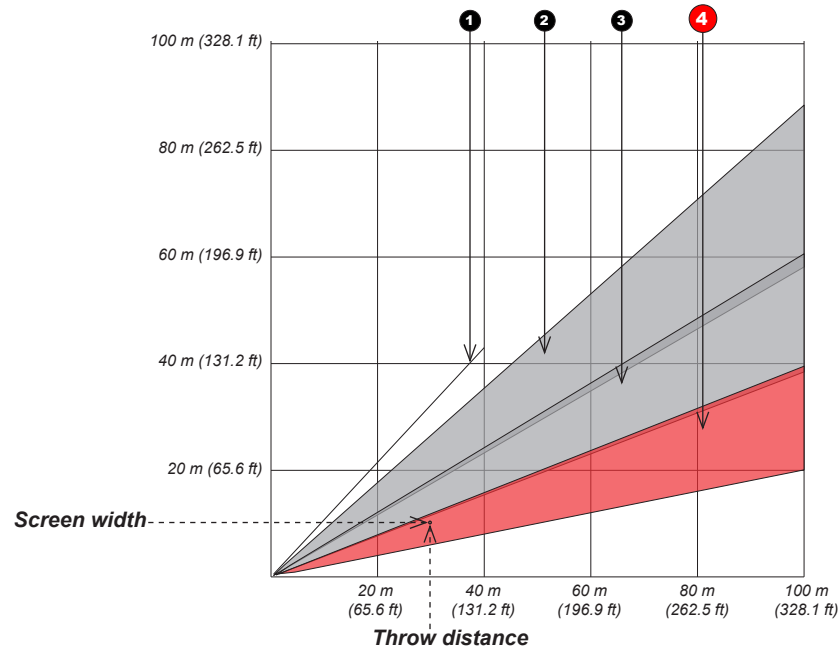
Notes

Lens chart, up to 100 m throw

1 0.93 : 1 fixed lens

2 1.13-1.72 : 1 zoom lens

3 1.65-2.60 : 1 zoom lens
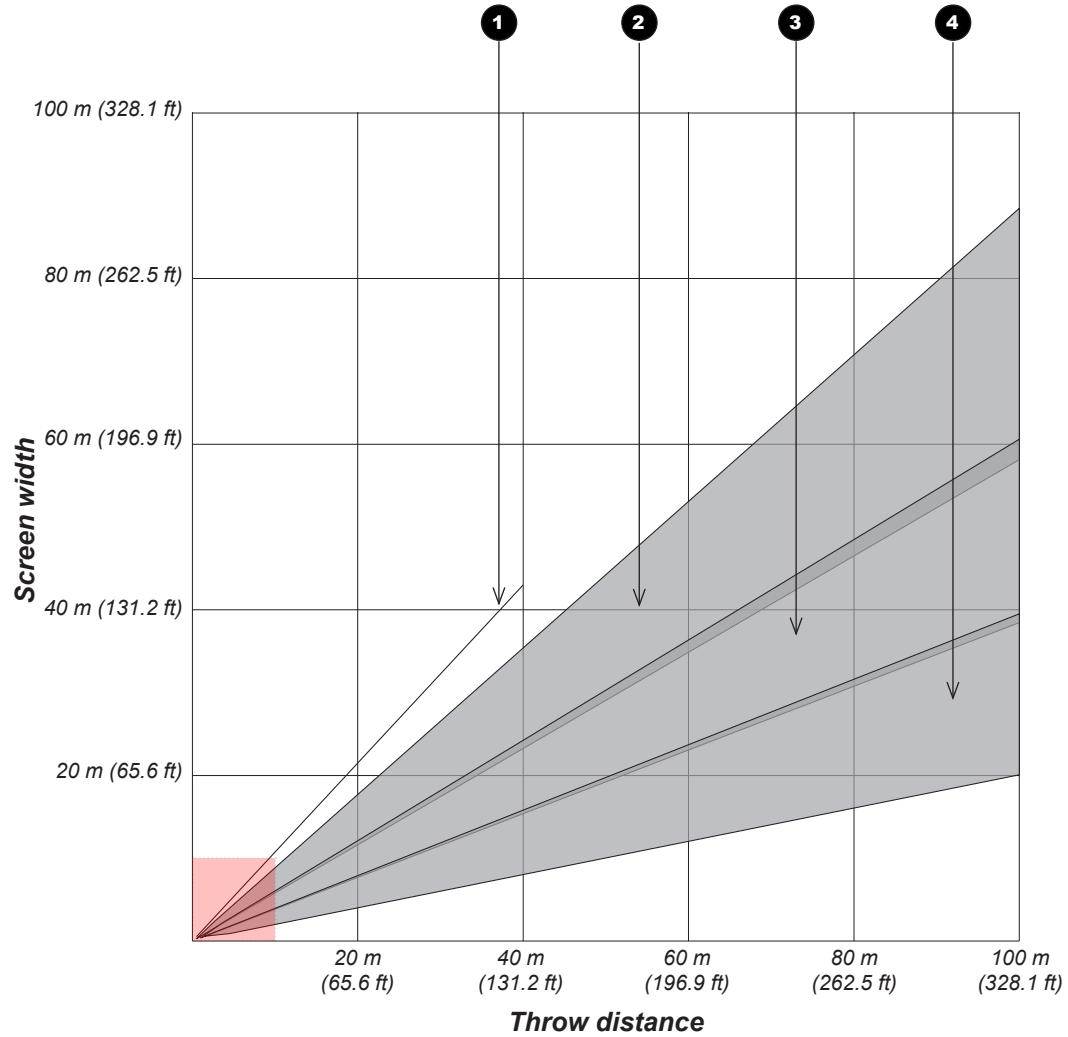
4 2.53-4.98 : 1 zoom lens

Notes

☞ *The semi-transparent red segment at the bottom left corner of the chart is shown on the next page in more detail.*

Lens chart, 10 m throw in detail

1 0.93 : 1 fixed lens

2 1.13-1.72 : 1 zoom lens

3 1.65-2.60 : 1 zoom lens

4 2.53-4.98 : 1 zoom lens
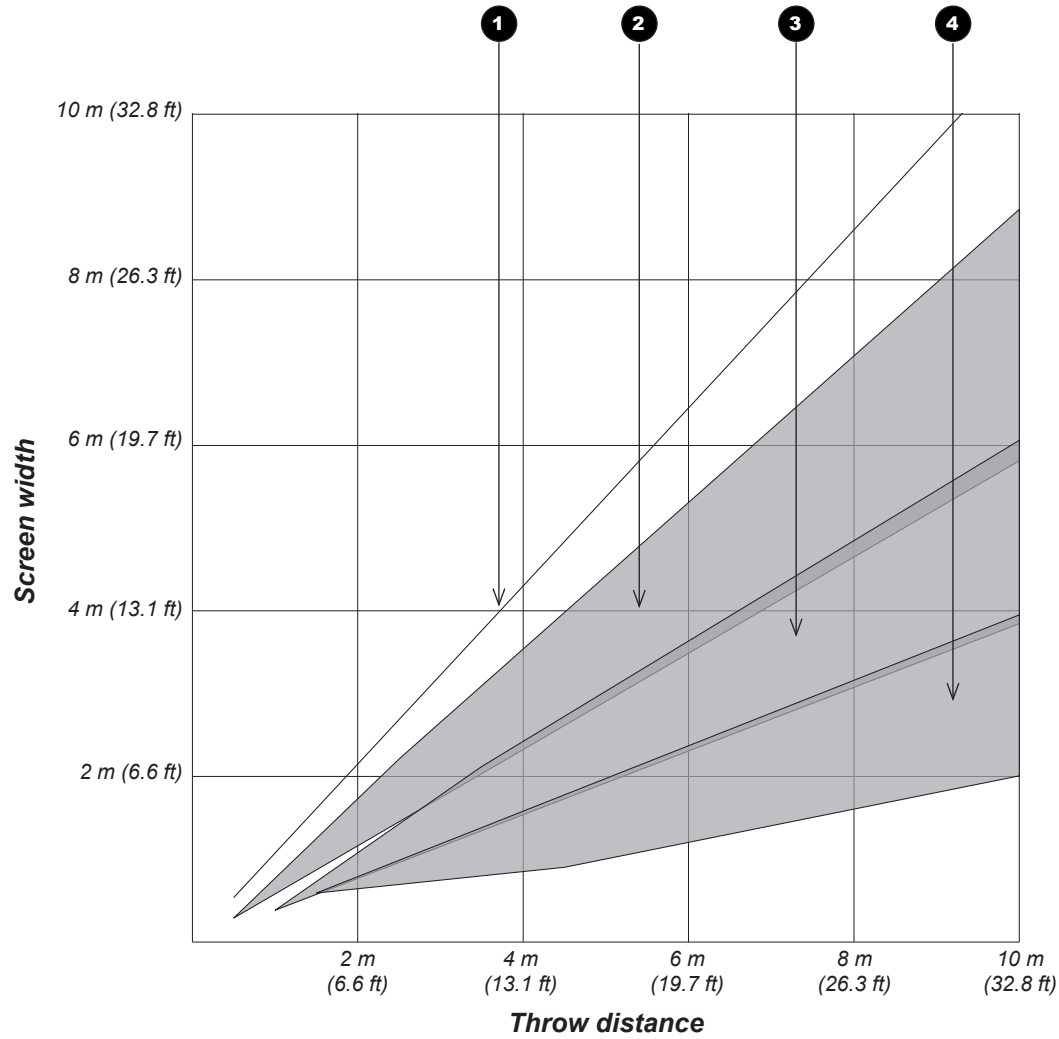
Notes

Appendix C: Supported Signal Input Modes

	Resolution	Color Model (YCrCb 4:2:2)	Color Model (RGB 4:4:4)	Max allowable Frame Rate Multiplier	Dual Pipe East-West	Dual Pipe Left-Right	3D Capability	Comments
HDMI 2.0	720p @ 24 Hz	✓	✓	x 3	—	—	Yes	Supports Deep Color
	1080p @ 24 Hz	✓	✓	x 3	—	—	Yes	Supports Deep Color
	3840 x 2160 @ 24 Hz	✓	✓	x 3	—	—	Yes	Supports Deep Color
	4096 x 2160 @ 24 Hz	✓	✓	x 3	—	—	Yes	Supports Deep Color
	720p @ 30 Hz	✓	✓	x 3	—	—	Yes	Supports Deep Color
	1080p @ 30 Hz	✓	✓	x 3	—	—	Yes	Supports Deep Color
	3840 x 2160 @ 30 Hz	✓	✓	x 3	—	—	Yes	Supports Deep Color
	720p @ 60 Hz	✓	✓	x 2	—	—	Yes	Supports Deep Color
	1080p @ 50/60 Hz	✓	✓	x 2	—	—	Yes	Supports Deep Color
	1080p @ 120 Hz	—	✓	x 1	—	—	Yes	Supports Deep Color
	3840 x 2160 up to 60 Hz	✓	✓	x 2	—	—	FrameSequential only	HDMI RGB 60 fps is limited to 8 bit.
	4096 x 2160 up to 60 Hz	✓	✓	x 2	—	—	FrameSequential only	

Notes

☞ INSIGHT Dual Laser 4K is capable of exceeding the **Rec. 709** gamut.

☞ HDMI formats up to 2K are automatically detected and converted to RGB, therefore the projector should be set to RGB. Formats over 2K are passed through to the video processing FPGA in their original color space: please select RGB or YCrCb as appropriate.

☞ HDMI receivers accept deep color and higher depth sources inline with HDMI standards. INSIGHT processing works at up to 12 bits per color (RGB in gamma space) and maps to a displayed palette of 16 bits per color (linear space).

☞ 24, 30, 50 and 60 Hz are nominal: the projector also accepts at least 23.98, 25, 48 and 59.94 Hz.

☞ Frame Sequential is accepted for 2K and 4K HDMI 3D sources. Frame packed, Top/Bottom and Side-by-Side formats are accepted for sources up to 1080p.

☞ Only HDMI A is enabled.

	Resolution	Color Model (YCrCb 4:2:2)	Color Model (RGB 4:4:4)	Max allowable Frame Rate Multiplier	Dual Pipe East-West	Dual Pipe Left-Right	3D Capability	Comments
DisplayPort 1.2	720p @ 24 Hz	—	✓	x 3	—	—		Up to 10 bit
	1080p @ 24 Hz	—	✓	x 3	—	—		Up to 10 bit
	3840 x 2160 @ 24 Hz	—	✓	x 3	—	—		Up to 10 bit
	4096 x 2160 @ 24 Hz	—	✓	x 3	—	—		Up to 10 bit
	720p @ 30 Hz	—	✓	x 3	—	—		Up to 10 bit
	1080p @ 30 Hz	—	✓	x 3	—	—		Up to 10 bit
	3840 x 2160 @ 30 Hz	—	✓	x 3	—	—		Up to 10 bit
	4096 x 2160 @ 30 Hz	—	✓	x 3	—	—		Up to 10 bit
	720p @ 60 Hz	—	✓	x 2	—	—		Up to 10 bit
	1080p @ 50/60 Hz	—	✓	x 2	—	—		Up to 10 bit
	3840 x 2160 @ 50/60 Hz	—	✓	x 2	—	—		Up to 10 bit
	4096 x 2160 @ 50/60 Hz	—	✓	x 2	—	—		8 bit
	2048 x 1080 up to 120 fps	—	✓	x 1	—	—		
	Up to 2048 x 2160 @ 60 Hz x2 (Dual Pipe)	—	✓	x 2	✓	—		Dual Pipe East-West up to 10 bit
	Up to 2048 x 2160 @ 30 Hz x2 (Dual Pipe)	—	✓	x 2	—	✓		Dual Pipe Left-Right up to 10 bit

Notes

☞ *INSIGHT Dual Laser 4K is capable of exceeding the **Rec. 709** gamut.*

☞ *DisplayPort receivers accept deep color and higher depth sources inline with DisplayPort 1.2 standards. INSIGHT processing works at up to 12 bits per color (RGB in gamma space) and maps to a displayed palette of 16 bits per color (linear space).*

☞ *DisplayPort formats up to 2048x1080 at up to 120 Hz can be accepted. These can be scaled 2:1 to best fit the DMD.*

Formats over 2048x1080 can have a maximum input rate of 60 fps and are multiplied in the formatter for 3D.

☞ *24, 30, 50 and 60 Hz are nominal: the projector also accepts at least 23.98, 25, 48 and 59.94 Hz.*

Appendix D: Wiring Details

Signal inputs - main connections panel

HDMI

19 way type A connector

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

HDMI: pin view of panel connector

DisplayPort

DisplayPort 1.2

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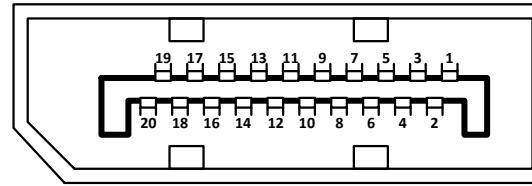
DisplayPort: pin view of panel connector

Notes

Control connections

LAN

RJ45 socket
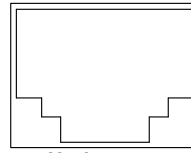
Update port

RS232

9 way D-type connector

Pin No.	RS-232C Signal Name	Functions as RS-232C	Projector Connector Operation
1	CD	Carrier detection	Not used (N.C.)
2	RXD	Reception data	Data transmission to an external device
3	TXD	Transmission data	Data reception from an external device
4	DTR	Data Terminal ready (Note)	Connection to 6 pins
5	GND	Signal GND	Signal GND
6	DSR	Data set ready (Note)	Connection to 4 pins
7	RTS	Transmission request	SYSTEM: Hi-Z (Not used) CINEMA: Hi-Z (Used)
8	CTS	Transmission available	SYSTEM: Fixed at -6.5 V (Not used) CINEMA: ±10.5 V (Used: Depends on communication status)
9	RI	Ring indicator	Not used (N.C.)

5　　　　1

9　　　　6
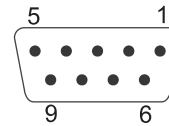
RS232:
pin view of female connector

3D Sync IN and 3D Sync OUT

75 ohm BNC

pin view of female connector

Notes

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

Appendix E: Glossary Of Terms

1080p

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

3D active glasses

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

3D passive glasses

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

Adjust lines

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

Anamorphic lens

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

Aperture

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

Aspect ratio

The proportional relationship between the width and the height of the projected image. It is represented by two numbers separated by a colon, indicating the ratio of image width and height respectively: for example, 16:9 or 2.35:1.

Not to be confused with *resolution*.

Blanking (projection)

The ability to intentionally turn off, that is, set to black, areas around the edges of the projected image. It is sometimes referred to as "curtains" since it can be used to blank an area of image that literally falls on the curtains at the side of the screen in a movie theater. Usually no image resizing or geometric correction takes place and the "blanked" part of the image is lost.

Not to be confused with horizontal and vertical *blanking (video signal)*.

Blanking (video signal)

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

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

Blend region

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

Brightness (electronic control)

A control which adds a fixed intensity value to every *pixel* in the display, moving the entire range of displayed intensities up or down, and is used to set the black point in the image (see *Contrast*).

Brightness (optical)

Describes how 'bright' an image that is projected onto a screen appears to an observer.

Color gamut

The spectrum of color available to be displayed.

Notes

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).

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.

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.

Dark time

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

DDC (Display Data Channel)

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

Deinterlacing

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

Notes

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 blend

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

Edge tear

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

EDID (Extended Display Identification Data)

Information stored in the projector that can be read by the source.

EDID is used on the HDMI, DVI and VGA inputs, allowing the source to automatically configure to the optimum display settings.

EDTV (Enhanced Definition Television)

A *progressive* digital television system with a lower resolution than *HDTV*.

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.

Notes

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.

Ghosting

An artifact in 3D image viewing. Ghosting occurs when an image intended for one eye is partially seen by the other eye.

Ghosting can be removed by optimizing the *dark time* and sync delay.

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.

Notes

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*.

Interlacing

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

Interleaving

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

LED (Light Emitting Diode)

An electronic component that emits light.

Letterboxing

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

Lumen

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

Noise

Electrical interference displayed on the screen.

Notes

Overlapping region

See *blend region*.

Pillarboxing

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

Pixel

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

Pond of mirrors

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

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).

Notes

RGB (Red, Green and Blue)

An uncompressed *Component Video* standard.

Scope

An *aspect ratio* of 2.35:1.

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.

Throw distance

The distance between the screen and the projector.

Throw ratio

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

TRC (Throw ratio correction)

A special number used in calculating *throw distances* and *throw ratios* when the image does not fill the width of the *DMD™*.

TRC is the ratio of the *DMD™ aspect ratio* to the image source aspect ratio:

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

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.

ZScreen

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

Notes

Technical Specifications

Digital Projection reserves the right to change product specifications without prior notice.

Models

The specifications on these pages refer to the following projector:

Series name
INSIGHT Dual Laser 4K

Color system: 3-chip DLP®

Display type: 3 x 1.38" DarkChip™ DMD™

DMD™ specification (native): 4096 x 2160 pixels, +/- 12° tilt angle

Fast transit pixels for smooth grayscale and improved contrast.

Inputs and outputs

Type	Connector	Qty
Video & Computer		
DisplayPort 1.2	DisplayPort	2
HDMI 1.4	HDMI	1

Type	Connector	Qty
Communication & Control		
3D Sync Out	BNC	1
3D Sync In	BNC	1
LAN	RJ45	1
RS232	9-pin D-Sub	1
Wired Remote In	3.5 mm Stereo Jack	1
Service Port	USB Type A	1

Bandwidth

N/A

Remote control and keypad

- Wired remote control
- On-board keypad with OSD

Notes

Automation control

- RS232

- LAN

Color temperature

- User selectable from 3,300 to 10,000K

Lenses

Detailed information about available lenses can be found in **Appendix A: Lens Part Numbers**.

Further information about lens offsets can be found in **Positioning The Image > Maximum offset range**.

Lens mount

- Motorised shift, zoom and focus. Intelligent Lens Memory with user-definable preset positions.

Mechanical mounting

- Front/Rear Table

- Front/Rear Ceiling

- Adjustable Front/Rear Feet

Orientation

- **Table Top or Inverted:**   Yes

- **Pointing Up:**   Yes

- **Pointing Down:**   Yes

- **Roll (Portrait):**   Yes

Notes

☞ *Information on lenses in this guide:*

- ***Appendix A: Lens Part Numbers** - detailed descriptions of available lenses.*

- ***Maximum offset range** - lens offsets.*

☞ *See also the lens calculator on the Digital Projection website.*

Electrical and physical specifications

- **Power requirements**   200-240 VAC, 50-60 Hz (single phase)

- **Power Consumption**   3,400 W

- **Thermal Dissipation**   11,602 BTU/hr

- **Fan Noise**   54 dBA

- **Operating Temperature**   0°C to 40°C (32 to 104F)

- **Storage Temperature**   -10°C to 50°C (14 to 122F)

- **Operating Humidity**   20% to 80% non-condensing

- **Weight**   100 kg (220 lb)

- **Dimensions**   H: 47.9 cm W: 72.2 cm L: 100.3 cm

    H: 18.9 in W: 28.4 in L: 39.5 in

Safety & EMC regulations

- CE, FCC Class A, UL, CCC

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