User Guide

Streaming AV Product

SME 211

Streaming Media Encoder

(FW version 1.00.0004-b000)

Extron

68-3158-01 Rev. A
06 18

Safety Instructions

Safety Instructions • English

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

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

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

Sicherheitsanweisungen • Deutsch

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

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

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

Instrucciones de seguridad • Español

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

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

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

Instructions de sécurité • Français

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

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

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

Istruzioni di sicurezza • Italiano

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

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

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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.

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

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안전 지침 • 한국어

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

Battery Notice

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

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

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

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ＶＣＣＩ－Ａ

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,,Øp1 scene 1,1 ^B 51 ^W^C.Ø
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
Esc X1 *X17* X20* X23* X21 CE←
```

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

Variables are written in slanted form as shown here:

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

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

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

Click the **OK** button.

Specifications Availability

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

Extron Glossary of Terms

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

Contents

Introduction

This section gives an overview of the user guide and describes the SME 211 and its features. Topics that are covered include:

About this Guide

This guide contains installation, configuration, and operating information for the SME 211.

- "Codec" refers to the H.264 / MPEG-4 AVC video codec or AAC-LC audio codec.
- "Stream" can refer to audio, video, or both that is transmitted by the SME.
- "UI" and "Web UI" refer to the web-based user interface.

About the SME 211

The SME 211 is a high performance H.264 streaming media encoder for streaming audio and video signals over IP networks. It accepts an HDMI signal with embedded audio and a stereo analog audio signal. The SME 211 supports unicast and multicast streaming protocols, including RTMP. The SME 211 can stream at two different resolutions and bit rates concurrently, supporting up to six simultaneous streams with push and pull streaming. Built in audio mixing and DSP features enable enhanced audio processing without requiring external mixing and DSP equipment.

See **figure 1** on the next page for an example of a typical SME 211 application.

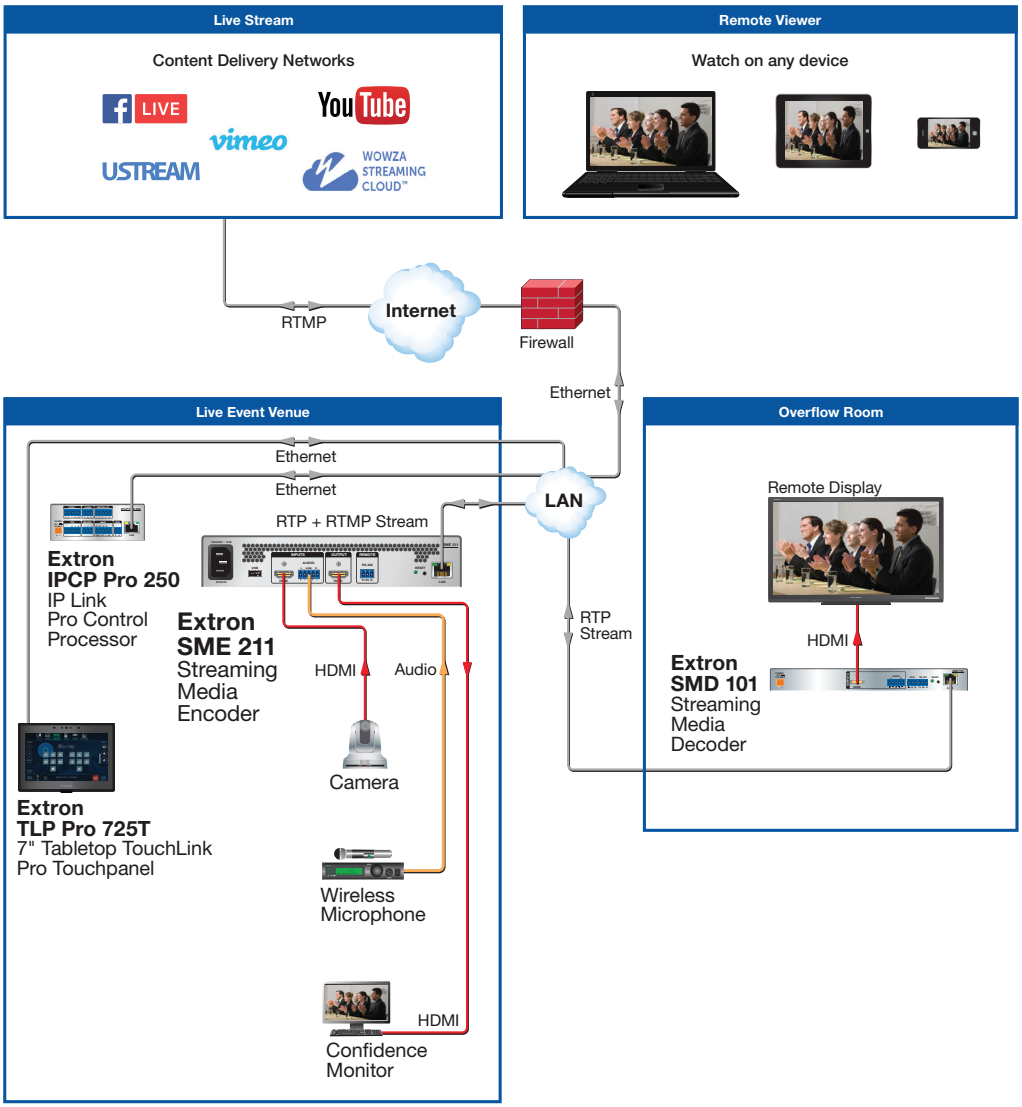


Figure 1. Typical SME 211 Application

PC Requirements

Below are the PC requirements to access the default web pages of the SME:

- **Hardware**
  - 2.0 GHz dual-core processor
- **Operating Systems**
  - Microsoft® Windows® XP or higher
  - Mac® OS® X® 10.6 or higher
- **Web Browsers**
  - Google® Chrome™ version 48 or higher (preferred)
  - Mozilla® Firefox® version 44 or higher
  - Microsoft® Internet Explorer®
  - Safari® version 9 or higher (for macOS® operating systems)

NOTE: The preview video in the AV Controls panel of the SME 211 uses an HTML5 player and is not supported by some older browser versions. To see a preview of the current stream you can either:

- Use a different browser
  or
- Open a standalone, third-party video player (such as VideoLAN™ opensource VLC™ media player) and connect to the SME streaming file. With IE 11 and Edge browsers, if the preview fails to start, switch to full screen mode (using the control in the preview window), then back.

- Additionally, the device web UI is compliant, but not fully featured, with the internal browser client:
  - QTWeb v4.x

Licensed Third-party Software

The following table lists the licensed third-party software used by the SME models.

NOTE: Licensed third-party software used by the SME models is subject to change without notice.

Licensed Third-party Software Used in the SME 211

Package	License	Package	License
ExtJS 4	Sencha Commercial License	Linux-PAM	BSD-3c
alsa-lib	LGPLv2.1	live555	LGPLv2.1+
alsa-utils	GPLv2	lm-sensors	libsensors LGPLv2.1, programs GPLv2
aufs2-util	GPLv2	lshw	GPLv2
avahi	LGPLv2.1	lsof	lsof license
bstrlib	BSD-3c	ltrace	GPLv2
busybox	GPLv2	lua	MIT
bzip2	bzip2 license	luaexpat	MIT
cjson	MIT	luasocket	MIT
dbus	AFLv2.1 GPLv2	luastruct	MIT
e2fsprogs	GPLv2, libuuid BSD-3c, libssGPLv2, libuuid BSD-3c, libss and libet MIT-like with advertising clause	lvm2	GPLv2 LGPLv2.1
ethtool	GPLv2	lzo	GPLv2
expat	MIT	mtd	GPLv2
fbdump	GPLv2	ncurses	MIT with advertising clause
fbset	GPLv2	neon	LGPLv2 (library), GPLv2 (manual and tests)
file	BSD-2c, one file BSD-4c, one file BSD-3c	netcat	GPLv2
fontconfig	fontconfig license	netsnmp	Various BSD-like
freetype	Dual FTL/GPLv2	nginx	nginx license
gdisk	GPL	nmap	GPLv2
gnupg	GPLv2	ntfs-3g	GPLv2 LGPLv2
gpgme	LGPLv2.1	ntp	ntp license

Licensed Third-party Software Used in the SME 211			
Package	**License**	**Package**	**License**
gst-plugins-base	LGPLv2 plus applicable external licenses	openssh	BSD
gst-plugins-good	LGPLv2.1 plus applicable external licenses	openssl	OpenSSL or SSLeay
gstreamer	LGPLv2	orc	BSD-2c, BSD-3c
heirloom-mailx	BSD-4c, Bellcore (base64), OpenVision (imap_gssapi), RSA Data Security (md5), Network Working Group (hmac), MPLv1.1 (nss)	pcre	BSD-3c
i2c-tools	GPLv2+, GPLv2 (py-smbus)	popt	MIT
ifplugd	GPLv2	procps	GPLv2, libproc and libps LGPLv2
iostat	GPL	psmisc	GPLv2
jpeg-turbo	jpeg-license (BSD-3c-like)	pv	Artistic-2.0
kmod	LGPLv2.1	python	Python software foundation license v2, others
libassuan	LGPLv2.1	qjson	LGPLv2.1
libcgicc	LGPLv2.1	qt	LGPLv2.1 with exceptions
libcurl	ICS	qwt	LGPL
libdaemon	LGPLv2.1	sdl	LGPLv2.1
libdnet	BSD-3c	smartmontools	GPLv2
libelf	LGPLv2+	socat	GPLv2
libfcgi	fcgi license	spawn-fcgi	BSD-3c
libffi	MIT	sqlite	Public domain
libglib2	LGPLv2	strace	BSD-3c
libgpg-error	LGPLv2.1	sudo	ICS BSD-3c
libmpeg2	GPLv2	sysstat	GPLv2
libogg	BSD-3c	tcpdump	BSD-3c
libpcap	BSD-3c	tiff	tiff license
libpng	libpng license	tzdata	Public domain
librsync	LGPLv2.1	udev	GPLv2
libssh2	BSD	usbutils	GPLv2
libungif	MIT	util-linux	GPLv2, BSD-4c, libblkid and libmount LGPLv2.1, libuuid BSD-3c
libusb	LGPLv2.1	vsftpd	GPLv2
libv4l	GPLv2	xinetd	xinetd license
lighttpd	BSD-3c	zlib	zlib license

General Product Overview

Input

The **SME 211** has one HDMI input and one analog audio captive screw input.

Signals from the input channel and metadata (descriptive information about data content) are combined in a user-configurable layout and encoded into streams.

Encoding and Output

The SME 211 offers extensive streaming capabilities with two simultaneous, independent streams, each with individual control of streaming protocol, bit rate, and stream resolutions ranging from 512x288 to 1080p. The dual encode functionality supports streaming at high resolution to an SMD-series decoder in an overflow room while simultaneously streaming at the same or lower resolution for remote viewing applications, such as Facebook Live. Bit rates can range from 200 Kbps to 10 Mbps for video and 80 Kbps to 384 Kbps for audio. A range of streaming transport protocols and session management methods are supported. These capabilities provide flexibility to stream from the SME 211 to a variety of devices in different system configurations and network conditions.

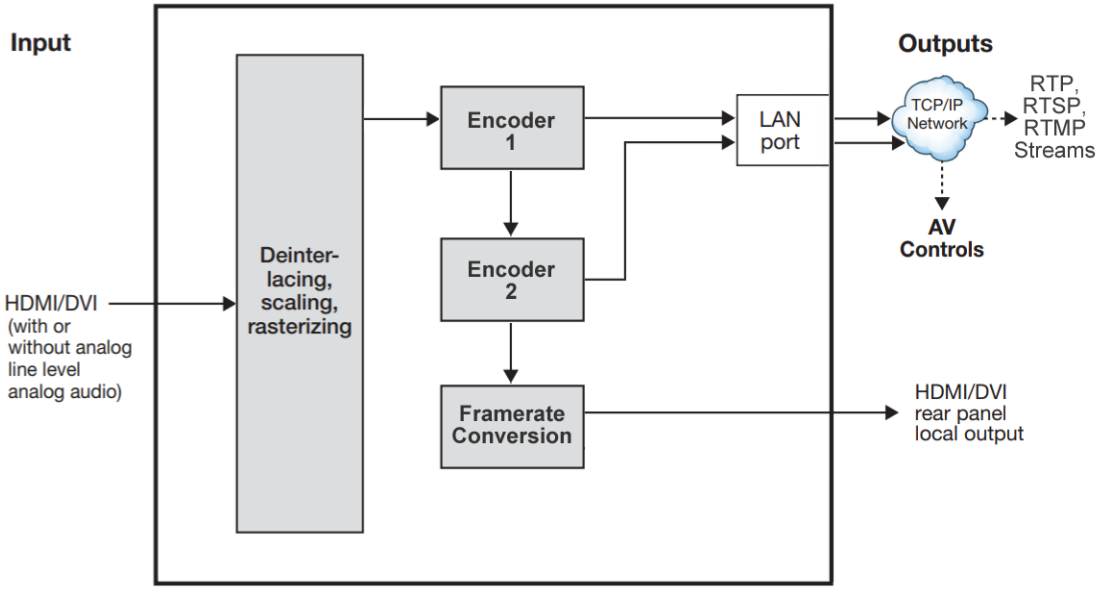


Figure 2. SME 211 Block Diagram

File Storage

Two USB ports (one on the front panel, one on the rear panel) provide a connection for portable, user-provided USB drives for transferring files to or from the unit (Mask images, etc.).

You can view the total storage size in the storage information table found on the `File Management` embedded web page (see `Storage Information` in the Help file) or in the storage information table found on the `Device Status` embedded web page.

Control Options

The SME 211 can be controlled using the following:

- Front panel controls.
- Simple Instruction Set (SIS) commands sent over Ethernet via the LAN connection, over RS-232 via the rear panel Remote captive screw connector, or over USB via the front panel Config port.
- Ethernet connection to the SME 211 embedded web pages.
- Front and rear USB ports provide for direct connection of a keyboard and mouse to permit the use of an internal browser client. This allows limited web page configuration of the network settings for the device.

Features

- **Process live, high resolution HDMI video and audio** — Combine high quality video and audio streams for an enhanced viewing experience.
- **Input Scaling** — Zoom in to a selected region of the source.
- **Stream at two resolutions and bit rates simultaneously with independent stream control** — Stream at high resolutions for overflow applications and lower resolutions for distribution and confidence viewing to different decoding destinations.
- **Simultaneous multicast and unicast streaming** — The SME 211 supports multiple stream modes allowing simultaneous push and pull streaming in unicast or multicast for each encode.
- **RTMP streaming protocol support for popular third-party hosting services** — RTMP push streaming with stream name or key, and user authentication support services like YouTube Live, Wowza Streaming Cloud, Facebook Live, IBM Video Cloud (Ustream), Vimeo, and more.

  NOTE: Some services do not mention support for resolution changes during streaming. Changing resolutions is allowed by the SME but may lead to artifacts in the stream delivered to users.

- **Audio mixing and DSP functionality** — Produce a quality audio experience without requiring the use of external mixing and DSP equipment.
- Integrate with SMD Streaming Media Decoders to provide complete end-to-end streaming systems
- **Stream at resolutions from 512x288 to 1080p** — High resolutions deliver superior quality images for overflow applications and lower resolutions are more efficient for streaming distribution and confidence viewing applications.
- **Connect High Definition sources up to 1920x1200, including HDTV 1080p** — The SME 211 supports a wide range of source resolutions, from standard definition up to the high resolutions commonly used for computer video and HDTV.
- **Support for HDMI with embedded and analog audio** — Facilitate the mixing of embedded AV audio with analog stereo audio for compatibility with AV presentation systems.
- **HDMI preview output with audio** — Display a preview of the presentation with mixed, HDMI-embedded stereo audio.
- **Embedded web interface** — Access an intuitive web interface for user-friendly configuration, setup, and system operation.

- **Live preview window** — Access an intuitive HTML5 web interface with an embedded video window for confidence viewing of the live stream, eliminating the need for browsing plug-ins or local decoding hardware.
- **Audio Delay processing** — Audio processing is zero timed with the HDMI video, but adjustment is available to accommodate upstream processes or alternative audio and video source signal paths causing lip sync errors.
- **Standards-based H.264 / MPEG-4 AVC video compression** — Support for Baseline, Main, or High Profiles at Levels 4.x, or 3.x enabling optimization of video encoding for use with various types of applications and decoders.
- **Presets for quick recall of system configurations** — Store and recall specific encoder, streaming, and combined encoding and streaming configuration settings. Specific presets for CDNs and live streaming platforms simplify connection to social media sites such as YouTube, Facebook Live, and Ustream.
- **Native RTP, MPEG-2 Transport Streams** — TS, unicast or multicast, or RTMP may be applied in streaming applications.
- **Pull streaming transport protocols** — RTP/RTSP, RTSP interleaved, and HTTP tunneled streaming transport protocols may be configured, based on the application, various network conditions or to aid in firewall navigation.
- **Video encoding quality adjustments** — In addition to resolution, video bit rate, and frame rate, fine tuning adjustments for constant or variable bit rate control, GOP length, and audio bit rate are available to fine tune encoding quality to fit any application.
- **On screen display information** — View device information and status of the encoder to aid in troubleshooting and fault-finding activities.
- **AAC audio encoding** — Standards-based audio compression is used to provide compatibility with many devices. The bit rate can be adapted to different application requirements.
- **Picture controls for brightness, contrast, position, and size** — 128 user memory presets per input are available to store image settings.
- **HDCP encryption and signal presence confirmation** — Verify HDCP status for the video input signal in real time. This allows for easy signal and HDCP verification through RS-232 or Ethernet, providing valuable feedback to a system operator or helpdesk support staff.
- Rack-mountable 1U, half rack width metal enclosure

Installation

This section provides information on:

- **Mounting the SME 211**
- **Rear Panel Overview**
- **SME 211 Rear Panel Reset**

Mounting the SME 211

The SME 211 is housed in a 1U high, half rack width, two piece metal enclosure that can sit on a table with the provided rubber feet or can be mounted using the attached rack mounts. Select a suitable mounting location, (see **Mounting the SME 211** on page 84) then choose an appropriate mounting option.

- Disconnect power from all external devices before connecting to the SME 211.
- Do not apply power to the SME before connecting external devices.

Rear Panel Overview

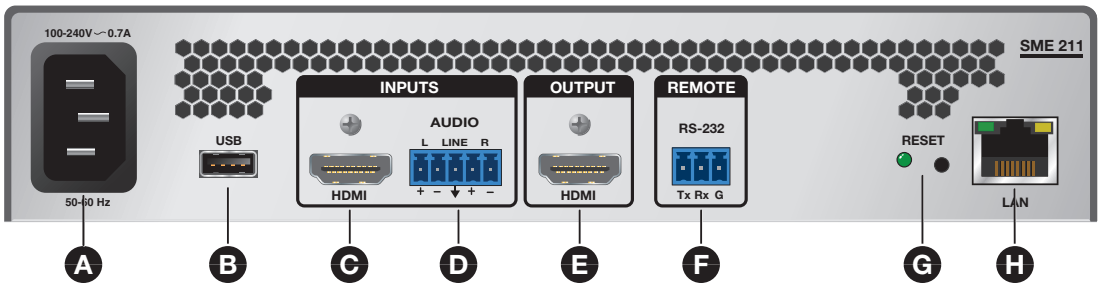


Figure 3. SME 211 Rear Panel

- **A** 100-240 VAC IEC connector for power input
- **B** **USB type A receptacle for external storage device**
- **C** **HDMI input**
- **D** **3.5 mm, 5-pole captive screw connector for analog stereo audio input**
- **E** **HDMI preview output**
- **F** **3.5 mm, 3-pole captive screw connector for Simple Instruction Set (SIS) control over RS-232**
- **G** **Reset button and LED**
- **H** **RJ-45 Ethernet connector for LAN connection**

Power Connection

A **100-240 VAC power input** — Connect the provided IEC cord. Verify the front panel buttons and LCD illuminate (see **Front Panel Features** on page 13).

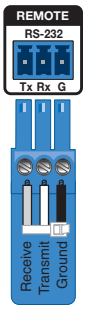
NOTE: Make all external device connections to the SME before applying power.

Control System and External Device Connections

The SME 211 can be configured and controlled from the rear panel RS-232 captive screw port (see **Figure 3**, Ⓕ on the previous page), the LAN port (Ⓗ), using SIS commands and DataViewer via Telnet port 23, or the front panel mini USB B Config port (see **Figure 6**, Ⓒ on page 13). It can also be configured and controlled using a standard web browser from the LAN port. Because the LAN port must be connected for streaming output, Extron recommends using it for configuration, control, and firmware upgrades.

Ⓑ **USB storage device** — You can attach an optional external USB storage device to the front or rear USB ports. The storage device can be any standard external hard drive or USB flash drive formatted with a compatible file system.

> **NOTE:** The SME 211 can read data from USB storage devices using FAT32, VFAT long file name extensions, EXT2, EXT3, EXT4 file systems, or NTFS-formatted storage volumes.



Ⓕ **Remote RS-232 port** — You can configure and control the SME 211 using SIS commands. Connect the host RS-232 cable to the rear panel with a 3-pole captive screw connector for bidirectional serial host control (see the image at right for wiring).

Ⓖ **Reset button and LED** — The SME 211 has several reset modes to return user-defined configuration settings or all settings back to factory defaults. The LED blinks to indicate the desired reset mode, and provides the reset status during the reset operation (see **SME 211 Rear Panel Reset** (see page 11).

Ⓗ **RJ-45 Ethernet connector (LAN)** — You can configure and control the SME 211 using SIS commands with a control system or PC connected to the same LAN or WAN. Connect a standard Ethernet cable to a network.

IP Address:	192.168.254.254
Subnet Mask:	255.255.0.0
Default Gateway:	0.0.0.0
DHCP:	OFF

Input Connections

The SME 211 has one HDMI digital video and audio input and one 3.5 mm, 5-pole captive screw connector for analog stereo audio input.

- **C** **HDMI input** — Connect an HDMI (or DVI with suitable adapter) source device to input (see **Figure 3**, C on page 8).
- **D** **Analog audio input** — Connect a balanced or unbalanced stereo line level audio device to this 5-pole, 3.5 mm captive screw connector. Analog audio can be selected for output with the HDMI input instead of the embedded audio. Wire the connector as shown below.

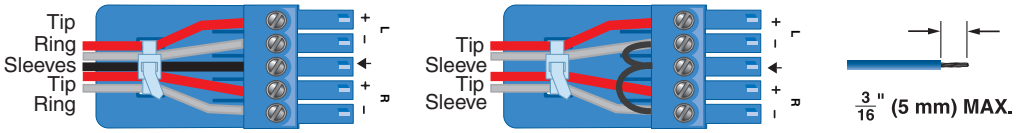


Figure 4. **Audio Input Captive Screw Connector Wiring**

ATTENTION:

- Do not tin the wires. Tinned wires are not as secure in the captive screw connector and could pull out.
- Ne pas étamer les câbles. Les câbles étamés ne sont pas aussi bien fixés dans les connecteurs des à vis captives et pourraient sortir.
- The length of the exposed wires in the stripping process is important. The ideal length is 3/16 inch (5 mm). If longer, the exposed wires may touch, causing a short circuit between them. If shorter, the wires can be easily pulled out even if tightly fastened by the captive screws.
- La longueur des câbles exposés est importante lorsque l'on entreprend de les dénuder. La longueur idéale est de 5 mm (3/16 inches). S'ils sont trop longs, les câbles exposés pourraient se toucher et provoquer un court-circuit. S'ils sont trop courts, ils peuvent être tirés facilement, même s'ils sont correctement serrés par les borniers à vis.

Output Connection

- **E** **HDMI output** — Connect an HDMI (or DVI with a suitable adapter) display device to this HDMI output connector for easy size and position setup and to access the internal web browser.

SME 211 Rear Panel Reset

The **Reset** button on the rear panel of the SME 211 (see **Figure 3**, G on page 8) returns the SME 211 to various default conditions. There are three unit reset modes (numbered 1, 4, and 5) that are initiated from the rear panel reset button. To select different reset modes, use a pointed stylus or small screwdriver to press and hold the **Reset** button while the SME 211 is powered or press and hold the **Reset** button while applying power to the SME 211.

NOTES:

- The reset modes listed in the **SME 211 Series Reset Modes** table on the next page close all open IP and Telnet connections and all sockets.
- Each reset mode is a separate reset (not a continuation from mode 1 to mode 5).
- Reset modes 2 and 3 are not available for the SME 211.
- The SME 211 can also be reset using the web-based user interface **Reset and Reboot** on page 56.
- The SME 211 can also be reset using SIS commands, see **Resets** on page 68.

ATTENTION:

- Review the reset modes carefully. Some reset modes delete all user loaded content and revert the device to default configuration.
- Analysez minutieusement les différents modes de réinitialisation. Certains modes de réinitialisation suppriment la totalité du contenu chargé de l'utilisateur et remettent l'appareil en mode de configuration par défaut.

See Figure 5 below for simple reset instructions and the **SME 211 Series Reset Modes** table on the next page for a summary of the reset modes.

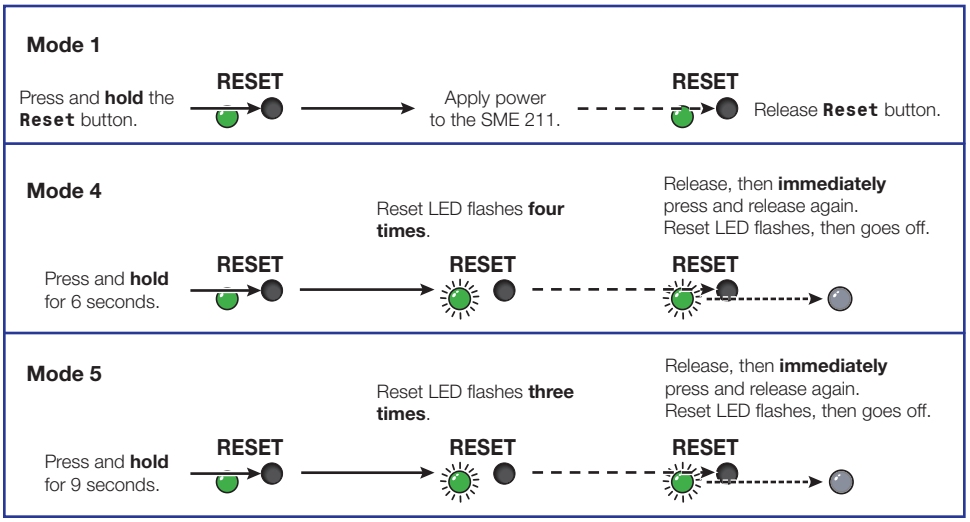


Figure 5. Resetting the SME 211

SME 211 Series Reset Modes				
	Mode	**Activation**	**Result**	**Purpose and Notes**
Factory Firmware	**1**	Hold in the recessed rear panel **Reset** button while applying power to the unit.	The SME 211 reverts to the factory default firmware for a single power cycle.	Use mode 1 to revert to the factory default firmware for a single power cycle if incompatibility issues arise with user-loaded firmware. All user files and settings are maintained.
		NOTE: Do not operate with the default firmware loaded by a mode 1 reset. Use it only to load the most current firmware to the device.		
Reset All IP Settings	**4**	Hold in the **Reset** button until the reset LED flashes four times. Then, release and press **Reset** again within 1 second*.	• Sets port mapping back to factory default. • Sets the IP address back to factory default (192.168.254.254). • Sets the subnet mask address back to the factory default (255.255.Ø.Ø). • Sets the gateway IP address to the factory default (Ø.Ø.Ø.Ø). • Turns DHCP off. • The reset LED on the rear panel of the unit flashes four times in succession.	Mode 4 is used to set IP address information using ARP and the MAC address. "Resetting IP Settings" appears on a connected display.
Reset to Factory Defaults	**5**	Hold in the **Reset** button until the reset LED flashes three times. Then, release and press **Reset** again within 1 second*.	Performs a complete reset to factory defaults (except the firmware). • Does everything mode 4 does. • Clears port configurations. • Resets all IP options. Clears all user settings. • Clears all files from the unit. • The reset LED on the rear panel of the unit flashes four times in succession.	Mode 5 is useful to start over with default configuration and uploading. "Resetting SME 211" appears on a connected display. Mode 5 is equivalent to SIS command ZQQQ (see SIS command **Absolute reset** on page 68.

NOTE: *For modes 4 and 5, nothing happens if the momentary press does not occur within 1 second.

Front Panel Operation

This section of the manual discusses the operation of the SME 211 front panel.

Topics covered include:

- **Front Panel Features**
- **SME 211 Power Up Procedure**
- **Front Panel Lockout (Executive Mode)**

Front Panel Features

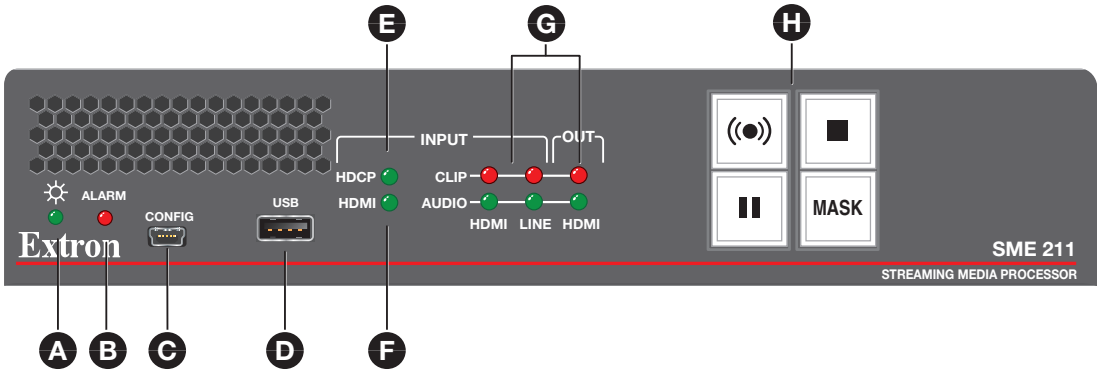


Figure 6. SME 211 Front Panel

Ⓐ Power LED

Ⓑ Alarm LED

Ⓒ USB mini-B port for configuration

Ⓓ **USB type A port for external storage**

Ⓔ **HDCP LED**

Ⓕ **HDMI LED**

Ⓖ **Audio Input indicators**

Ⓖ **Audio Output indicators**

Ⓗ **Streaming controls with LED indicators**

Ⓐ **Power LED** —

- **Green** — The power is on and the unit is operational.
- **Blinking Green** – The power is on but the unit is still booting (not operational).

Ⓑ **Alarm LED** — Lights up red when one or more alarms are triggered (see **Alarms and Traps** on page 43 for more information on the types of alarms and how to clear them).

Ⓒ **USB mini-B port for configuration** — Connect a control device to this port with a USB mini-B cable (not supplied). Use this port to send SIS commands to the SME 211 for device configuration and control (see **Remote Communication and Control** starting on page 58).

Configuration and adjustments can be performed using the embedded web pages (see **Web-Based User Interface** on page 16), and the SIS commands (see **Remote Communication and Control** starting on page 58).

D **USB type A port for external storage** (see **Figure 6** on the previous page)— Connect a USB compatible media device to this port. The storage device can be any standard external hard drive or USB flash drive formatted with a compatible file system.

> **NOTE:** The SME 211 can detect and read data from USB storage devices using FAT32, VFAT long file name extensions, EXT2, EXT3, EXT4 file systems, or NTFS-formatted storage volumes.

E **HDCP LED** — Lights green when HDCP content is detected.

F **HDMI LED** — Lights green when HDMI video input sync is detected.

G **Audio Signal and Clip LEDs** —

- **Audio Input indicators** — Red (signal clipping) and green (signal present) LEDs for HDMI and line input channels.
- **Audio Output indicators** — Red (clipping) and green (signal present) LEDs for the output channel.

For both the Audio Input and Audio Output indicators, the green signal LED varies in brightness corresponding to the input signal level. It begins to light at -60 dBFS, increasing to full intensity corresponding to signal level increases. When the signal level reaches -3 dBFS or above, the red clipping LED lights and remains lit as long as the signal remains about -3 dBFS. When it falls below that level, the red LED remains lit for 200 milliseconds, after which the indicator resumes real-time monitoring of the signal level.

H **Streaming controls with LED indicators** — Press the **Stream**, **Stop**, **Pause**, and **Mask** buttons to perform the operation. The buttons light to indicate the current state of streaming operation.

- **Stream** — Press  to start live streaming or resume live streaming after pausing. When the unit is streaming, the LED lights red steadily. When the unit is not streaming, the LED flashes red rapidly.

  > **NOTE:** Each encoder and stream type has individual controls. Check the settings to ensure the correct stream type is enabled for an application. If no individual streams are enabled, the **Stream** button will flash red when active, until at least one individual stream is enabled.

- **Stop** — Press  to stop the active streaming. When the unit is not streaming, the LED lights green steadily. When streaming is paused, the LED lights amber steadily.

- **Pause** — Press  to pause streaming. When pressed, the green **Pause** button blinks green to indicate streaming is paused. Press **Stream** or press **Pause** to resume streaming or **Stop** to halt the streaming.

- **Mask** — Press  to transition cleanly from streaming live video from the HDMI input to streaming a selected still image mask. Press the button again to transition cleanly back to streaming video from the HDMI input.

  > **NOTE:** The still image mask may be enabled or disabled independently of the streaming state (Stream, Stop, Pause).

SME 211 Power Up Procedure

NOTE: Before powering the SME 211, ensure that all necessary devices are connected properly. Connected devices do not need to be powered on.

Connect the power cord to a 100 to 240 VAC supply (see **Power Connection** on page 8).

Front Panel Lockout (Executive Mode)

To prevent accidental changes to front panel menu settings, enable executive mode. Executive mode can be enabled and disabled from the front panel. Press the **Stop** and **Mask** buttons simultaneously for 5 seconds. The **Mask** button flashes to confirm the mode change and all LEDs are turned off when Executive mode is enabled.

Executive Mode can also be enabled or disabled from the web pages or using SIS (see **System Settings** on page 46 or **Front Panel Lock (Executive Mode)** on page 68

When executive mode is enabled, any attempts to utilize the front panel buttons triggers the **Stream**, **Pause**, **Stop** and **Mask** button LEDs to blink 3 times.

When executive mode is active, all functions and adjustments can still be made via USB, RS-232, Ethernet, and web interface controls (see **Remote Communication and Control** starting on page 58).

NOTE: Control buttons indicate the current streaming status regardless of executive mode.

Setting the IP Address Using SIS Commands

Using the front panel config port, you can use the following SIS commands to enable and disable DHCP, view and configure the IP address, and change the subnet mask. Use DataViewer, available from **www.extron.com**, on a control PC via any of the control system connections to send commands to the SME 211 and view the results.

SIS Command	Description
Esc CI ←	View the current IP address
Esc 1DH ←	Enable DHCP
Esc ØDH ←	Disable DHCP
Esc 2BOOT ←	Restart the network interface and apply changes
Esc 192.168.254.254CI ←	Set the default IP address
Esc 255.255.Ø.ØCS ←	Set the default subnet mask

NOTE: ← = Carriage return (no line feed, hex 0D).

Web-Based User Interface

This section provides information about:

Overview of the Web-Based User Interface

The SME 211 embedded web pages provide the software user interface for operating and configuring the SME 211 via a control PC on the same network.

NOTES:

- Google Chrome is the preferred web browser for the web-based user interface.
- Preview video for the web pages is disabled in Internet Explorer 11.

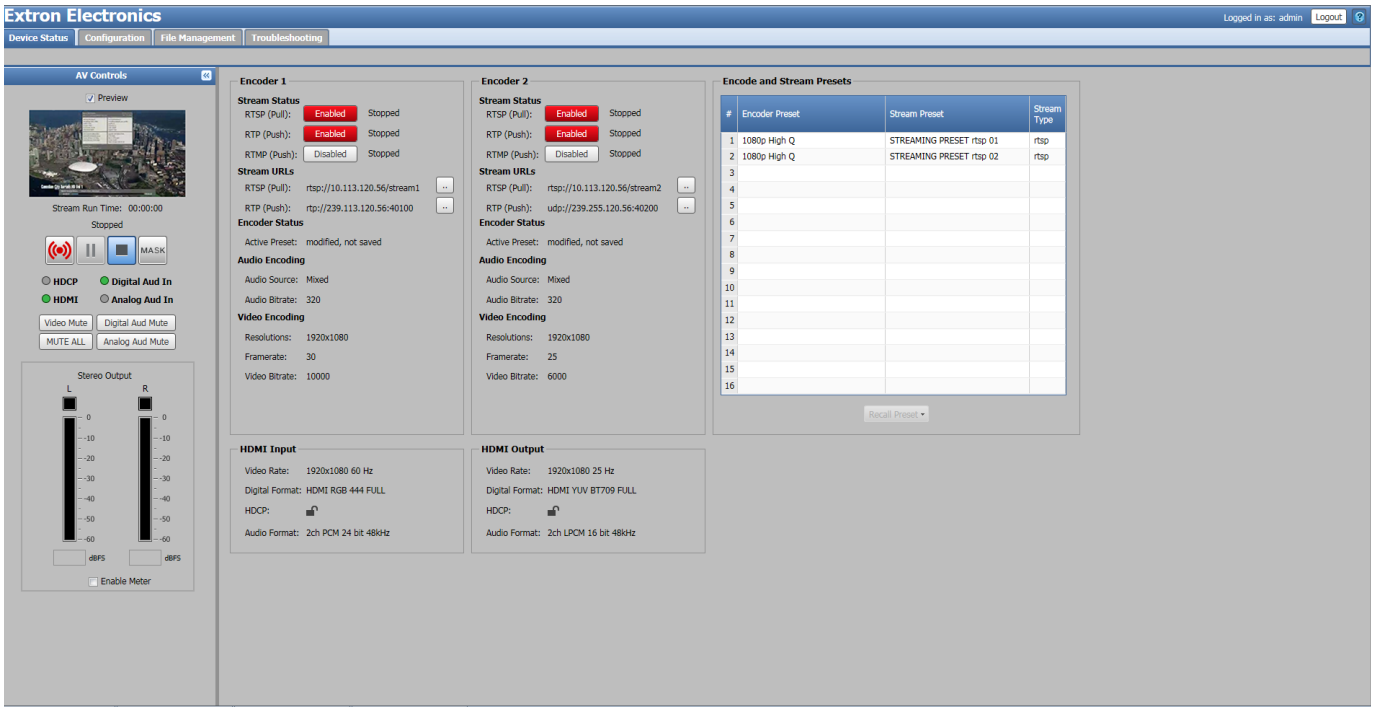


Figure 7. SME 211 Embedded Web Pages

These web pages provide the following features:

- Ability to fully configure the SME
- Remote control and active monitoring of the SME
- A small embedded video window to view the AV content that is being streamed
- Ability to display alarm history and allow administrators to clear active alarms
- Ability to update firmware

Web Browser Requirements

In order to view the SME 211 embedded web pages, use one of the supported web browsers (and versions) listed below.

- Google Chrome version 48 or higher
- Mozilla Firefox version 44 or higher
- Microsoft Internet Explorer version 11 or higher (for Windows operating systems)
- Safari version 9 or higher (for macOS operating systems)

NOTE: Safari is the preferred browser for macOS operating systems.

NOTE: The preview video in the AV Controls panel of the SME 211 uses an HTML5 player and is not supported by Microsoft Internet Explorer v.11, Microsoft Edge, or Safari. To see a preview of the current stream you can either:

- Use a different browser
  or
- Open a standalone, third-party video player (such as VideoLAN™ opensource VLC™ media player) and connect to the SME streaming file .

- Additionally, the device Web UI is compliant, but not fully featured, with the internal browser client:
  - QTWeb v4.x

Turning Off Compatibility Mode

The SME 211 embedded web pages do not support compatibility mode in Microsoft Internet Explorer.

To check compatibility view settings:

- From the browser, select **`Tools > Compatibility View Settings`**. The `Compatibility View Settings` dialog box opens.
- Be sure that the **`Display all Websites in Compatibility View`** checkbox is cleared and that the IP address of the SME 211 is not in the list of Compatibility view sites.

Web-based User Interface Help Files

The SME 211 web-based user interface contains an extensive set of help files to assist with the connection, configuration, monitoring, and operation of the SME 211. The following sections contain an overview of those files and also includes information not contained in the help files.

Accessing the Web-Based User Interface

To access the embedded web page user interface, connect a control PC to the LAN port of the SME 211, or to the same network shared by the SME, and open a web browser. Enter the IP address of the SME 211 (the default IP address is 192.168.254.254) into the browser address field. If necessary (if the unit has already been configured), enter the username and password to log in, then click **`Log In`** or **`OK`**.

The main user interface opens to the **`Device Status`** page (see Figure 8 below).

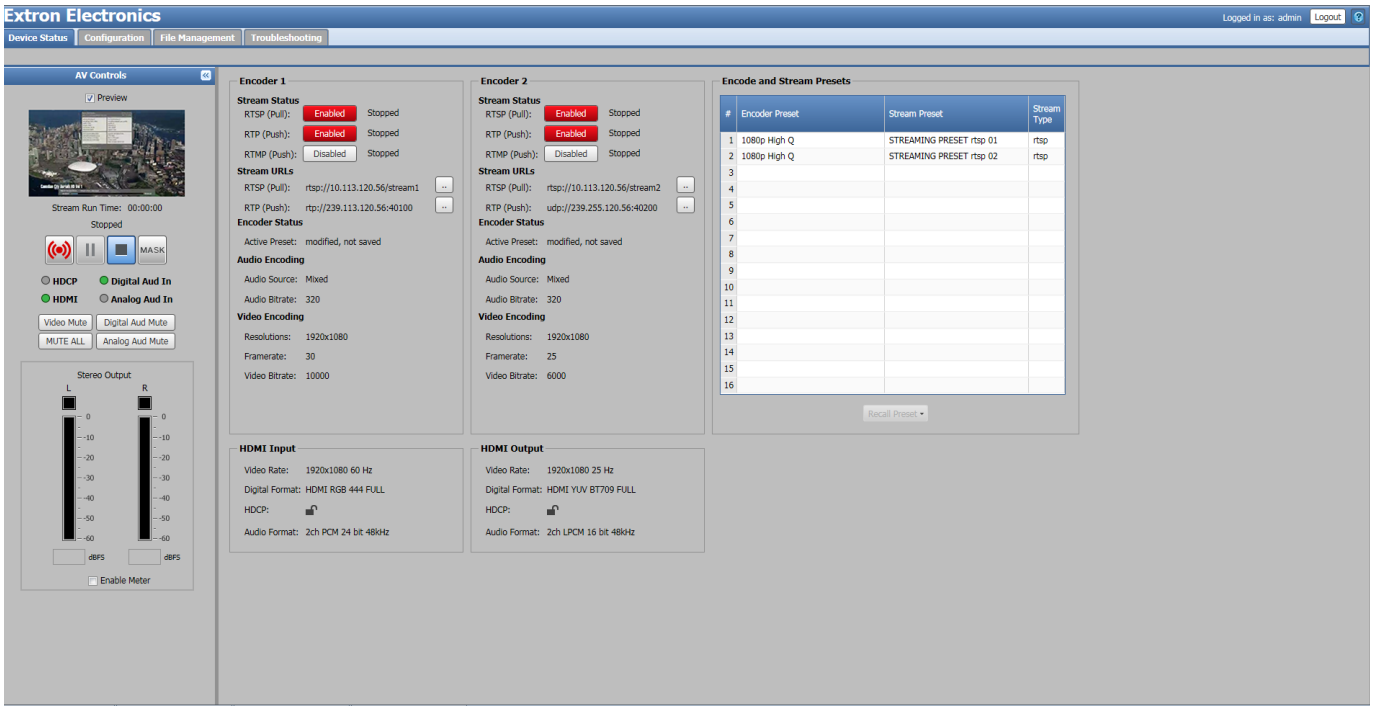


Figure 8. SME 211 Embedded Web Page

Page Overview

The SME 211 pages are organized by function and further organized within those main functions. Click the tabs to open the pages.

Tabs

The pages in the SME 211 are grouped within four main tabs at the top of the screen:

Figure 9. Four Main Function Tabs

❶ **`Device Status`** — This single page provides a view of the status of the input and outputs, along with details of the active stream or streams (the current event). The URLs of the stream or streams are also displayed on this page (see **Device Status** on page 24).

❷ **`Configuration`** — The eight pages within this tab contain the core controls typically needed during initial setup, or for upgrading the unit, or restoring a configuration. They make it possible for an administrator to:

- Configure basic AV input settings
- Output video test patterns for setup
- Save or apply EDID settings
- Configure output stream image settings and presets
- Set up AV encoding and presets
- Configure metadata and create streaming profiles
- Set passwords
- Set up notices and alarms

The **`Configuration`** pages also provide a way to configure basic communication, identity, time, and data storage settings. These pages also make it possible to update firmware, save a configuration, or restore a configuration from a saved file (see **Configuration** on page 25).

❸ **`File Management`** — This page provides a way to view folders and files on the internal drive and any attached external drive or drives. It also provides a way to connect the SME to shared network drives, and upload fonts to the SME (see **File Management** on page 49).

❹ **`Troubleshooting`** (see **Troubleshooting** on page 51) — The five pages within this tab display factory-defined and user-defined information including:

- Detailed system status and encoder status
- A log of events and a log of alarms with their status, which can be exported to a CSV file
- Three simple diagnostic tools for checking network connections
- Options to perform many types of resets on the SME

Pages Within Tabs

The **`Configuration`**, and **`Troubleshooting`** tabs each include several pages. To access each page, click the corresponding function within the second tier of tabs (sub-tabs) located below the main tabs near the top of the screen (**`Configuration`** > **`Input/Output Settings`** is shown selected in Figure 10 below).

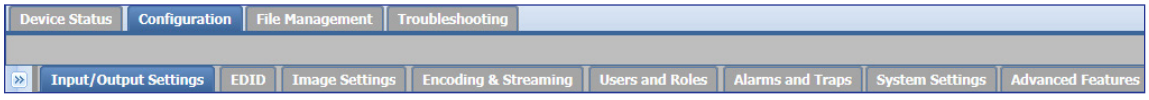


Figure 10. Pages Within Tabs (Subtabs)

Panels and Screen Sections

Each SME 211 web page contains at least one panel and a main window with sections that group the controls and information for each page. Most panels include controls and a variety of adjustments and settings. Specific sections can include controls or simply display information. Sections or panels can include tabs with additional selections and options.

All SME 211 web pages include the **AV Controls** panel at the left of the screen (see **AV Controls** on page 22). The **Device Status** page is the main page. It contains one panel and three sections.

Collapse and Expand Panels

Click the blue panel name bar or the **Expand** arrow button (see figure 11, ❶) on the right side of a panel. The panel opens to a full view, or as much as possible with the current display settings.

Click the blue panel name bar or the **Collapse** arrow button (❷) at the top corner of a panel to collapse it. This hides the controls and provides additional room for other panels.

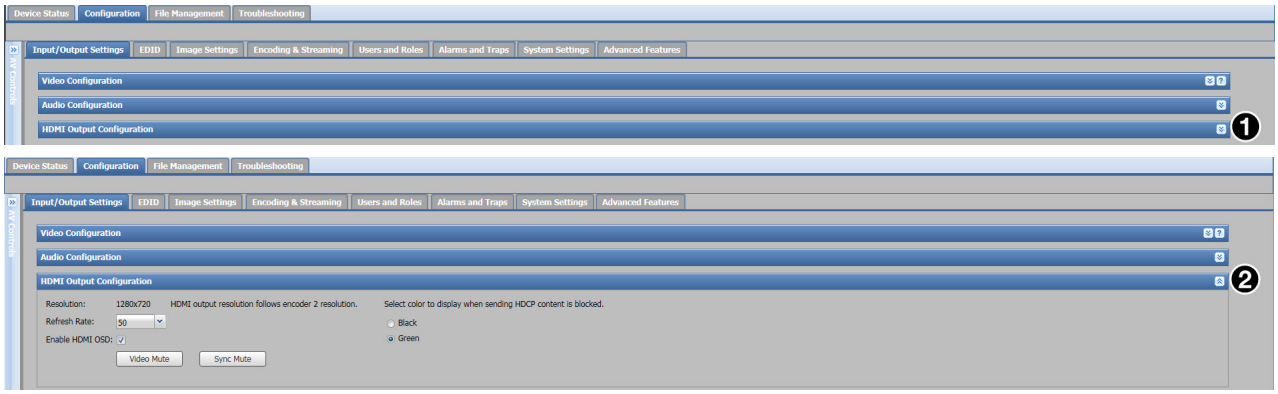


Figure 11. Collapsed and Expanded Panels

NOTE: For some pages, the last-selected view is maintained for each page within the SME 211 web pages. If the user navigates away from one page to a different tab or page, then returns to the page, the display appears as it did before the page was left.

For pages with many panels, the panels automatically collapse each time the user leaves and returns to the page.

Web Page Idle (Timeout)

To conserve resources (memory, bandwidth) on the PC, if the web browser is idle for more than about an hour, the SME 211 web page enters idle mode. During idle mode, status updates and video confidence (preview) display image updates are suspended, and the following message is displayed in front of the page (see figure 12 below):

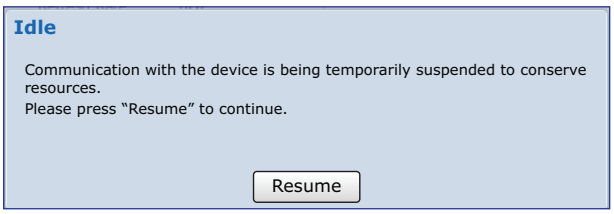


Figure 12. Communication Suspended Notification

The idle status does not affect the streaming operation, which continues unaffected no matter what state (active or idle) the web pages are in.

To reconnect the web page to the live feed from the SME 211, click **Resume**. In a moment, the browser refreshes the view, and the status updates and video confidence display resume.

NOTE: If the SME 211 loses the network connection, the connection to the embedded web pages is also lost. A notice of the connection failure may be sent, but there is no specific status indication for disconnection.

Logging In and Logging Out

To log in to an SME 211:

1. Open a web browser.
2. Enter the IP address of the SME into the address field and navigate to that unit. The Authentication Required (Chrome or Firefox) or Windows Security (Internet Explorer) login dialog box appears.
3. Enter the appropriate user or administrator user name and corresponding password into the fields.
4. Click **Log In** or **OK**. The embedded web page opens.

Before changing roles (from administrator to user, or user to administrator) or to change user accounts, log out of the embedded web pages. The user or administrator status is displayed in the upper-right corner of all web pages.

To log out of the web pages:

NOTE: The Logout button appears regardless of passwords being set for admin and user.

1. From any embedded web page, click the **Logout** button at the upper-right of the browser page.

   A Logout dialog box opens.

2. Click **OK** to log out of the SME 211 web pages, or click **Cancel** to remain logged on using the same account.

   The Logout dialog closes and returns to the embedded web pages.

NOTE:

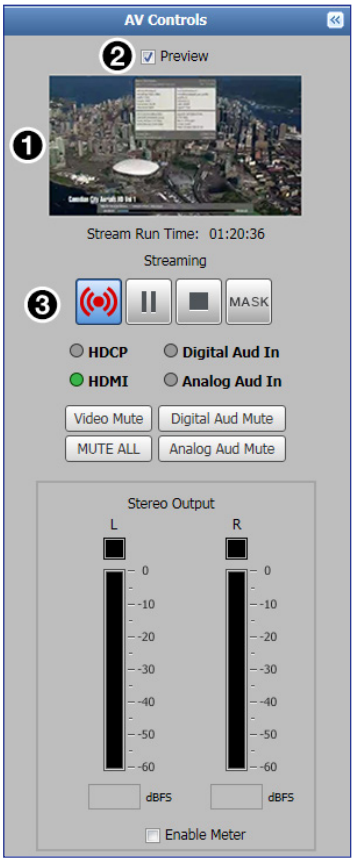
- If **Cancel** is clicked, the user remains logged in and the embedded web pages continue to function as they did before **Logout** was clicked.
- If **OK** is clicked, the controls are replaced by a message confirming that the user is logged out and asking to close the browser.
  - Close the browser completely. If only a tab within the browser is closed, the logout process does not complete.
  - Some browsers, such as Google Chrome, include an option to continue running in the background after closing.

AV Controls

The AV Controls panel is available on every page and within all tab views. Located along the left side of the pages, this panel makes it possible to easily control overall streaming operation, see a thumbnail view of the stream, along with the stereo output levels, and mute or unmute the AV output. The browser always opens with the AV Controls panel expanded and both users and administrators have access.

AV Controls Panel Features

The AV Controls panel includes the following features:

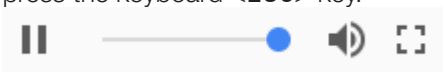


Preview video panel

This area (see ❶, at right) provides a small, live stream of the output video to view what is being streamed. To make the embedded web pages faster to refresh, the stream for this live view can be disabled. The output stream continues to be streamed when this preview is disabled. Select (check) the **Preview** checkbox (❷) above the preview window to enable or disable the live feed. The live preview stream is independent of the streaming settings configured on the Encoding Presets page.

NOTE: To use the preview video in the AV Controls panel of the SME 211, Extron recommends using Google Chrome or Mozilla Firefox web browsers.

To display the preview in full screen, hover the mouse pointer over the preview window to expose the preview controls (see image below) and click on the full screen icon. To exit full screen view, press the keyboard <**Esc**> key.



NOTE: Depending on operating conditions and resources, the preview video may be delayed.

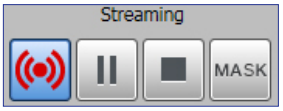
Preview Audio Mute

By default, the audio portion of the preview is muted. This does not affect audio of the stream. To listen to the audio associated with the video preview, click the preview audio **Mute** button (see ❹, below) to change from muted to unmuted:

NOTE: The preview audio mute is contained within the preview window and styling is browser dependent. Hovering over the preview window with the mouse will display the audio mute.

Streaming controls

Streaming control buttons (see **AV Controls Panel Features**, ❸ on the previous page) include:



- **Stream** — Begin streaming the enabled streams
- **Pause** — Pause streaming
- **Stop** — Stop streaming
- **Mask** — Click this button to transition cleanly from streaming live video from the HDMI input to streaming a selected still image mask. Click the button again to transition cleanly back to streaming video from the HDMI input.
  This button works like the **Mask** button on the front panel of the SME. The Mask feature can be enabled or disabled at any time, allowing the selected still image to be viewed on the HDMI output and browser preview before streaming starts.

NOTE: The front panel buttons also indicate the streaming state, mirroring the AV Controls panel indicators (see **Front Panel Features** on page 13).

Source Indication LEDs and Mute controls

Indicators display the presence of an active HDMI source, the HDCP status of the HDMI source, and the selected audio source (either digital [HDMI embedded] audio, analog audio, or a mix of both).

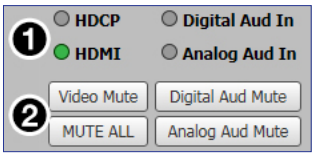


Figure 13. Active Inputs, Mute, Audio, and Auto-image

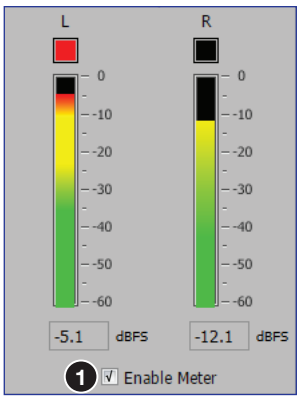
- **LEDs** — Indicate the presence, absence, and status of an HDMI signal and the audio types selected (see figure 13, ❶).
- **Mute buttons** — Click the desired button (❷) to mute video only (**Video Mute**), digital audio only (**Digital Aud Mute**), analog audio only (**Analog Aud Mute**), or both audio and video (**MUTE ALL**).

When a mute mode is selected (active), the corresponding button or buttons are red. Click the buttons or send SIS commands to the unit via RS-232 or USB control to toggle mute status (see **Command and Response Tables** starting on page 66).

When unmuted, the button changes from red to gray.

Audio Output Meter

Left and right channel indicators display the audio output level (in dBFS) of the encoded output stream when there is an active audio output. The boxes at the top of the meters are red when audio clipping occurs and black when audio is not clipped. To enable the meters, select (check) the **Enable Meter** checkbox (❶) below the meters.



Device Status

The `Device Status` page displays read only information about the presentation currently in progress.

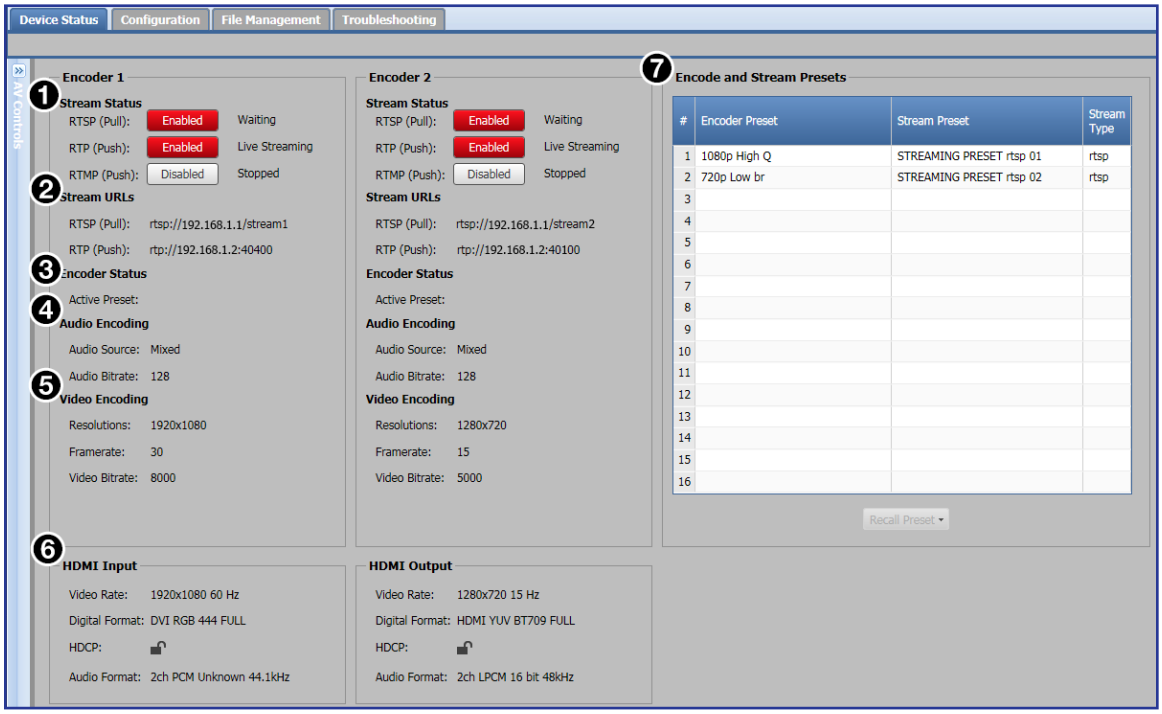


Figure 14. Device Status Page

This page contains five panels:

❶ `Stream Status` — The RTSP, RTP, and RTMP stream status

❷ `Stream URLs` — The URLs for the streams currently in progress

❸ `Encoder Status` — The currently active preset

❹ `Audio Encoding` — The current audio source and bitrate

❺ `Video Encoding` — The current resolution, framerate, and video bitrate

❻ `HDMI Input/Output` — The HDMI input and output video rate, digital format, HDCP status, and audio format

❼ `Encode and Stream Presets` — The available encode and stream presets

NOTE: See the *SME 211 Embedded Web Pages Help File* for more information.

Configuration

The eight pages within the Configuration tab contain the core controls needed during initial setup or for upgrading the unit and restoring a configuration.

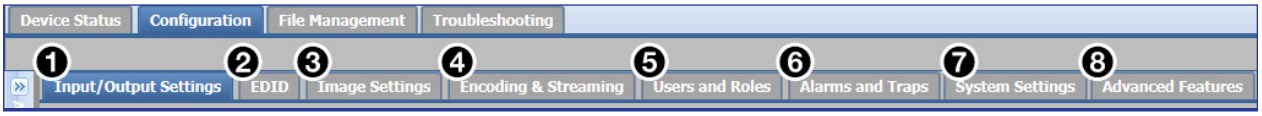


Figure 15. Configuration Tab and Subtabs

Using these pages, an administrator can:

- Configure basic AV input settings
- Configure digital Input and Output ports
- Output video test patterns for setup
- Configure output stream settings and presets
- Set up AV encoding and streaming
- Set passwords
- Set up notices and alarms
- Configure basic communication, identity, time, and data storage settings
- Upgrade the unit by updating firmware
- Save configurations or restore a configuration from a saved file

Configuration Tab Features

The pages within Configuration include the following (figure 14 above):

❶ **Input/Output Settings** — Makes it possible to change the name for the input, select an aspect ratio type, and enable or disable Auto-Image, Auto Memory, and HDCP Authorized. This page includes audio configuration controls to adjust audio levels.

It also allows the user to select the refresh rate for the local HDMI output, enable the HDMI OSD, and select HDCP Notification (see **Input/Output Settings** on the next page).

❷ **EDID** — Makes it possible to choose the preferred resolution and refresh rate for the HDMI input, from a selection of common settings, as well as configure custom EDID (see **EDID** on page 30).

❸ **Image Settings** — Makes it possible to configure video input sampling and sizing, set up overscanning of SMPTE input signals, and adjust picture controls (brightness, contrast, and the like). It also allows the user to save or recall input presets (see **Image Settings** on page 31).

NOTE: When the image size is increased above 1920x1080 the encoder receives a 1920x1080 region cropped from the up-scaled image.

❹ **Encoding & Streaming** — (see **Encoder Settings and Streaming** on page 32)

Use these settings to:

- Set up AV encoding
- Configure the streaming method, protocol, and settings
- Create, save, and recall encoder and streaming presets
- Set up mask OSD and test patterns
- Select fonts for metadata information
- Configure metadata elements
- Configure video test patterns

❺ **Users and Roles** (see **Figure 15** on the previous page) — Makes it possible to set administrator and user passwords (see **Users and Roles** on page 42).

❻ **Alarms and Traps** — Makes it possible to set up the e-mail server and the sender and recipient e-mail addresses for notifications within this page. Select the alarm "priority" level for each of several types of errors or conditions monitored by the unit (see **Alarms and Traps** on page 43).

❼ **System Settings** — (see **System Settings** on page 46)

Contains an assortment of settings in expandable panels. In this page, an administrator can configure settings for:

- Unit identity (unit name and network location)
- Date and time
- Networking
- USB Port Power
- Serial settings

It also makes it possible to:

- Update firmware
- Load a license
- Save configurations or restore a configuration from a saved file
- Enable and disable Executive mode

❽ **Advanced Features** — Makes it possible to enable a web browser client option on the unit or to upload new plug-in applications (see **Advanced Features** on page 47).

NOTE: See the *SME 211 Embedded Web Pages Help File* for more information.

Input/Output Settings

The controls within the **Input/Output Settings** page within the **Configuration** tab allow an administrator to select a number of settings in the three panels:

- **Video Configuration** — Name the Input, select an aspect ratio, and enable or disable Auto-Image, auto memory and HDCP authorization.
- **Audio Configuration** — Make adjustments to audio levels, and select options for audio mute.
- **HDMI Output Configuration** — Select output refresh rate, mute output video or output sync (allowing capable displays to go into standby), and enable the HDMI OSD.

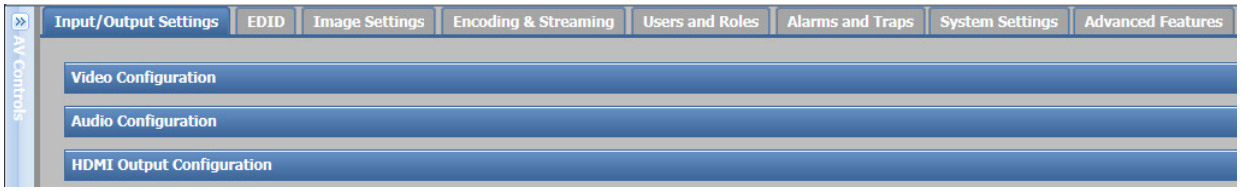


Figure 16. Input/Output Settings Panels (Collapsed)

Aspect Ratio

The `Aspect Ratio` adjustment (see ❶ in Figure 17 below) allows the user to select between aspect ratio conversion modes to fill the entire window (**`FILL`**), scale up to fit the window and keep the original aspect ratio (**`FIT`**), or to allow each input rate to display in its native aspect ratio with respect to the channel window (**`FOLLOW`**).

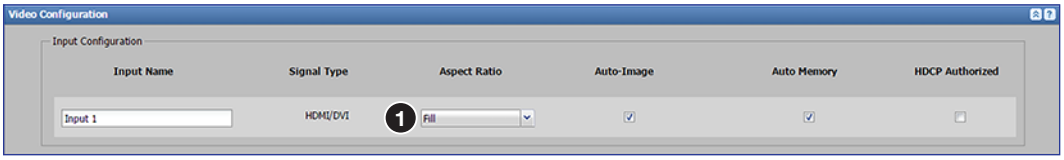


Figure 17. Video Configuration Aspect Ratio

Aspect Ratio	Screen Appearance	Description
FOLLOW		The input format passes unchanged. A 4x3 format (represented by the red block on the left) remains at its original aspect ratio. The vertical dimension fills, but not the horizontal dimension of the output. Letter box or pillar bars can be applied based on the horizontal and vertical size settings.
FIT		The input format is zoomed to fill the output with top and bottom or left and right information cropped out in order to fit the screen without letter boxing or adding pillars. Some loss of image occurs, represented by the dimmed image outside the red box.
FILL		The input format is non-uniformly scaled to fill the 16x9 output. A 4x3 input fills the horizontal and vertical screen of the output with some distortion of the input (default).

NOTE: The SME 211 has a scaler for each encoder allowing the resolution to be different for each, but the signal path is from Encoder 1 to Encoder 2. This aspect ratio setting affects the input to Encoder 1 and Encoder 2 and is always set to 'fill' the output from Encoder 1. In addition, custom resolutions are centered within the next largest standard resolution and padded with a black border on the HDMI output.

Auto Memory and Auto-Image

Select the checkbox to enable **Auto-Image** (see figure 18, ❶). Auto-Image simplifies setup by executing image sizing, centering, and filtering adjustments with a single button push.

Select the checkbox to enable **Auto Memory** (❷). Auto Memory recalls input and image settings for signals that have previously been applied. When Auto Memory is disabled, the SME 211 treats every new input as a new source.

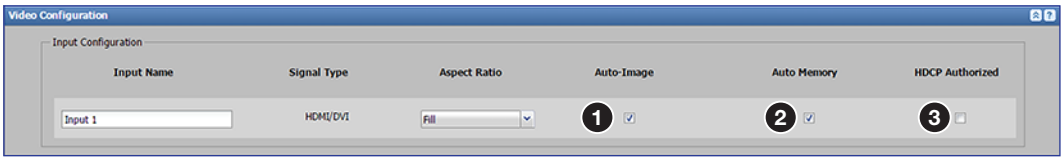


Figure 18. Video Configuration Auto-Image and Auto Memory

These two features can work together depending on the configuration the user chooses. See the table below for more information on the settings.

Auto Memory and Auto-Image Features		
Auto Memory	**Auto-Image**	**Information**
On	On	"New" signals or rates not previously detected by the device are initially set up using default parameters. Then, **Auto-Image** is automatically applied and those values are stored. The next time that signal is detected, the stored values in the auto memory location are applied.
On	Off	"New" signals or rates not previously detected by the device are set up using default parameters. If changes are made manually to the input and picture settings, an **Auto Memory** location is created and then recalled each successive instance that the input is detected.
Off	On	When **Auto Memory** is disabled, each change in the input sync is treated as a new signal, and **Auto-Image** is triggered automatically. Any changes that are made manually to the image and picture controls are lost each time a new refresh rate is detected.
Off	Off	Each change in the input sync causes default values to be applied to the rate. Any changes that are made manually to the image and picture controls are lost when a new rate is applied.

HDCP Authorization

Select this checkbox to turn the **HDCP Authorized** on or off (❸). When disabled (Off) the SME 211 requests that the source does not use encryption if possible. If the source enforces encryption, the SME 211 is unable to display the HDCP content, and displays a green or black screen.

Audio Configuration

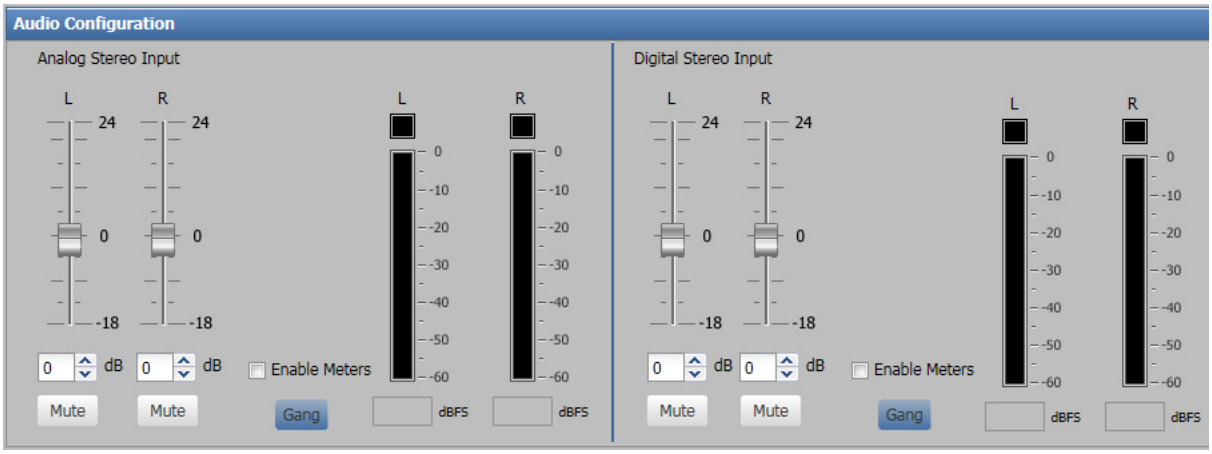


Figure 19. Audio Configuration Panel

Use the gain controls in this section to configure the analog and digital audio inputs.

HDMI Output Configuration

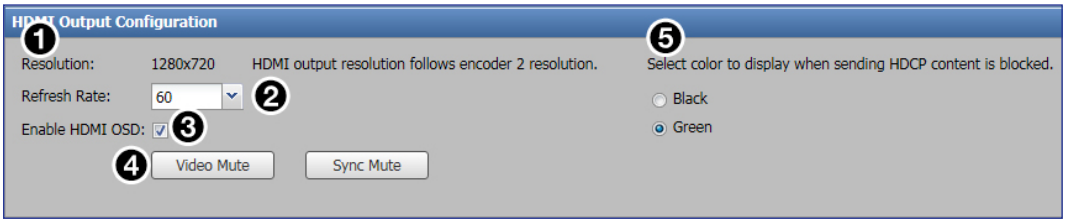


Figure 20. HDMI Output Configuration Panel

❶ The `Resolution` of the HDMI output can be viewed in this panel. It is configured in the **Encoder Settings and Streaming** page (see **page 32**).

> **NOTE:** Custom resolutions are centered within the next largest standard resolution and padded with a black border on the HDMI output.

❷ The `Refresh Rate` for the output of the SME can be selected from the drop-down list. Choose **50** Hz or **60** Hz.

❸ The Status OSD will be displayed on the top left corner of the HDMI preview output. By default, `Enable Status OSD on HDMI output` is enabled. Deselect the checkbox to disable.

❹ The HDMI mute output options can be selected in this panel. Choose one of the two options: **`Video Mute`** or **`Sync Mute`**.

❺ Choose the desired color to display when HDCP content is present.

EDID

The EDID page within the **Configuration** tab makes it possible to manage the EDID information (resolution and refresh rate) between the HDMI input and the output source. The SME uses EDID Minder, which ensures that a source device connected to the SME 211 input continuously sees the EDID of a sink device.

This page allows the user to select from 38 factory-loaded EDID or create up to three custom EDID (see **EDID Values** on page 83 for a complete list of available EDID).

The default EDID for the SME 211 is 720p @ 60 Hz.

To open this page, click the **Configuration** tab at the top of the SME 211 embedded web pages and then click the **EDID** tab on the second tier of tabs.

The EDID Minder page opens.

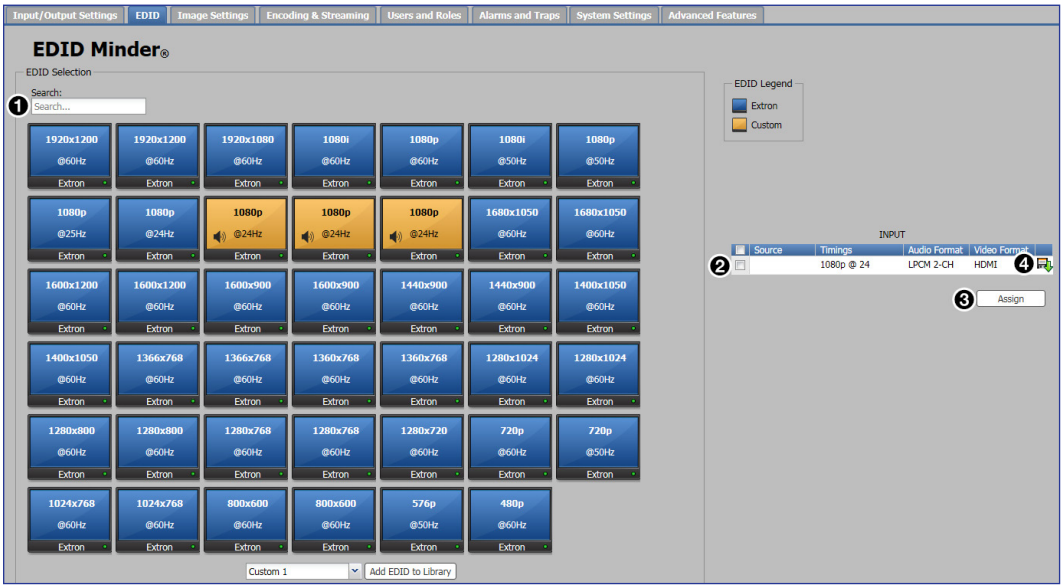


Figure 21. EDID Minder Page

To select an EDID:

1. Open the EDID Minder page.
2. Select the resolution and refresh rate from the EDID Selection panel, or use the **Search** field to find the desired EDID (❶).
3. Click the **Source** radio button (❷) in the INPUT panel.
4. Click the **Assign** button (❸) in the INPUT panel.
5. To save the selected EDID to a PC, click the download icon (❹) in the INPUT panel.

NOTE: See the *SME 211 Embedded Web Pages Help File* for additional information.

Image Settings

The controls within the **Image Settings** page within the **Configuration** tab provide options to configure video input sampling and sizing, set up overscanning of SMPTE input signals, and adjust picture controls (brightness, contrast, and similar). This page also allows the user to save or recall input presets. A user must be logged in as an administrator to see or change these settings.

To open this page, click the **Configuration** tab at the top of the SME 211 embedded web pages and then click the **Image Settings** tab on the second tier of tabs.

The **Image Settings** page opens.

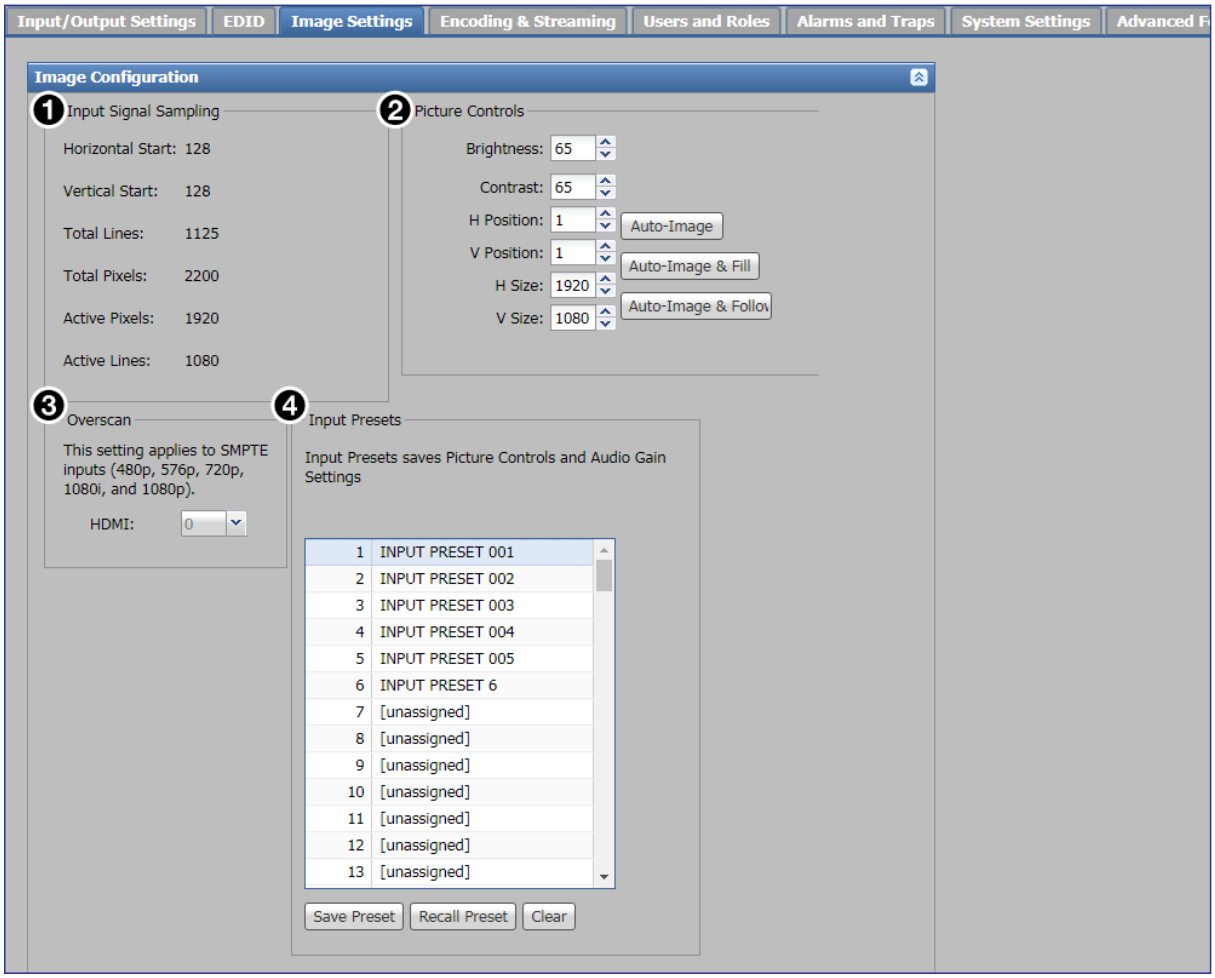


Figure 22. Image Settings Page

This page has the following panels:

❶ **Input Signal Sampling** — This is a read-only panel, which displays the **Horizontal Start**, **Vertical Start**, **Total Lines**, **Total Pixels**, **Active Pixels**, and **Active Lines**.

❷ **Picture Controls** — Alter the quality of the image by changing brightness and contrast, or select **Auto-Image**, **Auto-Image & Fill**, or **Auto-Image & Follow** buttons.

❸ **Overscan** — Set the amount (0, 2.5%, or 5%) of picture enlargement applied to the HDMI video signal for any SMPTE standard input.

❹ **Input Presets** — Save up to 128 presets or recall one of those presets, each with a combination of signal type, signal sampling, picture controls, and audio gain settings.

Encoder Settings and Streaming

The controls within the **Encoding & Streaming** page configure signal streaming and encoding and also permit configuration of an on-screen display and selection or configuration of metadata and streaming profiles. A user must be logged in as an administrator to see or change these settings.

To open this page, click the **Configuration** tab at the top of the SME 211 embedded web pages and then click the **Encoding & Streaming** tab on the second tier of tabs.

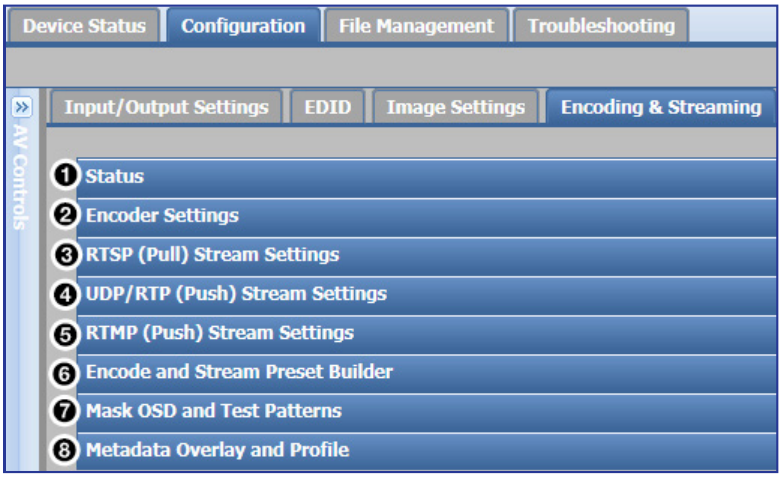


Figure 23. Configuration Tab, Encoding & Streaming Subtab

The **Encoding & Streaming** page opens. It features eight expandable panels:

❶ **Status** — Displays the status of the encoder streams

❷ **Encoder Settings** — Configure audio encoding, video encoding parameters, then create and save or recall presets of those settings

❸ **RTSP (Pull) Stream Settings** — Configure audio and video encoding settings and save or recall presets for the RTSP streams

❹ **UDP/RTP (Push) Stream Settings** — Configure audio and video encoding settings and save or recall presets for the UDP/RTP streams

❺ **RTMP (Push) Stream Settings** — Configure audio and video encoding settings and save or recall presets for the RTMP streams

❻ **Encode and Stream Preset Builder** — Save or recall combined encoder and stream presets

❼ **Mask OSD and Test Patterns** — Configure Mask settings, OSD settings, and test patterns

❽ **Metadata Overlay and Profile** — Configure the metadata overlay and save or recall metadata profiles

NOTE: See the *SME 211 Embedded Web Pages Help File* for additional information.

Some of the encoder settings can also be set using Extron SIS commands (see the **Encoder Presets** on page 75).

Status

This panel displays the current status of each encoder and their respective stream methods.

Stream Status

- **Enabled** — The stream method is enabled
- **Disabled** — The stream method is disabled
- **Live Streaming** — The video or audio are being streamed
- **Waiting** —
  - **RTSP**: Stream method is enabled, but no client is yet connected
  - **RTMP**: Device is attempting to connect to server and waiting for a response

    NOTE: If the connection has not been established after 20 seconds, check the server state (to ensure it has transitioned to the receive state), URL, and key details, and attempt to restart the stream.

- **Stopped** — Streaming is currently stopped

Encoder Settings

This panel contains fields to configure the audio and video settings of the encoders.

NOTE: Internal video signal flow is from Encoder 1 to Encoder 2. For best performance always set Encoder 1 to the higher resolution, if they differ.

Audio encoding

In this section, select or configure settings for:

- **Audio Source** — Select the desired audio source (**Digital**, **Analog**, or **Mixed**)
- **Audio Bitrate** — Select the desired audio bitrate in kbps
- **Audio Delay** — Enter the desired audio delay
- **Audio Sample rate** — Select the desired audio sample rate

Video encoding

In this section, select or configure settings for:

- **Resolution** — Select the desired resolution
- **Custom Width** — Enter a custom resolution width
- **Custom Height** — Enter a custom resolution height

  NOTE: The width and height controls are inactive unless the custom option is selected in the **Resolution** control.

- **Framerate** — Select the desired framerate
- **Video Bitrate** — Enter the desired video bitrate
- **Rate Control** — Select the desired rate control (**VBR**, **CBR**, or **CVBR**)

  NOTE: **VBR** is recommended and provides the best performance. However, **CBR** may be required for compatibility with some streaming services.

Click the **Advanced Settings** drop-down arrow to configure settings for:

- **GOP Length** — Enter the desired GOP length in frames (the resulting I frame interval, based on frame rate, is displayed in seconds)

  TIP: If the frame rate is 15 (frames per second) and the GOP Length is **30** (frames), the I frame interval will be 2 seconds.

- **IDR Interval** — Select the desired IDR interval (**1**, **2**, or **3**)

  TIP: If the IDR Interval is **2** (I frames) and the I frame Interval is 2 seconds, the IDR Interval (time) will be 4 seconds.

- **Entropy Encoding** — Select the entropy encoding (**CAVLC** or **CABAC**)
- **H.264 Profile** — Select the H.264 profile (**Baseline**, **Main**, or **High**)

  NOTE: **Baseline** profile provides the best compatibility with decoders. **High** provides the best performance (quality vs bitrate).

Stream Settings

Three separate panels contain settings for configuring each stream type

- **RTSP (Pull) stream**
- **UDP/RTP (Push) stream**
- **RTMP (Push) stream**

RTSP (Pull) stream

- **Stream URI** — Read only string compiled based on the settings below (enter on the decoder to connect)
- **Stream name** — Enter the desired stream name
- **RTSP Port** — Enter the TCP port used by clients (decoders to connect to the SME 211) for stream setup
- **RTP Port range** — Enter the UDP ports used for the actual stream data

NOTE: With RTSP "interleaved", the stream data is sent using TCP via the RTSP port.

Click the **Advanced Settings** drop-down arrow to configure settings for:

- **MTU** — Enter the desired bitrate for the MTU
- **TTL** — Enter the necessary TTL value for multicast operation

  NOTE: When using unicast, the TTL is set to **64** by default.

- **DiffServe QoS** — Select the desired DiffServe QoS from this drop-down menu

  NOTE: **High** (CS4) is usually recommended for live streaming video and audio. Local network policies or conditions may apply, consult with the Network Administrator.

- **RTSP over HTTP port** — Enter the HTTP port number to use for the stream
- **Enable Multicast** — Enable or disable Multicast by clicking this check box
- **Destination** — Enter the destination IP address

NOTE: RTSP stream settings cannot be changed while streaming is active. Stop all streaming (e.g. front panel or AV controls) before making changes.

UDP/RTP (Push) stream

- **Stream URI** — Read only string compiled based on the settings below (enter on the decoder to connect)
- **Transport** — Select the appropriate stream transport:
  - **TS/UDP** — Lower latency with some decoders
  - **TS/RTP** — Default and best for decoder compatibility
  - **ES/RTP** — Certain special applications
- **Destination (IP/Host)** — Enter the target
- **Port and Port range** — UDP ports used for audio and video streams (and RTCP control with RTP)

Click the **Advanced Settings** drop-down arrow to configure settings for:

- **MTU** — Enter the desired bitrate for the MTU
- **TTL** — Enter the necessary TTL value for multicast operation

  NOTE: When using unicast, the TTL is set to **64** by default.

- **DiffServe QoS** — Select the desired DiffServe QoS from this drop-down menu

  NOTE: **High** (CS4) is usually recommended for live streaming video and audio. Local network policies or conditions may apply, consult with the Network Administrator.

- **Enable SAP** — Allows the stream to be announced on the network for easy discovery and connection by decoders
- **Announce Interval** — The time in seconds between each announcement (Ø is automatic)
- **Session Name** — The logical name for this stream (to appear in the decoder listing)
- **Description** — Additional description text (appears as comments in VLC)
- **Author** — The group name for streams
- **Keywords** — Used to allow stream filtering and selection in some applications

RTMP (Push) stream

- **URL+Key Combination** — Read only string based on the values provided below. Used to confirm the URL and key have been correctly concatenated. To help avoid any duplicate or missing "/" separators
- **Server URL** — The generic connection address of the service
- **Stream Name/Key** — The unique portion of the connection details

Click the **Advanced Settings** drop-down arrow to configure settings for:

- **Port Number** — Usually TCP port 1935, but may be modified if required by the service provider
- **Username** — User username if required
- **Password** — User password if required

Encoding and streaming presets can also be selected from these panels (see the following section for more information on stream presets).

Encoder Presets

Any of the default encoder presets or user-created presets can be recalled and applied to a stream. Presets can also be recalled using SIS Commands (see the **Encoder Presets** on page 75).

There are 24 predefined Encoder Presets. The existing presets can be modified to suit specific applications or new Presets, up to a total of 64, can be created. The default values of predefined presets can also be restored. All `Encoder Presets` and `Streaming Presets` can be configured on the `Encoding & Streaming` page. Preset 3 is the **default** for Encoder 1 and Encoder 2.

Preset #	Preset Name	Resolution	Video Bit Rate (kbps)	Frame Rate (fps)	Audio Bit Rate (kbps)	Audio Sample Rate (kHz)	GOP	IDR Int.(s)	Bitrate Control	H.264 Prof.	Framing	Ref. Fr.	Coding
1	1080p High	1920x1080	8000	30	128	48	30	1	VBR	High	IP	4	CABAC
2	1080p Low	1920x1080	3000	15	128	48	150	1	VBR	High	IP	4	CABAC
3	1080p Compatible	1920x1080	5000	30	128	48	30	2	VBR	Base	IP	1	CAVLC
4	720p High	1280x720	5000	30	128	48	30	1	VBR	High	IP	8	CABAC
5	720p Low	1280x720	2000	15	128	48	150	1	VBR	Main	IP	8	CABAC
6	720p Compatible	1280x720	3000	30	128	48	30	2	VBR	Base	IP	1	CAVLC
7	480p High	848[854]x480	2500	30	128	48	30	1	VBR	High	IP	8	CABAC
8	480p Low	848[854]x480	1500	15	128	48	150	1	VBR	Main	IP	8	CABAC
9	480p Compatible	848[854]x480	1500	30	128	48	30	2	VBR	Base	IP	1	CAVLC
10	WSXGA+ (1440x900, 16:10)	1440x900	8000	15	128	48	30	1	VBR	High	IP	4	CABAC
11	WSXGA+ (960x900, 4:3)	960x600	6000	15	128	48	30	1	VBR	High	IP	4	CABAC
12	SXGA (1280x1024, 5:4)	1280x1024	5000	15	128	48	30	1	VBR	High	IP	4	CABAC
13	XGA (1024x768, 4:3)	1024x768	5000	15	128	48	30	1	VBR	High	IP	4	CABAC
14	YouTube 1080p30	1920x1080	6000	30	128	44.1	60	2	CBR	High	IP	1	CABAC
15	YouTube 720p30	1280x720	4000	30	128	44.1	60	2	CBR	High	IP	1	CABAC
16	YouTube 480p	848[854]x480	2000	30	128	44.1	60	2	CBR	High	IP	1	CABAC
17	Youtube 360p	640x360	1000	30	128	44.1	60	2	CBR	High	IP	1	CABAC
18	qHD (960x540)	960x540	1400	30	128	44.1	60	2	VBR	High	IP	3	CABAC
19	Facebook Live	1280x720	4000	30	128	48	60	2	CBR	High	IP	2	CABAC
20	UStream 1080p30	1920x1080	8000	30	192	48	60	1	VBR	High	IP	2	CABAC
21	UStream 720p30	1280x720	4000	30	128	48	60	1	VBR	Main	IP	2	CABAC
22	UStream 540p	960x540	1500	30	96	48	60	1	VBR	Main	IP	2	CABAC
23	UStream 360p	640x360	1200	30	96	48	60	1	VBR	Main	IP	2	CABAC
24	VGA	640x480	800	30	80	44.1	60	2	VBR	Base	IP	3	CABAC

Streaming Presets

`Streaming Presets` allow the user to quickly switch between various streaming options. There are 16 encoder presets for each stream type that can be saved or recalled.

NOTE: RTSP presets can only be saved or recalled when the main (front panel) stream control is off.

Streaming presets save the following parameters:

STREAMING PRESETS	
Preset name	Multicast IP/destination (for multicast only)
RTSP stream name (QoS is saved or recalled for RTSP pull)	RTSP over HTTP port (for pull streaming only)
Streaming method and protocol	QoS (for push streaming only)
Stream port	SAP setting (for push streaming only)
MTU	RTMP publish URL (for RTMP push only)
TTL	Advanced section of RTMP, such as the RTMP port, username, and password (for RTMP push only)

Encode and Stream Preset Builder

`Encoder Presets` and `Streaming Presets` are combinations of Encoding and Streaming presets. For example, an Encoding preset allows the content resolution and frame rate to be saved and recalled, while a Streaming preset allows the network settings (for example, IP addresses and port numbers) to be saved and recalled for each stream type. A combined preset allows content and network settings to be saved together for specific applications.

NOTES:

- An administrator can see or change these settings.
- RTSP Presets can only be saved or recalled when the main (front panel) stream control is off.

Encoder presets save the following parameters:

ENCODER PRESETS		
Video resolution	Audio bitrate	Profile level
Video bitrate	Audio delay	Profile type
Frame rate	Streaming mode	Preset name
Bitrate control		

OSD configuration

The `Mask, OSD and Test Patterns` panel in the `Encoding & Streaming` page allows selection and immediate output of one of seven internally stored test patterns or a universal OSD to all streams and the HDMI output from the SME 211.

Video test patterns are helpful for calibrating connected displays or projectors for color, convergence, focus, resolution, contrast, and aspect ratio. The audio test option is useful for testing audio output.

Mask settings

Use the drop-down list in this panel to select the image to display when the Mask function is enabled. Images located in the user file system in the `images` folder will be displayed in the drop-down list.

Outputting and using a video test pattern

NOTE: No input signal is needed when using a test pattern for display device setup.

To select and output a test pattern:

1. Open the `Input/Output Settings` page.
2. Expand the **`Mask, OSD and Test Patterns`** panel.
3. Select a pattern from the **`Test Patterns`** drop-down list. A preview of the test pattern appears above the drop-down list.

   Available test patterns include the following:

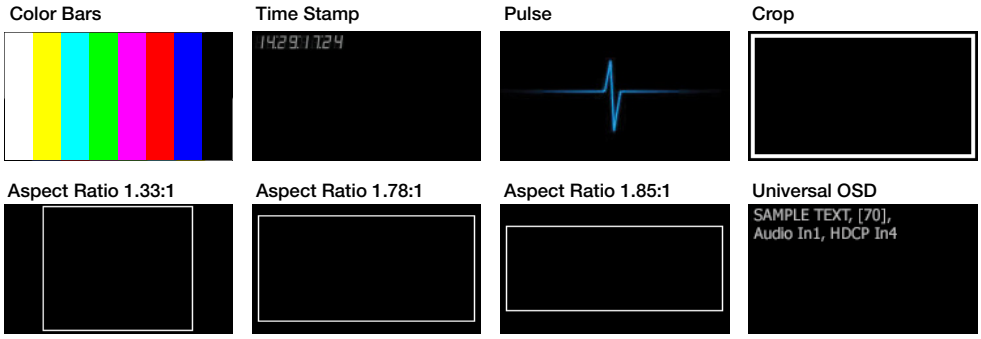


Figure 24. Test Patterns

- **Color Bars** — Standard full screen color bars
- **Time Stamp** — Displays white text with the unit date and time (for example: `Fri Apr 18 HH:MM:SS`) in the top left corner of the display window. It updates every second
- **Pulse** — Select **`Pulse`** to output an audio pulse of 400 Hz at -7 dBu (nominal) for audio output testing
- **Crop** — Outlines the active picture area
- **Aspect Ratio** — Three patterns with screen outlines in 1.33:1, 1.78:1, and 1.85:1 for centering and size adjustment
- **`Universal OSD`** — This pattern consists of white text overlaid atop the source video content. By default, it appears in the upper left corner of the screen. The location of the universal OSD and Timestamp is dependant on the position selected for the metadata OSD. The text includes brief custom text followed by three selectable elements separated by commas. The options for those elements are listed in **Setting up the universal OSD test pattern** on page 39.

  The universal OSD pattern can be displayed together with the main AV content because it overlays the video rather than replacing it. The universal OSD pattern can be used at any time, not just during setup. It can also serve as an on screen label for presentations, in addition to metadata labels (see **Encoder Settings and Streaming** on **page 32** for more information on metadata within screen layouts).

The selected test pattern is immediately output to the display and reflected in the preview in the `AV Controls` panel. The test pattern displays until another pattern, or **`Off`** is selected from the **`Test Patterns`** drop-down list, or until unit power is recycled.

Setting up the universal OSD test pattern

The `Font`, `Size`, `Color`, and `Location` are read only in this panel. To change these variables, see **Changing the Font Used for the Metadata Overlay** on the next page.

To set up the universal OSD test pattern:

1. Open the `Input/Output Settings` page.
2. Expand the **`OSD Configuration`** panel at the bottom of the page.
3. Select **`Universal OSD`** from the **`Test Patterns`** drop-down list. The fields and drop-down menus in the Universal OSD section become accessible.
4. Enter the text (up to 16 characters) into the **`Display Text`** field within the universal OSD area. This is the first text that appears in the universal OSD.
5. Select an information category from the **`Information 1`** drop-down list. If desired, select from the **`Information 2`** and **`Information 3`** drop-down lists.

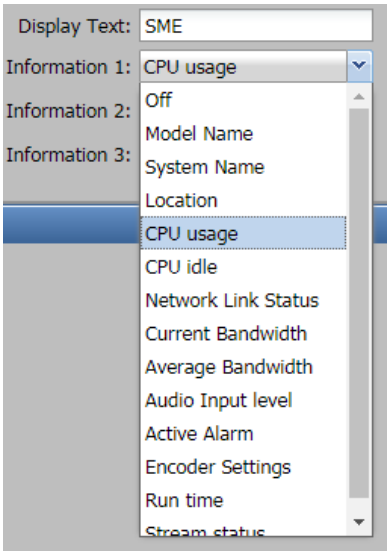


Figure 25. Universal OSD Information Selection

The categories are identical to those used in the SIS information commands (such as `1i`, `2i`, `3i`, and so forth). For reference, see **Command and Response Tables** on page 66.

Changes are saved automatically and applied shortly after being selected. The universal OSD text appears on-screen in this format:

`Display Text`, `Information 1`, `Information 2`, `Information 3`.

See Figure 26 for an example of how the configuration settings (on the left) translate to the universal OSD (on the right).

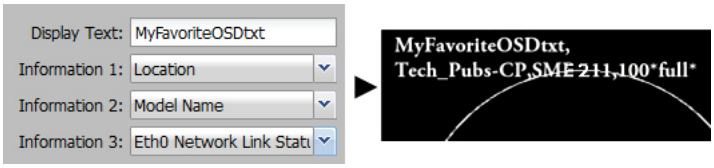


Figure 26. Universal OSD Information Selection

Metadata Overlay and Profile

NOTE: A user must be logged in as an administrator to see or change these settings.

Configuring the Metadata Overlay

Select and specify the metadata text content (see Figure 27, ❷) that is incorporated into the video and used for other purposes, and select the font (❶) and appearance of text that is used for that text overlay within the video.

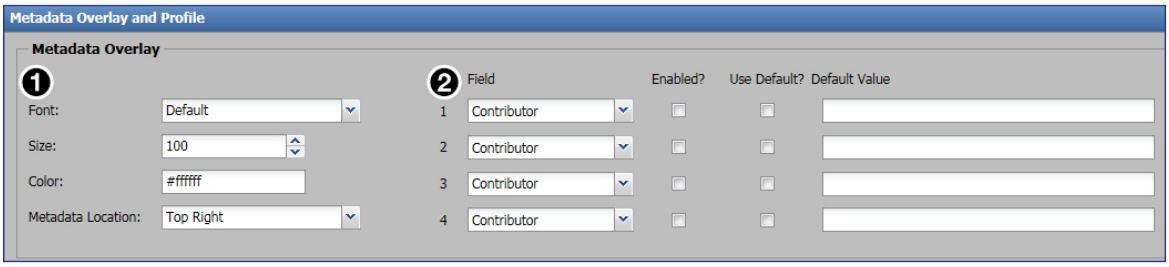


Figure 27. Metadata Overlay Panel

Changing the Font Used for the Metadata Overlay

If optional fonts are uploaded to the SME 211, the user can select and use one for displaying metadata text instead of the default font. Size and color can be selected for the OSD text. Optional fonts must be uploaded to the fonts folder within the SME 211 from the `File Management` page or by using an SFTP client program (for example, Filezilla) before selecting it in this page.

NOTES:

- The SME supports TrueType™(.ttf) and OpenType® (.otf) fonts.
- To upload a font file, use the file upload utility within the `File Management` page.
- The user is responsible for obtaining any necessary font licenses before uploading fonts to the SME 211.
- After changing the font, some text can appear truncated in the on-screen text because characters can be wider in the selected font than in the system default font.
- These settings also control the Universal OSD settings (font, size, color, and location).

TIP: Many free, open source fonts are available at **https://fonts.google.com/**.

To select a different font and change the size and color:

1. Open the `Encoding & Metadata` page.
2. Expand the **`Metadata Overlay and Profile`** panel.
3. From the first panel in the left corner, select an available font from the **`Font`** drop-down list (see Figure 28, ❶). The selected font is immediately applied to the universal OSD.

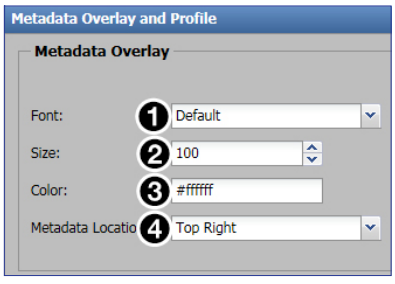


Figure 28. Change Font in the Metadata Overlay

4. To change the size, click the **`Up`** and **`Down`** arrows (**Figure 28**, ❷) to adjust the value. The number is a percentage of the baseline font height, from 80 to 200%, with 100 being the default.
5. To change the font color, enter a six-character hexadecimal color value into the **`Color`**

field (❸). The default color is `#ffffff` (white).

NOTE: Consult a hex color table, if needed. Each pair of characters represents the bits for the percentage of red, green, and blue, respectively. For example, red is represented by `#FFØØØØ`, which is 100% red, 0% green, 0% blue.

6. To change the location of the universal on-screen display (OSD), select a location from the **`Metadata Location`** drop-down list (❹). This metadata location also affects the location of the universal on-screen display (OSD).

NOTE: See the *SME 211 Embedded Web Pages Help File* for more information on metadata.

Configuring and saving Metadata Profiles

`Metadata Profiles` can be configured, saved, and recalled in the `Metadata Overlay and Profile` drop-down panel in the `Encoding & Streaming` page. Fill in the appropriate fields with the desired metadata text content to be associated with an individual Metadata Profile. There are 16 unassigned profiles that can be configured, saved, and recalled for future use.

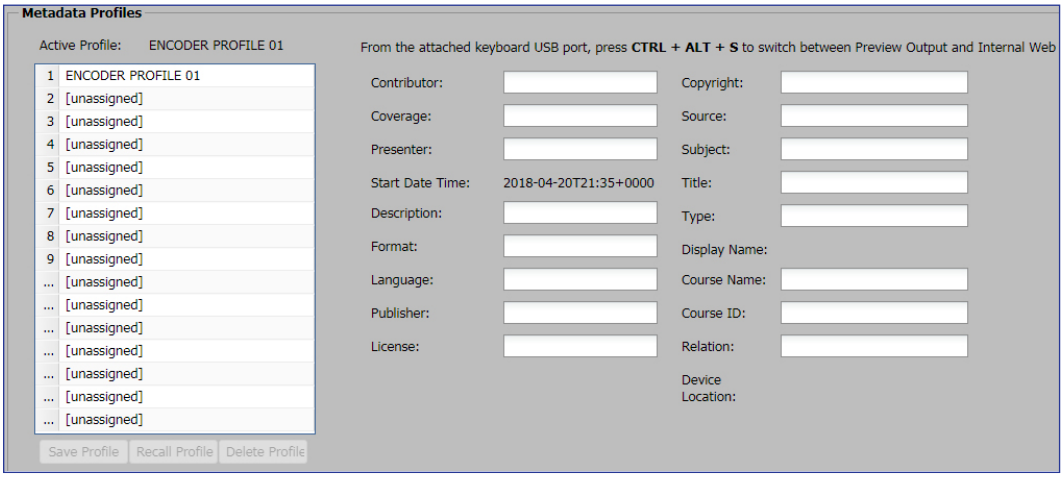


Figure 29. Metadata Profiles Panel

NOTE:

Several Metadata fields are populated automatically once streaming is active:

- Start Date and Time
- Display Name
- Device Location

Users and Roles

In the **Users and Roles** page within **Configuration**, an administrator can set up both administrator and user level passwords. Passwords are not required, though they are recommended for controlling access to configuration functions.

NOTES:

- If only an administrator password is set, only administrators are able to log in to the SME 211 pages. Users have no access.
- To allow user access to a password-protected unit, set both an administrator password and a user password, and users must log in using the user password.
- An administrator password is required before a user password can be set.

Passwords can be set up only via this page or using SIS commands (see **Password and Security Settings** on page 73).

To open this page, click the **Configuration** tab at the top of the SME 211 embedded web pages and then click the **Users and Roles** tab on the second tier of tabs.

The **Users and Roles** page opens, showing the **Password** panel (see Figure 30).

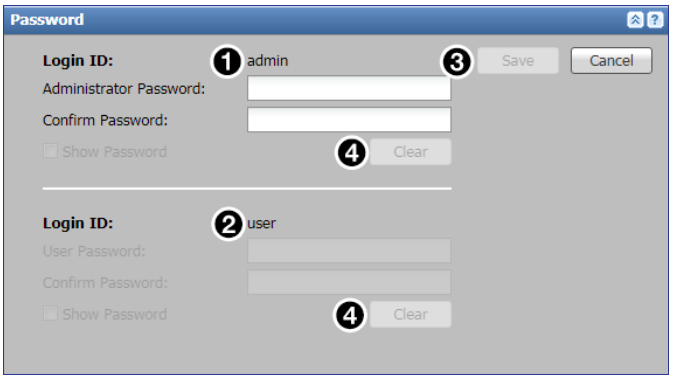


Figure 30. Password Panel

Setting Passwords

If no passwords are set, anyone who opens the internal web pages is connected with administrator-level access and can make changes to all settings. To limit access and prevent changes to system configuration, the following options are available:

- **Set an administrator level password only** — This option allows only administrators to access the SME 211 web pages. End users cannot log in and use the web pages.
- **Set both an administrator level password and a user level password** — This allows administrators to log in and manage all aspects of the SME 211. Users can log in to use just the AV **Controls** panel and the **Device Status** page.

To set passwords:

1. Enter the desired password, at least four characters long, into the **Administrator Password** field in the **Login ID: admin** panel (see figure 30, ❶ above).
   - Passwords must consist of up to 128 characters. The pipe character (|) is not allowed.
   - Passwords are case-sensitive and cannot be a single space character.
2. Enter the same password into the **Confirm Password** field directly below the **Administrator Password** field. Once a password is entered, the fields in the **Login ID: user** panel (see figure 30, ❷ above).

3. If no user password is set, click **Save** (see **figure 30**, ❸ on the previous page) in the upper right of the Password panel.

   To set a user password, complete steps 4 through 6.

4. To set a user level password, type a desired password into the **User Password** field in the Login ID: user panel (❷).

5. Type the same password into the **Confirm Password** field directly below the User Password field.

6. Click **Save** (❸). Both the administrator and user passwords are saved.

Clearing Passwords

To remove (clear) a password, click **Clear** (❹) corresponding to the administrator or user password and click **Save** (❸) to remove.

NOTE: When the administrator password is cleared, the user password is also cleared.

Alarms and Traps

In the Alarms and Traps page, an administrator can configure e-mail account and communication settings to allow the unit to send notification e-mails. This page is also the location for selecting whether to log, display a message about, or send an e-mail about various conditions and errors experienced by the unit.

To open this page, click the **Configuration** tab at the top of the embedded web pages and then click the **Alarms and Traps** tab on the second tier of tabs.

The Alarms page opens with two expandable panels: **Alarm Notifier Destinations** and **Alarm Message List**.

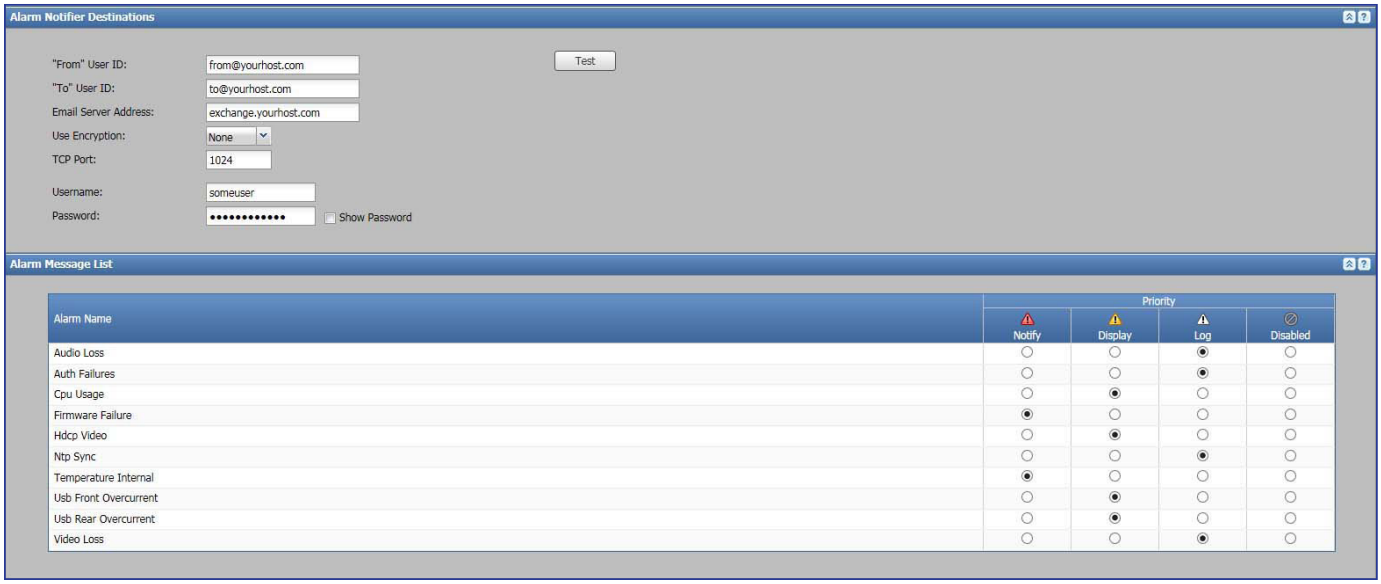


Figure 31. Alarms and Traps Page

Alarm Notifier Destinations

Fill in the necessary fields to send any alarm notifications to a specified user.

Alarm Message List

The `Alarm Message List` panel features a list of the available types of alarms. To configure each alarm in the list, select the radio button corresponding to the desired option in the Priority columns.

- **Notify** — When this option is selected, the unit sends an e-mail to the designated recipient each time the corresponding alarm is triggered. The alarm is also displayed and logged.
- **Display** — When this option is selected and when the corresponding alarm condition occurs, the unit displays a notice of the alarm condition within the embedded web pages. No e-mail is sent. The event is also logged.
- **Log** — When selected, this option tells the unit to list the corresponding alarm in the events log, which you can access by clicking the **`Troubleshooting`** tab and then the **`Logs`** sub-tab. No e-mail is sent.
- **Disabled** — When this option is selected, the unit does not create any log or notification for the corresponding alarm type, though it still appears in the alarms list log.

The **Alarm Table** on the next page lists alarms generated by the SME 211, what they mean, and how they are cleared.

NOTE: All active alarms can be manually cleared by an administrator via the web page.

Alarm	Alarm Generated	Alarm Cleared
Audio Loss	If audio is lost (remains below -60dBFS for 10 seconds) while streaming	• The audio signal is maintained above -60 dBFS for a contiguous period of 10 seconds • The alarm is manually removed via the Web UI or SIS • The streaming session is stopped
Authentication Failures	Any combination of access interfaces (web page, Telnet, API, SFPT, SIS via SSH) that require authentication, with a maximum of 20 failed login attempts within 20 seconds on any combination of user IDs (including non-existent user IDs)	The alarm is manually removed via the Web UI or SIS
HDCP Video	If the signal is HDCP protected and the SME cannot negotiate HDCP for any reason	• The HDCP source is no longer active or is taken off the input • Conditions become true to allow encrypted streaming of HDCP content to one or more authenticated decoders which are connected to HDCP compliant displays (Future Option)
NTP Sync	• The SME attempts to automatically sync with the configured NTP server and fails the primary and retry attempts • The SME fails manual sync attempts	• The NTP sync succeeds without retries for a period of five synchronization attempts • The alarm is manually removed via the Web UI or SIS
Streaming Halt	Streaming is terminated without a Stop command	The alarm is manually removed via the Web UI or SIS
Temperature Internal	The SME internal temperature exceeds 60° C for 2 minutes	• The SME temperature drops below 50° C • The alarm is manually removed via the Web UI or SIS
Video Loss	Video sync is lost on the selected input for 2 seconds	• Video sync is detected for 6 seconds • The alarm is manually removed via the Web UI or SIS
CPU Usage	When CPU usage is over 90% for 75% of a 5 minute window	When usage falls below 75% for 1 minute
Firmware Failure	An unrecoverable error to a firmware component has occurred	Requires a manual reboot or power cycle
USB Over Current (Front or Rear)	When a USB device exceeds the available current	Cleared by removing the device **NOTE:** USB port high current limit is manually selectable between Front or Rear ports.

System Settings

Controls within seven of the ten panels in the **System Settings** page within **Configuration** are essential during initial setup of the unit. The three other panels contain features that are used infrequently for updating the unit, restoring a configuration, or limiting access to front panel controls. A user must be logged in as an administrator to see or change these settings.

To open this page, click the **Configuration** tab at the top of the SME 211 embedded web pages and then click the **System Settings** tab on the second tier of tabs.

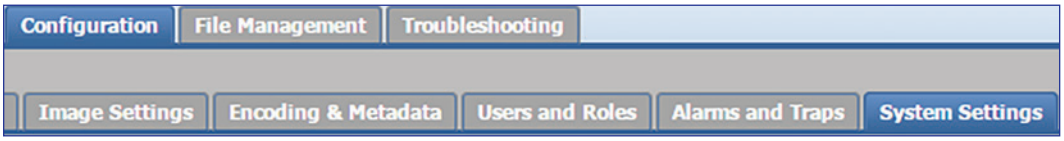


Figure 32. Configuration Tab, System Settings Subtab

The **System Settings** page opens.

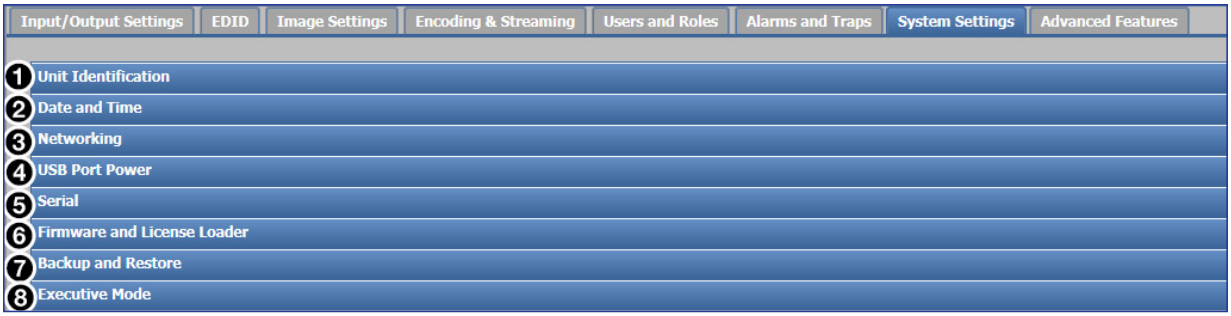


Figure 33. System Settings Page

The panels are:

❶ **Unit Identification** — Set the system (unit) name and a descriptive name for its location. This is also the read only location of the model name, description, part number, serial number, firmware version, overall unit temperature, remote panel connection, remote panel firmware, and enabled feature licences.

❷ **Date and Time** — Set the date, time, time zone, and settings for syncing with one or more NTP (network time protocol) servers.

❸ **Networking** — Set the IP address, subnet mask, gateway, and DNS server, as well as the port information for a variety of port types, or enable or disable SNMP.

❹ **USB Port Power** — Choose which USB port (front or rear) has the higher current limit.

❺ **Serial** — Set the baud rate and protocol for the rear panel remote control serial port.

❻ **Firmware and License Loader** — Firmware and LinkLicense uploads can be initiated here.

❼ **Backup and Restore** — Current SME or IP configuration settings can be backed up, or a previously saved configuration file can be restored to the unit from this panel.

❽ **Executive Mode** — Enable or disable front panel lock-out to limit access to the controls and functions of the SME.

NOTE: See the *SME 211 Embedded Web Pages Help File* for additional information.

Advanced Features

In the Advanced Features page within Configuration, an administrator can do the following things:

- Set the SME 211 to run a web browser client application for direct control using USB keyboard and mouse for network (IP) configuration when a network-connected computer is not available.
- Upload a FlexOS plugin application to add functions and configuration options, then use the plugin to configure features of the SME.

These settings are available only via this page.

To open this page, click the **Configuration** tab (at the top of the SME 211 embedded web pages) and then click the **Advanced Features** tab on the second tier of tabs.

The Advanced Features page opens, showing the Browser Client (❶) and FlexOS Apps (❷) panels.

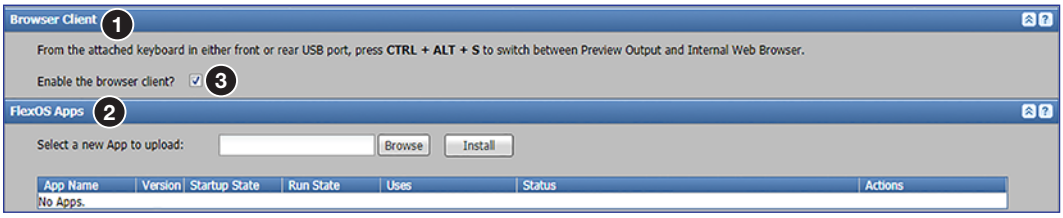


Figure 34. Advanced Features Page

Control the SME 211 Using an Internal Browser Client

The SME 211 can be configured to run a web browser client application for direct control if a standalone computer is not available on site. If enabled, the internal browser provides access to a subset of the Network (IP) Settings configuration panel.

NOTE: The internal browser client is enabled by default. If it has been disabled, it is necessary to use the config port to recover or reset the device IP address to reach the internal web pages.

To set up the SME 211 for local control using its internal browser client:

NOTE: The following steps do not require a computer and do not require the SME to be connected to a network.

1. Connect a monitor and a keyboard and mouse directly to the SME 211 (see **Control System and External Device Connections** on page 9).
   - Connect the keyboard to either the front or the rear USB port.
   - Connect the mouse to the other (rear or front) USB port.
   - Connect a display to the local HDMI Out port on the rear panel.
2. By default, the local output shows the preview (streaming) image on the connected monitor or display. To switch between viewing the preview and viewing the network configuration page, press <**Ctrl+Alt+S**> on the keyboard connected to the SME.

   NOTE: The default web page allows configuration of the network settings.
3. Use the mouse and keyboard to navigate in the network configuration page and make changes as needed.
4. When all the changes have been completed, press the <**Ctrl+Alt+S**> keys on the keyboard to switch back from the browser client to the preview display.

If the client is disabled, follow the steps below to enable it.

1. On a computer connected to the same network as the SME, open a browser, enter the IP address of the unit into the address field, and connect to the SME 211 web pages.
2. Click the **Configuration** tab at the top of the SME web pages and then click the **Advanced Features** tab on the second tier of tabs.
3. Select (check) the **Enable the browser client?** checkbox (see **Figure 34**, ❸ on the previous page) in the Browser Client panel.

Uploading a FlexOS Application to the SME 211

NOTE: This is a future option.

Occasionally Extron develops supplemental applications or plug-ins to enhance or add functions or control options to the product. The controls in the Advanced Features page upload the application (app) to the SME 211.

NOTES:

- Log into the **Extron website** with Extron Insider account information in order to download the software.
- See the *SME 211 Embedded Web Pages Help File* to upload a FlexOS application.

File Management

The File Management page contains a directory of files stored in the SME 211 and of any connected shared drives on the network, and a file upload utility so that new files can be added to the SME. It also provides a way to connect the SME to shared network drives and lists the URL available to upload or download files from the SME through an SFTP client.

Within the file directory, many files or folders can be deleted, renamed, or locked. Only Users logged into the SME 211 with administrator privileges can see and make changes.

To open the File Management page, click the **File Management** tab

The File Management page opens showing the File Directory (see Figure 35, ❶), File Upload Utility (❷), and Accessing Internal Filesystem panes (❸):

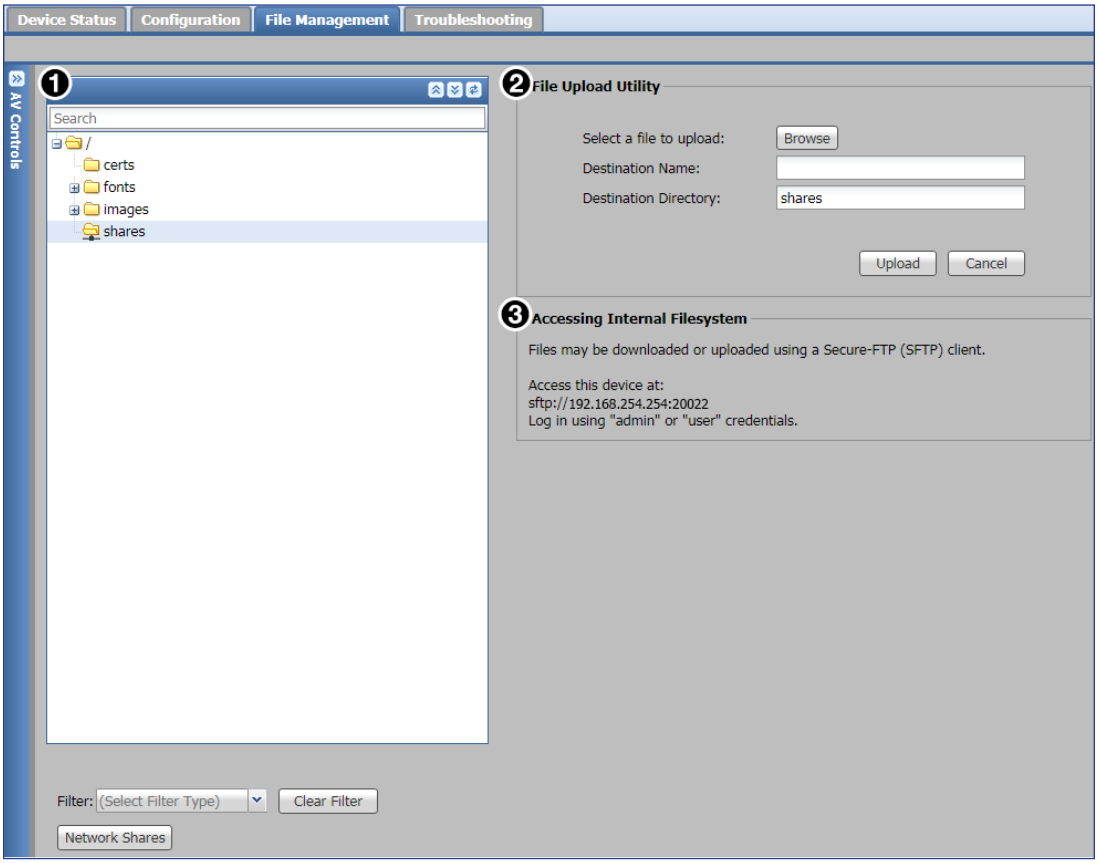


Figure 35. File Management Page

NOTE: See the *SME 211 Embedded Web Pages Help File* for information on using the file manager.

Add a Network Share

Network servers or network-attached storage drives (network shares) can be added to the file list so the SME 211 can access files and folders stored on shared network resources.

NOTE: The size of network shares is initially unknown and there can be significant performance issues if the entire contents of every network share is indexed on every filter or search request. To provide the best performance with available resources, the searches and filtering for network shares is limited to the layer immediately below the level that the user manually expands. If the user fully expands the share, then it is fully indexed, searched, and filtered.

See the *SME 211 Embedded Web Pages Help File* to add a network share using the Web UI.

Upload and Download Files Using an SFTP Client

Using the `Network Shares` option or the file upload option on the `File Management` page satisfy most file transfer needs. However, if there is a need to transfer files in to or out of the SME 211 outside of those controls, use an SFTP client utility.

To use an SFTP client utility to transfer files:

1. Click the **`File Management`** tab.
2. Copy the URL from the `Accessing Internal Filesystem` panel. The URL includes the SFTP protocol name (sftp), the address of the SME 211, and also the logical port number (default: `22Ø22`) of the LAN port. For example, `sftp://192.168.194.28:22Ø22`.
3. Open an SFTP client program (for example, Filezilla).
4. Paste the URL from the SME 211 into the host name or host address field of the SFTP client program. If necessary, delete "sftp" from the URL and select SFTP from a different field or menu and remove the port number from the URL and paste it into a port number field.
5. If an administrator username and password are set for the unit, enter those in the appropriate fields in the SFTP client.
6. Log into or connect to the SME 211.
7. Use the SFTP client software to copy files (fonts, logs, images) to and from the internal storage folders on the SME 211.
8. Disconnect from the SME 211 (close the SFTP session).

Troubleshooting

The five pages within the **Troubleshooting** tab contain controls typically used during initial setup to test connections, and then later if a product support issue arises. They make it possible for an administrator to:

- View current system conditions and connections
- View event logs and alarms
- Test network connections
- Reset the unit

NOTE: Only administrators have access to the **Troubleshooting** tab and can see and make changes to all settings.

Figure 36. Troubleshooting Tab and Subtabs

The pages within **Troubleshooting** include:

1. **Status** — Displays information about the firmware and web page versions, system temperature, Ethernet connection, MAC address, date and time, as well as details about the bit rates for audio and the encoder streams (see **Status** on the next page for more information).
2. **Logs** — Displays a list (log) of alerts and notices for any event set up for any status other than **Disabled** in **Configuration** > **Alarms and Traps** > **Alarm Message List**. The log can be sorted by date and time, priority, DB ID, or message. It can also be filtered, or exported to a CSV file (see **Logs** on page 53 for more information).
3. **Alarms** — Similar to Logs, this page displays a list of the more severe events that trigger alarms. The list can be sorted, filtered, or exported to a CSV file. Individual alarms can be cleared. Only active and recently active alarms are displayed (see **Alarms** on page 54 for more information).
4. **Diagnostic Tools** — Provides a convenient way to test network connections using a ping utility, a route (tracert) function, or Nmap test. It also includes a feature to run other diagnostic tests that generate a debugging log (see **Diagnostic Tools** on page 55 for more information).
5. **Reset and Reboot** — Allows the user to initiate a unit reboot, delete all stored content and format the internal storage, or perform one of five different types of reset (see **Reset and Reboot** on page 56 for more information).

Status

The **Status** page within the **Troubleshooting** page displays factory-defined and user-defined information about the unit. This page contains the firmware version, MAC address, and related information about the unit. It also displays the current audio and video bit rates for all encoding streams.

Some of the information in this page can also be found using SIS commands (see the **Command and Response Tables** starting on page 66).

To open this page, click the **Troubleshooting** tab at the top of the SME 211 embedded web pages and then click the **Status** tab on the second tier of tabs.

The **Status** page opens, showing the **Detailed System Status** (see Figure 37, ❶ below) and **Encoder Status** (❷) panels.

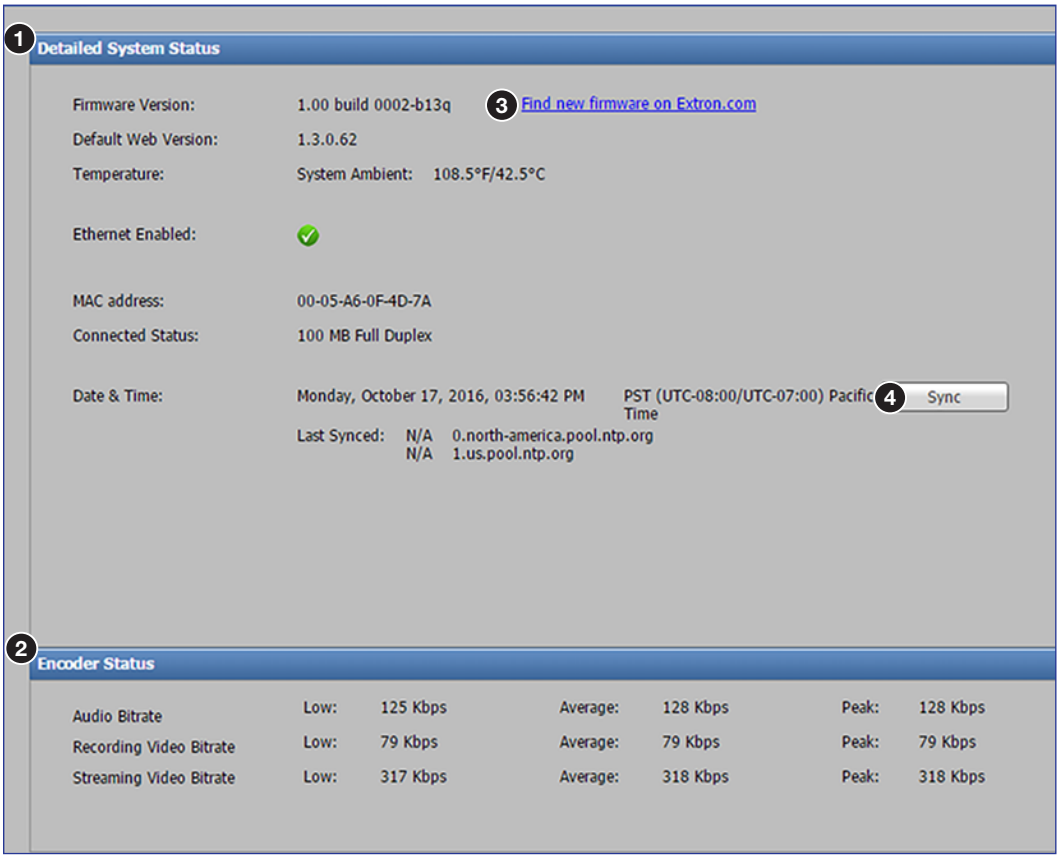


Figure 37. Troubleshooting, Status Page

All of the items on this page are read-only except the hyperlink to the Extron website **Find new firmware on Extron.com** (❸) where updated firmware for the unit is located, and the **Sync** button (❹) which commands the unit to sync its internal clock time and date with the settings from an NTP server.

Logs

The Logs page within Troubleshooting displays a list (log) of alerts and notices for any event set up for any status other than **Disabled** in Configuration > Alarms and Traps > Alarm Message panel. All log entries are read-only. The logs can be sorted, filtered, searched, or exported to a comma-separated values (CSV) file.

To open this page, click the **Troubleshooting** tab at the top of the embedded web pages, then click the **Logs** tab on the second tier of tabs.

The Logs page opens, showing filtering controls and the log list (see Figure 38 below).

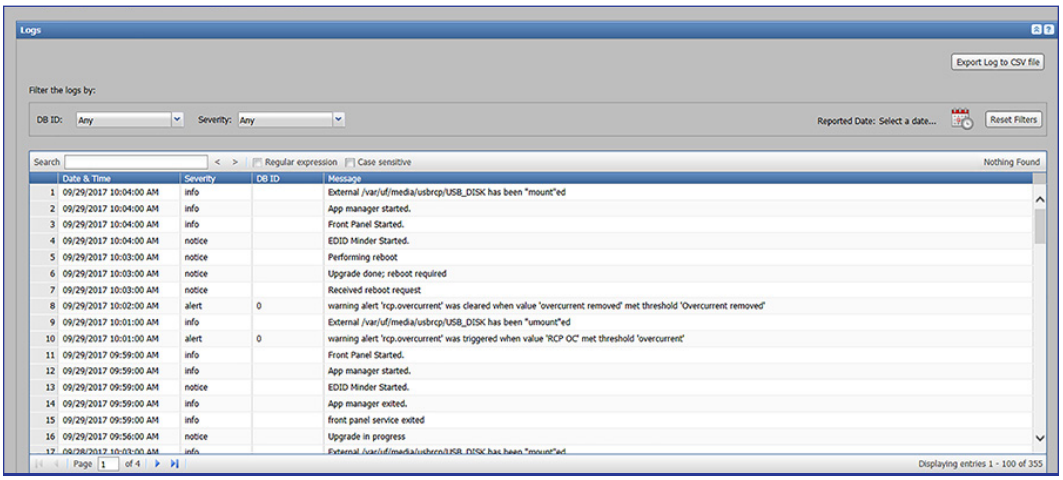


Figure 38. Troubleshooting, Logs Page

NOTE: See the *SME 211 Embedded Web Pages Help File* to for further information.

Alarms

The Alarms page within Troubleshooting displays a list of alerts for events as determined in Configuration > Alarms and Traps > Alarm Message List. Alarm list entries here are read-only, but alarms can be muted or cleared. The alarm list can be sorted, filtered, searched, or exported to a comma-separated values (CSV) file.

To open this page, click the **Troubleshooting** tab at the top of the SME 211 embedded web pages, then click the **Alarms** tab on the second tier of tabs.

The Alarms page opens, showing filtering controls and the alarm history list.

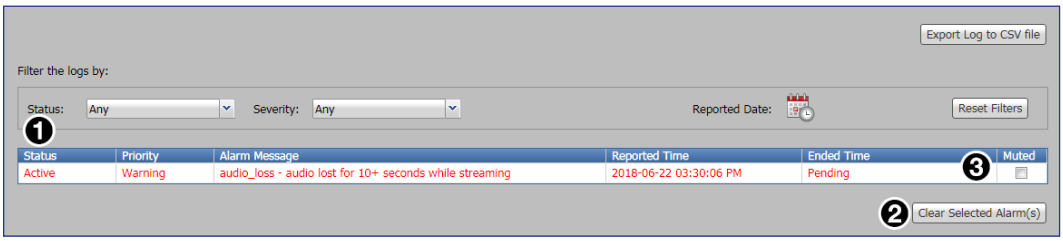


Figure 39. Alarm History

- Active, unresolved alarms are displayed as red text (see Figure 39 above, ❶).
- To clear or remove an alarm, click the row it is listed in and click **Clear Selected Alarm(s)** (❷).
- To mute an alarm, so that it does not appear in the alarm list again the next time it is triggered, select the **Muted** checkbox (❸) for that alarm.

NOTE: See the *SME 211 Embedded Web Pages Help File* for further information about the Alarms page.

Diagnostic Tools

The `Diagnostic Tools` page within `Troubleshooting` provides a convenient way to test network connections using a ping utility, a trace route (tracert) function, and an Nmap network discovery tool. It also allows the user to generate a log file that can be sent to Extron support staff to aid in troubleshooting problems with the unit or the system.

To open this page, click the **`Troubleshooting`** tab at the top of the embedded web pages and then click the **`Diagnostic Tools`** tab on the second tier of tabs.

The `Diagnostic Tools` page opens.

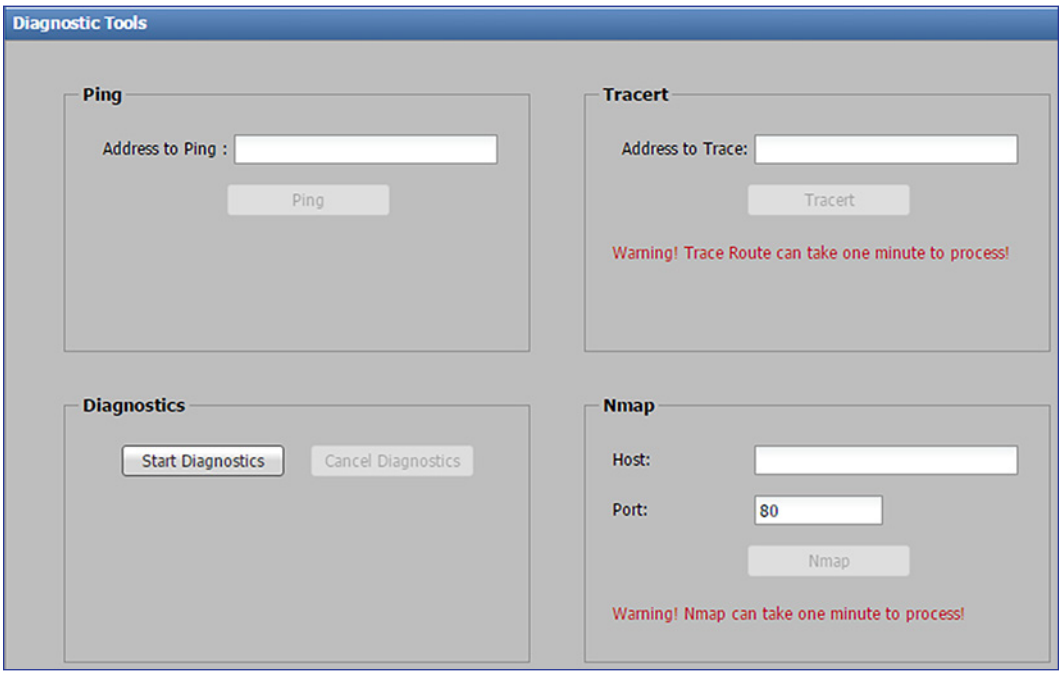


Figure 40. Troubleshooting, Diagnostic Tools

NOTE: See the *SME 211 Embedded Web Pages Help File* for further information about the `Diagnostic Tools` page.

Reset and Reboot

The **Reset and Reboot** page within **Troubleshooting** contains options to initiate a unit reboot, delete all stored content and format the internal storage, or perform one of five different types of reset. Some of the reset options offered here can also be performed using SIS commands.

To open this page, click the **Troubleshooting** tab at the top of the embedded web pages and then click the **System Resets** tab on the second tier of tabs.

The **Reset and Reboot** page opens to the **Reset** panel (see Figure 41 below).

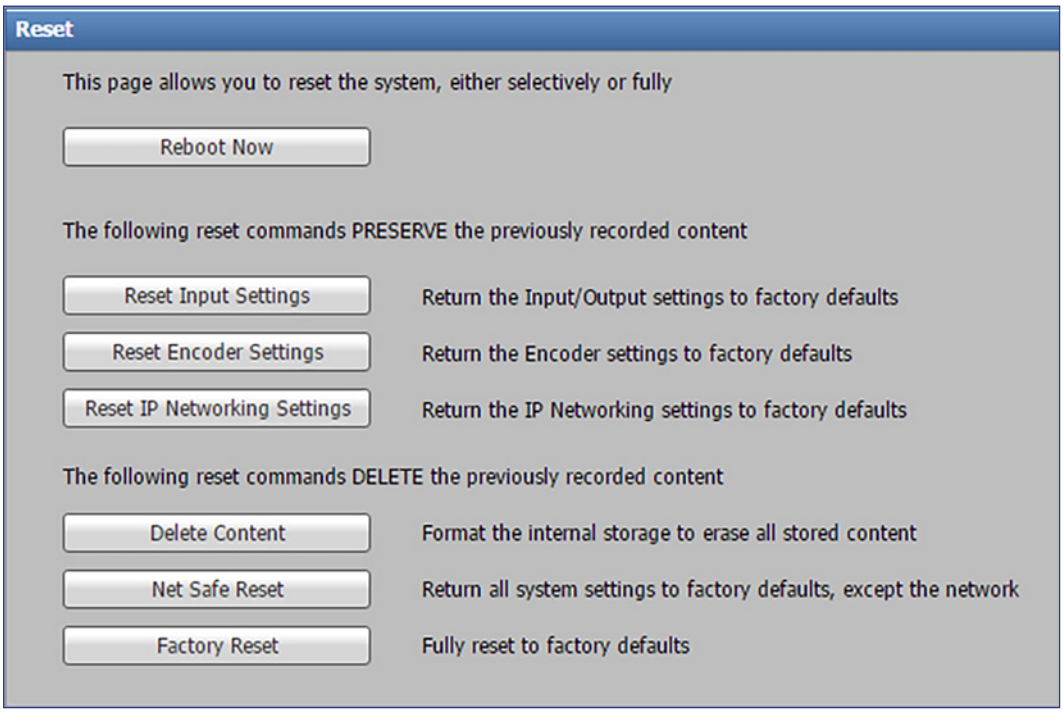


Figure 41. Reset and Reboot Panel

Each option within this page includes a description of its function. To perform a reboot, reset, or content deletion (storage reformatting), click the button for the desired option.

When a reset or reboot is performed, the unit reboots and loses its network connection.

- After a reset or reboot, it may take a few minutes for the SME to restart and connect to the network. Refresh the browser window to reconnect to the unit.
- For **Reset IP Networking Settings** and **Factory Reset**, all IP addresses and network settings are reset to factory defaults. Connect again using the default addresses.

NOTE: See the *SME 211 Embedded Web Pages Help File* for information about the system resets.

Remote Communication and Control

This section describes Simple Instruction Set (SIS) command programming and control of the SME 211, including:

- **Connection Options**
- **Host-to-device Communications**
- **Command and Response Tables**

The SME 211 Streaming Media Processor can be configured and controlled using SIS commands or embedded web pages. SIS commands can be executed using the Extron DataViewer program, found on the Extron website at **www.extron.com**.

Connection Options

The SME 211 can be remotely connected via a host computer or other device (such as a control system) to the rear panel RS-232 port, the LAN port, or the front panel USB Config port.

RS-232 Port

The SME 211 has a rear panel serial port (see **Figure 3**, Ⓕ on page 8) that can be connected to a host device such as a computer running a HyperTerminal utility, or the Extron DataViewer utility, making serial control of the SME possible. Use the protocol defaults to make the connection.

RS-232 protocol defaults:

- 9600 baud
- 8 data bits
- no parity
- no flow control
- 1 stop bit

Front Panel Configuration Port

The USB Mini-B port is located on the front panel (see **Front Panel Features** on page 13). It connects to a host computer for configuration using SIS commands with DataViewer, available at **www.extron.com**.

USB port details:

The Extron USB driver must be installed before use.

NOTE: If an Extron USB device has never been connected to the host computer, prior to connecting the SME 211 Config (USB) port for the first time, the USB driver must be installed and activated. The simplest way to do this is to install Dataviewer (see **DataViewer** on page 86).

Ethernet (LAN) Port

The rear panel LAN connector on the device can be connected to an Ethernet LAN or WAN. Communication between the device and the control system or PC is via Telnet (a TCP socket using port 23). The Telnet port can be changed, if necessary, via SIS or using the SME 211 Web user interface. This connection makes SIS control of the device possible using a control system or PC connected to the same LAN or WAN. The SIS commands and behavior of the product are common to the commands and behavior the product exhibits when communicating by serial port or USB.

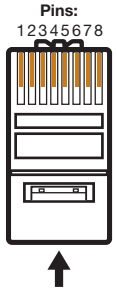
LAN port defaults:

DHCP:	`off`
SME 211 IP address:	`192.168.254.254`
Subnet mask:	`255.255.Ø.Ø`
Gateway IP address:	`Ø.Ø.Ø.Ø`

Ethernet Connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for the specific application.

- **Crossover cable** — Direct connection between the computer and the SME.
- **Patch (straight) cable** — Connection of the SME to an Ethernet LAN.



Crossover Cable
(for direct connection to a PC)

End 1		End 2	
Pin	Wire Color	Pin	Wire Color
1	white-orange	1	white-green
2	orange	2	green
3	white-green	3	white-orange
4	blue	4	blue
5	white-blue	5	white-blue
6	green	6	orange
7	white-brown	7	white-brown
8	brown	8	brown
T568B		T568A	

A cable that is wired as TIA/EIA T568A at one end and T568B at the other (Tx and Rx pairs reversed) is a "crossover" cable.

Straight-through Cable
(for connection to a switch, hub, or router)

End 1		End 2	
Pin	Wire Color	Pin	Wire Color
1	white-orange	1	white-orange
2	orange	2	orange
3	white-green	3	white-green
4	blue	4	blue
5	white-blue	5	white-blue
6	green	6	green
7	white-brown	7	white-brown
8	brown	8	brown
T568B		T568B	

A cable wired the same at both ends is called a "straight-through" cable because no pin/pair assignments are swapped.

Figure 42. RJ-45 Ethernet Connector Pin Assignments

To establish a network connection to the SME:

1. Open a TCP socket to port 23 using the SME 211 IP address.

   NOTE: If the local system administrators have not changed the value, the factory-specified default, `192.168.254.254`, is the correct value for this field.

2. The SME responds with a copyright message including the name of the product, firmware version, part number, and the current date and time.
   - If the SME is not password-protected, the device is ready to accept SIS commands immediately after it sends the copyright message.
   - If the SME is password-protected, a `Password` prompt appears below the copyright message. Proceed to step 3.
3. If the device is password protected, enter the appropriate administrator or user password.
   - If the password is accepted, the device responds with `Login User` or `Login Administrator`.
   - If the password is not accepted, the `Password` prompt reappears.

Connection Timeouts

The Ethernet link times out after a designated period of time with no communication. By default, this timeout value is 5 minutes, but the value can be changed (see **Set current session port timeout** on page 72).

NOTE: Extron recommends leaving the default timeout at 5 minutes and periodically issuing the Query (**Q**) command to keep the connection active. If there are long idle periods, disconnect the socket and reopen the connection when another command must be sent.

Verbose Mode

Telnet connections can be used to monitor for changes that occur, such as SIS commands from other Telnet sockets or serial port changes. For a Telnet session to receive change notices, the Telnet session must be in verbose mode 1 or 3. In verbose mode 1 or 3, the Telnet socket reports changes in messages that resemble SIS command responses.

Host-to-device Communications

The SME 211 accepts SIS commands through the rear panel Remote RS-232 port, the front panel Config port, and the rear panel Ethernet (LAN) port. SIS commands consist of one or more characters per command field. Each response to an SIS command ends with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

SME 211 - Initiated Messages

The SME 211 initiates messages under specific conditions. No response is required from the host. The SME 211 initiated message is as follows:

↵© Copyright 2Ø14-2Ø16, Extron Electronics, SME 211, V*n.nn*, 6Ø–*XXXX*-Ø1↵
Day, *DD MMM YYYY HH:MM:SS*↵

The SME sends the copyright messages under the following circumstances:

- If the SME is off and an RS-232 connection is already set up (the PC is cabled to the SME and a serial communication program such as DataViewer is open), the connected unit sends these messages via RS-232 when first powered on.
- If the SME is on, it sends the copyright message when a Telnet connection to the SME is first opened. The day of the week, date, and time are shown when the SME is connected via Telnet, but not via RS-232. If using a Telnet connection, the copyright message, date, and time may be followed by a password prompt.

Password Information

The ↵Password: prompt requires a password (administrator level or user level) followed by a carriage return. The prompt is repeated if the correct password is not entered.

If the correct password is entered, the unit responds with ↵Login Administrator↵ or ↵Login User↵, depending on the password entered. If passwords are the same for both administrator and user, the unit will default to administrator privileges.

Error Responses

When the SME is unable to execute the command, it returns an error response to the host. The error response codes and their descriptions are as follows:

E1Ø – Unrecognized command

E12 – Invalid port number

E13 – Invalid parameter (number is out of range)

E14 – Not valid for this configuration

E17 – Invalid command for signal type

E18 – System timed out

E22 – Busy

E24 – Privilege violation

E25 – Device not present

E26 – Maximum connections exceeded

E28 – Bad file name or file not found

Using the Command and Response Tables

The **Command and Response Tables** begins on page 66. Symbols used in the table represent variables in the command and response fields. Command and response examples are shown throughout the table. The SIS commands are not case sensitive. The conversion table below is for use with the command and response table.

ASCII Chart

DEC	HEX	ASCII	Ctrl KEY	DEC	HEX	ASCII	DEC	HEX	ASCII	DEC	HEX	ASCII
0	00	NUL	@	32	20	SP	64	40	@	96	60	'
1	01	SOH	A	33	21	!	65	41	A	97	61	a
2	02	STX	B	34	22	"	66	42	B	98	62	b
3	03	ETX	C	35	23	#	67	43	C	99	63	c
4	04	EOT	D	36	24	$	68	44	D	100	64	d
5	05	ENQ	E	37	25	%	69	45	E	101	65	e
6	06	ACK	F	38	26	&	70	46	F	102	66	f
7	07	BEL	G	39	27	'	71	47	G	103	67	g
8	08	BS	H	40	28	(	72	48	H	104	68	h
9	09	TAB	I	41	29	)	73	49	I	105	69	i
10	0A	LF	J	42	2A	*	74	4A	J	106	6A	j
11	0B	VT	K	43	2B	+	75	4B	K	107	6B	k
12	0C	FF	L	44	2C	,	76	4C	L	108	6C	l
13	0D	CR	M	45	2D	-	77	4D	M	109	6D	m
14	0E	SO	N	46	2E	.	78	4E	N	110	6E	n
15	0F	SI	O	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	P	48	30	0	80	50	P	112	70	p
17	11	DC1	Q	49	31	1	81	51	Q	113	71	q
18	12	DC2	R	50	32	2	82	52	R	114	72	r
19	13	DC3	S	51	33	3	83	53	S	115	73	s
20	14	DC4	T	52	34	4	84	54	T	116	74	t
21	15	NAK	U	53	35	5	85	55	U	117	75	u
22	16	SYN	V	54	36	6	86	56	V	118	76	v
23	17	ETB	W	55	37	7	87	57	W	119	77	w
24	18	CAN	X	56	38	8	88	58	X	120	78	x
25	19	EM	Y	57	39	9	89	59	Y	121	79	y
26	1A	SUB	Z	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	[	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	\	60	3C	<	92	5C	\	124	7C	|
29	1D	GS	]	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	^	62	3E	>	94	5E	^	126	7E	~
31	1F	US	_	63	3F	?	95	5F	_	127	7F	DEL

Figure 43. Conversion Table

Symbol definitions

↵ = CR/LF (carriage return/line feed)

| or ← = Pipe character or carriage return (no line feed, hex ØD)

• = Space

Esc or W = Escape

X1 = Encoder
1 = Encoder 1
2 = Encoder 2

X2 = Audio Channels
4ØØØØ = Analog audio left
4ØØØ1 = Analog audio right
4ØØØ2 = HDMI audio left
4ØØØ3 = HDMI audio right

X3 = Horizontal and Vertical start — Ø to 255
Default = 128 (Read only command)

X4 = Total lines

X5 = Total pixels — Up to ± 512 of the default value for the detected rate

X6 = Active pixels — Up to ± 512 of the default value for the detected resolution (range varies based on input resolution)

X7 = Active lines — Up to ± 256 of the default value for the detected resolution (range varies based on input resolution)

X8 = On/Off:
Ø = Disabled/unassigned/off/unmuted (**default**)
1 = Enabled/assigned/on/muted
Executive Mode:
Ø = Off (**default**)
1 = Complete lockout (no front panel control)

X9 = HDCP status
Ø = No sink/source undetected
1 = HDCP detected
2 = Sink/source detected but no HDCP

X10 = Input name (up to 16 characters)

X11 Brightness/contrast — 1 to 127

X12 Horizontal and vertical position — The range varies such that the window never goes completely off-screen (5-digit response).

X13 = Horizontal and vertical size — ØØ12Ø to Ø4Ø96 (5-digit response)

X14 = Test pattern
Ø = Off (**default**)
1 = Colorbars
2 = Aspect ratio 1.33
3 = Aspect ratio 1.78
4 = Aspect ratio 1.85
5 = Crop
6 = Pulse (audio test pattern)
7 = Timestamp
8 = Universal OSD

X15 = Output Resolution
Ø = 512x288
1 = 480p
2 = 720p (**default**)
3 = 1080p
4 = 1024x768
5 = 1280x1024

X16 = Output refresh rate
1 = 60 Hz
2 = 50 Hz

X17 = Input presets — 1 to 128 (two digit response — Ø padding)

X18 = Aspect ratio
1 = Fill (the input automatically fills the entire output raster; **default**)
2 = Follow (the input is displayed in its native aspect ratio)
3 = Fit (the input is zoomed in to fill the entire output raster while maintaining its aspect ratio)

X19 = Metadata parameter
Ø = Contributor
1 = Coverage
2 = Presenter (Creator)
3 = Start Date, Time, Zone (view only)
4 = Description
5 = Format
6 = Identifier/Event UID (view only)
7 = Language
8 = Publisher
9 = Course ID
1Ø = Copyright (Rights)
11 = Source
12 = Subject
13 = Title
14 = Type
15 = Device Name (System Name)
16 = Course Name
17 = License
18 = Relation
19 = Location

NOTE: The "view only" values return a response only while streaming.

X20 = Metadata value — 127 alpha-numerical characters

X21 = Encoder status
- Ø = Stop
- 1 = Encode
- 2 = Pause

X22 = Audio delay — Ø to 999 milliseconds

X23 = Front panel audio level indication
-1500 to Ø (in .01 dBfs steps)

X24 = Output frame rate
- 1 = 30
- 2 = 25
- 3 = 24
- 4 = 15
- 5 = 12.5
- 6 = 12
- 7 = 10
- 8 = 5

X25 = Output mode
- 1 = Video and audio
- 3 = Audio only
- 4 = Video/audio + audio only

X26 = Bit rate control and type
- Ø = VBR
- 1 = CVBR
- 2 = CBR

X27 = Video bit rate target — 200 to 25000
Default = 5000

X28 = Audio input gain in 0.1 dB steps
(-180 to 240 = -18.0 to +24.0 dB)

X29 = GOP length — 1 to 30 (**default** = 30)

X30 = Audio format
- Ø = Disable audio
- 1 = Analog
- 2 = PLCM 2 CH (**default**)

X31 = Presets — 1 to 64 (Encoder), 1 to 16 (Streaming)
Two digit response — Ø padding

X32 = Audio bit rate — 80, 96, 128, 192 (**default**), 256, 320 kbps

X33 = Mute status
- Ø = Unmuted
- 1 = Muted

X34 = EDID numbers — 1 to 38

X35 = Overscan
- Ø = Ø % (**default**)
- 1 = 2.5 %
- 2 = 5.Ø %

X36 = Encode profile
- Ø = Base
- 1 = Main
- 2 = High

X37 = Audio output
- 1 = HDMI only
- 2 = Analog only
- 3 = HDMI and Analog

X39 = EDID user slots — 1 to 3

X40 = Streaming method
- Ø = Disabled
- 1 = RTMP
- 2 = RTSP
- 3 = Push RTP

X41 = RTMP URL (String)

X42 = Json string of profile parameters (See X19 on previous page) — Example:

```
{
"id":1,
"name":"METADATA PROFILE 1",
"contributor":"Contributor 1",
"coverage":"Coverage 1",
"presenter":"Presenter 1",
"description":"Description 1",
"format":"Format 1",
"language":"Language 1",
"publisher":"Publisher 1",
"license":"License 1"
"copyright":"Copyright 1",
"source":"Source 1",
"subject":"Subject 1",
"title":"Title 1",
"type":"Type 1",
"course_name":"Course name 1",
"course_id":"Course ID 1",
"relation":"Relation 1",
"location":"Location 1"
}
```

X44 = Configuration type
- Ø = IP Config (ip.cfg)
- 2 = Box specific parameters (box.cfg)

X45 = Firmware version number

X46 = Device name (63 characters, max)
Must comply with internet host name standards.

X47 = Day, date, and time
(Day,•MM•DD•YY-HH:MM:SS)

X48 = Time zone acronym (2 to 6 letters)

X49 = Greenwich Mean Time (GMT) offset value: -12:00 to 14:00. Represents hours and minutes (HH:MM) offset from GMT including the time zone name.

X50 = IP address in dotted decimal notation (*xxx.xxx.xxx.xxx*)
Default IP address: 192.168.254.254 (no padding)
Default gateway IP address: Ø.Ø.Ø.Ø
Default DNS server IP address: Ø.Ø.Ø.Ø

X51 = Subnet mask
Default: 255.255.Ø.Ø (no padding)

X52 = Hardware MAC address (ØØ-Ø5-A6-NN-NN-NN)

X53 = Time in 10s of milliseconds to wait for characters coming into a serial port before terminating (min = Ø, max = 32767, **default** = 1Ø = 100ms).
The response is returned with leading zeros.

X54 = Time in 10s of milliseconds to wait between characters coming into a serial port before terminating (min = Ø, max = 32767, **default** = 2 = 20ms).
The response is returned with leading zeros.

X55 = Parameter to set either Length of message to receive or Delimiter value.
L = 3 = byte count (min = Ø, max = 32767, **default** = ØL = 0 byte count)
D = decimal value for ASCII character. (min = Ø, max = ØØ255, **default** = ØØØØØL).
Value is placed prior to parameter: 3 byte length = 3L and ASCII ØA delimiter is 1ØD. The parameter is case sensitive, must use capital D or capital L. The response is returned with leading zeros.

X56 = Priority status for receiving timeouts:
Ø = use Send data string command parameters (if they exist [**default**]).
1 = use Configure receive timeout command parameters instead.

X57 = RS-232 baud rate: 96ØØ (**default**), 192ØØ, 384ØØ, 576ØØ, 1152ØØ

X58 = RS-232 parity: Single letter:
Odd, **E**ven, **N**one (**default**), **M**ark, **S**pace.

X59 = RS-232 data bits: 7, 8 (**default**)

X60 = RS-232 stop bits: 1 (**default**), 2

X61 = Password: Maximum length 128 characters. All alpha-numeric characters permitted except |.

X62 = Port timeout in tens of seconds (zero padded. **default**: ØØØ3Ø = 3ØØ seconds. Range = 1-65ØØØ)

X63 = Default name: Combination of model name and last three pairs of MAC address (example: SME-211-Ø7-8C-EC)

X64 = SNMP contact name text. Up to 64 alphanumeric characters, hyphens, underscores, and period. (**Default** = Not Specified)

X65 = SNMP location. Up to 64 alphanumeric characters, hyphens, underscores, and period. (**Default** = Not Specified)

X66 = SNMP public community string. Up to 64 alphanumeric characters, hyphens, underscores, and period. (**Default** = public)

X67 = SNMP private community string. Up to 64 alphanumeric characters, hyphens, underscores, and period. (**Default** = private)

X68 = Verbose mode
Ø = Clear or none (**Default** for USB, RS-232, and Telnet host control)
1 = Verbose mode is on (**Default**)
2 = Tagged responses for queries
3 = Verbose mode and tagged responses for queries

X500 = Serial port mode:
Ø = Disable port
1 = Standard Host control (SIS - **default**)

X502 = Audio source
1 = HDMI
2 = Analog
3 = Mixed

X600 = Encoder-Stream reference:
11 = Encoder 1 RTSP stream
12 = Encoder 1 RTP stream
13 = Encoder 1 RTMP stream
21 = Encoder 2 RTSP stream
22 = Encoder 2 RTP stream
23 = Encoder 2 RTMP stream

X601 = Stream state
Ø = Disabled
1 = Enabled

X602 = Content type value
1 = Audio
2 = Video
3 = Audio and Video
4 = Text
7 = Audio and Video and Text

X603 = Stream Name/Key. For RTSP streams, this value defines the stream name. For RTMP streams, some service providers use the term "stream name", while others use the term "stream key".

X604 = Stream URL (the URL for a decoder to receive the stream).

X605 = UDP/RTP Stream transport type value:
Examples:
ES/RTP = 1
TS/UDP = 2
TS/RTP = 3

X606 = The destination IP address or host name (determines Unicast or Multicast operation).

X607 = Stream port number

Command and Response Tables

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Information Requests			
NOTE: An asterisk (*) after the version number indicates the currently running version. Question marks (?.??) indicate that only factory firmware is loaded. A caret (^) indicates the firmware version that should be running, but a Mode 1 reset (see **SME 211 Rear Panel Reset** on page 11) was executed and the default factory firmware is running. An exclamation point (!) indicates corrupted firmware. These apply to `ØQ-4Q.`			
Firmware version	`Q or 1Q`	X45↵	Firmware version to 2 decimal places (`1.ØØ`).
Firmware and build version	`*Q/q`	X45↵	Firmware version to 2 decimal places plus build number to 4 decimal places (`1.12.1234`).
Verbose version info	`ØQ`	Sum of `2Q-3Q-4Q`↵	Show bootstrap, factory-installed, and updated firmware version.
Bootstrap Version	`2Q`	X45 ↵	The bootstrap firmware is not user replaceable but this information may be needed for troubleshooting.
Factory Firmware Version	`3Q`	X45 plus Web ver.-desc-UL date/time↵	Factory installed firmware is not user replaceable. This firmware is the version the SME reverts to after a Mode 1 reset.
Example:	`3Q`	`1.ØØ.ØØØØ-b2325(1.81LX-SME 211 -Sat, 1Ø Feb 2Ø18 2Ø:1Ø UTC)`↵	
Updated firmware version	`4Q`	X45 plus Web ver.-desc-UL date/time↵	Use this command to find out which version of firmware has been uploaded into the SME 211.
	Example:	`1.ØØ.ØØØ4-b2635*(1.81LX-SME 211 -Sun, 11 Feb 2Ø18 ØØ:12 UTC)`↵	
Query part number	`N`	`6Ø-XXXX-Ø1`↵	
Query model name	`1I`	Example: `SME•211`↵	
Query model description	`2I`	`Streaming•Media•Encoder` ↵	
Query system memory usage	`3I`	`#Bytes used out of #KBytes`↵	
Query location	`5I`	`<Location>`↵	
Query internal drive free space	`15I`	`internal*xx.xxGB`↵	

NOTES: X45 = Firmware version number

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Query USB drive free space	16I	<drive volume>*xx.xxMB,<drive volume>*xx.xxMB↵	
View stream resolution and frame rate	31I	<Stream resolution>*<Frame rate>↵	
	Example:	128Ø x72Ø*3Ø	
View Encoder1 resolution and frame rate	33I	<Stream resolution>*<Frame rate>↵	
	Example:	128Ø x72Ø*3Ø	
View audio output level	34I	X23*X23↵	Left*right channel of the output audio
		Inf34*X23*X23↵	Verbose mode 2/3
View number of connected users	1ØI	*N*↵	Number of users.
View system processor usage	11I	*NN*↵	Returns a percentage of total.
View system processor idle	12I	*NN*↵	Returns a percentage of total.
View EthØ network link status	13I	Current link state (up/down)* speed in MB (1Ø/1ØØ/1ØØØ)* mode (full/half)↵	
View file transfer config	38I	Example: \\Network_Storage\Folder, cifs↵	
Clear active alarms	EscCALRM←	Alrm C↵	Clear all active alarms.
View active alarms	39I	<name:alarm_name>,<level:alarm_level>...>↵ If no active alarms: None active↵	
Set unit name	Esc X46 CN←	Ipn X46↵	
Set unit name to default	Esc • CN←	Ipn X63↵	
View unit name	Esc CN←	X46↵	
View Telnet connections	Esc CC←	*N*↵	*N* = Number of active IP connections.
		Icc *N*↵	Verbose mode 2/3.
Set verbose mode	Esc X68 CV←	Vrb X68↵	
View verbose mode	Esc CV←	X68↵	

NOTE: If tagged responses is enabled, all read commands return the data, the same as setting the value does (Example: command: Esc CV← Response: Vrb3↵)

NOTES:

X23 = Front panel audio level	-15ØØ to Ø (in .01 dBfs steps)
X46 = Unit name	Device name (63 characters max) Must comply with internet host name standards.
X63 = Default name	Combination of model name and last three pairs of MAC address (Example: SME-211-Ø7-8C-EC)
X68 = Verbose/Response mode	Ø = Clear/none (**Default** for USB, RS-232, and Telnet host control) 1 = Verbose mode (**Default** for USB and RS-232) 2 = Tagged responses for queries 3 = Verbose mode and tagged responses for queries

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Backup/Restore			
Save configuration	Esc 1*X44XF←	Cfg1*X44↵	Save configuration to file location (/nortxe-backup).
Restore configuration	Esc Ø*X44XF←	CfgØ*X44↵	Load configuration from file location (/nortxe-backup).
Front Panel Lock (Executive Mode)			
Enable	1X	Exe1↵	Disable all front panel controls.
Disable	ØX	ExeØ↵	Enable all front panel controls.
View status	X	X8↵ ExeX8↵	Show executive mode status. Verbose mode 2/3.
Resets			
Reboot system	Esc 1BOOT←	Boot1↵	Complete system reboot.
Restart the network interface	Esc 2BOOT←	Boot2↵	Apply changes and restart network interface.
Reset flash	Esc ZFFF←	Zpf↵	Reset flash memory, delete all user files.
System Reset (factory defaults)	Esc ZXXX←	Zpx↵	Resets device to default but retains all user files.
Reset all device settings and delete files	Esc ZY←	Zpy↵	Reset to default except IP address, delete all user files.
NOTE: This reset excludes IP settings such as IP address, subnet mask, gateway IP address, unit name, DHCP setting and port mapping (Telnet/Web/direct access) in order to preserve communication with the device.			
Absolute reset	Esc ZQQQ←	Zpq↵	Same as **System Reset**, but deletes all user files plus resets the IP address and subnet mask to defaults.
File Commands			
Change directory	Esc *path/directory*/CJ←	Dirl path/directory/↵	
Return to root directory	Esc /CJ←	Dirl/↵	
Up one directory	Esc ..CJ←	Dirl path/directory/↵	
View current directory	Esc CJ←	path/directory/↵	
Erase named file	Esc filenameEF←	Del•filename↵	
Erase current directory and included files	Esc /EF ←	Ddl↵	Also deletes files inside directory.
Erase current directory and sub-directories	Esc //EF ←	Ddl↵	
List files from current directory	Esc DF ←	*path/filename•date/time•length*↵ *path/filename•date/time•length*↵ *path/filename•date/time•length*↵ ... *space_remaining•Bytes Left*↵↵	filename/date/time/bytes left
List files from current directory and below	Esc LF ←	*path/filename•date/time•length*↵ *path/filename•date/time•length*↵ *path/filename•date/time•length*↵ ... *space_remaining•Bytes Left*↵↵	filename/date/time/bytes left

NOTES: X8 = Executive mode
X44 = Configuration type
Ø = Off; 1 = Complete lockout (no front panel control)
Ø = IP config (ip.cfg); 2 = Box specific parameters (box.cfg)

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Port Assignment			
NOTES: • Duplicate port# assignments are not permitted (for example, the Telnet and Web port assignment cannot be the same) and will return the E13 error. • Remapping of port# assignments must be to ports 1024 or higher (unless resetting to the default port number or disabling the port by setting it to 0).			
Telnet Port			
Set Telnet port map	Esc [port#]MT ←	Pmt[port#]↵	
Reset Telnet port map	Esc 23MT ←	Pmt00023↵	Reset the Telnet port to the default value (23).
Disable Telnet port	Esc 0MT ←	Pmt00000↵	
View Telnet port map	Esc MT ←	[port#]↵	
Web (HTTP) Port			
Set Web port map	Esc [port#]MH ←	Pmh[port#]↵	
Reset Web port map	Esc 80MH ←	Pmh00080↵	Reset the Web port to the default value (80).
Disable Web port	Esc 0MH ←	Pmh00000↵	
View Web port map	Esc MH ←	[port#]↵	
SNMP Port			
Set SNMP port map	Esc A[port#]PMAP ←	PmapA[port#]↵	
Reset SNMP port map	Esc A161PMAP ←	PmapA00161↵	Reset the SNMP port to the default value (161).
Disable SNMP port	Esc A0PMAP ←	PmapA00000↵	
View SNMP port map	Esc APMAP ←	[port#]↵	
SSH Port (SIS over SSH only)			
Set SSH port map	Esc B[port#]PMAP ←	PmapB[port#]↵	
Reset SSH port map	Esc B22023PMAP ←	PmapB22023↵	Reset the SSH port to the default value (22023).
Disable SSH port	Esc B0PMAP ←	PmapB00000↵	
View SSH port map	Esc BPMAP ←	[port#]↵	
HTTPS (SSL or TLS) Port			
Set HTTPS port map	Esc S[port#]PMAP ←	PmapS[port#]↵	
Reset HTTPS port map	Esc S443PMAP ←	PmapS00443↵	Reset the HTTPS port to the default value (443).
Disable HTTPS port	Esc S0PMAP ←	PmapS00000↵	
View HTTPS port map	Esc SPMAP ←	[port#]↵	
Direct access port			
Set direct access port map	Esc [port#]MD ←	Pmd[port#]↵	
Reset direct access port map	Esc 2001MD ←	Pmd02001↵	Reset the direct access port to the default value (2001).
Disable direct access port	Esc 0MD ←	Pmd00000↵	
View direct access port map	Esc MD ←	[port#]↵	

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
SNMP (Simple Network Management Protocol)			
SNMP Unit Contact			
Set unit contact	Esc C X64 SNMP ←	SnmpC* X64 ↵	Set the unit contact to X64.
Set unit contact to default	Esc C • SNMP ←	SnmpC*Not•Specified ↵	Set the unit contact to the default setting.
View unit contact	Esc CSNMP ←	X64 ↵	View the unit contact.
SNMP Unit Location			
Set unit location	Esc L X65 SNMP ←	SnmpL* X65 ↵	Set the unit location to X65.
Set unit location to default	Esc L•SNMP ←	SnmpL*Not•Specified ↵	Set the unit location to the default setting.
View unit location	Esc LSNMP ←	X65 ↵	View the unit location.
SNMP Community Strings			
Set public community string	Esc P X66 SNMP ←	SnmpP* X66 ↵	Set public community string to X66.
Set public community string to default	Esc P•SNMP ←	SnmpP*public ↵	Set community string to the default.
View public community string	Esc PSNMP ←	X66 ↵	View the public community string.
Set private community string	Esc X X67 SNMP ←	SnmpX* X67 ↵	Set private community string to X67.
Set private community string to default	Esc X•SNMP ←	SnmpX*private ↵	Set private community string to the default setting.
View private community string	Esc XSNMP ←	X67 ↵	View the private community string.
NOTE: Community strings are referred to as passwords in the Web-based User Interface.			
SNMP Access Enable			
Enable SNMP access	Esc E1SNMP ←	SnmpE*1 ↵	Enable SNMP access.
Disable SNMP access	Esc EØSNMP ←	SnmpE*Ø ↵	Disable SNMP access.
View SNMP state	Esc ESNMP ←	X8 ↵	View the SNMP access setting.

NOTES:

X8 = On/off	Ø = Disabled/off (**default**); 1 = Enabled/on	
X64 = SNMP contact name text	Up to 64 alphanumeric characters, hyphens, underscores, and period (**Default** = Not Specified)	
X65 = SNMP location	Up to 64 alphanumeric characters, hyphens, underscores, and period (**Default** = Not Specified)	
X66 = SNMP public community string	Up to 64 alphanumeric characters, hyphens, underscores, and period (**Default** = public)	
X67 = SNMP private community string	Up to 64 alphanumeric characters, hyphens, underscores, and period (**Default** = private)	

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Date and Time			
Set date/time	Esc MM/DD/YY-HH:MM:SS CT ←	Ipt • X47 ↵	Set the date and time.
View date/time	Esc CT ←	X47 ↵	View the date and time.
Set time zone Example:	Esc X48 * TZON ← Esc PST * TZON ←	Tzon • X48 * X49 ↵ Tzon • PST*(UTC-Ø8:ØØ/UTC-Ø7:ØØ)•Pacific Time↵	
View time zone Example:	Esc TZON ←	X48* X49 ↵ PST*(UTC-Ø8:ØØ/UTC-Ø7:ØØ) •Pacific Time↵	Verbose mode 2/3 response adds Tzon • to start of string.
View all time zones	Esc * TZON ←	X48* X49 ↵ ... X48* X49 ↵↵	Repeat for all time zones Verbose mode 2/3 adds Tzon • to start of string.
Network Time Protocol (NTP)			
Enable NTP	Esc 1NTEN ←	Nten1↵	
Disable NTP	Esc ØNTEN ←	NtenØ↵	Disables use of NTP service (**default**) and uses the local PC to set the time.
Sync NTP now	Esc 2NTEN ←	Nten2↵	
View NTP status	Esc NTEN ←	X8 ↵	Show the NTP service mode (0/1)
Set single NTP host	Esc X50 NTIP ←	Ntip X50 ↵	Set NTP server host name/IP address
Set multiple NTP hosts	Esc X50*... X50 NTIP ←	Ntip X50*... X50 ↵	Set NTP server host name/IP addresses
Clear all NTP hosts	Esc •NTIP ←	Ntip ↵	Clear all NTP server host names / IP addresses
View all NTP hosts	Esc NTIP ←	X50*... X50 ↵	View all NTP server host names / IP addresses

NOTES:
X8 = On/off — Ø = Disabled/off (**default**); 1 = Enabled/on
X47 = Day, date, and time — Day,•MM•DD•YY-HH:MM:SS
X48 = Time zone acronym — 2 to 6 letters
X49 = Greenwich Mean Time (GMT) offset value (-12:ØØ to 14:ØØ [Represents hours and minutes HH:MM offset from GMT, including the time zone name])
X50 = IP address — IP address in dotted decimal notation (**Default**: 192.168.254.254, no padding)

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
IP Setup Commands			
Set DHCP on	Esc 1DH ←	Idh1 ↵	Set DHCP to on.
Set DHCP off	Esc ØDH ←	IdhØ ↵	Set DHCP to off.
View DHCP mode	Esc DH ←	X8 ↵	Ø = off (**default**), 1 = on.
Set IP address, subnet mask, gateway	Esc 1*X50*X51*X50CISG ←	Cisg1*IP/subnet bits*gateway ↵	
NOTE: The CISG command resets the network immediately without the need for a BOOT command.			
View IP address, subnet mask, gateway	Esc 1CISG ← Example:	IP/subnet bits*gateway ↵ 192.168.254.254/16*Ø.Ø.Ø.Ø ↵	
Set IP address	Esc X50CI ←	Ipi•X50 ↵	
View IP address	Esc CI ←	X50 ↵	
View hardware MAC address	Esc CH ←	X52 ↵ Iph•X52 ↵	View the hardware MAC address. Verbose mode 2/3.
Set subnet mask	Esc X51CS ←	Ips•X51 ↵	
View subnet mask	Esc CS ←	X51 ↵	
Set gateway IP address	Esc X50CG ←	Ipg•X50 ↵	Set the gateway IP address.
View gateway IP address	Esc CG ←	X50 ↵	View the gateway IP address.
Set DNS server IP address	Esc X50DI ←	Ipd•X50 ↵	Set the DNS server IP address (**default**: Ø.Ø.Ø.Ø).
View DNS server IP address	Esc DI ←	X50 ↵	View the DNS server IP address.
Set current session port timeout	Esc Ø*X62TC ←	PtiØ*X62 ↵	
View current port timeout	Esc ØTC ←	X62 ↵	
Set global IP port timeout	Esc 1*X62TC ←	Pti1*X62 ↵	
View global IP port timeout	Esc 1TC ←	X62 ↵	

NOTES:

X8 = On/off	Ø = Disabled/off (**default**); 1 = Enabled/on
X50 = IP address (xxx.xxx.xxx.xxx)	**Default** IP: 192.168.254.254; **Default** gateway IP: Ø.Ø.Ø.Ø; **Default** DSN server IP: Ø.Ø.Ø.Ø
X51 = Subnet mask	**Default**: *255.255.Ø.Ø* (no padding)
X52 = Hardware MAC address	ØØ-Ø5-A6-NN-NN-NN
X62 = Port timeout	In tens of seconds (zero padded, range 1-65ØØØ). **Default**: ØØØ3Ø = 300 seconds

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
RS-232 Port			
Configure serial port parameters	Esc 1*X57,X58,X59,X60CP←	CpnØ1•CcpX57,X58,X59,X60↵	
Reset serial port	Esc 1*96ØØ,n,8,1CP←	CpnØ1•CcpX57,X58,X59,X60↵	
View serial port settings	Esc 1 CP←	X57,X58,X59,X60↵	
Set serial port receive timeout	Esc 1*X53,X54,X56,X55CE←	CpnØ1•CceX53,X54,X56,X55↵	
Password and Security Settings			
Set administrator password	Esc X61CA←	Ipa•X61↵	
View administrator password	Esc CA←	****↵	If no password is set, the response is ↵ (no ****).
Reset (clear) administrator password	Esc •CA←	Ipa•↵	
Set user password	Esc X61CU←	Ipu•X61↵	
View user password	Esc CU←	****↵	If no password is set, the response is ↵ (no ****).
Reset (clear) user password	Esc •CU←	Ipu•↵	
View session security level	Esc CK←	*n*↵	Security level of connection 11 = User, 12 = Administrator.

NOTES:

X53 = Time in 10s of milliseconds to wait for characters coming into a serial port before terminating
min = Ø, max = 32767, **default** = 1Ø = 100ms

X54 = Time in 10s of milliseconds to wait between characters coming into a serial port before terminating
min = Ø, max = 32767, **default** = 2 = 20ms

X55 = Parameter to set either Length of message to receive or Delimiter value
L = 3 = byte count (min = Ø, max = 32767, **default** = ØL = 0 byte count)
D = decimal value for ASCII character (min = Ø, max = ØØ255, **default** = ØØØØØL)

X56 = Priority status for receiving timeouts
Ø = use Send data string command parameters (if they exist [**default**])
1 = use Configure receive timeout command parameters instead

X57 = RS-232 baud rate — 96ØØ (**default**), 19ØØ, 384ØØ, 576ØØ, 1152ØØ

X58 = RS-232 parity — Single letter: **O**dd, **E**ven, **N**one (**default**), **M**ark, **S**pace

X59 = RS-232 data bits — 7, 8 (**default**)

X60 = RS-232 stop bits — 1 (**default**), 2

X61 = Password — Maximum length 128 characters. All alpha-numeric characters permitted except | (pipe)

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Input Name			
Set input name	Esc X10 NI ←	Nmi X10 ↵	Set the name X10.
View input name	Esc NI ←	"X10" ↵	
NOTE: To clear an input name, a single space character should be entered for X10. The name resets back to the default setting.			
Input Video Aspect Ratio			
Set to fill	Esc 1ASPR ←	Aspr1 ↵	
Set to follow	Esc 2ASPR ←	Aspr2 ↵	
Set to fit (zoom)	Esc 3ASPR ←	Aspr3 ↵	
View aspect ratio setting	Esc ASPR ←	X18 ↵	
Execute Auto-Image			
Execute	A	ImgØ ↵	Follow current aspect setting.
Execute and fill	1*A	Img1 ↵	Fill the entire output.
Execute and follow	2*A	Img2 ↵	Follow the input aspect ratio.
Master Stream Controls			
Stop live streaming	Esc YØ STRM ←	StrmYØ ↵	
Start live streaming	Esc Y1 STRM ←	StrmY1 ↵	
Pause live streaming	Esc Y2 STRM ←	StrmY2 ↵	Toggle the pause state (same as front panel button), replacing the live HDMI video feed to both encoders with a still frame grabbed from that input when active.
View live streaming status	Esc YSTRM ←	X21 ↵	
Metadata Setup			
Set stream metadata	Esc M X19 * X20 STRM ←	StrmM X19 * X20 ↵	Set metadata.
Example:	Esc M2*Professor SmithSTRM ←	StrmM2*Professor Smith ↵	
View stream metadata	Esc M X19 STRM ←	X20 ↵	View metadata.
Example:	Esc M2 STRM ←	Professor Smith ↵	

NOTES:

X10	= Input name	Up to 16 characters (**default**: Input 1)
X18	= Aspect ratio	1 = Fill (the input automatically fills the entire output raster; **default**); 2 = Follow (the input is displayed in its native aspect ratio; 3 = Fit (the input is zoomed in to fill the entire output raster while maintaining its aspect ratio)
X19	= Metadata parameter	See X19 on page 62
X20	= Metadata value	127 alpha-numerical characters
X21	= Encoder status	Ø = Stop, 1 = Encode, 2 = Pause

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Input Presets			
Recall preset (legacy)	2*X17.	2RprX17↵	
Save preset (legacy)	2*X17,	2SprX17↵	
Recall preset	Esc R2*X17PRST←	PrstR2*X17↵	
Save preset	Esc S2*X17PRST←	PrstS2*X17↵	
Delete/Clear preset	Esc X2*X17PRST←	PrstX2*X17↵	
Set preset name	Esc 2*X17,X10PNAM←	Pnam2*X17,X10↵	Set name of X10 for X31.
View preset name	Esc 2*X17PNAM←	X10↵	View name of encoder preset X31.
Encoder Presets			
Recall preset (legacy)	4*X1*X31.	4RprX1*X31↵	Recall Encoder preset X31 for X1.
Save preset (legacy)	4*X1*X31,	4SprX1*X31↵	Save Encoder preset X31 for X1.
Recall preset	Esc R4*X1*X31PRST←	PrstR4*X1*X31↵	
Save preset	Esc S4*X1*X31PRST←	PrstS4*X1*X31↵	
Delete/clear preset	Esc X4*X31PRST←	PrstX4*X31↵	Clear Encoder preset X31, and set Encoder preset name to [unassigned].
Encoder Preset Name			
Set name	Esc 4*X31,X10PNAM←	Pnam4*X31,X10↵	Set the name X10 for X31.
View name	Esc 4*X31PNAM←	X10↵	View name of Encoder preset X31.
Metadata Profiles			
Recall metadata profile	Esc R5*X31PRST←	PrstR5*X31↵	
Save metadata to profile	Esc S5*X31PRST←	PrstS5*X31↵	See the STRM command above for defining Metadata.
Query active metadata profile	Esc L5PRST←	X31↵	
View selected profile	Esc V5*X31PRST←	X42↵	
Delete metadata profile	Esc X5*X31PRST←	PrstX5*X31↵	

NOTES:
X1 = Encoder — 1 = Encoder 1; 2 = Encoder 2
X10 = Input name — Up to 16 characters
X17 = Input presets — 1 to 128 (two digit response; Ø padding
X31 = Presets — 1 to 64 (Encoder), 1 to 16 (streaming); Two digit response (Ø padding)
X42 = Json string of profile parameters (see X42 on page 63)

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Streaming Presets (RSTP)			
Recall preset	Esc R6* X1 * X31 PRST ←	PrstR6* X31 ↵	Recall Streaming preset X31 to encoder X1
Save preset	Esc S6* X1 * X31 PRST ←	PrstS6* X31 ↵	Save Streaming preset X31 to encoder X1
Delete/clear preset	Esc X6* X31 PRST ←	PrstX6* X31 ↵	Clear Streaming preset X31, and set Streaming preset name to [unassigned].
Set name	Esc 6* X31 , X10 PNAM ←	Pnam6* X31 , X10 ↵	Set the name X10 for X31.
View name	Esc 6* X31 PNAM ←	X10 ↵	View the name of Streaming preset X31.
Streaming Presets UDP-RTP			
Recall preset	Esc R7* X1 * X31 PRST ←	PrstR7* X31 ↵	Recall Streaming preset X31.
Save preset	Esc S7* X1 * X31 PRST ←	PrstS7* X31 ↵	Save Streaming preset X31 for selected channel.
Delete/clear preset	Esc X7* X31 PRST ←	PrstX7* X31 ↵	Clear Streaming preset X31, and set Streaming preset name to [unassigned].
Set name	Esc 7* X31 , X10 PNAM ←	Pnam7* X31 , X10 ↵	Set the name X10 for streaming preset X31.
View name	Esc 7* X31 PNAM ←	X10 ↵	
Streaming Presets (RTMP)			
Recall preset	Esc R8* X1 * X31 PRST ←	PrstR8* X31 ↵	Recall Streaming preset X31.
Save preset	Esc S8* X1 * X31 PRST ←	PrstS8* X31 ↵	Save Streaming preset X31 for selected channel.
Delete/clear preset	Esc X8* X31 PRST ←	PrstX8* X31 ↵	Clear Streaming preset X31, and set Streaming preset name to [unassigned].
Set name	Esc 8* X31 , X10 PNAM ←	Pnam8* X31 , X10 ↵	Set the name X10 for streaming preset X31.
View name	Esc 8* X31 PNAM ←	X10 ↵	

NOTES: X1 = Encoder — 1 = Encoder 1; 2 = Encoder 2
X10 = Input name — Up to 16 characters
X31 = Presets — 1 to 64 (Encoder), 1 to 16 (streaming); Two digit response (Ø padding)

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Stream State (Future Release)			
Set stream state	Esc E X600*X601 STRC ←	StrcE X600*X601 ↵	
View stream state	Esc E X600 STRC ←	X601 ↵	
Stream Content			
Set stream content type	Esc C X600*X602 STRC ←	StrcC X600*X602 ↵	
View stream content type	Esc C X600 STRC ←	X602 ↵	
RTSP Stream Name			
Set RTSP stream name	Esc N X600*X603 STRC ←	StrcN X600*X603 ↵	
View RTSP stream name	Esc N X600 STRC ←	X603 ↵	
Stream URL (RTMP - primary)			
Set server URL + stream key	Esc V X600*X604 STRC ←	StrcV X600*X604 ↵	For RTMP (push), the URL defines the server connection defined by the service provider PLUS the stream key (name).
View server URL + stream key	Esc V X600 STRC ←	X600 ↵	
Stream Transport (UDP-RTP)			
Set stream transport	Esc T X600*X605 STRC ←	StrcT X600*X605 ↵	
View stream transport	Esc T X600 STRC ←	X605 ↵	
Stream Destination			
Set stream destination	Esc D X600*X606 STRC ←	StrcD X600*X606 ↵	
View stream destination	Esc D X600 STRC ←	X600 ↵	
Stream Port			
Set stream port	Esc P X600*X607 STRC ←	StrcP X600*X607 ↵	
View stream port	Esc P X600 STRC ←	X600 ↵	

NOTES:
- X600 = Encoder-Stream reference — 11 = Encoder 1 RTSP stream; 12 = Encoder 1 RTP stream; 13 = Encoder 1 RTMP stream; 21 = Encoder 2 RTSP stream; 22 = Encoder 2 RTP stream; 23 = Encoder 2 RTMP stream
- X601 = Stream state — Ø = Disabled; Ø = Enabled
- X602 = Content type value — 1 = Audio; 2 = Video; 3 = Audio and Video; 4 = Text; 7 = Audio, Video, and Text
- X603 = Stream Name/Key — For RTSP streams, this value defines the streawm name. For RTMP streams, some service providers use the term "stream name", while other use the term "stream key".
- X604 = Stream URL — The URL for a decoder to receive the stream.
- X605 = UDP/RTP Stream transport type value (see X605 on page 65)
- X606 = The destination IP address or host name (determines Unicast or Multicast operation)
- X607 = Stream port number

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
RTMP (primary) Destination URL			
NOTE: These legacy RTMP commands duplicate two STRC commands above, but are retained for backward compatibility.			
Set RTMP URL	Esc U1*X41RTMP ←	RtmpU1*X41↵	
View RTMP URL	Esc U1RTMP ←	X41↵	
RTMP Stream Enable/Disable			
Enable RTMP push stream	Esc E1*X8RTMP ←	RtmpE1*X8↵	
View RTMP push stream	Esc E1RTMP ←	X8↵	
Video Encode Resolution			
Set encode resolution	Esc X1*X15VRES ←	VresX1*X15↵	
View encode resolution	Esc X1VRES ←	X15↵	
Video Encode Frame-Rate			
Set encode frame-rate	Esc X1*X24VFRM ←	VfrmX1*X24↵	
View encode frame-rate	Esc X1VFRM ←	X24↵	
Group of Picture (GOP) Length			
Set GOP length	Esc X1*X29GOPL ←	GoplX1*X29↵	
View GOP length	Esc X1GOPL ←	X29↵	
Encode (H.264) Profile			
Set encode profile	Esc X1*X36EPRO ←	EproX1*X36↵	
View encode profile	Esc X1EPRO ←	X36↵	
Bit Rate Control/Type			
Set value	Esc X1*X26BRCT ←	BrctX1*X26↵	Set bit rate type to X26.
View bit rate control type	Esc X1BRCT ←	X26↵	View current set output bit-rate type.
Video Bit Rate			
Set video bit rate	Esc VX1*X27BITR ←	BitrVX1*X27↵	Set video bit rate to X27.
View video bit rate	Esc VX1BITR ←	X27↵	View video bit rate setting.

NOTES:

X1 = Encoder	1 = Encoder 1; 2 = Encoder 2
X8 = On/off	Ø = Disabled/off (**default**); 1 = Enabled/on
X15 = Output resolution	Ø = 512x288; 1 = 480p; 2 = 720p (**default**); 3 = 1080p; 4 = 1024x768; 5 = 1280x1024
X24 = Output frame rate	1 = 30; 2 = 25; 3 = 24; 4 = 15; 5 = 12.5; 6 = 12; 7 = 10; 8 = 5
X26 = Bit rate control and type	Ø = VBR; 1 = CVBR; 2 = CBR
X27 = Video bit rate target	2ØØ to 25ØØØ (**default** = 5ØØØ)
X29 = GOP length	1 to 3Ø (**default** = 3Ø)
X36 = Encode profile	Ø = Base; 1 = Main; 1 = High
X41 = RTMP URL (String)	

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Audio Bit Rate			
Set audio bit rate	Esc A X1 * X32 BITR ←	BitrA X1 * X32 ↵	Set audio bit rate to X32.
View audio bit rate	Esc A X1 BITR ←	X32 ↵	View audio bit rate setting.
HDMI Output Rate			
Set output rate	Esc X16 RATE ←	Rate X16 ↵	
View output rate	Esc RATE ←	X16 ↵	
Horizontal Start			
View horizontal start	Esc HSRT ←	X3 ↵ Hsrt X3 ↵	Show the horizontal location of first active pixel in input. Verbose mode 2/3.
Vertical Start			
View vertical start	Esc VSRT ←	X3 ↵ Vsrt X3 ↵	Show vertical location of first active pixel in input. Verbose mode 2/3.
Total Pixels			
View total pixels	Esc TPIX ←	X5 ↵ Tpix X5 ↵	Show total pixels for input. Verbose mode 2/3.
Total Lines			
View total lines	Esc TLIN ←	X4 ↵ Tlin X4 ↵	Show total lines for input. Verbose mode 2/3.
Active Pixels			
View active pixels	Esc APIX ←	X6 ↵ Apix X6 ↵	Show active pixels for input. Verbose mode 2/3.
Active Lines			
View active lines	Esc ALIN ←	X7 ↵ Alin X7 ↵	Show active lines for input. Verbose mode 2/3.

NOTES:

X1 = Encoder	1 = Encoder 1; 2 = Encoder 2
X3 = Horizontal and Vertical start	Ø to 255 (**default** = 128; read only command)
X4 = Total lines	
X5 = Total pixels	Up to ±512 of the default value for the detected rate
X6 = Active pixels	Up to ±512 of the default value for the detected resolution (range varies based on input resolution)
X7 = Active lines	Up to ±256 of the default value for the detected resolution (range varies based on input resolution)
X16 = Output refresh rate	1 = 60 Hz; 2 = 50 Hz
X32 = Audio bit rate	8Ø, 96, 128, 192 (**default**), 256, 32Ø kbps

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Contrast			
Specify a value	Esc X11 CONT ←	Cont X11 ↵	X11 = 1 to 27
Increment value	Esc + CONT ←	Cont X11 ↵	Increases contrast level.
Decrement value	Esc – CONT ←	Cont X11 ↵	Decreases contrast level.
View	Esc CONT ←	X11 ↵	View current setting.
Brightness			
Specify a value	Esc X11 BRIT ←	Brit X11 ↵	X11 = 1 to 27
Increment value	Esc + BRIT ←	Brit X11 ↵	Increments brightness level.
Decrement value	Esc – BRIT ←	Brit X11 ↵	Decrements brightness level.
View	Esc BRIT ←	X11 ↵	View current setting.
Horizontal Shift (Position)			
Specific value	Esc X12 HCTR ←	Hctr X12 ↵	Set horizontal centering to X12.
Increment value	Esc + HCTR ←	Hctr X12 ↵	Shift window right.
Decrement value	Esc – HCTR ←	Hctr X12 ↵	Shift window left.
View	Esc HCTR ←	X12 ↵	View current setting.
NOTE: X12 = Horizontal position. The range varies such that the window never goes completely off-screen (5-digit response). The values are adjusted in multiples of 8. If a value is entered that is not a multiple of 8, the closest acceptable value is applied and returned.			
Vertical Shift (Position)			
Specific value	Esc X12 VCTR ←	Vctr X12 ↵	Set vertical centering to X12.
Increment value	Esc + VCTR ←	Vctr X12 ↵	Shift window down.
Decrement value	Esc – VCTR ←	Vctr X12 ↵	Shift window up.
View	Esc VCTR ←	X12 ↵	View current setting.
NOTE: X12 = Vertical position. The range varies such that the window never goes completely off-screen (5-digit response). The values are adjusted in multiples of 2. If a value is entered that is not a multiple of 2, the closest acceptable value is applied and returned.			
Horizontal Size			
Specific value	Esc X13 HSIZ ←	Hsiz X13 ↵	Set horizontal size to X13.
Increment value	Esc + HSIZ ←	Hsiz X13 ↵	Increase the width of the window.
Decrement value	Esc – HSIZ ←	Hsiz X13 ↵	Decrease the width of the window.
View	Esc HSIZ ←	X13 ↵	View current setting.
NOTE: X13 = Horizontal size ØØ12Ø to Ø4Ø96 (5-digit response). The values are adjusted in multiples of 8. If a value is entered that is not a multiple of 8, the closest acceptable value is applied and returned.			
Vertical Size			
Specific value	Esc X13 VSIZ ←	Vsiz X13 ↵	Set vertical size to X13.
Increment value	Esc + VSIZ ←	Vsiz X13 ↵	Increase the height of the window.
Decrement value	Esc – VSIZ ←	Vsiz X13 ↵	Decrease the height of the window.
View	Esc VSIZ ←	X13 ↵	View current setting.
NOTE: Vertical size values are adjusted in multiples of 2. If a value is entered that is not a multiple of 2, the closest acceptable value is applied and returned. The range varies such that the window never goes completely off-screen (5-digit response).			

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Video Mute			
Enable blanking	1B	Vmt1↵	Blanks video output.
Disable blanking	ØB	VmtØ↵	Displays video output.
View	B	X33↵	View the blanking status.
Test Pattern			
Select test pattern	Esc X14TEST←	TestX14↵	
Turn test pattern off	Esc OTEST←	TestO↵	
View test pattern	Esc TEST←	X14↵	
HDMI Input Signal Presence			
Query HDMI input signal presence	Esc ØLS←	X8↵ INØØ•X8↵	View HDMI input signal presence. Verbose mode 2/3
HDCP Settings			
Query HDCP input	Esc IHDCP←	X9↵	View HDMI input status.
Set input HDCP authorization on	Esc E1HDCP←	HdcpE1↵	Turn HDCP authorized device on for input. HDCP off = **default**.
Set input HDCP authorization off	Esc EØHDCP←	HdcpEØ↵	Turn HDCP authorized device off for input.
View input HDCP authorization	Esc EHDCP←	X8↵	
Enable HDCP notification	Esc N1HDCP←	HdcpN1↵	Enable green screen (**default**).
Disable HDCP notification	Esc NØHDCP←	HdcpNØ↵	Disable green screen and mute output.
View HDCP notification	Esc NHDCP←	X8↵	
Overscan Mode (applies only to SMPTE TV input rates [480p - 1080p])			
Set overscan mode	Esc X35 OSCN←	Oscn X35↵	
View overscan mode	EscOSCN←	X35↵	

NOTES:
X2 = Audio channels — 4ØØØØ = Analog audio left; 4ØØØ1 = Analog audio right; 4ØØØ2 = HDMI audio left; 4ØØØ3 = HDMI audio right
X8 = On/off — Ø = Disabled/off (**default**); 1 = Enabled/on
X9 = HDCP status — Ø = No sink/source undetected; 1 = HDCP detected; 2 = Sink/source detected, but no HDCP
X14 = Test pattern — Ø = Off (**default**), 1 = Colorbars, 2 = Aspect ratio 1.33, 3 = Aspect ratio 1.78, 4 = Aspect ratio 1.85, 5 = Crop, 6 = Pulse (audio test pattern, 7 = Timestamp, 8 = Universal OSD
X33 = Mute status — Ø = Unmuted; 1 = Muted
X35 = Overscan — Ø = 0% (**default**); 1 = 2.5%; 2 = 5.0%

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
EDID Minder			
Assign EDID to specific input	Esc A X34 EDID ←	EdidA X34 ↵	X34 = See **EDID Values** on the next page.
View EDID assignment	Esc AEDID ←	X34 ↵	View EDID resolution and refresh.
Import EDID to user location	Esc I X39 , [*filename.bin*] EDID ←	EdidI ↵	Import a 128 or 256-Byte binary EDID file to the user slot [1 to 3].
Export EDID in binary format	Esc E X34 , [*filename.bin*] EDID ←	EdidE ↵	Export a 128 or 256-Byte binary EDID file from EDID location X34. [filename] can optionally carry a full path name. The EDID file is a .bin file.
Audio Input Gain			
Set audio input gain	Esc G X2 * X28 AU ←	DsG X2 * X28 ↵	Set audio gain and attenuation of audio channel X2 to X28.
View audio input gain	Esc G X2 AU ←	X28 ↵	View audio level of audio channel X2.
Audio Mute			
Mute audio channel	Esc M X2 *1AU ←	DsM X2 *1 ↵	Mute audio channel.
Unmute audio channel	Esc M X2 *ØAU ←	DsM X2 *Ø ↵	Unmute audio channel.
View mute status	Esc M X2 AU ←	X33 ↵	View audio mute status.
Audio Output Level			
View level	34I	X23 * X23 ↵	Left*right channel of the output audio.
		Inf34 * X23 * X23 ↵	Verbose mode 2/3.

NOTES:
X2 = Audio channels — 40000 = Analog audio left; 40001 = Analog audio right; 40002 = HDMI audio left; 40003 = HDMI audio right
X23 = Front panel audio level indication -1500 to Ø (in .01 dBfs steps)
X28 = Audio input gain in 0.1 dB steps (-180 to 240 = -18.0 to +24 dB)
X33 = Mute status — Ø = Unmuted; 1 = Muted
X34 = EDID numbers — 1 to 38
X39 = EDID user slots — 1 to 3

X34	Resolution	Refresh	Rate Type	Video Format	Audio
01	800 x 600	60 Hz	PC	DVI	N/A
02	1024 x 768	60 Hz	PC	DVI	N/A
03	1280 x 720	60 Hz	PC	DVI	N/A
04	1280 x 768	60 Hz	PC	DVI	N/A
05	1280 x 800	60 Hz	PC	DVI	N/A
06	1280 x 1024	60 Hz	PC	DVI	N/A
07	1360 x 768	60 Hz	PC	DVI	N/A
08	1366 x 768	60 Hz	PC	DVI	N/A
09	1400 x 1050	60 Hz	PC	DVI	N/A
10	1440 x 900	60 Hz	PC	DVI	N/A
11	1600 x 900	60 Hz	PC	DVI	N/A
12	1600 x 1200	60 Hz	PC	DVI	N/A
13	1680 x 1050	60 Hz	PC	DVI	N/A
14	1920 x 1080	60 Hz	PC	DVI	N/A
15	1920 x 1200	60 Hz	PC	DVI	N/A
16	800 x 600	60 Hz	PC	HDMI	2-Ch
17	1024 x 768	60 Hz	PC	HDMI	2-Ch
18	1280 x 768	60 Hz	PC	HDMI	2-Ch
19	1280 x 800	60 Hz	PC	HDMI	2-Ch
20	1280 x 1024	60 Hz	PC	HDMI	2-Ch
21	1360 x 768	60 Hz	PC	HDMI	2-Ch
22	1366 x 768	60 Hz	PC	HDMI	2-Ch
23	1400 x 1050	60 Hz	PC	HDMI	2-Ch
24	1440 x 900	60 Hz	PC	HDMI	2-Ch
25	1600 x 900	60 Hz	PC	HDMI	2-Ch
26	1600 x 1200	60 Hz	PC	HDMI	2-Ch
27	1680 x 1050	60 Hz	PC	HDMI	2-Ch
28	1920 x 1200	60 Hz	PC	HDMI	2-Ch
29	480p	60 Hz	HDTV	HDMI	2-Ch
30	576p	50 Hz	HDTV	HDMI	2-Ch
31	720p	50 Hz	HDTV	HDMI	2-Ch
32*	720p	60 Hz	HDTV	HDMI	2-Ch
33	1080i	50 Hz	HDTV	HDMI	2-Ch
34	1080i	60 Hz	HDTV	HDMI	2-Ch
35	1080p	25 Hz	HDTV	HDMI	2-Ch
36	1080p	50 Hz	HDTV	HDMI	2-Ch
37	1080p	24 Hz	HDTV	HDMI	2-Ch
38	1080p	60 Hz	HDTV	HDMI	2-Ch
39	User Loaded Slot 1				
40	User Loaded Slot 2				
41	User Loaded Slot 3				

* Default

Table 1. EDID Values

Reference Information

This section provides information about:

- **Mounting the SME 211**
- **Supported Stream Types, Drive Formats, and Browsers**
- **Streaming Method Overview**
- **Glossary**

Mounting the SME 211

The 1U high, half rack width, 9.5 inch deep SME 211 Streaming Media Processor can be:

- Set on a table
- Mounted on a rack shelf
- Mounted under a desk or tabletop
- Mounted on a projector bracket

See the SME 211 product page at **www.extron.com** for compatible mounting kits.

Tabletop Use

The SME 211 includes rubber feet (not installed). For tabletop use, attach a self-adhesive rubber foot to each corner on the bottom of the unit.

Furniture Mounting

Furniture mount the SME 211 using an optional under-desk or through-desk mounting kit. Follow the instructions included with the mounting kit.

Table or Wall Mounting

Extron table or wall mounting brackets extend approximately 1/4 inch (6.4 mm) above the top surface of the SME 211 enclosure. This design allows an air space between the mounting surface and the enclosure. Follow the instructions included with the mounting kit.

Rack Mounting

For rack mounting using the included rack mounts, do not install the rubber feet. Mount the SME 211 on a 19 inch universal or basic rack shelf.

UL Rack Mounting Guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the safe installation of the SME 211 in a rack.

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

Supported Stream Types, Drive Formats, and Browsers

File Formats

The SME 211 supports H.264 encoded video and/or AAC encoded audio within MPEG transport streams or as native (Elementary) RTP streams (TS/UDP, TS/RTP or ES/RTP). Optional fonts can be used for on-screen displays.

Still Image File Types

- .jpg and .png (for Mask images)

Font File Types

- TrueType™ (.ttf)
- OpenType® (.otf)

NOTE: To upload a font file, use the `File Upload Utility` within the `File Management` page. The user is responsible for obtaining any necessary font licenses before uploading fonts to the SME.

Drive Formats

The SME 211 supports FAT32, NTFS, and VFAT long file names, EXT2, EXT3 and EXT4 formats for USB drives.

NOTE: A 3.8 GB file size limit is placed on FAT32 drives.

Browsers

In order to view the SME 211 embedded web pages, use one of the supported Web browsers (and versions) listed below.

- Google Chrome version 48 or higher
- Mozilla Firefox version 44 or higher
- Microsoft Internet Explorer (for Windows operating systems)
- Apple Safari version 9 or higher (for macOS operating systems)

  NOTE: Safari is the preferred browser for macOS operating systems.

NOTE: The preview video in the AV Controls panel of the SME 211 uses an HTML5 player and may not be supported by some older browser versions. Browser compatibility can be confirmed here: **http://html5test.com/**
To see a preview of the current stream you can either:

- Use a different browser
  or
- Open a standalone, third-party video player (such as VideoLAN opensource VLC media player) and connect to the SME stream.

- Additionally, the device web UI is compliant, but not fully featured, with the internal browser client:
  - QTWeb v4.x

DataViewer

DataViewer is an enhanced terminal emulation program that facilitates analysis of RS-232, USB, and TCP/IP communication with Extron devices. The software allows users to send commands to a device and view the responses in ASCII or hexadecimal format. Command and response logs can be saved in text or HTML format.

Dataviewer is available at **www.extron.com**. Download the installation file and load the program on the PC connected to the SME 211.

NOTE: For a new installation, the Extron USB driver must also be installed. The driver is included with the Dataviewer installer.

Start the Dataviewer program

1. Click the desktop icon.
2. The **Communication Setup** dialog box opens. Select a **Communication** tab (see **Figure 45** on the next page).
   a. Select the **Comm Port** (RS-232) tab (shown with the correct protocol settings below) if using the rear panel RS-232 port (❶).
   b. Select the **TCP/IP** tab if using a network connection (❷).
   c. Select the **USB** tab if using the front panel config port (❸).

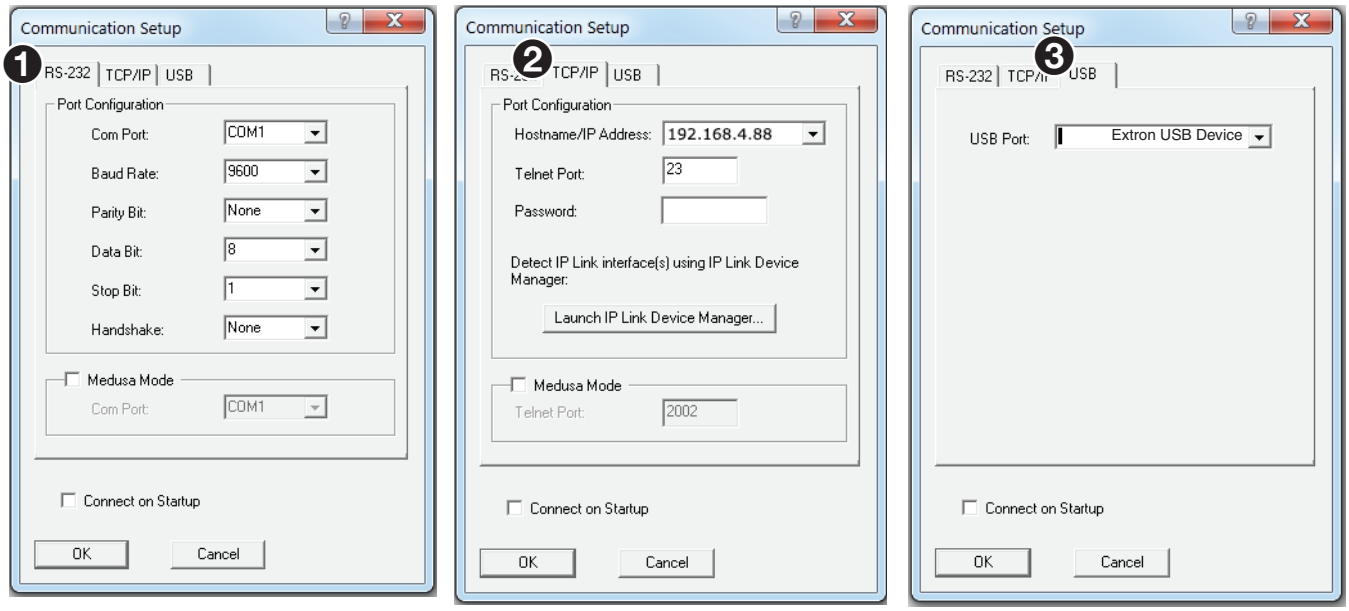


Figure 45. Communications Dialogs

3. Select the startup options:
   a. If RS-232 is selected (❶), configure the port settings.
   b. If TCP/IP is selected (❷), configure the IP address and Telnet port. Enter a password, if necessary.
   c. If USB is selected (❸), choose **Extron USB Device** in the drop-down window.

   NOTE: To automatically connect to the SME 211, select **Connect on Startup**.

4. Click **OK** to connect to the SME 211 and start using the program.

You are now ready to begin entering commands.

Open the *DataViewer Help File* from the toolbar for more information on the program.

Sending commands using a TCP/IP connection

1. Configure the network settings of a control PC so that it can be connected to the same network as the SME 211. Use an RJ-45 cable to connect the control PC to the network.
2. Start the DataViewer program (see **Start the Dataviewer program** on the previous page) and follow the steps to connect to the SME 211 via TCP/IP.
3. On the **Communication Setup** window (see Figure 45):
   a. Select the **TCP/IP** tab.
   b. Enter the IP address of the SME 211 into the **Hostname/IP Address** field.
   c. In the **Telnet Port** field, enter the port number for the connection.

   NOTE: The default telnet port to send SIS commands to the SME 211 is port 23.

4. Click **OK**. The **Communication Setup** dialog closes.

5. The main DataViewer dialog opens and the SME 211 responds with a copyright statement containing the model number, part number, and current firmware version of the connected SME 211, along with the date (see Figure 46, ❷).

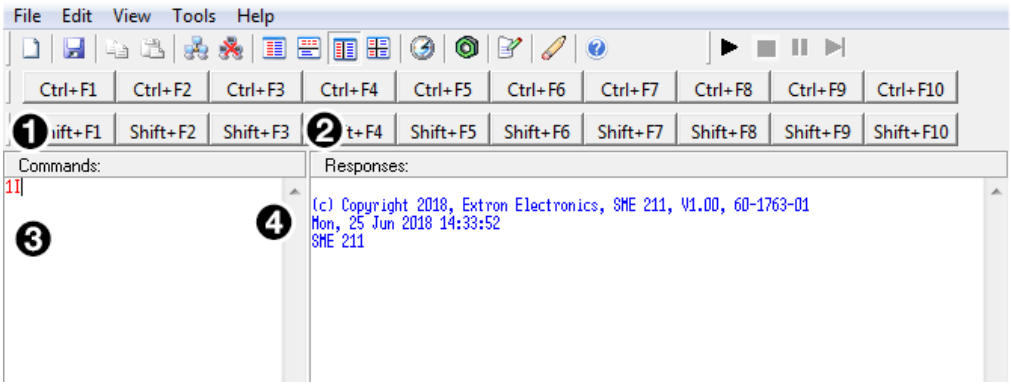


Figure 46. Enter Commands and View Responses

6. Use the **Commands** field to enter SIS commands (see Figure 46, ❶). View the responses in the **Responses** field (❷).

   For example, enter **1I**, the command to display the model name, in the **Commands:** field (❸). The **Responses:** field (❹) returns the model name of the connected device.

What is an IP Address?

A full explanation of IP addressing is beyond the scope of this user guide. However, the following information is enough to get started.

An IP address is a 32-bit binary number that is used to identify each device on an Ethernet network. This number is usually represented by four decimal numbers (each in the range Ø to 255) separated by dots, (for example, 198.123.34.24Ø). This is called "dotted decimal notation".

An IP address is divided into two parts:

- The network identifier
- The host identifier

On a given network, each address must have the same network identifier value, but have a unique host identifier. There are, therefore, different classes of addresses that define:

- The range of valid addresses.
- The parts of the address used to identify the network and host.

The most common IP address classes are:

Class	Valid Address Range	Identifier Arrangement
Class A	Ø.Ø.Ø.1 to 127.255.255.254	*NNN*.*HHH*.*HHH*.*HHH*
Class B	128.Ø.Ø.1 through 191.255.255.254	*NNN*.*NNN*.*HHH*.*HHH*
Class C	192.Ø.Ø.1 through 223.255.255.254	*NNN*.*NNN*.*NNN*.*HHH*

NOTES:

- *NNN* = Network identifier
- *HHH* = Host identifier

Private and Public Address Ranges

Within each of the classes are a range of addresses designated as "private" addresses. These are addresses that should only be used on private local networks and intranets and cannot be accessed directly from the Internet.

- 10.0.0.0 – 10.255.255.255
- 172.16.0.0 – 172.31.255.255
- 169.254.0.0 – 169.254.254.255 (reserved for link local usage)
- 192.168.0.0 – 192.168.255.255

Addresses outside these ranges are considered "public".

Multicast Address Range

A further range of addresses is available for multicast use:

- 224.0.0.0 – 239.255.255.255

These addresses (also known as class D addresses) are used to allow several devices to be part of the same multicast group. Each device in the group has the same multicast address and can effectively send data to all other devices in the same group simultaneously.

The SME uses 239.255.1.1 (Encoder 1) and 239.255.3.1 (encoder 2) as the default multicast addresses for the RTSP Pull stream.

Addresses in the range 224.0.0.0 – 224.255.255.255 are generally used for network control or are reserved and should typically not be used for streaming audio and/or video content.

Addresses in the range 239.0.0.0 – 239.255.255.0 are available to network administrators for Site Local multicast applications on local networks.

NOTE: The last 256 addresses should be reserved for a method known as offset addressing. Addresses 239.0.0.*x* and 239.128.0.*x* should be avoided due to layer 2 (MAC/IP) address conflict / flooding issues. Users should consult their network administrator for advice on multicast policies.

Subnet Mask

The subnet mask is a 32-bit binary number used to "mask" certain bits of the IP address. It extends the number of network options available for the IP address. The subnet mask does this by allowing part of the host identifier to be used as a subnetwork identifier.

It is important that the correct value is used for the subnet mask. The value of the subnet mask is dependent on the IP address class being used. Use the table below and the table in the **What is an IP Address?** section on the previous page to select the subnet mask class that matches the IP address class.

Class	Subnet Mask
Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

Port Number

A port number is combined with the IP address to create an application-specific or process-specific address. The port number can uniquely identify an application or process on a computer and thereby enable the computer to share a single Ethernet connection for multiple requirements. A port number is always associated with the IP address of the computer, as well as the type of protocol used for network communication.

The SME uses specific ports, but can be configured to meet most requirements. A number of ports in the range 1Ø24 - 49151 are also reserved for other applications. Consult the lists here.

Ports in the range 49152 - 65535 are available for private or dynamic use.
For more information on TCP and UDP port numbers, see the following website:
https://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers

NOTE: Ports previously assigned and currently in use by the SME cannot be used again.

All streaming methods (except TS/UDP push) use multiple port numbers. The following table shows the number of ports used by each streaming method. Encoder 1 and Encoder 2 streams have different port numbers.

	RTSP (Pull)	TS/UDP (Push)	TS/RTP (Push)	ES/RTP (Push)
Unicast (per stream)	4*	1	2	4*
Multicast	4*	1	2	4*
* 4 ports for "Audio/Video", or 2 ports for "Video only"				

When the SME 211 ports are configured, only the initial port is entered by the user. The SME 211 firmware then assigns the multiple port numbers based on the initial port number.

Choosing an IP Address

If the SME 211 and other devices are connected via an independent network, then follow the guidelines below when choosing IP addresses. However, if the SME 211 and other devices are being connected to an existing network, advise the network administrator and ask them to assign suitable addresses.

It is generally recommended that addresses in the private class C range are used (192.168.Ø.Ø through 192.168.255.255).

There are two rules for choosing IP addresses:

- The network identifier must be the same for each address.
- The host identifier must be unique for each address.

Applying these rules to class C addresses, the first three decimal values of the IP addresses must all be the same, while the last value is used to uniquely identify each device.

The table below shows an example of a valid class C addressing scheme.

Device	IP Address	Subnet Mask
Device 1	192.168.255.41	255.255.255.Ø
Device 2	192.168.255.42	255.255.255.Ø
Device 3	192.168.255.43	255.255.255.Ø

NOTE: The host identifiers (41, 42, and 43 in the example above) do not need to be in sequential or in any particular order. However, it is recommended that the numbers are grouped for simplicity.

The table below shows an example of an invalid class C addressing scheme.

Device	IP Address	Subnet Mask
Device 1	192.168.255.41	255.255.255.0
Device 2	192.168.101.42	255.255.255.0
Device 3	192.168.255.43	255.255.255.0

Assuming the IP address for device 1 is valid, the IP address for device 2 is invalid because the network identifier for each address must begin with 208.132.180.*xxx*. The IP address for device 3 is invalid because it is using the same IP address as device 1.

The ping command can be used from a computer (see below) or from the web interface to ensure that a device at an IP address is responding correctly.

Using the Ping Utility to Test Communications

Use the ping command to test communications between any two network devices. A ping test may fail if an intervening firewall or device setting blocks such messages.

For example, follow these steps on a Windows computer:

1. From the desktop, select **Start** > **Run**.
2. The Run dialog box displays. In the **Open** field, enter **ping** *nnn.nnn.nnn.nnn* **–t** (where *nnn.nnn.nnn.nnn* is the IP address of the device to test).
3. Click **OK** or press the **<Enter>** key. A window opens showing a series of response messages (explained below).
4. To stop the ping utility, press **<Ctrl+C>** on the keyboard.

NOTE: The embedded web page includes a ping utility (see **Diagnostic Tools** on page 55).

Response Messages

While running the ping utility, a series of response messages are displayed that are used to determine the status of the communications link. For example, pinging a device with the IP address 208.132.180.48 replies with a message similar to the following:

```
Reply from 208.132.180.48: bytes=32 time=2ms TTL=32
```

This is the correct response which indicates that the device at the specified address is communicating correctly. The response time value may vary according to network traffic. If one of the following messages are received:

- `Request timed out` — There has been no response from the specified address. Either the processor is not receiving data (from the computer) or is not sending data back. Check that the device is powered on and set to the same address that was pinged.
  Also, check that the device is correctly connected to the network.
- `Reply from 208.132.180.48: Destination host unreachable` — The IP address of the computer is not in the same class as the device being pinged. Check that the subnet mask on both the computer and the device are set to the same value. Also check that both IP addresses are within the correct range for the chosen class and are compatible (see **Subnet Mask** on page 89 and **Choosing an IP Address** on page 90 to select the subnet mask class that matches the IP address class).

Multicast IP Addressing for Multiple SME 211 Installations

When multiple SME 211 devices are installed in a system (when the multicast address is used for push or pull streaming), the streams are managed by the SME 211 to avoid conflicts.

Pull streaming (RTSP)

The SME 211 can use one of two multicast streaming IP address assignment methods.

If multicast IP addresses for a network are limited, the SME 211 devices can use unassigned port numbers within the available range (1024 to 65436).

NOTE: To prevent conflicts, always check to see if other devices using the same IP address have already used a port number before using it in the SME 211.

The following table shows a typical port assignment for multiple SME 211 devices using a single multicast IP address (RTSP pull streams require four sequential ports).

Device	SME IP	Multicast IP	Multicast Port
SME1	192.168.254.10	239.199.188.138	7000 to 7003
SME2	192.168.254.11	239.199.188.138	7004 to 7007
SME3	192.168.254.12	239.199.188.138	7008 to 7011

When there are different multicast IP addresses available, there is no need for multiple port numbers and the port number can remain at the default (7000) as shown in the next table.

Device	SME IP	Multicast IP	Multicast Port
SME1	192.168.254.10	239.199.188.138	7000
SME2	192.168.254.11	239.199.188.139	7000
SME3	192.168.254.12	239.199.188.140	7000

NOTE: The SME 211 automatically inserts the ending port number when the initial port number is entered.

Push streaming (TS/UDP, TS/RTP, ES/RTP)

Push streams to a multicast address generally require only two ports, except for ES/RTP which requires four. When push streaming from multiple SME 211 devices to multicast addresses, the same IP address rules apply as with pull streaming.

For push streaming, the destination IP and port number are adjusted using the encoder presets page.

Streaming Method Overview

The streaming method used by the SME 211 should be considered carefully. Multicast is typically used for live multicasting a "one-to-many" session when it is known there will be multiple viewers of a stream. Unicast streaming is used for on-demand video where the network infrastructure does not support multicast traffic. Typically, unicast streaming is used for a point-to-point (one-to-one) connection.

Protocols Used for Streaming

Streaming protocols must be selected based on the streaming method and the SME 211 capability. The following transport layer protocols can be used for SME streaming.

RTSP (Pull)		RTSP (Push)		RTMP (Push)
Unicast	**Multicast**	**Unicast**	**Multicast**	**Unicast**
RTP (RTP over UDP)	RTP (over UDP)	TS/UDP	TS/UDP	Only over TCP
		TS/RTP	TS/RTP	
		ES/RTP (Native RTP)	ES/RTP (Native RTP)	

The transport protocols are summarized in this section. For information on how to change the SME 211 transport protocol, see the *SME 211 Help File*.

Multicast Streaming Method — An Overview

This streaming method is used for live video multicasting with low latency in a "one-to-many" streaming session. The SME 211 uses a variety of streaming protocols to send data to a multicast group. Using multicasting, the SME 211 does not need to know the IP address of the devices viewing the stream. This allows a large number of users to view the data simultaneously while using bandwidth efficiently. The maximum number of connected users is dependent on the type of distribution network used.

NOTE: To use this streaming method, each segment of the network must be configured to pass multicast traffic.

Multicast streaming can use push or pull streaming. It can push the data to a network for broader distribution, or to many individual viewing devices. It can also use pull streaming, where the SME 211 waits for viewing devices to request the stream before exchanging connection details.

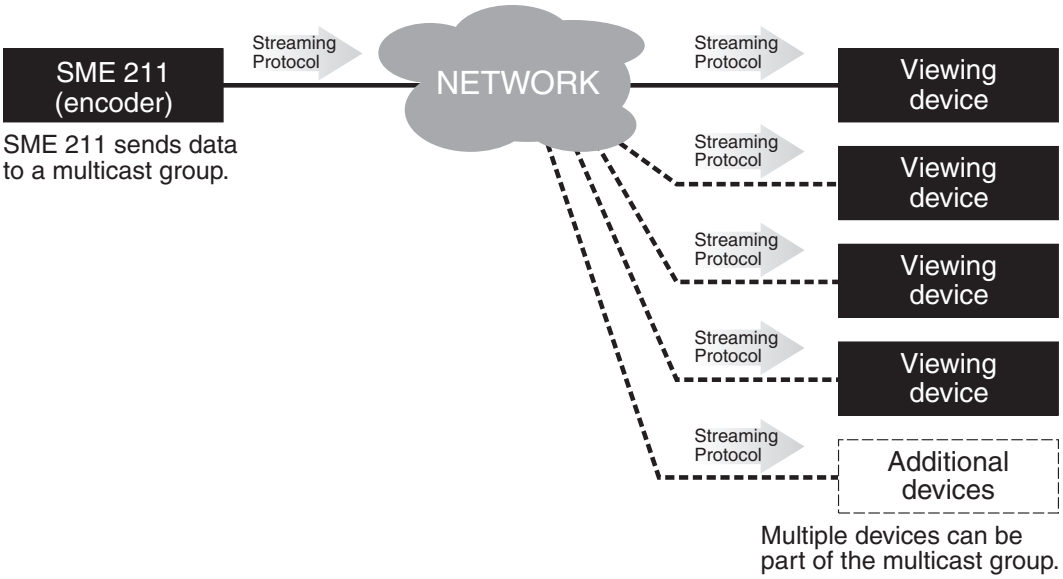


Figure 47. Multicast Streaming

NOTE: IGMP multicast protocol is used by routers and switches to deliver streams to subscribing endpoints. The SME 211 delivers packets and frames onto the network that are identified as multicast.

IGMP allows network equipment to efficiently manage multicast traffic. All network switches and routing equipment must be properly configured to support IGMP snooping, IGMP querying, and multicast filtering to avoid flooding all endpoints with unnecessary streaming traffic.

Unicast Streaming Method — An Overview

This streaming method is used for on-demand video with low latency and uses a variety of streaming protocols. It can be used where the network infrastructure does not support multicast traffic. Typically, unicast streaming is used for a point-to-point (one-to-one) connection (SME 211 to single viewing device), but can be configured to allow multiple active connections.

Unicast Push streaming can push exactly one (1) stream. Unicast Pull streaming can pull as many streams as the SME can handle. Unicast streaming can Push the data to individual devices, or it can use Pull streaming, where the SME 211 waits for individual viewing devices to request the stream before beginning transmission.

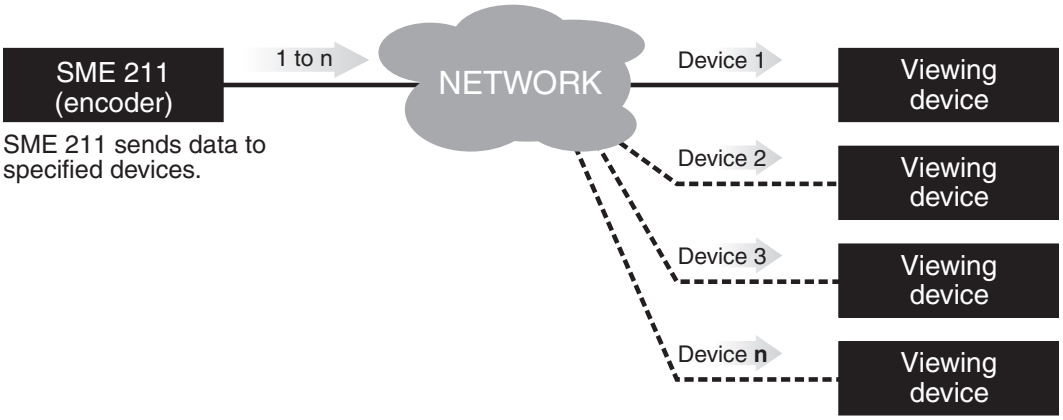


Figure 48. Unicast Streaming

NOTES:

- When unicast streaming, the SME 211 sends an individual stream to each viewing device. This means that the total bandwidth increases as the number of actively connected viewing devices increases and the total bandwidth between the SME 211 and associated local switch decreases as the number of actively connected viewing devices decreases.
- In the figure above, *n* represents an unspecified number of additional streams.

Streaming Playback Methods

Streams from the SME 211 can be viewed using various playback methods.

NOTE: The procedures presented in the following sections use a Microsoft Windows operating system and version 2.0.2 of VLC media player. These procedures may vary when a different operating system is used or when different versions of the VLC media player are used.

The following streaming playback methods are discussed:

- Push and Pull Streaming
- Playing a Push or Pull Stream Using VLC media player

Push and Pull Streaming

The client computer or media player, such as Extron SMD 101 or SMD 202 products, can either search the network for active streams (push streaming from the encoder) and select the desired video, or send a request to the encoder to begin streaming video to it (pull streaming).

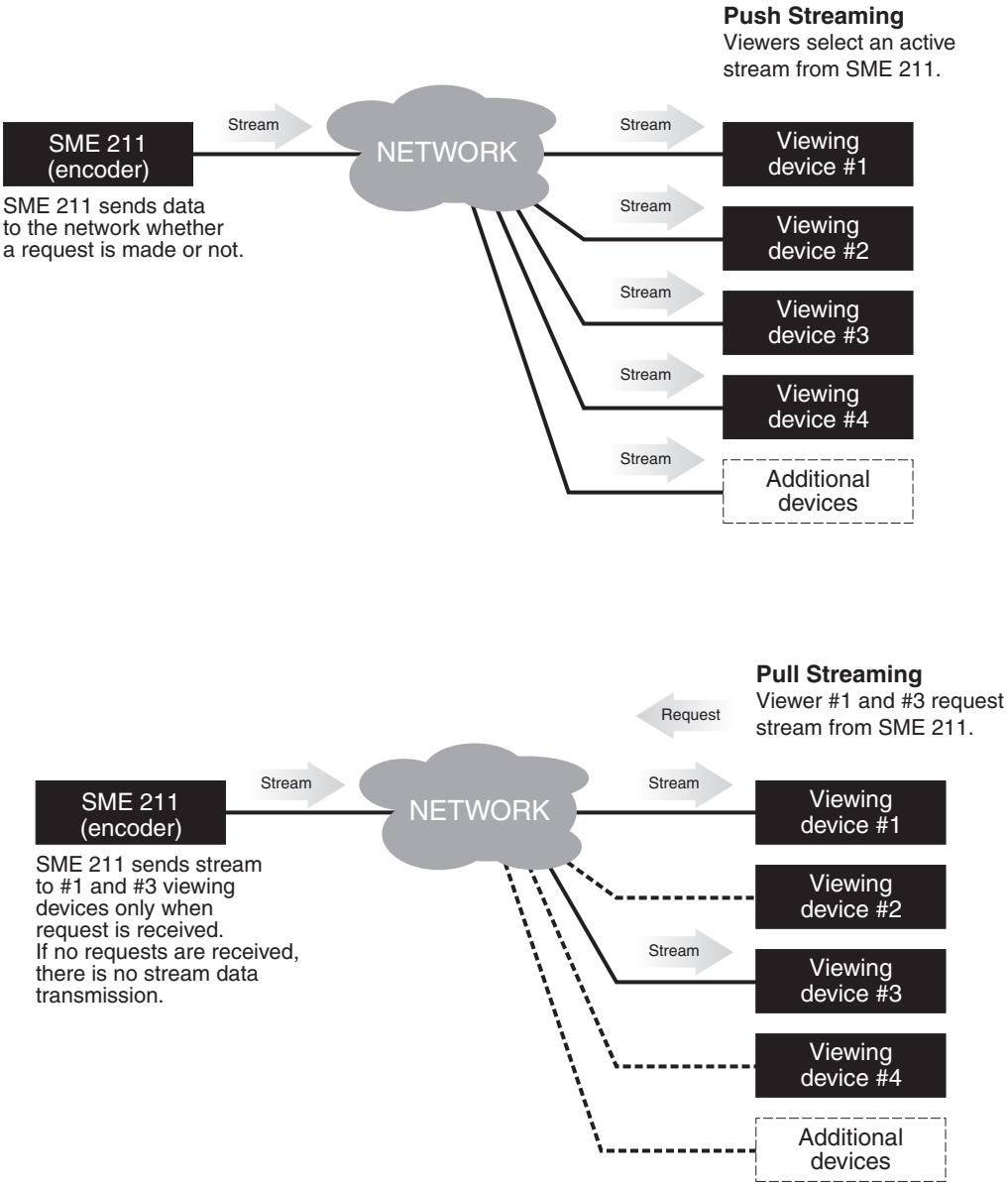


Figure 49. Push and Pull Streaming

Push Stream and Pull Stream Playback URLs

To verify a running stream, use the templates below to place the stream into the VLC "`Open Network Stream`" dialog (see step 5 of **Playing a Pull Stream Using QuickTime Media Player** on page 103).

Pull Stream URLs	
PULL Streaming:	**URL**
RTSP Unicast	`rtsp://<SME211_IP>/<stream name>`

RTSP Multicast	`rtsp://<SME211_IP>/<stream name>/multicast`
	or
	`HTTP://<SME211_IP>/live/pull/multicast.sdp`

Push Stream URLs	
PUSH Streaming:	**URL**
Unicast (Destination IP must be set to the location where the stream is played)	
TS/UDP	`UDP://@:<Destination_Port>`
TS/RTP	`RTP://@:<Destination_Port>`
ES/RTP	`HTTP://<SME211_IP>/live/push/s3.sdp` (For Encoder 1, use `s1`. For Encoder 2, use `s3`)
Multicast (Destination IP must be multicast IP address)	
TS/UDP	`UDP://@<Destination_IP>:<Destination_Port>`
TS/RTP	`RTP://@<Destination_IP>:<Destination_Port>`
ES/RTP	`HTTP://<SME211_IP>/live/push/s3.sdp` (For Encoder 1, use `s1`. For Encoder 2, use `s3`)

NOTES:

- *<SME211_IP>* is the IP address of the SME 211.
- *<DESTINATION_IP>*:*<DESTINATION_PORT>* are the IP address and port number of the destination.
- *<stream name>* is user-definable via the Web interface.
- Some dependencies may apply with certain versions of VLC. For ES/RTP push streams, SAP is available in "Video Only" stream mode.

Streaming Capabilities and System Scalability

The following tables detail the streaming capabilities of the SME 211. Data for the tables was obtained through laboratory testing using optimal bandwidth conditions and can vary depending on the selected video bit rate.

NOTE: Testing to determine the approximate maximum number of pull streams was done on the encoder with one pull unicast Streaming stream.

Available Unicast Streams

Video resolution and bit rate affect the total number of unicast streams the SME 211 can transmit. The following table compares the selected resolution and bit rate with the approximate number of unicast streams that will be available. Changing the resolution or using higher or lower bit rates may increase or decrease the available number of streams.

Unicast Pull Stream Method

Unicast Pull streams max at 20 streams:

Unicast		
Resolution (Pixels x Lines @ frame rate)	**Video Bit Rate** (Kbps)	**Approximate Number of Pull Streams**
848 x 480 @ 15	1500	20
1024 x 768 @ 15	2500	20
1280 x 1024 @ 30	3500	20
1280 x 720 @ 30	5000	18
1920 x 1080 @ 30	8000	14

NOTE: The following configuration options were set on the SME:

- Stream Type = VBR
- GOP Length = 30
- Streaming Pull Streaming Method = Unicast RTP

Unicast Push Stream Method

The SME 211 supports one UDP/RTP push stream and one RTMP push stream per encoder.

Available Multicast Streams

The SME 211 uses the IGMP multicast protocol to push or pull streams. The IGMP multicast protocol provides increased bandwidth efficiency because network equipment is able to manage the traffic efficiently when correctly configured. All network switches and routing equipment must be properly configured to support IGMP snooping, IGMP querying, and multicast filtering to avoid flooding all endpoints with unnecessary streaming traffic.

The table below indicates the approximate number of multicast streams supported by the SME 211 using the IGMP multicast protocol. Operating at different resolutions using higher or lower bit rates can increase or decrease the scalability of the streaming system.

NOTE: For networks not configured to use the IGMP multicast protocol, consider using a media server to deliver multiple unicast streams to control PCs and viewing devices.

Multicast Pull Stream Method

Multicast		
Resolution (Pixels x Lines @ frame rate)	**Recommended Video Bit Rate** (Kbps)	**Approximate Number of Pull Streams**
1920 x 1080 @ 30	8000	>180

NOTES: The number of available pull streams is dependent on bandwidth and content (high motion or static content).

The following configuration options were set on the SME:

- Stream Type = VBR
- GOP Length = 30
- Streaming Pull Streaming Method = Unicast RTP at default settings

If more streams are required, setting up a media server is the next step in expanding the streaming architecture. A media server provides a scalable live streaming media solution.

Multicast Push Stream Method

The number of multicast push streams is not limited.

Playing a Pull Stream Using VLC Media Player

Use the following procedure to play and view an SME 211 stream using the VLC media player.

1. If you know the stream URL, go to step 5. Otherwise, to obtain the stream URL, access the web-based user interface of the SME 211 (see **Accessing the Web-Based User Interface** on page 18).

   NOTE: If no password is set, anyone can view the stream URL. If a password is set, you must be logged in to the SME 211 web user interface view the URL.

   The `Device Status` page opens. In `Stream URL` line, if the streams are set to **`Pull`** (see **Push Stream and Pull Stream Playback URLs** on page 97) the box displays the URL necessary to request a stream from the SME 211. Highlight and copy this URL.

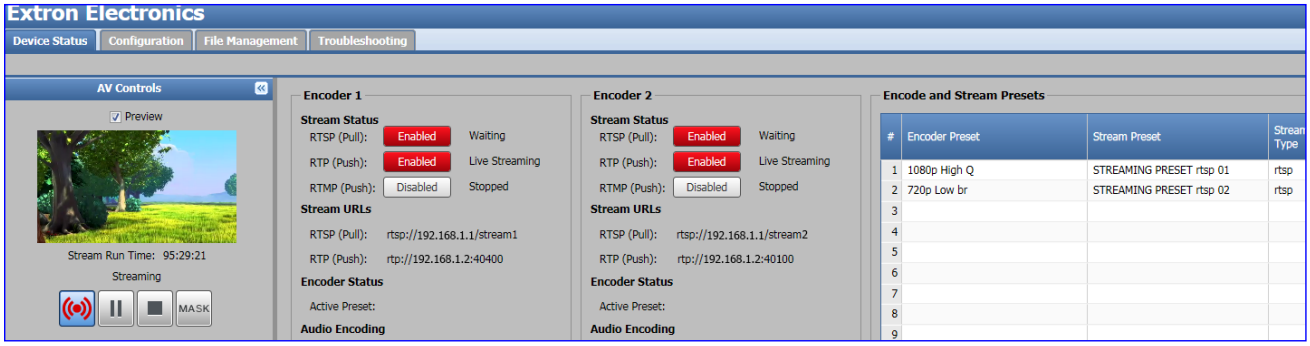


Figure 50. Device Status Page

2. Run the VLC media player.

   The media player opens.

3. Select **`Media > Open Network Stream`** (see Figure 51). The `Open Network Media` dialog box opens.

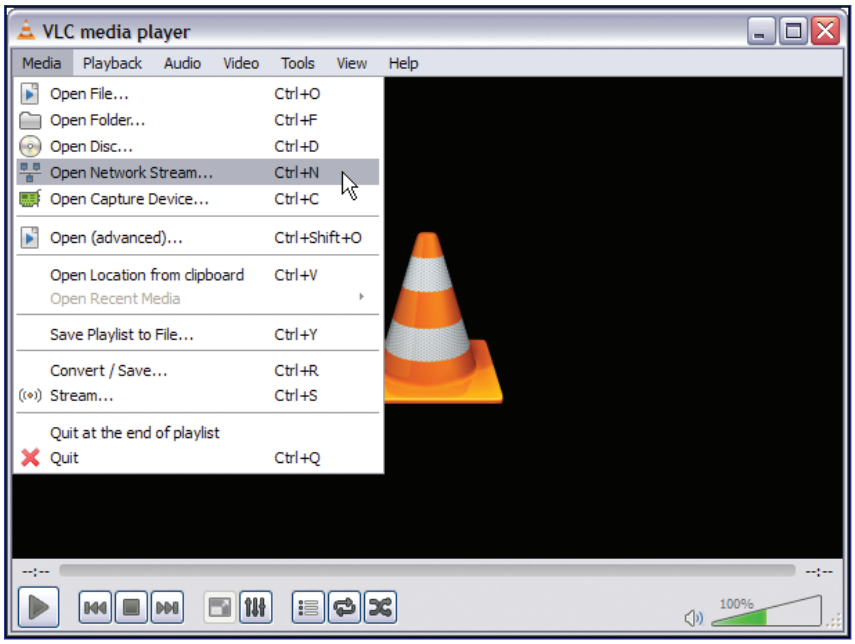


Figure 51. VLC Media Player — Open a Network Stream

4. Using the stream URL that was noted in step 1 above (Example: `rtsp://192.168.13.1/stream1`), enter or paste it into the **`Please enter a network URL:`** field (see Figure 52, ❶).

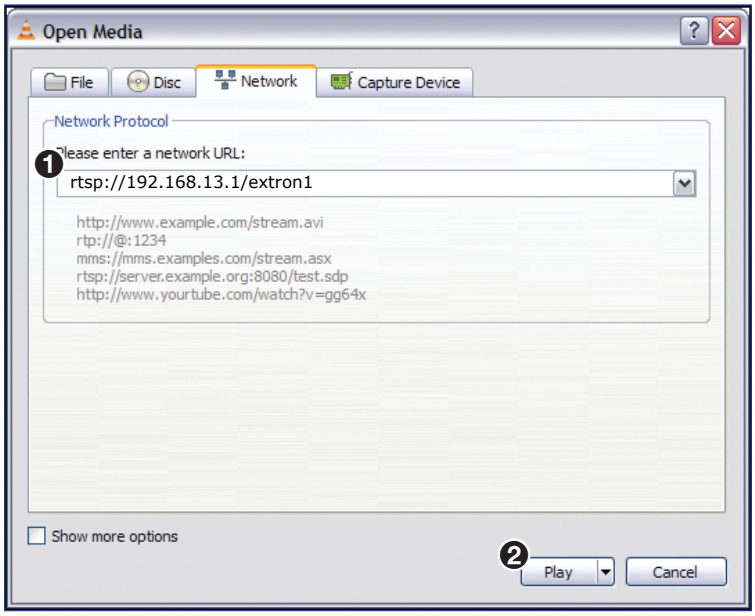


Figure 52. Enter Stream URL Information and Play

5. Click **`Play`** (❷). After a few seconds, the media streaming from the SME 211 plays on the VLC media player.

NOTES:

- The VLC media player image settings can now be changed if desired. For information on adjusting the image settings, see the VLC media player help file.
- Ensure the URL does not contain any trailing spaces. VLC does not strip training spaces and will be unable to connect if they are included.
- On any SMD product, paste the URL into the source field on the decoder web interface.

Playing a Push Stream Using Session Announcement Protocol (SAP)

NOTE: SAP messages from the SME 211 are disabled by default and must be enabled from the WebUI to use technique explained here.

In order to play a push stream, the VLC media player uses SAP to identify streams:

1. Open VLC media player.
2. From the **View** menu, select **Playlist** (see Figure 53, ❶, below.

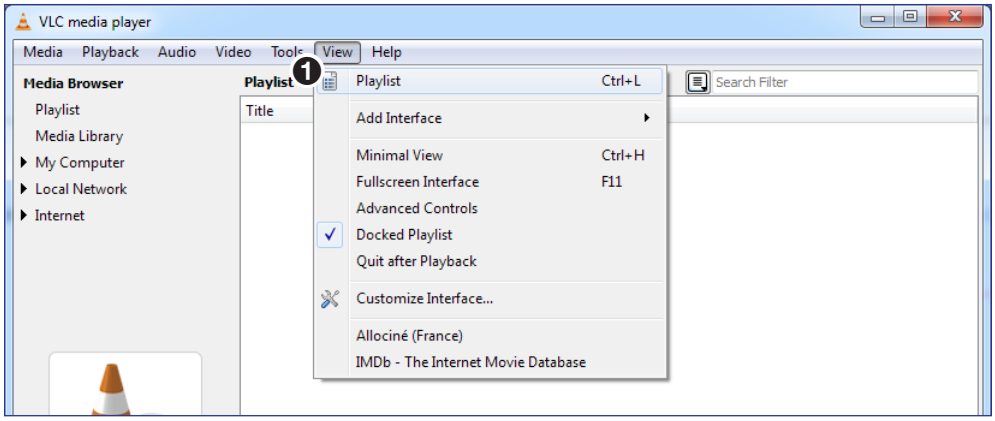


Figure 53. VLC Playlist

3. From the left menu column, select **Local Network** (see Figure 54, ❷).
4. Select **Network streams (SAP)** (❸).

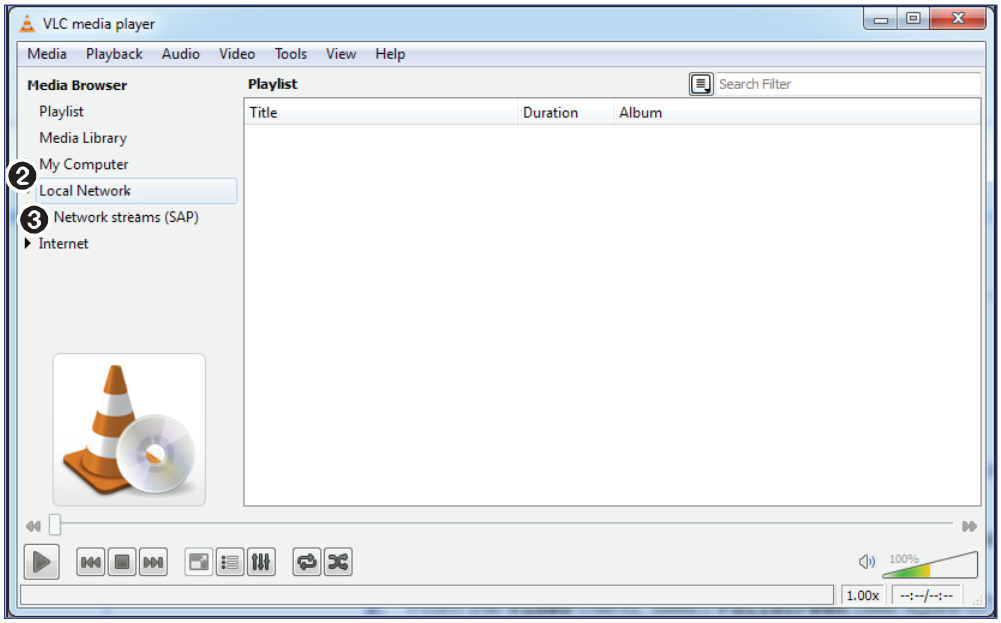


Figure 54. Select Local Network Streams

VLC populates the playlist with all streams that contain SAP information.

5. If a folder is shown, open it to view the SAP streams inside (see Figure 55, ❶).

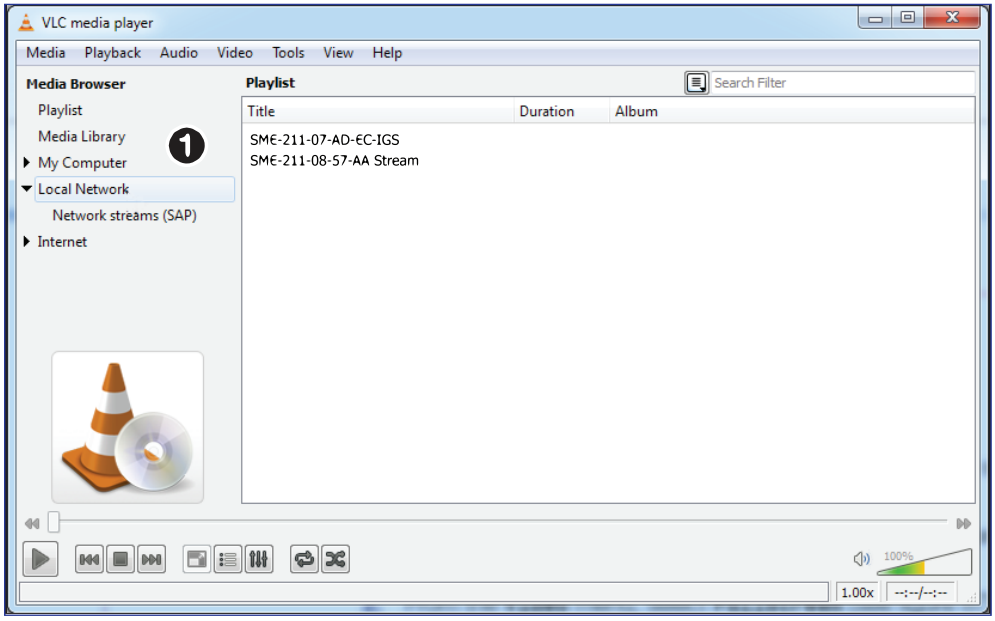


Figure 55. VLC - Select a Stream

6. Either double-click the desired stream to begin playback, or single-click, then use the VLC player controls at the bottom of the window to view and control the stream.

NOTE: Depending on the stream parameters, it may take several moments before the SAP streams appear. Long GOP streams are more efficient but may take longer to start.

Playing a Pull Stream Using QuickTime Media Player

Use the following procedure to playback and view SME 211 streams on the QuickTime player program.

NOTE: Only QuickTime 7 is able to play streams. QuickTime 10 does not support stream playback.

1. If you know the stream URL, go to step 4. Otherwise, to obtain the stream URL, access the Web-based User Interface of the SME 211 (see **Accessing the Web-Based User Interface** on page 18).

   NOTE: If no password is set, anyone can view the stream URL. If a password is set, you must be logged in to view the URL.

   The **Device Status** page opens (see Figure 56 below).

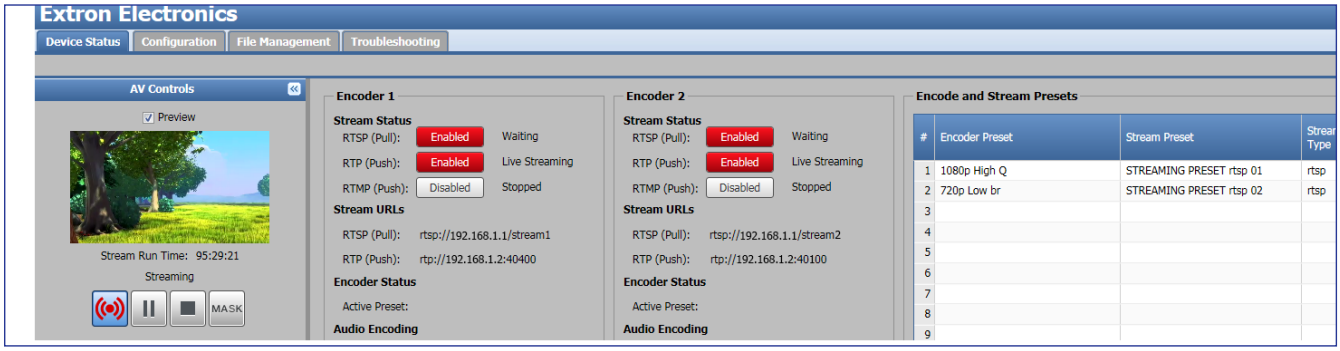


Figure 56. Device Status Page

2. Note the **Streaming URL Unicast** URL in the **Stream URL** line.
3. Open QuickTime player. From the desktop, select:
   Start > All Programs > QuickTime > QuickTime Player.

   The QuickTime media player opens.
4. From the **File** menu, select **Open URL** (see Figure 57, ❶).

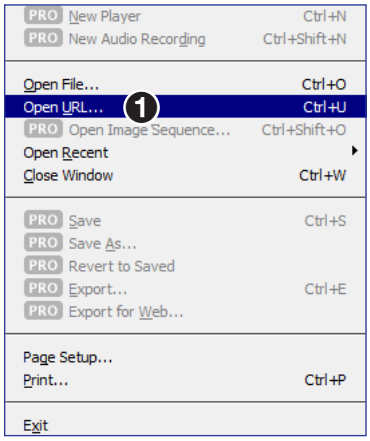


Figure 57. QuickTime Player Menu — Open URL

   The **Open URL** dialog opens (see Figure 57 above).
5. In the **Enter an Internet URL to open** field, enter the stream URL that was noted in step 2 above (❶).

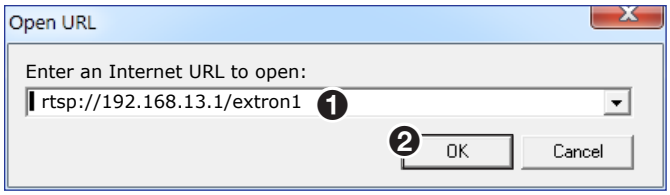


Figure 58. Enter Stream URL Information

6. Click **OK** (❷).

   After a few seconds, the media stream from the SME 211 plays on the QuickTime player.

If QuickTime player fails to play the stream:

1. From the QuickTime player menu, select:
   Edit > Preferences > QuickTime Preferences.
2. Click the **Advanced** tab and select **Safe mode (GDI only)**.
3. Click **Apply**, then **OK** to save the settings.
4. Close the player window and do this procedure again.

The QuickTime player image settings can now be changed if desired.

NOTE: The QuickTime player does not display closed caption information.

Glossary

Advanced Audio Coding (AAC) — A standardized compression and encoding scheme for lossy (low quality) digital audio. Higher bit rates provide higher quality. Part of the MPEG-2 and MPEG-4 specifications. The SME 211 supports AAC-LC (MPEG-2 part 7, MPEG-4 part 3, sub-part 4 and part 14, MP4 audio).

Advanced Video Coding (AVC) — Video compression format, H.264/MPEG-4 part 10 (see the **H.264 (MPEG-4 AVC)** definition on page 107).

Address Resolution Protocol (ARP) — A protocol for assigning an **IP address** (see page 108) to a device based on the device **MAC (Media Access Control)** (see page 108) address or physical machine address, that maintains a table showing the correlation between the two.

Aspect ratio control — The aspect ratio of the video output can be controlled by selecting a fill mode, which provides a full screen output, or a follow mode, which preserves the original aspect ratio of the input signal.

Auto-Image — An Extron technology for scan converters and signal processors that simplifies setup by executing image sizing, centering, and filtering adjustments with a single button push.

Auto Memory — Auto memory recalls input and image settings for signals that have previously been applied. If this feature is disabled, the device treats every newly applied input as a new source.

B-frames — Bidirectionally predictive coded picture. Contains predictive, difference information from the preceding and following I- or P-frame within a **GOP** (see page 107). Data preceding or following the B-frame are required to recreate video information in a B-frame. They offer significantly better compression than I or P frames, but are not available in Baseline profile.

Bandwidth — The total range of frequencies required to pass a specific signal without significant distortion or loss of data. In analog terms, the lower and upper frequency limits are defined as the half power, or -3 dB signal strength drop, compared to the signal strength of the middle frequency, or the maximum signal strength of any frequency, expressed as xx Hz to xx kHz (or MHz) @ -3 dB. In digital terms, it is the maximum bit rate at a specified error rate, expressed in bits per second (bps). The device bandwidth should be wider than the highest possible bandwidth of the signals it may handle. (In general, the wider the bandwidth, the better the performance. However, bandwidth that is too wide can pass excessive noise with the signal.)

Baud — The speed of data transmission, often in bits per second or megabits per second.

Bit rate — The number of bits that are conveyed or processed per unit of time. Bit rate is quantified using the bits per second (bit/s) unit, often in conjunction with an SI prefix such as kilo- (kbit/s or kbps), mega- (Mbit/s or Mbps), or giga- (Gbit/s or Gbps).

Codec — (1) Coder/decoder: A device that converts analog video and audio signals into a digital format for transmission over telecommunications facilities and also converts received digital signals back into analog format. It may also dial up the connection, like a modem for teleconferencing. (2) Compressor/decompressor. Codecs can be implemented in software, hardware, or a combination of both.

Compression — The art and science of reducing the amount of data required to represent a picture or a stream of pictures and sound before sending or storing it. Compression systems are designed to eliminate redundant or repeated information to the desired data level while allowing the original information to be reproduced to the desired quality.

Constant Bit Rate (CBR) — Constant bit rate encoding means that the rate at which codec output data is consumed is constant. CBR is useful for streaming multimedia content on data communication channels which operate more efficiently or require the bit rate to remain within a tight tolerance. Typically the constant bit rate is created by stuffing bits into a variable bit rate signal which has a defined peak or maximum limit.

Constrained Variable Bit Rate (CVBR) — This scheme is similar to **Variable Bit Rate (VBR)**, (see page 111) but sets a maximum allowed bit rate that the encoder cannot exceed.

Darwin Streaming Server (DSS) — Darwin Streaming Server is software developed by Apple that provides a high performance media streaming server for delivering content. The software is used to simultaneously stream to a broad range of screens and devices (including computers, televisions, smartphones, and tablets).

Data bits — The number of bits used to represent one character of data. Data bits can be 7, 8, or 16, but most serial devices use 8 bits for ASCII characters.

DDC — Display Data Channel (DDC) is a bidirectional communications standard developed by VESA (Video Electronics Standards Association) that defines a universal data transmission standard for the connectivity between display devices and computers.

Decoder — 1) In analog video, a device used to separate the RGBS (red, green, blue and sync) signals from a composite video signal. Also known as an NTSC decoder. 2) In digital systems, a device which does the reverse of an encoder, undoing the encoding so that the original information can be retrieved. The same method used to encode is usually just reversed in order to decode. Video over IP decoders accept IP data streams and output an analog or digital video signal. 3) In control systems, the device in a synchronizer or programmer which reads the encoded signal and turns it into a form of control.

Dynamic Host Configuration Protocol (DHCP) — A network protocol that enables a server to automatically assign unique network addresses (IP address, subnet mask, gateway) to a device using a defined range of numbers configured for the network.

DiffServe (Differentiated Services) — DiffServ specifies a scalable, coarse-grained mechanism for classifying and managing network traffic and providing quality of service (QoS).

Domain Name System (DNS) — A database system that translates domain names (such as **www.extron.com**) into IP addresses.

Dynamic IP address — An IP address that is automatically assigned to a client device in a TCP/IP network, typically by a DHCP server. Network devices that serve multiple users, such as servers and printers, are usually assigned a static (unchanging) IP address.

Extended Display Identification Data (EDID) — A data structure used to communicate video display information, including native resolution and vertical interval refresh rate requirements, to a source device over the Display Device Channel (DDC). The source device outputs the optimal video format for the display based on the provided EDID, ensuring proper video image quality.

EDID Minder — Automatically manages EDID communication between connected devices.

Elementary Stream — Raw **H.264 (MPEG-4 AVC) Glossary** (see page 107) video or raw **AAC** audio (see page 105), not wrapped by additional headers.

Encoder — A hardware device or software program used to compress (encode) or change a signal from one format to another or convert an analog signal into a digital data stream. The SME 211 is an encoder that converts analog audio and video into digital streams.

Ethernet — A Local Area Network (LAN) standard officially known as IEEE 802.3. Ethernet and LAN technology are used for interconnecting computers, printers, workstations, terminals, services, and similar devices, within the same building or campus. Ethernet operates over twisted pair and over coaxial cable at speeds starting at 10 Mbps. For LAN interconnectivity, Ethernet is a physical link and data link protocol reflecting the two lowest layers of the OSI Reference Model.

File Transfer Protocol (FTP) — A protocol that is used to transfer files from one host to another host over a TCP-based network (such as the Internet).

Gateway — A router or proxy server between networks, or a network node equipped to interface with another network that uses different protocols (an entrance and exit into a communications network).

Group of Pictures (GOP) — A group of successive pictures within a coded video stream. A GOP begins with an Intraframe (**I-frame**) (see page 108) containing the full spatial resolution and data of a video frame. Predictive frames (**P-frames**) (see page 109) follow `I`-frames and contain data that has changed from the preceding `I`-frame. Bi-predictive frames (**B-frames**) (see page 105) reference frames before and after the current frame.

H.264 (MPEG-4 AVC) — H.264/MPEG-4 Part 10. A block oriented, motion-compression-based codec standard developed by the ITU-T Video Coding Experts Group (VCEG) together with the ISO/IEC Moving Picture Experts Group (MPEG).

HDCP — High-bandwidth Digital Content Protection. HDCP is a digital rights management scheme developed by Intel® to prevent the copying of digital video and audio content. HDCP is mandatory for the HDMI interface, optional for DVI. HDCP defines three basic system components: source, sink, and repeater.

HDMI — High-Definition Multimedia Interface (HDMI®): an interface for the digital transmission of high definition video, multi-channel audio, and control signals, over a single cable.

NOTE: The SME transmits 2-channel digital audio only.

HDTV — High definition television with a resolution of 1080p (1920x1080p), 720p (1280x720p), or 1080i (1920x1080i).

HDTV 1080p/60 — High definition television displayed at 1920x1080 resolution (1080p; 2,073,600 pixels) with a refresh rate of 60 Hz.

Hop — In a packet-switching network, a hop is the trip a data packet takes from one router (or intermediate point) to another in the network.

Host name — This is a unique name by which a device is known on a network. It identifies a particular host in electronic communication.

Hypertext Transfer Protocol (HTTP) — A network protocol based on TCP/IP that is used to retrieve hypertext objects from remote web pages and allows servers to transfer and display web content to users.

Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS) — A networking protocol that allows web servers to transfer and display web content to users **securely**. All transferred data is encrypted so that only the recipient is able to access and read the content. It is not a protocol itself, but rather a combination of Hypertext Transfer Protocol (HTTP) on top of the SSL/TLS protocol, which adds the security capabilities of SSL/TLS to standard HTTP communications.

iCalendar file — An iCalendar file is a file containing schedule, task, or meeting information in a standard format. iCalendar files work independent of transport protocol and can be used cross-platform to share calendar data.

Internet Group Management Protocol (IGMP) — A TCP/IP communications protocol used by hosts and adjacent routers on a network to establish multicast group memberships.

The IGMP multicast protocol conserves network bandwidth because network equipment can efficiently deliver streams from the SME 211 when requested by the user or decoder. All network switches and routing equipment must be properly configured to support IGMP snooping, IGMP queries, and multicast filtering to avoid flooding all endpoints with unnecessary streaming traffic.

Internet Protocol (IP) — The primary protocol that establishes the Internet. It defines addressing methods and structures for datagram encapsulation, allowing delivery of packets from a source to a destination across an internetwork based purely on addressing.

Intraframe (I-frame) — In video compression schemes, intraframes (I-frames) are primary frames that contain the full spatial resolution and data of a video frame.

IP address — A numerical label using the Internet Protocol assigned to devices in a network. The IP address for the source and destination are included in an IP datagram. A unique, 32-bit binary number (12-digit dotted decimal notation — xxx.xxx.xxx.xxx) based on version 4 of the Internet Protocol (IPv4) that identifies each sender and each receiver of information connected to a LAN, WAN, or the Internet. IP addresses can be static (see **Static IP** on page 110) or dynamic (see **DHCP** on page 106).

Java™ — A class-based, object oriented programming language developed at Sun Microsystems®, Inc. (merged with Oracle® Corporation). Programs written in Java can run on multiple platforms.

JavaScript® — A scripting programming language adding interactive features to web pages.

LAN — Local Area Network. A computer network that connects devices in a limited area, such as a building or campus, using network equipment that does not include leased communications lines.

Maximum Transmission Unit (MTU) — The maximum allowable size for a network data packet.

Media Access Control (MAC) Address — A unique hardware number given to devices that connect to the Internet. When your computer or networking device (such as a router, hub, or interface) is connected to the Internet, a table (see **ARP** on page 105) relates the IP address of the device to its corresponding physical address on the **LAN** on page 108. This protocol allows for several terminals or network nodes to communicate within a multi-point network, typically a local area network.

Metadata — A metadata record consists of attributes to describe another object. The Dublin Core Metadata Element Set contains 15 generic elements for describing resources: Creater, Contributor, Publisher, Title, Data, Language, Format, Subject, Description, Identifier, Relation, Source, Type, Coverage, and Rights.

MPEG-2 — The video compression algorithm used for DVD-Video, Digital Broadcast Satellite (DBS), and Digital TV (including HDTV) delivery systems.

MPEG-4 — A patented collection of methods defining compression of audio and visual (AV) digital data. MPEG-4 allows higher amounts of data compression and encoding efficiency than MPEG-2. It also includes support for digital rights management and for interactive multimedia applications.

MPEG-4 uses include compression of AV data for streaming media on the web; CD, HD DVD, or Blu-Ray Disc distribution; voice (telephone, videophone) distribution; and broadcast television applications.

Multicast — A network technology for the delivery of information to a group of destinations simultaneously. A single stream is sent from the source to a group of devices at the same time in one transmission. Delivery is managed by network switches and routers using various strategies to reduce duplication or redundancy and to effectively manage group membership changes to deliver the messages over each link of the network only once, and creating copies only when the links to the group of destinations split.

Network Address Translation (NAT) — A network protocol that allows multiple devices to have their own, individual, private addresses, but they share one public IP address (IPv4) for connection to the internet or other networks.

Network Time Protocol (NTP) — A protocol used for synchronizing the clocks of computer systems over networks.

Opencast Server — An Opencast server is an open-source platform to support the management of audio and video content in the education market. Institutions can use an Opencast server to produce, manage, and distribute lecture recordings.

Overscan — An applied "zoom" on SMPTE inputs (NTSC, PAL, 480p, 576p, 720p,1080i, 1080p) to hide closed caption/ancillary data, edge effects, or other video artifacts.

Parity (or Parity checking) — An error detection technique that tests the integrity of the digital data being sent. Parity can be set to None, Even, or Odd.

Predictive frame (P-frame) — In video compression schemes, predictive frames follow I-frames and contain data that has changed from the preceding **I-frame** (see page 108).

Presenter — A person who manages encoding and streaming using the SME, regardless of their login role (user or administrator).

Pull streaming — Streaming method that allows users to search for content. Users specify a content source and initiate a download or view the stream. The content streaming is initiated by the end user (at the decoder rather than at the encoder).

Push streaming — A streaming method where the encoder sends content out to one (unicast) or more (multicast) decoders using one of the transport protocols. Content streaming is initiated at the encoder.

Quality of Service (QoS) — The grade of performance, such as transmission rates and error rates, of a communications channel or system. QoS provides a level of predictability and control beyond the best-effort delivery that the router provides by default (best-effort service provides packet transmission with no assurance of reliability, delay, jitter, or throughput).

Real-time Messaging Protocol (RTMP) — An application level protocol, developed by Adobe, designed for transmission of audio, video, and data over TCP.

Real-time Streaming Protocol (RTSP) — A network control protocol designed for use in audio visual and communications systems to control streaming media.

Real-time Transport Protocol (RTP) — An Internet Engineering Task Force (IETF) standard for streaming real-time multimedia over IP in packets.

Real Time Control Protocol (RTCP) — A companion of RTP used to allow both sender and receiver to exchange control information to optimize performance.

Router — A network device that forwards packets from one network to another.

Secure File Transfer Protocol (SFTP) — Similar to FTP, this protocol adds encryption and requires credentials for file transfers.

Secure Shell (SSH) — A network protocol that creates a secure channel used for secure communication between two computers on a network. SSH is typically used for data communication, remote shell (login) services, or command execution.

Secure Sockets Layer (SSL) — A protocol used by web servers and Web browsers that creates a uniquely encrypted channel for private communications over the public Internet.

Session Announcement Protocol (SAP) — Used by source devices (encoders or servers) in conjunction with SDP to publicize the availability of a stream to decoders and players. Devices using SAP periodically broadcast session description information on an industry standard multicast address and port. When received by remote clients, these announcements can be used to facilitate the viewing of streams, eliminating the need for user configuration.

Session Description Protocol (SDP) — This protocol is used to describe streaming media initialization parameters. It covers session announcement, session invitation, media type and format, and other forms of multimedia session initiation (as defined in RFC 2327). SDP does not deliver media itself. It simply details the stream parameters and how the stream will be started.

Simple Instruction Set (SIS) — A set of commands developed by Extron that allows for RS-232, USB, and TCP/IP control of certain Extron products. A command is sent from the control device to the product (using a minimal number of characters) and a response is received from the product and shown on the display of the control device.

Simple Network Management Protocol (SNMP) — An application-layer protocol that facilitates the exchange of management information between network devices. This protocol collects (and configures) information from network devices (such as servers, hubs, switches, and routers) on an Internet Protocol (IP) network.

Static IP address — An IP address specifically assigned to a device or system in a network configuration. This type of address requires manual configuration of the network device or system and can only be changed manually or by enabling **DHCP** (see page 106).

Stop bits — The bit or bits transmitted that signal the end of a character. Typically set to 1.

Streaming media (stream) — Multimedia that is constantly received by (and normally presented to) an end-user while being delivered by a streaming provider. Internet television is a commonly streamed medium.

Switch — A network switch enables communication between devices in a network by routing data between ports at the data link layer (layer 2 of the OSI model). A managed switch can be configured to transmit data only to the specific device for which the data was intended.

Telnet port — Most controllers support Telnet and use port 23 as the communication port to receive or issue commands.

Transmission Control Protocol (TCP) — A protocol developed for the Internet that provides reliable end-to-end data packet delivery from one network device to another.

Transmission Control Protocol/Internet Protocol (TCP/IP) — The communication protocol of the Internet. Computers and devices with direct access to the Internet are provided with a copy of the TCP/IP program to allow them to send and receive information in an understandable form.

Time To Live (TTL) — A value that specifies the remaining number of router hops multicast traffic can make between routed domains. The TTL value is decremented automatically by each router.

TMDS — Transition Minimized Differential Signaling. An all-digital video transmission standard developed by Silicon Image, Inc. TMDS is the core technology used in DVI and HDMI.

Transport Streams (TS) — A form of media wrapper which uses MPEG-2 transport stream headers. The MPEG-2 transport headers contain information about the media.

The SME is compatible with transport streams that contain H.264 encoded video and AAC encoded audio. Transport streams containing MPEG-2 video and AC3 audio are not supported.

- **TS/UDP** — (Unicast or multicast) An MPEG-2 transport stream containing the elementary streams for the audio and video. It is sent using UDP packets.
- **TS/RTP** — (Unicast or multicast) Transport stream that is sent using RTP/UDP. RTP provides sequencing, timing, and control information; if the sequencing information is reordered by the network, RTP reorganizes and processes the information in the correct order. UDP would process the sequencing information out of order, making RTP performance better on larger, many hop networks.

Unicast — Sending messages from one device to a single network destination on a network. Having *N* clients of a unicast stream requires the server to produce *N* streams of unicast data.

User Datagram Protocol (UDP) — A connectionless, transport layer protocol that sends packets (datagrams) across networks using "best-effort" delivery. It is a relatively simple protocol that does not include handshaking.

Variable Bit Rate (VBR) — A compression scheme that adjusts the output bit rate around a specified target bit rate depending on the audio or image complexity. More bandwidth is used when the video frame is more complex and less bandwidth is used when the video frame is simple.

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

Japan:
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe and Africa:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

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

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
Japan: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.