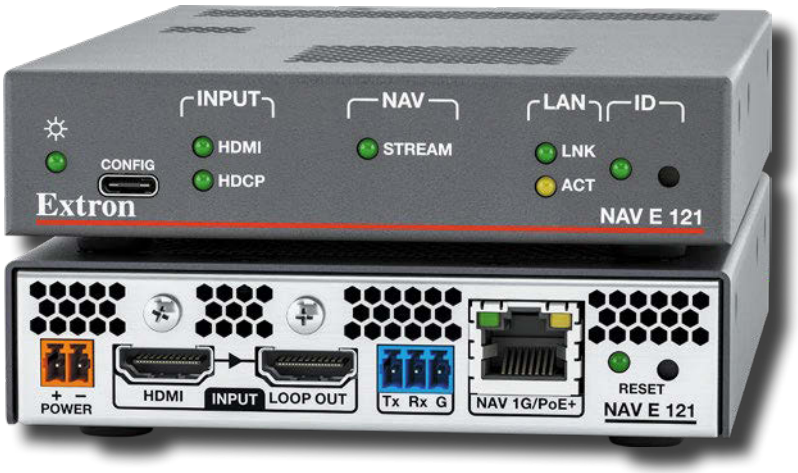
Extron

NAV E 121

Streaming HDMI Encoder



User Guide

NAV Pro AV Over IP

68-3771-01, Rev. Bx1
01 24

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**.

تعليمات السلامة • العربية

تحذير: هذا الرمز، ⚠، عند استخدامه على المنتج، مخصص لتنبيه المستخدم فيما يتعلق بوجود جهد كهربائي غير معزول على الغلاف الخارجي للمنتج وهو ما قد ينطوي على مخاطر حدوث صدمة كهربائية.

انتبه: هذا الرمز، ⚠، عند استخدامه على المنتج، مخصص لتنبيه المستخدم بتعليمات التشغيل والصيانة الهامة (الخدمة) في المواد التي يتم توفيرها مع المعدات.

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Sicherheitsanweisungen • Deutsch

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

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Instrucciones de seguridad • Español

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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.

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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，產品機殼內存在未隔離的危險電壓，可能會導致觸電之風險。

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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

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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

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주의: 이 기호가 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.

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AAP, AFL (Accu-RATE Frame Lock), ADSP (Advanced Digital Sync Processing), AVEdge, CableCover, CDRS (Class D Ripple Suppression), Codec Connect, DDSP (Digital Display Sync Processing), DMI (Dynamic Motion Interpolation), Driver Configurator, DSP Configurator, DSVP (Digital Sync Validation Processing), EQIP, Everlast, FastBite, Flex55, FOX, FOXBOX, IP Intercom HelpDesk, MAAP, MicroDigital, Opti-Torque, PendantConnect, ProDSP, QS-FPC (QuickSwitch Front Panel Controller), Room Agent, Scope-Trigger, SIS, Simple Instruction Set, Skew-Free, SpeedNav, Triple-Action Switching, True4K, Vector™ 4K , WebShare, XTRA, and ZipCaddy

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.

NOTES:

- This unit was tested with shielded I/O cables on the peripheral devices. Shielded cables must be used to ensure compliance with FCC emissions limits.
- For more information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the **Extron Safety and Regulatory Compliance Guide** on the Extron website.

Battery

CAUTION: Risk of explosion — Do not replace the battery with an incorrect type. Dispose of used batteries according to the instructions.

ATTENTION : Risque d'explosion — Ne pas remplacer la pile par le mauvais type de pile. Débarrassez-vous des piles usagées selon le mode d'emploi.

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

CAUTION: Risk of minor personal injury.

ATTENTION : Risque de blessure mineure.

ATTENTION:

- Risk of property damage.
- Risque de dommages matériels.

NOTE: A note draws attention to important information.

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

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,0p1 scene 1,1 ^B 51 ^W^C.0
[01] R 0004 0030 0040 0080 0600 [02] 35 [17] [03]
Esc X1 * X15 * X19 * X22 * X21 CE ←
```

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

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

```
Reply from 208.132.180.48: bytes=32 times=2ms TTL=32
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

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

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

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

Click the **OK** button.

Specifications Availability

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

Extron Glossary of Terms

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

Contents

Introduction

This section contains the following topics:

About this Guide

This guide contains installation, configuration, and operating information for the NAV E 121 Encoder, which streams HDMI video and audio over a managed 1G IP network.

NOTE: In this guide:

- The NAV E 121 is referred to as an "encoder."
- NAV encoders and decoders collectively are referred to as "endpoints."

About the NAV System

The Extron NAV decoders and one or more compatible encoders form an AV distribution and switching matrix on an Internet Group Management Protocol (IGMP) Managed IP Network. The encoders are configured for low latency multicast streaming. The decoders are configured to join the assigned multicast group.

About the Encoder

A NAV encoder (see **figure 1** on page 2) inputs an HDMI video signal and generates a video and audio stream that can be transmitted over an IP network using the Extron PURE3 Codec. The PURE3 Codec exceeds many of the performance characteristics of existing compression formats and provides exceptionally robust protection against network errors, making it ideal for quality-critical applications.

The data stream consists of HDCP-compliant HDMI video (which can include embedded digital audio [SMPTE 299M and SMPTE 272M-A]) at resolutions up to 4K @ 60 Hz.

You can manage the endpoints using an Extron NAVigator System Manager (see **figure 1**) . The base version of the NAVigator can control up to 16 endpoints. Available LinkLicense expansion options can accommodate up to 240 endpoints.

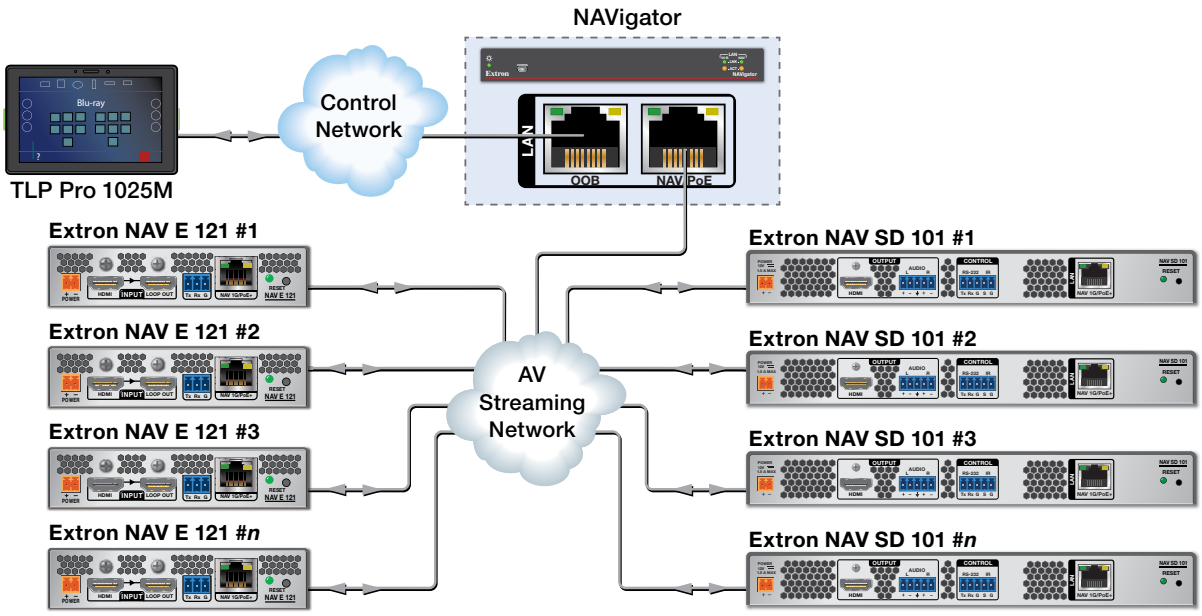


Figure 1. Typical NAV Application

The streamed NAV signal is routed using a managed network switch and can be dedicated to a specific LAN. AV switching can be done via a control system by interfacing to the NAV decoder or the NAVigator.

NOTE: The RS-232 communications are driven via a control system. The encoder and decoder do not generate or respond to the RS-232 communication signals.

About the Decoder

One or more compatible decoders, such as the NAV SD 501 or NAV SD 101, decode the data stream back into the original video and audio signal formats and output them locally.

System Interaction and Capabilities

Each encoder and decoder has an integrated web interface. All normal system configuration and control is via the web interface of the NAVigator. Using a computer on the same network and a standard web browser; such as Google Chrome™, Mozilla™ Firefox™, or Microsoft® Edge™; you can configure any encoder or decoder unit in the system.

The embedded audio can be transported as a 2-channel LPCM uncompressed stream. Audio can follow video to the same decoder or be broken away to a different endpoint.

A dedicated RS-232 port, a secure platform device (SPD), is available for distributing RS-232 data with the coded/decoded video, such as for control of a projector.

The encoder is housed in 1-inch high, quarter-rack width metal enclosure that can be mounted in any standard 19-inch rack or under furniture with optional mounting kits.

The optional external 100 VAC to 240 VAC, 50-60 Hz power supply provides worldwide power compatibility.

Features

- **Encodes and streams video and audio over 1 Gbps Ethernet networks** — Standard 1 Gbps Ethernet supports flexible system design and transmission over large distances to any location.
- **Supports HDMI 2.0 at resolutions up to 4K/60 @ 4:4:4** — HDMI up to 4K @ 60 Hz (4096 x 2160) with full 4:4:4 chroma subsampling ensures accurate reproduction of source images.
- **PURE3 Codec** — Patented by Extron, the wavelet-based compression technology delivers high image quality with very low-latency at highly efficient bit rates. With its high immunity to network errors and built-in error concealment, PURE3 facilitates reliable, real-time delivery of visually lossless video over IP networks.
- **PURE3 Intelligent Selective Streaming (ISS)** — Leverages low motion content to achieve extremely low bitrates while maintaining visually lossless performance.
- **Ultra-low latency with high quality video** — Streams professional-grade video with ultra-low latency using the unique wavelet-based Extron PURE3 codec, guaranteeing exceptional user experience and accurate reproduction of every detail.
- **AES67 audio support** — Supports the AES67 audio over IP standard, providing compatibility with Extron and third-party DSP processors.
- **HDCP 2.3 compliant** — Ensures display of content-protected media and interoperability with other HDCP-compliant devices.
- **PoE+ compatibility eliminates the need for a local power supply** — PoE+ enables receipt of power directly from the PoE switch, eliminating the need for bulky local power supplies.
- **Confidence preview** — Allows you to view the video output on the built-in HTML page of the encoder. This feature helps to remotely validate video output during configuration or debugging.
- **SRTP stream encryption (SRTP)** — Ensures encryption, message authentication, and data integrity for video and data streams.
- **Audio breakaway enables independent audio and video switching** — Provides the capability to break away an audio signal from its corresponding video signal.
- **Priority Routing** — Assign custom tags to endpoints using built-in NAVigator HTML pages. Tags can be used to further classify endpoints, easily locate them on the network, or apply rules for routing with an Extron control system.
- **802.1X port-based Network Access Control** — Supports 802.1X port-based authentication, requiring that all devices are approved before network access is granted.
- **Certified FIPS 140-2 module** — Extron cryptographic module meets NIST and CCS guidelines and is certified by CMVP to the FIPS 140-2 information processing standard in order to ensure protection of sensitive data.
- **Active Directory support** — Integrates with Microsoft Active Directory, simplifying user management, group authentication, and helping to maintain strong security policies.
- **Adjustable bit rate** — Selects bit rates while maintaining image quality for a more flexible network configuration that easily adapts to different application requirements. A non-blocking solution is available to accommodate even very large installations.
- **Error concealment** — Offers high immunity to network errors, ensuring reliable transmission of high quality imagery with the ability to conceal errors even during incidents of heavy packet loss.

- **HDMI loop-through** — Local HDMI output provides signal for a local display, an AV system, or a hardware codec, enabling monitoring or sharing of content without the need for a separate distribution amplifier.
- **Embedded web interface** — Intuitive, user-friendly embedded web interface simplifies device configuration, setup, and system operation.
- **EDID Minder automatically manages EDID communication between connected devices** — EDID Minder ensures that all sources power up properly and reliably output content for display.
- **Key Minder continuously verifies HDCP compliance for quick, reliable switching** — Key Minder authenticates and maintains continuous HDCP encryption between input and output devices to ensure quick and reliable switching in professional AV environments, while enabling simultaneous distribution of a single source signal to one or more displays.
- **HDCP Visual Confirmation** — When HDCP-encrypted content is transmitted to a non-HDCP compliant display, a full-screen green signal is sent to the display for immediate visual confirmation that protected content cannot be viewed on that display.
- **Supports embedded HDMI audio signals** — Directly interfaces with common AV source signals for compatibility with most audio devices.
- **Integrates with Pro Series control systems for secure, user-friendly external control** — Designed to integrate directly with Extron Pro Series control systems for secure, encrypted RS-232 control of external devices without the need for additional control processors.
- **Secure Platform Interface** — Working natively with NAV Systems, Extron Pro Series control systems offer flexible system management and matrix switching control via a Secure Platform Interface that encrypts all commands from control processor to endpoint. Together, NAV and Extron Pro Series control systems create the most secure and reliable Pro AV over IP solution on the market.
- **Multicast filtering with IGMP v2/v3** — Supports multicast filtering with IGMP v2/v3 for lower bandwidth consumption. Enables use of standard network equipment.
- **One-button endpoint identification** — Identify endpoints with an ID button and indicator for quick discovery of units on a network, simplifying diagnostics and installation.
- **1-inch (2.5 cm) high, quarter-rack width metal enclosure** — Compact, low profile enclosure for discreet placement and concealment.
- **Configurable Power Priority** — Selects PoE or line power priority for power management and redundancy
- **ZipClip 200 included** — Enables quick and secure mounting to rack rails, tables, shelves, and lecterns.

Installation and Basic Operation

This section describes the installation and the operation of the NAV E 121 encoder, including:

- **Mounting**
- **Rear Panel Connections and Features**
- **Front Panel Connection and Indicators**
- **Startup and Basic Operation**

Mounting

If desired, mount the encoder in a rack (see **Mounting the Encoder** on page 66).

Rear Panel Connections and Features

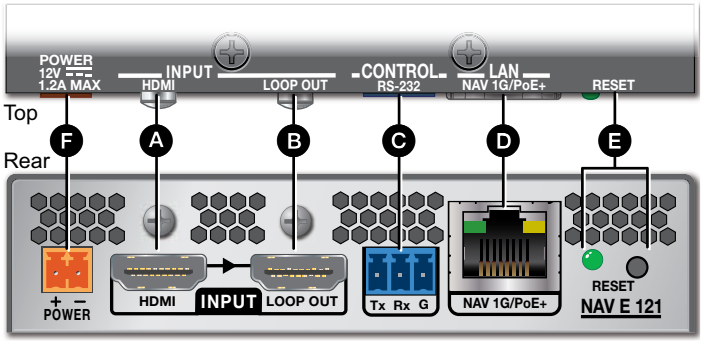
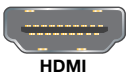


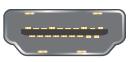
Figure 2. NAV E 121 Rear Panel Connectors and Features

- **A HDMI input port**
- **B LOOP OUT port**
- **C CONTROL RS-232 port**
- **D NAV 1G/PoE+ port**
- **E RESET button and LED**
- **F Power connector**

A HDMI input port — Connect an HDMI cable between this port and the HDMI output port (or DVI port, with an appropriate adapter) of the digital video source (see **LockIt Lacing Brackets** on page 7 to use the LockIt HDMI Cable Lacing Bracket to secure the connector to the encoder).

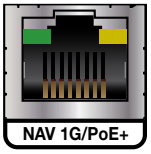


B LOOP OUT port — Connect a display to this female HDMI port for local loop-through monitoring of the source signal (see **LockIt Lacing Brackets**).



C CONTROL RS-232 port — Connect a serial RS-232 signal to this 3.5 mm, 3-pole captive screw port for bidirectional RS-232 communication for control of and communication with another device (see **Control connector wiring** on page 8 to wire the connector).

D **NAV 1G/PoE+ port** (see **figure 2** on page 5) — Connect to an Ethernet LAN on which one or more decoders also reside for streaming, control, and PoE+.



NOTES:

- See **TP cable termination** on page 8 to properly wire the RJ-45 connector **D**.
- RJ-45 port LEDs indicate as follows:
  - **Act (amber) LED** — Indicates transmission of data packets on the RJ-45 connector. This LED blinks as the encoder communicates.
  - **Link (green) LED** — Indicates that the encoder is properly connected to an Ethernet LAN. This LED lights steadily.

E **RESET button and LED** — The RESET button initiates three levels of encoder reset. For the different reset levels, press and hold the button while the encoder is running or while you power up the encoder (see **Reset Operations** on page 13 for details).

F **Power connector** — If desired, plug an optional external 12 VDC power supply into this 2-pole connector to power the encoder locally.

ATTENTION:

- Do not connect power to the encoder until you have read the **CAUTION** and **ATTENTION** notices on page 9.
- Ne connectez pas l'alimentation à l'encodeur avant d'avoir lu les rubriques « **ATTENTION** » des page 9.

Connector and Cable Details

HDMI connectors

HDMI signals for 4K video run at a very high frequency and are especially prone to errors caused by bad video connections, too many adapters, or excessive cable length. To avoid the loss of an image or jitter, follow these guidelines:

- Do not exceed 12 feet (3.6 meters) on the encoder input or loop-out output.
- Limit or avoid the use of adapters.
- Use only cables specifically intended for HDMI or DVI signals. Use of non-HDMI or non-DVI cables or modified cables can result in a missing video output.

Lockit Lacing Brackets

To securely fasten an HDMI cable cable to a device:

1. Plug the rear panel HDMI cable into the panel connection (see figure 3, ❶).

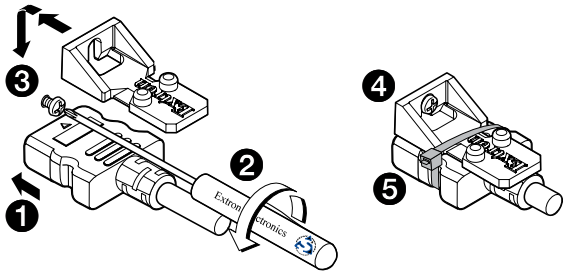


Figure 3. Installing the LockIt Lacing Bracket

2. Loosen the HDMI connection mounting screw from the panel enough to allow the LockIt lacing bracket to be placed over it (❷). The screw does not have to be removed.
3. Place the LockIt lacing bracket on the screw and against the HDMI connector, then tighten the screw to secure the bracket (❸).

ATTENTION:

- Do not overtighten the HDMI connector mounting screw. The shield to which it fastens is very thin and can easily be stripped.
- Ne serrez pas trop la vis de montage du connecteur HDMI. Le blindage auquel elle est attachée est très fin et peut facilement être dénudé.

4. Loosely place the included tie wrap around the HDMI connector and the LockIt lacing bracket as shown (❹).
5. While holding the connector securely against the lacing bracket, use pliers or similar tools to tighten the tie wrap, then remove any excess length (❺).

Control connector wiring

Figure 4 shows how to wire the Control RS-232 connector.

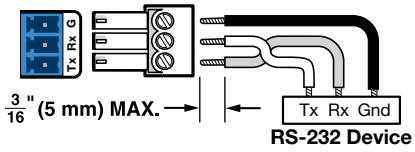


Figure 4. Control Connector Wiring

NOTES:

- The RS-232 Tx and Rx line pair must cross once between this connector and the source or destination.
- The length of exposed wires is important. The ideal length is 3/16 inch (5 mm).
  - If the stripped section of wire is longer than 3/16 inch, the exposed wires may touch, causing a short circuit.
  - If the stripped section of wire is shorter than 3/16 inch, wires can be easily pulled out even if tightly fastened by the captive screws.
- Do not tin the wires before installing them in the connector. Tinned wires are not as secure in the connector and could be pulled out.

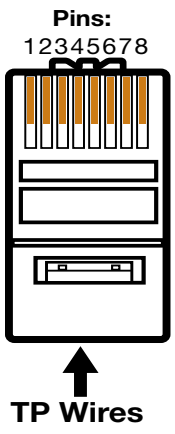
TP cable termination

The encoder NAV 1G/PoE+ port supports 1000Mbps (1000base T — Gigabit Ethernet), half-duplex and full-duplex Ethernet connections. It is vital that your Ethernet cable be the correct cable type and that it be properly terminated with the correct pinout. Ethernet links use Category (CAT) 5e or CAT 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to a length of 328 feet (100 meters).

NOTES:

- A CAT 5e cabling infrastructure is the minimum acceptable to support a NAV system. Anything less is insufficient.
- Do not stretch or bend cables. Transmission errors can occur.

The Ethernet cable must be terminated as a patch (straight-through) cable and must be properly terminated in accordance with the **TIA/EIA T568-B** wiring standard (see figure 5).



Pin	TIA/EIA T 568B Wire color
1	White-orange
2	Orange
3	White-green
4	Blue
5	White-blue
6	Green
7	White-brown
8	Brown

Figure 5. RJ-45 Connector and Pinout Table

Power supply wiring

Figure 6 shows how to wire the connector. Use the supplied tie-wrap to strap the power cord to the extended tail of the connector.

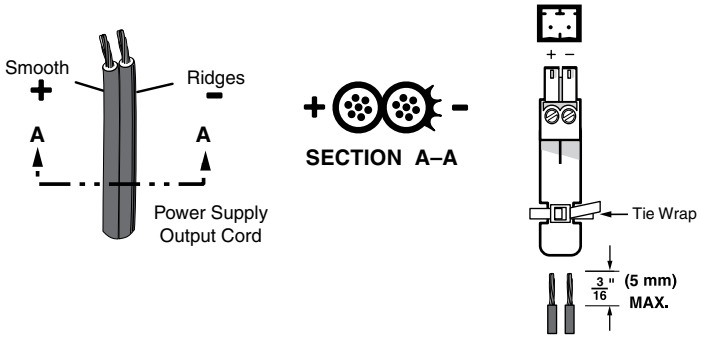


Figure 6. Power Connector Wiring

CAUTION:

ATTENTION :

- The DC output cables must be kept separate from each other while the power supply is plugged in. Remove power before wiring.
- Les câbles de sortie CC doivent être séparés les uns des autres tant que la source d'alimentation est branchée. Coupez l'alimentation avant d'effectuer les raccordements.
- The length of exposed wires is critical. The ideal length is 3/16 inch (5 mm).
  - Any longer and the exposed wires may touch, causing a short circuit.
  - Any shorter and the wires can be easily pulled out even if tightly fastened by the captive screws.
- La longueur des câbles exposés est primordiale. La longueur idéale est de 5 mm (3/16 inches).
  - S'ils sont un peu plus longs, les câbles exposés pourraient se toucher et provoquer un court circuit.
  - S'ils sont un peu plus courts, ils pourraient sortir, même s'ils sont attachés par les vis captives.
- Do not tin the power supply leads before installing them in the connector. Tinned wires are not as secure in the connector and could be pulled out.
- Ne pas étamer les conducteurs avant de les insérer dans le connecteur. Les câbles étamés ne sont pas aussi bien fixés dans le connecteur et pourraient être retirés.

ATTENTION:

- If not provided with a power supply, this product is intended to be supplied by a UL Listed power source marked "Class 2" or "LPS" and rated output 12Vdc, minimum 1.2 A or 56 Vdc (PoE), minimum 0.55 A. Always use a power supply supplied by or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.
- Si le produit n'est pas fourni avec une source d'alimentation, il doit être alimenté par une source d'alimentation certifiée UL de classe 2 ou LPS, avec une tension nominale 12 Vcc, 1.2 A minimum ou 56 Vdc (PoE), minimum 0.55 A. Utilisez toujours une source d'alimentation fournie ou recommandée par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute conformité réglementaire et peut endommager la source d'alimentation ainsi que le produit final.

ATTENTION:

- Power over Ethernet (PoE) is intended for indoor use only. It is to be connected only to networks or circuits that are not routed to the outside plant or building.
- L'alimentation via Ethernet (PoE) est destinée à une utilisation en intérieur uniquement. Elle doit être connectée seulement à des réseaux ou des circuits qui ne sont pas routés au réseau ou au bâtiment extérieur.

- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities.
- Sauf mention contraire, les adaptateurs AC/DC ne sont pas appropriés pour une utilisation dans les espaces d'aération ou dans les cavités murales.

- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to a building structure or similar structure.
- Cette installation doit toujours être en accord avec les mesures qui s'applique au National Electrical Code ANSI/NFPA 70, article 725, et au Canadian Electrical Code, partie 1, section 16. La source d'alimentation ne devra pas être fixée de façon permanente à une structure de bâtiment ou à une structure similaire.

- Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the unit. The ridges on the side of the cord (see **figure 6** on page 9) identify the power cord negative lead.
- La polarité de la source d'alimentation est primordiale. Une polarité incorrecte pourrait endommager la source d'alimentation et l'unité. Les stries sur le côté du cordon (voir **l'illustration 6** sur la page 9) permettent de repérer le pôle négatif du cordon d'alimentation.

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

Front Panel Features

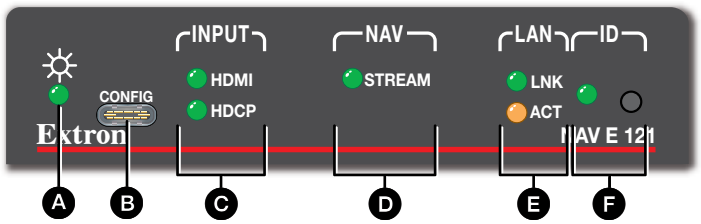


Figure 7. Encoder Front Panel Features

- **A Power LED**
- **B CONFIGURATION port**
- **C INPUT LEDs**
- **D NAV LED**
- **E LAN LEDs**
- **F ID button and LED**

A Power LED — Indicates power and startup status, as follows:

- **Blinking** — The unit is receiving power, either locally or via PoE and is booting up.
- **Lit** — The unit is receiving power, either locally or remotely (via PoE) and is operational.

B CONFIGURATION port — This USB-C port can be used to configure the encoder and to update firmware.

C **INPUT LEDs** (see **figure 7** on page 10) — Indicate status of the signal input, as follows:

- **HDMI LED** — The encoder is receiving an active HDMI input signal.
- **HDCP LED** — The HDMI signal is HDCP encrypted.

D **NAV LEDs** — Indicate the output status of the AV and USB streams, as follows:

- **Stream LED**
  - **Lit steadily** – The encoder is actively streaming a NAV output consisting of video, audio, or both to one or more NAV decoders.
  - **Blinking** – The encoder is actively streaming a NAV output, but network errors are present.
  - **Unlit** - The encoder is not actively streaming a NAV output.

E **LAN LEDs** — Indicate the status of the network connections, as follows:

- **Link LED** — Indicates the status of the link.
  - **Lit steadily**— Indicates that a network link is established at 1 Gbps.
  - **Blinking** – Indicates that network link is established less at than 1 Gbps.
- **Act LED** — Indicates the network traffic rate. The blink rate corresponds to activity.

F **ID button and LED** — The recessed ID button, when pressed, identifies the encoder to other network units and to the embedded HTML pages (see **Pairing Devices Manually** on page 12). The LED blinks when the encoder is in pairing mode and lights when it is paired or device identification is selected from the encoder or NAVigator HTML page.

Startup and Basic Operation

Power

The encoder can be powered in one of three ways:

- Remotely, receiving PoE via the NAV 1G/PoE+ port (see D on page 6); either from the network switch or from an optional PI 130 Power Injector.
- Locally, from an optional external power supply and via the power connector (see F on page 6).
- Remotely (D) and locally (F), with the priority selectable between the two (see **Power Priority page** on page 51). If the prioritized power voltage drops below a threshold, the encoder immediately transitions to the alternate power source with no effect on system operation.

When power is applied, the encoder runs a series of self-tests that blink the front panel Power LED and all other indicators. The encoder then boots the NAV operating system. It can take approximately 60 seconds for self-test and system startup to complete. When the process is complete, the Power LED lights steadily.

NOTE: The encoder is NOT operational until the boot process is complete (the Power LED is lit steadily).

Pairing Devices Manually

Manually pair devices as follows:

1. Use a Tweeker or other small screwdriver to press and hold the encoder front panel **ID** button for approximately 3 seconds, until the ID LED blinks. The encoder enters pairing mode.
2. One at a time, use a Tweeker or other small screwdriver to press and hold the decoder front panel **ID** button for approximately 3 seconds, until the ID LED blinks. Release the **ID** button. The decoder is now paired to the encoder.
3. Repeat step 2 for each decoder.
4. Use a Tweeker or other small screwdriver to press and release the encoder front panel **ID** button. The encoder exits pairing mode.
5. Repeat steps 1 through 4 to pair decoders to other encoders.

NOTE: Units can be paired manually via the ID button, but they cannot be unpaired manually. To unpair units, use the embedded HTML pages of either the decoder (see the applicable decoder user guide) or of the NAVigator (see the *NAVigator User Guide*). The applicable user guides are available at **www.extron.com**.

Operation

After the encoder, all decoders, and their connected devices are fully booted up and operational (the Power LED on each unit is lit steadily) and the devices are paired, the system is fully operational. If any problems are encountered, ensure all cables are routed and connected properly.

System operation with a NAVigator

Your NAV system must include an Extron NAVigator, a system manager that configures and controls the AV streaming system. The NAVigator allows you to make changes to multiple endpoints in the system from a central location, simplifying operations such as making ties or bulk configuration.

The base version of the NAVigator can support up to 16 endpoints by default, but if a LinkLicense is installed, support can be expanded to up to 240 endpoints, depending on the LinkLicense.

See the *NAVigator User Guide*, available at **www.extron.com** for details.

Configuration and other operations

Configuration and more complex operation of the system is accomplished via embedded web pages (see **HTML Operation**, beginning on page 15) or Extron Toolbelt. Simple Instruction Set (SIS) commands (see **SIS Operations**, starting on page 57) cannot be issued directly to the encoder, but are issued via an Extron control system on the AV network using a process known as “encapsulation” (see the *NAVigator User Guide*, available at **www.extron.com** for details).

Reset operations

The rear panel **RESET** button initiates three levels of resets. The RESET button is recessed, so use a pointed stylus, ballpoint pen, or small screwdriver to access it.

See the table below for a summary of the modes.

ATTENTION:

- Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or an encoder reboot.
- Étudier de près les différents modes de réinitialisation. Appliquer le mauvais mode de réinitialisation peut causer une perte inattendue de la programmation de la mémoire flash, une reconfiguration des ports ou une réinitialisation du contrôleur.

NOTES:

- The reset modes listed in the table are separate functions.
- The modes listed close all open IP and other connections and close all sockets.

Reset Mode Comparison and Summary

Mode	Activation	Result	Purpose and Notes
Use factory boot code	Hold down the recessed **RESET** button while applying power to the unit. **NOTE:** After resetting to factory boot code, update the unit firmware to the latest version. Do not operate the unit firmware version that results from the factory boot code reset. If you want to use the factory default firmware, you must upload that version again (see **FIRMWARE tab** on page 30 for details on uploading firmware).	**The unit reverts to the factory default firmware.** All user files and settings, such as IP settings, are maintained. **NOTE:** If you do not want to update firmware, or you reset to factory boot code by mistake, cycle power to the unit to return to the firmware version that was running before the reset (see **About Page** on page 52 to find the firmware version).	Reset to factory boot code to return the unit to the factory default firmware version if incompatibility issues arise with user-loaded firmware.
Reset network settings	Hold the **RESET** button for approximately 6 seconds, until the RESET LED blinks twice (once at 3 seconds and again at 6 seconds). Then momentarily press **RESET** within 1 second.	**Resets all the IP settings without affecting the device configuration:** • Enables ARP capability. • Sets the IP address, subnet address, gateway address, and port mapping to the factory default. • Sets the Multicast IP, stream number and device name to the factory default. • Turns DHCP on. The RESET LED blinks three times in succession during the reset.	Enables you to set IP address information using ARP and the MAC address.
Full factory reset	Hold the **RESET** button for approximately 9 seconds, until the RESET LED blinks three times (once at 3 seconds, again at 6 seconds, and then again at 9 seconds). Then momentarily press **RESET** within 1 second. **NOTE:** The factory configured password on this device has been set to the device serial number. In the event of a full factory reset, the unit reverts the factory-configured username to admin and password to extron.	**Does everything Reset network settings does:** • Resets all settings with the exception of factory boot code. • Resets all IP options. • Removes all files from the unit. • Removes the initial serial number passwords and sets them to extron. The RESET LED blinks four times in succession during the reset.	Full factory reset is useful if you want to start over with configuration and uploading or to replace events. Same as the Esc ZQQQ← SIS command on page 59.

Performing Network Settings and Full Factory Resets

Perform resets of the unit as follows (see figure 8):

1. Use a small screwdriver to press and **hold** the rear panel **RESET** button until the rear panel RESET LED blinks either:
   - Twice, for an IP settings reset
   - Three times for an absolute (factory) reset

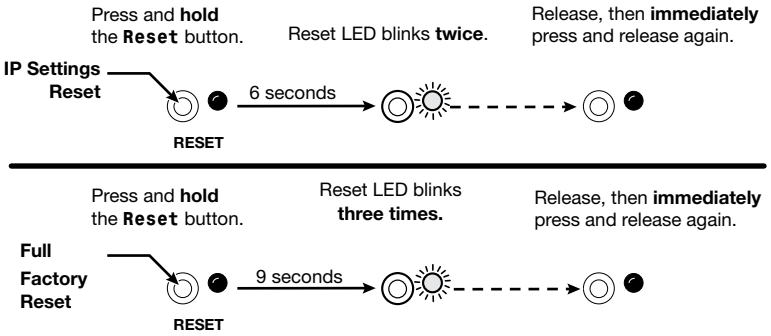


Figure 8. Resets

2. Release the **RESET** button and then immediately press and release the **RESET** button again. Nothing happens if you do not momentarily press **RESET** again within 1 second.

HTML Operation

This section introduces using the built-in HTML pages to configure and operate the NAV E 121 encoders, including:

- **Opening the Embedded HTML Pages**
- **Using the HTML Pages**

The encoder can be controlled and operated through either the front panel Configuration (USB) port (see **figure 7**, B on page 10) or the rear panel NAV 1G/PoE+ port (see **figure 2**, D on page 5). The Configuration port uses IP over USB technology. The factory-embedded HTML pages are always available and cannot be erased or overwritten.

Opening the Embedded HTML Pages

Access the encoder using HTML pages as follows:

1. Start the web browser.

NOTES:

- Extron recommends the following browsers to fully support the NAV system:
  - Google Chrome™ — All screen images in this guide use Chrome
  - Mozilla Firefox™
  - Microsoft Edge™
- The network must be properly configured for multicasting (IGMP). Failure to do so may result in degraded performance.

2. Click in the **Address** field of the browser and enter the IP address.

NOTES:

- For the NAV/PoE+ port, if unit does not receive an IP address from the DHCP server, it self-assigns a Link Local IP address in the range 169.254.*X*.*X*.
- **Default settings:**

Port	DHCP	IP address	Subnet mask
Config (USB)*		203.0.113.22	
NAV 1G/PoE+ (RJ-45)	On		

  * **For the Config port**, the address for IP over USB **CANNOT** be changed.
- If you use IP over USB, Extron recommends waiting a minute after plugging in the cable for your PC to identify the USB connection as a valid Ethernet port.

3. Press the keyboard <**Enter**> key.

NOTES:

- If you do not have the trusted SSL Certificate, the browser displays a privacy notification (see figure 9). Continue to the login dialog box as follows:
  1. Click the browser button that advances past the privacy notification (such as **Advanced** [❶] in Chrome). Explanatory text and a link appear.

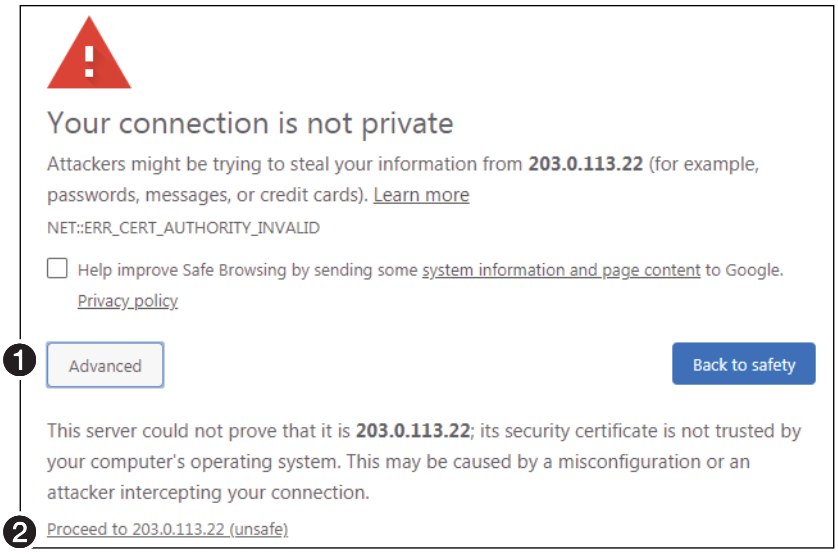


Figure 9. Privacy Notification, Chrome Browser

  2. Click **Proceed to <*IP address*> (unsafe)** (❷) (or similar message).

- Your IT department can provide an uploadable SSL Certificate (see **Toolbelt** on page 53). Once the certificate is loaded, the notification does not occur.

The browser opens to the **Login** dialog box (see figure 10).

Figure 10. Login Dialog Box

4. Enter the **Username** (see figure 10, ❶) and **Password** (❷) and click **SIGN IN** (❸). The browser opens the embedded encoder web pages (see **figure 11** on page 17).

NOTES:

- The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords revert to the default.
- The default username is **admin** and the default password is **extron**.
- Passwords are case sensitive.

NOTE: The HTML page may open with any of the panels (items ❷ through ❼ below) selected.

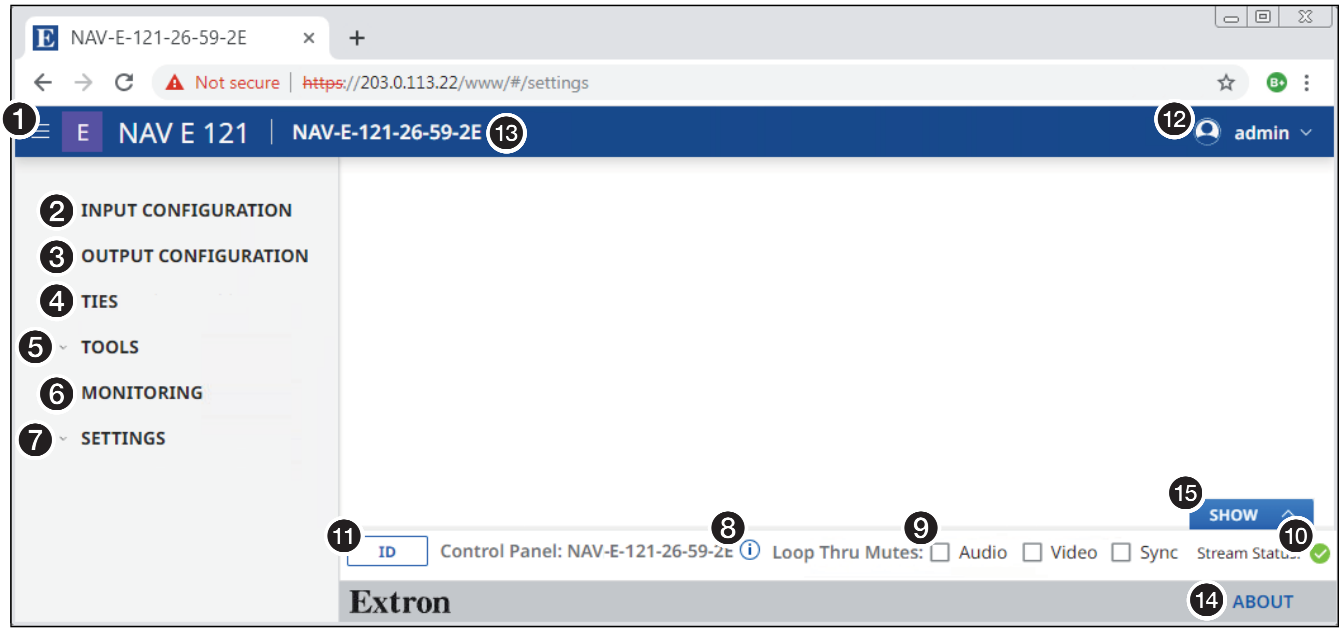


Figure 11. Home Page

See figure 11 and the detailed descriptions in **Using the HTML Pages** on page 18.

❶ **Menu icon**
❷ **INPUT CONFIGURATION link**
❸ **OUTPUT CONFIGURATION link**
❹ **TIES link**
❺ **TOOLS link**
❻ **MONITORING link**
❼ **SETTINGS link**
❽ **Control Panel Information indicator**
❾ **LOOP THRU MUTES panel**
❿ **Stream Status indicator**
⓫ **ID button**
⓬ **admin link**
⓭ **Name banner**
⓮ **About link**
⓯ **Show button**

Using the HTML Pages

See **figure 11** on page 17 and the following sections for detailed descriptions of the following pages or functions:

❶ **Menu icon** — Toggles to hide or show the links pane (items ❷ through ❼).

❷ **INPUT CONFIGURATION link** — Opens a page that provides input configuration information and the ability to change some input values (see **Input Configuration Page** on page 19).

❸ **OUTPUT CONFIGURATION link** — Opens a page that provides streaming output configuration information and the ability to change some output values (see **Output Configuration Page** on page 21).

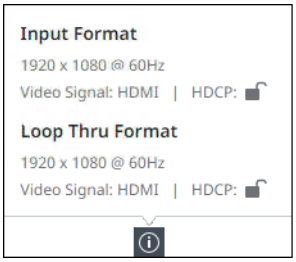
❹ **TIES link** — Opens a page that displays the status of the input to the encoder and the streaming output (see **Ties Page** on page 25).

❺ **TOOLS link** — Opens two pages that provide encoder and diagnostic tools (see **Tools Page** on page 26).

❻ **MONITORING link** — Opens a page that shows device status information (see **Monitoring Page** on page 34).

❼ **SETTINGS link** — Opens a page that provides access to many system settings (see **Settings Pages** on page 38).

❽ **Control Panel Information indicator** — Opens a dialog box that displays the format, resolution, and rate of the input and LOOP OUT output. Click anywhere outside the dialog box to close the box.



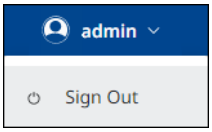
❾ **LOOP THRU MUTES panel** — Select (click) **`Audio`**, **`Video`**, or **`Sync`** to toggle the mute on (do not output) and off (output) for the associated plane.

NOTE: The mute function is for the LOOP OUT port output only (see Ⓑ on page 5). Video, audio, and sync are still streamed to the AV network.

❿ **Stream Status indicator** — Displays the AV stream output status of the encoder, active (), not active (), or error ().

⓫ **ID button** — Click to show the Status OSD on the LOOP OUT port (see Ⓑ) and light the front panel ID LED (see Ⓖ on page 13).

⓬ **admin link** — Click to display the **`Sign Out`** button. Click **`Sign Out`** to log out of the encoder HTML pages.



NOTES:

- The log in to the HTML pages automatically times out after 30 minutes of user inactivity.
- Signing out is disabled when the encoder is accessed via proxy from another device (see the **NOTE** on page 26).

⓭ **Name banner** — Displays the model name and hostname.

⓮ **About link** — Opens a pane that provides information about the encoder (see **About Page** on page 52).

⓯ **Show button** (see **figure 11** on page 17) — Opens a pane that displays the format, resolution, and rate of the input and LOOP OUT output. If Confidence Preview is enabled (see **Confidence Preview page** on page 51) the pane displays the confidence preview of the encoder (see figure 12, ❶). Click **Hide** (❷) to close the pane.

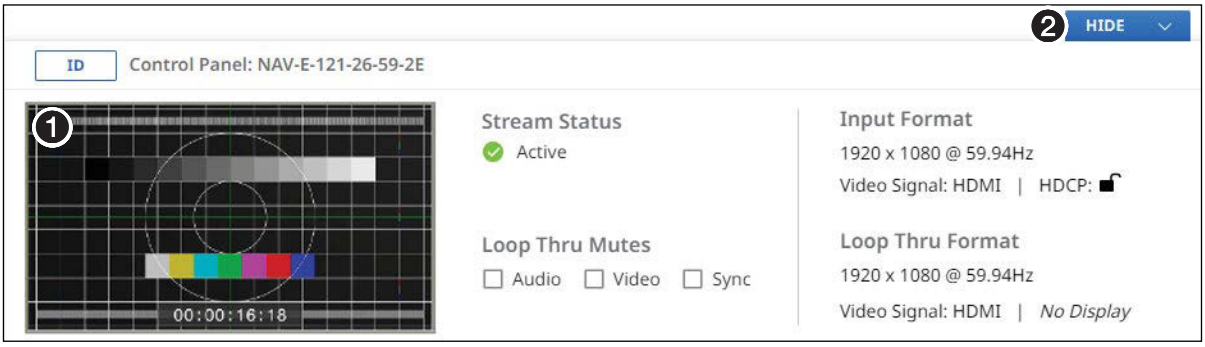


Figure 12. Show Pane

Input Configuration Page

Access the `Input Configuration` page (see figure 13) by clicking the link on the left side of the browser (❶). The browser displays the `Input Configuration` panel (❷).

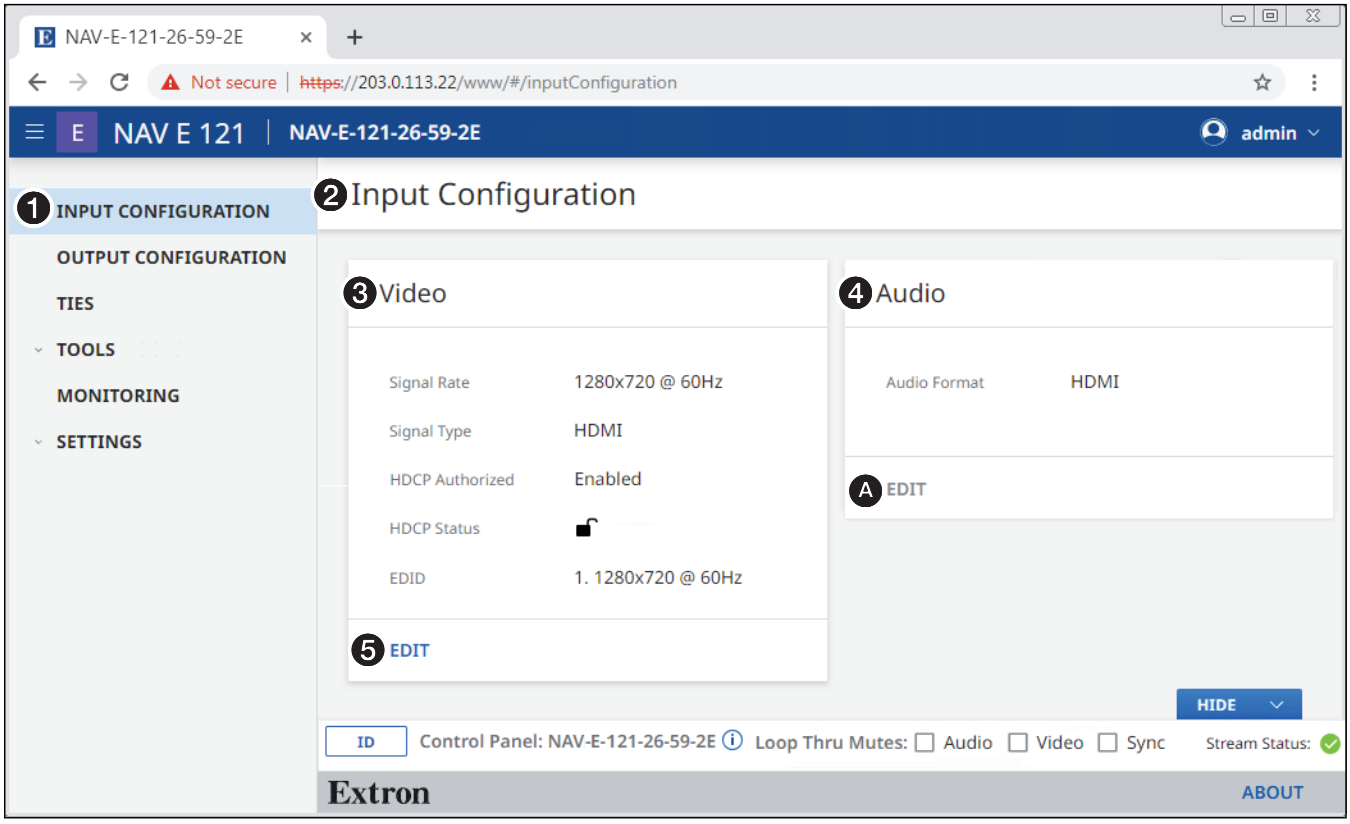


Figure 13. Input Configuration Page

The `Input Configuration` page consists of two read-only panes, `Video` (❸) and `Audio` (❹) that display the status of the input to the encoder.

The HDCP Authorized and EDID settings are accessible to change from the `Video` pane on the page. The selected pane opens (see **Video pane** on page 20).

NOTE: For the `Audio` pane, the `EDIT` button (Ⓐ) is not available for selection.

Video pane

If you change any of the settings in the **Video Input Configuration** dialog box (see figure 14, ❶ through ❹), the **SAVE** button (❺) becomes selectable. Click **SAVE** to take changes or **CANCEL** (❻) to abandon them. Clicking either button closes the dialog box.

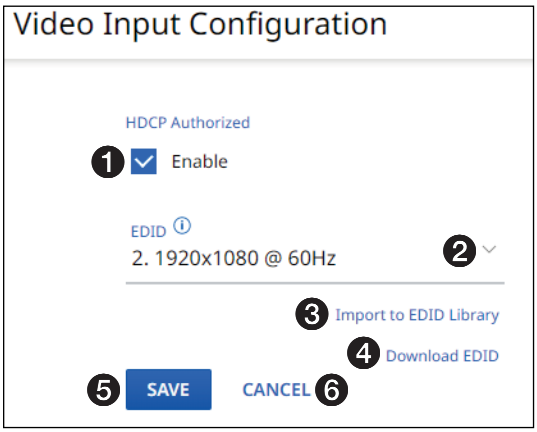


Figure 14. Video Input Configuration Dialog Box

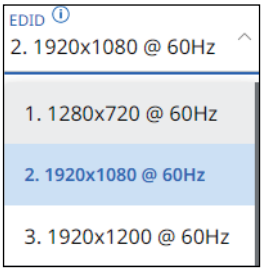
NOTE: **Import to EDID library** (❸) and **Download EID** (❹) are disabled when the encoder is accessed via proxy from another device (see the **NOTE** on page 26).

❶ **HDCP Authorized** — Click to toggle **HDCP Authorized** on and off. HDCP Authorized is used to determine if the HDMI input reports as an HDCP authorized sink to a source.

This helps with devices like Apple TV® that always encrypt the output even when not displaying HDCP content.

NOTE: When **HDCP Authorized** is selected the encoder communicates to the source device that it supports HDCP encrypted content. When deselected the encoder indicates that it does not support HDCP. If the source is unable to decrypt its output, the encoder generates a green screen.

❷ **EDID** — Click the drop-down list to select among the available EDIDs. When an EDID is selected, the encoder sends this information to the source, which adjusts its AV output to the EDID. The table below details the default encoder EDIDs. All EDIDs shown are HDMI format with 2-channel audio.



Slot	Resolution	Slot	Resolution
1	1280x720@60 Hz	5	3480x2160@60 Hz
2	**1920x1080@60 Hz***	6	Loop-thru monitor
3	1920x1200@60 Hz	7	Decoder output
4	3480x2160@30Hz	8	User EDID slot

*** Default**

❸ **Import to EDID Library** — Click to import a custom external EDID to the encoder EDID library, slot 8 if the EDID supplied by the encoder does not meet your needs.

❹ **Download EDID** — Click to download the currently-selected EDID to the connected computer to save it for use in other encoders. This feature is typically used when EDID slot 6 (loop-thru monitor) or 7 (decoder output) is selected to save the EDID from a connected display.

Output Configuration Page

Access the `Output Configuration` page (see figure 15) by clicking the link on the left side of the browser (❶). The browser displays the `Output Configuration` panel (❷).

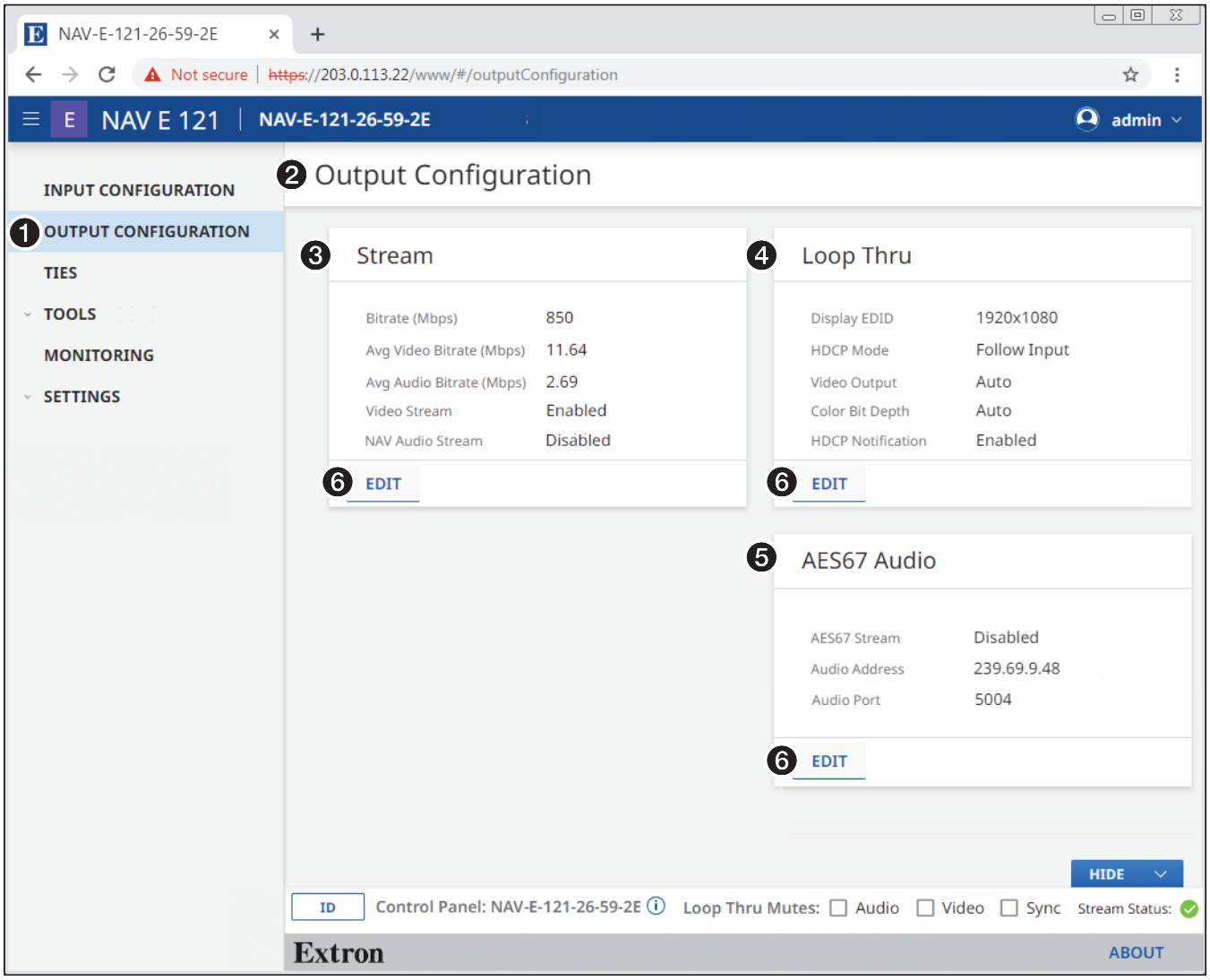


Figure 15. Output Configuration Page

The `Output Configuration` page consists of five panes, `Stream` (❸), `Loop Thru` (❹), and `AES67 Audio` (❺) that display the status of the streamed output.

Each pane has settings that can be changed by clicking the **`EDIT`** button (❻) in the appropriate pane. The selected dialog box opens (see **Stream pane** on page 22, **Loop Thru pane** on page 23, and **AES67 Audio** on page 24).

Stream pane

If you change any of the settings in the **Stream Configuration** dialog box (see figure 16, ❶ through ❸), the **SAVE** button (❹) becomes selectable. Click **SAVE** to take changes or **CANCEL** (❺) to abandon them. Clicking either button closes the dialog box.

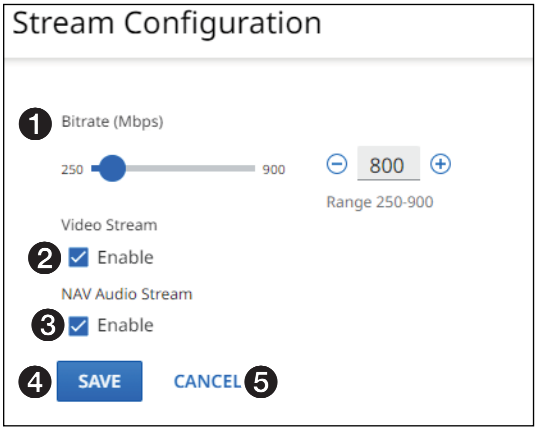


Figure 16. Stream Configuration Dialog Box

❶ **Bitrate** — Set the **Bitrate** in one of three ways:

NOTE: Extron recommends leaving the bitrate at the default setting, 850 Mbps. The bitrate is the rate at which the encoder transmits data. The bitrate affects the video image quality. Decreasing the bitrate lowers the quality, increasing the bitrate improves the quality.

- Click and drag the fader control.
- Click the ⊖ and ⊕ buttons.
- Directly type a rate into the field.

❷ **Video stream** — Click to toggle **Video Stream** on (stream video) and off (do not stream).

❸ **NAV Audio Stream** — Click to toggle **NAV Audio Stream** on (stream NAV audio) and off (do not stream).

Loop Thru pane

If you change any of the settings in the **Loop Thru Configuration** dialog box (see figure 17, ❶ through ❸), the **SAVE** button (❹) becomes selectable. Click **SAVE** to take changes or **CANCEL** (❺) to abandon them. Clicking either button closes the dialog box.

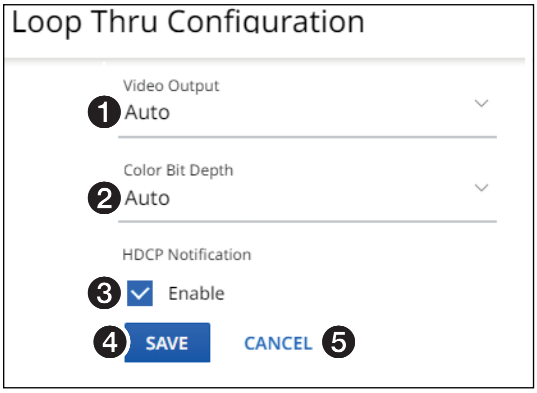
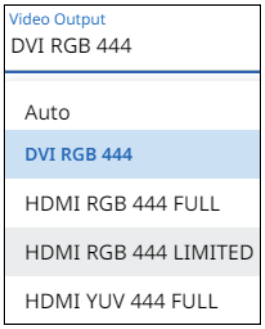


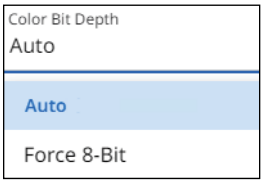
Figure 17. Loop Thru Pane

❶ **Video Output** — Click the drop-down list to select among the various output formats and colorspace for the LOOP OUT port (Ⓑ). The table below shows the available formats.



Format	Format
Auto (based on the EDID of the sink [**default**])	HDMI YUV 444 Full
DVI RGB 444	HDMI YUV 444 Limited
HDMI RGB 444 Full	HDMI YUV 422 Full
HDMI RGB 444 Limited	HDMI YUV 422 Limited

❷ **Color Bit Depth** — Click the drop-down list to select between the following two output formats for the LOOP OUT port (see Ⓑ on page 5).



- **Auto** — Adjusts color bit depth based on the display EDID (10 bit or 8 bit) (**default**).
- **Force 8-Bit** — Always uses 8 bit output.

❸ **HDCP Notification** — Click to toggle **HDCP Notification** on and off. This selection lets you select what is displayed on the HDMI output when the input signal contains HDCP-protected content and the output is a non-HDCP sink.

When **HDCP Notification** is checked, a green screen is generated to clearly indicate an HDCP issue has been encountered. When **HDCP Notification** is unchecked, a black screen is generated to discretely show there is an HDCP issue.

This feature has no effect on the functionality of HDCP. Extron recommends leaving **HDCP Notification** enabled to easily know when a HDCP issue has occurred.

AES67 Audio pane

If you enable or disable the AES67 stream (see figure 18, ❶) or change the audio address setting (❷) (either directly or by `RESET` (❸), the `SAVE` button (❹) becomes selectable. Click **`SAVE`** to take change or **`CANCEL`** (❺) to abandon it. Clicking either button closes the dialog box.

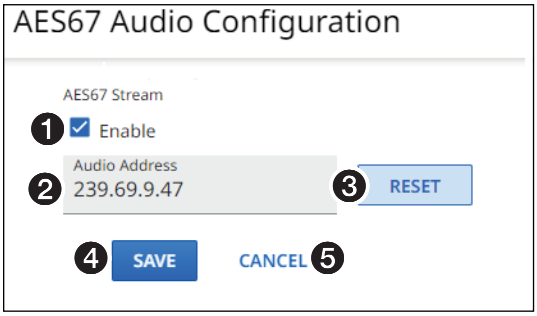


Figure 18. AES67 Pane

❶ **AES67 Stream Enable** — Select (click) or deselect the **`AES67`** checkbox to enable or disable AES67 audio streaming.

❷ **Audio Address** — Click in the **`Audio Address`** field and directly enter a new address as necessary.

❸ **RESET** — Click this button to return the `Audio Address` (❷) to the factory default value, `239.69.`*`xxx.xxx`* where the last two octets (*`xxx.xxx`*) are based on the encoder MAC address.

NOTE: The AES67 standard allows for interoperability among AES67 capable devices. Enabling AES67 audio allows the device to transmit an audio stream to a third-party AES67 capable receiver.

Ties Page

Access the `Ties` page (see figure 19) by clicking the link on the left side of the browser (❶). The browser displays the `Ties` panel (❷), which allows you to display AV ties and display and make USB ties.

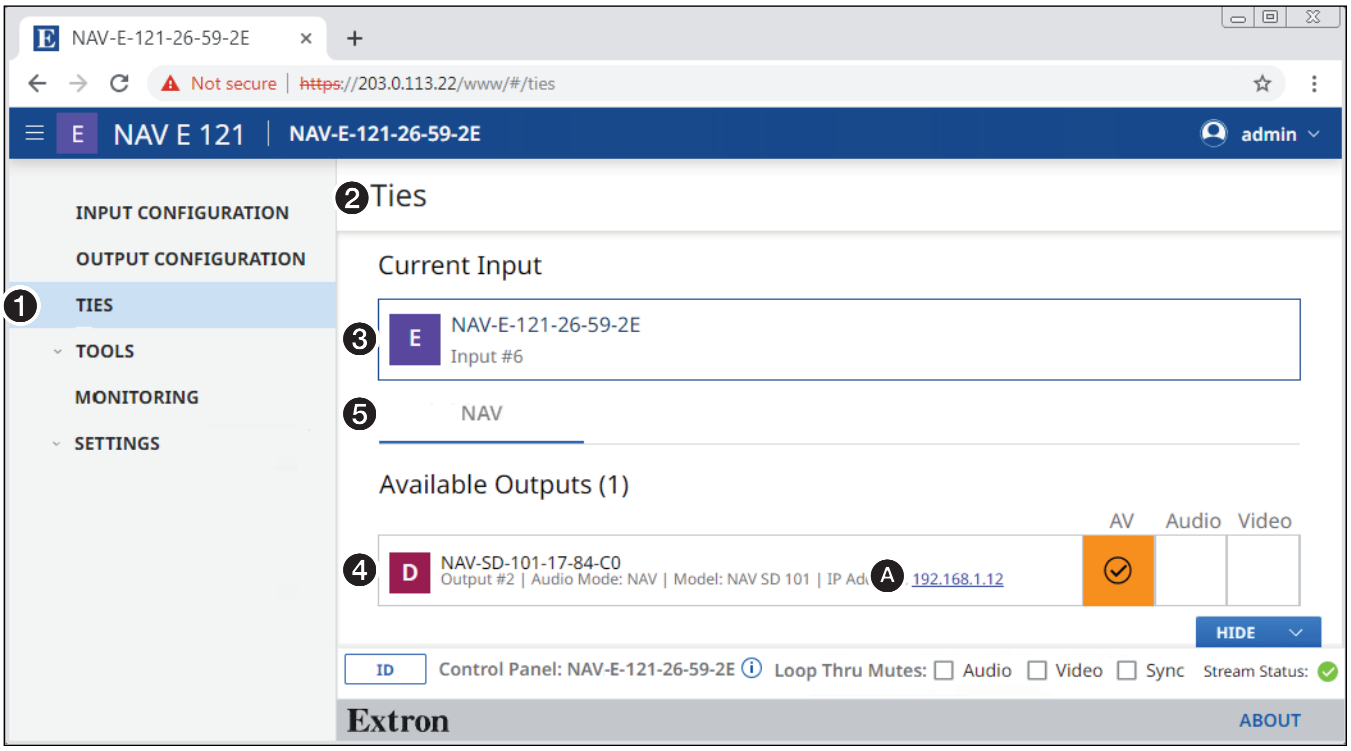


Figure 19. Ties Page

The `Ties` page consists of two panes, `Current Input` (❸) and `Available Outputs` (❹) that display the status of input and endpoints and tabs (❺) that allow you to tailor the ties shown.

NOTES:

- AV ties are read-only on this page.
- You can make and break ALL ties from the embedded HTML pages of a NAVigator or decoder (see the *NAVigator User Guide* or the applicable decoder user guide, available at **www.extron.com**, and the embedded HTML tie page for those devices).

Current Input pane

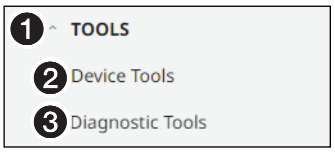
The `Current Input` pane displays the input number and name of the encoder.

Available Outputs pane

The `Available Outputs` pane (see **figure 19**, ❹ on page 25) displays the output number, audio mode, model, and IP address of all decoders available for tying to this encoder.

NOTE: Also on the `Ties` page, you can open an HTML page of a connected decoder. This is a direct page to the decoder, rather than a proxied endpoint as through a NAVigator. Click the **`IP Address`** link in the desired output (Ⓐ). The HTML page opens a new tab in the browser that is connected to the selected decoder. The decoder HTML page behaves as described in the guide for the decoder (see the applicable decoder guide available at **www.extron.com**).

Tools Pages



The `Tools` pages provide tools for the encoder (`Device Tools`) and tools for diagnosing communications (`Diagnostic Tools`). To access the `Settings` pages, if necessary, click the **`Menu`** link (see **figure 11**, ❶ on page 17). Click **`TOOLS`** (see ❶ at right) and either **`Device Tools`** (❷) or **`Diagnostic Tools`** (❸). The browser displays the selected `Tools` page (see figure 20, which shows the `Device Tools` page selected).

Device Tools page

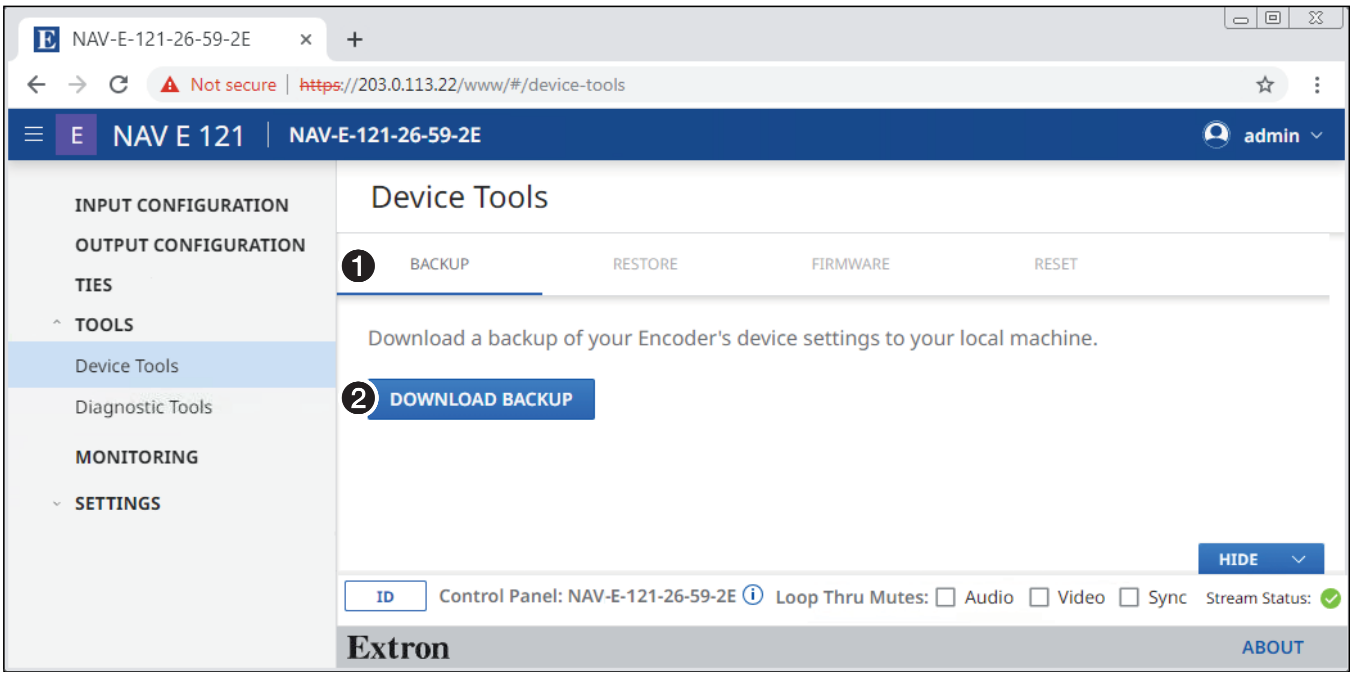


Figure 20. Device Tools Page

The `Device Tools` page consists of four tabs (see figure 20, ❶): `BACKUP` (see **BACKUP tab** on page 27) `RESTORE` (see **RESTORE tab** on page 28), `FIRMWARE` (see **FIRMWARE tab** on page 30) and `RESET` (see **RESET tab** on page 31) that provide encoder tools.

NOTE: System backup, restore, firmware update, and reset are available from the NAVigator (see the *Navigator User Guide*, available at **www.extron.com**).

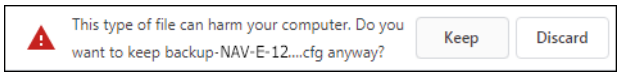
BACKUP tab

Backup the encoder settings as follows:

NOTE: Backup is disabled when the encoder is accessed via proxy from the NAVigator.

1. On the `Device Tools` page, click **`BACKUP`** (see **figure 20**, ❶ on page 26).
2. Click **`DOWNLOAD BACKUP`** (❷).

   The encoder creates a file of current settings and, depending on your browser, may prompt you to confirm that you want to save them.



   NOTE: Unless otherwise directed, the encoder backup file goes to the `Downloads` folder of the connected PC.

3. Click **`Keep`** to save the file to the `Downloads` folder or **`Discard`** as desired.

RESTORE tab

Restore the encoder settings as follows:

NOTE: Restore is disabled when the encoder is accessed via proxy from the NAVigator.

1. On the `Device Tools` page, click **`RESTORE`** (see figure 21, ❶).
2. Click **`SELECT FILE`** (❷).

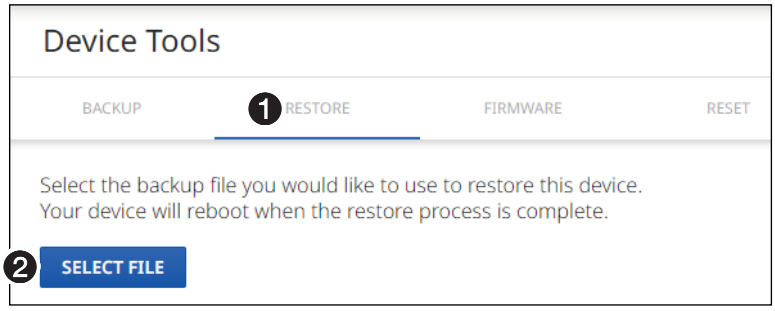


Figure 21. Tools — Restore Function

An `Open` dialog box opens (see figure 22).

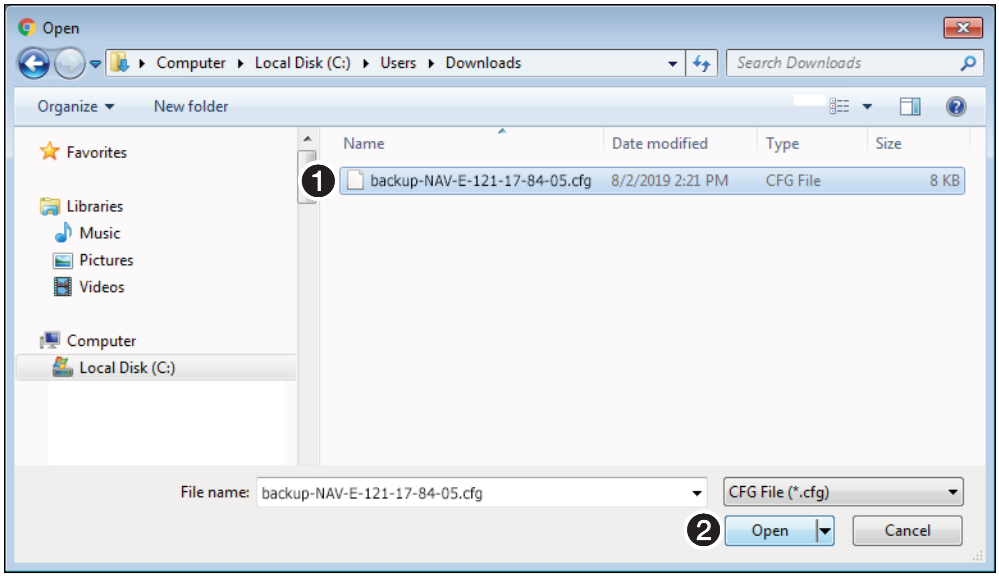


Figure 22. Open Dialog Box

3. Navigate to the folder where the `Restore` file is saved (typically the `Downloads` folder) (see figure 22, ❶). Select the file.
4. Click **`Open`** (❷). The `Tools` page returns to the top (see **figure 23** on page 29).

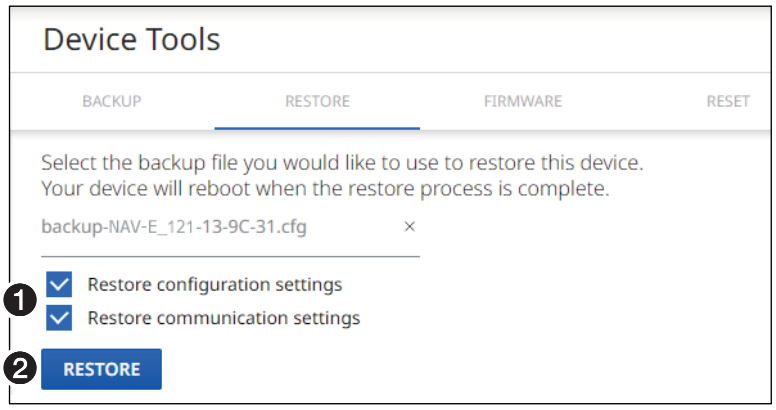


Figure 23. Tools — Restore Function, Steps 5 and 6

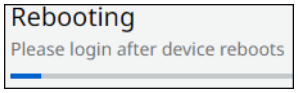
5. Select (click) the settings to restore (**`Configuration`**, **`Communication`**, or both; see figure 23, ❶).

Communication settings	Configuration settings	
• **Settings > General >** Device Details (name)	• **Settings > General** > Device Details (location)	• **Output Config. >** Stream
• **Settings > Networking >** Network Connection	• **Settings > General** > Date and Time	• **Output Config. >** Loop Thru
	• **Settings >** Advanced	• **Output Config >** AES67 Audio
	• **Input Config. >** Video	
	• **Input Config. >** Audio	

NOTE: Account password and custom image file are not backed up.

6. Click **`RESTORE`** (❷).

The encoder reports that it is **`Rebooting`** and displays a status bar that shows the progress of the Restore operation. When the operation completes, the encoder reboots.



NOTE: You must reconnect to the encoder (see **Opening the Embedded HTML Pages** on page 15) if you have additional operations to perform.

FIRMWARE tab

Upgrade the encoder firmware as follows:

NOTES:

- Firmware upgrade is disabled when the encoder is accessed via proxy from the NAVigator.
- Upgrading the encoder firmware results in the unit rebooting.
- Valid firmware files have the **.eff** file extension. Any other file extension is not a valid firmware update.

1. On the `Device Tools` page, click **`FIRMWARE`** (see figure 24, ❶).

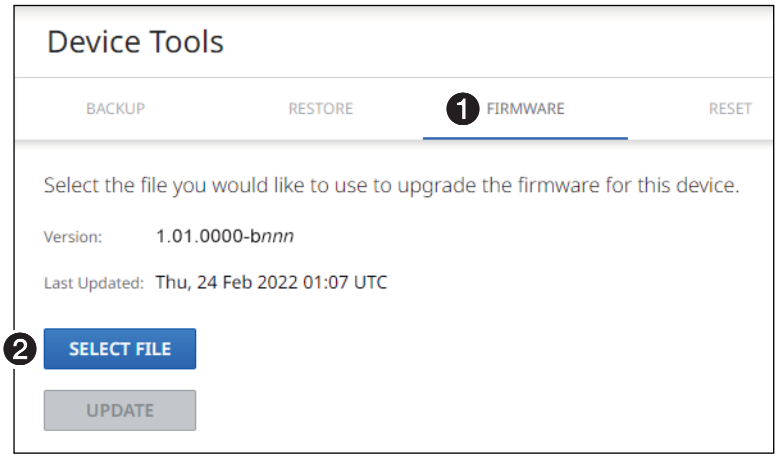


Figure 24. Tools — Firmware Function

2. Click **`SELECT FILE`** (❷). An `Open` dialog box opens (see figure 25).

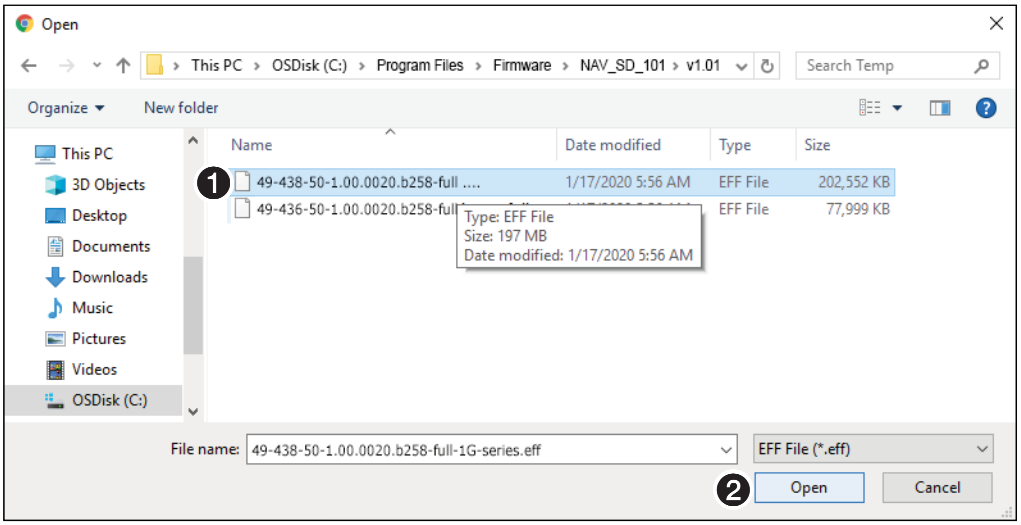


Figure 25. Open Dialog Box

3. Navigate to the folder where you saved the firmware upgrade file (see figure 25, ❶) and select the file.
4. Click **`Open`** (❷). The `Open` dialog box closes and the `Tools` pane returns to the top, with the selected firmware file identified (see **figure 26**, ❶ on page 31).

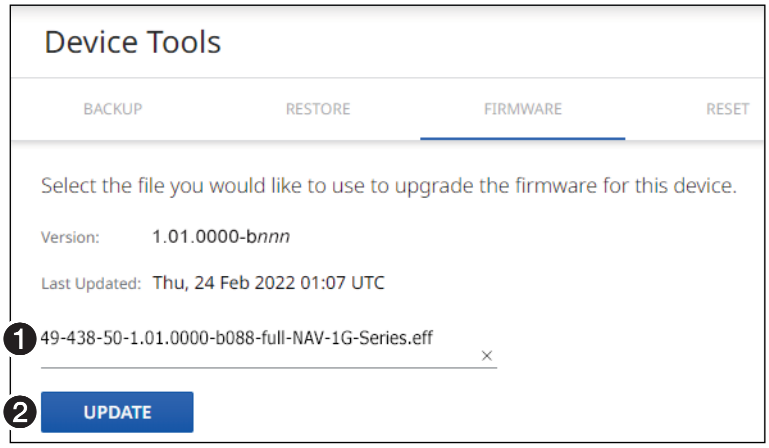


Figure 26. Device Pane with Firmware File Identified

5. Click **UPDATE** (❷).

   The encoder page displays a sequence that reports the progress as it uploads the file (see figure 27, ❶), updates the firmware (❷), and then reboots (❸).

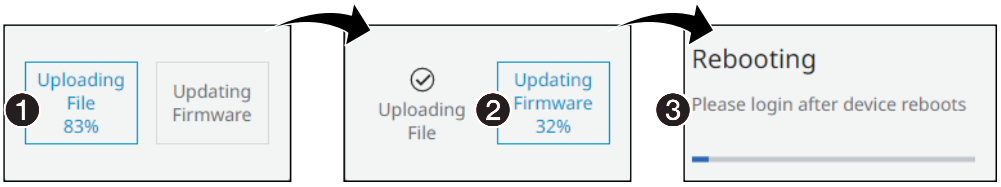


Figure 27. Firmware Upload Progress

When the encoder reboots, the connection to it is momentarily lost and after a few seconds, the browser displays the home page `Login` dialog box (see **figure 11** on page 16). To continue to operate the encoder, you must reconnect (see **Opening the Embedded HTML Pages** on page 15).

RESET tab

Reset or reboot the encoder as follows:

1. On the `Device Tools` page, click **RESET** (see figure 28, ❶).

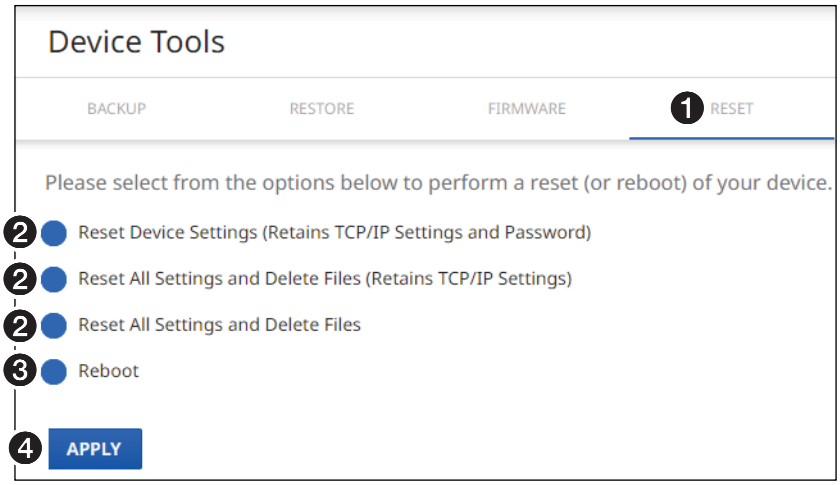


Figure 28. Tools — Reset Function

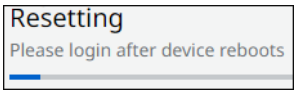
2. Select (click) a reset level (see **figure 28**, ❷ on page 31) or **Reboot** (❸).

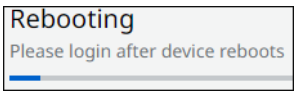
NOTES:

- **Reset Device Settings (Retains TCP/IP Settings and Password)** — Resets configuration settings. All communication settings and the password are retained. See the **table** of communication and configuration settings on page 29.
- **Reset All Settings and Delete Files (Retains TCP/IP Settings)** — Resets configuration settings **except** the communication settings, which are maintained. Resets the password to the default, which is **extron**. See the **table** of communication and configuration settings.
- **Reset All Settings and Delete Files** — This reset is identical to the Full Factory reset (see the **table** of rear panel reset modes on page 13), which resets all settings to factory defaults.

3. Click **APPLY** (❹).

The encoder reports that it is **Resetting** and **Rebooting** and displays a status bar that shows the progress of the operation. Any of these operations concludes with the encoder rebooting.





NOTE: You must reconnect to the encoder (see **Opening the Embedded HTML Pages** on page 15) if you have additional operations to perform.

Diagnostic Tools page

The **Diagnostic Tools** page (see figure 29) provides tools to troubleshoot the connection to other units on the NAV network. Access the page as follows:

1. Click the **TOOLS** > **Diagnostic Tools** link on the left side of the browser (❶). The browser displays the **Diagnostic Tools** page.

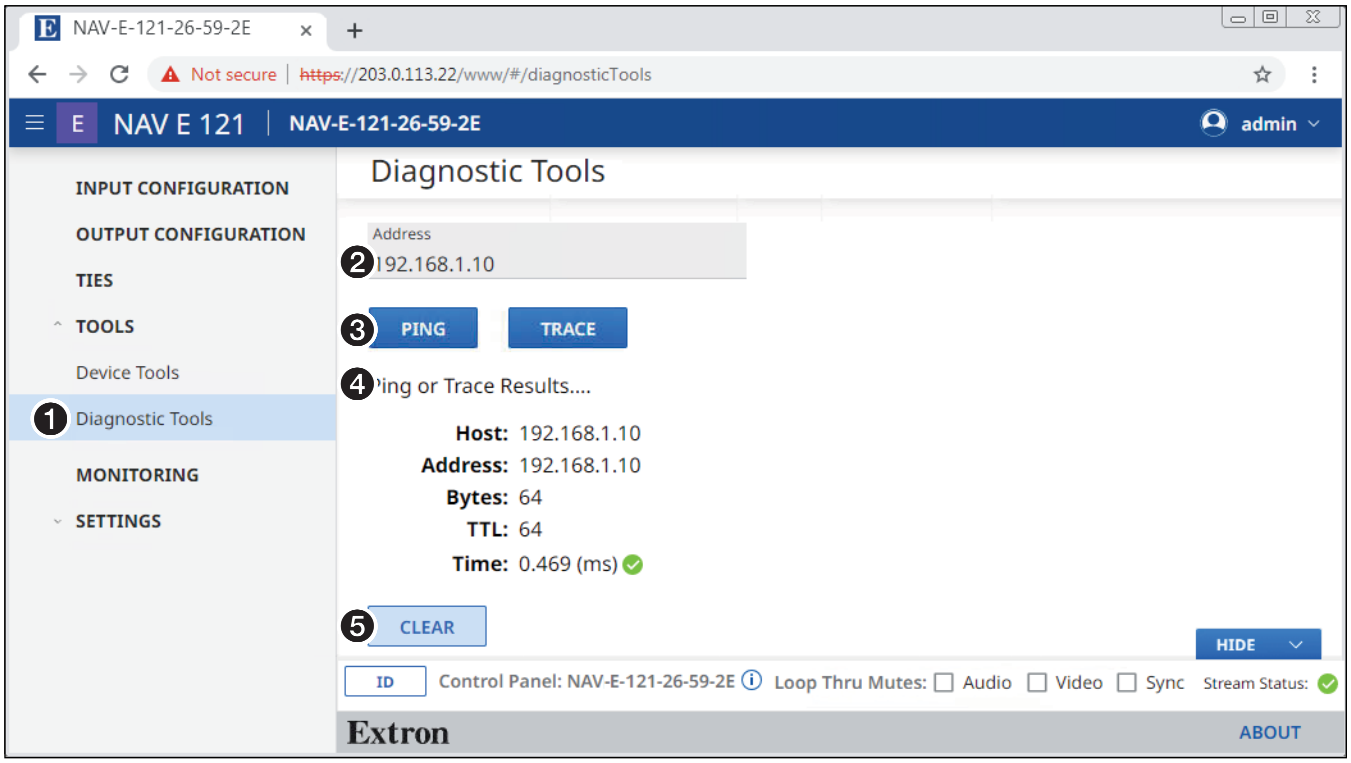


Figure 29. Diagnostic Tools Page, Ping Results Shown

2. Click in the **Address** field and type in the IP address of another unit on the network (❷).
3. Click either **PING** or **TRACE** (❸), depending on the diagnostic you want to run.

NOTES:

- **Ping** — Tests the connection to another unit on the network. Figure 29, ❹ shows the typical results of a Ping diagnostic. If you see the message `Ping to Host Address has Timed Out...`, contact your system administrator to troubleshoot.
- **Trace** — Traces the network route taken by a packet from source to destination and displays the network packet path as it traverses the network. If a trace is not fully successful, the diagnostic displays where the packet was last successful before it stopped and can no longer communicate to the next hop.

  Figure 30 shows the typical results of a Trace diagnostic.

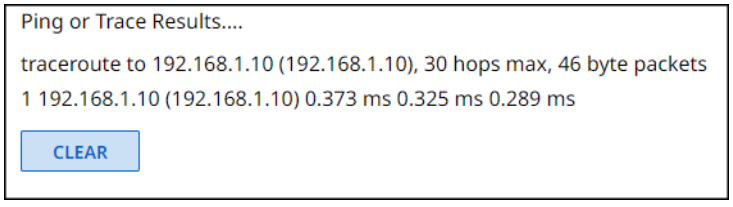


Figure 30. Trace Results Shown

4. Click **CLEAR** (❺) to reset the **Address** field if you want to run another diagnostic.

Monitoring Page

Access the **Monitoring** page (see figure 31) by clicking the link on the left side of the browser (❶). The browser displays the **Monitoring** page (❷), which shows device status information.

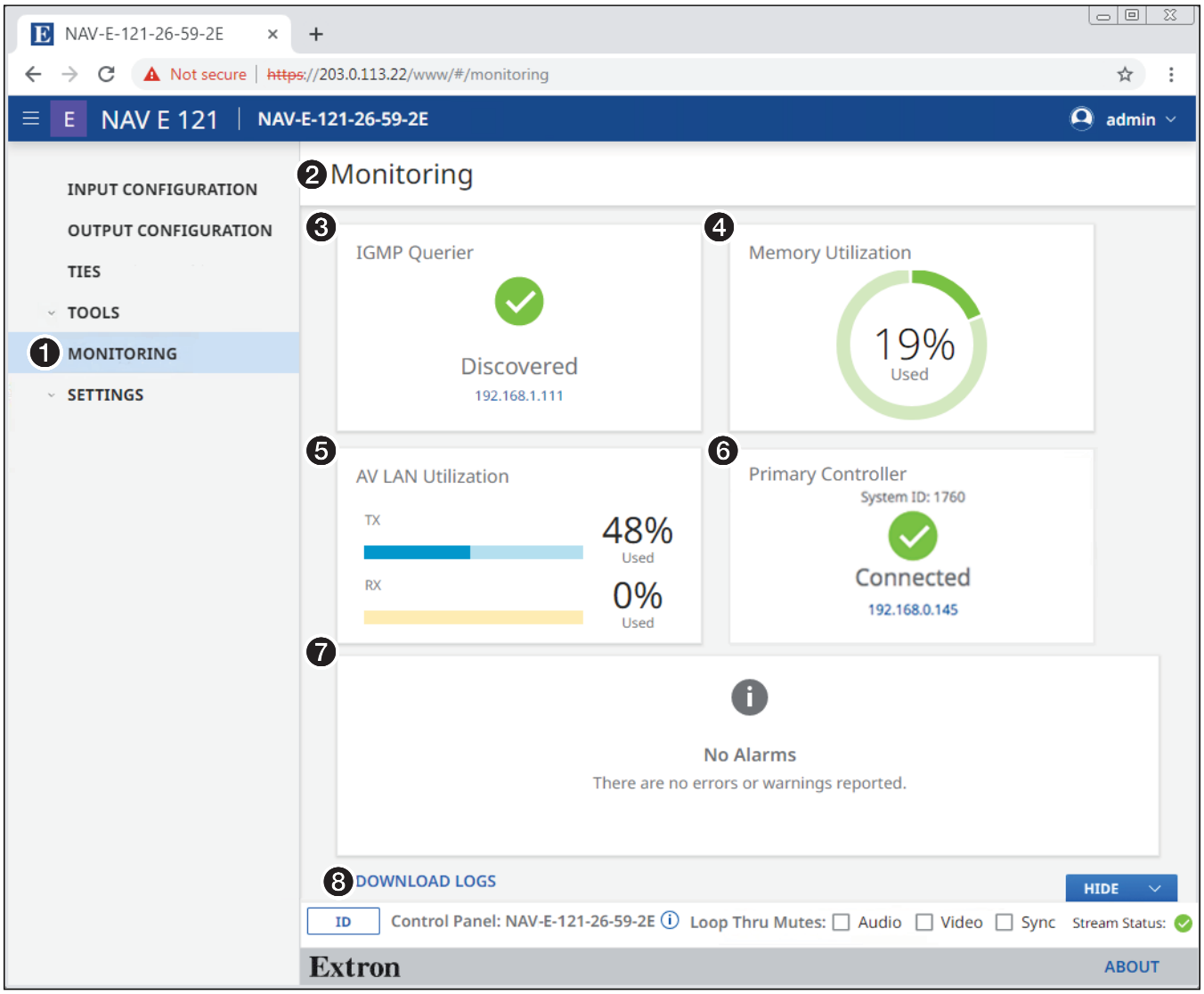


Figure 31. Monitoring Page

❸ **IGMP Querier pane** — See **IGMP Querier pane** on page 35.

❹ **Memory Utilization** — Indicates encoder memory usage, expressed in percent.

❺ **AV LAN Utilization** — Indicates the total bandwidth usage at that moment. The encoder generates an alarm if the utilization goes above 90%. The alarm clears automatically once the level drops below 90%.

NOTE: The encoder normally uses far more Tx than Rx bandwidth.

❻ **Primary Controller pane** — See **Primary Controller** pane on page 35.

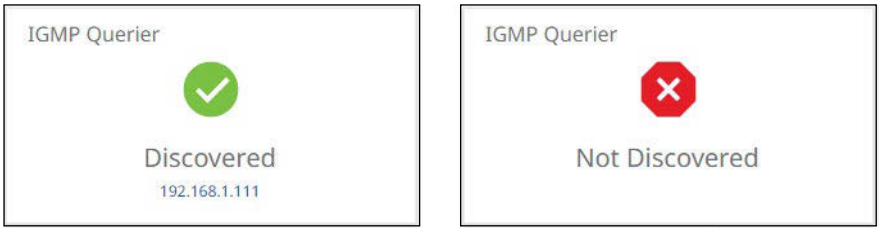
❼ **Alarms pane** — See **Alarms pane** on page 36.

❽ **Download Logs link** — See **Download Logs link** on page 37.

IGMP Querier pane

An IGMP querier is a network service, usually running on a network switch, that can initiate IGMP queries. An IGMP querier should be configured on the NAV network. It manages the multicast traffic. If there is no IGMP querier on the network, there is no effective multicast traffic management and the multicast traffic saturates the network and stream and communication errors can occur.

The `IGMP Querier` pane (see **figure 31**, ❸ on page 34) shows whether or not an IGMP querying device is present on the network, and the IP address of the IGMP querier. Figure 32 shows the normal indication and if no IGMP querier is present on the network.

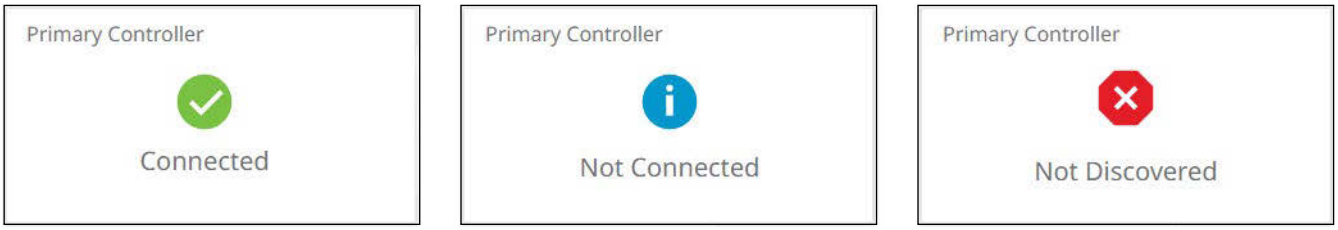


IGMP Querier Discovered **IGMP Querier Not Discovered**

Figure 32. IGMP Querier Pane Indications

Primary Controller pane

The `Primary Controller` pane (see **figure 31, ❻**) shows whether or not an Extron control processor, such as an IPCP Pro xi Control Processor, is paired with the NAV device, and the IP address of the device if present. Figure 33 shows the normal indication and if no primary controller is present on the network available or the endpoint is not connected to any controller.



Primary Controller Normal Indication **Primary Controller Not Connected** **Primary Controller Not Discovered**

Figure 33. Primary Controller Pane Indications

Alarms pane

The **Alarms** pane (see **figure 31, ❼** on page 34) shows any current alarms. Figure 34 shows the pane when alarm indications are present (see **Alarms** on page 63).

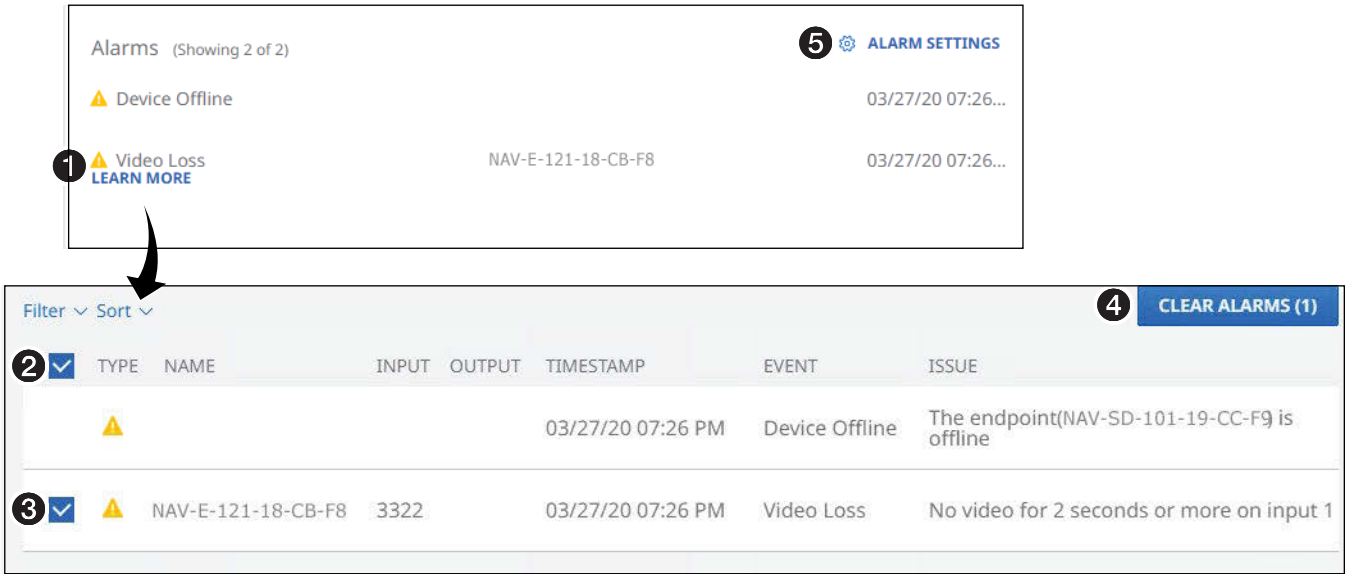


Figure 34. Clearing Alarms

NOTES:

- Critical alarms (⊗) should be resolved immediately.
- Warning alarms (⚠) are less serious.

Manually clear one or more alarms from the system as follows:

1. Click **LEARN MORE** (see figure 34, ❶).
2. Click the **All** checkbox (❷) or individual endpoint checkboxes (❸) to select one or more alarms to clear.
3. Click **CLEAR ALARMS** (❹) to clear this alarm.

Configure which alarms are and are not reported in this field as follows:

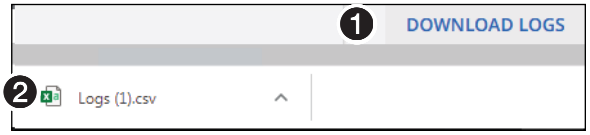
1. Click **ALARM SETTINGS** (see **figure 34**, ❺ on page 36). The `Edit Alarms Settings` dialog box opens (see figure 35).

Figure 35. Edit Alarm Settings Dialog Box

2. Click the **STATUS** switch (❶) to enable ( ) and disable ( ) alarm reporting.
3. Click **SAVE** (❷) to make the changes or **CANCEL** (❸) to abandon them.

Download Logs

Click the **DOWNLOAD LOGS** link (see ❶ at right) to download a history of errors in a comma-delimited `.csv` file that can be opened in Microsoft Excel. The figure at right shows the results of downloading an alarms log using the Chrome browser (❷).

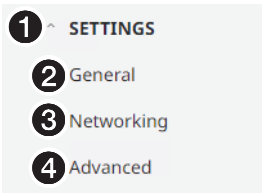


NOTES:

- Logs are a diagnostic tool that assists in troubleshooting or debugging. NAV devices log system changes that occur and time stamp each entry to assist in tracking the sequence of events that lead up to an issue. Logs can be reviewed to better understand the cause of failure.
- There is no upper limit to the number of alarms that can be logged, but a device can only have one alarm of the same type active at a time. The encoder monitors the active alarm states of all devices in the NAV system. All alarm state changes are logged even if status reporting is disabled from the encoder.

Settings Pages

The **Settings** pages provide access to many system settings grouped as **General**, **Networking**, and **Advanced**. To access the **Settings** pages, if necessary, click the **Menu** link (see **figure 11,** ❶ on page 17). Click **SETTINGS** (see ❶ in the illustration at right) and select among **General** (❷), **Networking** (❸), or **Advanced** (❹). The browser displays the **Device Settings** page (❶) with the selected group of settings open (see figure 36, which shows the **General** group page (❷) selected).



General page

Click the down arrow (❶) to open a drop-down list (see **Device Details page** on page 39, **Date & Time page** on page 41, or **Username/Password page** on page 43).

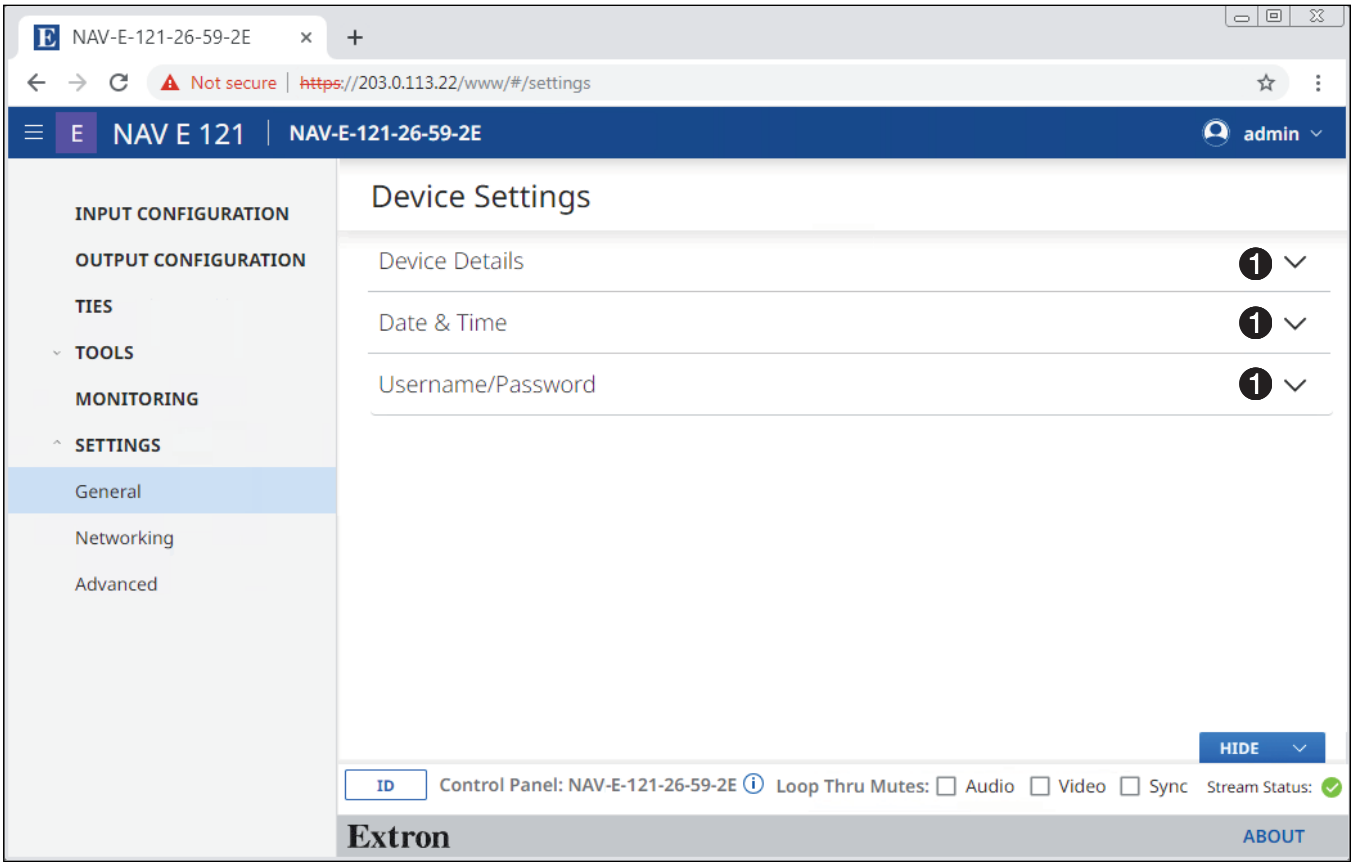


Figure 36. General Settings Page

Device Details page

The `Device Details` selection on the `General Settings` page (see **figure 36** on page 38) opens a read-only pane that shows general information unique to the encoder (see figure 37). The `Device Name`, `Input Number`, and `Location` can be edited by clicking the **`EDIT`** button (❶). An editable version of the selection opens (see **figure 38** on page 40).

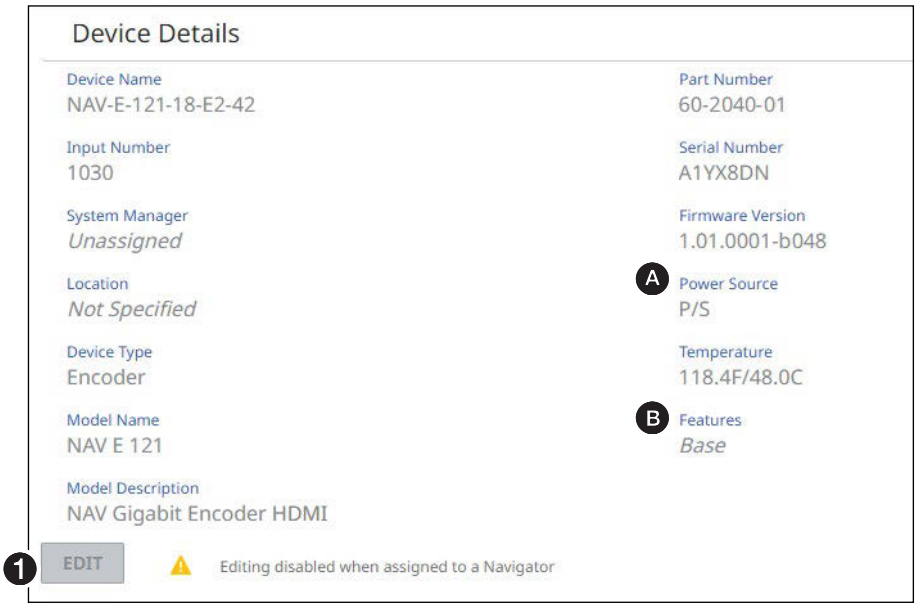


Figure 37. Device Details Selection

NOTES:

- Editing of `Device Detail` settings is disabled and the `EDIT` button is unavailable for selection when the encoder is assigned to a NAVigator.
  - Special characters, which are not allowed in tags, names, and locations, are as follows: ! ~ ` @ # $ % ^ & * ( ) _ + = { } [ ] |\ : ; “ ‘ < > , . ? and / . A hyphen (–) is not a special character.
  - Tags, names, and locations each have a 63-character limit.

Tag Rules	Name Rules	Location Rules

• Cannot begin or end with a hyphen.
• Cannot begin with a space.
  • Spaces are allowed after the first character.
• Multiple tags are allowed, making filtering, sorting, and searching easier.
	• Must begin with a letter.
	• Cannot end with a hyphen.
	• Spaces are not allowed.
		• Must begin with a letter.
		• Cannot end with a hyphen.
		  • Hyphens are allowed in any other position.
		• Cannot begin with a space.
		  • Spaces are allowed after the first character.

- The read-only `Power Source` datum (Ⓐ) indicates the power source of the encoder: `P/S` (power supply) or `PoE`.
- The read-only `Features` datum (Ⓑ) indicates the configuration of the encoder: `USB & Eth Extension` or `Base`

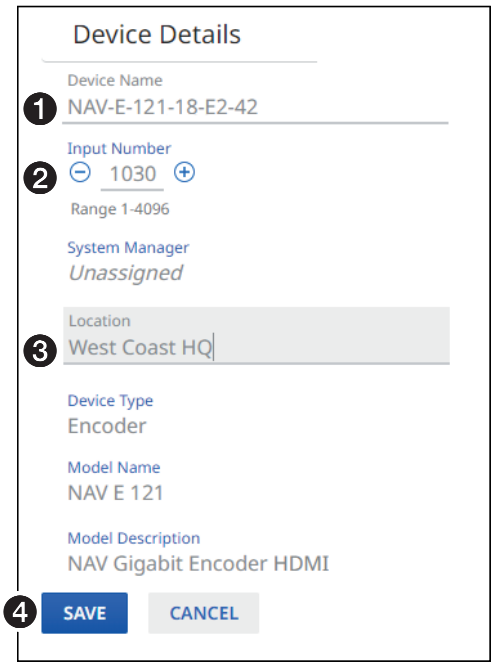


Figure 38. Editable Device Details Pane

❶ **Device Name** — Click in this field and type in a device name of your choice.

> **NOTE:** The `Device Name` is also the "hostname."

❷ **Input Number** — Click the ⊖ and ⊕ buttons or type a number into the field to overwrite the factory default input number, which is automatically generated in the range from 1 to 4096.

❸ **Location** — Click in this field and type in a location to customize your system.

❹ **SAVE and CANCEL buttons** — Click **`SAVE`** to take `Device Details` changes or **`CANCEL`** to abandon them. Clicking either button closes the editable pane.

Date & Time page

The `Date & Time` selection on the `General Settings` page (see **figure 36** on page 38) opens a read-only pane that shows date and time settings (see figure 39). Click **`SET MANUALLY`** (❶) and **`SYNC WITH SERVER`** (❷) to switch between the views applicable to each selection. The date and time can be edited by clicking the **`EDIT`** button (❸). An editable pane opens (see "Set time manually" and figure 40 and **Sync time with server** and figure 42 on page 42).

NOTE: Editing of these settings is disabled and the `EDIT` button is unavailable for selection when the encoder is assigned to a NAVigator.

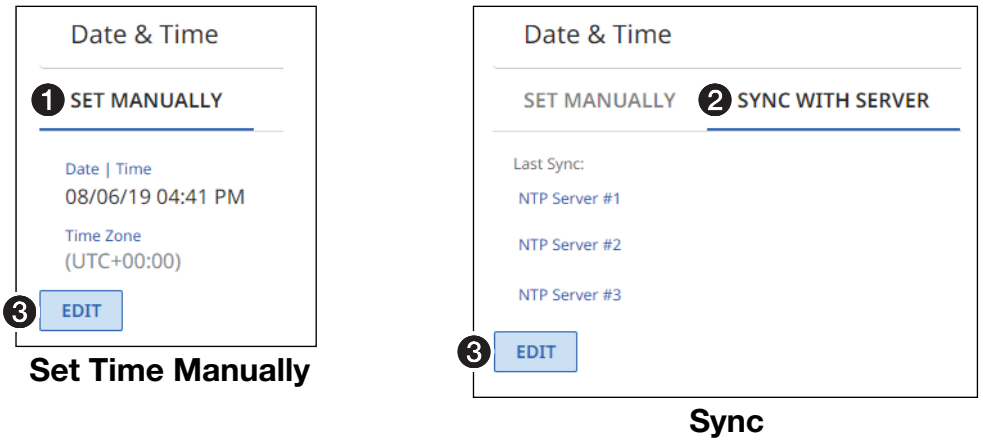


Figure 39. Date & Time Selection

Set time manually —

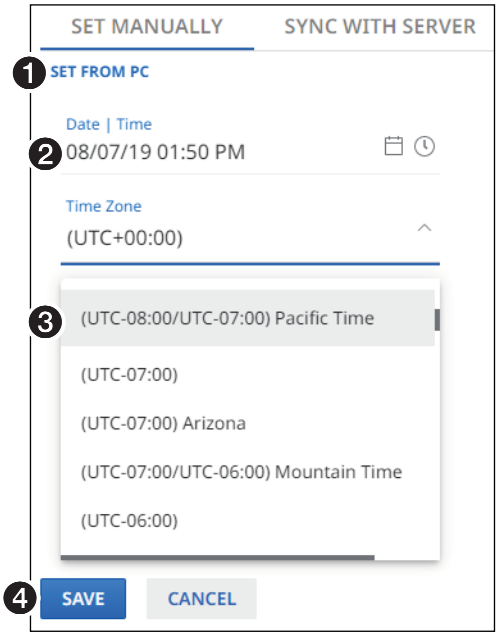


Figure 40. Set Time Manually

❶ **Set from PC** — Click this link to sync the encoder date and time to the computer with which you are connected.

❷ **Date & Time** — Click in this field and type in the date and time.

❸ **Time Zone** — Click the drop-down list to select the offset from Greenwich Mean Time (GMT).

❹ **SAVE and CANCEL buttons** (see **figure 40** on page 41) — Click **SAVE** to take Date & Time changes or **CANCEL** to abandon them. Clicking either button closes the editable pane.

NOTE: Or you can click the **Datepicker** (📅) or **Timepicker** (🕒) icons (see **figure 40**) and use those tools to set the date and time (see figure 41).

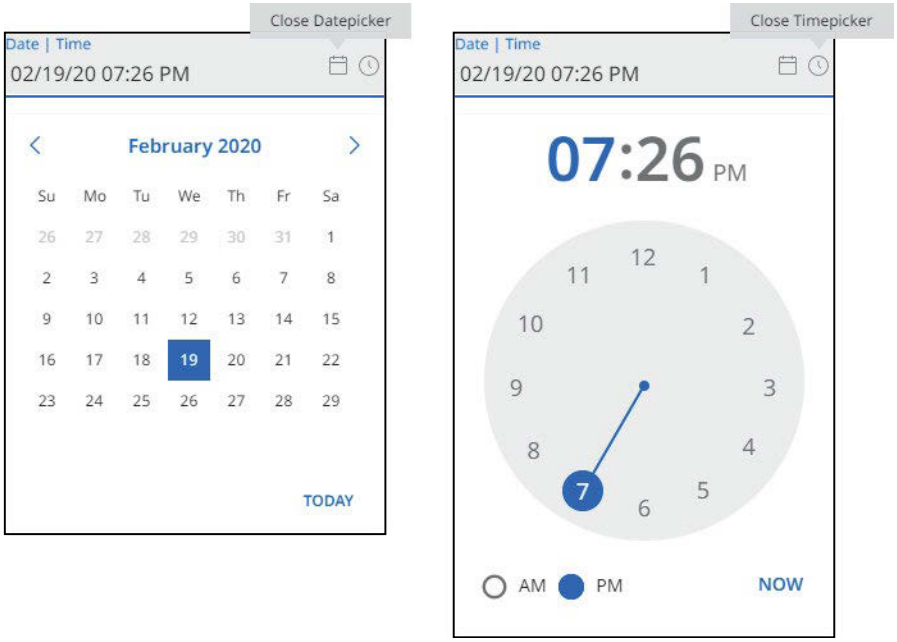


Figure 41. Using Datepicker and Timepicker Tools

Sync time with server —

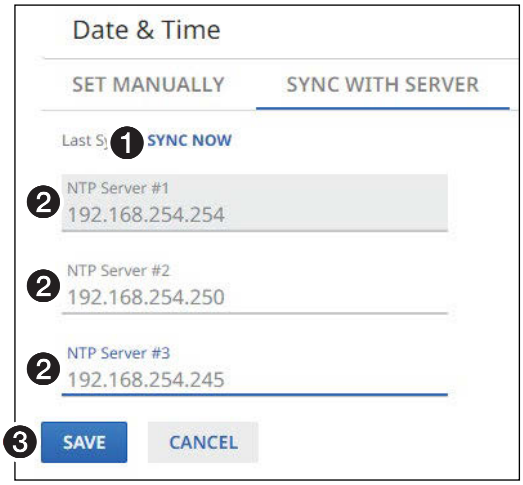


Figure 42. Sync Time with Server

❶ **SYNC NOW** — Click to force the encoder to sync its internal clock to an NTP server.

❷ **NTP server** — Click in these fields and type in the IP address or DNS name of an NTP server.

❸ **SAVE and CANCEL buttons** — Click **SAVE** to take Date & Time changes or **CANCEL** to abandon them. Clicking either button closes the editable pane.

Username/Password page

The `Username/Password` selection on the `General Settings` page (see **figure 36** on page 38) opens a read-only pane that shows the credentials of the encoder (see figure 43). The `Password` can be edited by clicking the **`EDIT`** button (❶). An editable version of the selection opens (see figure 44).

NOTES:

- Editing of these settings is disabled and the `EDIT` button is unavailable for selection when the encoder is assigned to a NAVigator.
- Any devices assigned to the NAVigator inherit the password of that NAVigator.

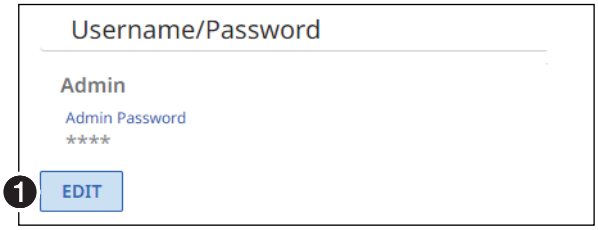


Figure 43. Username/Password Selection

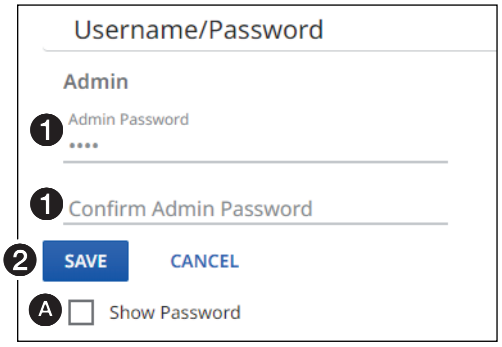


Figure 44. Editable Username/Password Selection

❶ **Password and Confirm Password** — Click in these fields and type in valid password values to enter the appropriate values for your encoder.

NOTES:

- A valid password meets the following requirements:
  - The length is up to 64 characters.
  - All alphanumeric characters and ASCII symbols are permitted except | (pipe).
  - The password cannot be blank.
  - The password cannot start with a space.
- The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords revert to the default.
- The default username is `admin` and the default password is `extron`.

TIP: Select (click) the **`Show Password`** checkbox (Ⓐ) to display the password as you type it.

❷ **SAVE and CANCEL buttons** — Click **`SAVE`** (❷) to take `Password` change or **`CANCEL`** to abandon it. Clicking either button closes the editable pane.

Networking page

On the `Networking Settings` page (see figure 45), click the down arrow (❶) to open a drop-down list (see **Network Connection page** on page 45 or **Port page** on page 47).

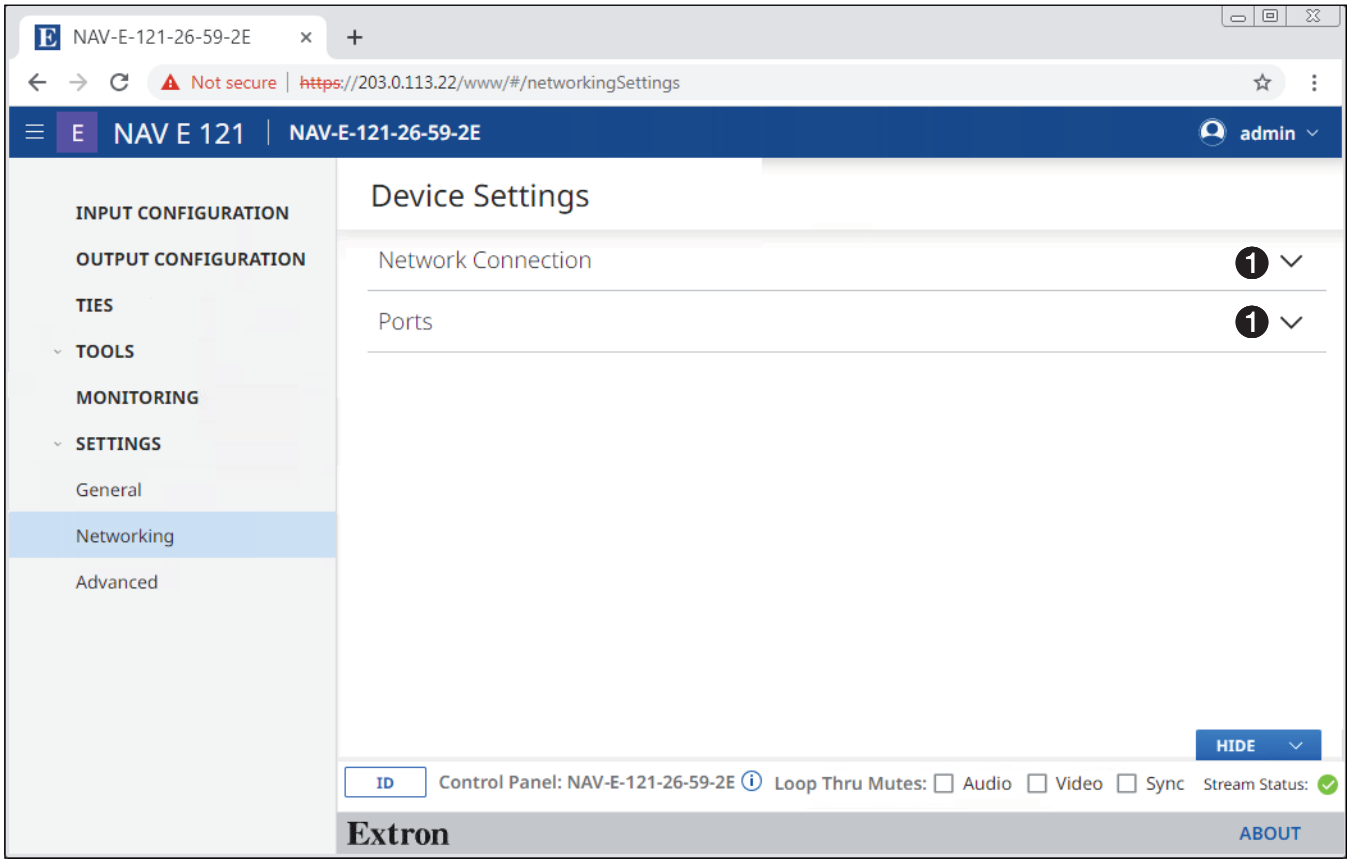


Figure 45. Networking Settings Page

Network Connection page

The `Network Connection` selection on the `Networking Settings` page (see **figure 45** on page 44) opens a read-only pane that shows the connection variables of the encoder (see figure 46). `DHCP`, `IP Address`, `Subnet`, `Gateway`, `DNS Server`, and `DNS Suffix` can be edited by clicking the **`EDIT`** button (❶). An editable pane opens (see **figure 47** on page 46).

NOTE: Editing of these settings is disabled and the `EDIT` button is unavailable for selection when the encoder is assigned to a NAVigator.

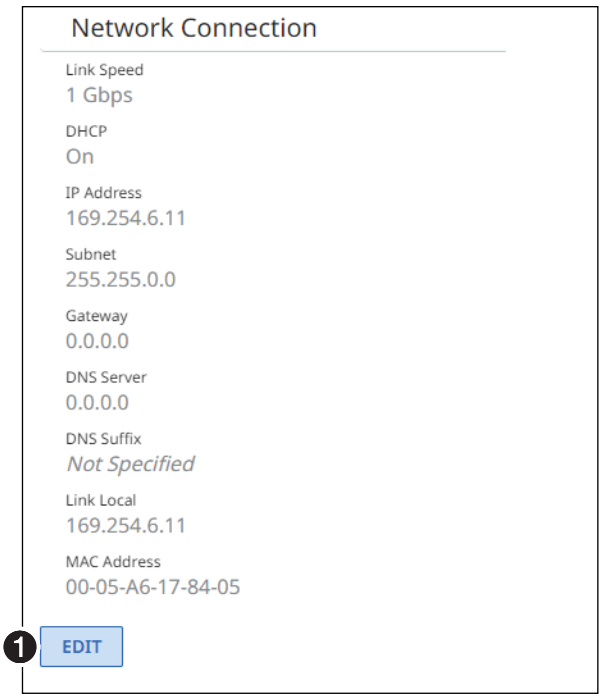
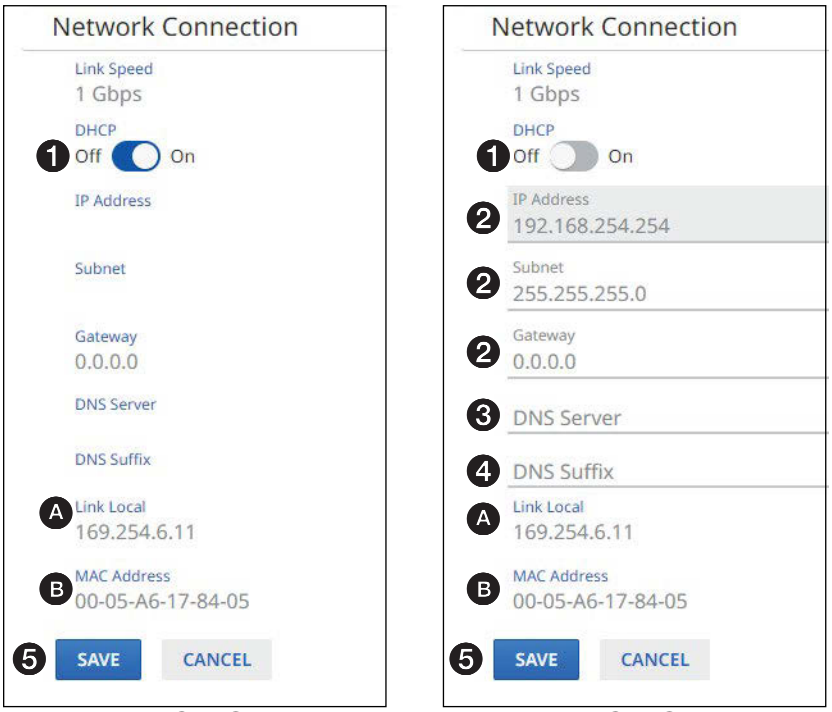


Figure 46. Network Connection Pane

NOTE: `IP Address`, `Subnet`, `Gateway`, `DNS Server`, and `DNS Suffix` are not editable when `DHCP` is on.



DHCP On **DHCP Off**

Figure 47. Editable Network Connection Pane

❶ **DHCP** — Click to toggle **`DHCP`** on and off. When DHCP is enabled, the endpoint automatically receives network configuration parameters from a DHCP server. If no DHCP server is available, the endpoint remains on Link local IP (see Ⓐ).

❷ **IP Address, Subnet, and Gateway** — Click in these fields and type in values to enter the appropriate connection values for your encoder.

❸ **DNS (Domain Name System) Server** — Click in this field and type in the name of the domain name server.

❹ **DNS suffix** — Click in this field and type the valid suffix of the domain name server.

❺ **SAVE and CANCEL buttons** — Click **`SAVE`** to take `Network Connection` changes or **`CANCEL`** to abandon them. Clicking either button closes the editable pane.

NOTES:

- **Link Local** (Ⓐ) — DHCP is on by default. When a DHCP server is not accessible, the Link Local IP address, an address in the range of `169.254.1.0` to `169.254.254.255`, is assigned to the endpoint when no other address assignment methods are available.
- **MAC Address** (Ⓑ) — A unique read-only identifier for network connected devices.

Ports page

The `Ports` selection on the `Networking Settings` page (see **figure 45** on page 44) opens a read-only pane that shows the port usage parameters of the encoder (see figure 48). The `HTTPS` and `RTP Start` parameters can be edited by clicking the **`EDIT`** button (❶). This feature gives the flexibility to use specific ports of your choosing, if the default ports are in use. An editable version of the selection opens (see figure 49).

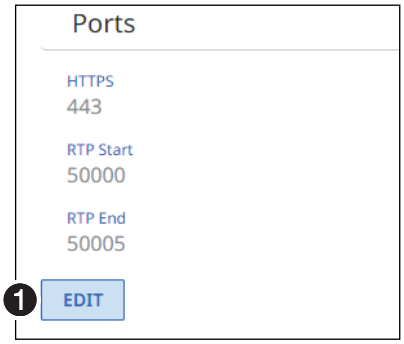


Figure 48. Ports Selection

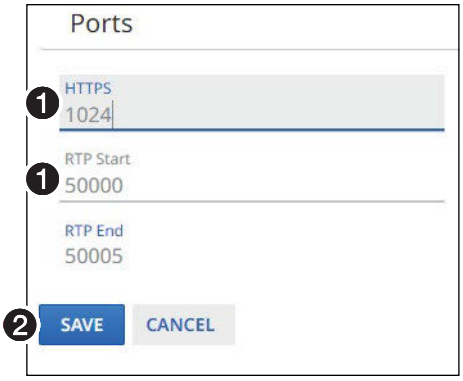


Figure 49. Editable Ports Selection

❶ **HTTPS and RTP Start** — Click in these fields and type in valid values for your encoder.

NOTES:

- Valid HTTPS values:
  - `0` = Disabled
  - `443` = **Default**
  - `1024` - `65535` = Other available options so long as they are not overlapping on the encoder.
- Valid RTP Start values:
  - `0` = Disabled
  - `443` = Default
  - `1024` - `65535` = Other available options so long as they are not overlapping on the encoder.
- See the *NAV Series Pro AV Ports and Licenses Guide*, available at **www.extron.com**, for more information on ports.

❷ **SAVE and CANCEL buttons** — Click **`SAVE`** to take `Port` changes or **`CANCEL`** to abandon them. Clicking either button closes the editable pane.

Advanced page

On the `Advanced Device Settings` page (see figure 50), click the down arrow (❶) to open a drop-down list (see **Advanced Networking page** on page 49, **LLDP page** on page 51), **Confidence Preview page** on page 51, and **Power Priority page** on page 51).

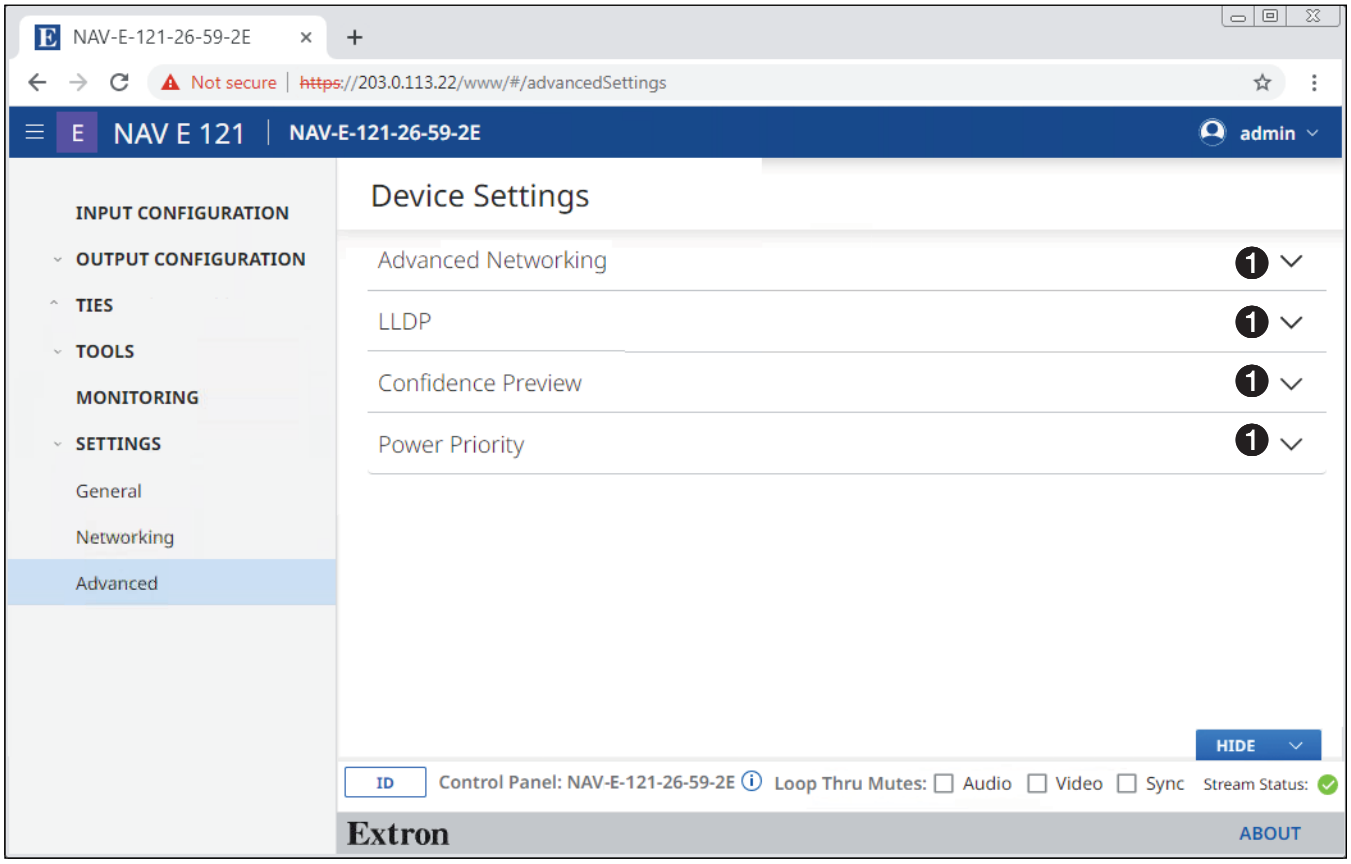


Figure 50. Advanced Settings Page

Advanced Networking page

The `Advanced Networking` selection on the `Advanced` page (see **figure 50** on page 48) opens a read-only pane that shows the port usage parameters of the encoder (see figure 51). The parameters can be edited by clicking the **`EDIT`** button (❶). An editable version of the selection opens (see figure 52).

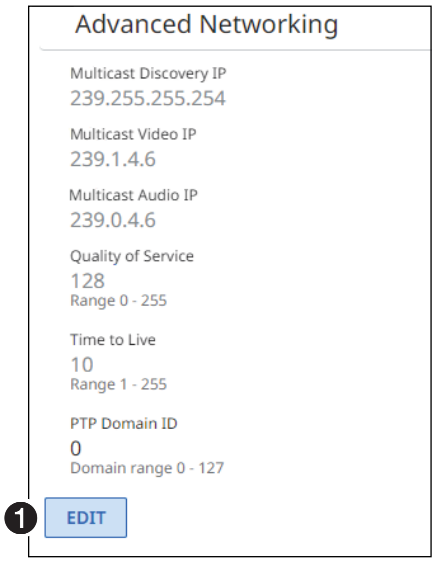


Figure 51. Advanced Networking Selection

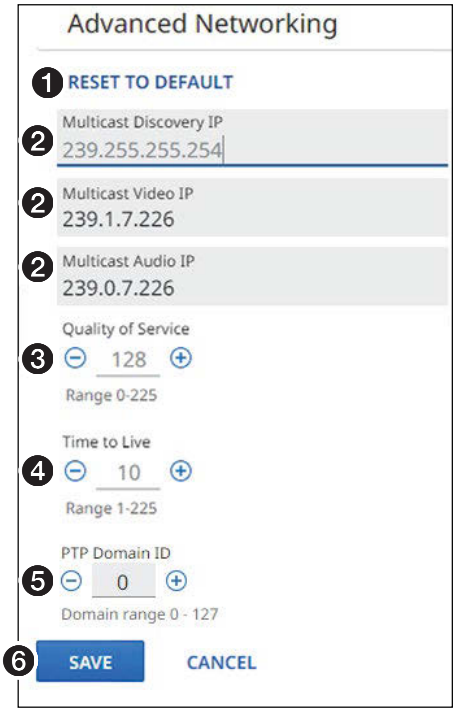


Figure 52. Editable Advanced Networking Selection

❶ **RESET TO DEFAULT** — Click to restore the advanced networking settings of the encoder to their default values.

❷ **Multicast IP addresses** (see **figure 52** on page 59) — Click in these fields and type in valid IP addresses for your encoder.

NOTES:

- **Multicast Discovery IP** is the multicast IP address that the encoder uses to discover and communicate with all other NAV devices on the network.
- **Multicast Video IP** is the IP address that outputs the NAV video stream.
- **Multicast Audio IP** is the IP address that outputs the NAV audio stream.

❸ **Quality of Service** — This setting affects the audio and video streams only and accepts valid differentiated services code point (DSCP) type of service (TOS) decimal values to adjust the priority of the packets. Click the ⊖ and ⊕ buttons or type a number into the field (within the range `0` to `225`) to overwrite the factory default.

NOTE: The lower the number, the lower the priority of the packet within a queue. This may result in packet loss, latency, and jitter in a saturated link.

❹ **Time to Live** — Click the ⊖ and ⊕ buttons or type a number into the field (within the range `1` to `225`) to overwrite the factory default.

NOTE: Understanding how many network hops your farthest endpoint is can help assure that the packet reaches the desired destination. If too small of a value is entered, the network could discard the packet before it reaches the destination. In this case, the endpoint does not receive the streams.

❺ **PTP** (Precision Time Protocol) **Domain ID** — Click in the **`PTP Domain ID`** field and edit it as desired or click ⊕ or ⊖ to increment or decrement the **`PTP Domain ID`**. If you change the value, the unit re-synchronizes its internal audio time clock to the domain of the newly entered value.

NOTE: PTP Domain is an integer value used with AES67 to logically group PTP clocks on a network. This synchronizes their clocks to eliminate latency between the audio signals. Endpoints can only synchronize to other devices in the same domain and devices outside the domain are ignored.

- If you enter a value above the valid range, such as **`128`**, the software automatically drops the value to **`127`**.
- If you enter a valid, but incorrect, domain, the decoder syncs to the new domain clocks and there is a potential for interrupted audio.

❻ **SAVE and CANCEL buttons** — Click **`SAVE`** to take changes or **`CANCEL`** to abandon them. Clicking either button closes the editable pane.

LLDP page

The `LLDP` selection on the `Advanced` page (see **figure 50** on page 48) opens a pane that shows the status of Link Layer Discovery Protocol (on or off) and provides general extended information about the NAV AV LAN (see figure 53).

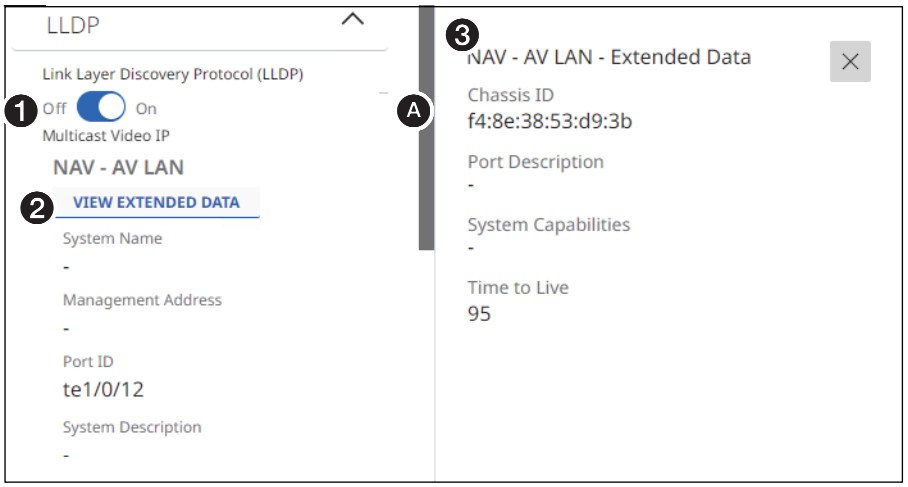


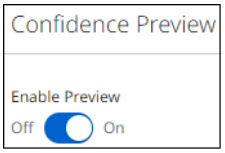
Figure 53. LLDP Page

❶ **Link Layer Discovery Protocol (LLDP)** — LLDP, a vendor-neutral protocol, is used by network devices to discover, identify and share information between two directly connected network devices. Click to toggle **`LLDP`** on and off.

❷ **VIEW EXTENDED DATA button (NAV - AV LAN)** — Opens a pane at the right of the page (❸) that shows additional LLDP neighbor information.

❸ **NAV - AV LAN Extended Data** pane — A read-only pane that provides additional, detailed, read-only LLDP information about the directly connected neighboring device on the interface. Click ✕ to close the pane.

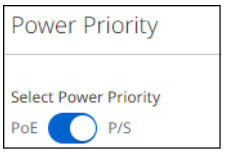
Confidence Preview page



The `Confidence Preview` selection on the `Advanced` page (see **figure 50**) opens a pane that allows you to toggle **`Confidence Preview On`** ( ) and **`Off`** ( ). Confidence Preview is a feature that shows the video output of the encoder on the HTML page (see ⓯ on page 19). This feature helps to remotely validate video output during configuration or debugging.

Power Priority page

The encoder can be powered via PoE or an optional power supply. It can also have both power sources available if power failover is desired.



The `Power Priority` selection on the `Advanced` page (see **figure 50**) opens a pane that allows you to toggle **`Power Priority`** as follows:

`PoE` (, **default**) — Prioritize PoE as the source of encoder power. If PoE is not available, the unit automatically reverts to the optional power supply (if installed).

`P/S` ( ) — Prioritize the optional power supply as the source of encoder power. If the power supply is unavailable, the unit automatically reverts to PoE.

About Page

Access the **About** page by clicking **ABOUT** (see figure 54, ❶).

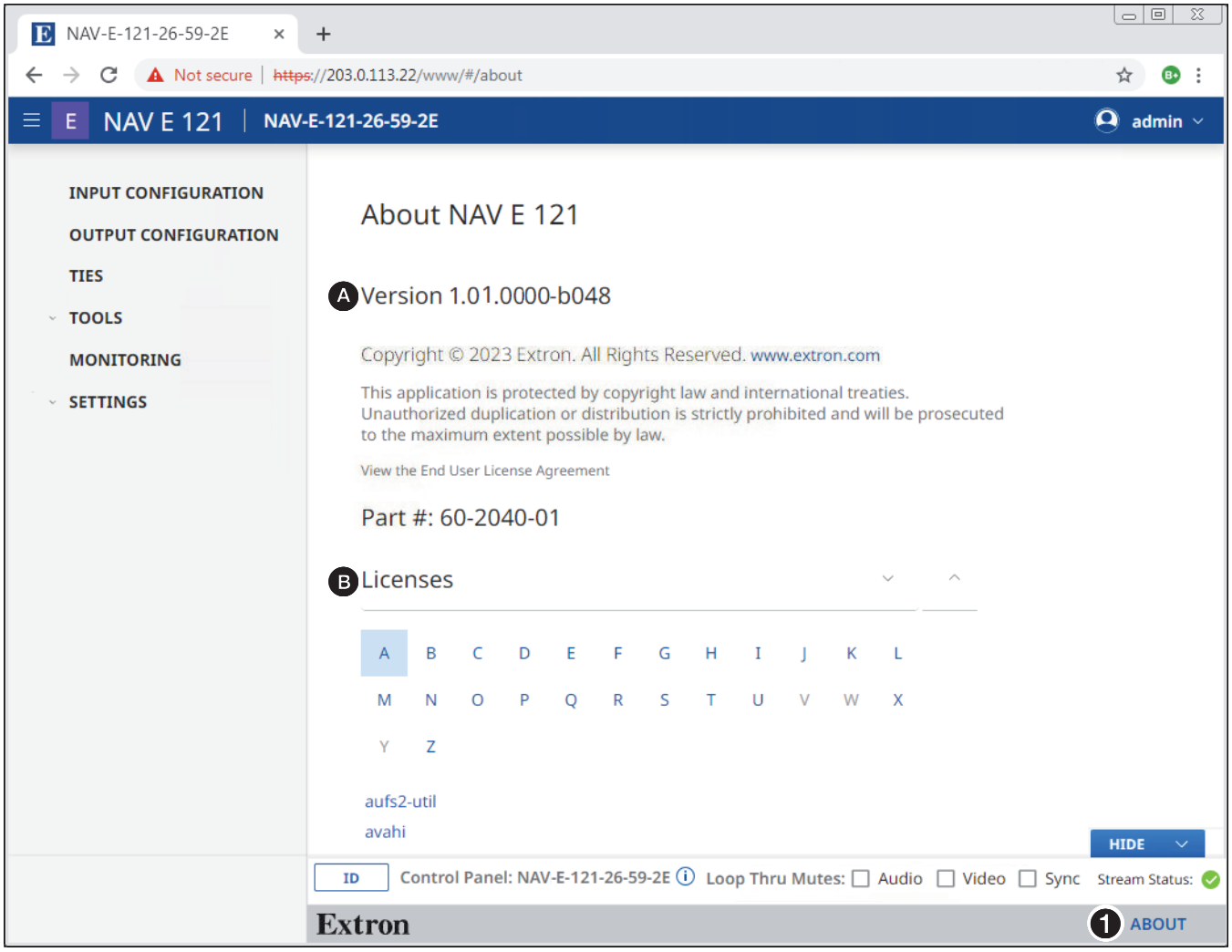


Figure 54. About Pane

The **About** pane provides the following useful information:

Ⓐ **Firmware version number**, which is current NAV firmware version running.

Ⓑ **Installed licenses**, which can be sorted by clicking the desired filtering letter.

Control System

This section includes:

- **Secure Platform Device**
- **Toolbelt**
- **Global Configurator Plus and Professional**
- **Global Scripter**
- **ControlScript Deployment Utility**

The encoder can be remotely controlled from a host device such as a computer or Extron control system. The controlling device communicates over the network via the NAV/PoE+ port (see D on page 6).

Secure Platform Device

As a Secure Platform Device (SPD), the encoder is a system-based device that communicates with an Extron controller and supports 802.1X port-based Network Access Control. When applied, 802.1X authentication requires that all devices are approved before network access is granted.

The encoder communicates with compatible controllers such as Extron IPCP Pro, IPL Pro, IPCP Pro xi, and IPCP Pro Q xi series control products over a secure, encrypted channel. The encoder hosts secure Serial as well as a Secure Port Interface for SIS control of the encoder.

Toolbelt

The Extron Toolbelt utility is available on the Extron **website**. Toolbelt is a stand-alone Windows application for the management of control systems. Toolbelt can automatically discover Pro Series controllers and devices and NAV devices on a network (see the *Toolbelt Help file*). You also can manually add devices, using the known IP addresses. Once you log in to a NAV device, such as a NAVigator or NAV E 121, you can perform tasks such as:

- Launch the embedded encoder HTML page after discovery.
- View the device and system information.
- View and edit network information.
- View and set SSL certifications.
- Use utilities such as `Ping`, `Reset`, and `Reboot.`
- Configure 802.1X security settings.
- View 802.1X status logs.
- Update the firmware to a selected device or group of devices.

Secure Sockets Layer (SSL) Certificates

Extron NAV devices ship with factory-installed SSL certificates created by Extron. If you want or are required to use a different SSL certificate at your installation site, you can use system utilities in the Toolbelt software to change the SSL certificate at any time. The *Toolbelt Help File* provides instructions on how to apply an SSL certificate to a device.

NOTES:

- You must run Toolbelt as an administrator.
- Some certificates require a passphrase that is created when the certificate is created. If a passphrase is required, you must enter that passphrase before uploading and applying the certificate.

NAV devices support standard OpenSSL certificate encodings such as `.pem` (Privacy-enhanced Electronic Mail) and `.der` (Distinguished Encoding Rules) file types. PEM file types are ASCII encoded and are the required format for uploading to the device. DER file types are binary encoded and can typically have several file extension variations, such as `.crt` and `.cer`. There are many standard tools that can convert from DER to PEM file encodings if needed.

NOTE: A DER format file must be converted to PEM encoding before uploading it to the device.

To properly create the certificate for uploading to Extron NAV devices, ensure that the certificate file meets the following requirements:

- Contains X.509 certificate information
- Contains public and private keys
- Uses PEM encoding

NOTE: ITU-T standard X.509 covers aspects of public key encryption, digital cryptography, certificates, and validation.

Contact your IT administrator for more information on what tools and policies are required to obtain or create the SSL certificate and, if necessary, the corresponding passphrase.

Global Configurator Plus and Professional

NOTE: NAV products can be used in control systems with the following Extron control products:

- **IPCP Pro Processors** such as the IPCP Pro 250
- **IPL Pro Control Processors** such as the IPL Pro S3
- **IPCP Pro Q xi processors** such as the IPCP Pro 255Q xi
- **IPCP Pro xi processors** such as the IPCP Pro 250 xi

Global Configurator is an Extron control system configuration software for use in AV systems that include Extron Pro Series control products. Conditional logic, variables, and macros provide flexibility for elaborate control system designs. No direct programming knowledge is needed to use the program.

The functional logic is built into Global Configurator. You merely select the functions that you want to use. You can quickly set up schedules, macros, monitors, and the like, using available actions and commands, without having to write control script.

Global Configurator has two modes:

- **Global Configurator Plus** — Ideal for smaller applications requiring one control processor and one control interface.
- **Global Configurator Professional** — Suited for applications requiring multiple control processors, enhanced functionality, and advanced configuration. Access to Global Configurator Professional requires ECP Certification.

In a NAV system with an Extron controller, such as an IPCP Pro 250, you can perform actions such as:

- Load device drivers for monitoring the status of and controlling devices with the NAV system.
- Upload GUI Designer interface layouts to touchpanels and third-party touch interfaces.
- Create the configuration containing all the settings for the control processor and the products with which it interacts in the NAV system.
- Upload the configuration to the control processor.
- Send limited commands (such as some SIS commands) via the controller to a NAV device (but without receiving a response from the device).

To obtain Extron control product software, you must have an Extron Insider account and contact an Extron support representative on the Extron S3 Sales and Technical Support Hotline (see **www.extron.com** for the phone number in your region of the world). Extron provides training to our customers on how to use the software. Access to the features of Global Configurator Professional is available to users who successfully complete Extron Control Professional Certification.

For detailed descriptions and procedures to setup a control system with an IPCP Pro device and Global Configurator, see the applicable *Global Configurator Help File*.

Global Scripter

NOTE: NAV products can be used in control systems with the following Extron control products:

- **IPCP Pro Processors** such as the IPCP Pro 250
- **IPL Pro Control Processors** such as the IPL Pro S3
- **IPCP Pro Q xi processors** such as the IPCP Pro 255Q xi
- **IPCP Pro xi processors** such as the IPCP Pro 250 xi

Global Scripter is a powerful and versatile control system programming software from Extron for AV systems that use an Extron Pro series control processor (such as an IPCP Pro 250). Global Scripter, being programming (rather than just configuration) software, is much more flexible than Global Configurator. Global Scripter allows an integrator to write customized programs for his or her specific AV system. Using customized programming commands for configuration and control allows for larger AV systems than Global Configurator.

Global Scripter uses the easy-to-learn Python scripting language and includes the Extron-exclusive Python library: ControlScript. ControlScript increases the productivity of AV programmers by incorporating functions used in common AV control system projects, as well as helpful documentation, reference material, and sample code. Global Scripter can insert specific AV devices (such as SPDs) and functions into the code.

In a NAV system with an Extron controller, such as an IPCP Pro 250, you can support many more devices (system controllers, NAVigators, and endpoints) than Global Configurator, send very specific SIS commands (as programmed code) and get feedback.

NOTE: Global Scripter software users and integrators must know how to program with Python and should know how to use Extron ControlScript.

For detailed descriptions and procedures to setup a control system with an IPCP Pro device and Global Scripter, see the *Global Scripter Help File*.

ControlScript Deployment Utility

NOTE: NAV products can be used in control systems with the following Extron control products:

- **IPCP Pro Control processors** — such as the IPCP Pro 550
- **IPCP Pro xi Control processors** — such as the IPCP Pro 350 xi
- **IPCP Pro Q xi Control processors** — such as the IPCP Pro 360 Q xi

The ControlScript Deployment Utility allows AV developers to deploy and debug control system programs created using Microsoft Visual Studio Code. The utility can load and retrieve projects from control processors and offers debugging tools like Program Logs and Trace Messages. Together with the Extron ControlScript Extension for VS Code, the deployment utility integrates ControlScript libraries into VS Code, enabling control system programmers to use the powerful VS Code editor to program Extron control systems.

NOTES:

- Extron recommends using Visual Studio Code to create your project file. The ControlScript Extension for Visual Studio Code is available from the Extron website.
- It is strongly recommended that all devices are updated to the latest firmware, to use all the features of this release of the ControlScript Deployment Utility.

See the ControlScript Deployment Utility release notes, available at the Extron **website**.

SIS Operation

The encoder can be remotely controlled, monitored, or configured using the following:

- A user-defined string consisting of SIS commands (see below)

  NOTE: SIS commands cannot be issued directly to the encoder, but are issued via an Extron control system on the AV network using a process known as "encapsulation".

- Extron Toolbelt or a control system constructed using either Global Configurator Plus, Global Configurator Pro, or Global Scripter (see **Control System** on page 53)
- Built-in HTML pages (see **HTML Operation** on page 15)

This section provides guidance on operation of the encoder via a string of commands and lists the SIS commands, including:

- **Host-to-Encoder Communications**
- **Encoder-Initiated Messages**
- **Encoder Error Responses**
- **Using the Command and Response Tables**
- **SIS Command and Response Table**

Host-to-Encoder Communications

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command character sequence. When a command is valid, the encoder executes the command and sends a response to the host device. All responses from the encoder to the host end with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Encoder-Initiated Messages

When the encoder completes its start-up, it issues the following message to the host:

© Copyright 20*yy*, Extron Electronics NAV E 121, V*x.xx*, 60-*nnnn-nn*↵
<date> and *<time>*↵

V*x.xx* is the firmware version number and 60-*nnnn-nn* is the part number.

Hplgl*<status>*↵

The HDMI input hot plug connection is changed. 1 is plugged and 0 is unplugged.

HplgO*<status>*↵

The HDMI loop out hot plug connection is changed. 1 is plugged and 0 is unplugged.

In*<status>*↵

A change in signal input status has occurred. 1 is input detected and 0 is no input.

Encoder Error Responses

When the encoder receives a valid SIS command, it executes the command and sends a response to the host device. If the encoder is unable to execute the command because the command is invalid or it contains invalid parameters, the encoder returns an error response to the host. The error response codes are:

`E10` — Invalid command
`E12` — Invalid port number
`E13` — Invalid parameter
`E14` — Invalid for this port configuration
`E17` — Invalid command for signal type
`E22` — Busy
`E24` — Privilege violation
`E25` — Device not present
`E28` — Bad file name or file not found

The command operation is aborted with no other indication.

Using the Command and Response Tables

The **command and response tables** begin on page 59. Symbols are used throughout the table to represent variables in the command and response fields. Command and response examples are shown throughout the table. The ASCII to HEX conversion table below is for use with the command and response table.

Space →

ASCII to Hex Conversion Table										Esc	1B	CR	ØD	LF	ØA
	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	4Ø	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	5Ø	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	6Ø	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	7Ø	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	I	7C	}	7D	~	7E	DEL	7F

Common symbol definitions

↵ = Carriage return/line feed
← = Carriage return (no line feed)
| = Pipe (can be used interchangeably with the ← character)
• = space
Esc = Escape key
W = Can be used interchangeably with the Esc character

SIS Command and Response Tables

Command and Response Table for Encoder Commands

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
HDCP authorized device			
Set input to HDCP authorized	Esc E1HDCP ←	HdcpE1 ↵	**Default**.
Set input to HDCP not authorized	Esc E0HDCP ←	HdcpE0 ↵	
View HDCP authorized status	Esc EHDCP ←	X1 ↵	
Input signal status			
View input signal status	Esc 0LS ←	X1 ↵	
Streaming control			
Set video stream on	Esc V1STRC ←	StrcV1 ↵	**Default.**
Set video stream off	Esc V0STRC ←	StrcV0 ↵	
Set audio stream on	Esc A1STRC ←	StrcA1 ↵	**Default.**
Set audio stream off	Esc A0STRC ←	StrcA0 ↵	
View video stream	Esc VSTRC ←	X1 ↵	
View audio stream	Esc ASTRC ←	X1 ↵	
Streaming bit rate			
Set streaming rate	Esc V X2 BITR ←	BitrV X2 ↵	
Show streaming bit rate	Esc VBITR ←	X2 ↵	
Video mute (HDMI LOOP OUT port)			
Mute video only	1B	Vmt1 ↵	
Mute video and sync	2B	Vmt2 ↵	
Unmute video and sync	0B	Vmt0 ↵	**Default**. Video output is active.
Show mute status	B	X3 ↵	
Audio mute (HDMI LOOP OUT port)			
Mute audio	1*1Z	Amt1*1 ↵	
Unmute audio	1*0Z	Amt1*0 ↵	**Default**. Audio output is active.
View audio mute status	1Z	X1 ↵	Audio mute status is X1.
Reset			
Reset to factory setting	Esc ZQQQ ←	Zpq ↵	Reset to factory defaults. Firmware version remains the same.
Device name			
Set device name	Esc X4 CN ←	Ipn• X4 ↵	
Read device name	Esc CN ←	X4 ↵	
Reset device name to factory default	Esc •CN ←	Ipn•NAV-E-121-*<last 3 pairs of the MAC address>* ↵	
Device tags			
View device tags	Esc DTAG ←	X5 ↵	

KEY:

- X1 = Status — 0 = Off, disabled, not detected; 1 = On, enabled, detected
- X2 = Streaming bit rate (in Mbps) — 250 — 900 (**default = 850**)
- X3 = Video mute status — 0 = Unmute; 1 = Mute video; 2 = Mute video and sync
- X4 = Name — A text string of up to 63 alphanumeric characters and minus sign/hyphen (-). No blank or space characters are permitted as part of a name. The first character must be a letter, and the last character must not be a minus sign/hyphen
- X5 = Tag — A list of text tags returned in a **json** string

Command and Response Table for Encoder SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
Device number			
View device number	Esc DNUM ←	X6 ↵	
Information requests			
Information request	I	SigI X1 •HdcpI X7 •HdcpO X7 •ResI X8 •AudI X9 •StrmI X9 •Lnk X9 •Enc ↵	
Response description:		*Input signal•Input HDCP•Output HDCP•Resolution•Input audio•Streaming•Link•Encoder* ↵	
Example:	I	SigI1•HdcpI2•HdcpO2•ResI1920x1080@60Hz•AudI0•StrmI1•Lnk1•Enc ↵	An input signal is detected, the input and output are HDCP devices, the resolution is 1920x1080@60 Hz, the digital audio input is selected, streaming and link are active, and the device is an encoder.
View model name	1I	NAV•E•121 ↵	
View model description	2I	NAV•Gigabit•Encoder•HDMI ↵	
View number of connected users	10I	X10 ↵	
View input video format	34I	X11 ↵	
View HDCP input status	35I	X7 ↵	
View streaming status	37I	X9 ↵	
View HDCP output status	38I	X7 ↵	
View connected video streams	39I	X12[1] ↵ X12[2] ↵ • • ↵ • • ↵ X12[n] ↵ ↵	Show all (*n*) connected video streams.
Example:	39I	Conf Rm 1, 192.168.254.254, 239.199.188.175 ↵ Conf Rm 2, 192.168.254.253, 239.199.188.165 ↵ • • • ↵ Class Rm 5, 192.168.254.252, 239.199.188.155 ↵ ↵	
View connected audio streams	40I	X12[1] ↵ X12[2] ↵ • • ↵ • • ↵ X12[n] ↵ ↵	Show all (*n*) connected audio streams.
View average bandwidth	41I	X13 ↵	
View current total bandwidth	42I	X13 ↵	
View current video bandwidth	43I	X13 ↵	
View current audio bandwidth	44I	X13 ↵	
View network status	46I	X9 ↵	
View dropped packets	48I	X14 ↵	

KEY:

X1 = Status	0 = Off, disabled, not detected	1 = On, enabled, detected	
X6 = Device number	0001 — 4096		
X7 = HDCP status	0 = No device	1 = Non-HDCP device	2 = HDCP device
X8 = Resolution and rate in plain text	*Example*: 1920x1080@60 Hz)		
X9 = Streaming and link status	0 = No link	1 = Active	2 = Active with errors
X10 = Number of connected users	0 — 1		
X11 = Input video format	0 = Not detected	1 = HDMI	2 = DVI
X12 = Connected streams	*<hostname>,<IP address>,<Multicast IP>*		
X13 = Bandwidth (in Mbps)	000 — 900		
X14 = Dropped packets (in percent)	00 — 100		

Command and Response Table for Encoder SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
Information requests, continued			
View IGMP querier	50I	X15↵	
View device serial number	98I	X16↵	
View internal temperature	Esc20STAT←	X17↵	
Firmware version			
Read firmware version	Q	X18↵	
Read full firmware version	*Q	X19↵	
Read full firmware version — Advanced	20Q	X20↵	
Part number			
View part number	N	60-*xxxx-xx*↵	

KEY:

X15	= IP address	*xxx.xxx.xxx.xxx*
X16	= Serial number	
X17	= Internal temperature	*xxx*F•*xx*C
X18	= Firmware version	*x.xx*
X19	= Full firmware version	*x.xx.xxxx*
X20	= Full firmware version — advanced	*x.xx.xxxx-bnnn*

Command and Response Table for IP-Specific SIS Commands

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
DHCP client			
Set DHCP on	Esc 1*1DHCP ←	Dhcp•1*1 ↵	
Set DHCP off	Esc 1*0DHCP ←	Dhcp•1*0 ↵	
View DHCP status	Esc 1DHCP ←	X1 ↵	
IP address			
Set IP address	Esc X15 CI ←	Ipi X15 ↵	
View IP address	Esc CI ←	X15 ↵	
Subnet mask			
Set subnet mask	Esc X15 CS ←	Ips X15 ↵	
View subnet mask	Esc CS ←	X15 ↵	
Gateway address			
Set gateway address	Esc X15 CG ←	Ipg X15 ↵	
View gateway address	Esc CG ←	X15 ↵	
DNS address			
Set DNS address	Esc X15 DI ←	Ipd X15 ↵	
View DNS address	Esc DI ←	X15 ↵	
IP address			
Set IP address	Esc 1*X15 CISG ←	Cisg•1*X15 ↵	
IP and subnet mask			
Set IP address and subnet mask	Esc 1*X15 IP *X15 Subnet CISG ←	Cisg•1*X15 IP /X21 Subnet *X15 Gateway ↵	
Set IP address and subnet mask	Esc 1*X15 IP /X21 Subnet CSIG ←	Cisg•1*X15 IP /X21 Subnet *X15 Gateway ↵	
IP, Subnet, and gateway address all at once			
Set IP address, subnet address, and gateway	Esc 1*X15 IP *X15 Subnet *X15 Gateway CISG ←	Cisg•1*X15 IP /X21 Subnet *X15 Gateway ↵	
Set IP address, subnet address, and gateway	Esc 1*X15 IP /X21 Subnet *X15 Gateway CISG ←	Cisg•1*X15 IP /X21 Subnet *X15 Gateway ↵	
View IP address, subnet address, and gateway	Esc 1CISG ←	X15 IP /X21 Subnet *X15 Gateway ↵	
MAC address			
View MAC address	Esc CH ←	X22 ↵	

KEY:
X1 = Status
X15 = IP address, subnet, gateway address
X21 = Subnet prefix
X22 = MAC address

0 = Off, disabled, not detected
xxx.xxx.xxx.xxx
Number of bits used to create the subnet
xx-xx-xx-xx-xx-xx

1 = On, enabled, detected

Troubleshooting

Alarms

The following table lists common NAV alarms shown on the `Monitoring` page (see **Alarms pane** on page 36) and suggested remedies:

Alarm	Cause	Remedy
`Assignment Conflict`	The endpoint is reporting a conflicting assignment status.	Verify that the endpoint is not assigned to another NAVigator. If it is, it must be unassigned from the previous NAVigator. If the previous NAVigator is unavailable, perform a **full factory reset** (see page 13) on the conflicted endpoint.
`Assignment Failure`	The endpoint failed to be assigned to a NAVigator.	Confirm that the NAVigator has not reached its endpoint assignment limit. If a device has been decomissioned from the NAV system, unassign the endpoint from the "Offline endpoints" list. If endpoint still cannot be assigned, perform a **full factory reset** on the endpoint.
`Auth Failures`	A user has attempted to login unsuccessfully 10 or more times.	Check whether login attempts were from internal personnel. If not, take action to strengthen security measures.
`Backup Restore Failure`	A problem occurred while trying to perform a backup or a restore.	Debug network connectivity between the NAVigator and endpoints.
`Channel Conflict`	Two or more NAV devices on the network have been given the same input or output number.	For devices affected, change the input number or output number so that each is unique to encoders in the system.
`Communication Failure`	An online assigned endpoint cannot establish a connection with the NAVigator.	Check the network settings to ensure unicast routing is possible between the NAVigator and endpoints.
`Controller Disconnect`	The NAV device is unable to connect to a paired control processor.	Verify the control processor is online. Review network settings to ensure unicast communication is possible from the NAV device to the control processor.
`CPU Usage`	The NAV device CPU is overloaded.	Check for excessive network data being delivered to the endpoint.
`Device Offline`	An assigned NAVigator is not discovered on the network.	Check the offline NAVigator for a power failure. Check the network connectivity of the endpoint.

Alarm	Cause	Remedy
Disk Space	Internal storage on the NAV device is low.	Reboot the NAV device. If the issue persists, perform a software reset that deletes files (see **RESET tab** on page 31).
Firmware Failure	A critical process has failed, crashing the endpoint.	Reboot the NAV device. If the failure persists, perform a factory boot code reset (see **Reset Operations** on page 13).
Firmware Incompatible	A firmware version discrepancy exists between the NAVigator and assigned endpoints.	Upgrade the firmware on the deviating device.
Firmware Upgrade	The firmware upgrade process on NAVigator or endpoints failed to complete.	Retry the firmware upgrade. If it is again unsuccessful, use Toolbelt or a web browser to directly manage the device and perform a unit firmware upgrade.
HDCP Error	**Encoder**: The video input signal is HDCP protected and HDCP negotiation has failed. **Decoder**: The incoming stream is HDCP protected and the display connected to the output does not support HDCP or the HDCP version.	**Encoder**: • Disconnect and reconnect the video input cable into the encoder. • Bypass video adapter cables and make a direct HDMI male-to-male connection. **Decoder**: Check the technical specifications of the display that is connected to the decoder for HDCP version support.
IGMP Failure	The NAV device failed to receive three consecutive IGMP queries from an IGMP querier.	Debug network connectivity between the NAV device and the IGMP querier (which can be either a router or a managed switch).
Link Speed	The negotiated communication speed (Link Speed) between the NAV device and a managed switch is lower than its capability of 1 Gbps.	Check switch configuration and ensure proper settings for the switch port to which the NAV device is connected.
Name Conflict	Two or more NAV devices on the network have the same device name.	Change the device names affected so that each is unique.
Network Conflict	Two or more NAV devices on the network have the same IP address.	Change the IP addresses affected so that each is unique.
Network Utilization	The NAV device is receiving excessive network traffic.	Check the network for flooding, also check for improper network configuration.
NTP Sync	The NAVigator cannot obtain time from the specified NTP server.	Debug the network connectivity between the NAVigator and the specified NTP server.
PTP Master Stability	The clock to which all devices are synchronized is changing too frequently, for example, due to network jitter.	Check network for flooding and correct PTPv2 packet priority.
PTP Sync	NAV device cannot synchronize its PTPv2 clock with any peers.	Ensure that network policies allow PTPv2 packets to reach the NAV Device from a clock master.

Alarm	Cause	Remedy
Stream Conflict	Multiple NAV endpoints are configured to use the same video, audio, AES67, or USB multicast IP address.	Reconfigure endpoint stream settings for a unique stream address.
Stream error	The encoder has lost reception of the USB stream for 2 seconds or more.	Check all network switches and routers that support your NAV system for proper multicast (IGMP) configuration.
Temperature Internal	The NAV device is overheating.	Check the ambient temperature of the NAV device installation location. • If greater than 104°F, (60ºC) use HVAC system to lower ambient temperature. • If ambient temperature is 104°F, (60°C) or less, check the mounting location for nearby equipment emitting excessive heat. Ensure there is an air gap around endpoint to allow adequate airflow.
Tie Failure	The encoder failed to establish a tie with the specified endpoint.	Debug the network connectivity between the encoder and decoder.
Video loss	The input is changed and video sync cannot be established for 2 seconds or more.	Debug the connectivity of the AV source device to the NAV encoder.

Reference Information

Mounting the Encoder

ATTENTION:

- Installation and service must be performed by authorized personnel only.
- L'installation et l'entretien doivent être effectués par le personnel autorisé uniquement.

The 1-inch high, quarter-rack width encoder can be placed on a table, mounted in a rack, or mounted under a desk or table.

Tabletop Use

Affix the included rubber feet to the bottom of the unit and place it in any convenient location.

Mounting kits

Mount the unit using any optional compatible mounting kit listed on the Extron website (**www.extron.com**), in accordance with the directions included with the kit.

ATTENTION:

- When mounting the encoder under furniture, mount the device upside-down to ensure proper ventilation.
- Si vous installez le encoder sous un mobilier, veillez à installer l'unité à l'envers pour assurer une bonne ventilation.

For rack mounting, see **UL Rack-Mounting Guidelines** on page 67.

UL Rack-Mounting Guidelines

The following Underwriters Laboratories (UL) requirements pertain to the installation of the unit into a rack.

CAUTION:

- **Elevated operating ambient temperature** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature (TMA = +104°F, +40°C) specified by Extron.
- **Reduced air flow** — Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical loading** — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit overloading** — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- **Reliable earthing (grounding)** — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as use of power strips).

Consignes UL pour le montage en rack

Les consignes UL (« Underwriters Laboratories ») suivantes concernent l'installation en rack d'un boîtier l'encodeur :

ATTENTION :

- **Température ambiante élevée** — En cas d'installation de l'équipement dans un rack fermé ou composé de plusieurs unités, la température du rack peut être supérieure à la température ambiante. Par conséquent, il est préférable d'installer l'équipement dans un environnement qui respecte la température ambiante maximale (Tma = +104°F, +40°C) spécifiée par Extron.
- **Réduction du flux d'air** — Si l'équipement est installé dans un rack, veillez à ce que le flux d'air nécessaire pour un fonctionnement sécurisé de l'équipement soit respecté.
- **Charge mécanique** — Installez l'équipement en rack de manière à éviter toute situation dangereuse causée par le déséquilibre de la charge mécanique.
- **Surcharge électrique** — Lorsque vous connectez l'équipement au circuit d'alimentation, observez la connexion de l'équipement et étudiez les effets possibles d'une surcharge du circuit sur les protections contre les surintensités et les conducteurs d'alimentation. Consultez à cet égard les indications de la plaque d'identification de l'équipement.
- **Mise à la terre** — Assurez-vous que l'équipement est correctement mis à la terre. Accordez une attention particulière aux connexions électriques autres

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

Africa and Middle East:
Extron Middle East
Dubai Airport Free Zone
F13, PO Box 293666
United Arab Emirates, Dubai

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 and 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.