E-Vision 6900 Series
High Brightness Digital Video Projector

- INSTALLATION AND QUICK-START GUIDE
- CONNECTION GUIDE
- OPERATING GUIDE
- REFERENCE GUIDE
About This Document

Please follow the instructions in this manual carefully to ensure safe and long-lasting use of the projector.
Keep this manual handy for future reference.

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:

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

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

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

Product revision

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

Legal notice

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**Introduction**

**Congratulations on your purchase of this Digital Projection product.**

Your projector has the following key features:

- Support for Side by Side, Frame Packing, Frame Sequential and Top Bottom 3D formats.
- HDBaseT® for reception of uncompressed High Definition Video up to 100 m from the source.
- Swappable color wheels for high brightness and color critical applications.
- DynamicBlack™ for improved black levels in dark scenes.
- Independent control of hue, saturation and gain for primary and secondary colors.
- Vertical and horizontal keystone correction.
- Control via LAN and RS232.
- Motorized lens mount.

A serial number is located on the product label. Please record it here:
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**Projector Overview**

**Front and rear views**

1. Connection panel
2. Rear infrared window
3. Color wheel door
4. Control panel
5. Power switch and power connection
6. Front infrared window
7. Air inlet
8. Indicators
9. Lens mount
10. Adjustable foot
11. Lamp compartment with air outlets
12. Lamp compartment door
13. Air outlet
14. Air inlet and filter
15. Adjustable feet
Connecting The Power Supply

Adjust the VOLTAGE SELECT switch \(^1\) to the required voltage, then firmly push the mains connector into the socket \(^2\).

Voltage selection

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

<table>
<thead>
<tr>
<th>Voltage of power supply used</th>
<th>Position of VOLTAGE SELECT switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 100 - 130 V outlet</td>
<td>200 240V~</td>
</tr>
<tr>
<td></td>
<td>100 130V~</td>
</tr>
<tr>
<td>AC 200-240 V (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.
Remote Control

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

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

---

Notes

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**  
This feature is not supported.

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 1 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...  
The SWAP function is not supported.

Continues on next page...
17 DISPLAYPORT / R / numeric input 4
DisplayPort is not supported.

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

19 3GSDI / B / numeric input 6
3G-SDI is not supported.

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
Component 2 and PIP are not supported.

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.
**Control Panel**

1. **POWER**
   Switches the projector on and off (STANDBY).

2. **INPUT**
   Switches to the next input source.

3. **AUTO SYNC**
   Re-synchronises with the current input signal.

4. **ASPECT**
   Changes the aspect ratio.

5. **CENTER LENS**
   Centers the lens.

6. **SHUTTER**
   Shows and hides the projected image.
   When OFF, the light source is completely switched off and the screen is black.

7. **MENU**
   Displays and exits the OSD.

8. **Arrow buttons & ENTER**
   Navigation buttons used to highlight menu entries in the OSD.
   Press **ENTER** to open or execute the highlighted menu entry.

9. **EXIT**
   Exits the current OSD page and enters the level above.

10. **LENS SHIFT arrow buttons**
    Each of these buttons moves the lens in the specified direction.

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

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

**SHUTTER**

**Behavior**

<table>
<thead>
<tr>
<th>State</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>The shutter is open.</td>
</tr>
<tr>
<td>Steady green</td>
<td>The shutter is closed.</td>
</tr>
</tbody>
</table>

**LAMP 2 / LAMP 1**

**Behavior**

<table>
<thead>
<tr>
<th>State</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>The lamp is switched off.</td>
</tr>
<tr>
<td>Flashing green</td>
<td>The lamp is preparing to switch on.</td>
</tr>
<tr>
<td>Steady green</td>
<td>The lamp is switched on.</td>
</tr>
<tr>
<td>One red flash, pause</td>
<td>No lamp.</td>
</tr>
<tr>
<td>Six red flashes, pause</td>
<td>The lamp failed to switch on.</td>
</tr>
<tr>
<td>Steady red</td>
<td>The lamp is end-of-life.</td>
</tr>
</tbody>
</table>

**STATUS**

**Behavior**

<table>
<thead>
<tr>
<th>State</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No error.</td>
</tr>
<tr>
<td>One red flash, pause</td>
<td>Cover error.</td>
</tr>
<tr>
<td>Two red flashes, pause</td>
<td>Temperature error.</td>
</tr>
<tr>
<td>Three red flashes, pause</td>
<td>System error.</td>
</tr>
<tr>
<td>Four red flashes, pause</td>
<td>Fan error.</td>
</tr>
</tbody>
</table>

**POWER**

**Behavior**

<table>
<thead>
<tr>
<th>State</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>The projector is switched off.</td>
</tr>
<tr>
<td>Flashing green</td>
<td>The projector is warming up.</td>
</tr>
<tr>
<td>Steady green</td>
<td>The projector is switched on.</td>
</tr>
<tr>
<td>Flashing amber</td>
<td>The projector is cooling down.</td>
</tr>
<tr>
<td>One amber flash, pause</td>
<td>Keypad Lock warning.</td>
</tr>
<tr>
<td>Steady amber</td>
<td>The projector is in Network STANDBY mode (&lt;3W).</td>
</tr>
<tr>
<td>Steady red</td>
<td>The projector is in Eco STANDBY mode (&lt;0.5W).</td>
</tr>
</tbody>
</table>
Changing The Lens, Lamps, Filter And Color Wheel

Inserting a new lens

1. Remove the front and rear lens caps.

2. Position the lens so that the labels are at the top, and gently insert it all the way into the lens mount.

3. Push the lens in firmly and turn it clockwise until it clicks into place.

Removing the lens

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

2. Remove the lens.

Notes

- Always allow the lamp to cool for 5 minutes before:
  - disconnecting the power
  - moving the projector

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

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

- The lens is shipped separately.

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

1. Unscrew the captive screw holding the lamp compartment door.

2. Remove the door to reveal the lamp modules.

3. Unscrew the three captive screws holding each lamp module in its place.

4. Pull out the old lamp modules and insert the new ones.

5. Use the three captive screws on each module to hold it into position, then replace the lamp compartment cover and secure it with the screw.

Notes

- Always allow the lamp to cool for 5 minutes before:
  - disconnecting the power
  - moving the projector

- The lamp must be changed only by suitably qualified personnel.

- The projector will shut down if the cover is opened whilst in operation.

- The filters should be changed at the same time as the lamp is changed.
### Changing the filter

1. Loosen the captive screw at the bottom of the filter door.

2. Remove the door and the filter as shown in the illustration.

3. Replace the filter, then close the door and tighten the screw to secure it in place.

---

**Notes**

Always allow the lamp to cool for 5 minutes before:
- disconnecting the power
- moving the projector

The lamp must be changed only by suitably qualified personnel.

The projector will shut down if the cover is opened whilst in operation.

The filters should be changed at the same time as the lamp is changed.
Changing the color wheel

1. Slide open the lamp compartment cover as shown in the picture.

2. Unscrew the two captive screws securing the color wheel.

3. Lift and pull the color wheel handle to remove the color wheel.

4. Insert a new color wheel, lower the handle, fasten the screws and replace the lamp compartment cover.

Notes

Always allow the lamp to cool for 5 minutes before:
- disconnecting the power
- moving the projector

The color wheel must be changed only by suitably qualified personnel.

The projector will shut down if the cover is opened whilst in operation.
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. Alternatively, six M4 bolts (max length 16 mm [0.6 in]) can be used to attach the projector to a ceiling mount (optional accessory).

Notes

- Always allow the lamp to cool for 5 minutes before:
  - disconnecting the power
  - moving the projector

- Ensure that there is at least 50cm (20in) of space between the ventilation outlets and any wall, and 10cm (4in) on all other sides.
  - If ceiling mounting, ensure there is 30cm (12in) of space between the projector and ceiling.

- Do not stack the projectors.

- Do not tilt the projector more than ±10° from side to side when in use, as this may cause serious lamp failure, damage the lamp module and cause extra cost on replacement.

Location of the ceiling mount holes at the bottom of the projector
Operating The Projector

Switching the projector on

- Connect the power cable between the mains supply and the projector. Switch on at the switch next to the power connector.
- Wait until the self-test has completed and the Power indicator on the projector control panel shows amber. The lamp will be off and the projector will be in STANDBY mode.
- Press \( \text{on the control panel or POWER ON on the remote control.} \)

The Power indicator on the control panel will flash green for a few seconds whilst the lamp comes up to full brightness. When the projector is ready for use, the Power indicator will show steady green.

Selecting an input signal or test pattern

Input signal

- Connect an image source to the projector. The signal should be automatically detected by the projector, and should be displayed within a two or three seconds.
- If more than one signal is connected, then select the image you want to display:
  - On the control panel, press [INPUT] to cycle through the inputs,
  or
  - on the remote control, press the button for the input of your choice,
  or
  - on any device, press [MENU] to show the OSD (On-screen Display), then highlight [Input], then press [OK/ENTER] to open the list of inputs.

Test pattern

To display a test pattern:

1. Press [MENU] to open the OSD. Use the [UP] and [DOWN] arrow buttons to highlight [Test Pattern], then press [OK/ENTER] to open the list of test patterns. Alternatively, on the remote control press [TEST] to open the same list.
2. Use the [UP] and [DOWN] arrow buttons to highlight the test pattern you wish to display and press [OK/ENTER].

Notes

Before switching on the projector for the first time, make sure the electric circuit is grounded. Poor grounding may damage the projector.

Always allow the lamp to cool for 5 minutes before:
- disconnecting the power
- moving the projector

For full details of how to connect an image source to the projector, see the Connection Guide.

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

**Zoom**
- Use the **ZOOM +/-** buttons on the control panel or the **ZOOM IN/OUT** buttons on the remote control to adjust the lens so that the image fills the screen.

**Focus**
- Use the **FOCUS +/-** buttons on the control panel or the **FOCUS IN/OUT** buttons on the remote control to adjust the lens until the image is sharp.

**Shift**
- Use the **LENS SHIFT** arrow buttons on the control panel to adjust the position of the image,
  - or press the **SHIFT** button on the remote control then use the arrow buttons to adjust the position of the image.

Adjusting the image

**Orientation**
- Use the **Orientation** settings in the **Setup** menu.

**Aspect ratio**
- Press the **ASPECT** button on the control panel to cycle through all the available settings.
  - or
- use the **Aspect Ratio** setting in the **Geometry** menu.

**Picture**
- Open the **Image** menu, then use the sliders to adjust brightness, contrast etc.

---

Notes

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

- Press \( \text{power} \) button on the control panel or POWER OFF on the remote control, then press the button a second time within 5 seconds to confirm.
  
  The lamp will go off, and the Power indicator on the control panel will flash amber for a few seconds whilst the lamp cools. The Power indicator on the control panel will then show amber and the projector will be in Standby mode.

- Switch the projector off completely from the switch next to the power connector. Disconnect the power cable from the projector.

Notes

Always allow the lamp to cool for 5 minutes before:
- disconnecting the power
- moving the projector
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Signal Inputs And Outputs

1. **HDBaseT/LAN**
   Receives digital signal from HDBaseT-compliant devices.

2. **HDMI II**
   This HDMI 1.4 input supports HDCP 1.1 and DVI 1.0.

3. **DVI-D**
   This input can receive digital (DVI-D) signal from a compatible source.
   Supports HDCP.

4. **Monitor Out**
   Connect an analog monitor cable (VGA) to the 15-pin D-type connector.
   The connected monitor will display signal received via the VGA input.

5. **HDMI I**
   This HDMI 1.4 input supports HDCP 1.1 and DVI 1.0.

6. **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.

7. **Component**
   Connect a set of RGBsB, RGBHV or YCbCr cables to the BNC connectors.

---

Notes

For a complete listing of pin configurations for all signal and control connectors, see *Wiring Details* later in this Guide.
Control Connections

1. **HDBaseT/LAN**
   Receives digital signal from HDBaseT-compliant devices.
   All of the projector’s features can be controlled via a LAN connection, using commands described in the Remote Communications Guide.

2. **Service**
   The USB Service port is used for firmware updates only.

3. **Screen Trigger**
   The Trigger output can be connected to an electrically operated screen, automatically deploying the screen when the projector is switched on, and retracting the screen when the projector is switched to standby.

4. **RS-232**
   All of the projector’s features can be controlled via a serial connection, using commands described in the Remote Communications Guide.

5. **3D Sync Out**
   Connect to a Z Screen or 3D IR emitter as appropriate.

6. **3D Sync In**
   Connect the 3D sync from your graphics card or server.

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

---

Notes

Plugging in the remote control cable will disable infrared transmission.
Using The Projector

Main menu

- Input
  Press ENTER to open the list of available inputs.
  Use the UP ▲ and DOWN ▼ arrow buttons to select an input from the list, then press ENTER to confirm your choice.
  Press MENU to return to the main menu.

- Test Pattern
  Choose from:
  ...Off, White, Black, Red, Green, Blue, Checkerboard, Crosshatch, V Burst, H Burst, Color Bar, H Ramp...
  Use the LEFT ◄ and RIGHT ► arrow buttons to switch between values.

- Lens, Image, Color, Geometry, 3D, Lamps, Setup and Information
  Press ENTER to open these menus and access various settings.

Notes

If no input is connected, the Image menu will be unavailable.

Some settings are associated with the current input and the value of the Image Mode setting (Bright, Presentation or Video). The projector automatically stores values of such settings to reuse when an Input / Image Mode combination is selected again. For example, if you increase the Contrast value while on the DVI-D input with Image Mode set to Bright, the next time you use the DVI-D input with Image Mode set to Bright, the projector will automatically set the same Contrast value.

Settings NOT associated with an Input / Image Mode combination are called global settings and are indicated with a globe icon 🌍 in the Menu Map further in this guide.
Lens menu

- Lens Lock
- Lens Control
  - Lens Control operates in Zoom/Focus and Shift mode.
  - When in Zoom/Focus mode:
    - Use the UP and DOWN arrow buttons to adjust Zoom.
    - Use the LEFT and RIGHT arrow buttons to adjust Focus.
  - When in Shift mode, use the arrow buttons to adjust Shift.
  - Press ENTER to switch between Shift and Zoom/Focus mode.
- Lens Type
  - Choose UST or non-UST lens.
- Center Lens
- Lens Memory
  - Open a submenu to save, load or clear a lens preset.

### Lens Control

<table>
<thead>
<tr>
<th>Lens Control</th>
<th>Zoom</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter to Shift</td>
<td>▲</td>
<td>▼</td>
</tr>
</tbody>
</table>

### Lens Memory

<table>
<thead>
<tr>
<th>Lens Memory</th>
<th>Save Memory</th>
<th>Load Memory</th>
<th>Clear Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Execute</td>
<td>Execute</td>
<td>Execute</td>
<td>Execute</td>
</tr>
</tbody>
</table>

### Notes

- See Lens Memory further in this guide.
Lens menu continued from previous page

**Lens Memory**

These menus allow 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.
**Image menu**

**Image Mode**
Choose from **Bright**, **Presentation** and **Video**.
Press **ENTER** to open the list.
Use the **UP ▲** and **DOWN ▼** arrow buttons to select an image mode from the list, then press **ENTER** to confirm your choice.
Press **MENU** to return to the main menu.

**Brightness and Contrast**
Highlight the setting you wish to edit, and then press the **LEFT ◀** or **RIGHT ►** arrow button to open the slider.
Use the **LEFT ◀** and **RIGHT ►** arrow buttons to adjust the slider.
Press **MENU** to close the slider.
Image menu continued from previous page

**Gamma**

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

**Dynamic Black**

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

**Saturation, Hue, Sharpness and Noise Reduction**

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

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

Press MENU to close the slider.
Image menu continued from previous page

**Position and Phase**
Press ENTER to open a submenu.

- **VGA Setup**
  
  H Total, H Start, H Phase, V Start
  Adjust these settings as required to suit the incoming image.

- **Digital Alignment**
  
  Digital Zoom, Digital Pan, Digital Scan
  Select a digital alignment control.

  **Reset**
  Press ENTER to reset all Digital Alignment settings to zero.

- **H/V Alignment**
  
  H Zoom, V Zoom, H Shift, V Shift
  Select an alignment control.

  **Reset**
  Press ENTER to reset all H/V Alignment settings to zero.

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

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

Press MENU to close the slider.

**Resync**
Press ENTER to force the projector to resynchronize with the current input.

### Notes

- **VGA Setup** is only accessible if the projector is connected to a VGA or Component input source.

- Digital Pan and Digital Scan will only work if Digital Zoom is greater than zero.

- H Shift will only work if the image has been reduced horizontally using H Zoom. Likewise, V Shift will only work once V Zoom has been applied.
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 menu continued from previous page**

**Color Temperature**
Choose a value from **5500K** (warmer) to **9300K** (cooler) or **Native** (no correction).

<table>
<thead>
<tr>
<th>Color Space</th>
<th>Native</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color Temperature</td>
<td>5500K</td>
</tr>
<tr>
<td>Trim</td>
<td>6500K</td>
</tr>
<tr>
<td>Hue / Saturation / Gain</td>
<td>7800K, 9300K</td>
</tr>
</tbody>
</table>

**Notes**
Color menu continued from previous page

**Trim**
Adjust the RGB lift and gain settings to improve the color balance of the projected image.

Highlight the setting you wish to edit, and then either press **ENTER** to access it, or use the **LEFT** and **RIGHT** arrow buttons to switch between values.

**Hue / Saturation / Gain**
Press **ENTER** to open a submenu, then use the **LEFT** and **RIGHT** arrow buttons to move the sliders.

**Hue**
Adjust hue of the main color as shown below:

<table>
<thead>
<tr>
<th>Main color</th>
<th>Hue</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Magenta ➤➤ Yellow</td>
</tr>
<tr>
<td>G</td>
<td>Yellow ➤➤ Cyan</td>
</tr>
<tr>
<td>B</td>
<td>Cyan ➤➤ Magenta</td>
</tr>
<tr>
<td>C</td>
<td>Green ➤➤ Blue</td>
</tr>
<tr>
<td>M</td>
<td>Blue ➤➤ Red</td>
</tr>
<tr>
<td>Y</td>
<td>Red ➤➤ Green</td>
</tr>
</tbody>
</table>

**Saturation**
When you adjust the saturation of the main color, the selected color becomes lighter or thicker.

**Gain**
When you adjust the gain of the main color, the selected color becomes brighter or darker.
Hue, Saturation and Gain explained

The levels of hue, saturation and gain 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.
**Geometry menu**

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

### Aspect Ratio

Choose from:
- 5:4
- 4:3
- 16:10
- 16:9
- 1.88:1
- 2.35:1
- TheaterScope
- Source
- Unscaled

To change the aspect ratio:
1. From the **Main** menu, open **Aspect Ratio**.
2. From the list on the right, select a new aspect ratio and press **ENTER**.
Geometry menu continued from previous page

Keystone

Use the **H Keystone** and **V Keystone** settings to compensate for any distortion caused by the projector being in a different horizontal or vertical plane to the screen.

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

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

Press **MENU** to close the slider.

Keystone example

1. The projector is positioned at an angle
2. The resulting image is distorted
3. The image is corrected when **V Keystone** is applied
**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 \textbf{H Keystone} value using the \textbf{RIGHT} arrow button.

2. **Projector to the right**
   - The projector is positioned to the right of the screen.
   - To correct, apply a negative \textbf{H Keystone} value using the \textbf{LEFT} arrow button.

3. **Projector high**
   - The projector is positioned above the screen at a downward angle.
   - To correct, apply a negative \textbf{V Keystone} value using the \textbf{LEFT} arrow button.

4. **Projector low**
   - The projector is positioned below the screen at an upward angle.
   - To correct, apply a positive \textbf{V Keystone} value using the \textbf{RIGHT} arrow button.

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

*Horizontal and vertical keystone corrections*
**Geometry menu continued from previous page**

**Corner Adjustment**

Use the arrow buttons to highlight the corner you wish to edit.

Press **ENTER** to enter edit mode, then use the arrows to change **H** and **V** values.

Reset the currently highlighted corner by pressing and holding **ENTER** for two seconds.

Exit edit mode with **EXIT**.
Geometry menu continued from previous page

Overscan
Set to **On** to compensate for noisy or badly defined image edges.

![Image with noisy edges](image1.png)

![Overscanned image](image2.png)

---

Notes

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

- **3D Format** — Off, Auto, Side by Side, Top and Bottom and Frame Sequential.
- **DLP Link** — On (if you are using 3D glasses that can utilise the DLP Link® signal embedded in the image) and Off
- **Eye Swap** — Normal and Reverse (set to Reverse if the left- and right-eye images are displayed in the wrong order)
- **3D 24Hz Display** — set to 96Hz or 144Hz depending on the source. This setting is disabled unless a 24Hz 3D input is detected.
- **Sync Reference** — set to Internal or External as required.
- **Sync Delay** — this setting is only available if Sync Reference is set to External.
  Set a value between 0 and 100 ms.

The 3D Swap setting explained
The outgoing 3D frames are in pairs - the dominant frame being presented first. You can determine which frame should be the dominant one.
By convention the default setting is **Left**.

### Notes
- If **3D Format** is set to Off, or if no 3D signal is detected in Auto mode, the other 3D settings will be unavailable.
- **Frame Sequential** is supported on the DVI input only.
- 3D video is only possible on the HDMI, HDBaseT and DVI inputs.
- The **Frame Packing** format is automatically detected by the projector.
- See also **3D types** 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:

- **Frame Packing**
  This format will be detected, re-synchronised, frame-multiplied and displayed at 144 Hz with the left eye / right eye dominance automatically extracted from the video data.

- **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.

- **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.

- **Frame Sequential**
  An example of Frame Sequential would be 60Hz (30 frames per eye in Left-Right sequence (L1, R1, L2, R2…) with 2x Frame Rate Multiplication, resulting in a displayed sequence at 120 Hz (L1, R1, L1, R1, L2, R2, L2, R2…). For sequential 3D, the projector will generate an output sync, but it may then be necessary to manually reset the dominance each time the player is started.
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.
Lamps menu

- **Lamp Mode**
  Choose from **Auto 1, Dual, Lamp 1 and Lamp 2**.

- **Power Mode**
  **Eco** will automatically set the lamp power to 80%. **Normal** will set the power to 92%. Set to **Custom** if you wish to adjust the power manually, from 80% to 100%.

- **Custom Power Level**
  Use the **LEFT** and **RIGHT** arrow buttons to set lamp power. This setting is only available if **Power Mode** is set to **Custom**.

- **High Altitude**
  **On** increases the fan speed to compensate for reduced air density at high altitude.

The following menu items show information only:

- **Lamp 1 Status, Lamp 2 Status**
- **Lamp 1 Time, Lamp 2 Time**
- **Lamp 1 Life Remaining, Lamp 2 Life Remaining**

<table>
<thead>
<tr>
<th>Lamps &gt;&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp Mode</td>
</tr>
<tr>
<td>Power Mode</td>
</tr>
<tr>
<td>Custom Power Level</td>
</tr>
<tr>
<td>High Altitude</td>
</tr>
<tr>
<td>Lamp 1 Status</td>
</tr>
<tr>
<td>Lamp 2 Status</td>
</tr>
<tr>
<td>Lamp 1 Time</td>
</tr>
<tr>
<td>Lamp 2 Time</td>
</tr>
<tr>
<td>Lamp 1 Life Remaining</td>
</tr>
<tr>
<td>Lamp 2 Life Remaining</td>
</tr>
</tbody>
</table>

Notes
Setup menu

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

- **Cooling Condition**
  Choose from Table, Ceiling, Upward and Downward.

- **Network**
  Set up a LAN network connection.

- **RS232**
  Set up a serial connection.

- **Security**
  Set up Control Panel Lock and Security Lock.

- **Filter**
  Set up filter exchange intervals and reset the filter timer.

- **EDID Mode**
  Configure EDID for each input.

- **Projector ID Control**
  Set up ID Control Enable and Control ID Number.

- **System**
  Adjust various system settings.

- **Screen Format**
  Set to 16:9, 16:10 or 4:3. Use this setting to adjust the projected image to your screen size.

- **Screen Shift**
  Set this to move the image within the unused area of the DMD depending on the Screen Format setting. For example, if the native resolution is WUXGA:
  - when Screen Format is set to 16:9, Screen Shift will move the image up and down;
  - when Screen Format is 4:3, Screen Shift will move the image left and right;
  - when Screen Format is 16:10, Screen Shift will be disabled.

- **High Altitude**
  Set to On to increase fan speed if working at high altitudes, where air density is reduced.
Setup menu continued from previous page

**Network**
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 set to **On**, it will not be possible to edit **IP Address**, **Subnet Mask**, **Gateway** or **DNS**.

- If **DHCP** is set to **Off**:
  1. Edit **IP Address**, **Subnet Mask**, **Gateway** and **DNS** as required.
  2. Select **Apply** and press **ENTER**.

**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.

**RS232**
- **Baud Rate**
  Choose between 38400, 19200 and 9600.

- **Channel**
  Choose between **Local** and **HDBaseT**.

---

### Setup >> Network

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>192.168.0.100</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Gateway</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>DNS</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>DHCP</td>
<td>Off</td>
</tr>
<tr>
<td>Standby Power</td>
<td>On</td>
</tr>
<tr>
<td>MAC Address</td>
<td>00:18:37:16:ef:ca</td>
</tr>
</tbody>
</table>

### Setup >> RS232

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baud Rate</td>
<td>9600</td>
</tr>
<tr>
<td>Channel</td>
<td>Local</td>
</tr>
</tbody>
</table>
Setup menu continued from previous page

Security

Control Panel Lock
Use this setting to lock the control panel keys.
To unlock the keys, press the DOWN arrow button and hold for 5 seconds.

Security Lock
When the Security Lock is enabled, a security password will need to entered before the projector can be used, or before the lock can be disabled.
When setting the lock for the first time, the password will need to be entered twice, to ensure that it has been entered correctly.

Filter
This menu allows you to set up a reminder that the filters are due for replacement and to reset the filter timer.
• Filter Message
  Choose from Off, 100 hours, 200 hours, 500 hours and 1000 hours.
• Filter Reset
  Press ENTER to reset the timer.

Notes
The password consists of a combination of five presses of the arrow keys.

Find details about changing filters in the Installation and Quick-Start Guide.
Setup menu continued from previous page

**EDID Mode**

For each input, choose from:

- Default
- 1024 x 768 @60
- 1280 x 720 @60
- 1280 x 800 @60
- 1280 x 1024 @60
- 1600 x 1200 @60
- 1680 x 1050 @60
- 1920 x 1080 @60

**Projector ID Control**

<table>
<thead>
<tr>
<th>Setup &gt;&gt; Projector ID Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID Control Enable</td>
</tr>
<tr>
<td>Control ID Number</td>
</tr>
</tbody>
</table>

Notes
**Setup menu continued from previous page**

**System**

- **Auto-Source**
  If this setting is **On**, the projector will automatically search for an active input source.

- **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 remote control.

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

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

- **Trigger**
  Choose from **Screen, 16:9, TheaterScope, 4:3, 4:3 Narrow** or **RS232** to determine what will cause the trigger output to activate.

- **Infrared Sensor**
  Choose from **Both**, **Front**, **Rear**, **HDBaseT** and **Off**.

- **Message Box**
  Switch this off if you wish to avoid system messages appearing on the screen during projection.

- **Anti-Dust Shutter**

- **Menu Position**
  Determine where the OSD should appear on the screen when activated.
  Choose from **Center**, **Top Left**, **Top Right**, **Bottom Left** and **Bottom Right**.

- **OSD Timeout**
  Determine how long the OSD should remain on the screen if no buttons are pressed. Choose **Always On** to disable this feature.

- **Language**
  Change the OSD language.
Information menu
This menu gives information about software and hardware configuration, input source and lamp operating times. It also allows you to restore the factory default settings.

Source Information
This page provides information about the currently selected input source.

Factory Reset
To restore the factory default settings:
1. Navigate to Factory Reset and press ENTER.
2. When prompted, use the LEFT ◄ and RIGHT ► arrow buttons to highlight the OK button and then press ENTER to confirm your choice.
### Menu Map

#### Menu Submenus and controls

#### INPUT 📲
- **HDMI 1, HDMI 2, DVI-D, VGA, Component, HDBaseT**

#### TEST PATTERN 📄
- **Off, White, Black, Red, Green, Blue, Checkerboard, Crosshatch, V Burst, H Burst, Color Bar, H Ramp**

#### LENS 🎥
- **Lens Lock**: On, Off
- **Lens Control**: Zoom / Focus, Shift V / Shift H
- **Lens Type**: non-UST Lens, UST Lens
- **Center Lens (command)**
- **Lens Memory**: Save Memory: Memory 1 to Memory 10, Load Memory: Memory 1 to Memory 10, Clear Memory: Memory 1 to Memory 10

### Notes
- Some of the information in this menu map is summarised. See the actual menu on the projector for full detail.
- Some menu options and controls may not be available due to settings in other menus. These will be lighter in color in the OSD.
- Where it would be helpful, some menu options are described in more detail earlier in this operating guide.
- Some settings are associated with the current input and the value of the **Image Mode** setting (Bright, Presentation, or Video). The projector automatically stores values of such settings to reuse when an **Input / Image Mode** combination is selected again. For example, if you increase the **Contrast** value while on the DVI-D input with **Image Mode** set to Bright, the next time you use the DVI-D input with **Image Mode** set to Bright, the projector will automatically set the same **Contrast** value.
- Settings NOT associated with an **Input / Image Mode** combination are called **global settings** and are indicated with a globe icon 🌎 in this section.
### Menu

**Submenus and controls**

<table>
<thead>
<tr>
<th>Menu</th>
<th>Submenus and controls</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMAGE</td>
<td><strong>Image Mode:</strong> Bright, Presentation, Video</td>
<td>![Icon] Some of the information in this menu map is summarised. See the actual menu on the projector for full detail.</td>
</tr>
<tr>
<td></td>
<td>Brightness, Contrast: sliders, 0 to 200 (100)</td>
<td>![Icon] Some menu options and controls may not be available due to settings in other menus. These will be shaded grey on the actual menu.</td>
</tr>
<tr>
<td></td>
<td>Gamma: 1.0, 1.8, 2.0, 2.2, 2.35, 2.5, S Curve</td>
<td>![Icon] Where it would be helpful, some menu options are described in more detail earlier in this operating guide.</td>
</tr>
<tr>
<td></td>
<td>Dynamic Black: On, Off</td>
<td>![Icon] Some settings are associated with the current input and the value of the Image Mode setting (Bright, Presentation or Video). The projector automatically stores values of such settings to reuse when an Input/Image Mode combination is selected again. For example, if you increase the Contrast value while on the DVI-D input with Image Mode set to Bright, the next time you use the DVI-D input with Image Mode set to Bright, the projector will automatically set the same Contrast value.</td>
</tr>
<tr>
<td></td>
<td>Saturation, Hue: sliders, 0 to 200 (100)</td>
<td>Settings NOT associated with an Input/Image Mode combination are called global settings and are indicated with a globe icon 🌍 in this section.</td>
</tr>
<tr>
<td></td>
<td>Sharpness: slider, 0 to 31</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Noise Reduction: slider, 0 to 15</td>
<td></td>
</tr>
<tr>
<td><strong>Position And Phase</strong></td>
<td>VGA Setup: H Total, H Start, H Phase, V Start: sliders, 0 to 200 (100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital Zoom: slider</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital Pan: slider</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital Scan: slider</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reset (command)</td>
<td></td>
</tr>
<tr>
<td><strong>H/V Alignment</strong></td>
<td>H Zoom: slider</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V Zoom: slider</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H Shift: slider</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V Shift: slider</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reset (command)</td>
<td></td>
</tr>
</tbody>
</table>
### COLOR

**Color Space:** Auto, YPbPr, YCbCr, RGB-PC, RGB-Video  
**Color Temperature:** Native, 5400K, 6500K, 7500K, 9300K  
**Trim:** Red Lift, Green Lift, Blue Lift, Red Gain, Green Gain, Blue Gain: sliders, 0 to 200 (100)  
**Hue / Saturation / Gain**  
- Red: Hue, Saturation, Gain: sliders, 0 to 200 (100)  
- Green: Hue, Saturation, Gain: sliders, 0 to 200 (100)  
- Blue: Hue, Saturation, Gain: sliders, 0 to 200 (100)  
- Cyan: Hue, Saturation, Gain: sliders, 0 to 200 (100)  
- Magenta: Hue, Saturation, Gain: sliders, 0 to 200 (100)  
- Yellow: Hue, Saturation, Gain: sliders, 0 to 200 (100)  
- White: Hue, Saturation, Gain: sliders, 0 to 200 (100)  
**Reset (command)**

### GEOMETRY

**Aspect Ratio:** 5:4, 4:3, 16:10, 16:9, 1.88:1, 2.35:1, TheaterScope, Source, Unscaled  
**Keystone:**  
- H Keystone, V Keystone: sliders, -30 to 30 (0)  
- Reset (command)  
**Corner Adjustment:** Selection and adjustment of each individual corner  
**Overscan:** On, Off

### 3D

**3D Format:** Off, Auto, Side by Side, Top and Bottom, Frame Sequential  
**DLP Link:** On, Off  
**Eye Swap:** Normal, Reverse  
**3D 24Hz Display:** 96Hz, 144Hz  
**Sync Reference:** Internal, External  
**Sync Delay:** slider, 0 to 100

---

**Notes**

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- Where it would be helpful, some menu options are described in more detail earlier in this operating guide.
- Some settings are associated with the current input and the value of the Image Mode setting (Bright, Presentation or Video). The projector automatically stores values of such settings to reuse when an Input / Image Mode combination is selected again. For example, if you increase the Contrast value while on the DVI-D input with Image Mode set to Bright, the next time you use the DVI-D input with Image Mode set to Bright, the projector will automatically set the same Contrast value.
- Settings NOT associated with an Input / Image Mode combination are called global settings and are indicated with a globe icon in this section.
Digital Projection E-Vision 6900 Series

LAMPS

Lamp Mode: Auto 1, Dual, Lamp 1, Lamp 2
Power Mode: Eco, Normal, Custom
Custom Power Level: 80% to 100%
Information only: Lamp 1 Status, Lamp 2 Status
Lamp 1 Time, Lamp 2 Time
Lamp 1 Life Remaining, Lamp 2 Life Remaining

SETUP

Orientation: Desktop Front, Desktop Rear, Ceiling Front, Ceiling Rear
Cooling Condition: Table, Ceiling, Upward, Downward
Network
   IP Address: numeric input (default IP address is 192.168.0.100)
   Subnet Mask, Gateway, DNS: numeric input
   DHCP: On, Off
   Apply (command)
   Standby Power: On, Off
   Information only: MAC Address
RS232
   Baud Rate: 38400, 19200, 9600
   Channel: Local, HDBaseT
Security
   Control Panel Lock: On, Off
   Security Lock: On, Off
Filter
   Filter Message: Off, 100 hours, 200 hours, 500 hours, 1000 hours
   Filter Reset (command)
EDID Mode
   HDMI 1, HDMI 2, DVI-D, VGA, HDBaseT: Default, 1024 x 768 @60, 1280 x 720 @60,
   1280 x 800 @60, 1280 x 1024 @60, 1600 x 1200 @60, 1680 x 1050 @60, 1920 x 1080 @60
Projector ID Control
   ID Control Enable: On, Off
   Control ID Number: slider, 1 to 99

Notes

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

Some menu options and controls may not be available due to settings in other menus. These will be shaded grey on the actual menu.

Where it would be helpful, some menu options are described in more detail earlier in this operating guide.

Some settings are associated with the current input and the value of the Image Mode setting (Bright, Presentation or Video). The projector automatically stores values of such settings to reuse when an Input/Image Mode combination is selected again. For example, if you increase the Contrast value while on the DVI-D input with Image Mode set to Bright, the next time you use the DVI-D input with Image Mode set to Bright, the projector will automatically set the same Contrast value.

Settings NOT associated with an Input/Image Mode combination are called global settings and are indicated with a globe icon in this section.
(SETUP menu continued)

**System**
- Auto Source: On, Off
- Auto Power Off: On, Off
- Auto Power On: On, Off
- Startup Logo: On, Off
- Blank Screen: Logo, Blue, Black
- Trigger: On, Off
- Infrared Sensor: Both, Front, Rear, HDBaseT, Off
- Message Box: On, Off
- Anti-Dust Shutter: On, Off
- Menu Position: Center, Top Left, Top Right, Bottom Left, Bottom Right
- OSD Timeout: Always On, 10 Seconds, 30 Seconds, 60 Seconds
- Language: English, Français, Español, Deutsch, Português, 简体中文, 繁體中文, 日本語, 한국어

**Screen Format:** 16:10, 16:9, 4:3
**Screen Shift:** slider, range depends on Screen Format value
**High Altitude:** On, Off

**INFORMATION**

**Model, Serial Number, Software Version 1, Software Version 2, Filter Time, Power On Time**

**Source Information:**
- Active Source, Pixel Clock, Signal Format, H/V Refresh Rate, Sync Type, Sync Polarity, Scan Type, Video Type

**Factory Reset (command)**

**Notes**
- Some of the information in this menu map is summarised. See the actual menu on the projector for full detail.
- Some menu options and controls may not be available due to settings in other menus. These will be shaded grey on the actual menu.
- Where it would be helpful, some menu options are described in more detail earlier in this operating guide.
- Some settings are associated with the current input and the value of the **Image Mode** setting (Bright, Presentation or Video). The projector automatically stores values of such settings to reuse when an **Input / Image Mode** combination is selected again. For example, if you increase the **Contrast** value while on the DVI-D input with **Image Mode** set to Bright, the next time you use the DVI-D input with **Image Mode** set to Bright, the projector will automatically set the same **Contrast** value.

Settings NOT associated with an **Input / Image Mode** combination are called **global settings** and are indicated with a globe icon 🌍 in this section.
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.

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

### Diagram 1
- **1. Casing**
- **2. Light shield**
- **3. Pond of mirrors**
- **4. Array**

### Diagram 2
- **1. Support posts**
- **2. Mirror element**
- **3. Torsion hinges**
- **4. Offset address electrode**

Notes

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

1. Projection lens
2. Incoming light from the illumination module
3. Mirror element tilted to the right
4. Mirror element tilted to the left
5. Reflected light, left tilt
6. Light dump
7. Reflected light, right tilt

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
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

- 2.35:1 (Scope) = 817 pixels
- 2.35:1 (Scope) = 1037 pixels
- 1.85:1 = 1080 pixels
- 16:9 = 1.78:1 = 1200 pixels
- full width = 1920 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

Max possible image height = 1080 pixels
Full height = 1200 pixels

Notes
WUXGA images displayed full height

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

\[ W = D \times 0.92 \quad H = D \times 0.39 \]

1.85:1

\[ W = D \times 0.88 \quad H = D \times 0.47 \]

16:9 = 1.78:1

\[ W = D \times 0.87 \quad H = D \times 0.49 \]

1.66:1 (Vista)

\[ W = D \times 0.86 \quad H = D \times 0.52 \]

16:10 = 1.6:1 (native aspect ratio for WUXGA projectors)

\[ W = D \times 0.85 \quad H = D \times 0.53 \]
**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)**
   \[ W = H \times 2.35, H = W \times 0.426 \]

---

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

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

Notes

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

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

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

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

The image can be flipped for rear projection (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.

Shifting the lens up (rising front)

Centered lens

Shifting the lens down (falling front)
Any single adjustment outside the ranges specified on the following page may result in an unacceptable level of distortion, particularly at the corners of the image, due to the image passing through the periphery of the lens optics.

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

*Full horizontal or vertical shift*

*Combined shift is reduced*
**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.

Original film, 24 fps

Field 1 (odd)

Field 2 (even)

Resulting video, 30 fps

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
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<tr>
<td>D</td>
<td>D</td>
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<td>D</td>
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</tbody>
</table>

Notes
### 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>
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<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
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</tr>
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<td>C</td>
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</tr>
<tr>
<td>D</td>
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<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>Focus range</th>
<th>Lens shift</th>
<th>Lens extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.38 : 1 fixed (UST)</td>
<td>117-341</td>
<td>0.82 m - 2.71 m</td>
<td>none</td>
<td>292.5 mm</td>
</tr>
<tr>
<td>0.75 - 0.93 : 1 zoom</td>
<td>115-339</td>
<td>1.02 m - 12.7 m</td>
<td>V: 0.5 (U) 0 (D) frame H: 0.1 (L) 0.1 (R) frame</td>
<td>59.4 mm</td>
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<tr>
<td>0.76 : 1 fixed</td>
<td>112-499</td>
<td>0.81 m - 5.08 m</td>
<td>none</td>
<td>30 mm</td>
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<td>1.25 - 1.79 : 1 zoom</td>
<td>112-500</td>
<td>1.33 m - 11.73 m</td>
<td>V: 0.5 (U) 0 (D) frame H: 0.1 (L) 0.1 (R) frame</td>
<td>36.5 mm</td>
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<td>1.72 - 2.27 : 1 zoom</td>
<td>112-501</td>
<td>1.83 m - 14.9 m</td>
<td>V: 0.5 (U) 0 (D) frame H: 0.1 (L) 0.1 (R) frame</td>
<td>10.8 mm</td>
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<tr>
<td>2.22 - 3.67 : 1 zoom</td>
<td>112-502</td>
<td>2.36 m - 24.2 m</td>
<td>V: 0.5 (U) 0 (D) frame H: 0.1 (L) 0.1 (R) frame</td>
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<tr>
<td>3.58 - 5.38 : 1 zoom</td>
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<td>3.8 m - 35.35 m</td>
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<td>5.31 - 8.26 : 1 zoom</td>
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<td>5.59 m - 54.8 m</td>
<td>V: 0.5 (U) 0 (D) frame H: 0.1 (L) 0.1 (R) frame</td>
<td>87.3 mm</td>
</tr>
</tbody>
</table>

**Notes**

- Throw distance calculations are based on the distance from the outer end of the lens, which will vary from lens to lens.
- The 0.38 : 1 fixed lens has no adjustable shift value. However, the lens has an inherent offset depending on image size. See the UST documentation published separately on the Digital Projection website.
### Appendix B: Supported Signal Input Modes

#### 2D formats

<table>
<thead>
<tr>
<th>Signal</th>
<th>Resolution</th>
<th>Refresh Rate (Hz)</th>
<th>VGA / 5BNC-YUV</th>
<th>VGA-RGBHV</th>
<th>5BNC-RGBHV</th>
<th>DVI-D</th>
<th>HDMI / HDBaseT</th>
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</thead>
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<tr>
<td></td>
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<td>RGB</td>
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<td>YUV 10-bit</td>
<td>YUV 12-bit</td>
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*continues on next page...*
### APPENDIX B: SUPPORTED SIGNAL INPUT MODES

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<tr>
<th>Signal</th>
<th>Resolution</th>
<th>Refresh Rate (Hz)</th>
<th>VGA / 5BNC-YUV</th>
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<th>5BNC-RGBHV</th>
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### Notes

Only the HDMI and HDBaseT inputs support HDMI 1.4 3D formats.
Appendix C: Wiring Details

RS232

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

Notes
### Trigger 1 & Trigger 2

3.5 mm mini jack

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Output: 12V

### Wired remote control

3.5 mm mini jack

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Output: 2.85-3.15V, Max. 500 mA

### 3D Sync IN / OUT

75 ohm BNC
**Appendix D: Glossary Of Terms**

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

**3D active glasses**
Wireless battery-powered glasses with LCD shutters. Synchronization information is communicated to the glasses by means of an infrared (IR) or radio frequency (RF) emitter which is connected to the Sync Out terminal on the projector. IR or RF pulses are transmitted by the emitter to signal when the left eye and right eye images are being displayed. The glasses incorporate a sensor which detects the emitter’s signal and synchronises the left and right eye shutters with the projected image.

**3D passive glasses**
Passive glasses do not require a power source to work. Light with left-hand polarisation can pass through the left lens and light with right-hand polarisation can pass through the right-hand lens. These glasses are used in conjunction with another device which polarizes the image, such as a ZScreen.

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

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

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

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

Not to be confused with resolution.

Blanking (projection)

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

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

Blanking (video signal)

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

Not to be confused with blanking (projection).

Blend region

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

Brightness (electronic control)

A control which adds a fixed intensity value to every pixel in the display, moving the entire range of displayed intensities up or down, and is used to set the black point in the image (see Contrast). 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, while the other dimension has moved outside the frame; the excess area is then cut out.

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

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

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

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

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

LED (Light Emitting Diode)
An electronic component that emits light.

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

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

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:

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

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.