

VN-Matrix® 250 Series


VNE 250 Encoder and VND 250 Decoder




Extron

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Safety Instructions • English


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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.

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In this user guide, the following are used:

⚠ WARNING: Potential risk of severe injury or death.
AVERTISSEMENT : Risque potentiel de blessure grave ou de mort.

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:

```
^ARMerge Scene,,Op1 scene 1,1 ^B 51 ^W ^C  
[ 01 ] R 0004 00300 00400 00800 00600 [ 02 ] 35 [ 17 ] [ 03 ]  
[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 “O” represents the capital letter “o”.

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

```
Reply from 208.132.180.48: 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 www.extron.com/technology/glossary.aspx.

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Introduction

This section provides an overview of the user guide and describes the Extron VN-Matrix (VNM) 250 series. Topics that are covered include:

- [About this Guide](#)
- [About the VNM 250](#)
- [VNM 250 System Controller](#)
- [Transport Protocols Used for Streaming](#)
- [Definitions](#)
- [Features](#)

About this Guide

The VN-Matrix 250 (VNM 250) series consists of the VNE 250 encoder and the VND 250 decoder. This guide contains installation, configuration, and operating information for both the encoder and the decoder.

In this guide:

- The terms "VNM 250" or "VNM" can refer to either the VND 250 or VNE 250.
- The term "encoder" refers specifically to the VNE 250 encoder.
- The term "decoder" refers specifically to the VND 250 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.

About the VNM 250

The VNE 250 distributes video, audio, and data input across an IP network to one or more VND 250 decoders. Transport across the network must be coordinated by a control device. For a small system (ten devices or fewer connected to the network) the controller can be either a VNM 250 encoder or decoder. For larger systems, a VNM Enterprise Controller is required.

The VNE 250 encodes video, audio, and data inputs into PURE3 data streams for transport across a local area or wide area network. Elsewhere on the network, one or more VND 250 units decode the stream.

VNE 250 inputs can include:

- Analog (VGA) video
- Digital (HDMI) video
- Analog audio
- Digital audio that is contained in an HDMI signal
- Serial (RS-232) and UDP data
- USB connections for remote mouse and keyboard

The individual video, audio, and data streams are synchronized and treated as a single logical stream.

The VNM 250 series also supports a reverse audio channel for collaborative applications where 2-way communication is required.

The VND 250 video output is available only in digital format. It can be configured to display at the same resolution and refresh rate as the encoder input or it can be scaled to match the requirements of the display attached to the decoder.

The decoder supports both digital audio, analog audio, or both. The audio output is independent of the encoder audio source.

User Datagram Protocol (UDP) network data originating from an external source is streamed along with the video and audio content to the appropriate decoder, where it is extracted for onward processing.

RS-232 pass-through data transport is full duplex. It can originate at either the encoder or decoder and may be sent to multiple destinations. It passes through the system unchanged and may not be recorded.

Figure 1 shows a typical application for the VNM 250.

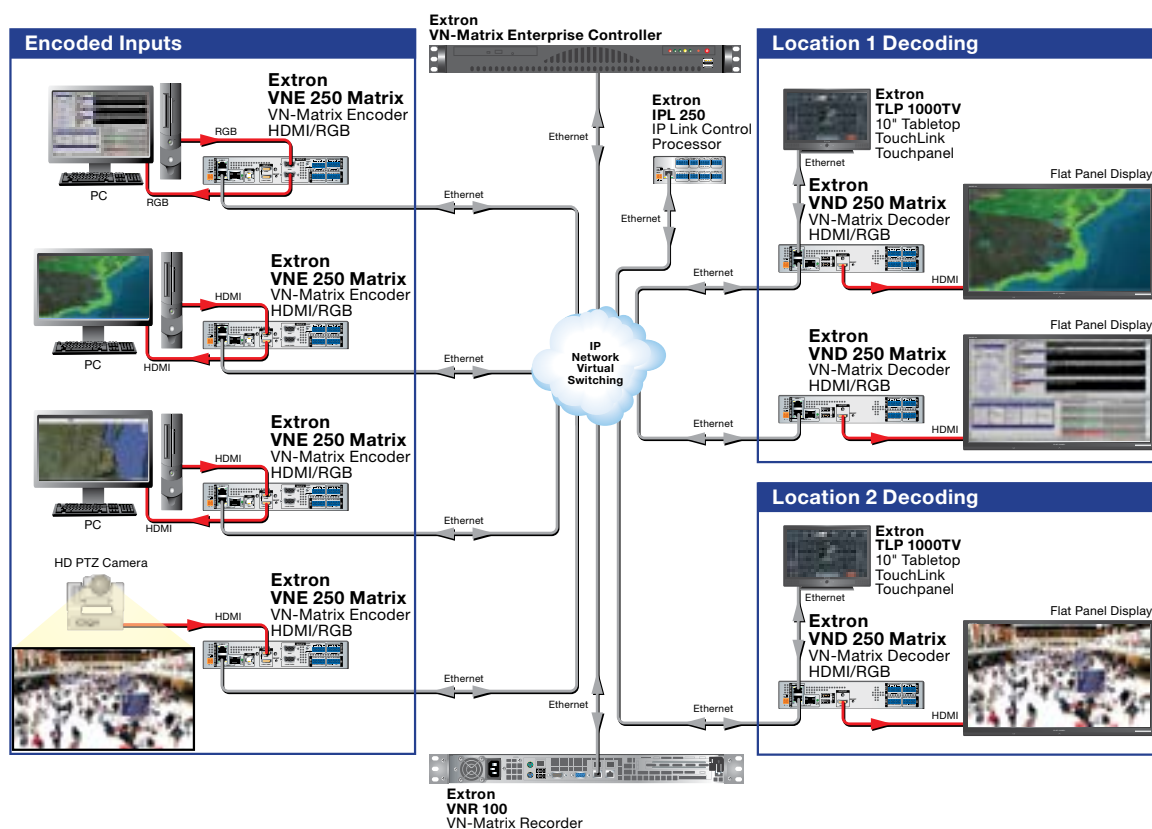


Figure 1. A Typical VNM 250 Application

NOTE: In the setup shown in figure 1, an Extron touchpanel is connected to the LAN-1 port of the VND 250.

Once the touchpanel is connected to the LAN-1 port of VND 250, the IP Link controller can receive commands from the touchpanel but can no longer update the touchpanel configuration.

This setup requires all configuration of the IP Link controller and the touchpanel to be completed before the touchpanel is connected to the VND 250.

VNM 250 System Controller

All matrix systems require one device that acts as the system controller. For small systems (ten devices or fewer), this can be either a VNE 250 or VND 250. For larger systems, a VN-Matrix Enterprise Controller must be used.

Systems Controlled by VNM Enterprise Controller	Systems Controlled by VNM 250 Device
The VNM Enterprise Controller is able to control all VN-Matrix systems (large and small) but is required for large systems (more than 10 devices).	A VNM 250 device can control small systems (10 devices or fewer). It is less effective as the system size increases.
The system is controlled through a powerful web-based user interface served from the Enterprise Controller. An HLI interface is also provided for control via an external control system.	The system is controlled through a more limited web-based user interface served from the VNM 250 controller device.
Supports all VN-Matrix devices, including recorders.	Supports VNM 250 encoders and decoders and PCs running the VNS 104 software decoder. Does not support recorders.

NOTES:

- A small system that includes a VNM 250 device must be controlled by either a VNM Enterprise Controller or a VNM 250 device.
- If an incompatible VN-Matrix device is added to a small system controlled by a VNM 250 device, the controller is unable to detect or control that device.

Transport Protocols Used for Streaming

The source data from a VN-Matrix encoder can be distributed to multiple displays/decoders (one-to-many) or to a single display/decoder (point-to-point). A previously recorded stream can be distributed in the same way and can 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:

- See [Multicast RTP — An Overview](#) on page 4.
- See [Unicast RTP — An Overview](#) on page 5.
- See [TCP — An Overview](#) on page 5.

Multicast RTP — An Overview

Multicast RTP allows a source to be displayed on multiple displays. This method uses a real-time variation of UDP called RTP (Real-time Transport Protocol).

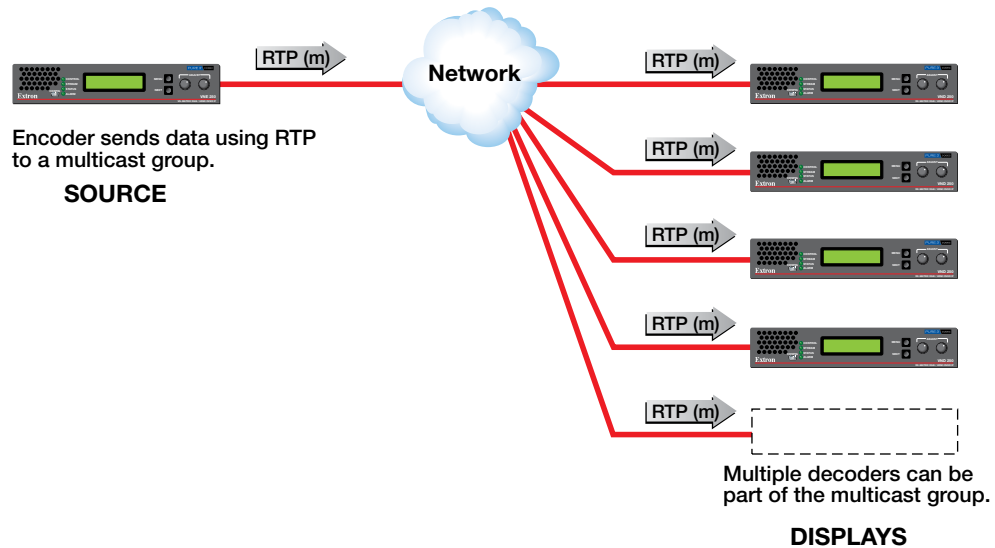


Figure 2. Multicast RTP Streaming

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.

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 VNM 250 devices carefully manage the data stream to minimize any image disruption.

Unicast RTP – An Overview

Similar to multicast RTP, this method uses a real-time variation of UDP protocol, called unicast RTP. This method can be 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 use up 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.

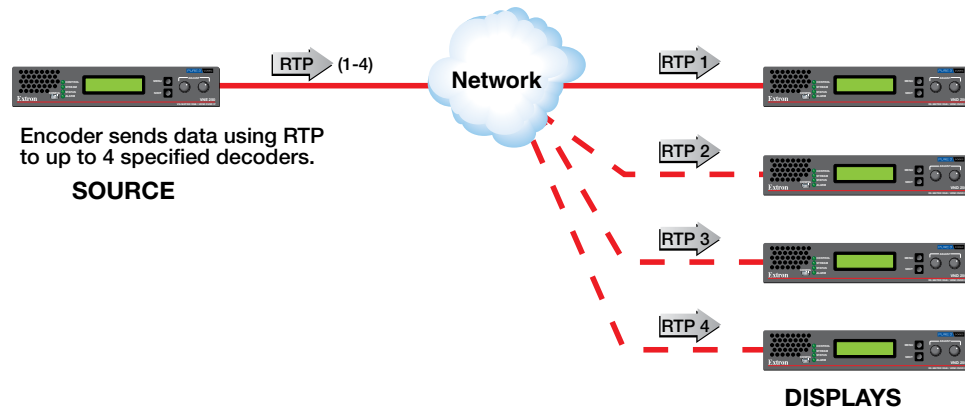


Figure 3. Unicast RTP Streaming

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 VNM 250 devices carefully manage the data stream to minimize image disruption.

TCP – An Overview

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

TCP is a connection-based protocol and, therefore, data is guaranteed to be delivered. However, in the event of excessive network traffic, delivery can be delayed which impacts real-time performance. Therefore, TCP transport should be avoided for streaming applications.

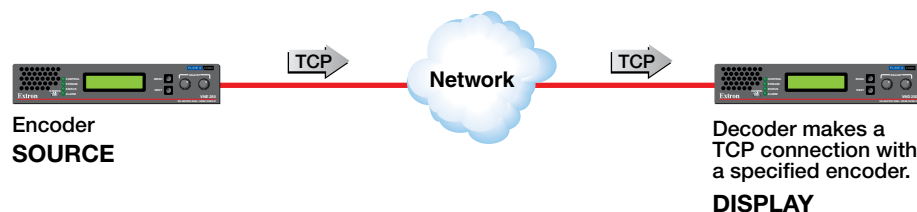


Figure 4. TCP Streaming

Definitions

- **PURE3** — is 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.
 - PURE3 streams always contain video or graphic elements.
 - PURE3 streams can also contain audio and data content that is associated with the video and graphic elements.
- **Media (stream)** — refers to 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.
- **Device license** — refers to the number of licensed features that are available on a device within a VN-Matrix system. All devices contain a license that offers a default level of functionality. Device licenses cannot be modified.
- **Controller license** — refers to the license that is set on the device designated as the system controller. The controller license enables the use of VN-Matrix software decoders. Controller licenses can be modified to suit changing system requirements.
- **UDP data** — refers to the transfer of serial data between an encoder and a decoder. Data input 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.
- **High-Level Interface (HLI)** — is the command protocol that is used to communicate between the VNM Enterprise Controller and an external control system.
- **Display Monitor Timings (DMT)** — is a list of VESA standard pre-defined timings which are commonly used within the computer industry.
- **Coordinated Video Timings (CVT)** — is the newest VESA standard for generating display timings (released on March 2003).
- **Generalized Timing Formula (GTF)** — is a method of generating industry standard timings used by a wide variety of display products.
- **Simple Instruction Set (SIS)** — **SIS Commands** (see page 126) consist of strings (one or more ASCII characters per command field) that are used to communicate between a control device and an Extron product.

Features

- **Stream at native resolutions up to 1920x1200 and 2048x1080** — compatible with signals used in high-resolution display applications.
- **Low latency streaming** — 35 ms encode and 35 ms decode — supports natural interaction, bidirectional communication, or remote device control in real-time operating environments.
- **SFP port for use with optical Ethernet transceivers** — provides the option to use an optical Ethernet network interface to optically isolate a source or eliminate electromagnetic emissions in secure applications.
- **Extensive bit rate management** — uses compression and bit rate management controls to tune image quality and bit rate to fit a variety of application and network requirements.
- **High immunity to network errors** — AV streaming maintains reliable, high-quality imagery, concealing errors even during heavy packet loss.

- **Unicast or multicast streaming** — supports scalability and compatibility with different network operating conditions.
- **PURE3 Codec** — low-latency, visually lossless compression offering efficient bit rates, and high immunity to network errors for streaming very high quality video with low delay over IP networks.
- **Synchronization of multiple streams of audio, video, or both** — audio and video timing is maintained from a source across encoders preserving lip sync quality and supporting multi-source streaming applications.
- **Decoder genlock connection for synchronized decoding** — supports synchronized decoding of source streams across multiple VND 250 decoders.
- **EDID emulation** — provides selectable resolutions and refresh rates, ensuring optimal resolution and format between video sources, encoders or decoders, and displays.
- **Auto-Image setup** — when activated, the unit automatically detects the resolution of the incoming video signal and sets the total pixels, active pixels, and active lines, as well as the horizontal and vertical starting points. This can save time and effort in setting up a newly connected source, particularly in presentation environments where the input is not connected to a fixed source, but instead goes to an open connection for a presenter's laptop.
- **Decode at native resolution or scale to match display resolution** — configure decoders to output the original source resolution or to scale incoming streams to match the display resolution and maintain clean switches when new source streams are selected.
- **Aspect ratio control** — the aspect ratio of the decoder output can be controlled by selecting a FILL mode, which provides a full screen output, or a FOLLOW mode, which preserves the original aspect ratio of the original source signal.
- **HDMI compliant** — both the encoder and decoder support RGB and YCrCb source formats.
- **HDCP compliant streaming** — supports streaming of HDCP-encrypted signals commonly used in AV environments.
- **Key Minder continuously verifies HDCP compliance** — authenticates and maintains continuous HDCP encryption from sources to encoders and decoders to displays ensuring reliable streaming of HDCP compliant displays.
- **HDCP Visual Confirmation provides a green signal when encrypted content is sent to a non-compliant display** — a full-screen green signal is sent when HDCP-encrypted content is transmitted to a non-HDCP compliant display, providing immediate visual confirmation that protected content cannot be viewed on the display.
- **Audio** — the VNM 250 incorporates:
 - Bidirectional audio streaming. Two-way audio streaming supports bidirectional audio communication between encoders and decoders.
 - HDMI embedded audio and analog stereo encoder inputs.
 - HDMI audio embedding or de-embedding by decoder. Audio signals can be embedded onto the HDMI output signal or extracted to the analog stereo output.
 - Audio breakaway streaming. Stream audio to decoders independently of associated video sources. (This feature requires a VNM Enterprise Controller.)
- **Alarm relay** — provides contact closure notice of warnings or alarms to control systems for proactive system monitoring and fault resolution.
- **Front panel LCD interface, buttons, and rotary encoders** — provide access and control over device status and system data, simplifying system setup and operation.

- **Front panel LEDs** — offers quick visual indication of device, system, or streaming status to simplify commissioning activities and troubleshooting.
- **VLAN tagging** — simplifies management of encoders and decoders, making management and operation on multi-purpose networks simple.
- **Local Ethernet control port** — offers the flexibility to connect a control device to the VN-Matrix 250 unit simplifying network cabling for the streaming system.
- **USB connector for configuration** — a USB mini-B port on the front panel can be connected to a local PC for low level configuration.
- **USB keyboard and mouse streaming** — rear panel USB connections are provided to allow for KVM type collaboration between an encoder and decoder pair. The encoder USB port allows connection to a local PC, while the decoder USB ports allow connection of a mouse and keyboard to remotely control a PC connected to the encoder.
- **On-screen display** — aids in identifying system connections and simplifies troubleshooting and programming activities.
- **System management with VNM Enterprise Controller** — simplifies management and control of systems with many VN-Matrix devices.
- **Compatible and interoperable with VN-Matrix 200 and VN-Matrix 225 models** — preserves the value of prior investment in VN-Matrix products.
- **Serial RS-232 data streaming** — manage RS-232 serially-controlled devices across VN-Matrix 250 connections.
- **Smart power management for encoder, decoder, source, and display operation** — configure encoder, decoder, or display to manage operation and sleep mode for continuous operation or energy management, lowering heat, and saving energy and operating costs.

Installation Overview

This section provides an overview of the installation process. To set up the VNE 250 and VND 250, follow these instructions and the instructions referenced by the links provided:

1. If required, install small form-factor pluggable (SFP) connectors in the LAN 2 ports (see [Streaming network \(LAN 2\)](#) on page 17).
2. Select a suitable location and mount the VNM 250 devices (see [Mounting](#) on page 130). Depending on your system, there may be multiple locations and multiple units at each location.
3. Power on the VNM 250 devices by connecting the provided power supplies (see [Power](#) on page 14). Do not connect the devices to a network.
4. Decide which device is the system controller. For large systems (more than 10 devices), you must use a VN-Matrix Enterprise Controller. To configure the system using the Enterprise Controller, see the *VN-Matrix Enterprise Controller User Guide* at www.extron.com.

For smaller systems, you can use the Enterprise Controller or a VNM 250 unit as the controller (see [Low Level Device Configuration](#) on page 25).

5. Connect the Control connector of the rear panel Coms port (three poles of the 5-pole captive screw connector) to a control computer. Use DataViewer to configure the IP addresses for both the control port and streaming port, the subnet mask, and gateway for each unit (see [Low Level Device Configuration](#)).

ATTENTION:

- Prepare thoroughly before connecting or configuring the VNM 250 for an existing network. Contact your network administrator to ensure you have the correct network information for each device that is being added to the network. Incorrect connection or configuration may disrupt the network.
- Préparez minutieusement avant toute connexion ou configuration le VNM 250 pour un réseau existant. Contactez votre administrateur réseau pour vous assurer que vous détenez les bonnes informations relatives au réseau pour chaque appareil relié au réseau. Une connexion ou configuration incorrecte est susceptible de perturber le réseau.

NOTE: Extron recommends configuring the IP addresses through the Coms port on the rear panel. Alternatively, it is possible to use SIS commands (through the USB port on the front panel) or the front panel menu.

6. Connect all the VNM 250 units to the network (see [Network Connections](#) on page 16).

NOTES:

- Ensure that the LAN 2 port is connected to the designated streaming network.
- The control port is used with IP Link or third-party control devices. A control port connection is not required for normal operation of the VNM 250 unit.

7. Connect the video sources to the encoders and display equipment to the decoders (see [Video Connections](#) on page 21).
8. Connect the audio sources to the encoders and the audio outputs to the decoders. If required, connect the reverse audio input to the decoder and the reverse audio output to the encoder (see [Audio Connections](#) on page 22).

NOTE: The reverse audio feature allows users at the decoder site to communicate with users at the encoder site.

9. If required, connect USB cables to allow [KVM function](#) (see page 18). This allows users at the decoder site to take control of the keyboard and mouse of the source computer at the encoder site.
10. If required, connect the encoder loop-through video (see [Video Connections](#)) and audio (see [Audio Connections](#)) outputs.
11. If required, set up [Genlock](#) connections (see page 20) to synchronize the video streams to multiple displays.
12. Use a PC or laptop to access the web interface served by the controller.
For larger systems, see the *VN-Matrix Enterprise Controller User Guide*. For smaller systems, see [VNM 250 GUI Overview](#) on page 34.
13. Configure the video and audio input and output properties for all the devices, using the appropriate GUI web interface.

NOTE: Extron recommends configuring the audio and video connections through the GUI web interface. Alternatively, it is possible to use the front panel menu.

Front Panels

This section describes

- [VNM 250 Front Panels](#)
- [Status Information](#)
- [Unit Identify Mode](#)

VNM 250 Front Panels

The front panels of both the VNE 250 and the VND 250 are identical apart from the product name on the silk screen. The VNE 250 is shown below:

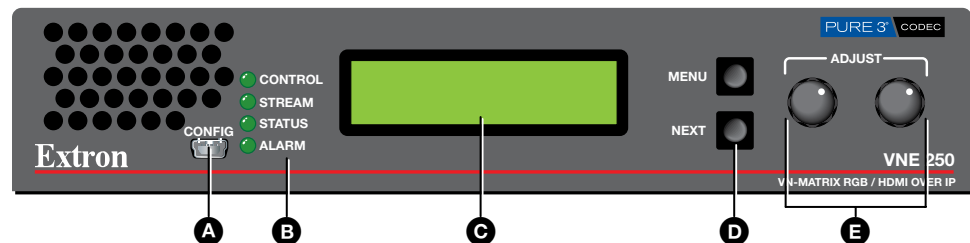


Figure 5. VNE 250 Front Panel

- A Config port** — connect this USB mini type B port to a control PC for low level configuration using SIS commands.
- B Unit status LEDs** — provide status information about the unit (see [Status Information](#) on the next page).
- C LCD display** — A 2 x 16 character LCD display provides status feedback and allows configuration through the front panel menu (see [Front Panel Menu Configuration](#) on page 92).
- D Menu and Next buttons** — use these buttons to move through different levels of the front panel menu.
- E Rotary encoders** — use these rotary encoders to select values from the front panel menu choices.

Status Information

Name	Color	Function		
Control	Orange	Indicates the status of the control network port: Fully lit or flashing intermittently — control data is being transmitted or received by the port. Unlit — no data or no network connection detected.		
Stream	Orange	Indicates the status of the active network port (streaming): Fully lit or flashing intermittently — system control or source data is being transmitted or received by the port. Unlit — no data or no network connection detected.		
Status	Green	Indicates the status of the VNE 250 or VND 250		
		Condition	Encoder (source)	Decoder (display)
		Unlit	No source input detected.	No stream being received.
		Flashing	Source being streamed.	Stream being received.
		Fully Lit	Source present but not being streamed (for example, the unit is currently disabled or in standby mode).	N/A
Alarm	Red	Fully lit — indicates that a critical alarm has occurred.		
		Flashing — indicates an over-temperature condition.		

For complete information, see [Alarm Types](#) on page 112.

Unit Identify Mode

In addition to the standard indicator modes described above, there is a Unit Identify mode, for troubleshooting. In large systems, with multiple units in a rack and multiple rack locations, unit identification is not always easy. The Unit Identify mode causes the front panel display back light to illuminate and flash and makes it easy to match the physical unit in a rack with the virtual unit displayed in the VN-Matrix Enterprise Controller graphical user interface (GUI).

The mode can only be triggered by a command from the Enterprise Controller. It is not available in smaller systems where a VNM 250 device is used as a controller.

Rear Panel and Connections

This section describes the VNE 250 and VND 250 rear panels and the connectors:

- [VNE 250 Rear Panel](#)
- [VND 250 Rear Panel](#)
- [Connections](#)

VNE 250 Rear Panel

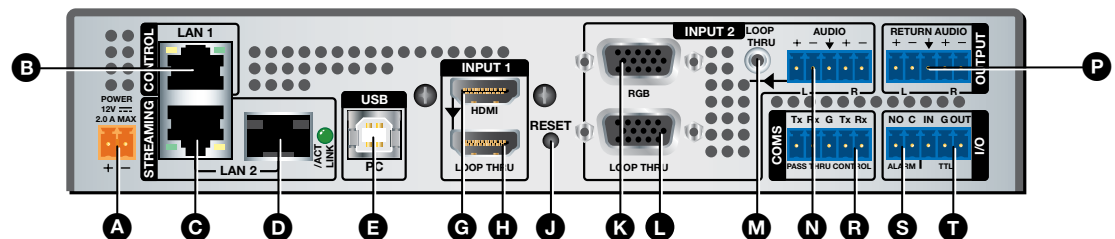


Figure 6. VNE 250 Rear Panel

VND 250 Rear Panel

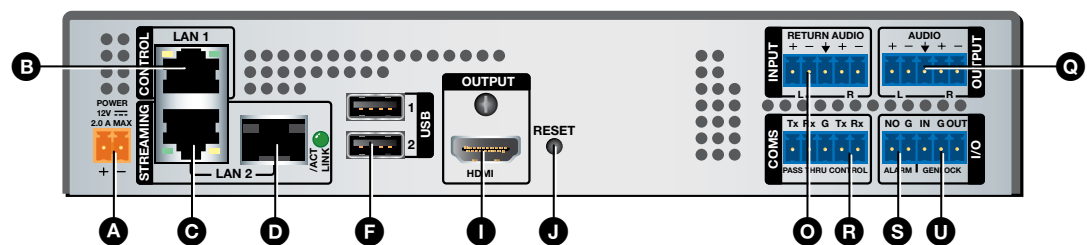


Figure 7. VND 250 Rear Panel

- | | | |
|---|--|---|
| A Power (see page 14) | H HDMI Loop-through (see page 21) | O Return Audio Input (see page 22) |
| B Control Network RJ-45 connector (see page 17) | I HDMI Output (see page 21) | P Return Audio Output (see page 22) |
| C Streaming Network RJ-45 connector (see page 17) | J Reset button (see page 22) | Q Program Audio Output (see page 22) |
| D Streaming Network SFP connector (see page 17) | K Analog Video Input (see page 21) | R Coms (see page 19) |
| E Type B USB Port (see page 18) | L Analog Video Loop-through (see page 21) | S Alarm Relay (see page 20) |
| F Type A USB Port (see page 18) | M Program Audio Loop-through (see page 22) | T TTL (not implemented) (see page 20) |
| G HDMI Input (see page 21) | N Program Audio Input (see page 22) | U Genlock (see page 20) |

Connections

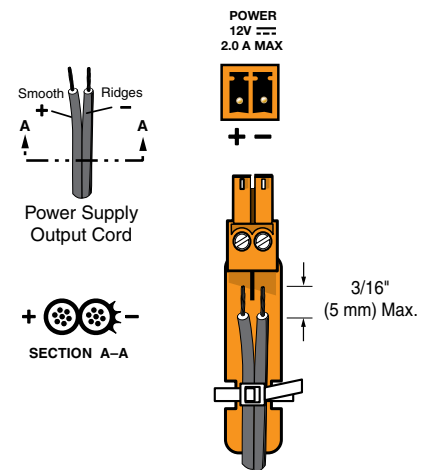
Power

The provided 12 VDC, 24 watt power supply connects to a 2-pole, 3.5 mm captive screw receptacle on the rear panel of the encoder (see [figure 6](#), [A](#) on page 13), or decoder (see [figure 7](#), [A](#) on page 13).

1. Connect the captive screw connector from the power supply to the power receptacle.

CAUTION: The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

ATTENTION : Les deux cordons d'alimentation doivent être tenus à l'écart l'un de l'autre quand l'alimentation est branchée. Couper l'alimentation avant de faire l'installation électrique.



2. Connect the AC power cord of the power supply unit to a 110 or 220 VAC electrical source.

If it is necessary to wire the captive screw connector, ensure the polarity of the wires is correct (see the figure to the right).

Ensure the wires are stripped correctly (see the attention notifications below and on the next page).

ATTENTION:

- Always use a power supply provided by or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.
- Utilisez toujours une source d'alimentation fournie ou recommandée par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute certification de conformité réglementaire, et peut endommager la source d'alimentation et l'unité.
- Extron power supplies are certified to UL/CSA 60950-1 and are classified as LPS (Limited Power Source). Use of a non-LPS or unlisted power supply will void all regulatory compliance certification.
- Les sources d'alimentation Extron sont qualifiées UL/CSA 60950-1 et sont classées LPS (Limited Power Source). L'utilisation d'une source d'alimentation non-listée ou non-listée LPS annulera toute certification de conformité réglementaire.
- If not provided with a power supply, this product is intended to be supplied by a UL Listed power source marked "Class 2" or "LPS" and rated output 12Vdc, minimum 2.0 A minimum.
- Si le produit n'est pas fourni avec une source d'alimentation, il doit être alimenté par une source d'alimentation certifiée UL de classe 2 ou LPS, avec une tension nominale 12 Vcc, 2 A minimum.
- The power supply provided must only be used with a single VNM 250 device. Never use it to power multiple devices.
- La source d'alimentation fournie doit être utilisée uniquement avec un seul appareil VNM 250. Veuillez ne jamais l'utiliser pour alimenter plusieurs appareils.

ATTENTION:

- These power supplies are not suitable for use in air handling spaces or in wall cavities. The power supply is to be located within the same vicinity as the Extron AV processing equipment in an ordinary location, Pollution Degree 2, secured to the equipment rack within the dedicated closet, podium, or desk.
 - Ces sources d'alimentation ne sont pas appropriées pour une utilisation dans les espaces d'aération ou dans les cavités murales. Cette source d'alimentation doit être située à proximité de l'équipement audiovisuel d'Extron, dans un endroit ordinaire avec une pollution IEC 1010 degré 2, et fixé à un équipement de rack au sein d'un placard, d'une estrade ou d'un bureau qui lui est dédié.
-
- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16.
 - Cette installation doit toujours être en accord avec les mesures qui s'applique au National Electrical Code ANSI/NFPA 70, article 725, et au Canadian Electrical Code, partie 1, section 16.
-
- The power supply shall not be permanently fixed to building structure or similar structure.
 - La source d'alimentation ne devra pas être fixée de façon permanente à une structure de bâtiment ou à une structure similaire.
-
- If a power strip is used, for example within rack-mounted installations, ensure that the current rating for the power strip and the supply is sufficient for all the equipment within the rack.
 - Si une multiprise est utilisée, pour des installations montées en rack, à titre d'exemple, assurez-vous que le courant nominal pour la multiprise et la source d'alimentation soit suffisant pour tous les équipements du rack.
-
- The length of the exposed wires in the stripping process is critical. The ideal length is 3/16 inch (5 mm). If it is any longer, the exposed wires may touch, causing a short circuit between them. If it is any shorter, the wires can be easily pulled out even if tightly fastened by the captive screws.
 - La longueur des câbles exposés est primordiale lorsque l'on entreprend de les dénuder. La longueur idéale est de 5 mm (3/16 inches). S'ils sont trop longs, les câbles exposés pourraient se toucher et provoquer un court-circuit. S'ils sont trop courts, ils peuvent être tirés facilement, même s'ils sont correctement serrés par les borniers à vis.
-
- Do not tin the wires. Tinned wires are not as secure in the captive screw terminals and could pull out.
 - Ne pas étamer les câbles. Les câbles étamés ne sont pas aussi bien fixés dans les borniers à vis et pourraient s'arracher.

Network Connections

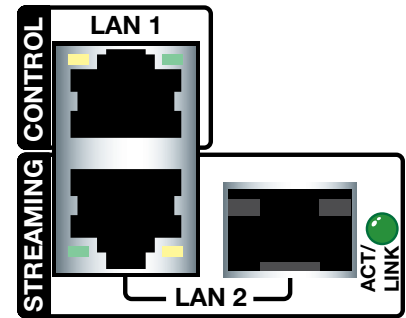
See [figure 6](#) or [figure 7](#), [B](#), [C](#), and [D](#).

The VNM 250 series units have two separate network connectors: one for the **Control network (LAN 1)** (see page 17) and the other for the **Streaming network (LAN 2)** (see page 17). Each port has its own IP address.

The control port (LAN 1) is not required for normal operation. When necessary, this port can be used to enable control by a third-party control system.

The streaming port is the primary network connection.

All media and device communication is delivered over this network link. To connect to the streaming network, use either the rear panel LAN 2 RJ-45 connector or SFP (fiber optic) connector.



NOTE: By default, only the LAN 2 RJ-45 connector is present and available for use. If an SFP connector is required, it must be purchased and installed by the user. When installed, the SFP connector becomes the active port and the RJ-45 connection is inactive. Both of the LAN 2 ports share the same IP address.

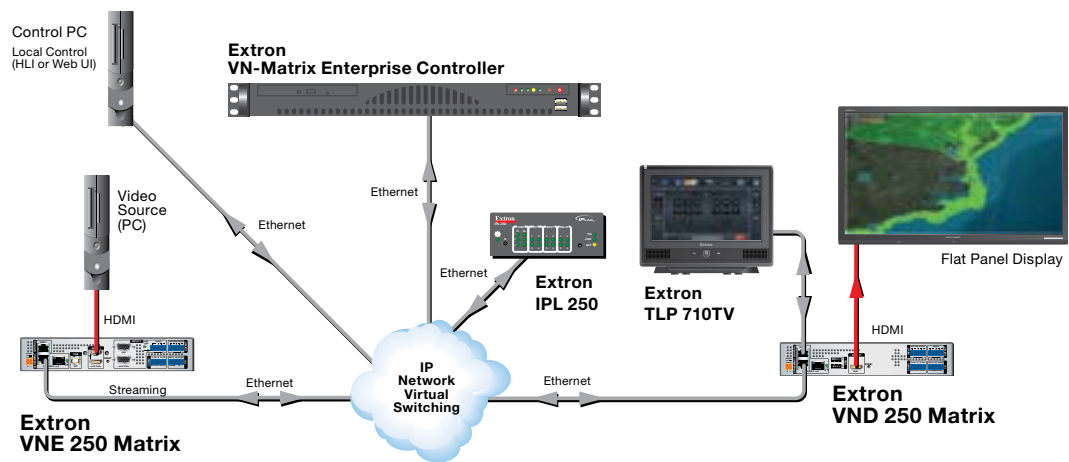


Figure 8. VNM 250 Control and Streaming Network Connections

NOTE: In the setup shown in figure 8, an Extron touchpanel is connected to the LAN-1 port of the VND 250.

Once the touchpanel is connected to the LAN-1 port of VNM 250, the IP Link controller can receive commands from the touchpanel but can no longer update the touchpanel configuration.

This setup requires all configuration of the IP Link controller and the touchpanel to be completed before the touchpanel is connected to the VND 250.

Streaming network (LAN 2)

NOTE: The RJ-45 and SFP streaming network connectors share the same IP address. Only one connector can be active at any time. If the SFP cage is unpopulated, the RJ-45 connector is active. If the SFP cage is populated, it becomes active and the RJ-45 connector is inactive.

By default, the RJ-45 port is the active streaming network connection and the SFP cage (see [figure 6, D](#) on page 13 for the encoder or [figure 7, D](#) on page 13 for the decoder) is unpopulated.

To use the RJ-45 port (see [figure 6, C](#) for the encoder or [figure 7, C](#) for the decoder), connect this port to the network with a standard LAN cable.

If required, third-party SFP connectors must be purchased separately. To install an SFP connector, follow these points:

1. Select and purchase the SFP connector that is most suitable for your requirements (most models are acceptable). Either single mode (1310 nm) or multi-mode (850 nm) modules can be used.
2. Power down the unit. In addition to being good safety practice, the unit needs to be rebooted for the device to correctly recognize the SFP port.
3. Install the module and reboot the unit. When a compatible SFP module is installed, the SFP port becomes active and the RJ-45 port is deactivated.
4. Connect a single mode or multi-mode cable to the encoder (see [figure 6, D](#)), or decoder (see [figure 7, D](#)).

To use a VNM 250 device as a controller:

1. Configure the network settings of the device that is to be used as the system controller (see [Low Level Device Configuration](#) on page 25).
2. Connect the device to the network using the streaming LAN 2 port on the rear panel of the encoder (see [figure 6, C](#) or [D](#)), or decoder (see [figure 7, C](#) or [D](#)).
3. Open a web browser on a control PC that is connected to the same network.
4. Enter the IP address of the streaming port of the VNM 250 device that was set as system controller in step 1, above, and use the GUI to configure the system settings (see [Setting a VNM 250 Device as the System Controller](#) on page 28).

NOTE: To control larger systems (ten or more components), use a VN-Matrix Enterprise Controller (see the *VN-Matrix Enterprise Controller User Guide* at www.extron.com).

Control network (LAN 1)

The control port LAN 1 can be used for system control, using the HLI control protocol. A touchpanel or similar control interface can be connected and configured to communicate with the VNM Enterprise Controller to recall previously configured presets (see the [Note](#) under [figure 8](#) on the previous page).

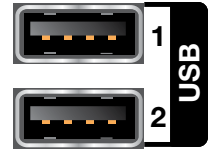
NOTE: This control method can only be used with a VN-Matrix Enterprise Controller. The HLI control protocol is not supported by the VNM 250 controller (see the *VN-Matrix Enterprise Controller User Guide* at www.extron.com).

USB Ports

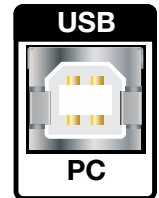
KVM function

KVM functionality permits remote collaboration between different endpoints on the network by allowing a mouse and keyboard connected to the decoder to control a PC connected to the encoder using the rear panel USB ports.

1. Connect a mouse and keyboard to the VND 250 rear panel USB ports (see [figure 7](#), **F** on page 13).



2. Connect a PC to the VNE 250 rear panel USB port (see [figure 6](#), **E** on page 13). This connection passes the mouse and keyboard control signals to the source PC.



3. If the system is controlled by a VNM Enterprise Controller, use the Enterprise Controller GUI for configuring KVM functionality (see the *VNM Enterprise Controller User Guide* at www.extron.com).

If a VNM 250 device is the system controller, use the GUI for that device to configure KVM functionality (see [VNM 250 GUI Overview](#) on page 34).

Both the encoder and decoder must be configured to allow KVM functionality, using the **Peripherals** page of the web user interface of the device being used as system controller (see [Configuring KVM Functionality](#) on page 90).

Once configured, the KVM mode is activated using a hot key sequence on the keyboard that is connected to the decoder (see [To activate a remote control session using hot keys](#) on page 90).

4. Configure the system so that the decoder is viewing the source PC.

NOTE: KVM is only available when there is an active video stream between the encoder and decoder.

Coms

RS-232 pass-through

The Coms port on the rear panel of the encoder (see [figure 6, R](#) on page 13), or decoder (see [figure 7, R](#) on page 13) is used for RS-232 pass-through communications, allowing a control device connected to one VNM 250 unit to control a remote device connected to a second VNM 250 unit.

Serial data received by one VNM 250 unit is transmitted over the network, using TCP/IP, and then converted back to serial data at the target VNM 250 unit. Data flow is fully bidirectional.

Units that are configured for this type of data flow are called **pass-through groups**:

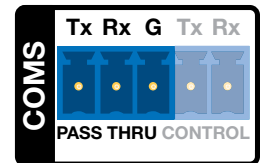
- One device in each pass-through group is designated as a server.
- One or more devices are connected as clients.
- There may be more than one pass-through group in a system.
- A pass-through group can consist of all encoders, all decoders, or both.
- A device can be a server or client independently of whether it is an encoder or decoder and independently of whether or not it is the system controller.
- Pass-through data is not part of the media stream and cannot be stored by a VN-Matrix recorder.
- Data passes through the system unchanged (transparently). No VNM 250 devices are affected by the commands.
- The serial ports on different devices do not need to share a common baud rate. However, if a large amount of data is sent from a high speed to a low speed data link, some form of handshaking or flow control may be required to prevent buffer overflow on the output device. Standard flow control methods are fully supported.

To set up the RS-232 pass-through group:

1. Decide which VNM 250 unit is the server in the pass-through group and which are the clients.
2. Connect your serial devices to the VNM 250 RS-232 ports accordingly. Communication can only take place between server and client, not between clients.

Use the first three poles of a shared captive screw connector (Tx, Rx, and G). See the **Attention** notifications on page 15 for information about preparing and connecting wires to a captive screw connector.

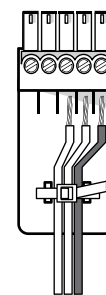
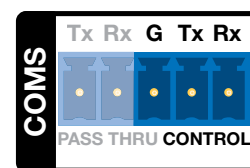
3. Log in to the web interface (see [VNM 250 GUI Login](#) on page 34).
4. Configure the server (see [Pass-through Coms Server Configuration](#) on page 91).
5. Configure one or more clients (see [Pass-through Coms Client Configuration](#) on page 91).



RS-232 control

RS-232 control — allows low level configuration of the encoder or decoder. Use the three poles to the right of the shared captive screw connector (see [figure 6, R](#), or [figure 7, R](#) on page 13). See the **Attention** notifications on page 15 for information about preparing and connecting wires to a captive screw connector. See [Low Level Device Configuration](#) on page 25.

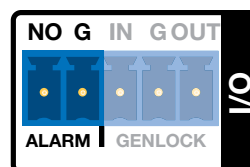
NOTE: The RS-232 pins are not in the standard Extron orientation. Ensure that the connector is correctly wired (see the figure to the right).



RS-232 Connector Wiring

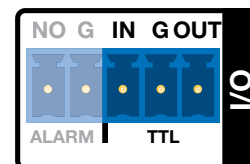
Alarms

Alarm relays — provide a normally open (NO) contact. Use the first two poles of a shared captive screw connector (see [figure 6, S](#) or [figure 7, S](#)). See the **Attention** notifications on page 15 for information about preparing and connecting wires to a captive screw connector.



TTL

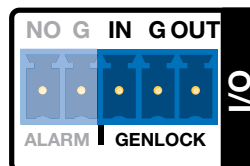
TTL (VNE 250) — the TTL (transistor-transistor logic) feature is not currently supported.



Genlock

Genlock I/O (VND 250) — is used to synchronize the video output on multiple decoders.

NOTE: The VND 250 uses TTL level signalling, which is not compatible with normal genlock sources.



One decoder is selected as the reference unit, and provides the signal that is used to synchronize all the other units.

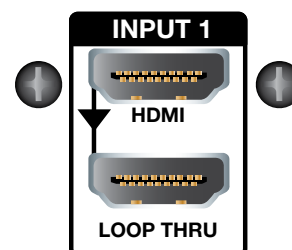
1. Configure one decoder as the primary unit, using the web-based GUI control interface (see [Genlock](#) on page 60).
2. All other decoders are secondary to the primary unit. They are configured by selecting the Genlock check box of the web-based GUI control interface (see [figure 41, 2](#), on page 59).
3. Connect the Ground connector of the primary unit to the ground connector of the first secondary device.
4. Connect the Out connector of the primary unit to the In connector of the first secondary device.

5. Connect the ground connector of the first secondary device to the ground connector of the second secondary device.
6. Connect the genlock out from the first secondary device to the genlock in of the second secondary device.
7. Repeat steps 5 and 6 to link as many secondary devices as required.

Video Connections

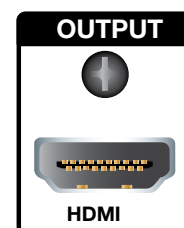
HDMI input (VNE 250) — connect an HDMI digital video source to this port (see [figure 6, G](#) on page 13). For a list of supported modes, see the Specifications on the VNM 250 web page at www.extron.com.

HDMI loop-through (VNE 250) — provides fully buffered output of all data from the HDMI input source. Connect a local HDMI monitor to this port (see [figure 6, H](#)).



HDMI output (VND 250) — connect an HDMI digital video display to this port (see [figure 7, I](#) on page 13).

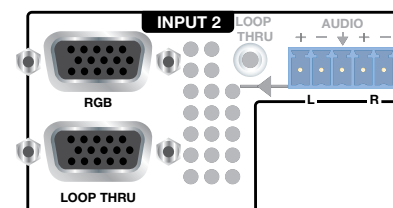
Use the provided LockIt HDMI Cable Lacing Brackets to secure the HDMI cables to the VND 250 (one screw above the port) or VNE 250 (two screws to the sides of the port). Follow the instructions on the card provided with the brackets. This card is also available at www.extron.com.



NOTE: A full-screen green image is displayed when a non-HDCP compliant display is used in conjunction with HDCP-encrypted content.

Analog video input (VNE 250) — connect an analog video source to the 15-pin HD connector labelled "RGB" (see [figure 6, K](#)). For a list of supported modes, see the Specifications on the VNM 250 web page at www.extron.com.

Analog video loop-through (VNE 250) — provides fully buffered output of all data from the analog video input source. Connect a local analog video monitor to the 15-pin HD connector labelled "Loop Thru" (see [figure 6, L](#)).



A list of [Supported EDID Modes](#) can be found on page 123.

NOTE: Both loop-through outputs display the image from the input that has been selected for streaming. HDCP-encrypted content is only shown on compliant displays.

Audio Connections

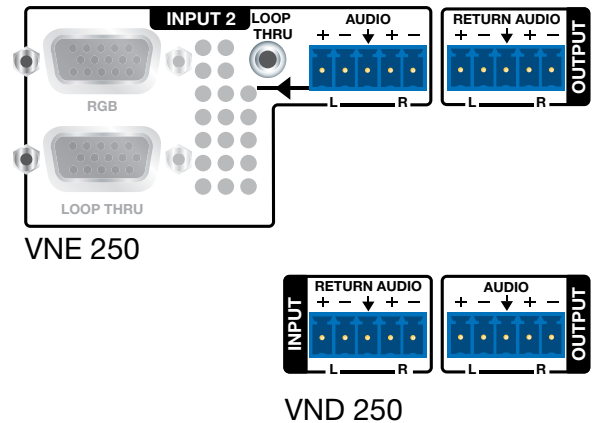
Audio loop-through (VNE 250) — Connect a 3.5 mm TRS jack to this socket for unbalanced buffered output from the audio input source (see [figure 6, M](#) on page 13).

Analog program audio input (VNE 250) — Connect balanced or unbalanced, mono or stereo audio to this 5-pole, 3.5 mm captive screw receptacle (see [figure 6, N](#)).

Return audio input (VND 250) — Allows bidirectional communication, using a reverse audio signal sent from a decoder to the associated encoder. Connect balanced or unbalanced, mono or stereo audio input to this 5-pole, 3.5 mm captive screw connector (see [figure 7, O](#) on page 13).

Return audio output (VNE 250) — Allows bidirectional communication by sending a reverse audio signal from an associated decoder, to be played by the encoder. Connect the audio output from this 5-pole captive screw connector to an amplifier or powered speakers (see [figure 6, P](#)).

Analog program audio output (VND 250) — Connect the audio output from this 5-pole captive screw connector to an amplifier or powered speakers (see [figure 7, Q](#)).



Reset

Reset button — Used to reboot the operating system. To activate this recessed button, insert the blade of a small screwdriver or a similar device into the hole and press the button (see [figure 6, J](#) or [figure 7, J](#)).

NOTE: The reset button simply reboots the system. It does not alter any settings. To reset IP addresses, use the Reset option on the front panel menu (see encoder [Reset Submenu](#) on page 100 or decoder [Reset Submenu](#) on page 110).

System Configuration with the Enterprise Controller

All Matrix systems require one device that acts as the system controller. For a small system (ten devices or fewer), this can be either a VNE 250 or VND 250. For larger systems a VN-Matrix Enterprise Controller must be used.

A system controlled by the Enterprise Controller can incorporate any VN-Matrix devices, including recorders, into the system.

Systems controlled by a VNM 250 device cannot exceed 10 devices in total. A VNM 250 controller supports VNM 250 encoders and decoders and PCs running the VNS 104 software. It does not support recorders. If an incompatible VN-Matrix device is added to a system controlled by a VNM 250 device, the controller cannot detect or control that device.

Controlling Your System with a VN-Matrix Enterprise Controller

1. Connect a PC and a VN-Matrix Enterprise Controller to the same network as the components of your streaming AV system.

NOTE: The PC and Enterprise Controller must be connected to the same network as the streaming port (LAN 2) of the VNM 250 device.

2. Open an internet browser on the PC and enter the IP address of the VNM Enterprise Controller in the address bar. The login screen opens.



Figure 9. VN-Matrix Enterprise Controller Login Page

3. Enter the **Username** and **Password**.

NOTE: Check with your Network Administrator for the Username and Password. If they have not been changed from the default settings, the Username is **admin** (all lower case) and there is no password (leave the box empty).

The Enterprise Controller GUI opens.

Device Name	IP Address	Device Type	Device ID
VN-Matrix_001	192.168.1.1	VN-Matrix_001	001
VN-Matrix_002	192.168.1.2	VN-Matrix_002	002
VN-Matrix_003	192.168.1.3	VN-Matrix_003	003
VN-Matrix_004	192.168.1.4	VN-Matrix_004	004
VN-Matrix_005	192.168.1.5	VN-Matrix_005	005
VN-Matrix_006	192.168.1.6	VN-Matrix_006	006
VN-Matrix_007	192.168.1.7	VN-Matrix_007	007
VN-Matrix_008	192.168.1.8	VN-Matrix_008	008
VN-Matrix_009	192.168.1.9	VN-Matrix_009	009
VN-Matrix_010	192.168.1.10	VN-Matrix_010	010
VN-Matrix_011	192.168.1.11	VN-Matrix_011	011
VN-Matrix_012	192.168.1.12	VN-Matrix_012	012
VN-Matrix_013	192.168.1.13	VN-Matrix_013	013
VN-Matrix_014	192.168.1.14	VN-Matrix_014	014
VN-Matrix_015	192.168.1.15	VN-Matrix_015	015
VN-Matrix_016	192.168.1.16	VN-Matrix_016	016
VN-Matrix_017	192.168.1.17	VN-Matrix_017	017
VN-Matrix_018	192.168.1.18	VN-Matrix_018	018
VN-Matrix_019	192.168.1.19	VN-Matrix_019	019
VN-Matrix_020	192.168.1.20	VN-Matrix_020	020
VN-Matrix_021	192.168.1.21	VN-Matrix_021	021
VN-Matrix_022	192.168.1.22	VN-Matrix_022	022
VN-Matrix_023	192.168.1.23	VN-Matrix_023	023
VN-Matrix_024	192.168.1.24	VN-Matrix_024	024
VN-Matrix_025	192.168.1.25	VN-Matrix_025	025
VN-Matrix_026	192.168.1.26	VN-Matrix_026	026
VN-Matrix_027	192.168.1.27	VN-Matrix_027	027
VN-Matrix_028	192.168.1.28	VN-Matrix_028	028
VN-Matrix_029	192.168.1.29	VN-Matrix_029	029
VN-Matrix_030	192.168.1.30	VN-Matrix_030	030
VN-Matrix_031	192.168.1.31	VN-Matrix_031	031
VN-Matrix_032	192.168.1.32	VN-Matrix_032	032
VN-Matrix_033	192.168.1.33	VN-Matrix_033	033
VN-Matrix_034	192.168.1.34	VN-Matrix_034	034
VN-Matrix_035	192.168.1.35	VN-Matrix_035	035
VN-Matrix_036	192.168.1.36	VN-Matrix_036	036
VN-Matrix_037	192.168.1.37	VN-Matrix_037	037
VN-Matrix_038	192.168.1.38	VN-Matrix_038	038
VN-Matrix_039	192.168.1.39	VN-Matrix_039	039
VN-Matrix_040	192.168.1.40	VN-Matrix_040	040
VN-Matrix_041	192.168.1.41	VN-Matrix_041	041
VN-Matrix_042	192.168.1.42	VN-Matrix_042	042
VN-Matrix_043	192.168.1.43	VN-Matrix_043	043
VN-Matrix_044	192.168.1.44	VN-Matrix_044	044
VN-Matrix_045	192.168.1.45	VN-Matrix_045	045
VN-Matrix_046	192.168.1.46	VN-Matrix_046	046
VN-Matrix_047	192.168.1.47	VN-Matrix_047	047
VN-Matrix_048	192.168.1.48	VN-Matrix_048	048
VN-Matrix_049	192.168.1.49	VN-Matrix_049	049
VN-Matrix_050	192.168.1.50	VN-Matrix_050	050

Figure 10. VN-Matrix Enterprise Controller Device List

- To configure the system with the Enterprise Controller, see the *VN-Matrix Enterprise Controller User Guide*, which is available at www.extron.com.

Low Level Device Configuration

This section discusses:

- **Initial Configuration**
- **Setting a VNM 250 Device as the System Controller**
- **Configuring a VNM 250 Series Unit for DHCP**
- **Using a Dedicated DHCP Server**
- **Configuring a Windows 2008 R2**
- **Control Port**
- **Configuring the Control Port**

Initial Configuration

The RS-232 control port is used to configure the network settings for the VNE 250 and the VND 250. Follow these instructions:

1. Use an RS-232 cable to connect a control PC to the rear panel **Coms** port of the VNM 250 device (see page 19).
2. On the PC or laptop, open a terminal emulation program, such as Extron DataViewer, with the following settings:
 - Baud rate: 115200
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None

NOTE: DataViewer can be downloaded, free of charge, from www.extron.com.

3. Enter the **User name** and **Password**.

NOTES:

- When DataViewer first opens, it may be necessary to press <Enter> for the **User name** prompt to appear.
- By default, the User name is **config** and the Password is also **config**.

The low level configuration menu opens (figure 11 shows default values):

Control Network port =====	Streaming Network port =====
0. Speed/Duplex: auto_10_100_1000	10. Speed/Duplex: auto_10_100_1000
1. IP Prov mode: static [dhcp]	11. IP Prov mode: static [dhcp]
2. address: 192.168.253.254	12. address: 192.168.254.254
3. netmask: 255.255.255.0	13. netmask: 255.255.255.0
	14. gateway: 192.168.254.1
6. mtu: 1500	16. mtu: 1500
7. VLAN ID: 0	17. VLAN ID: 0
8. controller ip: 192.168.254.254	18. Controller port: 5432
9. Exit	19. webserver port: 80

Please select an option:

Figure 11. Low Level Configuration Menu Page 1

NOTE: These values are held in local memory on the unit itself.

4. At the **Please select an option:** prompt, enter the number of the parameter you wish to change followed by **<Enter>**:
 - **0^a** or **10^b** — these options set the network link speed. When you choose either option, you are offered a further choice:
 1. **auto_10_100_1000** — configures for auto speed negotiation up to 1 Gbps.
 2. **auto_10_100** — configures for auto speed negotiation up to 100 Mbps.
 Enter **1** or **2** followed by **<Enter>** at the prompt. The default setting is **1. auto_10_100_1000**.

NOTE: A Gigabit network is recommended for streaming media applications.

- **1^a** or **11^b** — these options determine whether the IP address of the unit is static or set by DHCP. When you choose either option, enter **static** or **dhcp** followed by **<Enter>**. The default setting is **static**.

NOTES:

- **static** and **dhcp** are all lower case letters.
- When **1** is set to **dhcp**, options **2** and **3** are not available. When **11** is set to **dhcp**, options **12-14** are not available.

- **2^a** and **12^b** — these options set the local address of the network port. Standard rules for IP addresses apply. The default values are **192.168.253.254** (control network) and **192.168.254.254** (streaming network).
Do not use leading zeros. For example, **192.168.10.25** is valid; **192.168.010.025** is not valid.

NOTE: The control and streaming ports must be assigned to different subnets.

- **3^a** and **13^b** — these options set the network Subnet Mask. The default value is **255.255.255.0**. Standard rules for IP Addresses apply. Do not use leading zeros.
- **14^b** — this option sets the IP address for the default gateway. The default value is **192.168.254.1**.

This value is required for systems with multiple subnets. The Default Gateway must be on the same subnet as the streaming port.

To clear a Gateway Address, select **14** and press **<Enter>** with no value set.

- Options **4**, **5**, and **15** are not available.
- 6^a** and **16^b** — these options set the Maximum Transmission Unit (MTU) Setting. The default value is **1500**.

This value affects the system performance. Larger values may cause packets to be fragmented (split) and smaller values may not make efficient use of the network capacity.

- 7^a** and **17^b** — these options set the VLAN ID. The VLAN ID can be set on each of the network ports. The default value is **0**.

NOTES:

^a Options **0** to **6** relate to the control network LAN 1 (see [Configuring the Control Port](#) on page 33).

^b Options **10** to **16** relate to the streaming network LAN 2 (RJ-45 or SFP).

- 8** — this option sets the IP address of the system controller. The controller IP address must be set to the IP Address of the streaming port on the unit designated as controller. This is the network port over which system control data is sent. The default value is **192.168.254.254**.
- 18** — this option sets the number of the port that is used for communications with the system controller. The default value is **5432** but it may be changed, if required. All units in the system must have the same port number assigned.
- 19** — this option sets the number of the port that communicates with the web server. The default value is **80** but it may be changed, if required. The web browser in use must use the same port number.

NOTE: Option **19** is only available when the device is configured as the system controller.

- 9** — this option allows you to exit the network port configuration page and opens the controller and DHCP Configuration page. Any changes that have been made are activated only after exiting the controller and DHCP Configuration page and rebooting.

5. Select **9** followed by **<Enter>**.

The DHCP configuration settings page opens:

```
6. DHCPD/SLAAC server enable: dhcp
7. DHCP IP range:                192.168.254.200 192.168.254.254
9. Exit
```

Please select an option:

Figure 12. Low Level Configuration Menu Page

NOTE: The settings in this menu apply only when the device is configured as the system controller.

6. At the **Please select an option:** prompt, enter the number of the parameter you wish to change followed by **<Enter>**:

- 6** — this option enables or disables the DHCP/SLAAC server. To enable the server, enter **dhcp** followed by **<Enter>**. To disable the server, enter **none** followed by **<Enter>**.

NOTE: **dhcp** and **none** are all lower case letters.

- **7** — this option sets the DHCP IP range and is only available when DHCP is enabled (option 6). Enter the DHCP pool address range in the following format:

`xxx.xxx.xxx.xxx<space>xxx.xxx.xxx.xxx`

where the lower IP address value and the upper IP address value are separated by a single space.

- **9** — this option saves all changes, closes the controller and DHCP config page, and automatically reboots the device in the config login.

7. Select **9** followed by **<Enter>**.

The controller and DHCP configuration settings page closes and the device automatically reboots to the config login screen. The changes that were made in steps 4 through 6 are implemented.

Setting a VNM 250 Device as the System Controller

All Matrix systems require one device that acts as the system controller. For small systems (ten devices or fewer), this can be either a VNE 250 or VND 250. For larger systems, a VN-Matrix Enterprise Controller must be used.

The VNM 250 device that is chosen as the system controller must use static IP address settings.

Extron recommends using **Low Level Device Configuration** (see page 25) to set one device as the system controller.

Configuring the System Controller with a Static IP Address

To configure the system controller with a static IP address:

1. Open the configuration menu of each device (see **Initial Configuration** on page 25) and ensure that the Streaming Network port **IP Prov mode** (option 11) is set to static.
2. Set the IP address (option 12), netmask (option 13), and gateway (option 14) for the streaming network (LAN 2).
3. Set the controller IP address (option 8) to the same address as the streaming port.
4. Use option 9 to exit from the configuration menu.

Configuring Other VNM 250 Devices with a Static IP Address

To configure the system with static IP addresses for all devices:

1. Open the configuration menu (see **Initial Configuration** on page 25) and ensure that the Streaming Network port **IP Prov mode** (option 11) is set to static.
2. Set the IP address (option 12), netmask (option 13), and gateway (option 14) for the streaming network (LAN 2).
3. Set the controller IP address (option 8).

NOTES:

- Every device must have a unique Streaming network port (LAN 2) IP address (option 12).
- Every device in the system must have the same controller IP address (option 8) and this must be the same as the streaming network port (LAN 2) IP address on the device selected to be system controller.

4. Use option 9 to exit from the configuration menu.
5. Use option 9 again to exit from the controller and DHCP menu.
6. Repeat steps 1 through 5 to configure all other VNM 250 devices in the system.

Configuring a VNM 250 Series Unit for DHCP

VNM 250 devices can have their streaming port network settings configured using IP addresses from a DHCP server.

For small systems, the VNM 250 device that is used as the system controller can also be configured to act as a DHCP server. It is then used to set the streaming port parameters of the other VNM 250 devices in the same system. For larger systems a Windows DHCP server may be used.

NOTE: The VN Matrix Enterprise Controller does not support DHCP server functionality.

Configuring a VNM 250 System Controller as a DHCP Server

The following requirements must be observed:

- The DHCP server runs only on a VNM 250 device that is configured as the system controller.
- The streaming network settings of the controller device must be statically assigned.
- The controller IP address must be statically assigned.

To configure the VNM 250 system controller as a DHCP Server:

1. Connect a control PC to the chosen unit and log in as described in steps 1-3 of [Initial Configuration](#) on page 25.

Control Network port =====	Streaming Network port =====
0. Speed/Duplex: auto_10_100_1000	10. Speed/Duplex: auto_10_100_1000
1. IP Prov mode: static	11. IP Prov mode: static
2. address: 192.168.253.254	12. address: 192.168.254.254
3. netmask: 255.255.255.0	13. netmask: 255.255.255.255
	14. gateway: 192.168.254.254
6. mtu: 1500	16. mtu: 1500
7. VLAN ID: 0	17. VLAN ID: 0
8. controller ip: 192.168.254.254	18. Controller port: 5432
9. Exit	19. webserver port: 80
Please select an option: 9	

Figure 13. Configuring a VNM 250 Series Unit as a DHCP Server.

2. Set IP Prov mode (option 11) to static.
3. Ensure that option 12 has a valid IP address. This address must be in the same range that the user wishes to allocate when DHCP is enabled.
4. Ensure that option 13 has a valid netmask.
5. Ensure that option 14 has a valid gateway.

NOTE: If the gateway is invalid **or** not present, the unit is **not** able to act as a DHCP server.

6. Ensure that option 8 (controller address) is set to the same address as set in option 12.
7. Select option 9 to move to the controller section of the menu.

```

6. DHCPD/SLAAC server enable: none
9. Exit

Please select an option:

```

Figure 14. Low Level Configuration Menu, Page 2

8. Select option 6 and enter `dhcp`. This enables the DHCP server in the device.
9. Once option 6 is set to `dhcp`, option 7 becomes visible. Select option 7 and enter the range of addresses that the DHCP server uses when allocating addresses. This range must include the address set for option 12 on the previous page.

```

6. DHCPD/SLAAC server enable: dhcp
7. DHCP IP range:                192.168.254.200 192.168.254.254
9. Exit

Please select an option:

```

Figure 15. Controller Set as a DHCP Server

10. Select option 9 to commit the settings and reboot the unit.

Configuring a VNM 250 Series Unit to Operate with a DHCP Server

1. Login to the chosen unit using a serial cable and enter the user name of `config` with the password of `config`.
2. Select option 11 from the menu and enter the value `dhcp`.
3. Press **<Enter>**. Options 12, 13 and 14 disappear from the menu. These values are assigned when the unit contacts the DHCP server and acquires a valid IP address.
4. Select option 8 (controller address). Enter either the IP address of the system controller **or** set the IP address to "0.0.0.0". Either method is acceptable.

If the address is set to "0.0.0.0" the DHCP server must either be a VNM 250 unit **or** a DHCP server that has the "Vendor Specific Option" correctly configured. This is explained in the next section.

Control Network port =====	Streaming Network port =====
0. Speed/Duplex: auto_10_100_1000	10. Speed/Duplex: auto_10_100_1000
1. IP Prov mode: static	11. IP Prov mode: dhcp
2. address: 192.168.253.254	
3. netmask: 255.255.255.0	
6. mtu: 1500	16. mtu: 1500
7. VLAN ID: 0	17. VLAN ID: 0
8. controller ip: 0.0.0.0	18. Controller port: 5432
9. Exit	

Please select an option: 9

Figure 16. Configuring a VNM 250 Series Unit to Operate with a DHCP Server

5. Select option 9 (Exit) to enter the controller menu.

```
6. DHCPD/SLAAC server enable: none
9. Exit

Please select an option:
```

Figure 17. Low Level Configuration Menu, Page 2

Ensure that options 6 is set to none.

6. Select option 9 (Exit) to reboot the device.

The streaming network settings is configured when the VNM 250 device is connected to a network with a properly configured system controller or DHCP server.

NOTE: The VN-Matrix Enterprise Controller does not currently provide DHCP server functionality.

Using a Dedicated DHCP Server

If required, a dedicated DHCP server can be used to provide the IP address settings for the VNM 250 device in a system.

The device that is acting as the system controller must have its IP settings configured statically.

The other VNM 250 devices in the system are to be configured for DHCP as described in [Configuring a VNM 250 Series Unit to Operate with a DHCP Server](#) on the previous page.

If possible, the DHCP server should be configured to provide the controller IP address and port number, using the Vendor Specific Option. Otherwise, the IP address of the system controller must be entered on all VNM 250 devices in the system.

Configuring a Windows 2008 R2

The windows DHCP server can be configured so that when a VNM 250 device contacts the server for an IP address, the server can include the IP address of the system controller and the controller port number as part of the DHCP configuration.

The figure below shows a Windows Server 2008 R2 installation. Other operating systems may vary.

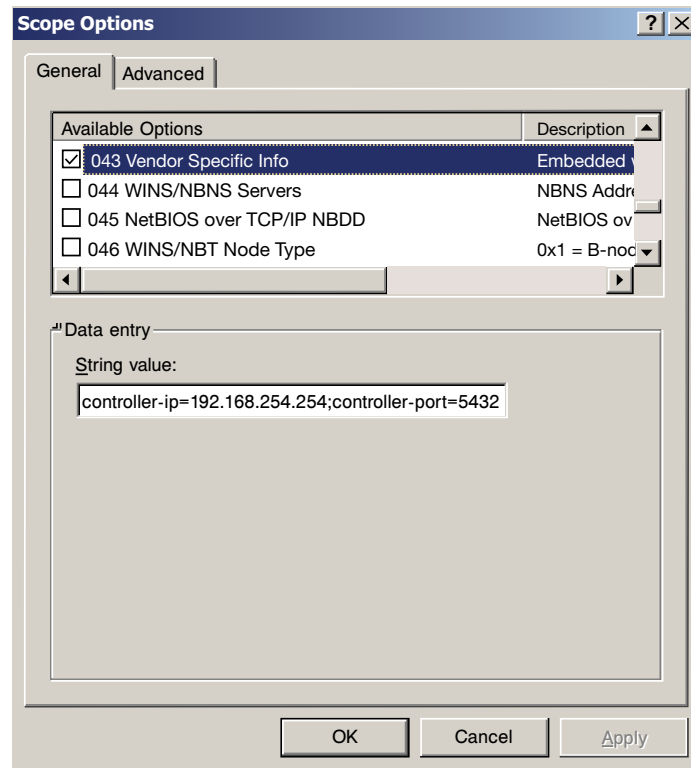


Figure 18. Scope Options Window

1. Open the Server Manager.
2. Highlight the scope options and right click. Select **Configure Options** from the pop-up.
3. In the **General** tab, navigate to option **043 Vendor Specific Info** and select the check box.
4. In the **Data Entry** text box, enter:
`controller-ip=xxx.xxx.xxx.xxx;controller-port=xxxx;`
where `xxx.xxx.xxx.xxx` is the IP address of the controller and "`xxxx`" is the port number used by the VNM 250 system for controller communication. By default, this value is **5432**.

Control Port

The control port is used to access the web UI or the HLI control interfaces on a VN-Matrix system.

The web UI on either a VNM 250 device (configured as the system controller) or a VNM Enterprise controller can be accessed from any device on the same system by connecting a PC to a properly configured control port. This can be useful when a system is undergoing commissioning, but is not required for normal operation.

If a VNM Enterprise controller is in use, then the HLI control interface can also be accessed from the control port of any VNM 250 device on the same system. This makes possible the connection of an external control system, where necessary.

The web UI and HLI interface are both accessed at the control port via a connection across the streaming network. A process similar to Network Address Translation (NAT) is used to map data received on the control port so that it is transferred to the system controller using the streaming network. Replies from the system controller to the local device follow the reverse path.

- From a web browser enter `http://[system controller IP address]` to access the system controller web UI.
- To access the HLI interface on a VNM Enterprise controller, then the IP address of the system controller is used along with the appropriate port number. For the HLI control protocol the port number is 9996.

NOTE: The user cannot directly access devices that are connected to the control ports of other VNM 250 devices.

Configuring the Control Port

Configure the control port by using the process described in the [Low Level Device Configuration](#) section that starts on page 25.

When configuring the control port the following must be observed:

- The IP addresses assigned to the control port and the streaming port **must not** be on the same subnet.
- Give the user PC a default gateway that forces IP messages to be passed to the system controller via the control port interface. For a directly connected PC, set the default gateway of the PC (or control system) to the IP address of the VNM 250 control port.

VNM 250 GUI Overview

This section discusses:

- [VNM 250 GUI Login](#)
- [VNM 250 GUI Tabs](#)
- [Tabs Shared by Both the Encoder and Decoder](#)
- [Encoder Tabs](#)
- [Decoder Tabs](#)

VNM 250 GUI Login

The system can be configured and controlled using a GUI, which is served by the VNM 250 device that is acting as the system controller. To use this GUI, follow these instructions:

1. Use one of the following web browsers with the version shown or later:
 - Windows® Internet Explorer® version 8
 - Mozilla® Firefox® version 20
 - Google® Chrome™ version 30

The PC must be on the same network as the VNM 250 controller.

2. Enter the controller IP address in the search bar. Press **<Enter>**.
3. The VN-Matrix Controller login page opens:



Figure 19. VN-Matrix Controller Login Page

4. Enter the Username and Password. By default, these are both **admin** (all lower case).
5. Press **Log In**. The VNM 250 GUI opens at the [Device List tab](#) (see page 36).

VNM 250 GUI Tabs

The following list shows the tabs that are available in the VNM 250 GUI control interface and provides links to more detailed descriptions of each tab. They are divided into Shared tabs (encoder and decoder), Encoder tabs, and Decoder tabs.

Configuration of the system, using the control interface is described in [Configuration with the VNM 250 GUI](#) (see page 67).

Tabs Shared by Both the Encoder and Decoder

- [Device List tab](#) (see page 36)
- [Accounts tab – controller configuration](#) (see page 37)
- [Alarms tab](#) (see page 38)
- [Alarm Logs tab](#) (see page 39)
- [Upgrade tab](#) (see page 41)
- [Peripherals tab](#) (see page 42)
- [License tab](#) (see page 45)

Encoder tabs

- Encoder [Device tab](#) (see page 46)
- [Configure \(VideoPort0\) tab](#) (see page 47)
- [Bandwidth tab](#) (see page 49)
- [Video Setup tab](#) (see page 53)
- [Configure \(AudioPort0\) tab](#) (see page 54)
- [Configure \(Data0\) tab](#) (see page 56)

Decoder tabs

- Decoder [Device tab](#) (see page 58)
- [Display tab](#) (see page 59)
- [Decoder video bandwidth tab](#) (see page 62)
- [Decoder audio Bandwidth tab](#) (see page 63)
- [Decoder data Bandwidth tab](#) (see page 65)
- [Decoder video format tab](#) (see page 66)

Tabs Shared by Both the Encoder and Decoder

Some of the tabs listed in this section, for example the **Device List tab** (see below), **Accounts tab — controller configuration** (see page 37), **Alarms tab** (see page 38), and **Alarm Logs tab** (see page 39), can be accessed without first selecting a device.

Other tabs, for example the **License tab** (see page 45), **Upgrade tab** (see page 41), and **Peripherals tab** (see page 42) tabs, can only be selected once a device has been selected. However, the options in these tabs are identical whether you navigate to the page from an encoder or a decoder. Therefore, they have also been included in this Shared Tabs section.

Save All, **Help**, and **Logout** are available in all screens, although these function as buttons rather than tabs.

Save All saves changes you have made:

On the **Device List** page, **Save All** saves all changes on the system.

On the **Device** page, **Save All** saves only the changes to that device.

Help provides a context-sensitive help page that explains the features of the tab that is currently open.

Logout logs you out of the system.

Device List tab

The control interface opens to the **Device List** tab.

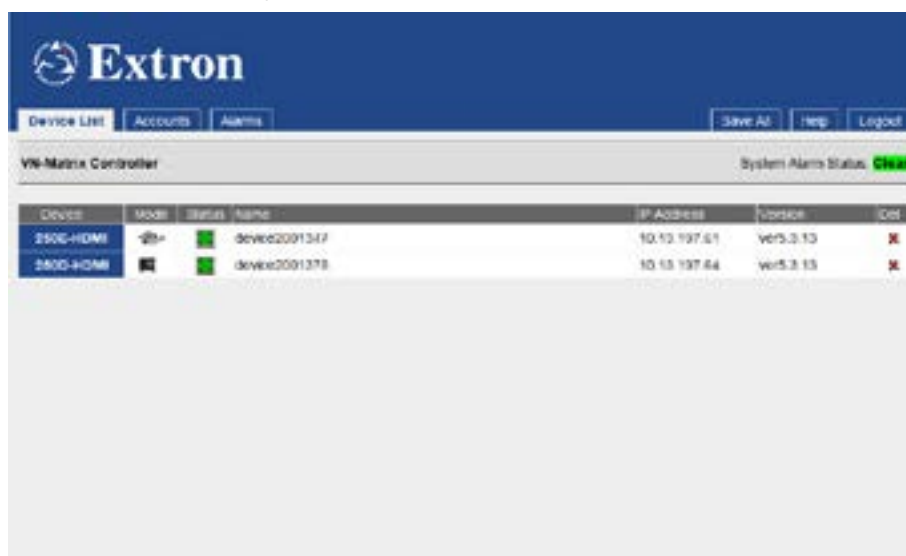


Figure 20. VN-Matrix Device List Tab.

When the **Device List** tab is selected, the **Accounts** and **Alarms** tabs become available.

The **Device List** lists all the devices in the system, using the following icons:

Mode Icon	Description	Status Icon	Description
	Unknown device		Alarm status gray — a device that has not contacted the controller during this session.
	Encoder device (source)		Alarm status green — a device under active control with no alarms.
	Decoder device (display)		Alarm status yellow — a device under active control showing only warning alarms.
			Alarm status red — a device under active control showing critical alarms.

Click on any of the text or icons for a specific device to open the **Device** tab for that device. For information about the encoder **Device tab** (see page 46). For information about the decoder **Device tab** (see page 58).

Accounts tab — controller configuration

From the Device List tab, click the **Accounts** tab:

Figure 21. Accounts Tab

The Accounts screen is used to change the passwords of the **public** and **admin** accounts, to update the system clock time, and to enter controller license details.

Password Management

The **admin** account (figure 21, ①) allows full access to the VNM 250 web GUI. The **public** account (②) allows read-only access.

The **admin** and **public** user names cannot be modified.

By default the password for the **admin** account is **admin**. The password for the **public** account is **public**.

The **admin** account password can only be modified when you are already logged in as **admin**. If you are logged in as **public**, the **admin** password modification fields are disabled.

To change the password, enter the current password, the new password, repeat the new password in the **Confirm** box then press **Update Passwords**.

NOTES:

- The password should consist of letters, numbers and the underscore character. Case is significant.
- Some changes must be implemented by pressing the **update** button. Where changes are pending both the changed item and the update button are shown in yellow.

Clock Management

NOTE: The Current Time is the date and time when the page was served.

The Current Time (see [figure 21](#), [③](#) on the previous page) is used by all devices to time stamp system events and alarms. The clock setting on all VNM 250 devices is factory set to UTC time and it is not necessary to make any changes to the setting for the system to operate. The clock setting can be changed to set the controller to local time, if required.

New Time is the updated date and time. It can only be modified by the **admin** user and should be input in an identical format to the **Current Time**: **year-month-date hours-minutes-seconds**.

- The year should include the century, eg: 2005.
- The month is a number from 1 to 12
- The date is a number from 1 to 31
- Hours is a 24 hours clock number from 0 to 23
- Minutes and seconds are numbers from 0 to 59

The time is updated by pressing **Change Time** ([④](#)).

Controller Licensing Management

Controller Licensing ([⑤](#)) is used to enable the use of VNS 104 and VNM Software decoders on a system. The controller license contains two elements, an option and a checksum. New licenses can be obtained from your Extron dealer when they are required. Talk to the Extron S3 Technical Support (for contact information see the last page of this user guide).

Click on the **Change Licence** button ([⑥](#)) to open the License tab.

Alarms tab

From the **Device List** tab, click the **Alarms** tab:

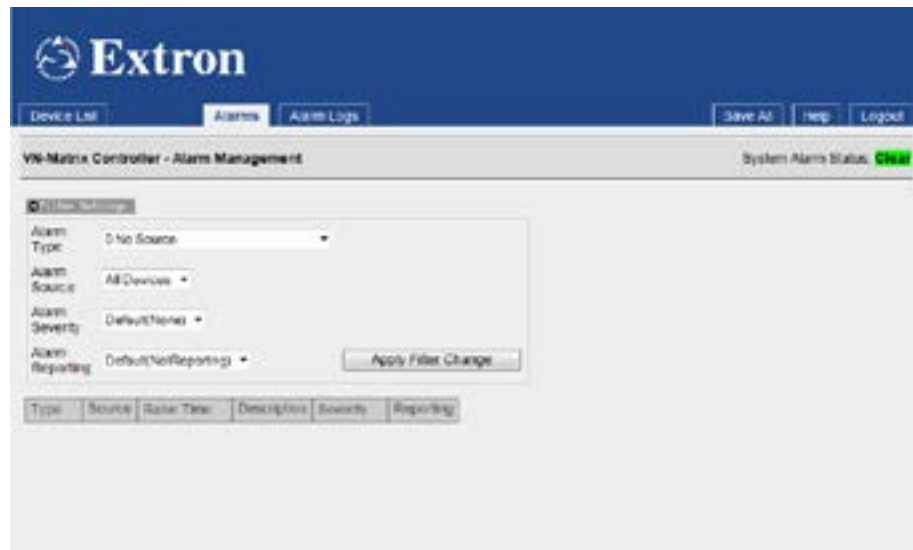


Figure 22. Alarms Tab

The **Alarms** page is used to monitor the active alarms on the system and to modify the severity and reporting attributes of alarms on a device by device basis.

Alarms are descriptions of problem events with the system. They are raised and cleared by hardware and typically have a 5 second hysteresis — once an alarm is raised, it stays on for 5 seconds even though the error event has cleared. This prevents noisy conditions saturating the alarm log buffer.

Alarms can have three degrees of severity indicated by the alarm icons in the device list and the alarm status messages at the top of each page:

- **Critical** is shown in red and usually means the service has failed. If the device has a critical alarm it illuminates the red LED on the front panel and activates the closure relay accessed by the rear panel connector.
- **Warning** is shown in amber and indicates a less severe error has occurred. Often a warning is raised when there is an expectation that another critical alarm shows the root-cause of the problem.
- Setting the severity to **None** effectively filters this alarm - it still appears in the alarms list but does not affect the colored indicators.

Alarms can also be **Reporting** or **Not-Reporting**. A Reporting alarm causes an SNMP trap to be sent to any registered SNMP client when the alarm is raised. Setting Not-Reporting prevents these traps from being sent.

Alarms can be filtered for all devices or for just a single device. This is achieved by selecting the **Alarm-Type**, **Alarm-Source**, **Alarm-Severity**, **Alarm-Reporting** and clicking **Apply Filter Change**. Note that if a global change is made, it does not affect any devices which are created after this time. All devices are always created with default severities and reporting.

Alarm Logs tab

From the **Alarms** tab, click the **Alarm Logs** tab:

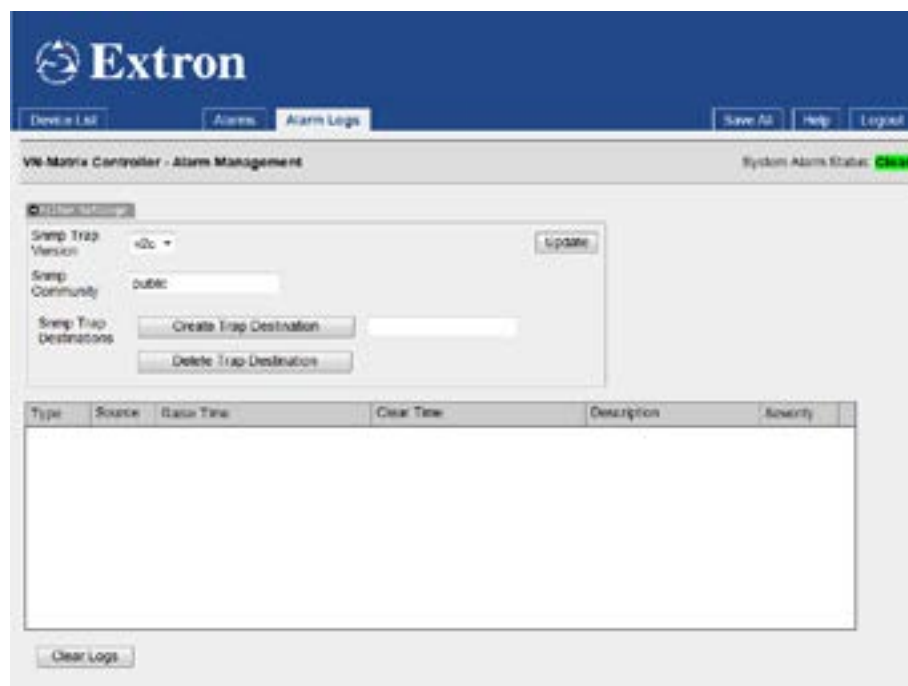


Figure 23. Alarms Logs Tab

An alarm log is a record of when an alarm condition was raised and when it was cleared. Alarm logs are paired so an alarm log with both a raise time and clear time describes a historic alarm condition.

The system contains space for 200 alarm logs. Once more than this number of events have been recorded the history of older events are discarded. Alarm logs can also be cleared by clicking the **Clear Logs** button.

Alarm logs can be sorted by type, raise time and severity by clicking on the column header. A small arrow shows the sort direction which is reversed when the column header is clicked a second time.

The system has the capability to report an alarm event via SNMP traps. To receive an Simple Network Management Protocol (SNMP) trap the user must add a trap destination by inserting the IP address of the trap recipient in the text box and clicking **Create Trap Destination**. Multiple destinations can be added in this manner. To delete a destination the user should again enter the IP address of the trap recipient and click **Delete Trap Destination**.

SNMP traps are only sent for Reporting alarm points as specified in the alarm reporting and filter screen.

The system supports two types of SNMP traps: version-1 and version-2c. The SNMP Community string is a type of weak password used by the trap recipient. This should be set appropriately by the user or the SNMP client may reject the trap. The trap version and password are globally assigned. It is not possible to set different trap levels and passwords for different destinations.

Overview – SNMP

SNMP is a protocol used to configure and monitor a network. The VNM 250 device has the ability to report alarm events using an SNMP trap (traps are used by network entities to signal abnormal conditions to network administrators).

When communicating using SNMP, the VNM 250 complies with the requirements of SNMPv3. When generating SNMP traps, the VNM 250 complies with the requirements of SNMPv1 and SNMPv2c.

Using an SNMP Password

The SNMP password is the same as the administrator password. By default this is set to `admin`.

NOTE: It is necessary to enter the administrator password in the accounts page before SNMP can be used. This process must be carried out for each of the following circumstances:

- When you are first using the system
- After a firmware upgrade to the system

A password for SNMPv3 must be eight characters long. If the administrator password is fewer than eight characters in length, additional characters from the password are concatenated as follows:

`admin` becomes `adminadm`.

If the administrator password is longer than eight characters, the value is truncated:

`administrator` becomes `administ`.

SNMP Community

The value in the **SNMP Community** field acts as a password. It is used to authenticate messages between the VNM 250 system and the network management system (NMS). By default, the **SNMP Community** field is set to public. The SNMP Community string must match that in use by the NMS; if not, it may not be possible to manage the VN-Matrix 250 device.

SNMP Trap Destinations

The Filter Settings dialogue on the Alarm Logs page is used to add and remove destination IP addresses for NMS servers.

A screenshot of the 'Filter Settings' dialogue box. It contains a 'Simp Trap Version' dropdown set to 'v2c' with an 'Update' button. Below it is the 'Simp Community' text field containing 'public'. At the bottom, there are two buttons: 'Create Trap Destination' and 'Delete Trap Destination', with an empty text input field between them.

Figure 24. Filter Settings Section of the Alarm Logs Page

The IP address of the NMS should be entered in the **Create Trap Destination** field. Multiple destinations can be added, one at a time.

Upgrade tab

To access the **Upgrade** tab, you must first select a device from the **Device List tab** (see page 36) and, when the **Device** tab opens, click the **Upgrade** tab. However, whether you navigate to the **Upgrade** tab from an encoder or a decoder, the functionality is the same.

A screenshot of the 'Upgrade' tab in the Extron VNM 250 GUI. The top header shows the Extron logo and navigation tabs: 'Device List', 'Device', and 'Upgrade'. The 'Upgrade' tab is active. Below the header, there's a breadcrumb 'SIT Device [device200134T] > Upgrade' and 'Alarm Status: Dev: Clear Sys: Clear'. The main area has a text box 'Please specify an upgrade file to upload:' with 'Browse' and 'upload' buttons. Below this is a table with columns for 'Select Firmware Version', 'Committed Version', 'Upgrade Version', and 'Device Upgrade Status'. The table shows '250_end_ver5.3.13' for Committed Version, 'none' for Upgrade Version, and 'WWT' for Device Upgrade Status. There are 'reverse' and 'forward' buttons at the bottom of the table.

Figure 25. Upgrade Tab

The Upgrade screen supports the network based upgrade of the device firmware (see **Upgrading Firmware** on page 88).

Peripherals tab

To access the **Peripherals** tab, you must first select a device from the **Device List tab** (see page 36) and, when the **Device** tab opens, click the **Peripherals** tab. Whether you navigate to the **Peripherals** tab from an encoder or a decoder, the functionality is the same.

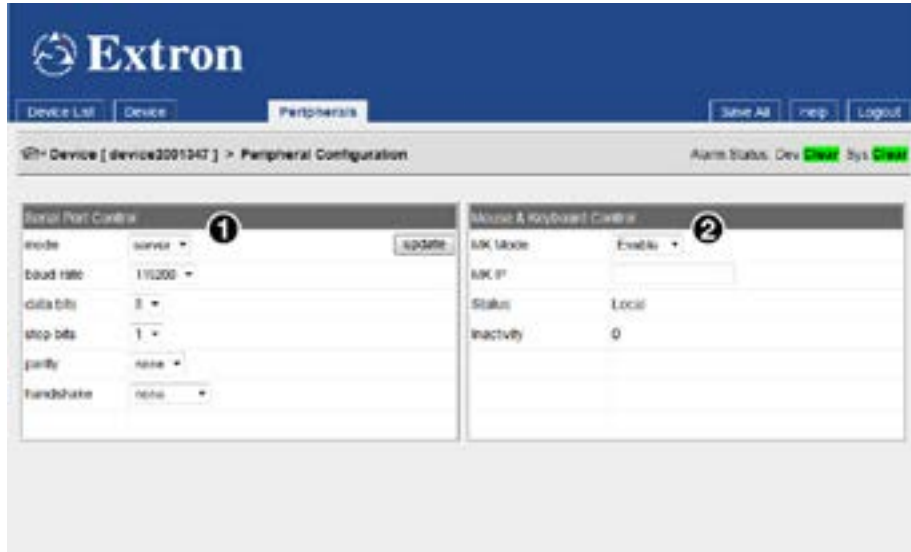


Figure 26. Peripherals Tab

The Peripherals screen is used to manage the Coms pass-through serial port and the mouse+keyboard forwarding operation.

RS-232 pass-through serial port

The RS-232 pass-through serial port supports two modes of operation:

- Serial RS-232 pass-through mode
- Serial RS-232 data channel mode

In either mode, the serial ports on each VNM 250 do not need to share a common baud rate. However, where large amounts of data are sent from a high-speed to a low-speed data link, some form of handshaking or flow control may be required to prevent buffer overflow on the output device. Standard flow control methods are fully supported.

Pass-through mode

In this mode, data received by a device (input) is transmitted over the network using TCP/IP and then converted back to serial data by a second device (output). Data flow is fully bidirectional and is independent of whether the VN-Matrix device is an encoder or decoder. Pass-through data cannot be recorded.

One device in the pass-through group is designated the server. One or more devices are connected as clients (in pass-through mode).

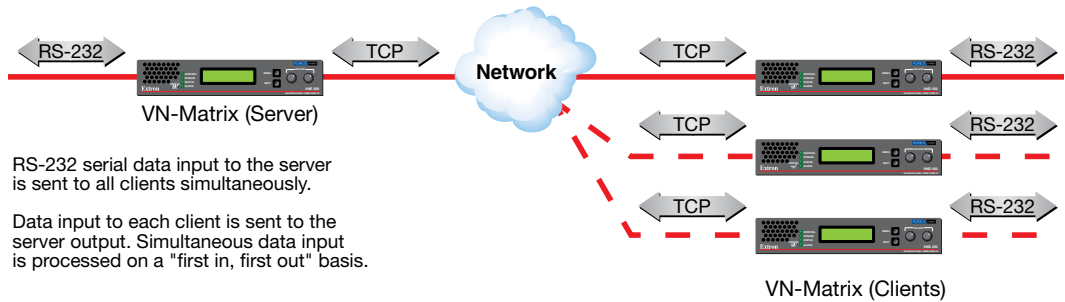


Figure 27. Example of Pass-through Mode

Any number of serial pass-through groups can exist on the same network.

Serial Port Control

Select a serial port mode (see [figure 26, 1](#), on the previous page):

- **none** - the serial port is not used
- **server** - the serial port is used to send serial RS-232 data to clients
- **client** - the serial port can connect to the server serial ports on other devices

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

NOTE: The destination can only be modified when the serial port is operating in client mode. The pulldown list allows a pass-through connection to be requested to each VN-Matrix device in the network, regardless of whether the device is currently configured as a server.

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.

The basic operation parameters of the serial port can be controlled on a device by device basis. There is no requirement for a server and connected client to share a common baud rate. However if serial data is continuously input at a high rate, some handshaking is required otherwise data is discarded when the internal buffer overflows.

Serial RS-232 Data Channel

In this mode, serial RS-232 data received on the pass-through port is transported over the network alongside the video stream. Data flow is unidirectional from the encoder to the decoder and can be recorded synchronously with the other streams that are configured on the encoder.

NOTE: Serial mode for both the encoder and decoder must be set to server.

It is recommended that all serial port settings are the same for both the encoder and decoder. Mismatches result in data being discarded if it arrives at a decoder faster than it can be transmitted.

Mouse & Keyboard Control

VNM 250 products have the capability to forward mouse and keyboard information from a display device to a source device (see [figure 26, ②](#) on page 42). This allows a source (PC) to be controlled remotely from the display location.

The forwarding operation is configured automatically and the display is connected to the source from which video is currently being streamed. The user enables and disables M+K Forwarding by entering a hotkey sequence on the keyboard that is connected to the decoder.

On a VNE 250 device, the mode can take two values, **Enable** and **Disable**. When enabled, the source permits M+K Forwarding. When disabled, all forwarding requests are denied.

On a VND 250 device, the mode can take on one of four values:

- **Disable** - the display does not forward mouse and keyboard information.
- **Keyboard** - the decoder forwards mouse and keyboard information.
- **Keyboard+Keepalive** - this is the same as Keyboard except the link is automatically re-established if broken until explicitly killed by a display hotkey input.
- **Force** - mouse and keyboard forwarding and keepalive is permanently enabled without the need for a hot key sequence.

The destination IP address is automatically configured and the **MK IP** field can be left blank for normal operation.

This screen also shows two items of status. The first status is the current status of the link. On the VNE 250 it is shown as **Disabled**, **Local**, or **Remote M+K**. On the display it is shown as **Disabled**, **Local**, or **Forwarding**. In case of a connection error, a reason is shown in brackets after **Local**.

The second item of status is the inactivity timer. This only operates on the VND 250 and counts the number of seconds since the mouse or keyboard last reported a change. The system controller may choose to drop a "Force" connection after a period of inactivity.

The page does not auto-update so fresh status values are present only after the page is loaded. Click the [Peripherals tab](#) (see page 42) to reload, or press <**F5**>.

License tab

Name	Serial Number	Structure	New Structure	New Checksum
device2001347	2001347	VE.A1.D1.W2.NA.MUND.Z		

UPDATE LICENSE

Figure 28. License Tab

Device License — for a VNM 250 device, the license features are fixed and cannot be modified.

Encoder Tabs

Device tab

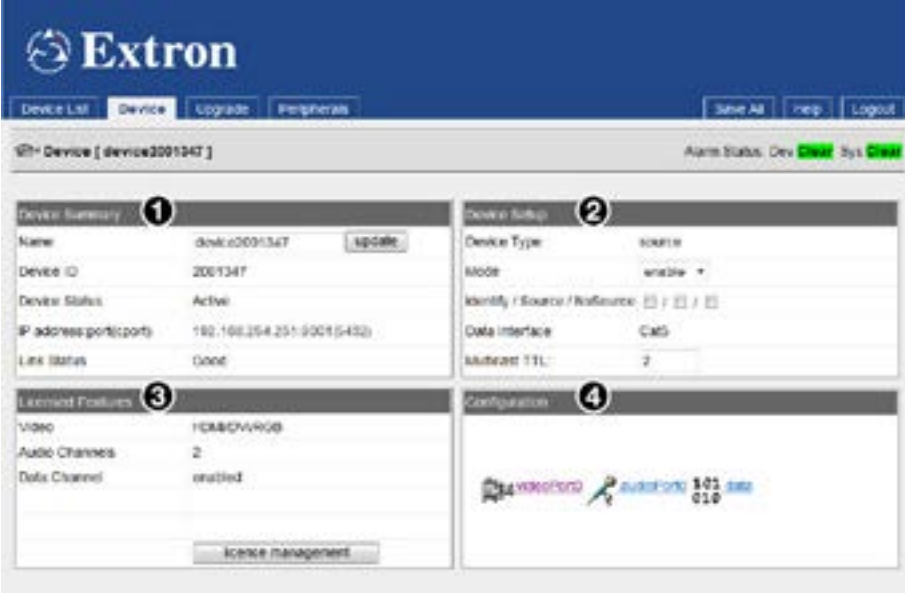


Figure 29. VN-Matrix Encoder Device Tab

Clicking an encoder on the **Device List** tab (see page 36), opens the Encoder **Device** tab, which also has the **Upgrade** and **Peripherals** tabs. The **Accounts** and **Alarms** tabs are no longer available. There are three additional links (**videoPort0**, **audioPort0**, and **data**) are in the **Configuration** panel. The encoder **Device** tab is split into four panels:

Device Summary (see figure 29, ①)— provides information about the device:

- The device can be named by editing the **Name** text box and clicking **Update**. Use any combination of letters, numbers, and the underscore character. Do not use spaces. By default, the device name is the word **device** followed by the device ID.
- The **Device Status** field is read only. The status can be **Active** (a device that is online and under control) or **No Device** (a device that cannot be contacted by the controller).
- The **IP address**, **port**, and **cport** are the current IP address of the streaming port network (LAN 2), the UDP port the device is using to contact the controller, and the UDP port on the controller that is being contacted. This field is read only.
- The **Link Status** can be **Good** (indicates little or no management packet loss), **Fair** (indicates a small amount of packet loss), or **Poor** (indicates a bad link). If the link is poor, determine whether the link has sufficient bandwidth for the traffic.

Device Setup (②) — controls some of the global actions for the device:

- The **Device Type** is a read-only field and shows **Source** for an encoder.
- The **Mode** can be **enable** (normal operation), **disable** (streaming is disabled but pass-through is enabled), or **test** (suspends normal streaming and displays a splash screen with the words **Test Mode**).
- The **Identity/Source/No Source** check boxes allow the device name and source type to be overlaid on the local display. This helps to identify a specific encoder in a large or complex system.
 - **Identity** displays the device name or device ID.
 - **Source** displays the currently detected source format.
 - **No Source** enables the Identity text when no valid source is detected.

- **Data Interface** is a read-only field that reports which of the CAT 5 (by default) or SFP connectors is currently active on LAN 2.
- **Multicast TTL** (Time to Live) defines the number of hops multicast traffic makes between routed domains when it exits a source.

Licensed Features (see [figure 29](#), ③, on the previous page) — allows you to license features on the VNM 250 series of units. Since all VNM 250 units are supplied fully licensed, the **license management** button is not needed by an end user and should not be used.

Configuration (④) — allows you to configure the video attributes of the source (**VideoPort** link), the audio attributes of the source (**AudioPort** link), the data attributes (**Data** link), or the display attributes and source selection.

Video Stream Input Configuration

Click on the **videoPort0** link (④) to configure the video input. The **Configure** tab for videoPort0 opens:

Configure (VideoPort0) tab

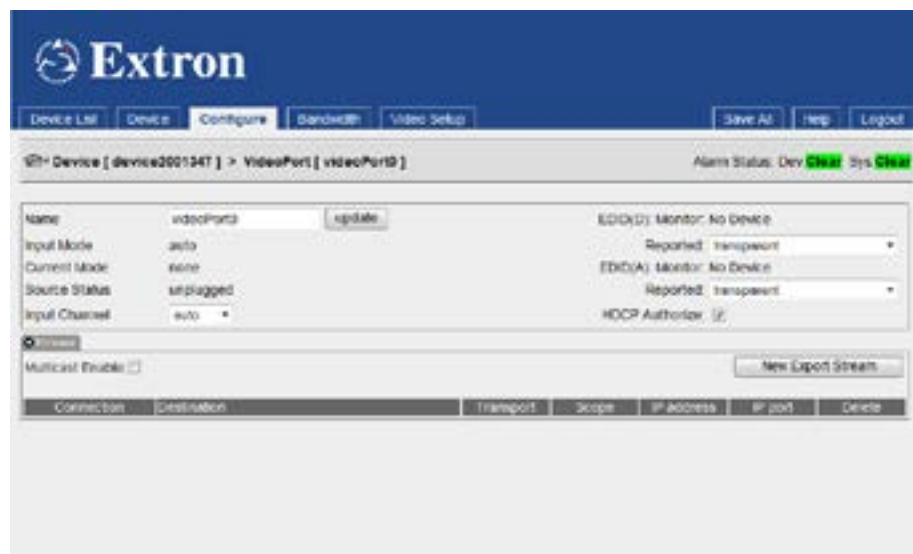


Figure 30. VideoPort0 Tab

The **Device List**, **Device**, **Configure**, **Bandwidth**, and **Video Setup** tabs are available. The **Upgrade** and **Peripherals** are no longer available.

By default the video port is named **videoPort0**. If required, change the name by editing the **Name** field and clicking **update**.

The top panel provides information about:

- **Input Mode** — shows the operating mode of the input. Normally this should show **auto**. It is controlled in the **Video Setup tab** (see page 53).
- **Current Mode** — shows the currently detected source type.
- **Source Status** — describes the video input connection. **Active** means the video source has been recognized at the input. **Unplugged** means either no source is connected or there is no active video signal from the connected source.

Video input — EDID settings

Set the EDID (D) for the digital video input and the EDID (A) for the analog input. In most cases, transparent is the correct option. This allows the EDID data of the loop-through display to pass through the VNE 250 to the source PC.

EDID (D) Monitor shows the name of the display currently connected to the loop-through video connector.

The reported EDID drop down allows selection of the EDID that the encoder reports to the source device. Selecting Transparent mode reports the EDID from the currently connected monitor. If no monitor is connected, the EDID from the last connected monitor is used.

EDID from previously connected displays is stored and may be selected.

Alternatively, you can select one of the fixed EDIDs listed in the drop-down list. Available EDID files are shown in the **Supported EDID Modes** tables (see page 123).

Video input — channel selection

Use the drop-down list to set the **Input Channel** mode to **auto**, **chan-1** (digital), or **chan-2** (analog).

Input Channel	auto
	auto
	chan-1
	chan-2

- **auto** causes the HDMI input to be selected whenever a digital source is detected.
- **chan-1** selects the HDMI input.
- **chan-2** selects the RGB input.

NOTE: Both the analog and digital inputs support full auto-detect of the input signal resolution and frame rate. No user configuration is necessary.

Video input — HDCP authorization

Select or deselect the **HDCP Authorize** check box.

This allows HDCP negotiation to be turned on or off. If the source requires HDCP and this setting is disabled, no image is displayed on the pass-through monitor and no video signal is streamed.

Streams — multicast enable

Select the **Multicast Enable** check box if RTP multicast source streaming is required. Otherwise, ensure the box is deselected, to enable RTP unicast.

If **Multicast Enable** is selected, a dialogue opens asking for a multicast address (see figure to the right). Obtain this from your network administrator.



Streams — New Export Stream

The **New Export Stream** button can be used to configure streaming between devices that are controlled by different system controllers. The VNM Enterprise Controller fully supports this feature and Extron recommends that it be used as the system controller if this function is required.

Managing Compression and Bandwidth Settings

From the **Configure** tab, click on the **Bandwidth** tab:

Bandwidth tab

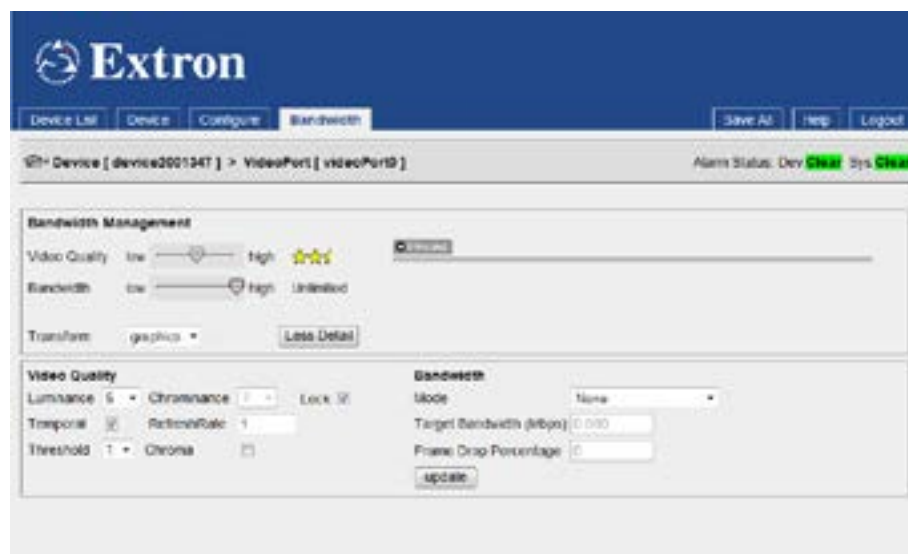


Figure 31. Video Bandwidth Tab

The VNE 250 can apply various types of compression to an input source in order to reduce the volume of source data streamed across the network. In addition, various parameters are provided to manage and, if necessary, limit the amount of data flow to ensure that the available network bandwidth is not exceeded.

The default compression settings applied by the VNE 250 offer a balance between the quality of the displayed material and network bandwidth. Where network bandwidth is restricted, extra compression can be applied. Depending on the source type and content, significant reduction in streamed data can be achieved with little or no perceptible effect on image quality.

Alternatively, where network bandwidth is not an issue, compression can be reduced to provide improved image quality. In most cases, this is not required as the VNE 250 uses highly efficient compression algorithms.

From the **Video Configuration** tab, click on the **Bandwidth** tab. The **Video Setup** tab disappears and the **Bandwidth** tab is highlighted. The **Bandwidth** tab can be set to show two levels of detail, by selecting the **Less Detail** button (see figure 31) or **More Detail** button (which replaces the **Less Detail** button when the GUI window contracts).

Bandwidth Management panel — simple control



Figure 32. Video Bandwidth Tab (Less Detail)

The **Bandwidth Management** panel provides a basic level of control over the encoder compression settings.

The **maximum bit rate** of the streamed image is set with the **Bandwidth** fader. The fader can be adjusted from 1 Mbps to unlimited. The selected maximum bit rate is displayed on the right hand side of the fader bar.

When the fader is set to **unlimited**, the bit rate depends on the complexity (detail and motion) of the source image. As the fader is adjusted to reduce the maximum bit rate, the encoder progressively drops frames in order to limit the instantaneous bit rate. The number of frames dropped depends on the source image complexity.

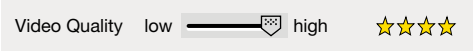
NOTE: Extron advises against using more than 300 Mbps for most applications. Check with your network administrator to determine the available bandwidth.

The **Video Quality** fader adjusts the amount of spatial compression that is applied to the source image. Video Quality is set in steps ranging from low to high quality.

The **low** setting (one star) provides the lowest image quality (with the highest compression).



The **high** setting (four stars) provides the highest image quality (with the lowest compression).



Either of two transform types can be selected using the transform drop-down list:

- **Graphics** is optimized for text and sharp lines, as are present on most computer screens.
- **Video** is optimized for smooth tone changes such as is present in movies and other video content.

Monitoring the bit rate

The bit rate of the streamed image is monitored in the **Streams** pane of the **Bandwidth** tab.

Streams					
#	Destination	Trans	BW(Mbps)	Drop%	RTT(us)
1	VND200_PDTEST.videowindow	rtp(m)	0.000	0.0	0

Figure 33. Bandwidth Streams

The **Streams** list shows network statistics for current RTP streams. For each RTP stream, three values are presented: the transmit bandwidth (BW[Mbps]), the packet drop percentage (Drop %) and the round trip delay time in microseconds (RTT[us]). The transmit bandwidth is the true bandwidth of the source measured over the last second.

All of this data may not have arrived at the destination if the link shows packets are being dropped. Most networks show a small amount of dropped traffic, but when this loss rate rises above 5%, it indicates that the capacity of the link has probably been exceeded. A lightly loaded network shows a fairly constant RTT. When this value starts to rise or fluctuates excessively it indicates the network is congested. Usually when network capacity has just been exceeded, the RTT rises to a large value just before packets start being dropped. The link latency rises as RTT increases.

Video quality and Bandwidth panel — advanced control

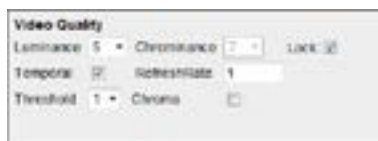


Figure 34. Bandwidth Tab: Video Quality and Bandwidth Panel

The **Video Quality and Bandwidth** panel (click **More Detail**, if necessary) provides a greater degree of control over the encoder compression settings.

These controls are divided into two main categories:

- Video Quality
- Bandwidth

They provide access to the complete set of image quality and bit rate tools for the VNE 250. When controls in this section duplicate controls found in the **Bandwidth Management** panel, the settings in both panels coincide.

Video Quality panel

- **Spatial compression** — this level is set using the **Luminance** and **Chrominance** drop-down lists.

A luminance value of 0 provides the minimum spatial compression; a luminance value of 10 provides the maximum spatial compression.

These controls are normally locked (using the **Lock** check box), with an optimal offset of 2 units between them. If required, the chrominance compression can be set independently by clearing the **Lock** check box.

NOTES:

- By default, the luma and chroma offset is set to 2 whenever the simple (standard) management scheme is selected.
- A spatial compression setting of 4/6 (luma 4; chroma 6) provides visually lossless compression.

- **Temporal compression** — is applied by selecting the **Temporal** check box (this option is selected by default). Temporal compression causes data to be transferred only when a change occurs between frames.
- **Threshold setting** — modifies the detection point of the temporal compression algorithm. A value of 0 results in all changes between frames being sent. As the threshold value is increased, only changes above a certain level are sent, thus reducing the bit rate.

This control compensates for image sources that have a level of noise in them. In general, there is always some noise in any source produced by an analog method. By applying a threshold, this noise can effectively be ignored by the PURE3 compression engine, resulting in a lower transmitted bit rate.

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 a value greater than 1.

- **Chroma setting** — controls whether the temporal algorithm should consider changes in the color or chrominance of the image. Enabling chroma gives better results on digital simulation source types. However, chroma thresholds can increase the transmission bandwidth by up to 20%; therefore, it should be disabled on bandwidth sensitive systems. It is usually not required on video or camera source types.

Bandwidth panel



Figure 35. Bandwidth Tab: Video Quality and Bandwidth Panel

The VNE 250 can apply various control modes to manage the bit rate. These control modes are selected in the **Mode** drop-down list.

- **None** — no bandwidth management policy is followed apart from the underlying compression settings.
- **Manual Frame Drop** — allows the user to specify the precise fraction of frames to drop. This doesn't manage the average bandwidth at a fixed level, but does result in a smoother update during rapidly changing video content types. Enter the percentage of frames to discard in the **Frame Drop Percentage** field. For example, a value of 95 (95%) discards 19 out of every 20 frames, reducing a 60 frames per second (fps) video signal to 3 fps.

NOTE: Slowing the frame rate to 1 fps can cause the decoder to behave as if the source stream has been interrupted and it may flash up the **No Source** splash screen.

- **Shared Flow rate** — limits the total network video traffic for all streams from this source to the flow rate (in Mbps) specified in the **Target Bandwidth** field. Frames are dropped if the instantaneous data rate is higher than the flow rate.
- **Peak Flow rate** — limits the network video traffic for a single stream from this source to the flow rate specified in the **Target Bandwidth** field. Frames are dropped if the instantaneous data rate is higher than the flow rate.
- **PBR-F** — Dynamically modifies the compression settings to limit the transmit bandwidth to the specified rate or below. The specified compression setting is used as the minimum compression value. The filter averages the bit rate over a period of 1 second.
- **PBR-F (FD)** - Same as **PBR-F** except frames are dropped when a larger reduction than can be achieved with just compression settings is required.

Flow rate control modes (shared flow rate and peak flow rate modes) limit the instantaneous traffic on the network and are useful where the network pipe between source and display has limited bandwidth and drops traffic when this rate is exceeded. Non-flow rate control modes (none, manual frame drop, PBR-F, and PBR-F (FD)) limit the average bandwidth, but the instantaneous bandwidth can be high. Non-flowrate control modes are best used on a LAN where the user does not wish the VNE 250 to consume excess bandwidth.

NOTE: The actual bandwidth usage for unicast transports is multiplied by the number of data stream destinations. For example, if the encoder has two unicast RTP connections plus a TCP connection, it sends three data streams across the network and requires bandwidth for each stream.

Video Setup tab

To access the **Video Setup** tab from the **Bandwidth** tab, click on the **Configure** tab and, when that opens, click on the **Video Setup** tab. The **Bandwidth** tab disappears and the **Video Setup** tab is highlighted.

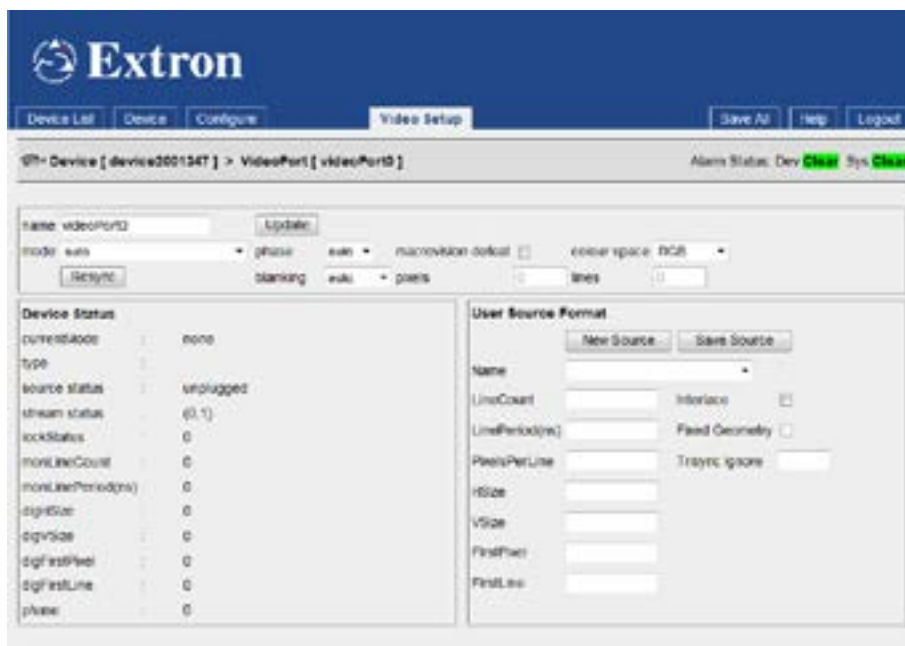


Figure 36. Video Setup Tab

This tab provides access to advanced functions that do not be needed in a typical setup. It reports detailed measurements made of the current source video waveform, allows user source formats to be defined (see [Constructing a custom user source format overview](#) on page 80) and manual setup of phase and blanking for analog sources.

Click **Resync** to restart the autodetection process.

The **phase** setting should normally be **auto**. However, if a waveform suitable for auto-detection is not available, a manual phase adjustment can be imposed. Automatic phase adjustment maximizes the contrast between pixels so good automatic waveforms tend to have adjacent black and white pixels. Phase adjustment is only required on analog sources.

The **macrovision defeat** setting is used when the source is a dvd player and the output has been content protected with the macrovision system. This adds additional sync level pulses to the waveform. These pulses need to be ignored for proper auto-detection. The pass-through output from matrix and the decoded output from the display do not preserve the macrovision content protection.

The **colour space** setting is used to select between **RGB** and **YPbPr** source types. Auto-detection usually succeeds even with the wrong transform selected, however the coloring is incorrect. Currently the YPbPr mode expects the data to be as defined by CCIR.601. This is the normal standard for all standard definition TV signals. If ITU-R BT.709 HDTV signals are used a red or green hue should be expected.

The **blanking** setting should normally be set to **auto**. However, if it is important that pixels on the very edge of the display are visible, then a manual override is required. Once in manual mode the user should enter small positive or negative integers in the **pixels** and **lines** boxes and click **update**. The offsets are made relative to the current User Source Format **firstpixel** and **firstline** values. Blanking adjustment is only required on analog sources.

Audio Stream Configuration

Configure (AudioPort0) tab

To access the **Configure (AudioPort0)** tab, click on the **Device** tab and, when that opens, click on the **AudioPort0** link in the **Configuration** panel (see [figure 29](#), ④, on page 46).

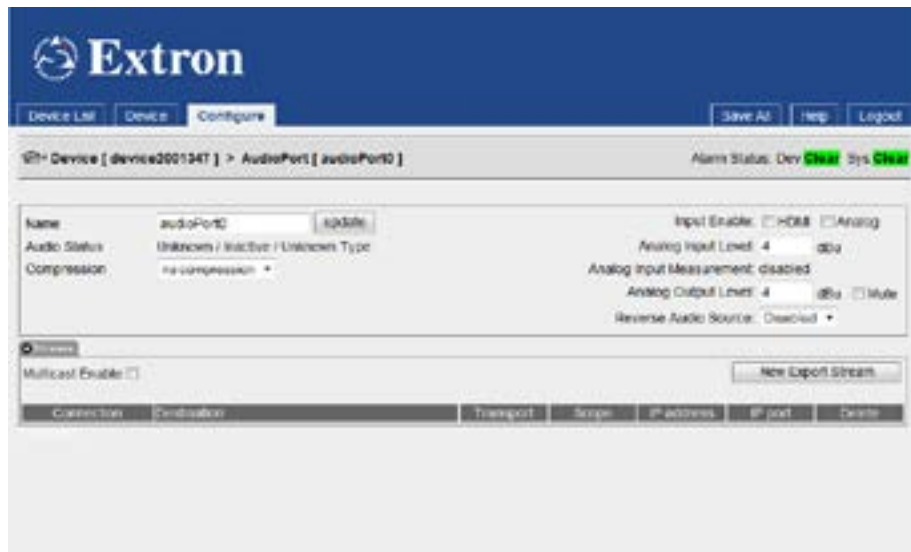


Figure 37. Configure (AudioPort0) Tab

The VNM 250 product range supports both program and return audio.

Program audio inputs may be analog or digital. The HDMI input supports 24 bit stereo PCM audio and AC-3 (Dolby 5.1) digital data at 44.1 kHz and 48.0 kHz sampling rates. The Analog input accepts balanced or unbalanced stereo audio and converts to 16 bit stereo PCM at a 48.0 kHz sampling rate.

Return audio is analog only and, when configured, is always returned from the decoder that is associated with the program audio stream.

The **Configure (Audioport0)** tab provides status information for the active audio input port. In addition, the analog program audio input level and the return audio output level can be adjusted.

- **Name** — Optionally, an audiopoint can be named by editing the **Name** field and clicking **update**. It is not necessary to name this field for normal operation.
- **Audio status** — When a valid digital audio signal is present, the type of the signal appears in the **Audio Status** field.
- **Compression** — Limited compression of audio sources is controlled by the **Compression** setting:

If the source is HDMI AC-3, a run length encoding is used resulting in an output bandwidth of about 430 kbps.

If the source is HDMI PCM, the full set of compression values can be used.

If the source is analog, only compression options **pack 16 bits**, **decimate 2** and **decimate 4** should be used. All other options are functional but increase the data stream bandwidth for no gain.

The following compression values are supported:

Compression	Stereo Audio	AC-3 Audio
no compression	24 bit native data (2975 kbps)	24 bit native data (2975 kbps)
pack 24 bits	24 bit data, full sample rate (2250 kbps)	16 bit data, zeros run length encoded (430 kbps)
pack 20 bits	20 bit data, full sample rate (1880 kbps)	16 bit data, zeros run length encoded (430 kbps)
pack 20 bits	20 bit data, full sample rate (1880 kbps)	16 bit data, zeros run length encoded (430 kbps)
pack 16 bits	16 bit data, full sample rate (1517 kbps)	16 bit data, zeros run length encoded (430 kbps)
decimate 2	16 bit data, 1/2 sample rate (784 kbps)	16 bit data, zeros run length encoded (430 kbps)
decimate 4	16 bit data, 1/4 sample rate (418 kbps)	16 bit data, zeros run length encoded (430 kbps)

The native uncompressed setting passes a full 24 bit payload plus 4 s/pdif control bits updating on a continuous frame basis. Other modes only transmit the specified number of bits and reduce the s/pdif control bits update rate to once per second.

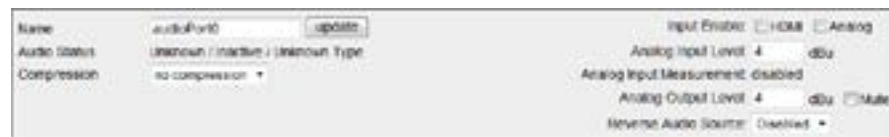


Figure 38.Audio Adjustment Panel

Audio Input Selection

- Audio **Input Enable** selection — only one audio source can be enabled at a time. Select either the **HDMI** or **Analog** check box.
- **Analog Input Level** (program audio) — is configured to achieve an undistorted signal with the optimum signal to noise ratio.

Set the **Analog Input Level** to a value just larger than the maximum value (peak) that is input. The analog input measurement shows the current measured input level and can be used as a reference to help determine the peak input level.

NOTE: This is a peak level adjustment that should be carried out when the input signal is at a maximum level. The program audio stream should be connected to a suitable decoder. If the audio is not being streamed, then the analog input measurement shows **disabled**.

If the analog input measurement shows over-range, the analog input level setting must be increased until the over-range condition clears. If the measurement is more than 2 dB below the set input value, the input value should be reduced to be 1 dB greater.

NOTE: There is no input level control for digital audio. The output level can be adjusted on the decoder.

- **Analog Output Level** (return audio) — a return audio source can be enabled using the **Return Audio Source** drop-down list. When enabled, return audio originates from a decoder that is receiving the program audio from this encoder.

NOTE: The decoder return audio setting must also be enabled. This drop-down list is populated only when a program audio connection has been made to the decoder.

The return audio can be muted and the output level adjusted using the **Analog Output Level** control.

Streams — multicast enable

NOTES:

- It is recommended that all streams (video, audio, and data) use the same transport.
- The same multicast group address can be used for all streams on an encoder.
- The multicast addresses used on each individual encoder must be unique.

Select the **Multicast Enable** check box if RTP multicast streaming is required. Otherwise, ensure the box is deselected, to enable RTP unicast.

If **Multicast Enable** is selected, a dialog opens asking for a multicast address (see the figure to the right). This must be obtained from your network administrator.



Streams — New Export Stream

The **New Export Stream** button is used to configure streaming between devices that are controlled by different system controllers. The VNM Enterprise Controller fully supports this feature and Extron recommends that it be used as the system controller if this function is required.

Configure (Data0) tab

To access the **Configure (Data0)** tab, click on the **Device** tab and, when that opens, click on the **Data0** link in the Configuration panel.

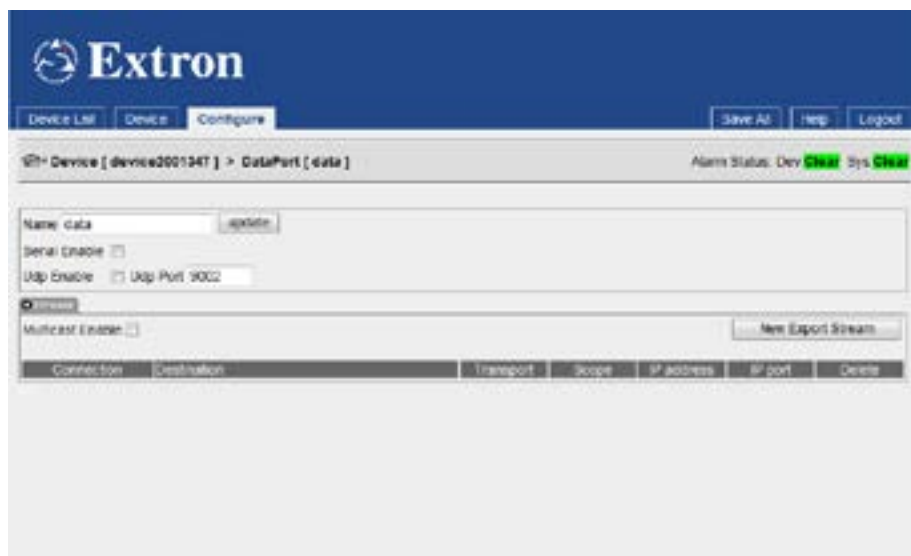


Figure 39. Configure (Data0) Tab

In this mode, data received by an encoder is transported to the decoder, along with video and audio, as part of the source stream. Data transport in this mode is unidirectional and is capable of being recorded and played back by the VNM Recorder and VNR 100 devices.

Two types of data are supported:

- Serial RS-232 data
- Serial UDP data

Serial data transports are connected from encoder to decoder devices and are unidirectional. As with the video and audio streams, serial data streams can use either **unicast** or **multicast** transports. It is recommended that all stream types use the same transport.

NOTE: Serial RS-232 data transport also requires configuration of the corresponding VND 250 device (see [Display tab](#) on page 59).

Serial RS-232 data transport

Serial RS-232 data that originates from an external source is transported alongside the video stream. The external RS-232 device is connected to the RS-232 pass-through connector on the VNE 250.

NOTE: The transport of serial RS-232 data also requires the correct configuration of the VNM 250 serial port and the serial RS-232 port parameters (see [Peripherals tab](#) on page 42).

To enable transport of serial RS-232 data, select the **Serial Enable** option.

Serial UDP data transport

UDP data that originates from an external source is transported alongside the video stream. The external data source must set the destination IP address of the data packets to be the same as the IP address of the encoder that is used for transport.

To enable UDP data transport, on the VNE 250 encoder, select the **UDP Enable** option and configure the UDP port number to match the destination port number that has been set by the external data source.

Streams — multicast enable

Select the **Multicast Enable** check box if RTP multicast source streaming is required. Otherwise, ensure the box is deselected, to enable RTP unicast.

If **Multicast Enable** is selected, a dialog opens asking for a multicast address (see the figure to the right). This should be obtained from your network administrator.



Streams — New Export Stream

The **New Export Stream** button can be used to configure streaming between devices that are controlled by different system controllers. The VNM Enterprise Controller fully supports this feature and Extron recommends that it be used as the system controller if this function is required.

Decoder Tabs

Device tab

Select a decoder in the **Device List** tab and click to open the decoder **Device** page.

The screenshot shows the Extron web interface for the 'Device' tab. At the top, there are tabs for 'Device List', 'Device', 'Upgrade', and 'Peripherals'. The 'Device' tab is selected. Below the tabs, there's a header for 'Device [device2001378]' and 'Alarm Status: Dev OK Sys OK'. The main content area is divided into two columns. The left column, labeled 'Device Summary' with a circled '1', contains fields for Name (device2001378), Device ID (2001378), Device Status (Active), IP address:port:cport (192.168.254.240:9901:5432), and Link Status (Good). The right column, labeled 'Device Setup' with a circled '2', contains fields for Device Type (display), Mode (enable), Identity / Source / No Source (checkboxes), Data Interface (Cat5), and Multicast TTL (2). Below these are sections for 'Learned Features' (Video: HDMI/VI, Audio Channels: 2, Video Scaler: enabled, Data Channel: enabled) and 'Configuration' (display icon).

Figure 40. Decoder Device Tab

The **Device List**, **Device**, **Upgrade**, and **Peripherals** tabs are available. The **Accounts** and **Alarms** tabs are no longer available. The decoder **Device** tab is split into four panels:

Device Summary — provides information about the device (see figure 40, ①):

- If required, the device is named by editing the **Name** text box and clicking **Update**. Use any combination of letters, numbers, and the underscore character. Do not use spaces. By default, the device name is the word **device** followed by the **Device ID**.
- **Device Status** is a read only field. It can be **Active** (a device that is online and under control) or **No Device** (a device that cannot be contacted by the controller).
- The **IP address**, **port**, and **cport** are the current IP address of the streaming port network (LAN 2), the UDP port the device is using to contact the controller, and the UDP port on the controller that is being contacted. This field is read only.
- The link status can be **Good** (indicates little or no management packet loss), **Fair** (indicates a small amount of packet loss), or **Poor** (indicates a bad link). If the link is poor, determine whether the link has sufficient bandwidth for the traffic.

Device Setup — controls some of the global actions for the device (②).

- The **Device Type** is a read-only field and shows **Display** for a decoder.
- **Mode** can be set to **enable** (normal operation), **disable** (for a decoder, the video stream is replaced by a splash screen), **standby** (for a decoder, disables all output), or **test** (suspends normal streaming and displays a splash screen with the words **Test Mode**).
- The **Identity/Source/No Source** check boxes allow the device name and source type to be shown on the local display. This helps to identify a specific encoder in a large or complex system.
 - **Identity** displays the device name or device ID.
 - **Source** displays the name of the encoder that is currently connected.
 - **No Source** enables the Identity text when no valid source is detected.

- **Data Interface** is a read-only field that reports which of the CAT 5 (by default) or SFP connectors is currently active on LAN 2.
- **Multicast TTL** defines how many hops multicast traffic makes between routed domains when it exits a source. If the TTL is not properly configured, information that is to be sent back to a corresponding encoder may fail to function correctly.

Licensed Features — contains the **License Management** button, which is used to license features on the VNM 250 series of units. As all VNM 250 units are supplied fully licensed, this feature is not applicable to an end user and should not be used.

Configuration — contains the **Display0** link (see Display tab below).

Output Configuration

Display tab

Select a decoder in the **Device List** tab. The **Device** tab opens. In the **Configuration** panel, click the **Display0** link:



Figure 41. Display Tab

The **Output Format** drop-down list has three scaling modes (see figure 41, ①):

- **Auto** — sets the display to the same resolution and frame rate as the source stream.
- **Monitor** — sets the decoder output mode to the preferred resolution and frame rate of the output monitor. To operate correctly, this feature requires the monitor to support EDID properly.
- **Fixed** — sets the decoder output mode to the chosen resolution and frame rate as selected from the **Output Format** drop-down list.

NOTE: The **scale** option must be enabled whenever **Monitor** or **Fixed** output formats are selected.

Enable or disable the **Nodata Splash**, **Scale Genlock**, **Clean Switch** and **HDCP Mode** check boxes (②).

- Select **Nodata Splash** to enable a splash screen to be displayed when the display detects a break in the input data stream. When disabled the last decoded frame is displayed. After startup, when no last decoded frame exists a black screen is displayed.

- Select **Scale** to enable the source image to be scaled to the required resolution and frame rate as defined by **Monitor** or the **Fixed** output format that is selected.

NOTE: Scaling is disabled when the output format is set to **auto**.

- The **Genlock** control allows the display output of multiple decoders to be coordinated and creates a genlock group. One VND 250 device is selected as the timing reference for the output of all the other VND 250 devices in the same decoder genlock group. The genlock output from the chosen reference device is connected to the other decoders in a daisy chain architecture.

A network-based protocol enables the chosen VND 250 to coordinate the frame timing so that all decoders display the same frame simultaneously.

- One decoder is selected as the reference (primary) unit, and provides the genlock signal that is used to synchronize all the other (secondary) units.
- The **Genlock** setting on the primary device must be disabled.
- The **Genlock** setting on the secondary devices must be enabled.
- The name of the primary device must be selected from the **Framelock Ref** drop-down list on **all** devices in the genlock group (see **Framelock Ref** below).

Framelock Ref (figure 41, 4, on the previous page) controls membership of the decoder genlock group. Each member of the group is selected to have the same genlock primary device, including the primary device itself. When such a group is formed, a network-based protocol permits the primary device to coordinate frame timing so that all decoders are showing frames captured at exactly the same times. This requires the separate enabling of the genlock feature, as described above.

- The **Clean Switch** feature allows glitch free transitions when switching between decoded streams that may have different resolutions and frame rates. Select the check box to activate this option.

NOTE: When using **Clean Switch** mode, the scale option must be checked and the required output mode must be selected in the **Output Format** drop-down list. **Clean Switch** is not supported when switching to an image from a recorded stream.

- The VND 250 fully supports HDCP. Source images that are HDCP encrypted can only be displayed on an HDCP compliant display. Selecting the **HDCP Mode** option forces HDCP encryption for all stream types. An HDCP compliant display must be used when this option is enabled. If not, a full green screen is displayed for all video streams.

NOTE: Setting this mode improves the **Clean Switch** performance in systems where it is necessary to switch between encrypted and non-encrypted stream types.

Active Format (3) shows the current output mode being used on the display.

- When the **Output Format** is set to **auto**, this field reports the source format for the current stream.
- When the **Output Format** is set to **monitor**, this field reports the source format that has been selected from the EDID of the currently connected display.
- When the **Output Format** is set to **fixed**, this field reports the same mode.

Assigning a video source stream

In a system with multiple encoders, each decoder in that system potentially has access to multiple video streams. To assign a specific source stream to a decoder select one of the available source streams from the video source drop-down list (see the figure to the right).



Each source is listed by the device name and videoPort name, and has a suffix that describes the connection type:

- `_rtp` — is an RTP unicast connection
- `_rtp(m)` — is an RTP multicast connection, if configured
- `_tcp` — is a TCP unicast connection

Selecting a source with an `_rtp` suffix causes the decoder to connect to an RTP stream output by the selected source. The controller automatically connects the data stream to that decoder. If the source IP address is currently set as a multicast group, a multicast RTP stream is used, otherwise an additional unicast RTP stream is created. Each encoder can support up to four unicast RTP output streams. Attempts to connect more than four displays to a unicast source will fail. Multiple unicast RTP connections from a single encoder can cause data errors if the total bandwidth becomes too high.

Selecting a source with a `_tcp` suffix causes the decoder to independently make a TCP stream connection to the selected encoder. This does not require the encoder to have been configured to transmit in multicast or unicast modes.

NOTE: Use either `_rtp` unicast or multicast connections for streaming. TCP transport is not recommended for streaming applications as it is a "guaranteed delivery" protocol, which causes a build up in latency.

Complete the source selection by clicking **Update**.

Clicking the **video**, **audio**, or **data** bandwidth links displays a screen that provides access to configuration settings and bandwidth data for the associated stream.

Assigning an audio source stream

To enable a program audio stream, check the **Audio** check box (❶ in the figure to the right) and click **Update** (see [figure 41](#), ❺, on page 59). The program audio stream is assigned from the same encoder selected for the video stream.



Once enabled, the read only audio source field populates with the name of the program audio stream (❷ in the figure above right). If no name is displayed, either no audio source is available or the check box selection was not implemented by clicking **Update**. The transport for the program audio follows that selected for the video stream. For RTP streams, the multicast option must be configured on the audio port. For further information, see [Decoder audio Bandwidth tab](#) on page 63.

Assigning data source stream

To enable a data stream, check the **Data** check box (❸ in the figure to the right) and click **Update** (see [figure 41](#), ❺). The data stream is assigned from the same encoder selected for the video stream.



Once enabled, the read only data source field populates with the name of the data stream (❹ in the figure above right). If no name is displayed, either no data source is available or the check box selection was not implemented by clicking **Update**. The transport for the data follows that selected for the video stream. For RTP streams, the multicast option must be configured on the data port (see [Decoder data Bandwidth tab](#) on page 65).

Decoder video bandwidth tab

To access the video **Bandwidth** tab from the **Device** tab, click the **Display0** link and, in the **Display** tab, click the **video** link.

Real-time Statistics	Total	Window	Pipeline
Megabits/sec	0.000	0.000	0.000
Packets/sec	0	0	0
Dropped Packets	0	0	0
Interval Time	0	30	5

Figure 42. Video Bandwidth Tab

This page provides statistics on the video stream and allows the decoder video buffer to be monitored and configured, if necessary.

If required, modify the **Window Name** by editing the current value and clicking **Update**. It is not necessary to name this field for normal operation.

Decoder video buffer

The delay time between the data being input to the encoder and output on the decoder is controlled by setting the **Channel Delay** and the **Frame Delay**. The channel delay is unique to each channel of video, audio, or data and is set in seconds. The frame delay can only be modified on the video channel and is converted from frames to seconds depending on the video frame rate that the decoder is currently receiving. The delay time is the sum of these two values and is shown in the **Total Delay** field.

In normal operation on a LAN, **Channel Delay** should be set to 0.0 and **Frame Delay** should be set to 6 frames. This gives an end to end delay of 100ms on a 60 fps signal.

On a WAN the **Channel Delay** parameter should be used to add an amount corresponding to the one-way network delay.

Under normal operational circumstances, there is no requirement to adjust the **Frame Delay** setting and the buffer is managed automatically.

The hardware has a minimum delay requirement of 2.5 frames in progressive mode and 3.5 fields in interlace mode. A **Total Delay** less than these values results in uneven playback and pipeline underflow alarms.

NOTE: There is one exception to this rule — setting the **Total Delay** to 0.0 (zero) places the system in a special minimum-latency mode. When operating with minimum latency, the display attempts to decode data as soon as it arrives. This reduces the elastic feel when using a remote cursor but can cause the display to be more jumpy and the lip sync to an audio stream to be lost.

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

To synchronize channels, either between video and audio on one device or between video channels on multiple devices, the frame delay should be set to 6 and the channel delay to 0. Valid Delay settings can be determined by setting values then checking the Pipeline Status Meter.



Setting is valid and should give a stable image.



Playback delay is too small: the playback image jumps as network loading changes.



Playback delay is too large: the image latency increases and can result in internal buffer overflow on high bandwidth data streams. This causes a jumpy and flashing screen.

Decoder video connection fields

The **Source** field shows the encoder name and the transport type for the current video stream, as selected in the source drop down box (see [Assigning a video source stream](#) on page 61).

Rtp destination reports the network address and port number that the current video stream is connected to. For multicast transports, this field reports the multicast group address.

Rtp source reports the network address and port number that return statistics are sent to. For multicast transports, this field reports the multicast group address.

Decoder video stream statistics

Statistics about the current stream are reported in a table.

- The **Total** column contains counts for the history of the current stream. These statistics are reset each time a new connection is made.
- The **Window1** and **Window2** columns contain stream statistics over user programmable intervals.
- The first row is a count of the number of Megabits per second received from the current stream.
- The second row is a count of the number of data packets per second received from the stream.
- The third row is a count of the number of data packets dropped during the associated interval time. This is always 0 for TCP streams. Dropped packets are counted when using RTP streams on busy networks. However some errors occur when using gigabit networks.
- The fourth row is the interval time over which the previous counts are averaged. The total interval time reports the duration of the current connection session. The remaining two times are user programmable in seconds.

Decoder audio Bandwidth tab

To access the audio **Bandwidth** tab from the **Device** tab, click the **Display0** link and, in the **Display** tab, click the **audio** link.

This page provides access to the audio channel configuration settings. Similar to the Decoder video bandwidth page, it also provides statistics on the audio stream and allows the decoder audio buffer to be monitored and configured, if necessary.

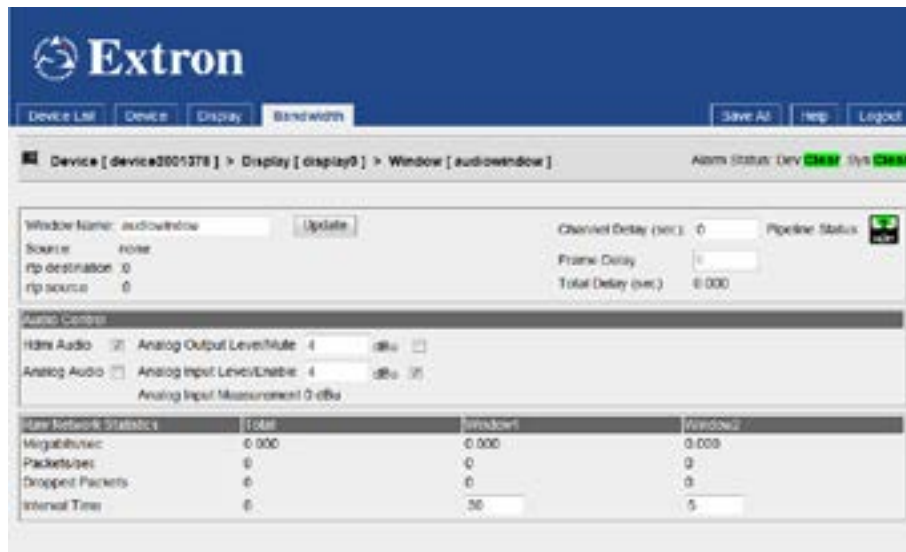


Figure 43. Audio Bandwidth Tab

Audio output selection (Audio Control panel)

Select the appropriate check boxes to output the received audio stream to the **HDMI** port, the **Analog** output port, or both. The HDMI output level cannot be controlled and is equal to the level seen on the encoder device.

The analog audio output level is controlled using **Analog Output Level1**. The output level is correct if the input level on the encoder has been correctly configured for optimum signal level.

Return audio configuration (Audio Control panel)

The return audio input must be separately enabled and the level must be manually configured to achieve an undistorted signal with the optimum signal to noise ratio. The input level is selected using the **Analog Input Level** setting and is set to a value just larger than the maximum input value. If this level is unknown, the **Analog Input Measurement** continuously shows the current input level. If the input measurement shows over-range the input level should be increased until the over-range condition clears. If the measurement is more than 2 dB below the set input value, the input value should be reduced to be 1dB greater. These measurements must be carried out when the content of input signal is at a maximum volume and the stream must be connected to a suitable encoder. If the audio is not being streamed, the measurement shows disabled.

Reverse audio data is always sampled using 16 bits stereo at 48000 Hz. It is then compressed to the "decimate 2" level resulting in a reverse bandwidth of 784 kbps. It uses a "best effort" delivery making no effort to obscure dropped packets and not managing the delay between decoder and encoder.

Decoder audio stream statistics

The audio stream **Statistics** operate in the same ways as the video statistics (see **Decoder video stream statistics** on the previous page).

Decoder audio buffer

The decoder audio buffer operates in the same ways as the video buffer (see **Decoder video buffer** on page 62).

NOTE: The frame delay setting reflects the value that is set in the video buffer and cannot be adjusted.

Decoder audio connection fields

The decoder audio connection fields operate in the same ways as the video connection fields (see [Decoder video connection fields](#) on page 63).

Decoder data Bandwidth tab

To access the data Bandwidth tab from the Device tab, click the **Display0** link and, in the Display tab, click the **data** link.

This page provides access to the data channel configuration settings. As with the Decoder video bandwidth page, it also provides statistics and allows the decoder buffer to be monitored and configured, if necessary.

Extron

Device List Device Display **Bandwidth** Save All Help Logout

Device [device3001378] > Display [display0] > Window [dataWindow] Alarm Status: Dev **OK** Sys **OK**

Window Name: dataWindow Update

Source: none Channel Delay (sec): 0 Pipeline Status: **OK**

RTP destination: 0 Frame Delay: 0

RTP source: 0 Total Delay (sec): 0.000

Serial Enable ☐ Udp Enable ☐ Udp IP: Udp Port: 5002

Real-time Statistics	Total	Window	Window2
Negotiated	0.000	0.000	0.000
Packets	0	0	0
Dropped Packets	0	0	0
Interval Time	0	30	5

Figure 44. Data Bandwidth Tab

Data channel configuration

RS-232 data configuration

Serial Enable — check this box to receive RS-232 serial data.

NOTE: Serial data transport also requires configuration of the corresponding VNE 250 device (see [Configure \(Data0\) tab](#) on page 56) and the serial RS-232 port parameters (see [Peripherals tab](#) on page 42).

UDP data configuration

Udp Enable — check this box to receive UDP data.

Udp IP — enter the IP address of the external device or system that receives UDP traffic. Unicast or multicast addresses are valid.

Udp Port — enter the port number used by the external device or system to receive UDP data.

Decoder data stream statistics

The decoder data stream **Statistics** operate in the same ways as the video statistics (see [Decoder video stream statistics](#) on page 63).

Decoder data buffer

The decoder data buffer operates in the same ways as the video buffer (see [Decoder video buffer](#) on page 62).

NOTE: The frame delay setting reflects the value that is set in the video buffer and cannot be adjusted.

Decoder data connection fields

The decoder data connection fields operate in the same ways as the video connection fields (see [Decoder video connection fields](#) on page 63).

Decoder video format tab

From the Display tab, click the **Format** tab:

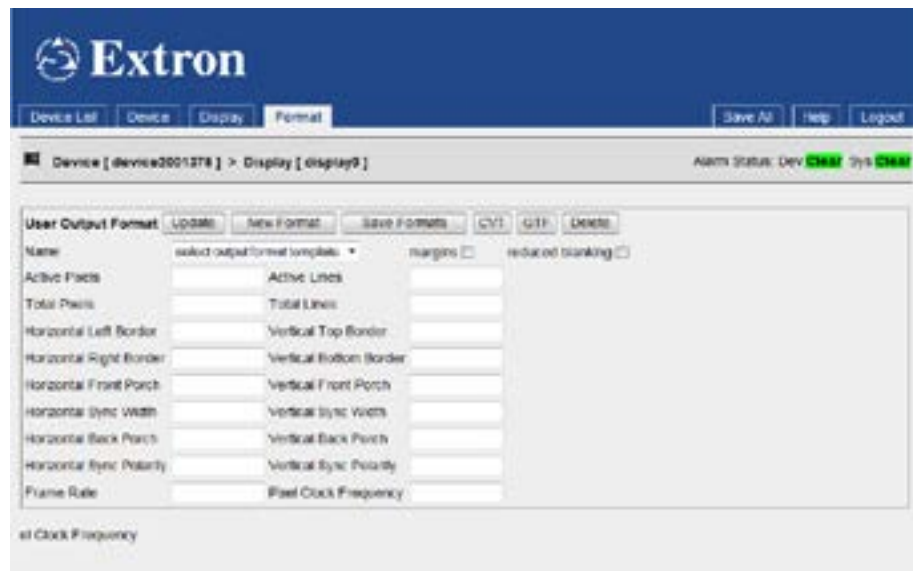
The screenshot shows the Extron web interface for the 'Format' tab. At the top is the Extron logo and navigation tabs: 'Device List', 'Device', 'Display', and 'Format'. Below the tabs, the breadcrumb path is 'Device [device2001278] > Display [display0]'. To the right, the 'Alarm Status' shows 'Dev Clear' and 'Sys Clear'. The main area is titled 'User Output Format' and contains a table with two columns for 'Active Lines' and 'Total Lines'. The table has rows for 'Active Pixels', 'Total Pixels', 'Horizontal Left Border', 'Vertical Top Border', 'Horizontal Right Border', 'Vertical Bottom Border', 'Horizontal Front Porch', 'Vertical Front Porch', 'Horizontal Sync Width', 'Vertical Sync Width', 'Horizontal Back Porch', 'Vertical Back Porch', 'Horizontal Sync Polarity', 'Vertical Sync Polarity', 'Frame Rate', and 'Pixel Clock Frequency'. There are also checkboxes for 'margins' and 'reduced blanking'. At the bottom left, there is a label 'Pixel Clock Frequency'.

Figure 45. Decoder Format Tab

This tab provides two methods to create new formats for displaying decoded video streams:

- Clone an existing mode and modify some parameters.
- Create a new CVT mode by entering a complete set of new values (see [Creating a CVT output mode](#) on page 84).

Configuration with the VNM 250 GUI

This section provides information about configuring the VN Matrix system with the VNM 250 GUI control interface.

NOTE: The VNM 250 GUI control interface should only be used with small systems (10 devices or fewer). For larger systems, the VNM Enterprise Controller must be used.

- [Configuring a VNE 250](#)
- [Configuring a VND 250](#)
- [Custom Input and Output Modes](#)
- [Upgrading Firmware](#)
- [Configuring KVM Functionality](#)
- [RS-232 Pass-through Configuration](#)

Configuring a VNE 250

1. Ensure that a source device (analog or HDMI) is connected to the encoder (see [Video Connections](#) on page 21).
If required, connect a loop-through display.
2. If required, ensure that the analog program audio input is connected (see [Audio Connections](#) on page 22).
3. If required, ensure that the return audio output is connected.
4. Open the [VNM 250 GUI Login](#) (see page 34).
5. In the [Device List tab](#) (see page 36), click on the VNE 250 you wish to configure. The Device tab opens.
6. Ensure the Mode is set to **enable** in the Device Setup panel (see figure 46, ❶):



Figure 46. Device Setup Panel

7. Configure the on-screen text overlay, which appears on the pass-through monitor, as required (see figure 46, ❷).
8. Click the **Save All** tab.

Configuring Encoder Video

9. In the Configuration panel, click on **VideoPort0** (see figure 47, ❶):



Figure 47. Device Configuration Panel

The Configure tab opens with video options.

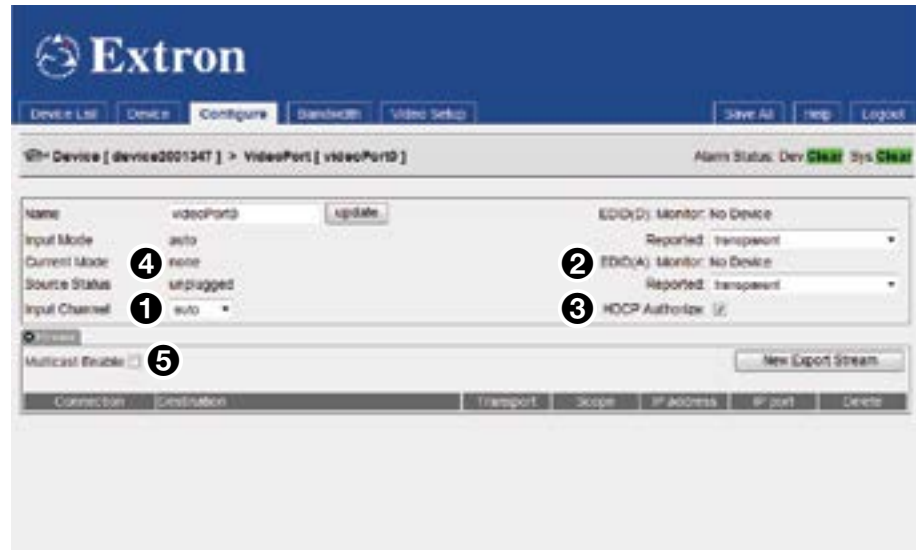
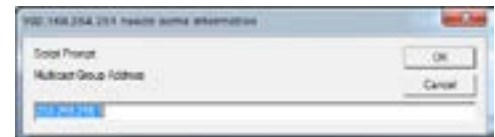


Figure 48. Configure Tab (Video Options)

10. Ensure the Input Channel is set to **auto** (see figure 48, ❶).
11. Set the EDID (D) for the digital video input and the EDID (A) for the analog input, as required (see figure 48, ❷).
12. If a digital source with HDCP is connected, ensure that the **HDCP Authorize** box is selected (❸).
13. Ensure the Current Mode shows the format of the connected source (❹).
14. If **RTP multicast** source streaming is required, select the **Multicast Enable** box (❺). A dialog is displayed asking for a multicast address (see the figure to the right). This must be obtained from your network administrator.



If **RTP unicast** is required, ensure the **Multicast Enable** box is deselected.

Managing Compression and Bandwidth Settings

1. Open the encoder **Bandwidth** tab.

For more information about the **Bandwidth tab**, see page 49.

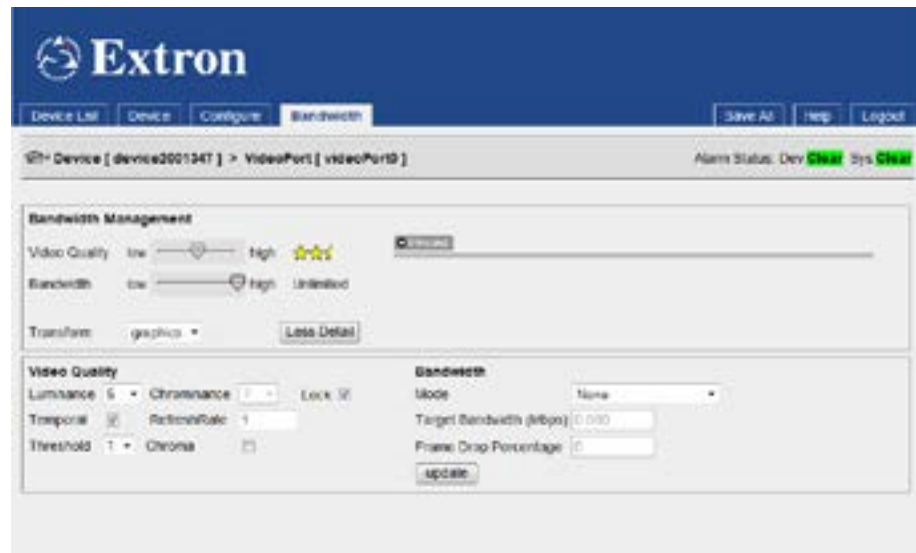


Figure 49. Encoder Video Bandwidth Tab

NOTE: When this page opens, only the Bandwidth Management panel is visible. Click the **More Detail** button to display the Video Quality and Bandwidth panel. When this panel is visible, the text on the button changes to **Less Detail**.

Bandwidth Management – Simple Control



Figure 50. Encoder Video Bandwidth Tab Less Detail

Video quality and bandwidth

2. Adjust the maximum bit rate, using the **Bandwidth** fader (see figure 50, ②), which can be adjusted from unlimited to 1 Mbps. The selected maximum bit rate is displayed on the right hand side of the fader bar.
3. Adjust the amount of spatial compression that is applied to the source image, using the **Video Quality** fader (see figure 50, ①).
4. Set the **Transform** type (③):
 - **Graphics** is optimized for text and sharp lines, (typically computer input).
 - **Video** is optimized for smooth tone changes (typically video content).
5. The bit rate of the streamed image is monitored at the **Streams** information area of the **Bandwidth** page (④). For more information, see **Monitoring the bit rate** (see page 50).

NOTE: The **Streams** information area is only populated once a connection is made to a decoder.

Bandwidth Management – Advanced Control

6. If necessary, click **More Detail** to open the Video Quality and Bandwidth panel:



Figure 51. Encoder Video Bandwidth Tab Advanced Control

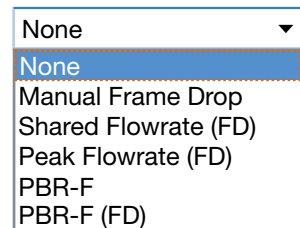
Spatial compression luminance and chrominance settings

7. Set the Luminance (see figure 51, ①) and Chrominance (②) values from the appropriate drop-down list. These controls are normally locked, using the **Lock** check box (③), with an offset of 2 units between them.
- A Luminance value of 0 provides the minimum spatial compression; a Luminance value of 10 provides the maximum spatial compression.
8. If required, the Chrominance compression can be set independently by clearing the **Lock** check box. A spatial compression setting of 4/6 (luma 4; chroma 6) provides visually lossless compression.
9. Apply temporal compression by selecting the **Temporal** check box (④). By default, this option is selected.
10. Adjust the **Threshold** (⑤) to modify the detection point of the temporal compression algorithm. A value of 0 results in all changes between frames being sent. As the threshold value is increased, only changes above a certain level are sent, thus reducing the bit rate.

NOTE: This control compensates for sources with high levels of noise.

11. Enable **Chroma** (⑥) to determine whether the temporal algorithm should consider changes in the color or chrominance of the image. Enabling **Chroma** gives better results on digital simulation type sources but results in a higher bit rate for any given compression.
12. Adjust the **Refresh Rate** (⑦) to control how frequently the non-changing parts of the screen are updated in temporal compression mode. A refresh rate setting of 1 is suitable for most applications.
13. If it is necessary to set a bit rate limit, select the control mode from the **Mode** drop-down box (⑧) and see the figure at right).

See **Bandwidth Management panel – simple control** on page 49 for a complete explanation of these options.



Configuring Encoder Audio

1. Click on the **Device** tab.
2. In the Configuration panel, click on **audioPort0** (see figure 52, ❶):



Figure 52. Device Configuration Panel

The Configure tab opens with audio options.

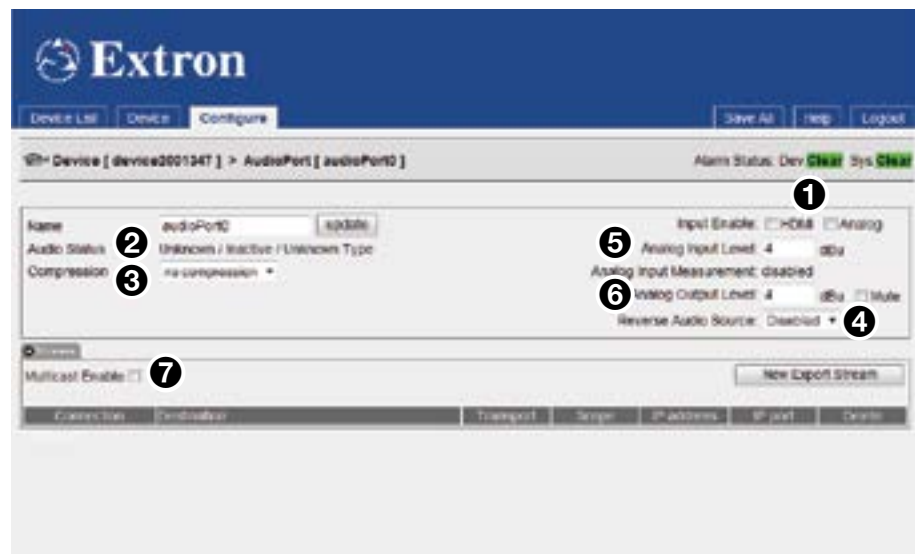


Figure 53. Configure Tab (Audio Options)

3. Select the audio source by checking either the **HDMI** or **Analog** box (see figure 53, ❶).
4. Ensure the Audio Status shows a valid audio source type (❷). If it does not, see [Audio Input Selection](#) on page 55.
5. Ensure that Compression is set to no compression (❸).
6. If a reverse audio signal is required, select a source from the Reverse Audio Source drop-down list (❹).

NOTE: This menu is only populated when a program audio stream is enabled and connected on the corresponding decoder, which must also have return audio enabled.

7. Set the program audio Analog Input Level (❺) and the Analog Output Level (❻) to obtain an undistorted signal with optimum signal to noise (see [Analog input level \(program audio\)](#) on page 55 and [Analog output level \(return audio\)](#) on page 56).

8. If RTP multicast source streaming is required, select **Multicast Enable** (see [figure 53](#), ⑦ on the previous page). If RTP unicast is required, ensure the box is not selected.

ATTENTION:

- Use the same transport type for all streams. Check that the **Multicast Enable** setting on the data tab is the same as that on the video (see [step 14](#) on page 68).
- Veuillez utiliser le même type de transport pour tous les flux. Vérifiez que le paramètre « Multicast Enable » sur l'onglet de données est identique que sur la vidéo (voir [étape 14](#), à la page 68).

Configuring Encoder Data

1. Click on the **Device** tab.
2. In the Configuration panel, click on **data** (see figure 54, ①):



Figure 54. Device Configuration Panel

The Configure tab opens with data options.

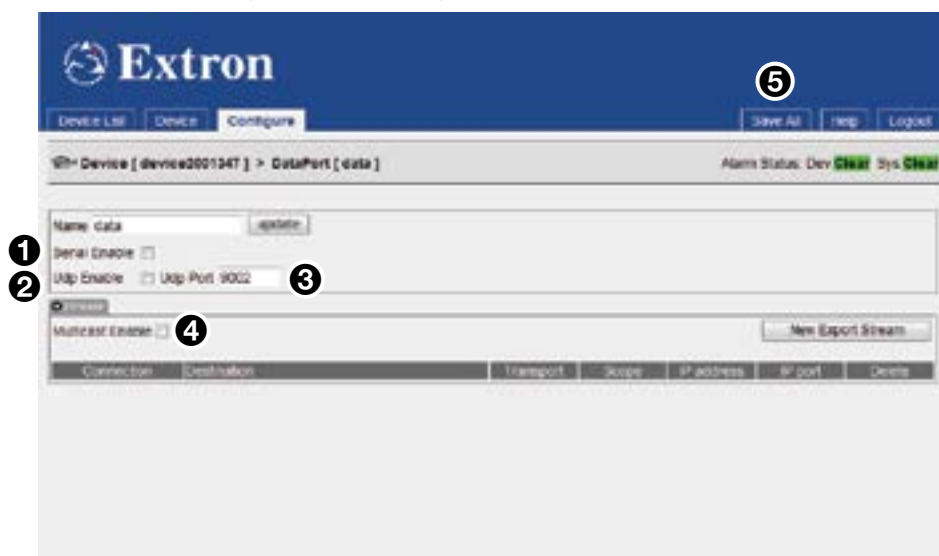


Figure 55. Configure Tab (Data Options)

3. If required, check the **Serial Enable** box (see figure 55, ①).
4. If required, check the **Udp Enable** box (②).
5. If required, enter a value for the **Udp port** number (③).

6. If RTP multicast source streaming is required, select the **Multicast Enable** box (see [figure 55](#), [4](#) on the previous page). If RTP unicast is required, ensure the box is not selected.

ATTENTION:

- Use the same transport type for all streams. Check that the **Multicast Enable** setting on the data tab is the same as that on the video (see [step 14](#) on page 68).
- Veuillez utiliser le même type de transport pour tous les flux. Vérifiez que le paramètre « Multicast Enable » sur l'onglet de données est identique que sur la vidéo (voir [étape 14](#), à la page 68).

7. Click the **Save All** tab (see [5](#)).
8. Encoder setup is now complete. Repeat this procedure for each encoder in the system.

Configuring a VND 250

1. Ensure that an HDMI display device is connected to the decoder (see [Video Connections](#) on page 21).
2. If required, ensure that the analog program audio output is connected (see [Audio Connections](#) on page 22).
3. If required, ensure that the return audio input is connected.
4. Open the [VNM 250 GUI Login](#) on page 34.
5. In the **Device List tab** (see page 36), click on the VND 250 you wish to configure. The **Device tab** opens (see page 58).
6. Ensure the **Mode** is set to **enable** in the **Device Setup** panel (see figure 56, [1](#)):



Figure 56. Device Setup Panel

7. Configure the on-screen text overlay, as required ([2](#)), and see [Device Setup](#) on page 58).
8. Click the **Save All** tab.

Configuring the Decoder Display

1. In the Configuration panel, click on **display0** (see figure 57, ❶):



Figure 57. Device Configuration Panel

The Display tab opens with display options (see figure 58 and [Display tab](#) on page 59).

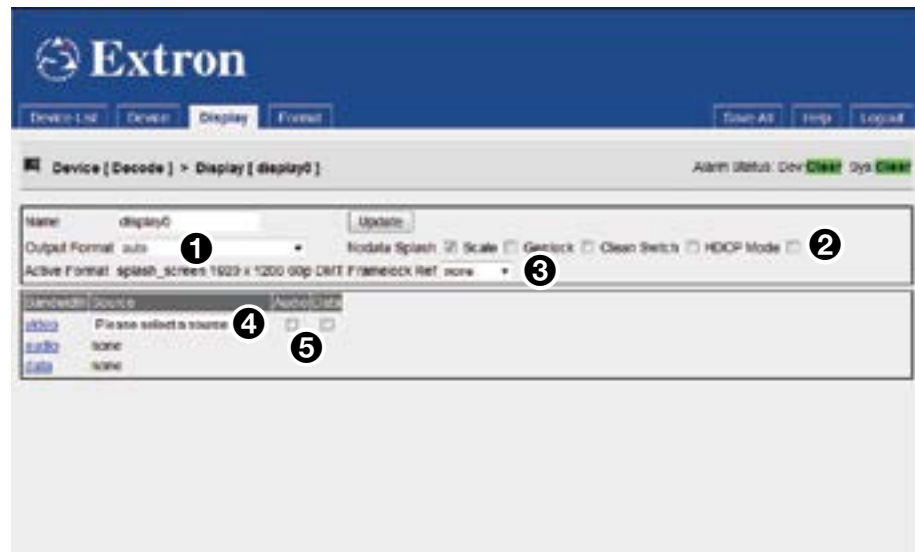


Figure 58. Display Tab

2. Set the **Output Format** from the drop-down list (see figure 58, ❶):
 - **Auto** — sets the display to the same resolution and refresh rate as the source stream.
 - **Monitor** — sets the decoder output mode to the preferred resolution and frame rate of the output monitor. To operate correctly, this feature requires the monitor to support EDID properly.
 - **Fixed** — sets the decoder output mode to the chosen resolution and frame rate as selected from the drop-down list.

NOTE: The **scale** option must be enabled whenever **Monitor** or **Fixed** output formats are selected.

3. Enable or disable the **Nodata Splash**, **Scale**, **Genlock**, **Clean Switch**, and **HDCP Mode** check boxes (❷). For more information, see [Display tab check boxes](#) on page 59.

4. If required, use the **FrameLock Ref** drop-down list (see [figure 58](#), ③, on the previous page) to set up membership of a decoder genlock group (see [FrameLock Ref](#) on page 60).
5. Select a video source from the **Source** drop-down list (④).
6. If required, select the **audio** and **data** check boxes (⑤).
7. Click the **Save All** tab.

Monitoring the Decoder Video Bandwidth



Figure 59. Decoder Bandwidth (video) Link

1. In the **Display** tab, select a video source from the drop-down list (see [figure 59](#), ①).
2. Click the **video** link (②). The **Bandwidth (video)** tab opens (see [figure 60](#)):

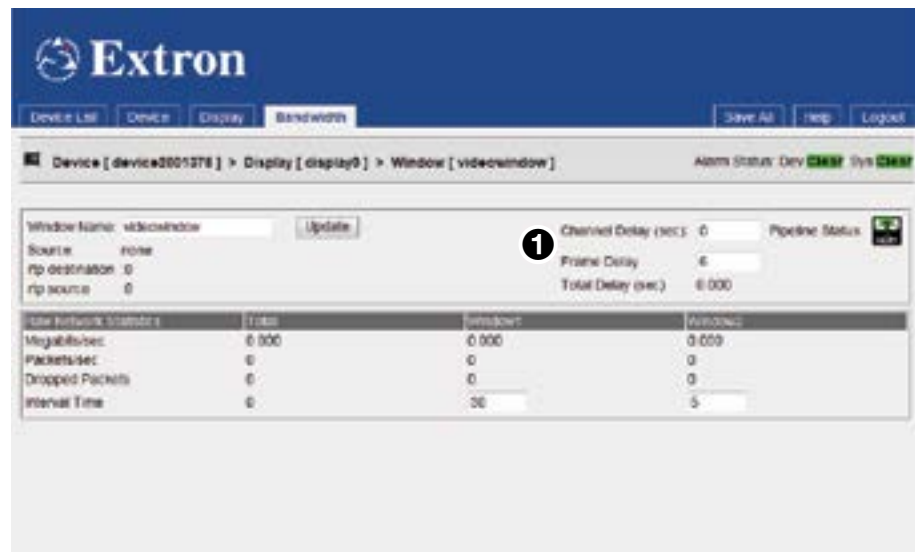


Figure 60. Bandwidth (video) Tab

3. Set the **Channel Delay** and **Frame Delay** (see [figure 60](#), ①). For more information about the **Bandwidth (video)** tab, see [Decoder video bandwidth tab](#) on page 62.
4. Save the changes by clicking **Save All**.

NOTE: The active status information on the video **Bandwidth** page only updates if a video source is selected in step 1 above.

Configuring the Decoder Audio



Figure 61. Decoder Audio Bandwidth Link

1. In the Display tab, ensure that the **Audio** check box (see figure 61, ❶) is selected.
2. Click the bandwidth **audio** link (❷). The Bandwidth (audio) tab opens. This is the same as the Bandwidth (video) tab but has an Audio Control panel (see figure 62):

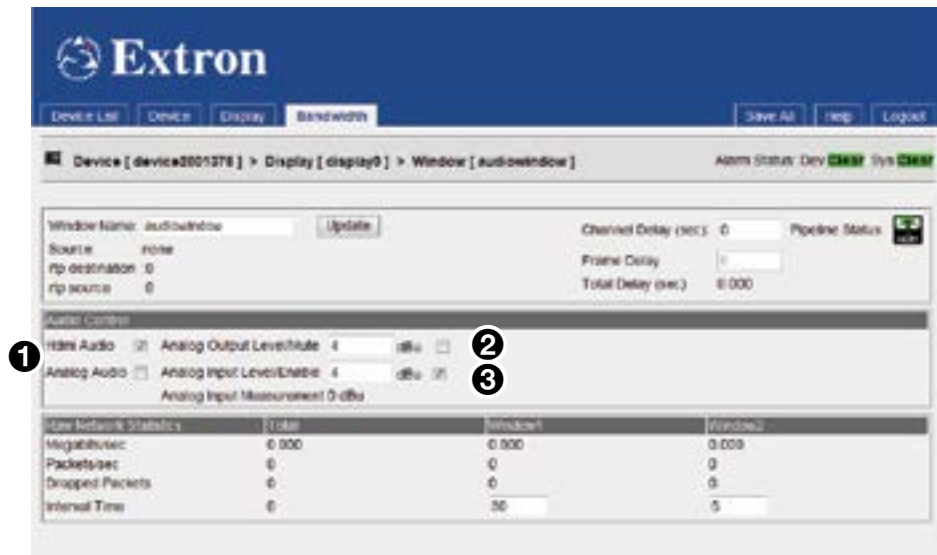


Figure 62. Bandwidth (audio) Tab

3. Select the appropriate check boxes to output the received audio stream to the HDMI port, the Analog output port or both (see figure 62, ❶).
4. The analog audio output level is controlled using Analog Output Level/Mute (❷). The output level is correct if the input level on the encoder was correctly configured for optimum signal.
5. Select the input level for the reverse audio, using Analog Input Level/Enable (❸). Set the value just larger than the maximum value that is being input. (For more information about the Bandwidth (audio) tab, see [Decoder audio Bandwidth tab](#) on page 63.)
6. Click **Save All** to save the changes.

NOTES:

- The active status information on this page updates only if the **audio** check box is selected in step 1, above.
- If the check box was not selected, no audio signal is carried by the selected stream and there is no audio output by the VND 250, even if the **HDMI** or **Analog** Audio boxes are selected.

Configuring the Decoder Data



Figure 63. Decoder Data Bandwidth Link

1. In the Display tab, ensure that the **Data** check box (see figure 63, ❶) is selected.
2. Click the bandwidth **data** link (❷). The Bandwidth (data) tab opens. This is the same as the Bandwidth (audio) tab but has a Data Control panel (see figure 64):

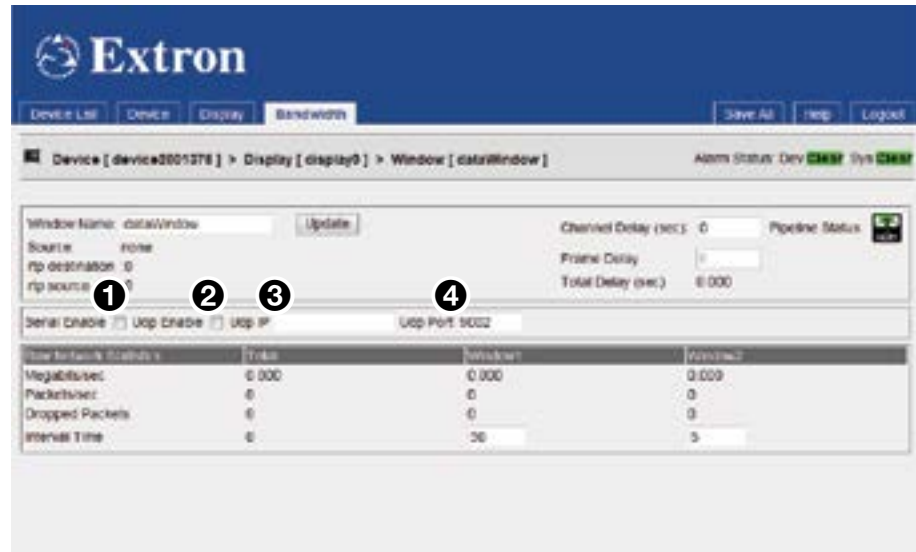


Figure 64. Bandwidth (data) Tab

3. If required, check the **Serial Enable** (see figure 64, ❶) and **Udp Enable** (❷) check boxes, and enter the Udp IP address (❸) and UDP Port number (❹). (For more information about these choices, see [Decoder data Bandwidth tab](#) on page 65.)
4. Click **Save All** to save the changes.

Custom Input and Output Modes

For most applications, the source input of the VNE 250 is set to auto mode. This enables the encoder to detect the electrical and timing characteristics of the input signal and determine the exact source type. It then invokes the appropriate input parameters for optimum processing of that source.

This also has the advantage of changing the input setup automatically, without user intervention, if the input source changes to another source type (for example, if the input is derived from a source switcher).

While the auto mode works with most standard video and graphics standards, there are circumstances (particularly with analog sources) in which additional fine-tuning may be required. For example, when the source:

- Is an RGB (sync on green) or YPrPb source type
- Has Macrovision copy protection
- Does not have a completely standard signal format

In extreme circumstances, it may be necessary to create a custom user source format (see [Constructing a custom user source format overview](#) on page 80). For example, when a source:

- Is completely non-standard
- Has a poor quality signal

NOTE: The advanced source setup procedures described here are only required for analog sources. For digital sources, the input mode is always set to auto.

Video Setup Page

All advanced source setup is performed with the [Video Setup tab](#) on page 53. To access the **Video Setup** tab, select an encoder from the **Device List** tab. When the **Device** tab opens, click on the **videoPort0** link. When the **Configure** tab opens, click the **Video Setup** tab:

The screenshot shows the Extron VNM 250 web interface. The top navigation bar includes 'Device List', 'Device', 'Configure', and 'Video Setup' (which is active). Below the navigation bar, the breadcrumb path is 'Device [device2001347] > VideoPort [videoPort0]'. The main content area is divided into several sections. At the top, there are input fields for 'name' (videoPort0), 'mode' (auto), 'phase' (auto), 'macrovision default' (checkbox), 'color space' (RGB), and 'blanking' (auto). There are also 'Update' and 'Recycle' buttons. Below this is a 'Device Status' section with a table of status indicators: currentMode (none), type (none), source status (unplugged), stream status (0/1), lock status (0), monitorCount (0), monitorPeriods (0), signal (0), signalSize (0), signalFirstLine (0), signalFirstLine (0), and phase (0). To the right of the status section is the 'User Source Format' section, which includes 'New Source' and 'Save Source' buttons, and input fields for Name, LineCount, LinePeriod, PixelsPerLine, HSize, VSize, FirstPixel, and FirstLine. There are also checkboxes for 'Interlace' and 'Fixed Geometry', and a 'Tray sync ignore' checkbox.

Figure 65. Video Setup Page



Figure 66. Advanced Video Setup

For most source types select **auto** from the **mode** drop-down list (see figure 66, ❶), allowing full auto-detection of the source. To apply a fixed input mode, select the required mode from the **mode** drop-down list and click **Update** or the **Save All** tab.

NOTE: Selecting a fixed input mode disables the auto-detect function.

Fine-tuning a source (manual overrides)

The following adjustments are manual overrides of the selected source format. The adjustments are not saved as part of the current source mode and after they are applied, remain active until they are changed.

Manual overrides

- **Phase** (pixel clock) (❷) — When an analog graphics signal is digitized, it is essential that each pixel be sampled as close to its center as possible in order to obtain a stable value. Sampling too close to a pixel boundary causes unreliable data capture and results in noise or artifacts, especially between pixels of significantly different hue or intensity.

Normally phase is set to auto, allowing the VNE 250 to determine the optimum pixel clock phase. If the auto setting is unsatisfactory for any reason, try adjusting the phase manually. The phase is determined by selecting a value between 0 and 31. Positive numbers advance the clock phase relative to the start of the active line; it is not possible to select negative numbers.

TIP: Optimum phase adjustment is easier to establish when a suitable test pattern is displayed. Typically, this contains a series of alternating black and white vertical lines at one pixel intervals.

- **Macrovision defeat** (❸) — Macrovision copy protection is often applied to commercially produced videos and DVDs. This adds additional sync-level pulses to the video waveform that need to be ignored for proper auto-detection.

If you know (or suspect) that your source material has Macrovision encoding, select the Macrovision defeat option. Leave this parameter unchecked for all other sources. Checking this parameter for non-Macrovision sources can result in tearing at the top of the image.

- **Blanking** (image positioning) (❹) — In analog video and graphics sources, active video occupies an area in the middle of the video frame. Around this is an area used for horizontal and vertical blanking signals.

The VNE 250 ignores the blanking area and digitizes only the active video area. To do this, it needs to know the position of the first active line of video and the first active pixel on that line. This is controlled by the blanking parameter (normally set to auto), that allows the encoder to calculate the values automatically.

If required, the calculated values for the first line and first pixel can be adjusted by applying a manual offset. To do this, set **blanking** to manual and type a positive or negative integer value into the **pixels** or **lines** fields as required, then click **Update**.

NOTE: The offsets are made relative to the current source format “digFirstPixel” and “digFirstLine” values (see figure 65 on the previous page).

- **Color space** (RGB/YPrPb) (see [figure 66](#), [5](#) on the previous page) — Because of the similarity between analog RGsB (sync on green) and component YPrPb signals, sources using these formats may not auto-detect correctly. RGsB and YPrPb sources have different color spaces and if the wrong setup is applied the resulting image, although stable, has a red or green color cast. Set **color space** to either RGB or YPrPb as required.
- **Resync** ([6](#)) — Click **Resync** to force an auto-detection of the source signal.

Custom Input Modes

There might be instances in which a VNE 250 cannot detect an input source. For example:

- An unrecognized input source that is not defined in the **User Source Format** of the encoder.
- The timing of the input source deviates from the standard timings for that signal.

In these situations, you need to create a custom input mode for the new source.

NOTE: Custom input modes are necessary only for analog sources. A VN-Matrix automatically creates custom input modes for HDMI sources based on their EDID.

Setting the EDID mode

It is easier to configure the custom input mode if the EDID mode on the VNE 250 is set correctly. To set the EDID mode, perform the following steps:

1. From the **Device List**, select the required encoder.
2. When the **Device** tab opens, click on the **videoPort0** link (see [figure 30](#) on page 47).
3. In the **Reported EDID** drop-down list, select the appropriate EDID mode. In most cases, this is **transparent**, which allows the EDID data of the display to pass through the matrix to the source PC.
4. Reboot the source PC to ensure it reads the correct EDID selection.

TIP: The EDID of your monitor has a significant effect on the mode that your graphics card displays. Also, the mode selected on the source PC may not produce the expected output resolution. For example, if the EDID of a monitor does not report any wide screen modes, your graphics card may still allow resolutions such as 1280x960, 1280x768, or 1280x720.

In this instance, the PC may output 1280x1024, and letterbox the wide screen image so it is vertically centered on the monitor. Therefore, although you have selected a mode such as 1280x960 on the computer, the VN-Matrix and your monitor detect this as 1280x1024. In this situation, creating a custom input mode is unnecessary, because the VN-Matrix has detected a valid 1280x1024 input mode. The VN-Matrix may ignore the mode because it has already found an internal mode that correctly captured the source.

Constructing a custom user source format overview

There are four basic steps to create a custom user source format:

1. Configure a source to display the unrecognized source format and connect it to the VN-Matrix encoder.
2. Create a custom input mode to match the resolution and timing of the source.
3. Verify that the encoder can automatically detect (auto-detect) the source format created in step 2.

4. Fine-tune the custom input mode.

NOTE: After the custom input mode is created for the VNE 250, you may need to create a custom output mode to match.

TIPS: It is recommended that:

- When creating a custom input mode, monitors are connected to both the video loop-out of the VNE 250 and the video output of the VND 250.
- The same monitors be used in the final system configuration.
- The monitor connected to the loop-out of the VNE 250 should be connected to the HDMI output. This negates auto-detect errors that would exist if the monitor was driven from the analog output.

Constructing a custom user source format

1. From the **Device List**, select the required encoder.
2. When the **Device** tab opens, click on the **videoPort0** link.
3. When the **Configure** tab opens, click the **Video Setup** tab.



Figure 67. Constructing a Custom User Source Format

4. Set the phase (see figure 67, ①), macrovision defeat (②), and color space (③) settings as desired (see [Manual overrides](#) on page 79).

NOTE: The above values are not saved as part of the source format; they are global settings saved for the mode selected in the mode drop-down list. If auto is selected from the mode drop-down list, the settings apply to any detected mode.

5. Set blanking (④) to **auto**.

6. Select a source type similar to the desired source type in the **Name** field of the **User Source Format** panel (see figure 68, ❶). If an existing (incorrect) mode was detected and displayed in the **currentMode** field of the **Device Status** panel, select that mode from the drop-down list. This acts as a baseline for the custom source format.



Figure 68. User Source Format Panel

7. Click **New Source** (❷). Enter a name for the new source in the popup box that opens and click **OK** (see the figure to the right). Suggested naming scheme is HresxVres_Frequency_Timing; for example, 1360x768_60Hz_CVT.
8. Select **Interlace** mode or leave the box blank for progressive (❸).
9. Some source types do not show content over their full active areas or have content which shows poorly defined edges and contrast. These types of sources should have **Fixed Geometry** (❹) checked. These source types are matched solely on sync timings not on active video timings. The Fixed Geometry option cannot be edited by the user at this time.
10. If configuring a HD video mode that uses TriSync, set the **Trisync Ignore** field (❺) to 100. Otherwise, leave it at 0.



HDTV sources with embedded synchronization data use a modified synchronization system called trisync. The synchronization pulse makes excursions into the active video area, causing the active area measurements to fail unless the pulses are ignored. Setting **Trisync Ignore** to 100 causes the active video detection logic to ignore any data until 2*100 pixels after the start of the horizontal sync pulse. 100 is a suitable setting for 1080i. This should always be set to zero unless it is known trisync is being used.

11. Copy the **monLineCount** value from the **Device Status** panel to the **User Source Format LineCount** field (❻).
12. Copy **monLinePeriod** from the **Device Status** panel to the **User Source Format LinePeriod** field (❼).
13. Enter the pixels per line in the **Pixels Per Line** field (❽). If this is unknown, consult a VESA timing chart, or calculate the value by using the following formula:

(Horizontal location of first pixel - 1 + pixels per line of detected source) * (1+[desired mode hsize - digHSize]/digHSize).

For example, if the new mode you are creating has a resolution of 1360x768, but 1280x768 is the detected mode and digFirstPixel is 401, the formula would be:

$$\begin{aligned}
 &(401 - 1 + 1280) * (1 + [1360 - 1280] / 1280) = \\
 &1680 * (1 + 0.0625) = \\
 &1680 * (1.0625) = 1785
 \end{aligned}$$

14. Enter the active horizontal resolution in the **HSize** field and the active vertical resolution in the **VSize** field (see [figure 68](#), [9](#) on the previous page).
15. Copy the values in the **digFirstPixel** and **digFirstLine** fields of the **Device Status** panel to the **FirstPixel** and **FirstLine** fields ([10](#)).
16. Click the **Update** button (see [figure 67](#), [1](#) on page 81). The **User Source Format** settings are copied into the **User.Source.Config** file of the VN-Matrix device designated as the controller.
17. Press **Save Source** (see [figure 68](#), [11](#)) to save the **User.Source.Config** file of the VN-Matrix device designated as the controller.

With the **mode** drop-down list still set to **auto**, the VN-Matrix device should now select the new user mode in the **currentMode** field.

18. Display a moiré pattern and check for clocking errors in the same user format area.

Clocking errors appear as vertical banding on the displayed image. If clocking errors exist, select the user mode from the **Name** drop-down list and adjust the value in the **PixelsPerLine** field. Each time you enter a new value in the field, you must click **Update**, click the **Save Source** button, and reboot the VN-Matrix controller and encoder. Repeat this process until the clocking error is gone.

After you create a custom input mode, if the decoder does not find a suitable output mode, you need to create a custom output mode (see [Custom Output Modes](#), on the next page).

NOTE: A stable video signal on the loop output of the encoder does not necessarily indicate that the signal is being properly recognized. An encoder generates the loop output signal by passing sync directly from the input connector to the output connectors (a pass-through), so it is not dependent on any previously stored modes to create a loop output.

TIP: Before creating the custom mode, be aware that the encoder can report inaccurate values for active horizontal pixels (**digHSize**) and active vertical lines (**digVSize**).

The encoder analyzes the content displayed by the source PC to determine these values. As a result, if your source is displaying a 100 pixel by 100 pixel white box against a black background, the encoder can report a **digHSize** value of 100, and a **digVSize** value of 100 as well.

It is a good practice to ensure that your PC is displaying a full image, preferably full white or a moiré pattern, before creating a custom input mode.

Custom Output Modes

The decoder **Format** tab allows you to create custom video output formats for displaying decoded video data streams.

One of the issues encountered when some graphics sources are used in conjunction with VN-Matrix encoder and decoder systems is that the encoder often produces a loop-through image and states that it has detected a valid input mode. However, the decoder outputs a display splash screen that states **No Matching Output Mode**.

The following section describes how to create a custom output mode that is automatically selected by the decoder when it is presented with the corresponding input mode from the encoder.

Creating a CVT output mode

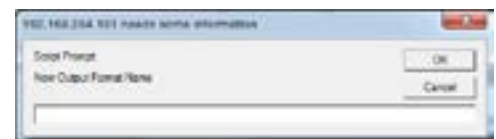
This procedure requires you to access the VN-Matrix decoder unit over a Telnet connection and access the VN-Matrix web GUI using a browser.

To create a coordinated video timing (CVT) mode:

1. Ensure that the graphics source causing the issues is connected to the VN-Matrix encoder and that the encoder has detected the correct mode for that source.

NOTE: Make sure that the source is displaying an image that occupies the entire desktop, such as a window that has been maximized.

2. Verify that an image is present on the loop-through output of the encoder.
3. Connect a PC to the VN-Matrix network and start the VN-Matrix web GUI (see **VNM 250 GUI Login** on page 34).
4. From the **Device List tab** (see page 36), select the encoder.
5. Click the **videoPort0** link in the **Configuration** panel and then select the **Video Setup** tab.
6. When the **Video Setup** page opens, make a note of the horizontal resolution (**digHSize**) and vertical resolution (**digVSize**) that are displayed in the **Device Status** panel. These are used as the basis for the new output mode.
7. Return to the device list and select the decoder that is displaying the **No Matching Output Mode** screen.
8. Click **display0** in the **Configuration** panel.
9. Click the **Format** tab.
10. When the **Format** page opens, click the **New Format** button. A pop-up box opens (see the figure to the right).
11. In the **New Output Format Name** field in the prompt window, enter a name for the mode you are building. It is a good idea to use the resolution, refresh rate, and PC type (such as Mac or Linux) in the title. The name “1280x960_60Hz_De11” is used in the following example. Click **OK**.
12. From the **Name** drop-down list, select the mode (**1280x960_60Hz_De11**).
13. In the **Active Pixels** field, enter the horizontal resolution that was noted in step 5.
14. In the **Active Lines** field, enter the vertical resolution that was noted in step 5.
15. In the **Frame Rate** field, enter the refresh rate of the source.
16. Click the **CVT** button. The VN-Matrix unit now attempts to build a mode using the standard CVT timing calculator. The remaining values on the screen update automatically.



17. Click **Update** and then click **Save Formats**.
18. From the source device that is supplying the encoder, change the resolution and allow the encoder to display the image on the loop-out. This forces the VN-Matrix to change both input and output modes.
19. Change the source back to the original resolution.
 If the image appears correctly on the display, the new mode that you created is working correctly. The mode creation is now complete and you can stop here.
 If the display still displays the **No Matching Output Mode** splash screen, the new mode is not a close enough match to the source to be automatically selected. To resolve this, see *Creating a custom output mode*, below.

Creating a custom output mode

If the CVT output mode that was created in the previous section is not automatically selected when the source was selected, create a new mode and manually enter specific timing values for it. To do this, perform the following steps:

1. Select the decoder in the **Device List tab** (see page 36) of the web interface.
2. Select the **Device** tab.
3. Click the **display0** link in the **Configuration** panel.
4. Use the **Output Format** drop-down list and select the CVT mode that was created in the previous section.
5. Select **Update**. The source should now be displayed correctly on the decoder output.

The mode must now be modified so it can be detected automatically when the source is connected to the encoder. To modify the mode:

1. Retrieve timing information using a Telnet session (see below).
2. Enter the observed timing values in the VN-Matrix web GUI (see **Entering the timing values in the VN-Matrix web GUI** on page 86).

Opening a Telnet session on port 4002 with a VN-Matrix decoder

To open a Telnet session with the VN-Matrix decoder, perform the following procedure:

1. From the Windows taskbar, open a terminal window and enter:
`telnet xxx.xxx.xxx.xxx 4002`, where `xxx.xxx.xxx.xxx` represents the IP address of the VN-Matrix decoder (leading zeroes are not required). Press **<Enter>**.

NOTE: You can also use Extron DataViewer to enter these commands. DataViewer can be downloaded, at no charge, from www.extron.com.

Source information is now continually streamed to the Telnet window. Although the numeric values may be different, you see a line similar to the one shown below:

resolution update message: 1280,960,60,1000,1800,fbbd,108001440,1:

The first five numeric values are interpreted as:

Parameter	Meaning
1280	Active area width of current source (in pixels)
960	Active area height of current source (in pixels)
60	Frame rate of current source, in Hz
1000	Total line count of current source
1800	Total pixels per line of current source

2. Write down the values that are reported for:
 - Active area width
 - Active area height
 - Frame rate
 - Total line count
 - Total pixels per line

These values are required in the next section.

Entering the timing values in the VN-Matrix web GUI

1. Return to the VN-Matrix GUI and open the decoder **Format** tab.

Figure 69. Decoder Format Tab

2. In the **Name** drop-down list (see figure 69, ❶), ensure that the mode you have just built is selected, then click **Update**.
3. Calculate the correct horizontal values for the mode you are using. Assume that the values for the **Horizontal Left Border**, **Horizontal Right Border**, **Horizontal Front Porch**, and **Horizontal Sync Width** are already correct.
4. Enter the values for **Active Pixels**, **Frame Rate**, and **Total Pixels** (❷) that were returned in the Telnet session.

Example:

The values in the table below are from the example shown under [Opening a Telnet session on port 4002 with a VN-Matrix decoder](#), on the previous page.

Parameter	Meaning
1280	Active area width of current source (in pixels)
960	Active area height of current source (in pixels)
60	Frame rate of current source, in Hz
1000	Total line count of current source
1800	Total pixels per line of current source

5. Calculate the horizontal back porch value. This value is calculated with the formula:

$$\text{total pixels per line} - (\text{active pixels in width} + \text{horizontal left border} + \text{horizontal right border} + \text{horizontal front porch} + \text{horizontal sync width})$$
 Using the values from the example in step 4, above, this equates to:

$$1800 - (1280 + 0 + 0 + 80 + 128) = 312$$
6. Enter this value into the **Horizontal Back Porch** field (see [figure 69](#), ③, on the previous page).
7. Calculate the correct vertical values for the mode. Assume that the **Vertical Top Border**, **Vertical Bottom Border**, **Vertical Front Porch**, and **Vertical Sync Width** are already correct.
8. Enter the values for **Active Lines** and **Total Lines** (④) that were returned in the Telnet session (see step 4, on the previous page).
9. Calculate the vertical back porch value. This value is calculated with the formula:

$$\text{total lines} - (\text{active pixels in height} + \text{vertical top border} + \text{vertical bottom border} + \text{vertical front porch} + \text{vertical sync width})$$
 In the step 4 example, this equates to:

$$1000 - (960 + 0 + 0 + 3 + 4) = 33$$
10. Enter this value in the **Vertical Back Porch** field (⑤).
11. Calculate the pixel clock frequency. This is calculated with the formula:

$$\text{total lines} \times \text{total pixels} \times \text{frame rate}$$
 Using the values from step 4, this equates to:

$$1000 \times 1800 \times 60 = 108000000$$
12. Enter this value in the **Pixel Clock Frequency** field (⑥).
13. Click **Update** (⑦).
14. Click **Save Formats** (⑧). The new mode should now be an exact match for the connected source.
15. To test the new mode select the **Display** tab for the decoder, and ensure that **Auto** is selected in the Output Format selector.
16. Switch the resolution on the source to a different resolution and then switch it back again. The mode should display. If it does not, see the [Troubleshooting Guide](#) on page 118.

Upgrading Firmware

Extron may issue firmware upgrades for the VNM 250 in order to make new functionality available. Details of the latest firmware release are published on www.extron.com.

ATTENTION:

- The encoder and decoder each have a different firmware file.
 - Example of an encoder upgrade file name: *250_enc_ver5.3.16.tar*.
 - Example of a decoder upgrade file name: *250_dec_ver5.3.16.tar*.
- L'encodeur et le décodeur possèdent chacun un fichier firmware distinct.
 - Exemple d'un nom de fichier de mise à niveau d'un encodeur : *250_enc_ver5.3.16.tar*.
 - Exemple d'un nom de fichier de mise à niveau d'un décodeur : *250_dec_ver5.3.16.tar*.
- Ensure you load the correct file to each unit.
- Assurez-vous de charger le bon fichier à chaque unité.

The update process consists of the following stages:

- **Upload** — the upgrade file is copied from the control PC to temporary storage on the VNM 250 controller.
- **Prepare** — The new firmware is unpacked and copied from the controller into the alternate flash memory of the VNM 250 device.
- **Activate** — The VNM 250 reboots to start using the new firmware. This is a temporary mode that allows testing of the firmware. If any problems are encountered, you can back out of this mode and return to the previous firmware version.
- **Commit** — The VNM 250 reboots to start using the new firmware permanently.

All stages of the upgrade process are carried out using the Web interface.

ATTENTION:

- It is essential that all the VNM 250 units in the same system are upgraded to the same firmware version number in order to ensure full compatibility.
- Il est indispensable que toutes les unités VNM 250 dans le même système soient mises à niveau avec le même numéro de version firmware afin d'avoir une complète compatibilité.

NOTES:

- Performing the Activate function on the VNM 250 device that is acting as the system controller causes the device to reboot, causing a temporary loss of the web interface. Once the controller has rebooted, the VNM 250 is able to resume serving the web interface.
- After the VNM 250 device has rebooted, the upgrade file (in the temporary storage area) is deleted.
- Several of the steps in this process (Prepare, Commit, and Backout) require re-writing flash memory, which can take a few minutes.

Uploading the Firmware File to the VNM 250 Device

1. Log in to the web interface (see [VNM 250 GUI Login](#) on page 34). The GUI opens to the **Device List** page.
2. Click on the VNM 250 unit to be upgraded. The **Device** page for that unit opens.
3. On the **Device** page, click the **Upgrade** tab. The **Upgrade** tab opens:



Figure 70. Upgrade Tab

4. Click **Browse** (see figure 70, 1) to open a file browser. Navigate to the required upgrade file, or enter the path and file name directly into the browser field. The file extension must be .tar.
5. Click **Upload** (2) to begin uploading the file to the VNM 250 device. This takes a few minutes.

Installing the New Firmware

1. From the **Select Firmware Version** drop-down list (3), select the new firmware file that you wish to install. Usually, the file listed is the one that has just been uploaded (see the previous section).
2. Click **forward** (4) - the **Device Upgrade Status** initially shows **PREPARE 0%**. As it writes the upgrade to flash, the status changes incrementally to **PREPARE 100%**. The **Device Upgrade Status** changes to **READYTOACTIVATE**.
3. Once the device is in the **READYTOACTIVATE** state:
 - a. Click **forward** (4) to activate the upgrade and move to the **READYTOCOMMIT** state.
 - b. Click **reverse** (5) to abandon the upgrade using the **BACKOUT** state.
4. Once the device is in the **READYTOCOMMIT** state:
 - a. Click **forward** (4) to irrevocably commit to the upgrade using the **COMMITTING** state.
 - b. Click **reverse** (5) to return to the original firmware and the **READYTOACTIVATE** state.
5. The unit reboots. Once the reboot is complete, the device upgrade process is complete and the device enters the **WAIT** state.

Configuring KVM Functionality

KVM functionality permits remote collaboration between different endpoints on the network by allowing a mouse and keyboard connected to the decoder to control a PC connected to the encoder. Both the VND 250 and VNE 250 units must be configured.

Before starting, ensure that a mouse and keyboard have been connected to the VND 250 and a PC has been connected to the VNE 250 (see **USB Ports** on page 18).

1. From the **Device List tab** (see page 36), click on one of the VNM 250 units that you wish to configure. The **Device** tab opens.
2. Click the **Peripherals** tab. The page opens with the **Mouse & Keyboard Control** panel on the right hand side of the window:



Figure 71. Mouse & Keyboard Control Panel

3. Set the MK Mode
 - For the VNE 250 encoder, set MK Mode to **Enable** (see figure 71, ❶).
 - For the VND 250 decoder, set MK Mode to **Keyboard** (❶).
4. Make sure that a video stream connection has been configured between the encoder and decoder.

Once configured, the KVM mode is enabled using a hot key sequence on the keyboard that is connected to the decoder.

To activate a remote control session using hot keys

5. Using the keyboard attached to the VN 250 decoder, press the <Ctrl> and <Shift> keys simultaneously, followed by the <F1> key.

The decoder monitor briefly shows **MK:Forward** in the top left-hand corner.

To terminate a remote control session using hot keys

6. Using the keyboard attached to the VN 250 decoder or encoder, press the <Ctrl> and <Shift> keys simultaneously, followed by the <F2> key.

The decoder display monitor briefly shows **MK:Local** in the top left-hand corner.

RS-232 Pass-through Configuration

The Pass-thru Control port on the rear panel of the encoder (see [figure 6, R](#) on page 13), or decoder (see [figure 7, R](#) on page 13) is used for RS-232 pass-through communications, allowing a control device connected to one VNM 250 unit (the server) to control remote devices connected to other VNM 250 units (clients).

Serial data received by one VNM 250 unit is transmitted over the network, using TCP/IP, and then converted back to serial data at the target VNM 250 unit. Data flow is fully bidirectional.

Units that are configured for this type of data flow are called pass-through groups (see [RS-232 pass-through](#) on page 19).

Pass-through Coms Server Configuration

1. On the **Device List tab** (see page 36), click on the device you want to configure as the server.
2. Click the **Peripherals** tab. The page opens with the **Serial Port Control** panel on the left hand side of the window:



Figure 72. Serial Port Control Panel

3. From the mode drop-down list, select **server** (see figure 72, 1).
4. Change other settings, as required.
5. Click **update** (2), followed by **Save All** at the top of the page.

Pass-through Coms Client Configuration

1. On the **Device List tab**, select the device you want to configure as a client.
2. Click the **Peripherals** tab (see [figure 26](#) on page 42).
3. From the mode drop-down list, select **client** (see figure 73, 1). This reveals the destination box (3).



Figure 73. Serial Port Control Panel with Destination menu

4. From the destination drop-down list, select **passthrough** for the appropriate server (3).
5. Change the other settings as required, then click **update** (2).
6. Click **Save All** at the top of the page.
7. Repeat steps 1-6 for other client devices.

Front Panel Menu Configuration

This section describes how to configure the VNM 250 units, using the front panel menu:

[Front Panel Menu Overview](#)

[Configuring the VNE 250 Encoder](#)

[Configuring the VND 250 Decoder](#)

Front Panel Menu Overview

The default menu screens display whenever the menu is not actively accessed. They are read-only and provide information about the current status of the encoder (see below) or decoder.

TIPS:

- To help when reviewing this information, it is possible to pause the default cycle and step through each screen using the rotary encoders.
- To pause the cycling of the default screens, press and hold the **next** button on the front panel.
- To step through each top level screen use the left hand rotary encoder; to step through each item in a screen, use the right hand rotary encoder.
- To cancel the pause mode, press the **menu** button.

Accessing the menu allows configuration of the unit.

NOTE: To prevent the units being reconfigured by unauthorized users, the front panel menu can be locked by simultaneously holding down the **menu** and **next** buttons.

Unlock the menu in the same way.

Configuring the VNE 250 Encoder

Default Menu Screens

On powering the unit up, or if the menu is not accessed for 30 seconds, the front panel LCD shows the default menu screens. These are a series of screens that show the current status and configuration of the unit. Each screen is shown for approximately two seconds before being replaced by the next. After displaying the last screen, the unit returns to the first screen and repeats the cycle.

- The first three screens provide information about the video input.
- The next four screens provide information about the device.
- The next three screens provide information about the connection.
- The final two screens provide information about the controller.

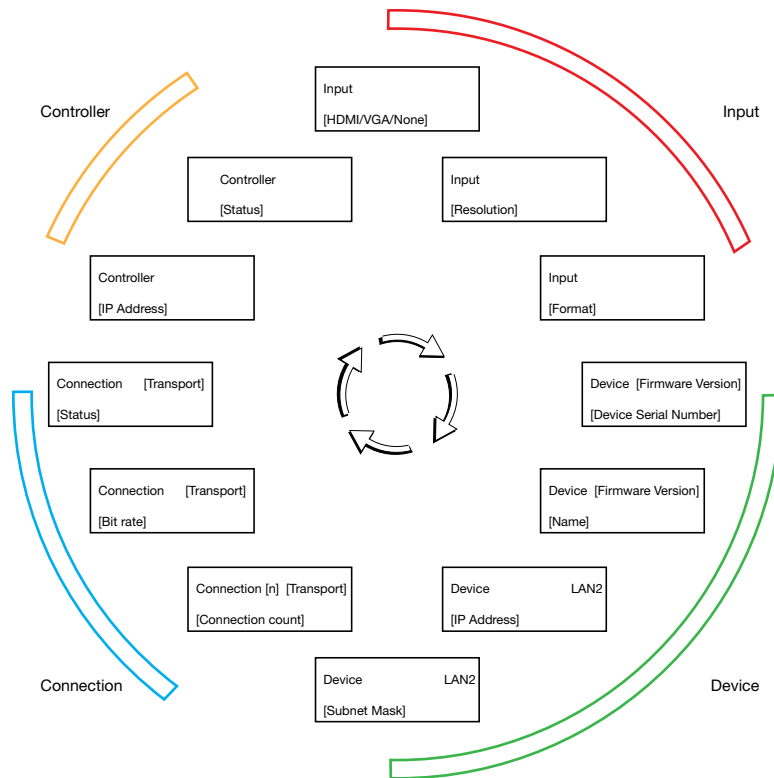


Figure 74. VNE 250 Encoder Default Menu Screens

Top Level Menu

These screens provide access to configure the encoder device.

NOTE: Some settings take a few seconds to action once a change is made.

To access the top level menu:

1. Press the **Menu** button to access **Encode Config**, the first item in the top level menu (see [figure 75](#) on the next page).
2. Continue pressing the **Menu** button to scroll through all the available top level options.
3. When the desired option appears in the LCD window, press the **Next** button to select the submenu options.

NOTE: If you cycle through all the top-level options, continuing to press the **Menu** button takes you back to the first option (**Encode Config**).

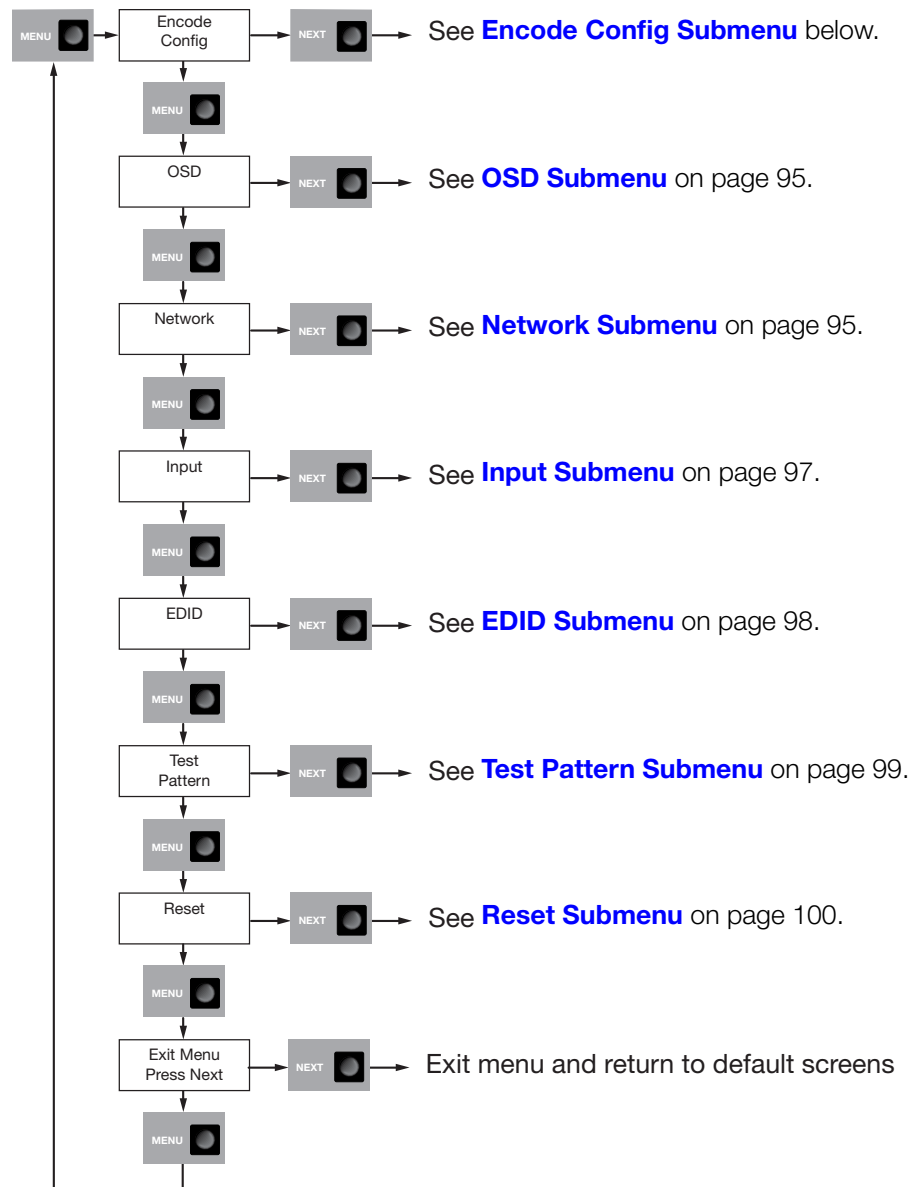


Figure 75. VNE 250 Encoder – Top Level LCD Menu

Encode Config Submenu

The Encode Config submenu allows you to enable or disable streaming.

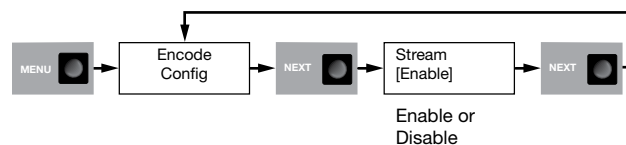


Figure 76. VNE 250 Encoder Encode Config Submenu

1. From the Encode Config screen, press **Next** to open the Stream window.
2. Use either rotary encoder to toggle between **Enable** and **Disable**.
3. Press **Next** to save the selected values and return to the main Encode Config screen.
4. Press **Menu** to open the main OSD screen.

OSD Submenu

The **OSD** submenu allows you to determine what information is overlaid on the loop-through display.

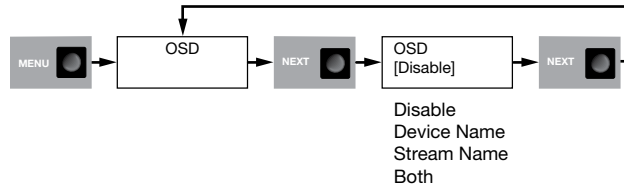


Figure 77. VNE 250 Encoder OSD Submenu

1. In the main OSD screen, press **Next** to open the **OSD** submenu.
2. Use either rotary encoder to select from:
 - **Disable** the on-screen display.
 - **Device Name** (if the device name has not been set previously by the user, the Device ID is displayed).
 - **Input Resolution** and frame rate of the connected source.
 - **Both** the **Device Name** and the **Input Resolution** with the frame rate.
3. Press **Next** to save the selected values and return to the main OSD screen.
4. Press **Menu** to open the main Network screen.

Network Submenu

NOTE: These screens are read only. They allow you to select and view a parameter but not to change it.

The **Network** submenu allows you to review and configure network settings for the streaming and control ports and for the system controller. The three upper level screens, which allow you to review the LAN1 -Control settings, LAN2 -Stream settings, and Sys Ctrl settings are read-only screens.

1. In the main Network screen, press **Next** to open the LAN 1-Control screen.
2. Use the left rotary encoder to select the IP address (**IP**) or subnet mask (**SM**) for the control network. The appropriate value is displayed on the LCD screen.
3. Press **Next** briefly to open the LAN 2-Stream screen.
4. Use the left rotary encoder to select IP address (**IP**), subnet mask (**SM**), gateway (**GW**), maximum transmission unit (**MTU**), or Mode (**MODE**) for the streaming network. The appropriate value is displayed on the LCD screen.
5. Press **Next** briefly to open the Sys Ctrl screen.
6. Use the left rotary encoder to select IP address (**IP**) or port number (**Port**) for the system controller. The appropriate value is displayed on the LCD screen.
7. Press **Next** briefly to return to the main Network screen.

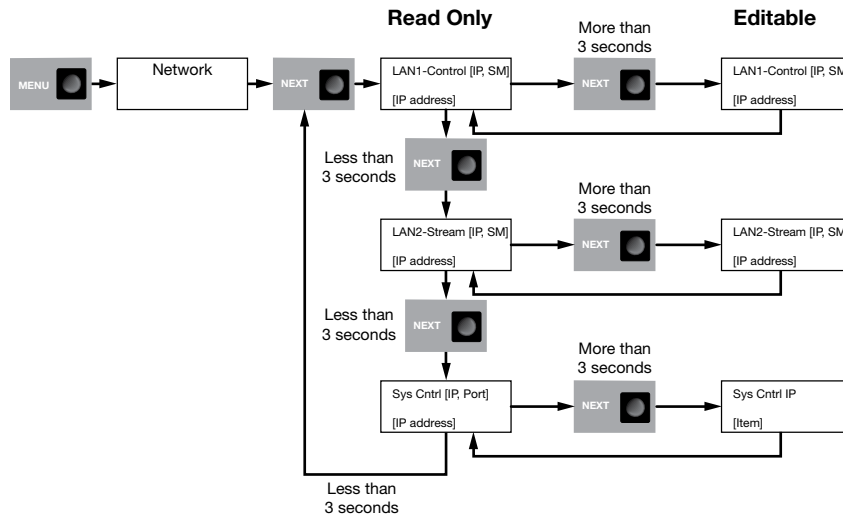


Figure 78. VNE 250 Encoder Network Submenu (Top Level)

To edit properties for any of these screens:

1. Navigate to the required screen.
2. Press the **Next** button for more than 3 seconds. The screen flashes rapidly and the selected value is shown in angled brackets.
3. Edit the network properties as desired.

Control

The **LAN1-Control** editing screen allows you to adjust the IP address (**IP**) and the subnet mask (**SM**) of the control network. The editing screen opens to show the IP address for VNE 250 control port, with the first octet of the address enclosed in angled brackets (by default, this is <192>168.253.254).

1. Use the right rotary encoder to adjust the value of the highlighted octet.
2. Use the left rotary encoder to highlight the next octet.
3. Use the right rotary encoder to adjust this value as required.
4. Repeat steps 2 and 3 to adjust all four octets as required.
5. Press **Next** to show the subnet mask for the VNE 250 control port.
6. Repeat steps 1 to 4 to set the value for the subnet mask.
7. Press **Next**. You are prompted to save the changes. Use either rotary encoder to toggle between **Yes** (save the changes and exit) and **No** (exit to the **LAN1-Control** screen, without saving).
8. If you select **Yes**, you are prompted to reboot the device. Use either rotary encoder to toggle between **Yes** (to reboot) and **No** (exit to the **LAN1-Control** screen, without rebooting).
9. If you select **Yes**, the VNE 250 reboots. If you select **No**, the VNE 250 does not reboot, but the changes saved in step 7 are saved and are applied the next time the VNE 250 is powered up.

Stream

The **LAN2-Stream** editing screen allows you to adjust the following properties of the streaming network:

- **IP address** — follow steps 1 through 4 of the Control section on the previous page.
- **Subnet mask** — follow steps 1 through 4 of the Control section.
- **Gateway** — follow steps 1 through 4 of the Control section.
- **MTU** — use either rotary encoder to adjust the **MTU** value (150 - 9000).

ATTENTION:

- The **MTU** setting adjusts the data payload in each network packet. The default setting of 1500 does not normally require adjustment.
- Le paramètre **MTU** ajuste la charge utile de données dans chaque paquet réseau. Le paramètre par défaut 1500 ne nécessite généralement aucun ajustement.
- All devices in the network should be set to the same value. Setting different values for different devices may cause failures in the VN-Matrix streaming network.
- Tous les appareils du réseau doivent avoir la même valeur. Un paramétrage avec des valeurs différentes sur plusieurs appareils peut entraîner des défaillances dans le réseau de streaming VN-Matrix.

- **Mode** — use either rotary encoder to toggle between **100 Mbps** and **1000 Mbps** network modes.
- **DHCP** — use either rotary encoder to toggle between **enable** and **disable**.

System Control

The **System Control** editing screen allows you to configure the **IP address** and **port number** of the system controller.

Input Submenu

The **Input** submenu allows you to select the input source, enable or disable the loop-through video signal, and enable or disable the power save feature for the loop-through signal.

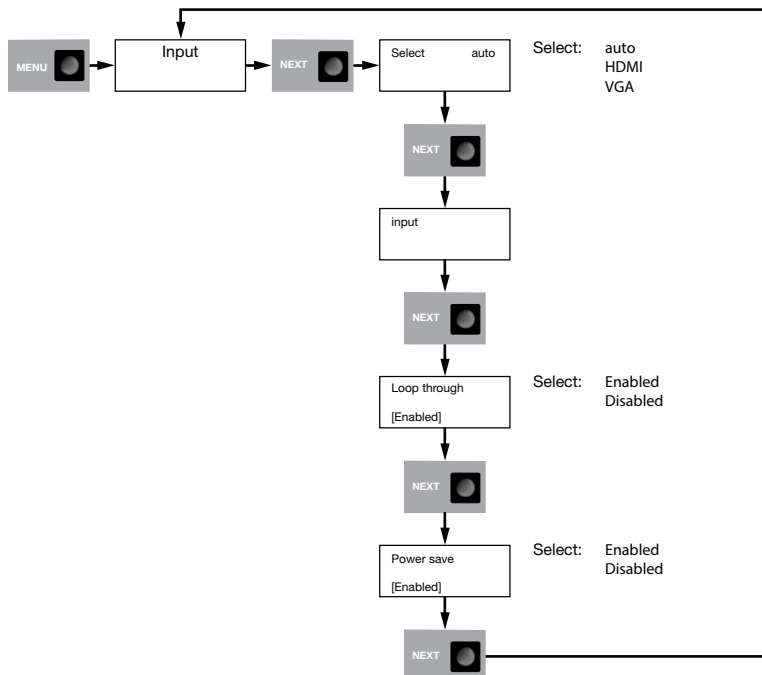


Figure 79. VNE 250 Encoder Input Submenu

1. In the main **Input** screen, press **Next** to open the **Input Source** screen.
2. In the **Input Source** screen, use either rotary encoder to select the video source:
 - **auto** (selects HDMI whenever a digital source is detected)
 - **HDMI** (digital)
 - **VGA** (analog)

If the signal resolution and refresh rate are supported by VNE 250 (see **Supported EDID Modes** on page 123), the LCD screen shows **Supported source: resolution** and **refresh rate** of the signal. If the source signal is not supported, the screen shows **Unsupported Sce**. If there is no source, the screen shows **No source**.

3. Press **Next** to open the **Loop through** screen.
4. Use either rotary encoder to enable or disable the signal to the loop-through monitor.
 - When **Enabled** is selected, the source image or a splash screen is displayed on the loop-through monitor.
 - When **Disabled** is selected, the loop-through signal, including sync, is disabled.

NOTE: This setting applies to both VGA and HDMI loop-through signals.

5. Press **Next** to open the **Power save** screen.
6. Use either rotary encoder to enable or disable the power save feature.
 - When power save is **Enabled**, the loop-through signal is disabled when input source syncs have been removed for 1 minute.
 - When power save is **Disabled**, the loop-through signal is always active.

NOTE:

- Power save is only effective when **Loop through** is **Enabled**.
- This setting applies to both VGA and HDMI loop-through signals.

EDID Submenu

The **EDID** submenu allows you to select the EDID that is provided to the source device.

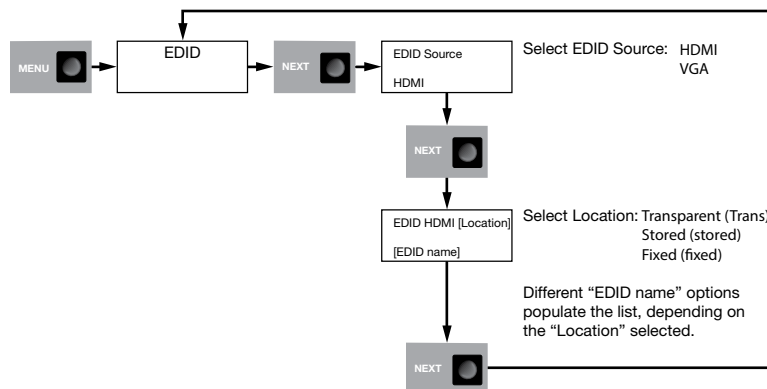


Figure 80. VNE 250 Encoder EDID Submenu

1. In the main **EDID** screen, press **Next** to open the **EDID Source** screen.
2. In the **EDID Source** screen, select the source type (**HDMI** or **VGA**).
3. Press **Next** to open the **Location** screen.

4. Use left rotary control to select the **location** (**Transparent**, **Stored**, or **Fixed**) and the **EDID name**. The choices available in the EDID name selection depend on which location you chose:
 - **Transparent** — If you select Transparent, the EDID from the locally connected display is passed to the source device.
The **Location** value shows **Trans**.
The **EDID name** value shows the name of the EDID provided by the local display.
If no local display is connected, the **EDID name** value displays "No EDID."
 - **Stored** — The EDID values of previously connected local displays are stored automatically and can be selected when no local display is present.
The **Location** value shows **Stored**.
The **EDID name** value shows the name of the stored value.
 - **Fixed** — A specific preferred mode can be selected from a fixed list.
The **Location** value shows **Fixed**.
The **EDID name** value shows the mode currently selected in the format [Horizontal resolution]x[Vertical resolution]@[Frequency].
A list of the fixed **Supported EDID Modes** is shown, starting on page 123.
5. Press **Next** to return to the main EDID screen.
6. Press **Menu** to move to the main Test Pattern screen.

Test Pattern Submenu

The **Test Pattern** submenu allows you to enable or disable test patterns and select a pattern that displays on the VND 250 output to assist in calibrating the system.

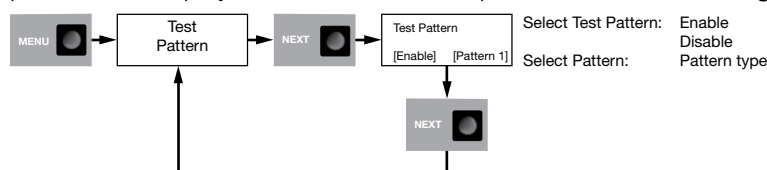


Figure 81. VNE 250 Encoder Test Pattern Submenu

1. In the main Test Pattern screen, press **Next** to open the Test Pattern selection screen.
2. In the Test Pattern selection screen, use the left rotary encoder to toggle between **Enable** and **Disable**. **Enable** displays the test pattern on the VND 250 (decoder) display. **Disable** allows the normal video input to the VND 250 display.
3. Use the right rotary encoder to select whether the test pattern is displayed.
Currently there is a single Test Mode splash screen (see the figure to the right).
4. Press **Next** to return to the main Test Pattern screen.
5. Press **Menu** to move to the Reset screen.



Reset Submenu

The **Reset** submenu allows you to reset many parameters to the factory defaults. It also allows you to run the Sanitize process.

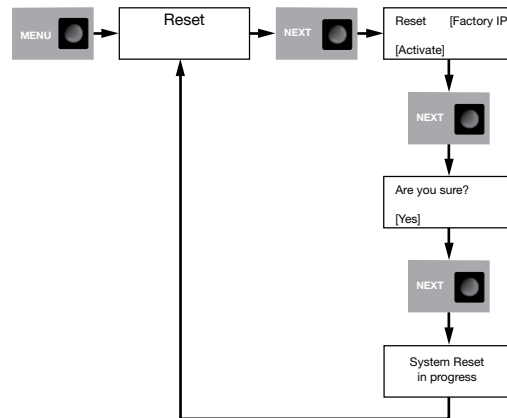


Figure 82. VNE 250 Encoder Reset Submenu

1. In the main **Reset** screen, press **Next** to open the **Reset** options screen.
2. In the **Reset** options screen, use the left rotary encoder to select which type of reset you want. You can choose **Factory IP** or **Sanitize**:

Factory IP — Restores the following parameters to the factory default:

- IP address
- Subnet mask
- Gateway IP address
- Controller IP address
- Link speed set to auto
- Static IP address
- Controller port number

For factory default values see [figure 11](#) on page 26.

Sanitize — Runs the sanitize process to overwrite volatile scaler memory (for the on-screen display), volatile wavelet memory, and all non-volatile memory. All these memory locations are overwritten three times:

- Firstly with a random pattern of zeroes and ones.
- Secondly with binary zeroes.
- Thirdly with binary ones.

3. Use the right rotary encoder to toggle between **Activate** or **Cancel**.
4. Press **Next**.
5. If you selected **Activate** in step 3, you are prompted about whether you want to proceed. Press **Yes**.
6. Press **Next**.
7. If you selected **Activate** in step 3, one of the reset processes runs. The screen shows **System Reset in Progress**.
8. When the reset is complete, press **Next** to return to [Encode Config Submenu](#) (see page 94).

Configuring the VND 250 Decoder

Default Menu Screens

On powering the unit up, or if the menu is not accessed for 30 seconds, the front panel LCD shows the default menu screens. These are a series of screens that show the current status and configuration of the unit. Each screen is shown for approximately two seconds before being replaced by the next. After displaying the last screen, the unit returns to the first screen and repeats the cycle.

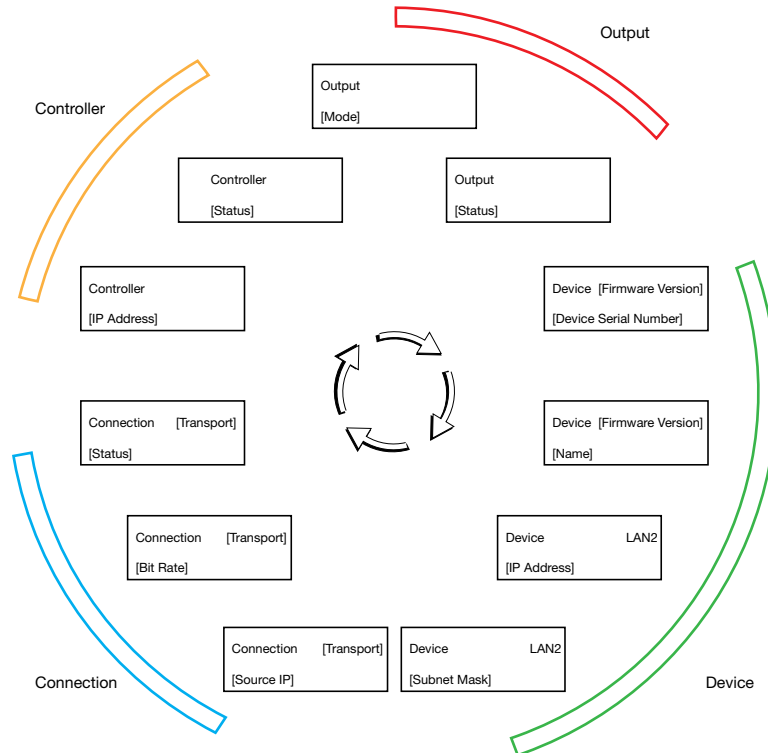


Figure 83. VND 250 Decoder Default Menu Screens

To access the front panel menu and configure the unit, follow these instructions:

1. Navigate through the menu system using the **Menu** and **Next** buttons.
2. Make selections from the menu choices using the rotary encoders.

Top Level Menu

To access the top level menu:

1. Press the **Menu** button to access the first item in the top level menu (**Decode Config**).
2. Continue pressing the **Menu** button to scroll through all the available top level options
3. When the desired option appears in the LCD window, press the **Next** button to select the submenu options.

NOTE: If you cycle through all the top-level options, continuing to press the **Menu** button takes you back to the first option (**Decode Config**).

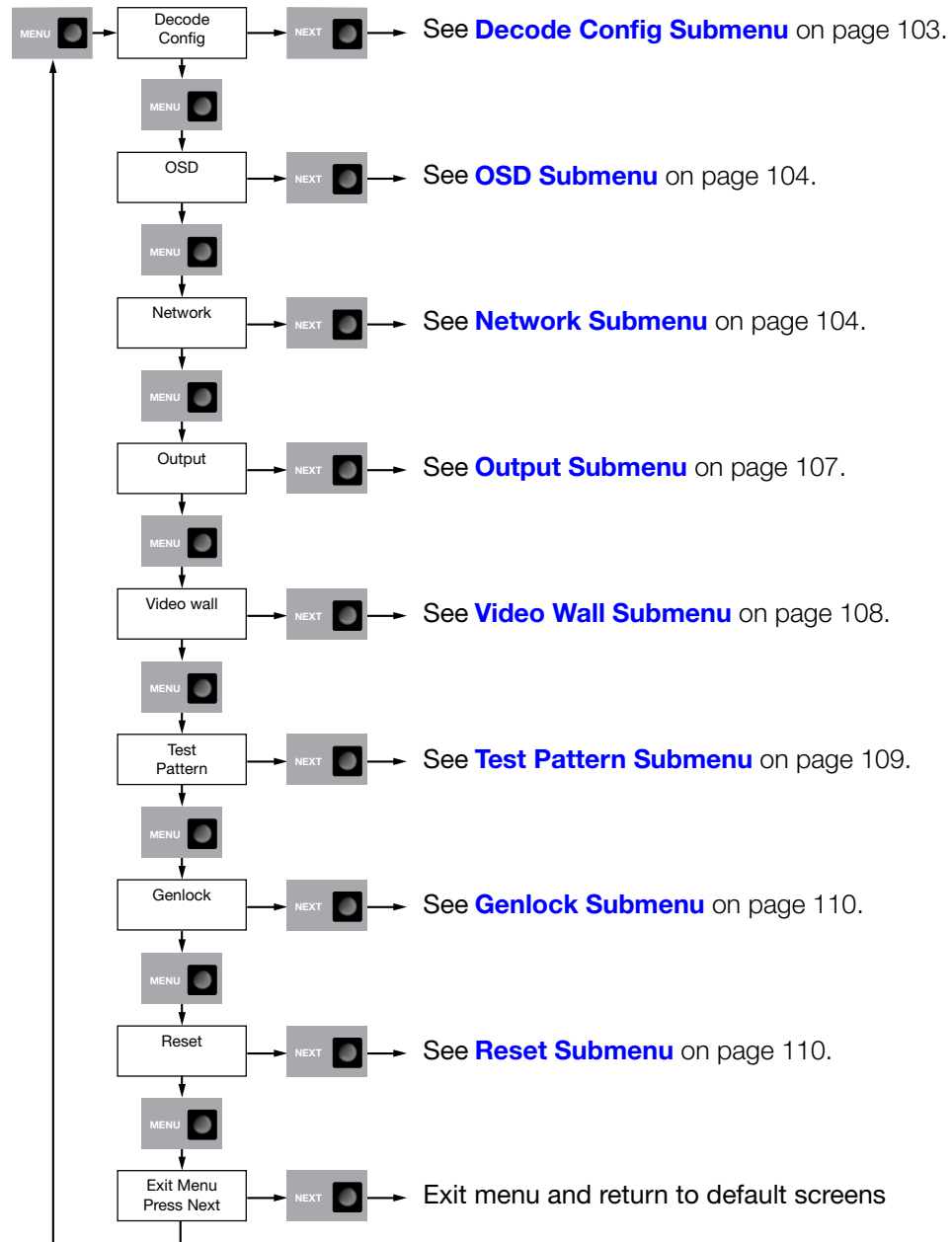


Figure 84. VND 250 Decoder — Top Level LCD Menu

Decode Config Submenu

The **Decode** Config submenu allows you to:

- Select a stream.
- **Enable** or **Disable** the splash screen.

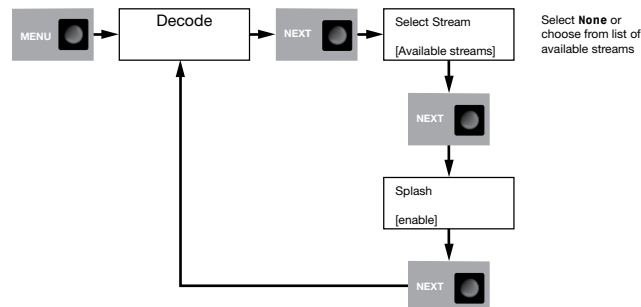


Figure 85. VND 250 Decoder Decode Config Submenu

1. In the main **Decode** screen, press **Next** to open the **Select Stream** screen.
2. Use either rotary encoder to select **None** or choose one of the streams that is available on the network.
3. If you have selected a stream, press **Next** to save the selection and return to the main **Decode** screen. Go to step 6.

If you selected **None** or the selected stream is not currently available, press **Next** to open the **Splash** Screen.

NOTE: If a stream was selected and that stream is currently available, the **Splash** screen is not available.

4. If the **Splash** screen is open, use either rotary encoder to toggle between **Splash enable** and **Splash disable**:
 - Select **enable** to show the splash screen.
 - Select **disable** to show a frozen screen capture of the last frame displayed.
5. Press **Next** to return to the main **Decoder Config** screen.
6. Press **Menu** to open the main OSD screen.

OSD Submenu

The **OSD** submenu allows you to determine what information is overlaid on the output display.

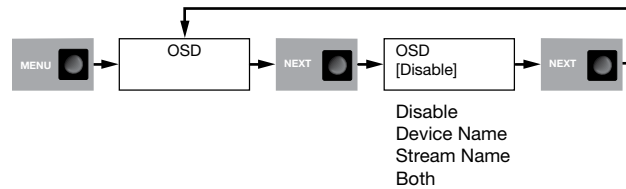


Figure 86. VND 250 Decoder OSD Submenu

1. In the main **OSD** screen, press **Next** to open the **OSD** submenu.
2. Use either rotary encoder to select from:
 - **Disable** the on-screen display.
 - **Device name** (if the device name has not been set previously by the user, the Device ID is displayed).
 - **Stream name** (the device name of the encoder to which the decoder is currently connected).
 - **Both** the Device Name and Stream Name.
3. Press **Next** to save the selected values and return to the main **OSD** screen.
4. Press **Menu** to open the main **Network** screen.

Network Submenu

NOTE: These screens are read only. They allow you to select and view a parameter but not to change it.

The **Network** submenu (see figure 87 on the next page) allows you to review and configure network settings for the streaming and control ports and for the system controller. The three upper level screens, which allow you to review the **LAN1-Control** settings, **LAN2-Stream** settings, and **Sys Ctr1** settings are read-only screens.

1. In the main **Network** screen, press **Next** to open the **LAN 1-Control** screen.
2. Use the left rotary encoder to select the IP address (**IP**) or subnet mask (**SM**) for the control network. The appropriate value is displayed on the LCD screen.
3. Press **Next** briefly to open the **LAN 2-Stream** screen.
4. Use the left rotary encoder to select IP address (**IP**), subnet mask (**SM**), gateway (**GW**), maximum transmission unit (**MTU**), or Mode (**MODE**) for the streaming network. The appropriate value is displayed on the LCD screen.
5. Press **Next** briefly to open the **Sys Ctr1** screen.
6. Use the left rotary encoder to select IP address (**IP**) or port number (**Port**) for the system controller. The appropriate value is displayed on the LCD screen.
7. Press **Next** briefly to return to the main **Network** screen.

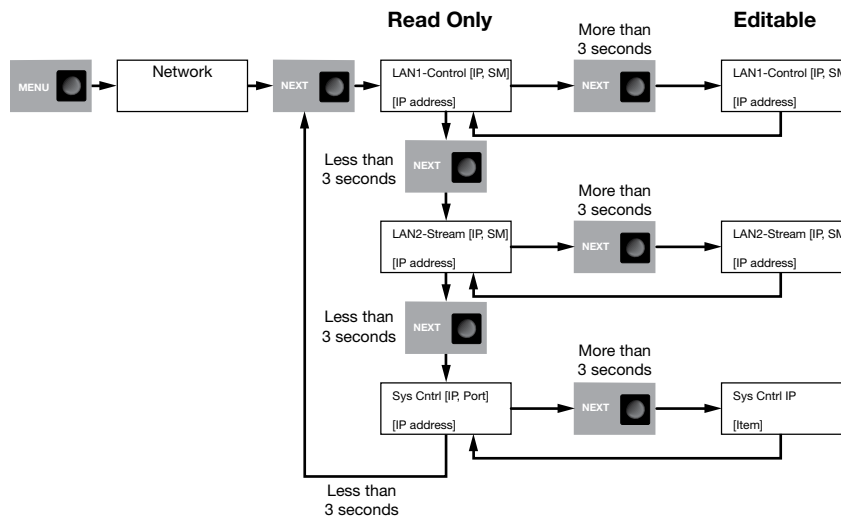


Figure 87. VND 250 Decoder Network Submenu (Top Level)

To edit properties for these screens:

1. Navigate to the required screen.
2. Press the **Next** button for more than 3 seconds. The screen flashes rapidly and the selected value is shown in angled brackets.
3. Edit the network properties as desired.

Control

The **LAN1-Control** editing screen allows you to adjust the IP address (IP) and the subnet mask (SM) of the control network. The editing screen opens to show the IP address for VND 250 control port, with the first octet of the address enclosed in angled brackets (by default, this is <192>168.253.254).

1. Use the right rotary encoder to adjust the value of the highlighted octet.
2. Use the left rotary encoder to highlight the next octet.
3. Use the right rotary encoder to adjust this value as required.
4. Repeat steps 2 and 3 to adjust all four octets as required.
5. Press **Next** to show the subnet mask for the VND 250 control port.
6. Repeat steps 1 to 4 to set the value for the subnet mask.
7. Press **Next**. You are prompted to save the changes. Use either rotary encoder to toggle between **Yes** (save the changes and exit) and **No** (exit to the **LAN1-Control** screen, without saving).
8. If you select **Yes**, you are prompted to reboot the device. Use either rotary encoder to toggle between **Yes** (to reboot) and **No** (exit to the **LAN1-Control** screen, without rebooting).
9. If you select **Yes**, the VND 250 reboots. If you select **No**, the VND 250 does not reboot, but the changes saved in step 7 are saved and are applied the next time the VND 250 is powered up.

Stream

The LAN2-Stream editing screen allows you to adjust the following properties of the streaming network:

- **IP address** — Follow steps 1 through 4 of the **Control** section on the previous page.
- **Subnet mask** — Follow steps 1 through 4 of the **Control** section.
- **Gateway** — Follow steps 1 through 4 of the **Control** section.
- **MTU** — Use either rotary encoder to adjust the MTU value (150 - 9000).

ATTENTION:

- The **MTU** setting adjusts the data payload in each network packet. The default setting of **1500** should not normally require adjustment.
- Le paramètre **MTU** ajuste la charge utile de données dans chaque paquet réseau. Le paramètre par défaut **1500** ne nécessite généralement aucun ajustement.
- All devices in the network should be set to the same value. Setting different values for different devices may cause failures in the VN-Matrix streaming network.
- Tous les appareils du réseau doivent avoir la même valeur. Un paramétrage avec des valeurs différentes sur plusieurs appareils peut entraîner des défaillances dans le réseau de streaming VN-Matrix.

- **Mode** — Use either rotary encoder to toggle between **100 Mbps** and **1000 Mbps** network modes.
- **DHCP** — Use either rotary encoder to toggle between enable and disable.

System control

The **System Control** editing screen allows you to configure the **IP address** and **port number** of the system controller.

Output Submenu

The **Output** submenu allows you to:

- **Enable** or **Disable** decoding
- Set **Power save** to **Active** or **Inactive**
- Scale the output resolution

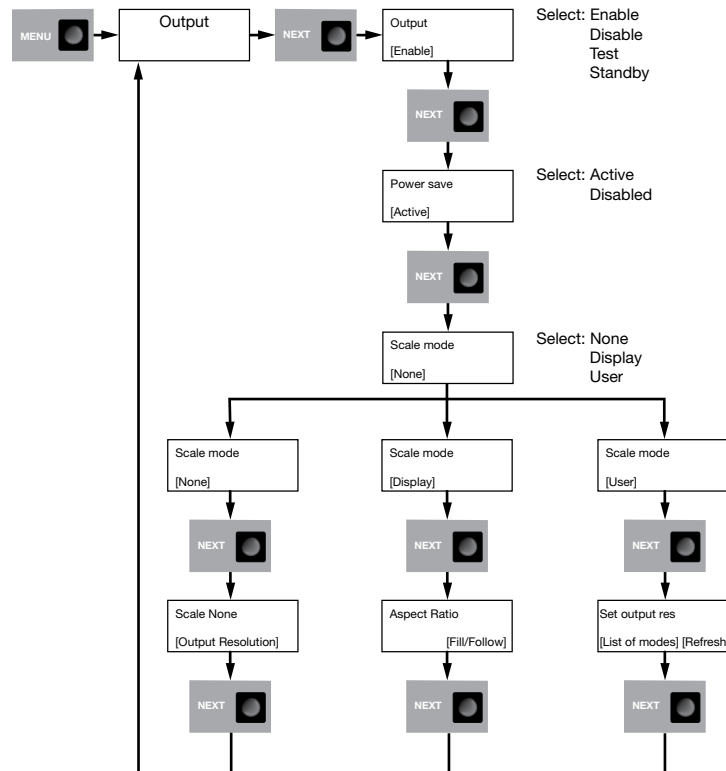


Figure 88. VND 250 Decoder Output Submenu

1. In the main **Output** screen, press **Next** to open the **Output** submenu.
2. Use either rotary encoder to select **Enable** (normal operation), **Disable** (stream decoding is suspended), or **Test** (stream decoding is suspended and replaced by a test pattern).

NOTE: Changing the mode in this menu resets the **Power save** timeout.

3. Press **Next** to open the **Power save** screen.
4. Use either rotary encoder to toggle between power save **Active** or **Disabled**.

NOTES:

- When power save is **Active**, after 5 minutes with no active stream, the output sync is dropped to allow a locally connected monitor to enter power save mode.
- When power save is **Disabled**, sync is available at all times.

5. Press **Next** to open the **Scale mode** screen.

6. Use either rotary encoder to select from:
 - **None** — No scaling. The output resolution and frame rate are the same as the input stream.
 - **Display** — The output resolution and frame rate are based on a supported resolution from the display.
 - **User** — The output resolution and frame rate are selected by the user from a list of supported modes.
7. Press **Next** to open the **Output resolution** screen. The menu options available in this screen depends on your choice in step 6:
 - **None** — Output resolution and frame rate are the same as the input screen. No options are available.
 - **Display** — Use either rotary encoder to toggle the aspect ratio between **Fill** and **Follow**. Fill scales the image to fill the display screen. Follow uses the output resolution and frame rate of the input screen.
 - **User** — Use the left rotary encoder to select from a list of supported resolutions. Use the right rotary encoder to select from a list of supported refresh rates.
8. Press **Next** to save the changes and return to the **Output** screen.
9. Press **Menu** to open the **Video wall** screen.

Video Wall Submenu

The **Video Wall** submenu allows the streamed video signal to be output on an array comprised of multiple displays.

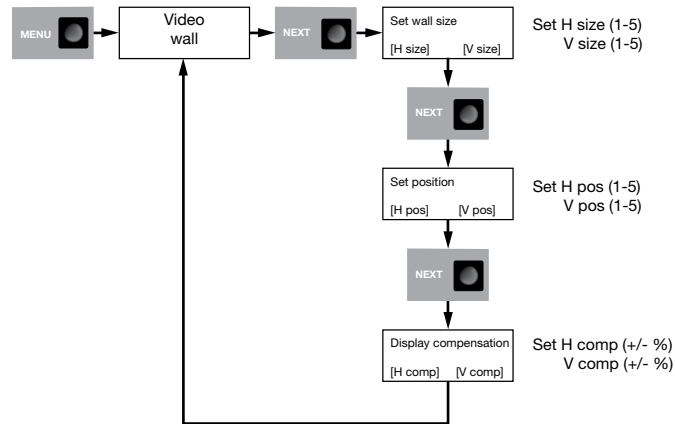


Figure 89. VND 250 Decoder Video Wall Submenu

1. In the main **Video wall** screen, press **Next** to open the **Set wall size** screen.
2. Use the left rotary encoder to select the horizontal number of displays in the Video wall array.
3. Use the right rotary encoder to select the vertical number of displays in the Video wall array.

NOTE: If you have a Video wall that is 4 displays high and 3 displays wide, you would set **V size** to 4 and **H size** to 3.

4. Press **Next** to save the changes and open the **Set position** screen.
5. Use the left rotary encoder to select the horizontal position of the display in the Video wall (1 represents the column furthest to the left).
6. Use the right rotary encoder to select the vertical position of the display in the Video wall (1 represents the top row).

NOTE: If you have a Video wall that is 4 displays high and 3 displays wide, and the video stream is output to the second monitor from the left, in the top row, you would set **V pos** to 1 and the **H pos** to 2.

7. Press **Next** to save the changes and open the **Display compensation** screen. This allows you to compensate for overscan or underscan in positive or negative percentage steps.
8. Use the left rotary encoder to adjust the horizontal compensation.
9. Use the right rotary encoder to adjust the vertical compensation.
10. Press **Next** to save the changes and return to the main **Video wall** screen.
11. Press **Menu** to open the **Test Pattern** submenu.

Test Pattern Submenu

The **Test Pattern** submenu allows you to enable or disable test patterns and select a pattern that displays on the VND 250 output to assist in calibrating the system.

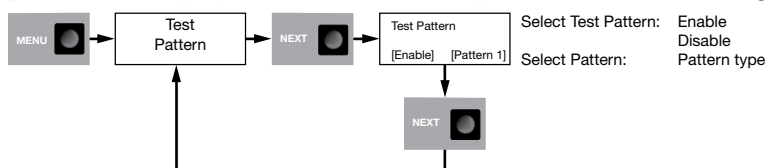


Figure 90. VND 250 Decoder Test Pattern Submenu

1. In the main **Test Pattern** screen, press **Next** to open the **Test Pattern** selection screen.
2. In the **Test Pattern** selection screen, use the left rotary encoder to toggle between **Enable** and **Disable**. **Enable** displays the test pattern on the VND 250 (decoder) display. **Disable** allows the normal video input to be displayed.
3. Use the right rotary encoder to select which test pattern is displayed.
Currently there is a single **Test Mode** splash screen (see the figure to the right).
4. Press **Next** to return to the main **Test Pattern** screen.
5. Press **Menu** to move to the main **GenLock** screen.



Genlock Submenu

The **Genlock** submenu allows you to enable or disable genlock and to determine whether the display is a primary or secondary device.

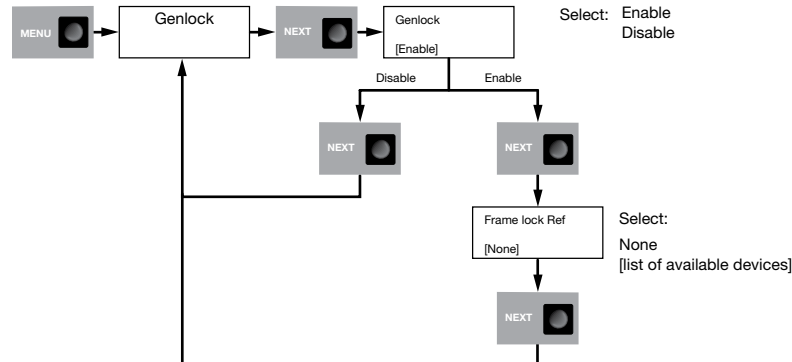


Figure 91. VND 250 Decoder Genlock Submenu

1. In the main **Genlock** screen, press **Next** to open the Genlock mode selection screen.
2. Use either rotary encoder to toggle between **Enable** and **Disable**. **Enable** ties the display to the Genlock signal. **Disable** displays the signal without tying it to the Genlock signal.
3. Use either rotary encoder to select a decoder to be the primary frame lock device.
4. Press **Next** to return to the main **Genlock** screen.
5. Press **Menu** to open the **Reset** submenu screen.

Reset Submenu

The **Reset** submenu allows you to reset many parameters to the factory defaults. It also allows you to run the Sanitize process.

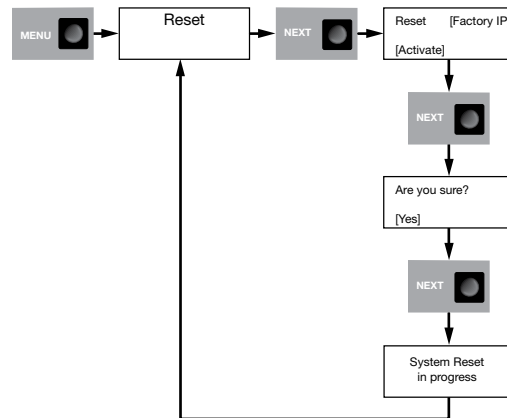


Figure 92. VND 250 Decoder Reset Submenu

1. In the main **Reset** screen, press **Next** to open the Reset Options screen.

2. In the **Reset** Options screen, use the left rotary encoder to select which type of reset you want. You can choose **Factory IP** or **Sanitize**:

Factory IP — Restores the following parameters to the factory default:

- IP address
- Subnet mask
- Gateway IP address
- Controller IP address
- Link speed set to auto
- Static IP address
- Controller port number

For factory default values see [figure 11](#) on page 26.

Sanitize — Runs the sanitize process to overwrite volatile scaler memory (for the on-screen display), volatile wavelet memory, and all non-volatile memory. All these memory locations are overwritten three times:

- Firstly with a random pattern of zeroes and ones.
- Secondly with binary zeroes.
- Thirdly with binary ones.

3. Use the right rotary encoder to toggle between **Activate** or **Cancel**.
4. Press **Next**.
5. If you selected **Activate** in step 3, one of the reset processes runs. The screen shows **System Reset in Progress**.
6. When the reset is complete, press **Next** to return to [Decode Config Submenu](#) (see page 103).

Alarms

Alarm Types

The VNE 250 and VND 250 generate alarms in response to a range of error conditions.

	Alarm Description	Fault Description	Alarm Type
Encoder Alarms	No source	No source is connected at the input.	Critical, Reporting
	Bad Source Sync	An input source is connected but the signal timing is not recognized. (Unable to input source due to bad sync measurement.)	Critical, Reporting
	No SDI Source Lock (not applicable to VNM 250)	An SDI source is connected but the signal timing is not recognized. (An SDI source is present but the PLL lock failed.)	Critical, Reporting
	Unsupported SDI Mode (not applicable to VNM 250)	The connected SDI mode is not supported.	Critical, Reporting
	Unsupported Mode	The connected source is not supported; a user-mode should be created.	Critical, Reporting
	Bad Source	A source is connected and syncs have been detected but it is not possible to make active pixel measurements.	Critical, Reporting
	Analog Phasing Error	The analog pixel clock auto-phasing process has failed.	Warning, Reporting
	Hardware Encoding Error	The hardware is unable to encode the input video.	Critical, Reporting
	Unsupported Audio Source	The digital audio source has a bad or unsupported clock rate.	Critical, Reporting
	Bad Audio Source	The audio source is not valid for the current video source.	Warning, Reporting
	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
	Network Overload	The network is dropping too many packets.	Warning, Reporting
	Bad Reverse Audio	The reverse audio channel contains no data or has a large number of dropouts	Warning, Reporting

	Alarm Description	Fault Description	Alarm Type
Decoder Alarms	No Decoder Video Data	A stream is assigned but the decoder is not receiving any video data.	Warning, Reporting
	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
	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
	Recovered Audio	The decoder has recovered from missing audio packets.	Warning, Reporting
	No Decoder Audio Data	An audio stream is assigned but the decoder is not receiving any audio data.	Warning, Reporting
	Bad Audio At Decoder	The decoder is receiving poor quality audio data.	Warning, Reporting
	Bad Audio PLL	The decoder is having problems synchronizing to the audio data.	Warning, Reporting
	Video Network Packets Dropped	Excess video data has been dropped in the network.	Warning, Reporting
	Decoder Buffer Overflow	Too many data frames at the decoder; reduce the pipeline delay.	Warning, Reporting
	Decoder Buffer Underflow	Too few data frames at the decoder; increase the pipeline delay.	Warning, Reporting
	Bad Video PLL	The decoder is having problems synchronizing to the video data.	Warning, Reporting
	No Decoder ANC Data	An ANC stream is assigned but the decoder is not receiving any ANC data.	Warning, Reporting
	Missing ANC at Decoder	The decoder is receiving poor quality ANC data.	Warning, Reporting
	Recovered ANC	The decoder has recovered from missing ANC packets.	Warning, Reporting
	No Genlock Source Present	The Genlock mode is enabled but there is no reference Genlock source present.	Critical, Reporting
	No Genlock Source Lock	The Genlock mode is enabled but the reference Genlock signal is invalid.	Critical, Reporting
	Genlock Source Mismatch	The Genlock mode is enabled but the Genlock reference signal mismatches the required output mode.	Critical, Reporting
	Unsupported Audio Type	The audio data being received are a type that is not supported by the current hardware.	Critical, Reporting
Encoder/Decoder Alarms	Audio Input Over-range	The analog input level is too large for the current range setting.	Warning, Reporting
	Bad Audio Hardware Reporting	The audio hardware has failed or is not present.	Critical, Reporting

	Alarm Description	Fault Description	Alarm Type
Controller Alarms	Over Temperature	The hardware is too hot and is likely to behave erratically.	Warning, Reporting
	Bad Device	The Device is not properly communicating with the controller.	Critical, Reporting
	RTP stream holdoff	The RTP data stream has been temporarily disabled due to excess packet drops.	Critical, Reporting

Alarm Handling

If there is a critical alarm, the front panel Alarm LED lights red. The rear panel relay contacts also close.

Alarms are reported on the following interfaces:

- Web User Interface **Alarms tab** (see page 38) and **Alarm Logs tab** (see page 39).
- Front panel alarm LED (see **figure 5, B** on page 11).
- SNMP traps (version 3) (see **Overview — SNMP** on page 40).

Troubleshooting

If you have followed the procedures on the preceding pages, you should by now have set up at least one VNE 250 encoder and one VND 250 decoder, and be able to display the source (encoder) signal on the display (decoder). If not, this section helps to diagnose most problems you may encounter.

If there are problems with the VN-Matrix system, you can find information about the problem from these sources:

- **Front Panel Status Indicators**
- **Front Panel LCD Menu**
- **Controller Web User Interface**

Use the **Troubleshooting Guide** (see page 118) to determine what the problem is.

The previous section provides information about **Alarms** (see page 112), which can provide important information for diagnosing problems within the system.

TIP: In systems with multiple units, you can identify a specific unit with the **Unit Identify Mode** (see page 12). This option is only available with the Enterprise Controller.

Front Panel Status Indicators

Name	Color	Function												
Control	Orange	Indicates the status of the control network port: Fully lit or Flashing intermittently — control data is being transmitted or received by the port. Unlit — no data or no network connection detected.												
Stream	Orange	Indicates the status of the active network port (streaming): Fully lit or Flashing intermittently — system control or source data is being transmitted or received by the port. Unlit — no data or no network connection detected.												
Status	Green	Indicates the status of the VNE 250 or VND 250												
		<table><tr><th>Condition</th><th>Encoder (source)</th><th>Decoder (display)</th></tr><tr><td>Unlit</td><td>No source input detected.</td><td>No stream being received.</td></tr><tr><td>Flashing</td><td>Source being streamed.</td><td>Stream being received.</td></tr><tr><td>Fully Lit</td><td>Source present but not being streamed (for example, the unit is currently disabled or in standby mode).</td><td>N/A</td></tr></table>	Condition	Encoder (source)	Decoder (display)	Unlit	No source input detected.	No stream being received.	Flashing	Source being streamed.	Stream being received.	Fully Lit	Source present but not being streamed (for example, the unit is currently disabled or in standby mode).	N/A
		Condition	Encoder (source)	Decoder (display)										
		Unlit	No source input detected.	No stream being received.										
		Flashing	Source being streamed.	Stream being received.										
Fully Lit	Source present but not being streamed (for example, the unit is currently disabled or in standby mode).	N/A												
Alarm	Red	Fully lit — indicates that a critical alarm has occurred.												
		Flashing — indicates an over-temperature condition.												

For complete information, see [Alarm Types](#) on page 112.

Front Panel LCD Menu

The default menu screens (see [Default Menu Screens \(Encoder\)](#) or [Default Menu Screens \(Decoder\)](#) on the next page) provide current status information:

- **Device** summary screen — Provides information about the IP address and the subnet mask of the device.
- **Encoder** input summary screen — Provides information on the currently selected source.
- **Decoder** output summary screen — Provides information on the current output mode and the status of the output itself.
- **Controller** summary screen — Provides the IP address of the system controller and its status.
- **Connection** summary screen — Provides information on the active connections that are in place.

TIPS:

- To help when reviewing this information, it is possible to pause the default cycle and step through each screen using the rotary encoders.
- To pause the cycling of the default screens, press and hold the **Next** button on the front panel.
- To step through each top level screen use the left hand rotary encoder; to step through each item in a screen, use the right hand rotary encoder.
- To cancel the pause mode, press the **Menu** button.

Default Menu Screens (Encoder)

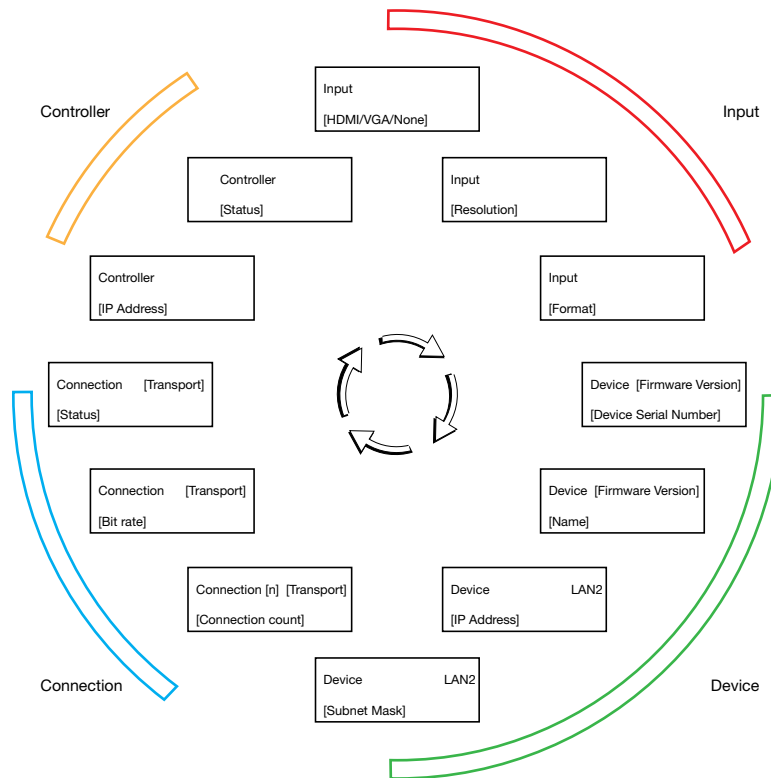


Figure 93. VNE 250 Encoder Default Menu Screens

Default Menu Screens (Decoder)

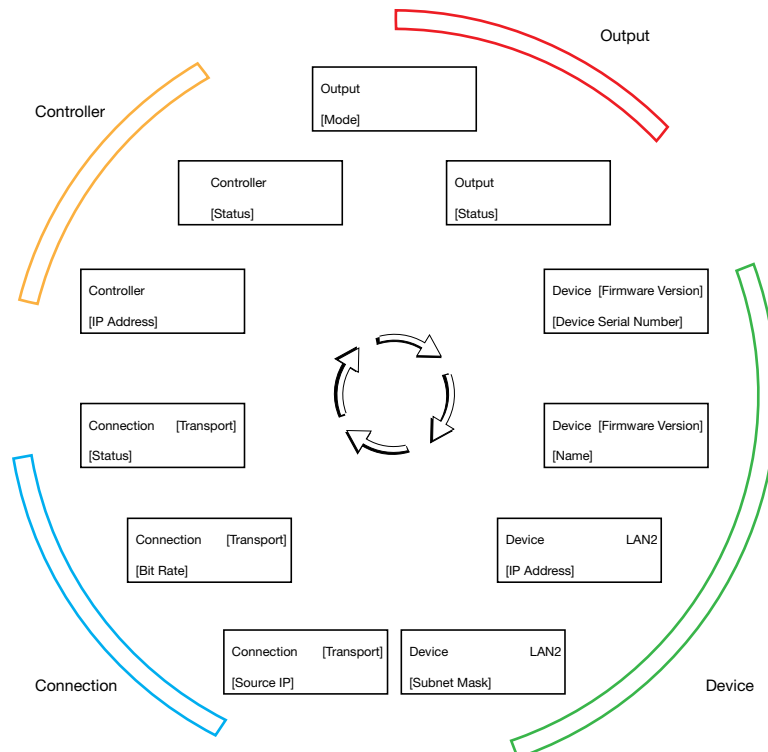


Figure 94. VND 250 Decoder Default Menu Screens

Controller Web User Interface

When troubleshooting using the Web UI, the following links may provide useful information about the cause of the problem:

Encoder [Device tab](#) (see page 46)

Decoder [Device tab](#) (see page 58)

[Alarms tab](#) (see page 38)

[Alarm Logs tab](#) (see page 39)

[Overview – SNMP](#) (see page 40)

[Alarms](#) (see page 112)

Troubleshooting Guide

The following section provides information about problems that you might encounter and offers methods to diagnose the problems. In small systems, using a VNM 250 device as system controller, follow the links provided for suggestions about resolving the problem. In large systems, controlled by a VN-Matrix Enterprise Controller, see the *VN-Matrix Enterprise Controller User Guide* to resolve the problem.

No Web UI Pages Served

Cause	Check
Controller is not powered on.	Check that the controller is powered on (see Power on page 14).
Incorrect controller IP address in use. PC not configured correctly.	Check that you have the correct IP address for the controller by pinging the controller from the control PC. To change the controller IP address, see Low Level Device Configuration on page 25. If the controller IP address is correct, ensure that the PC network interface is correctly configured.
Using an unsupported web browser	If you are using a VNM Enterprise Controller or VNM 250 device as the system controller, you must use one of the following browsers: <ul style="list-style-type: none">• Windows Internet Explorer (version 8 or later)• Mozilla Firefox (version 20 or later)• Google Chrome (version 30 or later)
Incorrect Web server port number	Check that the Web server port number is set correctly on the controller (see option 19 in Low Level Device Configuration). By default, browsers use 80 as the web server port. If another port has been set, the URL must be appended with :port number . For example 192.168.254.254:8080 .

Device Not Listed in the Device List Page

Cause	Check
The device is not powered on.	<p>If the front panel LEDs are unlit and the front panel LCD menu is not cycling through the default menu, the unit is not powered on.</p> <p>Check that the power supply is connected to the rear panel receptacle and that the IEC cord from the power supply is connected to a suitable power source (see Power on page 14).</p> <p>If necessary, try using a different power supply unit.</p>
There is a fault with the power or the device is over temperature.	<p>When the Alarm LED on the front panel flashes red, there is an over temperature condition and the unit shuts down.</p> <p>Ensure the grills on the front and rear panels are not obstructed and check the ambient temperature.</p> <p>Cycle the power off and on to reset the unit.</p>
The device has an incorrect IP address or subnet mask.	<p>Check that the IP address assigned to the VNM 250 unit is correct.</p> <p>The IP address and subnet mask for the device are displayed in the default menu screens.</p> <p>To change the IP address or subnet mask for the unit, see Low Level Device Configuration on page 25.</p>
The device has an incorrect controller IP address.	<p>The controller IP address must be the IP address of the Enterprise Controller or, in small systems, the IP address of the streaming port for the device acting as system controller.</p> <p>The controller IP address assigned to the unit is displayed by the front panel default menu.</p> <p>To change the controller IP address, see Low Level Device Configuration.</p>
No Gateway address set on the device.	<p>If the VNM 250 device and the controller are in different network segments, an appropriate gateway address must be provided. Check with your network administrator if this is required.</p> <p>To change the gateway address for the unit, see Low Level Device Configuration.</p>
Bad or missing network cable	<p>Check that the cable connecting the VNM 250 unit to the network works correctly and is securely seated in the Streaming LAN receptacle (LAN port 2).</p> <div style="border: 1px solid black; padding: 5px;"> <p>NOTE: This issue is normally be accompanied by a Controller Not Available status in the front panel LCD menu Controller Summary screen.</p> </div>

Encoder – Input Signal (Video) Issues

This checklist helps to identify problems associated with the video input on an encoder.

Cause	Check
No source connected to the encoder inputs.	<p>Check the connecting cable to see if it is faulty.</p> <p>Check that a video source is connected to one of the video inputs and that the cable is securely connected.</p> <div style="border: 1px solid black; padding: 5px;"> <p>TIP: Extron recommends that HDMI cables are secured to VNE 250 unit, using a LockIt HDMI Cable Lacing Bracket.</p> </div> <p>When no source is connected, the encoder Default Menu Screens (see page 92) shows None. If a source is connected, the menu screen shows the signal type (HDMI or VGA), the resolution, and format for the selected source.</p> <p>In the web UI, check the status of the Current Mode and Source Status fields (see page 47) to ensure the source is recognized by the VNE 250.</p>
The loop-through output is disabled.	<p>If there is no image on the loop-through display, check whether it has been disabled (see the encoder front panel Input Submenu on page 97).</p>

Cause	Check
The loop-through display is incompatible with the input.	Connect the source directly to the display and check that an image is shown.
The VNE 250 does not support the input signal format.	<p>The VNE 250 accepts VGA, DVI (with appropriate adapters), or HDMI signals. Other video types are not recognized and cannot be streamed.</p> <p>In the web UI, check the status of the Current Mode and Source Status fields (see page 47) to ensure the source is recognized by the VNE 250.</p> <p>For a PC source, try selecting another fixed mode in the EDID list for that input (analog or digital). Selecting a fixed mode with the same resolution and a 60 Hz refresh rate can bring the source into range (see Video input — EDID settings on page 47).</p> <p>For unsupported analog sources, it may be possible to construct a Custom Input Modes (see page 80).</p>
The HDCP Authorize setting is incorrect.	<p>Check to see if the source is HDCP encrypted.</p> <p>When HDCP-encrypted content is transmitted to a non-HDCP compliant display, a full-screen green signal is seen on the output screen. This mechanism is managed by the VNM 250 device. However, under these circumstances, some Blu-ray players output a blank, black image in place of content and this can be misleading.</p> <p>Check the setting of the Video input — HDCP authorization control (see page 48). For most HDMI sources the box must be checked. Try toggling between checked and unchecked.</p>
The wrong input is selected.	The VNE 250 has digital (HDMI) and analog (VGA) connectors. The input can be forced to a specific input type. Ensure that the correct video input is enabled (see Video input — channel selection on page 48).

Decoder — Problems with Viewing the Decoded Image

This checklist helps to identify problems with viewing a stream on the decoder.

Cause	Check
Connecting cable is faulty.	<p>Check the cable connecting the VND 250 to the display to see if it is faulty.</p> <div style="border: 1px solid black; padding: 5px;"> <p>TIP: Extron recommends that HDMI cables are secured to VND 250 unit, using a LockIt HDMI Cable Lacing Bracket.</p> </div>
The decoder is disabled.	Check that the device mode is set to enable (see the decoder front panel Output Submenu on page 107 or the web UI Device Setup on page 58).
The display is unable to support the output signal format.	If the decoder output format is set to auto , try setting it to monitor . This forces the Output Format to match the preferred mode of the display. Make sure the Scale option is selected (see Display tab on page 59).
The VND 250 does not support the output signal format.	If the decoder output format is set to auto , try setting it to monitor . This forces the Output Format to match the preferred mode of the display. Make sure the Scale option is selected (see Display tab).
The display is not HDCP compliant.	<p>When HDCP-encrypted content is transmitted to a non-HDCP compliant display, a full-screen green signal is seen on the output screen. This mechanism is managed by the VNM 250 device.</p> <div style="border: 1px solid black; padding: 5px;"> <p>NOTE: Streams that are not HDCP-encrypted can be viewed on non-compliant displays.</p> </div>
The HDCP mode check box is set.	When HDCP mode is enabled (see page 60), the display output signal is HDCP-encrypted for all source (stream) types. If the decoder display is not HDCP compliant, the a full green signal is shown at all times. The HDCP mode setting is used to improve the clean switch performance when HDCP streams are used.

Cause	Check
Power Save mode is enabled.	The decoder display enters power save mode if the stream assigned for decoding is no longer available and the power save mode is enabled in the decoder front panel Output Submenu (see page 107).
No stream is assigned.	Check that a video stream has been selected (see Assigning a video source stream (see page 61)).
The encoder is not correctly configured.	Check that the encoder has a compatible video source, that the correct input is selected, and that the HDCP settings are configured correctly (see Encoder – Input Signal (Video) Issues (see page 119)).
More than four decoders connected in RTP unicast mode.	A maximum of four streams are supported from each encoder when the transport is RTP unicast. No image is decoded for additional connections to more than 4 decoders (see Unicast RTP – An Overview (see page 5)).

Program Audio Problems

Cause	Check
Audio input not selected.	The encoder program audio source is selected in the web UI (see Audio Input Selection on page 55). Check to ensure that the correct input setting is selected.
Analog audio input level is not set correctly on the encoder.	The analog program audio input level is adjusted on the encoder (see Configure (AudioPort0) tab on page 54). An incorrect setting can result in overloading of the input or audio that is low in volume. NOTE: HDMI audio level cannot be adjusted.
HDMI audio format is not supported.	VNM 250 devices support 24-bit stereo PCM and AC-3 (Dolby 5.1) digital audio formats. Check the Audio status field (see page 54) to ensure that the digital audio is supported.
No audio stream has been assigned on the decoder.	Check that the audio stream is selected on the decoder (see Assigning an audio source stream on page 61).
The program audio output has not been selected on the decoder.	The program audio can be output on either or both of the HDMI or analog outputs. Check that the required output is selected on the decoder (see Audio output selection (Audio Control panel) on page 64).
The analog program audio output is muted on the decoder.	Ensure the Mute check box is not selected (see Audio output selection (Audio Control panel)).
The analog audio output level is incorrectly set on the decoder.	Check the correct value has been entered in the Analog Output Level text box (see Audio output selection (Audio Control panel)).

Return Audio Problems

Return audio requires settings to be made on both the encoder and decoder.

Cause	Check
The return audio input has not been enabled on the decoder.	Ensure the Analog input enable check box is selected on the decoder bandwidth page (see Return audio configuration (Audio Control panel) on page 64).
The return audio input level is not set correctly on the decoder.	The input level is adjusted using the Analog input level text box on the decoder bandwidth page (see Return audio configuration (Audio Control panel)).
A program audio stream has not been assigned on the decoder.	A program audio stream must be assigned on the decoder; return audio does not operate if the decoder is not receiving a program audio stream. Ensure that the program audio stream check box is selected (see Assigning an audio source stream on page 61)
A return audio source has not been selected on the encoder.	Select a source from the Reverse audio source drop down menu (see Analog output level (return audio) on page 56).
The return audio is not enabled on the encoder.	Ensure the Analog output check box is enabled on the encoder Configure (AudioPort0) tab (see page 54).
The return audio output level is not set correctly on the encoder or the output is muted.	The output level can be adjusted using the Analog output level text box on the encoder Configure page (see Analog output level (return audio)).

Reference Material

This section provides information about:

- [Supported EDID Modes](#)
- [VN-Matrix System Port Usage](#)

Supported EDID Modes

DVI

Resolution	Refresh	Audio	File Size
800x600	60 Hz	N/A	128 bytes
1024x768	60 Hz	N/A	128 bytes
1280x720	60 Hz	N/A	128 bytes
1280x768	60 Hz	N/A	128 bytes
1280x800	60 Hz	N/A	128 bytes
1280x1024	60 Hz	N/A	128 bytes
1360x768	60 Hz	N/A	128 bytes
1366x768	60 Hz	N/A	128 bytes
1400x1050	60 Hz	N/A	128 bytes
1440x900	60 Hz	N/A	128 bytes
1600x900	60 Hz	N/A	128 bytes
1600x1200	60 Hz	N/A	128 bytes
1680x1050	60 Hz	N/A	128 bytes
1920x1080	60 Hz	N/A	128 bytes
1920x1200	60 Hz	N/A	128 bytes
2048x1080	60 Hz	N/A	128 bytes

HDMI

Resolution	Refresh	Audio	File Size
800x600	60 Hz	2-Ch	256 bytes
1024x768	60 Hz	2-Ch	256 bytes
1280x768	60 Hz	2-Ch	256 bytes
1280x800	60 Hz	2-Ch	256 bytes
1280x1024	60 Hz	2-Ch	256 bytes
1360x768	60 Hz	2-Ch	256 bytes
1366x768	60 Hz	2-Ch	256 bytes
1400x1050	60 Hz	2-Ch	256 bytes
1440x900	60 Hz	2-Ch	256 bytes
1600x900	60 Hz	2-Ch	256 bytes
1600x1200	60 Hz	2-Ch	256 bytes
1680x1050	60 Hz	2-Ch	256 bytes
1920x1200	60 Hz	2-Ch	256 bytes
2048x1080	60 Hz	2-Ch	256 bytes
480p	60 Hz	2-Ch	256 bytes
576p	50 Hz	2-Ch	256 bytes
720p	50 Hz	2-Ch	256 bytes
720p	60 Hz	2-Ch	256 bytes
1080i	50 Hz	2-Ch	256 bytes
1080i	60 Hz	2-Ch	256 bytes
1080p	50/25 Hz	2-Ch	256 bytes
1080p	50 Hz	2-Ch	256 bytes
1080p	60/24 Hz	2-Ch	256 bytes

VGA

Resolution	Refresh	Audio	File Size
800x600	60 Hz	N/A	128 bytes
1024x768	60 Hz	N/A	128 bytes
1280x720	60 Hz	N/A	128 bytes
1280x768	60 Hz	N/A	128 bytes
1280x800	60 Hz	N/A	128 bytes
1280x1024	60 Hz	N/A	128 bytes
1360x768	60 Hz	N/A	128 bytes
1366x768	60 Hz	N/A	128 bytes
1400x1050	60 Hz	N/A	128 bytes
1440x900	60 Hz	N/A	128 bytes
1600x900	60 Hz	N/A	128 bytes
1600x1200	60 Hz	N/A	128 bytes
1680x1050	60 Hz	N/A	128 bytes
1920x1080	60 Hz	N/A	128 bytes
1920x1200	60 Hz	N/A	128 bytes
2048x1080	60 Hz	N/A	128 bytes

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 next 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 the ports required for your given application. The ports highlighted in **yellow** accommodate most simple applications.

Port	Transport	Usage
69	UDP	TFTP Server, for firmware upgrades.
80	TCP	HTTP data for communication between the web browser and the Enterprise Controller. Value is user definable; the default is 80.
554	TCP	Real-time streaming protocol (RTSP) server.
5432	UDP	Enterprise Controller 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.
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).
23	TCP	Telnet (can be disabled).
161	UDP	Simple network management protocol (SNMP) used for alarm access.
199	TCP	Simple network management protocol (SNMP) used for alarm access.
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).
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 Enterprise Controller.
9002	UDP	Default port for collecting UDP traffic for data transport. Value is user-definable.
9996	TCP	HLI server port.
9997	TCP	Annotation server port.

SIS Commands


This section provides the following information about the SIS commands that can be used to configure the VND 250 and VNE 250:

- [Introduction to SIS](#)
- [Symbols Used in this Guide](#)
- [Error Messages](#)
- [Command and Response Table for SIS Commands](#)

Introduction to SIS

Both the VND 250 and VNE 250 accept SIS commands from a host device such as a computer running the Extron DataViewer utility or other control system. The control device must be connected to the front panel USB Config port.

Host-to-Device Communications

SIS commands consist of strings (one or more characters per command field). No special characters are required to begin or end a command sequence. Unless otherwise stated, upper and lower case characters can be used interchangeably. Most responses from the VNM 250 device end with a carriage return and a line feed (CR/LF = ) , which signals the end of the response character string. When the VNM 250 device determines that a command is valid, it executes the command and sends a response to the host device.

Symbols Used in this Guide

During programming in the field, certain characters are most conveniently represented by their hexadecimal rather than their ASCII values. The table below shows the hexadecimal equivalent of each ASCII character:

ASCII to HEX Conversion Table															
Space 20	!	21	"	22	#	23	\$	24	%	25	&	26	'	27	
(28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F	
0 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	|	7C	}	7D	~	7E	DEL	7F	

Figure 95. ASCII to HEX Conversion Table

- ↵ — Carriage return with line feed (Hex: 0D0A)
- ← — Carriage return without line feed (Hex: 0D)
This character can be used interchangeably with the pipe character (|)
- — Space character (Hex: 20)
- Esc** — Escape key (Hex: 1B)
This character can be used interchangeably with the upper-case W character.

The **Xn** values defined in this section are the variables used in the fields of the command and response table (see page 127).

- X5** — Status
0 = disabled, off, or undetected
1 = enabled, on, or detected
- X6** — Port number (default = 5432)
- X14** — IP or Gateway address, in decimal format: four octets separated by periods.
For example 192.168.253.254 (default value for LAN 1)
or 192.168.254.254 (default value for LAN 2)
Leading zeros in any of the four fields are optional in setting values and are suppressed in returned values.
- X18** — Hardware (MAC) address
- X19** — Subnet mask in decimal format: four octets separated by periods.
for example 255.255.0.0. The default value is 255.255.255.0.
Leading zeros in any of the four fields are optional in setting values and are suppressed in returned values.
The subnet value is returned in standard format (255.255.255.0), not /24.
- X576** — NIC (Network Interface Card) Address:
1 = LAN 1
2 = LAN 2.

Error Messages

- E10 — Invalid command
- E13 — Invalid value (out of range)
- E14 — Invalid command for this configuration

Command and Response Table for SIS Commands

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Network			
Set DHCP	Esc X576 * X5 DH←	Idh X576 * X5 ↵	
Query DHCP	Esc X576 DH←	X5 ↵	
Set IP address	Esc X576 * X14 CI←	Ipi• X576 * X14 ↵	
View IP address	Esc X576 CI←	X14 ↵	
Set subnet mask	Esc X576 * X19 CS←	Ips• X576 * X19 ↵	
View subnet mask	Esc X576 CS←	X19 ↵	
Set gateway address	Esc X576 * X14 CG←	Ipg• X576 * X14 ↵	
View gateway address	Esc X576 CG←	X14 ↵	
View MAC address	Esc X576 CH←	X18 ↵	
Set controller IP	Esc X14 SYSC←	Sysc• X14 * X6 ↵	
Set controller IP and port	Esc X14 * X6 SYSC←	Sysc• X14 * X6 ↵	
View controller IP and port number	Esc SYSC←	X14 * X6 ↵	(Default value = 192.168.254.254*5432)
KEY: X5 = DHCP status Ø = disabled (default), 1 = enabled X6 = Port number X14 = IP address/Gateway address There is no gateway for LAN 1 (control port); E14 error is returned. X18 = MAC address X19 = Subnet mask X576 = NIC card number LAN 1 = 1, LAN 2 = 2			
Set IP/Subnet/Gateway (at the same time)			
Set IP address	Esc X576 * X14 CISG←	Cisg• X576 * X14 * X19 * X14 ↵	The first X14 value is the IP address and the second is the Gateway address.
Set IP/Subnet (IPv4)	Esc X576 * X14 * X19 CISG←	Cisg• X576 * X14 * X19 * X14 ↵	
Set IP/Subnet/Gateway (IPv4)	Esc X576 * X14 * X19 * X14 CISG←	Cisg• X576 * X14 * X19 * X14 ↵	
View IP/Subnet/Gateway	Esc X576 CISG←	X14 * X19 * X14 ↵	
KEY: X14 = IP address/Gateway address There is no gateway for LAN 1 (control port); E14 error is returned. X19 = Subnet mask X576 = NIC card number LAN 1 = 1, LAN 2 = 2			

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
General			
Query Firmware version	Q	x.xx.xxx↵	Firmware version as x.xx.xxx (major.minor.build)
Query Part Number	N	Pno xx-xxxx-xx↵	Part number 60-1274-01 (encoder) 60-1275-01 (decoder)
Query Model Name	I	VNE•250•Matrix↵ or VND•250•Matrix↵	Model name VNE•250•Matrix (encoder) VND•250•Matrix (decoder)
Absolute System Reset	[Esc]ZQQQ↵	Zpq↵	Runs the Sanitize feature (see page 100) of the VNM 250
Reboot System	[Esc]1B00T↵	Boot1↵	Saves and commits any changes made to the network settings
Restart Network	[Esc]2B00T↵	Boot2↵	Works in the same way as Boot 1. Currently, the VNM 250 does not support a restart of network ports alone.
Enable Telnet	[Esc]23MT↵	00023↵	
Disable Telnet	[Esc]0MT↵	00000↵	
Query Telnet state	[Esc]MT↵	00023↵ or 00000↵	enabled disabled

NOTES:

- Trying to set an IP address, subnet mask, or gateway address while DHCP is enabled, results in an E14 (Invalid command for this configuration) error message.
- Using the CISG command (to set the IP address, subnet mask, and gateway address at the same time) while DHCP is enabled, disables DHCP.
- Any changes to the network settings require a reboot to apply them.
- Currently, SIS implementation by the VNM 250 supports only Extron Verbose mode 0.
- To comply with industry standards, there cannot be any "1" bits to the right of a "0" bit in a subnet mask. For example, 255.255.128.0 (11111111.11111111.10000000.00000000) is valid; 255.255.64.0 (11111111.11111111.01000000.00000000) returns an E13 (Invalid value) error message.

Mounting

This section provides information on the following:

- **Choosing a Suitable Location for Mounting**
- **Environmental Requirements**
- **Mounting Procedures**

Choosing a Suitable Location for Mounting

The VNM 250 is designed to be used either as a free-standing unit or mounted in a 19-inch rack using optional mounting kits. Wherever the unit is mounted, observe the Environmental Requirements listed below.

Environmental Requirements

ATTENTION:

- The points in this section must always be observed whether the VNM 250 is free-standing or rack-mounted.
- Les indications de cette section doivent toujours être respectées, que le VNM 250 soit autonome ou monté en rack.

Orientation

The VNM 250 is designed to be used free-standing on a stable, horizontal surface. It can, however, be used in any orientation subject to the necessary ventilation requirements.

Temperature

- Do not install or operate the VNM 250 in an area where the ambient temperature exceeds 35°C (95°F) or falls below 5 C (35°F).
- The VNM 250 and its associated power supply produce heat, which can affect the ambient temperature.
- After the VNM 250 has been in use for a period of time, the external casing can become slightly warm to the touch. Ensure that any adjacent surfaces are not affected by the heat.

Ventilation

Do not obstruct the ventilation openings during use. The VNM 250 has an integral forced-air cooling system. A fan draws air in through the ventilation openings in the front panel and expels the heated air through the openings in the back panel. The fan speed is controlled automatically by an internal temperature sensor. The fan can, therefore, appear to run faster as the unit warms up or if the ambient temperature increases.

A self-resetting thermal cutoff shuts down the VNM 250 if the temperature exceeds design limits.

Humidity and water

Do not install or operate the VNM 250 in an area:

- Where the ambient relative humidity exceeds 85%
- That is prone to condensation
- Near water or in a location that may be prone to water

Mounting Procedures

WARNINGS:

- This equipment must be grounded.
- Cet équipement doit être fixé au sol.
- To avoid the possible risk of electric shock or product damage due to condensation, always allow the power supply to adapt to the ambient temperature and humidity for at least 30 minutes before switching it on. This is particularly important when moving the unit from a cold location to a warm location.
- Afin d'éviter un risque éventuel de choc électrique ou d'endommagement du produit dû à la condensation, laissez toujours le temps à la source d'alimentation de s'adapter à la température et à l'humidité ambiantes, pendant au moins 30 minutes, avant de les brancher. Ceci est particulièrement important lorsque vous déplacer l'unité depuis un lieu frais vers un lieu chaud.

For tabletop use, affix one of the supplied self-adhesive rubber feet to each corner of the bottom of the unit.

The VNM 250 Series encoders and decoders are housed in rack mountable, 1U high, metal enclosures. Optional mounting hardware lets you install the unit in any standard 19-inch rack or under or through furniture.

Mount the unit in a rack or under or through furniture in accordance with the directions included with the mounting kit.

UL Rack-Mounting Guidelines

The following Underwriters Laboratories (UL) requirements pertain to the installation of the VN-Matrix 250 into a rack.

Elevated operating ambient temperature — If the equipment 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, consider installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma} = +122°F [+50°C]) specified by Extron.

Reduced air flow — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.

Mechanical loading — Mount the equipment in the rack so that uneven mechanical loading does not create a hazardous condition.

Circuit overloading — When connecting the equipment to the supply circuit, consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Consider equipment nameplate ratings when addressing this concern.

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 use of power strips).

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 Electronics 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 Dubai, United Arab Emirates
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.