

Installation and Setup Guide
020-102791-02

Velvet LED Display System

CorePlus Series (Internal Power)

CHRISTIE®

NOTICES

COPYRIGHT AND TRADEMARKS

Copyright © 2018 Christie Digital Systems USA Inc. All rights reserved.

All brand names and product names are trademarks, registered trademarks or trade names of their respective holders.

GENERAL

Every effort has been made to ensure accuracy, however in some cases changes in the products or availability could occur which may not be reflected in this document. Christie reserves the right to make changes to specifications at any time without notice. Performance specifications are typical, but may vary depending on conditions beyond Christie's control such as maintenance of the product in proper working conditions. Performance specifications are based on information available at the time of printing. Christie makes no warranty of any kind with regard to this material, including, but not limited to, implied warranties of fitness for a particular purpose. Christie will not be liable for errors contained herein or for incidental or consequential damages in connection with the performance or use of this material. Canadian manufacturing facility is ISO 9001 and 14001 certified.

WARRANTY

Products are warranted under Christie's standard limited warranty, the complete details of which are available by contacting your Christie dealer or Christie. In addition to the other limitations that may be specified in Christie's standard limited warranty and, to the extent relevant or applicable to your product, the warranty does not cover:

- a. Problems or damage occurring during shipment, in either direction.
- b. Problems or damage caused by combination of a product with non-Christie equipment, such as distribution systems, cameras, DVD players, etc., or use of a product with any non-Christie interface device.
- c. Problems or damage caused by misuse, improper power source, accident, fire, flood, lightning, earthquake, or other natural disaster.
- d. Problems or damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized repair service provider.
- e. Problems or damage caused by use of a product on a motion platform or other movable device where such product has not been designed, modified or approved by Christie for such use.
- f. Except where the product is designed for outdoor use, problems or damage caused by use of the product outdoors unless such product is protected from precipitation or other adverse weather or environmental conditions and the ambient temperature is within the recommended ambient temperature set forth in the specifications for such product.
- g. Defects caused by normal wear and tear or otherwise due to normal aging of a product.

The warranty does not apply to any product where the serial number has been removed or obliterated. The warranty also does not apply to any product sold by a reseller to an end user outside of the country where the reseller is located unless (i) Christie has an office in the country where the end user is located or (ii) the required international warranty fee has been paid.

The warranty does not obligate Christie to provide any on site warranty service at the product site location.

PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.


REGULATORY

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

CAN ICES-3 (A) / NMB-3 (A)

이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

ENVIRONMENTAL

The product is designed and manufactured with high-quality materials and components that can be recycled and reused. This symbol  means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of the product appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in!

Content

Product overview.	5
Important safeguards.	5
General safety precautions.	5
Power precautions.	6
Terminology.	6
Product documentation.	7
Related documentation.	7
Required tools.	8
Typical LED solution.	9
Cable and controller layout and design.	10
Controller limitations.	11
E500 controller interface and ports.	12
E600 controller interface and ports.	13
FE600 controller extender interface and ports.	15
Installation and setup.	17
Installing an LED array from the front.	17
Installing an LED from the rear.	18
Installing the mounting pads.	18
Mounting the tiles.	20
Adjusting the spacing between tiles.	21
Connecting the data source cables.	22
Connecting the power cables.	23
Powering on the array.	23
Powering off the array.	24
Reinstalling the LED modules.	24
Connecting to video sources.	24
Installing the FE600 fiber optic extender.	24
Configuring the E500 controller.	26
Installing the E500 controller software.	26
Logging into the controller software.	26
Setting the output mode.	26
Adjusting the initial picture coordinates.	27

Testing the communication between the controller and tiles. 27

Reviewing the tile configuration. 27

Setting the input resolution. 28

Locking and unlocking the controller. 28

Upgrading the firmware on the E500 controller. 28

Configuring the E600 controller. 30

 Installing/Accessing the E600 controller software. 30

 Logging into the controller software. 30

 Adjusting the initial picture coordinates. 30

 Testing the communication between the controller and tiles. 31

 Reviewing the tile configuration. 31

 Setting the input resolution. 32

 Locking and unlocking the controller. 32

 Upgrading the firmware on the E500 controller. 32

Maintaining the LED panels. 34

 Cleaning the LED panels. 34

Regulatory. 35

 Safety. 35

 Electro-magnetic compatibility. 35

 Emissions. 35

 Immunity. 35

 Environmental. 36

Product overview

Velvet CorePlus (Internal Power) LED Display System tiles are modular, high-quality image display units that can be configured to achieve an HD display, depending on the pixel pitch of the tile being installed.

Important safeguards

To prevent personal injury and to protect the device from damage, read and follow these safety precautions.

General safety precautions

To prevent personal injury and to protect the device from damage, read and follow these safety precautions.



Warning! If not avoided, the following could result in death or serious injury.

- Observe all electrostatic precautions. Use a grounded wrist strap and insulated tools when handling, servicing, or cleaning electronic assemblies.
- A minimum of two people or appropriately rated lift equipment is required to safely lift, install, or move the product.
- A certified electrician must be present during installation to ensure the installation meets the local electrical code.
- Motors and fans may start without warning.



Notice. If not avoided, the following could result in property damage.

- Always wear clean, lint-free gloves when handling the product.

Power precautions

Ensure all power precautions are understood before installing the product.



Warning! If not avoided, the following could result in death or serious injury.

- After the replacement of the power supply, hi-pot and ground/earth bond tests must be performed. Only Christie qualified technicians who are familiar with the necessary precautions can perform these tests.
- A certified electrician must be present during installation to ensure the installation meets the local electrical code.
- Always connect the ground or earth first to reduce shock hazard.
- Do not return the current through the ground or earth.
- SHOCK HAZARD! The line cord has a maximum power carrying capability. For the maximum number of tiles that may be connected per daisy chain when connecting to the power supply, refer to the product specifications.
- SHOCK HAZARD! A permanent single-phase connection must be installed between the LED tile system and the AC power supply.
- FIRE AND SHOCK HAZARD! Do not operate the system unless certified power connections, providing the recommended voltage, are used.
- HIGH TOUCH CURRENT HAZARD! To ensure reliable grounding, the power connection must be made by using an industrial plug (pluggable type B), or be provided by a permanent connection.
- A 13-20 A double pole mains circuit breaker, certified for the applicable local regulations, is required. It must be part of the building installation and easily accessible.
- Do not use a wall breaker greater than 20 A. This could result in severe damage to the tile system in the event of a failure.



Caution! If not avoided, the following could result in minor or moderate injury.

- SHOCK HAZARD! The line cord has a maximum power carrying capability. For the maximum number of tiles that may be connected per daisy chain when connecting to the power supply, refer to the product specifications.
- SHOCK HAZARD! Only use the AC power cord provided with the product or recommended by Christie.
- TRIP OR FIRE HAZARD! Position all cables where they cannot contact hot surfaces, be pulled, be tripped over, or damaged by persons walking on or objects rolling over the cables.
- FIRE HAZARD! Do not use a power cord, harness, or cable that appears damaged.
- FIRE OR SHOCK HAZARD! Do not overload power outlets and extension cords.
- Only Christie qualified technicians are permitted to open product enclosures.

Terminology

Learn about the components of the LED display system.

Term	Definition
Tile	A cabinet that contains several LED modules.
Array	A group of connected tiles that form a larger display.

Term	Definition
Controller	Controls the LED display system array and video input source. Sometimes referred to as the control unit.
Pixel	A group of one red, one green, and one blue dot.
Subpixel	A pixel is comprised of three subpixels, one for each color: red, green, and blue. Each subpixel in LED display technology is an LED chip.
Pixel pitch	Specifies the distance from the center of one pixel to the center of the next pixel.
SMD package size	A technical supplier specification related to the pixel size, and denotes the size of the surface-mounted diode (SMD) itself.
Fill factor	Indicates the ratio between the area covered by pixels and the area not covered by pixels.

Product documentation

For installation, setup, and user information, see the product documentation available on the Christie Digital Systems USA Inc. website. Read all instructions before using or servicing this product.

1. Access the documentation from the Christie website:
 - Go to this URL: <http://bit.ly/2qXBAdX> or <https://www.christiedigital.com/en-us/digital-signage/products/led-tiles/coreplus-series>.
 - Scan the QR code using a QR code reader app on a smartphone or tablet.



2. On the product page, select the model and switch to the **Downloads** tab.

Related documentation

Additional information on the Velvet CorePlus (Internal Power) LED Display System is available in the following documents.

- *CorePlus (Internal Power) Product Safety Guide (P/N: 020-102801-XX)*
- *CorePlus (Internal Power) Specifications Guide (P/N: 020-102803-XX)*
- *E500 User Guide (P/N: 020-102222-XX)*
- *E600 User Guide (P/N: 020-102717-XX)*
- *E500 LED Display Controller Serial Commands Technical Reference (P/N: 020-102458-XX)*

Required tools

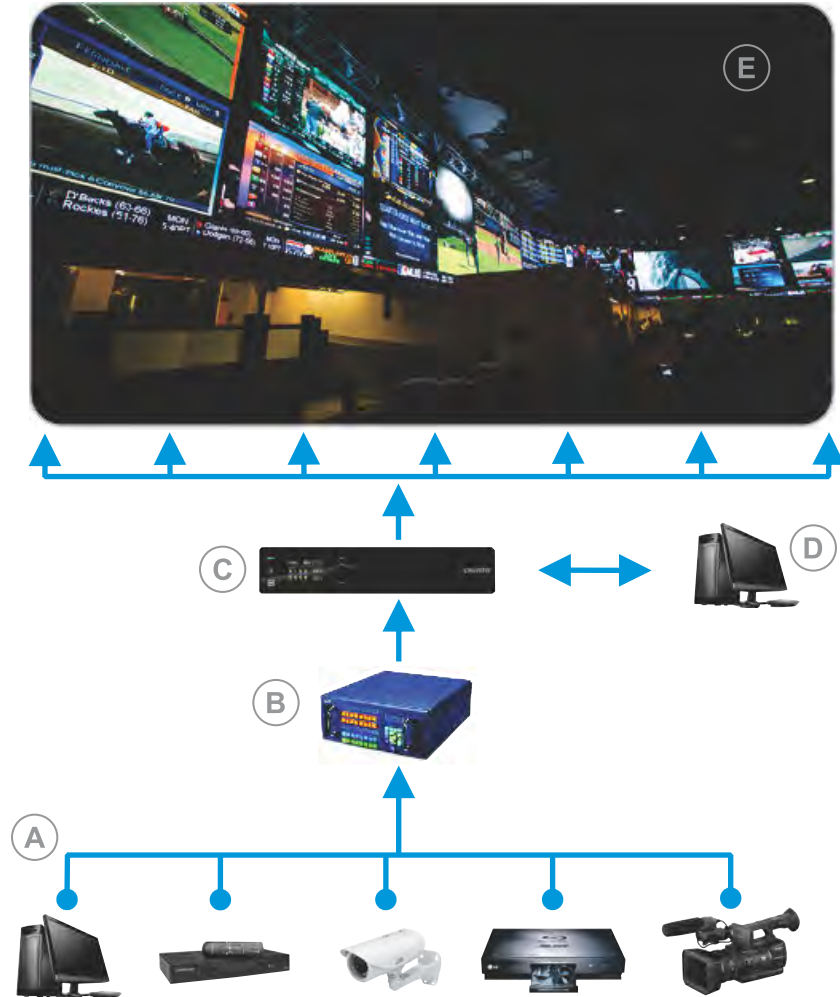
Make sure the following tools are available during the installation.

Tile installation tools and hardware

- Torque driver
- M6 screwdriver
- 8 mm wrench
- LED module removal tool (P/N: 003-006540-XX)
- Mounting block template (P/N: 003-006560-XX and 003-006563-XX)
- Screws appropriate for the mounting surface. These screws are not provided by Christie.

Typical LED solution

A typical LED display system installation contains a variety of components.



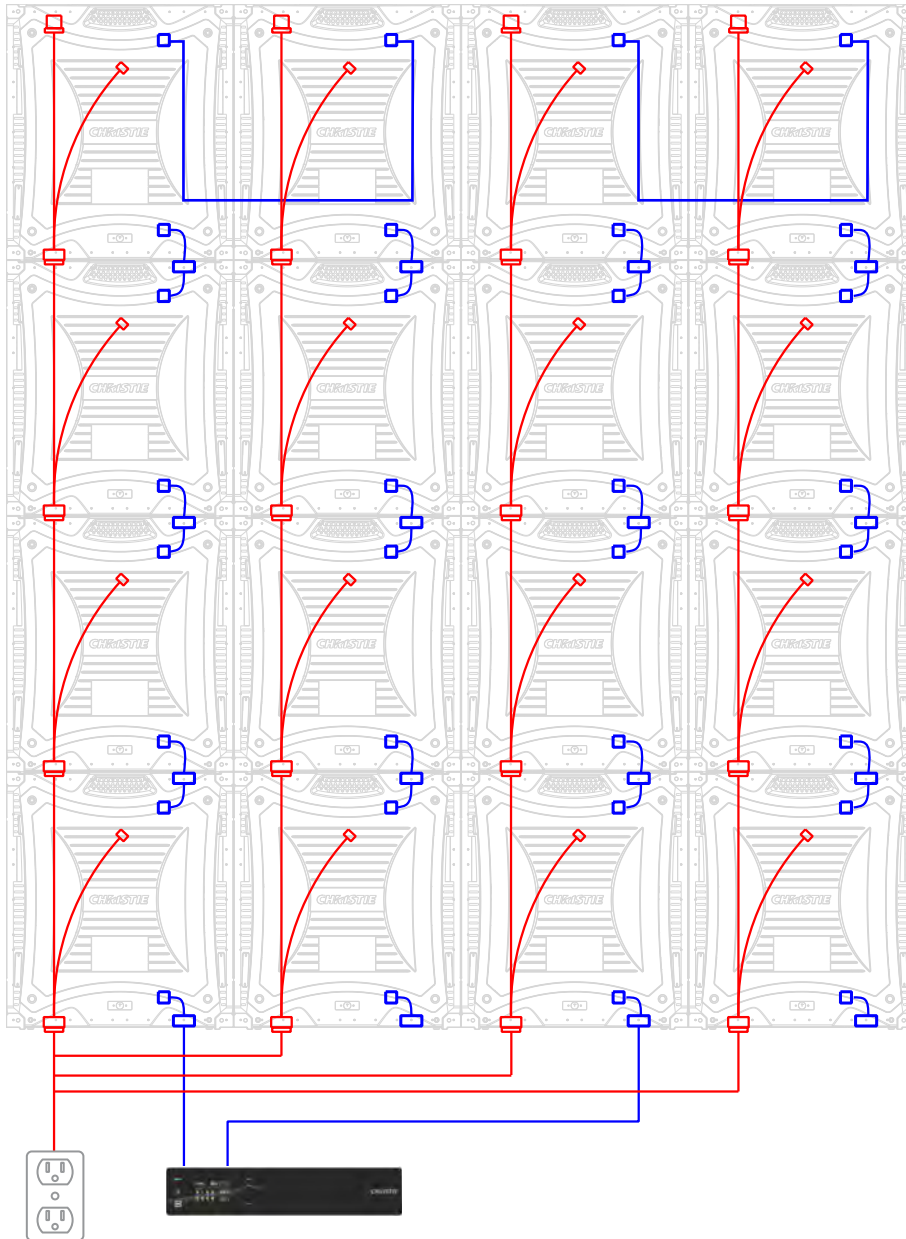
A	Media sources
B	Video matrix switch and splicing video processor
C	E600 LED Display Controller
D	Control computer
E	LED display

Cable and controller layout and design

Before an array is constructed, you must plan the design layout of the tiles to make sure that the controller placement and the cabling layout support the overall tile design objectives.

The LED display system offers considerable flexibility in terms of the number of media sources that can be displayed and the overall resolution. Color and brightness matching, as well as other functions, may be performed across an entire array.

The video source connections between the cabinets are represented by the blue line. The power connections between the cabinets are represented by the red line.



Related information

Connecting the data source cables (on page 22)

Connecting the power cables (on page 23)

Controller limitations

Each controller can support a maximum number of tiles, which varies depending on the pixel pitch of the tiles in the array. The configuration to achieve an HD display differs by the pixel pitch of the tile, as outlined in the table below.

E500 controller

Tile	Pixel pitch	2K array size	4K array size	8K array size	Maximum number of tiles per controller
LED012-CP-I	1.2 mm	–	10 x 5	20 x 10	12
LED014-CP-I	1.4 mm	6 x 3	12 x 6	24 x 12	18
LED019-CP-I	1.9 mm	8 x 4	16 x 8	32 x 16	32
LED024-CP-I	2.4 mm	10 x 5	20 x 10	40 x 20	50
LED030-CP-I	3.0 mm	12 x 6	24 x 12	48 x 24	72
LED040-CP-I	4.0 mm	16 x 8	32 x 16	64 x 32	128

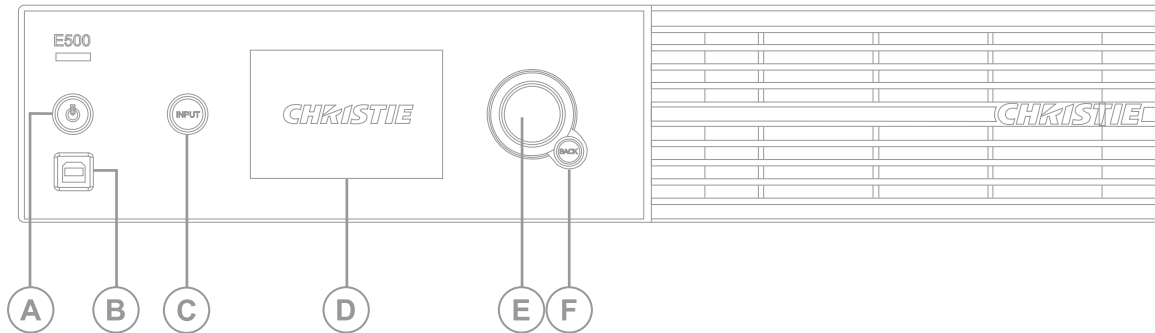
E600 controller

Tile	Pixel pitch	2K array size	4K array size	8K array size	Maximum number of tiles per controller
LED012-CP-I	1.2 mm	–	10 x 5	20 x 10	50
LED014-CP-I	1.4 mm	6 x 3	12 x 6	24 x 12	72
LED019-CP-I	1.9 mm	8 x 4	16 x 8	32 x 16	128
LED024-CP-I	2.4 mm	10 x 5	20 x 10	40 x 20	200
LED030-CP-I	3.0 mm	12 x 6	24 x 12	48 x 24	288
LED040-CP-I	4.0 mm	16 x 8	32 x 16	64 x 32	512

E500 controller interface and ports

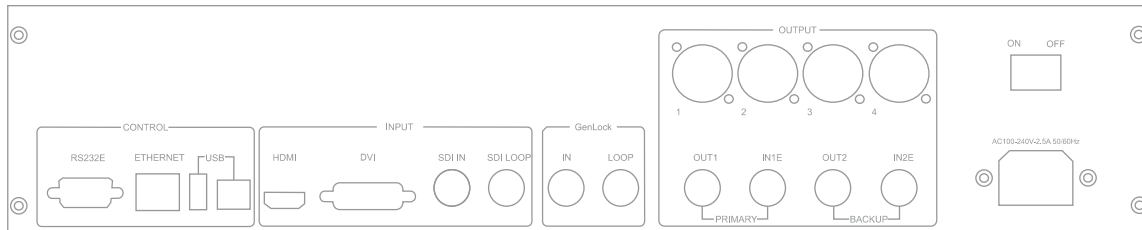
Learn about the interface and physical ports on the E500 controller.

Front



A	Power button
B	USB interface for communication with a computer
C	Input selector
D	LCD screen
E	Menu dial for interacting with the menu
F	Back button for exiting from the current operation or option in the menu

Rear



Inputs/Outputs		Description
Inputs	DVI	Single-link DVI, user-definable resolution <ul style="list-style-type: none"> • Horizontal resolution maximum: 3840 pixels • Vertical resolution maximum 1920 pixels
	HDMI	Standard HDMI 1.3 input Supports 8 bit and 12 bit; for <ul style="list-style-type: none"> • 8 bit—RGB 4:4:4 1080P • 12 bit—YCbCr 4:2:2 1080P
	SDI	Supports 3G-SDI progressive input in standard format
	SDI Loop	

Inputs/Outputs		Description
Outputs	BNC (Qty. 4)	Supports 2-channel output and 2-channel input, with each channel supporting up to 3.125G bandwidth. The loading capacity of one channel is up to 1920 x 1080 at 60hz. Of the two output channels, one is primary and the other is secondary. Supports low latency. The maximum transmission distance of coaxial cable is 100m.
	RJ45 (Qty. 4)	4-channel Gigabit Ethernet interface, with each channel supporting up to 1G bandwidth Total loading capacity: 2.3 million pixels Low latency is not supported
Genlock	BNC (Qty. 2)	Support Genlock IN & LOOP
Control		DB9 COM, USB, RJ45 (with SNMP support), USB cascading, and baud rate 115200 bps
Power		Power switch Power supply port: AC 100-240V~ 50/60hz

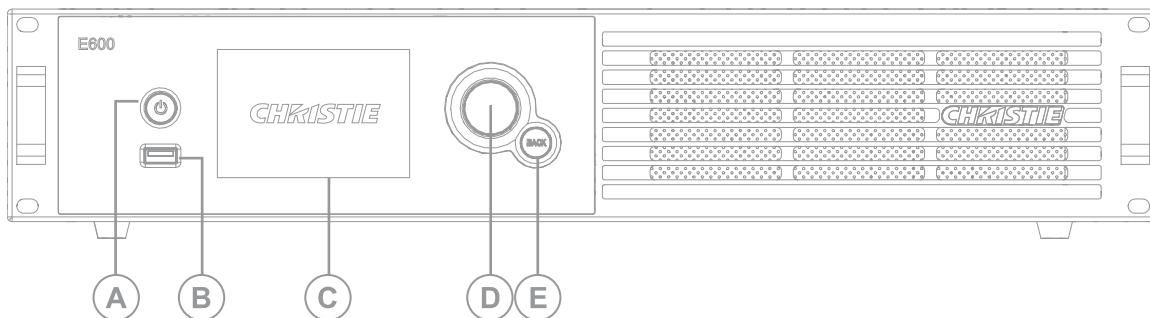
E600 controller interface and ports

Learn about the interface and physical ports on the E600 controller.

The E600 controller behaves as two independent controllers, displaying 3840 x 2160 pixels at 30 Hz with each virtual controller. The images of both DVI1 and DVI2 input sources can be displayed on the tiles simultaneously, but the inputs must be configured independently.

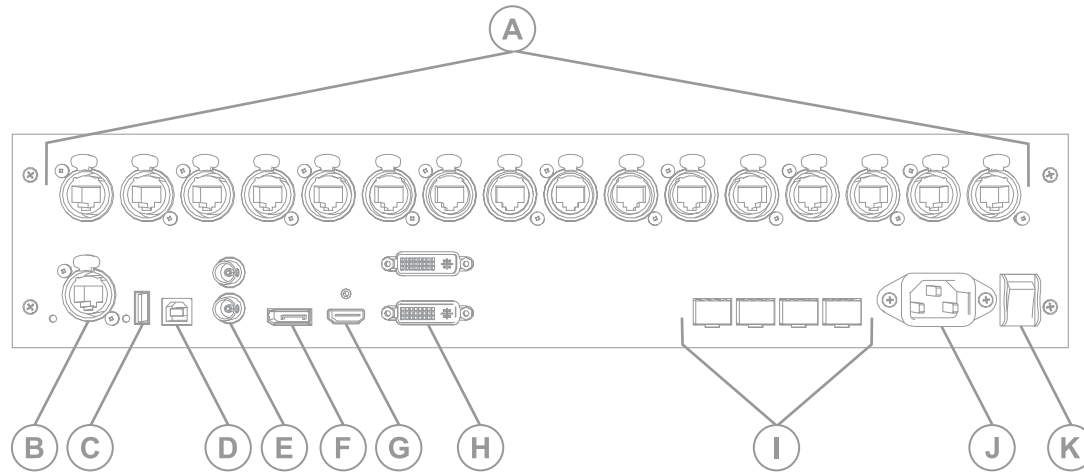
DVI1 corresponds to Ethernet ports 1-8, and DVI2 corresponds to Ethernet ports 9-16.

Front



A	Power button
B	USB interface for communication with a UDISK
C	LCD screen
D	Menu dial for interacting with the menu
E	Back button for exiting from the current operation or option in the menu

Rear



Inputs/Outputs		Description	
A	Outputs	RJ45 (Qty. 16)	16-channel Gigabit Ethernet interface, with each channel supporting up to 1G bandwidth Total loading capacity: 8.8 million pixels Low latency is not supported
B	Control	Ethernet	USB, RJ45 (with SNMP support), and USB cascading
C		USB Out	
D		USB In	
E	Genlock	BNC (Qty. 2)	Support Genlock IN & LOOP
F	Inputs	DisplayPort	Standard DisplayPort 1.2 input The maximum user-definable resolution is 7680 x 1080 @ 60Hz or 1080 x 6000 @ 60Hz.
G		HDMI	Standard HDMI 2.0 input Supports 8 bit, 10 bit, and 12 bit; refer to the table below.
H		DVI (Qty. 2)	Dual-link DVI, user-definable resolution <ul style="list-style-type: none"> • Horizontal resolution maximum: 3840 pixels • Vertical resolution maximum 3840 pixels
I	OPT Output		Fiber optic ports for connecting to the FE600 fiber optic extender
J	Power		Power supply port: AC 100-240V~ 50/60hz
K			Power switch

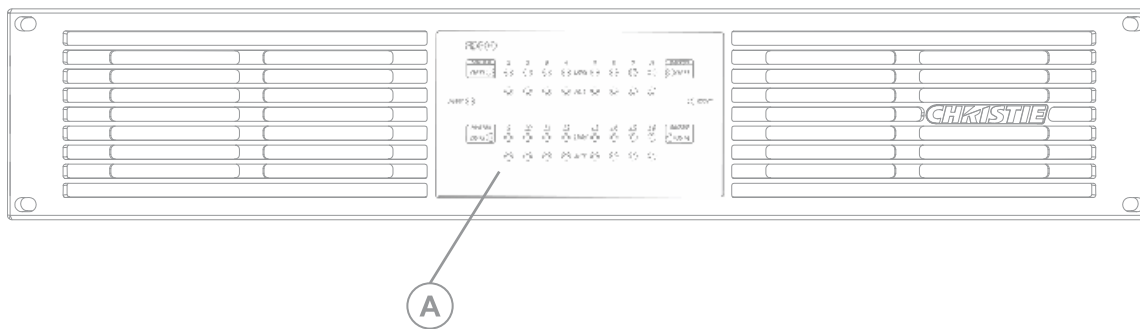
HDMI 8 bit, 10 bit, and 12 bit support

Color depth	Input source			
		3840 x 2160 @ 60Hz (HDCP)	3840 x 1080 @ 60Hz (HDCP)	1920 x 1080 @ 60Hz (HDCP)
8 bit				
	RGB444	Yes	Yes	Yes
	YCbCr444	Yes	Yes	Yes
	YCbCr422	Yes	Yes	Yes
	YCbCr420	Yes	Yes	Yes
10 bit				
	RGB444	No	Yes	Yes
	YCbCr444	No	Yes	Yes
	YCbCr422	Yes	Yes	Yes
	YCbCr420	Yes	Yes	Yes
12 bit				
	RGB444	No	Yes	Yes
	YCbCr444	No	Yes	Yes
	YCbCr422	Yes	Yes	Yes
	YCbCr420	Yes	Yes	Yes

FE600 controller extender interface and ports

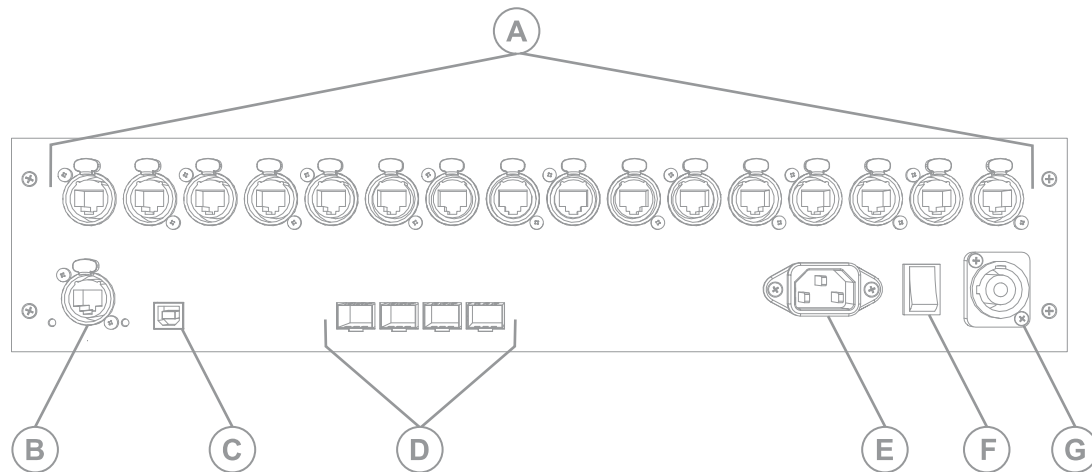
Learn about the interface and physical ports on the E600 controller.

Front



A	Status display
---	----------------

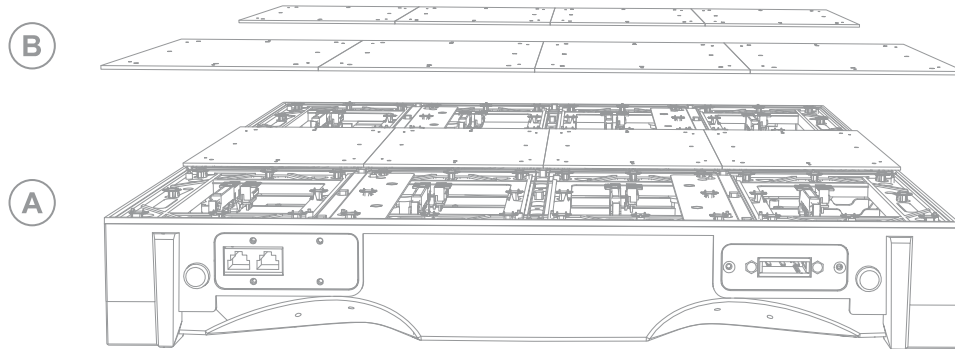
Rear



Inputs/Outputs		Description
A	Outputs	RJ45 (Qty. 16) 16-channel Gigabit Ethernet interface, with each channel supporting up to 1G bandwidth Total loading capacity: 8.8 million pixels Low latency is not supported
B	Control	Ethernet
C		USB In
D	OPT Output (Qty. 4)	Fiber optic ports for connecting to the E600 controller <ul style="list-style-type: none"> • OPT1 is used for transferring the data of port 1-8 • OPT2 is used for transferring the data of port 9-16 • OPT3 is the backup channel of OPT1 • OPT4 is the backup channel of OPT2 Either Gigabit Ethernet port or optical fiber port can be used at the same time, but cannot be used to connect devices simultaneously.
E	Power	Power supply port: AC 100-240V~ 50/60hz
F		Power switch
G		Power supply port: AC 100-240V~ 50/60hz

Installation and setup

The configuration of an array depends on the installation. Use the following instructions as a guideline only. Before you install an LED array, you must fully understand all site requirements and characteristics.



A	Chassis
B	LED modules

Installing an LED array from the front

Perform the following steps when you install an LED array while facing the LED modules.

1. *Install the mounting pads* (on page 18).
2. *Mount the tiles (A)* (on page 20).
3. *Connect the data cables* (on page 22).
4. *Connect the power cables between tiles* (on page 23).
5. *Reinstall the LED modules (B)* (on page 24).
6. *Connect the data cables to the video sources* (on page 24).
7. *Power on the array* (on page 23).
8. Install the controller software.
 - *Install the E500 controller software* (on page 26).
 - *Install the E600 controller software* (on page 30).
9. Configure the controller.
 - *Configure the E500 controller* (on page 26).
 - *Configure the E600 controller* (on page 30).

The controller can be configured at any time. Before connecting the controller to the wall, Christie recommends updating the firmware and configuring the controller.

Installing an LED from the rear

Perform the following steps when you install an LED array from the rear of the tile.

1. *Mount the tiles (A)* (on page 20).
2. *Connect the data cables* (on page 22).
3. *Connect the power cables between tiles* (on page 23).
4. *Reinstall the LED modules (B)* (on page 24).
5. *Connect the data cables to the video sources* (on page 24).
6. *Power on the array* (on page 23).
7. Install the controller software.
 - *Install the E500 controller software* (on page 26).
 - *Install the E600 controller software* (on page 30).
8. Configure the controller.
 - *Configure the E500 controller* (on page 26).
 - *Configure the E600 controller* (on page 30).

The controller can be configured at any time. Before connecting the controller to the wall, Christie recommends updating the firmware and configuring the controller.

Installing the mounting pads

If the tiles are being installed onto a flat wall surface, determine where the mounting pads should be installed, and attach them to the support structure.



Warning! If not avoided, the following could result in death or serious injury.

- External support for a display wall must be designed and implemented by a Christie qualified installer and must comply with local area regulations and safety standards.
- All display walls must have permanent external supports. The amount of external support required depends on the size of the display wall.
- A minimum of two people or appropriately rated lift equipment is required to safely lift, install, or move the product.

The mounting pads are available in three different configurations:

Corner pads with one hole

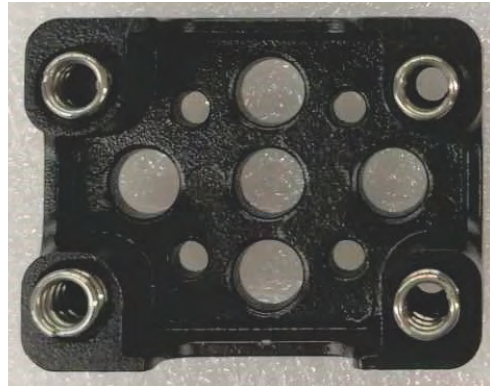


Exterior side pads with two holes

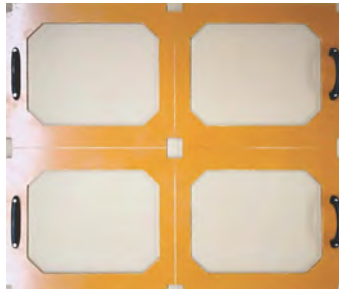
Exterior top or bottom edge pads with two holes



Interior pads with four holes



1. If the tiles are being mounted on an external support structure, ensure the external support structure is anchored to the wall and/or to the floor.
The design and anchoring of the LED display structure is not the responsibility of Christie Digital Systems USA Inc. Contact a Christie representative for structure design options.
2. Determine where the mounting pads should be installed.
 - a) Find the center of the bottom of the display area.
 - b) Position the mounting template with the bottom left template hole centered on the point identified in step 2a.
 - c) Level and hang the mounting template on the support structure.



3. Insert the springs into the mounting pads.
4. Install the mounting pads.
 - a) Place the mounting pads inside the template holes, and secure them to the support structure.
For installation onto a steel structure, tighten the M6 screws to a torque of 3.55 Nm (31.42 lbs.in).
For installation onto a wooden surface:
 - M8 wood screws—Tighten to a torque of 11.5 Nm (101.8 lbs.in)
 - 5/16-18 wood screws—Tighten to a torque of 10.5 Nm (93 lbs.in)
 - b) Install any exterior edge or corner mounting pads in the proper location inside the template holes, pushing the pads as close to the edge of the template holes as possible.
For example, install the mounting pads for the top left corner tile in the bottom right corner of the template hole.



The corners and sides of the tiles should line up with the center of the mounting pads.

- c) Slide the spring into the M6 bolt holes.
5. Remove the template from the mounting pads.
6. To install the remaining mounting pads for the array, place the template over already installed mounting pads so three of the template holes have mounting pads, and the remaining holes are empty. Repeat steps 2 to 4 for all other rows in the array.

Mounting the tiles

Install the tiles in the array row by row. Do not attempt to construct the array column by column.



Warning! If not avoided, the following could result in death or serious injury.

- External support for a display wall must be designed and implemented by a Christie qualified installer and must comply with local area regulations and safety standards.
 - All display walls must have permanent external supports. The amount of external support required depends on the size of the display wall.
 - A minimum of two people or appropriately rated lift equipment is required to safely lift, install, or move the product.
1. If present, remove the metal plates that cover all the external pass-through holes in the tile chassis, including the plate surrounding the power and data ports.
 2. Place the tile face down on a protected surface and remove the rear cover.
 3. Using the LED module removal tool, remove the top and bottom row of LED modules from the tile and set them on a padded surface.
To ensure the LED modules are reinstalled on the same tile and in the same position on the carrier assembly, label the chassis, carrier assembly, and LED modules.
 4. Ensure all adjustment screws are flush with the outside of the tile chassis.
 5. Attach the first tile in the center of the bottom row to the mounting pads in the four mounting points.
Ensure the M6 bolts have at least three full thread engaged into the tile and are torqued to 3.55 Nm (31.42 lb.in).
 6. To install the second tile in the row, repeat steps 1 to 5.
 7. Adjust the spacing between the tiles, and ensure there are minimal gaps between the LED modules of each tile.
To determine if adjustments are needed between the chassis, or to see how close the LED modules are, it may be necessary to install and remove the LED modules multiple times.
If the surface edges of the LED modules are not smooth, adjust the tightness of the bolts attaching the chassis to the mounting pads.

8. Repeat steps 1 to 7 for all the remaining tiles in the bottom row.
9. After the bottom row is installed and the gaps are adjusted, repeat steps 1 to 8 for the remaining rows.

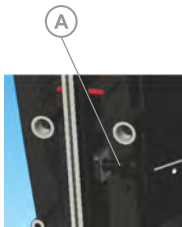
Related information

Adjusting the spacing between tiles (on page 21)

Adjusting the spacing between tiles

If there are gaps between the LED modules of different tiles, or the LED modules cannot be reinstalled, adjust the spacing between the tile chassis.

1. Using the LED removal tool, remove the top and bottom row of LED modules from the tile and set them on a padded surface.
To ensure the LED modules are reinstalled on the same tile and in the same position on the carrier assembly, label the chassis, carrier assembly, and LED modules.
2. Ensure there are minimal gaps between the LED modules of each tile.
 - a) To adjust the spacing between tiles in two columns, change the tightness of the screw located above the side cable pass-through hole (A).



- b) To adjust the spacing between tiles within a row, change the tightness of the screw located above the guide post (B).



To retract the guide post, turn the screw clockwise.

3. If the surface edges of the LED modules are not smooth, adjust the depth of the panel by changing the tightness of the screws attaching the tile to the mounting pads.
4. To test the spacing between tiles, replace the LED modules.

Related information

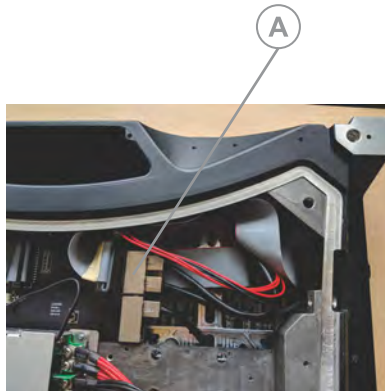
Mounting the tiles (on page 20)

Reinstalling the LED modules (on page 24)

Connecting the data source cables

Connect the data cables between the tiles in the array.

1. Remove the cover from the data port area.
2. Remove the main and redundant data cables from the port inside the tile, and feed the cables through the pass-through hole.
3. Plug the main data cable into the next tile in the column.
The data cables are connected from the main hub board of the tile to the data ports of the next tile in the column.
Consistently use either the left or right ports for all primary data connections, and the other port for all redundant data connections.
4. Pull any excess cable back into the cabinet.
5. Repeat steps 1 to 4 for all tiles in the array.
6. If the data cables need to be connected to the first tile in an adjacent column, follow these steps:
 - a) Ensure the covers for the pass-through holes on the sides of the tiles have been removed.
 - b) Disconnect the short Ethernet cables from the data ports at the top of the hub board (A).



- c) Connect 1.5m Ethernet cables to the main and redundant data ports at the top of the hub board.
 - d) Feed the cables through the interior of the tile and through the pass-through hole into the tile of the adjacent column.
 - e) In the first tile in the new column, connect the Ethernet cables to the data ports at the top of the hub board.
7. Connect an Ethernet cable from the first tile in the array to the controller.

Related information

Cable and controller layout and design (on page 10)

Connecting the power cables

Connect the power cables between the tiles in the array, column by column.



Caution! If not avoided, the following could result in minor or moderate injury.

- **SHOCK HAZARD!** The line cord has a maximum power carrying capability. For the maximum number of tiles that may be connected per daisy chain when connecting to the power supply, refer to the product specifications.

1. Remove the pass-through hole cover.
2. Feed the power cables through the pass-through holes.
3. Connect the power cable to the next tile in the array.
4. Pull any excess cable back into the cabinet.
5. If the cable needs to be connected to the first tile in an adjacent column, follow these steps:



Connecting cables from one column to the adjacent column can only be completed when accessing the tiles from the front.

- a) On the first tile of the new column, ensure the covers for the pass-through holes on the sides of the tile have been removed.
 - b) Remove the two screws securing the power port to the chassis.
 - c) Move the power port to the empty pass through hole on the left side of the tile, beside the original power port location.
 - d) Secure the port to the chassis.
 - e) Connect the power cable to the first tile in the new column.
6. After the data and power cables have been routed through the array, reinstall the metal plates onto the cable pass-through holes on the exterior sides of the array.
 7. Reinstall the rear covers on each tile.
 8. Connect the cabinet power cable to the wall outlet.

Related information

Cable and controller layout and design (on page 10)

Powering on the array

Turn on each component in the array in the order below.

1. Start the computer that is the video source.
2. Plug the tiles into the wall.
3. Turn on the controller.
 - a) On the rear of the controller, turn the power switch to **On**.
 - b) On the front of the controller, press the **Power** button.

Powering off the array

Turn off each component in the array in the order below.

1. Turn off the controller.
 - a) On the front of the controller, press the **Power** button.
 - b) On the rear of the controller, turn the power switch to **Off**.
2. Wait for 3-5 minutes after powering off the controller.
3. Unplug the tiles from the wall.

Reinstalling the LED modules

Replace the LED modules removed while installing the tiles.

1. Connect all the carrier assembly cables onto the LED module.
2. Line up the LED module with the alignment pins in the carrier assembly, ensuring the arrow on the back of the LED module is pointing up.
3. Set the LED module into place on the carrier assembly.

If the LED module does not fit back into place, or there is a gap between the LED modules of two tiles, adjust the spacing between the tiles.

Related information

Adjusting the spacing between tiles (on page 21)

Connecting to video sources

An LED array requires a controller to display content on the tiles.

1. Connect the data cable from the first tile in the array to the controller.
2. Connect the HDMI or DVI output from the video source (computer or media player) to the appropriate input port on the controller.

The E600 controller behaves as two independent controllers, displaying 3840 x 2160 pixels at 30 Hz with each virtual controller. The images of both DVI1 and DVI2 input sources can be displayed on the tiles simultaneously, but the inputs must be configured independently. DVI1 corresponds to Ethernet ports 1-8, and DVI2 corresponds to Ethernet ports 9-16.
3. Power on the array.

After the controller is connected and powered up, the video content is available as long as the video source is connected.

Installing the FE600 fiber optic extender

A fiber optic extender increases the available distance between the LED display and the E600 controller.



The FE600 fiber optic extender can only be used with the E600 controller.

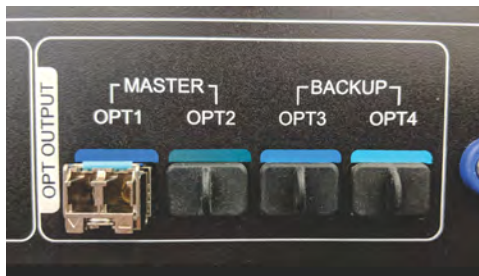
The FE600 fiber extender increases the transmission distance by 10 KM. Multiple extenders can be chained together between the controller and the array to extend the distance even further.



Notice. If not avoided, the following could result in property damage.

- Do not bend the fiber optic cables beyond their minimum bend radius. Sharp bends can damage the cables and cause transmission problems.

1. Connect the power cord to the FE600 fiber extender.
2. Plug the fiber optic cables from the controller into the fiber extender.
 - a) Remove the covers from the fiber optic cable ends.
 - b) Remove the protective plug from the fiber optic ports.
 - c) Connect one fiber optic cable into the Opt1 port on the controller and the extender.
 - d) Connect the other fiber optic cable into the Opt2 port on the controller and the extender.
If the fiber optic cables are not plugged into the same port on each device, the LED panels do not display any content.
 - e) Connect fiber optic cables into the Opt3 and Opt4 ports on the extenders.
The Opt3 port provides redundancy for the Opt1 connection, and Opt4 provides redundancy for Opt2.



3. Connect the fiber optic cables between the two fiber optic extenders.
4. Plug an Ethernet cable into the last extender in the chain, and connect it to the first panel in the array.
5. Plug the fiber extender power cables into a wall socket.
6. Power on all the components in the tile configuration.

Configuring the E500 controller

After installing the tiles and connecting all cables, complete the E500 controller initial configuration. For additional configuration settings, refer to *E500 User Guide (P/N: 020-102222-XX)*.

Installing the E500 controller software

The E500 controller software controls the configuration of the array.

1. On the Christie website, navigate to the *E500 product page*.
2. Switch to the **Downloads** tab and click **Software Downloads**.
3. Download and unzip the Christie LED Control Unit E500 Software zip file.
4. Double-click the `Christie Controller Software Setup <version>.exe` file, and follow the on-screen instructions and install the E500 controller software.

Logging into the controller software

To access the configuration features of the controller software, log in to the system.

1. Ensure the computer running the controller software is on the same network at the controller.
2. Connect a USB cable between the controller and the computer running the controller software.
3. Launch the controller software and log in as the administrator.
 - a) Click **User > Advanced User Login**.
 - b) Login with the password **admin**.

Setting the output mode

Ensure the E500 controller is configured to use the correct output mode.

When the incorrect output mode is selected, the tiles are not recognized by the controller.

1. On the front of the controller, press the menu dial.

When using the menu dial, rotate the dial to move through the items in the menu. To select a menu item or to set a value, push in the menu dial.

To return to the previous menu, press the button to the bottom right of the menu dial.
2. Select **Screen Settings > Output Modes > Ports**.

Use **SerDes** mode when connecting over RS232.

Adjusting the initial picture coordinates

Adjust the initial coordinates of the pictures on the screen.

1. On the front of the controller, press the menu dial.
When using the menu dial, rotate the dial to move through the items in the menu. To select a menu item or to set a value, push in the menu dial.
To return to the previous menu, press the button to the bottom right of the menu dial.
2. Select **Advanced Settings > Image Offset**.
3. Select **Start X** and push the menu dial.
4. Rotate the dial and set the horizontal offset.
5. Select **Start Y** and push the menu dial.
6. Rotate the dial and set the vertical offset.

Testing the communication between the controller and tiles

Verify that the array is connected to and recognized by the E500 controller.

1. Connect the USB cable between the controller and the computer running the E500 controller software.
2. Launch the E500 controller software and log in as the administrator.
 - a) Click **User > Advanced User Login**.
 - b) Login with the password **admin**.
3. To confirm the display is connected to and recognized by the controller, in the Local System Info area, ensure **Control System** has a value of **1**.
If the controller is not recognizing the tiles, select **System > Reconnect**.
4. If the Monitor Information area reports that there is no screen, verify that the output mode is set to Ports and in the E500 controller software select **System > Reconnect**.
5. Switch to the **Screen Control** tab.
6. To confirm the controller is communicating with all tiles, select a color from the Self Test list and click **Send**.
If the controller is communicating with all the tiles, each display changes to the selected color.
7. Reset the Self Test to **Normal** and click **Send**.
8. Close the **Screen Control** dialog.

Reviewing the tile configuration

Review the tile configuration reported in the E500 controller software.

1. In the E500 controller software, click **Screen Configuration**.
2. Select **Configure Screen** and click **Next**.
3. Switch to the **Screen Connection** tab.

4. Click **Read from HW**.
5. Review the configuration of the tiles in the array, and modify as needed.
The cable layout for the tiles in the array is identified with an **S** where the first cable starts, and the green line shows the path of the daisy chain of cables. **E** identifies the end of the daisy chain.

Setting the input resolution

Set the resolution for the home page display of interface, which must be consistent with the output resolution of the video source.

1. Log into the E500 controller software.
2. Click **Screen Configuration**.
3. Select **Configure Screen** and click **Next**.
4. Switch to the **Sending Card** tab.
5. In the Set the Sending Card Display Mode section, select the resolution of the video source from the Resolution list.
6. Click **Save**.

Locking and unlocking the controller

Disable the ability to navigate the menu and modify the settings from the front of the controller.

1. To disable access to the controller menu, press and hold the menu dial and back button until the controller screen flashes.
2. To re-enable access to the controller menu, press and hold the menu dial and back button for approximately 15 seconds.
3. Test if the controller is unlocked by using the menu dial to navigate the menu.
If the controller is still locked, press and hold the menu dial and back button for a longer period of time.

Upgrading the firmware on the E500 controller

When a new version of the software is released, the E500 controller must be upgraded.

1. Download the firmware file to a computer that will be connected to the controller for the upgrade, or to a USB key.
2. Unzip the downloaded firmware file.
3. Connect an HDMI or Ethernet cable between the computer running the controller software and the controller.
4. Launch the E500 controller software and log in as the administrator.
 - a) Click **User > Advanced User Login**.
 - b) Login with the password **admin**.
5. In the blank area beside the Monitoring icon, right-click and type **666888**.

6. In the Program Path area, browse to the location of the unzipped download, and select the firmware upgrade folder.
7. Click **Update**.
8. In the confirmation message, click **Yes**.
As the firmware upgrade is installed, the controller screen and controller software both display a progress indicator.
After the upgrade is complete, the controller reboots.
9. To verify the upgrade was successful, in the top left corner of the controller display verify the version number displayed is 1.0.5.9.

Configuring the E600 controller

After installing the tiles and connecting all cables, complete the E600 controller initial configuration. For additional configuration settings, refer to *E600 User Guide (P/N: 020-102717-XX)*.

Installing/Accessing the E600 controller software

The E600 controller software controls the configuration of the array.

1. On the Christie website, navigate to the *E600 product page*.
2. Switch to the **Downloads** tab and click **Software Downloads**.
3. Download and unzip the Christie LED Control Unit E600 Software zip file.
4. Double-click the *Christie Controller Software Setup <version>.exe* file, and follow the on-screen instructions and install the E600 controller software.

Logging into the controller software

To access the configuration features of the controller software, log in to the system.

1. Ensure the computer running the controller software is on the same network at the controller.
2. Connect a USB cable between the controller and the computer running the controller software.
3. Launch the controller software and log in as the administrator.
 - a) Click **User > Advanced User Login**.
 - b) Login with the password **admin**.

Adjusting the initial picture coordinates

Adjust the initial coordinates of the pictures on the screen.

1. On the front of the controller, press the menu dial.

When using the menu dial, rotate the dial to move through the items in the menu. To select a menu item or to set a value, push in the menu dial.

To return to the previous menu, press the button to the bottom right of the menu dial.
2. Select **Screen Settings > Image Offset**.
3. Select **Start X** and push the menu dial.
4. Rotate the dial and set the horizontal offset.
5. Select **Start Y** and push the menu dial.

6. Rotate the dial and set the vertical offset.

Testing the communication between the controller and tiles

Verify that the array is connected to and recognized by the E600 controller.

1. Connect a USB cable between the controller and the computer running the controller software.
2. Launch the controller software and log in as the administrator.
 - a) Click **User > Advanced User Login**.
 - b) Login with the password **admin**.
3. To confirm the display is connected to and recognized by the controller, in the Local System Info area, ensure **Control System** has a value of **1**.
If the controller is not recognizing the tiles, select **System > Reconnect**.
4. Select **Screen Control**.
5. To confirm the controller is communicating with all tiles, select a color from the Self Test list and click **Send**.
If the controller is communicating with all the tiles, each display changes to the selected color.
6. Reset the Self Test to **Normal** and click **Send**.
7. Click **Close**.

Reviewing the tile configuration

Review the tile configuration reported in the E600 controller software.

1. Connect a USB cable between the controller and the computer running the controller software.
2. Launch the controller software and log in as the administrator.
 - a) Click **User > Advanced User Login**.
 - b) Login with the password **admin**.
3. Click **Screen Configuration**.
4. Select **Configure Screen** and click **Next**.
5. Switch to the **Screen Connection** tab.
6. Click **Read from HW**.
7. Review the configuration of the tiles in the array, and modify as needed.
The cable layout for the tiles in the array is identified with an **S** where the first cable starts, and the green line shows the path of the daisy chain of cables. **E** identifies the end of the daisy chain.

Setting the input resolution

Set the resolution for the home page display of interface, which must be consistent with the output resolution of the video source.

1. Connect a USB cable between the controller and the computer running the controller software.
2. Launch the controller software and log in as the administrator.
 - a) Click **User > Advanced User Login**.
 - b) Login with the password **admin**.
3. Click **Screen Configuration**.
4. Select **Configure Screen** and click **Next**.
5. Switch to the **Sending Card** tab.
6. In the Set the Sending Card Display Mode section, select the resolution of the video source from the Resolution list.

Tile	Native resolution
LED012-CP-I	384 x 432
LED014-CP-I	320 x 360
LED019-CP-I	240 x 270
LED024-CP-I	192 x 216
LED030-CP-I	160 x 180
LED040-CP-I	120 x 135

7. Click **Set**.
8. Click **Save**.

Locking and unlocking the controller

Disable the ability to navigate the menu and modify the settings from the front of the controller.

1. To disable access to the controller menu, press and hold the menu dial and back button until the controller screen flashes.
2. To re-enable access to the controller menu, press and hold the menu dial and back button for approximately 15 seconds.
3. Test if the controller is unlocked by using the menu dial to navigate the menu.
If the controller is still locked, press and hold the menu dial and back button for a longer period of time.

Upgrading the firmware on the E500 controller

When a new version of the software is released, the E500 controller must be upgraded.

1. Download the firmware file to a computer that will be connected to the controller for the upgrade, or to a USB key.
2. Unzip the downloaded firmware file.

3. Connect an HDMI or Ethernet cable between the computer running the controller software and the controller.
4. Launch the E500 controller software and log in as the administrator.
 - a) Click **User > Advanced User Login**.
 - b) Login with the password **admin**.
5. In the blank area beside the Monitoring icon, right-click and type **666888**.
6. In the Program Path area, browse to the location of the unzipped download, and select the firmware upgrade folder.
7. Click **Update**.
8. In the confirmation message, click **Yes**.

As the firmware upgrade is installed, the controller screen and controller software both display a progress indicator.

After the upgrade is complete, the controller reboots.
9. To verify the upgrade was successful, in the top left corner of the controller display verify the version number displayed is 1.0.5.9.

Maintaining the LED panels

Learn the information and procedures for performing maintenance on the Velvet CorePlus (Internal Power) LED Display System.

Cleaning the LED panels

Learn how to clean the Velvet CorePlus (Internal Power) LED Display System panel.



Notice. If not avoided, the following could result in property damage.

- Always wear clean, lint-free gloves when handling the product.

To avoid the risk of damaging the LEDs, clean the panel only if absolutely necessary.

1. To clean the LED panels use a dry, clean, soft cloth with a low lint count or a paint brush to remove any particles.
2. To remove loose particles between the LEDs, use filtered compressed air. Ensure the air compressor does not spray oil or condensation.

Do not use the following products when cleaning the panels:

- Compressed air cans
- Liquids
- Abrasive cloths

Regulatory

This product conforms to the latest regulations and standards related to product safety, environmental requirements, and electromagnetic compatibility (EMC).

Safety

- CAN/CSA C22.2 No. 60950-1
- ANSI/UL 60950-1 - Information Technology Equipment – Safety – Part 1: General Requirements
- IEC 60950-1 IEC/EN 60950-1 - Information Technology Equipment – Safety – Part 1: General Requirements
- EN 60950-1
- IEC 62471-1 - Photobiological safety of lamps and lamp systems

Electro-magnetic compatibility

Emissions

- FCC CFR47, Part 15, Subpart B, Class A - Unintentional Radiators
- CAN ICES-003 (A)/NMB-003 (A) - Information Technology Equipment (Including Digital Apparatus) - Limits and Methods of Measurement
- CISPR 32/EN 55032, Class A
- IEC 61000-3-2/EN61000-3-2: Limits for Harmonic Current Emissions

Immunity

- IEC 61000-3-3/EN61000-3-3
- IEC/EN61000
- IEC 61000-4-2/EN61000-4-2
- IEC 61000-4-3/EN61000-4-3
- IEC 61000-4-4/EN61000-4-4
- IEC 61000-4-5/EN61000-4-5
- IEC 61000-4-6/EN61000-4-6
- IEC 61000-4-8/EN61000-4-8
- IEC 61000-4-11/EN61000-4-11

Environmental

EU Directive (2011/65/EU) on the restriction of the uses of certain hazardous substances (RoHS) in electrical and electronic equipment and the applicable official amendment(s).

EU Regulation (EC) No. 1907/2006 on the registration, evaluation, authorization and restriction of chemicals (REACH) and the applicable official amendment(s).

EU Directive (2012/19/EU) on waste and electrical and electronic equipment (WEEE) and the applicable official amendment(s).

Corporate offices

Christie Digital Systems USA, Inc.
Cypress
ph: 714 236 8610

Christie Digital Systems Canada Inc.
Kitchener
ph: 519 744 8005

Worldwide offices

Australia
ph: +61 (0) 7 3624 4888

Brazil
ph: +55 (11) 2548 4753

China (Beijing)
ph: +86 10 6561 0240

China (Shanghai)
ph: +86 21 6278 7708

France
ph: +33 (0) 1 41 21 44 04

Germany
ph: +49 2161 664540

India
ph: +91 (080) 6708 9999

Japan (Tokyo)
ph: 81 3 3599 7481

Korea (Seoul)
ph: +82 2 702 1601

Mexico
ph: +52 55 4744 1790

Republic of South Africa
ph: +27 (0)11 510 0094

Russian Federation
and Eastern Europe
ph: +36 (0) 1 47 48 100

Singapore
ph: +65 6877 8737

Spain
ph: +34 91 633 9990

United Arab Emirates
ph: +971 4 3206688

United Kingdom
ph: +44 (0) 118 977 8000

United States (Arizona)
ph: 602 943 5700

United States (New York)
ph: 646 779 2014

Independant sales consultant offices

Italy
ph: +39 (0) 2 9902 1161



For the most current technical documentation, visit www.christiedigital.com.

