SIM2 BV International Srl

CRYSTAL4-SH

SuperHybrid

CRYSTAL4-SH

The **CRYSTAL4-SH** is not only the first SIM2 hybrid but the products included in its body all the top features and performances SIM2 developed in the years spent to create , most probably, the best projector in its class (NERO 4 S and NERO4 S GOLD).

The perfect colorimetry coupled with the best Hybrid Light Source in the market and the tremendous dynamic create in this SIM2 mid class product a challenger in any categories including the top one.

Key features

Minimalist Elegance

High Performances

Luxurious Design

Contents

Release notes

This User Manual version (1.4) describe the CRYSTAL4-SH projector and its features corresponding to the software version B04 or higher:

Device	Software version
MCU (standby microprocessor)	B03
MST (main image processor)	B04
DDP (DLP processor)	B05
Ethernet device	B02

The above software combination is factory installed since March 8th 2021;

1 Important information

About this User Guide

This User Guide describes how to set up and operate the following projectors:

- CRYSTAL4-SH

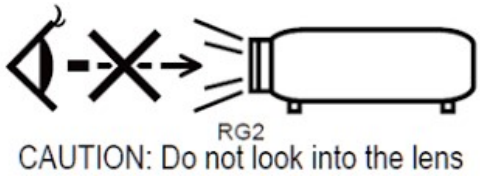
Except where otherwise indicated, the information in this guide applies to all the projectors listed above, that will be referred to as “CRYSTAL4-SH”.
Information contained in this User Guide may be updated from time to time due to product improvements and customer feedback. Visit www.sim2.com to find the latest version of this document.

Safety

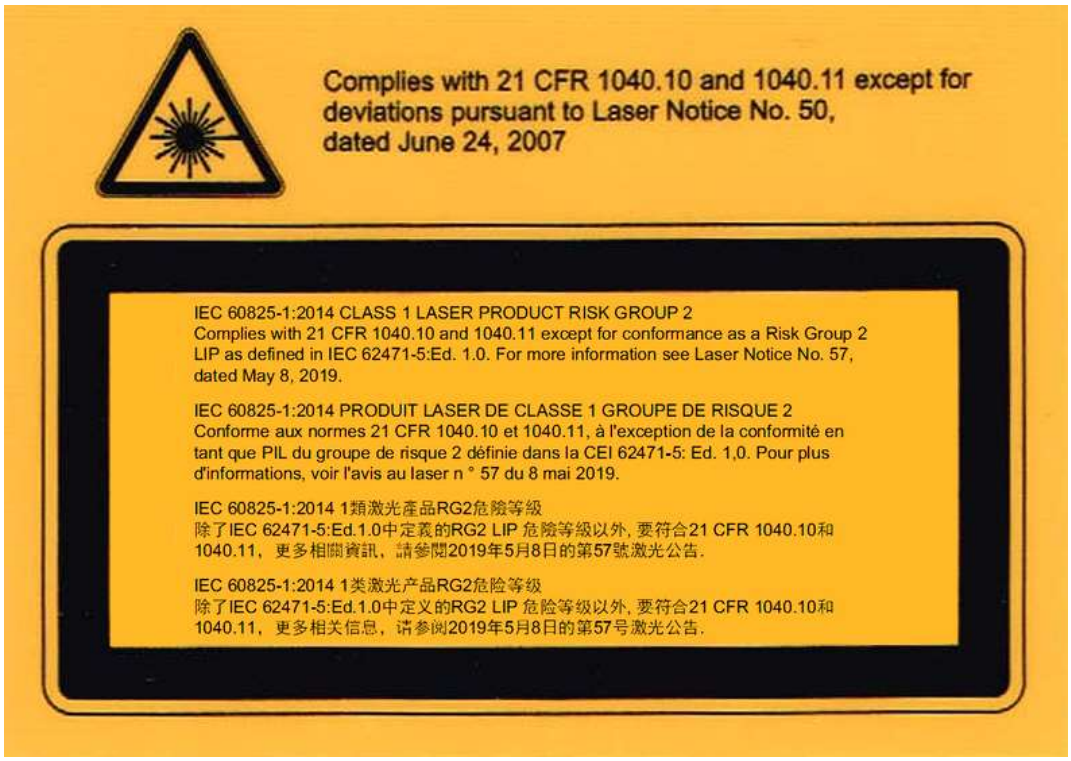
The lightning flash with arrow head within an equilateral triangle is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. DANGEROUS HIGH VOLTAGES ARE PRESENT INSIDE THE ENCLOSURE. DO NOT OPEN THE CABINET. REFER SERVICING TO QUALIFIED PERSONNEL ONLY.



Warning and explanation label



WARNING - Important Safety Instruction

1. This projector is a Class 1 laser device that conforms with IEC 60825-1:2014 – product risk group 2. Complies with CFR 1040.10 and 1040.11 except for conformance as a Risk Group 2 LIP as defined in IEC 62471-5:Ed. 1.0. For more information see Laser Notice No. 57, dated May 8, 2019
2. Class 1 laser product, do not stare into beam. The bright light may result in permanent eye damage, when the projector is on, RG2 IEC 62471-5:2015.
3. This projector has built-in laser module. Disassembly or modification is very dangerous and should never be attempted.
4. Do not open or disassemble the projector as this may cause damage by the exposure of laser radiation. Any operation or adjustment not specifically instructed by the user's guide creates the risk of hazardous laser radiation exposure.
5. Without following the control, adjustment or operation procedure, may cause damage by the exposure of laser radiation.
6. Do not block any ventilation openings. To ensure reliable operation of the projector and to protect from over heating, it is recommended to install the projector in a location that does not block ventilation. As an example, do not place the projector on a crowded coffee table, sofa, bed, etc. Do not put the projector in an enclosure such as a book case or a cabinet that restricts air flow.
7. Do not use the projector near water or moisture. To reduce the risk of fire and/or electric shock, do not expose the projector to rain or moisture.
8. Do not install near heat sources such as radiators, heaters, stoves or any other apparatus such as amplifiers that emits heat.
9. Clean using only our cleaning kit accessory.
10. Only use attachments/accessories specified by the manufacturer.
11. Do not use the unit if it has been physically damaged or abused. Physical damage/abuse would be (but not limited to):
    - Unit has been dropped.
    - Power supply cord or plug has been damaged.
    - Liquid has been spilled on to the projector.
    - Projector has been exposed to rain or moisture.
    - Something has fallen in the projector or something is loose inside.

    Do not attempt to service the unit yourself. Opening or removing covers may expose you to dangerous voltages or other hazards.
12. Do not let objects or liquids enter the projector. They may touch dangerous voltage points and short out parts that could result in fire or electric shock.
13. See projector enclosure for safety related markings.

The unit should only be repaired by appropriate service personnel. Adequate instructions for assembly, operation and maintenance, including clear warnings concerning precautions to avoid possible exposure to laser and collateral radiation in excess of the accessible emission limits in Class 1.

Usage Notice

WARNING - Do not look into the projector's lens when the LED is on. The bright light may hurt your eyes.

WARNING - To reduce the risk of fire or electric shock, do not expose this projector to rain or moisture.

WARNING - Please do not open or disassemble the projector as this may cause electric shock.

Do

- Turn off and unplug the power plug from the AC outlet before cleaning the product.
- Use a soft dry cloth with mild detergent to clean the display housing.
- Disconnect the power plug from AC outlet if the product is not being used for a long period of time.

Do not

- Block the slots and openings on the unit provided for ventilation.
- Use abrasive cleaners, waxes or solvents to clean the unit.
- Use under the following conditions:
  1. Ensure that the ambient room temperature is within 5°C ~ 35°C.
  2. Relative humidity is 10% ~ 85%.
- - In areas susceptible to excessive dust and dirt.
- - Near any appliance generating a strong magnetic field.
- - In direct sunlight.

Read this manual

Read all chapters of this manual carefully before switching on the projector. This manual provides basic instructions for operating the CRYSTAL4-SH projector. Installation, preliminary adjustments and procedures that necessitate the removal of the glass cover and the contact with electrical components, must be performed by authorized trained technicians. To ensure safe operation and long term reliability use only the power cord supplied by the manufacturer. Observe all warnings and precautions. Keep the manual for future consultation.

Do not touch internal parts of the projector

Inside the housing there are electrical parts carrying dangerously high voltages and parts operating at high temperature. Never open the housing. Entrust all servicing and repair work to a SIM2 Authorized Service Center. Opening the housing voids the warranty.

Disconnect the projector from the power supply

The device that disconnects the projector from the electrical outlet, is the power plug. Ensure that the power cord plugs and the electrical outlets are easily accessible during installation operations. Pull the plug, not the cord, to disconnect the projector from the electrical outlet. Use only the specified power supply. Connect the projector to the electrical supply with rated voltage of between 100-240 V AC, 50/60 Hz and equipped with a protective earth connection. If you are not sure of your domestic electrical outlet, contact an electrician. Take care to avoid overloading the power socket and any extension leads.

Switching the projector off

Pay attention to the switch off procedure for the projector. The projector must always be brought back to the standby state to allow the projector to carry out the cooling procedure. Should this not happen, for example due to a power cut, the projector may enter a state of protection that leads to switch-on being blocked. This block will last until the internal components of the projector have completely cooled down. Allow 90 seconds for the projector to cool down.

Be careful with cables

Make sure cables are routed so that people are not impeded or become a trip hazard. Keep all cables away from children. Install the projector as close to the wall socket as possible. Avoid stepping on power cords, make certain they do not become tangled, and never jerk or tug them; do not expose them to sources of heat, and make sure they do not become knotted or crimped. If the power cords become damaged, stop using the projector and request the assistance of an authorized technician.

Disconnect the projector from the electrical outlet during storms and when not in use

To prevent damage from lightning strikes in the vicinity, disconnect the projector during storms or when the projector is going to be left unused for a long time.

Avoid contact with liquids and exposure to damp

Do not use the projector near water (sinks, tubs and so on); do not place objects containing liquids on or near the projector and do not expose it to rain, humidity, drops of water or sprays; do not use water or liquid detergent to clean it.

Place the projector on a stable surface

Place the projector on a stable surface or use a suitable ceiling mounting bracket. Never place the projector on its side or rear, on the lens or top panel or rear.

Do not allow the projector to overheat

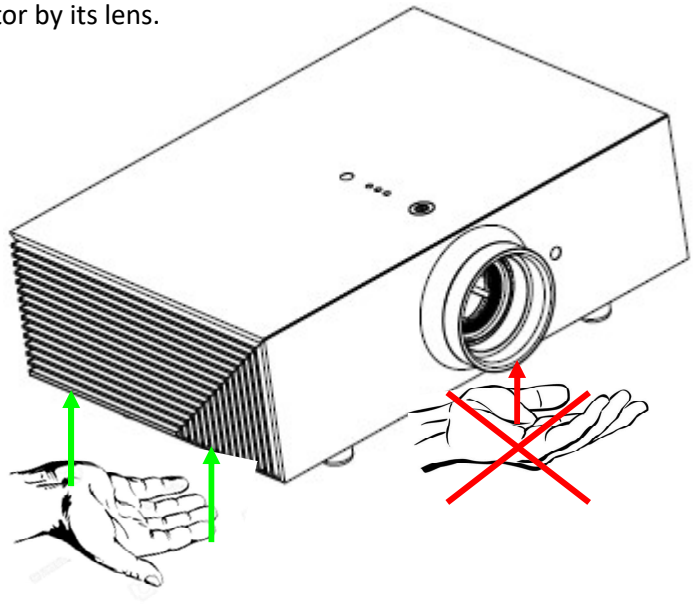
To prevent overheating, allow a free space of at least 0.20 m (5 in) on the rear, on the top, and on the right and left sides of the projector. Do not obstruct the ventilation slots. Do not place the projector near heat sources such as heaters, radiators or other devices (including amplifiers) that generate heat. Do not place the projector in an area where there is insufficient space (shelving units, bookshelves and so on) and in general avoid placing it in poorly ventilated areas as this may prevent sufficient cooling and significantly reduce light-source life.

Take special care regarding movement of the lens

Do not place objects in the slots on the side of the lens and also ensure that vertical lens movements are not impeded by external objects.
Do not hold the projector by its lens.

CRYSTAL4-SH handling and transportation

Do not pickup the projector by its lens.



Do not insert objects through the openings in the projector
Make sure that no objects are inserted inside the projector. If this should occur, disconnect the projector from the power supply immediately and call an authorized technician.

Power saving
We advise disconnecting the projector from the power supply when not in use. In this way you will achieve considerable power savings while at the same time protecting internal electrical parts from wear.

Do not use under the following conditions:

- In extremely hot, cold or humid environments
  - Ensure that the ambient room temperature is within 5°C ~ 35°C
  - Relative humidity is 10% ~ 85%
- In areas susceptible to excessive dust and dirt.
- Near any equipment generating a strong magnetic field.
- In direct sunlight.

Environment

This product contains materials derived from natural resources during its manufacture. It may contain materials that constitute a health and environmental

hazard. To prevent harmful materials from being released into the environment and to promote the use of natural materials, SIM2 provides the following information regarding the disposal and recycling of the product.

Waste electrical and electronic materials (WEEE) should never be disposed of in normal urban waste disposal facilities.

The label on the product, shown here, indicating a canceled garbage can, is intended to remind you that the product requires special handling at the end of its service life. Materials such as glass, plastic and some chemical compounds are recoverable and can be recycled for reuse.

Observe the following instructions:

- When you no longer wish to use your electrical and electronic equipment, take it to your local waste disposal facility for recycling.
- You may return your old equipment to your SIM2 Authorized Dealer free of charge when you buy a new product that is equivalent or has the same functions as the old one. Contact SIM2 to find your local dealer.
- If you need more information regarding recycling, reuse and product exchanges, contact SIM2 customer service.

Lastly we suggest further measures to safeguard the environment, such as recycling of internal and external packaging (including that used for shipping) in which the product was delivered. With your help, we can reduce the amount of environmental resources required to make electric and electronic equipment, reduce the use of waste tips for used equipment and, in general, improve our quality of life by making sure that hazardous materials are correctly scrapped. Incorrect treatment of the product at the end of its service life and failure to follow the above disposal instructions are punishable under local legislation.

Notice

The projector has been subjected to exhaustive operating tests by SIM2 to guarantee the highest quality. The projector light source life should thus initially be around 30-60 hours. In addition to the customary checks, the Quality Control department also runs additional statistical tests before shipment. In such cases, the packaging may show signs of having been opened, and the hours of light source operation may prove to be higher than those normally shown when only standard tests are performed.

As the optical system of the CRYSTAL4-SH is extremely compact and has the purpose of developing very high brightness and contrast, it is possible that a small quantity of light is visible outside of the projection area and will vary depending the zoom and shift setup. This characteristic of the optical system is to be deemed as normal. In order to reduce this effect SIM2 recommends that the area surrounding the projection screen is as dark as possible.

2 Introduction

- DLP Technology for a long life, 1 chip DMD DLP®
- 4K 8.3Million pixels UHD Resolution
- High Brightness: 3600 Ansi Lumens
- Lan control for commands and diagnostics
- Email malfunctions notifications
- Live Color Calibration
- HDR_{10} and Hybrid Log-Gamma (HLG)

Key features

Minimalist Elegance

High Performances

Luxurious Design

The CRYSTAL4-SH is not only the first SIM2 hybrid but the products included in its body all the top features and performances SIM2 developed in the years spent to create , most probably, the best projector in its class (NERO 4 S and NERO4 S GOLD).
The perfect colorimetry coupled with the best Hybrid Light Source in the market and the tremendous dynamic create in this SIM2 mid class product a challenger in any categories including the top one.

High Brightness & High Dynamic Range (HDR)
The CRYSTAL4-SH Superhybrid features a brightness as high as 3,600 lumens.
Because brightness is the key factor in experiencing all the benefits of the HDR processing in image quality, projectors with limited brightness suffer from low peak brightness which limits its dynamic range (no HDR ability).
That said, brightness without dynamics and proper management is not enough to create an extraordinary picture: based on our 20 years of experience in DLP development, coupled with the experience gained in designing the award- winning NERO 4S, we are now able to provide simply the best emotive experience in home cinema.

Perfect HDR
SIM2 is the company with one of the longest and most qualified experiences in the field of HDR, both in flat monitors and in video projection, having started to work on HDR more than 13 years ago. HDR processing is THE real revolution in video imaging and home cinema performance.
The CRYSTAL4-SH SuperHybrid features the same HDR processing developed for the world famous SIM2 NERO 4S, recognized as the reference standard for HDR image

perfection. The result of this accurate HDR processing is to make visible all image details either in the dark and/or bright parts of the image: an impressive cinematic achievement and quite an experience!

Accurate and vibrant lively Colors

A weak point of many Laser hybrid projectors has been the “colors”: images often appear yellowish or greenish.

The CRYSTAL4-SH SuperHybrid sports a perfect white point color and an expanded color space, exceeding 80% of the DCI standard (the color space of commercial Digital Cinema projectors).

This means perfect reproduction of images that look nothing more than “natural”.

To aid calibration, the CRYSTAL4-SH projector features SIM2’s advanced Live Colors Calibration, release 5.x, software that allows professional calibration of all projection parameters such as complete adjustment of the primary, secondary and white point color coordinates.

Luxury and elegant crystal glass cabinet

Home cinema projectors are now used more and more in living rooms as well as bedrooms, therefore they have to be properly integrated in interiors to avoiding the appearance of an obtrusive piece of technology that degrades the aesthetics of the room.

The CRYSTAL4-SH SuperHybrid sports an elegant and minimalist crystal glass-based cabinet for a sleek look when installed in the ceiling, over a bookshelf or furniture.

It comes in either a white or black glass finish, one that can be integrated in modern or classic environments. An invisible crystal glass back door hides all the inputs, cables, and connectors.

“A whisper in the air”

In some installations, the projector is really close to the viewers (i.e. small theatres with a low ceiling, etc.) and

therefore the projector has to be really silent.

The new CRYSTAL4-SH SuperHybrid is one of the most silent projectors in the market. Thanks to the design of the cooling system, and the solid 6 mm Crystal glass cabinet that prevents noise to come out from top, back and front of the projector.

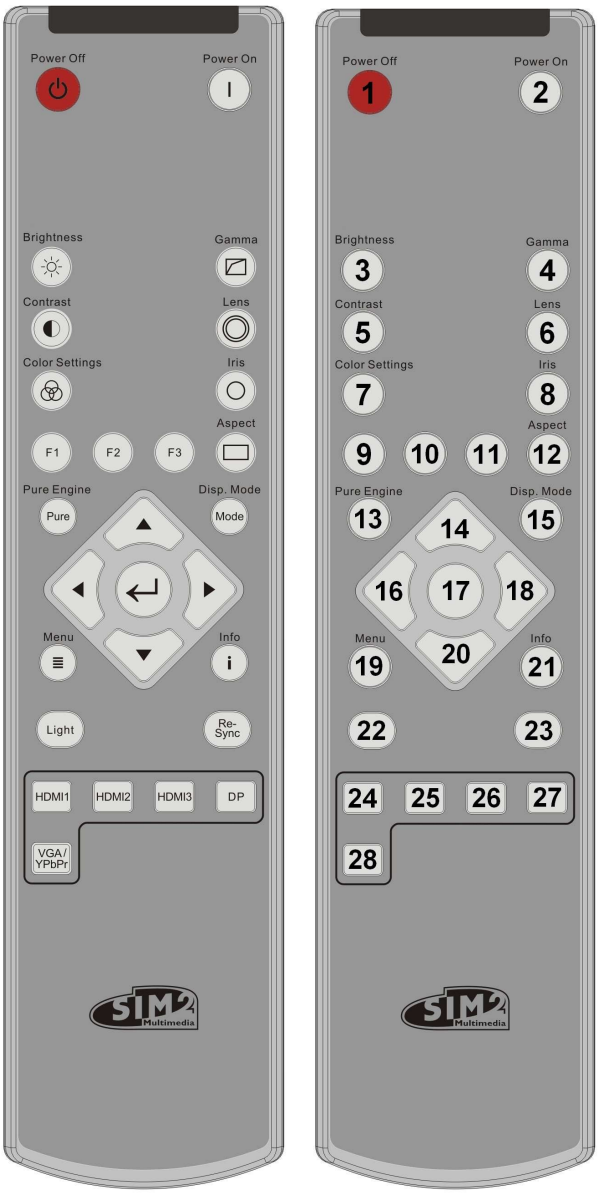
System Components

Your CRYSTAL4-SH projector ships with the following items:

- 1 x backlit remote control unit (with two AAA/LR03 batteries)
- 1 x AC power cord - 2 m (6.6 ft.) long
- 1 x User Guide (this document)

3 Overview

Remote Control



1	**Power Off**
2	**Power On**
3	**Brightness**
4	**Gamma**
5	**Contrast**
6	**Not supported**
7	**Color Adjustments [Color Settings]**
8	**Not supported**
9	**F1**
10	**F2**
11	**F3**
12	**Aspect**
13	**Advanced Image Processing [Pure Engine]**
15	**Display Mode**
14,16,17, 18,20	**Arrows for Menu**
19	**Menu**
21	**Info**
22	**Light**
23	**Re-Sync**
24	**HDMI 1**
25	**HDMI 2**
26	**Not supported**
27	**Not supported**
24	**VGA/YPbPr**

The Remote Control is the same of NERO4's model, but some functions were improved in the CRYSTAL4-SH and have a new names/labels. In square brackets are the original NERO4S names/labels.

1	**Power Off**	Turn Off the projector
2	**Power On**	Turn On the projector
3	**Brightness**	Adjust the brightness of the image
4	**Gamma**	Set up gamma curve type
5	**Contrast**	Control the degree of difference between the lightest and darkest parts of the picture
6	**Not supported**	
7	**Color Adjustments [Color Settings]**	Configure the color settings
8	**Not supported**	
9	**F1**	Function button, assignable, default is “DigZoomMin”
10	**F2**	Function button, assignable, default is “DigZoomNone”
11	**F3**	Function button, assignable, default is Trigger 12V B (on/off)
12	**Aspect**	Select the aspect ratio of the displayed image
13	**Advanced Image Processing [Pure Engine]**	A collection of advanced image processing technologies that enhances the quality of the displayed image.
15	**Display Mode**	Select a display mode for optimized settings for different applications
14,16,17, 18,20	**Arrows for Menu**	Four directional select keys – use these menu arrows to select items or make adjustments to your selection
19	**Menu**	Display or exit the on-screen display menus for projector
21	**Info**	View the projector information
22	**Light**	Turn on the backlight in the remote control
23	**Re-Sync**	Automatically synchronizes the projector to the input source
24	**HDMI 1**	Choose source from HDMI 1 connector
25	**HDMI 2**	Choose source from HDMI 2 (UHD, HDR and HLG) connector
26	**Not supported**	
27	**Not supported**	
24	**VGA/YPbPr**	Choose source from VGA connector (RGB or YPbPr)

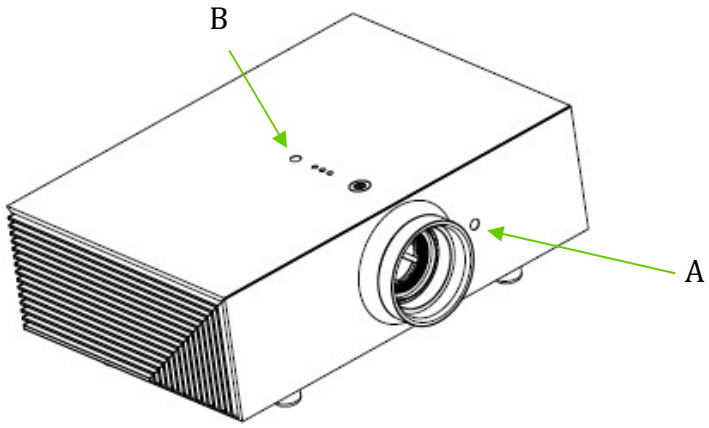
Custom Remotes

You can use your own IR remote control to control your CRYSTAL4-SH projector.

- If you are using a remote control with learning capabilities, use the projector remote control to teach the commands to your remote.
- If you are using a programmable remote control, the setup software probably allows importing Hex codes. See "*SIM2 NERO4 IR Control" document,* for a list of all the projector codes.

Operation

The CRYSTAL4-SH projector has two IR receivers (A , B) one on the front of the unit and one on the top. The operative range of the remote control is approximately 10 m (33 ft.) and ±15°. Make sure that there is nothing obstructing the infrared beam between the remote control and the IR receiver you are pointing to. You can point the remote control towards the screen, as the IR beam is reflected by the screen towards front IR receiver of the projector. In this case the effective range of the remote control may be smaller than declared.



Item	*Description*
A	Front IR receiver
B	Top IR receiver

Batteries

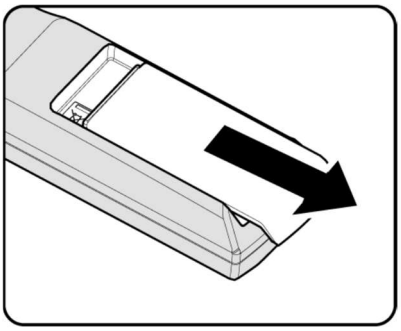
To install batteries in the remote control:

- Open the battery cover.
- Insert two AAA (LR03) batteries making sure the polarities match the **+** marks inside the battery compartment.

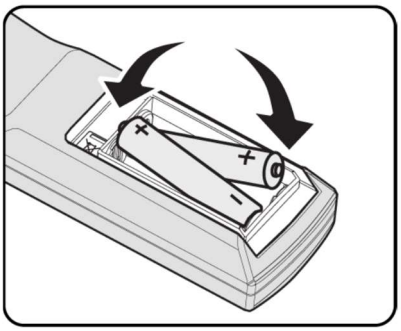
- Reinsert the cover.

Replace the batteries with new ones when the operating range of the remote control decreases. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to local regulations. Make sure you do not mix old and new batteries or different types of batteries.

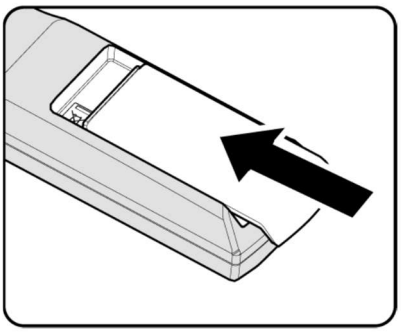
Remove the battery compartment cover by sliding the cover in the direction of the arrow.



Insert the batteries paying attention to the positive pole.

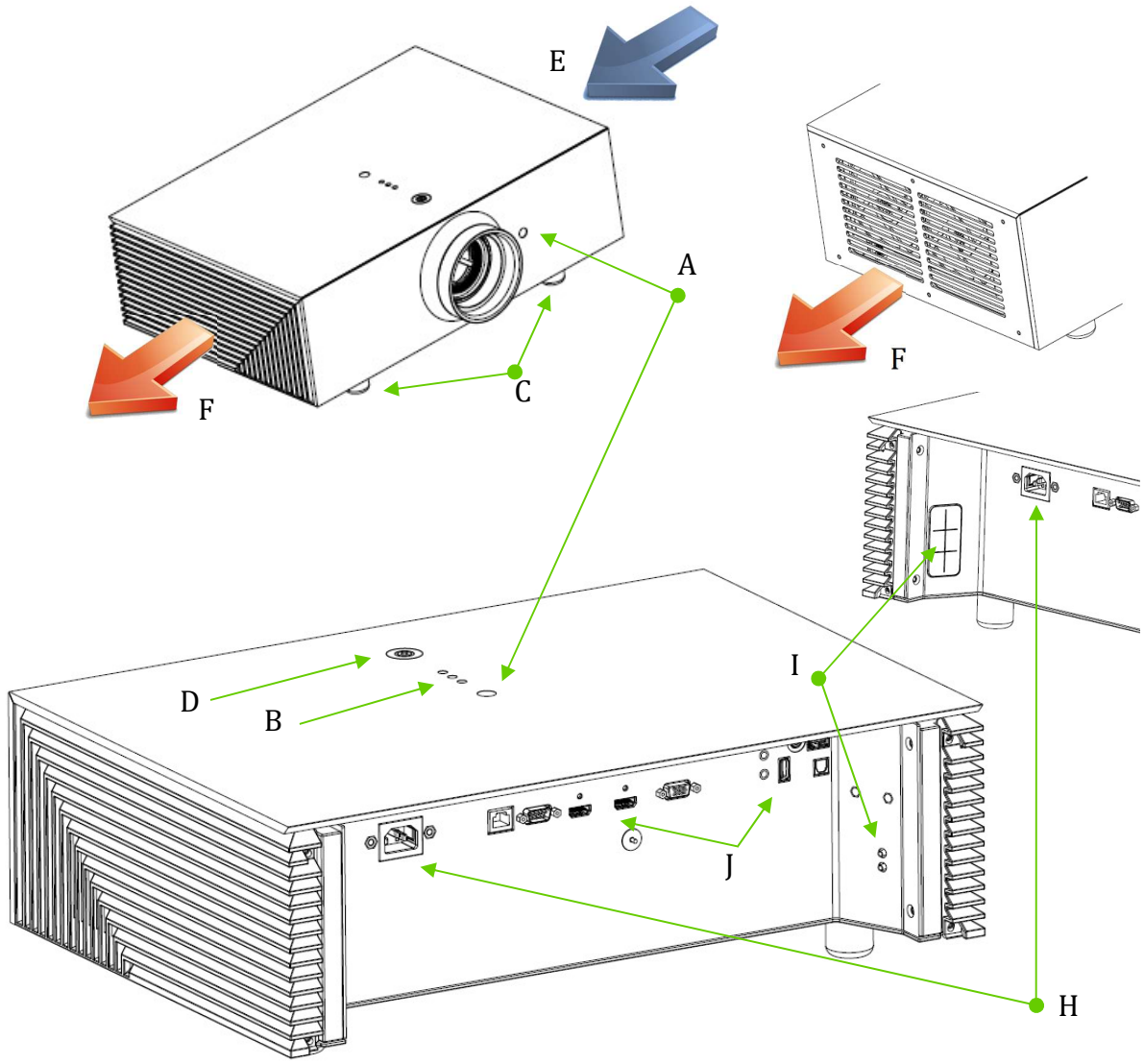


Reinsert the compartment cover by sliding the cover in the direction of the arrow.



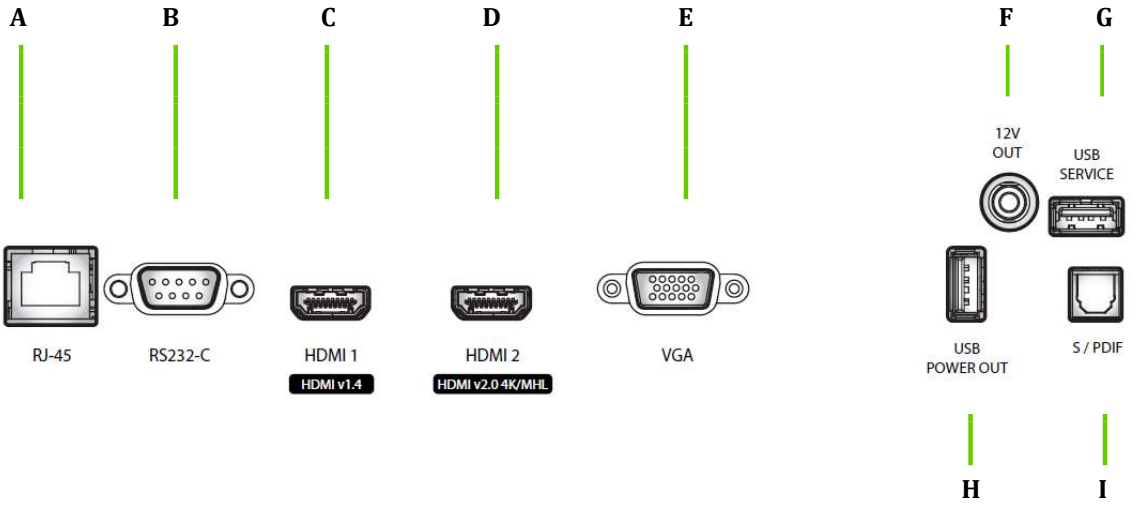
Warning: If you will not use the remote control for a long time, remove the batteries to avoid battery leakage. When you dispose of the battery, you must obey the law in the relative area or country.

Product overview



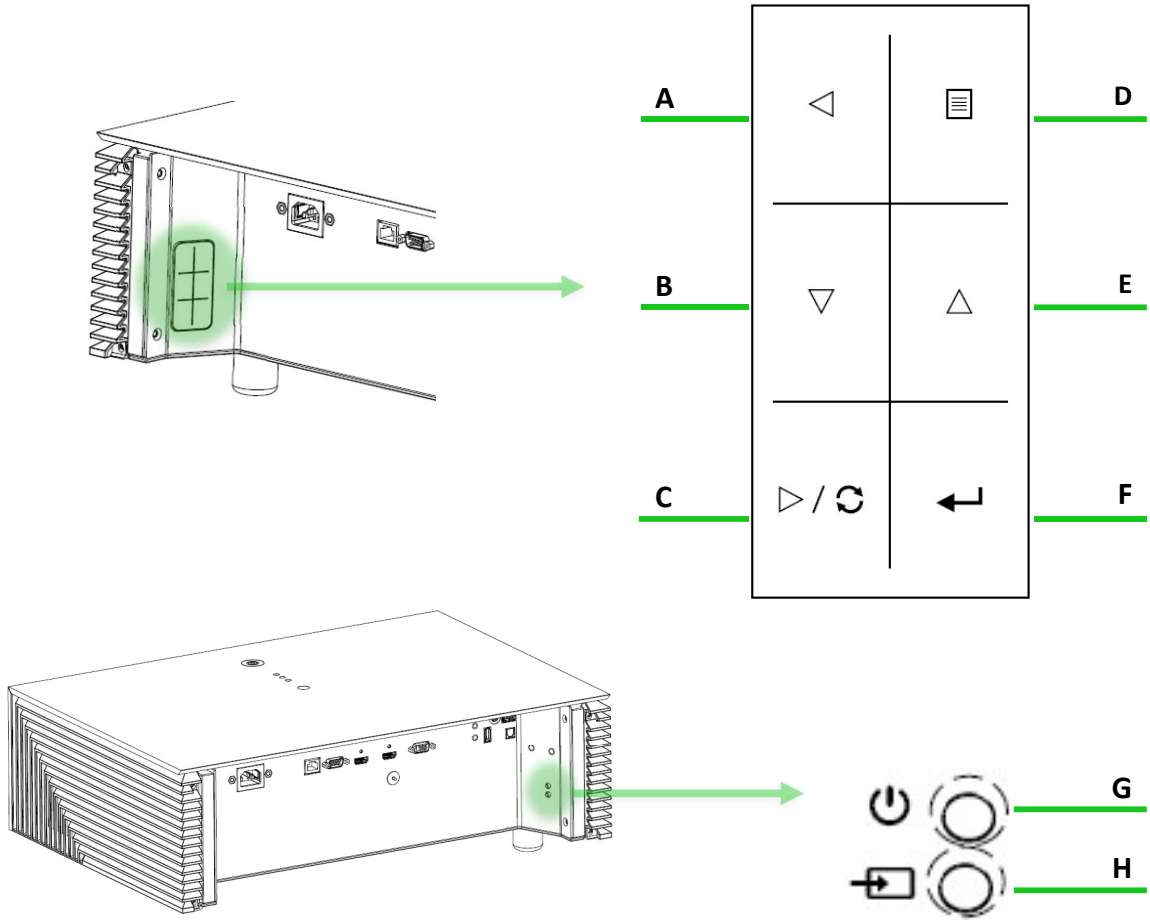
A	IR Receiver		F	Ventilation Outlet
B	LED Status Indicators		H	Power Socket
C	Tilt-Adjustment Feet		I	Keypad/ Power On/ Input selection
D	Optical Lens Vertical Shift		J	Input / Output
E	Ventilation Inlet			

Connections



Inputs	C	HDMI 1	v1.4a, HDCP 1.4 FHD
	D	HDMI 2	v2.0, HDCP 2.2 UHD, HDR/HLG, MHL 2.1
	E	VGA/YPbPr	VESA HD15. Support YpbPr.
	A	RJ45	Ehternet interface for commands and control. Support web control.
	K	Wired RC	Wired IR receiver
Control/ Service	G	USB SERVICE	USB-A Software update
	B	RS-232	RS232 (female D-Sub 9-pin) port for serial commands and firmware upgrade.
	H	USB POWER	USB type A, charger 5V/1.5A
Outputs	F	12V Trigger	DC 12V 500mA max, 3.5mm jack female
	I	S/PDIF	Digital audio, Toslink connector

Keypad



A	Left	(directional select key)
B	Down	(directional select key)
C	Re-Sync/ Right	(directional select key)
D	Menu	

E	Up	(directional select key)
F	Enter	(select key)
G	Power ON / OFF	
H	Inputs selection	

4 Installation

This section provides instructions for the installation of the CRYSTAL4-SH projector.
Important: Installation procedures should be performed by a qualified AV system specialist.

Location

When installing the CRYSTAL4-SH projector, take the following considerations into account.

Installation Type
Select the installation type that best suits your needs:

- front or rear projection
- floor or ceiling mount

Cooling
Make sure that the planned location for the projector has adequate ventilation. Check that room temperature is below 35° C and that the projector is away from heating vents. Ensure a minimum 0.20 m (5 inch) clearance on the left, right and rear sides of the projector.

Power Outlets
Verify that the powers outlets are grounded and preferably shielded from power surges and fluctuations. A UPS is optional. CRYSTAL4-SH power supply operates on any nominal line voltage between 100-240 V AC, 50-60 Hz.

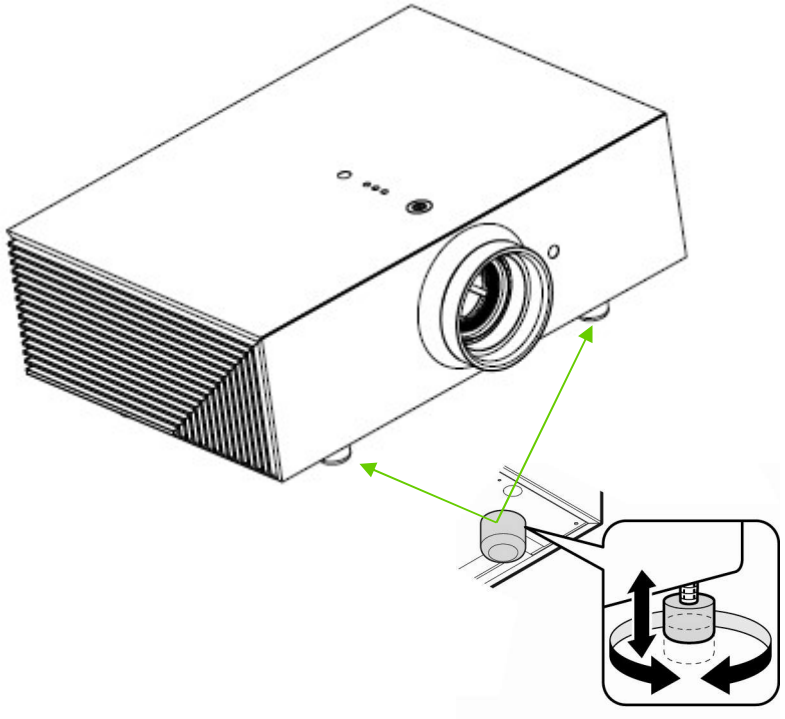
Cables
Check planned cable lengths for video and control cables and make sure these lengths do not exceed specifications.

Ambient Light
Avoid or minimize light sources directed at the screen to preserve the quality of the projected image.

Mounting

The projector can be Floor mounted (upright) or Ceiling mounted (inverted). Choose the method that best suits your installation.
The CRYSTAL4-SH projector has been design to be submit the EN60950/UL950 Safety Norms with it's glass cabinet.
Nevertheless, even if the best materials and adhesives available in the market, in order to guarantee a safe application on the long long run.
To determine where to position the projector, consider the size and shape of your screen, the location of your power outlets, and the distance between the projector and the rest of your equipment.
Important: The projection lens is centered to the chassis . Make sure the centerline of the lens is centered horizontally to the center of the screen.

Floor Mounting
Place the projector on a secure and flat surface (such as a table or a shelf). Adjust the two elevator feet at the bottom of the projector until the projector is level on all sides. Rotate the adjustable feet counter clockwise to raise the projector or clockwise to lower it. Repeat with the remaining feet as needed.



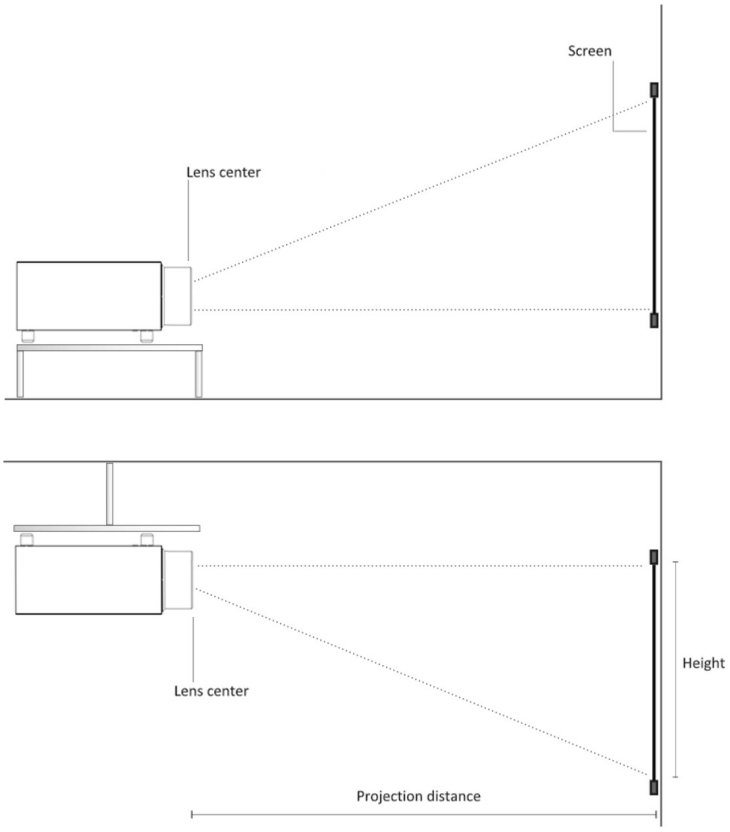
Ceiling Mounting
Invert the projector and hanged up it from the ceiling using a dedicated bracket.

Orientation
By default, the CRYSTAL4-SH is configured for a Front installation (projector installed upright and in front of the screen). If the projector is installed behind the screen or inverted, you can use the image orientation function of the projector.

Vertical Lens Shift
Ideally, the projector should be positioned at a right angle to the screen and in such a way that:

- the lens centre and bottom of the screen are aligned with each other
- the projected image fills the screen perfectly

More details in chapter #6 (page 52): Image size and projection distance.



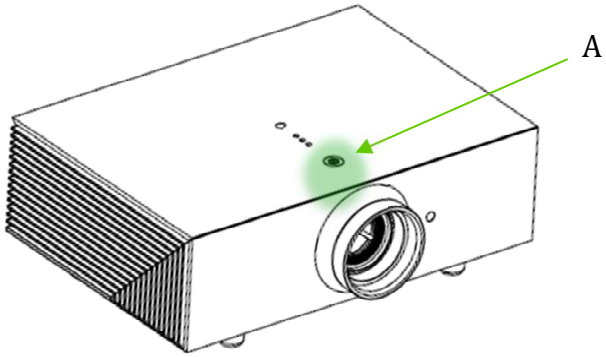
Keystone
If the projector is ceiling-mounted and the screen is lower than the projector, you may need to tilt the projector by adjusting the ceiling mount. If you do so:

- the top and bottom borders of the image will be unequal in length
- the sides of the image will be inclined

Mechanical Lens Shift, Focus and Zoom

Mechanical Lens Shift

The CRYSTAL4-SH provides manual Vertical Shift controls.

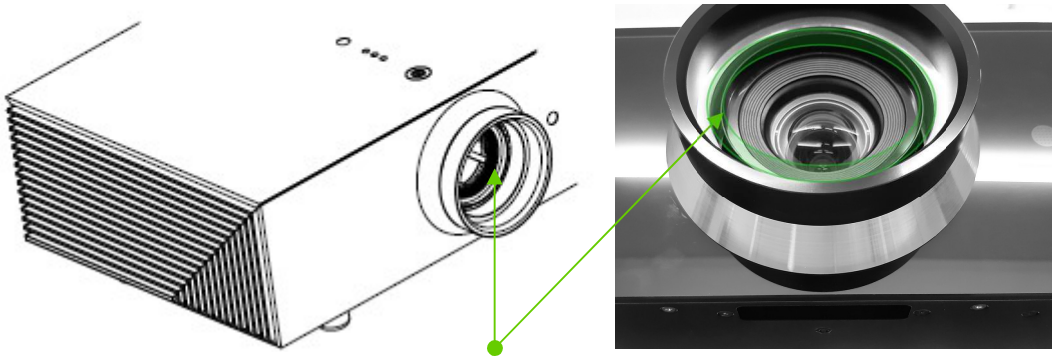


Shift Vertical: +15%.

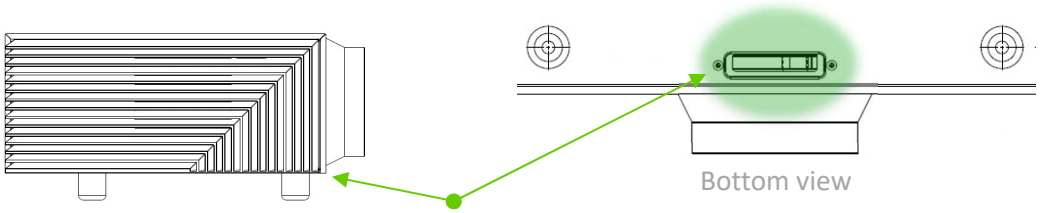
Use the Allen Screw (of 4mm or 0.15748 inch) available in the standard accessories in the package.

Mechanical Lens Shift and Zoom

The CRYSTAL4-SH provides manual Focus and Zoom controls



Focus adjustment



Zoom adjustment

Zoom ratio: 1.6 x.

Connections

Proceed as follows to connect the CRYSTAL4-SH to video sources, control devices, screen control systems and AC power.
When connecting your equipment:

- turn off all equipment before making any connections
- use the correct signal cables for each source
- make sure cables are routed so that people are not impeded or become a trip hazard
- ensure that the cables are securely connected (tighten the thumbscrews on connectors that have them)

HDMI The major benefits of this signal type are:

- best image quality, because the signal is carried in the digital domain throughout the entire signal path
- highest available resolution, because video sources can deliver full resolution content via HDMI only
- optimization of several image parameters (color space, aspect, signal range, over scan), thanks to auxiliary information (AVI infoframe) sent by the source device together with the signal.

If your source has dual HDMI outputs, we would recommend direct connection to the projector from one of the HDMI connections and the second HDMI output to the input of an appropriate AV receiver/processor for audio.
Sources with a DVI-D output can be connected to the HDMI input of the projector using a suitable DVI-D to HDMI cable. In this case no auxiliary information is sent from the source to the projector.

Note: HDMI uses a code known as HDCP (High-bandwidth Digital Copy Protection), which protects the recorded supports from being copied illegally. The connection between the source and display requires that the two devices perform a handshake and exchange code keys before being able to display an image. The InstaPort technology allows a simultaneous pre-authentication of every attached device at the same it is connected, reducing drastically the time required for HDMI source switching. For this reason you may note a slight delay before the image appears on the screen, but it is perfectly normal.

- **Graphics RGB** Input for Personal Computer and other sources that outputs RGB or YPrPb signals. These sources must be able to provide separate H/V sync or composite H+V sync.

Control

You can connect the CRYSTAL4-SH projector to a Personal Computer or a control system through one of the following methods:

- RS-232 port, using a standard 9-pin straight serial cable
- RS-232 port, using a USB to serial converter cable. In this case, installation of a device driver provided by the cable manufacturer may be required.
- Ethernet port, using a Straight Through cable.

Note: RS-232 communications are limited to max 15 m (50 ft.), VGA communication are limited to max 20 m (65 ft.), HDMI communication are limited to max 20 m (65 ft.), CVBS & YPbPr are limited to max 20 m (65 ft.).

Triggers

Some Home Theater devices can be controlled through a 12 V signal. The projector can output a 12 V (500mA) signal:

- 12V TRIGGER provides a standard trigger for motorized screens control

USB

USB-A for 5V, 1.5A for service functions.

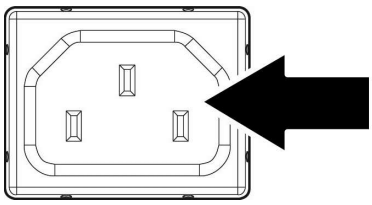
AC Power

Plug the female end of the power cord to the AC receptacle located on the left hand side of the projector (100-240 V AC, 50-60 Hz) and the other end into a grounded AC outlet. An high-quality surge protector is recommended while a UPS is optional.

Switching On and Off

Switching On

I. Securely connect the power cord supplied and the signal cable. When connected, the Power LED will turn red.



II. Turn on the projector by pressing ⏻ button either on the back panel of the projector or the " | " button on remote control. The power LED will now turn blue. The startup screen will display in approximately 10 seconds.

III. Turn on and connect the source that you want to display on the screen (computer, notebook, video player, etc.). The projector will detect the source automatically. If not, read the following note.

Note: if you connect multiple sources at the same time, press the "SOURCE" button on the back panel or the direct source keys on the remote control to switch between inputs.

Switching Off

I. Press the ⏻ button on the remote control or ⏻ button on the back panel of the projector one time. The following message will be displayed on the screen.

Press the ⏻ button on the remote control, or the ⏻ on the back panel again to confirm, otherwise the message will disappear after 15 seconds. When you press the ⏻ button for the second time, the projector will shut down (the interval between pressing has to be around one second to turn off the projector).

II. The cooling fans continue to operate for about 10 seconds for cooling cycle and the Power LED will flash blue. When the Power LED lights solid red, the projector has entered in standby mode. If you wish to turn the projector back on, you must wait until the projector has completed the cooling cycle and has entered standby mode. Once in standby mode, simply press the ⏻ button on the back panel or the " | " on the remote control to restart the projector.

III. Disconnect the power cord from the electrical outlet and the projector.

Warning: Do not turn on the projector immediately following a power off procedure.

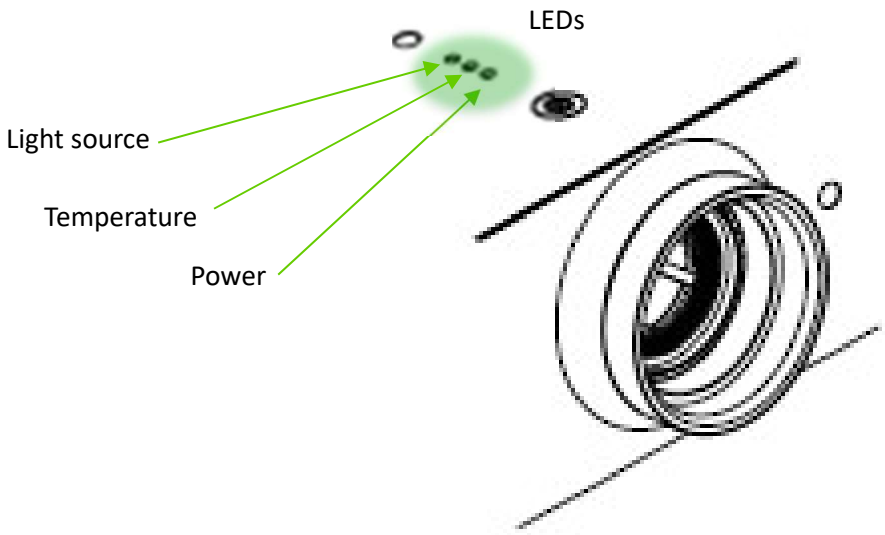
LED lightning indications

POWER LED is bi-color (Blue and Red).
TEMP LED indicates the projector has overheated.
LIGHT LED indicates the projector light source functionality. Status OFF indicates that not errors or warnings are present.

If one of the following status, shown in the table below, happens, unplug the power cord from the projector, wait for 30 seconds and try again. If the warning indicator light up again, please contact your nearest service center for assistance.

MESSAGE	POWER LED *(Red)*	POWER LED *(Blue)*	TEMP LED (Red)	LIGHT LED (Red)
Standby State (Input power cord)	Steady Light*	Off	Off	Off
Power On (Warming)	Off	Flashing	Off	Off
Power On and Light Lighting	Off	Steady Light	Off	Off
Power Off (Cooling)	Off	Flashing	Off	Off
Error (Light fail)	Flashing	Off	Off	Steady Light
Error (Fan fail)	Flashing	Off	Flashing	Off
Error (Over Temperature)	Flashing	Off	Steady Light	Off

* ON/STANDBY LED be ON when OSD appears, be OFF when OSD disappears.



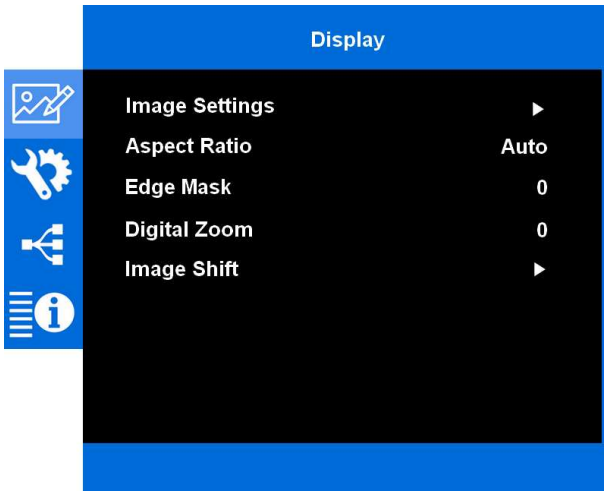
5 Operation

Main Menu

The main menu gives access to all projector adjustments. It is divided in four main sections:

Display	
Setup	
Network	
Information	

with various item and submenus in each of them.



To enter the main menu and select the desired section press ☰ on the remote control.
To enter a submenu (when available) press ↵ on the remote control.
Use ▲ or ▼ to select an item on a list either in the main menu and the submenu.
To return to the previous menu when in a submenu press ☰ on the remote control.

To select menu items press ◀▶ on the remote control. To turn off the main menu press ☰ on the remote control. Use ◀, ▶ to change settings on a selected item.

Note: Depending on the selected input source and signal characteristics, some adjustments may not be available.

Display and **Setup** menu sections provide access to most commonly-used projector adjustments. Note that, in **Display** menu:

- you can enter these sections only when an image is displayed;
- the controls in these sections only operate on the active input;
- when you select another input all the settings in these sections are automatically saved;
- each time you select an input the previously saved settings for that input or mode will be automatically recalled;

Setup section provide access to installation and OSD adjustments. The settings in these sections are global (for all inputs and modes, not just the active one).

Live Colors Calibration software (LCC)

To aid calibration, the CRYSTAL4-SH projector, feature the new SIM2's advanced Live Colors Calibration 5.0 software that enables professional calibration of many projection parameters such as complete adjustment of the primary, secondary and white point color coordinates. This PC-based software gives calibration experts unprecedented control over the projector image quality.
SIM2 recommends the use of LCC software to calibration experts only, by using spectrophotometers or color probes to correctly analyze and adjust the colorimetry.

Display

This menu section provides access to common image quality adjustments.

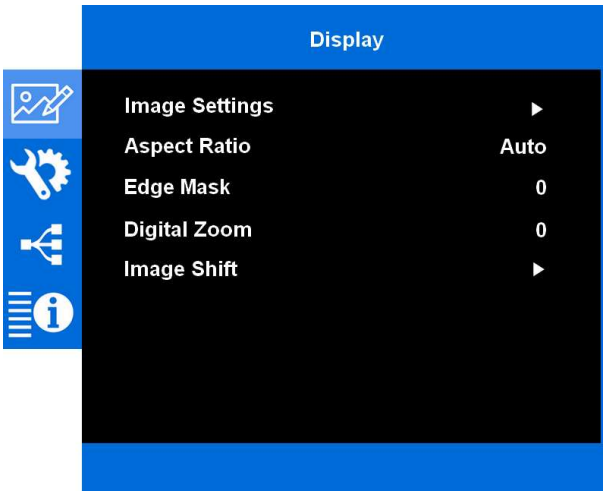


Image Settings	▶
Aspect Ratio	**value**
Edge Mask	**value**
Digital Zoom	**value**
Image Shift	▶

Item	***Description***
▶	Enter in a dedicated sub-menu
value	Enter in a quick menu, where is possible to select a list of values

Display – Image Settings

Display Mode	**value**
Noise Reduction	**value**
HDR Settings	**value**
Brightness	**value**
Contrast	**value**
Sharpness	**value**
Color	**value**
Tint	**value**
Gamma	**value**
Color Adjustments	▶
Analog Signal	▶
Auto Adaptive Contrast	**value**
Super Hybrid Mode	**value**
Laser Modulation	**value**
Advanced Image Processing	▶
Reset	▶

Display Mode

There are many factory presets optimized for various types of images:

NATURAL: this mode is intended to reproduce, as close as possible, the image the way the movie director intended.

DYNAMIC: this mode is suitable for showing PowerPoint presentations when the projector is connected to the PC.

BRIGHT: maximum brightness from PC input.

CINEMA: default settings for home theater.

SPORT: select this mode to increase the brightness and response time level for enjoying sporting events and video games.

HDR: this mode is intended to reproduce the images in High Dynamic Range. This mode is the default mode for the HDR images and it will recalled every time the projector will detect an HDR content inside the signal.

HLG: this mode is intended to reproduce the images processed with the Hybrid Log Gamma curve.

BrightHDR: it is the default Mode for the HDR signal. It has the same function as the HDR Mode, but is designed to have the maximum brightness in this status.

BrightHLG: It has the same function as the HLG Mode, but is designed to have the maximum brightness in this status.

USER: user's settings.

Note: When the projector recognize an HDR content, in the signal, it will switched the Display Mode in HDR or BrightHDR. Between these two last modes, it will selected the last one selected from the user. Example: if the projector is displaying a video, not HDR, and the present Display Mode is Natural, when the user will switch to an HDR signal, also the projector will change the present Display Mode in HDR or BrightHDR. At the moment that the user will come back to the signal without HDR content, also the projector will select the previous Display Mode, for this example, the Natural.
Same behavior when the projector recognize a video processed with the Hybrid Log-Gamma: it will switched the Display Mode in "HLG" or "BrightHLG".

Note: The HDR_{10} signals are processed only if they coming from the HDMI2 input, that is compliant with the standard HDMI v.2.0a - HDCP 2.2.

Note: The HLG signals are processed only if they coming from the HDMI2 input.

Note: The Display Mode depends on the input source and timings. For example, the display mode will be different from HDMI and VGA. If you change any of the image settings, the display mode presets will be changed and saved automatically. If you want to return to the factory default display mode, select RESET from the menu SETUP.

Noise Reduction

This adjustment lets you choose the value of the noise reduction filter. The Noise Reduction reduces the amount of visible interlaced signals.
Press ◀ to decrease the noise reduction
Press ▶ to increase the noise reduction
Range [Off, 1, 2, 3]

HDR Settings

This adjustment lets you choose the standard SMPTE 2084 curve, that better match the characteristic of your installation.
AUTO: this mode selects one EOTF SMPTE 2084 curve preset, between HDR1, HDR2, HDR3 and HDR4, depending of signal content.
SDR: this mode is suitable for showing images without HDR contents.
HDR1: this mode is suitable for showing HDR contents with the SMPTE 2084 curve for the following setup: screen dimensions of 100 inches and projector's lens set in wide angle.
HDR2: as HDR1, but for screen dimensions of 120 inches.
HDR3: as HDR1, but for screen dimensions of 140 inches.
HDR4: as HDR1, but for screen dimensions of 160 inches.
HLG1: this mode is suitable for showing HDR HLG contents with the SMPTE 2084 curve for the following setup: screen dimensions of 100 inches and projector's lens set in wide angle.
HLG 2: as HLG1, but for screen dimensions of 120 inches.
HLG 3: as HLG1, but for screen dimensions of 140 inches.

HLG 4: as HLG1, but for screen dimensions of 160 inches.

Note: In the OSD menu the labels displayed are “HDR/HLG N”, where in place of “N” there is a number from 1 to 4. Anyone of them recalls the right preset, depending on the Display Mode selected: “HDR”/“BrightHDR” or “HLG”/“BrightHLG”.

This Menu is enabled only in Display Mode “HDR”, “BrightHDR”, “HLG” or “BrightHLG”. With the lens in tele angle, it is necessary to select a preset greater than the default for that screen dimension. Example: in tele angle, with screen dimensions of 100 inches, selects the preset HDR3.

Note: HDR behavior has been deeply revised. Since the launch of the NERO 4 HT market, one of the very first 4K UHD HDR products in its category, a vast range of contents and signal sources have become usable. This vastness of content and players has led to a profound revision of the HDR video behavior of NERO 4, now optimized in all situations in which it is used to project a 4K UHD HDR image.

Brightness

Adjust the brightness of the image.
Use this control to adjust the darker areas of the picture (black level), without affecting bright areas. Increasing the value will give more detail in darker parts of the picture. For correct adjustment it may prove useful to display a gray scale test pattern with at least twenty bands. Now try to reduce the brightness of the black band as much as possible while ensuring that it can still be distinguished from the adjacent band with brightness slightly higher than black. Alternatively use a scene composed of black objects alongside other dark colored objects and try to ensure that all the objects can be separately identified.
Press ◀ to darken the image
Press ▶ to lighten the image
Range [-50 .. 50]

Contrast

The contrast controls the degree of difference between the lightest and darkest parts of the picture. Use this control to adjust the image's white level without affecting its dark areas. For correct adjustment it may prove useful to display a gray scale test pattern with at least twenty bands. Now try to increase the brightness of the white band as much as possible while ensuring that it can still be distinguished from the adjacent band with brightness slightly less than white. Alternatively use a scene composed of well-lit white objects surrounded by light objects with lower level lighting, and try to ensure that all the objects can be separately identified.
Press ◀ to decrease the contrast
Press ▶ to increase the contrast
Range [-50 .. 50]

Color

Adjust a video image from black and white to fully saturated color.
This control (also called Saturation) increases or decreases the picture color intensity. When set to zero, color images are shown in black and white. Increase the value until the colors appear natural: suitable references include skin tones and the green in grass in landscape shots.
Press ◀ to decrease the color saturation in the image
Press ▶ to increase the color saturation in the image
Range [-50 .. 50]
Note: Color is only supported for composite and component sources.

Tint

Adjust the color balance of red and green
This adjustment controls the purity of colors. Basically it determines the red-green ratio of the picture. Decreasing the value increases the red content of the image, increasing it increases the green content. For this adjustment use skin tones or a test card image with color bars as a reference. This adjustment is primarily used for NTSC sourced material.
Press ◀ to increase the amount of green in the image
Press ▶ to increase the amount of red in the image
Range [-50 .. 50]
Note: Tint is only supported for composite and component sources.

Sharpness

Adjust the sharpness of the image.
This adjustment increases or decreases the level of picture detail. When the sharpness value is reduced the image details appear less pronounced, while increasing the value raises image definition, making the outline of objects sharper. Note that an excessively large value may result in a noisy picture and the outline of images will have a high amount of edge enhancement.
Press ◀ to decrease the sharpness
Press ▶ to increase the sharpness
Range [1 .. 15]

Gamma

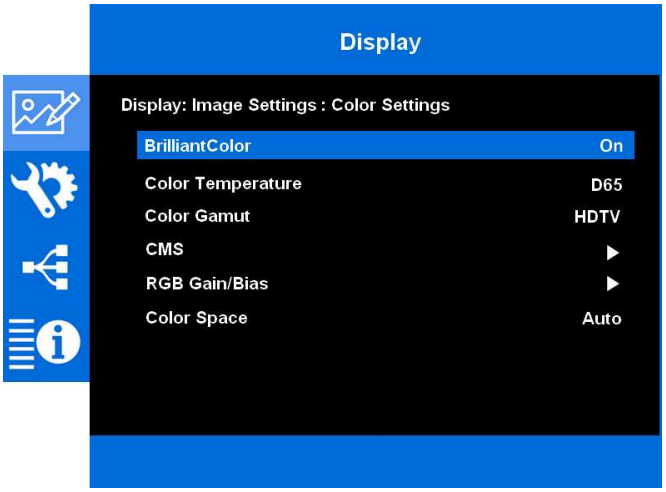
Determines the projector response to the gray scale, emphasizing or attenuating the different grades of brightness (blacks, dark, medium and light grays, whites) in the projected image. Choose the setting that is appropriate to the type of video source, the ambient lighting and your subjective preferences.
This allow you to set up gamma curve type. After the initial setup and fine tuning is completed, utilize the Gamma adjustment steps to optimize you image output.
The available settings are:

- **Film:** for home theater
- **Video (2.6):** for video or TV source

- **Graphics:** for PC/Photo source
- **Standard (2.2):** for standardized setting
- **1.8/2.0/2.4:** for specific PC/Photo source

Color Adjustments

Press the ↵ to enter the menu and then use ▲ or ▼ to select item.



- **BrilliantColor™**
  This adjustable item utilizes a new color-processing algorithm and enhancements to enable higher brightness while providing true, more vibrant colors in picture.
  Range [On,Off]

- **Color Temperature**
  Select a color temperature from D55, D65, D75, D83, D93 or Native.
  - **Native** the projector native white point
  - **D55, D65, D75**, **D83**, **D94** the C standard CIE illuminants

- **Color Gamut**
  The Color Gamut are the whole values of the primaries (red, green and blue), secondaries (yellow, cyan and magenta), the white color coordinates and the brightness. Each CRYSTAL4-SH projector is individually calibrated taking in account the projector hardware and optics to reach the HDTV REC709 Color Gamuts.
  Select an appropriate color gamut from Native, HDTV, User, Cinema and LCC.
  - **Native:** the projector native color gamut.
  - **HDTV:** the color gamut defined by the standards.
  - **LCC:** the color gamut defined by the user through the LCC software. When selected the LCC color gamut, the CMS menu and the Color Temperature are dimmed. With Live Color Calibration (LCC) you can change any of the color gamut directly entering absolute values.

- **User:** this mode is dedicated for the user, where he is able to change the whole relative values of the color gamut through the On Screen Display, in the CMS menu.
- **Cinema:** the color gamut nearest to the DLP Cinema. As for the User mode, the user could change the whole relative values of the color gamut through the On Screen Display, in the CMS menu.

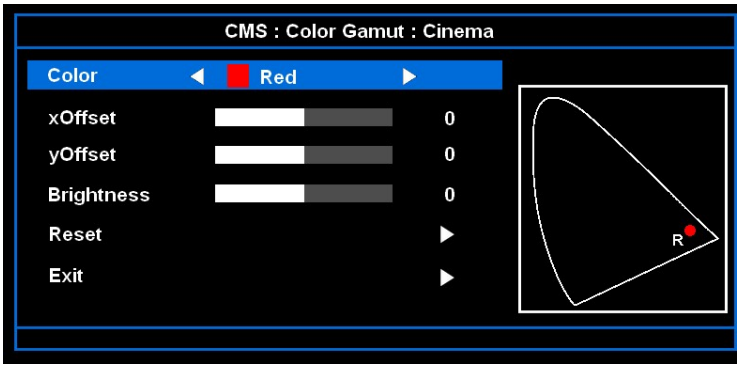
Note: Any **CRYSTAL4-SH** is factory adjusted to reach the HDTV REC709 standard color gamut. Calibration is stored in the Color Gamut "HDTV" and it was obtained selecting the Display Mode "Natural", "HDR" or "HLG" with Color Temperature "D65" and Gamma "2.2".

Note: Any **CRYSTAL4-SH** is factory adjusted to have the primaries colors in the maximum gamut positions, that coverage the 82% of DCI-P3, and secondaries colors calibrated. Calibration is stored in the Color Gamut "LCC" and it was obtained selecting the Display Mode "BrightHDR", or "BrightHLG".

- **Color Management System (CMS)**

This function allow to customize the Color Gamut by the user, when it is selected the Color Gamut "User" or "Cinema".

Press the ↵ to enter the menu and then use ▲ or ▼ to select item.
Select one of the colors (Red/Green/Blue/Cyan/Magenta/Yellow/White) to adjust its x & y offset and brightness.



- **Color:** use ◀ or ▶ to select from Red, Green, Blue, Cyan, Magenta, Yellow or White colors.
- **x Offset:** use ◀ or ▶ to adjust the x offset value of selected color.
- **y Offset:** use ◀ or ▶ to adjust the y offset value of selected color.
- **Brightness:** use ◀ or ▶ to adjust the brightness value of selected color (not available for White).
- **Reset:** choose "YES" to apply the factory default settings for color adjustments.
- **Exit:** to exit from the CMS settings.

- **RGB Gain/Bias**

  Press the ↵ to enter the menu and then use ▲ or ▼ to select item.
  Use ◀ or ▶ to adjust the Red, Green or Blue brightness (Gain) and contrast (Bias).
  - **RESET:** choose "YES" to apply the factory default settings for color adjustments.
  - **EXIT:** to exit from the RGB Gain/Bias settings.

- **Color Space**

  Determines the signal data range of HDMI signals. It is available when the HDMI signal comes from a RGB source or when the AVI (Auxiliary Video Information) infoframe of the HDMI signal is missing or inconsistent.
  Select an appropriate color matrix type from AUTO, RGB (0-255) RGB (16-235) or YUV.
  Color Space is available also for non-HDMI inputs.

  - **Auto** determines the signal range using the information provided by the AVI infoframe of the HDMI signal. If the AVI infoframe is missing or inconsistent, the projector uses values 0-255. Auto (which is the default setting) usually selects the correct signal range but you can force either 16-235 or 0-255
  - **RGB (0-255)** sets black at R, G, B = 0 and white at R, G, B = 255
  - **RGB (16-235)** sets black at R, G, B = 16 and white at R, G, B = 235, to match the luminance values of digital component standards
  - **YUV:** YUV signals are typically created from RGB (red, green and blue) source. Weighted values of R, G, and B are summed to produce Y', a measure of overall brightness or luminance. U and V are computed as scaled differences between Y' and the B and R values.

- **Live Color Calibration – PC sw application**

  SIM2 has developed with the experience gained over many years of projection as a premium brand, a PC SW that facilitates the tricolor calibration of its high-end machines: the Live Color Calibration, now arrived at Release 5.x. It's continuously updated to introduce new features and support new SIM2 projectors.
  The SW allows all the possible freedom of calibration, including an autocalibration, once the targets of the color gamut and color temperature to reach have been defined.
  The CRYSTAL4-SH has become part of the SIM2 family of machines that can take advantage of this application.

  The Live Color Calibration application stores the calibrated data in dedicated memories in the projector. They are recalled selecting the preset "LCC" in the "Color Gamut" menu. There are three different memories associated with the

"LCC" gamut. They are selected automatically, depending on the present Display Mode in use, as described in the table below:

Display Mode	LCC memory
Natural, HDR, HLG	LCC1
Bright, Cinema, Sport, User	LCC2
BrightHDR, BrightHLG, Dynamic	LCC3

Analog Signal

Press the ↵ to enter the menu and then use ▲ or ▼ to select item. This function is available only for analog input signal (RGB or Component) and permit to adjust the signal options.

- **Automatic**
  Configure automatically the signal (the frequency and phase items are grayed out). If automatic is disabled, the frequency and phase items will appear for tuning and saving the settings.

- **Frequency**
  Change the display data frequency to match the frequency of your computer's graphic card. Use this function only if the image appears to flicker vertically.

- **Phase**
  Synchronize the signal timing of the display with the graphic card. If the image appears to be unstable or flickers, use this function to correct it.

- **H. Position**
  Adjust the horizontal positioning of the image.

- **V. Position**
  Adjust the vertical positioning of the image.

- **Exit**
  Exit from the "Signal" menu.

Auto Adaptive Contrast

Press the ↵ to enter the menu.
Dynamic Contrast enables the projector to automatically optimize the brightness of the display during dark / light movie scenes to be shown in incredible detail.
SIM2 developed special processing that automatically adapts the parameters of the projector to the various Blu-ray disks and in particular to the "nits" of the disks,
thus preventing the clipping of the image in the bright part. The result is a rich image

with all details visible.
Press ◀ or ▶ to select its status.
Range [On, Off]

Super Hybrid Mode

Press the ↵ to enter the menu. This special processing dramatically improves the contrast by adjusting dynamically all the parameters of the projector in combination with the laser source
Press ◀ or ▶ to select its status.
Range [Standard, Enhanced, Deep Black, Off]

Laser Modulation

Press the ↵ to enter the menu. This item select the power percentage for laser modulation.
Press ◀ or ▶ to select its status.
Range [100%, 95%, 90%, 85%, 80%, 75%, 70%, 65%, 60%, 55%, 50%]

Advanced Image Processing

Press the ↵to enter the menu and then use ▲ or ▼ to select item.
The Pure Engine is a collection of advanced image processing technologies that enhances the quality of the displayed image.

- **Enhanced Detail**
  This is an edge enhancement tool that enables the edges in the projected image is be enhanced thus providing more perceived detail.
  Range [Off, 1, 2, 3]

- **Enhanced Colors**
  This adjustable item utilizes a new color- processing algorithm and enhancements to enable the picture's vividness to be significantly increased.
  Range [Off, 1, 2, 3, 4, 5]

- **Motion Compensation**
  It uses sophisticated algorithms to ensure that the natural in the image is preserved.
  Range [Off, 1, 2, 3]
  Note: Turn the Motion Compensation feature to “Off” to reduce the response lag during game/sport play.

Reset

Press the ↵to return the factory default settings for display menu parameters.

Display – Aspect Ratio

Press the ↵ to enter the menu.
Press ◀ or ▶ to select the status.
Range [4:3, 16:9, LBX, Superwide, Native, Auto]

This adjustment changes the dimensions and aspect ratio (relationship between width and height) of the displayed image. There are six default aspects available. You can select a different aspect for each source: the selected aspect ratio will be automatically applied the next time the relative source is displayed.

The following aspects are available:

- **4:3:** this format is for 4x3 input sources.
- **16:9:** this format is for 16x9 input sources, like HDTV and DVD enhanced for Widescreen TV.
- **LBX (Letterbox):** this format is for non-16x9, letterbox source and for users who use external anamorphic lens to display 2.35:1 aspect ratio using full resolution. It displays a 4:3 letterbox image (source signal with black bands above and below the picture) in such a way that it fills the 16:9 screen and maintains the correct aspect. This aspect ratio is also recommended when using Anamorphic Lenses.
  Some letter box format DVDs are not enhanced for 16x9 played in 16:9 mode. In this situation, please try to use the 4:3 mode to view the DVD. If the content is not 4:3, there will be black bars around the image in 16:9 display. For this type of content, you can use LBX mode to fill the image on the 16:9 display.
  If you use an external anamorphic lens, this LBX mode also allows you to watch a 2.35:1 content (include Anamorphic DVD and HDTV film source) that support anamorphic wide is enhanced for 16x9 Display in a wide 2.35:1 image. In this case, there are no black bars. LED power and vertical resolution are fully utilized.
- **Superwide:** use this special 2.0:1 aspect ratio to display both 16:9 and 2.35:1 aspect ratio.
- **Native:** this format displays the original image without scaling.
- **Auto:** automatically selects the appropriate display format.

Note: some **LBX** aspect format DVDs are not enhanced for 16x9 TVs. In this situation, the image will not look right when displaying image in 16:9 mode. In this situation, please try to use the 4:3 mode to view the DVD. If the content is not 4:3, there will be black bars around the image in 16:9 display. For this type of content, you can use LBX mode to fill the image on the 16:9 display. If you use an external anamorphic lens, this LBX mode also allows you to watch a 2.35:1 content (include Anamorphic DVD and HDTV film source) that supports anamorphic wide is enhanced for 16x9 Display in a wide 2.35:1 image. In this case, there are no black bars. Lamp power and vertical resolution are fully utilized.
Note: to use the **Superwide** format, set the screen aspect ratio to 2.0:1, than select “Superwide” format and final, align the projector image correctly on the screen.

Scaling Table

16:9 Screen	480i/p	576i/p	720p	1080i/p	2160p
4:3	Scale to 2880 x 2160				
16:9	Scale to 3840 x 2160				
LBX	3840 x 1620 center, then scale to 3840 x 2160 for display				
Native	No resize image, 1:1 mapping and centered. This format shows original image without scaling.				
Auto	If this format is selected, screen type will auto become 16:9 (3840 x 2160) If source is 4:3, auto resize to 2880 x 2160 If source is 15:9, auto resize to 3600 x 2160 If source is 16:10, auto resize to 3456 x 2160				

Auto Mapping Rule

	Input resolution		***Auto/Scale***	
	H resolution	***V resolution***	***3840***	***2160***
4:3	*640*	*480*	*2880*	*2160*
	800	*600*	*2880*	*2160*
	1024	*768*	*2880*	*2160*
	1280	*1024*	*2880*	*2160*
	1400	*1050*	*2880*	*2160*
	1600	*1200*	*2880*	*2160*
Wide Laptop	*1280*	*720*	*3840*	*2160*
	1280	*768*	*3600*	*2160*
	1280	*800*	*3456*	*2160*
SDTV	*720*	*756*	*2700*	*2160*
	720	*480*	*3240*	*2160*
HDTV	*1280*	*720*	*3840*	*2160*
	1920	*1080*	*3840*	*2160*

Display – Edge Mask

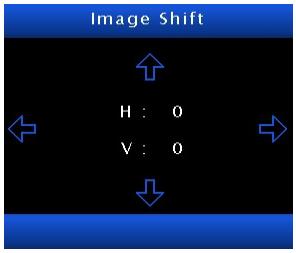
Edge mask the image to remove video encoding noise on the edge of video source.
It removes the outer edges of the image and magnifies the remaining portion of the image to fill the display area. It is useful with sources that output images with imperfections around their borders.
Note: Each I/O has different setting of “Edge Mask”.

Display – Digital Zoom

Press ◀ to reduce the size of an image
Press ▶ to magnify an image on the projection screen

Display – Image Shift

Press the ↵ to enter the menu.

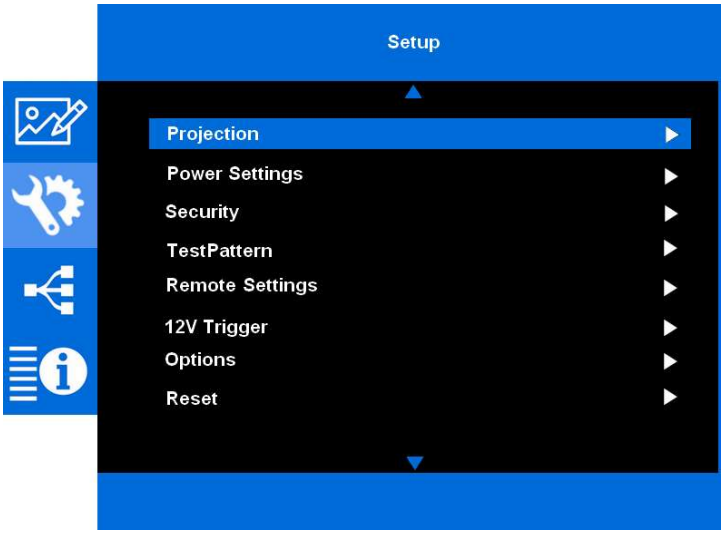


H: press the ◀ ▶ to shift the projected image position horizontally
V: press the ◀ ▶ to shift the projected image position vertically

This Image Shift is a digital image shift, inside the DMD active pixels area.

Setup

This menu section provides access to installation adjustments.



Projection

Selects the orientation of the projected image.

Press ↵ to select one the four preset orientation. Use arrow buttons to switch between the four presets.

- **Front-Projection:** this is the default selection. The image is projected straight on the screen.
- **Rear-Desktop:** when selected, the image will appear reversed
- **Front-Ceiling:** when selected, the image will turn upside down
- **Rear-Ceiling:** when selected, the image will appear reversed in upside down position

Note: Rear-Desktop and Rear-Ceiling are to be used with a translucent screen.

Power Settings

- **Direct Power On:** choose “On” to activate Direct Power mode. The projector will automatically power on when AC power is supplied, without pressing the “Power” key on the projector keypad or on the remote control.
- **Auto Power Off :** sets the countdown timer interval. The countdown timer will start when there is no signal being sent to the projector. The projector will automatically power off when the countdown has finished (in minutes). Range [0 .. 180], with minimum increments step of 5 minutes.
- **Sleep Timer :** sets the countdown timer.

- **Sleep Timer (min.)**: sets the countdown timer interval. The countdown timer will start with or without a signal being sent to the projector. The projector will automatically power off when the countdown has finished (in minutes). The Sleep Timer is reset every time when the projector is powered off. Range [0 .. 990], with minimum increments step of 30 minutes.
- **Always On**: Check to set the sleep timer always on.

- **Power Mode (Standby):** set the power mode setting.
  - **Active**: choose "Active" to return to normal standby.
  - **Eco**: choose "Eco." to save power dissipation further < 0.5W.

  According to the Europe Specification, the normal status of the "Power Mode" menu is disabled, because the standby mode, with the LAN feature, should be under 2W.
  Is it possible to enable it by pressing the following buttons sequence in the Remote Control: Power-Down-Right-Left-Down-Menu.

Security

Enable this function to prompt for a password before using the projector. Choose "On" to use security verification when the turning on the projector. In this status appear a quick menu to select the 4 digit password.
Choose "Off" to be able to switch on the projector without password verification.
The default Security password is "1234".

Test Pattern

Enters internal test patterns, that are needed for installation or calibration purposes. Select the test pattern from green grid, magenta grid, white grid, white or disable this function (off). They are DMD's Test Patterns.
Note: OSD menus are not available while test patterns are displayed.

Remote Settings

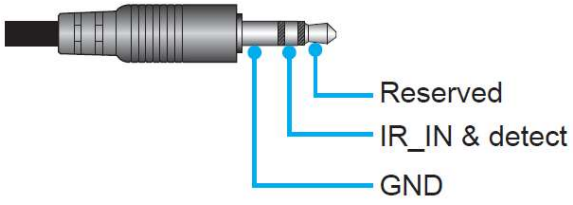
Set the IR function setting.

- **IR Function**: choose from which IR receivers the projector can be operated by remote control. The projector has two receivers: top and front.
  - **On** : operated from top and front receivers.
  - **Front:** operated from the front receiver.
  - **Top:** operated from the top receiver.
  - **Off:** the projector can't be operated by the remote control, you will be able to use only the keypad keys.

- **F1, F2, F3 buttons function**: assign the default function for F1, F2, or F3 between AV mute, Freeze, Test Pattern, Sleep Timer, CMS, Color Temp, 12V Trigger, Auto Source, Aspect Ratio, DigZoomMin, DigZoomNone, Gamma, Projection, LAN

Trigger 12V

Some Home Theater devices can be controlled through a 12V signal.
The projector can output a 12V (500mA) signal.
Choose “Off” to disable the trigger and “On” to enable it.



Options

Set the IR function setting.

- **Language**: selects the desired OSD language. It can display the menus in Multilanguage. Use ▲ or ▼ to select your preferred language. Press ↵ to finalize the selection. Select a language between English, Spanish, French, German, Portuguese, simplified Chinese, Italian, Russian.
- **Menu Settings**: Set the menu location on the screen and configure menu timer settings.
  - **Menu Location** : select the menu location on the display screen. There are 5 possible positions, the 4 corners and the center.
  - **Menu Timer**: set the duration where the OSD menu stay visible on the screen. Select “Off” to keep the OSD menu, until you change the OSD status, pressing a button in the remote control or keypad. Select 5 or 10 seconds to insert a countdown timer.
- **Auto Source**: If you set this option “On” and press the button on the projector keypad, then the next available input source is selected automatically. Set “Off” to disable auto source function.
- **Input Source**: select the input source between HDMI1, HDMI2, HDMI3, VGA, and DisplayPort.
- **High Altitude**: when “On” is selected, the fans will spin faster. This feature is useful in high altitude areas where the air is thin.
- **Display Mode Lock**: choose “On” or “Off” to lock or unlock adjusting display mode settings.
- **Keypad Lock**: when the keypad lock function is “On”, the Keypad will be locked. However, the projector can be operated by the remote control. By selecting “Off”, you will be able to reuse the Keypad.
- **Information Hide**: select “On” to hide the info message or choose “Off” to show the “Searching” message.

- **Logo**: use this function to set the desired startup screen. If changes are made, they will take effect the next time the projector is powered on. Select “Default” for the SIM2 startup screen or “Neutral” to do not have the logo displayed on startup screen.
- **Background Color**: use this function to display a blue, red, green, grey color, or none when no signal is available.
- **HDMI 2 Setting**: choose the HDCP configuration about the compatible input signal. Select EDID1 for 480i/p, 576i/p, 720p, 1080i/p, or 2160p input signal. Select EDID2 for non-interlaced signals only.
- **HDMI 1 EQ**: is to set HDMI 1 equalizer value for short or long HDMI cable to ensure all compatible signals passed between devices. Range [1..7].
- **HDMI 2 EQ**: is to set HDMI 2 equalizer value for short or long HDMI cable to ensure all compatible signals passed between devices. Range [1..7].
- **HDMI 3 EQ**: is to set HDMI 3 equalizer value for short or long HDMI cable to ensure all compatible signals passed between devices. Range [1..7].
- **Detail Filter**: is a sharpness function. It can adjust image display from softer to sharper. Range [0..2], where value 0 identify the Off status.

Reset

Return the factory default settings for specified submenu.

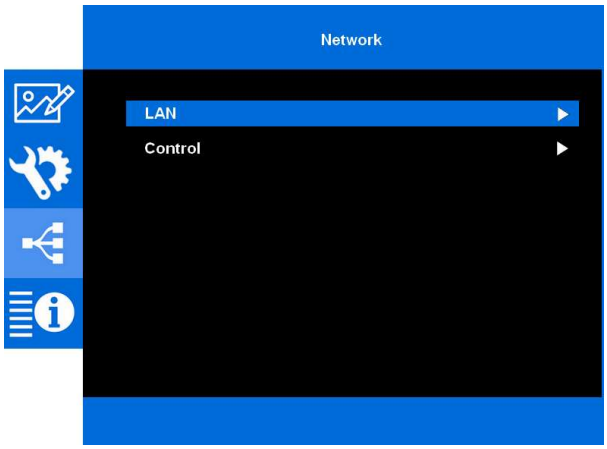
- **Reset OSD**: default settings for all OSD menus, except for the following parameters: projection, Power mode, Security, Language, Networks items, Bright Mode, Eco Mode, Total Lamp Hours.
- **Reset to Default**: default settings for all OSD menus.

Network

This menu section provides access to the Ethernet connection installation and diagnostics. The projector provides diverse networking and remote management features.

The LAN / RJ45 function of the projector through a network, such as remotely manage: Power On / Off, brightness, and contrast settings. Also, you can view the projector status information.

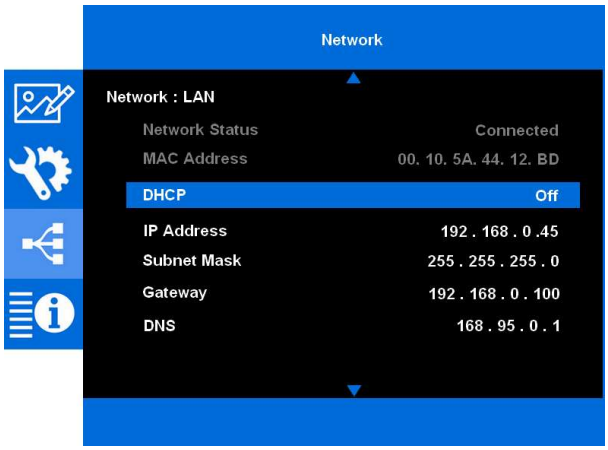
Once the internal web pages have been preset, the projector can be accessed via a PC to facilitate setup. Although CRYSTAL4-SH is a reliable machine, in case of malfunctions to rotating parts and at higher temperature, such as fans, lamps, etc., the projector can send an email to a service center decided during installation, notifying the type of malfunction occurred.



This projector can be controlled by using a PC (laptop) or other external device via LAN / RJ45 port and compatible with Crestron, Extron, AMX (Device -Discovery) or PJLink.

LAN

This sub-menu allows to setup Ethernet connection parameters.



Select the DHCP in “On” if the IP Address assignment of the projector has to be done from an external DHCP server automatically. In DHCP mode IP Address, Subnet Mask, Default Gateway are not selectable because the server automatically assign a reference number. With DHCP in “Off” status, enter the IP Address, Subnet Mask, Default Gateway if user need to insert the address manually.

- **DHCP:** choose “On” for an automatic IP assignment from an external DHCP server.
- **IP Address:** select an IP address
- **Subnet Mask:** select subnet mask number
- **Gateway:** select the default gateway of the network connected to the projector.
- **DNS:** select the Domain Name System (DNS), a hierarchical decentralized naming system.
- **Reset:** choose “Ok” to reset to their default values the items in this sub-menu.

Control

Enable specific communication protocol.

- **Crestron:** choose “On” to enable it.
- **Extron:** choose “On” to enable it.
- **PJLink:** choose “On” to enable it.
- **AMX Device Discovery:** choose “On” to enable it.
- **HTTP:** choose “On” to enable it.
- **Telnet**

Extron

Is a registered trademark of Extron Electronics, Inc. of the United States.
CRYSTAL4-SH is compliant to support Extron device(s) for reference. For more info see the web site http://www.extron.com/. Ethernet communication port number is 2023.

Crestron

Is a registered trademark of Crestron Electronics, Inc. of the United States.
The CRYSTAL4-SH projector is supported by the specified commands of the Crestron Electronics controller and related software, for example RoomView® (www.crestron.com/getroomview). For more info see the web site http://www.crestron.com/. Ethernet communication port number is 41794.

AMX

Is a registered trademark of AMX LLC of the United States.
This projector is supported by AMX (Device Discovery), see http://www.amx.com/.
Ethernet communication port number is 9131.

PJLink

Applied for trademark and logo registration in Japan, the United States of America, and other countries by JBMIA. This projector supports all commands of PJLink Class1 (Version 1.00), see http://pjlink.jbmia.or.jp/english/. Port number is 4352.

Telnet

Use standard telnet TCP/IP protocol, port 23. It is possible to communicate with the projector using all the commands available in the RS232 protocol. The packets must be sent in hexadecimal mode, without spacing, adding at its the end the hexadecimal code of Carriage Return character: 0x0D.

Ex: Select the input source HDMI1

The RS232 command is: BE EF 02 06 00 D5 E5 4C 01 00 00 00 00

The relative telnet command is: BE EF 02 06 00 D5 E5 4C 01 00 00 00 00 0D

Info

This menu section provides access to many projector information. It collect the main information from the other menu (Display, Setup and Network) and firmware versions.

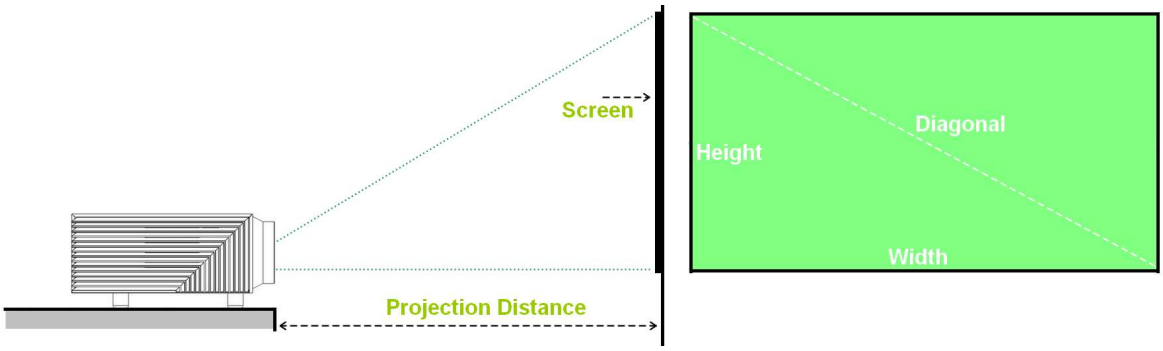
View the projector information as listed below:

Product Name
Serial Number
Source
Resolution
Refresh Rate
Display Mode
Power Mode (Standby)
Light Source Hours
Network Status
IP Address
Brightness Mode
FW versions

6 Image size and projection distance

Diagonal Size (inch)	Screen Size W x H				Projection Distance (D)			
	meter		inch		meter		feet	
	Width	Height	Width	Height	Wide	Tele	Wide	Tele
36	0.80	0.45	31.38	17.65	/	1.77	/	5.80
40	0.89	0.50	34.86	19.61	/	1.97	/	6.45
50	1.11	0.62	43.58	24.51	1.54	2.46	5.05	8.06
60	1.33	0.75	52.29	29.42	1.85	2.95	6.06	9.67
70	1.55	0.87	61.01	34.32	2.15	3.44	7.07	11.29
80	1.77	1.00	69.73	39.22	2.46	3.93	8.08	12.90
90	1.99	1.12	78.44	44.12	2.77	4.42	9.09	14.51
100	2.21	1.25	87.16	49.03	3.08	4.91	10.10	16.12
120	2.66	1.49	104.59	58.83	3.69	5.90	12.11	19.35
150	3.32	1.87	130.74	73.54	4.62	7.37	15.14	24.19
180	3.98	2.24	156.88	88.25	5.54	8.85	18.17	29.02
200	4.43	2.49	174.32	98.05	6.15	/	20.19	/
250	5.53	3.11	217.89	122.57	7.69	/	25.24	/
300	6.64	3.74	261.47	147.08	9.23	/	30.29	/

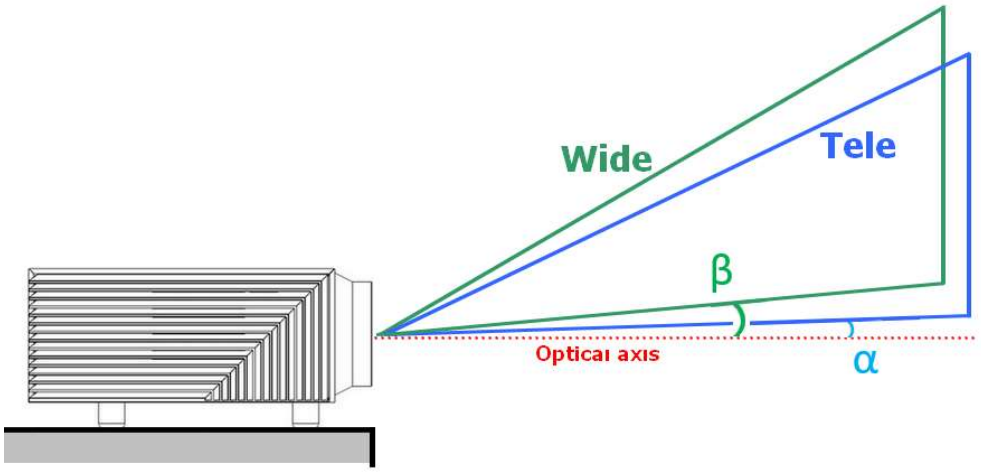
Note: Zoom ratio is 1.6 x. Diagonal size is relative to a 16:9 screen dimension.



F Number	2.5(Wide) ~ 3.26 (Tele)
Lens Shift	Vertical = +15%; Horizontal = 0%
Throw Ratio (2160p)	1.4 ~ 2.24
Projection Image Size	26.5 ~ 302 inches focus optimized in wide/60 inches
Projection distance	1.3m ~ 9.3m focus optimized in wide/1.85m

Offset angle from the Optical axis

The available vertical lens shift is in range [0%, 15%]. The available vertical lens shift is in the range [0%, 15%] degrees. Below is an example to explain the difference between the optical axis and projected image in Tele and Wide installations.

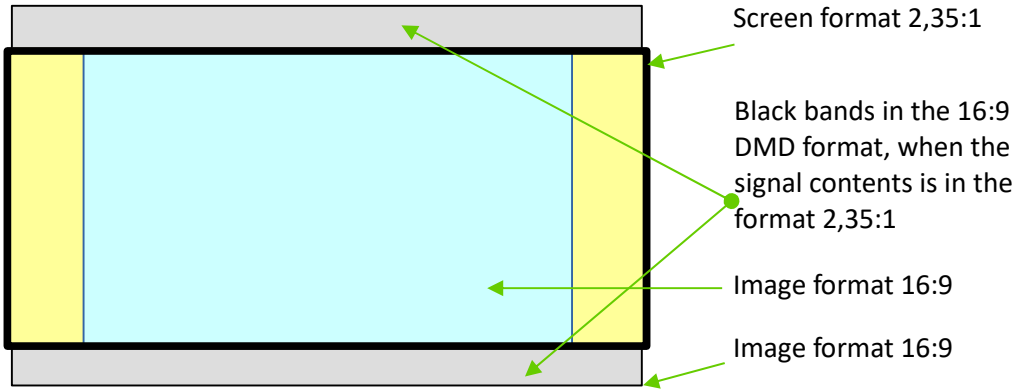


Screen size at 60 inches		
Offset	**Wide** β	**Tele** α
100 %	0.00	0.00
101 %	0.23	0.15
102 %	0.47	0.29
103 %	0.70	0.43
104 %	0.93	0.58
105 %	1.16	0.72
106 %	1.40	0.87
107 %	1.63	1.02
108 %	1.86	1.16
109 %	2.09	1.31
110 %	2.32	1.45
111 %	2.56	1.60
112 %	2.79	1.74
113 %	3.02	1.89
114 %	3.25	2.03
115 %	3.49	2.18

7 Electronic Perfect Fit

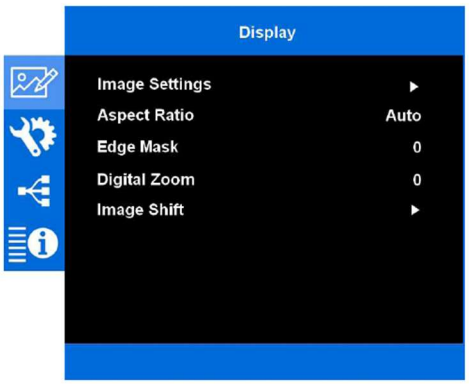
The Electronic Perfect Fit is a feature to accommodate both anamorphic and 16:7 images on the screen.
The CRYSTAL4 SH can project images with screen formats either anamorphic and 16:9, both matching an anamorphic screen. Below are the instructions for setting up the projector to display both screen formats to an anamorphic screen (2,35:1 or similar). This with a fixed anamorphic screen or a motorized horizontal masking screen.

Below the typical setup when there is a screen format of 2,35:1 or similar.
The projector needs to be positioned in the room to accommodate the 2:35 screen. The 16/9 being smaller will be fine.



To customize the 16:9 image size (to match some special screens), follow the procedure below:

1. Install the projector in your room to accommodate the anamorphic screen (see the User Manual installation chapter).
2. Display an anamorphic image or test pattern.
3. Adjust the Zoom, Focus and Optical Vertical shift to match your screen with the anamorphic format.
4. Display a source with image format at 16:9.
5. In “Display” menu, enter in “Digital Zoom” submenu. Set the digital zoom at the negative value (–xx), by using arrow keys, until the image matches your screen (-27 is the standard number that fits the 16/9 picture on anamorphic screen).



With this procedure, you will display a 16:9 image inside an anamorphic screen.
To get back to your anamorphic image, set the Digital Zoom value again to zero.

There are two options to directly set the 16:9 and anamorphic the image format to the screen:

1. Using the remote control
2. Sending the proper serial command to the projector, via serial interface

Here below both the adjustment options

Set the Electronic Perfect Fit via Remote Control

The easiest and direct way to switch between the 2,35:1 and the 16:9 image format is to push the button F1/F2 in the remote control:

IR button	Function
F1	display image in the 16:9 aspect
F2	display image in the 2,35:1 aspect

The default F1 and F2 functions are, respectively “DigZoomMin” and “DigZoomNone”
More detail about them in the Remote Settings menu, on page 42.

Set the Electronic Perfect Fit via Serial interface

Send one of the above commands via the RS2332 serial interface, choosing which one corresponds to the value number that better fits your requirements to match the 16:9 image aspect.

Digital Zoom value	Aspect	RS232 command (Hex format)
0	Anamorphic 2,35:1	BE EF 1A 0C 00 A8 3E 11 00 00 00 00 00 00 00 00 00 00
-25	16:9	BE EF 1A 0C 00 09 7E 11 00 00 00 E7 FF 00 00 00 00 00
-26	16:9	BE EF 1A 0C 00 C5 BF 11 00 00 00 E6 FF 00 00 00 00 00
-27	16:9	BE EF 1A 0C 00 D0 FF 11 00 00 00 E5 FF 00 00 00 00 00

8 Compatibility Modes

Computer/Video/HDMI/Mac Compatibility

Signal	Resolution	Refresh Rate (Hz)	Video	Analog	HDMI	Mac
NTSC	720 x 480	60	✓	-	-	-
PAL/SECAM	720 x 576	50	✓	-	-	-
SDTV (576i/p)	720 x 576	50	✓	-	✓	-
SDTV (480i/p)	720 x 480	60	✓	-	✓	-
VGA	640 x 480	60	-	✓	✓	✓
	640 x 480	67	-	✓	-	-
	640 x 480	72.8/ 85	-	✓	-	✓
SVGA	800 x 600	56.3	-	✓	-	-
	800 x 600	60.3/ 72.2	-	✓	✓	✓
	800 x 600	75	-	✓	-	-
	800 x 600	85.1	-	✓	✓	✓
	800 x 600	120	-	-	✓	-
XGA	1024 x 768	60/ 70.1/ 75/ 85	-	✓	✓	✓
	1024 x 768	120	-	✓	✓	-
HDTV (720p)	1280 x 720	50	✓	✓	✓	-
	1280 x 720	60	✓	✓	✓	✓
	1280 x 720	120	-	✓	✓	-
WXGA	1280 x 768	60 / 75 / 85	-	✓	✓	✓
	1280 x 800	60	-	✓	✓	✓
	1366 x 768	60	-	-	✓	-
WXGA+	1440 x 900	60/ 120(RB)	-	-	✓	-
SXGA	1280 x 1024	60/ 75	-	✓	✓	✓
	1280 x 1024	85	-	✓	✓	-
SXGA+	1400 x 1050	60	-	✓	✓	-
	1400 x 1050	85	-	-	✓	-
UXGA	1600 x 1200	60	-	✓	✓	-
	1600 x 1200	65/ 70/ 75/ 85	-	-	✓	-
HDTV (1080p)	1920 x 1080	24	✓	✓	✓	-
	1920 x 1080	30	-	-	✓	-
	1920 x 1080	50	✓	✓	✓	-
	1920 x 1080	60	✓	✓	✓	✓
HDTV (1080i)	1920 x 1080	50/ 60	✓	✓	✓	-
	1920 x 1080	75/ 85	-	-	✓	-
WUXGA	1920 x 1200	60[1]	-	✓	✓	✓
WQHD	2560 x 1440	60[1]	-	-	✓	-
UHD	3840 x 2160	24/ 30	-	-	✓	✓
	3840 x 2160	50/ 60	-	-	✓	-
4K	4096 x 2160	24	-	-	✓	✓
	4096 x 2160	30/ 50/ 60	-	-	✓	-

[1]: 1920 X 1200 @ 60 Hz only support RB (reduced blanking).

Computer Compatibility for MAC

		Macbook		Macbook Pro		Power Mac G5		Power Mac G4	
Resolution	**Hz**	**Digital**	**Analog**	**Digital**	**Analog**	**Digital**	**Analog**	**Digital**	**Analog**
800 x 600	60	✓	✓	✓	✓	-	-	✓	-
800 x 600	72	✓	✓	✓	✓	-	✓	✓	✓
800 x 600	75	✓	✓	✓	✓	-	✓	✓	✓
800 x 600	85	✓	✓	-	✓	-	✓	✓	✓
1024 x 768	60	✓	✓	✓	✓	-	✓	✓	✓
1024 x 768	70	✓	✓	✓	✓	-	✓	✓	✓
1024 x 768	75	✓	✓	✓	✓	-	✓	✓	✓
1024 x 768	85	✓	✓	✓	✓	-	✓	✓	✓
1280 x 720	60	✓	✓	✓	✓	-	✓	✓	✓
1280 x 768	60	✓	✓	✓	✓	-	-	-	✓
1280 x 768	75	-	✓	-	✓	-	✓	✓	✓
1280 x 768	85	-	✓	-	✓	-	-	-	✓
1280 x 800	60	-	✓	-	✓	-	✓	✓	✓
1280 x 1024	60	✓	-	-	✓	-	✓	✓	✓
1280 x 1024	75	✓	-	-	✓	-	✓	✓	-
1920 x 1080	60	✓	-	-	✓	-	✓	✓	✓
1920 x 1200[1]	60	✓	-	-	✓	-	✓	✓	✓
3840 x 2160	60	-	-	-	-	-	-	-	-

[1]: 1920 X 1200 @ 60 Hz only support RB (reduced blanking).

9 Specifications

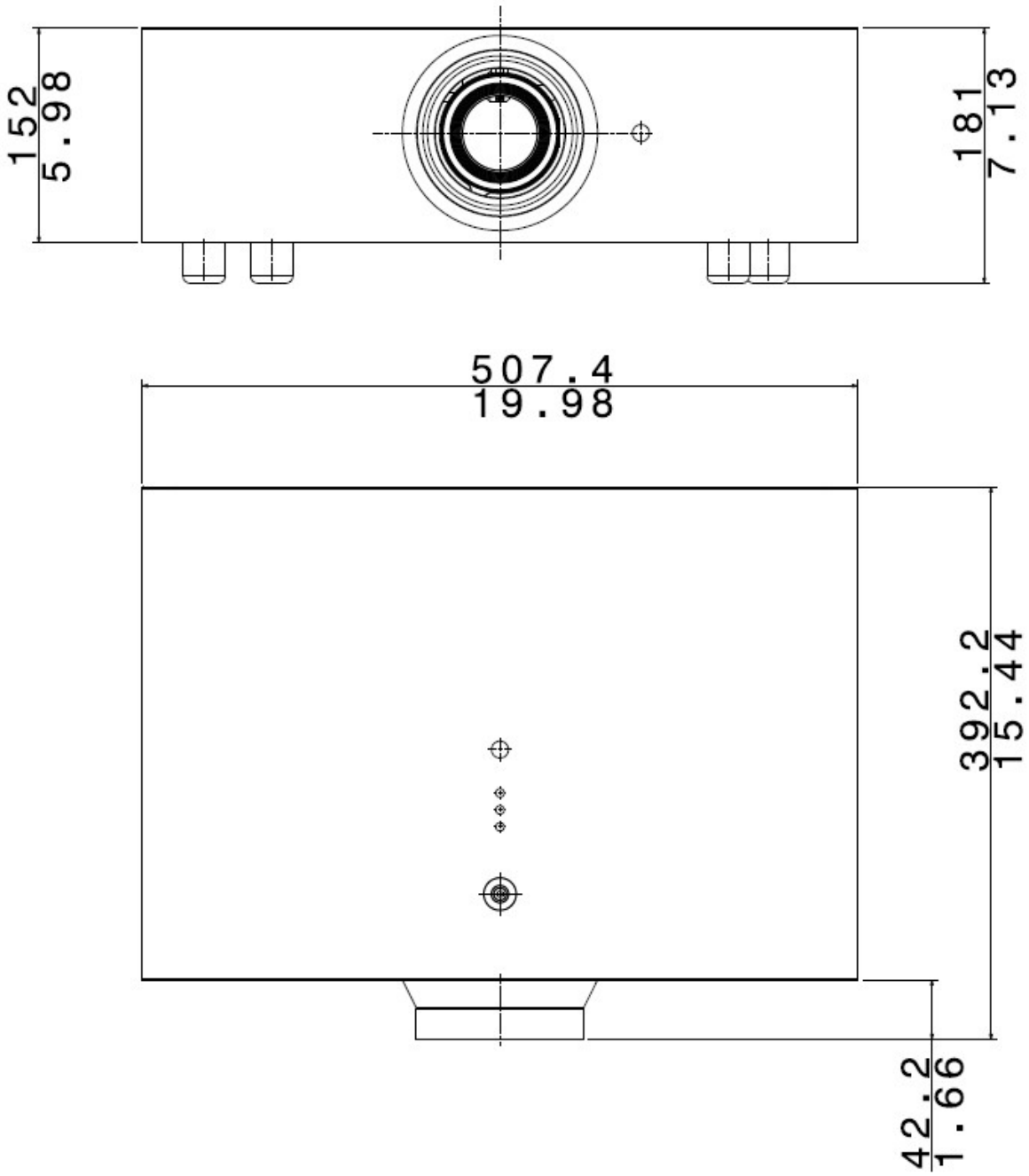
Projection Type	Digital Light Processing (DLP Type 0.66 in.) 1-chip 3840x2160
Projection Lens	High-quality glass Zoom range (ratio): 1.6x Throw ratio 1,4 ÷ 2.24 F Number 2.5(Wide) ~ 3.26 (Tele)
Image Resolution	4K UHD (support to 3840x2160@60Hz, 4096x2160@60Hz)
Projection Image Size	26.5 ~ 302 inches focus optimized in wide/60 inches
Projection distance	1.3m ~ 9.3m focus optimized in wide/1.85m
HDR	HDR_{10} and HDR Hybrid-Log gamma compliant, with dedicated Display Modes and 4 presets to cover the screen size from 100 to 160 inches.
Lens shift	Manual, vertically: + 15% offset
Zoom and Focus Adjustment	Manual
Light Source	Laser-hybrid (dimmable), 3.600 Lumens
Inputs/Outputs	• 1x RGBHV / YCbCr (D-Sub 15-pin female) • 1x HDMI v.1.4a, supp. to 3840x2160@30Hz (HDMI1) • 1x HDMI v.2.0a, HDCP 2.2, MHL 2.1, 3840x2160@60Hz UHD (HDMI2) • 1x USB type A for Fw upgrade • 1x USB type A, power charger 5V/1.5A • 1x RJ45 for control communications and internal web pages • 1x RS232 (D-sub 9 pin) for control communications • 2x IR receivers • 1x 12V, 500mA Trigger output
Controls	• IR remote control • Keypad on rear panel • RS-232 Serial commands • RJ45 ethernet commands and internal web pages
Frequency	• Horizontal: 31.500~135.000 kHz, Vertical: 24~120Hz

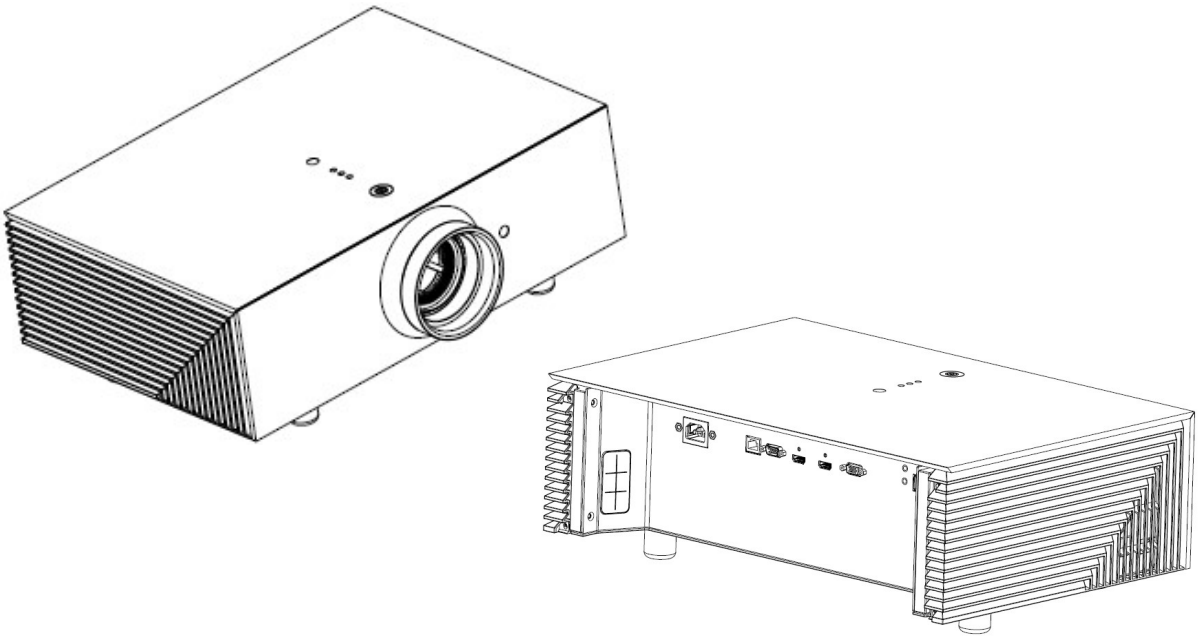
Power	• Requirement: 100~240 V AC ±10% @ 50-60 Hz
	• Power Consumption:
	  • Bright Typ. 343W, max 395W @110VAC,
	  Typ. 329W, max 378W @220VAC;
	  • Natural Typ. 281W, max 323W @110VAC,

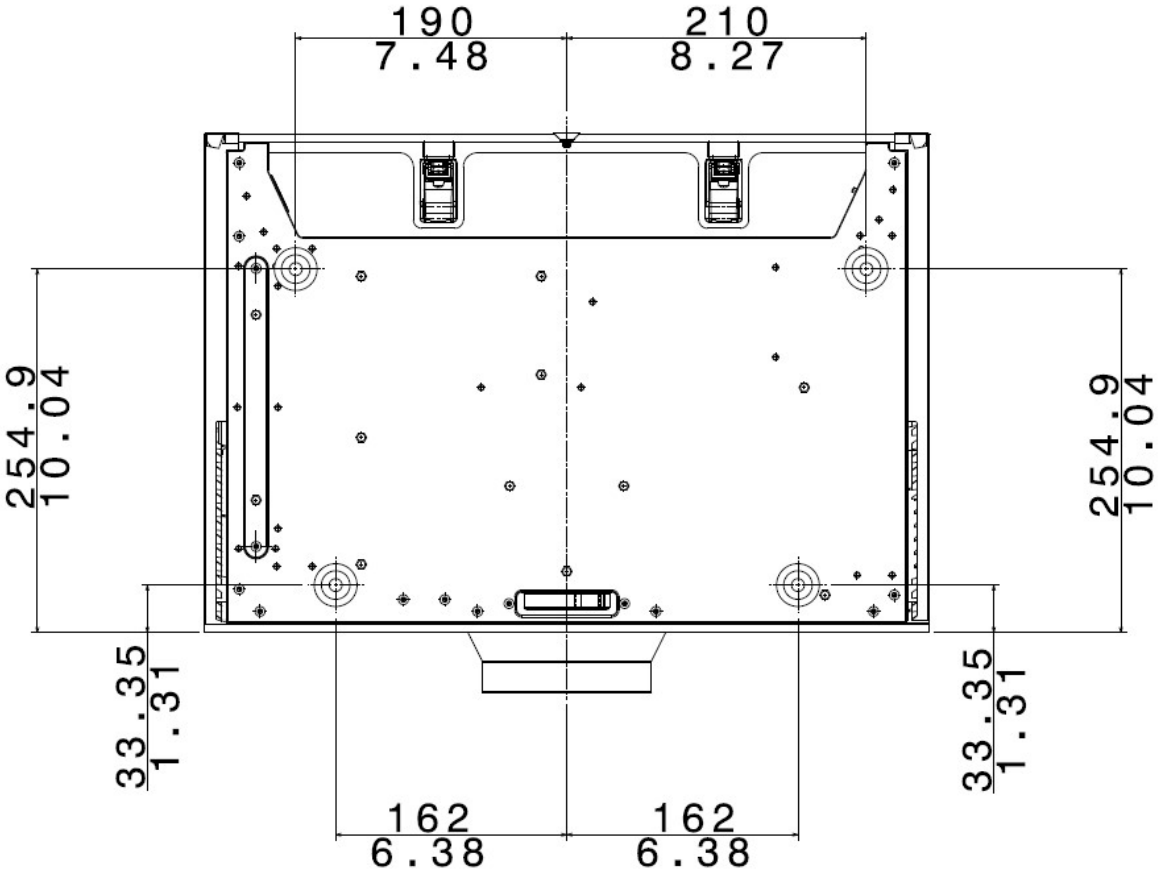
	Typ. 273W, max 314W @220VAC • Standby Consumption: < 0.5 W @110/220VAC • BTU/h max 1350 @ 110VAC max 1300 @ 220VAC
Size and Weight	• Depth: 507.4 mm (19.98 in.) • Width: 392.2 mm (15.44 in. - lens included) • Height: 181 mm (7.13 in. - lever feet included) • Weight: 14.5 kg (31.967 lb.) approx.
Operating Temperatures	5 ~ 35 °C
Altitude Operating	for 0 ÷ 2500 ft, 5 ~ 35 °C for 2500 ÷ 5000 ft, 5 ~ 30 °C for 5000 ÷ 10000 ft, 5 ~ 25 °C
Humidity Operating	10% ~ 85%, non-condensing
Lan control	• Enable specific communication protocol: Crestron, Extron, PJLink, AMX Device Discovery and Telnet • Internal web pages for command and diagnostics. • Email notifications in case of malfunctions.
LCC 5 (PC softawre application - Live Colors Calibration)	Projector's features, that allows professional calibration of all projection parameters such as complete adjustment of the primary, secondary and white point color coordinates.

10 Dimensions

CRYSTAL4-SH dimensions in millimeters and inches.



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7.48
210
8.27
254.9
10.04
254.9
10.04
33.35
1.31
33.35
1.31
162
6.38
162
6.38

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