User Guide

Streaming AV Products

VNM Recorder

VN-Matrix® Recorder

Extron

68-1998-01 Rev. D
11 20

Safety Instructions

Safety Instructions • English

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

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

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

Sicherheitsanweisungen • Deutsch

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

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

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

Instrucciones de seguridad • Español

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

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

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

Instructions de sécurité • Français

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

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

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

Istruzioni di sicurezza • Italiano

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

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

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

Instrukcje bezpieczeństwa • Polska

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

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

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

Инструкция по технике безопасности • Русский

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

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

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

安全说明 • 简体中文

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

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

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

安全記事 • 繁體中文

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

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

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

安全上のご注意 • 日本語

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

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

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

안전 지침 • 한국어

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

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

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

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. The Class A limits provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference. This interference must be corrected at the expense of the user.

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

Conventions Used in this Guide

Notifications

In this user guide, the following are used:

ATTENTION: Attention indicates a situation that may damage or destroy the product or associated equipment.

NOTE: A note draws attention to important information.

TIP: A tip provides a suggestion to make setting up or working with the device easier.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
[Ø1]RØØØ4ØØ3ØØØØ4ØØØØ8ØØØØ6ØØ[Ø2]35[17][Ø3]
Esc X1 * X17 * X20 * X23 * X21 CE ←
```

NOTE: For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for the number zero and "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 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

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

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

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

Click the **OK** button.

Specifications Availability

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

Extron Glossary of Terms

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

Contents

Introduction

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

About this Guide

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

In this guide:

- The term "recorder" refers specifically to the VNM Recorder.
- The term "codec" refers to either a VN-Matrix encoder or decoder.
- The term "stream" refers to multimedia that is constantly received by (and normally presented to) an end-user while being delivered by a VN-Matrix encoding device.
- The term "element" refers to the video/graphics, audio, data, and whiteboard (user data) content that is contained within a stream.

About the VNM Recorder

The VNM Recorder connects to a network and is used to digitally record and play back multiple PURE3® streams via the IP network of VN-Matrix encoders and decoders. The VNM Recorder is used with any VN-Matrix application to document, archive, review, and play back highly sophisticated or demanding AV imagery.

The VNM Recorder has the ability to record PURE3 encoded IP streams on each channel. Up to five PURE3 streams can be recorded or played back on a single recorder. PURE3 streams recorded together maintain proper synchronization on playback.

The VNM Recorder uses a network storage architecture which makes systems highly scalable and flexible. Storage capacity can be increased or decreased based on the number of inputs, recording time, and archiving requirements.

Figure 1 shows a typical VNM Recorder application, which includes a single VN-Matrix codec. The application shown in figure 1 can operate in recording mode or playback mode.

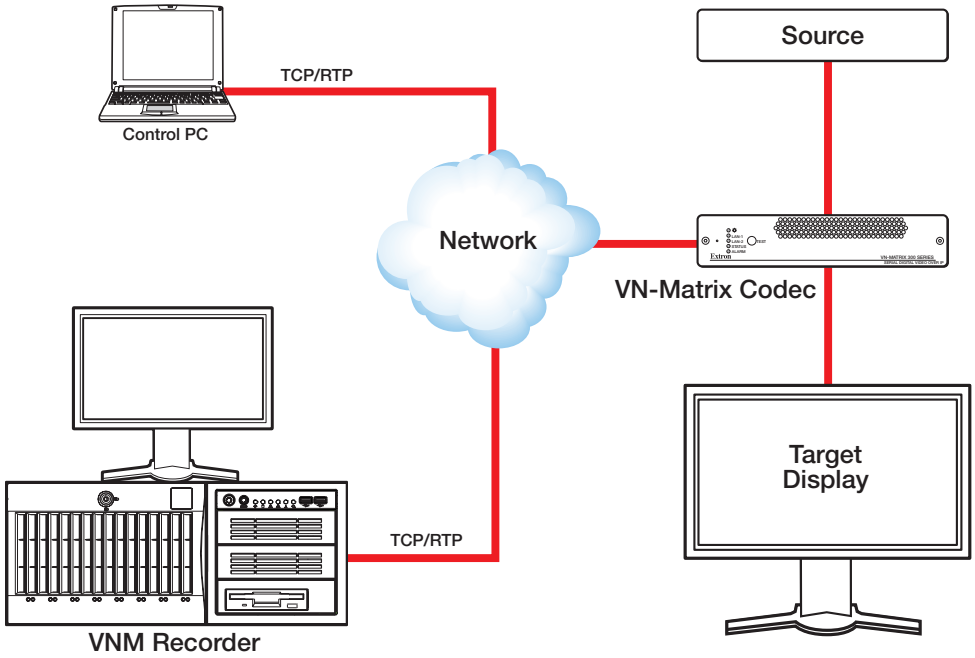


Figure 1. VNM Recorder Application Diagram

Overview of Recorded Streams

The following information is associated with recorded streams when using the VNM Recorder.

- Recorded streams are stored as files on the VNM Recorder.
  - Each recording contains (as a minimum) a video element.
  - A recording may also include elements containing audio, data, and whiteboard information (if these are present and enabled at the encoder). If these are selected for storage, each element is stored as an individual file under the same directory.
- Each recording may contain up to five channels.
  - Each channel originates from a VN-Matrix encoder device (or a VN-Matrix codec configured as an encoder).

Overview of Stream Playback

The following information is associated with stream playback when using the VNM Recorder.

- When a recording is selected for playback that contains multiple elements, the necessary files and channels (a maximum of five channels are supported) are loaded.
  - The files that are loaded in each channel are treated as a single recording and may not be split.
  - The video content, which is assigned to channel 1, is always played.
  - The audio, data, and whiteboard elements may be enabled or disabled for playback (when present in the recording).
  - During playback, the audio, whiteboard, and data elements are always synchronized to their respective video stream. In other words, all channels are synchronized to the video stream on channel 1.

About RAID5 Storage

RAID storage is a system which allows hard drives to be linked together to form a single large capacity storage device that offers superior performance, storage capacity, and reliability over other storage solutions.

The VNM Recorder uses RAID5 storage. RAID5 storage provides the following advantages.

- Increased storage performance.
- Full data redundancy which allows for data backup in the event of a hard drive failure.
- A hard drive is set aside as a hot spare drive which is used to automatically rebuild the data of a failed drive and allow the system to recover.

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 may be thought of as an encoder in this context.

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

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

By default, the VNM Recorder provides a choice of unicast RTP or unicast TCP transport protocols. A multicast transport protocol may be configured if required.

NOTES:

- During playback of a recorded stream, the default transport protocol used is unicast RTP.
- When a stream is recording, the VNM Recorder may be considered as a display (decoder) device.

Multicast RTP — An Overview

Multicast RTP allows a source to be displayed on multiple displays. This method uses RTP, which is a real-time variation of UDP (User Datagram Protocol).

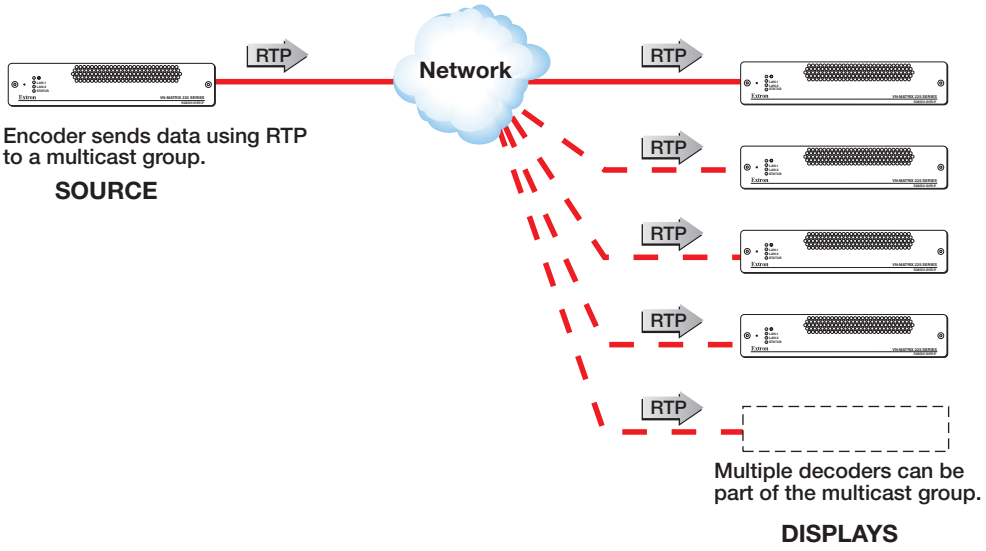


Figure 2. Multicast RTP Streaming

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 VN-Matrix 200 / 225 / 300 / 325 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.

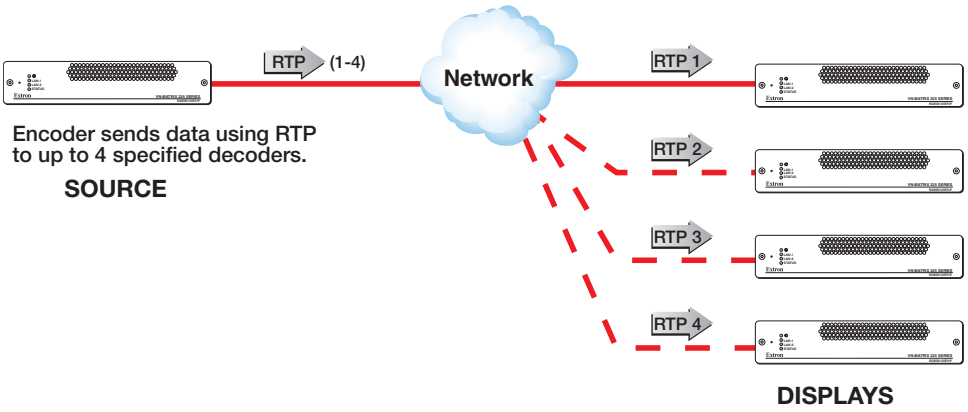


Figure 3. Unicast RTP Streaming

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 VN-Matrix 200 / 225 / 300 / 325 devices carefully manage the data stream to minimize any image disruption.

Unicast TCP — An Overview

This method transports data using standard TCP 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 may be delayed which will impact real-time performance.

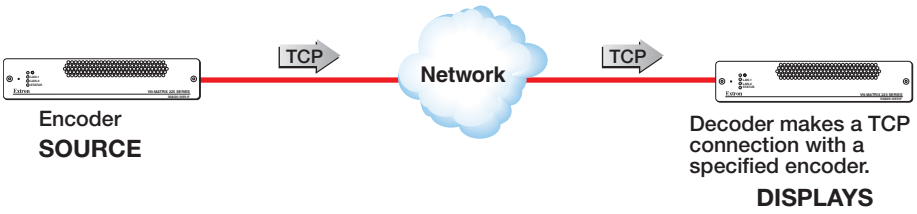


Figure 4. Unicast TCP Streaming

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

Definitions

PURE3 — 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 may contain audio, data, and whiteboard elements that are associated with the video and graphic elements.

Streaming media (stream) — This term 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 — This term refers to the number of licensed features that are available on a device within a VN-Matrix system. All devices contain a default license that offers a default level of functionality (see **Licensed Features panel** on page 29).

> **NOTE:** The VNM Recorder contains a default license that allows for five recorder channels and five player channels. It is currently not possible to change the license on the VNM Recorder.

Controller license — This term refers to the license that is supplied to the device designated as the system controller (see **Controller Licensing** on page 42).

Data — This refers to the transfer method of 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.

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

Features

- Record, synchronize, and play back up to five visually lossless PURE3 encoded VN-Matrix streams over IP.
- Digitally record and play back video/graphics, audio, and data.
- Use the gcode Frame Translator Utility to convert existing VN-Matrix video recordings into individual still frames (see **gcode Frame Translator Utility Instructions** on page 71).
- Virtual switching of video, graphics, and audio over IP.
- Point to point and long distance distribution.
- Link multiple recorder units together for applications requiring recording for more than five streams.
- The VNM Recorder is a scalable and flexible system.

Panels and Cabling

This section provides information on:

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

Installation Overview

1. Turn off and disconnect the VNM Recorder and all existing devices.
2. Mount the recorder, if necessary, as described in the **Mounting** section on page 72.
3. Connect any necessary devices to the recorder (see **Front Panel Features** below and **Rear Panel Features** on page 10).
4. Reconnect and power on all devices.

Front Panel Features

NOTE: Some features listed in this user guide may not be available on some units. This will not affect the overall functionality of the VNM Recorder.

The front panel of the VNM Recorder is shown in figure 5.

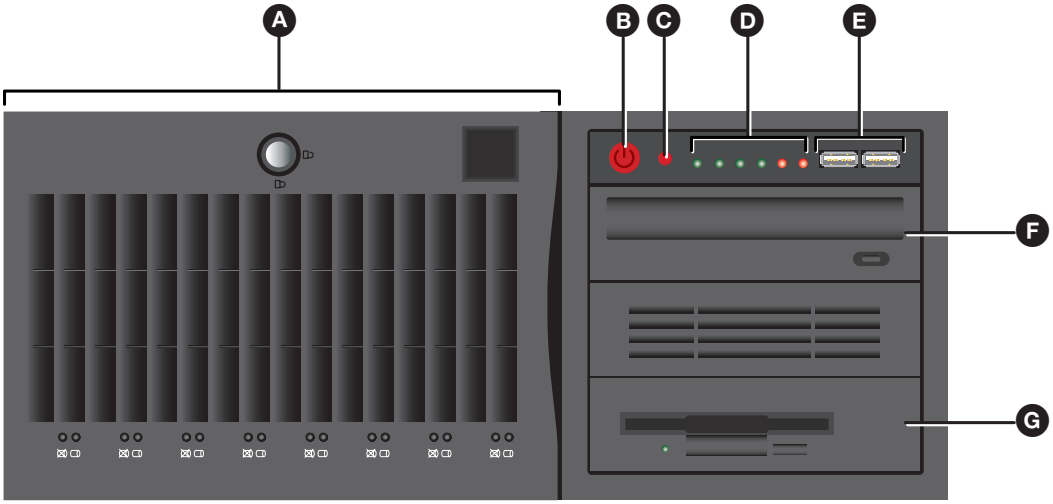


Figure 5. VNM Recorder Front Panel

- **A SCA / SATA drive panel**
- **B Power button**
- **C Reset button**
- **D Status LEDs**
- **E USB Ports**
- **F CD or DVD drive**
- **G 3.5 inch floppy drive**

Ⓐ **SCA / SATA drive panel** — This panel houses the RAID5 hard drives. One hard drive is referred to as a hot spare drive, which is a drive that is inactive until an active drive fails. When an active drive fails, the hot spare drive rebuilds the data of the failed drive so that the system can recover.

Ⓑ **Power button** — This is the main power button, which is used to apply or turn off the main power. When the main power is turned off, standby power is actively supplied to the recorder.

ATTENTION: If the recorder requires service, disconnect the power supply from the recorder before proceeding.

ATTENTION: Si l'entretient de l'enregistreur doit être fait, débranchez la source d'alimentation de celui-ci avant de procéder.

Ⓒ **Reset button** — Use this button to reboot the recorder.

Ⓓ **Status LEDs** — Six LEDs are used to provide the status of the VNM Recorder (see figure 6).

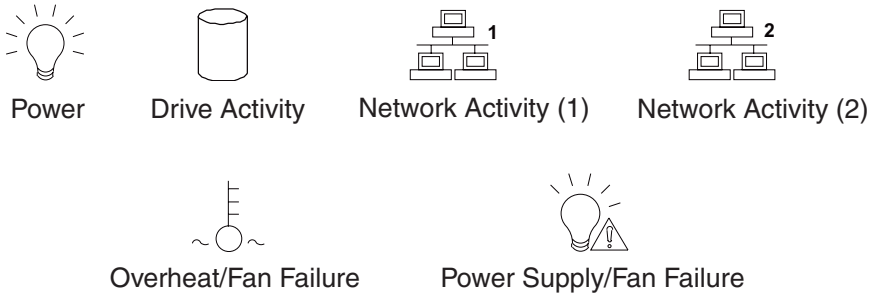


Figure 6. Status LED Icons

- **Power LED** — This LED lights when the recorder is receiving power.
- **Drive Activity LED** — This LED indicates drive activity when flashing or flickering.

NOTE: This light may not respond and an audible alarm may go off if a hard drive has failed. Check to see if a hard drive has failed and replace if necessary.

- **Network Activity LED (1)** — This LED flashes to indicate activity on the first network.
- **Network Activity LED (2)** — This LED flashes to indicate activity on the second network.
- **Overheat and Fan Failure LED** — When this LED is flashing, it indicates that a fan has failed inside the recorder. When the LED is continuously lit, it indicates that the recorder has achieved a condition which may cause it to overheat. This LED will remain flashing or on for as long as these conditions exist.

NOTE: If the LED is continuously lit, the condition may be caused by cables obstructing the airflow of the recorder or the ambient room temperature. Check the routing of the cables and make sure all fans are operating normally. If necessary, move the recorder to a cooler location or adjust the room temperature.

- **Power Supply/Fan Failure LED** — When this LED is lit, it indicates a power supply fan has failed. The power supply module has a redundant backup fan that will increase its speed to compensate, but the power module should be replaced as soon as possible. The recorder may sound louder than usual during operation until the power supply is replaced.

Ⓔ **USB (Universal Serial Bus) ports** — Insert any compatible USB device into these ports. Use an external USB storage device with these ports to update the system.

Ⓕ **CD/DVD drive** — Insert any compatible CD or DVD into this drive. This drive is used for system updates or software installation.

Ⓖ **3.5 inch floppy drive** — This drive accepts 3.5 inch floppy disks.

Rear Panel Features

NOTE: Some features listed in this user guide may not be available on all units. This will not affect the overall functionality of the VNM Recorder.

The rear panel connections of the VNM Recorder are shown in figure 7.

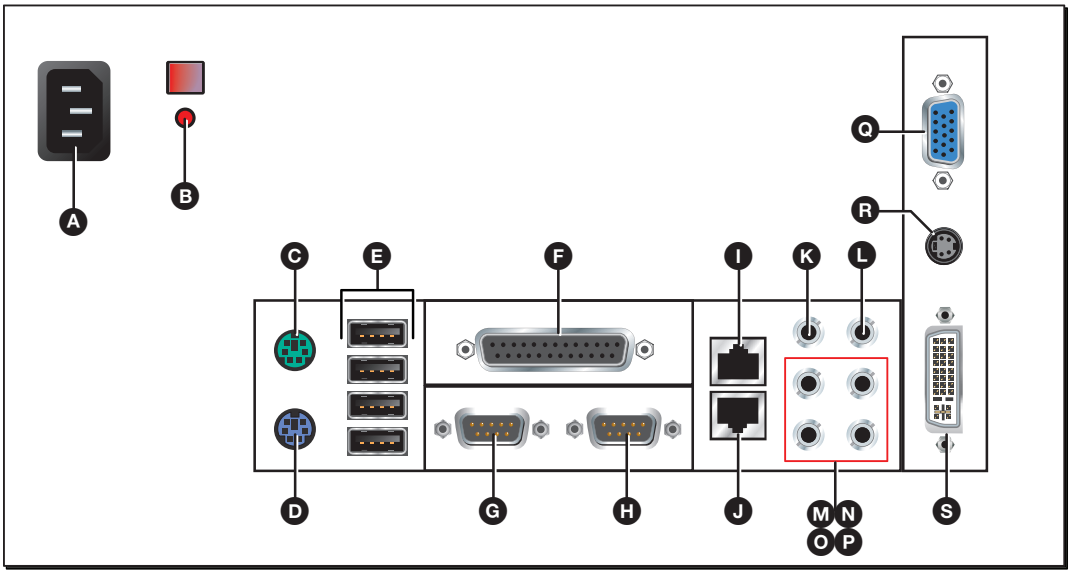


Figure 7. VNM Recorder Rear Panel Connections

Ⓐ Power input	Ⓚ Center/Subwoofer connector
Ⓑ Alarm Reset button and LED	Ⓛ Line in connector
Ⓒ PS/2 mouse connector	Ⓜ Rear speaker connector
Ⓓ PS/2 keyboard connector	Ⓝ Front speaker connector
Ⓔ USB connectors	Ⓞ Side speaker connector
Ⓕ Parallel/Printer connector	Ⓟ Microphone connector
Ⓖ COM1 serial connector	Ⓠ VGA connector
Ⓗ COM2 serial connector	Ⓡ 7-pin connector
Ⓘ Ethernet connector (eth0)	Ⓢ DVI connector
Ⓙ Ethernet connector (eth1)	

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

Ⓑ **Alarm Reset button and LED** — When the recorder overheats or when a hard drive fails, an audible alarm is activated and the LED turns on to indicate that there is a problem with the device. Press this button to turn the alarm off.

Ⓒ **PS/2 mouse connector (optional)** — Connect a PS/2 mouse to this port.

Ⓓ **PS/2 keyboard connector (optional)** — Connect a PS/2 keyboard to this port.

Ⓔ **USB (Universal Serial Bus) connectors** — Insert any compatible USB device into these ports.

Ⓕ **Parallel/Printer connector (not used)**

Ⓖ **COM1 serial connector (not required)** — Connect a compatible device to this 9-pin serial port.

Ⓗ **COM2 serial connector (not required)** — Connect a compatible device to this 9-pin serial port.

Ⓘ **Ethernet connector (eth0)** — Connect a RJ-45 cable to this port. This port connects to a primary network and is the default network port that should be used to connect to a VN-Matrix network.

Ⓙ **Ethernet connector (eth1)** — Connect a RJ-45 cable to this port. This port connects to a secondary network.

Ⓚ **Center/Subwoofer connector (not required; orange)** — Connect a compatible center speaker or subwoofer to this port.

Ⓛ **Line in connector (not required; blue)** — Connect a compatible line in device to this 3.5 mm port. Use this port to play external audio through the sound card of the recorder.

Ⓜ **Rear speaker connector (not required; black)** — Connect a compatible rear speaker to this 3.5 mm port.

Ⓝ **Front speaker connector (not required; lime)** — Connect a compatible front speaker to this 3.5 mm port.

Ⓞ **Side speaker connector (not required; gray)** — Connect a compatible side speaker to this 3.5 mm port.

Ⓟ **Microphone connector (not required; pink)** — Connect a compatible microphone to this port.

Ⓠ **VGA connector** — Connect a compatible VGA monitor to this port.

Ⓡ **7-pin connector (not active/used)**

Ⓢ **DVI connector** — Connect a compatible DVI monitor to this port.

Recorder Configuration and Hardware Setup

This section provides information on how to configure the VNM Recorder so that it will work within a VN-Matrix system. After completing this chapter, see **About the Web-based User Interface** on page 23 for information about controlling the VNM Recorder using a control PC.

Topics that are covered include:

- **Setup Overview**
- **VNM Recorder Power Up Procedure**
- **VNM Recorder Power Down Procedure**
- **Choosing the Controller Device**
- **Configuring the VNM Recorder**
- **Configuring the VN-Matrix Encoders and Decoders**

Setup Overview

1. Connect a mouse, a keyboard, and a computer monitor (for configuration purposes) to the VNM Recorder (see **Rear Panel Features** on page 10).
2. Use a network switch to connect a primary VN-Matrix network to the rear panel Ethernet connector (`eth0`) of the VNM Recorder (see **Rear Panel Features**).
3. Power on the VNM Recorder and all necessary devices (see **VNM Recorder Power Up Procedure** on page 13).
4. Determine the device that will function as the controller (see **Choosing the Controller Device** on page 16).
5. Configure the VNM Recorder network settings (see **Configuring the VNM Recorder** on page 17).
6. Configure the network settings of each VN-Matrix encoder and decoder (see **Configuring the VN-Matrix Encoders and Decoders** on page 22).
7. Power down the VNM Recorder (see **VNM Recorder Power Down Procedure** on page 15) and all configured devices. After a few seconds, power on the VNM Recorder and all necessary devices.

VNM Recorder Power Up Procedure

Use the following procedure to power up the VNM Recorder.

NOTE: Before turning on the VNM Recorder, ensure that all necessary devices are powered on and connected properly.

1. Press the power button on the front of the unit to initialize the bootup sequence.
2. After bootup is complete, the following login screen appears if a local monitor is connected. The VNM Recorder is now operational.

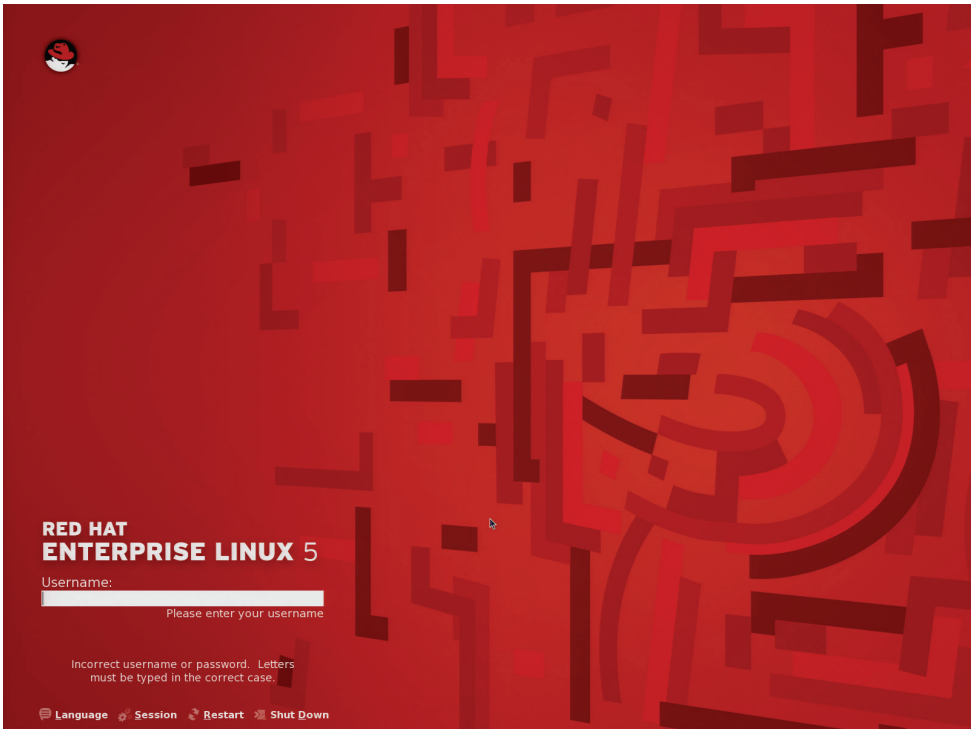


Figure 8. VNM Recorder Login Screen

Login Information

NOTES:

- A mouse, keyboard, and monitor must be connected to the VNM Recorder to log in to the unit itself.
- Login information is case sensitive.
- It is only necessary to log in to the VNM Recorder when it requires configuration. The VNM Recorder does not require login information for normal operation.

Log in to the VNM Recorder using the Red Hat® Enterprise Linux® login page (see **figure 8** on the previous page). The default login information is as follows.

- **Administrator username** — root
- **Administrator password** — Extron2010
- **Guest username** — matrix_rec
- **Guest password** — matrix

If necessary, the **administrator password**, **guest username**, and **guest password** can be changed. New **usernames** can also be added.

NOTE: The procedures detailed within this guide use the **administrator username** and **password** to configure the recorder. It is recommended that the **administrator username** and **password** are only given to those who require it. Others should be using the guest login information (or a created personal login) to access the recorder so that important configuration settings cannot be changed.

To change the administrator password:

1. From the menu bar on the desktop, select **System > Administration > Root Password**.
2. If prompted for an **administrator password**, type in the appropriate password. The default administrator password is listed above.
3. Follow the remaining prompts to change the password.

To add or change usernames and passwords:

1. From the menu bar on the desktop, select **System > Administration > Users and Groups**.
2. The User Manager window appears. Use this window to add, modify, or delete users. Click on the **Help** menu for more information.

VNM Recorder Power Down Procedure

Use the following methods to safely power down the VNM Recorder.

Using the Front Panel

If the VNM Recorder is not logged into:

1. Press and release the front panel power button.
2. The recorder takes approximately 20 to 30 seconds to power-down.

If the VNM Recorder is logged into:

1. Press and **hold** the power button until the LED of the power button turns off. This turns the recorder off instantly.

   - OR -

1. Press and release the front panel power button.
2. The recorder opens a prompt asking for a shut down confirmation. There are three options to choose from.

   - **`Log out`**
   - **`Shut down`**
   - **`Restart the computer`**

   If desired, click on the **`Save current setup`** check box to save the desktop configuration. Select the appropriate radio button and click **`OK`** (see figure 9). The recorder takes approximately 20 to 30 seconds to shut down.

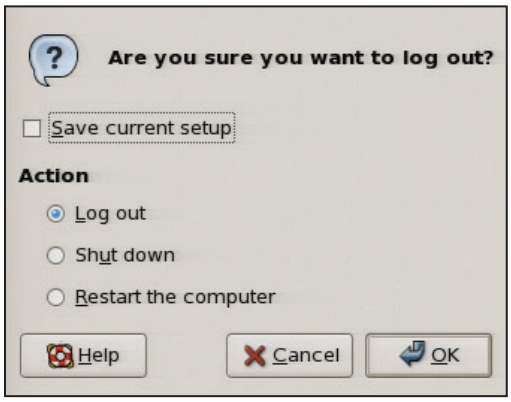


Figure 9. Front Panel Shut Down Confirmation Window

Using the Keyboard and Mouse

From the login screen:

1. Click on either **`Shut Down`** or **`Restart`** as required.
2. The recorder opens a prompt asking for confirmation of the selected request.
3. The recorder takes approximately 20 to 30 seconds to complete the request.

From the Linux desktop:

1. From the menu bar on the desktop, select **`System > Shut Down...`**
2. The recorder opens a prompt containing four options.
   - **`Hibernate`**
   - **`Restart`**
   - **`Cancel`**
   - **`Shut Down`**

   Select one of the options as desired. If no option is selected within 60 seconds, the recorder shuts itself down (see figure 10).

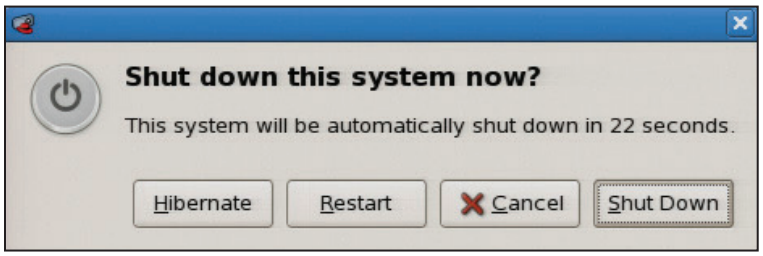


Figure 10. Mouse and Keyboard Shut Down Confirmation Window

Choosing the Controller Device

In any VN-Matrix system, one device needs to be configured as a controller. The controller acts as a central point of reference for each device, manages all of the system communications to every matrix device present, and also serves the web-based control interface to the user.

NOTE: The VNM Recorder is configured as a controller when shipped. The controller address is set to the same value as the eth**Ø** port (192.168.254.254).

The controller can be one of the following devices.

- VN-Matrix 200, 225, 300, or 325 device which is suitable for small network systems
- VNM Recorder which is suitable for small network systems
- VNM Enterprise Controller which is suitable for large network systems

When a controller device has been chosen, all devices within the VN-Matrix system must reference the IP address of the controller device. When configuration of the VN-Matrix system is complete, the IP address of the controller device can be entered into a suitable web browser running on any PC or laptop connected to the VN-Matrix network.

For information on how to configure the VNM Enterprise Controller, see the *VNM Enterprise Controller User Guide.* For information on how to configure the VN-Matrix encoders and decoders, see the *VN-Matrix 200 Series User Guide*, *VN-Matrix 225 Series User Guide*, *VN-Matrix 300 User Guide*, and the *VN-Matrix 325 User Guide*.

Configuring the VNM Recorder

NOTE: Initial configuration of the VNM Recorder requires a mouse, keyboard, and monitor. When configuration is complete, it is not necessary to keep these devices attached to the recorder. The recorder can be completely controlled using the web-based user interface.

Default Network Settings

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

IP Address: 192.168.254.254
Subnet Mask: 255.255.255.0
Controller IP Address: 192.168.254.254

NOTE: Using these settings, the VN-Matrix encoder/decoder unit(s) must use IP addresses within the range 192.168.254.1 through 192.168.254.253 and use the same subnet mask. The default network settings can also be changed to match an existing network setup. This is explained in the following sections.

Configuring the Network and IP Address Settings

Use the following procedure to change the network settings on the VNM Recorder.

Stage 1 — Configure the network settings

1. If the recorder is not turned on already, power up the unit and wait for the login screen to appear on the monitor (approximately two minutes and fifteen seconds).
2. Enter in the administrator username and password at the login screen (see **Login Information** on page 14 for username and password information).
3. From the menu bar on the desktop, select **`System > Administration > Network`**. The Network Configuration window appears (see figure 11).

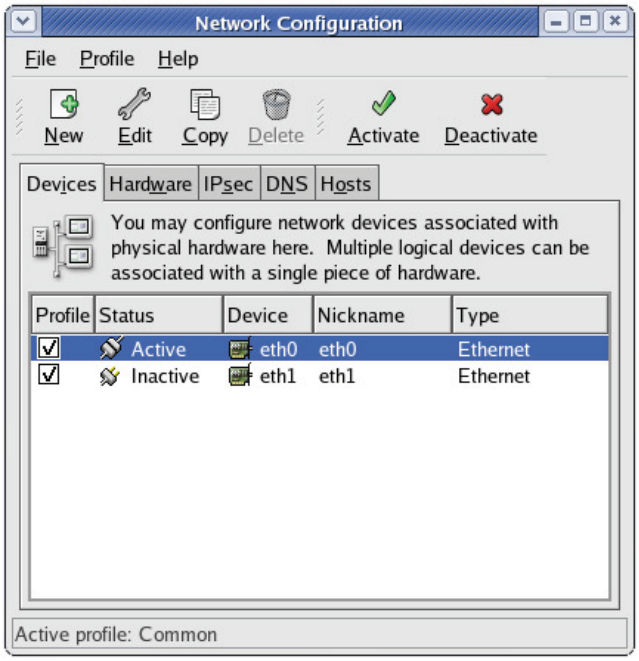


Figure 11. Network Configuration Window

4. Select the **`ethØ`** (upper Ethernet connector; primary network) device line to highlight it. If there is a network cable present and it is connected to a switch, the status should read **Active**.
5. Click **`Deactivate`**. The status of the **`ethØ`** device should now read **Inactive**.
6. Double-click on the **`ethØ`** device. The Ethernet Device window appears (see figure 12).

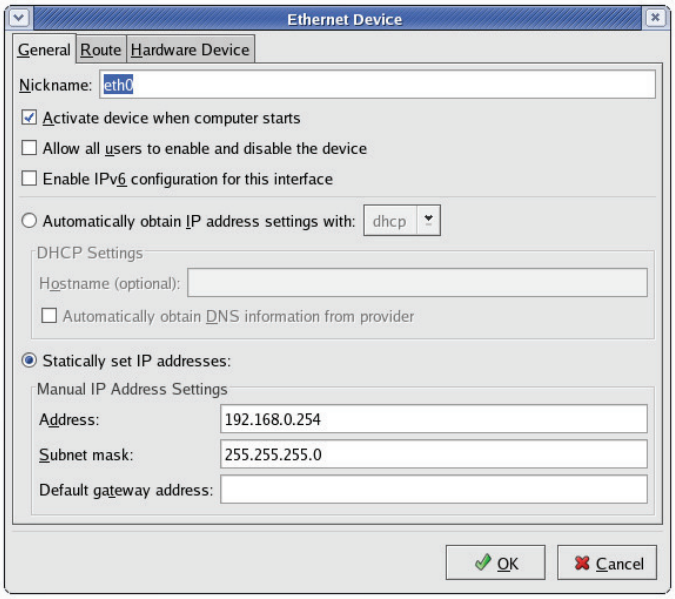


Figure 12. Ethernet Device Window

7. Change the **`Address`** and **`Subnet mask`** fields as required and then click **`OK`**.

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

8. Navigate back to the Network Configuration window (see **figure 11**). Select the **`ethØ`** device and then click **`Activate`**.

9. If changes were made, a dialog box appears asking to confirm the changes. Click **Yes** to confirm and save the changes (see figure 13).

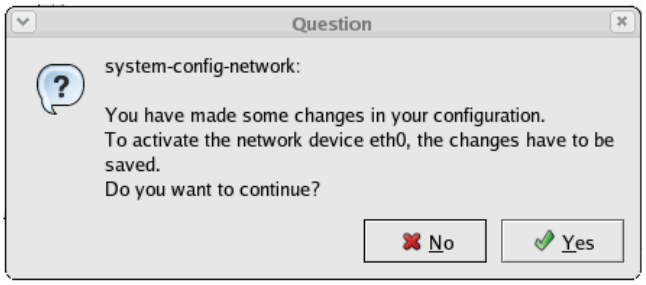


Figure 13. Confirm Settings Window

10. The following dialog box appears (see figure 14). Click **OK** to continue.

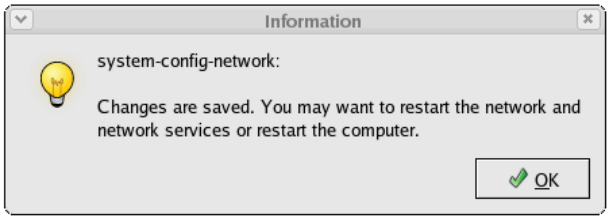


Figure 14. Settings Saved Window

11. A loading dialog box appears and the necessary changes are made to the system. After the loading dialog box disappears, navigate back to the Network Configuration window and check that the status of the **eth0** device now reads **Active**.
12. Close the Network Configuration window.

Stage 2 — Setting the controller IP address

1. If necessary, enter the administrator username and password at the login screen (see **Login Information** on page 14 for username and password information).
2. From the desktop, double-click on **`Computer > Filesystem > home > matrix_rec`** (see figure 15, ❶, ❷, ❸, and ❹).
3. Double-click on the folder that contains the latest release of the recorder software (❺). At the time this guide was released, the latest software would be stored in the **ver3.10.9** folder or in a folder with a similar name.

Figure 15. Navigating to the Recorder Software Folder

4. Click on the **config.xml** file to select it (❻).
5. From the **`Edit`** menu, select **`Duplicate`**. This creates a backup copy (named **`config (copy).xml`**) of the original **`config.xml`** file. Keep the backup copy for system restoration purposes.
6. Right-click on the **`config.xml`** file and select the **`Open with "Emacs Text Editor"`** option.

7. Near the bottom of this file are two values named `st_controlIp` and `st_localIpØ` with an IP address listed under each (see figure 16). Edit these values as follows.
   - If the VNM Recorder is the controller device, edit both values to match the IP address (ethØ) of the recorder.
   - If the VNM Recorder **is not** the controller device, change the `st_controlIp` value to match the IP address of the controller device. Change the `st_localIpØ` value to match the IP address (ethØ) of the recorder.

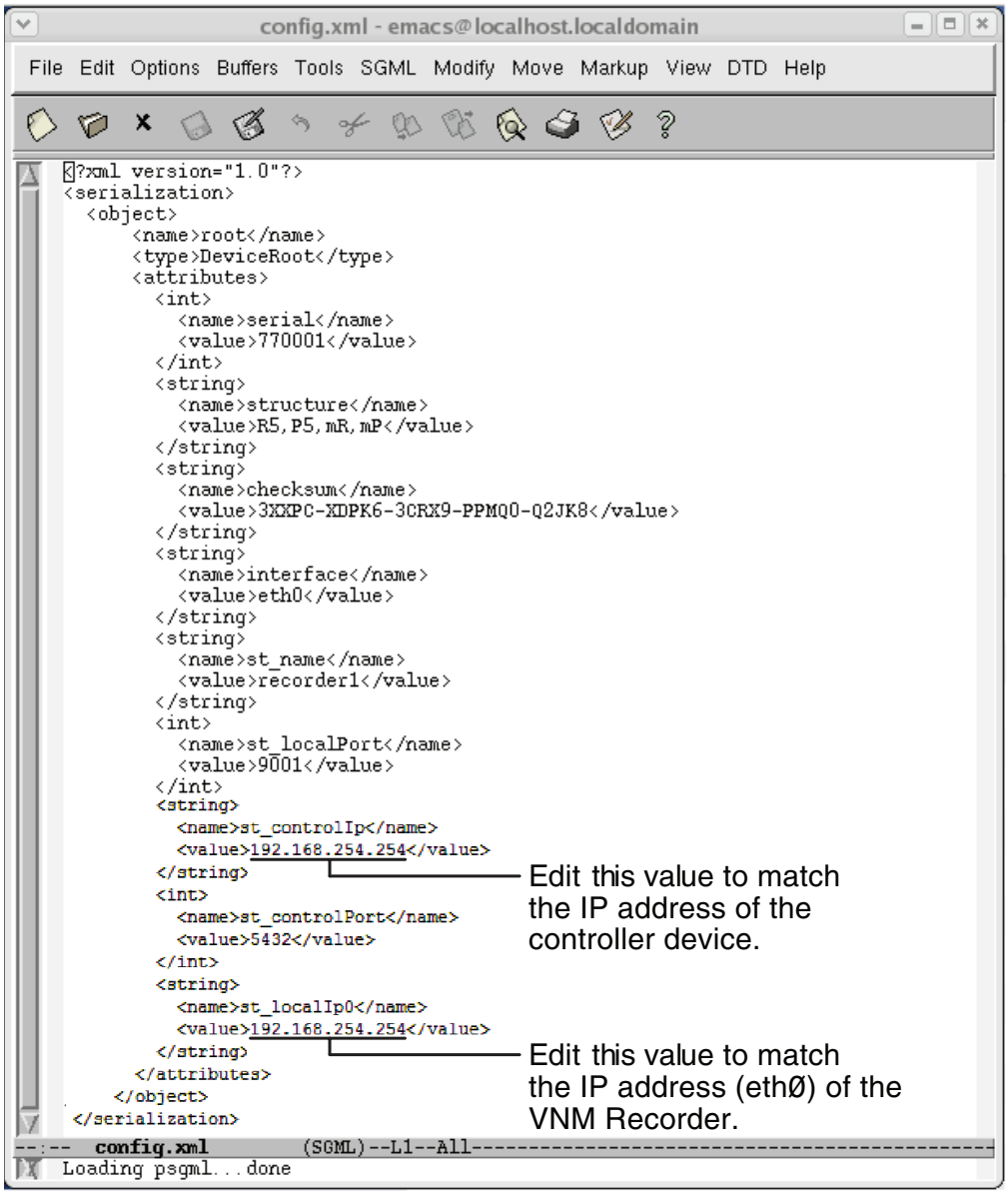


Figure 16. Config.xml Text Window

NOTE: Be careful not to change any other values or remove any of the special formatting characters in this file.

8. Click on the save icon or click on the **`File`** menu and select the **`Save (current buffer)`** option.
9. Close the text editor window and all other folder windows.

Stage 3 — Restart the VNM Recorder

Restart the VNM Recorder. See **VNM Recorder Power Down Procedure** on page 15).

Configuring the VN-Matrix Encoders and Decoders

For the VNM Recorder to function properly, update each VN-Matrix device to point to the new IP address of the controller device. For information on how to configure the encoders and decoders, see the *VN-Matrix 200 Series User Guide*, *VN-Matrix 225 Series User Guide*, *VN-Matrix 300 User Guide*, and the *VN-Matrix 325 User Guide*.

NOTE: The VNM Recorder can operate with unicast (RTP and TCP) or multicast streams. Keep this in mind when setting up and configuring the encoders on a VN-Matrix network.

About the Web-based User Interface

NOTE: It is important that all devices within the VN-Matrix network contain the same version of firmware to avoid communication and compatibility issues. Check that each device contains the same version of firmware by using the **Device List** (see page 26) of the web-based user interface. To update the VNM Recorder firmware, see **Firmware Updates** on page 63.

This section provides information on:

- **Overview of the Web-based User Interface**
- **Accessing the Web-based User Interface**
- **Web-based User Interface Control Options**
- **Advanced Configuration**
- **VN-Matrix Encoder and Decoder Configuration**

Overview of the Web-based User Interface

The web-based user interface is an application that is used to configure the devices in a VN-Matrix network. It is accessed by using a web browser and entering in the IP address of the controller device. The user interface allows for system level configuration and can be used with any VN-Matrix device that is connected to the controller device. The following list outlines the configuration options that are available.

- Configure all VN-Matrix devices that are connected to the controller device.
- Switch all VN-Matrix 200 / 225 / 300 / 325 codec devices from encoders to decoders and vice versa.
- Configure the type of compression that is applied to a stream.
- Choose the appropriate transport protocol that will be used between an encoder and a decoder.
- Configure the specific types of elements that are distributed over a PURE3 stream.

Accessing the Web-based User Interface

NOTE: The user interface shown in this guide is available when using VN-Matrix 200, 225, 300, or 325 devices or a VNM Recorder. This interface is best used when configuring small systems. For larger systems, using a VNM Enterprise Controller interface is recommended (see the *VNM Enterprise Controller User Guide*).

The web-based user interface can be accessed using a suitable web browser (for example, Microsoft® Internet Explorer® v7 or above or Mozilla® Firefox® v1.3 or above) running on any PC or laptop connected to the VN-Matrix network. With a web browser open, use the following steps to access the user interface.

1. Type in the IP address of the controller device into the address bar of the web browser (for example, http://192.168.254.254). The web page shown in figure 17 appears in the browser.

NOTES:

- If the VNM Recorder is configured as the controller device of the VN-Matrix network, the IP address must be appended with the port number that is used as the web page server (for example, http://192.168.254.254:8090).
- If the web browser cannot access the web-based user interface, the security settings of the web browser may need to be configured (see **Browser Configuration** on page 68).

Figure 17. Controller Login Page

2. Enter the appropriate username and password.

NOTES:

- By default, these are both set to **admin**.
- For information on how to change the password, see **Accounts Page** on page 41.

3. Click **Log In** or press <Enter> on the keyboard. The Device List page appears (see figure 18).

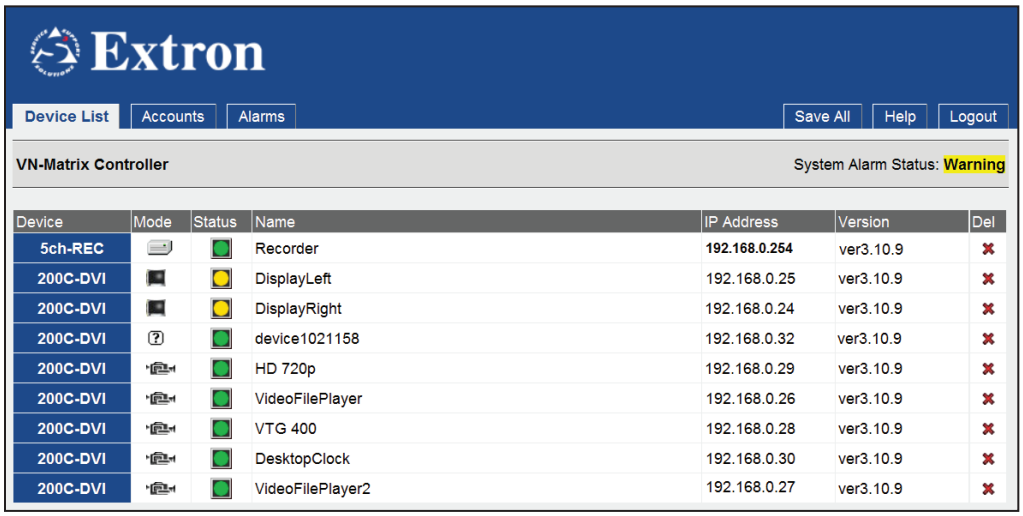


Figure 18. Device List Page

For more information on how to control and navigate the user interface, see **Web-based User Interface Control Options** below and **Advanced Configuration** on page 38.

NOTES:

- The system can be logged out of at any time using any of the interface pages. Click on the **Logout** tab to exit the user interface or simply close the web browser.
- If configuration changes were made to the system, it is recommended to click on the **Save All** tab before logging out.

Web-based User Interface Control Options

This section details the user interface pages that are associated with the VNM Recorder and describes what they are commonly used for. The pages associated with the VNM Recorder are listed below.

- **Device List Page**
- **Recorder Device Page**
- **Recorder Page**
- **Navigate Page**
- **Player Page**

Device List Page

The Device List page lists all of the VN-Matrix devices detected on the network. This is also the first page that is seen after logging in (see figure 19).

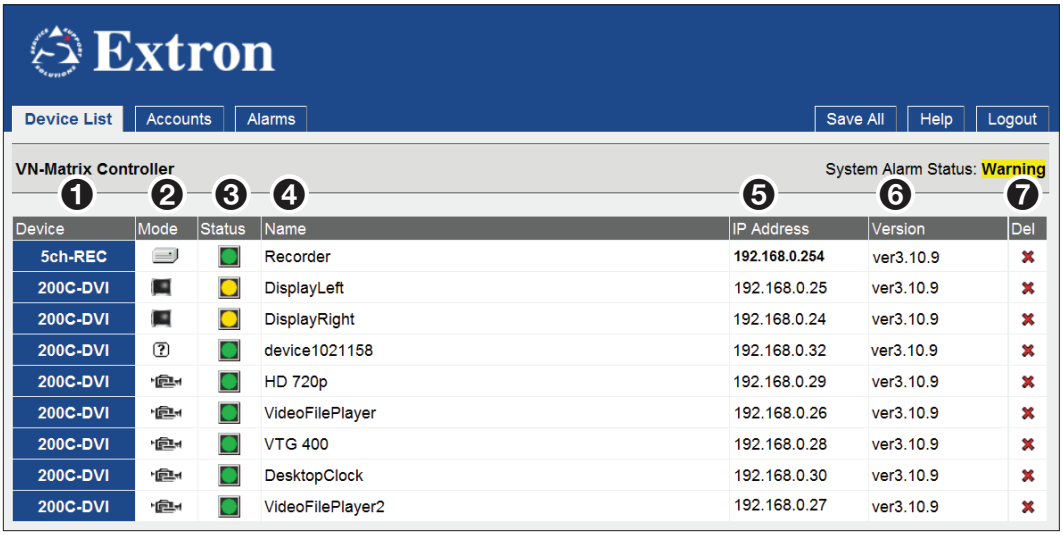


Figure 19. Device List Page

NOTE: If devices are added after the page has been displayed, they may not automatically appear on this list. Refreshing the page or clicking on the **`Device List`** tab updates the list.

When a VN-Matrix device has been detected and listed on the Device List page, an entry will be displayed even if the device is subsequently disconnected. All valid devices are listed by device name and followed by their current IP address.

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

❶ **Device Icons** — There are seven types of device icons.

NOTE: VN-Matrix 200 and 225 devices use the same icons shown below.

5ch-REC — A **five channel VNM Recorder**.

200C-DVI — A VN-Matrix **2xx series codec** device with DVI input or output.

200E-DVI — A VN-Matrix **2xx series encoder** device with DVI input or output.

200D-DVI — A VN-Matrix **2xx series decoder** device with DVI input or output.

300C-3GSDI — A VN-Matrix **300 series codec** device with 3GSDI input or output. The text after the hyphen details the video signal type.

300D-3GSDI — A VN-Matrix **300 series decoder** device with 3GSDI input or output.
The text after the hyphen details the video signal type.

325C-3G — A VN-Matrix **325 codec** device.

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

An undefined device.

A device configured as an encoder (source).

A device configured as a decoder (display).

A VNM Recorder.

❸ **Alarm Status Icons** — The alarm status of a device is indicated by a colored icon. For more information on alarm statuses, see "**About Alarms**" on page 55 or click on the **`Alarms`** tab and then click on the **`Help`** tab within the web-based user interface.

A device which has not contacted the controller this session.

A device under active control with no alarms.

A device under active control showing warning alarms.

A device under active control showing critical alarms.

❹ **Name** — The device name is shown in this column. To change the name of the device, see the "**Recorder Device Page**" section on page 28.

❺ **IP Address** — The IP address of the device is shown in this column.

> **NOTE:** The IP address of the device is only shown if the device is currently present on the network and configured to use the controller.

❻ **Version** — This column shows the current firmware version installed onto each device.

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

❼ **Del** — This column is used to remove devices from the VN-Matrix network. Clicking on the red **`X`** icon brings up a confirmation dialog. Click **`OK`** to delete the selected device from the database. Devices can only be deleted when the physical device is not actively being managed and when active connections have been disconnected from the device. Before deleting the device, the system carries out an implicit "save all" action to ensure that the current and persistent databases remain up-to-date.

Recorder Device Page

This page is accessed by selecting the VNM Recorder device on the **Device List** (see page 26).

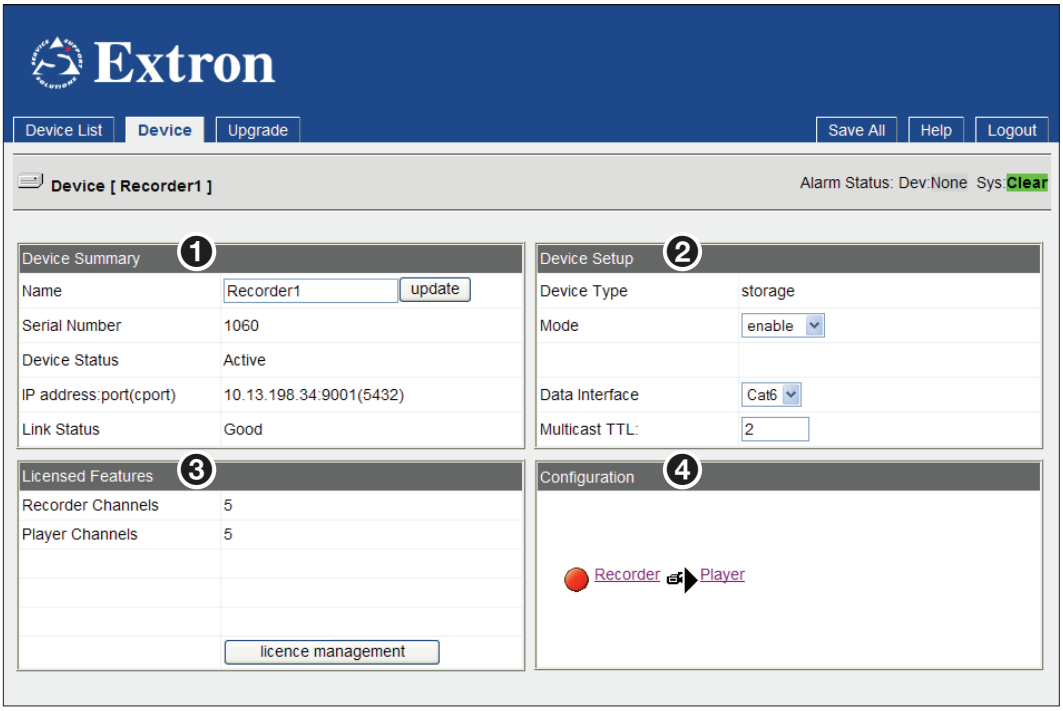


Figure 20. Recorder Device Page

The Recorder Device page shows the basic status for a VNM Recorder device. The device information is presented in four panels.

NOTE: This guide references the Device page for the VNM Recorder only. See the other device user guides or click on the **Help** tab for information on device specific control options.

❶ **Device Summary panel** — This panel indicates the connection status of the device and the status of the management link between the device and the system controller.

- **Name** — The device name can be modified by typing in a new name into this field and clicking **Update**. The name should be comprised of letters, numbers and the underscore character. Spaces should be avoided.
- **Serial Number** — The field displays the serial number of the device.
- **Device Status** — This field indicates the management state of the device. Normally it should show **Active**, but if the device is missing or it cannot be contacted via the controller it will show **No Device**.
- **IP address:port(cport)** — This field displays the IP address of the current device, the UDP port the device is using to communicate with the controller, and the controller UDP port it is contacting.
- **Link Status** — When a device is active, this field displays the quality of the management link between the device and the system controller. A link status of **Good** indicates little or no management packet loss. A link status of **Fair** indicates a small amount of packet loss. A link status of **Poor** indicates a bad link; investigate whether the link to the device has sufficient bandwidth to carry the data and management traffic.

❷ **Device Setup panel** — This panel controls various global actions for the device.

- **Device Type** — This field will always display **`storage`** as the device type for the VNM Recorder and cannot be changed.

  NOTE: When this field displays **`none`**, **`source`**, or **`display`**, it means that the device is a codec, encoder, or decoder.

- **Mode** — A device can be configured using four modes.

  NOTE: This configuration option is not available for the VNM Recorder. These modes are detailed for reference purposes.

  - **enable** — This is normal operation.
  - **disable** — Using this mode on a source device stops streaming to the network, but still shows pass-through output. Using this mode on a display device outputs a splash screen in place of normal data.
  - **standby** — Using this mode on a source device stops streaming and disables pass-through output. Using this mode on a display device disables all output. VN-Matrix 300 / 325 devices do not support standby mode.
  - **test** — Using this mode on a device (source or display) shows a splash screen with the words "Test Mode". Normal streaming is suspended.

- **Data Interface** — This option allows the streaming interface to be specified. Currently, the only option available is **`Cat6`**, which uses the eth**Ø** (primary) network interface.
- **Multicast TTL** — This field is used to specify the number of hops multicast traffic will make between routed domains when it exits a source. It is not used for TCP or unicast RTP traffic and is only used on a source.

❸ **Licensed Features panel** — This panel is used to manage the **device license** and indicates what features the user has access to. If the device has an incorrect checksum for the licensed features, a license error message will be shown and the device will not support streaming functions.

NOTE: The VNM Recorder contains a default license that allows for five recorder channels and five player channels. It is currently not possible to change the device license on the VNM Recorder (see **Controller Licensing** on page 42).

ATTENTION: **DO NOT** place information for a VNM Enterprise Controller license into this menu. Doing so causes the device to stop responding.

ATTENTION: Ne pas mettre d'informations pour une licence VNM contrôleur entreprise dans ce menu. Si c'est le cas l'appareil risque d'arrêter de répondre.

❹ **Configuration panel** — This panel indicates what features the user is able to control. Each device consists of a number of components which are accessed by clicking on the appropriate links.

The **`Recorder`** icon accesses the pages that manage the recording of VN-Matrix PURE3 streams to the VNM Recorder hard disk.

The **`Player`** icon accesses the pages that manage the playback of previously

recorded VN-Matrix PURE3 streams.

Recorder Page

This page is accessed by selecting the VNM Recorder device on the **Device List** page (see page 26) and then clicking the **Recorder** icon located on the Configuration panel of the **Recorder Device** page (see page 28).

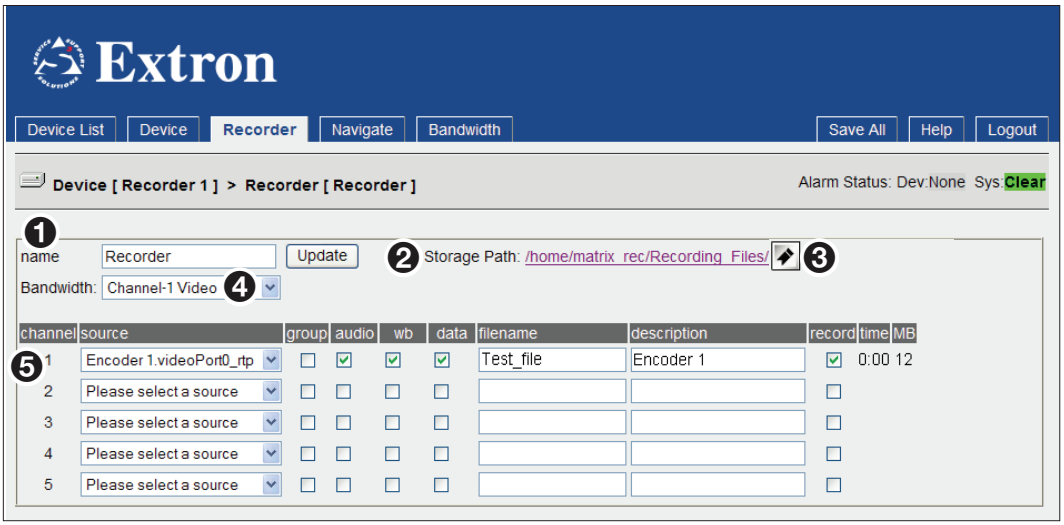


Figure 21. Recorder Page

The Recorder page controls the recording functionality of the VNM Recorder. The recorder is capable of recording up to five simultaneous channels. Each channel contains one video stream. In addition, a channel may also contain audio and data elements if these are present and enabled at the encoder.

NOTES:

- The audio and data elements can be recorded, but in order to do so, those elements must be selected using the appropriate check boxes (**audio**, **wb**, and **data**).
- The ability of the VNM Recorder to record multiple streams depends on the bandwidth of the source data streams and the disc writing capability of the recorder hardware.

❶ **name** — The device name can be modified by editing this field and clicking **Update**. The name should be comprised of letters, numbers, and the underscore character. Spaces can be used, but should be avoided if possible.

❷ **Storage Path** — Data is recorded in the directory specified in this field. This is modified on the Navigate page that can be accessed by clicking on either the **Storage Path** link or the **Navigate** tab at the top of the Recorder page. For more information on changing the storage path (see **Navigate Page** on page 32).

❸ **Bookmark button** — Clicking on this button during a recording sets a reference point within the stream that can be retrieved later. A new reference point is placed within the stream each time the button is pressed and allows for multiple reference points to be set (see **Using Bookmarks** on page 54).

NOTE: The bookmark button on this page only works while recording a stream.

❹ **Bandwidth** — This drop-down menu is used with the **Bandwidth** tab. Select a channel and a source element from the menu and use the **Bandwidth** tab to monitor bandwidth

statistics. For more information on monitoring bandwidth, see the *VN-Matrix 200 Series User Guide*, *VN-Matrix 225 Series User Guide*, *VN-Matrix 300 User Guide*, and the *VN-Matrix 325 User Guide*.

❺ **channel** — There are five channels that can be used for recording. Each recorder channel contains the following parameters.

NOTE: Channel 1 must always be used when recording. When using multiple recording channels, use them in consecutive order and do not skip channels. For example, assign three recordings to channels 1, 2, and 3. **DO NOT** assign the recordings to channels 1, 3, and 5 or to a similar configuration where one or more channels are skipped.

- **source** — This drop-down menu is used to select the RTP or TCP stream of each available VN-Matrix stream.
- **group** — Checking this box allows channel recordings to be grouped together. Grouped channels start, record, and stop together.
- **audio** — Checking this box enables synchronized recording of the audio channel.
- **wb** — Checking this box enables the recording of whiteboard (annotation) data. See **Definitions** on page 7 for more information.
- **data** — Checking this box enables the recording of user data (see **Definitions**).
- **filename** — This field is used to name the recording. The name of the file appears in the Content Directory and is placed at the beginning of all recorded elements for that channel.
- **description** — This field is used to enter important information about a recording.
- **record** — Check this box and click the **`Update`** button to start a recording. Uncheck this box and click the **`Update`** button to stop a recording. Grouped channels will start and stop together.
- **time** — While recording, the length of time that has been recorded is displayed.

- **MB** — While recording, the size of the recorded stream is displayed in megabytes.

Navigate Page

This page is accessed by selecting the VNM Recorder device on the **Device List** page (see page 26), clicking the **`Recorder`** icon located on the Configuration panel of the **Recorder Device** page (see page 28), and clicking on the **`Navigate`** tab.

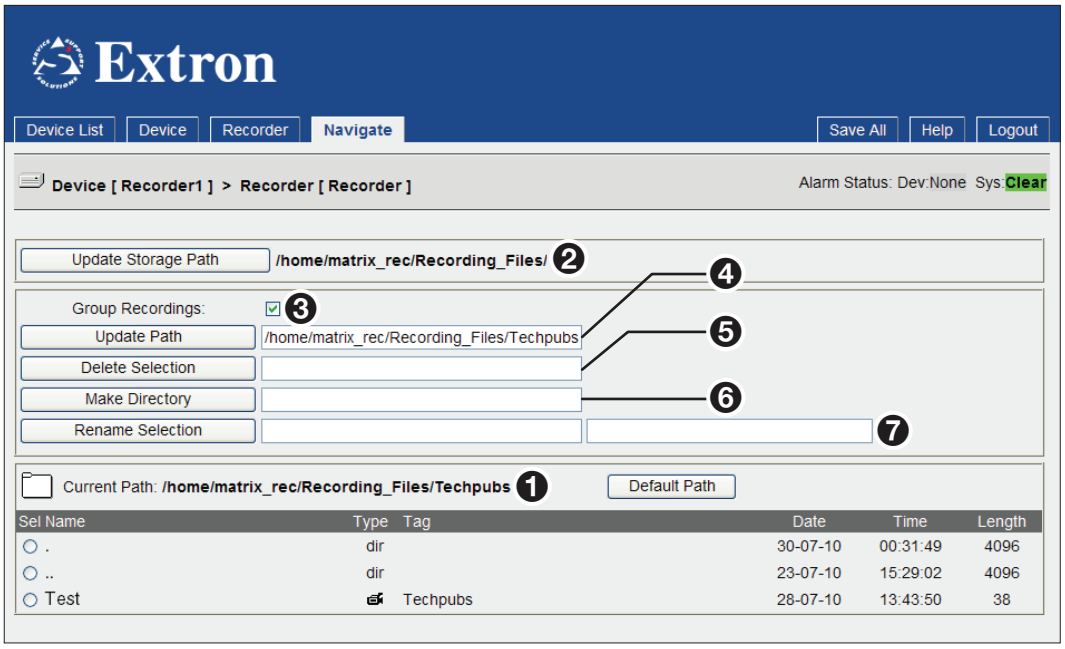


Figure 22. Navigate Page

ATTENTION: It is possible to access directories that contain critical files that should not be modified at all. Care must be taken when using the control options available on this page.

ATTENTION: Il est possible d'accéder à des index qui contiennent des fichiers essentiels qui ne doivent absolument pas être modifiés. Une attention particulière doit être portée lors de l'utilisation des options de contrôle accessibles sur cette page.

The Navigate page provides simple file manager capabilities for the VNM Recorder. This page is primarily used to set the default location that is used to store recordings as well as to create or delete directories and files.

❶ **Content Directory** — The Content Directory allows for content selection and navigation between directories. The Content Directory should be used when using the configuration options on this page (see **About the Content Directory** on page 43).

❷ **Update Storage Path** — Clicking on this button takes the storage path specified in the **`Update Path`** field and assigns it as the current file storage location.

❸ **Group Recordings** — A recording file is made up of a group of files sharing a common prefix all grouped together into a directory.

- When the **Group Recordings** box is checked, the content directory lists a logical view of each type of stream that is present in the recording (this is the default setting). Each stream type is represented by an icon in the **Type** column. The **Tag** column contains the text that was entered in the **description** field on the Recorder page (see **Recorder Page** on page 30).
- When the **Group Recordings** box is unchecked, the content directory lists the actual directories that are created for each element type of a recording. In this view, it is possible to access the individual files that make up the recorded stream.

> **NOTE:** The **Player** page (see page 35) automatically enables group recordings.

❹ **Update Path** — Use this field to set the recording storage location.

> **NOTE:** The default storage path of the VNM Recorder is set to `/home/matrix_rec/Recording_Files`. This is the recommended path where all recordings should be stored.

1. Use the Content Directory to navigate to the appropriate location. The **Update Path** field automatically updates to confirm the selected location.
2. Click the **Update Storage Path** button to assign the storage location.
3. Click the **Save All** tab to save and set the default storage location.

- OR -

1. Manually type in the location of the directory into this field.

> **NOTE:** When typing in a directory or file location, it must contain the exact characters. Characters are case sensitive.

2. Click the **Update Path** button to go directly to the specified location.
3. Click the **Update Storage Path** button to assign the storage location.
4. Click the **Save All** tab to save and set the default storage location.

❺ **Delete Selection** — Use this field to delete files or directories.

> **NOTES:**
> - Incorrect use of the delete function will cause the VNM Recorder to become unstable. This feature should only be used by an experienced technician.
> - A directory can only be deleted when it is empty.

1. Use the Content Directory to navigate to the appropriate location.
2. Click on the appropriate radio button in the **Sel** column to select the file that needs to be deleted.
3. Click **Delete Selection**.
4. A prompt appears asking to confirm the deletion. Click **OK** to delete the selection.

- OR -

1. Manually type in the location of the file or directory into this field.
2. Click **Delete Selection**.
3. A prompt appears asking to confirm the deletion. Click **OK** to delete the selection.

❻ **Make Directory** — Use this field to add a new directory.

> **NOTE:** It is recommended that a new directory is created for each recording so that they are easier to identify and retrieve for playback.

1. Use the Content Directory to navigate to the appropriate location.
2. Enter the name of the new directory into the **`Make Directory`** field.
3. Click **`Make Directory`** to create the new directory.

- OR -

1. Manually type in the location of where the new directory will be placed, followed by the name of the new directory (for example, `/home/matrix_rec/Recording_Files/test`).
2. Click **`Make Directory`** to create the new directory. In the example above, the name of the new directory is called **test** and is located in the **Recording_Files/Techpubs** directory path.

❼ **Rename Selection** — Use this field to rename a file or directory.

> **NOTE:** Incorrect use of the rename function will cause the VNM Recorder to become unstable. This feature should only be used by an experienced technician.

1. Use the Content Directory to navigate to the directory of the file to be renamed.
2. Click on the appropriate radio button in the **Sel** column to select the file that needs to be renamed. The filename appears in the first text field next to the **`Rename Selection`** button. **DO NOT** rename the file using this field.
3. **Using the second field**, type in the desired name for the file.
4. Click **`Rename Selection`** to rename the file.

Player Page

This section is obsolete. Please see the *Enterprise Controller User Guide* (available at **www.extron.com**) for complete instructions.

Advanced Configuration

Config Page

This section is obsolete. Please see the *Enterprise Controller User Guide* (available at **www.extron.com**) for complete instructions.

Accounts Page

Access this page by selecting the **`Accounts`** tab on the **Device List** page (see page 26).

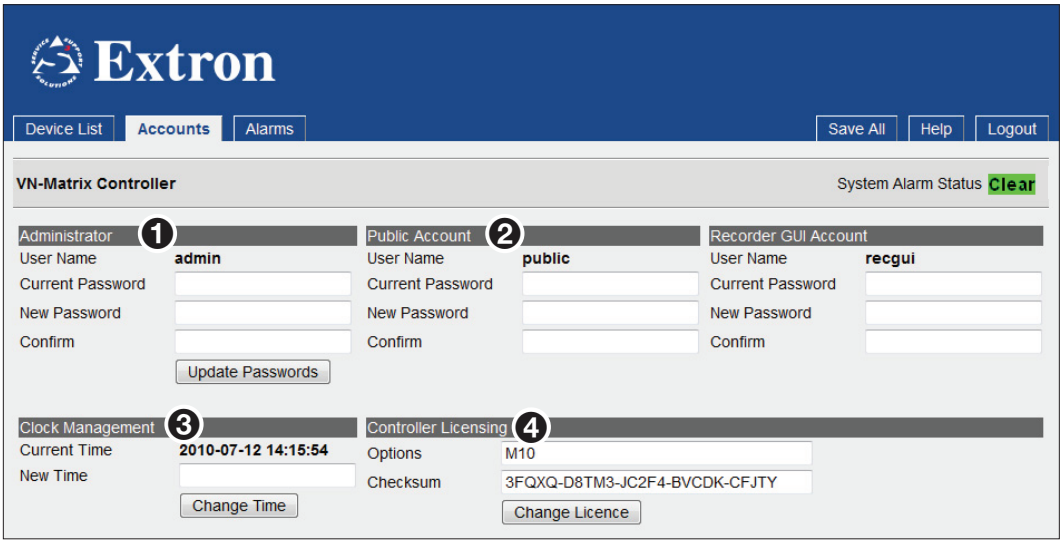


Figure 23. Accounts Page

The Accounts page is primarily used to change the password that is used for logging into the designated controller device of the VN-Matrix system. This page is also used to manage the license that is assigned to the controller device and adjust the internal clock.

Changing User Login Passwords

There are two accounts that can be used for logging into the controller device.

❶ **Administrator** — Allows full read and write access to all configuration options. The default password for this account is **admin** (which is the same as the username).

❷ **Public** — Allows read only access to configuration options. The default password for this account is **public** (which is the same as the username).

NOTES:

- Passwords can only be modified when the user is logged in with the **Administrator** account. If the user is logged in with the Public account, password modification fields will be disabled.
- The **username** and **password** entries are case sensitive.
- The username entries cannot be changed.
- The **Recorder GUI** account is not required for normal operation. For information on this account, call the Extron S3 Sales and Technical Support Hotline and ask for an Applications Engineer.

Use the following procedure to change the password for either account.

1. Enter the current password in the **Current Password** field.
2. Enter the desired password in the **New Password** field. The password should consist of letters, numbers, and the underscore character. Password entries are case sensitive.
3. Re-enter the password in the **Confirm** field.
4. Save the new password by clicking **Update Passwords**.

NOTE: Account passwords can be changed simultaneously, if desired. Repeat steps 1 through 3 above for each account that requires a different password. Click on **Update Passwords** to update passwords simultaneously.

❸ **Clock Management**

The **Current Time** field displays the date and time the user interface page was served.

Use the **New Time** field to update the date and time. Use the following guidelines and refer to **figure 23** on the previous page when updating the date and time.

- The entry should be input in an identical format shown in the **Current Time** field: year-month-date hours-minutes-seconds.
- The year should include the century (for example, 2012).
- The month is represented by a two digit number from 01 through 12.
- The date is represented by a two digit number from 01 through 31.
- **Hours** are represented by a 24 hour clock using two digit numbers from 00 through 23.

Click on **Change Time** to save the date and time entered in the **New Time** field.

❹ Controller Licensing

ATTENTION: **DO NOT** place information for a **device license** into this area. Doing this may cause the VNM Recorder to stop responding. This area is used for **controller licenses** only (see the **Licensed Features panel** on page 29 for information about device licenses).

ATTENTION: Ne placez **PAS** d'informations sur **une licence d'appareil** à cet endroit. Cela pourrait bloquer la communication avec l'enregistreur VNM. Cette zone est réservée aux **licenses des contrôleurs** uniquement (voir le **tableau Licensed Features** à la page 29 pour obtenir des informations sur les licences des appareils).

In addition to each device containing a device license, the VN-Matrix system also includes a controller license. The controller license manages the number of connections that can be made simultaneously when using the VNM Software Decoder (part number 29-098-01).

To obtain a new controller license, follow the procedure below:

1. Contact the Extron S3 Sales and Technical Support Hotline and provide the following information.
   - The **serial number** of the VN-Matrix device configured as the system controller. This can be obtained from the back of the device.
   - The **order number** of the VN-Matrix device.
2. The Extron S3 Sales and Technical Support Hotline provides an **options key** and a **checksum**.
   - Enter the **options key** into the **`Options`** field.
   - Enter the **checksum** into the **`Checksum`** field.
3. Click **`Change License`** to save the new license.

VN-Matrix Encoder and Decoder Configuration

The user interface pages discussed in this guide are associated with the VNM Recorder. The VN-Matrix encoders and decoders may need to be configured using the other pages of the web-based user interface for the system to operate properly. For more information on how to configure the encoders and decoders, see the *VN-Matrix 200 Series User Guide*, *VN-Matrix 225 Series User Guide*, *VN-Matrix 300 User Guide*, and the *VN-Matrix 325 User Guide*.

About the Content Directory

This section discusses how to use the Content Directory for organizing and locating files. The following sections give an overview of how it is used and details some of the functionality of the Content Directory.

This section provides information on:

- **Overview**
- **Content Directory Basics**
- **Setting a Stream Storage Location**
- **Creating a Directory**
- **Understanding Saved Recordings With Multiple Elements**
- **Renaming a Stream or Directory**
- **Deleting a Stream or Directory**

Overview

The Content Directory allows for content selection and navigation between directories. This directory can also be used to see how the file structure of a recording system is set up.

NOTE: The Content Directory is shared between the **Player** page, and **Navigate** page (see page 32). The Content Directory may display incorrect information if the directories and files within these pages are changed at the same time using different browser windows.

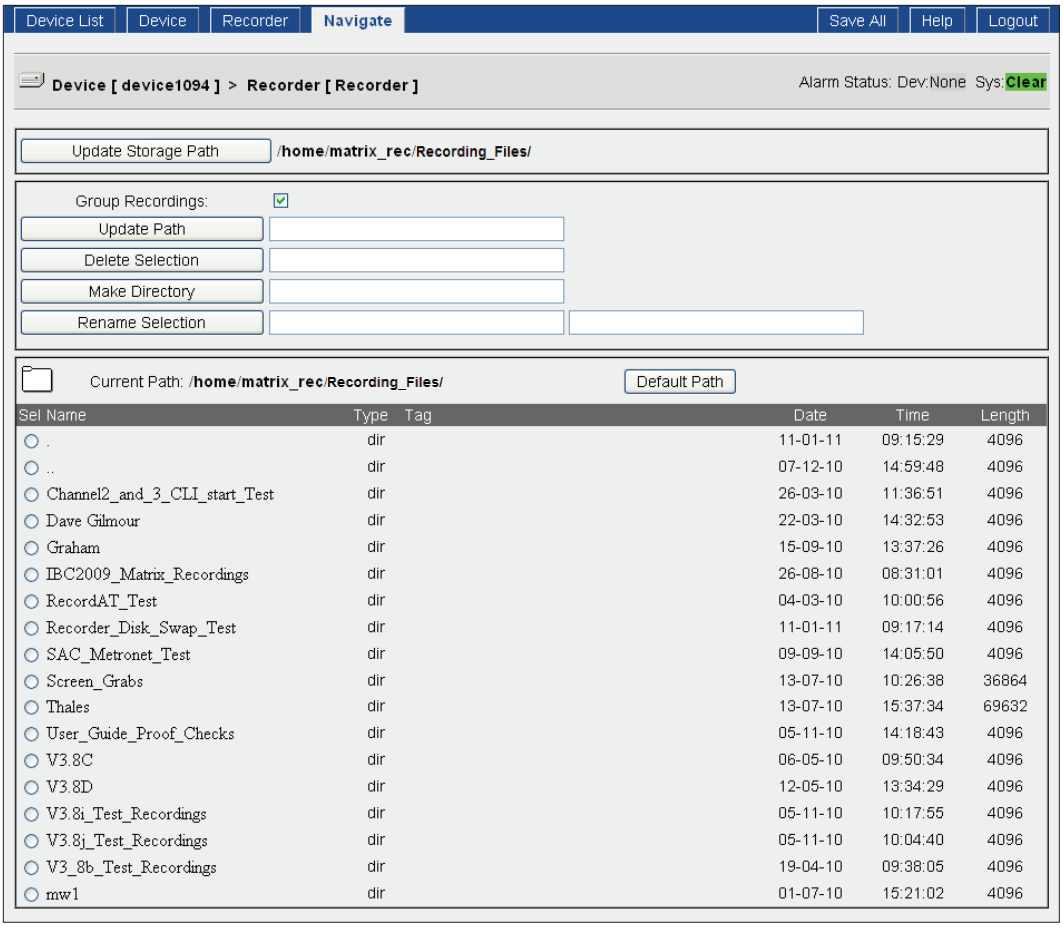


Figure 24. Navigate Page — Content Directory

Figure 24 shows the Navigate page with a list of recorded files and contains the following settings:

- The **`Group Recordings`** check box is selected (by default).
- The default storage path is initially set to `/home/matrix_rec/Recording_Files`. This is the path where all recordings should be stored. To change the storage path, see **Update Path** on page 33 of the **Navigate Page** section.

Content Directory Basics

A single directory or filename can be selected by clicking on the radio button to the left of the directory or filename. Selecting directories or filenames using this method also fills in the **`Delete Selection`** and **`Rename Selection`** fields and is a useful alternative to the user having to manually type in the location of a directory or file.

To move around within the directory, use the following navigation controls.

- Click on a folder name to see the files within the folder.
- Click **`Default Path`** to return to the root directory.
- Click the **`.`** link to display the root directory.
- Click the **`..`** link to move up to the parent directory.
- Click the folder icon to refresh the listing.

Switching between directories may take some time and the folder icon changes to a loading icon while waiting. After the directory has loaded, the **Update Path** field is updated with the current location. If the directory is not made available after ten seconds, an alert icon is displayed (see the icons below).

Folder Icon

Loading Icon

Alert Icon

NOTE: When a directory is not found or unable to be displayed, try refreshing the page using the **Navigate** tab. Alternatively, click **Default Path** which resets the Content Directory listing.

Bookmarks can also be viewed using the Content Directory (see **Using Bookmarks** on page 49).

Setting a Stream Storage Location

See **Update Path** on page 33 of the **Navigate Page** section for information.

Creating a Directory

See **Make Directory** on page 34 of the **Navigate Page** section for information.

Understanding Saved Recordings With Multiple Elements

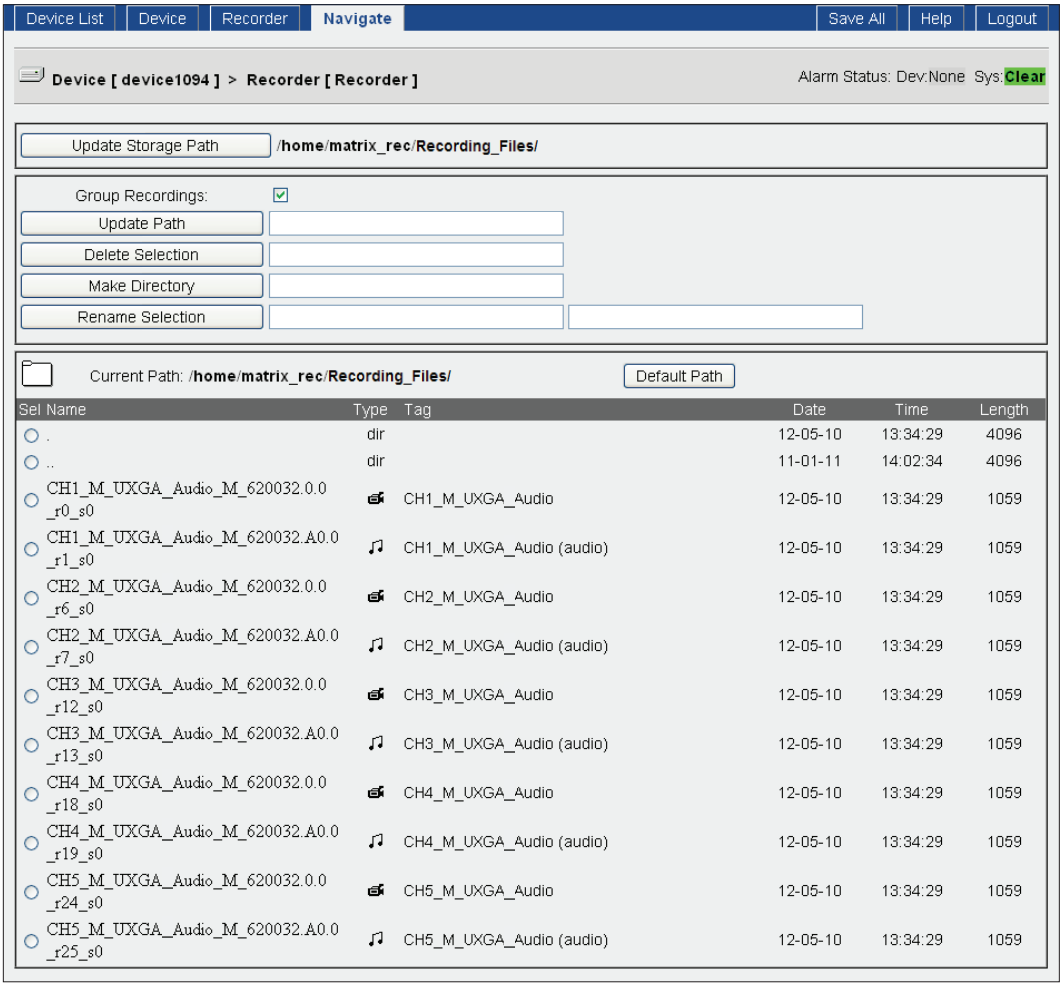


Figure 25. Navigate Page — Multiple Element Recording

When a recording contains multiple elements (such as video, audio, data, and whiteboard), the stream is saved as multiple directories containing multiple files.

Figure 25 shows an example of a stream that has been saved using multi-channel recording, viewed on the Navigate page of the web-based user interface. Information to note from figure 25 includes:

- The **Tag** column displays the text that was entered in the **description** column on the **Recorder** page (see page 30).
- The **Date**, **Time**, and **Length** columns all show the same value, indicating that these files are part of a single recording.
- The same encoder was used as a source for all five channels.
- The files are organized by channel and are listed in order from 1 to 5.
- The files for each channel are listed with the video content listed first, followed by the audio content.

The **file naming table** on the next page explains how filenames are created by the VNM Recorder software. This table can also be used to determine what element is contained within the file.

File Naming Table		
Channel Number	**Filename Section**	**Description**
1	CH1_M_UXGA_Audio_M	This is the text that was entered by the user in the **filename** column on the **Recorder** page (see page 30).
	620032.0.0_r0_s0	This is entered automatically by the VNM Recorder software. • 620032 = The serial number of the encoder unit • 0.0_r0_s0 = This stream contains **video** for channel 1
	CH1_M_UXGA_Audio_M	This is the text that was entered by the user in the **filename** column on the **Recorder** page (see page 30).
	620032.A0.0_r1_s0	This is entered automatically by the VNM Recorder software. • 620032 = The serial number of the encoder unit • A0.0_r1_s0 = This stream contains **audio** for channel 1
2	CH2_M_UXGA_Audio_M	This is the text that was entered by the user in the **filename** column on the **Recorder** page (see page 30).
	620032.0.0_r6_s0	This is entered automatically by the VNM Recorder software. • 620032 = The serial number of the encoder unit • 0.0_r6_s0 = This stream contains **video** for channel 2
	CH2_M_UXGA_Audio_M	This is the text that was entered by the user in the **filename** column on the **Recorder** page (see page 30).
	620032.A0.0_r7_s0	This is entered automatically by the VNM Recorder software. • 620032 = The serial number of the encoder unit • A0.0_r7_s0 = This stream contains **audio** for channel 2
NOTE: This table only uses the first two channels to illustrate how filenames are created by the VNM Recorder software.		

Renaming a Stream or Directory

See **Rename Selection** on page 34 of the **Navigate Page** section for information.

Deleting a Stream or Directory

See **Delete Selection** on page 33 of the **Navigate Page** section for information.

Recording and Playing Streams

NOTE: It is recommended that all devices within the VN-Matrix network contain the same version of firmware to avoid communication and compatibility issues. Check that each device contains the same version of firmware by using the Device page of the web-based user interface. To update the VNM Recorder firmware, see the **Firmware Updates** section on page 63.

This section provides information on:

- **Initial Setup and Configuration**
- **Recording a Stream**
- **Playing a Recorded Stream**
- **Using Bookmarks**

If necessary, refer to the information in the **Web-based User Interface Control Options** section on page 25 while following the various procedures below.

Initial Setup and Configuration

This section talks about how to set up each VN-Matrix as a decoder or encoder.

NOTE: All connections (streams) must be removed from the VN-Matrix system before a codec can be assigned as an encoder or a decoder.

Setting up a VN-Matrix Codec as a Decoder

1. From the **Device List** page (see page 26), click on a VN-Matrix codec device. The Device page appears.
2. In the Device Setup section, click **`create display`** (see figure 26, ❶). If the Device Setup section is not visible, click **`change device type`** to change the view.

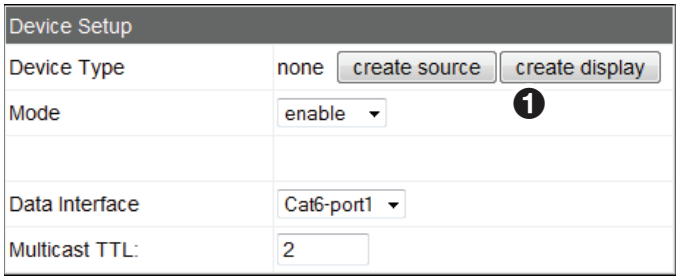


Figure 26. Device Setup

3. Click the **`display0`** icon. The Display page appears.

4. In the **Source** drop-down menu, choose the appropriate source (see figure 27, ❶). This can be a playback channel source streaming from the VNM Recorder device or a source streaming from a VN-Matrix encoder.

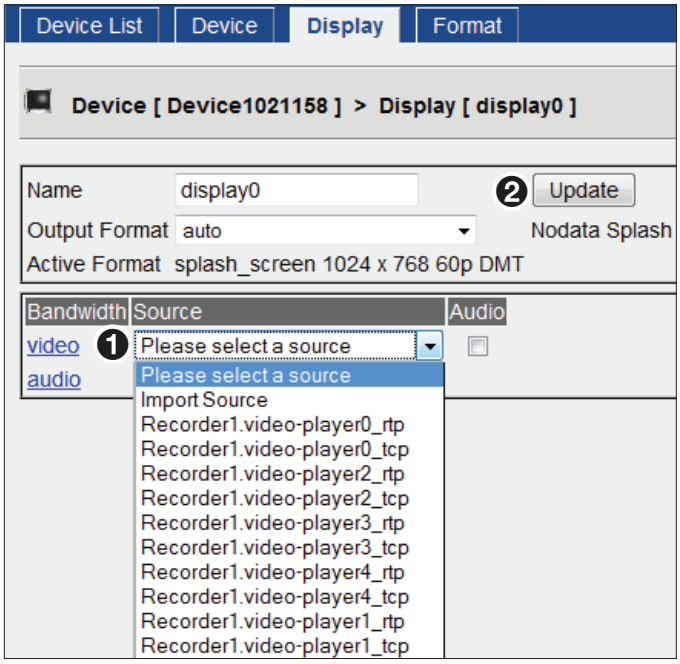


Figure 27. Choose the Video Source

NOTE: The playback channels are identified by the recorder device name using the names **video-player0** to **video-player4**. For a single channel record or playback system, always choose **video-player0**.

5. Click **Update** (see figure 27, ❷).
6. Click the **Save All** tab in the top menu bar. The codec is now configured as a basic decoder. For information on advanced decoder setup, see the VN-Matrix 200, 225, 300, or 325 user guides.

Setting up a VN-Matrix Codec as an Encoder

1. From the **Device List** page (see page 26), click on a VN-Matrix codec device. The Device page appears.
2. In the Device Setup section, click **create source** (see figure 28, ❶). If the Device Setup section is not visible, click **change device type** to change the view.

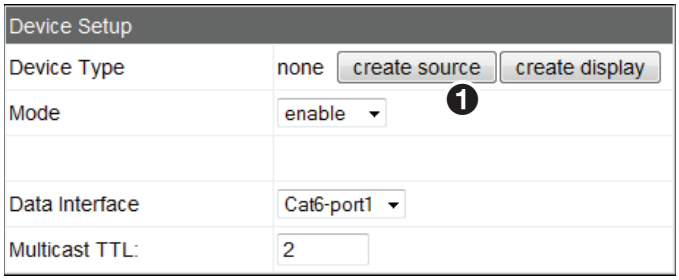


Figure 28. Create Source

3. Click the **Save All** tab in the top menu bar. The codec is now configured as a basic encoder with an auto-detect source input mode. For information on advanced encoder setup, see the VN-Matrix 200, 225, 300, or 325 user guides.

Switching a Codec between Encoder and Decoder

1. From the **Device List** page (see page 26), click on a VN-Matrix codec device. The Device page appears.
2. Click **`change device type`** (see figure 29, ❶).

NOTE: All connections (streams) must be removed from the codec before it can be assigned as an encoder or a decoder.

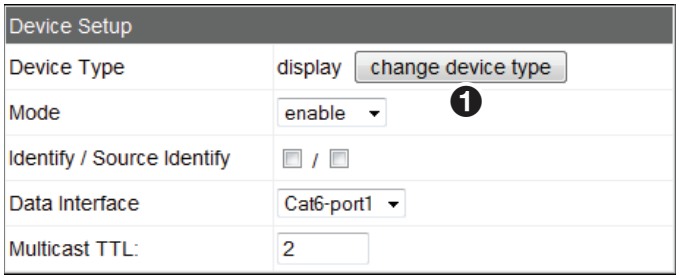


Figure 29. Change Device

3. Click **`create source`** to load the encoder configuration, or **`create display`** to load the decoder configuration.
4. Click the **`Save All`** tab.

Recording a Stream

When a recording is created, each element that is present within a stream is stored as an individual file under the same directory. A recording that contains a single element (such as video) will only require a single file. When a recording contains multiple elements (such as video, audio, data, and whiteboard), the stream will be saved as multiple files (see **Understanding Saved Recordings With Multiple Elements** on page 41).

Recording Preparation

To prepare a stream for recording, follow the procedure below.

NOTES:

- Before recording, it is recommended to set the stream storage location (see **Update Path** on page 33).
- It is recommended that a new directory is created for each recording so that associated files are easier to locate (see **Make Directory** on page 34).

1. Ensure that the VN-Matrix codec is configured as an encoder (see **Setting up a VN-Matrix Codec as an Encoder** on page 49).
2. From the **Device List** page (see page 26), click on the VNM Recorder device.

   The **Recorder Device** page (see page 28) appears.
3. From the **Recorder Device** page (see page 28), click the **`Recorder`** icon. The **Recorder** page (see page 30) appears.

4. Using the **source** drop-down menus, choose the VN-Matrix encoder devices that will be recorded from.

   NOTE: Channel 1 **must always** be used when recording. For a single channel record/playback system, use channel 1 only.

5. Enter a **filename** for the stream and an optional **description**.
6. To record an associated audio stream, check the audio box. The ability to record associated whiteboard or data streams can also be checked if these elements are available on the source.

   NOTES:

   - The timing relationship of the elements contained within the stream is maintained by the recorder.
   - The information from each recorded element is placed into its own folder within the chosen directory. If necessary, those folders can be opened and the individual files of each recorded element can be viewed.

Initialize Recording

To start recording, check **record** (figure 30, ❶) and click **Update** (❷).

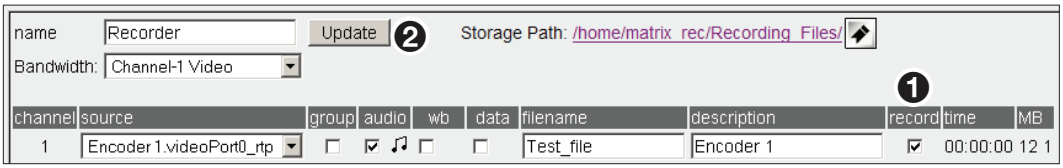


Figure 30. Initialize Recording

NOTE: Recording does not actually start until **Update** is clicked. While recording is in progress, the time and MB (file size) values steadily increase.

Stop Recording

To stop recording, clear the **record** check box and click **Update**.

NOTE: Recording does not actually stop until **Update** is clicked.

Creating Still Frames from a VN-Matrix Video Recording

The gcode Frame Translator Utility allows existing VN-Matrix video recordings to be converted to a series of individual still frames (see **gcode Frame Translator Utility Instructions** on page 71).

Playing a Recorded Stream

All elements of a recording are loaded when a recorded file is selected for replay at a later time and cannot be separated from the recording. The video element is always replayed. The optional elements may be enabled or disabled for replay, provided they are present in the original recording.

Playback Preparation

To prepare a stream for playback, follow the procedure below.

1. Ensure that the VN-Matrix codec is configured as a decoder with a VNM Recorder channel set as the **`Source`** device (see **Setting up a VN-Matrix Codec as a Decoder** on page 43).
2. From the **Device List** page (see page 26), click on the VNM Recorder device. The **Recorder Device** page (see page 28) appears.
3. From the **Recorder Device** page (see page 28), click the **`Player`** icon. The **Player** page (see page 35) appears.
4. In the Listing Directory, click on the media stream that will be played back. The stream appears on channel 1 (see figure 31, ❶).

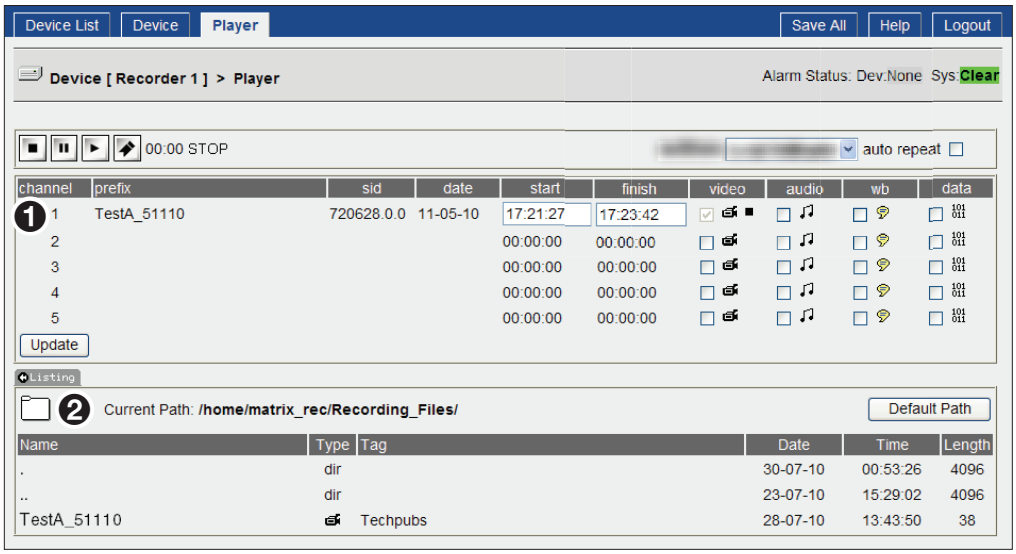


Figure 31. Player Page

See **About the Content Directory** on page 38 for more information on how to navigate within the directory.

NOTES:

- If the listing section (see figure 31, ❷) is empty, click the folder icon to refresh the list. Also be sure to check that the listing section is not minimized by clicking on the **`Listing`** tab.
- The Listing Directory shows the contents of the location indicated by the **`Current Path`** field. This will be the last location visited on the **Player** page (page 35), or **Navigate** page (page 32).
- The **`Current Path`** field defaults to the folder that is saved as the default storage location (see **Setting a Stream Storage Location** on page 45).

Initialize Playback

- From the **Player** page (see page 35), play a media stream by clicking **Play**.

Pause Playback

- To pause a stream, click **Pause**.

- To resume playback, click **Play**. Playback will continue from the point where it was paused.

Stop Playback

- To stop a stream, click **Stop**.

NOTE: Clicking **Play** following a **Stop** operation will initiate playback from the start of the media stream.

When playback is paused or stopped, the VN-Matrix decoder will behave as if the source data stream has stopped. If the **NoData Splash** feature is enabled on the decoder, the display will show the "No Source Datastream" message until playback resumes.

Disabling the **NoData Splash** feature will instead display the last frame of video received. This has the effect of simulating a true pause of the playback.

NOTE: For more information on the **NoData Splash** feature, see the VN-Matrix 200 / 225 / 300 / 325 user guides.

Start and Finish Times

When a stream is selected for playback, the start and finish times are populated with the original start and finish times of the recording.

If required, it is possible to play back only a part of the original stream by entering different start and finish times.

- Change the **start** and **finish** times as required and click **Update**.
- To recall the original times, reopen the file.

Auto Repeat

- By default, a stream will play through once from start to finish.
- By selecting the **auto repeat** check box, the stream will loop continuously.

Using Bookmarks

Bookmarks are used to set and quickly retrieve reference points within a stream. When a bookmark is created, it is stored in the Content Directory. Bookmarks are created by pressing the **Bookmark** button while recording a stream using the **Recorder** page (see page 30) or while playing back a previously recorded stream using the **Player** page (see page 35).

NOTES:

- Bookmarks are only visible in the same directory as their content material.
- Bookmarks cannot be renamed.
- Bookmarked streams are found on the **Player** page (see page 35) and the **Navigate** page (see page 32).

File Structure

When a bookmark is created, the file consists of the name of the recorded content prefixed by "BMn-" and a bookmark icon is displayed under the file type.

NOTE: A bookmark is always represented as a single file while viewing the Content Directory. This is also relevant to bookmarked files that were created using multiple recording or playback channels.

Playback of Bookmarked Streams

Use the following procedure to play back a bookmarked stream.

1. From the **Player** page (see page 35), use the Content Directory to select a bookmark. This loads the recording and any additional channels that were used to create the bookmark.
2. Press the **Play** button to play back the bookmarked stream.

NOTE: If a bookmark is selected while a file is playing, it will not be activated until the original file is stopped by pressing the **Stop** button, then pressing the **Play** button.

Deleting Bookmarks

See **Delete Selection** on page 33 of the **Navigate Page** section for information.

About Alarms

NOTE: Simple Network Management Protocol (SNMP) is not compatible with the VNM Recorder and not covered in this user guide. For information on using SNMP, see the *VN-Matrix 200 Series User Guide*, *VN-Matrix 225 Series User Guide*, *VN-Matrix 300 User Guide*, and the *VN-Matrix 325 User Guide*.

This section provides information on:

Overview

The VN-Matrix system is configured to generate alarms for error conditions. A list of these error conditions and their meanings are presented on the following pages.

Alarms can be monitored using the web interface at the following locations.

- On the Alarms page in the list that is immediately below the Filter Settings box. This details the alarm conditions that are currently active on the system.
- On the Alarm Logs page in the list that is immediately below the Filter Settings box. This provides a historical log of when an alarm condition was raised and cleared.
- On the Device List page where a traffic light system represents the status of connected devices.
- On the top right hand corner of each page in the web interface where the device status and system status is displayed.

Alarm conditions, when triggered, remain active for the entire duration of the error condition and for an additional five seconds after the error has cleared.

Alarms Page

This page is accessed by selecting the **Alarms** tab on the **Device List** page (see page 26).

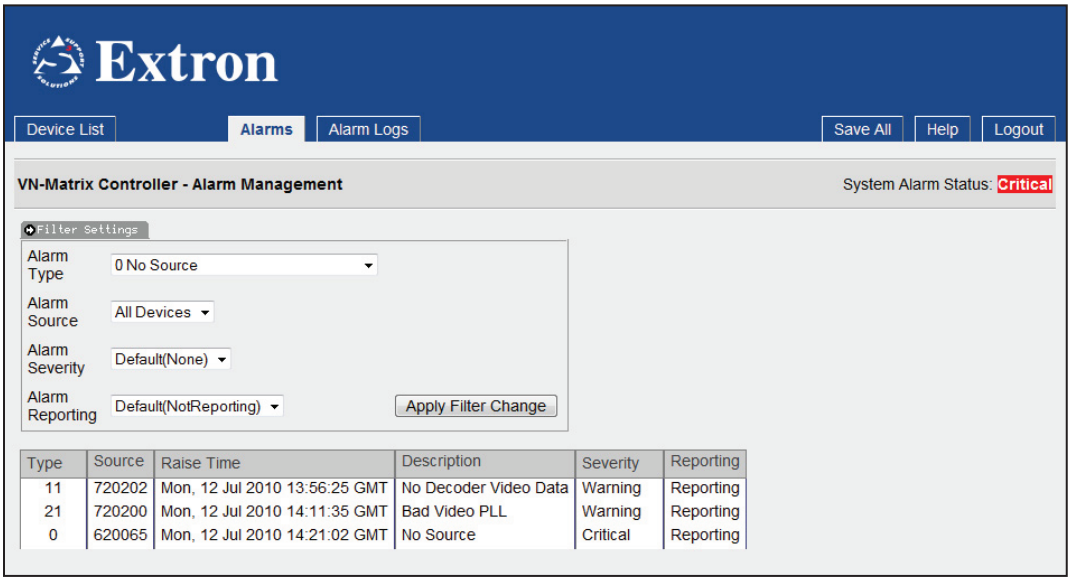


Figure 32. Alarms Page

The Alarms page enables a user to define and monitor system alarms.

Filter Settings

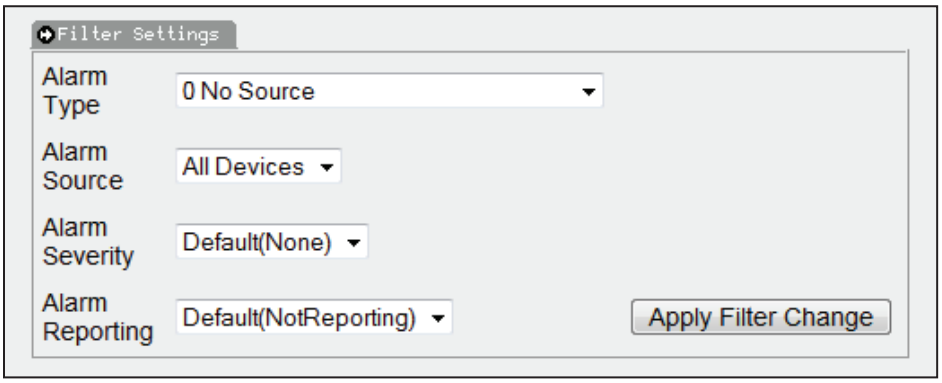


Figure 33. Filter Settings Panel

The Filter Settings panel allows the default settings for each alarm type to be modified.

- **Alarm Type** — Select the particular alarm that is to have its default setting changed (see **Alarm Type** on page 52).
- **Alarm Source** — Select the device where the alarm is to change. Alarm filters may be set for either a single, specific unit or for all VN-Matrix 200, 225, 300, or 325 devices in the system.
- **Alarm Severity** — Set the alarm severity. Each alarm condition has a default severity which may be overwritten using the filter controls. The default setting is shown in this drop-down menu (see **Alarm Severity** on page 52).
- **Alarm Reporting** — Set the alarm to be either "reporting" or "not reporting". Each alarm condition has a default reporting setting. The default setting is shown in this drop-down menu.

Alarm Type

This drop-down menu lists the available alarm error conditions for all units. Alarm error conditions are divided into two categories:

- Alarm errors that occur on an encoder
- Alarm errors that occur on a decoder

In addition, there is one alarm error that only occurs on the device that is configured as the system controller.

See the **Alarm Reference Tables** section on page 55 for more information.

Alarm Severity

Alarms may be set to one of three severities.

Alarm Severity	Description
Critical	A red colored traffic light indicator for the device (see **Alarm Status Icons** on page 27) is displayed.
Warning	When triggered, a warning alarm will result. An amber colored traffic light indicator for the device (see **Alarm Status Icons**) is displayed.
None	A setting of **`Default (None)`** effectively filters the alarm condition. The alarm still appears in the alarms list, but it will not affect any colored indicators.

Applying Alarm Filter Settings

Apply the alarm filter settings by clicking **`Apply Filter Change`**.

NOTE: Changes will be lost after the VN-Matrix system is powered down unless the **`Save All`** tab is clicked to make changes permanent.

Alarm List

The alarm list provides information on all alarm events that are currently active. The alarm list is refreshed each time the **Alarms** tab is selected and is located at the bottom of the Alarms page.

Alarm events that are listed may be sorted by **Type** (see figure 34, ❶), **Raise Time** (❷), and **Severity** (❸). To change the order of the alarm list, left-click the desired heading. The list is refreshed each time the sorting criteria is applied.

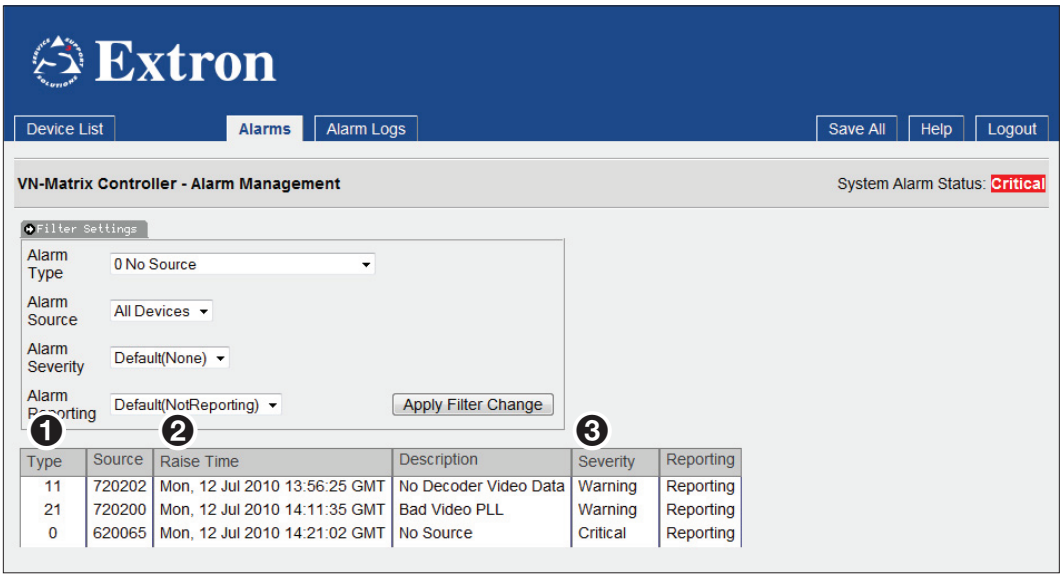


Figure 34. Alarms Page — Alarm List Sorting

Alarm Logs Page

This page is accessed by selecting the **Alarms** tab on the **Device List** page (see page 26) and then selecting the **Alarm Logs** tab.

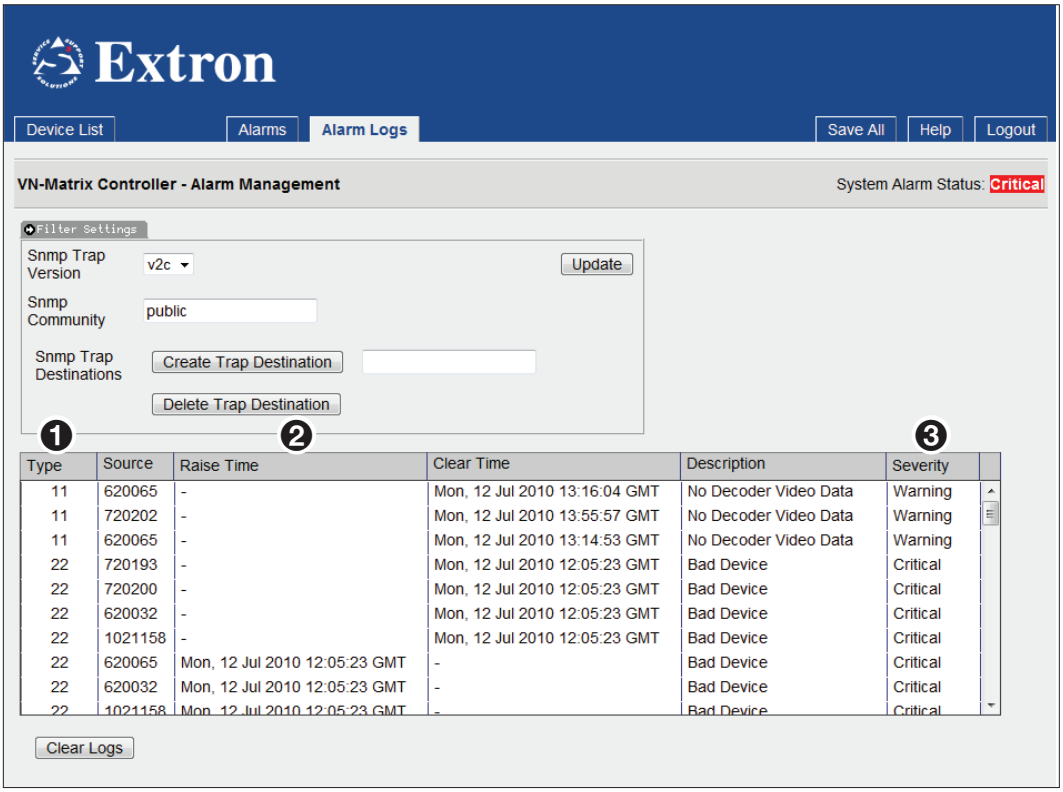


Figure 35. Alarm Logs Page

The Alarm Logs page provides data on when an alarm condition was raised and cleared.

The log holds a historical record of the last 200 alarm events. When more than 200 events occur, the oldest event is deleted from the log.

Alarm events that are listed may be sorted by **Type** (see figure 35, ❶), **Raise Time** (❷), and **Severity** (❸). To change the order of the alarm list, left-click the desired heading. The list is refreshed each time the sorting criteria is applied.

Alarm Reference Tables

Alarm Type Description — Encoder

Alarm Type	Description	Action	Default Settings
No source	No source present at the input.	Check input connections; is there an output on the loop through connector?	Critical, reporting
Bad source syncs	Source is present, but unrecognized due to bad sync measurement.		Critical, reporting
No SDI source lock	Source is present, unable to lock. Applicable to the VN-Matrix 300 / 325, ignore for VN-Matrix 200 / 225.		Critical, reporting
Unsupported SDI mode	Source is present, mode not supported. Applicable to the VN-Matrix 300 / 325, ignore for VN-Matrix 200 / 225.		Critical, reporting
Unsupported mode	Source is present, mode not supported.		Critical, reporting
Bad source			Critical, reporting
Analog phasing error			Warning, reporting
Hardware encoding error	The hardware is unable to encode the input signal.		Critical, reporting
Unsupported audio source			Critical, reporting
Data rate overload	The compressed data rate is too high.	Increase the compression or reduce the required bit rate.	Critical, reporting
Network overload	The network is dropping too many packets.		Warning, reporting

Alarm Type Description — Decoder

Alarm Type	Description	Action	Default Settings
No decoder video data	Indicates that there is a valid connection, no video data present. Usually accompanied by "no source data stream" message in the web interface.		Warning, reporting
No decoder mode	No matching decoder mode for the incoming stream.		Warning, reporting
No source report	Unable to detect the format of the received data stream.		Warning, reporting
Recovered audio			Warning, reporting
No decoder audio data			Warning, reporting
Bad audio at decoder			Warning, reporting
Bad audio PLL			Warning, reporting
Video network packets dropped	Excessive network packet loss has occurred.		Warning, reporting
Decoder buffer overflow	The incoming data rate is high; reduce the pipeline delay.		Warning, reporting
Decoder buffer underflow	The incoming data rate is too low; increase the pipeline delay.		Warning, reporting
Bad video PLL	The decoder cannot synchronize to the video data.		Warning, reporting
No decoder ANC data	The decoder is not receiving any embedded audio (ancillary) data.		Warning, reporting
Missing ANC at decoder	The Decoder is receiving poor quality ANC data.		Warning, reporting
Recovered ANC	Error correction has recovered corrupted / missing ANC.		Warning, reporting
No genlock source present	Indicates that genlock is enabled, but that there is no genlock source connected.	Connect a valid genlock signal.	Warning, reporting
No genlock source lock	Indicates that a signal is present on the genlock connector, but it is not within the expected range.	Check the format of the genlock signal.	Warning, reporting
Genlock source mismatch	Indicates that the timing of the genlock signal does not match the format of the decoded source.	Connect a valid genlock signal.	Warning, reporting

Alarm Type Description — System Controller

Alarm Type	Description	Action	Default Settings
Bad device	The controller is unable to contact the specified device. The device is not available or has failed. Note that this alarm is only generated on the controller.	Check the device in question. Is power applied? Is the network cable or network connection present? Has the unit been removed?	Critical, reporting

Firmware Updates

NOTE: The Update page on the web-based user interface is unable to update the firmware of the VNM Recorder directly. Use the procedure detailed in this section to update the firmware.

This section provides information on:

- **Preparing the Firmware**
- **Gathering Firmware Installation Information**
- **Installing the Firmware**

Preparing the Firmware

Use the following procedure to prepare the firmware for installation.

NOTE: For device connection information, see **Front Panel Features** on page 8 and **Rear Panel Features** on page 10.

1. Connect a mouse, a keyboard, and a computer monitor to the VNM recorder.
2. Plug a standard IEC power cord into the rear panel of the VNM Recorder and connect it to a power source.
3. Login into the VNM Recorder using the Red Hat Enterprise Linux login page. Use the following login information.
   - **Guest username** — matrix_rec
   - **Guest password** — matrix
4. Call the Extron S3 Sales and Technical Support Hotline and ask for an Applications Engineer to supply an updated firmware package file.

   NOTES:
   - The Applications Engineer will provide a download link to the firmware package file.
   - The firmware package file contains `tar.gz` at the end of the filename.
   - The firmware package file contains the version number of the file in the filename (for example, `VNRecorder_`**`ver3.10.9`**`.tar.gz`).
5. Using a PC connected to the Internet, navigate to the provided download link and save the firmware package file to a USB drive.
6. Plug the USB drive into one of the USB ports on the VNM Recorder.
7. From the desktop of the VNM Recorder, double-click on **`Computer > Filesystem > home > matrix_rec`**.
8. Copy the firmware package file from the USB drive to the above location.

9. From the matrix_rec window, right-click on the firmware package file and select the **`Extract Here`** option.

> **NOTE:** The firmware files are extracted to a subdirectory that is automatically named according to the package file, e.g. `VNRecorder_ver`*`x.xx.x`* (where *`x`* represents the version number). The directory path can be changed by renaming the folder after extraction has been completed (optional).

Gathering Firmware Installation Information

It is important to gather the current manufacturing and license details before installing new firmware onto the VNM Recorder. The `config.xml` and the `admin.xml` files are used for reference when installing firmware. To access these files, use the following procedure.

1. From the VNM Recorder desktop, double-click on **`Computer > Filesystem > home > matrix_rec`**.
2. Double-click on the folder that contains that latest release of the recorder software (at the time this guide was released, the latest software would be stored in the **`3.1Ø.9`** folder or in a folder with a similar name).
3. Right-click on the `config.xml` file and select the **`Open with "Emacs Text Editor"`** option. A text window appears containing information needed to complete the firmware installation. This text window should be kept open or printed out for reference.
4. Repeat steps **1** through **3** for the `admin.xml` file.

Figure 36 shows example `config.xml` and `admin.xml` files. The text in **bold** and underlined represents important information that will be needed during firmware installation.

```
<?xml version="1.0"?>
<serialization>
  <object>
      <name>root</name>
      <type>DeviceRoot</type>
      <attributes>
        <int>
          <name>serial</name>
          <value>1094</value>
        </int>
        <string>
          <name>structure</name>
          <value>R5,P5,mR,mP,mV</value>
        </string>
        <string>
          <name>checksum</name>
          <value>3FJVY-3R3CH-YBJC2-MM2TH-2C4MJ</value>
        </string>
        <string>
          <name>interface</name>
          <value>eth0</value>
        </string>
        <string>
          <name>st_name</name>
          <value>recorder1</value>
        </string>
        <int>
          <name>st_localPort</name>
          <value>9001</value>
        </int>
        <string>
          <name>st_controlIp</name>
          <value>10.100.245.57</value>
        </string>
        <int>
          <name>st_controlPort</name>
          <value>5432</value>
        </int>
        <string>
          <name>st_localIp0</name>
          <value>10.100.245.57</value>
        </string>
      </attributes>
    </object>
</serialization>
```

```
        <name>portBase</name>
        <value>8000</value>
      </int>
      <string>
        <name>cssSelect</name>
        <value>extron</value>
      </string>
      <string>
        <name>checkpointDirectory</name>
        <value></value>
      </string>
      <int>
        <name>checkpointRateMs</name>
        <value>0</value>
      </int>
      <int>
        <name>serial</name>
        <value>1094</value>
      </int>
      <string>
        <name>options</name>
        <value></value>
      </string>
      <string>
        <name>checksum</name>
        <value></value>
      </string>
      <int>
        <name>rtspPort</name>
        <value>1554</value>
      </int>
      <int>
        <name>cliPort</name>
        <value>9998</value>
      </int>
    </attributes>
  </object>
</serialization>
```

Figure 36. Config.xml and Admin.xml Text Files

Installing the Firmware

Use the following procedure to install the firmware onto the VNM Recorder.

1. From the menu bar of the VNM Recorder desktop, select **`Applications > Accessories > Terminal`**.
2. Change to super user mode by typing in the following command and pressing the <Enter> key.
   - `su`
3. When prompted for a password, type in the following and press the <Enter> key.
   - `Extron2010`
4. Change the directory of the terminal window by typing in the `cd` command followed by the location of the extracted firmware (see **Preparing the Firmware** on page 58). Then press the <Enter> key.
   - For example: `cd /home/matrix_rec/3.10.9`

   NOTE: This folder name is only an example to illustrate how to write the command line. After typing in the `cd` command, you must enter the correct folder location for your extracted firmware (see **Preparing the Firmware - Step 9** on page 59).

5. Run the installation program by typing in the following command and pressing the <Enter> key.

   ```
   ./vnrecorder_install
   ```

6. A series of prompts will start to request configuration information. Use the **config.xml** and the **admin.xml** files (see **Gathering Firmware Installation Information** on page 59) while using the **Firmware Installation Table** below to fill in the requested configuration information.

   NOTES:

   - The `Controller options` and `Controller checksum` prompts require an options key and a checksum which is provided by Extron.
   - If keys have been previously provided by Extron, they can be found within the `admin.xml` file. See `Controller options:` and `Controller checksum:` in the **Firmware Installation Table** below.

Firmware Installation Table

Prompt	Value to Enter	Xml File Reference	Value Reference
`User name to run application:`	• `matrix_rec`	none	none
`Serial number:`	• Serial number of the VNM Recorder	config.xml	serial
`Licensed Recorder channels:`	• Check the **R** value (for example, **R5**, P5, mR, mP, mV determines that **5** is the necessary value). • **5** is the default value.	config.xml	structure
`Recorder GUI enabled (yes/no):`	• Check the mV value (for example, R5, P5, mR, mP, **mV**). • If **mV** is present, answer **`Yes`**. Otherwise, answer **`No`**.	config.xml	structure
`License checksum:`	• Checksum of the VNM Recorder • Copy and paste the value	config.xml	checksum
`Controller IP address:`	• The IP address of the device acting as the system controller	config.xml	st_controlIP
`Controller port number:`	• The controller port number • The default value is `5432`	config.xml	st_controlPort
`Local IP address:`	• The IP address of the VNM Recorder	config.xml	st_localIPØ
`Controller options:`	• This is the options key provided by Extron for use in VNM Recorders acting as the system controller. • If no data is provided or available, leave blank or contact the Extron S3 Sales and Technical Support Hotline and ask for a structure key.	admin.xml	options
`Controller checksum:`	• This is the checksum provided by Extron for use in VNM Recorders acting as the system controller. • If no data is provided or available, leave blank or contact the Extron S3 Sales and Technical Support Hotline and ask for a license key.	admin.xml	checksum
`Control port:`	• The controller port number • The default value is `5432`	config.xml	st_controlPort

7. The firmware installation is complete when the command prompt is displayed in the terminal window. Manually close the terminal window.

   NOTE: The recording application is a service, which means that no application window will open after the installation has completed.

8. To finalize the firmware installation, reboot the VNM Recorder by powering down and powering up the unit (see **VNM Recorder Power Down Procedure** on page 15 and **VNM Recorder Power Up Procedure** on page 13).
9. When the VNM Recorder has powered back on, it is necessary to set the folder location where the recordings are stored (see **Update Path** on page 33 and **Make Directory** on page 34).

Browser Configuration

This section provides information on configuring the following web browsers:

- **Microsoft® Internet Explorer® (version 7 or above)**
- **Mozilla® Firefox® (version 1.3 or above)**

Microsoft Internet Explorer (version 7 or above)

1. Open Internet Explorer and select **`Tools > Internet Options`**. The Internet Options window appears (see figure 37).

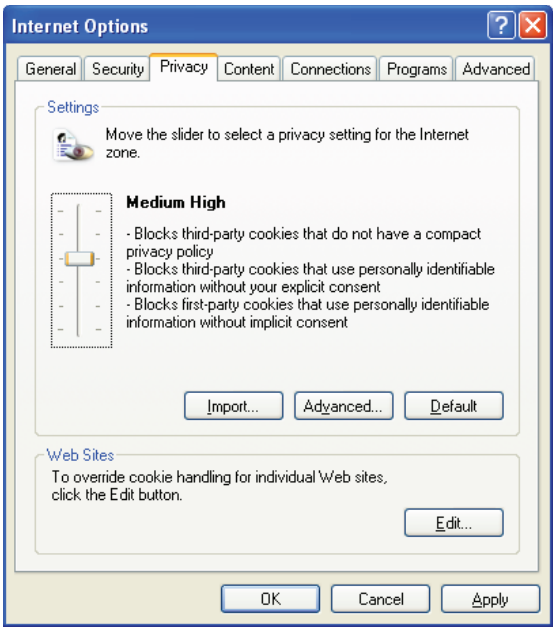


Figure 37. Internet Options

2. To enable cookies, select the **`Privacy`** tab and (if required) adjust the slider control to set the required security level. VN-Matrix systems operate correctly when using security that **does not** exceed the **`Medium High`** setting.

> **NOTE:** Setting the security slider to block all cookies prevents the VN-Matrix web interface from operating.

TIP: If a high security level is required, click on the **Edit** button and allow the VN-Matrix web interface to use cookies (see figure 38).

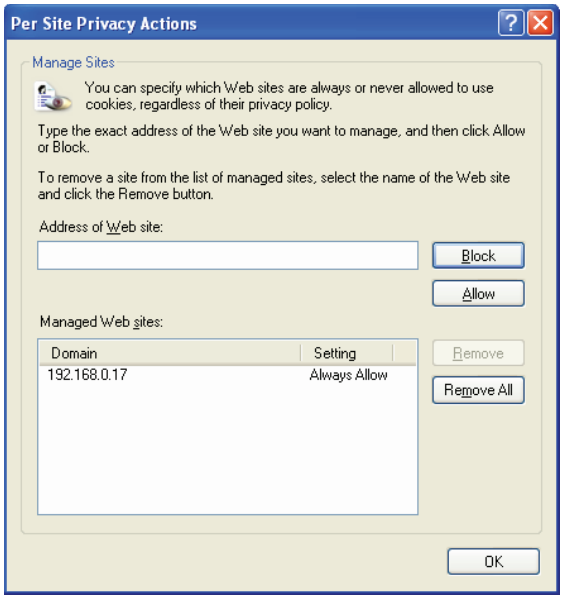


Figure 38. Per Site Internet Options

3. To enable JavaScript, select the **Security** tab (see figure 39).

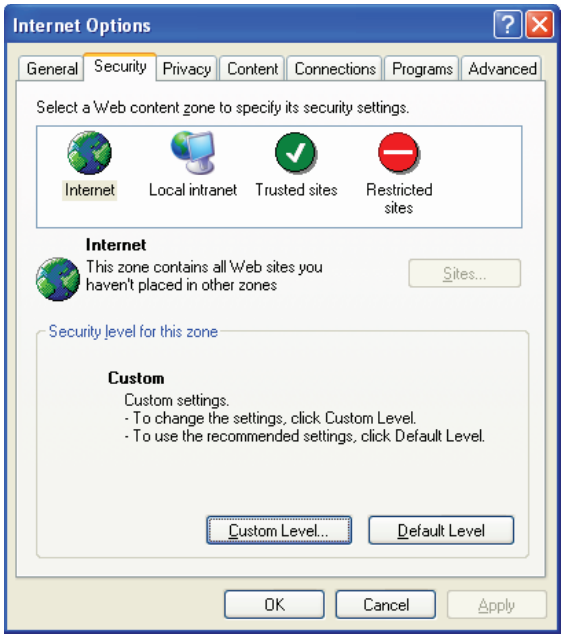


Figure 39. Security Options

4. Click the **Custom Level** button. The Security Settings window appears.

5. Scroll down to the **Scripting** setting and under **Active scripting**, select **`Enable`** (see figure 40).

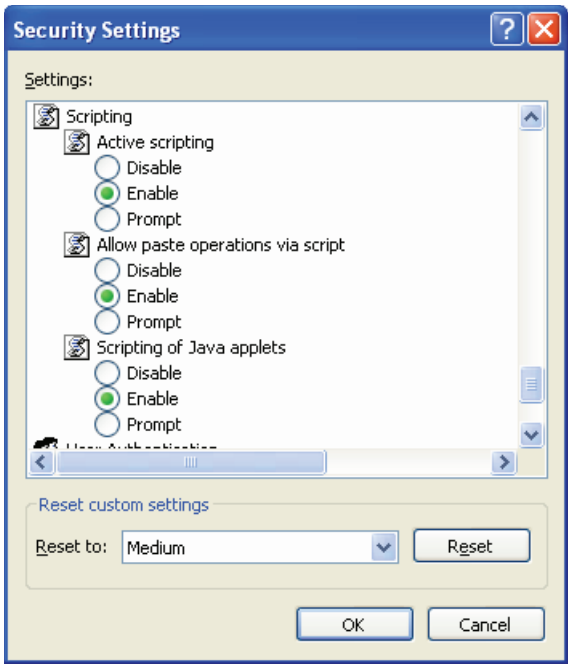


Figure 40. Custom Level Security Options

6. Click **`OK`** on both dialogs to close and save the new settings.

Mozilla Firefox (version 1.3 or above)

1. Open Mozilla Firefox and select **Edit > Preferences**. The Preferences window appears.
2. To enable cookies, go to the **Privacy & Security** category and choose **Cookies** (see figure 41).

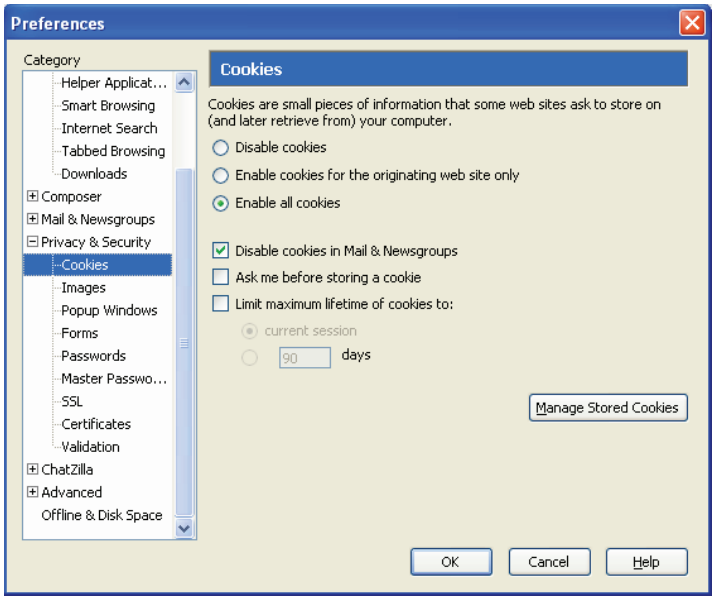


Figure 41. Cookie Preferences

3. Ensure that either the **Enable all cookies** or **Enable cookies for the originating web site only** option is selected.
4. To enable JavaScript, go to the **Advanced** category and choose **Scripts & Plugins** (see figure 42).

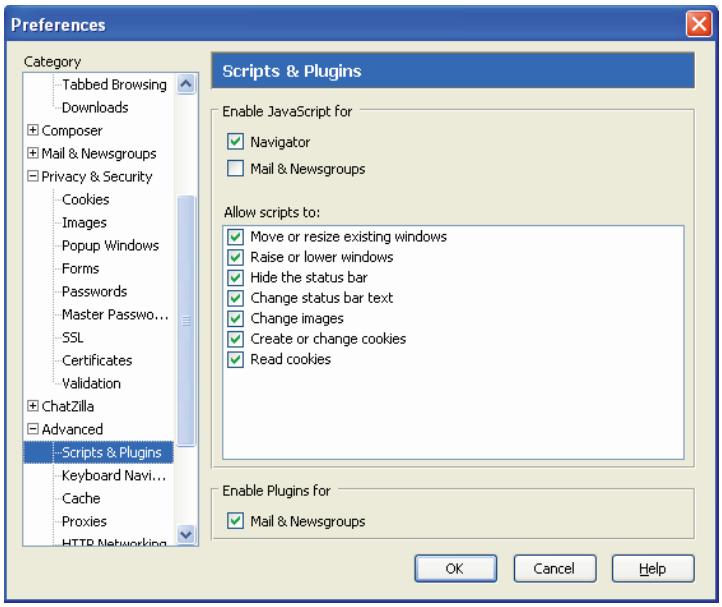


Figure 42. Scripts and Plugins Preferences

5. Ensure that the **Enable JavaScript for Navigator** option is selected.
6. Click **OK** to close the window and save the settings.

Mounting

This section outlines the various mounting options available for the VNM Recorder.

- **Tower Installation**
- **Rack Installation**

Tower Installation

Attach the appropriate feet to the unit and place it in a well ventilated area. The tower can be placed on its side (horizontally) on a hard surface with the cover latch facing up or placed standing up (vertically) on a flat surface.

Rack Installation

This section provides information on installing the recorder into a rack cabinet. Rack installation requires the use of the rack mount kit, which is included with the VNM Recorder.

There are a variety of rack cabinets on the market, which may mean the assembly procedure will differ slightly. If necessary, refer to the instructions that came with the rack cabinet to complete the rack installation.

UL Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines are relevant to the safe installation of these products in a rack:

1. **Elevated operating ambient temperature** — If the unit is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the equipment in an environment compatible with the maximum ambient temperature (TMA: +122 °F, +50 °C) specified by Extron.
2. **Reduced air flow** — Install the equipment in the rack so that the equipment gets adequate air flow for safe operation.
3. **Mechanical loading** — Mount the equipment in the rack so that uneven mechanical loading does not create a hazardous condition.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Consider the equipment nameplate ratings when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Rack Mounting

The supplied rack mount kit includes two rack rail assemblies. Each of these assemblies consist of three sections: an inner fixed rail that secures to the recorder frame, an outer rack rail that secures directly to the rack itself, and two rail brackets that also attach to the rack (see figure 43).

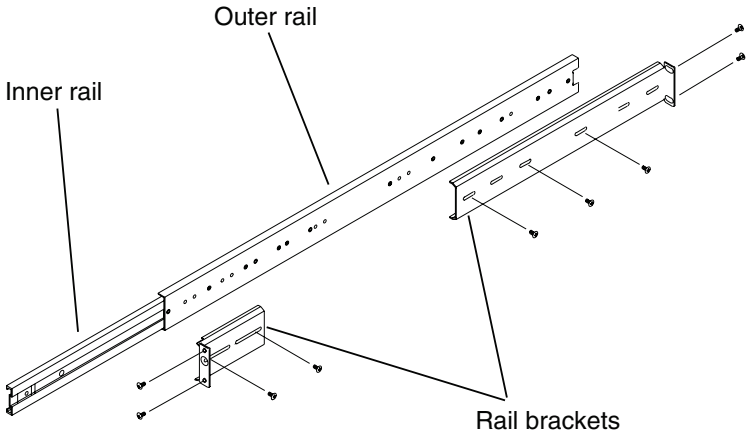


Figure 43. Identifying the Sections of the Rack Rails

To install the recorder into a rack, follow the steps below.

1. Remove the inner rail by pulling it out as far as possible. The locking tab should lock the rail and make a clicking noise when fully extended. Depress the locking tab to pull the inner rail completely out. Do this for both assemblies (one for each side).

   NOTE: The rails have a locking tab, which serves two functions. The first is to lock the recorder in place when installed and pushed fully into the rack. Secondly, these tabs lock the recorder in place when fully extended from the rack to prevent pulling the recorder completely out of the rack.

2. Place the recorder on its side (horizontally) on a hard surface with the cover latch facing up.
3. Remove the top and right covers by first removing the screws that secure them to the frame. Depress the button on the top of the frame to release and remove the cover. Remove the screws from the feet and remove them from the frame (see figure 44).

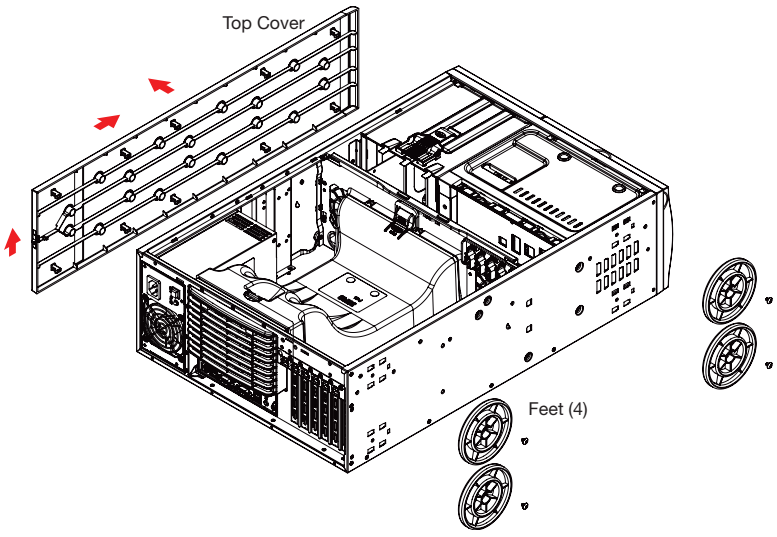


Figure 44. Preparing to Install the Rails

4. Attach the rack handles to the inner rails.
5. Align each inner rail (with the rack handle attached) to the screw holes located on the left and right side of the recorder. Secure the rails to the sides of the recorder frame (see figure 45).

NOTE: The two inner rail assemblies are left and right specific.

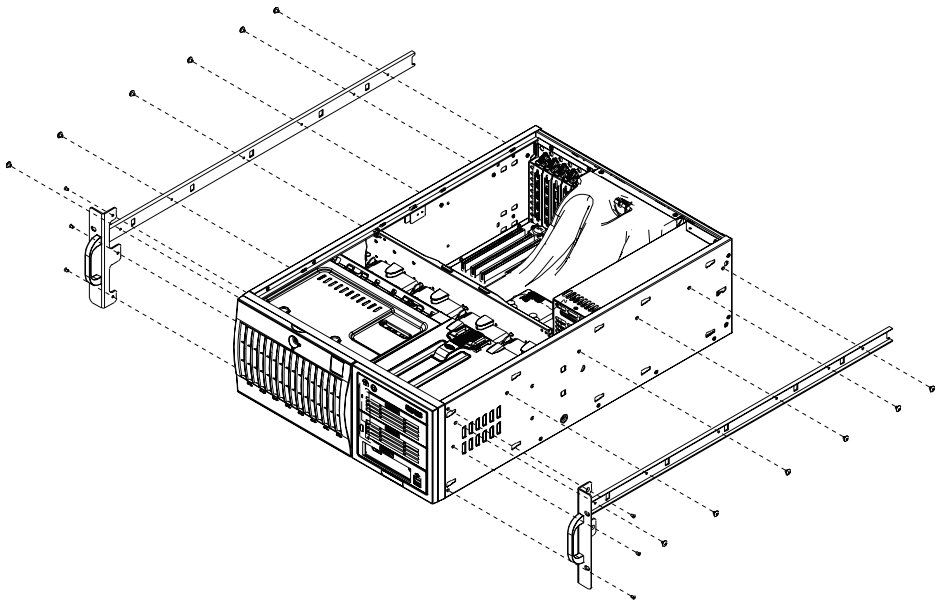


Figure 45. Installing the Rails onto the Recorder Frame

6. Determine where the recorder will be located within the rack (see the **UL Guidelines for Rack Mounting** on page 67 for safe rack installation).
7. Position the rail brackets at the desired location in the rack. Screw the rail brackets securely to the rack. Attach the remaining rail brackets to the other side of the rack, making sure both sets are at the exact same height.

NOTE: The smaller rail bracket should be positioned at the front of the rack and the larger rail bracket should be positioned at the back of the rack.

8. Secure the outer rails to the rail brackets.

NOTE: The two outer rails are left and right specific.

9. Line up the inner rails on the recorder with the outer rails on the rack. Gently slide the recorder into the outer rails of the rack (see **figure 46**). Depress the locking tabs, if necessary, when sliding the recorder into the outer rails.
10. Connect the necessary devices to the recorder (see the **Front Panel Features** section on page 8 and the **Rear Panel Features** section on page 10).
11. When the recorder is pushed completely into the rack, the locking tabs make a clicking noise. If necessary, secure the rack handles to the rack to keep the recorder in a fixed position.

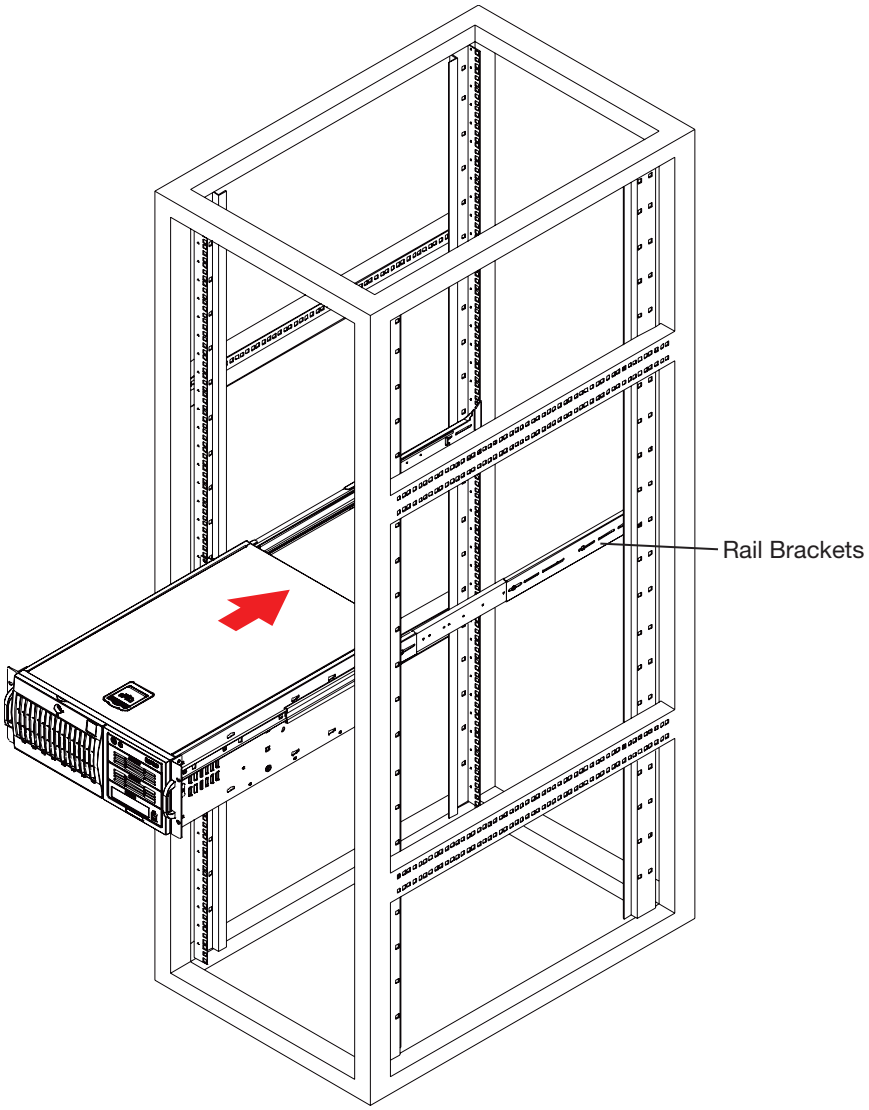


Figure 46. Installing the VNM Recorder into a Rack

gcode Frame Translator Utility Instructions

The VN-Recorder Frame Translator utility described in this section allows the conversion of existing VN-Matrix video recordings to individual still frames. These frames can be assembled into standard video, HD video, or other types of media files using third-party editing applications.

The utility also allows audio files to be converted to .WAV format.

NOTE: The information in this document is accurate for 5-channel VNM recorders running firmware version 5.2.0 or later.

This section provides information on:

Overview

To create a media file from a VN-Matrix recording:

1. Use VN-Matrix encoders and recorders to create a VN-Matrix recording.
2. Create a directory on the VN-Matrix recorder, where the still frames and audio file will be stored (see **Recording File Directory Nomenclature** on page 75).
3. Use the Frame Translator Utility to export the video recordings as still frames to the directory created in step 2. If required, use the utility to export audio recordings as WAV files to the same directory (see **Frame Translation Procedure** on page 76).
4. Transfer the still frames and audio files to a PC running a third-party editing application.
5. Create a video or media file from the still frames and audio file.

The main focus of this document is step 3, the **Frame Translation Procedure**.

Preparation for Using the gcode Frame Translator Utility

The gcode utility is run in a command window on the recorder where the required recording is stored.

A command window may be opened from a remote Windows PC using WinSCP.

Using WinSCP and PuTTY

1. Open WinSCP and enter the IP address of the VN-Recorder. Use the following parameters to log in.

- **`Port number`** = 22
- **`File protocol`** = SFTP
- **`User_name`** = `matrix_rec`
- **`Password`** = `matrix`

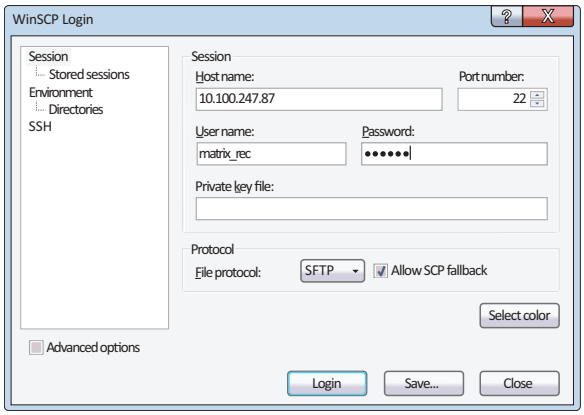


Figure 47. WinSCP Login

2. Select **`Login`**. The directory structure of the VN Recorder is displayed:

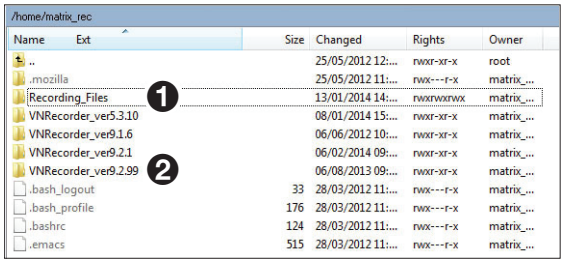


Figure 48. VN Recorder Directory Structure

By default, recordings are held in the **`Recording_Files`** directory (see figure 50, ❶) and the gcode Utility is located in the **`VNRecorder_verx.y.z`** directory (❷). Usually, only one VNRecorder directory will be present; if the recorder has been upgraded, use the current version directory.

Opening a command line window

1. Use PuTTY to open a command window session from WinSCP. From the **Commands** menu, select **Open in PuTTY** (see figure 49, ❶).

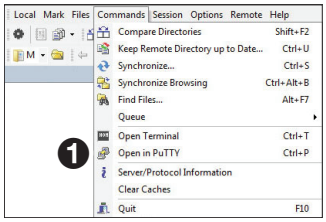


Figure 49. Open a Command Window Session

A command line window opens with a password prompt:

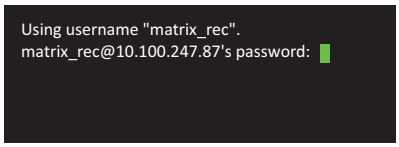


Figure 50. PuTTY Password Prompt

2. Enter **matrix** and press <Return>.

   The command line window opens at the following directory location:

   `/home/matrix_rec`

   Use the command line window to enter the gcode commands that are described in the following section.

Description of the Frame Translator Utility

The Frame Translator utility is a command line utility that is run from a terminal window on the VN-Matrix Recorder. The command line follows this structure:

`./gcode command flags`

The available command flags are:

Flag	Description
`-g`	Enables graphical output. Opens a window that displays each frame in succession after it has been exported. **NOTE:** A local display must be connected to the VN Recorder.
`-t`	Enables targa file output (.tga), one file per frame. Each frame is labelled video and numbered sequentially from 1 onwards (for example `video000001.tga`).
`-j quality`	Enables jpeg file output (.jpg), one file per frame. The quality parameter is a value between 0 and 100 that sets the compression of the jpg file from the minimum quality value (0, or maximum compression) to the maximum quality value (100, or minimum compression). A value of 100 produces the best quality image with the largest file size. A typical quality value is 80.
`-o outputdir`	*outputdir* defines the path to the directory where the output files are stored. If this flag is not specified, the files are output to the same directory as the gcode utility (typically `/home/matrix_rec/VNRecorder_verx.y.z`). **NOTE:** The `-o` flag does not create the directory. To create a directory, see step 1 of **Frame Translation Procedure** on page 76. Each frame is labelled video and numbered sequentially from 1 onwards (for example `video000001.tga`). To aid identification and help with file management, Extron recommends that a new output directory is created for each gcode file conversion.
`-i inputdir`	*inputdir* defines the path to the source directory containing the recording (`*.rec`) that is being exported. For information about selecting the correct directory name, see **Recording File Directory Nomenclature** on the following page.
`-l`	Lists the start and end times for the specified recording. This flag is used in conjunction with the `-i` flag, which specifies the directory where the recorded files are stored.
`-s start time`	Specifies the time stamp from which the gcode process starts. The time is in the format *HH:MM:SS.tt*.
`-f end time`	Specifies the time stamp at which the gcode process ends. The time is in the format *HH:MM:SS.tt*. **NOTE:** Setting a start time is optional. It is recommended that an end time is always specified. Failure to do this may cause the command window to freeze after the last frame to process. If this happens, use the <Ctrl>+<C> keys to end the process.
`-h`	Print help screen. This displays a list of flags and a brief description in the terminal window.

NOTES:

- When using the `-j`, `-i`, `-o`, `-s`, and `-f` flags, it is necessary to leave a space between the command flag and the parameter that follows (for example: `-o /home/matrix_rec/Recording_Files/recording1`).
- Only one stream can be exported at a time. Video and audio must be exported separately (see **Working with Video and Audio Streams** on page 79).

Recording File Directory Nomenclature

The `-i` flag must be followed by the directory path that contains the recording that is being exported.

A typical path may look like:

`/home/matrix_rec/Recording_Files/Mission1/OTW_5400036.0.0_r0_s0.rec`

where:

`/home/matrix_rec/Recording_Files/` is the factory default path, where recording files are stored.

`Mission1/` is a user-created subdirectory for housing a recording session. This session may contain recordings from multiple VN-Matrix recorders.

`OTW_5400036.0.0_r0_s0.rec` is the directory that holds the recording files for a single encoded stream, recorded from one VN-Matrix encoder. The name reflects whether the folder holds a recorded video, audio, data, or whiteboard stream. The individual naming elements have the following significance:

Naming element	Explanation	
`OTW`	Refers to the name assigned to the VN-Matrix encoder at the time of the recording.	
`_5400036`	Refers to the serial number of the VN-Matrix encoder.	
`.0`	This digit refers to the type of recorded content. The options are: • `0` — video • `A0` — audio • `D0` — data • `W0` — whiteboard.	
`.0`	Indicates the stream type: • `0` — RTP stream • `1` — TCP stream	
`_r0`	Indicates the recording channel:	
	Video Streams • `r0` — video recording channel 1 • `r6` — video recording channel 2 • `r12` — video recording channel 3 • `r18` — video recording channel 4 • `r24` — video recording channel 5	**Audio Streams** • `r1` — audio recording channel 1 • `r7` — audio recording channel 2 • `r13` — audio recording channel 3 • `r19` — audio recording channel 4 • `r25` — audio recording channel 5
`_s0`	Indicates the recording number. This value increases incrementally if a subsequent recording with the same name is made.	

Frame Translation Procedure

Use the Frame Translation procedure as follows:

1. Create an output directory.

   To create a new directory on the VN-Matrix Recorder:

   a. Return to the WinSCP window.

   b. Use the mouse to select the window showing the VN Matrix Recorder folders.

   c. Navigate to the required location. Use the <F7> key to launch the **`Create folder`** dialog.

   d. Enter the name of the folder and click **`OK`** in the dialog box.

2. Navigate to the directory holding the Frame Translator utility.

   The gcode frame translator utility may be found in the same directory as the VN-Matrix recorder application at the following location:

   `/home/matrix_rec/VNRecorder_verx.y.z`

   where `verx.y.z` denotes the version number of the VN-Matrix application files. This name may vary slightly depending on which version is installed.

   In the Command line window, navigate to the directory containing the Frame Translator utility, using the following commands:

   `cd` — change directory

   `cd ..` — go one directory back up the file hierarchy

   `ls` – list the directories and file at the current location

   `pwd` — show the working directory (your current location).

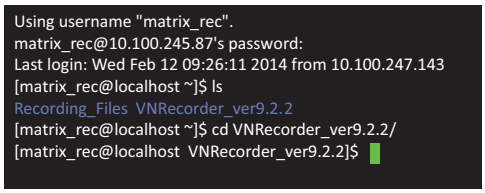


Figure 51. Navigating to the Frame Translator Utility Directory

3. Configure the gcode command line in the terminal window.

   Once you are in the correct directory, the command `./gcode` runs the application although, on its own, it won't do anything until it is told which file to work with. Decide which command line flags are needed and type the command line in the terminal window. For example:

```
./gcode -t -o /home/matrix_rec/Recording_Files/Video_Audio_
Data/TGA -i /home/matrix_rec/Recording_Files/Video_Audio_Data/
Chan1_1021526.0.0_r0_s0.rec -s 09:44:18.00 -f 09:44:20.00
```

NOTE: To run the utility, gcode must be preceded by the `./` characters.

4. Press <Enter> to run the command. If an error is detected in the command line, an indicator message appears in the terminal window.

   If the command line is valid, the utility exports one image file per video frame to the designated output directory. The command line window will continually update as the process runs.

   If you activate the graphic output flag (`-g`) for video exports, each frame appears on the screen as it is generated.

   When the process is complete the command line prompt will be displayed:

```
SdBase: final close on dbase: 0x933c19c
ntpStart=3581405058 ntpFinish=3581405060
seekToTime: fn= isopen=0
TBPLDLEN=16300
openNewFile(/home/matrix_rec/Recording_Files/Video_Audio_Data/Chan1_1021526.0.0_
r0_s0.rec/device1021526.videoPort0.1021526.0.0_1.rtp)
  rtpts = 3001955953 ntpmsw = 3581405058 ntplsw = 1860627077 payloadtype = 81
mtStart = -1293050332
starting at fn=17 (1-->378)
skipped 1 at start of file
syncFrameno to 18
Video Stream: w=1280 h=720
BBB: alloc
ofmt: w:0 h:0 f:0
nfmt: w:1280 h:720 f:60
dtime = 1499.97 fps = 60.000970
TIME: 12420
Timed end of content detected, mt:300298353 fin:-1292870332
Missing Packet, last=0 now=0
StreamExhausted
BBB: free
SdBase: final close on dbase:0x933c19c
SdBase: final close on dbase:0x933946c
[matrix_rec@localhost VNRecorder_ver9.2.2]$
```

Figure 52. gcode Process Completed

NOTES:

- The average conversion time for a video file is approximately eight times the length of the original recording. One second of recorder content may produce 60 exported image files.
- The conversion time for a audio recording is much shorter. An audio file that is 2 minutes and 30 seconds in length is encoded to a .WAV file in less than 10 seconds.

Example Strings

NOTE: The following examples are all unbroken character strings without a line break. When the text moves to the next line, it is "text wrap."

Example1 — decoding a file on the local graphics output

The command is:

```
./gcode -g  -i /home/matrix_rec/Storage/SAC_Test/
Dave_Gilmour_Dimming_of_the_Day_620027.0.0_r0_s0.rec
```

- Each frame is displayed as it is generated (`-g`)
- No output directory is specified. By default the newly generated files are displayed on the local display of the VN Recorder.
- The input directory is `/home/matrix_rec/Storage/SAC_Test/Dave_Gilmour_Dimming_of_the_Day_620027.0.0_r0_s0.rec`

Example 2 — decoding a file to Targa files and placing them in a specified output directory

The command is:

```
./gcode -t -o /home/matrix_rec/Targa -i /home/matrix_rec/Storage/SAC_
Test/ Dave_Gilmour_Dimming_of_the_Day_620027.0.0_r0_s0.rec
```

- Since there is no `-g` flag, the frames are not displayed as they are generated.
- The output is targa (tga) files (`-t`).
- The ouput directory path is `/home/matrix_rec/Targa`.

Example 3 — outputting JPG files with graphical output

The command is:

```
./gcode -g -j 80 -i /home/matrix_rec/Storage/SAC_Test/
Dave_Gilmour_Dimming_of_the_Day_620027.0.0_r0_s0.rec
```

- Each frame is displayed as it is generated (`-g`).
- The output is jpg files (`-j`).
- Since no `-o` flag is set, the output files are stored at the default location (`/home/matrix_rec/VNRecorder_verx.y.z`).
- The quality setting is 80%.

Example 4 — generating audio files, specifying the output directory.

To convert an Audio file to a .wav file and place in a folder “Targa.” The default name for the audio file is `music.wav`.

```
./gcode  -o /home/matrix_rec/Targa -i /home/matrix_rec/Storage/SAC_Test/
Dave_Gilmour_Dimming_of_the_Day_620027.A0.0_r1_s0.rec
```

- The gcode utility recognizes that the file is an audio file (`.A0`) and automatically creates a .WAV file with the name `music.wav`.

Advanced Use

Example 1 — stopping the export process

To stop the export process, press <Ctrl> + <C> at any time. Any image files that were generated prior to the process being stopped remain in the specified output folder.

Example 2 — determining the start and end points of the recording

The command is:

```
./gcode -l -i /home/matrix_rec/Storage/SAC_Test/
Dave_Gilmour_Dimming_of_the_Day_620027.0.0_r0_s0.rec
```

- The `-l` flag causes the utility to return the start and end time stamp of the recording: `17:45:27.53 - 17:47:27.65`.
- The length of the recording is calculated by subtracting the start time from the finish time (in this case 2 minutes 0.12 seconds).

Example 3 — start decoding a file at a time other than the beginning of the recording

The command is:

```
./gcode -g -s 17:45:37.53 -i /home/matrix_rec/Storage/SAC_Test/
Dave_Gilmour_Dimming_of_the_Day_620027.0.0_r0_s0.rec
```

- The file conversion starts ten seconds into the recording at `17:45:37.53`.

Example 4 — finish decoding a file at a time other than the end of the recording

The command is:

```
./gcode -g -f 17:46:27.53 -i /home/matrix_rec/Storage/SAC_Test/
Dave_Gilmour_Dimming_of_the_Day_620027.0.0_r0_s0.rec
```

- The file conversion finishes at `17:46:27.53`.

Example 5 — generating Targa files, specifying the output directory, and the start and finish times.

The command is:

```
./gcode -t -o /home/matrix_rec/Targa -s 17:45:37.53
-f 17:46:27.53 -i /home/matrix_rec/Storage/SAC_Test/
Dave_Gilmour_Dimming_of_the_Day_620027.0.0_r0_s0.rec
```

- The output files are Targa (tga) files (`-t`)
- The output folder is `/home/matrix_rec/Targa`
- The file conversion starts at `17:45:37.53`.
- The finish time is `17:46:27.53`.

Working with Video and Audio Streams

When recording video content along with associated audio, the Start and Finish times for the each of the different recorded file types can differ by a small amount. Usually, the video file will be slightly longer and its start and end times will overlap the other files in the recording.

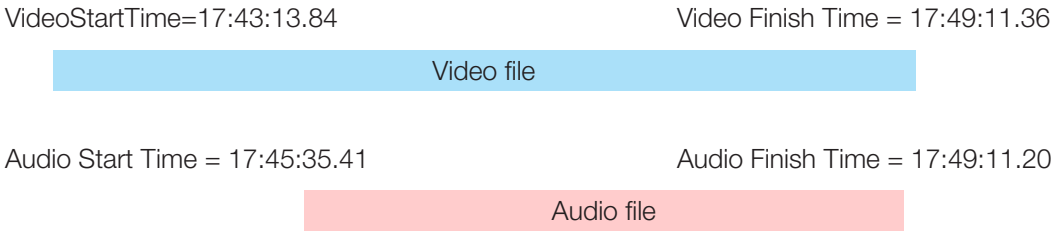
The times specified in the gcode utility must take this difference into account or synchronization of the content in the converted files will be lost, most noticeable in loss of lip sync between video and audio content.

When using the gcode utility to convert two files, the start and end times set for each file conversion must be the same and must overlap.

When setting the start time for a conversion, check the start times for each of the files that are to be converted and use the start time of the file that is last to start up, that is the latest start time.

For the end time, use a similar process but use the end time of the file that is first to stop, that is the earliest end time.

Example 1:



In the above diagram, the start and end times of the video and audio files are different.

NOTE: The difference in start time is exaggerated to illustrate this point. In practice, the difference will be much smaller.

To create the correct number of video frames and a .WVA file of the correct length you must specify the correct Start and Finish times within the gcode command line.

For this example a Start time of 17:45:35.50 (after both the audio and video files have started) and a Finish time of 17:49:11.00 (before either file finishes) would be appropriate.

This results in video and audio files of the same length being created. These files can be used with third-party video editing software to produce a correctly lip-synced file.

You will need two separate commands, the first to generate the video file and the second to generate the audio file:

```
./gcode -t -o /home/matrix_rec/Targa -s 17:45:35.5Ø
-f 17:49:11.ØØ -i /home/matrix_rec/Storage/SAC_Test/
Dave_Gilmour_Dimming_of_the_Day_62ØØ27.Ø.Ø_rØ_sØ.rec
```

```
./gcode -o /home/matrix_rec/Targa -s 17:45:35.5Ø -f 17:49:11.ØØ -i /
home/matrix_rec/Storage/SAC_Test/Dave_Gilmour_Dimming_of_the_Day_62ØØ27.
AØ.Ø_rØ_sØ.rec
```

- The first command uses a video file to produce targa files (`-t`).
- The second command uses an audio file (`.AØ`) to produce a WAV file.
- Both the audio and video files are generated from the same start time (`17:45:35.5Ø`) to the same finish time (`17:49:11.ØØ`).

Extron Warranty

Extron 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 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
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

Asia:
Extron Asia Pte. Ltd.
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Japan:
Extron, 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 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 be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron 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.