

The top half of the page features a complex, abstract background of overlapping, semi-transparent blue triangles and polygons, creating a faceted, crystalline effect. The colors range from light sky blue to deep navy blue. A white diagonal line separates this patterned area from the plain white background below.

User Guide

020-001941-01

Christie E510 LED Display Controller

CHRISTIE

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Content

- Product overview 5**
 - Features 5
 - Video source features 5
 - Specifications 6
 - Applications 6
 - Cascading devices 8
 - Christie E510 LED Display Controller interface and ports 8
 - Dimensions 11
 - Home screen 11
 - Terminology 12
 - Related documentation 12

- Configuring the array..... 14**
 - Installing the Christie E510 LED Display Controller software 14
 - Logging into the controller software 14
 - Setting the input resolution 14
 - Resolution requirements 15
 - Identify the screen cabling path 15
 - Adjusting the initial picture coordinates 16
 - Adjusting the image brightness 17
 - Adjusting the image quality 17
 - Setting the redundancy backup 17
 - Testing the communication between the controller and tiles 18
 - Reviewing the tile configuration 18
 - Loading a cabinet configuration file 19
 - Adjusting dark and light lines between tiles 19
 - Displaying a picture when there is no signal 19
 - Changing the display to black when there is no signal 20
 - Restoring the factory settings 20
 - Locking the controller 20
 - Color matching LED modules 21
 - Calibrating replacement LED modules 22
 - Controlling the status of the display 22
 - Mirroring the image 22

Backing up and restoring the system.....	25
Setting Advanced features	26
Mapping function.....	26
Loading RCFG files	27
Setting alarm thresholds.....	27
Adjusting image settings.....	28
Saving to RV card	28
Setting redundancy	29
Storing settings in presets.....	29
Setting up a backup video source.....	29
Reducing time delay between input of video signal	30
Configuring the system and communication	31
Restoring factory default settings.....	31
Determining current screen time.....	31
Adjusting OLED brightness	31
Checking the hardware version	31
Setting communication and network parameters.....	32
Setting the Working mode.....	32
Setting the OLED menu screen language.....	33
PC and web page operations.....	34
Adjusting individual Gamma for RGB	34
Configuring the screen from the web page	34
Updating the firmware	36
Customizing the sending card name	36
Monitoring Christie Velvet LED Display System with SNMP	38
Christie E510 LED Display Controller MIB traps	38
Troubleshooting.....	40
Line adjustments do not appear on the module edges.....	40
Text displays beyond the button outline	40
An image remains on the display after disconnecting the source	40

Product overview

Christie Velvet 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.

Each Christie E510 LED Display 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.

Pixel pitch	Array size	Maximum number of tiles per controller
0.96 mm	3 x 3	9 tiles
1.2 mm	4 x 4	16 tiles
1.6 mm	5 x 5	25 tiles
1.9 mm	6 x 6	36 tiles
2.5 mm	8 x 8	64 tiles

Features

Understand the important features of the Christie E510 LED Display Controller.

- Input of ultra-high color depths: 10-bit/12-bit RGB 4:4:4/YCbCr 4:4:4, with input resolutions up to 1920x1200@60Hz
- Low latency—Less than 1ms (when the start position of image is 0.)
- Auto LED screen configuration
- Web control
- Image mirroring
- Dual working modes—Working as sending card and fiber converter
- Pixel level brightness and chroma calibration
- Supports individual Gamma adjustment for RGB when the color depth of input source is 10-bit or 12-bit.
- Monitoring of inputs
- One-click backup and recovery
- Multiple E510 units can be cascaded.

Video source features

Under the video source features for the Christie E510 LED Display Controller.

Input connector	Color depth	Sampling format	Maximum input resolution
HDMI 1.4a	8-bit	RGB 4:4:4	1920x1200@60Hz
	10-bit/12-bit	YCbCr 4:4:4	1920x1080@60Hz
YCbCr 4:2:2			
Single-link DVI	8-bit	YCbCr 4:2:0	1920x1200@60Hz

	10-bit/12-bit		1920×1080@60Hz
3G-SDI	Maximum supported input resolution: 1920×1080@60Hz. 3G-SDI input sources do not support input resolution and color depth settings. The Gamma value can be adjusted for 8-bit input sources and cannot be adjusted for 10-bit or 12-bit input sources.		

Specifications

Learn the specifications of the Christie E510 LED Display Controller.

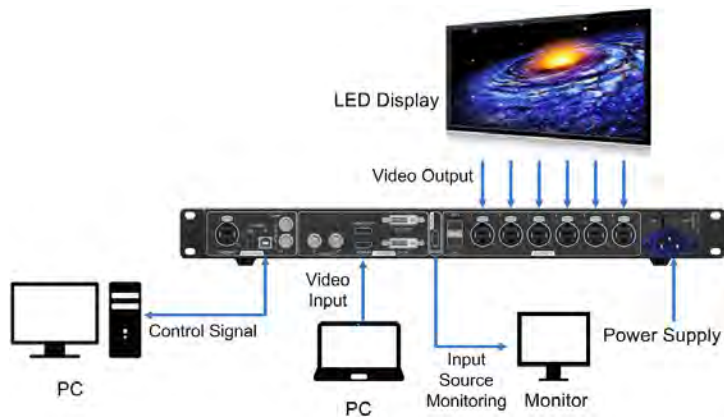
Specification	Description
Electrical parameters:	
Input voltage	100 V–240 V AC
Rated power consumption	20 W
Operating environment:	
Temperature	-20°C to 60°C (-4°F to 140°F)
Humidity	10% RH–90% RH, non-condensing
Storage temperature	-20°C to 70°C (-4°F to 158°F)
Packing information:	
Carrying case	550 mm × 440 mm × 175 mm (21.7 × 17.3 × 6.9 inches)
Packing box	530 mm × 140 mm × 410 mm (20.9 × 5.5 × 16.1 inches)
Accessories	1 × Ethernet cable 1 × DVI cable 1 × USB cable 1 × HDMI cable 1 × Power cord
Dimensions	482.6 mm × 356.0 mm × 50.1 mm (10 × 14 × 2 inches)
Space	1U
Net Weight	4.6 kg (10.1 lbs)
Certifications	RoHS, EMC, FCC, IC, LVD

Applications

The E510 can work as a sending card or fiber converter, meeting multiple application needs.

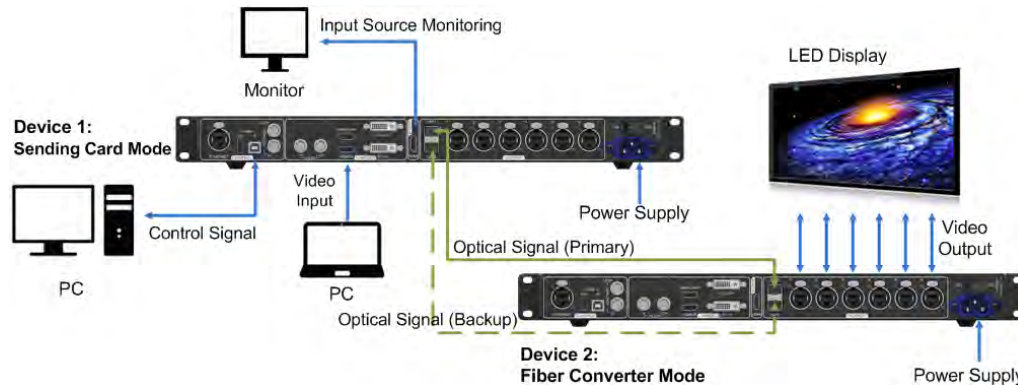
- Scenario 1: Application of Sending Card mode

On the OLED menu screen, choose Working Mode > Sending Card. This mode uses the optical ports or Gigabit Ethernet ports to output video signals.



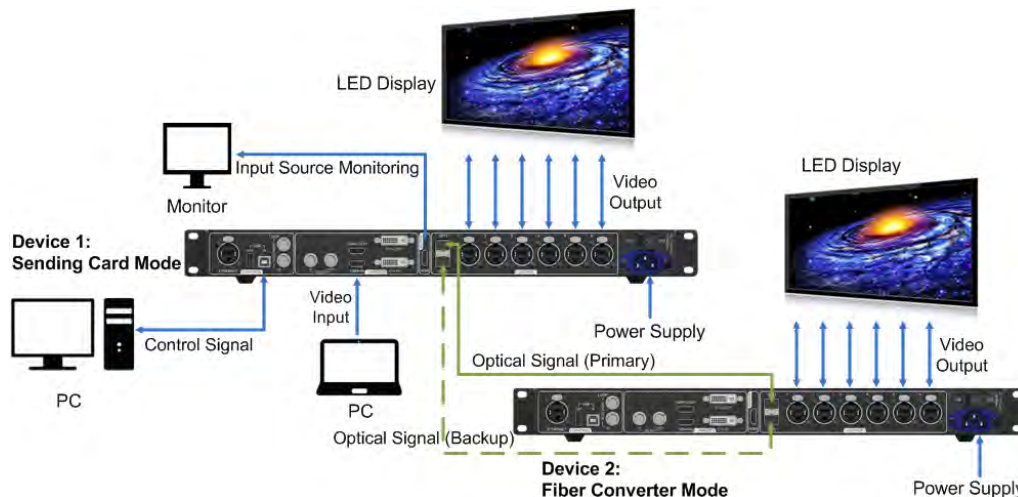
- Scenario 2: Application of Fiber Converter mode

Set the working mode for the two devices respectively, as shown in the image below. Device 2 uses the optical ports (for input/output) and Gigabit Ethernet ports (for output/input) to realize optical and electric signal conversion, which allows for long-distance signal transmission.



- Scenario 3: Application of Dual-Output Working mode

Set the working mode for the two devices respectively, as shown in the image below. Device 1 uses the optical ports and Gigabit Ethernet ports to output video signals at the same time.

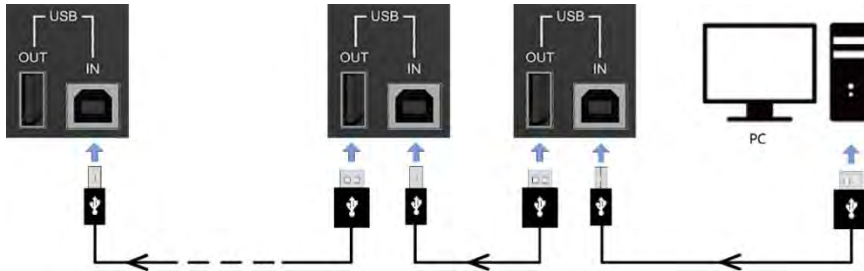


Cascading devices

Learn about cascading devices.

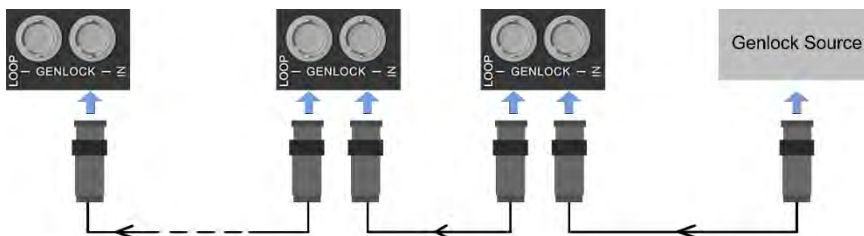
- The control computer must control multiple E510 devices.

Cascade devices using USB IN and USB OUT ports of the E510 devices. Up to eight devices can be cascaded.



- Multiple E510 devices must output image simultaneously.

Cascade devices using GENLOCK IN and GENLOCK LOOP connectors of the E510 devices. Up to eight devices can be cascaded.

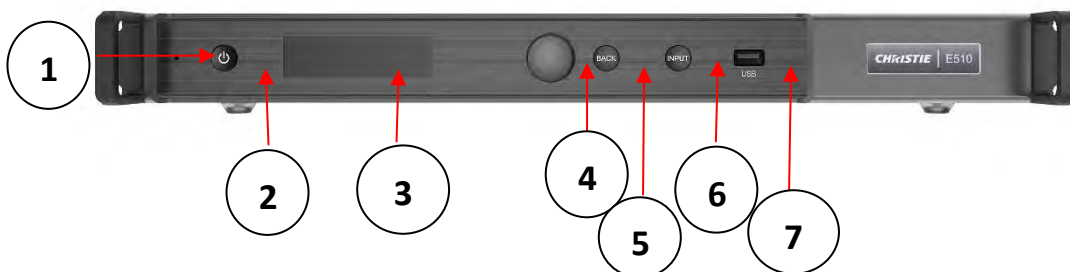


Christie E510 LED Display Controller interface and ports

Learn about the interface and physical ports on the Christie E510 LED Display Controller.

Front

The following provides the components at the front of the controller.



1	<p>Operating indicator</p> <ul style="list-style-type: none"> Green—The device is running normally.
---	--

	<ul style="list-style-type: none"> Red—The device is in Standby mode.
2	Standby button
3	OLED operation screen
4	Function knob
5	BACK button—Press to return to the previous menu.
6	INPUT button—Press to choose a video source.
7	USB port—Used to update firmware

Rear

The following provides information about the inputs and outputs of the controller.

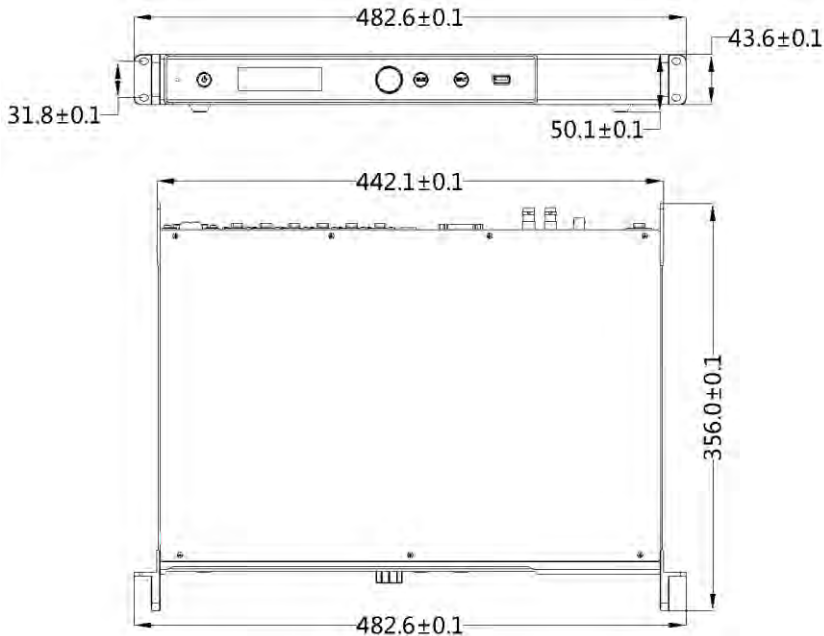


Inputs/outputs	Description
DVI IN	<ul style="list-style-type: none"> Single-link DVI connector Custom resolutions supported: Maximum width: 3840 pixels Maximum height: 2560 pixels Supported standard resolutions: <ul style="list-style-type: none"> 1024×768@(24/30/48/50/60/72/75/85/100/120)Hz 1280×1024@(24/30/48/50/60/72/75/85)Hz 1366×768@(24/30/48/50/60/72/75/85/100)Hz 1440×900@(24/30/48/50/60/72/75/85)Hz 1600×1200@(24/30/48/50/60)Hz 1920×1080@(24/30/48/50/60)Hz 1920×1200@(24/30/48/50/60)Hz 2560×960@(24/30/48/50)Hz 2560×1600@(24/30)Hz
HDMI IN	<ul style="list-style-type: none"> HDMI 1.4a compliant HDCP 1.4 compliant Custom resolutions supported: Maximum width: 3840 pixels Maximum height: 2560 pixels Supported standard resolutions: <ul style="list-style-type: none"> 1024×768@(24/30/48/50/60/72/75/85/100/120)Hz 1280×1024@(24/30/48/50/60/72/75/85)Hz 1366×768@(24/30/48/50/60/72/75/85/100)Hz 1440×900@(24/30/48/50/60/72/75/85)Hz 1600×1200@(24/30/48/50/60)Hz 1920×1080@(24/30/48/50/60)Hz

	<ul style="list-style-type: none"> • 1920×1200@(24/30/48/50/60)Hz • 2560×960@(24/30/48/50)Hz • 2560×1600@(24/30)Hz
3G-SDI IN	<ul style="list-style-type: none"> • SMPTE ST 425-1 Level A and B, SMPTE ST 274, ST 296, ST 295 compliant • Maximum supported input resolution—1920×1080@60Hz <p>Note: 3G-SDI input sources do not support input resolution and color depth settings.</p>
RJ45 × 6	<ul style="list-style-type: none"> • 6 Gigabit Ethernet ports • Maximum loading capacity of a single Ethernet port: <ul style="list-style-type: none"> • For 8-bit input sources: 650,000 pixels • For 10-bit/12-bit input sources: 320,000 pixels • Support redundancy between Ethernet ports.
OPT1 OPT2	<ul style="list-style-type: none"> • 10G optical ports • Single-mode twin-core fiber—Support LC optical connectors; wavelength: 1310 nm; transmission distance: 10 km; OS1/OS2 recommended. • Dual-mode twin-core fiber—Support LC optical connectors; wavelength: 850 nm; transmission distance: 300 m; OM3/OM4 recommended. • The maximum loading capacity of a single optical port equals that of all the six Ethernet ports. • 2 OPT inputs/outputs • The OPT1 works as the primary input or output port, and the 6 Gigabit Ethernet ports • The OPT2 works as the backup input or output port of OPT1. • In the sending card mode, both OPT ports and 6 Gigabit Ethernet ports can work as output ports to output the same image. • In the fiber converter mode, when the OPT ports work as the input ports, the 6 Gigabit Ethernet ports work as output ports. When the 6 Gigabit Ethernet ports work as input ports, the OPT ports work as output ports.
DVI LOOP	DVI loop output
HDMI LOOP	<ul style="list-style-type: none"> • HDMI loop output • Support HDCP 1.3 loop output encryption.
3G-SDI LOOP	SDI loop output
HDMI	<ul style="list-style-type: none"> • Connect to a monitor to monitor the inputs. The output resolution of this connector is 1920×1080@60Hz (fixed output with a width of 1920 pixels and height of 1080 pixels). • If the input resolution exceeds the monitor resolution, the input is automatically scaled in proportion and displayed on the monitor starting from its top left.
GENLOCK IN	<ul style="list-style-type: none"> • GENLOCK input connector • Genlock type—Blackburst • Input Genlock sync signal to ensure synchronization and same refresh rate between the output signals of cascaded E510 units and the external Genlock input signal.
GENLOCK LOOP	Genlock loop output connector. Up to eight E510 units can be cascaded.
ETHERNET	Fast Ethernet port, which connects to PC and supports TCP/IP
USB IN	Input port for cascading devices or connecting to PC
USB OUT	Output port for cascading devices. Up to eight E510 units can be cascaded.
Power supply	100 V–240 VAC
Power switch	ON/OFF

Dimensions

The following illustrates the dimensions of the product.

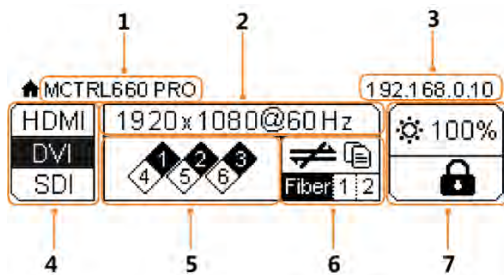


Home screen


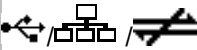



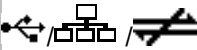



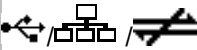


The Home screen changes depending on the mode.

- Sending Card mode

In the Sending Card mode, the Home screen of the E510 is shown below.



No.	Description
1	Device name
2	Display the device IP address and sending card name alternatively. The sending card name can be customized in the Christie E510 LED Display Controller software. See Customizing the sending card name.
3	The OPT1 port is the master input/output optical port, corresponding to the 6 Gigabit Ethernet ports. The OPT1 icon has different statuses: <ul style="list-style-type: none"> • Always on—The OPT1 port connection works.

	<ul style="list-style-type: none"> Off—The OPT1 port is not connected or the connection does not work. 						
4	<p>1–6: Indicate Ethernet ports 1–6.</p> <ul style="list-style-type: none"> LINK—Ethernet port connection status. The following diamond icon status indicates the Ethernet connection status. <ul style="list-style-type: none"> Always on—The Ethernet port connection works. Off—The Ethernet port is not connected or the connection does not work. ACT—Signal transmission status of Ethernet port. The following diamond icon status indicates the signal transmission status of Ethernet port. <ul style="list-style-type: none"> Flashing—The Ethernet port is transmitting signals. Off—The Ethernet port is not transmitting signals. 						
5	<p>The OPT2 port works as the backup input/output port of OPT1.</p> <ul style="list-style-type: none"> Always on—The OPT2 port connection works. Off—The OPT2 port is not connected or the connection does not work. 						
6	<p>Operating status</p> <table border="1"> <tr> <td></td> <td>Normal voltage and temperature—Voltage alarm/Temperature alarm/Voltage and temperature alarms</td> </tr> <tr> <td></td> <td>Connection status of control ports—USB connected/Ethernet connected/Not connected When both USB and Ethernet ports are connected to the control computer, USB port has the priority in control.</td> </tr> <tr> <td></td> <td>Buttons on the front panel are locked/unlocked. Hold down the knob and BACK button simultaneously for three seconds to lock or unlock the buttons. When the buttons are locked, any button operations are disabled and the Lock  icon appears on the Home screen.</td> </tr> </table>		Normal voltage and temperature—Voltage alarm/Temperature alarm/Voltage and temperature alarms		Connection status of control ports—USB connected/Ethernet connected/Not connected When both USB and Ethernet ports are connected to the control computer, USB port has the priority in control.		Buttons on the front panel are locked/unlocked. Hold down the knob and BACK button simultaneously for three seconds to lock or unlock the buttons. When the buttons are locked, any button operations are disabled and the Lock  icon appears on the Home screen.
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	Connection status of control ports—USB connected/Ethernet connected/Not connected When both USB and Ethernet ports are connected to the control computer, USB port has the priority in control.						
	Buttons on the front panel are locked/unlocked. Hold down the knob and BACK button simultaneously for three seconds to lock or unlock the buttons. When the buttons are locked, any button operations are disabled and the Lock  icon appears on the Home screen.						

Terminology

Learn about the components of the LED display system.

Term	Definition
Tile	A cabinet containing several LED modules.
Array	A group of connected tiles forming a larger display.
Controller	Controls the LED display system array and video input source. It is 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.
Fill factor	Indicates the ratio between the area covered by pixels and the area not covered by pixels.

Related documentation

Additional information on the Christie LED Display System is available in the following documents.

- Christie LED Display Control System Core Series II Installation and Setup Guide (P/N:020-001930-XX)

- *Christie LED Display Control System Core Series II Product Safety Guide (P/N: 020-001929-XX)*
- *Christie E510 LED Display Control System Serial Commands Technical Reference (P/N: 020-001940-XX)*
- *Monitoring the Remote Power 48V (P/N: 020-000850-XX)*

Configuring the array

Perform these tasks when configuring the array.

To configure the array, the computer running the Christie E510 LED Display Controller software must be connected to the controller with a USB A to B cable.

1. Install the Christie E510 LED Display Controller software (on page 14).
2. Set the input resolution (on page 14).
3. Review the screen connections (on page 15).
4. Adjust the initial picture coordinates (on page 16).
5. Adjust the screen brightness (on page 17).
6. Adjust the image quality (on page 17).
7. Set the redundancy backup (on page 17).
8. Test the communication between the controller and the tiles (on page 18).
9. Review and modify the tile configuration (on page 18).

Installing the Christie E510 LED Display Controller software

The Christie E510 LED Display Controller software controls the configuration of the array.

1. Disable the firewall.
2. Insert the Christie E510 LED Display Controller software USB flash drive into the computer.
3. Follow the on-screen instructions and install the Christie E510 LED Display Controller software.

Logging into the controller software

To access the configuration features of the controller software, log into 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 Christie E510 LED Display Controller software.
3. Launch the Christie E510 LED Display Controller software and log in as the administrator.
 - a. Click User > Advanced User Login.
 - b. Login with the password admin.

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 Christie E510 LED Display 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.

Tile	Native resolution
LED009	640 pixels by 360 pixels
LED012	480 pixels by 270 pixels
LED016	384 pixels by 216 pixels
LED019	320 pixels by 180 pixels
LED025	240 pixels by 135 pixels

6. Click Save.

Resolution requirements

Understand how to calculate the resolutions for the LED display tile array.

- The maximum vertical and horizontal resolutions may vary. Contact Christie Technical Support if required.
- 8 bit sources (30Hz - 120Hz)—All resolutions from 640 x 480 to 1920 x 1200 refer to standard resolutions selectable within the Christie E510 LED Display Controller software.
- 8 bit sources (30Hz - 60Hz)—Resolutions 2048 x 1152 and 2560 x 960
- 10/12 bit sources (30Hz - 60Hz)—All resolutions from 640 x 480 to 1440 x 900
- Custom resolutions are accepted by following the formula below. Custom input is restricted to Single Link DVI/HDMI, using a recommended 94% of the pixels.

The maximum bandwidth of each output is 1Gbit/second, and is calculated with this formula:

Pixel Number x Frame Rate x (Red bit depth + Green bit depth +Blue bit depth)

8bit calculation	1G = Pixel Num x Frame Rate x (8+8+8)
10bit calculation	1G = Pixel Num x Frame Rate x (10+10+10)
12bit calculation	1G = Pixel Num x Frame Rate x (12+12+12)

For example, the 10 bit calculation for a 60Hz DVI signal is:

- $1G = \text{Pixel Number} \times 60 \times (10+10+10)$
- Pixel Number: $555,555 \times 94\% = 522,221$ pixels
- Multiply the number of pixels by the number of ports: $522,221 \times 4 = 2,088,884$

Identify the screen cabling path

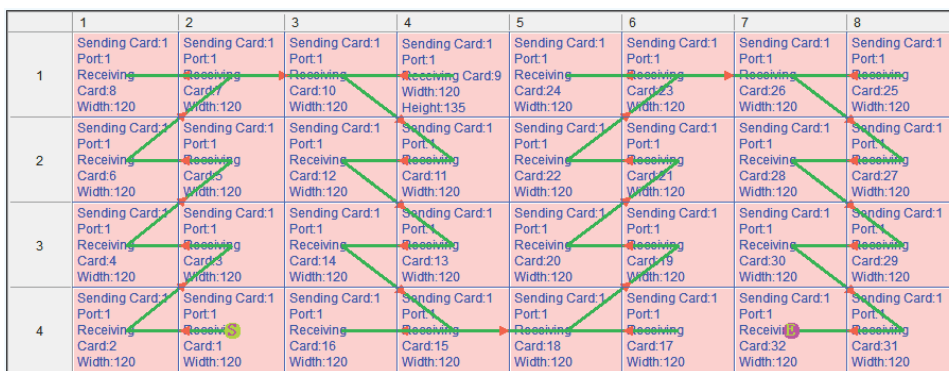
Verify the cabling between tiles is mapped correctly and adjust as necessary.

1. Connect the computer to the controller with both an HDMI cable and a USB cable.
2. Launch the Christie E510 LED Display Controller software and log in as the administrator.
 - a. Click User > Advanced User Login.
 - b. Log in with the password admin.
3. Click Screen Configuration.
4. Select Configure Screen and click Next.
5. Select Standard Screen and specify the number of columns and rows of tiles in the array.
6. Specify the receiving card size.

Tile	Receiving card size
LED009-AP	—
LED012-AP	270 x 240
LED012-AL	240 x 270
LED016-AL	192 x 216
LED019-AL	160 x 180
LED025-AL	120 x 135

7. In the Sending Card Number area, select the controller.
8. Starting with the first tile connected to the controller, left-click and drag the mouse along the rough path the data cables take between the tiles.

Each tile in the array spans two columns of the grid, one section for each receiver card in the tile. When dragging the path, ensure that each receiver card in the tile is selected before moving on to the next tile.



9. Click Send to HW.
10. Repeat steps 7 to 9 for each controller in the array.

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.

Adjusting the image brightness

Change the brightness level of each tile to create a uniform brightness across the array.

1. In the Christie E510 LED Display Controller software, click Brightness.
2. To adjust the brightness, use the Brightness Adjustment slider.
3. If the brightness is uneven across the tiles, set all brightness values to zero and raise them to the required brightness to re-sync the tiles.
4. Click Save To HW.

Adjusting the image quality

Change the darker and lighter tones of the source video.

1. In the Christie E510 LED Display Controller software, click Brightness.
2. In the Contrast section of the Brightness Adjustment dialog, use the Gamma slider to adjust the darker and lighter tones of the source video.
3. Click Save To HW.

Setting the redundancy backup

If the connection to one tile is lost, the redundancy backup passes information to the other tiles so the display continues to work normally.

1. In the Christie E510 LED Display Controller software, click Screen Configuration.
2. Select Configure Screen and click Next.
3. Switch to the Sending Card tab.
4. In the Redundancy section, click Add.

Only tiles in the same cascade chain can have a primary-backup redundancy backup relationship.

5. Set the serial number of the primary sending card and port number.
6. Set the serial number of the backup sending card and port number.

A backup tile cannot be set as a primary if it is part of a redundancy backup relationship.

7. Click Add.

8. Add any additional redundancy relationships.
9. Click Close.
10. Click Save.

Testing the communication between the controller and tiles

Verify the array is connected to and recognized by the Christie E510 LED Display Controller.

1. Connect the USB cable between the controller and the computer running the Christie E510 LED Display Controller software.
2. Launch the Christie E510 LED Display 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 there is no screen, verify the output mode is set to Ports and in the Christie E510 LED Display 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 Christie E510 LED Display Controller software.

1. In the Christie E510 LED Display 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:

- S—Indicates where the first cable starts.
- Green line—Shows the path of the daisy chain of cables.
- E—Identifies the end of the daisy chain.

Loading a cabinet configuration file

After the screen is powered on, if the tile fails to display normally, you must load the cabinet files. The cabinet files are sent to the controller through the Christie E510 LED Display Controller software.

1. In the Christie E510 LED Display Controller software, click Screen Configuration.
2. Select Configure Screen and click Next.
3. Switch to the Receiving Card tab.
4. Click Load from File.
5. In the Open dialog, navigate to the .rcfg file and click Open.
6. Click Send to Receiving Card.
7. Click Save.

Adjusting dark and light lines between tiles

To blend two tiles together, change the brightness of the lines between two tiles.

1. Connect the computer to the controller with both an HDMI cable and a USB cable.
2. Launch the Christie E510 LED Display Controller software and log in as the administrator.
 - a. Click User > Advanced User Login.
 - b. Log in with the password admin.
3. In the controller software, select Tools > Quickly Adjust Dark or Bright Lines > Adjust Dark or Bright Lines.
4. At the bottom of the dialog, select the color to display on the array.
5. Select the line to adjust.
 - To select more than one line, select each line.
 - To adjust only specific pixels, double-click the selected line and choose the pixels to adjust.
Each tile in the array spans two columns of the grid. To select the right edge of the top left tile, select the bar at the right of the row 1, column 2 sector.
6. Move the Adjust slider until the selected line matches the surrounding LEDs and disappears.
Adjustments are made in real-time but depending on the size of the area being adjusted it may take a few seconds for the tiles to refresh.
7. After the line adjustment is complete, click Save to HW.
8. In the confirmation dialog, click OK.
9. Repeat steps 4 to 7 for each line to be adjusted.

Displaying a picture when there is no signal

Configure the controller to display a picture when there is no source signal to the controller.

1. Ensure the main display is showing on the array.
2. In the Christie Controller software select Settings > Prestore Screen.
3. In the Prestore Picture Settings area, click Browse and navigate to the picture to display when there is no signal to the controller.
4. In the Prestore Picture Settings area, select Save to HW.
5. A confirmation message is displayed when the save is completed.
6. For Disconnect Cable select Prestore Picture.
7. For No DVI Signal select Prestore Picture.
8. In the Function Settings area, select Save to HW.

Changing the display to black when there is no signal

Configure the controller to display black when there is no source signal to the controller.

1. Ensure the main display is showing on the array.
2. In the Christie Controller Software select Settings > Prestore Screen.
3. For Disconnect Cable select Black.
4. For No DVI Signal select Black.
5. In the Function Settings area, select Save to HW.

Restoring the factory settings

Return the configuration back to the factory default settings.

1. In the Christie E510 LED Display Controller software, click Screen Configuration.
2. Select Configure Screen and click Next.
3. Switch to the Sending Card tab.
4. Click Restore Factory Settings.
5. At the confirmation dialog, click OK.

The system is returned to its factory settings.

6. At the completion dialog, click OK.

Locking 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.

Color matching LED modules

Adjust the color of an LED module to match the modules around it.

1. Connect the computer to the controller with both an HDMI and USB cable.
2. Launch the Christie E510 LED Display Controller software and log in as the administrator.
 - a. Click User > Advanced User Login.
 - b. Log in with the password admin.
3. In the controller software, click Calibration.
4. Switch to the Manage Coefficients tab, and click Adjust coefficients.
5. Select the receiver card to adjust.
6. Ensure Select by Topology is selected.
7. Select the area to adjust.
 - a. Double-click the receiver card to be adjusted.
 - b. Enter the module size.

Tile	Pixels per module
LED009-AP	—
LED012-AP	120 x 90
LED012-AL	120 x 90
LED016-AL	96 x 72
LED019-AL	80 x 60
LED025-AL	60 x 45

- c. Select the module to adjust.
8. Click Next.
9. Select Adjust its own effect.
10. In the confirmation dialog, select OK.
The array turns white.
11. Adjust the color sliders to match the surrounding LED modules.
Adjustments are made in real-time, but depending on the size of the area being adjusted it may take a few seconds for the tiles to refresh.
12. After the adjustments are completed, click Next.
13. Click Save.
14. In the confirmation dialog, select OK.

15. Click Finish.

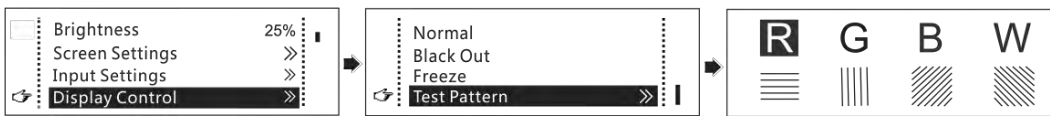
Calibrating replacement LED modules

After replacing a defective LED module, import the calibration information for the new module.

1. Before installing the replacement LED module, record the ID and serial number of the module.
2. Launch the Christie E510 LED Display Controller software and log in as the administrator.
 - a. Click User > Advanced User Login.
 - b. Log in with the password admin.
3. Click Settings > Module Flash.
4. Click Check coefficients in modules.
5. After the information is loaded to the modules, click Save calibration coefficients on receiving cards.

Controlling the status of the display

Use the Display Control to control the status of display on the LED screen.



1. On the Home screen, press the knob to enter the menu.
2. Choose Display Control to enter its submenu.
3. Select a control mode and press the knob to apply it.

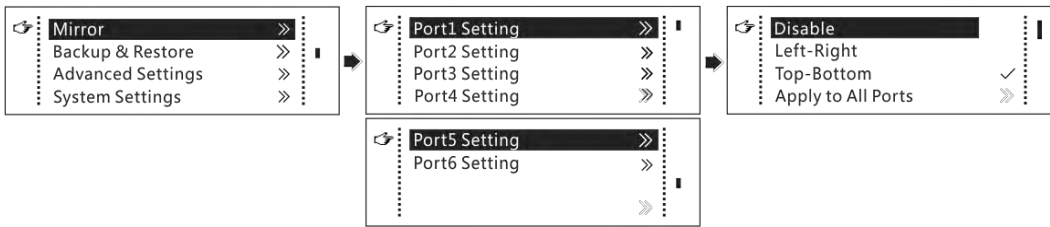
Control mode	Description
Normal	The LED screen displays the current input source normally.
Black Out	The LED screen goes black and does not display input source still being played in the background.
Freeze	The LED screen always displays the frame when frozen. The input source is still being played in the background.
Test Pattern	Use test patterns to check the display effect and pixel operating status. Eight test patterns exist, including pure colors and line patterns.

Mirroring the image

Mirror images displayed on the LED screen. You can disable mirroring, mirror the image from left to right or from top to bottom. The image mirroring is based on the entire output image.

It constrains the following:

- This function is disabled when the input source is SDI.
- Image mirroring and low latency cannot be enabled at the same time.



1. On the Home screen, press the knob to enter the menu.
2. Select Mirror and press the knob to enter its submenu.
3. Set the mirroring mode for the image loaded by current Ethernet port.
4. Optionally, select Apply to All Ports and press the knob.

The mirroring settings takes effect on all other Ethernet ports automatically.

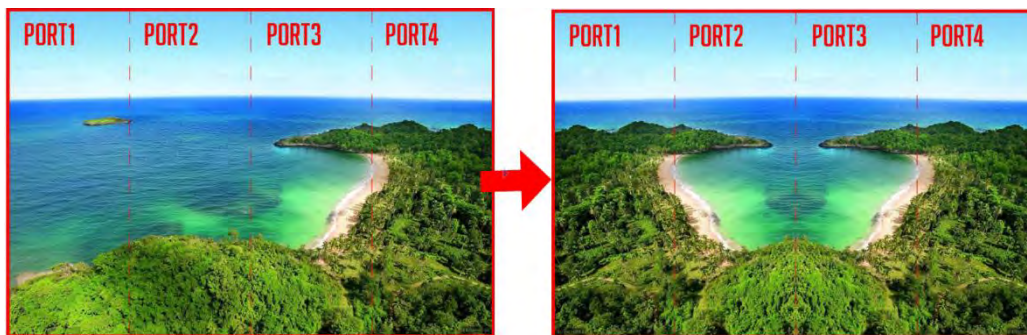
The mirroring effects are illustrated in the following figures.

- Left-right mirroring of the image loaded by Ethernet port 1



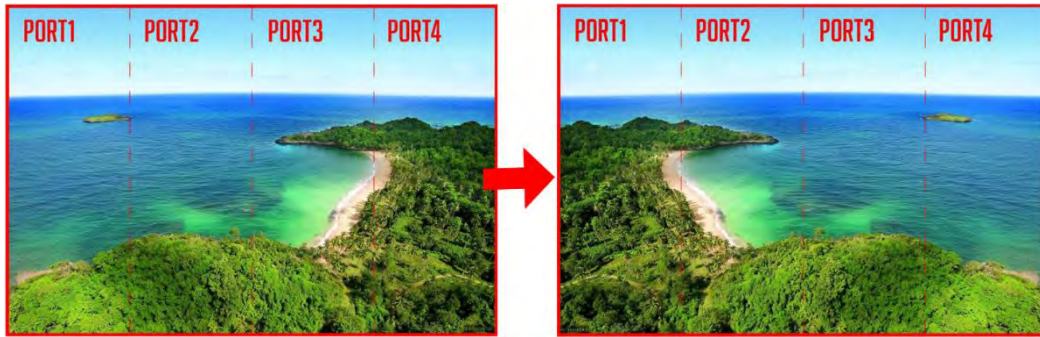
As shown above, after setting the mirroring mode as left-right for Ethernet port 1, the entire image is mirrored horizontally but only the Ethernet port 1 area displays the partial mirrored image.

- Left-right mirroring of images loaded by Ethernet port 1 and 2



As shown above, after setting the mirroring mode as left-right for Ethernet ports 1 and 2, the entire image is mirrored horizontally but only the areas of Ethernet ports 1 and 2 display the partial mirrored images.

- Left-right mirroring of the entire image



As shown above, after setting the mirroring mode as left-right for Ethernet ports 1 to 4, the entire image is mirrored horizontally.

- Top-bottom mirroring of the image loaded by Ethernet port 1



As shown above, after setting the mirroring mode as top-bottom for Ethernet port 1, the entire image is mirrored vertically but only the Ethernet port 1 area displays the partial mirrored image.

- Top-bottom mirroring of the entire image

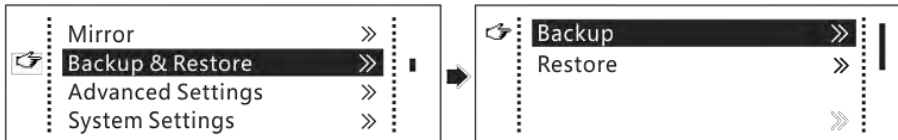


As shown above, after setting the mirroring mode as top-bottom for Ethernet ports 1 to 4, the entire image is mirrored vertically.

Backing up and restoring the system

Use the Backup & Restore option to do the following:

- Back up the system configuration to the controller.
- Restore the system configuration from the controller.
- Restore the receiving card configuration from the controller.
- Restore the sending card configuration from the controller.

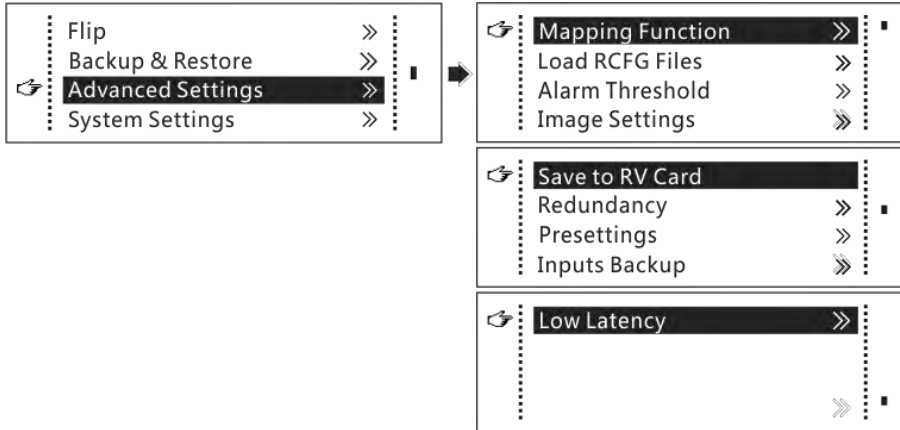


System configuration includes configuration files of the sending card (namely the controller) and receiving cards.

1. On the Home screen, press the knob to enter the menu.
2. Select Backup & Restore.
3. To back up the system, press the knob to enter Backup submenu.
4. To restore the system, press the knob to enter the Restore submenu.

Setting Advanced features

The Advanced settings provide access to the mapping function, saving to an RV card, and the low latency feature.



Mapping function

When mapping function is enabled, each of the cabinets displays its cabinet number and the number of the Ethernet port that loads the cabinet.



Receiving cards used by the system must support mapping function.



For example:

- P: 05 indicates the Ethernet port.
- No. #001 indicates the cabinet number.

Follow these steps to enable the mapping function.

1. On the Home screen, press the knob to enter the menu.
2. Select Advanced Settings and press the knob to enter its submenu Mapping Function.
3. Press the knob to enable.

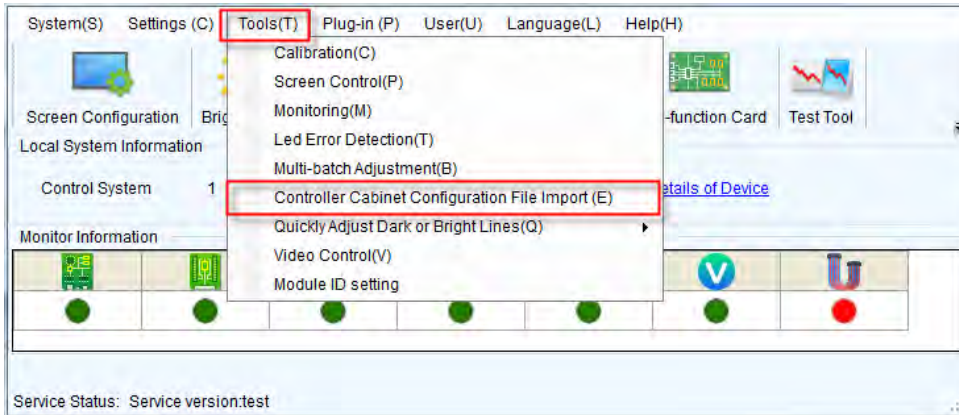
Loading RCFG files

Before you begin, save the cabinet configuration file (*.rcfgx or *.rcfg) to the local PC.

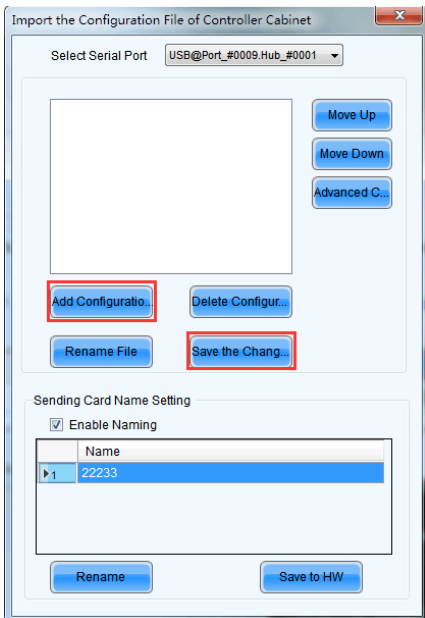


Configuration files of irregular cabinets are not supported.

1. Run the Christie E510 LED Display Controller software and choose Tools > Controller Cabinet Configuration File Import.



2. On the displayed page, select the currently used serial port or Ethernet port, click Add Configuration File to select and add a cabinet configuration file.



3. To save the change to the controller, click Save the Change to HW.

Setting alarm thresholds

Set the alarm thresholds for device temperature and voltage.

1. On the Home screen, press the knob to enter the menu.
2. Select Advanced Settings and press the knob to enter its submenu Alarm Threshold.
3. Set the threshold.



When no temperature or voltage alarms exist, the Home screen displays the backup status.

When a threshold is exceeded, its corresponding icon is flashing, instead of displaying the value.

Icon	State	Range
	Voltage alarm, icon flashing	3.5 V–7.5 V
	Temperature alarm, icon flashing	-20°C to 85°C (-4°F to 185°F)
	Voltage and temperature alarms at the same time, icon flashing	—

Adjusting image settings

Adjust the color of parameters of the output image on the LED screen.

1. On the Home screen, press the knob to enter the menu.
2. Select Advanced Settings and press the knob to enter its submenu Image Settings.
3. Adjust the image settings.

Parameter	Range	Stepping
Color temperature	4000 K to 500 K	100
Red/Green/Blue	0 to 255	1
Gamma	1.0 to 4.0	0.1
Contrast	0% to 100%	1
Saturation	0% to 100%	1
Hue	-180 to 180	1

Saving to RV card

By using this function, you can:

1. On the Home screen, press the knob to enter the menu.
2. Select Advanced Settings and press the knob to enter its submenu Save to RV Card.
3. Set the following:
 - Send and save the configuration information to the receiving cards, including brightness, color temperature, Gamma and display settings.
 - Overwrite the information saved to the receiving card earlier.

- Ensure the data saved in the receiving cards is not be lost in the event of a power failure of the cards.

Setting redundancy

Set the controller as the primary or backup device. When the controller works as a backup device, set the data flow direction as opposite to the primary device.

1. On the Home screen, press the knob to enter the menu.
2. Select Advanced Settings and press the knob to enter its submenu Redundancy.
3. Set if the controller is the primary or backup device.

If the controller is set as the backup device, when the primary device fails, the backup device immediately takes over the work of the primary device and the backup takes effect. After the backup takes effect, the target Ethernet port icons on the Home screen have marks on top flashing once every second.

Storing settings in presets

Use presets to store configured settings so you can switch between the presets as required.

1. On the Home screen, press the knob to enter the menu.
2. Select Advanced Settings and press the knob to enter its submenu Presettings.
Up to 10 presets can be saved.
3. To save the current parameters as a preset, select Save.
4. To read back the parameters from the saved preset, select Load.
5. To delete the parameters saved in the preset, select Delete.

Setting up a backup video source

Set a backup video source for each primary video source. Other input video sources supported by the controller can be set as backup video sources.

1. On the Home screen, press the knob to enter the menu.
2. Select Advanced Settings and press the knob to enter its submenu Input Backups.
3. Set the backup video source for the primary video source.

Number	Primary video source	Backup video source
Backup 1	HDMI	NULL/DVI/SDI
Backup 2	DVI	NULL/SDI/HDMI
Backup 3	SDI	NULL/DVI/HDMI

After a backup video source takes effect, the video source selection is irreversible.

Reducing time delay between input of video signal

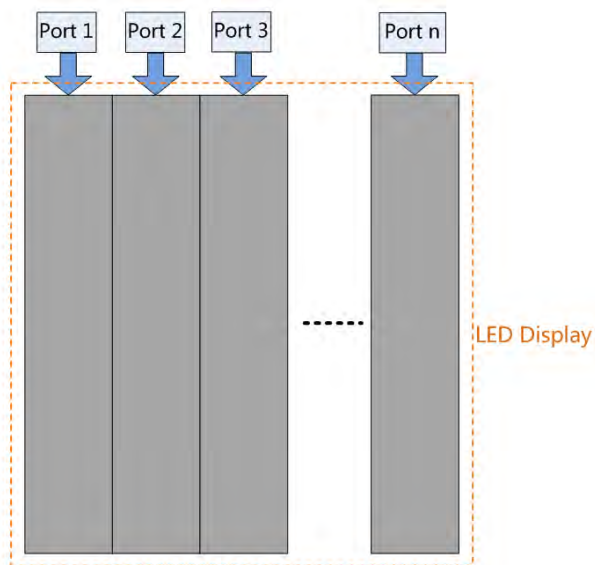
The E510 supports a low latency of less than 1 ms (when the start position of image is 0). Low latency is used to reduce the time delay between the input of video signal to the controller and the corresponding output.

1. On the Home screen, press the knob to enter the menu.
2. Select Advanced Settings and press the knob to enter its submenu Low Latency.
3. Set the horizontal resolution loaded by a single Ethernet port to less than or equal to 512 pixels.

Low latency cannot be enabled with any of the following functions at the same time.

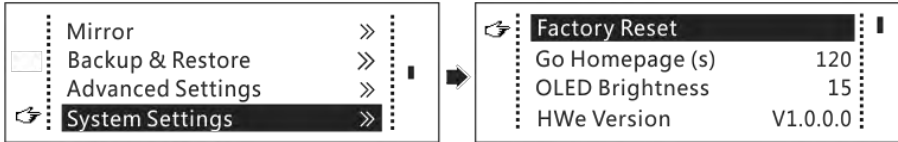
- Image mirroring
- Input of interlaced SDI video sources
- GENLOCK

Each Ethernet port must load the cabinets vertically in the configured screen, as shown in the figure below.



Configuring the system and communication

The System Settings menu provides access to the factory reset, communication settings, working modes, and so on.



Restoring factory default settings

Restoring factory settings removes all custom settings.

1. On the Home screen, press the knob to enter the menu.
2. Select System Settings and press the knob to enter its submenu Factory Reset.
3. To reset to factory defaults, use the knob.

Determining current screen time

Set the time to staying on the current screen before returning to the Home screen when no action is performed.

1. On the Home screen, press the knob to enter the menu.
2. Select System Settings and press the knob to enter its submenu Go Homage (s).
3. Set the time range.

The time range is 30s to 3600s.

Adjusting OLED brightness

Adjust the brightness of the OLED menu screen on the front panel.

1. On the Home screen, press the knob to enter the menu.
2. Select System Settings and press the knob to enter its submenu OLED Brightness.
3. Adjust the OLED menu screen brightness.

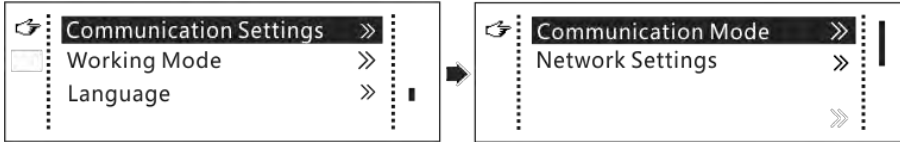
Checking the hardware version

Check the hardware version of the controller. If a new version is released, update the firmware programs in the Christie E510 LED Display Controller software.

1. On the Home screen, press the knob to enter the menu.
2. Select System Settings and press the knob to enter its submenu HWe Version.

Setting communication and network parameters

Set the communication mode and network parameters of the E510.



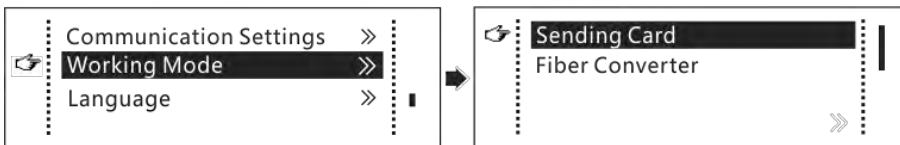
1. On the Home screen, press the knob to enter the menu.
2. Select Communication Settings and press the knob to enter its submenu Communication Mode.
3. To set the Communication mode.

USB preferred and Local Area Network (LAN) preferred. The controller connects to the PC using the USB port or ETHERNET port. If USB Preferred is selected, the PC prefers to communicate with the controller using the USB port or the ETHERNET port.

4. Select Communication Settings and press the knob to enter its submenu Network Settings.
5. Select either Manual or Automatic and configure their settings.
 - Manual settings parameters include controller IP address and subnet mask.
 - Automatic settings can read the network parameters automatically.
6. To reset the network parameters to default values, select Communication Settings and press the knob to enter its submenu Network Settings.
7. Select Reset.

Setting the Working mode

The E510 allows you to switch between Sending Card and Fiber Converter modes.



1. On the Home screen, press the knob to enter the menu.
2. Select Working Mode.
3. Press the knob to set the Working mode as Sending Card.

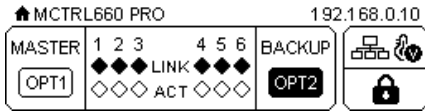
Both the optical ports and Gigabit Ethernet ports can work as output ports to output video signals. Refer to "Scenario 1: Application of Sending Card mode" in the *Applications* topic on page 6. The Home screen in sending card mode is shown below.



4. Press the knob to set the Working mode as Fiber Converter.

Only communication settings and working mode settings are available. The temperature and voltage alarm ranges are the same as their last settings.

On the OLED menu screen, set the working mode as Fiber Converter. The optical ports (for input/output) and Gigabit Ethernet ports (for output/input) are used to realize conversion between optical and electric signals. Refer to "Scenario 2: Application of Fiber Converter mode" in the *Applications* topic on page 6. The Home screen in fiber converter mode is shown below.



Setting the OLED menu screen language

Change the user interface language of the OLED menu screen.

5. On the Home screen, press the knob to enter the menu.
6. Select Language.
7. Select a language.

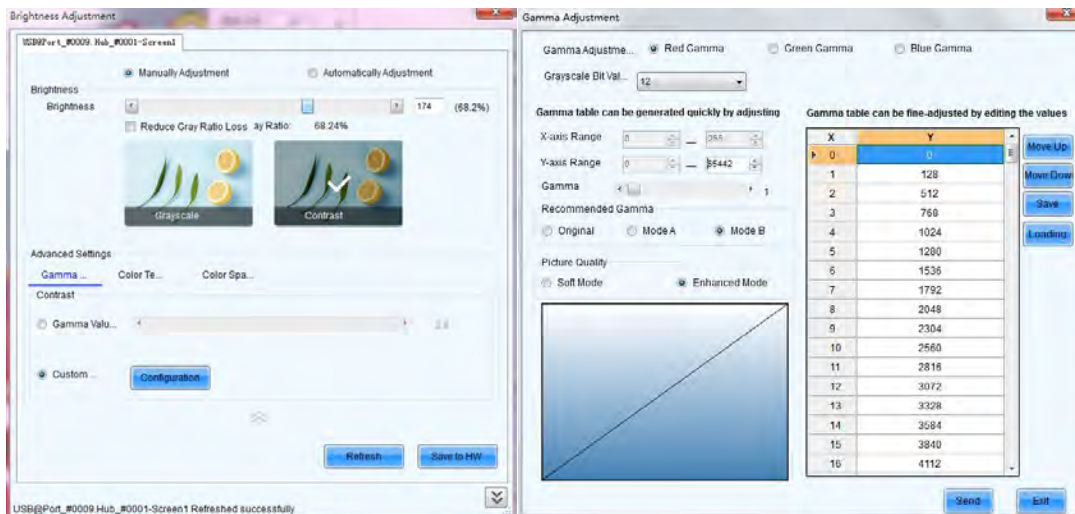
PC and web page operations

Learn about what operations can be done on the PC and web page.

Adjusting individual Gamma for RGB

The E510 supports individual Gamma adjustment for RGB when the color depth of input source is 10-bit or 12-bit, which effectively controls image non-uniformity under low grayscale and white balance offset to improve image quality.

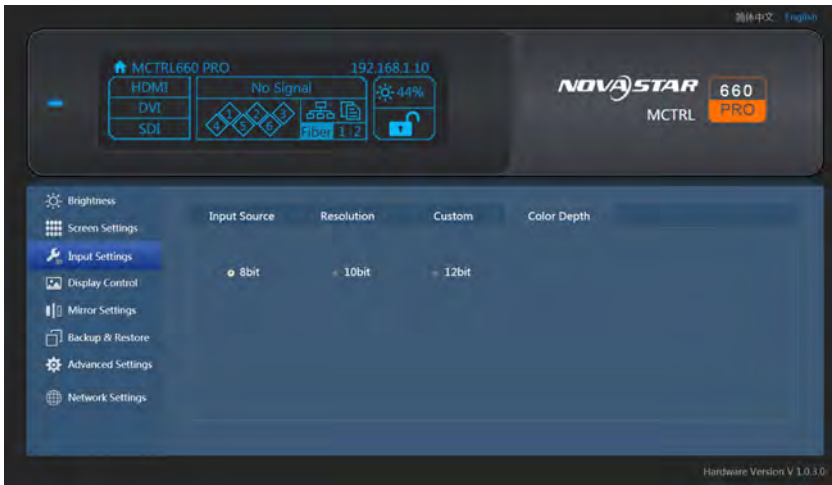
1. Run the Christie E510 LED Display Controller software, click Screen Configuration, choose the current operation communication port and click Next.
2. On the Sending Card tab page, select the corresponding input source bit depth and click Set.
3. On the home page of the Christie E510 LED Display Controller software, choose Brightness > Manually Adjustment.
4. Under Advanced Settings, choose Gamma > Custom Gamma Adjustment and click Configuration to enter the Gamma Adjustment page.
5. Adjust Red Gamma, Green Gamma and Blue Gamma, respectively.
6. Click Send.



When the color depth of input source is 8-bit, the individual Gamma adjustment for RGB is realized by the A8s or C10s receiving card.

Configuring the screen from the web page

The E510 supports screen configuration on web page, allowing for more convenient screen configuration.



The following operations cannot be done from the web page:

- Loading RCFG files
- Presettings
- Inputs backup
- System settings
- Communication mode settings
- Working mode settings

Environment Configuration

1. Connect the E510 to PC (or mobile device).
 - Scenario 1: E510 connected to PC using an Ethernet cable
 - Scenario 2: E510 connected to PC (or mobile device) using a router to the same LAN
2. Set the PC (or mobile device) and the E510 on the same LAN.
3. Obtain the IP address of the E510.
4. On the browser, enter the IP address to enter the operation page.

Christie recommends Google Chrome (Safari browser can also be used on iOS).

Applications

- Scenario 1: E510 connected to PC using an Ethernet cable



- Scenario 2: E510 connected to PC (or mobile device) using the LAN



Updating the firmware

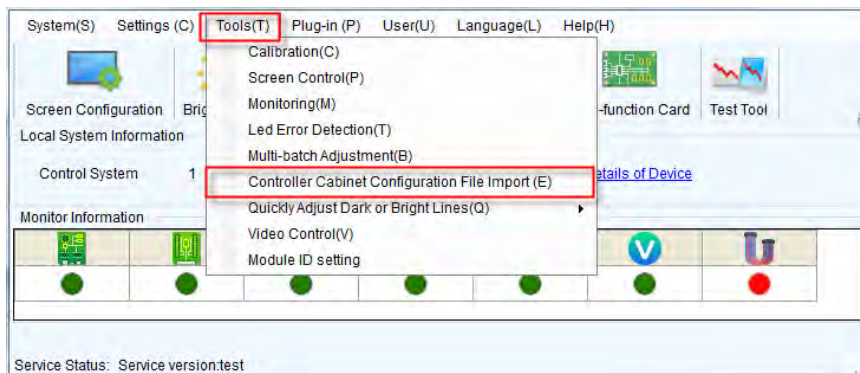
In the Christie E510 LED Display Controller software, follow these steps to update the E510 firmware.

1. Start Christie E510 LED Display Controller software and choose User > Advanced Synchronous System User Login and log in as an advanced user.
2. Type the code `admin` to enter the program loading page.
3. To select the update program path, click Browse.
4. Click Update.

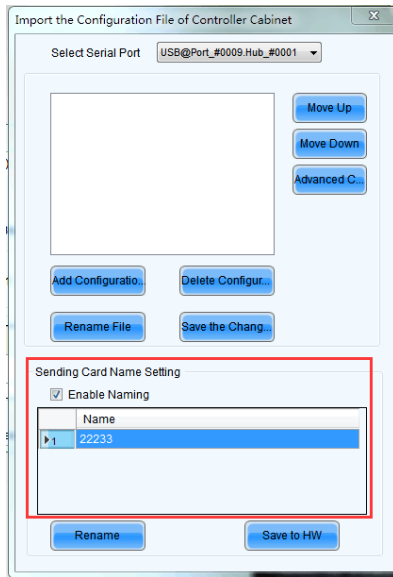
Customizing the sending card name

Customize the sending card name. This name and the device IP address is displayed on the Home screen.

1. Run the Christie E510 LED Display Controller software and choose User > Advanced Synchronous System User Login and log in as an advanced user.
2. Choose Tools > Controller Cabinet Configuration File Import.



3. Under Sending Card Name Setting on the displayed page, select Enable Naming.
4. Click Rename.
5. In the Rename dialog box, enter a name and click OK.



6. Click Save to HW.

Monitoring Christie Velvet LED Display System with SNMP

Use the Christie E510 LED Display Controller SNMP application to monitor the Christie Velvet LED Display System and to configure what trap notifications are be sent when certain events occur.

Simple Network Management Protocol (SNMP) enables network administrators to monitor their network devices from a single location. For information on the Christie E510 LED Display Controller Object Identifiers (OIDs), refer to the MIB files.

Events logged by SNMP can be recorded, and notification of SNMP events can be sent to specified email addresses.

1. Download and install any MIB browser software.
2. Download the following MIB files from www.christiedigital.com/SNMP:
 - CDS-SMI.mib
 - CDS-E510.mib
3. Import the Christie MIB files into the browser.
Load the CDS-SMI.MIB file first and load the CDS-E510.MIB file.
4. Configure the SNMP alarms and identify where alarms and trap messages are sent.

Christie E510 LED Display Controller MIB traps

Understand what the MIB files monitor.

Trap	Trigger
cdTemperatureWarning	The current temperature value from controller sensor is larger than the threshold.
cdTemperatureWarningCleared	The current temperature value from controller is less than threshold.
cdVoltageWarning	The current voltage value from controller is larger than threshold.
cdVoltageWarningCleared	The current voltage value from controller has dropped below the threshold.
cdRXcardsConnected	The receiving card is connected.
cdRXcardsNotConnected	The receiving card is removed or is not connected.
cdPort1Connected	An Ethernet cable is plugged into Ethernet port 1. The trap is only triggered when in Ethernet mode.
cdPort1NotConnected	The Ethernet cable is removed from port 1.
cdPort2Connected	An Ethernet cable is plugged into Ethernet port 2. The trap is only triggered when in Ethernet mode.
cdPort2NotConnected	The Ethernet cable is removed from port 2.
cdPort3Connected	An Ethernet cable is plugged into Ethernet port 3. The trap is only triggered when in Ethernet mode.
cdPort3NotConnected	The Ethernet cable is removed from port 3.
cdPort4Connected	An Ethernet cable is plugged into Ethernet port 4. The trap is only triggered when in Ethernet mode.

cdPort4NotConnected	The Ethernet cable is removed from port 4.
cdSerdesConnected	A coaxial cable is connected. The trap is only triggered when in SerDes mode.
cdSerdesNotConnected	The coaxial cable is removed.
cdSourceChange	The input source is changed.
cdSourceCurrent	This trap show what the current input source is.
cdFPGAConnected	If controller running normal, this trap show FPGA work normally.
cdFPGAFailed	If controller shutdown, there will be a trap show FPGA failed.

Troubleshooting

Learn about common issues and their solutions.

Line adjustments do not appear on the module edges

When darkening and lightening the lines between modules, the adjustments appear beside the joints and not on the joints.

Resolution

In the Control Panel, ensure the display text size and the DPI are both set to 100%.

Text displays beyond the button outline

The text on buttons extends beyond the edges of the button.

Resolution

In the Control Panel, ensure the display text size and the DPI are both set to 100%.

An image remains on the display after disconnecting the source

When the source is disconnected, the last image remains on the display.

Resolution

Configure the display to show a picture or to change to a black screen when the source is disconnected.

Related information

- Displaying a picture when there is no signal (on page 19)
- Changing the display to black when there is no signal (on page 20)

