HIGHlite Laser II 3D 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.

🔗 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.

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

Congratulations on your purchase of this Digital Projection product.

Your projector has the following key features:

- Support for most 3D formats.
- HDBaseT® for transmission of uncompressed High Definition Video up to 100 m from the source.
- 3G-SDI with loop-through.
- Edge Blend.
- Blanking control for custom input window sizing.
- Cornerstone, Vertical & Horizontal Keystone, Pincushion & Barrel, and Image Rotation.
- Control via LAN and RS232.
- Motorised lens mount.

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

INSTALLATION AND QUICK-START GUIDE .............................................1

WHAT’S IN THE BOX? .................................................................3

CONNECTING THE POWER SUPPLY ........................................4
  Voltage selection ......................................................................4

PROJECTOR OVERVIEW ...........................................................5
  Front and rear views ................................................................5
  Control panel ..........................................................................6

REMOTE CONTROL ..................................................................7
  Infrared reception ..................................................................10

POSITIONING THE SCREEN AND PROJECTOR ............................11
  Roll and pitch .........................................................................12

CHANGING THE LENS ................................................................13
  The lens hood ..........................................................................13
  Inserting a new lens ................................................................14
  Removing the lens ...................................................................15

CHANGING THE FILTERS ..............................................................16

OPERATING THE PROJECTOR .....................................................17
  Switching the projector on .....................................................17
  Switching the projector off ....................................................17
  Selecting an input signal ........................................................18
  Selecting a test pattern ..........................................................18
  Adjusting the lens ...................................................................19
  Adjusting the image ...............................................................19

CONNECTION GUIDE ......................................................................21

SIGNAL INPUTS .............................................................................23
  Digital inputs and outputs .....................................................23
  Analog inputs and outputs ....................................................24
  EDID on the HDMI, DisplayPort and VGA inputs .................25
  Using HDMI/DisplayPort switchers with the projector ........25
  3D connections .......................................................................26
    3D sources up to 60Hz requiring frame doubling and left/right interleaving ........................................26
    Frame sequential 3D sources up to 120Hz .........................26
    Dual Pipe 3D ........................................................................26
  3D Sync ....................................................................................27
    3D Sync in ............................................................................27
    3D Sync out ..........................................................................27

CONTROL CONNECTIONS ..............................................................28
  LAN connection examples ......................................................29
  RS232 connection example ....................................................30
OPERATING GUIDE ................................................................. 31

USING THE MENUS .................................................................... 33
Opening the OSD ........................................................................ 33
Opening a menu .......................................................................... 33
Exiting menus and closing the OSD .............................................. 33
Inside a menu ............................................................................. 34
  Accessing sub-menus ................................................................. 34
  Executing commands ................................................................. 34
Editing projector settings ............................................................ 35
  Using a slider to set a value ...................................................... 35
  Editing numeric values ............................................................. 35

USING THE PROJECTOR ......................................................... 36
Main menu ................................................................................. 36
Lens menu ................................................................................. 37
  Lens Control ........................................................................... 37
  Lens Memory ........................................................................... 38
Image menu ................................................................................. 39
  Noise Reduction ....................................................................... 40
  Position and Phase ................................................................. 40
Color menu ................................................................................ 41
  Color Space ............................................................................ 41
  Color Mode ............................................................................ 42
Geometry menu .......................................................................... 47
  Aspect Ratio ........................................................................... 47
  Digital Zoom & Shift ............................................................... 49
  Overscan ................................................................................ 50
  Blanking ................................................................................ 51

Keystone .................................................................................. 52
4 Corners .................................................................................. 54
Rotation .................................................................................... 55
Pincushion / Barrel ..................................................................... 56
Edge Blend menu ....................................................................... 57
  Blend Width ............................................................................ 58
  Black Level Uplift .................................................................. 59
3D menu .................................................................................... 60
  3D types ................................................................................. 61
  Some 3D settings explained ................................................... 62
  Frame rate multiplication in 3D images .................................... 63
Laser menu ................................................................................. 64
Setup menu ............................................................................... 65
  ColorMax Setting .................................................................... 67
  Power On/Off ......................................................................... 68
  Clock Adjust .......................................................................... 69
  OSD Settings ......................................................................... 70
  Memory .................................................................................. 70
Network menu ............................................................................. 71
PIP menu .................................................................................... 72
Information menu ....................................................................... 73
  Signal Format .......................................................................... 73
  System Status ......................................................................... 74
  Thermal Status ........................................................................ 74
  Factory Reset .......................................................................... 75

POSSIBLE COMBINATIONS OF SETTINGS ........................................ 76
APPENDIX E: WIRING DETAILS ................................................................. 128
  Signal inputs and outputs ................................................................. 128
    VGA ............................................................................................... 128
    HDMI 1 and 2 ................................................................................. 129
    DisplayPort .................................................................................. 130
    3G-SDI In, 3G-SDI Out ........................................................... 131
    COMPONENT ............................................................................... 131
  Control connections ......................................................................... 132
    LAN ............................................................................................... 132
    RS232 .......................................................................................... 132
    Trigger 1 & Trigger 2 ................................................................. 133
    IR input ......................................................................................... 133
    3D Sync IN and 3D Sync OUT .................................................. 133

APPENDIX F: GLOSSARY OF TERMS ......................................................... 134

TECHNICAL SPECIFICATIONS ............................................................ 145
  Models ............................................................................................ 145
  Inputs and outputs .......................................................................... 146
  Bandwidth ....................................................................................... 146
  Remote control and keypad .......................................................... 146
  Automation control ......................................................................... 146
  Color temperature ........................................................................... 146
  Lenses ............................................................................................. 147
  Lens mount ....................................................................................... 147
  Mechanical mounting ...................................................................... 147
  Orientation ....................................................................................... 147
  Electrical and physical specifications ........................................ 148
  Safety & EMC regulations ............................................................ 148
HIGHlite Laser II 3D Series
High Brightness Digital Video Projector

INSTALLATION AND QUICK-START GUIDE
IN THIS GUIDE

What's In The Box? .................................................................................................................. 3
Connecting The Power Supply ................................................................................................ 4
  Voltage selection ................................................................................................................... 4
Projector Overview .................................................................................................................. 5
  Front and rear views .............................................................................................................. 5
Control Panel ............................................................................................................................ 6
Remote Control .......................................................................................................................... 7
  Infrared reception .................................................................................................................. 10
Positioning The Screen And Projector .................................................................................... 11
  Roll and pitch ....................................................................................................................... 12
Changing The Lens ................................................................................................................... 13
  The lens hood ....................................................................................................................... 13
  Inserting a new lens .............................................................................................................. 14
  Removing the lens .................................................................................................................. 15
Changing The Filters ............................................................................................................... 16
Operating The Projector ........................................................................................................... 17
  Switching the projector on .................................................................................................... 17
  Switching the projector off .................................................................................................... 17
  Selecting an input signal ....................................................................................................... 18
  Selecting a test pattern .......................................................................................................... 18
  Adjusting the lens .................................................................................................................. 19
  Adjusting the image .............................................................................................................. 19
What’s In The Box?

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

Only one remote will be supplied with the projector. For more information, see Remote Control further in this guide.

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.

Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.

For further information about using the right lens and hood, see The lens hood further in this guide.

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

Lift the cable lock up, push the mains connector in firmly and push the lock down to secure the cable.

1. AC mains inlet with cable lock

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

<table>
<thead>
<tr>
<th>Voltage of power supply used</th>
<th>Position of VOLTAGE SELECT switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC100V outlet</td>
<td>200 240V~</td>
</tr>
<tr>
<td></td>
<td>100 130V~</td>
</tr>
<tr>
<td>AC200V (single phase) outlet</td>
<td>200 240V~</td>
</tr>
<tr>
<td></td>
<td>100 130V~</td>
</tr>
</tbody>
</table>

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. Control panel
2. Connection panel
3. Air outlet
4. Lens hood
5. Front infrared window
6. Power switch and power connection
7. Air outlet
8. Rear infrared window
9. Air inlet
10. Adjustable feet

Notes

⚠️ Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.

🔧 For further information about using the right lens and hood, see The lens hood further in this guide.
Control Panel

1. **ON indicator (blue)**
   - **Behavior**: Off, On, Flashing
   - **Meaning**: The projector is switched off, ON, warming up or cooling down.

2. **ERROR indicator (red)**
   - **Behavior**: Flash once, then pause, Flash twice, then pause, Flash three times, then pause, Flash four times, then pause, On
   - **Meaning**: Laser failure, Cover open, Fan failure, Over temperature, System error.

3. **STANDBY indicator (green)**
   - **Behavior**: On, Flashing
   - **Meaning**: The projector is in STANDBY mode, it can be switched on with a network command.

4. **MENU button**
   - Access the projector OSD (on-screen display).

5. **Navigation (arrow buttons and ENTER)**
   - Navigate the OSD and edit settings with the arrows, confirm choice with ENTER.

6. **INPUT button**
   - Select input source.

7. **Focus IN / OUT**
   - Adjust focus.

8. **Zoom IN / OUT**
   - Adjust zoom.

9. **Shutter CLOSE / OPEN**
   - Open and close the shutter.

10. **POWER button**
    - Switch the projector on and off (in STANDBY mode)

11. **EXIT button**
    - Close the OSD.

12. **SHIFT button**
    - Press and hold this button, then press the arrow buttons to move the lens.

Notes
Remote Control

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

2. **Pic Mute OPEN / CLOSE**
   - Shows and hides the projected image.
   - When CLOSE is pressed, the light source switches off completely and the screen becomes black.

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

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

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

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

7. **FREEZE**
   - Freeze the current frame.

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

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

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

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

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

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

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

continues on next page...

Notes
For further information about user presets, see Memory in the Operating Guide.
17 DISPLAYPORT / R / numeric input 4
Select DisplayPort input.

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

19 3GSDI / B / numeric input 6
Select the 3G-SDI input.

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

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

22 COMP2 / PIP / numeric input 9
Select the Component 2 input.
Use with ALT to switch on Picture In Picture (PIP) mode.

23 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.
**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.
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.

- **Four adjustable feet**
- **Six M6 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 (20 in) of space between the ventilation outlets and any wall, and 30 cm (12 in) on all other sides.
- Do not stack more than 3 projectors.
**Roll and pitch**

The projector can be operated in numerous positions.

It is not recommended to position the projector in portrait mode with inputs facing upward, as shown in the diagram.

1. Positions to avoid: inputs side up
2. Recommended positions
Changing The Lens

The lens hood

There are two types of lens hood, short and long. The short lens hood is used with the following lenses:

<table>
<thead>
<tr>
<th>Throw ratios</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.77 : 1 fixed lens</td>
<td>110-808</td>
</tr>
<tr>
<td>1.16 : 1 fixed lens</td>
<td>110-809</td>
</tr>
<tr>
<td>1.45 - 1.74 : 1 zoom lens</td>
<td>110-803</td>
</tr>
<tr>
<td>1.74 - 2.17 : 1 zoom lens</td>
<td>112-878</td>
</tr>
<tr>
<td>2.17 - 2.90 : 1 zoom lens</td>
<td>113-852</td>
</tr>
<tr>
<td>2.90 - 4.34 : 1 zoom lens</td>
<td>110-806</td>
</tr>
</tbody>
</table>

The long lens hood must be used with the following long throw lens:

<table>
<thead>
<tr>
<th>Throw ratios</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.34 - 6.76 : 1 zoom lens</td>
<td>110-807</td>
</tr>
</tbody>
</table>

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.

Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens. The projector will not power on without the lens and lens hood fitted.
Inserting a new lens

1. Insert the lens into the lens aperture, making sure that the plug on the zoom drive mechanism lines up with socket on the right of the lens aperture.

2. Rotate the lens clockwise until it clicks into place.

3. Secure the lens hood to the front of the projector with the screws.

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.

- Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.

- The projector will not power on without the lens and lens hood fitted.
Removing the lens

1. Loosen the four screws securing the lens hood to the body of the projector. Remove the lens hood.

2. Push down the lens holder tab.

3. Rotate the lens anti-clockwise.

4. Pull the lens forward to remove it from the lens aperture.

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 and lens hood fitted.
Changing The Filters

1. Remove the two screws 1 holding the filter cover.
2. Remove the filter cover 2.
3. Remove the old filter 3.
4. Place the new filter in the slot. Make sure the air flow arrow 4 points toward the projector, as shown in the illustration.
5. Replace the filter cover 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.

🔍 In a normal environment the filters should be changed every 2000 hours.
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, CheckerBoard, CrossHatch, V Burst, H Burst, ColorBar, Screen Layout, Off*

- Alternatively, open the OSD by pressing **MENU**. Highlight **Test Patterns** from the main menu, then select a test pattern using the **LEFT** and **RIGHT** arrow buttons.

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

- press **TEST** or **EXIT** at any time.

---

**Notes**

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.

**Keystone**
- This 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

- When adjusting focus and zoom, you may find it useful to display the CrossHatch test pattern: press TEST on the remote control and navigate through the list of patterns using the LEFT and RIGHT arrow buttons.

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

Signal Inputs........................................................................................................... 23
  Digital inputs and outputs............................................................ 23
  Analog inputs and outputs.......................................................... 24
  EDID on the HDMI, DisplayPort and VGA inputs........................... 25
  Using HDMI/DisplayPort switchers with the projector ................. 25
3D connections .................................................................................. 26
  3D sources up to 60Hz requiring frame doubling and left/right interleaving .... 26
  Frame sequential 3D sources up to 120Hz.................................. 26
  Dual Pipe 3D ........................................................................... 26

3D Sync ...................................................................................... 27
  3D Sync in .......................................................................... 27
  3D Sync out ......................................................................... 27

Control Connections ........................................................................ 28
  LAN connection examples ................................................. 29
  RS232 connection example............................................. 30
**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 I**
   HDMI 1.4a input. Connect an HDMI cable to the connector.

5. **HDMI II**
   HDMI 1.4a input. Connect an HDMI cable to the connector.

6. **DisplayPort**
   DisplayPort 1.1a input. Connect a DisplayPort cable to the connector.
   Supports sources up to 1920x1200 resolution, 24-120 Hz. Supports HDCP.

---

**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.

- The projector can receive 100/120Hz and display 3D at 100/120Hz.

- For a complete listing of all supported signal input modes, see Appendix C: Supported Signal Input Modes in the Reference Guide.

- For a complete listing of pin configurations for all signal and control connectors, see Appendix E: Wiring Details in the Reference Guide.
Analog inputs and outputs

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

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

Notes

- For a complete listing of all supported signal input modes, see Appendix C: Supported Signal Input Modes in the Reference Guide.
- For a complete listing of pin configurations for all signal and control connectors, see Appendix E: Wiring Details in the Reference Guide.
**EDID on the HDMI, DisplayPort and VGA 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 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.

*The EDIDs in the switcher should be the same as the one in the projector.*
3D connections

3D sources up to 60Hz requiring frame doubling and left/right interleaving
1. Connect to either of the following inputs on the connection panel:
   • HDMI 1
   • HDMI 2
   • HDBaseT
2. Set 3D Format in the 3D menu to match the format of the incoming signal. Choose from Auto, Side by Side (Half) and Top and Bottom.
   The Frame Packing format is automatically detected by the projector.

Frame sequential 3D sources up to 120Hz
• Connect to the DisplayPort input.
   The Frame Sequential format is automatically detected by the projector and is supported on the DisplayPort input only.

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

**3D Sync in**
Sync input signal – normally only required for Sequential 3D sources.
- Connect the 3D sync from your graphics card or server.

**3D Sync out**
Sync output signal. This may be affected by the **Sync Offset** setting in the **3D Control** menu.
Connect this to your IR emitter or ZScreen.

---

**Notes**

For a complete listing of pin configurations for all signal and control connectors, see Appendix E: Wiring Details in the Reference Guide.

The projector can be used with active 3D glasses. Passive 3D glasses such as polarized and split wavelength glasses cannot be used with this projector.
Control Connections

1. **LAN**
   - All of the projector’s features can be controlled via a LAN connection, using commands described in the Protocol Guide.
   - Use a crossed LAN cable to connect directly to a computer, or an uncrossed cable to connect to a network hub.
   - This connection is also used by the HDBaseT input.

2. **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.

3. **RS232**
   - All of the projector’s features can be controlled via a serial connection, using commands described in the Protocol Guide.
   - Use a straight-through cable to connect directly to a computer.

4. **Wired Remote**
   - The remote control can be connected using a standard TRS cable.

Notes

- For simultaneous HDBaseT and LAN connectivity, a third-party distribution product can be utilized to combine HDBaseT video stream with LAN connection for delivery to the projector.
- For a list of all commands used to control the projector via LAN, see the Protocol Guide.
- For a complete listing of pin configurations for all signal and control connectors, see Appendix E: Wiring Details in the Reference Guide.
- Only one remote connection (RS232 or LAN) should be used at any one time.
**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.

![Diagram of LAN connections]

**Notes**

*Projector Controller* is available for download, free of charge, from the Digital Projection website.
RS232 connection example

Connection Guide
# IN THIS GUIDE

## Using The Menus
- Opening the OSD .......................................................... 33
- Opening a menu ............................................................... 33
- Exiting menus and closing the OSD ................................. 33
- Inside a menu .................................................................. 34
  - Accessing sub-menus .................................................. 34
  - Executing commands ................................................... 34
- Editing projector settings .................................................. 35
  - Using a slider to set a value .......................................... 35
  - Editing numeric values .................................................. 35

## Using The Projector
- Main menu ....................................................................... 36
- Lens menu ......................................................................... 37
  - Lens Control ................................................................. 37
  - Lens Memory ................................................................. 38
- Image menu ...................................................................... 39
  - Noise Reduction .......................................................... 40
  - Position and Phase ........................................................ 40
- Color menu ...................................................................... 41
  - Color Space ................................................................. 41
  - Color Mode ................................................................. 42
- Geometry menu ............................................................... 47
  - Aspect Ratio ............................................................... 47
  - Digital Zoom & Shift ................................................... 49
  - Overscan ................................................................. 50
  - Blanking ................................................................. 51
  - Keystone ................................................................. 52
  - 4 Corners ................................................................. 54
  - Rotation ................................................................. 55

## Possible Combinations Of Settings

- Pincushion / Barrel ........................................................ 56
- Edge Blend menu ............................................................. 57
  - Blend Width .............................................................. 58
  - Black Level Uplift ........................................................ 59
- 3D menu ......................................................................... 60
  - 3D types ..................................................................... 61
  - Some 3D settings explained .......................................... 62
  - Frame rate multiplication in 3D images ......................... 63
- Laser menu ..................................................................... 64
- Setup menu ..................................................................... 65
  - ColorMax Setting ........................................................ 67
  - Power On/Off ............................................................. 68
  - Clock Adjust .............................................................. 69
  - OSD Settings ............................................................. 70
  - Memory ................................................................. 70
- Network menu ................................................................. 71
- PIP menu ........................................................................ 72
- Information menu .......................................................... 73
  - Signal Format ............................................................ 73
  - System Status ............................................................ 74
  - Thermal Status ........................................................... 74
  - Factory Reset ............................................................. 75

## Possible Combinations Of Settings

- Some settings explained ................................................. 76
**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.
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.

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.
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, CheckerBoard, CrossHatch, V Burst, H Burst, ColorBar, Plunge...
  Use the LEFT ◄ and RIGHT ► arrow buttons to switch between values.

• Lens, Image, Color, Geometry, Edge Blend, 3D, Laser, Setup and Network
  Press ENTER/OK to open these menus and access various settings.

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

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

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

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 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

![LaTeX](/image.png)

When adjusting focus and zoom, you may find it useful to display the **CrossHatch** test pattern: press **TEST** on the remote control and navigate through the list of patterns using the **LEFT ◀** and **RIGHT ▶** arrow buttons.
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

The Lens Memory function is only available with memory enabled lenses.
Image menu

• **Dynamic Black**
  Set to On to allow for increased contrast in darker scenes by modulating the light source.

• **Gamma**
  Choose a de-gamma curve from 1.0, 1.8, 2.0, 2.2, 2.35, 2.5, S-Curve and DICOM.
  Used correctly, the Gamma setting can improve contrast while maintaining good details for blacks and whites.
  If excess ambient light washes out the image and it is difficult to see details in dark areas, lower the Gamma setting to compensate. This improves contrast while maintaining good details for blacks. Conversely, if the image is washed out and unnatural, with excessive detail in black areas, increase the setting.
  S-Curve is an enhanced mid-tone gamma.
  DICOM is a simulated DICOM display, which can be used for training applications.

• **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, Position and Phase**
  These items open sub-menus, see next page.

• **Freeze**
  Freezes the current frame.
  Press again to unfreeze.

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

<table>
<thead>
<tr>
<th>Image</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Black</td>
<td>Off</td>
</tr>
<tr>
<td>Gamma</td>
<td>2.2</td>
</tr>
<tr>
<td>Brightness</td>
<td>100</td>
</tr>
<tr>
<td>Contrast</td>
<td>100</td>
</tr>
<tr>
<td>Saturation</td>
<td>100</td>
</tr>
<tr>
<td>Hue</td>
<td>100</td>
</tr>
<tr>
<td>Sharpness</td>
<td>10</td>
</tr>
<tr>
<td>Noise Reduction</td>
<td></td>
</tr>
<tr>
<td>Position and Phase</td>
<td></td>
</tr>
</tbody>
</table>

Notes

- Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.

Noise Reduction and Position and Phase are only available when the projector is connected to an analog VGA source.
Image menu continued from previous page

Noise Reduction

- **Temporal**
  A time-based filter that removes the noise on the luminance component.

- **Block**
  This filter helps reduce block noise, which appears like small blocks in the image and is caused by MPEG compression.

- **Mosquito**
  This filter helps reduce mosquito noise, which appears around the edges of the image and is caused by the image compression algorithm.

- **Horizontal, Vertical**
  These filters soften the image.

- **Reset**

Position and Phase

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

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

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

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

Highlight the setting you wish to edit, and then press ENTER/OK, or the LEFT or RIGHT arrow button to open the slider.

Use the LEFT and RIGHT arrow buttons to adjust the slider.

Press EXIT to close the slider and return to the menu, or MENU to exit both the slider and the menu.

### Noise Reduction

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporal</td>
<td>2</td>
</tr>
<tr>
<td>Block</td>
<td>0</td>
</tr>
<tr>
<td>Mosquito</td>
<td>0</td>
</tr>
<tr>
<td>Horizontal</td>
<td>0</td>
</tr>
<tr>
<td>Vertical</td>
<td>0</td>
</tr>
<tr>
<td>Reset</td>
<td>0</td>
</tr>
</tbody>
</table>

### Position and Phase

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V Position</td>
<td>100</td>
</tr>
<tr>
<td>H Position</td>
<td>100</td>
</tr>
<tr>
<td>Phase</td>
<td>100</td>
</tr>
<tr>
<td>Tracking</td>
<td>100</td>
</tr>
<tr>
<td>Sync Level</td>
<td>100</td>
</tr>
</tbody>
</table>

Notes

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

Adjust the Phase after adjusting Tracking.
**Color 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*.
**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.
**Manual Color Matching**

1. Set **Color Mode** to **Manual Color Matching**.

2. Open the **Manual Color Matching** submenu.

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

---

### Manual Color Matching — Red

- **Hue**: 100
- **Saturation**: 100
- **Gain**: 100

### Manual Color Matching — White

- **Red**: 100
- **Green**: 100
- **Blue**: 100

---

**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.
**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).

### Color

<table>
<thead>
<tr>
<th>Color Space</th>
<th>Auto</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color Mode</td>
<td>Color Temperature</td>
</tr>
<tr>
<td>ColorMax</td>
<td>Peak</td>
</tr>
<tr>
<td>Manual Color Matching</td>
<td>Native</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>Native</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gains and Lifts</th>
</tr>
</thead>
<tbody>
<tr>
<td>3200K</td>
</tr>
<tr>
<td>5400K</td>
</tr>
<tr>
<td>6500K</td>
</tr>
<tr>
<td>7500K</td>
</tr>
<tr>
<td>9300K</td>
</tr>
<tr>
<td>Native</td>
</tr>
</tbody>
</table>

---

**Notes**

Some settings may be unavailable depending on other settings. For more information, see **Possible Combinations Of Settings** further in this guide.
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.

<table>
<thead>
<tr>
<th>Gains and Lifts</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Lift</td>
<td></td>
</tr>
<tr>
<td>Green Lift</td>
<td></td>
</tr>
<tr>
<td>Blue Lift</td>
<td></td>
</tr>
<tr>
<td>Red Gain</td>
<td></td>
</tr>
<tr>
<td>Green Gain</td>
<td></td>
</tr>
<tr>
<td>Blue Gain</td>
<td></td>
</tr>
<tr>
<td>Reset</td>
<td></td>
</tr>
</tbody>
</table>
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 Screen Setting feature (Setup menu) to define the screen aspect ratio. It will enable the aspect ratio defined here best fit the actual screen.

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

Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.

Some combinations of aspect ratios (selected from Geometry > Aspect Ratio and from Setup > Screen Setting) may result in black bars all around the image: letterboxing and pillarboxing due to the disagreeing width and height of image and frame.

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 & Shift**

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.

![Digital Zoom & Shift settings](image)

**Notes**

Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
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.

---

### Geometry

<table>
<thead>
<tr>
<th>Aspect Ratio</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Zoom &amp; Shift</td>
<td></td>
</tr>
<tr>
<td>Overscan</td>
<td>Off</td>
</tr>
<tr>
<td>Blanking</td>
<td>Off</td>
</tr>
<tr>
<td>Keystone</td>
<td>Crop</td>
</tr>
<tr>
<td>4 Corners</td>
<td>Zoom</td>
</tr>
<tr>
<td>Rotation</td>
<td></td>
</tr>
<tr>
<td>Pincushion / Barrel</td>
<td></td>
</tr>
<tr>
<td>Custom Warp</td>
<td>Off</td>
</tr>
</tbody>
</table>

---

**Notes**

Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
Geometry menu continued from previous page

Blanking

Use this feature to:

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

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

Use the Reset command to restore blanked edges.

<table>
<thead>
<tr>
<th>Blanking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
</tr>
<tr>
<td>Bottom</td>
</tr>
<tr>
<td>Left</td>
</tr>
<tr>
<td>Right</td>
</tr>
<tr>
<td>Reset</td>
</tr>
</tbody>
</table>

Notes

Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
Geometry menu continued from previous page

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

Keystone example
1. The projector is positioned at an angle
2. The resulting image is distorted
3. The image is corrected when Keystone is applied

<table>
<thead>
<tr>
<th>Keystone</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>H Keystone</td>
<td>0</td>
</tr>
<tr>
<td>V Keystone</td>
<td>0</td>
</tr>
<tr>
<td>Rotation</td>
<td>0</td>
</tr>
<tr>
<td>Reset</td>
<td></td>
</tr>
</tbody>
</table>

Notes
Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
Geometry menu continued from previous page

Keystone settings

1. Projector to the left
   The projector is positioned to the left of the screen. To correct, apply a positive Horizontal Keystone value using the RIGHT arrow button.

2. Projector to the right
   The projector is positioned to the right of the screen. To correct, apply a negative Horizontal Keystone value using the LEFT arrow button.

3. Projector high
   The projector is positioned above the screen at a downward angle. To correct, apply a negative Vertical Keystone value using the DOWN arrow button.

4. Projector low
   The projector is positioned below the screen at an upward angle. To correct, apply a positive Vertical Keystone value using the UP arrow button.

5. Projector straight
   The projector is directly opposite the screen at a right angle both horizontally and vertically. No correction is needed.

Notes

Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
Geometry menu continued from previous page

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

Top Right Corner example
In this illustration, the top right corner requires both horizontal and vertical correction.

Top Right Corner adjustment

<table>
<thead>
<tr>
<th>Top Right Corner Adjustment</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Right Corner x</td>
<td>▼</td>
<td>0</td>
</tr>
<tr>
<td>Top Right Corner y</td>
<td>▲</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes

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

- Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
Geometry menu continued from previous page

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

Rotation example

1  DMD™ area
   The DMD™ is not rotated. It still covers the area that would be occupied by the image without correction.

2  Rotated image
   The image is smaller than the surrounding DMD™ area. It is scaled in order to remain within the DMD™ area.

3  Angle of rotation
   The angle equals a quarter of the Rotation setting.
   In this example the angle is 5°, therefore Rotation = 20.

Notes

Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
Geometry menu continued from previous page

**Pincushion / Barrel**

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

Use the **Pincushion / Barrel** control to compensate electronically for such distortions. You can also use this menu to make simple panoramic screen corrections without using external processors.

<table>
<thead>
<tr>
<th>Pincushion / Barrel</th>
<th>H Pin/Barrel</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>V Pin/Barrel</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keystone</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pincushion / Barrel example**

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

---

**Notes**

Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
Edge Blend menu
Use this menu to blend together images from an array of two or more projectors.

The feature feathers the light output of the projector within the edges that overlap with other projectors in the array: as a result, the overlapping edges are evenly lit and easily blend in with the rest of the image.

- **Edge Blend**
  Enable and disable Edge Blend

- **Align Pattern**
  Add markers to the image showing the edges of the blend area and making the overlaps more visible to help adjust the physical position of the projectors in the array.

- **Blend Width**
  Determine the width of the blended regions.

- **Black Level Uplift**
  Adjust black levels to compensate if the blended regions appear brighter than the rest of the image.

- **Reset**
  Reset all Edge Blend settings to their factory default values.

<table>
<thead>
<tr>
<th>Edge Blend</th>
<th>On</th>
</tr>
</thead>
<tbody>
<tr>
<td>Align Pattern</td>
<td>Off</td>
</tr>
<tr>
<td>Blend Width</td>
<td></td>
</tr>
<tr>
<td>Black Level Uplift</td>
<td></td>
</tr>
<tr>
<td>Reset</td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

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

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

- Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.
**Edge Blend menu continued from previous page**

**Blend Width**

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

![Diagram showing blend width settings](image)

### Notes

Some settings may be unavailable depending on other settings. For more information, see [Possible Combinations Of Settings](#) further in this guide.
**Black Level Uplift**

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

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

You may experience artifacts at the edges where the blended region of one projector overlaps the pond of mirrors of its neighbor. In the example below, the blended image comes from **two projectors**, 1 and 2. Both images have black level uplift applied; as a result, artifacts 3 and 4 have emerged at the edges where the black level uplift region of one projector overlaps the pond of mirrors of the other.

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

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

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

Some settings may be unavailable depending on other settings. For more information, see Possible Combinations Of Settings further in this guide.

---

**Black Level Uplift**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

1 2 3 4
3D menu
Use this menu to enable, disable and set up 3D input, as follows:

- **3D Format** — Off, Auto, Side by Side (Half), Top and Bottom, Dual Pipe and Frame Sequential.
- **Eye Swap** — Normal and Reverse (set to Reverse if the left- and right-eye images are displayed in the wrong order)
- **Dark Time** — 0.65 ms, 1.3 ms and 1.95 ms. Set to reduce the effect of images overlapping while the glasses are switching.

### 3D Sync

- **Offset** — use the LEFT ◀ and RIGHT ► arrow buttons to compensate for signal processing delays in the projector.
- **Reference** — External, Internal and Auto.

### 3D Settings Table

<table>
<thead>
<tr>
<th>3D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3D Format</td>
<td>Auto</td>
</tr>
<tr>
<td>Eye Swap</td>
<td>Normal</td>
</tr>
<tr>
<td>Dark Time</td>
<td>1.95 ms</td>
</tr>
</tbody>
</table>

### Notes

- For further information about supported 3D formats, see **3D connections** in the **Connection Guide**.
- If **3D Format** is set to Off, all other 3D settings will be unavailable.
- Some settings may be unavailable depending on other settings. For more information, see **Possible Combinations Of Settings** further in this guide.
- **Frame Sequential** is supported on the HDMI, DVI-D and DisplayPort inputs only.
- **3D video is only possible on the HDMI, HDBaseT, DisplayPort and DVI inputs.**
- **The Frame Packing format** is automatically detected by the projector.
- See also **3D types** and **Some 3D settings explained** further in this guide.
**3D menu continued from previous page**

**3D types**

In most situations you can use the **Auto** setting to have the projector automatically detect the format. Otherwise, consider the notes below to help you set up the 3D input manually.

The following 3D formats are supported:

- **Dual Pipe (LEFT and RIGHT)**
  The left and right eye images are delivered on two separate HDMI links, which the projector will interleave for 3D display.

- **Frame Packing**
  This format will be detected, re-synchronised, frame-multiplied and displayed at 96 Hz with the left eye / right eye dominance automatically extracted from the video data. You need to optimize **Dark Time** and **Sync Delay** manually to suit your chosen switching glasses.

- **Top and Bottom**
  Sets the projector to reformat the video frames and map them to the display with the left eye / right eye dominance automatically extracted from the video data. You need to optimize **Dark Time** and **Sync Delay** manually to suit your chosen switching glasses.

- **Side by Side (Half):** interlaced and progressive, 50 and 60Hz
  The side-by-side image will be de-interlaced (if appropriate), resized and then sequentially displayed at 100 or 120 Hz. The left eye / right eye dominance will be automatically extracted from the video data, however you will need to optimize **Dark Time** and **Sync Delay** manually to suit your chosen switching glasses.

**Dark Time** and **Sync Delay** need to be set only once, to optimize the image for the glasses in use.
3D menu continued from previous page

Some 3D settings explained

Dark Time
Ghosting can be caused by the left and right images overlapping during the time that the ZScreen or 3D glasses are switching. **Dark Time** allows you to minimize this effect.

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

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

Sync Delay
The sync signal from the 3D server will be in phase with the frames generated by its graphics card. However, to compensate for processing delays in the projector, **Sync Delay** introduces a delay to the sync output signal sent to the ZScreen or 3D glasses.

Notes

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

1. Set **Dark Time** to a value appropriate to the glasses or ZScreen, say 1.3 ms or 1.95 ms.
2. Adjust **Sync Offset** time to eliminate ghosting and achieve a smooth grayscale.
3. Repeat steps 1 and 2 until the best result is obtained.
Frame rate multiplication in 3D images

When displaying a low frame rate 3D video, the projector multiplies the frame rate to obtain a flicker-free image. For example, a 60Hz frame rate is doubled to 120 Hz, or a 48 Hz frame rate is tripled to 144 Hz.

Frame rate multiplication is an automatic process. It occurs in the background and cannot be modified by the user.
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 20 and 100, ranging from 20% to 100% laser power.
Setup menu

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

- **Cooling Condition**
  Choose from *Table, Ceiling, Freerilt* and *Auto.*

- **High Altitude**
  Choose from *On* and *Auto.*

- **Screen Setting**
  Choose from *16:10, 16:9* and *4:3.*

- **ColorMax**
  Set up user-defined color gamut values.

- **Power On/Off**
  Access the submenu to set up automatic projector power on and power off.

- **Clock Adjust**
  Access the submenu to set current date and local time.

- **Startup Logo**
  Set this to *On* if you want the DP logo to show when the projector is first switched on.

- **Blank Screen**
  Choose from *Logo, Black, Blue* and *White.*

- **Trigger-1** 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.

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

### Setup

<table>
<thead>
<tr>
<th>Setup</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Auto-front</td>
</tr>
<tr>
<td>Cooling Condition</td>
<td>Auto</td>
</tr>
<tr>
<td>High Altitude</td>
<td>Auto</td>
</tr>
<tr>
<td>Screen Setting</td>
<td>16:10</td>
</tr>
<tr>
<td>ColorMax</td>
<td></td>
</tr>
<tr>
<td>Power On/Off</td>
<td></td>
</tr>
<tr>
<td>Clock Adjust</td>
<td></td>
</tr>
<tr>
<td>Startup Logo</td>
<td>On</td>
</tr>
<tr>
<td>Blank Screen</td>
<td>Logo</td>
</tr>
<tr>
<td>Trigger-1</td>
<td>Off</td>
</tr>
<tr>
<td>Trigger-2</td>
<td>Off</td>
</tr>
</tbody>
</table>

### Notes

- **Auto-front** automatically detects the projector’s position and sets the orientation accordingly.

- Use **Screen Setting** in combination with the **Aspect Ratio** feature found in the **Geometry** menu to provide the best fit for the projected image and to minimize *letterboxing* and *pillarboxing.*

- The **Trigger-1** and **Trigger-2** functions output 12 V depending on the set value:
  - If **Screen** is set, the trigger will be activated when the projector is switched on.
  - If **RS232** is set, the trigger will be activated upon receiving a protocol command.
  - If any of the other values are set, the trigger will be activated if the **Geometry > Aspect Ratio** function is set to match the trigger value. For example, if **Trigger-1** is set to **4:3,** it will output a 12 V charge if you set **Geometry > Aspect Ratio** to **4:3.**
• **Auto Source**  
  If this setting is **On**, the projector will automatically search for an active input source.

• **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.

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

ColorMax Setting 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.

Measured Data

<table>
<thead>
<tr>
<th>Color</th>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>0.658</td>
<td>0.339</td>
</tr>
<tr>
<td>Green</td>
<td>0.315</td>
<td>0.662</td>
</tr>
<tr>
<td>Blue</td>
<td>0.146</td>
<td>0.043</td>
</tr>
<tr>
<td>White</td>
<td>0.276</td>
<td>0.283</td>
</tr>
</tbody>
</table>

Target Data – User 1

<table>
<thead>
<tr>
<th>Color</th>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>0.640</td>
<td>0.390</td>
</tr>
<tr>
<td>Green</td>
<td>0.300</td>
<td>0.600</td>
</tr>
<tr>
<td>Blue</td>
<td>0.150</td>
<td>0.060</td>
</tr>
<tr>
<td>Yellow</td>
<td>0.419</td>
<td>0.505</td>
</tr>
<tr>
<td>Cyan</td>
<td>0.225</td>
<td>0.329</td>
</tr>
<tr>
<td>Magenta</td>
<td>0.321</td>
<td>0.154</td>
</tr>
<tr>
<td>White</td>
<td>0.285</td>
<td>0.302</td>
</tr>
</tbody>
</table>

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.
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.

```
<table>
<thead>
<tr>
<th>Clock Adjust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date (dd:MM:yyyy)</td>
</tr>
<tr>
<td>Time (HH:mm)</td>
</tr>
<tr>
<td>Time Zone</td>
</tr>
</tbody>
</table>
```
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.

**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**, **Dynamic Black**, **RGB Lift** and **RGB Gain**
- From the **Geometry** menu — **Aspect Ratio** and **Overscan**

To recall a saved preset:

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

To save a preset:

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

---

**Notes**

Presets from one input cannot be applied to another input.
**Network menu**

- **Network Mode**
  Choose between **Projector Control** and **Service**.

- **Standby Power**
  If this setting is **On**, the LAN socket remains active when the projector is in STANDBY mode. If the setting is **Off**, the LAN socket is disabled when the projector is in STANDBY mode.

- **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.

**Table: Network**

<table>
<thead>
<tr>
<th>Network Mode</th>
<th>Projector Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby Power</td>
<td>Off</td>
</tr>
<tr>
<td>DHCP</td>
<td>Off</td>
</tr>
<tr>
<td>IP</td>
<td>192.168.000.100</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>255.255.255.000</td>
</tr>
<tr>
<td>Gateway</td>
<td>000.000.000.000</td>
</tr>
<tr>
<td>DNS</td>
<td>000.000.000.000</td>
</tr>
<tr>
<td>MAC</td>
<td>00:18:27:2d:f2:06</td>
</tr>
<tr>
<td>AMX</td>
<td>Off</td>
</tr>
</tbody>
</table>

**Notes**
**PIP menu**

- **PIP**
  
  Turn PIP on and off.

- **Source**
  
  Select an input source for the PIP image.

  Any combinations are possible between main and PIP input source, as long as the two inputs are **not** from the same group:

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDMI 1</td>
<td>HDMI 2</td>
</tr>
<tr>
<td>DVI</td>
<td>VGA</td>
</tr>
<tr>
<td>DisplayPort</td>
<td>COMP</td>
</tr>
<tr>
<td>HDBaseT</td>
<td>3G-SDI</td>
</tr>
</tbody>
</table>

- **Position**
  
  Set the location of the PIP image on the screen. Choose from **Top-Left**, **Top-Right**, **Bottom-Left**, **Bottom-Right** and **PBP**.

**Notes**

Some settings may be unavailable depending on other settings. For more information, see **Possible Combinations Of Settings** further in this guide.
**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.

<table>
<thead>
<tr>
<th>Information</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Name</td>
<td>E-Vision Laser 8500</td>
</tr>
<tr>
<td>Serial Number</td>
<td>X000XXXXX0000</td>
</tr>
<tr>
<td>Software Version 1</td>
<td>MD03-SE10-FE09</td>
</tr>
<tr>
<td>Software Version 2</td>
<td>LE07-14-RE04-3092</td>
</tr>
<tr>
<td>Active / PIP Source</td>
<td>HDMI2 / DVI</td>
</tr>
<tr>
<td>Signal Format</td>
<td></td>
</tr>
<tr>
<td>Laser Hours</td>
<td>00041 HRS</td>
</tr>
<tr>
<td>System Status</td>
<td></td>
</tr>
<tr>
<td>Thermal Status</td>
<td></td>
</tr>
<tr>
<td>Factory Reset</td>
<td></td>
</tr>
</tbody>
</table>

**Signal Format**

<table>
<thead>
<tr>
<th>Signal Format</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Source</td>
<td></td>
</tr>
<tr>
<td>Timing</td>
<td>1080p/60Hz</td>
</tr>
<tr>
<td>H Refresh</td>
<td>67.500 KHz</td>
</tr>
<tr>
<td>V Refresh</td>
<td>60.00 Hz</td>
</tr>
<tr>
<td>Pixel Clock</td>
<td>148.500 MHz</td>
</tr>
</tbody>
</table>

| PIP Source     |       |
| Timing         | 576p/50Hz |
| H Refresh      | 31.250 KHz |
| V Refresh      | 50.00 Hz |
| Pixel Clock    | 27.0 MHz |
**System Status**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric Pressure</td>
<td>98988 Pa (116 m)</td>
</tr>
<tr>
<td>AC Voltage</td>
<td>160V – 264V</td>
</tr>
<tr>
<td>Ceiling Mode</td>
<td>0</td>
</tr>
<tr>
<td>Tilt Angle</td>
<td>4 deg</td>
</tr>
<tr>
<td>Portrait Angle</td>
<td>0 deg</td>
</tr>
<tr>
<td>Altitude Mode</td>
<td>Low</td>
</tr>
<tr>
<td>Laser Power</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Thermal Status**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet 1/2 Temp.</td>
<td>24 / 34 (C)</td>
</tr>
<tr>
<td>DMD Temp.</td>
<td>38 (C)</td>
</tr>
<tr>
<td>Laser 1/2 Temp.</td>
<td>49 / 42 (C)</td>
</tr>
<tr>
<td>Outside Temp.</td>
<td>32 (C)</td>
</tr>
<tr>
<td>Fan 1-3 Speed</td>
<td>1399 / 1402 / 1391</td>
</tr>
<tr>
<td>Fan 4-6 Speed</td>
<td>1410 / 1200 / 1205</td>
</tr>
<tr>
<td>Fan 7-9 Speed</td>
<td>1211 / 1407 / 1410</td>
</tr>
<tr>
<td>Fan 10-12 Speed</td>
<td>0 / 3005 / 3007</td>
</tr>
<tr>
<td>Fan 13-15 Speed</td>
<td>2986 / 2984 / 2984</td>
</tr>
<tr>
<td>Fan 16 Speed</td>
<td>3020 / NA / NA</td>
</tr>
<tr>
<td>Water Pump Speed</td>
<td>3506</td>
</tr>
</tbody>
</table>
**Factory Reset**

To restore the factory default settings:

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

**Information**

- **Model Name**: E-Vision Laser 8500
- **Serial Number**: X000XXXXX0000
- **Software Version 1**: MD03-SE10-FE09

**WARNING**

All user settings will be lost!

- Press **OK** to confirm
- Press **Exit** to cancel

**Thermal Status**

**Factory Reset**

OK
### Possible Combinations Of Settings

Some OSD settings cannot be used in combination with others. The table below shows the possible combinations.

A tick (✓) means that the combination is possible. A cross (✗) means applying the new setting is impossible if the existing setting is being used. A number sign (#) means applying the new setting will disable the existing one.

<table>
<thead>
<tr>
<th>Existing Setting</th>
<th>New Setting</th>
<th>3D</th>
<th>Warp / Geometry</th>
<th>Blending</th>
<th>Picture Mode</th>
<th>Color Temp.</th>
<th>Overscan</th>
<th>Aspect Ratio</th>
<th>Digital Zoom</th>
<th>PIP</th>
<th>Dynamic Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Warp / Geometry</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Blending</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Picture Mode</td>
<td>#</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Color Temp.</td>
<td>#</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Overscan</td>
<td>#</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Digital Zoom</td>
<td>#</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>PIP</td>
<td>#</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Dynamic Black</td>
<td>#</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>
IN THIS GUIDE

The DMD™ ................................................................. 80
Choosing A Lens .......................................................... 82
   Basic calculation ....................................................... 83
   Basic calculation example ........................................ 84
   Full lens calculation .................................................. 85
      Introducing TRC ..................................................... 85
      Calculating TRC ................................................... 86
      Calculating the throw ratio with TRC ......................... 87
   Full lens calculation example ...................................... 88
Screen Requirements .................................................... 89
   Fitting the image to the DMD™ .................................... 89
      WUXGA images displayed full width .......................... 89
      WUXGA images displayed with a height of 1080 pixels .... 90
      WUXGA images displayed full height .......................... 91
   Diagonal screen sizes .................................................. 92
   Fitting the image to the screen ..................................... 93
   Positioning the screen and projector .............................. 94
Positioning The Image .................................................... 95
   Maximum offset range ................................................ 97
Aspect Ratios Explained ................................................. 98
   Aspect ratio examples ................................................ 99
Frame Rates And Pulldowns Explained ............................... 101
   Interlaced and progressive scan ................................... 101
   Frame rates of image sources ....................................... 101
   Pulldowns - conversion into destination formats ............... 102
      2:3 (normal) pulldown .............................................. 102
      2:3:3:2 (advanced) pulldown ..................................... 103
Appendix A: Lens Part Numbers ....................................... 104
Appendix B: Lens Charts ............................................... 105
   How to use the lens charts ........................................... 105
      TRC values applied in the charts ................................. 106
      Fixed lenses - full DMD™ width images ....................... 107
      Zoom lenses - full DMD™ width images ....................... 108
      Fixed lenses - 1.25:1 images ...................................... 109
      Zoom lenses - 1.25:1 images ..................................... 110
      Fixed lenses - 1.33:1 images ...................................... 111
      Zoom lenses - 1.33:1 images ..................................... 112
Appendix C: Supported Signal Input Modes ........................... 113
   2D formats .................................................................. 113
   3D formats .................................................................. 115
Appendix D: Menu Map .................................................... 117
   INPUT ....................................................................... 117
   TEST PATTERN .......................................................... 117
   LENS ........................................................................ 117
   IMAGE ...................................................................... 118
   COLOR ....................................................................... 119
   GEOMETRY ................................................................. 121
   EDGE BLEND .............................................................. 123
   3D .............................................................................. 123
   LASER ....................................................................... 123
   SETUP ....................................................................... 124
   NETWORK ................................................................... 126
   PIP ............................................................................. 126
   INFORMATION ............................................................. 127
IN THIS GUIDE (continued)

Appendix E: Wiring Details ................................................................. 128
  Signal inputs and outputs ............................................................ 128
    VGA ......................................................................................... 128
    HDMI 1 and 2 ........................................................................... 129
    DisplayPort ............................................................................. 130
    3G-SDI In, 3G-SDI Out ............................................................... 131
    COMPONENT ............................................................................. 131
  Control connections ................................................................. 132
    LAN ......................................................................................... 132
    RS232 .................................................................................... 132
    Trigger 1 & Trigger 2 ............................................................... 133
    IR input ..................................................................................... 133
    3D Sync IN and 3D Sync OUT .................................................... 133

Appendix F: Glossary Of Terms ..................................................... 134

Technical Specifications ............................................................... 145
  Models ......................................................................................... 145
  Inputs and outputs ................................................................. 146
  Bandwidth .................................................................................. 146
  Remote control and keypad ....................................................... 146
  Automation control ..................................................................... 146
  Color temperature ................................................................. 146
  Lenses ......................................................................................... 147
  Lens mount ................................................................................ 147
  Mechanical mounting ............................................................. 147
  Orientation ................................................................................. 147
  Electrical and physical specifications ....................................... 148
  Safety & EMC regulations ....................................................... 148
The DMD™

A DMD™ (Digital Micromirror Device™) is a true digital light modulator which utilises an array of up to 2.3 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

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
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

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
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:

<table>
<thead>
<tr>
<th>Throw ratios</th>
<th>Throw distance range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.77 : 1 fixed lens</td>
<td>1.3 - 15 m (4.3 - 49.2 ft)</td>
</tr>
<tr>
<td>1.16 : 1 fixed lens</td>
<td>1.4 - 25 m (4.6 - 82 ft)</td>
</tr>
<tr>
<td>1.45 - 1.74 : 1 zoom lens</td>
<td>1.8 - 9.3 m (5.9 - 30.5 ft)</td>
</tr>
<tr>
<td>1.74 - 2.17 : 1 zoom lens</td>
<td>2.2 - 11.8 m (7.2 - 38.7 ft)</td>
</tr>
<tr>
<td>2.17 - 2.90 : 1 zoom lens</td>
<td>2.7 - 15.4 m (8.9 - 50.5 ft)</td>
</tr>
<tr>
<td>2.90 - 4.34 : 1 zoom lens</td>
<td>3.6 - 22.5 m (11.8 - 73.8 ft)</td>
</tr>
<tr>
<td>4.34 - 6.76 : 1 zoom lens</td>
<td>5.5 - 35 m (18 - 114.8 ft)</td>
</tr>
</tbody>
</table>

To choose a lens, either calculate the throw ratio required, or use the lens charts provided in Appendix B at the end of this document.

Notes

- For information about individual lens part numbers, see Appendix A at the end of this document.
- See also Appendix B: Lens Charts at the end of this document.
- Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.
- For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
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:

\[
\text{Throw ratio} = \frac{\text{Throw distance}}{\text{Screen width}}
\]

1. Use the formula above to obtain the required throw ratio.
2. Match the throw ratio with a lens from the table below:

<table>
<thead>
<tr>
<th>Throw ratios</th>
<th>Throw distance range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.77:1 fixed lens</td>
<td>1.3 - 15 m (4.3 - 49.2 ft)</td>
</tr>
<tr>
<td>1.16:1 fixed lens</td>
<td>1.4 - 25 m (4.6 - 82 ft)</td>
</tr>
<tr>
<td>1.45 - 1.74:1 zoom lens</td>
<td>1.8 - 9.3 m (5.9 - 30.5 ft)</td>
</tr>
<tr>
<td>1.74 - 2.17:1 zoom lens</td>
<td>2.2 - 11.8 m (7.2 - 38.7 ft)</td>
</tr>
<tr>
<td>2.17 - 2.90:1 zoom lens</td>
<td>2.7 - 15.4 m (8.9 - 50.5 ft)</td>
</tr>
<tr>
<td>2.90 - 4.34:1 zoom lens</td>
<td>3.6 - 22.5 m (11.8 - 73.8 ft)</td>
</tr>
<tr>
<td>4.34 - 6.76:1 zoom lens</td>
<td>5.5 - 35 m (18 - 114.8 ft)</td>
</tr>
</tbody>
</table>

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

Notes
The basic calculation on this page does not take into consideration DMD™ and image size, which could affect the throw ratio. 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.

See also Appendix B: Lens Charts at the end of this document.

Do not use the short lens hood with the 4.34 - 6.76:1 zoom lens.

For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
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
   \[
   \frac{11}{4.5} = 2.44
   \]

2. Match the result with the lens table.
   The lens matching a throw ratio of 2.44 is the 2.17 - 2.90 : 1 zoom lens.

3. Check whether the lens covers the required throw distance.
   The range quoted for the 2.17 - 2.90 : 1 zoom lens is 2.7 - 15.4 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:**

<table>
<thead>
<tr>
<th>Throw ratios</th>
<th>Throw distance range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.77 : 1 fixed lens</td>
<td>1.3 - 15 m (4.3 - 49.2 ft)</td>
</tr>
<tr>
<td>1.16 : 1 fixed lens</td>
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<td>1.45 - 1.74 : 1 zoom lens</td>
<td>1.8 - 9.3 m (5.9 - 30.5 ft)</td>
</tr>
<tr>
<td>1.74 - 2.17 : 1 zoom lens</td>
<td>2.2 - 11.8 m (7.2 - 38.7 ft)</td>
</tr>
<tr>
<td>2.17 - 2.90 : 1 zoom lens</td>
<td>2.7 - 15.4 m (8.9 - 50.5 ft)</td>
</tr>
<tr>
<td>2.90 - 4.34 : 1 zoom lens</td>
<td>3.6 - 22.5 m (11.8 - 73.8 ft)</td>
</tr>
<tr>
<td>4.34 - 6.76 : 1 zoom lens</td>
<td>5.5 - 35 m (18 - 114.8 ft)</td>
</tr>
</tbody>
</table>

### Notes

- 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)**.

**Example**

**Fig. 1** illustrates a 4:3 image within a WUXGA DMD™.

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

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

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

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

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

**Fig. 3** shows the image projected on the same screen with a lens chosen using TRC.

The increased throw ratio has allowed the 4:3 image to fill the 4:3 screen seamlessly.

**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:

\[ TRC = \frac{1.6 \text{ (DMD™ aspect ratio)}}{\text{Source aspect ratio}} \]

TRC table

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

<table>
<thead>
<tr>
<th>Format</th>
<th>Resolution</th>
<th>TRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.35:1 (Scope), 1920 x 817 pixels</td>
<td>TRC &lt; 1, not used</td>
<td></td>
</tr>
<tr>
<td>1.85:1 (Flat), 1920 x 1037 pixels</td>
<td>TRC &lt; 1, not used</td>
<td></td>
</tr>
<tr>
<td>1.78:1 (16:9), 1920 x 1080</td>
<td>TRC &lt; 1, not used</td>
<td></td>
</tr>
<tr>
<td>1.66:1 (Vista), 1792 x 1080 pixels</td>
<td>TRC &lt; 1, not used</td>
<td></td>
</tr>
<tr>
<td>1.6:1 (16:10), 1728 x 1080 pixels</td>
<td>TRC = 1, not used (native resolution)</td>
<td></td>
</tr>
<tr>
<td>1.33:1 (4:3), 1440 x 1080 pixels</td>
<td>TRC = 1.2</td>
<td></td>
</tr>
<tr>
<td>1.25:1 (5:4), 1350 x 1080 pixels</td>
<td>TRC = 1.28</td>
<td></td>
</tr>
</tbody>
</table>

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:

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

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

<table>
<thead>
<tr>
<th>Throw ratios</th>
<th>Throw distance range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.77 : 1 fixed lens</td>
<td>1.3 - 15 m (4.3 - 49.2 ft)</td>
</tr>
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<td>1.16 : 1 fixed lens</td>
<td>1.4 - 25 m (4.6 - 82 ft)</td>
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<td>2.2 - 11.8 m (7.2 - 38.7 ft)</td>
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</tr>
<tr>
<td>4.34 - 6.76 : 1 zoom lens</td>
<td>5.5 - 35 m (18 - 114.8 ft)</td>
</tr>
</tbody>
</table>

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

Notes

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

- Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.

- For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
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:
   \[ TRC = \frac{1.6}{1.33} = 1.2 \]

2. Calculate the throw ratio:
   \[ \text{Throw ratio} = \frac{11}{4.5 \times 1.2} = 2.04 \]

3. Find a match in the lens table.
   The table shows that the matching lens is the 1.74 - 2.17 : 1 zoom lens.

4. Check whether the lens covers the required throw distance.
   The range quoted for the 1.74 - 2.17 : 1 zoom lens is 2.2 - 11.8 m. The required distance of 11 m is within the range.

---

INFORMATION YOU NEED FOR THESE CALCULATIONS

- The TRC formula
  \[ TRC = \frac{DMD\text{™ aspect ratio}}{Source \text{ aspect ratio}} \]

- 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) \( TRC \) not used (native resolution)
  1.33:1 (4:3) \( TRC = 1.2 \)
  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:

<table>
<thead>
<tr>
<th>Throw ratios</th>
<th>Throw distance range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.77 : 1 fixed lens</td>
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<td>2.7 - 15.4 m (8.9 - 50.5 ft)</td>
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<td>3.6 - 22.5 m (11.8 - 73.8 ft)</td>
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<tr>
<td>4.34 - 6.76 : 1 zoom lens</td>
<td>5.5 - 35 m (18 - 114.8 ft)</td>
</tr>
</tbody>
</table>
Screen Requirements

Fitting the image to the DMD™

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

WUXGA images displayed full width

Notes

full width = 1920 pixels

2.35:1 (Scope) = 817 pixels
1.85:1 = 1037 pixels
16:9 = 1.78:1 = 1080 pixels
full height = 1200 pixels
WUXGA images displayed with a height of 1080 pixels

- 4:3 = 1.33:1 = 1440 pixels
- 16:10 = 1.6:1 = 1728 pixels
- 1.66:1 (Vista) = 1792 pixels
- full width = 1920 pixels
**WUXGA images displayed full height**

- **UXGA** = 4:3 = 1.33:1 = 1600 pixels
- **WUXGA** = 16:10 = 1.6:1 = 1920 pixels

**Notes**

Only WUXGA or UXGA images can fill the full height of the DMD™, using all 1200 pixels without scaling.
**Diagonal screen sizes**

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

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

2.35:1 (Scope)
\[
W = D \times 0.92 \\
H = D \times 0.39
\]

1.85:1
\[
W = D \times 0.88 \\
H = D \times 0.47
\]

16:9 = 1.78:1
\[
W = D \times 0.87 \\
H = D \times 0.49
\]

1.66:1 (Vista)
\[
W = D \times 0.86 \\
H = D \times 0.52
\]

16:10 = 1.6:1 (native aspect ratio for WUXGA projectors)
\[
W = D \times 0.85 \\
H = D \times 0.53
\]
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. **4:3 = 1.33:1**
   \[ W = H \times 1.33, H = W \times 0.75 \]

2. **16:10 = 1.6:1**
   (native aspect ratio for WUXGA projectors)
   \[ W = H \times 1.6, H = W \times 0.625 \]

3. **1.66:1 (Vista)**
   \[ W = H \times 1.66, H = W \times 0.6 \]

4. **16:9 = 1.78:1**
   \[ W = H \times 1.78, H = W \times 0.56 \]

5. **1.85:1 (Flat)**
   \[ W = H \times 1.85, H = W \times 0.54 \]

6. **2.35:1 (Scope)**
   \[ W = H \times 2.35, H = W \times 0.426 \]
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 (see Setup menu in the Operating Guide) 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.

Notes

- For more information on shifting the lens, see Lens control in the Operating Guide.

Whenever possible, position the projector so that the lens is centered for the highest quality image.
Any single adjustment outside the ranges specified on the following page may result in an unacceptable level of distortion, particularly at the corners of the image, due to the image passing through the periphery of the lens optics.

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

Full horizontal or vertical shift

Combined shift is reduced

Notes

For more information on shifting the lens, see Lens control in the Operating Guide.
**Maximum offset range**

The maximum offset range available with no distortion or vignetting is dependent on which lens is used. Shifting the lens beyond its undistorted limits may be physically possible, however you may experience some vignetting or distortion.

<table>
<thead>
<tr>
<th></th>
<th>vertical (pixels)</th>
<th>horizontal (pixels)</th>
<th>vertical (frame)</th>
<th>horizontal (frame)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0.77 : 1 and 1.16:1 fixed lens</strong></td>
<td>±240</td>
<td>±96</td>
<td>±0.2</td>
<td>±0.05</td>
</tr>
<tr>
<td><strong>all zoom lens</strong></td>
<td>±720</td>
<td>±288</td>
<td>±0.6</td>
<td>±0.15</td>
</tr>
</tbody>
</table>

*Notes*

For more information on shifting the lens, see *Lens control* in the Operating Guide.
Aspect Ratios Explained

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

- The DMD™ resolution is WUXGA with a 1920 x 1200 resolution, corresponding to an aspect ratio of 16:10
- The aspect ratio of the input signal: usually 4:3, 16:9 or 16:10
- The value of the Aspect Ratio setting of the projector:
  - 16:9, 4:3, 16:10 and 5:4 stretch the image to the selected aspect ratio. 16:9 leaves black bars at the top and bottom of the screen (letterboxing effect); 4:3 and 5:4 leave black bars at the sides of the screen (pillarboxing).
  - TheaterScope is a special setting used in combination with an anamorphic lens, an optional accessory. It removes letterboxing from a 2.35:1 source packed into a 16:9 frame.
  - 4:3 Narrow is a special setting used in combination with an anamorphic lens, an optional accessory. It squeezes 4:3 content so that the intended aspect ratio is displayed on screen when projected through an anamorphic lens.
  - Source shows the image with its original aspect ratio, not using the whole screen if the DMD™ aspect ratio does not match. The image is scaled to fit either the full width or height of the screen.
### Aspect Ratio Examples

**Source: 4:3**

- Aspect Ratio: Source / 4:3
- Aspect Ratio: 16:10

**Source: 16:9**

- Aspect Ratio: Source / 16:9
- Aspect Ratio: 16:10

**Source: 16:10 (native)**

- Aspect Ratio: Source / 16:10
- Unused screen areas
**Aspect ratio example: TheaterScope**

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

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

![Black margin – part of the source](image1.png)

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™:

![Black margin – part of the source](image2.png)

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

![Black margin – part of the source](image3.png)
Frame Rates And Pulldowns Explained

Interlaced and progressive scan

A **progressive scan** is a method of updating the image by drawing all the lines of each frame in a sequence. In contrast, **interlaced video** alternately scans odd and even lines. In old analog TV interlacing was commonly used as a way of doubling the refresh rate without consuming extra bandwidth.

The following artifacts are common with interlaced video:

- **edge tear (combing)**
  The image lands between two fields and blurs. This is commonly observed when viewing rapid lateral movement.

- **aliasing (stair-stepping)**
  The texture of the image becomes populated with unrealistic patterns. Aliasing occurs because of differences between the original frame rate and the destination format.

- **twitter**
  The image shimmers, for example when showing rolling credits. This happens when the image contains thin horizontal lines that only appear in one field.

Frame rates of image sources

**Original analog films** are made at 24 fps and the whole frame is projected at once. To eliminate flicker and create an impression of continuous movement, the projector blades divide the images so that the viewer sees 48 frames per second.

**Interlaced video** scans odd lines, then even. Two fields are blended into one image. NTSC video (60i) is 29.97 fps, or 59.94 fields per second.

**24p video** is progressive but without the benefit of projector blades dividing the images, so it looks jumpier on playback than film. 24p is the optimal format for projects that are finished on film.

**30p** is optimal for projects finished on video. It has fewer strobing issues than 24p in video playback.
**Pulldowns - conversion into destination formats**

Pulldowns are a method of converting a 24p source into a different destination format by adding extra frames to the source.

**2:3 (normal) pulldown**

This method is used to convert a 24p source (film) into a 60i destination (NTSC video) by adding two extra fields for every four frames, effectively increasing the frame rate to 30 fps. The frame is split into fields and then two fields are repeated for every four original frames as shown in the illustration below.

<table>
<thead>
<tr>
<th>Original film, 24 fps</th>
<th>Field 1 (odd)</th>
<th>Field 2 (even)</th>
<th>Resulting video, 30 fps</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

**Notes**

Original film, 24 fps: A B C D
Field 1 (odd): A B C D
Field 2 (even): A B C D
Resulting video, 30 fps: A B C D
2:3:3:2 (advanced) pulldown

This method is very similar to the normal pulldown. Unlike the normal pulldown method, the resulting 30 fps video sequence contains only one frame containing fields from two different source frames.

The advantage of this method is that it is easier to reverse, if necessary.

<table>
<thead>
<tr>
<th>Original film, 24 fps</th>
<th>Field 1 (odd)</th>
<th>Field 2 (even)</th>
<th>Resulting video, 30 fps</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

Notes

The projector will use advanced pulldown on suitable video material, wherever possible.
## Appendix A: Lens Part Numbers

<table>
<thead>
<tr>
<th>Throw ratios</th>
<th>Part number</th>
<th>Throw distance range</th>
<th>Lens extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.77 : 1 fixed lens</td>
<td>110-808</td>
<td>1.3 - 15 m (4.3 - 49.2 ft)</td>
<td>170.9 mm</td>
</tr>
<tr>
<td>1.16 : 1 fixed lens</td>
<td>110-809</td>
<td>1.4 - 25 m (4.6 - 82 ft)</td>
<td>144.3 mm</td>
</tr>
<tr>
<td>1.45 - 1.74 : 1 zoom lens</td>
<td>110-803</td>
<td>1.8 - 9.3 m (5.9 - 30.5 ft)</td>
<td>115.1 mm</td>
</tr>
<tr>
<td>1.74 - 2.17 : 1 zoom lens</td>
<td>112-878</td>
<td>2.2 - 11.8 m (7.2 - 38.7 ft)</td>
<td>73.7 mm</td>
</tr>
<tr>
<td>2.17 - 2.90 : 1 zoom lens</td>
<td>113-852</td>
<td>2.7 - 15.4 m (8.9 - 50.5 ft)</td>
<td>80.6 mm</td>
</tr>
<tr>
<td>2.90 - 4.34 : 1 zoom lens</td>
<td>110-806</td>
<td>3.6 - 22.5 m (11.8 - 73.8 ft)</td>
<td>72.6 mm</td>
</tr>
<tr>
<td>4.34 - 6.76 : 1 zoom lens</td>
<td>110-807</td>
<td>5.5 - 35 m (18 - 114.8 ft)</td>
<td>83.3 mm</td>
</tr>
</tbody>
</table>

### Notes
- The throw ratios given here apply only when the image fills the width of the DMD™.
- For images that do not fill the width of the DMD™, the throw ratio needs to be recalculated using a throw ratio correction (TRC).
- For further information, see Choosing A Lens and Appendix B: Lens Charts.
- Throw distance calculations are based on the distance from the outer end of the lens, which will vary from lens to lens.
- Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.
- For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
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.

Example
For a projector with
- throw distance 11 m, and
- screen width 4.5 m,
the correct lens would be number 3 in the chart.

Notes
- For information about individual lens part numbers, see Appendix A earlier in this document.
- Do not use the short lens hood with the long throw lens.
- For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
**TRC values applied in the charts**

**Full width images**

Formats that fit the width of the DMD™ without applying a throw ratio correction (TRC) include:

- **2.35:1 (Scope)** 1920 x 817 pixels  TRC = 1
- **1.85:1 (Flat)** 1920 x 1037 pixels  TRC = 1
- **1.78:1 (16:9)** 1920 x 1080 pixels  TRC = 1
- **1.66:1 (Vista)** 1920 x 1156 pixels  TRC = 1
- **1.6:1 (16:10)** 1920 x 1200 pixels (native resolution)  TRC = 1

**Full height images**

A throw ratio correction (TRC) has been applied to the following charts:

- **1.25:1 (5:4)** 1500 x 1200 pixels  TRC = 1.28
- **1.33:1 (4:3)** 1600 x 1200 pixels  TRC = 1.2

---

*Notes*

For information about individual lens part numbers, see Appendix A earlier in this document.
Fixed lenses - full DMD™ width images
Full width images are 2.35:1 (Scope), 1.85:1 (Flat), 1.78:1 (16:9), 1.66:1 (Vista) and 1.6:1 (native).

1. 0.77 : 1 fixed lens
2. 1.16 : 1 fixed lens

Notes
- This chart has a TRC of 1.0, for use with the following images:
  - For WUXGA: 2.35:1 (Scope), 1.85:1 (Flat), 1.78:1 (16:9), 1.66:1 (Vista) and 1.6:1 (native)
- Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.
- For information about individual lens part numbers, see Appendix A earlier in this document.
- For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
Zoom lenses - full DMD™ width images

Full width images are 2.35:1 (Scope), 1.85:1 (Flat), 1.78:1 (16:9), 1.66:1 (Vista) and 1.6:1 (native).

1. 1.45 - 1.74:1 zoom lens
2. 1.74 - 2.17:1 zoom lens
3. 2.17 - 2.90:1 zoom lens
4. 2.90 - 4.34:1 zoom lens
5. 4.34 - 6.76:1 zoom lens

Notes

This chart has a TRC of 1.0, for use with the following images:

For WUXGA:
2.35:1 (Scope), 1.85:1 (Flat), 1.78:1 (16:9), 1.66:1 (Vista) and 1.6:1 (native)

For information about individual lens part numbers, see Appendix A earlier in this document.

Do not use the short lens hood with the 4.34 - 6.76:1 zoom lens.

For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
Fixed lenses - 1.25:1 images

1. 0.77 : 1 fixed lens
2. 1.16 : 1 fixed lens

Notes

This chart has a TRC of 1.28, for use with the following images:

1.25:1 (5:4)

For information about individual lens part numbers, see Appendix A earlier in this document.

Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.

For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
**Zoom lenses - 1.25:1 images**

1. 1.45 - 1.74 : 1 zoom lens
2. 1.74 - 2.17 : 1 zoom lens
3. 2.17 - 2.90 : 1 zoom lens
4. 2.90 - 4.34 : 1 zoom lens
5. 4.34 - 6.76 : 1 zoom lens

- **1.25:1 (5:4)**
  - **Screen width**
    - 1 m (3.3 ft)
    - 2 m (6.6 ft)
    - 3 m (9.8 ft)
    - 4 m (13.1 ft)
    - 5 m (16.4 ft)
    - 6 m (19.7 ft)

- **Throw distance**
  - 6 m (19.7 ft)
  - 12 m (39.4 ft)
  - 18 m (59.1 ft)
  - 24 m (78.7 ft)
  - 30 m (98.4 ft)
  - 36 m (118.1 ft)

**Notes**

- This chart has a TRC of 1.28, for use with the following images:

- Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.

- For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.

- For information about individual lens part numbers, see Appendix A earlier in this document.
Fixed lenses - 1.33:1 images

1. 0.77 : 1 fixed lens
2. 1.16 : 1 fixed lens

Notes

This chart has a TRC of 1.2, for use with the following images:

1.33:1 (4:3)

For information about individual lens part numbers, see Appendix A earlier in this document.

Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.

For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
Zoom lenses - 1.33:1 images

1. 1.45 - 1.74 : 1 zoom lens
2. 1.74 - 2.17 : 1 zoom lens
3. 2.17 - 2.90 : 1 zoom lens
4. 2.90 - 4.34 : 1 zoom lens
5. 4.34 - 6.76 : 1 zoom lens

Notes

- This chart has a TRC of 1.2, for use with the following images:
  - 1.33:1 (4:3)

- For information about individual lens part numbers, see Appendix A earlier in this document.

- Do not use the short lens hood with the 4.34 - 6.76 : 1 zoom lens.

- For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
# Appendix C: Supported Signal Input Modes

## 2D formats

<table>
<thead>
<tr>
<th>Standard</th>
<th>Resolution</th>
<th>Horizontal Frequency (kHz)</th>
<th>Frame Rate (Hz)</th>
<th>PCLK (MHz)</th>
<th>Component / 5BNC</th>
<th>VGA - RGBHV</th>
<th>5BNC - RGBHV</th>
<th>DisplayPort / DVI-D</th>
<th>HDMI / HD-BaseT</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>640x480</td>
<td>31.469</td>
<td>59.94</td>
<td>25.175</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>640x480</td>
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<td>31.500</td>
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<td>VESA DMT</td>
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<tr>
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</tr>
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<td>1600x1200</td>
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## APPENDIX C: SUPPORTED SIGNAL INPUT MODES

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**Notes**
### Supported Signal Input Modes

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<th>DisplayPort / DVI-D</th>
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**Notes**

- Remarks: *1: HB (High Bandwidth) mode without warping/blending.
- *2: 8-bit / color.
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**Notes**

*1: HB (High Bandwidth) mode without warping/blending.
*2: 8-bit / color.
## Appendix D: Menu Map

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| **LENS**     | **Lens Lock**  
|              | **On**  
|              | **Lens Control**  
|              | **Zoom / Focus mode**  
|              | **Zoom** (uses input from the UP and DOWN arrows to zoom the image)  
|              | **Focus** (uses input from the LEFT and RIGHT arrows to focus the image)  
|              | **Lens Shift mode**  
|              | **Lens Shift** (uses input from the arrows to shift the lens)  
|              | **Center Lens** (command)  
|              | **Lens Memory**  
|              | **Load Memory**  
|              | **Memory1 to Memory10**  
|              | **Save Memory**  
|              | **Memory1 to Memory10**  
|              | **Clear Memory**  
|              | **Memory1 to Memory10**  |

### Notes
- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
## IMAGE

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<tr>
<td>Reset (command)</td>
<td></td>
</tr>
<tr>
<td>Position and Phase</td>
<td></td>
</tr>
<tr>
<td>V Position (slider, value range 0~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>H Position (slider, value range 0~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Phase (slider, value range 0~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Tracking (slider, value range 0~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Sync Level (slider, value range 0~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Freeze (command)</td>
<td></td>
</tr>
<tr>
<td>Resync (command)</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
COLOR

**Color Space** Auto, YPbPr, YCbCr, RGB PC, RGB Video

**Color Mode** Color Max, Manual Color Matching, Color Temperature, Lifts & Gains

**Color Max** REC709, EBU, SMPTE, Peak, User 1, User 2

**Manual Color Matching**

- **Auto Test Pattern** Off, On
- **Red**
  - Hue (slider, value range 0 ~ 200 [100])
  - Saturation (slider, value range 0 ~ 200 [100])
  - Gain (slider, value range 0 ~ 200 [100])
- **Green**
  - Hue (slider, value range 0 ~ 200 [100])
  - Saturation (slider, value range 0 ~ 200 [100])
  - Gain (slider, value range 0 ~ 200 [100])
- **Blue**
  - Hue (slider, value range 0 ~ 200 [100])
  - Saturation (slider, value range 0 ~ 200 [100])
  - Gain (slider, value range 0 ~ 200 [100])
- **Yellow**
  - Hue (slider, value range 0 ~ 200 [100])
  - Saturation (slider, value range 0 ~ 200 [100])
  - Gain (slider, value range 0 ~ 200 [100])
- **Cyan**
  - Hue (slider, value range 0 ~ 200 [100])
  - Saturation (slider, value range 0 ~ 200 [100])
  - Gain (slider, value range 0 ~ 200 [100])
- **Magenta**
  - Hue (slider, value range 0 ~ 200 [100])
  - Saturation (slider, value range 0 ~ 200 [100])
  - Gain (slider, value range 0 ~ 200 [100])
- **White Balance**
  - Red (slider, value range 0 ~ 200 [100])
  - Green (slider, value range 0 ~ 200 [100])
  - Blue (slider, value range 0 ~ 200 [100])
- **Reset**

**Color Temperature** 3200K, 5400K, 6500K, 7500K, 9300K, Native

---

**Notes**

Some of the information in this menu map is summarised. See the actual menu on the projector for full details.

The underlined text represents the factory default value for each setting.
### Menu Sub Menus

**COLOR** (continued)

<table>
<thead>
<tr>
<th>Gains and Lifts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Lift (slider, value range 0 ~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Green Lift (slider, value range 0 ~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Blue Lift (slider, value range 0 ~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Red Gain (slider, value range 0 ~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Green Gain (slider, value range 0 ~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Blue Gain (slider, value range 0 ~ 200 [100])</td>
<td></td>
</tr>
<tr>
<td>Reset (command)</td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes**

- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
<table>
<thead>
<tr>
<th>Menu</th>
<th>Sub Menus</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOMETRY</td>
<td></td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td><strong>Source</strong>, 5:4, 4:3, 16:10, 16:9, 1.88, 2.35, Theaterscope, Source, Unscaled</td>
</tr>
</tbody>
</table>
| Digital Zoom | Digital Zoom (slider, value range 0% ~ 100% [0%])  
|             | Digital Pan (slider, value range depends on current input timing)  
|             | Digital Scan (slider, value range depends on current input timing)  
|             | Reset (command)                                                        |
| Overscan   | **Off**, Crop, Zoom                                                      |
| Blanking   |                                                                          |
| Top        | (slider, value range 0 ~ 360 [0])                                       |
| Bottom     | (slider, value range 0 ~ 360 [0])                                       |
| Left       | (slider, value range 0 ~ 534 [0])                                       |
| Right      | (slider, value range 0 ~ 534 [0])                                       |
| Reset      | (command)                                                               |
| Keystone   |                                                                          |
| Horizontal Keystone | (slider, value range -600 ~ 600 [0])                        |
| Vertical Keystone | (slider, value range -400 ~ 400 [0])                        |
| Rotation   | (slider, value range -10 ~ 10 at 0.25 degree/step)                      |
| Reset      | (command)                                                               |
| 4 Corners  |                                                                          |
| Top Left Corner Adjustment | Top Left Corner X (numeric value)                                     |
|             | Top Left Corner Y (numeric value)                                       |
| Top Right Corner Adjustment | Top Right Corner X (numeric value)                                    |
|             | Top Right Corner Y (numeric value)                                       |
| Bottom Left Corner Adjustment | Bottom Left Corner X (numeric value)                                  |
|             | Bottom Left Corner Y (numeric value)                                     |
| Bottom Right Corner Adjustment | Bottom Right Corner X (numeric value)                                 |
|             | Bottom Right Corner Y (numeric value)                                    |
| Reset      | (command)                                                               |
| Rotation   |                                                                          |
| Rotation   | (slider, value range -100 ~ 100 at 0.25 degree/step)                     |
| Reset      | (command)                                                               |

**Notes**

- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
<table>
<thead>
<tr>
<th>Menu</th>
<th>Sub Menus</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOMETRY (continued)</td>
<td></td>
</tr>
</tbody>
</table>

**Pincushion / Barrel**
- **H Pin / Barrel** (slider, value range -150 ~ 300 [0])
- **V Pin / Barrel** (slider, value range -150 ~ 300 [0])

**Keystone**
- **Horizontal** (slider, value range -60 ~ 60 [0])
- **Vertical** (slider, value range -40 ~ 40 [0])
- **Rotation** (slider, value range -10 ~ 10 at 0.25 degree/step)
- **Reset** (command)

**Notes**
- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
<table>
<thead>
<tr>
<th>Menu</th>
<th>Sub Menus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDGE BLEND</strong></td>
<td></td>
</tr>
<tr>
<td><em>Edge Blend</em></td>
<td>Off, On</td>
</tr>
<tr>
<td><em>Align Pattern</em></td>
<td>Off, On</td>
</tr>
<tr>
<td><em>Blend Width</em></td>
<td></td>
</tr>
<tr>
<td>Top (slider, value range 0, 100 ~ 500)</td>
<td></td>
</tr>
<tr>
<td>Bottom (slider, value range 0, 100 ~ 500)</td>
<td></td>
</tr>
<tr>
<td>Left (slider, value range 0, 100 ~ 500)</td>
<td></td>
</tr>
<tr>
<td>Right (slider, value range 0, 100 ~ 500)</td>
<td></td>
</tr>
<tr>
<td><strong>Black Level Uplift</strong></td>
<td></td>
</tr>
<tr>
<td><em>Select Area:</em></td>
<td></td>
</tr>
<tr>
<td>Top (slider, value range 0 ~ 32 [0])</td>
<td></td>
</tr>
<tr>
<td>Bottom (slider, value range 0 ~ 32 [0])</td>
<td></td>
</tr>
<tr>
<td>Left (slider, value range 0 ~ 32 [0])</td>
<td></td>
</tr>
<tr>
<td>Right (slider, value range 0 ~ 32 [0])</td>
<td></td>
</tr>
<tr>
<td><em>Color Adjustment:</em></td>
<td></td>
</tr>
<tr>
<td>All (slider, value range 0 ~ 255 [0])</td>
<td></td>
</tr>
<tr>
<td>Red (slider, value range 0 ~ 255 [0])</td>
<td></td>
</tr>
<tr>
<td>Green (slider, value range 0 ~ 255 [0])</td>
<td></td>
</tr>
<tr>
<td>Blue (slider, value range 0 ~ 255 [0])</td>
<td></td>
</tr>
<tr>
<td><strong>Reset</strong></td>
<td>(command)</td>
</tr>
<tr>
<td><strong>3D</strong></td>
<td></td>
</tr>
<tr>
<td><em>3D Format</em></td>
<td>Off, Auto, Side by Side (Half), Top and Bottom, Dual-Pipe, Frame Sequential</td>
</tr>
<tr>
<td><em>Eye Swap</em></td>
<td>Normal, Reverse</td>
</tr>
<tr>
<td><em>Dark Time</em></td>
<td>0.65 ms, 1.3 ms, 1.95 ms, 2.5 ms</td>
</tr>
<tr>
<td><em>Sync Offset</em></td>
<td>(slider, value range 0 ~ 200 [0])</td>
</tr>
<tr>
<td><em>Sync Reference</em></td>
<td>External, Internal</td>
</tr>
<tr>
<td><strong>LASER</strong></td>
<td></td>
</tr>
<tr>
<td><em>Power Mode</em></td>
<td>Eco, Normal, Custom</td>
</tr>
<tr>
<td><em>Power Level</em></td>
<td>(slider, value range 30%~ 100% [100%])</td>
</tr>
</tbody>
</table>

---

**Notes**

- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
## SETUP

### Orientation
- **Front Tabletop**, **Front Ceiling**, **Rear Tabletop**, **Rear Ceiling**

### High Altitude
- **On**, **Auto**

### Screen Setting
- **16:10**, **16:9**, **4:3**

### ColorMax Measured Data
- **Red x** (numeric, value range 0.550 ~ 0.750 [0.662])
- **Red y** (numeric, value range 0.250 ~ 0.450 [0.334])
- **Green x** (numeric, value range 0.200 ~ 0.400 [0.322])
- **Green y** (numeric, value range 0.400 ~ 0.750 [0.656])
- **Blue x** (numeric, value range 0.050 ~ 0.250 [0.138])
- **Blue y** (numeric, value range 0.000 ~ 0.120 [0.042])
- **White x** (numeric, value range 0.200 ~ 0.400 [0.291])
- **White y** (numeric, value range 0.250 ~ 0.450 [0.334])

### Reset (command)

#### Target Data - User 1
- **Red x** (numeric, value range 0.550 ~ 0.750 [0.662])
- **Red y** (numeric, value range 0.250 ~ 0.450 [0.334])
- **Green x** (numeric, value range 0.200 ~ 0.400 [0.322])
- **Green y** (numeric, value range 0.400 ~ 0.750 [0.656])
- **Blue x** (numeric, value range 0.050 ~ 0.250 [0.138])
- **Blue y** (numeric, value range 0.000 ~ 0.120 [0.042])
- **Yellow x** (numeric, value range 0.300 ~ 0.500 [0.000])
- **Yellow y** (numeric, value range 0.400 ~ 0.600 [0.000])
- **Cyan x** (numeric, value range 0.125 ~ 0.325 [0.000])
- **Cyan y** (numeric, value range 0.225 ~ 0.425 [0.000])
- **Magenta x** (numeric, value range 0.200 ~ 0.500 [0.000])
- **Magenta y** (numeric, value range 0.050 ~ 0.250 [0.000])
- **White x** (numeric, value range 0.200 ~ 0.400 [0.291])
- **White y** (numeric, value range 0.250 ~ 0.450 [0.334])

### Reset (command)

#### Target Data - User 2
- Same as **User 1** above

---

### Notes
- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
<table>
<thead>
<tr>
<th>Menu</th>
<th>Sub Menus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SETUP</strong></td>
<td>(continued)</td>
</tr>
<tr>
<td><strong>Power On/Off Management</strong></td>
<td></td>
</tr>
<tr>
<td>Auto Power Off</td>
<td>Off, On</td>
</tr>
<tr>
<td>Auto Power On</td>
<td>Off, On</td>
</tr>
<tr>
<td>Scheduled On/Off</td>
<td>Off, On</td>
</tr>
<tr>
<td>Numeriuc input - a selection of on/off times during the week.</td>
<td></td>
</tr>
<tr>
<td><strong>Clock Adjust</strong></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>(numeric input, YYYY/MM/DD)</td>
</tr>
<tr>
<td>Time</td>
<td>(numeric input, HH:MM)</td>
</tr>
<tr>
<td>Time Zone</td>
<td>(numeric input, UTC -11 ~ 12)</td>
</tr>
<tr>
<td><strong>Startup Logo</strong></td>
<td></td>
</tr>
<tr>
<td>Off, On</td>
<td></td>
</tr>
<tr>
<td><strong>Blank Screen</strong></td>
<td></td>
</tr>
<tr>
<td>Logo</td>
<td>Black, Blue, White</td>
</tr>
<tr>
<td><strong>Trigger 1</strong></td>
<td>Off, Screen, 5:4, 4:3, 16:10, 16:9, TheaterScope, Source, Unscaled, RS232</td>
</tr>
<tr>
<td><strong>Trigger 2</strong></td>
<td>Off, Screen, 5:4, 4:3, 16:10, 16:9, TheaterScope, Source, Unscaled, RS232</td>
</tr>
<tr>
<td><strong>Auto-Source</strong></td>
<td></td>
</tr>
<tr>
<td>Off, On</td>
<td></td>
</tr>
<tr>
<td><strong>Infrared Remote</strong></td>
<td></td>
</tr>
<tr>
<td>Off, On</td>
<td></td>
</tr>
<tr>
<td><strong>IR Code</strong></td>
<td>(numeric input, two digits)</td>
</tr>
<tr>
<td><strong>IR Code Reset</strong></td>
<td>(command)</td>
</tr>
<tr>
<td><strong>OSD Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>English, Simplified Chinese</td>
</tr>
<tr>
<td>Menu Position</td>
<td>Top-Left, Top-Right, Bottom-Left, Bottom-Right, Center</td>
</tr>
<tr>
<td>Menu Transparency</td>
<td>0%, 25%, 50%, 75%</td>
</tr>
<tr>
<td>TimeOut</td>
<td>Always On, 10 Seconds, 30 Seconds, 60 Seconds</td>
</tr>
<tr>
<td>Message Box</td>
<td>Off, On</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td></td>
</tr>
<tr>
<td>Recall Memory</td>
<td>Preset A, Preset B, Preset C, Preset D, Default</td>
</tr>
<tr>
<td>Save Settings</td>
<td>Preset A, Preset B, Preset C, Preset D</td>
</tr>
</tbody>
</table>

Notes:
- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
## NETWORK

**Network Mode**  
*Projector Control*, Service

**Standby Power**  
*Off*, *On*

**DHCP**  
*Off*, *On*

**IP**  
*(numeric input, IP address format)*

**Subnet Mask**  
*(numeric input, IP address format)*

**Gateway**  
*(numeric input, IP address format)*

**DNS**  
*(numeric input, IP address format)*

**MAC**  
*(information only)*

**AMX**  
*Off*, *On*

---

## PIP

**PIP**  
*Off*, *On*

**Source**  
HDMI1, HDMI2, VGA, COMP, DisplayPort, HDBaseT, 3G-SDI

**Position**  
*Top Left*, *Top Right*, *Bottom Left*, *Bottom Right*, PBP

---

### Notes

- Some of the information in this menu map is summarised. See the actual menu on the projector for full details.
- The underlined text represents the factory default value for each setting.
## MENU MAP

<table>
<thead>
<tr>
<th>Menu</th>
<th>Sub Menus</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFORMATION</td>
<td></td>
</tr>
<tr>
<td>Model Name</td>
<td>(information only)</td>
</tr>
<tr>
<td>Serial Number</td>
<td>(information only)</td>
</tr>
<tr>
<td>Software Version 1</td>
<td>(information only)</td>
</tr>
<tr>
<td>Software Version 2</td>
<td>(information only)</td>
</tr>
<tr>
<td>Active Source</td>
<td>(information only)</td>
</tr>
<tr>
<td>Signal Format</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Active Source</td>
</tr>
<tr>
<td></td>
<td>Timing (information only)</td>
</tr>
<tr>
<td></td>
<td>H Refresh (information only)</td>
</tr>
<tr>
<td></td>
<td>V Refresh (information only)</td>
</tr>
<tr>
<td></td>
<td>Pixel Clock (information only)</td>
</tr>
<tr>
<td></td>
<td>PIP Source</td>
</tr>
<tr>
<td></td>
<td>(same as Active Source above)</td>
</tr>
<tr>
<td>Laser Hours</td>
<td>(information only)</td>
</tr>
<tr>
<td>System Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wheel 1/2 Speed (information only)</td>
</tr>
<tr>
<td></td>
<td>Atmospheric Pressure (information only)</td>
</tr>
<tr>
<td></td>
<td>AC Voltage (information only)</td>
</tr>
<tr>
<td></td>
<td>Altitude Mode (information only)</td>
</tr>
<tr>
<td></td>
<td>Laser Power (information only)</td>
</tr>
<tr>
<td>Thermal Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intake Temp. (information only)</td>
</tr>
<tr>
<td></td>
<td>DMD Temp. (information only)</td>
</tr>
<tr>
<td></td>
<td>Laser Temp. (information only)</td>
</tr>
<tr>
<td></td>
<td>Fan Speed (information only)</td>
</tr>
<tr>
<td></td>
<td>Water Pump 1 Speed (information only)</td>
</tr>
<tr>
<td></td>
<td>Water Pump 2 Speed (information only)</td>
</tr>
<tr>
<td>Factory Reset</td>
<td>(command, opens a confirmation dialog)</td>
</tr>
</tbody>
</table>

**Notes**

Some of the information in this menu map is summarised. See the actual menu on the projector for full details.

The underlined text represents the factory default value for each setting.

Do NOT reset the settings unless you are sure that you want to restore ALL the current settings to their factory defaults.
Appendix E: Wiring Details

Signal inputs and outputs

VGA

15 way D-type connector

1  R
2  G
3  B
4  unused
5  Digital Ground (H Sync)
6  R Ground
7  B Ground
8  G Ground
9  +5V
10 Digital Ground (V Sync/DDC)
11 unused
12 SDA
13 H Sync
14 V Sync
15 SCL

VGA: pin view of female connector
### HDMI 1 and 2

19 way type A connector

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

**HDMI: pin view of panel connector**
### DisplayPort

*DisplayPort 1.2*

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>ML_Lane 0 (p)</td>
<td>Lane 0 (positive)</td>
</tr>
<tr>
<td>Pin 2</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>Pin 3</td>
<td>ML_Lane 0 (n)</td>
<td>Lane 0 (negative)</td>
</tr>
<tr>
<td>Pin 4</td>
<td>ML_Lane 1 (p)</td>
<td>Lane 1 (positive)</td>
</tr>
<tr>
<td>Pin 5</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>Pin 6</td>
<td>ML_Lane 1 (n)</td>
<td>Lane 1 (negative)</td>
</tr>
<tr>
<td>Pin 7</td>
<td>ML_Lane 2 (p)</td>
<td>Lane 2 (positive)</td>
</tr>
<tr>
<td>Pin 8</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>Pin 9</td>
<td>ML_Lane 2 (n)</td>
<td>Lane 2 (negative)</td>
</tr>
<tr>
<td>Pin 10</td>
<td>ML_Lane 3 (p)</td>
<td>Lane 3 (positive)</td>
</tr>
<tr>
<td>Pin 11</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>Pin 12</td>
<td>ML_Lane 3 (n)</td>
<td>Lane 3 (negative)</td>
</tr>
<tr>
<td>Pin 13</td>
<td>CONFIG1</td>
<td>connected to Ground1</td>
</tr>
<tr>
<td>Pin 14</td>
<td>CONFIG2</td>
<td>connected to Ground1</td>
</tr>
<tr>
<td>Pin 15</td>
<td>AUX CH (p)</td>
<td>Auxiliary Channel (positive)</td>
</tr>
<tr>
<td>Pin 16</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>Pin 17</td>
<td>AUX CH (n)</td>
<td>Auxiliary Channel (negative)</td>
</tr>
<tr>
<td>Pin 18</td>
<td>Hot Plug</td>
<td>Hot Plug Detect</td>
</tr>
<tr>
<td>Pin 19</td>
<td>Return</td>
<td>Return for Power</td>
</tr>
<tr>
<td>Pin 20</td>
<td>DP_PWR</td>
<td>Power for connector (3.3 V 500 mA)</td>
</tr>
</tbody>
</table>
3G-SDI In, 3G-SDI Out
75 ohm BNC

**COMPONENT**
5 x 75 ohm BNC

<table>
<thead>
<tr>
<th>RGBHV</th>
<th>RGsB</th>
<th>YPbPr</th>
<th>YCbCr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Green + Sync</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Blue</td>
<td>Blue</td>
<td>Pb</td>
<td>Cb</td>
</tr>
<tr>
<td>Red</td>
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<td>Pr</td>
<td>Cr</td>
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<td>Hsync</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Vsync</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HDBaseT input**

*HDBaseT input*  
RJ45 socket.

**Notes**

3G-SDI signals are very high speed digital signals which require better quality coaxial cable than conventional analogue video. The data rate is 3 Gigabits per second. In choosing cable length and connectors for any installation the frequency response loss in decibels should be proportional to √f, from 1 MHz, to 3 GHz.

High-bandwidth Digital Content Protection (HDCP) is supported on this input.
**Control connections**

**LAN**

- RJ45 socket

*(Shared with HDBaseT)*

**RS232**

- 9 way D-type connector
- 1 unused
- 2 Received Data (RX)
- 3 Transmitted Data (TX)
- 4 unused
- 5 Signal Ground
- 6 unused
- 7 unused
- 8 unused
- 9 unused

**Notes**

- Only one remote connection (RS232 or LAN) should be used at any one time.
**APPENDIX E: WIRING DETAILS**

### Trigger 1 & Trigger 2
3.5 mm mini jack
- **Tip**: Signal
- **Sleeve**: Ground
- Output: 12V, 200 mA max

### IR input
3.5 mm mini jack
- **Tip**: Signal
- **Ring**: Not connected
- **Sleeve**: Ground

### 3D Sync IN and 3D Sync OUT
75 ohm BNC
- **Sync OUT output voltage**: 5V
- **Sync IN input voltage**: 3.3V~5V

![pin view of female connector]
Appendix F: 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.

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**). 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.

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; 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.

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.

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.

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 into 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.

**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.

**Overlapping region**

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

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

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

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

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

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

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

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

**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.

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

**Synchronization**
A timing signal used to coordinate an action.

**Test pattern**
A still image specially prepared for testing a projection system. It may contain various combinations of colors, lines and geometric shapes.
TheaterScope
An aspect ratio used in conjunction with a special anamorphic lens to display 2.35:1 images packed into a 16:9 frame.

Throw distance
The distance between the screen and the projector.

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

TRC (Throw ratio correction)
A special number used in calculating throw distances and throw ratios when the image does not fill the width of the DMD™.
TRC is the ratio of the DMD™ aspect ratio to the image source aspect ratio:

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

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

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

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.

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.
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:

<table>
<thead>
<tr>
<th>Series name</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGHlite Laser II 3D</td>
</tr>
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</table>

Color system: 3-chip DLP®

Display type: 3 x 0.67" DarkChip™ DMD™

DMD™ specification (native): 1920 x 1200 pixels, +/- 12° tilt angle

Fast transit pixels for smooth grayscale and improved contrast.
## Inputs and outputs

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<tr>
<th>Type</th>
<th>Connector</th>
<th>Qty</th>
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<tbody>
<tr>
<td><strong>Video &amp; Computer</strong></td>
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<td>HDMI 1.4</td>
<td>HDMI</td>
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<td>DisplayPort 1.1a</td>
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<td>HDBaseT/LAN</td>
<td>RJ45</td>
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<td>3G-SDI In</td>
<td>BNC</td>
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<td>3G-SDI Out</td>
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<td>Component Video</td>
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<table>
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<th>Type</th>
<th>Connector</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication &amp; Control</strong></td>
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<td>3D Sync Out</td>
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<tr>
<td>3D Sync In</td>
<td>BNC</td>
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<tr>
<td>LAN (shared with HDBaseT)</td>
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<td>RS232</td>
<td>9-pin D-Sub</td>
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<td>Wired Remote</td>
<td>3.5 mm Stereo Jack</td>
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<tr>
<td>12V Trigger</td>
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</tr>
<tr>
<td>Service Port</td>
<td>USB Type A</td>
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</tr>
</tbody>
</table>

### Bandwidth
- 170 MHz on analog RGB
- 165 Megapixels per second on HDMI
- 295 Megapixels per second on DisplayPort

### Remote control and keypad
- Addressable IR remote control, wireless and wired
- On-board keypad

### Automation control
- RS232
- LAN

### Color temperature
- User selectable from 3200 to 9300 K
**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.

**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.
- Appendix B: Lens Charts - quick reference charts depicting throw distances for commonly used aspect ratios.

See also the lens calculator on the Digital Projector website.

Do not use the short lens hood with the long throw lens.

For further information about using the right lens and hood, see The lens hood in the Installation and Quick-Start Guide.
**Electrical and physical specifications**

- **Power requirements**: 110-240 VAC, 50-60 Hz (single phase)
- **Power Consumption**: 1700 W
- **Thermal Dissipation**: 5800 BTU/hr
- **Fan Noise**: 52 dBA
- **Operating Temperature**: 0°C to 35°C (32 to 95°F)
- **Storage Temperature**: -20°C to 60°C (-4 to 140°F)
- **Operating Humidity**: 20% to 90% non-condensing
- **Weight**: 55 kg (121.3 lbs)
- **Dimensions**: H: 26.5 cm W: 58.5 cm L: 71.0 cm (without lens hood)
  
  H: 10.4 in W: 23.0 in L: 28.0 in (without lens hood)

**Safety & EMC regulations**

- CE, FCC Class A, UL, CCC, KC
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