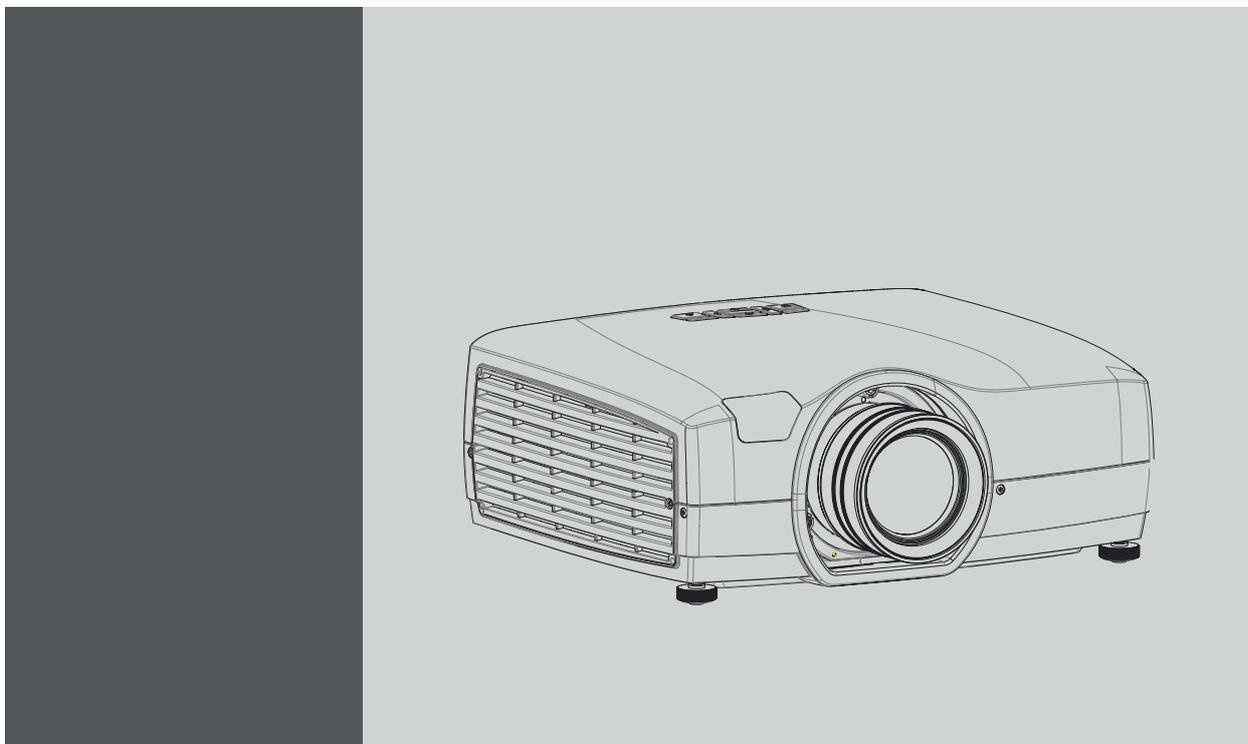


F50



User Manual

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1. INTRODUCTION

Overview

- Welcome
- About this manual

1.1 Welcome

Welcome!

Congratulations on your purchase of a Barco F50 projector! The F50 projectors are part of a proud tradition of quality projectors built for superior performance, and feature compact footprint, high performance optics and lenses, excellent resolution, Active Stereo 3D capabilities and built-in frame-lock synchronization.

1.2 About this manual

General

We recommend you read this user manual before setting up and operating your projector for the first time. Familiarizing yourself with the projectors' features and functions, as well as its safety and maintenance features, will help ensure you enjoy many years of hassle-free projection.

Following is a brief overview of how information in the manual is organized and presented.

The content in this manual is systematized primarily by function, and then topic.

On the first page of each chapter is an overview of the chapter contents.

A menu path is expressed in the following manner: *Main Menu — Sub Menu — Sub sub menu*. For example, *Main Menu — Installation — Synchronization*

All physical measurement units given in this manual are according to the International Standard of Units (SI units). Conversion from this to other measurement units is the responsibility of the user.

Illustrations used in the manual are for general reference only, and may differ from your product.

2. SAFETY

About this chapter

Read this chapter thoroughly before attempting to install or operate the projector.

To prevent personal injury to users or physical damage to the projector while installing and using your projector, ensure that you understand and follow all safety guidelines, instructions and warnings included in this chapter and this manual.

Overview

- General Considerations
- Important safety instructions
- Product safety labels

2.1 General Considerations

General safety instructions

- Before operating this equipment please read this manual thoroughly and retain it for future reference.
- All warnings on the projector and in the documentation manuals shall be adhered to.
- All instructions for operating and use of this equipment shall be followed precisely.
- All local installation codes shall be adhered to.

Owner's record

The part number and serial number are printed on a label which is stuck on the respective part. Record these numbers in the spaces provided below. Refer to them whenever you call upon your Barco dealer regarding this product.

Product article number	
Product serial number	
Dealer	

General conditions for use

- Use only the cables and cords supplied with the projector or original replacement cables. Using other cables or cords may lead to malfunction and permanent damage to the unit.
- Always use a grounded (3-pronged) power cord to ensure proper grounding of the unit. Never use 2-pronged power cords, as this is dangerous and could lead to electrical shock.
- Do not attempt to open the projector unit. The projector contains no user serviceable parts. Refer all repairs to qualified personnel only. Make sure that no objects enter into the vents and openings of the chassis.
- Do not spill any liquids on the projector or into the vents or openings of the unit.
- Always remove the lens cap before switching on the projector. If the lens cap is not removed, it may melt due to the high energy light emitted through the lens. Melting the lens cap may permanently damage the surface of the projection lens.
- Only place the projector on a stable surface, or mount it securely using an approved ceiling-mount.
- Always operate the projector according to the rotation guidelines. Operating the unit in other positions may reduce lamp life significantly, and may lead to overheating, resulting in malfunctioning.
- Always allow ample airflow through the projector. Never block any of the air vents. Never cover the unit in any way while running. Allow for sufficient distance to walls and ceilings to avoid overheating.
- Minimum safety (clearance) distance to the sides and rear of the unit is 50cm / 20" in any direction (15 cm/ 6" to ceiling).
- Hot air is exhausted from the rear vent. Do not place objects that are sensitive to heat nearer than 50cm / 20" to the exhaust vent.
- The projector is designed for indoor use only. Never operate the unit outdoors.
- Do not operate the projector outside its temperature and humidity specifications, as this may result in overheating and malfunctioning.
- Only connect the projector to signal sources and voltages as described in the technical specification. Connecting to unspecified signal sources or voltages may lead to malfunction and permanent damage of the unit.
- Wherever possible, use main power supply with surge protection to prevent damage to the projector caused by unscheduled power surges.
- Allow lamp to cool down for at least 60 minutes before changing. **USE ONLY ORIGINAL LAMPS.**
- Connecting sources to a powered projector may result in product failure. It is recommended that the power cable connector (projector-end) or the mains power socket is accessible whilst the product is in use to enable mains power to be disconnected or switched off when connecting source devices. This should be considered during product installation.

2.2 Important safety instructions

To prevent the risk of electrical shock

- This projector should be operated from an AC power source. Ensure that the mains voltage and capacity matches the projector electrical ratings. If you are unable to install the AC requirements, contact your electrician. Do not defeat the purpose of the grounding.
- Installation according to the local electrical code and regulations by qualified technical personnel only.
- A readily accessible disconnect device must be incorporated externally to the equipment for removal of the power to the projector cord.
- 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

- Isolate electrically before replacing the lamp or lamp house. Caution: Hot lamp (house).
- Caution: High pressure lamp may explode if improperly handled. Refer servicing to qualified service personnel.
- To prevent injury and physical damage, always read this manual and all labels on the system before inserting the lamp casing, powering the projector or adjusting the projector.
- To prevent injury, ensure that the lens 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 lamps:** This projector uses extremely high brightness lamps. Never attempt to look directly into the lens or at the lamp. If the projection distance is less than 6 meter, any person needs to be at least 4 meters away from the projected image. Avoid close range reflection of the projected image on any reflecting surface (such as glass, metal, ...) . When operating the projector, we strongly recommend wearing suitable safety glasses.
- Before attempting to remove any of the projector's covers, disconnect the projector power cord for removal of all power from the projector.
- When required to remove all power from the projector, to access parts inside, always disconnect the projector power cord for removal of all power from the projector.
- 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.
- It is hazardous to operate without lens or shield. Lenses, shields or ultra violet 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.
- **Warning: Protection from ultraviolet radiation:** Do not look directly in the light beam. The lamp contained in this product is an intense source of light and heat. One component of the light emitted from this lamp is ultraviolet light. Potential eye and skin hazards are present when the lamp is energized due to ultraviolet radiation. Avoid unnecessary exposure. Protect yourself and your employees by making them aware of the hazards and how to protect themselves. Protecting the skin can be accomplished by wearing tightly woven garments and gloves. Protecting the eyes from UV can be accomplished by wearing safety glasses that are designed to provide UV protection. In addition to the UV, the visible light from the lamp is intense and should also be considered when choosing protective eye wear.
- **Mercury Vapor Warnings:** Keep the following warnings in mind when using the projector. The lamp used in the projector contains mercury. In case of a lamp rupture, explosion there will be a mercury vapor emission. In order to minimize the potential risk of inhaling mercury vapors:
 - Ensure the projector is installed only in ventilated rooms.
 - Replace the lamp module before the end of its operational life.
 - Promptly ventilate the room after a lamp rupture, explosion has occurred, evacuate the room (particularly in case of a pregnant woman).
 - Seek medical attention if unusual health conditions occur after a lamp rupture, explosion, such as headache, fatigue, shortness of breath, chest-tightening coughing or nausea.
- **Exposure to UV radiation:** Some medications are known to make individuals extra sensitive to UV radiation. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends occupational UV exposure for an-8 hour day to be less than 0,1 micro-watts per square centimeters of effective UV radiation. An evaluation of the workplace is advised to assure employees are not exposed to cumulative radiation levels exceeding these government guidelines.



WARNING: This product contains chemicals, including lead, known to the State of California to cause birth defects or other reproductive harm. Recycle properly, do not dispose of in ordinary waste!



WARNING: Service personnel must use eye and skin protection during servicing.

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 all DLP Cinema projectors. The exclusion zone on the lens side must be at least 5 m. Do not cover the projector or the lens with any material while the projector is in operation. Keep flammable and combustible materials away from the projector at all times. 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, CO₂ 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 console to the outside of the building.
- Let the projector cool completely before storing. Remove cord from the projector when storing.
- Heat sensitive materials should not be placed in the path of the exhaust air or on the lamp house.

To prevent projector damage

- This projector has been designed for use with a specific lamp (house) type. See installation instructions for its correct type.
- The air filters of the projector must be cleaned or replaced on a regular basis (a "clean" booth 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.
- 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 its 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. Loose papers or other objects may not be nearer to the projector than 10 cm (4") on any side.
- Do not use this equipment near water.
- Proper operation of the projector can only be guaranteed in table mounting. It is not permitted to use the projector in another position. See installation procedure for correct installation. A ceiling mount will be supported in the future.
- **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 projector 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, petrol, 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. Do not use a damp cloth, detergent solution, or thinner.
- Rated maximum ambient temperature, $t_a = 35^{\circ}\text{C}$ (95°F).
- The lamp house shall be replaced if it has become damaged or thermally deformed.

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.
- Possible explosion hazard: Always keep in mind the caution below:

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.

2.3 Product safety labels

Product safety labels

Label image	Label description
	The Lamp House is very hot after operation. To avoid burns, let the projector cool down for at least 60 minutes before proceeding to remove the Lamp House.
	General Warning Hazard
	Electric Voltage Hazard
	Hot Surface Hazard
	UV Hazard
	Hazardous moving parts. Keep away from moving fan blades. Keep fingers and other body parts away.

3. GETTING TO KNOW THE PROJECTOR

Overview

- Introducing a small revolution
- About the projector
- Projector components
- User interface
- Accessories

3.1 Introducing a small revolution

A world best in fit and function

The F50 is the market's brightest, sharpest and most compact 120Hz single chip DLP® projector.

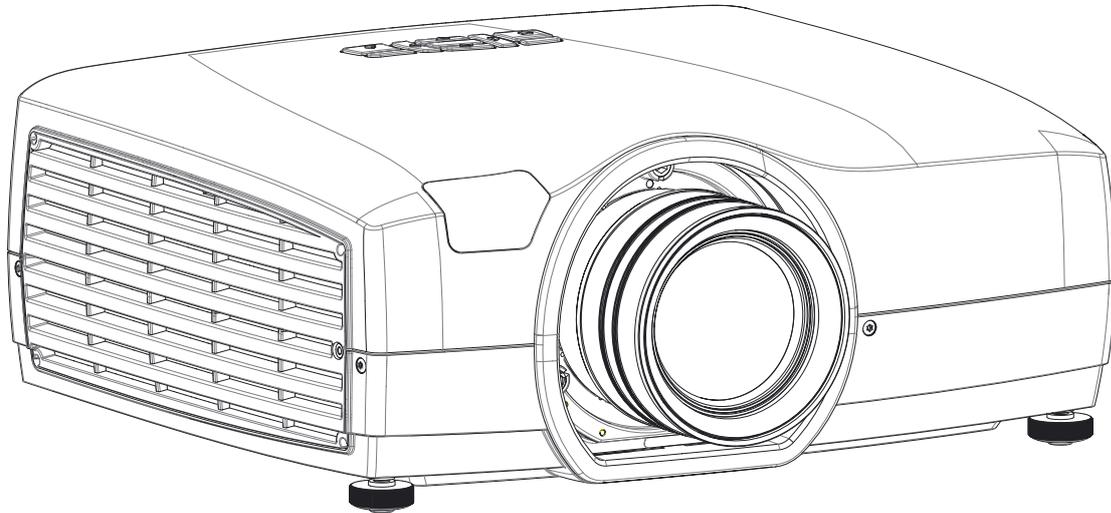


Image 3-1

Unmatched imagery

- 1 Chip DLP®
- Wide range of resolutions
- High Performance Optics
- Custom-designed smear reduction technology
- High ANSI contrast

Built for the challenge

- Compact footprint and weight
- Motion platform warranted (3G Certified)
- Optical locking systems
- Minimal maintenance requirements

Ideal for multichannel installations

- Large depth of focus (DoF)
- Unmatched sharpness
- RealColor™ Color Management
- Color batch matching for quicker and easier color calibration in color critical applications

3.2 About the projector

Available configurations

Product	Lamp		Color Wheel			Chassis Color		Display Resolution
	Standard	IR	HB+	VizSim Bright	VizSim	Black	White	
F50 PN	✓	✗	✓	✓	✓	✓	✓	Panorama
F50 WQXGA	✓	✗	✓	✓	✓	✓	✓	WQXGA
F50 WQXGA	✓	✓	✓	✓	✓	✓	✗	WQXGA
F50 WUXGA	✓	✗	✓	✓	✓	✓	✓	WUXGA
F50 WUXGA	✓	✓	✓	✓	✓	✓	✗	WUXGA
F50 1080	✓	✗	✓	✓	✓	✓	✓	1080
F50 1080	✓	✓	✓	✓	✓	✓	✗	1080
CTPN-41B	✓	✗	✓	✗	✗	✗	✓	Panorama
CTWQ-51B	✓	✗	✓	✗	✗	✗	✓	WQXGA
CTHD-61B	✓	✗	✓	✗	✗	✗	✓	WUXGA
CTWU-61B	✓	✗	✓	✗	✗	✗	✓	1080
Orion Cinemascope T	✓	✗	✗	✗	✓	✓	✗	Panorama
Orion Cinemascope T	✓	✗	✓	✗	✗	✗	✓	Panorama
Orion T	✓	✗	✗	✗	✓	✓	✗	1080
Orion M	✓	✗	✓	✗	✗	✗	✓	1080

User access levels

The projector's software platform uses access levels to define what each user can do.

There are two user access levels:

- Standard User
- Power User

A standard user has access to all projector functionality and OSD menu items.

A power user has, in addition to access to all projector functionality and OSD menu items, access to the 'service' menu *Main menu — Settings — Service* which provides advanced information and functionality such as 'lens shift calibration' and 'enable remote control id (RCID)'. Access to the power user service menu is password-protected. Contact your projector supplier for more information.

Projector service (LFM) and consumables

The F50 has no user-serviceable parts. The projector fans and color wheels require service or replacement, typically after 8000 operating hours. Both of these service tasks must only be carried out by the manufacturer or a manufacturer-authorized service technician.

The projector lamp has a normal lifetime of approximately 2000 running hours, though this is dependent on the lamp mode used. Users can replace the projector lamp. See "Replace the projector lamp", page 118 for details of the procedure.

3.3 Projector components

Projector components

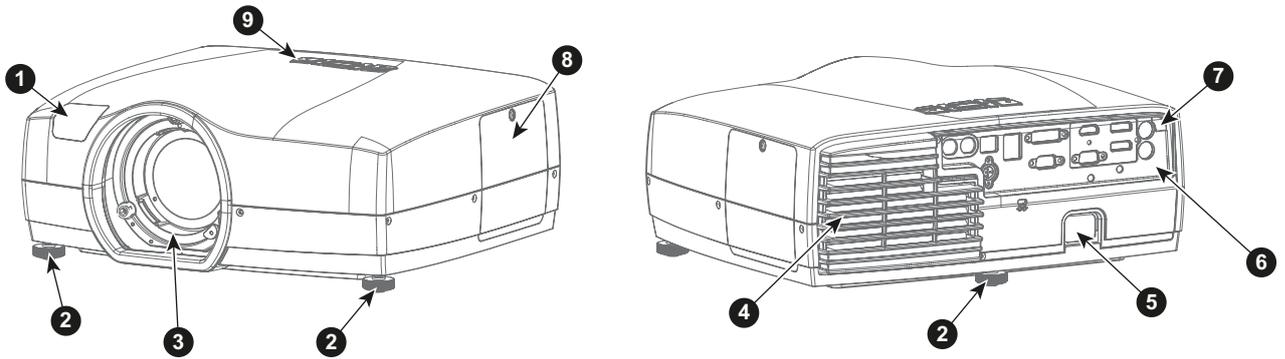


Image 3-2

Item No.	Description
1	IR receiver, front
2	Adjustable feet
3	Projector lens holder
4	Projector exhaust
5	Mains power connector
6	Connector panel
7	IR Receiver, rear
8	Lamp house cover
9	Keypad

3.4 User interface

General

The primary user interface for the F50 is the On Screen Display (OSD) system. The OSD is a menu—based interface. Topics are sorted and displayed by main (topic) — sub (topic) — sub (topic).

There are six (6) main menu topics, each represented by a graphical icon: 3D, picture, installation, settings, language, status.

When a main topic is active, the icon is colored, as illustrated below. An inactive topic is displayed in grayscale.

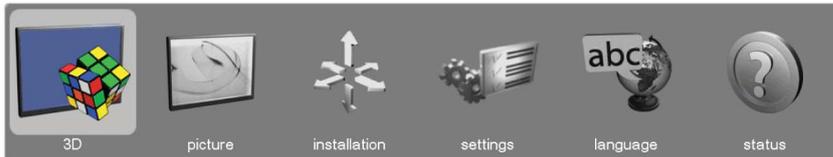


Image 3-3

Navigation and selection

Navigation of the OSD is done primarily using the arrow buttons — left, right, up, down. All navigation and selection occurs dynamically.

If there is a subtopic available, an arrow will be displayed at the right hand side of the menu, as illustrated in image 3-4 reference 1.

Expanding a menu topic is done using the right arrow. To collapse a submenu topic, use the left arrow. To confirm a selection, for example 'back', use the **ok** button on your control interface.

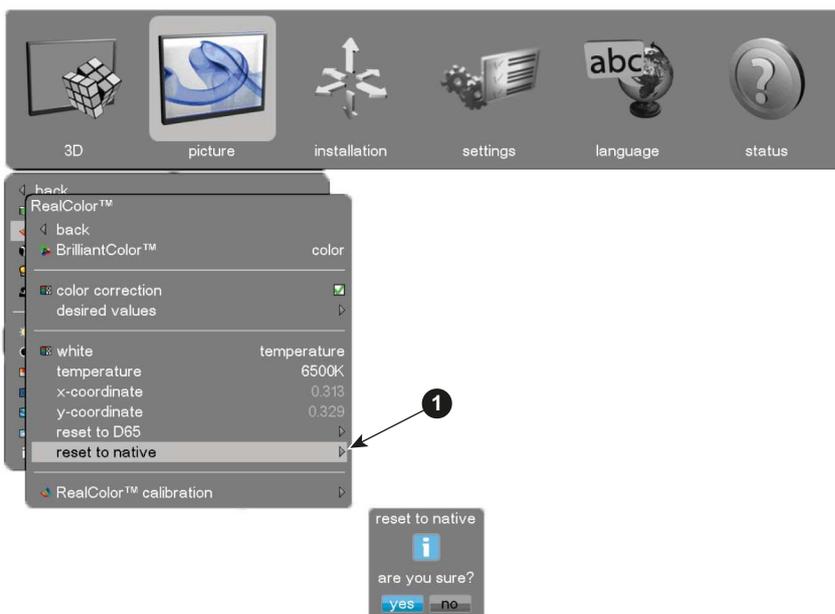


Image 3-4

3.5 Accessories

Ceiling mount cover

The ceiling mount cover is designed to improve exhaust capabilities of the F50 when it is ceiling mounted.

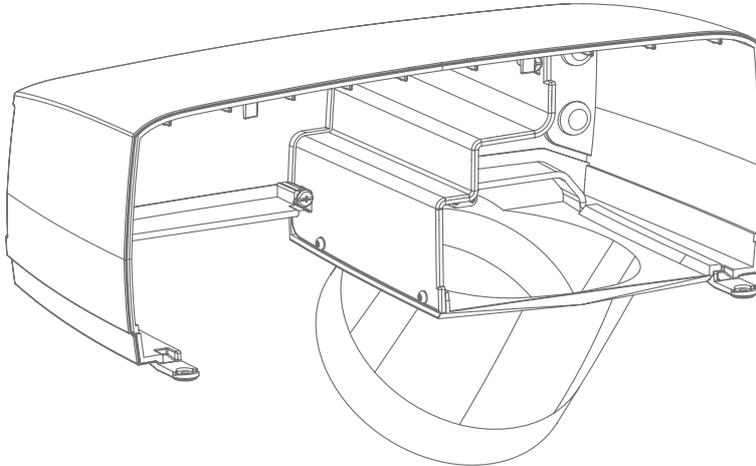


Image 3-5

Item number	Description
R9801322	Ceiling mount cover, black
R9801323	Ceiling mount cover, white

Noise reduction kit

The noise reduction kit comprises the ceiling mount cover and an air inlet filter and muffler to reduce noise and improve exhaust capabilities. This kit is only for use when the projector is ceiling mounted.

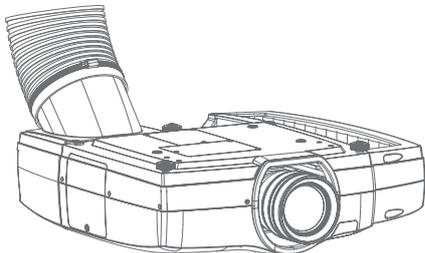


Image 3-6

Item number	Description
R9801322	Ceiling mount cover, black
R9801323	Ceiling mount cover, white
R9801320	Air inlet filter and muffler kit, black
R9801321	Air inlet filter and muffler kit, black

Rigging frame

The rigging frame comes in two versions: fixed and adjustable. Different frames can easily be stacked and locked together. A truss mount is also available for safe and quick installations.

Item number	Description
R9801416	Basic rigging frame
R9801417	Adjustable rigging frame
R9801418	Truss mount frame

Warp & Blend Box WB2560

The multi image processor WB2560 is a processing engine for warping and blending with a whole range of features including camera-based AutoAlign and RealTime warp. Adding low-latency, patented Black Level Matching, and Sub-Pixel Level Matching for color correction, it guarantees that each pixel has the same color and brightness.

For use with WQXGA @ 60 Hz (max 330 MHz).

Item number	Description
R9801224	WB2560 Image Processor

4. LENSES

Overview

- Lens range
- Installing a lens
- Lens shift
- Adjust zoom, focus and iris
- Lens lock

4.1 Lens range



CAUTION: Always remove the lens from the lens holder before moving or transporting the projector. Failure to do this may cause damage to the lens holder and prism.

General

The information in this section is subject to change. For the most up-to-date information, go to the Barco website and select your product to see its technical specifications or other information.

Available lenses

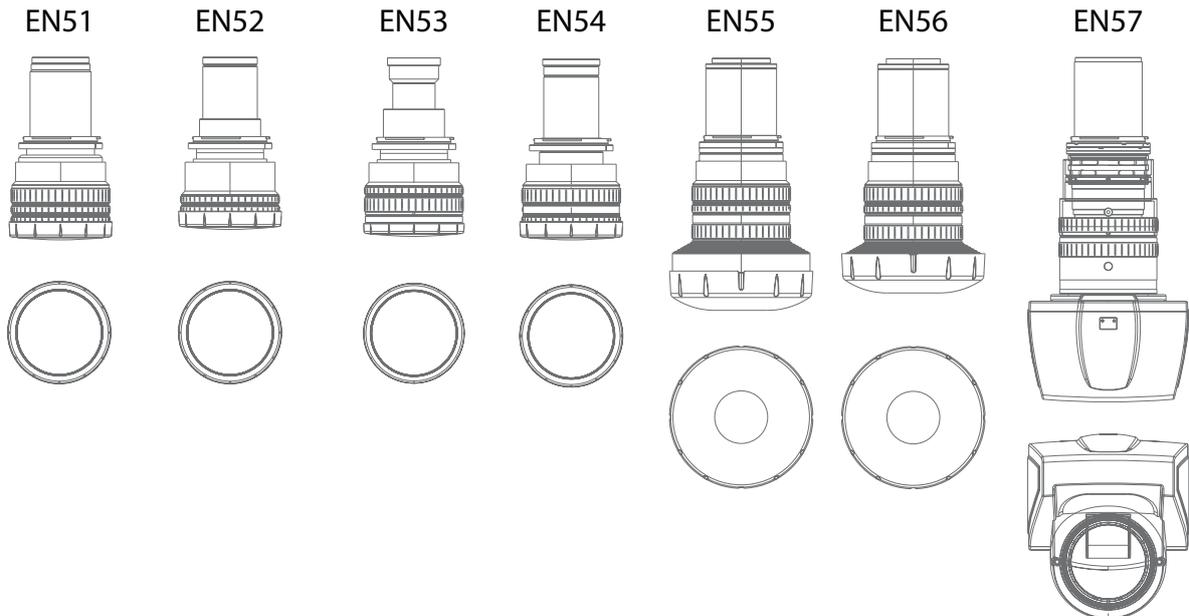


Image 4-1

Lens specifications

Name	Description	Part Number	Lens throw ratio 1080 / WUXGA	Lens throw ratio Panorama / WQXGA
EN51	Standard zoom	R9801310	1.6-2.21:1	1.71-2.37:1
EN52	Wide angle fixed	R9801311	0.92:1	0.99:1
EN53	Ultra wide angle fixed	R9801313	0.74:1 @ 1.65M	0.79:1 @ 1.65M
EN54	Long throw zoom	R9801312	2.5-3.9:1	2.68-4.18:1
EN55	Ultra wide angle zoom	R9801314	0.8-1.08:1	0.86-1.16:1
EN56	Wide angle zoom	R9801315	1.06-1.62:1	1.14-1.74:1
EN57	Ultra short throw	R9801316	0.28:1	0.30:1

Name	Working F#	Iris F#	Zoom ratio	Focal length (mm)	Focus range (m)	MTF	Weight (kg)
EN51	2.6-3.1	2.6 — 6.0	1.38	33.85- 46.54	1.5-10	50 lp/mm	1.10
EN52	2.6	2.6 — 6.0	NA	19.7	1.0-10	38 lp/mm	0.96
EN53	2.6	2.6 — 6.0	NA	15.81	0.8-3.3	38 lp/mm	0.94
EN54	2.6-3.3	NA	1.55	52.6-81.5	5.0-25	46 lp/mm	1.04
EN55	2.5-2.7	2.5 — 6.0	1.35	17.2-23.1	0.80-5.0	66 lp/mm	1.76
EN56	2.5-3.1	2.5 — 6.0	1.52	22.8-34.7	1.3-7.0	66 lp/mm	1.96
EN57	2.5	NA	NA	-5.46	0.45-1.05	66 lp/mm	2.50

4.2 Installing a lens

Insert a lens into the lens holder

1. Remove the protection cap on the bayonet side of the lens.
2. Insert the lens, making sure that the red line (marking) on the bayonet is positioned towards the top of the cabinet. The lens assembly should enter the projector body fully and cleanly.

Caution: *The lens is fragile. Do not try to force the lens into position. If there is any resistance, remove the lens from the projector and then try again.*

3. Screw the lens clockwise until it clicks into position.

Remove a lens from the lens holder

Depress the lens release button (reference 1, image 4-2) and then turn the lens anticlockwise until the lens bayonet is clear of the projector chassis.

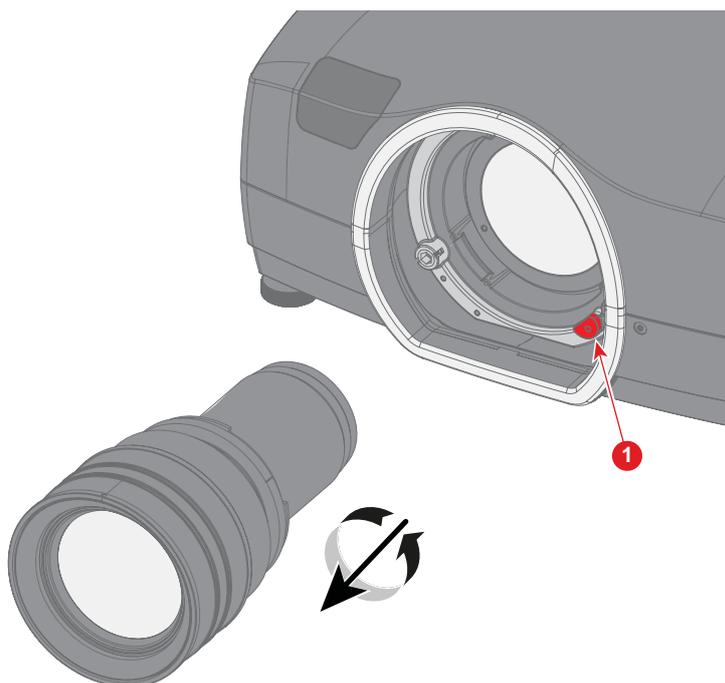


Image 4-2



To prevent dust contamination in the projector light processor, always replace the lens bayonet cap, lens cap and projector lens cap (if applicable) immediately after removing the lens.

4.3 Lens shift

General

This section describes how to shift the lens using the projector keypad and the remote control.

For information on the available shift and offset values for each lens, see "Lens shift and offset matrix", page 40.



All F50 lenses have limited downwards shift.

Lens shift can also be carried out via the RS232 communication interface. See the relevant ASCII Commands Protocol for more details.

Shift the lens using the keypad

1. Press 'OK' to activate lens shift
2. Use the arrow keys to move the lens up, down, left, and right.

Shift the lens using the remote control

1. Press the shift button  to activate lens shift.
2. Use the navigation arrows to move the lens up, down, left and right.

4.4 Adjust zoom, focus and iris

General

Zoom controls the size of the projected image.

Focus controls the sharpness of the projected image.

Iris controls the contrast and focus depth of the image. Decreasing the iris stop will increase contrast and image depth, at the same time as it decreases brightness.

Lens zoom, focus and iris adjustments are done manually; they are not motorized.



Not all lenses have zoom or iris control. The table below shows what controls are available per lens.

	EN51	EN52	EN53	EN54	EN55	EN56	EN57
Iris control	✓	✓	✓	✗	✓	✓	✗
Zoom control	✓	✗	✗	✓	✓	✓	✗
Focus control	✓	✓	✓	✓	✓	✓	✓

For best results, lens adjustments should be done in the following order: zoom, focus and then iris (where applicable).

4.5 Lens lock

About

The projector lens barrel is fitted with adjustment screws that are used to adjust and lock the focus (ref.1), zoom (ref.3) and, where applicable, iris (ref.2) settings.



Image 4-3

The lens lock function is not needed for most installations, however it can be very useful in high-motion installations.

To lock the lens in position, you will need a 1.5 mm Allen Key. Use the Allen key to tighten each of the adjustment screws, one at a time, until the respective ring cannot be turned.

5. INSTALLATION



CAUTION: Always remove the lens from the lens holder before moving or transporting the projector. Failure to do this may cause damage to the lens holder and prism.

Overview

- Installing the projector
- Installation conditions
- Initial inspection
- Positioning the projector
- Mounting the projector on a flat surface
- Installing the projector to a ceiling mount or frame
- Throw distance
- Lens shift and offset matrix
- Scheimpflug (Boresight) adjustment
- Scheimpflug adjustment

5.1 Installing the projector

General

This chapter explains how to physically install the projector, and what considerations you should take when designing and setting up the projection installation. Each projector installation is unique, and as such the information in this chapter is only provided as a guideline. Likewise, any images or graphical representations shown here are for illustrative purposes only.

If you require further information and assistance during the installation process, contact a qualified projection technician or your local support office for advice.

For guidelines and information when setting up multi-channel installations, see chapter "Multichannel installations", page 95

Installation sequence

1. Confirm that the installation area meets all technical and environmental requirements. See "Installation conditions", page 31
2. Decide where the projector will be mounted, "Positioning the projector", page 34 gives some general advice and guidelines for determining the best location.
3. Unpack the projector, and confirm that all equipment is present and in good order. See "Initial inspection", page 33 for information.
4. Install the projector to its position. The projector can be mounted on a flat surface, installed to a ceiling-mount or using a rigging frame¹.
5. Connect an Ethernet cable to the projector.
6. Connect the video and/or data signals. See "Connector Panel", page 49 for more information about available sources.
7. Install the selected projector lens. See "Installing a lens", page 25.
8. Connect the projector to the mains power net.
9. Switch the projector ON () using the power button on the local keypad or the wireless remote control. The LED status indicator will glow a steady blue light when the projector is warmed up and ready for use.
10. Confirm the projector is running the correct software. Upgrade if required. See "Update the projector firmware", page 119 for the upgrade procedure.
11. Select the video and/or data sources. See "Connect to a source", page 50
12. Adjust the projected image on the screen. See "Set up the picture", page 71 for more information.

1. A range of rigging frames are available as optional accessory

5.2 Installation conditions

General

This section contains important physical and environmental information that will help you determine the optimal installation position and conditions for your projector.



Barco projectors are manufactured according to specific design standards, which also include environmental conditions. Failing to follow the terms and conditions outlined in this chapter can result in loss of product warranty.

Environmental conditions

The table below summarizes the physical environment in which the projector may be safely operated or stored.

Environment	Operating	Storage
Ambient Temperature @ 1500 M	10 °C (50 °F) to 40 °C (104 °F)	-15 °C (5 °F) to 60 °C (140 °F)
Ambient Temperature @ 3000 M	10 °C (50 °F) to 35 °C (95 °F)	-15 °C (5 °F) to 60 °C (140 °F)
Air cleanliness	Clean office environment (equivalent with cleanroom standard ISO 14644-1 ISO Class 9)	n.a.
Relative humidity (RH)	20% to 80% RH Non-condensed	10% to 90% RH Non-condensed

Mains power requirements

Projector	Power requirements
F50	100 — 240 V, 50 — 60 Hz, 16 A @ 240 V

To protect operating personnel, the National Electrical Manufacturers Association (NEMA) recommends that the instrument panel and cabinet be grounded. In no event shall this projector be operated without an adequate cabinet ground connection.

The AC supply must be installed by a qualified electrician in conformance to local codes. Hardware, wire sizes and conduit types must comply with local codes.

Ventilation

The projector is fan cooled and must be installed with sufficient space around the projector to ensure sufficient air flow. See image 5-1. Ventilation inlets are located on the left and right sides of the projector. Hot air is exhausted from the rear vent.

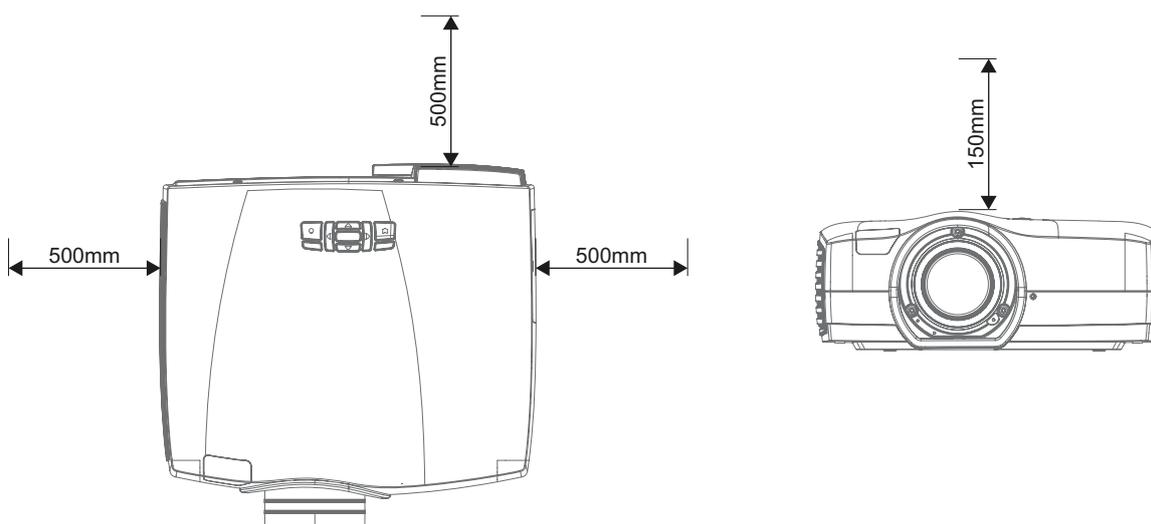


Image 5-1

Projector weight and footprint

Weight: 7.5 kg (exclusive of lens)

Dimensions shown in millimeters (mm).

5. Installation

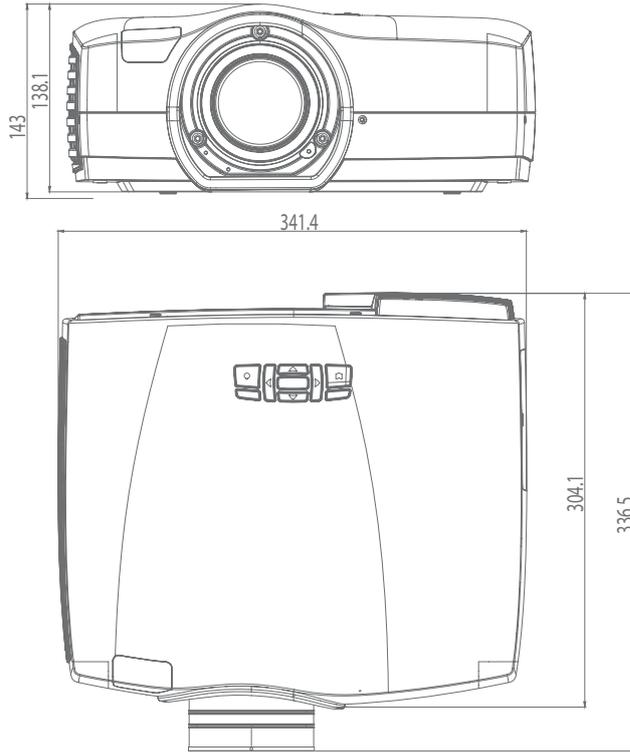


Image 5-2

5.3 Initial inspection

General

Each projector is inspected and rigorously tested at our production facility to ensure that it is free from any mechanical or electrical defects.

Upon receipt of the projector, we recommend that customers inspect the projector for any signs of damage that may have occurred in transit. If damage is found, file a claim with the shipping carrier immediately. Notify the Barco Sales and Service office, or your preferred Barco agent, of the damage as soon as possible.

Box Contents

Your projector box should contain the following:

- Projector unit
- Power cord (suitable for region)
- User and installation manual (electronic copy)
- Quick start guide
- Safety manual



The projector lens is delivered in a separate box.

5.4 Positioning the projector

General guidelines

Proper positioning of the projector will ensure a better image on screen and may lessen the time needed to adjust and align the image on screen.



Focus and sharpness of the image can be adversely affected if the lens axis is not fully perpendicular to the projection surface.

The following guidelines can help you determine the best physical location for the projector.

- The ambient air temperature of the room or enclosure should not be greater than 40°C, and there must be sufficient ventilation area around the projector. See illustration below, or read "Installation conditions", page 31 for more detail.

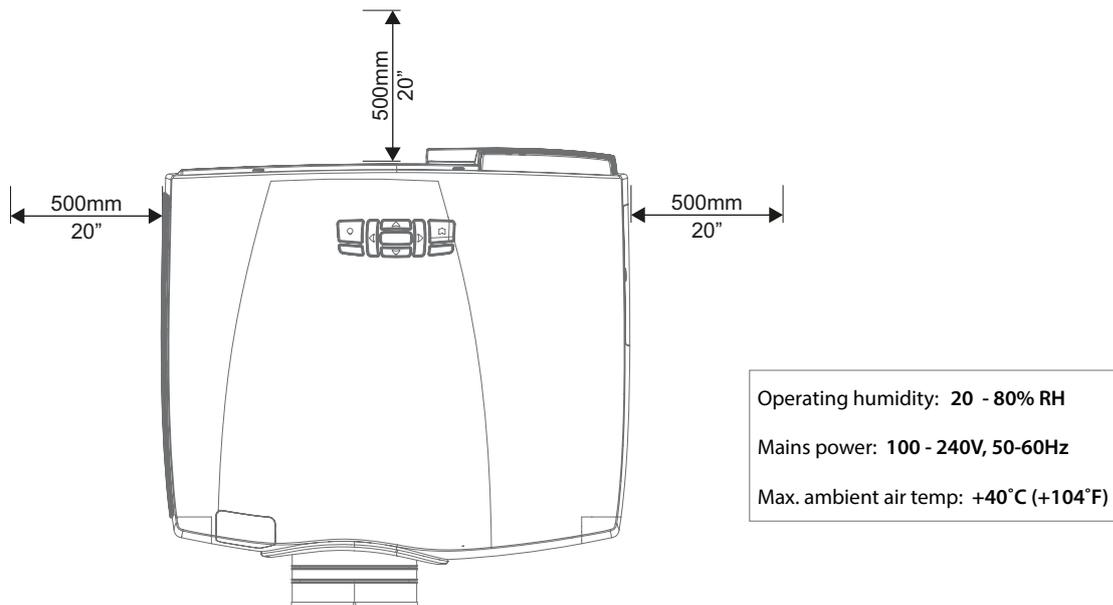


Image 5-3

- Use the throw ratio of the installed lens as a guideline for the projector's physical distance from the screen. See "Throw distance", page 38 for more information.
- Ensure that the source signal interface and cable lengths are matched to the installation. See user manual chapter "Input and communication", page 45 for source—cable specifications. In general:
 - HDBaseT and 3G-SDI are long-haul interfaces and suitable for bespoke installations using relatively long cables
 - DP, HDMI, DVI and VGA are short-haul interfaces using pre-assembled cables with limited cable lengths. Using extended cable lengths may result in reduced image quality as well as loss of control information such as EDID (Extended Display Information Data).
- Wherever possible, the projector lens surface should be positioned so that it is perfectly perpendicular to the center of the screen. Offset (lens shift), rather than physical angling, should be used primarily to correct any off-center positioning.
- Installing the projector on a tilt is not recommended, however if it is necessary to do so, ensure that it is within the following guidelines:
 - The projector can be rotated up to ± 20 degrees on the side-to-side-axis without influencing lamp performance, as shown in image 5-4.
 - The projector can be rotated 360 degrees on the through-the-lens-axis.

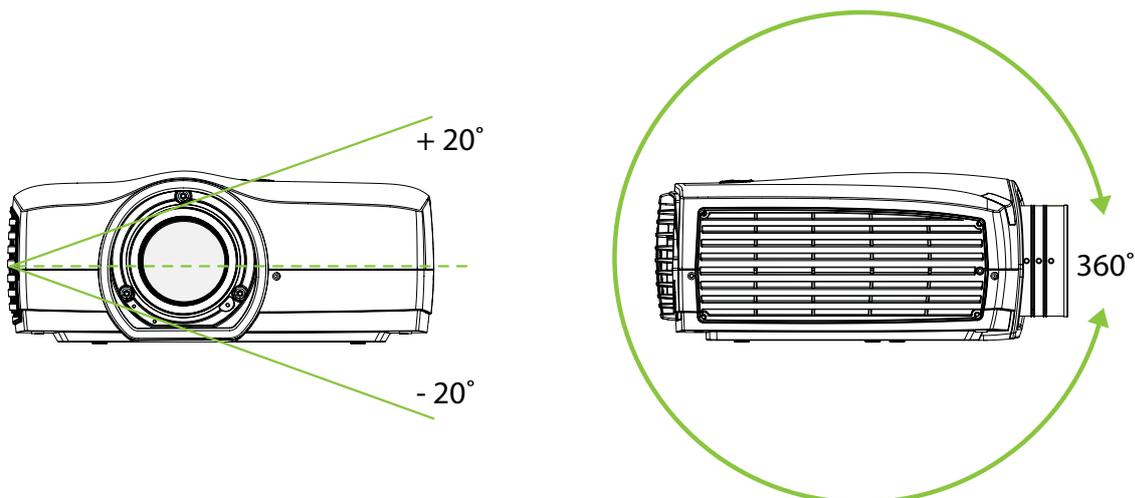


Image 5-4

5.5 Mounting the projector on a flat surface

Suggested procedure

1. Place the projector on a pedestal or similar, sturdy object. Make sure that all three projector feet are in contact with the surface of the installation area.
2. Adjust the projector legs so that so that the projector is completely level. To do this, turn the collar on each foot clockwise or anti-clockwise until the correct level is achieved.

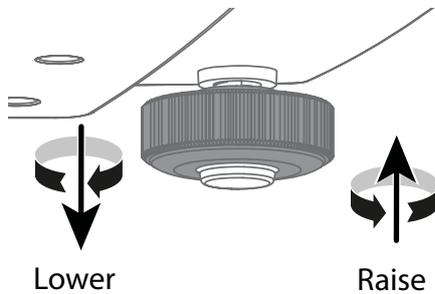


Image 5-5

3. In an ideal installation, the projector lens surface is centered with and parallel to the screen. This orientation helps to ensure optimized lens performance with minimal offset. If this position is not possible (such as when the projector is significantly higher than the center of the screen), it is better to rely on offset (lens shift) rather than extra tilt. If tilt is required, make sure that it does not exceed 20 degrees on the side-to-side axis. See "Positioning the projector", page 34 for more information.

5.6 Installing the projector to a ceiling mount or frame

Necessary tools

- 3 x M6 screws, user supplied. See procedure below for information on sizing.
- Screwdriver, type dependent on screws used.

Necessary parts

Ceiling mount or rig frame



Selection and supply of the ceiling mount and installation screws (3 of.) is the responsibility of the user.

Suggested procedure

1. Confirm that the physical conditions of the proposed installation area complies with the projector installation requirements.
2. In an ideal installation, the projector lens surface is centered with and parallel to the screen. This orientation helps to ensure optimized lens performance with minimal offset. If this position is not possible (such as when the projector is significantly higher than the center of the screen), it is better to rely on offset (lens shift) rather than extra tilt. If tilt is required, make sure that it does not exceed 20 degrees on the side-to-side axis. See "Positioning the projector", page 34 for more information.
3. There are three (3) projector ceiling mount holes that are used to install the projector onto a ceiling mount. Reference 1, image 5-6.

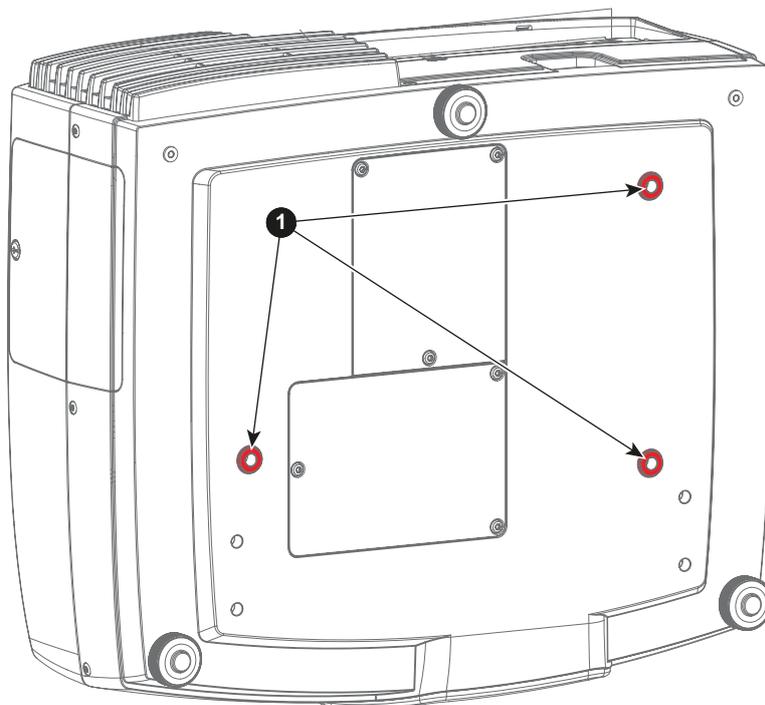


Image 5-6

4. Installation screws are not supplied by the manufacturer. The length of the screw is dependent on the dimensions of the ceiling mount or frame you are using. The screw should not protrude more than 9 mm into the projector chassis.
Caution: *Correct screw length is extremely important. Failing to observe these limitations may cause damage to your projector.*
5. Install all three screws, making sure not to overtighten.

5.7 Throw distance

Calculating the installation throw distance

Throw is the distance (D) measured from your projector lens to the screen. To calculate the throw distance for an installation, you will need two pieces of data: the selected lens throw ratio (L) and the horizontal width (W) of the screen.

For example, if the screen width (W) is 2.4 meters and the projector lens has a throw ratio (L) of 0.99:1, then the throw distance (D) will be 2.38 meters.

Calculation: $2.4 \times 0.99 = 2.38$

The following graphs illustrate the image size (W) and projection distance (D) for each of the projector lenses.



Tolerances are typically +/- 5% due to optical (lens) variation.

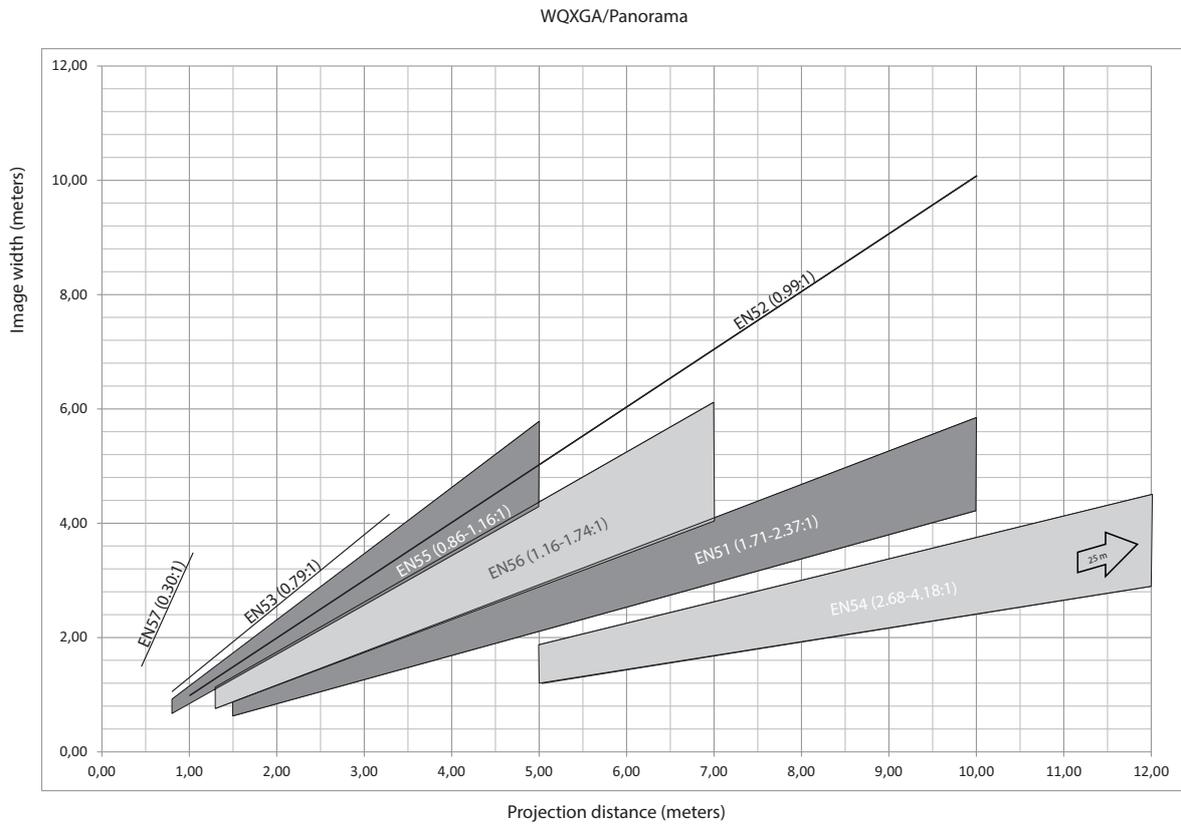


Image 5-7

WUXGA/1080

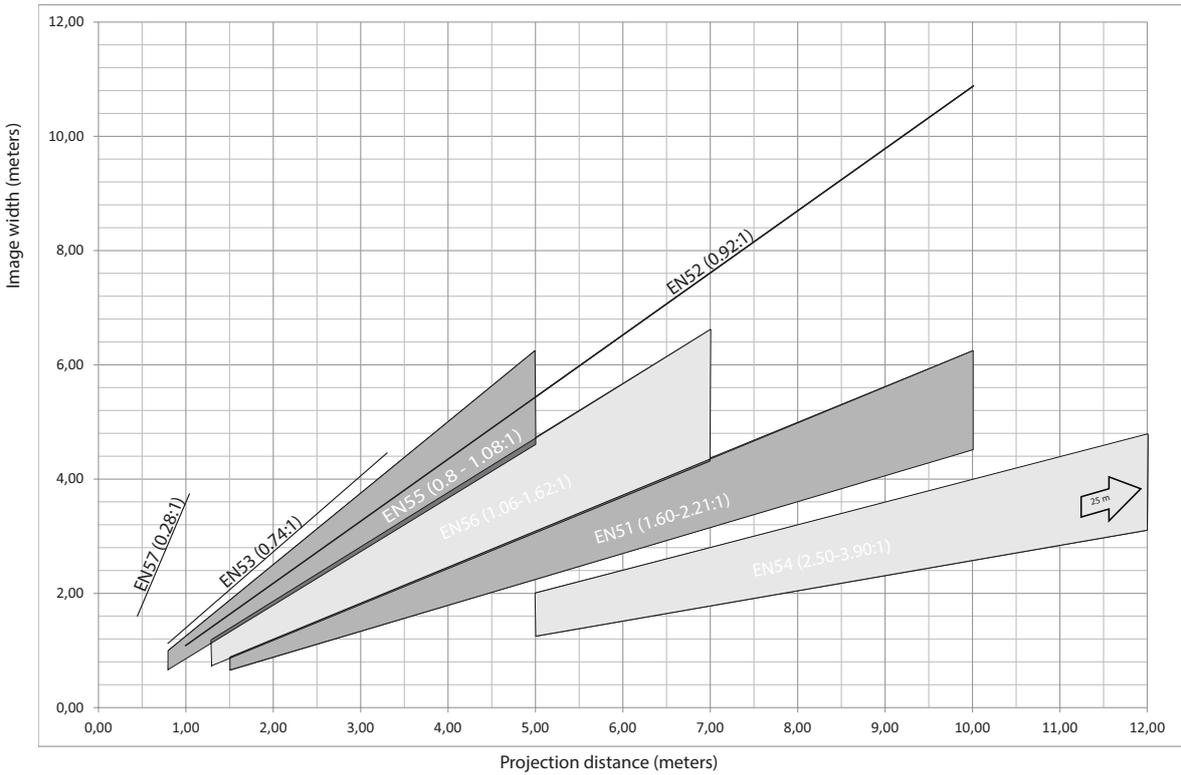


Image 5-8

5.8 Lens shift and offset matrix

Adjusting the horizontal and vertical position of the image

Ideally in any installation the projector is positioned totally perpendicular to the screen to ensure a wholly rectangular image. However, physical limitations mean that this is not always possible to do and the result is a trapezoidal effect upon the displayed image. One way to correct this is by adjusting, or shifting, the vertical or horizontal position of the image.

The amount of available vertical or horizontal offset is dependent on what type of lens is installed in the projector and the projector resolution, see image 5-9 which illustrates the vertical offset values of an image. The same theory applies to horizontal shift. The middle of the image is the optical axis (0%), i.e. no shift. 100% shift equals half of the image height.

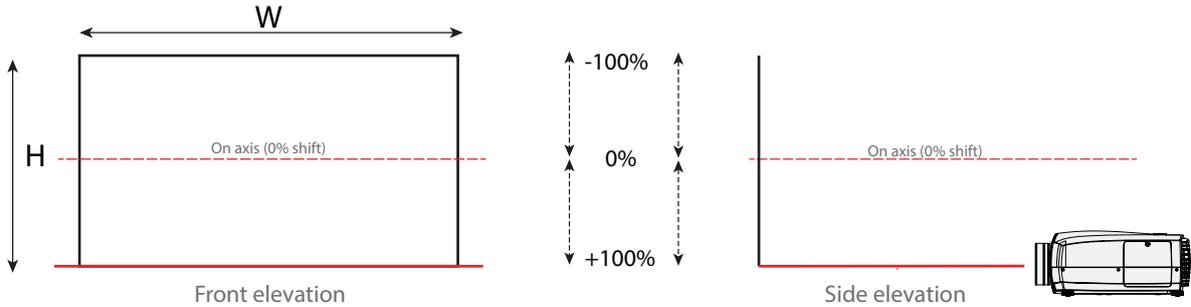


Image 5-9

Vertical Lens Shift Formula

$$\text{Vertical shift} = \text{Screen Height} \times (\text{Max. Lens Shift Vertical} (\%) \div 2) \div 100$$

If the screen is 1.2 meters high and the vertical lens offset value is +120% to +150% (min/max), then the vertical lens shift will be 0.9 meters. This means that the (centre of the) image can be shifted up or down a maximum of 90 centimeters.

Calculation: $1.2 \times (150 \div 2 = 75) \div 100 = 0.9$

Horizontal Lens Shift Formula

$$\text{Horizontal shift} = \text{Screen Width} \times (\text{Max Lens Offset Horizontal} (\%) \div 2) \div 100$$

If the screen is 4.2 meters wide and the horizontal lens offset value is +42%, then the horizontal lens shift will be 0.89 meters. This means that the (centre of the) image can be shifted left or right by 89 centimeters.

Calculation: $4.2 \times (42 \div 2 = 21) \div 100 = .89$



0% Lens Shift equals on axis (i.e. no shift). 100% Lens Shift equals half of image height / width.

F50-series offset matrix

The following table shows the available offset for each lens by projector resolution.

	EN57	EN53	EN55	EN52	EN56	EN51	EN54
1080							
Vertical	+120% to +140%	0 to +18%	0 to +108%	0 to +84%	0 to +108%	0 to +132%	0 to +130%
Horizontal	+/- 4%	+/- 6%	+/- 42%	+/- 32%	+/- 42%	+/- 54%	+/- 54%
WUXGA							
Vertical	+116% to +130%	0 to +6%	0 to +86%	0 to +66%	0 to +86%	0 to +110%	0 to +106%
Horizontal	+/- 4%	+/- 2%	+/- 40%	+/- 30%	+/- 40%	+/- 52%	+/- 50%
Panorama							
Vertical	+120% to +200%	0 to +92%	0 to +210%	0 to +180%	0 to +210%	0 to +212%	0 to +212%
Horizontal	+/- 4%	+/- 22%	+/- 58%	+/- 48%	+/- 88%	+/- 72%	+/- 70%
WQXGA							
Vertical	+116% to +132%	0 to +30%	0 to + 110%	0 to + 88%	0 to + 110%	0 to + 142%	0 to + 142%
Horizontal	+/- 4%	+/- 12%	+/- 52%	+/- 40%	+/- 52%	+/- 64%	+/- 64%

Motorized lens shift

The F50 lens shift function is fully motorized and can be controlled via the projector keypad, wireless remote control, or wired control interface e.g. RS232.

To activate lens shift, press the **OK** button on the keypad, or the **Shift** button on the remote control. Use the corresponding arrows to move the lens up, down, right and left. For more detail on this procedure, see "Lens shift", page 26.

For information on using the RS-232 or LAN control interfaces, please refer to the relevant ASCII Commands Protocol available for download at www.barco.com

5.9 Scheimpflug (Boresight) adjustment

What is Scheimpflug?

The lens holder has to be adjusted so that the "sharp focus plane" of the projected image falls together with the plane of the screen (Fp1→Fp2). This is achieved by changing the distance between the DMD plane and the lens plane (Lp1→Lp2). The closer the lens plane comes to the DMD plane the further the sharp focus plane will be. It can occur that you won't be able to get a complete focused image on the screen due to a tilt (or swing) of the lens plane with respect to the DMD plane. This is also known as Scheimpflug's law. To solve this the lens plane must be placed parallel with the DMD plane. This can be achieved by turning the lens holder to remove the tilt (or swing) between lens plane and DMD plane (Lp3→Lp4).

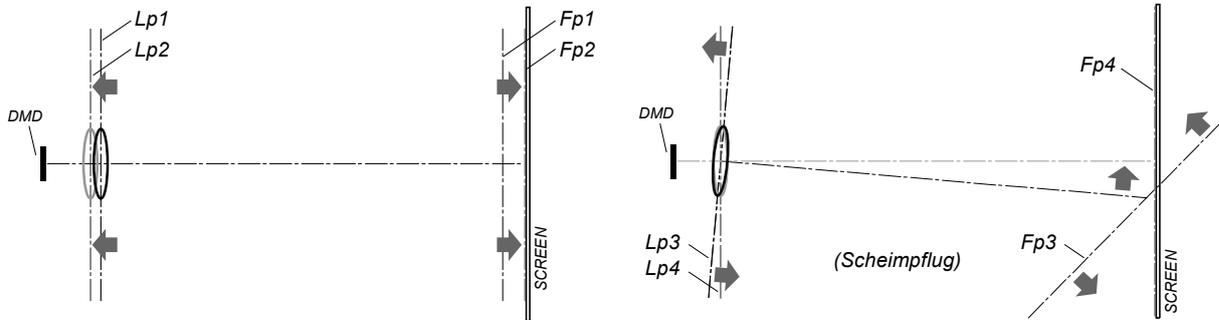


Image 5-10
Scheimpflug principle



Scheimpflug principle

The "plane of sharp focus" can be changed so that any plane can be brought into sharp focus. When the DMD plane and lens plane are parallel, the plane of sharp focus will also be parallel to these two planes. If, however, the lens plane is tilted with respect to the DMD plane, the plane of sharp focus will also be tilted according to geometrical and optical properties. The DMD plane, the principal lens plane and the sharp focus plane will intersect in a line below the projector for downward lens tilt.

Scheimpflug adjustment points

There are three (3) Scheimpflug set and adjustment screws on the F50. The adjustment screw (a) is adjusted using an Allen Key screw, hex size 3. The set screw (b) is locked and unlocked using an Allen Key screw, hex size 5. The set screw is NOT used during Scheimpflug adjustment.

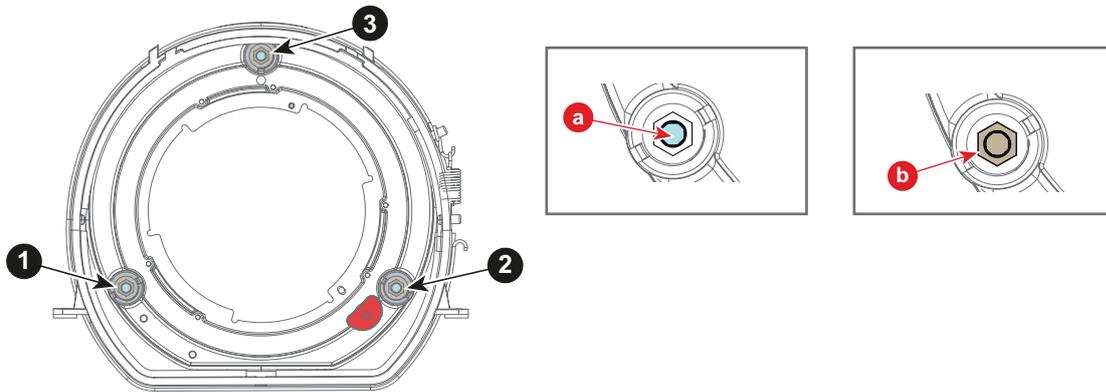


Image 5-11

When to apply Scheimpflug?

Only apply a Scheimpflug correction in case the overall focus of the projected image is not equally sharp (can be caused if the projector is **NOT in parallel** with the screen or a previous misaligned Scheimpflug). Take into account that the consequence of applying Scheimpflug correction upon a screen not in parallel with the projector is that the projected image differs from the rectangle shaped image. In other words "distortion" of the projected image occurs. **Masking** will be required to solve the distortion.

The disadvantage of Masking is loss of content. Therefore it is strongly **recommended** to place the projector **in parallel** with the projection screen and use the **SHIFT** functionality of the Lens Holder to match the projected image with the projection screen. In case the SHIFT range is not sufficient then the projector can be tilted and Scheimpflug can be applied.

5.10 Scheimpflug adjustment



CAUTION: A Scheimpflug adjustment should only be carried out by properly qualified and experienced projection specialists. A poor Scheimpflug adjustment may result in an extremely degraded image and will require factory—servicing to the projector.

Necessary tools

- Allen key, hex size 3
- Allen key, hex size 5
- Allen key, hex size 1.5

Preparation

1. Prepare the test area. Barco recommends a projector-screen distance of 2 metres be used for all Scheimpflug adjustments. Verify that the throw ratio of the installed lens matches the requirements of the installation area (projection distance and screen size).
2. Check that the lens is correctly installed, and lens shift is in centre position. See "Lens shift and offset matrix", page 40.
3. If the installed lens has Iris control, open the Iris all the way up. Lock the iris position using a 1.5mm Allen Key.
Note: Before locking the iris, confirm that this will only affect the iris position. Do not apply lens lock if iris and zoom function is interlocked.
4. Open the focus ring all the way up. Lock the focus position using a 1.5mm Allen Key.
Note: Before locking the focus ring, confirm that this will only affect the focus position. Do not apply lens lock if focus and zoom function is interlocked.
5. Project the chosen test image on the screen.
Tip: The projector focus test image, Main menu – Installation – Test images – Focus, is only available to Power and Service users. Input the Power User/Service code before navigating to this menu.
6. Zoom the lens to its widest opening (maximum image size on the screen).

Apply a Scheimpflug correction

1. Loosen the three set screws (reference 1b, 2b, 3b).

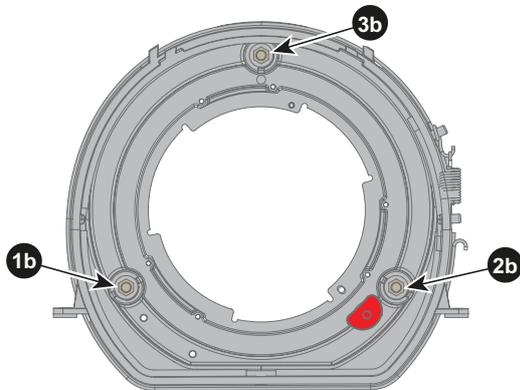


Image 5-12

2. Adjust the left side Scheimpflug adjustment screw (reference 1) until the test image in the top right side of the screen is in focus. Use a size 3 hex key to do this.

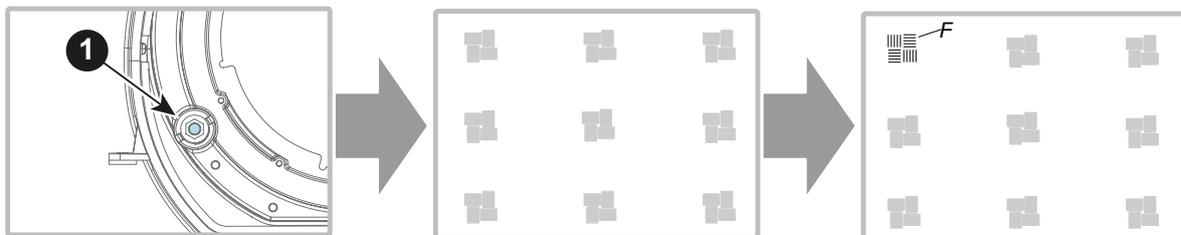


Image 5-13

Note: This process may cause the other areas of the image to slide out of focus. This is totally normal.

3. Adjust the right side Scheimpflug adjustment screw (reference 2) until the test image in the top left side of the screen is in focus. Use a size 3 hex key to do this.

5. Installation

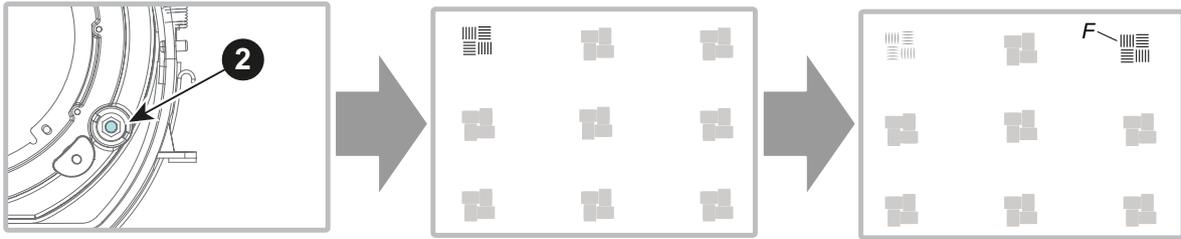


Image 5-14

Note: This process may cause the other areas of the image to slide out of focus. This is totally normal.

- Adjust the top Scheimpflug adjustment screw (reference 3) until the test image in the bottom half of the screen is in focus. Use a size 3 hex key to do this.

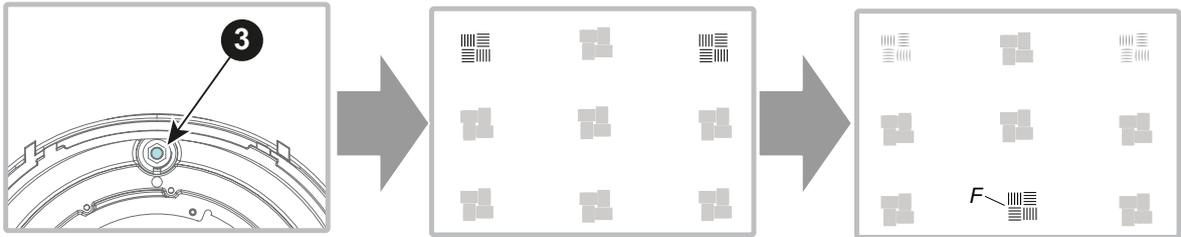


Image 5-15

Note: This process may cause the other areas of the image to slide out of focus. This is totally normal.

- Continue adjusting the screws one at a time until the test image is uniformly sharp across all areas of the display.
- Test the focus by zooming out (minimum image size on screen) and then zooming in again. Verify the image is still sharp. If there are any deviations to sharpness, repeat steps 2 to 6 until the image is correct.
- Tighten the three set screws in the following order: left (1b), right (2b) and then top (3b). Use a size 5 hex key to do this.

6. INPUT AND COMMUNICATION

Overview

- Local keypad
- Status indicator light
- Wireless remote control
- Connector Panel
- Connect to a source
- Extended Display Identification Data (EDID)
- HDBaseT
- VGA
- DVI-D
- HDMI
- Display Port 1
- Display Port 2
- LAN (Control)
- RS232 (Control)
- USB-A
- Sync 1 and 2
- Sync 3

6.1 Local keypad

Keypad functions

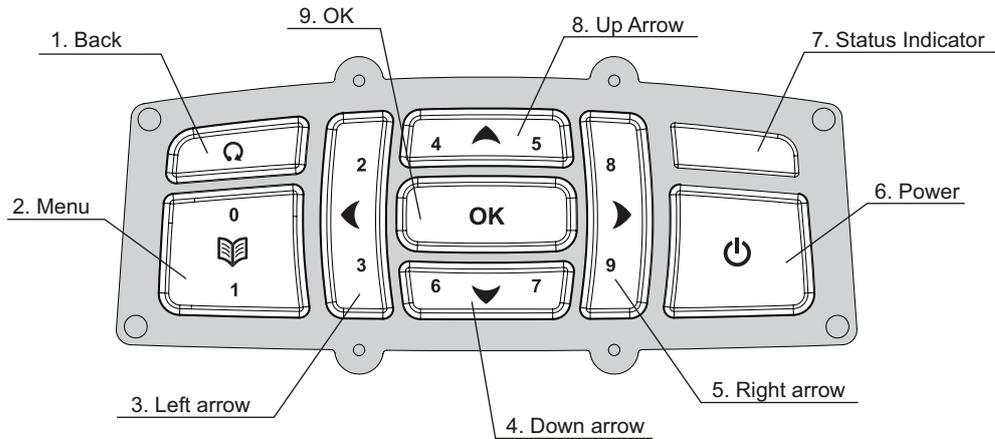


Image 6-1

Item No.	Name	Description
1	Back	Return to previous menu alternative
2	Menu	Multi-use key. Press to display or hide OSD. Can also be used for PIN numeric entry (0, 1).
3	Left arrow	Multi-use key. With Lens Shift active, used to move the lens to the left. With OSD active, used to navigate selection left. Can also be used for PIN numeric entry (2, 3).
4	Down arrow	Multi-use key. With Lens Shift active, used to move the lens down. With OSD active, used to navigate selection down. Can also be used for PIN numeric entry (6, 7).
5	Right arrow	Multi-use key. With Lens Shift active, used to move the lens to the right. With OSD active, used to navigate selection right. Can also be used for PIN numeric entry (8, 9).
6	Power	Press once to turn projector ON. Press twice to put projector in STANDBY mode.
7	Status indicator	LED color bar that displays current projector status. See "Status indicator light", page 47 for more information.
8	Up arrow	Multi-use key. With Lens Shift active, used to move the lens up. With OSD active, used to navigate selection up. Can also be used for PIN numeric entry (4, 5).
9	OK	Multi-use key. With OSD active, confirms a selection. With OSD not active, activates Lens Shift function.

6.2 Status indicator light

General

The status indicator light on the projector keypad (reference 7, image 6-1) shows the current status of the projector, and can be used to troubleshoot operating issues.

Indicator	Description	Action required
Blue (steady)	Normal operation	None
Blue flashing (1 flash per second / 60FPM)	Booting up	Wait for an image to appear
Yellow (steady)	Standby (off)	Press the power button to bring the projector out of standby or sleep mode
Yellow heartbeat (1 flash per 6 seconds/ 10 FPM)	ECO standby	Press the power button to bring the projector out of standby or sleep mode
Yellow flashing (1 flash per second / 60FPM)	Wait	None
Yellow pulsing (3 flashes per second / 180FPM)	Firmware upgrade package verified	Wait for flash procedure to complete
Red (steady)	Lamp life expired	Replace the affected lamp module as soon as possible
Flashing red (1 flash per second / 60FPM)	System error	Upgrade/replace the projector system firmware
Pulsing red (3 flashes per second / 180FPM)	Internal temperature	The projector will automatically go to standby mode, and attempt to cool down internal parts. Do NOT remove mains power supply. Verify that room's environmental conditions meet requirements. See "Installation conditions", page 31. Check that the projector exhaust system is unobstructed and working correctly. Contact the service technician.

Turn the status indicator light ON/OFF

Main Menu — Settings — LED Indicators Mute

During normal operations, the status indicator will glow to indicate the current status of the projector. The indicator light can be turned off (muted) to eliminate light pollution in totally dark installations.



Critical error indications (red status indicator) will still display when the LED Indicator is muted.

6.3 Wireless remote control

General

The projector has 2 IR receivers, one at the front and one at the rear, which are used to receive signals from the wireless remote control.

The wireless remote control is powered by two (2) standard AAA batteries. The battery compartment is on the back side of the remote control (ref. 11, image 6-2).

Functions

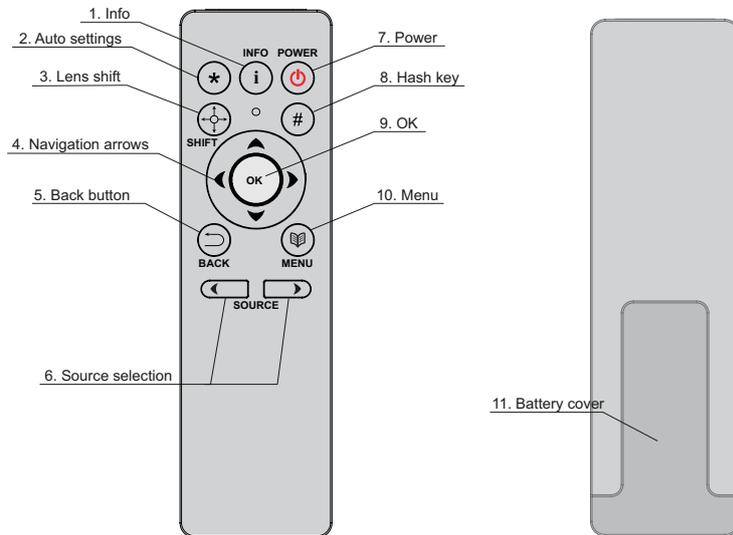


Image 6-2

Item No.	Name	Description
1	Info	Shortcut key to activate the projector OSD 'Status' menu
2	Auto settings	Activates the projector 'Auto' settings
3	Lens shift	Activates Lens Shift function.
4	Navigation arrows	Directional / navigation tools
5	Back button	Return to previous menu alternative
6	Source selection	Toggles forward and backwards between available sources
7	Power	Switches the projector lamp and electronics ON or OFF
8	Hash key	Not in use
9.	OK	Confirms the current selection
10.	Menu	Shortcut key to activate or deactivate the on screen menu display (OSD)
11.	Battery cover	Removable battery compartment cover

Specifications

Parameter	Value
Type	IR, NEC protocol
Sensors	2
Carrier	38 kHz
Range	7m
Laser	1 mW, 670nm

Disable an IR Receiver on the projector

Each of the IR receivers on the projector operates individually of the other, and can be enabled or disabled as required.

To enable or disable the front IR receiver, go to *Main Menu — Installation — IR Front*.

To enable or disable the rear IR receiver, go to *Main Menu — Installation — IR Rear*.

6.4 Connector Panel



CAUTION: The projector must be powered off before connecting or disconnecting any signal or control cables to the connector panel.

General

All source and control connections are made via the connector panel located on the rear cover. There are 13 available interfaces (7 source, 6 control), each of them is labelled for easy identification. For individual interface specifications, see the sections below.

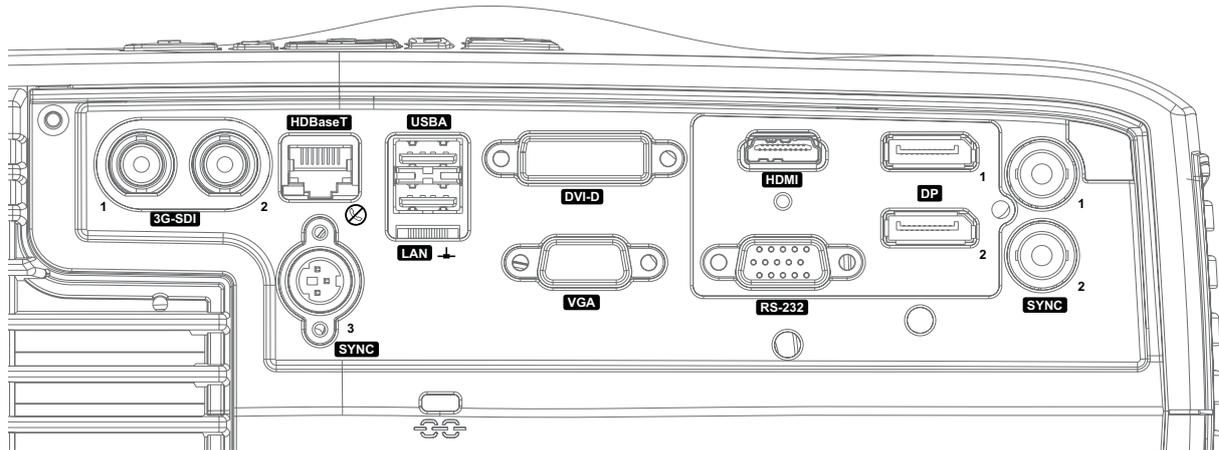


Image 6-3

6.5 Connect to a source



CAUTION: Risk of Cable Discharge Event (CDE) and Transient Overvoltage damage to LAN and HDBaseT ports when connected to PoE equipment. To minimize the risk of damage to the projector, use only IEEE 802.3 compliant power sources and equipment in PoE systems.

General

Choice of connectivity depends on the installation requirements as well as the sources connected. Generally, digital interfaces are preferred over analog. Multiple signals can be connected in parallel to allow for a selection of sources to be viewed in sequence.



The quality and length of cables may cause distorted or even failing signal quality. For best results Barco recommends the cable quality and cable length limitations be taken into consideration when setting up the installation.

To connect to a video or data source, simply plug the required interface in to the IO panel. Once a source is connected, turn the projector back on and then use the arrow keys (left / right) of the keypad or wireless remote control to select the applicable source.



Source selection with the keypad can only be done when the OSD menu and Lens Shift functions are closed/inactive.

Current (active) source information is displayed in the OSD Status menu, which can be accessed by pressing the **Info** button on the remote control or by going to *Main Menu — Status*.

Source Scan

Main Menu — Installation — Source Scan

When Source Scan is on, the projector automatically scans the input connectors for a valid signal each time the projector is turned on and, if one is found, automatically sets up the image. The default setting for Source Scan is disabled.

To activate Source Scan go to *Main Menu — Installation — Source Scan*.

6.6 Extended Display Identification Data (EDID)

Restore source format integrity

Main menu — Installation — EDID

In some instances when using 3rd party system equipment, such as signal repeaters or switchers, EDID (Extended Display Identification Data) information can be lost or corrupted in translation. Wrong EDID data may result in distorted images, wrong aspect ratios or reduced image resolutions.

To manually define the EDID detailed timing descriptor, go to the EDID sub menu *Main menu — Installation — EDID*.

Connector	Values	Auto settings 1080	Auto settings WUXGA	Auto settings WQXGA
VGA	Auto, 960x1080@60 Hz ² , 960x1200@60 Hz ² , 1280x1600@@60 Hz ² , WUXGA, 1080@60 Hz, SX+, SXGA, 1366x768, 720@60 Hz, 720@50 Hz, XGA, SVGA, VGA.	1080@60 Hz	WUXGA@60 Hz	WUXGA@60 Hz
DVI	Auto, 960x1080@60 Hz ² , 960x1200@60 Hz ² , 1280x1600@@60 Hz ² , WQXGA@60 Hz, WUXGA@60 Hz, 1080@60Hz, SX+, SXGA, 1366x768, 720@60Hz, 720@50Hz, XGA, SVGA, VGA.	1920x1200@60 Hz. Dual link	1920x1200@60 Hz. Dual link	2560x1600@60 Hz. Dual link
HDMI ³	Auto, 960x1080@60 Hz ² , 960x1200@60 Hz ² , 1280x1600@@60 Hz ² , WUXGA@60Hz, 1080 @60Hz, SX+, SXGA, 1366x768, 720@60Hz, 720@50Hz, XGA, SVGA, VGA.	1920x1080@60 Hz	1920x1200@60 Hz	2560x1600@60 Hz
HDBaseT ⁴	Auto, 960x1080@60 Hz ² , 960x1200@60 Hz ² , 1280x1600@@60 Hz/120 Hz ² , WUXGA@60Hz, 1080@60Hz, SX+, SXGA, 1366x768, 720@60Hz, 720@50Hz, XGA, SVGA, VGA.	1920x1080@60 Hz	1920x1200@60 Hz	2560x1600@60 Hz
Display Port 1	Auto, 960x1080@60 Hz/120 Hz ² , 960x1200@60 Hz ² , 1280x1600@@60 Hz ² , WQXGA@60Hz, WUXGA@120Hz, WUXGA@60Hz, 1080@60Hz, SX+, SXGA, 1366x768, 720@60Hz, 720@50Hz, XGA, SVGA, VGA.	1920x1080@60 Hz	1920x1200@60 Hz	2560x1600@60 Hz
Display Port 2	Auto, 960x1080@60 Hz ² , 960x1200@60 Hz ² , 1280x1600@@60 Hz ² , WQXGA@60Hz, WUXGA@60Hz, 1080@60Hz, SX+, SXGA, 1366x768, 720@60Hz, 720@50Hz, XGA, SVGA, VGA.	1920x1080@60 Hz;	1920x1200@60 Hz	2560x1600@60 Hz

2. For Picture by Picture use

3. All settings except **Auto** use DVI as type.

4. All settings except **Auto** use HDMI as type.

6.7 HDBaseT

Specifications

Parameter	Value
Connector	Standard RJ-45, 8P8C
Max. TMDS Clock Frequency	270 MHz
Max. video resolution supported	2560x1600 – 60Hz – 24bit
HDCP Pass-Through	Yes, from Source to Projector
CEC Pass-Through	Yes, from Source to Projector
IR Extension	Not Supported
RS-232 Extension	Not Supported
10/100Mbps Ethernet Pass-Through	Yes
Fallback to 100BaseTx, IEEE 802.3u	Not Supported
USB Over Centre Tap	Not Supported
Power Over Ethernet	Not Supported
Audio	Not Supported
Status LED	Operation: Green, Left. Link/Mode: Yellow, Right.

6.8 VGA

Specifications

Parameter	Value
Connector	VGA 15 pin female HD-DSUB analog RGBHV
Horizontal frequency range	10 - 150kHz
Vertical frequency range	50 - 110Hz
Sync signals	Separate horizontal and vertical Composite sync on H-sync Input Sync on Green (SoG)
Scan format	Interlaced or progressive
Dot (pixel) clock rate	Analog VGA 10 - 162 MHz max
Maximum resolution	1920x1200 @ 60Hz
Nominal sync impedance	Selectable 75 ohms or 2k2 ohms
Input levels	
RGB with sync	1.0Vp-p \pm 2dB (0.35 Vpp – 1.4 Vpp)

6.9 DVI-D

Specifications

Parameter	Value
Connector	DVI-I female digital RGB
Signal characteristics	DVI 1.0, Digital, TMDS
Max. pixel rate	330 MHz (dual link), 165 Mhz (single link)
Scan format	Interlaced or progressive
Max. input resolution	2560x1600 (dual link), 1920x1200 (single link) @ 60 Hz
Bit depth	8 bit
EDID	Supported
HDCP	HDCP 1.1

6.10 HDMI

Specifications

Parameter	Value
Connector	Standard HDMI
Signal characteristics	HDMI 1.4 (video only); Digital, TMDS
Max. pixel rate	270 MHz
Ethernet	No
Audio	No
Scan format	Interlaced or progressive
Max. input resolution	2560x1600 @60Hz – 24bit
EDID	Supported
HDCP	HDCP 1.4

6.11 Display Port 1

Specifications

Parameter	Value
Connector	Standard Display Port
Signal characteristics	DP 1.2
Max. cable length	15 m (24 AWG) - RBR; 2 m (24 AWG) – HBR, HBR2
3D formats supported	Frame field sequential, Frame stacked, Side by side
Scan format	Interlaced or progressive
Max. input data resolution	2560x1600 @120Hz
Bit depth	8, 10, 12 bit
EDID	Supported
HDCP	HDCP 1.4

6.12 Display Port 2

Specifications

Parameter	Value
Connector	Standard Display Port
Signal characteristics	DP 1.1
Max. cable length	15 m (24 AWG) - RBR; 2 m (24 AWG) – HBR, HBR1
3D formats supported	Frame field sequential, Frame stacked, Side by side
Scan format	Interlaced or progressive
Max. input data resolution	2560x1600 @60Hz
Bit depth	8, 10, 12 bit
EDID	Supported
HDCP	No

6.13 LAN (Control)

Specifications

Parameter	Value
Connector	1 RJ45 Connector for projector control (not content)
Protocols	DHCP, TCP/IP, UDP/IP
Speed	10/100/1000 MBit

6.14 RS232 (Control)

Virtual Comport (RS232 Serial Communication)

The USB-IN port of the IO Panel supports RS232 serial communication. You can use the RS232 input port to connect a computer to your projector. This way you can configure and control your projector from your local computer.

Advantages of using RS232 serial communication:

- easy adjustment of the projector via PC (or MAC)
- wide range of control options
- straightforward update and backup process between PC and projector



When using RS232 Serial Communication, the projector baud rate may need to be adjusted to match that of your computer. The default value is 19200. Baud rate is set from *Main Menu — Settings — Baud Rate*.

The ASCII Commands Protocol for the projector are available for download from www.barco.com

Specifications

Parameter	Value
Connector	1 female DB9 connector (RS232-in) for projector control

6.15 USB-A

Specifications

Parameter	Value
Connector	USB type A
Function	Firmware upgrade using USB stick

6.16 Sync 1 and 2

Specifications

Parameter	Value
Connector	BNC
Function	Input / output sync control

6.17 Sync 3

Specifications

Parameter	Value
Connector	DIN
Function	Input / output sync control; can be used to power (5V) IR emitter when Glass Sync selected in OSD

7. CHANGE PROJECTOR SETTINGS

Overview

- Select a power mode
- Lock the projector
- Customize the On Screen Display (OSD)
- Review and change network settings
- Review system status
- Revert to factory settings

7.1 Select a power mode

Power on/standby

Switch the projector ON using the POWER button on the keypad or wireless remote control. The LED status light flashes blue when the projector warming up; a solid blue light will be displayed when the projector is on and running normally.

Press the POWER button twice to put the projector into STANDBY mode. The LED status light will flash yellow while the projector is cooling down. A solid yellow light indicates the projector is in STANDBY mode.

DPMS

When activated, the Display Power Management Signalling (DPMS) system automatically puts the projector in standby mode after a source is removed. If the projector is powered down in DPMS power save, it will automatically power back on when a valid source is acquired.

DPMS is activated from the SETTINGS menu. Users select the timeout value in the DPMS TIMEOUT sub-menu.

Standby ECO

This power saving mode sends the projector into a deep sleep setting when in standby.

The projector is returned to normal operation by pressing the power button on the projector keypad or remote control, or remotely via the RS232 connector using the ASCII protocol / Wake on LAN via the Ethernet.



Baud rate for RS232 communication is fixed at 19200 when the projector is in standby eco.

If DPMS is enabled in the SETTINGS menu, the projector will automatically wake out of Standby ECO mode and power back on when a valid source is acquired from the following inputs:

- DP1 and DP2
- HDMI
- DVI
- VGA
- SDI 1 and SDI 2

7.2 Lock the projector

PIN code

Main Menu — Settings — Pin code

Projector access and operation can be regulated using a 4 digit PIN code.

The default setting for the PIN is DISABLED. The factory set PIN code is '1234'.

Users can set their own PIN code. To do this, go to *Main Menu — Settings — PIN code — Change PIN code*.

The system will issue a prompt for the current PIN code. Once this is successfully entered, it will prompt the user to enter and then confirm a new 4 digit code. When this is done, click **OK** to set the code and exit the submenu.



Users have three attempts to correctly enter the PIN. After 3 consecutive failed attempts, the projector will automatically be locked and a PUK code will be needed to unlock the projector.

If the PUK code is entered incorrectly 3 consecutive times, the projector will be locked and can only be unlocked by an authorized Barco service partner. Proof of purchase will be required to unlock the projector.



The PUK code for each projector is individual and cannot be used with other projectors. Your projector PUK code is provided with your original packaging.

Kensington Lock

A lock slot (reference 1, image 7-1) is located at the back of the projector for use with the Kensington® Lock Slot (K-Slot) security system.

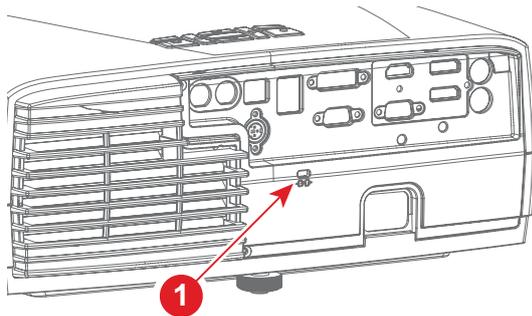


Image 7-1

7.3 Customize the On Screen Display (OSD)

Change the display language

Main Menu — Language

The default language for the projector menu system is English. To select a new display language, go to the Language submenu and scroll down the list until you reach the desired language. Click **OK** to activate the highlighted language. The menu language will change immediately.

There are currently 11 menu display languages available:

- Chinese Simplified
- Chinese Traditional
- English
- French
- German
- Italian
- Japanese
- Korean
- Norwegian
- Portuguese
- Russian
- Spanish
- Swedish

Define OSD behavior

Main Menu — Installation — OSD Enable

On Screen Display (OSD) messages are used to prompt and confirm projector menu actions and functions. There are three modes of OSD behavior:

Mode	Description
On	All messages, warnings and information is displayed.
Off	No messages are shown.
Only warnings	Only critical warning messages, for example temperature overheating, are displayed.

Change OSD time-out value

Main Menu — Settings — Menu Timeout

The OSD menu will automatically close after it has been inactive for a given period of time.

The default time-out period is 30 seconds. This value can be regulated from 5 to 60 seconds. Selecting **Never** will disable the time-out function.

Set background color

Main Menu — Settings — Background

A solid, colored background is displayed whenever the projector is searching for a source. Use this menu to change the background between black, white and gray.

Change the splash screen

Main Menu — Settings — Splash

By default, the manufacturer's logo will appear during projector startup. This can be changed to a solid colored screen, if desired.

7.4 Review and change network settings

General

The projector uses Dynamic Host Configuration Protocol (DHCP) to enable better identification and control of the projector when connected to the Local Area Network (LAN).

DHCP is enabled by default. It can be disabled from *Main Menu — Settings — Network — Change LAN settings*

When DHCP is enabled, current network settings are automatically displayed at *Main Menu — Settings — Network*.

When DHCP is disabled, users can set a fixed IP address for the projector at *Main Menu — Settings — Network — Change LAN settings*.

7.5 Review system status

Projector status menu

Main Menu — Status

The following system status information can be reviewed at any time by pressing the **Info** button the remote control, or by going into the OSD *Main Menu — Status*

- Part number
- Serial number
- Year/week of manufacture
- Current software version
- Lamp runtime and remaining hours
- Projector operating hours (total)
- Network information
- Active source(s)

Detailed source information

Detailed source information is available in the OSD, *Main Menu — Status — Source Information*

Source timing information and other source analysis data can be reviewed at *Main Menu — Status — Source Information — Advanced*.

7.6 Revert to factory settings

About

Main menu — Settings — Factory reset

Performing a factory reset will return the selected setting(s) to the values set when the projector left the factory. Users with advanced rights (power users) can define whether a factory reset will be 'full' or 'limited'. For normal access users, the factory reset default is set to 'limited'.

The following projector settings can be individually selected or deselected for inclusion in the reset:

- Picture
- 3D
- Communication
- Real Color

8. SET UP THE PICTURE

About

This chapter describes how to set up and adjust the picture display in order to get the best possible image on screen.

For best results, picture adjustments should be carried out whenever the source, signal type and/or format is changed. General settings out of the box are standardized to meet accepted industry standard signal levels. Signal levels deviating from these standards will need proper calibration before the output matches the desired result.

Wherever possible, we recommend you use customized test images during picture adjustments.

In general, the following order is recommended when adjusting the picture display:

1. Contrast
2. Gamma
3. Brightness
4. Saturation

Overview

- Select the image orientation
- Use test images
- Set up Picture-by-Picture
- Apply a display profile
- Adjust lamp power
- Use gamma curves
- Adjust brightness, saturation and contrast
- Choose an aspect ratio

8.1 Select the image orientation

About

Main Menu — Installation — Image Orientation

The projector supports the following installation orientations:

- Desktop front (default)
- Ceiling front
- Desktop rear
- Ceiling rear

8.2 Use test images

About

Main Menu — Installation — Test Image

Built-in test images can be used to check and refine display aspect and focus on the screen when installing the projector or a new lens.

Use the arrow keys to navigate to the required aspect ratio. The display will change dynamically.

Available test images:

- Off
- 4:3
- 16:9
- 16:10
- 1.85:1
- 2.35:1
- 5:4
- Combined (displays all available aspect ratios simultaneously)
- Focus

8.3 Set up Picture-by-Picture

About

Main Menu — Installation — Picture by Picture

The Picture by Picture (PBP) function enables you to view 2 sources with full content simultaneously in a side by side setup. Images are compressed, but the aspect ratio is maintained.

Browse to *Main Menu — Installation — Picture by Picture* and click  to enable Picture by Picture.

The Picture by Picture setup menu option will now be available for selection. *Main Menu — Installation — Picture by Picture* setup.

PbP source input matrix

	DP1	DP2	HDBaseT	DVI (single link mode)	HDMI	DVI (dual link mode)	VGA	3G SDI (A)	3G SDI (B)
DP1	✘	✓	✓	✓	✓	✘	✓	✓	✓
DP2	✓	✘	✓	✓	✓	✘	✓	✓	✓
HDBaseT	✓	✓	✘	✘	✓	✘	✓	✓	✓
DVI (single link mode)	✓	✓	✘	✘	✓	✘	✓	✓	✓
HDMI	✓	✓	✓	✓	✘	✘	✓	✓	✓
DVI (dual link mode)	✓	✓	✘	✘	✘	✘	✓	✓	✓
VGA	✓	✓	✓	✓	✓	✘	✘	✓	✓
3G SDI (A)	✓	✓	✓	✓	✓	✘	✓	✘	✓
3G SDI (B)	✓	✓	✓	✓	✓	✘	✓	✓	✘

8.4 Apply a display profile

About

Main Menu — Picture — Profile

The projector has a selection of 6 predefined display profiles that can be used to optimize the display for different uses. Each of the display profiles can be modified by the user. An asterisk (*) beside the profile name indicates that the original settings have been changed. In addition, there is a custom profile where users can create and save their preferred settings.

Picture settings that can be modified in a profile are:

- BrilliantColor mode
- Gamma curve
- Color correction (white point)
- Lamp power

Changes to the current profile can be discarded by selecting, *Main Menu — Picture — Profile Reset* and then selecting **current profile** and **ok**.

To reset all the display profiles to the factory settings, go to *Main Menu — Picture — Profile Reset* and select **all profiles** and **ok** when prompted.

The table below shows the factory settings for each of the 6 predefined display profiles.

Profile	Description	BrilliantColor	Gamma	Color Correction	Lamp Power
Standard		Color	Dynamic	Off	350
Presentation		Bright	Dynamic	Off	350
Bright		Bright	Computer 2	Off	350
Cinema		Off	Film 2.2	On	350
DICOM	Digital Imaging and Communications in Medicine (DICOM) compliant.	Off	DICOM 180 LUX	On	350
SRP™	Smear Reduction Processing. Not available with High Brightness color wheel.	SRP Half	Film 2.2	Off	350

8.5 Adjust lamp power

Adjust lamp power settings

Main Menu — Picture — Lamp Power

Running the projector lamp at different power levels will alter the brightness of the image on the screen. Higher levels give higher brightness and shorter lamp life time. Lower levels save energy, extend lifetime and reduce brightness.

The lamp power can be adjusted between 280 W and 350 W. Each step has a value of 3 W.

8.6 Use gamma curves

About

Main menu — Picture — Gamma

Gamma compensation, or gamma correction, is a way of adjusting the signal input to light output characteristics of a display or projector in order to suit the eye's sensitivity to different light levels and to compensate for non-linearities in displays. Without gamma compensation, images may look too dark or too bright, lack detail or depth. By adjusting the amount of gamma compensation changes, you can change not only the perceived brightness levels, but also the ratios of red to green to blue.

Different types of displays have different gamma factors that need to be corrected in order to look and be perceived the same. For example, an MS Windows generated image displayed on a CRT monitor will require a gamma correction value of about 2.5 to avoid color bleaching and burning.

The gamma curve correction formula is based on $\text{output level} = \text{input level}^\gamma$.

Gamma curves

The projector has a range of built-in gamma curves, available at *Main menu — Picture — Gamma*.

The name of the curve, for example, Computer 1, describes the recommended use.

Some curves are reserved for Advanced or Service users, and will only be viewable after the access code is input.



Using any of the computer curves for video applications will result in significant image noise.

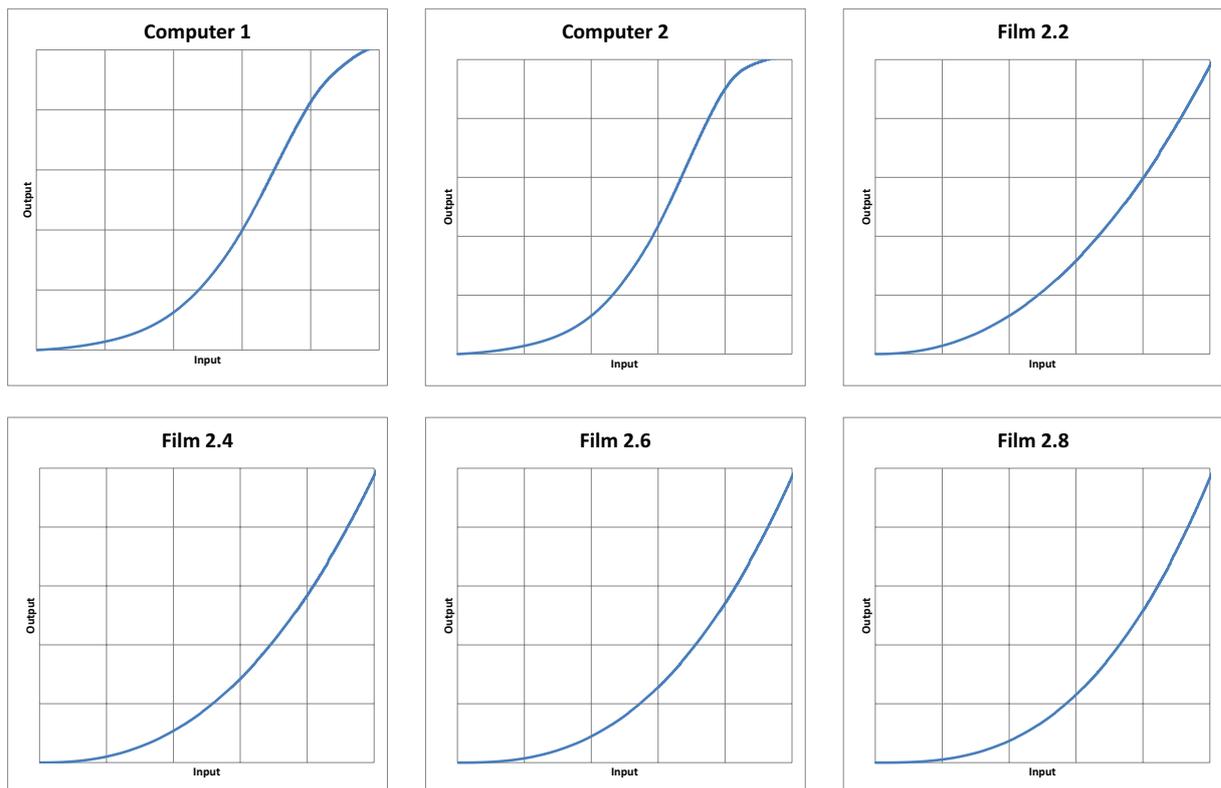


Image 8-1

8. Set up the picture

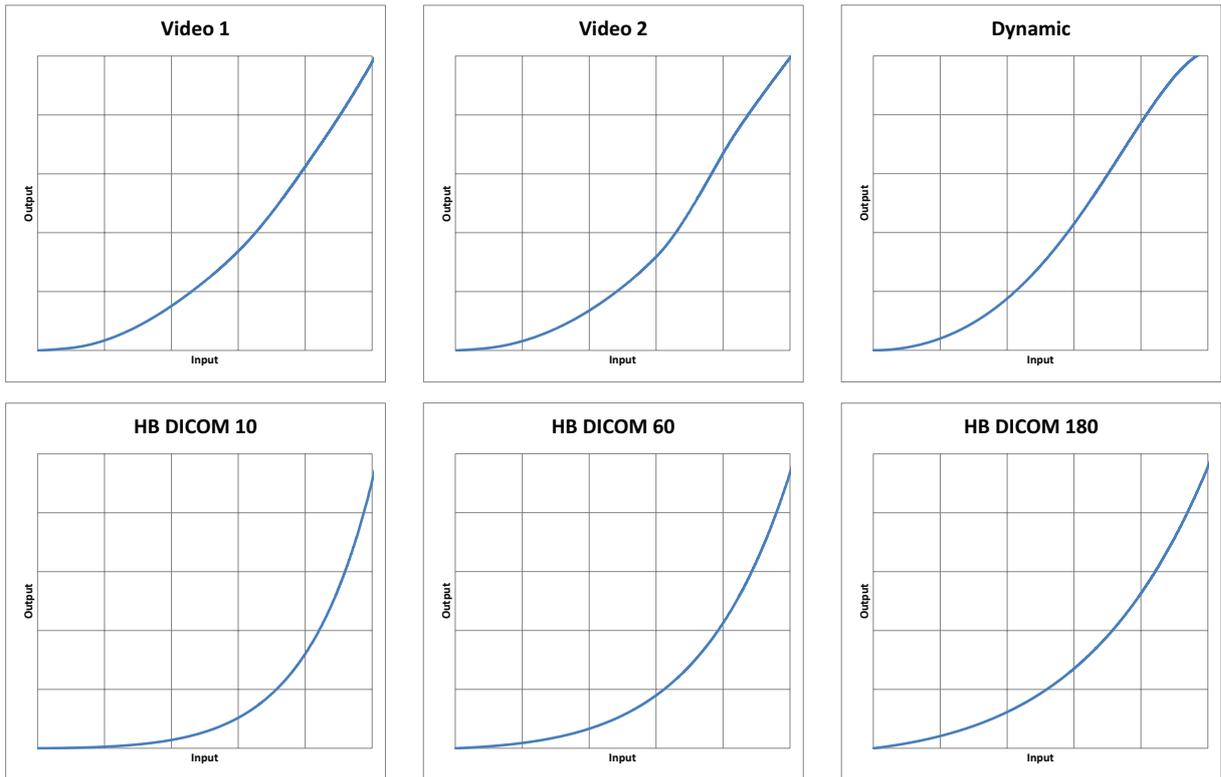


Image 8-2

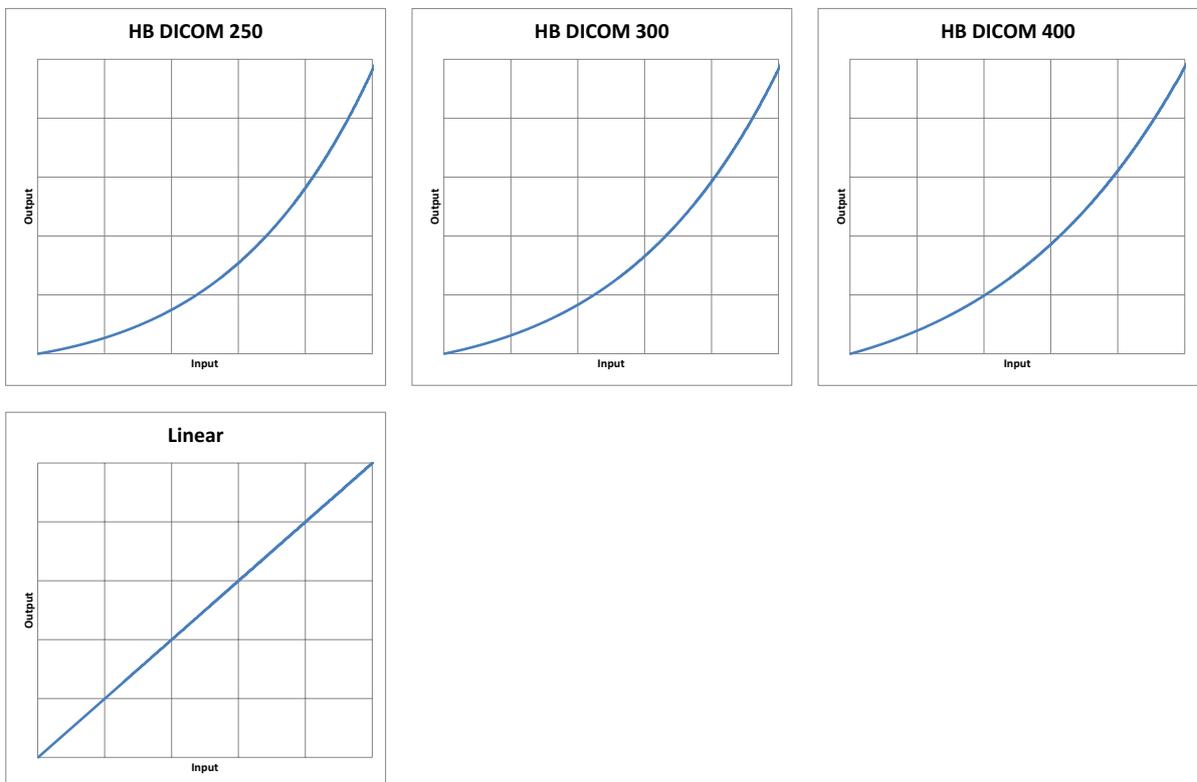


Image 8-3

8.7 Adjust brightness, saturation and contrast

About

The brightness, contrast and saturation levels of an image can be adjusted in any display profile. Any changes to these values will automatically be saved to the active profile when you exit the OSD menu.

In general, it is recommended to adjust image contrast first, then brightness and finally saturation.

For best results, use a proper test image to adjust all picture settings.

Brightness

Main Menu — Picture — Brightness

Brightness levels define the black levels and detail shown in the darkest parts in an image; the higher the value, the brighter the image.

All adjustments (-50 to +50) are dynamic. Any changes will be saved to the active display profile when you exit the OSD menu.



Brightness levels can dramatically impact upon an image; important shadow detail may be lost with incorrect brightness levels.

Contrast

Main Menu — Picture — Contrast

Contrast is the difference in brightness between the brightest and darkest parts in an image; the higher the value, the greater the contrast.

All adjustments (-50 to +50) are dynamic. Any changes will be saved to the active display profile when you exit the OSD menu.

Saturation

Main Menu — Picture — Saturation

Saturation levels impact on the white levels and the intensity of the color display; the higher the value, the more vivid the color display will be.

All adjustments (-50 to +50) are dynamic. Any changes will be saved to the active display profile when you exit the OSD menu.

8.8 Choose an aspect ratio

About

Main menu — Picture — Aspect

This menu option allows you to select the best aspect ratio to display your image:

Aspect ratio	Description
Fill aspect ratio	Fills the imaging device in horizontal and/or vertical direction to maintain the source image aspect ratio.
Fill all	Fills the entire imaging device regardless of the input aspect ratio and resolution.
Fill 16:9	Displays the image with a 16:9 (widescreen) aspect ratio (scaled) image regardless of input aspect ratio and resolution.
Fill 4:3	Displays the image with a 4:3 aspect ratio (scaled) image regardless of the input aspect ratio and resolution.
One to one	Turns off all scaling; projects the input image mapped pixel-by-pixel without scaling.

9. ADVANCED PICTURE ADJUSTMENTS

9.1 Apply smear reduction processing (SRP)

About

Smear Reduction Processing (SRP) is a custom-designed temporal blanking solution used to reduce or eliminate smearing in high motion imagery. Available settings are either SRP Half, SRP Full or Off.

Both settings introduce 8.3333 ms Dark Time to the image @ 60 Hz or 4.1666 ms @ 120Hz, however the color wheel sequencing differs between the two modes of operation to give a different visual effect. Respective color wheel sequences are RGB, blank for SRP™ Half and RGB, RGB blank / blank for SRP™ Full. Results are subjective and therefore the mode selected is entirely at the discretion of the end user.

Increasing Dark Time has an adverse effect on projector brightness. For example increasing Dark Time by 8.3333 ms represents exactly half of the 16.6666 ms video frame interval at 60Hz, brightness subsequently reduced by 50% as a result. It is important to note that full color bit depth is retained even when brightness is reduced. In order to recover some brightness color wheel spokes are enabled by default when SRP™ Half and Full settings are applied. This default setting can be overridden by enabling SRP at *Main menu — Settings — Service — Enable advanced profiles* if required.



Using SRP™ with the projector in AS3D mode is not supported.

Mode selection is from the OSD *Main menu — Picture — RealColor — BrilliantColor* menu or via external control.

Model	Color wheel	SRP Half	SRP Full
F50 60Hz (HD / WUXGA / 2560 x 1080 / WQXGA)	VizSim	✓	✓
F50 60Hz (HD / WUXGA / 2560 x 1080 / WQXGA)	VizSim Bright	✓	✓
F5060Hz (HD / WUXGA / 2560 x 1080 / WQXGA)	HB+	✗	✗
F50 120Hz (HD / WUXGA / 2560 x 1080 / WQXGA)	VizSim	✓	✗
F50 120Hz (HD / WUXGA / 2560 x 1080 / WQXGA)	VizSim Bright	✓	✗
F50 120Hz (HD / WUXGA / 2560 x 1080 / WQXGA)	HB+	✗	✗

9.2 Crop the image

About

Main menu — Picture — Advanced — Cropping

Cropping is used to manage image loss and/or letterboxing when the aspect ratio of the projector display and the image source do not match.

The crop can only be applied to the image's vertical position, that is the top and bottom of the image.

The default setting for the crop function is disabled; all cropping functions are turned off and the display aspect is set via the aspect menu (see "Choose an aspect ratio", page 80).

There are 3 crop modes: preset, auto and manual.



All cropping is done dynamically. For best results we recommend you pause the movie on the screen, making sure any subtitles or text are visible, and then activate the cropping function from the menu, *Main menu — Picture — Advanced — Cropping*.

Preset crop mode

In Preset mode, the image is altered **without constraints** to fill the display aspect. Available aspects are:

- 16:9
- 1.85:1
- 2.35:1
- 2.37:1
- 2.40:1



In this mode the image is adjusted to fill the frame, and may not be proportionally correct.

Auto crop mode

In Auto mode, the projector analyses the top area of the image for letterbox bars and automatically calculates the ideal crop location. The crop is equally applied to the top and bottom of the image.



The auto crop algorithm assumes that the top and bottom of the image are identical.

Manual crop mode

Manual mode allows the user to manually input the number of lines (top and/or bottom) that will be cropped from the image. This is ideal for films or videos where text or subtitles appear in the upper or lower letterbox bars.

To calculate a manual crop value, use the following equation:

Vertical resolution — (Horizontal resolution ÷ aspect ratio) = crop value.

The projector has a native display aspect of 16:9 (1920x1080) but the movie you want to display has a native resolution of aspect ratio of 2.4:1 (2560x1080). The movie subtitles are located in the lower letterbox, and some of the text is missing when the movie is displayed in its native aspect.

The crop value calculation will look like this: $1080 - (1920 \div 2.4 = 800) = 280$.

280 is the total number of lines that shall be cropped. How that value is distributed over the upper and lower letterbox bars can be affected by details such as location of subtitles and should be decided on a case-by-case basis.

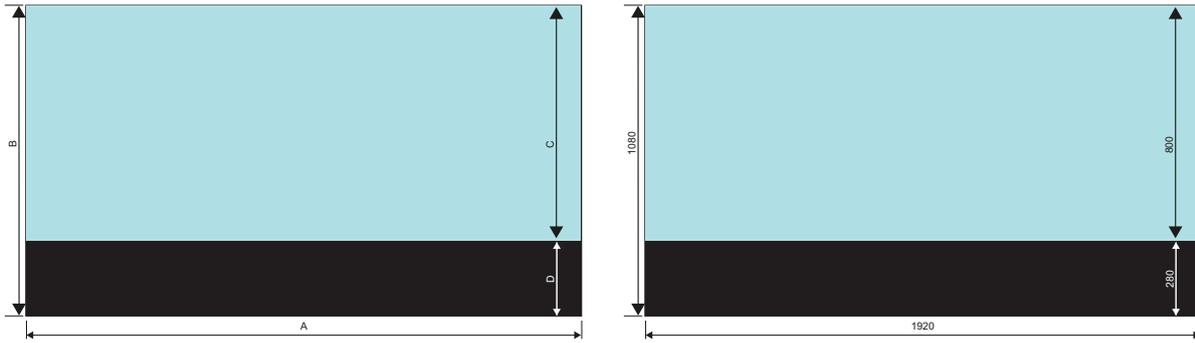


Image 9-1

- A Horizontal resolution
- B Vertical resolution
- C Relative image display (lines)
- D Crop value (lines)

9.3 Manual adjustments on VGA inputs

About

Typically, the projector will automatically adjust source signals to get the best picture on the screen. However analog signals such as VGA may require manual adjustment to eliminate artefacts or disturbances. This can be done via the advanced picture sub menu.

Adjust phase or frequency

In some instances a picture may become jittery or display vertical bands or other artefacts.

Main menu — Picture — Advanced — Phase is used to adjust the source phase to gain a more stable image.

Main menu — Picture — Advanced — Frequency is used to eliminate vertical bands or manually adjust the width of the image.

Alternatively, pressing the 'Auto' setting button on the remote control will auto-correct the source phase and frequency.

Adjust picture position

Main menu — Picture — Advanced — Horizontal position is used to shift the image left or right.

Main menu — Picture — Advanced — Vertical position is used to shift the image up or down.

10. COLOR CALIBRATION

Overview

- RealColor™
- BrilliantColor™
- Define the x,y coordinates for RGB(W)
- Use color temperature to adjust white point
- Color calibration best practice
- Calibrate projector color

10.1 RealColor™

About RealColor™

All Barco projectors are measured and calibrated for maximum color and brightness before leaving the factory, however a number of factors, including lamp life, display type and projector location, may impact on the accuracy of the projector's color settings. RealColor is a proprietary color management suite developed to give users better, faster and more accurate control of projector color display. This feature is particularly useful in multi-channel installations where precise color reproduction is a necessity.

The basis of RealColor is a unique measurement and characterization process that each projector goes through before it leaves the factory. The results of the procedures, the measured optical and electrical characteristics, are input into the projector and stored as system settings. This data is then used by the projector as a reference point for all future alterations. All projectors are hand calibrated to D65⁵ before leaving the factory.

Using RealColor™ to manage the color display

All colors visible to the eye are defined by the CIE XYZ Chart, ref. image 10-1. The boundary of the colors the projector can display is called the system color gamut. The white area in the upper center of the figure is an example of a system color gamut.

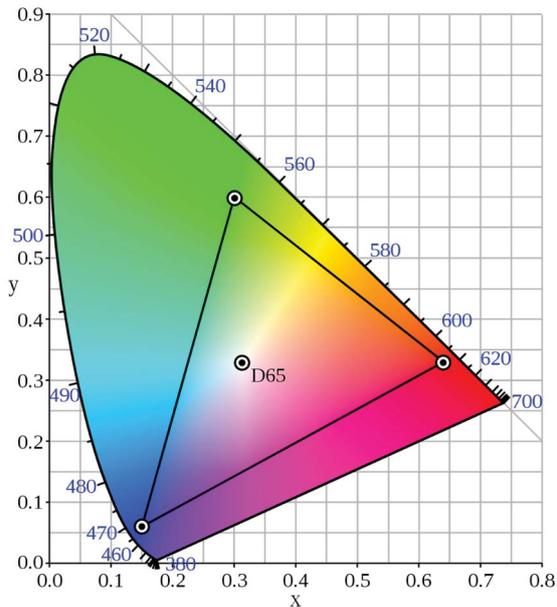


Image 10-1

Changing the system color gamut may be useful to:

- Color match multiple projectors
- Meet defined color standards, e.g. REC 709
- Create a certain 'look' to the image



The system color gamut cannot be expanded outside of the projector's native color gamut.

There are three ways that you can use RealColor to manage the projector's color display settings:

- Apply a color profile, see "BrilliantColor™", page 90
- Define the coordinates of the color display "Define the x,y coordinates for RGB(W)", page 91
- Adjust the white point of the image using color temperature "Use color temperature to adjust white point", page 92

5. CIE Standard Illuminant D65.

RealColor™ menu

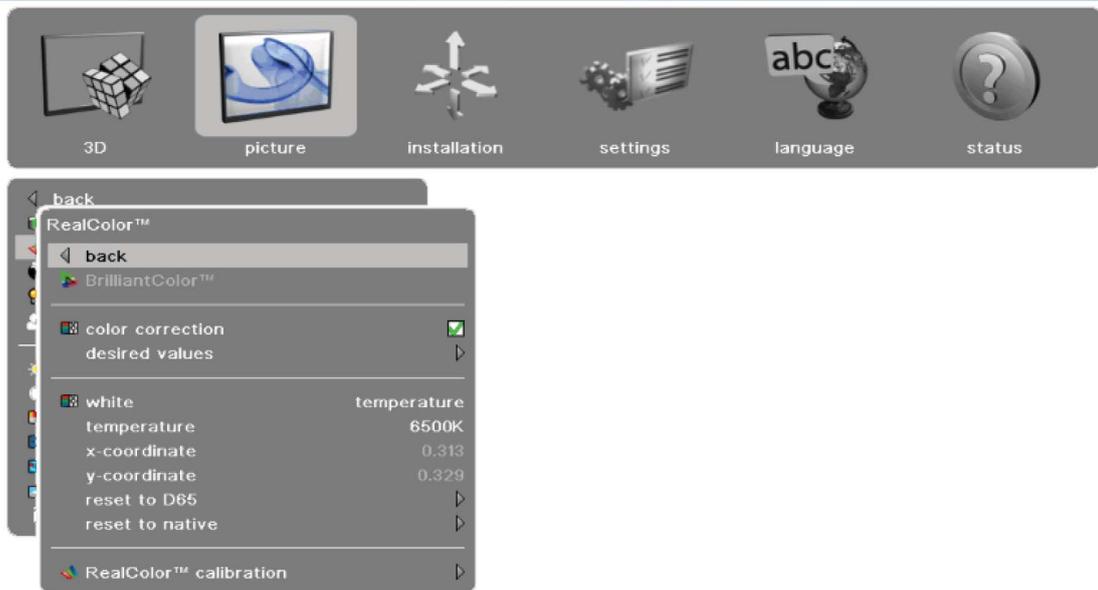


Image 10-2

10.2 BrilliantColor™

About BrilliantColor™ profile modes

Mode	Description
Off	No mode is selected.
Color	RGB color replication is prioritized.
Bright	Brightness is prioritized.
SRP Half	Temporal blanking solution to reduce smear in high motion imagery. See "Apply smear reduction processing (SRP)", page 83 for more information.
SRP Full	Temporal blanking solution to reduce smear in high motion imagery. See "Apply smear reduction processing (SRP)", page 83 for more information.

10.3 Define the x,y coordinates for RGB(W)

About

Main menu – RealColor – RealColor

This feature provides total control of the way colors behave along both axes, and enables users to adjust the display white point, with a three decimal accuracy. This is particularly useful when color matching several projectors.



Color Correction must be enabled before any changes can be made to color coordinates. Do this at *Main menu – Picture – RealColor – RealColor – ColorCorrection*

Coordinates (x,y, white point) can be set to eclipse any color in the available optical gamut for any one projector. The default setting is D65, x=0.3127, and y=0.329.

All changes applied to the color display occur dynamically.

Color settings can be reset to D65⁶ at any time by selecting, *Main Menu — Picture — RealColor — Reset to D65*

6. CIE Standard Illuminant D65

10.4 Use color temperature to adjust white point

About

Color temperature refers to the overall color cast of screen images—slightly reddish, slightly bluish, or neutral. It is a characteristic of visible light. The CIE system characterizes colors by a luminance parameter Y and two color coordinates x and y which specify the point on the chromaticity diagram. The color temperature of a light source is determined by comparing its chromaticity with a theoretical, heated black-body radiator.

Changing the color temperature of an image can be likened to applying an external photo filter to an image, in that it enables you to change the physical mood of the film. This feature is useful when projecting images developed for broadcasting where the color temperature of images can vary greatly. For most professional (studio-shot) films, there should be no need to alter color temperature.

The color temperature of the image display can be set to points along the blackbody curve (values ranging between 3200K and 9300K). Color steps are done in 100K increments.

All changes to the display color occur dynamically.

The default setting for color temperature is 6500K, which in most typical images will deliver an accurate display of video white.

Color settings can be reset to factory settings at any time by going to *Main Menu — Picture — Picture reset*

10.5 Color calibration best practice

General

Best practice is to perform the calibration in the same environment as the projector will be used. If this is not possible due to the nature of the installation, calibration should be performed in a controlled light environment (dark room). Too much ambient light falling onto the screen can make it impossible to get exact results.

It is important to do all measurements from the same place in the room, at the same place on the screen. Use a tripod for the chroma meter if possible. The test images should fill the screen and be measured one at a time.

Always calibrate using test images from the same source that is to be used with the projector in the installation.

10.6 Calibrate projector color

Necessary tools

- Calibrated Chroma Meter
- Tripod

About

All monitors and displays change over time. Correctly calibrating your projector balances the brightness levels in all three colors (RGB) and establishes the correct white point (D65) which in turn yields a more balanced and controlled level of brightness in your imagery.



The internal temperature of the projector can affect calibration. For best results, allow the projector to warm up for at least 10 minutes before starting the color calibration process.

Procedure

1. Turn off Color Correction. *Main menu — Picture — RealColor — Color Correction*
2. Select the desired BrilliantColor setting : off / color / bright / SRP half / SRP full. *Main menu — Picture — RealColor — Brilliant-Color*
3. Activate the RealColor test image. *Main Menu — Picture — RealColor — RealColor Calibration — Color Calibration Test Image*
4. Position the Chroma or Spectro meter to map the center of the image.
5. Use the arrow keys to page through the White, Red, Green & Blue test images. Record the X,Y and luminance values for each image. Where necessary, round up the last digit so that there are only 3 digits past the decimal point, e.g. 0.605 instead of 0.6049
6. Input the measured values into the RealColor calibration menu: *Main Menu — Picture — RealColor Calibration — Measured Values*
Note: *The luminance value of White (B) acts as the normalizer. To calculate the normalized luminance values (V) for each of the other colors (A), divide each individual luminance value by the white luminance.*
For example: If the luminance value of White (B) is measured as 794, and the Red luminance value (A) is 205, then the normalized value of Red will be 0.26L (205L/794L=0.26L).
7. Adjust the desired values *Main Menu — Picture — RealColor Calibration — Desired Values* until the color display meets your requirements.
8. Select *Main Menu — Picture — RealColor — Reset to native* to set the projector's color system to match the current measured values input.

Verify the calibration

1. Go to *Main Menu — Picture — RealColor* and select RealColor mode **Coordinate x,y**
2. Set up a full white test image and measure the coordinates (x,y).
3. Depending on the accuracy of the Chroma Meter used, the measured coordinates should be close to the following values:
 - x = 0.312
 - y = 0.329
4. If the measured coordinates are not within the tolerance range, do the following:
 - Check that the values input in the OSD are correct
 - Perform the calibration procedure again (see "Color calibration best practice", page 93)**Note:** *The calibration tolerance margin will change depending on the type of color wheel installed.*

11. MULTICHANNEL INSTALLATIONS

About this chapter

This chapter will provide more information on how to synchronize the signals of two or more projectors for a single installation, a setup often referred to as dual-channel or multi-channel installations.



Implementing a successful multi-channel installation is a highly technical and demanding task that requires significant theoretical understanding of projection techniques. Barco recommends that all multi-channel installations be carried out by, or in close association with, qualified and experienced projectionists.

Overview

- Synchronization best practice
- Synchronization concept for the F50
- The Installation — Synchronization menu
- Synchronization menu 2D
- Synchronization menu 3D
- Troubleshoot source sync issues

11.1 Synchronization best practice

Projector requirements

- Use projectors and lenses that are of the same make, age and model
- Make sure lamps are the same age, and that lamp settings are identical across all projectors
- Ensure that all projector settings, including current software version, are identical

Physical setup

- Always align the projectors precisely
- Allow an overlap of 10% of the total image size

General

Wherever possible, synchronization in multi-channel installations should be done at the image generator (IG) level rather than at the projector level.

Consider the setup shown in . This is a typical dual head setup where each projector channel is driven by two individual Image Generators (IG). The problem is that the IG are not in sync with each other. Each projector will synchronize its projected image with the DP1 input. Frame rate conversion will be applied to the other input as necessary, but the two projectors will not be in sync with each other.

11.2 Synchronization concept for the F50

General

The F50 is equipped with bidirectional sync inputs. The projector has a total of three such connectors, 2 BNC and one DIN. All three connectors have the same synchronization functions. The DIN connector can also supply +5V to some connected equipment, such as glass sync emitters.

The synchronization menu, *Main menu — Installation — Synchronization*, is divided in two parts: the top part is used for 2D setups and the bottom part is for 3D setup. For complex systems it is possible to have completely different setups for 2D and 3D.

In many instances it is necessary to send a signal to more than one projector. To achieve this, the signal is sent to one projector in the lineup and this projector then emits the same signal on another sync connector to the next projector and so on. For example, to send what comes in on SYNC1 out on SYNC2, set SYNC1 to input and then set SYNC2 to SYNC1. This means that whatever comes in on SYNC1 is retransmitted to SYNC2.

For example, to use SYNC 1 for 2D source synchronization, you set the 2D source synchronization menu to SYNC 1. This has precedence, so the connector will now be configured as an input and the signal here is now used for 2D source synchronization.

Further down the menu is the option to define what signal is sent out on the individual sync connectors, as long as they are not used for source or display synchronization.



Where the signals are used for source or display synchronization, they will automatically be configured as input and it will not be possible to select any type of output signal for this connector.

Troubleshooting multichannel synchronization issues can be done using the Status menu. See section "Troubleshoot source sync issues", page 102 for more information.

11.3 The Installation — Synchronization menu

OSD menu

Main menu — Installation — Synchronization

The synchronization menu, *Main menu — Installation — Synchronization*, is divided in two parts: the top part is used for 2D setups and the bottom part is for 3D setup. For complex systems it is possible to have completely different setups for 2D and 3D. For information on AS3D installations, see "Stereoscopic multichannel setup", page 105.

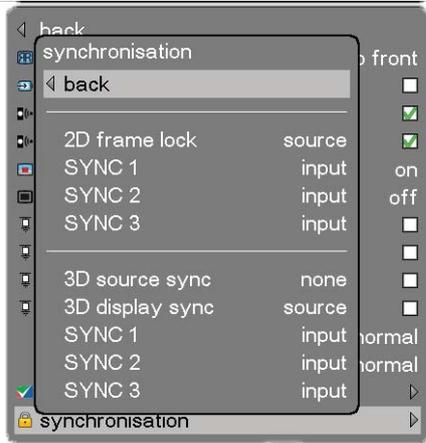


Image 11-1

11.4 Synchronization menu 2D

2D frame lock

Main menu — Installation — Synchronization — 2D frame lock

Used to define which display source will be used for synchronization signal.

See table below for more information:

Menu option	Description
Source	Use the order of the input frames from the source itself.
Sync 1,2,3	Use the signal on the selected sync-in to determine the order of the input frames.

2D Sync 1

Main menu — Installation — Synchronization — [2D] Sync 1

This menu option is used to select which signal the Sync 1 connector shall send out.



When a Sync in connector (Sync 1,2,3) is used for source or display synchronization it will automatically be configured as 'input' and it will not be possible to select any type of output for this connector.

Menu option	Description
Input	Used as sync signal to determine the order of input frames.
Display sync	Sends the sync signal from the display sync source.
Sync 2	Sends the sync signal from the sync 2 connector.
Sync 3	Sends the sync signal from the sync 2 connector.

2D Sync 2

Main menu — Installation — Synchronization — [2D] Sync 2

This menu option is used to select which signal the Sync 1 connector shall send out.



When a Sync in connector (Sync 1,2,3) is used for source or display synchronization it will automatically be configured as 'input' and it will not be possible to select any type of output for this connector.

Menu option	Description
Input	Used as sync signal to determine the order of input frames.
Display sync	Sends the sync signal from the display sync source.
Sync 1	Sends the sync signal from the sync 1 connector.
Sync 3	Sends the sync signal from the sync 3 connector.

2D Sync 3

Main menu — Installation — Synchronization — [2D] Sync 3

This menu option is used to select which signal the Sync 1 connector shall send out.



When a Sync in connector (Sync 1,2,3) is used for source or display synchronization it will automatically be configured as 'input' and it will not be possible to select any type of output for this connector.

Menu option	Description
Input	Used as sync signal to determine the order of input frames.
Display sync	Sends the sync signal from the display sync source.
Sync 1	Sends the sync signal from the sync 1 connector.
Sync 2	Sends the sync signal from the sync 2 connector.

11.5 Synchronization menu 3D

3D Source sync

Main menu — Installation — Synchronization — 3D source sync

Used to define which input source will be used for left eye/right eye synchronization signal.

The menu options for 3D source sync differ lightly depending on which 3D mode is selected.

See table below for more information:

Menu option	Frame sequential mode	In side by side mode	In dual head mode
Source	The source will determine the order of the input frames. Accurate only with DP sources with inband sync. For other sources this will only be correct 50% of the times and the 3D menu option, Swap eyes, must be used to correct the problem.	Not available	Not available
Sync 1,2,3	Use the signal on the selected sync-in to determine the order of the input frames.	Use the signal on the selected sync-in to determine the order of the input frames.	Use the signal on the selected sync-in to determine the order of the input frames.

3D Display sync

Main menu — Installation — Synchronization — 3D source sync

Used to define which display source will be used for left eye/right eye synchronization signal.

The menu options for 3D source sync differ lightly depending on which 3D mode is selected.

See table below for more information:

Menu option	Frame sequential mode	In side by side mode	In dual head mode
Source	Use the order of the input frames from the source itself. This will only be correct 50% of the times and the swap eyes option must be used to correct the problem.	Not available	Not available
Sync 1,2,3	Use the signal on the selected sync-in to determine the order of the input frames.	Use the signal on the selected sync-in to determine the order of the input frames.	Use the signal on the selected sync-in to determine the order of the input frames.

3D Sync 1

Main menu — Installation — Synchronization — [3D] Sync 1

This menu option is used to select which signal the Sync 1 connector shall send out.



When a Sync in connector (Sync 1,2,3) is used for source or display synchronization it will automatically be configured as 'input' and it will not be possible to select any type of output for this connector.

Setting	Description
Input	Used as sync signal to determine the order of input frames.
Display sync	Sends the sync signal from the 3D display sync source.
Glass sync	Sends a signal that is used to synchronize the shutter glasses. Connect this signal to the IR or RF emitter.
Sync 2	Sends the sync signal from the sync 2 connector.
Sync 3	Sends the sync signal from the sync 2 connector.

3D Sync 2

Main menu — Installation — Synchronization — [3D] Sync 2

This menu option is used to select which signal the Sync 1 connector shall send out.



When a Sync in connector (Sync 1,2,3) is used for source or display synchronization it will automatically be configured as 'input' and it will not be possible to select any type of output for this connector.

Setting	Description
Input	Used as sync signal to determine the order of input frames.
Display sync	Sends the sync signal from the 3D display sync source.
Glass sync	Sends a signal that is used to synchronize the shutter glasses. Connect this signal to the IR or RF emitter.
Sync 1	Sends the sync signal from the sync 1 connector.
Sync 3	Sends the sync signal from the sync 3 connector.

3D Sync 3

Main menu — Installation — Synchronization — [3D] Sync 3

This menu option is used to select which signal the Sync 1 connector shall send out.



When a Sync in connector (Sync 1,2,3) is used for source or display synchronization it will automatically be configured as 'input' and it will not be possible to select any type of output for this connector.

Setting	Description
Input	Used as sync signal to determine the order of input frames.
Display sync	Sends the sync signal from the 3D display sync source.
Glass sync	Sends a signal that is used to synchronize the shutter glasses. Connect this signal to the IR or RF emitter.
Sync 1	Sends the sync signal from the sync 1 connector.
Sync 2	Sends the sync signal from the sync 2 connector.

11.6 Troubleshoot source sync issues

About

The source synchronization status menu, *Main menu — Status — Source Synchronization* can be used to troubleshoot synchronization issues for both 2D and 3D installations.

Status information is provided for three source signals:

- 2D
- 3D source signal
- 3D display signal



This is a status (information) menu only. No browsing or changes to values can be made from this menu.

Setting	Value	Description	Comment
3D	OFF	AS3D mode is not active. 2D projection only.	
	Side by side	AS3D mode is active. Side by side source setup selected.	
	Frame sequential	AS3D mode is active. Frame sequential source setup selected.	
	Dual head	AS3D mode is active. Dual head source setup selected.	
2D frame lock	Source / Sync 1 / Sync 2 / Sync 3	Frame lock source information.	
[2D] frequency	XX Hz	Current frequency (Hz)	
	Unstable	Frequency of display and source signals is not synchronized.	Lack of synchronization between display and source signal frequency may prevent projector processing and displaying image properly, or at all.
[2D] status	Locked	Display and source signals are synchronized.	
	Free running	Display and source signals are not synchronized.	Asynchronous display and source signal may prevent projector processing and displaying image properly, or at all.
[2D] phase	Slider bar	Time taken to complete a single input phase.	@60hz, 1 phase is equal to 10 seconds.
[3D source] source sync	Source / Sync 1 / Sync 2 / Sync 3	Source sync information.	
[3D source] source has inband sync	Yes	Source signal can be used to define LR source sync.	Only available on DP inputs.
	No	Source signal cannot be used to define LR source sync.	Use 'swap eyes' to correct LR input
[3D source] frequency	XX Hz	Current frequency (Hz)	
	Unstable	Frequency of display and source signals is not synchronized.	Lack of synchronization between display and source signal frequency may prevent projector processing and displaying image properly, or at all.
[3D source] duty cycle	XX%	50% duty cycle is required to successfully display picture.	+/- 5% tolerance. Values greater than 55 or less than 45 can prevent projector from displaying image properly, or at all.
[3D source] status	Locked	Display and source signals are synchronized.	

Setting	Value	Description	Comment
	Drifting, free running		
	Free running	Display and source signals are not synchronized.	
[3D source] phase	Slider bar	Time taken to complete a single input phase.	@60hz, 1 phase is equal to 10 seconds.
[3D] display sync	Source / Sync 1 / Sync 2 / Sync 3	Source sync information.	
[3D display] frequency	XX Hz	Current frequency (Hz)	
	Unstable	Frequency of display and source signals is not synchronized.	Lack of synchronization between display and source signal frequency may prevent projector processing and displaying image properly, or at all.
[3D display] status	Free running	Display and source signals are not synchronized.	Asynchronous display and source signal may prevent projector processing and displaying image properly, or at all.
	Locked	Display and source signals are synchronized.	
	Drifting, locked	Display and source signals are synchronized but drifting.	May cause interference to signal and produce artefacts in image.
[3D display] phase	Slider bar	Time taken to complete a single input phase.	@60hz, 1 phase is equal to 10 seconds.

12. STEREOSCOPIC MULTICHANNEL SETUP

About

The projector is capable of displaying both active stereo 3D (AS3D) and passive stereo 3D (passive 3D) imagery.

Setup of an 3D Multichannel installation, in particular AS3D, is a technically and practically demanding task that requires advanced theoretical understanding of projection techniques as well as significant practical experience. In this setup, it is crucial that the projected images are perfectly synchronized to ensure that all projectors project the left eye image at the same time and the right eye image at the same time.

This chapter discusses some of the theory and practicalities involved in setting up an AS3D multichannel installation with the projector.

Overview

- AS3D modes
- AS3D synchronization best practice
- The 3D menu
- Synchronous frame sequential
- Asynchronous frame sequential
- Synchronous side by side
- Asynchronous side by side

12.1 AS3D modes

About

The F50 supports four different 3D modes: frame sequential, side-by-side, dual-head 3D and embedded 3D formats defined for HDMI only.

When the source has 3D signal information embedded in the signal the projector will automatically switch to 3D and process the signal correctly. This will happen regardless of the 3D menu setting. When the signal doesn't include 3D information, the user manually chooses the 3D mode in the menu that matches the setup.

In **frame sequential 3D** every other frame is interpreted as the left eye frame and the other input frame is interpreted as the right eye frame. To ensure that the projector chooses the correct frames as the left eye and right eye frames, a 3D sync signal should be connected from the IG's display adapter DIN connector to one of the projector's sync connector. If such a signal isn't present (or the 3D input sync is set to source), the projector will choose the first input frame as the left eye frame and the next input frame as the right eye frame. This will be wrong half the times the signal is acquired.

In **side-by-side 3D** each input frame is divided in half and the left half of the frame is used as the left eye frame and the right half of the input frame is used as the right eye frame. This makes the output width become half of the input width. If, for example, the input is 1920x1200 @ 60 Hz, the output will be 960 x 1200 @ 120 Hz . As each input frame contains both left- and right-eye information there is no need to synchronize the signal input in this mode.

In **dual head, side-by-side 3D** the projector will choose what is defined as the dual-head 3D source 1 as left eye signal and dual-head 3D source 2 as right eye. Note that not all source combinations are possible. The projector will use source 1 to synchronize the input. If the two input sources are not synchronous image artifacts will occur. The projector is only capable of displaying up to 120 Hz output, therefore it does not make sense to have individual sources faster than 60 Hz in this mode.

For sources with **embedded HDMI 3D** signals the projector will automatically switch to 3D and process the signal correctly. The projector will do so regardless of the 3D mode menu setting. This option is not visible in the 3D mode menu.

12.2 AS3D synchronization best practice

General

System complexity is naturally increase when the installation consists of multiple channels. If the system is not designed correctly or the individual system components are not configured correctly, image artifacts will occur; or the image might not be displayed at all. A very important aspect of planning any multi-channel installation is how to synchronize the projected channels.

When in AS3D it is impossible to obtain realistic 3D imagery if the projectors and projected images are not perfectly synchronized as the left eye information and the right eye information will be slightly different.

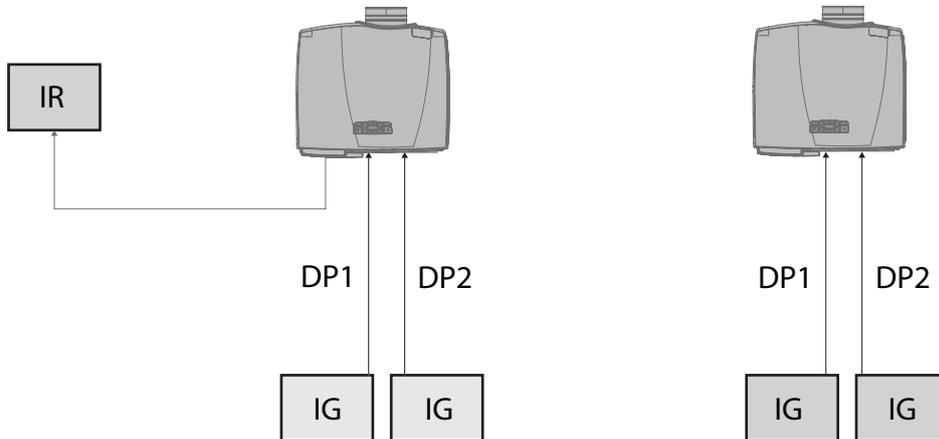


Image 12-1

Consider the setup shown above. This is a typical dual head 3D setup where each projector channel is driven by two individual Image Generators (IG). The problem is that the IG are not in sync with each other. Each projector will synchronize its projected image with one of the DVI inputs. Frame rate conversion will be applied to the other input as necessary but the two projectors will not be in sync with each other. The preferred way to synchronize the projected images is to synchronize the IG. This is the only way all image artifacts may be eliminated from the resulting image and is true for all projector brands; not only Barco projectors. If, for some reason, one chooses to have asynchronous IG then extra synchronization must be performed by the projectors and while an excellent 3D experience is obtained this way, there will be motion artifacts in the resulting image. Troubleshooting AS3D multichannel installation issues, and in particular source synchronization issues, can be done using the Status menu. See "Troubleshoot source sync issues", page 102 for more information.

12.3 The 3D menu

3D

Main Menu — 3D — 3D

This menu is used for setting the 3D mode. There are four mode options:

Mode	Description
Off	3D is off. Standard 2D projection.
Frame sequential	Every other input frame is interpreted as the left eye frame and the other is interpreted as the right eye frame. For sources up to 120 Hz.
Side-by-side	The left half of every input frame is used as the left eye output frame and the right half of every input frame is used as the right eye output frame. For sources up to 60 Hz.
Dual head	User selects the input sources for left and right eye manually. For sources up to 60 Hz. See next section for more information.

Dual head setup

This menu option allows the user to select left eye and right eye input sources. Some combinations are not possible, see matrix below for more information:

	DP1	DP2	HDBaseT	DVI-S	HDMI	DVI-D	VGA	3G SDI (A)	3G SDI (B)
DP1	✗	✓	✓	✓	✓	✗	✓	✓	✓
DP2	✓	✗	✓	✓	✓	✗	✓	✓	✓
HDBaseT	✓	✓	✗	✗	✓	✗	✓	✓	✓
DVI-S	✓	✓	✗	✗	✓	✗	✓	✓	✓
HDMI	✓	✓	✓	✓	✗	✗	✓	✓	✓
DVI-D	✗	✗	✗	✗	✗	✗	✗	✗	✗
VGA	✓	✓	✓	✓	✓	✗	✗	✓	✓
3G SDI (A)	✓	✓	✓	✓	✓	✗	✓	✗	✓
3G SDI (B)	✓	✓	✓	✓	✓	✗	✓	✓	✗

3D Glass sync delay

Main Menu — 3D — 3D Glass sync delay

Some shutter glasses may need the synchronization pulse to be shifted in time to correct ghosting occurring between the left and the right eye.

This menu option enables the user to set this delay (0–359°) in increments of 1°.

Swap eyes

Main Menu — 3D — Swap eyes

Use this to swap the order of the eyes (L/R) for 3D glass synchronization.

12.4 Synchronous frame sequential

About this mode

In this setup, the IG are synchronized and the 3D sync from the source is connected from the DIN connector on the IG to the SYNC 1 connector. This signal is then sent to the next projector in the setup out on the SYNC 2 connector. A typical synchronous frame sequential 3D setup is illustrated in image 12-2.



For this setup, any SYNC connector on the projector can be used for connections from the DIN connector on the IG.

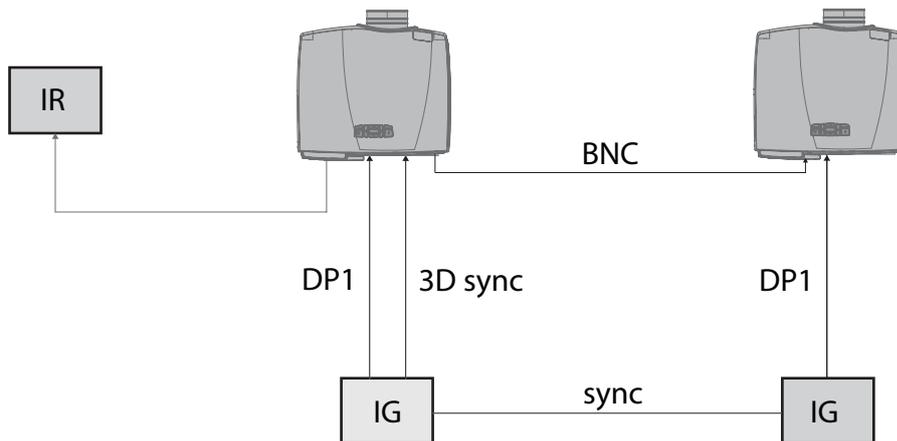


Image 12-2

The table below shows the recommended settings for synchronous frame sequential 3D.

Setting	Projector 1	Projector 2
3D	Frame sequential	Frame sequential
3D L/R sync sync	Sync 1	Sync 1
Sync 2	Sync 1	Sync 1 ⁷

7. The choice of SYNC 1 over SYNC 2 on the last projector in the sync chain is irrelevant, but setting it so is the recommended best practice.

12.5 Asynchronous frame sequential

About

The projector is capable of displaying asynchronous frame sequential 3D. For this mode, a lot of synchronization signals must be used. This is the most complex 3D setup the F50 can handle.

To achieve this setup, each IG needs to send a separate source 3D sync to each projector. The first projector needs a signal to lock its output to; this is usually the same as the source input on the first projector. The first projector sends its display sync to the second projector which uses this as its display 3D sync. A typical setup is shown in

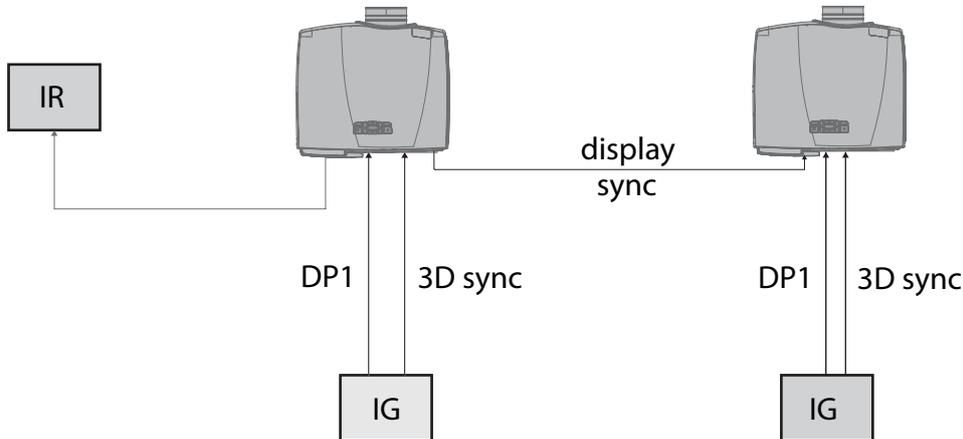


Image 12-3

As mentioned previously, motion artifacts will occur when the signals are asynchronous. This is also indicated in the Synchronization status menu, where the status of the 3D Display sync on projector 2 will show **Drifting, Frame locked** meaning that the display sync signal is asynchronous with the input source.

The table below shows the settings for asynchronous side-by-side 3D. These settings will make the first projector generate 3D display L/R sync from its source and output it on the SYNC 1 connector and the second projector to accept and use this on its SYNC 1 connector and pass it along to the next projector in the sync chain on its SYNC 2 connector.

Setting	Projector 1	Projector 2
3D	Dual Head stereo	Dual Head stereo
3D Dual head source 1	DP 1	DP 1
3D Dual head source 2	DP 2	DP 2
3D L/R sync	N/A	N/A
3D display sync	Source	Sync 1
Sync 1	Display sync	Input
Sync 2	N/A	Sync 1
Sync 3	Glass sync	N/A

12.6 Synchronous side by side

About

In this setup, the IG are synchronized and the projector SYNC connectors are utilized to distribute a system wide display sync.

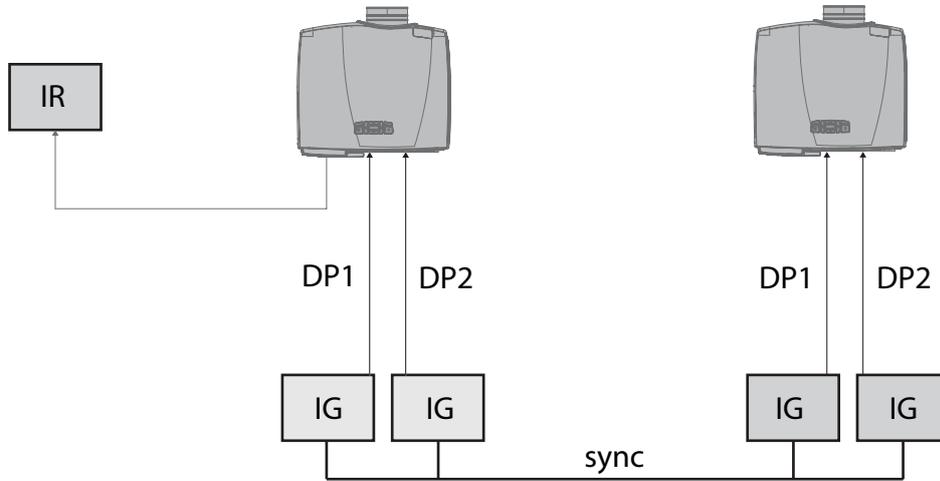


Image 12-4

Setting	Projector 1	Projector 2
3D	Dual head stereo	Dual head stereo
3D L/R sync	N/A	N/A
3D BNC sync out signal display sync	Source	Source

12.7 Asynchronous side by side

About

In asynchronous side-by-side 3D (single and dual head), the projector utilizes the SYNC connectors to distribute a system wide display sync. This display sync is used by all projectors to perform frame rate conversion on the input signals if necessary. An extra cable is connected between a SYNC connector on projector 1 and a SYNC connector on projector 2, as illustrated in image 12-5 .

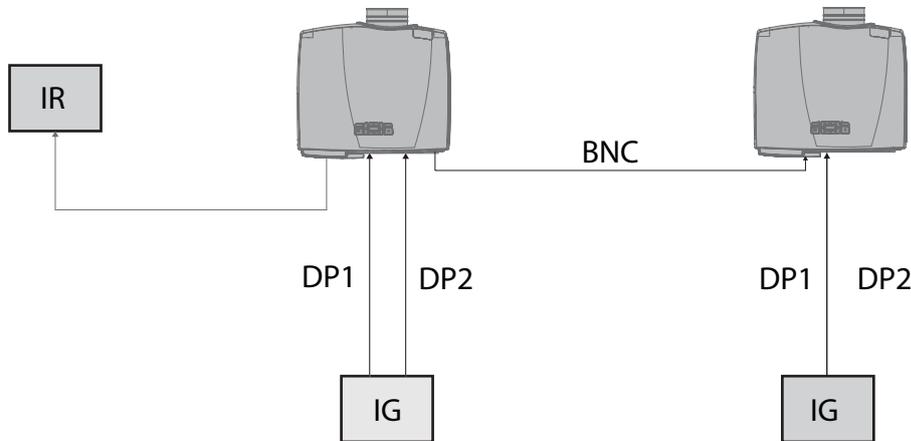


Image 12-5

In this setup the projectors need the following settings to send/utilize the display sync correctly:

Setting	Projector 1	Projector 2
3D	Dual Head stereo	Dual Head stereo
3D Dual head source 1	DP 1	DP 1
3D Dual head source 2	DP 2	DP 2
3D L/R sync	N/A	N/A
3D display sync	Source	Sync 1
Sync 1	Display sync	Input
Sync 2	N/A	Sync 1
Sync 3	Glass sync	N/A

13. COLOR WHEEL

General

DLP™ technology creates projected images by presenting colors in a sequential format, using the primary colors red, green, and blue to create and reproduce any computer or video generated color or combination of colors. Sequential color display works by displaying only one single color at the time, for very short periods, so that the eye and brain interprets the resulting image as a full color one. Switching between the primary colors, thus creating full color images, happens incredibly fast, imperceptible to the human eye. By giving the user or integrator the option to specify color wheels, projectors can be tailored to specific requirements and applications, such as pure black and white imaging, wide color gamut simulation and visualization, general graphics display, medical imaging, and so forth.

The F50 is available with 3 color wheel options. Each color wheel option gives slightly different performance characteristics, enabling a perfect match to the desired application.

Color wheels can be easily interchanged by certified service personnel.

Color wheel compatibility matrix

Product model	VizSim	VizSim Bright	High Brightness
F50 PANORAMA	✓	✓	✓
F50 WQXGA	✓	✓	✓
F50 WUXGA	✓	✓	✓
F50 1080	✓	✓	✓

Overview

- VizSim (RGB)
- VizSim Bright (RGB)
- High Brightness MKIII (RGBC + White)

13.1 VizSim (RGB)

About

VizSim is a pure RGB color wheel that delivers great depth of color and a broad gamut, without raw brightness.

Typical applications: post production and home theatre.

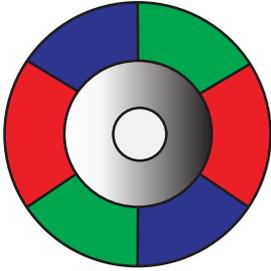


Image 13-1

13.2 VizSim Bright (RGB)

About

VizSim Bright is perfectly suited to larger venues where brightness and color are of equal importance. The color wheel arrangement enables faster processing and less artefacts than a standard 3-segment color wheel, while the use of improved coating and higher transmission for improved brightness ensures highly accurate colors, making it the recommended choice for multi-channel installations.

Typical applications: simulation, visualization, collaboration room, visitor attraction and multi-channel applications.

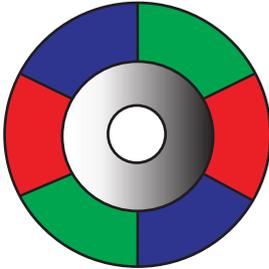


Image 13-2

13.3 High Brightness MKIII (RGBC + White)

About

High Brightness MKIII is ideal for brightness critical applications. The white segment of the wheel ensures added brightness and an extra boost to white segments, as well as very good primary and secondary colors.

When using a High Brightness Color wheel some picture adjustment functions, for example Smear Reduction Processing, are not available.

Typical applications: digital signage, education, meeting rooms and large venues.

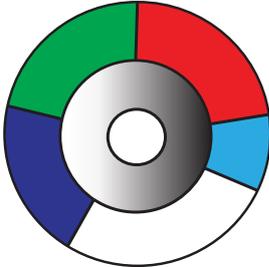


Image 13-3

14. USER MAINTENANCE

General

The F50 is designed with no user-serviceable parts. Consumables, such as the projector lamp, can be replaced by properly trained personnel.

Overview

- Replace the projector lamp
- Update the projector firmware

14.1 Replace the projector lamp

General

The lamp holder is fitted with an electronic lamp timer that tracks the life time of the lamp. Remaining lamp time can be checked in the OSD at any time by going to *Main Menu — Status* or by pressing the **Info** button on the remote control.

The indicator light on the keypad will turn RED when lamp life is expired. The lamp must be changed within 50 operating hours of the lamp life expiring.

Necessary tools

Flat iron or Philip head screw driver.



WARNING: Allow lamp to cool down for at least 60 minutes before opening the lamp module cover.



WARNING: In the unlikely event of a lamp rupture, a limited amount of mercury vapor may be emitted into the room. To avoid inhaling potentially toxic mercury vapor the room should be thoroughly ventilated for at least 30 minutes.



CAUTION: Do not touch the protective glass when replacing the lamp. Touching the protective glass may cause it to overheat and break while in use.



CAUTION: Be extremely careful when removing the lamp module. In the unlikely event that the bulb ruptures, small glass fragments may be generated. The lamp module is designed to contain these fragments, but use caution when removing the lamp module.



CAUTION: Failure to use genuine replacement parts will void your product warranty.

Lamp change procedure

1. Turn the projector off using the Power button. Wait 60 seconds and then disconnect the mains power supply.
2. Allow the projector to cool down for at least 60 minutes before continuing with the lamp change procedure.
Warning: *The lamp house is very hot and must be allowed to cool down before any replacement procedure is attempted.*
3. Loosen the lamp door captive screw and open the lamp door.
4. Loosen the three lamp module screws (reference 1) and use the handle to pull the lamp module out of the projector chassis.
Note: *The projector lamp contains mercury and must be disposed of in accordance with local regulations. Contact your local waste facility or qualified recycling company for information on the recycling program for High Intensity Discharge (HID) lamps in your area.*



Image 14-1

5. Insert a new lamp module, making sure the module enters the projector chassis properly.
6. Fasten the three lamp module screws.
7. Close the lamp door and install the lamp door captive screw.

14.2 Update the projector firmware

Necessary tools

USB memory stick with FAT-file system



ECO standby must be disabled to flash a new firmware.



Once initiated, the flash procedure can take up to 20 minutes to complete.

Flash procedure

1. Is Standby ECO mode disabled?
If yes, Continue with the update procedure outlined below.
If no, Power up the projector and disable Standby ECO mode in the OSD menu, then perform a projector restart before continuing with procedure.
2. Go to www.barco.com and select your product. All available software and hardware downloads are filed under the Technical Downloads tab of the product page.
3. Download and save the <version>.tar file to a USB stick with FAT-file system. Use the **eject** function on your PC to safely remove the device.
4. Place the projector in Standby mode. Status indicator is steady yellow.
5. Insert the USB stick into the projector's USB port.
After a few seconds, the status indicator will flash yellow (rate: 3 Hz/180 FPM). This signals that the upgrade is in progress.
If the upgrade file is corrupt or invalid, the status indicator will turn red and the upgrade process will stop.
Note: *The upgrade will not be installed in this instance, and the upgrade process must be restarted with a full and correct file.*
Tip: *If the flash does not automatically initiate after 30 seconds, check that the projector is not in sleep mode. If the projector is sleeping, use the power button to wake the projector and initiate flashing.*
6. Once the upgrade is in progress, the USB stick can be removed from the projector.
Note: *Do not turn off, power down or remove power to the projector when an upgrade is in progress.*
7. The projector may restart several times during the upgrade.
8. When the upgrade is completed successfully, the projector will return to Standby mode (status indicator is steady yellow).

15. TECHNICAL SPECIFICATIONS

About

The information in this section is subject to change without notice. For current technical information, visit the product website or contact your sales support representative.

15.1 F50 1080

F50 1080

Projector type	Single chip DLP digital projector
Technology	LVDS DMD™ with DarkChip3™
Resolution	2,560 x 1,600 (WQXGA) / 2,560 x 1,080 (Panorama) / 1,920 x 1,200 (WUXGA) / 1,920 x 1,080 (Full HD)
Brightness	5,000 ANSI lumens (High Brightness WQXGA)/2,500 ANSI lumens (VizSim Bright WQXGA)/1,800 ANSI lumens (VizSim WQXGA) 3,800 ANSI lumens (High Brightness Panorama)/1,900 ANSI lumens (VizSim Bright Panorama)/1,500 ANSI lumens (VizSim Panorama) 5,500 ANSI lumens (High Brightness WUXGA)/2,700 ANSI lumens (VizSim Bright WUXGA)/2,000 ANSI lumens (VizSim WUXGA) 5,500 ANSI lumens (High Brightness Full HD)/2,700 ANSI lumens (VizSim Bright Full HD)/2,000 ANSI lumens (VizSim Full HD)
Contrast ratio	up to 5,300:1
Brightness uniformity	>80%
Aspect ratio	16:10
Lens type	All pure glass lenses
Lenses	Ultra Wide Fixed EN53 (0.79@1.65m), Wide Fixed EN52 (0.99), Super Wide Zoom EN55 (0.86 - 1.16), Wide Zoom EN56 (1.14 - 1.74), Zoom EN51 (1.71-2.37), Ultra short throw EN57 (0.28 - 0.3)
Optical lens shift	Vertical: +121%; Horizontal: +/-82% (lens dependant)
Color correction	RealColor™
Lamps	1 x 350W UHP (dimmable)
Lamp lifetime	Up to 2,000 hours (Full power), Up to 2,500 hours (Eco mode)
Lamp house, quick replace	Yes
Lamp warranty	500 hours or 90 days
Sealed DLP™ core	Yes
Orientation	Table - ceiling (360 degrees through lamp axis)
3D	Up to 2,560 x 1,600 @ 120Hz
Inputs	2x DisplayPort 1.2 (HBR2), 1 x DVI-Dual Link, 1 x HDMI 1.4a, 1 x VGA, 2x 3G-SDI, 1x HDBaseT
Input resolutions	2,560 x 1,600 - 640 x 480 pixel resolution, RGBHV, RGBS, RGsB, custom formats available, HDTV (1080p, 1080i, 720p), NTSC, PAL, SECAM
Max. pixel clock	Up to 600 Mhz (2,560 x 1,600@120 Hz max) DP 1.2 Up to 330 Mhz Dual link DVI
Software tools	SimCAD, Projector Toolset
Control	IR, RS232, Ethernet, USBA, 2x BNC sync, 1x MiniDIN
Network connection	10/100/1000 base-T, RJ-45 connection, RS-232
Power requirements	100-240V 50-60Hz
Power consumption	less than 530W
Operational ambient temperature	10 - 40 °C /50 - 104 °F, 0-3,000m (Storage temperature: -20 - 60 °C/-4 - 140 °F)
Operating humidity	20 - 80% RH (Storage Conditions: 10 - 90% RH)
Dissipation BTU	max 1,807 BTU/h
Dimensions (WxLxH)	342 x 306 x 143 mm / 13.46 x 12.05 x 5.63 in
Weight	7.5 kg / 16.5 lbs
Standard accessories	Power cord, wireless remote control
Certifications	Compliant with FCC, part 15 Class A and CCC, cCSAus, cUL, UL and CE
Warranty	Limited 3 years parts and labour

15.2 F50 WUXGA

F50 WUXGA

Projector type	Single chip DLP digital projector
Technology	LVDS DMD™ with DarkChip3™
Resolution	2,560 x 1,600 (WQXGA) / 2,560 x 1,080 (Panorama) / 1,920 x 1,200 (WUXGA) / 1,920 x 1,080 (Full HD)
Brightness	5,000 ANSI lumens (High Brightness WQXGA)/2,500 ANSI lumens (VizSim Bright WQXGA)/1,800 ANSI lumens (VizSim WQXGA) 3,800 ANSI lumens (High Brightness Panorama)/1,900 ANSI lumens (VizSim Bright Panorama)/1,500 ANSI lumens (VizSim Panorama) 5,500 ANSI lumens (High Brightness WUXGA)/2,700 ANSI lumens (VizSim Bright WUXGA)/2,000 ANSI lumens (VizSim WUXGA) 5,500 ANSI lumens (High Brightness Full HD)/2,700 ANSI lumens (VizSim Bright Full HD)/2,000 ANSI lumens (VizSim Full HD)
Contrast ratio	up to 5,300:1
Brightness uniformity	>80%
Aspect ratio	16:10
Lens type	All pure glass lenses
Lenses	Ultra Wide Fixed EN53 (0.79@1.65m), Wide Fixed EN52 (0.99), Super Wide Zoom EN55 (0.86 - 1.16), Wide Zoom EN56 (1.14 - 1.74), Zoom EN51 (1.71-2.37), Ultra short throw EN57 (0.28 - 0.3)
Optical lens shift	Vertical: +121%; Horizontal: +/-82% (lens dependant)
Color correction	RealColor™
Lamps	1 x 350W UHP (dimmable)
Lamp lifetime	Up to 2,000 hours (Full power), Up to 2,500 hours (Eco mode)
Lamp house, quick replace	Yes
Lamp warranty	500 hours or 90 days
Sealed DLP™ core	Yes
Orientation	Table - ceiling (360 degrees through lamp axis)
3D	Up to 2,560 x 1,600 @ 120Hz
Inputs	2x DisplayPort 1.2 (HBR2), 1 x DVI-Dual Link, 1 x HDMI 1.4a, 1 x VGA, 2x 3G-SDI, 1x HDBaseT
Input resolutions	2,560 x 1,600 - 640 x 480 pixel resolution, RGBHV, RGBS, RGsB, custom formats available, HDTV (1080p, 1080i, 720p), NTSC, PAL, SECAM
Max. pixel clock	Up to 600 Mhz (2,560 x 1,600@120 Hz max) DP 1.2 Up to 330 Mhz Dual link DVI
Software tools	SimCAD, Projector Toolset
Control	IR, RS232, Ethernet, USBA, 2x BNC sync, 1x MiniDIN
Network connection	10/100/1000 base-T, RJ-45 connection, RS-232
Power requirements	100-240V 50-60Hz
Power consumption	less than 530W
Operational ambient temperature	10 - 40 °C /50 - 104 °F, 0-3,000m (Storage temperature: -20 - 60 °C/-4 - 140 °F)
Operating humidity	20 - 80% RH (Storage Conditions: 10 - 90% RH)
Dissipation BTU	max 1,807 BTU/h
Dimensions (WxLxH)	342 x 306 x 143 mm / 13.46 x 12.05 x 5.63 in
Weight	7.5 kg / 16.5 lbs
Standard accessories	Power cord, wireless remote control
Certifications	Compliant with FCC, part 15 Class A and CCC, cCSAus, cUL, UL and CE
Warranty	Limited 3 years parts and labour

15.3 F50 WQXGA

F50 WQXGA

Projector type	Single chip DLP digital projector
Technology	LVDS DMD™ with DarkChip3™
Resolution	2,560 x 1,600 (WQXGA) / 2,560 x 1,080 (Panorama) / 1,920 x 1,200 (WUXGA) / 1,920 x 1,080 (Full HD)
Brightness	5,000 ANSI lumens (High Brightness WQXGA)/2,500 ANSI lumens (VizSim Bright WQXGA)/1,800 ANSI lumens (VizSim WQXGA) 3,800 ANSI lumens (High Brightness Panorama)/1,900 ANSI lumens (VizSim Bright Panorama)/1,500 ANSI lumens (VizSim Panorama) 5,500 ANSI lumens (High Brightness WUXGA)/2,700 ANSI lumens (VizSim Bright WUXGA)/2,000 ANSI lumens (VizSim WUXGA) 5,500 ANSI lumens (High Brightness Full HD)/2,700 ANSI lumens (VizSim Bright Full HD)/2,000 ANSI lumens (VizSim Full HD)
Contrast ratio	up to 5,300:1
Brightness uniformity	>80%
Aspect ratio	16:10
Lens type	All pure glass lenses
Lenses	Ultra Wide Fixed EN53 (0.79@1.65m), Wide Fixed EN52 (0.99), Super Wide Zoom EN55 (0.86 - 1.16), Wide Zoom EN56 (1.14 - 1.74), Zoom EN51 (1.71-2.37), Ultra short throw EN57 (0.28 - 0.3)
Optical lens shift	Vertical: +121%; Horizontal: +/-82% (lens dependant)
Color correction	RealColor™
Lamps	1 x 350W UHP (dimmable)
Lamp lifetime	Up to 2,000 hours (Full power), Up to 2,500 hours (Eco mode)
Lamp house, quick replace	Yes
Lamp warranty	500 hours or 90 days
Sealed DLP™ core	Yes
Orientation	Table - ceiling (360 degrees through lamp axis)
3D	Up to 2,560 x 1,600 @ 120Hz
Inputs	2x DisplayPort 1.2 (HBR2), 1 x DVI-Dual Link, 1 x HDMI 1.4a, 1 x VGA, 2x 3G-SDI, 1x HDBaseT
Input resolutions	2,560 x 1,600 - 640 x 480 pixel resolution, RGBHV, RGBS, RGsB, custom formats available, HDTV (1080p, 1080i, 720p), NTSC, PAL, SECAM
Max. pixel clock	Up to 600 Mhz (2,560 x 1,600@120 Hz max) DP 1.2 Up to 330 Mhz Dual link DVI
Software tools	SimCAD, Projector Toolset
Control	IR, RS232, Ethernet, USBA, 2x BNC sync, 1x MiniDIN
Network connection	10/100/1000 base-T, RJ-45 connection, RS-232
Power requirements	100-240V 50-60Hz
Power consumption	less than 530W
Operational ambient temperature	10 - 40 °C /50 - 104 °F, 0-3,000m (Storage temperature: -20 - 60 °C/-4 - 140 °F)
Operating humidity	20 - 80% RH (Storage Conditions: 10 - 90% RH)
Dissipation BTU	max 1,807 BTU/h
Dimensions (WxLxH)	342 x 306 x 143 mm / 13.46 x 12.05 x 5.63 in
Weight	7.5 kg / 16.5 lbs
Standard accessories	Power cord, wireless remote control
Certifications	Compliant with FCC, part 15 Class A and CCC, cCSAus, cUL, UL and CE
Warranty	Limited 3 years parts and labour

15.4 F50 Panorama

F50 Panorama

Projector type	Single chip DLP digital projector
Technology	LVDS DMD™ with DarkChip3™
Resolution	2,560 x 1,600 (WQXGA) / 2,560 x 1,080 (Panorama) / 1,920 x 1,200 (WUXGA) / 1,920 x 1,080 (Full HD)
Brightness	5,000 ANSI lumens (High Brightness WQXGA)/2,500 ANSI lumens (VizSim Bright WQXGA)/1,800 ANSI lumens (VizSim WQXGA) 3,800 ANSI lumens (High Brightness Panorama)/1,900 ANSI lumens (VizSim Bright Panorama)/1,500 ANSI lumens (VizSim Panorama) 5,500 ANSI lumens (High Brightness WUXGA)/2,700 ANSI lumens (VizSim Bright WUXGA)/2,000 ANSI lumens (VizSim WUXGA) 5,500 ANSI lumens (High Brightness Full HD)/2,700 ANSI lumens (VizSim Bright Full HD)/2,000 ANSI lumens (VizSim Full HD)
Contrast ratio	up to 5,300:1
Brightness uniformity	>80%
Aspect ratio	16:10
Lens type	All pure glass lenses
Lenses	Ultra Wide Fixed EN53 (0.79@1.65m), Wide Fixed EN52 (0.99), Super Wide Zoom EN55 (0.86 - 1.16), Wide Zoom EN56 (1.14 - 1.74), Zoom EN51 (1.71-2.37), Ultra short throw EN57 (0.28 - 0.3)
Optical lens shift	Vertical: +121%; Horizontal: +/-82% (lens dependant)
Color correction	RealColor™
Lamps	1 x 350W UHP (dimmable)
Lamp lifetime	Up to 2,000 hours (Full power), Up to 2,500 hours (Eco mode)
Lamp house, quick replace	Yes
Lamp warranty	500 hours or 90 days
Sealed DLP™ core	Yes
Orientation	Table - ceiling (360 degrees through lamp axis)
3D	Up to 2,560 x 1,600 @ 120Hz
Inputs	2x DisplayPort 1.2 (HBR2), 1 x DVI-Dual Link, 1 x HDMI 1.4a, 1 x VGA, 2x 3G-SDI, 1x HDBaseT
Input resolutions	2,560 x 1,600 - 640 x 480 pixel resolution, RGBHV, RGBS, RGsB, custom formats available, HDTV (1080p, 1080i, 720p), NTSC, PAL, SECAM
Max. pixel clock	Up to 600 Mhz (2,560 x 1,600@120 Hz max) DP 1.2 Up to 330 Mhz Dual link DVI
Software tools	SimCAD, Projector Toolset
Control	IR, RS232, Ethernet, USBA, 2x BNC sync, 1x MiniDIN
Network connection	10/100/1000 base-T, RJ-45 connection, RS-232
Power requirements	100-240V 50-60Hz
Power consumption	less than 530W
Operational ambient temperature	10 - 40 °C /50 - 104 °F, 0-3,000m (Storage temperature: -20 - 60 °C/-4 - 140 °F)
Operating humidity	20 - 80% RH (Storage Conditions: 10 - 90% RH)
Dissipation BTU	max 1,807 BTU/h
Dimensions (WxLxH)	342 x 306 x 143 mm / 13.46 x 12.05 x 5.63 in
Weight	7.5 kg / 16.5 lbs
Standard accessories	Power cord, wireless remote control
Certifications	Compliant with FCC, part 15 Class A and CCC, cCSAus, cUL, UL and CE
Warranty	Limited 3 years parts and labour

16. ENVIRONMENTAL INFORMATION

Overview

- Disposal information
- RoHS compliance
- Production address

16.1 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/en/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.

16.2 RoHS compliance

中国大陆 RoHS Chinese Mainland RoHS

根据中国大陆《电子信息产品污染控制管理办法》(也称为中国大陆RoHS), 以下部分列出了Barco产品中可能包含的有毒和/或有害物质的名称和含量。中国大陆RoHS指令包含在中国信息产业部MCV标准:“电子信息产品中有毒物质的限量要求”中。

According to the “China Administration on Control of Pollution Caused by Electronic Information Products” (Also called RoHS of Chinese Mainland), the table below lists the names and contents of toxic and/or hazardous substances that Barco's product may contain. The RoHS of Chinese Mainland is included in the MCV standard of the Ministry of Information Industry of China, in the section “Limit Requirements of toxic substances in Electronic Information Products”.

零件项目(名称) Component Name	有毒有害物质或元素 Hazardous Substances or Elements					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印制电路配件 Printed Circuit Assemblies	X	O	O	O	O	O
外接电(线)缆 External Cables	X	O	O	O	O	O
内部线路 Internal wiring	O	O	O	O	O	O
散热片(器) Heatsinks	O	O	O	O	O	O
光学镜头 Optical lenses	X	O	X	O	O	O
镜头支架 Lensholder	X	O	O	O	O	O
灯泡 Lamp	O	X	O	O	O	O
底架 Chassis	O	O	O	O	O	O
外壳 Enclosure	O	O	O	O	O	O
电机 Motor	X	O	O	O	O	O
电源供应器 Power Supply Unit	X	O	O	O	O	O
风扇 Fan	X	O	O	O	O	O
附電池遙控器 Remote control	X	O	O	O	O	O

这个表被制备按照规定SJ/T 11364

This table is prepared in accordance with the provisions of SJ/T 11364.

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。

O: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。

X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

Turkey RoHS compliance



■ Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.
[Republic of Turkey: In conformity with the WEEE Regulation]

16.3 Production address

Factory

Barco Fredrikstad AS

Harbornveien 53, 1630 Gamle Fredrikstad, Norway