User Manual

020-102838-03

Terra

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

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China RoHS Compliance Information

关于中国《电子信息产品污染控制管理办法》的说明

- 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

<table>
<tr>
<td colspan="7" align="center">設備名稱：控制器
Equipment name
型號（型式）：SCO 100 EO
Type designation(Type)</td>
</tr>
<tr>
<td rowspan="2">單元
Unit</td>
<td colspan="6" align="center">限用物質及其化學符號
Restricted substances and its chemical symbols</td>
</tr>
<tr>
<td>鉛Lead
(Pb)</td>
<td>汞Mercury
(Hg)</td>
<td>鎘Cadmium
(Cd)</td>
<td>六價鉻Hex avalent chromium
(Cr^{+6})</td>
<td>多溴聯苯Polybrominated biphenyls
(PBB)</td>
<td>多溴二苯醚Polybrominated diphenyl ethers
(PBDE)</td>
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<tr>
<td>機械組件/Mechanical enclosure</td>
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<tr>
<td colspan="7">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.</td>
</tr>
</table>

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.

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.

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

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 *29*
6.	Optionally, use the Terra Manager to set up Stringent Security.	*Enable Stringent Security*, page *57*
7.	Use the Terra Manager to set up users.	*Users*, page *53*
8.	Use the Terra Manager to review global settings.	*Global*, page *55*
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.	*Apply Receivers to a Display Array*, page *34*
11.	Use the Terra Manager to add Transmitters to the Display Arrays.	*Create a Layout on a Display or* Display Array, page *37*

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.

	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 multiple content and control connections, including HDMI 2.0, USB, HDCP 2.2, DisplayPort 1.2, serial RS-232, EDID and more. This powerful and flexible component does not require additional devices to process signals.
	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 multiviewer application. Terra Receiver delivers artifact-free video at resolutions up to 4K@60Hz with zero-frame latency, and device control over standard 10G networks.
	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 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.

i 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. **i** 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 the Terra Startup Assistant to print the addresses for all discovered devices. Refer to *Configure Associated Devices*, page *25*.

> **i** Two addresses are used per device; each device has two MAC addresses. One is used by the 10G and 1G Ethernet ports together, and the second MAC address is used for USB management.

> **i** 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.

Wall Mode

Genlock is the only mode available in 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 display device.

Install and Setup

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

- Terra Controller Installation and Setup Manual (020-001433-*nn*)
- Terra Transmitters and Receivers Setup and Installation Guide (020-001436-*nn*)

Transmitter and Receiver Ports and Status Indicators
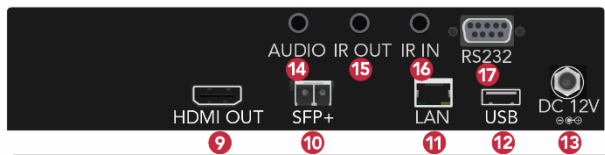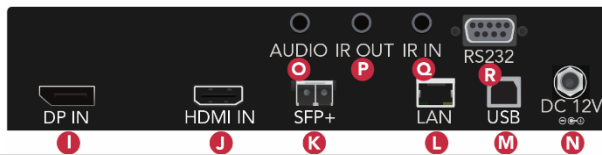
A	Power indicator	1	Power indicator
B-F	Signal and system indicators	2-6	Signal and system indicators
G	Button (currently unused but can be set using Terra Manager, refer to *Devices Page*, page *46*.)	7	Button (currently unused but can be set using Terra Manager, refer to *Devices Page*, page *46*.)
H	Switch button to switch between inputs; or to reset to factory defaults.	8	Button used to copy EDID to Transmitter
I	DisplayPort 1.2 input port	9	HDMI 2.0 output port
J	HDMI 2.0 input port	10	10G SFP+ Transceiver for with LC-LC port
K	10G SFP+ Transceiver with LC-LC port	11	1G Ethernet (RJ-45) port
L	1G Ethernet (RJ-45) port	12	USB 2.0 type-A port
M	USB 2.0 Type-B port	13	External power port
N	External power port	14	Analog stereo audio (3.5 mm stereo mini-jack) female port
O	Analog stereo audio (3.5 mm stereo mini-jack) female port	15	Serial IR control out (3.5 mm DC mini-jack) female port
P	Serial IR remote control out (3.5 mm DC mini-jack) female port	16	Serial IR control in (3.5 mm stereo mini-jack) female port
Q	Serial IR remote control in (3.5 mm stereo mini-jack) female port	17	Serial RS-232 (9Pin DIN) female port
R	Serial RS-232 (9Pin DIN) female port		

Terra Controller Ports and Status Indicators

C1	Power indicator
C2	LED display for IP address and startup 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 (low voltage)

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
- .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 other end to the switch.

2. Power on the Controller.

3. Review the front panel display, and verify the Controller's MAC address is displayed.
    ⓘ When the Controller is configured, the Controller's IP address is displayed.

Resetting TXs and RXs 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:

> ℹ️ 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 to configure the Controller is a mandatory step for setting up your system.

The Terra Startup Assistant is available from the Terra Manager sign in page http://bit.ly/2xzkCYc.

To configure a controller, you need to connect a Controller, a management PC (or other Windows-based device), and all associated devices to the same LAN.

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.
    - Optionally, set redundancy for the Controller
- Configure associated devices (Configure Devices tab)
    - Connect to a controller.
    - Specify a range of devices to configure.
    - Automatically assign IP addresses to the connected devices from the list of available addresses.

        ⓘ   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 manage the Terra system using static addresses assigned using the Terra Startup Assistant.

Start the Terra Startup Assistant on your PC

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

1. From the Terra Manager sign in page, click **Launch Terra Startup Assistant**.
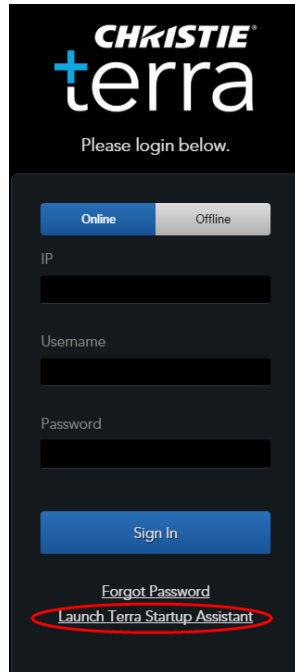
When the software starts, the following is displayed:
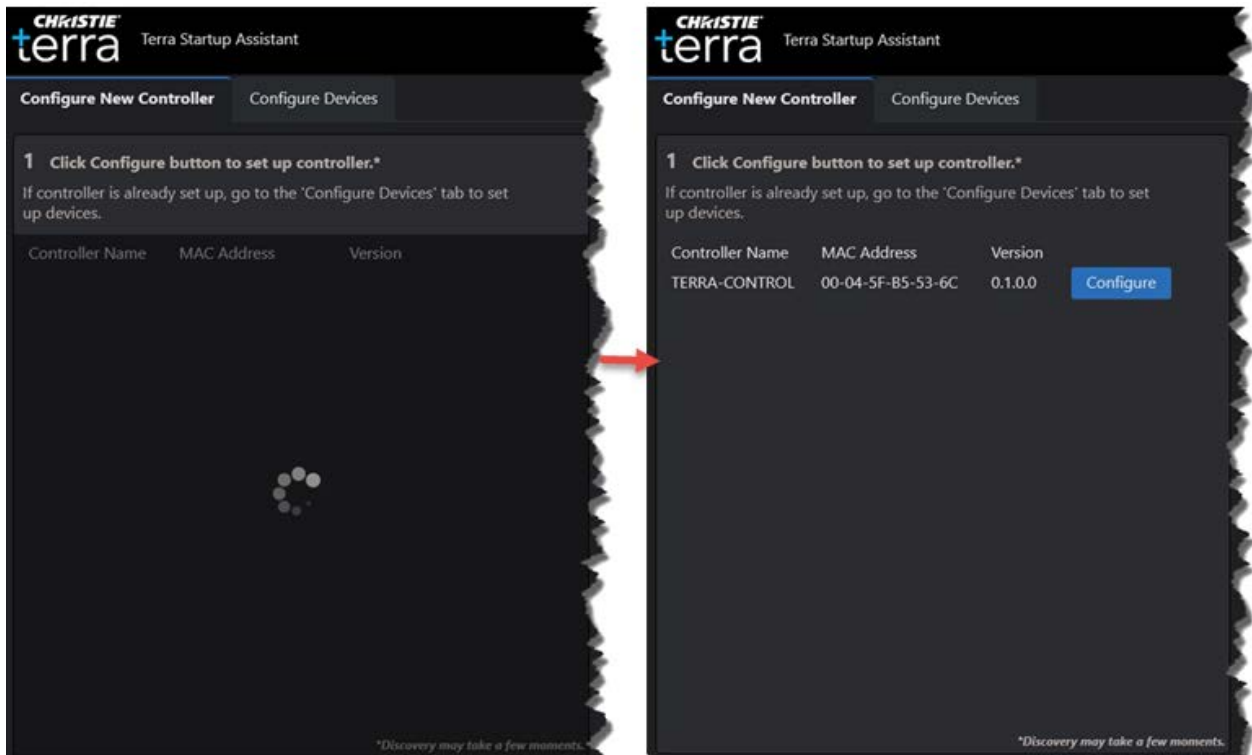
Configure a new Controller

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.

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.
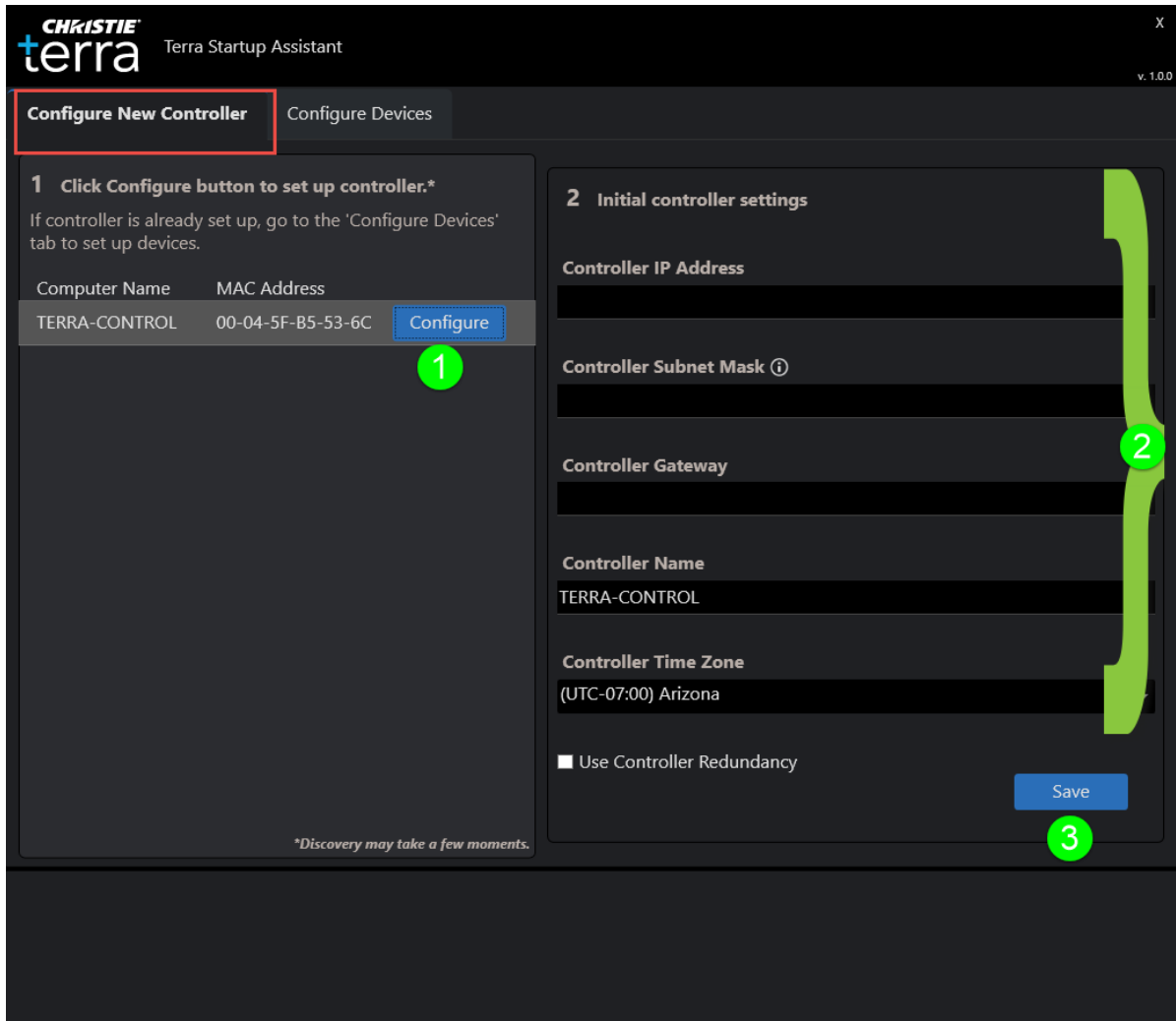
2. Configure the initial controller settings as follows:

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.

Optionally, select the **Use Controller Redundancy** check box to assign an IP address for the primary and backup controllers.
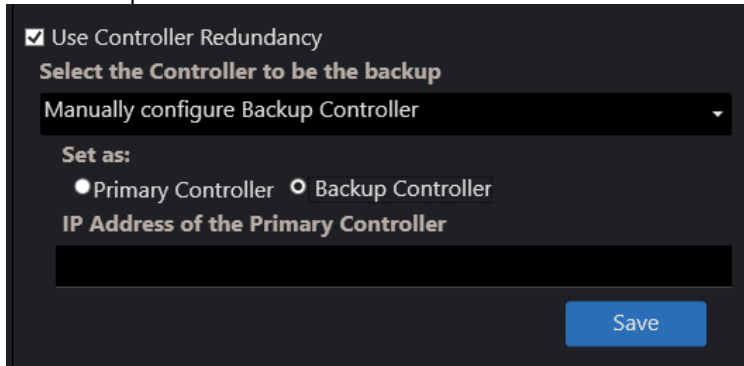
In the **Select the Controller to be the backup** field, click the dropdown arrow and select the backup controller from the dropdown list.

> ℹ This option is available only when more than one controller is available.

- In the **Select the Controller to be the backup** field, click **Manually configure Backup Controller** and then enter the IP address of the Backup Controller.

3. Click **Save**. The Controller will be restarted. When the Controller is ready (displaying the IP address on the front of the Controller), Terra Startup Assistant will attempt to connect to it. If you want to connect to a different Controller, type the IP address in the **Select Controller or Enter IP and Press Enter** field.

4. Click **Configure Devices** to continue startup. Refer to *Configure Associated Devices*, page *25.*

Configure Associated Devices

To configure devices that are connected to the Controller and are on the same network as the Controller:

1. From the **Configure Devices** tab, select the Network Adapter you want to use to connect to the Controller.

> ℹ If your device has multiple network adapters, select the one that is on the same network as the Terra Controller.
> For example: if the Terra controller has an IP Address of 10.10.160.10 and your device has two network adapters, one that is wired with an IP address of 10.10.160.50 and one that is wireless with an IP of 192.168.0.50; the wired network adapter (10.10.160.50) would be the one that can communicate with the Controller.
> If you select an adapter and it doesn't connect, select another adapter from the list until one connects.

2. Select the IP address of the controller you want to connect to.

---
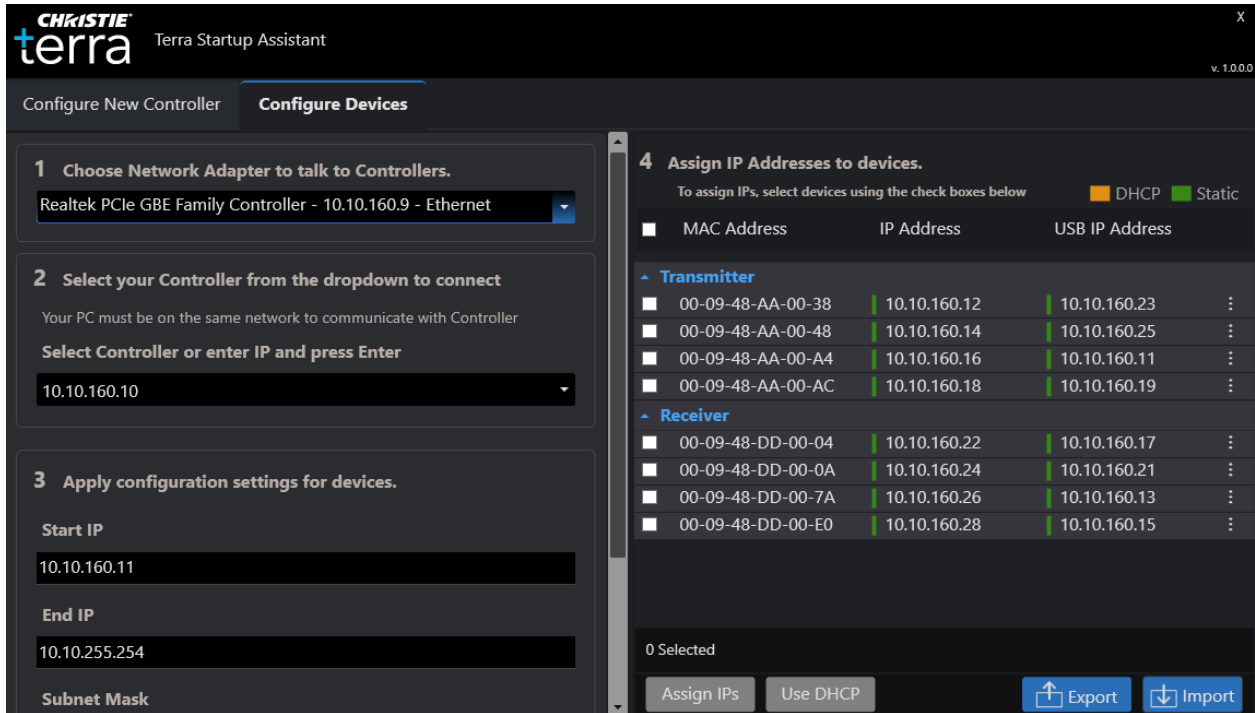
3. Select the IP address range to use for Terra devices by entering a **Start IP** and **End IP**.

> ℹ️ The range will be auto-filled based on the IP address of the Controllers. To change these values, enter the desired values in these fields.
>
> When specifying the range, make sure no IP addresses within the range are currently in use.
>
> Each Transmitter and Receiver uses two IP addresses. You will need twice the number of Terra Transmitters and Receivers.

4. Review the Subnet Mask that is valid for all associated devices.

> ℹ️ The devices must have the same Subnet Mask as the controller.

5. Review the Gateway for all associated devices.

> ℹ️ The devices must have the same Gateway as the controller.

6. Select the checkbox for the devices you want to assign IPs (this can be done individually or through the check all checkbox (MAC Address)) and click **Assign IPs**.

> ℹ️ The color indicator next to the IP address indicates if the IP address was assigned using DHCP (orange) or statically (green).

7. Optionally, click Export to export the device information to a file (.csv) to print.

> ℹ️ The file could be used to print the network information for the devices.

8. Optionally, select the controls to the right of each device to perform the following:
   a. Edit the assigned IP addresses. Complete the fields and click **Save**.
   b. Refresh – Queries the device for IP information.
   c. Reboot – Reboots the device.
   d. Blink – When enabled (slider switch is green), causes the VIDEO, TX, and RX lights on the front of the device to blink very quickly. When disabled, returns the lights to their normal blinking.
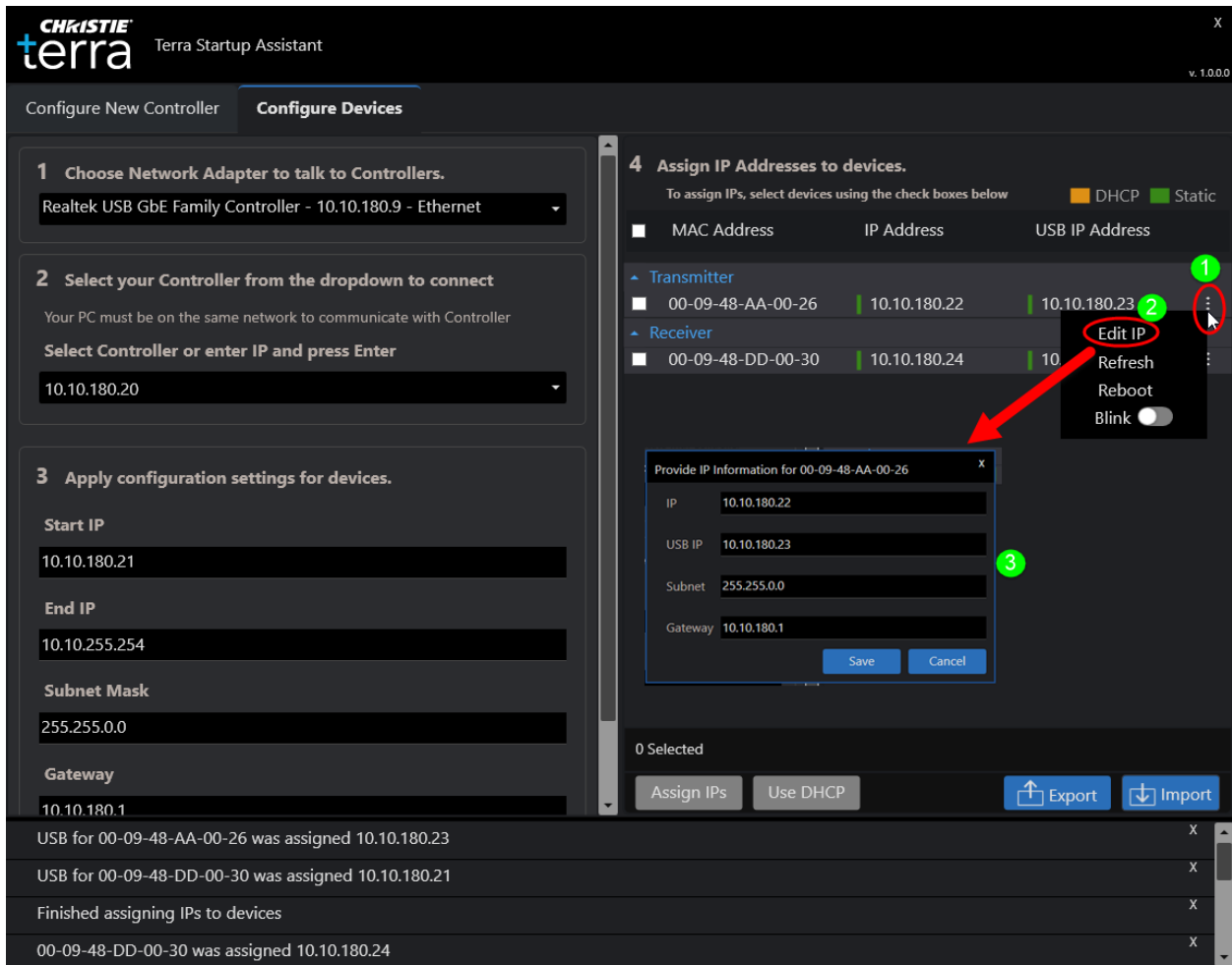
9. Optionally, manually assign IP addresses to the devices. Refer to *Assign IP Addresses to Discovered Devices*, page *27.*

10. Optionally, make any desired changes to the previously exported network settings for the devices and click [↓ Import] to import the changes to the controller. See Importing Device IP Configuration (page 65) for more details.

    ⓘ   If DHCP is selected, you cannot make changes to the network settings for the devices.

Assign IP Addresses to Discovered Devices

To assign IP addresses to the discovered devices:

1. Navigate to the **Configure Devices** tab in Terra Startup Assistant.

2. Do one of the following:
    - To select all discovered devices, select the check box next to the **Device MAC Address** header.

    [□ MAC Address]

    - To select one of more devices, select the check box associated with the device's MAC Address.

3. Click **Assign IPs**.
    The list of IP addresses is displayed when the addresses are assigned.

Set a Discovered Device to Use DHCP

If your IT policies dictate the use of an active DHCP server, use this option to set the IP address for one or more devices from a static IP address to DHCP. When **Use DHCP** is selected, if the device is still powered on and connected to the Controller, the current IP address for the device is made available for another device and it is no longer associated with the device.

ⓘ When using the Use DHCP option, do not complete the **Apply configuration settings for devices** (see the following illustration) in the step 3.
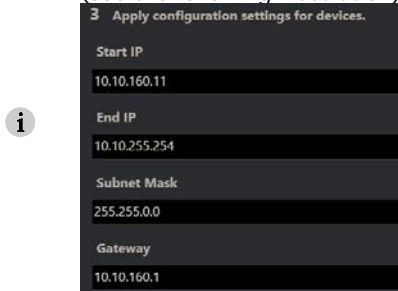
To set a discovered device to DHCP:

1. Do one of the following:
    - To select all discovered devices, select the **Device check all** check box.

    - To select one of more devices, select the check box associated with the device.

2. Click **Use DHCP**.
    The devices are set to use DHCP. The list is updated to show no assigned IP as the devices switch over.

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 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).

ℹ️ 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.

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 *29*.

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 create. Refer to *Working in Offline Mode*, page *30*.

Logging in to the Terra Manager

From the sign in page of the Terra Manager, you can sign in to access the Terra Manager features, get help with your password, and launch Terra Startup Assistant.

To sign in, perform the following:

1. To display the sign in page, open the Terra Manager by clicking on the TerraManager.exe file.
   The sign in page is displayed.

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

3. In the Username field, type **service**.

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

> **i**   Passwords are masked.

> **i**   Change the default password for security purposes. Refer to *Change Password for Default Account*, page *31*.
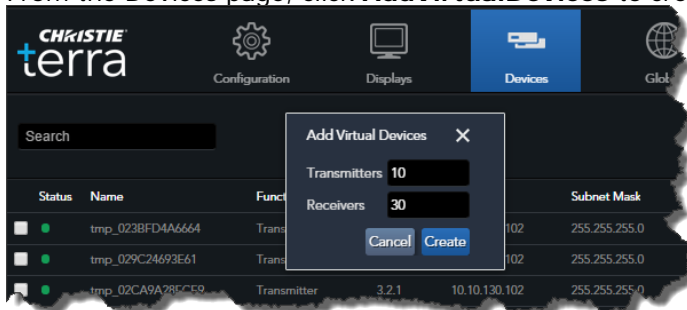
5. Click **SIGN IN**.

Working in Offline Mode

To work in offline mode to create a configuration without a Controller:

1. To display the sign in page, open the Terra Manager by clicking on the TerraManager.exe file.
2. Click **Offline** and then click **Sign In**.
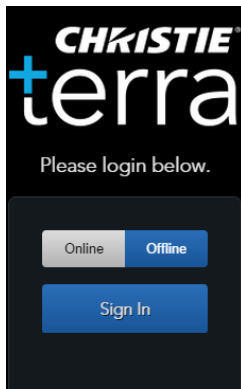
3. From the Devices page, click **AddVirtualDevices** to create devices.

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

> **i**   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. Create a backup of the configuration you created using the **Backup Configuration** option on the Global page. Refer to *Backup the System*, page *58*.
8. Log off from Offline mode.
9. Verify all devices are physically connected to the same network as the Controller.
10. Log on using Online mode. Refer to *Logging in to the Terra Manager*, page *29*.
11. Run Terra Startup Assistant to discover the physical devices. Refer to *Terra Startup Assistant*, page *22*.
12. From the Devices page, note the devices that were created. Optionally, click **Export** to export the device IP configuration.

13. Restore the configuration you created in step 7 using the **Restore Configuration** option on the Global page. Refer to *Restore the System*, page *59*.

14. From the Devices page, select a device from the list that you created in offline mode.

15. Select the Hardware tab on the Devices page.

16. 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 *51*.

17. Click **Swap**.

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

18. Repeat steps 14-17 for all of the devices you created in offline mode.

19. On the Devices page, select the device you created in offline mode.

20. Select the hardware tab and click **Delete**. Refer to *Delete a Device*, page *51.*

21. Repeat steps 19-20 for each device you want to delete.

Change Password for Default Account

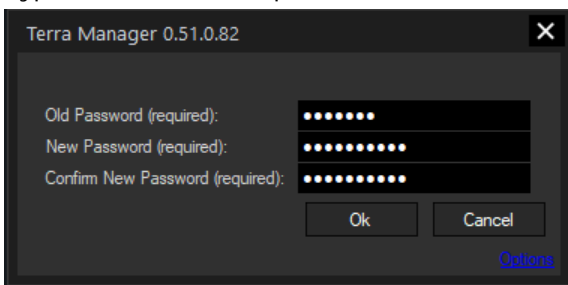For security purposes, change the password for the default user account.

1. Login in using the default account (user name: service; password: service).

2. Click the dropdown arrow next to the currently logged in user in the upper right navigation panel.
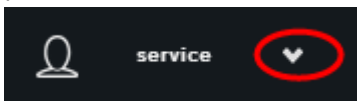
3. Click **Change Password**.
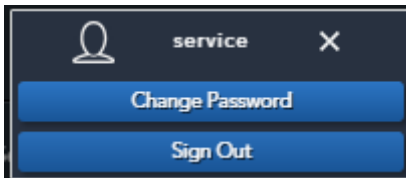
4. Type the old and new password. Refer to See *Password Management*, page *53*.

5. Click **OK**. You are signed out.

6. Login back into Terra Manager using the new password.

Main Navigation Panel

The main navigation panel 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 help file, software version, and third-party licensing.

Configuration Page

The Configuration page is the first page you use after using the Terra Startup Assistant.
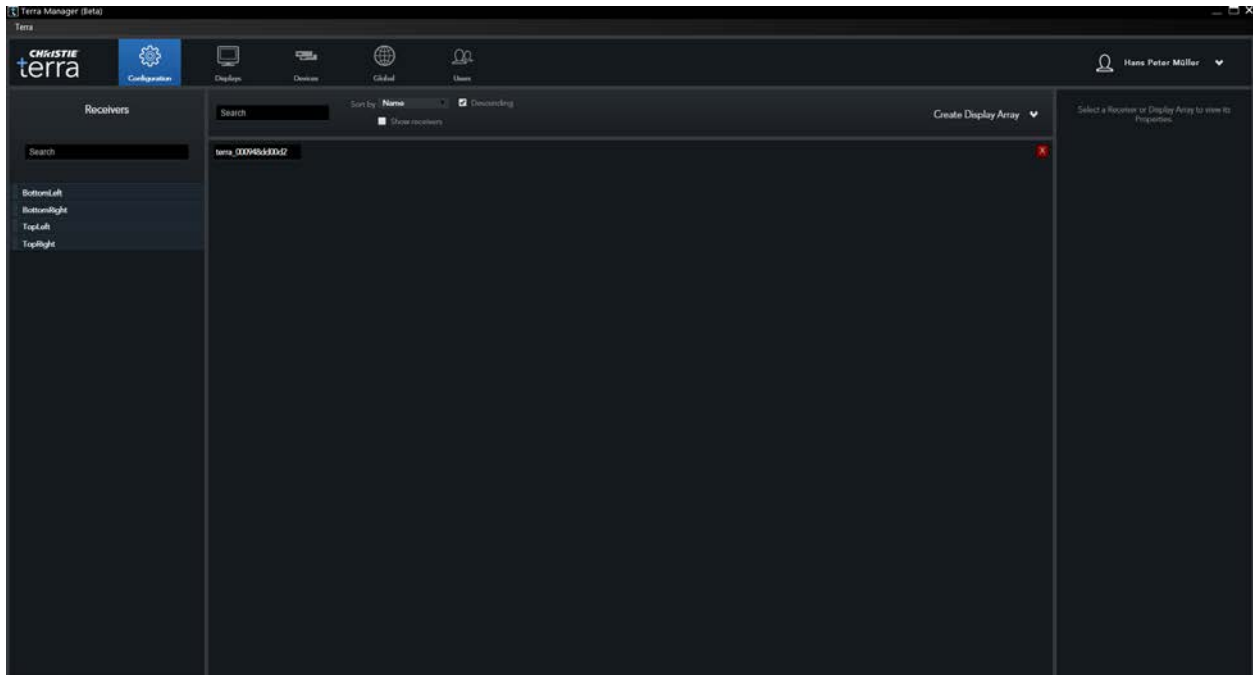

This page enables you to:

- View a list of Receivers.
- Create a Display Array.
- View the current Display Arrays.
- Change a Display Array's properties.
- Change a Receiver's properties.
- Add and delete Tags for a Display Array or a Receiver.

Create a new Display or Display Array

Create a display or a display array for each physical grouping of displays that will be used with Terra.

1. To create a new Display Array, click **Create Display Array**.
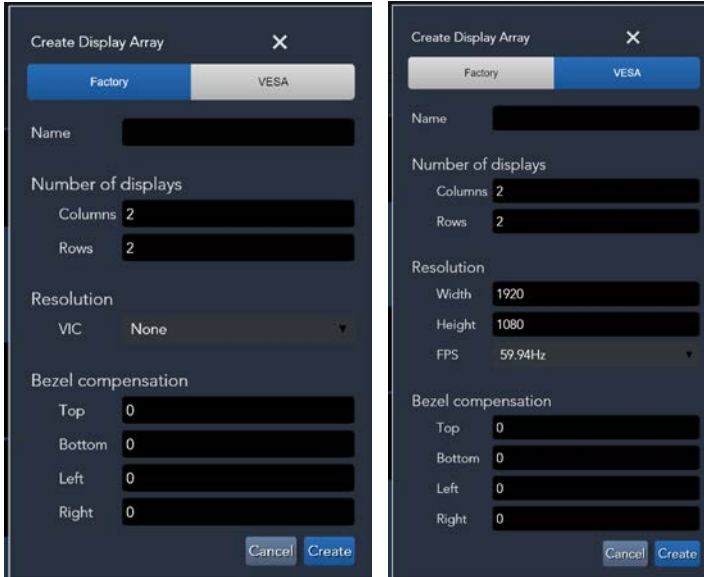
2. Configure the details for the display array as follows:

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

Type	Factory or VESA. The preferred method is Factory.
	VESA is used for equipment that requires a resolution that is not supported as a factory format or if more control over the output timing is needed.
	If Factory is selected, you need to select the format for the display.
	If VESA 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)	VIC	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 of displays horizontally in the physical arrangement of the displays.
	Height	Height of displays vertically in the physical arrangement of the displays.
	FPS	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.	
	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.

3. Click **Create**.

> **i** To delete an existing display array, click the red X (❌) in the upper right corner of the display array.

View Display Arrays

Display Arrays are shown in the middle pane on the Configuration page. Use the scroll bar to the right of the pane to scroll through the Display Arrays.

Use the Search options on the top of the middle pane to search for a specific string in the Display Array name. Use the Sort options to sort the Display Arrays.
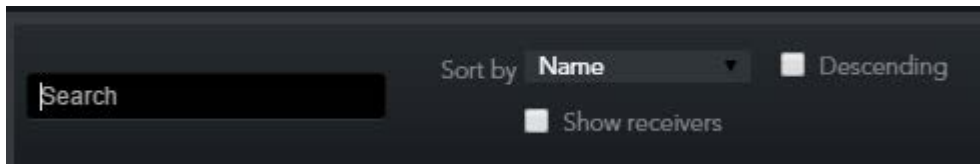
Change a Display Array's Properties

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

Apply 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 pane of the Configuration page. One Receiver is assigned to each of the displays in the display array.

> **i** New devices are added to the list when they are found.

To add Receivers to the Display Arrays:

1. Navigate to the desired Display Array.
2. Click the Receiver name (default: MAC Address) of the desired Receiver and drag it to the desired location in the Display Array.

> **i** Use the Search tool to search for a specific Receiver.
> When a Receiver is assigned to a Display Array, it is removed from the list of available receivers.
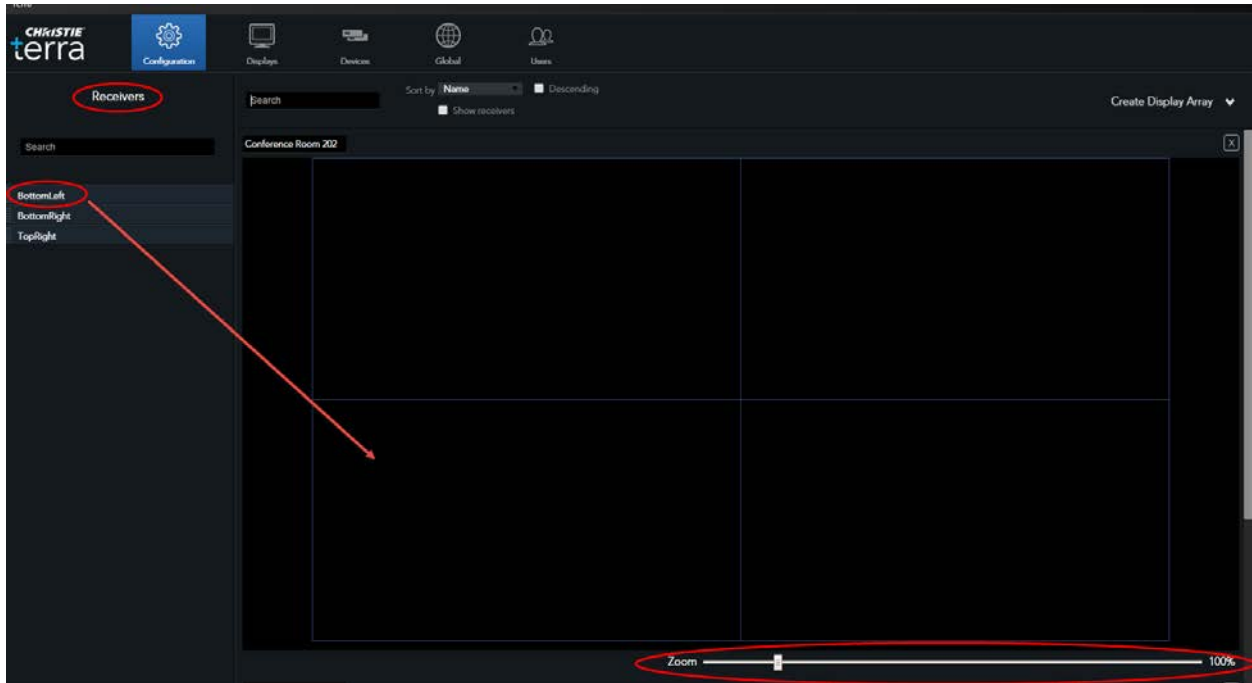
3. Repeat the above step for each tile in the display array.

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

Receiver Property	Description	
Info		
Device Name	User-defined name for the device. Defaults to the MAC Address for the device. ℹ️ 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.	
Mode	Genlock	Used for the lowest latency between the source and the display. Display genlocked to the source.
	Genlock scaling	Scaled output, genlocked to source with very low latency.
	Fast switch	Used for switching quickly between sources. Scaled and buffered output produces fast clean switches between sources.

Display Array Properties

Display Array Property	Description
Info	
Name	User-assigned name for the device.
	ℹ Best practice is to apply logical names to all devices and system assets.
Total Column	Number of vertical column for the Display Array.
Total Rows	Number of horizontal rows for the Display Array.
Device count	The number of RX 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.
Tags	Type the name of a new Tag to be associated with the Display Array.

Video Mode

Displays Page

The Displays page is accessed by clicking the Displays icon on the top navigation bar.
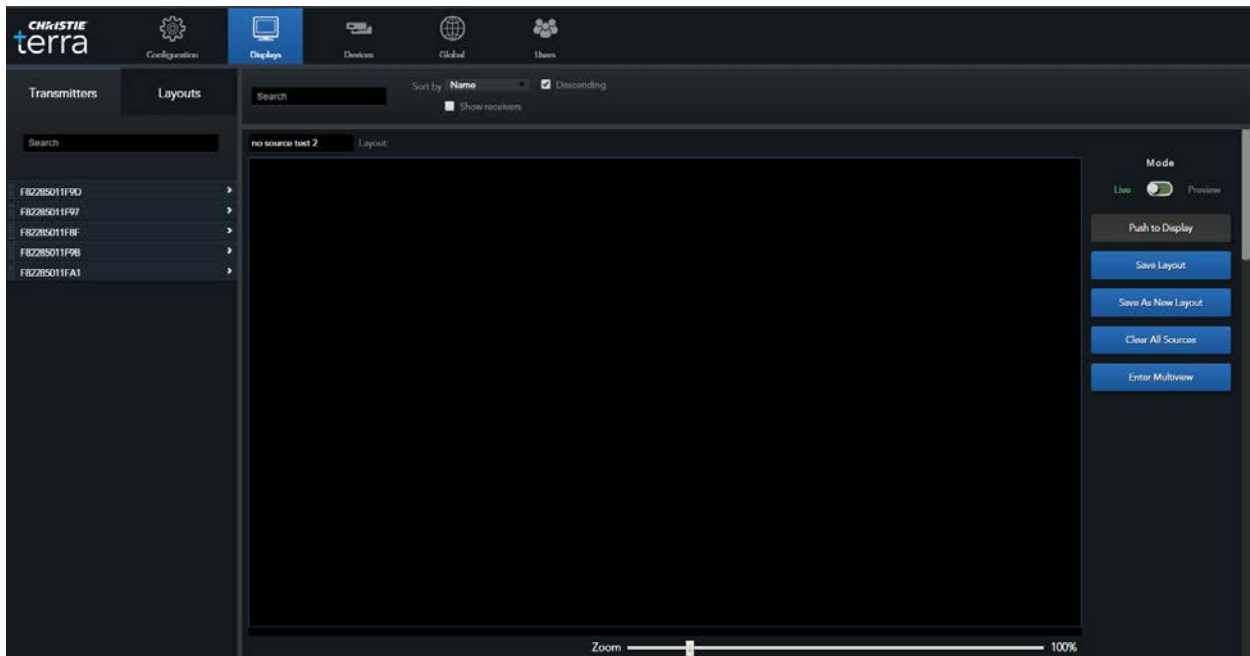
This page enables you to:

- 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.
- Apply 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.

When you assign a source or design 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 *43* for more details.

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

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.
- 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.

To add Transmitters to the displays:

1. From the Displays 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.

> ℹ️   When a source is dragged onto a tile of the Display Array, the source fills the full tile initially.
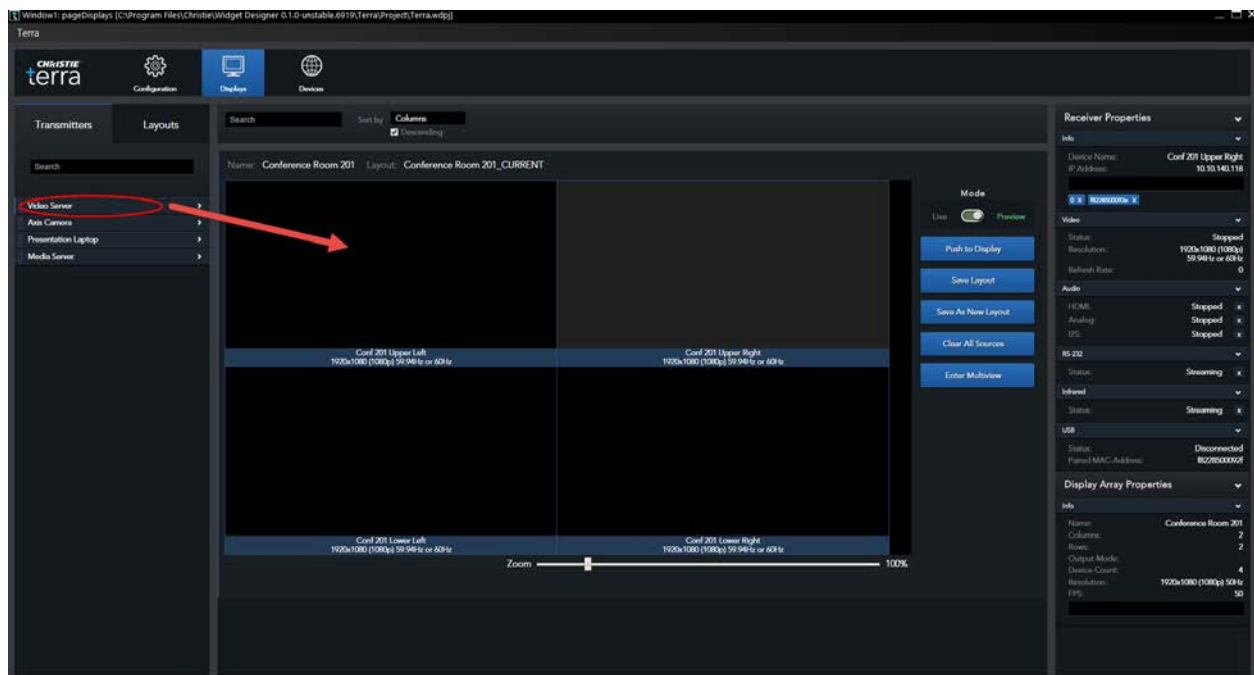
2. Optionally, to route additional functions with the video stream, refer to *Creating Groups*
3. Create groups to help organize layouts and Transmitters. Groups are similar to folders. Layouts can be added to one or more groups.
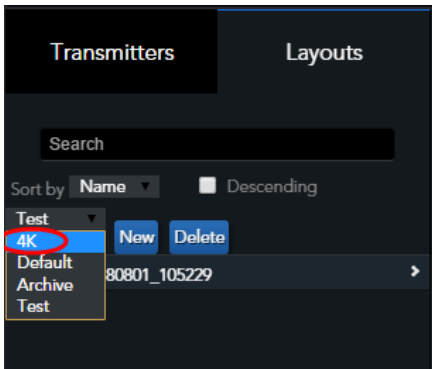
To create a new group:
1. From the Layouts tab on the Displays page, click **New** on the left pane.
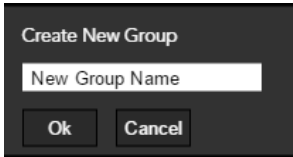
2. Type a name for the new group.
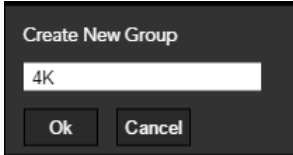
3. Click **OK**.
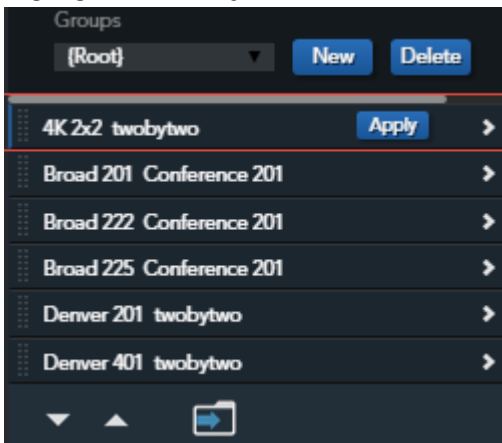   The new group is now available from the Group dropdown list.
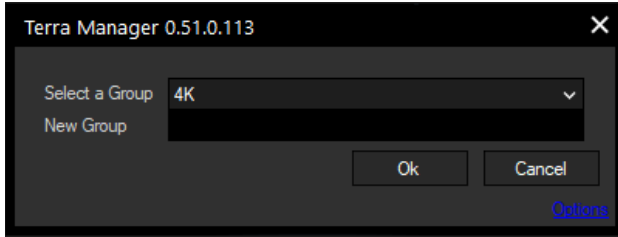

Adding Items to Groups

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

To move it to another group:
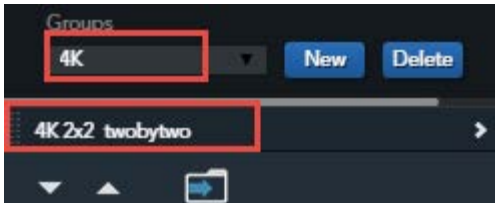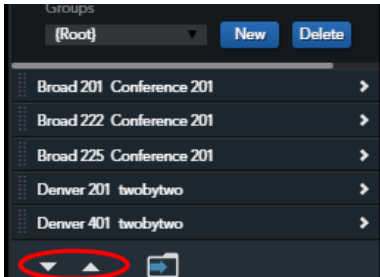1. Highlight the item you want to move to a different group.

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.

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

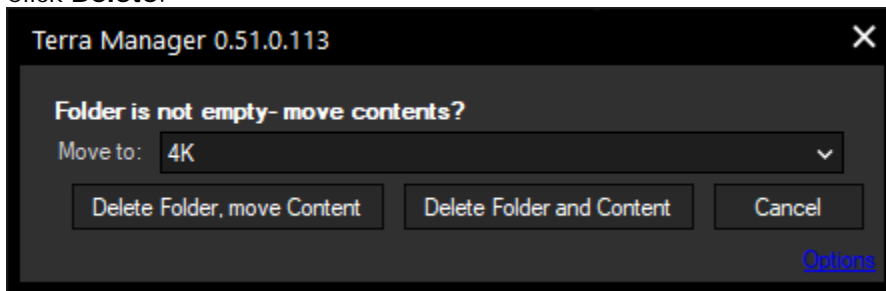6. Optionally, to reorganize the list of items, use the **Up** and **Down** buttons to move items in the list.

Delete 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.

ℹ️   Groups cannot be renamed.

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**.

4. Routing Additional Data Stream, page .

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

5. 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.
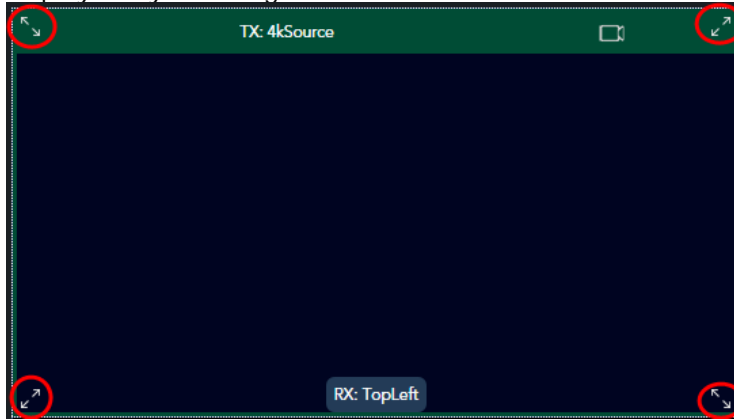

6. Optionally, to delete a source from a Display, click the source you want to delete (it is outlined in green) and press the Delete key on your keyboard.

7. Optionally, to reposition a source, highlight the source (it is outlined in green) and drag it to the desired position.

> ℹ️ 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.

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

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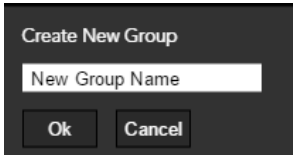

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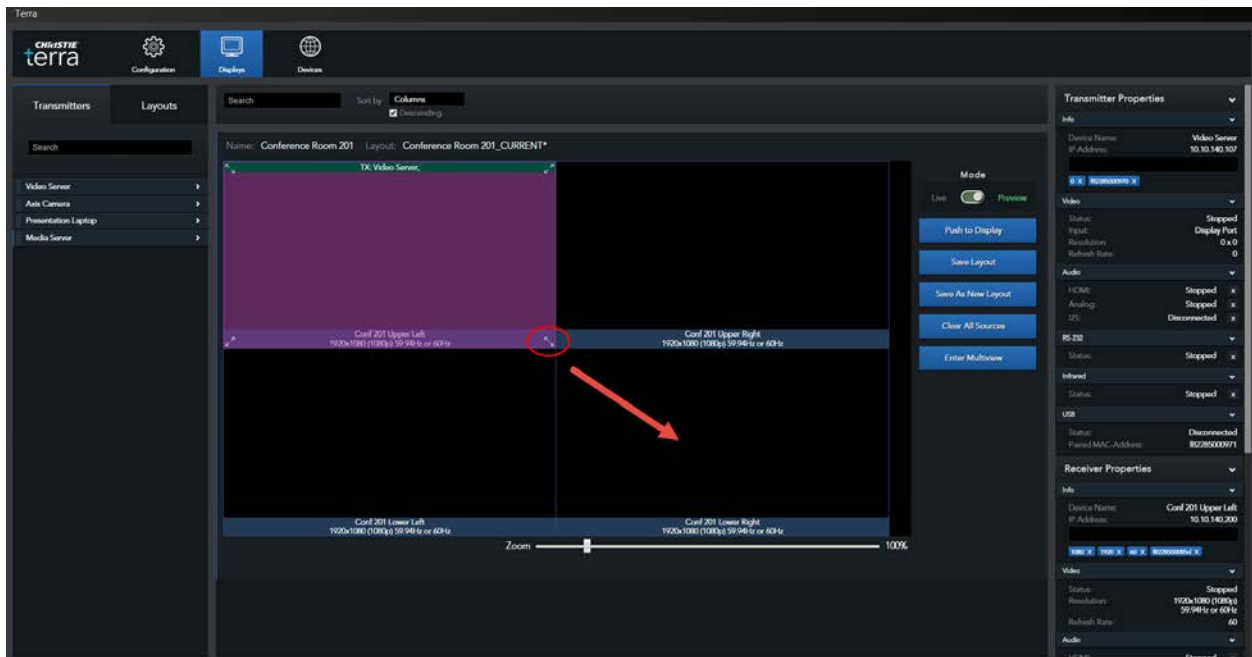
9. If using the Preview mode, click **Push to Display** to display the sources on the outputs.

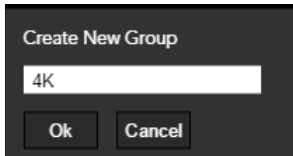10. To save the layout, click **Save Layout**.

Creating Groups

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

To create a new group:

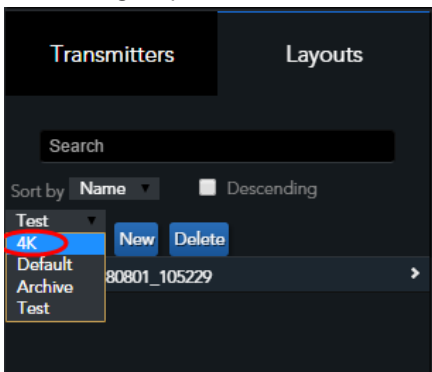4. From the Layouts tab on the Displays page, click **New** on the left pane.

5. Type a name for the new group.

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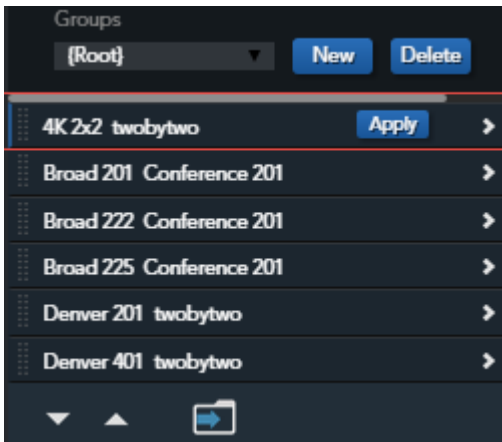   The new group is now available from the Group dropdown list.

Adding Items to Groups

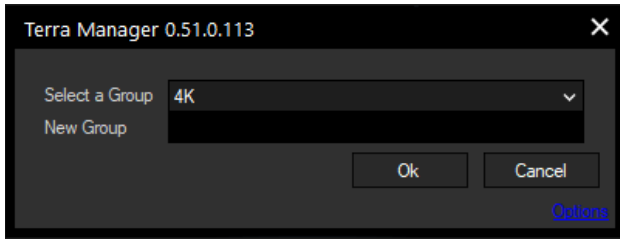When an item is first saved, it is saved to the Root group.

To move it to another group:

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

8. Click the folder button .

9. Perform one of the following:
    a. Select the desired group from the dropdown.
    b. Type a new group name in the **New Group** field.

10.
11. Click **OK**. The selected item is now avaiable in the specified goup.

12. Optionally, to reorganize the list of items, use the **Up** and **Down** buttons to move items in the list.
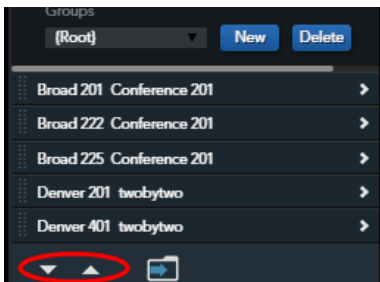
Delete a Group

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.

ℹ️   Groups cannot be renamed.

To delete a group:

4. Select the group name from the Groups dropdown.

5. Click **Delete**.

6. Perform one of the following:

    c. To save the items to a new group, select a group to move the items to and click **Delete Folder, move Content**.

---

    d. To delete the group and the items in the group, click **Delete Folder and Content**.

Routing Additional Data Streams

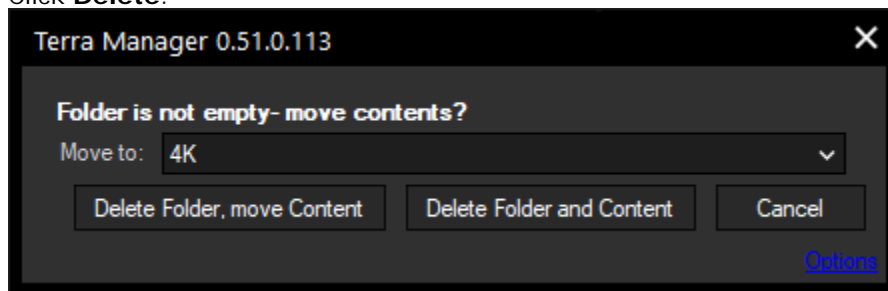To route additional functions with the video stream:

1. From the **Displays** page, click the down arrow associated with the Transmitter.

2. Select the desired check boxes to add additional data streams.
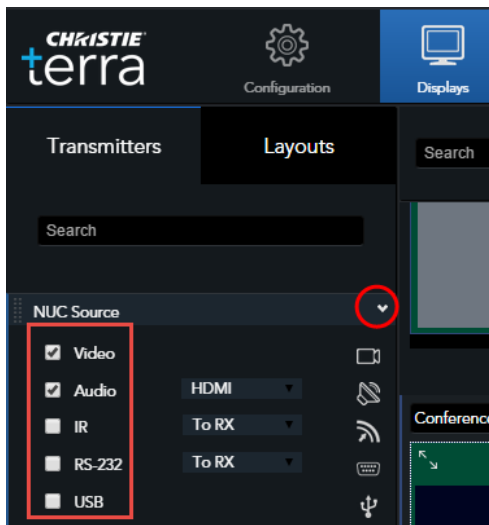
Icon	Description
🎥	Video
🎧	Digital audio (HDMI)
🔇	Analog audio
🔊	IR out
📞	IR in
⌨	RS232
�🖰	USB

When a stream is selected, the associated icon is displayed in the header area of the Transmitter on the Display Array and the Display Array's properties panel is updated with the additional streams.
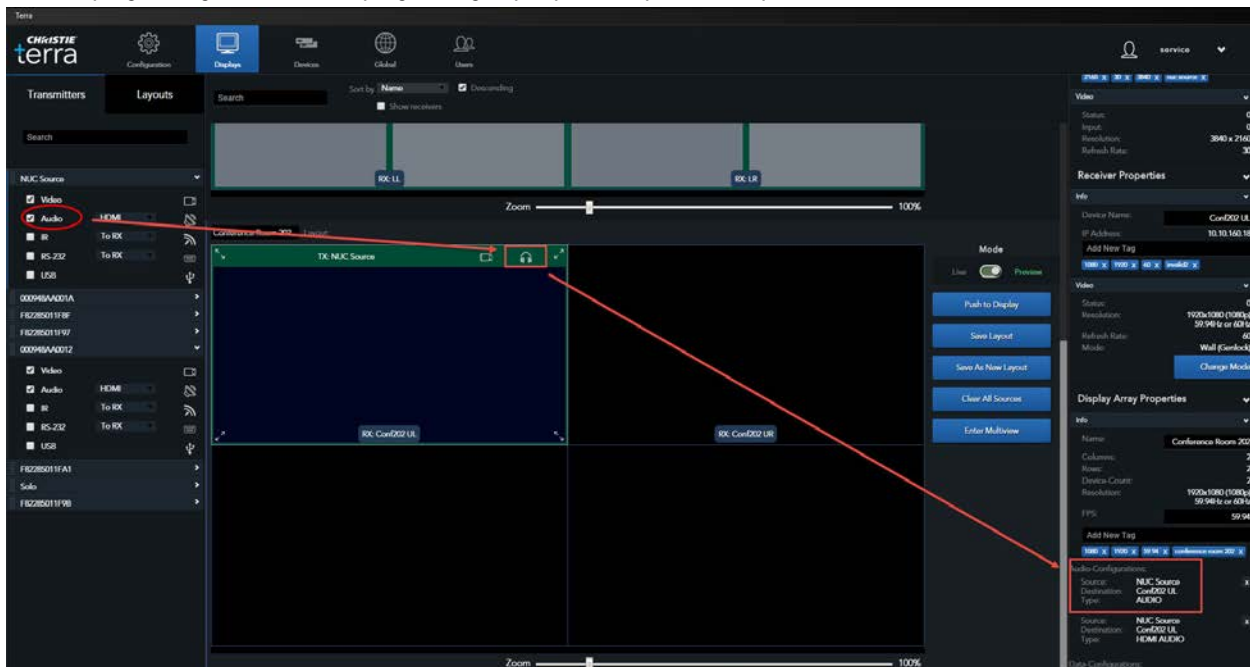
Create a Multiview Layout

A Multiview layout can consist of more than one source on one receiver.

1. Click **Displays**.

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

ℹ   The area you are converting to Multiview cannot have any sources on it.
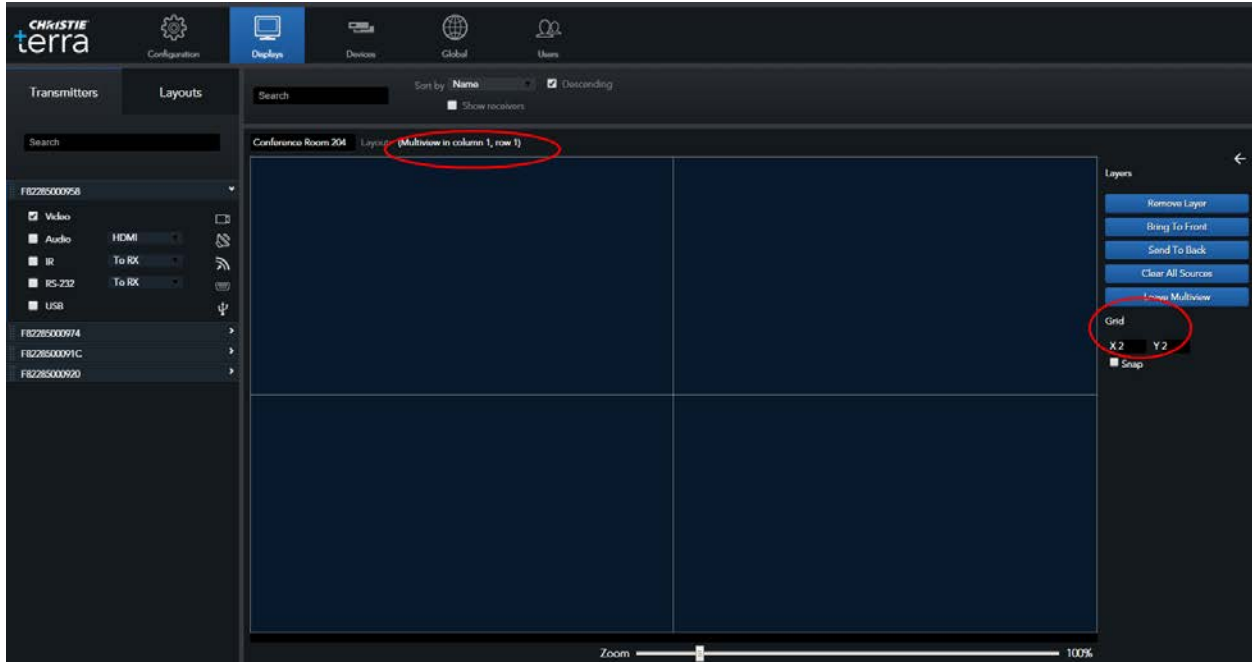
3. Use the Grid settings to define the Multiview layout. A new array is displayed with the Multiview settings.
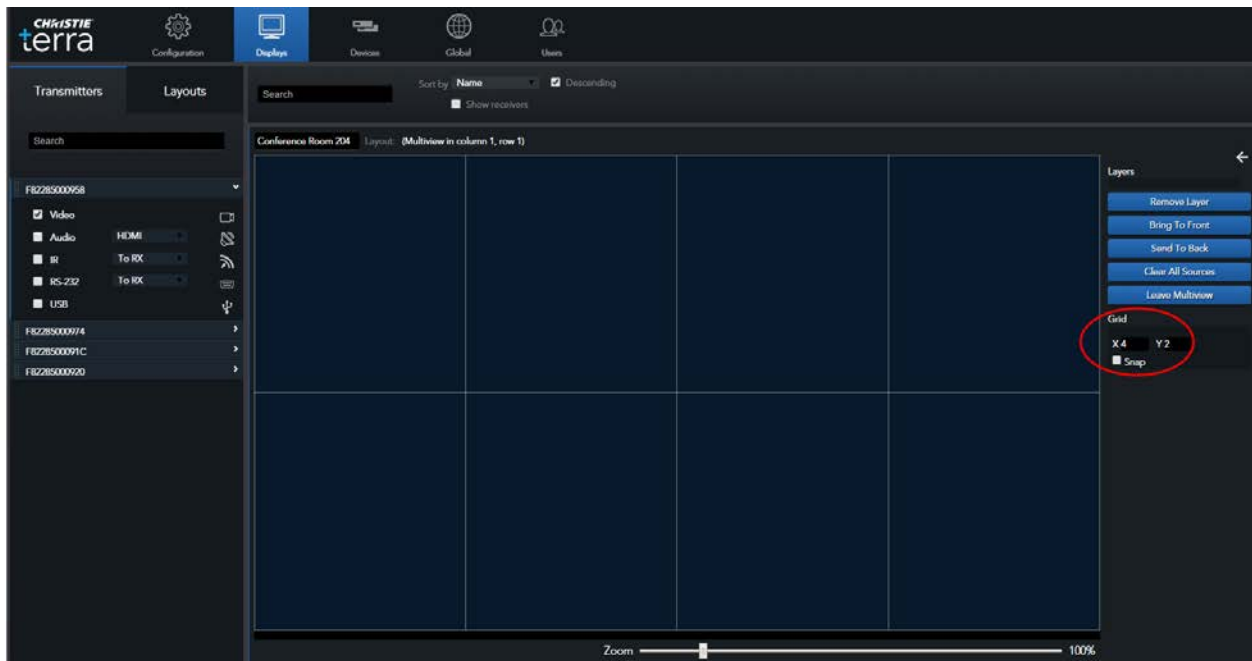
4. Drag one or more sources into the Multiview array.

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

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

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.
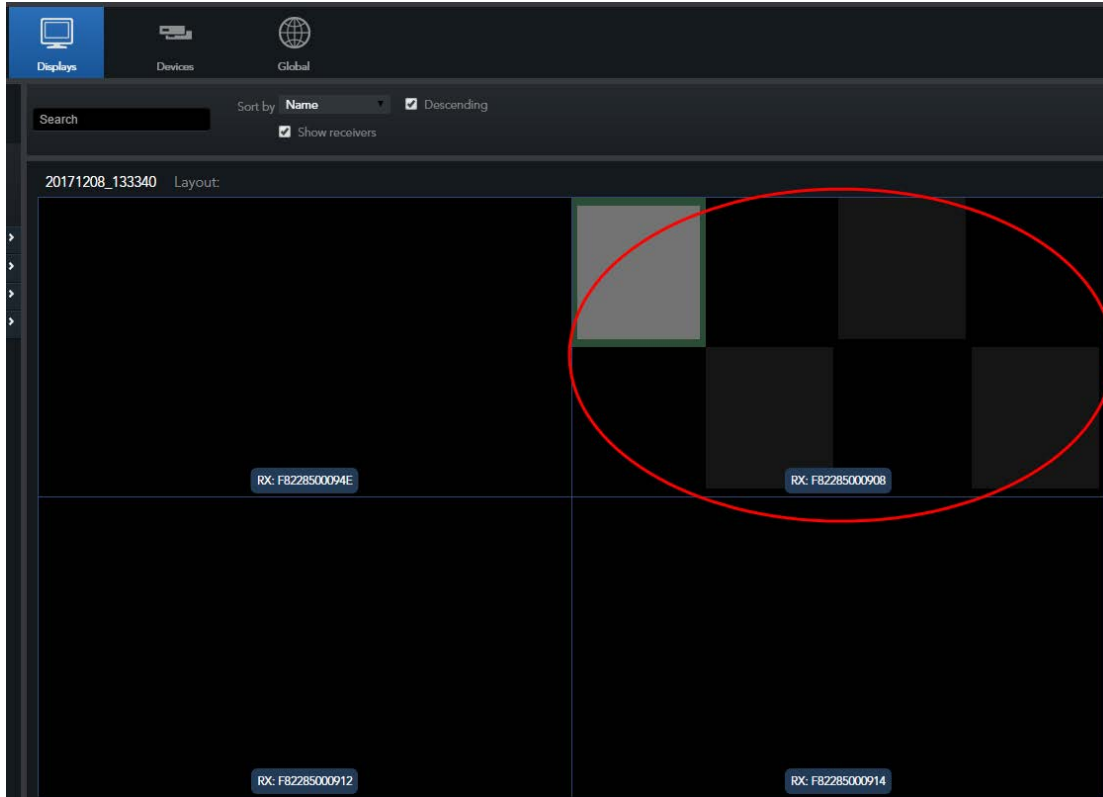
Delete a Layout

To delete a layout:

1. Highlight the layout name in the Layouts list.

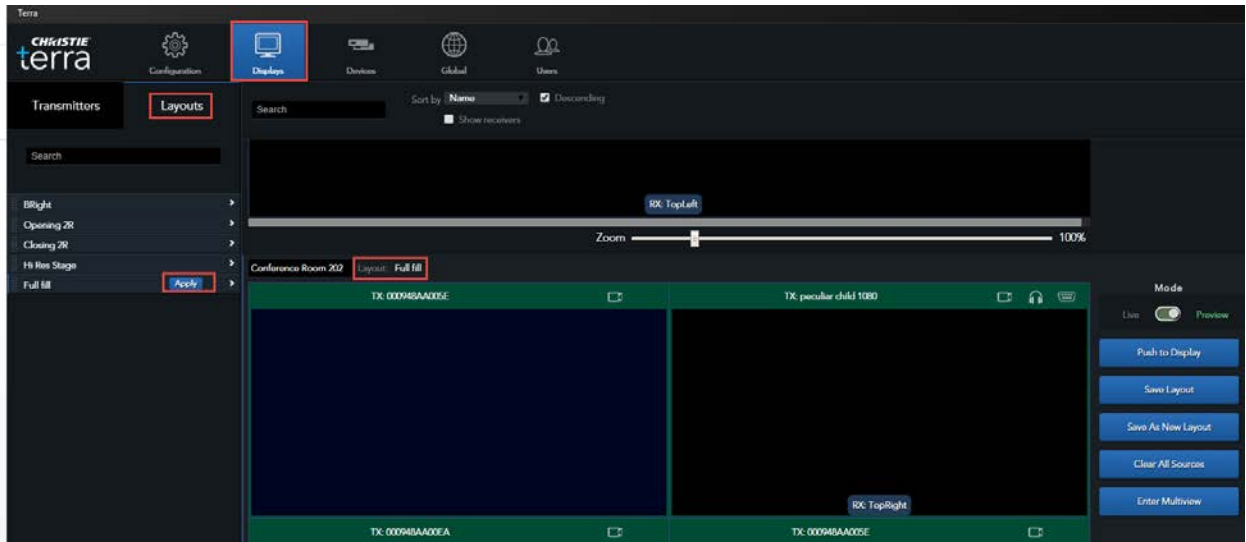2. Click the arrow to expand the layout's options.

3. Click **Delete**.

Recall a Layout

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

1. Navigate to the Displays 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.

> **i** 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. Additionally, if other Transmitters are currently occupying the tiles that need to be applied to part of the layout, the layout will only be partially applied. Priority is given to the Transmitters that are already present.
>
> 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. **i** 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.

Devices Page

This page enables you to view the status of all devices, copy the configuration of a device and apply it to one or more devices, delete selected devices, and add Transmitters and Receivers to groups.

Additionally, using the tabs at the bottom of the page you can display and change the configuration for audio, video, network (display only), RS-232, external buttons, the LEDs for selected Transmitters or Receivers, and Hardware settings. See *Devices Tabs* (page *48*) for more details.

The Devices page lists the following information for each device.

Status	Green indicates there are no problems with the device. Red indicates there is a problem with the device.
Name	The user-defined device name (default is the MAC address).
Function	Transmitter or Receiver
Firmware	Version number of the device's firmware.

IP	IP address for the device.
Subnet Mask	Subnet mask for the device.
Gateway	Gateway for the device.
ID	The MAC address for the device.
Tags	User-defined and system tags for the device.
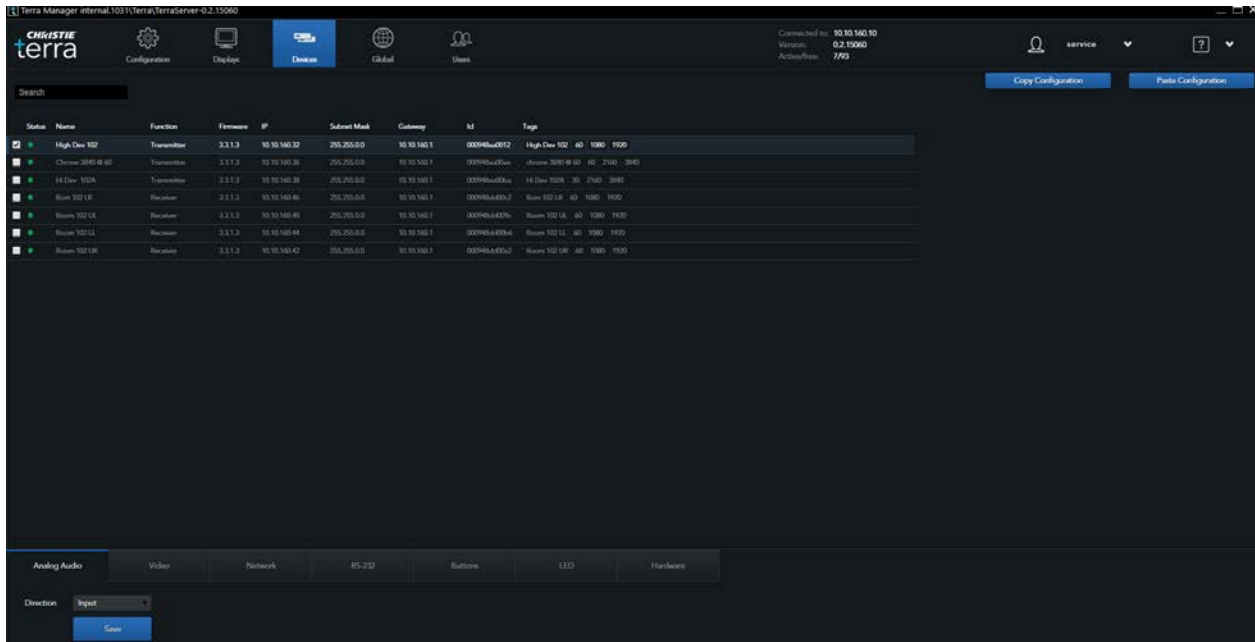
Copy and Paste Configuration

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 settings including parity/Speed/Stop Bits.

To copy a configuration:

1. Navigate to the Devices page.
2. Click the source device you want to copy the configuration from.
   The device information is highlighted.
3. Click **Copy Configuration**.
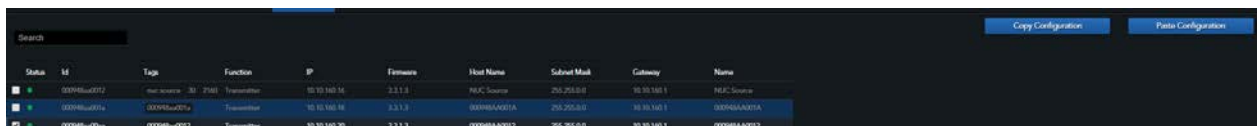
4. Select the checkbox associated with one or more destination devices you want to copy the configuration to.

5. Click **Paste Configuration**.
Respond to the confirmation prompt.

Create Devices in Offline Mode

On the Devices page, you can create virtual devices to work in offline mode.

1. Specify the number of devices (Transmitters or Receivers) to create.

2. Perform one of the following:
   a. To create Receivers, click **Create Receivers**.
   b. To create Transmitters, click **Create Transmitters**.
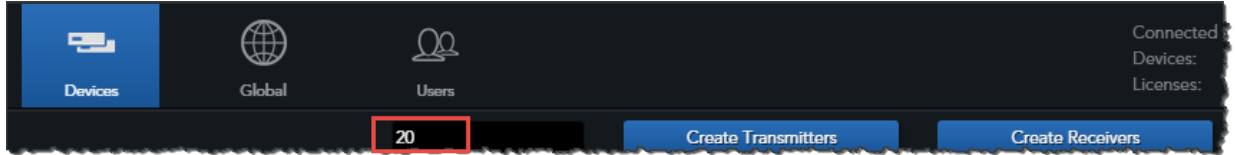
For additional information about working in offline mode, refer to *Working in Offline Mode*, page *30*.

Saving a List of Devices

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

1. Click **Save Devices List**.
2. Browse to the desired location to save the list and enter the file name.
3. Click **Save**.

Devices Tabs

The Devices page has tabs at the bottom of the page to set or review the Analog Audio, Video, Network, RS-232, Buttons, LED, and Hardware properties.
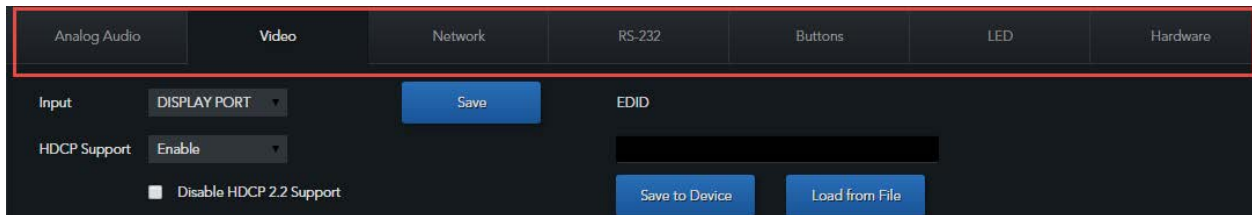
Use the tabs near the bottom of the Devices page to modify settings for the selected devices.

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

   i To select more than one adjacent items 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 tab.

3. *Refer to Devices Properties Tabs* (page *48*) to make your selections.

4. Click **Save**.

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 display only.

The following summarizes the properties for TXs and RXs.

TX

RX

Analog Audio	Digital Audio / EDID	Network	RS-232	Buttons	LED	Hardware

Analog Audio Tab (TX and RX)

TX

Use to configure the direction of the analog audio port.

Direction	Input	Analog audio source is connected to the TX and the audio is routed to one or more RX units.
	Output	The TX will breakout the 2-channel down-mixed version of the HDMI audio coming into the TX and send it out on the local Analog Audio port. For the Output option, the initial HDMI audio has to be uncompressed LPCM audio. Dolby, DTS, or compressed audio is not supported.

RX

Use to set the audio source for the analog audio output port.

Audio Source	HDMI Audio (Downmix)	2-channel down-mixed version of the original HDMI audio
	Analog Audio	The received analog audio stream is embedded into the HDMI output.
	I2S Audio	Uses uncompressed audio for the I2S bus.
	I2S audio local loop out	I2S audio is looped to play locally.

Video Tab (TX)

Use to change the input port, enable/disable HDCP support, and access and modify the EDID that is visible to the source device.

Input	DisplayPort	Select if the Transmitter is connected to a Display Port.
	HDMI	Select if the Transmitter is connected to a HDMI port.
HDCP Support	Enable	Enable HDCP support.
	Disable	Disable HDCP support. If disabled, streaming video from a HDCP source to a display will result in black image displayed.
	Disable HDCP 2.2 support	Select to only enable HDCP 1.4 support.
EDID	Use to upload an EDID file to a TX if a source is not displayed properly.	
	EDID (Resolutions supported)	Select the desired resolution.
	Load from File	Upload the selected EDID.

Digital Audio/EDID Tab (RX)

Use to control the audio source for the HDMI port.

Audio Source	HDMI Audio (original audio from video subscription in Genlock mode)	The original HDMI audio stream received with the video is used if the RX device is in Genlock mode or if RX device is in any video mode and separate HDMI audio is not enabled.

	Analog Audio	Audio stream plugged into the analog port on the TX going to an RX. Independent of HDMI audio streaming
	HDMI Audio (Stereo Downmix)	TX HDMI audio stream is downmixed into an analog audio and plays on the Analog output on the RX
	HDMI (all available channels)	The multichannel audio is received as a separate HDMI audio stream and is embedded into the HDMI output signal.
	I2S Audio subscription	Uses a specific type of PCM digital audio communication. Audio passes through the serial bus.
	I2S Audio local loop out	I2S audio is looped to play locally.
EDID	Use to export an EDID file from a display connected to a RX.	
	EDID (Resolutions supported)	Used to review the desired resolution.
	Export to file	Exports the selected EDID to a file.

Network Tab (TX and RX)

Use to view network settings (display only).

HostName	Defaults to the MAC address for the device. To change it, enter a new name.
IP Settings	DHCP or Manual.
IP Address	IP address of the device.
Mask	The subnet mask for the network address.
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.

RS-232 Tab (TX and RX)

Use to modify the RS232 port settings.

Baud	The speed data is sent over the RS-232 line. Default is 115200.
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.

Buttons Tab (TX and RX)

TX

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

Button right	None	Not assigned to any feature.
	Switch video input	Used to switch the source between the DisplayPort and the HDMI port.
Button Left	None	Currently not used.

RX

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

Button right	None	Not assigned to any feature.
	Send EDID	Sends the current EDID file to all configured Transmitters.
Button left	Currently not used.	

LED Tab (TX and RX)

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

LED0	Unknown	Not used.
	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	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	Deletes the selected device in the Devices list.

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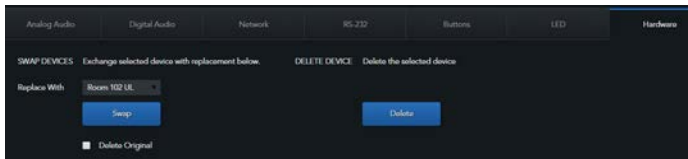
4. In the **Replace With** field, select the device you want to use as the replacement.

5. Click **Swap**.

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

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 **Delete Device** option forgets the device.

If one or more devices are not currently used with Terra, you can remove the device from the list of devices.

To remove a device from the list a devices:

1. Navigate to the **Devices** page.

2. Select the check box associated with the device(s) you want to delete.

3. Click on the **Hardware** tab.

4. Click **Delete**. The device is deleted from the device list.

EDID Management

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.

EDID files can be captured from displays, or they can be uploaded and applied to Transceivers. The following are options for applying EDID files:

- Using the **COPY EDID** button on the Receiver to copy the EDID file from a display attached to the Receiver.
- Using the Digital Audio/EDID tab for a Receiver on the Devices page, click the **Export to file** button to save the EDID format to a file.
- Using the Video tab for a Transmitter on the Devices page, click the **Load from File** button to upload an EDID file and copy it to one or more Transceivers.

Managing EDID using the COPY EDID Button on a Receiver

1. To copy the EDID associated with a display attached to a Receiver, press the **COPY EDID** button on the Receiver.
2. The EDID file is copied to all connected Transmitters.

## *Managing EDID using the Receiver Digital Audio/EDID Tab*

1. On the Devices page, highlight the Receiver that you want to copy the EDID file from.
2. Review the list of supported resolutions to verify the file contains the desired resolutions.
3. Click **Export to file**. You can load this file to one or more Transmitters using the Transmitter Video tab.

Managing EDID using the Transmitter Video Tab

1. On the Devices page, highlight a Transmitter that you want to upload an EDID file to.
2. On the Video tab, click **Load from File**. Valid EDID files are *.EDID (EDID files), *.dat (Phoenix EDID Editor files), and *.txt (plain text files).
   The EDID list is refreshed and displays the resolutions supported by the new EDID file and the unit is reset.
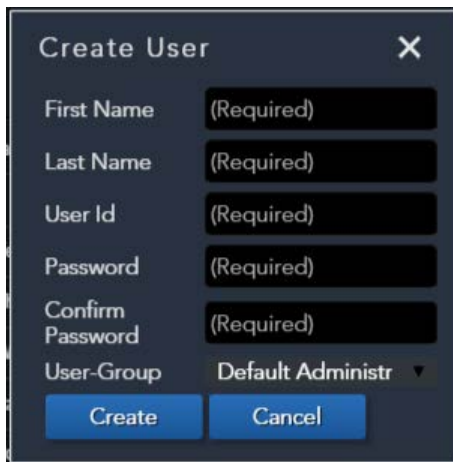
Users Page

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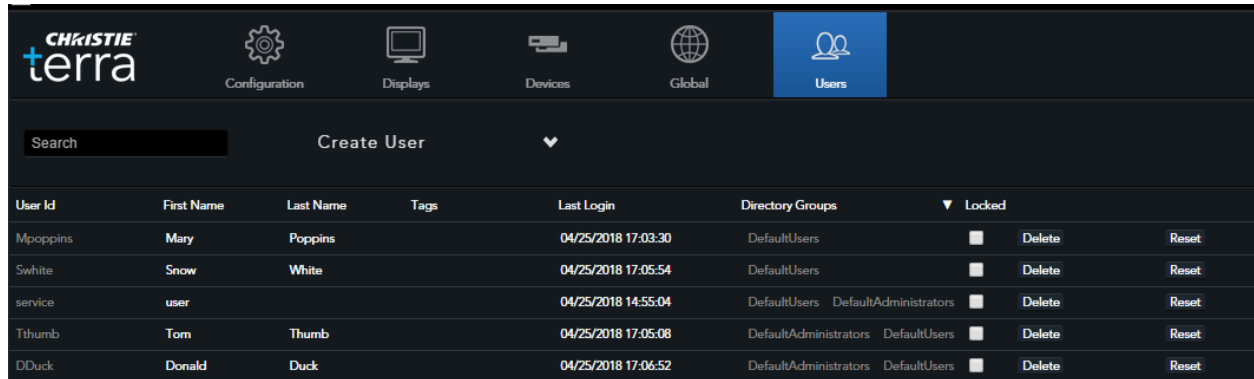
Add a User

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 *53*.
User-Group	Select User or 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:

- 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**.
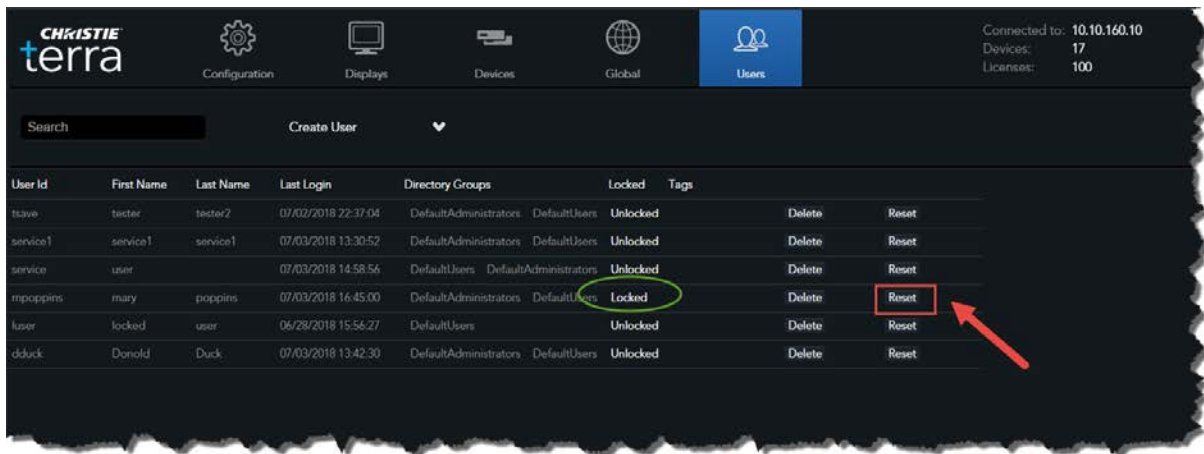
How to Unlock a User's Account

An account is locked when a user attempts to log in three 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.

Global Page

The Global page enables you to

- Configure Controller settings

- Enable and configure a redundant Controller

- Restart the Controller

- Shutdown/power off the Controller

- Update the Controller firmware

- Update the Transmitter and Receiver firmware

- Backup the system

- Restore the system

- Reset the configuration to factory settings

- Download logs

- Obtain and upload a software license key

- Configure external controller settings

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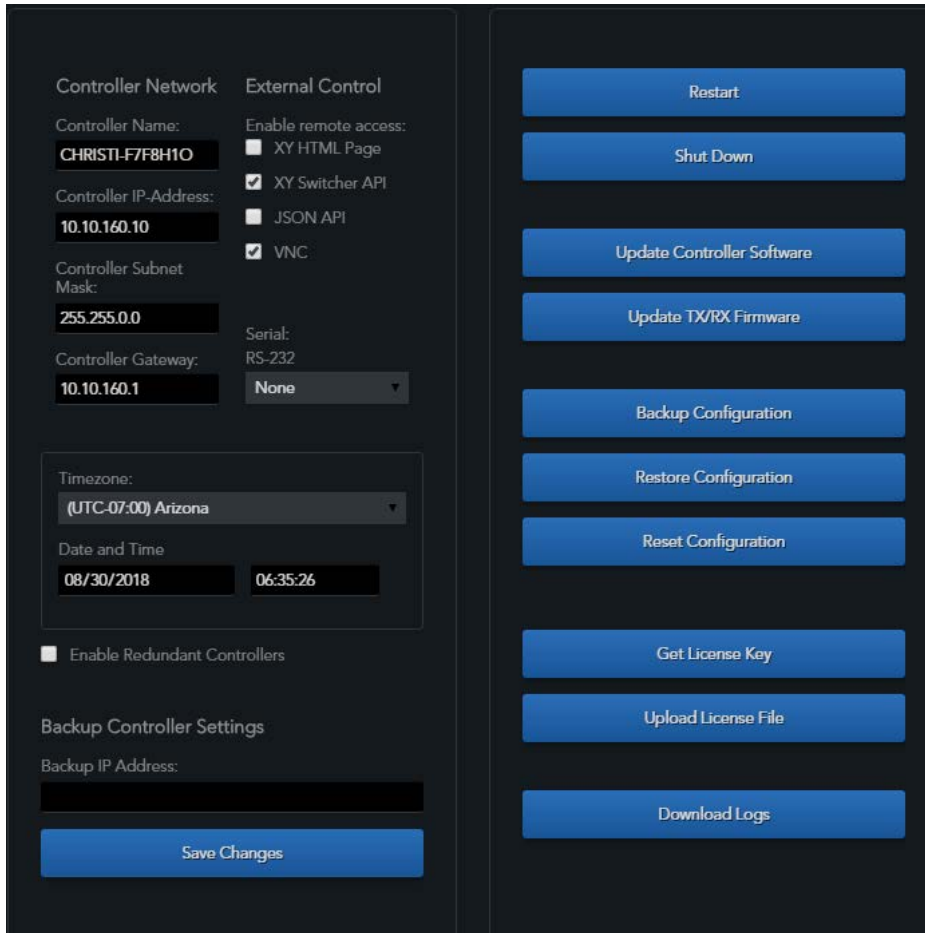
Configure Controller Settings

The Controller settings can be updated on the Global page.

> ℹ️ 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

Refer to *Configure a new Controller*, page *23*.

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.

Enable Stringent Security

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.

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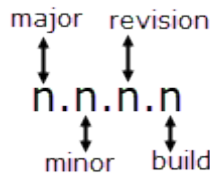
Major	Increases by one when new functionality is added.
Minor	Increases by one when enhancements to the functionality are added.
Revision	Incremented by one for every release including internal releases. This may result in gaps in the numbering for customer software releases.
Build	Internal software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

How to Update the Controller

What you need: A .ter file with the desired version of the software and/or firmware.

To update the system:

1. From the Global page, click **Update Controller Software** to browse to the desired .ter file.
2. Select the file and click **Open**.

3. When prompted, confirm the reboot. The system will begin the update process and will restart when completed.

4. When the update is complete, log in to connect to the Controller.

Update the TX/RX firmware

What you need: A .zip file with the desired version of the software and/or firmware.

To update the system:

1. From the Global page, click **Update TX/RX Firmware** to browse for the desired .zip file.
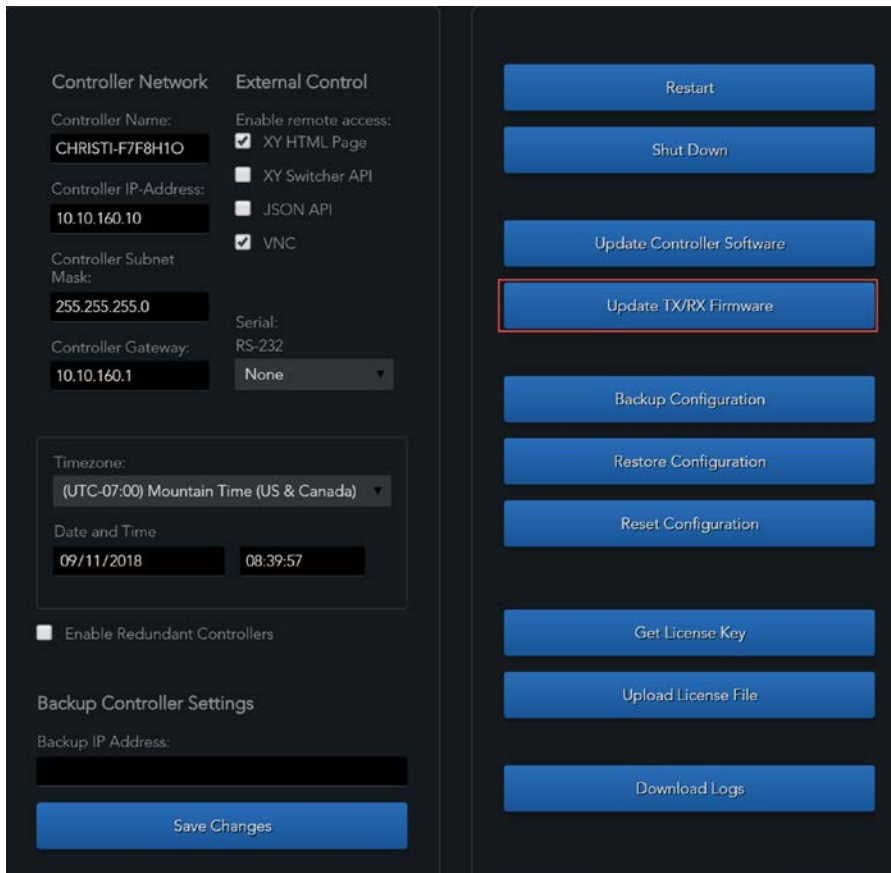
2. Select the file.

The Transmitters and Receivers are updated and restarted.

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.

How to Backup the System

To create a backup of your system:

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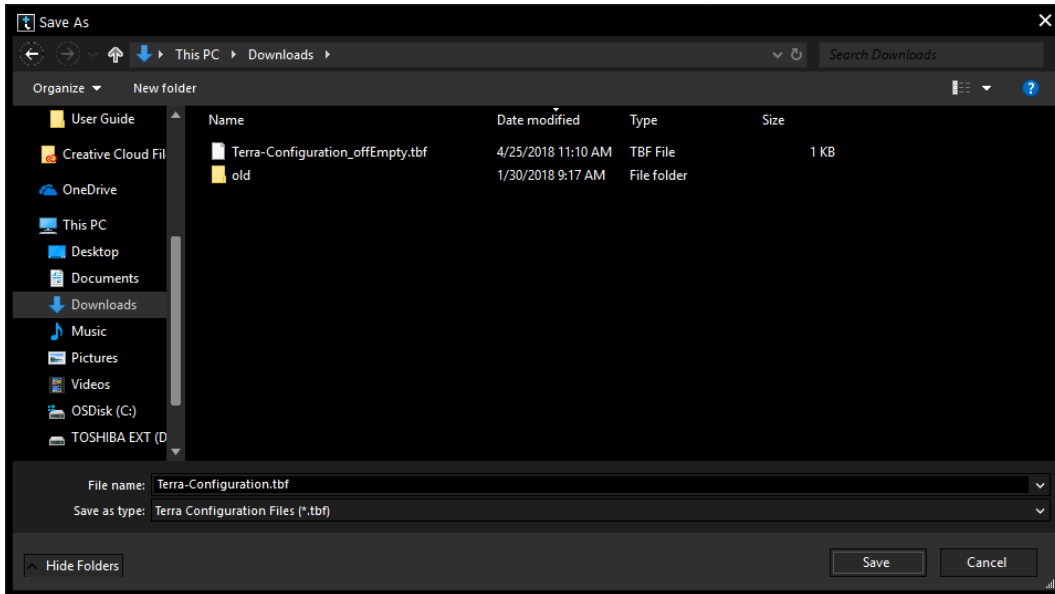
3. Browse to the location you want to store the backup file.
4. Type a file name. The file name defaults to Terra-Configuration.tbf.
5. Click **Save**.

Restore the System

You should restore your system when a problem occurs and the system needs to be restored to a restore point. 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 and restarts the Controller.

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 *58*.

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 in to Terra Manager software after the Controller restarts.

Reset Configuration

The Reset Configuration option 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 56); if that does not resolve your problem, perform a system restore (Restore the System, page 59).

The Reset Configuration process completely overwrites your current configuration settings for the following:

- Layouts
- User profiles
- Display arrays

The following configuration settings are not impacted by the Reset Configuration process:

- Device settings
- Controller settings

The Reset Configuration process 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 Configuration process. This option should not be performed when any configuration changes are being made.

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

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.
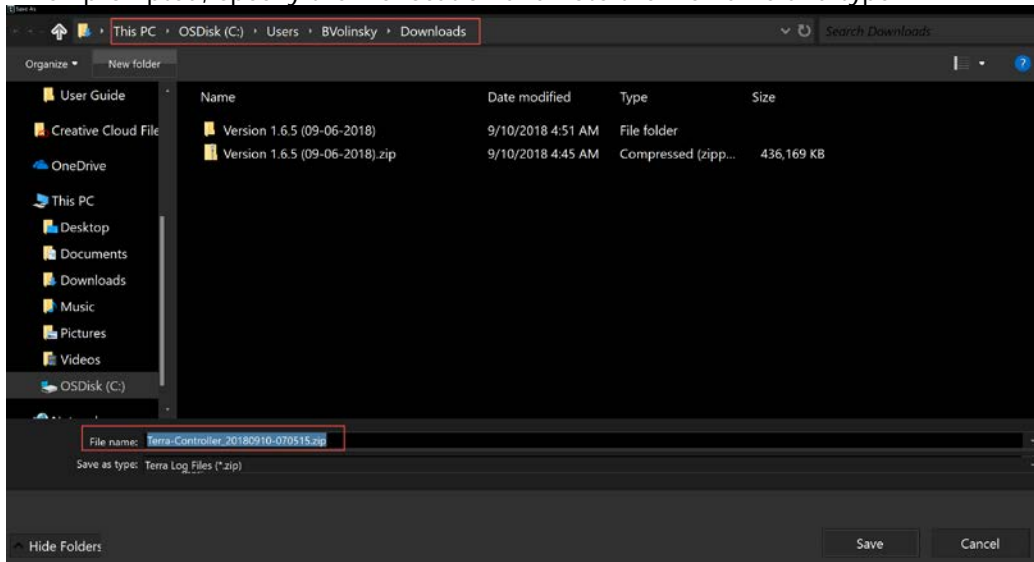
3. Click **Save**.

How to Activate a License Key

Controllers are shipped with a license 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.
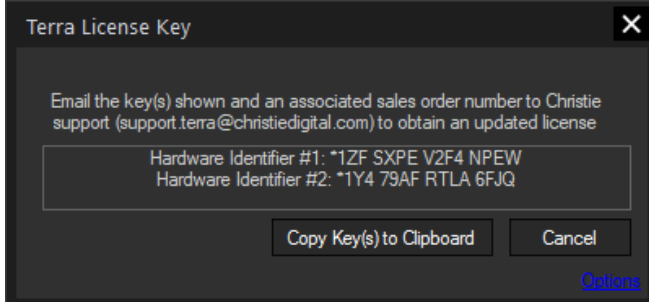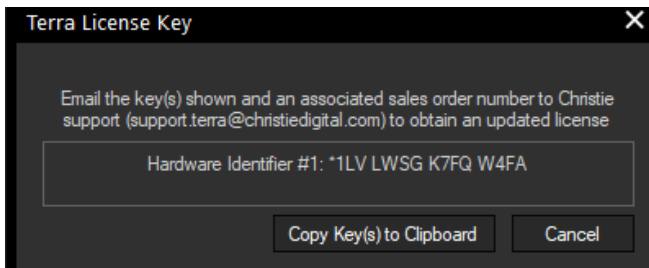
1. Navigate to the Global page.

2. Click **Get License Key**.
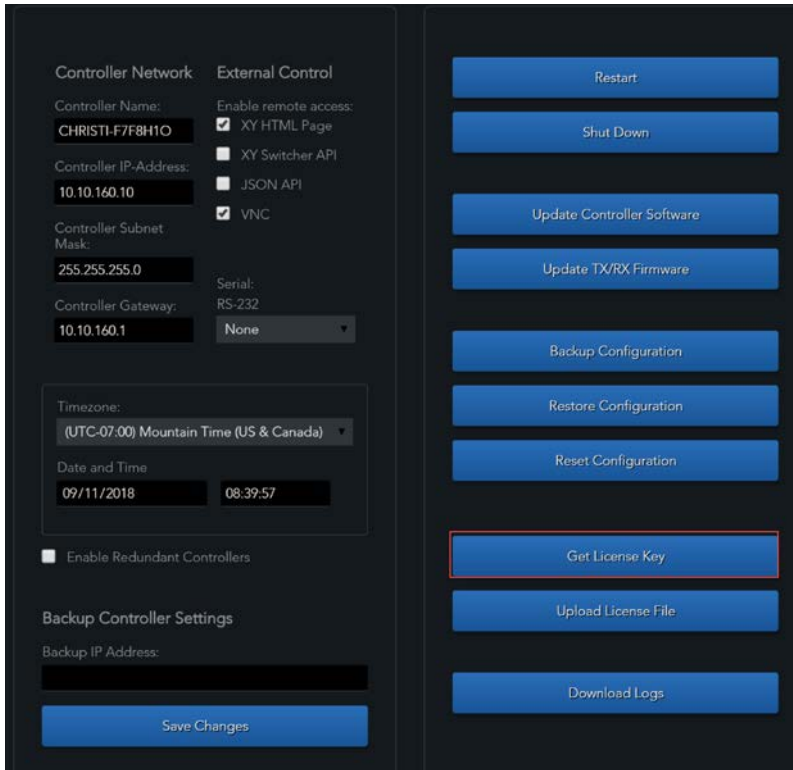
The key is generated.

ℹ️ 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 license file.

(two keys – one for the backup controller)

4. From the Terra Manager Global page, click **Upload License File** 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 by one or more of the following services:

- Terra XY Switcher web page
- Terra XY Switcher API commands
- Terra JSON API commands
- VNC remote sharing

The XY Switcher API commands and the JSON API commands can access 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 commands 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.

The following example shows access to Terra by the XY Switcher using TCP, the JSON API using the serial port, and no VNC access or XY HTML page access.
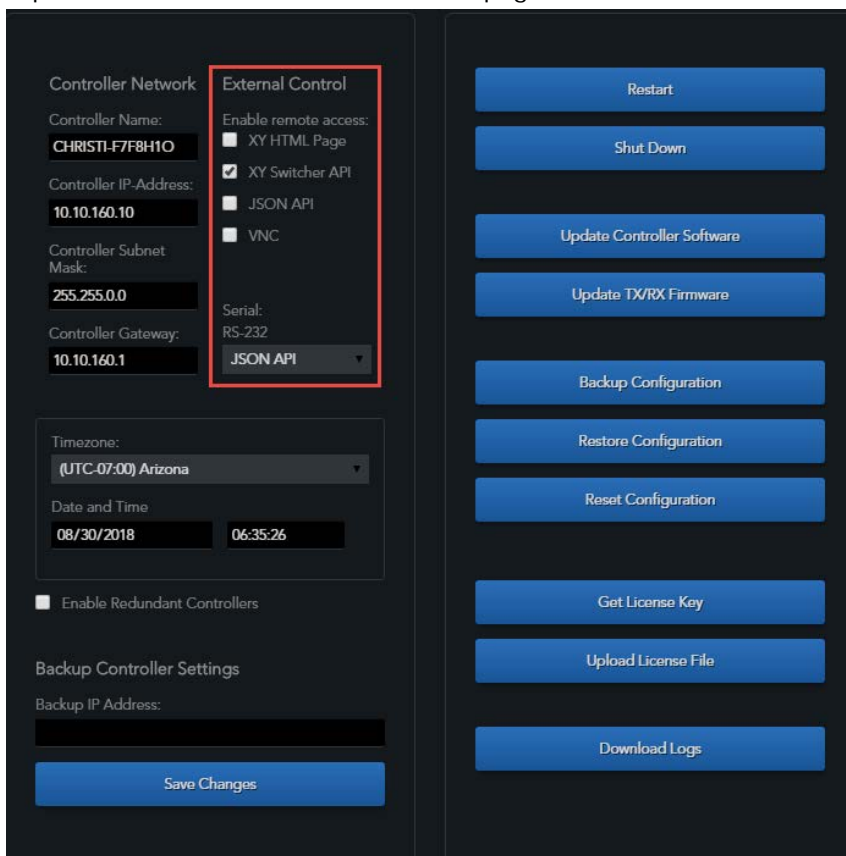
Addressing Guidelines

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. 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).

ℹ️ 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 *63*.

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.

Reference Information

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

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

Fast Switch Mode

- Fast Switch Mode is the default presentation mode in Terra.

- Source has to be progressive.

- RX output is always RGB 8 bit, regardless of the source being 8, 10, or 12 bits.
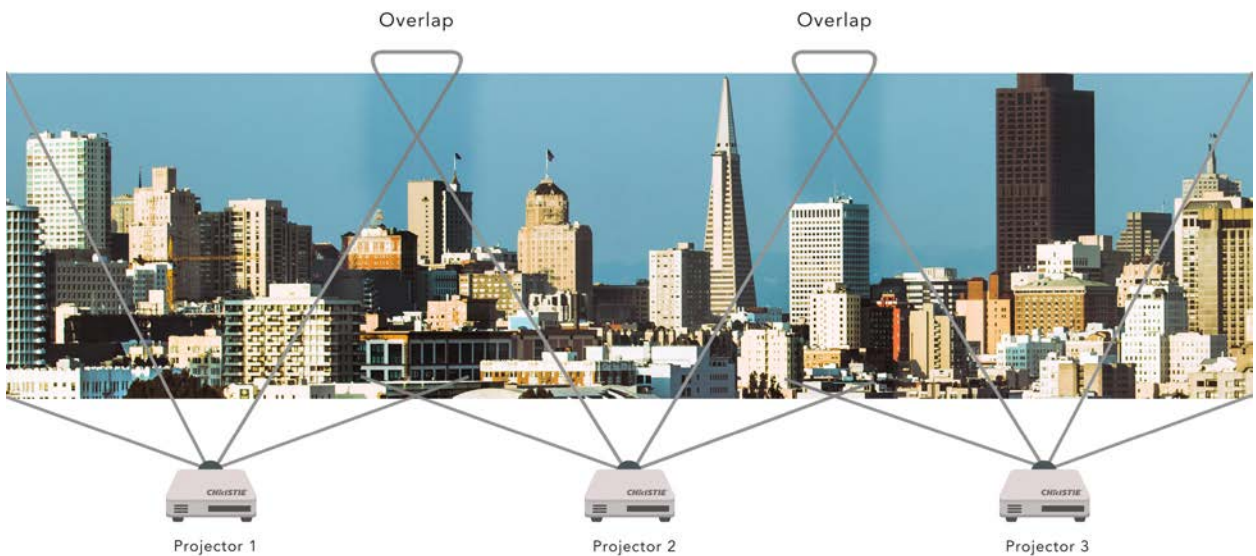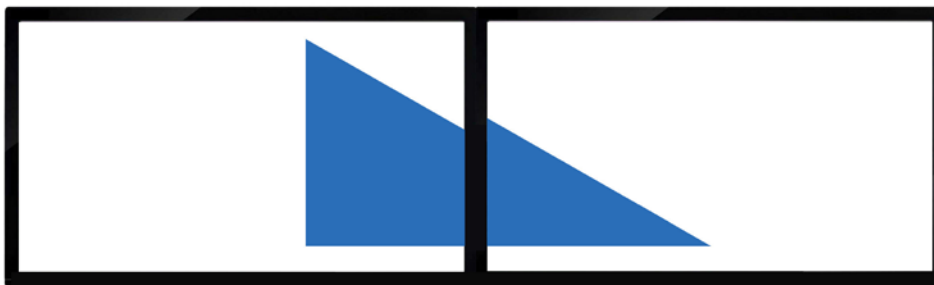
Videowall Modes

- Maximum size of videowalls:

    o 16x16 array if displays operate at HD / 2K resolutions

    o 8x8 array if 4K displays are used

    o 16x16 for HD resolution displays

    o Magnifications are integer 1x1, 2x2, 2x3, 2x4, 4x4... to various sizes. They can be anamorphically stretched (not uniform in H&V) 1x2, 2x3, 3x5.

- Genlock is the only mode available in 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 display device.

- Source has to 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 have to be the same and properly aligned without any physical gaps between displays.

Bezel Compensation

No Bezel Compensation

Overlap   Overlap

Projector 1   Projector 2   Projector 3

Delay in Wall Mode

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.

Multi-viewer Mode

- Limited to presenting 32 discrete sources

- The combined bandwidth of the downscaled sources on the display cannot exceed 8.5 Gbps.

- One 4K/60 source alone uses all the available bandwidth that a multiviewer requires. Only one 4K/60 source can be displayed alone in multiviewer mode.

- The smallest grid size for mulitviewers 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 has to 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 have to be the same and properly aligned without any physical gaps between displays.

Genlock Mode

- Referred to as Genlock mode because the display is genlocked to the source.

- 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.

Genlock Scaling Mode

Genlock scaling mode includes the low latency benefits of Genlock mode; but at the same time 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.

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 have to 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
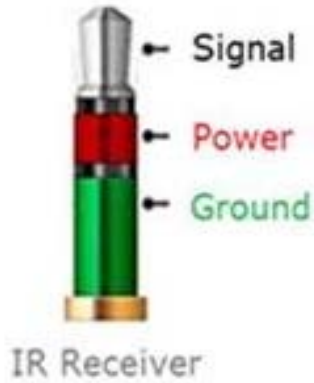
DC Mini Jack – left connector

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 infra-red 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.

Video Operating Modes

Operating Mode	Description	Re-sync or Seamless Transition	Transport Latency	Approximate Processing Latency
Genlock	Use for very low latency between the source and the display. Display genlocked to the source.	Re-sync	100 µs	0ms
Genlock scaling	Scaled output, genlocked to source	Re-sync	100 µs	3ms
Multiview	Used to receive video from multiple TX units. Scaled and buffered output	Seamless	100 µs	33ms
Videowall mode	Used when each RX in the videowall receives video from the same TX. Integer videowall magnification Each display updates at independent time.	Re-sync	100 µs	33ms

Audio Operating Modes

Operating Mode	Description	Audio Format Support
Genlock mode	Display genlocked to source	Format unchanged, including Dolby or MTS
Genlock scaling	Scaled output, genlocked to source	Stereo or LPCM formats only
Multi-viewer	Scaled and buffered output	Stereo or LPCM formats only
Videowall mode	Integer videowall magnification	Stereo or LPCM formats only

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
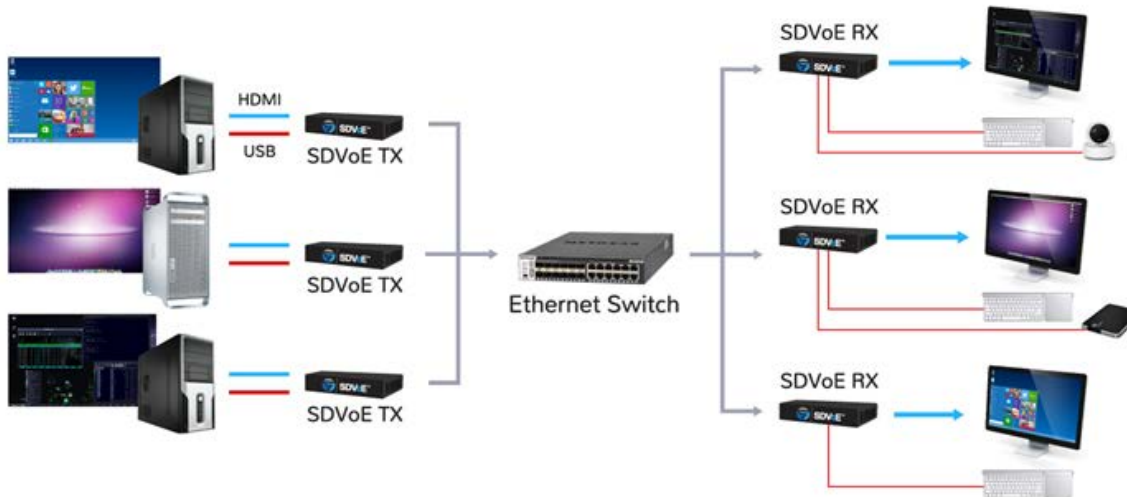

Application 2: AV Switching Solutions
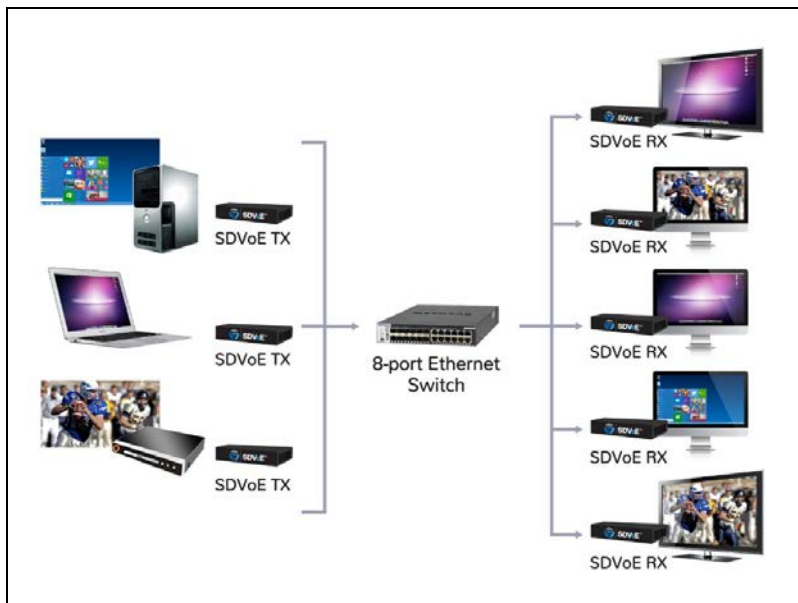
Application 3: KVM Switching Solutions

020-102838-03 Rev. 1 (09-2018)
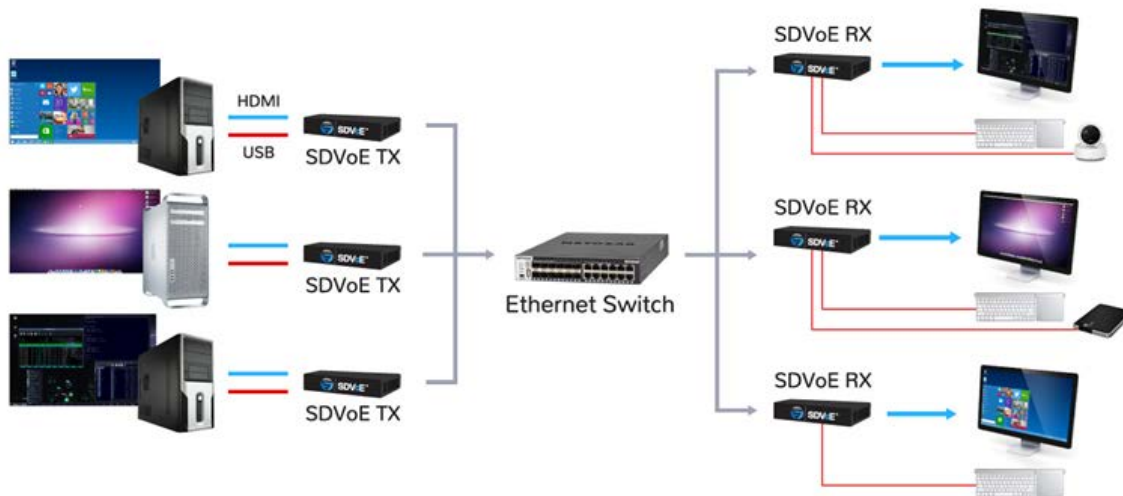
Application 4: Videowall
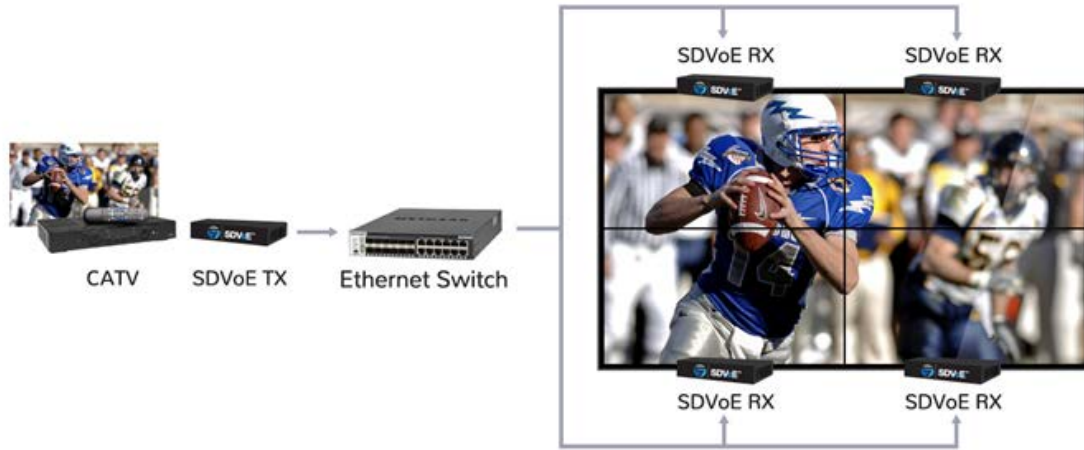
Application 5: Multi-Viewer

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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.
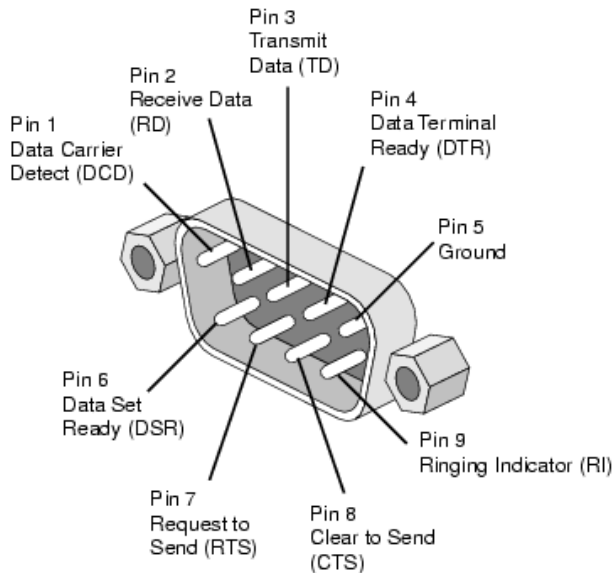
RS-232 Maximum Cable Length

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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