User Manual

020-102838-10

Terra

CHRISTIE

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- Environmentally Friendly Use Period
  环保使用期限

The year number in the centre of the label indicates the Environmentally Friendly Use Period, which is required to mark on the electronic information product sold in China according to the China RoHS regulations.

本标志中表示的年数是根据《电子信息产品污染控制管理办法》（2006年2月28日）以及《电子信息产品污染控制标识要求》（2006年11月6日）制定的、适用于在中华人民共和国境内销售的电子信息产品的环保使用期限

- Material Concentration Values Table
  有毒有害物质含量表

Part Name	部件名称	Material Concentration (有毒有害物质或元素)					
		铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr 6+)	多溴联苯 (PBB)	多溴二联苯醚 (PBDE)
Audio/Video input PCB	音影输入卡	X	O	O	O	O	O
System board PCB	主板	X	O	O	O	O	O
Mechanical enclosure*	机械附件	X	O	O	O	O	O

Note:

O: indicates that the concentration value of the particular hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C, is below the stipulated levels in China SJ/T11363-2006.

表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006规定的限量要求以下。

X: indicates that the concentration value of the particular hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C, may be above the stipulated levels in China SJ/T11363-2006.

表示该有毒有害物质至少在该部件的某一均质材料中的含量可能超出SJ/T11363-2006规定的限量要求。

* This part uses metallic alloys, which may contain Lead. 因该部件使用金属合金材料，故可能含有铅。

Taiwan RoHS Compliance Information

台灣限用物質含有情況標示

設備名稱：控制器 Equipment name 型號（型式）：SCO 100 EO Type designation(Type)						
單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻Hexavalent chromium (Cr^{+6})	多溴聯苯Polybrominated biphenyls (PBB)	多溴二苯醚Polybrominated diphenyl ethers (PBDE)
外殼/Chassis	○	○	○	○	○	○
主機板/System board PCB	-	○	○	○	○	○
風扇/Fan	○	○	○	○	○	○
電源供應器/Power Supply	○	○	○	○	○	○
機械組件/Mechanical enclosure	-	○	○	○	○	○

備考1.〝超出0.1 wt %〞及〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。

Note 1：“Exceeding 0.1 wt %” and “exceeding 0.01 wt %” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2.〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。

Note 2：“○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3.〝-〞係指該項限用物質為排除項目。

Note 3：The “–” indicates that the restricted substance corresponds to the exemption.

BSMI 甲類警語

“警告使用者:這是甲類資訊產品，在居住環境使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取**某些適當的對策。”**

Content

About this Document

This manual provides the details of features, functionality, setup, and operation for Terra systems using a Terra Controller.

Document Conventions

The following format conventions are used in this document to identify special information:

Warning statements identify conditions or practices that could result in personal injury.

Caution statements identify conditions or practices that could result in damage to equipment or loss of data.

The graphical illustrations in this document are for example purposes only and the hardware and software illustrated may differ from your version.

Variable text that is entered by a user is italicized in this document (for example, in the text, *6-digit serial number*, the 6-digit serial number would be replaced by the actual serial number).

Related Documentation

Access the latest documentation from the Christie website at http://bit.ly/TerraDownloads.

Additional information is available in the following documents:

- Terra Installation and Setup Guide for Controlled Systems (020-102804-*nn*)
- Terra Installation and Setup Guide for Transmitters and the Receivers (020-102814-*nn*)
- Terra Product Safety Guide (020-102786-*nn*)
- Terra JSON API Reference Manual (020-102837-*nn*)
- Terra XY Switcher API Reference Manual (020-102884-*nn*)
- Terra XY Switcher User Manual (020-102883-*nn)*

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.

- SHOCK HAZARD! Disconnect the product from AC before moving, servicing, cleaning, removing components, or opening any enclosure.
- Motors and fans may start without warning.

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.

- FIRE AND SHOCK HAZARD! Do not operate the system unless certified power connections, providing the recommended voltage, are used.
- FIRE AND SHOCK HAZARD! Do not attempt operation unless the power cord, power socket, and power plug meet the appropriate local rating standards.

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

- 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.
- SHOCK HAZARD! The AC power cord must be inserted into an outlet with grounding.
- SHOCK HAZARD! Do not attempt operation if the AC supply is not within the specified voltage and power range, as specified on the license label.

Service Warning

All servicing instructions are for use by qualified service personnel only. There are no procedures, exchange, or parts that are inside the unit that are intended to be performed by the user.

Unplug all power and power supply cords from the apparatus before servicing.

Getting Started

The Terra solution is scalable to your needs. Use the following steps to help get started.

1.	Learn about the Terra's features and capabilities.	*Product Overview*, page *14*
2.	Prepare the network for Terra multicast.	*Prepare Network for Terra Multicast*, page *15*
3.	For ease of identifying all the hardware, attach the MAC address to front or rear of each unit. The address can be found on the label on the bottom of the unit.	*Good Practices*, page *17*
4.	Install and setup the equipment.	*Install and Setup*, page *18* Also refer to the Install and Setup Guides.
5.	For Controlled System, log in to the Terra Manager.	*Logging in to the Terra Manager*, page *28*
6.	Optionally, use the Terra Manager to set up Stringent Security.	*Enable Stringent Security*, page *80*
7.	Use the Terra Manager to set up users.	*Users*, page *77*
8.	Use the Terra Manager to review global settings.	*Global*, page *77*
9.	Use the Terra Manager to create Display Arrays.	*Create a new Display or Display Array*, page *32*
10.	Use the Terra Manager to add Receivers to the Display Arrays.	*Assign Receivers to a Display Array*, page *36*
11.	Use the Terra Manager to add Transmitters to the Display Arrays.	*Create a Layout on a Display or Display Array*, page *56*

Product Overview

Christie Terra is an AV over IP solution enabling the transport, processing and control of audiovisual content, including 4K@60Hz video formats, over 10G Ethernet networks. Built on standardized SDVoE technology, Christie Terra provides unprecedented performance capabilities including the delivery of uncompressed, zero-frame latency, artifact-free video over readily available and affordable 10G components.

For additional information, view the Terra product literature at http://bit.ly/TerraDownloads.

Hardware

The Terra solution consists of transmitters, receivers, and a controller. Each features front-facing LED indicators providing quick status.

The Transmitter processes audiovisual sources and control signals to deliver uncompressed, zero-frame latency, artifact-free content over 10G networks. The Terra Transmitter supports video resolutions up to 4K@60Hz and accepts various port connections, including HDMI 2.0, USB, HDCP 2.2, DisplayPort 1.2, serial RS-232, EDID and more. This powerful and flexible device does not require additional devices to process signals.

The Receiver delivers audiovisual data and control from an SDVoE system to displays and other devices. Benefit from full signal management and processing including magnification, downscaling, KVM, PiP, image compositing and multiview layout applications. Terra Receiver delivers artifact-free video at resolutions up to 4K@60Hz with zero-frame latency, and device control over standard 10G networks.

The Terra Controller provides secure operational control and management of SDVoE systems.

Prepare Network for Terra Multicast

If you are using a Terra Controller, use the following guidelines to plan your installation:

- If you are operating on a customer network, prepare an addressing plan and review it with your IT System Administrator. Include the following topics in the plan:
  - Use of multicast networking
  - IP address range, subnet mask, and gateway values for the controller(s) and associated devices.
- If the network switch is supplied, managed, and operated by the customer's IT department, review the following with the IT System Administrator:
  - The switch requirements including the multicast address range used.
  - The configuration information identified in the following sections.

Setting up the Switch

The most practical method for preparing a network for a Terra system is to use Layer 2 IGMP V2 Multicast management across one broadcast domain/VLAN.

Non-IGMPv2 multicast management techniques are not supported for use with Terra.

Best practice is to not have DHCP active on the Terra network. The Terra Startup Assistant is used to assign static addresses to the Terra devices.

DHCP address management is popular for desktop PCs because they frequently migrate, and this eliminates configuration time for IT staff. Terra Controllers, Transmitters and Receivers are network appliances that are similar to printers and servers which do not migrate and are better managed using static IP addresses. Use of static IP addresses also reduces the amount of DHCP/DNS network traffic resulting in greater efficiency. A compromise that can be used when network policies dictate use of DHCP addressing is to reserve a block of static IP addresses for use with Terra Transmitters and Receivers and other AV devices.

Set up the network switch with the following capabilities and features enabled:

Feature	Relevance
10G Ethernet Switch	Clock rate per port required for the SDVoE standard.
Full 10G line rate	Full data rate supported on the network port throughout the network switch between the backplane and all ports.
Non-blocking design	Switch fabric or backbone of system supports sustained, uninterrupted, full capacity 10G transport of SDVoE content inputs and outputs to all devices.
L2/L3 Managed Switch	Switch is programmable with VLANs, IGMPv2 multicast and data forwarding features. Layer 3 switches frequently include a querier.
IPv4	Addressing format used in SDVoE, future upgradable to IPv6.
IGMPv2	IGMP 2 version multicast protocols support system scalability.
IGMP Snooping	Essential multicast management activity.
IGMP Querier	Essential multicast management activity.

IGMP Fast-Leave	Quick switching between sources when using multicast.
Drop Unregistered Multicast	Remove unnecessary traffic from the network.

Good Practices

Here are some tips to help you quickly install and configure the system.

Identify the Addresses of each Unit

To help identify all the hardware during setup, it is helpful to easily view the MAC address and IP address of each device. Use an easily-removal sticker or tape for this purpose.

Use Terra Manager to export a list of devices to print the addresses for all discovered devices. Refer to *Devices Setup Subpage: Saving a List of Devices*, page *42*.

Two addresses are used per device; each device has two MAC addresses. One address (even number) is used by the 10G and 1G Ethernet ports together, and the second address (odd number) is used for USB management.

An extra MAC address sticker has been supplied in a small plastic bag in the Terra Transmitter and Receiver boxes.

This sticker can be placed on the front or rear of the unit to aid in system device identification.

MAC Address

Each Transceiver and Receiver device has a MAC address. By default, every device uses its MAC address as the default Host Name. The MAC address is used as the 'device id' and used by the API to send and retrieve data from a particular device.

Genlock Wall Mode

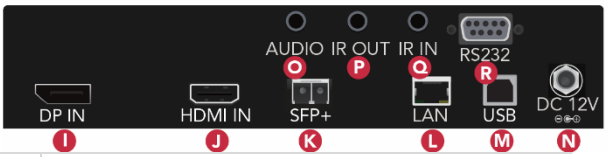
This mode requires the same frame rate for the source (Transmitter) and the output display (Receiver). When there is a mismatch in frame rate, the Transmitter frame rate will be applied to the Receiver, potentially causing issues with the image display.

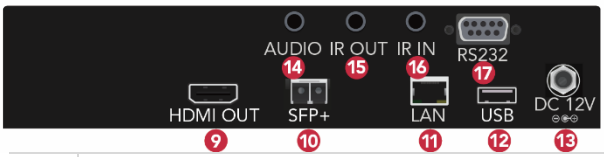
Install and Setup

Refer to the Install and Setup manuals for installation and setup instructions:

- Terra Controller Installation and Setup Manual (020-102804-*nn*)
- Terra Transmitters and Receivers Setup and Installation Guide (020-102814-*nn*)

Transmitter and Receiver Ports and Status Indicators

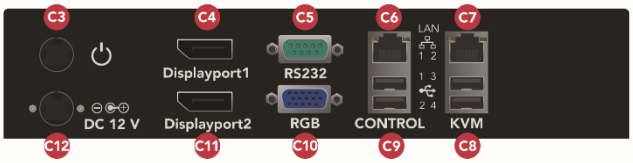




A	Power indicator
B-F	Signal and system indicators
G	Button (reserved for future use)
H	Switch button to switch between inputs; or to reset to factory defaults.
I	DisplayPort 1.2 input port
J	HDMI 2.0 input port
K	10G SFP+ Transceiver with LC-LC port
L	1G Ethernet (RJ-45) port (can be disabled on Network tab)
M	USB 2.0 Type-B port
N	External power port
O	Analog stereo audio (3.5 mm stereo mini-jack) female input port
P	Serial IR remote control out (3.5 mm DC mini-jack) female port
Q	Serial IR remote control in (3.5 mm stereo mini-jack) female port
R	Serial RS-232 (9-Pin DIN) female port

1	Power indicator
2-6	Signal and system indicators
7	Button (reserved for future use)
8	Button used to copy EDID from display to Transmitter
9	HDMI 2.0 output port
10	10G SFP+ Transceiver for with LC-LC port
11	1G Ethernet (RJ-45) port (can be disabled on Network tab)
12	USB 2.0 type-A port
13	External power port
14	Analog stereo audio (3.5 mm stereo mini-jack) female output port
15	Serial IR control out (3.5 mm DC mini-jack) female port
16	Serial IR control in (3.5 mm stereo mini-jack) female port
17	Serial RS-232 (9-Pin DIN) female port

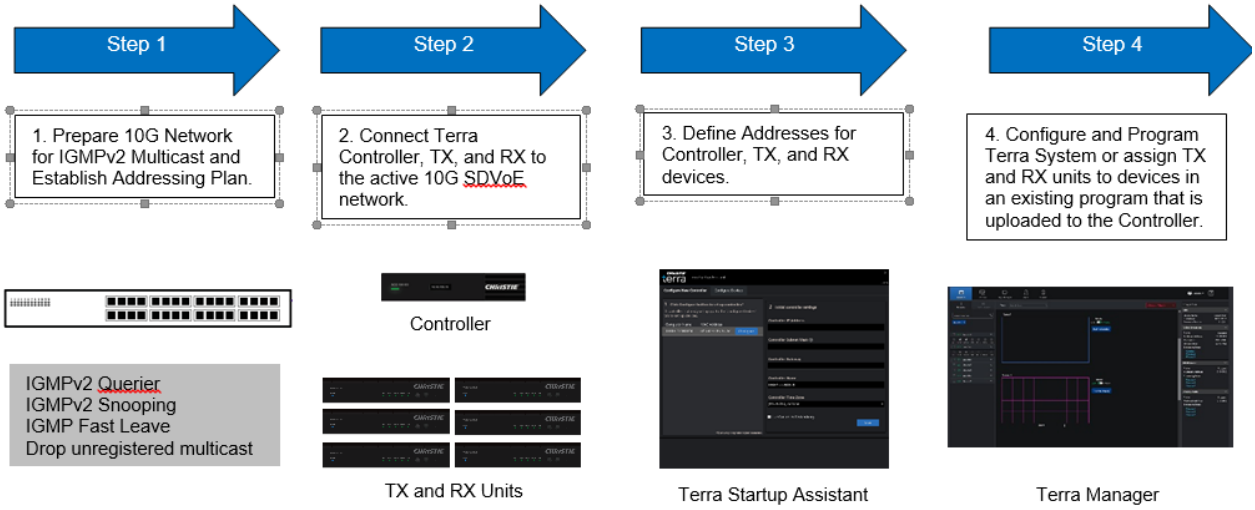
Terra Controller Ports and Status Indicators



C1	Power indicator
C2	OSD display for IP address and system status
C3	Power switch
C4	DisplayPort 1.2 output port (female), unused
C5	Serial RS-232 port for connecting to 3rd Party control system
C6	1000BASE-T Ethernet connector for device control and optional access for 3rd Party control system
C7	1000BASE-T Ethernet connector, Unused
C8	USB connectors V2.0, unused
C9	USB connectors V2.0, unused
C10	15PinHD output port, unused
C11	DisplayPort 1.2 output port (female), unused
C12	Power supply port (12 Volts)

System Configuration and Setup

Follow these steps to ensure proper device discovery on the network.



Connecting a computer

To interact with the Terra system, you must connect a computer to the same LAN and the same subnet address as the controller.

Computer Requirements

A computer used to access the Terra system requires the following:

- One Ethernet port
- 64-bit Windows operating system (Version 7 or higher)
- .Net Framework 4.5.1 or higher
- 1GB free storage space
- 2GB RAM

Connecting the Controller to the Network

When connecting a Controller, best practices include:

- Use the Terra Startup Assistant software to set IP addresses for Terra devices.
- Include the Gateway address for the Controller.
- Apply static IP addresses.

Best practice is to apply static IP addresses to Terra devices. Static addresses are superior for managing permanently installed AV devices and for verifying system configuration, device status, and troubleshooting. DHCP address management is popular for desktop PCs because they frequently migrate, and this eliminates configuration time for IT staff. Terra Controllers, Transmitters, and Receivers are network appliances that are similar to printers and servers that do not migrate and are better managed using static IP addresses.

Use of static IP addresses also reduces the amount of DHCP/DNS network traffic resulting in greater efficiency. A compromise that can be used when network policies dictate use of DHCP addressing is to reserve a block of static IP addresses for use with Terra Transmitters and Receivers and other AV devices.

1. Connect a standard CAT6 Ethernet cable to the Ethernet CONTROL port (C6) on the Controller and the other end to a 1G port on the 10G network switch.
2. Power on the Controller.
3. Review the front panel display and verify the Controller's MAC address is displayed.

It may take up to two minutes before the status of the boot up progress is displayed on the Controller's front panel display.

When the Controller is configured, the Controller's IP address, date, and software version are displayed.

If the controller does not start and BOOT FAIL is displayed on the Controller's front panel display, contact Christie Support.

Resetting TXs and RXs to Factory Defaults

If it is necessary to reset a Transmitter or Receiver to factory defaults, use the SWITCH button (Transmitter) or COPY EDIT button (Receiver) to reset a device to the factory settings. Refer to *Transmitter and Receiver Ports and Status Indicators,* page *18*).

To reset the Transmitters and Receivers:

Read all the instructions before starting the reset process since power needs to be applied while a button is continually pressed.

1. Unplug the device to power off the unit.
2. Perform one of the following:
   -To reset a Transmitter, press and hold the **SWITCH** button.
   -To reset a Receiver, press and hold the **COPY EDID** button.
3. While continuing to hold the button in, plug in the device to power on the unit.
   Continue holding the button until both the RX/TX LEDs flash green. This may take 20-30 seconds.
4. Release the button.

Terra Startup Assistant

If you are using a Controller, using the Terra Startup Assistant is a mandatory step for setting up your Controller.

The Terra Startup Assistant is available from the **Terra Manager** Sign In page.

To configure a controller, you need to connect the controller to a management PC (or other Windows-based device) and all associated devices to the same LAN. Refer to the steps in *System Configuration and Setup*, page *19*.

A new Terra Controller shipped from the factory will be configured for DHCP addressing. Terra Startup Assistant is used to discover the Controller on the network and create a network scheme for the Terra System.

The Terra Startup Assistant is used to:

- Configure the Controller (Configure New Controller tab)
  - Display the MAC Address for all controllers connected to the same network as the PC.
  - Set/display the Controller name.
  - Assign the network settings for the Controller.

    A DHCP server is not recommended for use to address Terra devices. Best practice is to apply static IP addresses to Terra devices.

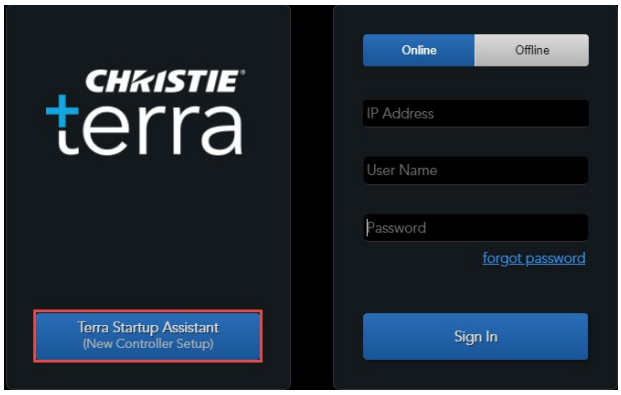
  - Set/display the time zone.
- Assist in diagnosing problems.
  -

    By default, the Terra Controller is ready for DHCP address management. If a DHCP server is present on the network, it will assign an address to the Terra Controller. Best practice is to disable the DHCP server and manage the Terra system using static addresses assigned using the Terra Startup Assistant.

Start Terra Startup Assistant on your PC

The Controller must be connected to the same broadcast domain, subnet, and gateway as the PC running the Terra Startup Assistant.

1. From the Terra Manager sign in page, click **Terra Startup Assistant**.

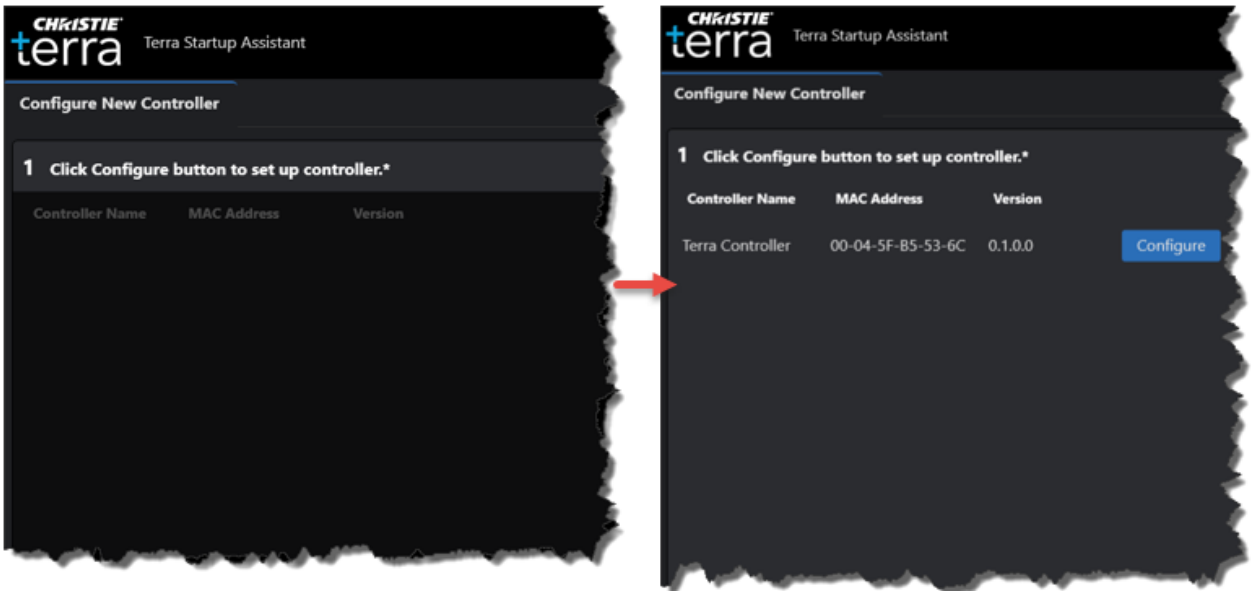


Configure a New Controller

A new Terra Controller shipped from the factory will be configured for DHCP addressing. Terra Startup Assistant is used to discover the Controller and assign the IP address and name.

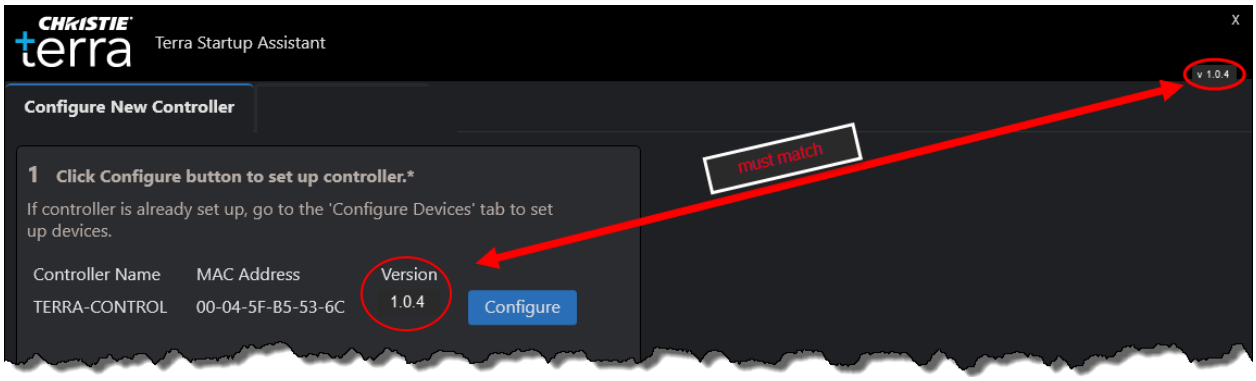
When the software starts, the following is displayed (if a new Controller is present on the network):

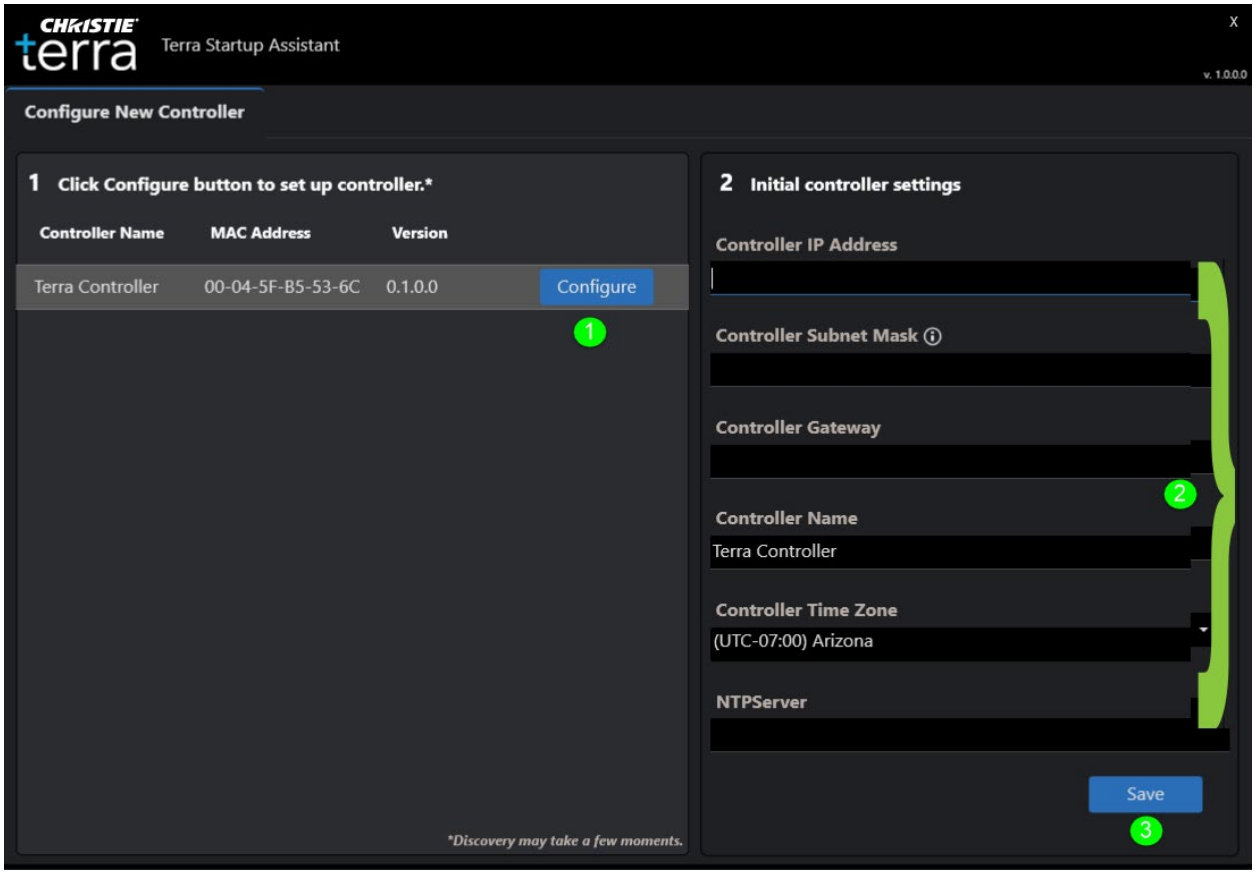
> If no Controller is found, the second screen is not displayed. The software will continue to monitor for new connection.
>
> Exit the software if no new controller(s) are being added to the system, and use Terra Manager to connect to the existing Controller, configure a redundant Controller, configure devices, and setup the system.



The **Configure New Controller** tab is used to configure a new Controller.

1. On the **Configure New Controller** tab, click **Configure** next to the Controller you want to configure.





2. Configure the initial controller settings as follows:

Controller IP Address	The Internet Protocol version 4 address for the node. The valid format is: nnn.nnn.nnn.nnn. If your network uses an active DHCP server, make sure any static IP addresses do not conflict with any addresses assigned by the DHCP server.
Controller Subnet Mask	The subnet mask for the network address.
Controller Gateway	The node on the network that the network software uses when an IP address does not match any other routes in the routing table.
Controller Name	User-defined name for the Controller.
Controller Time Zone	Sets the time zone for the controller.
NTPServer	Optional, used only when an NTP server is used for time. The IP address or server name for the NTP server.

3. When the controller (and optional redundant controller) are configured, close Terra Startup Assistant and continue configuring devices using Terra Manager.

View and Delete Messages

Status and warning messages are displayed in the message page at the bottom on the page.

To view and optionally delete a message:

1. Hover over the message to display the tooltip associated with the message to display the full contents.
2. Optionally, click **X** to delete the message.

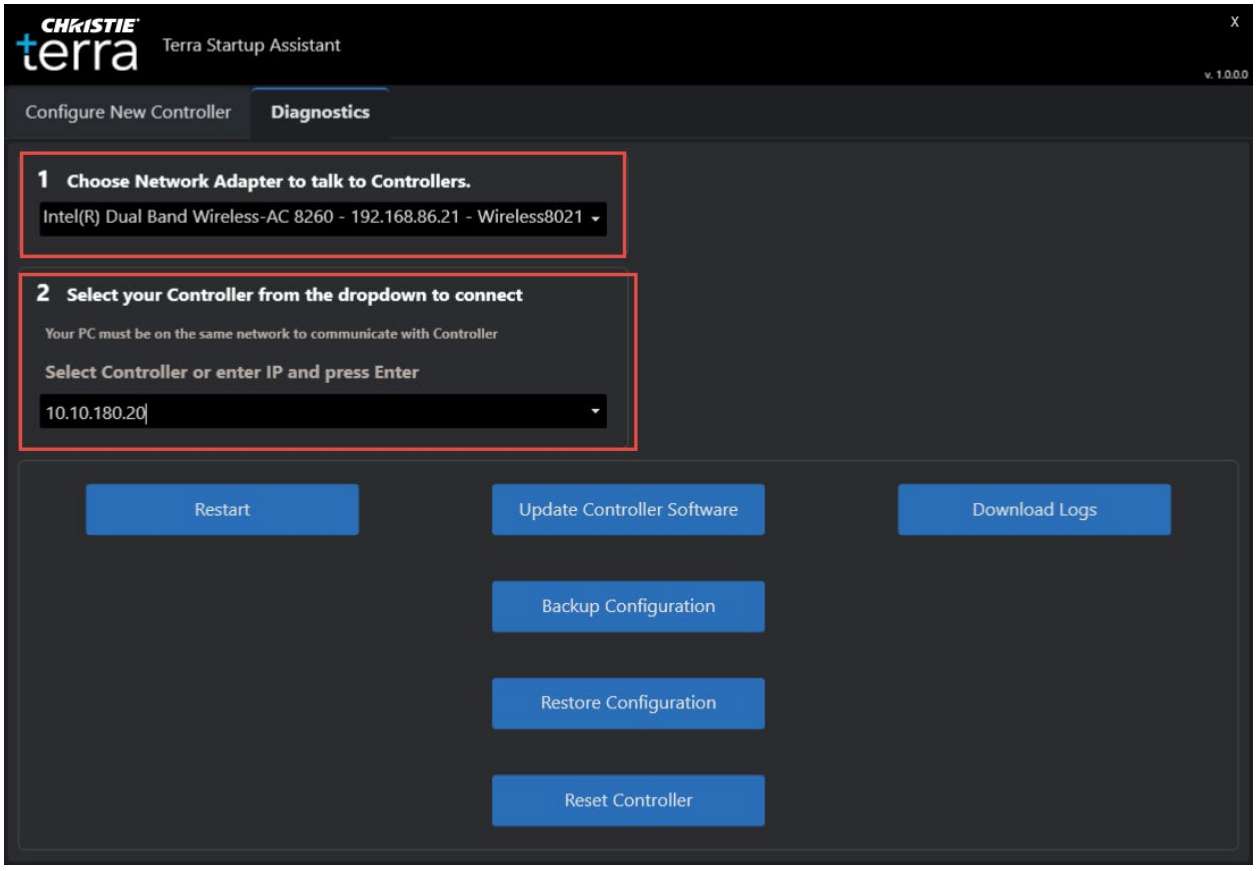
Terra Startup Assistant Diagnostics

The Diagnostic tab is available only when the Controller is in a faulted state and not fully functional. Contact support for assistance when a Controller is in this state. This tab provides options to help diagnose and resolve the problem.

⚠	The diagnostic options on this tab should be used with the guidance of Christie support personnel.

This page enables you to:

- Restart the Controller (refer to *Restart the Controller*, page *80)*
- Update the Controller software (refer to *Update Controller Software*, page *26*)
- Backup the configuration (refer to *How to Backup the System*, page *80*)
- Restore the configuration (refer to *Restore the System*, page *81*)
- Reset the Controller (refer to *Reset the Controller (Restore to Initial State)*, page *26*)
- Download logs (refer to *Download Logs*, page *82*)



Update Controller Software

The **Update Controller Software** option updates your system with a new version of software and/or firmware. It should only be performed when you are notified of an update.

If at any time the Controller software version becomes incompatible with the Terra Manager software, you will be prompted to install a new version. The new version must be installed by a user with administrative privileges.

This process requires a restart of the controller.

A system update should not be performed when any changes are being made to the system. If there are users logged on, ask them to log out.

Refer to *Software Versioning* (page *95*) for additional information on software versioning.

How to Update the Controller

Refer to *Updating the Controller Software*, page *27*.

Reset the Controller (Restore to Initial State)

The **reset controller** options on the Global page and on the Diagnostics tab in Terra Startup Assistant should be used to restore your system to the default factory settings when all other recovery efforts have failed.

Before using this option, try the following:

1. Restart the Controller. Refer to *Restart the Controller*, page *80*.
2. If the restart does not resolve your problem, perform a System Restore. Refer to *Restore the System*, page *81*.

The reset controller process completely overwrites your current system configuration including devices, display arrays, layouts, user profiles, etc. The controller and the backup controller (if present) are set to DHCP and returned to a factory default state.

This procedure restarts the controller.

Verify all users are logged off before starting the reset controller process.

Resetting the system should not be performed when any configuration changes are being made.

Do not perform a firmware update while a reset controller process is in progress.

This option is also available on the Terra Manager Global page.

- Refer to *Reset Controller*, page *82* for details.

Devices may be reset to factory defaults using the buttons on the device or using Terra Manager. Refer to *Resetting TXs and RXs to Factory Defaults*, page *21*.

Terra Manager

The Terra Manager is used with the Controller to configure and manage a system.

Installing the Terra Manager

Download the latest Terra Manager Software (TerraManager.exe) from the Christie website (http://bit.ly/TerraDownloads).

If at any time the Controller software version becomes incompatible with the Terra Manager software, you will be prompted to install a new version. The new version must be installed by a user with administrative privileges. Refer to *Updating the Controller Software*, page *27.*

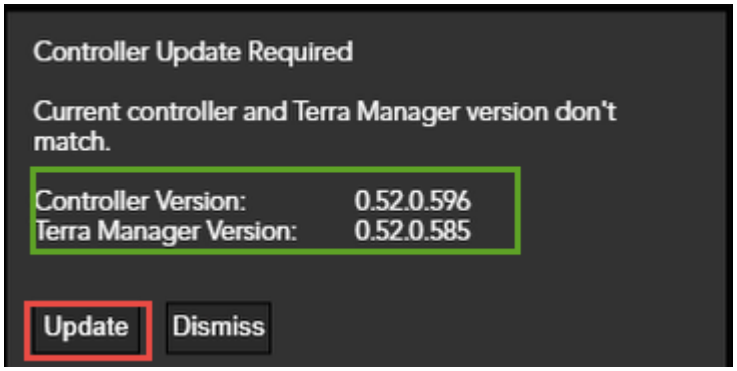
Firmware updates may be available after updating the Terra Manager software. Refer to *Updating the Firmware*, page *47.*

Updating the Controller Software using Terra Manager

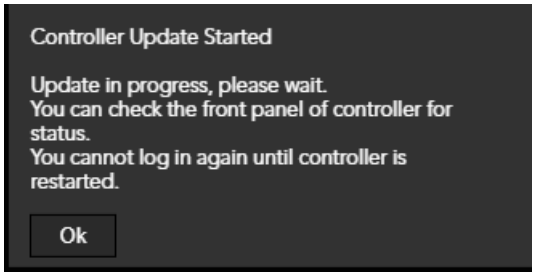
What you need: A computer (laptop or admin PC) with the file with the desired version of the software and/or firmware.

The versions of the controller and Terra Manager must match to use Terra Manager.

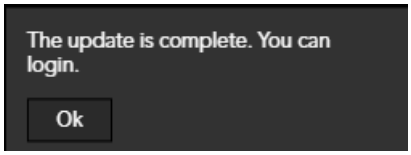
1. Download the desired Terra Manager software to your device that is connected to the same network as the Terra Controller.
2. Launch Terra Manager. If there is a mismatch between the Controller software and Terra Manager software, a dialog is displayed requesting a confirmation to update the software version on the controller.



3. To update, click **Update**. A dialog is displayed:



4. Click **Ok**.



5. Click **Ok**. When the update is complete, log in to connect to the Controller.

Working with Terra Manager

There are two modes that can be used with Terra Manager – online and offline. When using online mode, you connect to a controller to immediately configure and use Terra Manager. Refer to *Logging in to the Terra Manager*, page *28*.

When using offline mode, you do not connect to a controller. You configure the system offline and connect to a controller to import the configuration you created. Refer to *Working in Offline Mode*, page *29*.

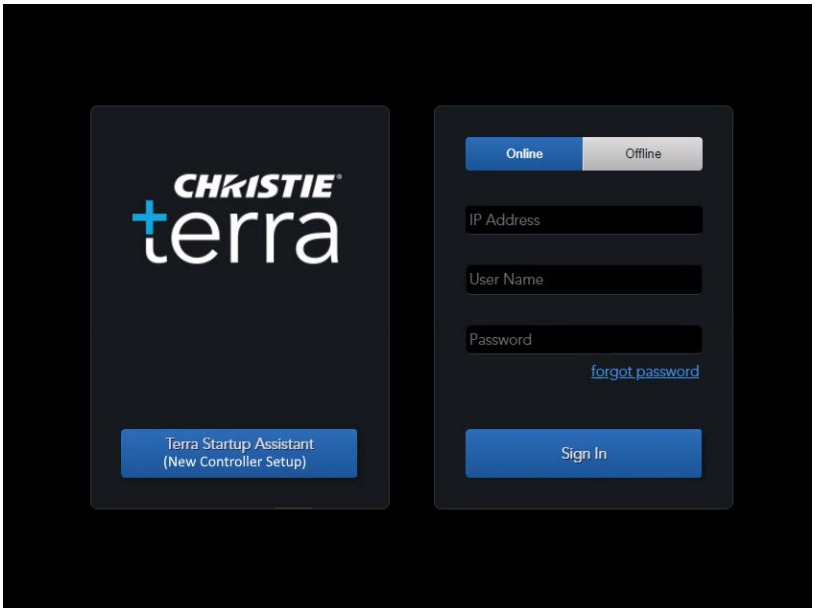
Logging in to the Terra Manager in Online Mode

From the Sign In page of the Terra Manager do one of the following:

- Launch Terra Startup Assistant for initial setup (refer to *Start Terra Startup Assistant on your PC*, page *22).*
- Sign in using online mode to access the Terra Manager features.
- Sign in using offline mode (refer to *Working with Terra Manager*, page *28*).
- Get help with your password.

To sign in using online mode, do the following:

1. To display the Sign In page, open the Terra Manager by clicking on the **TerraManager.exe** file.



2. Click **Online**.
3. In the IP Address field, type the IP address of the Controller you want to connect to.

   If the Controller is auto-discovered, the Controller's IP address field will automatically be populated.

4. In the Username field, type **service**.
5. In the Password field, type **service** (case sensitive).

   Passwords are masked.

Change the default password for security purposes. Refer to *Change Password for Service (*Default) Account, page *31*.

6. Click **SIGN IN**.

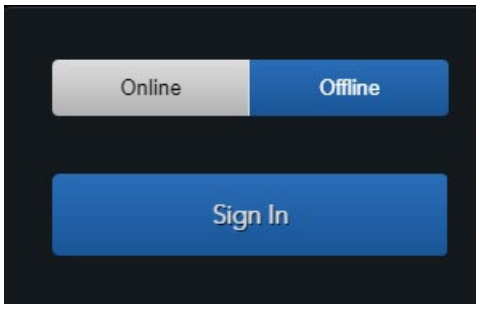
Working in Offline Mode

Working in offline mode enables devices to be created without being connected to a controller. When in offline mode, display arrays and layouts can be created. After the devices are created in offline mode, the devices can be swapped out with the real devices when connected to a controller.

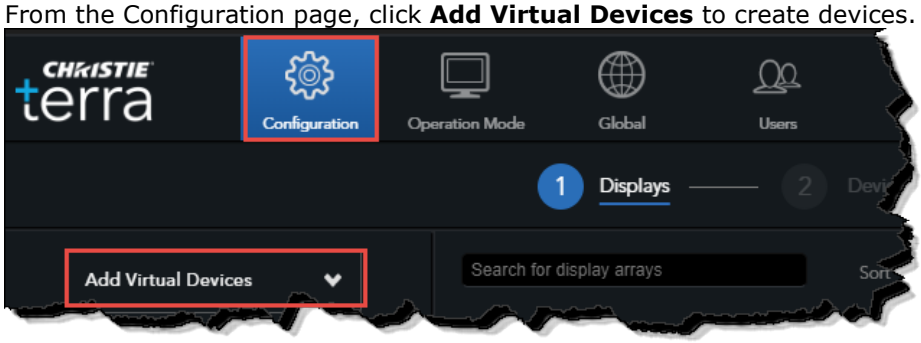
This is the only section of this document that pertains to offline mode. All other sections assume the user is logged in using online mode and is connected to a Controller.

How to create a configuration without being connected to a Controller:

1. To display the Sign In page, launch Terra Manager software by clicking on the TerraManager.exe file.
2. Click **Offline** and then click **Sign In**.



3. From the Configuration page, click **Add Virtual Devices** to create devices.

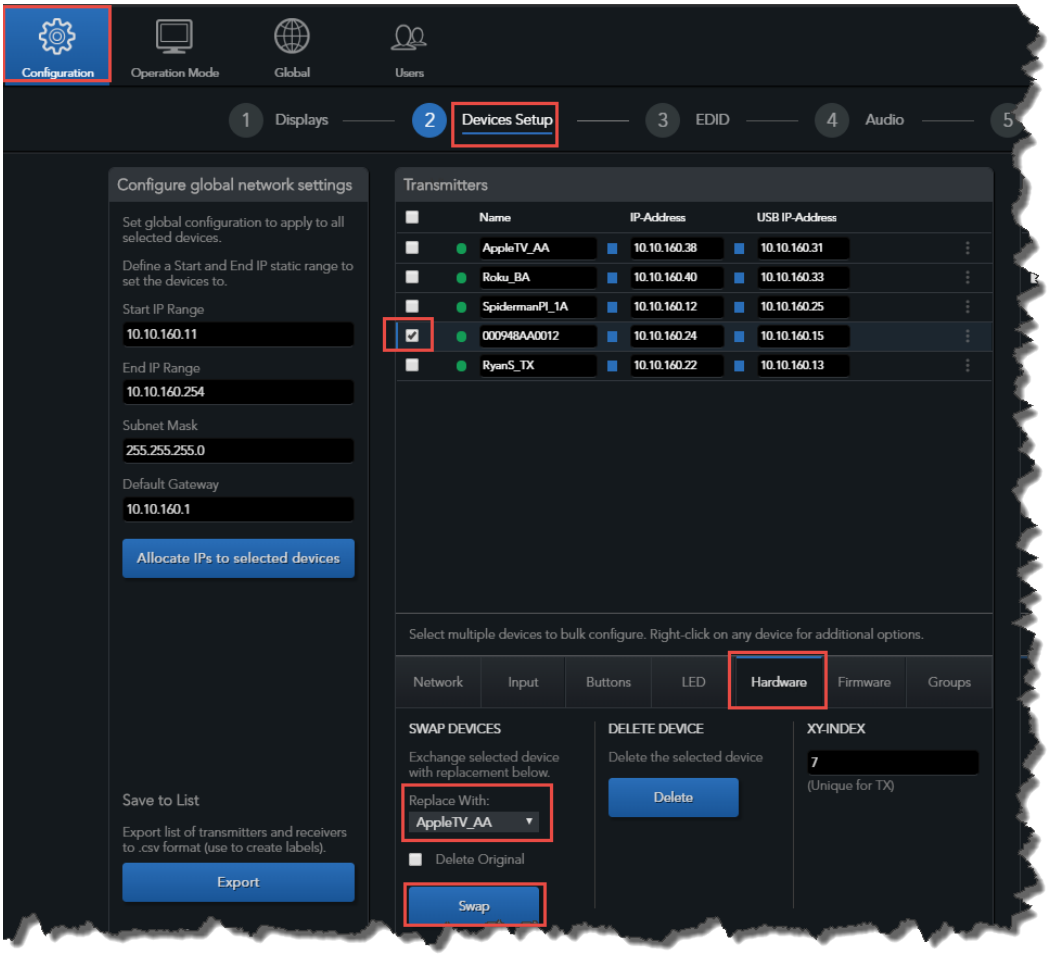


4. Enter the number of Receivers and Transmitters you will be configuring.

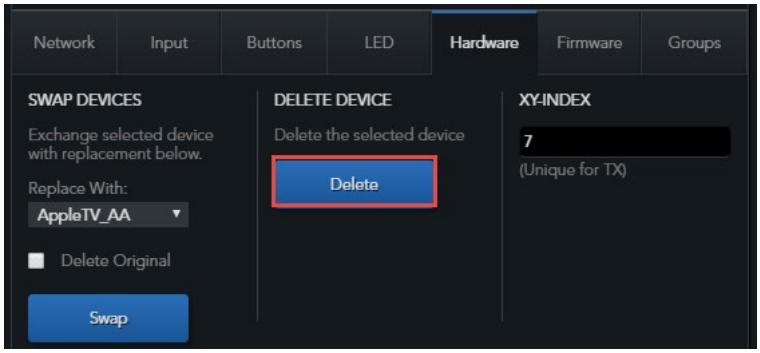
These numbers should match the number of physical devices that will be connected to the Controller.

5. Click **Create**.
6. Optionally, create Display Arrays and layouts using these devices. Refer to *Create a new Display or Display Array*, page *32*.
7. Log off from Offline mode.
8. Verify all devices are physically connected to the same network as the Controller.
9. Log on using Online mode. Refer to *Logging in to the Terra Manager*, page *28*.
10. From the Devices Setup subpage, select a device from the list that you created in offline mode.
11. Select the Hardware tab at the bottom of the Devices Setup subpage.
12. In the **Replace With** field, select a discovered device that you want to replace the device you created in offline mode. Refer to *Swap a Device*, page *30*.
13. Click **Swap**.

Optionally, click the **Delete Original** checkbox to delete the device after the swap is completed.



14. Repeat steps 10-13 for all of the devices you created in offline mode.
15. On the Devices Setup page, select the device you created in offline mode.
16. Select the Hardware tab and click **Delete**. Refer to *Delete a Device* page *45.*



17. Repeat steps 15-16 for each device you want to delete.
18. Use Terra Manager to create a backup of the configuration you created using the **Backup Configuration** option on the Global page. Refer to *Backup the System*, page *80*.

Change Device Name in Offline Mode

When devices are created in offline mode, the default name is tmp_*xxxxxxxxxx* (where *x* is alphanumeric). To change the default name:

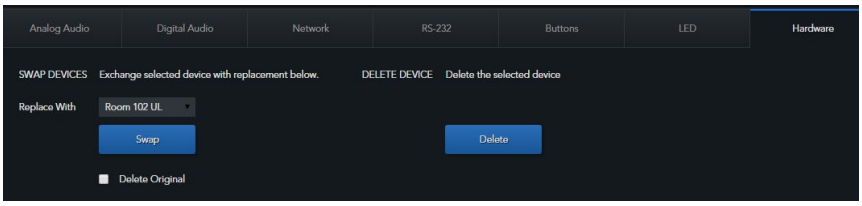
1. Navigate to **Devices Summary** page.
2. Click the device to rename.
3. Click the pencil icon .
4. Type the desired name.
5. Click **Save**.

Swap a Device

This option swaps one device for another. One use of this option enables you to replace any devices that were created in offline mode. When you create devices in offline mode, you need to replace them with physical devices connected to the Controller.

To swap devices:

1. Navigate to the **Devices** page.
2. Select the check box associated with the device you want to replace.
3. Click on the **Hardware** tab.



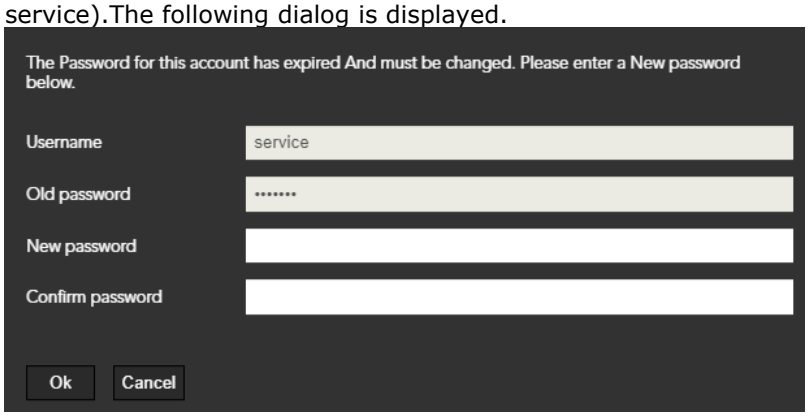
4. In the **Replace With** field, select the device you want to use as the replacement.
5. Click **Swap**.

Optionally, click the **Delete Original** checkbox to delete the device when the swap is completed.

Change Password for Service (Default) Account

For security policies, the password for the default user account (service) must be changed the first time Terra Manager connects to a network, or when updating to software version 1.3 or later.

1. Login into Terra Manager using the default account (User Name: service; Password: service).The following dialog is displayed.



2. Type the new password and confirm it. Refer to See *Password Management*, page *88*.
3. Click **OK**. You are signed out.
4. Login back into Terra Manager using the new password.

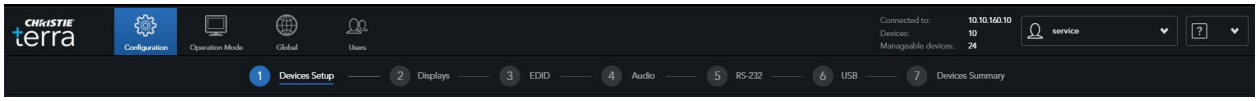
Main Navigation Panel

The main navigation panel for online mode is displayed on the top of the page. This panel contains the links to the other pages, the name of the user currently logged in, the IP address of the Controller,

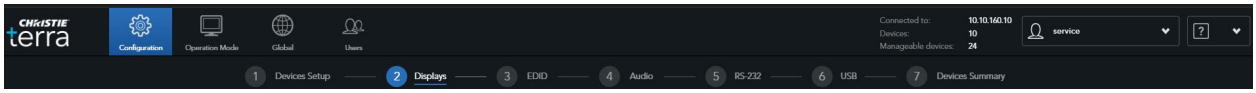
number of devices configured, number of available licenses, and the **?** link. The **?** link contains a link to the related user guide, software version, and third-party licensing.

Configuration Page

The Configuration page is the first page you use after closing the Terra Startup Assistant. This page has numbered subpages that guide you through the logical steps to configure a Terra system. It is recommended to use the subpages in the numbered sequence.



If devices are configured, the next time you navigate to the Configuration tab, step 2 is automatically highlighted.



Configuration Page→ Displays Subpage

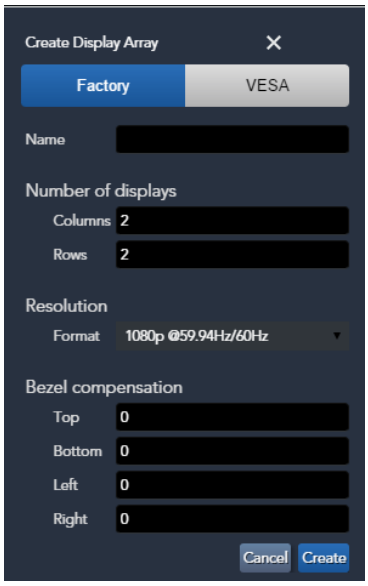
This subpage enables you to

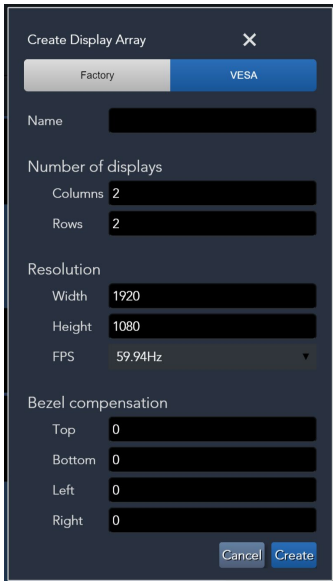
- View a list of Receivers.
- Create Display Arrays.
- View a list of Display Arrays.
- View the details for a Display Array.
- View/edit the Display Array properties.
- Create virtual devices when using offline mode

Displays Subpage: Create a New Display or Display Array

Create a display or a display array for each cluster of displays that will be used with Terra:

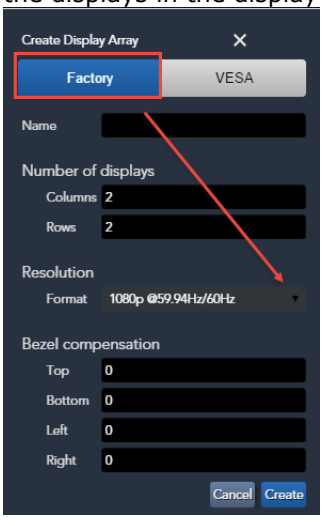
1. Navigate to Configuration Page → Displays Subpage.
2. To create a new Display Array, click **Create Display Array**.

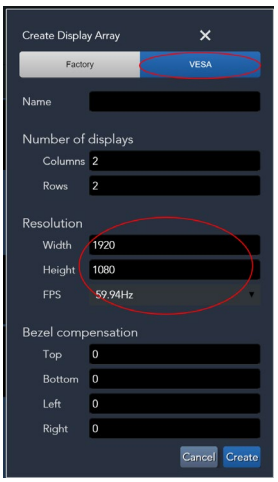




3. Configure the properties for the display array as follows:

Best practice is to apply logical names to all devices and system assets.

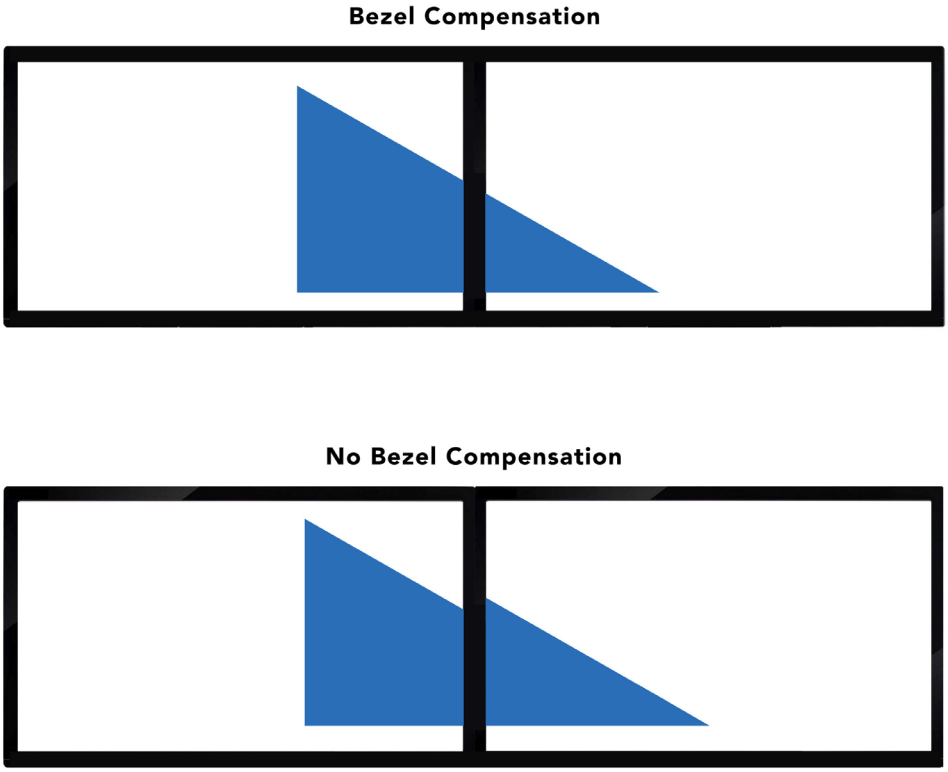
Type	Factory or VESA. The preferred method is Factory (standard Video resolutions). VESA is used for sources that requires a resolution that is not supported as a factory format (Graphic display resolutions), or if more control over the output timing is needed. If Factory resolution is selected, you need to select the format for the display. If VESA resolution is selected, you need to specify the display size in pixels, and the refresh rate (Hz).	
Name	User-defined name.	
Number of displays	Columns	Number of displays horizontally in the physical arrangement of the displays.
	Rows	Number of displays vertically in the physical arrangement of the displays.
Resolution (Factory)	Format	The format including the resolution and frame rate for the displays in the display array. 

Resolution (VESA)	The format including the resolution and frame rate for the displays in the display array. 
Width	Width (pixels) of displays horizontally in the physical arrangement of the displays.
Height	Height (pixels) of displays vertically in the physical arrangement of the displays.
FPS	Frame rate the display is refreshed. Select from the dropdown list.
Bezel Compensation	Optionally, complete the fields to compensate for the width of the bezel around the edges of the display when using multiple monitors. Refer *Bezel Compensation*, page *35* for illustrations.
Top	Enter the width of the bezel on the top of the display in pixels.
Bottom	Enter the width of the bezel on the bottom of the display in pixels.
Left	Enter the width of the bezel on the left side of the display in pixels.
Right	Enter the width of the bezel on the right side of the display in pixels.

4. Click **Create**.

To delete an existing display array, click the X in the upper right corner of the display array.

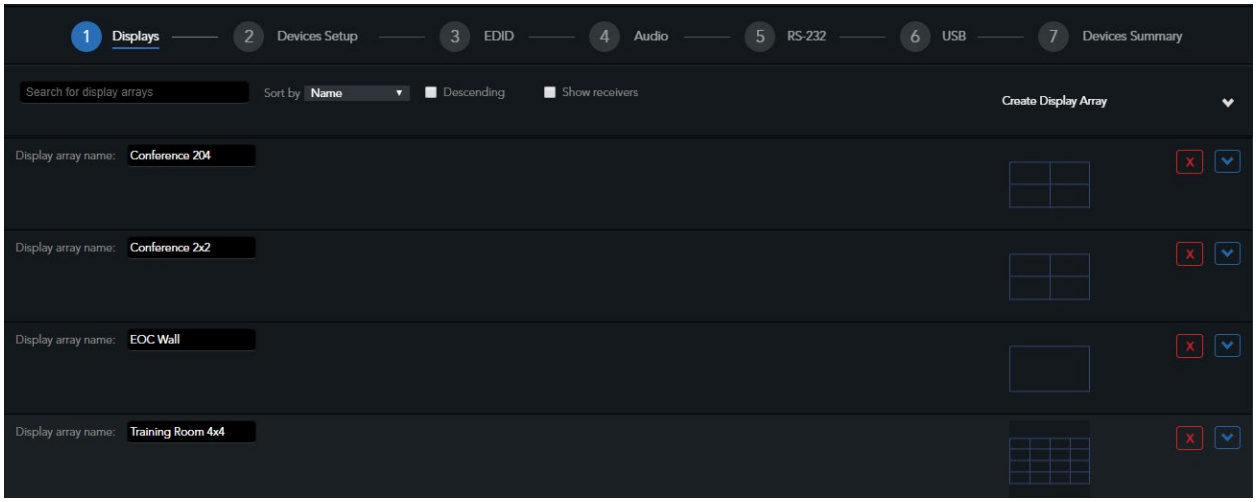
Bezel Compensation



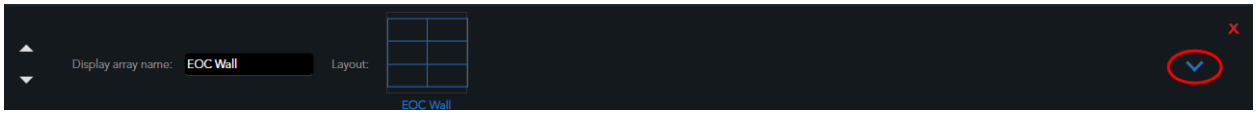
Displays Subpage: View Display Arrays

A list of Display Arrays is shown on the Displays subpage on the Configuration page. Use the scroll bar to the right of the panel to scroll through the list.

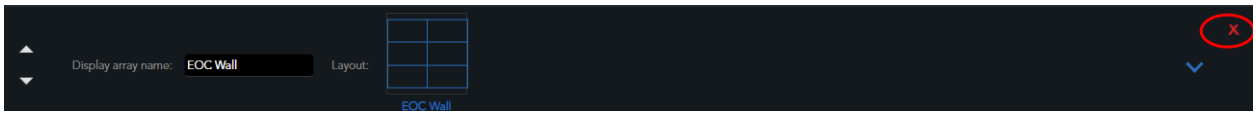
The Display Array details are collapsed by default.



To expand the details of a display array, click the blue caret.

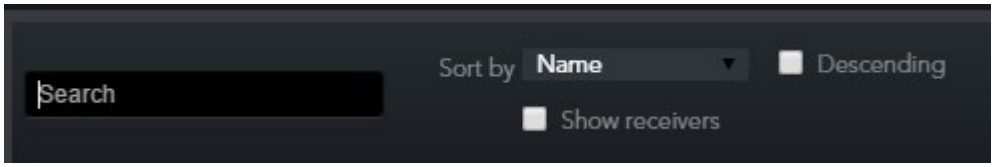


To delete a display array, click the red X.

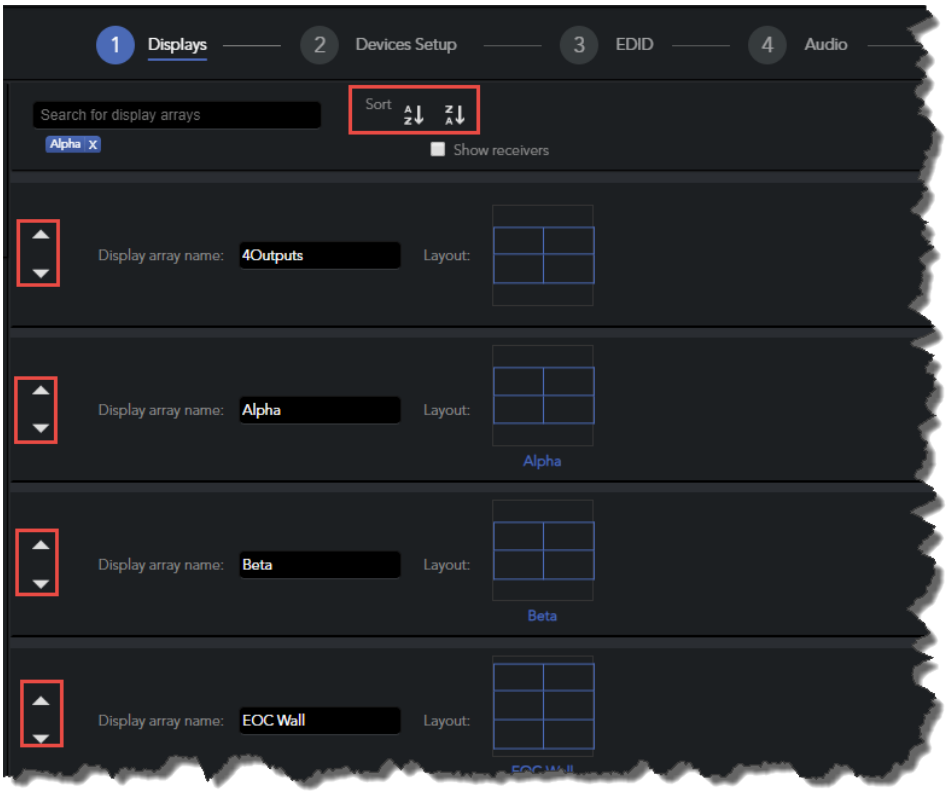


Use the Search option on the top of the middle panel to search for a specific string in the Display Array name or a tag.

Tags can be user-defined; and some tags are automatically created (for example, a tag is created automatically using the device name).



Use the Sort option to sort the Display Arrays. Displays can be sorted alphabetically using the sort A-Z or Z-A options; or custom sorted by using the up and down arrows associated with each display array.



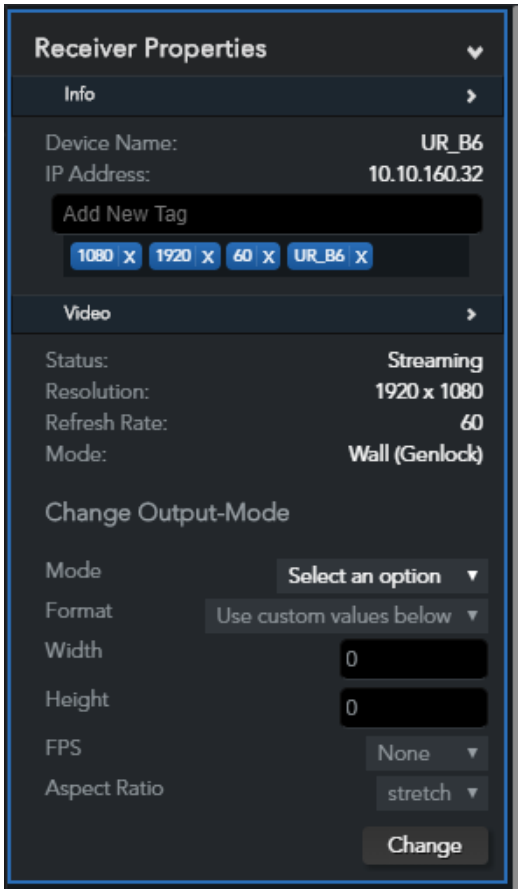
When the **Show receivers** checkbox is selected, the receivers are added to the list of display arrays.

Displays Subpage: Change a Display Array's Properties

Click on an editable field in the Display Array Properties panel and make your changes.

Displays Subpage: Change a Receiver's Properties

On the Displays subpage on the Configuration page, expand the display array view and click on a Receiver to open the properties panel. Click on an editable field in the Receiver's Properties panel and make your changes. Click **Change** to save the changes.



Receiver Properties

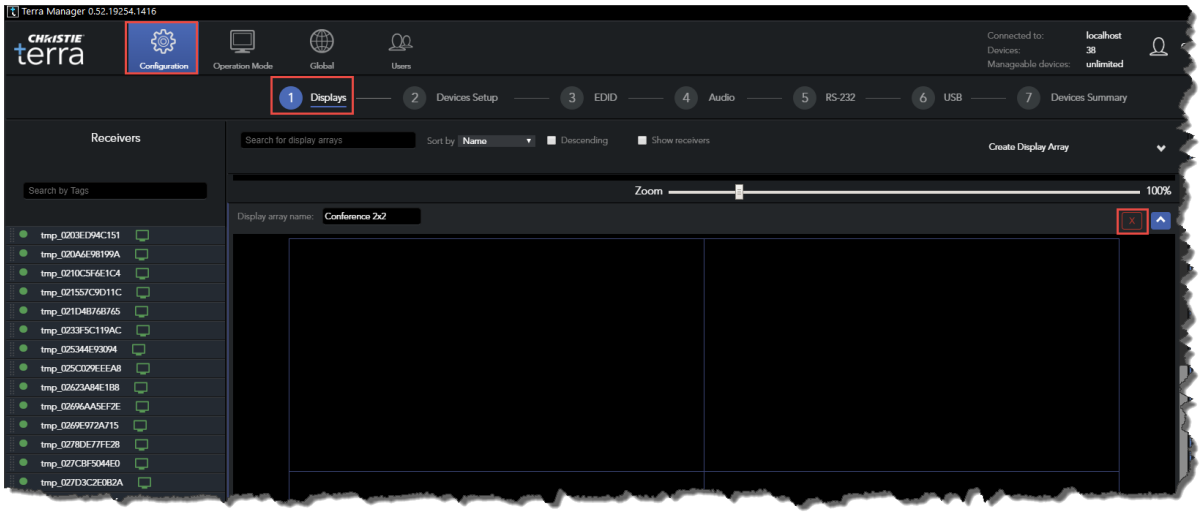
Receiver Property	Description	
Info		
Device Name	User-defined name for the device. Defaults to the MAC Address for the device. Best practice is to apply logical names to all devices and system assets.	
IP Address	IP address assigned to the device.	
Add New Tag	Type the name of a new Tag to be associated with the Receiver. Click the **X** next to the tag name to delete a tag.	
Video		
Status	Streaming	Video is streaming to the device.
	Stopped	All RX devices joined to this particular video display a black screen.
	Disconnected	Device is disconnected from the network.
	Only subscribing	Connected to a stream but not actually streaming.
	Unsubscribing	Stream is being removed.
Resolution	Resolution of the device.	
Refresh Rate	The display refresh rate in Hz.	

Receiver Property	Description	
Mode	Genlock 	Used for the lowest (zero frame) latency between the source and the display. The display is genlocked to the source. For example, a straight extension with cable uses Genlock mode.
	Genlock scaling 	Scaled output, genlocked to source with very low latency. Video output can be scaled to match the output of the display.
	Fast switch 	Used for seamless switching between sources. Scaled and buffered output produces seamless clean switches between sources.
Change Output Mode	Use to make changes to the output mode.	
Mode	Select mode from the dropdown.	
Format	Select format from the dropdown. If **Use custom values below** is selected, set the width and height.	
FPS	Select frame rate from dropdown.	
Aspect Ratio (only available in Fast Switch Mode)	Stretch	Use if aspect ratio of the source is different than the output. This mode fills the screen and prevents displaying black stripes on the output, but it may distort the image.
	Crop	Keeps the current aspect ratio but zooms to prevent displaying black stripes. This option may distort the image.
	Keep	Maintain the current aspect ratio. If the current ratio does not match the output, black stripes will be displayed.
Change	Click to save your changes.	

Displays Subpage: Delete a Display Array

To delete a Display Array:

From the Displays subpage on the Configuration page, click the  (in the upper right corner) associated with the display array you want to delete.



Displays Tab: Assign Receivers to a Display Array

Receivers are automatically discovered by their MAC Address when the Controller is configured. A list of Receivers (sorted alphabetically by their MAC Address) is displayed in the left panel of the Configuration page. One Receiver is assigned to each of the displays in the display array.

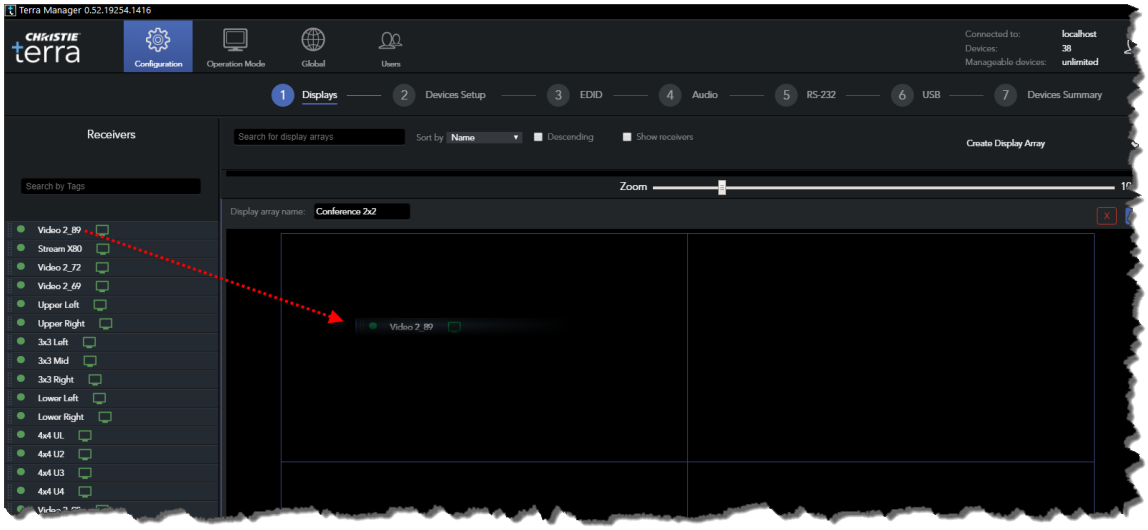
New devices are added to the list when they are found.

To assign Receivers to the Display Arrays:

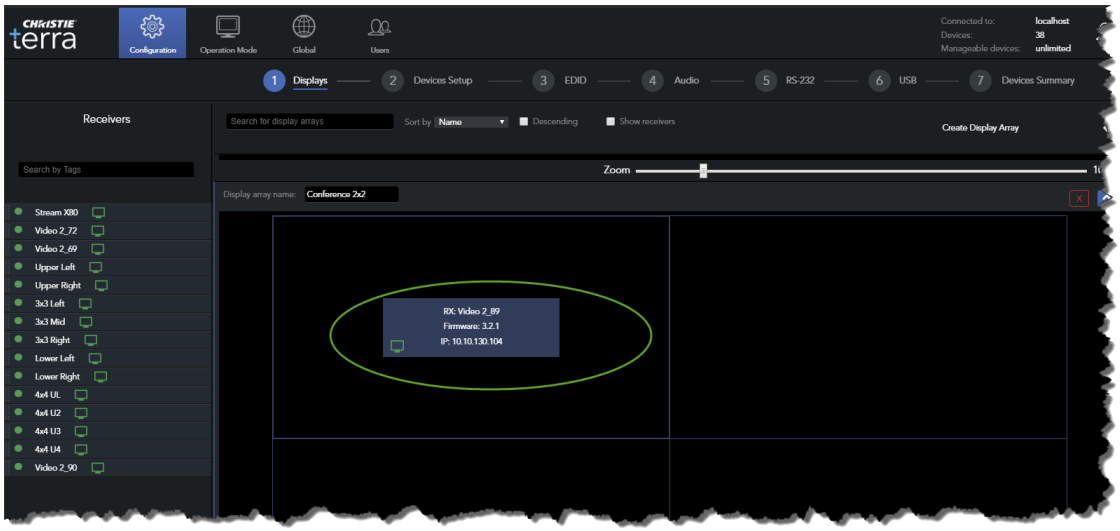
1. From the Displays subpage on the Configuration page, navigate to the desired Display Array.
2. Click  to expand the display array.
3. Click the Receiver name (default: MAC Address) of the desired Receiver and drag it to the desired location in the Display Array. Best practice is to name receivers to help identify their position in a Display Array; for example: RX1 for display 1, RX2 for display 2, etc.

Use the Search tool to search for a specific Receiver.

Use the Zoom tool to change the visible view of the display array.



When a Receiver is assigned to a Display Array, it is removed from the list of available receivers.



4. Repeat the above step for each tile in the display array.

Display subpage: Display Array Properties

Display Array Property	Description
Name	User-assigned name for the device. Best practice is to apply logical names to all devices and system assets.
Add New Tag	Type the name of a new Tag to be associated with the Display Array. Click the **X** next to the tag name to delete a tag.
Columns	Number of vertical columns for the Display Array.
Rows	Number of horizontal rows for the Display Array.
Device count	The number of Receivers that have been placed on the Display Array.
Resolution	Resolution for the displays in the Display Array.
FPS	Frame rate for the device connected to the Output port on the Receiver.
Windows	Window IDs of the sources on the display array in Indexed order.
Audio Configurations	Properties of any audio stream currently running.
Data Configurations	Data streams (e.g. RS232, USB) currently applied to the display array.

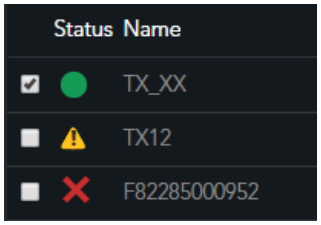
Configuration Page→ Devices Setup Subpage

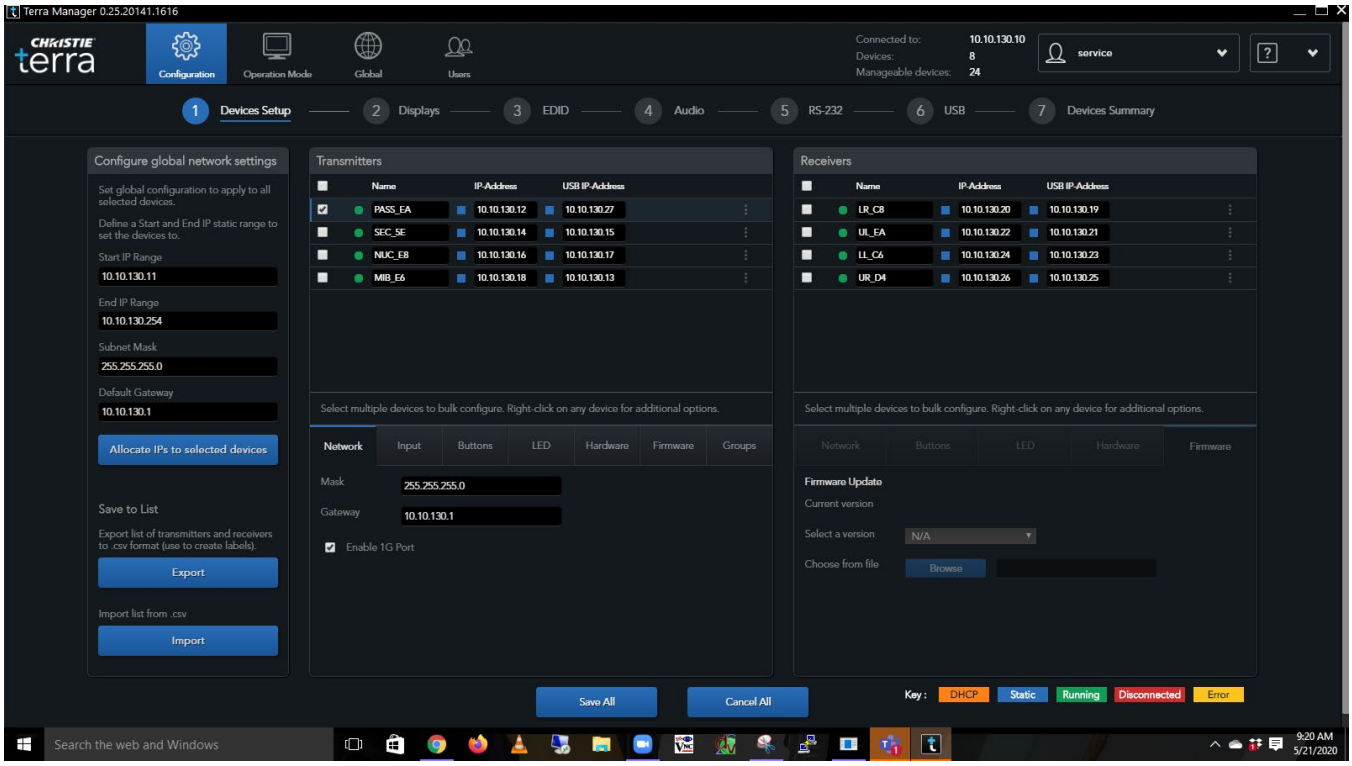
This subpage enables you to:

- Configure global network settings for devices
- View the status of all devices
- Copy the configuration of a device and apply it to one or more devices
- Delete selected devices
- Add Transmitters and Receivers to groups
- Save a list of devices
- Import a list of devices
- Refresh a device
- Reboot a device
- Toggle the blink feature for a device
- Update the device firmware

Additionally, using the tabs at the bottom of the page you can display and change the settings for IP address, input types, front panel buttons, LEDs for selected transmitters or receivers, hardware settings, firmware settings, and groups. See *Devices Tabs* (page *45*) for more details.

The Devices Setup subpage page lists the following information for each device.

Status	The status indicators display the connectivity status and the video signal status: **Connectivity**  Green circle indicates the device is connected. Yellow exclamation mark indicates the device is in an error state. Red X indicates the device is not connected. **Video Signal** Transmitters:  A green video camera icon indicates video is detected on the device. No camera icon indicates that there is no video detected on this device. Receivers:  A green display icon indicates the device has a display detected, the display is powered on, and is working properly. No display icon indicates the receiver is not connected to a display, the display is not powered on, or is not working properly.
Name	The user-defined device name (default is the MAC address).
IP	IP address for the device.
USB IP Address	IP address for the USB.



Devices Setup Subpage: Configure Global Network Settings

Use this pane to configure the network settings for all selected devices.

Network settings include the IP address range, subnet mask, and default gateway. Use the Enable 1G Port check box to enable or disable the 1G port on the Controller. Enter the values and click **Save**.

Devices Setup Subpage: Saving a List of Devices

To save a list (*.csv) of devices:

1. Navigate to the **Configuration→ Devices Setup**.
2. Click **Export**.
3. Browse to the desired location to save the list and enter the file name.
4. Click **Save**.

Devices Setup Subpage: Importing a List of Devices

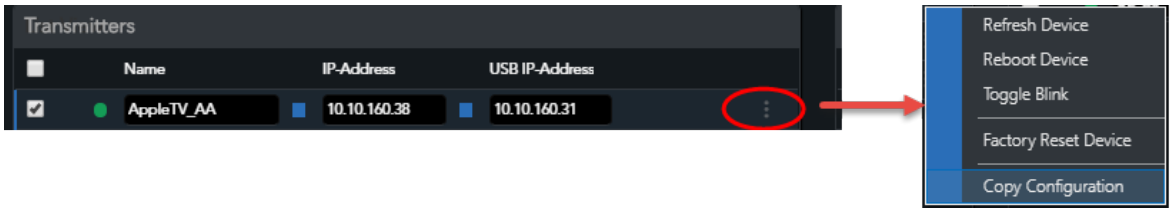
To import a list (*.csv) of devices:

1. Navigate to the **Configuration→ Devices Setup**.
2. Click **Import**.
3. Browse to the desired file name.
4. Click **Open**.

> If any validation errors are found, Notepad is opened and displays the errors. Use the displayed information to correct the errors.

Devices Setup Subpage: Device Action Menu

On this subpage, a device action menu is associated with each device.



Click the device action menu associated with a device to:

- Refresh the device
- Reboot the device
- Toggle the blink feature for the device
- Reset device to factory settings (**requires re-entry of account password**)
- Copy the device's configuration

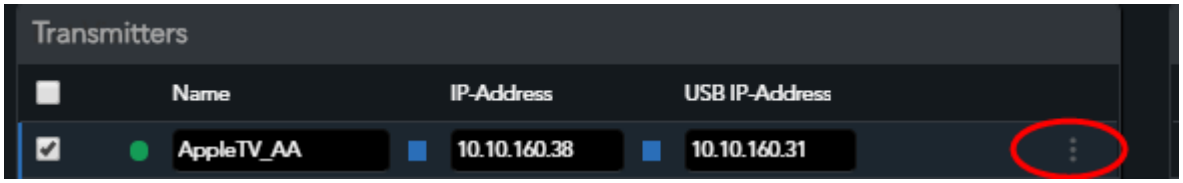
Devices Setup Subpage: Copy and Paste Configuration

Use the Copy Configuration and Paste Configuration features to copy the configuration of one device to one or more like devices (a Transmitter configuration to other Transmitters and a Receiver configuration to other Receivers). The configuration parameters include:

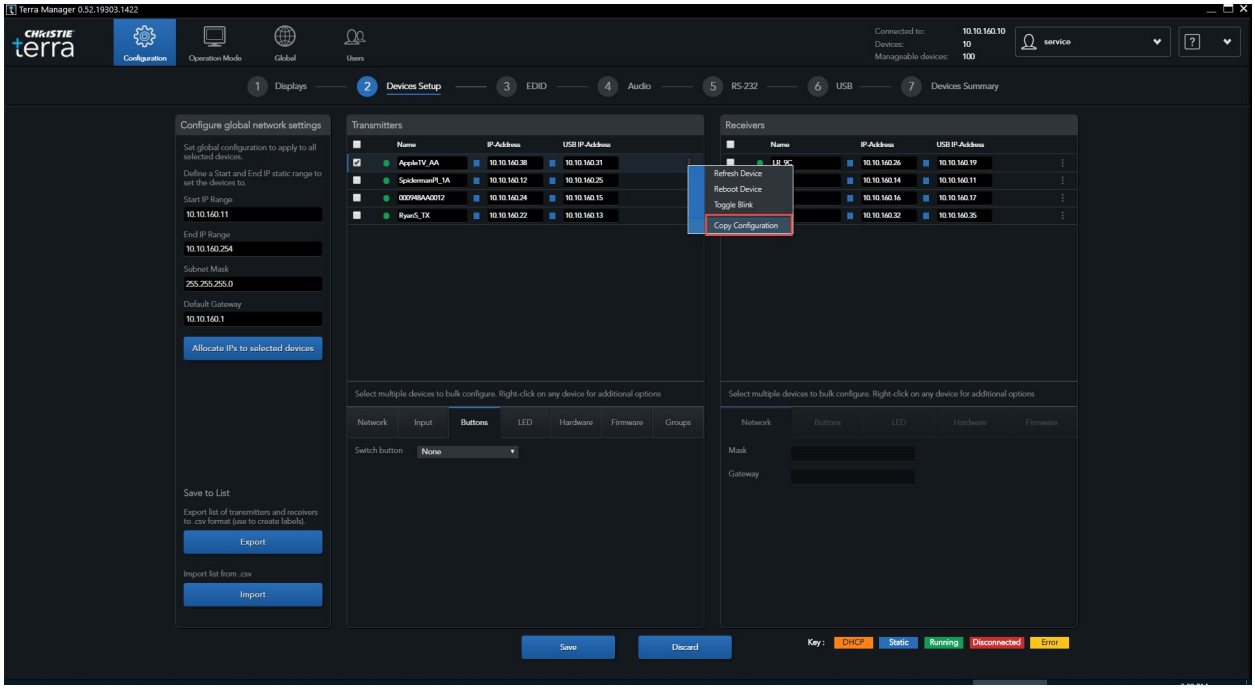
- Analog audio including any downmixed HDMI stream.
- HDMI Audio.
- The direction of stream from the analog port (input or output).
- HDCP status either 2.2 or 1.4.
- Behavior of the Switch and Copy EDID buttons.
- LED behavior for all LEDs on the TX and RX.
- RS232 (UART) settings including baud rate, data bits, stop bits, and parity.

To copy a configuration:

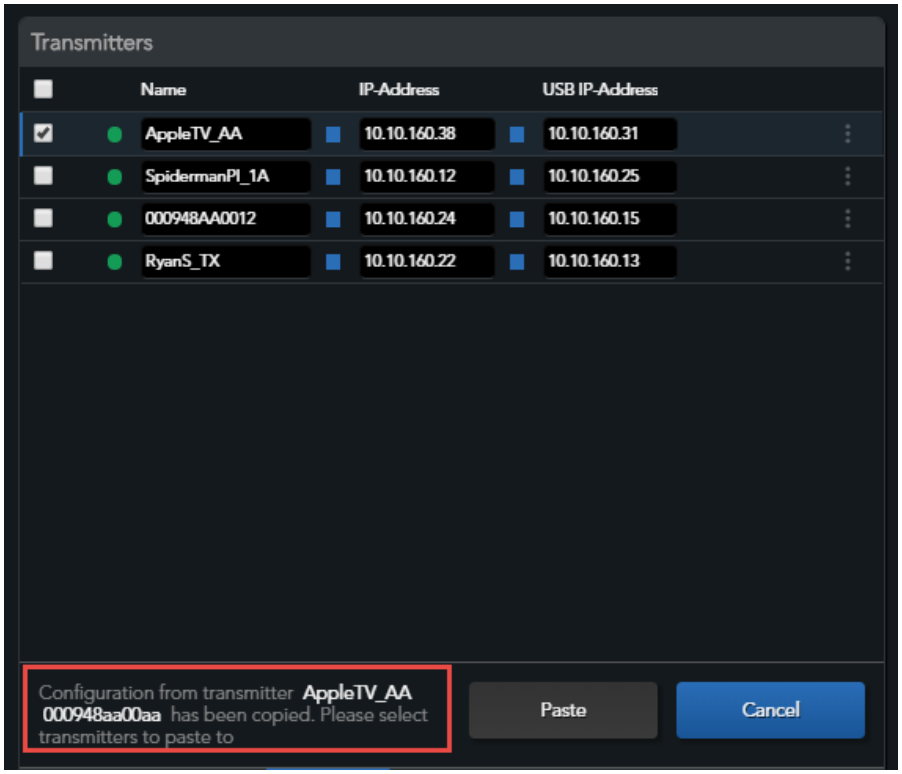
1. Navigate to the **Device Setup** subpage.
2. Click the source device you want to copy the configuration from.
   The tabs on the bottom of the page are available.
3. Click the Device Action menu associated with the device.



4. Click **Copy Configuration.**



5. A confirmation message is displayed when the configuration has been copied.

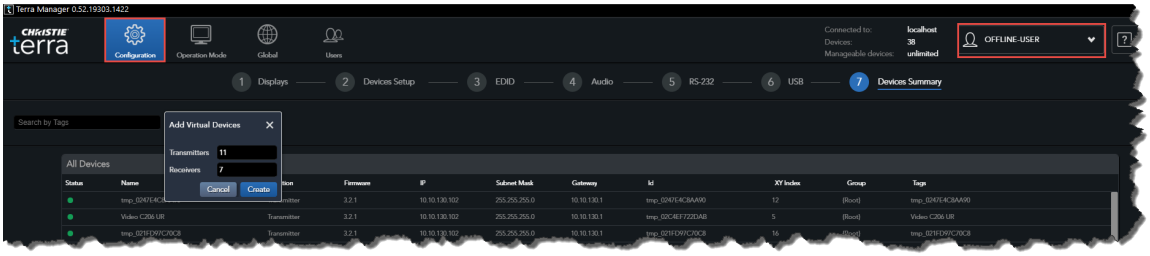


6. Select the checkbox associated with one or more destination devices you want to copy the configuration to.
   The **Paste configuration** message is displayed next to all devices that are the same type as the device that was copied.
7. Click **Paste**.
   Respond to the confirmation prompt.

Configuration Page: Create Devices in Offline Mode

On the Configuration page, you can create virtual devices to work in offline mode. When created, the list of Receivers and Transmitters is updated. View the list of receivers on the Configuration page. View the list of transmitters on the Operation Mode page.

1. Click **Add Virtual Devices**.



2. Specify the number of devices to create.
3. Click **Create**.

For additional information about working in offline mode, refer to *Working in Offline Mode*, page *29*.

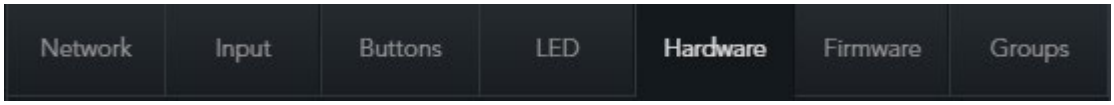
Devices Setup Subpage: Tabs

The Device Setup subpage has additional tabs at the bottom of the subpage to set or review additional settings for the selected device(s). Some properties are editable, and some are display only.

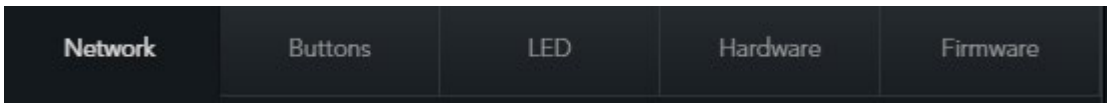
If more than one device is selected and the properties differ between the devices, N/A is displayed for the properties.

When a change is made on a tab, an asterisk is displayed to notify the user of unsaved changes.

For transmitters, these include settings for IP address, input types, front panel buttons, LEDs, hardware, firmware, and groups.



For receivers, these include settings for IP address, front panel buttons, LEDs, hardware, and firmware.



Use the tabs near the bottom of the Devices Setup subpage to modify settings for the selected devices.

1. Select the devices you want to modify by clicking on the device.

   To select more than one adjacent item in the list, click the first item and hold down the SHIFT key and select the last item, then release the SHIFT key.

   To select non-adjacent items in the list, hold down the Ctrl key and click all the items you want to select, then release the Ctrl key.

2. Click the desired tab near the bottom of the Devices Setup tab.
3. Refer to *Devices Properties Tabs* (page *45*) to make your selections.
4. Click **Save All**.

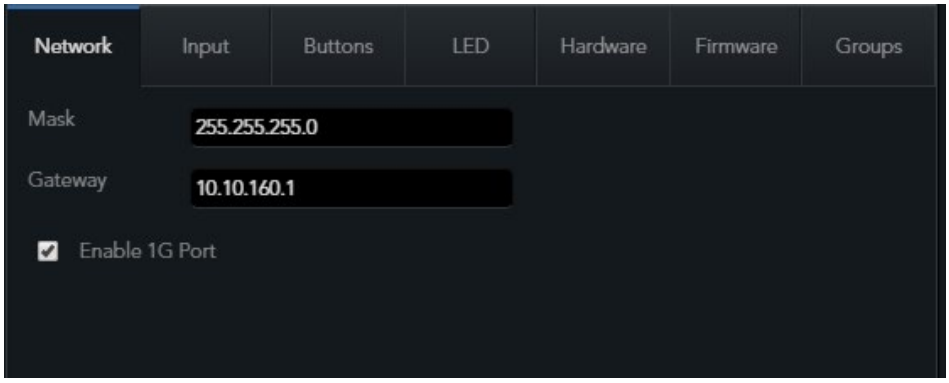
Devices Properties Tabs

The device properties are available on the tabs on the bottom of the Devices page. Some properties are editable, and some are informational only.

Devices Setup Subpage→ Network Tab (TX and RX)

Use to set network settings.

Mask	The subnet mask for the network address (display only).
Gateway	The node on the network that the network software uses when an IP address does not match any other routes in the routing table (display only).
Enable 1G port	This port can be used to communicate with the Controller. Enabled by default. Uncheck to disable LAN port on the device.



Devices Setup Subpage→ Input Tab (TX)

Use to change the input type and enable/disable HDCP support.

	The Transmitter detects the initial input connection and switches to that input.	
Input	DisplayPort	Select if the Transmitter is connected to a DisplayPort source.
	HDMI	Default setting. Select if the Transmitter is connected to a HDMI source.
	Auto Detect	If selected when both HDMI and DisplayPort are connected, input defaults to the first detected signal.
HDCP Support	Enable	Enable HDCP support.
	Disable	Disable HDCP support. If disabled, streaming video from an HDCP encrypted source to a display may result in black image displayed.
	Disable HDCP 2.2 support	Disable HDCP 2.2 if the connected display does not support 4K HDCP 2.2 content.

Devices Setup Subpage→ Buttons Tab (TX and RX)

TX

Use to set the functionality of the front panel buttons on the Transmitters.

SWITCH button	Switch video input (default)	Used to switch the source between the DisplayPort and the HDMI port.
	DISABLED	Disables the SWITCH video input button.
Blank (not labeled) button	Not functional.	Reserved for future use. Currently not assigned to any feature.

RX

Use to set the functionality of the external buttons on the Receivers.

COPY EDID button	Send EDID	Sends the current EDID from the connected display to the selected Transmitters (selected using Terra Manager/EDID tab).
	DISABLED	Disables the COPY EDID button.
Blank (not labeled) button	Not functional.	Reserved for future use. Currently not assigned to any feature.

LED Tab (TX and RX)

Use to set the functionally for the front panel LEDs on the Transmitters and Receivers.

LED0	N/A	Future use. Currently not assigned to any feature.
	Blink	Blinks all LEDs.
	Default function for this LED	LEDs blink individually depending on the signal they are receiving.

Hardware Tab (TX and RX)

Use to swap one device for another; or to delete a device that is no longer needed.

Swap Devices	Swaps the selected device in the Devices list with the device selected on the Hardware tab.
Delete Original	Deletes the selected device in the Devices list when Swap is selected.
Delete Device	Deletes the selected device in the Devices list.
XY-Index	Displays the current XY index for the device. To change the index, enter a new index number and click **Save**. This number is updated in the XY index column and in the web-based Terra XY Switcher.

Devices Setup Subpage→ Hardware Tab (TX and RX): Delete a Device

When a device is discovered, Terra keeps track of it. If a device fails, is no longer needed, or is moved from the Terra network, the device can be deleted.

To remove one or more devices from the list a devices:

1. Navigate to the **Devices Setup** subpage.
2. Select the check box associated with one or more devices you want to delete.
3. Click the **Hardware** tab.
4. Click **Delete** and respond **OK** to the confirmation dialog. The selected devices are deleted.

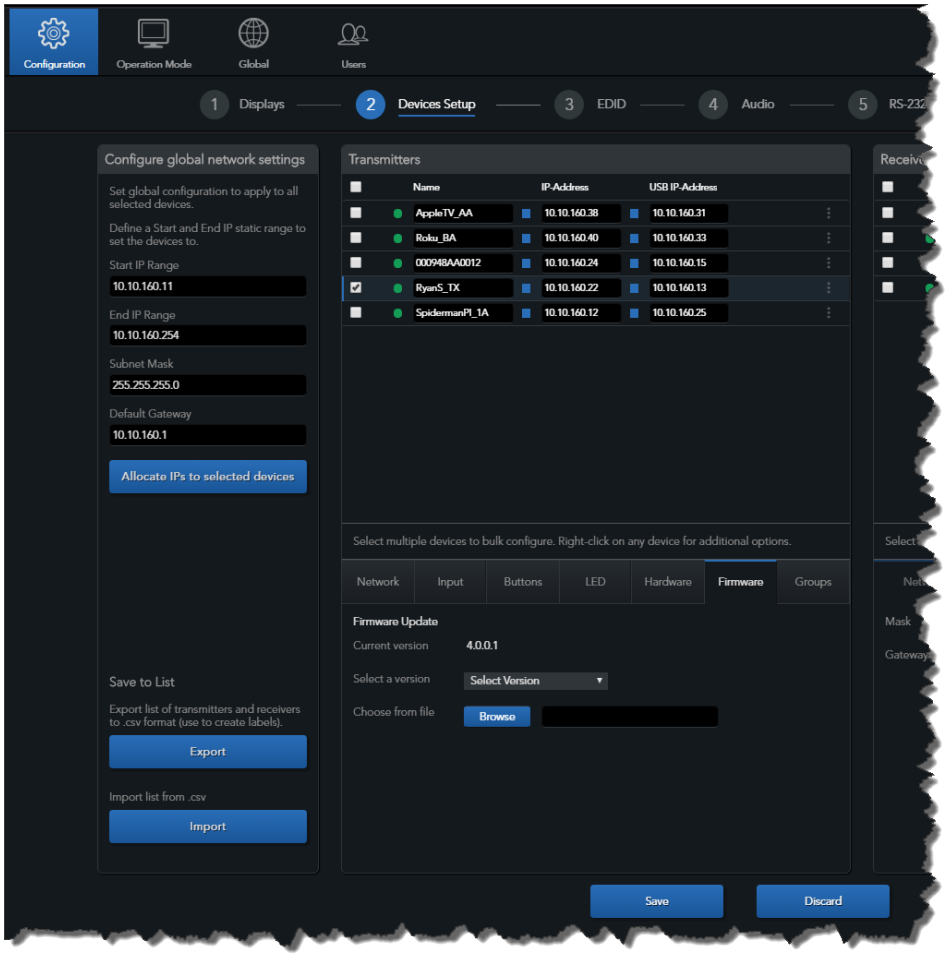
Devices Setup Tab→ Firmware Tab (TX and RX)

Firmware updates may be available after updating the Terra Manager software. Firmware updates can be selected from a list or from a file on the device running Terra Manager.

To update the firmware for a device:

1. On the **Devices Setup** subpage, select one of more or the same types of devices (Transmitters or Receivers).

2. Click the **Firmware tab**.



3. Click **Select Version** or **Browse**.
    a. If **Select Version** is selected, select the desired version from the list.
    b. If **Browse** is selected, browse to the location of the appropriate .apz file or .zip file (firmware files will have TX or RX as part of the name). Select the file and click **Open**.
4. Click **Save All** to start the update.
5. When the firmware update is complete, the updated devices are restarted.

Devices Setup→ Groups Tab (TX only)

Use this tab to add more than one transmitter to a group.

Refer to Operation Mode page for additional group features.

Devices Setup Subpage→ Audio Subpage (TX)

TX

Use to configure the path of the analog input mode for selected transmitters.

Configuration Page→ EDID Subpage (TX)

Terra supports a variety of resolutions and formats. The Extended Display Identification Data (EDID) file identifies the resolution, format, and refresh rate supported by the connected displays, as well as a preferred resolution and refresh rate.

Use this subpage to apply an EDID to one or more transmitters.

1. On the EDID subpage, select the Transmitter(s) that you want to upload an EDID file to.
2. Select one of the following:

Select EDID from factory list	Applies the selected factory EDID to the selected transmitter(s).
Import EDID from a file	Imports an EDID from the specified file to the selected transmitter(s). Valid EDID files are *.EDID (EDID files), *.dat (Phoenix EDID Editor files), and *.txt (plain text files).
Apply from Receiver	Applies the EDID settings from the specified Receiver to the selected transmitter(s).

3. Click **Apply All**.

Configuration Page→ Audio Subpage

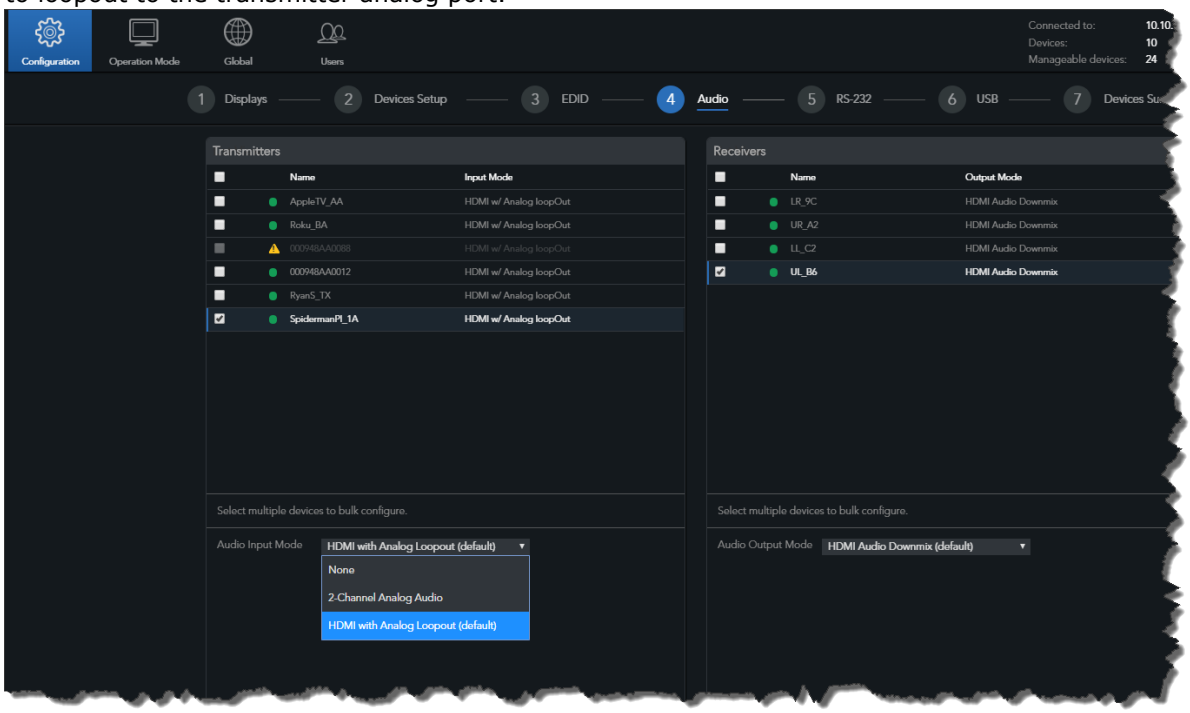
The following audio settings apply to Terra manager Software version 1.3 and later.
Upgrading from older versions of software may require reconfiguration of the audio settings.

This section addresses configuring the audio path through the system.

Setting up Audio on the Transmitter

Changes to Audio settings are updated in real time.

1. Connect the desired audio input type (embedded on HDMI, or analog via 3.5 mm stereo mini-jack connector).
2. Select the transmitter(s).
   Hint: You can multi-select (group-select) transmitters to configure more than one device.
3. Select the input type from the drop-down menu to route the audio to the network switch and to loopout to the transmitter analog port.



Audio input modes

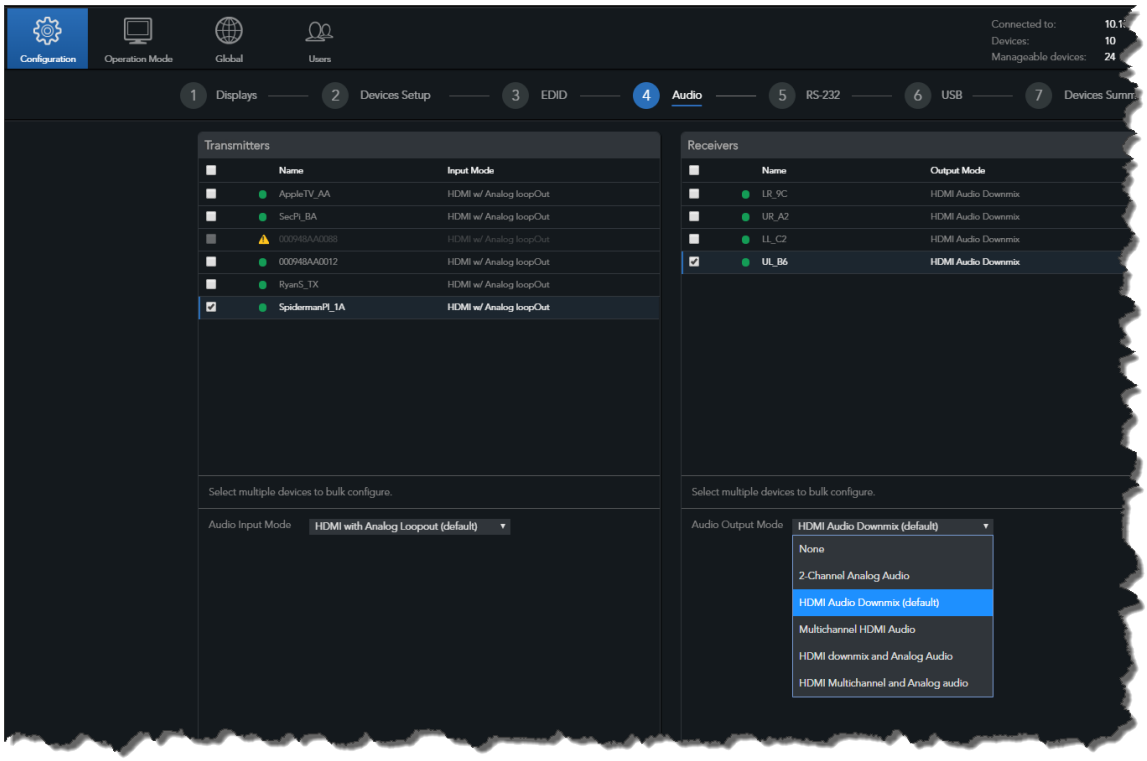
None	Does not pass audio to the switch or loop-out to the analog audio port.
2-Channel Analog Audio	Passes audio from the 3.5 mm connected source.
HDMI with Analog Loopout (default)	Passes the audio associated with the HDMI video to the connected switch, and peels out (de-embeds) the 2-channel analog to the 3.5 mm port on the transmitter. The analog audio can be fed to a local DSP, audio receiver, amplifier, or speaker. HDMI multichannel audio cannot be downmixed on the transmitter loopout analog port.

4. To save changes, click **Save** associated with the transmitter(s) or click **Save all** if multiple transmitters are selected.
   Changes to audio settings are made in real time.

Setting up Audio on the Receiver

Prior to setting up audio on Receivers, set up audio on the Transmitters.

1. Connect the HDMI output to a display.
2. Optionally, using a 3.5 mm stereo mini-jack cable, connect it to a DSP, Audio receiver, amplifier, or speakers.
3. Select the receiver(s).
   Hint: You can multi-select (group-select) receivers to configure more than one device.
4. Select the Audio Output Mode from the dropdown list.



Audio output modes

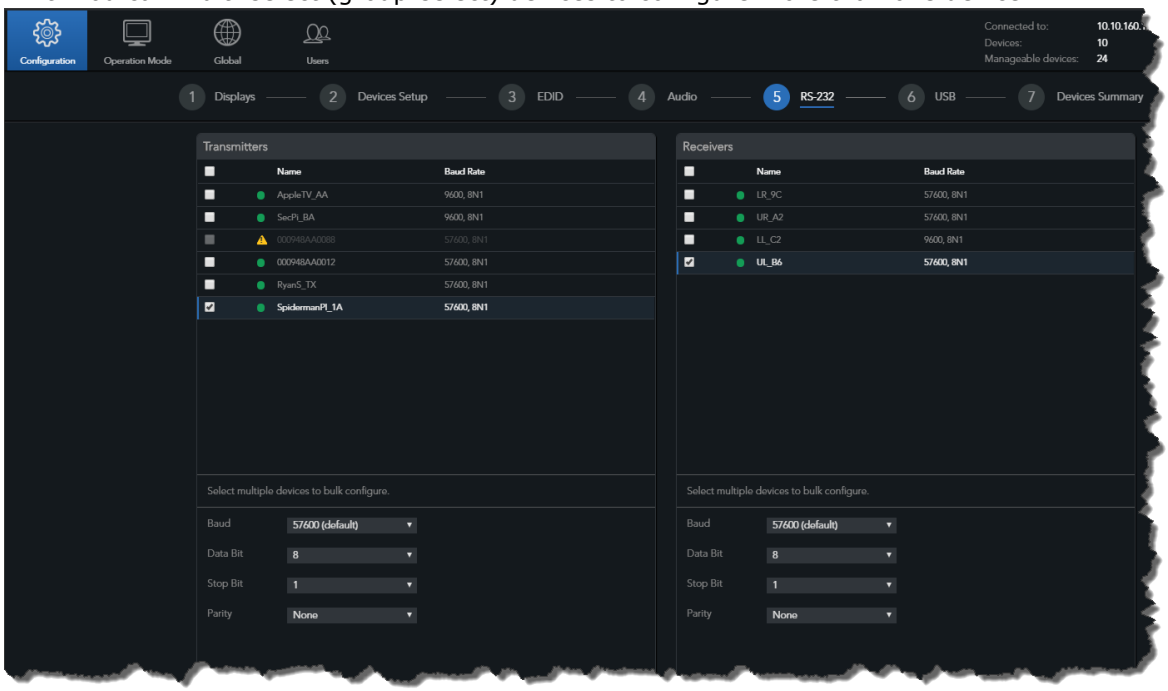
None	Audio will not output from the receiver.
2-Channel Analog Audio	If the analog audio input is connected to the transmitter or if the embedded HDMI audio source connected to the transmitter is 2-channel, audio will be output to the 3.5 mm analog port.
HDMI Audio Downmix (default)	If the embedded HDMI audio source connected to the transmitter is multichannel (up to 8-channels), HDMI audio output from the receiver is downmixed to 2-channels.
Multichannel HDMI Audio	If the embedded audio source connected to the transmitter is multichannel (up to 8-channels), embedded HDMI audio output from the receiver will remain (pass through) as Multichannel.
HDMI downmix and analog audio	If the embedded HDMI audio source connected to the transmitter is multichannel (up to 8-channels), output on the embedded HDMI and the analog on the 3.5 mm analog port will be downmixed to 2-channels.
HDMI Multichannel and analog audio	If the embedded HDMI audio source connected to the transmitter is multichannel (up to 8-channels), the embedded HDMI audio output on the receiver will remain multichannel, but will also be downmixed and de-embedded on the 3.5 mm analog output port.

5. To save changes, click **Save** associated with the receiver(s) or click **Save all** if multiple receivers are selected.

Configuration Page→ RS-232 Subpage (TX and RX)

Use this subpage to modify the RS232 port settings for devices.

1. Select the transmitter(s) and/or receiver(s).
   Hint: You can multi-select (group-select) devices to configure more than one device.



2. Select from the following settings:

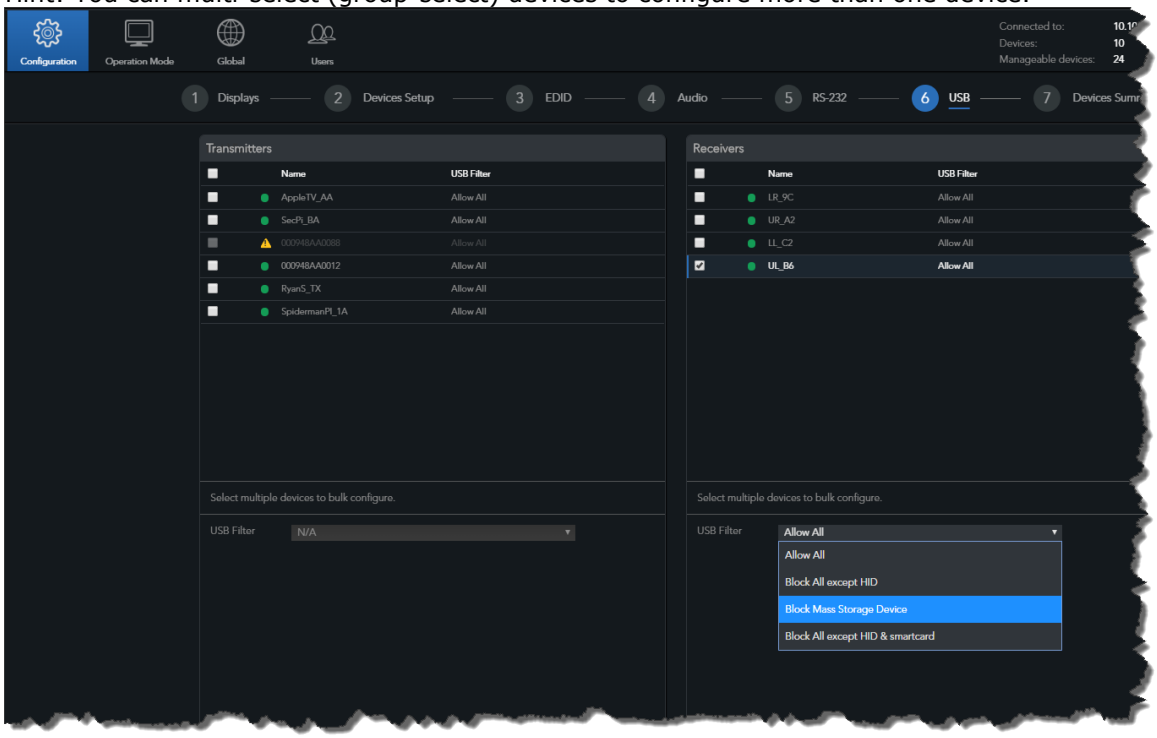
Baud	The speed data is sent over the RS-232 line. Default is 57,600.
Data Bit	Number of data bits. Default is 8.
Stop Bit	Period of time before the next start bit can be transmitted. Default is 1.
Parity	Error detection mechanism. Default is None.

3. To save changes, click **Save** associated with the device(s) or click **Save All** if multiple devices are selected.

Configuration Page→ USB Subpage (TX and RX)

Use this subpage to view and set the USB filter to allow or block data from specific USB devices.

1. Select the transmitter(s) and/or receiver(s).
   Hint: You can multi-select (group-select) devices to configure more than one device.



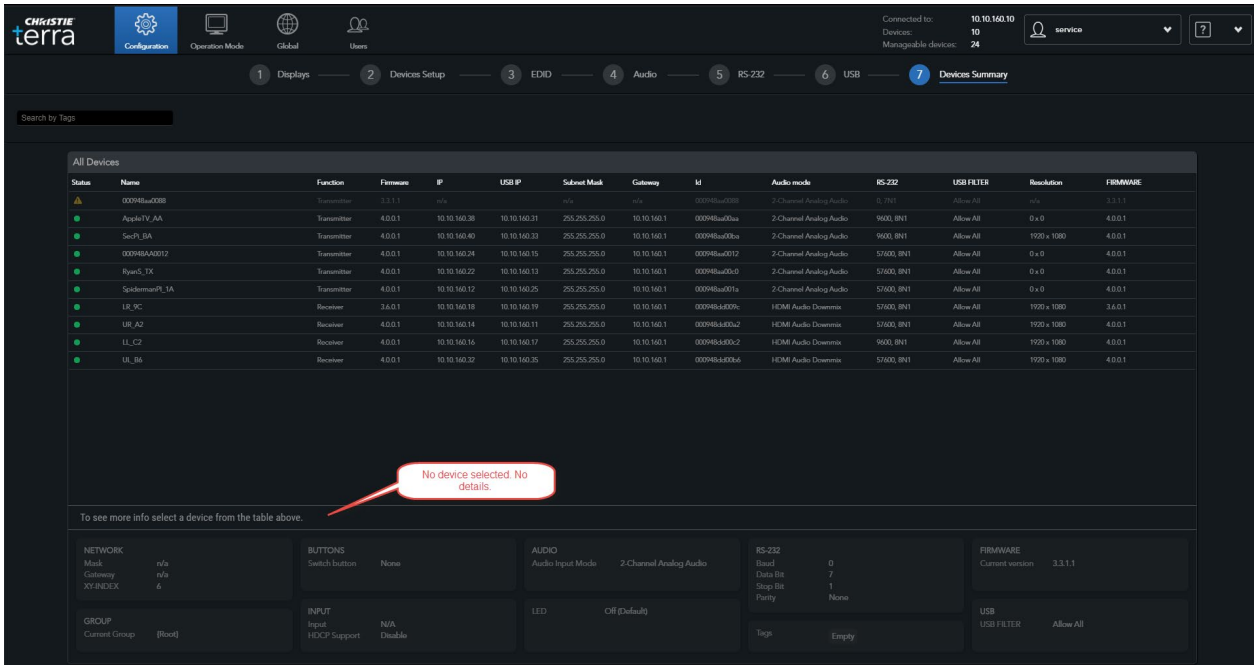
2. Select from the following settings:

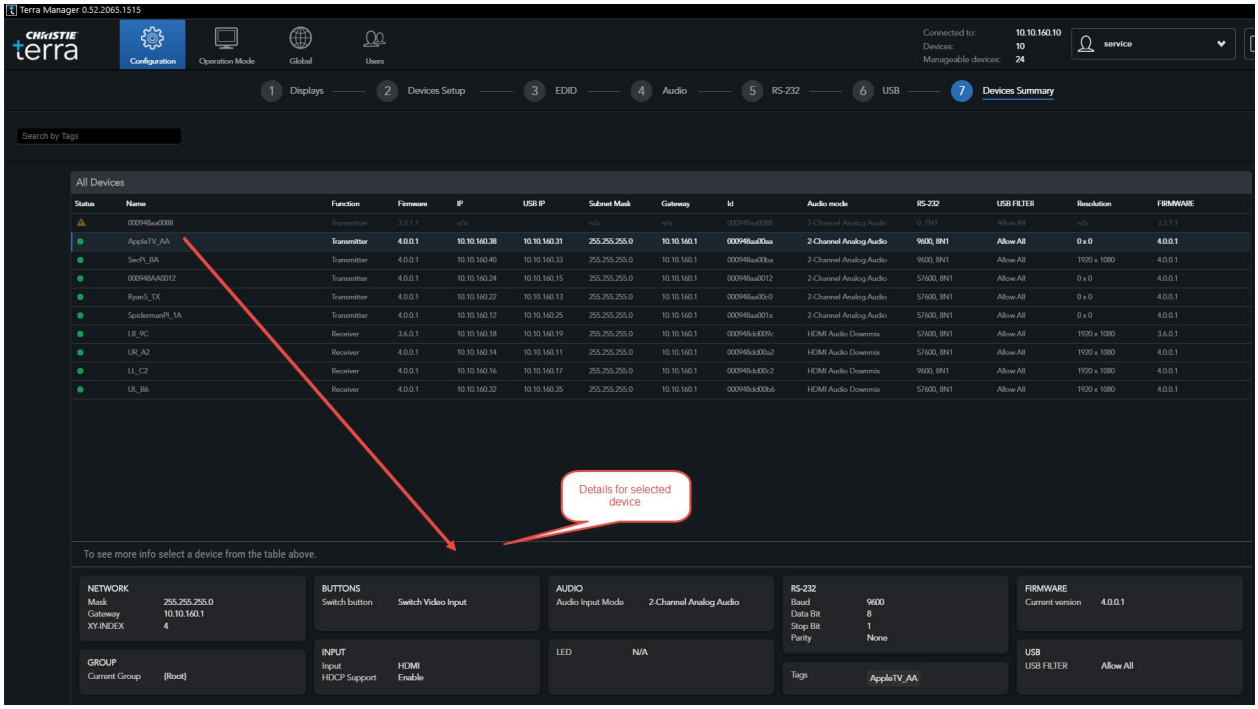
USB Filter	Allow all.	Allow data from all types of 2.0 USB devices.
	Block all devices except HID.	Allow only HID data from 2.0 USB ports and hubs.
	Block Mass Storage devices.	Block data from mass storage devices.
	Block all devices except HID and smartcards.	Allow data only from HID devices and smartcards.

3. To save changes, click **Save** associated with the device(s) or click **Save All** if multiple devices are selected.

Configuration Page→ Devices Summary

This subpage displays a summary of settings and current status for all devices. If a device is selected, additional information is displayed for the selected device at the bottom of the page.

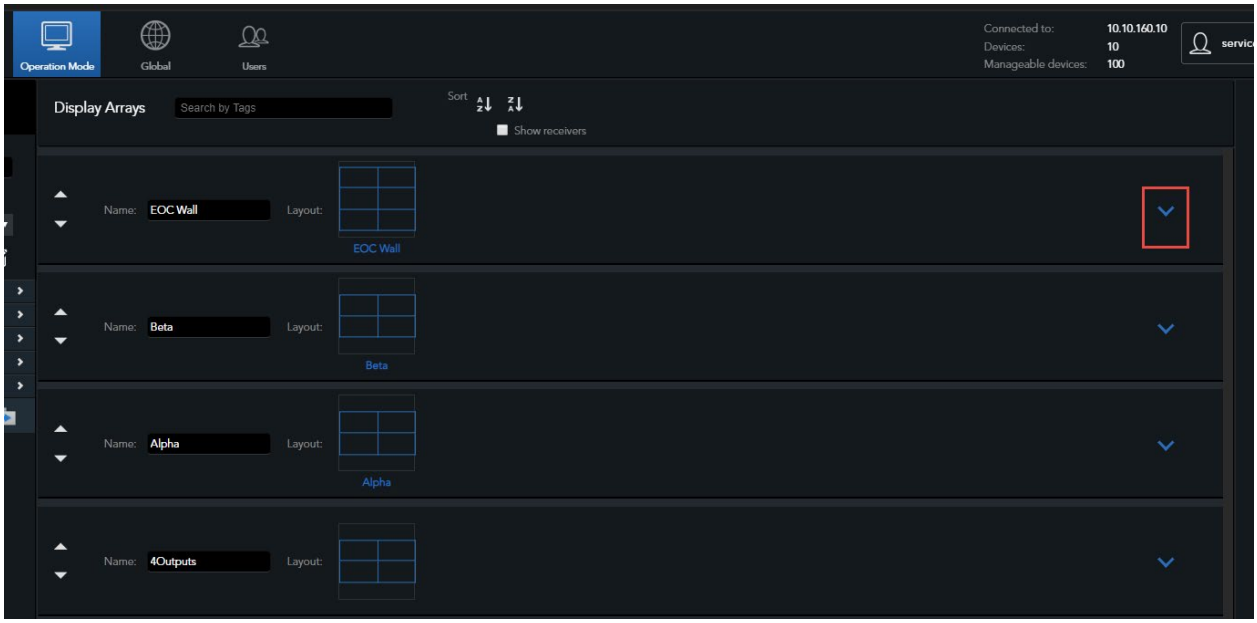




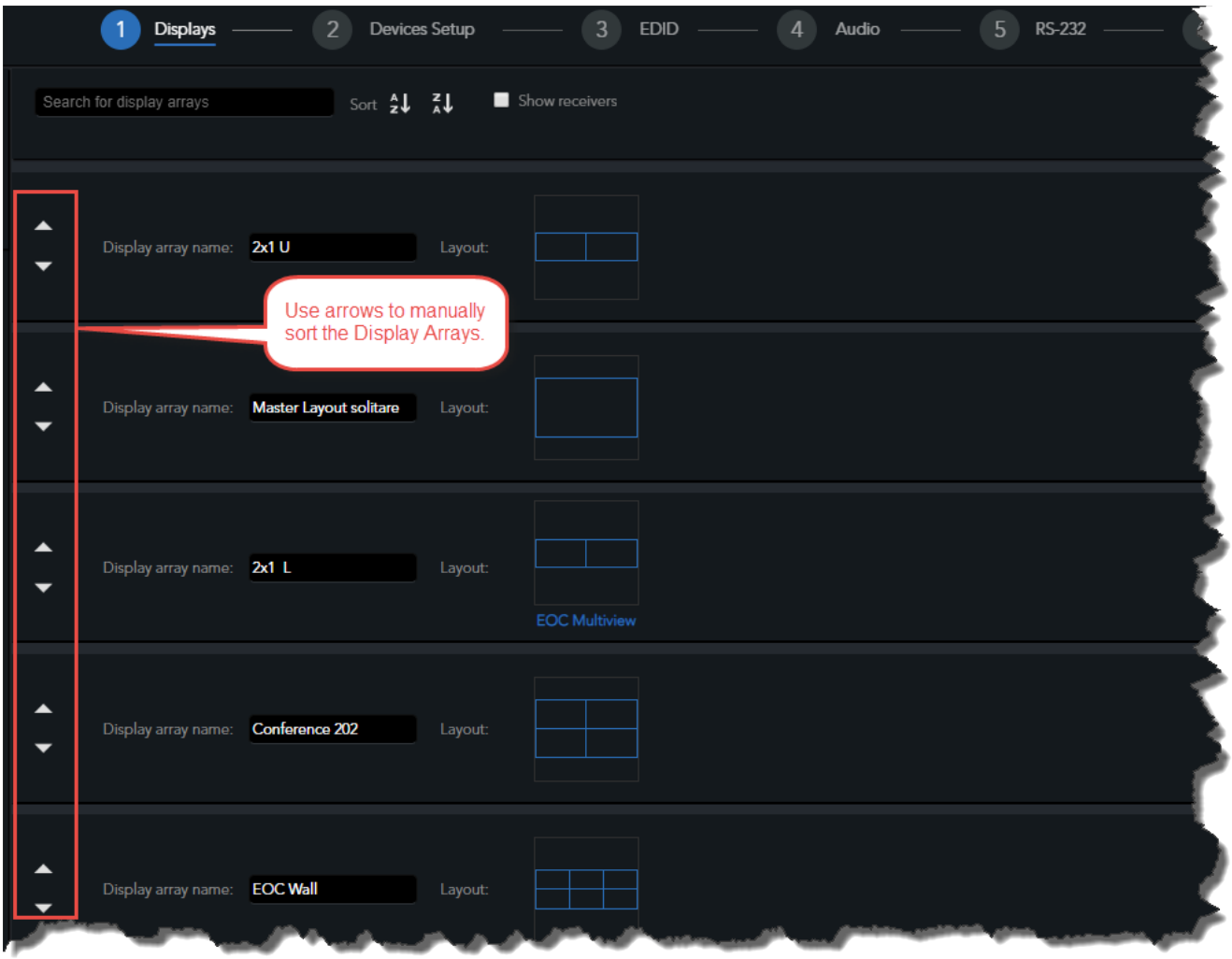
Operation Mode Page

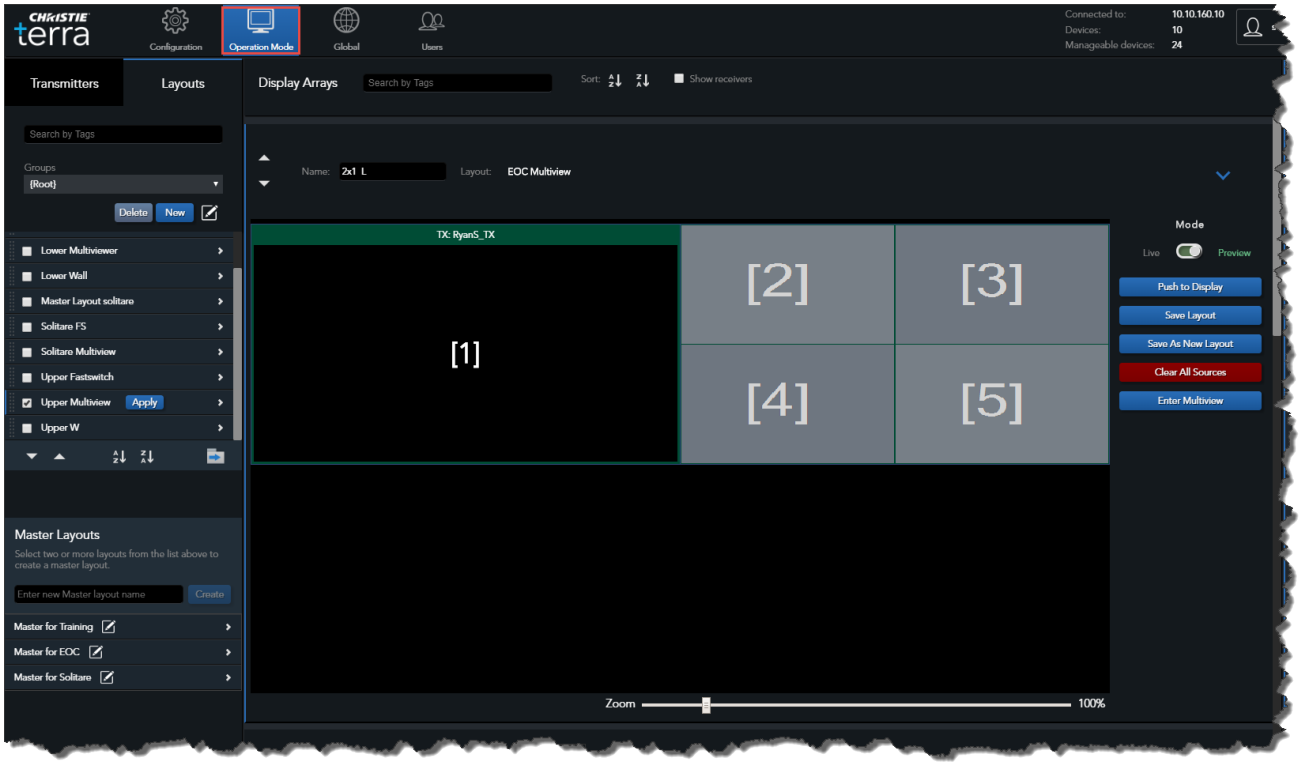
To access, click the **Operation Mode** icon on the top navigation bar.

By default, existing Display Arrays are listed in a compressed view. To expand the view, click the blue caret associated with the display array.



Use the up and down arrows on the left side of the page to manually sort the Display Arrays.





This page enables you to:

- View the current Display Arrays.
- Create layouts for Display Arrays by arranging the sources attached to Transmitters onto the Displays.
- Add and manage tags for Display Arrays.
- Edit the Display Arrays properties.
- Route sources to displays.
- Create layouts that can be recalled using Terra Manager or an external control system.
- Add layouts to groups.
- Add Transmitters to groups.
- Route audio.

When you assign a source or create an arrangement of sources you would like to save, click **Save Layout**. If you want to make changes to an existing layout, make the changes and click **Save as New Layout**.

To clear all sources from the Display Array, click **Clear All Sources**.

To create a layout with more than one source on one tile in the Display Array, click **Enter Multiview**. Refer to *Create a Multiview Layout*, page *69* for more details.

Prior to creating layouts on a Display Array, connect the sources to the Transmitters.

Terra Window ID Conventions

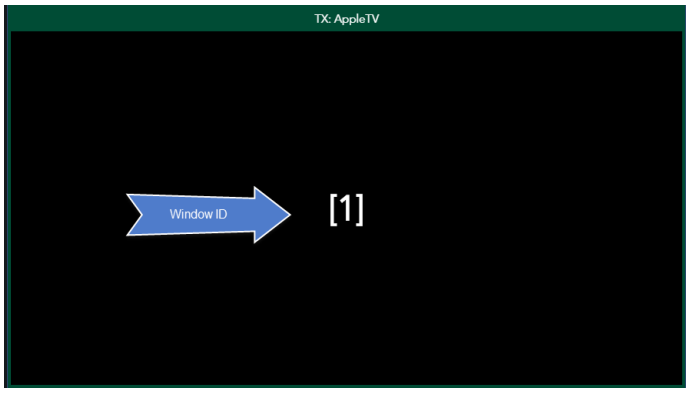
Each window in a display array is assigned a number starting at 1. The XY position of the upper left pixel is used to assign the window ID.

The window ID sequence starts at the top left, going left to right; then goes down one level, again starting from left to right, etc.

Conventions for Non-Multiview Layouts

Each Window gets the next sequential number assigned. See the two examples below.

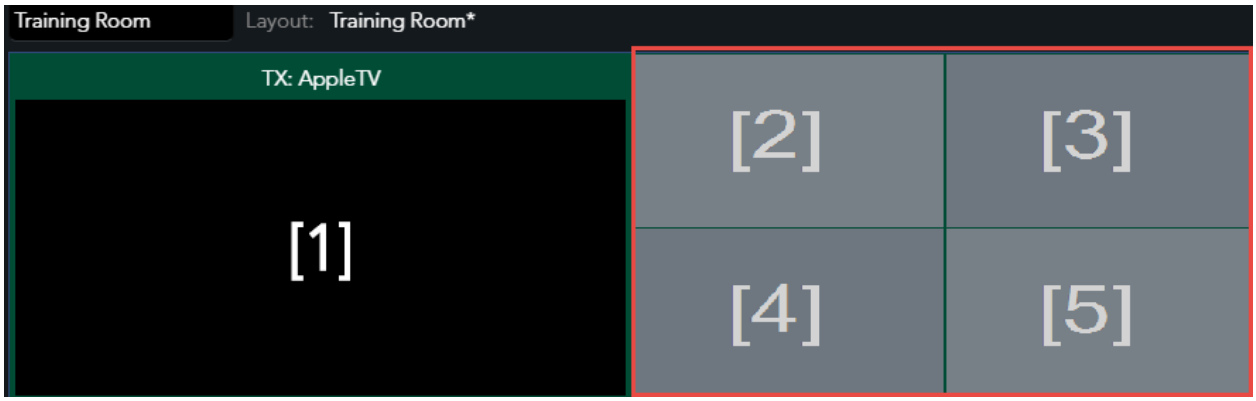
1x1 Display Array



Conventions for Multiview Layouts

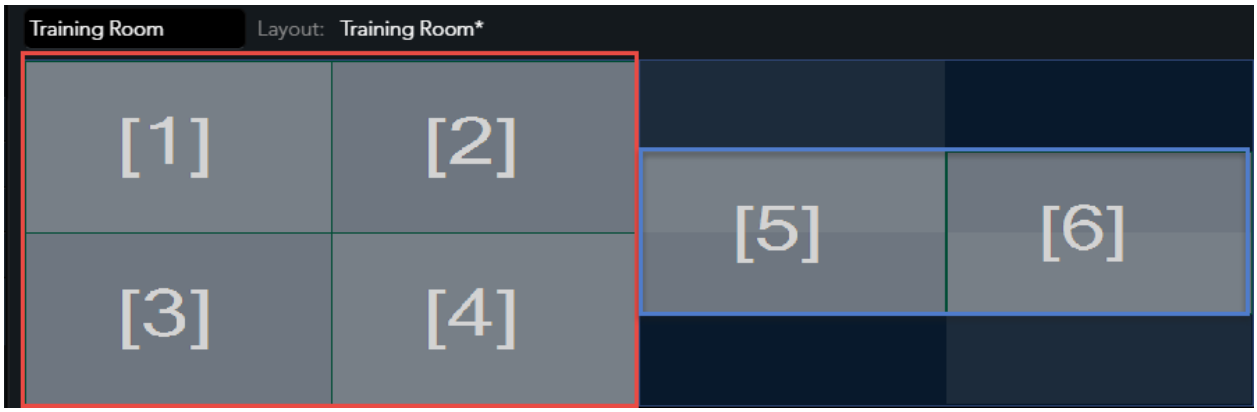
Multiviewer follows the same convention within the multiview layout; however, a multiview layout is treated as a standalone display when mixed with other Display Arrays. See the examples below.

1x2 Display Array with 1 Multiviewer on the Right

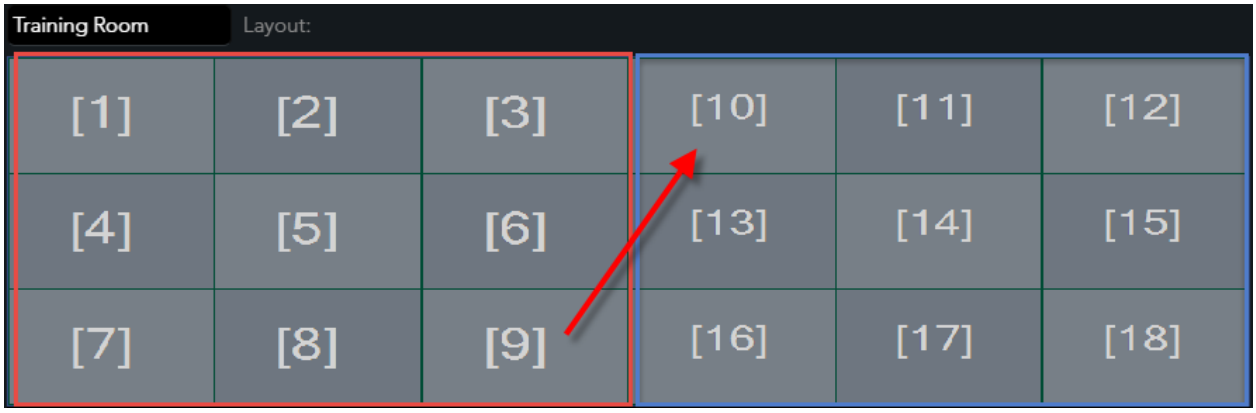


1X2 Display Array with 2 Multiviewers

Windows # 3 and 4 take a higher window priority over 5 and 6, although 5 and 6 have a higher vertical pixel position because multiview sources are all grouped together as one source group.



1x2 Display Array with 2 Multiviewers



Operation Mode: Create a Layout on a Display or Display Array

Assigning Transmitters to the display array displays the sources attached to the Transmitters on the specified location on the Display Array outputs. The video stream is the only function that is active unless you activate additional functions, such as audio, infrared (IR) control, RS-232, and USB.

There are two modes to use when creating a layout: Live and Preview.

- Use the Live mode to update the display in real time, it is updated as soon as you have assigned a source to the display.

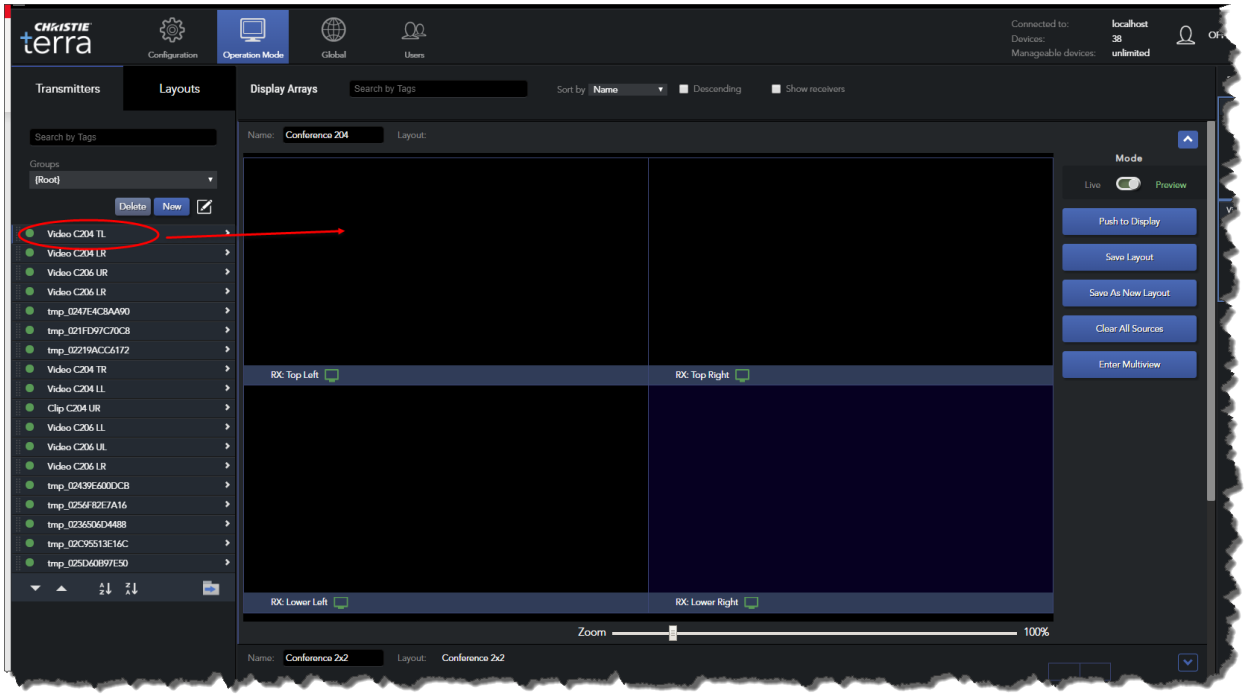
i	If something is arranged in Preview mode and then you change to Live mode, the changes made in Preview mode will be lost.

- Use the Preview mode to stage a layout prior to applying the source arrangement to the display. This option enables you to review the layout before displaying it on the outputs. When using the Preview mode, click **Push to Display** when you want to display the layout on the outputs. When a Transmitter is dragged to a Receiver, the Transmitter is represented by a green frame on top of the Receiver. The Transmitter's name is displayed on the top of the green frame. The Receiver's name is visible on the bottom of the frame. To remove a Transmitter from a Receiver in the Display Array, click on the Transmitter and press the Delete key on your keyboard.

To add Transmitters to the displays:

1. From the Operation Mode page, click the name (default name is the MAC Address) of the desired Transmitter and drag it to the desired location in the Display Array.

   i When a source is dragged onto a tile of the Display Array, the source fills the window initially.

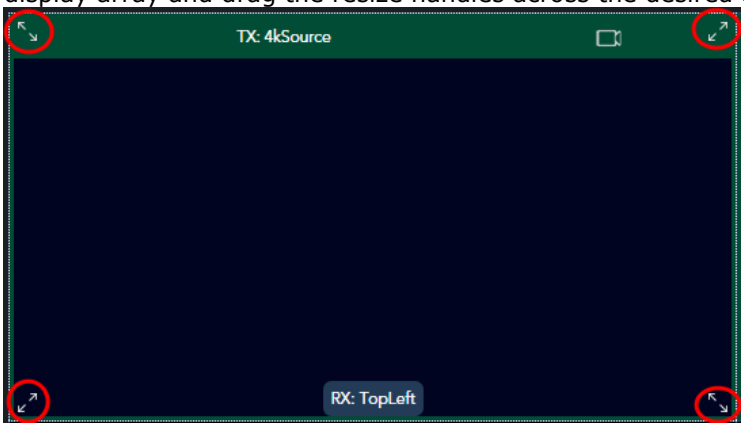


When video is streaming, a green border highlights the source.

2. Optionally, to route additional functions with the video sources, refer to Operation Mode: Routing Additional Data Streams, page 66.

   You can modify some of these settings using the Transmitter Properties panel.

3. Optionally, if you want one source to span more than one display, click the Transmitter in the display array and drag the resize handles across the desired area.



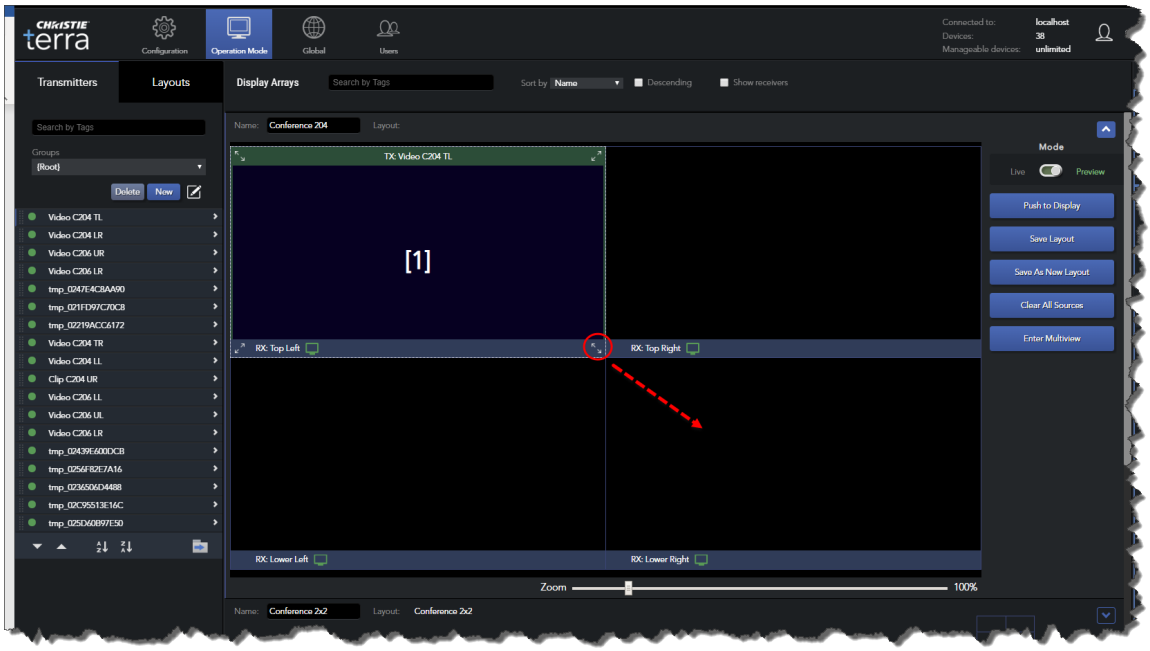
4. Optionally, to delete a source from a Display, click the source you want to delete (it is outlined in green) and press the Delete key on your keyboard.
5. Optionally, to reposition a source, highlight the source (it is outlined in green) and drag it to the desired position.

   If there is a source on each display in the array, you cannot reposition the sources. You first have to delete a source.

   Use the Multiview feature to have more than one source in one tile in the Display Array.

6. Repeat the above step for each source you want to add to the layout.

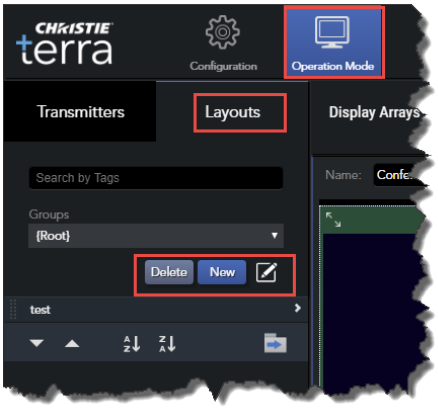
Use the Zoom tool to change the visible view of the Display Array.



7. If using the Preview mode, click **Push to Display** to display the sources on the outputs.
8. To save the layout, click **Save Layout**.

Operation Mode: Groups

From the Transmitters tab and the Layouts tab on the Operation Mode page, create, rename, or delete groups.

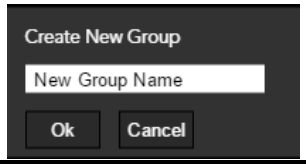


Creating Groups

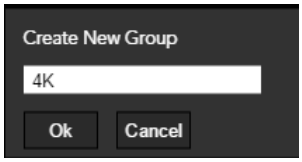
Create groups to help organize layouts and Transmitters. Groups are similar to folders. Transmitters (sources) and Layouts can be added to one or more groups.

To create a new group:

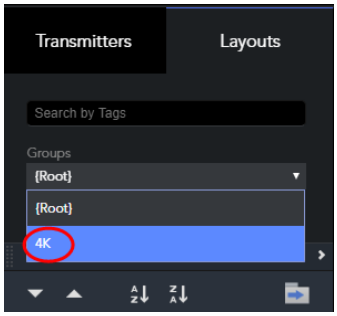
1. From the Transmitters or Layouts tab on the Operation Mode page, click **New** on the left panel.



2. Type a name for the new group.



3. Click **OK**.
The new group is now available from the Group dropdown list.

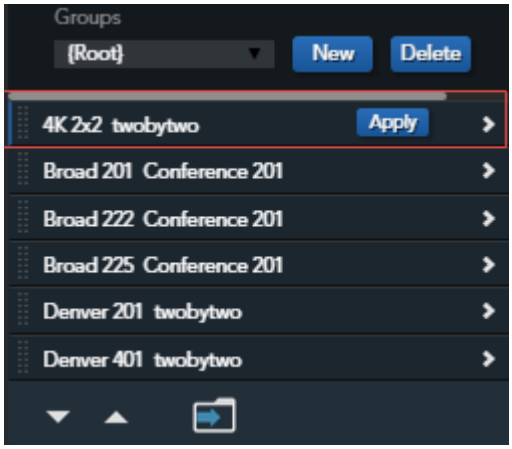


Adding Items (Transmitters and Layouts) to Groups

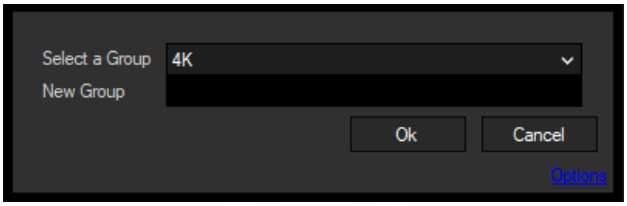
When an item is first saved, it is saved to the Root group.

To move it to another group:

1. Highlight the item you want to move to a different group.

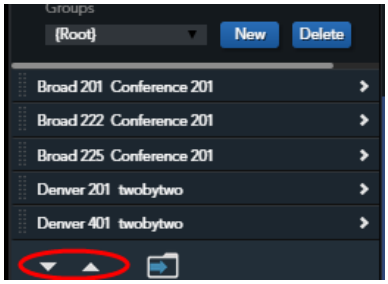


2. Click the folder button  .
3. Perform one of the following:
    a. Select the desired group from the dropdown.
    b. Type a new group name in the **New Group** field.



4. Click **OK**. The selected item is now avaiable in the specified goup.

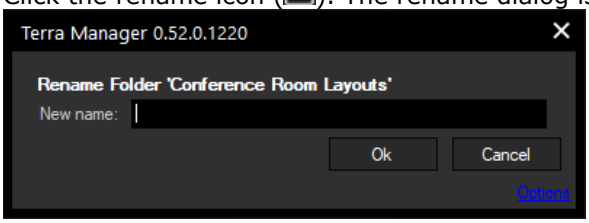
5. Optionally, to reorganize the list of items, use the **Up** and **Down** buttons to move items in the list.



Renaming a Group

To rename a group:

1. Select the group name from the Groups dropdown.
2. Click the rename icon (). The rename dialog is displayed:



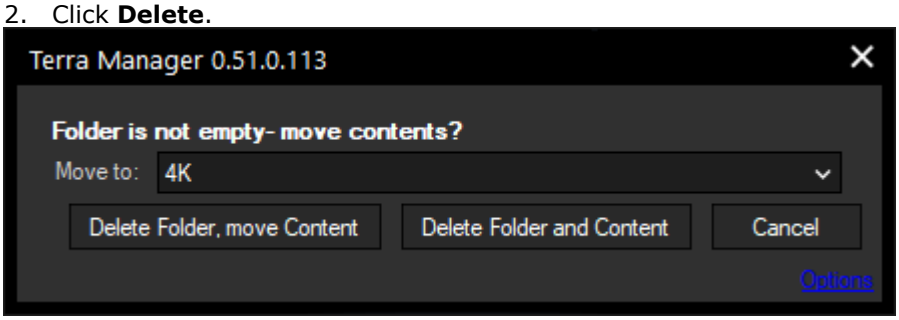
3. Type the new name for the group and Click **OK**.

Deleting a Group

If you have created groups, you can delete the group and all the items in the group; or you can move the items to a new group.

To delete a group:

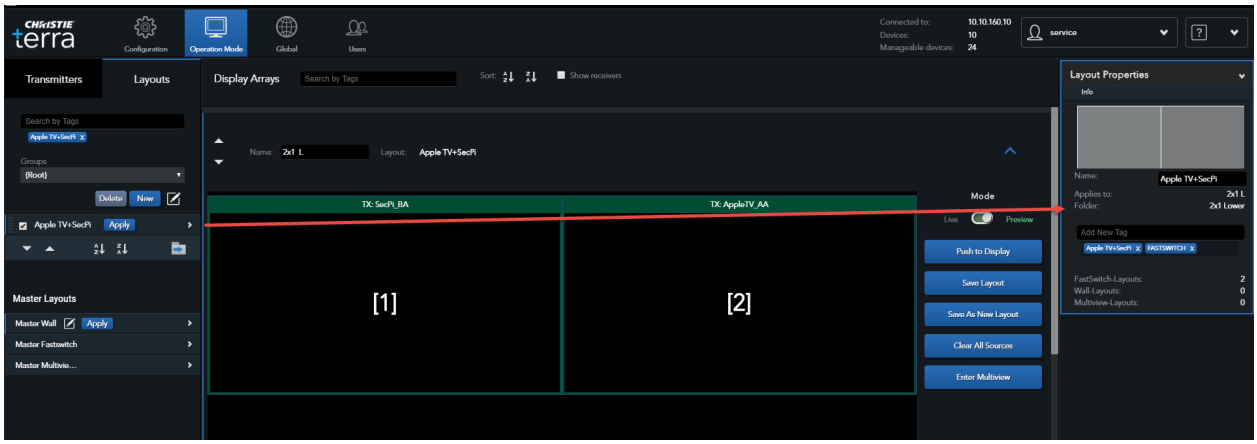
1. Select the group name from the Groups dropdown.
2. Click **Delete**.



3. Perform one of the following:
   a. To save the items to a new group, select a group to move the items to and click **Delete Folder, move Content**.
   b. To delete the group and the items in the group, click **Delete Folder and Content**.

Searching Groups

1. Navigate to the Operation Mode page.
2. Select the Layouts or Transmitters tab.
3. In the **Search by Tags** field, enter the search text.
4. The layouts or transmitters meeting the search criteria are listed.
5. Click on the desired one to display the item.
6. Click on the name. The properties panel associated with the item is displayed on the far-right side. It displays the details for the item.



Creating a Master Layout

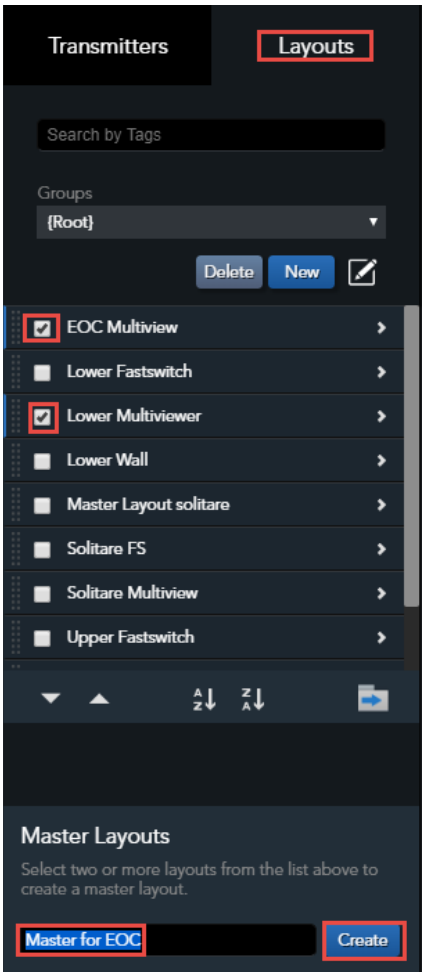
Layouts can be grouped into a Master Layout and simultaneously recalled with one click on multiple display arrays.

Master layouts consist of two or more predefined layouts for two or more Display Arrays; but only one layout from each Display Array can be used in a Master Layout. For example, if you have three Display Arrays, you can have one layout from each Display Array.

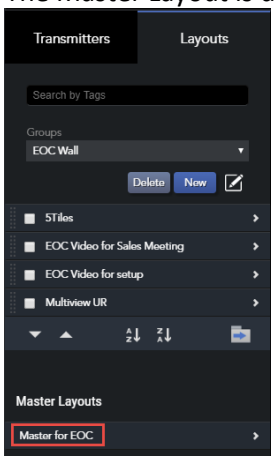
If a layout is modified that is part of a master layout, the master layout will not be updated until the layout is pushed to the display array.

To create a Master Layout:

1. Navigate to **Operation Mode→ Layouts**.
2. Using the check boxes associated with the layouts, select two or more layouts from the layout list.
3. Type a name for the Master Layout.
4. Click **Create**.



The Master Layout is displayed in the Master Layout list.

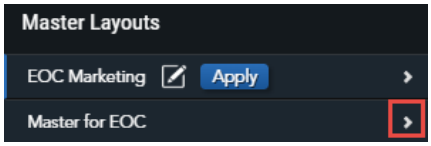


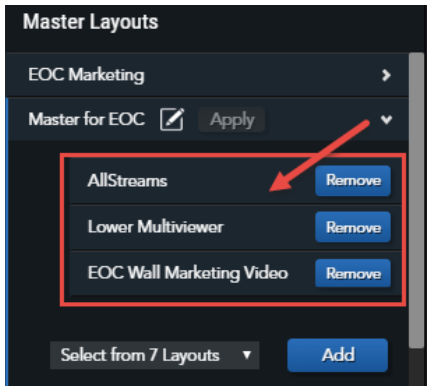
Viewing/Editing a Master Layout

To view/edit the layouts in a Master Layout:

1. Navigate to **Operation Mode→ Layouts**.

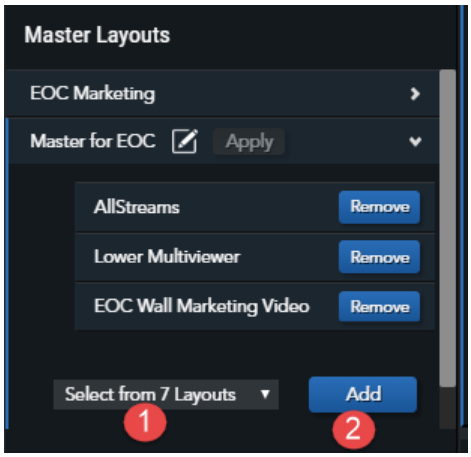
2. Click the caret associated with the Master Layout name.





3. Optionally, click the available layouts list and select a layout to add to the Master Layout and click **Add**.

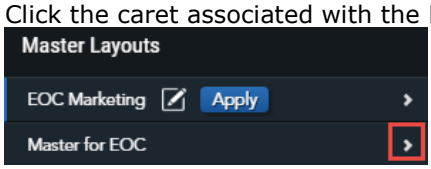
The layout must be associated with a Display Array that is not already included in the Master Layout. The Display Array associated with each layout is enclosed in brackets after the name (for example, All Streams: [Conference Room].



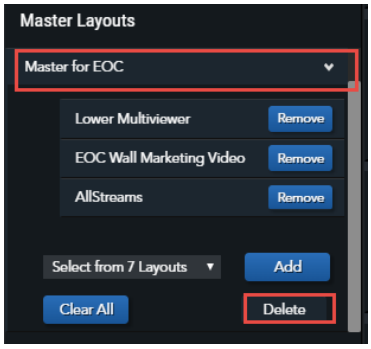
4. Optionally, click **Remove** to remove a layout from the Master Layout.

Deleting a Master Layout

1. Navigate to **Operation Mode→ Layouts**.
2. Click the caret associated with the Master Layout name.



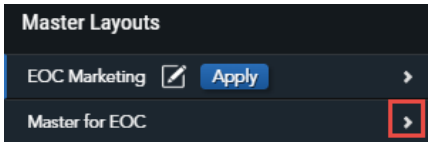
3. Click **Delete**.



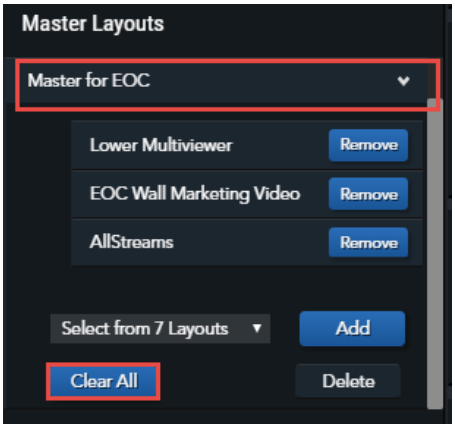
4. Respond **Yes** to the confirmation prompt.

Clear a Master Layout from the Display Arrays

1. Navigate to **Operation Mode→ Layouts**.
2. Click the caret associated with the Master Layout name.



Click **Clear All**.



The Master Layout is cleared from all display arrays.

Operation Mode: Routing Additional Data Streams

Additional data streams can be routed by selecting the checkbox next to the stream type on the Transmitters tab. Video is selected by default.

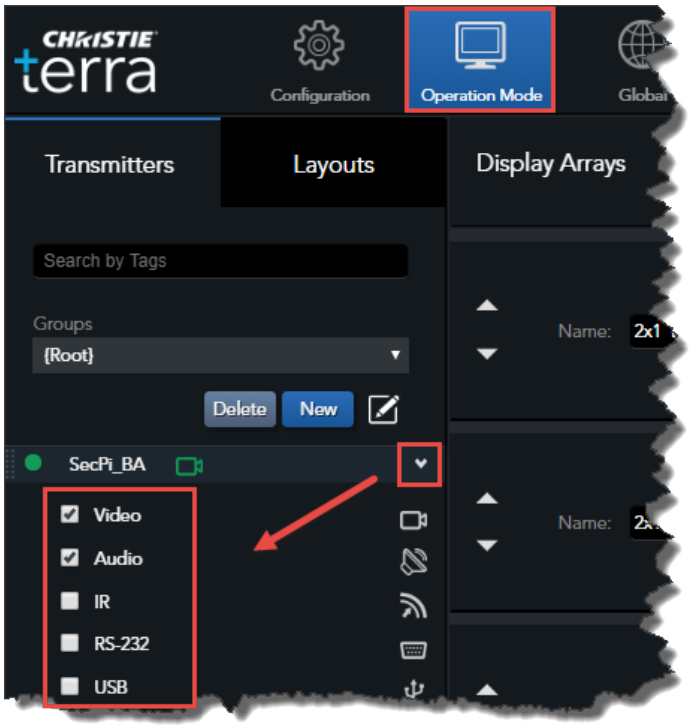
> To route additional streams, you must check the desired options BEFORE dragging the transmitter on to a Display Array. Checking additional options does not update transmitters that are currently on Display Arrays.

Routing additional streams from a Transmitter to a Receiver is independent of video. Once streams are created, they remain active until stopped. Switching or replacing a video stream will NOT clear other previously routed streams such as audio or RS232 communication as they are independent of the video stream.

To clear a stream, refer to *Operation Mode: Clearing Additional Data Streams*, page *67*.

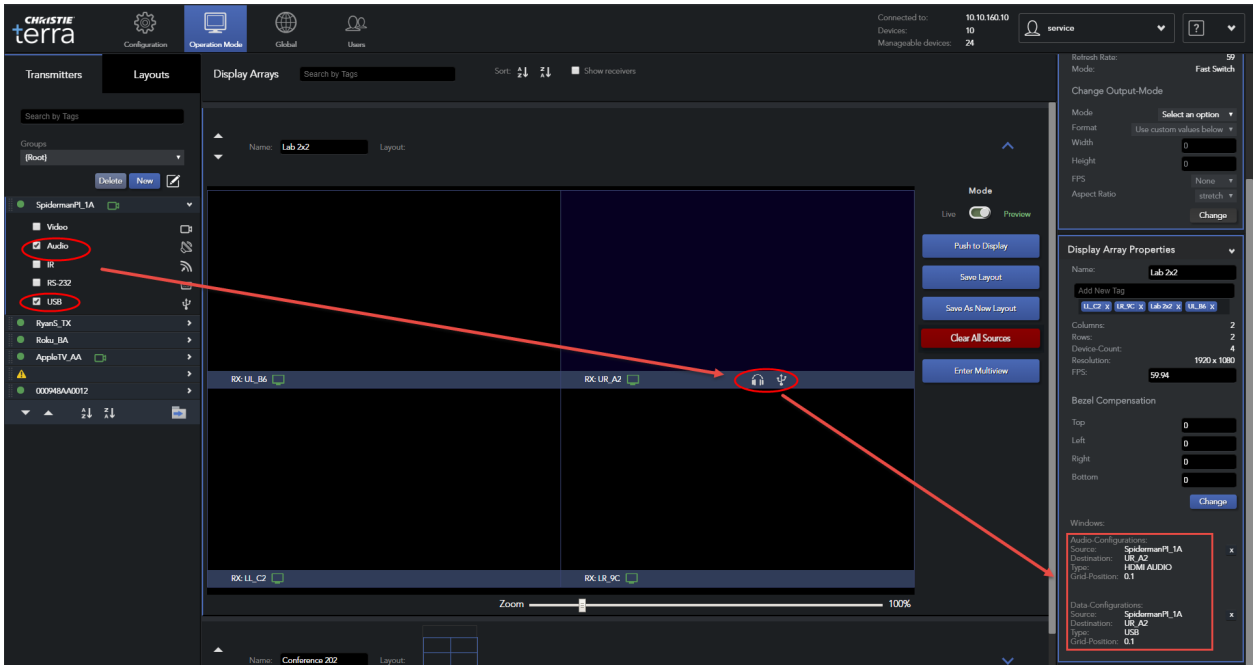
To route additional signal formats with the video stream:

1. From the Operation Mode page, click the caret associated with the Transmitter.
2. Select the desired check boxes to add additional data streams.



Icon	Description
	Video
	Digital audio (HDMI)
	Analog audio
	IR out
	IR in
	RS232
	USB

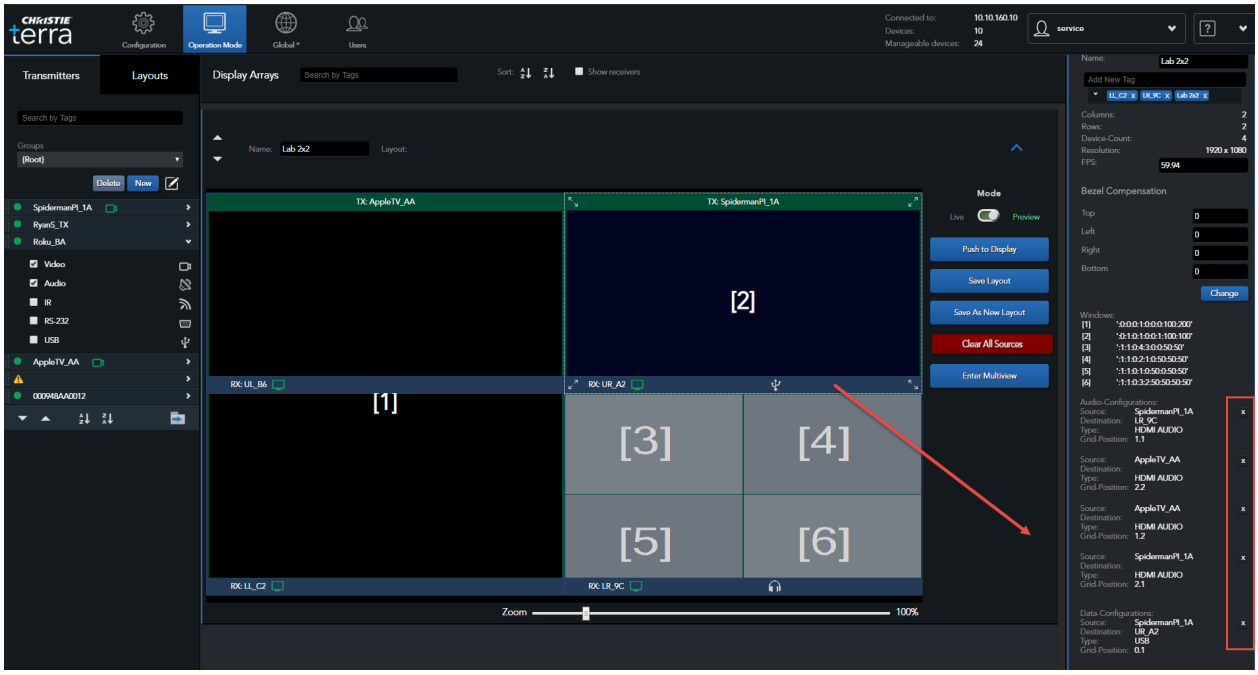
When a stream is selected, the associated icon is displayed on the Transmitter on the Display Array and the Display Array's properties panel is updated with the additional streams.

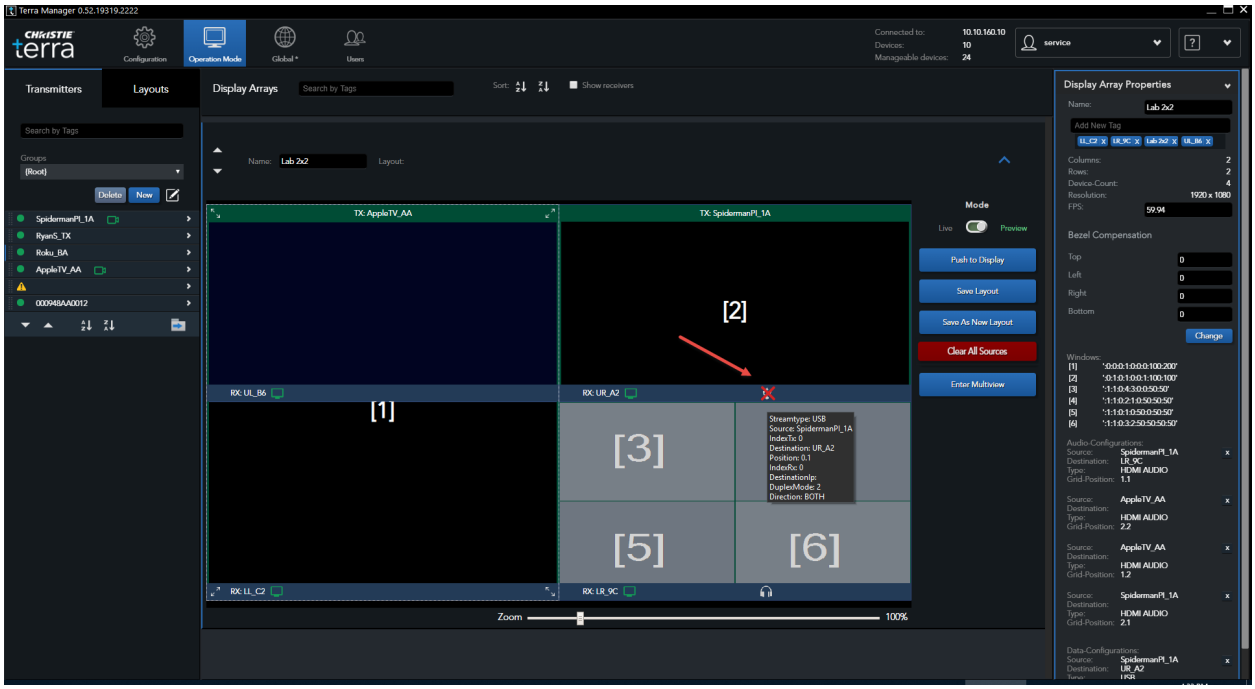


Operation Mode: Clearing Additional Data Streams

To clear the additional streams and sources, click **Clear All Sources** on the Operation Mode page.

To clear a specific stream only click the **X** associated with the stream in the Display Array Properties panel; or hover over the icon representing the stream to clear and click the red X.



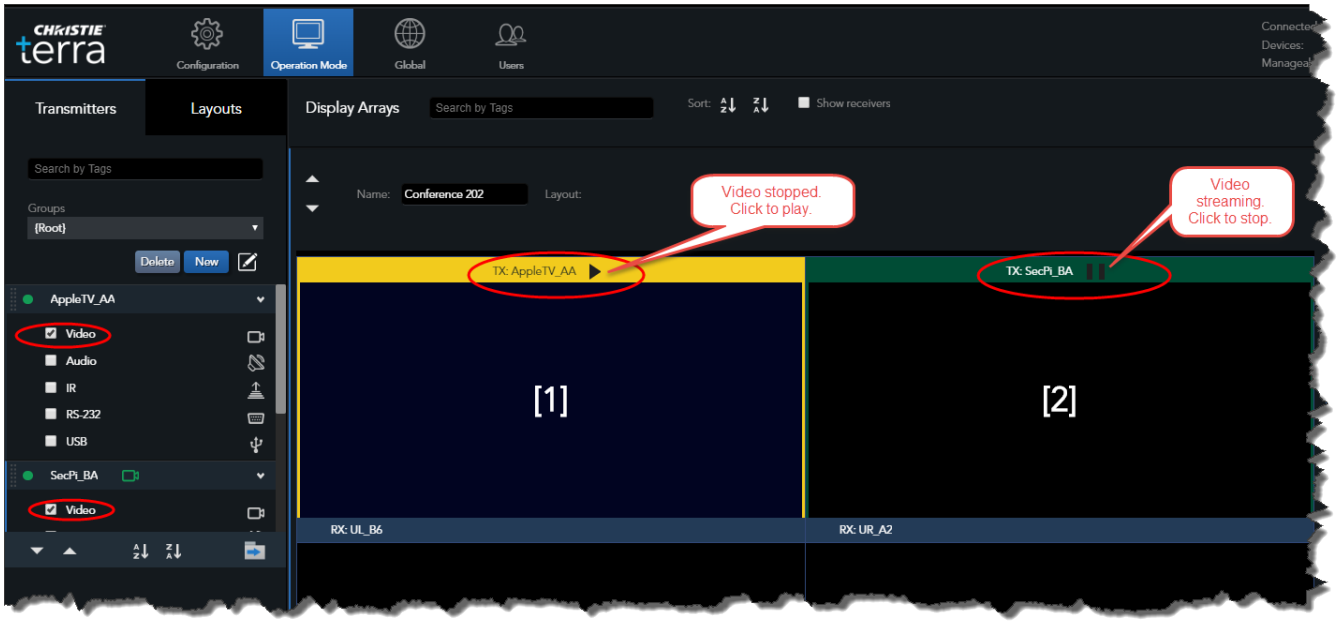


Starting or Stopping Video Streams

When Transmitters with the Video stream enabled are added to display arrays, a stop button is displayed.

Transmitters with the Video stream enabled, automatically stream video when added to a display array. On the display array, these transmitters have a green border and a stop button. When a video is stopped, the transmitter has a yellow border.

Toggle the stop/start button to stop and start a selected video and enabled streams.



Operation Mode: Create a Multiview Layout

A multiview layout can consist of two or more sources on one receiver.

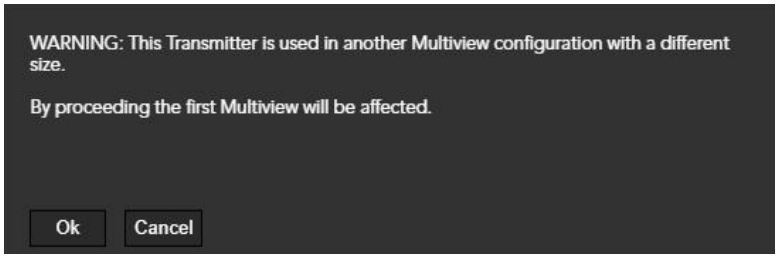
Multiview Design Considerations

Review the following guidelines to help create multiview layouts:

- Multiview layouts are best used for confidence monitoring and preview applications, not for live presentation displays.
    - A Terra multiview layout assembles downscaled sources. It is not a multi-windowing processor that freely upscales and downscales sources.
    - Default operation presents downscaled sources at 30 FPS.
- Best approach is to use one display array in the system for multiview mode.

Careful design is required if more than one multiview layout is used in a system.

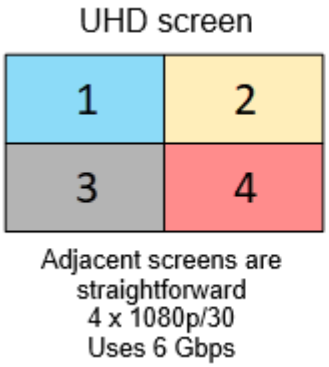
- There is one down-scaler available per source throughout a system. For example, showing the same source on multiple multiview layouts at different window sizes is not supported.
- Terra Manager provides a warning but doesn't prevent users from proceeding when attempting to add a Transmitter that is already used in a multiview layout. The outcome may result in undesirable image artifacts due to bandwidth oversubscription. See the following example dialog:

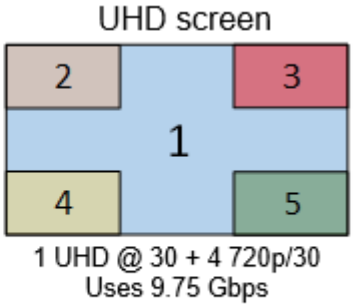


The window of the source on the first Multiview will stay the same size, but the image will be scaled inside the window.

- A common downscale resolution must be used for multiview layouts.
- Lower resolution displays (1080p) are best to use with multiview layouts because they pull less bandwidth to the Receiver.

- Use EDID files in Transmitters to display the source at 1080p where it is practical.
- Identify UHD and 4K 50/60 sources and displays in the Terra system configuration and acknowledge operating restrictions for multiview mode.
- Up to 32 images can be used in multiview mode if all images are presented adjacent to each other in a grid; however, when the grid is not used or windows are overlapped, the number of sources and performance will be reduced.
- Receivers operating in multiview mode have limits to the bandwidth that can be subscribed to. The limit is based on the Ethernet 10Gbps connection. Example bandwidths used by two UHD multiview scenarios are presented below:



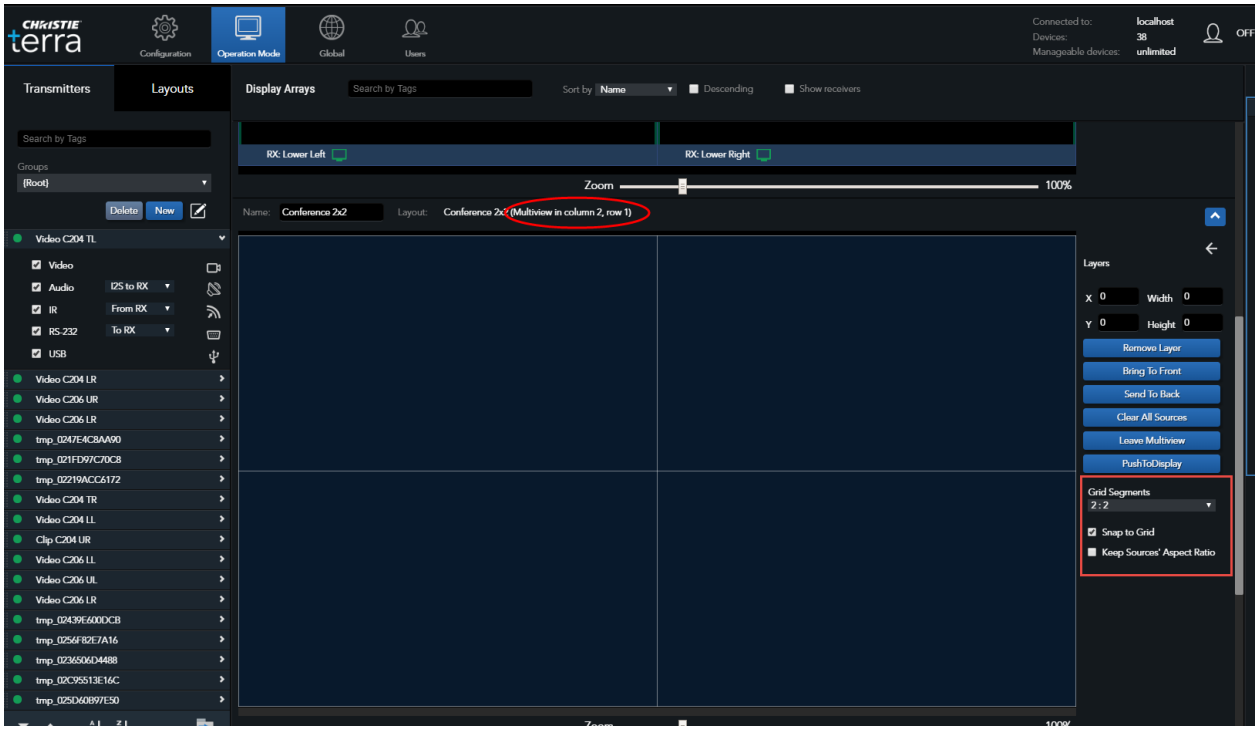


- Best practice is to present full images in FastSwitch mode. Avoid using Multiviewer mode for full images.
- Best practice is to present sources in a standard arrangement adjacent to each other such as 2x2, 3x3, and 4x4; otherwise the quality of the images may be reduced.
- Best practice is to use the "Snap to Grid" tick box.
- Free form window sizing is discouraged, and special considerations need to be taken when used:
  - ✓ Overlapped and overlayered windows count against the 32-window rule.
  - ✓ Spaces between windows count against the 32-window rule.
  - ✓ A source used in more than one window cannot be of different sizes (one down scale rule).
- If one source is used multiple times with different dimensions in a multiview layout, it will not display properly, since it can only provide one downscaled stream (refer to the first bullet point).
- Oversubscription issues at a Receiver (pixel dropouts) can be identified by removing layers from the multiview layout.

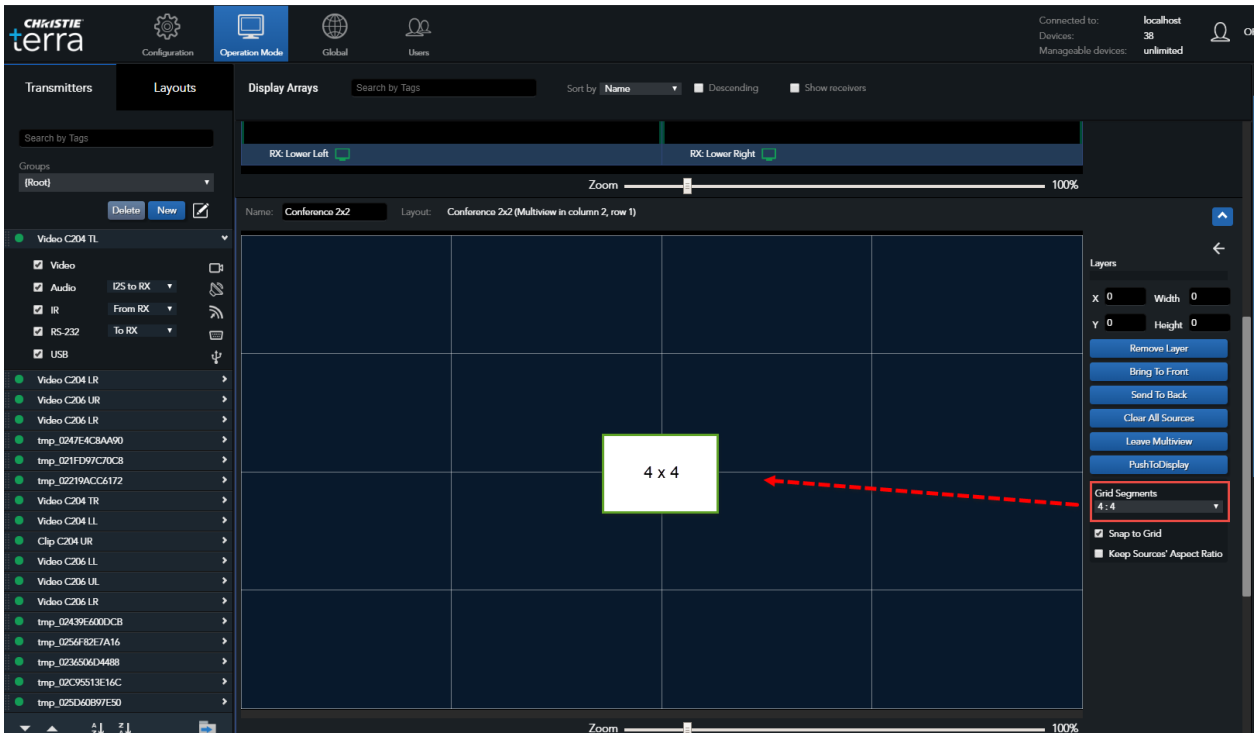
To create a multiview layout:

1. Click **Operation Mode**.
2. On a Display Array, double click the area you want to convert to Multiview; or click **Enter Multiview**.

   The area you are converting to Multiview cannot have any sources on it.



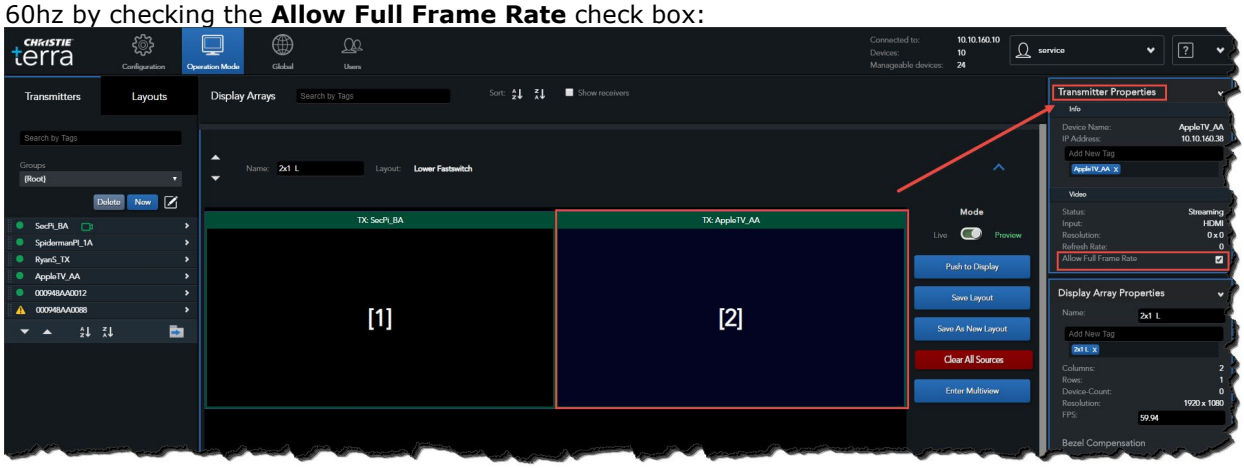
3. Use the Grid settings to define the Multiview layout. A new array is displayed with the Multiview settings.



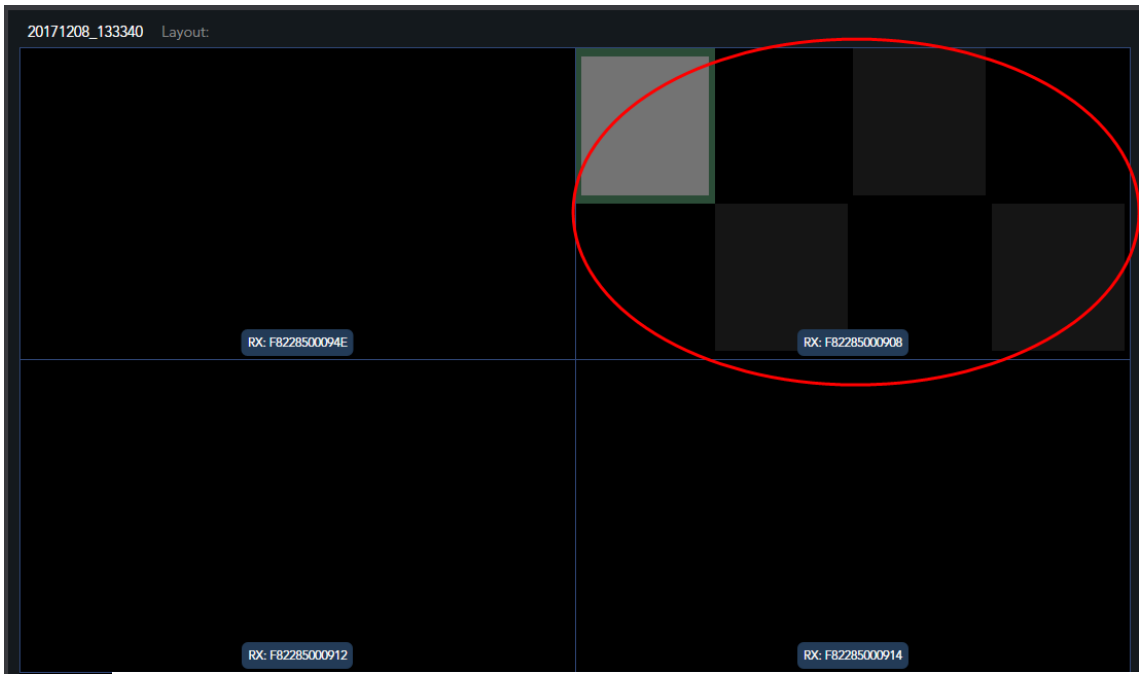
4. Drag one or more sources into the Multiview array.

Select the **Snap** checkbox to help position the sources within the nearest boundaries.

5. Optionally, if you arrange sources so they overlap, click **Send to Back** to move the selected tile behind the overlapping tiles; or click **Bring to Front** to move the selected tile to the top of the overlapping tiles.
6. Optionally, use **Clear All Sources** to remove all sources.
7. By default, the Multiviewer drops the scaled window to 30 fps to conserve on bandwidth. Optionally, on the Transmitter Properties pane, change the multiview settings from 30hz to 60hz by checking the **Allow Full Frame Rate** check box:



8. Use the back arrow ( ) or click **Leave Multiview** to return to the original Display Array.

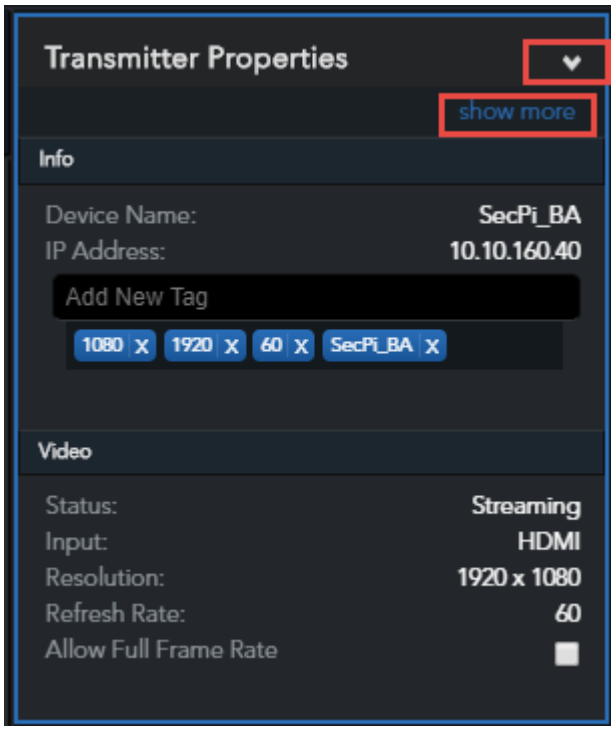


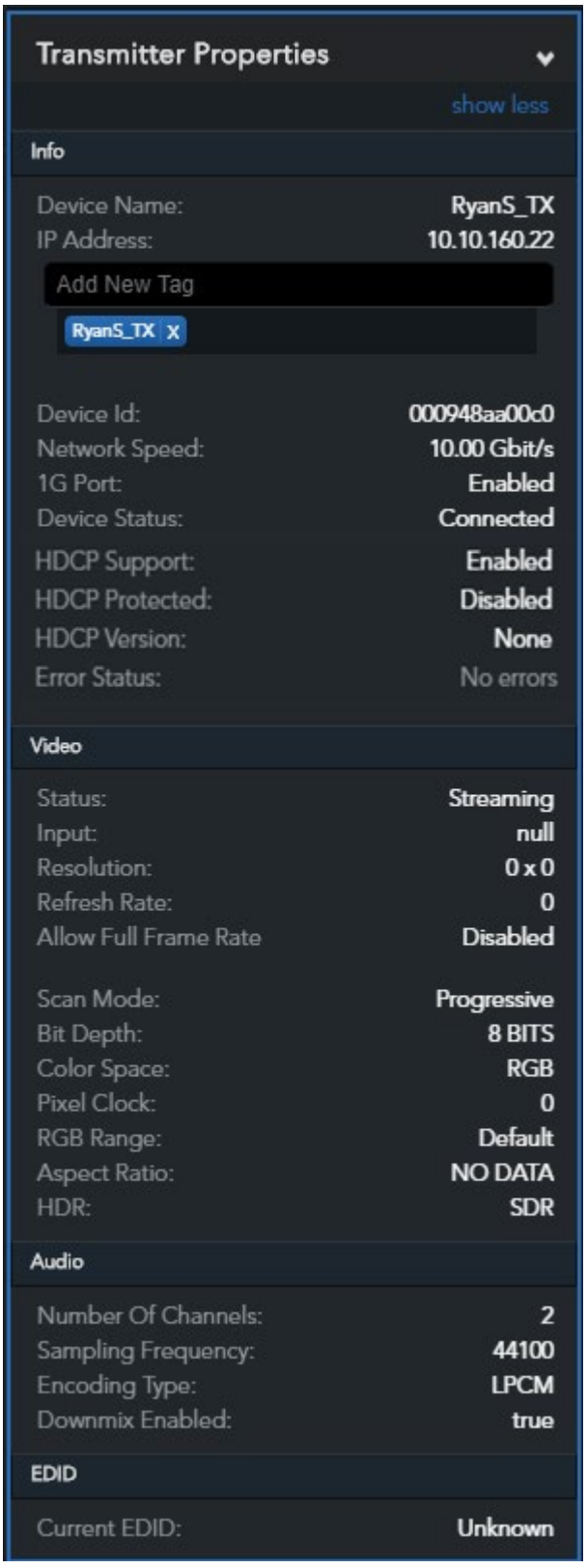
The Multiview area is shown as a checkerboard pattern of dark gray and black. Sources on a Multiview area are shown as light grey.

Operation Mode: Transmitter Properties

The Transmitter Properties panel displays basic properties by default. There are two controls to show less or more properties. The caret toggles between showing/hiding the basic properties. The **show more**/**show less** toggles between basic and advanced properties.

Basic Properties	Advanced Properties





Info	
Device Name	User-defined name for the device. Defaults to the MAC Address for the device. Best practice is to apply logical names to all devices and system assets.
IP Address	IP address assigned to the device.
Tags	Type the name of a new Tag to be associated with the Transmitter. Click the **X** next to the tag name to delete a tag.
Device ID	The MAC address of the device.
Network Speed	Displays the speed (5G or 10G) of the network switch.
1G Port	Displays the status of the 1G port (enabled or disabled).
Device Status	Connected, disconnected, error, or unreachable.
HDCP Support	Displays the status of the HDCP support set on the Input tab (Configuration → Devices Setup).
HDCP Protected	Copy protection for the source. Not set in Terra manager, setting is obtained from the source. False = disabled. True = enabled.
HDCP Version	The HDCP version that is supported: 1.4, 2.2, or NA.
Error Status	Displays no error or current error description.
Video	
Status	Streaming: Video is streaming to the device. Stopped: All RX devices joined to this particular video display a black screen. Disconnected: Device is disconnected from the network. Only subscribing: Joined to a stream but not actually streaming. Unsubscribing: Stream is being removed.
Input	Connection type (either HDMI or DisplayPort).
Resolution	Resolution of the source (e.g., 1080p/1920x1080).
Refresh Rate	Frame Refresh rate (Hz) of the source.
Allow Full Frame Rate (Checkbox)	Check to run the Transmitter at full frame rate (50/60) for multiview layouts. If unchecked, the rate defaults to half of the full frame rate (25/30).
Scan Mode	Progressive or interlaced.
Bit Depth	8-bit, 10-bit,12-bit. Not set in Terra manager, setting is obtained at the source.
Color Space	Color components (RGB, YCBR 444, YCBR 422, YCBR 420). Not set in Terra manager, setting is an attribute of the source.
Pixel Clock	Transmitting speed for the pixels in MHz.
RGB Range	Default, Limited, Full. Not set in Terra manager, setting is an attribute of the source.
Aspect Ratio	Aspect ratio defined by the source resolution: 4:3, 16:9, 16:10

HDR	The format for HDR (High Dynamic Range) setting: HDR10 SMPTE 2084, HLG, Dolby Vision source dependent.
Audio	
Number of Channels	Source dependent. Number of channels- 2-channel, 6-channels, 8-channels.
Sampling Frequency	Sampling frequency in Hz (32KHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, or 192 kHz). Not set in Terra manager, encoding type is a function of the source.
Encoding Type	Audio Encoding type: LPCM, HBR. Not set in Terra manager, setting is obtained from the source.
Downmix	Set on Audio tab. Enabled = Yes Disabled = No.
EDID	
Current EDID	Name of current EDID file.

Operation Mode: Organizing Layouts and Sources

Layouts and sources can be organized into groups using the group feature. New groups can be created, or items can be moved to existing groups. When an item is added to a group, the group name is displayed in the item list. Items in groups can be sorted alphabetically (ascending and descending) and they can be moved to another position in the group list using the up and down arrow buttons.

Operation Mode: Delete a Layout

To delete a layout:

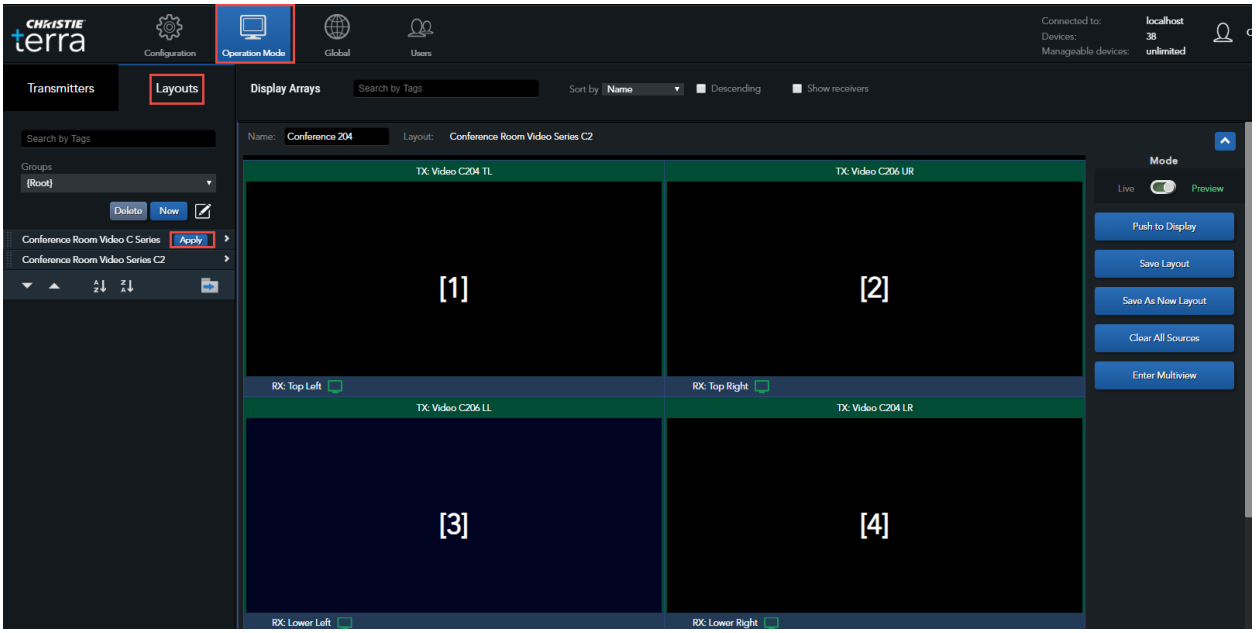
1. Highlight the layout name in the Layouts list.
2. Click the arrow to expand the layout's options.

3. Click **Delete**.

Operation Mode: Recall a Layout

To recall a layout and display it on the Display Array:

1. Navigate to the **Operation Mode** page.
2. Click **Layouts**.
3. Click the Layout name from the Layout List and drag it to the desired location; or click **Apply** next to the name to apply the layout to the Display Array it was created on.



If you drag a layout to a Display Array that has more tiles than the Display Array it was created on, it will only apply to the number of tiles it was created on.

The number of tiles in a Display Array is determined when the Display Array is created using the Configuration tab. If Multiview is activated, a single tile can have up to 15x15 tiles per tile.

Layout Property	Description
Name	User-defined name for the layout. Best practice is to apply logical names to all devices and system assets.
Applies to	Name of the Display Array the layout was created on.
Add New Tag	User-defined tag for the layout.
FastSwitch-Layouts	Number of sources in the layout that are that are in FastSwitch mode.
Wall-Layouts	Number of sources in the layout that are in Wall mode.
Mutliview-Layouts	Number of sources in the layout that are in Multiview mode.

Global Page

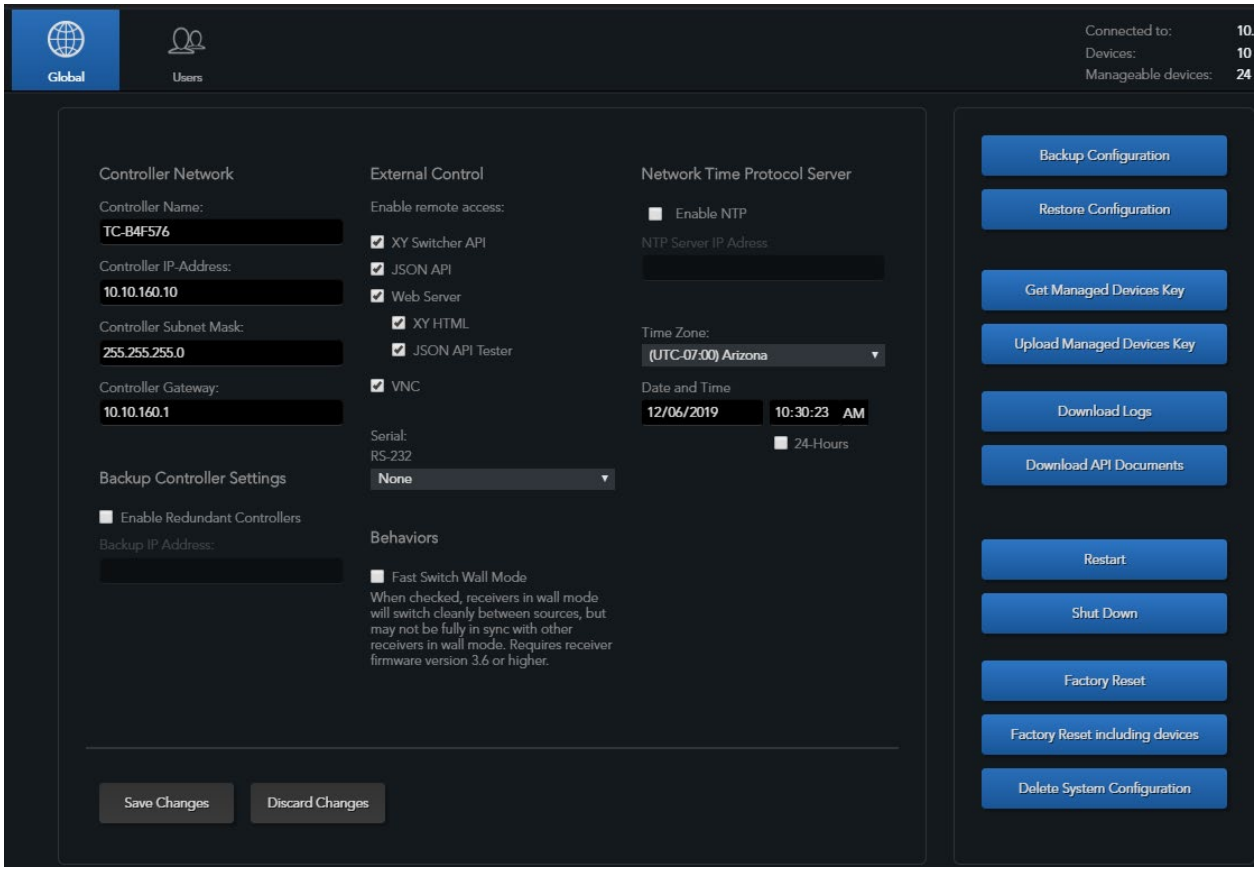
The Global page enables you to

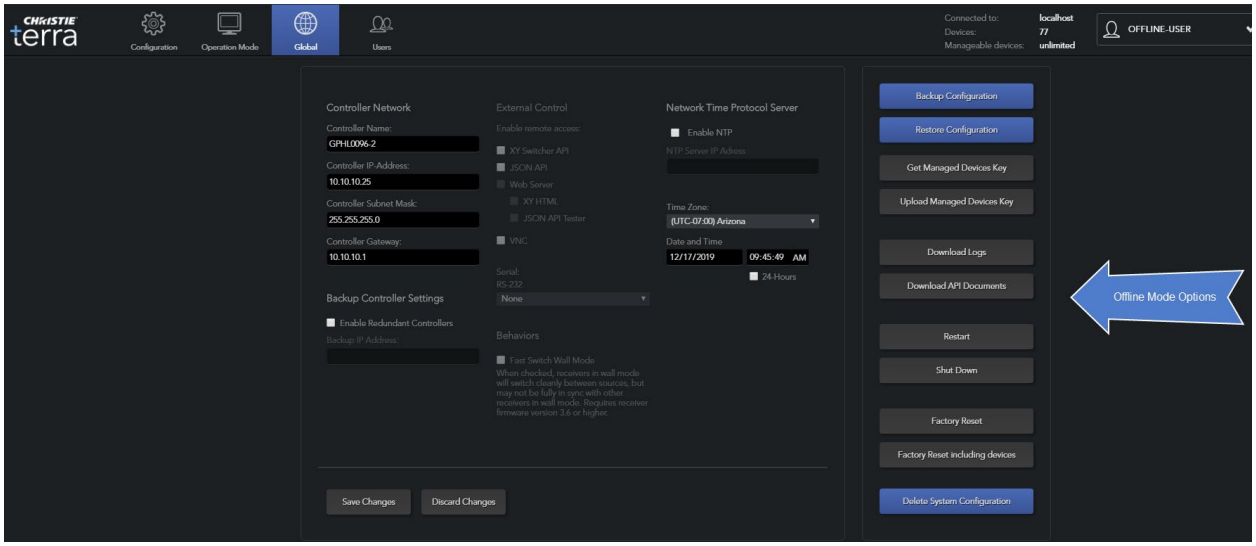
- Configure Controller settings
- Enable and configure a redundant Controller
- Set a Network Time Protocol (NTP) Server
- Set the time zone
- Set date and time
- Shutdown/power off the Controller
- Restart the Controller
- Factory set the controller (requires re-entry of account password)

- Factory set the controller including the Devices (requires re-entry of account password)
- Delete System Configuration
- Backup the system
- Restore the system
- Download logs
- Download API Documents
- Display User Manual (click the "?" then select "Help")
- Obtain and upload a Managed Devices key
- Enable Fast Switch Wall Mode

Not all options are available when working in offline mode.

To configure or update global setting for the system, click the Global tab in the main navigation area.





Configure Controller Settings

The Controller settings can be updated on the Global page.

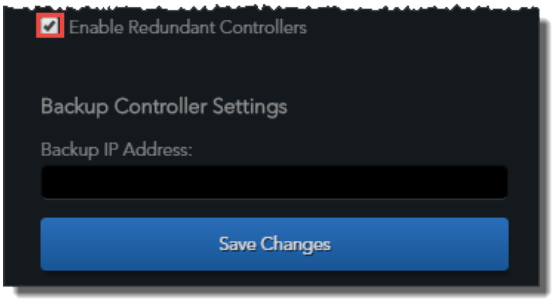
The Terra Startup Assistant should be used to initially configure the Controller. Refer to *Terra Startup Assistant*, page *22*.

1. Navigate to the Global page.
2. To update the settings, type new information in any of the editable fields.
3. Click **Save Changes**.

Enable Controller Redundancy

To enable controller redundancy:

1. Select the Enable Redundant Controllers check box on the Global page.



2. Enter the IP address of the backup controller.
3. Click **Save Changes**.
   The controller exits Terra Manager and reboots to activate the changes.

Set a Network Time Protocol (NTP) Server

To enable NTP, click the **Enable NTP** check box.

When the Enable NTP check box is selected, the Time zone and Date and Time fields are unavailable and are not used.

To assign a server to be used as the NTP server, enter the IP address or the server name in the NTP Server IP Address field.

Set Date and Time

Using the Time Zone and Date and Time settings, set the date and time and the clock type (12-hour or 24-hour).

Restart the Controller

The Restart option should be used to restart (power off and then power on) the Controller.

The restart process initiates a restart of the controller. Make sure all changes are saved.

Verify all users are logged off before starting the restart process.

Do not perform a firmware update when a restart process is in progress.

To restart the Controller:

1. Navigate to the Global page.
2. Click **Restart**.
3. Respond **Yes** to the confirmation dialog to proceed.

Shut Down the Controller

The Shut Down option should be used to power off the Controller.

The shutdown process initiates a power off of the controller. Make sure all changes are saved.

Verify all users are logged off before starting the shutdown process.

Do not perform a firmware update when a shutdown process is in progress.

To shut down (power off) the controller:

1. Navigate to the Global page.
2. Click **Shut Down**.
3. Respond **Yes** to the confirmation dialog to proceed.

Backup the System

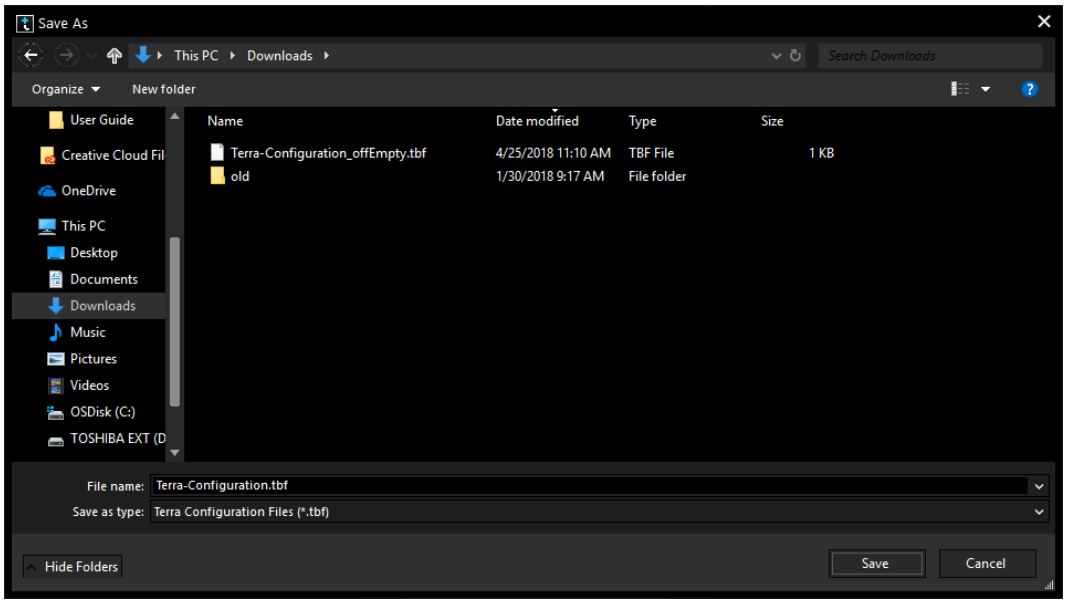
The Backup Configuration option creates a .TBF file that backups the configuration for Transmitters, Receivers, Display Arrays, layouts, users, and Terra Manager global settings on the controller.

Best practice is to create backups regularly. If your configuration is changing often, increase the frequency of your backups to ensure the most recent data is backed up.

How to Backup the System

To create a backup of your system:

1. Navigate to the Global page.
2. Click **Backup Configuration**.



3. Browse to the location you want to store the backup file.
4. Type a file name. The file name defaults to Terra-Configuration.tbf.
5. Click **Save**.

Restore the System

You should restore your system configuration when a problem occurs and the system needs to be restored. Additionally, you can use the restore feature to update your configuration with data you configured in Offline mode.

The restore process completely overwrites your current system configuration (**except the Service account credentials**) and restarts the Controller.

The restore will **not** contain any changes made after the backup was created (for example, if a user changes their password after the backup was created, the new password will NOT be available in the restored data).

Verify all users are logged off before starting the restore process. Restoring the system should not be performed when any changes are being made to the system configuration.

Do not perform a firmware update when a backup or restore operation is in progress.

To restore the system, you must have a backup file (*filename*.TBF). Refer to *Backup the System*, page *80*.

To restore the system:

1. Navigate to the Global page.
2. Click **Restore Configuration**.
3. Browse to the location of the backup file.
4. Select the desired backup file name.
5. Click **Save**.
6. Log back into Terra Manager software after the Controller restarts.

Reset Controller

The Reset Controller options should be used to reset the system configuration when all other recovery efforts have failed. Before using this option, perform a system restart (refer to *Restart the Controller* page *80*); if that does not resolve the problem, perform a system restore (*Restore the System*, page *81*).

Reset options require re-entry of account password.

Reset Controller options include:

- Factory Reset
  Removes all configuration settings (devices, layouts, user profiles, display arrays, etc.) and IP addressing for the controller, returning the unit to factory defaults. This option is useful when transferring the controller to a new owner or to a new environment.
- Factory Reset including Devices
  Removes all configuration settings and IP addressing for the controller and attached devices. Returns all units to factory defaults. This option is useful when transferring the controller and devices to a new owner or to a new environment.
- Delete System Configuration
  Removes all configuration settings but does not modify existing controller network configurations. This option is useful when restarting the controller configuration in an existing environment.

The Factory Reset including Devices option initiates a restart of all the devices connected to the controller. After the devices begin to restart, the Controller restarts. After the process completes, you will need to log back in.

Verify all users are logged off before starting the Reset Controller process. This option should not be performed when any configuration changes are being made.

Do not perform a firmware update when a Reset Controller process is in progress.

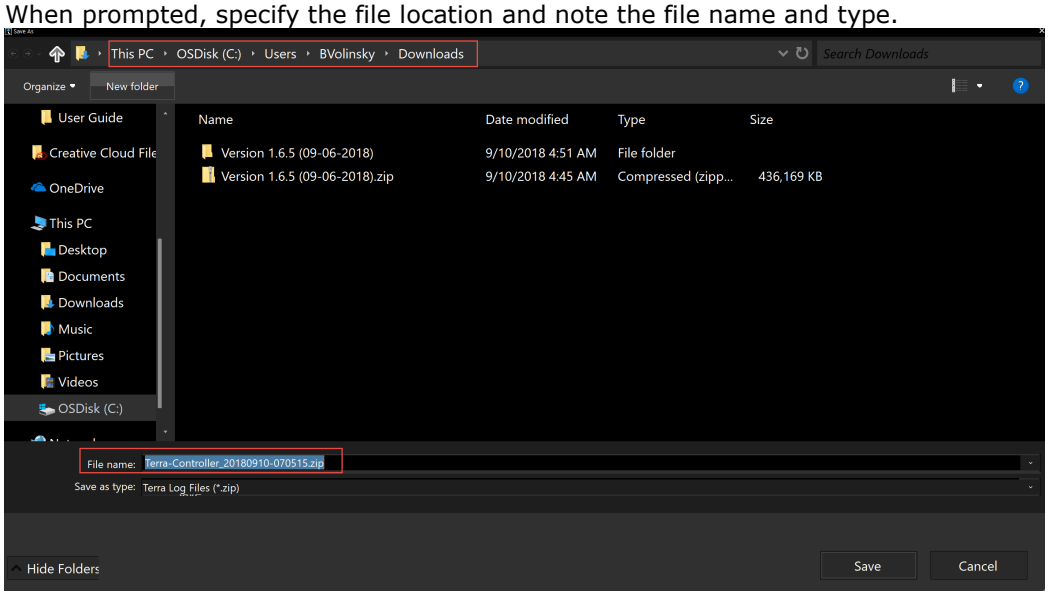
Download API Documents

To download the API documents, click **Download API Documents**, select the document to download, and select the location to download the file.

Download Logs

1. To download the logs when requested by customer support, click **Download Logs**.

2. When prompted, specify the file location and note the file name and type.

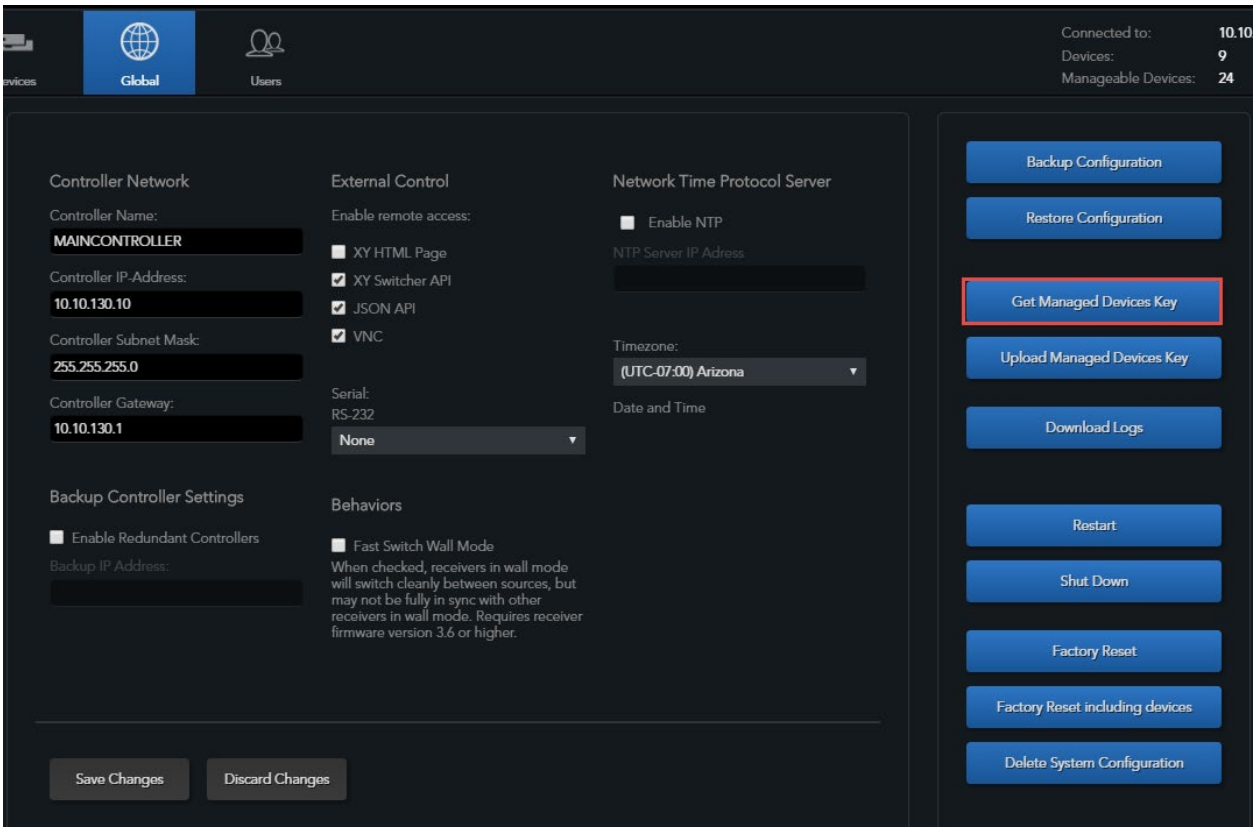


3. Click **Save**.

How to Activate Managed Devices Key

Controllers are shipped with a key for 24 devices (TX/RX). If your configuration has more than 24 devices, you need to purchase an upgrade. Contact your Christie Sales Representative to review your system design and obtain an upgrade.

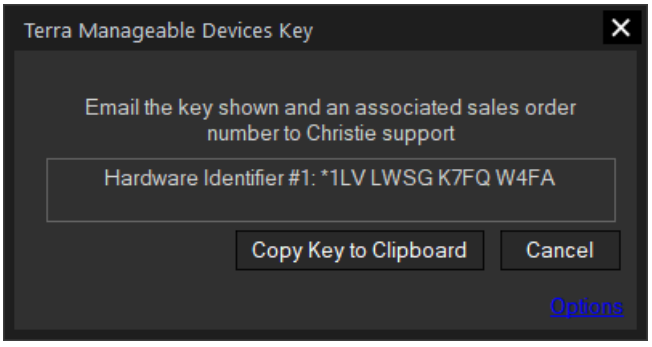
1. Navigate to the Global page.
2. Click **Get Managed Devices Key**.

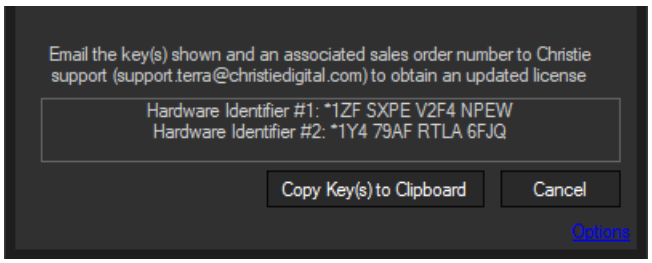


The key is generated.

If you have a backup controller configured, two keys are generated.

3. Click **Copy Key(s) to Clipboard** and email the key to Christie Support at support.terra@christiedigital.com.
   Support personnel will send you a key file.





(two keys – one for the backup controller)

4. From the Terra Manager Global page, click **Upload Managed Devices Key** and browse to the file you received from Support personnel and click **Open**.

5. Optionally, repeat the above steps for any Redundant Controller.

Enable Remote Control to Terra

Use the External Control settings on the Global page to enable remote access to Terra API and web browser(s) by one or more of the following services:

- XY Switcher API
- JSON API
- Web Server
  - XY HTML
  - JSON API Tester
- VNC

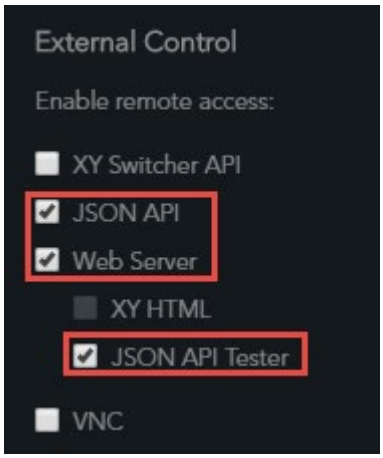
When one of the Web Server options is selected, the related API checkbox is automatically selected. For example, if XY HTML is selected, the XY Switcher API is automatically selected.

The XY Switcher API commands and the JSON API commands can control Terra using TCP protocol or a RS-232 connection via the serial port on the Controller. Only one connection via the serial port is available. To change access for one of the API protocols to the serial port, select the desired option from the RS-232 dropdown list.

To enable access to a service, select the checkbox associated with the service.

When a mode is selected and **Save Changes** is clicked, the controller exits Terra Manager and reboots to activate the update.

The following example shows access to Terra by the XY Switcher using TCP, the JSON API using the serial port, and JSON API Tester webpage access.

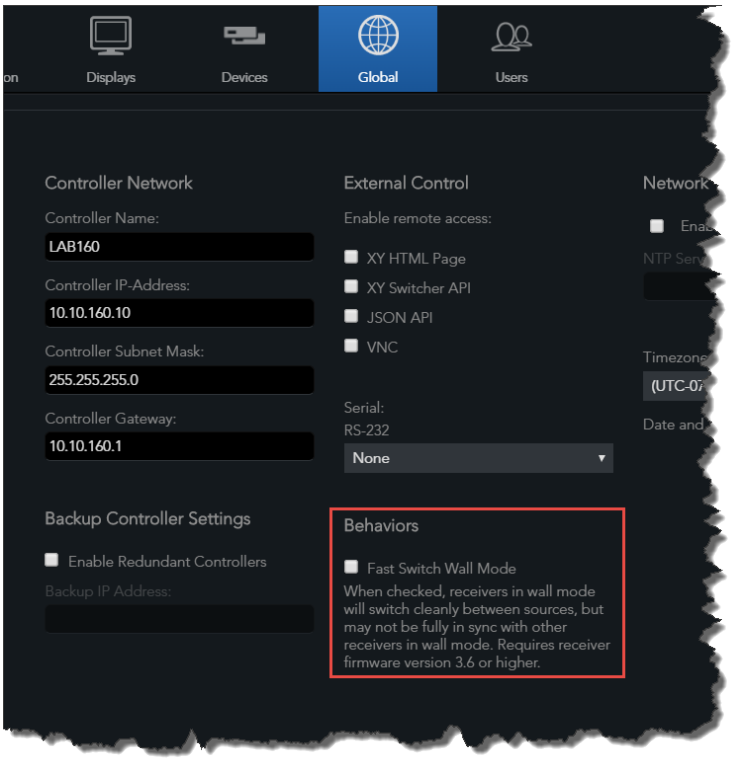


Enable Fast Switch Wall Mode

Select the **Fast Switch Wall Mode** check box to improve the switching experience between sources.

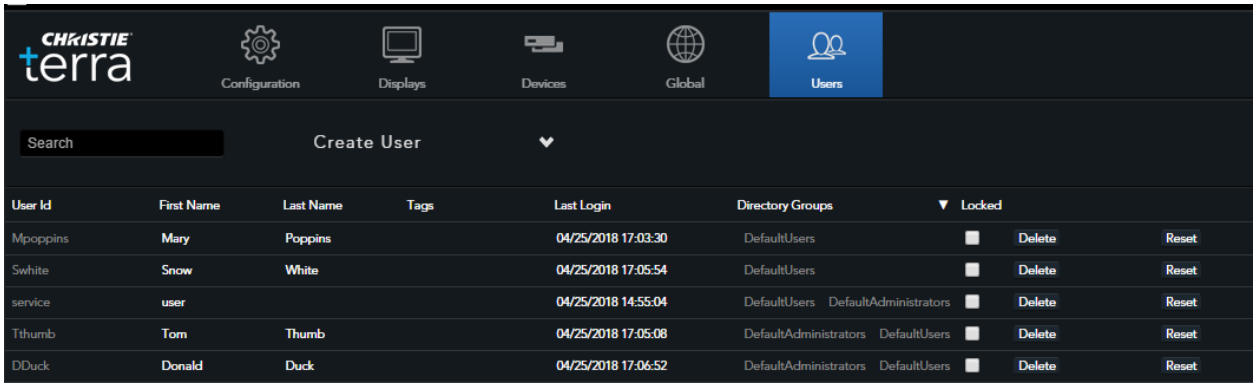
Refer to *Fast Switch Wall Mode, page 93* for additional details.

When the check box is selected and **Save Changes** is clicked, the controller exits Terra Manager and reboots to activate the new mode.



Users Page

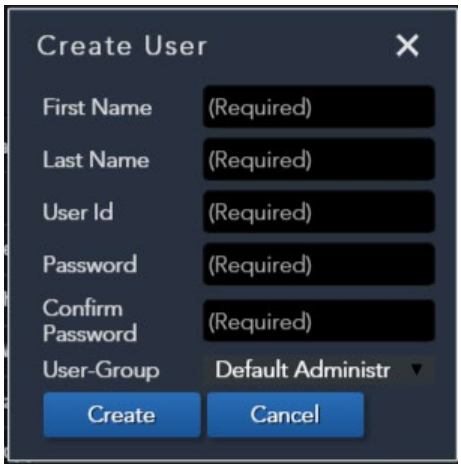
This page enables you to add a user, reset password, rename user, delete a user, and unlock a user's account.



Add a User

It is highly recommended to create at least one user with administrative privileges (User Group set to Default Administrator). The default user, Service, should not be the only account with administrative privileges.

1. Navigate to the Users page.
2. Click Create User.
   The following dialog is displayed.



3. Complete the required fields using the following table:

First Name	Up to 24 alpha characters.
Last Name	Up to 24 alpha characters.
User ID	Up to 20 alphanumeric characters. No spaces allowed.
Password	See *Password Management*, page *88*.
User-Group	Select Default Administrators or Default Users. Administrators have access to all features. Users have access to the Displays tab and are able only to apply layouts and drag sources to existing Display Arrays.

4. Click **Create**.

Password Management

The following rules apply to passwords:

- The password for the default user account (service) must be changed the first time Terra Manager connects to a network, or when updating to software version 1.3 or later.
- Passwords cannot contain spaces.
- Passwords must contain eight or more characters, including at least three of the following:
  - Uppercase letter
  - Lowercase letter
  - Number
  - Special character
- A new password cannot be the same password as the three previously used passwords.
- If a user attempts to login in using an invalid password three times, the account will be locked. An administrator must unlock the account.

Delete a User

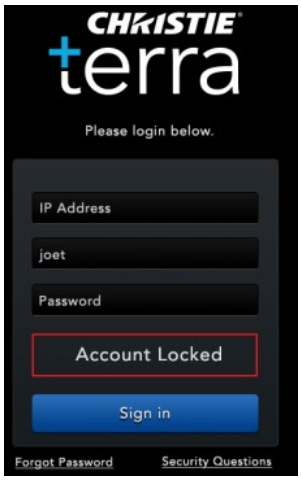
1. Navigate to the Users page.
2. Highlight the user you want to delete.
3. Click Delete.
4. Respond to the confirmation dialog.

Reset Password

1. Navigate to the Users page.
2. Highlight the user you want to reset the password for.
3. Click **Reset**.
4. Respond to the confirmation dialog.
5. In the new password dialog, type a new password and confirm the password.
   Passwords cannot contain spaces and must contain eight or more characters, including at least three of the following:
   - Uppercase letter
   - Lowercase letter
   - Number
   - Special character
6. Click **OK**.

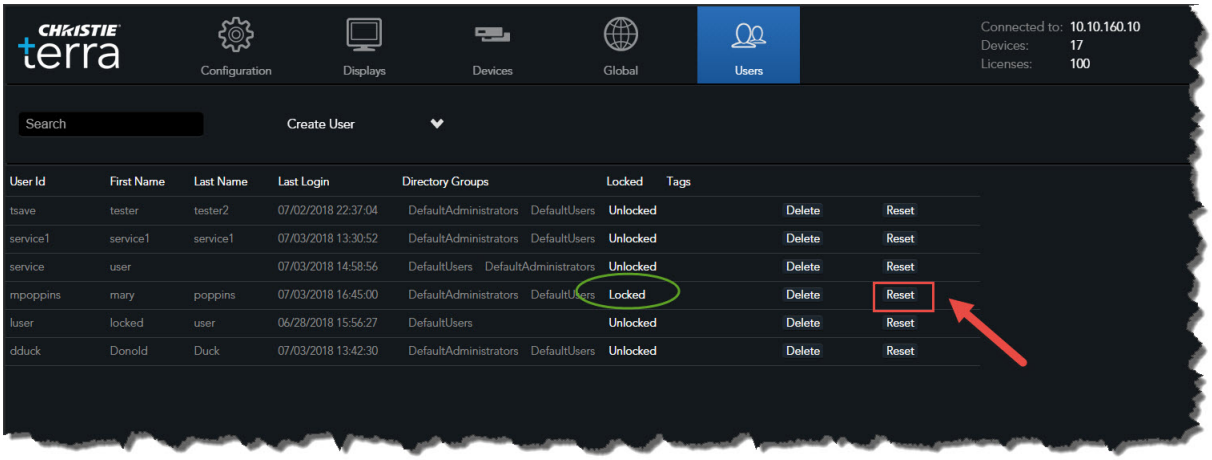
How to Unlock a User's Account

An account is locked when a user attempts to log in seven times with the wrong password. A system administrator must unlock the account.



To unlock a user account:

1. Login as an administrator.
2. From the Users tab, locate the blocked user and click **Reset** associated with the user name to reset the password.



3. Respond to the confirmation dialog.
4. Enter and confirm the new password and click **OK**.
5. Send the new password to the user.

Unlock the Service Account

If the default Service account is the only account with administrative privileges and it gets locked, a special procedure must be used to unlock it. The password is reset to the default password (service).

This procedure should only be used to regain access to the Controller when all administrative accounts are locked.

1. Connect a keyboard to the Controller using a USB port.
2. Using the keyboard, type **resetpassword** and press Enter.
   The OLED display on the front of the Controller displays *Password Reset* for 10 seconds.
3. Disconnect the keyboard.
4. Login to Terra Manager and reset the default password for the service account. Refer to *Change Password for Service (Default) Account*, page *31*.

Addressing Guidelines

All devices and the Controller must be on the same IP subnet.

Devices can have their IP address and subnet mask configured either through a DHCP server or static values can be applied.

Using static values is strongly advised.

If a device is configured for DHCP address allocation and no DHCP server can be reached, the device falls back to self-allocation using the Automatic Private IP Addressing (APIPA) scheme, also commonly called auto-IP. This scheme allocates addresses in the 169.254.0.0/16 range (i.e. 169.254.x.x with a subnet mask of 255.255.0.0). If a device is configured for manual IP address allocation, addresses are set using the Terra software (Terra Startup Assistant and Terra Manager).

The Controller must be connected to the same broadcast domain, subnet, and gateway as the device running the Terra Startup Assistant.

Best practices include:

- Using the Terra Startup Assistant software to assign IP addresses to Terra devices.
- Include the Gateway address for the Controller.
- Apply static addressing.
  DHCP address management is popular for desktop PCs because they frequently migrate, and this eliminates configuration time for IT staff. Terra Controllers, Transmitters and Receivers are network appliances that are similar to printers and servers which do not migrate and are better managed using static IP addresses. Use of static IP addresses also reduces the amount of DHCP/DNS network traffic resulting in greater efficiency. A compromise that can be used when network policies dictate use of DHCP addressing is to reserve a block of static IP addresses for use with Terra Transmitters and Receivers and other AV devices.

Multicast IP Addresses

Audio and video data is exchanged between Terra devices using IP multicasting. The address range for these devices is 224.1.1.1 to 224.1.3.255. This address range is reserved and must not be used by other network applications. The range is used as follows:

224.1.1.1-221.1.1.252	Available for audio and video
224.1.1.253	Reserved for RS232 and IR data to all TX (encoders)
224.1.1.254	Reserved for RS232 and IR data to all RX (decoders)
224.1.1.255	Available for audio and video
224.1.2.0-224.1.2.255	Available for audio and video
224.1.3.0-224.1.3.255	Available for audio and video

IP Address

Terra devices support IPV4 addresses. IPV6 addresses are not supported.

For additional information on addressing, refer to *Addressing* Guidelines, page *90*.

Dynamic IP Address Assignment

By default, Terra devices are configured to use a DHCP (Dynamic Host Configuration Protocol) server to have an IP address assigned automatically. For this to work, a DHCP server has to be present and connected either directly to the 10G network switch or connected to one of the Terra devices over the 1G network port.

Automatic IP Addressing

If Terra devices are enabled to receive IP addresses from a DHCP server but there is no DHCP server present, each Transmitters and Receivers device will automatically assign itself an IP address in the 169.254.X.X range with subnet mask of 255.255.0.0 using Automatic Private IP addressing (APIPA scheme).

Static (Manual) IP Address Assignment

Terra devices can be assigned a static address using the Terra software. When manually assigning static IP addresses, extra care is required to make sure that each address is unique and that all addresses are within the same subnet.

Switching Modes

The following switching modes are available based on the Terra configuration:

- Genlock
- Genlock Scaling
- Fast Switch
- Multiviewer
- Genlock Wall
- Fast Switch Wall

Genlock Mode

The primary benefit of Genlock mode is unaltered resolution (no scaling) and the lowest latency delivery.

This mode is referred to as Genlock mode because the display is genlocked to the source. The mode acts as a cable extension, native data transmission).

This mode is the lowest latency solution available in Terra. When in Genlock mode, the RX outputs the HDMI video and audio in the exact same format as received by the TX connected to the source.

Used for the lowest (0) frame latency between the source and the display.

This mode requires the same frame rate for the source (Transmitter) and the output display (Receiver). When there is a mismatch in frame rate, the Transmitter frame rate will be applied to the Receiver, potentially causing issues with the display device.

- Source must be progressive.
- RX output is always RGB 8 bit, regardless of the source being 8, 10, or 12 bits.
- Since the display is synchronized with the source and when switching to another source, the display disconnects. It then reconnects and resynchronizes to the new source. The exact time it takes to handshake is display-dependent.
- Bezel correction values are set independently for top, bottom, left, and right side but it assumes the same correction for each display forming the matrix. Thus, all displays must be the same and properly aligned without any physical gaps between displays. Refer *Bezel Compensation*, page *35* for illustrations.

Genlock Scaling Mode

The primary benefit of Genlock Scaling mode is the additional scaling feature. Genlock scaling mode includes the low latency benefits of Genlock mode; additionally, it enables the RX scaler to scale the video to different resolution. For example, the source can be 4K resolution while the RX output can be 1080P. However, it does not offer frame conversion; and as with the Genlock mode, the display needs to disconnect, reconnect, and resynchronize to the new source.

Fast Switch Mode

The primary benefit of Fast Switch mode is fast switching between sources.

- Provides the added benefit of frame conversion over Genlock scaling.
- Fast switching always maintains constant timing and format, the display never needs to resync or handshake, thus switching is fast and seamless.
- Fast Switch Mode is the default presentation mode in Terra.
- The source must be progressive.
- RX output is always RGB 8 bit, regardless of the source being 8, 10, or 12 bits.

Multiviewer Mode

Multiviewer mode is used for multi-windowing for preview and confidence monitoring applications.

- Limited to presenting 32 discrete sources.
- The combined bandwidth of the downscaled sources on the display cannot exceed 8.5 Gbps.
- The smallest grid size for multiviewers are 2x2.
- The multiviewer uses a scaler on a transmitter. A second display in a system may cause a conflict between displays trying to use the downscaler. System programming must avoid potential display combinations that may result in a conflict.
- Source must be progressive.
- RX output is always RGB 8 bit, regardless of the source being 8, 10, or 12 bits.
- Bezel correction values are set independently for top, bottom, left, and right side but it assumes the same correction for each display forming the matrix. Thus, all displays must be the same and properly aligned without any physical gaps between displays. Refer *Bezel Compensation*, page *35* for illustrations.

Videowall Modes

Videowall modes allow a single source to be stretched and magnified across multiple displays.

The following modes are available:

- Genlock Wall
- Fast Switch Wall

Application	Genlock Wall Mode	Fast Switch Wall Mode	Where to enable
Fast moving, panning video, sports, live camera content	X		Default when configuring wall arrays.
Low refresh static content, graphics, text, stills		X	Global Page

Genlock Wall Mode

The primary benefit of Genlock Wall mode is a synchronized (genlocked) output to all the displays.

- In this mode, all the receivers are synchronized to the source and therefore to each other.
- Signals supplied by receivers driving videowall magnifications use unique timing for outputs based on the original source resolution, display resolution, and number of rows in a videowall array. They deliver a signal for use with identical displays arranged in an array, each of which will process or present that signal with independent timing that can be synchronized across the array. Contact Christie Support for more details.
- Switching between sources requires the displays to disconnect, reconnect, and resynchronize.
- Videowall mode is the default mode and it is used for fast moving/panning video content (for example; movies, sports, live camera) where frame locking between displays is critical.

Fast Switch Wall Mode

When this mode is enabled, it changes the wall mode from Genlock Wall to Fast Switch Wall.

The primary benefit of this mode is fast switching.

- The receiver maintains a sync lock using a frame buffer to the display while seamlessly and quickly switching between sources.
- Frame rate conversion is available (like the other Fast Switch mode).
- Use for relatively static content (for example; graphs, text, still images, etc.).

The individual displays are not locked to the source, and latency is a variable. Up to 1 frame of screen tearing can occur.

- Fast Switch Wall mode should be used with low refresh, relatively static content.

Video Switching Modes Summary

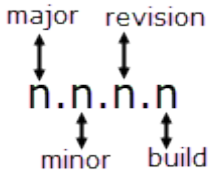
Switching Mode	Description	Signal Negotiation with Displays: Signal Resync or Seamless Transition	Transport Latency	Approximate Processing Latency for 1 60Hz signal
Genlock	• Use for lowest latency between the source and the display. • Display genlocked to the source. • Acts as a cable extension, native data transmission.	Resync	<120 microseconds	0ms
Genlock scaling	• Scaled output, genlocked to source. • No frame conversion.	Resync	<120 microseconds	4ms
Fast Switch	• Produces the quickest and cleanest switching experience. • Scaled output. • Frame conversion available.	Seamless	<120 microseconds	16.7ms
Multiview	• Used for preview and confidence monitoring applications. • Scaled and buffered output.	• Seamless between sources. • Switching between layouts is not seamless; resync.	<120 microseconds	16.7ms
Genlock Wall	• Use for fast moving, panning video applications such as sports and live cameras.	Resync	<120 microseconds	16.7ms
Fast Switch Wall	• Use in low refresh, relatively static content • Produces quickest switching experience between sources	Seamless	<120 microseconds	16.7ms

Reference Information

This section contains reference information that may be useful for understanding the Terra system.

Software Versioning

The system software release numbering is in the form of four numeric fields (e.g., 2.1.19.2343) separated by decimal points. The fields in order from left to right are: major, minor, revision, and build.



Major	Increases by one when new functionality is added.
Minor	Increases by one when enhancements to the functionality are added.
Revision	Incremented by one for every release including internal releases. This may result in gaps in the numbering for customer software releases.
Build	Internal software build number.

Importing Device IP Configuration

The Import button on the Terra Startup Assistant can be used to import IP configuration. The file can be created by using the Export button or by creating a new file. The format of the import is exactly as exported:

- MACAddress,IP,USBIP,SubnetMask,Gateway,IsDHCP
- Values may have double quotes or nothing around them: "10.10.180.22" or 10.10.180.22. (Note that the double quotes are not the Microsoft Office styled quotes)
- Setting IsDHCP to TRUE for a device within the import list will ignore values for IP, USBIP, SubnetMask, and Gateway.
- The imported list is compared to the devices that are available. Only devices that are available will have their network information imported.
- Validation is performed on the import to prevent invalid network information.
  - Import validation errors are displayed using the local computer's default text editor.
  - Validation must be 100% pass, or no part of the import will be performed.
- Example content of an import file:

  MACAddress,IP,USBIP,SubnetMask,Gateway,IsDHCP

  00-09-48-AA-00-26,10.10.180.24,10.10.80.25,255.255.0.0,10.10.180.1,FALSE

  00-09-48-DD-00-30,10.10.180.22,10.10.180.23,255.255.0.0,10.10.180.1,FALSE

Videowall Specifications

- Maximum size of videowalls:
  - 16x16 array if displays operate at HD / 2K resolutions
  - 8x8 array if 4K displays are used
  - 16x16 for HD resolution displays
  - Magnifications are integer 1x1, 2x2, 2x3, 2x4, 4x4… to various sizes. They can be anamorphically stretched (not uniform in H&V) 1x2, 2x3, 3x5.

Protocol Ports

The table below lists port numbers used by Terra. These ports must not be used by other services on the same host as the Terra Controller and must not be blocked by firewall rules. In the case of the UDP ports, also ensure that these port numbers are not in use by other applications on your network as some data is sent to broadcast IP addresses on those ports.

TCP	6970	Telnet/TCP connections between clients and the Terra Controller.
UDP	6969	Used by Terra Controller and Transmitters and Receivers to exchange control information
UDP	10001 to 10004	Used by Terra Controller and Transmitters and Receivers to exchange RS-232 data.

RS-232

RS-232 and IR data is routed between TX and RX devices using Unicast or Broadcast protocols when sending RS-232 data to one or all devices. Unlike for audio and video, where data is always routed from a TX unit to one or more RX units, TX and RX devices can both send and receive RS232 and IR data. This means both TX and RX devices are shown as both senders and receivers.

When a receiver is joined to a sender, a one directional data tunnel is created. To establish two-way RS232 or IR communication, devices must be joined twice; once as a sender and then again as a receiver.

RS-232 and IR data transport is not limited to in-between devices. It is also possible to inject RS232 and IR data through the control layer (API Server) to a device and/or create one-way routing from a device to the control layer (API Server) using the Terra JSON API.

RGMII 1000Base-T Interface

Transmitters and Receivers include an RJ45 connector labeled as LAN. This interface is identified as RGMII in the Terra software. This interface can be connected to any device that supports communication speed between 10 Mbps and 1 Gbps. It effectively adds 1 Gigabit network ports to the system at every Transmitter and Receiver. Use devices on these ports that can be addressed and configured directly and independently of any DHCP and discovery protocols. A laptop and even the Terra Controller can be connected to these ports.

Multichannel I2S Audio Interface

Terra includes 4 synchronized I2S inputs (slave) and 4 synchronized I2S output (master) lines to both extract and insert audio.

This interface supports:

- Multichannel (up to 8 channels) audio extraction
- Multichannel (up to 8 channels) audio insertion
- Up to 192 KHz sampling rate
- PCM and proprietary audio formats

Ancillary I2S Audio Interface

This interface transports ancillary 2-channel audio across networked Terra devices. The IIS interface is configured as follows:

- On Transceivers, this interface can be configured to be either an input or output.
- On Receivers, this interface is always an output.
- Transmitters and Receivers chipset is always the I2S master.
- Sampling rate is fixed to 48 KHz.
- Convert the audio back into analog audio and output it as analog audio (Analog Audio Output connector).
- Embed the 2-channel audio into the HDMI output signal for the connected display or AV receiver.

Analog audio is routed like HDMI video and HDMI audio using multicast addresses starting at address 224.1.1.1. TX devices are assigned an unused multicast address and send audio packets to this address. When one or more RX units are joined to the analog audio feed coming from the TX, the network switch starts sending all audio packets to the network ports that these devices are connected to. The TX analog audio port can also be configured as an output port. When configured as an output port it can be used as an analog audio breakout port for the audio coming in on the HDMI input connector.

RGMII USB 2.0 interface

The second RGMII interface is used with Icron ExtremeUSB core to enable USB 2.0 extension capabilities for remote USB devices such as keyboard, mouse, USB drive, web camera and others.

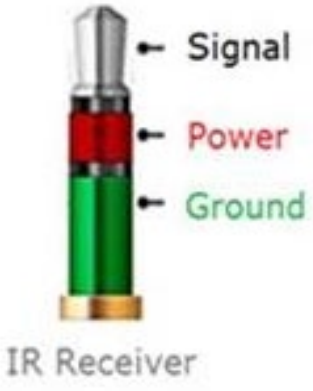
Infrared

Each Transceiver and Receiver has two IR ports: an input and an output which operate at 3.3V. The output connects to an output circuitry that amplifies the 3.3V output to 5V. Similarly, the 3.3V input is connected to a clamping circuit to drop 12V input voltage down to 3.3V.

Cabling

Connector	Wired IR In	IR Receiver
Type	3.5 mm Stereo Mini-jack	IR Receiver Head
IR Signal	B Ring	IR Signal
+5V Signal	A Tip	Power
Ground	C Sleeve	Sleeve

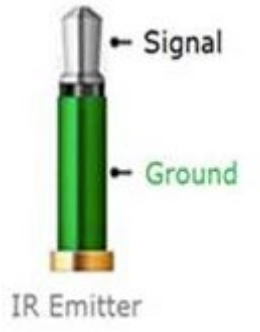
Stereo Mini Jack



DC Mini Jack – left connector

Connector	Wired IR Out	IR Receiver
Type	3.5mm DC mini-jack	IR Emitter
IR Signal	1 Tip	Anode
Ground	2 Ring	Cathode

P1 = Wired IR Out, 3.5mm DC plug
P2 = IR Emitter



HDCP

Terra devices fully support HDCP.

Color-space Conversion

When in Genlock mode, the RX outputs the HDMI video in the exact same format as received by the TX connected to the source.

But when the RX is in any other mode (processing mode) the RX output is always in 8-bit RGB color space.

Chroma resampling is available for YUV 422 and YUV 420 source to RGB as well as conversion of both 10- and 12-bit sources into 8 bit.

HDMI Audio Routing

- By default, HDMI audio follows the HDMI video; if video is routed from TX 1 to RX 1, the audio follows automatically.
- If the RX unit is in Genlock mode, then the audio that follows the video is unchanged regardless of the audio format (LPCM, Dolby, DTS, Stereo, and Surround).
- If the RX unit is receiving, both the original multichannel (up to 8 channels) audio and downmixed 2-channel (stereo) is to the RX.
- If the HDMI audio received from the source is in LPCM format, it is possible to locally breakout the audio as downmixed 2-channel and output it as ancillary audio stream.
- An RX receiving HDMI audio can embed the audio into the HDMI output signal or output the 2-channel downmixed audio as 2-channel ancillary audio.

IR Control

IR control has two modes:

- Transport mode: IR signals are transported between end devices; from any end device RX or TX to any other RX or TX device. Once the routing is configured, any IR signal received from an infrared remote by the IR receiver on the transmitting device comes from the IR transmitter on the receiver device.
- Injection mode: IR data is injected into the Transmitters and Receivers system through the control layer. The IR data is routed from the control layer to the target end point where it is sent out as IR signal using the IR transmitter embedded into the end device to turn on. The opposite is also true. It is possible to route IR data received by Transmitters and Receivers end point to the control layer.

In Transport mode the IR output carrier frequency is not necessarily the same as the IR input carrier frequency. The IR receiver will strip the carrier before it is transported and then the IR transmitter will add a fixed 38 KHz signal carrier.

Specifications

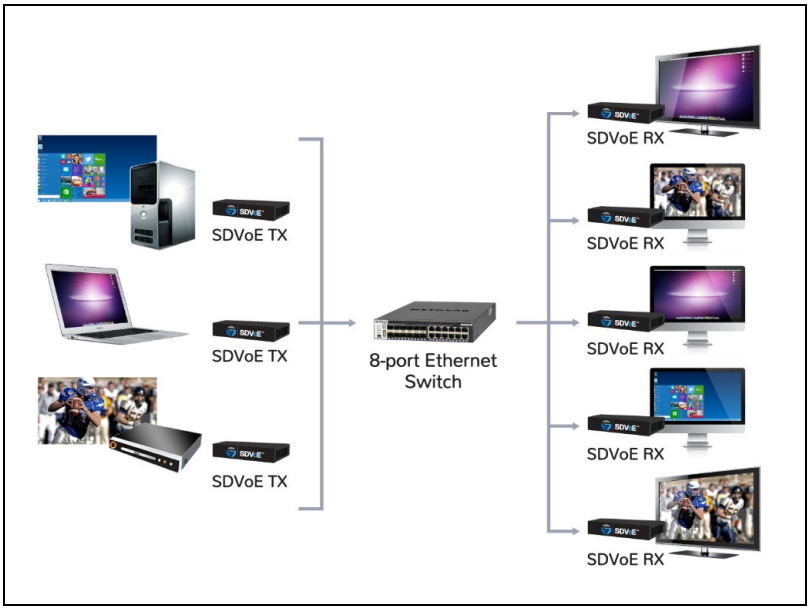
Due to continuing research, specifications are subject to change without notice. The latest specifications are available on the Christie website at http://bit.ly/TerraDownloads.

Sample Applications

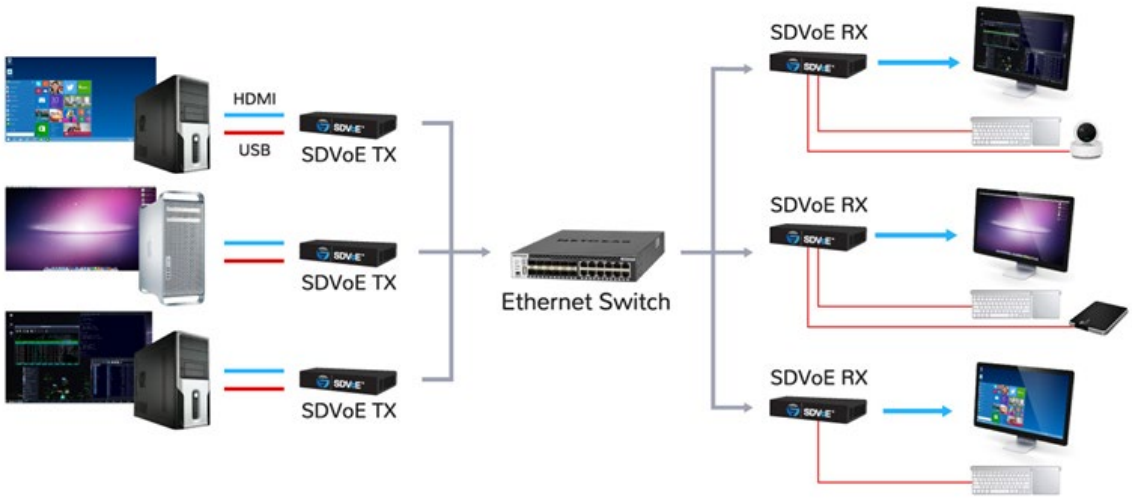
In the following illustrations the Terra Transmitter is represented as SDVoE TX and the Terra Receiver is represented as SDVoE RX.

Application 1: AV Signal Extension

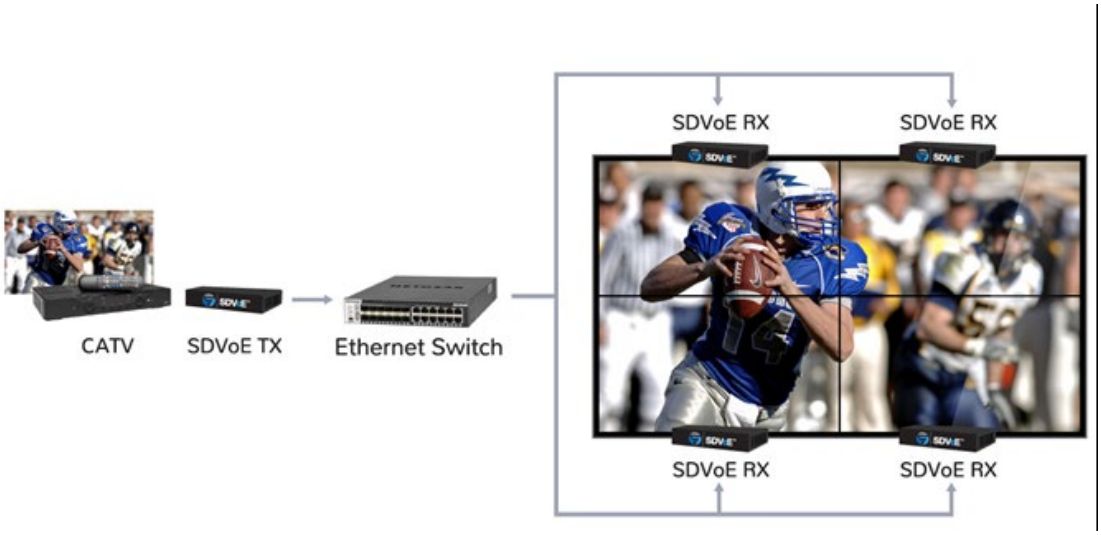
Application 2: AV Switching Solutions



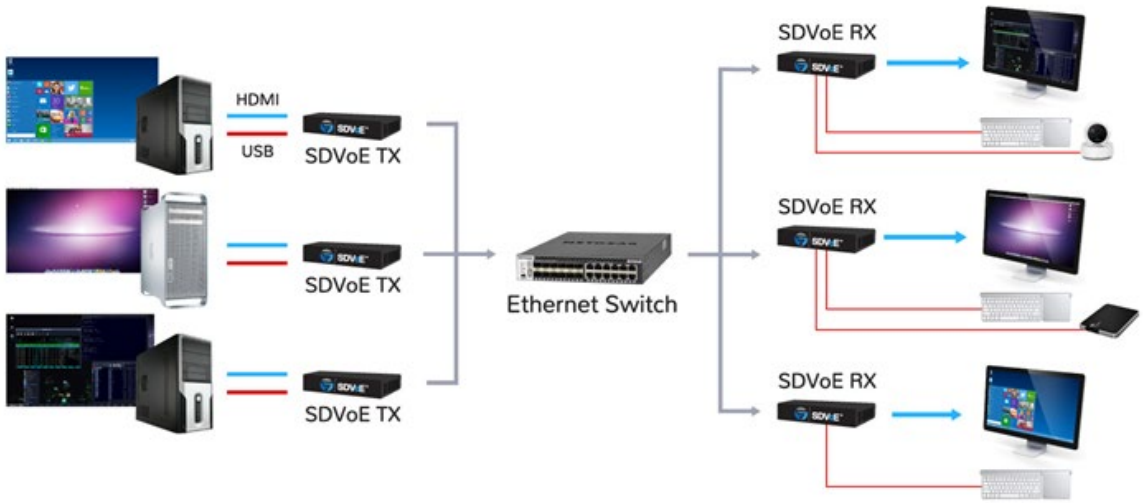
Application 3: KVM Switching Solutions



Application 4: Videowall



Application 5: Multiview



Transmitters and Receivers Mounting Instructions

The Terra transmitters and Receivers are rack mountable or under table mountable.

Mounting accessories and instructions are available in the ship kit.

The TXO/RXO Rack Mount Shelf (166-111104-01) is a one unit (1U) high full-width rack shelf for securing Terra Transmitter or Terra Receiver units.

The TXO / RXO Under Table Mount (166-112105-01) is for securing Terra Transmitters (Terra TXO 102 SO) and Terra Receivers (RXO 101 SO) under tables or other surfaces parallel to the ground.

RS-232 Cabling

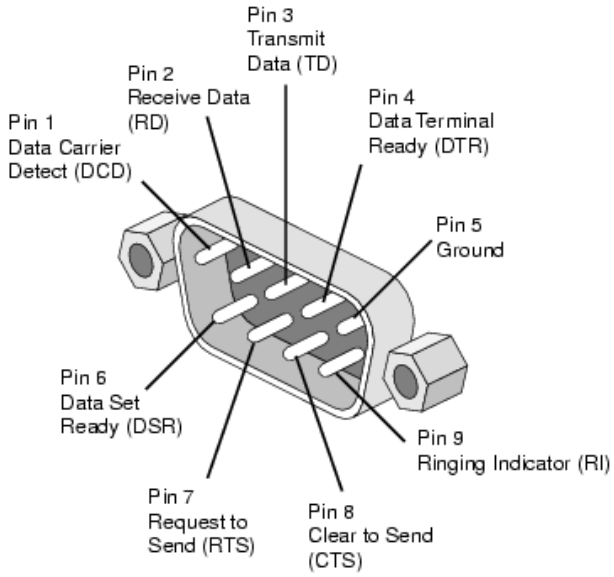
The following describe the details for the Rs-232 cable.

D-sub 9 Connector Pinout

Pinout and diagram of DE9 connector (DB9 connector), commonly used for serial ports (RS-232).

Pin	SIG.	Signal Name	DTE (PC)
1	DCD	Data Carrier Detect	in
2	RXD	Receive Data	in
3	TXD	Transmit Data	out
4	DTR	Data Terminal Ready	out
5	GND	Signal Ground	-
6	DSR	Data Set Ready	in
7	RTS	Request to Send	out
8	CTS	Clear to Send	in
9	RI	Ring Indicator	in

The RX has the male connector (shown below), and the TX has the female.



RS-232 Maximum Cable Length

The maximum cable length for RS-232 is 50ft, but in practice it depends on baud rate, cable specific capacitance, and ambient noise. The table below contains some guidelines:

Baud rate	Maximum range / cable length
19200	50ft
9600	500ft
4800	1000ft
2400	3000ft

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