User Guide

020-102222-02

Christie E500 LED Display Controller

CHRISTIE

NOTICES

COPYRIGHT AND TRADEMARKS

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!

CHRISTIE

Content

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.

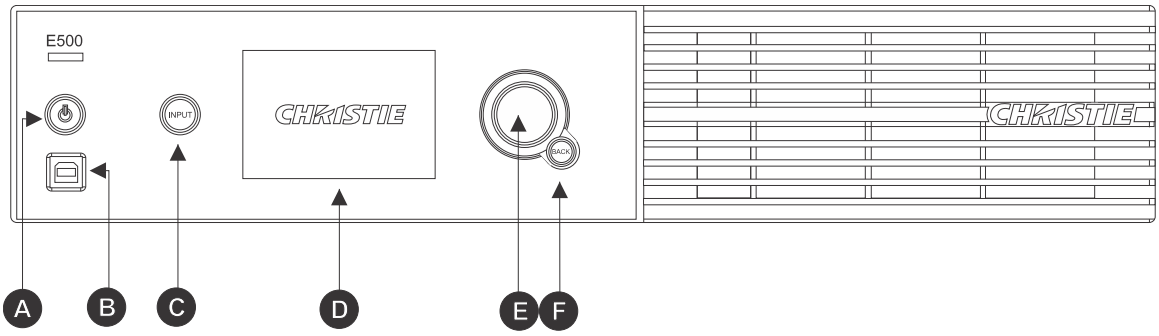
Each Christie E500 LED Display Controller can support a maximum number of tiles, which varies depending on the pixel pitch of the tiles in the array. The configuration to achieve an HD display differs by the pixel pitch of the tile, as outlined in the table below.

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

Christie E500 LED Display Controller interface and ports

Learn about the interface and physical ports on the Christie E500 LED Display Controller.

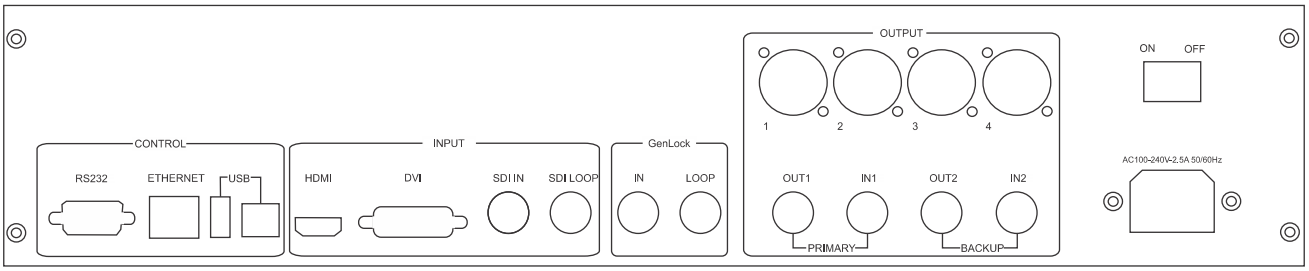
Front



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 • Horizontal resolution maximum: 3840 pixels • Vertical resolution maximum 1920 pixels
	HDMI	Standard HDMI 1.3 input Supports 8 bit and 12 bit; for • 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	
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

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.
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	
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 Velvet LED Display System is available in the following documents.

- *Christie Velvet LED Display Control System Apex Series Installation and Setup Guide* (P/N: 020-102213-XX)
- *Christie Velvet LED Display Control System Apex Series Product Safety Guide* (P/N: 020-102212-XX)
- *Christie E500 LED Display Control System Serial Commands Technical Reference* (P/N: 020-102458-xx)
- *Monitoring the Remote Power 48V* (P/N: 020-000850-01)

Configuring the array

Perform these tasks when configuring the array.

To configure the array, the computer running the Christie E500 LED Display Controller software must be connected to the controller with a USB A to B cable.

1. *Install the Christie E500 LED Display Controller software* (on page 7).
2. *Set the input resolution* (on page 8).
3. *Review the screen connections* (on page 9).
4. *Adjust the initial picture coordinates* (on page 10).
5. *Adjust the screen brightness* (on page 10).
6. *Adjust the image quality* (on page 10).
7. *Set the redundancy backup* (on page 10).
8. *Test the communication between the controller and the tiles* (on page 11).
9. *Review and modify the tile configuration* (on page 11).

Installing the Christie E500 LED Display Controller software

The Christie E500 LED Display Controller software controls the configuration of the array.

1. Disable the firewall.
2. Insert the Christie E500 LED Display Controller software USB flash drive into the computer.
3. Follow the on-screen instructions and install the Christie E500 LED Display Controller software.

Logging in to 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 Christie E500 LED Display Controller software.
3. Launch the Christie E500 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 E500 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 px by 360 px
LED012	480 px by 270 px
LED016	384 px by 216 px
LED019	320 px by 180 px
LED025	240 px by 135 px

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 a Christie representative for support, if required.
- 8 bit sources (30 Hz - 120 Hz)—All resolutions from 640 x 480 to 1920 x 1200 refer to standard resolutions selectable within the Christie E500 LED Display Controller software
- 8 bit sources (30 Hz - 60 Hz)—Resolutions 2048 x 1152 and 2560 x 960
- 10/12 bit sources (30 Hz - 60 Hz)—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)`

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

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

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

Identify the screen cabling path

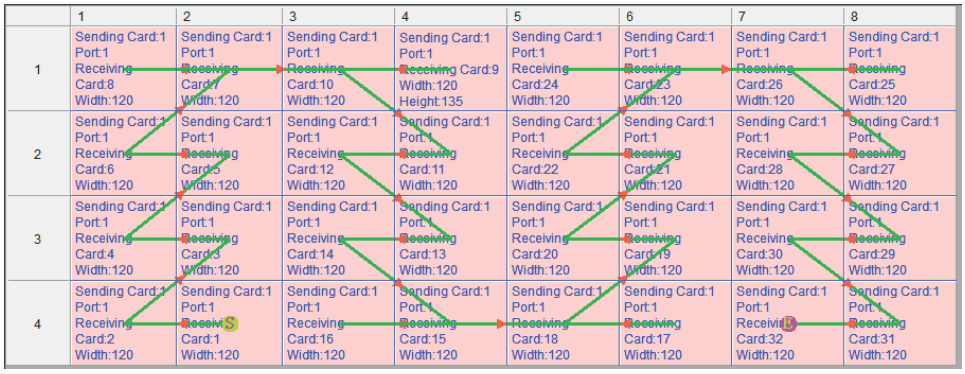
Verify the cabling between tiles is mapped correctly, and adjust as necessary.

1. Connect the computer to the controller with both an HDMI cable and a USB cable.
2. Launch the Christie E500 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 rought 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 E500 LED Display Controller software, click **Brightness**.
2. Use the **Brightness Adjustment** slider to adjust the brightness.
3. If the brightness is uneven across the tiles, set all brightness values to zero and raise them to the desired 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 E500 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 E500 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 master-slave 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 can not 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 that the array is connected to and recognized by the Christie E500 LED Display Controller.

1. Connect the USB cable between the controller and the computer running the Christie E500 LED Display Controller software.
2. Launch the Christie E500 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 that there is no screen, verify that the output mode is set to Ports and in the Christie E500 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 E500 LED Display Controller software.

1. In the Christie E500 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 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.

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 E500 LED Display Controller software.

1. In the Christie E500 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 E500 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 that needs 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 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**.
   A confirmation message is displayed when the save is completed.
5. For Disconnect Cable select **Prestore Picture**.
6. For No DVI Signal select **Prestore Picture**.
7. 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 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 E500 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 cable and a USB cable.
2. Launch the Christie E500 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 E500 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**.

Monitoring Christie Velvet LED Display System with SNMP

Use the Christie E500 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 E500 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-E500.mib
3. Import the Christie MIB files into the browser.
   Load the CDS-SMI.MIB file first, and then load the CDS-E500.MIB file.
4. Configure the SNMP alarms, and identify where alarms and trap messages are sent.

Christie E500 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.

Trap	Trigger
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 I disconnect 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 12)
Changing the display to black when there is no signal (on page 13)

Corporate offices

USA – Cypress
ph: 714-236-8610

Canada – Kitchener
ph: 519-744-8005

Consultant offices

Italy
ph: +39 (0) 2 9902 1161

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

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

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

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

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