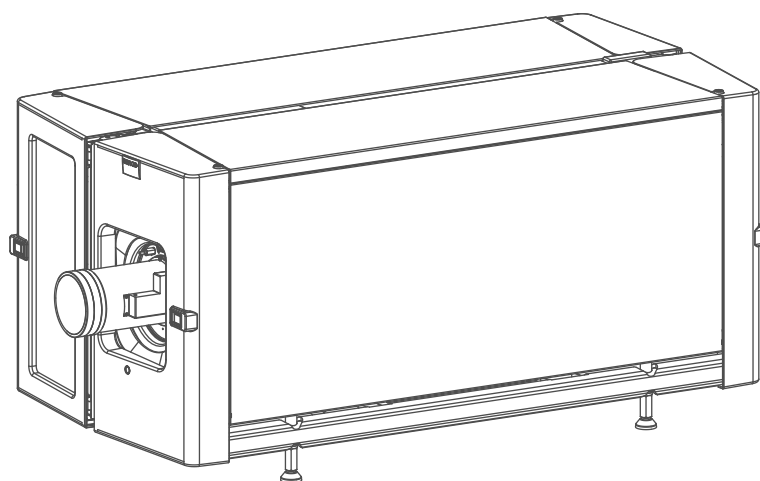


# XDL



## User Manual



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The environmental conditions as well as the servicing and maintenance regulations specified in this manual must be complied with by the customer.

## Federal Communications Commission (FCC Statement)

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to 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 at his own expense

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

FCC responsible: Barco Inc.  
3059 Premiere Parkway Suite 400  
30097 Duluth GA, United States  
Tel: +1 678 475 8000

## **EMC notices**

### **EN55032/CISPR32 Class A MME (MultiMedia Equipment)**

**Warning :** This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

### **GB9254 Class A ITE (Information Technology Equipment)**

**Warning :** This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### **BSMI Taiwan Class A statement:**

警告使用者：此為甲類資訊技術設備，於居住環境中使用，可能會造成射頻擾動，在此情況下，使用者會被要求採取某些適當的對策。



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# Safety

# 1

## Overview

- General considerations
- Important safety instructions
- Product safety labels
- High Brightness precautions: Hazard Distance (HD)
- HD for fully enclosed projection systems
- HD in function of modifying optics

## About this document

Read this document attentively. It contains important information to prevent personal injury while installing and using the XDL projector. Furthermore, it includes several cautions to prevent damage to the XDL projector. Ensure that you understand and follow all safety guidelines, safety instructions and warnings mentioned in this chapter before installing the XDL projector.

## Clarification of the term “XDL” used in this document

When referring in this document to the term “XDL” means that the content is applicable for following Barco products:

- XDL-4K30, XDL-4K60, XDL-4K75

## Model certification name

- XDL



Barco provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. Observing the specification mentioned in this chapter is critical for projector performance. Neglecting this can result in loss of warranty.

## 1.1 General considerations



**WARNING:** Be aware of suspended loads.



**WARNING:** Wear a hard hat to reduce the risk of personal injury.



**WARNING:** Be careful while working with heavy loads.



**WARNING:** Mind your fingers while working with heavy loads.



**WARNING:** In case of optical radiation emergency, please disconnect the device from the mains current; this by employing the mains switch. In case the mains switch is not easily accessible, the projectors shall be disconnected by other means for example the mains junction box. It is advised to employ the shutter or select a black image on the projector in order to reduce the risk of the emergency.

### General safety instructions

- Before operating this equipment please read this manual thoroughly and retain it for future reference.
- Installation and preliminary adjustments should be performed by qualified Barco personnel or by authorized Barco service dealers.
- All warnings on the projector and in the documentation manuals should be adhered to.
- All instructions for operating and use of this equipment must be followed precisely.
- All local installation codes should be adhered to.

### Notice on safety

This equipment is built in accordance with the requirements of the international safety standards IEC60950-1, EN60950-1, UL60950-1 and CAN/CSA C22.2 No.60950-1, which are the safety standards of information technology equipment including electrical business equipment. These safety standards impose important requirements on the use of safety critical components, materials and insulation, in order to protect the user or operator against risk of electric shock and energy hazard and having access to live parts. Safety standards also impose limits to the internal and external temperature rises, radiation levels, mechanical stability and strength, enclosure construction and protection against the risk of fire. Simulated single fault condition testing ensures the safety of the equipment to the user even when the equipment's normal operation fails.

### Notice on optical radiation

This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the projector's optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been diffused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye and skin when exposed directly within the beam. This risk is not specifically related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is equivalent with lamp based systems.

Thermal retinal eye injury is possible when exposed within the Hazard Distance (HD). The HD is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter "Hazard Distance".



**WARNING:** No direct exposure to the beam within the hazard distance shall be permitted, RG3 (Risk Group 3) IEC 62471-5:2015



**CAUTION:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Users definition

Throughout this manual, the term SERVICE PERSONNEL refers to persons having appropriate technical training and experience necessary to be knowledgeable of potential hazards to which they are exposed (including, but not limited to HIGH VOLTAGE ELECTRIC and ELECTRONIC CIRCUITRY and HIGH BRIGHTNESS PROJECTORS) in performing a task, and of measures to minimize the potential risk to themselves or other persons. The term USER and OPERATOR refers to any person other than SERVICE PERSONNEL, AUTHORIZED to operate professional projection systems.

The XDL projector is intended "FOR PROFESSIONAL USE ONLY" by AUTHORIZED PERSONNEL familiar with potential hazards associated with high voltage, high intensity light beams and high temperatures generated by the light source and associated circuits. Only qualified SERVICE PERSONNEL, knowledgeable of such risks, are allowed to perform service functions inside the product enclosure.

## 1.2 Important safety instructions

### To prevent the risk of electrical shock

- This product is equipped with a five-terminal barrier strip for the connection of a 3W+N+PE or 3W+PE three phase power system.
- This projector should be operated from an AC power source. Ensure that mains voltage and capacity matches the projector electrical ratings.
- **Electrical ratings for Star system (3W+N+PE):**
  - The cross-sectional area of the conductors in the power supply cord shall be 4 mm<sup>2</sup> to 6 mm<sup>2</sup>, 10 AWG to 8 AWG.
  - The electrical rating of the XDL-4K60/75 projector is 200-240V/346-415V 3W+N+PE 16A 50-60Hz (Y connection).
  - The electrical rating of the XDL-4k30 projector is 200-240V/346-415V 3W+N+PE 10A 50-60Hz (Y connection).
  - The building installation has to be provided with a circuit breaker of 25-40 A to protect the complete unit.
- **Electrical ratings for Delta system (3W+PE):**
  - The cross-sectional area of the conductors in the power supply cord shall be 6mm<sup>2</sup>, 8AWG.
  - The electrical rating of the XDL-4K60/75 projector is 200-240V 3W+PE 28A 50-60Hz (Δ connection).
  - The electrical rating of the XDL-4k30 projector is 200-240V 3W+PE 15A 50-60Hz (Δ connection).
  - The building installation has to be provided with a circuit breaker of 40 A to protect the complete unit.
- **REMARK for XDL-4K60/75 projector:** In case of a Delta system (3W+PE) the circuit breakers rated lower than 40A can trip unwanted because of the internal laser power supply redundancy system. The projector remains working if one internal laser power supply module fails or is removed, but this results in a higher current in one mains power line. In case of very low line voltage (between 180V and 200V), and one failed or removed laser power supply, the line current can reach 35A.
- Installation according to the local electrical code and regulations by qualified technical personnel only. Do not defeat the purpose of the grounding.
- The cross-sectional area of the UPS inlet cord shall be not less than 0.75 mm<sup>2</sup> or AWG 18.
- The electronics of the projector (UPS INLET) must be powered either from a suitable UPS unit or from the power outlet socket (UPS OUTLET) provided on the projector. An adapted short power cord (2-pole 3-wire grounding) is added to the projector accessories to loop through the power from UPS OUTLET to UPS INLET.
- The provided power output socket (UPS OUTLET) on the projector may only be used to provide power to the projector electronics (UPS INLET). Never connect other devices to this power output socket.
- A readily accessible disconnect device must be incorporated externally to the equipment for removal of the power to the projector mains terminals.
- Disconnect the power to the projector mains terminals and unplug the power cord at UPS INLET for removal of all power from the projector.
- Warning: High leakage current. Earth connection essential before connecting supply.
- Do not allow anything to rest on the power cord. Do not locate this projector where persons will walk on the cord.
- Do not operate the projector with a damaged cord or if the projector has been dropped or damaged - until it has been examined and approved for operation by a qualified service technician.

- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.
- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.
- Never push objects of any kind into this projector through cabinet slots as they may touch dangerous voltage points or short circuit parts that could result in a risk of fire or electrical shock.
- Do not expose this projector to rain or moisture.
- Do not immerse or expose this projector in water or other liquids.
- Do not spill liquid of any kind on this projector.
- Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Do not disassemble this projector, always take it to a trained service person when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, remove all power from the projector. This will prevent damage to the projector due to lightning and AC power-line surges.

### To prevent personal injury

- To prevent injury and physical damage, always read this manual and all labels on the system before powering the projector or adjusting the projector.
- Do not underestimate the weight of the projector. The projector weighs  $\pm 240$  kg ( $\pm 529$  lbs). To prevent personal injury a hoisting tool should be used to lift the projector.
- To prevent injury, ensure that the lens, cooling system and all cover plates are correctly installed. See installation procedures.
- Warning: high intensity light beam. NEVER look into the lens ! High luminance could result in damage to the eye.
- **Warning: extremely high brightness projector:** This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the projectors optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been defused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam. This risk is not specific related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is comparable with lamp based systems. Thermal retinal eye injury is possible when exposed within the Hazard Distance. The Hazard Distance (HD) is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter "High Brightness precautions: Hazard Distance (HD)", page 16.
- Based on international requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness precautions: Hazard Distance (HD)", page 16.
- The projector shall be installed in a restricted access room equipped with a key or security lock preventing untrained persons entering the Class 4 use zone.
- Before attempting to remove any of the projector's covers, disconnect the projector power cable from the mains electricity for removal of all power from the projector.
- When required to remove all power from the projector (e.g. during service), always disconnect the power from the projector mains terminals and UPS INLET connector. Use the disconnect device in the building installation to disconnect the power to the projector mains terminals, and unplug the power cord at the UPS INLET connector if the UPS INLET is separately powered.
- Do not place this equipment on an unstable cart, stand, or table. The product may fall, causing serious damage to it and possible injury to the user.
- Lenses, shields or screens shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired. For example by cracks or deep scratches.
- The associated Laser Safety responsible of the unit must evaluate the setup before the unit may be started.
- Never point or allow light to be directed on people or reflective objects within the HD zone.
- If the unit is shut down, remove the key control from the system; avoiding unauthorized startup.
- All operators shall have received adequate training and be aware of the potential hazards.



- Strictly minimize the number of people who have access to the unit. The unit may never be operated without permission of the responsible for laser safety.
- When the projected light causes a dangerous situation the operator must hit the beam stop button which is located close to the control panel. The beam stop removes all power from the laser power supplies.
- Don't put your hand in front of the beam.
- Do not clean the port window when the projector is switched on.
- Position the hoses of the cooling system so that they will not be tripped over, pulled, or contact hot surfaces.

### To prevent battery explosion

- Danger of explosion if battery is incorrectly installed.
- Replace only with the same or equivalent type recommended by the manufacturer.
- For disposal of used batteries, always consult federal, state, local and provincial hazardous waste disposal rules and regulations to ensure proper disposal.

### To prevent fire hazard

- Do not place flammable or combustible materials near the projector!
- Barco large screen projection products are designed and manufactured to meet the most stringent safety regulations. This projector radiates heat on its external surfaces and from ventilation ducts during normal operation, which is both normal and safe. Exposing flammable or combustible materials into close proximity of this projector could result in the spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an "exclusion zone" around all external surfaces of the projector whereby no flammable or combustible materials are present. The exclusion zone must be not less than 40 cm (16") for this projector.
- Do not place any object in the projection light path at close distance to the projection lens output. The concentrated light at the projection lens output may result in damage, fire or burn injuries.
- Ensure that the projector is solidly mounted so that the projection light path cannot be changed by accident.
- Do not cover the projector or the lens with any material while the projector is in operation. . Mount the projector in a well ventilated area away from sources of ignition and out of direct sun light. Never expose the projector to rain or moisture. In the event of fire, use sand, CO<sub>2</sub> or dry powder fire extinguishers. Never use water on an electrical fire. Always have service performed on this projector by authorized Barco service personnel. Always insist on genuine Barco replacement parts. Never use non-Barco replacement parts as they may degrade the safety of this projector.
- Slots and openings in this equipment are provided for ventilation. To ensure reliable operation of the projector and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the projector too close to walls, or other similar surface. This projector should never be placed near or over a radiator or heat register. This projector should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Projection rooms must be well ventilated or cooled in order to avoid build up of heat. It is necessary to vent hot exhaust air from projector and cooling system to the outside of the building.
- Let the projector cool completely before storing. Remove cord from the projector when storing.

### To prevent projector damage

- The air filters of the projector must be cleaned or replaced on a regular basis. Cleaning the booth area would be monthly-minimum. Neglecting this could result in disrupting the air flow inside the projector, causing overheating. Overheating may lead to the projector shutting down during operation.
- The projector must always be installed in a manner which ensures free flow of air into its air inlets.
- If more than one projector is installed in a common projection booth, the exhaust air flow requirements are valid for EACH individual projector system. Note that inadequate air extraction or cooling will result in decreased life expectancy of the projector as a whole as well as causing premature failure of the lasers.
- In order to ensure that correct airflow is maintained, and that the projector complies with Electromagnetic Compatibility (EMC) and safety requirements, it should always be operated with all of it's covers in place.
- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. The device should not be placed in a built-in installation or enclosure unless proper ventilation is provided.

- Ensure that nothing can be spilled on, or dropped inside the projector. If this does happen, switch off and remove all power from the projector. Do not operate the projector again until it has been checked by qualified service personnel.
- Do not block the projector cooling fans or free air movement around the projector.
- Proper operation of the projector can only be guaranteed in table mounted position. However, it is permitted to place the table-mounted projector under a specific tilt or roll angle. See installation procedure for correct installation.
- **Special care for Laser Beams:** Special care should be used when DLP projectors are used in the same room as high power laser equipment. Direct or indirect hitting of a laser beam on to the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Never place the projector in direct sunlight. Sunlight on the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Save the original shipping carton and packing material. They will come in handy if you ever have to ship your equipment. For maximum protection, repack your set as it was originally packed at the factory.
- Disconnect the power to the projectors mains terminals before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Never use strong solvents, such as thinner or benzine or abrasive cleaners, since these will damage the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution.
- To ensure the highest optical performance and resolution, the projection lenses are specially treated with an anti-reflective coating, therefore, avoid touching the lens. To remove dust on the lens, use a soft dry cloth. For lens cleaning follow the instructions precisely as stipulated in the projector manual.
- Rated maximum ambient temperature,  $t_a = 35\text{ }^{\circ}\text{C}$  (95  $^{\circ}\text{F}$ ).
- Rated humidity = 5% RH to 75% RH Non-condensed.
- An external frame must be used to stack projectors.
- For functionality and reliability, the projector requires accurate temperature control and cooling below ambient. Therefore a liquid cooling system is provided consisting of liquid circuits inside the projector which are connected via hoses to external chillers. Only chiller models and hoses exclusively developed for this application and approved by Barco are allowed to be used. Barco approved chillers models are listed on the Barco website.
- An adequate draining system must be coupled with the drain pipes at the bottom of the projector to collect and lead away the condensed water from the built-in air-dryers. The capacity of the draining system must meet the humidity conditions wherein the projector operates. The water drain must arrive into an 'open' water container!

## On servicing


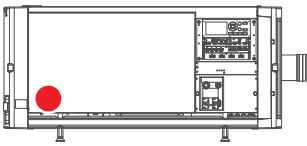

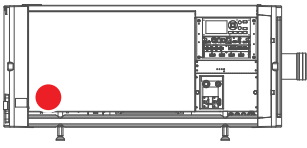
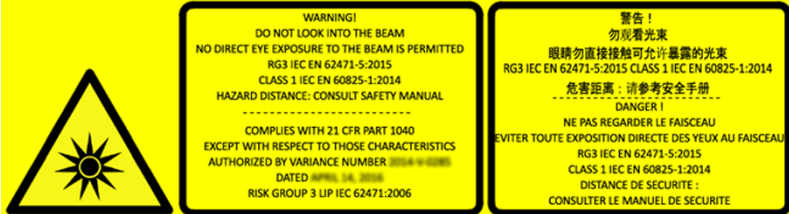
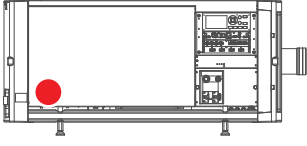

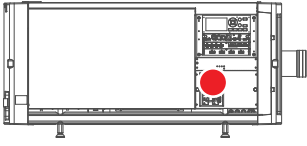

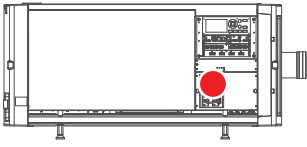
- Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage potentials and risk of electric shock.
- Refer all servicing to qualified service personnel.
- Attempts to alter the factory-set internal controls or to change other control settings not specially discussed in this manual can lead to permanent damage to the projector and cancellation of the warranty.
- Remove all power from the projector and refer servicing to qualified service technicians under the following conditions:
  - When the power cord or plug is damaged or frayed.
  - If liquid has been spilled into the equipment.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of the other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
  - If the product has been dropped or the cabinet has been damaged.
  - If the product exhibits a distinct change in performance, indicating a need for service.
- Replacement parts: When replacement parts are required, be sure the service technician has used original Barco replacement parts or authorized replacement parts which have the same characteristics as the Barco original part. Unauthorized substitutions may result in degraded performance and reliability, fire, electric shock or other hazards. Unauthorized substitutions may void warranty.
- Safety check: Upon completion of any service or repairs to this projector, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

## Safety Data Sheets for Hazardous Chemicals


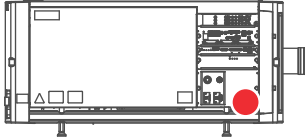

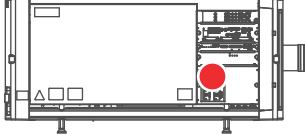
For safe handling information on chemical products, consult the Safety Data Sheet (SDS). SDSs are available upon request via [safetydatasheets@barco.com](mailto:safetydatasheets@barco.com).

## 1.3 Product safety labels

### Light beam related safety labels

Label image	Label description	Label location
	Hazard RG3: not for household use symbol	
	Hazard RG3: optical radiation warning symbol	
	<p><b>WARNING!</b> DO NOT LOOK INTO THE BEAM NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED. RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014 HAZARD DISTANCE: CONSULT SAFETY MANUAL.</p> <p>警告！ 勿观看光束 眼睛勿直接接触可允许暴露的光束 RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014 危害距离：请参考安全手册</p> <p><b>DANGER !</b> NE PAS REGARDER LE FAISCEAU EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU. RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014 DISTANCE DE SECURITE : CONSULTER LE MANUEL DE SECURITE</p>	
<p>WARNING! DO NOT LOOK INTO THE LIGHT BEAM NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED. RG3 IEC EN 62471-5:2015. CLASS 1 IEC EN 60825-1:2014. HAZARD DISTANCE: CONSULT SAFETY MANUAL.</p> <p>COMPLIES WITH 21 CFR 1040 EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2014-V-0285 DATED APRIL 14, 2016 RISK GROUP 3 LIP IEC 62471:2006.</p> <p>警告！勿观看光束 眼睛勿直接接触可允许暴露的光束 (RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014) 危害距离：请参考 安全手册</p> <p>DANGER ! NE PAS REGARDER LE FAISCEAU EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU. RG3 IEC EN 62471-5:2015. CLASS 1 IEC EN 60825-1:2014. DISTANCE DE SECURITE : CONSULTER LE MANUEL DE SECURITE.</p>		
	<p>Beam stop. Arrêt de faisceau. 光束衰减器</p>	
	<p>Enable key. Clé de active. 启动钥匙</p>	

## Electric related safety labels

Label image	Label description	Label location
	<p>Disconnect the power to the unit mains terminals and unplug power cord at UPS inlet for removal of all power from the unit.</p> <p><b>WARNING : HIGH LEAKAGE CURRENT EARTH CONNECTION ESSENTIAL BEFORE CONNECTING SUPPLY SEE INSTALLATION INSTRUCTIONS BEFORE CONNECTING TO THE SUPPLY.</b></p> <p>Déconnecter l'alimentation des bornes du réseau et déconnecter le câble de la prise UPS pour la coupure de toute l'alimentation de l'appareil. ATTENTION : COURANT DE FUITE ÉLEVÉ RACCORDEMENT À LA TERRE INDISPENSABLE AVANT LE RACCORDEMENT AU RÉSEAU VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RÉSEAU.</p> <p>断开放映机主电源端的电源并从UPS电源接入插座上拔下电源线。警告：大漏，电流在接通电源之前必须先接地。在与电源连接前请查看安装说明书。</p>	 <p>(located behind cover)</p>
	<p><b>UPS INLET : 200-240V 6A max. 50-60Hz. UPS OUTLET : ONLY FOR CONNECTION TO UPS INLET</b></p> <p><b>WARNING :</b> Disconnect the power to the mains terminals and unplug power cord at UPS inlet for removal of all power from the unit.</p> <p><b>ATTENTION :</b> Eteindre et déconnecter le câble dans la prise UPS pour la coupure de toute l'alimentation de l'appareil.</p> <p><b>警告</b> 断开放映机主电源端的电源并从UPS电源接入插座上拔下电源线。切断放映机的所有电源。</p> <p><b>UPS电源输入插座：200-240V 最大电流 6A 50-60Hz. UPS 输出插座：仅用于连接 UPS电源输入插座。</b></p> <p><b>警告</b> 断开放映机主电源端的电源并从UPS电源接入插座上拔下电源线，切断放映机的所有电源。</p>	

## 1.4 High Brightness precautions: Hazard Distance (HD)

### HD



Hazard Distance (HD) is the distance measured from the projection lens at which the intensity or the energy per surface unit becomes lower than the applicable exposure limit on the cornea or on the skin. The light beam is considered (to be) unsafe for exposure if the distance from a person to the light source is less than the HD.

### Restriction Zone (RZ) based on the HD

The HD depends on the amount of lumens produced by the projector and the type of lens installed. See next chapter "HD in function of modifying optics", page 20.

To protect untrained end users (as cinema visitors, spectators) the installation shall comply with the following installation requirements: Operators shall control access to the beam within the hazard distance or install the product at the height that will prevent spectators' eyes from being in the hazard distance. Radiation levels in excess of the limits will not be permitted at any point less than 2.0 meter (SH) above any surface upon which

persons other than operators, performers, or employees are permitted to stand or less than 1.0 meter (SW) lateral separation from any place where such persons are permitted to be. In environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD.

These values are minimum values and are based on the guidance provided in IEC 62471-5:2015 section 6.6.3.5.

The installer and user must understand the risk and apply protective measures based upon the hazard distance as indicated on the label and in the user information. Installation method, separation height, barriers, detection system or other applicable control measure shall prevent hazardous eye access to the radiation within the hazard distance.

For example, projectors that have a HD greater than 1 m and emit light into an uncontrolled area where persons may be present should be positioned in accordance with “the fixed projector installation” parameters, resulting in a HD that does not extend into the audience area unless the beam is at least 2.0 meter above the floor level. In environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD. Sufficiently large separation height may be achieved by mounting the image projector on the ceiling or through the use of physical barriers.

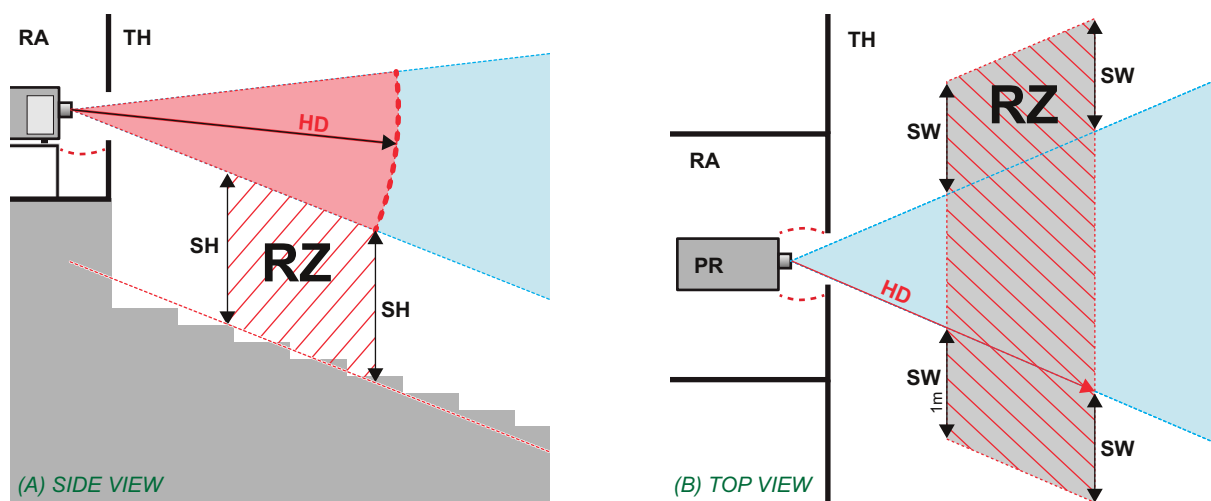


Image 1-1

- A** Side view.
- B** Top view.
- RA** Restricted Access location (boot area of projector).
- PR** Projector.

- TH** Theater.
- RZ** Restriction Zone in the theater.
- SH** Separation Height.
- SW** Separation Width.

Based on national requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related hazard distance (HD). This shall be physically impossible by creating sufficient separation height or by placing barriers. The minimum separation height takes into account the surface upon which persons other than operator, performers or employees are permitted to stand.

On Image 1-2 a typical setup is displayed. It must be verified if these minimum requirements are met. If required a restricted zone (RZ) in the theater must be established. This can be done by using physical barrier, like a red rope as illustrated in Image 1-2.

The restricted area sticker can be replaced by a sticker with only the symbol.

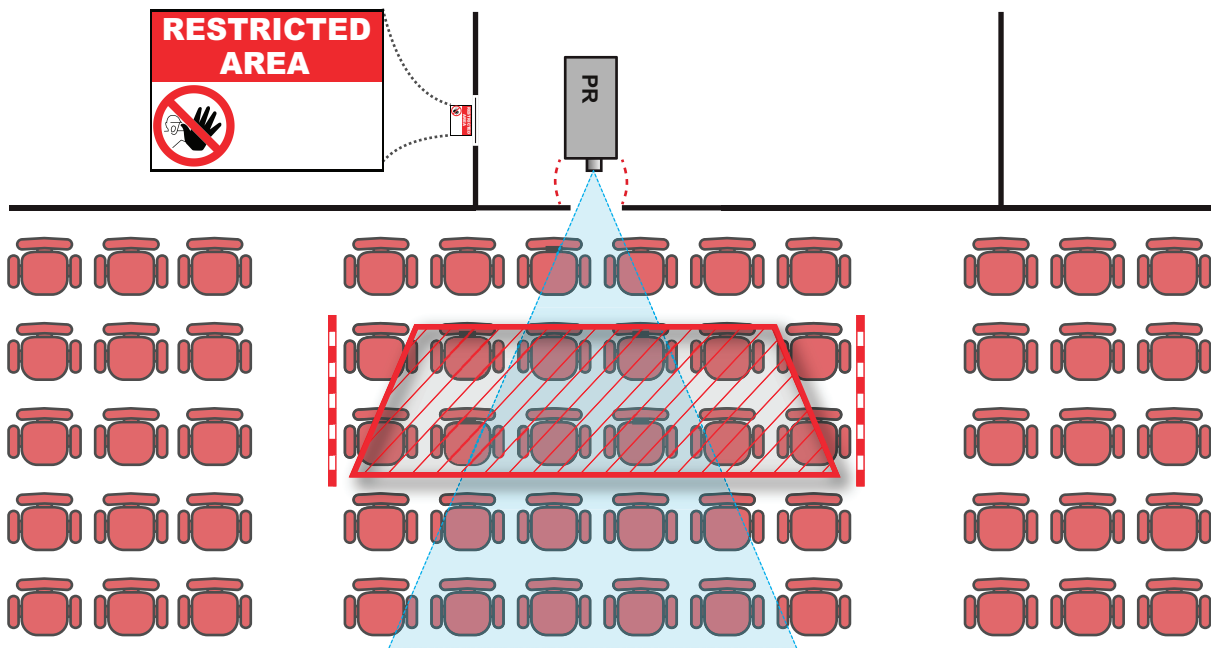


Image 1-2

## 1.5 HD for fully enclosed projection systems

### HD



Hazard Distance (HD) is the distance measured from the projection lens at which the intensity or the energy per surface unit becomes lower than the applicable exposure limit on the cornea or on the skin. The light beam is considered (to be) unsafe for exposure if the distance from a person to the light source is less than the HD.

### Restriction Zone (RZ) based on the HD

The projector is also suitable for rear projection applications; projecting a beam onto a diffuse coated projection screen. As displayed in Image 1-3 two areas should be considered: the restricted enclosed projection area (RA) and the observation area (TH).

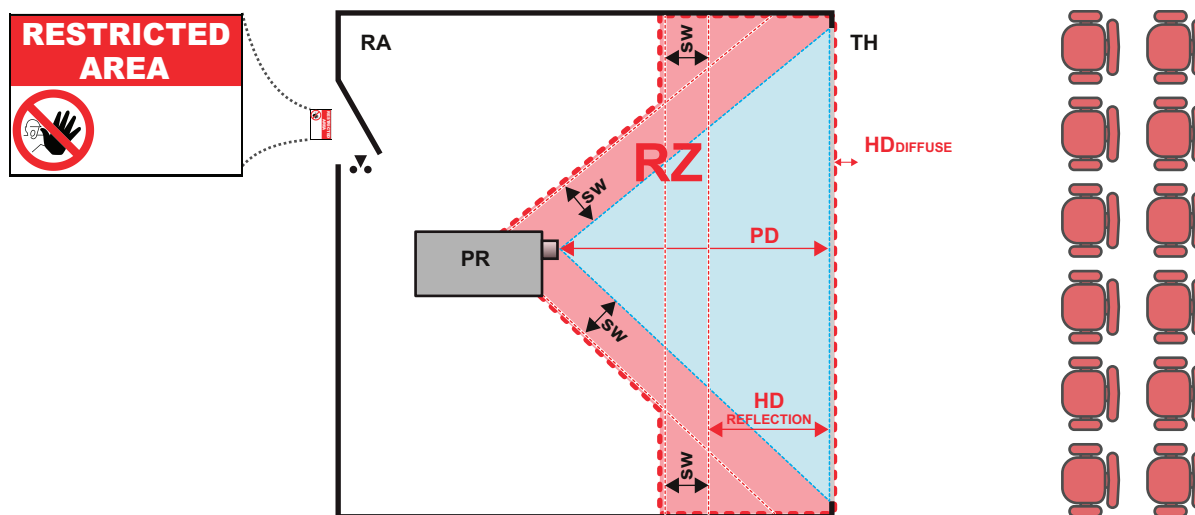


Image 1-3

**RA** Restricted Access location (enclosed projection area).

**PR** Projector.

**TH** Theater (observation area).

**RZ** Restriction Zone.

**PD** Projection Distance.

**SW** Separation Width. Must be minimum 1 meter.

For this type of setup 3 different HD shall be considered:

- HD as discussed in “High Brightness precautions: Hazard Distance (HD)”, page 16, relevant for intrabeam exposure.
- $HD_{\text{reflection}}$  : the distance that has to be kept restrictive related to the reflected light from the rear projection screen.
- $HD_{\text{diffuse}}$  : the relevant distance to be considered while observing the diffuse surface of the rear projection screen.

As described in “High Brightness precautions: Hazard Distance (HD)”, page 16, it is mandatory to create a restricted zone within the beam areas closer than any HD. In the enclosed projection area the combination of two restricted zones are relevant: The restricted zone of the projected beam toward the screen; taking into account 1 meter Separation Width (SW) from the beam onward. Combined with the restricted zone related to the rear reflection from the screen ( $HD_{\text{reflection}}$ ); also taking into account a 1 meter lateral separation.

The  $HD_{\text{reflection}}$  distance equals 25% of the difference between the determined HD distance and the projection distance to the rear projection screen. To determine the HD distance for the used lens and projector model see graphs in chapter “HD in function of modifying optics”, page 20.

$$HD_{\text{reflection}} = 25\% (HD - PD)$$

The light emitted from the screen within the observation shall never exceed the RG2 exposure limit, determined at 10 cm. The  $HD_{\text{diffuse}}$  can be neglected if the measured light at the screen surface is below 5000 cd/m<sup>2</sup> or 15000 LUX.



## 1.6 HD in function of modifying optics

### Hazard Distance

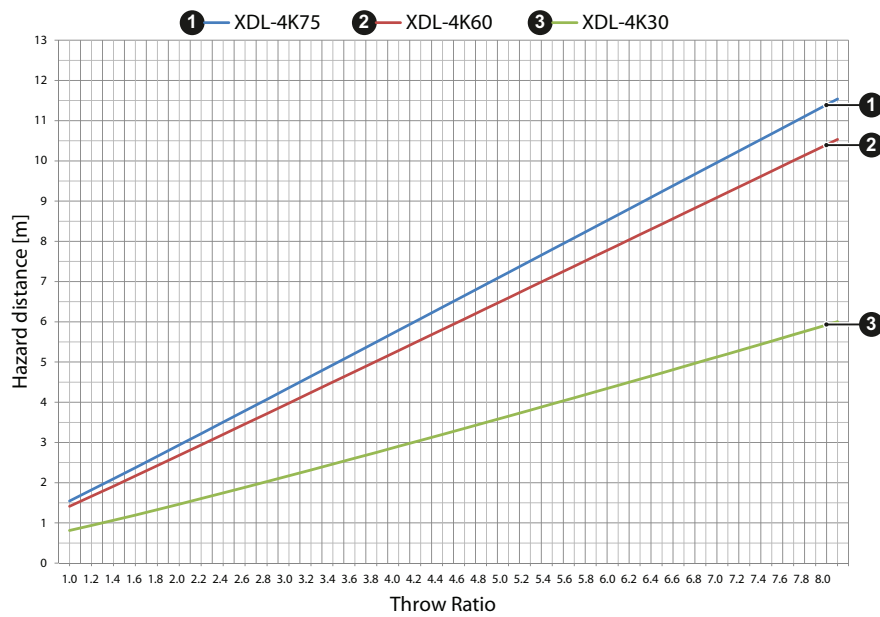


Image 1-4



# Pulse Remote Control Unit

# 2

## Overview

- Remote control, battery installation
- Remote control, protocol setup
- Remote control, on/off button
- Functionality overview
- Functions of the “button pressed indicator”
- Function of the RGB filter button
- Displaying and Programming addresses into the RCU
- Using the XLR connector of the RCU
- Using the mini-jack connector of the RCU
- Silicone protection sleeve for the RCU (optional)

## 2.1 Remote control, battery installation

### Where to find the batteries for the remote control ?

The batteries are not placed in the remote control unit to avoid control operation in its package, resulting in a shorter battery life time. At delivery the batteries can be found in a separated bag attached to the remote control unit. Before using your remote control, install the batteries first.

### How to install

1. Push the battery cover tab with the fingernail a little backwards (1) and pull, at the same time, the cover upwards (2).

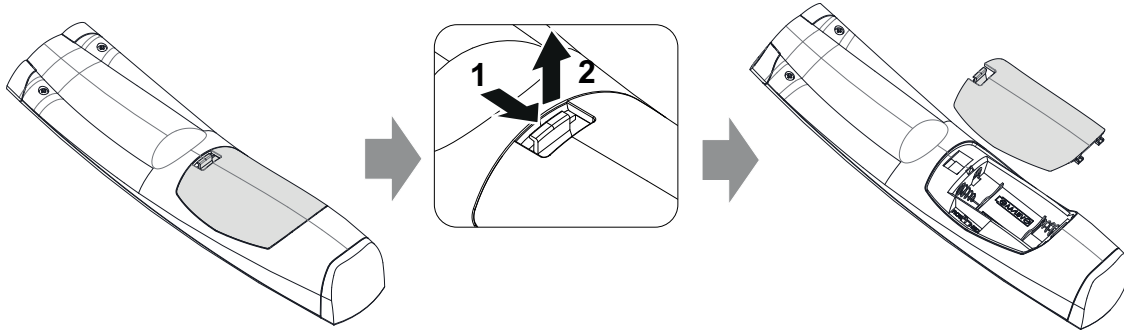


Image 2-1

2. Insert the two AA size batteries, making sure the polarities match the + and - marks inside the battery compartment.



*Tip:* Use alkaline batteries for optimum range and life time.

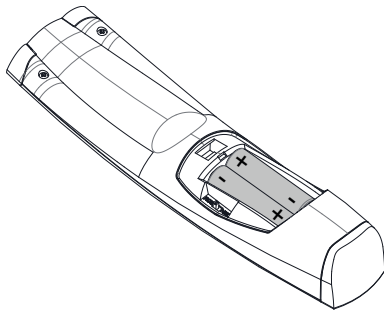


Image 2-2

3. Insert (1) both lower tabs of the battery cover in the gaps at the bottom of the remote control, and press (2) the cover until it clicks in place.

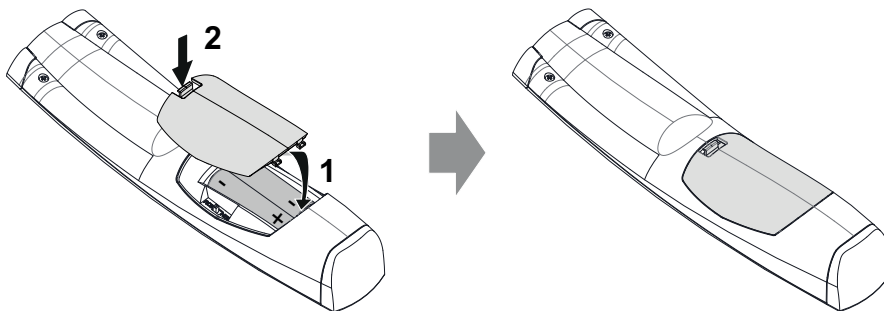


Image 2-3



When replacing batteries, the broadcast address of the RCU will be reset to its default value '0'.



**CAUTION:** Replace with the correct battery type. Use two AA size batteries. There is a risk of explosion if the battery is replaced with an incorrect type.



**CAUTION:** Replace the battery as explained above. There is a risk of explosion if the battery is incorrectly installed.

## 2.2 Remote control, protocol setup

### About the used protocol

The protocol is the code send out by the remote control when a button is pressed. Depending on this code, the projector can decode the signals. The remote control can be used with two different protocols: RC5 and NEC. Depending on the projector to control the remote control can be switched between these protocols.

### Which protocol to use

- The **NEC** protocol has to be used for Barco projectors based on the Pulse platform: F70, F80, F90, HDX 4K, UDX, XDL, etc.
- The **RC5** protocol has to be used all legacy Barco projectors: HDQ 2k40, HDF, HDX W, etc.

### How to set

1. Remove the cover. For more info on how to remove, see “Remote control, battery installation”, page 22.
2. Place the switch in the desired position.

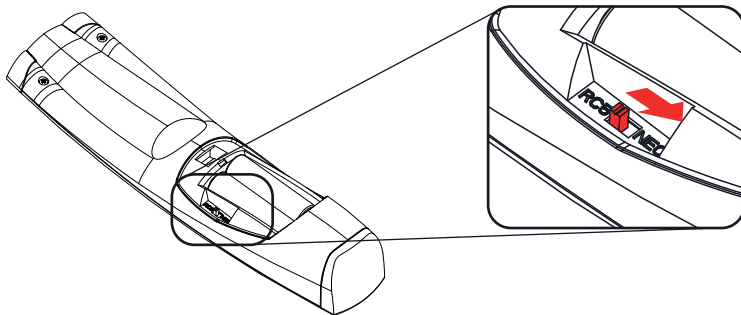


Image 2-4

### Remarks when using the RC5 protocol

Due to new or updated functionality not all buttons of the Pulse RCU are one-to-one compatible with the legacy Barco RCU and projectors. Take the following limitations into account:

- Buttons **Shutter open** and **Shutter close** emit the same code when in RC5 mode. This because the legacy RCU's only had 1 button for Shutter functionality.
- Buttons **Power on** and **Power off** emit the same code when in RC5 mode. This because the legacy RCU's only had 1 button for Power functionality.
- The **RGB filter** button is not supported.
- The **Input selection** button is not supported.
- The **Default value** button is not supported.
- The **Macro** button is not supported.

## 2.3 Remote control, on/off button

### Purpose of the remote control on/off button

The Pulse remote control unit has at the front side an on/off switch (reference 1 Image 2-5). Switching off the remote control prevents that unwanted commands are send due to an accidental key press. Furthermore, switching the RCU off will extend the battery life time of the remote control.

To activate the remote control press the on/off button.

To deactivate the remote control press the on/off button again.

Default when (re)placing batteries, is "ON".

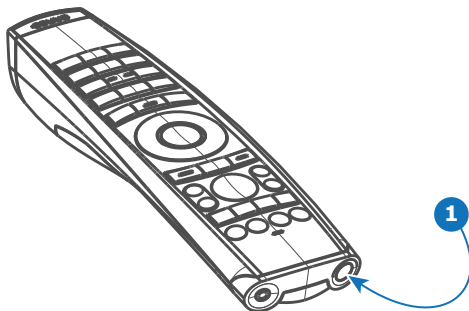


Image 2-5

## 2.4 Functionality overview

### Remote Control Unit buttons

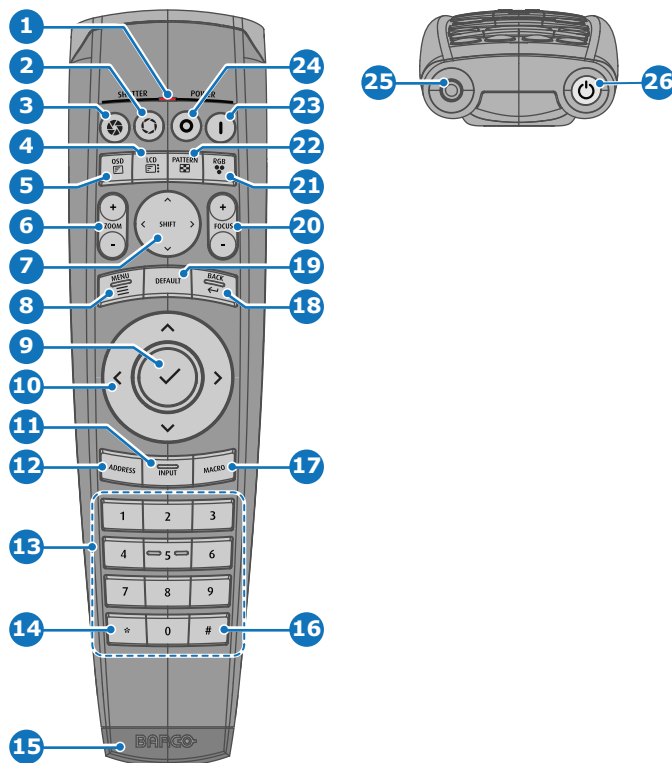


Image 2-6

- |                                    |  |
|------------------------------------|--|
| <b>1</b> Button pressed indicator  | <b>14</b> Backspace (while entering values)    |
| <b>2</b> Shutter open              | <b>15</b> XLR connector                        |
| <b>3</b> Shutter close             | <b>16</b> Decimal mark (while entering values) |
| <b>4</b> LCD panel on / off        | <b>17</b> Macro button                         |
| <b>5</b> Project OSD on / off      | <b>18</b> Menu back                            |
| <b>6</b> Lens zoom                 | <b>19</b> Default value button                 |
| <b>7</b> Lens shift                | <b>20</b> Lens focus                           |
| <b>8</b> Menu open / close         | <b>21</b> RGB filter                           |
| <b>9</b> Menu selection, OK button | <b>22</b> Test patterns                        |
| <b>10</b> Menu navigation          | <b>23</b> Power on                             |
| <b>11</b> Input selection          | <b>24</b> Power off                            |
| <b>12</b> Address button           | <b>25</b> 3.5 mm jack                          |
| <b>13</b> Numeric buttons          | <b>26</b> RCU on / off                         |

## 2.5 Functions of the “button pressed indicator”

### Functions button pressed indicator

- Rapidly flashes when commands are sent, this is the normal “button pressed” indication.
- 1 Short flash when remote control is switched ON by means of the on/off button.
- Continuously lit (up to 5 seconds) when address digits are expected after pressing the ADDR button.
- Slowly flashes (2 times a second) when the battery level is becoming low; typically when more than 85% of the useful life is past.

## 2.6 Function of the RGB filter button

### Filtering the color of the projected image

By pressing the RGB filter button on the RCU you can place a color filter on the output of the projector. This feature can be useful during the installation and configuration of a multi-projector or multi-channel setup. By having one projector project a red image and another project a green image, it is easier to spot and adjust the overlap section.

By pressing this button multiple times, you will have different active filters, in the following cycle:

- Red + Green + Blue (default)
- Red only
- Green only
- Blue only
- Red + Green
- Green + Blue
- Red + Blue
- Red + Green + Blue
- etc



After powering up, the colors will always revert back to full RGB.

## 2.7 Displaying and Programming addresses into the RCU

### Displaying the Projector Address on the Screen.

1. If the projector is on, press the menu key and navigate to the Status page. The projector address and the broadcast address can be seen under the Communication heading.

The projector's address is displayed on the LCD status screen and / or the OSD.

### How to Program an Address into the RCU?

1. Press the **Address** button until the *Button pressed indicator* lights up continuously (proximately 5 seconds).
2. Enter the address with the digit buttons within the time the indicator lights up (also proximately 5 seconds).



**Note:** That address can be any value between 0 and 31.

*Tip:* A few examples:

To enter address 3, press "3" digit button on the RCU to set the RCU's address to 3 and wait until the *button pressed indicator* is out. Alternatively, you can also press "0" and "3". This way, the *button pressed indicator* goes out immediately.



To enter address 31, then press "3" and "1" on the digit button on the RCU and the *button pressed indicator* goes out immediately.

## 2.8 Using the XLR connector of the RCU



Connecting a cable with the XLR connector will reset the broadcast address of the RCU to its default value '0'.

### How to use the XLR connector

1. Remove the XLR cover by pulling it backwards.



Image 2-7

2. Connect a cable with XLR plug into the XLR connector of the RCU.
3. Connect the other end of the cable with the XLR input of the projector.



*Note:* While the XLR cable is connected, the IR beam of the RCU is switched off.

## 2.9 Using the mini-jack connector of the RCU



Connecting a cable with the mini-jack connector will reset the broadcast address of the RCU to its default value '0'.

### How to use the mini-jack connector

1. Connect a cable with the mini-jack connector (reference 2 Image 2-8) of the RCU.
2. Connect the other end of the cable with the mini-jack input of the projector.

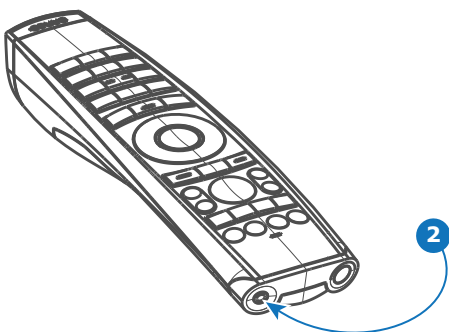


Image 2-8



*Note:* While the mini-jack cable is connected, the IR beam of the RCU is switched off.

## 2.10 Silicone protection sleeve for the RCU (optional)

### Introduction

Barco offers a silicone form fitting protection sleeve for the Pulse RCU. The silicone material keeps it comfortably, non slip and soft touch. All buttons and holes remain accessible. The sleeve is quick and easy installed. For ordering information see Barco website.

### How to install

1. Pull off the rubber XLR-lid from the RCU.



Image 2-9

2. Place back side (XLR side) of the RCU into the sleeve and pull the other side of the sleeve over the front side of the RCU.

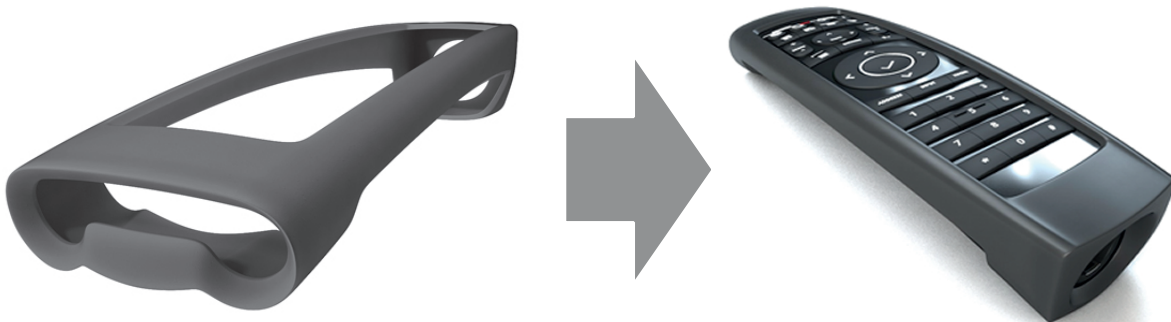


Image 2-10





# Input & Communication

# 3

## Overview

- Introduction
- Local Keypad and LCD panel
- Communication connections
- Input source connections – Quad combo input Mark II
- Input source connections – Quad DP 1.2 Input board
- LED and Button indication chart
- Laser Status

## 3.1 Introduction

### General

The Input & Communication side of the projector consists of a local keypad (1), a communication panel (4), a Quad Combo input board (5) and the Quad DP 1.2 input board (6 – exclusive to XDL 4k30 and 4k60).

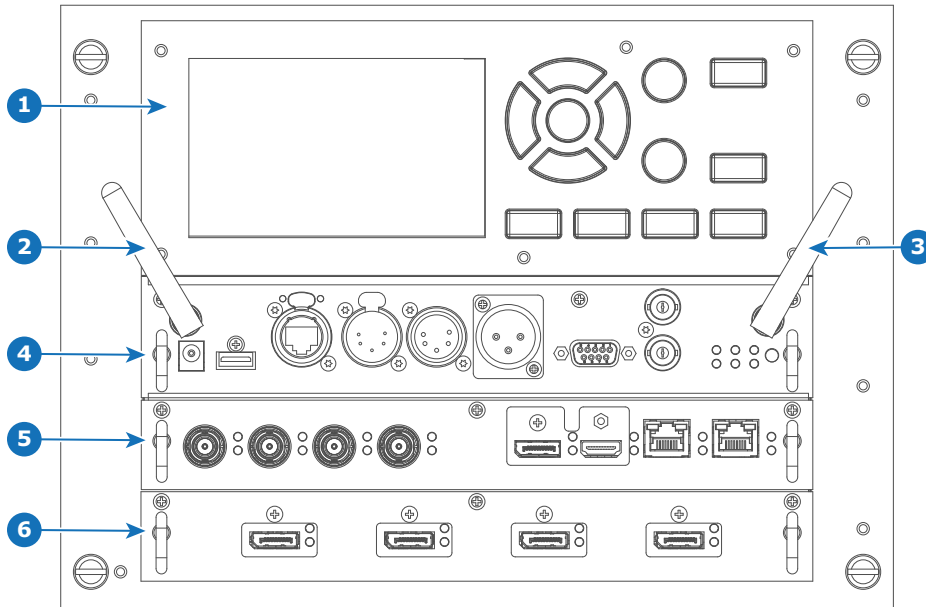


Image 3-1

- |  |  |
|--|--|
| 1 Local keypad and LCD panel           | 4 Communication panel                              |
| 2 Optional antenna for WiFi connection | 5 Quad Combo Input board Mk II                     |
| 3 Optional antenna for GSM             | 6 Quad DP 1.2 Input board (XDL-4k30 and 4k60 only) |

## 3.2 Local Keypad and LCD panel

### Overview

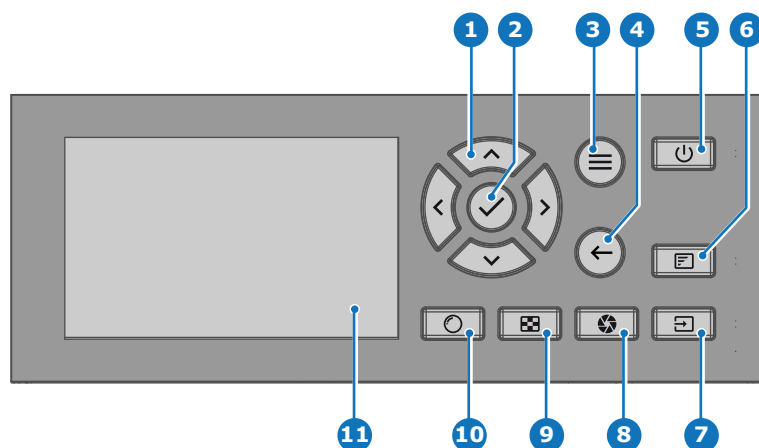


Image 3-2

- |                                |                        |
|--------------------------------|------------------------|
| 1 Menu navigation              | 7 Input selection      |
| 2 Menu confirmation, OK button | 8 Shutter open / close |
| 3 Menu open / close            | 9 Test patterns        |
| 4 Menu back                    | 10 Lens adjustment     |
| 5 Power on / off               | 11 LCD panel           |
| 6 Project OSD on / off         |                        |

## Local Keypad

The Keypad gives direct access to several functions, in addition to access to the menu system.

The keypad has a backlight that can be switched on and off manually. By default the light turns off after 5 minutes.

The Power button and Shutter buttons are equipped with white, blue and red backlit LEDs. The other keys are only equipped with white and blue backlit LEDs. The LEDs are controlled according to the features available.

## LCD panel

The LCD panel has two main functions:

1. Showing the menus, the adjustment information and also a mirror of the OSD, (On Screen Display) described in *User Interface* when this is enabled.
- Information regarding the status of the projector showing this data:
  - Projector status
  - Network address
  - Active source
  - Current firmware version
  - Operation Data
  - Active functions (Enabled Functions).

Toggle between the two indications by using the **Menu** button on the keypad, or on the remote control.

The LCD Display will fade out 30 seconds after the last key operation.

## 3.3 Communication connections

### Communication Panel

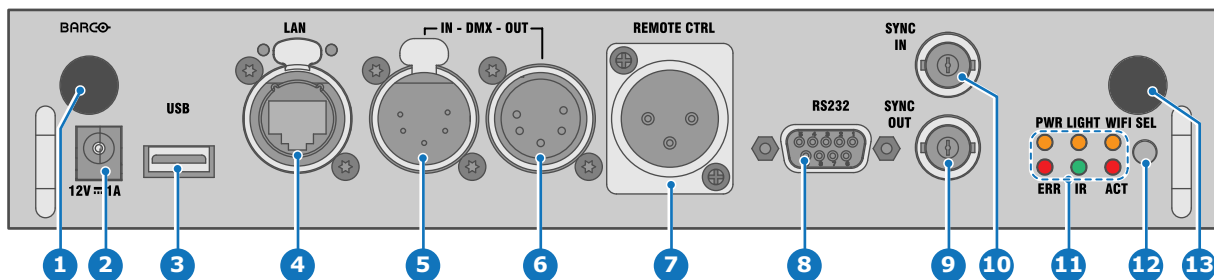


Image 3-3

- |  |                                  |
|--|----------------------------------|
| 1 WIFI antenna for wireless IP (optional)                | 8 RS232 for serial communication |
| 2 12V 1A output  | 9 Sync Out 3D                    |
| 3 Firmware update / USB download log files               | 10 Sync In 3D                    |
| 4 10/100 base-T for external control over IP and Art-Net | 11 Status lights                 |
| 5 DMX interface input                                    | 12 IR receive sensor             |
| 6 DMX interface output                                   | 13 GSM antenna input (optional)  |
| 7 XLR input for wired projector control                  |                                  |

### 12 V output

12 V output, maximum 1 A, available when projector is not in stand by.

### DMX interface

DMX is used as communication bus between different devices in the light technic. Each device has an input and an output, so that the bus can be looped between the different devices. According the standard a five wire cable with XLR connector is used.

You can use the DMX input port to connect a DMX device (DMX console) to the projector. This way you can control the projector from that DMX device (console). The DMX output port can be connected with the next device in the loop.

Pin	Description
1	Earth
2	Cold
3	Hot
4	Return - (or not used)
5	Return + (or not used)

**DMX**

DMX-512 Lighting protocol over RS-485 interface. Carries information of 512 channels from a lighting controller to lighting devices. Standardized by USITT.

**RS232/RS422 input**

The communication interface of the XDL series projector supports RS232 and RS422 serial communication on two different types of input connectors, a Sub-D connector and an USB connector acting as RS input when connected to an USB input of a PC.

You can use the RS232/RS422 input to connect a local PC to your XDL series projector. By this way you can configure and control your projector from your local PC.

Advantages of using RS232/RS422 serial communication:

- easy adjustment of the projector via PC (or MAC).
- allow storage of multiple projector configurations and set ups.
- wide range of control possibilities.
- address range from 0 to 255.
- sending data to the projector (update).
- copying data from the projector (backup).

**RS232/422 input (Sub-D) port**

Pin	Description
1	DCD : Data Carrier Detect
2	RXD- : Receive Data
3	TXD- : Transmitted Data
4	DTR : Data Terminal Ready [RS232] TXD+ : Transmitted Data [RS422]
5	GND : Ground
6	DSR : Data Set Ready [RS232] RXD+ : Received Data [RS422]
7	— (not connected) —
8	CTS : Clear To Send
9	RI : Ring Indicator

**RS232**

An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using either D-SUB 9 pins or D-SUB 25 pins connectors. This standard is used for relatively short-range communications and does not specify balanced control lines. RS-232 is a serial control standard with a set number of conductors, data rate, word length and type of connector to be used. The standard specifies component connection standards with regard to computer interface. It is also called RS-232-C, which is the third version of the RS-232 standard, and is functionally identical to the CCITT V.24 standard. Logical '0' is  $> +3V$ , Logical '1' is  $< -3V$ . The range between  $-3V$  and  $+3V$  is the transition zone.

**RS422**

An EIA serial digital interface standard that specifies the electrical characteristics of balanced (differential) voltage, digital interface circuits. This standard is usable over longer distances than RS-232. This signal governs the asynchronous transmission of computer data at speeds of up to 920,000 bits per second. It is also used as the serial port standard for Macintosh computers. When the difference between the 2 lines is  $< -0.2V$  that equals with a logical '0'. When the difference is  $> +0.2V$  that equals to a logical '1'.

**USB port**

The communication interface is equipped with a master USB port, type "A" connector. This USB port will simplify the service procedures for firmware updates or for downloading the log files without a network connection.

If the only file on the USB device is the firmware file (a "\*.fw" file), the projector will automatically start one of the following processes.

- **cornet<version nr>.fw**: The projector will upgrade or downgrade, depending on the version number.
- **LogExtractor.fw**: The log files will be downloaded.



Make sure that any used USB-stick is FAT32 compatible and contains no other files or folders.

## 3.4 Input source connections – Quad combo input Mark II

**About the Quad combo input Mark II**

Due to demand from the market, Barco has created a second generation of the Input board to support 12G input and throughput on the SDI connectors. From the release of this board onward, the Quad combo input will be supported and will be the standard input board in every Input & Communication Unit, effectively replacing the Mark I variant.

The updates on this new board include the following compared to its predecessor:

- **SDI Input A** now also supports **12G** input signals.
- **SDI Input C** now also functions as a **loop-through output** for any signal placed on **Input A**.
- **SDI Input D** now also functions as a **loop-through output** for any signal placed on **Input B**.
- **HDBaseT Input 1** now also supports **network connectivity**.

**SDI Input & output – How does it work?**

When connecting an SDI source to the projector and the signal is HD or 3G, you can choose any of the four input connectors.

When connecting multiple projectors with the same signal, you can connect the signal as follows:

- Connect the source signal to Input A or B of the first projector.
- If the source signal is connected to **Input A**, connect **Input/Output C** to the Input of the following projector.
- If the source signal is connected to **Input B**, connect **Input/Output D** to the Input of the following projector.
- Continue in the same fashion until all projectors are connected.

When connecting a 12G SDI source to the projector, you can only connect that source to input A.



Only Input A accepts 12G SDI signals . While it is technically possible to connect a 12G SDI source to Input B and connect that source to another projector in line (using Input/Output D), this first projector itself will not be able to process the 12G signal.

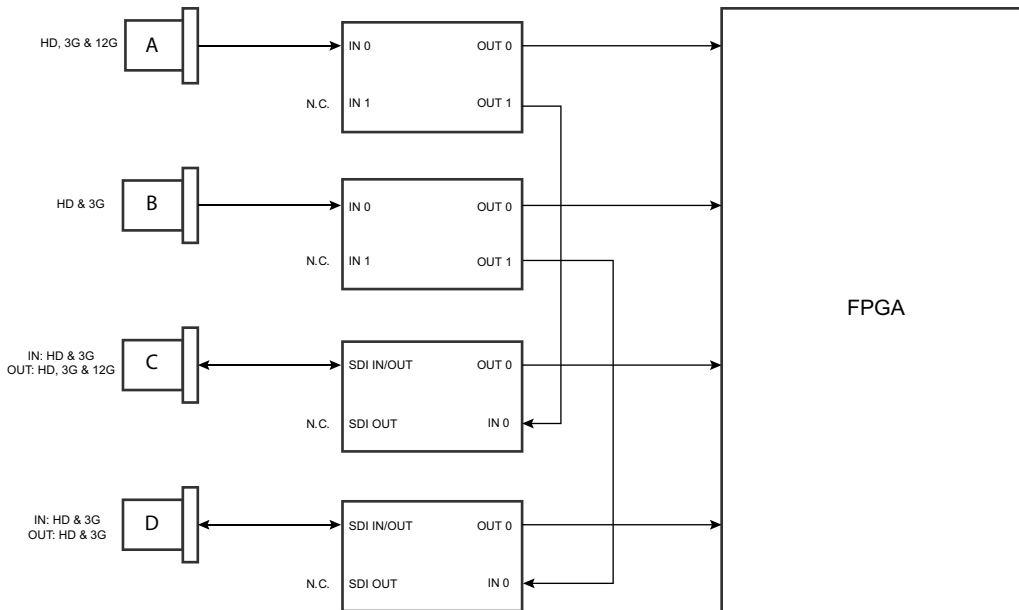


Image 3-4

## Spotting the difference between the Mark I and Mark II Input boards

Since there will be projectors in the field that have the Mark I Input Board and others that have the Mark II input board, it is important to know the difference between the two variants.

While there are several minor and barely noticeable differences between the two boards, there is one real visual aid to tell the two variants apart. There are visual markings added on the Mark II Input board, marking which connector supports 12G and which only supports 3G.

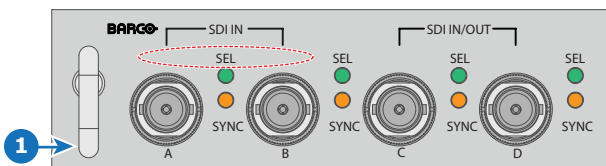


Image 3-5: Mark 1 Quad Combo input board, without markings above the SDI inputs

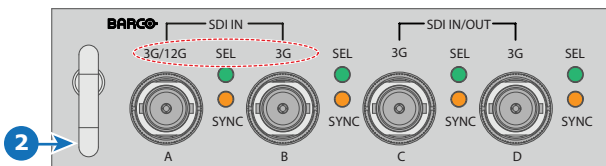


Image 3-6: Mark 2 Quad Combo input board, with 3G/12G markings above the SDI inputs/outputs.

## Overview Mark 2 Quad Combo Input board

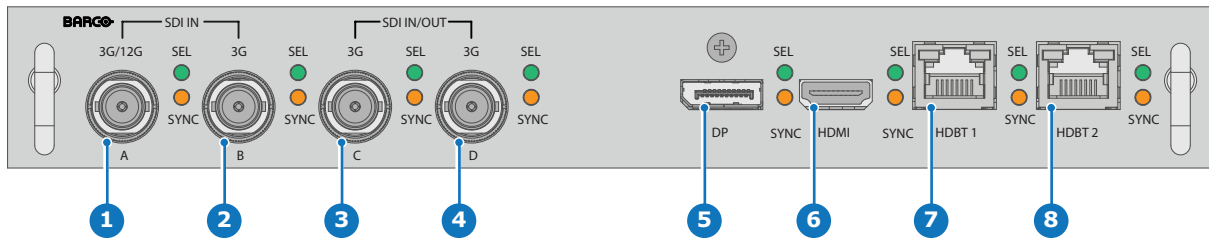


Image 3-7

- |   |                            |
|---|----------------------------|
| <b>1</b> Quad SDI channel A: 3G/12G input                 | <b>5</b> DisplayPort Input |
| <b>2</b> Quad SDI channel B: 3G input                     | <b>6</b> HDMI input        |
| <b>3</b> Quad SDI channel C: 3G SDI input + 3G/12G output | <b>7</b> HDBaseT input 1   |
| <b>4</b> Quad SDI channel D: 3G SDI input / output        | <b>8</b> HDBaseT input 2   |



The yellow LED lights up when valid input sync is detected.  
The green LED lights up when the input is selected.  
The green LED lights blink when the input/output is selected and configured as output.

## Input specifications – SDI Inputs



HD-SDI follows the SMPTE 292M standard  
3G SDI follows the SMPTE 425M standard Level A  
12G-SDI follows the SMPTE ST-2082-1 and ST-2082-10 standards.

<b>Color space</b>	YCbCr		
<b>Color depth</b>	10 bpc		
<b>Chroma sampling</b>	4:2:2		
<b>Audio support</b>	not supported		
<b>For future release</b>	<ul style="list-style-type: none"> <li>• 3D support</li> <li>• Interlaced support</li> <li>• Segmented frame support</li> </ul>		
Video timings progressive <sup>1</sup>	Type	Port type	Format
	HD-SDI	Single link Quad link	<ul style="list-style-type: none"> <li>• Up to 1920 x 1080 @24 Hz</li> <li>• Up to 1920 x 1080 @25 Hz</li> <li>• Up to 1920 x 1080 @30 Hz</li> <li>• Up to 1280 x 720 @50 Hz</li> <li>• Up to 1280 x 720 @60 Hz</li> </ul>
	3G-SDI “BarcoLink”	Single link Quad link	1920 x 1200 @50 Hz, @59.94 Hz and @60 Hz.
	12G-SDI (Channel A only)	Single link	3840 x 2160 @50 Hz and @60 Hz 4096 x 2160 @50 Hz and @60 Hz

## Input specifications – HDMI Input

<b>Pixel rate</b>	25 – 600 MHz pixel clock
<b>HDCP support</b>	<ul style="list-style-type: none"> <li>• HDCP 1.x</li> <li>• HDCP 2.2</li> <li>• RGB 4:4:4</li> </ul>

1: For the full list of video timings, see Appendix

<b>Color space</b>	<ul style="list-style-type: none"> <li>• YCbCr 4:2:0</li> <li>• YCbCr 4:2:2</li> <li>• YCbCr 4:4:4</li> <li>• RGB 4:4:4</li> </ul>
<b>Color depth</b>	<ul style="list-style-type: none"> <li>• 24 bpp</li> <li>• 30 bpp</li> <li>• 36 bpp</li> </ul>
<b>3D support</b>	<ul style="list-style-type: none"> <li>• Field sequential 3D (Active 3D)</li> <li>• Passive 3D not supported on this board.</li> </ul>
<b>For future release</b>	<ul style="list-style-type: none"> <li>• Interlaced support</li> </ul>
<b>Audio</b>	Not supported
<b>Video timings<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• Up to 4096 x 2160 @24 Hz</li> <li>• Up to 4096 x 2160 @25 Hz</li> <li>• Up to 4096 x 2160 @30 Hz</li> <li>• Up to 2048 x 1080 @48 Hz</li> <li>• Up to 4096 x 2160 @50 Hz</li> <li>• Up to 4096 x 2160 @60 Hz</li> </ul>
<b>Native video timings</b>	<ul style="list-style-type: none"> <li>• 3840 x 2400 @60 Hz</li> </ul>



**CAUTION:** The HDBaseT inputs can bridge a distance of 100 m but are sensitive to radiated electromagnetic interference: radiated electromagnetic interference (e.g. from GSM or switching inductive or capacitive loads) within the limits of electromagnetic compatibility requirements of 3 V/m can cause random flashes or temporary loss of the projected image. As such, shielded CAT-6 cables with metal RJ-45 connectors are recommended; choose cable length no longer than required and route HDBT cable optimally screened from possible sources of electromagnetic emission.

## Input specifications – HDBaseT inputs

<b>Pixel rate</b>	25 – 297 MHz pixel clock	
<b>Color space</b>	<ul style="list-style-type: none"> <li>• YCbCr 4:2:2</li> <li>• YCbCr 4:4:4</li> <li>• RGB 4:4:4</li> </ul>	
<b>Color depth</b>	<ul style="list-style-type: none"> <li>• 24 bpp</li> <li>• 30 bpp</li> <li>• 36 bpp</li> </ul>	
<b>HDCP support</b>	HDCP 1.x supported on HDBaseT Input 1	
<b>Network support</b>	Yes, on HDBaseT Input 1	
<b>For future release</b>	<ul style="list-style-type: none"> <li>• 3D support</li> <li>• Interlaced support</li> </ul>	
<b>Audio</b>	not supported	
<b>Video timings progressive<sup>1</sup></b>	<b>Layout mode</b>	<b>Supported formats</b>
	Standard layout (1x1 layout)	<ul style="list-style-type: none"> <li>• Up to 4096 x 2160 @24 Hz</li> <li>• Up to 4096 x 2160 @25 Hz</li> <li>• Up to 4096 x 2160 @30 Hz</li> <li>• Up to 2048 x 1080 @48 Hz</li> <li>• Up to 2560 x 1600 @50 Hz</li> <li>• Up to 2560 x 1600 @60 Hz</li> </ul>



- |                            |  |
|----------------------------|--|
| 2 Column mode (2x1 layout) | <ul style="list-style-type: none"> <li>• 1920 x 2160 @50 Hz</li> <li>• 1920 x 2160 @60 Hz</li> <li>• 2048 x 2160 @50 Hz</li> <li>• 2048 x 2400 @60 Hz</li> </ul> |
|----------------------------|--|

**Native video timings** • 3840 x 2160 @60 Hz



**CAUTION:** In order to display high resolution images (e.g.: 3840 x 2160 @60 Hz) via the DP1.2 input, the quality of the cable must be adequate, in addition the length of the cable can also influence the performance. In case there is an issue with one of these criteria the automatic link-training initiated by the DP-standard may decide to switch to a lower resolution.

## Input specifications – DisplayPort 1.2 input

<b>Pixel rate</b>	Up to 600 MHz pixel clock		
<b>Color space</b>	<ul style="list-style-type: none"> <li>• YCbCr 4:2:2</li> <li>• YCbCr 4:4:4</li> <li>• RGB 4:4:4</li> </ul>		
<b>Color depth</b>	<ul style="list-style-type: none"> <li>• 24 bpp</li> <li>• 30 bpp</li> <li>• 36 bpp</li> </ul>		
<b>Data rate support</b>	<ul style="list-style-type: none"> <li>• 1.62 Gbps: Reduced Bit Rate (RBR)</li> <li>• 2.7 Gbps: High Bit Rate (HBR)</li> <li>• 5.4 Gbps: High Bit Rate 2 (HBR2)</li> </ul>		
<b>HDCP support</b>	HDCP 1.4		
<b>For future release</b>	<ul style="list-style-type: none"> <li>• Interlaced support</li> </ul>		
<b>Audio</b>	not supported		
<b>3D support</b>	<ul style="list-style-type: none"> <li>• Field sequential 3D (Active 3D)</li> <li>• Passive 3D not supported on this board.</li> </ul>		
<b>Video timings progressive<sup>1</sup></b>	<b>2D / 3D</b>	<b>Layout Mode</b>	<b>Supported formats</b>
	2D	Standard layout (1x1 layout)	<ul style="list-style-type: none"> <li>• Up to 4096 x 2160 @24 Hz</li> <li>• Up to 4096 x 2160 @30 Hz</li> <li>• Up to 2048 x 1080 @48 Hz</li> <li>• Up to 4096 x 2160 @50 Hz</li> <li>• Up to 4096 x 2160 @60 Hz</li> <li>• Up to 2560 x 1600 @120 Hz</li> </ul>
	Active 3D	Standard layout (1x1 layout)	<ul style="list-style-type: none"> <li>• 1600 x 1200 @120 Hz</li> <li>• 2560 x 1080 @120 Hz</li> <li>• 2560 x 1600 @120 Hz</li> </ul>
<b>Native video timings</b>	<ul style="list-style-type: none"> <li>• 3840 x 2400 @60 Hz</li> </ul>		

## 3.5 Input source connections – Quad DP 1.2 Input board

### Quad DP 1.2 Input board

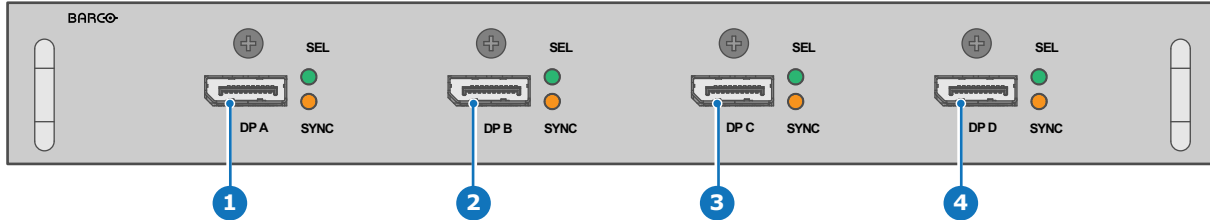


Image 3-8

- 1 Quad DisplayPort channel A input
- 2 Quad DisplayPort channel B input
- 3 Quad DisplayPort channel C input
- 4 Quad DisplayPort channel A input

The yellow LED lights up when valid input sync is detected.

The green LED lights up when the input is selected.



### Input specifications – DisplayPort 1.2 inputs

<b>Pixel rate</b>	Up to 600 MHz pixel clock		
<b>Color space</b>	<ul style="list-style-type: none"> <li>• YCbCr 4:2:2</li> <li>• YCbCr 4:4:4</li> <li>• RGB 4:4:4</li> </ul>		
<b>Color depth</b>	<ul style="list-style-type: none"> <li>• 24 bpp</li> <li>• 30 bpp</li> <li>• 36 bpp</li> </ul>		
<b>Data rate support</b>	<ul style="list-style-type: none"> <li>• 1.62 Gbps: Reduced Bit Rate (RBR)</li> <li>• 2.7 Gbps: High Bit Rate (HBR)</li> <li>• 5.4 Gbps: High Bit Rate 2 (HBR2)</li> </ul>		
<b>For future release</b>	<ul style="list-style-type: none"> <li>• Interlaced support</li> <li>• HDCP 1.4</li> </ul>		
<b>Audio</b>	not supported		
<b>3D support</b>	<ul style="list-style-type: none"> <li>• Field sequential 3D (Active 3D)</li> <li>• Passive stereoscopic 3D (Passive stereo) converted to active 3D</li> </ul>		
<b>Video timings progressive</b>	<b>2D / 3D</b>	<b>Layout Mode</b>	<b>Supported formats</b>
	2D	Standard layout (1x1 layout)	<ul style="list-style-type: none"> <li>• Up to 4096 x 2160 @24 Hz</li> <li>• Up to 4096 x 2160 @30 Hz</li> <li>• Up to 2048 x 1080 @48 Hz</li> <li>• Up to 4096 x 2160 @50 Hz</li> <li>• Up to 4096 x 2160 @60 Hz</li> <li>• Up to 2560 x 1600 @120 Hz</li> </ul>
	2D	2 column mode (2x1 layout)	<ul style="list-style-type: none"> <li>• 1920 x 2160 @60 Hz</li> <li>• 1920 x 2160 @120 Hz</li> <li>• 1920 x 2400 @60 Hz</li> </ul>
	2D	4 quadrant mode (2x2 layout)	<ul style="list-style-type: none"> <li>• 960 x 1080 @120 Hz</li> <li>• 960 x 1200 @120 Hz</li> <li>• 1280 x 1080 @60 Hz</li> </ul>

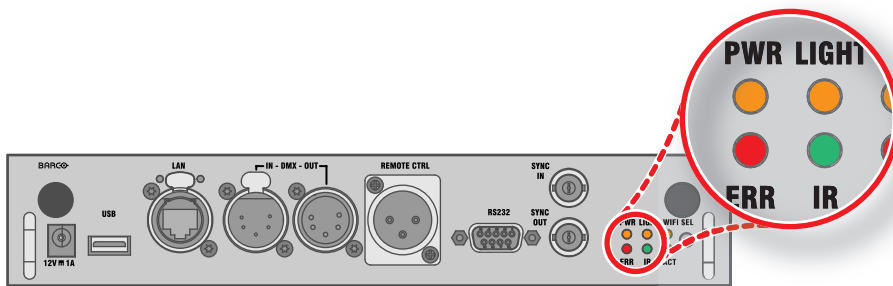
		<ul style="list-style-type: none"> <li>• 1280 x 1080 @120 Hz</li> <li>• 1280 x 1600 @60 Hz</li> <li>• 1280 x 1600 @120 Hz</li> <li>• 1920 x 1080 @120 Hz</li> <li>• 1920 x 1200 @120 Hz</li> <li>• 2048 x 1080 @120 Hz</li> </ul>
2D	4 column mode (4x1 layout)	<ul style="list-style-type: none"> <li>• 960 x 2160 @120 Hz</li> <li>• 960 x 2400 @120 Hz</li> <li>• 1024 x 2160 @60 Hz</li> </ul>
Active 3D	Standard layout (1x1 layout)	<ul style="list-style-type: none"> <li>• 1600 x 1200 @120 Hz</li> <li>• 2560 x 1080 @120 Hz</li> <li>• 2560 x 1600 @120 Hz</li> </ul>
Active 3D	2 column mode (2x1 layout)	1920 x 2160 @120 Hz
Active 3D	4 quadrant mode (2x2 layout)	<ul style="list-style-type: none"> <li>• 1920 x 1080 @120 Hz</li> <li>• 1920 x 1200 @120 Hz</li> <li>• 2048 x 1080 @120 Hz</li> </ul>
Active 3D	4 column mode (4x1 layout)	<ul style="list-style-type: none"> <li>• 960 x 2160 @120 Hz</li> <li>• 960 x 2400 @120 Hz</li> <li>• 1024 x 2160 @120 Hz</li> </ul>
Passive stereo	Standard layout (1x1 layout)	3840 x 2160 @60 Hz
Passive stereo	2 column mode (2x1 layout)	1920 x 2160 @60 Hz

## 3.6 LED and Button indication chart

### Button Backlight Status

Button	Color status	Description
Standby button 	Blinking WHITE (slow)	Projector starts up (booting)
	Blinking WHITE (fast)	Projector is upgrading firmware
	Solid WHITE	Projector is in Standby mode
	Blinking BLUE	Projector goes to ON mode
	Solid BLUE	Projector is ON
	Blinking RED	Error condition
Shutter button 	Off (no color)	Projector is OFF, starts up, or is in Standby mode.
	Solid WHITE	Projector is ON, shutter is open
	Solid RED	Projector is ON, shutter is closed

## LED Status



LED	Color status	Description
PWR (power LED)	Off	Projector powers up or has no power
	RED	Projector is in Standby
	ORANGE	Projector is Ready
	GREEN	Projector is on
LIGHT (Illumination LED)	Off	Light source is off
	RED	No light source detected
	GREEN	Light source is on in normal mode
	GREEN-ORANGE	Light source is on in CLO mode
ERR (error LED)	Off	No error
	RED toggles on/off	Error
	ORANGE toggles on/off	Projector is installing firmware Warning
IR	RED	IR signal received
	GREEN	IR signal acknowledged

## 3.7 Laser Status

### About the Laser Status Light

The Laser Status Light is located at the rear top of the projector (reference 2 Image 3-9). The Laser Status Light is a real time indicator of the laser condition.

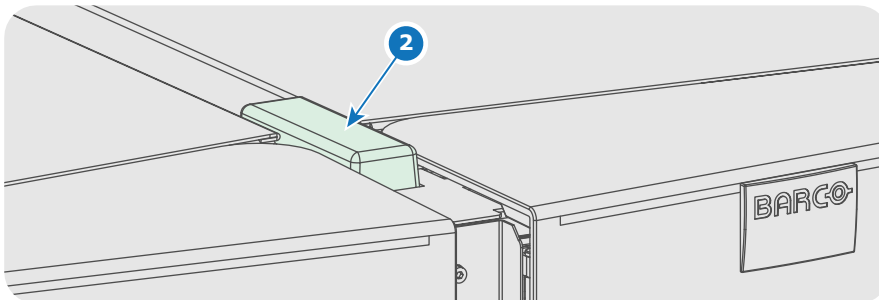


Image 3-9

### Status overview

The Laser Status light has only one color: white. The combination of the Laser Status light and the backlight of the Light button on the Local Keypad indicates a certain condition of the projector. See table below.

Status light	Power On/Off button	Meaning
<b>Off</b>	Off, blinking white, blinking blue or continuous white	Sealed compartments are DECONDITIONED. Lasers are not activated. It is safe for service personnel to open the compartments.
<b>Blinking</b> (6 seconds)	Blinking blue	Indicates the start of the CONDITIONING process. After six seconds the status light will light up continuously.
<b>On</b>	Blinking blue	Ongoing CONDITIONING process. Lasers are tested
	Continuous blue	Sealed compartments are fully CONDITIONED. Lasers are activated for image projection.
	Blinking white	Ongoing DECONDITIONING process. Lasers can be active on low power.
<b>Slow blinking</b>	Continuous white or red	Not safe to open the sealed compartments due to risk of condensation. The external dew point of the booth area is too high. Wait until the status light turns off and remains off.



# Getting Started

# 4

## How to control the projector ?

The projector can be controlled by the local keypad, by the remote control unit or by browser application.

## Location of the local keypad ?

The local keypad is located on the input side of the projector.

## Remote control functions.

This remote control includes a battery powered infrared (IR) transmitter that allows the user to control the projector remotely. This remote control is used for source selection, control, adaptation and set up.

Other functions of the remote control are :

- switching between stand by and operational mode.
- switching to "pause" (blanked picture, full power for immediate restarting)
- direct access to all connected sources.

## Overview

- Switching on the XDL
- Switching to standby
- Projector ON/OFF cycle explained
- Using the RCU
- Projector Address
- Quick setup via Direct access
- Software update

## 4.1 Switching on the XDL

### About the start up process

To start up the XDL series projector the sealed compartment of the Light Processor and the sealed compartment of the Laser Clusters must be brought into a 'condition' which is safe for the electronics to operate (avoid moisture due to extreme cooling). In other words, the temperature and humidity inside these compartments must be brought within specs prior to activating the lasers and Light Processor. The time needed to bring the projector from a **deconditioned** state into a **conditioned** state depends on the ambient conditions and can take several minutes. This process is called **conditioning**.



Keep in mind that it can take up to 10 minutes to start the lasers again after they were switched off. If there are only 30 to 45 minutes between the shows it's advisable to keep the lasers on with shutter closed. When the shutter is closed the lasers are automatically dimmed.

### Start up procedure

1. Switch on the chiller(s). The status light of the chiller(s) should light up white. See documentation set of the chiller.
2. Press the **Power Switch** (reference 1, Image 4-1) to switch the projector **ON**.

The projector starts up to standby mode. The **Power on/off** button will blink until standby mode is achieved (reference 1, Image 4-2). Once in standby mode, the Power on/off button will be lit WHITE, but the display will be off.

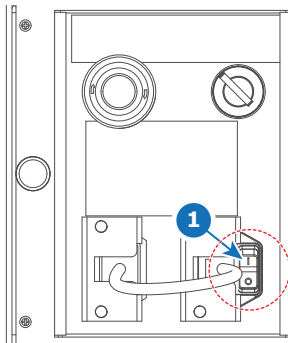


Image 4-1

3. Press the **Power on/off** button on the projector, or the **Power On** button on the remote control. The projector will continue to operational mode. The **Power on/off** button will blink BLUE until the projector is ready (reference 2, Image 4-2). In this process the shutter will close and the **Shutter** button will be lit RED. The start up screen is displayed on the touch panel and when fully started up, it changes to the overview screen.

Once the projector is ready & conditioned, the Power on/off button will be lit BLUE. Now the lasers are active and light can come out of the projector. The shutter however remains closed. While the shutter is closed, the lasers will be set to minimum power.

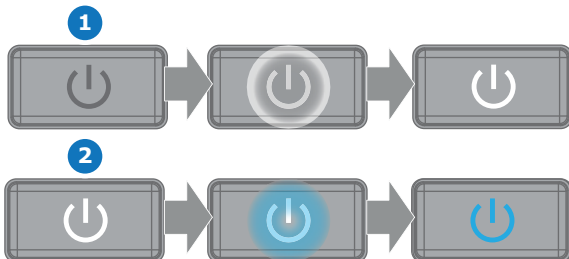


Image 4-2

4. Press the **SHUTTER** button on the Local Keypad, remote control or use the Projector Toolset to open the shutter.



**Note:** The state of the shutter (open or closed) when starting up the projector will be the same as when the projector was switched off. This procedure assumes that the shutter was closed.




## Status overview

Once the projector is started, press the **Menu Activation** button to get an overview of parameters such as :

- Device serial number and article number
- Current firmware version and model name
- Current illumination (in percentage)
- Projector runtime in hours
- Uptime in hours
- Chosen source
- Current resolution and refresh rate
- Chosen communication method and IP address (if connected)
- Active functions

## Starting image projection

1. Make sure the available sources are connected to the appropriate input ports.

 **Tip:** If properly connected, the “SYNC” LED will light up ORANGE.

2. Press the **Input Selection** button on the keypad or on the remote control until:

- the LED of the selected source (the “SEL” LED) light up GREEN, and
- the image of the selected source is projected.

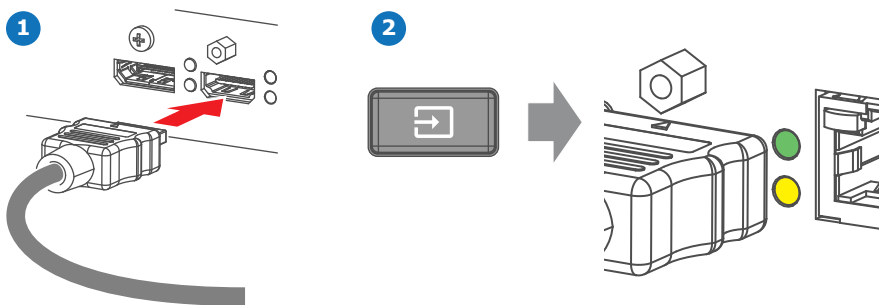


Image 4-3


## 4.2 Switching to standby

### About the switch off process

To switch off the projector in a safe manner to protect the internal electronics (avoid moisture due to warming up) the temperature inside the sealed compartments has to be brought back to ambient in a controlled manner. This process is called **deconditioning**.

### How to switch to standby

1. Press and hold the **Power on/off** button for 3 seconds on the local keypad, or press the **Power Off** button on the remote control.

 **Caution:** Do not switch off the power from the projector until the laser status light is off. Also make sure not to power off the chiller(s). The chiller(s) should remain on as long as the projector is powered on.

The projector goes to standby mode. The deconditioning cycle will start and the lasers will be turned off. During this period the Power on/off button will blink. Once the deconditioning cycle has ended, the projector will be in preconditioned state. If left alone, the projector will eventually go into standby mode. In both states, the power on/off button will be lit WHITE.



Keep in mind that it can take up to 10 minutes to start the lasers again after they were switched off. If there are only 30 to 45 minutes between the shows it's advisable to keep the lasers on with shutter closed. When the shutter is closed the lasers are automatically dimmed.

## 4.3 Projector ON/OFF cycle explained

### Projector ON/OFF cycle

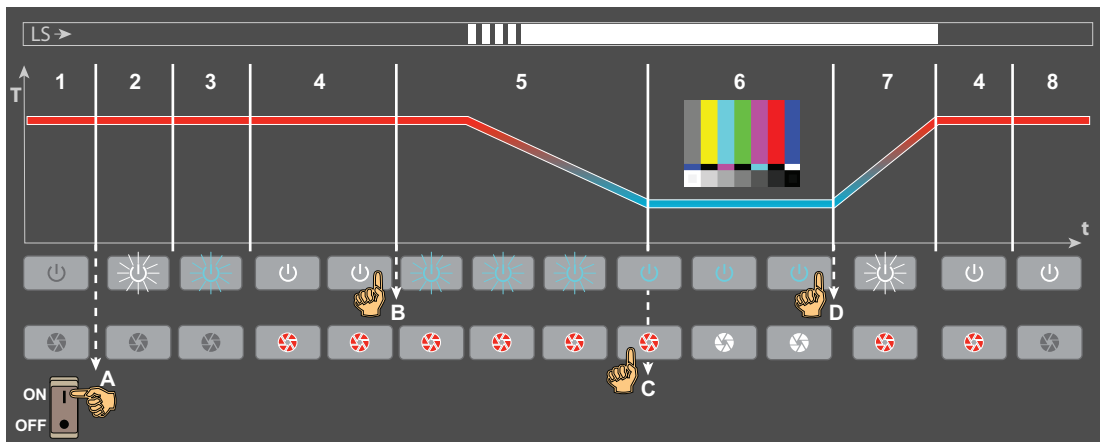


Image 4-4

**LS** Laser Status light.

**T** Temperature inside sealed compartments.

**t** time.

**A..** Operator manipulations.

**D**

**1..8** Different process stages.

### Stage description

**Stage 1** : Projector is **switched off**. Input & Communication Unit is not active and the laser status light (LS) is off.

**Stage 2** : Projector is **booting**. This process starts as soon as the power switch is switched on (reference A, Image 4-4). This process takes several seconds and during this process the Power On/Off button is blinking white. The laser status light remains off.

**Stage 3 : Initialization**. This process starts as soon as the projector has finished booting up. The initialization of all electronic boards takes approximately two minutes and during this process the backlight of the Power On/Off button is blinking blue. The laser status light remains off.

**Stage 4** : Projector is **READY**. All electronic boards are up and running. On the local keypad the OK button, Shutter button and the Menu Activation button become active. The backlight of the Power on/off button is white. The laser status light remains off.

**Stage 5** : The projector is in **CONDITIONING** mode. This process starts as soon as the On/Off button is pressed when the projector is in READY mode (reference B, Image 4-4). The shutter automatically closes in this stage for laser safety reasons. The laser status light remains off.

The first stage of the **CONDITIONING** process is the environmental checks. In this stage, the projector verifies if it is safe to turn on the pump of the cooling circuit and to extract humidity from the sealed compartments without having the risk of condensation. The temperature inside the sealed compartments is kept on ambient level.

Once the projector has confirmed it is safe to start conditioning, the conditioning process itself will start. This is indicated by the **laser status light (LS)** on the top of the projector. This light will flash a few times and will then light up continuously white. The sealed compartments are cooling down from ambient to operating temperature and humidity is extracted. The conditioning process takes approximately 3 to 20 minutes (exact time depends on the environmental conditions).

Following substages take place during **CONDITIONING**:

**Stage 6.1** : Checking ambient and internal conditions.

**Stage 6.2** : Turning pump on. Reaching liquid flow target.

**Stage 6.3** : Flow target reached. Conditioning humidity in the projector.

**Stage 6.4** : Cooling started.

**Stage 6.5** : Reaching liquid temperature target.

**Stage 6 :** Projector is **CONDITIONED** and **ON**. Temperature and humidity inside the sealed compartments are within specifications and the lasers are activated. The backlight of the On/Off button is blue. Once you press the Shutter button (reference C, Image 4-4), the image will be projected on the screen (if a source has been selected or a test pattern is active). The laser status light on the top of the projector lights up white.



While the shutter is closed (backlight of Shutter button is red) the laser power is set to minimum power and a protective test pattern is projected. This to protect the DMDs and Shutter itself. When you open the shutter again, the projector will resume the previous power settings.

**Stage 7 :** Projector is in **DECONDITIONING** mode. This process starts as soon as the On/Off button is pressed for 3 seconds (reference D, Image 4-4) while the projector is in conditioning or conditioned mode. The DECONDITIONING mode brings the system back to the **READY** mode. The laser status light on the top of the projector remains lighting up white. The sealed compartments are brought back to ambient temperature and humidity extraction is stopped. The deconditioning process can take up to 15 minutes (depending on the environmental conditions). During this process the backlight of the Power On/Off button is blinking white.

If the projector is left alone for several minutes while it is in **READY** mode, the projector will automatically go into **STANDBY** mode. You can also go from Ready to Standby mode by pushing the On/Off button for 3 seconds.

**Stage 8 :** Projector is in **STANDBY** mode. The Input & Communication Unit remains running, but only the On/Off button is active and solid white. The shutter button turns off. The laser status light remains off.

By pressing the On/Off button, you activate the projector and go to **CONDITIONING** mode (effectively skipping Ready mode). Alternatively, you can transition to **READY** mode instead. Do this by pressing the (non-lit) Menu button for three seconds.

## 4.4 Using the RCU

### Pointing to the reflective screen

1. Point the front of the RCU to the reflective screen surface.

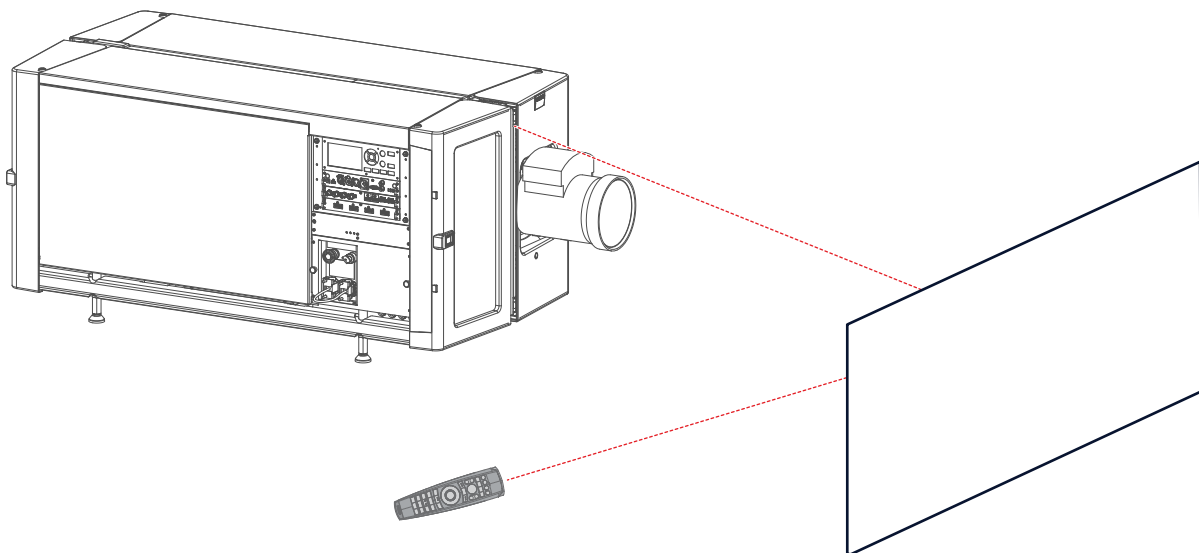


Image 4-5: IR control via reflective screen

### Hardwired to the XLR input

1. Plug one end of the remote cable in the connector on the bottom of the RCU.
2. Plug the other end in the big connector on the communication interface of the projector, labelled '*Remote CTRL*'.



*Note:* Plugging the remote control will switch the broadcast address of the remote control to the default value '0'. This is the only broadcast address that will work when hardwired. If you want to change the broadcast address after disconnecting the remote control, see "Displaying and Programming addresses into the RCU", page 25.

## Pointing directly to the IR sensor

When using the wireless remote control, make sure you are within the effective operating distance (30 m, 100 ft in a straight line). The remote control unit will not function properly if strong light strikes the sensor window or if there are obstacles between the remote control unit and the projector IR sensor.

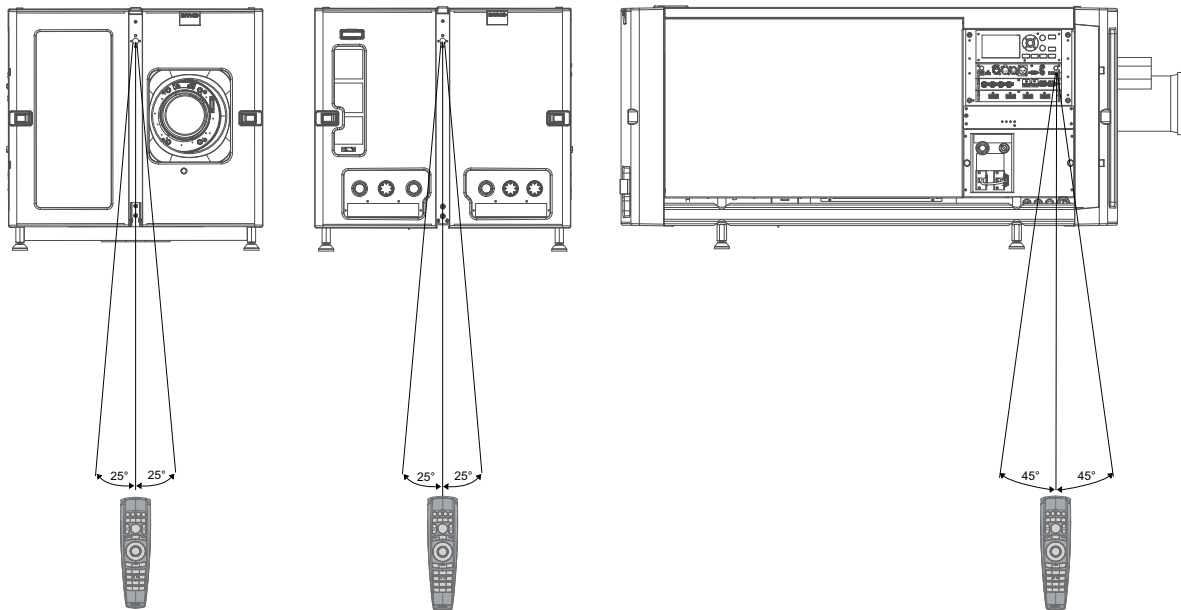


Image 4-6: RCU to one of the three IR sensors

## Using the RCU in combination with a 3D emitter

When using a 3D emitter that radiates IR beams (e.g. the optional 3D emitter that Barco provides), the IR beams of the 3D emitter may interfere with the IR communication between the RCU and the projector.

If such interference occurs, connect the RCU to the projector using the remote cable with XLR connector. It is also advised to turn the IR receivers of the projector off to avoid the 3D emitter interference. The IR receivers can be turned off in the GUI: *System Settings* → *Communication* → *IR Control*.

## 4.5 Projector Address



### Projector address

Address installed in the projector to be individually controlled.



### Broadcast address

Projector will always execute the command coming from a RCU programmed with that broadcast address.

## Why a projector address?

As more than one projector can be installed in a room, each projector should be separately addressable with an RCU or computer. Therefore each projector has its own address.

## Set up an individual Projector Address

The set up of a projector address can be done via the software.

## Projector controlling

When the address is set, the projector can be controlled now:

- with the RCU: only for addresses between 1 and 31.

## Broadcast Address

Every projector has a broadcast (common) address '0' or '1'. The default address is '0'.

The choice between '0' and '1' can be selected in the GUI: “*System Settings*” → “*Communication*” → “*IR Control*”.



Placing new batteries in the remote control or plugging the remote to a projector via a cable will automatically reset the address back to its default value '0'.

## 4.6 Quick setup via Direct access

### Quick source selection

1. Press the **Input** button on the remote control or local keypad.

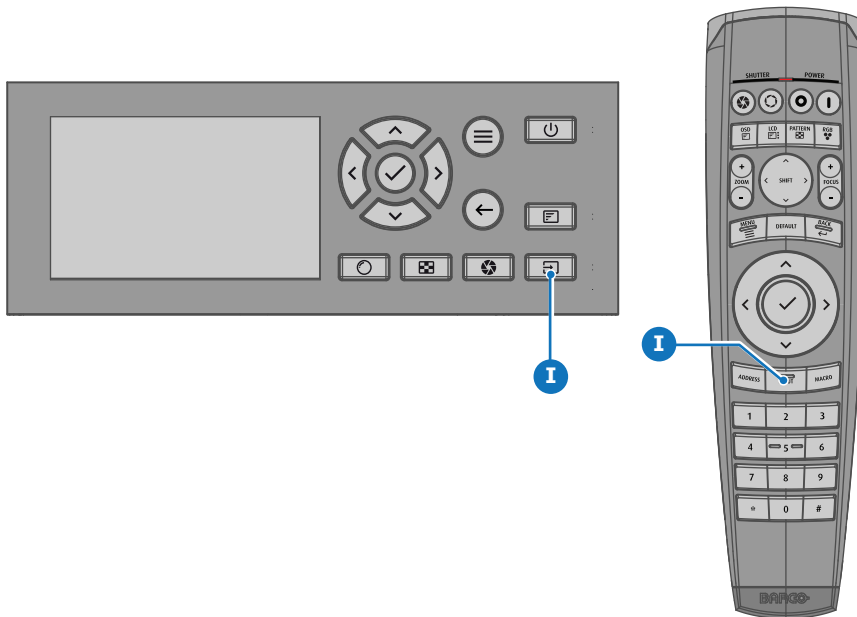


Image 4-7

The *Source selection* menu opens on the LCD display.

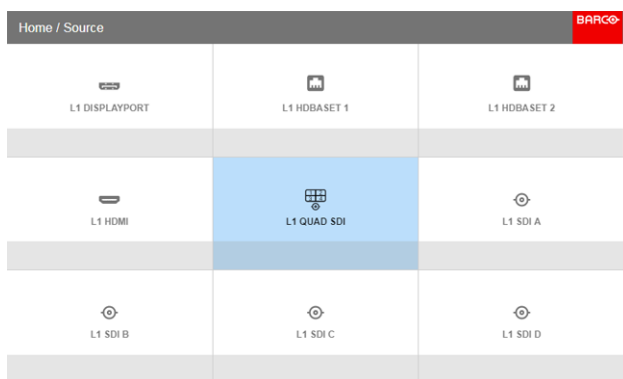


Image 4-8: Input selection

2. Use the arrow keys to select the desired source.

### Quick test pattern selection

1. Press the Test pattern button on the remote control or local keypad.

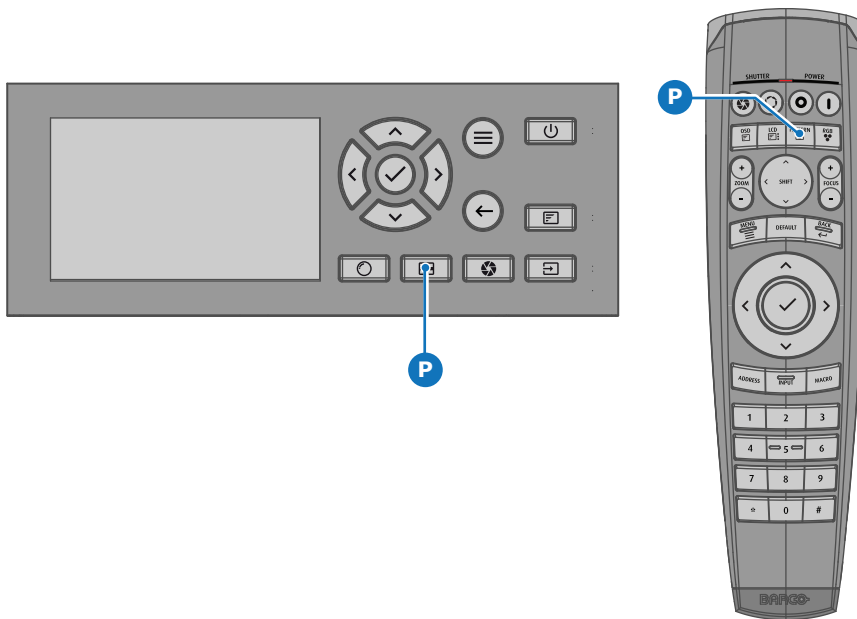


Image 4-9

The *Test pattern* menu opens on the LCD display.

2. Use the arrow keys to select the desired test pattern.

## 4.7 Software update



**CAUTION:** Make sure not to power off or unplug the projector while the software update is going on.

### How to update the software

1. Power on the projector. Wait until the **Power on/off** button is lit white or blue.
2. Download and install the latest version of Projector Toolset for Pulse. The program can be downloaded for free from Barco's website, (URL: <http://www.barco.com>). Click on *myBarco* and log n to get access to secured information. Registration is necessary.  
If you are not yet registered, click on *New to myBarco* and follow the instructions. With the created login and password, it is possible to log in where you can download the software.
3. Download the latest firmware (format .fw) from Barco's website in the same way as for Projector Toolset.
4. Start Projector Toolset and make a connection with the projector. For more information, see the Projector Toolset user guide.
5. Select tab **Update settings**.
6. Fill out the path to the update file (1)

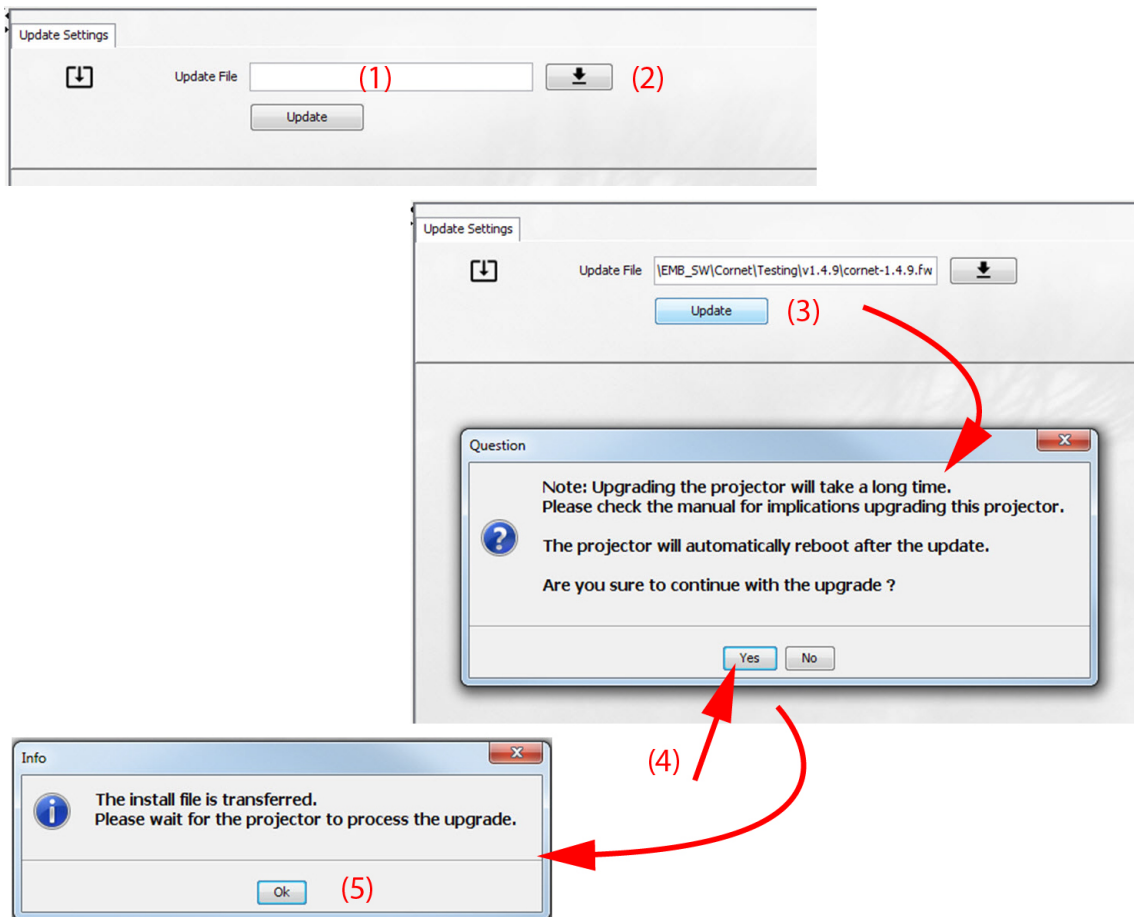


Image 4-10: Update Pulse projector


or

click on the path selection icon (2) to open a browser window.

7. Browse to the desired update package (format .fw) and click **Select Update Package**.  
The path will be filled out in the input field next to *Update File*.
8. Click **Update** (3).  
The update starts. This action can take a long time. A message is displayed.
9. Click **Yes** to continue (4).  
The update file will be transferred to the projector and installed. The projector will reboot.  
A message is displayed. Click Ok to clear the message.

### How to update the software if the projector isn't connected to the network

1. Power on the projector. Wait until the **Power on/off** button is either lit white or blue.
2. Download the latest firmware file (format .fw) from Barco's website. The firmware can be downloaded for free from Barco's website, (URL: <http://www.barco.com>). Click on *myBarco* and log in to get access to secured information. Registration is necessary.  
If you are not yet registered, click on *New to myBarco* and follow the instructions. With the created login and password, it is possible to log in where you can download the software.
3. Place the firmware file on a clean USB flash drive.
 

 **Note:** Make sure the flash drive is FAT32 compatible & no other files are on the flash drive.
4. Plug the flash drive in the USB port on the Communication Panel.

The update file will be transferred to the projector and installed. The projector will reboot when completed.



Take note that the update process can take a long time to complete.



# Graphic User Interface (GUI)

# 5

## Overview

- Overview
- Navigation
- Test Patterns

## 5.1 Overview

### GUI - Main Menu overview

The projector on screen display (OSD) is the primary user interface (UI). From here, you can review and adjust all projector and display settings.

The OSD interface uses tabs to display the main menu. Each main menu contains submenus.

The OSD can be disabled by pressing the OSD on/off button.

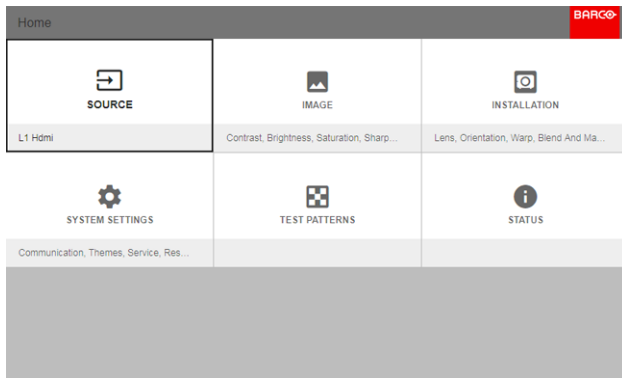


Image 5-1: Home menu

The projector's software platform uses access levels what each user can do. A standard user has access to all projector functionality. A certified service technician has also access to the service menu. This menu is password protected.

## 5.2 Navigation

### Navigation via the RCU or local keypad

Navigating the OSD can be done using the remote control or the local keypad.

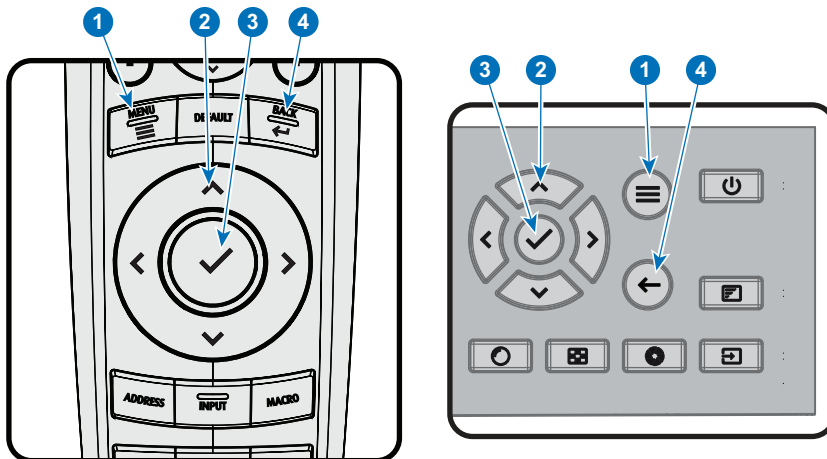


Image 5-2

To start up the menu structure, press **MENU** (1).

Use the arrow keys (**Menu Navigation** buttons) to navigate to the desired menu item (2). The background color changes to light blue.

Press the **Menu Selection** button (center key of the arrow keys), also called **OK** button, to activate that item and to jump one level deeper (3).

Use the numeral keys to enter values, or use the arrow keys to move the bar scale up or down.

Press the **Back** button to go up one level (4).

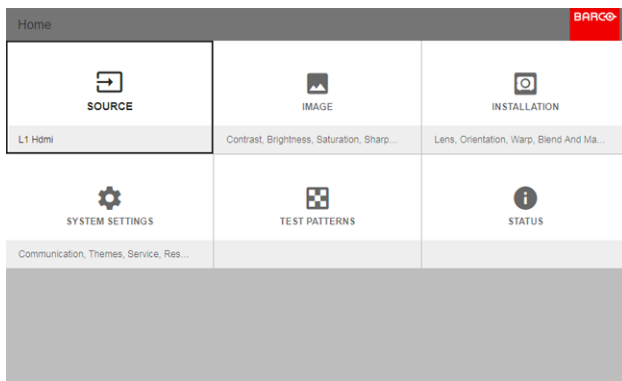


Image 5-3: Home menu

Remark: a blue slider bar on the right side of the window means that there are more items to show than those currently displayed.

## Define values

Menu settings are displayed using check boxes, bar scale sliders, and drop-down lists.

To set a value:

- Press **OK** to select or deselect a checkbox (turn a function ON or OFF).
- Use the arrow keys to move the bar scale slider up or down on the value line. For a bar scale 0-9, each step will equal 10% of the total value.
- To enter the value as a direct number, press **OK**, input the digit(s), and then press **OK** again to execute and exit cursor mode e.g. OK 79 OK.  
Within an input field, use the \* button as backspace button to remove an entered digit. Use the # button to enter a dot (.).

Changes to values are implemented dynamically.

To enter values with the local keyboard, use the arrow keys to select the first digit, press **OK**. Select the second digit and press **OK**. Continue until all digits are entered. Close the action by selecting the **enter** (↵) button and press **OK**. Select the **backspace** button and press **OK** to remove the last entered digit.

## Menu memory

The OSD menu remembers the last selected sub-item as long as the projector is running. The menu memory is reset when restarting the projector from standby.

# 5.3 Test Patterns

## How to use test patterns

1. In the main menu, select *Test Patterns*.  
or  
Push the *Test Patterns* button on the RC.

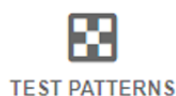


Image 5-4: Main menu, Test Patterns

2. In the Test Patterns menu, select either *Internal*, or *Output* test patterns.
3. In the chosen submenu, select the desired test pattern from the list.

You can select one of the following *Internal* test patterns:

- Color bars
- Checker board
- Blue / Green / Red / White
- Focus
- Focus White
- Aspect
- Cross hatch
- L Pattern
- Monoscope
- 3D Stereo

You can select one of the following *Output* test patterns:

- Blemish zone
- Checkerboard
- Color bars
- Convergence
- FIP
- Full screen black / white / blue / green / red / cyan / magenta / yellow
- Grid
- Horizontal Ramp
- Vertical Ramp
- MTF

4. To turn the test pattern off, return to the previous menu.

# GUI – Source

# 6

## About the Source menu

This menu is used to select, review and configure sources into the projector.

## Overview of features

- Displaying a single source
- Displaying multiple sources: Stitched layouts
- Connector Settings

## 6.1 Displaying a single source

### About selecting a source

Before a source can be projected, the source signal must be connected to the source input(s) of the device and a valid synchronization signal must be available along with the source signal on at least one of the input connectors.

### How to select?

1. Press **Menu** to activate the menus and select **Source**.



L1 Hdmi

Image 6-1: Select Source

2. Press **OK**.  
The *Select Source* menu is displayed with the actual available sources filled out.
3. Select the desired input.

## 6.2 Displaying multiple sources: Stitched layouts

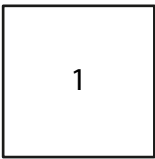
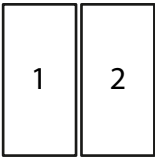
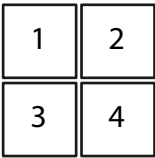
### About stitched layouts

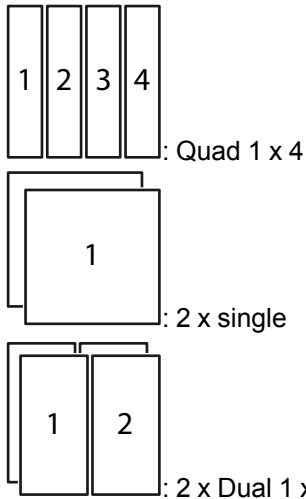
The first time you use a selected single source, the source will be displayed in the projector's native resolution. If the resolution of the source is different to the projector's resolution, the image is stretched or shrunk.

It is however possible to configure and display two or four source signals to make up one single image in full native resolution. This is called a **Stitched Layout**: the sources are stitched together.

The following table lists which stitched layouts you can use, and in which display mode these layouts can be used.

The table below describes the different Stitch Layouts and scan directions.

Type of layout	Description	Available connectors	Mode
 : Single	A single source is displayed in full screen	Quad Combo input: <ul style="list-style-type: none"> <li>• SDI (4x)</li> <li>• HDBaseT (2x)</li> <li>• DisplayPort</li> <li>• HDMI</li> </ul> Quad DP 1.2 Input: <ul style="list-style-type: none"> <li>• DisplayPort (4x)</li> </ul>	Mono / Active stereo
 : Dual 1 x 2	Two inputs are required. The sources are displayed next to each other.	Quad DP 1.2 Input: <ul style="list-style-type: none"> <li>• 2x DisplayPort</li> </ul>	Mono / Active stereo
 : Quad 2 x 2	Four inputs are required. The sources are displayed in four quadrants.	Quad Combo input: <ul style="list-style-type: none"> <li>• 4x SDI input</li> </ul> Quad DP 1.2 Input: <ul style="list-style-type: none"> <li>• 4x DisplayPort</li> </ul>	Mono / Active stereo

**Type of layout****Description**

Four inputs are required. The sources are displayed next to each other.

Two inputs are required. The sources are displayed one above the other.

Four inputs are required. Two sources are displayed next to each other, while the other two are displayed above the first two.

**Available connectors**

Quad DP 1.2 Input:

- 4x DisplayPort

Quad DP 1.2 Input:

- 2 x DisplayPort

Quad DP 1.2 Input:

- 4x DisplayPort

**Mode**

Mono / Active stereo

Passive stereo

Passive stereo



Even if passive stereo sources are selected, the output of this projector can only be in either 2D or in Active Stereo. Advanced image processing will make sure a passive stereo image is properly converted to active stereo.

**How to select a stitched layout**

1. Press **Menu** to activate the menus and select *Source*.



SOURCE

L1 Hdmi

Image 6-2: Select Source

2. Press **OK**.

The *Select Source* menu is displayed with the actual available sources filled out, including all available stitched layout options.

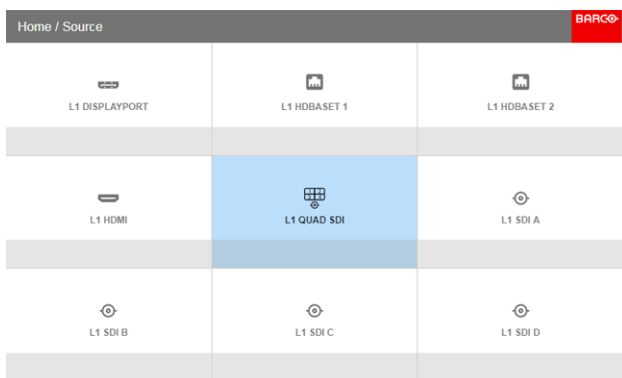


Image 6-3: Input selection menu

3. Select the desired stitched input.



**Tip:** If the V&AR board is installed, scroll all the way down the Input Selection menu for the stitched options on that board.

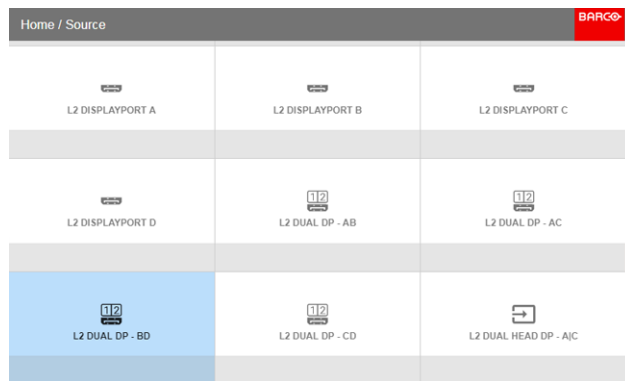


Image 6-4: Input Selection menu, stitched options

## 6.3 Connector Settings

### About Connector Settings

The Connector Settings menu allows you to change settings for each input connector of the projector.

By default all options for every connector are set to automatic, together with the native Extended Display Identification Data (EDID).

When entering the menu for each input connector, you can change the following:

- Color Space
- Signal Range
- EDID

### How to configure a connector

1. Press **Menu** to activate the menus and select *Source*.



SOURCE

L1 Hdmi

Image 6-5: Select Source

2. Press **OK**.

The *Select Source* menu is displayed with the actual available sources filled out.

3. Scroll down to the bottom of the list of available sources and select *Connector Settings*.



CONNECTOR SETTINGS

L1 Displayport, L1 Hdbaset 1, L1 Hdba...

Image 6-6: Source menu, Connector Settings

The available input connectors are displayed.



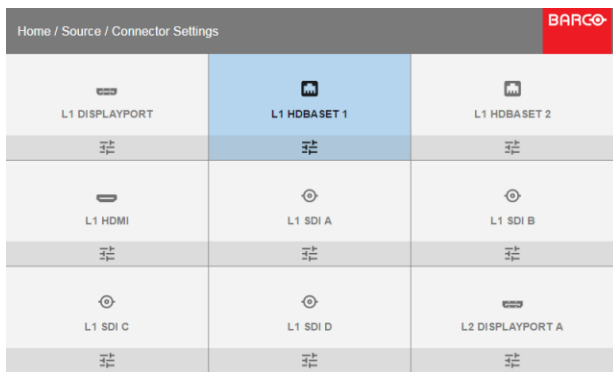


Image 6-7: Select source

4. Select the desired connector.

The **Connector Settings** menu for this connector will be displayed.

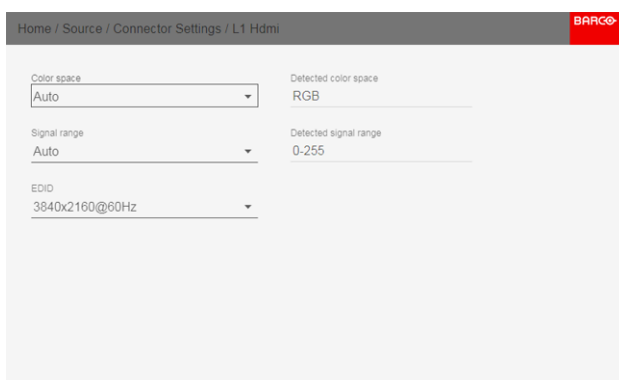



Image 6-8: Example of connector settings for an HDMI connector

5. You can change the following:

- To force a limit on the color space, select one of the available *color spaces*.
- To force a limit on the used signal range, select one of the available *signal ranges*.
- To set a video timing other than the one native for the connector, select one of the options under *EDID*.

 **Note:** You cannot change the EDID for SDI connectors.



# GUI – Image

# 7

## Overview of features

- Setting image levels manually
- Adjusting the sharpness
- Adjusting the gamma correction
- P7 Realcolor
- Brilliantcolor
- Displaying HDR content – Perceptual Quantizer (PQ)

## 7.1 Setting image levels manually

### Purpose

**Contrast:** Change the contrast of the complete output signal (main and PiP window together) of the projected image.

**Brightness:** Change the brightness of the complete output signal (main and PiP window together) of the projected image.

**Saturation:** Change the saturation of the complete output signal (main and PiP window together) of the projected image.

### How to set up Contrast

1. In the main menu, select *Image* → *Contrast*.



1

Image 7-1: Image menu — Contrast

2. Use the ◀ or ▶ key to change the contrast enhancement until the desired value is reached (adjustable between 0 and 2).

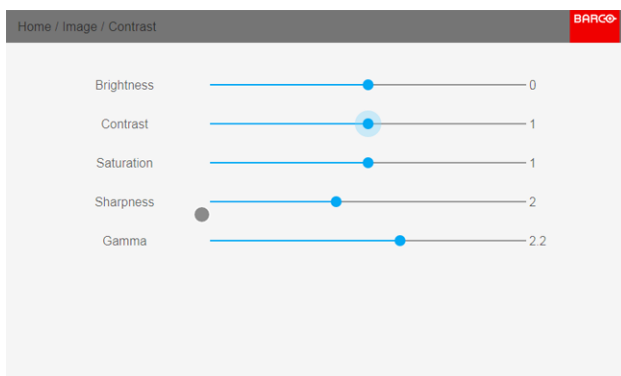


Image 7-2: Contrast slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

### How to set up Brightness Level

1. In the main menu, select *Image* → *Brightness*.



0

Image 7-3: Image menu — Brightness

2. Use the ◀ or ▶ key to change the brightness until the desired value is reached (adjustable between –1 and 1).

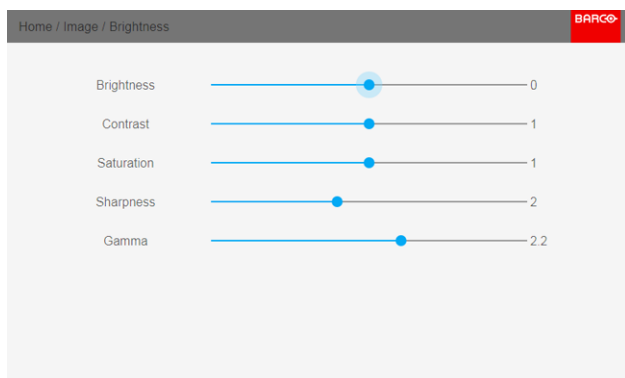


Image 7-4: Brightness slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

## How to set up Saturation Level

1. In the main menu, select *Image* → *Saturation*.

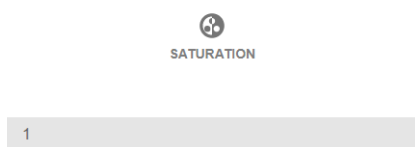


Image 7-5: Image menu — Saturation

2. Use the ◀ or ▶ key to change the saturation until the desired value is reached (adjustable between 0 and 2).

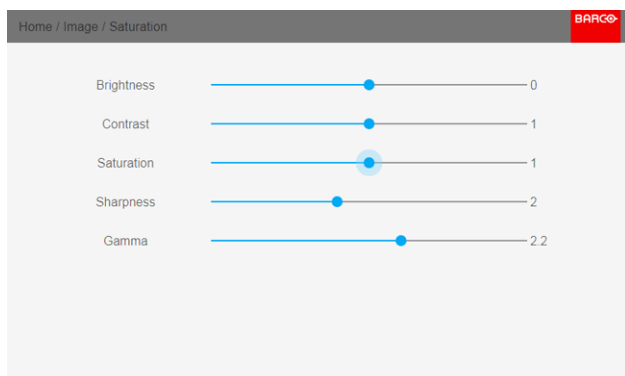


Image 7-6: Saturation slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

## 7.2 Adjusting the sharpness

### About adjusting the sharpness

The sharpness adjustment amplifies the high frequency components in the picture. This means that by increase the sharpness, the picture will be perceived as sharper, and if decreased, the picture will be perceived as more blurry.

Increasing the sharpness will have the best effect in high contrast images, eg a table with text and borders.

In a natural picture, high sharpness can be perceived as noise, as all details in the picture will be amplified.

Available range: -2 to 8.

Default value: 0

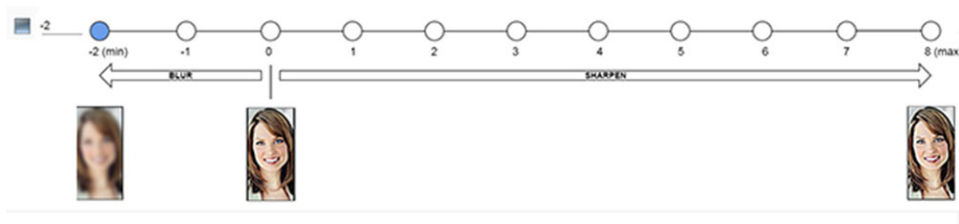


Image 7-7: Effect of sharpness adjust

## How to adjust

1. In the main menu, select *Image* → *Advanced* → *Sharpness*.



2

Image 7-8: Image menu — Sharpness

2. Use the ◀ or ▶ key to change the sharpness until the desired value is reached.

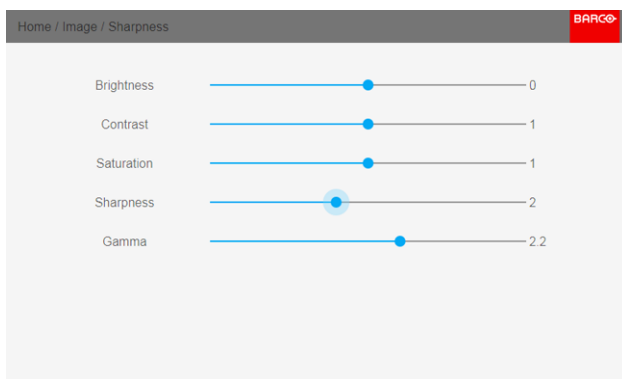


Image 7-9: Sharpness slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

## 7.3 Adjusting the gamma correction

### About gamma correction

Gamma correction is an image quality enhancement function that offers a richer image by brightening the already darker portions of the image without altering the brightness of the brighter portions (contrast feeling enhanced).

### How to adjust

1. In the main menu, select *Image* → *Advanced* → *Gamma*.



GAMMA

2.2

Image 7-10: Advanced menu – Gamma

2. Use the ◀ or ▶ key to change the gamma value between 1.0 and 2.8 . The default value is 2,2.



**Tip:** The slider can be adjusted with a precision of 0.1.

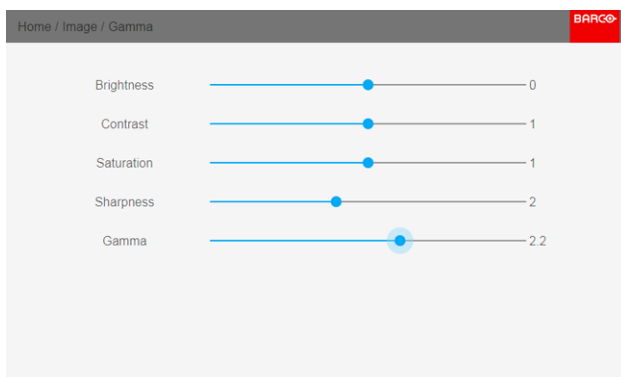


Image 7-11: Gamma slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

## 7.4 P7 Realcolor

### Purpose

When blending images from multiple projectors, the perceived color coordinates of each projector can be altered to a desired common level, so that the projected colors are identical over all projectors used.

Alternatively, if you are unfamiliar with how adjusting the Colors to a specific setting, there are also a certain number of presets available, which forces the color output to specific color standards.

The selection of the presets will vary, depending on the projector type and on the peripherals installed.

### How to set custom P7 values

1. In the main menu, select *Image* → *Advanced* → *P7 Realcolor*.



P7 REALCOLOR



Image 7-12: Advanced menu — P7 Realcolor

The P7 menu is displayed.

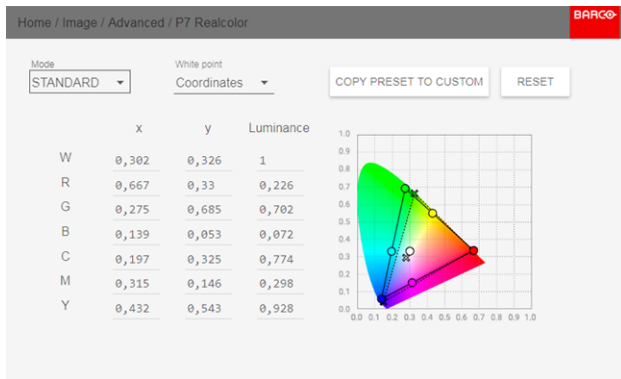



Image 7-13: P7 Realcolor menu

2. Select the desired *Mode*. Choose one of the following *custom* options:
  - **Custom RGB:** 3-point color configuration.  
In RGB mode, the C, M and Y coordinates will be calculated automatically based on the R, G and B coordinates.
  - **Custom RGBCMY:** 6-point color configuration (both RGB and CMY).  
In RGBCMY mode, each color can be given a specific coordinate within the measured color triangle.
  - **Custom WHITE:** Configure only the White temperature.
3. Define the coordinates for each available color.  
Click on a coordinate value and select the current value. Enter the desired value with the numeric keys.
 

 **Note:** You can only pick coordinates within the measured color triangle.
4. For **Custom White**, click on White point and choose one of the following:
  - **Coordinates:** Configure the white point via specific coordinates.  
The white point is specified using an x, y coordinate in the CIE 1931 Chart.
  - **Temperature:** Configure the white point via a color temperature slider.  
The white point is specified on a Kelvin scale between 3200K and 13000K tracking along the black body curve.



You can reset all coordinates to the default values (to native) by selecting Reset modes to native. Press **OK** button to reset.

## How to choose one of the P7 presets

1. In the main menu, select *Image* → *Advanced* → *P7 Realcolor*.

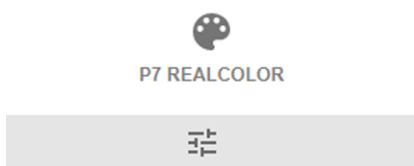


Image 7-14: Advanced menu — P7 Realcolor

The P7 menu is displayed.



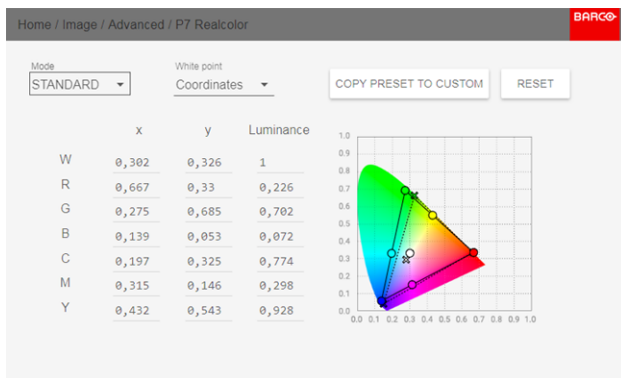


Image 7-15: P7 Realcolor menu

## 2. Choose one of the pre-defined presets:

- **Native:** Projector native color settings. Default setting
- **DCI-P3:** Color standard for Cinema.
- **EBU:** European color standard for broadcasting
- **SMPTE-C:** American color standard for broadcasting.
- **Rec. 709:** Color standard for high-definition televisions (HDTV).

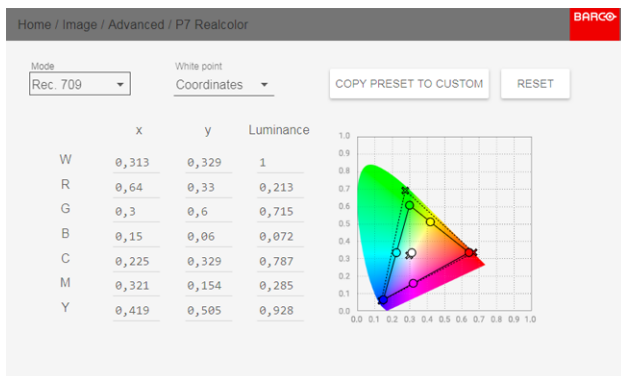


Image 7-16: Example of one of the presets: Rec. 709



**Note:** After choosing one of the presets, you can still alter the values of the coordinates to your own choosing, similarly to how you set custom P7 values.  
Use **Reset** to return to the default values of the chosen preset.

## 7.5 Brilliantcolor

### About

The Brilliant Color mode has an effect on the color rendering.

With Brilliant Color mode set to Off, only primary colors are generated by the light source.

In Native and Video mode, a secondary color is added (C1). This has the effect of increasing the color intensity, and by that also the perceived light intensity.

Enter the menu, and select the option that give the best result.

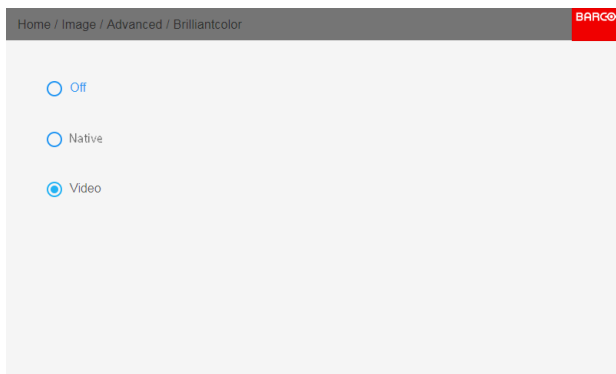


Image 7-17

## 7.6 Displaying HDR content – Perceptual Quantizer (PQ)

### About PQ

Perceptual Quantizer (PQ) is a non-linear electro-optical transfer function (EOTF) that allows for the display of High Dynamic Range (HDR) content with a luminance level of up to 10 000 cd/m<sup>2</sup> and can be used with the Rec. 2020 color space.

### How to properly display HDR content?

If your provided HDR content has been mastered with PQ (e.g. HDR10 and Dolby Vision), a few changes can be made in order to project the intended mastering on screen. These changes are necessary because HDR content has been mastered specifically for HDR capable displays that are watched in living rooms. These conditions are different from a non-HDR projector and darker cinema-like environments.

The projected HDR content depends on the following factors:

- **Mastering luminance:** This is content-specific and cannot be changed.
- **Screen luminance:** Every projection screen has a specific luminance (measured in nits or foot-lambert). Entering this luminance in the projector will adapt the content towards the intended HDR result.
- **HDR Boost:** A variable “booster” that may amplify or downplay the HDR output.

### How to set the PQ?

1. In the main menu, select *Image* → *Advanced* → *PQ*.



Image 7-18

The PQ menu is displayed.

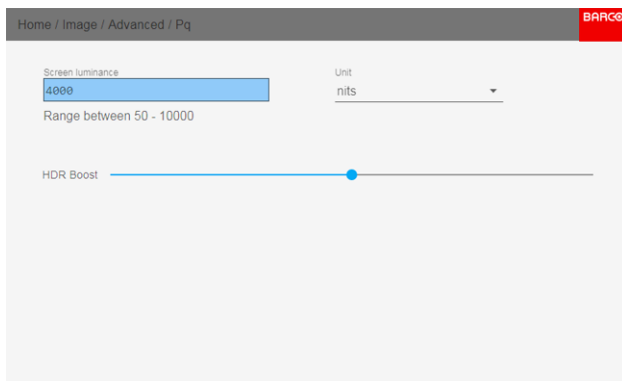


Image 7-19

2. Select the desired Unit (nits or foot-lambert).
3. Enter the Screen luminance (either in nits or foot-lambert).
4. Alter the HDR boost if necessary. You can modify this value to somewhere between 0.8 and 1.2.



# GUI – Installation

# 8

## Overview of features

- Configuring the lens, zoom-focus
- Configuring the lens, shift
- Orientation
- Warping
- Blending & masking
- Laser illumination
- Scaling modes
- 3D projection

## 8.1 Configuring the lens, zoom-focus

### What can be done?

Once a lens has been installed in the projector, you can fine-tune the projected image.

### Zoom - Focus

1. In the main menu, select *Installation* → *Lens* → *Zoom focus*.

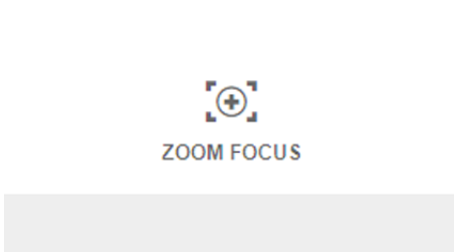


Image 8-1: Lens menu, Focus & Zoom

2. Use the ▲ or ▼ key to zoom the lens in or out.  
Use the ◀ or ▶ key to focus the lens to far or near.

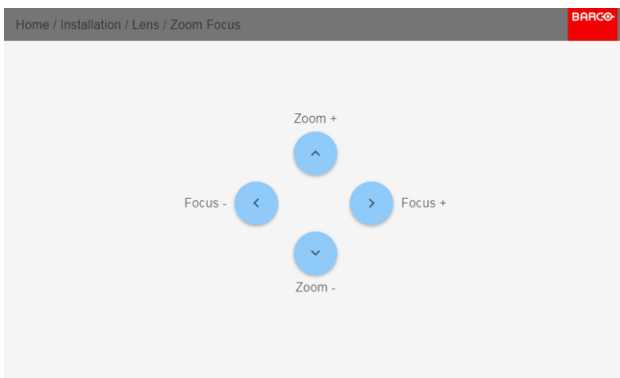


Image 8-2: Zoom and focus adjustment

## 8.2 Configuring the lens, shift

### What can be done?

The image can be shifted by using the vertical and horizontal lens shift.



Lens shift is only possible when lens shift is calibrated. Please refer to the lens calibration section in *System Settings* → *Lens Calibration* menu.

### Vertical and Horizontal Shift

1. To change the position of the projected image, select *Installation* → *Lens* → *Shift*.

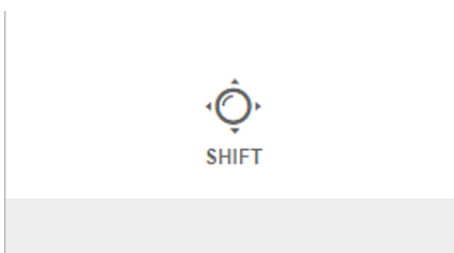


Image 8-3: Lens menu, Lens shift

2. Use the ▲ or ▼ key to shift the lens (image) in vertical direction.  
Use the ◀ or ▶ key to shift the lens (image) in horizontal direction.

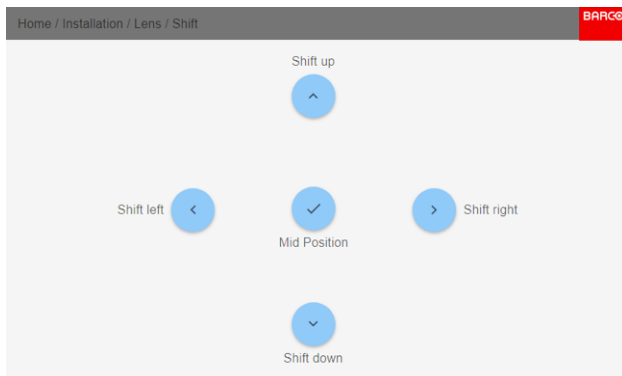


Image 8-4: Shift adjustment

3. You can force the lens back to the center position by selecting **Mid Position** and confirming.



*Note:* When chosen, the lens will calibrate itself and then return to the middle position.

## 8.3 Orientation

### What can be done?

The way of physical installation of the projector can be defined to the projector.

The following installation are possible:

- front/table
- front/ceiling
- rear/table
- rear/ceiling

### How to set the correct orientation

1. In the main menu, select *Installation* → *Orientation*.

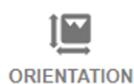


Image 8-5: Installation menu, Orientation

The Orientation menu is displayed.

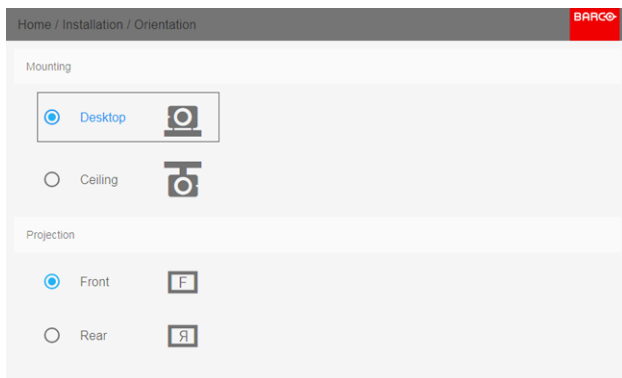


Image 8-6: Orientation menu

2. Use the ▲ or ▼ key to select the desired mounting position and press **OK** button to activate.  
Use the ▲ or ▼ key to select the desired projection position and press **OK** button to activate.

## 8.4 Warping

### 8.4.1 About warping

#### Overview

Image warping is the process of digitally manipulating an image to compensate for the distortion of the screen. Consequently, it can also be used to generate an image with irregular shape.

While an image can be transformed in various ways, pure warping doesn't affect the colors.

### 8.4.2 Warping – On/Off

#### About warping on/off

By toggling between on and off the warping functionality can be enabled or disabled.

#### How to toggle

1. In the main menu, select *Installation* → *Warp*.



Warp, Screen Size, 4 Corners, Bow, Files

Image 8-7: Installation menu, Warp

The Warp menu is displayed.



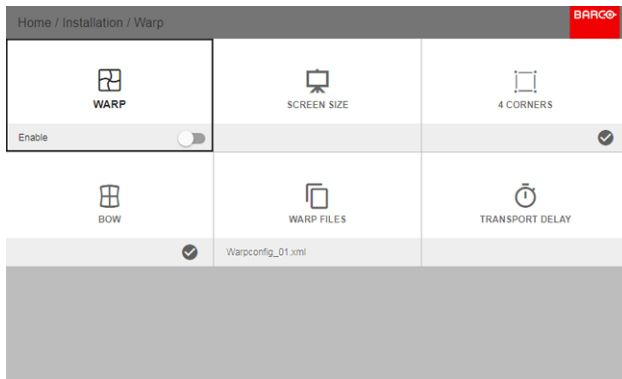


Image 8-8

2. In the Warp menu, click *Warp* to toggle between *On* and *Off*.

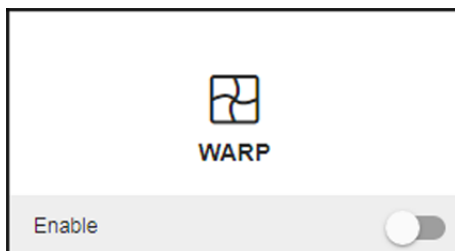


Image 8-9



Image 8-10

### 8.4.3 Warping – Screen Size

#### About (Warp) Screen Size adjustment

If the used source aspect ratio is different than the projector aspect ratio, e.g. source is 16:9 and projector is 16:10, then black bars will be projected. In the example case a black bar on top and bottom of the image will be projected. The warp area contains not only the image information but also the black bars. If we want to position e.g. the active left top corner exactly on the screen using 4 corner warp, then it is very hard to do that as we are moving the black left top corner and we do not have control over the exact position of image left top corner. By moving the outline of the warp screen size to the active image information, the corner points of the warp area are now exactly on the corner points of the active image information and makes warping much easier.

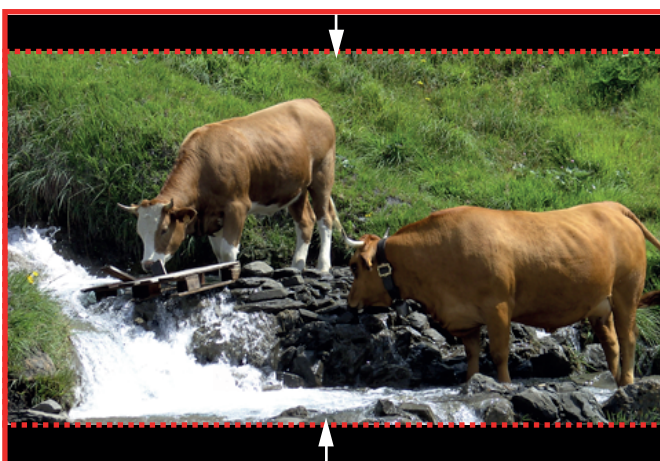


Image 8-11: Warp outline example

#### How to adjust the image?

1. In the main menu, select *Installation* → *Warp* → *Screen Size*.

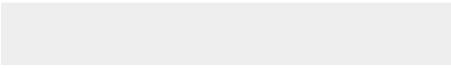


Image 8-12: Warp Menu, Screen Size

The Screen Size menu is displayed.

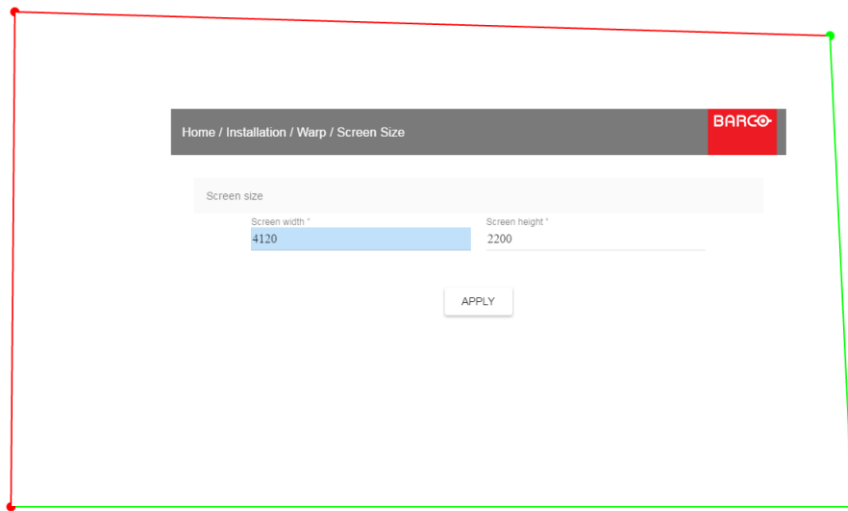




Image 8-13: Screen size

2. Select either *Screen width* or *Screen height*.
3. Set the new value to shrink either the width or height of the warp outline so that the outline is equal with the active source.
  -  **Tip:** A red border will be projected along with the current image. The border is a visual tool, showing the result of the adjusted outline.
  -  **Tip:** The value can also be entered by the numeric keys on the remote control. Press \* to delete existing numbers, and enter the new value by the numeric keys.
4. Click **Apply**.

## 8.4.4 Warping – 4 corners adjustment

### About 4 Corners adjustment

4 corner adjustment is typically used when the mechanical installation of the projector prevents it from pointing perpendicularly at the screen. For example, you can overshoot the screen and use 4 corner adjustment to pull your projected image corners back into the screen.

Some examples:



Image 8-14: 4 corner adjustment

How to adjust the image?

- 1. In the main menu, select *Installation* → *Warp* → *4 Corners*.



Image 8-15: Warp menu, 4 Corners

The 4 Corners menu is displayed.

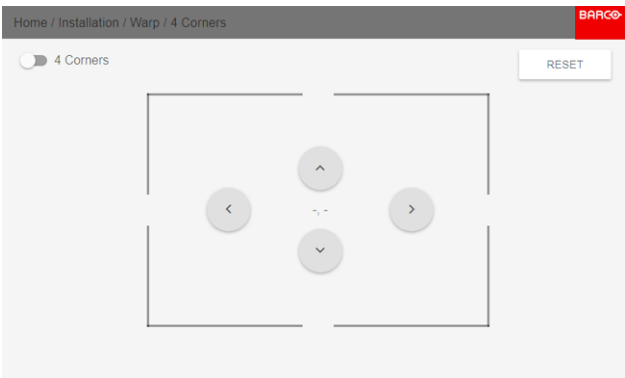


Image 8-16: 4 Corners Warping

- 2. To enable 4 Corners warping, make sure the *4 corners* slider is set to *On*.

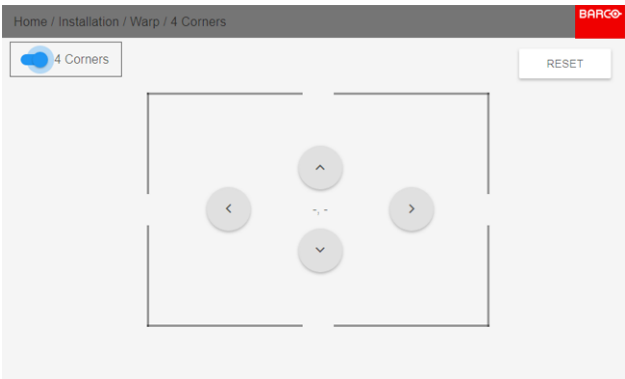


Image 8-17

The slider is enabled when set to the right and when it is colored blue.

- 3. Use the arrow keys to select the four corners and confirm. The corners will be colored blue.

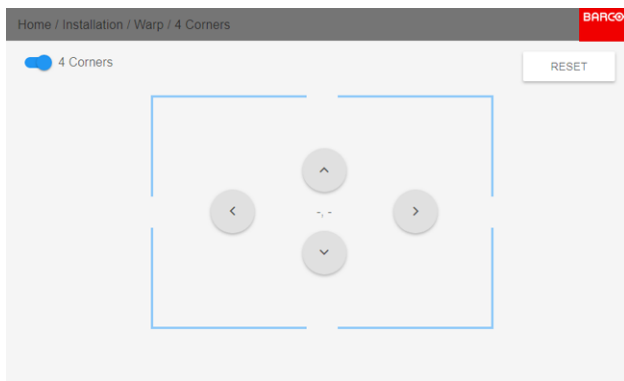


Image 8-18

4. To set warping on one of the four corners, select one of the four corners and confirm.
5. Set the desired X and Y coordinates for this corner, using the arrow keys, and confirm.

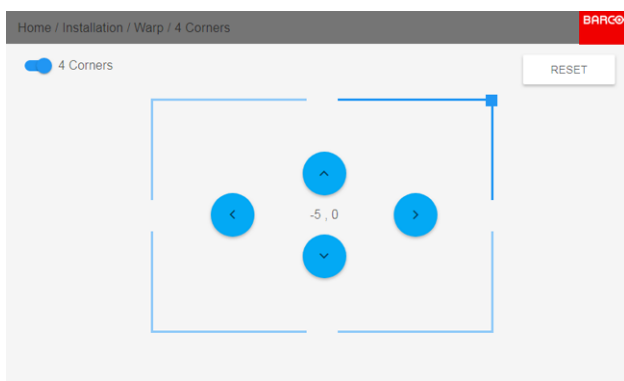


Image 8-19



*Tip:* A red border corner will be projected along with the current image. The border is a visual aid, showing the result of the warped corners.

6. Repeat from for each corner, until all corners are warped in the desired position.



To reset the 4 corner adjustments, select *Reset* and press the **OK** button.

## 8.4.5 Warping – Bow

### About bow adjustment

A bow distortion can be adjusted so that a normal image is displayed. Positive adjustments introduce more outside bow distortion. Negative adjustments introduce more inside bow distortion.

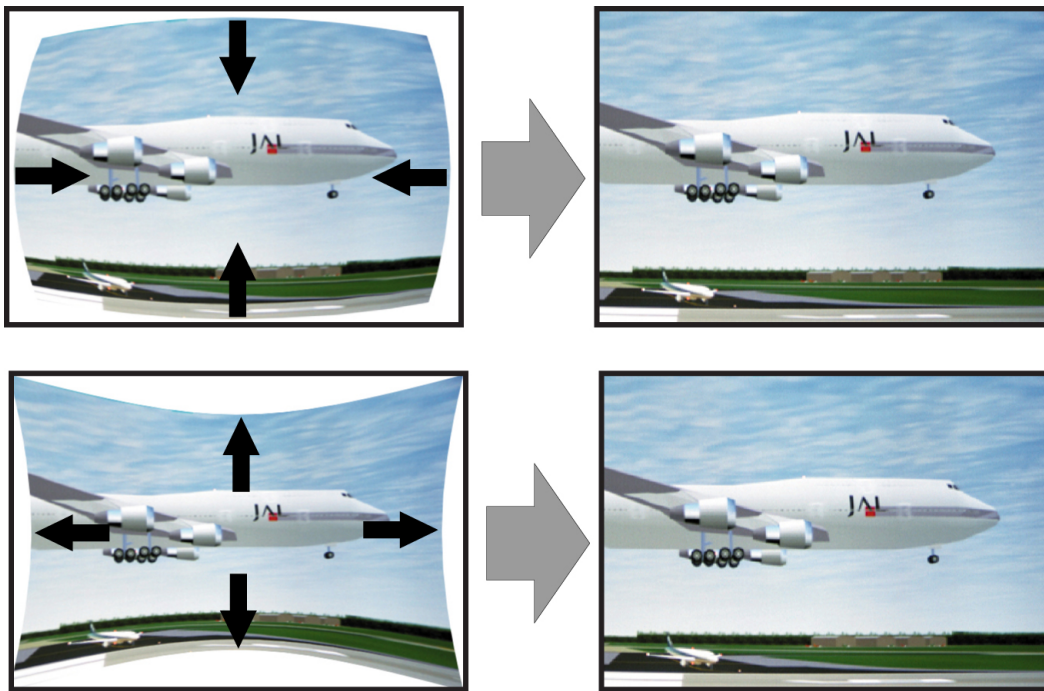


Image 8-20: Bow distortion

### Symmetric bow correction

1. In the main menu, select *Installation* → *Warp* → *Bow*.



Image 8-21: Warp menu, Bow

2. To enable Bow correction, make sure the *Bow* slider is enabled (visible by the blue highlight).
3. To perform a symmetric adjustment, make sure the *Symmetric* slider is set to *On* (visible by the blue highlight).

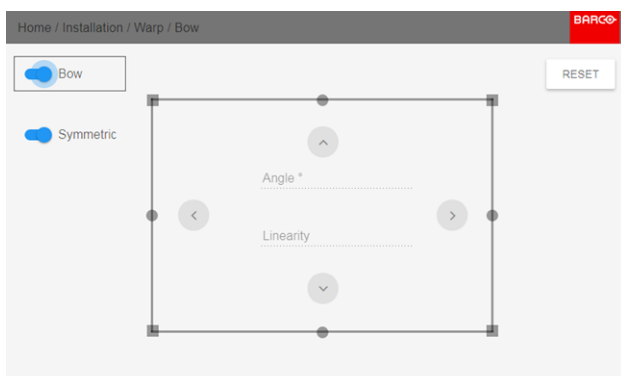


Image 8-22: Bow menu – both Bow and Symmetric sliders are set to On

4. Use the arrow keys to select the helping lines that represent the picture and confirm. The helping lines that represent the projected picture are now colored blue.

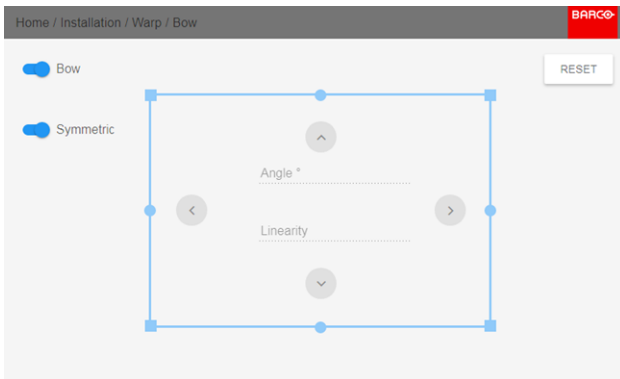


Image 8-23

5. Use the arrow keys to select the side of the picture that needs a correction and confirm.

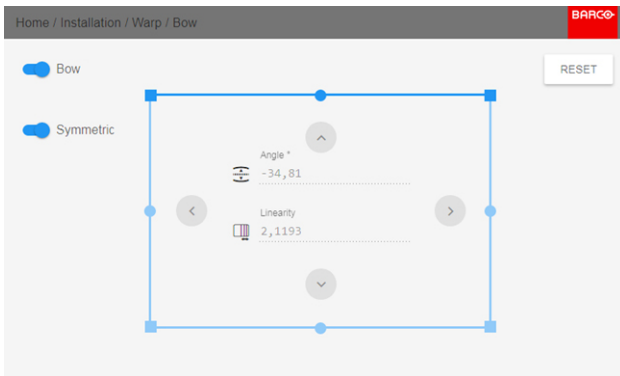


Image 8-24: Symmetric Bow correction.

6. Use the arrow keys to adjust the angle and linearity (length) of the vectors.



*Tip:* The angle is adjusted by using the up and down arrow keys. The linearity is adjusted by using the left and right arrow keys.

The correction will occur symmetrically on each side of the center of the highlighted side.

7. Repeat this step for all sides of the picture that has to be corrected, until the desired transformation has been achieved.

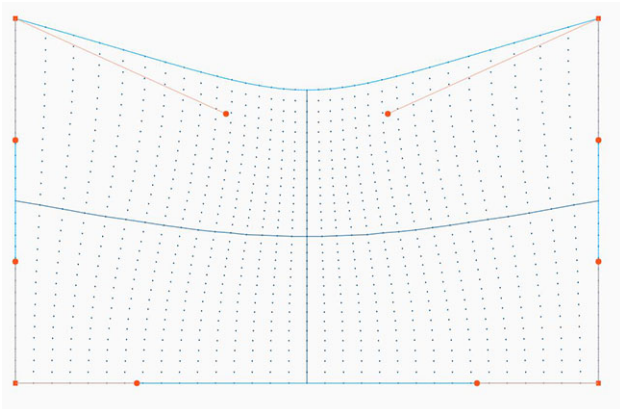


Image 8-25: Example of a symmetric bow correction

## Non symmetric bow correction

1. In the Bow menu, enable the Bow slider and disable the symmetric slider.

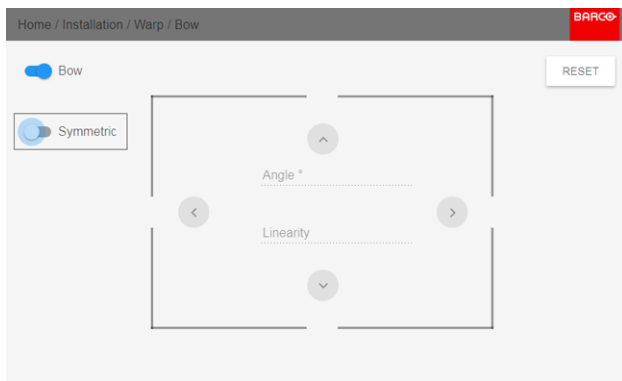


Image 8-26

There are now two vectors on each side of the picture that can be adjusted individually.

2. Select the desired slider and confirm.

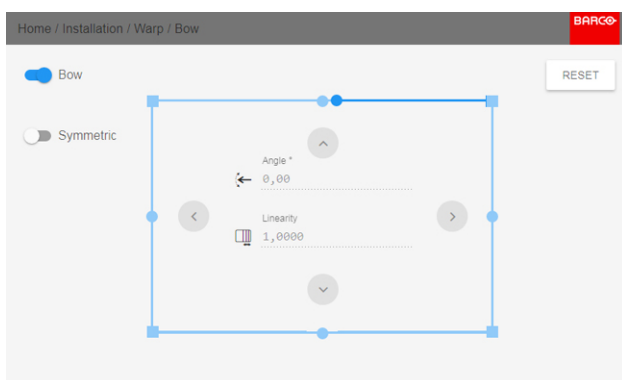


Image 8-27: Right vector of the upper side of the picture.

3. Adjust angle and linearity (length) individually to obtain the correct correction and confirm.



**Tip:** Adjust the angle by using the up and down arrow keys. Adjust the linearity by using the left and right arrow keys.

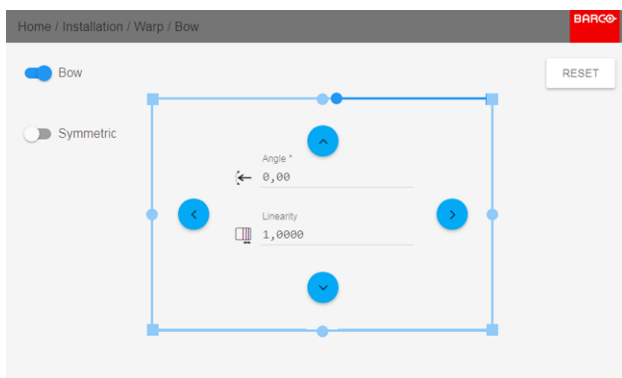


Image 8-28

4. Repeat the step for each side of the picture that must be corrected.

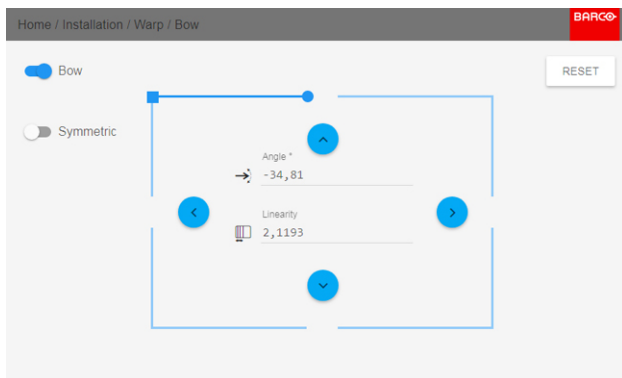


Image 8-29: Left vector of the upper side of the picture.

5. When completed, a transformation will occur in a way similar to the following example. Observe that the upper side of the picture now has an asymmetric correction.

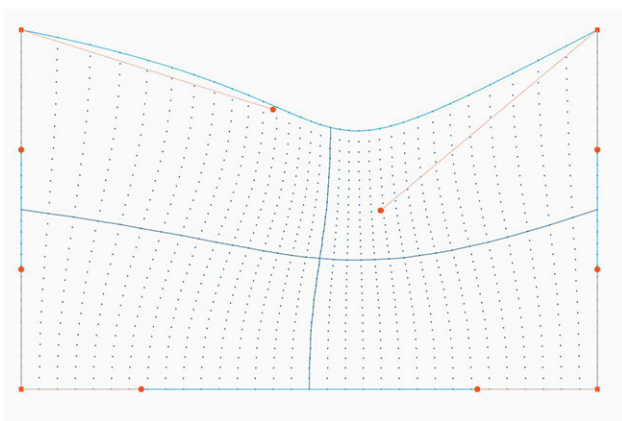


Image 8-30: Example of an asymmetric bow correction

## Definition of angle and linearity (length) in the bow warp procedure

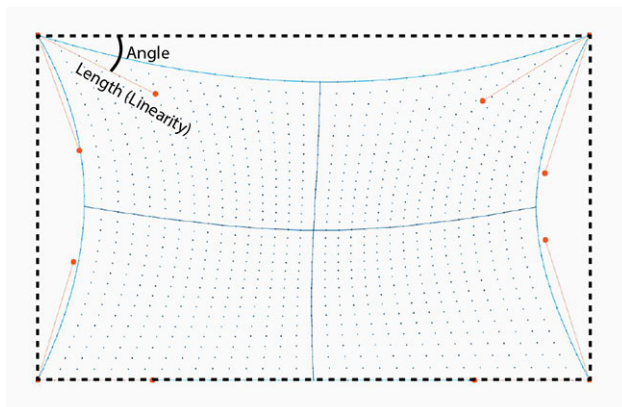


Image 8-31



To reset the bow adjustments, select *Reset* and confirm.

## 8.4.6 Warping – Warp files

### About custom Warp Files

Next to setting your specific warp configuration in the GUI, you can also upload or download a custom warp grid in XML format to/from the projector. This is a time-saving option when multiple projectors need an identical Warp configuration.



To upload or download warp files you can use Projector Toolset or Prospector tool to upload/download the warp grid in the format of an XML file. Alternatively, you can contact the “file endpoint” directly via the curl program or some other tool that supports http upload.

For more information on uploading/downloading Warp files using the Projector Toolset, refer to the Projector Toolset user manual.

For more information on uploading/downloading Warp files using curl or other tools that supports HTTP upload, refer to the Pulse API Reference Guide.

**How to activate an uploaded Warp grid?**

- 1. In the main menu, select *Installation* → *Warp*.

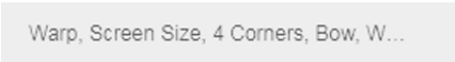


Image 8-32: Installation menu, Warp

- 2. In the Warp menu, select *Files*.

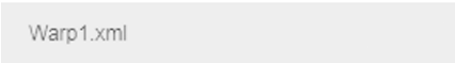


Image 8-33: Warp menu, Files

The Warp Files menu is displayed.



Image 8-34

- 3. If any custom Warp files are available, select the desired warp file.



Image 8-35

4. Click on the on/off button on top to activate the selected warp file.



Image 8-36

## 8.4.7 Warping – Latency control in a multi projector setup



### Transport latency

The added delay in the image processing chain. The value is the number of lines relative to the output resolution.



### Latency

The total time from the first pixel is coming in on an input source, until the first light representing that pixel is visible on the screen. This includes the transport delay. The value is normally given in milliseconds.

## Functional description

Every projector in a multi-projector setup will have a different latency. This latency depends on the amount of warp and on the frequency of the projected image. In order to have no visible difference in the overall projected image, the user needs to be able to control the latency of each projector.

The latency value can be read out in the status menu for each individual projector.

## How to configure transport delay?

1. Read out and note the latency of each projector in the multi-projector setup. You can find this latency under **Transport delay** in the status menu for each projector.

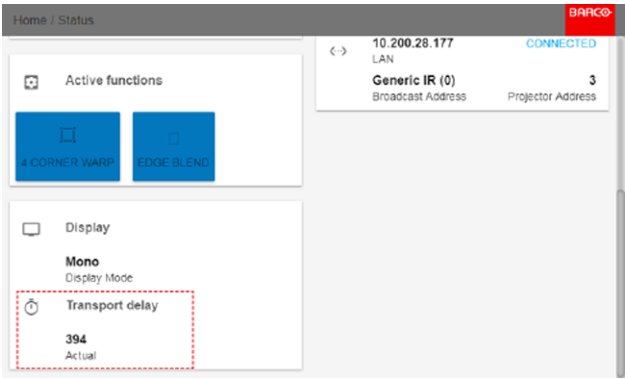


Image 8-37

- 2. Identify the projector with the longest delay.
- 3. For each projector in the setup, select *Installation* → *Warp* in the main menu.

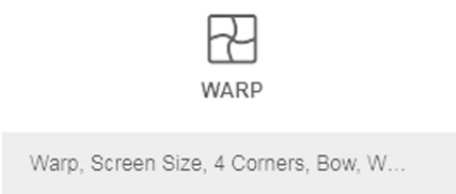


Image 8-38: Installation menu, Warp

- 4. In the Warp menu, select *Transport Delay*.

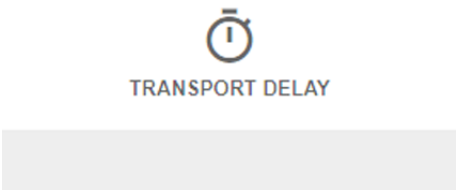


Image 8-39: Warp menu, Transport delay

The Transport menu is displayed.

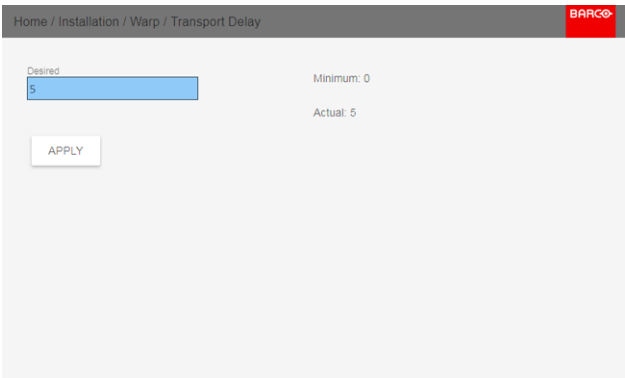


Image 8-40

- 5. Enter the value either by the arrow keys (one step at a time) or directly by the numeric keys on the remote control.
- 6. Enter “Apply” to confirm the value.

7. Repeat this process for every projector in the setup.

## 8.5 Blending & masking

### About Blending & Masking

Blending is used in multi channel installation to have a seamless transition between the channels. Image blending gives the appearance of a single view, thus achieving realistic immersion for the majority of wide screen applications.

The principle is that the light intensity in the blend zone from each projector will be adjusted individually, so that the rendering on the screen are perceived as from one projector.

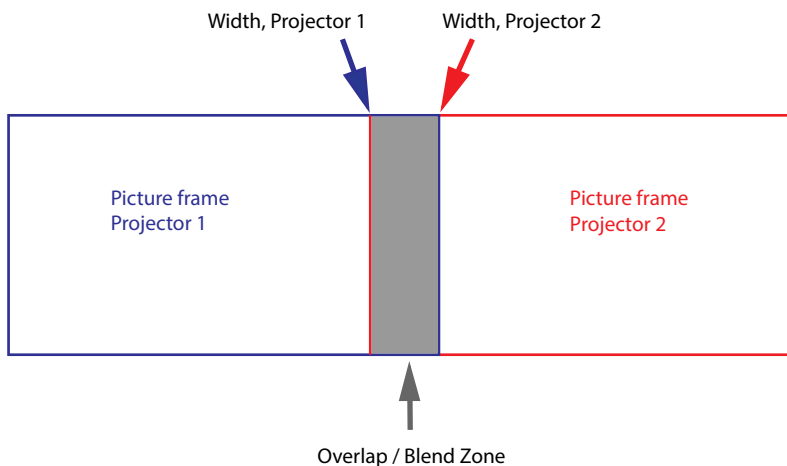


Image 8-41

From the start (mask) position, you can blend zone size per edge (left, top, right, bottom). For each edge there will be a drop-off curve for the blend zone.

### 8.5.1 Blend & Mask

#### About masking and blending width or height

Offset is used to clip the image on one or multiple sides (masking). This is used to hide parts of the picture that should not be shown on the screen. For example: if the source is a Windows PC, you can hide the menu bar using this method.

The larger the Mask value, the more the image is masked (by black bar) at the corresponding side. E.g. Top mask of 100 will blank the top 100 lines.

Height or width is used to create a blending zone with a smooth brightness drop off. This is used to compensate for the double brightness in overlap areas. The value is the size of the blended area in pixels.

#### How to adjust blend zones?

1. In the main menu, select *Installation* → *Blend and Mask* → *Blend – Mask*.

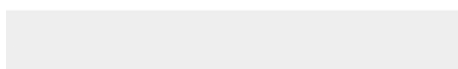


Image 8-42: Blend and Mask menu, Blend – Mask

The Blend – Mask menu is displayed.

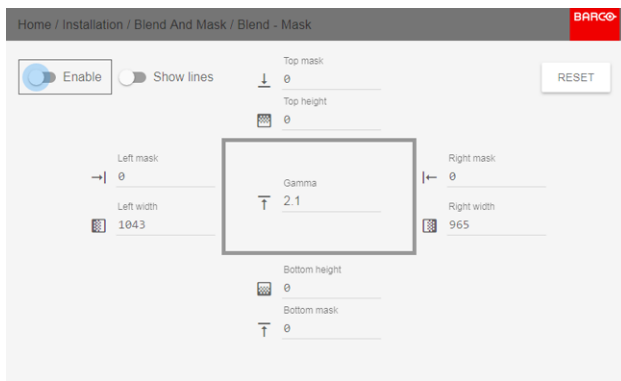


Image 8-43: Blend &amp; Mask menu

2. To enable blending, put the **Enable** switch to the right. The color of the switch becomes blue when enabled.
3. To project masking lines on the screen, put the **Show lines** switch to the right. The color of the switch becomes blue when enabled.
4. Determine the start position of the mask (1) for the masking height and width, together with the desired size of the mask (2) to determine the width of the masked area.

When the blending lines are activated, you will get a visual indication of the screen of the installed blending area.

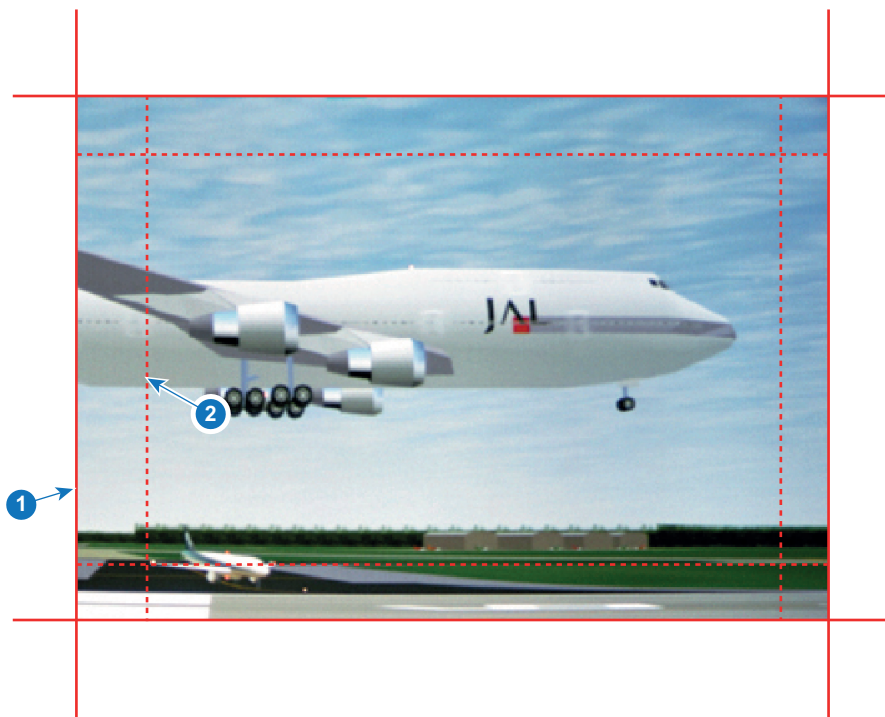


Image 8-44

- 1 Start position (mask)
- 2 Blending width
5. Select one of the four starting positions values with the arrow keys and confirm.
6. Use the arrow keys or remote digits to change the value of the mask and confirm.
7. Repeat this process for the desired width/height value.
8. Repeat this process for all other desired sides.



Do not forget to disable the **Show lines** button after you achieved the desired blend zone.

## Example of the use of blending

When projecting an image with 2 or more projectors, there is always an small overlap that should be corrected by using the blending function.



In order to obtain a satisfying result for the Blend function, the overlap / mask zone are recommended to be at least 10% of the picture width.

The basic principle is that the overlap setup in the source shall correspond with the mask width setup for the projector. That means that if the overlap zone for the source is set to 500 pixels, the width of the mask zone for the projector also must be set to 500 pixels.

First step is to align the image from the projectors as accurate as possible in a mechanical way, meaning without any optical corrections. At the same time, establish an overlap in the pictures between the two screens.

Then adjust the remaining irregularities by using the shift and warp features in the projectors to obtain the last fine tuning of the alignment.

Enable blending and activate Show lines.

First set the mask width for the right edge of the first projector. Enter a width value equal to the overlap area (width1).

Repeat for the left edge of the second projector.

Adjust the offset to cut the image on each side (masking).

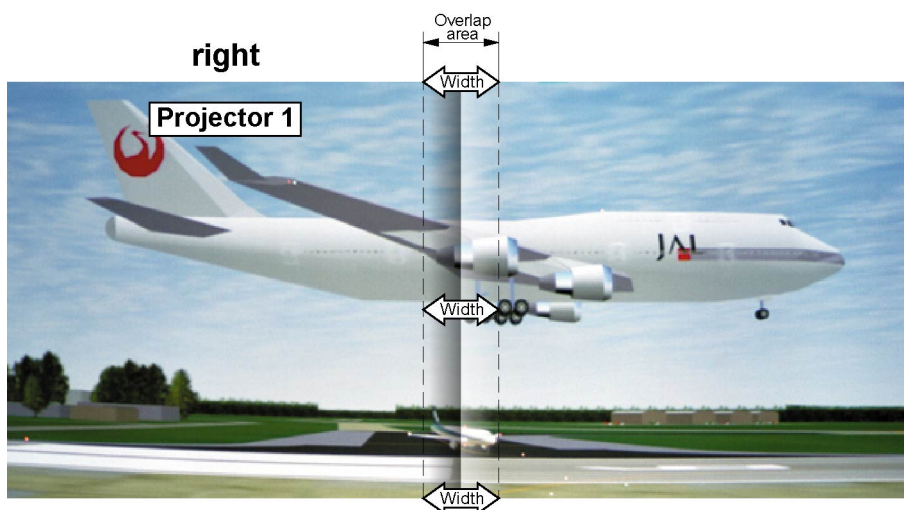


Image 8-45: Set up for projector 1

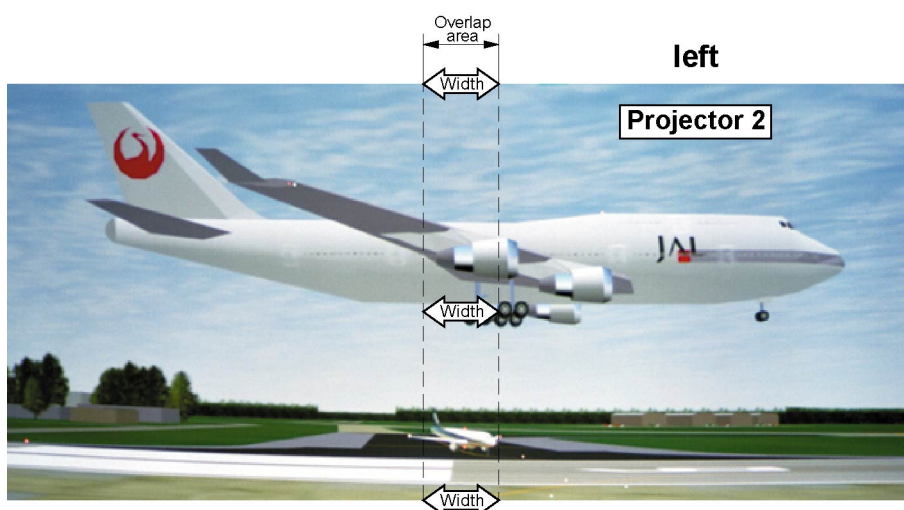


Image 8-46: Set up for projector 2

## 8.5.2 Blend Files

### About custom Blend Files

Next to setting your specific Blending configuration in the GUI, you can also upload or download a custom Blend configuration file in png, jpg or tiff format to/from the projector. This is a timesaving option when multiple projectors need an identical blending configuration.

To upload or download Blend configuration files you can use Projector Toolset or upload/download the Blend configuration file in the format of an xml file. Alternatively, you can contact the “file endpoint” directly via the curl program or some other tool that supports http upload.

For more information on uploading/downloading Blend files using the Projector Toolset, refer to the Projector Toolset user manual.

For more information on uploading/downloading Blend files using curl or other tools that supports HTTP upload, refer to the Pulse API Reference Guide.

### How to activate an uploaded Blend configuration file?

1. In the main menu, select *Installation* → *Blend and Mask* → *Blend Files*.



Image 8-47: Blend and Mask menu, Blend Files

The Blend Files menu is displayed.

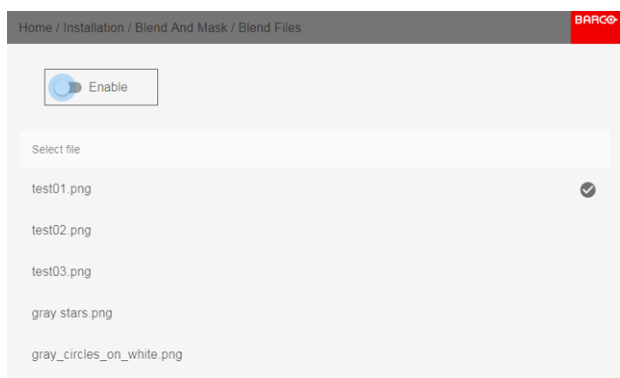


Image 8-48

2. If any custom Blend files are available, select the desired file.

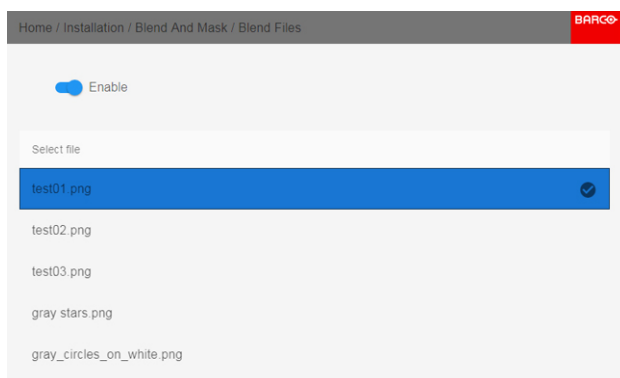


Image 8-49

- Click on the *Enable* slider on top to activate the selected Blend file.

### 8.5.3 Basic black level adjustment

#### About adjusting the black level

The purpose of the black level adjustment is to align the black levels in the overlapped regions with the black levels in the other regions.

This is needed because the black levels will be brighter in the blend zones, since multiple projectors will project on the same screen area.

The size of the black level area is calculated automatically from the blend zones. This is done by using the start position and size of each edge of the blend and adding an additional size of 8 pixels to reduce the effect known as "sea of mirrors".

You can also specify the offsets manually by turning off the automatic calculation. The black level value is adjusted in a 8 bit resolution from 0 to 255.

The following figure shows how this occurs in a side by side configuration without any correction of the black level.



Image 8-50

#### How to adjust the black level manually

- In the main menu, select *Installation* → *Blend and Mask* → *Black Level* → *Basic Black Level*.

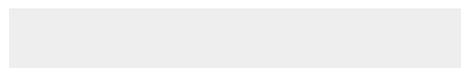


Image 8-51: Black Level menu — Basic Black Level

The Basic black level menu is displayed.



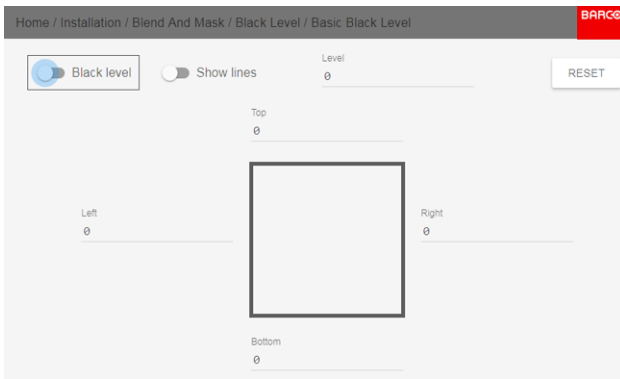


Image 8-52: Basic Black Level menu

2. Enable the **Black level** button. If you want a visual aid, enable the **Show lines** button as well.
  3. Move the cursor to the side where the overlapped area occurs (left/right/top/bottom) and press enter.
  4. Adjust the level with the arrow keys and press enter when the desired black level zone is reached.
- or
- enter the black level value with the numeric keys in the remote control.
5. Move the cursor to “Level”, press enter and adjust this level until the black level equals the level in the blend zone.  
This value can also be entered by the numeric keys on the remote control.
  6. Repeat the same procedure for any other projector connected to this projector, but on the opposite side.

 **Note:** Do not forget to disable the **Show lines** button after you achieved the desired blend zone.

## 8.5.4 Black Level Files

### About custom Black Level Files

Next to setting your specific Black Level Adjustment in the GUI, you can also upload or download a custom Black Level adjustment file in png, jpeg or tiff format to/from the projector.

To upload or download Black Level adjustment files you can use Projector Toolset or upload/download the Black Level adjustment file in the format of an XML file. Alternatively, you can contact the “file endpoint” directly via the curl program or some other tool that supports http upload.

For more information on uploading/downloading Black Level files using the Projector Toolset, refer to the Projector Toolset user manual.

For more information on uploading/downloading Black Level files using curl or other tools that supports HTTP upload, refer to the Pulse API Reference Guide.

### How to activate an uploaded Black Level adjustment file?

1. In the main menu, select *Installation* → *Blend and Mask* → *Black Level* → *Black Level Files*.

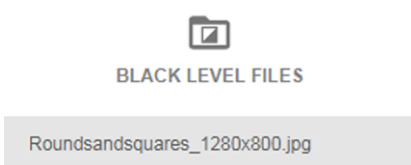


Image 8-53: Black Level menu, Black Level Files

The Black Level Files menu is displayed.

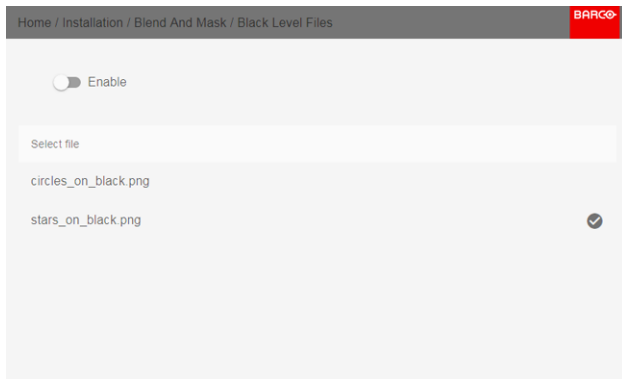


Image 8-54

2. If any custom Black Level adjustment files are available, select the desired file.

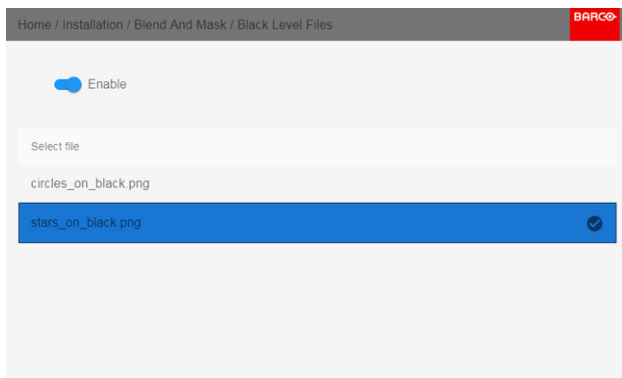


Image 8-55

3. Click on the *Enable* slider on top to activate the selected Black Level adjustment file.

## 8.5.5 RGB adjustment

### About RGB adjustment

The purpose of black level correction is to ensure a uniform black level in multi projector setups. Even when two projectors are of the same type, different projectors will output slightly different colors for black due to minor variations in their optical components. So if the projected image of the projectors overlap, there will be 3 different black levels: one for the zone where only the picture of the left projector (zone 1), one for the Blend zone (zone 2), and one for the zone where there is only the picture of the right projector (zone 3).

Picture Left

Blend Zone

Picture Right

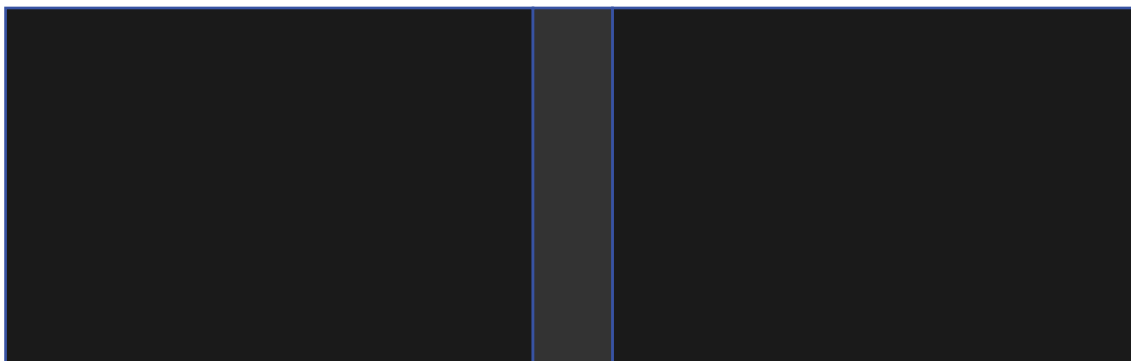


Image 8-56

The black levels for zone 1 and zone 3 are typically corrected by defining a black level mask, which is applied to the image of each projector. This system is already in place but the applied mask is monochrome.

Using the Basic Black Level menu, you can already specify the area of the mask and its contents. But by using the RGB Adjustment page, you can specify the multiplication factors (gains) for the Red, Green and Blue colors separately.

## How to perform an RGB adjustment

1. In the main menu, select *Installation* → *Blend and Mask* → *Black Level* → *RGB Adjustment*.



Image 8-57: Black Level menu, RGB Adjustment

The RGB Adjustment menu is displayed.

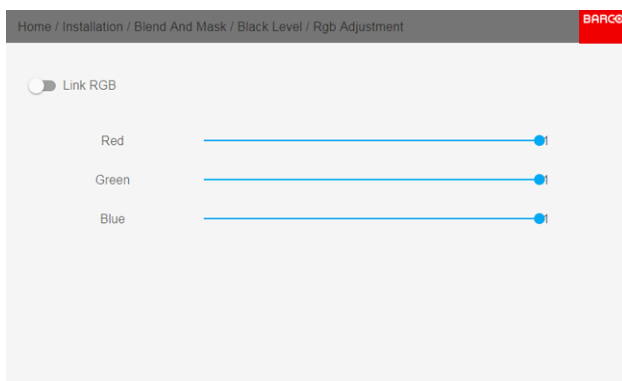


Image 8-58: RGB Adjustment menu

2. Select whether or not you want to link the Red, Green and Blue colors together. Enable *Link RGB* to do so. Enabling *Link RGB* will allow you to adjust the gain of the three colors together.

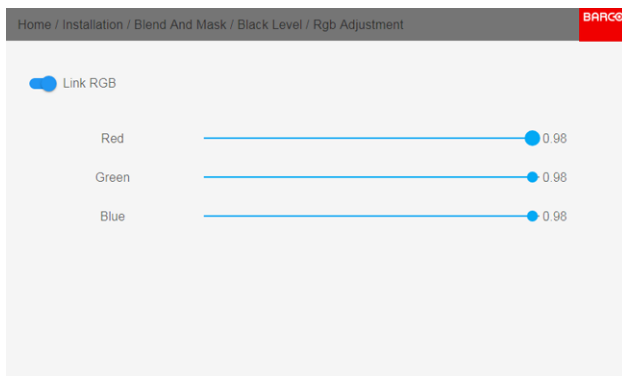


Image 8-59

3. Select one of the three sliders.
4. Use the left and right arrow keys to modify the gain of the chosen color.

- Repeat for every slider until the desired result is achieved on screen.

## 8.6 Laser illumination

### What can be done?

Within a certain percentage, the light output of the light source can be reduced by reducing the laser power.

Alternatively, you can enable CLO mode (Constant light output) for a constant light output over a longer period of time.



You can only change the power output when the shutter is opened.

### About CLO mode

All light sources naturally decrease their intensity over time. In order to prevent a decreasing output in a multi-projector setup, you can activate CLO mode to make sure that the light output remains constant.

CLO mode will ensure that the projector regulates its illumination power to maintain the same level of output light during the lifetime of the light source. This requires that the light source power is not set to 100% from the start, but to a lower value. The lower this value is set, the longer the projector will be able to maintain the output level.

### How to reduce the power

- In the main menu, select *Installation* → *Illumination* → *Power*.

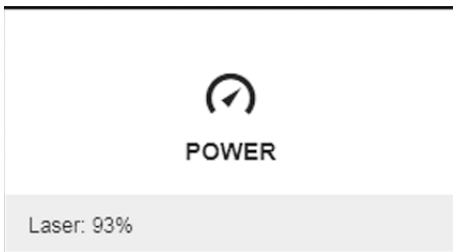


Image 8-60: Illumination menu, Power

The actual power setting is indicated at the bottom of the *Power* button.

- Use the Slider to change the power value.

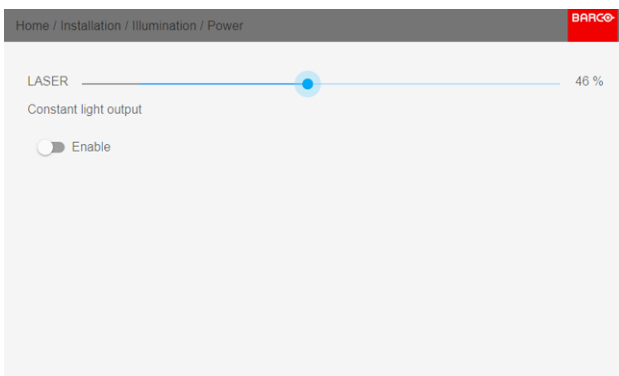


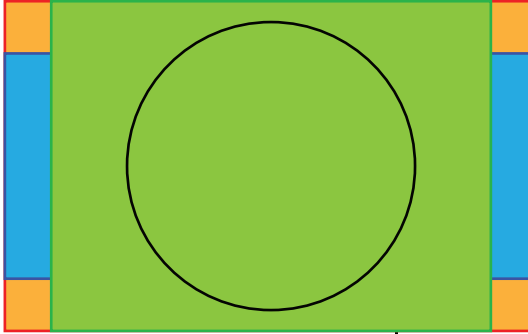
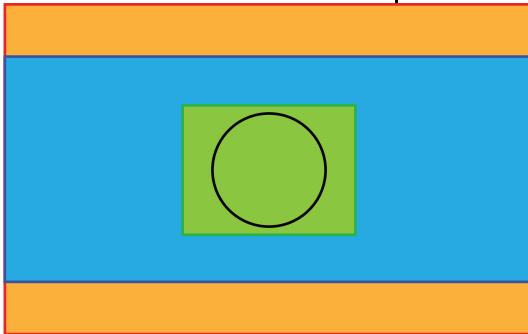
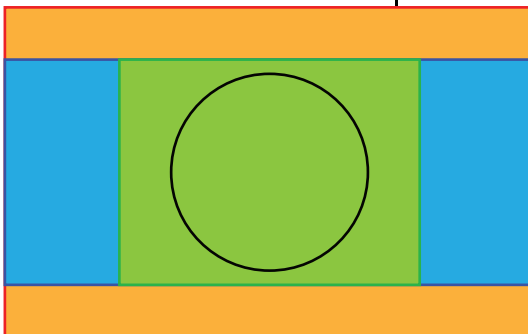
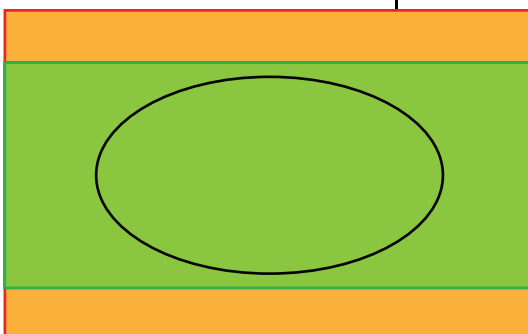
Image 8-61

- If you want CLO mode to be active, click **Enable** underneath *Constant light output*.

## 8.7 Scaling modes

### About scaling modes

While the default mode of projection is to fill the screen while respecting the aspect ratio (fill aspect), it is also possible to stretch the image in a different way. You can choose from one of the following scaling methods:

Scaling Mode	Explanation	Example image <sup>2</sup>
Fill aspect	<b>Default scaling mode.</b> Stretches the image to the native resolution of the DMD, while respecting the original aspect ratio.	
1:1	An exact rendering of the source signal, which may be smaller than the native resolution	
Fill screen	Fills the screen to the screen size defined in the Screen Size menu, while respecting the original aspect ratio. For more info on adjusting the Screen Size menu, see “Warping – Screen Size”, page 77.	
Stretch	This mode stretches the image to the screen size defined in the Screen Size menu, while ignoring the original aspect ratio. For more info on adjusting the Screen Size menu, see “Warping – Screen Size”, page 77.	

### Setting a scaling mode

1. In the main menu, select *Installation* → *Scaling*.

<sup>2</sup>: Example using a screen of 2,35:1, an input signal of 4:3 and a projector with a native resolution of 3840 x 2400



Image 8-62: Installation menu, Scaling

The Scaling menu is displayed.

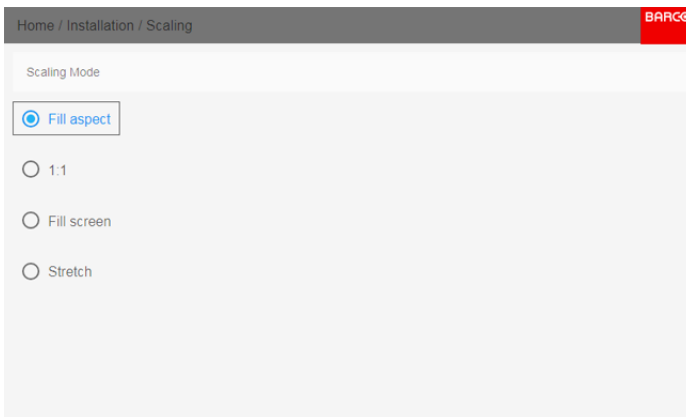


Image 8-63: Scaling Menu

2. In the Scaling menu, select the desired scaling mode and confirm.

## 8.8 3D projection

### 3D setup

The projector is capable of displaying 3D images and movies in active stereoscopic 3D.

Setup of a 3D installation requires an advanced understanding of 3D systems, both for the projector as well as for the system the signal source originates from. In a 3D setup it is crucial that the projected images are perfectly synchronized through the whole signal path, from the signal source to the picture viewed through the 3D goggles.

Regarding setting up the proper signal source, please refer to the user manual or online help for that graphic card. For example: when using NVIDIA Quadro cards, use the NVIDIA Control Panel to manage your 3D settings.

### 8.8.1 Active Stereo & Passive Stereo

#### What is Passive Stereo?

Passive Stereoscopic 3D (also known as “Passive Stereo”) is the standard method of creating the illusion of depth in an image, by means of stereopsis for binocular vision.

To present stereoscopic pictures, two images are projected superimposed onto the same screen through polarizing filters or presented on a display with polarized filters. For Digital Cinema, a silver screen is used so that polarization is preserved. On most passive displays every other row of pixels are polarized for one eye or the other. This method is also known as interlacing.

The viewer wears glasses which contain a pair of opposite polarizing filters. As each filter only passes light which is similarly polarized and blocks the opposite polarized light, each eye only sees one of the images, and the effect is achieved.

## What is Active Stereo?

Field sequential 3D (also known as active 3D or “Active Stereo”) is a technique of displaying stereoscopic 3D images. It works by only presenting the image intended for the left eye while blocking the right eye's view, then presenting the right-eye image while blocking the left eye, and repeating this so rapidly that the interruptions do not interfere with the perceived fusion of the two images into a single 3D image.

This system setup uses liquid crystal shutter glasses (also known as active shutter glasses). Each eye's glass contains a liquid crystal layer which has the property of becoming opaque when voltage is applied, being otherwise transparent. The glasses are controlled by a timing signal that allows the glasses to alternately block one eye, and then the other, in synchronization with the refresh rate of the screen. The timing synchronization to the video equipment may be achieved via a wired signal or via wireless communication, this by using either an infrared or radio frequency (e.g. Bluetooth, DLP link) transmitter.

## Projection method used

This projector can only show active 3D images, used in combination with a 3D emitter and active shutter glasses. While it is allowed to connect passive stereo source signals, the image processing of the projector will convert those signals to an active 3D compatible image.

The options on the projector software allow you to fine-tune the 3D settings accordingly to the specifications of the 3D emitter.



If a 3D emitter is used that radiates IR beams, the IR beams may interfere with the IR communication between projector and the RCU. If such interference occurs, connect the RCU to the projector using the remote cable. It is also advised to turn the IR receivers on the projector off to avoid the 3D emitter interference. To turn off the IR receivers, see “Remote control, on/off button”, page 23.

## 8.8.2 Setup process 3D projection

### How to setup 3D projection?

1. Connect the proper source cables to the projector. For more info, see “Connection possibilities”, page 99.
2. Set up and connect your 3D emitter to the projector. For more info, refer to the user manual of your 3D emitter.
3. Power on the projector completely.
4. Select the correct stitched source Input in the Source menu. See “Displaying multiple sources: Stitched layouts”, page 58.
5. Select the desired Display format. For more info, see “Choosing the desired Display Setup”, page 100.
6. Depending on the chosen 3D emitter, correct the 3D setup. For more info, see “”, .

## 8.8.3 Connection possibilities



At this moment, the only inputs supporting 3D on the Pulse input boards are the DisplayPort inputs and HDMI input. More inputs may support 3D in a future release.

### Connecting with the quad combo input card

There is only one way of projecting Active stereoscopic 3D with the Combo input card, using the following setup:

- **Source:** Active Stereo (sequential L/R)
- **Layout mode:** Standard layout (1x1 layout)
- **Video Timing:** 2560 x 1600 (WQXGA) @120 Hz
- **Color depth:** 30 bpp
- **Connector:** DisplayPort 1.2 or HDMI

### Connecting with the quad DP 1.2 Input card

You can use one of the following methods. The resulting image will always be an Active Stereo image.

Source	Layout mode	Video Timing / cable	Fixed configuration?	Color depth
Active Stereo (sequential L/R)	Standard layout (1x1 layout)	2560 x 1600 @120 Hz		30 bpp
Active Stereo (sequential L/R)	4 Column mode (4x1 layout)	960 x 2160 @120 Hz		30 bpp
Active Stereo (sequential L/R)	4 Quadrant mode (2x2 layout)	1920 x 1080 @120 Hz		30 bpp
Passive Stereo (separate L/R)	Standard layout (1x1 layout)	3840 x 2160 @60 Hz	<ul style="list-style-type: none"> <li>• Cable 1: left eye</li> <li>• Cable 2: right eye</li> </ul>	30 bpp
Passive Stereo (dual pipe L/R)	2 Column mode (2x1 layout)	1920 x 2160 @60 Hz	<ul style="list-style-type: none"> <li>• Cable 1: left eye, left column</li> <li>• Cable 2: left eye, right column</li> <li>• Cable 3: right eye, left column</li> <li>• Cable 4: right eye, right column</li> </ul>	30 bpp

## 8.8.4 Choosing the desired Display Setup

### Output modes

The following output modes are available:

- **AutoStereo**: Automatic mode (2D input = 2D output, 3D input = Active Stereo output).
- **Mono**: Forces all source signals to 2D output.
- **ActiveStereo**: Forces all source signals to Active Stereoscopic 3D.

Use the following table as an indicator of what display mode you require.

Source signal	AutoStereo	Mono	ActiveStereo
2D Source	Output is a 2D image	Output is a 2D image	Output is in Active Stereo
Active Stereo source	Output is in Active Stereo	Output is a 2D image	Output is in Active Stereo
Passive Stereo source	Output is in Active Stereo	Output is a 2D image	Output is in Active Stereo



When a different Display Mode is chosen compared to the source signal (e.g. Active Stereo source with Mono output), advanced image processing will make sure you a desirable image will be displayed.

### How to select the desired projection method?

1. In the main menu, select *Installation* → *Display Setup*.



DISPLAY SETUP

Image 8-64: Installation menu, Display setup

The Display setup menu is displayed.

2. Select the desired Display Mode:
  - AutoStereo (default value)
  - Mono
  - ActiveStereo



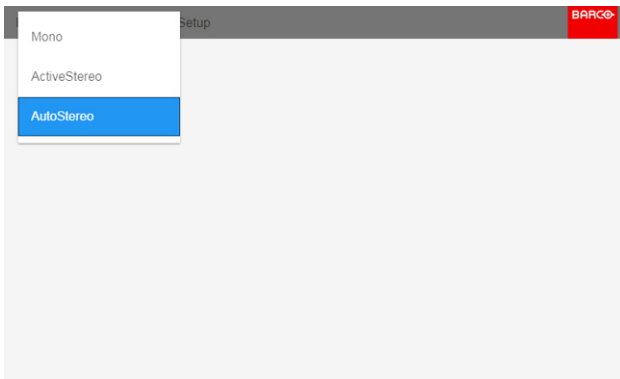


Image 8-65

## 8.8.5 3D emitter Setup

### Why change the 3D setup?

While Barco can provide a 3D emitter and active shutter glasses as options to this projector, you are also free to use a 3D emitter and active shutter glasses of your own choice. Since glasses and emitter can have various specifications compared to the ones Barco can provide, the 3D setup menu allows you to configure the output image to the specifications of your glasses and emitter. The following can be configured:

- **Swap Eye:** You can choose to invert the stereo Sync output signal ( depending on the chosen 3D emitter and glasses).
- **Swap frame pair:** You can choose to invert the stereo input signal (depending on the chosen source input).
- **Dark time:** You can select how much dark time the projected image will have between frames. You can choose one of the options between 1000  $\mu$ s and 2500  $\mu$ s.
- **Stereo glasses:** You can select the desired type of 3D glasses. You can choose between Active 3D glasses, or 6P Laser Glasses.
- **Sync Delay:** You can increase or decrease the sync delay. The scale goes from –10 000  $\mu$ s to +10 000  $\mu$ s with a step of 100  $\mu$ s.



If a 3D emitter is used that radiates infrared beams (IR beams), the IR beams may interfere with the IR communication between projector and the RCU. If such interference occurs, connect the RCU to the projector using the remote cable. It is also advised to turn the IR receivers on the projector off to avoid the 3D emitter interference. To turn off the IR receivers, see “Remote control, on/off button”, page 23.

### How to adjust the projector to the 3D emitter?

1. In the main menu, select *Installation* → *3D Setup*.



Image 8-66: Installation menu, 3D setup

The 3D setup menu is displayed

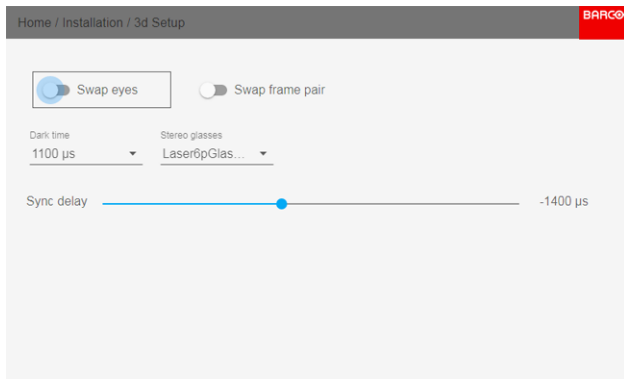


Image 8-67: 3D Setup menu

2. Select the desired the stereo *Dark Time*.
3. Select the type of 3D glasses you are using in the setup, using the *Stereo Glasses* option.
4. Use the slider to set the desired stereo *Sync delay*.
5. If it is necessary to invert the stereo sync output, enable the *Swap eyes* option.
6. If it is necessary to invert the stereo sync input, enable the *Swap frame pair* option.

# GUI – System Settings

# 9

## Overview of features

- Communication, LAN setup
- IR control
- Setting a custom projector name
- DMX
- GSM configuration
- Themes
- Lens features
- Controlling the backlight of the LCD Display
- Reset
- Lens Calibration
- Electronic Convergence
- Advanced Settings

## 9.1 Communication, LAN setup

### About a network connection

A network connection can be made via a wired connection or via the optional wireless unit.

#### 9.1.1 Introduction to a Network connection

##### DHCP



Dynamic host configuration protocol. DHCP is a communications protocol that lets network administrators manage centrally and automate the assignment of IP addresses in an organization's network. Using the Internet Protocol, each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.



##### IP

Internet Protocol. The network layer of TCP/IP. Required for communication with the internet.



##### Subnet mask

A number that is used to identify a subnetwork so that IP addresses can be shared on a local area network.



##### Default Gateway

A router that serves as an entry point into and exit point out of a network. For example, a local network (LAN) may need a gateway to connect it to a wide area network (WAN) or to the Internet.



##### MAC address

Media Access Control address. Unique hardware number, used in combination with the IP-address to connect to the network (LAN or WAN).

### What should be set up for an Ethernet address?

Two ways can be used to assign an address:

- use the *Automatic* setting so that an automatic address will be assigned.
- Assign manually an IP address, Net-mask (subnet-mask), (default) gateway address.
  - Set the IP-Address field to the desired value. This must NOT be 0.0.0.0 for static IP-Address assignment. The IP address identifies a projector's location on the network in the same way a street address identifies a house on a city block. Just as a street address must identify a unique residence, an IP address must be globally unique and have a uniform format.
  - Set the Subnet-Mask as appropriate for the local subnet.
  - Set the Default-Gateway to the IP-Address of the local router (MUST be on the local subnet!) on the same network as this projector that is used to forward traffic to destinations beyond the local network. This must not be 0.0.0.0. If there is no router on the projector's local subnet then just set this field to any IP-Address on the subnet.

#### 9.1.2 Wired IP address set up

##### How to automatically set up the IP address

1. In the main menu, select *System Settings* → *Communication* → *LAN*.



10.200.28.177

Image 9-1: Communication menu, LAN

The LAN menu is displayed

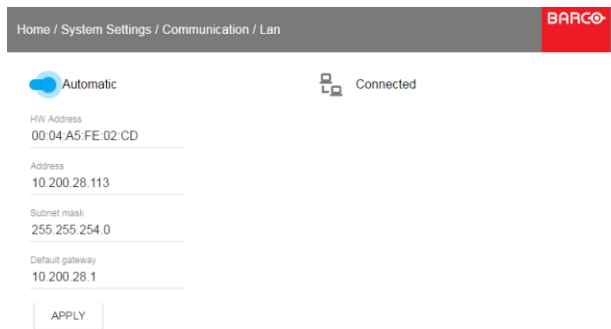


Image 9-2: LAN menu

2. To enable Automatic, put the switch to the right. The color of the switch becomes blue.  
An automatic IP is assigned.  
When connected, it is indicated with the connection symbol and the indication *Connected*.
3. Select **APPLY** and click **OK**.

## How to manually set up the IP address

1. In the main menu, select *System Settings* → *Communication* → *LAN*.



10.200.28.177

Image 9-3: Communication menu, LAN

The LAN menu is displayed

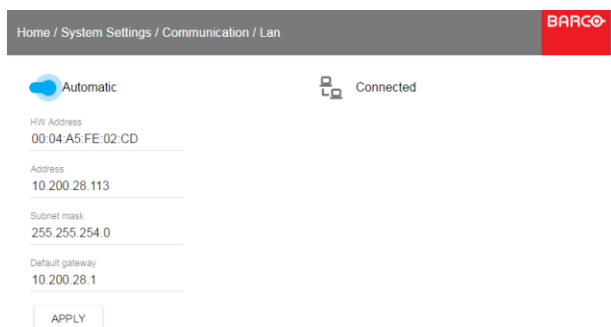


Image 9-4: LAN menu

2. Disable Automatic. Put the switch to the left. The switch becomes gray.

3. Use the ▲ or ▼ key to select *Address* and press **OK** button to activate the input box.
4. Use the ▲ or ▼ key to change the selected character.  
Use the ◀ or ▶ key to select another character.



**Note:** Digits can be entered with the digit keys on the remote control or the local keypad. When a digit is entered in that way, the next character will be selected automatically.

5. Repeat steps 4 and 5 for the Subnet mask and Default Gateway.
6. Select **APPLY** and click **OK** to confirm all changes.  
When the connection is established, it is indicated with the connection symbol and the indication *Connected*.

## 9.2 IR control

### Overview

- Broadcast address
- Projector address
- IR sensors

### 9.2.1 Broadcast address

#### About broadcast address

Broadcast address is a common address that can be set on the projector. That can be “0” or “1”.  
Any command coming from a remote control programmed with that common address will be executed.

#### How to the broadcast address

1. In the main menu, select *System Settings* → *Communication* → *IR Control*.



Image 9-5: Communication menu, IR control

The IR control menu is displayed.

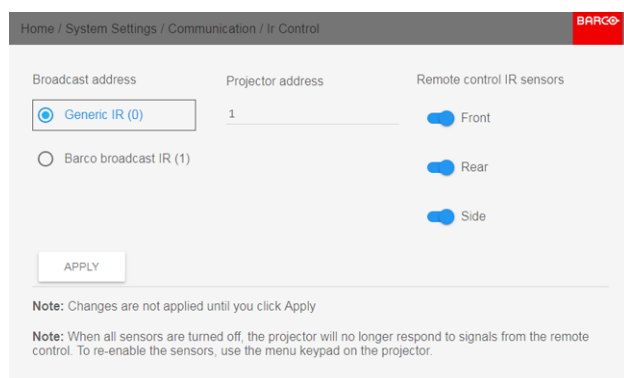


Image 9-6: IR control menu

2. To change the broadcast address select the radio button of your choice.

The following choices are possible:

- Generic IR (address 0)
- Barco broadcast IR (address 1)

3. Select **APPLY** and click **OK** to apply the changes.

## 9.2.2 Projector address

### About individual projector address

Before a projector, and only this projector, can be controlled via a remote control, an individual address must be entered in the projector.

This individual projector address can then be used to control the projector via remote control.

Next to an individual projector address, each projector has also a broadcast address for group control.

### How to change

1. In the main menu, select *System Settings* → *Communication* → *IR Control*.



Image 9-7: Communication menu, IR control

The IR control menu is displayed.

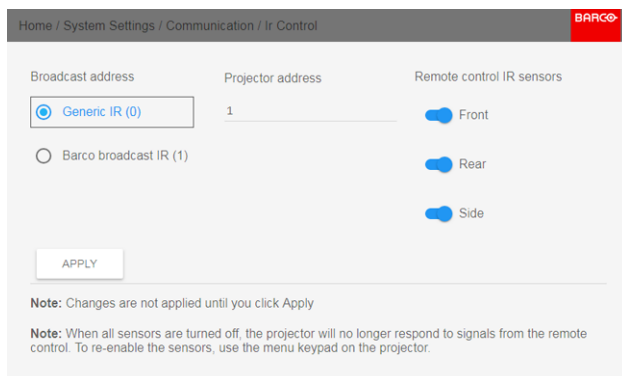


Image 9-8: IR control menu

2. Select the current projector address and enter a new address.
3. Select **APPLY** and click **OK** to apply the changes.

From now on the projector will only listen to this new address and to its broadcast address.

## 9.2.3 IR sensors

### What can be done?

Each IR sensor can be individually disabled or enabled.

When all sensors are turned off, the projector will no longer respond to signals from the remote control. To re-enable the sensors, use the menu keypad on the projector.

### How to disable

1. In the main menu, select *System Settings* → *Communication* → *IR Control*.



Image 9-9: Communication menu, IR control

The IR control menu is displayed.

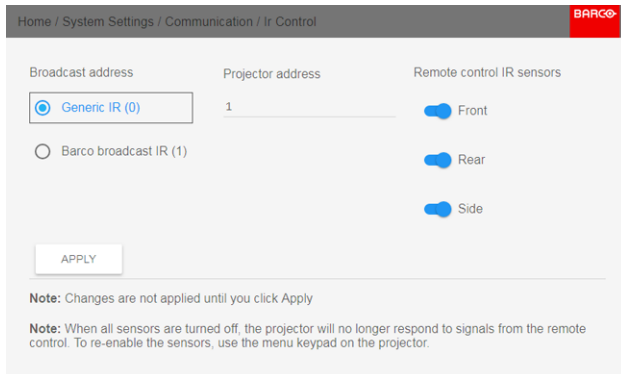


Image 9-10: IR control menu

2. To disable an IR sensor, select the slider and drag to the left.  
A blue slider means an active IR sensor.  
A gray slider means an inactive IR sensor.
3. Select **APPLY** and click **OK** to apply the changes.

## 9.3 Setting a custom projector name

### What can be done?

The default name of the projector is “Pulse”. However, you can change this name to make it easier to spot in a network with multiple devices or projectors

### How to set a different Hostname

1. In the main menu, select *System Settings* → *Communication* → *Hostname*.



Default

Image 9-11: System Settings, Hostname

The Hostname menu is displayed.



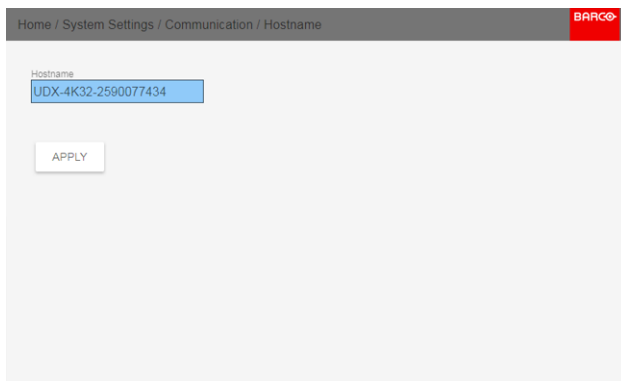


Image 9-12

2. In the Hostname menu, press confirm to edit the Hostname field.
3. Use the digital keyboard to change the Hostname to the desired custom name.

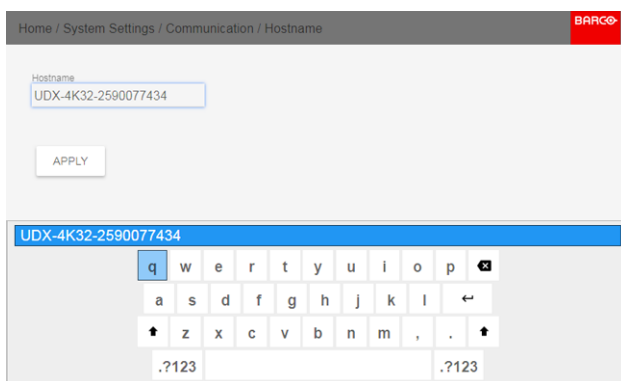


Image 9-13

4. Click OK to confirm the typed name and Click *Apply to update the name*.

## 9.4 DMX

### About the ways to control the projector via DMX

DMX signals can be connected to the DMX In port on the communicator interface when using a standard DMX cable equipped with XLR connector. The DMX out can be used to create a chain of DMX devices. One universe can control up to 512 channels.

If you are using a DMX console and other automated lighting products compatible with Art-Net, the Ethernet network can serve as the link for DMX control. All DMX controls can be sent over the Ethernet cable. Multiple universes are possible.

### About the DMX menu

DMX Feature	What can be done?
DMX Address	Before a projector can execute DMX commands, a unique address (named DMX address) should be given to the projector. This address can vary from 1 to 512.
DMX Mode	Two different modes for DMX are available. <ul style="list-style-type: none"> <li>• <b>Basic:</b> A basic configuration where 2 channels are implemented.</li> <li>• <b>Extended:</b> A full configuration, spread over 14 channels.</li> </ul> For the full mapping of each used channel, refer to the DMX chart in the appendices. See “DMX chart”, page 153.

DMX Feature	What can be done?
DMX Monitor	If a DMX device is connected, the settings per channel can be displayed via the Monitor button.
Art-Net DMX	DMX can be sent via the Ethernet connector to the projector instead of the classic DMX connector. This function can be enabled or disabled. Art-Net is generally used when more than 512 addresses are used in your setup.
DMX Universe	<b>Note:</b> DMX Universe can only be used when Art-Net DMX is enabled. If Art-Net is enabled, you can specify which DMX universe this projector belongs to.
DMX Power Down	The projector can be forced to shut down after a certain time-out period (in minutes) if no DMX signals are available.

## How to set up DMX?

1. In the main menu, select *System Settings* → *Communication* → *DMX*.



Image 9-14: Communication menu, DMX

The DMX menu is displayed.

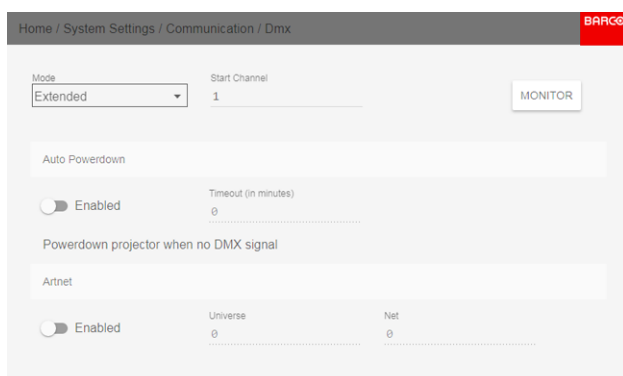


Image 9-15: DMX menu

2. Choose the desired DMX mode.
3. Choose the desired starting channel.
4. Choose whether or not you want the Auto power-down feature to be enabled. If enabled, determine the time-out.
5. If required, enable Art-Net. If enabled, determine the desired Art-Net Universe and Art-Net channel.

## 9.5 GSM configuration



Only possible when a GSM module with SIM card is installed in the projector.

## What can be done ?

To configure the projector software with the installed SIM card, a correct PIN code (4digits) must be entered.



As the PIN code cannot be checked with the one on the SIM card, ensure to enter the correct PIN code.



When your SIM card is blocked, you have to remove the SIM card from the GSM module and to insert the SIM card in a mobile phone so that you can enter the PUK code to unblock the SIM card.

## How to activate

1. In the main menu, select *System Settings* → *Communication* → *GSM*.



Image 9-16: Communication menu, GSM

The GSM pin code input menu is displayed. The current configured PIN code is indicated next to Pin input field. If the code is still the same, it is not necessary to enter the PIN code again. If it is a PIN code, continue with next step.

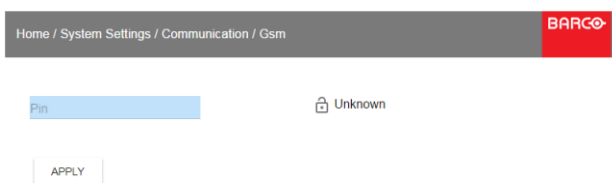


Image 9-17: Enter PIN code

2. Enter the 4 digits of the pin code and select **APPLY** and click **OK**.

## 9.6 Themes

### About Themes

Themes are used to apply a predefined functionality to the OSD display. There are two options: light or dark (default).



While the default theme is dark, all images in this manual are taken while using the light theme.

### How to select a different interface theme

1. In the main menu, select *System Settings* → *Themes*.



THEMES

Light, Dark

Image 9-18: System Settings Menu — Themes.

2. In the themes menu, select the desired *Theme*.  
You can choose one of the following: *Light*, or *Dark*.

## 9.7 Lens features

### What can be done?

Some lens features can be disabled once they are correctly aligned so that a misalignment during a show is not possible.

### How to enable/disable

1. In the main menu, select *System Settings* → *Lens Features*.



LENS FEATURES

Image 9-19: System Settings menu, Lens Features

The Lens features menu is displayed.

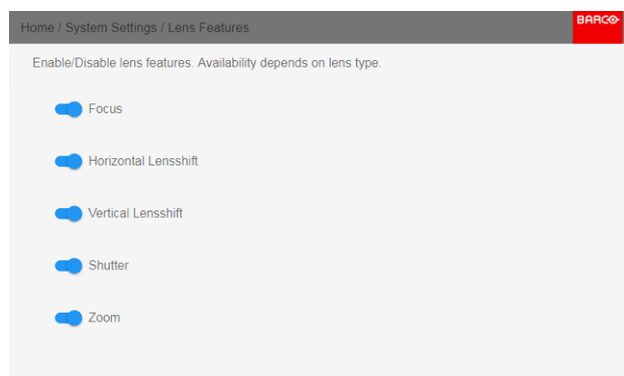


Image 9-20: Lens features menu

Depending on the lens type, different functions are available such as:

- Focus
  - Horizontal lens shift
  - Vertical lens shift
  - Shutter
  - Zoom
2. To enable/disable a feature, click on the slider and drag it to the left to disable the feature or the right to enable the feature.

When enabled, the slider becomes blue; when disabled, the slider is gray.

## 9.8 Controlling the backlight of the LCD Display

### What lighting can be controlled?

You can choose how quickly the backlight of the LCD turns off. You can select one of the default values, or enter a custom value.

Alternatively, you can turn on **Stealth Mode** instead. By activating this mode, both the backlight of the LCD as well as the backlight of all the buttons of the keypad will be permanently disabled.

### How to control

1. In the main menu, *System Settings* → *Backlight*.

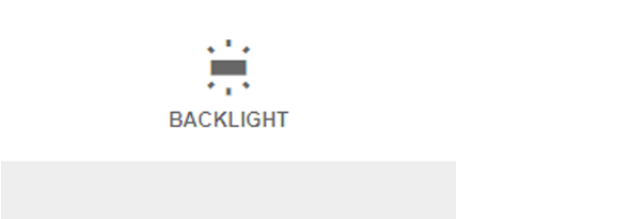


Image 9-21: System settings, Backlight

The Backlight menu will be displayed.

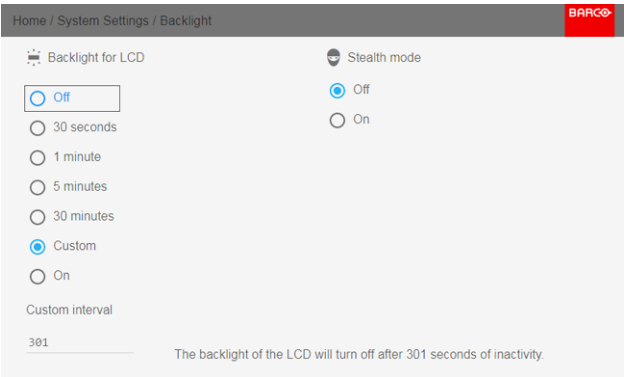


Image 9-22: Backlight menu

2. Choose the desired setting for the backlights. Select one of the predetermined options, or a custom value.

## 9.9 Reset

### What can be done?

All settings and values on the projector can be reset to its default values. This can be done for one or more settings separately, or all settings together (factory reset).

### Default settings

The following settings are default settings:

	Setting	Default value
UserInterface	Theme	Light
Network	Communication	LAN, Automatic settings
System	Eco Mode (if applicable)	Available

	Setting	Default value
	Ready Timeout	auto
Screen	Screen luminance - Unit	nits
Optics	High Contrast	Off
Illumination	Power	100%
ImageConnector	Color Space	auto
	Signal Range	auto
ImageResolution	Output Resolution (if applicable)	4K UHD
ImageWarp	Screen size	5120x3200 / 2560x1600
	4 corner	
	Bow	Warp off, no warp
	Warp files	Disabled, no files selected
ImageBlend	Blend/Mask size	
	Black Level	disabled, all value to zero
	Black Level Files	
	Blend Files	Disabled, no files selected
ImageRealColor	P7 Realcolor	all set to native
ImageStereo	Sync delay	0 µs
	Swap eye	Off
	Dark time	lowest value available
ImageDisplay	Display mode	AutoStereo
ImageOrientation	Orientation	Table, Front
ImageSource	Source files	Standard
ImageFeatures	Contrast	mid value
	Brightness	mid value
	Saturation	mid value
	Sharpness	mid value
	Gamma	mid value
	Cropping (if applicable)	Off
	Aspect Ratio (if applicable)	16:9

### How to reset all projector settings

1. In the main menu, select *System Settings* → *Reset*.
2. In the Reset menu, select *RESET ALL* and click **OK**.

### How to reset one or more projector settings

1. In the main menu, select *System Settings* → *Reset*.



Image 9-23: System Settings menu, Reset

The Reset menu is displayed.

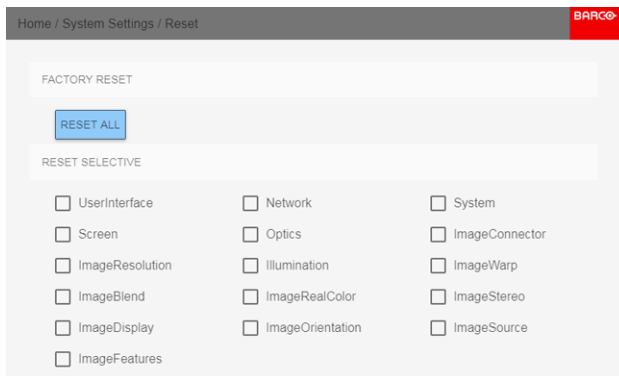


Image 9-24: Reset menu

2. Navigate to the checkbox next to the settings that need to be reset and press **OK**. Multiple selections are possible.
3. Select **RESET** and press **OK** to reset all selected settings.

## 9.10 Lens Calibration



Lens calibration is a time consuming operation.

### How to calibrate

1. In the main menu, *System Settings* → *Maintenance* → *Lens Calibration*.



Image 9-25: Maintenance menu, Lens Calibration

The Lens Calibration menu is displayed.

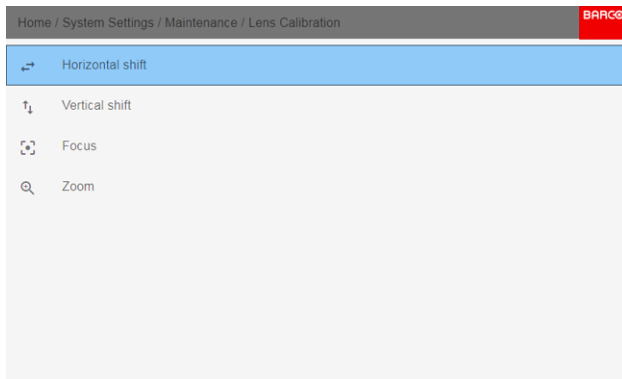


Image 9-26: Lens Calibration menu

2. In the Lens Calibration menu, select the desired calibration action and click **OK**.

You can select one of the following functions:

- Horizontal shift
- Vertical shift
- Focus
- Zoom

The text **Calibration in progress** will be displayed next to selected function until the calibration is completed. When an error is detected, the message *Calibration Error* is displayed next to function.

## 9.11 Electronic Convergence

### What can be done?

The convergence patterns can be used to check the convergence alignment of red, green and blue. If there is a misalignment of at least one 1 pixel, an electronic realignment is possible.

Mechanical realignment of the convergence can only be done by a qualified service technician.

### How to display the convergence settings

1. In the main menu, navigate to *System Settings* → *Maintenance* → *Electronic Convergence*.



Image 9-27: Maintenance menu, Electronic Convergence

The Electronic Convergence menu is displayed.



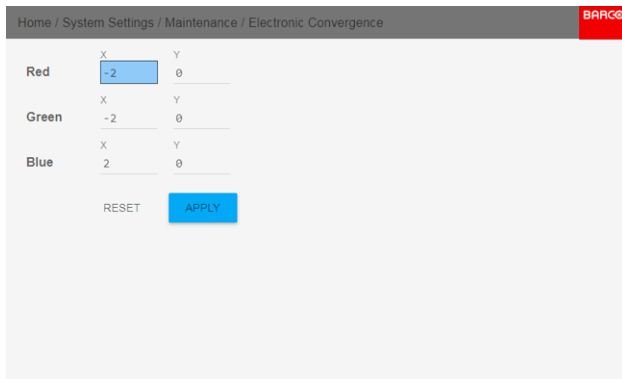


Image 9-28

2. Select the desired X or Y value for one of the three colors and confirm.
3. Use the arrow keys to raise or lower the value and confirm.
4. Confirm all changes by pressing **Apply**.

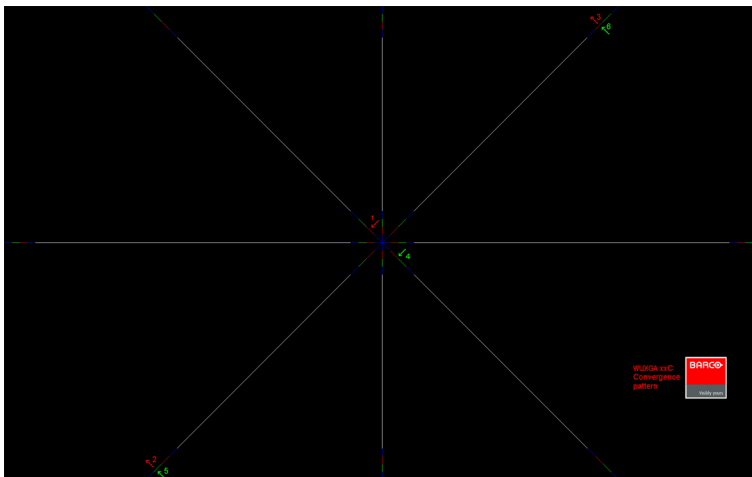


Image 9-29



**Tip:** Press **Reset** to return all values to the factory settings.

5. Repeat all steps until the desired alignment is achieved.

## 9.12 Advanced Settings

### About the Advanced Settings menu

The Advanced Settings menu is hidden by default for the regular user. you can only make this visible after entering a *Service code* with the remote control.

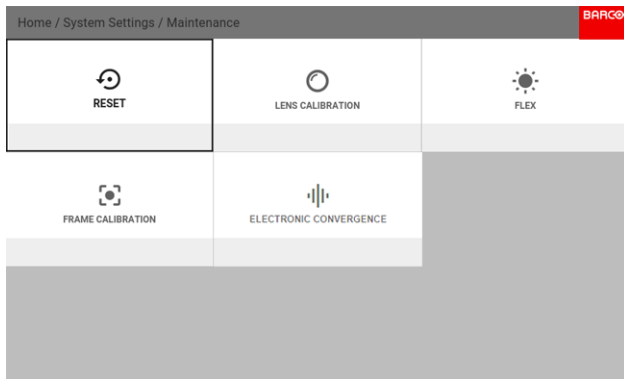


Image 9-30: Maintenance menu, with the Advanced Settings Hidden

If you have a service code, navigate to the Maintenance menu. Enter the code with the numeric keys. If entered correctly, the Advanced Settings option will become visible.



It doesn't matter what else you do or type with the remote. As long as you type in the service code in the correct order, the Advanced Settings option will become visible.



Statistics, Color, Laser Banks

Image 9-31: Maintenance menu, Advanced Settings



The Advanced Settings menu item will remain visible until you leave the Maintenance menu.

## Overview

- Advanced Settings – Color
- Advanced Settings – Dual Eye Real Color correction
- Advanced Settings – Statistics

### 9.12.1 Advanced Settings – Color



**CAUTION:** The native colors have been measured and set during factory production. Do not change them, unless parts of the optical path have been replaced due to servicing. If you need to change the native colors on the device, make sure to also perform a **P7 calibration**, using the Projector Toolset and a chroma meter. For more info on P7 calibration, refer to the Projector Toolset Reference guide.

## How to adjust the P7 native settings

1. In the main menu, navigate to *System Settings* → *Maintenance* → *Advanced Settings*.



Statistics, Color, Laser Banks

Image 9-32: Maintenance menu, Advanced Settings

2. In the Advanced Settings menu, select *Color*.



Image 9-33: Advanced Settings Menu, Color

The Color menu will be displayed.

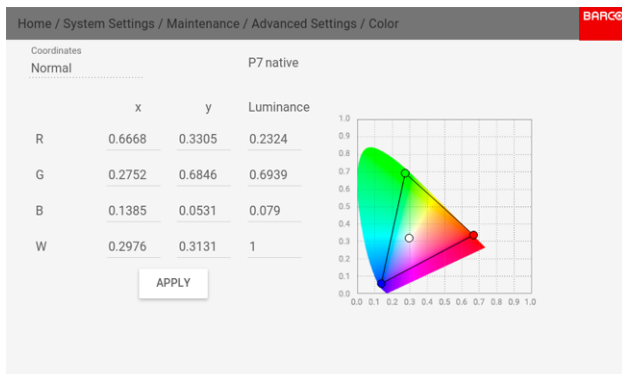


Image 9-34: Color menu

3. Select the desired value to change and confirm.
4. Change the values to the desired position, taking into account the color gamut values.
5. Select **APPLY** and click **OK**.

## 9.12.2 Advanced Settings – Dual Eye Real Color correction

### Why dual eye Real Color correction

When using the XDL in 6P 3D mode, it is possible to do color correction on the colors for both eyes separately.

While the native colors have been measured and set during factory production, it may be necessary to change these after changes (or service actions) on the optical path.

If you need to change these settings, make sure to also perform a P7 calibration, using the Projector Toolset and a chroma meter. For more info on this topic, refer to the Projector Toolset User Guide.

### How to adjust the P7 Dual Eye Color

1. In the main menu, navigate to *System Settings* → *Maintenance* → *Advanced Settings*.



Statistics, Color, Laser Banks

Image 9-35: Maintenance menu, Advanced Settings

2. In the Advanced Settings menu, select *Color*.



Image 9-36: Advanced Settings Menu, Color

The Color menu will be displayed.

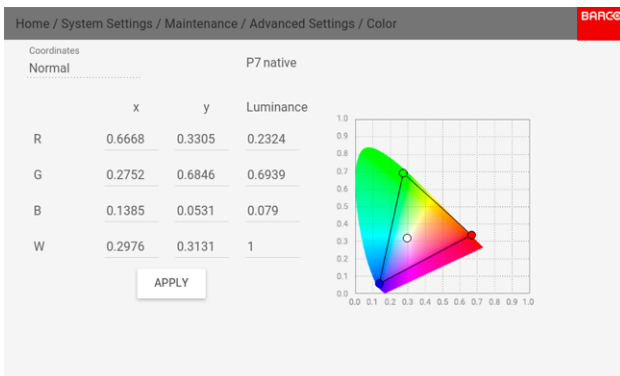


Image 9-37

3. Select the coordinates for the Eye. you can select either Left eye, or Right eye.

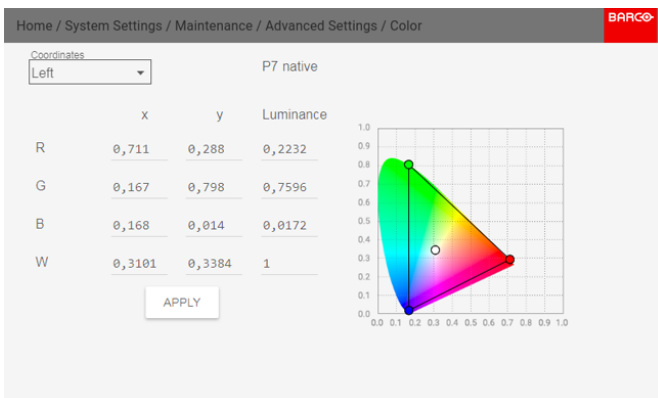


Image 9-38

4. Select the desired value to change and confirm.
5. Change the values to the desired position, taking into account the color gamut values.
6. Select **APPLY** and click **OK**.

### 9.12.3 Advanced Settings – Statistics

#### What can be seen?

The statistics screen shows the general information about the projector.

The following items will be displayed:

- Laser runtime
- Projector Runtime
- System time
- Current Uptime

## How to display the statistics

1. In the main menu, navigate to *System Settings* → *Maintenance* → *Advanced Settings*.



Statistics, Color, Laser Banks

Image 9-39: Maintenance menu, Advanced Settings

2. In the Advanced Settings menu, select *Statistics*.



Image 9-40: Advanced Settings menu, Statistics

The Statistics will be displayed.

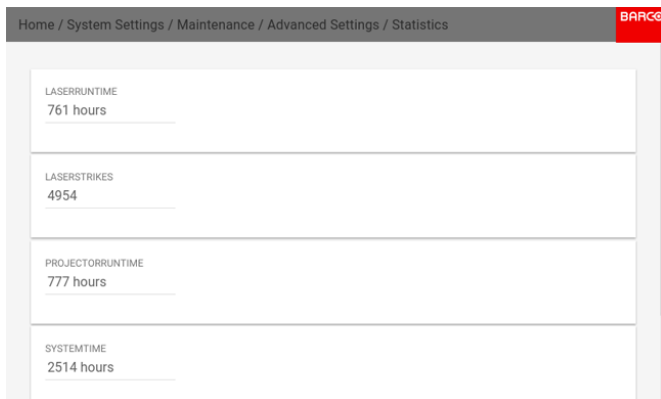


Image 9-41: Statistics menu



# Status menu

# 10



This is a status menu only. No changes can be made to settings from this menu.

## Overview

- Status menu overview

## 10.1 Status menu overview

### Status menu

While in the main menu, press Status.

### Source status

Displays active source information

### Product

Displays active product information:

- Article number: Projector article / part number
- Serial number: Projector serial number
- Firmware: Projector software package version
- Model name: Projector model name

### Illumination

Shows the used light source power (in %) and runtime.

### Communication

Lists the projector network address, the remote control broadcast address and the remote control projector address.

### Warp

Displays the Warp status and type of warp used

### Blend

Displays the Warp status and type of Blend used

### Environment

Shows the ambient temperature.

### Display

Shows display settings

### Active Functions

Shows the active function enabled.



# Maintenance procedures

# 11

## About this chapter

This chapter describes several maintenance procedures for the projector.



**WARNING:** All procedures described in this chapter may only be performed by TRAINED PROJECTIONISTS or qualified SERVICE PERSONNEL.

## Overview

- Check the dust filters
- Vacuum cleaning of the dust filters
- Vacuum cleaning of the dust filters
- Washing and drying the dust filters
- Cleaning the lens
- Cleaning the exterior of the projector

## 11.1 Check the dust filters

### How to check the large dust filter?

1. Unlatch and pivot the front cover door which contains the dust filters.



*Note:* In case there is insufficient space to pivot the front cover door 90 degrees pull out the small side panel from the front cover door assembly as illustrated below.

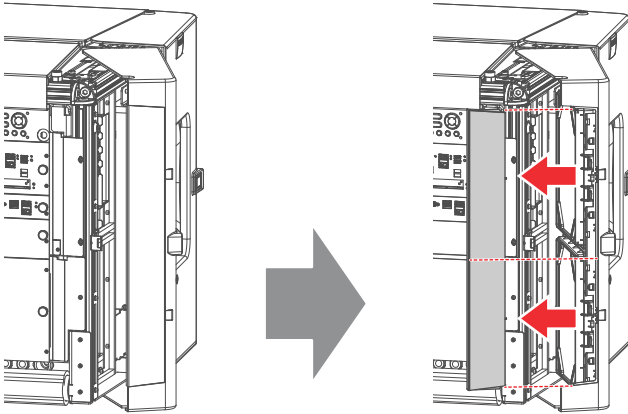


Image 11-1

2. Detach the dust filters from the inner side of the front cover door. Do this by pushing the two latches (reference 1 Image 11-2) of the dust filter inwards.

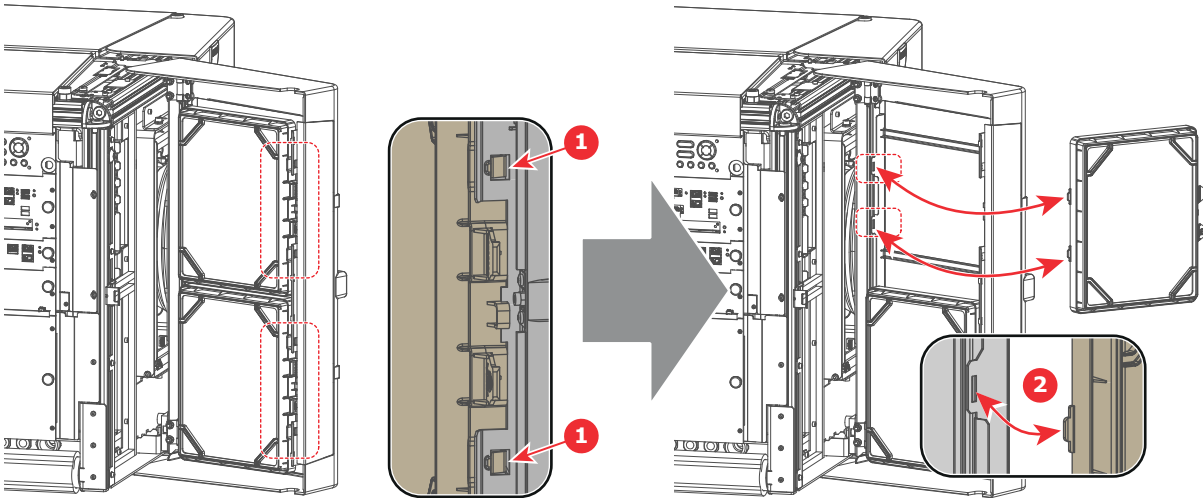


Image 11-2

3. Check the “air in” side of the dust filter for **dust** and/or **grease**.

In case the filter is contaminated with grease wash and dry the dust filter. See cleaning procedure “Washing and drying the dust filters”, page 128.

In case the filter contains dust but doesn't feel greasy then vacuum clean the dust filter. See procedure “Vacuum cleaning of the dust filters”, page 127.



*Note:* Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.



*Tip:* Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

4. Attach the clean dust filters to the inner side of the front cover door. Ensure that both latches and both mounting lips (reference 1 and 2 Image 11-2) of the dust filters are engaged.



**Caution:** UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE INTERNAL COMPONENTS OF THE SYSTEM.

5. Reinstall the small side panel (if removed, see Image 11-1) and close the front cover door.



The dust filter is cleanable. See cleaning procedure for correct cleaning and drying instructions.

## 11.2 Vacuum cleaning of the dust filters

### When to vacuum the dust filters?

The dust filters of the projector should be checked every month. If the filters are contaminated with dust then cleaning the filters with a vacuum cleaner should be sufficient. In case the filters feel greasy these must be washed. See cleaning procedure "Washing and drying the dust filters", page 128.



This procedure assumes that the dust filters are removed from the projector.

### Required tools

Vacuum cleaner with soft brush suction nozzle.

### How to vacuum-clean the dust filter?

1. Carefully vacuum the air inlet side of the dust filter. Use a vacuum cleaner with a soft brush suction nozzle. The air inlet side of the dust filter is the side which is surrounded with a glue edge.



**Tip:** Lightly tap the filter on its dusty side to expel heavy dust contamination.



**Tip:** Compressed air is also permitted to clean the filters but take care not to damage them.



**Caution:** Do not use compressed air inside the booth area. Bring the dust filters outside the building to blow off the dust.



**Caution:** Do not damage the dust filter. Replace damaged dust filters immediately.

## 11.3 Vacuum cleaning of the dust filters

### When to vacuum clean the dust filters?

The dust filters of the projector should be checked every month. If the filters are contaminated with dust then cleaning the filters with a vacuum cleaner should be sufficient. In case the filters feel greasy these must be washed. See cleaning procedure "Vacuum cleaning of the dust filters", page 127.



Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.



This procedure assumes that the dust filters are removed from the projector.

## Required tools

Vacuum cleaner with soft brush suction nozzle.

## How to vacuum-clean the dust filter?

1. Carefully vacuum the air inlet side of the dust filter. Use a vacuum cleaner with a soft brush suction nozzle. The air inlet side of the dust filter is the side which is surrounded with a glue edge.



*Tip:* Lightly tap the filter on its dusty side to expel heavy dust contamination.



*Tip:* Compressed air is also permitted to clean the filters but take care not to damage them.



**Caution:** Do not use compressed air inside the booth area. Bring the dust filters outside the building to blow off the dust.



**Caution:** Do not damage the dust filter. Replace damaged dust filters immediately.

# 11.4 Washing and drying the dust filters

## About filter washing and drying

For environments where popcorn grease and such can contaminate the filters, Barco advises the client to purchase one extra set of filters to cover drying time, as well as taking following extra precautions and instructions pertaining to filter cleaning and drying.

## Cleansing agent

To clean sticky, greasy dust filters we suggest usage of **Sodium carbonate** crystals ( $\text{Na}_2\text{CO}_3$ ). Sodium carbonate (Often called **washing soda**, **soda crystals**, or **sal soda** in the detergent section of stores) is widely used to effectively remove oil, grease, alcohol stains ... The product itself is relatively safe, sodium carbonate is used in toothpastes and as a food additive (E500). Potential Hazards are described in the section "Hazards", page 140.

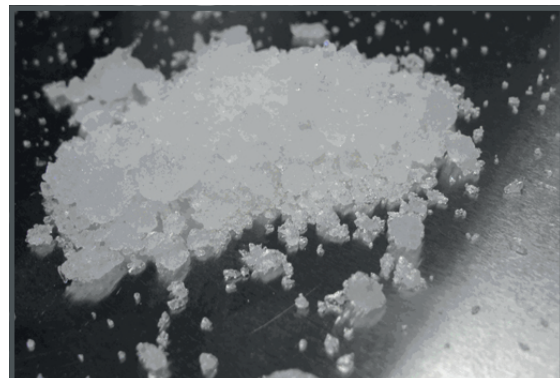


Image 11-3: Sodium carbonate crystals.



This cleaning procedure assumes that the filters are already removed from their slots.



Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

## Required tools

- Bucket with hot water.
- Sodium carbonate, 30 gram (handful) per liter hot water.

## How to wash and dry the dust filters?

1. Make a solution with a ratio of 30 gram (a handful) sodium carbonate to 1 liter **hot water**.
2. Soak the dust filters in the solution for **30 to 60 minutes**. The grease should be dissolved after 1 hour.
3. If the dust filter is still clogged repeat this procedure from step 1.
4. Rinse the dust filters with clean water to flush all grease residue away.
5. Shake out all excess liquid by repeatedly swinging the filter to-and-fro in a centrifugal action.
6. Then allow the filters to **dry thoroughly**.



**Note:** Drying time of the dust filters can be up to 24h or more. Drying time can be shorter when being done in a well-ventilated area.



**Tip:** To speed-up drying, allow the filter(s) to dry at 50°C max in a well ventilated room.



**CAUTION:** UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.



**CAUTION:** Do not install/use damaged dust filters. Replace damaged dust filters immediately with new dust filters of the same type. See <https://my.barco.com> for the correct replacement part.

## 11.5 Cleaning the lens



**WARNING:** Make sure that the lasers are switched OFF before performing this procedure



To minimize the possibility of damage to optical coatings, or scratches to lens surfaces follow the cleaning procedure as described here precisely.

### Required tools

- Compressed air.
- Clean Toraysee® cloth or any micro fiber lens cleaning cloth.
- Clean cotton cloth.

### Required parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any water-based lens cleaner)

### How to clean the lens?

1. Blow off dust with clean compressed air (or pressurized air cans<sup>3</sup>).
2. Clean with lens cleaner together with a clean lens cleaning cloth to remove the dust and contamination. Use big wipes in one single direction.
 

**Warning:** Do not wipe back and forwards across the lens surface as this tends to grind dirt into the coating.
3. Use a dry lens cleaning cloth to remove left liquid or stripes. Polish with small circles.
4. If there are still fingerprints on the surface, wipe them off with lens cleaner together with a clean lens cleaning cloth. Polish again with a dry one.

3: Pressurized air cans are not efficient if there is too much dust on the surface, the pressure is too low



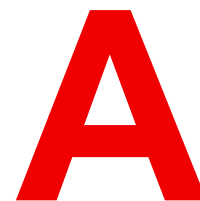
If smears occur when cleaning lenses, replace the cloth. Smears are the first indication of a dirty cloth.

## 11.6 Cleaning the exterior of the projector

### How to clean the exterior of the projector ?

1. Switch off the projector and unplug the projector from the mains power net.
2. Clean the housing of the projector with a damp cloth. Stubborn stains may be removed with a cloth lightly dampened with a mild detergent solution.

# Specifications



## About this chapter

This chapter gives an overview of the specification of your XDL series projector as well as the dimensions and the center of gravity.

## Overview

- Specifications of the XDL-4k30
- Specifications of the XDL-4k60
- Specifications of the XDL-4k75
- Dimensions of the XDL series projector
- Technical Regulations

## A.1 Specifications of the XDL-4k30

### Specifications

<b>Projector type</b>	Native 4K 3-chip DLP digital projector up to 120 Hz
<b>Technology</b>	1.38" DMD™ x3
<b>Resolution</b>	4,096 x 2,160
<b>Brightness</b>	Up to 28,000 center lumens using HC lenses / Up to 30,000 center lumens using HB lenses
<b>Native contrast ratio</b>	2,800:1 (typical using HC lenses) / 500:1 ANSI contrast (typical)   2,000:1 (typical using HB lenses) / 450:1 ANSI contrast (typical)
<b>Prime lenses</b>	HC: 1.13-1.72; 1.35-1.86; 1.46-2.10; 1.65-2.60; 2.00-3.35 / HB : XLD 0.8; 1:0 ; 1.45-1.8; 1.8-2.4; 2.2-3.0; 2.8-5.5; 5.5-8.5
<b>Optical lens shift</b>	V: -100% to +100% / H: +/- 40% (lens dependent)
<b>Light source</b>	Direct coupled RGB lasers 6P
<b>Light source lifetime</b>	20,000 hrs*
<b>Color correction</b>	P7
<b>Optical dowser</b>	Standard
<b>Orientation</b>	Tilt 45° up and 30° downwards   Rotation – 20 degrees / +90 degrees (=Portrait)
<b>Sealed DLP™ core</b>	standard
<b>Inputs</b>	Slot 1 :Dual HDBt; HDMI 2.0 (HDCP 2.2); DP 1.2 (HDCP 1.3); Quad 3G/12G SDI / BarcoLink   Slot 2: Quad DP1.2
<b>Input resolutions</b>	From NTSC up to 4K (4,096 x 2,160) 120 Hz
<b>Picture-in-picture</b>	Two sources simultaneously
<b>CLO (constant light output)</b>	Standard
<b>ScenergiX</b>	Horizontal and vertical edge blending, Direct adjust OSD + toolset
<b>Image processing</b>	Embedded warp & blend engine
<b>Keystone correction</b>	Yes
<b>Integrated web server</b>	Yes
<b>Software tools</b>	Projector Toolset
<b>Control</b>	XLR wired + IR, RS232, Wifi (opt), GSM (opt)
<b>Network connection</b>	10/100 base-T, RJ-45 connection, Wifi (optional)
<b>Dimensions (WxLxH)</b>	Projector: 744 x 1,445 x 706 mm / 29.3 x 56.9 x 27.8 inches (with feet, no lens) one chillers, with the following dimensions: 701 x 701 x 800 mm / 27.6 x 27.6 x 31.5 inches
<b>Weight</b>	Projector: 200kg (~440lb) / Chiller: ~115kg (~250lb)
<b>Cooling liquid hose length</b>	2.5-5-10m (8.2-16.4-32.8ft)
<b>Power requirements</b>	Projector: 200-240/346-415V 50-60Hz 16A 3W+N+PE (Y connection) / Power cord size range: 4 sq mm to 6 sq mm, 10AWG to 8AWG /Circuit breaker range: 25A to 40A   200-240V 3W+PE 28A 50-60Hz (Λ-connection) / Power cord size: 6 sq mm, 8AWG / Circuit breaker: 40A



	Chillers: 230/400V 3W+N+PE 16A, 2.5 sq mm (Y connection) or 208V / 3W+PE (Δ- connection) / Max. 16A per phase
<b>Ambient temperature</b>	10-35°C (95°F) Max. (projector and chillers)
<b>Operational humidity</b>	5-80% (non condens)
<b>Power consumption</b>	Projector @ full laser power: 3.5 kW (2D or Polarization 3D) / 2.0 kW (Barco Laser3D - 6P) Chillers @ full laser power: 2.0 kW (2D or Polarization 3D) / 1.6 kW (Barco Laser3D - 6P)
<b>3D systems</b>	Color3D (Barco Laser3D): Native 6-primary color-3D system. Only requires color filter glasses / Active glasses systems / Polarization recuperation systems
<b>Safety class</b>	Class 1, RG3
<b>Certifications</b>	CE; ETL/UL/FCC
<b>*Note</b>	*Less than 20% decrease during a runtime of 20,000 hrs

## A.2 Specifications of the XDL–4k60

### Specifications

<b>Projector type</b>	Native 4K 3-chip DLP digital projector up to 120 Hz
<b>Technology</b>	1.38" DMD™ x3
<b>Resolution</b>	4,096 x 2,160
<b>Brightness</b>	Up to 56,000 center lumens using HC lenses / Up to 60,000 center lumens using HB lenses
<b>Native contrast ratio</b>	2,800:1 (typical using HC lenses) / 500:1 ANSI contrast (typical)   2,000:1 (typical using HB lenses) / 450:1 ANSI contrast (typical)
<b>Prime lenses</b>	HC: 1.13-1.72; 1.35-1.86; 1.46-2.10; 1.65-2.60; 2.00-3.35 / HB : XLD 0.8; 1:0 ; 1.45-1.8; 1.8-2.4; 2.2-3.0; 2.8-5.5; 5.5-8.5
<b>Optical lens shift</b>	V: -100% to +100% / H: +/- 40% (lens dependent)
<b>Light source</b>	Direct coupled RGB lasers 6P
<b>Light source lifetime</b>	20.000 hours*
<b>Color correction</b>	P7
<b>Optical dowser</b>	Standard
<b>Orientation</b>	Tilt 45° up and 30° downwards   Rotation – 20 degrees / +90 degrees (=Portrait)
<b>Sealed DLP™ core</b>	Standard
<b>Inputs</b>	Slot 1 :Dual HDBt; HDMI 2.0 (HDCP 2.2); DP 1.2 (HDCP 1.3); Quad 3G/12G SDI / BarcoLink   Slot 2: Quad DP1.2
<b>Input resolutions</b>	From NTSC up to 4K (4,096 x 2,160) 120 Hz
<b>Picture-in-picture</b>	Two sources simultaneously
<b>CLO (constant light output)</b>	Standard
<b>ScenergiX</b>	Horizontal and vertical edge blending

<b>Image processing</b>	Embedded warp & blend engine
<b>Keystone correction</b>	Yes
<b>Integrated web server</b>	Yes
<b>Software tools</b>	Projector Toolset
<b>Control</b>	XLR wired + IR, RS232, Wifi (opt), GSM (opt)
<b>Network connection</b>	10/100 base-T, RJ-45 connection, Wifi (optional)
<b>Dimensions (WxLxH)</b>	Projector: 744 x 1,445 x 706 mm / 29.3 x 56.9 x 27.8 inches (with feet, no lens)   Two chillers, each with the following dimensions: 701 x 701 x 800 mm / 27.6 x 27.6 x 31.5 inches
<b>Weight</b>	Projector: 235kg (~520lb) / Chillers: ~115kg (~250lb) per chiller (two chillers needed)
<b>Cooling liquid hose length</b>	2.5-5-10m (8.2-16.4-32.8ft)
<b>Power requirements</b>	Projector: 200-240/346-415V 50-60Hz 16A 3W+N+PE (Y connection) / Power cord size range: 4 sq mm to 6 sq mm, 10AWG to 8AWG / Circuit breaker range: 25A to 40A   200-240V 3W+PE 28A 50-60Hz (Λ-connection) / Power cord size: 6 sq mm, 8AWG / Circuit breaker: 40A Chillers: 230/400V 3W+N+PE 16A, 2.5 sq mm (Y connection) or 208V / 3W+PE (Λ-connection) / Max. 16A per phase
<b>Ambient temperature</b>	10-35°C (95°F) Max. (projector and chillers)
<b>Operational humidity</b>	5-80% (non condens)
<b>Power consumption</b>	Projector @ full laser power: 6.7 kW (2D or Polarization 3D) / 3.6 kW (Barco Laser3D - 6P) Chillers @ full laser power: 3.0 kW (2D or Polarization 3D) / 2.5 kW (Barco Laser3D - 6P)
<b>3D systems</b>	Color3D (Barco Laser3D): Native 6-primary color-3D system. Only requires color filter glasses / Active glasses systems / Polarization recuperation systems
<b>Safety class</b>	Class 1, RG3
<b>Certifications</b>	CE; ETL/UL/FCC
<b>*Note</b>	*Less than 20% decrease during a runtime of 20,000 hrs

## A.3 Specifications of the XDL-4k75

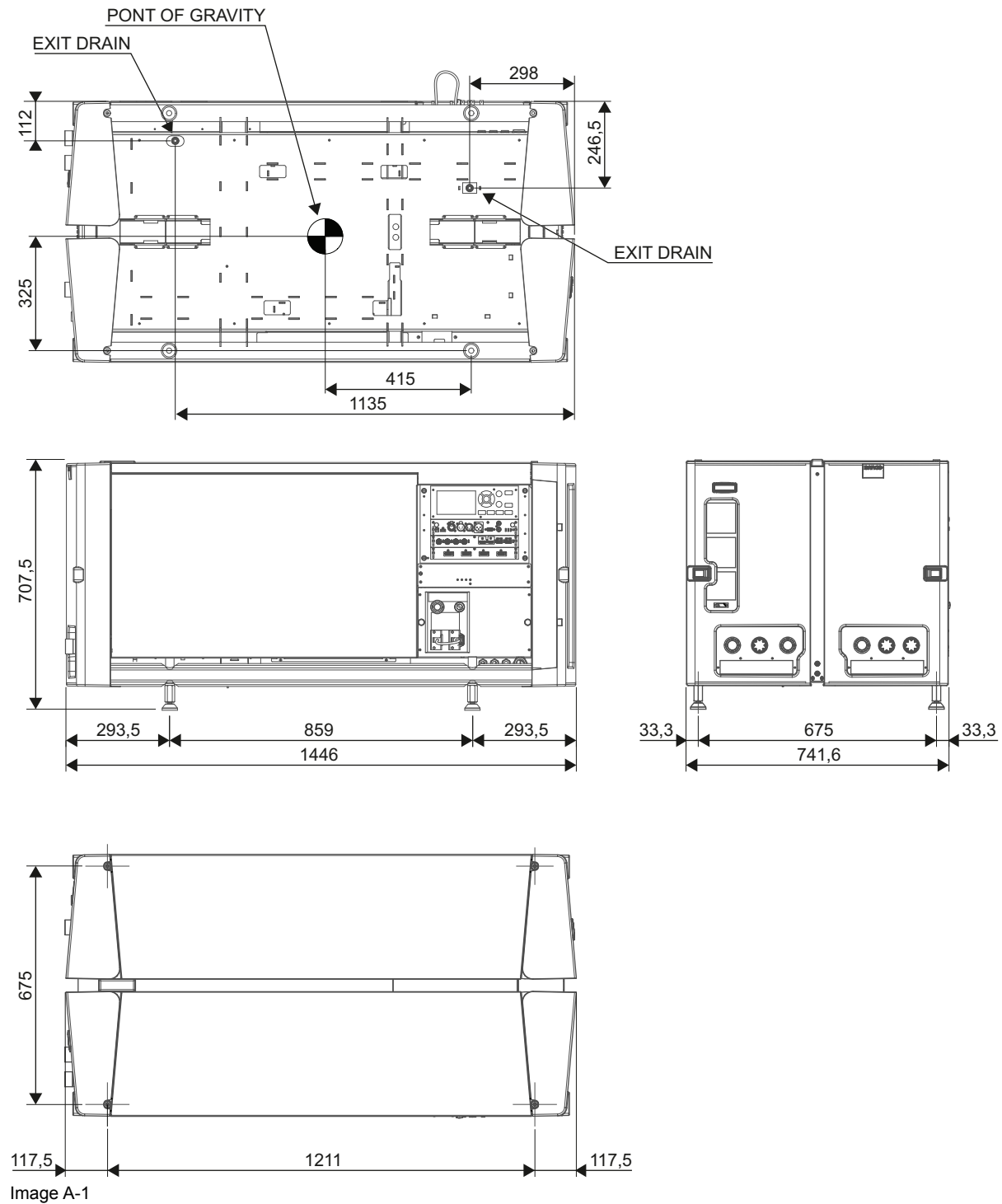
### Specifications

<b>Projector type</b>	Native 4K 3-chip DLP digital projector up to 120 Hz
<b>Technology</b>	1.38" DMD™ x3
<b>Resolution</b>	4,096 x 2,160
<b>Brightness</b>	Up to 70,000 center lumens using HC lenses / Up to 75,000 center lumens using HB lenses
<b>Native contrast ratio</b>	2,800:1 (typical using HC lenses) / 500:1 ANSI contrast (typical)   2,000:1 (typical using HB lenses) / 450:1 ANSI contrast (typical)
<b>Prime lenses</b>	HC: 1.13-1.72; 1.35-1.86; 1.46-2.10; 1.65-2.60; 2.00-3.35 / HB : XLD 0.8; 1:0 ; 1.45-1.8; 1.8-2.4; 2.2-3.0; 2.8-5.5; 5.5-8.5
<b>Optical lens shift</b>	V: -100% to +100% / H: +/- 40% (lens dependent)

<b>Light source</b>	Direct coupled RGB lasers 3P
<b>Light source lifetime</b>	15,000 hours
<b>Color correction</b>	P7
<b>Optical dowser</b>	Standard
<b>Orientation</b>	Tilt 45° up and 30° downwards   Rotation – 20 degrees / +90 degrees (=Portrait)
<b>Sealed DLP™ core</b>	standard
<b>Inputs</b>	Slot 1 :Dual HDBt; HDMI 2.0 (HDCP 2.2); DP 1.2 (HDCP 1.3); Quad 3G/12G SDI / BarcoLink
<b>Input resolutions</b>	From NTSC up to 4K (4,096 x 2,160) 120 Hz
<b>Picture-in-picture</b>	Two sources simultaneously
<b>CLO (constant light output)</b>	Standard
<b>ScenergiX</b>	Horizontal and vertical edge blending, Direct adjust OSD + toolset
<b>Image processing</b>	Embedded warp & blend engine
<b>Keystone correction</b>	Yes
<b>Integrated web server</b>	Yes
<b>Software tools</b>	Projector Toolset
<b>Control</b>	XLR wired + IR, RS232, Wifi (opt), GSM (opt)
<b>Network connection</b>	10/100 base-T, RJ-45 connection, Wifi (optional)
<b>Dimensions (WxLxH)</b>	Projector: 744 x 1,445 x 706 mm / 29.3 x 56.9 x 27.8 inches (with feet, no lens) Two chillers, each with the following dimensions: 701 x 701 x 800 mm / 27.6 x 27.6 x 31.5 inches
<b>Weight</b>	Projector: 235kg (~520lb) / Chillers: ~115kg (~250lb) per chiller (two chillers needed)
<b>Cooling liquid hose length</b>	2.5-5-10m (8.2-16.4-32.8ft)
<b>Power requirements</b>	Projector:200-240/346-415V 50-60Hz 16A 3W+N+PE (Y connection) / Power cord size range: 4 sq mm to 6 sq mm, 10AWG to 8AWG /Circuit breaker range: 25A to 40A   200-240V 3W+PE 28A 50-60Hz (Λ-connection) / Power cord size: 6 sq mm, 8AWG / Circuit breaker: 40A Chillers: 230/400V 3W+N+PE 16A, 2.5 sq mm (Y connection) or 208V / 3W+PE (Λ- connection) / Max. 16A per phase
<b>Ambient temperature</b>	10-35°C (95°F) Max. (projector and chillers)
<b>Operational humidity</b>	5-80% (non condens)
<b>Power consumption</b>	Projector @ full laser power: 6.7 kW Chillers @ full laser power: 3.0 kW
<b>3D systems</b>	Active glasses systems / Polarization recuperation systems
<b>Safety class</b>	Class 1, RG3
<b>Certifications</b>	CE; ETL/UL/FCC
<b>*Note</b>	*Less than 20% decrease during a runtime of 15,000 hrs

## A.4 Dimensions of the XDL series projector

### Dimensions



# A.5 Technical Regulations

## Certificates



Image A-2: Rohs



Image A-3:  
Rohs OK



Image A-4: CE mark



Image A-5: FCC label



Image A-6: RCM mark



# Environmental information

# B

## Overview

- Turkey RoHS compliance
- Disposal information
- Hazards
- Contact information

## B.1 Turkey RoHS compliance

### Turkey RoHS compliance



■ Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.

[Republic of Turkey: In conformity with the WEEE Regulation]

## B.2 Disposal information

### Disposal Information

Waste Electrical and Electronic Equipment



■ This symbol on the product indicates that, under the European Directive 2012/19/EU governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

For more information about recycling of this product, please contact your local city office or your municipal waste disposal service.

For details, please visit the Barco website at: <http://www.barco.com/AboutBarco/weee>

### Disposal of batteries in the product



This product contains batteries covered by the Directive 2006/66/EC which must be collected and disposed of separately from municipal waste.

If the battery contains more than the specified values of lead (Pb), mercury (Hg) or cadmium (Cd), these chemical symbols will appear below the crossed-out wheeled bin symbol.

By participating in separate collection of batteries, you will help to ensure proper disposal and to prevent potential negative effects on the environment and human health.

## B.3 Hazards

### Safety notice Sodium Carbonate ( $\text{Na}_2\text{CO}_3$ )

According to the Material Safety Data Sheet (MSDS), Sodium Carbonate could cause the following hazards:

- Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation (lung irritant).
- Potential Chronic Health Effects: Slightly hazardous in case of skin contact (sensitizer). The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organ damage.

## B.4 Contact information

### Barco contact information

Registered office address: President Kennedypark 35, 8500 Kortrijk, Belgium

Contact address: Beneluxpark 21, 8500 Kortrijk, Belgium



## Importers contact information

To find your local importer, contact Barco directly or one of Barco's regional offices via the contact information given on Barco's web site, [www.barco.com](http://www.barco.com).



# Overview video timings for video interfaces

C

## C.1 Overview video timings

### List of compatible signals

The following table specifies the video signals that the projector can project. Barco Events projectors supports the signal with “X” in the Compatible signals column.

**Note:** Support for refresh rates 24.00, 30.00, 60.00 Hz automatically includes support of 1/1.001 x those refresh rates.

Resolution	Vertical refresh rate (Hz)	Compatible signal				
		HDMI 2.0 Inputs	12G SDI Input on Mk II Input board	3G SDI Inputs	DisplayPort 1.2 Inputs	HDBaseT & HDMI 1.4 Inputs
640 x 480	60	X	—	—	X	X
720 x 480	60	X	—	—	—	X
720 x 576	50	X	—	—	—	X
800 x 600	60	X	—	—	X	X
1024 x 768	60	X	—	—	X	X
1280 x 720	24	—	X	X	—	—
1280 x 720	25	—	X	X	—	—
1280 x 720	30	—	X	X	—	—
1280 x 720	50	X	X	X	X	X
1280 x 720	60	X	X	X	X	X
1280 x 800	60	X	—	—	X	X
1280 x 960	60	X	—	—	X	X
1280 x 1024	60	X	—	—	X	X
1400 x 1050	60	X	—	—	X	X
1600 x 1200	60	X	—	—	X	X
1600 x 1200	120	—	—	—	X	—
1920 x 1080	24	X	X	X	X	X
1920 x 1080	25	X	X	X	—	X
1920 x 1080	30	X	X	X	—	X
1920 x 1080	50	X	X	X	X	X
1920 x 1080	60	X	X	X	X	X
1920 x 1080	120	—	—	—	X	—
1920 x 1200	50	X	X	X	X	X
1920 x 1200	60	X	X	X	X	X
1920 x 1200	120	—	—	—	X	—
2048 x 1080	24	X	—	—	X	X
2048 x 1080	25	X	—	—	X	X
2048 x 1080	30	X	—	—	X	X
2048 x 1080	48	X	—	—	X	X
2048 x 1080	50	X	X	X	X	X

Resolution	Vertical refresh rate (Hz)	Compatible signal				
		HDMI 2.0 Inputs	12G SDI Input on Mk II Input board	3G SDI Inputs	DisplayPort 1.2 Inputs	HDBaseT & HDMI 1.4 Inputs
2048 x 1080	60	X	X	X	X	X
2048 x 1080	120	—	—	—	X	—
2560 x 1600	50	X	—	—	X	X
2560 x 1600	60	X	—	—	X	X
2560 x 1600	120	—	—	—	X	—
3840 x 2160	24	X	—	—	X	X
3840 x 2160	25	X	—	—	X	X
3840 x 2160	30	X	—	—	X	X
3840 x 2160	50	X	X	—	X	—
3840 x 2160	60	X	X	—	X	—
3840 x 2400	50	X	—	—	X	—
3840 x 2400	60	X	—	—	X	—
4096 x 2160	24	X	—	—	X	X
4096 x 2160	25	X	—	—	X	X
4096 x 2160	30	X	—	—	X	X
4096 x 2160	50	X	X	—	X	—
4096 x 2160	60	X	X	—	X	—

## C.2 Overview video timings SDI Inputs

### Overview

The following standard video formats are available for the projector.

Video timing (active pixels x active lines)	Vertical refresh rate (Hz) <sup>4</sup>	Type	Port Type
1280 x 720	24	HD-SDI	Single Link & Quad Link
1280 x 720	25	HD-SDI	Single Link & Quad Link
1280 x 720	30	HD-SDI	Single Link & Quad Link
1280 x 720	50	HD-SDI	Single Link & Quad Link
1280 x 720	60	HD-SDI	Single Link & Quad Link
1920 x 1080	24	HD-SDI	Single Link & Quad Link
1920 x 1080	25	HD-SDI	Single Link & Quad Link
1920 x 1080	30	HD-SDI	Single Link & Quad Link
1920 x 1080	50	3G-SDI	Single Link & Quad Link

<sup>4</sup>: Support for refresh rates 24.00, 30.00 and 60.00 Hz automatically includes support of 1/1.001 x those refresh rates.

Video timing (active pixels x active lines)	Vertical refresh rate (Hz) <sup>4</sup>	Type	Port Type
1920 x 1080	60	3G-SDI	Single Link & Quad Link
1920 x 1200	50	3G-SDI "BarcoLink"	Single Link & Quad Link
1920 x 1200	59.94	3G-SDI "BarcoLink"	Single Link & Quad Link
1920 x 1200	60	3G-SDI "BarcoLink"	Single Link & Quad Link
2048 x 1080	50	3G-SDI	Single Link & Quad Link
2048 x 1080	60	3G-SDI	Single Link & Quad Link
3840 x 2160	50	12G-SDI <sup>5</sup>	Single Link
3840 x 2160	60	12G-SDI <sup>5</sup>	Single Link
4096 x 2160	50	12G-SDI <sup>5</sup>	Single Link
4096 x 2160	60	12G-SDI <sup>5</sup>	Single Link

## C.3 Overview video timings HDMI 2.0 inputs

### Overview

The following standard video formats are available for the projector.

**Note:** support for refresh rates 24.00, 30.00, 60.00 Hz automatically includes support of 1/1.001 x those refresh rates

Video timing (active pixels x active lines)	Vertical refresh rate (Hz)	Support for 3D?
640 x 480	60	
720 x 480	60	
720 x 576	50	
800 x 600	60	
1024 x 768	60	
1280 x 720	50	Frame packing Top – bottom
1280 x 720	60	Frame packing Top – bottom
1280 x 800	60	
1280 x 960	60	
1280 x 1024	60	
1400 x 1050	60	
1600 x 1200	60	
1920 x 1080	24	Frame packing Top – bottom

4: Support for refresh rates 24.00, 30.00 and 60.00 Hz automatically includes support of 1/1.001 x those refresh rates.

5: 12G SDI board only, and only on Channel A

Video timing (active pixels x active lines)	Vertical refresh rate (Hz)	Support for 3D?
1920 x 1080	25	
1920 x 1080	30	
1920 x 1080	50	Side by Side (SbS) Half
1920 x 1080	60	Side by Side (SbS) Half
1920 x 1200	50	
1920 x 1200	60	
2048 x 1080	24	
2048 x 1080	25	
2048 x 1080	30	
2048 x 1080	48	
2048 x 1080	50	
2048 x 1080	60	
2560 x 1600	50	
2560 x 1600	60	
3840 x 2160	24	
3840 x 2160	25	
3840 x 2160	30	
3840 x 2160	50	
3840 x 2160	60	
3840 x 2400	50	
3840 x 2400	60	
4096 x 2160	24	
4096 x 2160	25	
4096 x 2160	30	
4096 x 2160	50	
4096 x 2160	60	

## C.4 Overview video timings DisplayPort 1.2 inputs

### Overview

The following standard video formats are available for the projector.

**Note:** support for refresh rates 24.00, 30.00, 60.00 Hz automatically includes support of 1/1.001 x those refresh rates

Video timing (active pixels x active lines)	Vertical refresh rate (Hz)	Available layout modes, other than standard layout (1 x 1 layout) <sup>6</sup>	Support for 3D?
640 x 480	60		
800 x 600	60		
960 x 1080	120	4 Quadrant mode (2 x 2 layout)	Active 3D
960 x 1200	120	4 Quadrant mode (2 x 2 layout)	Active 3D
960 x 2160	120	4 Column mode (4 x 1 layout)	Active 3D
960 x 2400	120	4 Column mode (4 x 1 layout)	Active 3D
1024x 768	60		
1024 x 2160	60	4 Column mode (4 x 1 layout)	
1024 x 2160	120	4 Column mode (4 x 1 layout)	Active 3D
1280 x 720	50		
1280 x 720	60		
1280 x 800	60		
1280 x 960	60		
1280 x 1024	60		
1280 x 1080	60	4 Quadrant mode (2 x 2 layout)	
1280 x 1080	120	4 Quadrant mode (2 x 2 layout)	Active 3D
1280 x 1600	60	4 Quadrant mode (2 x 2 layout)	
1280 x 1600	120	4 Quadrant mode (2 x 2 layout)	Active 3D
1400 x 1050	60		
1600 x 1200	60		
1600 x 1200	120		Active 3D
1920 x 1080	50		
1920 x 1080	60		
1920 x 1080	120	4 Quadrant mode (2 x 2 layout)	Active 3D
1920 x 1200	50		
1920 x 1200	60		
1920 x 1200	120	4 Quadrant mode (2 x 2 layout)	Active 3D

6: Other layout modes are only available on Input boards that have multiple DP inputs.



<b>Video timing (active pixels x active lines)</b>	<b>Vertical refresh rate (Hz)</b>	<b>Available layout modes, other than standard layout (1 x 1 layout)<sup>6</sup></b>	<b>Support for 3D?</b>
1920 x 2160	60	2 Column mode (2 x 1 layout)	Passive stereo
1920 x 2160	120	2 Column mode (2 x 1 layout)	Active 3D
1920 x 2400	60	2 Column mode (2 x 1 layout)	
2048 x 1080	24		
2048 x 1080	25		
2048 x 1080	30		
2048 x 1080	48		
2048 x 1080	50		
2048 x 1080	60		
2048 x 1080	120	4 Quadrant mode (2 x 2 layout)	Active 3D
2048 x 2160	60	2 Column mode (2 x 1 layout)	
2048 x 2160	120	2 Column mode (2 x 1 layout)	Active 3D
2560 x 1080	120		Active 3D
2560 x 1440	120		Active 3D
2560 x 1600	50		
2560 x 1600	60		
2560 x 1600	120		
3840 x 2160	24		
3840 x 2160	25		
3840 x 2160	30		
3840 x 2160	50		
3840 x 2160	60		Passive Stereo
3840 x 2400	50		
3840 x 2400	60		
4096 x 2160	24		
4096 x 2160	25		
4096 x 2160	30		
4096 x 2160	50		
4096 x 2160	60		

6: Other layout modes are only available on Input boards that have multiple DP inputs.

## C.5 Overview video timings HDBaseT inputs

### Overview

The following standard video formats are available for the projector.

**Note:** support for refresh rates 24.00, 30.00, 60.00 Hz automatically includes support of 1/1.001 x those refresh rates.

Video timing (active pixels x active lines)	Vertical refresh rate (Hz)	Available layout modes, other than standard layout (1 x 1 layout)
640 x 480	60	
720 x 480	60	
720 x 576	50	
800 x 600	60	
1024 x 768	60	
1280 x 720	50	
1280 x 720	60	
1280 x 800	60	
1280 x 960	60	
1280 x 1024	60	
1400 x 1050	60	
1600 x 1200	60	
1920 x 1080	24	
1920 x 1080	25	
1920 x 1080	30	
1920 x 1080	50	
1920 x 1080	60	
1920 x 1200	50	
1920 x 1200	60	
1920 x 2160	50	2 Column mode (2 x 1 layout)
1920 x 2160	60	2 Column mode (2 x 1 layout)
2048 x 1080	24	
2048 x 1080	25	
2048 x 1080	30	
2048 x 1080	48	
2048 x 1080	50	
2048 x 1080	60	
2048 x 2160	50	2 Column mode (2 x 1 layout)
2048 x 2160	60	2 Column mode (2 x 1 layout)
2560 x 1600	50	
2560 x 1600	60	
3840 x 2160	24	

<b>Video timing (active pixels x active lines)</b>	<b>Vertical refresh rate (Hz)</b>	<b>Available layout modes, other than standard layout (1 x 1 layout)</b>
3840 x 2160	25	
3840 x 2160	30	
4096 x 2160	24	
4096 x 2160	25	
4096 x 2160	30	



**DMX chart**

**D**

## D.1 DMX chart input board positioning

### About the input boards

6 Input selection ranges are reserved in the DMX chart per input board location (named L1 and L2). With the current version of DMX support, it is important to take into account to keep the input boards in their original slots.

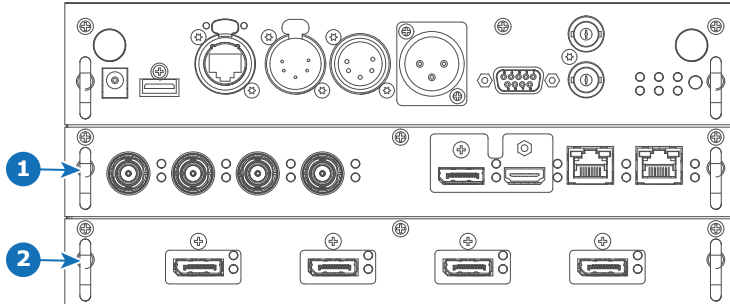


Image D-1

- 1 Slot L1, here filled with the Quad combo Input board
- 2 Slot L2, here filled with the Quad DP 1.2 Input board

## D.2 DMX chart, Basic

### Overview

Channel	Function	Value	Default	Action
1	Shutter + Intensity	0 - 7	255	Close shutter
		8 - 255		Adjust intensity
2	Function select	0 - 7	0	No function
		8 - 15		Activate default macro (full screen) (If held for 1 second) <sup>7</sup>
		16 - 23		Activate macro 2 (If held for 1 second) <sup>7</sup>
		24 - 31		Activate macro 3 (If held for 1 second) <sup>7</sup>
		32 - 39		Activate macro 4 (If held for 1 second) <sup>7</sup>
		40 - 47		Activate macro 5 (If held for 1 second) <sup>7</sup>
		48 - 55		Activate macro 6 (If held for 1 second) <sup>7</sup>
		56 - 63		Activate macro 7 (If held for 1 second) <sup>7</sup>
		64 - 71		Activate macro 8 (If held for 1 second) <sup>7</sup>
		72 - 79		Activate macro 9 (If held for 1 second) <sup>7</sup>
		80 - 87		Activate macro 10 (If held for 1 second) <sup>7</sup>
		88 - 95		Select input 1: HDMI Input (If held for 1 second) <sup>8</sup>
		96 - 103		Select input 2: DisplayPort Input (If held for 1 second) <sup>8</sup>
		104 - 111		Select input 3: SDI Input A (If held for 1 second) <sup>8</sup>
		112 - 119		Select input 4: SDI Input B (If held for 1 second) <sup>8</sup>
		120 - 127		Select input 5: HDBaseT Input 1 (if held for 1 second) <sup>8</sup>
		128 - 135		Select input 6: Quad SDI input (if held for 1 second) <sup>8</sup>
		136 - 143		Select input 7: Quad DP board Input A (if held for 1 second) <sup>9</sup>
		144 - 151		Select input 8: Quad DP board Input B (if held for 1 second) <sup>9</sup>
		152 - 159		Select input 9: Quad DP board Input C (if held for 1 second) <sup>9</sup>
		160 - 167		Select input 10: Quad DP board Input D (if held for 1 second) <sup>9</sup>
		168 - 175		Select input 11: Quad DP board Inputs A-B (if held for 1 second) <sup>9</sup>

7: Will be available in a future release.

8: Only when the Quad Combo input board is installed in slot L1

9: Only when the Quad DisplayPort input board is installed in slot L2

Channel	Function	Value	Default	Action
		176 - 183		Select input 12: Quad DP board quad column mode (if held for 1 second) <sup>9</sup>
		184 - 207		Reserved for future functionality
		208 - 115		Power on / Light source on (If held for 5 seconds)
		216 - 223		Power down / Light source off (if held for 5 seconds)
		224 - 255		Reserved for future functionality

## D.3 DMX chart, Extended

### Overview

Channel	Function	Value	Default	Actions
1	Shutter + Intensity	0 - 7	255	Close shutter
		8 - 255		Adjust intensity
2	Brightness	0 - 255	128	Adjusts the brightness between 0 and 100% on input.
3	Contrast	0 - 255	128	Adjusts the contrast between 0 and 100% on input
4	Input selection	0 - 7	0	No function
		8 - 15		Activate default macro (full screen) (If held for 1 second)
		16 - 23		Activate macro 2 (If held for 1 second) <sup>7</sup>
		24 - 31		Activate macro 3 (If held for 1 second) <sup>7</sup>
		32 - 39		Activate macro 4 (If held for 1 second) <sup>7</sup>
		40 - 47		Activate macro 5 (If held for 1 second) <sup>7</sup>
		48 - 55		Activate macro 6 (If held for 1 second) <sup>7</sup>
		56 - 63		Activate macro 7 (If held for 1 second) <sup>7</sup>
		64 - 71		Activate macro 8 (If held for 1 second) <sup>7</sup>
		72 - 79		Activate macro 9 (If held for 1 second) <sup>7</sup>
		80 - 87		Activate macro 10 (If held for 1 second) <sup>7</sup>
		88 - 95		Select input 1: HDMI Input (If held for 1 second) <sup>8</sup>
		96 - 103		Select input 2: DisplayPort Input (If held for 1 second) <sup>8</sup>
		104 - 111		Select input 3: SDI Input A (If held for 1 second) <sup>8</sup>
		112 - 119		Select input 4: SDI Input B (If held for 1 second) <sup>8</sup>
		120 - 127		Select input 5: HDBaseT Input 1 (if held for 1 second) <sup>8</sup>
		128 - 135		Select input 6: Quad SDI input (if held for 1 second) <sup>8</sup>
		136 - 143		Select input 7: Quad DP board Input A (if held for 1 second) <sup>9</sup>
		144 - 151		Select input 8: Quad DP board Input B (if held for 1 second) <sup>9</sup>
		152 - 159		Select input 9: Quad DP board Input C (if held for 1 second) <sup>9</sup>
		160 - 167		Select input 10: Quad DP board Input D (if held for 1 second) <sup>9</sup>
		168 - 175		Select input 11: Quad DP board Inputs A-B (if held for 1 second) <sup>9</sup>
		176 - 183		Select input 12: Quad DP board quad column mode (if held for 1 second) <sup>9</sup>
		184 - 255		Reserved for future functionality
5	Focus (MSB)	0 - 255	128	Set coarse lens focus adjustment <sup>10</sup>
6	Focus (LSB)	0 - 255	128	Set fine lens focus adjustment <sup>10</sup>
7	Zoom (MSB)	0 - 255	128	Set coarse lens zoom adjustment <sup>10</sup>

<sup>10</sup>: Only when lens has been calibrated

Channel	Function	Value	Default	Actions
8	Zoom (LSB)	0 - 255	128	Set fine lens zoom adjustment <sup>10</sup>
9	Lens shift vertical (MSB)	0 - 255	128	Set coarse lens shift in vertical direction
10	Lens shift vertical (LSB)	0 - 255	128	Set fine lens shift in vertical direction
11	Lens shift horizontal (MSB)	0 - 255	128	Set coarse lens shift in horizontal direction
12	Lens shift horizontal (LSB)	0 - 255	128	Set fine lens shift in horizontal direction
13	Light Source Power <sup>11</sup>	0 - 3	0	Set light source to 100%
		4 - 7		Set light source to 95%
		8 - 11		Set light source to 90%
		12 - 15		Set light source to 85%
		16 - 20		Set light source to 80%
		21 - 23		Set light source to 75%
		24 - 27		Set light source to 70%
		28 - 31		Set light source to 65%
		32 - 35		Set light source to 60%
		36 - 39		Set light source to 55%
		40 - 43		Set light source to 50%
		44 - 47		Set light source to 45%
		48 - 51		Set light source to 40%
		52 - 55		Set light source to 35%
		56 - 59		Set light source to 30%
		60 - 63		Set light source to 25%
		64 - 67		Set light source to 20%
		68 - 71		Set light source to 15%
		72 - 75		Set light source to 10%
		76 - 79		Reserved for future functionality
		80 - 87		Power on / Light source on (If held for 5 seconds)
		88 - 95		Power down / Light source off (if held for 5 seconds)
		96 - 255		Reserved for future functionality
14	Various	0 - 7	0	Reserved for future functionality
		8 - 15		Calibrate lens zoom & focus (if held for 5 seconds)
		16 - 23		Calibrate lens horizontal and vertical shift (if held for 5 seconds)
		24 - 31		Calibrate lens (zoom, focus and shift)
		32 - 255		Reserved for future functionality

11: If the Light Source is forced to a output below its minimum value, it will remain at its minimum output value



# Glossary

## **HD**

Hazard Distance (HD) is the distance measured from the projection lens at which the intensity or the energy per surface unit becomes lower than the applicable exposure limit on the cornea or on the skin. The light beam is considered (to be) unsafe for exposure if the distance from a person to the light source is less than the HD.

## **HD**

Hazard Distance (HD) is the distance measured from the projection lens at which the intensity or the energy per surface unit becomes lower than the applicable exposure limit on the cornea or on the skin. The light beam is considered (to be) unsafe for exposure if the distance from a person to the light source is less than the HD.

## **DMX**

DMX-512 Lighting protocol over RS-485 interface. Carries information of 512 channels from a lighting controller to lighting devices. Standardized by USITT.

## **RS232**

An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using either D-SUB 9 pins or D-SUB 25 pins connectors. This standard is used for relatively short-range communications and does not specify balanced control lines. RS-232 is a serial control standard with a set number of conductors, data rate, word length and type of connector to be used. The standard specifies component connection standards with regard to computer interface. It is also called RS-232-C, which is the third version of the RS-232 standard, and is functionally identical to the CCITT V.24 standard. Logical '0' is  $> +3V$ , Logical '1' is  $< -3V$ . The range between  $-3V$  and  $+3V$  is the transition zone.

## **RS422**

An EIA serial digital interface standard that specifies the electrical characteristics of balanced (differential) voltage, digital interface circuits. This standard is usable over longer distances than RS-232. This signal governs the asynchronous transmission of computer data at speeds of up to 920,000 bits per second. It is also used as the serial port standard for Macintosh computers. When the difference between the 2 lines is  $< -0.2V$  that equals with a logical '0'. When the difference is  $> +0.2V$  that equals to a logical '1'.

## **Projector address**

Address installed in the projector to be individually controlled.

## **Broadcast address**

Projector will always execute the command coming from a RCU programmed with that broadcast address.

## **Transport latency**

The added delay in the image processing chain. The value is the number of lines relative to the output resolution.

**Latency**

The total time from the first pixel is coming in on an input source, until the first light representing that pixel is visible on the screen. This includes the transport delay. The value is normally given in milliseconds.

**DHCP**

Dynamic host configuration protocol. DHCP is a communications protocol that lets network administrators manage centrally and automate the assignment of IP addresses in an organization's network. Using the Internet Protocol, each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

**IP**

Internet Protocol. The network layer of TCP/IP. Required for communication with the internet.

**Subnet mask**

A number that is used to identify a subnetwork so that IP addresses can be shared on a local area network.

**Default Gateway**

A router that serves as an entry point into and exit point out of a network. For example, a local network (LAN) may need a gateway to connect it to a wide area network (WAN) or to the Internet.

**MAC address**

Media Access Control address. Unique hardware number, used in combination with the IP-address to connect to the network (LAN or WAN).

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