DIGITAL PROJECTION

A Delta Associate Company

Satellite HIGHlite 4K-UHD

Digital Video Projector

INSTALLATION & QUICK START GUIDE

CONNECTION GUIDE

ON SCREEN DISPLAY (OSD) OPERATING GUIDE

REFERENCE GUIDE

Rev A August 2022

122-933A

Introduction

Congratulations on your purchase of this Digital Projection product. The Satellite HIGHlite 4K-UHD has the following key features:

- Satellite Modular Laser System
- Offers separation of Head from the light source for reduced size, weight and noise compared to a conventional projector.
- Native 4K-UHD projection Head delivering up to 9,000 ISO lumens.
- RGB laser illuminated
- Satellite Link Cable enables light source MLS modules to be remote
- Wide color gamut very close to REC2020
- DisplayPort and HDMI Inputs
- Control via LAN
- Motorised and memorized lens mount with shift, zoom and focus using compatible lenses.

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

Follow the instructions in this manual carefully to ensure safe and long-lasting use of the projection system. Do not attempt to power the system on or operate the projector until the system has been safely installed. Please refer to the Installation and Quick Start Guide later in this manual for full installation details.

Notes

About this document

Symbols used in this document

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

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

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

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

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

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

Product revision

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

Additional Documentation

Updates to this manual may be available online.

Please use the QR code (also located on the satellite projector head, modular light source and satellite control module) to access the latest Satellite system user guides and other documentation via the Digital Projection website.

Or visit the Digital Projection website to download the latest user guide and other documentation. www.digitalprojection.co.uk/digital-products/manuals/satellite/

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Notes

Electrical and Physical Specifications

Satellite Head

Mains Voltage	100-240 VAC 50/60Hz single phase	
Current	1.4 A at 100-240 VAC	
Operating Temperature	0°C to 40°C (32°F to 104°F)	
Storage Temperature	-20°C to 60°C (-4°F to 140°F)	
Operating Humidity	20% to 80% non-condensing	
Storage Humidity	20% to 90%	
Dimensions	298.5mm x 315mm x 337mm	
Weight	19 kg	
Power Consumption	at 100 VAC: typical 95 W, max 103 W at 100 VAC: typical 122 W, max 132 W (High Altitude Mode) at 240 VAC: typical 94 W, max 101 W at 240 VAC: typical 120 W, max 130 W (High Altitude Mode)	
Thermal Dissipation	at 100 VAC:	typical 776 BTU/hr, max 817 BTU/hr at 10,000 Lumens typical 537 BTU/hr, max 570 BTU/hr at 5,000 Lumens (2 Heads) typical 457 BTU/hr, max 487 BTU/hr at 3,333 Lumens (3 Heads) typical 418 BTU/hr, max 446 BTU/hr at 2,500 Lumens (4 Heads)
	at 100 VAC: (High Altitude Mode)	typical 861 BTU/hr, max 910 BTU/hr at 10,000 Lumens typical 622 BTU/hr, max 663 BTU/hr at 5,000 Lumens (2 Heads) typical 542 BTU/hr, max 580 BTU/hr at 3,333 Lumens (3 Heads) typical 503 BTU/hr, max 539 BTU/hr at 2,500 Lumens (4 Heads)
	at 240 VAC:	typical 773 BTU/hr, max 813 BTU/hr at 10,000 Lumens typical 534 BTU/hr, max 566 BTU/hr at 5,000 Lumens (2 Heads) typical 454 BTU/hr, max 483 BTU/hr at 3,333 Lumens (3 Heads) typical 415 BTU/hr, max 442 BTU/hr at 2,500 Lumens (4 Heads)
	at 240 VAC: (High Altitude Mode)	typical 855 BTU/hr, max 903 BTU/hr at 10,000 Lumens typical 616 BTU/hr, max 656 BTU/hr at 5,000 Lumens (2 Heads) typical 536 BTU/hr, max 573 BTU/hr at 3,333 Lumens (3 Heads) typical 497 BTU/hr, max 532 BTU/hr at 2,500 Lumens (4 Heads)
Fan Noise		

Modular Light Source - MLS10000

Mains Voltage	100-240 VAC 50/60Hz single phase
Current	10.1 A at 100 VAC 4.9 A at 240 VAC
Operating Temperature	0°C to 40°C (32°F to 104°F)

Notes

Storage Temperature	-10°C to 50°C (14°F to 122°F)
Operating Humidity	20% to 80% non-condensing
Storage Humidity	20% to 90%
Dimensions	19" 3U rack unit - 483mm (w) x 133mm (h) x 500mm (d)
Weight	16.5 kg
Power Consumption	at 100 VAC: typical 908.7 W, max 1004.6 W at 240 VAC: typical 872.4 W, max 963.4 W
Thermal Dissipation	at 100 VAC: typical 2623 BTU/hr, max 2950 BTU/hr at 240 VAC: typical 2499 BTU/hr, max 2809 BTU/hr
Fan Noise	< 45 dBA
Fuse in Fuse Holder	marking T15AH/250 VAC, or F15AH/250 VAC

Satellite Control Module

Mains Voltage	100-240 VAC 50/60Hz single phase
Current	0.4 A at 100 VAC 0.4 A at 240 VAC
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-10°C to 50°C (14°F to 122°F)
Operating Humidity	20% to 80% non-condensing
Storage Humidity	20% to 90%
Dimensions	19" 3U rack unit - 483 mm (w) x 133 mm (h) x 265 mm (d)
Weight	6.5 kg
Power Consumption	at 100 VAC: typical 23.9 W, max 25.1 W at 240 VAC: typical 21.3 W, max 22.5 W
Thermal Dissipation	at 100 VAC: typical 82 BTU/hr, max 86 BTU/Hr at 240 VAC: typical 73 BTU/hr, max 77 BTU/Hr
Fan Noise	< 32 dBA
Fuse in Fuse Holder	marking T10AH/250 VAC

Satellite Link Cable

Operating Temperature	0°C to 40°C (32 F to 104 F)
Storage Temperature	-10°C to 50°C (14 F to 122 F)
Operating Humidity	20% to 80% non-condensing

Specifications are subject to change without notice.

Notes

Laser Parameters

Wavelength (Red)	635-647nm
Wavelength (Blue)	459-471nm
Wavelength (Green)	519-531nm
Mode of operation	CW
Total internal power	194W
Apparent source size	>10mm
Divergence	>10 Deg

Laser Power

The laser power for this projector is related to the fitted lens and the number of Modular Light Sources (MLS) connected to Satellite Heads:

Ratio MLS:Satellite Head	Maximum Laser Power at Lens (mW)			
	0.83 - 1.21 : 1 zoom	1.21 - 1.70 : 1 zoom	1.50 - 2.15 : 1 zoom	2.00 - 3.90 : 1 zoom
1:4	65	100	109	320
1:3	80	140	145	420
1:2	95	180	215	600
1:1	136	340	436	1170

Hazard Distance

The hazard distance for this projector is related to the fitted lens and the number of Modular Light Sources (MLS) connected to Satellite Projector Heads.

Ratio MLS:Satellite Head	Hazard Distance (m)			
	0.83 - 1.21 : 1 zoom	1.21 - 1.70 : 1 zoom	1.50 - 2.15 : 1 zoom	2.00 - 3.90 : 1 zoom
1:4	0	0	0	0
1:3	0	0	0	0
1:2	0	0	0	1.4
1:1	0	0	1.3	2.3

Light Output

The light output for this projector is related to the number of Modular Light Sources (MLS) connected to Satellite Projector Heads:

Ratio MLS:Satellite Head	Light Output (klm) at Projector Head
1:4	2.25klm
1:3	3klm
1:2	4.5klm
1:1	9Klm

Notes

Compliance with International Standards

RF Interference

FCC

The Federal Communications Commission does not allow any modifications or changes to the unit EXCEPT those specified by Digital Projection in this manual. Failure to comply with this government regulation could void your right to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant with Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference.

Noise

GSGV Acoustic Noise Information Ordinance

The sound pressure level for the Satellite Laser Head is less than 39 dB (A) according to ISO 3744 or ISO 7779.

The sound pressure level for the Modular Light Source is less than 45 dB (A) according to ISO 3744 or ISO 7779.

The sound pressure level for the Satellite Control Module is less than 32 dB (A) according to ISO 3744 or ISO 7779.

European Waste Electrical and Electronic Equipment (WEEE) Directive

Digital Projection Ltd is fully committed to minimizing Waste Electrical and Electronic Equipment. Our products are designed with reuse, recycling and recovery of all components in mind. To this end, at end of life, your projector may be returned to Digital Projection Ltd or its agent so that the environmental impact can be minimized.

Notes

Contents

Notes

Notes

Notes

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Digital Video Projector

INSTALLATION & QUICK START GUIDE

Rev A August 2022
122-933A

General Precautions

Warning! Death or Serious Injury could occur if the following precautions are ignored

Eye Hazard! Do not look directly into the lens when the light source is on. The high brightness can cause permanent eye damage

Fire Hazard! Keep any combustible material away from hot surfaces and the projected beam. Ensure cables do not contact hot surfaces

Shock Hazard! Use only authorized components, tools, accessories and replacement parts specified by the manufacturer

Trip Hazard! Locate cables where they cannot be pulled, tripped over or damaged by persons or objects

Operate the product in the specified operating environment and conditions

Product should be powered off and disconnected from the mains before any service or maintenance operation

Keep body parts, hair, clothing and jewelery away from moving parts in the product.

Do not operate the product without a lens installed

Use a lens plug when installing or moving the product

The system is never to be operated if a component is defective or the covers are damaged.

No maintenance allowed by end user.

Do not open any of the modules. There are no user serviceable parts inside.

No service is allowed except by authorized personnel.

Service personnel should use effective laser safety goggles during service operations.

Use only the power cable provided.

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

Take care to prevent small objects such as paper or wire from falling into the Satellite Head , MLS or SCM. If this does happen, switch off immediately, and have the objects removed by authorized service personnel.

Do not expose the Satellite Head , MLS and SCM to rain or moisture, and do not place any liquids on top of the projector.

Unplug before cleaning, and use a damp, not wet, cloth.

Do not touch the power plug with wet hands.

Notes

Do not touch the power plug during a thunder storm.

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

Do not touch the ventilation outlets, as they will become hot in use.

Do not cover or obstruct the ventilation outlets or inlets.

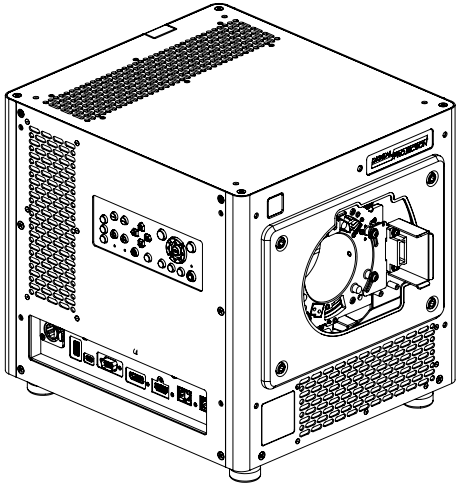
Do not cover the lens whilst the system is switched on. This could cause a fire.

Always allow the Satellite Head , MLS and SCM to cool for 5 minutes before disconnecting the power or moving the projector.

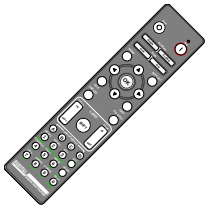
Never use strong detergents or solvents such as alcohol or thinners to clean the projector and lens.

Notes

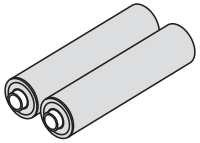
What's in the box?



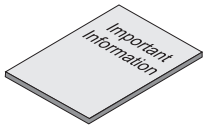
Satellite Head



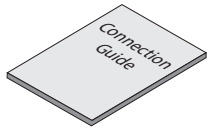
Remote Control



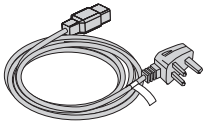
Batteries (2xAAA)



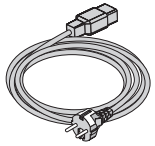
Important Information Book



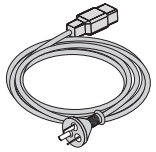
Connection Guide



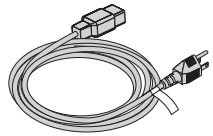
Power Cable, UK



Power Cable, Europe



Power Cable, China



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

Notes

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

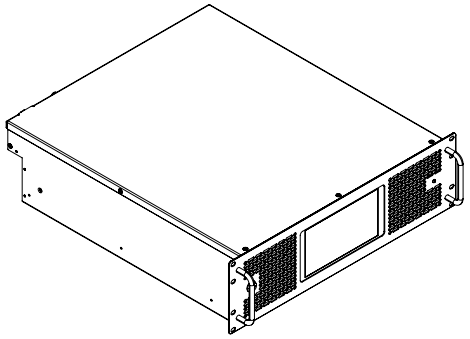
Only one remote is supplied with the projector.

Save and store the original box and packing materials, in case you ever need to ship your projector.

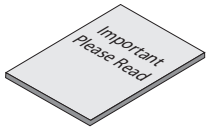
The projector is shipped without a lens.

Only the appropriate cable for destination territory is supplied with the projector

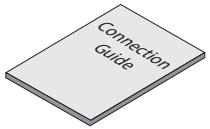
Modular Light Source (Shipped Separately)



Modular Light Source (MLS)



Important Please Read Booklet

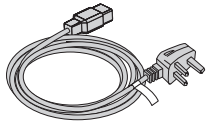


Connection Guide

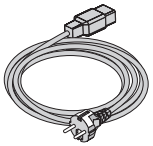
Laser Key (x2)

LAN Cable

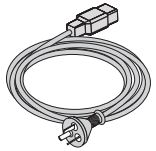
SCM - MLS Signal Cable



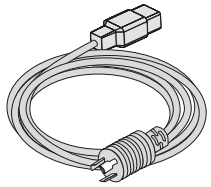
Power Cable, UK



Power Cable, Europe

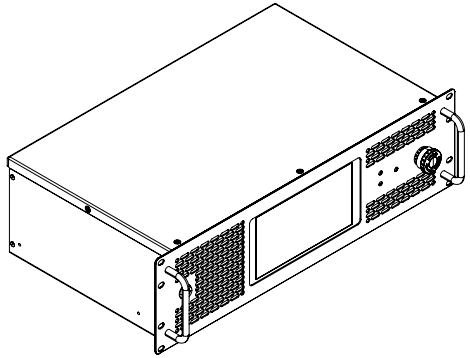


Power Cable, China

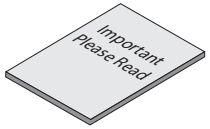


NEMA L5-20P - C19 Power Cable, North America

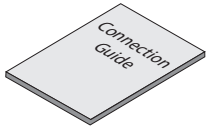
Satellite Control Module (Shipped Separately)



Satellite Control Module (SCM)

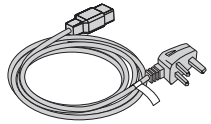


Important Please Read Booklet

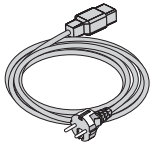


Connection Guide

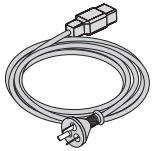
Laser Key (x2)



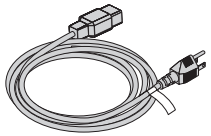
Power Cable, UK



Power Cable, Europe



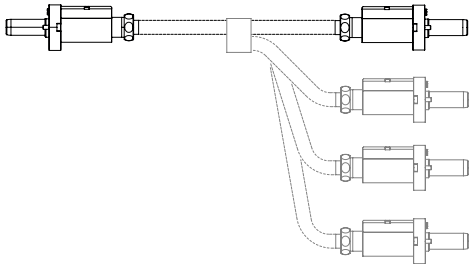
Power Cable, China



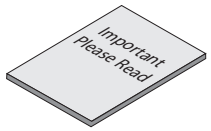
NEMA 5-15P - C19 Power Cable, North America

Notes

Satellite Link Cable (Shipped Separately)

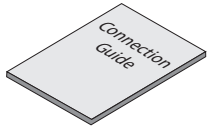


Satellite Link Cable (SLC)



Important Please Read Booklet

LAN Cable



Connection Guide

Hex Driver

Notes

The SLC connects Modular Light Sources (MLS) to Satellite Heads. The SLC includes a built in junction box with additional MLS or Satellite Head connections when there are multiple MLS or Satellite Heads. See Satellite Link Cable on page 29 for guidance regarding your installation.

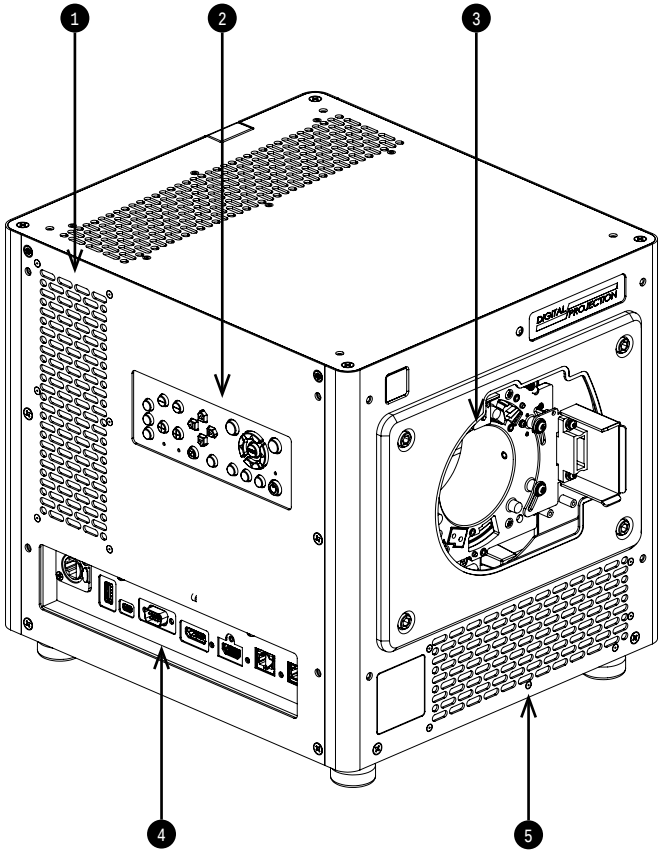
The appropriate number of LAN cables are included. One LAN cable is supplied per Satellite Head.

Handle the SLC with care. Do not drop or knock the SLC when removed from its packaging. The curvature of the SLC should never have a radius of less than 20 cm. Below this, the fiber inside the cable may be damaged.

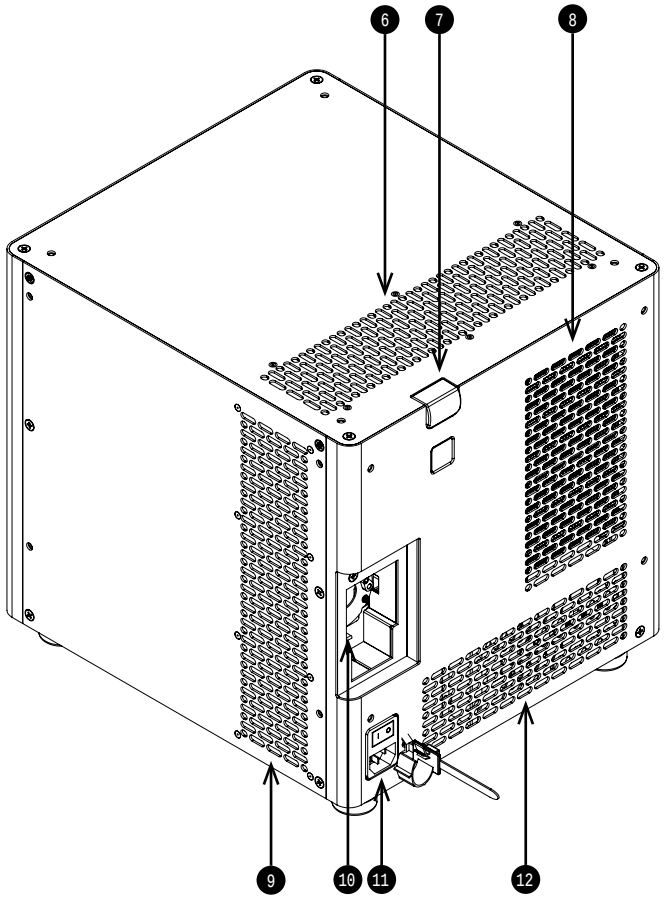
Overviews

Projector Head

1. Air inlet
2. Control panel
3. Lens mount
4. Connections panel
5. Air inlet
6. Air inlet
7. Rear infrared window
8. Air outlet
9. Air inlet
10. SLC socket
11. Mains socket
12. Air outlet



Front View



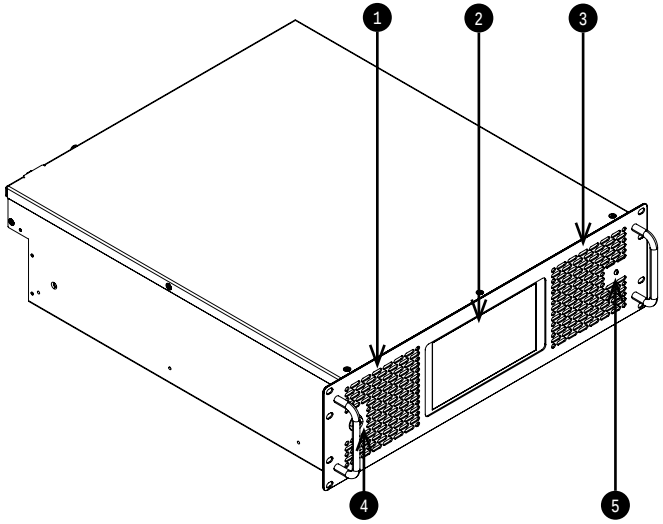
Rear View

Notes

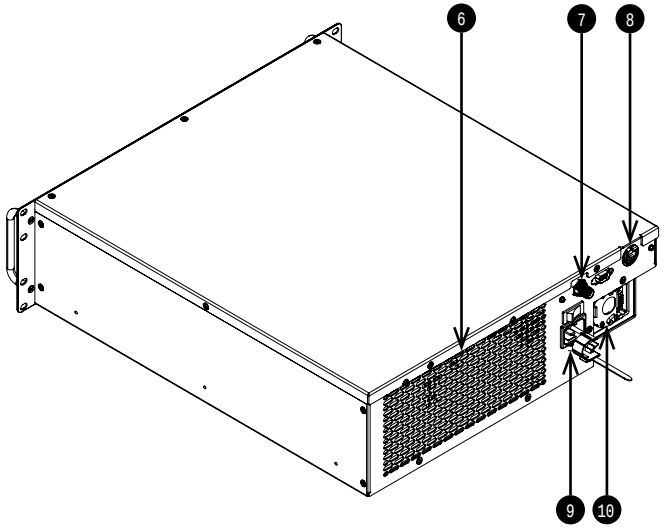
See Product Labels on page 1 for details about the labels that are located on the Satellite Head, MLS, SCM and SLC.

Modular Light Source

1. Air inlet
2. Touch Screen Control Panel
3. Air inlet
4. Laser Activation Lock
5. Laser Indicator
6. Air outlet
7. Signal Cable socket
8. LAN socket
9. Mains socket
10. SLC socket



Front View

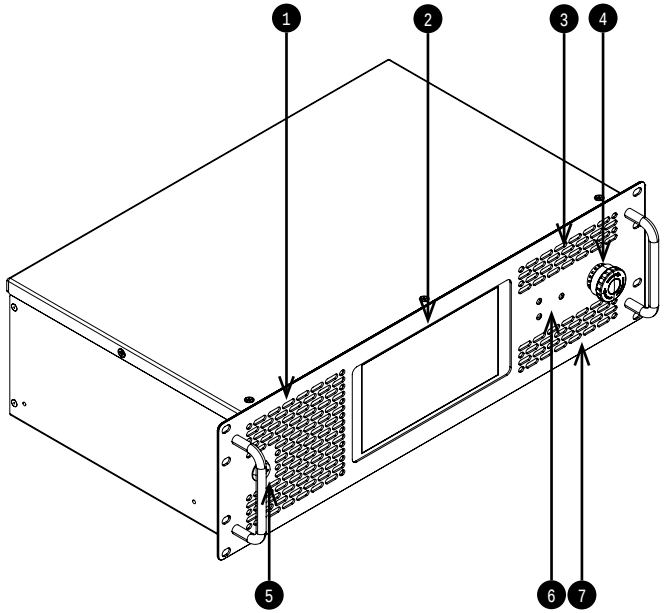


Rear View

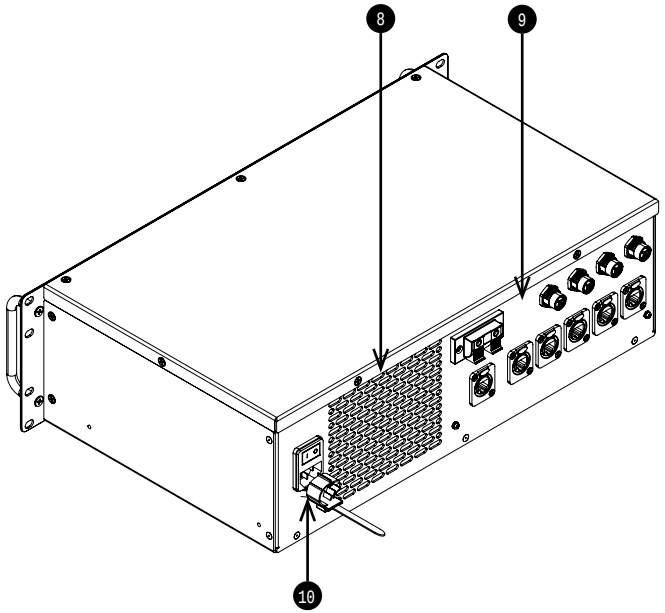
Notes

Satellite Control Module

1. Air inlet
2. Touch Screen Control Panel
3. Air inlet
4. Emergency Stop
5. Laser Activation Lock
6. SCM Indicators
7. Air inlet
8. Air outlet
9. Connections panel
10. Mains socket



Front View



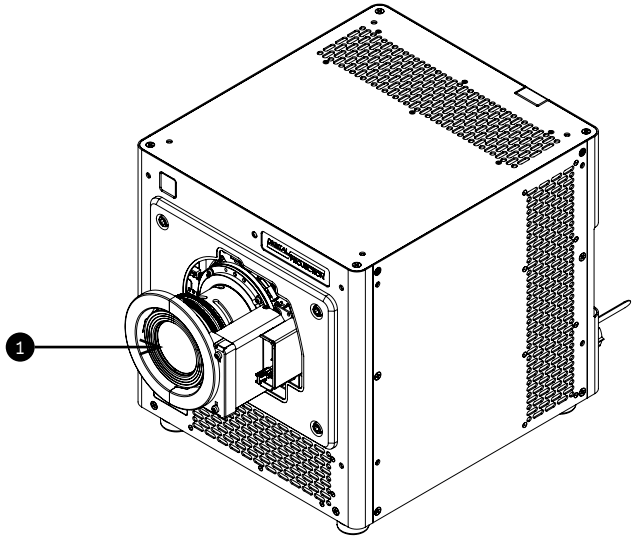
Rear View

Notes

Location of Laser Aperture

1. The laser aperture is located as indicated below.

Do not look directly at the light coming from the lens.



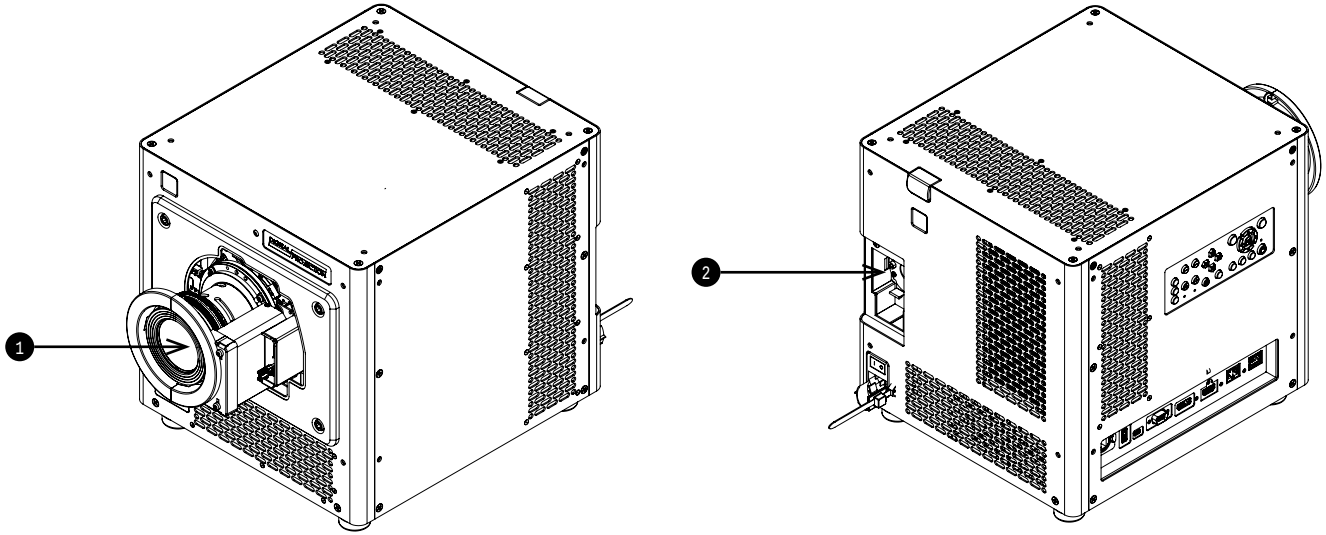
Notes

Interlock Switches

Interlock switches are installed. Any individual interlock switch will power-off the lasers when opened.

Satellite Head

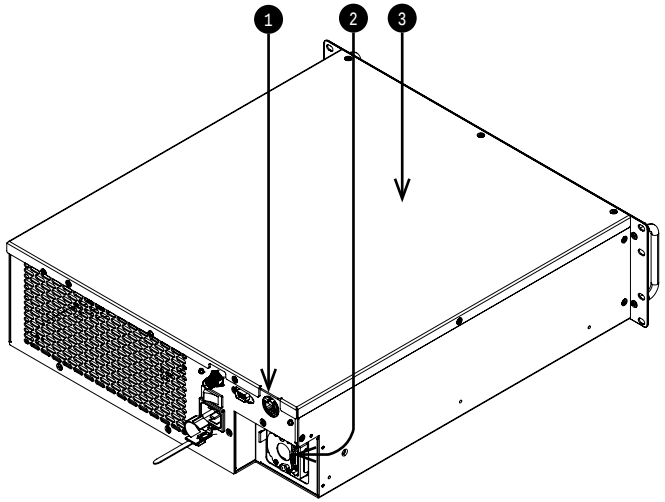
1. Will be opened when the projection lens is removed or misplaced.
2. Will be opened when the Satellite Link Cable is removed or misplaced.



Notes

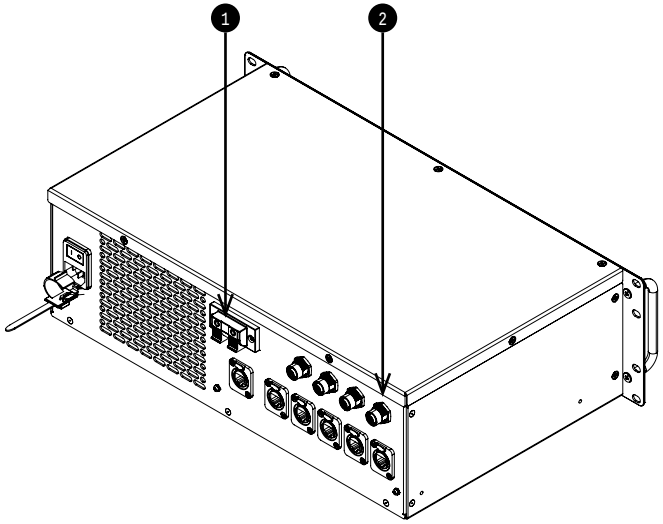
Modular Light Source

1. Will be opened when the MLS-SCM signal cable is removed or misplaced.
2. Will be opened when the Satellite Link Cable is removed or misplaced.
3. Will be opened when the cover is removed.



Satellite Control Module

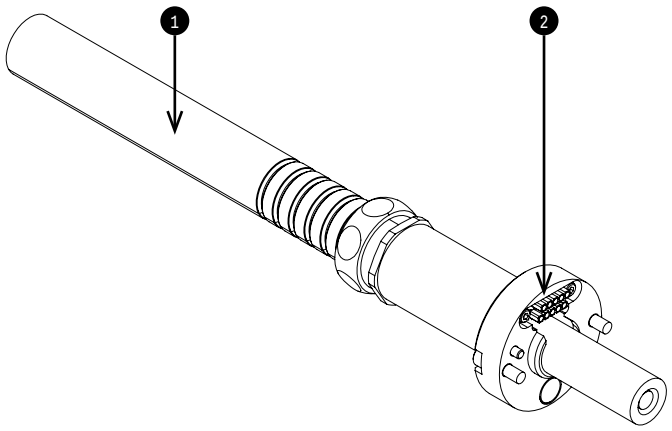
1. External interlock. Use this to allow an external device, such as a door switch, to switch off the laser. The interlock is delivered with a wire link in place. If the link is removed the interlock will open and prevent the laser from turning on.
2. Will be opened when the MLS-SCM signal cable is removed or misplaced.



Notes

Satellite Link Cable

1. The cable contains a thermal sensor. Avoid direct sources of heat.
2. Will be opened when the Satellite Link Cable is removed or misplaced in the Satellite Head or MLS.



Notes

Handle the SLC with care. Do not drop or knock the SLC when removed from its packaging. The curvature of the SLC should never have a radius of less than 20 cm. Below this, the fiber inside the cable may be damaged.

Once the thermal sensor has exceeded its trip level, it cannot be reset. Do not exceed 100°C.

Installation Precautions

Warning! This product is a Class 1, Risk Group 3 Laser Product.

The product should be installed and operated in accordance with the provisions of IEC 62471-5:2015 and the Important Information document and User Manual by instructed and skilled persons only (IEC 62368-1:2020).

Operators shall control access to the beam within the hazard distance or install the product at a height that will prevent exposure of the spectator's eyes within the hazard distance.

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

Do not place reflective objects in the projected beam

The hazard zone must be no lower than 3 meters above the floor and the horizontal clearance to the hazard zone must be a minimum of 2.5 meters. See See Risk Group 3 Laser Hazard Installation Precautions on page 32.

All installations should follow local building and electrical codes of practice

Components of the Satellite MLS are heavy. Use safe handling techniques when lifting.

Do not drop or knock the Satellite Head, Modular Light Source (MLS), Satellite Control Module (SCM) or Satellite Link Cable (SLC).

Use only the power cables, SLC cables and MLS signal cables provided.

The power cables, MLS signal cable, satellite link cable and signal input cable should be connected before the system is powered on.

During startup and operation, DO NOT insert or remove the SLC, MLS signal cable, signal input cable or the power cable to avoid damaging the system.

For Installations within the United States:

The following requirements must be in place for installations within the USA:

Any human access to the hazard zone must be restricted by barriers to enforce the no access zone

Permanent show installations containing RG3 laser illuminated projectors must meet the following conditions:

- Installed by Digital Projection or Digital Projection authorized and trained engineers
- Operated according to instructions provided by Digital Projection
- Ensure the projection system is securely mounted to prevent unintended movement of the projector

A copy of the FDA Variance Approval Letter must be with the operator or other responsible person

Temporary show installations containing RG3 laser illuminated projectors may be installed by Digital Projection, or sold or leased, only to valid laser light show variance holders for image projection applications. This requirement also applies to dealers and distributors of this equipment.

Notes

For temporary installations, the FDA variance holder must maintain complete records of all show itineraries with dates, locations, operator's name and contact information in a clear and concise way.

The Digital Projection Laser Projector Installation Checklist must be fully completed after installation and sent to Digital Projection. The user may retain a copy.

Certain US States have additional laser regulatory requirements.

Dealers and Distributors of Laser Illuminated Projectors, including installers, must comply with the record keeping requirements described in 21 CFR 1002.40.

Satellite Head

Do not install the Satellite Head close to anything that might be affected by its operational heat, for instance, polystyrene ceiling tiles, curtains etc. Place the projector in a dry area away from sources of dust, moisture, steam, smoke, sunlight or heat.

Ensure that the intake vents do not recycle hot air from the exhaust vent.
When operating the Satellite Head in an enclosed space, ensure that the surrounding air temperature within the enclosure does not exceed operation temperature while the Satellite Head is running, and the air intake and exhaust vents are unobstructed.

All enclosures should pass a certified thermal evaluation to ensure that the Satellite Head does not recycle exhaust air, as this may cause the device to shutdown even if the enclosure temperature is with the acceptable operation temperature range.

Avoid installing at high temperature, insufficient cooling and heavy dust locations.

Avoid installing near an air conditioner duct or a subwoofer.

The Satellite Head 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.

Please pay attention to Satellite Head installation with respect to other staging laser light equipment set-up. These systems can cause permanent damage to the imaging devices (DMD™) used in the Satellite Head . This damage is not covered by our warranty.

When using a Satellite Head in an environment with third party high power laser systems avoid direct laser beams pointing towards the projection lens. This may cause incident light to converge into the optical engine and cause damage to the imaging devices (DMD™).

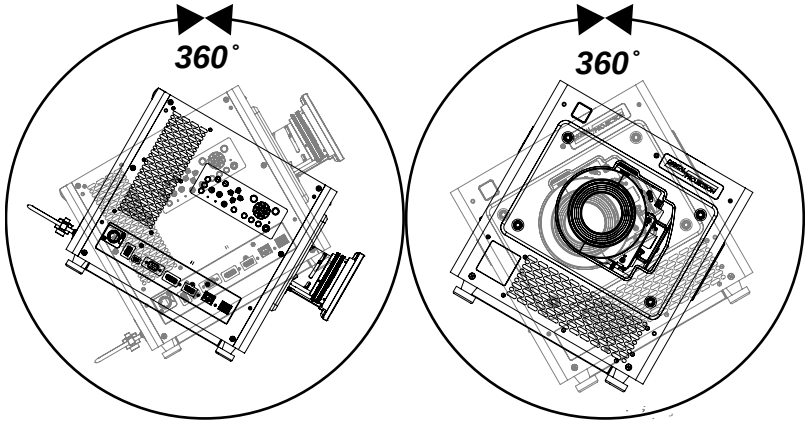
Before installation, make sure that the surface, ceiling or rigging that is to support the Satellite Head is capable of supporting the combined weight of the Satellite Head, lens, SLC and cables.

Backup safety chains or wires should always be used with ceiling mount installations.

When installing a ceiling mount, make sure the weight limit is not exceeded and the Satellite Head is firmly secured.

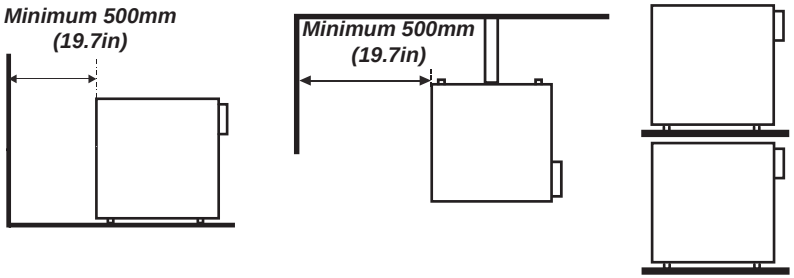
Notes

The Satellite Head can be operated any position, as shown in the diagram:



Tilt (Left) and Roll (Right)

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



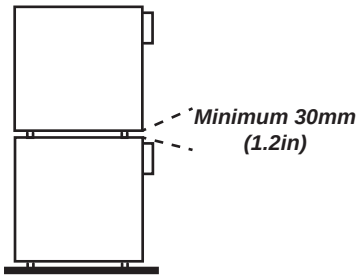
Example Positioning

When stacking the Satellite Head , the stack MUST be vertical, to ensure that the stresses are distributed to all four chassis corners.

Do not stack more than 2 Satellite Heads.

Notes

Make sure that there is a 3cm (1.2in) gap between Satellite Heads when stacked.



Example Stacking

Make sure the lens cap is removed from the lens before operating the Satellite MLS. Light energy levels have been known to cause damage to both the lens and projector optics. This damage is not covered by our warranty.

Make sure the lens cap is removed from the rear of the lens before it is inserted into the Satellite Head .

Connect the LAN cable only to a computer LAN connection. Other similar connectors may have a dangerously high voltage source.

The Satellite Head generates heat during use. The internal fans dissipate the heat of the Satellite Head when shutting down, which could continue for a certain period. After the projector enters STANDBY MODE, remove the power cord. DO NOT remove the power cord during shutdown as it may cause damage to the Satellite Head and may affect the service life of the Satellite Head .

Do not place heavy objects on top of the Satellite Head . Only the chassis corners and the optional rigging frame are capable of withstanding the weight of another Satellite Head .

Modular Light Source and Satellite Control Module

The MLS and SCM are designed to be installed in a rack system. The MLS and SCM can also set up in a free standing installation.

The MLS must be mounted or placed horizontally during operation.

The laser colors must be calibrated after installation or after changing MLS within a system. See Laser color calibration on page 49 for guidance.

Rack Mounts

Do not install the rack containing the MLS and SCM close to anything that might be affected by its operational heat, for instance, curtains or other combustible materials etc.

Place the rack in a dry area away from sources of dust, moisture, steam, smoke, sunlight or heat.

Inside the rack, make sure there is a space between MLS and SCM modules.

Notes

Air vents are located at the front and rear of the modules. Make sure that the air intake and exhaust vents on the MLS and SCM are unobstructed and that the intake vent does not recycle hot air from the exhaust vent.

Make sure that the rack mount is ventilated and that any door or coverings include ventilation holes.

Make sure that the surrounding air temperature within the rack does not exceed operation temperature while the MLS and SCM are running. The rack mount should pass a certified thermal evaluation to ensure that the MLS and SCM do not recycle exhaust air, as this may cause the system to shutdown even if the temperature is within the acceptable operation temperature range.

Avoid installing at high temperature, insufficient cooling and heavy dust locations.

Avoid installing near an air conditioner duct or a subwoofer.

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

The EMERGENCY OFF button on the SCM should be easily accessible.

Free Standing

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

Place the MLS and SCM in a dry area away from sources of dust, moisture, steam, smoke, sunlight or heat.

Air vents are located at the front and rear of the modules. Make sure that the air intake and exhaust vents on the MLS and SCM are unobstructed and that the intake vent does not recycle hot air from the exhaust vent.

Allow at least 50cm (19.7in) of space between the ventilation outlets and any wall.

Example Positioning

When operating the MLS and SCM in an enclosed space, ensure that the surrounding air temperature within the enclosure does not exceed operation temperature while the MLS and SCM are running. All enclosures should pass a certified thermal evaluation to make sure that the MLS and SCM do not recycle exhaust air, as this may cause the system to shutdown even if the enclosure temperature is with the acceptable operation temperature range.

Avoid installing at high temperature, insufficient cooling and heavy dust locations.

Avoid installing near an air conditioner duct or a subwoofer.

The MLS and SCM should be installed as close to the power outlet as possible.

Notes

The EMERGENCY OFF button on the SCM should be easily accessible.

Before installation, make sure that the surface, ceiling or rigging that is to support the MLS and SCM is capable of supporting their weight.

Backup safety chains or wires should always be used with ceiling mount installations.

When stacking MLS or SCM, the stack MUST be vertical, to ensure that the stresses are distributed to all four chassis corners.

Do not stack more than 2 MLS or SCM.

Make sure that there is a 3cm gap between MLS when stacked.

The MLS and SCM modules generate heat during use. The internal fans dissipate the heat of the MLS or SCM when shutting down, which could continue for a certain period. After the projector enters STANDBY MODE, remove the power cord. DO NOT remove the power cord during shutdown as it may cause damage to the MLS or SCM and may affect the service life.

Do not place heavy objects on top of the projector MLS or SCM. Only the chassis corners and the optional rigging frame are capable of withstanding the weight of another MLS or SCM.

Satellite Link Cable

Handle the SLC with care. Do not drop or knock the SLC when removed from its packaging. The curvature of the SLC should never have a radius of less than 20cm. Below this, the fiber inside the cable may be damaged.

When spooling cable in multiple loops, maintain a minimum diameter of 80cm and avoid twisting the cable.

The end caps on the Satellite Link Cable should remain in place until fitting.

When installed in trunking, the SLC should be hand laid along the entire length of trunking. Do not pull the cable through a conduit.

Use a cable protector at any location where the cable may be exposed to traffic.

Avoid installing the cable at locations where it may be exposed to high temperatures. The Satellite Link Cable contains a thermal sensor, avoid direct sources of heat. Do not exceed 100°C. If the thermal sensor exceeds its trip level it cannot be reset and the interlock circuit will remain open.

Make a basic visual inspection on the ends of the Satellite Link Cable to check for dust. Cleaning with cloth should be avoided and only an optical grade aerosol type duster should be used sparingly.

When removing the cable, it should be rolled up to avoid twisting the cable. Maintain a minimum diameter of 80cm when rolling the cable up.

Handling Precautions

The SLC must be handled with care. The SLC can be damaged if handled improperly. Follow the handling procedures shown in this document to prevent damage to the SLC assembly.

Notes

Digital Projection Ltd. will not guarantee or be held responsible for any damage caused when failing to follow these precautions:

Unroll the product from its packaging to avoid any twisting in the SLC.

Do not allow kinks or knots to develop in the SLC.

Do not bend the SLC tighter than a 20cm radius.

Hold the SLC connector when connecting or unplugging it from a device.

Never use the SLC to pick up or drag the device to which it is attached.

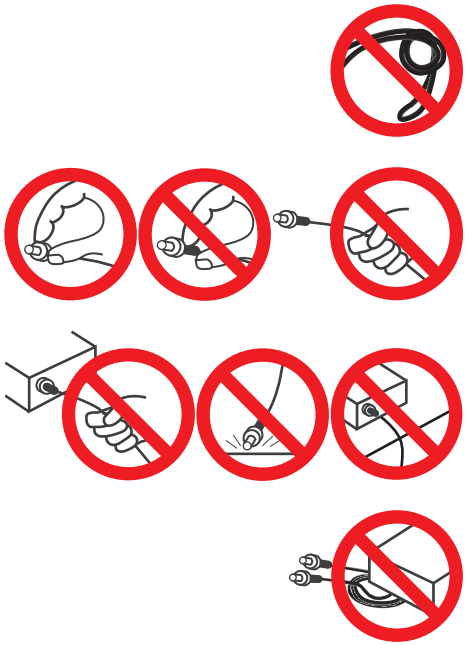
The end of the connector is an exposed glass surface. This is fragile, take care not to damage it. Keep the protective caps in place when not in use.

Do not let the SLC dangle over sharp corners.

Do not place anything heavy on the SLC. Do not allow a heavy object to fall on the cable. Do not stand on the cable.

Prevent any contamination of the connectors. See Cleaning the SLC on page 149 for information on cleaning a contaminated SLC.

Do not disassemble the optical connectors.



Notes

Laser Safety Precautions

Warning! Death or Serious Injury could occur if the following precautions are ignored

Permanent/Temporary Blindness Hazard

Not for household use.

Class 1 Laser Product, IEC 60825-1:2014.
Class 3R laser product GB7247.1-2012 / IEC 60825-1:2007.
No direct exposure to the beam shall be permitted, RG3 IEC 62471-5:2015.

Operators shall control access to the beam within the hazard distance or install the product at a height that will prevent exposure of the spectator's eyes within the hazard distance.

The product should be installed and operated in accordance with the provisions of IEC 62471-5:2015 and the Important Information document or User Manual by instructed and skilled persons only (IEC 62368-1:2020).

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

Lens Change should only be carried out by instructed and skilled persons in accordance with the Important Information document or User Manual. If in doubt consult your dealer.

Ensure the projector is switched off and AC power removed before attempting a lens change

Do not attempt to operate the product without covers in place.

This product (MLS) has a built in Class 4 laser module. Do not attempt to disassemble or modify the laser module.

Do not look directly into the lens when the light source is on. The high brightness can cause permanent eye damage.

Notes

See Product labels on page 122 for details about the labels that are located on the Satellite Head, MLS, SCM and SLC.

Risk Group 3 Laser Hazard Installation Precautions

This product is a Class 1 Risk Group 3 laser product. It must be installed in a safe place and must be handled by qualified and professionally trained personnel.

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

Do not operate the projector without its protective covers.

Do not operate the projector without a lens installed.

Please make sure that the Satellite system is fully powered down and disconnected from the mains before changing the lens.

Light Hazard Warning

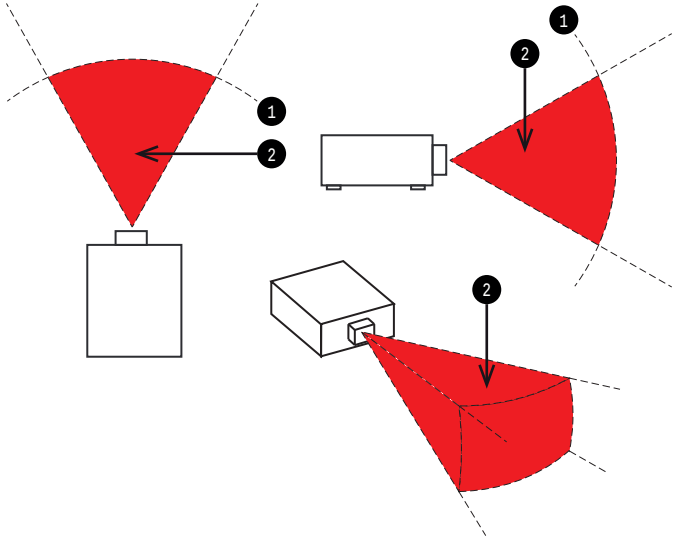
No direct exposure to the beam is permitted, RG3 IEC 62471-5:2015.
Operators should control access to the beam within the hazard distance or install the projector at sufficient height to prevent exposures of spectators' eyes within the hazard area.
When the laser is installed overhead, allow a minimum of 3m between the floor surface and the Risk Group 3 area.

Light Hazard Distance and Hazard Zone

The hazard distance is the distance measured from the projection lens at which the intensity or energy per unit of surface is lower than the applicable exposure limit on the cornea or skin. 1

The hazard zone is the area from the projection lens up to the hazard distance that encompasses where the projected beam is considered hazardous. 2

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



Notes

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

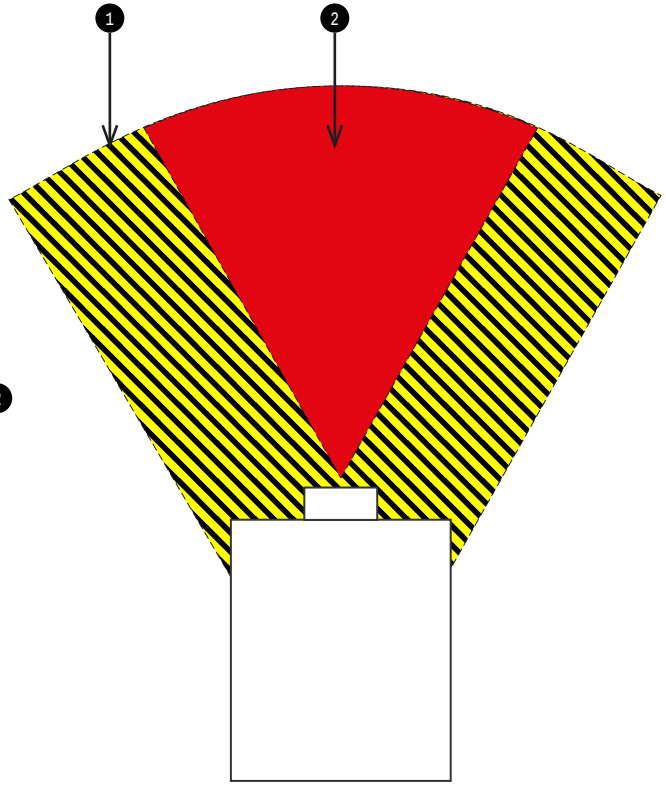
The hazard distance for this projector is related to the fitted lens and the number of Modular Light Sources (MLS) connected to the Satellite Head. See Laser Parameters on page 6 for the light hazard distances for this system.

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

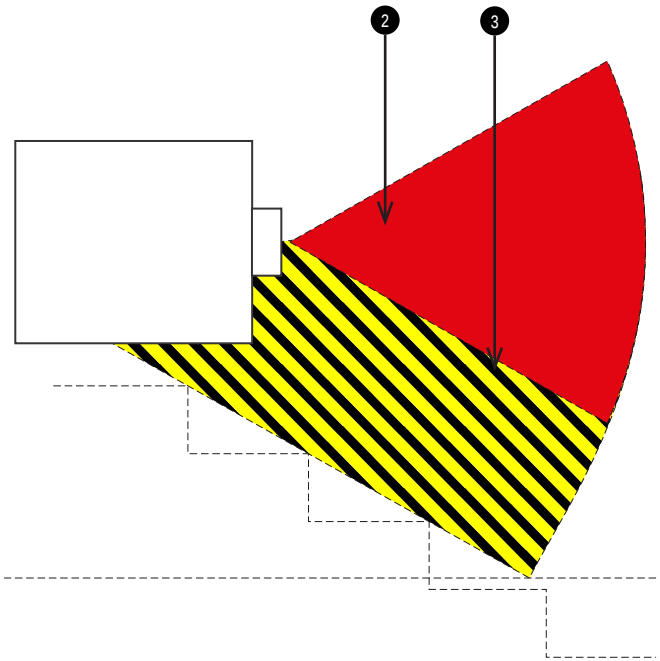
Restriction Zone

A restriction zone should be in place around the hazard zone to prevent any person from entering the hazard zone with any part of their body:

- Horizontal clearance 1. This should be no less than 2.5m around the hazard zone 2.
- Vertical clearance 3. This should be no less than 3m between the hazard zone 2 and the floor when the projector is installed overhead.



Hazard Zones - Horizontal Clearance (Top View)



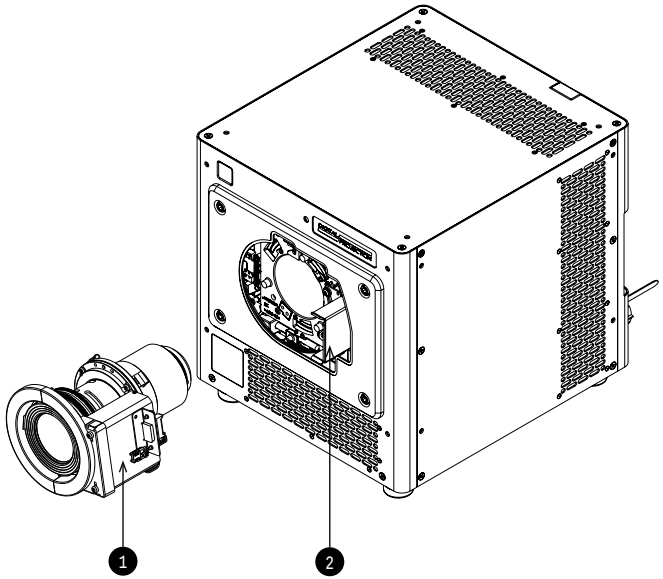
Hazard Zones - Vertical Clearance (Side View)

Notes

Fitting a lens

Inserting a new lens

1. Remove the lens aperture cap from the Satellite Head
2. Remove the lens caps from the lens
3. Align the plug on the zoom drive mechanism ❶ with the socket on the right side of the lens aperture ❷ and insert the lens



Notes

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

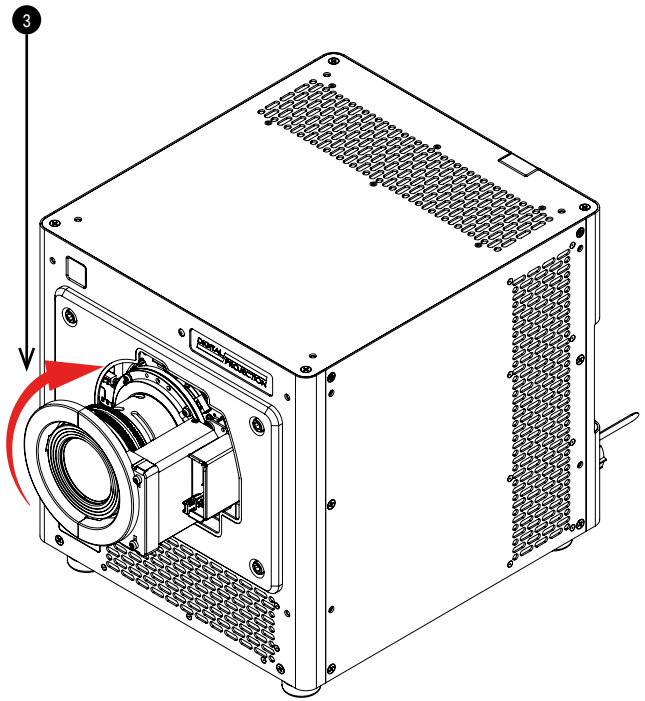
When changing the lens, avoid using excessive force as this may damage the equipment.

Avoid touching the surface of the lens as this may result in image impairment.

The lens is shipped separately.

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

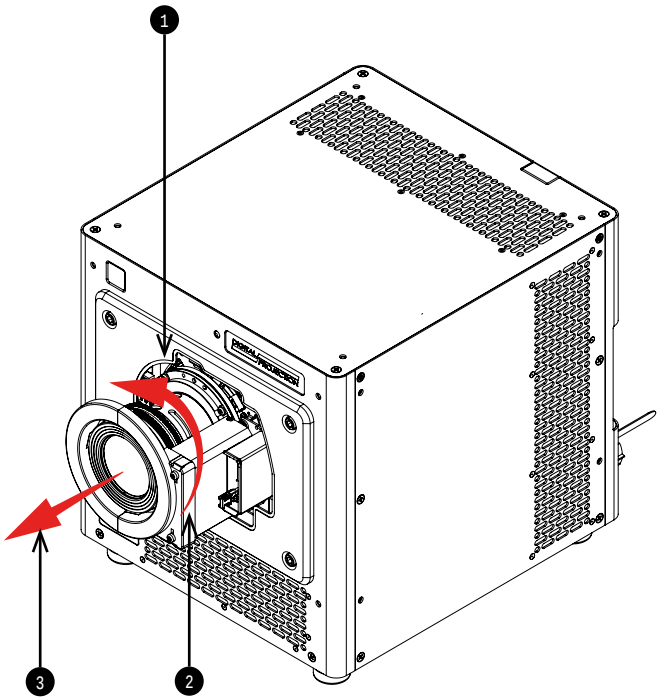
4. Rotate the lens clockwise ❸ until it clicks into place



Notes

Removing the lens

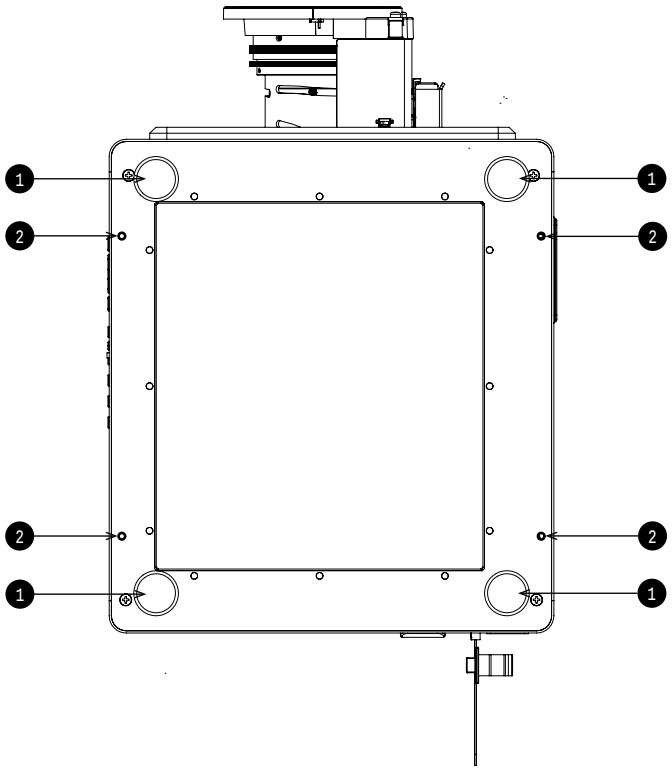
1. Push down the lens holder tab
2. Rotate the lens anti-clockwise
3. Slowly remove the lens
4. Fit lens caps to the front and rear of the lens
5. Fit a lens aperture cap or a new lens to the projector. See Inserting a new lens on page 34 for guidance on inserting a lens.



Notes

Positioning the screen and Satellite Head

1. Install the screen, ensuring that it is in the best position for viewing by your audience.
2. Mount the Satellite Head, ensuring that it is at a suitable distance from the screen for the image to fill the screen.
   The drawing shows the positions of the mounting points:
   - **Four adjustable feet for tabletop mount** ❶.
     Set the adjustable feet so that the Satellite Head is level, and perpendicular to the screen.
     Remove the feet and fit them to the top of the Satellite Head if you need to invert the Satellite Head during tabletop use.
   - **Four M4 holes for ceiling mount** ❷**.**
     The mounting screws should not penetrate more than 15 mm into the body of the projector.



Satellite Head Bottom

Notes

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

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

Do not use the threaded holes for the adjustable feet to hang or mount the Satellite Head.

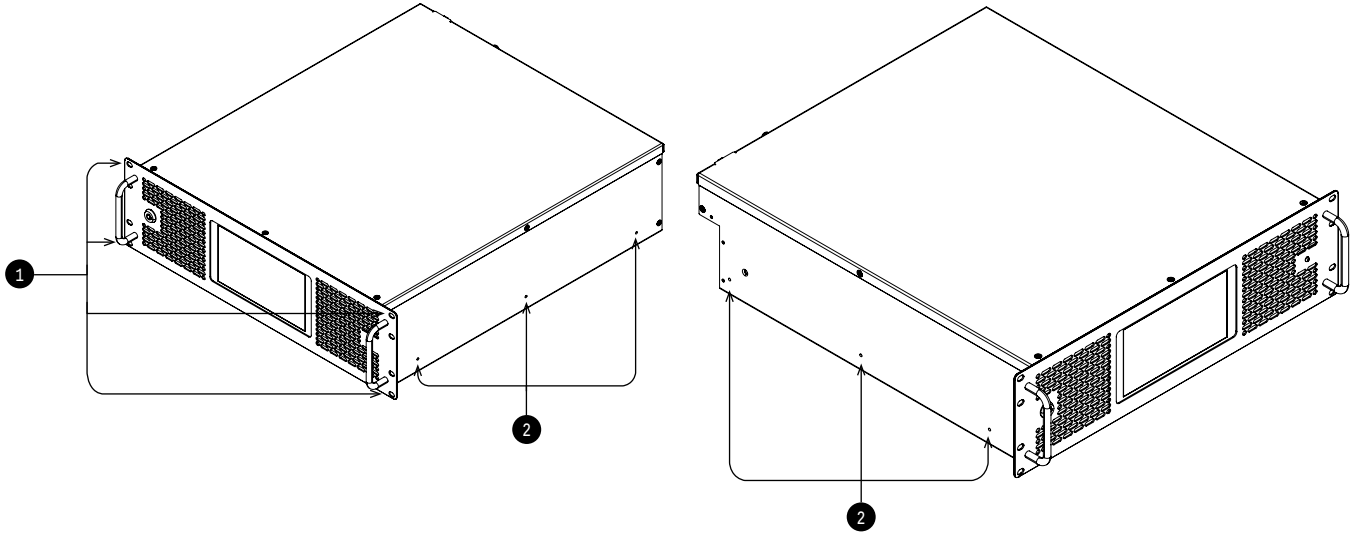
Avoid extending the adjustable feet to the limit of the thread.

Mounting the rack mount modules

1. Fit any shelves or rails to the rack as required.
2. Fit any rails or mount supports to the Modular Light Source (MLS) or Satellite Control Module (SCM) as required.
3. Mount the module into the rack and secure in place with 4 standard rack locating bolts

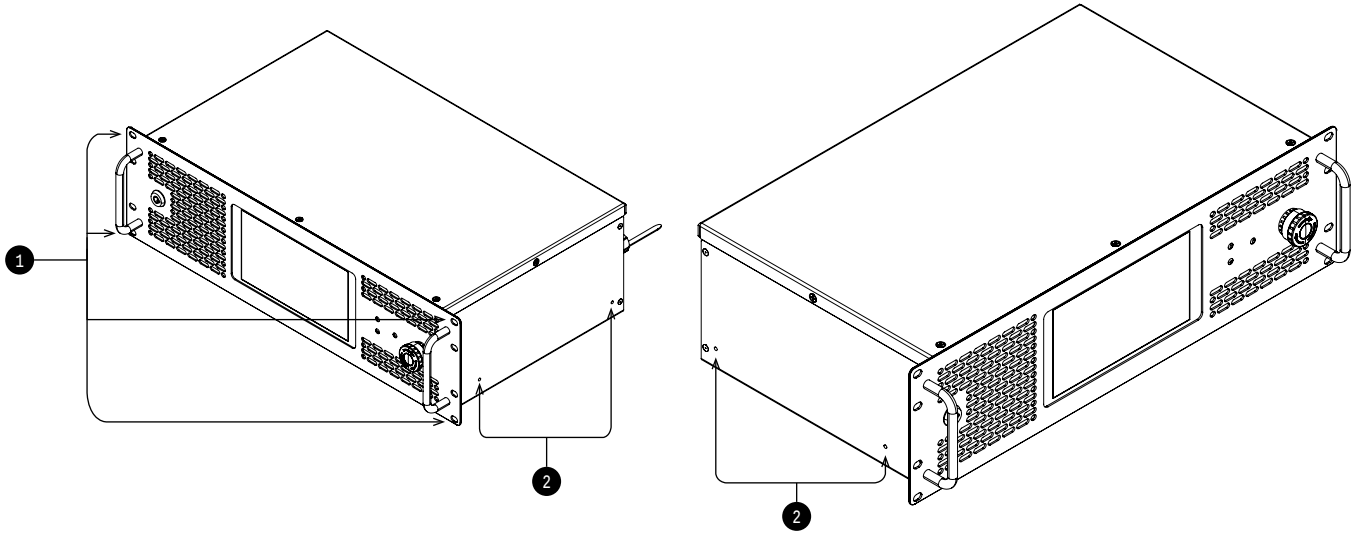
The drawing shows the positions of the fixing holes for the mount supports and rack locating bolts on the MLS.

1. **Four standard rack locating bolt holes** ❶.
2. **Six M4 fixing holes** ❷ **for mounting rails or supports**. The screws should not penetrate more than 10 mm into the body of the MLS.



The drawing shows the positions of the fixing holes for the mount supports and rack locating bolts on the SCM.

1. **Four standard rack locating bolt holes** ❶.
2. **Four M4 fixing holes** ❷ **for mounting rails or supports**. The screws should not penetrate more than 10 mm into the body of the SCM.

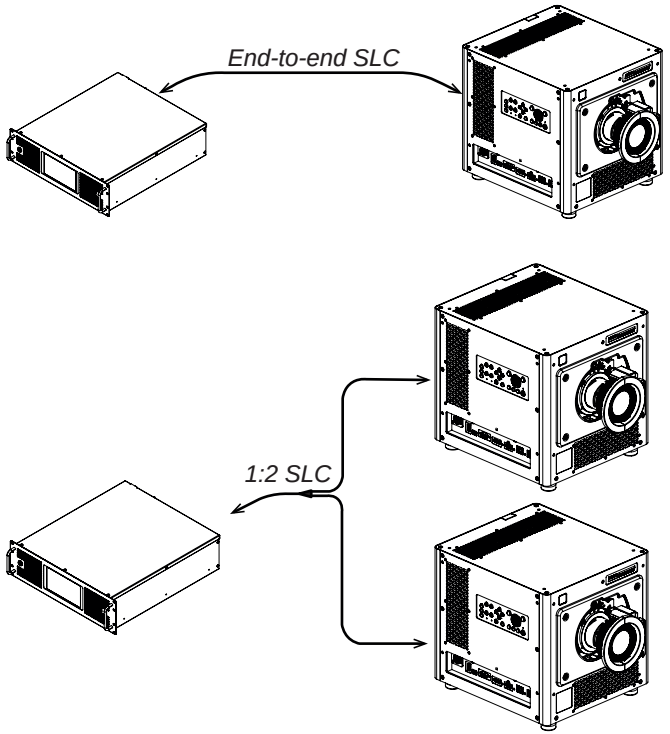


Notes

Connecting the Satellite Link Cable

The Satellite Link Cable (SLC) must connect each Satellite Head to one or more Modular Light Sources (MLS). The type of SLC that is supplied depends on the number and type of connections required for your system:

- 1:1. This system uses a single end-to end cable to connect a single MLS to a single Satellite Head.
- 1:n. This system connects a single MLS to between two and four Satellite Head. A single cable is supplied for this purpose. The cable includes a junction box with a single MLS connector extending from one side and multiple Satellite Head connectors extending from the other.



The connectors at each end of the SLC are identified by polarity pins and holes:

- A connector with a polarity hole ❶ can only connect to a MLS.
- A connector with a polarity pin ❷ can only connect to a Satellite Head.

Notes

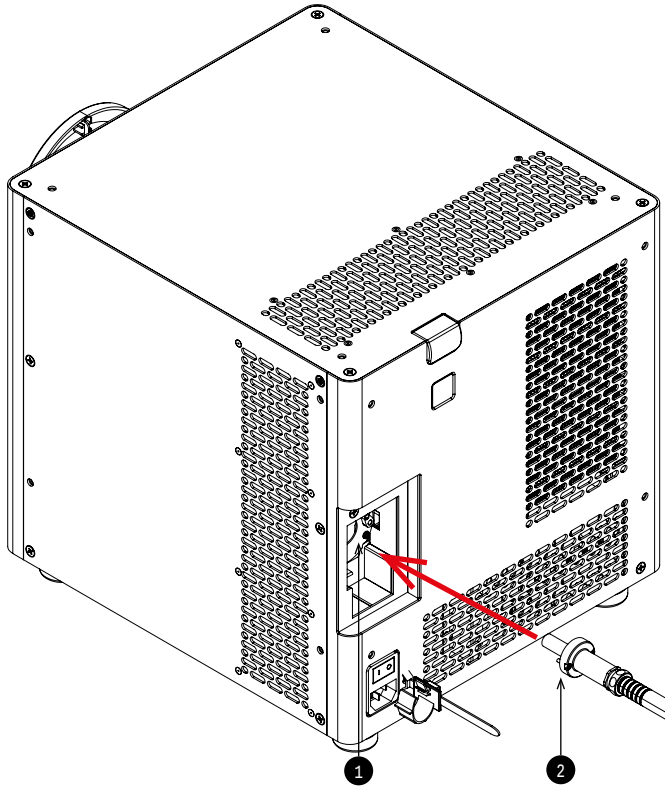
Handle the SLC with care. Do not drop or knock the SLC when removed from its packaging. The curvature of the SLC should never have a radius of less than 20 cm. Below this, the fiber inside the cable may be damaged.

The appropriate SLC cables are supplied with the system. Use only the SLC cable provided.

It may be necessary to clean the SLC connectors before installation. See Cleaning the SLC on page 149

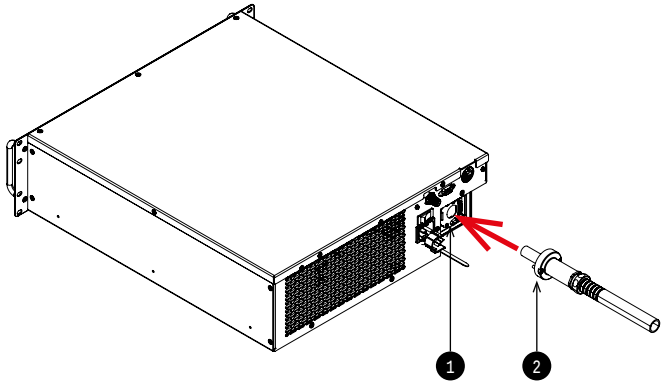
To fit the SLC to the Satellite Head :

1. Remove the end cap from the SLC-Satellite Head connector.
2. Slide the protective cover on the SLC socket on the Satellite Head open ❶.
3. Align the polarity pin on the SLC ❷ with the polarity hole on the SLC socket.
4. Insert the SLC.
5. Use the hex driver to screw in the fixing screw on the SLC and secure it in place.



To fit the SLC to the MLS:

1. Remove the end cap from the SLC-MLS connector.
2. Slide the protective cover on the SLC socket on the MLS open ❶.
3. Align the polarity hole on the SLC ❷ with the polarity pin on the SLC socket.
4. Insert the SLC.
5. Use the hex driver to screw in the fixing screw on the SLC and secure it in place.

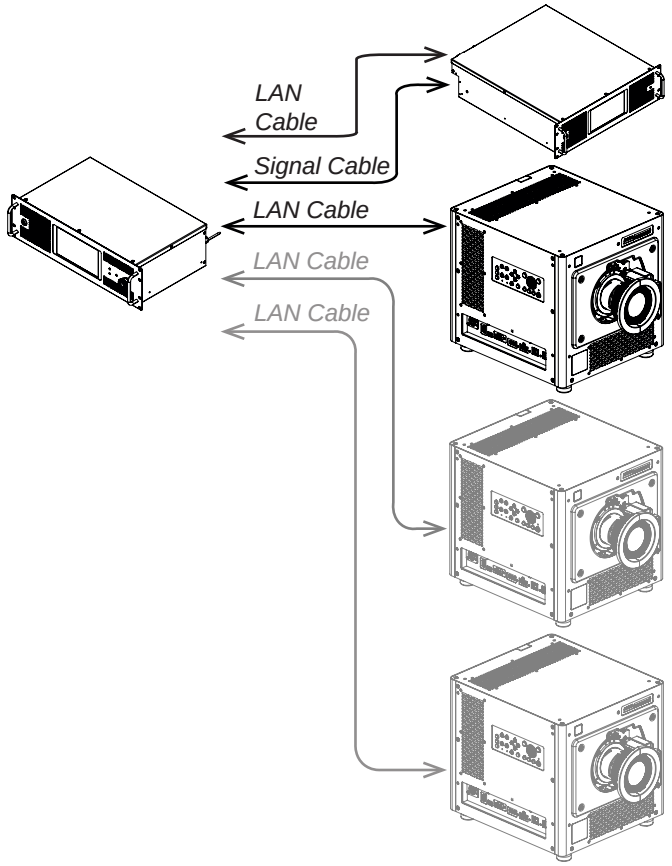


Notes

Connecting the Signal and LAN cables

Each Modular Light Source (MLS) must be connected to the Satellite Control Module (SCM) with a signal cable and a LAN cable. Each Satellite Head must be connected to the SCM with a LAN cable.

- 1:1. One MLS and one Satellite Head are connected to the SCM.
- 1:n. Up to four Satellite Head and one MLS can be connected to the SCM.

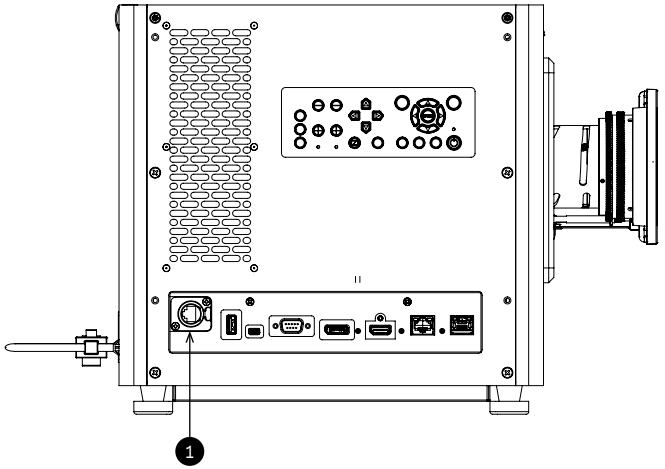


1:n System

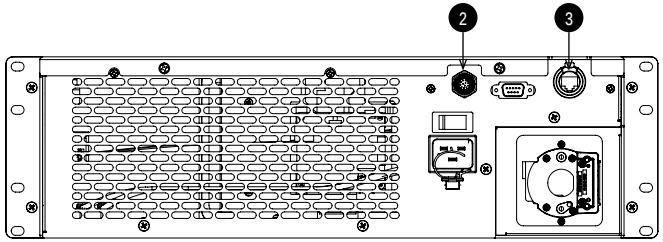
Notes

The appropriate cables are supplied with the Satellite MLS. A single signal cable is supplied for each MLS and a single LAN cable is supplied for each MLS and Satellite Head . Use only the cables provided.

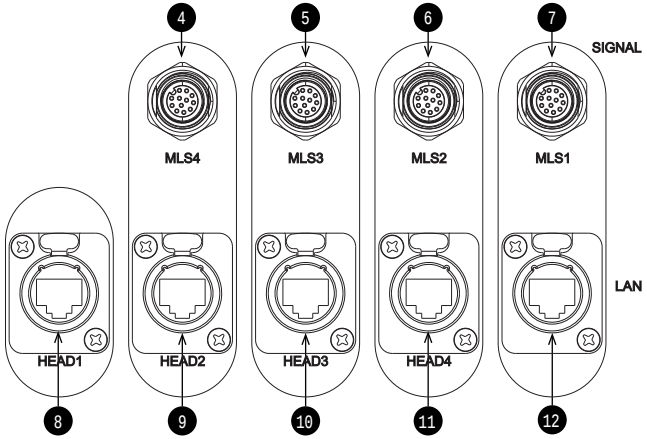
A single LAN port ❶ is located on the right side of the Satellite Head.



A single signal cable port ❷ and a single LAN port ❸ are located on the rear of the MLS.



There are four signal cable ports ❹ - ❼ and five LAN ports ❽ - ⓬ located on the rear of the SCM.



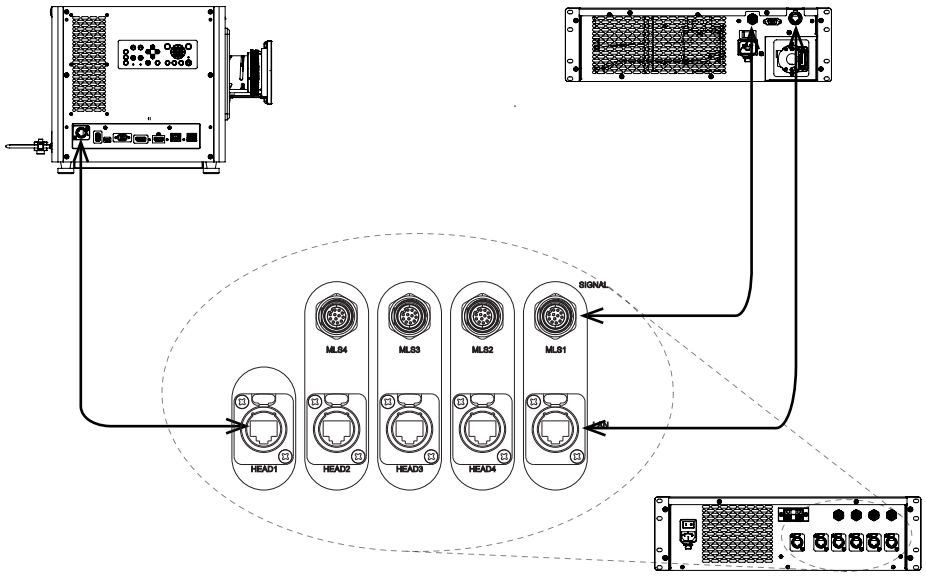
Notes

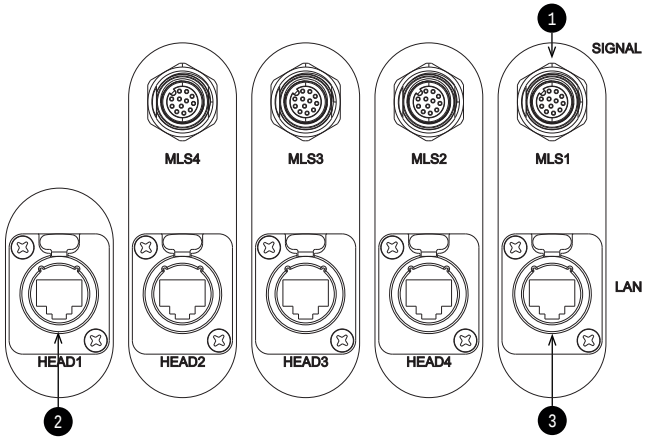
The appropriate cables are supplied with the Satellite MLS. A single signal cable is supplied for each MLS and a single LAN cable is supplied for each MLS and Satellite Head . Use only the cables provided.

Single Satellite Head and Modular Light Source - 1:1 System

Make the following connections when connecting a system with a single Satellite Head and a single Modular Light source:

1. Connect a signal cable to the MLS and connect it to the MLS 1 socket ❶ on the SCM.
2. Connect a LAN cable to the MLS and connect it to the MLS 1 LAN socket ❸ on the SCM.
3. Connect a LAN cable to the Satellite Head and connect it to the Head 1 socket ❷ on the SCM.





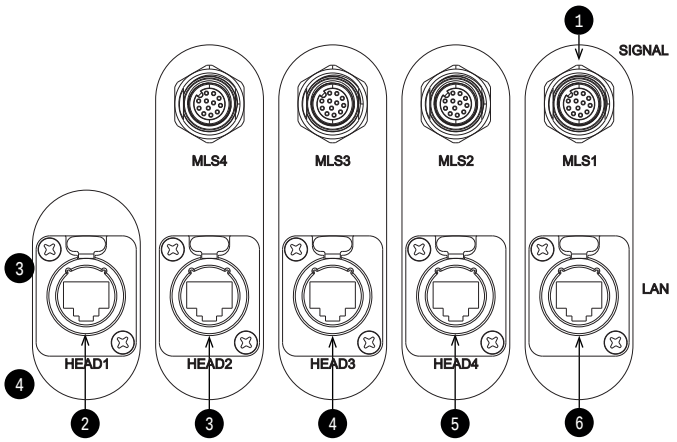
Example of a 1:1 system configuration

Notes

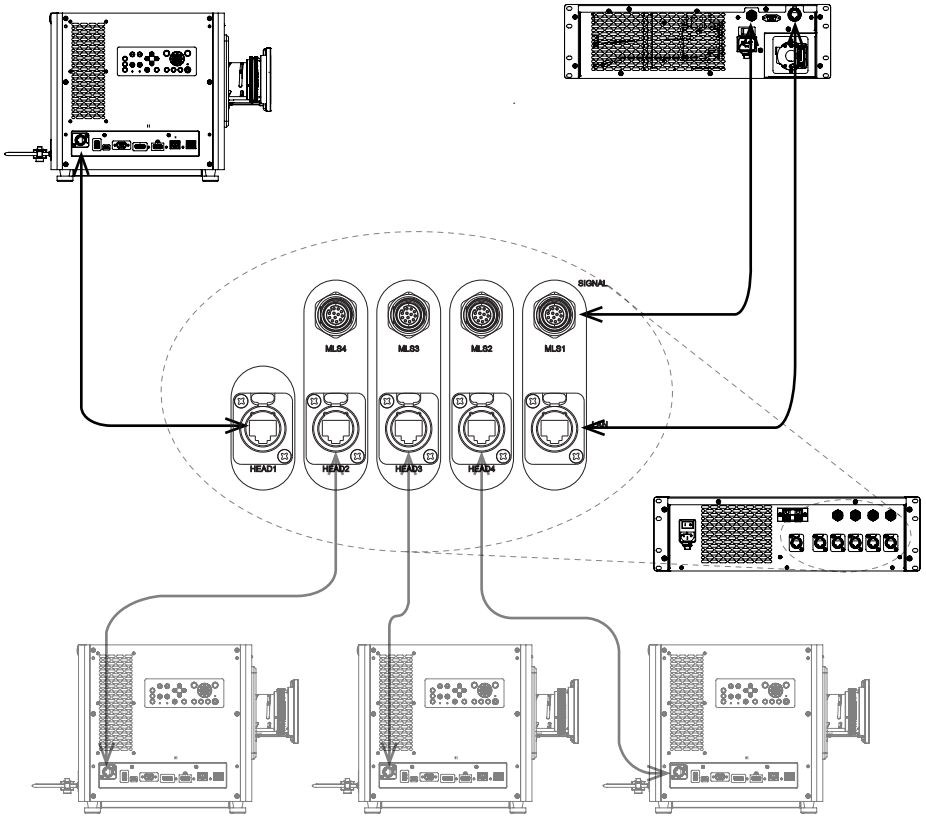
Multiple Satellite Projector Heads - 1:n System

Make the following additional connections when connecting multiple Satellite Heads:

1. Connect a signal cable to the MLS and connect it to the MLS 1 socket ❶ on the SCM.
2. Connect a LAN cable to the MLS and connect it to the MLS 1 LAN socket ❻ on the SCM.
3. Connect a LAN cable to the first Satellite Head and connect it to the Head 1 socket ❷ on the SCM.
4. Second Satellite Head:
   - Connect a LAN cable to the Satellite Head and connect it to the Head 2 LAN socket ❸ on the SCM.
5. Third Satellite Head:
   - Connect a LAN cable to the Satellite Head and connect it to the Head 3 LAN socket ❹ on the SCM.
6. Fourth Satellite Head:
   - Connect a LAN cable to the Satellite Head and connect it to the Head 4 LAN socket ❺ on the SCM.



Notes



Example of a 1:n system configuration

Notes

Power Supply

AC Power Precautions

Warning! Death or Serious Injury could occur if the following precautions are ignored

Shock Hazard! Only use the AC power cord provided or recommended by the manufacturer

Fire & Shock Hazard! Do not operate the product unless the power cord, socket and plug meet local rating standards

Do not attempt operation if the AC supply is not within the specified parameters

The AC power cord must be inserted into a socket with grounding

Disconnect the product from the AC supply before installing, moving, servicing, cleaning or removing covers

Do not use an AC power cord that appears damaged

Do not overload power sockets or extension cords

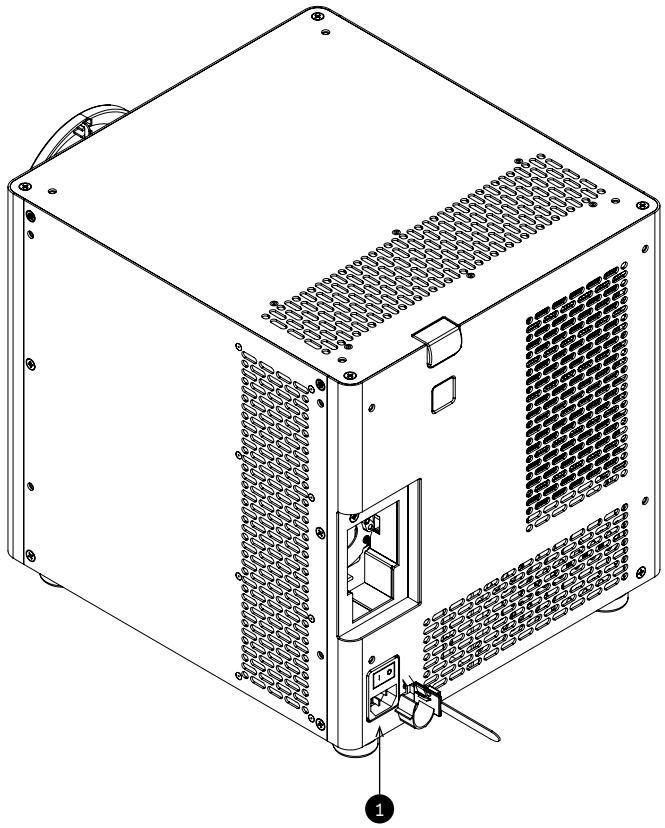
Notes

Connecting the power supply

1. Firmly push the mains connector into the AC In socket ❶

When the cable is plugged in and the power supply is on, the module is OFF until the power button is switched to ON.

When power is applied to the MLS the Laser illumination is not switched on.



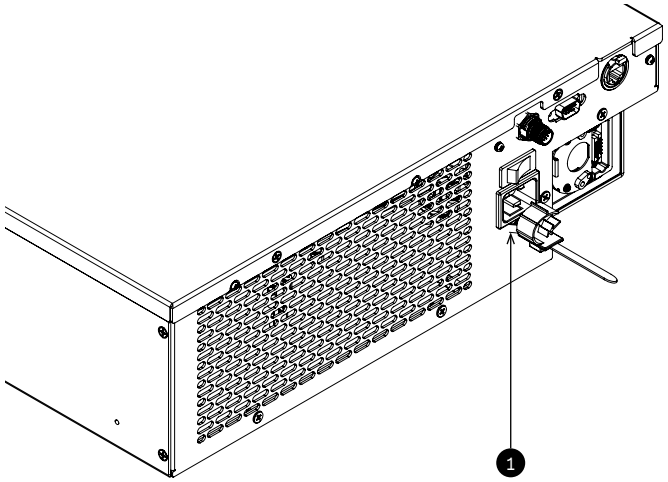
Satellite Head Rear

Notes

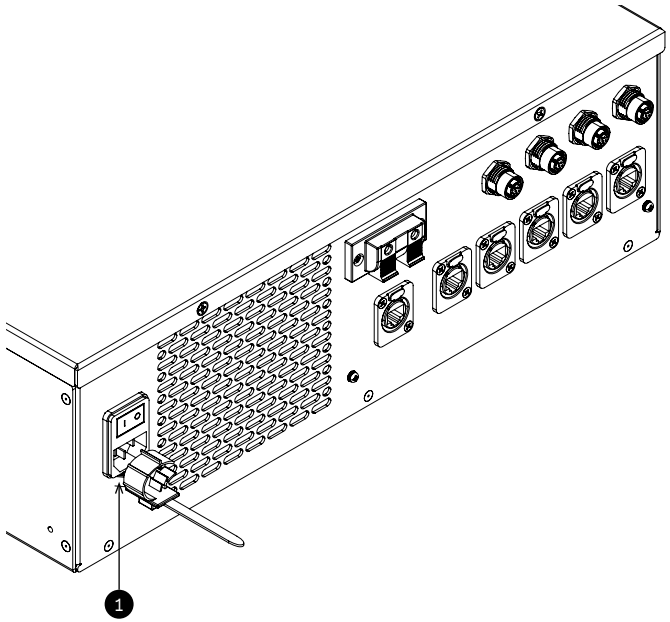
Use only the power cable provided.

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.



MLS Rear



SCM Rear

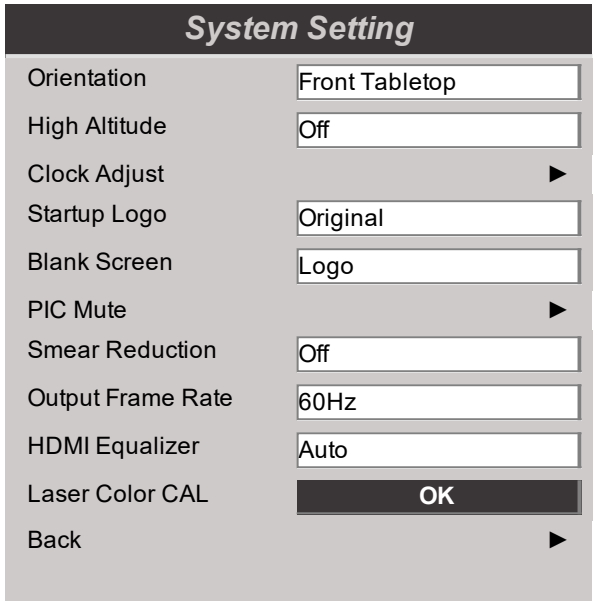
Notes

Laser color calibration

The laser colors must be calibrated after installation or after changing MLS within a system:

1. Press **Menu** on the remote control to display the OSD on the screen
2. Use the navigation buttons to highlight the Setup menu and press **OK** to access it
3. Navigate to the System Setting menu and press **OK** to access it
4. Navigate to the Laser Color CAL function and press **OK** to recalibrate the colors.

The calibration will take approximately 30 to 40 minutes to complete.



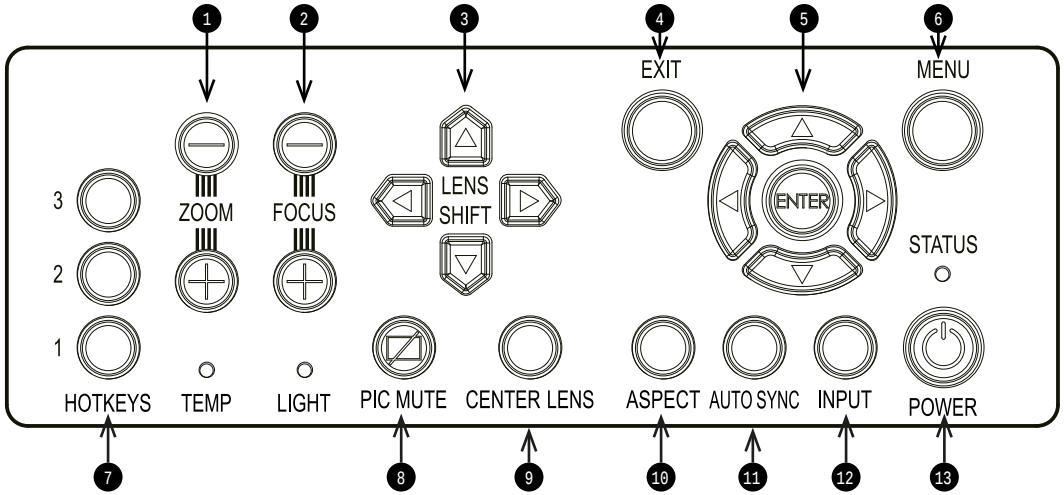
Notes

Operating the system

The system has the following controls:

- Remote control
- Control panel on the Satellite Head
- Touchscreen control panel on the MLS
- Touchscreen control panel on the SCM

Satellite Head Control panel



Control Panel

1. **ZOOM**
   Plus and minus buttons zoom in and out.
2. **FOCUS**
   Plus and minus buttons move the focus in and out.
3. **LENS SHIFT**
   Arrow buttons move the lens in the specified direction.
4. **EXIT**
   Exits the current OSD page and enters the level above.
5. **Arrow buttons & ENTER**
   Press an arrow button to open the keystone menu. Use the arrow buttons to adjust vertical and horizontal keystone. After opening the OSD, use the arrow buttons to highlight menu entries. Press **ENTER** to open or execute the highlighted menu entry.
6. **MENU**
   Displays and exits the OSD.
7. **HOTKEYS**
   User selectable functions. Pre-set functions:
   HOTKEY 1 Information
   HOTKEY 2 Test Pattern
   HOTKEY 3 Lens Load Memory
   Additional options: Picture Mode, Ambient Brightness Correction, Freeze, PIP Swap.
8. **PIC MUTE**
9. **CENTER LENS**
   Centers the lens.
10. **ASPECT**
    Changes the aspect ratio.
11. **AUTO SYNC**
    Re-synchronises with the current input signal.

Notes

See Connecting the power supply on page 47.

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

See Introduction to the OSD on page 72 for full details of how to use the menu system.
See Introduction to the MLS Touchscreen on page 108 for full details of how to use the MLS touchscreen control panel.
See Introduction to the SCM Touchscreen on page 1 for full details of how to use the SCM touchscreen control panel.

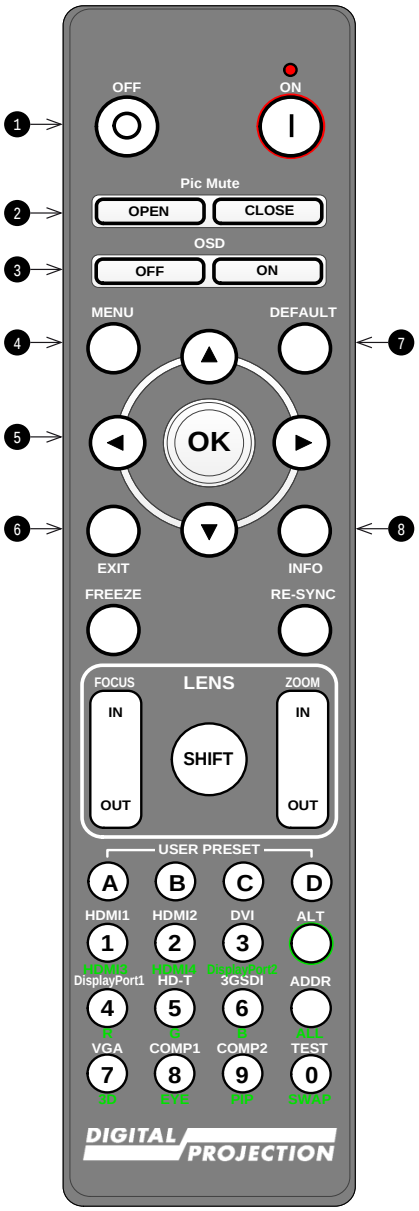
Make sure the projector is fully installed, all interlocks are in place and the laser key switch on the SCM and each MLS are enabled before switching the projector on.

12. **INPUT**
    Switches to the next input source.
13. **POWER**
    Switches the Laser on and off.

Notes

Remote control

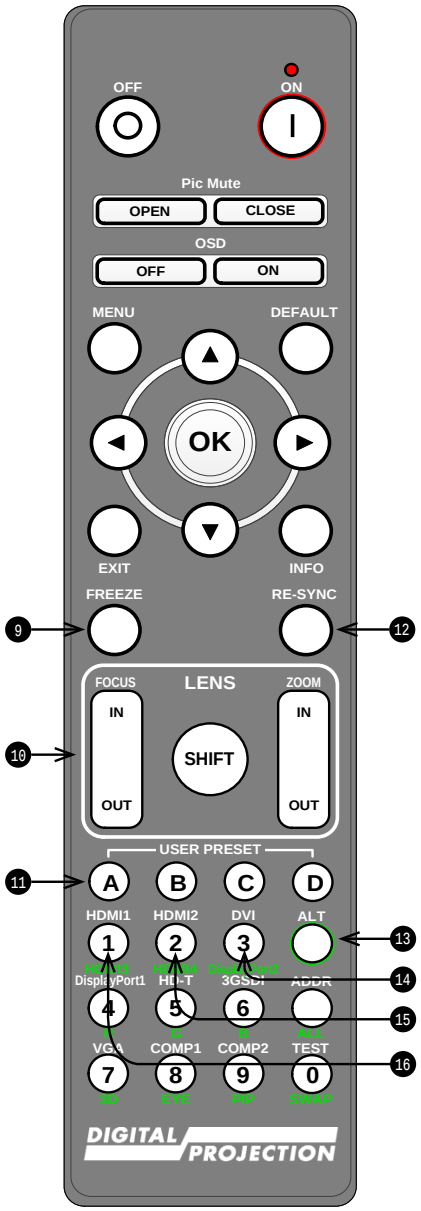
1. **Power ON / OFF**
   Turns power on and off.
2. **Pic Mute OPEN / CLOSE**
   - Press CLOSE to hide the projected image. When off, the laser remains on and a black image is projected.
   - Press OPEN to display the hidden image.
3. **OSD ON / OFF**
   Enable and disable screen timeout messages and control whether to show the OSD during projection.
4. **MENU**
   Access the on screen display (OSD). If the OSD is open, press this button to go back to the previous menu.
5. **Navigation (arrows and OK)**
   OSD mode: Navigate through the menus with the arrows, confirm your choice with **OK**.
   Lens adjustment modes: Press OK to switch between **Shift Adjustment** and **Zoom / Focus Adjustment**. Use the arrows to shift, zoom or focus the lens. See **10** below.
6. **EXIT**
   Go up one level in the OSD. When the top level is reached, press to close the OSD.
7. **DEFAULT**
   When editing a parameter, press this button to restore the default value.
8. **INFO**
   Access information about the projector.



Remote Control

Notes

9. **FREEZE**
   Freeze the current frame.
10. **LENS adjustment**
    - **FOCUS IN / OUT**: adjust focus.
    - **SHIFT**: press and hold this button, then use the Navigation arrow buttons to move the lens.
    - **ZOOM IN / OUT**: adjust zoom.
11. **USER PRESET A, B, C, D**
    Load user presets.
12. **RE-SYNC**
    Re-synchronise with the current input signal
13. **ALT**
    Press and hold this button to access alternative functions for other buttons on the remote.
14. **DVI / DisplayPort2 / numeric input 3**
    There is no DVI input on this projector.
    There is no DisplayPort 2 input on this projector.
15. **HDMI 2 / HDMI 4 / numeric input 2**
    There is no HDMI 2 input on this projector.
    There is no HDMI 4 input on this projector
16. **HDMI 1 / HDMI 3 / numeric input 1**
    Select the HDMI 1 input.
    There is no HDMI 3 input on this projector



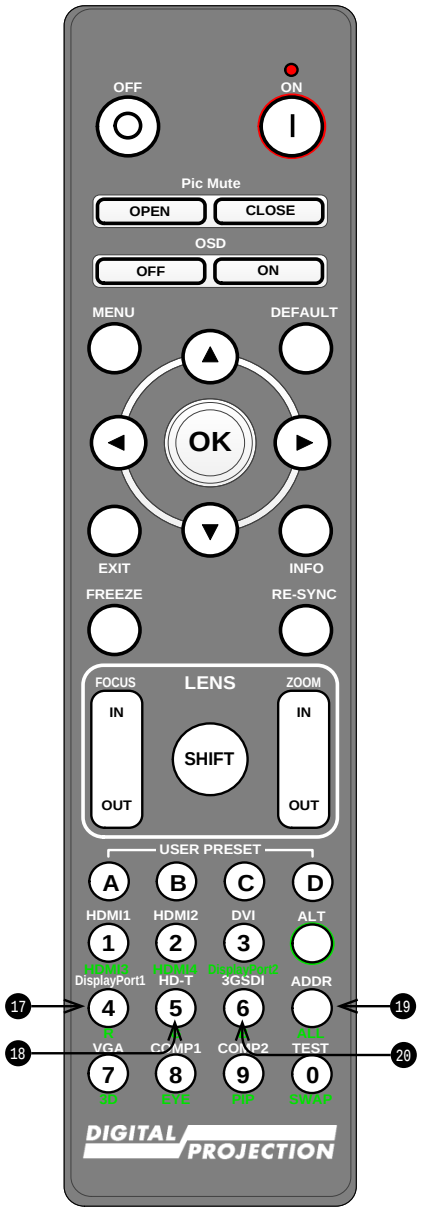
Remote Control

Notes

This projector does not use the following options on the remote:
HDMI2
HDMI3
HDMI4
DisplayPort2
DVI

17. **DISPLAYPORT 1 / R / numeric input 4**
    Select DisplayPort 1 input.
18. **HD-T / G / numeric input 5**
    Select the HDBaseT input.
19. **ADDR / ALL (with red indicator at the top)**
    Assign and unassign an IR remote address.
    To assign an IR remote address:
    1. Press and hold this button until the red indicator starts flashing.
    2. Release this button and while the red indicator is still flashing, enter a two-digit address using the numeric input buttons. The indicator will flash three times quickly to confirm the change.

    To unassign an address and return to the default address 00:
    1. Press and hold ALT and this button simultaneously until the red indicator flashes to confirm the change.
20. **3GSDI / B / numeric input 6**
    There is no 3G-SDI input on this projector.

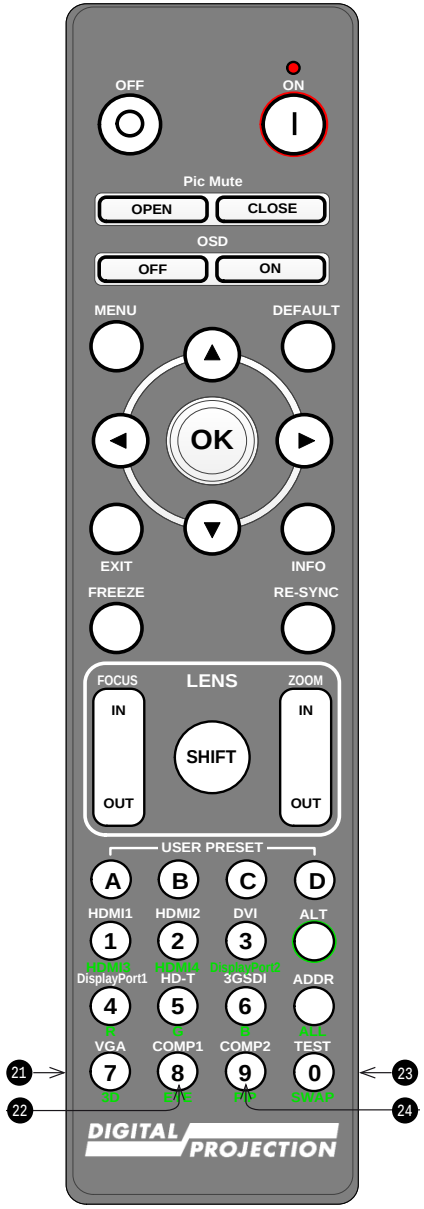


Remote Control

Notes

This projector does not use the following options on the remote: 3GSDI

21. **VGA / 3D / numeric input 7**
    There is no VGA input on this projector.
22. **COMP1 / EYE / numeric input 8**
    There is no Component 1 input on this projector.
23. **TEST / SWAP / numeric input 0**
    Show a test pattern. Press again to show the next test pattern: Off*, Native White, Native Black, Native Red, Native Green, Native Blue,* Checkerboard*, Crosshatch, ColorBar, Aspect Ratio, Grayscale*
    The **SWAP** function is not used on this projector.
24. **COMP2 / PIP / numeric input 9**
    There is no Component 2 input on this projector.
    The **PIP** function is not used on this projector.



Remote Control

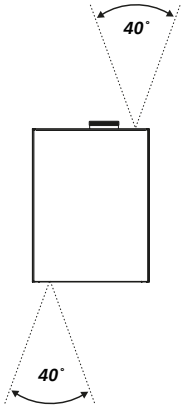
Notes

This projector does not use the following options on the remote:
VGA
COMP 1
COMP 2
PIP

Infrared reception

The projector has infrared sensors at the front and rear.

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

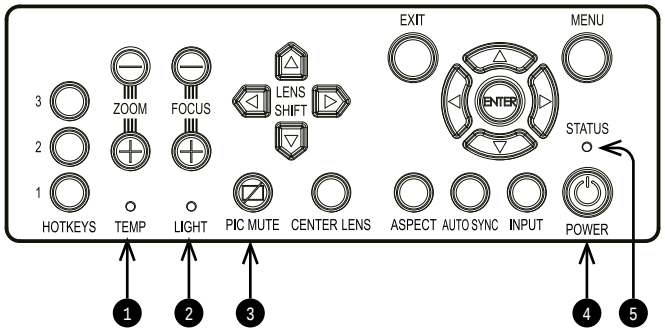


Notes

Module indicators

Satellite Head

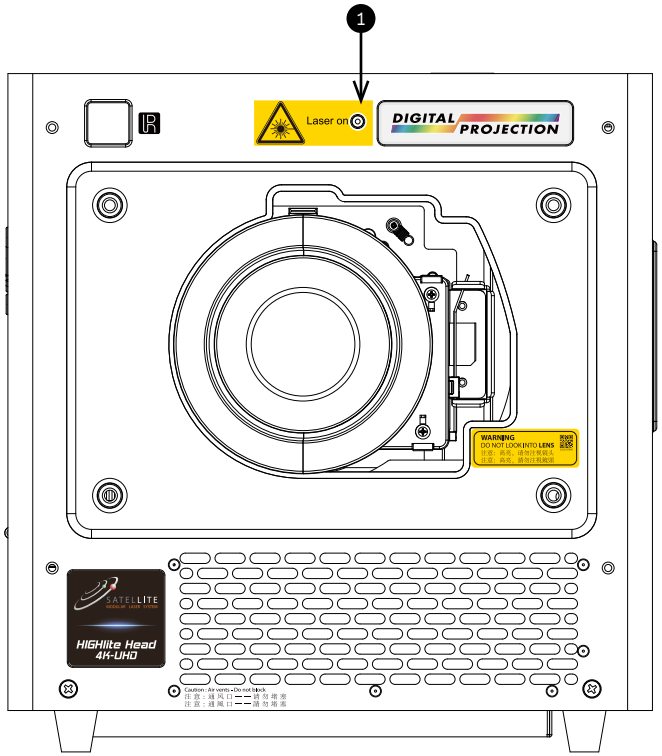
1. **TEMP INDICATOR**
   Off = no problem
   Flashing red = temperature error
2. **LIGHT INDICATOR**
   Off = light is switched off
   On, amber = light is in forced ECO mode at high temperature
   Flashing red (cycles of single flashes) = failure to light up during power up
   Flashing red (cycles of double flashes) = unexpected light off while running
   On, green = light is switched on
   Flashing green (cycles of single flashes) = shutter is on and light source is temporarily off
3. **PIC MUTE**
   Off = the projector is in standby
   On, blue = the projector is on, normal projection
   Flashing red = the projector is on, picture mute is activated
4. **POWER**
   Off = the projector is switched off
   Flashing amber = the projector is cooling down to standby mode
   On, amber = the projector is in standby mode
   Flashing green = the projector is warming up
   On, green = the projector is switched on
5. **STATUS**
   Off = no problem
   Flashing amber (cycles of double flashes) = request to calibrate the lens
   Flashing green (cycles of double flashes) = the projector is calibrating the lens
   Flashing red (cycles of double flashes) = TEC or color sensor error
   Flashing red (cycles of four flashes) = fan error
   On, red = system error



Control Panel

Notes

1. **LASER ON**
   Off = laser is off
   On = laser is on

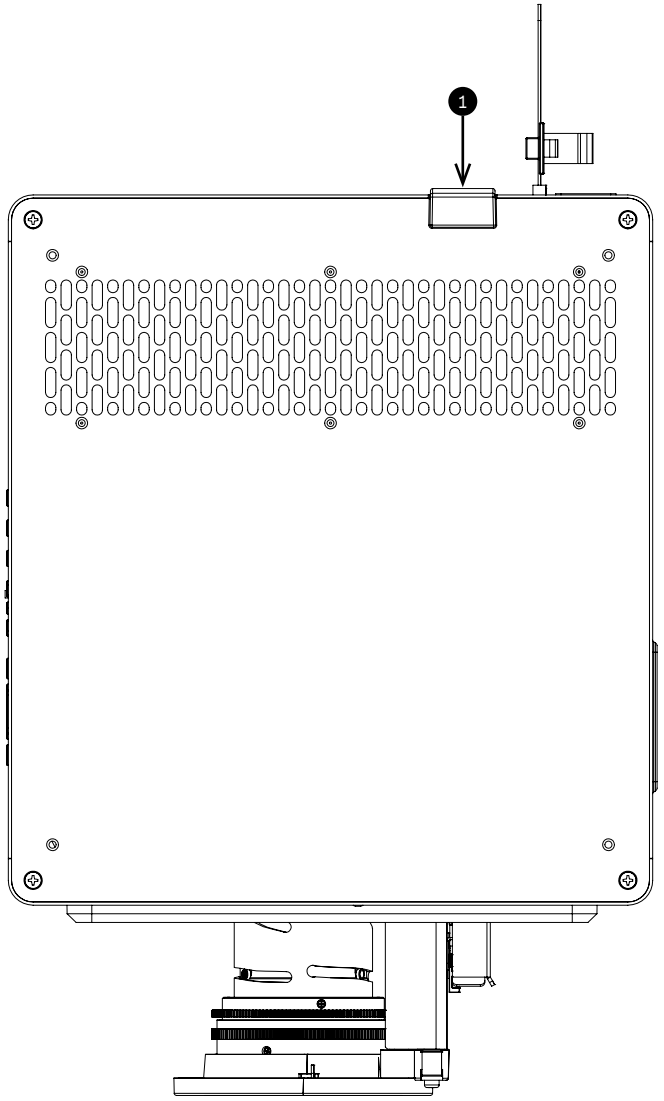


Satellite Head Front

Notes

The Laser ON indicator will light up for 30 seconds before the Laser turns on to warn that the laser is about to turn on.

1. **STATUS**
   Off = no problem
   Flashing amber = the projector is cooling down to standby mode
   Flashing amber (cycles of double flashes) = request to calibrate the lens
   On, amber = the projector is in standby mode
   Flashing green = the projector is warming up
   Flashing green (cycles of double flashes) = the projector is calibrating the lens
   On, green = the projector is switched on
   Flashing red (cycles of single flashes) = the lens or fiber link is open
   Flashing red (cycles of double flashes) = TEC or color sensor error
   Flashing red (cycles of four flashes) = fan error
   On, red = system error

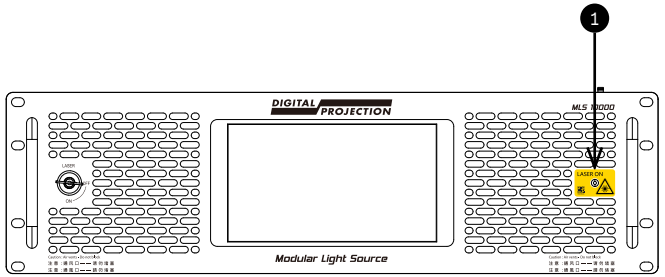


Satellite Head Top

Notes

Modular Light Source

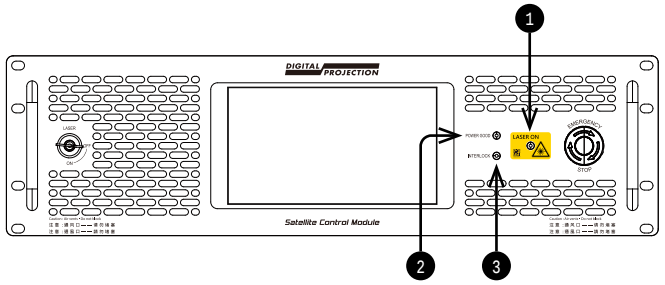
1. **LASER ON**
   Off = laser is off
   On = laser is on



MLS Front

Satellite Control Module

1. **LASER ON**
   Off = laser is off
   On = laser is on
2. **POWER GOOD**
   Green = 12V power is good
   Amber = 12V good, but internal power rail has a fault
   Red = 12V PSU not operating within specifications
3. **INTERLOCK**
   On = Laser system is active and interlock complete
   Off = Laser system is not active



SCM Front

Notes

The Laser ON indicator will light up for 30 seconds before the Laser turns on to warn that the laser is about to turn on.

The Laser ON indicator will light up for 30 seconds before the Laser turns on to warn that the laser is about to turn on.

Switching the system on

1. Make sure a lens is fitted
2. Make sure the Signal, LAN and SLC cables are fitted
3. Make sure power cables are fitted to the Satellite Head, MLS and SCM
4. Make sure the power supply is on
5. Use the power switch located on the power cable socket to apply power to:
    - The Satellite Head
    - The MLS
    - The SCM
6. Insert the laser on key into the laser on switch on the SCM and each MLS and turn to enable
7. Press **ON** on the Remote Control, or;
    - Press **Power** on the Control Panel, or;
    - Tick **Enable** in the Laser Power Page on the Satellite Control Module touch panel

Switching the projector off

1. Press **OFF** on the Remote Control, or;
    - Press **Power** on the Control Panel, or;
    - Deselect **Enable** in the Laser Power Page on the Satellite Control Module touch panel
2. Turn the laser on key on the SCM and each MLS to disable.

Emergency off

In an emergency, press the **Emergency OFF** button on the front of the Satellite Control Module to turn off the Laser Illumination

Notes

Interlock reset

In the event of the laser illumination turning off as a result of an Interlock break:

1. Make sure all interlocks are in place. See Interlock Switches on page 21
2. Turn ON the laser illumination. See Switching the system on on the previous page

Selecting an input signal

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

Selecting a test pattern

The following test patterns are available:Off*, Native White, Native Black, Native Red, Native Green, Native Blue,* Checkerboard*, Crosshatch, ColorBar, Aspect Ratio, Grayscale*

Use one of the following methods to display a test pattern:

- Press **TEST** on the remote control.
  Use the **LEFT** and **RIGHT** arrow buttons to cycle through the test patterns.
- Press **MENU** open the OSD. 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

Please refer to the connection guide for details about connecting a signal source. See Signal inputs on page 66

Adjusting the lens

You can use the following options to adjust the lens:

- Remote control. See Remote control on page 52
- On screen display (OSD).

Adjusting the image

Orientation

This can be set from the **Setup** menu. See on page 1 for guidance.

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

Picture

Settings such as **Gamma**, **Brightness**, **Contrast**, **Saturation**, **Hue** and **Sharpness** can be set from the **Image** menu. See on page 1 for guidance.

Notes

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DIGITAL PROJECTION

A Delta Associate Company

Satellite HIGHlite 4K-UHD

Digital Video Projector

CONNECTION GUIDE

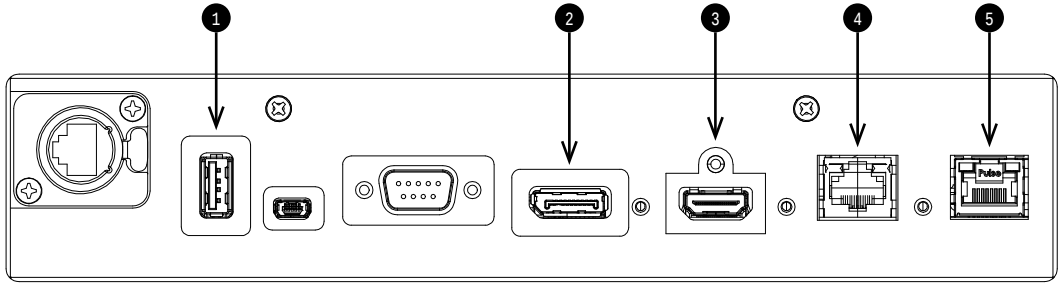
Rev A August 2022

122-933A

Signal inputs

Digital inputs and outputs

1. **USB**
   USB 5V / 2A output. Connect a USB cable to supply power to an external device.
2. **DisplayPort**
   DisplayPort 1.2 input. Connect a DisplayPort cable to the connector. Supports sources up to 4K resolution at 60 Hz and 2048 x 1080 at 120Hz.
3. **HDMI**
   HDMI 2.0 inputs supporting HDCP 2.2. Connect an **HDMI** cable to the connector.
4. **HDBaseT/LAN**
   Receives digital signal from HDBaseT-compliant devices. Connect an HDBaseT cable.
5. **Ethernet**
   Provides LAN connectivity via an ethernet cable.



Satellite Head Connection Panel

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.

See 2D formats on page 144 for information about supported 2D signal input modes.

EDID on the DisplayPort, HDMI, and HDBaseT inputs

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

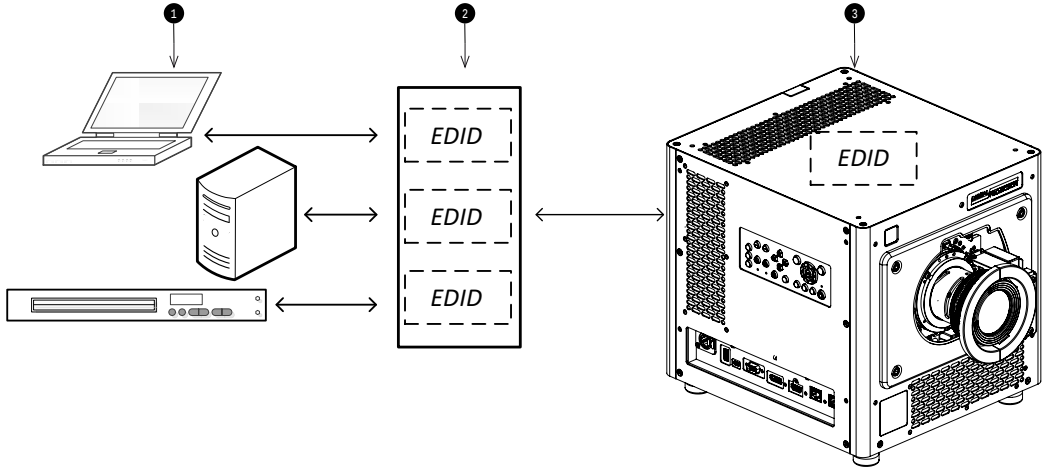
Otherwise refer to the documentation supplied with the source to manually set the resolution to the DMD™ resolution of the projector or the nearest suitable setting. Switch off the source, connect to the projector, then switch the source back on again.

Using DisplayPort / HDMI / HDBaseT switchers with the projector

When using a DisplayPort/HDMI/HDBaseT source switcher with the projector, it is important to set the switcher so that it passes the projector EDID through to the source devices.

If this is not done, the projector may not be able to lock to the source or display the source correctly as its video output timings may not be compatible with those of the projector. Sometimes this is called transparent, pass-through or clone mode. See your switcher's manual for information on how to set this mode.

1. Sources
2. Switcher
3. Satellite Head

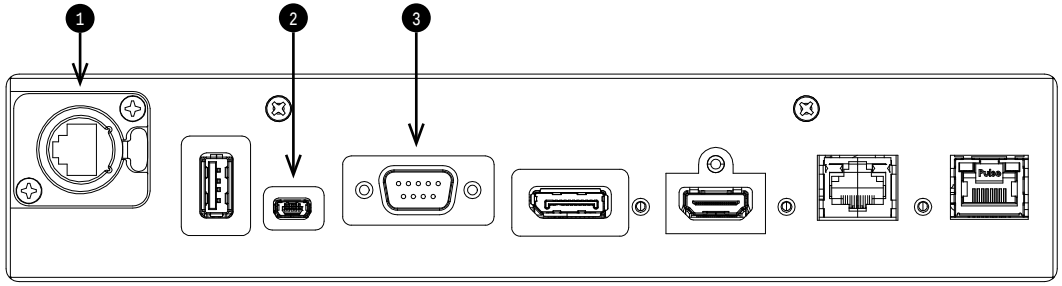


The EDIDs in the switcher should be the same as the one in the projector.

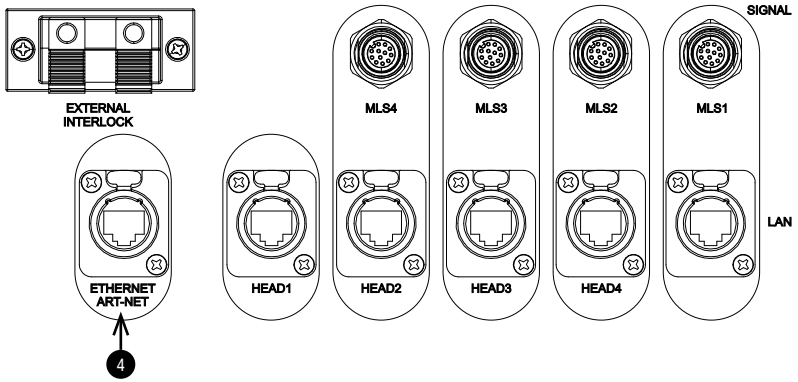
Notes

Control connections

1. **Ethernet**
   This system is linked via a series of Ethernet connections. See Connecting the Signal and LAN cables on page 41
2. **Service**
   This port is for servicing purposes only.
3. **RS232**
   This port is for servicing purposes only.
4. **Ethernet**
   This system can be controlled via an Ethernet connection. Use an Ethernet cable to connect the SCM to your computer.



Satellite Head Connection Panel



SCM Connection Panel

Notes

See "Connecting the Signal and LAN cables" on page 41 and "Connecting the Satellite Link Cable" on page 39 for guidance on setting up the connections between each Satellite Head, MLS and SCM.

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

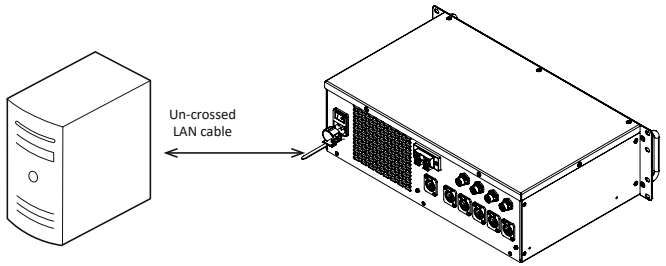
Only one control connection should be used at any one time.

With an Ethernet connection the system can serve a web page offering status and controls. See Served web pages on page 153 for guidance on accessing and using the served web pages.

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

LAN connection examples

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



Notes

With an Ethernet connection the system can serve a web page offering status and controls. See Served web pages on page 153 for guidance on accessing and using the served web pages.

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

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

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DIGITAL PROJECTION

A Delta Associate Company

Satellite HIGHlite 4K-UHD

Digital Video Projector

ON SCREEN DISPLAY (OSD) OPERATING GUIDE

Rev A August 2022
122-933A

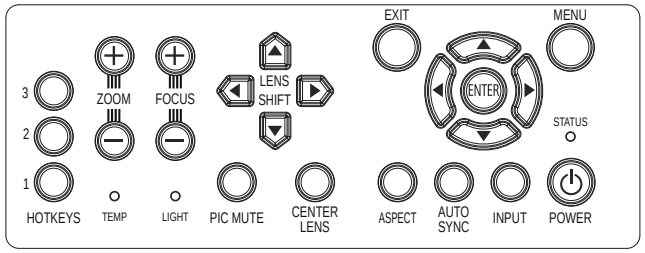
Introduction to the OSD

This section describes the operation of the OSD.

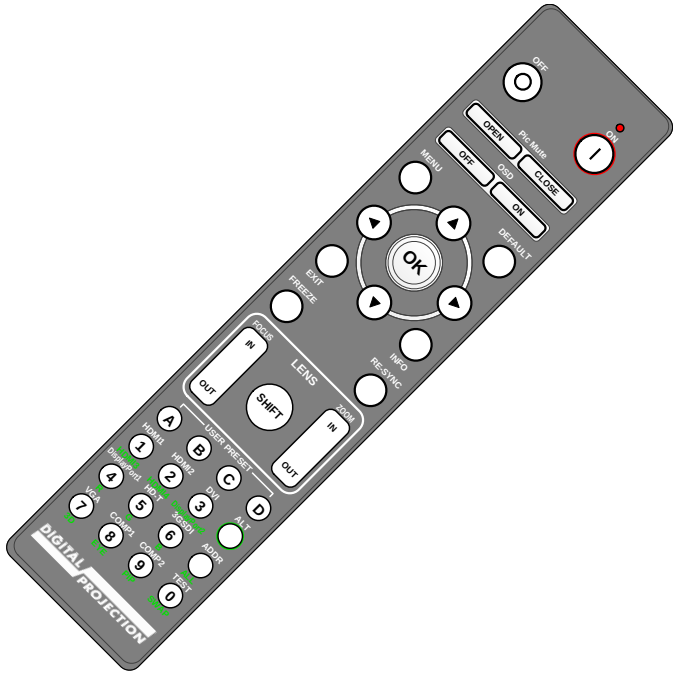
Opening the Menu

Use the projector control panel or the remote control to open the on-screen display (OSD). On either device:

1. Press the **MENU** button. The OSD opens showing the list of available menus



Projector control panel



Remote control

Opening a submenu

1. Move up and down the list using the **UP** and **DOWN** arrow buttons.
2. Press **ENTER** on the control panel or **OK** on the remote control to open a submenu.

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

Notes

Exiting menus and closing the OSD

To go back to the previous page:

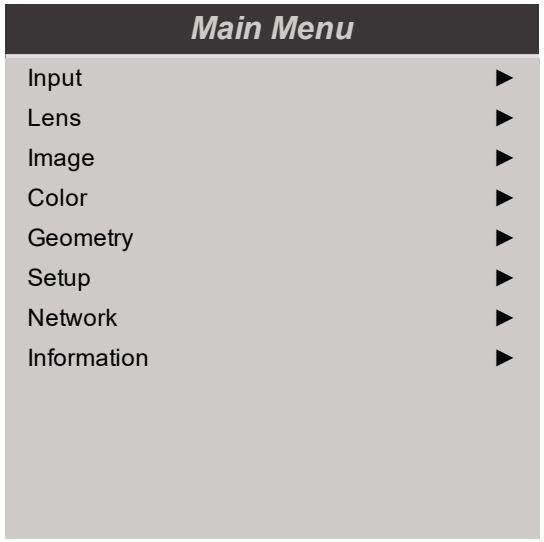
1. Press **EXIT**.

To close the OSD:

1. Press **MENU**.

Or:

1. Go back to the top level menu
2. Press **EXIT**.

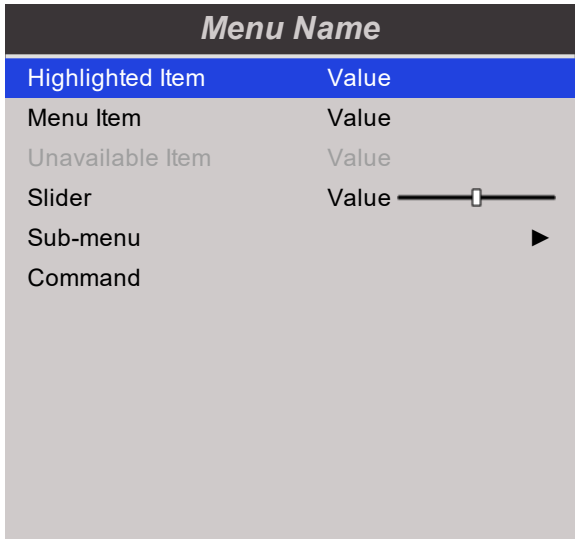


On Screen Display (OSD): Top Level Menu

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).



Inside a menu

Notes

The highlighted item has blue background.

Accessing sub menus

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

Executing commands

Some items contain a command, such as 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.

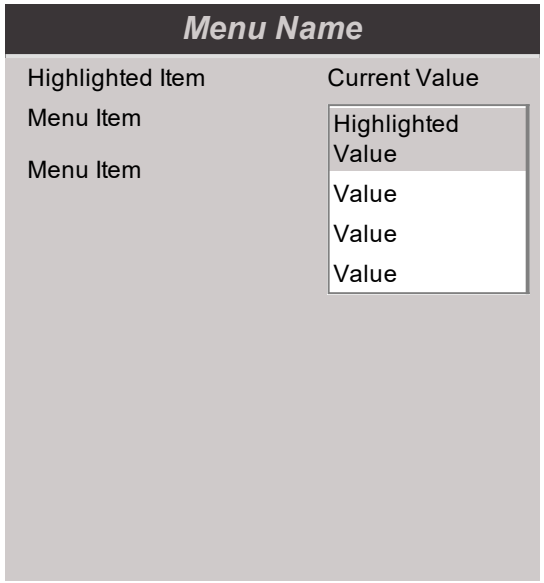
Command

Notes

Editing projector settings

If the highlighted menu item contains a list of values to choose from, you can change the value by doing the following:

1. Highlight the menu item and press **ENTER/OK**.
2. In the list of values that opens, use the **UP** and **DOWN** arrow buttons to highlight a value, then press **ENTER/OK** again to select the highlighted value.

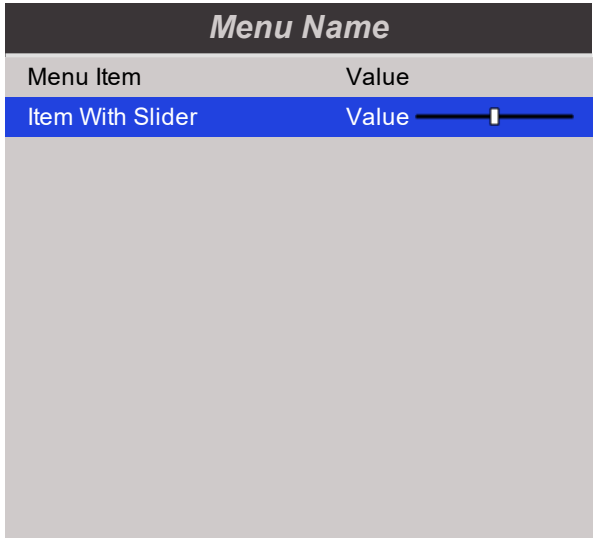


List of Values

Using a slider to set a value

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

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



Slider

Notes

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

Please wait for any value changes to be applied

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.

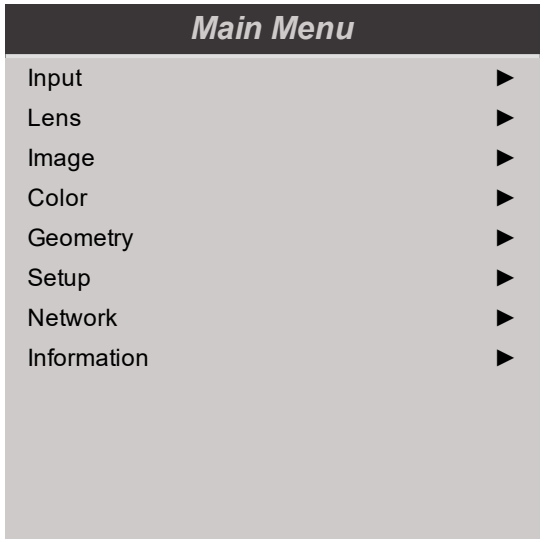
Data	
Row	x: 0.658 y: 0.339
Highlighted Row	x: 0.315 y: 0.662
Row	x: 0.146 y: 0.043
Row	x: 0.276 y: 0.283

Notes

Using the projector

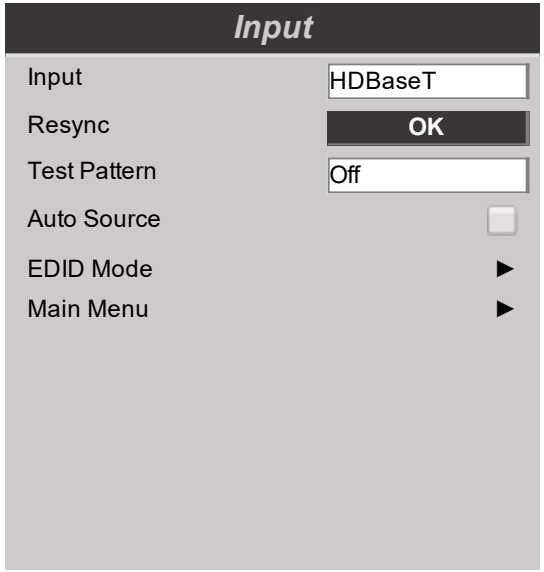
Main Menu

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



Input

- **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**
  Off, Native White, Native Black, Native Red, Native Green, Native Blue, Checkerboard, CrossHatch, ColorBar, Aspect Ratio, Greyscale.
  Use the **LEFT** and **RIGHT** arrow buttons to switch between values.
- **Resync**
  Press **ENTER/OK** to force the projector to resynchronize with the current input
- **Auto Source**
  If this setting is **On**, the projector will automatically search for an active input source.
- **EDID Mode.**
  Press **ENTER/OK** to open this sub menu.
- **Main Menu**
  Go back to the main menu.



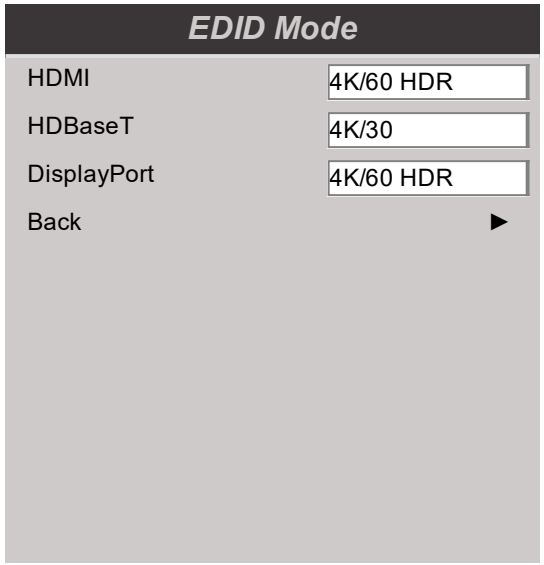
Notes

See Signal inputs on page 66 for 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*

EDID Mode

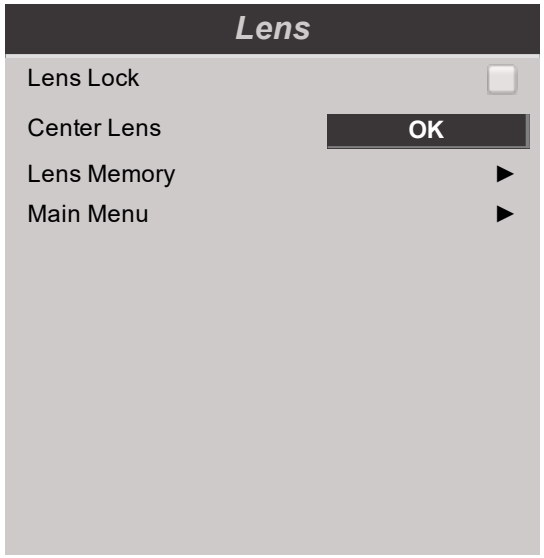
Each signal input type is available in the menu. Select the appropriate frame rate and display resolution for each input.



Notes

Lens

- **Lens Lock**
  When this feature is **On**, all other Lens menu items are disabled.
- **Center Lens**
  Centers the lens.
- **Lens Memory**
  Opens a sub-menu, see next page.
- **Main Menu**
  Go back to the main menu.

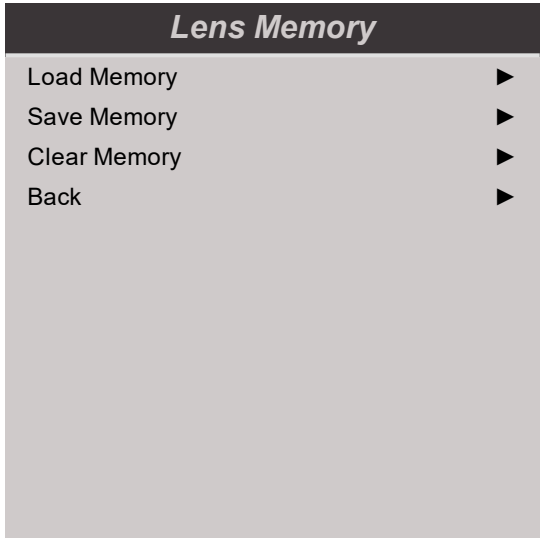


Lens Memory

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

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

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



Notes

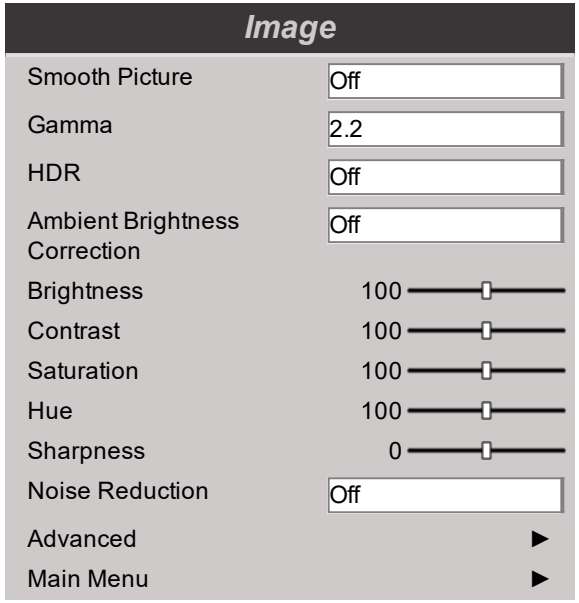
Lens Load Memory	
Memory 1	OK
Memory 2	OK
Memory 3	OK
Memory 4	OK
Memory 5	OK
Memory 6	OK
Memory 7	OK
Memory 8	OK
Memory 9	OK
Memory 10	OK
Back	►

Lens Save Memory	
Memory 1	OK
Memory 2	OK
Memory 3	OK
Memory 4	OK
Memory 5	OK
Memory 6	OK
Memory 7	OK
Memory 8	OK
Memory 9	OK
Memory 10	OK
Back	►

Lens Clear Memory	
Memory 1	OK
Memory 2	OK
Memory 3	OK
Memory 4	OK
Memory 5	OK
Memory 6	OK
Memory 7	OK
Memory 8	OK
Memory 9	OK
Memory 10	OK
Back	►

Notes

Image



- **Smooth Picture**
  When this feature is **On**, the projector will resize the incoming signal to display in 4K-UHD resolution.
  When **Off** sources will be displayed within native 4K resolution.
  Aspect ratio selection applies for both Smooth Picture **On** or **Off**.
- **Gamma**
  Choose a de-gamma curve from **1.0, 1.8, 2.0, 2.2, 2.35, 2.5, 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.
  DICOM is a simulated DICOM display, which can be used for training applications.
- **HDR**
  Choose from ***Off***, ***Auto***, ***PQ-400***, ***PQ500***, ***PQ1000*** and ***HLG***.
  HDR (High Dynamic Range) is a form of gamma developed to create more realistic experience when viewing images delivered using this format, such as scenes with bright sunlight. Unlike traditional gamma, HDR is not device or installation independent. HDR content will come with a recommended brightness regardless of screen size.
  For best results, as a guideline, the following screens sizes are suggested.

HDR Screen sizes		Screen width (cm)					
Model	**Lumens**	**300 NIT**	**400 NIT**	**500 NIT**	**600 NIT**	**1000 NIT**	**4000 NIT**
HIGHLite Satellite 4K-UHD	9,000	411	356	319	291	226	113

  HDR options should only be used with media players and sources equipped with HDR capability and outputting HDR content.
  Perceptual Quantizer (PQ) is the digitizing concept for capture and display and provides metadata to enable the display to understand the coding of the content.
  The NIT numbers relate to the brightness of the viewing conditions in NIT. NIT is the unit of brightness measurement for monitors and LED walls that emit light rather than reflect it such as a projection screen. However it is a reference to the brightness you would choose for a given environment.
  HLG is High Dynamic Range – hybrid-log-gamma. This is a broadcast version of HDR for live TV and events.
- **Ambient Brightness Correction**
  Choose from; Off, BC1, BC2, BC3, BC4, BC5, BC6
  This adjusts brightness, contrast, saturation, hue and sharpness settings to levels that are pre-configured for different levels of ambient light.
- **Brightness, Contrast, Saturation, Hue, Sharpness**
  Highlight the setting you wish to edit, and then press **ENTER/OK**, or the **LEFT** or **RIGHT** arrow button to open the slider.
  Use the **LEFT** and **RIGHT** arrow buttons to adjust the slider.
  Press **EXIT** to close the slider and return to the menu, or **MENU** to close the slider and return to the projected image.
- **Noise Reduction**
  Choose a level of noise reduction from **Off, Low, Middle** and **High**.

Notes

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

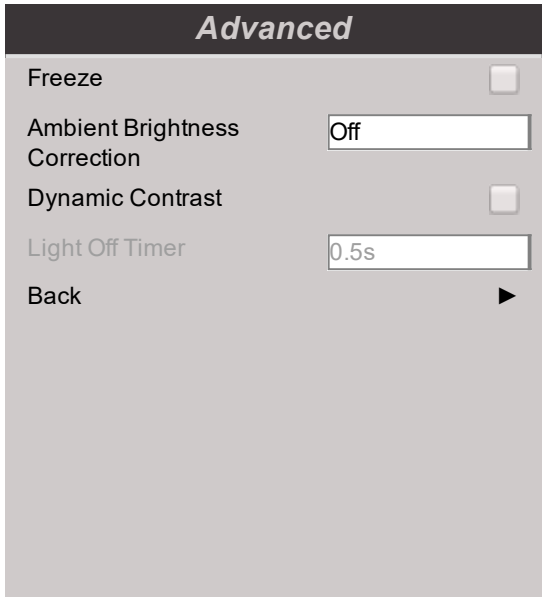
Selecting a HDR setting will disable the Gamma setting.
If the HDR setting is Auto, the Gamma setting is only disabled when the image source is HDR

The HDR AUTO setting is only available when the incoming signal is HDR capable

- **Advanced**
  Opens a sub-menu.
- **Main Menu**
  Go back to the main menu.

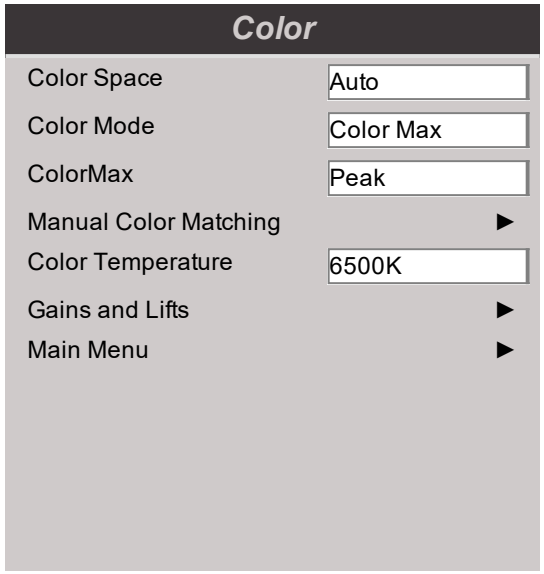
Advanced

- **Freeze**
  Freezes the current frame.
- **Ambient Brightness Correction**
  Choose from; Off, BC1, BC2, BC3, BC4, BC5, BC6
  This adjusts brightness, contrast, saturation, hue and sharpness settings to levels that are pre-configured for different levels of ambient light.
- **Dynamic Contrast**
  Tick to activate. Will automatically adjust the contrast level according the displayed image.
- **Light Off Timer**
  When **Dynamic Contrast** is **On**, the **Light Off Timer** will define if laser light source will turn off after a period of time has passed. The options are: **0.5, 1.0, 1.5, 2.0, 3.0, 4.0** seconds.
- **Main Menu**
  Go back to the main menu.



Notes

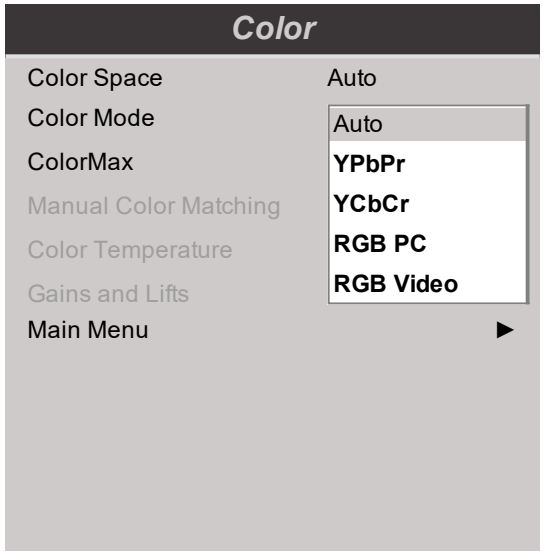
Color



Color Space

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

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

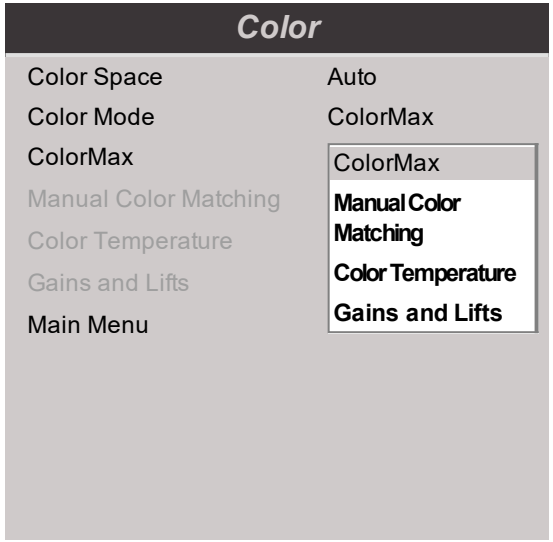


Notes

Color Mode

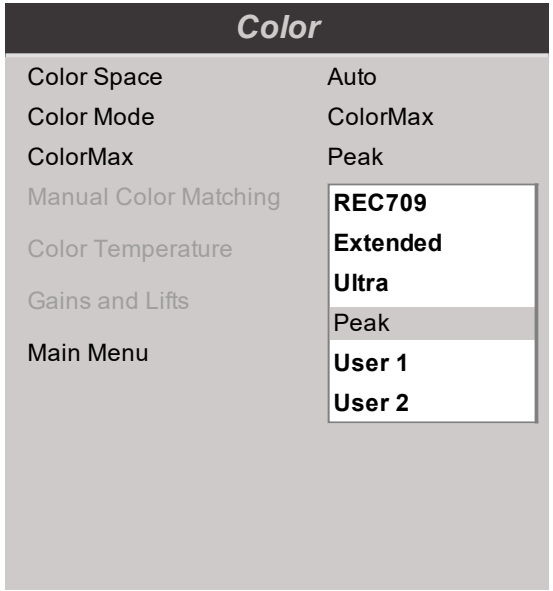
The projector can work in the following color modes:

- **ColorMax**
- **Manual Color Matching**
- **Color Temperature**
- **Gains and Lifts**



ColorMax

1. Set **Color Mode** to **ColorMax**.
2. Navigate to the **ColorMax** setting.
3. Choose from **REC709, Extended, Ultra, 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.

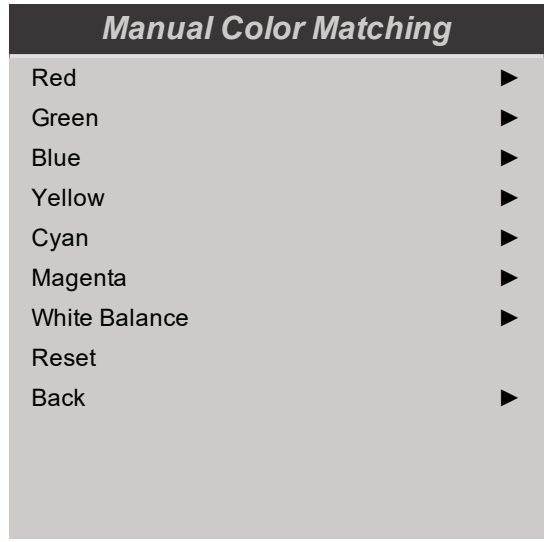
*See Setup menu on page 1 for further information about setting up the **User 1** and **User 2** color gamuts.*

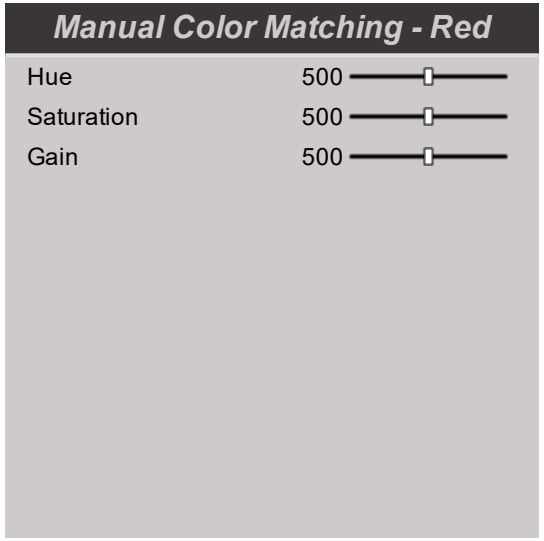
Manual Color Matching

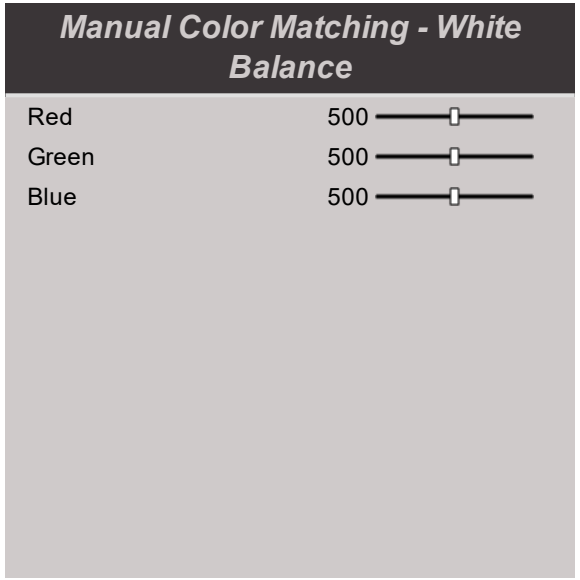
1. Set **Color Mode** to **Manual Color Matching**.
2. Open the **Manual Color Matching** submenu.

Here you can do the following:

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







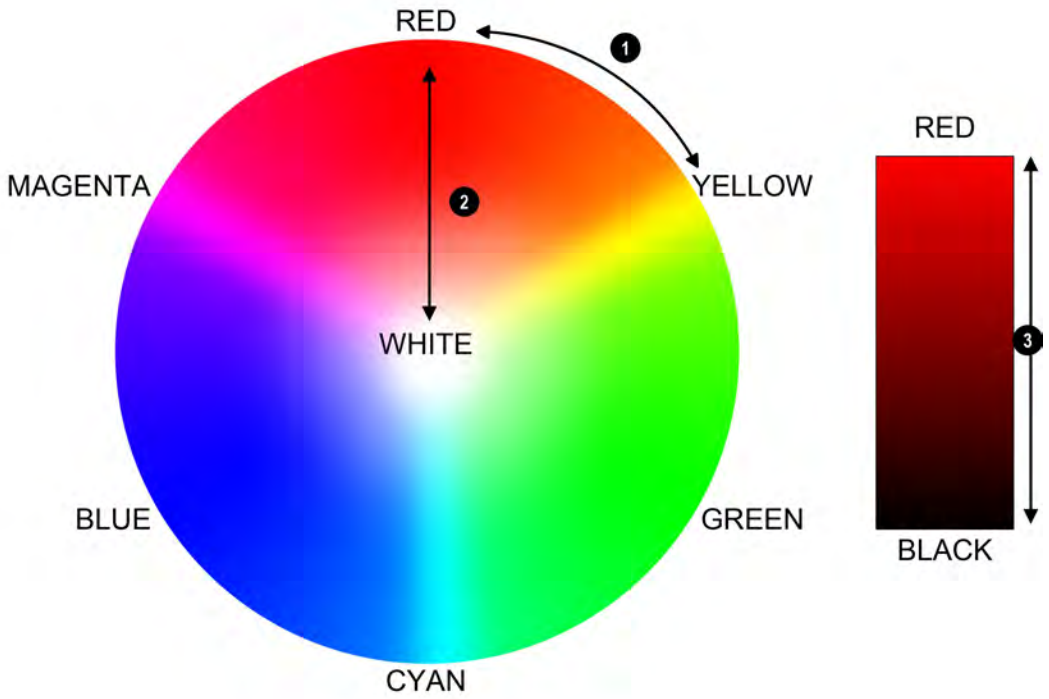
Notes

See Color matching parameters explained on the next page for more details about the Hue, Saturation and Gain settings.

Color matching parameters explained

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

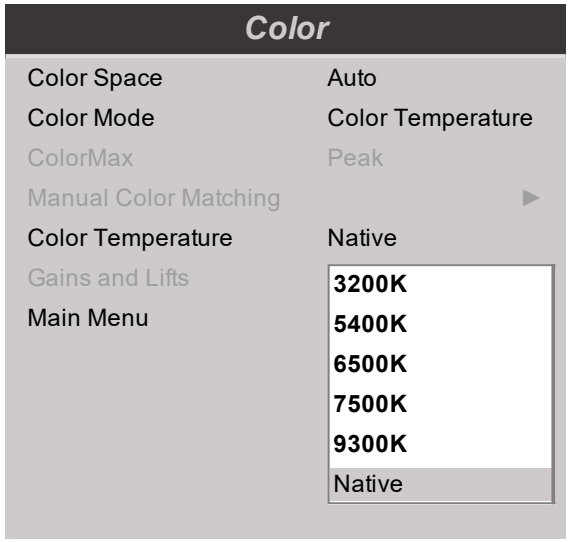
1. **Hue** Specifies the position of each color (red, yellow, green, cyan, blue and magenta) relative to its neighboring colors.
2. **Saturation** Specifies the level of white in each color (i.e. how “pale” each color is).
3. **Gain** Controls the amount of light that goes into each color, i.e. the lowest gain would produce black.



Notes

Color 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).

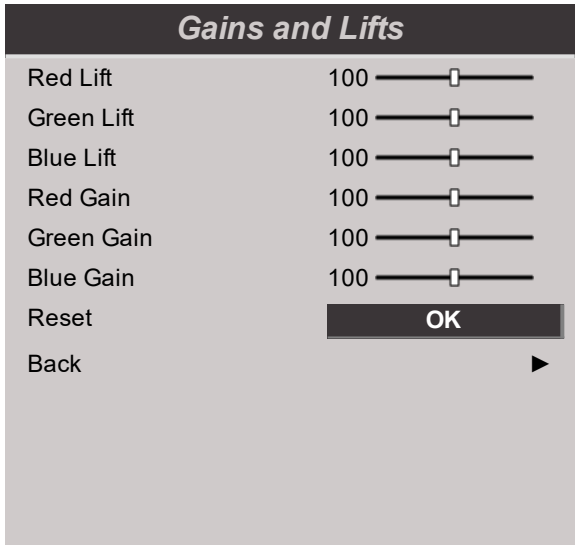


Gains and Lifts

1. Set **Color Mode** to **Gains and Lifts**.
2. Open the **Gains and Lifts** submenu.

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

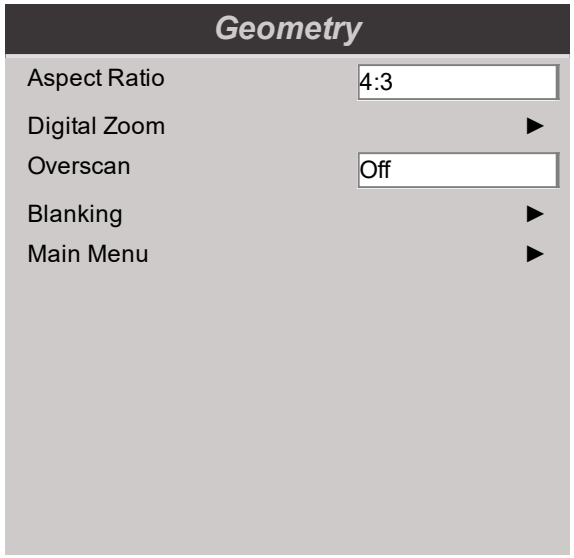
Set the sliders as required



Notes

Geometry

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



Aspect Ratio

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

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

Choose from:

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

Notes

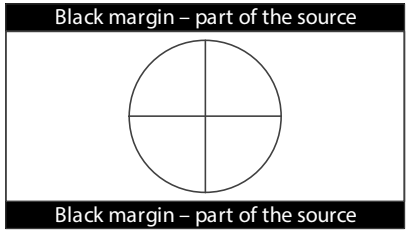
*Image scaling and aspect ratio are also influenced by **Setup > Screen Setting**.*

*See Theaterscope setting on the facing page for further information about the **TheaterScope** aspect ratio.*

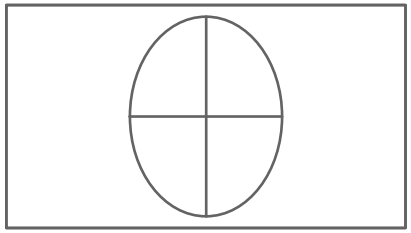
Theaterscope setting

The **TheaterScope** setting is used in combination with an anamorphic lens to restore 2.35: 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.

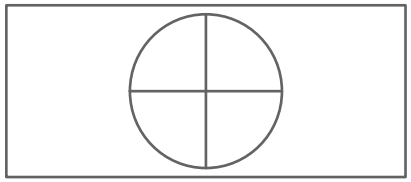
Without an anamorphic lens and without the TheaterScope setting applied, a 16:9 source containing a 2.35:1 image looks like this:



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.

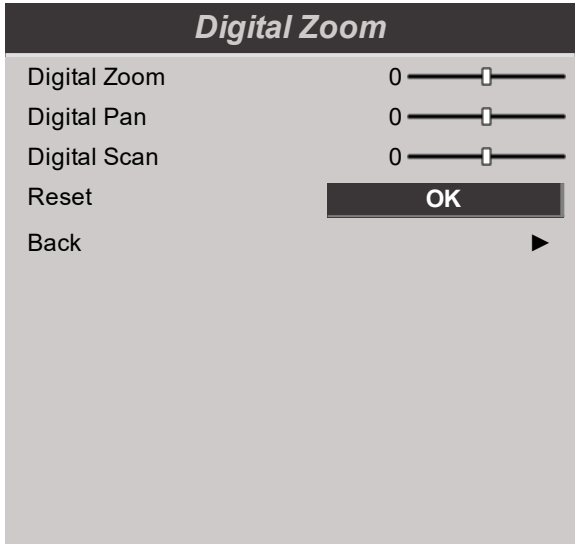
If you use TheaterScope, set your screen aspect ratio to 16:9.

Digital Zoom

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

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

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



Notes

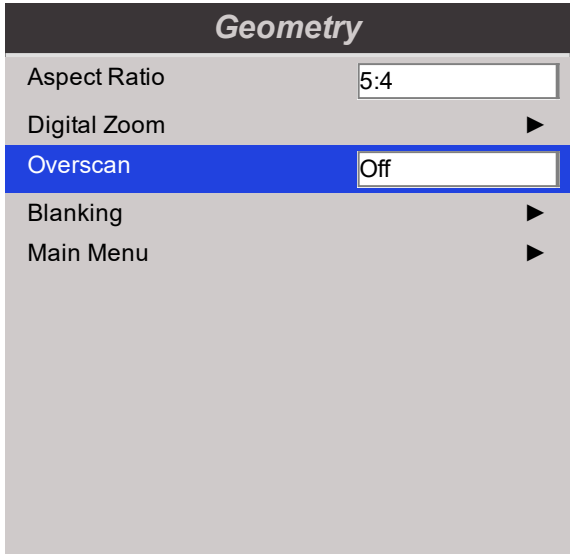
Digital Zoom is a temporary setting and not retained after an input change or power cycle.

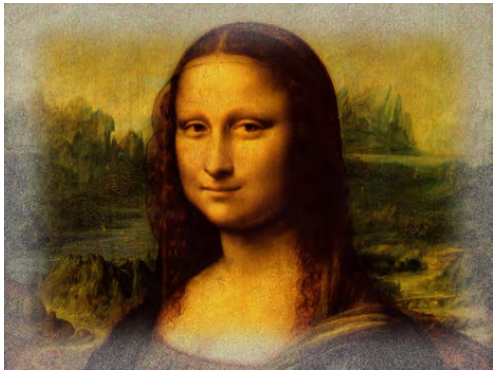
Overscan

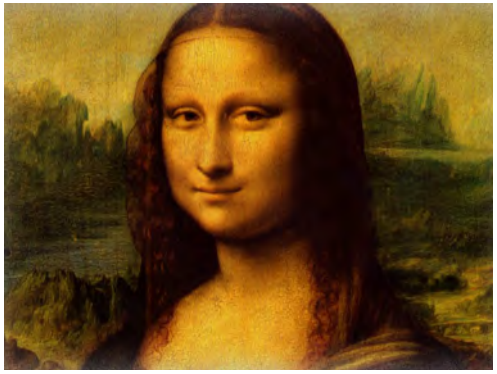
Use this setting to compensate for noisy or badly defined image edges.

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







Notes

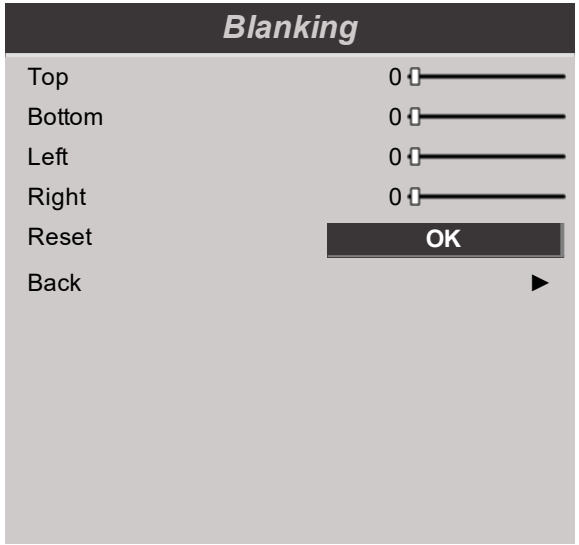
Blanking

Use this feature to:

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

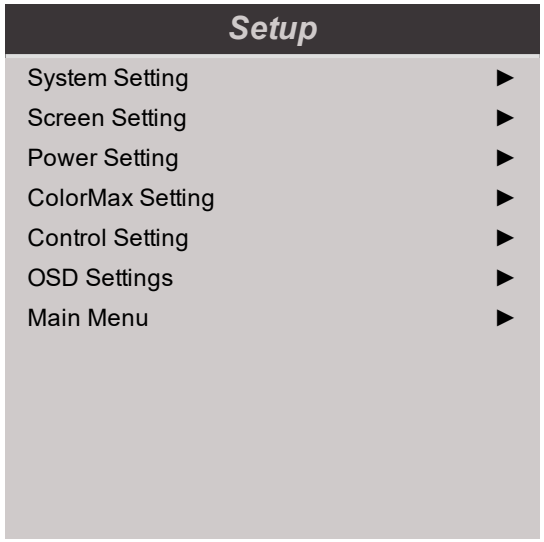
Select the edge you wish to blank and use the **LEFT** and **RIGHT** arrow buttons to determine the amount of correction.

Use the **Reset** command to restore blanked edges.



Notes

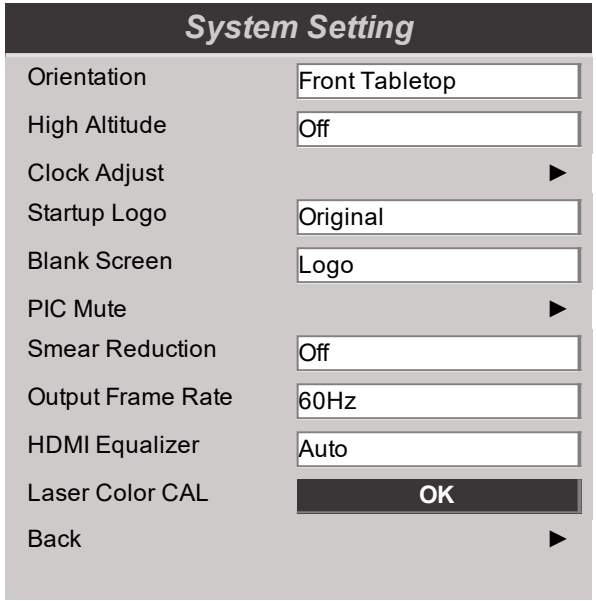
Setup


Setup
System Setting ►
Screen Setting ►
Power Setting ►
ColorMax Setting ►
Control Setting ►
OSD Settings ►
Main Menu ►

Notes

System Setting

- **Orientation**
  Choose from **Front Tabletop, Front Ceiling, Rear Tabletop, Rear Ceiling** and **Auto-front**.
- **High Altitude**
  Choose from **Off, On** and **Auto**.
- **Clock Adjust**
  Access the submenu to set current date and local time.
- **Startup Logo**
  Choose from **Off**, **Original** and **User**.
  Select original to display the Digital Projection Ltd. logo on startup. Select User to display a custom logo. Use the custom logo upload tool to set the custom logo for the User option.
- **Blank Screen**
  Choose from **Logo, Black, Blue** and **White**.
- **PIC Mute**
  Access sub menu to set up the picture mute control.
- **Smear Reduction**
  Choose from **Off, 6ms, 7ms, 8ms, 9ms,** and **10ms**. When projecting footage with a high frame rate, fast moving images may appear as a smear across the display. Select a smear reduction value to reduce this effect.
- **Output Frame Rate**
  Choose from **Auto, 48Hz, 50Hz** and **60Hz**. Select Auto to use the same frame rate as the input signal. When switching between inputs on auto output frame rate, the projector measures the input frame rate before setting the output frame rate. When you know that all input frame rates are the same value, you can set an output frame rate to reduce the time it takes to switch between inputs.
- **HDMI Equalizer**
  Choose from **Auto, High, Middle** and **Low**. When transmitting signals via a HDMI cable, signal noise can disrupt the information received by the projector. High bandwidth signals, poor quality HDMI cables and longer HDMI cables can increase the signal noise. Use the HDMI Equaliser to improve HDMI signal acquisition.
- **Laser Color CAL**
  Select **OK** to recalibrate the colors.
- **Back**
  Go back to the previous menu.



Notes

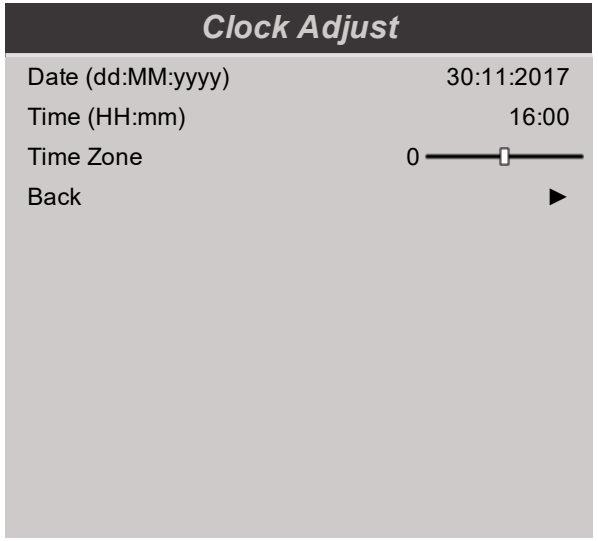
Smear reduction *reduces the brightness of the displayed image*

When using the Laser Color CAL, the command must be sent from head 1 in the system. Use the color max function to adjust the color settings of any additional heads.

Clock Adjust

Use this menu to set date (in **dd:MM:yyyy** format), time (in **HH:mm** format) and time zone.

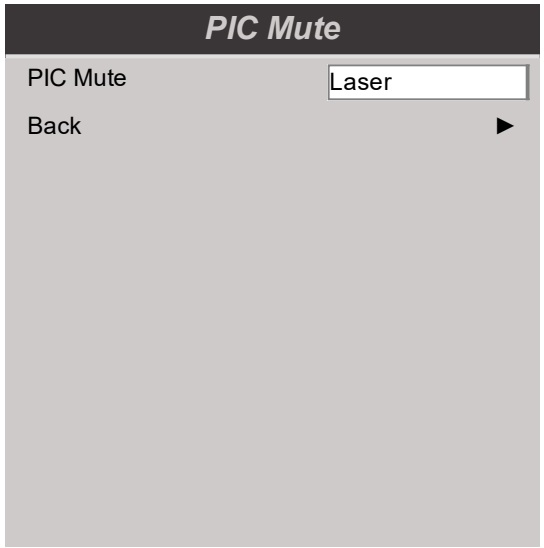
The date and time set here will affect any schedule created within the **Power On/Off** menu.



PIC Mute

PIC mute allows the projected image to be hidden without turning the projector off.

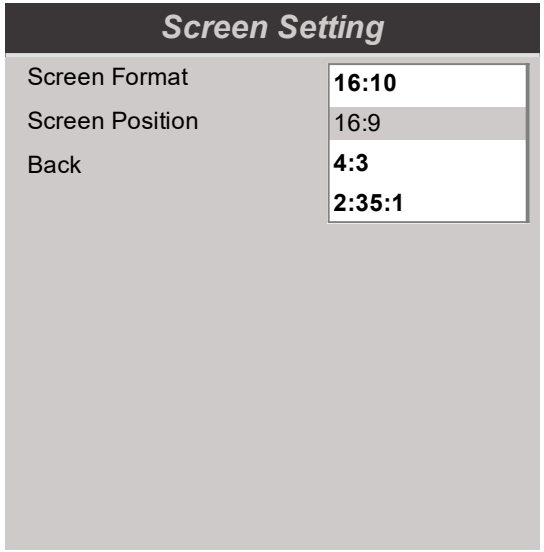
- **PIC Mute**
  Choose from **Laser** and **DMD Blanking**. Select PIC Mute to turn the laser off when the PIC Mute activated. Select DMD Blanking to project a black image when PIC Mute is activated.



Notes

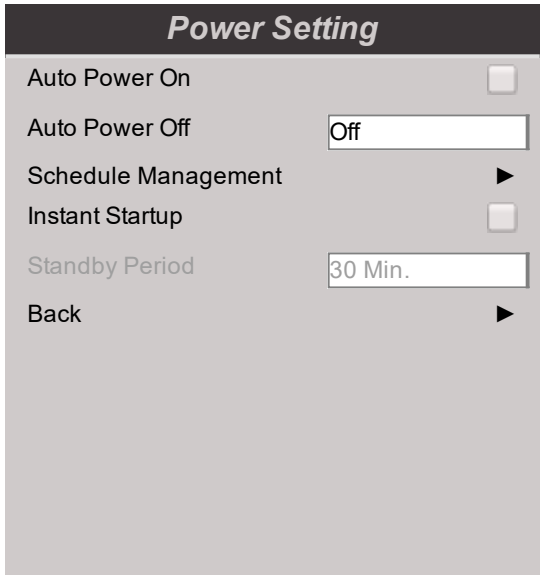
Screen Setting

- **Screen Format**
  Choose from **16:10, 16:9, 4:3** and **2.35:1**.
- **Screen Position**
  Use the slider to adjust the position of the image within the unused space of the projectors display.
- **Back**
  Go back to the previous menu.



Power Setting

- **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.
- **Auto Power Off**
  Choose from **Off, 5 min, 10 min, 15 min, 20 min**. Use this setting to activate STANDBY mode when no input source is detected after a period of time.
- **Schedule Management**
  Access sub menu to set up a power on-off schedule.
- **Instant Startup**
  When **ON** only the Laser will be turned off when the Power off command is given. A subsequent Power On will turn on the laser giving an apparent very fast power on.
- **Standby Period**
  Used with Instant Startup. If Instant Startup in **ON** and the projector is powered down then the projector will go to Standby after the selected “Standby Period” 30 minutes, 60 minutes, 90 minutes.

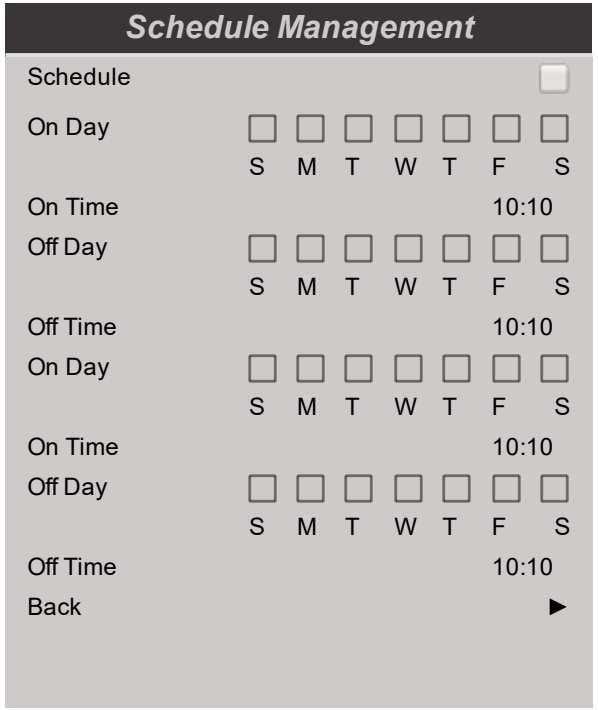


Notes

See Aspect ratios explained on page 141 for information about how the image is modified when the aspect ratio of the input signal does not match the screen format.

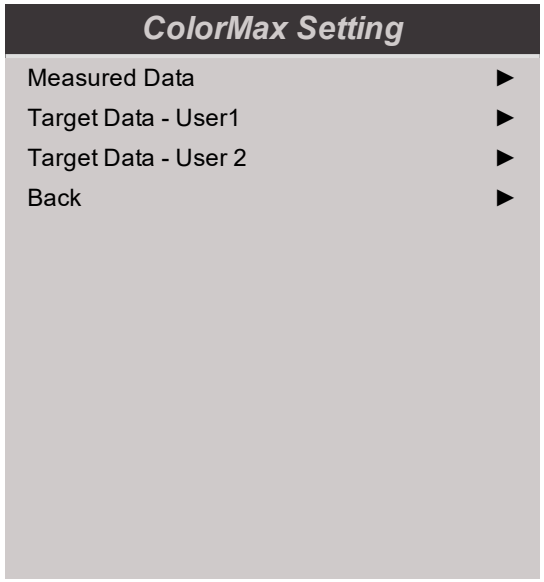
Schedule Management

- **Scheduled on-off**
  Access this submenu to create a weekly schedule for automatic on and off times:
  1. Set the 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. Press **ENTER/OK** to select a day. Set time values with the **UP** and **DOWN** arrow buttons.
     - To exit edit mode, press **ENTER/OK**. Alternatively, press **EXIT** if you don't want the changes to take effect. Move to another row using the **UP** and **DOWN** arrow buttons.
  2. To enable the schedule, set Schedule to **On**.



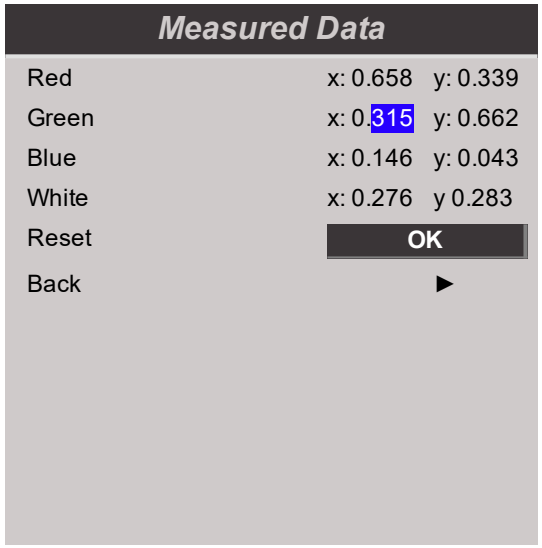
Notes

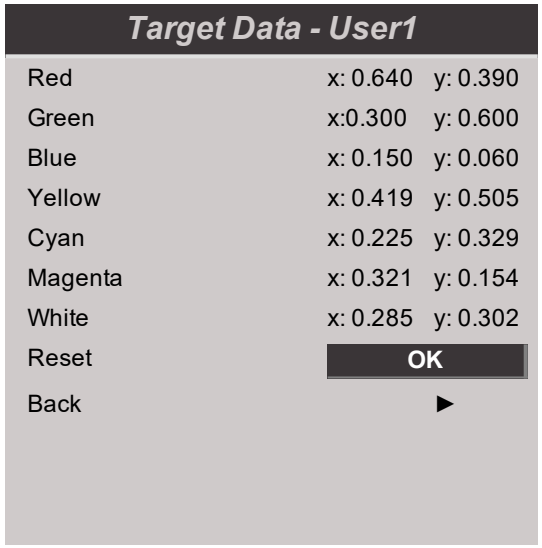
ColorMax Setting



Measured Data / Target Data

1. Use the **UP** and **DOWN** arrow buttons to highlight a color, then use the **LEFT** and **RIGHT** arrow buttons to navigate to the x or y coordinate.
2. Use the **UP** and **DOWN** arrow buttons to increase and decrease the value, respectively.
3. Exit edit mode:
   - press **ENTER/OK**, if you want to save the edited values.
   - press **EXIT**, if you do not wish to save the edited values
4. If necessary, highlight another color and repeat the procedure.

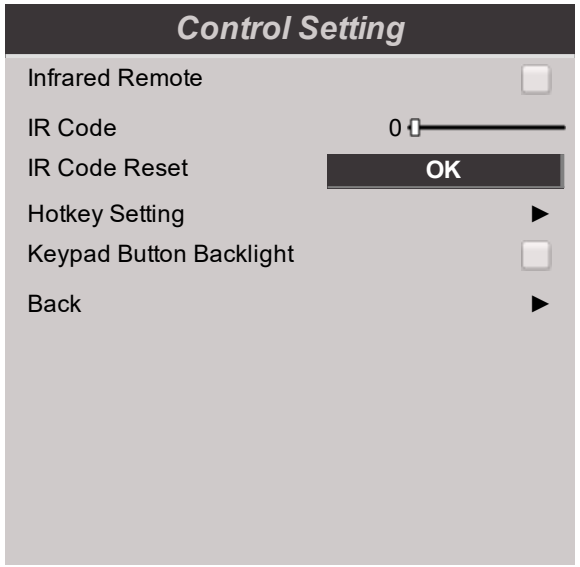




Notes

Control Setting

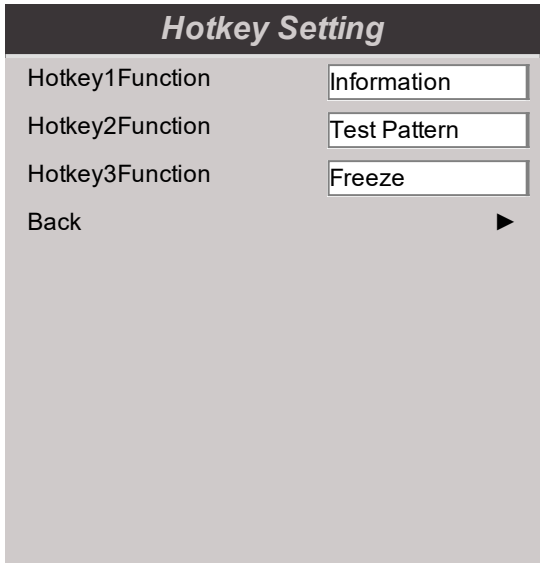
- **Infrared Remote**
  Set to **Off** if you wish to disable the remote control.
- **IR Code**
  The projector and the remote control need a matching IR code: a two-digit number between ***00*** and ***99***.
  The default IR code is ***00***. This is also a master code, which, if assigned to a remote, will work regardless of the value assigned to the projector.
  - **To assign an IR code for the projector:** Select IR code. Use the slider to change the value.
  - **To assign an IR code for the remote**, press and hold the **ADDR** button on the remote until the On indicator starts flashing. Release the **ADDR** button and while the indicator is still flashing, enter a two digit address using the numeric input buttons. The indicator will flash three times quickly to confirm the change.
- **IR Code Reset**
  Use this command to unassign an IR code from the projector. This will revert the **IR Code** value to 00.
  To unassign an IR code from the remote control, press and hold **ALT** and **ADDR** simultaneously until the On indicator flashes to confirm the change.
- **Hotkey Setting**
  Access this submenu to set the option for each hotkey.
- **Keypad Button Backlight**
  Choose from **On** or **Off**. Select On to switch the keypad backlight on. This will light the keypad controls on the projector.



Notes

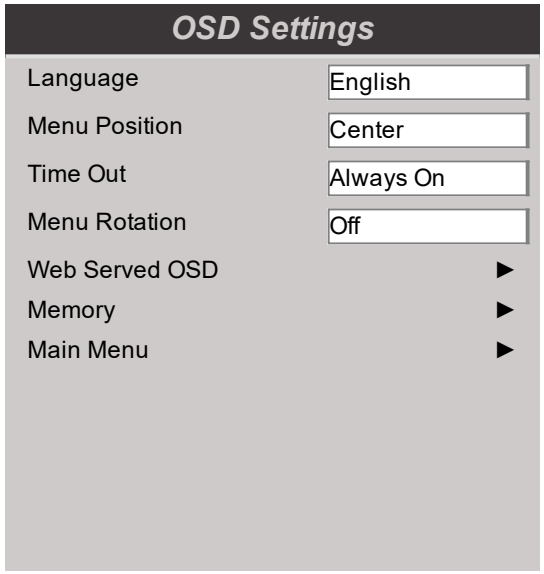
Hotkey Setting

- **Hotkey1Function**
  Choose from **Information, Test Pattern, Lens Memory Load, Ambient Brightness Correction** and **Freeze**. Select the function that you want to assign to hotkey1. This function will be activated when you press hotkey 1 on the control panel.
- **Hotkey2Function**
  Choose from **Information, Test Pattern, Lens Memory Load, Ambient Brightness Correction** and **Freeze**. Select the function that you want to assign to hotkey2. This function will be activated when you press hotkey 2 on the control panel.
- **Hotkey3Function**
  Choose from **Information, Test Pattern, Lens Memory Load, Ambient Brightness Correction** and **Freeze**. Select the function that you want to assign to hotkey3. This function will be activated when you press hotkey 3 on the control panel.



OSD Settings

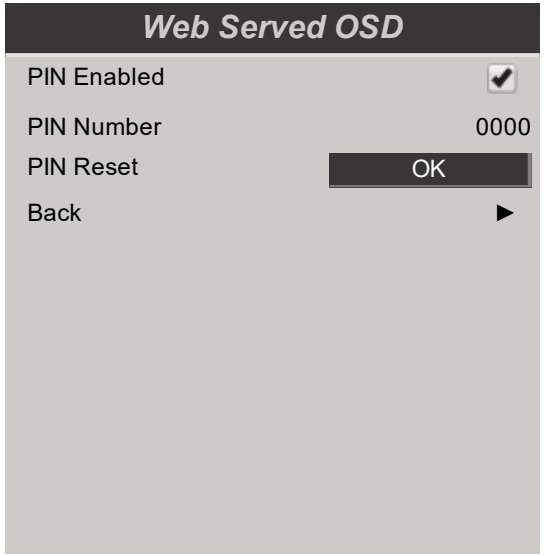
- **Language**
  Set the OSD language.
- **Menu Position**
  Set where the OSD should appear on the screen when activated. Choose from **Top Left, Top Right, Bottom Left, Bottom Right** and **Center**.
- **Time Out**
  Set how long the OSD should remain on screen if no buttons are pressed. Choose from **10 Seconds, 20 Seconds** or **30 Seconds**. Choose **Always On** to disable this feature.
- **Menu Rotation**
  Choose from **Off, Clockwise** and **Anticlockwise**. Select a rotation option to rotate the OSD menu when the projector is displaying in portrait.
- **Web Served OSD**
  Access this submenu to set a PIN for the web served OSD.
- **Memory**
  Access this submenu to save up to four presets containing custom combinations of image settings, or to recall a saved preset.



Notes

Web Served OSD

- **PIN Enabled**
  Enable to request the PIN number when you access the projector via the web served OSD.
- **PIN Number**
  Choose the PIN number for the projector.
- **PIN Reset**
  Select to reset the PIN number to the factory default (0000).
- **Back**
  Go back to the OSD menu.



Memory

The current image settings can be saved as a preset, which you can recall later. The default settings can be recalled at any time as well.

Up to four custom presets can be stored for each input.

The following settings are saved in a preset:

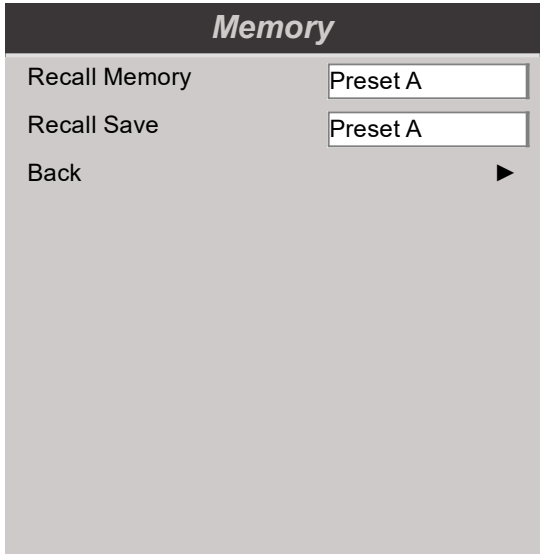
- From the **Image** menu — **Dynamic Black, Smooth Picture, Gamma, Brightness, Contrast, Saturation, Hue, Sharpness, Noise Reduction**
- From the **Color** menu — **Color Space, Color Mode, ColorMax, Color Temperature, Red Lift, Green Lift, Blue Lift, Red Gain, Green Gain, Blue Gain**
- From the **Geometry**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

To recall a saved preset:

- Select a recall memory preset from **Preset A** to **Preset D** and press **ENTER/OK**. Select **Default** to load factory default values.

To save a preset:

- Select a save memory preset from **Preset A** to **Preset D** and press **ENTER/OK**.



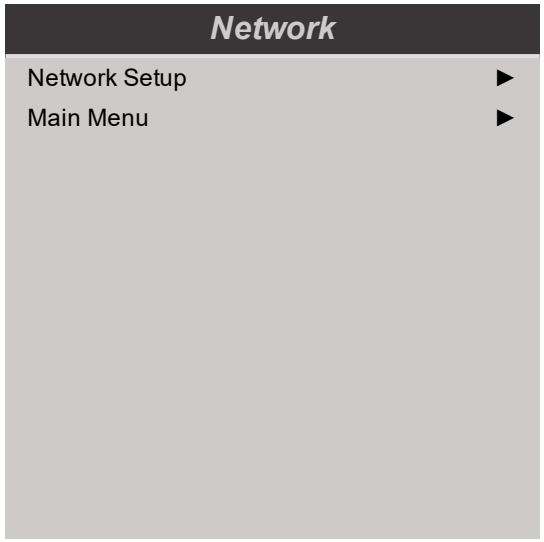
Notes

Presets from one input cannot be applied to another input.

See Memory scheme and memory items on page 150 for information about the parameters that can be saved in a memory preset.

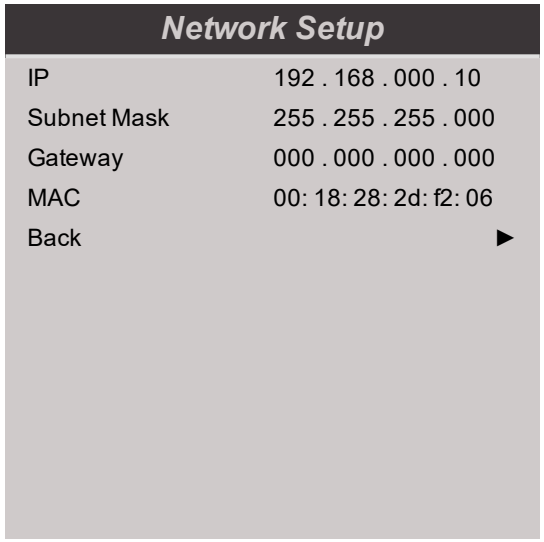
Network

- **Network Setup**
  Access this submenu to view the network settings for the projector



Network Setup

- **IP, Subnet Mask, Gateway, MAC**
  These settings are read-only. See Network on page 117 for guidance on network settings in the SCM.



Notes

Information

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

Information	
Model Name	Satellite HIGHLite 4K-UHD
Serial Number	X000XXXXX0000
Software Version 1	MD03-SE10-FE09
Software Version 2	STEP_D08-24-17-3120
Software Version 3	2.0.16.0-P503
OSD Version	2.0.16.0-P503
Active Source	HDMI 1
Signal Format	▶
System Status	▶
Thermal Status	▶
Factory Reset	OK
Main Menu	▶

Signal Format

Signal Format	
Active Source	HDMI 1
Timing	3580x2160@59.9Hz
Scanning Frequency	H: 134.8 KHz V:59.9 Hz
Pixel Clock	593.80 MHz
Color Format	YCbCr 4:2:0 8 bit
HDR Format	No Data
Back	

Notes

System Status

System Status	
Atmospheric Pressure	98988 Pa (116m)
Altitude Mode	Auto
System Hours	1
Back	►

Thermal Status

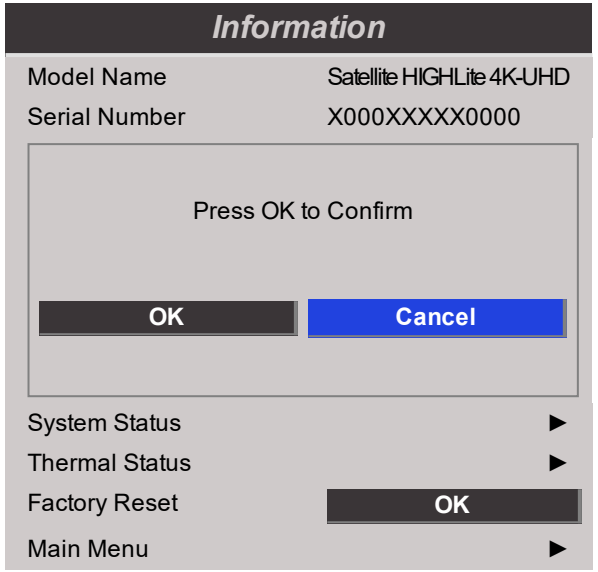
Thermal Status	
Inlet Temp.	Ti1 = 24 (C)
DMD Temp.	38 (C)
Fan 1-3 Speed	1399 / 1402 / 4391
Fan 4-6 Speed	1310 / 1200 / 1205
Fan 7-10 Speed	1211 / 1407 / 1410
Water Pump Speed	3506
Back	►

Notes

Factory Reset

To restore the factory default settings:

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



Notes

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

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DIGITAL PROJECTION

A Delta Associate Company

Satellite HIGHlite 4K-UHD

Digital Video Projector

MLS TOUCHSCREEN OPERATING GUIDE

Rev A August 2022
122-933A

Introduction to the MLS Touchscreen

This section describes the operation of the Satellite Modular Laser Source (MLS). Please refer to the page 11 for guidance on installing the MLS as part of the Satellite system. Your MLS has the following key features:

- RGB Laser light source
- Generates 10,000 Lumens per MLS
- Can be linked to up to 4 paralleled Satellite Heads for multiple displays with the appropriate SLC

The MLS displays a touch screen menu when the power is on.

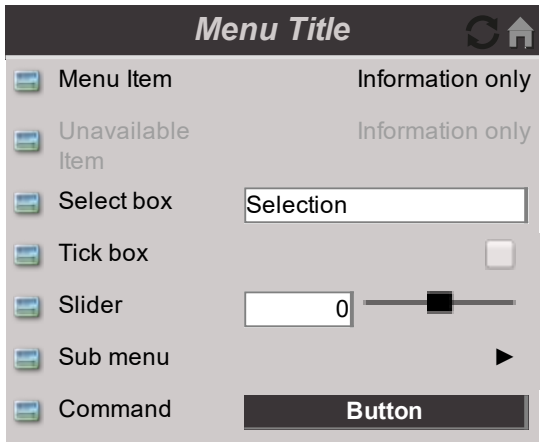
Using the menus

The MLS displays a touch screen menu when the power is on.

Some menus have items that are hidden by the bottom of the screen. Press and drag to scroll the menu up and down.

When you open a menu, the page consists of the following elements:

- Title bar at the top shows which menu you have accessed. Additional buttons are available in the title bar:
  - tap the refresh button to refresh the information on the screen
  - tap the home button to return to the main menu
- 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 information only
  - has a value that can be selected. The current selection is displayed in a box. Tap to select a new option
  - has a tick box. A tick indicates that the feature is enabled. Tap to enable or disable the feature
  - has a slider. A box displays the current value of the setting. Press and drag the slider to adjust the value
  - opens a sub-menu. Tap the arrow button to open the sub menu
  - executes a command. Tap the command button to execute.

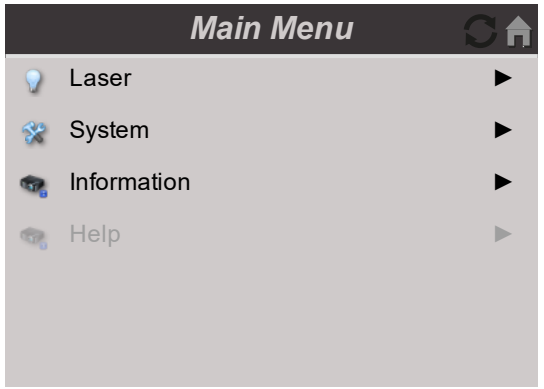


Inside a Menu

Notes

Main Menu

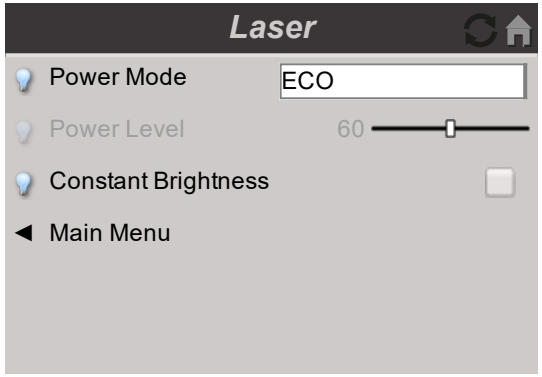
- **Laser, System, Information, Help.**
  Tap to open these menus and access various settings.



Touchscreen Display: Top Level Menu

Laser

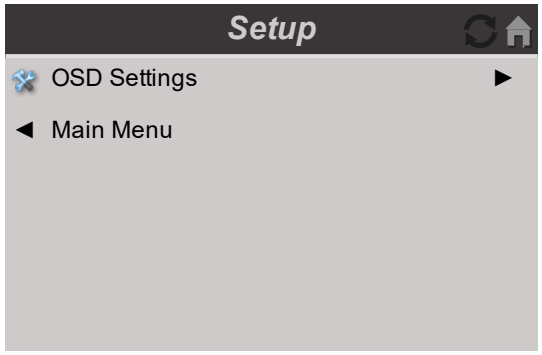
- **Power Mode**
  - **Eco** will automatically set the laser power to 80%.
  - **Normal** will set the power to 100%.
  - Set to **Custom** if you wish to adjust the power manually.
- **Power Level**
  This setting is only available if **Power Mode** is set to **Custom**.
  Choose a value between 30 and 100, ranging from 30% to 100% laser power.
- **Constant Brightness**
  Once the **Power Mode** has been set to **Custom**, then Constant Brightness can be turned **ON**. The Constant Brightness setting will maintain the projectors set brightness until the maximum laser power has been reached (this maximum laser power will decrease overtime). Hence, the lower the set Constant Brightness power level the longer the set brightness output will be maintained.
- **Main Menu**
  Tap to go back to the main menu.



Notes

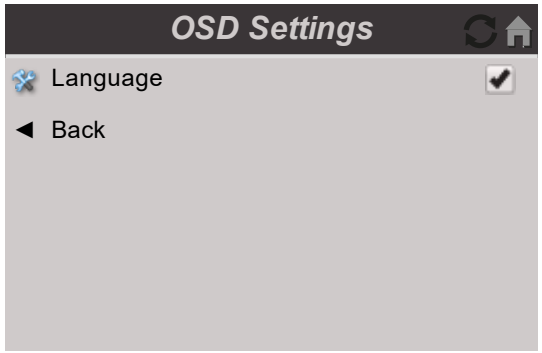
Setup

- **OSD Settings**
  Press **ENTER/OK** to open the submenu.
- **Main Menu**
  Go back to the main menu.



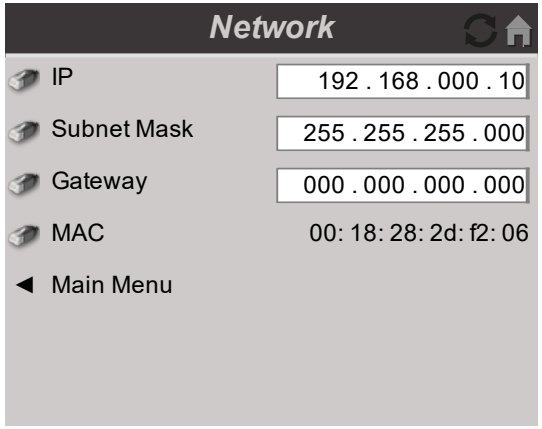
OSD Settings

- **Language** sets the OSD language.
- **Back**
  Tap to go back to the setup menu.



Network

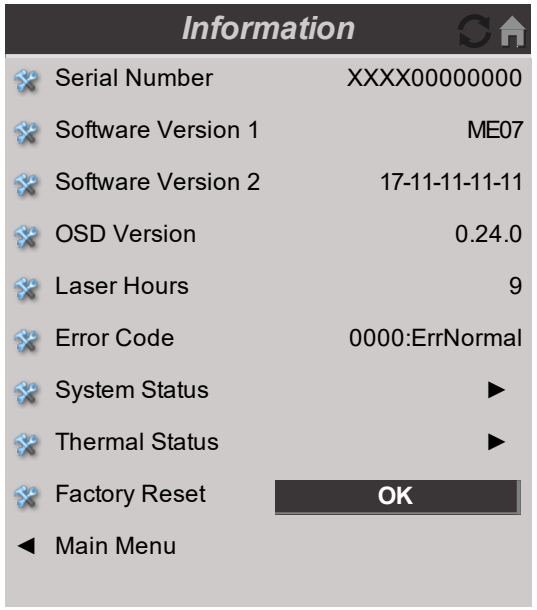
- **IP, Subnet Mask, Gateway, MAC**
  These settings are read-only. See Network on page 117 for guidance on network settings in the SCM.
- **Main Menu**
  Tap to go back to the main menu.



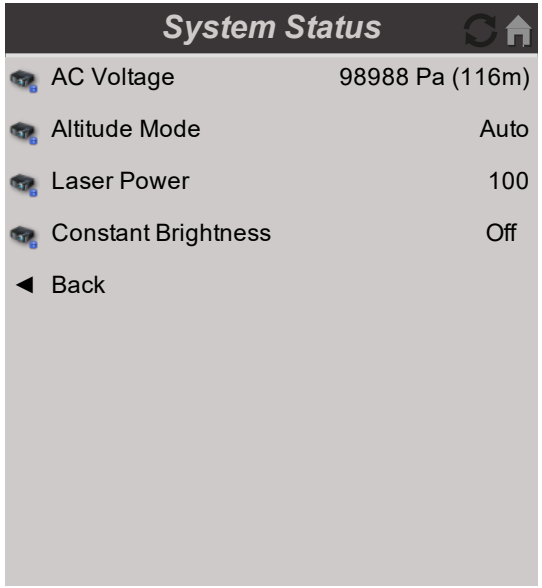
Notes

Information

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

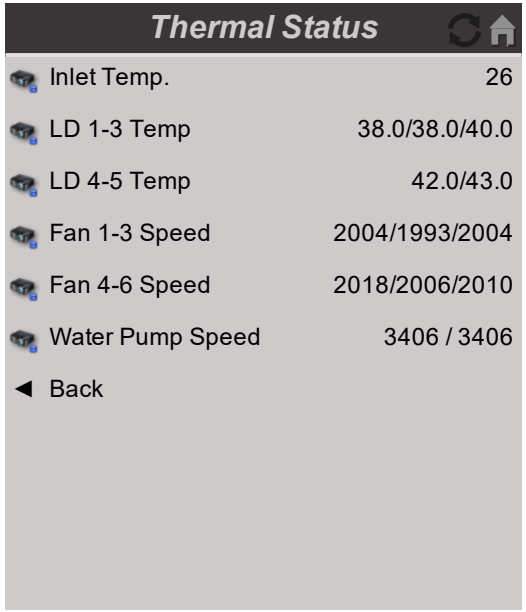


System Status



Notes

Thermal Status



Factory Reset

To restore the factory default settings:

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

Notes

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

DIGITAL PROJECTION

A Delta Associate Company

Satellite HIGHlite 4K-UHD

Digital Video Projector

SCM TOUCHSCREEN OPERATING GUIDE

Rev A August 2022
122-933A

Introduction to the SCM Touchscreen

This section describes the operation of the Satellite Control Module (SCM) touchscreen control panel. Please refer to the page 11 for guidance on installing the SCM as part of the Satellite system. Your SCM has the following key features:

- Centralized system configuration management and control
- User remote control via LAN.
- System operation monitoring, including Interlocks and warnings.

The SCM displays a touchscreen menu when the power is on.

Notes

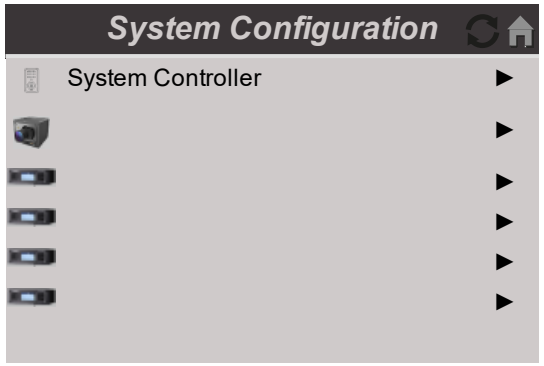
Using the menus

The SCM displays a touch screen menu when the power is on.

Notes

System Configuration

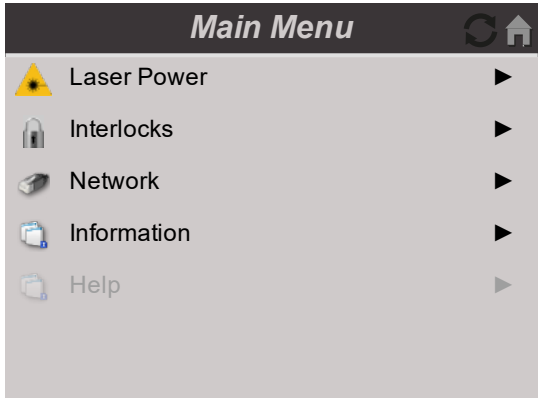
- **System Controller.**
  Tap to open this menu and access various settings.
- Component sub menus.
  Each component menu provides information about the other modules installed in the system. This could be 1 MLS and up to 4 Satellite Heads. Tap to open these menus and access various settings.



On Screen Display (OSD): Top Level Menu

Main Menu

- **Laser Power, Interlocks, Network, Information, Help.**
  Tap to open these menus and access various settings.

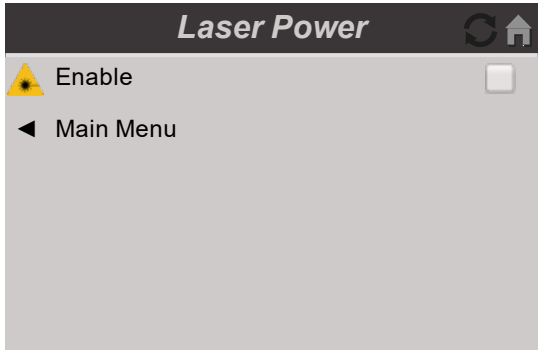


On Screen Display (OSD): Top Level Menu

Notes

Laser Power

Tick Enable to switch the laser on.

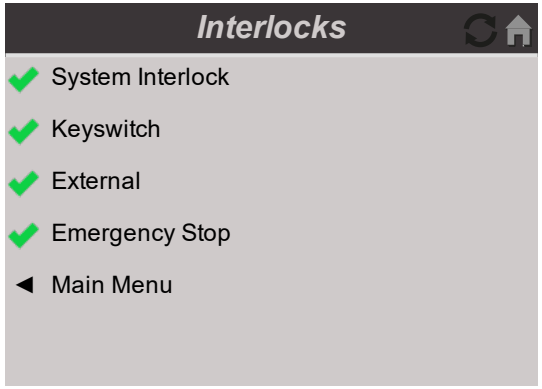


Interlocks

Displays the current state of interlocks in the Satellite system:

- A green tick indicates that the interlock is currently closed and the system can operate as normal.
- A red error symbol indicates that the interlock has been opened.

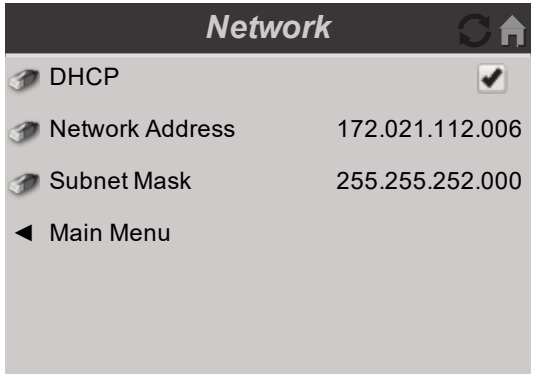
Every interlock must be closed to allow the system to operate as normal.



See Interlock Switches on page 21 for more information about system interlocks.

Network

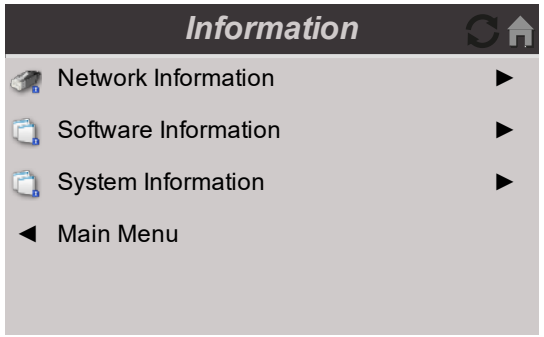
- **DHCP, Network Address, Subnet Mask**
  Tick **DHCP** to assign the IP address via a DHCP server.
  If **DHCP** is not enabled, edit the Network address and Subnet Mask as required.
- **Main Menu**
  Go back to the main menu.



Notes

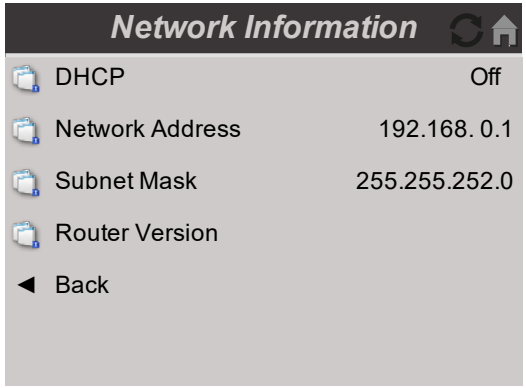
Information

Each submenu in this menu provides information about this system.



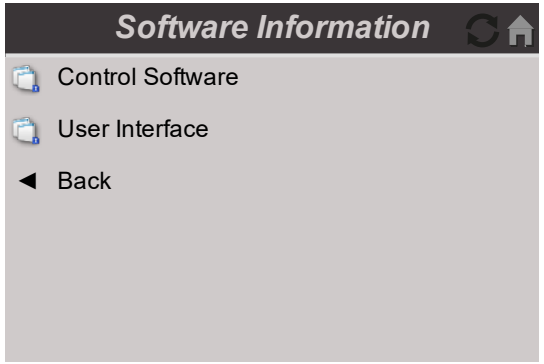
Network Information

Information Only



Software Information

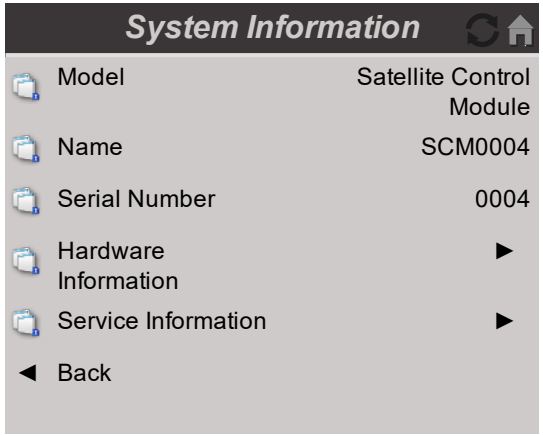
Information Only



Notes

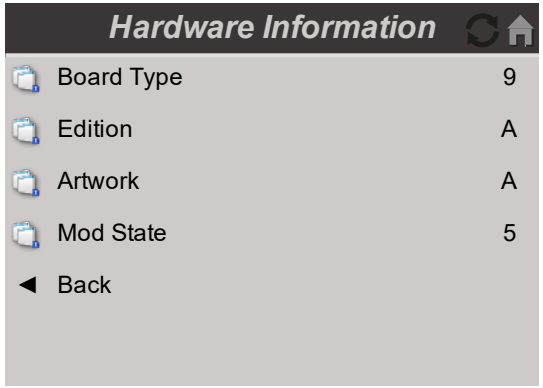
System Information

Information Only



Hardware Information

Information Only



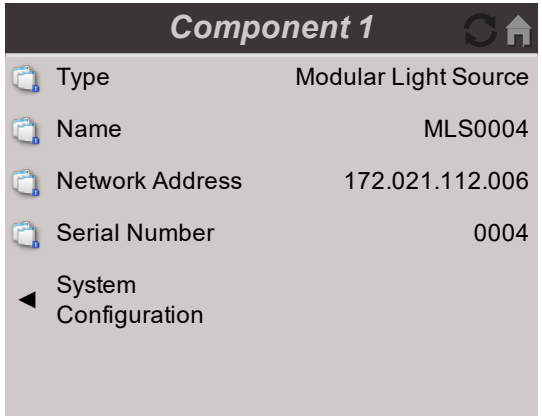
Notes

Service Information

Information Only

Component menu

Information Only



Example Component

Notes

DIGITAL PROJECTION

A Delta Associate Company

Satellite HIGHlite 4K-UHD

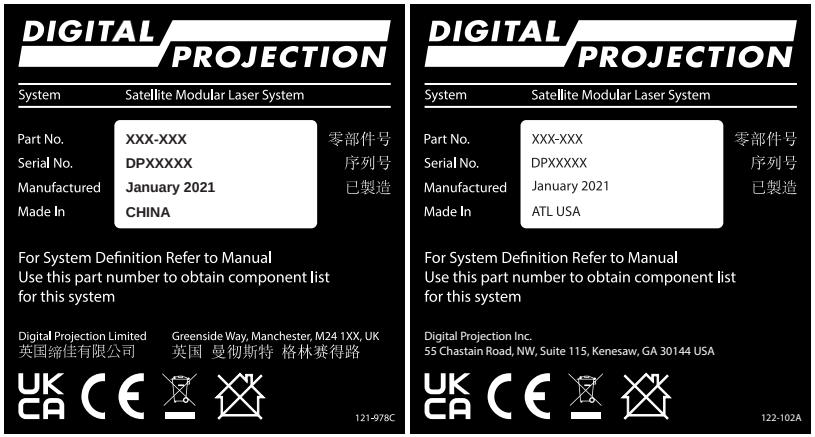
Digital Video Projector

REFERENCE GUIDE

Rev A August 2022
122-933A

Appendix A: Product labels

Satellite Head



Manufacturers ID Label - System

Manufacturers ID Label - System Component

Laser Aperture Label

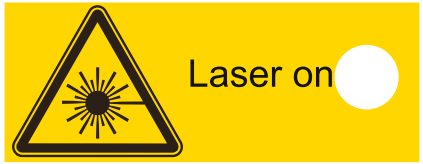
Light Hazard Explanatory Label

Laser Warning Label

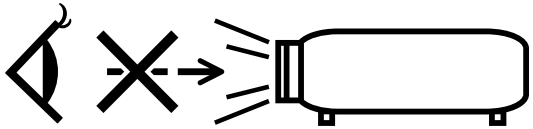
Electrical Safety Label

Notes

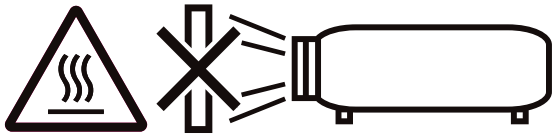
Fiber Interface Label



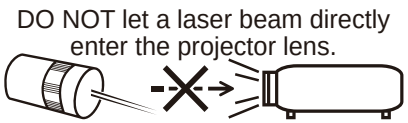
Laser On Hazard Indicator Label



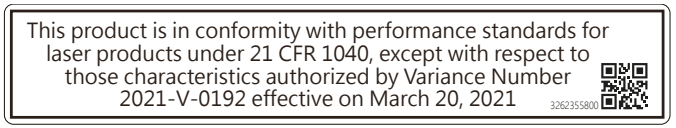
Laser Hazard Label



Lens Obstruction Hazard Label

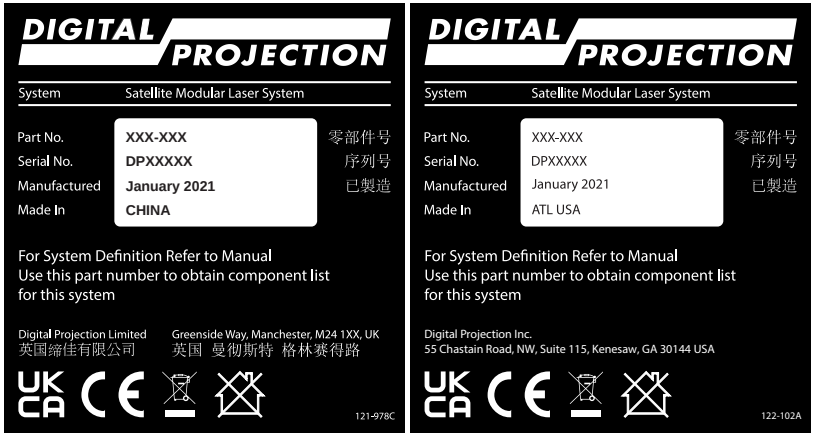


Lens Safety Label



FDA Laser Standards Conformity Label

Modular Light Source



Manufacturers ID Label - System

Manufacturers ID Label - System Component

Notes

Laser Warning Label

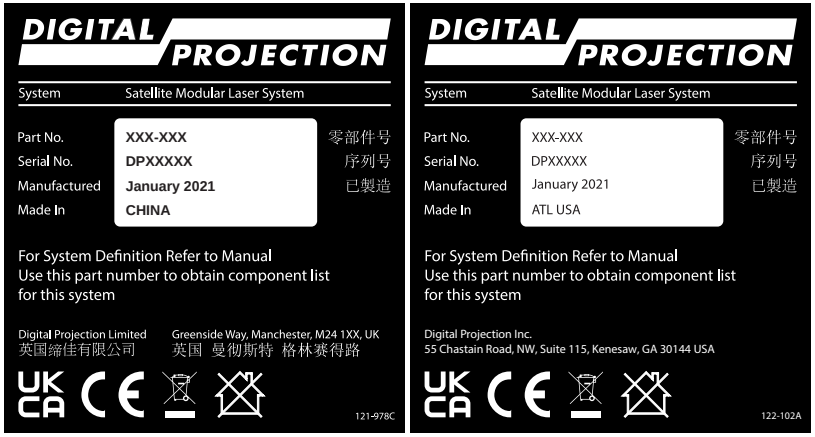
Light Hazard Explanatory Label

Fiber Interface Label

Laser On Hazard Indicator Label

FDA Laser Standards Conformity Label

Satellite Control Module



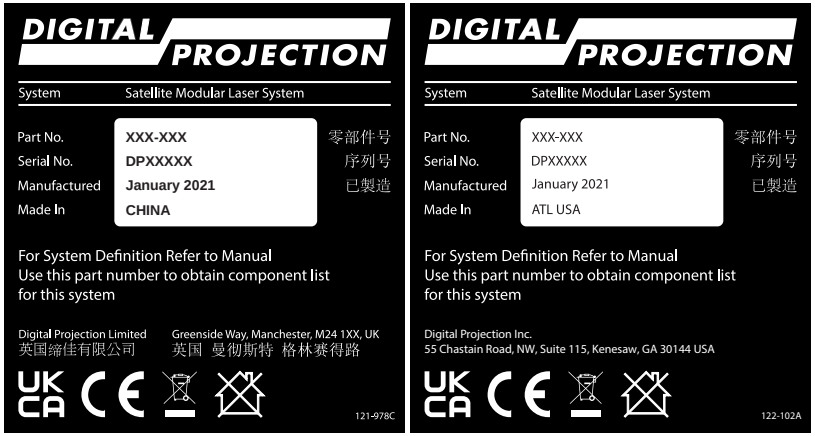
Manufacturers ID Label - System

Manufacturers ID Label - System Component

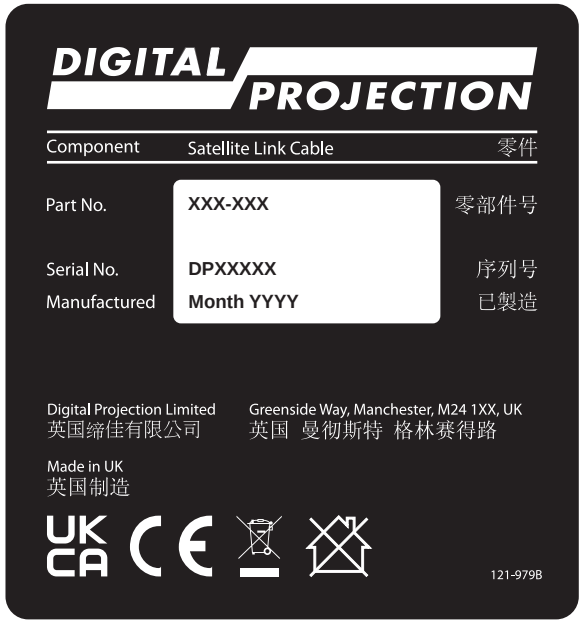
Notes

Laser On Hazard Indicator Label

Satellite Link Cable



Manufacturers ID Label - System



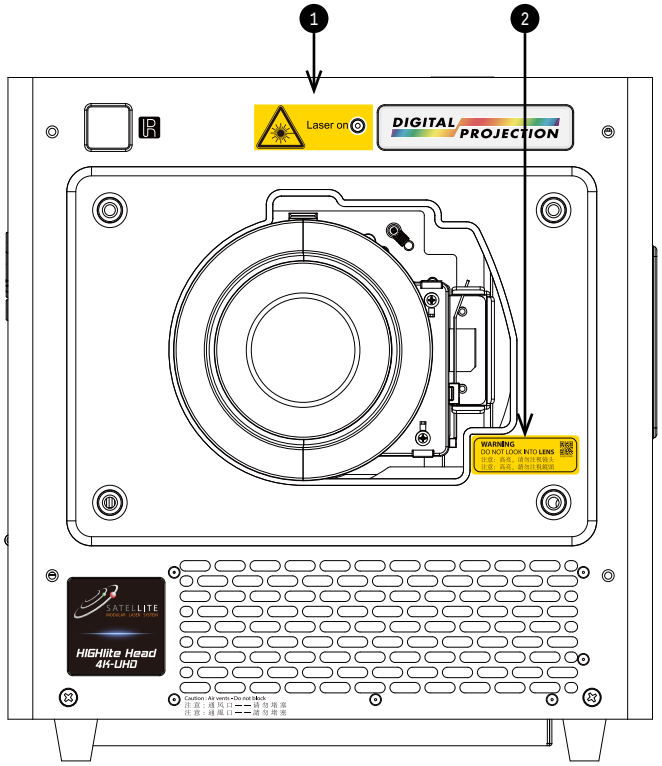
Manufacturers ID Label - System Component

Notes

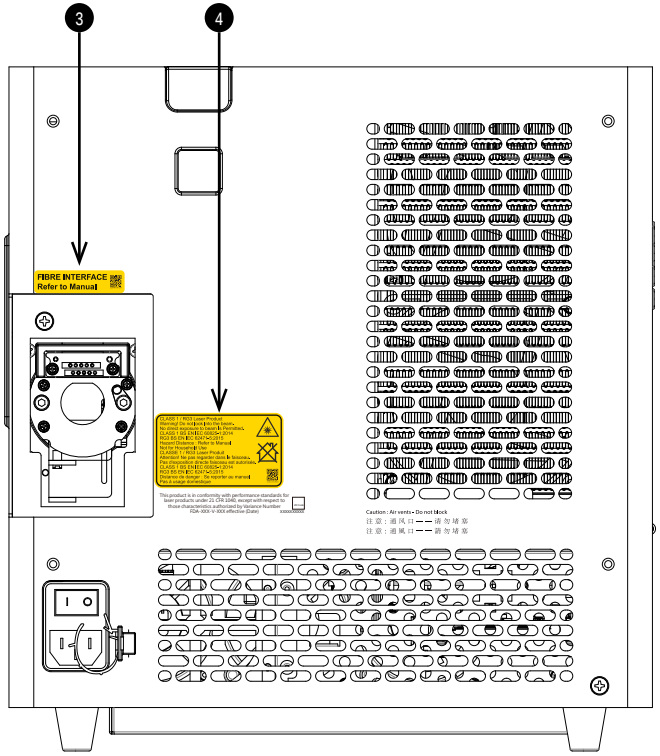
Label Locations

Satellite Head

1. Location of the Laser On Hazard Indicator Label on the front of the Satellite Head.
2. Location of the Laser Warning Label on the front of the Satellite Head.
3. Location of the Fiber Interface Label on the rear of the Satellite Head.
4. Location of the Light Hazard Explanatory Label and the FDA Standards Conformity Label on the rear of the Satellite Head.



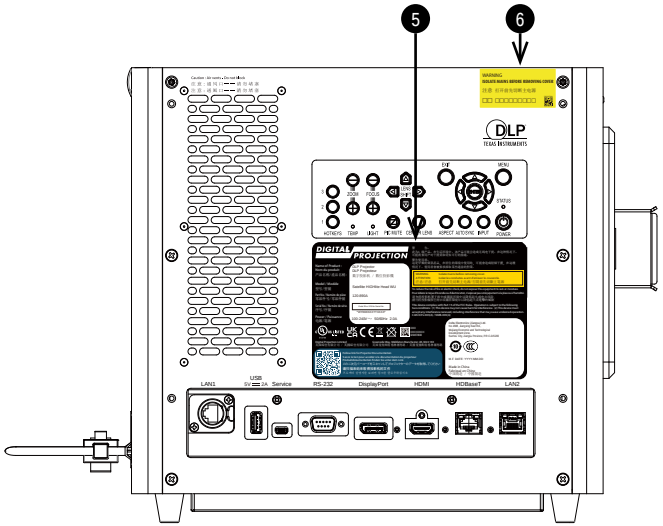
Satellite Head Front



Satellite Head Rear

Notes

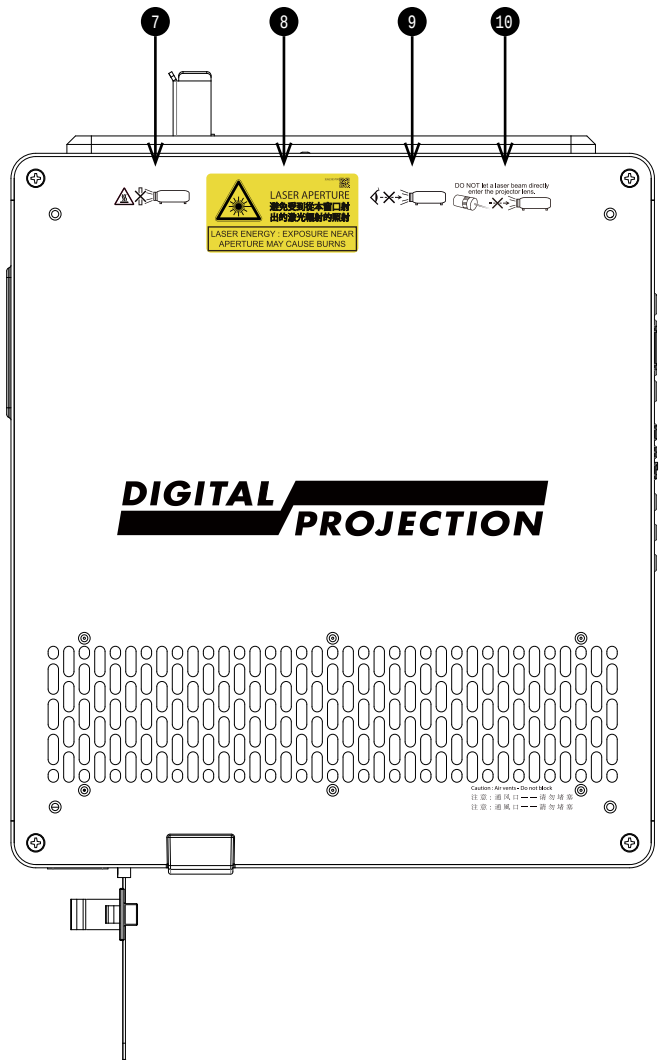
5. Location of the Manufacturer's ID Label (System Component) on the right side of the Satellite Head.
6. Location of the Electrical Safety Labels on the right side of the Satellite Head.



Satellite Head Right Side

Notes

7. Location of the Lens Obstruction Hazard Label on the top of the Satellite Head.
8. Location of the Laser Aperture Label on the top of the Satellite Head.
9. Location of the Laser Hazard Label on the top of the Satellite Head.
10. Location of the Lens Safety Label on the top of the Satellite Head.

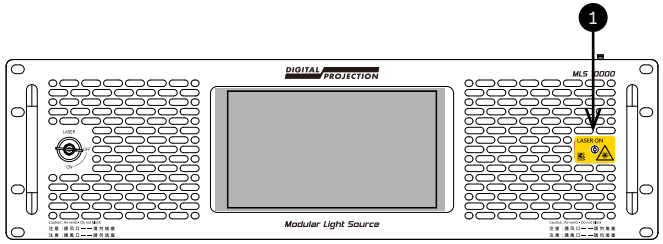


Satellite Head Top

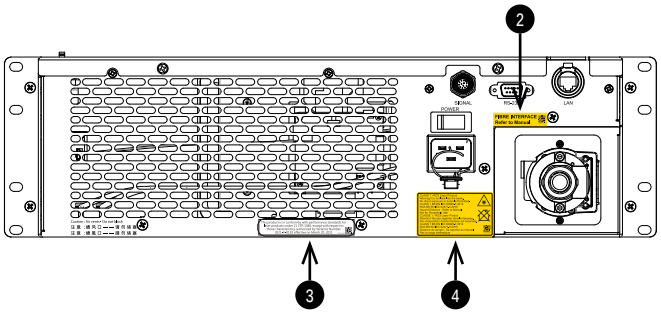
Notes

Modular Light Source

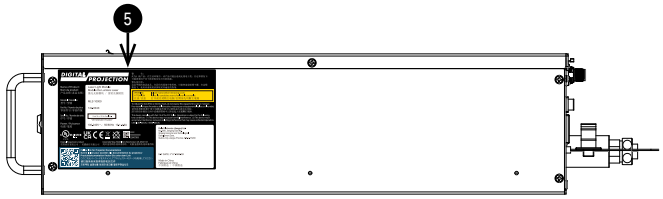
1. Location of the Laser On Hazard Indicator Label on the front of the MLS.
2. Location of the Fiber Interface Label on the rear of the MLS.
3. Location of the FDA Standards Conformity Label on the rear of the MLS.
4. Location of the Light Hazard Explanatory Label on the rear of the MLS.
5. Location of the Manufacturer's ID - System Component Label on the left side of the MLS.
6. Location of the Internal Laser Warning Label inside the top cover of the MLS.



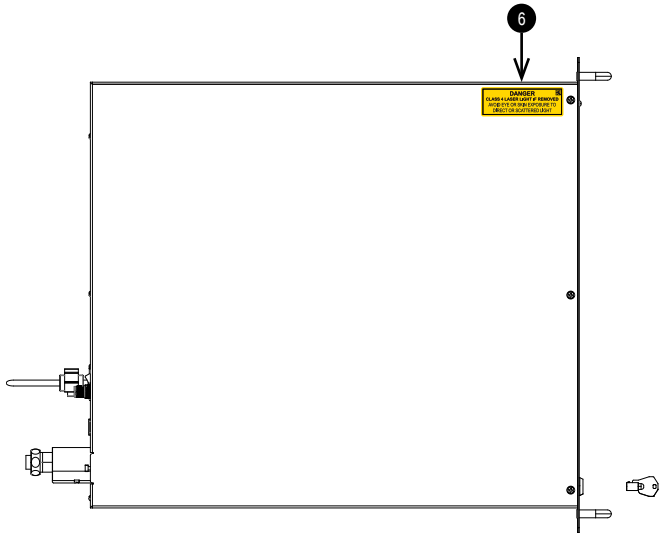
MLS Front



MLS Rear



MLS Left Side

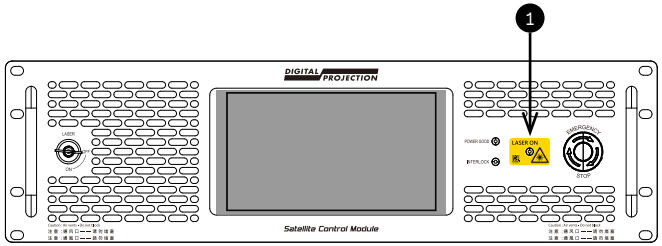


MLS Top

Notes

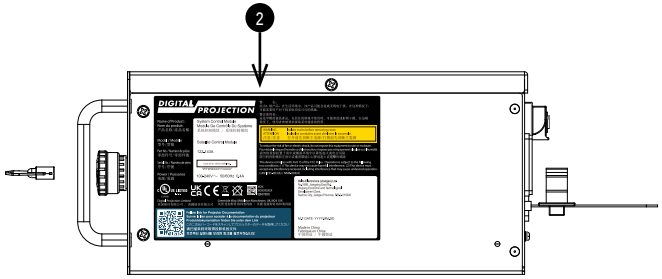
Satellite Control Module

1. Location of the Laser On Hazard Indicator Label on the front of the SCM.



SCM Front

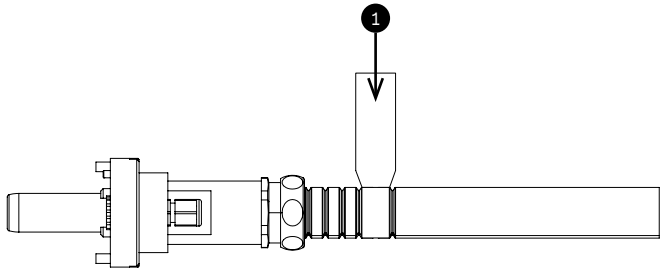
2. Location of the Manufacturer's ID - System Component Label on the left side of the SCM.



SCM Left Side

Satellite Link Cable

1. Location of the Manufacturer's ID - System Label and the Manufacturer's ID - System Component Label on the opposite sides of the SLC label tag.



SLC Label Tag

Notes

Appendix B: Choosing a lens

A number of lenses are available. Which lens you choose depends on the screen size, image aspect ratio, throw distance and light output.

The following table shows all available lenses in order of their throw ratios:

Throw ratios	Lens extension	Lens shift	Optimized focus range	Part number
0.83 - 1.21 : 1 zoom	277 mm	V: 0.5 (U) 0.5 (D) frame H: 0.15 (L) 0.15 (R) frame	1.9 m - 15 m (6.2 - 49.2 ft)	122-817
1.21 - 1.70 : 1 zoom	192 mm	V: 0.47 (U) 0.47 (D) frame H: 0.15 (L) 0.15 (R) frame	3.6 m - 18 m (11.8 - 59.1 ft)	122-818
1.50 - 2.15 : 1 zoom	157mm	V: 0.47 (U) 0.47 (D) frame H: 0.15 (L) 0.15 (R) frame	4.5 m - 22.5 m (14.8 - 73.8 ft)	122-819
2.00 - 3.90 : 1 zoom	152mm	V: 0.47 (U) 0.47 (D) frame H: 0.15 (L) 0.15 (R) frame	6 m - 30 m (19.7 - 98.4 ft)	122-820

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

Notes

Throw distance calculations are based on the distance from the outer end of the lens, which varies from lens to lens.
The lens extension is the distance between the front of the projector chassis and the outer end of the lens when it is fully extended.

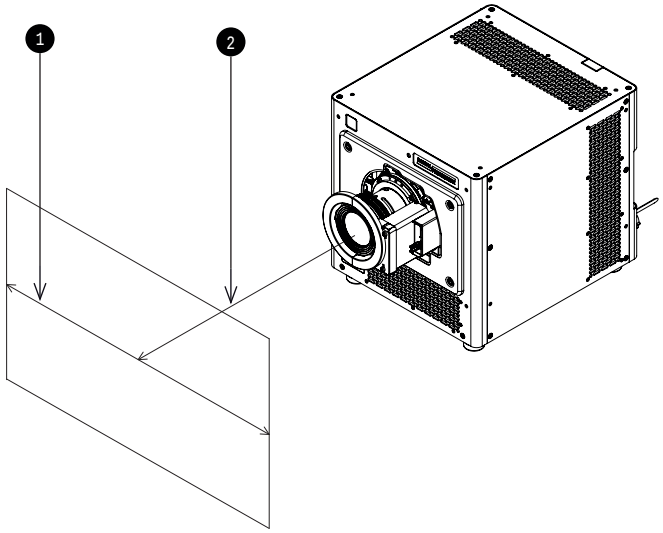
Refer to the projector CAD drawings for individual lens extension figures.

Basic calculation

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

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

$$ThrowRatio = ThrowDistance / ScreenWidth$$



1. Use the formula above to obtain the required throw ratio.
2. Allow a tolerance of +/- 3% in the throw ratio calculation and match the throw ratio with a lens from the table below:

Throw ratios	Optimized focus range
0.83 - 1.21 : 1 zoom	1.9 m - 15 m
1.21 - 1.70 : 1 zoom	3.6 m - 18 m
1.50 - 2.15 : 1 zoom	4.5 m - 22.5 m
2.00 - 3.90 : 1 zoom	6 m - 30 m

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

Notes

The basic calculation on this page does not take into consideration DMD™ and image size, which could affect the throw ratio. See Full lens calculation on page 134 for a more complex and realistic calculation.

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

See Choosing a lens on the previous page for information about individual lens part numbers

Basic calculation example

1. Calculate the throw ratio using the formula.
   Your screen is ***4.5m*** wide and you wish to place the projector approximately ***11m*** from the screen. The throw ratio will then be
   11 ÷ 4.5= ***2.44***
2. Match the result with the lens table.
   The lens matching a throw ratio of 2.44 is the ***2.00 - 3.90 : 1 zoom***.
3. **Check whether the lens covers the required throw distance.**
   The focus range quoted for the 2.00 - 3.90 : 1 zoom lens is **6 - 30m**.The required distance of 11m is within the range.

INFORMATION YOU NEED FOR THIS CALCULATION

The throw ratio formula:

$$ThrowRatio = ThrowDistance / ScreenWidth$$

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

The lens table:

Throw ratios	Optimized focus range
0.83 - 1.21 : 1 zoom	1.9 m - 15 m
1.21 - 1.70 : 1 zoom	3.6 m - 18 m
1.50 - 2.15 : 1 zoom	4.5 m - 22.5 m
2.00 - 3.90 : 1 zoom	6 m - 30 m

Notes

The basic calculation on this page does not take into consideration DMD™ and image size, which could affect the throw ratio.See Full lens calculation on the next page for a more complex and realistic calculation.

See Choosing a lens on page 131 for information about individual lens part numbers.

Full lens calculation

Introducing TRC

The choice of lens will affect the image size and will address discrepancies between the DMD™ resolution and the source.

When an image fills the height of the DMD™ but not the width, it uses less than 100% of the DMD™ surface. A lens chosen using the basic formula may produce an image that is considerably smaller than the actual screen.

To compensate for loss of screen space in such situations, you need to increase the throw ratio using a **Throw Ratio Correction (TRC)**.

Example

Fig. 1 illustrates a 4:3 image within a 16:9 display

When a 16:9 projector is used for a 4:3 image, the image does not fill the width of the DMD™, creating a **pillarboxing** effect - blank spaces to the left and right.

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

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

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

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

Fig. 3 shows the image projected on the same screen with a lens chosen using TRC. The increased throw ratio has allowed the 4:3 image to fill the 4:3 screen seamlessly

Fig 1

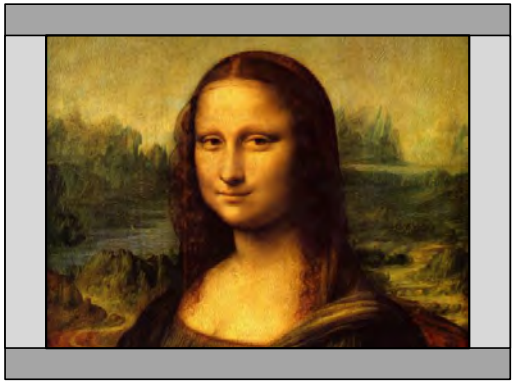


Fig 2

Fig 3

Notes

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

Calculating TRC

To calculate TRC, use the following formula:

$$TRC = 1.78(DMD™\ AspectRatio)/SourceAspectRatio.$$

TRC table

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

2.35:1 (Scope)	3840 x 1634 pixels	TRC < 1, not used
1.85:1 (Flat)	3840 x 2075 pixels	TRC < 1, not used
1.78:1 (16:9)	3840 x 2160 pixels	TRC = 1, not used (native aspect ratio)
1.6:1 (16:10)	3456 x 2160 pixels	TRC = 1.11
1.33:1 (4:3)	2873 x 2160 pixels	TRC = 1.33
1.25:1 (5:4)	2700 x 2160 pixels	TRC = 1.42

Calculating the throw ratio with TRC

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

   $$ThrowRatio = ThrowDistance/ScreenWidth * TRC$$

   Allow a tolerance of +/- 3% in the throw ratio calculation.
2. Once a throw ratio is established, identify the matching lens from the table:

Throw ratios	Optimized focus range
0.83 - 1.21 : 1 zoom	1.9 m - 15 m
1.21 - 1.70 : 1 zoom	3.6 m - 18 m
1.50 - 2.15 : 1 zoom	4.5 m - 22.5 m
2.00 - 3.90 : 1 zoom	6 m - 30 m

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

Notes

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

Throw ratio for sources with a width of 3840 will be as the 4K-UHD ratio on the lens table.

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

Full lens calculation example

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

1. Calculate TRC as follows:
   TRC = 1.78 / 1.33 = 1.34.
2. Calculate the throw ratio:
   Throw ratio = 11 / 4.5 x 1.34 = **1.82**
3. Allow a tolerance of +/- 3% in the throw ratio calculation and find a match in the lens table.
4. Check whether the lens covers the required throw distance.
   The required distance of 11 m is within the range.

INFORMATION YOU NEED FOR THESE CALCULATIONS

The TRC formula

$$TRC = DMD™\ AspectRatio/SourceAspectRatio$$

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 (native aspect ratio)
1.6:1 (16:10)	TRC = 1.11
1.33:1 (4:3)	TRC = 1.33
1.25:1 (5:4)	TRC = 1.42

The throw ratio formula

$$ThrowRatio = ThrowDistance/ScreenWidth * TRC$$

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

The lens table:

Throw ratios	Optimized focus range
0.83 - 1.21 : 1 zoom	1.9 m - 15 m
1.21 - 1.70 : 1 zoom	3.6 m - 18 m
1.50 - 2.15 : 1 zoom	4.5 m - 22.5 m
2.00 - 3.90 : 1 zoom	6 m - 30 m

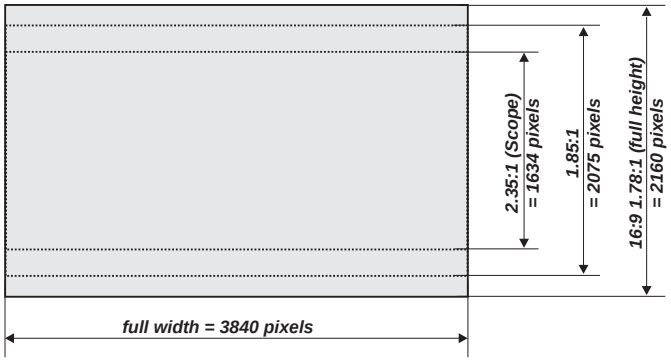
Notes

Appendix C: Screen requirements

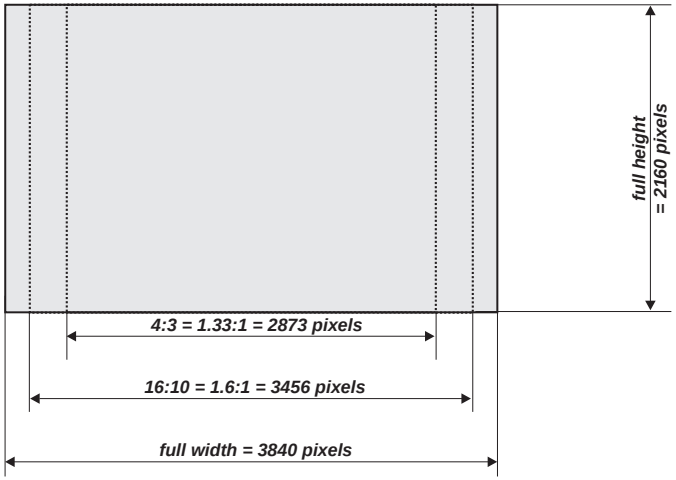
Fitting the image to the display

If the source image supplied to the projector is smaller than the 4K-UHD resolution, the image will not fill the display. The following examples show how a number of common formats may be displayed, depending on your DMD™ resolution.

Images displayed full width of 3840 pixels

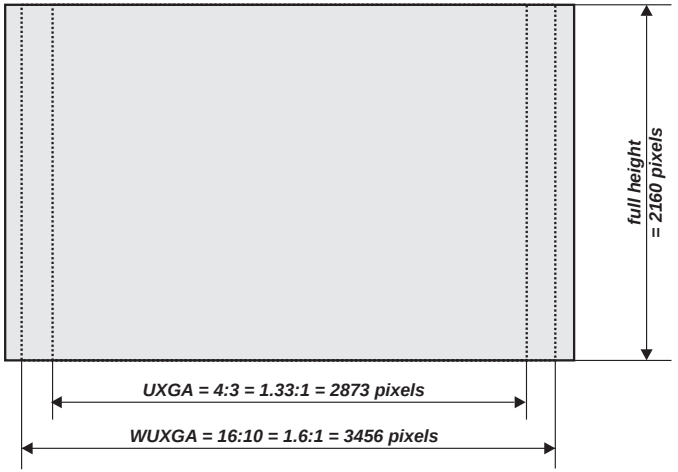


Images displayed with a height of 2160 pixels



Notes

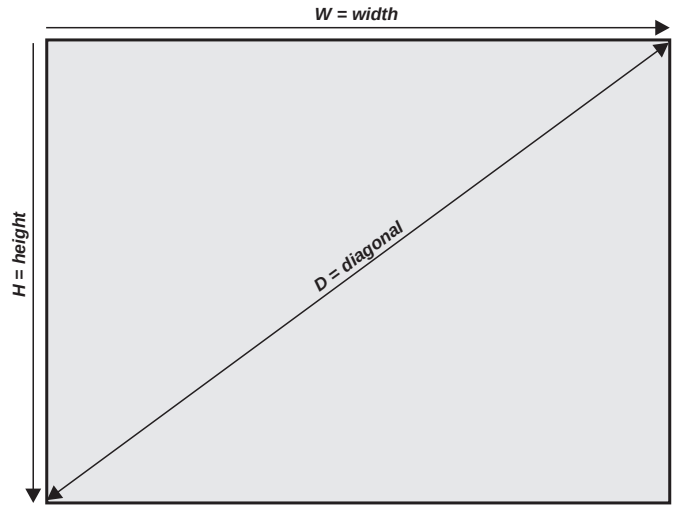
Images displayed full height of 2160 pixels



Diagonal screen sizes

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

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



2.35:1 (Scope)
W = D x 0.92 H = D x 0.39

1.85:1
W = D x 0.88 H = D x 0.48

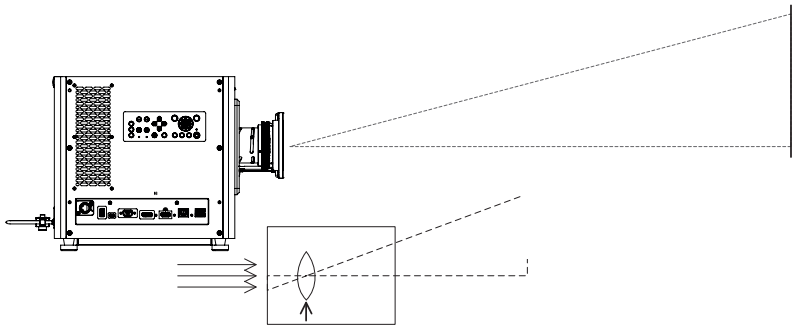
16:9 = 1.78:1 (native aspect ratio for 4K-UHD projectors)
W = D x 0.87 H = D x 0.49

16:10 = 1.6:1
W = D x 0.85 H = D x 0.53

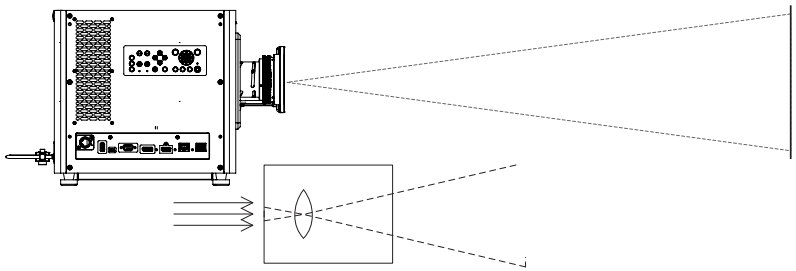
Notes

Appendix D: Positioning the image

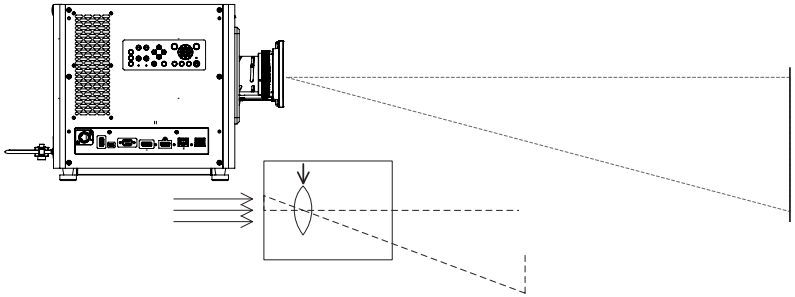
The normal position for the projector is at the center of the screen. However, you can set the projector above or below the center, or to one side, and adjust the image using the **Lens shift** feature (known as **rising and falling front**) to maintain a geometrically correct image.



Shifting the lens up (rising front)



Centred Lens



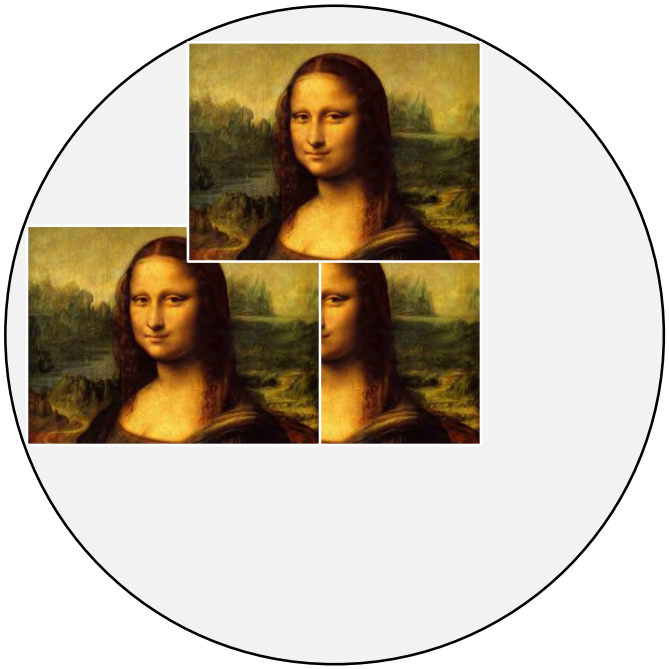
Shifting the lens down (falling front)

Notes

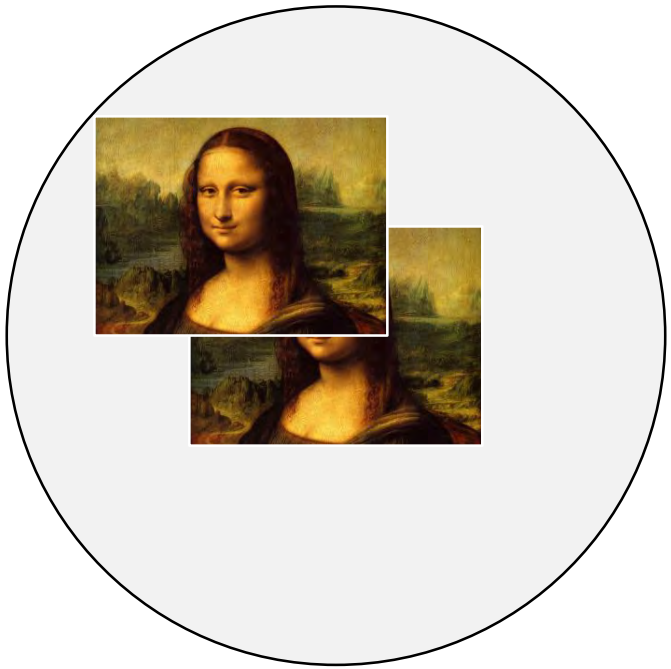
Whenever possible, position the projector so that the lens is centered for the highest quality image

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.



Full horizontal or vertical shift



Combined shift is reduced

Notes

Appendix E: Aspect ratios explained

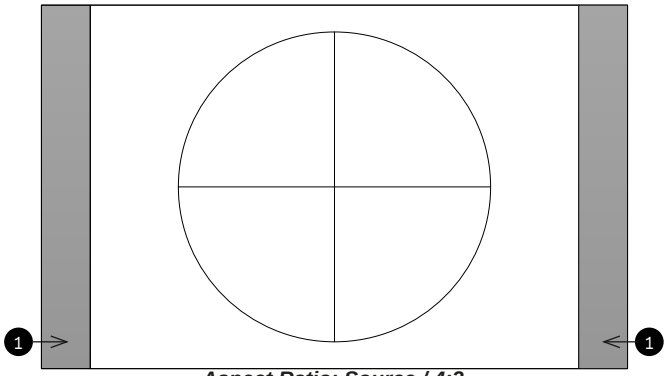
The appearance of a projected image on the screen depends on a combination of the following:

- The display resolution: **4K-UHD** with a 2160 x 3840 resolution, corresponding to an aspect ratio of 16:9
- 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:
  - **4:3**, **16:10** and **5:4** stretch the image to the selected aspect ratio. **16:10**, **4:3** and **5:4** leave black bars at the sides of the screen (pillarboxing).
  - **Source** shows the image with its original aspect ratio, if this does not match the native aspect ratio of the DMD^{TM}, then the image will be scaled to either fit the full width or height of the display.

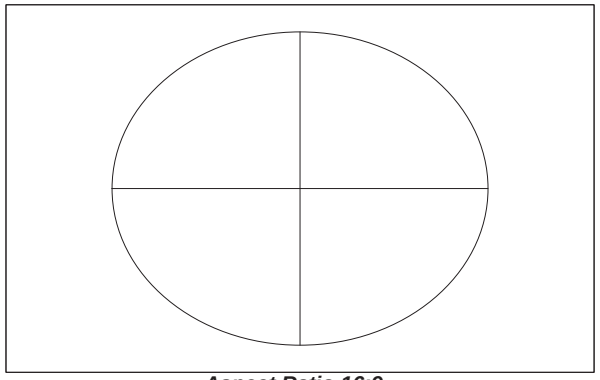
Aspect ratios examples

1. Unused screen areas

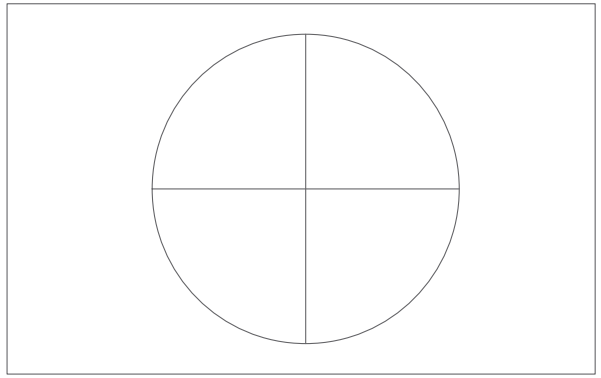
Source: 4:3



Aspect Ratio: Source / 4:3

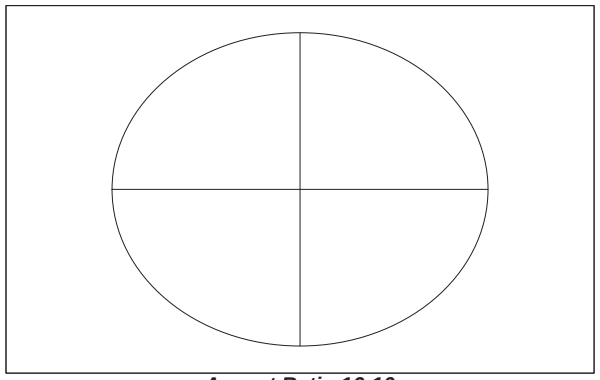


Aspect Ratio 16:9

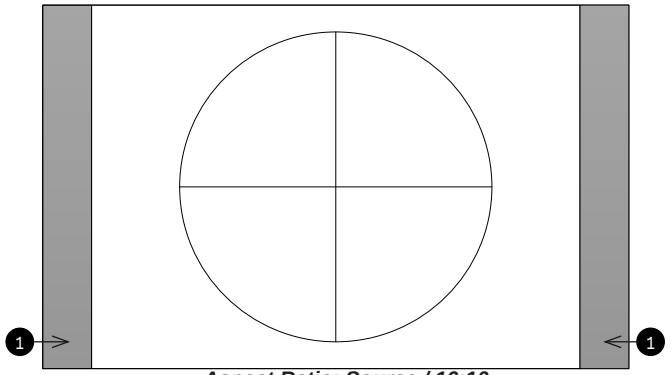


Aspect Ratio: Source / 16:9

Notes



Aspect Ratio 16:10



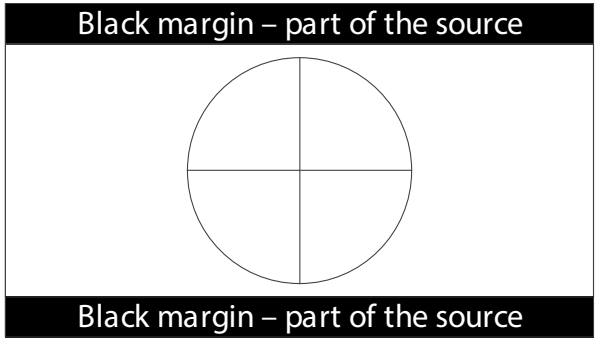
Aspect Ratio: Source / 16:10

Notes

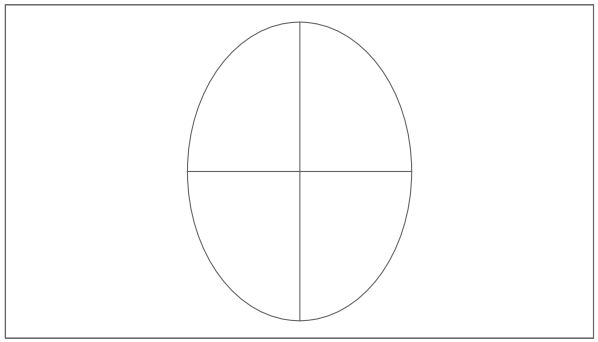
Aspect ratio example: TheatreScope

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

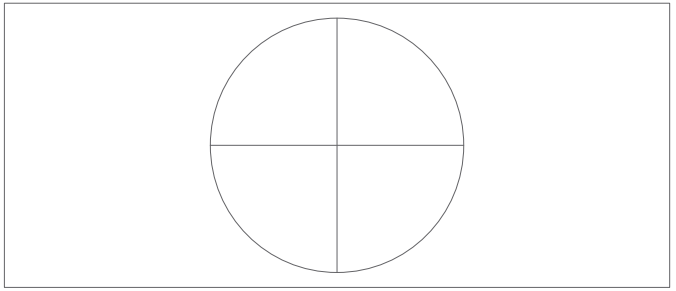
Without an anamorphic lens and without the TheaterScope setting applied, a 16:9 source containing a 2.35:1 image looks like this:



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

Appendix F: Supported signal input modes

2D formats

Signal Format	Resolution	Frame Rate (Hz)	Display Port	HDMI / HD-BaseT				Output Frame Rate (Hz)
				RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	
PC	640 x 480	60	✓	✓				60
	640 x 480	75	✓	✓				60
	640 x 480	85	✓	✓				60
	800 x 600	60	✓	✓				60
	800 x 600	75	✓	✓				60
	800 x 600	85	✓	✓				60
	848 x 480	48	✓	✓				48
	848 x 480	60	✓	✓				60
	1024 x 768	60	✓	✓				60
	1024 x 768	75	✓	✓				60
	1024 x 768	85	✓	✓				60
	1280 x 720	48	✓	✓				48
	1280 x 768	60	✓	✓				60
	1280 x 800	60	✓	✓				60
	1280 x 960	60	✓	✓				60
	1280 x 1024	60	✓	✓				60
	1280 x 1024	75	✓	✓				60
	1280 x 1024	85	✓	✓				60
	1366 x 768	60	✓	✓				60
	1440 x 900	60	✓	✓				60
	1400 x 1050	60	✓	✓				60
	1600 x 1200	60	✓	✓				60
	1680 x 1050	60	✓	✓				60
	1920 x 1080	48	✓	✓				48
	1920 x 1200 RB	50	✓	✓				50
	1920 x 1200 RB	60	✓	✓				60
	1920 x 1080	100	✓	✓*4				50
	1920 x 1080	120	✓	✓*4				60
	1920 x 1200	100	✓	✓*4				50
	1920 x 1200 RB	120	✓	✓*4				60
Apple Mac	640 x 480	67	✓	✓				60
	832 x 624	75	✓	✓				60

Notes

**1 HDBaseT supports 4K 24/25/30Hz 4:2:2 only(No HDR support)*

**2 HDBaseT does not supports 4K 50/60Hz.*

**3 HDMI support up to 4:2:2, HDBaseT does not support*

**4 HDMI support but HDBaseT does not support*

Signal Format	Resolution	Frame Rate (Hz)	Display Port	HDMI / HD-BaseT				Output Frame Rate (Hz)
				RGB	YUV 8-bit	YUV 10-bit	YUV 12-bit	
SDTV	1440x480i	60.00		✓	✓	✓	✓	60
	1440x576i	50.00		✓	✓	✓	✓	50
EDTV	480p	59.94	✓	✓	✓	✓	✓	60
	576p	50.00	✓	✓	✓	✓	✓	50
HDTV	1035i	60.00	✓	✓	✓	✓	✓	60
	1080i	50.00	✓	✓	✓	✓	✓	50
	1080i	59.94	✓	✓	✓	✓	✓	60
	1080i	60.00	✓	✓	✓	✓	✓	60
	720p	50.00	✓	✓	✓	✓	✓	50
	720p	59.94	✓	✓	✓	✓	✓	60
	720p	60.00	✓	✓	✓	✓	✓	60
	1080p	23.98	✓	✓	✓	✓	✓	48
	1080p	24.00	✓	✓	✓	✓	✓	48
	1080p	25.00	✓	✓	✓	✓	✓	60
	1080p	29.97	✓	✓	✓	✓	✓	60
	1080p	30.00	✓	✓	✓	✓	✓	60
	1080p	50.00	✓	✓	✓	✓	✓	50
	1080p	59.94	✓	✓	✓	✓	✓	60
	1080p	60.00	✓	✓	✓	✓	✓	60
	2K (2048x1080)	24	✓	✓	✓	✓	✓	48
	2K (2048x1080)	25	✓	✓	✓	✓	✓	50
	2K (2048x1080)	30	✓	✓	✓	✓	✓	60
	2K (2048x1080)	50	✓	✓	✓	✓	✓	50
	2K (2048x1080)	60	✓	✓	✓	✓	✓	60
	4K-UHD (3840x2160)	24	✓	✓	✓	✓*1	✓*1	48
	4K-UHD (3840x2160)	25	✓	✓	✓	✓*1	✓*1	50
	4K-UHD (3840x2160)	30	✓	✓	✓	✓*1	✓*1	60
	4K-UHD (3840x2160)	50	✓(8 bits)	✓(8 bits)	✓*2	✓*3	✓*3	50
	4K-UHD (3840x2160)	60	✓(8 bits)	✓(8 bits)	✓*2	✓*3	✓*3	60

Notes

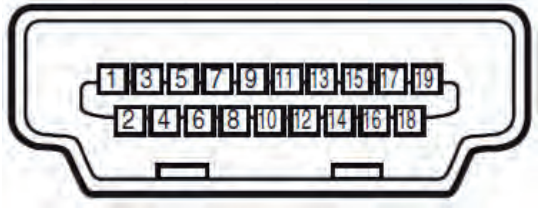
Appendix G: Wiring details

Signal inputs and outputs

HDMI

19 way type A connector

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



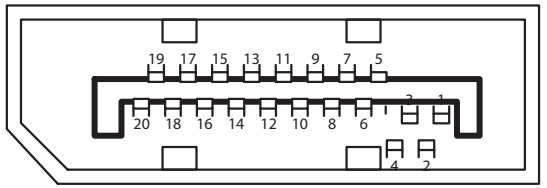
HDMI: pin view of panel connector

Notes

DisplayPort

DisplayPort 1.2

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

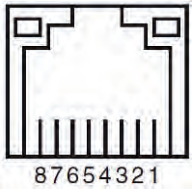


DisplayPort: pin view of panel connector

HDBaseT input

RJ45 socket.

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



HDBase-T

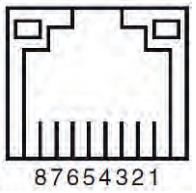
Notes

Control connections

LAN

RJ45 socket

1. TX+
2. TX-
3. TXC
4. Ground
5. Ground
6. RXC
7. RX+
8. RX-

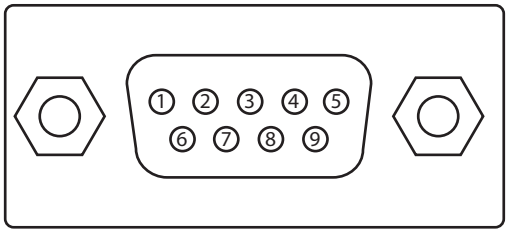


LAN: pin view of panel connector

RS232

9 way D-type connector

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



RS232: pin view of panel male connector

Notes

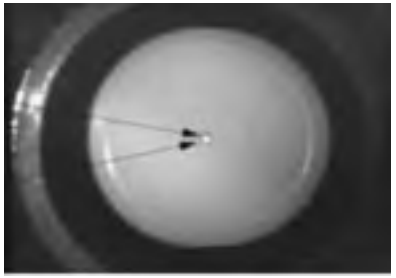
Only one remote connection (RS232 or LAN) should be used at any one time.

Appendix H: Cleaning the SLC

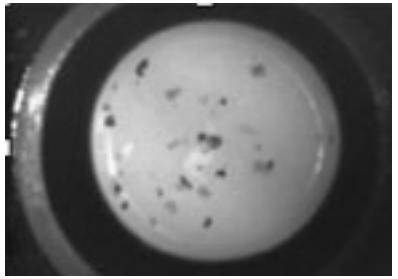
Repeated installations and device changes may expose the surface of the optical fiber in the SLC to dirt and other contaminants.

Prolonged use of a contaminated SLC may damage the SLC. It is important to clean the SLC to maintain the performance of the SLC.

The SLC connectors should be cleaned every time they are connected to a device.



Example of a clean SLC



Example of a dirty SLC

The basics of cleaning:

1. Use a pure grade of isopropyl alcohol on a clean lint-free tissue to wipe the end face of the SLC and the connector.

2. Wipe the surfaces with a dry lint-free tissue. Do not allow the surface to air dry.

3. Inspect the connector to make sure it is clean. Repeat cleaning if necessary.

Example of a damaged SLC

Notes

You can use a 100x illuminated microscope (fiberscope) to inspect the connector.

Contact a Digital Projection service center for further information on cleaning and cleaning products.

Appendix I: Memory scheme and memory items

Below is a summary of the OSD parameters that can be saved in the memory presets.

Satellite Head

Item	Global Memory	Per Input Memory (Preset A/B/C/D)	Remark
Input Select	◎		
Resync			Not Memorized
Test Pattern			Not Memorized
Auto Source	◎		
EDID Mode	◎		
Lens Lock / Lens Memory	◎		
Smooth Picture	◎		Unavailable if no signal (signal = Searching) (Only availabe for 4K Model)
Gamma		◎	Will apply the general gamma when HDR is not activated.
HDR Mode		◎	Will apply the gamma for HDR when auto detected the HDR signal or manual select the PQ-400/PQ-500/PQ-1000/HLG option.
Brightness		◎	
Contrast		◎	
Saturation		◎	
Hue		◎	
Sharpness		◎	
Noise Reduction		◎	
Freeze			Not Memorized
Ambient Brightness Correction		◎	
Dynamic Contrast		◎	not CBC on, not test pattern on, Only support full on/ full off and base on "Light off timer" define black image keep time to active.
Light Off Timer		◎	Available when Dynamic Contrast is set at ON, ' not CBC on, not test pattern on
Color Space		◎	
Color Mode		◎	
ColorMax		◎	When Color Mode is selected at ColorMax option.
Manual Color Matching		◎	When non-HDR and the Color Mode is selected at Manual Color Matching option.
		◎	When HDR and the Color Mode is selected at Manual Color Matching option.
Color Temperature		◎	When Color Mode is selected at Color Temperature option.

Notes

Item	Global Memory	Per Input Memory (Preset A/B/C/D)	Remark
Red Lift		◎	When Color Mode is selected at Gains and Lifts option.
Green Lift		◎	
Blue Lift		◎	
Red Gain		◎	
Green Gain		◎	
Blue Gain		◎	
Aspect ratio		◎	
Digi Zoom			Not Memorized and reset to 0 after power cycle
Digi Pan			
Digi Scan			
OverScan		◎	
Blanking	◎		
Orientation	◎		
High Altitude	◎		
Startup Logo	◎		
Blank Screen	◎		
Pic.Mute Setting	◎		
Smear Reduction	◎		4K Model: Only available in WUXGA mode(SP Off). WU Model: Available.
Output Frame Rate	◎		
HDMI Equalizer	◎		
Screen Setting	◎		
Auto Poweroff	◎		
Auto Poweron	◎		
Schedule Setting	◎		
Instant Startup	◎		
Standby Period	◎		
ColorMax Setting	◎		
Ir Enable	◎		
Ir Code	◎		
Hotkey Setting	◎		
Keypad Blacklight	◎		
OSD Language	◎		
OSD Menupos	◎		
OSD Trans	◎		
OSD Timer	◎		

Notes

Item	Global Memory	Per Input Memory (Preset A/B/C/D)	Remark
Lan IP	◎		When SCM enable, those network setting function may disable and will only show up information.
Lan Subnet	◎		
Lan MAC	◎		

MLS

Item	Global Memory	Per Input Memory (Preset A/B/C/D)	Remark
Power Mode	◎		
Power Level	◎		
Contrast Brightness	◎		
OSD Language	◎		
MUBC	◎		
Lan IP	◎		When SCM enable, those network setting function may disable and will only show up information.
Lan Subnet	◎		
Lan MAC	◎		

SCM

Item	Global Memory	Per Input Memory (Preset A/B/C/D)	Remark
Lan DHCP	◎		
Lan IP	◎		
Lan Subnet	◎		

Notes

Appendix J: Served web pages

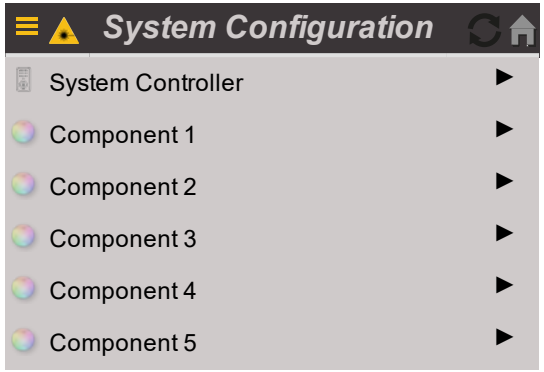
The served web pages allow you to control the system remotely via Ethernet. The controls replicate some or all of the functions available in the OSD, or the touchscreen control panels on each Satellite module.

The device you use to access the served web pages must be connected to the same network as the SCM. Use a web browser to access the served web pages.

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

The home page for the served web pages is the system configuration page. Use this page to access the controls for each individual module:

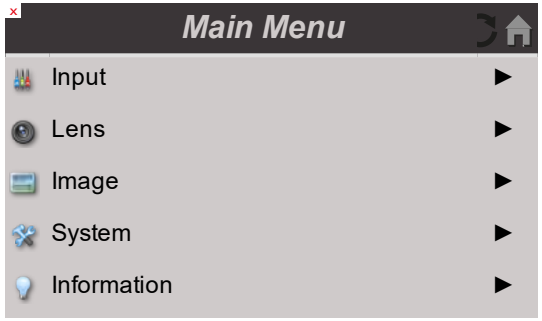
- The system controller menu provides access to the controls on the SCM touchscreen.
- **Component 1, Component 2, Component 3, Component 4, Component 5.**
  Each component menu provides information about the other modules installed in the system. This could be 1 MLS and up to 4 Satellite Heads.
  Click the menu icon in the header to enable the link to the component menus. Click on a component menu open its touchscreen menus and access various settings.



Web Served Screen Display: Top Level Menu

A Satellite Head component menu provides access to the controls on the Satellite Head touchscreen.

Refer to the operating guide for the Satellite Head for guidance on using the menus. Click the close icon in the header to go back to the top level web served menu.



Satellite Head Touchscreen Display: Top Level Menu

Notes

See Control connections on page 68 for guidance on connecting to the projector via Ethernet.

See Introduction to the OSD on page 72 for guidance on the available controls for this system. See Introduction to the MLS Touchscreen on page 108. See Introduction to the SCM Touchscreen on page 1.

The IP address for the system can be changed on the SCM. See Network on page 117.

Appendix K: Glossary of terms

Notes

1

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

3

3D active glasses
Wireless battery-powered glasses with LCD shutters. Synchronization information is communicated to the glasses by means of an infrared (IR) or radio frequency (RF) emitter which is connected to the Sync Out terminal on the projector. IR or RF pulses are transmitted by the emitter to signal when the left eye and right eye images are being displayed. The glasses incorporate a sensor which detects the emitter's signal and synchronizes 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 polarization can pass through the left lens and light with right hand polarization can pass through the right-hand lens. These glasses are used in conjunction with another device which polarizes the image, such as a ZScreen.

4

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

A

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

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

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

Aspect ratio
The proportional relationship between the width and the height of the projected image. It is represented by two numbers separated by a colon, indicating the ratio of image width and height respectively: for example, 16:9 or 2.35:1. Not to be confused with resolution.

B

Blanking (projection)
The ability to intentionally turn off, that is, set to black, areas around the edges of the projected image. It is sometimes referred to as “curtains” since it can be used to blank an area of image that literally falls on the curtains at the side of the screen in a movie theater. Usually no image resizing or geometric correction takes place and the “blanked” part of the image is lost. Not to be confused with horizontal and vertical blanking (video signal).

Blanking (video signal)
The section of the video signal where there is no active video data. Not to be confused with blanking (projection).

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

Brightness (electronic control)
A control which adds a fixed intensity value to every pixel in the display, moving the entire range of displayed intensities up or down, and is used to set the black point in the image (see Contrast). In Component Video signals, brightness is the same as luminance.

Brightness (optical)
Describes how ‘bright’ an image that is projected onto a screen appears to an observer.

C

C
Also known as ‘Chrominance’, this is the component, or pair of components, of a Component Video signal which describes color difference information.

Chrominance
Also known as ‘C’, this is the component, or pair of components, of a Component Video signal which describes color difference information.

Color difference
In Component Video signals, the difference between specified colors and the luminance component. Color difference is zero for monochrome images.

Color gamut
The spectrum of color available to be displayed.

Color temperature
The position along the black body curve on the chromaticity diagram, normally quoted in Kelvin. It takes into account the preset values for color balance in the service set-up to take up the variations in the prism. The projector allows you to adjust this temperature (i.e. adjust the picture color temperature).

Notes

Component video
A three-wire or four-wire video interface that carries the signal split into its basic RGB components or luminance (brightness) and two-color difference signals (YUV) and synchronization signals.

Contrast (electronic control)
The adjustment of the white point of the image without affecting the black point. This increases the intensity range of the displayed image.

Contrast (optical)
The intensity difference between the darkest and lightest areas of the screen.

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

Crop
Remove part of the projected image. Alternatively, fit an image into a frame with a different aspect ratio by removing part of the image. The image is resized so that either its length or its width equals the length or width of the frame, while the other dimension has moved outside the frame; the excess area is then cut out.

D

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

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

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

DHCP (Dynamic Host Configuration Protocol)
A network protocol that is used to configure network devices so that they can communicate on an IP network, for example by allocating an IP address.

DMD™ (Digital Micromirror Device™)
The optical tool that transforms the electronic signal from the input source into an optical image projected on the screen. The DMD™ of a projector has a fixed resolution, which affects the aspect ratio of the projected image. A Digital Micromirror Device™ (DMD™) consists of moving microscopic mirrors. Each mirror, which acts as a pixel, is suspended between two posts by a thin torsion hinge. It can be tilted to produce either a bright or dark pixel.

Notes

E

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

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

EDID (Extended Display Identification Data)
Information stored in the projector that can be read by the source. EDID is used on the HDMI, DVI and VGA inputs, allowing the source to automatically configure to the optimum display settings.

EDTV (Enhanced Definition Television)
A progressive digital television system with a lower resolution than HDTV.

F

Field
In interlaced video, a part of the image frame that is scanned separately. A field is a collection of either all the odd lines or all the even lines within the frame.

Frame
One of the many still images displayed in a sequence to create a moving picture. A frame is made of horizontal lines of pixels. For example, a 1920x1080 frame consists of 1080 lines, each containing 1920 pixels. In analog video frames are scanned one at a time (progressive scanning) or split into fields for each field to be scanned separately (interlaced video).

Frame rate
The number of frames shown per second (fps). In TV and video, a frame rate is the rate at which the display device scans the screen to “draw” the frame.

Frame rate multiplication
To stop low frame rate 3D images from flickering, frame rate multiplication can be used, which increases the displayed frame rate by two or three times

G

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

Ghosting
An artifact in 3D image viewing. Ghosting occurs when an image intended for one eye is partially seen by the other eye. Ghosting can be removed by optimizing the dark time and sync delay.

Notes

H

HDCP (High-bandwidth Digital Content Protection)
An encryption scheme used to protect video content.

HDTV (High Definition Television)
A television system with a higher resolution than SDTV and EDTV. It can be transmitted in various formats, notably 1080p and 720p.

Hertz (Hz)
Cycles per second.

Horizontal Scan Rate
The rate at which the lines of the incoming signal are refreshed. The rate is set by the horizontal synchronization from the source and measured in Hertz.

Hs + Vs
Horizontal and vertical synchronization.

Hue
The graduation (red/green balance) of color (applicable to NTSC).

I

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

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

L

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

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

Notes

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

Luminance
Also known as 'Y', this is the part of a Component Video signal which affects the brightness, i.e. the black and white part.

N

Noise
Electrical interference displayed on the screen.

NTSC (National Television Standards Committee)
The United States standard for television - 525 lines transmitted at 60 interlaced fields per second

O

OSD (on-screen display)
The projector menus allowing you to adjust various settings.

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

P

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

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

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

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

Notes

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

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

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

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

R

Resolution
The number of pixels in an image, usually represented by the number of pixels per line and the number of lines (for example, 1920 x 1200).

RGB (Red, Green and Blue)
An uncompressed Component Video standard.

S

Saturation
The amount of color in an image.

Scope
An aspect ratio of 2.35:1.

SDTV (Standard Definition Television)
An interlaced television system with a lower resolution than HDTV. For PAL and SECAM signals, the resolution is 576i; for NTSC it is 480i.

SECAM (Sequential Color with Memory)
The television system used in France, Russia and some other countries - 625 lines transmitted at 50 interlaced fields per second.

Smooth picture
A feature that can display a higher resolution source than the native resolution of the projector without loosing any pixel data.

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

Notes

Synchronization
A timing signal used to coordinate an action.

T

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

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

Throw distance
The distance between the screen and the projector.

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

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

U

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

V

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

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

Vista
An aspect ratio of 1.66:1.

Notes

W

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

Y

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

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

Z

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

Notes

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