Matrox ConductIP

Installation and User Guide

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(Go to our *website* for the latest version)

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CHAPTER 1

Introduction

This chapter includes the following topics:

About Matrox ConductIP

Transitioning your equipment installation to IP does not have to be expensive or complicated. With Matrox® ConductIP, you can discover, monitor, and route any AMWA NMOS-enabled SMPTE ST 2110 or IPMX-ready device or signal. ConductIP is available as a web server-based application packaged in a small form factor appliance.

ConductIP gives you a real-time, comprehensive view of all media connections on your IP network while allowing you to organize devices based on your unique setup. Designed to simplify content distribution in AV networks of any size, ConductIP enables you to manage video, audio, and ancillary data streams, whether they come from native IP devices or are converted from your existing broadcast and ProAV equipment.

For more information about Matrox ConductIP, go to our *website*.

Matrox ConductIP terminology

This section provides short definitions of some of the terms commonly used in this documentation and in the ConductIP user interface. Whenever possible, our terminology attempts to be consistent with the official NMOS (Networked Media Open Specifications) terminology:

- **Devices:** These are physical devices on the network that are NMOS compliant, can be seen by ConductIP, and whose video/audio/ancillary data can be routed in the ConductIP user interface (e.g. Matrox ConvertIP devices).

  In ConductIP, devices are shown as rectangles (

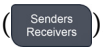
).

- **Groups:** These are groups of senders or receivers. A natural group, as defined by NMOS, includes all three types of streams (audio/video/ancillary data).

  In ConductIP, groups are shown as rectangles with rounded corners (

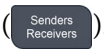
).

- **Senders (Tx):** A sender is an NMOS resource that transmits a single video, audio, or ancillary data stream to a receiver. For ConductIP, the term may also indicate a device or a group that contains several senders. In the Matrox ConductIP user interface and documentation, the abbreviation “Tx” may be used, depending on the context.

  In ConductIP, senders are shown as rectangles with two rounded corners (

).

- **Receivers (Rx):** A receiver is an NMOS resource that receives a single video, audio, or ancillary data stream from a sender. For ConductIP, the term may also indicate a device or a group that contains several receivers. In the Matrox ConductIP user interface and documentation, the abbreviation “Rx” may be used depending on the context.

  In ConductIP, receivers are shown as rectangles with two rounded corners (

).

- **Streams/flows:** Streams or flows are audio/video/ancillary data that pass from senders to receivers. In the Matrox ConductIP documentation, either term may be used depending on the topic’s context.

- **Rooms:** A ConductIP Administrator or Super operator creates rooms for operators. A room contains the groups, and optionally devices as well, that ConductIP users are allowed to route.
- **Panels:** These are where you connect the flows between senders and receivers.

Matrox ConductIP roles

There are three different types of ConductIP users:

Administrators: As a ConductIP Administrator, you have full rights and permissions over all aspects of the ConductIP.

Super operators: As a Super operator, you have the same rights that an Administrator has regarding Room and Panel management, but you do not have access to advanced configuration options such as registry or certificate configuration, user management, licensing, updating, etc.

Operators: As an operator, you can see the Rooms and Panels that are assigned to you, and make the required sender/receiver connections in the Panels page.

Matrox ConductIP user documentation

The Matrox ConductIP user documentation consists of the following:

Matrox ConductIP Device Setup sheet: This is a printed quick start sheet included with your ConductIP MRA (Media Routing Appliance). It describes the hardware connections and basic setup required to create an Administrator account and get you logged in to the ConductIP. This document is also available on our *website*.

Matrox ConductIP Installation and User Guide: This is the main documentation for the ConductIP and is accessible from the ConductIP user interface at any time. Please note that the version of the user guide included with the ConductIP software is only current at the time of the official release. The most up-to-date version of the user guide can always be found on our *website.*

Tooltips: In addition to the traditional documentation, the ConductIP user interface includes tooltips that provide immediate contextual information on various commands and settings. Mouse over most buttons in ConductIP for a short description of their function.

Guided user interface tours: The ConductIP user interface features guided tours, which offer a step-by-step overview of the key areas you will frequently use. These tours are particularly valuable for users who are new to the interface.

Supported web browsers

Matrox ConductIP currently supports Microsoft Edge, Google Chrome, and Mozilla Firefox (on Windows and macOS).

Other web browsers may work but have not been fully validated by Matrox Video.

About the Matrox ConductIP Media Routing Appliance

The Matrox ConductIP MRA (Media Routing Appliance) is a small form factor appliance that you connect to your network and then log in to using your web browser. If needed, you can also connect to it locally using a keyboard, mouse, and monitor for troubleshooting or debugging purposes (see *Logging in locally to the ConductIP MRA*).

Where to find more information

Matrox ConductIP MRA Device Setup: The setup sheet that is included in the box with your ConductIP MRA device provides all the information needed to get started with connecting it to your network and setting it up. The setup sheet is also available on the Matrox Video *website*.

Rackmount kit: If you want to secure the Matrox ConductIP MRA to a rack, please contact Matrox Video technical support for more information.

CHAPTER 2

Getting Started with Matrox ConductIP

This chapter includes the following topics:

Initial setup overview

The following list is an overview of the tasks you'll need to perform to get started with Matrox ConductIP. When needed, links to other topics are provided for more information.

Although this list is shown as a series of steps, you do not necessarily need to do all these tasks in the order described. For example, you could update your ConductIP before updating the security certificate and it would not impact your setup process. With other tasks, the order matters; such as connecting your hardware before logging in to the ConductIP software.

NOTE The ConductIP user interface features guided tours, which offer a step-by-step overview of the key areas you will frequently use. These tours are particularly valuable for users who are new to the interface.

To get started with Matrox ConductIP:

Step 1. **Verify your network:** Make sure your NMOS devices (such as your Matrox ConvertIP devices) are connected to your network.

Step 2. **Connect the Matrox ConductIP MRA to your network:** Matrox ConductIP is installed on a small form factor Media Routing Appliance (the ConductIP MRA) that you must connect to your network. When it is connected to your network, you can log in to it from your web browser, or you can physically connect to it using a monitor, keyboard, and mouse.

More info: This process is described in the *Matrox ConductIP MRA Device Setup* sheet that is included in the box with your device. You can also download it from the Matrox Video *website*.

Step 3. **Create an Administrator account:** When ConductIP is connected to your network, it will boot in DHCP and broadcast in mDNS, so you can connect to it from your web browser by typing *https://conductip* in the address bar or by typing the IP address (e.g. *https://192.168.12.345*). When you first log in to ConductIP, you will need to create the initial Administrator account.

More info: This process is described in the *Matrox ConductIP MRA Device Setup* sheet that is included in the box with your device (also available on the Matrox Video *website*).

Step 4. **Verify your date and time settings:** If you have not already done so in the basic setup when connected locally to the ConductIP MRA, you must verify the date and time settings now. Specify whether ConductIP uses an NTP time server (recommended), or set the time and date manually. If your date and time settings are not correct, you will not be able to activate your trial or full license.

More info: System

Step 5. **Review network and security best practices:** There are several best practices you should follow when setting up your ConductIP.

More info: Configuring your network and security

Step 6. **Activate your license:** Whether you already have a full license for ConductIP or want to activate the trial license, you will need to activate the license in ConductIP to begin using the software.

More info: Activating your ConductIP license

Step 7. **Update security certificate:** When you log in to ConductIP, you typically receive a warning that the security certificate is not valid. You can ignore this warning each time you log in, but it is better to update your computer certificate store to verify the ConductIP user interface and remove the warning.

More info: Managing ConductIP certificates

Step 8. **Specify your NMOS registry:** You need to specify which NMOS registry server ConductIP will use, as well as any redundancy servers if applicable. You can use ConductIP's internal registry server, or you may already have one available.

More info: Connecting to an NMOS registry server

Step 9. **Update Matrox ConductIP:** There may be a more recent firmware version available for your ConductIP from the Matrox Video website. It is recommended to always use the latest version. Ignore this step if you already have the latest version of ConductIP.

More info: Updating Matrox ConductIP

Step 10. **Confirm that your devices appear:** Whenever you log in to ConductIP, the available NMOS devices on your network will automatically appear in the device bin. If no devices appear, there may be a network issue that is interfering with ConductIP's scanning.

Step 11. **Create users:** As an Administrator, you will need to create user accounts for the ConductIP. You can create other Administrators, Super operators, and Operators. Each user type has specific permissions.

More info:

- *Matrox ConductIP roles*
- *Creating user accounts*
- *Creating user groups*

Step 12. **Create and configure your Rooms:** By default, a single Room is created for you when you first start with ConductIP. At minimum, you will need to rename and configure that room for your specific workflow. Depending on your needs, you may need to create more rooms for your users.

More info:

- *About the Matrox ConductIP User Interface*
- *Creating rooms*
- *Adding groups and devices to rooms*
- *Assigning users and user groups to rooms*

Step 13. **(Optional) Create your Panels:** The Panels page is where you make the connections between devices and set up your streaming workflow. This step is optional because ConductIP automatically creates a panel every time you cre-

ate a room. However, you can create other panels when needed or change the names of your panels to customize your workspace.

More info:

- *About the Matrox ConductIP User Interface*
- *Creating panels*
- *Connecting senders and receivers*
- *Creating connection presets (salvos)*

Step 14. **Export your database:** After you have configured your ConductIP, it is highly recommended that you export your database (i.e. back it up) so that you can easily re-configure your settings in the event an unexpected issue occurs. This can also help you configure other ConductIP setups if they are similar.

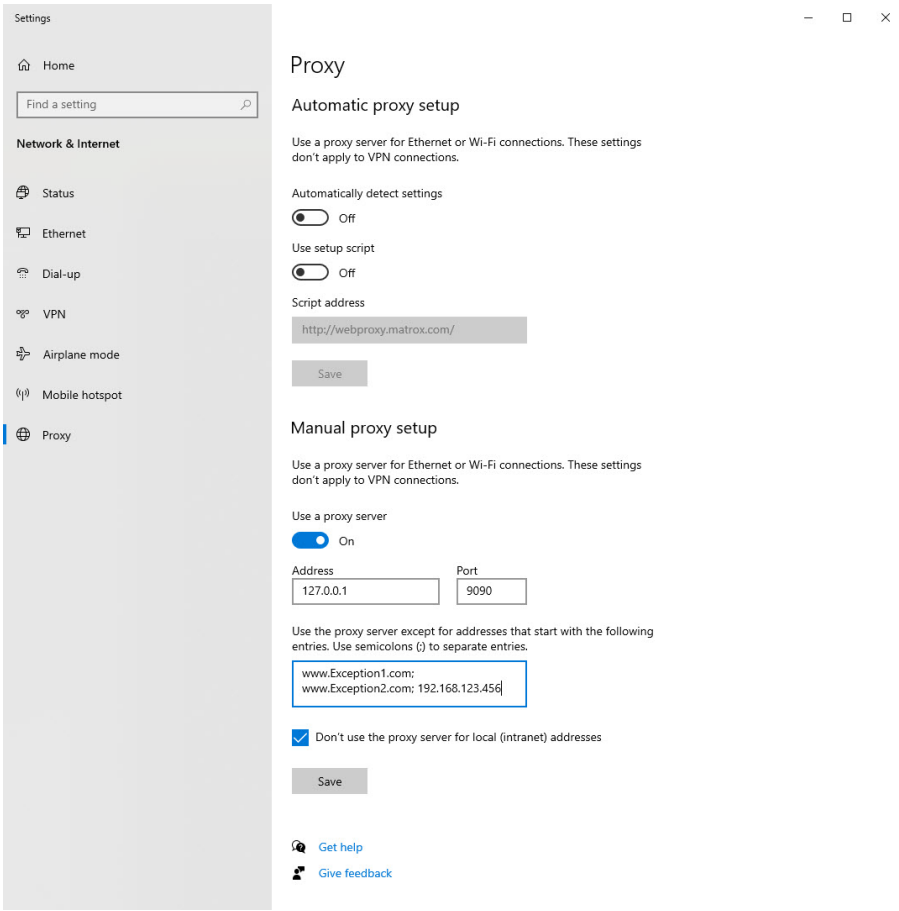
More info: Application

Result of this task: You are ready to use ConductIP. Any remaining tasks, such as customizing your workspace, can be done at your convenience.

Configuring your network and security

When you connect ConductIP to your network, it is recommended to follow these best practices to maintain optimal security:

- Make sure the ConductIP MRA is in a secure area that cannot be easily accessed by unauthorized personnel.
- If possible, install and use your own security certificate instead of the standard ConductIP certificate.
- Protect the ConductIP MRA BIOS with a secure password.
- If you want to use DNS-SD to detect the ConductIP registry, it must be added to the table of the DNS-SD server. The table entry must expose the service name "_nmos-register._tcp".
- If you are connecting via a proxy server, configure the Windows Proxy settings as follows (it is recommended to consult your network administrator for this step):



  - Turn off **Automatically detect settings**.
  - Turn on **Use a proxy server**.
  - Enter your company's proxy address and port.
  - Enter your list of exceptions, such as your company's website, IP subnet, etc.
  - Select **Don't use the proxy server for local (intranet) addresses**.

Finding Matrox ConductIP on your network

When Matrox ConductIP is connected to your network, it will boot up in DHCP mode and broadcast itself in mDNS (multicast DNS). This means that you can connect to it from your web browser by typing *https://conductip* in the address bar, or by typing the IP address (e.g. *https://192.168.12.345*). The mDNS capability ensures that the domain name is recognized.

If the mDNS address system does not work (e.g. if your computer does not have *Bonjour* or *Avahi* installed), you can always use the IP address to connect to ConductIP.

You can find the IP address as follows:

- **Connect an HDMI monitor:** If an HDMI monitor is connected to the ConductIP hardware when you turn it on, the IP address will be displayed on the monitor. This is the simplest way to find the IP address if you have a monitor available and have access to the ConductIP MRA.
- **Use Matrox ConvertIP Manager:** The *Matrox ConvertIP Manager* utility that is offered with the Matrox ConvertIP devices allows you to find any ConvertIP device on the network, as well as the ConductIP MRA if it is on the same subnet.

When you know the IP address of your ConductIP, you can bookmark it in your web browser for easier and quicker access.

Logging in to Matrox ConductIP

You can log in to ConductIP remotely from your web browser, or locally using a keyboard, mouse, and monitor connected to the ConductIP MRA.

Logging in to ConductIP remotely

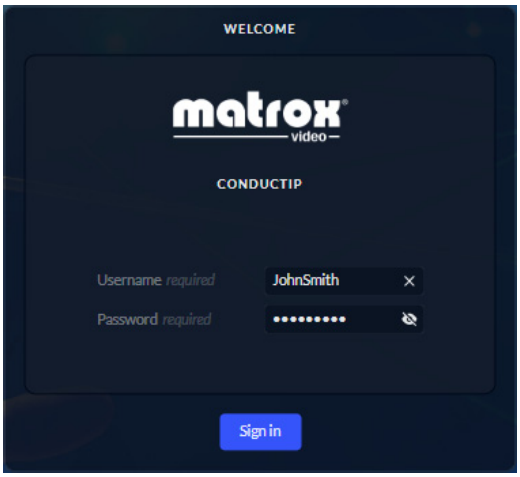
To access the ConductIP user interface from a web browser:

Step 1. Open your web browser (Google Chrome is recommended).

Step 2. Do one of the following:

- Go to *https://conductip*. If your computer is set up to use mDNS, this will take you to the ConductIP login page.
- Go to the IP address of your ConductIP MRA (e.g. *https://192.168.12.345*). If you don't know the IP address, see *Finding Matrox ConductIP on your network*.

Step 3. Log in to the ConductIP with your username and password.



More info: If this is the first time you are logging in to this ConductIP, you will instead be prompted to create an Administrator account so you can continue with initial setup. This process is described in the *Matrox ConductIP MRA Setup* sheet included with your ConductIP MRA, or you can download the setup sheet from our *website*.

More info: When you log in for the first time, ConductIP will guide you through its basic features to help you get started. You can watch the tour later or revisit it if needed (see *Guided tours*).

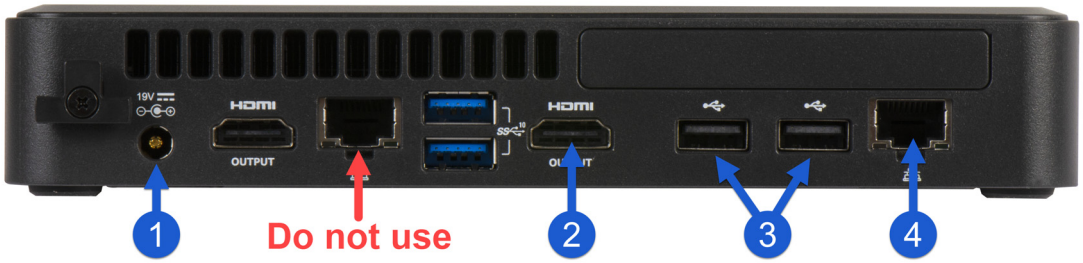
Result of this task: You are logged in to the ConductIP and you should see your Rooms and available devices.

Logging in locally to the ConductIP MRA

You can log in to the ConductIP MRA by connecting a monitor, keyboard, and mouse to the device and booting it up. Logging in locally is typically used for the following:

- Creating the Administrator account as part of the initial setup process. Although this is usually done by remote login, you have the option of doing it by logging in locally. For more information on this, see the *Matrox ConductIP MRA Setup* sheet included with your device, or download it from our *website.*
- Accessing the **Recovery Tools** for troubleshooting or technical support purposes.
- Finding the IP address of the ConductIP MRA. When the log in page appears, the IP address is shown on the bottom left of the screen.

To log in to the ConductIP MRA:



Step 1. Connect your power cable to the ConductIP MRA.

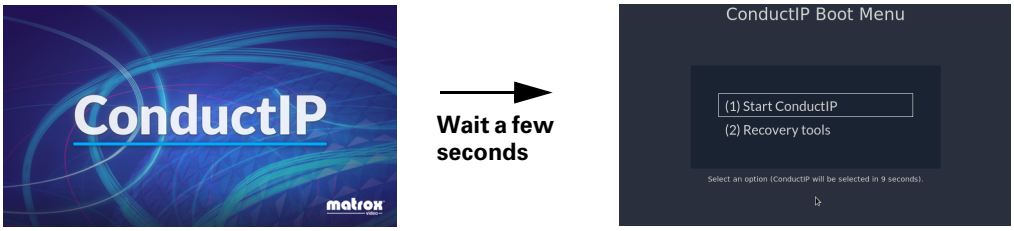
Step 2. Connect an HDMI monitor to the HDMI port.

Step 3. Connect a keyboard and mouse to any of the USB ports. The ports indicated above may be the most accessible.

Step 4. Connect the ConductIP MRA to your network via the LAN port on the far right. Do not use the central LAN port.

Step 5. Press the power button (⏻) on the front of the ConductIP MRA to turn it on.

When the ConductIP boots up you will see the initial splash screen. After a few seconds the **ConductIP Boot Menu** will appear.



Step 6. Select **ConductIP** to access the ConductIP user interface.

More info: **Recovery Tools** are intended for technical support purposes only. For more information, see *Using the Matrox ConductIP recovery application*.

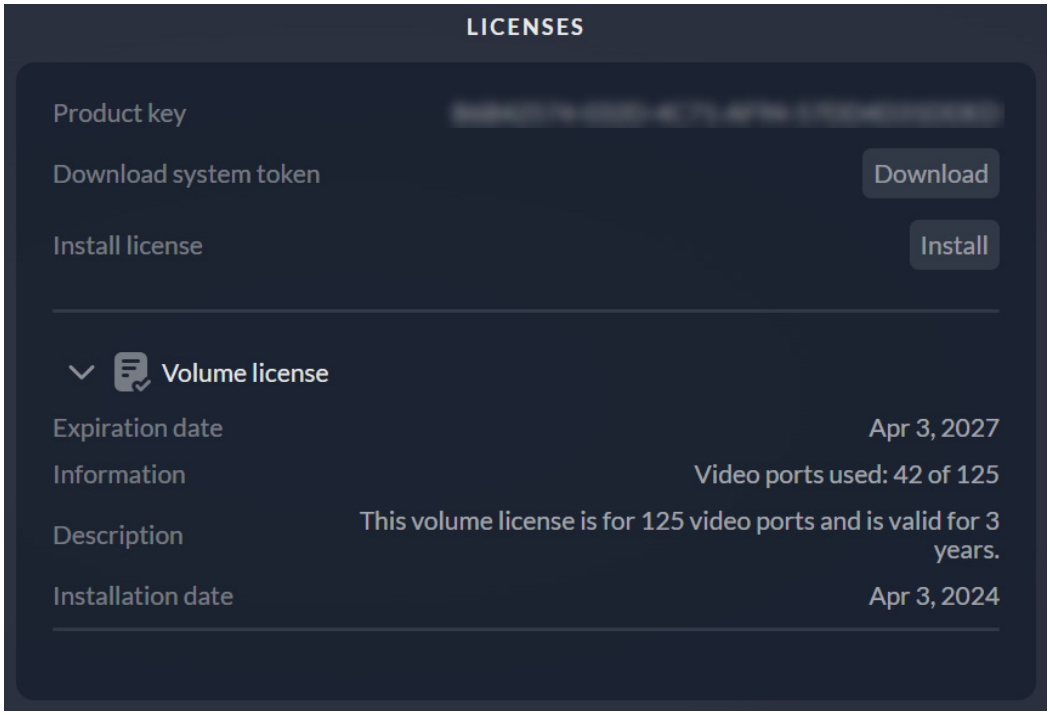
Step 7. Enter the user credentials to start a ConductIP session.

Result of this task: You are logged in to the ConductIP locally on the MRA.

Activating your ConductIP license

Activating your Matrox ConductIP license requires that you download a system token from the ConductIP **Licenses** page, and use that token to get a license file (*.lic*) from the Matrox Video website.

Step 1. Go to **Settings > Application > Licenses**.



Step 2. Click **Download** and save the file to your computer.

More info: Contact your Matrox Video reseller and specify the number of video ports and number of years you require for your license. Your reseller will use your system token to obtain the corresponding license file (*.lic*) you'll need to activate your license in ConductIP.

Step 3. When you have your license file, go to **Settings > Application > Licenses**, click **Install**, then select the license file you received.

Step 4. Click **OK** to install the new license.

Result of this task: Your Matrox ConductIP license has been activated.

Connecting to an NMOS registry server

Matrox ConductIP has an internal NMOS registry server that is enabled by default, but you can choose to use any NMOS registry server available on your network. For more information on the settings described in this section, go to *NMOS*.

Configuring the ConductIP NMOS registry

If you want to use the ConductIP internal NMOS registry, you must configure the following settings. For more information on any of these settings, see *NMOS*.

To configure the ConductIP NMOS registry:

Step 1. Go to **Settings > NMOS > Internal registry configuration.**

Step 2. Enable the **Matrox ConductIP registry**.

More info: If you disable the ConductIP registry, the remaining settings on this page will become unavailable.

Step 3. Make sure **mDNS advertisement** is enabled.

Step 4. Select the **Protocol** for the ConductIP registry (http or https).

More info: If you select https, you may need to configure your server certificates accordingly (see *Managing ConductIP certificates*).

Step 5. Select the **Priority** for the ConductIP registry.

More info: If you have several NMOS registry servers on your network (e.g. for redundancy), specify what priority you want the ConductIP NMOS registry to have relative to the other servers.

Step 6. Select the **Expiry interval** for the ConductIP registry.

Step 7. Click **Save**.

Result of this task: The ConductIP NMOS registry has been configured.

When done, remember: Make sure **Internal** is selected in **Settings > NMOS > Registry selection** or the ConductIP NMOS registry will not work even if you enabled it above (see *Selecting an NMOS registry*).

Selecting an NMOS registry

Whether you want to use the ConductIP NMOS registry or any other NMOS registry, you must specify which registry you want ConductIP to use. For more information on any of these settings, see *NMOS*.

To select an NMOS registry:

Step 1. Go to **Settings** > **NMOS** > **Registry selection**.

Step 2. Select one of the registry selection modes:

- **Internal:** Uses the internal ConductIP NMOS registry. You will need to configure the settings described in *Configuring the ConductIP NMOS registry*. This option is only available when the Matrox ConductIP registry is enabled.
- **Manual:** Uses a specific NMOS registry on your network. You will need to configure the corresponding settings. For more information on the settings, see *NMOS*.
- **Automatic:** Allows ConductIP to automatically select from available NMOS registries on the network. You will need to enter your search domain name. NMOS registries with DNS-SD advertisement will be prioritized before mDNS advertisement, with advertised priority (such as what you would select for the ConductIP NMOS registry) coming after that.

Step 3. Click **Save**.

Result of this task: You have selected the NMOS registry that ConductIP will use.

When done, remember: If an NMOS registry uses the https protocol, you may need to configure your server certificates accordingly (see *Managing ConductIP certificates*).

Managing ConductIP certificates

The Matrox ConductIP has a self-signed root certificate (root CA) that you can use to verify the secure connection between the ConductIP user interface and your client machine. If you don't want to use the default certificate, you have the option to specify a different one.

Downloading the root certificate

When you first log in to the ConductIP user interface, your browser will not recognize the ConductIP root certificate and display a security warning. You will need to accept the warning to continue. By downloading the root certificate and installing it in your browser, that security warning will no longer be displayed, as you have designated the ConductIP as a trusted secure connection.

For more information on any of these settings, go to *Security*.

To download the root certificate:

Step 1. Log in to ConductIP (see *Logging in to Matrox ConductIP*).

Step 2. Go to **Settings > Security > Server certificate**.

Step 3. Click **Download** and save the file to your computer.

Step 4. Install the root certificate in your web browser.

Step 5. Close your web browser.

More info: To use the root certificate in Mozilla Firefox, you must either enable Firefox to use the certificate in the Windows trusted store (type about:config in the URL and search for security.entreprise_roots.enabled) or install the certificate manually in the Firefox settings (Settings > Privacy & security > Certificates > View certificates > Import).

Step 6. Re-open your web browser and log in to the ConductIP user interface.

Result of this task: The security warning is not displayed when you log in to ConductIP.

Specifying a different certificate

If you don't want to use the ConductIP root certificate, you can upload a different one that ConductIP will use.

For more information on any of these settings, go to *Security*.

To install a server certificate:

Step 1. Log in to ConductIP (see *Logging in to Matrox ConductIP*).

Step 2. Go to **Settings > Security > Server certificate**.

Step 3. Click **Install** and follow the on-screen instructions.

More info: If your certificate includes an embedded private key, ConductIP will detect it and you can skip that step.

Step 4. After you have uploaded the certificate and the ConductIP has rebooted, click **Download** to use the certificate (see *Downloading the root certificate*).

Result of this task: ConductIP is now using your installed certificate as the root certificate.

Adding trusted certificates

ConductIP connects to NMOS devices on a network in non-encrypted http protocol. However, if you have an NMOS device (e.g. an NMOS secure registry) that is using https protocol, you may need a trusted security certificate to allow the connection. You can add the certificate to ConductIP.

For more information on any of these settings, go to *Security*.

To add a trusted certificate to ConductIP:

Step 1. Log in to ConductIP (see *Logging in to Matrox ConductIP*).

Step 2. Go to **Settings > Security > Trusted certificates**.

Step 3. Click **Add** and select the certificate file to upload.

Your certificate will appear in the list of certificates.

Step 4. (Optional) If you want ConductIP to ignore specific IP addresses or host-names, you can add them to the **Exceptions** list.

Example: If your certificate has expired and you do not want to renew it, add the device's IP address or hostname to this list and ConductIP will not verify the certificate for that device.

Step 5. (Optional) If you do not want ConductIP to verify any certificates on the net-work, click **Disable certificate validation**.

Example: If your secure NMOS registry has an expired certificate, you can temporarily disable certificate checking so you can continue working while resolving the issue.

Result of this task: You have added your trusted certificate(s) to ConductIP.

Updating Matrox ConductIP

Software updates will be made available on our website. We recommend that you visit the site periodically to check for new software versions.

To update your Matrox ConductIP:

Step 1. Download the latest update from our *website*.

Step 2. Log in to your ConductIP (see *Logging in to Matrox ConductIP*).

Step 3. Go to **Settings > Application > Software update**.

Step 4. Click **Update** and follow the on-screen instructions. Do not refresh or close the page while an update is in progress.

More info: The ConductIP MRA will reboot to complete the update.

Result of this task: The Matrox ConductIP has been updated.

CHAPTER 3

Managing Matrox ConductIP Users

This chapter includes the following topics:

Creating user accounts

As a Matrox ConductIP Administrator, it is up to you to create the required ConductIP Super operator and Operator user accounts. Each role has specific permissions and responsibilities. For more information on what each type of user can do in ConductIP, see *Matrox ConductIP roles*.

To create a new user:

Step 1. Go to the ConductIP *User management* settings.

Step 2. If you have access to an LDAP (Lightweight Directory Access Protocol) server, follow the steps below. If you are creating users manually, go to *Step 3.*

a. Go to the *LDAP service* settings.

b. If you know the user domain enter the information required, or scan for LDAP servers on the network and select **Use detected LDAP servers** for ConductIP to use them. The additional LDAP servers are listed.

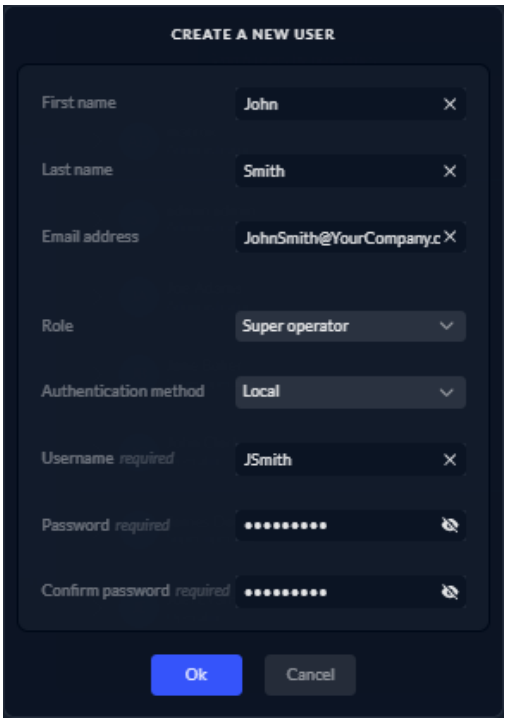
c. Click **Save**.

Step 3. Go to the *Users* settings.

More info: If this is the first time you are creating ConductIP users, your Administrator account (created at initial log in) will be the only account listed in the table. Otherwise, all the users with access to the ConductIP should be listed.

Step 4. Click **Add.**

The **Create a new user** window opens.



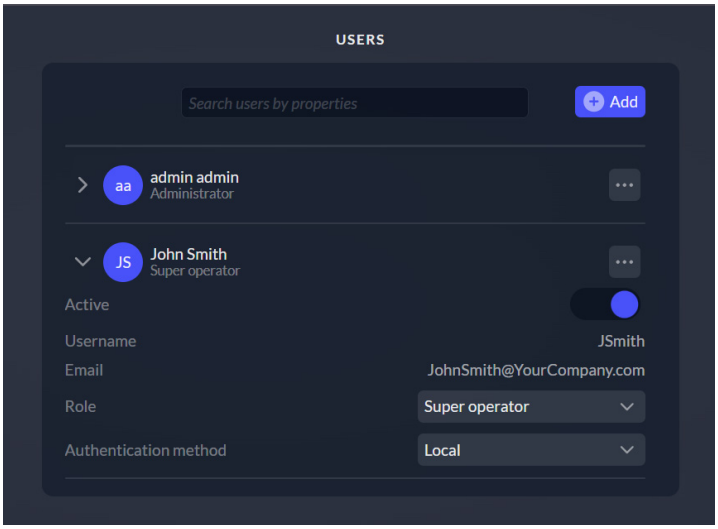
a. Enter the user's personal information.

b. Select the user's ConductIP **Role**.

c. Select the **LDAP** or **LOCAL** authentication method. If you select **LDAP**, enter the username that corresponds to the user's LDAP server (the LDAP server verifies the password). If you select **LOCAL**, provide a password for your new user.

d. Click **Ok**.

Step 5. Verify that your new user is on the list.



Result of this task: Your new user is created and has the credentials associated to their role.

When done, remember: With your users created, you can quickly activate/deactivate their accounts, edit their information, change their passwords, or choose which user groups they belong to from this list.

Creating user groups

User groups allow Administrators and Super operators to assign multiple users to a room simultaneously (see *Assigning users and user groups to rooms*). When you create a user, you will add them to either the Operator or Super Operator group, depending on their role. However, as a Matrox ConductIP Administrator, you can also group users together who will access the same rooms, regardless of their roles.

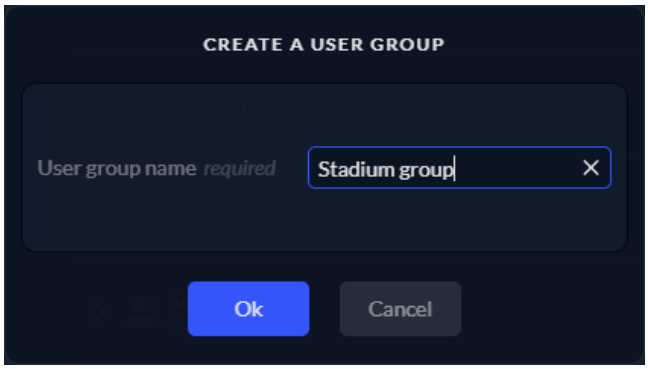
To create a new user group:

Step 1. Go to the ConductIP *User management* settings.

Step 2. Go to the *User groups* settings.

Step 3. Click **Add**.

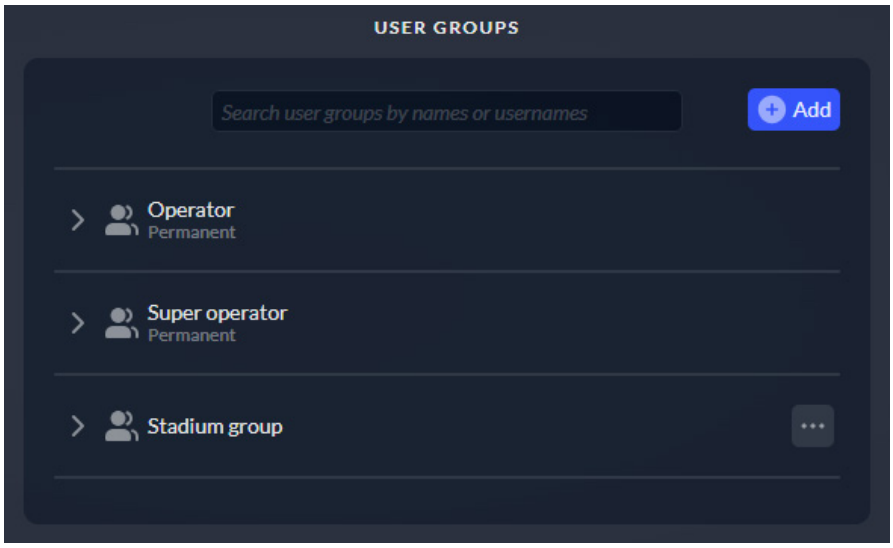
The **Create a user group** window opens.



a. Enter a user group name.

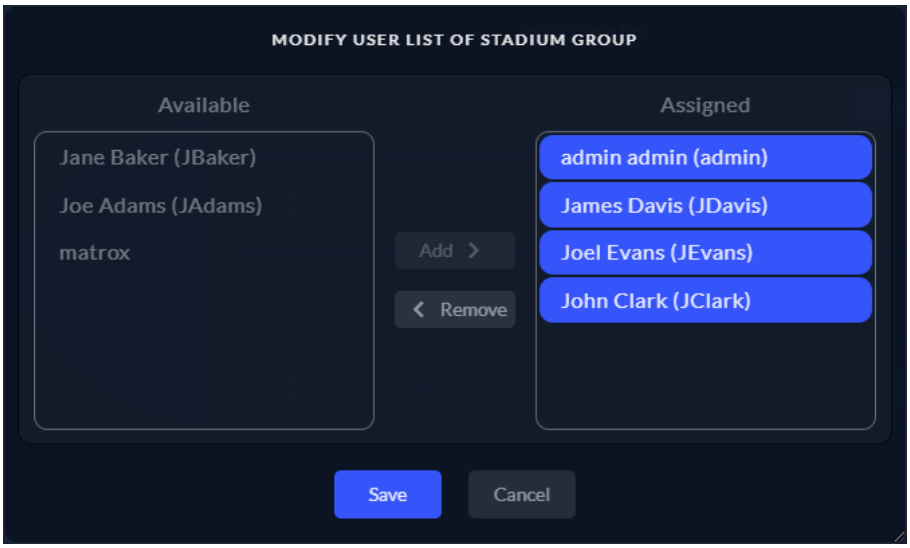
b. Click **Ok**.

Step 4. Verify that your new group is on the list.



Step 5. Click the more options menu (⋯) and select **Edit users list**.

The **Modify user list** window opens.

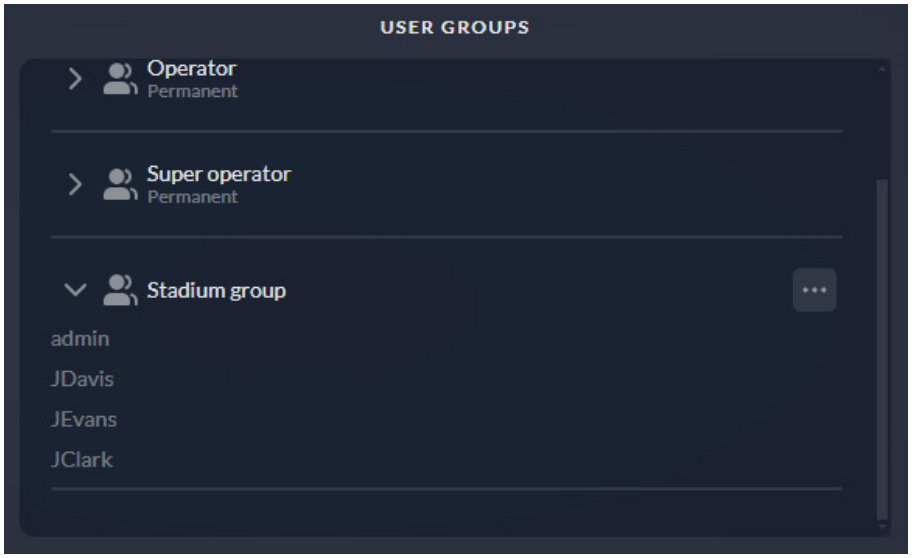


a. Hold the Ctrl key and select users in the **Available** list.

b. Click **Add >** to move users to the **Assigned** list.

c. Click **Save**.

Step 6. Verify that the users are in the user group.



Result of this task: Your new user group is created and it includes the users you selected.

When done, remember: With your user group created, from this list you can edit the group name, modify the list of users included in the group, or delete the group.

Assigning users and user groups to rooms

As a Matrox ConductIP Administrator, you will be able to see all the rooms that were created on your ConductIP. Other users will only have access to the rooms they are authorized to manipulate. You can assign authorized users to a room as individuals or as part of a user group.

Both Administrators and Super operators can assign users to rooms. However, Super operators can only assign users to the rooms they themselves are authorized to use.

To assign users to a room:

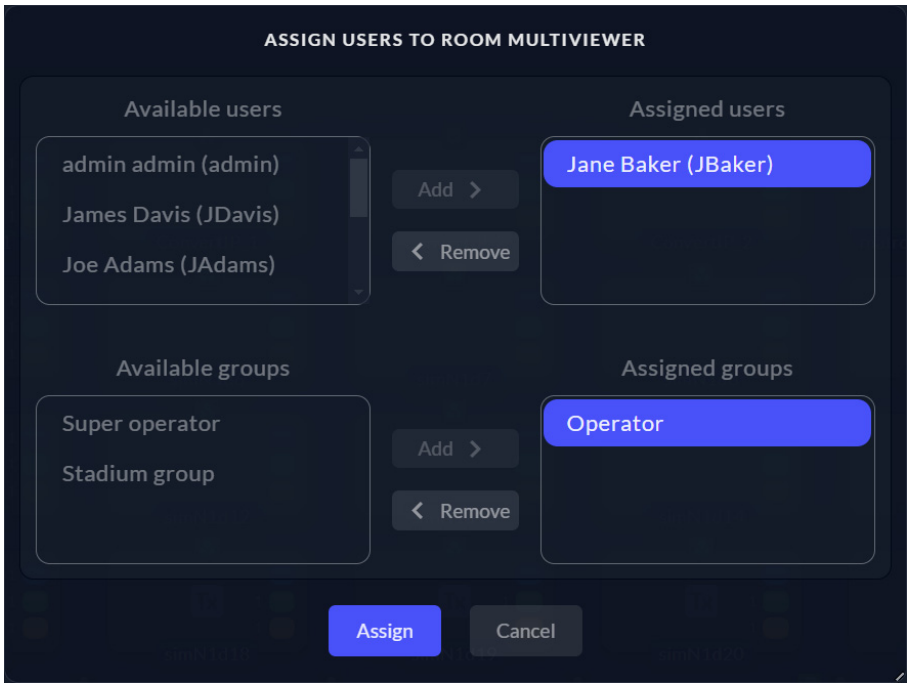
Step 1. Go to the ConductIP **Rooms** page.

Step 2. Click on a room

Step 3. Click (•••) directly above the Rooms list.

Step 4. Click **Assign users**.

The **Assign users to room** window opens.



a. Hold the **Ctrl** key and select groups in the **Available groups** list.

b. Click **Add >** to move the user groups to the **Assigned groups** list.
You can also double-click a group in the **Available groups** list to move it to the **Assigned groups** list. To remove groups from the room, select them in the **Assigned groups** list and click **< Remove**.

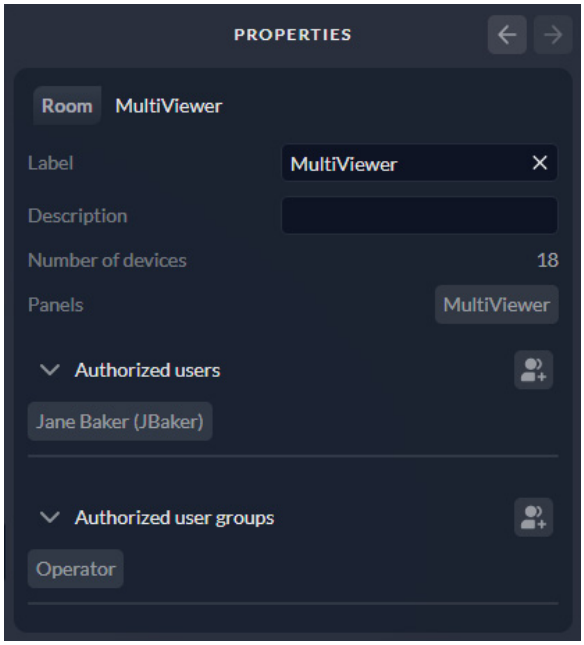
c. Hold the **Ctrl** key and select individual users in the **Available users** list.
You only need to select users who are not included in the groups that were assigned.

d. Click **Add >** to move the users to the **Assigned users** list.
You can also double-click a user in the Available users list to move it to the

Assigned users list. The user who creates a room is assigned to it by default. To remove users from the room, select them in the **Assigned users** list and click **< Remove**.

e. Click **Assign**.

Step 5. In the **Properties** panel, verify that the authorized users and groups are assigned to the room.



Result of this task: Authorized users and user groups are assigned to the selected room.

When done, remember: Only the users and user groups you have assigned to the room will be able to see that room. You can modify the list of authorized users and groups at any time.

CHAPTER 4

Using Matrox ConductIP

This chapter includes the following topics:

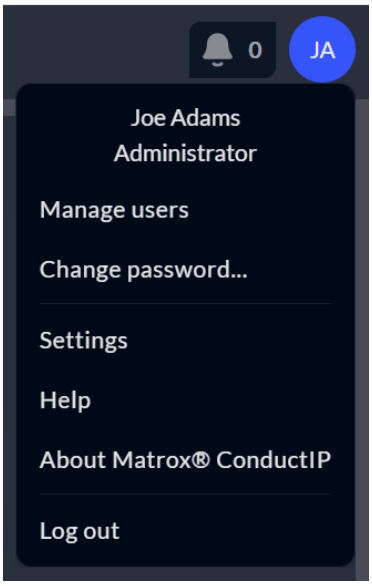
About the Matrox ConductIP User Interface

You control and configure the Matrox ConductIP via a web-based user interface that you access through a web browser.

Here are some quick concepts to understand about the user interface:

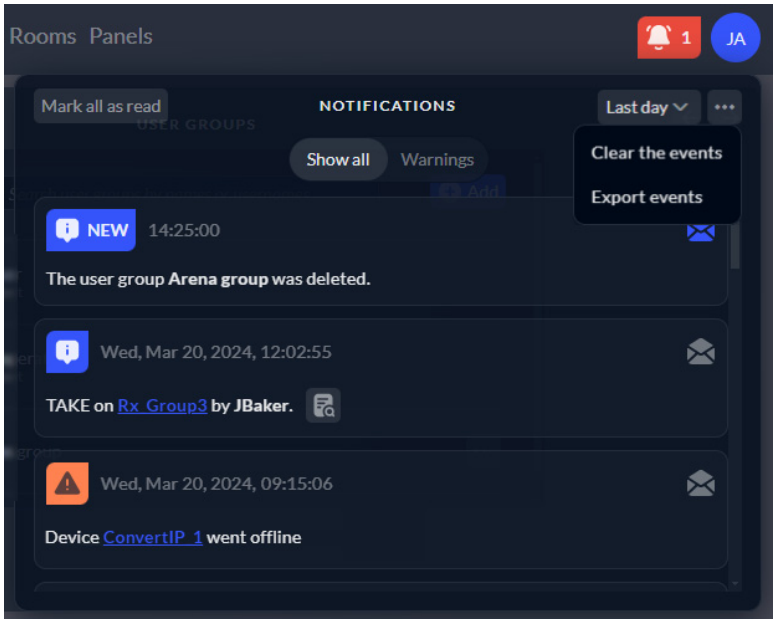
- The user interface is split into two main work areas: **Rooms** (see *About Rooms*) and **Panels** (see *About Panels*).
- There are three types of users for ConductIP: *Administrators*, *Super operators*, and *Operators*. Each type of user has different responsibilities and tasks which will be discussed in later sections.
- As a browser-based user interface, ConductIP can be used on many different operating systems and devices. However, there are certain requirements that you should be aware of before you begin using ConductIP (see *Supported web browsers*).

ConductIP's notifications log and main menu are at the top-right. From the main menu you can access information about the ConductIP as well as general functions, depending on your role.



The **Notifications** panel logs any events that have occurred (e.g. deleted rooms, lost connections, etc). Events can be filtered by time period or by their warning status. New notifications are those that have happened since the last time the log was checked. When details are available, click ( ) to see them in the Properties panel.

From the options menu (•••), you can export the events log to use for troubleshooting. Events are exported based on the applied filters.



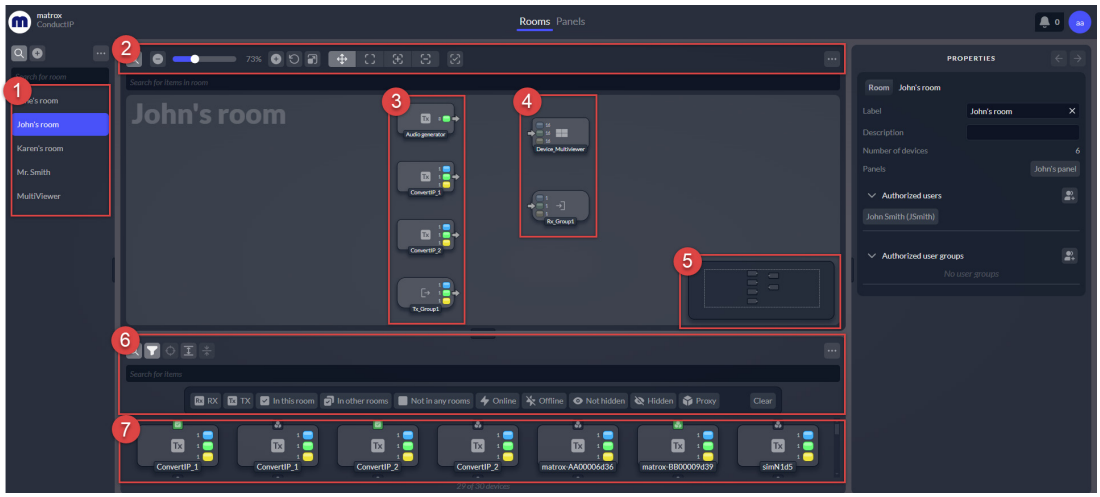
About Rooms

Matrox ConductIP uses the concept of a “room” to show the senders and receivers that can be manipulated by users. Administrators and Super operators can create, edit, and delete rooms, and populate those rooms with devices and groups of senders and receivers. They can also assign the users and user groups that will manipulate items in the room.

ConductIP rooms do not necessarily represent physical places in the real world. They are simply a way of grouping senders and receivers together for an operator. A room’s devices and groups of senders and receivers can literally be in the same room (such as a server room), or they could be miles apart in completely different locations.

For example, to illustrate how this concept works, here is a **Rooms** page called *John’s room* that contains a variety of devices and groups:

Image A. John's Rooms page



1. These are the rooms that Administrators or Super operators have created for this ConductIP. Although all the rooms are visible, for the purposes of this example, we will assume that John will only manipulate his own room and the resources in it.
2. These options allow John to change the view of the items in the room (e.g. zoom, scale to fit, etc), and to change the behavior of his mouse when selecting items (e.g. grab, select all, etc).

   From the options menu on the right (**...**), John can reorganize some or all items in the room, edit a selected item's properties or delete it, or show/hide the selection tools or minimap.
3. These are the senders available to John. There are three (3) sender devices (*Audio generator*, *ConvertIP_1*, *ConvertIP_2*), and one (1) sender group (*Tx_Group1*).
4. These are the receivers available to John. There is one (1) receiver device (*Device_Multiviewer*) and one (1) receiver group (*Rx_Group1*).
5. The minimap gives John an overall view of the room. He can draw an outline in the minimap or click and drag the dotted outline to focus on specific devices, or quickly identify issues when they flash in red.
6. These options allow John to customize the view of the device bin, locate a specific item in the room, and filter on the items that he wants to see. From the submenu (···), John has additional options for manipulating the items in the device bin.

   By mousing over any individual item in the device bin, more options become available. The options that appear depend on the type of item. Tooltips are provided to describe what each option does.

7. This is the device bin. All the devices and sender/receiver groups that are visible on the network are shown here. Administrators and Super operators can drag and drop the ones they want to include in John's room.

John's room is essentially a visual representation of John's ConductIP workspace. He can quickly see which senders and receivers are connected and if the connections are working (in the image above, no connections have yet been made from the **Panels** page).

Now that John's room has been set up by the Administrator or Super operator, some of the things he can do in the room are:

- Search for and view the details of other rooms. For example, John can see what's happening in Jane's room.
- Search for and view the devices and sender/receiver groups on the network. From the device bin, John can see all the network NMOS resources visible to the ConductIP. He does not have permission to add them to his room but he can see them.
- View the connection status of the senders and receivers in his room. This is the main function of the **Rooms** page.
- Arrange the senders and receivers as needed for a better visual representation of the actual workspace. For example, in the image of *John's Rooms page* above, senders are positioned on the left and the receivers on the right. John can re-arrange these as desired.
- The right side of the **Rooms** page consists of the Properties panel, where John can view information about the room and the items in the room. Administrators and Super operators can edit properties in the panel.

John is now ready to make the needed connections in the **Panels** page (see *About Panels*).

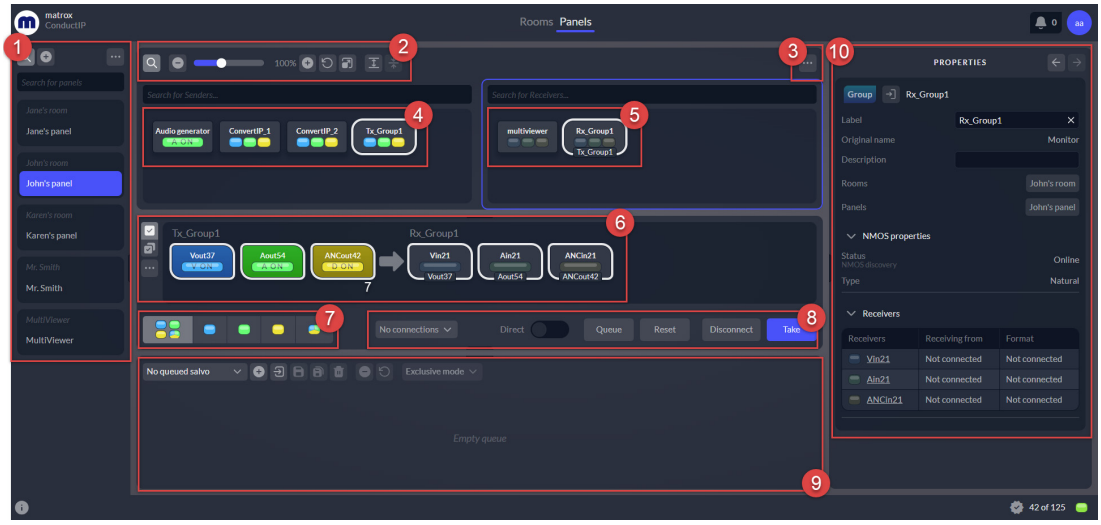
About Panels

The Matrox ConductIP **Panels** page is where you make the connections between your senders and receivers. You can think of this as a virtual switchboard that allows connections between any available senders and receivers (devices, groups, or individual senders/receivers).

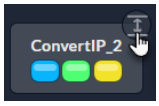
Before you can make connections from the **Panels** page, you must have a room created and populated with senders and receivers (see *About Rooms*). After the Administrator or Super operator has created and populated the room, you have several different ways to connect senders and receivers (see *Connecting senders and receivers*).

To continue with the example of John's room from the *About Rooms* topic, this is the **Panels** page that John sees, based on the room that was created for him.

Image B. John's Panels page (Side-by-side mode)



1. John can search for a specific panel. If John were an Administrator or Super operator, he would have additional options. Tooltips are provided to describe each option.
2. John can search for senders and receivers, and adjust the view of the page (e.g. zoom in/out, scale to fit, etc). John can also expand or collapse devices and groups as needed to access individual flows.
   - Click ↕ once to expand all *devices*. Click ↓↑ to collapse them.
   - Click ↕ twice to expand all *groups*. Click ↓↑ once to collapse back to devices, or twice to collapse all groups and devices.
   - Mouse over any individual device or group to expand or collapse it. It will take a second for the expand/collapse icon to appear.



3. John can view senders and receivers in **Matrix mode** or **Side-by-side mode**. Depending on the number of senders and receivers available, one mode may be easier than another to help visualize and make the connections (see *Connecting senders and receivers*). In this example, John is using **Side-by-side mode**, but he can switch between modes at any time as needed (see *Panel viewing options*).
4. These are John's available senders (*Tx_Group1* is selected).
5. These are John's available receivers (*Rx_Group1* is selected).
6. The subpanel is where John makes the connections between senders and receivers. In this subpanel, *Tx_Group1* will be connected to *Rx_Group1*. John can also choose how to select senders and receivers (**Multi-select mode** or **Single-select mode**). For more information on connections, see *Connecting senders and receivers*.
7. John can filter the senders/receivers by type of flow:
   - () Shows senders/receivers with all flows.
   - () Shows senders/receivers with Video only.
   - () Shows senders/receivers with Audio only.

- – () Shows senders/receivers with Data only (ancillary data).
- – () Shows senders/receivers with video, audio, and ancillary data mixed together in a single flow (i.e. muxed or multiplexed).

8. This is the connection toolbar. When John selects his senders and receivers, this is where he makes the connections (i.e. he “takes” the sender data he wants). For more information on connections, see *Connecting senders and receivers*.
9. The Salvos panel lets John manage device connection presets. For more information, see *Creating connection presets (salvos)*.
10. The Properties panel lets John see the status of whatever he clicks on in the main page (e.g. room, device, group, etc).

Creating rooms

Matrox ConductIP Administrators and/or Super operators must create rooms for their Operators. A single room is available by default when you initially start Matrox ConductIP. A room contains the individual senders and receivers, or groups of senders and receivers, that authorized users can route in the **Panels** page (see *Connecting senders and receivers*).

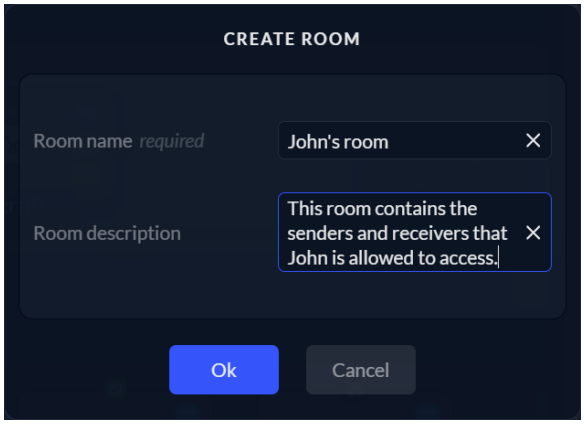
For more information about ConductIP **Rooms** and how they are used, see *About Rooms*.

To create a room:

Step 1. Go to the ConductIP **Rooms** page.

Step 2. Click the **Create room** button (⊕).

Step 3. In the **Create room** window, enter the information for the room.



Step 4. Click **Ok**.

Result of this task: Your new room is created and will appear in the list of rooms.

Additional room options

Administrators and Super operators have additional room options. From the ConductIP **Rooms** page, click on a room and then click (•••) directly above the Rooms list.

- **Edit** (✎): Edit the selected room's name and/or description.
- **Assign users** (👤+): Assign users and user groups to a room (see *Assigning users and user groups to rooms*).
- **Duplicate** (⧉): Quickly create a new room with the same senders and receivers in it (i.e. clone a room).
- **Delete** (🗑): Delete the selected room.
- **Show my rooms**: (Administrators only) See only the rooms that are assigned to them in the Rooms list.

Adding non-NMOS senders to ConductIP

You can add non-NMOS senders to ConductIP using a dummy NMOS device as a proxy. This proxy implements the essential features to be compatible with NMOS, but it provides the SDP data of the non-NMOS sender.

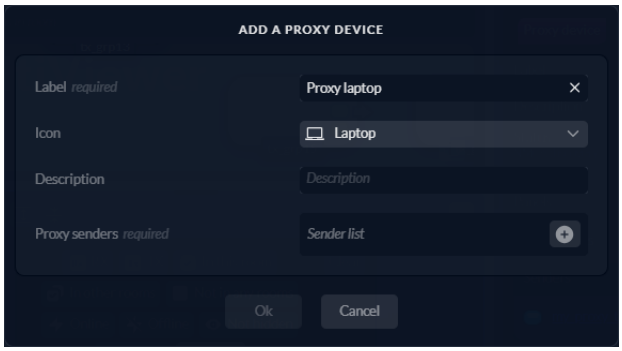
Each proxy device can host multiple proxy senders. When creating a proxy sender, you must provide the SDP data of the non-NMOS device. The proxy device and its senders do not communicate with the non-NMOS devices.

NOTE Proxy senders must have valid SDP data. If you modify the configuration of the non-NMOS device, you must also update the SDP data in the proxy sender.

To create a proxy device:

Step 1. In the Device bin, click (•••) and select **Add proxy device**.

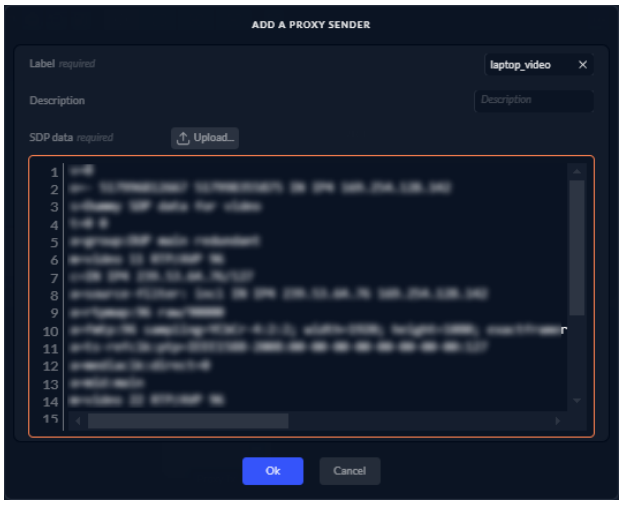
Step 2. In the **Add a proxy device** window, enter a label and description for the device, and select an icon.



Step 3. Click the **Add a proxy sender** button (⊕).

Step 4. In the **Add a proxy sender** window, enter a label for the sender.

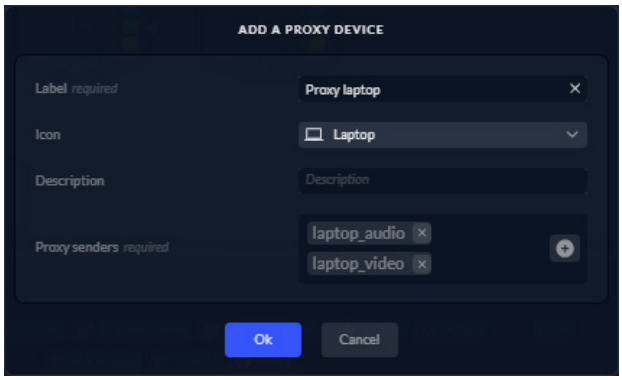
Step 5. Click **Upload** to add a SDP data file. Alternatively, cut and paste the SDP data into the text box.



Step 6. Click **Ok**. The sender is added to the sender list.

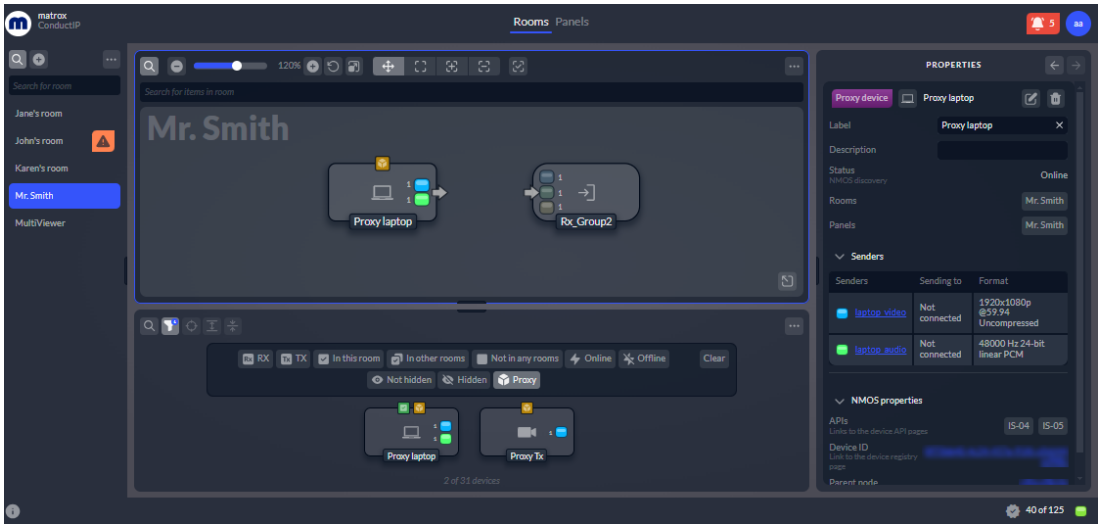
Step 7. Add other proxy senders to the device as needed.

Step 8. Once all senders have been added, click **Ok**.



Result of this task: Your new proxy device is created.

When done, remember: Once you've created your proxy devices, you can use the Proxy filter in the Device bin to quickly locate them. To access modification or removal options, mouse over a device. You can edit the proxy device information, including the SDP data, in the Properties panel.



Adding groups and devices to rooms

After creating a room, Administrators and Super operators must add sender and receiver groups and devices to the room so that Operators can perform their routing tasks. The sender/receiver groups and devices are available from the device bin.

To add a device or group to the room:

Step 1. Go to the ConductIP **Rooms** page.

More info: The device bin at the bottom of the page contains all the sender and receiver devices that ConductIP can see on the network via the NMOS registry.

Step 2. Select a room from the Rooms list.

Step 3. From the device bin toolbar, search for items ( ), filter for items ( ), locate an item in the room ( ), expand all devices ( ), collapse all devices ( ), or see other options (•••) to help you find the senders and receivers you want. You can also edit the device properties.

More info: To see additional options for individual devices or groups, mouse over a device or group and the options icon will appear. Tooltips are provided to describe each option.

Step 4. Drag and drop items from the device bin to the room area to make them available for your Operators.

More info: When a device or group is already in the room area, it will be displayed in the device bin with a checkmark. If the device or any group within it is already in the room, it cannot be dragged to the room area.

Step 5. Repeat for all the senders and receivers you need.

Result of this task: The room is ready for your Operators.

When done, remember: You must assign Operators to the room before they can use it. For more information, see *Assigning users and user groups to rooms*.

Additional room area options

Once items have been added to the room, click (•••) above the room area for more options.

- **Reorganize all items in room** ( ): You can automatically arrange all items in the room by senders/receivers and their connections.

- **Reorganize selected items** ( ): You can automatically arrange selected items in the room by senders/receivers and their connections.
- **Edit properties** ( ): Administrators and Super operators can edit the properties of a selected item, including the item label, description, and icon.
- **Remove from room** ( ): Administrators and Super operators can remove all selected items from the room.
- **Show selection tools**: You can activate this option to show the selection tools in the panel area toolbar.
- **Open minimap**: You can activate this option to open the minimap in the room area.

Creating panels

Matrox ConductIP automatically creates a panel each time a room is created, but Administrators and/or Super operators may need to create additional panels for their Operators. A panel is where the connections between the senders and receivers are made.

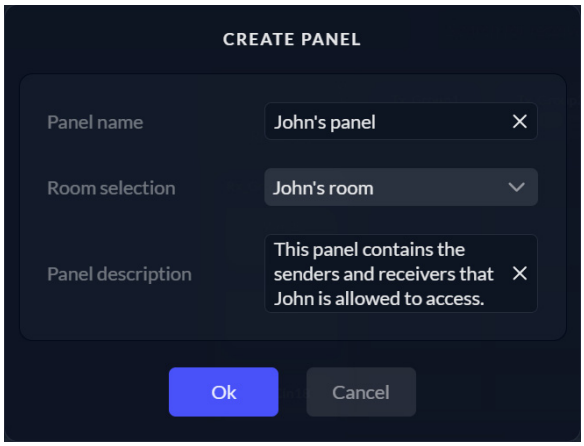
For more information about ConductIP **Panels** and how they are used, see *About Panels*.

To create a panel:

Step 1. Go to the ConductIP **Panels** page.

Step 2. Click the **Create panel** button (⊕).

Step 3. In the **Create panel** window, enter the information for the panel and specify which room it is associated to (e.g. create “John’s panel” and associate it to “John’s room”).



Step 4. Click **Ok**.

Result of this task: Your new panel is created and the senders and receivers in the room associated to it will appear.

Additional panel options

From the ConductIP **Panels** page, click on a panel and then click (•••) directly above the Panels list for more panel management options.

- **Group by rooms:** You can associate rooms to more than one panel. Grouping them by rooms will help you visualize which rooms are associated with which panels.
- **Edit** (✎): Administrators and Super operators can edit the selected panel’s name and/or description.
- **Delete** (🗑): Administrators and Super operators can delete the selected panel.

Panel viewing options

From the ConductIP **Panels** page, select a panel and then click (•••) on the right for more viewing options.

- **Matrix mode:** You can select this option to view the panel in matrix mode.
- **Side-by-side mode**: You can select this option to view the panel in side-by-side mode.
- **Flip senders and receivers**: When in Matrix mode, you can activate this option to transpose the matrix layout.
- **Hide offline items**: You can select this option to hide offline devices from the panel.
- **Ignore receiver constraints:** You can select this option to ignore device constraints for all receivers in the panel. When enabled, the ConductIP will try to connect to the elements even if they seem incompatible. The receivers will return an error if they cannot perform the connection.
- **Deactivate unused senders:** You can select this option to automatically deactivate senders that will no longer be in use once a Take or a Disconnect operation is done or once a salvo is applied.

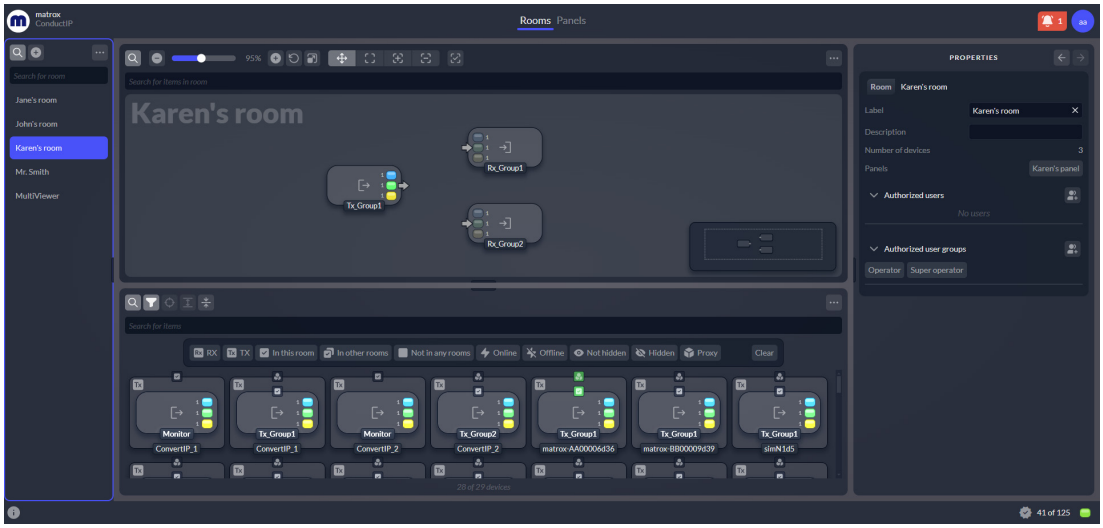
Connecting senders and receivers

The senders and receivers in your **Rooms** must be connected to each other from the **Panels** page for the streaming flows to function.

Although your real-world setup will likely be more complex than what is shown here, this simplified example will help you understand the connection process. After you understand how it works, you can connect as many senders to as many receivers as needed.

In this example, the ConductIP Administrator has created a room called *Karen's room* with one sender group and two receiver groups. Two receiver groups are being used to show the optional queuing feature.

Image A. Karen's room



With Karen's room already created by the Administrator or Super operator, connect your senders and receivers as follows:

Step 1. Go to the ConductIP **Panels** page. Karen's panel appears in **Matrix mode** or in **Side-by-side mode**.

More info: Both views are shown below, but this procedure will continue to describe the steps using **Matrix mode**. You can switch between modes at any time as needed.

Image B. Karen's panel in Matrix mode

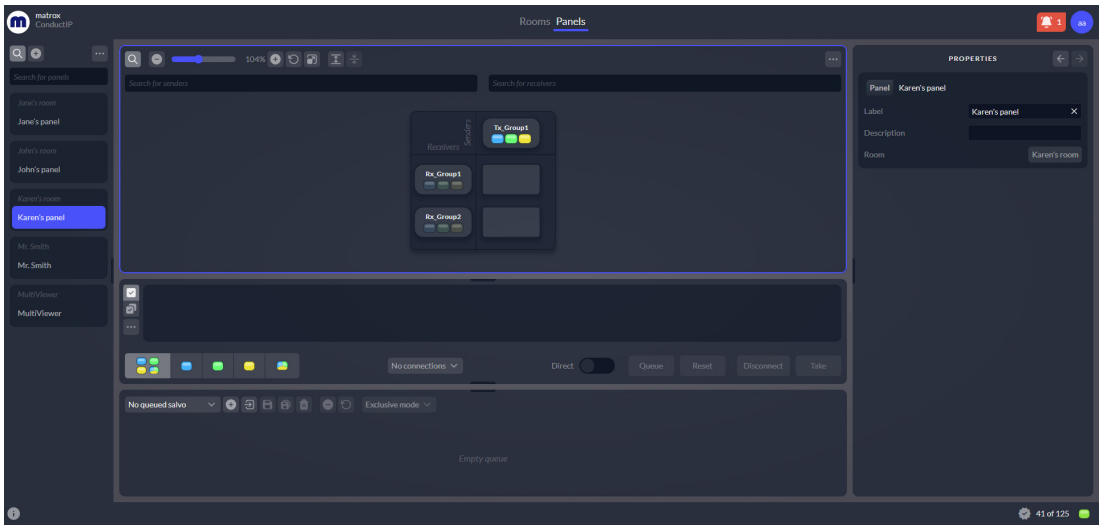
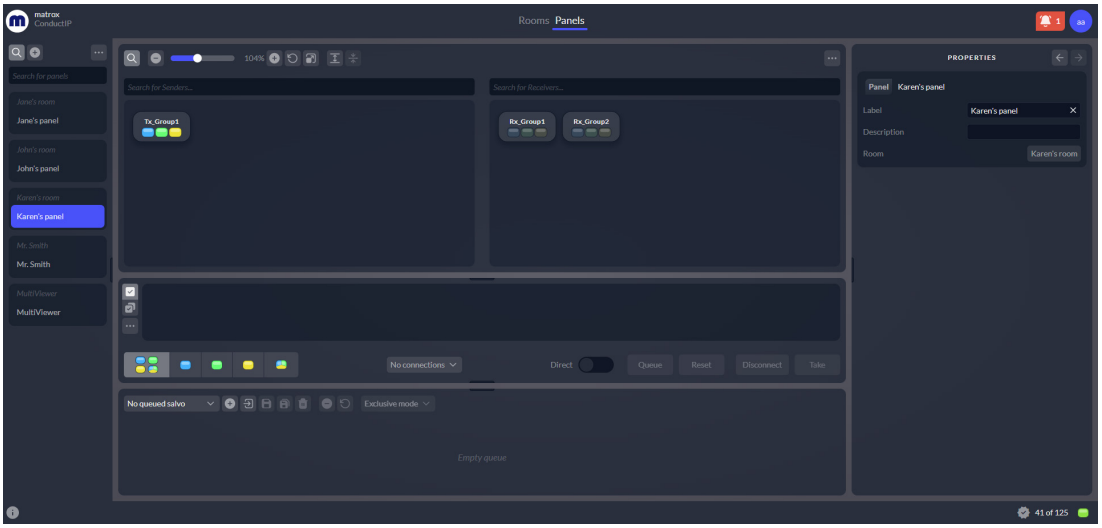


Image C. Karen's panel in Side-by-side mode



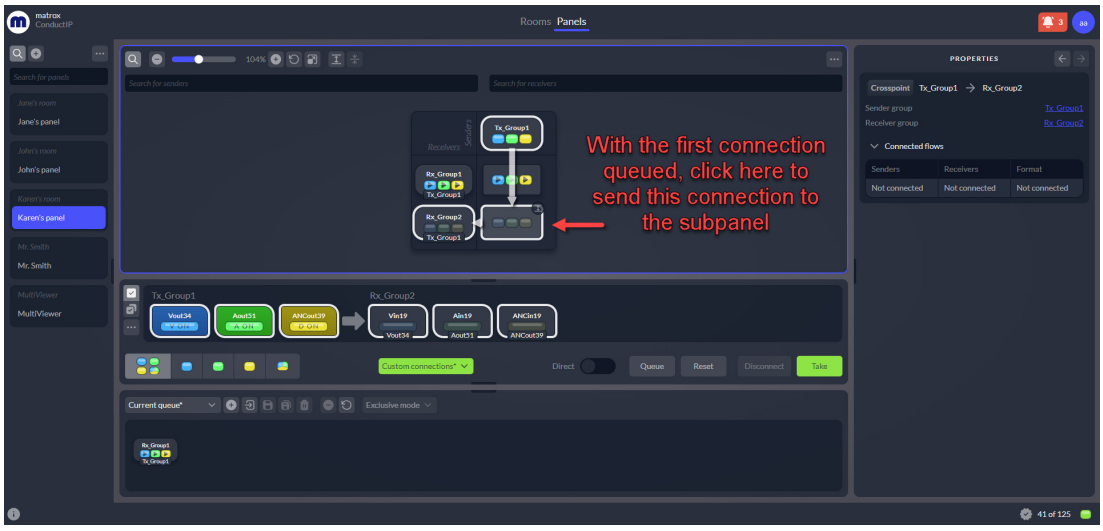
Step 2. In **Matrix mode**, click the crosspoint (i.e. the rectangle that corresponds to the intersection) of *Tx_Group1* and *Rx_Group1*. The senders and receivers will appear in the subpanel below the main panel area.

Step 3. Click **Queue** to queue this connection. If you prefer to apply it right away rather than queuing it up, go directly to *Step 6.*

More info: When a connection is queued, the colored flow indicators change from a solid color to a *Play* button and the Take button turns green.

More info: You can also execute takes immediately by toggling **Direct** to the ON position, in which case the take will be applied the moment you click on the crosspoint connection. You will not be able to queue connections if you use this option.

Step 4. Click the crosspoint of *Tx_Group1* and *Rx_Group2*.

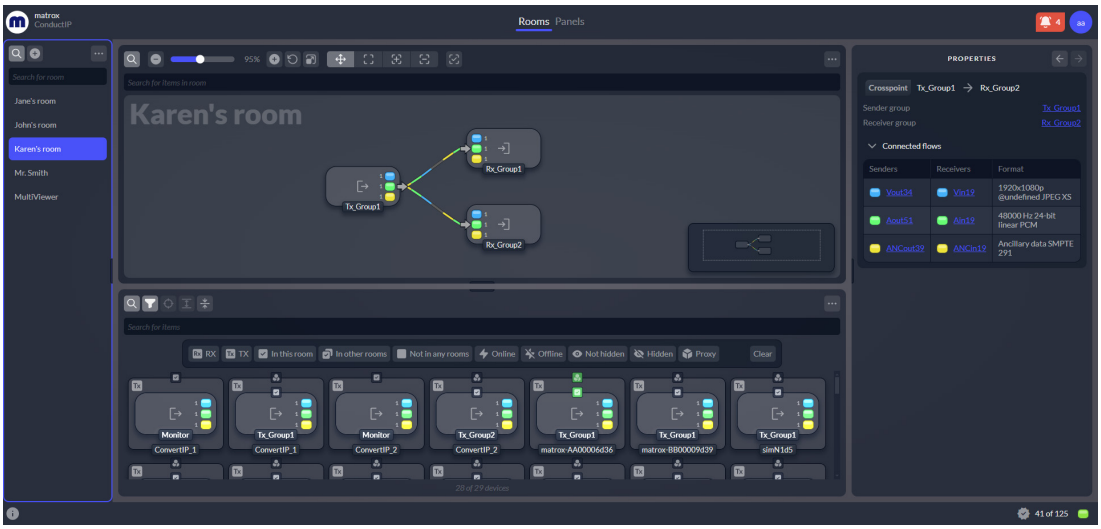


Step 5. Click **Queue** to queue this connection.

Step 6. Click **Take** to apply your connection(s) or click **Reset** to purge all queued connections and start over. A "Take" should also clear any unconnected receivers.

Result of this task: The sender and receiver connections are applied and you can go to Karen's room to see the flows. You can click **Disconnect** at any time to disconnect the sender and receiver flows.

Image D. Karen's room with senders and receivers connected

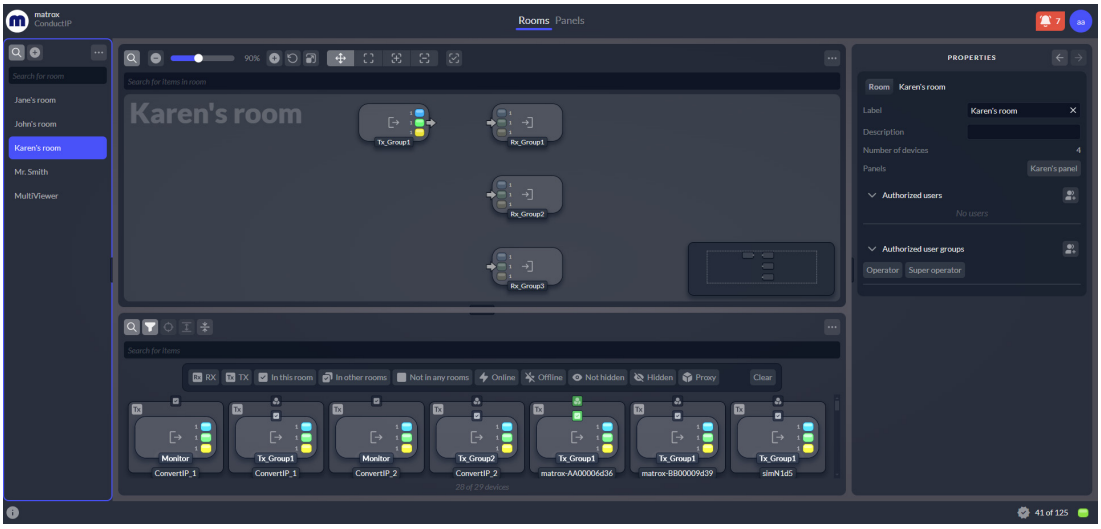


Connecting individual sender and receiver flows

The connection options with ConductIP go beyond connecting sender groups to receiver groups. You can also perform breakaway connections (i.e. send individual flows to different receivers).

For example, you can have a typical sender group of video, audio, and ancillary data send each of those individual flows to a different receiver. To illustrate this, we will add an extra receiver group to *Karen's room* and send a flow to each (video to *Rx_Group1*, audio to *Rx_Group2*, and ancillary data to *Rx_Group3*).

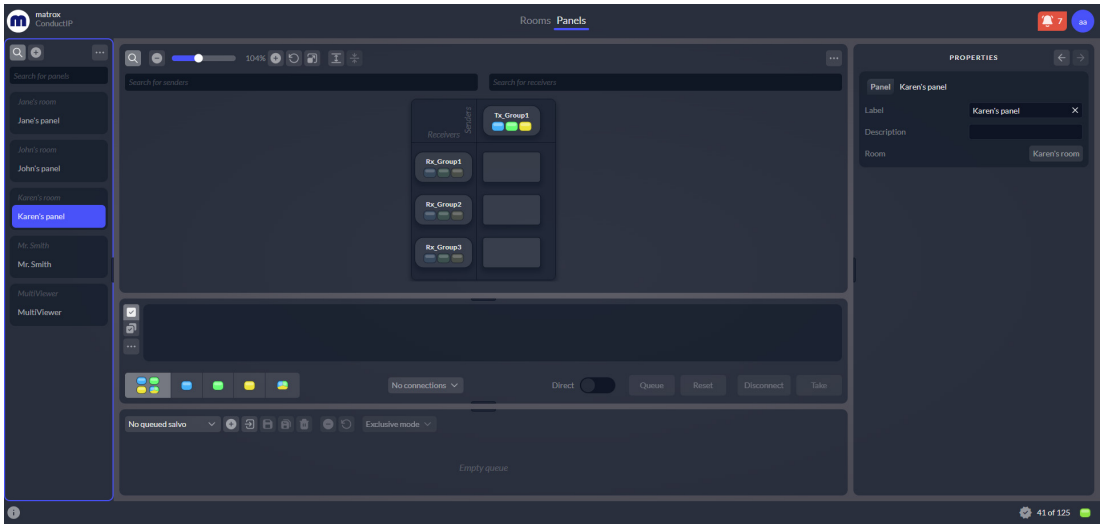
Image E. Karen's room with three receiver groups



To connect Karen's sender flows to their receivers:

Step 1. Go to the ConductIP **Panels** page.

Karen's panel appears (**Matrix mode** shown).



Step 2. Click the crosspoint of *Tx_Group1* and *Rx_Group1*. The senders and receivers will appear in the subpanel below the main panel area.

Step 3. In the subpanel, choose **Single select mode** then click the video flow under *Tx_Group1*. This will select that individual flow.

More info: When you click the sender flow, the compatible receiver is automatically selected and a green label will appear above it to show the connection that will be made when you click **Take**.

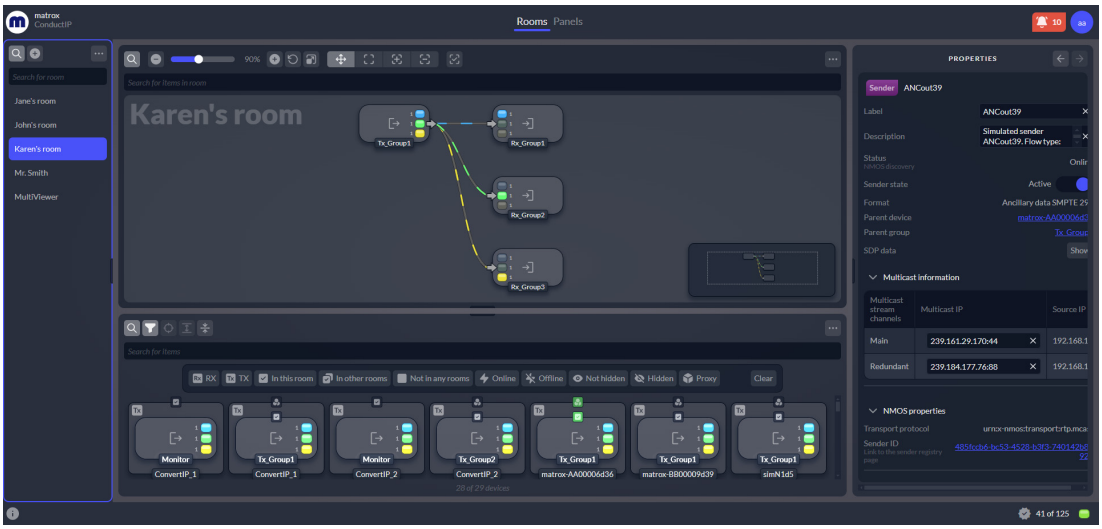
Step 4. Click **Take**.

The video sender flow from *Tx_Group1* is now connected to the video receiver *Rx_Group1*.

Step 5. As you did with the video flow, connect the audio flow from *Tx_Group1* to *Rx_Group2*, and the ancillary data flow from *Tx_Group1* to *Rx_Group3*.

Karen's panel should now look like this:

Karen's room should now look like this:



Result of this task: As you can see in Karen's room, each receiver now has its own flow connected to it. Video (blue) is going from *Tx_Group1* to *Rx_Group1,* audio (green) is going from *Tx_Group1* to *Rx_Group2*, and ancillary data (yellow) is going from *Tx_Group1* to *Rx_Group3*.

When done, remember: The flow colors can be changed (see *User interface*), and you can filter your subpanel view according to each type of flow, which will help you view all your individual connections (see *About Panels*). You can also execute takes immediately by toggling **Direct** to the ON position, and **Disconnect** any of your sender/receiver connections at any time.

Creating connection presets (salvos)

In a real-world setup, you may need to change multiple connections simultaneously. Salvos (i.e. connection presets) let you set up multiple connections between senders and receivers that you can then apply all at once. You can save these configurations and use them whenever necessary, avoiding the need to reconnect them in the subpanel each time. While each panel has its own salvos, you can transfer them between panels if needed.

When you create a ConductIP panel, it comes with a default salvo: *No connections*. If you activate this salvo, it disconnects all panel connections.

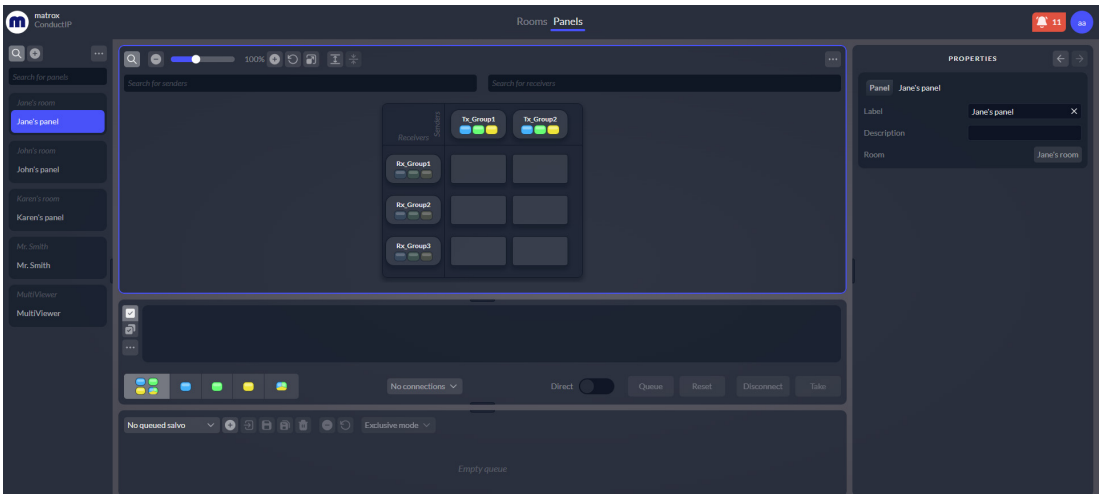
In this example, the ConductIP Administrator has created a room called *Jane's room* with various devices and sender/receiver groups.

Image F. Jane's room

With Jane's room already created by the Administrator or Super operator, create a salvo as follows:

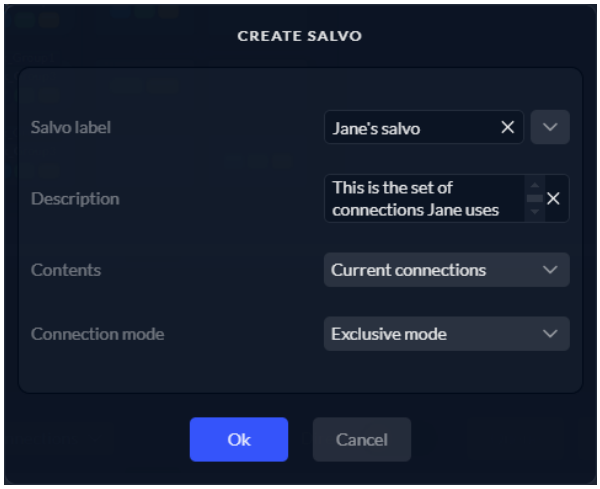
Step 1. Go to the ConductIP **Panels** page. Jane's panel appears in **Matrix mode**.

Image G. Jane's panel in Matrix mode



Step 2. Connect your senders and receivers as needed (see *Connecting senders and receivers*).

Step 3. In the Salvos panel, click (⊕) to create a new salvo.

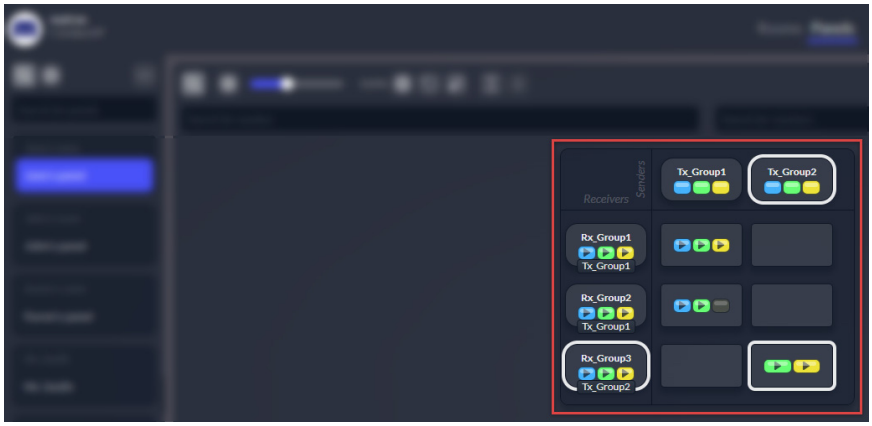


Step 4. In the **Create salvo** window, enter the following information:

- **Salvo label:** Each salvo must have a unique label or name.
- **Contents:** Select **Current connections** if you made your connections in *Step 2.* You can also create a salvo that contains **Queued connections** or create an **Empty salvo**. You can edit your salvo later if needed.
- **Connection mode:** Select **Exclusive mode** to override all panel connections when you execute a take, leaving only your salvo connections. Select **Merge mode** to merge your salvo connections with any existing connections. You can change the mode later if needed.

Step 5. Click **Ok** to create the salvo.

More info: The typical video, audio, and VANC colored indicators appear as *Play* buttons when they belong to a salvo.



Result of this task: You have created your salvo, and it has been added to the list of salvos that you can apply to the panel.

When done, remember: Salvos work like any other queued connections. You can click **Take** to execute the salvo or it will be executed immediately if **Direct** is on. To disconnect all connections at once, apply the **No connections** salvo.

Additional salvo options

There are several options in the **Salvos** panel. All include tooltips for more information.

- **Salvo drop-down list**: You can select a salvo to automatically queue its preset connections. When a salvo is queued and/or applied, the colored indicators for the flows that are included in the salvo will be squares and the **Take** button appears green.

- **Import salvos** ( ): You can import a copy of a single salvo or multiple salvos from another panel. Only the connections that use devices that are in your panel will be carried over. When you modify an imported salvo, it will not affect the original.
- **Save salvo** ( ): You can save a modified salvo.
- **Save salvo as** ( ): You can create a new salvo by modifying an existing one and saving it with a different label and description.
- **Delete** ( ): You can delete a selected salvo.
- **Remove connections** ( ): You can remove selected connections from the salvo. This change is not automatically saved.
- **Reset connections** ( ): You can reset the salvo connections to remove them from the queue.
- **Mode drop-down list**: You can change the salvo mode. This change is not automatically saved.

Modifying a salvo's preset connections

Once a salvo is created, you can select it in the drop-down list to see its preset connections in the Salvo panel. From there, you can modify the salvo by adding or removing connections.

Just like in the panel area, you can mouse over an individual device or group to expand or collapse it.

Image H. Expanded preset connections in the Salvo panel

Modify a selected salvo as follows:

Step 1. Add connections.

a. Click a crosspoint in the panel area.

b. Click **Queue**.

More info: An asterisk appears beside the salvo label to indicate that its connections were modified.

The queued connection will appear in the Salvo panel.

Step 2. Remove connections.

a. In the Salvo panel, select the connections to be removed. Use **Ctrl** + click to select multiple connections.

b. Click **Remove connections** ( ).

More info: An asterisk appears beside the salvo label to indicate that its connections were modified.

Step 3. Click **Save salvo** ( ).

Step 4. Verify that the modifications were saved.

a. Click **Reset connections** ( ).

b. Select the salvo from the drop-down list to see its connections.

Result of this task: The salvo's connections have been modified.

CHAPTER 5

Matrox ConductIP Settings Reference

This chapter includes the following topics:

System

This section describes the **System** settings in Matrox ConductIP.

Setting	Description
Date and time	
Current server time	The current server time of your ConductIP.
Time zone	Select the time zone of the ConductIP MRA.
Clock mode	**Manual:** Specify a date and time for the ConductIP MRA. This disables time synchronization with an NTP server. **Auto (NTP):** Specify a primary and secondary NTP server for time synchronization. If needed, use the **Test** button to check the connection with the server. The connection status is indicated on the right.
Network configuration	
Current configuration	Display the current network configuration of the ConductIP, including IP address, Subnet mask, Gateway, MAC address, Search domains, and DNS servers.
Network configuration	**Hostname:** Specify a name for the ConductIP. This name will be broadcast on the network. If you choose a name that is already being used on the network, ConductIP will automatically add a numbered suffix to differentiate between them (e.g. ConductIP-1, ConductIP-2, ConductIP-3, etc). **Search domains:** Enter the search domain(s) to resolve DNS searches to a Fully Qualified Domain Name. You can use spaces to separate each domain if you enter more than one. **DNS servers:** Enter the IP addresses of your DNS server(s). You can use spaces to separate each address if you enter more than one.

Setting	Description
Protocol	**DHCP:** Select DHCP if you are connected to a DHCP-enabled network. The DHCP network will assign the ConductIP's IP address. **Static IPv4:** If you use a static IP address instead of DHCP, you must enter the related information (e.g. **IP address**, **Subnet mask**, etc).
Reboot	
Reboot the Matrox ConductIP Media Routing Appliance	Reboots the ConductIP MRA.

NMOS

This section describes the **NMOS** settings in Matrox ConductIP.

Setting	Description
System parameters configuration (IS-09)	
Matrox ConductIP IS-09 registry	Enable to activate the ConductIP internal NMOS registry. This is enabled by default.
mDNS advertisement	Enable to broadcast the ConductIP internal NMOS registry on the network under the multicast DNS protocol. This resolves host-names to IP addresses within networks that do not include a domain name server. **NOTE** Multicast DNS publication only works with devices on the same subnet.
Protocol	Select the security level of communication that the ConductIP internal NMOS registry will use: HTTP (unsecured) or HTTPS (secured).
Priority	Priority values from 0 to 99 correspond to an active NMOS Registration API, with 0 being the highest priority. Values of 100 and over are reserved for development work to avoid conflicts with a live system.
Heartbeat interval	Defines how often nodes should perform a heartbeat to maintain their resources in the Registration API.
PTP announce receipt timeout	Defines the number of announce intervals that must pass before declaring a timeout.
PTP domain number	Defines the PTP domain number.
Internal registry configuration	
Matrox ConductIP registry	Enable to activate the ConductIP internal NMOS registry. This is enabled by default.

Setting	Description
mDNS advertisement	Enable to broadcast the ConductIP internal NMOS registry on the network under the multicast DNS protocol. This resolves host-names to IP addresses within networks that do not include a domain name server. **NOTE** Multicast DNS publication only works with devices on the same subnet.
Protocol	Select the security level of communication that the ConductIP internal NMOS registry will use: HTTP (unsecured) or HTTPS (secured).
Priority	By default, ConductIP is set to 99 as a priority and will function as the redundant NMOS server if other servers become unavailable. Lower values indicate a higher priority (e.g. "1" is the highest priority).
Expiry interval	Defines the time lapse after which a resource is removed from the library when there is no heartbeat detected.
Registry selection	
Connection status	Displays the IP address and connection status of the registry currently in use, and indicates if the connection is secure (i.e. http or https). If you see an **Invalid certificate** icon, click on it to add the certificate to the registry list.

Setting	Description
Registry selection mode	**Internal:** Use the internal ConductIP NMOS registry. This option is only available if the ConductIP registry is enabled. **Manual:** Specify an NMOS registry to use by selecting the protocol and entering the IP address, query port, and registration port of the registry server. **Automatic:** Automatically selects a registry that is discovered on the network according to priority. The available registries will appear in the **Registry list** where you can see their connection status and expand each for more information. You may need to specify a search domain for the registries to appear in the list.

Security

This section describes the **Security** settings in Matrox ConductIP.

Setting	Description
Server certificate	
Install server certificate	Install the certificate to use for secure communication. For more information, see "*Managing ConductIP certificates*" on page *17*.
Download Root CA	Download the ConductIP Root CA certificate to your computer.
Remove certificate	Remove the current certificate installed on the server. An internal Root CA certificate will be used instead. A reboot is required after removal.
Trusted certificates	
Add	Add a certificate that has been previously saved to your computer. This recognizes a secure connection. For more information, see "*Managing ConductIP certificates*" on page *17*.
Trusted certificates	List of trusted certificates that have been added to your ConductIP.
Remove certificate	Remove the current certificate installed on the server.
Trusted certificates validation	**Exceptions:** Add a list of hosts that ConductIP will ignore when validating trusted certificates. **Disable certificate validation:** Disables checking so ConductIP will not validate certificates for any host.

User management

This section describes the **User management** settings in Matrox ConductIP.

Setting	Description
LDAP service	
Search domains	Enter the domain name of your LDAP (Lightweight Directory Access Protocol) server if available.
Default user domain	The default user domain to use when communicating with the LDAP server. This is only used when the user does not specify a domain in the login dialog.
LDAP servers	**Scan LDAP servers:** Click **Scan** to perform a search of LDAP servers. **Use scanned LDAP servers:** Select to allow ConductIP to search the network for LDAP servers automatically. **Additional LDAP servers:** Enter additional LDAP server names, IP addresses, and ports.
Users	
Search users	Enter the keyword term to search for within the list of current users.
Add	If you are the Administrator, you can add new users and select their roles. For more information, see "*Creating user accounts*" on page *21*.
Users list	Administrators can deactivate users, change their roles, choose their authentication method, edit their information, change their passwords, and choose their user groups. They can also delete users.
User groups	
Search user groups	Enter the keyword term to search for within the list of user groups.

Setting	Description
Add	Administrators can create a group and add users to it. For more information, see "*Creating user groups*" on page *24*.
User groups list	Administrators can change the group name, modify the list of users in the group, and delete the group. The default **Operator** and **Super operator** groups are updated automatically and cannot be modified or deleted.

Application

This section describes the **Application** settings in Matrox ConductIP.

Licenses	
Product key	Your ConductIP product key.
Download system token	Downloads the system token file to the download directory of your computer. You send this file to Matrox Video to get back a license file (*.lic*) to activate the full ConductIP license.
Install license	Select and install the license file obtained from Matrox Video. The current license usage is also displayed at the bottom-right of the ConductIP application.
Installed licenses list	List of licenses that have been installed on your ConductIP. Click on a license to see a description as well as its installation and expiration dates.
Software update	
Version	Your ConductIP software version.
Upload an update package	Browse to an update file to update the ConductIP. You will need to obtain an update file from Matrox Video. For more information, see "*Updating Matrox ConductIP*" on page *19*.
Web application	
Install as a Progressive Web Application (PWA)	Installs ConductIP as a progressive web application so you can run it from your desktop rather than through your web browser. This option is only available if you have installed the root CA in your web browser.
Database	
Clear all database events	Clears all database event messages.
Import a data file into the database	Imports a ConductIP data file into the database.

Export content of the database to a file	Exports the current database to the download directory of your computer.

User interface

This section describes the **User interface** settings in Matrox ConductIP.

Setting	Description
Date and time	
Current time	The current time of your ConductIP.
Date format	Change the way the date is displayed.
Time format	Change the format to 12- or 24-hour clock.
Theme	
Color theme	Change the look of the user interface.
Workspace	
Reset the application windows and areas to their factory default settings	Reset the look of the user interface to factory default settings.
Colors	
Media colors	Change the colors used for the video, audio, and ancillary data device media components. Click **Default** at any time to reset to factory default settings (i.e. blue, green, yellow).
Connection wire	
Connection wire settings	Change the look of the virtual wires connecting devices in the user interface. Click **Default** at any time to reset to factory default settings.

Guided tours

This section describes the **Guided tours** settings in Matrox ConductIP.

Setting	Description
Guided tours	
Overview of the most important configuration settings	See an overview of the most important settings to configure before using ConductIP.
Overview of the basic features	See an overview of ConductIP's core features.

Support

This section describes the **Support** settings in Matrox ConductIP.

Setting	Description
Contact us	Link to the Matrox Video Contact Support web page that includes all *technical support* resources.
Download a diagnostic data file	Exports a snapshot of the system's current configuration to the download directory of your computer. The snapshot includes system logs and is typically used for troubleshooting by Matrox Video *technical support*.
Open the Matrox ConductIP Installation and User Guide	Opens the *Matrox ConductIP Installation and User Guide*.
Open debug ports for technical support	Only to be used when approved by Matrox Video *technical support* during a support session.

About

This section describes the **About** settings in Matrox ConductIP.

Setting	Description
Software version	The current ConductIP software version.
Product key	The ConductIP product key.
OS version	The ConductIP operating system version.
End-user license agreement	See the end-user license agreement.
Third-party software notices	See the list of third-party licenses for the software packages that ConductIP uses.

Appendix A

Troubleshooting Matrox ConductIP

This appendix includes the following topics:

- *Using the Matrox ConductIP recovery application*
- *Common issues*

Using the Matrox ConductIP recovery application

The Matrox ConductIP MRA includes a local application that you can use for troubleshooting. To access the application, you will need to use a monitor, mouse, and keyboard to physically connect to the ConductIP MRA. For more information, see the section *Logging in locally to the ConductIP MRA*.

NOTE Some of the recovery tools require a USB key (only one partition, formatted in FAT32). To ensure that USB is enabled in the BIOS of the device, reboot your ConductIP and press F2 to access the system BIOS settings, then enable USB.

IMPORTANT It is recommended that you only use the recovery tools when guided by Matrox Video technical support staff.

Tool	Description
Status	Shows you the current and previous ConductIP software versions that are installed on your ConductIP MRA.
Start ConductIP	Launches the latest ConductIP software version that was installed on your ConductIP MRA, as well as your current database of settings, users, rooms, panels, and salvos.
Start previous ConductIP	Launches the previous ConductIP software version that was installed on your ConductIP MRA, with your database of settings, users, rooms, panels, and salvos as it was at the time of your last update.
Configure network settings	Allows you to change the network settings.
Create Administrator account	Allows you to create an Administrator account.
Generate a diagnostic file	Allows you to export a snapshot of the system's current configuration to a USB key. The snapshot includes system logs and is typically used for troubleshooting by Matrox Video *technical support*.
Export database	Allows you to export the current database to a USB key.
Repair database	Checks for database corruption and attempts a repair.
Clear database	Clears the entire ConductIP database, keeping only network settings and licenses.

Tool	Description
Update ConductIP software	Updates the ConductIP from an update file stored on a USB key. You will need to download the latest update from our *website* and save it in the root directory of a USB key before launching the update.
Restore to factory default settings	Resets your ConductIP MRA software and settings to the manufacturer default (i.e. the software and settings that were installed when you received your ConductIP MRA). When you restore to factory default settings, your databases will be deleted and you will no longer be able to launch a previously installed software version.
Reboot	Reboots the ConductIP MRA.

Common issues

Here are some common issues you may encounter when using Matrox ConductIP and possible solutions for each.

Issue	Solution
Network connection	
I cannot access ConductIP since I changed my network settings.	You may have entered the wrong network settings. You will need to connect directly to the ConductIP MRA and change them via the Recovery Tools application. You can also find the IP address of the ConductIP MRA using the ConvertIP Manager. Refer to the ConvertIP Manager embedded help for more information.
I'm stuck on the "waiting for server" message.	There are three possible reasons for this: • You may have entered the wrong network settings. You will need to connect directly to the ConductIP MRA and change them via the Recovery Tools application. • You may have switched the ConductIP to a static IP address while your Web browser is still using your DHCP-assigned address. Open a new browser window and enter the new static IP address. • You may have reinstalled a server root CA for the same server in your Web browser. Delete the cache from your Web browser then restart the browser.
NTP server connection	
I still get the error message "NTP server not found" even after I set the NTP time in the ConductIP settings.	ConductIP may be set to a static IP address. You can either set ConductIP to DHCP, or if you want to keep it as a static IP, you need to properly configure the DNS server. For more information, see the *System* settings.

Issue	Solution
Browser	
My Web browser doesn't display the Web UI correctly.	Verify that the web browser you are using is officially supported (see *Supported web browsers*).

Legal and compliance

USA

FCC Compliance Statement

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

WARNING Changes or modifications to this unit not expressly approved by the party responsible for the compliance could void the user's authority to operate this equipment. The use of shielded cables for connection of the monitor to the card is required to meet FCC requirements.

CANADA

(English) Innovation, Science and Economic Development Canada

Remark for the Matrox hardware products supported by this guide These digital apparatus does not exceed the Class A limits for radio noise emission from digital devices set out in the Radio Interference Regulation of Innovation, Science and Economic Development Canada.

(Français) Innovation, Sciences et Développement économique Canada

Remarque sur les produits matériels Matrox couverts par ce guide Ce present appareil numérique n'émet aucun bruit radioélectrique dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par Innovation, Sciences et Développement économique Canada.

UNITED KINGDOM

United Kingdom user's information – Declaration of Conformity

Remark for the Matrox hardware products supported by this guide These devices comply with Directive UK SI 2016 No. 1091 relating to electromagnetic compatibility for a Class A digital device. They have been tested and found to comply with EN55032/CISPR32 and EN55035/CISPR35. In a domestic environment these products may cause radio interference in which case the user may be required to take adequate measures. To meet UK requirements, shielded cables must be used to connect the monitor and other peripherals to the card. These products have been tested in a typical class A compliant host system. It is assumed that these products will also achieve compliance in any class A compliant system.

USA

(English) FDA (Food and Drug Administration) requirements for Laser Products

Remark for the Matrox hardware products supported by this guide This product includes a 850 nm Laser Product compliant to 21CFR Subpart J Class 1.

KOREA

A 급 기기 (업무용 방송통신기자재)

이 기기는 업무용 (A 급) 전자파적합기기로서 판 매자 또는 사용자는 이 점을 주의하시기 바라 며 , 가정 외의 지역에서 사용하는 것을 목적으 로 합니다 .

EUROPE

(English) European user's information – Declaration of Conformity

Remark for the Matrox hardware products supported by this guide These devices comply with EC Directive 2014/30/EU for a Class A digital device. They have been tested and found to comply with EN55032/CISPR32 and EN55035/CISPR35. In a domestic environment these products may cause radio interference in which case the user may be required to take adequate measures. To meet EC requirements, shielded cables must be used to connect the monitor and other peripherals to the card. These products have been tested in a typical class A compliant host system. It is assumed that these products will also achieve compliance in any class A compliant system.

(Français) Informations aux utilisateurs Européens – Déclaration de conformité

Remarque sur les produits matériels Matrox couverts par ce guide Ces unités sont conformes à la directive communautaire 2014/30/EU pour les unités numériques de classe A. Les tests effectués ont prouvé qu'elles sont conformes aux normes EN55032/CISPR32 et EN55035/CISPR35. Le fonctionnement de ces produits dans un environnement résidentiel peut causer des interférences radio, dans ce cas l'utilisateur peut être amené à prendre les mesures appropriées. Pour respecter les impératifs communautaires, les câbles de connexion entre le moniteur ou autres périphériques et la carte doivent être blindés. Ces produits ont été testés dans un système hôte typique compatible classe A. On suppose qu'ils présenteront la même compatibilité dans tout système compatible classe A.

(Deutsch) Information für europäische Anwender – Konformitätserklärung

Anmerkung für die Matrox Hardware-Produktunterstützung durch dieses Handbuch Diese Geräte entsprechen EC Direktive 2014/30/EU für ein digitales Gerät Klasse A. Sie wurden getestet und entsprechen demnach EN55032/CISPR32 und EN55035/CISPR35. In einer Wohnumgebung können diese Produkte Funkinterferenzen erzeugen, und der Benutzer kann genötigt sein, entsprechende Maßnahmen zu ergreifen. Um EG-Anforderungen zu entsprechen, müssen zum Anschließen des Monitors und anderer Peripheriegeräte an die Karte abgeschirmte Kabel verwendet werden. Diese Produkt wurden in einem typischen, der Klasse A entsprechenden, Host-System getestet. Es wird davon ausgegangen, daß diese Produkte auch in jedem Klasse A entsprechenden System entsprechend funktionieren.

(Italiano) Informazioni per gli utenti europei – Dichiarazione di conformità

Nota per i prodotti hardware Matrox supportati da questa guida Questi dispositivi sono conformi alla direttiva CEE 2014/30/EU elativamente ai dispositivi digitali di Classe A. Sono stati provati e sono risultati conformi alle norme EN55032/CISPR32 e EN55035/CISPR35. In un ambiente domestico, questi prodotti possono causare radiointerferenze, nel qual caso all'utente potrebbe venire richiesto di prendere le misure adeguate. Per soddisfare i requisiti CEE, il monitor e le altre periferiche vanno collegati alla scheda grafica con cavi schermati. Questi prodotti sono stati provati in un tipico sistema host conforme alla classe A. Inoltre, si dà per scontato che questi prodotti acquisiranno la conformità in qualsiasi sistema conforme alla classe A.

(Español) Información para usuarios europeos – Declaración de conformidad

Observación referente a los productos de hardware de Matrox apoyados por este manual Estos dispositivos cumplen con la directiva de la CE 2014/30/EU para dispositivos digitales de Clase A. Dichos dispositivos han sido sometidos a prueba y se ha comprobado que cumplen con las normas EN55032/CISPR32 y EN55035/CISPR35. En entornos residenciales, estos productos pueden causar interferencias en las comunicaciones por radio; en tal caso el usuario deberá adoptar las medidas adecuadas. Para satisfacer las disposiciones de la CE, deberán utilizarse cables apantallados para conectar el monitor y demás periféricos a la tarjeta. Estos productos han sido sometidos a prueba en un típico sistema anfitrión que responde a los requisitos de la clase A. Se supone que estos productos cumplirán también con las normas en cualquier sistema que responda a los requisitos de la clase A.

EUROPE

(English) European user's information – Directive on Waste Electrical and Electronic Equipment (WEEE)

Please refer to the Matrox Web site (www.matrox.com/environment/en/weee) for recycling information.

(Français) Informations aux utilisateurs Européens – Règlementation des déchets d'équipements électriques et électroniques (DEEE)

Se référer au site Web de Matrox (www.matrox.com/environment/en/weee) pour l'information concernant le recyclage.

(Deutsch) Information für europäische Anwender – Europäische Regelungen zu Elektro- und Elektronikaltgeräten (WEEE)

Bitte wenden Sie sich an der Matrox-Website (www.matrox.com/environment/en/weee) für Recycling-Informationen.

(Italiano) Informazioni per gli utenti europei – Direttiva sui rifiuti di apparecchiature elettriche ed elettroniche (RAEE)

Si prega di riferirsi al sito Web Matrox (www.matrox.com/environment/en/weee) per le informazioni di riciclaggio.

FRANCE

Avertissement sur l'épilepsie

À lire avant toute utilisation d'un jeu vidéo par vous-même ou votre enfant Certaines personnes sont susceptibles de faire des crises d'épilepsie ou d'avoir des pertes de conscience à la vue de certains types de lumières clignotantes ou d'éléments fréquents dans notre environnement quotidien. Ces personnes s'exposent à des crises lorsqu'elles regardent certaines images télévisées ou qu'elles jouent à certains jeux vidéo. Ces phénomènes peuvent apparaître alors même que le sujet n'a pas d'antécédent médical ou n'a jamais été confronté à une crise d'épilepsie.

Si vous-même ou un membre de votre famille avez déjà présenté des symptômes liés à l'épilepsie (crise ou perte de conscience) en présence de stimulations lumineuses, veuillez consulter votre médecin avant toute utilisation.

Nous conseillons aux parents d'être attentifs à leurs enfants lorsqu'ils jouent avec des jeux vidéo. Si vous-même ou votre enfant présentez un des symptômes suivants: vertige, trouble de la vision, contraction des yeux ou des muscles, perte de conscience, trouble de l'orientation, mouvement involontaire ou convulsion, veuillez immédiatement cesser de jouer et consultez un médecin.

Précautions à prendre dans tous les cas pour l'utilisation d'un jeu vidéo Ne vous tenez pas trop près de l'écran. • Jouez à bonne distance de l'écran de TV et aussi loin que le permet le cordon de raccordement. • Utilisez de préférence les jeux de vidéo sur un écran de petite taille. • Évitez de jouer si vous êtes fatigué ou si vous manquez de sommeil. • Assurez-vous que vous jouez dans une pièce bien éclairée. • En cours d'utilisation, faites des pauses de dix à quinze minutes toutes les heures.

USA

FCC Compliance Statement

Remark for the Matrox hardware products supported by this guide This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment causes

harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: • Reorient or relocate the receiving antenna • Increase the separation between the equipment and receiver • Connect the equipment into an outlet on a circuit different from that to which the receiver is connected • Consult the dealer or an experienced radio/TV technician for help.

WARNING Changes or modifications to this unit not expressly approved by the party responsible for the compliance could void the user's authority to operate this equipment. The use of shielded cables for connection of the monitor to the card is required to meet FCC requirements.

Declaration of conformity of a Class B digital device according to the FCC rules

We, the Responsible Party Matrox, 2002 Ridge Road, Champlain, NY 12919 • Telephone: (514) 822-6000 (extension 2026) • Attention: Conformity Group Matrox

Declaration The Matrox hardware products supported by this guide comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) these devices may not cause harmful interference, and (2) these devices must accept any interference received, including interference that may cause undesired operation. Any question regarding this declaration should be forwarded to the above coordinates.

CANADA

(English) Innovation, Science and Economic Development Canada

Remark for the Matrox hardware products supported by this guide These digital devices do not exceed the Class B limits for radio noise emission from digital devices set out in the Radio Interference Regulation of Innovation, Science and Economic Development Canada.

(Français) Innovation, Sciences et Développement économique Canada

Remarque sur les produits matériels Matrox couverts par ce guide Ces appareils numériques n'émettent aucun bruit radioélectrique dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par Innovation, Sciences et Développement économique Canada.

KOREA

B 급 기기 (가정용 방송통신기자재)

이 기기는 가정용 (B 급) 전자파적합기기로서 주 로 가정에서 사용하는 것을 목적으로 하며 , 모든 지역에서 사용할 수 있습니다 .

EUROPE

(English) European user's information – Information on Conformity

Remark for the Matrox hardware products supported by this guide These devices comply with EC Directive 2014/30/EU for a Class B digital device. They have been tested and found to comply with EN55032/CISPR32 and EN55024/CISPR24. In a domestic environment these products may cause radio interference in which case the user may be required to take adequate measures. To meet EC requirements, shielded cables must be used to connect the monitor and other peripherals to the card. These products have been tested in a typical class B compliant host system. It is assumed that these products will also achieve compliance in any class B compliant system.

(Français) Informations aux utilisateurs Européens – Informations sur la conformité

Remarque sur les produits matériels Matrox couverts par ce guide Ces unités sont conformes à la directive communautaire 2014/30/EU pour les unités numériques de classe B. Les tests effectués ont prouvé qu'elles sont conformes aux normes EN55032/CISPR32 et EN55024/CISPR24. Le fonctionnement de ces produits dans un environnement résidentiel peut causer des interférences radio, dans ce cas l'utilisateur peut être amené à prendre les mesures appropriées. Pour respecter les impératifs communautaires, les câbles de connexion entre le moniteur ou autres périphériques et la carte doivent être blindés. Ces produits ont été testés dans un système hôte typique compatible classe B. On suppose qu'ils présenteront la même compatibilité dans tout système compatible classe B.

(Deutsch) Information für europäische Anwender – Konformitäts-Informationen

Anmerkung für die Matrox Hardware-Produktunterstützung durch dieses Handbuch Diese Geräte entsprechen EC Direktive 2014/30/EU für ein digitales Gerät Klasse B. Sie wurden getestet und entsprechen demnach EN55032/CISPR32 und EN55024/CISPR24. In einer Wohnumgebung können diese Produkte Funkinterferenzen erzeugen, und der Benutzer kann genötigt sein, entsprechende Maßnahmen zu ergreifen. Um EG-Anforderungen zu entsprechen, müssen zum Anschließen des Monitors und anderer Peripheriegeräte an die Karte abgeschirmte Kabel verwendet werden. Diese Produkt wurden in einem typischen, der Klasse B entsprechenden, Host-System getestet. Es wird davon ausgegangen, daß diese Produkte auch in jedem Klasse B entsprechenden System entsprechend funktionieren.

(Italiano) Informazioni per gli utenti europei – Informazioni sulla conformità

Nota per i prodotti hardware Matrox supportati da questa guida Questi dispositivi sono conformi alla direttiva CEE 2014/30/EU relativamente ai dispositivi digitali di Classe B. Sono stati provati e sono risultati conformi alle norme EN55032/CISPR32 e EN55024/CISPR24. In un ambiente domestico, questi prodotti possono causare radiointerferenze, nel qual caso all'utente potrebbe venire richiesto di prendere le misure adeguate. Per soddisfare i requisiti CEE, il monitor e le altre periferiche vanno collegati alla scheda grafica con cavi schermati. Questi prodotti sono stati provati in un tipico sistema host conforme alla classe B. Inoltre, si dà per scontato che questi prodotti acquisiranno la conformità in qualsiasi sistema conforme alla classe B.

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(English) Disclaimer

THE INFORMATION IN THIS GUIDE IS SUBJECT TO CHANGE AT ANY TIME AND WITHOUT NOTICE.

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(Français) Responsabilité

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(Deutsch) Haftungsablehnungserklärung

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(Italiano) Discrezionalità

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(Español) Renuncia

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