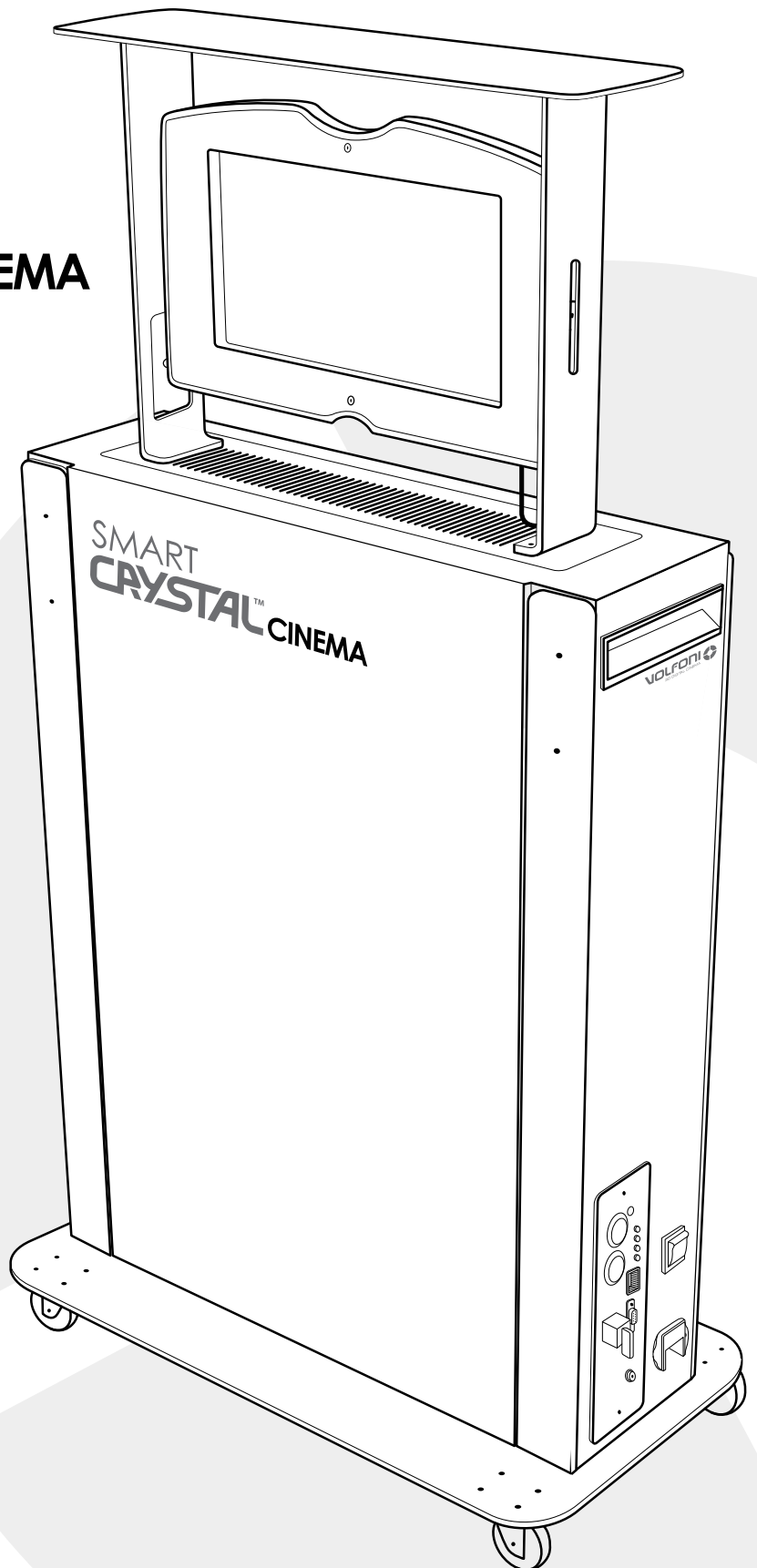


SMART **CRYSTAL**[™] CINEMA

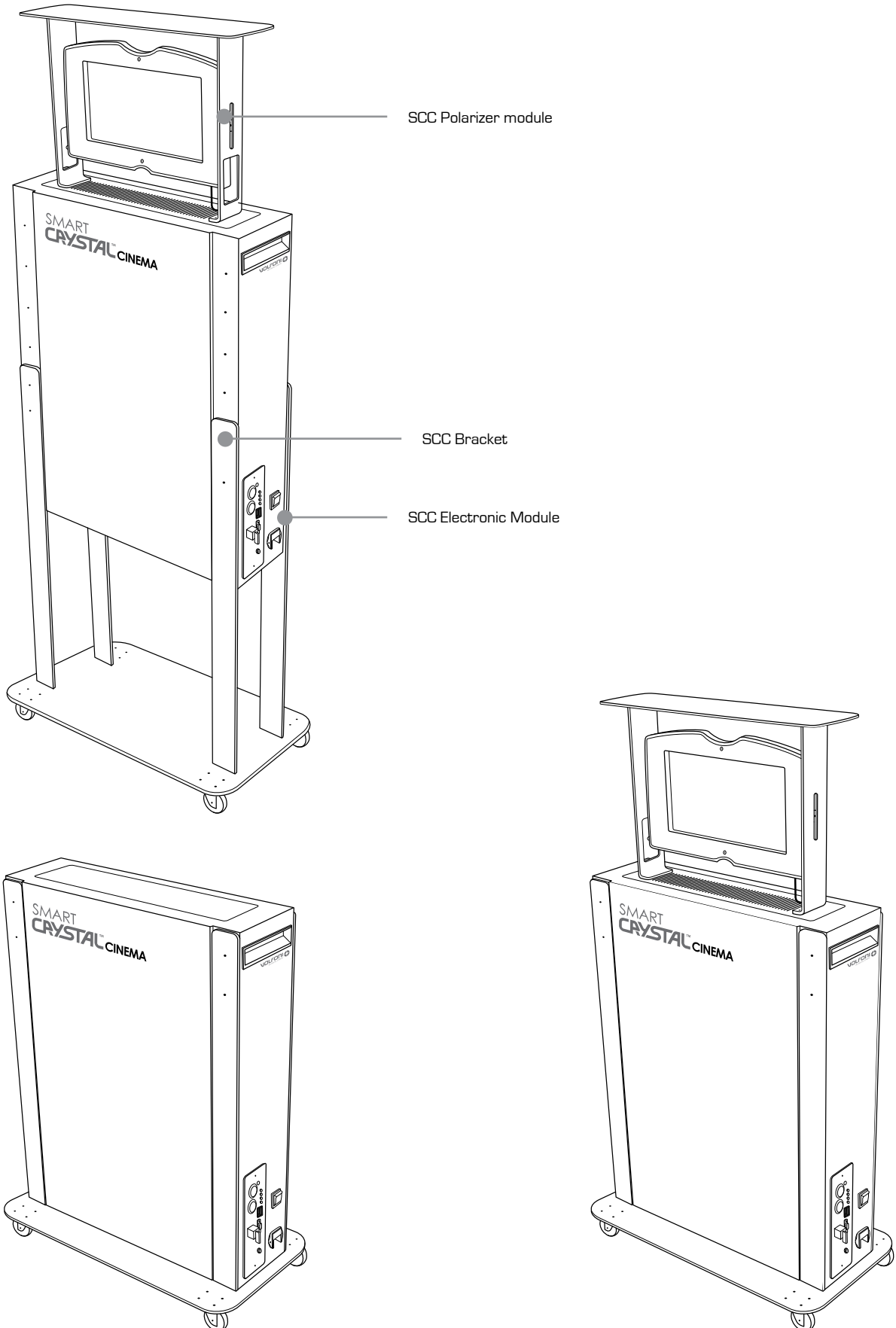


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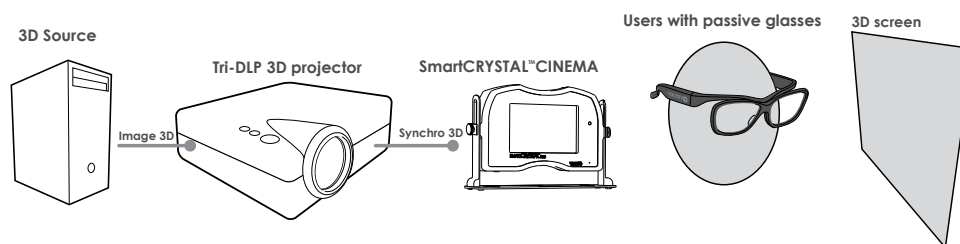
1. PRODUCT OVERVIEW

The SmartCrystal™ Cinema, Volfoni's latest innovation in passive 3D technology, is a polarization window that can be placed immediately in-front of the projector in order to generate stereoscopic 3D images on a suitable projection-screen when using lightweight passive viewing-glasses. It is suitable for movie-theaters with DCI-compliant DLP projectors and permits a quick installation in any projection booth with optimal support brackets. The lens of the SmartCrystal™ Cinema comprises a multi-layer stack of liquid crystal elements based on Volfoni's Surface Switching Technology™, and enables high frame rates of up to 200Hz to be achieved, creating crisp and bright 3D images. The SmartCrystal™ Cinema can be connected directly to any suitable 3D synchronization source and operates with Cinema projectors up to 7kW.



2. REQUIREMENTS

To use the SmartCrystal™ Cinema product, 3D content is required together with, a polarization preserving silver screen, a cinema projector and passive circular polarized 3D glasses.



Projector

Most types of 3D Projectors Cinema projectors are compatible with the SmartCrystal™ Cinema.

DLP (Digital Light Processor) projectors are especially efficient for 3D projection. The system is easy to set-up with a DCI-compliant DLP projector and operates with projector lamps up to 7KW.

LCD™ (Liquid Crystal Display) and LCoS™ (Liquid Crystal on Silicon) projection technologies, such as JVC's D-ILA™ and Sony's SXR™, generate a polarized light beam that may not be compatible with the SmartCrystal™ Cinema's active polarization system. Please consult with Volfoni for additional information.

Polarization Preserving Silver Screen

In order to enjoy the best quality 3D images, a polarization-preserving silver screen designed for 3D projection is required. If your screen was not manufactured specifically for 3D use, you might experience uncomfortable and blurry 3D images with a high level of cross talk.

The SmartCrystal™ Cinema is used for projection with screen sizes up to 18 meters (60 feet) together with a 2,4 screen gain.

3D Polarized Glasses

The SmartCrystal™ Cinema is compatible with most passive 3D glasses commonly used (circular-polarizing only). Please contact Volfoni (contact@volfoni.com) should you be interested in our line of passive 3D Glasses.

3. SMARTCRYSTAL™ CINEMA FEATURES

3.1 - Technical specifications

- Maximum power of projector: 7 KW
- Maximum switching speed: 192/200Hz
- Optical light efficiency: > 16%
- Power supply: 110V/240V 50/60Hz
- Operating temperature: +10°C to +55°C (50°F to 131°F)
- Storage temperature: -10°C to +55°C (14°F to 131°F)
- Dimensions of the SmartCrystal™ Cinema are shown at the end of this manual.

3.2 - General specifications

- Mechanical-housing material in Aluminium
- New Surface Switching Technology™ with crisp and bright images
- Upgradeable software for optimal 3D performance
- Meets all standards for electronics approved by CE
- Approved by Hollywood Studios
- 3 years guarantee. The SCC Polarizer Module and the SCC Electronic Module, can be separately replaced should this be required.
- For use with lightweight 3D circular polarized viewing glasses
- Passive 3D glasses are available from Volfoni. Please contact us for more details.

3.3 - Electrical specifications

- V = 240 / 110 V AC.
- F = 50 / 60 Hz.
- P = 35 W.
- The unit has a built in safety cut circuit.
- The system is supplied with two different power cables, a European model and an American model.
- This equipment should be electrically grounded.
- The electrical circuit will detect any current peaks generated in the system and the system will be shut-down should this occur, Thereafter, it will be necessary to re-start the system once has been rectified the fault.
- In case of malfunction, one of the LED indicators on the control board will illuminate and the system will be shut-down. Thereafter, the fault should be rectified before re-starting the system.
- To rectify any indicated faults, please contact your dealer, installer or the manufacturer directly stating the model number shown in the silver label of the product.

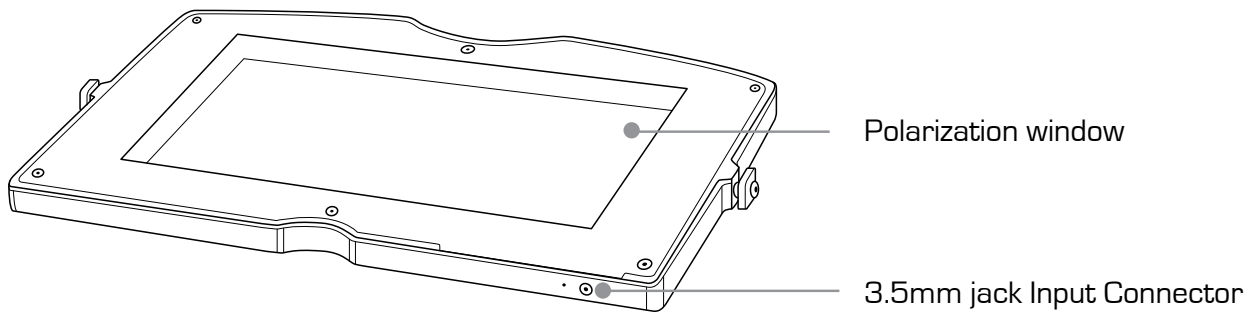
3.4 - Setting of Projector

To use the SmartCrystal™ Cinema, the 3D projector should be set as below :

- Dark Time : 1200 μs
- Delay : 0 or -1000 μs

4. DESCRIPTION OF THE SMARTCRYSTAL™ CINEMA POLARIZER MODULE

Ref SCC Polarizer Module
Module : VASP-01000



The SmartCrystal™ Cinema Polarizer Module is a polarization modulator. It includes:

- mechanical frame
- polarization window comprising the LCD
- electronic board with a connector for the jack cable
- labeling to indicate which side should face the projector

Using your SmartCrystal™ Cinema Polarizer Module

Electrical power supply and synchronization

An angled 3,5mm jack cable is integrated directly into the backplane of the SmartCrystal™ Cinema bracket and should be connected to the SmartCrystal™ Cinema Polarizer Module in order to provide the synchronization. The SmartCrystal™ Cinema system will be automatically powered when it is connected to the jack cable so it is not necessary to use a second power cable.

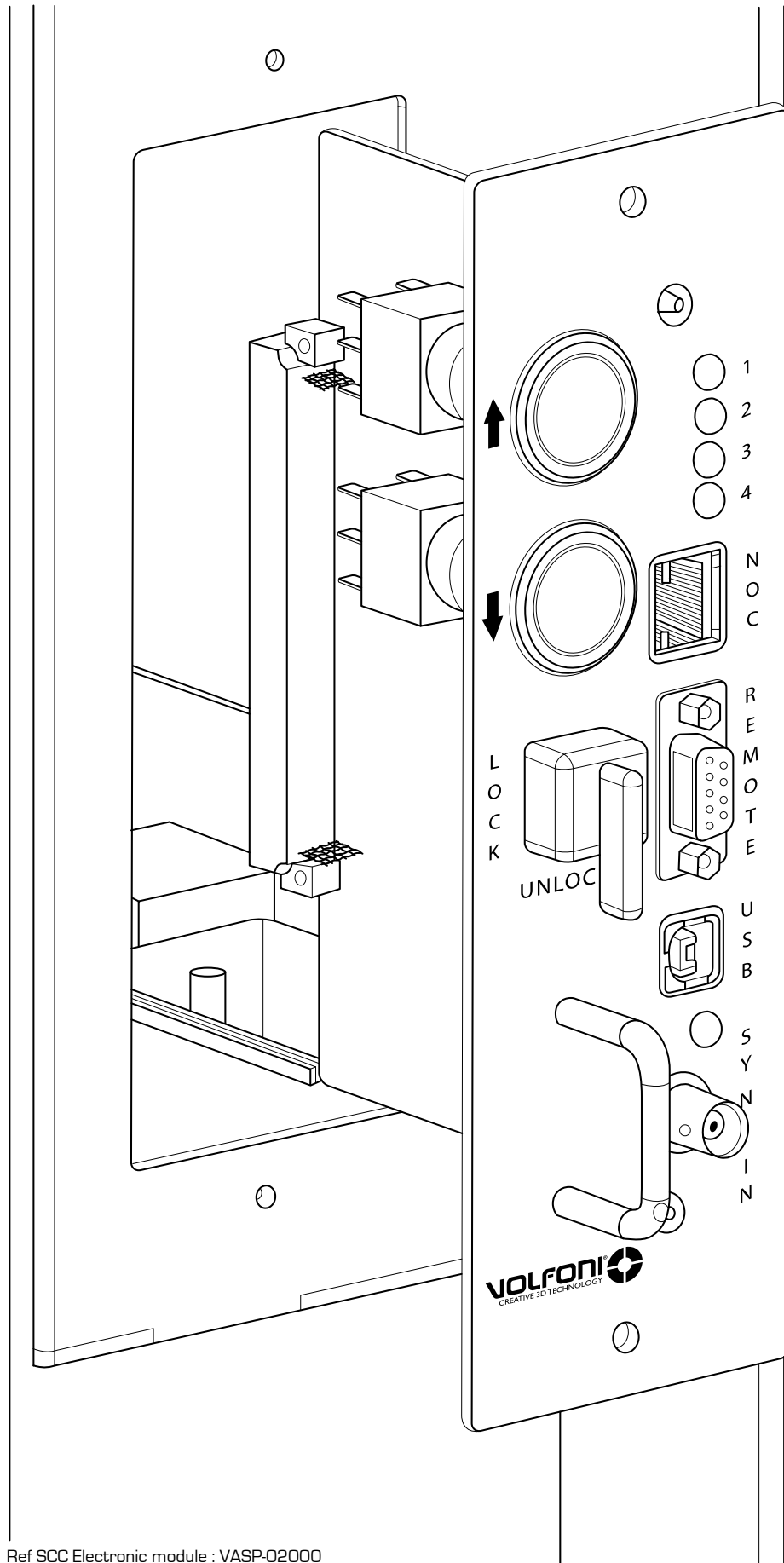
Technical information of the SmartCrystal™ Cinema Polarizer Module

- Window Polarization Size: 258 x 137 mm (10.2 x 5.4 inches)
- Dimensions: 356 x 212 x 16 mm (14 x 8.3 x 0.63 inches)
- Weight: 1500 g (52.9 oz)

5. DESCRIPTION OF SMARTCRYSTAL™ CINEMA ELECTRONIC MODULE

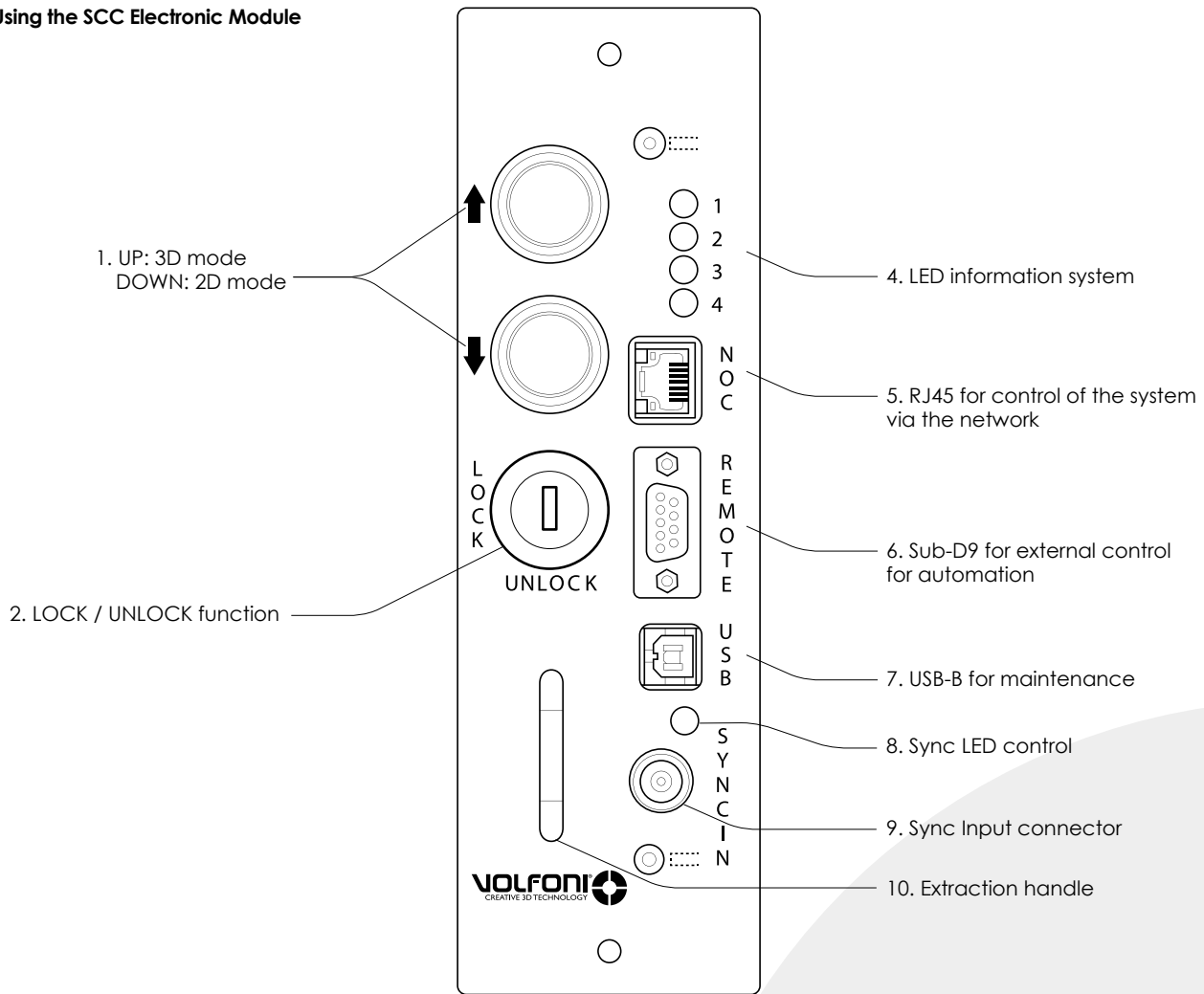
5.1 - Description

An electronic module is inserted into side of SmartCrystal™ Cinema bracket. This module enables the management of the SmartCrystal™ Cinema system.



Ref SCC Electronic module : VASP-02000

5.2 Using the SCC Electronic Module



- There are two buttons for moving up and down the polarization window of the SmartCrystal™ Cinema Polarizer Module :
 - If the button with the UP arrow is pressed, the window of the SmartCrystal™ Cinema will rise and it will be ready for use in 3D mode.
 - If the button with the DOWN arrow is pressed, the window of the SmartCrystal™ Cinema will lower into the system.

Note

If both buttons are pressed together (up and down), the movement of the Smart Crystal™ Cinema Polarizer Module will stop. Then, you can either press the «UP» button to rise it, or press the «DOWN» button to lower it into the system.

- There is also a key switch with two positions permits to keep the system open:
 - If the key switch is in the "LOCK" position, the SmartCrystal™ Cinema Polarizer Module can be locked in the UP position and it can not be lowered.
 - If the key switch is in the "UNLOCK" position, then the window of the SmartCrystal™ Cinema Polarizer Module can be raised and lowered as required using the UP and DOWN buttons.

- A metallic handle allows the SmartCrystal™ Electronic Module to be easily removed from the SmartCrystal™ Cinema.

- There are 4 four LEDs to indicate the following information:

- ▶ **LED number 1:** Power supply (3V). This LED is green when the system is properly powered and off when the system is not powered.
- ▶ **LED number 2:** This LED indicates if the temperature of the LCD is raised above the set value (not currently in use).
- ▶ **LED number 3:** State of motor. This LED flashes green when the motorized component to raise and lower the window of the SmartCrystal™ Cinema Polarizer Module is working correctly and red when there is a problem with the motorized system.
- ▶ **LED number 4:** State of fan. This LED is green when the fan is running and red when there is a problem with the ventilation system.

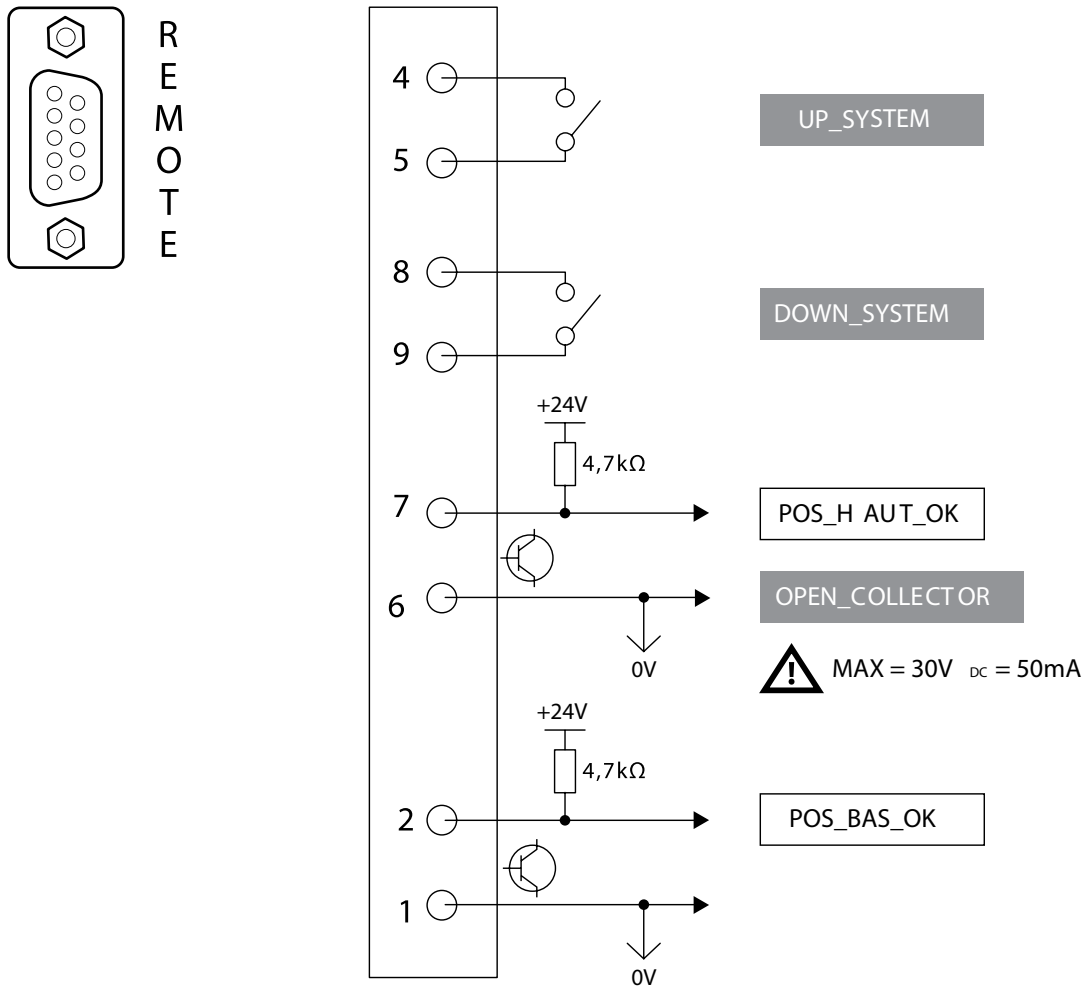
- The NOC connector allows the system to be connected to a central network in order to retrieve information and perform remote operations on the SmartCrystal™ Cinema (eg, intervention, monitoring, piloting, etc).

There are two different modes of use for the SmartCrystal™ Cinema :

- ▶ **Manual mode:** the interface of the SmartCrystal™ Cinema Electronic Module directly controls the operation of the SmartCrystal™ Cinema system
- ▶ **NOC mode:** information and operations are automatically sent from the server via the central network.

For detailed information, please refer to the SmartCrystal™ Cinema NOC user guide or contact your technical support.

6. The Sub-D9 connector is used for external control for Automation.



7. The USB-B connector is used for maintenance only.

Generally no adjustment is needed for standard use.

For professional use, the SmartCrystal™ Cinema can be connected to a computer using a USB cable connected to the USB-B. It allows the user to update the software version or adjust the settings of the LCD in order to optimize image quality for a specific venue for example. Please contact your system's distributor/integrator for further information regarding maintenance and settings.

IMPORTANT: the USB-B connector shall only be used for maintenance applications.

8. The "SYNC" LED indicates if the SmartCrystal™ Cinema is synchronized with the signal.

The "SYNC" LED operates as follows:

> Once the system is powered (but not synchronized), the SYNC LED will illuminate in red.

The system starts as soon as it is connected to a power source.

> Once the SmartCrystal™ Cinema receives the signal synchronization, the SYNC LED will illuminate in green as follows :

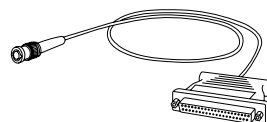
- Green continuous light: signal for 2D synchronization (less than 96Hz)
- Green flashing light: signal for 3D synchronization (greater than 96Hz)

9. The BNC connector allows the user to synchronize the SmartCrystal™ Cinema together with the cinema projector.

Two cables are supplied with the SmartCrystal™ Cinema:



BNC / BNC cable(2meters long)

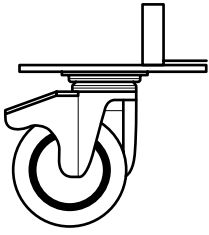


BNC / GPIO 37 cable (2 meters long)

6. INSTALLATION

1. Place the SmartCrystal™ Cinema directly in front of the projector, between it and the projection window. Ensure that the floor where the SmartCrystal™ Cinema stands is level and stable.

2. Apply the wheel brake to secure the position of the SmartCrystal™ Cinema.



3. Adjust the height of the equipment.
(See paragraph 7. Configuration and height adjustment)

4. Connect the power cable to the SmartCrystal™ Cinema.

5. Connect the sync cable to the projector.

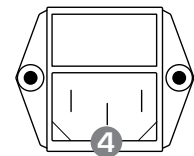
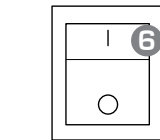
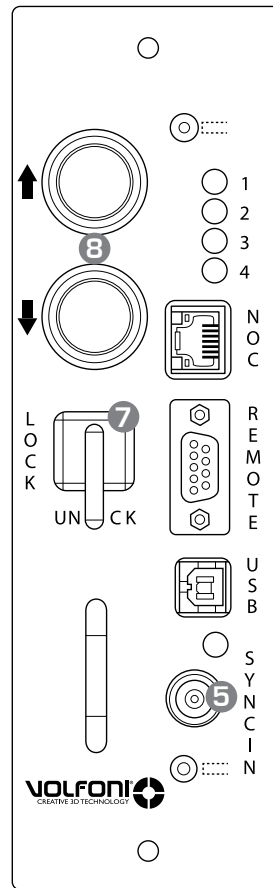
6. Press the ON ("I") button

7. Check that there is nothing blocking the path of the projector.

8. For 3D mode, press the UP button and the window of the SmartCrystalSmartCrystal™ Cinema will be raised into the UP position

9. For 2D mode, press the DOWN button and the window of the SmartCrystal™ Cinema Polarizer Module will lower into the system.

The SmartCrystal™ Cinema is now ready for operations.



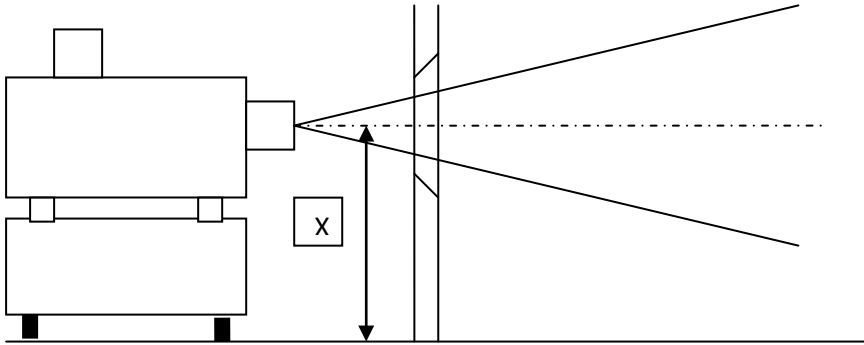
7. CONFIGURATION AND HEIGHT ADJUSTMENT.

The system is designed in order to be able to make a height adjustment the first time the system is installed so that the equipment matches the projection alignment axis of the Projector - 3D System - Window projection.

This is a simple operation that once made, will remain unchanged for both 2D and 3D mode.

Please proceed as follows:

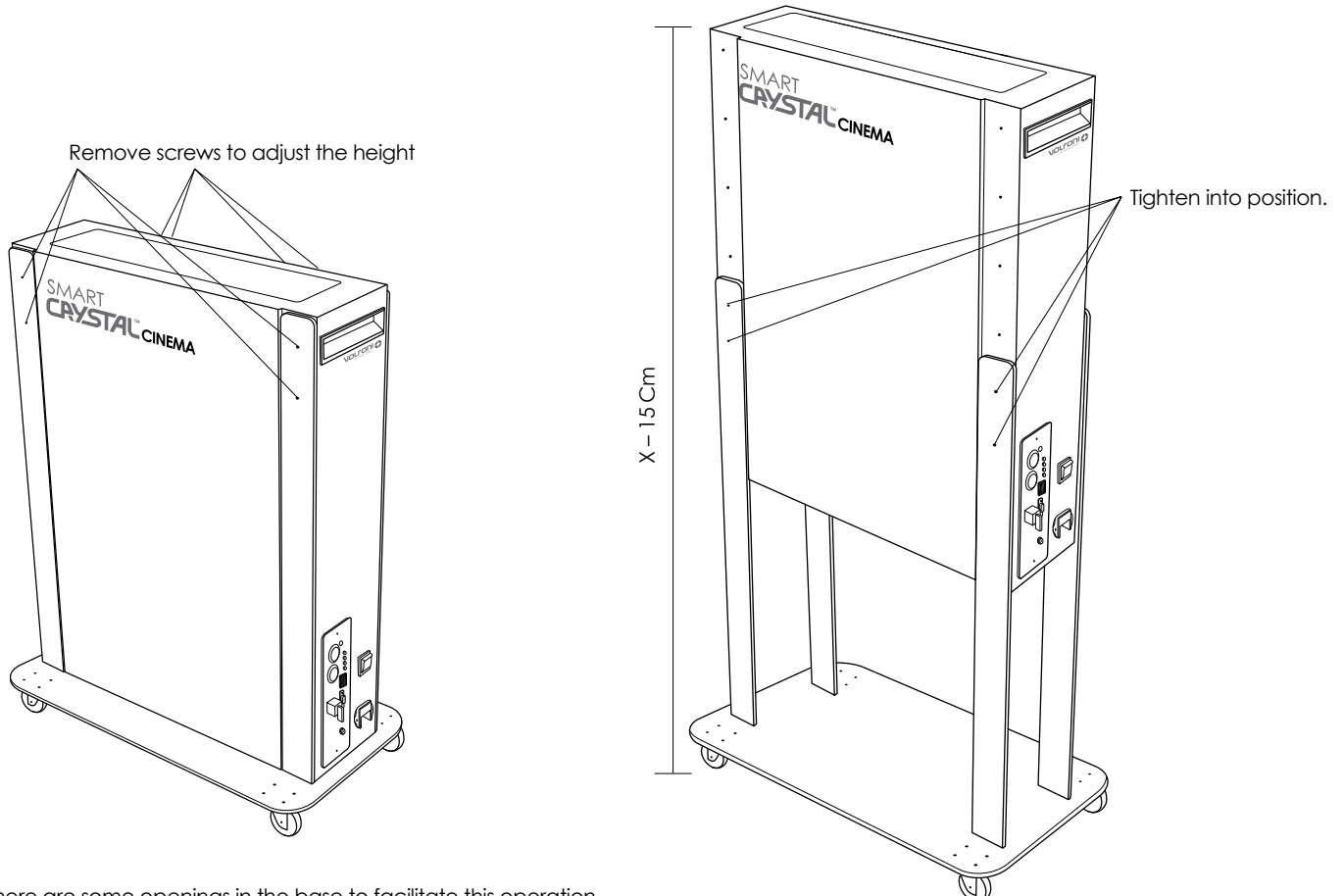
1. - Measure the height from the floor to the center of the digital projector lens. (X)



2. - Ensure the window of the SmartCrystal™ Cinema Polarizer Module is lowered into the mechanical-housing and set, as indicated below, the height of the equipment to the value closest to X - minus 15 cm (i.e $X - 15$ cm). To do this proceed as follows :

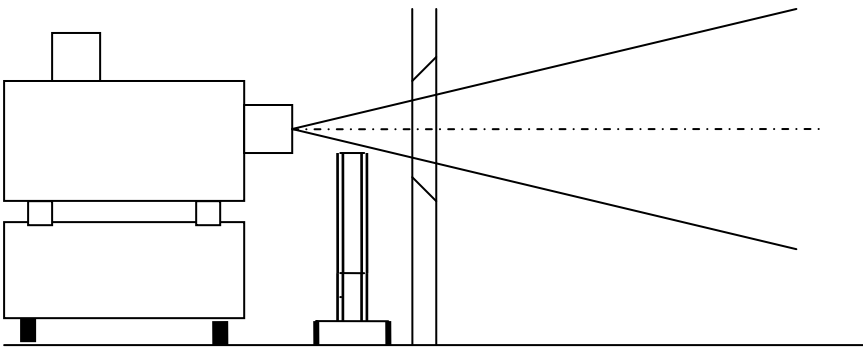
2.1.- Unscrew the 8 screws shown. (4 on each side): Remove screws to adjust the height of the system. Tighten into position. $X - 15$ cm

2.2.- raise the black mechanical housing on the side guides to the position closest to the value calculated above and refit the four screws as shown.

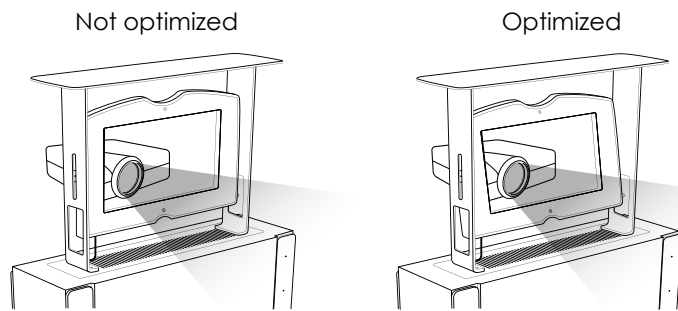
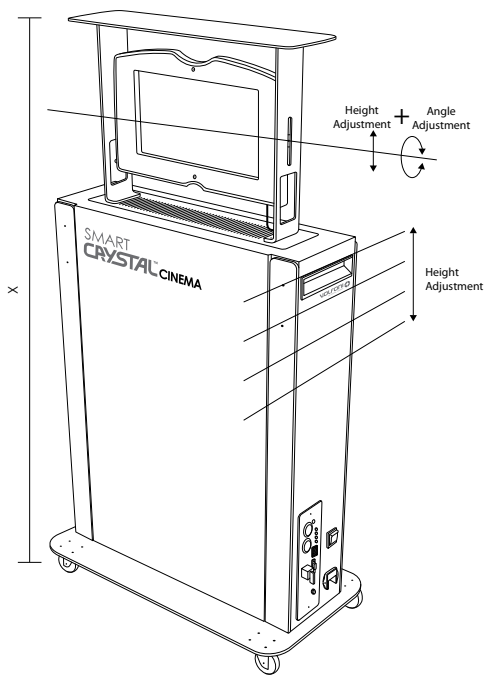


Also, there are some openings in the base to facilitate this operation.

2.3.- There after, place the unit between the projector and the projection window.



2.4.- manually operate the switch to raise the window of the SmartCrystal™ Cinema Polarizer Module in order to check it is raised to the correct position.



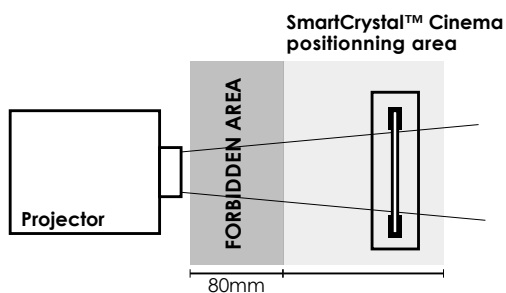
Set the SmartCrystal™ polarization panel at a slight incline to avoid scattering light reflection onto the projector lens and to reduce potential ghosting.

Installation

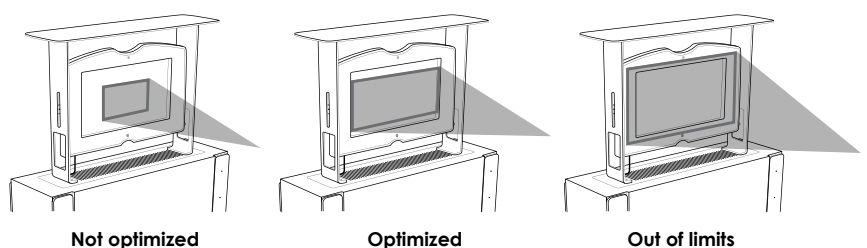
The SmartCrystal™ Cinema should be placed directly in-front of the lens of the projector at a distance such that the image from the projector covers as much as possible the entire area of the polarization window in order to minimize thermal heating effects. Ensure that the side of the SmartCrystal™ Cinema marked "PROJECTOR SIDE" is facing towards the projector. The SmartCrystal™ Cinema Polarizer Module should not be placed **closer than 80mm from** the projector lens. The system starts as soon as it is connected to a power source.



Monitor the distance between the projector and the SmartCrystal™ Cinema is very important to preserve the LCD. The image must cover as much as possible of the LCD to avoid heating only a small part of the LCD.



A distance more than 80mm is normally recommended for this purpose.



8. SOFTWARE UPDATE

A software is available on Volfoni website to update your product.
How to use the software update:

- Go to Volfoni website (www.volfoni.com)
- Choose the menu SERVICES/SUPPORT
- Then DOWNLOAD
- Download the software VOLFONI LOADER
- Connect your computer to SmartCrystal™ Cinema with the cable USB-A /USB-B (cable not supplied by Volfoni)
- Power your SmartCrystal™ Cinema
- Verify that the software recognizes your system
- Once the SmartCrystal™ Cinema is connected, press CHECK FOR UPDATE
- Load the latest version if it's not already in your SmartCrystal™ Cinema

9. TROUBLESHOOTING

PROBLEM	SOLUTION
The system does not work.	Verify that the Power LED is illuminated. If it is OFF, this indicates that there is a problem with the power-supply of the system. Check that the SmartCrystal™ Cinema electronic module is correctly mounted in the bracket. Check that the power supply is connected and that the system is in the power ON state. Should the error persist, please contact your technical support.
SYNC LED does not illuminate.	Ensure the jack cable is connected to the SmartCrystal™ Cinema Polarizer Module.
Red continuous light. (Sync LED)	The system is powered but there is no synchronization signal. Ensure the 3D mode is selected in the setup of your 3D synchronization source.
The LED flashes correctly but no 3D images are shown. (Sync LED)	Ensure the SmartCrystal™ Cinema is facing the right way (i.e the side marked PROJECTOR SIDE should be facing the projector). Check that the projection screen is 3D-compliant (silver screen whit gain 2,4), content is 3D, and the projector is running in 3D mode.
The LED for "state motor" illuminates in red.	In such case, please contact directly your technical support. Do not touch the electronics of the SmartCrystal™ Cinema.
The LED for "state fan" lights in red.	In such case, please contact directly your technical support Do not touch the electronics of the SmartCrystal™ Cinema.
It is not possible to lower the window of the SmartCrystal™ Cinema Polarizer Module	Check that key-button « LOCK/UNCLOCK » is not in the LOCK position. Should this be the case, please turn the key-button to the UNLOCK position to lower the window of the SmartCrystal™ Cinema into the Bracket.

For other problems, please contact your technical support.

10. IMPORTANT SAFETY RECOMMENDATIONS

- Protect all parts of the 3D system from direct sunlight, heat or water.
- Extreme conditions may alter the product's performance.
- Do not modify the electrical or mechanical components of your 3D system.
- Do not apply force to the window of the polarization modulator.
- Do not touch the polarization window.
- Avoid vibrations and shock.
- Use a clean soft cloth when cleaning the polarization modulator to avoid scratching.
- Always transport the SmartCrystal™ Cinema system with the window of the SmartCrystal™ Cinema Polarizer Module lowered into the bracket to avoid scratching the LCD or the frame.
- In case of problems with the cooling ventilation system, turn off the projector, and contact your technical support.
- In case of damage to the SmartCrystal™ Cinema where the skin is exposed to liquid crystal material, we recommend that you immediately wash the area with soap and water.
- In case of eye exposure to liquid crystal material, please seek medical advice immediately.
- Please note the viewing glasses must not be used as sunglasses.

11. GUARANTEE

The SmartCrystal™ Cinema is guaranteed to the original purchaser for three (3) years according to local legislation. Equipment (modules and cables) should be returned in their original packaging along with the original proof of purchase. Equipment that is broken or scratched is not covered.

The SmartCrystal™ Cinema may become damaged if it is placed in front of the projector-lens such that the image from the projector does not cover as much as possible the entire area of the polarization-window (see section 6 "Installation").

Damage caused by placing the SmartCrystal™ Cinema too close to the projection lens is not covered by guarantee.

Volfoni does not guarantee uninterrupted or error-free operation of the product.

12. FURTHER INFORMATION

NOTICE:

The Volfoni Group reserves the right to make changes in the hardware, packaging or other documentation without prior written notice.

SmartCrystal™ Cinema is a trademark of the Volfoni Group.

All trademarks are the property of their respective companies.

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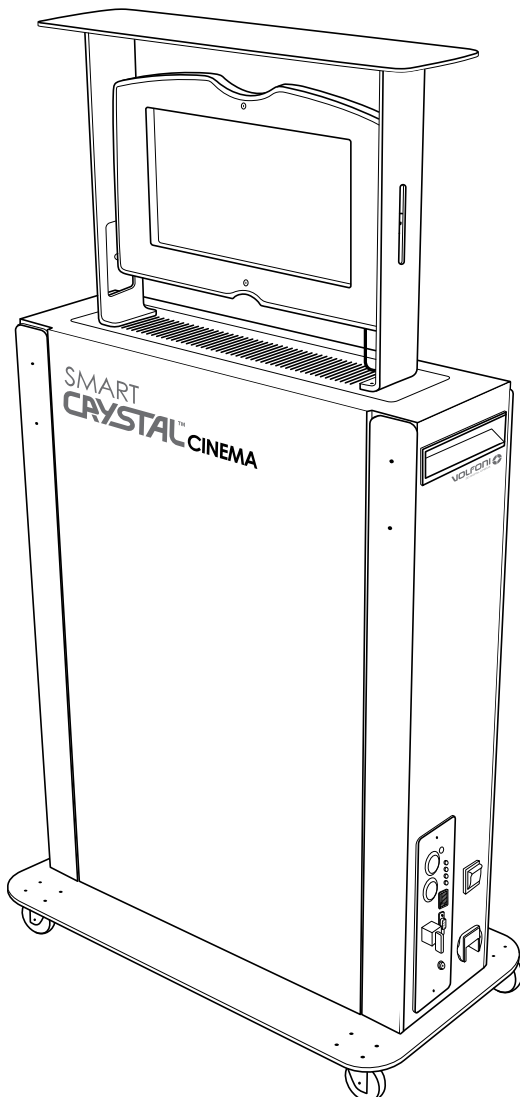
13. REGULATORY STANDARDS



European Union - Disposal information :

This symbol means that according to local laws and regulations your product should be disposed of separately from household waste. When this product reaches the end its of life, take it to a collection point designated by local authorities. Some collection points accept product for free. The separate collection and recycling of your product at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

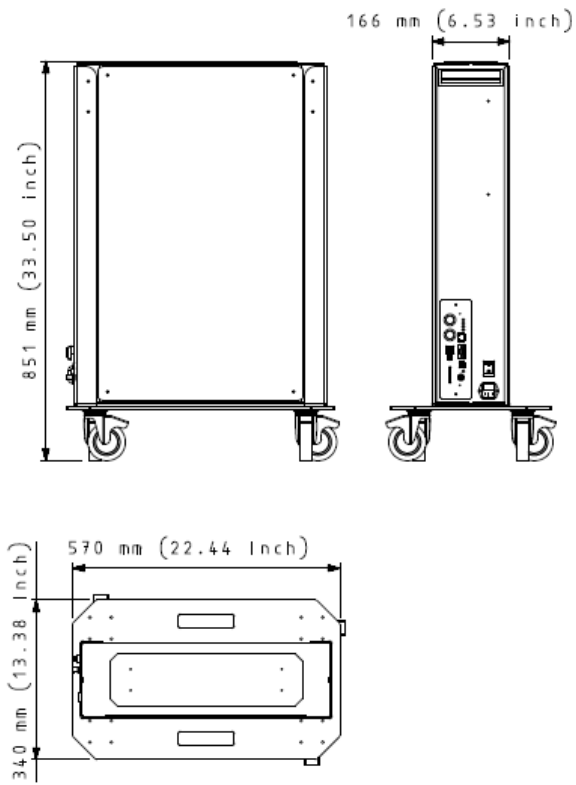
- This Class B digital apparatus complies with Canadian ICES-003.



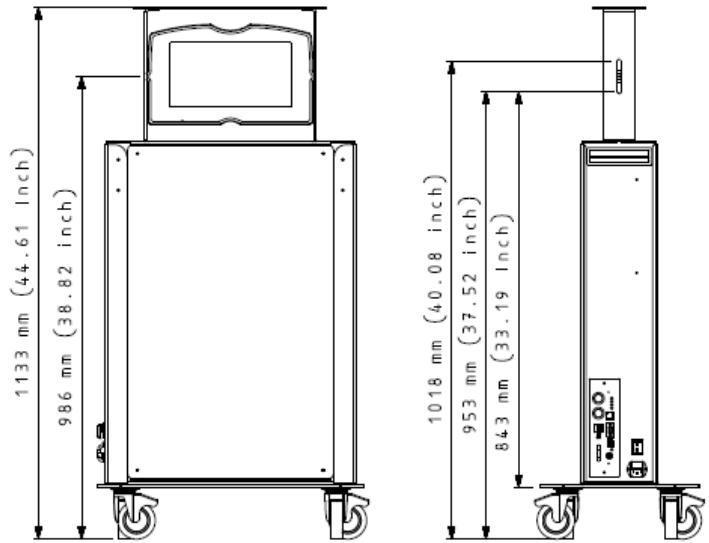
TO AVOID ANY DAMAGE :

- The SmartCrystal™ Cinema should not be used with projectors over 7kW.
- The SmartCrystal™ Cinema should not be placed closer than 80mm from the projector lens.

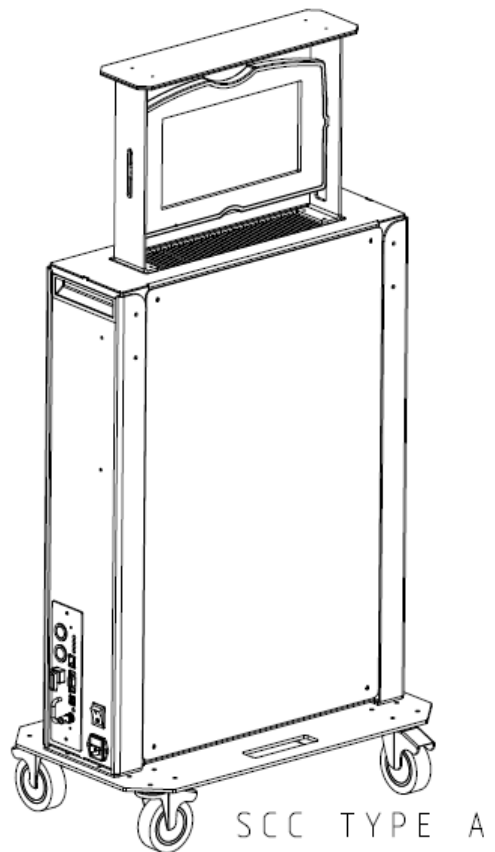
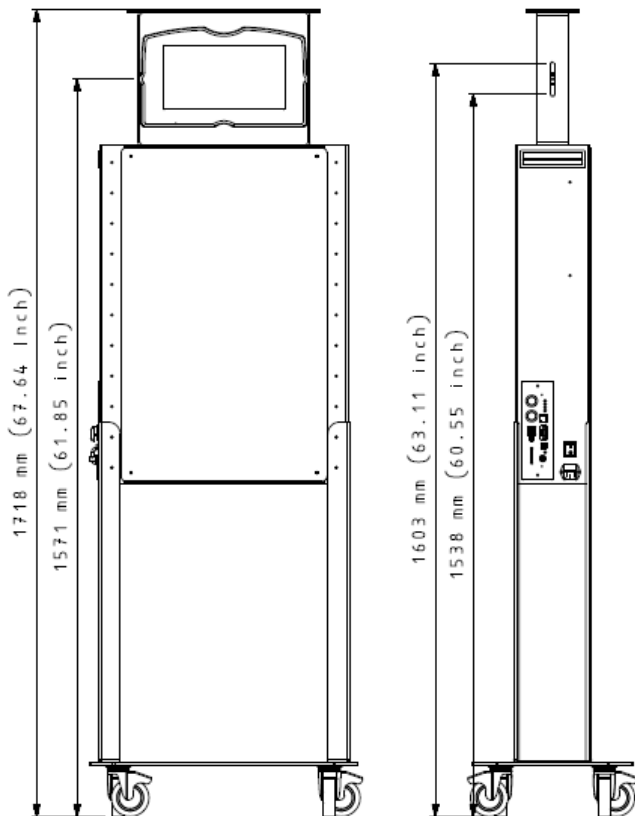
CLOSED



MINIMUM DOWN OPEN



MAXIMUM TOP OPEN





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