User Guide

Streaming AV Products

VNM Enterprise Controller
VN-Matrix® Enterprise Controller 201

Extron

Safety Instructions

Safety Instructions • English

WARNING: This symbol, ⚠,when used on the product, is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

ATTENTION: This symbol, ⚠, when used on the product, is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

For information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the Extron Safety and Regulatory Compliance Guide, part number 68-290-01, on the Extron website, **www.extron.com.**

Sicherheitsanweisungen • Deutsch

WARNUNG: Dieses Symbol ⚠ auf dem Produkt soll den Benutzer darauf aufmerksam machen, dass im Inneren des Gehäuses dieses Produktes gefährliche Spannungen herrschen, die nicht isoliert sind und die einen elektrischen Schlag verursachen können.

VORSICHT: Dieses Symbol ⚠ auf dem Produkt soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Weitere Informationen über die Sicherheitsrichtlinien, Produkthandhabung, EMI/EMF-Kompatibilität, Zugänglichkeit und verwandte Themen finden Sie in den Extron-Richtlinien für Sicherheit und Handhabung (Artikelnummer 68-290-01) auf der Extron-Website, **www.extron.com**.

Instrucciones de seguridad • Español

ADVERTENCIA: Este símbolo, ⚠, cuando se utiliza en el producto, avisa al usuario de la presencia de voltaje peligroso sin aislar dentro del producto, lo que puede representar un riesgo de descarga eléctrica.

ATENCIÓN: Este símbolo, ⚠, cuando se utiliza en el producto, avisa al usuario de la presencia de importantes instrucciones de uso y mantenimiento recogidas en la documentación proporcionada con el equipo.

Para obtener información sobre directrices de seguridad, cumplimiento de normativas, compatibilidad electromagnética, accesibilidad y temas relacionados, consulte la Guía de cumplimiento de normativas y seguridad de Extron, referencia 68-290-01, en el sitio Web de Extron, **www.extron.com**.

Instructions de sécurité • Français

AVERTISSEMENT : Ce pictogramme, ⚠, lorsqu'il est utilisé sur le produit, signale à l'utilisateur la présence à l'intérieur du boîtier du produit d'une tension électrique dangereuse susceptible de provoquer un choc électrique.

ATTENTION : Ce pictogramme, ⚠, lorsqu'il est utilisé sur le produit, signale à l'utilisateur des instructions d'utilisation ou de maintenance importantes qui se trouvent dans la documentation fournie avec le matériel.

Pour en savoir plus sur les règles de sécurité, la conformité à la réglementation, la compatibilité EMI/EMF, l'accessibilité, et autres sujets connexes, lisez les informations de sécurité et de conformité Extron, réf. 68-290-01, sur le site Extron, **www.extron.com**.

Istruzioni di sicurezza • Italiano

AVVERTENZA: Il simbolo, ⚠, se usato sul prodotto, serve ad avvertire l'utente della presenza di tensione non isolata pericolosa all'interno del contenitore del prodotto che può costituire un rischio di scosse elettriche.

ATTENTZIONE: Il simbolo, ⚠, se usato sul prodotto, serve ad avvertire l'utente della presenza di importanti istruzioni di funzionamento e manutenzione nella documentazione fornita con l'apparecchio.

Per informazioni su parametri di sicurezza, conformità alle normative, compatibilità EMI/EMF, accessibilità e argomenti simili, fare riferimento alla Guida alla conformità normativa e di sicurezza di Extron, cod. articolo 68-290-01, sul sito web di Extron, **www.extron.com**.

Instrukcje bezpieczeństwa • Polska

OSTRZEŻENIE: Ten symbol, ⚠, gdy używany na produkt, ma na celu poinformować użytkownika o obecności izolowanego i niebezpiecznego napięcia wewnątrz obudowy produktu, który może stanowić zagrożenie porażenia prądem elektrycznym.

UWAGI: Ten symbol, ⚠, gdy używany na produkt, jest przeznaczony do ostrzegania użytkownika ważne operacyjne oraz instrukcje konserwacji (obsługi) w literaturze, wyposażone w sprzęt.

Informacji na temat wytycznych w sprawie bezpieczeństwa, regulacji wzajemnej zgodności, zgodność EMI/EMF, dostępności i Tematy pokrewne, zobacz Extron bezpieczeństwa i regulacyjnego zgodności przewodnik, część numer 68-290-01, na stronie internetowej Extron, **www.extron.com**.

Инструкция по технике безопасности • Русский

ПРЕДУПРЕЖДЕНИЕ: Данный символ, ⚠, если указан на продукте, предупреждает пользователя о наличии неизолированного опасного напряжения внутри корпуса продукта, которое может привести к поражению электрическим током.

ВНИМАНИЕ: Данный символ, ⚠, если указан на продукте, предупреждает пользователя о наличии важных инструкций по эксплуатации и обслуживанию в руководстве, прилагаемом к данному оборудованию.

Для получения информации о правилах техники безопасности, соблюдении нормативных требований, электромагнитной совместимости (ЭМП/ЭДС), возможности доступа и других вопросах см. руководство по безопасности и соблюдению нормативных требований Extron на сайте Extron: , **www.extron.com**, номер по каталогу - 68-290-01.

安全说明 • 简体中文

警告: ⚠产品上的这个标志意在警告用户该产品机壳内有暴露的危险 电压，有触电危险。

注意: ⚠产品上的这个标志意在提示用户设备随附的用户手册中有重要的操作和维护(维修) 说明。

关于我们产品的安全指南、遵循的规范、EMI/EMF 的兼容性、无障碍使用的特性等相关内容，敬请访问 Extron 网站，**www.extron.com**，参见 Extron 安全规范指南，产品编号 68-290-01。

安全記事 • 繁體中文

警告：⚠ 若產品上使用此符號，是為了提醒使用者，產品機殼內存在著可能會導致觸電之風險的未絕緣危險電壓。

注意 ⚠ 若產品上使用此符號，是為了提醒使用者，設備隨附的用戶手冊中有重要的操作和維護（維修）説明。

有關安全性指導方針、法規遵守、EMI/EMF 相容性、存取範圍和相關主題的詳細資訊，請瀏覽 Extron 網站：**www.extron.com**，然後參閲《Extron 安全性與法規遵守手冊》，準則編號 68-290-01。

安全上のご注意 • 日本語

警告: この記号⚠が製品上に表示されている場合は、筐体内に絶縁されていない高電圧が流れ、感電の危険があることを示しています。

注意: この記号 ⚠ が製品上に表示されている場合は、本機の取扱説明書に記載されている重要な操作と保守（整備）の指示についてユーザーの注意を喚起するものです。

安全上のご注意、法規厳守、EMI/EMF適合性、その他の関連項目については、エクストロンのウェブサイト **www.extron.com** より『Extron Safety and Regulatory Compliance Guide』(P/N 68-290-01) をご覧ください。

안전 지침 • 한국어

경고: 이 기호 ⚠ 가 제품에 사용될 경우, 제품의 인클로저 내에 있는 접지되지 않은 위험한 전류로 인해 사용자가 감전될 위험이 있음을 경고합니다.

주의: 이 기호 ⚠ 가 제품에 사용될 경우, 장비와 함께 제공된 책자에 나와 있는 주요 운영 및 유지보수(정비) 지침을 경고합니다.

안전 가이드라인, 규제 준수, EMI/EMF 호환성, 접근성, 그리고 관련 항목에 대한 자세한 내용은 Extron 웹 사이트(**www.extron.com**)의 Extron 안전 및 규제 준수 안내서, 68-290-01 조항을 참조하십시오.

FCC Class A Notice

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. The Class A limits 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 instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference. This interference must be corrected at the expense of the user.

> **NOTE:** For more information on safety guidelines, regulatory compliances, EMI/ EMF compatibility, accessibility, and related topics, see the **Extron Safety and Regulatory Compliance Guide** on the Extron website.

Battery Notice

This product contains a battery. **Do not open the unit to replace the battery.** If the battery needs replacing, return the entire unit to Extron (for the correct address, see the Extron Warranty section on the last page of this guide).

> **CAUTION:** Risk of explosion. Do not replace the battery with an incorrect type. Dispose of used batteries according to the instructions.
>
> **ATTENTION :** Risque d'explosion. Ne pas remplacer la pile par le mauvais type de pile. Débarrassez-vous des piles usagées selon le mode d'emploi.

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

> **CAUTION:** Risk of minor personal injury.
> **ATTENTION :** Risque de blessure mineure.

> **ATTENTION:**
> - Risk of property damage.
> - Risque de dommages matériels.

> **NOTE:** A note draws attention to important information.

> **TIP:** A tip provides a suggestion to make working with the application easier.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

Esc X1 * X17 * X20 * X23 * X21 CE ←

> **NOTE:** For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for the number zero and "0" is the capital letter "o."

Computer responses and directory paths that do not have variables are written in the font shown here:

```
Reply from 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx —t
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

Specifications Availability

Product specifications are available on the Extron website, **www.extron.com**.

Extron Glossary of Terms

A glossary of terms is available at **http://www.extron.com/technology/glossary.aspx**.

Contents

Introduction

This section gives an overview of the user guide and describes the Extron VNM EC 201 and its features. Topics that are covered include:

- **About this Guide**
- **About the VNM EC 201**
- **About the Web-based User Interface**
- **Transport Protocols Used for Streaming**
- **Definitions**
- **Features**

About this Guide

This guide contains installation, configuration, and operating information for the VNM EC 201.

In this guide:

- The terms "controller", "Enterprise Controller", "VNM EC 201", and "EC 201" refer specifically to the VNM Enterprise Controller 201.

- The term "codec" refers to a VN-Matrix device that can be configured as either an encoder or decoder.

- The term "stream" refers to multimedia that is constantly received by (and normally presented to) an end-user while being delivered by a VN-Matrix encoding device.

- The term "element" refers to the video/graphics, audio, (user) data, and whiteboard (annotation data) content that is contained within a stream.

- The VN-Matrix system model prefix "VNM" is used generically to refer to the VNC (codec), VND (decoder), and VNE (encoder) models, and is used to refer to both the 2*xx* series and 3*xx* series devices. If specific models are referenced, the exact model name is used.

> **NOTE:** This user guide details menus used to configure and control VN-Matrix encoder, decoder, and codec devices, VNM recorders, and VNS software decoders. The menus on the VNM EC 201 contain configuration and control menus for these devices. Where necessary, differences in the configuration and operation of controls for a specific VN-Matrix model or series are identified.

About the VNM EC 201

The VNM EC 201 is a dedicated control device for VN-Matrix systems. The Controller simplifies managing a large VN-Matrix deployment allowing users to view, manage, and dynamically control multiple VN-Matrix systems and networked VN-Matrix domains from a single interface. See figure 1 for an example of a simple application.
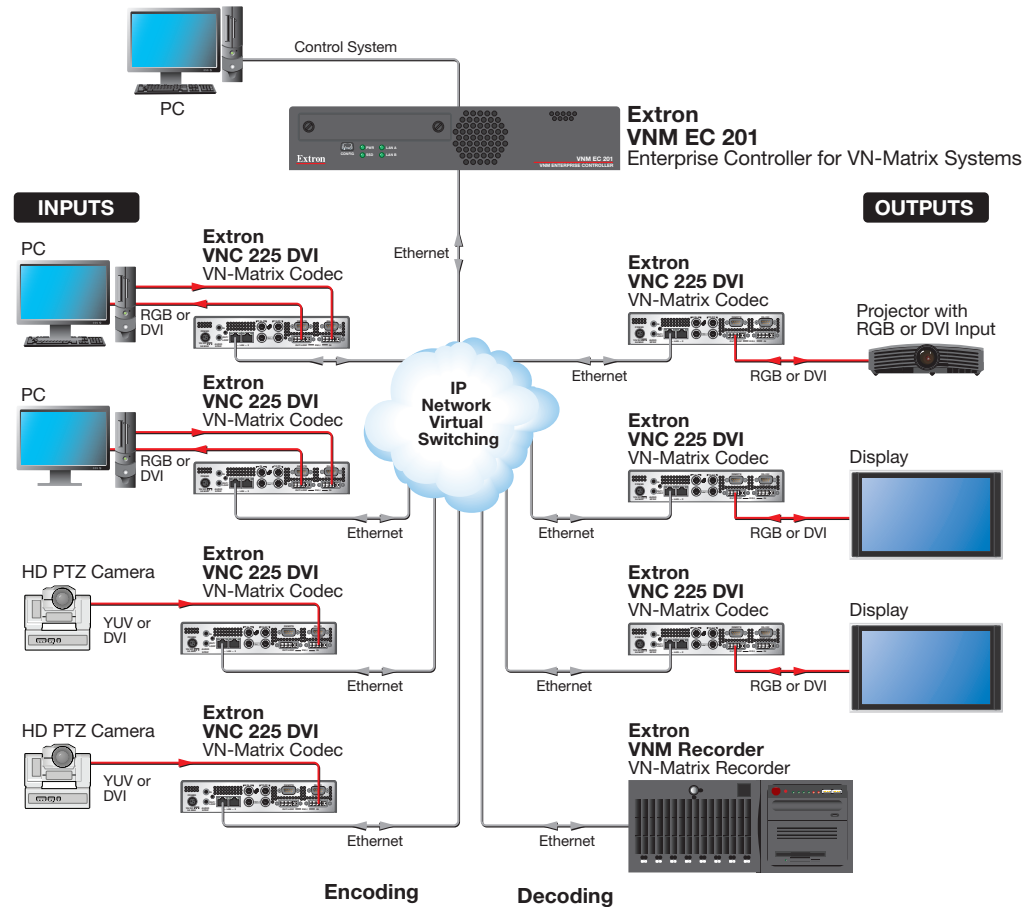
Figure 1.   Single VNM EC 201 System

The VNM EC 201 is recommended when:

- More than ten VN-Matrix units are configured into a system.
- A system of VN-Matrix units are interfaced to an external control system requiring dynamic control of the units in a switching solution.
- Preset configurations must be prepared and recalled.

For information on setting up a single VNM EC 201 system, see **VNM EC 201 Configuration** starting on page 12.

About the Web-based User Interface

Every VN-Matrix system product includes a basic embedded interface for configuration and control of itself and a few additional units. This interface is useful when control is limited to several units that generally remain in a fixed operational state.

However, for large systems (more than ten devices) the VNM EC 201 provides a more sophisticated user interface that simplifies the configuration and usability of a VN-Matrix system.

The EC 201 includes a removable SSD (Solid State Drive) that, by purchasing a spare drive, allows users to easily and quickly switch system classifications in secure and unsecure environments.

Transport Protocols Used for Streaming

The source data from a VN-Matrix encoder can be distributed to multiple displays or decoders (one-to-many) or to a single display or decoder (point-to-point). A previously recorded stream can be distributed in the same way and may be thought of as an encoder in this context.

A stream can be transported from the source (encoder, recorded stream) to the display (decoder) using one of three methods:

- Multicast Real-time Transport Protocol (RTP)
- Unicast Real-time Transport Protocol (RTP)
- Unicast Transmission Control Protocol (TCP)

These transport protocols are summarized in this section. For information on how to change the transport protocol used by the VNM EC 201 **System Config Page** on page 24.

Multicast RTP — An Overview

Multicast Real-time Tranport Protocol (RTP) allows a source to be viewed on multiple displays. This method uses a real-time variation of UDP (User Datagram Protocol).

SOURCE
RTP (m)
Network
DISPLAYS
RTP (m)

Encoder sends data using RTP to a multicast group.

RTP (m)

RTP (m)

RTP (m)

RTP (m)

Multiple decoders can be part of the multicast group.
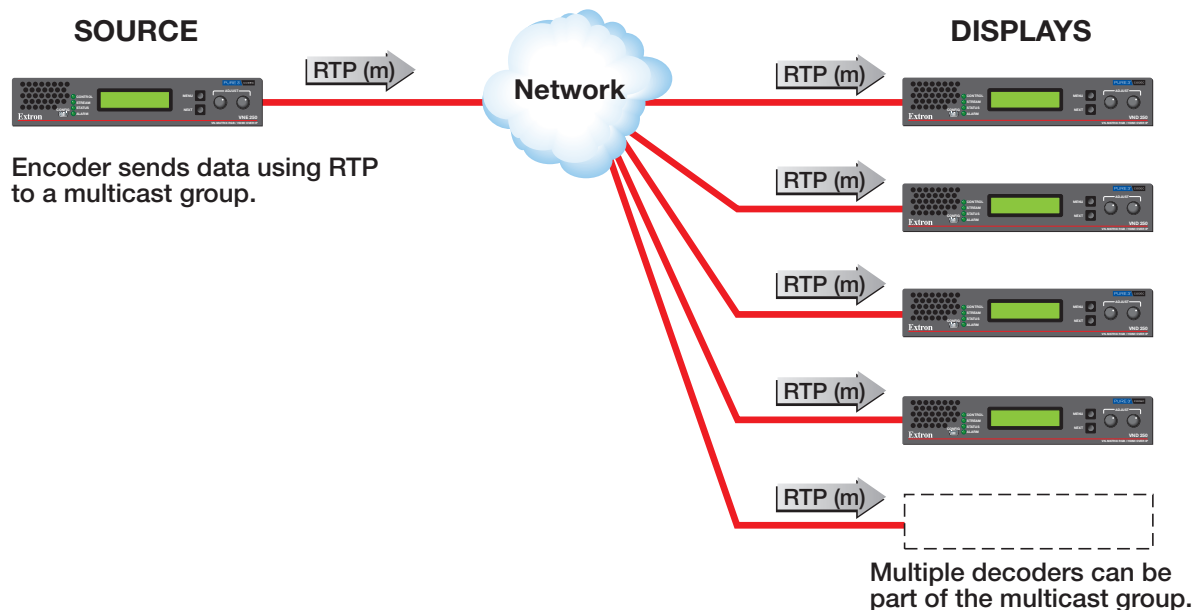
Figure 2.   **Multicast RTP Streaming**

The source encoder uses RTP to send data to a multicast group. The source does not need to know the IP address of the decoders that are using the source.

Multicast RTP provides very low latency which is important for video streaming. Unlike other protocols, RTP packets include a time stamp. If packets are received in the wrong order, they are sorted into the correct order for display or discarded if the time stamp is out-of-date.

However, because RTP is a connectionless protocol, data delivery is not guaranteed. When data packets are lost (for example, due to excessive network traffic) the VN-Matrix devices carefully manage the data stream to minimize image disruption.

Unicast RTP — An Overview

Similar to multicast RTP, this method uses a real-time variation of UDP, called unicast RTP. Unicast RTP is used where the network infrastructure does not support multicast traffic. Typically, this protocol is used for point-to-point configuration (single source to single display), but can be configured to stream to a maximum of four displays.

> **NOTE:** The encoder sends an individual stream to each decoder. This means that the total bandwidth of the VN-Matrix system increases as more decoders are added.

SOURCE

DISPLAYS

Encoder sends data using RTP to up to 4 specified decoders.
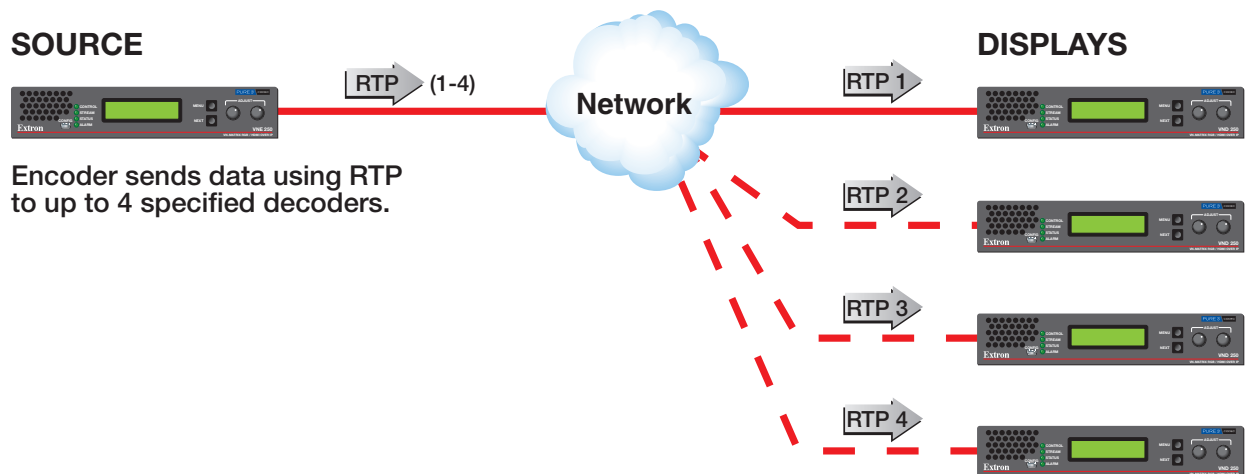
Figure 3. Unicast RTP Streaming

Unicast RTP provides very low latency which is important for video streaming. Unlike other protocols, RTP packets include a time stamp. If packets are received in the wrong order, they are sorted into the correct order for display or discarded if the time stamp is out-of-date.

However, because RTP is a connectionless protocol, data delivery is not guaranteed. When data packets are lost (for example, due to excessive network traffic) the VN-Matrix devices carefully manage the data stream to minimize image disruption.

Unicast TCP — An Overview

This method transports data using standard Transport Control Protocol (TCP) and should only be used for single point-to-point transfer of data.

TCP is a connection-based protocol and, therefore, data delivery is guaranteed. However, in the event of excessive network traffic, delivery can be delayed, impacting real-time performance.

SOURCE VN-MATRIX

DISPLAY VN-MATRIX

Encoder

Decoder makes a TCP connection with a specified encoder.
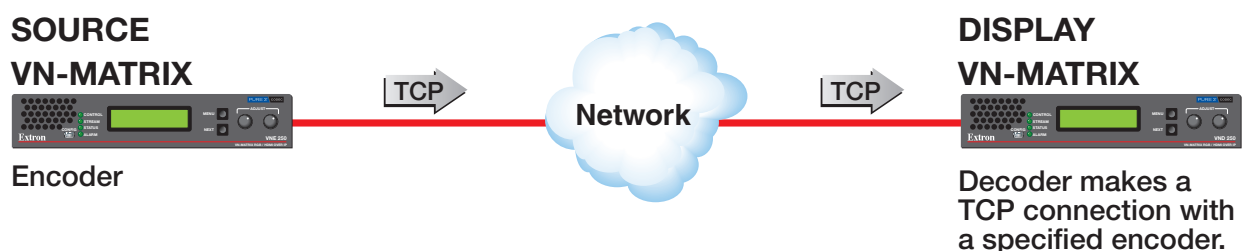
Figure 4. Unicast TCP Streaming

The decoder defines which source it connects to. Other than defining an IP address and source type (if required), no special source encoder setup is required.

Definitions

- **PURE3** — Specifically designed for network transmission of real time media (such as video or graphics, audio, data, and whiteboard elements), it features both spatial and temporal image compression, which allows for efficient bandwidth usage and eliminates the need for forward error correction.

  - PURE3 streams always contain video or graphic elements.
  - PURE3 streams may contain audio, data, and whiteboard elements that are associated with the video and graphic elements.

- **Streaming media (stream)** — Multimedia that is constantly received by (and normally presented to) an end-user while being delivered by a streaming provider. Internet television is a commonly streamed medium. Streaming media (stream) in this guide refers to a PURE3 media stream that is produced by a VN-Matrix encoding device.

- **Element** — The video, graphics, audio, (user) data, and whiteboard (annotation data) content that is contained within a stream.

- **Device license** — The number of licensed features that are available on a device within a VN-Matrix system. All devices contain a default license that offers a default level of functionality (see **License Menu** on page 55 for information about device licenses).

- **Controller license** — The license that is applied to the VNM EC 201 (see **Controller Firmware and License Updates** starting on page 158 for information about controller licenses).

- **(User) Data** — The transfer of user data between an encoder and a decoder. User data is created at the encoder, placed into the PURE3 stream, and sent to the decoder. The data is received in the same form that it was transmitted. This method of data transfer is unidirectional and can only be sent from an encoder to a decoder.

- **Whiteboard (wb) data** — Also known as annotation data, whiteboard data outputs text and/or simple pointer annotation onto local displays that are connected to VN-Matrix encoders or decoders. This type of data is bidirectional, which allows a decoder to send whiteboard data to an encoder.

Features

- **Manage, configure, and control all VN-Matrix units as a system**
- **Create system presets for stream routing and recording configurations**
- **Control VNS 104 Multi-Stream Decoding Software display configurations and streaming connections**
- **High-level interface provides single point of control from external control systems**
- **Manage multiple VN-Matrix systems in combined or independent domains**
- **Supplies the network heartbeat for encoder and decoder synchronization and communication.**
- **Removable Solid State Drive for reliability or temporary removal of sensitive system data**
- **Internal Extron Everlast power supply** — Provides worldwide power compatibility, with high-demonstrated reliability and low power consumption for reduced operating cost
- **Extron Everlast Power Supply is covered by a 7-year parts and labor warranty**

Panels and Cabling

This section provides information on:

- **Front Panel Features**
- **Rear Panel Features**
- **Installation Overview**

Front Panel Features

The front panel of the VNM EC 201 is shown in figure 5.
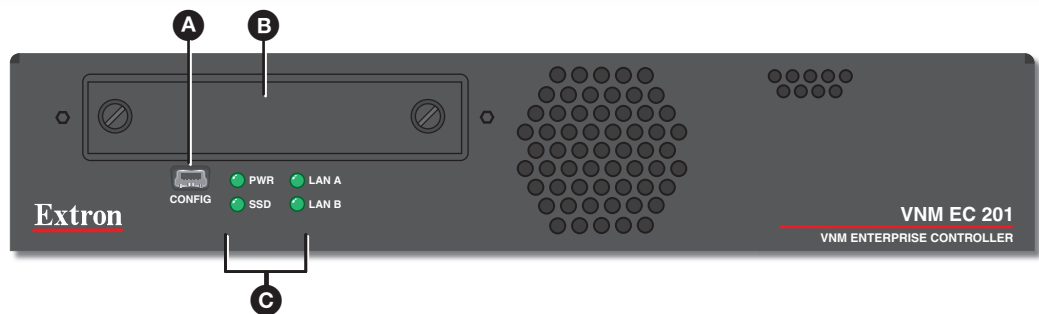
Figure 5.   VNM EC 201 Front Panel

Ⓐ **Config port** — Mini-USB config port for basic network configurations and system resets using Simple Instruction Set (SIS) commands.

Ⓑ **SSD Drive** — This removable drive holds the operating system (OS) and software required for operation.

Ⓒ **Status LEDs** — Four LEDs provide the status of the VNM EC 201 (see figure 6).

- **LAN A (Network Activity) LED** — Lights solid when a network link is established and flashes to indicate activity on the first network.

- **LAN B (Network Activity) LED** — Lights solid when a network link is established and flashes to indicate activity on the second network.

- **SSD (Drive Activity) LED** — Blinks to indicate drive activity.

- **PWR (Power) LED** — Lights when the controller is powered.

> **ATTENTION:**
>
> - **Do not** remove the SSD drive when the VNM EC 201 is powered on. Power down the controller (**Power Down Procedure** on page 11) before removing the drive.
>
> - Veuillez ne pas retirer le lecteur SSD lorsque le VNM EC 201 est en marche. Le contrôleur doit être éteint (voir la procédure de mise hors tension (**Power Down Procedure** on page 11) avant de pouvoir retirer le lecteur.

Rear Panel Features

The rear panel of the VNM EC 201 is shown in figure 6.

Figure 6.   **VNM EC 201 Rear Panel**

Ⓐ **Power input (IEC connector)** — Plug a standard IEC power cord into this connector to connect the controller to a 100 to 240 VAC, 50 Hz or 60 Hz power source. The EC 201 automatically starts.

Ⓑ **DisplayPort output** — Connect a compatible display.

Ⓒ **HDMI output** — Connect a compatible display.

Ⓓ **USB (Universal Serial Bus) ports** — Connection a for mouse and keyboard control during configuration to these two USB ports.

Ⓔ **Lan A port (eth0)** — Connect an RJ-45 cable to this port. This port connects to a primary network and is the default network port to connect the controller to a VN-Matrix network.

Ⓕ **Lan B port (eth1)** — This port is not required for normal operation and should not be connected.

Ⓖ **VGA output** — Connect a compatible VGA monitor to this port.

Ⓗ **RS-232 port** — Connect a host computer or control system to this connector. This port can control the VNM EC 201 using HLI commands (see **System Control** starting on page 154).

Ⓘ **Reset button and indicator LED** — Press the recessed button to initiate one of two reset modes to restore default configuration settings or all settings back to defaults. The LED indicates the desired reset mode, and provides the reset status during the reset operation (see **Rear Panel Reset** on page 8).

NOTE: The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords convert to the default (see **Accessing the Web-based User Interface** on page 10 for the default passwords).

Ⓙ **Recessed power button** — Press to initiate a safe shut down of the system.

NOTE: When the EC 201 has been shut down using the power button, there are two ways to start it again:

- Remove the power input (see figure 6, Ⓐ) and plug it back in.
- Press the recessed power button momentarily (Ⓙ).

Rear Panel Reset

The **Reset** button on the rear panel (see **figure 6**, **J** on the previous page) returns the EC 201 to default states depending on the reset mode. As shown in the reset mode summary, each reset affects different configurations and local files, resetting some to default condition and retaining others. The reset modes are used when the device IP address has been forgotten, when improper operation is detected, and to start a new configuration.

To enter each reset mode, see the EC 201 Reset Mode Summary table below.

> **NOTES:**
> - Each reset mode is a separate reset (not a continuation from mode 4 to mode 5).
> - For information on resetting the EC 201 using SIS commands, see **Resets** on page 201 of the Command and Response Tables.

	Mode	Activation	Result	Purpose and Notes
			EC 201 Reset Mode Summary	
Reset All IP Settings	4	Hold in the **Reset** button for about 12 seconds until the Reset LED blinks four times (once at 3 seconds, twice at 6 seconds, three times at 9 seconds, and four times at 12 seconds). Then, release and press **Reset** again within 1 second*.	Sets the following back to default: • IP address (192.168.254.254). • Subnet mask (255.255.255.0). • Gateway IP address (192.168.254.1). • MTU (Maximum Transmission Unit) (1500). • The Reset LED on the rear panel of the unit flashes four times in succession.	Used to reset IP address information. Equivalent to `Esc` 1ZQQQ← SIS command.
Reset to Defaults	5	Hold in the **Reset** button for about 15 seconds until the Reset LED blinks five times (once at 3 seconds, twice at 6 seconds, three times at 9 seconds four times at 12 seconds, and five times at 15 seconds.). Then, release and press **Reset** again within 1 second*.	Performs a complete reset to defaults (except the firmware). • Resets all mode 4 items. • Resets all IP options. • Clears all user configuration settings. • The Reset LED on the rear panel of the unit flashes four times in succession.	Useful when it is desired to start over with a new configuration. Equivalent to `Esc` ZQQQ← SIS command.

> **NOTE:** The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords convert to the default, which is **admin** for the **admin** and no password for the **user**.

> **NOTE:** * Nothing happens if the momentary press does not occur within 1 second.

Installation Overview

1. Power down and disconnect the VNM EC 201 and all devices.
2. Mount the controller (see **Mounting** on page 163).
3. Connect all devices to the controller (see **Front Panel Features** on page 6 and **Rear Panel Features** on page 7).
4. Power on all devices.
5. Connect a control PC to the VNM EC 201 and configure the controller (see **Accessing the Web-based User Interface** on page 10).
6. Use the VNM EC 201 and the web-based user interface to configure all connected devices.

Controller Configuration and Operation

This section provides information on:

- **Power Up Procedure**
- **Web-based User Interface Overview**
- **Accessing the Web-based User Interface**
- **Power Down Procedure**

Power Up Procedure

> **NOTE:** Before applying power to the VNM EC 201, ensure that all necessary devices are powered on and connected properly.

Plug the IEC power cord into the VNM EC 201 (see **Rear Panel Features** on page 7). The VNM EC 201 is configured to start automatically. The power LED lights indicating the unit is powered. It takes about 60 seconds to boot before it is fully operational.

Web-based User Interface Overview

The web-based user interface is used to configure the controller and operate connected devices in a VN-Matrix network. It is accessed by entering the IP address of the VNM EC 201 into a compatible web browser. The user interface provides system-level configuration, monitoring, and operation of VN-Matrix devices connected to the VNM EC 201. The following list outlines the main features of the user interface.

- Codec device configuration includes device name, compression settings, peripheral communications, and device mode.
- Monitor the network bit rate and active connections in a VN-Matrix system.
- Enable and configure the on-screen display (OSD) feature for VN-Matrix devices.
- Update the firmware of connected VN-Matrix devices.
- Record and play back video using a connected VN-Matrix recorder.
- Create and save presets to quickly reconfigure devices.
- Stream to desktops with VN-Matrix software decoders.

Web Browser Requirements

To access and view the EC 201 web-based user interface, use one of the supported web browsers (and versions) listed below.
- Google® Chrome™ version 46 or higher
- Mozilla® Firefox® version 41 or higher
- Microsoft® Internet Explorer® version 9 (for Windows® operating systems) or higher

> **NOTE:** Some of the embedded configuration and operation pages displayed via a web browser require the Adobe® Flash® Player plugin for proper viewing.

Accessing the Web-based User Interface

To access the web-based user interface:

1. Configure the network settings of a control PC so that it is compatible with the VN-Matrix network and connect the control PC to the VN-Matrix network.

2. Open a compatible web browser running on the PC or laptop connected in step 1.

> **NOTE:** See **Configuring the Network Settings** on page 13 for information on how to configure the network settings of the VNM EC 201.

3. In the address bar, enter the IP address of the EC 201 (default IP address is 192.168.254.254).

   The login screen opens in the browser (see figure 7). The controller is security protected.

> **NOTE:** If the web browser cannot access the web-based user interface, the security settings of the browser could require configuration.

Extron Electronics Matrix Enterprise Controller

Username: [   ]
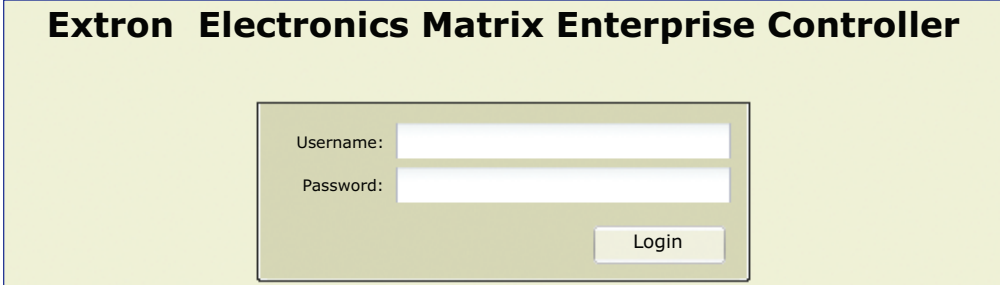
Password: [   ]

[Login]

Figure 7.   VNM EC 201 Login Page

4. Enter the appropriate username and password. Two profiles are available.

> **NOTES:**
> - The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords convert to the default, which are listed below.
> - The procedures detailed use the administrator username and password to configure the VNM EC 201. Extron recommends that the administrator username and password be given only to those who require it. Other users should use the guest login information to access the controller ensuring that important configuration settings are not changed.
> - Username and password entries are case sensitive.
> - For information on how to change the password, see **Changing the login password** on page 19.

Guest — This profile hides the `Configuration` and `Format Editor` tabs prohibiting system changes to the VNM EC 201.

- **Guest username** — Default: user
- **Guest password** — By default, no password is required.

Administrator — This profile allows full access to all of the web-based user interface configuration settings and is the default configuration profile.

- **Administrator username** — Default: admin
- **Administrator password** — Default: admin

5. Click **Login** or press <**Enter**>. The `Devices` page opens (see figure 8). The VNM EC 201 is now ready for configuration and operation.

> **NOTE:** The `Devices` page displays only devices properly configured to operate with the VNM EC 201 (see the user guides for individual devices for more information). The VNM EC 201 must also be configured properly.

Figure 8. Devices Page

The `Alarms`, `Configuration`, and `System Info` pages, are used to configure and operate the EC 201. The remaining tabs for the `Devices`, `Preset Manager`, and `Format Editor` pages can configure and operate connected devices.

Power Down Procedure

To safely power down the VNM EC 201, press the recessed power button on the rear of the controller (see **Rear Panel Features** on page 7). The power LED turns off.

> **NOTE:** Turning off the controller using the power button removes the main power, but standby power is still supplied to the system.

VNM EC 201 Configuration

This section details basic information needed to configure the settings of a VNM EC 201.

This section provides information on:

- **Setup Overview**
- **VNM EC 201 Configuration**
- **Configuring a Single EC 201 as the System Controller**
- **Configuring the VN-Matrix Devices**

> **NOTE:** For additional configuration information, see **Advanced Controller Configuration** on page 17.

Setup Overview

1. Use a network switch to connect the primary VN-Matrix network to the rear panel Ethernet connector (LAN A) of the VNM EC 201 (see **Rear Panel Features** on page 7.

2. Power on the VNM EC 201, all VN-Matrix devices present in the system, and all necessary devices (see **Power Up Procedure** on page 9).

3. Connect a control PC to the VN-Matrix network and navigate to the web-based user interface of the VNM EC 201 (see **Accessing the Web-based User Interface** on page 10).

4. Configure the settings of the VNM EC 201 (see **VNM EC 201 Configuration** on page 12.)

5. Configure the VNM EC 201 as the VN-Matrix system controller (see **Configuring a Single EC 201 as the System Controller** on page 15).

6. Configure the VN-Matrix system devices (see **Configuring the VN-Matrix Devices** on page 16).

7. If necessary, update the license of the VNM EC 201 (see **Controller Firmware and License Updates** on page 158).

8. Power down the VNM EC 201 (see **Power Down Procedure** on page 11) and all configured devices. After a few seconds, power on the VNM EC 201 and all necessary devices.

VNM EC 201 Configuration

This section details procedures on how to set up and configure a single VNM EC 201 (see **Advanced Controller Configuration** on page 17 for additional configuration information).

Configuring the Network Settings

The VNM EC 201 is pre-configured with the following network settings.

IP address:	192.168.254.254
Subnet mask:	255.255.255.0
Gateway:	192.168.254.1
MTU:	1500

> **NOTE:** With these settings, the units connected to the VN-Matrix network must use IP addresses within the range of 192.168.254.2 through 192.168.254.253 and use the same subnet mask.

Use the following procedure to change the network settings of the VNM EC 201.

1. Log on the VNM EC 201 **Accessing the Web-based User Interface** on page 10.

2. Click the `Configuration` tab (see figure 9, ❶).

   The `Configuration` page opens.
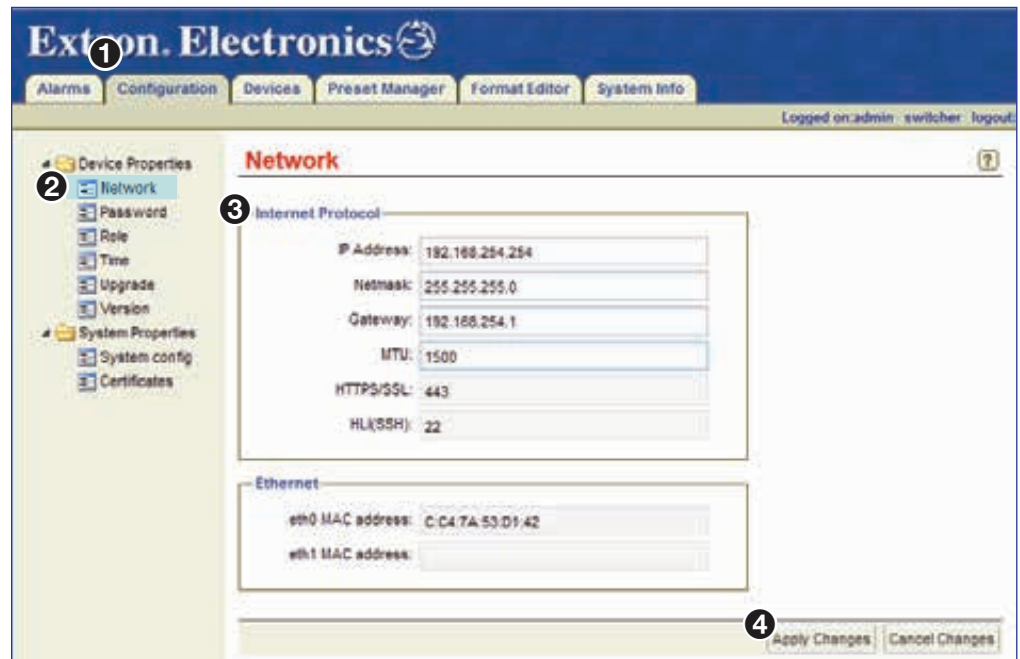
Figure 9. Configuration Page — Configuring the Network Settings

3. Under `Device Properties`, click the **Network** link (❷).

4. Change the **IP Address**, **Netmask**, **Gateway**, and **MTU** fields as necessary (❸).

   > **NOTE:** The default value of **1500** in the **MTU** field is the correct setting for most applications.

5. Click **Apply Changes** (❹), to save and apply the configuration.

6. Configure the IP address of the control PC so that it is within the address range of the VNM EC 201.

   > **NOTE:** Complete this step only if the IP address of the VNM EC 201 is using a **network prefix** other than **192**.**168**.**254**.xxx or **subnet mask** other than **255**.**255**.**255**.**0**.

7. If necessary, restart the control PC to save the configuration.

Configuring the Transport Protocol

Use the following procedure to configure the transport protocol that is used throughout the VN-Matrix system (see **Accessing the Web-based User Interface** on page 10 for information on how to log in).

1. Click the `Configuration` tab.

    The `Configuration` page opens (see figure 10, ❶).

Figure 10.   Configuration Page — Configuring the Transport Protocol

2. Click the `System config` link (❷).

3. From the `Protocol` drop-down list, select the preferred transport protocol that is used throughout the VN-Matrix system (❸).

    > **NOTE:**   The default transport protocol is **Unicast**. For more information on transport protocols (see **Transport Protocols Used for Streaming** on page 3).

4. Click `Apply Changes` (❹), to save the configuration.

Configuring a Single EC 201 as the System Controller

This section details how to assign a single VNM EC 201 as the system controller. Before proceeding, make sure the procedures detailed in **VNM EC 201 Configuration** on page 12 are completed first.

Adding the VNM EC 201 to the Controller List

Use the following procedure to add the VNM EC 201 to the controller list (see **Accessing the Web-based User Interface** on page 10 for information on how to log in).

1. Click the `Configuration` tab.

    The `Configuration page` opens (see figure 11, ❶).
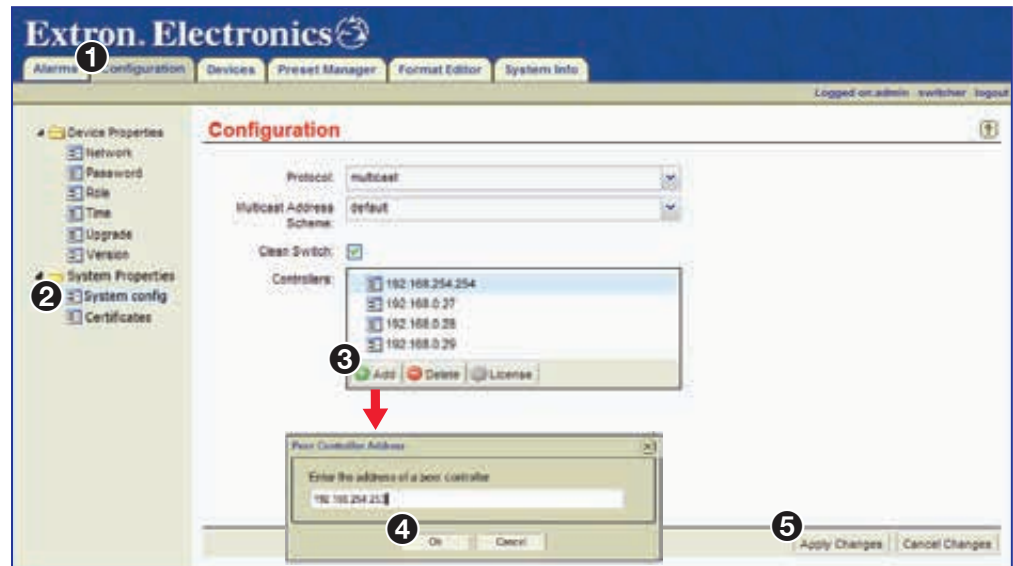
Figure 11.   **Configuration Page — Adding Controllers to the Controller List**

2. Click the `System config` link (see figure 11, ❷).

3. Click **Add** (❸). The `Peer Controller Address` (Add IP) dialog box opens.

4. Enter the IP address of this VNM EC 201 and click **OK** (❹).

> **NOTE:**   If necessary, clear the `Controllers` field. Highlight the displayed IP addresses and click `Delete`.

5. Click **Apply Changes** (❺) to save the configuration.

    The VNM EC 201 restarts the user interface, and is assigned as the system controller.

Configuring the VN-Matrix Devices

For the VNM EC 201 to function properly with connected devices:

1. Update each VN-Matrix device with the IP address of the VNM EC 201 and configure each device to operate on the same network as the VNM EC 201.

2. Access the VNM EC 201 web-based user interface by entering the IP address of the VNM EC 201 into the address bar of a web browser.

3. Use the web-based user interface to select one or more devices from the `Devices` page and use the `Actions` menu bar at the bottom of the page to configure the selected devices (see **Actions Menu Bar Features** on page 39, and **Mode Menu (VNC Devices Only)** on page 58).

For information on configuring VN-Matrix devices, see the user guide for each device.

Advanced Controller Configuration

The Configuration page contains eight pages to configure the general settings of the VNM EC 201. This section presents a detailed overview of each page. The following configuration pages are available:

- **Network Page**
- **Password Page**
- **Time Page**
- **Upgrade Page**
- **Version Page**

- **System Config Page**
- **Certificates Page**
- **System Info Page**
- **About the Default Multicast Address**

Network Page

The `Network` page (see figure 12) configures the primary physical (LAN A [eth0]) IP address of the VNM EC 201.

Figure 12.   Network Page

The following fields are available for configuration.

❶ IP Address — Enter a valid IP address into this field.

❷ Netmask — Enter a valid subnet mask into this field.

❸ Gateway — Enter a valid gateway address into this field.

> **NOTE:**   The `gateway address` field is only required if devices are on different subnets.

④ **MTU** (see **figure 12** on the previous page)— Enter a valid MTU into this field.

> **NOTE:** The default value of **1500** in the **MTU** field is the correct setting for most systems.

⑤ **HTTPS/SSL** — The HTTPS/SSL and HLI (SSL) section displays ports that are active when the EC 201 is running. These settings are read only and cannot be changed. Port values are shown whether the EC 201 is running in secure or unsecure mode.

⑥ **HLI (SSH)** — SSH port when the EC 201 is running in secure mode. The port displays one of two values:

- 9996 when not in secure mode.
- 22 when in secure mode.

⑦ **eth0 MAC address (LAN A)** — This field displays the Media Access Control (MAC) address assigned to the primary LAN A (eth0) IP address. This field cannot be modified.

⑧ **eth1 MAC address (LAN B)** — This field displays the MAC address assigned to the secondary LAN B (eth1) IP address. This field cannot be modified.

For information on how to change the network settings of the VNM EC 201, see **Configuring the Network Settings** on page 13.

Password Page

The `Password` page is used to set the passwords for the administrator and user profiles.

Figure 13.   Password Page

Changing the login password

1. From the **User** drop-down list, select **user** or **admin** to change the selected password.

> **NOTE:**   The user name entries (**user** and **admin**) cannot be changed.

2. Enter the desired password in the top **Password** field. The password can consist of letters, numbers, and the underscore character. Password entries are case sensitive.

3. Re-enter the password in the bottom **Password** field.

4. Click **Apply Changes**, to save the password.

> **NOTES:**
> - The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords convert to the default, which is **admin** for the **admin** and no password for the **user**.
> - Extron recommends that the administrator username and password be given only to those who require it. Other users should use the guest login information to access the controller ensuring that important configuration settings are not changed.
> - Username and password entries are case sensitive.

Time Page

The `Time` page on the **Configuration** tab (see figure 14) is used to manage the clock-related functions available on the VNM EC 201.

Figure 14.   Time Page

Reported Time Panel

This panel (❶) has a read-only field that displays the current system time of the controller that is logged in to.

Clock Synchronization Panel

This panel (❷) is used to select the master clock source for the controller. All devices in a VN-Matrix system (controllers, encoders, decoders, and recorders) reference a master system clock, sourced from the controller.

> **NOTE:**   If the system has only one VNM EC 201, it is not necessary to configure clock synchronization.

- If the **Enable Clock Synchronization** check box is **selected** (checked), the controller that is logged in offsets its own time to match the system time of the first VNM EC 201 in the **Sources** list. If the first controller fails, the system time of the second controller in the list is used as the reference, and so on.

- If the **Enable Clock Synchronization** check box is **not selected** (unchecked), the controller that is logged in references its own clock for the system time.

Adding controllers to the Sources list

NOTE: Only IP addresses of valid controller devices can be added to this list.

1. To add a controller to the list, click the [Add] button (see figure 15, ❶).

Figure 15. Sources Panel

The `Peer Controller Address` dialog box opens (see figure 16).
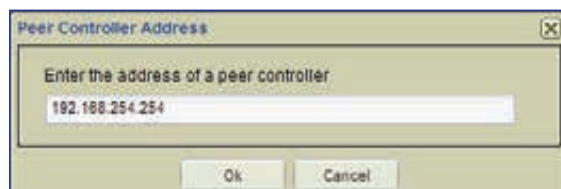
Figure 16. Peer Controller Address Dialog Box

2. Enter the desired IP address and click **OK**.

3. Repeat steps **1** and **2** for each controller in the VN-Matrix system.

4. When finished adding controllers, click **Apply Changes** (see **figure 14**, ❺).

Removing controllers from the Sources list

1. To remove a controller from the list, select a controller from the **Sources** list (❷).

2. Click the [Delete] button (see figure 15, ❷) to remove the selected IP address.

3. When finished, click **Apply Changes** (see **figure 14**, ❺).

Enabling clock synchronization

1. Add all of the controller IP addresses to the **Sources** list (see **Adding controllers to the Sources list)**.

2. Select (check) the **Enable Clock Synchronization** check box (see image on the right).

3. Click **Apply Changes** (❺) to save the setting.

4. Repeat this procedure for each controller device listed in the **Sources** list.
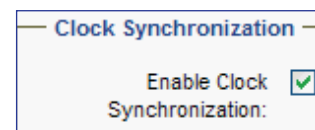
Disabling clock synchronization

1. Deselect the **Enable Clock Synchronization** check box (uncheck).

2. Click **Apply Changes** (❺) to save the setting.
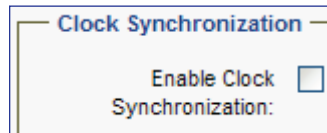
Clock Settings Panel

This panel (see **figure 14**, **❸** on page 20) is used to set the local time and date on the controller that is logged into.

Setting the time and date

> **NOTE:** Set the time zone **before** manually setting the time and date (see **Setting the time zone**).

1. Make sure **Enable Clock Synchronization** is **not selected** (unchecked).

    ```
    ┌─ Clock Synchronization ─┐
    │                          │
    │      Enable Clock  ☐     │
    │   Synchronization:       │
    └──────────────────────────┘
    ```

    > **NOTE:** If **Enable Clock Synchronization** is checked, the **Set time** and **Set date** fields are unavailable for selection.

2. Enter the time in the **Set time** field.

    | Set time: | 11:39:43 | ⌄ |

    - Use the HH:MM:SS (`hours:minutes:seconds`) format based on the 24-hour clock. For example, `08:25:00` or `20:35:10`.

3. Enter or select the date in the **Set date** field.

    | Set date: | 06/25/2019 | 🗓 |

    - Use the MM/DD/YYYY (`month/day/year`) format. For example, `05/14/2012`.

4. Click **Apply Changes** (see **figure 14**, **❺**) to save the configuration.

Time Zone Panel
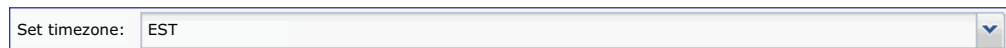
This panel (**❹**) is used to set the time zone.

Set timezone — Use the drop-down list to select the desired time zone.

> **NOTE:** Setting the time zone automatically adjusts the field in the `Reported Time` panel (see **Reported Time Panel** on page 20).

Setting the time zone

1. Select the desired time zone from the **Set timezone** drop-down list.

    | Set timezone: | EST | ⌄ |

2. Click **Apply Changes** (**❺**) to save the configuration.

Upgrade Page

The `Upgrade` page is used to update the firmware of the VNM EC 201. For information on updating the firmware of a single VNM EC 201, see **Updating the Firmware of a Single EC 201** on page 160.

Version Page

The `Version` page (see figure 17) details the versions of firmware running on various components of the VN-Matrix system.

Figure 17.   Version Page

The following fields are read-only (cannot be edited).

❶ **enterprise controller** — Displays the version of software running on the VNM EC 201.

❷ **matrix controller** — Displays the version of firmware running on the VNM EC 201.

❸ **heartbeat** —Not reported in normal operation.

❹ **pacemaker** — Not reported in normal operation.

❺ **drbd** — Not reported in normal operation.

❻ **linux kernel** — Displays the version of Linux running on the VNM EC 201.

System Config Page

The `System Config` page (see figure 18) is used to configure the following sets of control options.

- Transport protocol (multicast RTP, unicast TCP, unicast RTP)
- Multicast addressing schemes
- Clean switch
- Secure mode
- Controller listing and licensing
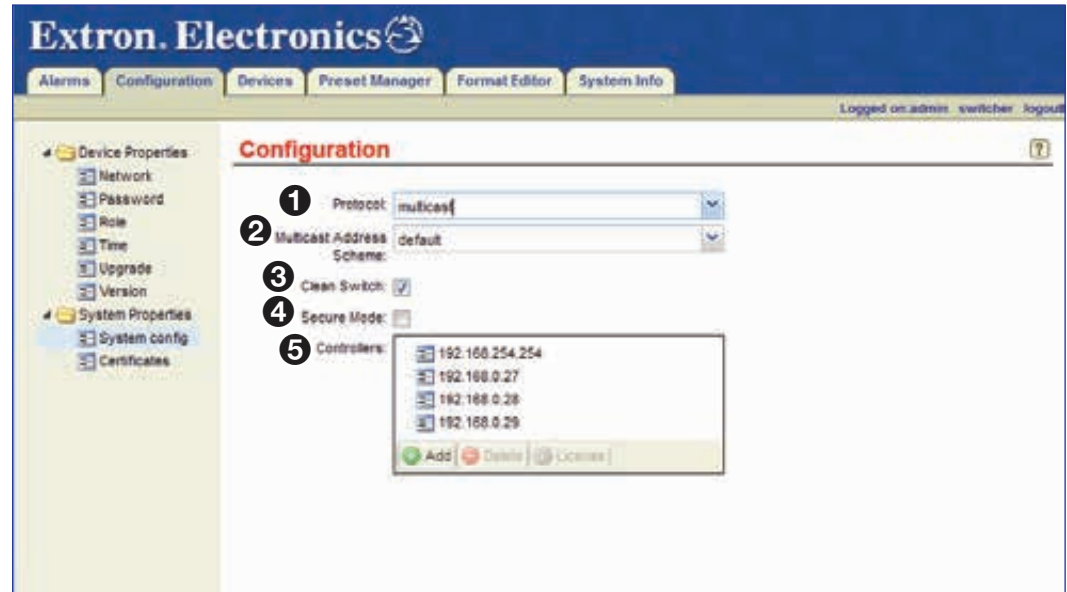
Figure 18.   System Config Page

The following options are available for `Configuration`.

❶ **Protocol** — Set the default transport protocol from the drop-down list. Three transport protocol selections are available.

- **multicast** — Supports unlimited endpoints (displays) per single stream (source) (see **Multicast RTP — An Overview** on page 3).
- **unicast** — Supports up to four endpoints (displays) per single stream (source) (see **Unicast TCP — An Overview** on page 4).
- **tcp** — Supports one endpoint (display) per single stream (source) (see **Unicast TCP — An Overview** on page 4).

❷ **Multicast Address Scheme** — Select the algorithm that calculates the multicast addresses within the VN-Matrix system from the drop-down list.

> **NOTES:**
> - Only set if `multicast` is selected in the `Protocol` field
> - Class C (`255.255.255.0`) subnet addresses are supported by default. Contact the Extron S3 Sales and Technical Support Hotline for other addressing schemes.

Four multicast address schemes are available (see **figure 18** on the previous page):

- **default** — This setting assumes that VN-Matrix devices on the system use Class C (255.255.255.0) subnet addresses. This is the default setting (see **About the Default Multicast Address** on page 30).

- **octet-0-1-3** — This is specific to systems that have special addressing schemes. This scheme is not suitable for use on standard system configurations and should not be used.

- **octet-1-3** — This scheme is specific to systems that have special addressing schemes. This scheme is not suitable for use on standard system configurations and should not be used.

- **octet-6-3** — This scheme is specific to systems that have special addressing schemes. This scheme is not suitable for use on standard system configurations and should not be used.

Select the **default** multicast address scheme and click **Apply Changes** (see **figure 14**, ❺ on page 20) to save the setting.

❸ **Clean Switch (VN-Matrix 2xx only)** — The clean switch feature allows glitch free transitions when switching between decoded streams.

- Select the check box to activate the clean switch option.

- Deselect to deactivate the clean switch option.

- Click **Apply Changes** (❺) to save the setting.

> **NOTES:**
> - The **scale output** feature must be **activated on the decoder** when using clean switch.
> - VN-Matrix 300 / 325 devices do not support clean switch and ignore this setting.

❹ **Secure Mode** — This feature allows the EC 201 to run in a secure mode. When selected, the web UI can only be contacted using HTTPS. The HLI server can only be contacted using SSH.

- Click the checkbox to activate the secure switch option. If it is checked, click it to uncheck (deactivate).

- Click **Apply Changes** in the lower right corner of the window.

❺ **Controllers** — This field adds the IP addresses of all singleton controllers. This field is used to keep the VNM EC 201 that is logged into aware of the devices it is controlling and the devices that are managed by the other controllers in the system. The field also allows streaming between devices managed by other controllers, as well as editing configuration options of devices connected to other controllers.

> **NOTE:** If only one controller is used in the VN-Matrix system, the IP address of the controller still needs to be added to this field. If the IP address is not added, the **Devices** page is empty (see **Actions Menu Bar Overview** on page 38).

Adding and removing controllers from this field is similar to adding and removing controllers on the **Time** page **Network Page** on page 17 (see **Adding controllers to the Sources list** on page 21 and **Removing controllers from the Sources list** on page 21 for information on how to add and remove controllers).

Certificates Page

The SSL Certificate is used to validate a secure connection between the web server of the VNM EC 201 and the web browser. When the VNM EC 201 is configured in secure mode the web browser must connect using Secure Socket Layer (SSL) which is denoted by the browser showing "https://" in the address bar.

The `Certificates` page allows the user to generate, download, and upload new security certificates when running the system in secure mode. The EC 201 includes a self-signed certificate which can be modified by the user. When modified, the EC 201 then generates a new self-signed certificate. If the company has its own signed certificate, it can be uploaded to the EC 201 from this page.

> **NOTE:** The ability to download or upload a certificate can only be done when the system is running in secure mode. This is to ensure that security keys cannot be intercepted by outside parties.

The `Certificate Details` panel displays the information for the currently loaded certificate (see figure 19).

Figure 19.   Certificates Page

The default self-signed certificate causes the browser to display a warning to the user that the site is not secure. The user must manually accept the connection. Once accepted, the browser and server communicate over a secure link.

Self-signed Certificate Generation

Users can generate a self signed certificate using the **Generate** (see figure 19, ❶) button.

- When **Generate** is selected, the `Certificate Details` fields are available to edit and can be modified with the user information.

- When changes are complete, select **Apply Changes** to save the current data.

- The new data then validates the SSL connection when the system is in secure mode.

- If the system is in secure mode and a new certificate is generated and saved, the web browser returns the user to the login screen. The user must login and manually accept the security warning.

When the system is running in secure mode it is possible to save the current certificate details. It is also possible to upload a previously saved self-signed certificate or a Certified Certificate.

> **NOTE:**   A Certified Certificate allows the client to connect without manually accepting the connection. The browser validates the certificate against the CA trusted list.

Generate a new certificate:

Generate

1. Click **Generate** (see **figure 19**, ❶ on the previous page).

    The `Certificate Details` panel (see **figure 19**) unlocks for editing.

2. Click on the desired fields.

3. Enter the required text.

4. When editing is complete, select **Apply Changes** (❹).

Apply Changes

Download the current certificate:

Download

1. Select **Download** (❷).

2. A dialog opens. Ensure that the `Save File` option is selected.

3. Click **OK**.

4. When the `Enter name of file to save to..` dialog box opens, browse to the desired save location for the certificate.

5. Click **Save**.

6. The certificate is saved and the dialog closes.

Upload a new Certificate:

Upload

1. Click the **Upload** button (see **figure 19**, ❸ on the previous page).

2. The `Upload Certificate` dialog opens (see figure 20).

3. Select **Browse**.
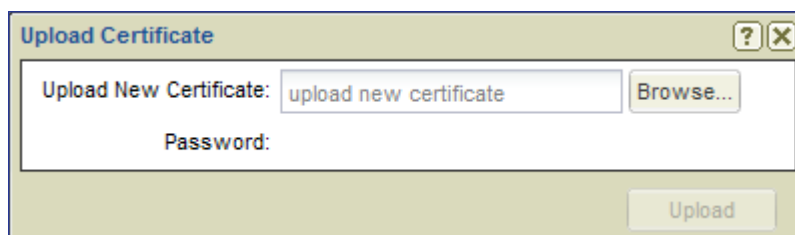
Figure 20.   Upload Certificate Dialog

The `File Upload` dialog opens (see figure 21).
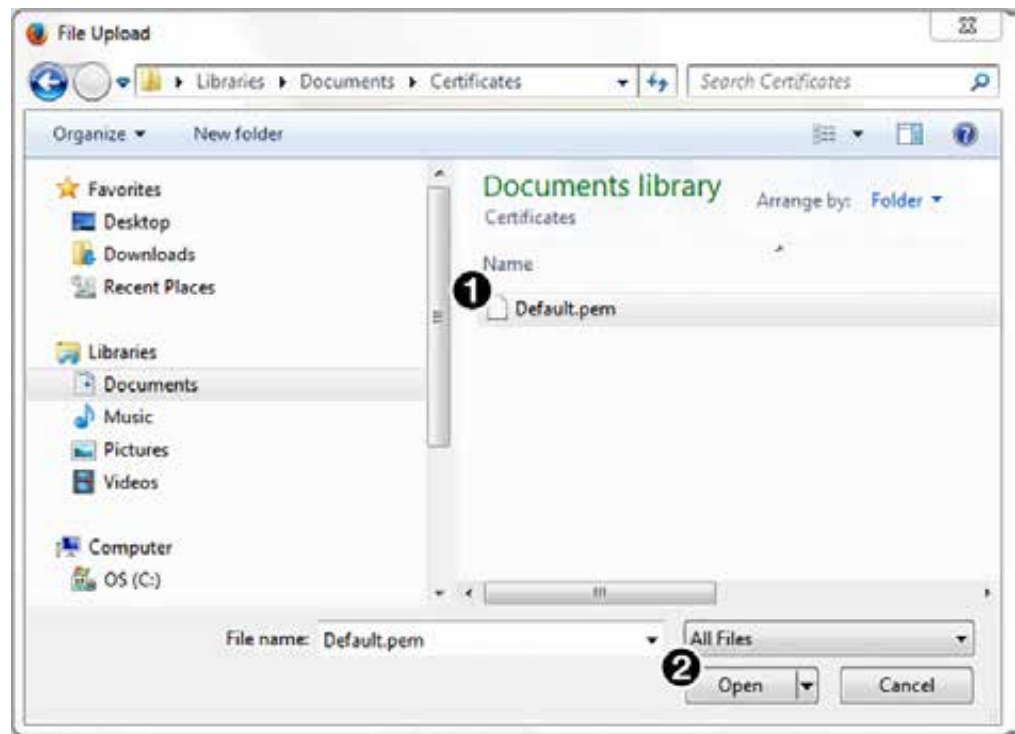
Figure 21. **File Upload Dialog**

4. Navigate to the folder where the new certificate resides and select the desired file (❶).

5. Click **Open** (❷). The certificate is prepared for upload to the EC 201.

   When the upload is complete, the `Upload Certificate` dialog opens with the new certificate file (see figure 22).
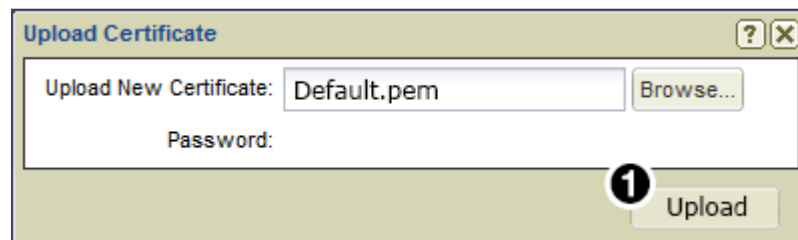
Figure 22. **Upload Certificate Dialog**

6. Click **Upload** button (see figure 22, ❶).

   The `Confirm Certificate Change` dialog opens (see figure 23).
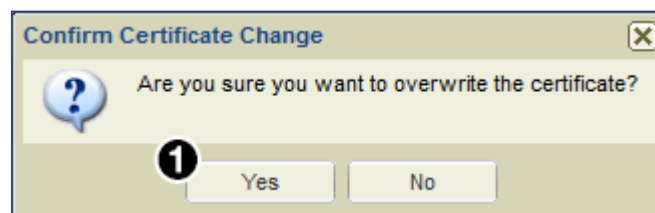
Figure 23. **Confirm Certificate Change**

> **NOTE:** If the certificate is password protected, the user is prompted to enter the password.

7. Click **Yes** to complete loading the new certificate (see figure 23, ❶).

System Info Page

The System Info page is accessed by selecting the **System Info** tab (see figure 24).

Figure 24. System Info Page

The System Info page displays general information about the VNM EC 201. If the VN-Matrix system contains multiple controllers, they are displayed on this page by IP address using individual columns. The following information is displayed.

❶ cluster_server — This field displays the role of the VNM EC 201 cluster as follows:

- **singleton** for a single.

❷ hli.memory_usage — Displays the amount of memory the VNM EC 201 cluster is currently using for the web-based user interface.

❸ hli.uptime — Displays the number of days the VNM EC 201 cluster web-based user interface has been operational.

❹ server.disk_usage — Displays the amount of disk space being used by the VNM EC 201 cluster to keep the VN-Matrix system operational.

❺ server.memory_usage — Displays the amount of memory being used by the VNM EC 201 cluster to keep the VN-Matrix system operational.

❻ server.uptime — Displays the number of days the VNM EC 201 cluster server has been operational.

❼ time.delta — Displays the time difference between the clock of this Controller and the reference time source. This value is normally less than one video frame.

❽ time.last_mark — Displays the date and time that the controller was last updated.

❾ time.last_rejam — Displays the date and time that the controller was force updated.

❿ time.last_switch — No longer required in normal operation.

⓫ time.source — Displays the device being used for clock synchronization within the VN-Matrix system.

About the Default Multicast Address

When multicast is chosen as the transport protocol, the VNM EC 201 assigns multicast IP addresses automatically. Four schemes are available. Each scheme is designed to calculate and assign a multicast address based on the IP address of an encoder device. This section details how the default multicast address scheme operates.

The default multicast address scheme is used for all VN-Matrix systems. It creates at least one and a maximum of four multicast addresses for each encoder. This is dependant on how many stream elements are selected for transport. The last two octets in the derived multicast address are derived from a standard 8-bit binary format. The table below details how the IP address is derived.

Default Multicast Address Scheme		
Address Type	**Address Format**	**Description and Comments**
VN-Matrix device IP address	`aaa.bbb.ccc.ddd`	**aaa.bbb.ccc.** is the subnet.
		ddd is a host number in the range **1** to **254**.
VN-Matrix device subnet mask	`255.255.255.0`	Subnet mask set on all devices.
Derived multicast address	`239.192.bbbxxxyy.zzzzzzzz`	**b** represents bits **8**, **7**, and **6**. • These bits are always **0**.
		x represents bits **5**, **4**, and **3** and is the channel number in the range **0** to **4**. • Encoders are always **0**. • Recorder channels are **0** to **4** as appropriate.
		y represents bits 2 and 1 and is the stream element number. • **00** = audio • **01** = video • **10** = whiteboard • **11** = data
		z represents the value of the fourth octet in the host IP address.

An example of how video multicast addresses are created is shown in the table below.

Video Multicast Address Example for IP Address 192.168.0.102			
Item	Value	Binary	Comments
Default Value for the First Two Octets			
First octet	239		All multicast addresses in this scheme use these values.
Second octet	192		
Deriving the Third Octet			This is a binary value derived as follows.
Bits 8, 7, 6 (**bbb**)	0	000 xxx yy	The most significant three bits are always **0**.
Channel number (**xxx**)	0	bbb 000 yy	The channel number for an encoder is **0**.
Video stream element (**yy**)	1	bbb xxx 01	The value for the video stream element is **01**.
Resulting third octet	1	000 000 01	
Deriving the Fourth Octet			
Fourth octet (**z**)	102		Takes the value of the last octet in the device IP address.
Final Multicast Address			
Video stream multicast address	239.192.1.102		

For each of the multicast group addresses, the VNM EC 201 creates two port numbers. The table below details how port numbers are derived.

Default Multicast Address Port Numbers		
Port Type	Port Format	Description and Comments
Base port number	9004	
Derived port number (even)	9004 + xxxyyzzzzzzzzE	**x** represents the channel number in the range **0** to **4**. • Encoders are always **0**. • Recorder channels are **0** to **4** as appropriate.
		y represents the stream element number. • **00** = audio • **01** = video • **10** = whiteboard • **11** = data
		z represents the value of the last octet in the host IP address.
		E represents the last bit. • **0** makes the port number an even value. • **0 + 1** makes the port number an odd value.
Derived port number (odd)	9004 + xxxyyzzzzzzzz0 + 1	Derived even port number plus **1**.

An example of how port numbers are created is shown in the table below.

Video Port Number Example for IP Address 192.168.0.102			
Item	**Value**	**Binary**	**Comments**
Base port number	9004		All multicast port numbers in this scheme start from this value.
Deriving the Port Number Offset			
Channel number (**xxx**)	0	000yyzzzzzzzzE	The channel number for an encoder is **0**.
Video stream element (**yy**)	1	xxx01zzzzzzzzE	The value for a video stream element is **01**.
Fourth octet (**zzzzzzzz**)	102	xxxyy01100110E	Takes the value of the last octet in the device IP address.
Last bit (**E**)	0	xxxyyzzzzzzzz0	Always **0** to make the port number an even value.
Port number offset value	716	00001011001100	**716** is the decimal value of the binary number.
Creating the Final Port Number			
NOTE: There are two port numbers associated with each multicast address. The even port number is for RTP stream data. The odd port number is for the associated RTCP data.			
Final port number (RTP, video)	9720		The sum of **9004** and the port offset value, **716**.
Second port number (RTCP, video)	9721		Even port number plus **1**.

Devices Configuration and Control

The VN-Matrix EC 201 is the center of an audio and video streaming network that connects and controls VN-Matrix hardware encoders, decoders, recorders, and software decoders.

The EC 201 can control all VN-Matrix devices residing on the same network. Each matrix device must have its system controller IP address set to the IP address of the EC 201.

The VN-Matrix devices are monitored and configured from the `Device List` page. Connections between the devices are made on the `Preset Manager` page and can also be made on the `Switcher` page. To enable rapid system configuration, the presets are saved for later use.

This section provides instructions on how to view VN-Matrix codecs, recorders, and software decoders on a VNM EC 201, configure the devices for proper operation, and to operate those devices in a VN-Matrix network.

Sections include:

- **Devices Page Overview**
- **Devices Page Features**
- **Actions Menu Bar Overview**
- **Actions Menu Bar Features**
- **Device Configuration**
- **VNM 200/225/300/325 Configuration**
- **VNM 250 Configuration**
- **Recorder Configuration**
- **VNS 104 Software Decoder Configuration**
- **Switcher Page**

For the VNM EC 201 to operate and control devices on the network:

- Update each VN-Matrix device with the IP address of the VNM EC 201 and configure them to operate on the same network as the VNM EC 201.

- Access the VNM EC 201 web-based user interface from a control computer on the same network by entering the IP address of the VNM EC 201 into the address bar of a web browser (see **Accessing the Web-based User Interface** on page 10).

- Use the web-based user interface to select one or more devices from the `Devices` page and use the `Actions` menu bar at the bottom of the page to configure the selected device (see **Devices Page Features** on page 34.)

For information on the configuration of VN-Matrix devices, see the user guide for each device.

Devices Page Overview

The VN-Matrix EC 201 is the center of an audio and video streaming network that connects and controls VN-Matrix hardware encoders, decoders, recorders, and software decoders. The controller provides support for third party system control using the HLI protocol.

The following VN-Matrix devices are discussed in this section:

Device	Description
VNM 2xx Series	DVI, HDMI, and RGB encoders, decoders and codecs
VNM 3xx Series	3G-SDI codecs
VNR 100	Single channel recorder/player
VNM Recorder	Five-channel recorder/player
VNS 104	Multi-stream software decoder

To use the devices in a VN-Matrix system, the EC 201 is required. The devices are added to the system, then configured for control from the EC. The controller connects the devices together in smaller systems to support specific operations and tasks using the **Preset Manager** on page 91.

Devices Page Features

The `Devices` page lists all VN-Matrix devices detected on the network and is the main page for configuring and managing devices. It is also the default page upon logging in (see figure 25).

Figure 25. Devices Page

> **NOTE:** If devices are added when the page is open, they might not automatically appear in this list. Refresh the page or click the **Devices** tab to update the list.

When a VN-Matrix device is detected and listed on the `Devices` page, an entry is always displayed even if the device is subsequently disconnected. All valid devices are listed by device name, followed by their current IP address.

> **NOTE:** Some listed devices do not show an IP address. These devices are inactive. A device is considered inactive if it is disconnected from the network or powered down.

The columns on the devices page detail important information about VN-Matrix devices. Each recognized device is listed (see **figure 25** on the previous page).

❶ **Status Icons** — The status of a device is indicated by a colored icon.

A device under active control and connected to the VN-Matrix network.

A device that is not under active control (not online in the VN-Matrix network).

❷ **Mode Icons** — The current configuration status of each device is identified by an icon.

An undefined device. This icon is shown when a codec device is connected to the VN-Matrix system for the first time and before it has been configured as a source or a display.

A VN-Matrix 200 / 225 device configured as an encoder (source).

A VN-Matrix 200 / 225 device configured as a decoder (display).

A VN-Matrix 300 / 325 device configured as an encoder (source).

A VN-Matrix 300 / 325 device configured as a decoder (display).

A VNE 250 encoder.

A VND 250 decoder.

A VNR 100 recorder.

A VN-Matrix 5-channel recorder.

A single sub-channel of a VN-Matrix 5-channel recorder.

A VNS 104 software decoder.

A single VNS 104 window. The lit window indicates the position of the window with active streaming (example icon indicates window 1).

> **NOTE:** A warning triangle over the device icon represents an issue or a problem with the device (such as the device not having an active source or display connection). Search for the device on the **Alarms Page** (see page 149) to see if the device contains an active alarm.

❸ **Device ID** — A unique identifier for each device is shown in this column.

❹ **Device Name** — The device name is displayed. To change the name of the device, see **Device Name** in the **Configure Menu** on page 63.

5 **IP Address** (see **figure 25** on page 34)— The IP address of the device is displayed.
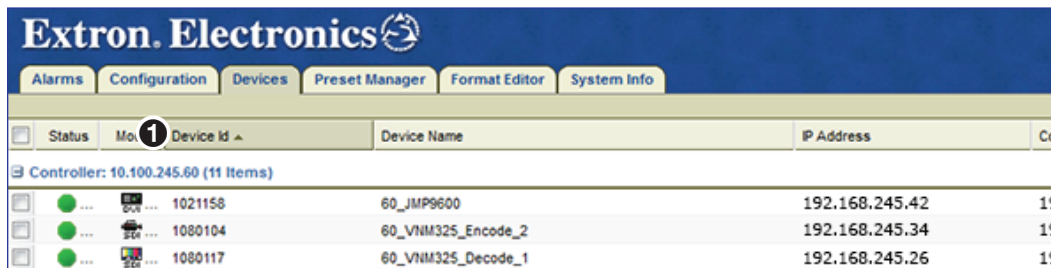
> **NOTE:** The IP address of a device is shown only if the device is currently present on the network and configured to use the VNM EC 201.

6 **Controller** — The IP address of the device acting as the system controller is displayed.

7 **Device Type** — The type of device connected to the VN-Matrix system is displayed.

8 **Version** — The current firmware version installed on each device is displayed.

> **NOTE:** To avoid compatibility issues, all devices of the same model must have the same version of firmware installed on each device.

Sorting Devices by Column
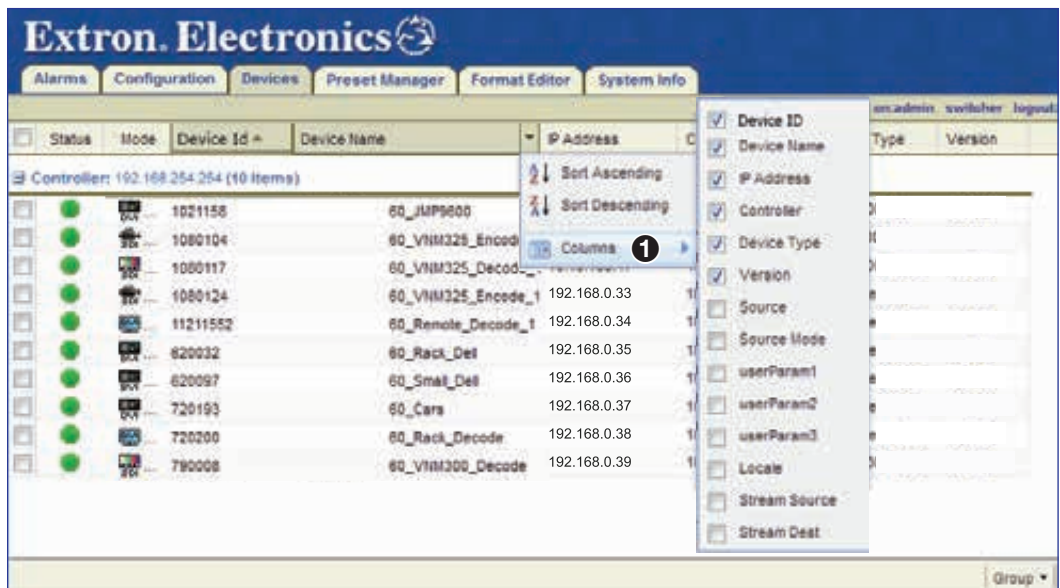
Columns can be sorted by clicking directly on any of the column names. Click a column name to sort the list in ascending or descending order. In figure 26, the devices are sorted by device ID number (**1**). The `Device Id` column is darkened and contains a ▲ icon to indicate the devices are sorted by the device ID number in ascending order.

Figure 26. **Sort by Device ID**

Hovering over the right side of a column name reveals a drop-down arrow ▶ that, when clicked, accesses the advanced column sorting menu (see figure 27, **1**). Use this menu to sort columns in ascending or descending order and populate the page with necessary information by adding or removing columns. A checkmark indicates the column is visible.

Figure 27. **Advanced Column Sorting**

Sorting Devices by Group

Devices can be sorted in groups using the **Group By** menu (see figure 28, ❶).
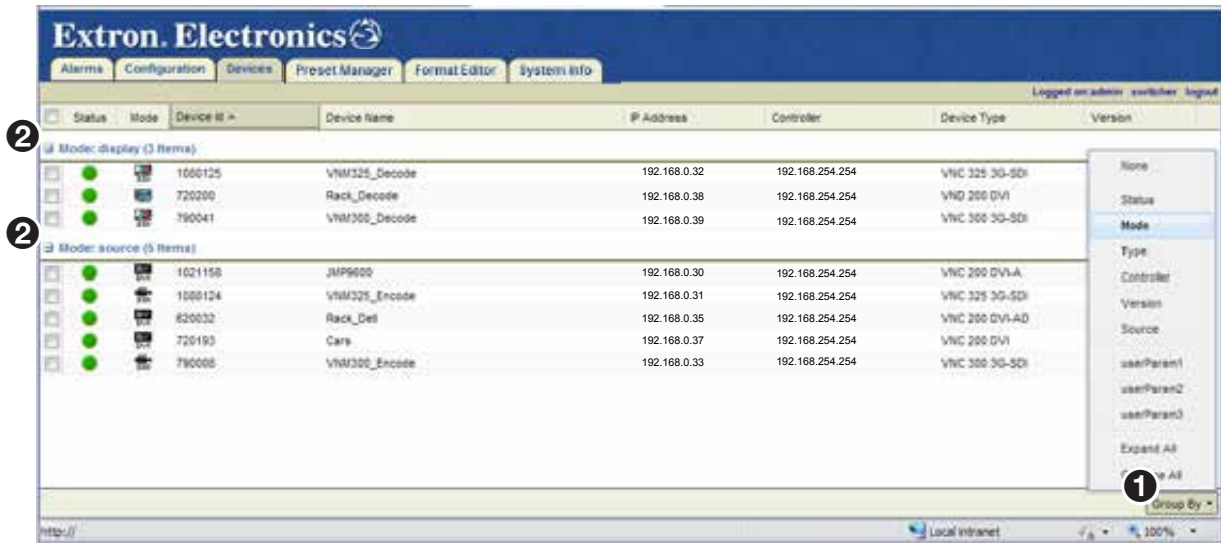
Figure 28.   Grouping Devices

The following group options are available:

> **NOTES:**
> - After selecting a grouping option, groups can be further sorted using column sorting. In figure 28, the devices are grouped by mode and sorted by device ID in ascending order.
> - Grouped devices can be expanded and collapsed by clicking on the square icon ⊟ located next to the group name (❷).

- **None** — Removes group sorting.
- **Status** — Organizes the devices into the following groups:
   - Active
   - No device
- **Mode** — Organizes the devices into the following groups:
   - Display
   - Recorder
   - Source
   - None
- **Type** — Groups the devices by their description (type). For example, all VN-Matrix 201/225/250/300/325 codec devices are grouped together, all VN-Matrix decoder devices are grouped together, all VN-Matrix encoder devices are grouped together, and so on.
- **Controller** — Groups the devices by system controller. When a VN-Matrix system contains more than one system controller, use this option to link the devices to each system controller.
- **Version** — Groups the devices by firmware version.
- **Source** — Groups each source by device ID. Displays or connections associated with each source are also grouped together. Similar devices that are not connected to a source are also grouped together.
- **Expand All** — Reveals all the devices. The devices are displayed under the appropriate group name.
- **Collapse All** — Hides all devices. Only the group names are displayed on the page.

Actions Menu Bar Overview

The `Actions` menu bar, located at the bottom of the `Devices` page when a device is selected, is used to check information, configure, license, and upgrade controlled devices. `Actions` menu items change with the selected device (see figure 29).

Encoder

| Actions: | Info | Connections | Configure | Format | Compression | Peripherals | License | Upgrade | Mode ▼ | Misc ▼ | | Group ▼ |

Decoder

| Actions: | Info | Connections | Configure | Format | Peripherals | License | Upgrade | Mode ▼ | Misc ▼ | | Group ▼ |

VN-Matrix Recorder

| Actions: | Info | Recorder | Configure | License | Upgrade | Misc ▼ | | Group ▼ |

VN-Matrix Recorder Sub-channel

| Actions: | Info | Recorder | License | Misc ▼ | | Group ▼ |

VNS 104

| Actions: | Info | Connections | Configure | Audio | Misc ▼ | | Group ▼ |

VNS 104 Decode Windows

| Actions: | Info | Format | Misc ▼ | | Group ▼ |

Figure 29.   Actions Menu Bar

Using the `Actions` menu bar, the following sections provide individual configuration and connection details for the various VN-Matrix devices.

1. Click a device on the `Devices` page (see figure 30) to open its action bar.

2. Click an action bar menu item to open a dialog box with configuration options for its intended operation.
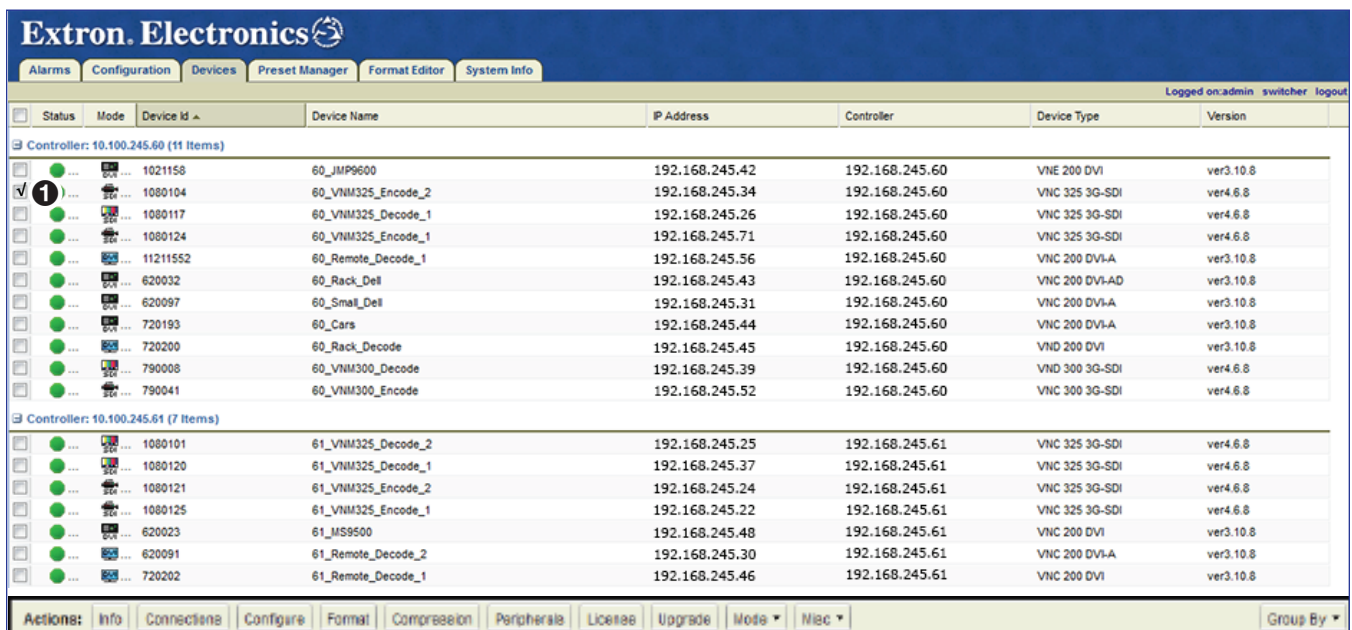
Figure 30.   Encoder Actions Bar

The VNM 325 is selected in the example in figure 30 (**❶**). Notice the check in the device selection box. When a device is selected, the `Actions` menu bar at the bottom of the page enables all options, connections, and configuration for the device.

Actions Menu Bar Features

The `Actions` menu bar buttons perform similar functions regardless of the device selected (see **figure 29** on the previous page). The following is an overview of each button and the devices they are associated with:

- **Info (all devices)** — Provides information about the device including the Device ID, Device Name, IP address (control and streaming), current status (active, inactive), and the network link status (poor, good). These items change depending on the selected device.

- **Connections (Encoders, Decoders, VNS 104)** — Provides a real-time display of the device connections.

- **Configure (Encoders, Decoders, VNS 104)** — Opens a dialog that provides the ability to name the device and enable the text overlay on the local display.

- **Format (Encoders, Decoders, VNS 104)** — Opens a dialog that shows the current status of the device and allows selection and control of the input or output format, video and audio properties, and other configuration options depending on the selected device.

- **Compression (Encoders)** — Opens a dialog used to configure the audio and video compression of the encoder and set the bitrate.

- **Peripherals (Encoders and Decoders)** — Configures the serial control port of the selected device.

- **License (Encoders, Decoders, and Recorders)** — Opens a dialog that shows information about the features that are enabled on the device.

- **Upgrade (Encoders, Decoders, and VNR 100)** — Opens a dialog that allows a firmware upgrade file to be downloaded to the selected device.

- **Mode (Encoders, Decoders)** — Opens a drop-down list used to set a selected codec device to either encoder or decoder operation.

- **Misc (All)** — Access five options from the drop-down list that includes a real-time bandwidth monitor, a delete device function to remove the selected device from the device list, a multiple device licensing upgrade application, an OSD ID editor, and an application to issue HLI commands to the system.

- **Recorder (Recorders only)** — Opens the recording browser to allow a user to select previously recorded streams. The browser provides information for each recording and allows users to manage the recordings of a selected device.

- **Audio (VNS 104 only)** — Opens the `Configure Audio Settings` dialog box. This dialog sets the level for the audio stream and also allows it to be muted.

> **NOTE:** Only one of the connected video streams is able to decode audio.

Device Configuration
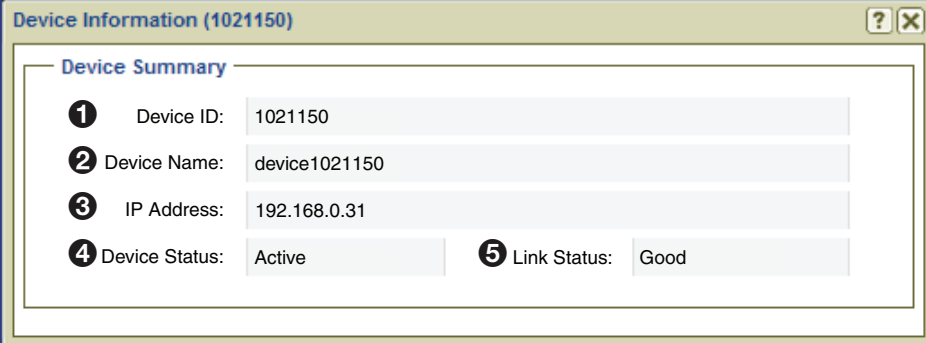
The next section describes the general configuration of VN-Matrix devices and applies to VN-Matrix hardware encoders, decoders, and codecs. For details on the configuration of the VNM-250 see **VNM 250 Configuration** on page 62; for VN-Matrix recorders see **Recorder Configuration** on page 77; and for software decoders see **VNS 104 Software Decoder Configuration** on page 82. For a full description of a specific function, see the user guide for the device.

The menus change slightly between the encoders, decoders, and codecs. Where differences exist, they are noted.

VNM 200/225/300/325 Configuration

Info Menu

Click **Info** button (see **figure 29** on page 38) to open the `Device Information` dialog box to display basic information for the selected VN-Matrix device (see figure 31).

Figure 31.   **Device Information (Encoder or Decoder Shown)**

The following fields are read-only (cannot be edited).

❶ Device ID — Displays the device ID number of the selected device.

❷ Device Name — Displays the name of the selected device.

❸ IP Address — Displays the IP address of the selected device.

❹ Device Status — Displays the status of the selected device:

- Normally it displays `Active` and the quality of the link is indicated in the `Link Status` field.

- If the device is missing or cannot be contacted on the network, it displays `No Device`.

❺ Link Status — Investigate whether the link to the device has sufficient bandwidth to carry the data and management traffic.

- A link status of `Good` indicates little or no management packet loss.

- A link status of `Fair` indicates a small amount of packet loss.

- A link status of `Poor` indicates a bad link.

Connections Menu

When devices are part of an active (launched) preset, the columns populate with the connection details of the selected VN-Matrix device (see figure 32).

Click the **Connections** button (see **figure 29** on page 38) to open the Connections dialog box.

VNM 200/225

VNM 300/325

Figure 32.   Connections Dialog Box

> **NOTE:**   The VN-Matrix 3*xx* connections dialog changes the **Whiteboard** column to **FEC Rows** and the **Data** column to **FEC Cols**.

The following fields are read-only (cannot be edited).

❶ Description —
  - For a **source**, it has the name of devices receiving a stream from the selected source.
  - For a **display**, it has the name of the device providing the stream.

❷ id — Displays the device ID of the connected device.

❸ Source —
  - For **unicast transports**, displays the IP address and port number of the source stream.
  - For **multicast transports** this value is zero on an encoder.

❹ Destination — Displays the IP address and port number of the stream receiver device.

❺ Locale —
  - Displays `loc` when the data streaming between source and display are controlled by the same controller (`loc`).
  - Displays `ext` if the data stream is exported across two different controllers or if the transport protocol is multicast RTP.

❻ Slot — Displays information depending on the type of transport protocol used.
  - For **unicast RTP**, the stream number is displayed. Four streams are available, numbered **0**, **1**, **2**, and **3**.
  - For **multicast RTP**, this field displays **0** for a source and **-1** for a display.

Configure Menu

To set global parameters specific to the VN-Matrix 200/225 and 3*xx* devices (see figure 33), click the **Configure** button (see **figure 29** on page 38).
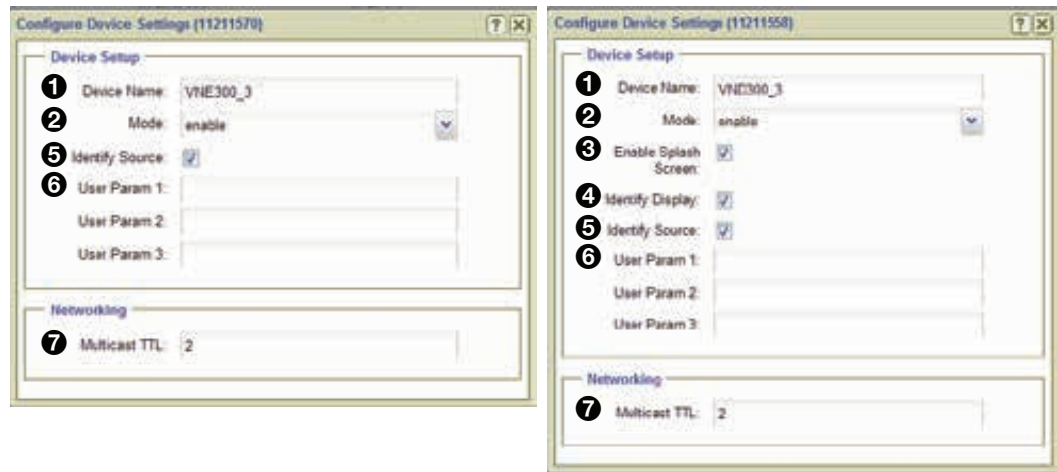
Encoder   Decoder

Figure 33.   Configure Device Settings

Device Setup panel

❶ **Device Name** — Enter a name for the device in this field. This name appears in the device list and can be comprised of letters, numbers, and the underscore character. Spaces are not allowed.

❷ **Mode** — Configure a device using one of four modes.

   • **enable** — This is normal operation.
   • **disable** — Stop streaming a source device to the network, but still show pass-through output. A display device outputs a splash screen.
   • **standby** — Stop streaming a source device and also disable pass-through output. On a display device this mode disables all output.
   • **test** — Shows a splash screen with the words `Test Mode` on a device (source or display). Normal streaming is suspended.

❸ **Enable Splash Screen (Decoder Only)** — Check this box to display a splash screen on the video output when no video stream is available.

❹ **Identify Display (Decoder Only)** — Check this box to show the device name on the connected display. The position and appearance of the label can be modified (see **OSD Identifier Editor (Encoders and Decoders)** on page 60).

❺ **Identify Source (Encoder)** — Check this box to display the name of the device on the image output to the loop-through connector. The position and appearance of the label can be modified (see **OSD Identifier Editor (Encoders and Decoders)**).

❺ **Identify Source (Decoder)** — Check this box to display the name of the currently connected encoder on the connected display. The position and appearance of the label can be modified (see **OSD Identifier Editor (Encoders and Decoders)**).

❻ **User Param [1, 2, 3]** — Enter user defined parameter names. When entering HLI or CLI commands into a control program from an external control system, the parameter names can be used to identify devices. The names can be comprised of letters, numbers, and the underscore character. Spaces are not allowed.

Networking panel

❼ **Multicast TTL** — Specifies the number of hops multicast traffic can make between routed domains when it exits a source. It is not used for TCP or unicast RTP traffic.

Format Menu (Encoders)

Click the **Format** button (see **figure 29** on page 38) to open the `Source Format` dialog box (see figure 34) used to view information about the incoming source. It is also used to make adjustments to the signal and to set the EDID options). The menu differs between the VN-Matrix 201/225 and VN-Matrix 3*xx* series.
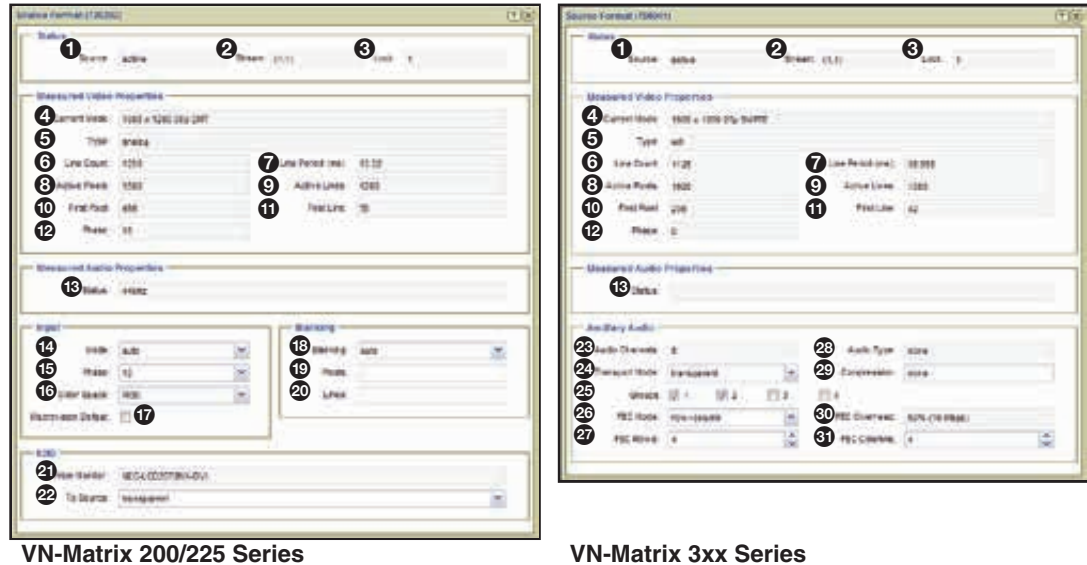
VN-Matrix 200/225 Series   VN-Matrix 3xx Series

Figure 34.   **Source Format Dialog Box**

NOTES:

- The `Status` panel and `Measured Video Properties` panel contain fields that are read-only (cannot be edited).

- This menu works differently when a decoder or a display device is selected. For information on how to use the menu for decoders and display devices, see **Format Menu (Decoders)** on page 48.

Status panel

❶ Source — Details the video input connection.

-   `Active` means a video source is recognized at the input.

-   `Unplugged` means no source is connected or there is no active video.

❷ Stream —

-   Displays `(1,1)` when the source is recognized and ready to stream.

-   Displays `(0,1)` the source is either not connected or not recognized.

❸ Lock —

-   Displays a value of `0`, if the VN-Matrix device has not locked on to the incoming source.

-   Displays a value of `1`, if the VN-Matrix device has locked on to the source.

Measured Video Properties panel

This panel provides information about currently connected sources (see **figure 34** on the previous page). The following fields are read-only (cannot be edited).

④ Current Mode — Details the current video resolution of the connected source. A complete list of supported resolutions is available in the *VN-Matrix 200*, *VN-Matrix 225*, *VN-Matrix 250*, *VN-Matrix 300*, and *VN-Matrix 325 User Guides*.

⑤ Type — Details the type of video format that is connected to the source.

> **NOTE:** The VN-Matrix 200/225 reports DVI or analog. The VN-Matrix 3xx reports SDI.

⑥ Line Count — Details the total number of lines used in the connected source.

⑦ Line Period (ms) — Details how often the lines of information are updated in milliseconds (ms).

⑧ Active Pixels — Details the number of active pixels used in the connected source.

⑨ Active Lines — Details the number of active lines used in the connected source.

⑩ First Pixel — Details the position of the first active pixel in a line.

⑪ First Line — Details the position of the first active line in a frame.

⑫ Phase — Details the current waveform phase setting. The phase setting can be adjusted in the **Input panel** (see below).

Measured Audio Properties panel (VN-Matrix 200/225 only)

This panel (see **figure 34**, **⑬**) provides the sampling rate of the incoming audio source for the VN-Matrix 200/225. The line is blank for the VN-Matrix 3*xx* (see **Ancillary Audio Panel (VN-Matrix 3xx Only)** on page 46 for audio details of the VN-Matrix 3*xx*).

Input panel (VN-Matrix 200/225 only)

This panel is only active for VN-Matrix 200/225 models and provides timing information for the connected analog sources (see **figure 34**).

> **NOTE:** This panel is only active when configuring analog source types.

⑭ Mode — VN-Matrix codecs support automatic video format detection for most standard source types. However, if a non-standard source type is used, the video format can be manually specified using this drop-down list.

⑮ Phase — Adjust the waveform phase setting with this drop-down list. This value should normally be set to `auto`. However, if a waveform suitable for automatic detection is not available, manually select a phase value to provide better image quality.

Automatic phase adjustment maximizes the contrast between pixels. A good image for phase adjustment should have adjacent black and white pixels.

> **NOTE:** Phase adjustment is only required on analog sources.

⑯ Color Space — Select between RGB and YPbPr video source types from this drop-down list.

> **NOTES:**
> - When `auto` is selected from the `Mode` drop-down list, the color space cannot be determined.
> - Component sources are detected as an RGsB video type.

17 **Macrovision Defeat** (see **figure 34** on page 43) — Macrovision copy protection is often applied to commercially produced videos and DVDs. This adds additional sync level pulses to the waveform which must be ignored for proper video detection.

- **Select** this check box if the source contains content protected with Macrovision copy protection.

- **Deselect** this check box for all other sources. Selecting this check box for non-Macrovision sources may result in tearing at the top of the image.

Blanking panel (VN-Matrix 200/225 Only)

18 **Blanking** — Adjusts the blanking setting with this drop-down list . This value is normally set to `auto`. However, if it is important that pixels on the very edge of the display are visible, setting this value to `manual` activates the `Pixels` and `Lines` fields so that offsets can be entered. The offsets are made relative to the `First Pixel` and `First Line` values of the source format selected on the `Format Editor` page (see **Format Menu (Encoders)** on page 43).

> **NOTE:** Blanking adjustment is only required on analog sources.

19 **Pixels** — Enter an offset to adjust the horizontal blanking. The value is entered as a positive (for example, 6) or negative (for example, -6) integer.

20 **Lines** — Enter an offset to adjust the vertical blanking. The value is entered as a positive (for example, 6) or negative (for example, -6) integer.

EDID panel (VN-Matrix 200/225 Only)

21 **From Monitor** — Reports the EDID of the locally connected display. If no display is present or the display does not support EDID, `No Device` is reported. This is a read-only field (cannot be edited).

22 **To Source** — Specifies the EDID device type the VN-Matrix unit identifies itself as when connected to a source from this drop-down list. Values are chosen from any of the stored EDID codes used on previously connected devices.

> **NOTE:** If the `transparent` option is selected, the EDID of the last display or the currently connected display is reported.

Ancillary Audio Panel (VN-Matrix 3xx Only)

The VN-Matrix 3*xx* models replace the `Input`, `Blanking`, and `EDID` panels with an `Ancillary Audio` panel for audio configuration (see figure 35). Configuration options change depending upon the model and the transport mode selection. The differences are noted in the following descriptions.

Transparent Mode

Stereo Mode (VNM 325 Only)

Figure 35.   Ancillary Audio Menus

❶ **Audio Channels** — Reports the number of available audio channels.

- **VN-Matrix 300** — 4, 8, 12, or 16 depending on the number of licensed groups.
- **VN-Matrix 325** — Reads **16** when the transport mode is set to **Transparent**. Reads **2** when the transport mode is set to **Stereo**.

❷ **Transport Mode** — A drop-down list with two selections:

- **Transparent** — Audio is transported in groups of 4 channels. Multiple groups (see **Selection Boxes** on the next page) can be selected for transport with payloads depending on the data: SDI (8 Mbps) or HDSDI/3G-SDI (16 Mbps).

  Transparent mode is supported on both the VN-Matrix 300 and 325.

- **Stereo** — Audio is transported in stereo pairs. Only one pair can be selected at a time. Stereo pairs have a payload of 2.4 Mbps.

  Stereo mode is supported for the 325 only.

❸ **Audio Type (Stereo mode only)** — Reports the format of the audio data stream.

- PCM 24, 48 KHz — HDSDI and 3GSDI (typical)
- PCM 20, 48 KHz — SDI (typical)

❹ **Compression (Stereo mode only)** — Select the compression to apply to the stereo audio signal from this drop-down list. The normal bitrate for a stereo pair is 2.4 Mbps.

- **Pack 24** — Sends all audio (20 or 24 bits) without compression and sends audio control data once per second.
- **Pack 20** — Same as Pack 24 except the least significant 4 bits of audio data are removed and set to zero. The bit rate is 1.92 Mbps.
- **Pack 16** — Same as Pack 24 except the least significant 8 bits of audio data are removed and set to zero. The bit rate is 1.54 Mbps.

- • **Decimate 2** — Same as Pack 16 except the sample rate is reduced to half. The bit rate is 768 Kbps.
- • **Decimate 4** — Same as Pack 16 except the sample rate is reduced to one-quarter. The bit rate is 384 Kbps.

❺ Selection Boxes — `Groups` or `Stereo Pairs` indicate different items depending on the selected transport mode (see **figure 35** on the previous page).

- • **Transparent** — Each box, when selected, indicates the number of audio groups that are transported with the video stream.

  - • **VN-Matrix 300** — The number of groups depends on the license of the connected device. The VN-Matrix 300 series can be licensed for up to four groups (see **Audio Channels** above).

  - • **VN-Matrix 325** — Up to four groups can be selected.

- • **Stereo** — The selection boxes indicate the stereo pair selected for transport with the video stream. Only one stereo pair can be selected at a time.

❻ FEC Mode (Transparent mode only) — FEC (Forward Error Correction) can be applied to the ancillary audio to protect against errors caused by packet loss when the data is transported over a network. FEC enables the decoder to recreate data that has been lost or corrupted without the need for retransmission. The FEC data is sent separate from the image and ancillary data. The level of FEC can be set to protect against different levels of data loss. This produces a corresponding change in the amount of data that is transported and thus, the bit rate is increased or decreased in proportion to the amount of FEC applied.

❼ FEC Rows (Transparent mode only) — Row FEC protects against the loss of a single packet. It is the simplest method of protection and results in the lowest overhead in terms of bitrate and latency. However, it is not able to handle consecutive (burst) packet loss. Refer to the *VN-Matrix 3xx Series User Guide* for details on how to configure this setting.

❽ FEC Overhead (Transparent mode only) — Reports the calculated overhead as a percentage of the signal bitrate.

❾ FEC Columns (Transparent mode only) — Protects against burst packet losses, providing that the burst of packet losses are not in the same row. Column `FEC` is known as 1D (dimension) FEC, as correction data is only calculated on one dimension (see the *VN-Matrix 3xx Series User Guide* for details on how to configure this setting).

NOTES:
- • The values set in the `FEC` row and column drop-down lists depend on the quality of the network link in use.
- • The FEC data can add a large overhead to the overall bit rate. Some settings, while providing a high level of reliability, are inefficient.
- • Settings that add little overhead may not provide a sufficient level of protection on networks with a poor Quality of Service (QoS).
- • The recommended starting point for the `FEC` row and column error correction is 5, 5.

Format Menu (Decoders)

When a decoder device is selected, click the **Format** button (see **figure 29** on page 38) to open the `Display Format` dialog box used to configure the output format of a decoder (see figure 36). The menu differs slightly depending on the selected VN-Matrix device.

> **NOTES:**
> - The `Current Format` field is read-only (cannot be edited).
> - This menu works differently when an encoder or a source device is selected. For information on how to use the menu for encoders and source devices, see **Format Menu (Encoders)** on page 43.

VN-Matrix 200/225 Display Format
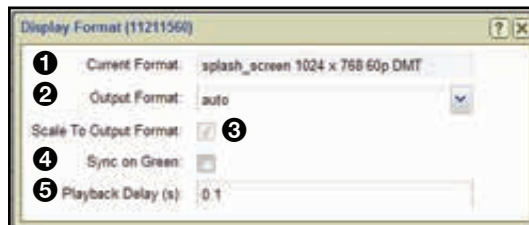
Figure 36. VN-Matrix 200/225 Display Format Dialog Box

❶ Current Format — Displays the current output video format of the selected VN-Matrix device.

- When the **Output Format** field is set to **auto**, this field displays the resolution of the decoded stream. If an exact match is not possible, then this field displays **Special** followed by the available resolution closest to the decoded stream.

- When the **Output Format** field is **not** set to **auto**, this field displays the chosen resolution.

- If the **Enable Splash Screen** check box is selected and the device is not connected to a stream (or not decoding), this field displays **splash screen 1024x768**.

❷ Output Format (VN-Matrix 200/225 only) — Select preset output video formats, plus an additional **auto** option from this drop-down list. Selecting a preset format forces the output of the VN-Matrix device to the selected format. Selecting **auto** matches the output video format to the native resolution of the decoded stream.

> **NOTE:** When a preset output format is selected, the **Scale to Output Format** check box **must be selected**.

❸ Scale to Output Format (VN-Matrix 200/225 only) — Select (check) this check box to enable scaling of the decoded stream to the resolution selected in the **Output Format** drop-down list. Upscaling and downscaling are supported.

> **NOTES:**
> - For smooth playback, select an output format with approximately the same frame rate as the source.
> - Scaling adds two frames of latency to the delay between source capture and display output.
> - Scaling is disabled when **auto** is selected in the **Output Format** drop-down list or when the scaling ratio is 1:1.

④ Sync on Green (SoG) (VN-Matrix 200/225 only) — Select (check) this check box (see **figure 36** on the previous page) to enable Sync on Green on the output analog waveform. When SoG is enabled, separate horizontal and vertical syncs are present on the analog output.

> **NOTE:** SoG is currently limited to the output of progressive modes. If an interlace mode is selected, the SoG request is ignored.

⑤ Playback Delay (s) — This field is used to enter the amount of time (in seconds) that the display waits before playing back the source stream.

VN-Matrix 3xx Display Format
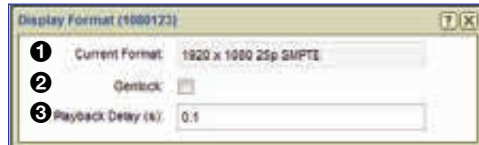
Figure 37.   VN-Matrix 3xx Series Display Format Dialog Box

The VN-Matrix 3*xx* series display format dialog box (see figure 37) shares two configuration options with the VN-Matrix 201/225 (see **figure 36**).

① Current Format

② Genlock — When selected, enables a local SDI source with the same refresh rate as the streamed video to act as a digital genlock signal to synchronize the decoder.

③ Playback Delay (s)

These configuration options function identically to those on the VN-Matrix 2*xx* series Display Format menu.

Genlock is added to the VN-Matrix 3*xx* menu, selected with the check box:

Compression Menu (Encoders Only)

When an encoder device is selected, click **Compression** (see **figure 29** on page 38) to open the `Compression Settings` dialog box used to set the amount of compression on the encoded source (see figure 38).
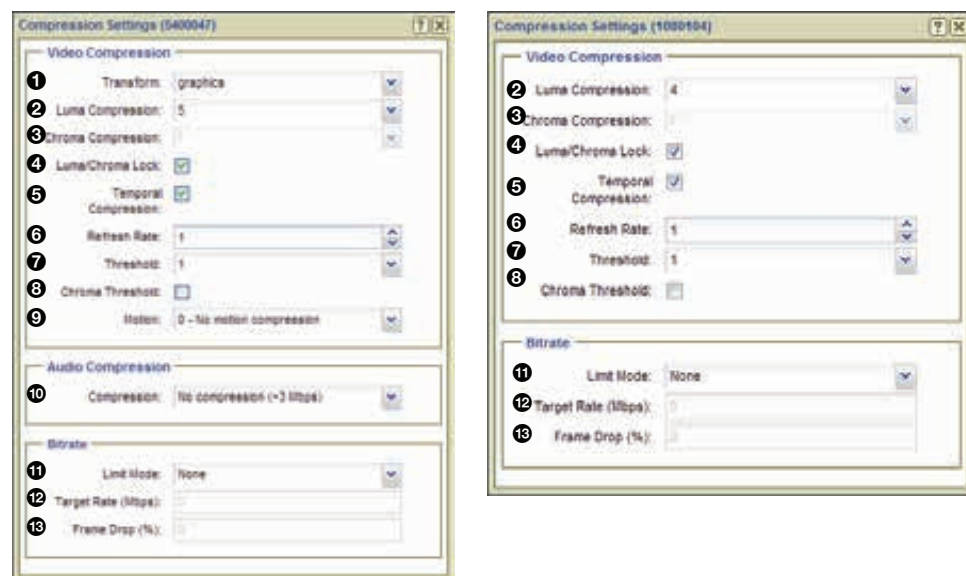
VNx 200/225 Series   VNx 3xx Series

Figure 38.   Compression Dialog Box

The configuration options have a direct effect on the network bandwidth required for the encoded stream.

- Increasing compression decreases the network bandwidth requirements for the stream.
- Decreasing compression increases the network bandwidth requirements for the stream.

Alternatively, the desired bandwidth can be set using the **Bitrate panel** (see page 52) and the VN-Matrix adjusts compression and frame rate to meet the specified bandwidth limit.

> **NOTE:** This menu is only available when an encoder device is selected.

Video Compression panel (see **figure 38** on the previous page)

❶ **Transform (VN-Matrix 2xx only)** — Two transform types are supported.

- **graphics** — Optimizes the video to support text and sharp lines, such as are present on most computer screens.
- **video** — Optimizes the video to support smooth tone changes such as are present in movies and other video content.

❷ **Luma Compression** — This drop-down list sets the amount of compression on the luma (black and white) portion of the signal. A value of **1** is the minimum amount of compression available; a value of **10** is maximum compression.

❸ **Chroma Compression** — This drop-down list sets the amount of compression on the chroma (color) portion of the signal. A value of **1** is the minimum amount of compression available; a value of **10** is maximum compression.

> **NOTE:** This field is available only when the `Luma/Chroma Lock` is not selected.

❹ **Luma/Chroma Lock** — Selecting this check box automatically sets the chroma compression value higher than the `Luma Compression` setting.

When the check box is selected, the `Chroma Compression` field tracks the `Luma Compression` field by a fixed value of +1 (Luma Compression = 1) or +2 (Luma Compression > 1).

❺ **Temporal Compression** — Selecting this check box causes areas of the screen to refresh only when a change between frames is detected. Enabling temporal compression can significantly reduce network bandwidth.

> **NOTE:** For all normal operation, `Temporal Compression` should be enabled.

❻ **Refresh Rate** — This field controls how frequently static parts of the screen are updated when the `Temporal Compression` check box is selected. This is useful when connecting new displays to a temporally encoded source and fills in gaps in the data when using a lossy network transport (such as RTP). A value of **1** refreshes the screen once a second; a value of **10** refreshes the screen once every ten seconds. A value of **0** disables the refresh. Valid settings are **1** though **17**.

❼ **Threshold** — This drop-down list controls the sensitivity of the temporal change detection algorithm. A value of **0** means any screen changes will be sent. Increasing the value increases the send threshold and reduces the network bandwidth. A setting of **0** is suitable for DVI computer generated sources. Sources with more noise or video-type motion should use a setting between **1** and **4**. Camera sources should always use values greater than **0**.

⑧ **Chroma Threshold** (see **figure 38** on page 49) — This check box controls whether the temporal algorithm should consider changes in the color (chrominance) of the image. Selecting this check box provides better results when using digital simulation type sources. However, this can increase the transmit bandwidth by up to 201%, so it should be disabled on bandwidth sensitive systems.

> **NOTE:**   The option is normally not required for video or camera type sources.

⑨ **Motion (VN-Matrix 2xx only)** — This drop-down list is used to adjust motion compression. The value can be set from **0** to **15**, where **0** is no additional motion compression and **15** is full motion compression. When enabled, motion detected on the area of the screen is heavily compressed. This reduces bandwidth when the eye cannot perceive significant detail due to the motion. When motion stops, the video continues at the standard resolution preserving screen integrity.

Audio Compression panel (VN-Matrix 200/225 only)

> **NOTE:**   The audio compression settings for the VNM 3*xx* series are located in the source format menu (see **Ancillary Audio Panel (VN-Matrix 3xx Only)** on page 46).

⑩ **Compression** — VN-Matrix supports limited compression of S/PDIF audio sources. This is controlled by the `Compression` setting. The S/PDIF digital data bus can carry two types of data: 2-channel uncompressed audio and encoded digital data, the latter often in AC-3 (Dolby Digital) format. The following compression values are supported.

Available Compression Settings		
Compression	**Stereo Audio Tracks**	**AC-3 Data Track**
`No compression`	24 bit native data (2975 kbps)	24 bit native data (2975 kbps)
`24-bit to 16-bit`	16 bit data, full sample rate (1517 kbps)	16 bit data, zeros run length encoded (430 kbps)
`44 kHz to 22 kHz`	16 bit data, 1/2 sample rate (784 kbps)	16 bit data, zeros run length encoded (430 kbps)
`44 kHz to 11 kHz`	16 bit data, 1/4 sample rate (418 kbps)	16 bit data, zeros run length encoded (430 kbps)`

Bitrate panel

The `Bitrate` panel (see **figure 38** on page 49) sets a specific bandwidth limit for the encoded stream.

⑪ Limit Mode — This drop-down list contains management modes that limit the instantaneous traffic on the network and drops traffic when the bandwidth rate is exceeded. This is useful when the network connection between the source and display has limited bandwidth.

> **NOTE:** Rapidly changing content may produce instantaneous peaks in bandwidth rate when using PBR-F management mode.

Six bandwidth management modes are supported.

- **None** — This mode does not use bandwidth management. Only the underlying compression settings are managed.

- **Manual Frame Drop** — This mode allows the user to specify the precise fraction of frames to drop. This mode does not manage the bandwidth rate at a fixed level, but does result in a smoother display update when using rapidly changing video content types.

- **Shared Flowrate (FD)** — This mode limits the total video network traffic for the source. Frames are dropped if the **instantaneous** data rate is higher than the flowrate entered in the `Target Rate (Mbps)` field.

- **Peak Flowrate (FD)** — This mode limits the video network traffic for a single source stream. Frames are dropped if the **instantaneous** data rate is higher than the flowrate entered in the `Target Rate (Mbps)` field. Using N output streams increases the bandwidth N times unless the multicast RTP transport protocol is used.

- **PBR-F** — This mode dynamically modifies the compression settings to limit the transmitted bandwidth depending on the specified value entered in the `Target Rate (Mbps)` field. The specified `Compression` setting is used as the minimum compression value. This control mode averages the bit rate over a period of two frames.

- **PBR-F (FD)** — This mode is the same as `PBR-F` except frames are dropped when a larger bandwidth reduction (such as a reduction that cannot be achieved with compression settings alone) is required.

⑫ Target Rate (Mbps) — This field is used in all bandwidth management modes (except `Manual Frame Drop`) to specify the network bandwidth used by the source. This value is specified in Megabits per second (Mbps).

⑬ Frame Drop (%) — This field is used in `Manual Frame Drop` mode and specifies the percentage of frames to discard. A value of **95%** discards 19 out of every 20 frames reducing a 60 frames per second (fps) video signal to 3 fps (1 fps is the minimum frame rate). A value of **99%** results in all frames being dropped due to rounding.

Peripherals Menu

Click **Peripherals** (see **figure 29** on page 38) to open the `Peripherals Settings` dialog box to manage remote keyboard and mouse communications on a VN-Matrix 200/225 (see figure 39).

> **NOTE:** Mouse and keyboard functions are supported by VN-Matrix 2*xx* series devices only. For a complete description, see the device user guide at **www.extron.com**.

Encoder   Decoder

Figure 39.   Peripherals Dialog

Serial Port

This panel (see figure 39) configures the RS-232 port on VN-Matrix encoder and decoder devices. For a full description of the serial port configuration, including server/client setup, see the User Guide for the device. Default settings are shown in figure 39.

❶ **Mode** — The serial port can operate in one of three modes:

- **None** — The serial port is not used.
- **Pass-through server** — The serial port acts as a destination for serial port clients.
- **Pass-through client** — The serial port connects to server serial ports on other devices.

A point to point link can be established by setting the serial port of one VN-Matrix device to pass-through server mode and a second device to pass-through client mode. The destination of the second device is set to the pass-through port on the first (server) device.

A server can accept multiple client connections. Under these conditions the data input by the server serial port is duplicated to all connected clients. The data received from the clients is multiplexed (in order of arrival) and output through the server serial port.

- **RS-232 Settings** — (see **figure 39**, **②** through **⑥** on the previous page). Basic configuration of the serial port includes baud rate, data bits, stop bits, parity, and handshake.

- **Destination** — This option (**❼**) can only be modified when the serial port is in client mode. The dropdown list allows a pass-through connection request from each VN-Matrix device in the network, regardless of whether the device is currently configured as a server.

Data Channel

The data channel panel (see **figure 39**) configures the UDP data stream.

❽ **UDP Data TX (encoder)** — Enables or disables UDP data transport through the dataport.

❽ **UDP Data Port (encoder)** — The port number to receive UDP traffic on. This setting must match the port number defined by the external device or system that generates the UDP data.

❾ **UDP Data RX (decoder)** — Enables or disables the UDP data.

❾ **UDP Dest IP (decoder)** — The IP address of the external device or system that receives UDP traffic. UNICAST or MULTICAST addresses are valid.

❿ **UDP Dest Port (decoder)** — This is the port number used by the (external) device or system to receive the UDP data.

Pointer Overlay

⓫ **Overlay: (encoder)** — Enable the overlay pointer on the local loop-through display.

⓫ **Annotation Port: (decoder)** — Read-only value of the annotation port.

Mouse and Keyboard

⓬ **Mode** — Device specific.

Encoder — Enabled, allows mouse and keyboard forwarding.

Decoder — This control has four options:

- **`Disable`** — The decoder does not forward mouse and keyboard information.
- **`Keyboard`** — The decoder forwards mouse and keyboard information.
- **`Keyboard + keepalive`** — The link is automatically established if broken.
- **`Force`** — Mouse and keyboard forwarding + keepalive is permanently enabled.

⓭ **IP Address** —

Encoder — Not Required.

Decoder — Used to specify the IP address of the target encoder when the transport is multicast or when the encoder exists on a different controller domain.

> **NOTE:** Leading zeros are not allowed.

⓮ **Status** — Read-only, is the current status of the Link.

Encoder — Disabled, local, or remote keyboard and mouse is displayed.

Decoder — Disabled, local, or forwarding is displayed. In case of a connection error, a reason is shown in brackets.

⓯ **Inactivity:** — Read-only, (decoder only). Displays the number of seconds since the mouse or keyboard reported a change.

License Menu

Click **License** (see **figure 29** on page 38) to open the `Device License Management` dialog box. This dialog displays the enabled features on the selected unit and also enables optional features (see figure 40).

VN-Matrix 200/225

VN-Matrix 3xx
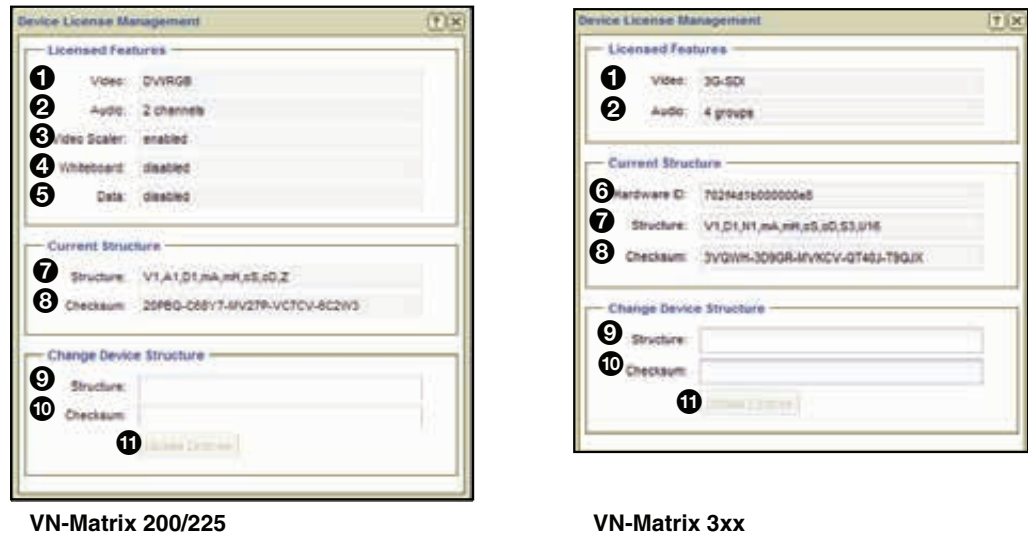
Figure 40.   License Menu

> **NOTE:** The `Licensed Features` panel and `Current Structure` panel fields are read-only.

Licensed Features panel

The `Licensed Features` panel details the features currently enabled on the device.

❶ **Video (all)** — Details the input signal format type.

❷ **Audio (all)** — Details the number of supported audio channels.

❸ **Video Scaler (VNM 200/225)** — Details if video scaling is enabled or disabled.

❹ **Whiteboard (VNM 200/225)** — Details if whiteboard data streaming is enabled or disabled.

❺ **Data (VNM 200/225)** — Details if data streaming is enabled or disabled.

Current Structure panel

❻ **Hardware ID (VNM 3xx only)** — Displays the hardware ID of the device.

❼ **Structure (all)** — Details the current structure key used by the selected device.

❽ **Checksum (all)** — Details the current checksum used by the selected device.

Change Device Structure panel

> **NOTE:** See **Update a device license** below for information on updating the structure key and checksum.

> **ATTENTION:**
>
> - **DO NOT place information for a VNM EC 201 license** into this menu. Doing so causes the device to stop responding.
> - Ne pas mettre d'informations pour une licence VNM contrôleur entreprise dans ce menu. Si c'est le cas l'appareil risque d'arrêter de répondre.
>
> - This menu is used for **updating a device license** only (see **Controller Firmware and License Updates** on page 158 for information about VNM EC 201 licenses).
> - Ce menu est utilisé seulement pour mettre à jour la licence d'un appareil (voir **Controller Firmware and License Updates** on page 158 pour obtenir des informations sur les licences du contrôleur VNM EC 201.

⑨ Structure — This field is used to update the structure key used by the device.

⑩ Checksum — This field is used to update the checksum used by the device.

Update a device license

To obtain and install a new device license, follow the procedure below.

1. Contact the Extron S3 Sales and Technical Support Hotline and provide the following information:
   - The **device ID** of the VN-Matrix device. This can be obtained from the back of the device.
   - The **order number** of the VN-Matrix device.
2. The Extron S3 Sales and Technical Support Hotline provides a **structure key** and a **checksum**.
   - Enter the **structure key** into the `Structure` field (see **figure 40**, ⑨ on the previous page).
   - Enter the **checksum** into the `Checksum` field (⑩).
3. Click `Update License` (⑪) to save the new license.

Upgrade Menu (2xx and 3xx Devices)

Click **Upgrade** (see **figure 29** on page 38) to open the `Upgrade Device Firmware` dialog box used to upgrade the firmware of one or more VN-Matrix devices (see figure 41).

> **ATTENTION:**
>
> - Ensure that compatible firmware is used to upgrade the selected VN-Matrix devices.
> - Assurez-vous qu'un firmware compatible est utilisé pour mettre à jour les appareils VN-Matrix sélectionnés.
> - Upgrading with incorrect firmware can cause the VN-Matrix devices to stop responding.
> - Effectuer une mise à jour incorrecte de firmware peut interrompre les communications avec les appareils VN-Matrix.

Figure 41.   Upgrade FW Dialog

> **NOTE:**   When the VNM EC 201 is running in secure mode (see **System Config Page** on page 24), devices cannot be upgraded. Take the controller out of secure mode for the upgrades, then place it back in secure mode after completing the upgrades.

❶ **Select a Version** — This drop-down list contains previously uploaded firmware versions that are available.

❷ **Upload New Version** — Click **Browse** to upload new firmware versions. New firmware versions uploaded to the VNM EC 201 are added to the **Select a Version** drop-down list.

To upgrade the firmware:

1. Select a device or multiple devices from the `Devices` page (see **Devices Page Features** on page 34).

2. Click **Upgrade** on the `Actions` toolbar (see **figure 29** on page 38).

3. Select the desired version from the **Select a Version** drop-down list (see figure 41, ❶) and click **Upgrade** (❸).

If the desired version is not available in the **Select a Version** drop-down list:

1. Select a device or multiple devices from the `Devices` page (see **Devices Page Features**).

2. Click **Upgrade** on the `Actions` toolbar.

3. Click **Browse** (❷) and navigate to the appropriate location of the firmware. When the firmware is selected, it is uploaded to the VNM EC 201.

4. After the proper firmware is uploaded, select the version from the **Select a Version** drop-down list (❶) and click **Upgrade** (❸).

NOTES:
- If a VN-Matrix device selected for upgrade already contains the latest version of firmware, the upgrade status displays `WAIT`. If multiple devices are selected for upgrade, the devices already containing the firmware upgrade display `WAIT` while the other devices are upgraded (see figure 42).
- See **Update a device license** on page 56 for information on updating the structure key and checksum.
- The firmware for the VN-Matrix 2*xx* series differs from the firmware for the VN-Matrix 3*xx* series. Upgrading multiple devices is possible only when selected devices are either all VN-Matrix 2*xx* series or all VN-Matrix 3*xx* series.
- The VNM Recorder cannot be upgraded from this page (see the *VNM Recorder User Guide* at **www.extron.com**).

Upgrade Device Firmware			? X
Device	Vers	Up Vers	Status
11212090	ver4.6.9	ver4.6.9	Done
11212068	ver4.6.9	ver4.6.9	Done
11212094	ver4.6.9	none	WAIT
11212093	ver4.6.9	none	WAIT

Figure 42.   Device Firmware Upgrade Status

Mode Menu (VNC Devices Only)

The mode menu assigns VN-Matrix codec devices as decoders or encoders.

NOTE: Choosing a mode or toggling a device between an encoder and a decoder can take a few seconds after the selection is made.

To configure a codec device as a decoder or encoder:

1. Select a codec device or multiple codec devices from the `Devices` page (see **Devices Page Features** on page 34).

2. On the action toolbar, click **Mode** (❶).

    The **Mode** menu opens.
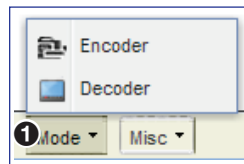
3. Select **Decoder** to set the codec as a display device or select **Encoder** to set the codec as a source device.

Misc Menu

This menu contains five selections (see figure 43).

- **Real-time Bandwidth Monitor**
- **Delete Device**
- **Multiple Device Licensing**
- **OSD Identifier Editor (Encoders and Decoders)**
- **Send HLI Command**
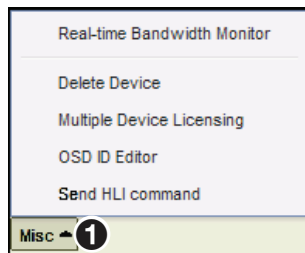
Figure 43. **Misc Menu**

Click **Misc** (see figure 43, ❶) to open the list.

Real-time Bandwidth Monitor

Select the real-time bandwidth monitor to open a new dialog box that monitors the bandwidth (measured in Mbps) used by the selected device or devices (see figure 44).
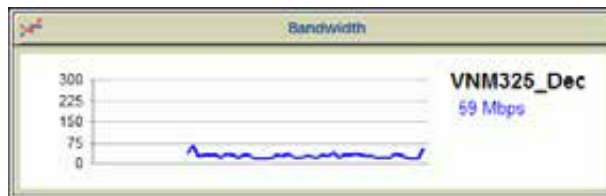
Figure 44. **Bandwidth Monitor**

> **NOTE:** Bandwidth data is displayed only for decoder devices. A graph is displayed for an encoder, but the data always shows **0** Kbps.

Delete Device

Select this option to delete the selected device or devices.

> **NOTES:**
> - Be certain the appropriate devices are selected when using this menu option. The selected devices are deleted right away; no notification or warning is given when the option is selected.
> - A device can only be deleted when it is offline. Active devices cannot be removed from the device list.

Multiple Device Licensing

This option is not available on the VNM 250, the VNM 200/225 and VNM 300/325 series.

OSD Identifier Editor (Encoders and Decoders)

Select this option to customize the appearance of the **on-screen display** for the selected device or devices (see figure 45).

VNM 200/225/300/325   VNE 250, VND250, VNS 104
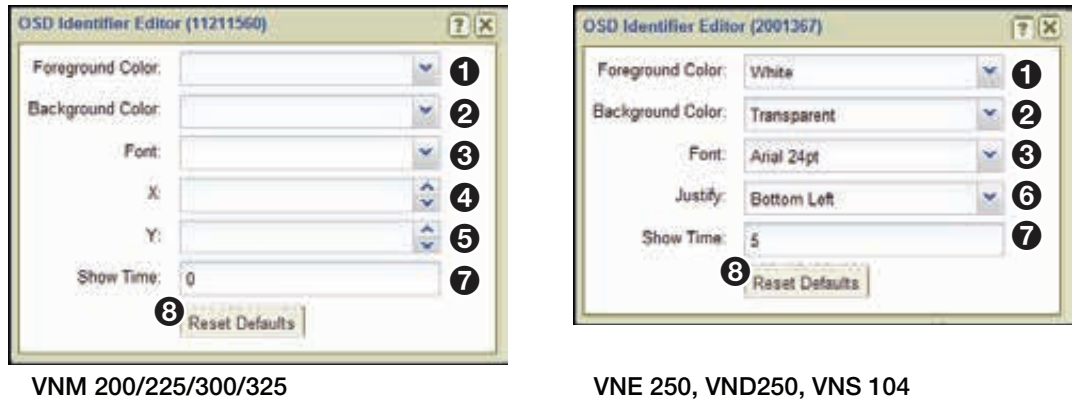
Figure 45.   OSD Identifier Editor

❶ **Foreground Color** — This drop-down list selects the color of the text box font.

❷ **Background Color** — This drop-down list selects the text box background color.

❸ **Font** — This drop-down list selects the type of font used in the text block.

❹ **X** — This field selects the X (horizontal) position for the text block. The value is a percentage of the screen width and references the **center** of the text block.

❺ **Y** — This field selects the Y (vertical) position for the text block. The value is a percentage of the screen height and references the **center** of the text block.

❻ **Justify** — This drop-down list places the text block in one of nine fixed positions.

❼ **Show Time** — Sets the length of time (in seconds) the name of the source device is visible after a connection is made. A value of **0** keeps the name visible indefinitely.

❽ **Reset Defaults** — Returns all OSD Identifier configuration to their defaults.

> **NOTES:**
> - This control option only functions when the `Identify Source` check box is selected on the **Configure menu** (see **Configure Menu** on page 42).
> - The OSD is not recorded.
> - See **VNS 104 Software Decoder Configuration** on page 82 for VNS 104 OSD options.

Send HLI Command

Selecting this option opens a dialog box for sending High Level Interface (HLI) command strings to VN-Matrix devices (see figure 46).
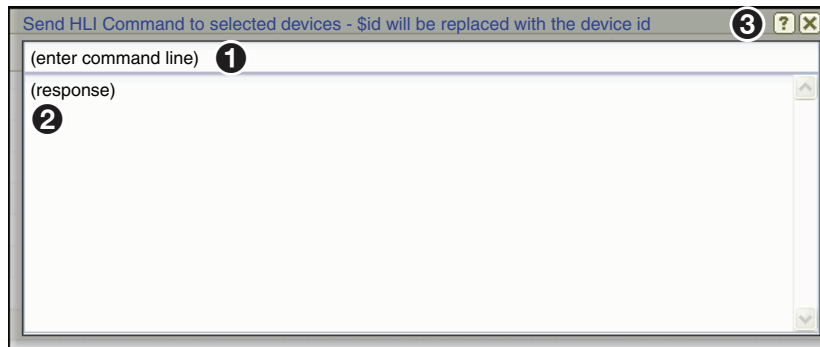
Figure 46.   HLI Command Window

To send a command, click in the **(enter command line)** text field (❶), type the command, and press <**Enter**>.

> **NOTE:**   The response is returned in the response area of the dialog box (❷).

Click the **X** box (❸) to close the dialog

Example HLI commands and information on how to use them are available in **System Control** on page 154.

Group Menu

See **Sorting Devices by Group** on page 37 for information on using this menu.

VNM 250 Configuration

The VND 250 and VNE 250 add HDMI input and output capability to the VN-Matrix system. Several configuration items are added to the normal encoder and decoder configuration pages for HDMI and HDCP compatibility.

Info Menu (VNM 250)

The **Info** action bar dialog adds two LAN port connection entries for separate control and streaming connections. Click **Info** to open the `Device Information` dialog box that displays basic information for the selected VNM 250 (see figure 47).

VNE 250

VND 250

Figure 47.   Device Information - VNM 250

The following fields are read-only (cannot be edited).

❶ **Device Id** — Displays the ID number of the selected device.

❷ **Device Name** — Displays the name of the selected device.

❸ **LAN 1 IP (Control)** — Displays the IP address of the control port.

❹ **LAN 2 IP (Streaming)** — Displays the IP address of the streaming port.

❺ **Device Status** — Displays the status of the selected device.

- Normally it shows `Active` and the quality of the link is indicated in the `Link Status` field.

- If the device is missing or cannot be contacted on the network, it shows `No Device`.

❻ **Link Status** — Displays the link status of the selected device.

- A link status of `Good` indicates little or no management packet loss.

- A link status of `Fair` indicates a small amount of packet loss.

- A link status of `Poor` indicates a bad link. Investigate whether the link to the device has sufficient bandwidth to carry the data and management traffic.

Configure Menu

Click **Configure** to open the `Configure Device Settings` dialog box and set global parameters specific to the VNM 250 devices (see figure 48).
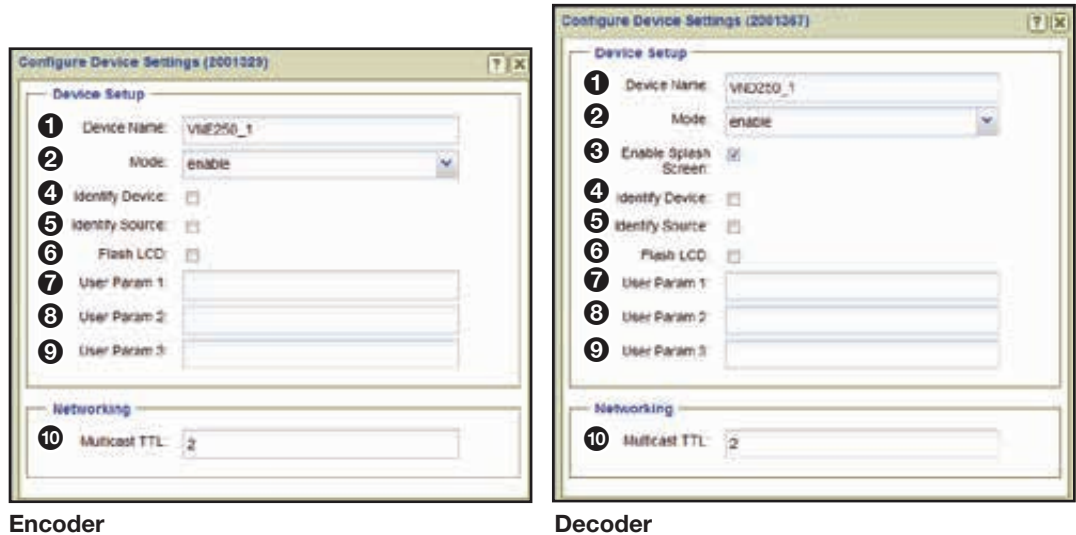
Encoder   **Decoder**

Figure 48.   VNM 250 Configure Device Settings

Device Setup panel

❶ Device Name — Enter a name for the device.

❷ Mode — A device can be configured in one of four modes.

- **enable** — This is normal operation.
- **disable** — On a source device, stops streaming to the network, but still shows pass-through output. A display device outputs a splash screen.
- **standby** — Use this mode on a source device to stop streaming and also disable pass-through output. On a display device this mode disables all output.
- **test** — Use this mode on a device (source or display) to show a splash screen with the words "Test Mode". Normal streaming is suspended.

❸ Enable Splash Screen (decoder only) — Check this box to display a splash screen on the connected display or device when no video is available.

❹ Identify Device —Check this box to show the device name on the pass-through output. The position and appearance of the label can be modified .

❺ Identify Source (Encoder) — Check this box to display the name of the device on the image output to the loop-through connector. The source resolution and frame rate are displayed on the image that is output to the loop-through connector. The position and appearance of the label can be modified (see **OSD Identifier Editor (Encoders and Decoders)** on page 60).

❺ Identify Source (Decoder) — Check this box to display the name of the currently connected encoder on the connected display. The position and appearance of the label can be modified **OSD Identifier Editor (Encoders and Decoders)**.

❻ Flash LCD — Check this box to flash the front panel of the selected device. This assists users with identifying an individual device within a large system.

❼,❽,❾ User Param [1, 2, 3] — These fields are used to enter up to three user defined parameter names (see figure 48).

Networking panel

❿ Multicast TTL — This field specifies the number of hops multicast traffic can make between routed domains as it exits a source. It is not used for TCP or unicast RTP traffic.

Connections Menu

When devices are part of an active (launched) preset, the columns in the `Connections` menu populate with the connection details of the selected VN-Matrix device (see **Connections Menu** on page 41). The `Connections` dialog adds the location of the return audio path to the columns.

Format Menu (VNE 250)

Select the VNE 250 and click `Format` from the action bar to open the source menu. `Status`, `Measured Video Properties`, `Measured Audio Properties`, and `EDID` panel configuration is the same as the VNM 200/225/300/325 device (see **Format Menu (Encoders)** on page 43). The VNE 250 adds an input selection, HDCP authorization, EDID selection, program audio selection, analog audio selection and return audio selection.

Figure 49.   VNE 250 Source Format

Input Configuration

❶ **Input Select**

- **Auto** — When enabled, the HDMI input is automatically selected whenever a digital source is detected. The EDID settings become read only in this mode.
- **HDMI (1)** — Selects the HDMI input. The `EDID Settings` panel is active.
- **RGB (2)** — Selects the RGB input. The `EDID Settings` panel is active.

❷ **HDCP Authorize** — When an HDMI signal is detected, enable or disable HDCP authorization.

EDID Settings

❸ **From Monitor** — This read-only field reports the EDID of the locally connected display. If no display is present or the display does not support EDID, `<No Device>` is reported. This is a read-only field (cannot be edited).

❹ **To Source** — This drop-down lists the EDID device type the VN-Matrix unit identifies itself as when connected to a source. Values are chosen from the stored EDID codes used on previously connected devices or from a fixed list of input formats.

> **NOTE:**   If the transparent option is selected, the EDID of the last display or the currently connected display is reported.

Program Audio

Figure 50.   Program Audio, Analog Audio Input and Return Audio Panels

❶ **Input Select** — Selects the input audio source. HDMI audio is not supported if Analog (2) input video is selected.

- **HDMI (1)** — Selects the embedded HDMI audio.
- **Analog (2)** — Selects the rear panel analog audio input.
- **Disable**: Mutes all audio inputs.

❷ **Audio Status** — Read-only field that displays the sampling rate of the selected audio source.

Analog Audio Input

❸ **Peak Input Level (dBu)** — Optimize Signal to Noise Ratio (SNR) prior to the Analog to Digital Conversion (ADC) process. Set the `Peak Input Level` to a value just above the highest level of the source audio material. For example, if the input level from the source material peaks at +3 dBu, the `Peak Input Level` is set to +4 dBu. The range is -26 to +12 dBu. Default: +4 dBu.

❹ **Measured Input Level (dBu)** — This field shows the current measured input level of the analog input source in dBu. The value is updated every second and can be used as a guide to determine the `Peak Input Level` (see above) of the source material.

❺ When the measured input level exceeds the specified peak input level, the `Clip` warning indicator glows red. When the input level falls back within range, the warning indicator remains lit for three seconds and then turns off.

Return Audio

`Return Audio` controls the audio level for audio received from a decoder. Only one decoder receiving an audio stream from an encoder can send return audio to the source or connected audio device. Only analog audio is supported for return audio.

❻ **Mute Audio** — Mutes the return audio.

❼ **Output Level (dBu)** — Only available when a connection is made to a decoder. Adjust the audio level of the rear panel return audio output. The range is -70 to +12 dBu. Default is +4 dBu.

Format Menu (VND 250)

The VND 250 `Display Format` dialog shares two configuration options with the VN-Matrix 200/225:

- **Current Format** (see figure 51, ❶)
- **Output Format** (❷)

These two configuration options function identically to those on the VN-Matrix 200/225 (see **Format Menu (Decoders)** on page 48).
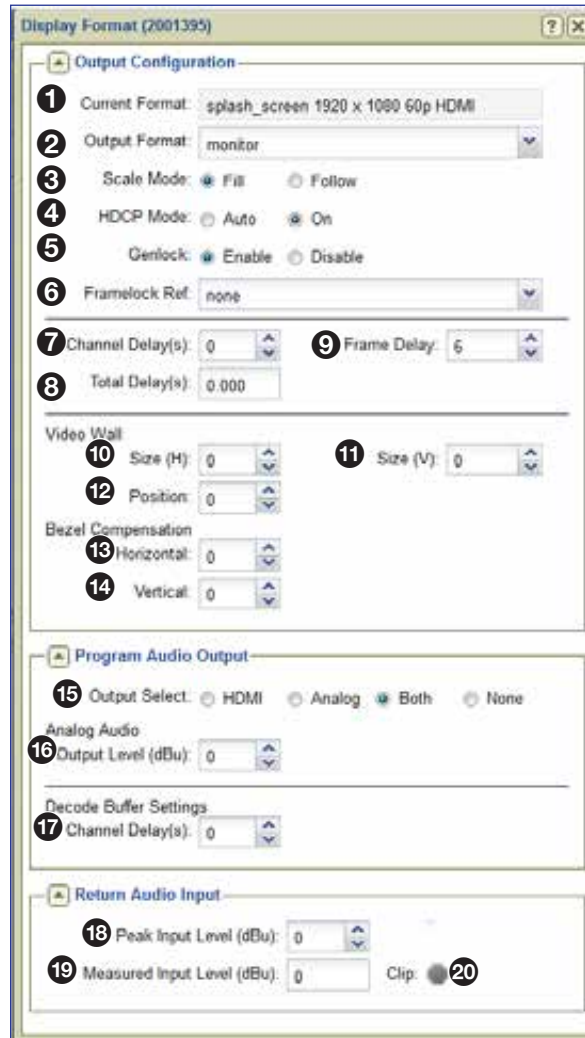
Figure 51. **VND 250 Display Format Dialog Box (Decoder)**

The following configuration options are added:

❸ **Scale Mode** — Select fill or follow.

- **Fill** scales the output video to fill the entire screen of the connected display. The aspect ratio is not maintained.
- **Follow** keeps the output format the same as the input, maintaining the aspect ratio and adding black bars as needed.

> **NOTE:** Scale mode options are not available when the output format is set to `Auto`.

④ **HDCP Mode** — The HDCP mode control (see **figure 51** on the previous page) sets the encryption negotiation method between the decoder and an HDCP compliant display.

- **Auto:** HDCP negotiation occurs each time a new stream is decoded. Encryption is set automatically, dependent on the decoded stream. Encryption is enabled if the decoded stream is protected and disabled if not.

- **On:** Encryption is forced on (enabled) at all times regardless of the decoded stream type. Forcing encryption results in a cleaner switching transition between encrypted and non-encrypted content.

⑤ **Genlock** — Enables the synchronization of the output to a reference waveform. The VND 250 uses TTL level signaling which is not compatible with normal genlock sources.

- **Enable:** Setting this option enables the decoder output to lock to an incoming genlock signal generated by another VND 250 device.

- **Disable:** The decoder output is locked to its own internal timing reference. Any incoming genlock signal is ignored.

⑥ **Framelock Ref** — This drop-down control is used with the genlock control described above. It defines which VND 250 device is used as the frame reference in a genlock group. When such a group is formed, a network-based protocol permits the chosen VND 250 to coordinate frame timing so that all decoders are showing frames captured at the same time.

⑦ **Channel Delay(s)** — The channel delay is unique to each channel of video, audio, data or whiteboard data and is set in seconds. In normal operation on a LAN, Channel Delay is set to 0.0.

⑧ **Total Delay(s)** — The delay time between the data being input to the encoder and output on the decoder is controlled by setting the Channel Delay(s) and the Frame Delay. The Total Delay(s) time shown in this read-only field is the sum of the two values.

Where synchronization between channels is required, either between video and audio on one device or between video channels on multiple devices, the default values (Channel Delay: `0.0`, Frame Delay: 6) results in an end to end delay of 100ms on a 60 fps signal. On a WAN, the Channel Delay parameter can be used to add an amount corresponding to the one-way network delay (half of the round trip time [RTT]).

The hardware has a minimum delay requirement of 2.5 frames in progressive mode and 3.5 fields in interlace mode. Setting a Total Delay less than these values results in uneven playback and pipeline underflow alarms. There is one exception to this rule. Setting the Total Delay to `0.0` (zero) places the system in a special minimum-latency mode.

Excessively long delays cause data to build up in a software buffer within the decoder. When the build up is more than 10 video frames, frames of data are discarded which can result in on-screen artifacts.

⑨ **Frame Delay** — The frame delay can only be modified on the video channel and is converted from frames to seconds depending on the video mode the decoder is currently receiving. In normal operation on a LAN, Frame Delay is set to 6 frames.

Videowall panel (not available when output format is set to Auto)

The `Video Wall` configuration settings (see **figure 51** on page 66) allow a video stream from a single source to split over several decoders, each attached to one monitor of a videowall layout. The number of monitors that make up the full size of the wall and the selected decoders position in the wall must be configured for each decoder.

The videowall can be as large as 5 monitors tall by 5 monitors wide in any variation. The decoder segments its portion of the full video into the proper size based on the two size entries and the position of the connected monitor.

Size tells the decoder how many total monitors (and decoders) make up the videowall. For instance, in the videowall example below, H size is 2 and V size is 2 indicating a 2x2 videowall resulting in four segments of the full video.

Position is the location of the monitor as part of the entire wall and tells the decoder which segment of the full video it displays. Numbering always begins with the upper left monitor.

⑩ Size (H) — 1 to 5

⑪ Size (V) — 1 to 5

⑫ Position — 0 to 25. Position 0 ignores the size entries and displays the full video on the connected display. The top left monitor as the user views the videowall is position 1. Numbering runs left to right and top to bottom from that point as shown.

Example: The selected decoder is connected to the video monitor in the lower left of the 2x2 videowall shown at right. The configuration is:

⑩ Size (H) — 2: indicates the videowall is 2 monitors wide.

⑪ Size (V) — 2: indicates the videowall is 2 monitors tall.

⑫ Position — 3: selects the segment of the full video the decoder outputs, in this example the lower left monitor.

Bezel Compensation panel (Mullion Compensation)

In Videowall mode (see **figure 51**), the bezel compensation settings correct image geometry when the decoded image is spread across displays that have a mullion. The settings in the horizontal and the vertical adjustments are applied equally to both edges.

⑬ Horizontal — 0 to 100%

⑭ Vertical — 0 to 100%

Configuring for Videowall

In addition to the size, bezel compensation, and position settings, when configuring a group of decoders for videowall use, the following settings are required:

② Output Format — Select the same output resolution for all decoders in the group.

③ Scale Mode — Select `Fill` for all decoders in the group.

> **NOTE:** The aspect ratio of the decoded source image is not maintained.

⑤ Genlock and ⑥ Framelock settings — All decoders are configured as a genlock group (see **Genlock** on the previous page).

> **NOTE:** The image quality of a single source that is scaled across multiple displays depends on the compression applied to the source, and on the size of the final image. The recommended maximum videowall size is three displays horizontal by three displays vertical. It is further recommended that displays used in a videowall be the same type, resolution, and size.

Program Audio Output panel (see **figure 51** on page 66)

⑮ **Output Select** — Select HDMI audio, analog audio, both, or none.

⑯ **Analog Audio Output Level (dBu)** — Sets the analog output level from a range of -26 to +12 dBu.

⑰ **Decode Buffer Settings Channel Delay(s)** — Configured the same as the video channel delay (see **Channel Delay(s)** on page 67).

Return Audio Input panel

⑱ **Peak Input Level (dBu)** — To optimize signal-to-noise ratio (SNR) prior to the Analog to Digital Conversion (ADC) process, the Peak Input Level is set to a value just above the highest level of the source audio material. For example, if the input level from the source material peaks at +3 dBu, the peak input level is set to +4 dBu. The range is -26 to +12 dBu.

⑲ **Measured Input Level (dBU)** — This read-only field shows the audio level of the analog input source in dBu. The value is updated every second and can be used as a guide to determine the `Peak Input Level` (see above) of the source material.

⑳ **Clip Warning Indictor** — If the measured input level exceeds the specified peak input level, the `Clip` warning indicator glows red. When the input level falls back within range, the warning indicator remains lit for three seconds and then turns off.

Compression Menu (VNE 250 Only)

With an encoder device selected, click `Compression` to open the `Compression Settings` dialog box to set the amount of compression on the encoded source (see figure 52).
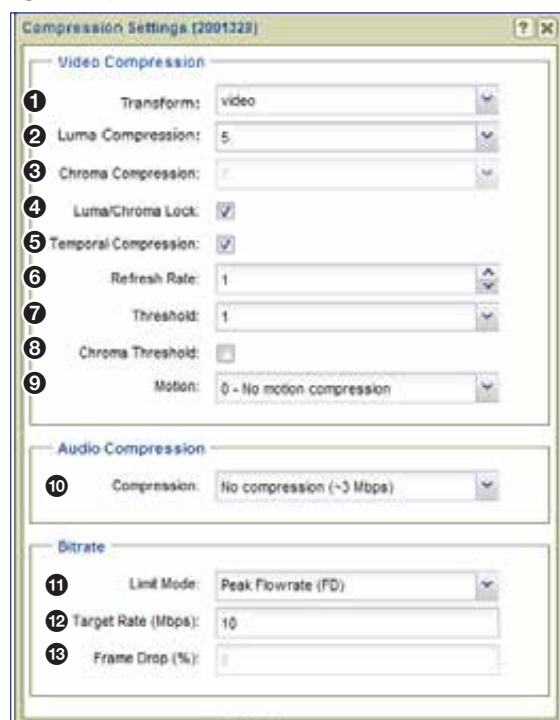
Figure 52. **Compression Dialog Box (Encoder Only)**

These configuration options have a direct effect on the network bandwidth required for the encoded stream.

- Increasing compression decreases the network bandwidth requirements for the stream.
- Decreasing compression increases the network bandwidth requirements for the stream.

Alternatively, the desired bandwidth is set in the `Bitrate` panel to meet the specified bandwidth limit.

Video Compression panel (see **figure 52** on the previous page)

❶ Transform — Two transform types are supported.

- **graphics** — Optimizes the video to support text and sharp lines, such as are present on most computer screens.
- **video** — Optimizes the video to support smooth tone changes, such as are present in movies and other video content.

❷ Luma Compression — Set the amount of compression on the luma (black and white) portion of the signal with this drop-down list. A value of **1** is the minimum amount of compression available; a value of **10** is maximum compression.

❸ Chroma Compression — Set the amount of compression on the chroma (color) portion of the signal with this drop-down list. A value of **1** is the minimum amount of compression available; a value of **10** is maximum compression.

> **NOTE:** This field is available only when the `Luma/Chroma Lock` is **not** selected.

❹ Luma/Chroma Lock — Select this box to disable the `Chroma Compression` field and automatically sets chroma compression two levels higher than `Luma Compression`.

When selected, the `Chroma Compression` field tracks the `Luma Compression` field by a fixed value of +1 (Luma Compression = 1) or +2 (Luma Compression > 1).

❺ Temporal Compression — Selecting this check box causes areas of the screen to refresh only when a change between frames is detected. Enabling temporal compression can significantly reduce network bandwidth.

> **NOTE:** For all normal operation, `Temporal Compression` should be enabled.

❻ Refresh Rate — This field controls how frequently static parts of the screen are updated when the `Temporal Compression` check box is selected. This is useful when connecting new displays to a temporally encoded source and fills in gaps in the data when using a lossy network transport (such as RTP). A value of **1** refreshes the screen once a second; a value of **10** refreshes the screen once every ten seconds. A value of **0** disables the refresh. Valid settings are **1** though **17**.

❼ Threshold — This drop-down list controls the sensitivity of the temporal change detection algorithm. A value of **0** means any screen changes will be sent. Increasing the value increases the send threshold and reduces the network bandwidth. A setting of **0** is suitable for DVI computer generated sources. Sources with more noise or video-type motion should use a setting between **1** and **4**. Camera sources should always use values greater than **0**.

❽ Chroma Threshold — This check box controls whether the temporal algorithm should consider changes in the color (chrominance) of the image. Selecting this check box provides better results when using digital simulation type sources. However, this can increase the transmit bandwidth by up to 201%, so it should be disabled on bandwidth sensitive systems.

> **NOTE:** This option is normally not required for video or camera type sources.

⑨ **Motion** (see **figure 52** on page 69) — This drop-down list is used to adjust motion compression. The value can be set from **0** to **15**, where **0** is no additional motion compression and **15** is full motion compression. When enabled, motion detected on the area of the screen is heavily compressed. This reduces bandwidth when the eye cannot perceive significant detail due to the motion. When motion stops, the video continues at the standard resolution, preserving screen integrity.

Audio Compression panel

⑩ **Compression** — VN-Matrix devices support limited compression of audio sources. The S/PDIF digital data bus can carry two types of data: 2-channel uncompressed audio and encoded digital data, the latter often in AC-3 (Dolby Digital) format. If the source is HDMI AC-3, run length encoding (RLE) is applied that results in an output bandwidth of about 430 kbps. If the source is HDMI PCM, the full set of compression values is used.

The following compression values are supported:

Compression	Stereo Audio Tracks	AC-3 Audio Track
No compression (~3 Mbps)	24 bit native data (2975 kbps)	24 bit native data (2975 kbps)
24-bit to 16 bit (~1.5 Mbps)	16 bit data, full sample rate (1517 kbps)	16 bit data, zeros run length encoded (430 kbps)
44 kHz to 22 kHz (~800 kbps)	16 bit data, half sample rate (784 kbps)	16 bit data, zeros run length encoded (430 kbps)
44 kHz to 11 kHz (~400 kbps)	16 bit data, quarter sample rate (418 kbps)	16 bit data, zeros run length encoded (430 kbps)

Bitrate panel

The `Bitrate` panel sets a specific bandwidth limit for the encoded stream.

⑪ **Limit Mode** — This drop-down list contains management modes that limit the instantaneous traffic on the network and drops traffic when the bandwidth rate is exceeded. This is useful when the network connection between the source and display has limited bandwidth.

> **NOTE:** Rapidly changing content may produce instantaneous peaks in bandwidth rate when using PBR-F management mode.

Six bandwidth management modes are supported.

- **None** — This mode does not use bandwidth management. Only the underlying compression settings are managed.

- **Manual Frame Drop** — This mode allows the user to specify the precise fraction of frames to drop. This mode does not manage the bandwidth rate at a fixed level, but does result in a smoother display update when using rapidly changing video content types.

- **Shared Flowrate (FD)** — This mode limits the total video network traffic for the source. Frames are dropped if the **instantaneous** data rate is higher than the flowrate entered in the `Target Rate (Mbps)` field.

- **Peak Flowrate (FD)** — This mode limits the video network traffic for a single source stream. Frames are dropped if the **instantaneous** data rate is higher than the flowrate entered in the `Target Rate (Mbps)` field. Using N output streams increases the bandwidth N times unless the multicast RTP transport protocol is used.

- **PBR-F** — This mode dynamically modifies the compression settings to limit the transmitted bandwidth depending on the specified value entered in the **`Target Rate (Mbps)`** field. The specified **`Compression`** setting is used as the minimum compression value. This control mode averages the bit rate over a period of two frames.

- **PBR-F (FD)** — This mode is the same as **`PBR-F`** except frames are dropped when a larger bandwidth reduction (such as a reduction that cannot be achieved with compression settings alone) is required.

⑫ **Target Rate (Mbps)** (see **figure 52** on page 69) — This field is used in all bandwidth management modes (except **`Manual Frame Drop`**) to specify the network bandwidth used by the source. This value is specified in Megabits per second (Mbps).

⑬ **Frame Drop (%)** — This field is used in **`Manual Frame Drop`** mode and specifies the percentage of frames to discard. A value of **95%** discards 19 out of every 20 frames reducing a 60 frames per second (fps) video signal to 3 fps. 1 fps is the minimum frame rate. A value of **99%** results in all frames being dropped due to rounding.

Peripherals Menu

Click **`Peripherals`** to open the `Peripherals Settings` dialog box to manage serial port, data channel, pointer overlay, and remote keyboard and mouse communications for the VNM 250 (see figure 53).
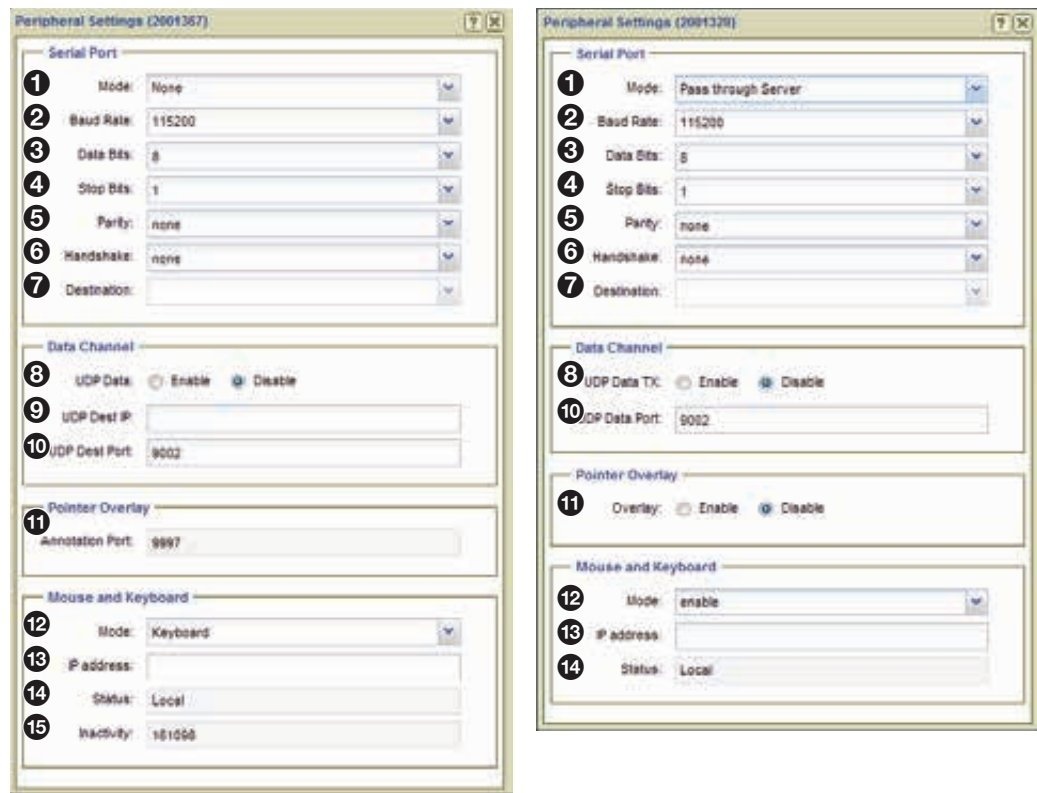
VND 250   VNE 250

Figure 53. Peripherals Dialog Box

Serial Port

The serial port panel configures the RS-232 port. For a full description of the serial port configuration, including server/client setup, see the *VNM 250 User Guide*. Default settings are shown in figure 53.

① **Mode** (see **figure 53** on the previous page) — The serial port can operate in one of three modes:

- **None** — The serial port is not used.
- **Pass through Server** — The serial port acts as a destination for serial port clients.
- **Pass through Client** — The serial port can connect to serial ports on other devices.

A point to point link can be established by setting the serial port of one VN-Matrix device to `Pass-through Server` mode and a second device to `Pass-through Client` mode. The destination of the second device is set to the pass-through port on the first (server) device.

A server can accept multiple client connections. Under these conditions the data input by the server serial port is duplicated to all connected clients. The data received from the clients is multiplexed (in order of arrival) and output through the server serial port.

② through **⑥** **RS-232 Settings** — Basic configuration of the serial port includes baud rate, data bits, stop bits, parity, and handshake.

⑦ **Destination** — This option can only be modified with the serial port in client mode. The drop-down list allows a pass-through connection request from each VN-Matrix device in the network, regardless of whether the device is currently configured as a server.

Data Channel

The data channel panel configures the UDP data stream.

⑧ **UDP Data TX (encoder)** — Enables or disables UDP data transport through the dataport.

⑩ **UDP Data Port (encoder)** — The port number to receive UDP traffic on. This setting must match the port number defined by the external device or system that generates the UDP data.

⑧ **UDP Data RX (decoder)** — Enables or disables the UDP data.

⑨ **UDP Dest IP (decoder)** — The IP Address of the external device or system that receives UDP traffic. UNICAST or MULTICAST addresses are valid.

⑩ **UDP Dest Port (decoder)** — This is the port number used by the (external) device or system to receive the UDP data.

Pointer Overlay

⑪ **Overlay (encoder)** — Enable the overlay pointer on the local loop-through display.

⑪ **Annotation Port (decoder)** — Read-only value of the annotation port number.

Mouse and Keyboard

⑫ **Mode** — Device specific.

Encoder — Enabled, allows mouse and keyboard forwarding.

Decoder — The control has four options;

- **Disable** — The decoder does not forward mouse and keyboard information.
- **Keyboard** — The decoder forwards mouse and keyboard information.
- **Keyboard + keepalive** — the link is automatically established if broken.
- **Force** — Mouse and keyboard forwarding + keepalive is permanently enabled.

13 **IP Address** (see **figure 53** on page 72) —

- **Encoder** — Not Required.
- **Decoder** — Used to specify the IP address of the target encoder when the transport is multicast or when the encoder exists on a different controller domain.

> **NOTE:** Leading zeros are not allowed.

14 **Status:** — Read-only, is the current status of the link

- **Encoder** — Disabled, local, or remote keyboard and mouse is displayed.
- **Decoder** — Disabled, local, or forwarding is displayed. In case of a connection error, a reason is shown in brackets.

15 **Inactivity:** — Read-only (decoder only). Displays the number of seconds since the mouse or keyboard reported a change.

License Menu

Click **License** to open the `Device License Management` dialog box. This dialog displays enabled features for the selected unit and enables optional features (see figure 54).
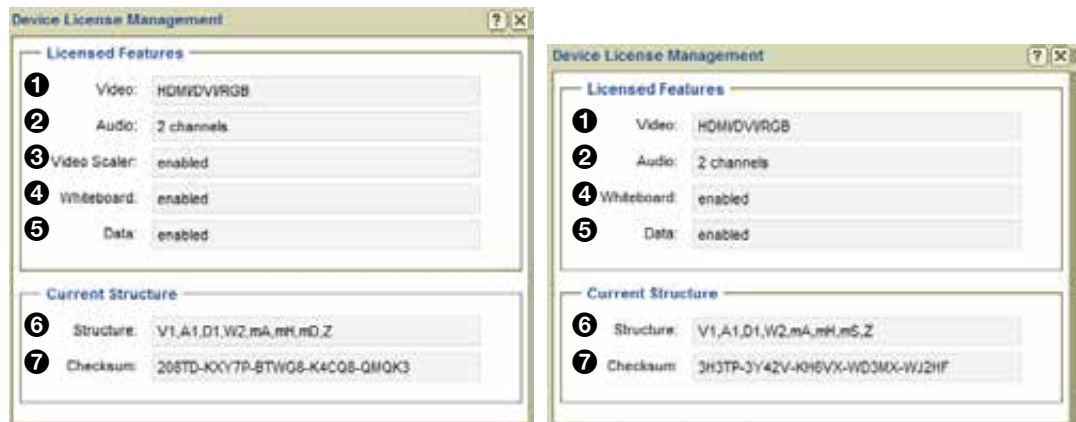
Figure 54. **VND 250 (Left) and VNE 250 (Right) License Menu**

> **NOTE:** The `Licensed Features` panel and `Current Structure` panel fields are read-only (cannot be edited).

Licensed Features panel

The `Licensed Features` panel details the features currently enabled on the device.

1 **Video** — Indicates the input signal format type.

2 **Audio** — Indicates the number of supported audio channels.

3 **Video Scaler (VND 250 only)** — Indicates whether video scaling is enabled or disabled.

4 **Whiteboard** — Indicates whether whiteboard data streaming is enabled or disabled.

5 **Data** — Indicates whether data streaming is enabled or disabled.

Current Structure panel

The `Current Structure` panel details the current structure code and its corresponding checksum (see **figure 54** on the previous page). These are read-only (cannot be edited) fields.

⑥ Structure — Shows the current feature set of the selected device. The values in this code correspond to the active features displayed in the `Licensed Features` panel.

⑦ Checksum — Shows the checksum value used to enable the structure code.

Upgrade Menu

Click **Upgrade** to open the `Upgrade Device Firmware` dialog box used to upgrade the firmware (see **Upgrade Menu (2xx and 3xx Devices)** on page 57).

> **ATTENTION:**
> - Ensure that compatible firmware is used to upgrade the selected VN-Matrix devices.
> - Assurez-vous qu'un firmware compatible est utilisé pour mettre à jour les appareils VN-Matrix sélectionnés.
>
> - Upgrading with incorrect firmware can cause the VN-Matrix devices to stop responding.
> - Effectuer une mise à jour incorrecte de firmware peut interrompre les communications avec les appareils VN-Matrix.

Misc Menu

This menu contains four selections for the VND 250 and three for the VNE 250 (see figure 55).

① Real-time Bandwidth Monitor (VND 250)

② Delete Device

③ OSD Identifier Editor

④ Send HLI Command

Figure 55. **VNM 250 Misc Menu**

Real-time Bandwidth Monitor (VND 250)

Select the real-time bandwidth monitor (see figure 55, **①**) to open a new dialog box that monitors the bandwidth (measured in Mbps) used by the selected device or devices (see figure 56).
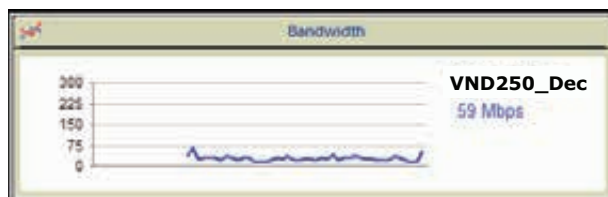
Figure 56. **Bandwidth Monitor**

> **NOTE:** Bandwidth data is displayed only for decoder devices. A graph is displayed for an encoder, but the data always shows **0** Kbps.

Delete Device

Select this option (see **figure 55**, ❷ on the previous page) to delete the selected device or devices.

NOTES:
- Be certain the appropriate devices are selected when using this menu option. The selected devices are deleted right away; no notification or warning is given when the option is selected.
- A device can only be deleted when it is offline. Active devices cannot be removed from the device list.

OSD Identifier Editor

Select this option (see **figure 55**, ❸) to customize the appearance of the **on-screen display** for the selected device or devices (see figure 57).

Figure 57. VNM 250 OSD Identifier Editor

❶ **Foreground Color** — Select the color of the text box font from this drop-down list.

❷ **Background Color** — Select the text box background color from this drop-down list.

❸ **Font** — Select the type of font used in the text block from his drop-down list.

❹ **Justify** — Place the text block in one of nine fixed positions from this drop-down list.

❺ **Show Time** — Set the length of time (in seconds) the name of the source device is visible after a connection is made. A value of **0** keeps the name visible indefinitely.

NOTE: This control option only functions when the `Identify Source` check box is selected in the **Configure menu** (see **VNM 250 Configuration** on page 62).

---

❻ **Reset Defaults** — Return all OSD ID settings to defaults.

Send HLI Command

Select this option (see **figure 55**, **④** on page 75) to open a dialog box for sending High Level Interface (HLI) command strings to VN-Matrix devices (see figure 58).
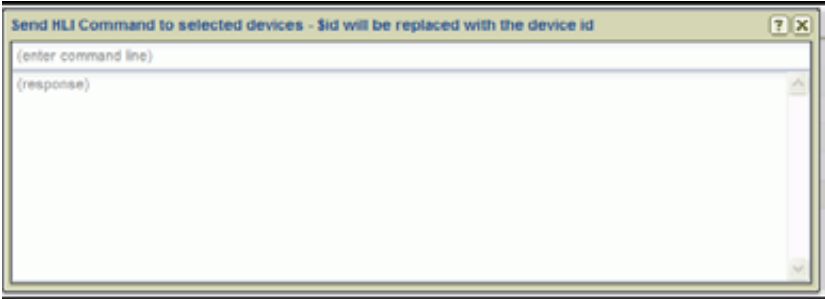
Figure 58.   HLI Command Window

To send a command, click in the **(enter command line)** text field, type the command, and press <**Enter**>.

> **NOTE:**   The response is returned in the area of the dialog box **(response)** just below the command.

Example HLI commands and information on how to use them are available in **System Control** starting on page 154.

Recorder Configuration

This section details options available in the `Actions` menu bar located at the bottom of the devices page. The options associated with recorders are listed below (see figure 59). The first action bar configuration displays when a recorder is selected. The next bar is available only on the sub-channels of a recorder device. Each sub-channel can be used to record video, audio, and data from an associated VN-Matrix encoder. Click an action button to configure the selected recorder.

VN-Matrix Recorder

| Actions: | Info | Recorder | Configure | License | Upgrade | Misc ▼ | | Group ▼ |

VN-Matrix Recorder Sub-channel

| Actions: | Info | Recorder | License | Misc ▼ | | Group ▼ |
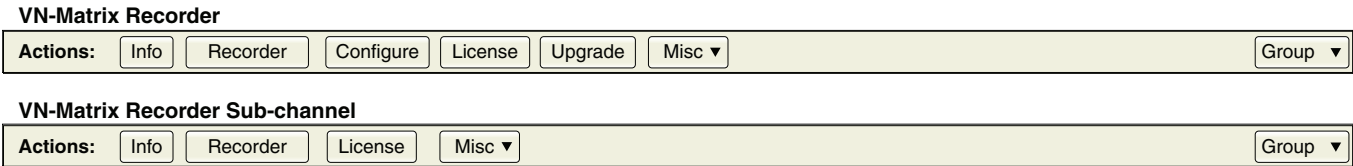
Figure 59.   Actions Bar Menu, VN-Matrix Recorders

Info Menu

Click **Info** (see **figure 59** on the previous page) to open the `Device Information` dialog box. The box displays read-only information for the selected recorder or sub-channel. The display is the same for the VNR 100 and VNM Recorder (see figure 60).

Figure 60.   **VN-Matrix Recorders, Device Information**

❶ **Device ID** — Displays the device ID number of the selected device.

❷ **Device Name** — Displays the name of the selected device.

❸ **IP Address** — Displays the IP address of the selected device.

❹ **Device Status** — Displays the status of the selected device.

- Normally it shows `Active` with the quality of the link indicated in the `Link Status` field.

- If the device is missing or cannot be contacted on the network, it shows `No Device`.

❺ **Link Status** — Displays the link status of the selected device.

- `Good` indicates little or no management packet loss.

- `Fair` indicates a small amount of packet loss.

- `Poor` indicates a bad link; investigate whether the link to the device has sufficient bandwidth to carry the data and management traffic.

Recorder Menu

Click **Recorder** (see **figure 59** on page 77) to open the `Recording Browser` dialog box (see figure 61). This dialog displays recorded files for the selected recorder and recorder sub-channels.
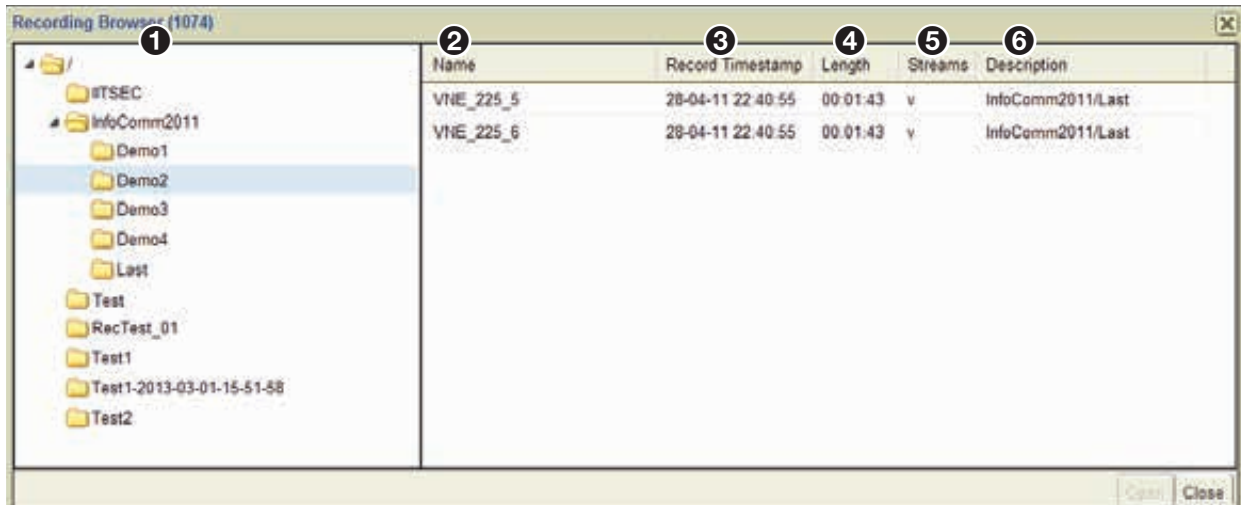
Figure 61.   VN-Matrix Recorders, Recording Browser

The user can select a recording from the default location or navigate to another location on the hard drive. The browser provides information on each recording, allowing a user to manage the recordings on the selected device (see **File Management Overview** on page 109).

The menu items are:

❶ **Directory Tree** — The directory structure of the recorder. The tree functions like a standard Windows directory structure.

❷ **Name** — The name of each channel in the recording. If a name is not set by the user, the default name of the file is the device ID of the connected encoder.

❸ **Record Timestamp** — The date and time a recording is created.

❹ **Length** — The duration of the recording in hours, minutes, and seconds (`HH:MM:SS`).

❺ **Streams** — The stream types included in the recording:

- v=video
- a=audio
- d=data.

❻ **Description** — A text string entered by the user when the recording is created.

Configure Menu

Click **Configure** (see **figure 59** on page 77) to open the `Configure Device Settings` dialog box (see figure 62) used to change the device name or to configure up to three user parameters for the recorder. The dialog box is the same for the VNM Recorder and the VNR 100.

Figure 62.   Recorder Configure Dialog Box

Device Setup Panel

❶ **Device Name** — Enter a user defined name for the VN-Matrix Recorder. This is the name that appears in the device list. The name can be letters, numbers, and the underscore character. Spaces are not allowed.

❷ **User Parameters** — Up to three user parameters can be entered in these three fields to customize the operation of the recorder (see **Device Setup panel** on page 63).

Networking Panel

❸ **Multicast TTL** — Specifies the number of router hops multicast traffic can make between routed domains.

License Menu

Click **License** (see **figure 59** on page 77) to open the `Device License Management` dialog box (see figure 63). This dialog provides information about the recorder features licensed for use on the VN-Matrix system. The information is read-only, shown for reference.

Figure 63.　Device License Dialog Box, Recorders

Licensed Features

❶　The `Licensed Features` panel is not functional at this time.

Current Structure

❷　**Structure** — This field details the current structure key for the recorder.

❸　**Checksum** — This field details the current checksum for the recorder.

Change Device Structure

❹　The `Change Device Structure` panel is not functional at this time.

VNS 104 Software Decoder Configuration

The VNS 104 Multi-stream Decoding Software decodes up to four video streams and one stereo audio stream from VNE 225/250 real-time encoders and VN-Matrix Recorder playback channels. It operates on a Windows PC and is managed from the VN-Matrix EC 201. Before you can view content, ensure the VNM EC 201 is properly licensed with the VNS 104 option and checksum (provided by Extron). Once the Controller license is updated, the VNS 104 Multi-stream Software Decoder can be selected and configured.

The VNS 104 appears in the devices list as five separate icons, one for the root and one for the each of the decode windows. Each decode window appends the device ID with a number from 1 to 4 (see figure 64).

> **NOTE:** The position of the highlighted display in a VNS 104 icon ([icon]) is the screen position target for the associated video stream (see figure 64). Notice the lit screen in the icon for VNS104:1 is the top left; for VNS104:2, its the top right and so on.

☑	●		21212121	VNS104	192.168.254.254	10.90.0.43	VNS 104	ver1.0.0
☐	●		21212121:1	VNS104:1	192.168.254.254	10.90.0.43	VNS 104	ver1.0.0
☐	●		21212121:2	VNS104:2	192.168.254.254	10.90.0.43	VNS 104	ver1.0.0
☐	●		21212121:3	VNS104:3	192.168.254.254	10.90.0.43	VNS 104	ver1.0.0
☐	●		21212121:4	VNS104:4	192.168.254.254	10.90.0.43	VNS 104	ver1.0.0

Figure 64.   Devices Tab, VNS 104

Actions Menu Bar

Action menu bar items change when switching between the main VNS 104 root icon and the individual decode windows. The `Actions` menu bar for the main device (see figure 65, top) contains information and configuration options common to all four decode windows. Selecting an action opens a dialog box to configure the individual device (see figure 65, bottom).

VNS 104

Actions:	Info	Connections	Configure	Audio	Misc ▼		Group ▼

VNS 104 Decode Windows

Actions:	Info	Format	Misc ▼		Group ▼
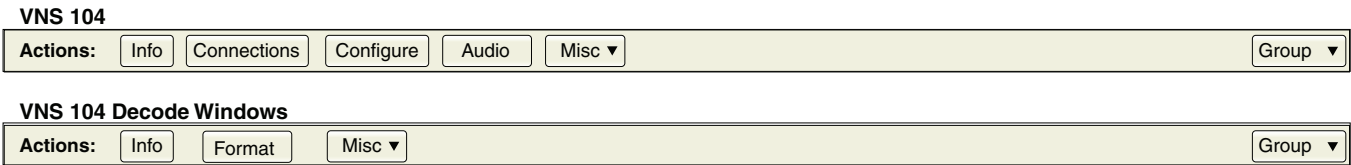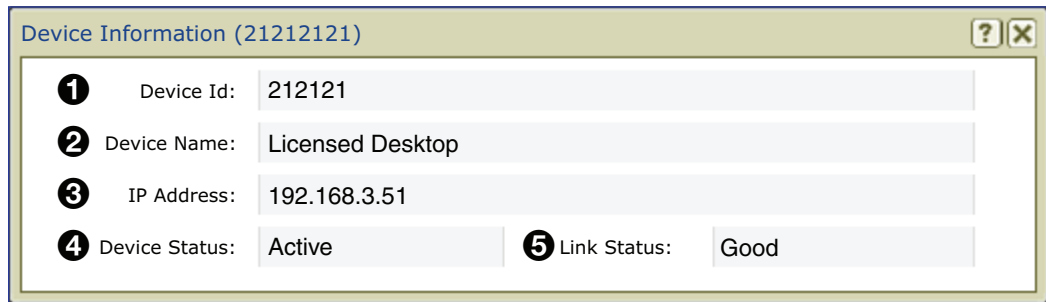
Figure 65.   VNS 104 Action Bar, Main Menu

Info Menu

Click **Info** (see **figure 65** on the previous page) to open the `Device Information` dialog box (see figure 66). There are no configuration settings, only information about the connected VNS 104 device.
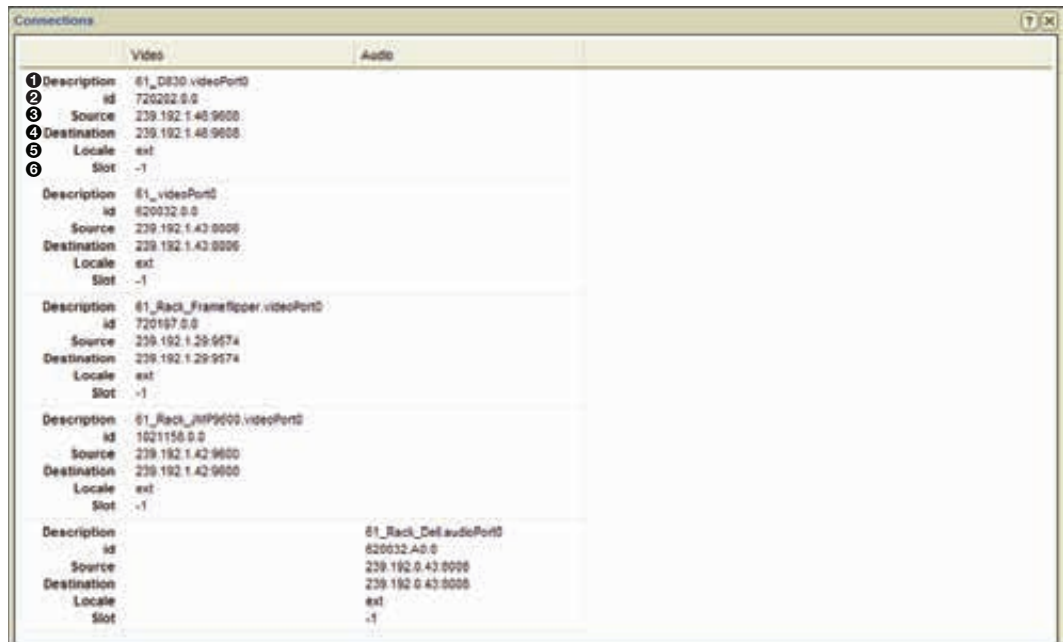
Figure 66.   **VNS 104 Root Device - Device Information**

The fields are:

❶ **Device ID** — Displays the device ID of the connected VNS 104.

❷ **Device Name** — Displays the name of the connected VNS 104.

❸ **IP Address** — Displays the IP address of the connected VNS 104 device.

❹ **Device Status** — Displays `Active` when there is a VNS 104 connected, or `No Device` if a VNS 104 is not detected. When the device is active, the **`Link Status`** indicates the quality of the management link.

❺ **Link Status** — Displays `Good` when an active VNS 104 device is connected with little or no management packet loss; `Fair` when a small amount of packet loss is detected; and `Poor` for a bad link. When the Link Status is `Poor`, ensure the link has sufficient bandwidth to carry the data.

Connections Menu

Click **`Connections`** (see **figure 65**) to open the `Connections` dialog box (see figure 67). This box contains general information for the connected VNS 104 device and shows the active stream source for each of the four connections.

Figure 67.   **VNS 104 Root Device - Connections**

For each connection, the `Connections` dialog box includes (see **figure 67** on the previous page):

❶ Description — Displays the name of the stream source device.

❷ ID — Displays the device ID of the stream source device.

❸ Source — For unicast transports, displays the IP address and port number of the stream source device.

❹ Destination — Displays the IP address and port number of the device receiving the stream.

❺ Locale — Displays `loc` when the data streaming between the source and display are controlled by the same controller (`loc`). This field displays `ext` if the data stream has been exported across two different controllers or if the transport protocol is multicast RTP.

❻ Slot — Displays information depending on the type of transport protocol in use.

- Using the **unicast RTP** transport protocol, this field displays the stream number. Four streams are available numbered **0**, **1**, **2**, and **3**.

- Using the **multicast RTP** transport protocol, this field displays **0** for a source and -1 for a display.

Configure Menu

Click `Configure` (see **figure 65** on page 82) to open the `Configure Device Settings` dialog box (see figure 68). This dialog contains general information for the connected VNS 104 device and shows the active stream source for each connection.

Figure 68.   VNS 104 Root Device - Actions Bar, Configure Device Settings

This dialog box contains the following settings:

❶ Device Name — Enter a user defined name for the device in this field. The name appears in the device list and can be letters, numbers, and the underscore character. Spaces and other characters are not allowed.

❷ Mode — Select the operation of the VNS 104 from the drop-down list. Selections are:

- **Enable** — Enables normal decoding of assigned streams.

- **Disable** — Disables decoding. Displays a splash screen (if enabled), or a black screen.

- **Standby** — Disables decoding and displays a black screen.

- **Test** — Disables decoding and displays a splash screen (if enabled), or a black screen.

③ **Enable Splash Screen** (see **figure 68** on the previous page) — Enables the display of a splash screen when the display device detects a break in the input data stream or a source stream is not assigned. When this check box is not selected, a black screen is displayed when a source stream is not present or when the display device detects a break in the input data stream (see the *VNS 104 User Guide* for instructions on how to install and use a custom splash screen).

④ **Identify Display** — Overlays the device name on the decode window or windows.

⑤ **Identify Source** — Overlays the source name on the decode window or windows. If a source is not selected for the window, "No Stream Selected" is displayed.

⑥ **User Parameters 1-3** — Enter up to three user defined parameter names in these fields (see **Device Setup panel** on page 63) to customize the operation of the VNS 104.

Audio Menu

Click **Audio** (see **figure 65** on page 82) to open the `Configure Audio Settings` dialog box (see figure 69). Only one of the connected video streams can have its audio selected for decode. The audio stream is assigned in the preset manager device attributes control. This dialog sets the level for that stream and also allows it to be muted.

```
Configure Audio Settings (21212121)                    [?][X]
  ┌─ Analog Output ────────────────────────────────────────┐
  │                                                          │
  │   ❶  Mute Output:    ☑                                  │
  │                                                          │
  │   ❷  Volume Level:   │ 4                          │ ⌃⌄   │
  │                                                          │
  └──────────────────────────────────────────────────────────┘
```
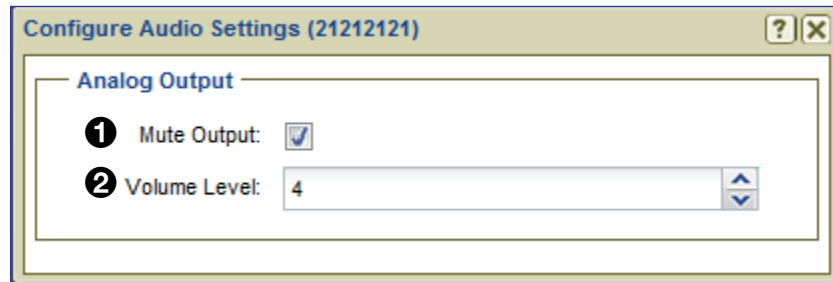
Figure 69.   Root Device - Audio Settings Dialog Box

The audio output configuration dialog box provides the following settings:

❶ **Mute Output** — Select (check) the box to mute the audio decode stream.

❷ **Volume Level** — Adjust the audio level from -70 to +12 dBu. Default is 4.

VNS 104 Misc Menu

The miscellaneous menu (`Misc`) (see **figure 65** on page 82) provides the following selections:
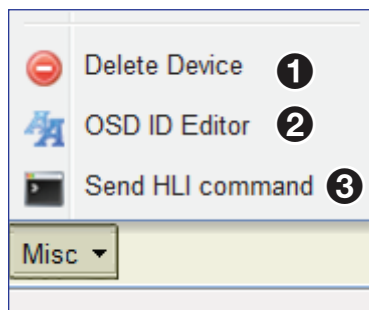
Figure 70. **Actions Bar - VNS 104 Root, Misc**

① **Delete Device** — Deletes the VNS 104 device from the EC 201 `Devices` list.

> **NOTES:**
> - Be certain the appropriate devices are selected when using this menu option. The selected devices are deleted right away; no notification or warning dialog box appears when the option is selected.
> - A device can only be deleted when it is offline. Active devices cannot be removed from the device list.

② **Send HLI command** — Sends an HLI command to the selected device.

③ **VNS 104 OSD ID Editor** — Customize the format and placement of the display text entered in the configuration menu (see **Configure Menu** on page 84).
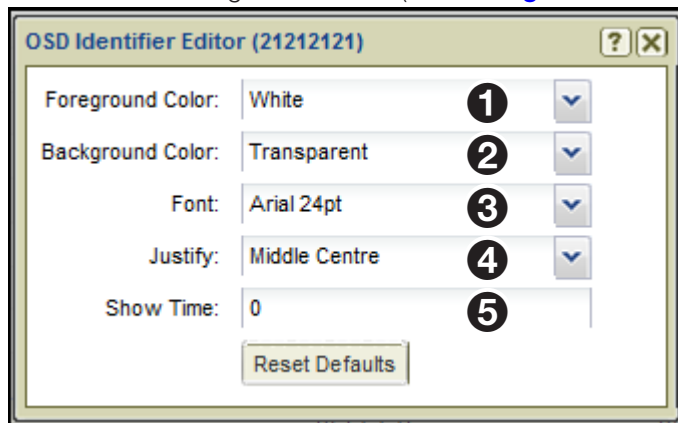
Figure 71. **OSD ID Editor, VNS 104 Shown**

The OSD ID editor provides the following:

① **Foreground Color** — Sets text color from a list of 11 colors and shades (or transparent).

② **Background Color** — Sets background color from a list of 11 colors and shades (or transparent).

③ **Font** — Sets the font and font size from a drop-down list.

④ **Justify** — Sets the position of the text window from a list of nine locations.

⑤ **Show Time** — Sets the time (in seconds) that text remains on-screen. **0** leaves the text onscreen permanently.

> **NOTE:** These settings are applied globally to all VNS 104 decode windows.

VNS 104 Decode Windows

When the streams for each of the four displays are assigned using the Preset Manager (see **Preset Manager Page** on page 92), select an individual stream to view information specific to that stream and also allow the stream to be customized for the preset.

VNS 104 Decode Windows

Actions:	Info	Format	Misc ▼		Group ▼

Figure 72. VNS 104 Action Bar, Single Stream Menu

Info

The `Information` dialog menu is the same as the main VNS 104 root device (see **Info Menu** on page 83).

VNS 104 Display Format

Click the `Format` button (see figure 72) to open the `Display Format` dialog box (see figure 73). Each decode window provides a dialog box that allows several ways to customize the display of each stream.

Display Format (21212121:3)

❶ Stream Format: 1280 X 720 60p

❷ Screen Mode: fill

❸ Screen Layout: QuadSplit
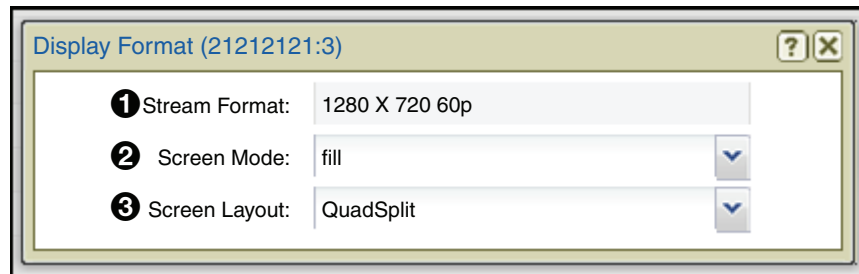
Figure 73. VNS 104 Display Format (One of Four Streams)

In this dialog box the following items are shown:

❶ **Stream Format (read-only)** — Displays the format of the assigned stream.

❷ **Screen Mode** — Select from the three screen modes: `fill`, `follow`, or `unity` (see the *VNS 104 User Guide* for details on how these screen modes appear on a VNS 104 display).

❸ **Screen Layout** — Select `Full screen` or `QuadSplit` screen layouts.

- **Full Screen** — The selected decode window is displayed full screen. Only one decode window can be set to full screen. The other decode windows are no longer visible. The decode window last set becomes the active full screen window.

- **Quadsplit** — The VNS 104 is configured as four decode windows. Each decode window is positioned as part of a 2x2 array.

Using either layout, streams are assigned to decode windows using the Preset manager control or the Switcher page (see **Device Attributes – VNS 104 Software Decoder: Decode Window** on page 104 and **Switcher Page** on the next page).

> **NOTES:**
> - Settings made here are intended to configure the VNS 104 when the VNM EC 201 Switcher page is used.
>
> - `Screen Mode` and `Screen Layout` configuration settings are also available in the Preset manager device attributes control for the VNS 104.
>
> - The settings operate on a "last configuration takes precedence" basis. Modifications to the settings made in either the device list page or preset manager page overwrite previous settings.

Switcher Page

The `Switcher` page assigns encoders (sources) to decoders (displays). This allows the user to control streaming throughout the entire system using a single page. Use the following procedure to configure the Switcher page.

1. Click **`switcher`** (see figure 74, ❶) to open the `Switcher` page (see **Accessing the Web-based User Interface** on page 10 for information on how to log in).
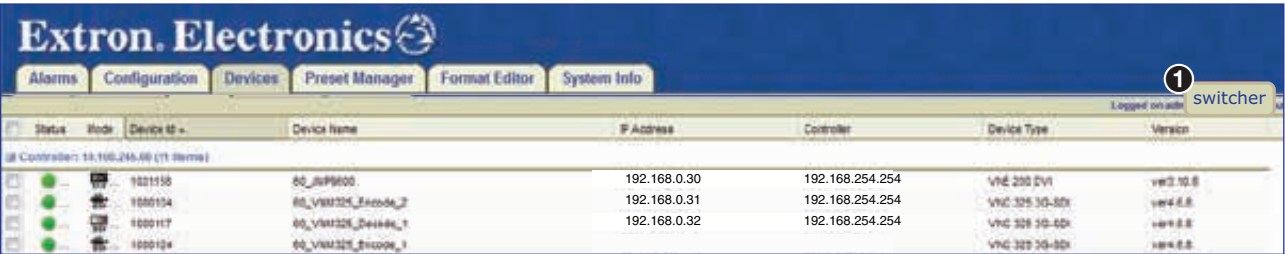
Figure 74. Switcher Access Button

The `Switcher` page opens in a new window (see figure 75).
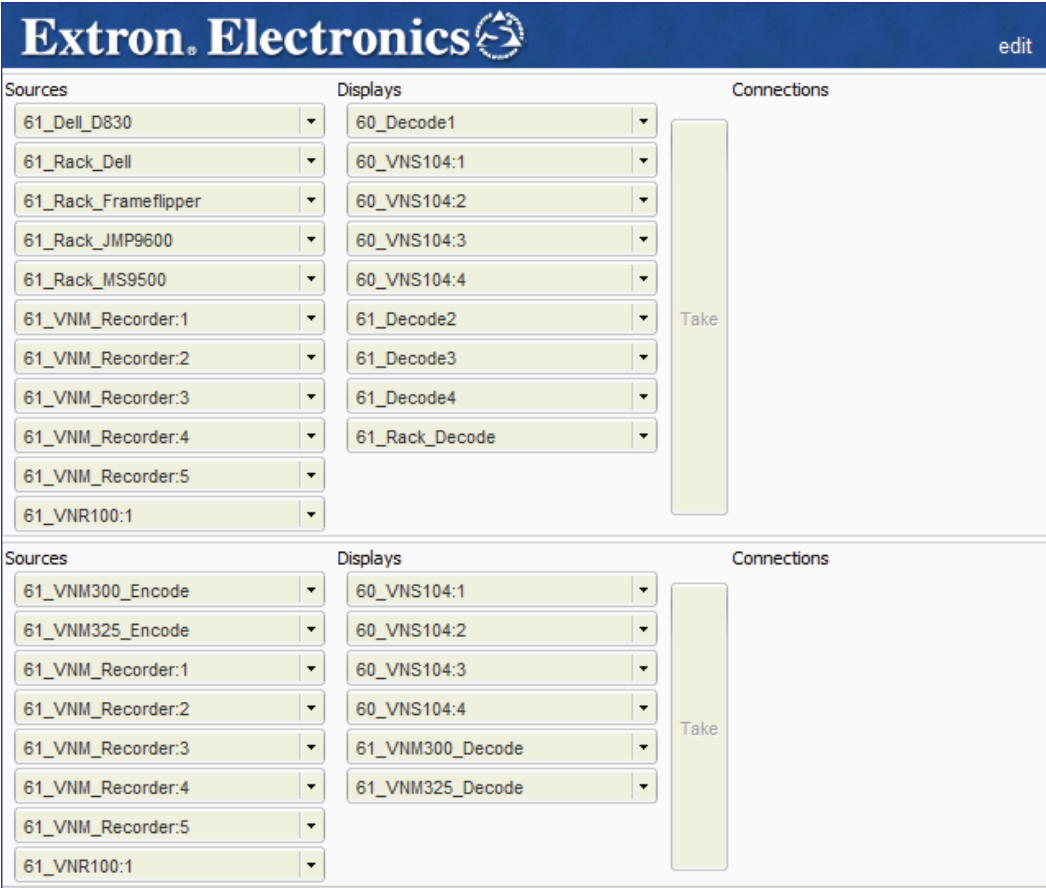
Figure 75. Switcher Window

> **NOTES:**
> *   In the `Switcher` window, VN-Matrix 2xx series devices are in the upper part of the window and VN-Matrix 3xx devices are below. VNS 104 devices and recorders can be listed in either place.
> *   If a VNS 104 is in full screen mode, only a single channel is available for switching. The other three channels are listed, but are unavailable for selection.

2. In the `Sources` column, click an encoder (sources) (see figure 76, ❶).

   The selected box darkens.

3. In the `Displays` column, click a decoder (displays) (❷).

   The selected box darkens.

4. Click **Take** (❸).

   A connection is created between the selected encoder (source) and decoder (display).

   - That the JMP9600 **Source** is streaming media to **Rack_Decode** is shown in figure 76.

   - Also, the VN-Matrix 300 source, **VNM300_Encode**, is streamed to the display, **VNM300_Decode** (both highlighted in figure 76) when **Take** is pressed.

Figure 76. Switcher Window "Take"

5. Repeat this procedure to create other connections as necessary.

> **NOTES:**
> - To remove a connection, select a connection from the `Connections` column and click **Break Connection** from the drop-down list.
> - To break all connections, select any connection and click **Break All Connections**.
> - Selecting **Break All Connections** immediately disconnects all devices. No other warning is given.

6. If audio data is present within the stream, click on the **edit** link located at the top right of the `Switcher` page and select the **Switch audio with video** option (see ❶ in the image on the right).

   This keeps the audio and video together when creating connections.

   Select **Edit Hidden Devices** (see **Hidden Devices** on the next page) to display a pop-up that allows the user to hide any devices on the `Switcher` page.

Hidden Devices

When there are too many devices on the screen, management becomes difficult. The switcher provides a way to hide unused or rarely used devices.

There are two ways to set and recover hidden devices:

1. Click the drop-down button on any source or display device and select **Hide Device** (❶).
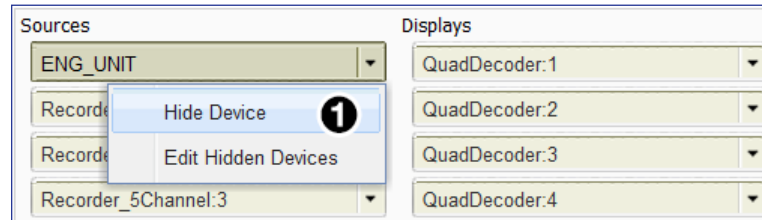
2. To display the **Edit hidden devices** menu:

   • Click the drop-down button from a source or display device and choose **Edit hidden devices** (❷)

   -Or-
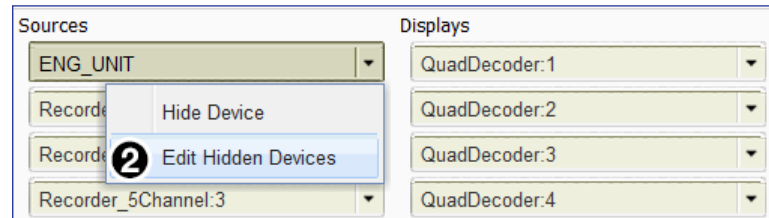
   • Click **Edit > Edit hidden devices** (❸) on the main switcher menu.
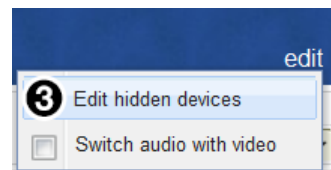
Both step 2 options open the **Edit Hidden Devices** menu (see the image on the right). The menu displays a list of all connected devices whether hidden, or not.

A checkmark in the box indicates the device is hidden.

• To display the device, uncheck the box.

• To hide a device or series of devices, place a check mark in each device box.
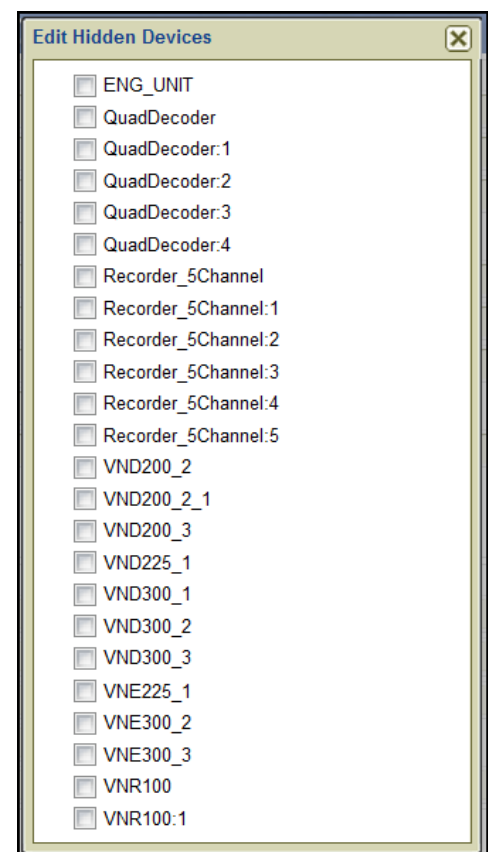
Preset Manager

This section provides instructions to connect, disconnect, and operate VN-Matrix Devices using the Preset Manager.

Sections include:

- **Presets Overview**
- **Preset Manager Page**
- **Preset List**
- **Matrix Devices List**
- **Preset Design Panel**
- **Device Attributes**
- **Recorder Directory and File Management**
- **Creating Presets**
- **Selecting a File for Playback**
- **Chase-Play Feature (VNR 100 Only)**

Presets Overview

Presets can quickly configure and connect devices to operate as a system and fall into three types:

- **Switching presets** (encoders and decoders only) — Connect an input device (encoder) to an output device (decoder).
- **Recording presets** (encoders and recorders only) — Connect input devices to the inputs (Record) of the recorder in order to record the connected stream.
- **Player presets** (players and decoders only — Connect recorder outputs (Play) to stream previously recorded programs to an output device.

> **NOTE:** The current settings for a device are reflected in the dialog boxes whenever they are accessed in the `Device List` page, `Actions` bar.
>
> - Configuration changes made on the `Preset Manager` page using `Device Attributes` are applied only when the preset is launched.
> - Changes made to a device on the `Device List` page are applied immediately.

Preset Manager Page

The `Preset Manager` page enables connection of system devices from the device list for use in the VN-Matrix system. It allows users to create, save, and recall simple and complex system configurations using drag and drop rules under the following guidelines:

- A preset can contain a mix of VNM device types.

> **NOTE:** Some device combinations are not allowed (see **Preset Design – Connection Rules** on page 96).

- A preset can have a set of attributes that define the mode and configuration parameters of devices in that preset.
- A preset can be named and saved for easy recall.
- A preset can be recalled by name using HLI commands.
- Presets are non-exclusive. The recall of one preset does not affect other devices in the VNM system that are not part of that preset.

Click the **Preset Manager** tab to open the page (see figure 77).
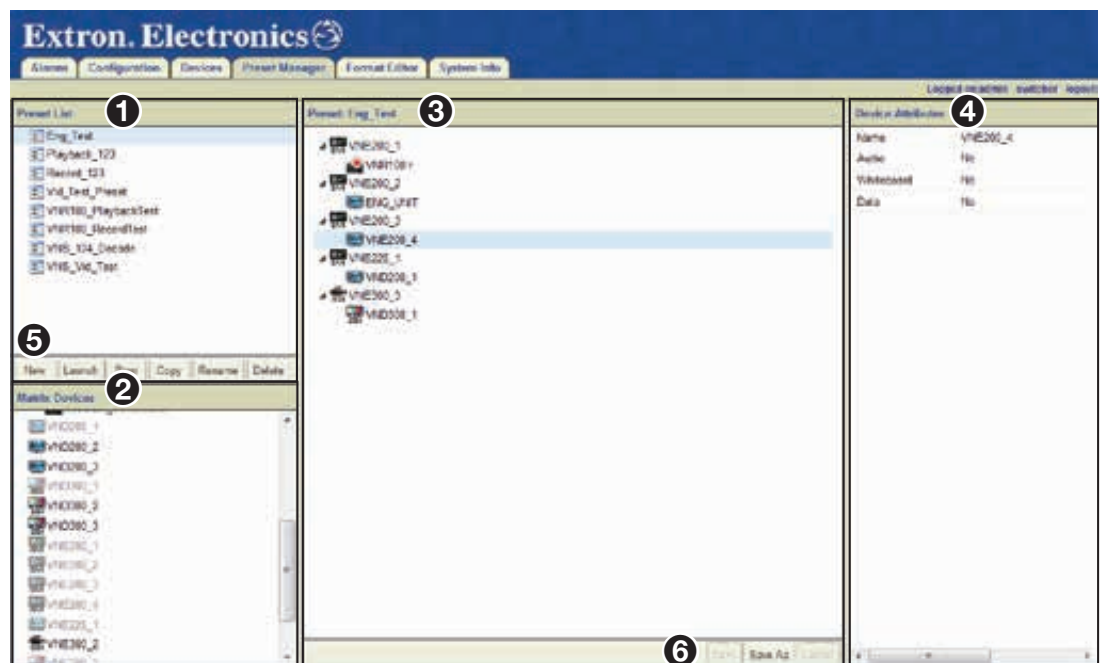
Figure 77. Preset Manager Page

The `Preset Manager` page is divided into four panels:

❶ `Preset List`

❷ `Matrix Devices` list

❸ The `Preset: Design` workspace

❹ `Device Attributes`

In addition, there are two toolbars:

❺ To create, launch, stop, copy, rename, or delete a selected preset, a toolbar is located at the bottom of the `Preset List` panel (❶).

❻ When a new preset is configured or an existing preset modified, it is saved using the toolbar at the bottom of the `Preset: Design` workspace (❸).

Preset List

The `Preset List` panel (see **figure 77**, **❶** on the previous page) provides management and control of the system presets from the preset list toolbar and provides a way to quickly reconfigure devices.

System presets configure and connect groups of VN-Matrix devices for a specific task. They are built using devices in the `Matrix Devices` list (**❷**). Once defined in the **Preset Design** workspace (**❸**), presets are saved (**❻**) to the `Preset List` for use at a later time.

Each preset can contain a mix of matrix devices that includes encoders, decoders, codecs, and recorders. Controls to manage presets are provided at the bottom of the preset list panel (**❺**).

All saved presets are listed in the `Preset List` workspace in alpha-numeric order. If the list of presets is too long to display within the area, a scroll bar is on the right side of the pane.

> **NOTE:** Multiple presets can be active, however, the last preset launched takes precedence when connections conflict with other active presets.

Preset List Controls

A toolbar at the bottom of the `Preset List` workspace provides preset creation and control (**❺**). It is not possible to select multiple presets.

New

Select **New** to create a preset. When selected, it clears a previously loaded preset from the preset design area (see **Preset Design Panel** on page 95).

> **NOTE:** Preset names must not include spaces or non alphanumeric characters such as / \ *, % ! " £ $ % ^ & * ( )@~#?><. These characters are blocked from use. Underscore (_) and hyphen (–) are permitted.

Launch

Launch configures and connects devices included in the preset. Click **Launch** to activate a preset:

1. Select a preset from the list.
2. Click **Launch** to activate the preset.

Launch is also available by right-clicking on a selected preset in the preset list.

Stop

Stop clears all settings made in a preset when launched, including:

- Connections between encoders or players and decoders or recorders are removed.
- An active recording or playback is stopped.

Copy

Click **Copy** to copy a previously defined preset and save it as another name. To copy a preset:

1. In the `Preset List`, select the desired preset.
2. Click **Copy**. The `Copy Selected Preset` dialog box opens.

3. Enter the name for the new preset into the field entry area.

4. Click **OK** to save the new preset to the `Preset List`, or

   Click **Cancel** to abandon the copy process.

5. The new preset appears in the `Preset List`.

> **NOTE:** Preset names must not include spaces or non alphanumeric characters such as / \ *, % ! " £ $ % ^ & * ( )@~#?><. These characters are blocked from use. Underscore (_) and hyphen (–) are permitted.

Rename

Rename changes the name of a previously defined preset.

1. In the preset list, select the required preset.

2. Click **Rename**. The `Rename Selected Preset` dialog box opens.

3. Enter the name for the new preset.

4. Click **OK** to save the new preset to the preset list, or

   Click **Cancel** to abandon the rename process.

5. The renamed preset appears in the preset list.

Delete

Delete erases a previously defined preset.

> **NOTE:** **Delete** does not clear existing connections made by the preset. To clear those connections, first **Stop** the preset.

Right-click Behavior

Select a preset from the `Preset List` and <**right-click**> to access the following controls:

- **Refresh** — Update the list with the latest status.
- **Launch** — Activate the selected preset.
- **Transport Controls** — For a player or recorder preset, displays the `Transport Controls` dialog.
- **Delete** — Deletes the currently selected preset.

Matrix Devices List

The available VN-Matrix devices are displayed on the `Preset Manager` page as a list in the `Matrix Devices` panel (right).

- Matrix devices are listed alphabetically by device name. It is not possible to sort or group them.
- Icons that represent each device are the same as the icons on the devices page (see **Devices Page Features** on page 34).
- The icon that represents VN-Matrix codecs depends on the mode of that device as set by the active preset.

  To determine the current mode, right-click anywhere inside the Matrix device area and select **Refresh**.

- Devices assigned to the currently selected preset appear dim in the list. Note the difference between **device11212054**, not assigned in the selected preset, and **device11212060** and also **device11212070** below it (see **figure 77** on page 92), which are both assigned.

- A question mark in place of the device icon indicates a device that is either no longer connected to the system or is powered down.

- After the first channel of a 5-channel recorder is added to a preset, all channels default to the same mode; either all recorder channels or all player channels.

- Single channel recorders are listed as one player and one recorder device.

- When the list is too long to display all devices, a scroll bar allows navigation of the list.

- Devices are selected one at a time. It is not possible to select multiple devices from the list.

Preset Design Panel

The workspace in the `Preset: design` panel is where new system presets are created and details of a selected preset are viewed.

- Whether creating a new or modifying a current preset, devices are dragged from the devices list into the design area to create a preset (see **Creating Presets** on page 111).

- A new preset is saved the first time using the **Save As** button. Updates are saved using **Save.**

- Click **Cancel** to discard changes made to a preset.

- **Save As** copies a selected preset to a new name.

- Devices are removed from a preset by highlighting the device, then right-clicking and selecting **Delete**.

- When a preset is selected from the `Preset` list (see **Preset Manager Page** on page 92), the design workspace displays the configuration of all devices used in that preset.
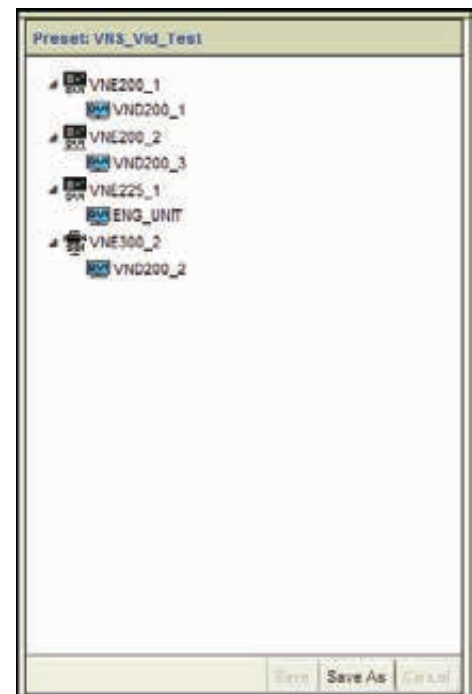
Preset Design – Device Icons

Device icons used in the preset design area are the same as those used on the `Device` page (see **Devices Page Overview** on page 34).

The icon used in a preset for certain devices depends on the device function in that preset.

- The function of VNM Recorder devices is set only when the channel is placed in a preset. When the first channel is placed, all channels are set to the same mode (recorder or player).

- A codec device can be used as an encoder or decoder. The appropriate icon is shown when the device is placed in the preset.

Preset Design – Connection Rules

Preset connections are subject to connection rules. In the table below, **X** represents connections not allowed or invalid combinations for devices in a preset.

Connection Rules		Source (Input) Device			
		2xx Codec	**2xx Encoder**	**3xx Codec**	**Player**
Output Device	**2xx Codec**	Yes	Yes	Yes	Yes
	2xx Decoder	Yes	Yes	Yes	Yes
	3xx Codec	X	X	Yes	Yes
	300 Decoder	X	X	Yes	Yes
	Recorder	Yes	Yes	Yes	X
	SW Decoder	Yes	Yes	Yes	Yes

Additionally, it is not possible to place fixed function devices such as encoder-only or decoder-only devices into an illegal position in the preset.

NOTES:

- In unicast transport mode, the maximum number of connections made to an encoder is four.
- It is not possible to record VNE 250 source material that is HDCP encrypted with the VNR 100 or the VNM 5-Channel recorder.
- HDCP protected content cannot be displayed by VNM 200/225 decoders, VNS 104 and VNM Software Decoders.

Device Attributes

When a device is placed in the `Preset Design` workspace, the `Device Attributes` panel (see figure 78) provides access to preset-specific device settings available to the preset manager.

When the device is selected, an appropriate set of attributes for that device populates the device attributes panel. Attributes customize the device for a specific function within that preset and are a subset of the full configuration control set available in the device list view (see **Devices Page Features** on page 34).

Device Attributes	
Name	VN_Recorder_5CH:1
Directory	/Test1/
File	diff1
Launch Status	Play
Repeat	No
Time Sync	Yes
Start Offset	00:00:00
Stop Offset	00:07:02
File Length	00:07:02

Figure 78. **Preset Manager, Device Attributes (Player)**

The `Device Attributes` configuration panel populates according to the selected device and its function in the preset. The following information details configuration options available in the attribute panel for each device.

Device Attributes – Codecs

Device attributes change depending on the role of the codec in the preset (see **Device Attributes – Encoders** below and **Device Attributes – Decoders** on the following pages).

Device Attributes – Encoders

Only the VNE 250 has attributes configurable by the preset manager. The attribute panel for the other encoder devices contain only a read-only `Name` field.

Figure 79. Device Attributes, VNE 250

❶ **Name** — Read-only field for the device name taken from the device list.

❷ **Video Input** — Drop-down list to select the input video source. Choices are:
- **Auto** — Automatically selects the HDMI input when a digital source is detected.
- **HDMI** — Selects the HDMI input.
- **RGB** — Selects the RGB input.

❸ **Program Audio Input** — Drop-down list to select the program input source:
- **HDMI** — Selects the digital audio from the HDMI input.
- **Analog** — Selects the analog audio input.
- **Disable** — Disables both audio inputs.

❹ **Return Audio Source (read-only)** — Reports the name of the VND 250 device with return audio enabled in the current preset.

❺ **RS-232 Mode** — Drop-down list to select the RS-232 channel mode. Choices are:
- **None** — the RS232 pass-through port is disabled.
- **Pass through Server** — Configures the device as a server.
- **Pass through Client** — Configures the device as a client.
- **Data channel** — Configures the device to transport RS-232 communications over the data channel.

NOTES:
- In pass-through mode, RS-232 data is bi-directional and can be sent and received between server and client devices. In this mode, RS-232 communications operate independently of device connections. Pass-through communications cannot be recorded.
- In data channel mode, RS-232 communications operate over the current connections and are uni-directional, from encoder to decoder. Data channel communications can be recorded.

6 **RS-232 Server** (see **figure 79** on the previous page) — Drop-down list with the servers currently on the same domain. Only available when `Pass through Server` is selected in RS-232 mode.

7 **RS-232 Data Tx** — Enable and disable RS-232 data transmission.

8 **UDP Data Tx** — Enable and disable a UDP data transmission port.

9 **UDP Data Port** — Enter the port number that UDP data is received on. This setting must match the port number that is defined by the external device or system that generates the UDP data.

Device Attributes – Decoders

Decoder device attributes differ depending on the selected device (see figure 80).

200/225 Series   **3xx Series**

Figure 80.   **Device Attributes Panel, Decoders**

1 **Name** — Read-only field for the device name taken from the device list.

Stream settings

The following attributes enable or disable the connection of a specific stream. By default, the video stream is always made when a preset is built. A stream type can only be enabled if it is present in the connection from an encoder or player device.

VND 200/225 series only

2 **Audio** — Enable or disable the audio channels.

3 **Whiteboard (VND 200/225 only)** — Select **Yes** to decode available whiteboard data from the stream (see **License Menu** on page 55).

4 **Data** — Select **Yes** to decode data information from the stream.

VND 3xx series only

5 **Ancillary** — See **Ancillary Audio Panel (VN-Matrix 3xx Only)** on page 46.

6 **Column FEC** — See **Ancillary Audio Panel (VN-Matrix 3xx Only)**.

7 **Row FEC** — See **Ancillary Audio Panel (VN-Matrix 3xx Only)**.

> **NOTE:** The configuration of individual streams is made on the appropriate device in the device list page. For example, the video compression settings or the audio format for an encoder are set on the device list page.

Device Attributes – VND 250 Decoder

The VND 250 decoder has an extended set of device attributes (see figure 81).

Figure 81.   Device Attributes Panel, VND 250

❶ Name — Read-only field for the device name, taken from the device list.

❷ Output Format — Drop-down list of available output resolutions. Choices are:

- **Auto** — Output format is the same as the input source (stream) format.
- **Monitor** — Output format is set to the preferred mode (EDID) of the display. If necessary, scaling is applied.
- **Fixed** — Output format is selected from a drop-down of available resolutions. If necessary, scaling is applied.

❸ Scale Mode — Drop-down list available when the `Output Format` is `Monitor` or `Fixed`. Choices are:

- **Fill** — The decoded image is scaled to the selected output format. Aspect ratio is **not** maintained.
- **Follow** — The decoded image is scaled to the selected output format. Aspect ratio is maintained.

❹ Audio Stream — Drop-down list with the following choices:

- **None** — Mute the audio streams.
- **Program** — Enable the decoding of program audio.
- **Program plus Return** — Enable the decoding of program audio and return path audio.

❺ Program Audio Source — Drop-down list of the other VNE 250 devices in the preset.

- **None** — Select audio from the currently connected stream (Default).
- **{List}** — Select an audio source from a list of VNE 250 devices in the preset.

❻ Program Audio Output— Selects the required output for the program audio.

- **HDMI** — Select to enable the HDMI audio output.
- **Analog** — Select to enable the analog audio output.
- **Both** — Select both the analog and digital audio outputs.
- **Disable** — Mute all audio output.

7 **RS-232 Mode** (see **figure 81** on the previous page) — Drop-down list to select the RS-232 channel mode.

- **None** — The RS-232 pass-through port is disabled.
- **Pass through Server** — Configure the device as a server.
- **Pass through Client** — Configure the device as a client.
- **Data Channel** — Configure the device to transport RS-232 communications over the data channel.

> **NOTES:**
> - In pass-through mode, RS-232 data is bi-directional and can be sent and received between server and client devices. In this mode, RS-232 communications operate independently of device connections. Pass-through communications cannot be recorded.
> - In data channel mode, RS-232 communications operate over the current connections and are uni-directional, from encoder to decoder. Data channel communications can be recorded.

8 **RS-232 Server** — When RS-232 mode is set to `Pass through Client`, a drop-down list of available servers on the system is enabled.

9 **Data Stream** — Select `Yes` to enable the data stream, `No` to disable.

10 **UDP Data Rx** — Select `Enable` to receive UDP data from the system. When enabled, the UDP Dest IP and UDP Dest Port selections are listed below.

11 **UDP Dest IP** — The IP address of the external device or system that receives UDP traffic. UNICAST or MULTICAST addresses are valid.

12 **UDP Dest Port** — The port number used by the (external) device or system to receive the UDP data.

13 **Annotation** — Select `Yes` to enable annotation pointer overlay functions.

> **NOTES:**
> - When creating a videowall using presets, VND 250 devices are configured and connections are built using the **Preset Manager**. Modifying the output format or the scale mode settings of a VND 250 decoder in the Presets `Device Attributes` panel changes the current configuration of the decoder in the `Device List` to those set in the `Device Attributes` panel **only when the preset is launched**.
> - The normal encoder to decoder connection count limit applies.
> - Unicast transport supports a maximum of four connections to a single encoder. Note that each unicast connection increases the bit rate by the same amount for each connection. The aggregate bit rate for four unicast connections cannot exceed the maximum supported bit rate of 270 Mbps for an encoder.
> - Multicast transport supports "one to many" connections allowing for wall sizes of more than four displays.
>
> See the **System Config Page** on page 24 for additional information on unicast and multicast connections.

Device Attributes – VN-Matrix Recorder: Play Mode

The 5-channel VN-Matrix Recorder in player mode operates with Ch1 set as the master for all channels (see figure 82, left).

Figure 82.   Device Attributes, 5-channel Player

The player device attributes for a 5-channel device provide the following functions:

> **NOTE:**   The attributes for individual channels 2, 3, 4, and 5 (shown in figure 82, right) are a reduced set of the attributes for Ch1.

❶ **Name** — Displays the device name and selected sub-channel number (read only).

❷ **Directory** — Open the recorder browser for directory level navigation and selection.

❸ **File** — Open the directory listed in the `Directory` field to enable selection of a single recorded file and displays the filename.

❹ **Launch Status** — Define the start condition of a `Play` or `Record` preset with the drop-down control.

- **Play** (player channel 1 only) — When the preset is launched, playback begins immediately.

- **Provision** — Delays playback until the appropriate command is sent from the transport bar or from an external control system.

❺ **Repeat** —Set a player into loop mode with the drop-down control.

❻ **Time Sync** — Set the timing relationship between the channels on multiple devices in a player preset with the drop-down control.

❼ **Start Offset** — Set the start time of a selected file.

❽ **Stop Offset** — Set the stop time of a selected file.

❾ **File Length** — Displays the length of the recording in `hh:mm:ss` format.

Device Attributes – VN-Matrix Recorder: Record Mode

The 5-channel VN-Matrix Recorder in recorder mode operates with Ch1 set as the master for all other channels on that device.

Device Attributes		
❶ Name	Recorder_5Channel:1	
❷ Directory	/RecTest_01/	
❸ File	ChaseTST01	
❹ Launch Status	Record	
❺ Description		
❻ Audio	No	
❼ Whiteboard	No	
❽ Data	No	

Figure 83.   **Device Attributes, 5-channel Recorder**

The recorder device attributes for a 5-channel device provide the following functions:

❶ **Name** — Displays the device name. For the 5-channel recorder, if a sub-channel is selected, this displays the device name and sub-channel number.

❷ **Directory** — Type a new directory name directly into an editable field or use a file browser to create and delete directories (see **Recorder Directory and File Management** on page 104).

❸ **File** — Navigation tree to create and delete files.

❹ **Launch Status** — Define the start condition of the preset.

- **Provision** — Places the recorder in pause when the preset is launched. The recording begins only when the record button is clicked on the transport bar.

- **Record** — Starts the recording immediately when the preset is launched.

❺ **Description** — Describes the recording.

❻ **Audio** — Select **Yes** to enable, or **No** to disable the audio stream.

❼ **Whiteboard** — Enable or disable whiteboard (see **Recorder Configuration** on page 77).

❽ **Data** — Enable or disable a data stream (see **Recorder Configuration**).

Device Attributes – VNR 100 Player

The VNR 100 player `Device Attributes` panel provides the following functionality:

Device Attributes		
❶	Name	VNR100:p
❷	Directory	/GFChaseTest/
❸	File	TEST
❹	Launch Status	Play
❺	Time Sync	Yes
❻	Start Offset	00:00:00
❼	Stop Offset	00:00:00

Figure 84.   Device Attributes, VNR 100 Player

The function of each attribute is the same as the 5-channel player (see **Device Attributes – VN-Matrix Recorder: Play Mode** on page 101).

> **NOTE:**   You cannot set a stop offset in chase-play (live) mode when using a single channel recorder (see **Chase-Play Feature (VNR 100 Only)** on page 126).

Device Attributes – VNR 100 Recorder

Device Attributes		
❶	Name	VNR100:r
❷	Directory	/New_Directory/
❸	File	GDFTST_002
❹	Launch Status	Record
❺	Description	Test File
❻	Audio	No
❼	Whiteboard	No
❽	Data	No

Figure 85.   Device Attributes, Single-Channel Recorder

The VNR 100 recorder `Device Attributes` panel provides the following functionality:

❶ **Name** — Displays the device name.

❷ **Directory** — Type a new directory name into this field or use a file browser to create and delete directories.

❸ **File** — Create and delete files with this editable field and navigation tree.

❹ **Launch Status** — Define the start condition of a preset with this drop-down control.

- • **Provision** — Place the recorder in pause mode when the preset is launched. The recording begins only when the record button is clicked on the transport bar.

- • **Record** — Starts the recording immediately when the preset is launched.

❺ **Description** — Describes the recording.

❻ **Audio** — Enable or disable audio recording.

❼ **Whiteboard** — Enable or disable whiteboard data recording.

❽ **Data** — Enable or disable data stream recording.

Device Attributes – VNS 104 Software Decoder: Decode Window

Device Attributes	
❶ Name	VNS104:1
❷ Audio	No
❸ Mute Audio	No
❹ Audio Volume	4
❺ Screen Mode	Fill
❻ Screen Layout	QuadSplit

Figure 86.   Device Attributes, VNS 104

Each VNS 104 decode window has the following attributes (see figure 86):

❶ **Name** — Displays the device name.

❷ **Audio** — Enable (`Yes`) or disable (`No`) connection of specific stream types within a decoder channel.

❸ **Mute Audio** — Mute the audio stream.

❹ **Audio Volume** — Set the volume level of the audio stream.

❺ **Screen Mode** — Select from three screen modes; `Fill`, `Follow`, or `Unity` (see the *VNS 104 User Guide* for more details on how these screen modes appear on a connected display).

❻ **Screen Layout** — Select between `Full` screen or `QuadSplit` screen layouts. In full screen layout, the selected channel is the only one available to the display (see **VNS 104 Software Decoder Configuration** on page 82).

Recorder Directory and File Management

VN-Matrix recorders can be used as a source (player) or display (recorder). The following section describes the recorder directory and file structure and rules to assist in their management.

Directory Management Overview

A recording can be made on single or multiple devices (recorders). A recording contains all files required to recreate the original stream from an encoder in a set. The set can consist of audio, video, and data file types. Each recording set is stored in a unique directory.

• Each directory can hold only the files for a single recording.

• Directories must have a unique name, duplicates are not allowed.

A new directory can be created in two ways. The same methods are used on both the single and 5-channel devices.

> **NOTE:**   Directory names must not include spaces or non alphanumeric characters such as / \ *, % ! " £ $ % ^ & * ( )@~#?><. These characters are blocked from use. Underscore (_) and hyphen (–) are permitted.

Create Directory – Directory browser method (preferred)

To create a new directory using the navigation tree:

1. Create a preset with an encoder and recorder (see **Recorder Presets** on page 117).

2. Select a recorder (channel) in the `Preset Design` workspace.

3. Click anywhere inside the **Directory** field of the `Device Attributes` panel, then select the drop-down box on the right hand side (see figure 87, ❶).

Device Attributes		
Name	VNR100:p	
Directory		❶
File		
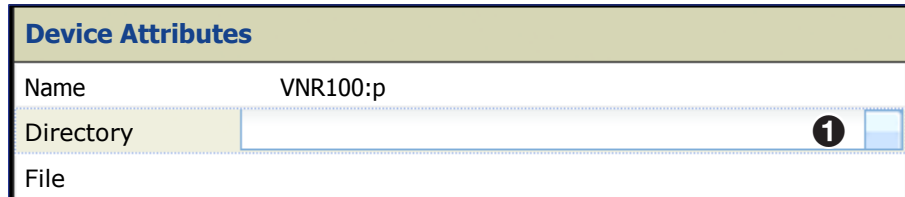
Figure 87. Select Directory Drop-down Box

The `Recording Browser` dialog box opens (see figure 88).
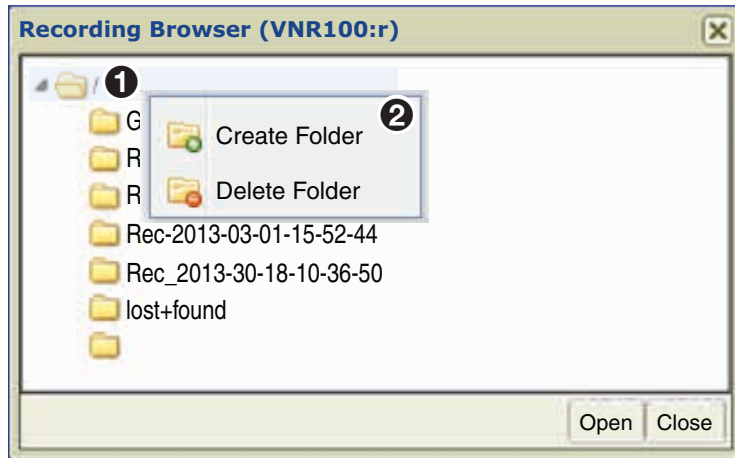
Figure 88. Recording Browser Window, Create Folder

4. Select the root folder (❶), <**right-click**> on the folder.

5. Click **Create Folder** (❷).

   The `Create Folder` dialog box opens (see figure 89).

6. Enter the directory name (❶).
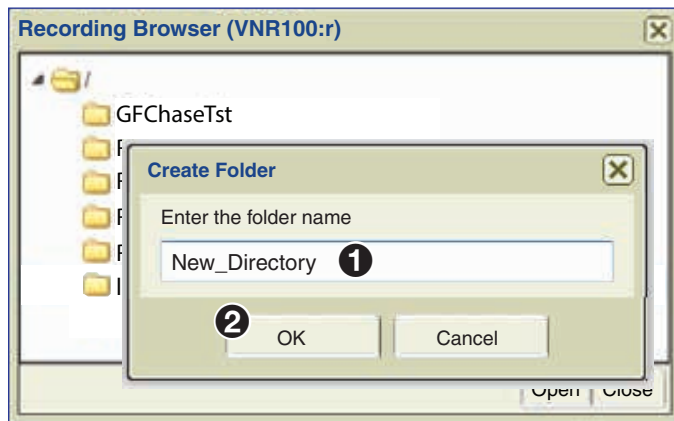
Figure 89. Create Directory, Enter Name

7. Click **OK** (❷).

> **NOTE:** Using this method, the directory is created and displayed in the directory list immediately.

The new directory is created and the `Recording Browser` dialog box displays all directories, including the new one. The browser remains open.

8. Select the new directory, and click **Open** to continue (see figure 90, ❶).

A dialog box opens.

> **NOTE:** Select **Close** to cancel the process (the new folder remains).
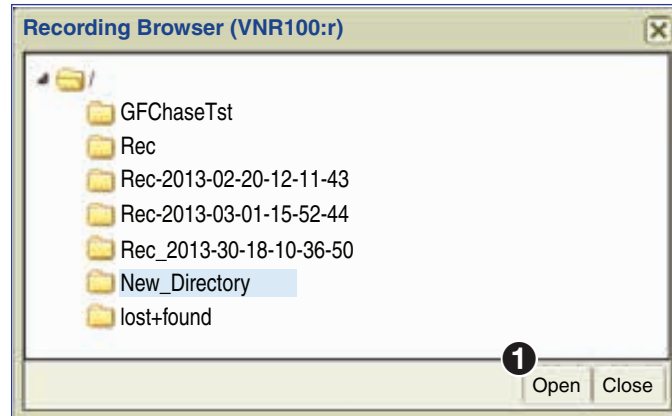
Figure 90. **Recording Browser, Select and Open Directory**

9. Select **Yes** (see figure 91, ❶) to automatically create the same directory on other recorder devices in the preset, or **No** to continue.

Figure 91. **Recording Browser, Auto Populate Other Recorders**

> **NOTE:** If multiple recorder devices (single or 5-channel) are in the preset, using the same directory simplifies file selection for replay.

Create Directory – Direct entry method (advanced)

To create a directory using direct entry:

1. Create a preset with an encoder and recorder (see **Recorder Presets** on page 117).

2. Select a recorder (channel) in the `Preset Design` workspace.

3. In the `Device Attribute` panel, click in the `Directory` row (see figure 92, ❶) and enter the new directory name in the field.

   A red marker indicates a change in the device attributes.

Device Attributes	
Name	VNR100:r
Directory	New_Directory ❶
File	
Launch Status	Record
Description	
Audio	No
Whiteboard	No
Data	No

Figure 92.   Device Attributes - Create Directory (Advanced)

> **NOTE:**   Using this method, the new directory appears in the browser directory listing only after the preset is launched.

4. Save the preset. The red marker clears when the preset is saved.

> **NOTE:**   It is only necessary to set the directory name on one channel in a 5-channel device. Although it is possible to enter different directory names in the other four channels, the name used for the directory when the preset is launched is the directory name last entered. Therefore, all channels use the directory name entered last and ignore the previous entries.

Duplicate Directory Naming

If a recorder preset is built (or copied) using an existing directory name, or if the same preset is launched more than once without changing the name of the directory, a new directory name is automatically created. The first time a recording is launched, the previously entered directory name is created (see figure 93).

Figure 93.   Duplicate Directory Naming

When the same preset is launched a second time, a new directory name is created using the original directory name appended with a time and date stamp (see figure 94).
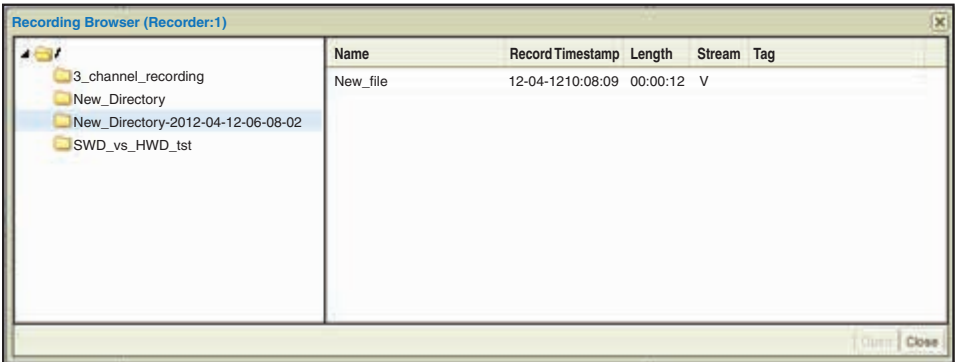
Figure 94.   Duplicate Directory Naming, New Recording

Each directory contains only the files from a single recording.

Delete Directory – Recording Browser

Directories are deleted using the `Recording Browser`. **`<Right-click>`** on the folder and select **`Delete Folder`** (see figure 95).

Figure 95.   Delete Directory

All files in the directory are deleted. A warning is given to confirm the deletion.

> **NOTE:** The root directory cannot be deleted.

File Management Overview

The recorder allows creation of both directories and files while the player can only select directories and files after they are created by the recorder.

Filename

By default, the name of the encoding device is used as the name of the recorder file. The default name is changed by entering a new name in the **Device Attributes File** field.

Creating a File

A file is created when a recording begins. If the file field is blank when the recording starts (see figure 96, ❶), the device name of the encoder is used as the filename (❷).

Figure 96. Create a File

> **NOTE:** The filename field in the `Device Attributes` panel remains blank.

If a specific filename is desired, the name is entered in the **File** field (see figure 97, ❶), which then becomes the name of the file in the recording (❷).

> **NOTE:** File names must not include spaces or non alphanumeric characters such as / \
> *, % ! " £ $ % ^ & * ( )@~#?><. These characters are blocked from use. Underscore (_)
> and hyphen (–) are permitted.
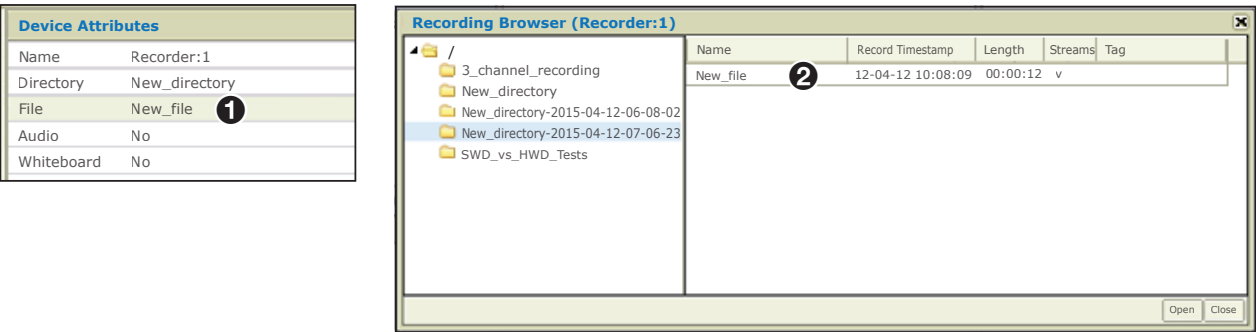
Figure 97. Create a File Using Direct Text Input

Completed Directory Structure

A recording directory contains one set of files for each recorder (channel) in the preset. A file set can contain audio, whiteboard, and other data streams associated with the video file.
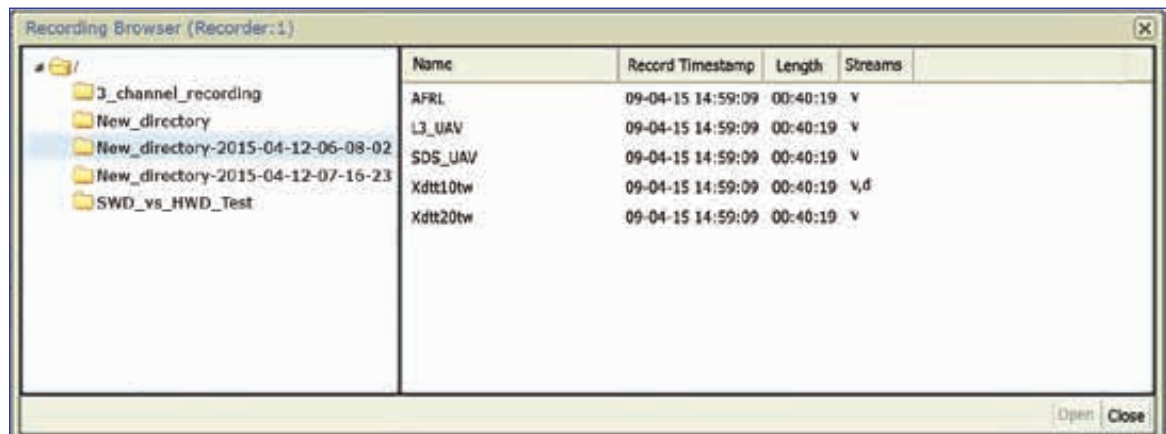
Figure 98.   **Recording Browser, One File per Channel**

Deleting a File

Delete a file by highlighting it in the browser, <**right-click**>, then select **Delete File**.
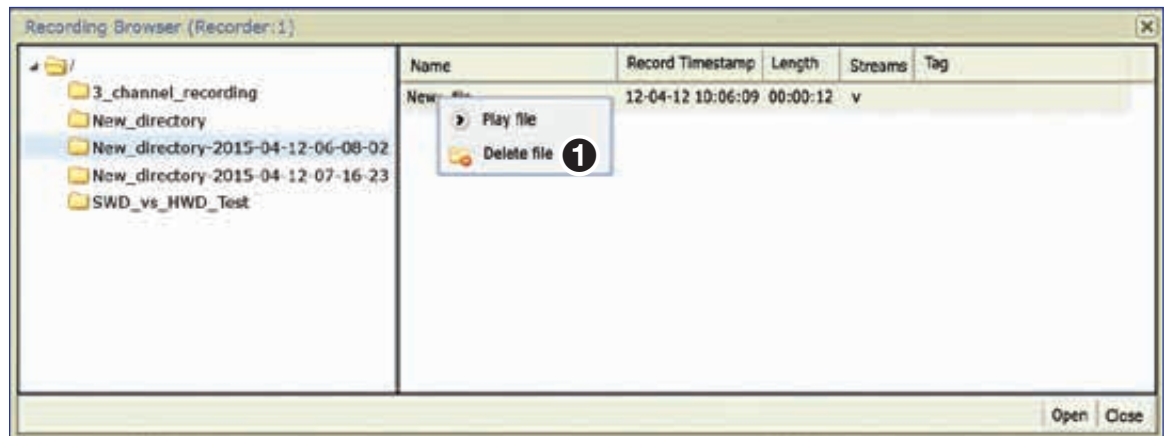
Figure 99.   **File Browser, Delete a Channel**

> **NOTE:**   The browser must be refreshed after a delete.

Player File Management

All files for a single recording are in one directory. In a 5-channel device, the directory can contain up to five sets of files, one for each channel.

In a multi-player system, the same directory must be present on all devices, and each directory must contain the files recorded for that channel.

When selecting a previously recorded file for playback, navigate to the directory using the `Recording Browser`. When the directory is selected, files in the directory are loaded into all players automatically. It is not necessary to select individual files for each player device.

Creating Presets

Presets are created that configure devices to operate as a system. Once created, presets can be launched with a single button click. The EC 201 then reconfigures and connects the devices in the preset to create the system.

The three preset types are:

- **Switching** — Connect inputs to outputs. Source devices must always be placed into the design area first. Source devices (codecs, encoders, or players) are dragged from the `Matrix Devices` list into any blank space in the `Preset Design` workspace.

- **Record** — Connect encoders to a record channel, select the stream and stream types to record, and specify the directory and file names. Source devices are always placed first with the desired recording channel dropped on it.

- **Play** — Connect decoders to a player and view previously recorded material. Players are always placed first followed by the decoder.

Several general rules for the `Preset Design` workspace are:

- The first device dragged into the design area is positioned vertically on the left hand side of the workspace. Subsequent devices are positioned under the previous one in the order placed.

- Once placed in this column, the space to the right of a source device becomes a connection point for decoders or recorder channels.

- A codec can be added to a preset regardless of its current mode. When dropped into the design area first, a codec formatted as a decoder reconfigures to an encoder. Similarly, a codec formatted as an encoder, reconfigures to a decoder when dropped onto an encoder.

Create a New Preset

To create a new preset, drag and drop a device onto the `Preset` panel, then drag an appropriate device onto the first device. In this example, Encode1 is an encoder streaming video to the system. Decode1 is a decoder connected to a display.

To create an encoder to decoder preset:

1. Click **New** (see figure 100, ❶) at the base of the `Preset List` panel to create a blank preset (see **Preset Manager Page** on page 92).
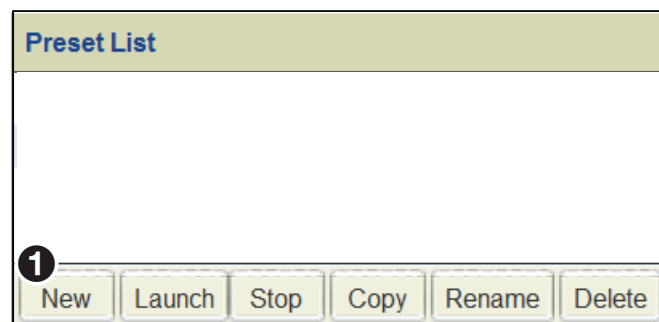
Figure 100. **Preset List - New Preset**

2. Add an encoder to the `Preset` panel. Click and hold the encoding device (see figure 101, ❶).
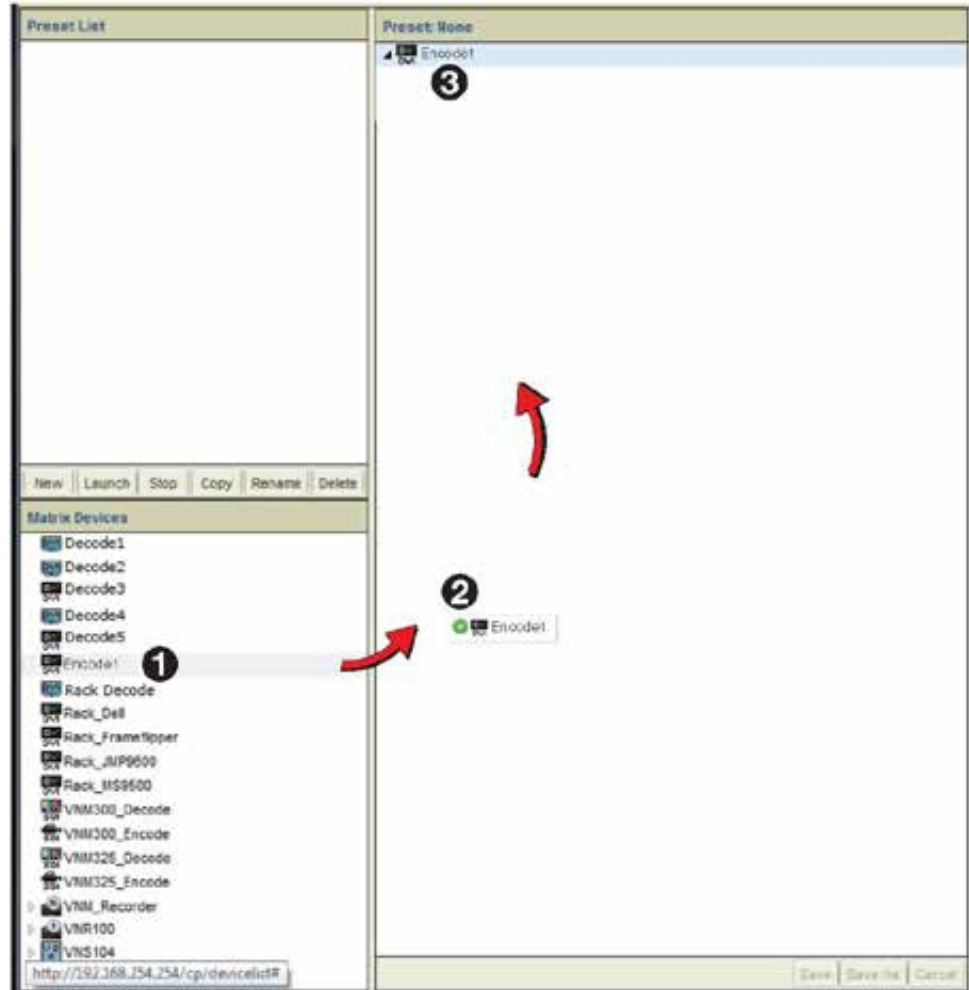
Figure 101. **Preset Workspace, Place a Device**

3. Drag the device to the upper left corner of the `Preset` panel (❷).
4. Drop the device (❸).

> **NOTE:** Devices dragged and dropped into the `Preset Design` workspace are positioned on the left side in the first open space vertically, and in the order they are placed.

5. Add a decoder to the `Preset` panel. Click on and hold the desired decoder (see figure 102, ❶).
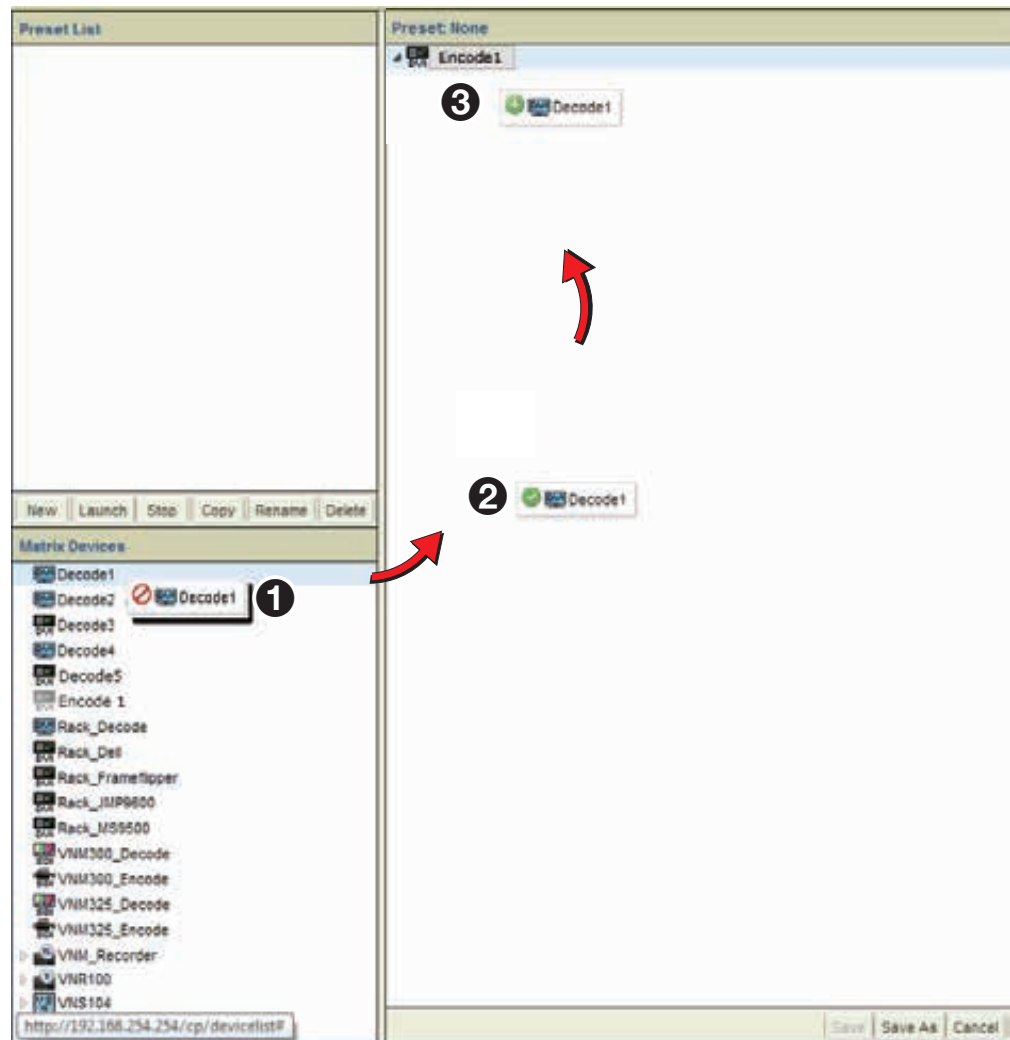
Figure 102. Preset Workspace, Add a Decoder

6. Drag the device to the upper left corner of the preset panel (❷).

7. While holding the decoder, place it on top of the previously placed Encoder1, then release (❸).

The preset completes after a moment.

> **NOTE:** Although the user interface shows a connection between the devices, the connection is made **only when the preset is launched** (see **Launch Behavior** on page 118).

Saving Presets
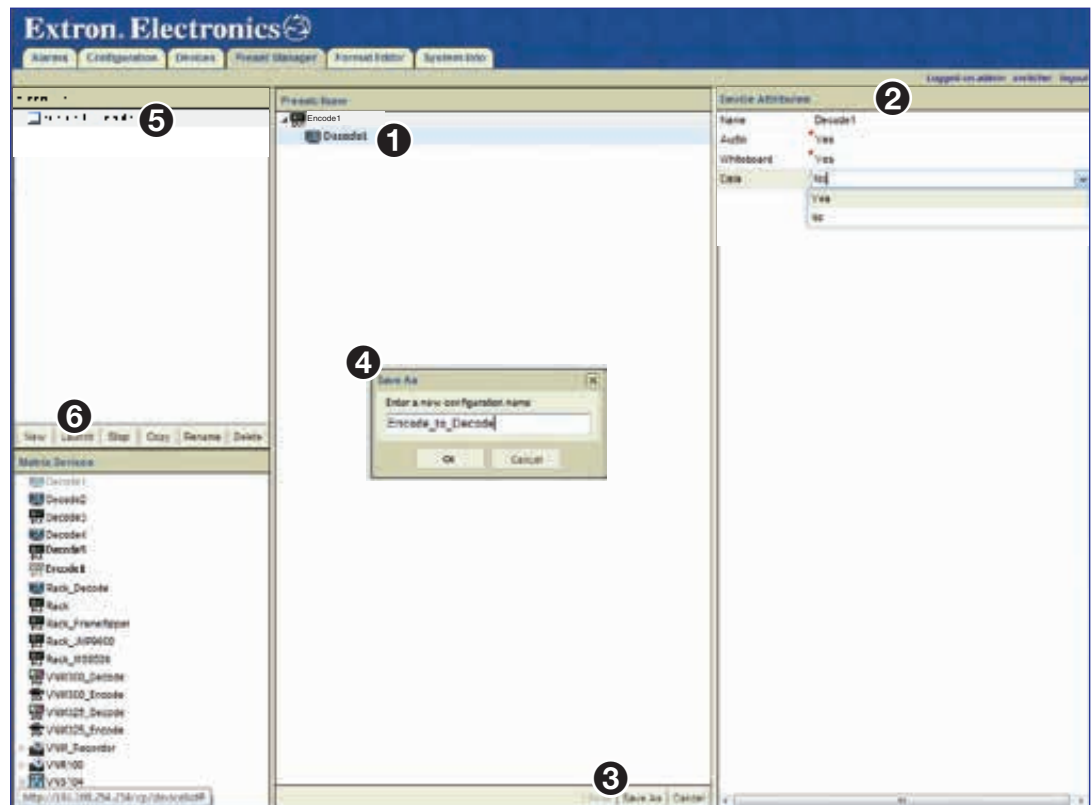
Figure 103. Save a Preset

Before saving the preset, configure the decoder using the `Device Attributes` panel (the encoder has no attributes available).

1. Click on the decoder device in the `Preset` panel (see figure 103, ❶) to populate the device attributes (❷).

2. Configure the attributes of the decoder (❷) as needed (see **Device Attributes** on page 96).

> **NOTE:** A red triangle appears as each attribute is changed to remind you the changes are not saved. The triangle goes away when the preset is saved.

3. When the decoder is configured, click **Save As** on the `Presets` panel toolbar (❸). The `Save As` dialog opens.

4. Type a name using the standard naming format, then click **OK** (❹).

5. The new name appears in the `Preset List` panel (❺).

6. Click on the preset, then click **Launch** on the `Preset List` toolbar to activate the preset (❻).

Using the VNS 104 in a Preset

The VNS 104 is identified in the `Device List` as a four channel decoder with four possible connections. In the `Preset Design` panel, each channel can be connected to the same or to a different encoder or player channel.

1. Select **New** at the base of the `Preset List` panel to create a blank preset (see figure 104, ❶).

Preset List

- Eng_Test
- Playback_123
- RecChaseTst_play
- RecChaseTst_rec
- Record_123
- Vid_Test_Preset
- VNR100_PlaybackTest
- VNR100_RecordTest
- VNS_104_Decode
- VNS_Vid_Test

❶
| New | Launch | Stop | Copy | Rename | Delete |
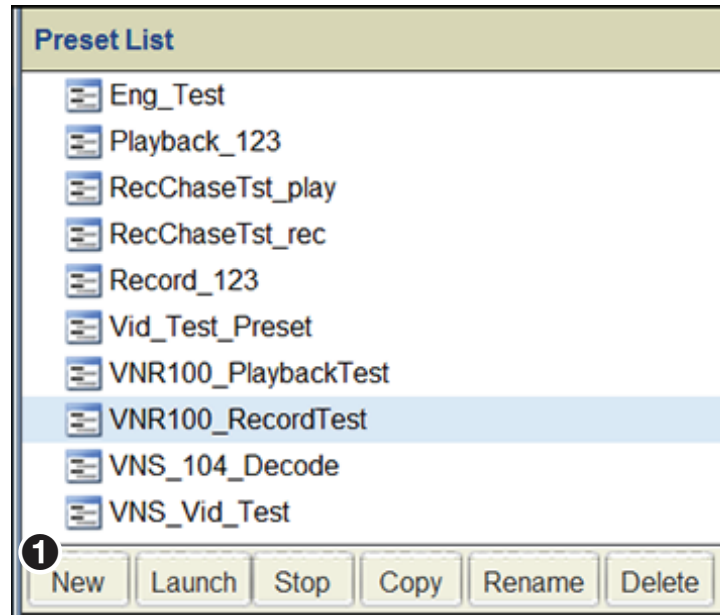
Figure 104. Presets, Using the VNS 104

2. Drag an encoder from the `Device List` and drop it onto the `Preset` design panel (see figure 105, ❶).

Preset: None

◢ 📟 VNE200_1 ❶

| Save | Save As | Cancel |
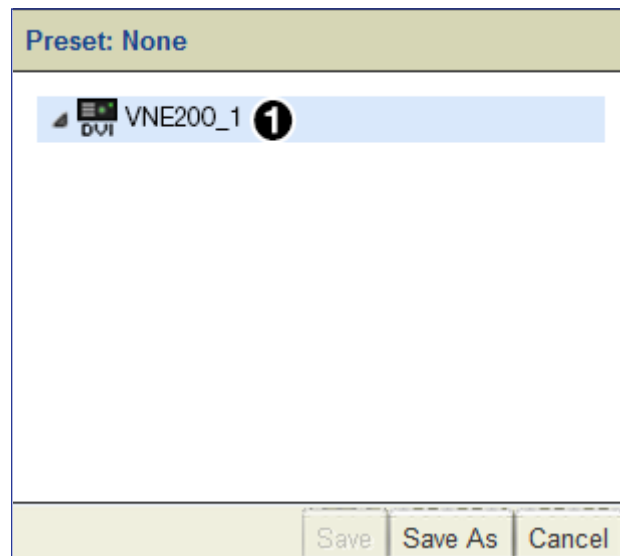
Figure 105. Presets, Drag and Drop an Encoder

> **NOTE:**   Devices dragged into the `Preset` panel workspace are positioned in the first open space vertically on the left hand side of the design area in the order they are placed.

3. Drag one of the four software decoder channels from the `Device List` (see figure 106, ❶) and drop it onto the source device in the `Preset` panel (❷).
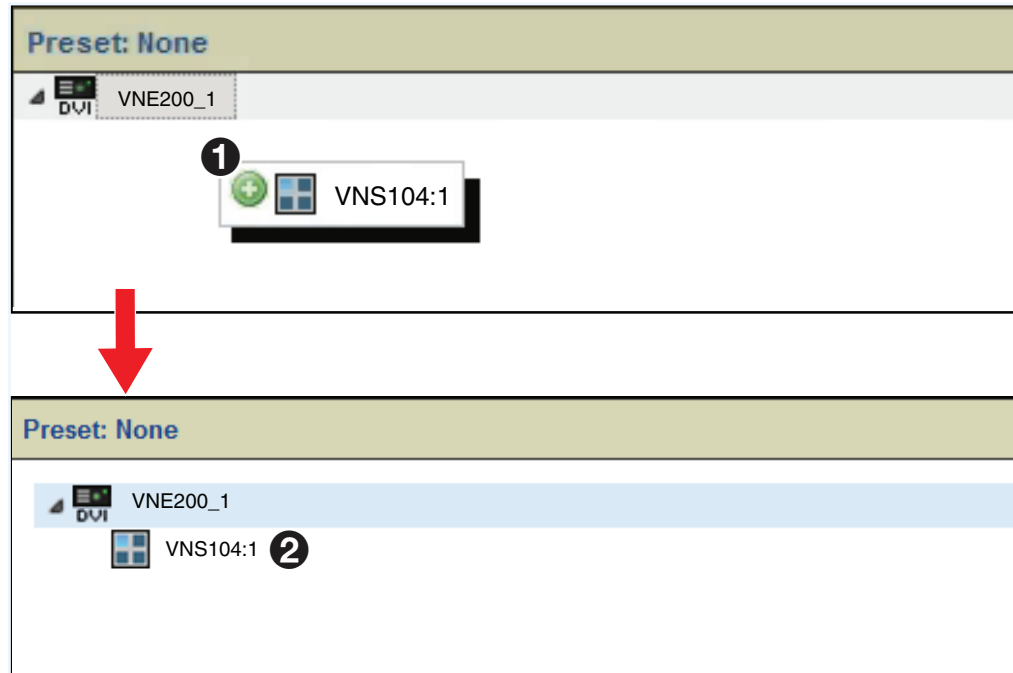
Figure 106. Presets, Drag and Drop the VNS 104

> **NOTE:** Output devices are positioned below and to the right of the source device they are connected to.

4. Set output device attributes as required (see **Device Attributes** on page 96).

5. Click **Save As** and name the preset (see **Preset List** on page 93).

   The connection between the source device and the VNS 104 Software Decoder window is now available.

6. Either drop more software channels onto the encoder, or drag more encoders into the `Preset` panel, then drop additional software decoder channels onto them as required.

In this manner, connections are made between inputs (sources) and any or all channels of the VNS 104 Multi-stream Software Decoder.

Recorder Presets

Recorder presets are created similar to switching presets. Place an encoder device into the `Preset` panel first, followed by a recorder channel or channels. Use the `Device Attributes` panel of a recorder to create or select a file directory, and select the channels to record.

To Record a Channel

1. Create a preset with an encoder source and recorder channel (see figure 107, ❶).

Figure 107. Create a Preset

2. Select the record channel (see figure 108, ❶). The `Device Attributes` panel populates with the configuration options appropriate for the recorder.

3. Create or select a directory (❷) for the recording file (see **Directory Management Overview** on page 104).

Figure 108. Select the Record Channel

4. Enter a filename for the recording in the `File` field (❸) (see **Recorder Directory and File Management** on page 104).

5. Set the `Launch Status` (❹) (see **Launch Behavior** on page 118).

6. Enter a `Description`, if desired (❺).

7. Select the remaining recording options (`Audio`, `Whiteboard` ❻, and `Data`) as needed.

8. In the `Preset` panel, click `Save` (see **Saving Presets** on page 114).

   The record preset is now complete.

9. Click `Launch` in the `Preset List` panel to begin the recording.

VNE250, HDCP, and Recording

It is not possible to record an HDCP encrypted source, however, this condition is not rules checked in the preset manager (see **Preset Design – Connection Rules** on page 96). The source content is known only when the preset is launched and the recording starts.

If there is an attempt to record HDCP content, the system behaves as described for other content. However, the recorded file is not created if the content is HDCP encrypted. This condition is not flagged in the user interface.

Player Presets

Player presets are created similar to switching presets. A player channel is placed into the `Preset` panel first, followed by a decoder or decoders. The player channel attributes include the playback directory, the playback file, set the start and end offset time and synchronization, and select the playback channels.

To Play a Channel

1. Create a preset with a player channel and a decoder (see **Creating Presets** on page 111).
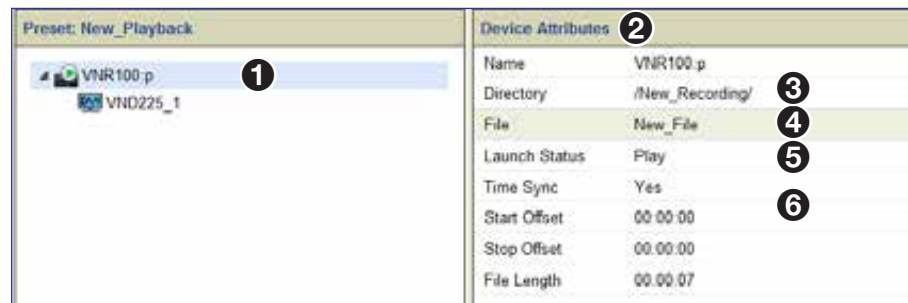
Figure 109. Preset for Playing a Channel

2. In the `Preset` panel, select the player (see figure 109, ❶).

   The `Device Attributes` panel populates with the configuration options appropriate for the player (❷).

3. Select an existing directory (❸) (see **Selecting a File for Playback** on page 122).

4. Select a filename (❹) for playback (see **Selecting a File for Playback**).

5. Set the `Launch Status` (❺) as desired (see **Launch Behavior**).

6. Select playback options (`Time Sync`, `Start Offset`, `Stop Offset`, and `File Length`) from the remainder of the list (❻).

7. In the `Preset` panel, click `Save`, then name the preset (see **Saving Presets** on page 114).

   The play preset is now ready.

8. Click `Launch` in the `Preset List` panel to start playback of the file.

Launch Behavior

Click `Launch` (see the **Preset List Controls** on page 93) to activate a previously saved preset. Launching a preset causes the configuration of the devices to change according to the device attributes and connections specified in the preset. Until launched, the `Preset List` defaults each preset to `Stop`.

In general, presets operate independently of each other. When a preset launches, devices in the preset are configured according to the attributes and connections of the preset regardless of their previous mode and operation. No other devices in the system are affected.

When the same devices are used in multiple presets, device operation is defined by the configuration and connections made in the last preset launched.

Switcher Launch Behavior

When a switching preset is launched, attributes for each device in the preset are changed according to the device attributes saved in the preset (see **Device Attributes** on page 96). The connections between the devices are then made according to the diagrams in the `Preset` design workspace (see **Preset Design Panel** on page 95).

Recorder Launch Behavior

The `Launch Status` in the `Device Attribute` panel (see **Device Attributes** on page 96) is available for presets that contain recorder or player devices. A recorder preset follows the same behavior as a switcher, first changing attributes which include creating recording directories and files, then making connections. The recording action provides a transport bar to monitor operation (see **Transport Bar Shortcut** on page 125). Playback behavior first selects the location of the playback files, then begins playback according to the launch state selection.

The behavior defines the recorder or player actions when launched, specifically when a new preset uses a device active in another preset. Specific behavior is described in the following tables.

Player		Active Status		
		Playing	**Recording (5-Channel Only)**	**None**
Player Preset	Play	Stop playing the existing file, load and play the new file.	Stop recording the existing file, provision and play the new file.	Provision and play the file per the preset.
	Provision	Provision the new file, continue playing the current file according to its preset status and wait.	Stop recording the existing file, provision the new file and wait.	Provision the file and wait.

Recorder		Active Status		
		Playing (5-Channel Only)	**Recording**	**None**
Recorder Preset	Record	Stop playing the existing file, provision and record the new file.	Stop recording the existing file. Provision and record the new file.	Provision the new file and start recording.
	Provision	Stop playing the current file, provision the new file for recording and wait.	Stop recording the current file. Provision the new file, and wait.	Provision the recorder per the preset and wait.

NOTE: All channels on a 5-channel recorder are automatically set to the same mode (record or play) whether they are present in the active preset or not.

Transport Dialog Box – Recorder

When a recorder preset is launched (see **Preset List Controls** on page 93), a transport dialog box displays the recording status and provides control of the recording. Only the most recent preset launch is displayed (see figure 110).

Figure 110. **Transport Dialog Box-Recorder**

The following information is provided in the recorder `Preset` dialog box.

❶	The name of the preset.	❹	The current recording file size.
❷	The recorder status (`Recording` or `Stopped`).	❺	A button to manually start the recording (red during live recording).
❸	The current recording duration (elapsed time).	❻	A button to stop the current recording.

When the launch status in the `Device Attributes` panel is configured to `Record`, recording begins immediately and the transport dialog monitors the recording (see figure 110). If the launch status is set to `Provision`, the panel provides manual control of the recording start and stop.

The recorder transport dialog box has the following functionality:

Status / Action	Description	Comment
Preset launched (❶)	Transport dialog opens.	❷ Recording Status = Stopped ❸ Recording duration = `00:00:00:00` ❹ Filesize = `0` MBytes
Record button (Provision) (❺)	Begins recording when pressed.	Same as above.
Record button (Record) (❺)	Recording starts immediately.	❷ Status = Recording ❸ Recording duration = Displays the current duration (time) of the recording. ❹ Filesize = displays the current storage size (MBytes) of the recording.
Stop (Provision or Record) (❻)	Stops recording.	❷ Status = Stopped ❸ Recording duration = Displays the duration (time) of the entire recording. ❹ Filesize = displays the final storage size (MBytes).

NOTE: It is not possible to record an HDCP encrypted source. This condition is not rules checked in the `Preset Manager` since the source content is known only when the recording is started.

If an attempt to record HDCP content is made, the transport bar behaves as described for all other content. However, the recorded file is not created if the content is HDCP encrypted. This condition is not flagged in the user interface.

Transport Dialog Box – Player

When the launch status in `Device Attributes` is configured to `Play`, playback begins immediately and the transport dialog box monitors playback. If the launch status is set to `Provision`, manual control of the playback start and stop is available.

The `Player` panel (see figure 111) also provides the following functionality:

Figure 111. Transport Dialog Box - Player

Play Transport Control Behavior		
Status / Action	**Description**	**Comment**
Preset launched	Transport dialog box launched.	❶ Status = Stopped ❷ Current file time = `00:00:00:00` ❸ Progress bar = Slider positioned at left hand side. ❹ File duration = File length [time]. ❻ Shuttle control = Play x1
Play button (❼)	From `Stop`: Start playing the current file. From `Pause`: Resume play from the current time.	❶ Status = Playing ❷ Current file time = Shows running file time. ❸ Progress bar = Slider moves to the right as the file plays. ❹ File duration = File length [time]. ❻ Shuttle control = Play x1
Pause button (❼)	Pauses the current file (not operable from stop mode).	❶ Status = Paused ❷ Current file time = Current file time. ❸ Progress bar = Slider stationery. ❹ File duration = File length [time]. ❻ Shuttle control = Pause
Stop (❼)	Stops playback.	❶ Status = Stopped ❷ Current file time = `00:00:00:00` ❸ Progress bar = Slider positioned at left hand side. ❹ File duration = File length [time]. ❻ Shuttle control = Play x1
Shuttle control (❻)	Provide access to x1, x2, x4 and x8 speed control in forward and reverse.	❶ Status = Shows direction and speed. ❷ Current file time = Static at last value. ❸ Progress bar = Tracks the time and direction. ❹ File duration = File length [time]. ❻ Shuttle control = Speed and direction are above the slider control.
Slider control (❺)	This slider can be dragged to any point on the progress bar. Forces play x1.	❶ Status = Playing ❷ Current file time = Current time, incrementing. ❸ Progress bar = File time at the slider position. ❹ File duration = File length [time]. ❻ Shuttle control = Play x1

Play Transport Control Behavior		
Status / Action	**Description**	**Comment**
Jog Control (❽) (see **figure 111** on the previous page)	Provides access to 1, 5, 10 and 20 frame steps in both forward and reverse direction. Only active from Pause mode.	❶ Status = Paused ❷ Current file time =Not updated. ❸ Progress bar = Not updated. ❹ File duration = File length [time]. ❻ Shuttle control = Pause
		NOTE: File time is displayed to the nearest second.

Selecting a File for Playback

To select a file for playback (single or five channel recorder):

1. Create a preset with a player and decoder or display (see **Creating Presets** on page 111).

2. Select the player channel in the `Preset` workspace. The `Device Attributes` panel populates with the appropriate options.

3. Click in the `Directory` field of the `Device Attribute` panel, then click the drop-down button at the right hand side of the **Directory** field (see figure 112, ❶).

Device Attributes	
Name	VNR100:p
Directory	❶
File	
Launch Status	Play
Time Sync	Yes
Start Offset	00:00:00
Stop Offset	00:00:00
File Length	00:00:09

Figure 112. Device Attributes, Directory Selection

The `File Recording` browser opens (see **figure 113** on the next page).

4. In the browser, click the directory containing the desired file (the directory is highlighted, see figure 113, ❶).
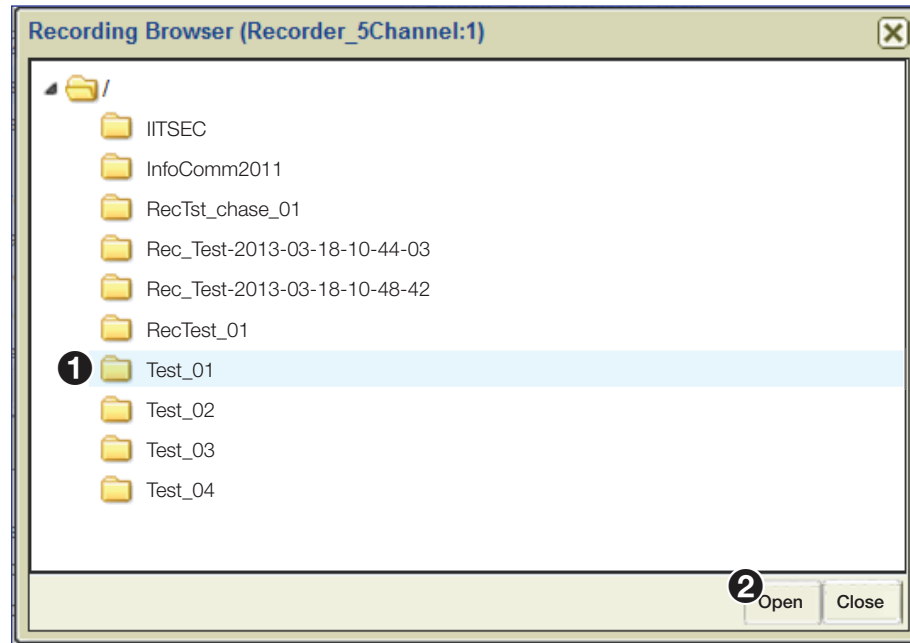
Figure 113. **Recorder Browser, Directory Browsing**

5. Click **Open** (see figure 113, ❷).

6. A dialog box opens (see figure 114):

    • Select **Yes** (❶) to automatically assign the video files to corresponding player channels. If the directory contains five files recorded on a 5-channel recorder, it loads the corresponding files into slots 1 through 5 of the device. It also populates multiple player devices within the preset if they are all part of the same original recording group. The preset is ready to launch.

    • Select **No** (❷) to load the file only to the device selected in the `Preset` panel.

Figure 114. **Device Attributes, Load Playback File**

NOTE: For multi-channel recordings made on a 5-channel device, it is not possible to select content from different directories (recordings) for replay.

7. Click in the **File** field of the Device Attribute panel (see figure 115, ❶), then click on the drop-down button at the right hand side of the **File** field.

Device Attributes	
Name	VNR100:p
Directory	/GFChaseTst/
File	❶
Launch Status	Play
Time Sync	Yes
Start Offset	00:00:00
Stop Offset	00:00:00
File Length	00:00:03

Figure 115. Recorder Device Attributes, File Selection

The browser opens to the directory (see figure 116) and a list of available files.

8. Select the desired file (see figure 116, ❶).

Name	Record Timestamp	Length	Streams	Description
GFRecTst_01 ❶	18-03-13 13:07:02	00:01:11	v	

❷ Open   Close

Figure 116. File Browser, Select File

9. Click **Open** (❷).

The recorder is ready to play the selected file (see figure 117).

Device Attributes		
Name	VNR100:p	
Directory	/GFChaseTst/	
File	GFRecTst_01	
Launch Status	Play	❶
Time Sync	Yes	❷
Start Offset	00:00:00	❸
Stop Offset	00:00:00	❹
File Length	00:01:11	❺

Figure 117. Device Attributes, Playback File Selected

The remaining device attributes provide several options for of the selected file.

Launch Status

The launch status (see **figure 117**, ❶ on the previous page) options are:

- **Play:** When launched, the preset immediately configures the devices in the preset and starts playback of the selected file.

- **Provision:** When launched, the preset configures the devices for playback to begin, then displays the player transport controls with the player in pause. The **Play** button must be pressed to initiate playback.

The playback transport panel opens regardless of which launch status is chosen.

Time Sync

The time sync setting (❷) maintains the timing relationship between content loaded across multiple devices.

- Select **Yes** (enabled) to play related files made at the same point in time across multiple devices as part of a group.

- Select **No** (disabled) to play unrelated files across multiple devices in a preset.

Setting the start and end times for playback

- **Start** offset (❸) is changed to set the starting point for replay in hours, minutes, and seconds. The default value is **00:00:00**.

- **Stop** offset (❹) is changed to set the end point for replay in hours, minutes, and seconds. The default value is the end of the file.

Adjustment of both settings is limited to within the time of the recorded file.

> **NOTE:** An end time cannot be set for live play mode.

File length

The read-only **File Length** field (❺) displays the total play time in *hh:mm:ss* format.

Transport Bar Shortcut

The transport bar can also be launched by <**right-clicking**> the preset in the **Preset List**, then choosing **Transport Controls** (see figure 118, ❶).
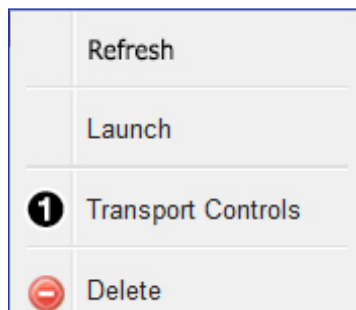
Figure 118. **Right-click Access to Transport Controls**

Chase-Play Feature (VNR 100 Only)

The chase-play feature allows a user to view a live recording while the recording is in progress. The live file can be played, paused, or searched from any point in the file as the recording progresses.

Configuration

A recording preset is built and configured in the normal way (see **Recorder Presets** on page 117). Note the directory and filename given to the recording (see figure 119).
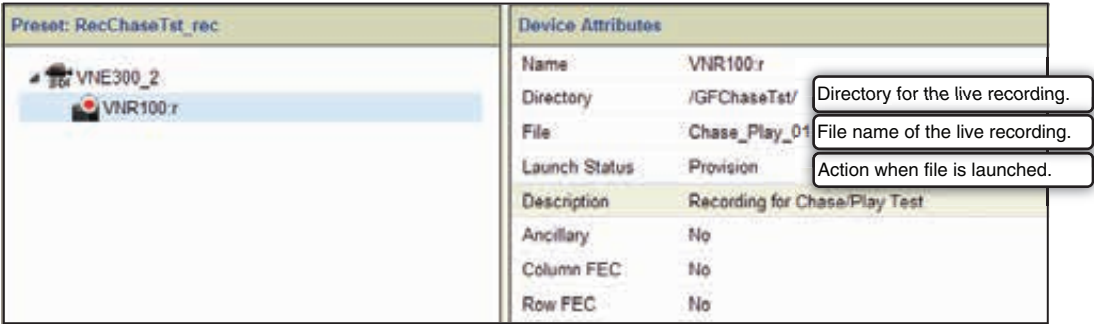
Figure 119. Device Attributes, Recording Preset for Live Recording

A corresponding player preset is built and configured in the normal way using the same directory and filename configured in the recorder preset (see **Player Presets** on page 118).

Figure 120. Device Attributes, Player for Live Recording

NOTE: When selecting the playback filename, a file that is currently recording is flagged with a red record marker in the file browser (see figure 121).

Figure 121. File Browser, Active Recording

To begin chase-play:

1. Launch the recorder preset. The transport bar opens with the recorder in pause (see **Transport Dialog Box – Recorder** on page 120).

2. Start the recorder from the transport bar.

3. Launch the player preset (see **Transport Dialog Box – Recorder** on page 120). The transport bar opens with the player in pause.

4. The player file transport bar displays the file information for the live recording. Transport control behavior in live flow is shown in the following table.

Features available for playback of live content (chase-play) are the same as those supported for normal playback (see **Launch Behavior** on page 118).

Transport Control Behavior – Live Play		
Player Control	**Function**	**Comments**
Play	Starts playing the active recording from any point (time).	The location where replay starts can be set to any time from the file beginning to within one second of the end of the live file.
Pause	Pauses the replay at its current time.	Live recording continues.
Stop	Stops the replay.	Live recording continues.
Fast forward (shuttle)	The content is decoded at the required (faster than real-time) rate in the forward direction.	The speed can be any supported rate.
	NOTE: If the fast forward time is equal to the current time of the file minus 1 second, the transport mode changes to play.	
Fast reverse (shuttle)	The content is decoded at the required (faster than real time) rate in the reverse direction.	The speed can be any supported rate.
	NOTE: If the fast reverse time is equal to the start time of the file, then the transport mode changes to pause.	
Frame advance (jog)	The content is paused and the next new frame is decoded each time the control is operated.	**NOTE:** If the frame advance time is equal to the current time of the file minus 1 second, then the transport mode remains paused.
Frame reverse (jog)	The content is paused and the previous frame is decoded each time the control is operated.	**NOTE:** If the fast reverse time is equal to the start time of the file, then the transport mode remains paused.

Format Editor Page

This section provides information about:

- **Custom Source and Display Formats Overview**
- **Creating a New Source Format (Input Mode)**
- **Creating a New Display Format (Output Mode)**
- **Deleting Formats**
- **Source Format Editor**
- **Display Format Editor**

This page is accessed by selecting the **Format Editor** tab (see figure 122, ❶).
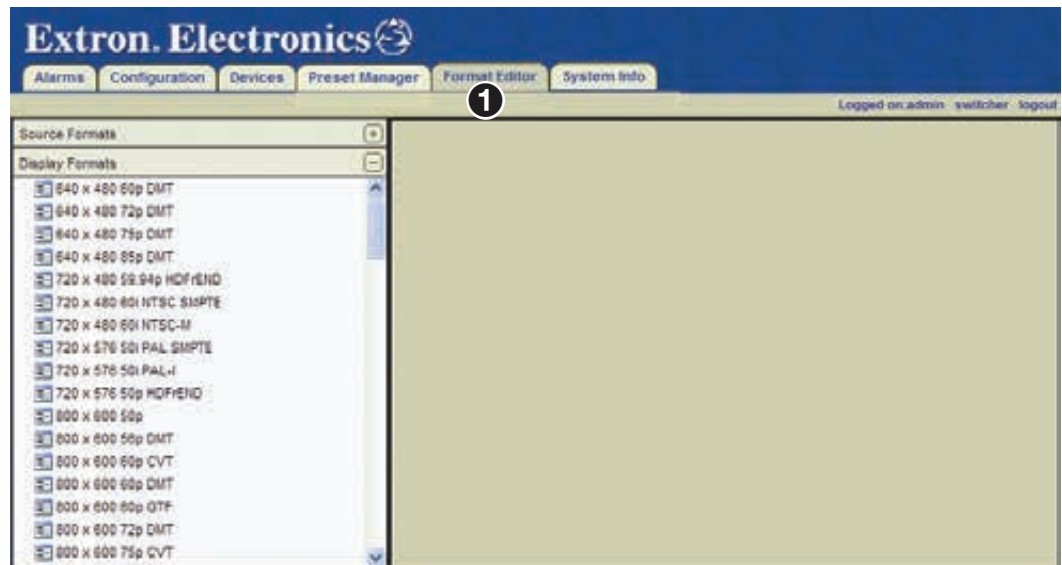
Figure 122. Format Editor Page

The **Format Editor** page manages and creates resolutions that can be used by sources and displays on the VN-Matrix system.

> **NOTE:**   The VN-Matrix 300 and 325 series input and output resolutions are fixed and cannot be modified.

Custom Source and Display Formats Overview

Custom source and display formats may be created when a specific input or output mode is not supported in the standard list of resolutions supplied with a VN-Matrix device. Once defined, the parameters for custom input and output modes are stored on the VNM EC 201. This means that they are available for use on any VN-Matrix device that is managed by that controller.

> **NOTE:**   Custom input modes can only be created for unsupported analog input types. It is not possible to create custom input modes for digital inputs.

The recommended system configuration used to create a new input or output mode is shown in figure 123.
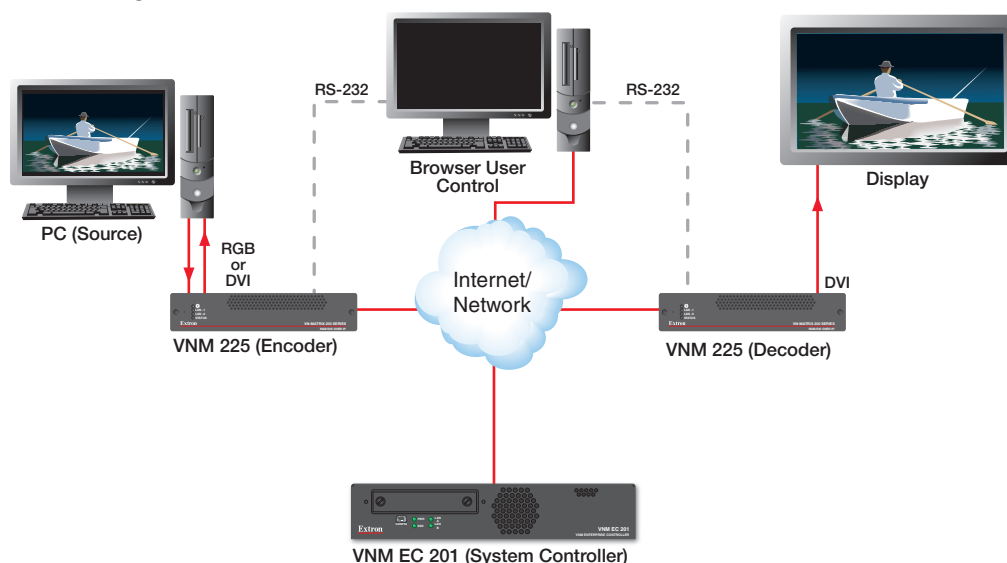
Figure 123. **Recommended Setup for Creating Custom Input and Output Modes**

Creating a New Source Format (Input Mode)

There can be instances when a VN-Matrix device configured as an encoder cannot detect an input source. This can happen when:

- An unrecognized input source connected to the encoder is not defined in the format menu (see **Measured Video Properties panel** on page 44).

- The timing of the input source deviates from the standard timings for that signal.

In these situations, a custom input mode can be created for the source.

> **NOTE:** Custom input modes are only required for analog sources. A VN-Matrix device automatically creates custom input modes for DVI sources based on their EDID.

Use the following procedure to create a custom source format (input mode).

> **NOTE:** This procedure relates to creating a specific new mode (**1280 x 600 60Hz, progressive**). However, it can be used to create any new input mode.

1. Connect a source that requires a custom input mode to a VN-Matrix encoder.

2. Connect a display monitor to the out/loop connector on the encoder. An analog monitor can also be used, but is not recommended.

> **NOTES:**
> - Using a DVI display eliminates any issues with the monitor not correctly sampling the analog input. If the display device in use does not fully support the source format, then it may not be possible to properly adjust the settings for the encoder itself.
>
> - The VN-Matrix encoder is designed to accept an analog source and output a digital image on the DVI-I out/loop connector if a digital display is connected.
>
> - Initially, there may not be any image output to the display from the DVI-I out/loop connector. If this happens, the default splash screen is displayed.

3. Connect the encoder to the VN-Matrix network (see the VN-Matrix 200/225/300/325 user guides for more information.

4. Open a web browser on the control PC and log into the VNM EC 201 (see **Web-based User Interface Overview** on page 9). Keep this tab on the left (see figure 124, ❶).

5. **Duplicate** the web-based user interface of the VNM EC 201 using a second browser tab. Keep this tab on the right (❸).

   Leave both browser tabs open as they are needed to complete this procedure (see images below).

6. **On the left tab**, select the **`Devices`** tab (❷).

First Tab, Devices Selected   Second Tab, Format Editor Selected

Figure 124. Devices and Format Editor

On the left tab (see figure 125, ❶) the `Devices` page opens (❷).

7. Choose the encoder connected to the VN-Matrix network in step 3 (❸).
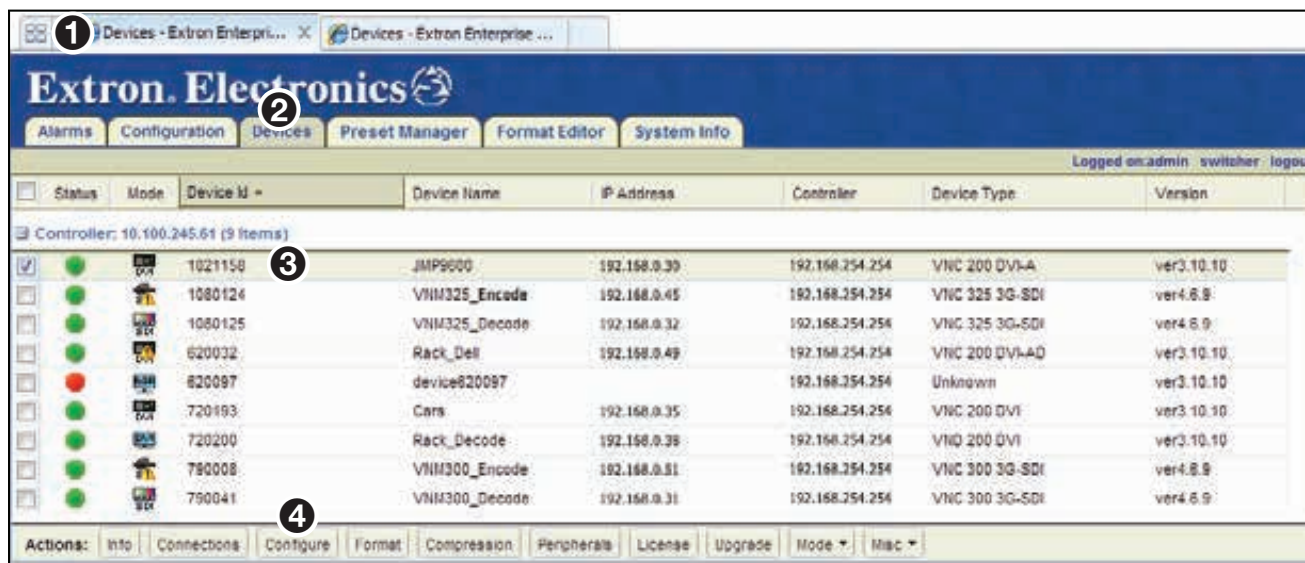
Figure 125. Devices Page

8. From the `Actions` bar, click **`Format`** (❹).

   The `Source Format` dialog box opens (see **figure 126** on the next page).

9. Select **auto** from the **Mode** drop-down list (❶).

Figure 126. Source Format Menu

10. Select **0** from the **Phase** drop-down list (see figure 126, ❷).

11. Use the **Color Space** drop-down list to select the option that matches the connected source (❸).

12. Select **manual** from the **Blanking** drop-down list (❹).

13. Enter **0** in the **Pixels** field (❺).

14. Enter **0** in the **Lines** field (❻).

    Leave the Source Format window open.

15. **Using the right tab** (see **figure 127**, ❶ on the next page), select the **Format Editor** tab (❷).

16. Select an input mode from the list of source formats (❸).

> **NOTE:**   If the frame rate or the resolution of the source is already known, select a similar source format. Otherwise, select any source format from the list.
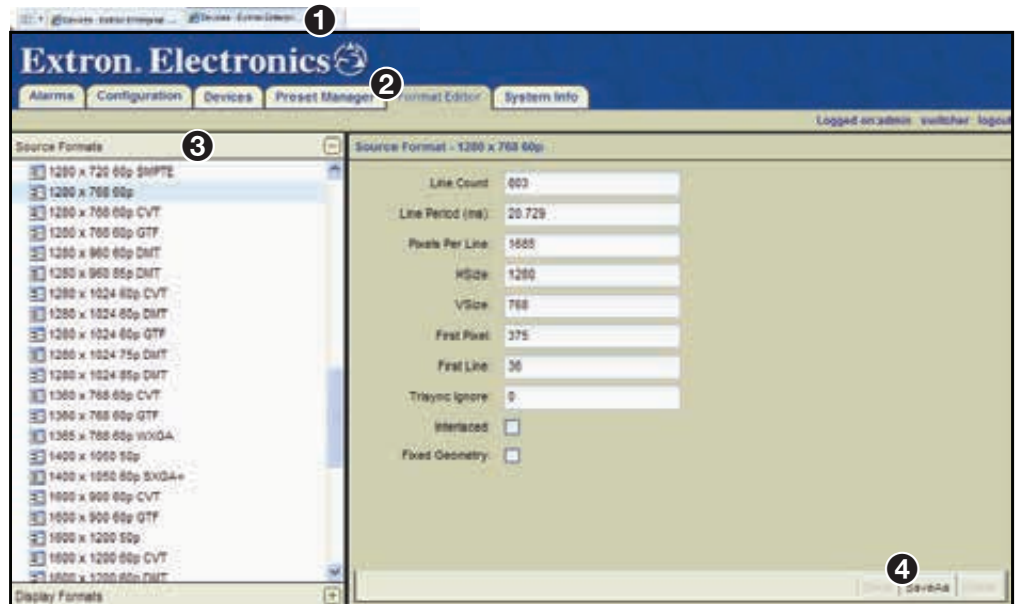
Figure 127. Source Format Editor Page (VN-Matrix 2xx Only)

17. Click **SaveAs** (see figure 127, ❹), to save the resolution.

18. In the `Save Source Format As` dialog box, enter a name for the new source format and click **OK** (see figure 128).
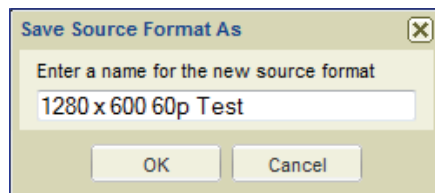
Figure 128. Saving a Source Format

> **NOTES:**
> - Resolutions must be saved using the following format at the beginning of the filename: `<Hres> x <Vres> <Frame_Rate><Format>`
> - The end of the filename can contain identifying characters.
>
>   Examples:
>
>   `640 x 400 85p`
>
>   `640 x 400 85p TEST`
>
>   `720 x 480 59.94p HDFrEND`

19. The name of the new source is listed above the source format properties (see figure 129, **❶**).
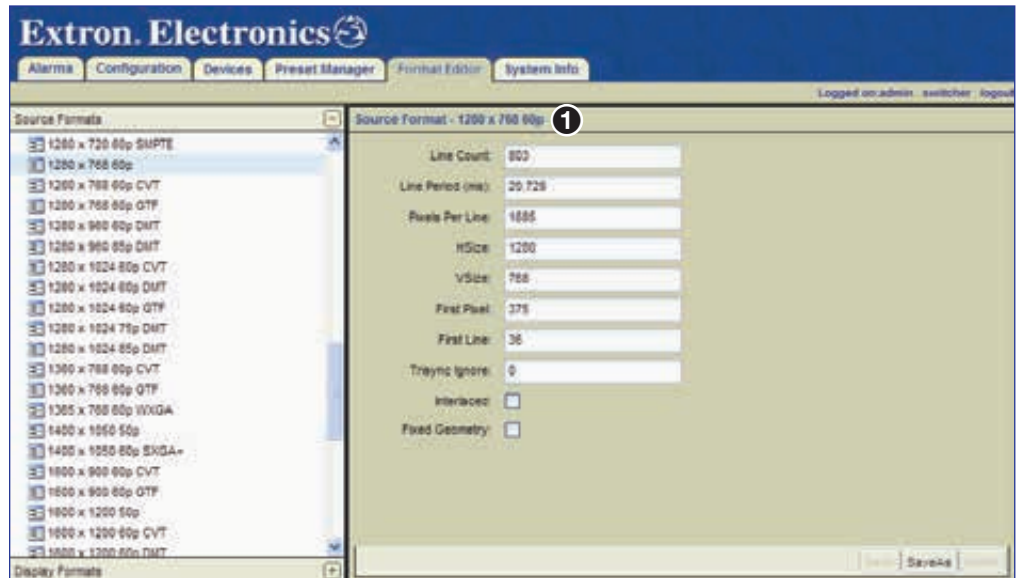
Figure 129. New Source Format Saved

20. **Return to the left tab** (see figure 130, **❶**) where the `Source Format` dialog box is open. Note the values in the **Line Count** (**❷**) and **Line Period (ms)** (**❸**) fields.
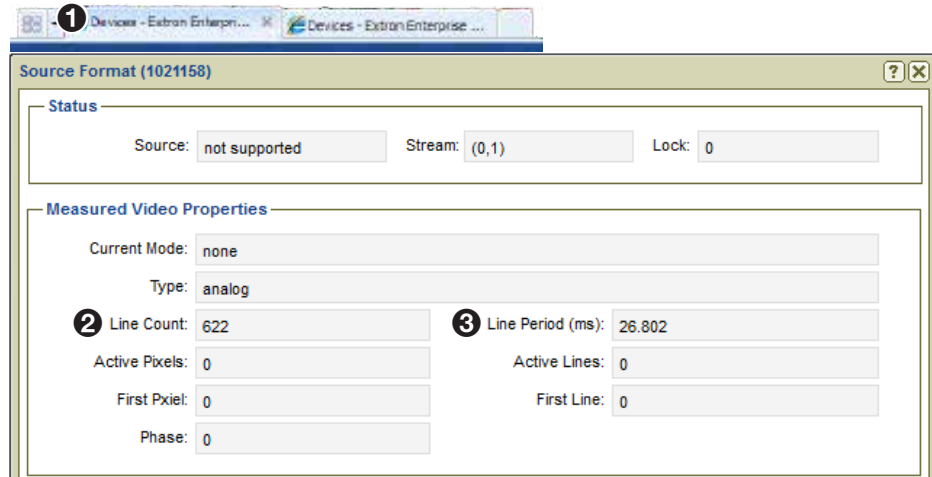
Figure 130. Source Format Line Count and Line Period (ms)

21. **On the right tab** (see figure 131, ❶) and the `Format Editor` (❷), make sure the new source is selected from the `Source Formats` (❸) panel and enter the values from **step 20** into the **Line Count** (❹) and **Line Period (ms)** (❺) fields on the right panel (`Source Format − 1280 x 600 60p Test`) (❸).
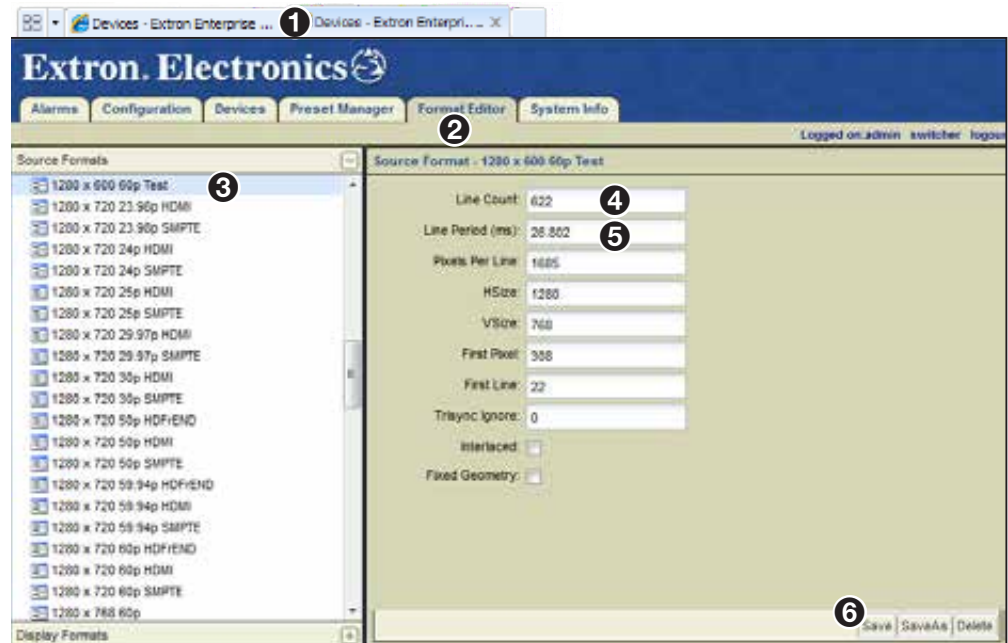
Figure 131. Enter Values Into the Source Format Editor Page

22. Click **Save** (❻) to save the resolution.

23. Click the **left tab** (see figure 132, ❶).

Figure 132. First Tab, Devices Selected

24. Click **Devices** (❷).

25. Select **auto** from the **Mode** drop-down list to force a resync of the source (see figure 133, ❶).

Figure 133. Force a Resync of the Source

26. The name of the new source created in **step 18** (see page 132) is now visible in the **Current Mode** field (❷). If the new source name is not visible, check these items.

- Refresh the `Source Format` dialog box. Close, then open the dialog box by clicking **Format** from the `Actions` menu bar.

- Is the source still connected or if the source is a PC, is the PC still active or has it entered hibernate mode?

- Is the new source name in the **Mode** drop-down list? If not, use the **right tab** (`Source Format Editor`) and make sure the new source is saved.

- Check that values entered into the `Source Format Editor` dialog box (see **step 21** on the previous page) were input correctly.

The `Measured Video Properties` panel (see **figure 134**, ❶ on the next page) now displays information about the new source.

> **NOTE:** The loop-through display now shows an image. The edges of the image can be missing since the image is not properly adjusted at this point.

27. Note the values in the **First Pixel** (see figure 134, ❷) and **First Line** fields (❸).

Figure 134.   Source Format Menu First Pixel and First Line Values

28. Using the right tab (see figure 135, ❶), on the Format Editor page (❷), enter the values noted in step 27 into the **First Pixel** (❸) and **First Line** (❹) fields.

Figure 135.   Enter Values Into the Source Format Editor Page

29. Click **Save** (see **figure 135**, ❺ on the previous page) to save the resolution.

30. **Return to the left tab (Source Format menu)** (see figure 136, ❶) and select **auto** from the **Mode** drop-down list (❷) to force a resync of the source.

> **NOTE:** Although the overall image can still look incorrect, the loop-through display now has its top left corner correctly positioned and there should be no cropping on this edge of the image.
>
> If the top left corner is still not correctly positioned, fine tune the image position. Alter the value of the **First Pixel** field on the **Source Format Editor** (right tab) dialog box, force a resync of the source (using the left tab, **Source Format** menu), and check the image on the loop-through display.

Figure 136. **Force a Resync of the Source**

31. **Click the right device tab** (see figure 137, ❶).

32. Select the **Format Editor** (❷).

33. In the `Source Format` panel, adjust the **Pixels Per Line** field (❸) to size the image correctly. Be sure to click the **Save** button each time the line is adjusted (❹).

> **NOTE:** The pixels per line may or may not be close to the required value depending on the mode chosen as the starting point in **step 16** on page 131. A suitable starting value can be estimated by adding together the values of the **Active Pixels** and **First Pixel** fields shown in the `Source Format` dialog box (left tab in this procedure).
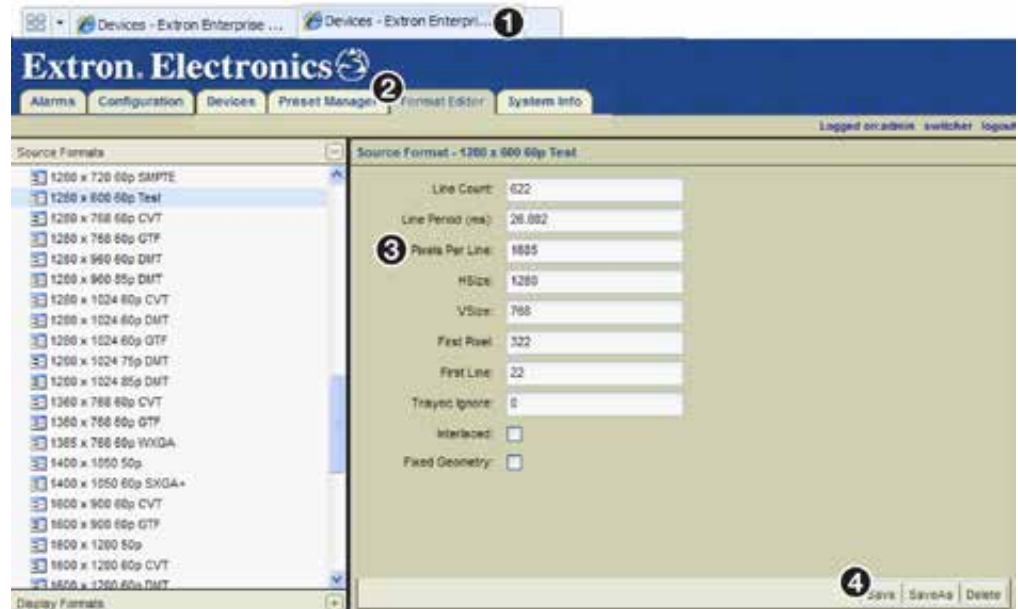
Figure 137. Enter Values Into the Source Format Editor Page

- Use the fine line moiré test pattern on the display to adjust this field.

  > **NOTE:** If a fine line moiré test pattern is not available, then this field can be adjusted by monitoring the right side of the image and setting the value so that adding or subtracting 1 pixel either shows all of the image or crops the last pixel.

- With the fine line moiré test pattern displayed, there should be no aliasing (banding) visible in the image.

- If banding is visible and the right side of the image is missing, reduce the **Pixels Per Line** value by 20 or 30 pixels.

- If banding is visible and all of the image is shown, increase the **Pixels Per Line** value by 20 or 30 pixels.

34. **Return to the left tab (Source Format menu)** (see figure 138, ❶) and select `auto` from the **Mode** drop-down list (❷) to force a resync of the source. Check the display for banding.

Figure 138. Force a Resync of the Source

35. Repeat **step 33** (see the previous page) and **step 34**. Adjust the number of pixels added or subtracted until there is no banding in the image.

36. **Using the left tab (Source Format menu)**, note the value of the `First Pixel` field (see figure 139, ❶).

Figure 139. Note Source Format Menu Value

37. Click the right tab (Source Format Editor page), (see figure 140, ❶) and enter the value from **step 36** (see the previous page) into the **First Pixel** field (❷).

Figure 140.   Enter Values Into the Source Format Editor Page

38. Click **Save** (❸) to save the resolution.

39. Click the left tab (Source Format menu), (see figure 141, ❶) and select **auto** from the **Mode** drop-down list to force a resync of the source (❷).

> **NOTE:**   The loop-through display now displays the left side of the image correctly.

Figure 141.   Force a Resync of the Source

40. **Click the right tab (Source Format Editor)** (see figure 142, ❶) and adjust the **Pixels Per Line** value (❷) by plus or minus one pixel to see if this improves image sharpness. Click the **Save** button (❸) each time the source is adjusted.

When you are satisfied with the image, proceed to step 41.
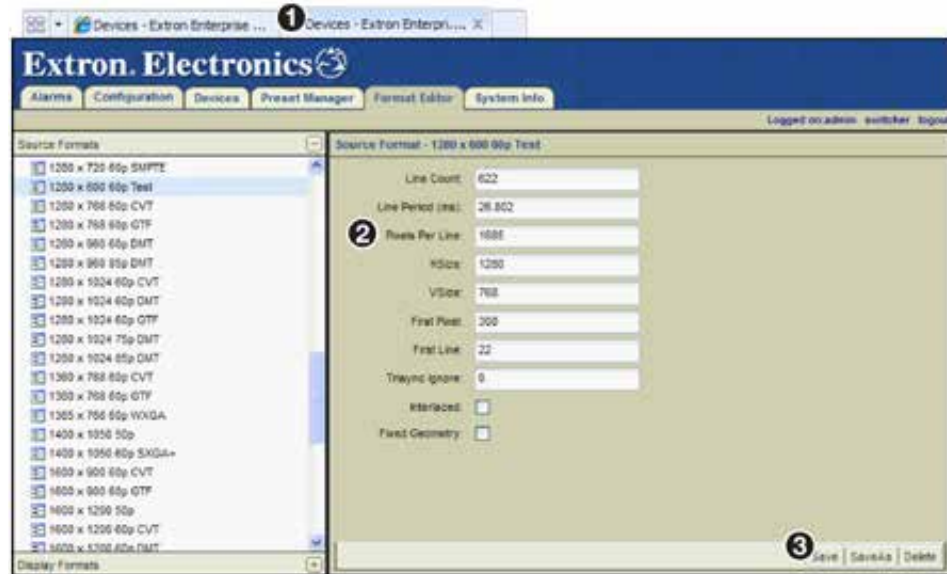
Figure 142.   Enter Values Into the Source Format Editor Page

41. **Click the left tab (Source Format menu)**, (see figure 143, ❶) and force a resync of the source by reselecting **auto** from the **Mode** drop-down list (❷).
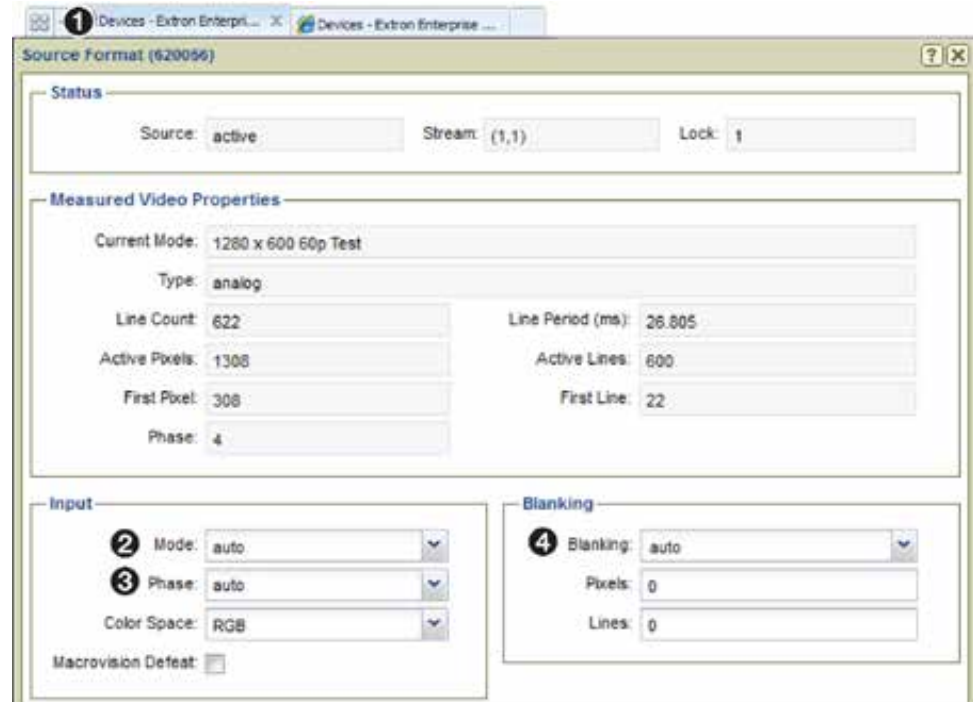
Figure 143.   Force a Resync of the Source

NOTES:

- Check the positioning of the image and adjust if necessary (**First Pixel** and **First Line** fields on the Source Format Editor page).
- Check for aliasing in the moiré pattern and fine tune the **Pixels Per Line** field on the Source Format Editor page if required.
- Check that the right edge of the image is properly displayed.
- Adjustments made to the **Pixels Per Line** field affects the aliasing in the moiré and the right edge of the image.
- Resync the source each time an adjustment is made.
- Repeat this process to fine tune the displayed image.

42. Select **auto** from the **Phase** drop-down list (see **figure 143**, ❸ on the previous page).

43. Select **auto** from the **Blanking** drop-down list (❹).

44. The new source format is now correctly configured. If necessary, see **Creating a New Display Format (Output Mode)** for information on how to create a corresponding display format.

Creating a New Display Format (Output Mode)

One issue encountered when using graphic sources with VN-Matrix encoders and decoders is that the encoder often produces a loop-through image stating it has detected a valid input mode, but the decoder displays a splash screen stating "No Matching Output Mode."

Use the following procedure to create a custom display format (output mode) that is automatically selected by the decoder when it sees a corresponding input mode.

NOTE: Before starting this procedure, there must be an active input source connected to a VN-Matrix 2xx encoder (output modes of the VN-Matrix 3xx are fixed) and the source format must be correctly configured (displayed properly).

1. Open a web browser on the control PC and log into the VNM EC 201 (see **Accessing the Web-based User Interface** on page 10 for information on how to log in).

2. Duplicate the web-based user interface of the VNM EC 201 using a second browser tab. **Leave both browser tabs open** as they are required to complete this procedure.

3. **Click the left tab** (see figure 144, ❶). Select the **Devices** tab (❷) and choose a VN-Matrix 2xx series decoder from the device list (❸). A checkmark appears in the checkbox to the left of the decoder row.
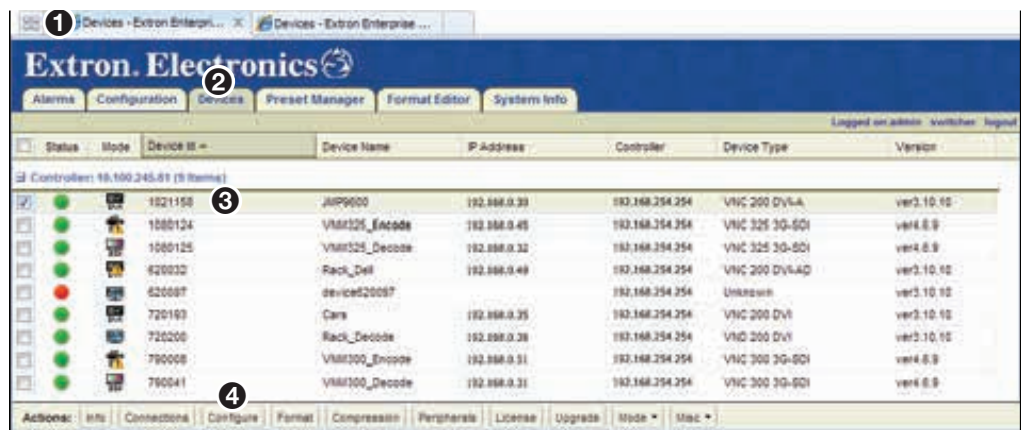
Figure 144. Devices Page

4. From the `Actions` menu bar located at the bottom of the `Devices` page, click **Configure** (see **figure 144**, ❹ on the previous page).

   The `Configure Device Settings` dialog box opens (see figure 145).

5. Select **enable** from the **Mode** drop-down list (❶).

6. Click the **X** in the upper right corner of the dialog box (❷) to close the dialog box.
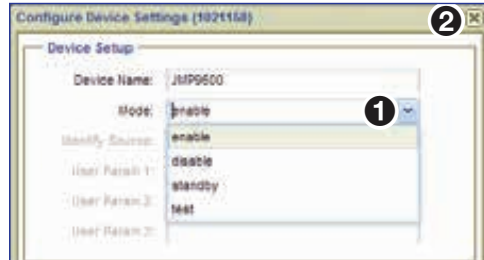
Figure 145. Configure Device Settings Dialog Box

7. Use the **Switcher Page** (see page 88) to create a connection between the required source format and a decoder.

   > **NOTE:** The decoder must have a display connected to the DVI-I Out/Loop connector.

8. **Click the right tab**, (see figure 146, ❶) and select the **Format Editor** tab (❷).

9. Select an output mode from the `Display Formats` panel (❸).

   > **NOTE:** Select a display format from the list that closely matches the properties of the new custom display format that is being created.

Figure 146. Display Format Editor Page

10. Make sure that the **Manual** button (❹), located at the bottom of the page, is selected.

11. Enter the required values into the **Active Pixels** (❺), **Active Lines** (❻), and **Frame Rate** fields (❼).

12. Click **CVT** (see figure 147, ❶) located at the bottom of the page.

Notice that most of the remaining fields are now not available for selection.

Figure 147. Display Format Editor Page

13. Click **Save As** (❷) to save the new display format.

14. In the `Save Display Format As` dialog box (see figure 148), enter a name for the new display format and click **OK**.

NOTES:

- Resolutions must be saved using the following format at the beginning of the filename: `<Hres> x <Vres> <Frame_Rate><Format>`.

- The end of the filename can contain any identifying characters.

  Examples:

  640 x 400 85p

  640 x 400 85p TEST

  720 x 480 59.94p HDFrEND
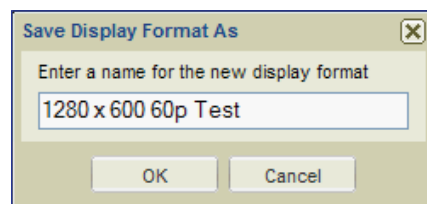
Figure 148. Save a Display Format

15. After saving the new display format, note the fields that are unavailable to select are updated revealing the timing details of the required display format.

16. Using the left browser tab, select the `Devices` tab (see **Creating a New Display Format (Output Mode)** on page 142) and choose a VN-Matrix decoder from the device list.

17. From the `Actions` menu bar at the bottom of the `Devices` page, click **Format**. The `Display Format` dialog box opens (see figure 149).
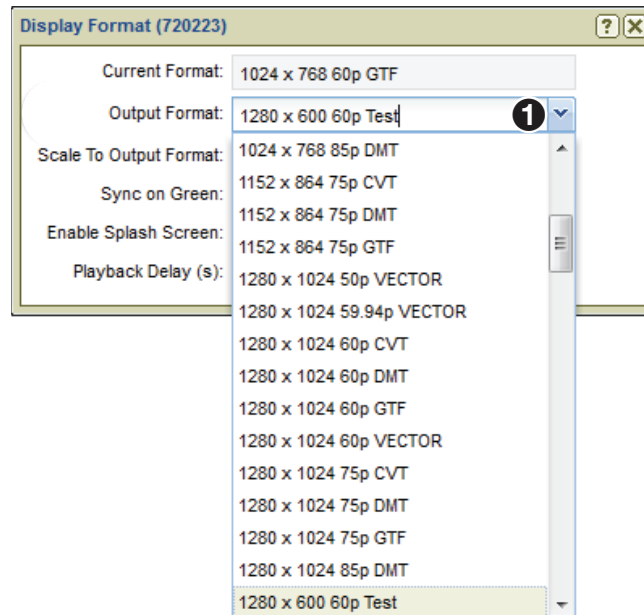
Figure 149. Display Format Menu

18. Select the new display format created in **step 13** (see the previous page) from the **Output Format** drop-down list (❶). The new display format is applied and the image is displayed.

Deleting Formats

> **NOTES:**
> - The default resolutions provided with the VNM EC 201 cannot be deleted.
> - Custom resolutions in use by any active VN-Matrix device cannot be deleted.

To delete a custom resolution format, select a resolution from the `Source Format` panel (see **figure 150** on the next page) and click **Delete** (❼).

Source Format Editor

To view or change the properties of a source format:

1. **Click the right tab** (see **figure 150**, ❶).

2. Click the **Format Editor** tab (❷).

The `Format Editor` page opens.

3. Click the **Source Formats** bar to open a list of source formats (❸).

4. Select the desired source format (❹). The properties of the selected resolution are listed in the `Source Format` panel on the right (❺).
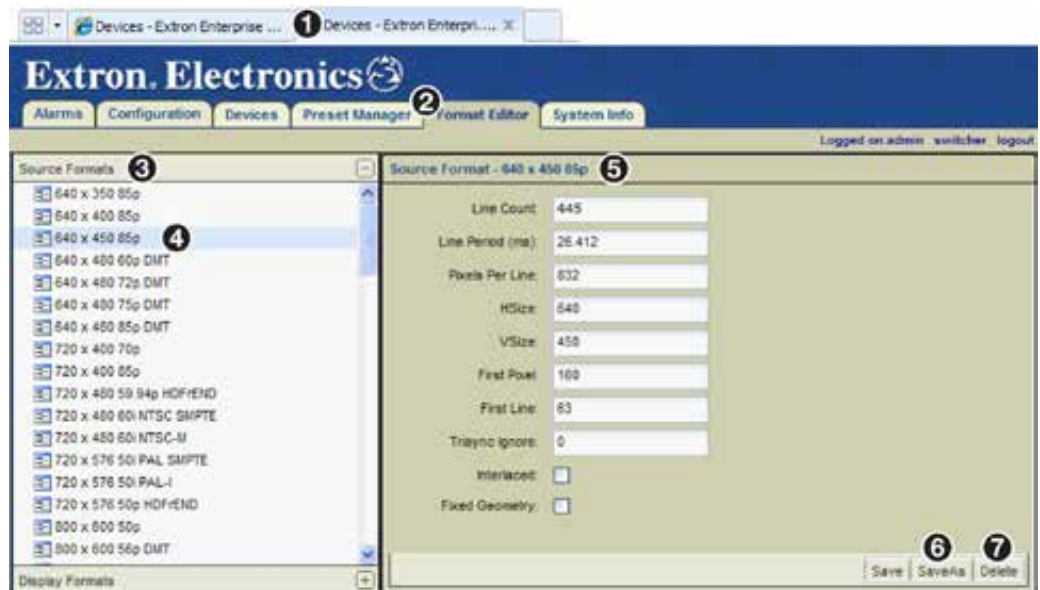
Figure 150. Source Resolution Properties

Source Format panel (❺)

To create a new source format, modify the desired fields:

- **Line Count** — Number of horizontal lines of information.
- **Line Period (ms)** — How often the horizontal lines of information are updated.
- **Pixels Per Line** — How many pixels are used to create each line of information.
- **HSize** — Horizontal resolution (number of pixels wide) from the source.
- **VSize** — Vertical resolution (number of pixels high) from the source.
- **First Pixel** — Position of the first active pixel in the line.
- **First Line** — Position of the first active line in the frame.
- **Trisync Ignore** — Zero for all source types. 100 for source types using tri-level sync.
- **Interlaced** — Check this box to use interlaced video.
- **Fixed Geometry** — This function is currently not implemented.

5. Click **SaveAs** (❻) to save the resolution to the list with a new name.

For additional information on creating source formats, see **Creating a New Source Format (Input Mode)** on page 129.

NOTES:

- Resolutions must be saved using the following format at the beginning of the filename: `<Hres> x <Vres> <Frame_Rate><Format>`.
- The end of the filename can contain any identifying characters.

    Examples:

    640 x 400 85p

    640 x 400 85p TEST

    720 x 480 59.94p HDFrEND

Display Format Editor

1. Select the **Format Editor** tab (see figure 151, ❶).

2. Click the **Display Formats** bar (❷) to open a list of display resolutions.

3. Select the desired source format resolution (❸). The properties populate the `Display Format` panel on the right (❹).

Figure 151. **Display Resolution Properties**

Display Format Editor (❹)

To create a new display format, modify the fields in the `Display Format` panel as needed:

- **Active Pixels** — Horizontal resolution (number of pixels wide).

- **Active Lines** — Vertical resolution (number of pixels high).

- **Total Pixels** — Total number of pixels (including syncs and blanking).

- **Total Lines** — Total number of lines (including syncs and blanking).

- **Horizontal Left Border** — Horizontal size of the left outer border on the display.

- **Vertical Top Border** — Vertical size of the top outer border on the display.

- **Horizontal Right Border** — Horizontal size of the right outer border on the display.

- **Vertical Bottom Border** — Vertical size of the bottom outer border on the display.

- **Horizontal Front Porch** — Properly fit the image on the display. The image is shifted to the left or right and is directly related to the **Horizontal Back Porch** field. If an adjustment is made to this field, it is recommended to adjust the **Horizontal Back Porch** to compensate for the shifted image.

- **Vertical Front Porch** — Properly fit the image on the display. The image is shifted up or down and is directly related to the **Vertical Back Porch** field. If an adjustment is made to this field, it is recommended to adjust the **Vertical Back Porch** to compensate for the shifted image.

- **Horizontal Sync Width** — Width (in pixels) of the horizontal sync pulse.

- **Vertical Sync Width** — Width (in lines) of the vertical sync pulse.

- **Horizontal Back Porch** — Properly fit the image on the display. The image is shifted left or right and is directly related to the **Horizontal Front Porch** field. If an adjustment is made to this field, it is recommended to adjust the **Horizontal Front Porch** to compensate for the shifted image.

- **Vertical Back Porch** (see **figure 151** on the previous page) — Properly fit the image on the display. The image is shifted up or down and is directly related to the `Vertical Front Porch` field. If an adjustment is made to this field, it is recommended to adjust the `Vertical Front Porch` to compensate for the shifted image.

- **Horizontal Sync Polarity** — Select a positive (pos) or negative (neg) horizontal sync.

- **Vertical Sync Polarity** — Select a positive (pos) or negative (neg) vertical sync.

- **Frame Rate** — Refresh rate of the video in Hz (frames per second).

- **Pixel Clock Frequency** — Pixel clock frequency. The higher the frequency of the pixel clock, the more pixels that appear across the screen.

- **Margins** — Legacy control that is used with input sources that contain a colored border used to accommodate displays that have wide bezels.

- **Reduced Blanking** — Control that is usually required for wide-screen modes. This control accommodates input sources containing active pixels that extend past the normal (blanking) region.

Edit and VIdeo Timing (**5**)

These selections set the video standards for the display timings and allow editing of the display format configuration.

- **Manual** — By default, this button is selected. The button enables modification of all the display resolution properties.

- **CVT** — Check to select the coordinated video timing (CVT) standard. This is a VESA standard.

- **GTF** — Check to select the generalized timing formula (GTF) standard. This is a VESA standard.

4. Click `SaveAs` (**6**) to save the resolution to the `Display Formats` list.

For additional information on creating display formats, see **Creating a New Display Format (Output Mode)** on page 142.

NOTES:

- Resolutions must be saved using the following format at the beginning of the filename: `<Hres> x <Vres> <Frame_Rate><Format>`.

- The end of the filename can contain any identifying characters.

  Examples:

  `640 x 400 85p`

  `640 x 400 85p TEST`

  `720 x 480 59.94p HDFrEND`

Alarms

This section provides information on:

- **Alarms Overview**
- **Alarms Page**
- **Alarm Type Reference Tables**

Alarms Overview

The VN-Matrix system is configured to generate alarms for error conditions. A list of these error conditions and their meanings are presented on the following pages.

Alarms can be monitored using the `Alarms` page. Alarm conditions, when triggered, remain active for the duration of the error condition and for an additional five seconds after the error is cleared.

Alarms Page

This page is accessed by selecting the **Alarms** tab (see figure 152. ➊).

Figure 152. Alarms Page

The `Alarms` page enables a user to sort and monitor system alarms. For information on alarm types, see the **Alarm Type Reference Tables** starting on page 151.

➋ **ID Number** — The ID number of the alarm.

➌ **Severity Icons** — The alarm severity is indicated by a colored icon.

     🟡 — A device under active control showing warning alarms.

     🔴 — A device under active control showing critical alarms.

➍ **Alarm Description** — The type of alarm. The information listed here is directly related to the **Alarm Type** column in the **Alarm Type Reference Tables**.

➎ **Device** — The device ID of the VNM device is shown in this column.

➏ **Name** — The name assigned to the device by the user.

➐ **Device Type** — The type or model number of the connected device.

➑ **Raised Time** — The date and time the alarm first occurred.

➒ **Controller** — The IP address of the device acting as the system controller.

Sorting Alarms by Column

Columns can be sorted by clicking directly on any of the column names. Clicking on a column name sorts the list in ascending or descending order (see figure 153, ❷ to see the alarms sorted by raised time). The `Raised Time` column is darkened and contains a ▼ icon to show that the devices are sorted by the raised alarm time in ascending order.

Hovering over the right side of a column name reveals a pull-down arrow ▾ that accesses the advanced column sorting menu, when clicked. Use this menu to sort columns in ascending or descending order.

Sorting Alarms by Group

Alarms can be sorted in groups using the **Group By** menu (❶).

ID	Severity	Alarm Description	Device	Name	Device Type	Raised Time ▼	❷	controller
⊟ Severity: critical (11 Items) ❸								
450772	🔴	Bad Device	620038	device620038	VNC 200 DVI-AD	2012/03/22 17:43:33 GMT+0000		
450112	🔴	Bad Device	620115	device620115	VNC 200 DVI-AD	2012/03/22 16:27:56 GMT+0000		
322	🔴	Bad Device	720202	Small rack	VNC 200 DVI-AD	2012/04/02 17:06:01 GMT+0100		
562	🔴	Bad Device	11211552	D830	VNE 200 DVI	2012/04/02 17:05:08 GMT+0100		
742	🔴	Bad Device	620091	JMP_Left	VNC 200 DVI-A	2012/04/02 17:04:33 GMT+0100		
382	🔴	Bad Device	6020056	JMP_Right	VNC 200 DVI-A	2012/04/02 17:04:33 GMT+0100		

Figure 153. Grouping Alarms

The following grouping options (❶) are available.

- **None** — Removes group sorting.
- **Severity** — Groups the alarms by critical severity and warning severity.
- **Type** — Groups the alarms by their description (type).
- **Device** — Groups the alarms by device ID, linking each alarm to the device it originates from.
- **Controller** — Groups the alarms by system controller. When a VN-Matrix system contains more than one system controller, this option links alarms to each system controller.
- **Expand All** — Reveals all alarms. The alarms display under the appropriate group name.
- **Collapse All** — Hides all alarms. Only the group names are displayed on the page.

> **NOTES:**
> - After selecting a grouping option, groups can be further sorted using column sorting (see **Sorting Devices by Column** on page 36). See figure 153, ❷ to see the alarms sorted by raised time in ascending order.
> - Grouped alarms are expanded and collapsed by clicking on the square icon ⊟ located next to the group name (❸).

Alarm Type Reference Tables

Encoders			
CLI Alarm	**Alarm Description**	**Fault Description**	**Alarm Type**
NOSRC	No Source	No input source is connected.	Critical, Reporting
BADSRCSYN	Bad Source Syncs	An input source is connected but the sync timing is not recognized (unable to input source due to bad sync measurements).	Critical, Reporting
NOSDILOCK	No SDI Source Lock	An SDI source is connected but the signal timing is not recognized. (An SDI source is present but the PLL lock failed).	Critical, Reporting
NOSDIMODE	Unsupported SDI Mode	The connected SDI source mode not supported.	Critical, Reporting
NOMODE	Unsupported Mode	The connected source is not supported; a user-mode must be created.	Critical, Reporting
BADSRC	Bad Source	A source is connected and syncs have been detected, but it is not possible to make active pixel measurements.	Critical, Reporting
PHASING	Analog Phasing Failure	The analog pixel clock auto-phasing process failed.	Warning, Reporting
HWNOVIDEO	Hardware Encoding Error	The hardware is unable to encode the input video.	Critical, Reporting
UNSUPAUDIOSRC	Unsupported Audio Source	The digital audio source has a bad or unsupported clock rate.	Critical, Reporting
BADAUDIOSRC	Bad Audio Source	The audio source is not valid for the current video source.	Warning, Reporting
VIDEOOVERLOAD	Data Rate Overload	The system is not able to process the source at the current settings; increase the compression. (The compressed data rate is too high, increase the compression).	Critical, Reporting
NWOVERLOAD	Network Overload	The network is dropping too many packets.	Warning, Reporting
BADREVAUDIO	Bad Reverse Audio	The reverse audio channel contains no data or has a large number of dropouts.	Warning, Reporting

Decoders			
CLI Alarm	**Alarm Description**	**Fault Description**	**Alarm Type**
NOMATCH	No Decoder Mode	A video stream is assigned but the decoder does not recognize the format. (The decoder cannot output the current input stream).	Warning, Reporting
NOSRCREPORT	No Source Report	A video stream is assigned but there is no source present at the encoder. (The encoder is reporting "No Source" to the Decoder).	Warning, Reporting
RECAUDIO	Recovered Audio	The decoder has recovered missing audio packets.	Warning, Reporting
NOAUDIO	No Decoder Audio Data	An audio stream is assigned, but the decoder is not receiving audio data.	Warning, Reporting
BADAUDIO	Bad Audio At Decoder	The decoder is receiving poor quality audio data.	Warning, Reporting
BADAPLL	Bad Audio PLL	The decoder is having problems synchronizing to the audio data.	Warning, Reporting
VIDEODROP	Video Network Packets Dropped	Excess video data has been dropped in the network.	Warning, Reporting
BUFFEROVERFLOW	Decoder Buffer Overflow	Too many data frames at the decoder; reduce the pipeline delay.	Warning, Reporting
BUFFERUNDERFLOW	Decoder Buffer Underflow	Too few data frames at the decoder; increase the pipeline delay.	Warning, Reporting
BADVPLL	Bad Video PLL	The decoder is having problems synchronizing to the video data.	Warning, Reporting
NOANC	No Decoder ANC Data	An ANC stream is assigned, but the decoder is not receiving the ANC data.	Warning, Reporting
BADANC	Missing ANC at Decoder	The decoder is receiving poor quality ANC data.	Warning, Reporting
RECANC	Recovered ANC	The decoder has recovered from missing ANC packets.	Warning, Reporting
GENLOCKNOSOURCE	No Genlock Source Present	There is no reference genlock source present.	Critical, Reporting
GENLOCKNOLOCK	No Genlock Source Lock	Invalid reference genlock signal.	Critical, Reporting
GENLOCKMISMATCH	Genlock Source Mismatch	The genlock reference signal mismatches the required output mode.	Critical, Reporting
UNSUPAUDIOTYPE	Unsupported Audio Type	Audio data type not supported by current hardware.	Critical, Reporting

Encoder/Decoder

CLI Alarm	Alarm Description	Fault Description	Alarm Type
BADAUDIOHW	Bad Audio Hardware Reporting	The audio hardware has failed or is not present.	Critical, reporting

System Controller

CLI Alarm	Alarm Description	Fault Description	Alarm Type
BADDEVICE	Bad Device	The device is not properly communicating with the controller.	Critical, Reporting
RTPHOLDOFF	RTP Stream Holdoff	The RTP data stream has been temporarily disabled due to excess packet drops.	Critical, Reporting

System Control

The VNM EC 201 is used to configure and control a VN-Matrix system. When used as part of a larger installation, it is likely that a third party control system integrates all of the system equipment into a single control interface. The VNM EC 201 also uses Extron Simple Instruction Set (SIS) commands from the front panel config connector to perform various reset functions.

It also incorporates two methods of control to support this system architecture.

- **High Level Interface (HLI)** — The HLI is a control protocol that allows users to interface their control system with the devices on a VN-Matrix network. This is the main control protocol used with the VNM EC 201.
- **Command Line Interface (CLI)** — The CLI provides low level control of a VN-Matrix device. This is the control protocol that is used by the system controller to communicate with other VN-Matrix devices on the network. The CLI protocol contains a complex instruction set and requires a thorough understanding of VN-Matrix devices and their operation. This complexity makes the CLI unsuitable for most users with limited knowledge of a VN-Matrix system.

> **NOTE:** The Command Line Interface protocol is not thoroughly documented in this user guide.

This section provides information on:

- **HLI Overview**
- **HLI Features**
- **HLI Connection and Control**
- **HLI Command Tables**

HLI Overview

The HLI is positioned **between** the CLI and the user control system. The HLI manages the underlying complexity of the CLI and presents a streamlined control method.

The HLI is accessed from the control computer over the VN-Matrix network or by direct connection using the Remote RS-232 port or Ethernet port on the rear panel of the VNM EC 201 (see **Rear Panel Features** on page 7) .

HLI commands are sent to the VN-Matrix system using the following programs:

- Telnet (see **HLI Connection and Control** on page 155).
- VNM EC 201 web-based user interface (see **About the Web-based User Interface** on page 2.

> **NOTE:** The commands detailed in the HLI command sections are commonly used to communicate with devices on a VN-Matrix network and represent a subset of the HLI command language.

HLI Features

HLI commands:

- Provides a single point of control for all VN-Matrix domains.
- Operates using TCP on port 9996 (SSH port 22 when running in secure mode).

HLI Connection and Control

HLI commands can be sent from the control computer to the EC 201 using the Remote RS-232 port, the Ethernet port, or using the VNM EC 201 web-based user interface (see **HLI Command Examples** on page 165.

Ethernet Connection

When secure mode is not enabled, the HLI can be accessed using TCP by initiating a Telnet connection to the IP address of the VNM EC 201 on port number 9996.

> **NOTES:**
> - If the IP address has not changed, the factory default IP address of a VNM EC 201 is 192.168.254.254.
> - Ensure the Telnet service is installed.

Example: Connect to the HLI in Microsoft® Windows® operating systems using the command prompt:

`C:\> telnet 192.168.254.254 9996 <enter>`

When secure mode is enabled (see **System Config Page** on page 24), HLI can only be accessed using a third party application that supports SSH via a TCP connection to the IP address of the VNM EC 201 on port number 22.

> **NOTES:**
> - If the IP address has not changed, the factory default IP address of a VNM EC 201 is `192.168.254.254`.
> - Ensure an application that supports SSH is installed.
> - The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords convert to the default. If the admin user account of the web-based user interface has not changed, the login details match the default administrator profile:
>   - username — admin
>   - password — admin

Remote RS-232 Port (COM) Connection

The VNM EC 201 receives HLI commands from a control computer directly connected to the RS-232 port (see **Rear Panel Features** on page 7).

> **NOTE:** The default configuration settings for the Remote RS-232 serial connector are:
> - Baud rate — 115200
> - Parity bit — None
> - Data bit — 8
> - Start bit — None
> - Stop bit — 1
> - Flow control (handshake) — None

Using the VNM EC 201 User Interface

To enter HLI commands using the VNM EC 201 web-based user interface:

1. Access the web-based user interface (see **Accessing the Web-based User Interface** on page 10).

2. From the `Devices` page, select a device. If necessary, multiple devices can be selected by clicking the check boxes located on the left side of the `Devices` page (see **Devices Page Overview** on page 34).

3. At the bottom of the `Devices` page, select the **Misc** menu.

   A menu list opens (see figure 154).
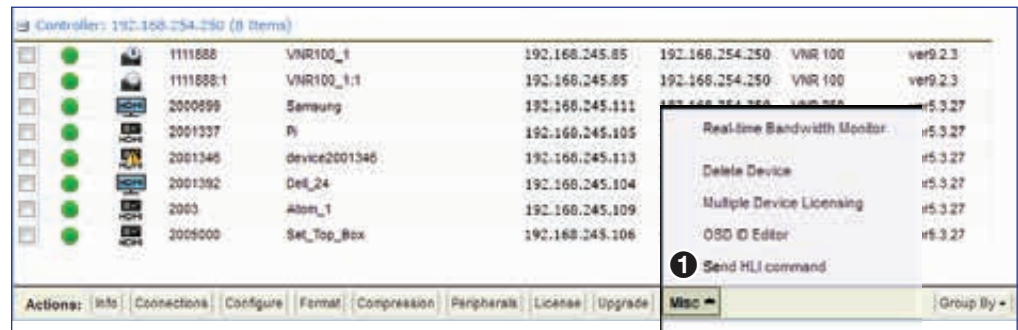
Figure 154. Misc Menu — Select "Send HLI Command"

4. Select **Send HLI command** (see figure 154, ❶). A HLI command window opens (see figure 155).

Figure 155. HLI Command Window

5. To send a command, click in the **(enter command line)** text box (see figure 155, ❶), and enter the desired HLI command.

6. Press <**Enter**> on the keyboard.

   The response appears in the lower portion of the window (❷).

   Click the **X** button in the upper right hand corner (❸) to close the HLI command window.

HLI Command Tables

HLI commands are listed in the reference section (see **HLI Command Examples** on page 165.)

HLI general commands are used to:

- Control a specific function of a single device.
- Build a connection between devices.
- Modify the mode of a device.
- Retrieve system information and monitor system status.

HLI preset commands are used to:

- Launch an action or series of actions.
- Control and modify system configurations.

HLI Responses

HLI responses are formatted using the Java Script Object Notation (JSON) format. Response strings consist of objects, arrays, and values.

object
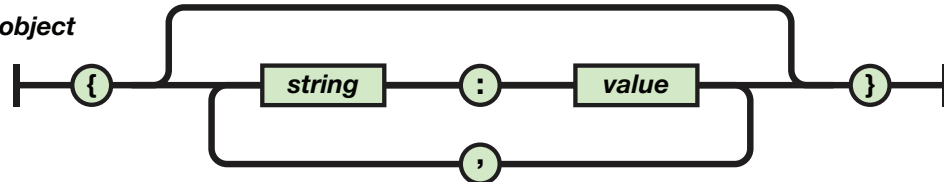
An object is an unordered set of name or value pairs. An object begins with a left brace (**{**) and ends with a right brace (**}**). Each name is followed by a colon (**:**) and the name or value pairs are separated by a comma (**,**).

array
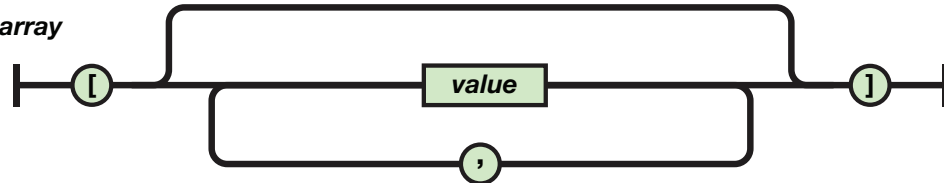
An array is an ordered collection of values. An array begins with a left bracket(**[**) and ends with a right bracket (**]**). Values are separated by a comma (**,**).

value
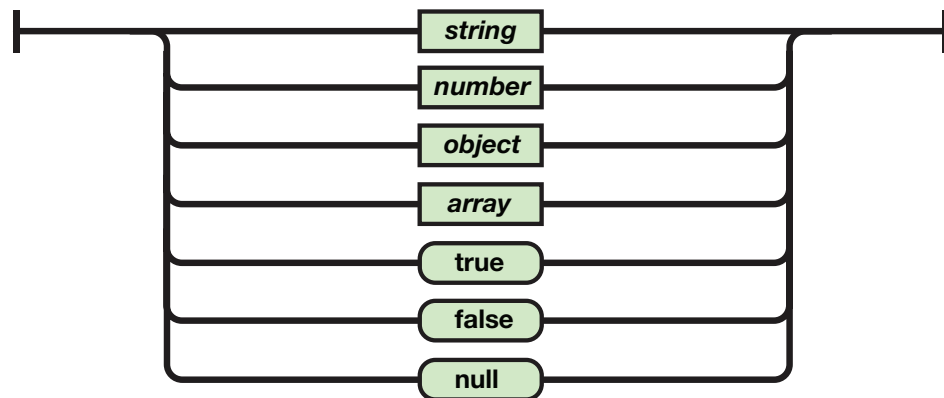
A value can be a string in double quotes, a number, true or false, null, an object, or an array. These structures can be nested.

Controller Firmware and License Updates

This section provides information about:

- **Updating the VNM EC 201 License**
- **Updating the Firmware of a Single EC 201**

Updating the VNM EC 201 License

The VNM EC 201 includes a basic license when purchased. Updating the license of the VNM EC 201 enables the VN-Matrix system to operate with the VNM Software Decoder and the VNS 104 Multi-stream Software Decoder.

> **ATTENTION:**
>
> - **DO NOT place information for a device license** into the controller license panel. Doing this may cause the VNM EC 201 to stop responding. This section provides information for **updating the VNM EC 201 license** only.
> - N'indiquez AUCUNE information concernant une licence d'appareil dans la fenêtre associée à la licence du contrôleur. Vous risqueriez d'interrompre la communication avec le VNM EC 201. Cette section fournit des informations relatives uniquement à la mise à jour de la licence du VNM EC 201.
>
> - See **License Menu** on page 55 for information about device licenses.
> - Consultez la section **License Menu** on page 55, pour en savoir plus sur les licences d'appareils.

To update the VNM EC 201 license:

1. Click the **`Configuration`** tab to open the page (see figure 156, ❶).

    If login information is required, see **Accessing the Web-based User Interface** on page 10.

Figure 156. Configuration Page — Updating the Controller License

2. Click the **`Certificates`** link (❷).

3. From the **`Controllers`** field in the `Configuration` panel, select the IP address of the controller that requires a new license (❸).

4. Click **`License`** (❹).

    The `Controller License Management` dialog box opens (see figure 157). Keep this window open.
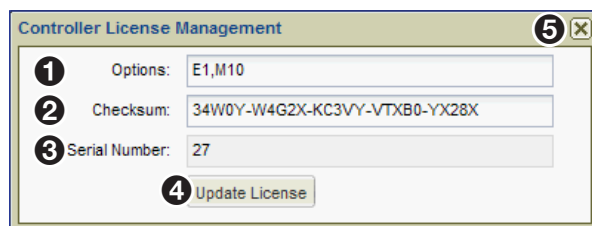
Figure 157. Controller License Management Dialog

5. Contact **Extron Sales Support** and provide the following information.

    *   The **serial number** of the VNM EC 201 (❸). This can be obtained from the `Controller License Management` dialog, or from the rear panel.

    *   The **order number** of the VNM EC 201.

    > **NOTE:** Contact information is available on the last page of this user guide.

6. Extron Sales Support provides a **structure key** and a **license key**.

    *   Enter the **structure key** in the **`Options`** field (❶).

    *   Enter the **license key** in the **`Checksum`** field (❷).

7. Click **`Update License`** (❹) to assign the new license settings.

8. Click **X** in the upper right corner of the dialog box (❺) to close dialog box.

Updating the Firmware of a Single EC 201

Before starting, go to **www.extron.com/download** and download the latest VNM EC 201 firmware. Then use the following procedure to update the firmware of a single VNM EC 201.

1. Click the **Configuration** tab (see figure 158, ❶).

   The Configuration page opens.
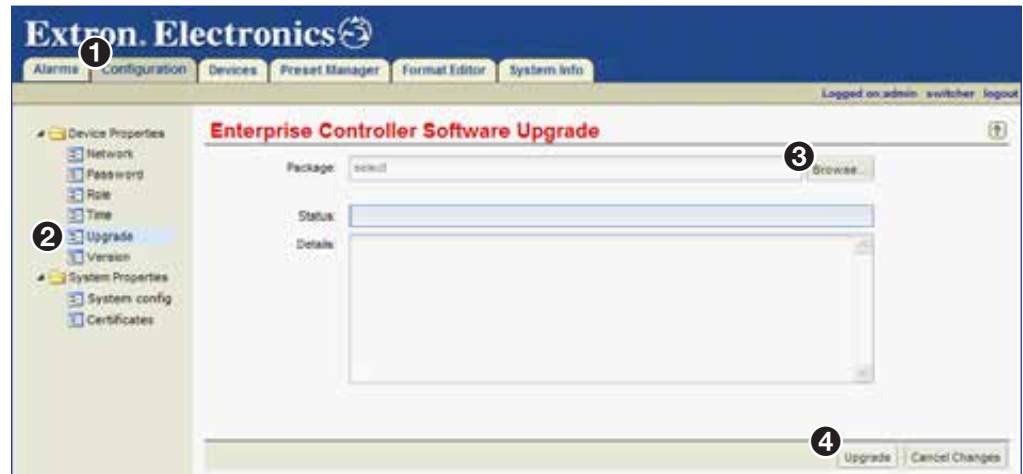
Figure 158.   Configuration Page — Single EC 201

2. Click the **Upgrade** link (❷).

3. Click **Browse** (❸) to open a file browser.

4. Navigate to the location of the firmware file, select the file and click **Open**.

5. Click **Upgrade** (❹) to start the firmware update.

6. When the update completes, power down the VNM EC 201 and restart.

Reference Information

This section provides information about:

- **Default Factory Settings**
- **VN-Matrix System Port Usage**
- **Mounting**
- **HLI Command Overview**
- **HLI Command Examples**
- **General Commands**
- **Preset Commands**
- **Remote Communication and Control Using SIS Commands**
- **Host-to-device Communications**
- **Command and Response Table**
- **DataViewer**

Default Factory Settings

LAN A Network settings (eth0)	IP address	`192.168.254.254`
	Subnet mask	`255.255.255.0`
	Gateway address	`192.168.254.1`

VN-Matrix System Port Usage

The VN-Matrix system uses a variety of network port numbers for streaming and inter-communication functions. Just as the universal "telnet" function typically uses TCP port number 23, VN-Matrix systems use specific port numbers for operation.

The table on the following page lists the port numbers used by the VN-Matrix series products. The port numbers are, in most cases, for the sender. Port numbers used for receiving are less important in regards to security.

When configuring a network, make sure it allows traffic on ports required for your given application. The ports highlighted in yellow accommodate most simple applications.

Port	Transport	Usage
22	TCP	HLI server port when running in secure mode. To access this port the user needs to enter login credentials.
23	TCP	Telnet (can be disabled).
69	UDP	TFTP Server, for firmware upgrades.
80	TCP	Secure HTTP data communication between the web browser and the EC 201. Value is not definable; the default is 80.
161	UDP	Simple network management protocol (SNMP) used for alarm access.
199	TCP	Simple network management protocol (SNMP) used for alarm access.
443	TCP	Secure HTTP data communication between the web browser and the EC 201. The value is undefinable and enabled only when the user has selected secure mode from the web browser.
554	TCP	Real-time streaming protocol (RTSP) server.
4002	TCP	Source stream information, used to telnet to a VN-Matrix decoder to view information about the source it is decoding.
5002	TCP	Serial port bidirectional protocol (not data channel streaming).
5432	UDP	EC 201 outgoing and incoming control messages used on the device acting as controller to communicate with other VN-Matrix devices. Value is user definable; the default is 5432.
5555	TCP	Old XML interface and old VN-Matrix recorder software application. No longer used.
6666	TCP	Keyboard and mouse forwarding.
7777	UDP	Upgrade daemon, local access only.
8000-8098 (even)	UDP	RTP unicast or RTP multicast audio, video, whiteboard, and data streams used as the port number of the destination (receiver). The controller selects a port number, starting at 8000.
8001-8099 (odd)	UDP	RTCP channel for audio, video, whiteboard, and data streams used as the port number of the destination (receiver). Grouped with the even-numbered stream (8000 with 8001, 8002 with 8003, and so on).
8000	TCP	Video streams, used as the port number of the source (sender).
8100	TCP	Audio streams, used as the port number of the source (sender).
8200	TCP	Whiteboard streams, used as the port number of the source (sender).
8201	TCP	Data streams, used as the port number of the source (sender).
9000	TCP	HSI interface when using ThorDebug.
9001	UDP	VN-Matrix outgoing and incoming control messages. Communicates with port 5432 (or the user defined port number) on the EC 201.
9002	UDP	Default port for collecting UDP traffic for data transport. Value is user-definable.
9996	TCP	HLI server port when the EC 201 is not running in secure mode.
9997	TCP	Annotation server port.
9998	TCP	Telnet Command Line Interface (CLI) messages to the controller used for sending text-based control commands.
9999	TCP	Deprecated: Old remote control server, replaced by CLI (port 9998).

Mounting

Rack Installation

This section provides information on installing the controller into a rack cabinet. Rack installation requires the use of the optional rack mount kit. The unit can be rack mounted, using the RSU129 and RSB129 rack mount trays.

- Units can be rack mounted in a single or side by side configuration.
- Rack trays are used to support the unit when rack mounting.

Refer to the instructions that came with the rack cabinet to complete the rack installation.

UL Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines are relevant to the safe installation of these products in a rack:

1. **Elevated operating ambient temperature** — If the unit is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the equipment in an environment compatible with the maximum ambient temperature (TMA: +122 °F, +50 °C) specified by Extron.

2. **Reduced air flow** — Install the equipment in the rack so that the equipment gets adequate air flow for safe operation.

3. **Mechanical loading** — Mount the equipment in the rack so that uneven mechanical loading does not create a hazardous condition.

4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Consider the equipment nameplate ratings when addressing this concern.

5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Desk Mounting

The unit can set on a desk using the supplied rubber feet. It can be desk mounted using the MBU125 under-desk and MBD129 through desk mounting. Follow the instructions included with the mounting kits.

HLI Command Overview

The format of an HLI command is shown below.

Command Structure
command *argument1 argument2* [optional argument1] [optional argument2]...↵

> **NOTE:** The number of arguments, both required and optional, depends on the command.

Each command has a defined structure. The HLI command must begin the string but additional commands can follow that include arguments, parameters, and other variables. Each command string ends with an <**enter**> (**CRLF**) command (↵).

In the commands and examples that follow, HLI commands are represented in `fixed fonts`. Identifiers, variables, arguments, and parameters are in *slanted fonts*.

> **NOTES:**
> - Text inside brackets [*example text*] represent optional command arguments. Do not include the brackets when entering the command.
> - A response is returned each time an HLI command is properly sent. The text depends on the type of command. If the command is formatted correctly and accepted, the reply is "`okay`" unless otherwise stated.

Devices can be identified in one of three ways:

- **IP Address** — The IP address of the target device.
- **Device Name** — The name of the device as assigned by the user.
- **Device ID** — A unique number identifying the target device.

> **NOTE:** The device ID is found on the product sticker located on the device, or in the Device List of the EC 201. The ID numbers used in the following examples have been simplified for the HLI command structure examples and do not represent actual device IDs.

HLI Command Examples

The HLI command examples that follow refer to a VN-Matrix system consisting of the devices in figure 159. The devices are connected to the network with corresponding device ID, IP address, and device names.

Browser Based Control PC

VNM 200 or 225 Series Codec (Source)
Device ID: 20001
IP Address: 192.168.0.21
Device Name: 200_Device1

VNM 200 or 225 Series Codec (Source)
Device ID: 20002
IP Address: 192.168.0.22
Device Name: 200_Device2

VNM 300 Series Codec
Device ID: 30001
IP Address: 192.168.0.31
Device Name: 300_Device1

VNM 300 Series Codec
Device ID: 30002
IP Address: 192.168.0.32
Device Name: 300_Device2

VNR 100
Device ID: 10001
IP Address: 192.168.0.11
Device Name: 100_Device1

Network

VNM Enterprise Controller 201
IP Address: 192.168.254.254

VNM 200 or 225 Series Codec (Display)
Device ID: 20003
IP Address: 192.168.0.23
Device Name: 200_Device3

VNM 200 or 225 Series Codec (Display)
Device ID: 20004
IP Address: 192.168.0.24
Device Name: 200_Device4

VNS 104
Device ID: 40001
IP Address: 192.168.0.41
Device Name: 104_Device1

VN-Matrix Recorder
Device ID: 50001
IP Address: 192.168.0.51
Device Name: 5Ch_Device1

Figure 159. Basic Application Diagram for HLI Command Control (VNM 250 not shown)

General Commands

General commands are structured using both fixed commands and variables. In the following pages, fixed commands are in `command fonts` that identify the HLI commands. Variables that represent the device identifier, argument, or parameter values are in *`italic fonts`*.

analogOutputEnable

The `analogOutputEnable` command enables or disables audio for devices running the VNS 104 software decoder. The command is sent to window 4, the VNS 104 audio channel.

> **NOTE:** This command uses zero-based window numbering. Channel numbers **0** to **3** refer to the top-left, top-right, bottom-left and bottom-right positions respectively. Channel number 4 selects the audio channel.

Command line structure — analogOutputEnable
set device *identifier* swdecoder window 4 analogOutputEnable *enablemode*↵

Available parameters and arguments for this command are:

Parameter	Argument	Description
identifier	Device ID, IP address or Device name	
enablemode	enable or disable	Mutes or unmutes the audio.

For the following examples:

VNS 104: Device name = **104_Device1**, Device ID = **40001**, IP = **192.168.0.41**

Example 1 — Enable (unmute) audio on a VNS 104 using device name.

set device *104_Device1* swdecoder window 4 analogOutputEnable *enable*↵

Example 2 — Disable (mute) audio on a VNS 104 using device ID

set device *40001* swdecoder window 4 analogOutputEnable *disable*↵

analogOutputMute

The `analogueOutputMute` command mutes or un-mutes the audio channel for devices running the VNS 104 software decoder. The command is sent to window 4, the VNS 104 audio channel.

> **NOTE:** This command uses zero-based window numbering. Channel numbers **0** to **3** refer to the top-left, top-right, bottom-left and bottom-right positions respectively. Channel number 4 selects the audio channel.

Command line structure
set device *identifier* swdecoder window 4 analogOutputMute *mutemode*↵

Available parameters and arguments for this command are:

Parameter	Argument	Description
identifier	Device ID, IP address or Device name	
mutemode	normal or mute	Mutes or unmutes the audio.

For the following examples:

VNS 104: Name = **104_Device1**, ID = **40001**, IP = **192.168.0.41**

Example 1 — Mute the audio on a VNS 104 using the device name.

set device *104_Device1* swdecoder window 4 analogOutputMute *mute*↵

Example 2 — Unmute audio on a VNS 104 using the device ID.

set device *40001* swdecoder window 4 analogOutputMute *normal*↵

analogOutputSetLevel

The `analogueOutputSetLevel` command sets the level of the audio channel on VNS 104 devices. The command is sent to window 4, the VNS 104 audio channel.

> **NOTE:** This command uses zero-based window numbering. Channel numbers **0** to **3** refer to the top-left, top-right, bottom-left and bottom-right positions respectively. Channel number 4 selects the audio channel.

Command line structure

`set device` *identifier* `swdecoder window 4 analogOutputSetLevel` *level*

Available parameters and arguments for this command are:

Parameter	Argument	Description
identifier	`Device ID, IP address, or device name`	
level	integer between -**70** and **12**	

For the following examples:

VNS 104:   Name = **104_Device1**, ID = **40001**, IP = **192.168.0.41**

Example 1 — Set the audio level on a VNS 104 to a value of +6 using the device name.

`set device` *104_Device1* `swdecoder window 4 analogOutputSetLevel` *6* ↵

Example 2 — Set the audio level on a VNS 104 to a value of -36 using a device ID:

`set device` *40001* `swdecoder window 4 analogOutputSetLevel` *-36* ↵

connect

The `connect` command switches streams from a source device to a destination device. This command manages the individual parameters required to configure a VN-Matrix stream, including the provisioning of the VN-Matrix devices, to their required state.

Command line structure

`connect` *source:n destination:n* [*optional parameters*]

Available parameters and arguments for this command are:

Parameter	Argument	Description
source:n	`Device ID, IP address`, or `Device name` followed by an optional channel number *:n*	
destination	`Device ID, IP address`, or `Device name` followed by an optional channel number *:n*	

Additional stream types (audio, data, whiteboard) can be specified as well as the network transport protocol (TCP, UDP or multicast) using optional parameters. Unless otherwise specified, the current global values as defined in the system controller are used.

The channel designator *:n* provides support for channel-based devices such as the VN Recorder and VNS 104.

If either the source or destination devices are a VNM Recorder or VNR 100, the connect command is also used to select or create a directory for recording or to load an existing directory for playback.

If the command and parameters are correctly entered and accepted by the controller the return is: **"okay"**

Additional optional parameters and arguments for this command are:

Parameter	Arguments	Description
source	`50001:1`	The serial number (ID) of the source device followed by the channel number (if applicable)
	`192.168.0.51:1`	The IP address of the source device followed by the channel number (if applicable)
	`VN_Recorder:1`	The user-defined name of the source device followed by the channel number (if applicable)
	`none`	Clears all connections to this source
destination	`40001:1`	The serial number (ID) of the display device followed by the channel number (if applicable)
	`192.168.0.41:1`	The IP address of the display device followed by the channel number (if applicable)
	`VNS_104:1`	The user-defined name of the display device followed by the channel number (if applicable)
	`none`	Removes the display device connection from the source device
streams	`a`	Audio (excluding VNM 3xx series devices)
	`a2`	Program and return audio (VNM 250 only)
	`n`	ANC (VNM 3xx series audio)
	`v`	Video
	`w`	Whiteboard (specially licensed feature)
	`d`	Data (specially licensed feature)
	`r`	Row FEC (VNM 3xx only)
	`c`	Column FEC (VNM 3xx only)
	Example: `streams=n,v,d`	ANC, video and data
program_au-dio_source	`25002`	The serial number (ID) of the device (VNE 250 only)
	`192.168.0.252`	The IP address of the device (VNE 250 only)
	`250_Encoder_2`	The user-defined name of the device (VNE 250 only)
transport	`unicast`	UDP point to point connection
	`tcp`	TCP connection using IP address of source and destination devices
	`multicast`	Multicast – addresses managed by EC 201 settings
	Example: `transport=unicast`	Unicast mode

name	`name=dir1`
	Example:
	`name=dir1:Matrix1`
		Specifies directory name "dir1" for recording
		Specifies directory name "dir1" with filename "Matrix1" for recording

directory	`directory=dir1`	Specifies directory name "dir1" for playback
filename	`filename=Matrix1`	Specifies filename "Matrix1" for playback
timestamp	`timestamp="duplicate1"`	Specifies a user-defined text string appended to a new directory if the directory name exists. For example, a duplicate Matrix1 directory becomes Matrix_1-duplicate1. If the timestamp parameter is not included, duplicate directories are automatically appended with the Controller date and time in the form YYYY-MM-DD-hh-mm-ss. Example: `Matrix_1-2013-01-19-12-19-24`

VNM 200/225 Device Examples

For the VNM 200/225 device examples:

2xx Device1:   Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

2xx Device2:   Name = **200_Device2**, ID = **20002**, IP = **192.168.0.22**

Example 1 — Connect Device1 to Device2 using the device IDs.

   connect *20001 20002* ↵

Example 2 — Connect Device1 to Device2 using the device names.

   connect *200_Device1 200_Device2* ↵

Example 3 — Connect Device1 to Device2 using the IP addresses.

   connect *192.168.0.21 192.168.0.22* ↵

Example 4 — Connect Device1 to Device2 using a device ID and IP address.

   connect *20001 192.168.0.22* ↵

Example 5 — Connect Device1 to Device2 with audio, video, and data streams.

   connect *20001 20002 streams=a,v,d* ↵

Example 6 — Connect Device1 to Device2 in multicast mode, with audio, video, and data streams.

   connect *20001 20002 transport=multicast streams=a,v,d* ↵

Example 7 — Break connections to Device1 (where Device1 is a source).

   connect *20001* none ↵

Example 8 — Break connections to Device2 (where Device2 is a display).

   connect none *20002* ↵

VNM 250 Device Examples

For the VNM 250 device examples:

VNE 250 Encoder1:   Name = **250_Encoder1**, ID = **25001**, IP = **192.168.0.251**

VNE 250 Encoder2:   Name = **250_Encoder2**, ID = **25002**, IP = **192.168.0.252**

VND 250 Decoder1:   Name = **250_Decoder1**, ID = **25003**, IP = **192.168.0.253**

Example 1 — Connect Encoder1 to Decoder1 using the device IDs.

   connect *25001 25003* ↵

Example 2 — Connect Encoder1 to Decoder1 using the device names.

   connect *250_Encoder1 250_Decoder1* ↵

Example 3 — Connect Encoder1 to Decoder1 using the device IP addresses.

   connect *192.168.0.251 192.168.0.253* ↵

Example 4 — Connect Encoder1 to Decoder1 using a combination of device ID and IP address.

   connect *25001 192.168.0.253* ↵

Example 5 — Connect Encoder1 to Decoder1 with audio, video, and data streams.

   connect *25001 25003 streams=a,v,d* ↵

Example 6 — Connect Encoder1 to Decoder1 in multicast mode, with audio, video, and data streams.

   connect *25001 25003 transport=multicast streams=v,d* ↵

Example 7 — Connect Encoder1 to Decoder1 with breakaway audio from Encoder2.

   connect *25001 25003 streams=v,a program_audio_source=25002* ↵

Example 8 — Connect Encoder1 to Decoder1 with program and return audio (Decoder1 back to Encoder1).

connect *25001 25003 streams=v,a2* ↵

Example 9 — Break connections to Encoder1.

connect *25001* none ↵

Example 10 — Break connections to Decoder1.

connect none *25003* ↵

VNM 3xx Devices

For the VNM 3xx device examples:

3xx Device1:   Name = **300_Device1**, ID = **30001**, IP = **192.168.0.31**

3xx Device2:   Name = **300_Device2**, ID = **30002**, IP = **192.168.0.32**

Example 1 — Connect Device1 to Device2 using device ID.

connect *30001 30002* ↵

Example 2 — Connect Device1 to Device2 using device names.

connect *300_Device1 300_Device2* ↵

Example 3 — Connecting Device1 to Device2 using IP addresses.

connect *192.168.0.31 192.168.0.32* ↵

Example 4 — Connecting Device1 to Device2 using a combination of device ID and IP address.

connect *30001 192.168.0.32* ↵

Example 5 — Connect Device1 to Device2 with audio, video, FEC row, and FEC column streams.

connect *30001 30002 streams=n,v,r,c* ↵

Example 6 — Connect Device1 to Device2 in multicast mode, with video, FEC row, and FEC column streams.

connect *30001 30002 transport=multicast streams=v,r,c* ↵

Example 7 — Break connections to Device1 (where Device1 is a source).

connect *30001* none ↵

Example 8 — Break connections to Device2 (where Device2 is a display).

connect none *30002* ↵

VNS 104 Devices

For the VNS 104 device examples:

VNS 104:   Name = **104_Device1**, ID = **40001**, IP = **192.168.0.41**

VNM 2xx: Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

Example 1 — Connect VNM 2xx to VNS 104 top left quadrant using device IDs.

connect *20001 40001:0* ↵

Example 2 — Connecting VNM 2xx to VNS 104 top left quadrant using device names.

connect *200_Device1 104_Device1:0* ↵

Example 3 — Connect VNM 2xx to VNS 104 top left quadrant using IP addresses.

connect *192.168.0.21 192.168.0.41:0* ↵

Example 4 — Connect VNM 2xx to VNS 104 using a combination of device ID and IP address.

connect *20001 192.168.0.41:0* ↵

Example 5 — Connect VNM 2xx to VNS 104 bottom right quadrant.

> `connect 20001 40001:3` ↵

Example 6 — Connect VNM 2xx video and audio only to VNS 104 bottom right quadrant.

> `connect 20001 40001:3 streams=v,a` ↵

Example 7 — Connect VNM 2xx video and audio to VNS 104 bottom right quadrant in multicast mode.

> `connect 20001 40001:3 streams=v,a transport=multicast` ↵

Example 8 — Break connection of the VNS 104 bottom left quadrant.

> `connect none 40001:2` ↵

VNR 100 Devices

For the VNR 100 device examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**
VNM 2xx: Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

Example 1 — Connect VNM 2xx (source) to VNR 100 (recorder) specifying a recording directory "dir1".

> `connect 20001 10001 name=dir1` ↵

Example 2 — Connect VNM 2xx (source) to VNR 100 (recorder) specifying a recording directory "dir1" with a filename of "matrix".

> `connect 20001 10001 name=dir1:matrix` ↵

Example 3 — Connect VNM 2xx (source) to VNR 100 (recorder) with video, audio, and data streams and specify a recording directory "dir1" with a filename of "matrix".

> `connect 20001 10001 streams=a,v,d name=dir1:matrix` ↵

Example 4 — Connect VNM 2xx (source) audio, video, and data streams to VNR 100 (recorder) specifying a recording directory "dir1" with a filename of "matrix" and a custom duplicate directory suffix of "duplicate1".

> `connect 20001 10001 streams=a,v,d name=dir1:matrix`
> `timestamp="duplicate1"` ↵

Example 5 — Connect VNM 2xx (source) video, audio, and data streams to VNR 100 (recorder) in multicast mode specifying a recording directory "dir1" with a filename of "matrix".

> `connect 20001 10001 transport=multicast streams=a,v,d`
> `name=dir1:matrix` ↵

Example 6 — Connect VNR 100 (player) to VNM 2xx (display) specifying a filename "recording1" located in directory "dir1".

> `connect 10001 20001 directory=dir1 filename=recording1` ↵

Example 7 — Connect VNR 100 (player) video and audio streams to VNM 2xx (display) in unicast mode specifying a filename "recording1" located in directory "dir1".

> `connect 10001 20001 transport=unicast streams=v,a directory=dir1`
> `filename=recording1` ↵

Example 8 — Break connections to the VNR 100 (recorder).

> `connect none 10001` ↵

VNM Recorder (5 Channel) Devices

For the VNM Recorder device examples:

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

VNM 2xx: Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

Example 1 — Connect VNM 2xx (source) to VNM Recorder channel 2 specifying a recording directory "dir1".

`connect 20001 50001:2 name=dir1` ↵

Example 2 — Connect VNM 2xx (source) to VNM Recorder channel 2 specifying a recording directory "dir1" with a filename of "matrix"

`connect 20001 50001:2 name=dir1:matrix` ↵

Example 3 — Connect VNM 2xx (source) video, audio, and data streams to VNR 100 (recorder) specifying a recording directory "dir1" with a filename of "matrix".

`connect 20001 10001 streams=a,v,d name=dir1:matrix` ↵

Example 4 — Connect VNM 2xx (source) video, audio, and data streams to VNM Recorder channel 2 specifying a recording directory "dir1" with a filename of "matrix" and a custom duplicate directory suffix of "duplicate1".

`connect 20001 50001:2 streams=a,v,d name=dir1:matrix`
`timestamp=duplicate1` ↵

Example 5 — Connect VNM 2xx (source) video, audio, and data streams to VNM Recorder channel 2 in multicast mode specifying a recording directory "dir1" with a filename of "matrix".

`connect 20001 50001:2 transport=multicast streams=a,v,d`
`name=dir1:matrix` ↵

Example 6 — Connect VNM-Recorder (player) channel 3 to VNM 2xx (display) specifying a filename "rec1" located in directory "dir1".

`connect 50001:3 20001 directory=dir1 filename=rec1` ↵

Example 7 — Connect VNM-Recorder (player) channel 3 video and audio streams to VNM 2xx (display) in unicast mode with a filename "rec1" located in directory "dir1".

`connect 50001:3 20001 transport=unicast streams=v,a`
`directory=dir1 filename=rec1` ↵

Example 8 — Break connections to VNM-Recorder channel 2.

`connect none 50001:2` ↵

createdisplay

The `createdisplay` command sets a VN-Matrix codec device to display mode (decoder). It disconnects existing connections before changing the device mode.

Command line structure
`createdisplay device`

device: Device name, device ID, or IP address.

For the following examples:

VNM 2xx: Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

VNM 3xx: Name = **300_Device2**, ID = **30001**, IP = **192.168.0.31**

Example 1 — Set a VNM 2xx device to display mode using the IP address.

`createdisplay 192.168.0.21` ↵

Example 2 — Set a VNM 2xx device to display mode using the device name.

`createdisplay 200_Device1` ↵

Example 3 — Set a VNM 3xx device to display mode using the device ID.

`createdisplay 30001` ↵

createsource

The `createsource` command sets a VN-Matrix codec device to source mode (encoder). It disconnects existing connections before changing the device mode.

Command line structure
createsource *device*

device: Device name, device ID, or IP address.

For the following examples:

VNM 2xx: Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

VNM 3xx: Name = **300_Device2**, ID = **30001**, IP = **192.168.0.31**

Example 1 — Set a VNM 2xx device to source mode using the IP address.

createsource *192.168.0.21* ↵

Example 2 — Set a VNM 2xx device to source mode using the device name.

createsource *200_Device1* ↵

Example 3 — Set a VNM 3xx device to source mode using the device ID.

createsource *30001* ↵

currentTime

The `currentTime` command returns the current system time of the VN-Matrix controller. It can be obtained from any active VN-Matrix device on the system excluding the VN-Matrix EC 201. The `currentTime` value is the reference point when setting future event start times (see `play`).

Command line structure
get device *identifier* currentTime

identifier: Device name, device ID, or IP address of VN-Matrix device (not the EC).

Return attributes: currentTime: hh:mm:ss:uuuuuu

For the following examples:

2xx Device1:   Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

Example 1 — Getting the VN-Matrix controller system time using the IP address as identifier.

get device *192.168.0.21* currentTime ↵

Returns: "*11:53:02.174478*"

Example 2 — Getting the VN-Matrix controller system time using device name as identifier.

get device *200_Device1* currentTime ↵

Returns: "*11:53:02.174478*"

deletedevice

The `deletedevice` command removes unused devices from the VN-Matrix system. Attempting to remove a device currently in use results in a fail code.

Command line structure
deletedevice *device*

device: Device name, device ID, or IP address.

For the following examples:

2xx Device1:   Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

2xx Device2:   Name = **200_Device2**, ID = **20002**, IP = **192.168.0.22**

Example 1 — Delete an unused 2xx device from the system.

> deletedevice *20001* ↵

Example 2 — Attempting to delete a 2xx device with active connections.

> deletedevice *20002* ↵
> Returns: "`fail: code=13,object in use`"

disconnectall

The `disconnectall` command breaks all connections to all devices on the VN-Matrix controller.

Command line structure
disconnectall

Example 1 — Break all connections to all devices on a VN-Matrix controller.

> disconnectall ↵

getalarmlogs

The `getalarmlogs` command returns a list and details of alarms present on the VN-Matrix system.

Command line structure
`getalarmlogs`

Returned attributes for this command are:

Attribute	Value	Description
severity	`critical, warning, none`	A summary of the severity of the alarm.
alarm_id	`nnn` Example: `232`	The associated ID number of the alarm.

controller	`IP address: nnn.nnn.`
	`nnn.nnn`
	Example: `192.168.0.254`
		The IP address of the controller on which the alarm has been flagged.

device_type	`Text string` Example: `VNM Recorder`	The type of device the alarm has been raised.

raisetime	`Text string, date`
	Example: `Wed, 06 Feb 2013`
	`09:56:15 GMT`
		The time and date when the alarm condition was raised.

type	`Text string` Example: `22 — Bad Device`	The type code and description of the raised alarm.
serial	`nnnnn` Example: `50001`	The serial number (ID) of the device where the alarm has been raised.
name	`Text string` Example: `5ch_Device1`	The name of the device where the alarm has been raised.

Example 1 — Return a list of current alarms on the system.

> `getalarmlogs` ↵
>
> Returns: `[{"severity":"Critical","alarm_id":232,"controller":"`
> `192.168.0.254","device_type":"VNM Recorder","raisetime":"Wed,`
> `06 Feb 2013 09:56:15 GMT","type":"22 — Bad Device","serial":50001`
> `,"name":"5ch_Device1"}]`

getcontrollers

The `getcontrollers` command returns a list of controller IP addresses associated with the VN-Matrix system.

Command line structure
`getcontrollers`

Example 1 — Return a list of controller IP addresses on the VN-Matrix system.

> `getcontrollers` ↵
>
> Returns: `["192.168.0.254"]`

getdevices

The `getdevices` command returns attributes and values for all devices connected to the VN-Matrix System Controller. Optional parameters can limit the attributes that are returned or can filter which devices return attributes.

Command line structure
`getdevices keys where order_by`

Available parameters and arguments for this command:

Parameter	Argument	Description

`keys`	`Attribute`
	or
	`Attribute1,Attribute2`
	Example:
	`keys="name,localIp0"`
		Any attribute from the `getdevices` attribute table. Comma separated list of desired attributes.

`where`	`Attribute`	Any attribute from the getdevices attribute table.
	`=`	Equals
	`<>`	Does not equal
	`like 'so%'`	Starts with string 'so'
	`like '%urce'`	Ends with string 'urce'
	`like '%our%'`	Contains string 'our'
	`and`	Logical and
	`or`	Logical or

	Example:
	`where="type='source'"`
	Example:
	`where="type='source' and source_status='Active'"`	

`order_by`	`Attribute:`	Any attribute from the `getdevices` attribute table.
	`ASC`	Sort in ascending order.
	`DESC`	Sort in descending order.
	Example: `order_by="localIp0 ASC"`	

Attributes for the command parameter argument (all are returned by default):

Attribute	Value	Description
`controllerIp`	`nnn.nnn.nnn.nnn` Example: `192.168.0.254`	IP address of the controller for this device.
`curver`	`ver(major.minor.build)` Example: `ver5.2.0`	Current firmware version of the device.
`device_id`	`Serial number:channel` Example: `50001:2`	The unique serial number of the device, followed by the channel number if applicable (VNM Recorder and VNS 104).
`device_type`	`Text string` Example: `VNC 200 DVI-AD`	Hardware type associated with the device.

`dstIp`	`nnn.nnn.nnn.nnn:nnnn`
	Example:
	`192.168.0.23:8000`
		Stream destination IP address and port number.

Attribute	Value	Description
localIp0	nnn.nnn.nnn.nnn Example: `192.168.0.51`	IP address of Ethernet port 0 on the device.
mode	`enable/disable/standby` Example: `enable`	The current operating mode of the device.
name	`Name: channel` Example: `5ch_Device1:2`	The user-defined name of the device followed by the channel number if applicable (VNM Recorder and VNS104).

source_device	`Serial number: channel`
	`or none`
	Example: `50001:2`
		The device ID of the video source associated with this device, if applicable.

source_mode	`Text string` Example: `1280x720 60p`	The current video mode of the device.
source_status	`active/unplugged/null` Example: `active`	Indicates status of the video input of a source device. Null in the case of a display device.

srcIp	`nnn.nnn.nnn.nnn:nnnn`
	Example:
	`192.168.0.23:8000`
		Stream source IP address and port number.

status	`active/no device` Example: `active`	Indicates a device is present (active) or unreachable (no device) on the system.

type	`source/display/re-`
	`corder/swdecoder`
	`none`
	Example: `swdecoder`
		Current device type configuration. Where a codec device has yet to be provisioned as a source or display, 'none' is returned.

userParam1	`Text string` Example: `Group1`	User text field.
userParam2	`Text string` Example: `Group2`	User text field.
userParam3	`Text string` Example: `Group3`	User text field.

For the following examples:

VNM 200 (Source): Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

VNM 200 (Source): Name = **200_Device2**, ID = **20002**, IP = **192.168.0.22**

VNM 200 (Display): Name = **200_Device3**, ID = **20003**, IP = **192.168.0.23**

VNM 200 (Display): Name = **200_Device4**, ID = **20004**, IP = **192.168.0.24**

VNS 104: Name = **104_Device1**, ID = **40001**, IP = **192.168.0.41**

Example 1 — List all device names.

> getdevices keys=*name* ↵
>
> Returns: ["200_Device1","200_Device2","200_Device3","200_Device4","104_Device1","104_Device1:1","104_Device1:2","104_Device1:3","104_Device1:4"]

Example 2 — List all device names and firmware versions.

> getdevices keys=*name,curver* ↵
>
> Returns: [{"name":"200_Device1","curver":"ver3.11.0"},{"name":"200_Device2","curver":"ver3.11.0"},{"name":"200_Device3","curver":"ver3.11.0"},{"name":"200_Device4","curver":"ver3.11.0"},{"name":"104_Device1","curver":"ver1.0.0"},{"name":"104_Device1:1","curver":"ver1.0.0"},{"name":"104_Device1:2","curver":"ver1.0.0"}, {"name":"104_Device1:3","curver":"ver1.0.0"},{"name": "104_Device1:4","curver":"ver1.0.0"}]

Example 3 — List by name all VNM 200 devices that are provisioned as displays.

getdevices keys=*name* where="*device_type='VNC 200 DVI-AD'* and type=*'display'"* ↵

Returns: ["200_Device3","200_Device4"]

getDeviceLayout (VNS 104 Only)

The getDeviceLayout command determines whether video streams are currently displayed in quad-split mode or single window full screen mode on a specific device.

Command line structure
getDeviceLayout *device*

device: Device name, device ID, or IP address

For the following example:

VNS 104:   Name = **104_Device1**, ID = **40001**, IP = **192.168.0.41**

Example 1 — Determine the current layout of a VNS 104 device using the IP address.

getDeviceLayout *192.168.0.41* ↵

Returns: QuadSplit

getFilesInFolder

The getFilesInFolder command returns a formatted list of files in a specified recorder path.

Command line structure
getFilesInFolder ***device path type***

Available parameters and arguments for this command are:

Parameter	Argument	Description
device	50001	The serial number (ID) of the recorder device.
	192.168.0.51	The IP address of the recorder device.
	VN_Recorder	The user-defined name of the recorder device.
path	String Example: /folder1	The path from which the walk command is processed.
type	v	Video
	a	Audio
	w	Whiteboard
	d	Data
	NOTE: Specifies the type of files to return if they exist. If no type is specified, all files are returned.	

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

Example 1 — Return a list of recorded files in a directory named 'folder3' of a VNR 100.

getFilesInFolder *10001* path=/*folder3* ↵

Returns: [["File3_20001.0.0_r0_s0.rec","File3_20001.A0.0_r1_s0.rec"]]

Example 2 — Return a list of audio files in a directory named 'folder3' of a VNM Recorder.

getFilesInFolder path=/*folder3* type=*a* ↵

Returns: [["File3_20001.A0.0_r1_s0.rec"]]

getFolderTree

The `getFolderTree` command returns a formatted list of folders in a specified recorder path.

Command line structure
`getFolderTree` *device path levels*

Available parameters and arguments for this command are:

Parameter	Argument	Description
device	50001	The device ID of the recorder.
	192.168.0.51	The IP address of the recorder.
	VN_Recorder	The user-defined name of the recorder.
path	String Example: /folder1	The path from which the walk command is processed.
levels	1 to 10	Level of folder depth to which the walk function searches. If a level number is not specified, the maximum of 10 is selected.

For the following examples:

VNR 100: Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

Example 1 — Return a list of folders from the root recording directory of a VNR 100.

getFolderTree *10001* path=*/* levels=*1* ↵

Returns: `[[“/”,[“folder1”,”folder2”,”folder3”]]]`

Example 2 — Return a list of the folders in two levels of directories from the root of a VNM Recorder.

getFolderTree *50001* path=*/* levels=*2* ↵

Returns: `[[“/”,[“folderA”,”folderB”,”folderC”]],`
`[“/folderA”,[]],[“/folderB,[]],[“/folderC”,[]]]`

Stat

The `Stat` command returns attributes for the selected recording.

Command line structure
`stat` *device* '*recording name*' *path*

Available parameters and arguments for this command are:

Parameter	Argument	Description
device	50001	The device ID of the recorder.
	192.168.0.51	The IP address of the recorder.
	VN_Recorder	The user-defined name of the recorder.
recording name	'test_file_1.rec'	The file name of the recording. This can be found using the 'getFilesInFolder' command.
path	String Example: /folder1	The path from which the stat command is processed.

For the following example:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

Example 1 — Return the attributes of the recording '*Test_file_1.rec*' from folder
/*tstfolder1* on a VNR 100.

stat *10001* 'Test_file_1.rec'/*tstfolder1* ↵

Returns: {"startTimeUs":626652,"lengthUs":406367,
"isdst":0,"tag":"","length":238,"prefix":
"device2000715.videoPort0.2000715.0.0",
"ftype":"recording","startTime":55040,"date":"06-09-13",
"path":"/Tstfolder1/Test_file_1.rec"}

mkdir

The mkdir command creates a new directory on a recorder device.

Command line structure (required parameters in bold):
mkdir *device path*

device: Device ID, IP address or name.

path: Path and name of new directory.

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

Example 1 — Create a new directory named "dir1" in the root folder of a VNR 100 device.

mkdir *10001* /*dir1* ↵

Example 2 — Create a subdirectory named "sub1" within the ***existing1*** directory of a
VNR 100 device.

mkdir *192.168.0.11* /*existing1*/*sub1* ↵

pause (VNM Recorder and VNR 100 devices only)

The pause command freezes playback of the specified player and channel number. All
associated streams (video, audio, data, whiteboard) are paused when the command is
issued.

Command line structure (required parameters in bold):
pause *source:n*

source: Device ID, IP address or name of the VNM Recorder or VNR 100.

:n :   Channel number (if not specified, defaults to channel 1).

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

Example 1 — Pause playback of a VNR 100 using the IP address.

pause *192.168.0.11* ↵

Example 2 — Pause playback of a VNR 100 using the device name.

pause *100_Device1* ↵

Example 3 — Pause playback on channel 2 of a VNM Recorder using the device ID.

pause *50001:2* ↵

play (VNM Recorder and VNR 100 devices only)

The `play` command starts playback of the specified player and channel number. All associated streams (video, audio, data, whiteboard) start when the command is issued. A `playat` time can be included to start playback at a pre-defined system time in the future, enabling the synchronization of multiple channels. In addition, an offset time can specify a start point other than the beginning of the recording.

Command line structure (required parameters in bold):
play **source**:*n* playat offset

Available parameters and arguments for this command are:

Parameter	Argument	Description
source	Device ID, IP address, or name of the device.	
:n	Channel number	Defaults to channel 1 if not otherwise specified.
playat	hh:mm:ss.uuuuuu Example: 13:23:25.123456	Future time based on the system controller clock. Setting the same `playat` time across multiple devices and channels allows scalable playback synchronization.
offset	nnn (seconds) Example: 126	Allows playback from a position other than the start of the recording. For example, specifying a value of 126 starts playback 2 minutes and 6 seconds into the recording.

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

Example 1 — Start playback on a VNR 100 device using the IP address.

> play *192.168.0.11* ↵

Example 2 — Start playback on a VNR 100 device using the device name.

> play *100_Device1* ↵

Example 3 — Start playback on a VNR 100 device 3 minutes into the recorded file.

> play *100_Device1* offset=*180* ↵

Example 4 — Start playback at a system time of 15:12:22 on a VNR 100 device 3 minutes into the recorded file.

> play *100_Device1* playat=*15:12:22.123456* offset=*180* ↵

Example 5 — Start playback on channel 2 of a VNM Recorder using device ID.

> play *50001:2* ↵

Example 6 — Start playback at a system time of 15:12:22 on channel 2 of a VNM Recorder.

> play *50001:2* playat=*15:12:22.123456* ↵

record (VNM Recorder and VNR 100 devices only)

The `record` command starts recording on the specified recorder and channel number.

Command line structure
record *source:n*

source: Device name, device ID, or IP address of the VNM Recorder or VNR 100.

:n   Channel number (defaults to channel 1 if not specified).

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

Example 1 — Start recording on a VNR 100 device using the IP address.

         record *192.168.0.11* ↵

Example 2 — Start recording on a VNR 100 device using the device name.

         record *100_Device1* ↵

Example 3 — Start recording on channel 2 of a VNM Recorder device using the device ID.

         record *50001:2* ↵

rmdir

The `rmdir` command deletes empty directories on a recorder device.

Command line structure
rmdir *device path*

device: Device ID, IP address or name.

path: Path and name of the directory to delete.

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

Example 1 — Delete directory "dir1" in the root folder using the device ID.

         rmdir *10001 /dir1* ↵

Example 2 — Delete subdirectory "**sub1**" within the "dir1" directory using the IP address.

         rmdir *192.168.0.11 /dir1/sub1* ↵

setDeviceLayout (VNS 104 only)

The `setDeviceLayout` command determines whether video streams are displayed in quad-split mode or full screen mode. This command uses one-based window numbering. VNS 104 channel numbers 1 to 4 refer to top-left, top-right, bottom-left and bottom-right positions respectively.

> **NOTE:** Connections to all four decode windows are maintained in the background when a specific channel is set to full screen mode, in order to ensure smooth switching between layout modes.

Command line structure (required parameters in bold):
setDeviceLayout *device:n layout*

Available parameters and arguments for this command are:

Parameter	Argument	Description

device:n	`40001:1`
	or
	`192.168.0.41:1`
	or
	`104_Device1:1`
		The serial number (ID), IP address, or device name of the VNS 104 device followed by the decode window number, 1-4

layout	`QuadSplit`
	or
	`Fullscreen`
		Quad split layout
		Full screen layout

For the following examples:

VNS 104:   Name = **104_Device1**, ID = **40001**, IP = **192.168.0.41**

Example 1 — Set the top-right window of a VNS 104 device to full screen using the IP address.

      `setDeviceLayout` *192.168.0.41:2 Fullscreen* ↵

Example 2 — Set the bottom-left window of a VNS 104 device to full screen using the device name.

      `setDeviceLayout` *104_Device1:3 Fullscreen* ↵

Example 3 — Return the VNS 104 device to quad split mode using the device ID.

      `setDeviceLayout` *40001:1 QuadSplit* ↵

scaleMode

The `scaleMode` command sets the type of scaling applied to VNS 104 decoder windows.

> **NOTE:** This command uses zero-based window numbering. Channel numbers 0, 1, 2, and 3 refer to top-left, top-right, bottom-left, and bottom-right positions respectively. Channel number 4 refers to the audio channel.

Command line structure
`set device` *identifier* `swdecoder window` *n* `scaleMode` *mode*

Available parameters and arguments for this command are:

Parameter	Argument	Description
identifier	Device name, device ID, or IP address	
n:	Window number 0, 1, 2, 3	
mode	`fill, follow, unity`	

For the following examples:

VNS 104:   Name = **104_Device1**, ID = **40001**, IP = **192.168.0.41**

Example 1 — Set scaling on a VNS 104 top-left quadrant to fill using the device ID.

      `set device` *40001* `swdecoder window` *0* `scaleMode` *fill* ↵

Example 2 — Set scaling on a VNS 104 top-right quadrant to follow using the device name.

      `set device` *104_Device1* `swdecoder window` *1* `scaleMode` *follow* ↵

Example 3 — Set scaling on a VNS 104 bottom-right quadrant to unity using the IP address.

      `set device` *192.168.0.41* `swdecoder window` *3* `scaleMode` *unity* ↵

stop (VNM Recorder and VNR 100 devices only)

The `stop` command stops playback of a file on the specified player and channel number. All associated streams are also stopped when the command is issued.

Command line structure
`stop` *source:n*

source: Device name, device ID, or IP address of the VNM Recorder or VNR 100.

:n   Channel number (defaults to channel 1 if not specified).

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

Example 1 — Stop playback on a VNR 100 device using the IP address.

       `stop` *192.168.0.11* ↵

Example 2 — Stop playback on a VNR 100 device using device name.

       `stop` *100_Device1* ↵

Example 3 — Stop playback on channel 2 of a VNM Recorder device using the device ID.

       `stop` *50001:2* ↵

userParam [1, 2 or 3]

The `userParam1`, `userParam2` and `userParam3` attributes can be set to hold a user-defined character string. This enables effective filtering and searching when using commands such as `getdevices`.

Command line structure for setting `userParam` values
`set device` *identifier* `userParam1` *string*
`set device` *identifier* `userParam2` *string*
`set device` *identifier* `userParam3` *string*

Command line structure for getting `userParam` values
`get device` *identifier* `userParam1`
`get device` *identifier* `userParam2`
`get device` *identifier* `userParam3`

identifier: Device name, device ID, or IP address of VN-Matrix device.

string: Text or character string.

For the following examples:

VNR 100:   Name = **200_Device1**, ID = **20001**, IP = **192.168.0.21**

Example 1 — Set `userParam1` to hold the string "`group1`" using the IP address.

       `set device` *192.168.0.21* `userParam1` *group1* ↵

Example 2 — Set `userParam3` to hold the string "`group3`" using the device name.

       `set device` *200_Device1* `userParam3` *group3* ↵

Example 3 — Get `userParam3` (example 2) from device ID **20001**.

       `get device` *20001* `userParam3` ↵

       Returns: "`group3`"

walk

The `walk` command returns a formatted list of folders and files in a specified recorder path.

Command line structure (required parameters in bold):
walk *device path type levels*

Available parameters and arguments for this command are:

Parameter	Argument	Description
device	50001 192.168.0.51 VN_Recorder	The serial number (ID) of the recorder. The IP address of the recorder. The user-defined name of the recorder.
path	String Example: /folder1	The path from which the walk command is processed.
type	v	Video
	a	Audio
	w	Whiteboard
	d	Data
	Specifies the type of files to return if they exist. If not specified, all files are returned.	
levels	1 to 10	Level of folder depth the walk function searches. If a level number is not specified, the maximum of 10 is applied.

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

Example 1 — Return the contents of only the root recording directory on a VNR 100.

walk *10001* path=/ levels=*1* ↵

Returns: [["/",["folder1","folder2","folder3"],[]]]

Example 2 — Return the contents of two levels of directories from the root on a VNM Recorder.

walk *50001* path=/ levels=*2* ↵

Returns: [["/",["folderA","folderB","folderC"], []],["/folderA",[],[]],["/folderB,[],[]],["/folderC", [],["FileC_20001.0.0_r0_s0.rec","FileC_20001. A0.0_r1_s0.rec"]]]

Example 3 — Return only the audio files from the directory named **folder3** on a VNR 100.

walk *10001* path=/*folder3* type=*a* levels=*1* ↵

Returns: [["/folder3",[],["File3_20001.A0.0_r1_s0.rec"]]]

delete (VNM Recorder and VNR 100 devices only)

The `delete` command deletes recordings on a recording device.

Available parameters and arguments for this command are:

Parameter	Argument	Description
device	50001	The serial number (ID) of the recorder.
	192.168.0.51	The IP address of the recorder.
	VN_Recorder	The user-defined name of the recorder.
path	String	The path of the recording to be deleted.

For the following examples:

VNR 100:   Name = **100_Device1**, ID = **10001**, IP = **192.168.0.11**

VNM Recorder: Name = **5ch_Device1**, ID = **50001**, IP = **192.168.0.51**

Example 1 — Delete the root folder and all recorded content from a folder on a VNR 100.

         delete *10001* /Delete_Test

         Returns: okay

Example 2 — Delete the recording from a folder on a VNR 100.

         delete *100_Device1* /Device_Test/
         Delete_Test_Record_2001346.0.0_r0_s0.rec

         Returns: okay

Example 3 — Delete the root folder and all recorded content from a folder on a
         VNM Recorder.

         delete *192.168.0.51* /Delete_Test

         Returns: okay

Example 4 — Delete the recording made on Channel 2 from a folder on a VNM Recorder.

         delete *5ch_Device1* /Delete_Test/
         Delete_Test_Record_2001346.0.0_r6_s0.rec

         Returns: okay

> **NOTE:** When deleting a single file, the full file name must be specified. The full file name can be found by using the command **getFilesInFolder** on page 178.

Preset Commands

Preset commands are structured using both fixed commands and variables. In the following pages, fixed commands are in `command fonts` that identify the HLI commands, and variables that represent the device, argument, or parameter value are in *`slanted fonts`*.

presetadvance

The `presetadvance` command advances or reverses the player in a preset by a single frame. The command is issued each time a single frame advance or reverse is required. The players in the preset must be in pause (playspeed: `0`) before the command is issued. See `presetplay` and `pause`.

> **NOTE:** This command only applies to video channels. To step both video and data synchronously, use the `presetstep` command.

Command line structure (required parameters in bold):

presetadvance ***name direction***

Available parameters and arguments for this command are:

Parameter	Argument	Description
name	`string` Example: `preset1`	The name of the stored preset.
direction	`Any positive or negative integer` Example: `1 or -1`	A positive integer is a single forward frame step. A negative integer is a single reverse frame step.

Example 1 — Stepping the players in the preset named "`preset1`" by 1 frame in a forward direction.

> presetadvance *preset1 1* ↵

Example 2 — Stepping the players in the preset named "`preset1`" by 1 frame in a reverse direction.

> presetadvance *preset1 -1* ↵

Example 3 — Stepping the players in the preset named "`preset1`" by 2 frames in a reverse direction.

> presetadvance *preset1 -1* ↵

> presetadvance *preset1 -1* ↵

Example 4 — Stepping the currently running players in "`preset1`" by 1 frame in a reverse direction.

> presetplay preset1 0 ↵

> presetadvance preset1 -1 ↵

presetcopy

The `presetcopy` command makes a copy of an existing preset and assigns it a new name.

Command line structure (required parameters in bold):

presetcopy *name newname*

name: Name of the stored preset.

newname: New preset name.

Example 1 — Make a copy of "`preset1`" named "`preset2`".

> presetcopy preset1 preset2 ↵

presetdelete

The `presetdelete` command deletes the specified preset from memory.

Command line structure
`presetdelete` *name*

name:　　　Name of the stored preset.

Example 1 — Delete a preset named `preset1`.

　　　　`presetdelete` *preset1* ⏎

presetget

The `presetget` command returns the connection status of all devices within a specified preset. Devices are listed by connection in the returned JSON string, depending on their assigned function.

Command line structure
`presetget` *name*

name:　　　Name of the stored preset.

Returned attributes for this command are:

Attribute	Value	Description
device	`Device ID` Example: `20001`	The device ID within the preset.
onlaunch	`Provision, Play, or Launch`	The launch status of the device within the preset.
directory	Example: `/dir1/`	The directory used by a device for recording or playback.
filename	Example: `file1`	The filename used by the device for recording or playback.
timesync	`Yes` or `No`	Time Sync (playback only).
start	`hh:mm:ss` Example: `01:30:23`	The start offset time (playback only).
stop	`hh:mm:ss` Example: `02:31:25`	The stop offset time (playback only, not applicable to VNR 100 chase-play mode).
tag	Example: `tag1`	The tag name (recording only).
streams	`a, v, w, d, r, c` Example: `a,v,d`	The streams provisioned for playback or recording.
mode	`fill, follow, or unity`	The scale mode of a VNS 104 decoder window.
audio_level	`-36 to +6`	The audio level of a VNS 104 decoder window.
mute_audio	`yes` or `no`	The mute status of a VNS 104.

Example 1 — List connection attributes of a preset named "`preset1`".

　　　　`presetget` *preset1* ⏎

　　　　Returns: {"connections":[{"source":{"device":"20001"},
　　　　"sinks":[{"device":"20001"}]}],"name":"preset1"}

presetgetlist

The `presetgetlist` command returns a list of all currently stored presets on a system.

Command line structure
`presetgetlist`

Example 1 — Return a list of all the presets on a system.

> `presetgetlist` ⏎
>
> Returns: `["Preset1","Preset2","Preset3","Preset4"]`

presetgetplayerstatus (VNM Recorder and VNR 100 only)

The `presetgetplayerstatus` command returns a list of playback status properties associated with a specified preset.

Command line structure
`presetgetplayerstatus` *name device*

Available parameters and arguments for this command are:

Parameter	Argument	Description
name	`string` Example: `preset1`	The name of the stored preset.
device	`Device serial number` Example: `50001`	The ID of a specific player device within the preset. This optional parameter can be used for filtering or search.

Returned attributes for this command are:

Attribute	Value	Description

playstate
`ts_playstate`
	`PLAY`
	`STOP`
	`PAUSE`
		File is currently playing.
		Playback is stopped.
		Playback is paused.

position_timecode `ts_position_time-code`	`hh:mm:ss:ff` Example: `01:23:22:00`	The current playback position within the recorded file in the format hh:mm:ss:ff. **NOTE:** Frames are always `00`.
filename	`String` Example: `file1_20001.0.0_r0_s0.rec`	Name of the recorded file currently loaded for playback.
directory	`String` Example: `/dir1`	Name of the directory containing the currently loaded playback file.
duration_timecode `ts_duration_time-code`	`hh:mm:ss:ff` Example: `02:23:22:00`	The total duration of the recorded file in the format: hh:mm:ss:ff. **NOTE:** Frames are always `00`.
duration `ts_duration`	`nnnn (seconds)` Example: `8602`	The total duration of the recorded file in seconds.
position `ts_position`	`nnnn (seconds)` Example: `5002`	The current playback position within the recorded file in seconds.
speed `ts_speed`	`-10.0` to `10.0` Example: `2.3`	The current playback speed (a value of `0` indicates the content is paused).
device_id	`serial number: channel` Example: `50001:2`	The device ID and channel number of the player device.

NOTE: Attributes with a ts_ prefix refer to the synchronized playback status of a preset where Time Sync mode is enabled.

Example 1 — Return the playback properties of all player devices within a preset named "preset1".

presetgetplayerstatus *preset1* ↵

Returns: [{"playstate":"PLAY","position_
timecode":"01:23:22:00",
"filename":"File1_20001.0.0_r0_ s0.rec","directory":"/dir1",
"duration_timecode":"02:23:22:00","duration":8602,
"position":5002,"speed":2.3,"device_id":"100_Device1"},
{"playstate":"PLAY","position_timecode" :"01:23:22:00",
"filename":"File2_20002.0.0_r0_s0.rec","directory"
:"/dir2","duration_timecode":"02:23:22:00","duration":8602,
"position":5002,"speed":2.3,"device_id":"100_Device2"},
{"ts_playstate":"PLAY","ts_duration_timecode":"02:23:22:00",
"ts_speed":2.3,"ts_ position":5002,"ts_position_
timecode":"01:23:22:00","device_id":"preset","ts_
duration":8602}]

Example 2 — Return the playback properties of device ID **10002** within a preset named "preset1".

presetgetplayerstatus *preset1* device=*10002* ↵

Returns: [{"playstate":"PLAY","position_timecode":"01:23:22:
00","filename":"File2_20002.0.0_r0_ s0.rec","directory":"/
dir2","duration_timecode":"02:23:22:00","duration":"8602",
"position":"5002","speed":"2.3","device_id":"100_Device2"}]

presetgetrecorderstatus (VNM Recorder and VNR 100 only)

The presetgetrecorderstatus command returns a list of recording status properties associated with a specified preset.

Command line structure
presetgetrecorderstatus *name device*

Available parameters and arguments for this command are:

Parameter	Argument	Description
name	string Example: preset1	The name of the stored preset.
device	Device serial number Example: 50001	The ID of a specific recorder device within the preset. This optional parameter can be used for filtering or search.

Returned attributes for this command are:

Attribute	Value	Description
recordstate	enable disable	Recording is currently in progress. Recording is stopped.
duration	0-99999 Example: 5002	The current length (or total length if the recording has completed) of the recorded file in seconds.
Mbytes	0-99999 Example: 5002	The current size (or total size if the recording has finished) of the recorded file in megabytes.
filename	String Example: file1_20001.0.0_r0_s0.rec	Name of the recording file.
directory	String Example: /dir1	Name of the recording directory.
device_id	serial number: channel Example: 50001:2	The device ID and channel number of the recorder device.

Example 1 — Return the recording properties of all recorder devices in "`preset1`".

> `presetgetrecorderstatus` *`preset1`* ↵

> Returns: [{"Mbytes":"1564","filename":"File1_20001.0.0_r0_
> s0.rec","directory":"/dir1","duration":"8602","recordstate":
> "disable","device_id":"10001:1"},{"Mbytes":"1564","filename":
> "File2_20002.0.0_r0_s0.rec","directory":"/dir2","duration":
> "8602","recordstate":"disable","device_id":"10002:1"}]

Example 2 — Return the recording properties of device ID **10002** within a preset named "preset1".

> `presetgetplayerstatus` *`preset1`* `device=`*`10002`* ↵

> Returns: [{"Mbytes":"1564","filename":
> "File2_20002.0.0_r0_s0.rec","directory":
> "/dir2","duration":"8602","recordstate":"disable",
> "device_id":"10002:1"}]

presetgetplayerstatusfirst (VNM Recorder and VNR 100 only)

The `presetgetrecorderstatus` command returns a list of recording status properties associated with a specified preset.

Command line structure
`presetgetplayerstatusfirst`

Available parameters and arguments for this command are:

Parameter	Argument	Description
name	`string` Example: `preset1`	The name of the stored preset.

Returned attributes for this command are:

Attribute	Value	Description
playstate ts_playstate	PLAY STOP PAUSE	File is currently playing. Playback is stopped. Playback is paused.
position_timecode ts_position_timecode	`hh:mm:ss:ff` Example: `01:23:22:00`	The current playback position within the recorded file in the format hh:mm:ss:ff. **NOTE:** Frames are always **00**.
filename	`String` Example: `file1_20001.0.0_r0_s0.rec`	Name of the recording file currently loaded for playback.
directory	`String` Example: `/dir1`	Name of the directory containing the currently loaded playback file.
duration_timecode ts_duration_timecode	`hh:mm:ss:ff` Example: `02:23:22:00`	The total duration of the recorded file in the format hh:mm:ss:ff. **NOTE:** Frames are always **00**.
duration ts_duration	`nnnn` (seconds) Example: `8602`	The total duration of the recorded file in seconds.
position ts_position	`nnnn` (seconds) Example: `5002`	The current playback position within the recorded file in seconds.
speed ts_speed	`-10.0` to `10.0` Example: `2.3`	The current playback speed (a value of **0** indicates the content is paused).
device_id	`serial number: channel` Example: `50001:2`	The device ID and channel number of the player device.

Example 1 — Return the playback properties of the first player within the preset named "`preset1`".

> `presetgetplayerstatusfirst` *preset1* ↵

> Returns: [{"playstate":"PLAY","position_timecode":"00:21:05:00" :"filename":"Xdtt1Otw1_1021374.0.0_f0_s0.rec","directory": "/IITSEC2010/afrlThurs10","duration_timecode":"00:27:51:00", "duration":1671,"position":1265,"speed":1,"device_id": "10099:1"},{"ts_playstate":"PLAY","ts_duration_timecode": "00:27:51:00","ts_speed":1,"ts_position":1265,"ts_position_ timecode":"00:21:05:00","device_id":"preset","ts_duration": 1671}]

presetgetrecorderstatusfirst (VNM Recorder and VNR 100 only)

Command line structure
`presetgetrecorderstatusfirst`

Available parameters and arguments for this command are:

Parameter	Argument	Description
name	string Example: `preset1`	The name of the stored preset.

Returned attributes for this command are:

Attribute	Value	Description
recordstate	enable disable	Recording is currently in progress. Recording is stopped.
duration	0 - 99999 Example: 5002	The current length (or total length if the recording has completed) of the recorded file in seconds.
Mbytes	0 - 99999 Example: 5002	The current size (or total size if the recording has finished) of the recorded file in seconds.
filename	String Example: `file1_20001.0.0_r0_s0.rec`	Name of the recording file.
directory	String Example: `/dir1`	Name of the recording directory.
device_id	serial number: channel Example: `50001:2`	The device ID and channel number of the player device.

Example 1 — Return the recording properties of the first recorder device the preset "`preset1`".

> `presetgetrecorderstatusfirst` *preset1* ↵

> Returns: [{"Mbytes":13,"filename":"ch1","directory":"/preset1" ,"duration":5,"recordstate":"enable","device_id":"1094:1"},{ "Mbytes":8,"filename":"ch2","directory":"/preset1","duration ":5,"recordstate":"enable","device_id":"1094:2"},{"Mbytes":20 ,"filename":"ch3","directory":"/preset1","duration":5,"record state":"enable","device_id":"1094:3"},{"Mbytes":19,"filename" :"ch4","directory":"/preset1","duration":10,"recordstate":"en able","device_id":"1094:4"},{"Mbytes":68,"filename":"ch5","di rectory":"/preset1","duration":5,"recordstate":"enable","devi ce_id":"1094:5"}]

presetlaunch

The `presetlaunch` command calls a previously stored preset and creates all associated connections between source and sink devices. If the preset includes recorder devices (VNM Recorder or VNR 100), directories and filenames are created (if they do not exist). If the preset includes player devices (VNM Recorder or VNR 100), associated files and offset times are provisioned ready for playback. In addition, players or recorders start to playback or record if the `onlaunch` status within the preset is set to play or record respectively (see `presetset`).

Command line structure
`presetlaunch` *name*

name: Name of the stored preset.

Example 1 — Launch `preset1`.

  `presetlaunch` *preset1* ⏎

presetload

The `presetload` command calls a previously stored preset and creates all of the associated connections between source and sink devices. If the preset includes recorder devices (VNM Recorder or VNR 100), directories and filenames are created (if they do not already exist).

If the preset includes player devices (VNM Recorder or VNR 100), associated folders, files and offset times are provisioned ready for playback. Optional parameters allow certain preset attributes to be changed and loaded on a one-time basis.

> **NOTE:**   Optional parameters allow certain preset attributes to be changed and loaded on a one-time basis. The changes do not overwrite the original preset.

When a VNR 100 is present in the preset, both the media and filename parameters **MUST** be set for the command to complete.

Command line structure
`presetload` *name parameters*

name: Name of the stored preset.

parameters: Optional parameters.

Available parameters and arguments for this command:

Parameter	Argument	Description
media	`directory` Example: `media=/dir1`	The directory for recording or playback.
filename	`filename` Example: `filename=file1`	The name of a file present in the specified media folder.
tag	`string` Example: `tag='session1'`	A description (tag) associated with a recording.
start	`hh:mm:ss` Example: `start=00:01:33`	The start offset associated with playback.
stop	`hh:mm:ss` Example: `stop=00:02:50`	The stop offset associated with playback.

Example 1 — Load a preset named "`preset1`".

  `presetload` *preset1* ⏎

Example 2 — Load a preset named "`preset1`", specifying directory '`dir1`'.

> `presetload` *preset1* `media=/dir1`↵

Example 3 — Load a preset named "`preset1`", specifying directory '`dir1`' and a filename '`test`'.

> `presetload` *preset1* `media=/dir1 filename=test`↵

Example 4 — Load a preset named "`preset1`", specifying directory '`dir1`', and start and stop offsets.

> `presetload` *preset1* `media=/dir1 start=00:01:33 stop=00:02:50`↵

presetplay

The `presetplay` command controls the playback speed of all currently playing player devices (VNM Recorder and VNR 100) within a preset. If `presetplay` is called while the players in a preset are paused, playback is resumed at the specified speed.

> **NOTE:** `presetplay` cannot be used to start players currently stopped. The `presetplayerstart` command is used in this instance.

Command line structure
`presetplay` *name speed*

Available parameters and arguments for this command:

Parameter	Argument	Description
name	`string` Example: `preset1`	The name of the stored preset.
speed	`-10.0` to `10.0`	Playback speed where -10.0 to 10.0 is a multiple of 1x play speed (negative values are reverse playback).

Example 1 — Setting the players in `preset1` to play at x1.5 speed forward.

> `presetplay` *preset1 1.5* ↵

Example 2 — Setting the players in `preset1` to play at x2.3 speed in reverse.

> `presetplay` *preset1 -2.3* ↵

Example 3 — Setting the players in `preset1` to play at x0.0 speed (pause).

> `presetplay` *preset1 0* ↵

presetplayerpause

The `presetplayerpause` command pauses playback on all active players in a specified preset.

Command line structure
`presetplayerpause` *name*

name: Name of the stored preset.

Example 1 — Pause all active playback in "`preset1`".

> `presetplayerpause` *preset1* ↵

presetplayerstart

The `presetplayerstart` command activates playback on all provisioned players in a specified preset. The optional `keepoffset` parameter determines whether a start and stop offset (specified in the preset) is applied.

Command line structure
`presetplayerstart` *name keepoffset*

name: Name of the stored preset.

Available parameters and arguments for this command are:

Parameter	Argument	Description
`keepoffset`	`yes` or `no` Example: `keepoffset=yes`	Applies start, stop, or both offsets specified in a preset.

Example 1 — Start all players in "`preset1`".

> `presetplayerstart` *preset1* ↵

Example 2 — Start all players in "`preset1`" while maintaining all offsets.

> `presetplayerstart` *preset1 keepoffset=yes*↵

presetplayerstop

The `presetplayerstop` command stops playback on all active players in a specified preset.

Command line structure
`presetplayerstop` *name*

name: Name of the stored preset.

Example 1 — Stop all active playback in a preset named "`preset1`".

> `presetplayerstop` *preset1* ↵

presetrecstart

The `presetrecstart` command activates recording on all provisioned recorders in a specified preset.

Command line structure
`presetrecstart` *name*

name: Name of the stored preset.

Example 1 — Start all recorders in the preset named "`preset1`".

> `presetrecstart` *preset1* ↵

presetrecstop

The `presetrecstop` command stops all active recordings on all recorders in a specified preset.

Command line structure
`presetrecstop` *name*

name: Name of the stored preset.

Example 1 — Stop all active recordings in a preset named "`preset1`".

> `presetrecstop` *preset1* ↵

presetrename

The `presetrename` command renames the specified preset to a new name.

Command line structure
`presetrename` *name newname*

name: Name of the stored preset.

newname: New preset name.

Example 1 — Rename "`preset1`" to "`preset2`".

         `presetrename` *preset1 preset2* ↵

presetset

The `presetset` command creates and stores a new preset with a specified name and attributes using a JSON string (see **HLI Responses** on page 157).

Command line structure
`presetset` *name* '{*JSON*}'

name: The name of the preset (A-Z, a-z, 0-9, dash [-], and underscore [_]).

{JSON}:   The JSON string containing details of sources, displays, and attributes.

presetstep

The `presetstep` command advances or reverses the players in a preset by approximately 250 milliseconds, referred to as a **step**. The command is issued each time a single step advance or reverse is required. The players in the preset must be paused before this command can be issued (see **presetplay** on page 194, **presetplayerpause** on page 194 and **pause (VNM Recorder and VNR 100 devices only)** on page 180).

> **NOTE:** This command applies to video, data, and whiteboard channels.

Command line structure
`presetstep` *name direction*

Available parameters and arguments for this command are:

Parameter	Argument	Description
name	`string` Example: `preset1`	The name of the stored preset.
direction	Any positive or negative integer. Example: `-1` or `1`	A positive integer is a single step forward, a negative integer is a single reverse step.

Example 1 — Step the players in the preset named "`preset1`" by one step in a forward direction.

         `presetstep` *preset1 1* ↵

Example 2 — Step the players in the preset named "`preset1`" by one step in a reverse direction.

         `presetstep` *preset1 -1* ↵

Example 3 — Step the players in the preset named "`preset1`" by two steps in a reverse direction.

         `presetstep` *preset1 -1* ↵
         Returns: "okay"

         `presetstep` *preset1 -1* ↵
         Returns: "okay"

Example 4 — Stepping the currently running players in "preset1" by one frame in a reverse direction.

> presetplay *preset1 0* ↵
> Returns: "okay"

> presetstep *preset1 -1* ↵
> Returns: "okay"

presetseek

The presetseek command allows the user to seek a specific point in the files of the currently playing recorders in a preset.

> **NOTE:** Playback automatically continues from the specified time. No additional play commands are required to continue the playback.

Command line structure
presetseek *name time*

name: Name of the stored preset.

time: Time value in hh:mm:ss:dd (must be within the maximum time of the file)

Example 1 — Search all channels of all recorders in the preset named "preset1" to 00:03:30:00.

> presetseek *preset1 00:03:30:00*↵
> Returns: "okay"

presetunlaunch

The presetunlaunch command breaks all connections to and from devices associated with a specific preset.

> **NOTE:** The command does not stop file playback on associated player devices (VNM Recorder or VNR 100).

Command line structure
presetunlaunch *name*

name: Name of the stored preset.

Example 1 — Break all connections specific to "preset1".

> presetunlaunch *preset1* ↵

Remote Communication and Control Using SIS Commands

The VNM EC 201 can be remotely connected via a host computer or other device (such as a control system) to the front panel USB Config port. That allows the VNM EC 201 to be reset and provides limited configuration using Simple Instruction Set (SIS) commands. SIS commands are executed using the Extron DataViewer program, found at **www.extron.com**.

USB port details: The Extron USB driver must be installed before use.

Front Panel Configuration Port

The mini type B USB port is located on the front panel (see **Front Panel Features** on page 6). It connects to a host computer for configuration using SIS commands with DataViewer, available at **www.extron.com**.

To connect the EC 201 to a host computer:

> **NOTE:** If an Extron USB device has never been connected to the host computer, prior to connecting the EC 201 config (USB) port for the first time, you must install and activate the USB driver. The simplest way to do this is to install **DataViewer** (see page 202).

1. After the USB driver is loaded, connect a USB A to mini B cable between the Config port on the EC 201 front panel and a USB port of the PC.

   If this is the first time an Extron product is connected to the PC, the `Found New Hardware Wizard` dialog opens. The first screen offers to connect to Windows Update to search the web for the appropriate driver. This is not necessary if the USB driver is already on your PC (see the NOTE above).

Figure 160. Found New Hardware Wizard

   Select `No, not this time` if the driver is already on the PC (see figure 160, ❶).

2. Click `Next` (❷).
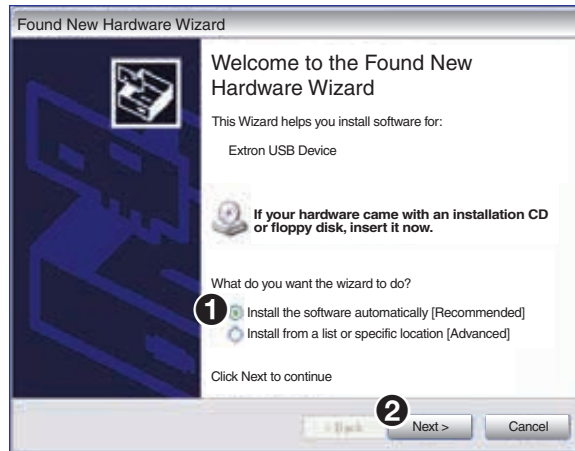
   The following dialog box opens:

Figure 161. Install the Software Automatically

3. Select **Install the software automatically (Recommended)** (see figure 161, ❶).

> **NOTE:** You do not need to insert an installation disc.

4. Click **Next** (❷).

   The PC locates the driver and installs it.

5. When the `Completed` dialog opens, click **Finish** to close the wizard.

> **NOTE:** The wizard opens only on the first occasion you connect the EC 201 to a USB port. The wizard reopens only if you connect the EC 201 to a different USB port or if you connect a different piece of equipment, requiring a different driver, to the same USB port.

6. Configure the EC 201 as required.

Verbose Mode

Telnet connections can be used to monitor for changes that occur, such as SIS commands from other Telnet sockets or serial port changes. For a Telnet session to receive change notices, the Telnet session must be in verbose mode 1 or 3. In verbose mode 1 or 3, the Telnet socket reports changes in messages that resemble SIS command responses.

Host-to-device Communications

The EC 201 accepts SIS (Simple Instruction Set) commands through the front panel Configuration port (see **Front Panel Features** on page 6). SIS commands consist of one or more characters per command field. They do not require special characters to begin or end the command character sequence. Each response to an SIS command ends with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

EC 201-initiated Messages

The EC 201 initiates messages under specific conditions. No response is required from the host. The EC 201-initiated messages are listed here (underlined).

↵© Copyright 2019, Extron Electronics, Enterprise Controller 201, V*n.nn*, 60—*xxxx*-01↵
Day, DD MMM YYYY HH:MM:SS↵

V*n.nn* is the firmware version number.

Error Responses

When the EC 201 is unable to execute the command, it returns an error response to the host. The error response is `E10` to indicate an unrecognized command.

Using the Command and Response Tables

The **Command and Response Table** on the next page. Symbols used in the table represent variables in the command and response fields. Command and response examples are shown throughout the table. The SIS commands are not case sensitive. The ASCII to HEX conversion table below is for use with the command and response table.

ASCII to Hex Conversion Table																			Esc	1B	CR	ØD	LF	ØA
Space →	20	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	l	7C	}	7D	~	7E	DEL	7F

Figure 162. ASCII to Hex Conversion Table

Symbol definitions

↵ = CR/LF (carriage return/line feed)

← or ¦ = Carriage return (no line feed, hex `0`D)

• = Space

Esc = Escape

Command and Response Table

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Information requests			
Read IP Address	`Esc` CI ←	xxx.xxx.xxx.xxx↵	Dotted decimal notation
Reset Admin password	`Esc` •CA←	Ipa•↵	Returns admin to: User name: admin Password: admin
Resets			
Reset IP (mode 4 reset)	`Esc` 1ZQQQ←	Zpq1↵	Returns IP Address, Subnet Mask, Gateway, and MTU to default values (see below). User configuration is not changed.
Absolute reset (mode 5 reset)	`Esc` ZQQQ←	Zpq↵	Returns the unit to default values including the IP address, Subnet Mask, Gateway, and MTU (see below).

> **NOTE:** The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords convert to the default, which is **admin** for the **admin** and no password for the **user**.

Absolute reset and Reset IP default values			
IP Address:	192.268.254.254		
Subnet Mask	255.255.255.0		
Gateway:	192.168.254.1		
MTU:	1500		
Admin Password:	admin		
User Password:	none		
Role:	Singleton		
Time Enable Clock Syncronization:	Unchecked		
Time Sources:	Empty		
Time Zone:	UTC		
Protocol:	Unicast		
Multicast Address Scheme:	default		
Clean Switch:	Checked		
Secure Mode:	Unchecked		
Controller Address:	192.168.254.254		
Certificate:	Default as shown in help file		
All device .xml files:	Removed		
All presets:	Removed		

DataViewer

DataViewer is an enhanced terminal emulation program that facilitates analysis of RS-232, USB, and TCP/IP communication with Extron devices. The software allows users to send commands to a device and view the responses in ASCII or hexadecimal format. Command and response logs can be saved in text or HTML format.

Dataviewer is available at **www.extron.com**. Download the installation file and load the program on the PC connected to the EC 201.

Start the Dataviewer program

1. Click the desktop icon.

2. The `Communications Setup` dialog box opens. Select the communications tab. Select the **USB** tab (see figure 163, ❶) when using the front panel config port.
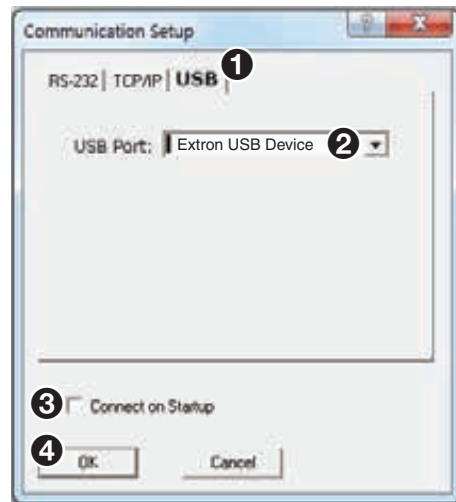
Figure 163. Communications Dialogs

3. If USB is selected, choose **Extron USB Device** in the drop-down window (❷).

> **NOTE:**   To automatically connect to the EC 201, select **Connect on startup** (❸).

4. Click **OK** (❹) to connect to the EC 201 and start using the program.

You are now ready to begin entering commands.

Open the DataViewer help file from the toolbar for more information on the program.

Sending commands using Dataviewer

1. Connect the control PC to the EC 201 using the front panel Config Port.

2. Start DataViewer (see **Start the Dataviewer program** on the previous page) and follow the steps to connect to the EC 201 via USB.

3. Click **OK**. The `Communication Setup` dialog closes.

4. The main `DataViewer` dialog opens and the EC 201 responds with a copyright statement containing the model number, part number, and current firmware version of the connected EC 201, along with the date (see figure 164, ❷).
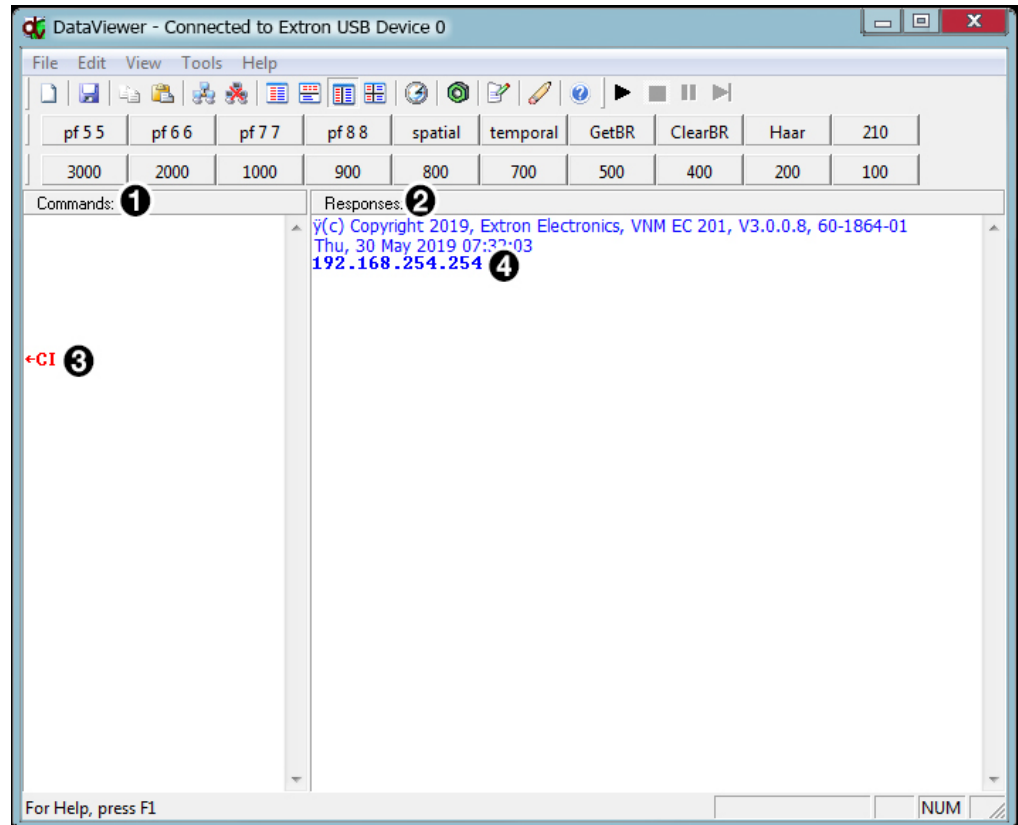

Figure 164. Enter Commands and View Responses

5. Use the **Commands** field to enter SIS commands (❶). View the responses in the **Responses** field (❷).

   For example, in the **Commands** field (❸), enter ←CI, the command to display the IP address. The **Responses** field (❹) returns the IP address of the connection.

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

Asia:
Extron Asia Pte Ltd
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Japan:
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Middle East:
Extron Middle East
Dubai Airport Free Zone
F13, PO Box 293666
United Arab Emirates, Dubai

Africa:
Extron South Africa
South Tower
160 Jan Smuts Avenue
Rosebank 2196, South Africa

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

> **NOTE:** If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.
>
> | | | | |
> |---|---|---|---|
> | **USA**: | 714.491.1500 or 800.633.9876 | **Asia**: | 65.6383.4400 |
> | **Europe:** | 31.33.453.4040 or 800.3987.6673 | **Japan**: | 81.3.3511.7655 |
> | **Africa:** | 27.11.447.6162 | **Middle East**: | 971.4.299.1800 |

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.