User Guide

Streaming AV Products

SMP 351

Streaming Media Processor

Extron Electronics

INTERFACING, SWITCHING AND CONTROL

68-2238-01 Rev. C
11 15

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.**

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**.

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**.

Инструкция по технике безопасности • Русский

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

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

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

安全说明 • 简体中文

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

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

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

安全記事 • 繁體中文

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

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

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

安全上のご注意 • 日本語

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

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

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

안전 지침 • 한국어

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

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

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

FCC Class A Notice

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

NOTE: This unit was tested with shielded I/O cables on the peripheral devices. Shielded cables must be used to ensure compliance with FCC emissions limits.

A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기를 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

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.

NOTE: For 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.

Trademarks
All trademarks mentioned in this guide are the properties of their respective owners.

The following registered trademarks®, registered service marks℠, and trademarks™ are the property of RGB Systems, Inc. or Extron Electronics:

Registered Trademarks ®
AVTrac, Cable Cubby, CrossPoint, DTP, eBUS, EDID Manager, EDID Minder, Extron, Flat Field, FlexOS, Global Configurator, GlobalViewer, Hideaway, Inline, IP Intercom, IP Link, Key Minder, LinkLicense, LockIt, MediaLink, NetPA, PlenumVault, PoleVault, PowerCage, Pure3, Quantum, SoundField, SpeedMount, SpeedSwitch, System *INTEGRATOR*, TeamWork, TouchLink, V-Lock, VersaTools, VN-Matrix, VoiceLift, WallVault, WindoWall, XTP, and XTP Systems
Registered Service Mark℠ : S3 Service Support Solutions
Trademarks ™
AAP, AFL (Accu-Rate Frame Lock), ADSP (Advanced Digital Sync Processing), Auto-Image, CableCover, CDRS (Class D Ripple Suppression), DDSP (Digital Display Sync Processing), DMI (Dynamic Motion Interpolation), Driver Configurator, DSP Configurator, DSVP (Digital Sync Validation Processing), eLink, EQIP, FastBite, FOX, FOXBOX, IP Intercom HelpDesk, MAAP, MicroDigital, ProDSP, QS-FPC (QuickSwitch Front Panel Controller), Room Agent, Scope-Trigger, ShareLink, SIS, Simple Instruction Set, Skew-Free, SpeedNav, Triple-Action Switching, True4K, Vector, WebShare, XTRA, ZipCaddy, ZipClip

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

CAUTION: Risk of minor personal injury.

ATTENTION : Risque de blessure mineure.

ATTENTION:

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

NOTE: A note draws attention to important information.

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

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
Esc X1 * X17 * X20 * X23 * X21 CE ←
```

NOTE: For commands and examples of computer or device responses mentioned in this guide, the character “0” 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 SMP 351 and its features. Topics that are covered include:

About this Guide

This guide contains installation, configuration, and operating information for the SMP 351 and SMP 351 3G-SDI. In this guide:

- "SMP" and "SMP 351" refer to either model. Where a difference occurs, it is noted.
- "Codec" refers to the H.264 / MPEG-4 AVC codec.
- "Stream" can refer to audio, video, or both that is transmitted by the SMP 351.
- "UI" and "Web UI" refer to the Web-based User Interface.

About the SMP 351

The Extron SMP 351 is a compact, high performance H.264 recording and streaming processor that provides the ability to record a presentation and output an HDMI signal to a local display, and, if needed, stream the AV content live while recording.

Two versions of the SMP 351 are available:

- SMP 351
- SMP 351 3G-SDI

NOTE: Both versions have similar front and rear panel features and function exactly the same. The SMP 351 3G-SDI supports a 3G-SDI video input.

Figure 1 on the next page shows a typical SMP 351 application featuring a computer input with embedded audio, an analog camera input, and a wireless microphone for audio. The presentation is output to a local monitor for previewing and recorded to an optional USB drive connected to the front USB input.

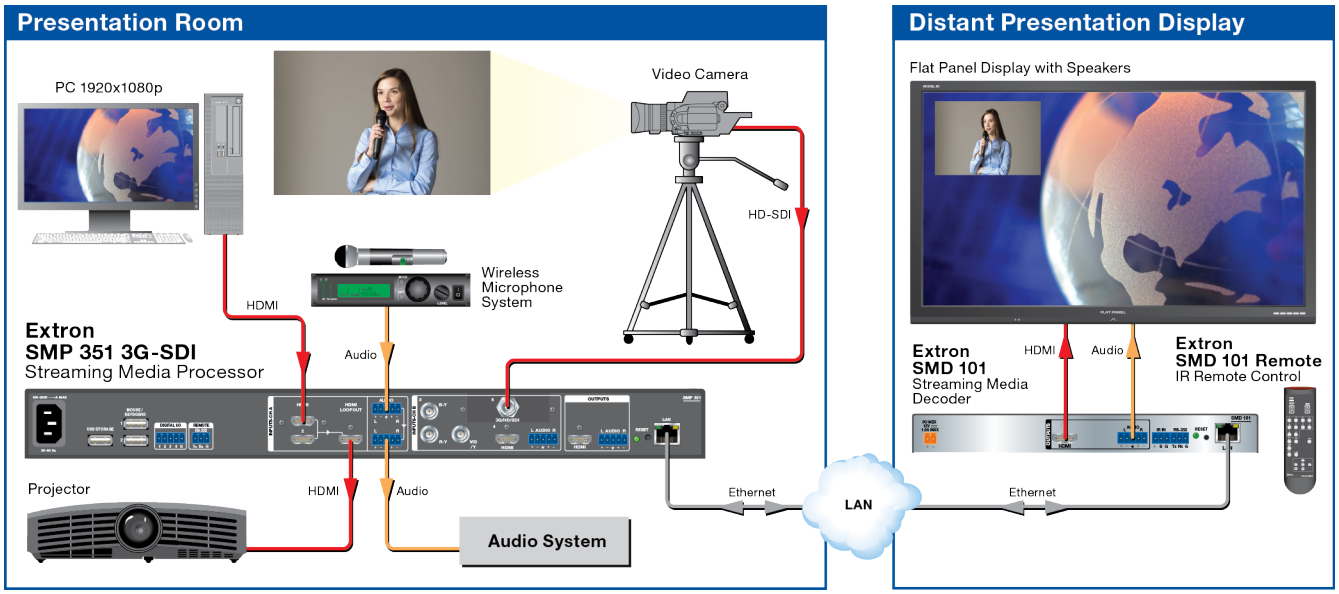


Figure 1. Typical SMP 351 Application

Suggested PC Requirements

The suggested PC requirements to access the default Web pages of the SMP 351 are listed below.

- **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 37 or higher

    NOTE: Chrome version 42 disables many plugins. For the SMP this means that the preview video in the AV Controls panel is not supported by Chrome version 42 or higher. To see a preview of the current stream you can either:
    - Use a different browser or
    - Open a stand-alone, third-party video player (such as VideoLAN™ opensource VLC™ media player) and connect to the confidence stream from the SMP.

  - Mozilla® Firefox® version 35 or higher
  - Microsoft® Internet Explorer® version 9 or higher (for Windows® operating systems)

    NOTE: If you are using Internet Explorer, compatibility mode must be turned off.

  - Apple® Safari® version 8 or higher (for Mac® OS X® operating systems)

    NOTE: Apple Safari is the preferred browser for an Apple-based computer platform.

Licensed Third-party Software

The following table lists the licensed third-party software used by the SMP 351.

NOTE: Licensed third-party software used by the SMP 351 is subject to change without notice.

Licensed Third-party Software Used in the SMP 351			
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	nmap	GPLv2
gdisk	GPL	ntfs-3g	GPLv2 LGPLv2
gnupg	GPLv2	ntp	ntp license
gpgme	LGPLv2.1	openssh	BSD
gst-plugins-base	LGPLv2 plus applicable external licenses	openssl	OpenSSL or SSLeay
gst-plugins-good	LGPLv2.1 plus applicable external licenses	orc	BSD-2c, BSD-3c
gstreamer	LGPLv2	pcre	BSD-3c
heirloom-mailx	BSD-4c, Bellcore (base64), OpenVision (imap_gssapi), RSA Data Security (md5), Network Working Group (hmac), MPLv1.1 (nss)	popt	MIT
i2c-tools	GPLv2+, GPLv2 (py-smbus)	procps	GPLv2, libproc and libps LGPLv2
ifplugd	GPLv2	psmisc	GPLv2

Licensed Third-party Software Used in the SMP 351			
Package	**License**	**Package**	**License**
iostat	GPL	pv	Artistic-2.0
jpeg-turbo	jpeg-license (BSD-3c-like)	python	Python software foundation license v2, others
kmod	LGPLv2.1	qjson	LGPLv2.1
libassuan	LGPLv2.1	qt	LGPLv2.1 with exceptions
libcgicc	LGPLv2.1	qwt	LGPL
libcurl	ICS	sdl	LGPLv2.1
libdaemon	LGPLv2.1	smartmontools	GPLv2
libdnet	BSD-3c	socat	GPLv2
libelf	LGPLv2+	spawn-fcgi	BSD-3c
libfcgi	fcgi license	sqlite	Public domain
libffi	MIT	strace	BSD-3c
libglib2	LGPLv2	sudo	ICS BSD-3c
libgpg-error	LGPLv2.1	sysstat	GPLv2
libmpeg2	GPLv2	tcpdump	BSD-3c
libogg	BSD-3c	tiff	tiff license
libpcap	BSD-3c	tzdata	Public domain
libpng	libpng license	udev	GPLv2
librsync	LGPLv2.1	usbutils	GPLv2
libssh2	BSD	util-linux	GPLv2, BSD-4c, libblkid and libmount LGPLv2.1, libuuid BSD-3c
libungif	MIT	vsftpd	GPLv2
libusb	LGPLv2.1	xinetd	xinetd license
libv4l	GPLv2	zlib	zlib license
lighttpd	BSD-3c		

General Product Overview

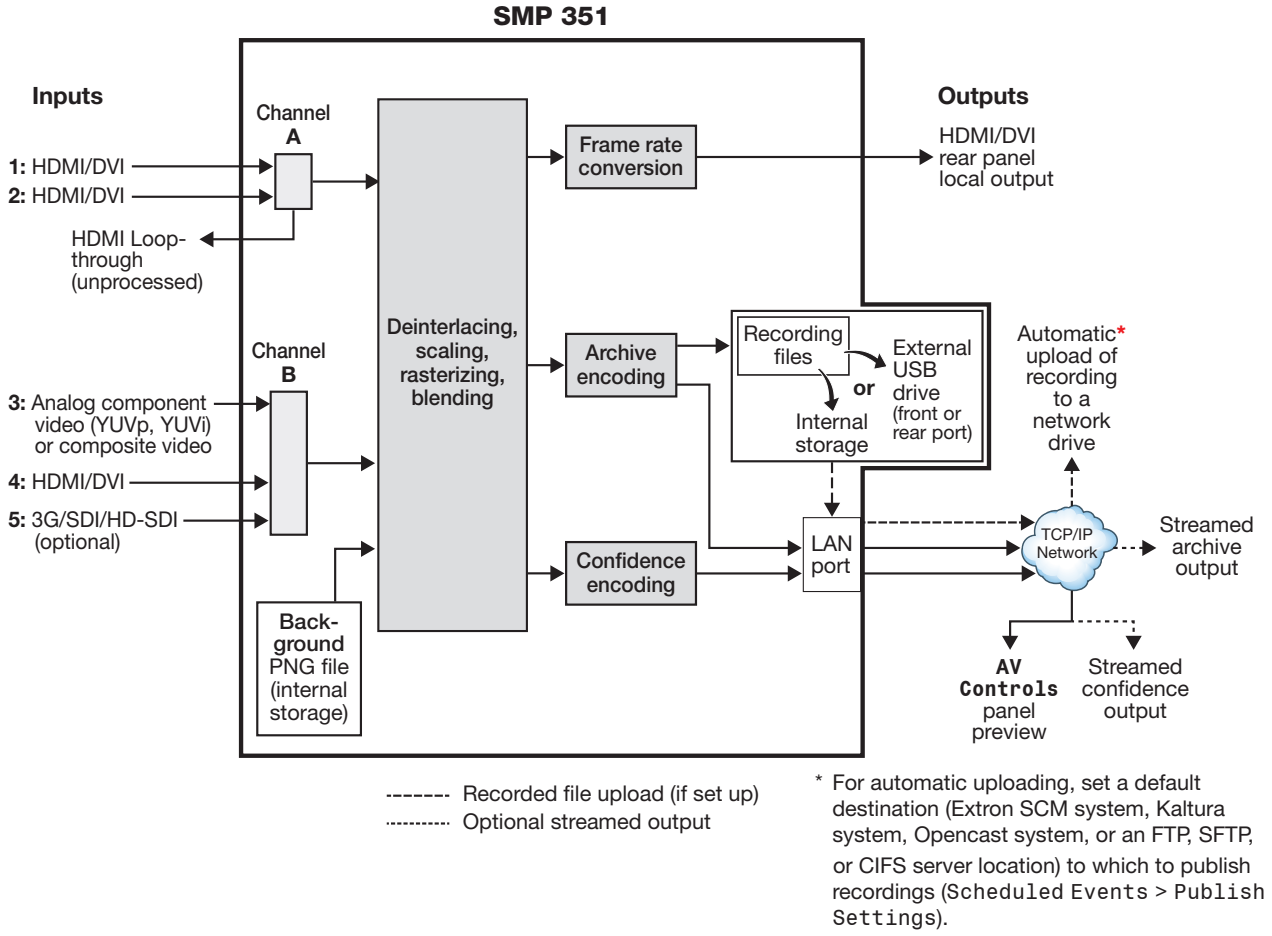
Input

The **SMP 351** can accept up to three HDMI inputs and one component or composite video input. The **SMP 351 3G-SDI** is identical to the SMP 351 except that it includes the 3G/HD/SDI input (input 5). Both models accept digital audio embedded on HDMI signals or analog audio input via captive screw connectors.

- Input 1 (HDMI) and input 2 (HDMI) are grouped as channel A.
- Input 3 (component or composite video), input 4 (HDMI) and optional input 5 (3G/HD/SDI) are grouped as channel B.
- One video and one audio input can be selected and active per input channel.

Encoding and Output

Signals from the two input channels, a background image, and metadata (descriptive information about data content) are combined in a user-configurable layout and encoded into streams. The SMP 351 can encode a high quality stream (for recording and optional live streaming) and also encode a lower resolution stream (for preview within its embedded Web pages and optional live streaming). See the **Encoder Settings and Layout Presets** on page 69 for a comparison of the two encoding types (archive and confidence). The video output can be scaled and its aspect ratio modified. The SMP 351 also outputs high quality encoded HDMI video with embedded audio on a single output for display on any HDMI display, supporting resolutions up to 1920x1080 at 60 Hz.



* For automatic uploading, set a default destination (Extron SCM system, Kaltura system, Opencast system, or an FTP, SFTP, or CIFS server location) to which to publish recordings (`Scheduled Events` > `Publish Settings`).

Figure 2. SMP 351 Block Diagram

File Storage

Internal storage is available for storing background image files and storing recordings to be uploaded to a file server. Some models have 80 GB internal, solid state storage, other models have 400 GB internal, solid state storage. The higher capacity storage models are identical to the standard storage models. You can tell the models apart by viewing the total storage size in the storage information table on the `Recording Controls` embedded Web page (see `Storage Information` in the Help file) or check the part number (`Configuration` > `System Settings` > `Unit Identification`). From the front panel, use the **`STATUS`** menu (see **Status Menu** on page 43) and scroll down to the **`DRIVE SPACE`** sub-menu to determine the total drive space and remaining space.

Two USB ports (one on the front panel, one on the rear panel) provide a connection for portable, user-provided USB drives for storing recordings.

Background image files provided by a user can be uploaded to the SMP or imported from a network attached storage drive, if the unit is connected to a LAN (see **Add a Network Share** on page 80). Background image files must reside in the internal storage to be used.

Control Options

The SMP 351 can be controlled using the following:

- Front panel menus and controls
- Simple Instruction Set™ (SIS™) commands sent over Ethernet via the LAN connection, over RS-232 via the rear panel Remote captive screw connector, and over USB via the front panel Config port.
- Ethernet connection and the SMP 351 embedded web pages or SIS commands.

USB mouse and keyboard ports provide for direct connection of a keyboard and mouse to permit the use of an internal browser client that allows limited Web page configuration of the network settings for the device.

Four digital I/O ports can be configured (using a FlexOS™ application) as digital inputs to receive status from other devices like pushbutton controls and projector lifts. Alternatively they can be configured as digital outputs to drive LEDs or devices that accept a TTL input signal for local device control.

Recordings

The core function of the SMP 351 is to create recording files from the audio and video input sources.

Start a recording

Recordings are initiated in one of several ways:

- **Unscheduled (ad hoc) recordings** — Require manual configuration. To use this method, perform one of the following:
  - Press the **`Record`** () button on the front panel of the SMP 351
  - Click the **`Record`** () button in the AV Controls panel of the SMP 351 embedded Web pages (see **Start an Ad Hoc Recording** on page 56) and set the options in the `Start an Ad hoc Recording` window
  - Tap a control button on a configured touchpanel (such as an Extron TLP Pro Series touchpanel with a custom script).

- **Scheduled recordings** — Start automatically at the date and time specified in a calendar schedule. Schedules can be imported on a one-time basis, on a periodic basis (updated on a fixed interval), or on an ongoing basis (using a compatible scheduling server such as Opencast or Microsoft Exchange). See **Schedule Settings** on page 61 for details on how to set up recording schedules.

Make a recording

The SMP 351 creates recordings by:

- Scaling and arranging the content from one or both AV input channels (A and B) and the optional background .png file as defined by the selected layout preset (see **Layout presets** on page 71)
- Encoding the content and layout into two encoding streams (archive and confidence) as configured by the encoding presets (see **Encoder Settings and Layout Presets** on page 69)
- Creating a set of files — one or more .m4v files and other files containing metadata, thumbnail images, and optional chapter markers. These files are stored either within the unit (the internal, default location), or on an optional USB drive. See **Setting the Default Recording Media** on page 75 for how to set the default recording storage location.

The SMP 351 creates a set of the same types of files for every recording, regardless of how a recording is initiated. Default file names are specified within the `System Settings` page (see **Setting the Default Recording Media** on page 75 for details).

Output and share recordings

Recording files can be saved in the SMP 351 internal memory and on an optional connected USB drive. Recordings stored internally (not on a USB drive) can also be automatically uploaded to a network server folder.

NOTES:

- When integrated with an Opencast server, both ad hoc and scheduled recordings are automatically uploaded to the server location defined during the scheduling setup.
- To upload recordings for other scheduling or integration methods, specify a publish destination during system setup
- FTP, SFTP, or CIFS/Windows Net Share server folder during system setup (see **Publish Settings Tab** on page 62).

Uploading recordings to a server allows you to archive or share files with others who are authorized to access that folder or to use tools such as Extron Streaming Content Manager (SCM) software. Streaming Content Manager checks the designated network server locations for new recordings, packages SMP 351 recording files with a player application (Extron Media Player, EMP) and additional information, and automatically distributes recording packages to event presenters via a secure Web page interface.

Features

- **Process two high resolution AV signals from up to five available inputs** — Size and position two AV source signals in layouts that maximize the viewing experience.
- **Stream and record simultaneously** — Use the SMP 351 to document presentations and extend live streaming to overflow rooms or media servers. AV and IT staff can also view streaming in low resolution for support functions.
- **High quality scaling with flexible two-window management** — Display one or two high resolution sources in various window arrangements, including picture-in-picture and picture-by-picture arrangements for optimal interpretation.
- **Record to internal and USB storage simultaneously** — Enable dual recording from the embedded web pages, and the SMP 351 can save a copy of the recording to the internal SSD drive and an identical copy to the selected USB storage drive.
- **Produces MP4 media files that are compatible with virtually any media player** — Use recordings produced by the SMP 351 directly with any software media player, computer, or mobile device.
- **Flexible I/O ports for advanced AV system management** — Install Extron FlexOS applications onto the SMP 351 that interface with control ports and automate system operation.
- **License-free operation contributes to a low cost of ownership** — With no licensing or support fees, the SMP 351 is a cost effective solution for AV streaming and recording.
- **Save recordings to internal solid state drive, external USB storage, or a defined network storage directory** — Recordings can be saved to pre-defined locations most convenient to users.
- **Stream concurrently at two resolutions and bit rates** — High resolutions and high bit rates deliver superior quality images for overflow applications and lower bit rates and resolutions are more efficient for streaming distribution and confidence viewing applications.
- **Chapter and event marking with thumbnails viewable in Extron Media Player** — Chapters or events can be marked, and JPEG image thumbnails are produced that promote efficient searching and scanning from the Extron Media Player (EMP).
- **Record at 480p, 720p, 1080p, 1024x768, 1280x1024, or custom resolution** — Use standard video resolutions or computer resolutions and user-defined custom rates based on content or viewing requirements.
- **Stream at resolutions from 512x288 to 1080p/30** — High resolutions deliver superior quality images for overflow applications and lower resolutions are more efficient for streaming distribution and confidence viewing applications.
- **HDMI, component, composite, and optional 3G-SDI input** — Provides compatibility with common AV signal formats at resolutions up to 1920x1200 including 1080p/60. The SMP 351 3G-SDI model offers an additional 3G-SDI input connection.
- **Easy to configure and operate from the front panel or external control system** — Ensures that presentations will be streamed and recorded and valuable information will be documented and repurposed.
- **Window layout presets simplify control** — Sixteen standard and customized source layouts are available to be recalled quickly from the front panel or an external control system.
- **Internal Solid State Storage** — Save recorded data to reliable, internal storage, before transferring it to external destinations. Up to eighty hours of material can be saved to internal storage using archive quality media encoded at 10 Mbps.

- **Define specific storage destinations for recorded data** — Configure the SMP 351 to save recordings to specific storage directories based on the user environment or application requirements.
- **Manage AV recordings using Extron Streaming Content Manager** — SCM prepares recording packages that offer an enhanced playback experience from the Extron Media Player (EMP). SCM manages users and groups, and transfers recording packages to a rights-managed storage directory.
- **HDCP-compliant input and output signal management** — Encrypted signals can be viewed on compliant displays connected to the SMP 351 loop through, but cannot be streamed or recorded. A green signal is presented at non-compliant destinations.
- **HDMI output with audio** — Presents a preview of the blended source layout that is recorded or streamed with mixed, HDMI-embedded stereo audio. Mixed analog stereo audio is also available.
- **HDMI-embedded stereo audio or analog stereo input and output signal support** — Digital and analog audio signals are supported on the input channels and the output channel.
- **Audio mixing and DSP functionality** — Produces a quality audio experience without requiring the use of external mixing and DSP equipment.
- **Directly compatible with Opencast Server** — Integrate scheduling and publishing of recorded media directly to the Opencast open source content management system.
- **Compatible with third party content management systems** — Manually upload recordings to systems such as Kaltura, iTunes-U, Blackboard LMS, SharePoint, CaptionSync, YouTube, Moodle, and RSS feed.
- **Schedule recordings using iCalendar** — Configure recording schedules on the SMP 351 by importing iCalendar files manually or automatically.
- **Uploadable Extron FlexOS applications** — Upload applications that use the four digital I/O ports to control and manage devices used in the AV presentation environment for recording or streaming applications.
- **RS-232, Ethernet, and digital I/O control ports** — Interface with control systems, sensors, or external devices used in the AV presentation environment.
- **Supports source resolutions up to 1920x1200, including HDTV 1080p/60** — The SMP 351 supports a wide range of input resolutions, from standard definition up to the resolutions commonly used for computer video and HDTV.
- **Standards-based H.264/MPEG-4 AVC video compression** — The SMP 351 supports use of the Baseline, Main, or High Profiles at Levels 4.x, or 3.x providing the ability to optimize video coding for use with various types of applications and decoding devices.
- **Channel A buffered input loop-through** — Channel A input connectors include a buffered loop-through, for easy integration into new or legacy systems without the need for additional AV equipment such as distribution amplifiers.
- **Auto-Image setup** — When activated, the unit automatically analyzes the incoming video signal and then automatically adjusts sizing, centering, and filtering to optimize image quality. This can save time and effort in fine tuning displayed images.
- **Recording layout presets simplify control** — The SMP 351 provides 16 standard or customizable presets that specify the size and positioning of AV sources and metadata, simplifying management and selection of layouts from the front panel or an external control system.

- **Encoding presets for quick recall of specific compression settings** — The SMP 351 provides 16 standard or customizable presets for saving specific encoding settings such as H.264 profile, resolution, GOP (group of pictures) length, and bit rate session management configurations. Users can quickly switch between these presets to support different applications.
- **Push and pull streaming session management** — The flexibility to apply push and pull streaming session management makes the SMP 351 compatible with a variety of H.264 devices and streaming applications.
- **Pull streaming transport protocols** — RTP, RTSP interleaved, and HTTP tunneled streaming transport protocols may be applied, based on various network conditions or to aid in firewall navigation.
- **Push streaming transport protocols** — Native RTP and MPEG-2 Transport Streams (TS) may be applied in unicast or multicast streaming applications. TS may be transported using UDP or RTP based on network conditions.
- **Session Announcement Protocol (SAP)** and **Session Description Protocol (SDP)** — SAP and SDP protocols simplify identification of AV source streams in unicast or multicast push streaming applications.
- **Adjustable recording and streaming bit rates** — Select video bit rates from 200 Kbps to 10 Mbps for video and audio bit rates from 80 Kbps to 320 Kbps based on the viewing application, storage, streaming or network conditions.
- **Clean switching** — Switching has a clean transition between sources. Distractions such as visual jumps, glitches, and distortion commonly experienced when switching between computer and video sources will not be experienced when using the SMP 351.
- **Recording metadata** — Metadata can be assigned to make indexing and searching of recordings simple including: Title, Presenter, Subject, Description, Publisher, Contributor, and Date.
- **Metadata text overlay** — Data concerning the recording can be presented and clearly identified on recording layouts with AV sources and a background image.
- **Uploadable background image files** — Upload PNG image files at resolutions up to 1920x1080 to identify organizational or event information.
- **On-screen display information** — Present device information and status on source images to aid in troubleshooting and fault finding activities.
- **Onscreen display video time reference** — Text displaying a time reference (HH:MM:SS Format) can be presented within the onscreen display in the top left corner of the output signal.
- **System workflow alarms** — Notify monitoring systems or support staff if disk space is low, encrypted signals are detected, AV signal errors occur, or other error conditions exist.
- **Alarm reporting** — Automate communication with monitoring systems or support staff using e-mail via Simple Mail Transfer Protocol.
- **AAC audio encoding** — Standards-based audio compression provides compatibility with many devices. The bit rate can be adapted to different application requirements.
- **Video encoding quality controls including video resolution, video bit rate, frame rate, constant or variable bit rate control, GOP length, and audio bit rate** — Several user controls are available to adjust encoding quality.
- **Auto Input Memory** — When activated, the SMP 351 automatically stores input sampling, and picture settings based on the incoming signal. When the same signal is detected again, these image settings are automatically recalled from memory.

- **EDID Minder automatically manages EDID communication between connected devices** — EDID Minder automatically manages EDID communications between devices, ensuring use of optimal signal formats.
- **Audio input gain and attenuation** — Gain or attenuation can be adjusted for each input signal to eliminate noticeable differences when switching between sources, or adjusting audio levels for the output stream.
- **Picture controls for brightness, contrast, signal sampling, and overscan** — 16 user memory presets are available for each input to store all image settings.
- **Aspect ratio control** — The aspect ratio of a source window can be controlled by selecting a Fill mode, which provides a full screen output, Follow mode, which preserves the aspect ratio, or Fit mode, which maintains image uniformity and zooms into the source.
- **HDCP authentication and signal presence confirmation** — Provides real-time verification of HDCP status for each digital video input and output signal. This allows for easy signal and HDCP verification through RS-232 or Ethernet, providing valuable feedback to a system operator or help desk support staff.
- **HDCP Visual Confirmation provides a green signal when encrypted content is sent to a non-compliant display** — A full-screen green signal is sent when HDCP-encrypted content is transmitted to a non-HDCP compliant display, providing immediate visual confirmation that protected content cannot be viewed on the display.
- **Quad standard video decoding** — The SMP 351 uses a digital, five-line adaptive comb filter to decode NTSC 3.58, NTSC 4.43, and PAL for integration into systems worldwide.
- **Internal test patterns for setup** — The SMP 351 offers eight test patterns as well as on-screen display (OSD) data overlay including timestamp, time and date, and system information to aid in calibration and setup of the encoder.
- **Front panel security lockout** — This feature locks out all front panel functions except for input selection; all functions however, are available through IP and RS-232 control via SIS commands, and the embedded web pages.
- **Ethernet monitoring and control** — The SMP 351 is controllable over Ethernet, supporting configuration and real-time management from a control system.
- **Embedded Web interface** — The SMP 351 provides an intuitive Web interface with an embedded video window for viewing the live stream, as well as source input and encoding adjustments.
- **RS-232 control port** — Using serial commands, the SMP 351 can be controlled and configured via the SIS command protocol, a set of basic ASCII code commands that allow for quick and easy programming.
- **USB keyboard and mouse ports** — Configure and control the SMP 351 and system settings using a keyboard and mouse viewing the embedded Web page from the HDMI output connection.
- Includes LockIt HDMI cable lacing brackets
- Rack-mountable 1U, full rack width metal enclosure
- **Internal universal power supply** — The 100-240 VAC, 50-60 Hz, international power supply provides worldwide power compatibility.

Installation

This section provides information on:

- **Mounting the SMP 351**
- **Rear Panel Overview**
- **SMP 351 Rear Panel Reset**

Mounting the SMP 351

Before connecting the SMP 351, turn off all devices that will be connected to it. The SMP 351 is housed in a 1-inch high, full-rack width metal enclosure that can sit on a table with the provided rubber feet or can be rack mounted. Select a suitable mounting location (see **Mounting the SMP 351** on page 115), then choose an appropriate mounting option.

Make all external device connections before applying power.

Rear Panel Overview

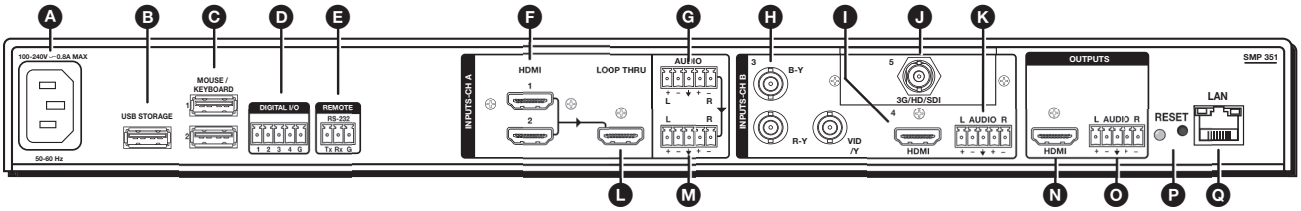


Figure 3. SMP 351 Rear Panel (SMP 351 3G-SDI shown)

- **A** **100-240 VAC IEC connector** for power input
- **B** **Type A USB connector** for external storage
- **C** (2) Type A USB connectors for **mouse and keyboard connection**
- **D** 3.5 mm, 5-pole captive screw connector for **digital I/O**
- **E** 3.5 mm, 3-pole captive screw connector for **SIS control over RS-232**
- **F** **HDMI inputs 1 and 2**
- **G** 3.5 mm, 5-pole captive screw connector for **channel A analog stereo audio input**
- **H** 3 BNC connectors for component or composite **video input 3**
- **I** **HDMI input 4**
- **J** **3G/HD/SDI input card (input 5)**, SMP 351 3G-SDI only
- **K** 3.5 mm, 5-pole captive screw connector for **channel B analog stereo audio input**
- **L** **HDMI loop thru from input 1 or 2**
- **M** 3.5 mm, 5-pole captive screw connector for **channel A analog stereo audio loop thru output**
- **N** **HDMI preview output**
- **O** 3.5 mm, 5-pole captive screw connector for **analog stereo audio output**
- **P** **Reset button and LED**
- **Q** RJ-45 Ethernet connector for **LAN connection**

Power Connection

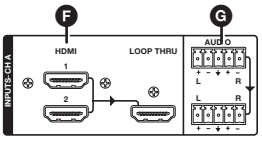
Ⓐ **100-240 VAC power input** – Connect the provided IEC cord. Verify the front panel buttons and LCD illuminate (see **Front Panel Features** on page 18).

Input Connections

The audio and video inputs are grouped into channel A and channel B. Channel A analog audio input can be selected for video inputs 1 or 2 (Ⓕ). Channel B analog audio can be selected for video inputs 3 (Ⓗ), 4 (Ⓘ), or 5 (Ⓙ).

Ⓕ **HDMI input (1 and 2)** – Connect an HDMI (or DVI with suitable adapter) source device to input 1 and input 2.

NOTE: Channel A (inputs 1 and 2) is optimized for full range sources such as PCs. When using a video source with adjustable quantization range on these inputs, select "Full Range" for the most accurate video reproduction.



Ⓖ **Channel A analog audio input** – Connect a balanced or unbalanced stereo line level audio device to this 5-pole, 3.5 mm captive screw connector. Channel A audio can be selected for output with HDMI inputs 1 and 2 instead of the embedded audio. Wire the connector as shown in figure 4.

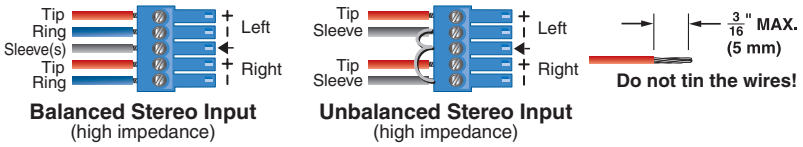
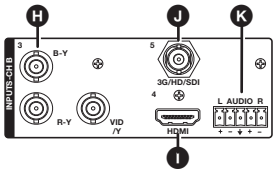


Figure 4. Audio Input Captive Screw Connector Wiring

Ⓗ **Analog video input 3** – Connect component video to the three BNC connectors (B-Y, R-Y, VID/Y). Connect a composite video signal to the VID/Y BNC connector.

Ⓘ **HDMI input 4** – Connect an HDMI (or DVI with suitable adapter) source device to input 4.

Ⓙ **Serial digital video input 5 (SMP 351 3G-SDI only)** – Connect a 3G/HD/SDI video signal to this BNC connector.



Ⓚ **Channel B analog audio input** – Connect a balanced or unbalanced stereo line level audio device to this 5-pole, 3.5 mm captive screw connector. Channel B audio can be selected from either the HDMI embedded audio, Ch B analog audio, or the audio can be set to Off. Wire the connector as shown in figure 4.

Output Connections

L **HDMI loop-thru output** – Connect an HDMI (or DVI with suitable adapter) display device to the HDMI Loop Thru connector to view the selected input 1 or input 2.

M **Audio loop output** – Connect a balanced or unbalanced stereo line level audio device to this 5-pole, 3.5 mm captive screw connector (see **figure 3**, **M** on page 12). Wire the connector as shown in figure 5. Audio is always from audio input **G**.

ATTENTION:

- For unbalanced audio, connect the sleeves to the ground contact. DO NOT connect the sleeves to the negative (–) contacts.
- Pour l'audio asymétrique connectez les manchons au contact au sol. Ne PAS connecter les manchons aux contacts négatifs (–).

Figure 5. Audio Output Captive Screw Connector Wiring

ATTENTION:

- 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 un peu plus longs, les câbles exposés pourraient se toucher et provoquer un court circuit. S'ils sont un peu plus courts, ils pourraient sortir, même s'ils sont attachés par les vis captives.
- Do not tin the wires. Tinned wires are not as secure in the captive screw terminals and could pull out.
- Ne pas étamer les câbles. Les câbles étamés ne sont pas aussi bien fixés dans les terminaisons des à vis captives et pourraient sortir.

N **HDMI preview output** – Connect an HDMI (or DVI with suitable adapter) display device to this HDMI output connector. Using an attached USB keyboard and mouse, the Preview Output can be switched beween a preview of the recorded content and an internal browser client.

O **Analog Audio output** – Connect a balanced or unbalanced stereo line level audio device to this 5-pole 3.5 mm captive screw connector (see figure 5) for select audio output. Wire the connector as shown in figure 5.

The audio output depends both on the input selection and either the embedded audio or analog audio as selected for that input (see **Audio Select** on page 38). Audio output is selected from channel A, from channel B, or a mix of both channel A and channel B.

NOTE: The default audio channel is channel B.

Control System and External Device Connections

The SMP 351 can be configured and controlled from the Remote RS-232 port (see **figure 3**, Ⓔ on page 12) or the front panel USB mini-B Config port (see **figure 8**, Ⓑ on page 18) using SIS commands and DataViewer via Telnet port 23. A standard Web browser can be used for control and configuration from the LAN port. Because the LAN port must be connected for streaming output, Extron recommends using it for configuration, remote control, and firmware upgrades.

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

NOTE: The SMP 351 can detect and record to USB storage devices using FAT32, VFAT long file name extensions, EXT2, EXT3, or EXT4 file systems.

Ⓒ **USB keyboard and mouse** – Connect a keyboard and mouse to the two USB type A ports. With a keyboard and mouse connected, the user can toggle <CTL+ALT+S> the HDMI output (see **figure 8**, Ⓝ) between the standard preview output and the internal browser view.

Ⓓ **Digital I/O** – Connect to the four 3.5 mm, 5-pole captive screw connectors to provide user-defined digital inputs or outputs (see **About the FlexOS App - Digital I/O Configurator** on page 87).

Ⓔ **Remote** — To control the SMP 351 using SIS commands over RS-232, connect the host RS-232 cable to the rear panel (see **figure 3**, Ⓔ on page 12) with a 3-pole captive screw connector for bi-directional (±5 V) serial host control. The default protocol for this port is as follows:

- **9600 baud**
- **no parity**
- **8 data bits**
- **1 stop bit**
- **no flow control (handshaking)**.

Ⓟ **Reset button and LED** — Press the reset button to reset the SMP 351. There are several reset modes to return to user-defined configuration settings or to return all settings back to factory defaults. The LED indicates the desired reset mode, and provides the reset status during the reset operation (see **SMP 351 Rear Panel Reset** on page 16).

Ⓠ **RJ-45 Ethernet connector (LAN)** — Use a standard Ethernet cable to connect to a network. The default network settings are:

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

NOTE: To connect the SMP 351 directly to a computer Ethernet port, use a crossover Ethernet cable (see **Connection Options** on page 88).

SMP 351 Rear Panel Reset

The Reset button on the rear panel of the SMP 351 (see **figure 3** on page 12) returns the SMP 351 to various modes of operation. To select different reset modes, use a pointed stylus or small screwdriver to press and hold the **Reset** button while the SMP 351 is powered or press and hold the **Reset** button while applying power to the SMP 351.

NOTES:

- The reset modes listed in the 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 SMP 351.
- The SMP 351 can also be reset using the Web-based user interface (see **System Resets** on page 86).
- For information on resetting the SMP 351 using SIS commands, see **Resets** on page 97.
- Further details comparing the reset modes and detailing affected configuration settings and user content are available in the operations section below.

ATTENTION:

- Review the reset modes carefully. Some reset modes delete all user loaded content and revert the device to default configuration.
- Étudier de près 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.

There are three unit reset modes (numbered 1, 4, and 5) that are initiated from the rear panel reset button. Press the button with a pointed stylus, pen, or similar item to access the modes. See the following for a summary of the reset modes.

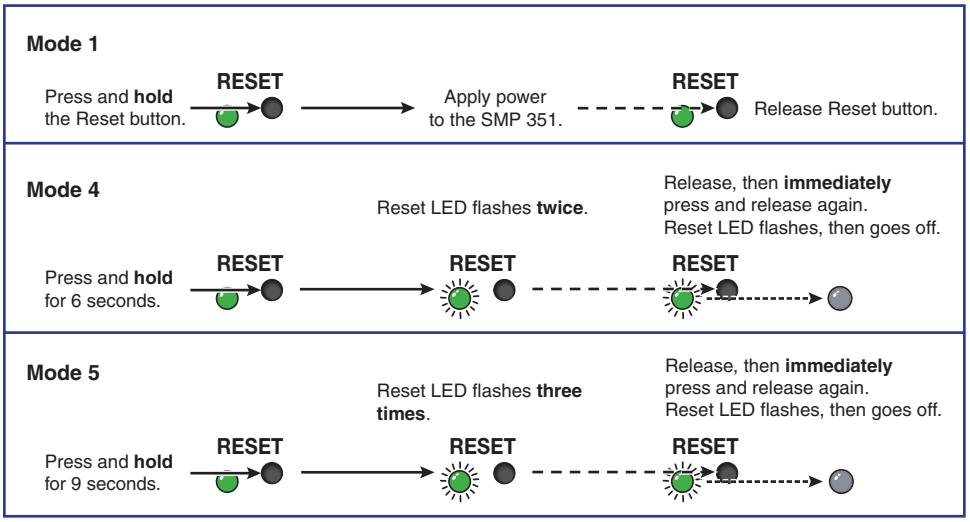


Figure 6. Resetting the SMP 351

SMP 351 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 SMP 351 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 blinks twice (once at 3 seconds, again at 6 seconds). 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 (255.255.0.0). • Sets the gateway IP address to the factory default (0.0.0.0). • 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 blinks three times (once at 3 seconds, again at 6 seconds, again at 9 seconds). 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, and also to replace events. "Resetting SMP 351" appears on a connected display. Mode 5 is equivalent to SIS command ZQQQ (see the **Absolute reset SIS command** on page 97).

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

Figure 7. Reset Mode Comparison

Front Panel Operation

This section of the manual discusses the operation of the SMP 351 from the front panel. Topics covered include:

- **Front Panel Features**
- **Layout Presets**
- **SMP 351 Power Up Procedure**
- **Front Panel Menu Operation**
- **Front Panel Lockout (Executive Modes)**
- **Alarms**

Front Panel Features

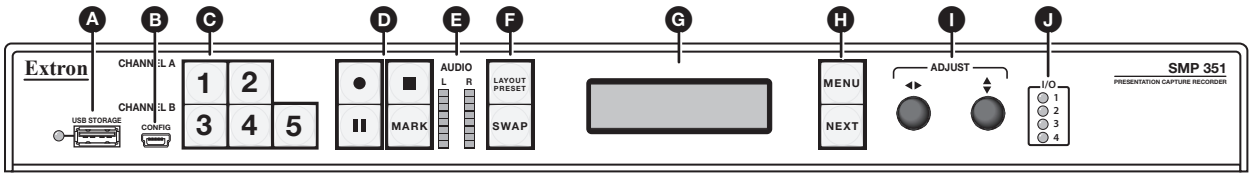


Figure 8. SMP 351 Front Panel

- **A** Type A USB connector and activity LED for **external storage**
- **B** USB mini B connector for **configuration**
- **C** **Input** buttons for source selection
- **D** **Record controls** with LED indicators
- **E** **Audio level indicators**
- **F** **Layout Preset** and **Swap**
- **G** **Menu display**
- **H** **Menu Navigation** (**MENU** and **NEXT**)
- **I** **Adjust knobs** (left ◄► and right ▲▼)
- **J** **I/O display**

A **USB storage port and activity LED** – Connect a USB compatible media device to this port. The green LED blinks during both reading and writing of data. The storage device can be any standard external hard drive or USB flash drive formatted with a compatible file system.

NOTE: The SMP 351 can detect and record to USB storage devices using FAT32, VFAT long file name extensions, EXT2, EXT3, or EXT4 file systems.

ATTENTION:

- Disconnecting a USB device while recording to it may result in corrupt or lost data.
- Déconnecter un périphérique USB alors qu'un enregistrement y est effectué, peut engendrer une altération ou une perte de données.

B **Config port** — Connect a control device to this port with a USB mini-B cable (not supplied). Use this port to send SIS commands to the SMP 351 for device configuration and control (see **Remote Communication and Control** on page 88).

Ⓒ **Input selection —** Press these buttons to select inputs associated with the rear panel input connections.

- **Channel A** – Press the corresponding button to select HDMI input 1 or 2. If analog audio (instead of embedded audio) is selected for an input, Channel A analog audio is output with the video.
- **Channel B** – Press the corresponding button to select composite/component input 3, HDMI input 4, and (optional) SDI input 5. If analog audio is selected for input 4, Channel B analog audio is output with the selected video input.

The currently selected Channel A input button and currently selected Channel B input button light solid amber.

NOTE: Input 5 lights only when the optional SDI input card is installed and the input is selected.

Ⓓ **Record controls with LED indicators** – Press the **Record**, **Stop**, **Pause**, and **Mark** buttons to perform the operation. The buttons light to indicate the current state of record operation.

- **Record** – Press ⏺ to record the selected inputs. The record button lights solid red during active recording.
- **Stop** – Press ⏹ to stop the active recording. When pressed during a recording, the stop button blinks green while the recorded file is being finalized, then lights solid green when the file is finalized.
- **Pause** – Press ⏸ to pause recording. When pressed, the **Pause** button blinks green to indicate recording is paused. Press **Record** or press **Pause** again to resume recording, or press **Stop** to halt the recording.
- **Mark** – Press MARK to place a chapter marker in the recorded file. When pressed during recording, the button illuminates green momentarily to indicate a chapter marker is inserted. The button also illuminates when JPEG thumbnails are automatically created at a fixed interval (default: 5 minutes).

Ⓔ **Audio level indicators** – Two stacks of eight green LEDs track the audio level of the left and right audio channels from -60 dBFS (one LED) to 0 dBFS (eight LEDs). The LEDs indicate both signal presence and active input signal levels.

- **Input Configuration Mode** – When input gain is adjusted, the meters display the currently selected input left and right channel audio levels to assist setting audio gain (see **Audio level** on page 38).
- **Normal Mode** – The meters display the left and right encoder input levels measured after after all audio input adjustements are applied and audio sources are blended/merged (if applicable).

Ⓕ **Layout Preset and Swap** – Press **LAYOUT PRESET** to select one of the 16 capture presets (see **Layout Presets** on page 21). The button illuminates green. Use the **ADJUST** knobs (Ⓘ) to select the desired output layout. Press **NEXT** (Ⓗ) to activate it.

Press **SWAP** to switch Channel A and B inputs between the two layout windows. The button illuminates green for 1 second to indicate the input swap.

Ⓖ **Menu display** – Displays configuration menus and status information. Use the **MENU** and **NEXT** buttons (Ⓗ) and **ADJUST** knobs (Ⓘ) to navigate the menu. During normal operation, a default display cycle is presented (see **SMP 351 Power Up Procedure** on page 22). If there is an active alarm (see **Alarms** on page 45), it is listed instead.

H **Menu Navigation (MENU and NEXT)** – Lights amber (unless menu lockout is enabled). Press to access and navigate the configuration and control menus and submenus.

> **NOTE:** The menu button blinks red when there is an active alarm (see **Alarms** on page 45).

MENU — Use this button to enter and move through the main menu system.
NEXT — Use this button to step through the submenus of the selected menu.

I **Adjust knobs (left ◄► and right ▲▼)** – Rotate these controls to scroll through menus and to make adjustments within a menu or submenu.

> **NOTE:** The buttons and controls on the SMP 351 can be locked so that configuration using the front panel is not possible (see **Front Panel Lockout (Executive Modes)** on page 44).

J **I/O display** – A stack of four green LEDs that correspond to the four digital I/O connections on the rear panel (see **figure 3** on page 12). Each LED indicates the on or off status of the corresponding ports which can be configured as digital input or digital output (see **About the FlexOS App - Digital I/O Configurator** on page 87).

Layout Presets

Layout presets define which inputs are selected and where they are placed on the output screen. There are 12 preconfigured and 4 user presets for custom layout configurations.

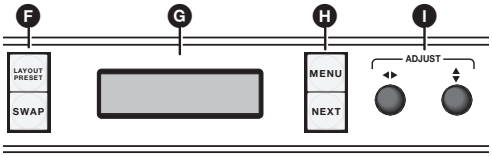


Figure 10. Front Panel Layout Preset and Swap (F)

The two input channels, A and B, are determined by direct selection from the front panel.

To select 1 of the 12 preconfigured layout presets:

1. Select input 1 or 2 for channel A and input 3, 4, or 5 for channel B (see **Front Panel Features** on page 18).
2. Press **LAYOUT PRESET** (F) to open the menu on the front panel display (G).
3. Use either **ADJUST** knob (I) to cycle through the presets. When the desired layout name appears on the output display, stop.

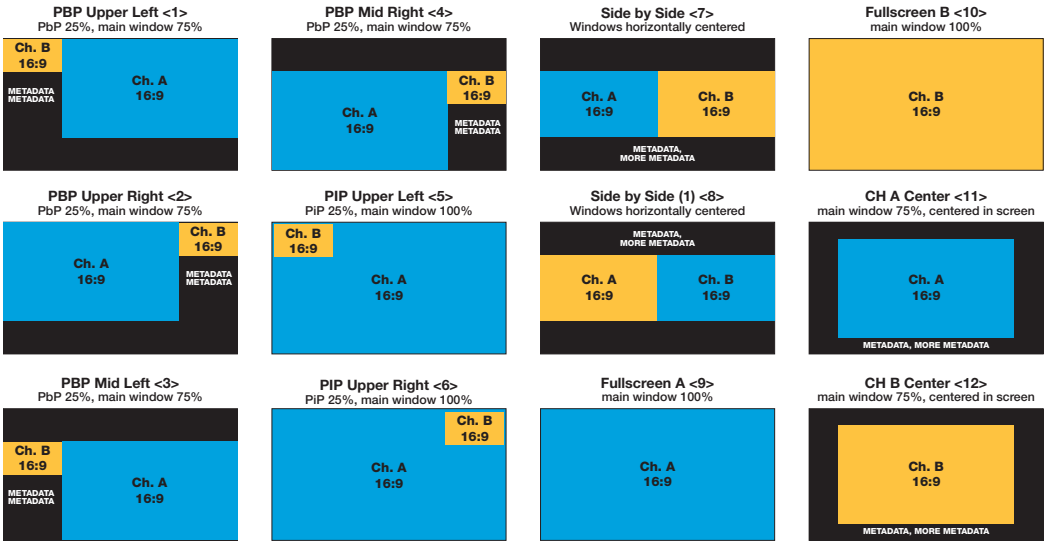


Figure 11. Layout Presets

NOTE: **PBP** = Picture Beside Picture
PIP = Picture In Picture

4. Press **NEXT** (H) to select the layout.
5. If desired, press **SWAP** to reverse the screen position of the A and B input selections.

To store a custom layout configuration:

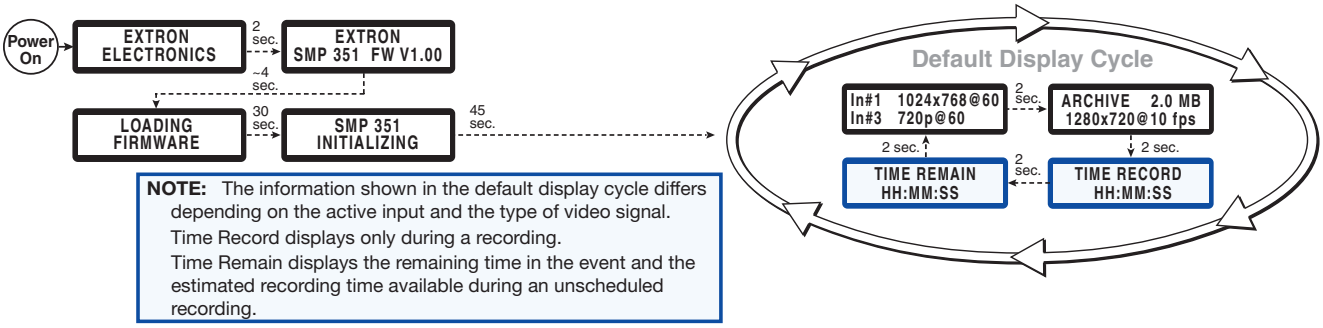
1. Select the layout from the above configurations closest to your requirements.
2. Change the window size and centering adjustments for each input to modify the layout as needed (see **Picture Control Menu** on page 27),
3. Press and hold **LAYOUT PRESET** for 3 seconds to enter the save layout menu.
4. User either **ADJUST** knob to select the desired preset location to store the new layout.
5. Press **NEXT** to save the new layout.

NOTE: In order to preserve the aspect ratios of the windows, some layouts can have slightly different spacing at lower resolutions. It is recommended to save custom layouts at the resolution at which they will be recalled.

SMP 351 Power Up Procedure

NOTE: Before powering the SMP 351, ensure that all necessary devices are connected properly. Devices do not need to be powered.

Connect the power cord to a 100 to 240 VAC supply (see **Power Connection** on page 13). The unit undergoes self testing during the boot sequence (see figure 12). After the sequence is complete (and when the device is not being configured or has an active alarm), the default display cycle is on the LCD display.



NOTE: The information shown in the default display cycle differs depending on the active input and the type of video signal.
Time Record displays only during a recording.
Time Remain displays the remaining time in the event and the estimated recording time available during an unscheduled recording.

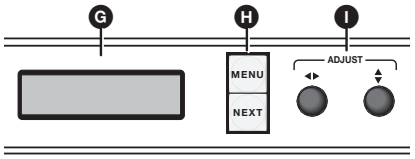
Figure 12. Boot Sequence and Default Display Cycle

The default display cycle varies depending on the input video signal and output stream selection. It shows the selected inputs and their resolutions, stream bit rate, and output resolution. During recording, the current length of the recording and time remaining are added to the default cycle.

Front Panel Menu Operation

Configuration and adjustments can be performed using the embedded Web pages (see **Web-Based User Interface** on page 47), the SIS commands (see **Remote Communication and Control** on page 88), or using the front panel controls and the menus displayed on the LCD screen. These menus are used primarily during the initial set up.

Menu Navigation

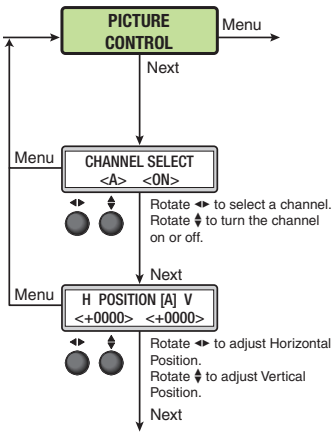


Menu display (G) — Displays the configuration menus on a 16x2 LCD display.

MENU button (H) — Press **MENU** to activate menus and cycle through the main menus.

NEXT button (H) — Press **NEXT** to move between the submenus of the selected main menu.

ADJUST (◄►,▲▼) knobs (I) — In configuration mode, rotate the left (◄►) control and right (▲▼) control to scroll through submenu options and to make configuration selections. See the flowcharts in this chapter for details.



Menu Overview

After start-up, when no adjustments are actively being made, the Default Display Cycle (see figure 13) runs on the LCD (G on the previous page). The screen progressively cycles through the input and output format information, showing the number and video format of the active input and the current output resolution.

NOTE: If a signal is not present on the currently selected input, `NO SIGNAL` appears in place of the input type. For example, `IN#4 NO SIGNAL`.

If there is an active recording, `TIME RECORD` displays the current length of the recording. `TIME REMAIN` shows the time remaining for an active scheduled recording.

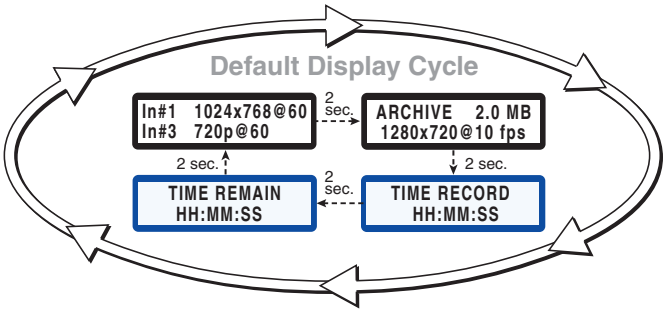


Figure 13. Default Display Cycle

Press the **MENU** button once to bring up the first main (top level) menu, as shown below. Each successive **MENU** button press cycles to the next main menu.

NOTE: From any menu or submenu, after 20 seconds of inactivity, the SMP 351 times-out to the default display cycle.

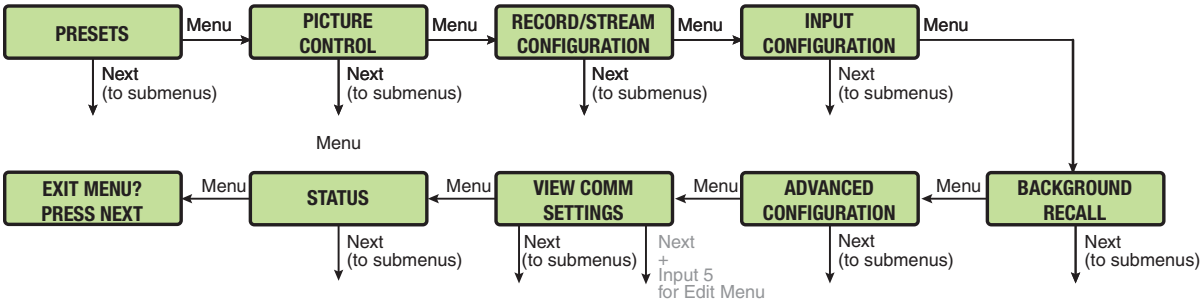


Figure 14. Top Level Menus

The flowchart above provides an overview of the menu system.

The top level menus are displayed one at a time, in order, on the LCD panel by pressing the **MENU** front panel button.

To return to the default cycle from a top level menu or submenu, press **MENU** repeatedly until **EXIT MENU?** appears, then press **NEXT**. Alternatively, the menu times out after 20 seconds of inactivity and returns to the default cycle.

Press **NEXT** when a menu displays to access its submenu. Within the submenu, press **MENU** to exit the submenu and return to the currently active menu or press **NEXT** to move to the next submenu.

Submenu details with configuration and options for each setting Fare on the following pages. A complete schematic of the menus and submenus is in the reference section (see **Front Panel Menu Diagrams** on page 138).

Presets Menu

The presets menu allows the user to save or recall encoder and user presets.

From the default menu, press **MENU** to cycle to the `Presets` menu.

Press **NEXT** to enter the submenus.

Press **NEXT** to advance to the relevant submenu: `Recall` or `Save`.

Within the submenu, use the **ADJUST** controls to select the preset, then press **NEXT** to recall or save the selection.

Press **MENU** to exit the submenu.

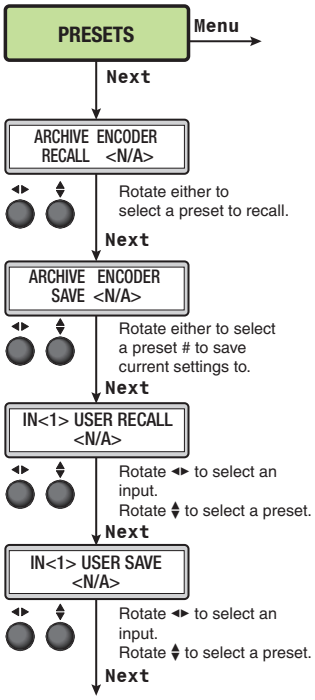


Figure 15. Presets Menu

Encoder presets

Encoder presets allow users to quickly switch between various encoder profiles for different resolution and bit rates. There are 16 encoder presets for different streaming and recording applications.

Encoder presets save the following parameters:

ENCODER PRESETS	
Video Resolution	Audio bit rate
Video bit rate	Audio Delay
Frame Rate	Record Mode
bit rate Control	GOP Length
Profile type	Preset Name
Profile Level	

Default encoder presets

The first nine encoder presets are predefined.

Preset 3 is the default value for the Archive Encoder.

Preset 9 is the default value for the Confidence Encoder.

Preset #	Preset Name	Resolution	Video Bit Rate (kbps)	Frame Rate (fps)	Audio Bit Rate (kbps)	Bit Rate Control	GOP Length	H.264 Profile	H.264 Level
1	1080p High	1920x1080	8000	30	320	VBR	30	High	4.1
2	1080p Low	1920x1080	6000	15	128	CVBR	30	Main	3.1
*3	720p High	1280x720	5000	30	192	VBR	30	High	3.1
4	720p Low	1280x720	3000	15	128	CVBR	30	Main	3.1
5	480p High	848x480	2500	30	128	VBR	30	High	3.1
6	480p Low	848x480	1500	15	80	CVBR	30	Main	3.1
7	VGA High	1280x1024	3500	30	128	VBR	30	High	4.1
8	VGA Low	1024x768	2500	15	128	VBR	30	High	3.1
9	Confidence	512x288	350	15	*	VBR	15	Base	3.0
10	User Defined								
11	User Defined								
12	User Defined								
13	User Defined								
14	User Defined								
15	User Defined								
16	User Defined								

NOTES:

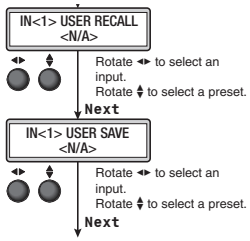
- * Audio settings are determined by the encoding for the primary recording or stream. Audio for confidence monitoring is not re-encoded. Therefore, by default, the recording uses encoder preset 3, and the audio bit rate is 192 kbps.
- Default record mode is video and audio.
- The predefined encoder presets can be modified by the user. If necessary, a factory reset returns all changes to the above table values.

User presets

User presets save current settings or recall previously saved configurations for the selected input. User presets can be saved on one input rate and recalled on a different input rate. There are 16 user presets per input.

User presets save the following parameters (per input):

- Color
- Tint
- Contrast
- Preset name
- Aspect ratio
- Brightness



To save a user preset from the front panel:

1. From the `Picture Control` menu, configure the selected input as desired (see **Input Configuration Menu** on page 34).
2. Press **`MENU`** to cycle through the main menus to the `Presets` menu.

3. Press **NEXT** to cycle to the `User Save` submenu.
4. Rotate the left (◄►) **ADJUST** knob to select the input.

   NOTE: Only the selected front panel channel A and the selected channel B inputs are available.

5. Use the right (▲▼) **ADJUST** knob to select one of the 16 user presets.
6. Press **NEXT** to save the new preset values.

Each input has sixteen user preset locations available. A configuration can be saved to any preset number using this menu, the embedded Web pages, or via SIS. Select **N/A** and press **NEXT** to exit without saving settings.

To recall a user preset from the front panel:

1. Press **MENU** to cycle through the main menus to the `Presets` menu.
2. Press **NEXT** to cycle to the `User Recall` submenu.
3. Rotate the left (◄►) **ADJUST** knob to select the input.

   NOTE: Only the selected front panel channel A and the selected channel B inputs are available.

4. Use the left (▲▼) **ADJUST** knob to select one of the sixteen user presets.
5. Press **NEXT** to select the new preset for the input.

Each input has 16 user presets recalled using this menu, the Web pages, or via SIS. Select N/A and press **NEXT** to exit without applying the user preset settings.

Picture Control Menu

The `Picture Control` menu includes all picture settings such as color, tint, brightness, and contrast. It allows the user to adjust horizontal and vertical window positioning along with horizontal and vertical window size for the selected input (see **Layout Presets** on page 21).

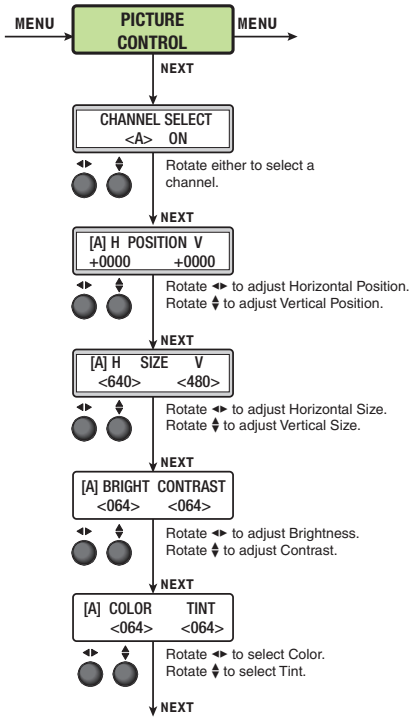
From the `Picture Control` menu, press **`NEXT`** to move to the desired submenu.

In full screen mode, only channel A or only channel B is displayed. If both channels are active, use the `Channel Select` submenu and either adjustment control to select between channel A and B. The submenu displays the status of the selected window.

Within the submenu, use the **ADJUST** knobs to select and change values as required.

Press **`MENU`** to exit the submenu.

The `Channel Select` submenu is available for all inputs. Subsequent picture control submenus are available depending on the input selection (see the following table).



	Range	YUVp/ HDTV	YUVi	Composite Video	HDMI
Position	*	X	X	X	X
Size	`Vert:64` to `4Ø96` `Horz:12Ø` to `4Ø96`	X	X	X	X
Brightness	`Ø` to `127`	X	X	X	X
Contrast	`Ø` to `127`	X	X	X	X
Color	`Ø` to `127`		X	X	
Tint	`Ø` to `127`			NTSC Only	

NOTES:

- * The position range depends on the selected resolution.
- X indicates applicable picture controls for the input type.
- The position and size values are for archive endoding.

Channel select

This submenu selects the input channel for the remainder of the submenus.

Rotate either **ADJUST** knob to select channel A and channel B

Picture position

This submenu sets the horizontal (H) and vertical (V) position of the active video for the selected channel. The maximum value depends on the archive encoder resolution. The range is dynamically adjusted to ensure t least 32x32 pixels of the window stays on the screen. A small window (for example, 300 pixels wide) cannot go far into the negative (in this case it is limited to -268 pixels).

To use the `Picture Position` submenu:

- Rotate the left (◄►) **ADJUST** knob to change the horizontal position of the video for the selected input. The selected value relates to the left edge of the active video. The default is `ØØØØ`.
- Rotate the right (▲▼) **ADJUST** knob to change the vertical position of the video for the selected input. The selected value relates to the top edge of the active video. The default is `ØØØØ`.

Picture size

The `Size` submenu is used to set the horizontal and vertical size of the active video for the selected input.

To use this submenu:

- Rotate the left (◄►) **ADJUST** knob to change the horizontal size of the video for the selected input. The range of settings is dependent on the output resolution.
- Rotate the right (▲▼) **ADJUST** knob to change the vertical size of the video for the selected input. The range of settings is dependent on the output resolution.

Bright and contrast

This submenu is used to adjust the brightness and contrast of the active video for the selected input.

To use this submenu:

- Rotate the left (◄►) **ADJUST** knob to change the brightness of the video for the selected input. The range of settings is `ØØØ` to `127`. The default is `Ø64`.
- Rotate the right (▲▼) **ADJUST** knob to change the contrast of the video for the selected input. The range of settings is `ØØØ` to `127`. The default is `Ø64`.

Color and tint

This submenu is used to adjust the color and tint of the active video for the selected input.

NOTES:

- The color adjustment is only available for composite and YUVi video signal inputs.
- The tint adjustment is only available for composite NTSC video signal inputs. Tint is not available for PAL video signal inputs.

To use this submenu:

- Rotate the left (◄►) **ADJUST** knob to adjust the color of the video for the selected input. When this configuration option is set to `Ø`, colors appear as shades of gray. The range of settings is `ØØØ` to `127`. The default is `Ø64`.
- Rotate the right (▲▼) **ADJUST** knob to adjust the tint (appearance of colors) of the video for the selected input. The range of settings is `ØØØ` to `127`. The default is `Ø64`.

Record and Stream Configuration Menu

This menu allows the user to configure the archive (recording) and confidence encodes.

Use either **ADJUST** knob to change the selections. Press **NEXT** to enter changes and move to the next submenu. Press **MENU** to enter changes and return to the main menu.

The flow chart on the right shows all possible submenus for the RECORD/STREAM CONFIGURATION menu. Subsequent submenus are hidden or displayed depending on previous submenu selections (see the image at right).

Encoder select menu

This submenu determines the purpose of the encoded stream. The subsequent encoder configuration submenus are dependent this setting. Select one of the following:

- **Archive** – Provides the highest quality stream but uses the most bandwidth and resources. The settings also apply to the recordings.
- **Confidence** – Provides a lower quality stream, typically for confidence monitoring.

Recording mode

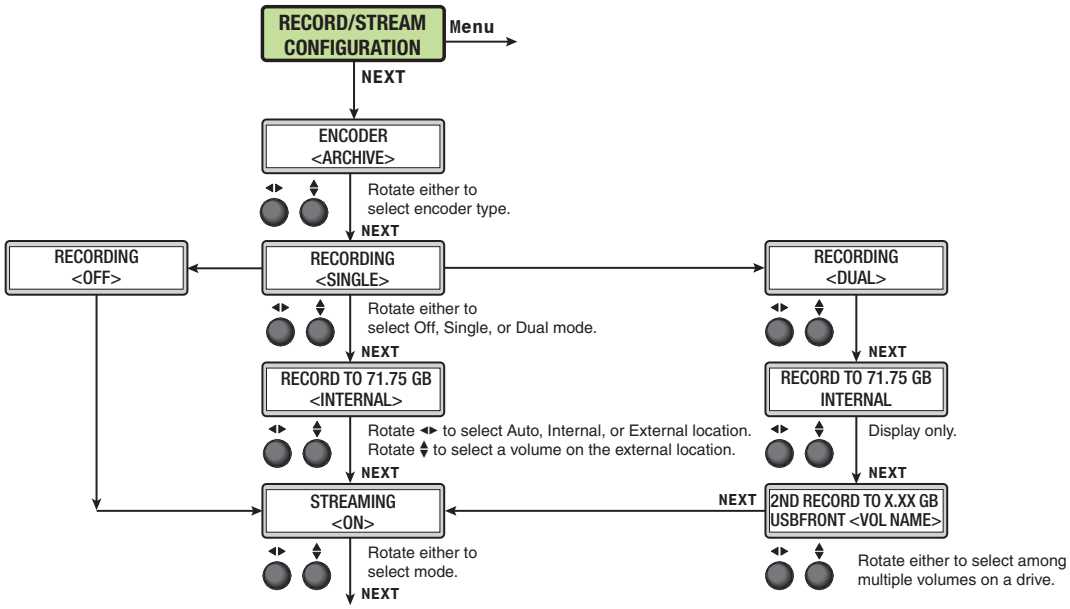


Figure 16. Recording Submenus

The `Encoder Archive` mode submenu contains options for directing the recording to a storage location. Rotate either selection knob to select:

- **Single** – The archive stream is recorded to the internal drive only (default).
- **Dual** – The archive stream is recorded to the internal drive and the drive connected to the one of the USB ports (front or rear).
- **Off** – Recording is off.

Subsequent submenus are available based on the **`Recording`** selection.

NOTE: When a USB device has more than one logical volume, each volume is enumerated. Use the right (▲▼) **ADJUST** knob to select from among the different volumes on USB front and USB rear storage devices.

ATTENTION:

- Disconnecting a USB device while recording to it may result in corrupt or lost data.
- Déconnecter un périphérique USB alors qu'un enregistrement y est effectué, peut engendrer une altération ou une perte de données.

NOTE: The SMP 351 can detect and record to USB storage devices using FAT32, VFAT long file name extensions, EXT2, EXT3, or EXT4 file systems. For compatibity with FAT32, file sizes must be limited to 3.8 GB

Record To (Single)

The `Record To` submenu selects the drive the input is recorded to.

`Auto` – The SMP 351 automatically selects a record destination from connected devices and internal storage depending on the available space of each destination.

`Internal` – Selects the internal drive and displays the available drive space.

`External` – Selects the drive connected to the front panel USB port and displays the available drive space. If there is no drive connected, the submenu is skipped.

When **External** is active, rotate the left (◄►) **ADJUST** knob to select from the following:

- **<INTERNAL>** (default) – The internal storage memory and capacity (*xxx.xx* GB)
- **<USBFRONT [*VOLNAME*]>** – An external drive connected to the front panel USB port.
- **<USBREAR [*VOLNAME*]>** – An external drive connected to the rear panel USB port.
- **<AUTO>** – The SMP 351 automatically selects a record destination from connected devices and internal storage.

Auto mode uses a hiearchy to choose from attached devices and internal memory.

Device Present		Record Location
USB Front	USB Rear	
No	No	Record to internal memory storage.
Yes	No	Record to USB Front. If USB Front is full, record to internal.
No	Yes	Record to USB Rear. If USB Rear is full, record to internal.
Yes	Yes	Record to USB front. If USB Front is full, record to USB rear. If USB rear is full, record to internal.

NOTE: In auto mode, when a physical device has more than one logical volume, the volume with the most free space is used to store content (see step 3 of **Start an Ad Hoc Recording** on page 56).

Record To (Dual)

The **Record To** submenu selects the drive the input records to. Selecting **Dual** assumes there is a USB drive connected. The input is always recorded to both the internal and external drives.

Internal – Displays the available drive space for the internal drive.

External – Displays the available drive space of the connected USB drive. If no drive is currently connected, the drive space will be **N/A**.

When **External** is active, rotate the left (◄►) **ADJUST** knob to select from the following:

- **<USBFRONT [*VOLNAME*]>** – An external drive connected to the front panel USB port.
- **<USBREAR [*VOLNAME*]>** – An external drive connected to the rear panel USB port.

Streaming

Streaming is available in both archive and confidence encodes. Streaming can be **ON** (enabled) or **OFF**. When streaming is enabled, the **STREAM METHOD**, **STREAM PROTOCOL**, and **MULTICAST** or **DESTINATION IP** submenus are available. The appropriate submenus are displayed depending on the previous submenu selection.

In the menus and submenus **MULTI** refers to a multicast protocol and **UNI** refers to unicast.

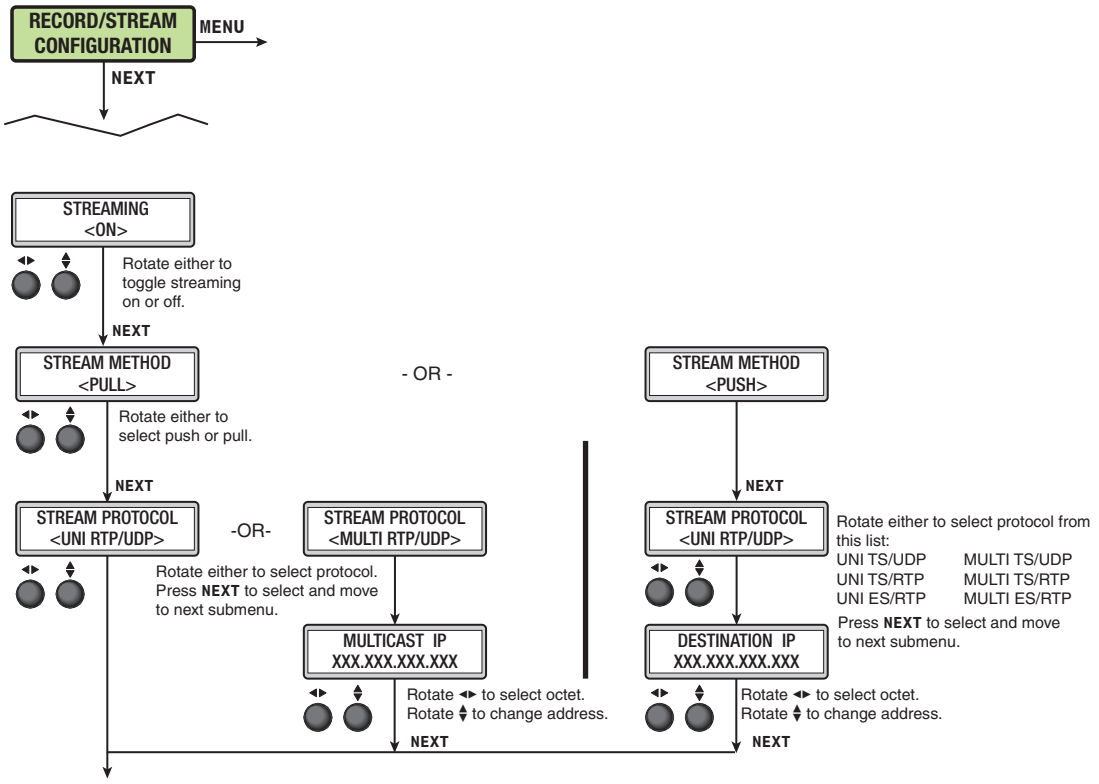


Figure 17. Streaming Submenus

The following submenus appear only when the encoder selection is **ARCHIVE**. Confidence encodes have independent stream settings.

Stream Method

Rotate either **ADJUST** knob to select a stream method: **PULL** (default) or **PUSH**.

Stream Protocol

The available stream protocol follows push or pull streaming.

When **PULL** streaming is selected, the user can choose between **UNI RTP/UDP** (default) and **MULTI RTP/UDP**.

When **PUSH** streaming is selected, the user can pick one of six options: **UNI TS/UDP** (default), **UNI TS/RTP**, **UNI ES/RTP**, **MULTI TS/UDP**, **MULTI TS/RTP** and **MULTI ES/RTP**.

Multicast IP for pull multicast

When a multicast protocol is selected, the **MULTICAST IP** address must be entered. Check with the IT department for the correct multicast IP address for your network.

Enter the **MULTICAST IP** address:

Rotate the left (◄►) **ADJUST** knob to select the octet.

Rotate the right (▲▼) **ADJUST** knob to change the address.

Destination IP for push streaming

When push streaming is selected, the **DESTINATION IP** address must be entered.

Enter the **DESTINATION IP** address:

Rotate the left (◄►) **ADJUST** knob to select the octet.

Rotate the right (▲▼) **ADJUST** knob to change the address.

NOTE: The destination can also be configured to a local hostname or fully qualified domain name using the Web-based User Interface. See the Help file for details.

Output mode

When the **Archive** encoder is selected, an option is provided to output audio and video or video only.

Rotate either **ADJUST** knob to select a stream method: **PULL** (default) or **PUSH**.

Resolution

Archive and confidence encoders have independent resolution settings.

The selections are:

- **Custom**
- **512x288**
- **848x480**
- **1024x768**
- **1280x720** (default)
- **1280x1024**
- **1920x1080**

There are two types of encoders - Archive/Record and Confidence.

	Output Rate	Aspect	Format Name	Max FPS
1	848x480	16:9	480p	30
2	1280x720	16:9	720p	30
3	1920x1080	16:9	1080p	30
4	1024x768	4:3	XGA	30
5	1280x1024	5:4	SXGA	30
6	512x288	16:9	WCIF	30

Recording resolution defaults to 1280x720.

NOTES:

- If the archive and confidence aspect ratios do not match, the source material can appear stretched on the confidence stream.
- A custom rate is defined with the Web-based UI.
- The confidence encode cannot have a higher resolution than the archive encode.

Frame Rate (video)

Archive and confidence encodes have independent frame rate settings. This menu provides a frame rate selection (frames per second) from the following list:

- **30** (default)
- **25**
- **24**
- **15**
- **12.5**
- **12**
- **10**
- **5**

Frame rates are selected separately for the archive and confidence encoder configurations.

Bit Rate (Video)

Archive and confidence encodes have independent video bit rate settings. **Video** (**VID**) bit rate sets a target video bit rate from **200** kbps to **10000** kbps (default **5000** kbps).

Rotate the left (◄►) **ADJUST** knob to select the video bit rate.

Bit Rate (Audio)

Archive and confidence encodes have independent audio bit rate settings. **Audio** (**AUD**) bit rate allows the user to select an audio bit rate in kbps from the following selections:

- **80**
- **96**
- **128**
- **192** (default)
- **256**
- **320**

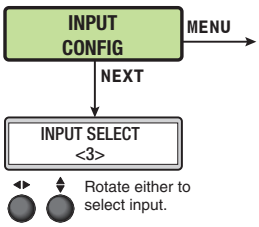
Rotate the right (▲▼) **ADJUST** knob to select an audio bit rate.

Input Configuration Menu

This menu allows the user to configure each of the five inputs.

NOTE: The **Input Configuration** submenus are input specific. Depending on the input type, not all submenus (shown in gray on subsequent pages) are available.

From the **Input Config** menu, press **NEXT** to enter the submenu (see image at right).

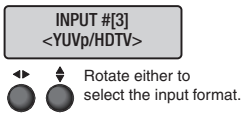


Input Select

The first submenu is the input selection (see image at right). Rotate either **ADJUST** knob to select the desired input number from the active front panel input selections for further configuration. This selection determines the subsequent submenus that are visible.

Input format

The next submenu selects the input signal format (see image at right).



INPUT #1	INPUT #2	INPUT 3	INPUT 4	**INPUT 5
*HDMI/DVI	*HDMI/DVI	*YUVp/HDTV	*HDMI/DVI	*Auto-SDI
		YUVi		3G-SDI
		Composite		HD-SDI
				SDI

*Default
**Input 5 requires an optional 3G/HD/SDI input card.

NOTE: When there is no active input, the input parameters show "N/A". For digital inputs, H/V start, H/V active, total pixel and phase submenus do not apply.

Film detection (interlaced input formats only)

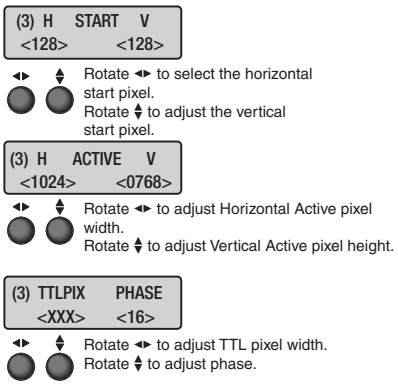
Film detection is automatically enabled when an interlaced input format is selected (see Input format above). Film detection supports 2:2 and 3:2 detection. The processing maximizes image detail and sharpness for interlaced sources that originated from film. Film detection is valid for any interlaced input type. The SMP 351 de-interlaces NTSC, PAL, and 1080i inputs.

If PIP mode and film detection are on for both inputs, the priority is given to the interlace input. If both inputs are interlaced, priority is first to the larger window size, or to the main window.

Film detection mode cannot be disabled and has no user adjustments.

Signal sampling configuration

Signal sampling optimizes the input signal for the currently selected input. The signal sampling settings are only available for analog inputs.



- H START (horizontal start) and V START (vertical start) — This submenu is used to set the horizontal and vertical start positions of the active video for the selected input.

  To use this submenu:

  Rotate the left (◄►) **ADJUST** knob to change the horizontal start pixel position (left edge) of the active video for the selected input. The default is 128.

  Rotate the right (▲▼) **ADJUST** knob to change the vertical start line position (top edge) of the active video for the selected input. The default is 128.

- H ACTIVE (horizontal active pixels) and V ACTIVE (vertical active lines) — This submenu is used to set the horizontal active pixels and vertical active lines of the active video for the selected input.

  To use this submenu:

  Rotate the left (◄►) **ADJUST** knob to change the width (in pixels) of the active video for the selected input.

  Rotate the right (▲▼) **ADJUST** knob to change the height (in lines) of the active video for the selected input.

- TTLPIX (total pixels) and PHASE (pixel phase) — This submenu is used to set the total pixels and pixel phase of the active video for the selected input.

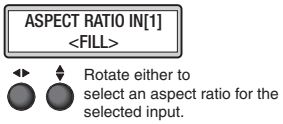
  To use this submenu:

  Rotate the left (◄►) **ADJUST** knob to change the width (in pixels) of the total display area to be sampled for the selected input.

  Rotate the right (▲▼) **ADJUST** knob to move the pixel sampling point for the selected input. The range of settings is ØØØ to Ø63. The default is Ø32.

Aspect Ratio

The `Aspect Ratio` adjustment allows the user to select between input rates to fill the entire window for that channel (**`FILL`**), scale up to fit the channel 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`**).



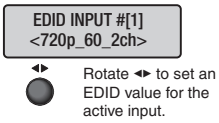
The aspect ratio can be changed per input. The selected input is displayed in the first line. Rotate either **`ADJUST`** knob to select **`FOLLOW`**, **`FILL`** (default), and **`FIT`** for the selected input.

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 or recording. Letter box or pillar bars can be applied based on the horizontal and vertical size settings (see **Picture Control Menu** on page 27).
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 letterboxing or adding pillars. Some loss of image occurs represented by the dimmed image outside the red block.
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 or recording with some distortion of the input (default)

NOTE: The selected input aspect ratio setting is applied to both the archive and confidence outputs. If the confidence resolution is different, the applied aspect ratio can not be maintained. For example, if the archive resolution is 1080p with an aspect ratio of 16:9, and the confidence display is 1024x768 with an aspect ratio of 4:3, the input aspect ratio selection can not be maintained for both.

EDID on HDMI connectors

EDID emulation is available on HDMI inputs 1, 2 and 4. By default, all three custom EDIDs are set to 720p @ 60 Hz, 2-channel audio. The selected input is displayed in the first line. Rotate either **ADJUST** knob to select the desired EDID from the following table.



EDID	Resolution	Refresh Rate	Rate Type	Video Format	Audio
1	800x600	60 Hz	PC	DVI	N/A
2	1024x768	60 Hz	PC	DVI	N/A
3	1280x720	60 Hz	PC	DVI	N/A
4	1280x768	60 Hz	PC	DVI	N/A
5	1280x800	60 Hz	PC	DVI	N/A
6	1280x1024	60 Hz	PC	DVI	N/A
7	1360x768	60 Hz	PC	DVI	N/A
8	1366x768	60 Hz	PC	DVI	N/A
9	1400x1050	60 Hz	PC	DVI	N/A
10	1440x900	60 Hz	PC	DVI	N/A
11	1600x900	60 Hz	PC	DVI	N/A
12	1600x1200	60 Hz	PC	DVI	N/A
13	1680x1050	60 Hz	PC	DVI	N/A
14	1920x1080	60 Hz	PC	DVI	N/A
15	1920x1200	60 Hz	PC	DVI	N/A
16	800x600	60 Hz	PC	HDMI	2-Ch
17	1024x768	60 Hz	PC	HDMI	2-Ch
18	1280x768	60 Hz	PC	HDMI	2-Ch
19	1280x800	60 Hz	PC	HDMI	2-Ch
20	1280x1024	60 Hz	PC	HDMI	2-Ch
21	1360x768	60 Hz	PC	HDMI	2-Ch
22	1366x768	60 Hz	PC	HDMI	2-Ch
23	1400x1050	60 Hz	PC	HDMI	2-Ch
24	1440x900	60 Hz	PC	HDMI	2-Ch
25	1600x900	60 Hz	PC	HDMI	2-Ch
26	1600x1200	60 Hz	PC	HDMI	2-Ch
27	1680x1050	60 Hz	PC	HDMI	2-Ch
28	1920x1200	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				

Audio Select

Each of the inputs has a corresponding input audio format selection. The selected input is displayed in the first line.

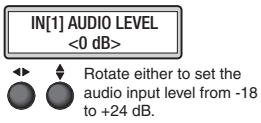
For HDMI inputs 1, 2, and 4, the audio format can be:

- **LPCM 2CH** — for embedded digital audio (default)
- **ANALOG AUDIO** — for analog audio from the rear panel captive screw connections
- **OFF** — for no audio

For analog video input 3 and optional SDI input 5, the audio format can be:

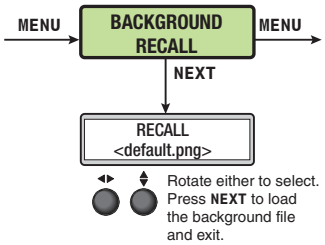
- **ANALOG AUDIO** — for analog audio from the rear panel captive screw connections (default)
- **OFF** — for no audio

Audio level



Each audio input channel can be adjusted from **-18 dB** to **+24 dB**. The default value is **Ø dB**. The selected input is displayed in the first line.

Background Recall Menu



A background can be selected to record with the channel A and B inputs. Background files must be in PNG format and uploaded to the `Background` folder of the SMP 351 using the embedded Web pages or an SFTP client.

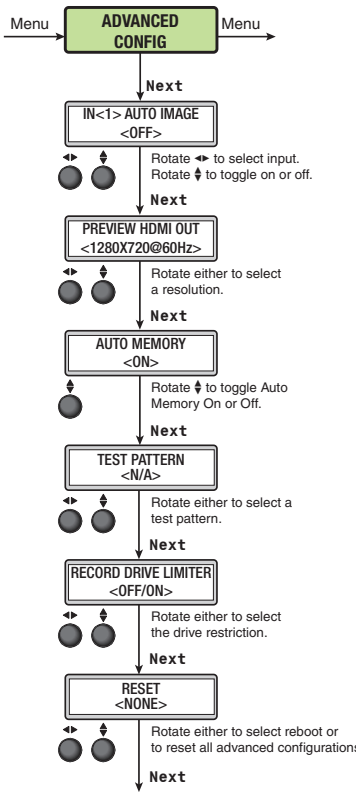
Use either knob to scroll through available files. Press **NEXT** to apply the background to the current layout. If the file is smaller than the selected output resolution, the background displays from the top left corner. If the file resolution is larger, the background is cropped to fit the selected resolution.

Advanced Configuration Menu

The following flowchart provides an overview of the `Advanced Configuration` menu. Options include Auto-Image (on or off), Auto Memory (on or off), HDMI preview out resolution, test patterns, record drive location limiter, device reboot, and factory reset to defaults.

Auto-Image

This mode is selectable per input and is used where a variety of input sources are likely to be encountered. Auto-Image automatically sizes and positions an incoming video signal to fill the channel window when a new input signal is detected. When Auto Memory is off, Auto-Image executes regardless of whether the same input frequency has been detected before.



NOTE: Enabling Auto-Image when overscan is also enabled recalls the default sampling settings for the detected input rate.

Use the left (◄►) **ADJUST** knob to select the desired input. The right (▲▼) **ADJUST** knob toggles Auto-Image on or off (default).

When enabled and a new input frequency is detected, an existing Auto Memory for the signal (if **AUTO MEMORY** is enabled) is applied. If no entry exists, an automatic Auto-Image is applied to the new signal. This sizes and positions the incoming video signal to display properly within the channel window, with respect to the current aspect ratio setting.

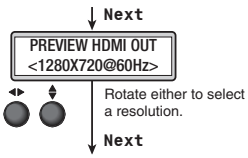
The value is global to all analog inputs on the SMP 351 and defines the minimum luminosity that the Auto-Image routine defines as active video (default: 25%).

Auto-Image affects active pixel, active lines, H/V start, and phase configurations. All other picture controls remain unchanged. If the aspect ratio is set to Fill, H/V position returns to 0, 0 and the H/V size is set to match the current output rate. Input sampling settings are updated according to standard Auto-Image operation. If the aspect ratio is set to Follow or Fit, the H/V position and H/V size are set to maintain the native aspect ratio of the input in respect to the current output resolution. All input sampling settings are updated according to standard Auto-Image operation. Image size and position are reset to default values after auto imaging.

Press **NEXT** to select the input value and move to the next submenu.

NOTE: Aside from the standard Auto-Image SIS command, there are unique commands to Auto-Image to fill the output and maintain input aspect ratio (see **Auto-Image and Memory** on page 103).

Preview HDMI output

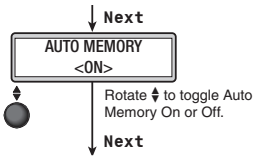


Use either front panel **ADJUST** knob to select the refresh rate of the `Preview HDMI Output`. It can be either **`5ØHz`** or **`6ØHz`** (default). The resolution follows the archive output and cannot be changed.

Press **NEXT** to select the value and move to the next submenu.

NOTE: When the selected archive resolution is under 720 lines (for example, if the archive encoder is set as 848x480 or 512x288) the HDMI preview output is set to 1280x720, with the video content centered in the 720p window.

Auto Memory



`Auto Memory` is enabled on all inputs by default. It should only be disabled if the user desires to have a source applied to the input treated as a new source regardless of whether the source was detected previously.

When enabled and a new input frequency is detected, an existing Auto Memory for the signal (if Auto Memory is enabled) is first applied. If no entry exists, it performs an automatic Auto-Image on the new signal. This sets a size and position for the image to fill the screen, with respect to the current aspect ratio setting.

The SMP 351 has 16 global memory locations, and stores unique entries for each input format (example: YUVi versus YUV-HD). Auto Memory saves H/V start, active pixels, active lines, total pixels, phase, brightness, contrast, color, and tint settings.

The input lookup table identifies new analog inputs based on input type, total line count of the input, and H/V frequency. Auto Memory locations associate with specific entries in the input lookup table (not based solely on H/V frequency). For example the RGBHV 1024x768 @ 60 Hz input lookup table entry can only have a single associated Auto Memory.

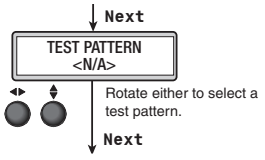
Digital inputs are automatically set up using information regarding image size and refresh provided by the digital input. This allows for non-standard rates (not found in the input lookup table) to display correctly. Digital inputs that do not match an existing lookup table are saved to Auto Memory as unique entries based on the total line count, H/V active, and vertical refresh rate.

Press **`NEXT`** to select the value and move to the next submenu.

Test Patterns

Test patterns are an essential tool for configuration and troubleshooting.

The SMP 351 offers eight different selections, applied per window: color tbars, time stamp, pulse, crop aspect ratio (1.33, 1.78, 1.85), and universal OSD patterns.



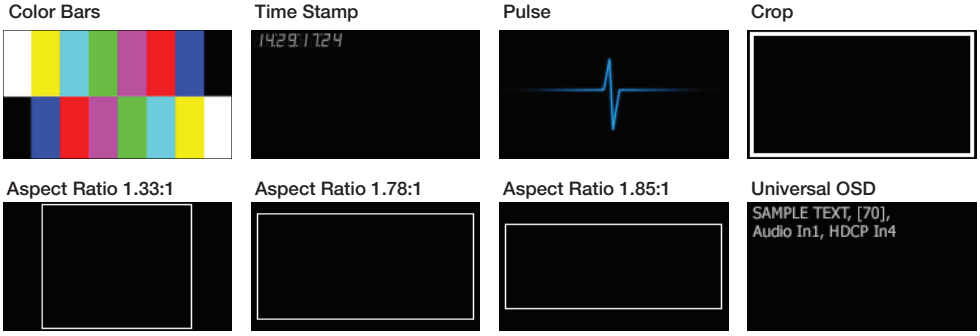


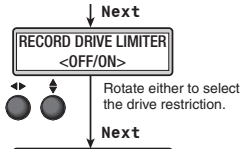
Figure 18. Test Patterns

- **Color Bars** – Standard full screen color bars overlaid on top of the current layout.
- **Time Stamp** – Displays white text in a small, translucent, gray rectangle with the unit date and time (for example: `Fri Apr 18 HH:MM:SS`) in the top left corner of the display window.
- **Pulse** – Select **`Pulse`** to output an audio pulse of 400 Hz at -10 dBu 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 a small, translucent, gray rectangle with white text overlaid atop the source video content. It appears in the upper left of the screen. The text includes brief text of your choice followed by three selectable elements separated by commas (see **Setting up the universal OSD test pattern** on page 66).

Rotate either **ADJUST** knob to scroll through the the patterns. Stop on the desired pattern and press **NEXT**. The selected test pattern is immediately output to the display. The test pattern displays until another patttern is selected, **Off** is selected from the Test Pattern drop-down list, or unit power is recycled.

Record Drive Limiter



This submenu allows the selection of record drive locations to be limited or to be fully automatic.

The following limitations can be selected:

- **OFF** (not restricted, default) – Allows recording to internal memory and any connected drives.
- **ON** – See **Record To (Dual)** on page 31.

Based on the top level selection, the **REC LOCATION** submenu under Record/Stream Config offers different record drive options.

NOTE: Recordings are saved to the designated destination only.

Reset

The Reset submenu provides a factory reset or firmware reboot. The selections are:

To Factory – Equivalent to a ZXXX command (see **Command and Response Tables** on page 96). The unit is reset to factory defaults with the current firmware.

Reboot Unit – Identical to a power cycle.

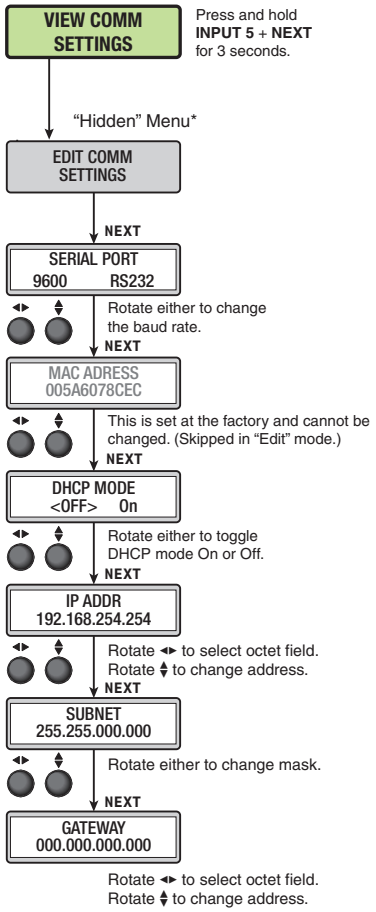
A reset or reboot confirmation message appears before the reset or reboot. Upon confirmation, the front panel LCD displays "Resetting/Rebooting Unit".

Comm Settings (View and Edit) Menu

The two `Comm Settings` menus provide a status of the current serial port and IP settings for the communications ports. A hidden menu allows changes to the settings.

The main menu defaults to the `VIEW COMM SETTINGS` submenus for viewing all communication port settings. Press **`NEXT`** to cycle through the submenu.

The `VIEW COMM SETTINGS` submenu is read-only. To make changes, press and hold **`NEXT`** and **`INPUT 5`** simultaneously for 3 seconds in the `VIEW COMM SETTINGS` menu or any of the submenus. The `VIEW COMM SETTINGS` menu changes to the `EDIT COMM SETTINGS` menu.

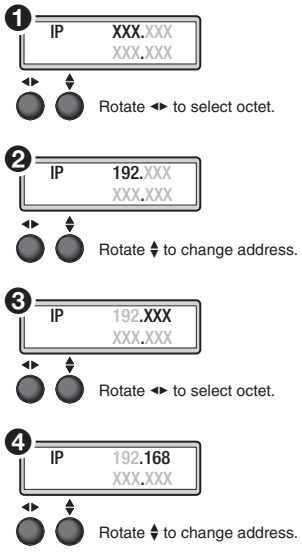


Change an address

To change the IP address, Subnet Mask address, and Gateway IP address:

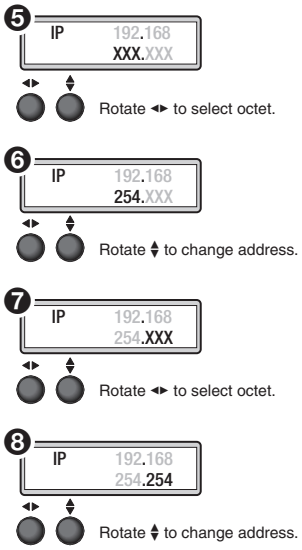
Enter the `EDIT COMM SETTINGS` menu and navigate to the desired address (IP address shown).

1. Make the octet selection with the left (◄►) **`ADJUST`** knob. The selected octet blinks (shown in **`Bold`** in the illustration at right, ❶).
2. Change the selected octet value using the right (▲▼) **`ADJUST`** knob (❷).
3. Make the next octet selection with the left (◄►) **`ADJUST`** knob. The selected octet blinks ((shown in **`Bold`** in the illustration at lower right (❸).
4. Change the selected octet value using the right (▲▼) **`ADJUST`** knob (❹).



5. Make the next octet selection with the left (◄►) **ADJUST** knob. The selected octet blinks, shown in **Bold** in the illustration at right (❺).
6. Change the selected octet value using the right (▲▼) **ADJUST** knob (❻).
7. Make the next octet selection with the left (◄►) **ADJUST** knob. The selected octet blinks, shown in **Bold** in the illustration at right (❼).
8. Change the selected octet value using the right (▲▼) **ADJUST** knob (❽).

When you are done with the changes, press **MENU** to cancel the changes and return to the EDIT COMM SETTINGS menu or **NEXT** to submit the value. The network connection restarts to reflect the changes after pressing **NEXT** from the **GATEWAY** submenu.



NOTE: The subnet mask is changed using either **ADJUST** knob.

Status Menu

The STATUS menu contains read-only submenus that show the current unit status including active alarms, recording file names, free space and total internal and external drive capacity, and bit rates for archive and confidence streams.

ALARM STATUS – Scrolls through the active alarms. If no Alarms are present, it shows "None."

ARCHIVE – This submenu displays filenames currently being written to or the last file created. If the filename is longer than sixteen characters, the filename scrolls. It shows N/A if no new or current recordings are present.

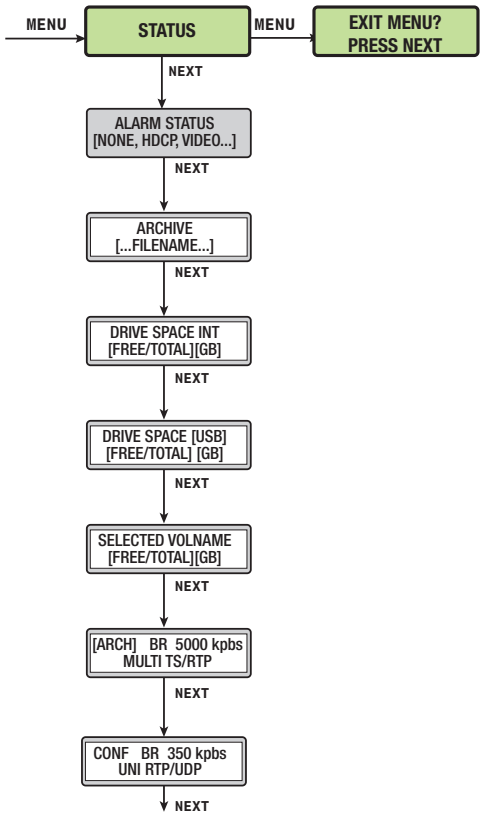
NOTE: A non-ASCII character in a filename is displayed as a white block.

DRIVE SPACE – This submenu indicates the free and total space on the internal hard drive and the selected USB drive. The capacity is shown in three digits with two decimals in either MB or GB.

SELECTED VOLUME NAME – Displays the size and free space on a connected USB drive.

OUTPUT STREAM – Displays the video bit rate and protocol of the output stream.

Press **NEXT** to return to the STATUS menu.



Exit Menu

From this submenu, press **MENU** to return to the PRESETS menu cycle, or press **NEXT** to exit the menu and return to the default cycle.

Front Panel Lockout (Executive Modes)

To prevent accidental changes to front panel menu settings, press **MENU** and **MARK** simultaneously for 3 seconds to enable front panel lockout mode.

The menu system returns to the default menu within 10 seconds.

Executive mode begins in mode 1. Rotate either **ADJUST** knob to cycle to mode 2, then mode 3, and mode 4 (Executive mode off).

When executive mode is active, all functions and adjustments can still be made via USB, RS-232, or Ethernet control (see **Remote Communication and Control** on page 88).

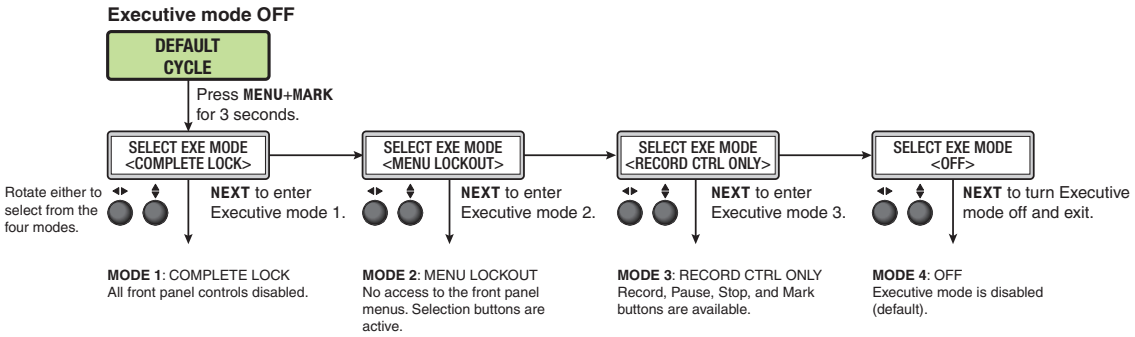


Figure 19. Front Panel Lockout (Executive Mode)

When executive mode is enabled, press **MENU** and **MARK** simultaneously to display the SELECT EXE MODE submenu. The current executive mode status is listed in this submenu.

In addition, when executive mode is enabled, the front panel button colors change corresponding to the active executive mode (see the following table).

Executive Mode	Executive Mode Description	Active Input Buttons	LAYOUT PRESET/SWAP	MENU/NEXT
1	Complete lock	Amber	Off	Off
2	Menu lockout	Amber	Amber	Off
3	Record ctrl only	Amber	Off	Off
Off	OFF (no lockout)	Amber	Amber	Amber

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

Alarms

The front panel alarms display lists alerts for events as determined in the Web page (see **Alarms** on page 84). The following table lists alarms generated by the SMP 351, 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 Alarm	The SMP generates this alarm only during a recording when either of the following conditions are met: • If audio is absent (signal is at or below -60 dBFS) before a recording starts, an alarm triggers after 5 minutes of the start of the recording. • If audio is lost during a recording, the alarm triggers after 10 seconds.	• During a recording, the audio signal is maintained above -60 dBFS for a contiguous period of 60 seconds • The current recording ends
Authentication Failures	Any combination of access interfaces (Web page, Telnet, API, SFPT, SIS via SSH) that requires authentication, there can be a maximum of 20 failed login attempts within 20 seconds on any combination of user IDs (including non-existent user IDs).	Can only be cleared by an administrator via the Web page (see **Alarms and Traps** on page 73)
CPU Usage alarm	When the device exceeds 90% utilization for 75% of a 5 minute window.	Automatically by remaining below 75% utilization for 75% for a 1 minute
Disk Error alarm	• The internal system storage volume registers one or more read or write errors that cannot be recovered. • Inability to write to the target storage (for example: a write protected drive). • The target storage volume is not found (for example: **USBFront** is selected but the SMP does not detect any external storage).	• Replace the affected USB storage • Choose a different target storage volume • Remove the write protection from the volume
Video loss alarm	• When video sync is lost during a recording for a period of 0.5 seconds that is not the result of an input change • The input is changed and video sync cannot be established within a 2 seconds limit.	Video sync is detected for about 2 seconds.
Disk space alarm	• The SMP is recording and the external USB storage volume has dropped to <10 minutes of recording time. • At the start of an event for which the target volume does not have sufficient space to record.	• For USB: Replace the affected storage with one having adequate space. • Choose an alternate target storage volume with adequate space.
HDCP video alarm	For an active input, if the signal is HDCP protected and the SMP cannot negotiate HDCP for any reason.	• The HDCP source is no longer active or is taken off the input

Alarm	Alarm Generated	Alarm Cleared
NTP Sync Loss	• If the SMP attempts to automatically sync with the configured NTP server and fails the primary and retry attempts. • If the SMP fails multiple manual sync attempts.	The NTP Sync succeeds without retries for a period of five synchronization attempts.
Recording halt alarm	When a recording is interrupted due to a system error or a power outage.	Can only be cleared by an Administrator via the Web page (see **Alarms and Traps** on page 73).
Temperature alarm	When the SMP internal temperature exceeds 60° C for 2 minutes.	When the SMP system temperature drops below 50° C.
USB overcurrent alarm (front and rear USB)	The alarm is initiated when a USB device is connected to either USB port and the current draw exceeds the 1.5 A limit of the ports.	When the offending device is removed from the SMP 351.
USB overcurrent alarm (keyboard and mouse)	The alarm is initiated when a user connects a USB device to either the keyboard or mouse USB port and the current draw exceeds the 0.5 A limit of the ports.	When the offending device is removed from the SMP 351.
Schedule server	The alarm is initiated when there is an error communicating with the scheduling server.	When the connection to the server is restored or an alternate scheduling configuration is set.

Web-Based User Interface

This section provides information about:

Overview of the Web-Based User Interface

The SMP 351 embedded Web pages provide the software user interface for operating and configuring the SMP 351 via a control PC on the same network.

NOTE: Google Chrome was used to take the SMP 351 user interface screen shots in this user guide. Pages and panels viewed in other browsers may not appear exactly the same.

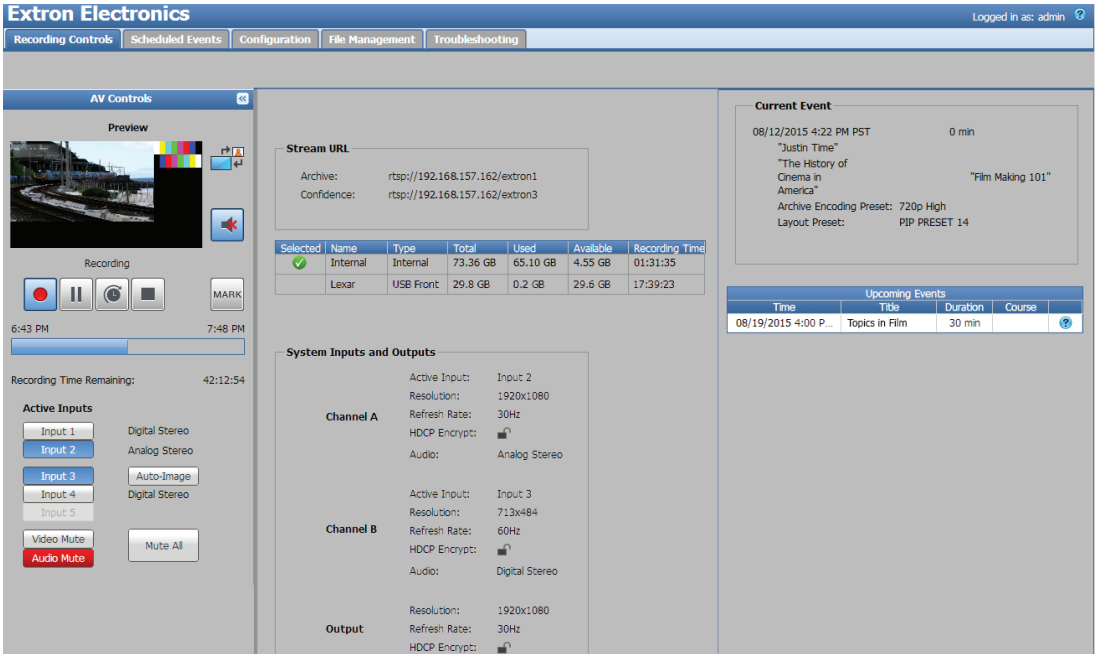


Figure 20. SMP 351 Embedded Web Pages

These Web pages provide the following features:

- Ability to fully configure the SMP 351
- Ability to import a schedule or create ad hoc recordings
- Remote control and active monitoring of the SMP 351
- A small embedded video window to view the AV content that is being recorded and streamed
- Access to upload background files to and download or transfer presentation recordings from the SMP 351
- Ability to display alarm history and allow administrators to clear active alarms
- A way to update firmware

Web Browser Requirements

In order to view the SMP 351 embedded Web pages, use one of the supported Web browsers (and versions) listed below.

- Google Chrome version 37 or higher

  NOTE: Chrome version 42 disables many plugins. For the SMP this means that the preview video in the AV Controls panel is not supported by Chrome version 42 or higher. To see a preview of the current stream you can either:

  - Use a different browser, *or*
  - Open a stand-alone, third-party video player (such as VideoLAN™ opensource VLC™ media player) and connect to the confidence stream from the SMP.

- Mozilla Firefox version 35 or higher
- Microsoft Internet Explorer version 9 or higher (for Windows operating systems)

  NOTE: If you are using Internet Explorer, compatibility mode must be turned off.

- Apple Safari version 8 or higher (for Mac OS X operating systems)

  NOTE: Apple Safari is the preferred browser for Apple- and Macintosh-based computer platforms.

Turning Off Compatibility Mode

The SMP 351 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`** check box is cleared and that the IP address of the SMP 351 is not in the list of Compatibility view sites.

Web-based User Interface Help Files

The SMP 351 Web-based user interface contains an extensive set of help files to assist with the connection, configuration, monitoring, and operation of the SMP 351. 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 or viewing device to the LAN port of the SMP 351 and open a Web browser. Enter the IP address of the SMP 351 (the default IP address is 192.168.254.254) into the browser address bar.

The main user interface opens to the **Recording Controls** page (see figure 21).

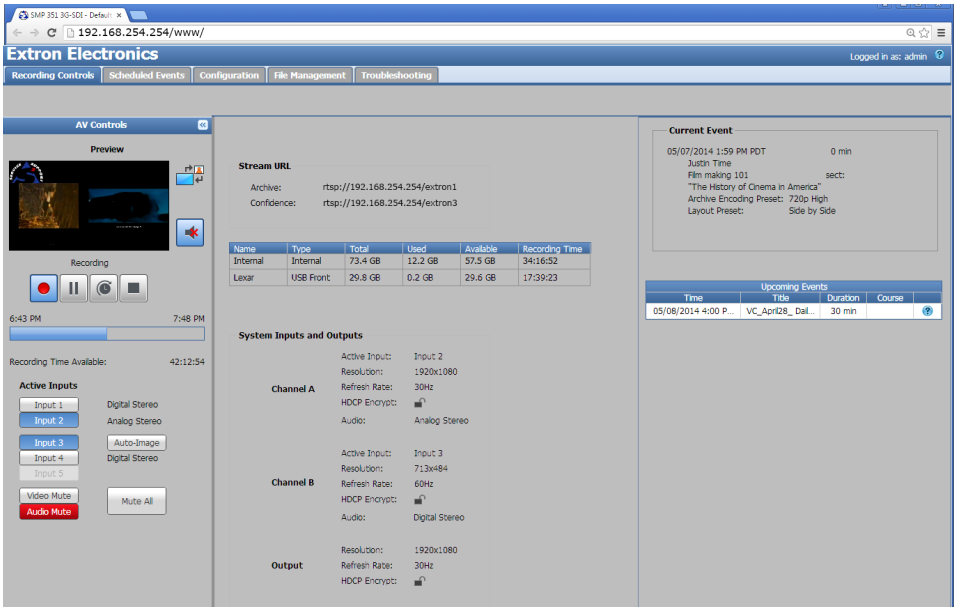


Figure 21. SMP 351 Main User Interface

Select a tab to open the desired page.

Page Overview

The SMP 351 pages are organized by function and further organized within those main functions. Click the tabs to open the pages.

Tabs

The pages in the SMP 351 are grouped within five main tabs at the top of the screen:

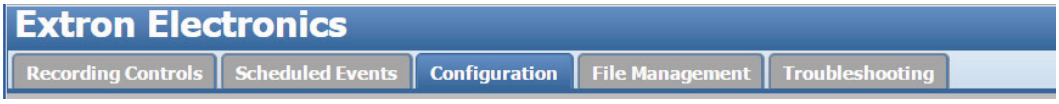


Figure 22. Five Main Function Tabs

Recording Controls (see **Recording Controls** on page 59) — This single page provides a view of the status of currently selected inputs and outputs along with details of the active recording and stream (the current event) and a table-style list of upcoming scheduled events. The URLs of the streams are also displayed on this page.

Scheduled Events (see **Scheduled Events** on page 60) — This page provides a calendar view of previous and upcoming recording events as well as scheduling and publishing configuration options.

Configuration (see **Configuration Overview** on page 63) — The nine 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 a user logged in as an administrator to configure basic AV input settings, output video test patterns for setup,

and configure output stream settings and presets. The administrator can also set up AV encoding and presets, select or configure layouts and layout presets, set passwords, set up notices and alarms, and select preview window settings. The Configuration pages also provide a way to configure basic communication, identity, time, data storage, and recording location settings, along with making it possible to update firmware or restore a configuration from a saved file.

File Management (see **File Management** on page 79) — This page provides a way to view folders and files on the internal drive and any attached external drive, and to upload background image files to the unit. It also provides a way to connect the SMP 351 to shared network drives.

Troubleshooting (see **Troubleshooting** on page 81) — The five pages within this tab display factory-defined and user-defined information about the unit and the encoded streams, display a log of events and a log of alarms and their status, provide two simple diagnostic tools for checking network connections, and provide a way to perform a variety of types of resets on the SMP 351 .

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** shown selected in figure 23).

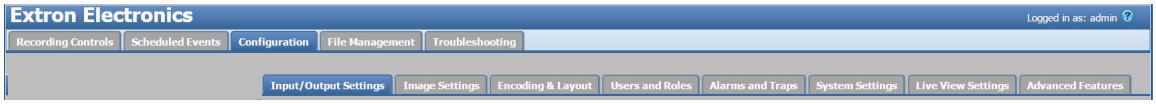


Figure 23. Pages Within Tabs (Sub-Tabs)

Panels and screen sections

Each SMP 351 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 SMP 351 Web pages include the AV **Controls** panel at the left of the screen (see **AV Controls Panel** on page 54). The **Recording Controls** page is the main page and also serves as the main operating interface. It contains one panel and three sections. Pages such as the **Systems Settings** page within the **Configuration** tab include several panes, each with a different collection of information and settings.

Collapse and expand panes

Click the **Expand** (❶) arrow button on the right side of a pane. The pane opens to a full view, or as much as possible with the current display settings.

Click the **Collapse** (❷) arrow button at the top corner of a pane to collapse it. This hides the controls and provides additional room for other panes.

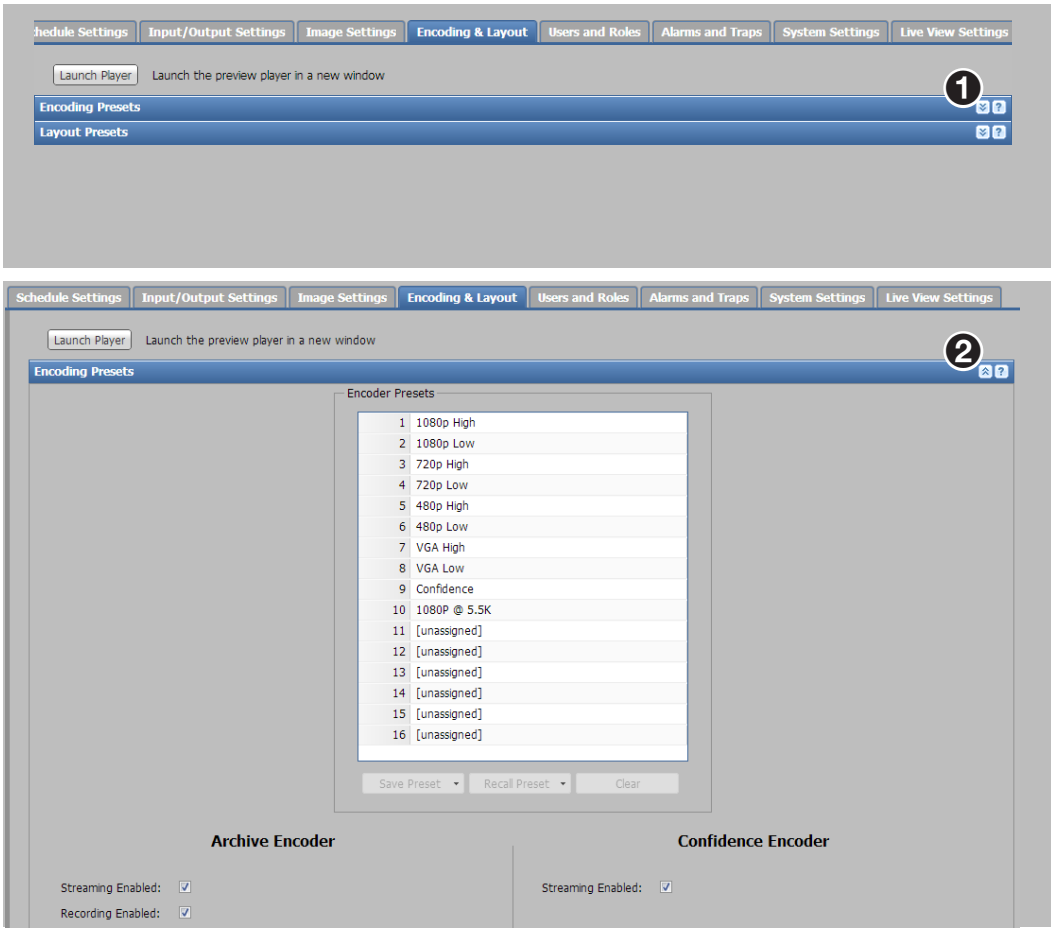


Figure 24. Collapsed and Expanded Panes

NOTE: For some pages, the last-selected view is maintained for each page within the SMP 351 Web pages. If you navigate away from one page to a different tab or page, then return to the page, the display appears as it did before you left that page.

For pages with many panes, the panes automatically collapse each time you leave and return 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 SMP 351 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:

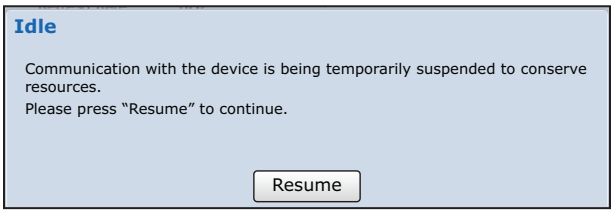


Figure 25. Communication Suspended Warning Dialog

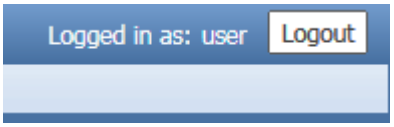
The idle status does not affect the recording or the output AV streams, which continue unaffected no matter what state (active or idle) the Web pages are in.

Click **Resume** to reconnect the Web page to the live feed from the SMP 351. In a moment, the browser refreshes the view, and the status updates and video confidence display resume.

NOTE: If the SMP 351 loses the network connection, the connection to the embedded Web pages is also lost. You may receive notice of the connection failure, but there is no specific status indication for disconnection.

Logging Out and Logging In

To change 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:



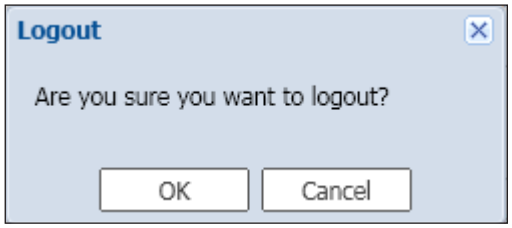
The **Logout** button appears only if one or more passwords is active.

To log out of the Web pages:

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 SMP 351 Web pages, or click **Cancel** to remain logged on using the same account.



The Logout dialog closes and returns you to the embedded Web pages screen.

NOTE: If you click **Cancel**, you remain logged in and the embedded Web pages continue to function as they did before you clicked **Logout**.

If you click **OK**, the controls are replaced by a message confirming that you are logged out and asking you to close the browser. Close the browser completely. If you close only a tab within the browser, the logout process does not complete.

Some browsers, such as Google Chrome, include an option to continue running in the background after closing. If this is enabled on Windows, the browser can be exited completely using the taskbar notification icon.

To log in to an SMP 351 :

1. Open a Web browser.
2. Enter the IP address of the SMP 351 into the address field and navigate to that unit. The **Authentication Required** dialog for Chrome (see figure 26), Firefox (see figure 27), and **Windows Security** for Internet Explorer (see figure 28) **Login** dialog box opens.

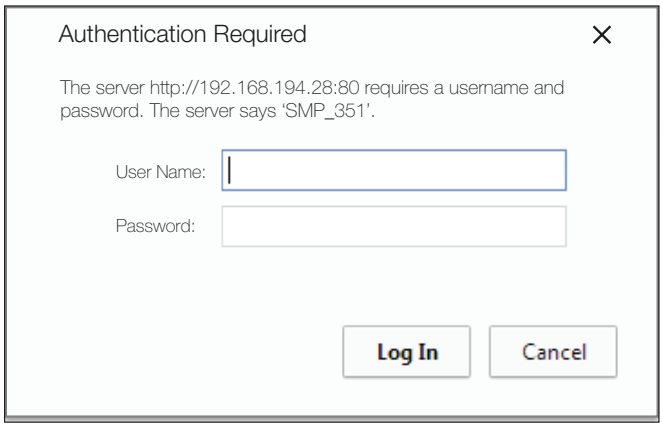


Figure 26. Chrome Authentication Dialog

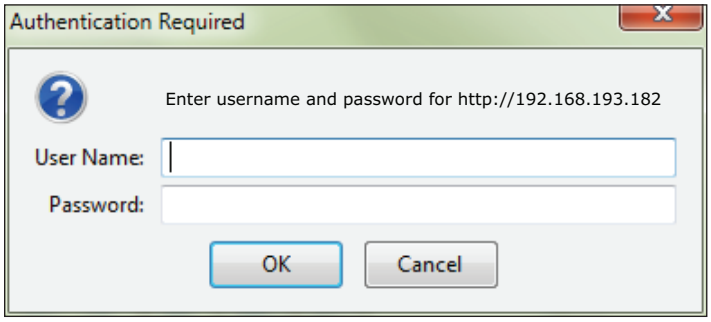


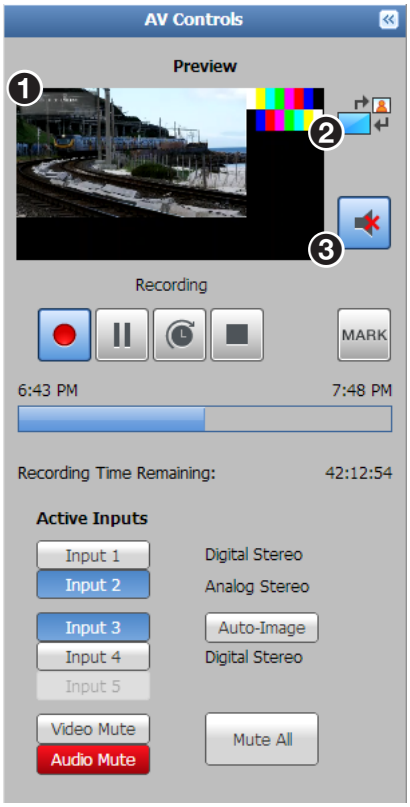
Figure 27. Firefox Authentication Dialog

Figure 28. Windows Authentication Dialog

3. Enter the appropriate user or administrator user name and corresponding password into the fields.
4. Click **Log In** or **OK**. The embedded webpage opens.

AV Controls Panel

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 a recording, see a thumbnail view of the recorded and output video, swap video content between windows, select different inputs, and mute or unmute the AV output. The browser always opens with the AV Controls panel expanded and both presenters and administrators have access. The AV Controls panel includes the following features:



Preview

This area (see ❶, at right) provides a small, live stream view of the output video so you know what is being recorded. To make the embedded web pages faster to refresh, the confidence stream for this live view can be disabled and an icon can be displayed here in place of the streamed image. The recording (archive) and output streams continue to be streamed when this preview is disabled. The control to disable the live feed to this page is located in the Encoding Presets pane (see **Encoder Settings and Layout Presets** on page 69). The confidence stream for the preview can also be disabled using front panel controls (see **Front Panel Menu Operation** on page 22).

NOTE: Chrome version 42 disables many plugins. For the SMP this means that the preview video in the AV Controls panel is not supported by Chrome version 42 or higher. To see a preview of the current stream you can either:

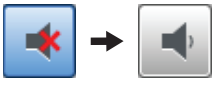
- Use a different browser or
- Open a stand-alone, third-party video player (such as VideoLAN™ opensource VLC™ media player) and connect to the confidence stream from the SMP.

Swap

Click the **SWAP** icon (❷) to make video from channel A trade window locations with video from channel B.

Preview mute

By default, the audio portion of the preview is muted, which does not affect audio to the recording and Web streams. To listen to the audio that accompanies the preview, click the preview audio **Mute** button (❸) to change from muted (default) to unmuted:



Recording controls

Recording control buttons function the way controls do on a DVR or other recording device. Buttons include:

- **Record** — Set up an ad hoc* recording session and start or resume recording.
- **Pause** — Pause recording.
- **Extend** — Extend the duration of a recording event beyond the scheduled end time.

  NOTE: The **`Extend Recording`** button only applies to scheduled recordings.

- **Stop** — Stop recording and end the recording session.
- **Mark** — This button works like the **`Mark`** button on the front panel of the SMP. It is grayed out and inaccessible when the unit is not recording, and becomes accessible and clickable once a recording starts. When you click this button during a recording, you create a time-referenced chapter marker to make it easy to find content at that point in the recording during playback. When you click the button, the button becomes unavailable (grays out), there is a brief delay (about five seconds) while unit stores the marker information, and then the button reactivates.

*An ad hoc recording session is one that has been set up for a specific occasion without being scheduled. Ad hoc recordings can last up to eight hours.

Text above the buttons confirms the state of the recording: recording, paused, or stopped. A button is blue when selected (active or on) and gray when deselected (inactive or off).

NOTE: The front panel buttons also indicate the recording state, mirroring the AV `Control` panel indicators (see **Front Panel Features** on page 18).

Progress bar

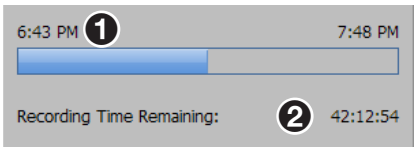


Figure 29. Progress Bar and Record Time Available

A progress bar (see figure 29, ❶) below the recording control buttons is a horizontal bar graph that shows how much recording time has elapsed and, if it is a scheduled session rather than an ad hoc recording, how long the presentation is expected to last. For an ad hoc recording, initially the progress bar shows a five minute duration. The displayed duration increases in five-minute increments as the ad hoc recording progresses.

Recording time available

Recording time remaining (❷) is indicated below the progress bar in the format HHH:MM:SS. The estimate of how much time remains available is based on the combination of available storage space and the current stream resolution and bitrate.During a scheduled recording, this field indicates how much time remains in the event. During an ad-hoc recording, the calculated time is displayed.

If dual recording mode is enabled, the remaining time is listed first for the internal storage drive and then for the selected secondary (external USB) drive (132:46:27*00:03:44, for example).

Input selection

Inputs are grouped into two channels:

- Input 1 (HDMI) and input 2 (HDMI) form channel A (see figure 30, ❶)
- Input 3 (component/composite), input 4 (HDMI), and optional input 5 (3G/HD/SDI) make up channel B (❷)

There is one analog audio input per channel. HDMI inputs can be configured for digital audio (embedded in HDMI) or a shared analog input for the channel. The audio type for each input is displayed in the right column (❹).

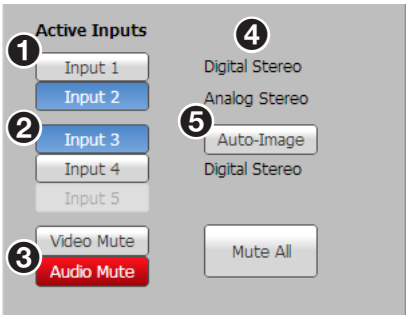


Figure 30. Active Inputs, Mute, Audio, and Auto-image

Audio mode (digital stereo or analog stereo) must be configured in the `Input/Output Settings` page (see **Input/Output Settings** on page 64).

To select AV sources:

1. Click the input buttons in the left column of the `Active Inputs` panel to select AV sources for a presentation. Input changes take effect immediately.
2. To apply Auto-Image to input 3, click **`Auto-Image`** to the right of Input 3 (❺). Auto-Image automatically sizes and centers the selected input to match the channel B window.

Mute buttons — Click the desired button (❸) to mute video only (**`Video Mute`**), audio only (**`Audio 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 to toggle mute states, use the front panel controls, or send SIS commands to the unit via RS-232 or USB control.

When unmuted, the button changes from red to gray.

Start an Ad Hoc Recording

A user logged on to the SMP 351 , either at the user (presenter) level or the administrator level, can initiate an ad hoc (unscheduled) recording.

NOTES:

- See (see **Setting the Default Recording Media** on page 75) within **`Configuration > System Settings`** for more information about single and dual recording modes.
- If the unit is set for recording destination limiting, users do not have the option to select a different storage location. The storage location or location are preselected and cannot be changed from this dialog box.
- If the recording is restricted to a USB device with multiple partitions, then partition selection within the USB drive is still available.
- Ad hoc recordings can last up to eight hours. At the end of eight hours, the SMP stops recording.

Start an ad hoc recording from the AV **Controls** panel (see the *SMP 351 Help* files for additional recording information).

If the unit is set for single storage mode (recordings are saved to only one storage drive), choose a recording destination from the **Recording Destination:** drop-down list.

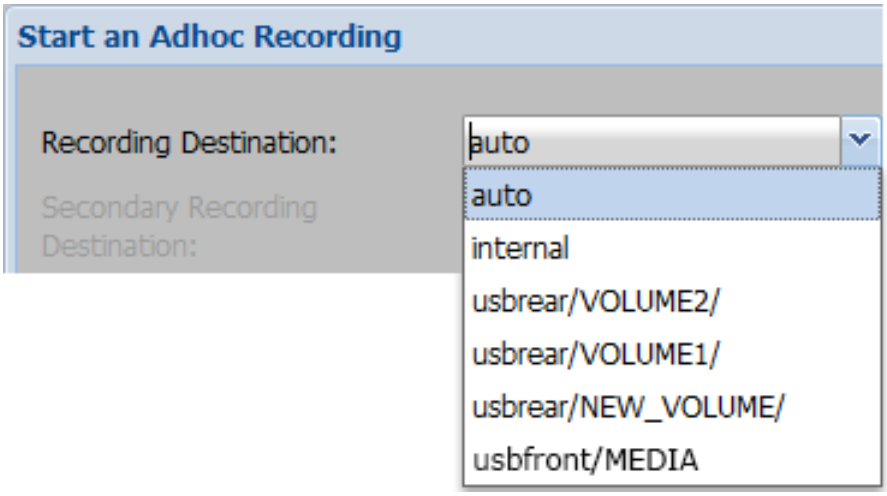


Figure 31. Ad-hoc Recording Destination Dialog, Single Recording Destination

If the unit is **NOT** set to limit the recording destination, select a storage option from the **Recording Destination** drop-down list.

auto — The recording is saved to the first available storage location that is not full. Priority is given starting with the front USB port, then the rear USB port, then internal memory.

- If a USB drive has more than one logical volume, only the volume with the largest free space for that port in the **Recording Destination:** drop-down list is used to store content. All other volumes on that drive are ignored.
- To record to another volume on the device you must manually select the target location rather than using the auto option.

internal — The recording will be saved in the internal memory of the SMP 351.

usbrear/VOLUME2/, **usbrear/VOLUME1/**, **usbrear/NEW_VOLUME,** and so forth — The recording is stored to the indicated external USB drive and volume (using whatever volume name is on that drive) connected to the front panel or rear panel USB storage port on the SMP 351.

If the unit is set to limit the recording destination, you cannot change the storage location (internal, front USB, rear USB). However, if the unit is set to store recordings to one of the

USB ports, and if the connected drive contains more than one volume, you can select a volume from the **Recording Destination** drop-down list.

If the unit is set for dual recording, the file is saved to two storage drives simultaneously. In dual recording mode, the recording is always saved to the internal drive as the primary storage location; only the secondary location is configurable.

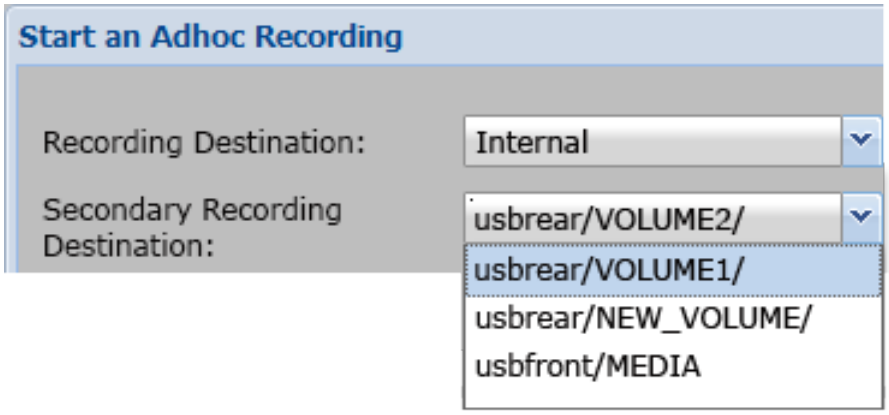


Figure 32. Ad-Hoc Recording, Secondary Recording Destination Selection

Select the secondary storage location from the drop-down list.

- If the unit is set to restricted mode, you can select only from front panel USB drives or from rear panel USB drives, depending on whether the front or the rear option is selected in the system settings. If the unit is set to use a front panel USB drive for the secondary storage location but a drive is connected to the rear panel USB port instead of the front panel port, the **Secondary Recording Location:** drop-down list displays **n/a** (not available or not applicable) as the only option.
- If the unit is not set for restricted mode, you can select any available USB drive and volume.
- If no USB drive is attached to a particular port, the option for that port is either not shown at all or is shown as **n/a** (not available or not applicable).

Recording Controls

The `Recording Controls` page displays information about the active inputs and the output signal, the presentation event currently in progress, and a list of upcoming presentations.

Information on this page updates every few seconds. Contents of the page are read-only and are displayed for all users.

This page contains five panels:

- Stream URLs
- Storage Information
- System Inputs and Outputs
- Current Event
- Upcoming Events

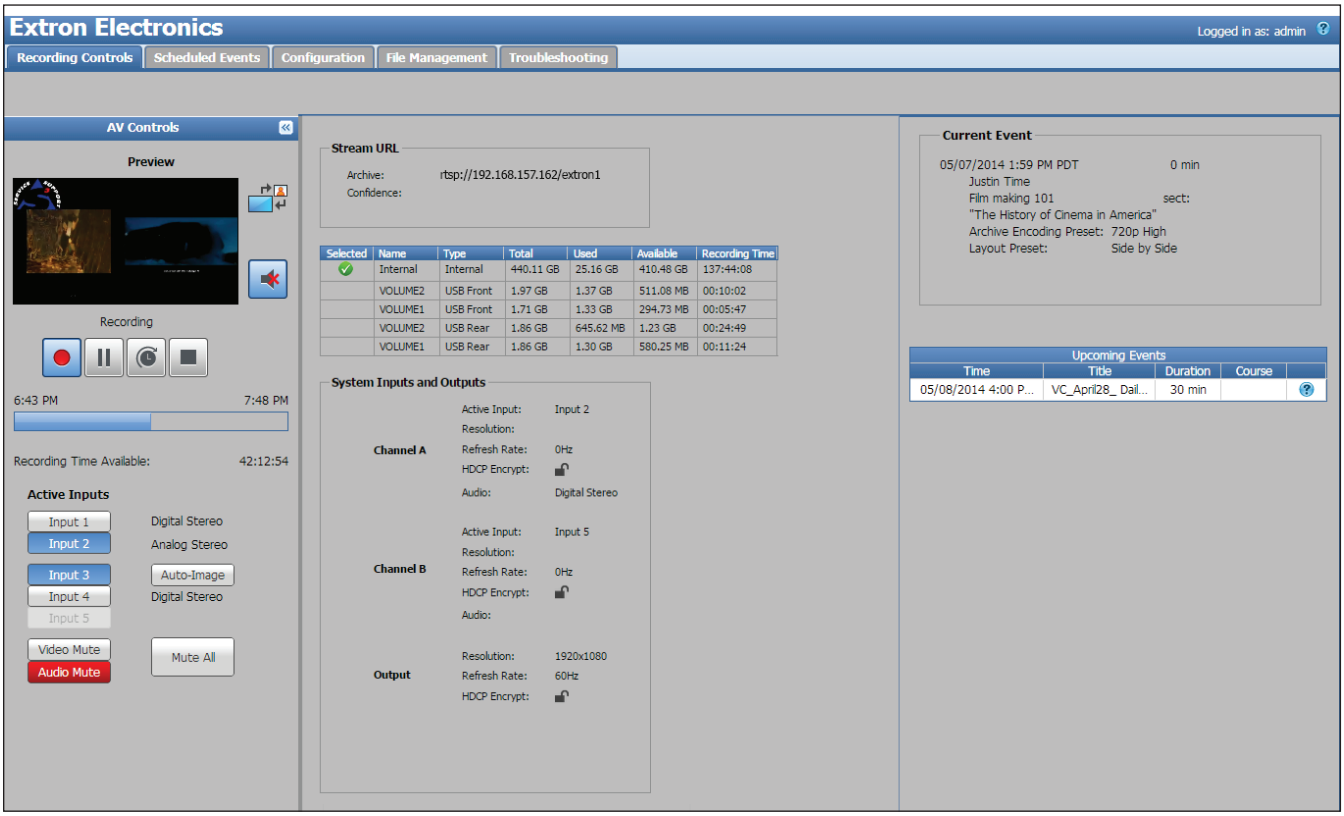


Figure 33. AV Controls, Recording Controls

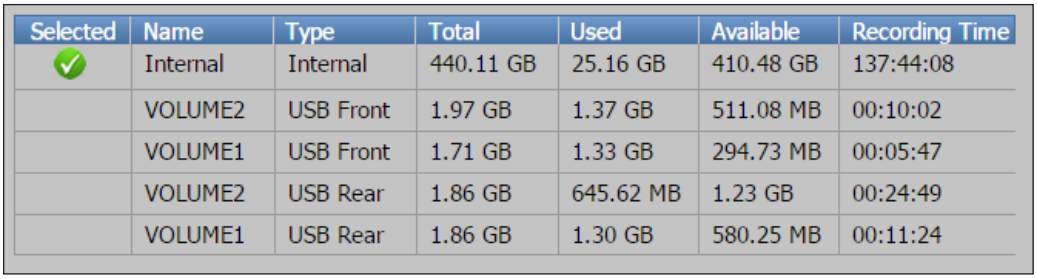
For information on the AV Controls panel at the left of the page and on how to initiate an ad-hoc recording or control an in-progress recording, see **AV Controls Panel** on page 54 and see the *SMP 351 Help* file.

For information on the `Recording Controls` panels, see the *SMP 351 Help* file.

Storage Information

The storage information table below the Stream URL panel (also available in the `File Management` page) displays the names of the available connected storage devices, their locations (internal, USB front panel port, USB rear panel port), total capacity, and amount of used and available storage space. It also provides an estimate of remaining recording time for each drive and indicates (with a check mark) which drive is selected as the only or primary recording location.

NOTE: The capacity of the internal drive shown in the "Total" column depends on the options you selected for your device. 73 Gigabytes is the standard storage size. 440 Gigabyte is the optional size.



Selected	Name	Type	Total	Used	Available	Recording Time
✓	Internal	Internal	440.11 GB	25.16 GB	410.48 GB	137:44:08
	VOLUME2	USB Front	1.97 GB	1.37 GB	511.08 MB	00:10:02
	VOLUME1	USB Front	1.71 GB	1.33 GB	294.73 MB	00:05:47
	VOLUME2	USB Rear	1.86 GB	645.62 MB	1.23 GB	00:24:49
	VOLUME1	USB Rear	1.86 GB	1.30 GB	580.25 MB	00:11:24

Figure 34. Recording Controls, Storage Information Table

NOTE: Recordings stored on the internal drive can be automatically uploaded to a network server (see **Setting the Default Recording Media** on page 75). If internal storage space is nearly full and the SMP is set up to automatically upload recordings to a server, the SMP uses an automatic disc cleanup feature to make room for new recordings. As needed, the unit automatically deletes recordings previously uploaded to a server, starting with the oldest recordings, until there is enough free space on the disk. For details on recording deletion and to learn how to lock a recording to prevent it from being automatically deleted, see Locking and Unlocking a Recording Package Folder in the *SMP 351 Help* file.

Scheduled Events

The `Scheduled Events` page contains three sub-tabs: **`Recording Calendar`**, **`Schedule Settings`**, and **`Publish Settings`**.

Recording Calendar Tab

This page lists the currently selected scheduling source and publishing destination and when the schedule was last synchronized. It also features two different ways to view all recordings (in-progress events, upcoming scheduled events, and recordings that have already taken place).

The calendar view is a graphical way to list recordings in a calendar format. You can access a detailed view dialog box about each specific event from this page. Also, in the event that a recording does not transfer to the designated network server or if you need to upload the files again, you can initiate a re-upload from the detail view, as well.

The list view is an alternative way to show recording events in a list table format. Recordings are listed by title, starting time, course ID, creator, identifier (file name), state, and the like. Entries can be sorted or searched in this view.

Schedule Settings

The `Schedule Settings` page within **`Scheduled Events`** allows a user with administrator privileges to choose how to obtain presentation schedules and, if appropriate, import calendars or connect to an Opencast server scheduling system. Scheduling must be set up using this page. It cannot be set up via the front panel. The `Schedule Settings` page has two panes: Active Profiles and Schedule Source Configuration, which has four sub-panes that provide options to import calendars from sources such as an iCalendar file, a Microsoft Exchange Server schedule, and an Opencast Matterhorn Server.

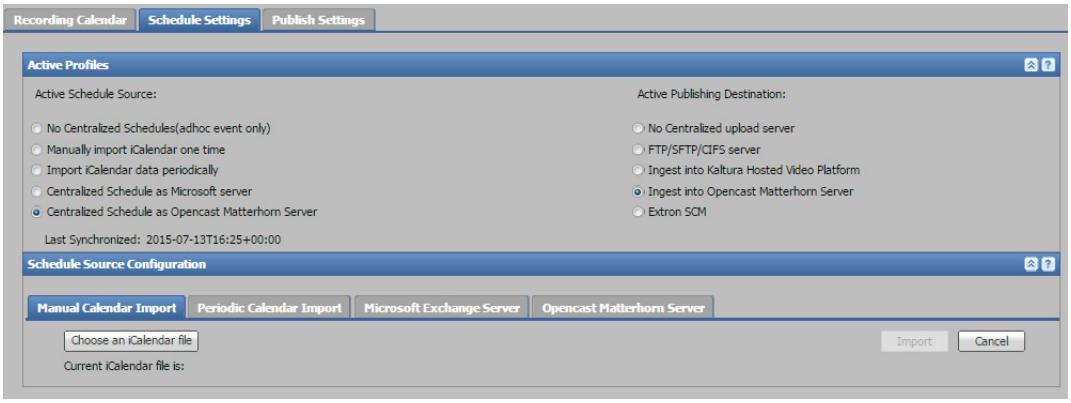


Figure 35. Schedule Settings Page

Read the *SMP 351 Help* file for details and step-by-step procedures on scheduling.

A Note on Using the SMP 351 With an Opencast server System

The SMP supports HTTP ETags (entity tags), which make it possible to cache some scheduling information to minimize network traffic. When the SMP requests schedules from the Opencast server system, the Opencast server sends an ETag parameter to the SMP. Each time the SMP and Opencast server exchange schedule information, the system reads the ETag and determines whether there were any changes to scheduled events since the last synchronization.

- If there have been no changes, then less scheduling data is exchanged between the SMP and the server, which reduces network traffic and the time needed for schedule updates.
- If changes have been made, the Opencast server issues a new ETag, and the SMP updates its schedules.

Publish Settings Tab

The **Publish Settings** tab provides the ability to change the current active publishing destination and configure the options for the destinations.

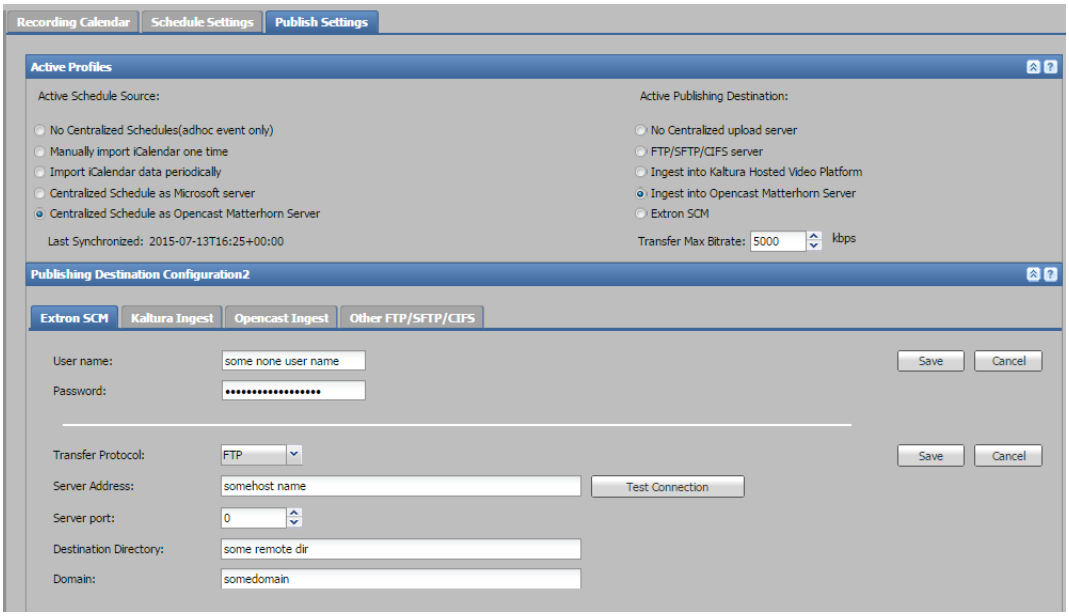


Figure 36. Publish Settings Tab

The **Active Profiles** pane is the same on both the **Publish Settings** and the **Schedule Settings** page.

To select an **Active Schedule Source:**, select the desired radio button for the following options:

Active Schedule Source	Corresponding Tab
No centralized Schedules (ad-hoc event only) *default	**Not applicable**
Manually import calendar one time	**Manual Calendar Import**
Import iCalendar data periodically	**Periodic Calendar Import**
Centralized Schedule as Mircosoft server	**Microsoft Exchange Server**
Centralized Schedule as Opencast Server	**Opencast Server**

To select a publishing destination, select the desired radio button below the **Active Publishing Destination:** for the following options:

Active Publishing Destination	Corresponding Tab
No centralized upload server. This is the default option unless the schedule source is a Microsoft Exchange server.	**Not Applicable**
Extron SCM	**Extron SCM**
Ingest into Kaltura Hosted Video Platform	**Kaltura Ingest**
Ingest into Opencast Server	**Opencast Ingest**
FTP/SFTP/CIFS server	**Other FTP/SFTP/CIFS**

See the *SMP 351 Help* file for additional information.

Configuration Overview

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

They make it possible for a user logged in as an administrator to configure basic AV input settings, output video test patterns for setup, configure output stream settings and presets, set up AV encoding and presets, select or configure layouts and layout presets, set passwords, set up notices and alarms, select preview window settings, and configure digital I/O ports.

It also provides a way to configure basic communication, identity, time, data storage, and recording location settings, along with making it possible to update firmware or restore a configuration from a saved file.

Only users logged in with adminstator privileges can see and make changes to all settings. Those logged in at the user level do not have access to the **Configuration** tab.

Figure 37. Configuration Pages

Configuration Tab Features

The pages within **Configuration** include the following:

- **Input/Output Settings** — Provides a way to change the name for each input, select the video format for input 3, select an aspect ratio type, and enable or disable Auto-Image, Auto Memory, HDCP authorization, and audio gain for each input. It also allows you to output one of several video test patterns for use during display setup, select the refresh rate for the local HDMI output, and configure the universal OSD content.
- **Image Settings** — Provides a way 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 you to save or recall input and user presets
- **Encoding & Layout** — Makes it possible to set up AV encoding; configure the streaming method, protocol, and settings; and create encoder presets in the top portion of this page. In the lower portion configure layouts (arrangement of windows) and select or create layout presets.
- **Users and Roles** — Provides a way to set administrator and user passwords.
- **Alarms and Traps** — Sets up the e-mail server and the sender and recipient e-mail addresses for notifications within this page. Select the alarm "severity" level for each of several types of errors or conditions monitored by the unit.
- **System Settings** — Contains an assortment of settings for unit identity, communication, storage, and date and time. It provides a way to configure settings for network and serial communication, identity (unit name and network location), and date and time. It also makes it possible to update firmware or restore a configuration from a saved file.
- **Live View Settings** — Provides a way to select and set up the player software that is used for the live preview shown in the AV **Controls** panel.
- **Advanced Features** — Enables a Web browser client option on the unit or to upload new applications such as the digital I/O port configuration plug-in.

See the *SMP 351 Help* file for additional information.

Input/Output Settings

The controls within the `Input/Output Settings` page within the **`Configuration`** tab provide a way to select a number of settings for video input and test the output and select options for audio output mode, mute, and levels.

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

NOTE: The selected input aspect ratio setting is applied to both the archive and confidence outputs. If the confidence resolution is different, the applied aspect ratio can not be maintained. For example, if the archive resolution is 1080p with an aspect ratio of 16:9, and the confidence display is 1024x768 with an aspect ratio of 4:3, the input aspect ratio selection can not be maintained for both.

Auto Memory — Select the check box to enable Auto Memory. Auto Memory recalls input and image settings for signals that have previously been applied. When Auto Memory is disabled, the SMP 351 treats every new input as a new source.

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.

NOTE: The resolution of the local (preview) output follows (is based on) the archive encoder resolution.
However, when the selected archive resolution is under 720 lines (if the archive encoder is set as 848x480 or 512x288, for example), the HDMI preview output is set to 1280x720, with the video content centered in the 720p window.

Changing the Font Used for Input Switching and Universal OSD

If optional fonts are uploaded to the SMP 351, you can select and use one for displaying OSD text instead of the default font. The same font is used for both the input switching OSD and the universal OSD. You must upload the font to the font folder from the `File Management` page or by using an SFTP client program before selecting it in this page.

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

NOTES:

- The SMP supports TrueType™ (.ttf) and OpenType® (.otf) fonts.
- To upload a font file, use the file upload utility within the `File Management` page (see **File Management** on page 79).
- The user is responsible for obtaining necessary font licenses before uploading fonts.
- After changing the font, some text may appear truncated in the OSDs because characters may be wider in the selected font than in the system default font.
- The font selected here can be different from the font that is used for the metadata overlay within a recording layout (see **Configuring Metadata Elements** on page 71).

To select a different font:

1. Open the `Input/Output Settings` page (see **Input/Output Settings** on page 64).
2. Expand the `OSD Configuration` panel.
3. Navigate to the `OSD Font` panel and select an available font from the **`Font`** drop-down list. The selected font is immediately applied to both the input switching OSD and the universal OSD.

Outputting and using a video test pattern

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

The `Input/Output Settings` page allows selection and immediate output of one of eight internally stored test patterns to the local HDMI preview and recording output, and the output stream. Video test patterns are helpful for calibrating connected displays or projectors for color, convergence, focus, resolution, contrast, and aspect ratio. Audio test options are useful for testing audio output.

To select and output a test pattern:

1. Open the `Input/Output Settings` page.
2. Expand the **`OSD Configuration`** 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:

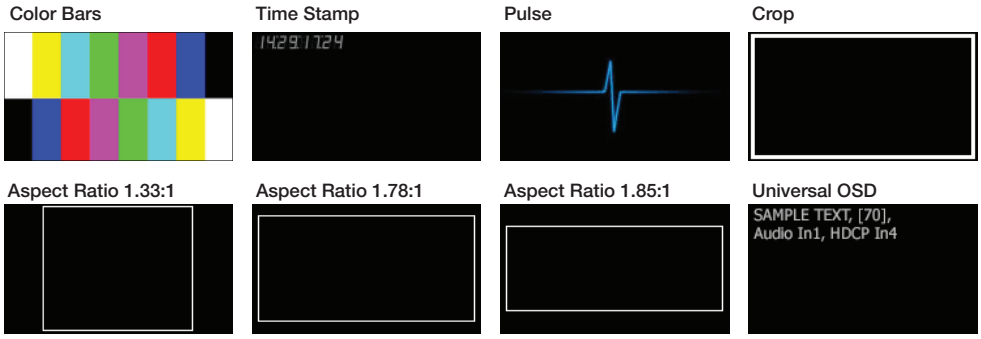


Figure 38. Test Patterns

- The **Pulse** "test pattern" is an audio-only test. Select **Pulse** to output an audio pulse of 400 Hz at -10 dBu for audio output testing.
- The **Time Stamp** pattern displays white text in a small, gray rectangle with the unit date and time (for example: Fri Apr 18 HH:MM:SS) on a black background in the top left corner of the display window.
- The **Universal OSD** pattern consists of a small, translucent, gray rectangle with white text overlaid atop the source video content. It appears in the upper left of the screen. The text includes brief custom text followed by three selectable elements separated by commas. The options for those elements are listed in the Setting up the universal OSD test pattern section below. The universal OSD pattern can be displayed together with the main AV content because it overlays the video rather than replacing it. As a result, 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 (which may or may not be displayed, depending on the screen layout). See **Encoder Settings and Layout Presets** on page 69 for more information on metadata within screen layouts and on selecting content for the metadata fields.

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

NOTE: When a test pattern is selected, the test pattern is streamed to the display, stream, and recording, overlaid atop the source AV material. If **Off** is selected from the **Test Pattern** drop-down list, the test pattern is turned off.

Setting up the universal OSD test pattern

The universal OSD is a gray rectangle with white text that overlays the selected source video as part of a "test pattern." It can be turned on or off as needed.

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.
4. Enter the text (up to 16 characters) into the **Display Text** field within the universal OSD area in the Preview Output Configuration panel. This is the first text that appears in the universal OSD, and can function as a brief title or description.

5. Select an information category from the **Information 1** drop-down list.

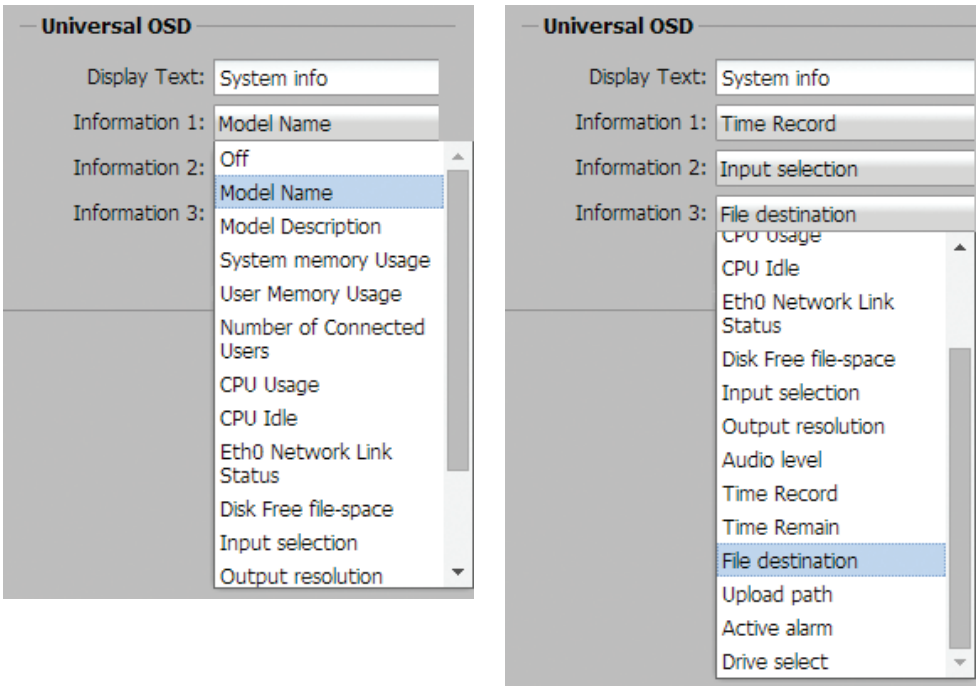


Figure 39. Universal OSD Information Selection

As an example, when **File destination** is selected, the OSD text might be `Front USB` or `Internal Drive Only`, depending on the current system settings.

The categories are identical to those used in the SIS information commands (such as `1i`, `2i`, `3i`, and so forth). For reference, see the **Command and Response Tables** on page 96.

6. If desired, select an information category from the **Information 2** drop-down list and select another category from the **Information 3** drop-down list.

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`. Figure 40 has examples of how the configuration settings (on the left) translate to the universal OSD (on the right).

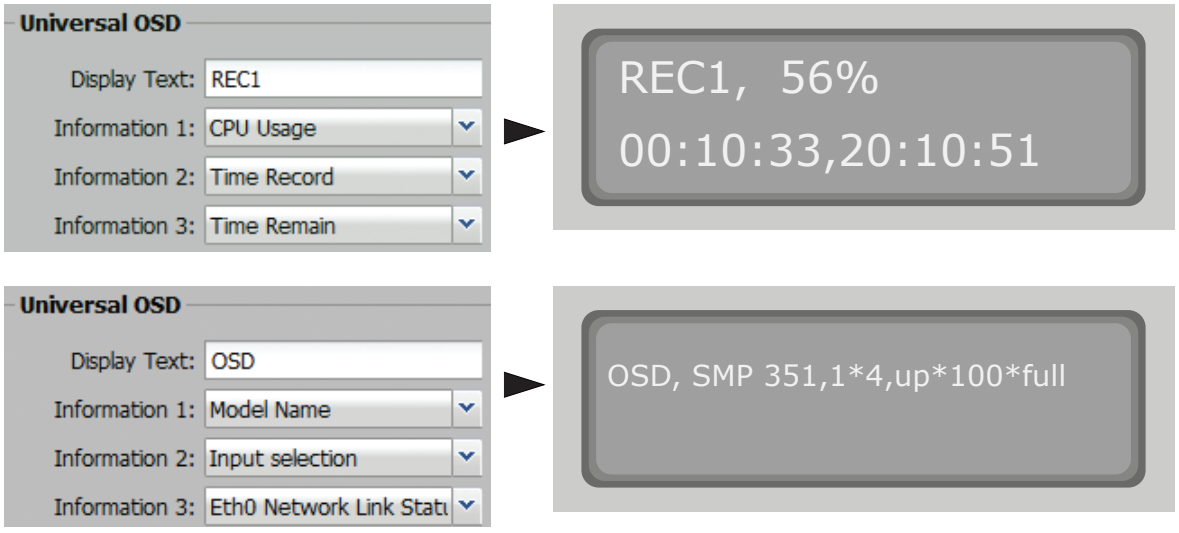


Figure 40. Universal OSD Information Selection

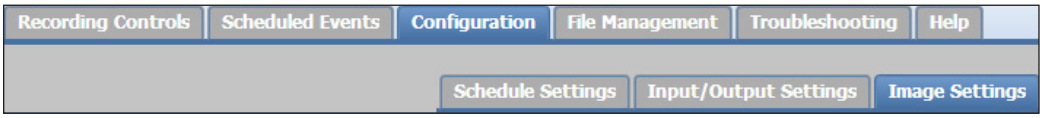
Image Settings

The controls within the **Image Settings** page within the **Configuration** tab provides a way 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 you to save or recall input and user presets.

A user must be logged in as an administrator to see or change these settings. This page is divided into seven panels:

- **Input Config** – select the input to be configured.
- **Picture Controls** – Alter the quality of the image by changing brightness, contrast, color, and tint.
- **Signal Sampling** – Configure the size, location, and aspect ratio of the currently selected input or select **Auto-Image**, **Auto-Image & Fill**, and **Auto-Image & Follow**.
- **Overscan** – Set the amount (0, 2.5%, or 5%) of picture enlargement applied to each video signal type for any SMPTE standard input.
- **Input Presets** – Save or recall preset combinations of signal type, signal sampling, and picture controls.
- **User Presets** – Save or recall sets of picture controls.
- **SDI Settings** – Set the quantization range for SDI signals from input 5 (SMP 351 3G-SDI only).

To open this page, click the **Configuration** tab at the top of the SMP 351 embedded Web pages and then click the **Image Settings** tab on the second tier of tabs.



The **Image Settings** page opens.

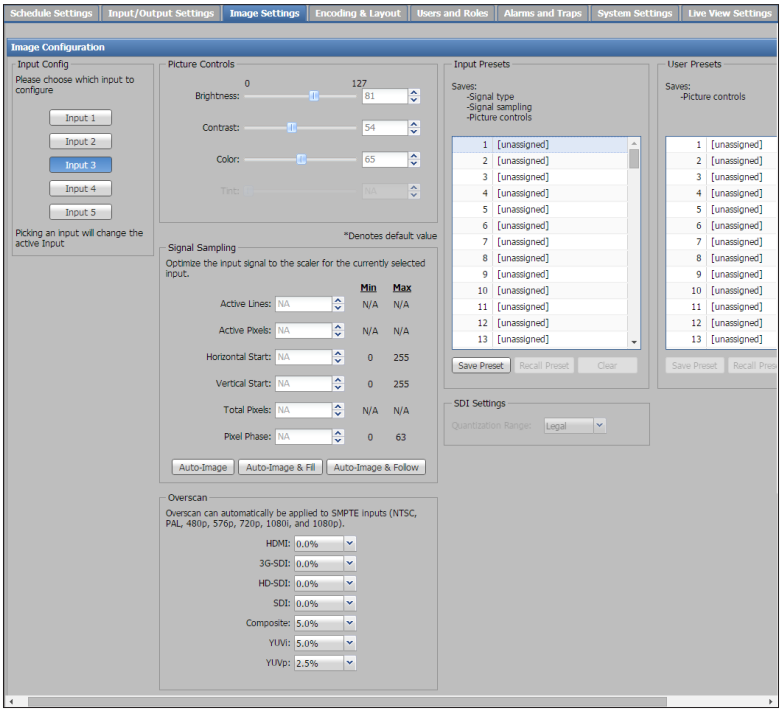


Figure 41. Image Settings Page

Except for the overscan settings and input preset saving and recalling, the settings on this page can also be configured using the front panel menu and controls.

You must select an input from the **Input Config** panel in the upper left of this page before you can adjust the image settings or save or recall presets. Note that selecting an input within the **Image Settings** page also changes the active input.

See the *SMP 351 Help* file for additional information.

Selecting SDI-specific Settings

For input 5 of an SMP 351 3G-SDI you can select the quantization range, which sets the black and white level for the quantized YCbCr data of the SDI input.

To set the quanitzation:

Select one of the following options from the **Quantization Range** drop-down list:

Legal — Select this option when the YCbCr video data of the SDI source (input 5) is within the "legal" range (64-940 for luma and 64-960 for chroma).

Full — Select this option when the quantized YCbCr video data of the SDI source uses the full range of available bandwidth.

NOTES:

- The SDI settings are disabled for inputs 1 through 4.
- Most SDI sources use the "legal" range.

Encoder Settings and Layout Presets

The controls within the **Encoding & Layout** page configure signal streaming and encoding and also permit selection or configuration of video layouts. 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 SMP 351 embedded Web pages and then click the **Encoding & Layout** tab on the second tier of tabs.

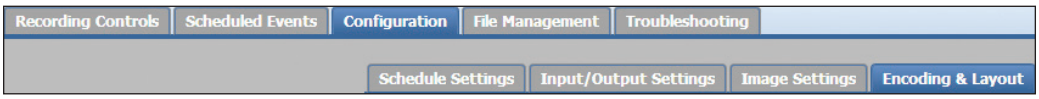


Figure 42. Configuration Tab, Encoding & Layout

The **Encoding & Layout** page opens. It features two panes:

- **Encoding Presets** – Configure audio encoding, video encoding, and streaming parameters, then create and save or recall presets of those settings.
- **Layout Presets** – Set the size, position, and aspect ratio of video windows for both channels and save those settings as a preset or recall default or user-created presets.

See the *SMP 351 Help* file for additional information.

Some of the encoder settings can also be set using the front panel menu and controls or using Extron SIS commands (see **Command and Response Tables** on page 96). Layout presets are set up in this Web page or via the front panel menu.

Encoding Presets

Encoding presets are combinations of settings for audio and video encoding that allow users to quickly switch between various encoder profiles for different resolution and bit rates. The archive encoder defines the resolution of the recording and establishes the highest quality live stream available from the unit while the confidence encoder allows for a lower resolution live stream, such as the preview video in the AV Controls panel. Settings changed on either encoder are applied immediately to the active streams. The SMP 351 supports up to two encodings (archive, confidence), one recording, one local output, and multiple live streams simultaneously.

NOTE: The video encoding resolution of the archive encoder must always be higher than that of the confidence encoder.

Any of the default encoder presets or user-created presets are recalled and applied to a recording session (archive encoder) using the embedded Web pages. Presets are also recalled for the archive stream using the front panel menu and controls (see **Presets Menu** on page 24). Presets are not applied to the confidence (preview) stream.

NOTE: Encoding presets must be selected prior to the start of a recording. You cannot change encoding settings during an active recording. Also, for custom resolutions, the resolution height and width must be specified before the custom rate can be used.

The first nine presets are populated with factory configurations which can be overwritten. Presets 10 through 16 are unassigned and unconfigured. All presets can be configured on the `Encoding & Layout` page.

NOTE: Some of the parameters available on this page can also be set individually using front panel controls.

An overview of encoding

Each of the two encoders for the SMP 351 can be used for multiple purposes. It can be useful to understand how each encoder is typically used and the differences.

Encoding Stream	Usage	Conditions or Differences	Comment
Archive Encoder	Recording	Refresh rate: 5 to 30 fps	Highest quality and resolution
	Local HDMI output through the rear panel Output (preview) port	Refresh rate: 50 or 60 Hz. Does not use the compression settings specified in the archive encoder preset. This output bypasses compression and encoding.	
	Live stream via the LAN port and network if using a decoder application	Refresh rate: 5 to 30 fps (same as the recording stream)	
Confidence Encoder	Preview window in the `AV Controls` panel		Must always be lower resolution than archive encoder
	Live stream via the LAN port and network if using a decoder application		

For details about the operation of the encoding controls, see the *SMP 351 Help* file.

Layout presets

NOTE: A user must be logged in as an administrator to see or change these settings. Users can recall layout presets when setting up recordings.

Layout presets define where on the screen the video windows for each input channel are located and how big each window is. Each channel (A and B) has a defined aspect ratio, size, and position. Depending on the layout arrangement, a layout can also include metatdata text and some areas that let a black background or background images be a background. The **Layout Presets** panel also provides a way to set up some of the metadata that can appear in streams.

Any of the default or user-created layout presets can be recalled and applied. Layouts apply to all streams at once: a recording session, Web streams, and the preview stream within the AV **Controls** panel (see **AV Controls Panel** on page 54). Presets can also be recalled using SIS commands.

The first 12 presets are factory default layouts. Presets 13 through 16 can be configured through the controls in the **Encoding & Layout** page.

See the *SMP 351 Help* file for additional information.

Configuring Metadata Elements

You can select and specify the metadata text content that is incorporated into the video and used for other purposes, and you can select the font that is used for that text overlay within the video.

Changing the Font Used for On-screen Displays

If optional fonts are uploaded to the SMP 351, you can select and use one for displaying metadata text instead of the default font.

NOTES:

- The SMP 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 SMP 351.
- 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.
- The font selected here for the overlay can be different from the font that is used for both the input switching OSD and the universal OSD (see **Changing the Font Used for Input Switching and Universal OSD** on page 65).

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

To select a different font see if the *SMP 351 Help* file.

Users and Roles

In the **Users and Roles** page within **Configuration**, a user with administrator privileges can set up both administrator and user level passwords. Passwords are not required, though they are recommended for controlling access to configuration functions. An administrator password is required before a user password can be set.

Passwords can be set up only via this pane or using SIS commands (see **Remote Communication and Control** on page 88). They cannot be set via the front panel.

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 SMP 351 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** pane.

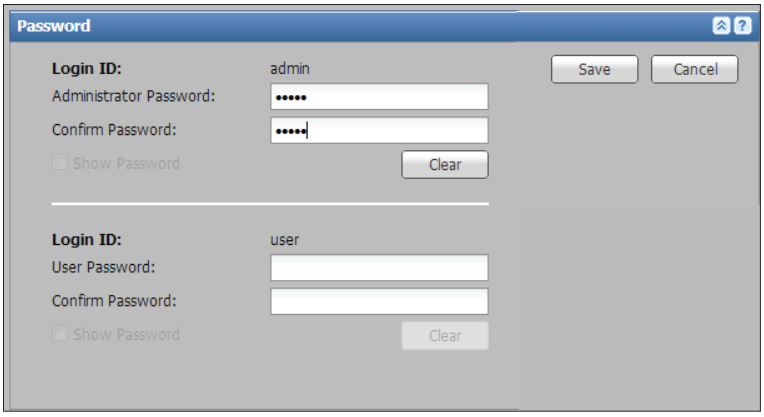


Figure 43. Password Pane

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 SMP 351 Web pages. End users cannot log into 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 SMP 351. Users can log in to use just the AV **Controls** panel and the **Recording Controls** page.

To set only an administrator level password or both an administrator level password and a user level password:

1. Enter a the desired password, at least four characters long, into the **Administrator Password:** field in the **Login ID: admin** panel.
   - Passwords must consist of alphanumeric characters (letters and numbers) only. Special characters and punctuation are not allowed.
   - Passwords are case-sensitive.

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 are accessible.

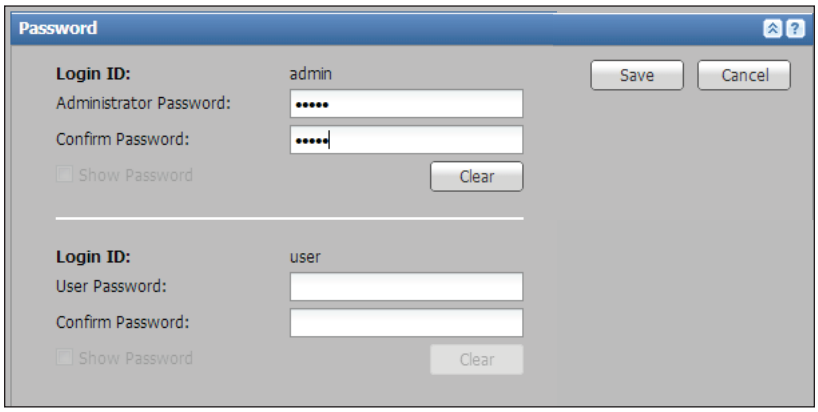


Figure 44. Password Pane Closeup

3. If no user password is set, click **Save** in the upper right of the Password pane. 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: panel.
5. Type the same password into the **Confirm Password:** field directly below the User Password field.
6. Click **Save**. Both the administrator and user passwords are saved.

NOTE: If only an administrator password is set, only administrators are able to log in to the SMP 351 Web pages. Users have no access.

To allow user access to a password-protected unit, set both an adminstrator password and a user password, and users must log in using the user password.

Clearing Passwords

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

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

Alarms and Traps

In the Alarms and Traps page within **Configuration**, a user with administrator privileges can configure e-mail account and communication settings to allow the unit to send notification e-mails. This is also the location for selecting whether to log, display a message about, or send an email about various conditions and errors experienced by the SMP 351.

NOTE: If internal storage space is nearly full (at the point when the disk space alarm is triggered) and the SMP 351 is set up to automatically upload recordings to a server (see **Publish Settings Tab** on page 62), then the SMP 351 uses an automatic disc cleanup feature to make room for new recordings. As needed, the unit automatically deletes previous recordings that have been uploaded to a server, starting with the oldest recordings, until there is enough free space on the disk.

System Settings

Controls within seven of the ten panes in the **System Settings** page within **Configuration** are essential during initial setup of the unit. The three other panes 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.

The panes are:

- **Unit Identification** — Set the system (unit) name and a descriptive name for its location. This is also the location where you can read the model name and description, part number, firmware version, and overall unit temperature.
- **Date and Time** — Set the date, time, time zone, and settings for syncing with one or more NTP (network time protocol) servers
- **Networking** — Set the IP addresses for the unit, gateway, and DNS server, as well as the subnet mask and port numbers for a variety of port types, or enable or disable SNMP
- **Recording Media Selection** — which makes it possible to set where the recording is saved during its creation and to choose whether and how much to limit the size of recordings
- **Default Recording File Names** — which allows you to choose what type of information will be used to compose names of recordings
- **Marks and Thumbnails** — where you can choose whether to have the SMP produce normal (small) size thumbnail images of the recorded video or to make thumbnail images the same size (resolution) as the archive encoder settings
- **Serial** — where you can set the baud rate and protocol for the rear panel remote control serial port
- **Firmware Loader** — which makes it possible to upload firmware to the unit
- **Backup and Restore** — where you can save a copy of the configuration settings or upload a previously-saved configuration file to the unit
- **Executive Mode** — which allows you to enable or disable various levels of front panel lock-out to limit access to the controls and functions of the SMP.

See the *SMP 351 Help* file for additional information.

Setting the Default Recording Media

To choose where a recording is saved during its creation:

1. In the System Settings page, click the **Expand** button ( ) for the Recording Media Selection pane. The pane opens.

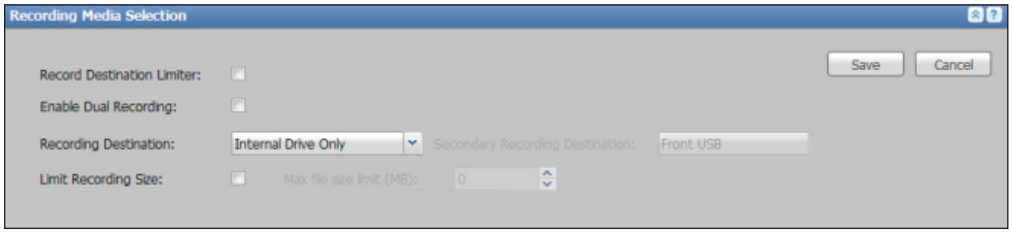


Figure 45. Recording Media Selection Pane

2. To save recordings to a single location (to use single recording mode):
   a. Verify that the **Enable Dual Recording** check box is disabled (unchecked).
   b. In the **Recording Destination** drop-down list, select where recordings should be stored as they are being made (during recording).
   - **Auto** — The SMP 351 stores recordings where space is available. The SMP stores the recording to available locations in the following order of priority: front USB > rear USB > internal drive.
   - **Internal Drive Only** — This forces the unit to store recordings only in its internal storage, even if USB drives are attached to the front and rear panel ports.
   - **Front USB Only, Rear USB Only** — These options force the unit to record to a USB drive connected to the corresponding port.

NOTE: The SMP 351 can automatically upload recording files to a network server only for files that are recorded to and stored on the internal drive. If you select one of the USB-only options, files cannot be auto-uploaded to a server.

3. To save recordings to two locations at once (to use dual recording mode):
   a. Select (check) the **Enable Dual Recording** check box.

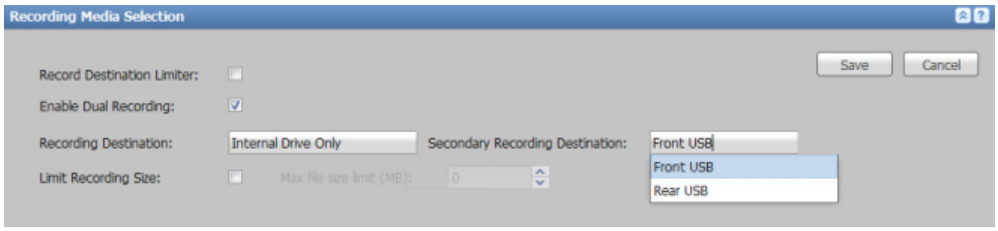


Figure 46. Recording Media Selection - Enable Dual Recording

   - The selection in the **Recording Destination:** field changes to Internal Drive Only. This cannot be changed while dual recording mode is enabled. The recording is always stored to the internal drive.
   - The **Secondary Recording Destination:** drop-down list is enabled.
   b. Select an option (**Front USB** or **Rear USB**) from the **Secondary Recording Destination:** drop-down list. This designates which storage drive (if one is connected at that location) is used to store a second copy of the recording.

4. If desired, you can limit users to the storage drive location selected in step 2 or the specified dual recording drives specified in step 3 (without the ability to change locations). To do so, select (check) the **Record Destination Limiter** check box.

   NOTE: If the recording destination limiter is enabled (the **Record Destination Limiter** check box is selected and the setting has been saved by clicking the **Save** button within the **Recording Media Selection** panel), you cannot change any destination settings or enable or disable dual recording mode until the record destination limiter is disabled and that change is saved. Once the record destination limiter has been disabled, then you can make changes to the other settings, which can be applied once they are saved.

5. If desired you can limit recording files (portions of long recordings) to a specific size. If this feature is enabled, during an ongoing recording event, each time a recording file reaches the specified size, the file is saved and a new files is created (of up to the specified size) for the next portion of the recording, and so on until the recording event ends or the storage space is exhausted.

Figure 47. Limit Recording Size

   To set a recording file size limit, select (check) the **Limit Recording Size** check box (see figure 47) then enter a number into the **Max file size limit (MB):** field or use the **Up** and **Down** arrows next to the field to select a number. The file size can be limited to any size between 100 MB to 3.8 GB (3800 MB). The default is 3584 MB. If you deselect the **Limit Recording Size** check box, the size limit function is disabled, and the entire recording is stored in a single file.

6. Click **Save**, or click **Cancel** to discard the changes.

Live View Settings

In the **Configuration > Live View Settings** page, administrators can configure the media player settings for the Preview window in the AV Controls panel.

These settings are available only via this page. They cannot be set from the front panel. See the *SMP 351 Help* file to configure the live preview player using the Web-based UI.

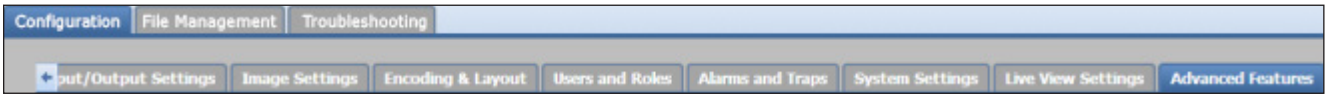
Advanced Features

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

- Set the SMP 351 to run a Web browser client application for direct control on site when a network-connected computer is not available.
- Upload a plugin application to add functions and configuration options, then use the plugin to configure features of the SMP 351.

These settings are available only via this page. They cannot be set via the front panel.

To open this page, click **Configuration > Advanced Features**. You may need to scroll the page to the right or scroll the second tier of tabs to see **Advanced Features** at the far right.



The **Advanced Features** page opens, showing the Browser Client and Apps panes.

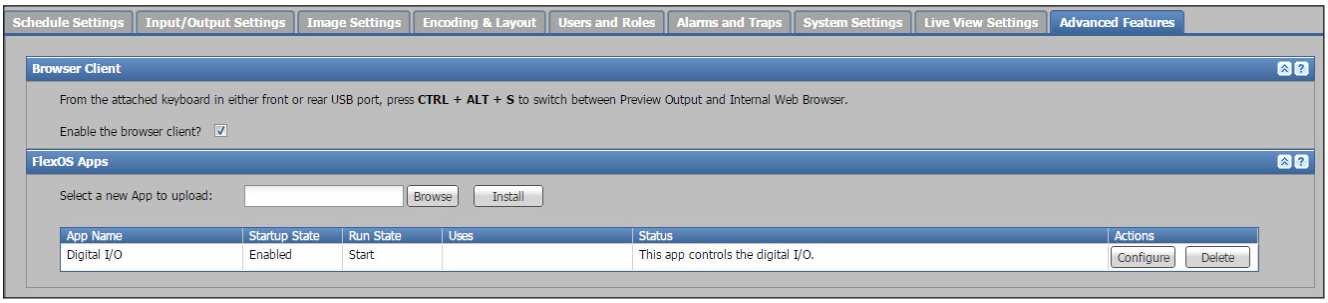


Figure 48. Advanced Features Page

Connect a keyboard and mouse to control the SMP 351

You can configure the SMP 351 to run a Web browser client application for direct control if a stand-alone computer is not available on site. If enabled, the internal Web browser provides access to a subset of the Network (IP) Settings configuration pane.

To set up the SMP 351 for local control using its internal browser client:

1. On a computer connected to the same network as the SMP 351, open a browser, enter the IP address of the unit into the address field, and connect to the embedded Web pages.
2. Click the **Configuration** tab at the top of the SMP 351 embedded Web pages and then click the **Advanced Features** tab on the second tier of tabs.
3. Select (check) the **Enable the browser client?** checkbox in the Browser Client pane.

NOTE: The following steps do not require a computer and do not require the SMP 351 to be connected to a network.

4. Connect a monitor and a keyboard and mouse directly to the SMP 351 (see **Control System and External Device Connections** on page 15).
   - Connect the keyboard to either the front or the rear USB port, or to the rear panel Mouse/Keyboard USB connectors.
   - Connect the mouse to the other (rear or front) USB port or to the rear panel Mouse/Keyboard USB connectors.
   - Connect a display to the local HDMI Preview Out port on the rear panel.

5. By default, the local output shows the preview (confidence) image on the connected monitor or display. To switch between viewing the preview and viewing the embedded Web pages, press the <Ctrl + Alt + S> keys on the keyboard connected to the SMP 351.

   NOTE: The default Web page allows configuration of the network settings.

6. Use the mouse and keyboard to navigate through the pages and panels and to make changes as needed.
7. 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.

Uploading a FlexOS Application to the SMP 351

Occasionally Extron develops supplemental applications or plug-ins to enhance or add functions or control options to the product. For example, you can download a plug-in application that allows you to use the embedded Web pages to configure and monitor the rear panel digital I/O ports. The controls in the `Advanced Features` page upload the application (app) to the SMP 351.

See the *SMP 351 Help* file to upload a FlexOS application using the Web-based UI.

NOTE: You may need to log in to the Extron Website using your Extron Insider account information in order to download the software.

Available applications

Digital I/O configuration — The digital I/O configuration (Digital I/O) application is included with the SMP 351 . It makes it possible to rename each digital input/output port, set its use mode (input or output, with or without pull-up), create labels for on and off states, and see the status of each port. Additionally, this application lets you link monitored conditions (such as the state of a particular I/O port, a specific recording mode or mute state or alarm) with actions (changing an input, recording mode, or mute mode, or swapping channels or setting a chapter marker). For further information, see **FlexOS Applications** on page 87.

Additional applications may become available in the future for download from the Extron Website.

File Management

The **File Management** tab contains a directory of files stored in the SMP 351 and also of any connected shared drives on the network, and a file upload utility so that new files can be added to the SMP for use as background images. It also provides a way to connect the SMP to shared network drives and lists the URL you can use to upload or download files from the SMP through an SFTP client.

Within the file directory, many files or folders can be deleted, renamed, or locked.

Those logged in at the user level do not have access to the **File Management** page. Users logged in to the SMP 351 with administrator privileges can see and make changes.

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

The **File Management** tab opens showing the File Directory and the File Upload Utility panels:

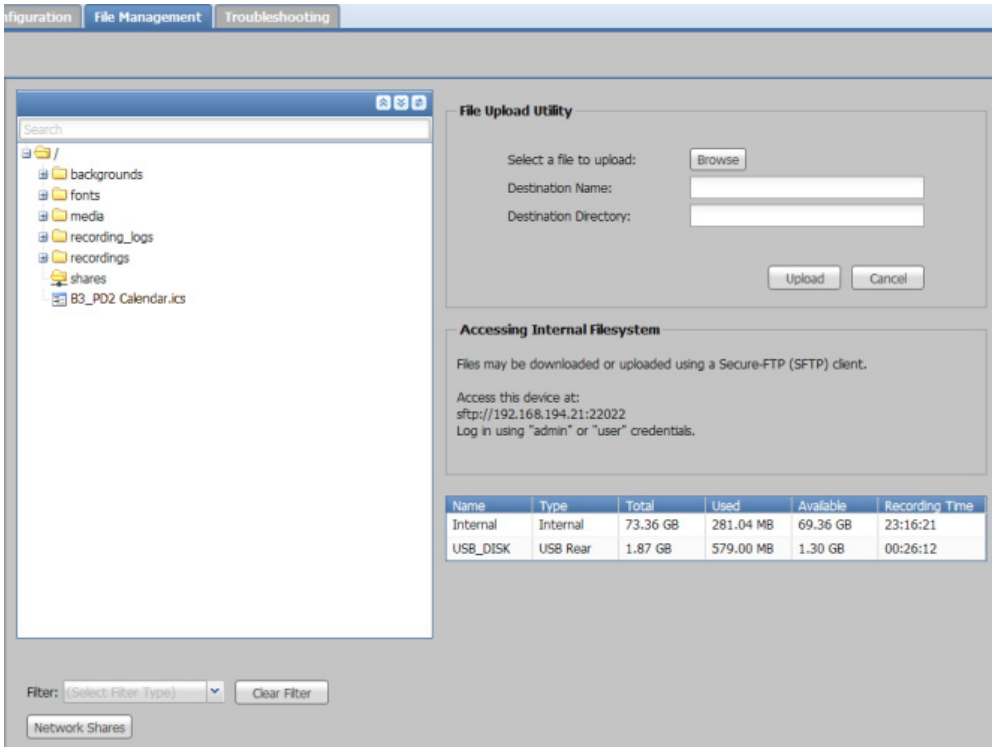


Figure 49. Configuration, File Management Tab

The storage information table in the lower right of the File Management page (and also displayed in the middle of the Recording Controls page) displays the names of the available connected storage devices, their locations (internal, USB front panel port, USB rear panel port), total capacity, and amount of used and available storage space. It also provides an estimate of remaining recording time for each drive.

Name	Type	Total	Used	Available	Recording Time
Internal	Internal	73.4 GB	0.2 GB	69.4 GB	25:52:43
500MB_DR...	USB Front	0.5 GB	0.5 GB	0.0 GB	00:00:15
USB_DISK	USB Rear	1.9 GB	0.2 GB	1.7 GB	00:38:04

This list can be sorted. Click on any of the table headings or click the arrow that appears when you hover the pointer over a table heading and select a sort order from the drop-down list.

See the *SMP 351 Help* file for information on using the file manager with the Web-based UI.

NOTE: Recordings stored on the internal drive can be automatically uploaded to a network server (configured in **Configuration > System Settings > Default Recording Destination** or in **Configuration > Schedule Settings > Opencast Scheduling**). If internal storage space is nearly full and the SMP is set up to automatically upload recordings to a server, the SMP uses a disc cleanup feature to make room for new recordings. As needed, the unit automatically deletes old recordings that have already been uploaded to a server, starting with the oldest recordings, until there is enough free space on the disk.

Add a Network Share

Network servers or network-attached storage drives (network shares) can be added to the file list so the SMP 351 can access files and folders stored on shared network resources. These shares can store background images.

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 *SMP 351 Help* file to add a network share using the Web-based UI.

Upload Files To and Download Files From the SMP 351 Using an SFTP Client

Automatic file uploading to a network location (see **Setting the Default Recording Media** on page 75), the recording re-transfer (re-upload) option within the `Scheduled Events` page, and the option listed on the previous page for uploading background image files to the unit satisfy most file transfer needs. However, if there is a need to transfer files into or out of the SMP 351 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. The URL includes the SFTP protocol name (sftp), the address of the SMP 351, and also the logical port number (usually 22Ø22) of the LAN port. For example, `sftp://192.168.194.28:22Ø22`.
3. Open an SFTP client program of your choice.
4. Paste the URL from the SMP 351 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 SMP 351.
7. Use the FTP client software to copy files (recordings, logs, background images) to and from the internal storage folders on the SMP 351.
8. Disconnect from the SMP 351 (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 a user logged in as an administrator to view current system conditions and connections, view event logs and alarms, test network connections, and reset the unit.

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

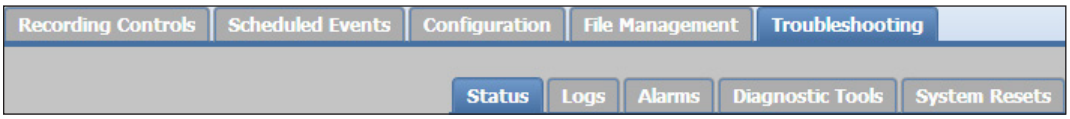


Figure 50. Troubleshooting Tab

Features of the Troubleshooting Tab

The pages within **Troubleshooting** include the following:

Status — Displays information about the firmware and Web page versions, system and component temperatures, fan speeds, Ethernet connection, MAC address, date and time, as well as details about the bit rates for audio and both the archive and confidence encoder streams.

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, severity, ID, or message. It can also be filtered, or exported to a CSV file.

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.

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.

System Resets — Initiates a unit reboot, deletes all stored content and formats the internal storage, or performs one of five different types of reset.

Status

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

Some of the information in this page can also be found using SIS commands (see **Command and Response Tables** on page 96) or the front panel (see **Status Menu** on page 43).

To open this page, click the **Troubleshooting** tab at the top of the SMP 351 embedded Web pages and then click the **Status** tab on the second tier of tabs (see figure 51).

The **Status** page opens, showing the **Detailed System Status** and **Encoder Status** panes.

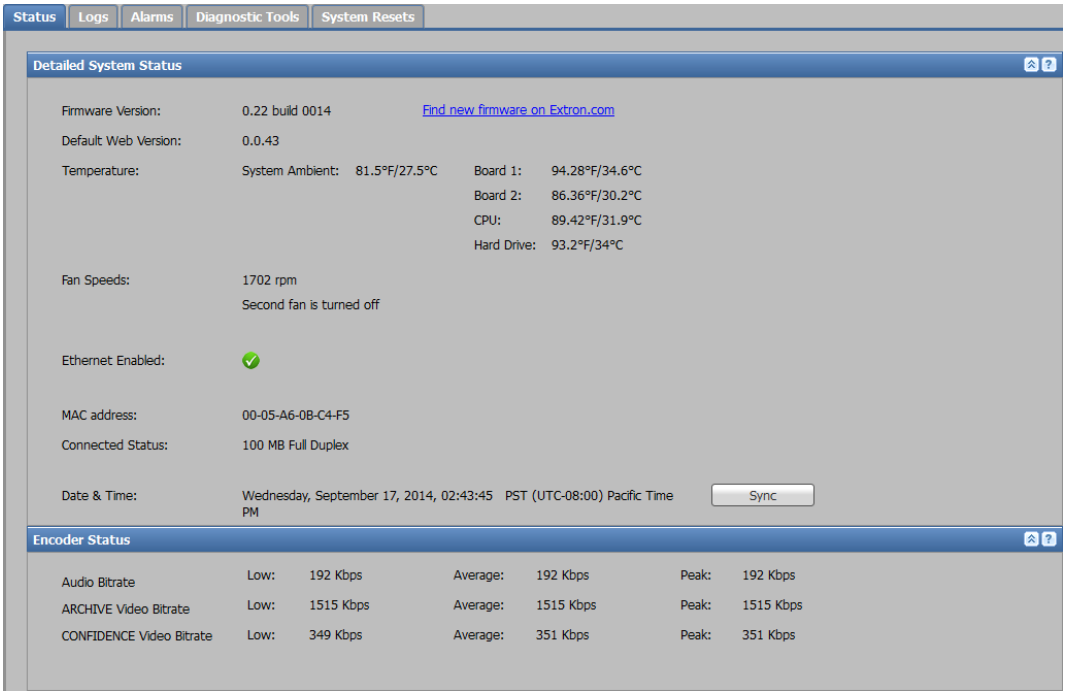


Figure 51. Troubleshooting, Status Page

All of the items on this page are read-only except the **Find new firmware on Extron.com** link, a hyperlink to the Extron Website, where you can search for updated firmware for the unit, and the **Sync** button which commands the unit to sync its internal clock time and date with the settings from an NTP server.

Logs

The **Logs** tab 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 panes. 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.

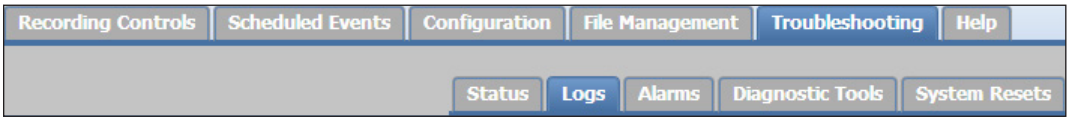


Figure 52. Troubleshooting, Logs

The Logs page opens, showing filtering controls and the log list (see figure 53).

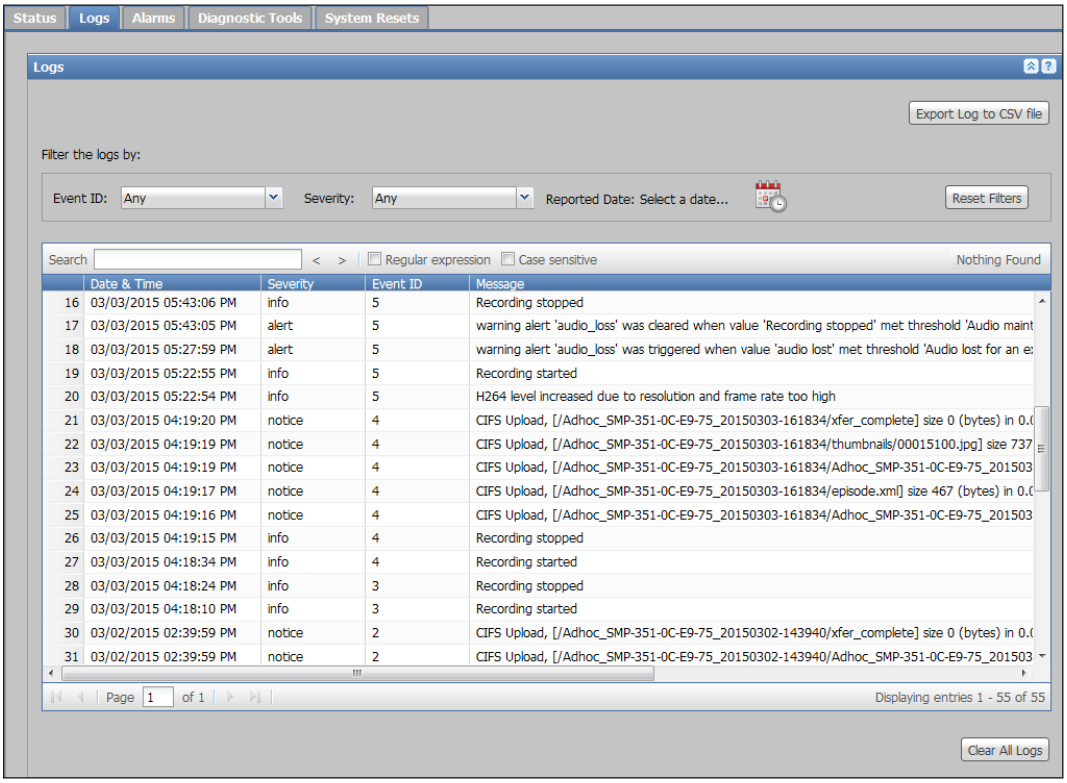


Figure 53. Troubleshooting, Logs Page

See the *SMP 351 Help* file to for further information available using the Web UI.

Alarms

The **Alarms** tab 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. The alarm list can be sorted, filtered, searched, or exported to a comma-separated values (CSV) file.

See the *SMP 351 Help* file for further information about the Alarms page.

To open this page, click the **Troubleshooting** tab at the top of the SMP 351 embedded Web pages, then click the **Alarms** tab on the second tier of tabs.

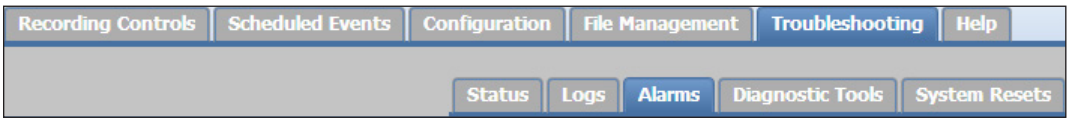


Figure 54. Troubleshooting, Alarms

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

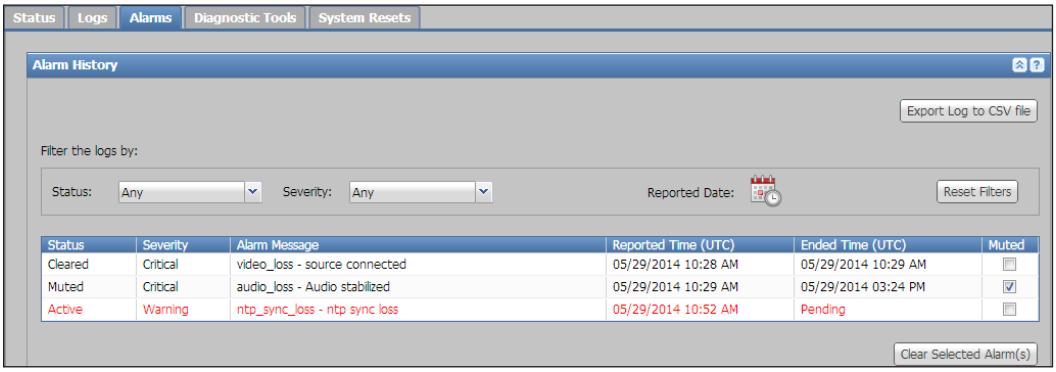


Figure 55. Troubleshooting, Alarms>Alarm History

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

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 you to generate a log file that you can send 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.

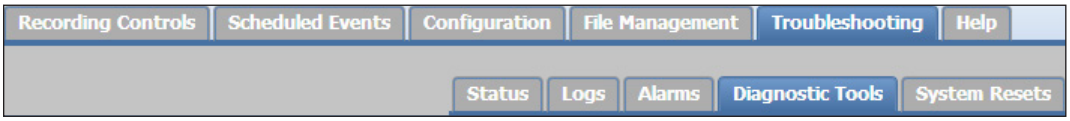


Figure 56. Troubleshooting, Diagnostic Tools

The `Diagnostic Tools` page opens.

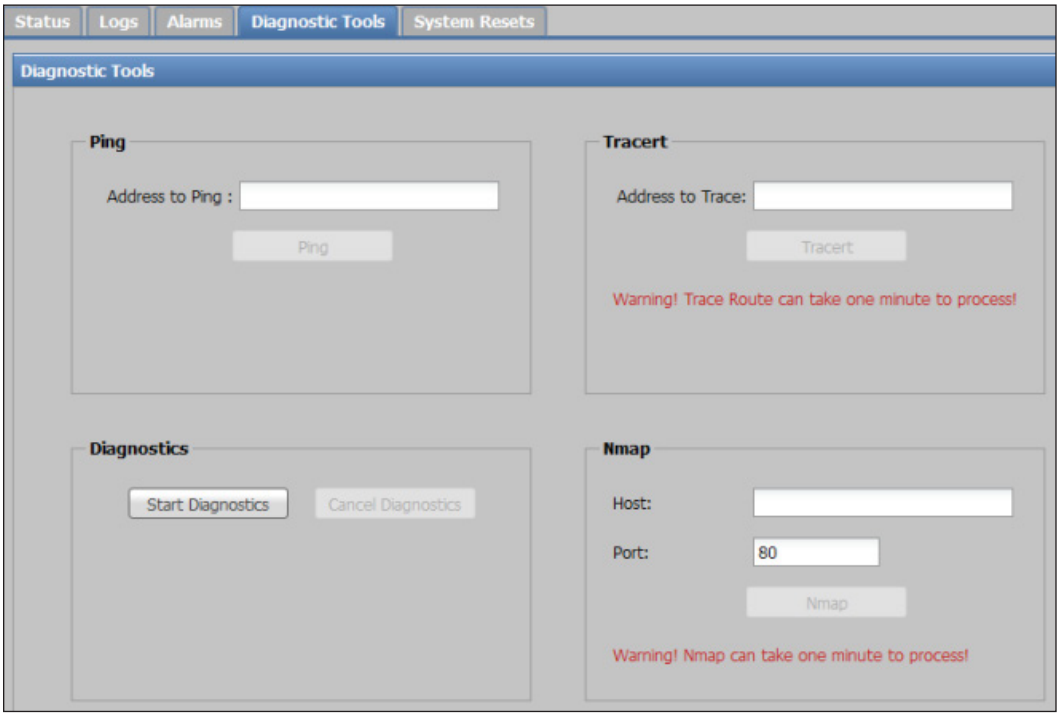
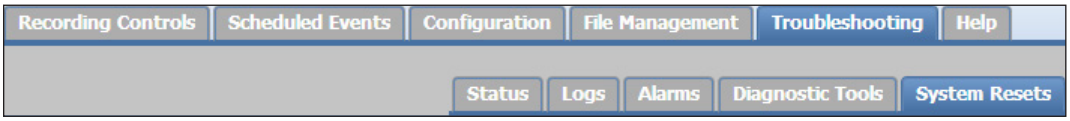


Figure 57. Troubleshooting, Diagnostic Tools

System Resets

The `System Resets` 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 or the front panel menu.

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 `System Resets` page opens to the `Reset` pane.

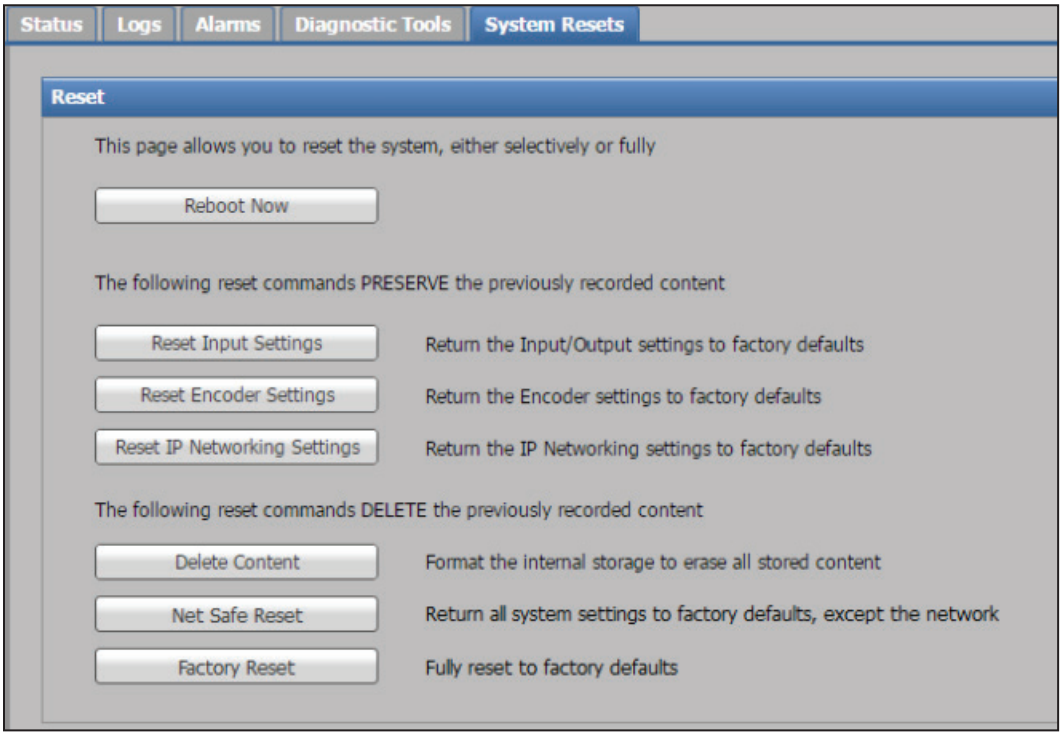


Figure 58. System Resets Page

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 SMP 351 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. You must connect again using the default addresses.

See the *SMP 351 Help* file for information about the system resets using the Web UI.

FlexOS Applications

This section provides basic instructions on how to use each supplemental plug-in application (app) available for the SMP 351.

When an app is downloaded and installed (see **Advanced Features** on page 77), a user must have administrator privileges to access the `Advanced Features` page and to use the applications. The apps are available on the SMP 351 product page at **www.extron.com**.

About the FlexOS App - Digital I/O Configurator

This application allows you to first configure and label the digital input/output (I/O) ports and then create up to 16 different monitors that check for conditions and apply actions when the conditions are met.

Full instructions for loading and using FlexOS Applications in the Web-based User Interface, are available in the *SMP 351 Help* file.

NOTE: Pull-up resistors are often used with buttons and switches that are wired as contact closures to ground. With a pull-up resistor, the input pin reads a high state when the button is not pressed (the circuit is open). When the button is pressed, it connects the input pin directly to ground, and the input pin reads a low state.

TIPS: Here are some guidelines on when to select one of the pull-up modes.

- Input with pull-up — Enable the pull-up resistor if the external device does not have the capability or is not configured to drive the SMP 351 digital input above the minimum logic high threshold (such as when connected to a switch contact closure to ground, or when a digital output drives an open collector or drain).
- Output with pull-up — Enable the pull-up resistor if the load requires that a logic high signal be driven from the source (the SMP) (when the load does not have its own internal pull-up resistor, for example). Pull-ups do not need to be used when driving loads that require only contact closure to ground (when controlling an Extron IPL T PC1, for example).

Remote Communication and Control

This section describes SIS programming and control of the SMP 351, including:

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

Connection Options

The SMP 351 Streaming Media Processor can be remotely connected via a host computer or other device (such as a control system) to the rear panel RS-232 port or LAN port, or the front panel USB Config port.

The SMP 351 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**.

RS-232 protocol defaults:

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

See RS-232 Port, for additional details on connecting the RS-232 port.

USB port details:

The Extron USB driver must be installed before use (see **Front Panel Configuration Port** on page 89) .

LAN port defaults:

DHCP:	`off`
SMP 351 IP address:	`192.168.254.254`
Subnet mask:	`255.255.0.0`
Gateway IP address:	`0.0.0.0`

RS-232 Port

The SMP 351 has a rear panel serial port (see **figure 3**, item E on page 12) that can be connected to a host device such as a computer running a HyperTerminal utility, or the Extron DataViewer utility. The port makes serial control of the media processor possible. Use the protocol information listed above to make the connection (see **Host-to-device Communications** on page 91).

Front Panel Configuration Port

The mini type B USB port is located on the front panel (see **Front Panel Features** on page 18). It connects to a host computer for configuration using SIS commands with DataViewer, available at **www.extron.com**.

To connect the SMP 351 to a host computer:

NOTE: If an Extron USB device has never been connected to the host computer, prior to connecting the SMP 351 config (USB) port for the first time, you must install and activate the USB driver. The simplest way to do this is to install Dataviewer (see **DataViewer** on page 119).

1. After the USB driver is loaded, connect a USB A to mini B cable between the Config port on the SMP 351 front panel and a USB port of the PC.
2. If this is the first time an Extron product is connected to the PC, the `Found New Hardware Wizard` dialog opens. The first screen offers to connect to Windows Update to search the Web for the appropriate driver. This is not necessary if the USB driver is already on your PC (see the note above).

Figure 59. Found New Hardware Wizard

Select **`No, not this time`** if the driver is already on the PC.

3. Click **`Next`**.

The following dialog opens:

Figure 60. Install the Software Automatically

4. Select **`Install the software automatically (Recommended)`**.

NOTE: You do not need to insert an installation disc.

5. Click **Next**.

   The PC locates the driver and installs it.

6. When the **Completed** dialog opens, click **Finish** to close the wizard.

   NOTE: The wizard opens only on the first occasion you connect the SMP 351 to a USB port. The wizard reopens only if you connect the SMP 351 to a different USB port or if you connect a different piece of equipment, requiring a different driver, to the same USB port.

7. Configure the SMP 351 as required.

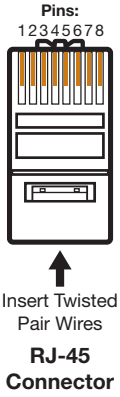
Ethernet (LAN) Port

The rear panel LAN connector on the device can be connected to an Ethernet LAN or WAN. Communication between the device and the control PC is via Telnet (a TCP socket using port 23). The Telnet port can be changed, if necessary, via SIS or using the SMP 351 user interface. This connection makes SIS control of the device possible using a computer 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.

Ethernet Connection

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

- **Crossover cable** — Direct connection between the computer and the SMP 351.
- **Patch (straight) cable** — Connection of the SMP 351 to an Ethernet LAN.



Crossover Cable
(for direct connection to a PC)

End 1 Pin	End 1 Wire Color	End 2 Pin	End 2 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 Pin	End 1 Wire Color	End 2 Pin	End 2 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 61. RJ-45 Ethernet Connector Pin Assignments

To establish a network connection to the SMP 351:

1. Open a TCP socket to port 23 using the SMP 351 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 SMP 351 responds with a copyright message including the name of the product, firmware version, part number, and the current date/time.

   a. If the SMP 351 is not password-protected, the device is ready to accept SIS commands immediately after it sends the copyright message.

   b. If the SMP 351 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.
   a. If the password is accepted, the device responds with `Login User` or `Login Administrator`.
   b. If the password is not accepted, the `Password` prompt reappears.

Connection Timeouts

The Ethernet link times out after a designated period of time of no communications. By default, this timeout value is 5 minutes, but the value can be changed.

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 SMP 351 accepts SIS (Simple Instruction Set) commands through the rear panel Remote RS-232 port, the front panel Configuration port, and the rear panel Ethernet (LAN) Port. SIS commands consist of one or more characters per command field. They do not require special characters to begin or end the command character sequence. Each response to an SIS command ends with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

SMP 351-initiated Messages

The SMP 351 initiates messages under specific conditions. No response is required from the host. The SMP 351-initiated messages are listed here (underlined).

↵© Copyright 2Ø14, Extron Electronics, SMP 351, V*n.nn*, 6Ø–1324-Ø1↵
Day, DD MMM YYYY HH:MM:SS↵

or

↵© Copyright 2Ø14, Extron Electronics, SMP 351 3G-SDI, V*n.nn*, 6Ø–1324-Ø2↵
Day, DD MMM YYYY HH:MM:SS↵

V*n.nn* is the firmware version number.

The SMP 351 sends the copyright messages under the following circumstances:

- If the SMP 351 is off and an RS-232 connection is already set up (the PC is cabled to the SMP 351 and a serial communication program such as HyperTerminal is open), the connected unit sends these messages via RS-232 when first powered on.
- If the SMP 351 is on, it sends the copyright messages when a Telnet connection to the SMP 351 is first opened. The day of the week, date, and time are shown when the SMP 351 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 SMP 351 is unable to execute the command, it returns an error response to the host. The error response codes and their descriptions are as follows:

E10 – 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

E26 – Maximum connections exceeded

E28 – Bad file name or file not found

Using the Command and Response Tables

The **Command and Response Tables** begin on page 96. Symbols used in the table represent variables in the command and response fields. Command and response examples are shown throughout the table. The SIS commands are not case sensitive. The ASCII to HEX conversion table below is for use with the command and response table.

ASCII to Hex Conversion Table

Space →	20	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F

Esc 1B CR 0D LF 0A

Figure 62. ASCII to Hex Conversion Table

Symbol definitions

↵ = CR/LF (carriage return/line feed)

← or ¦ = Carriage return (no line feed, hex ØD)

• = Space

Esc or W = Escape

X9 = Ø=disabled/unassigned/off/unmuted
1=enabled/assigned/on/muted

X10 = Configuration type
Ø = IP Config (ip.cfg)
2 = Box specific parameters (box.cfg)

X11 = Firmware version number

X12 = Device name (63 characters, max)
Must comply with internet host name standards.

X13 = Day, date, and time
(Day,•MM•DD•YY-HH:MM:SS)

X14 = Time zone acronym (2 to 6 letters)

X15 = 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.

X16 = 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

X17 = Subnet mask
Default: 255.255.0.0 (no padding)

X18 = Hardware MAC address
(00-05-A6-NN-NN-NN)

X19 Time in 10s of milliseconds to wait for characters coming into a serial port before terminating (min=Ø, max=32767 and default=1Ø=1ØØ ms). The response is returned with leading zeros.

X20 Time in 1Øs of milliseconds to wait between characters coming into a serial port before terminating (min=Ø, max=32767 and default=2=2Ø ms). The response is returned with leading zeros. Commands using both X17 and X20 must have both values = Ø or both set non-zero.

X21 Parameter to set either Length of message to receive or Delimiter value. L=#=byte count (min=Ø, max=32767. default=ØL=Ø 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.

X22 Priority status for receiving timeouts:
Ø=use **Send** data string command parameters (if they exist).
1=use **Configure** receive timeout command parameters instead (default=Ø).

X23 = Verbose mode
Ø=clear/none (default for Telnet connections
1=verbose mode (default for USB and RS-232 host control)
2=tagged responses for queries
3=verbose mode and tagged responses for queries

X25 = RS-232 baud rate (9600 [default], 19200, 38400, 57600, 115200)

X26 = RS-232 parity: single letter:
Odd, **E**ven, **N**one (default), **M**ark, **S**pace

X27 = RS-232 data bits: 7, 8 (default)

X28 = RS-232 stop bits: 1 (default), 2

X33 = Password: maximum length 12 characters. All alpha-numeric characters permitted except /,\,|,"space", and "*".

X40 = Encode profile
1=base
2=main
3=high

X41 = Output mode
1=video and audio
2=video only

X42 = Bit rate control type
Ø=VBR
1=CVBR
2=CBR

X43 = Video bit rate (2ØØ to 1ØØØØ)

X44 = Audio bit rate (8Ø, 96, 128, 192, 256, 32Ø)

X45 = GOP length (1 to 3Ø)

X46 = Record resolution
1=848x480p
2=1280x720p
3=1920x1080p

X47 = Record frame rate
1=30
2=25
3=24
4=15
5=12.5
6=12
7=10
8=5

X48 = Output refresh rate
1=60 Hz
2=50 Hz

X49 = Aspect Ratio

Ø1=Fill (the input automatically fills the entire output raster; default)

Ø2=Follow (the input is displayed in its native aspect ratio)

Ø3=Fit (the input is zoomed in to fill the entire output raster while maintaining its aspect ratio)

X50 = Record resolution (full):
Custom
1920x1080
1280x1024
1280x720
1024x768
848x480

X51 = Executive mode:
Ø=off
1=complete lockout (no front panel control)
2=menu lockout (menu only)
3=allow recording controls only

X67 = EDID User location (1, 2, and 3)

X68 = EDID resolution (see **table 1** on page **110**)

X69 = Port timeout in tens of seconds (zero padded. Default: ØØ3Ø = 3ØØ seconds)

X100 = Default name: combination of model name and last three pairs of MAC address (for example SMP-351-Ø7-8C-EC)

X500 = Stream selection
1 = Archive
3 = Confidence

X501 = Input number 1 to 5
1 or 2 digit command,
2 digit response

X502 = Output channel
1 = A (input 1 and 2)
2 = B (input 3, 4, and 5)

X504 = Input video format
1 = YUVp / HDTV (default)
2 = YUVi
3 = Composite
4 = 3G-SDI
5 = HD-SDI
6 = SDI
7 = Auto-SDI (Input 5 default)

X505 = Output Selection
1 = ChA loopout
2 = preview

X506 = Audio selection
4ØØØØ= Analog Input A (Left)
4ØØØ1= Analog Input A (Right)
4ØØØ2= Digital input A (Left)
4ØØØ3= Digital input A (Right)
4ØØØ4= Analog Input B (Left)
4ØØØ5= Analog Input B (Right)
4ØØØ6= Digital input B (Left)
4ØØØ7= Digital input B (Right)
6ØØØØ= Output (Left, for audio mute control only)
6ØØØ1= Output (Right, for audio mute control only)

X507 = Audio level in 0.1 dB steps
(-180 to 240 = -18.0 to +24.0 dB)

X510 = Overscan
Ø = 0 % (default: HDMI inputs)
1 = 2.5 %
2 = 5.0 % (default: component input)

X511 = HDCP status
Ø = no sink/source detected
1 = HDCP detected,
2 = sink/source detected but no HDCP

X512 = HDCP notification
Ø = on (green HDCP notification-screen)
1 = off (mute output to black)

X514 = Input name, up to 16 characters (default: "Input *X*" where "*X*" is the input number)

X530 = User/Encoder/Layout Preset number (1 to 16)

X531 = Preset name (up to 16 characters)

X532 = Input preset number (1 to 128)

X538 = Metadata parameter
0=Contributor
1=Coverage
2=Presenter
3=Date (view only)
4=Description
5=Format
6=Identifier (view only)
7=Language
8=Publisher
9=Relation
10=Rights
11=Source
12=Subject
13=Title
14=Type
15=SystemName
16=Course

X539 = Metadata value: 127 character maximum

X540 = Recorder status
0 = Stop
1 = Start
2 = Pause

X541 = Recorder time in minutes (1-60)

X542 = Record destination
`Auto`
`Internal`
`usbfront/`*`VOLUMEn`*
`usbrear/`*`VOLUMEn`*

X543 = Filesize (in megaBytes)

X544 = 0=recording disabled
1=single recording enabled
2=dual recording enabled

X545 = Thumbnail size
0=normal (default)
1=follows archive resolution

X551 = Video Output Frame Rate
1 = 30 Hz
2 = 25 Hz
3 = 24 Hz
4 = 15 Hz
5 = 12.5 Hz
6 = 12 Hz
7 = 10 Hz
8 = 5 Hz

X564 = Audio delay (0 to 999 ms)

X565 = Test patterns (0 to 8)
0= Off (default)
1= Color bars
2= Aspect ratio 1.33
3= Aspect ratio 1.78
4= Aspect ratio 1.85
5= Crop
6= Pulse
7= Timestamp
8= Universal OSD

X581 = Front panel audio level indication
`-15ØØ` to `Ø`
full bars =`Ø`
no bars = ≤`-6ØØ`
format: `left*right`
Example: `-58*-63`

X603 = Pixel phase adjustment (0 to 63)
Default: 32

X604 = Horizontal and Vertical start (0 to 255)
Default: 128

X605 = Total pixels: up to ± 512 of the default value for the detected rate

X606 = Active lines: up to ± 256 of the default value for the detected resolution (range varies based on input resolution)

X607 = Active pixels: up to ± 512 of the default value for the detected resolution (range varies based on input resolution)

X608 = Picture adjust (0 to 127) default: 64

X609 = Horizontal centering (varies based on archive resolution)

X611 = Vertical centering (varies based on archive resolution)

X612 = Horizontal size (120 to 4096)

X613 = Vertical size (64 to 4096)

X620 = `Ø` = Off or disable
`1` = On or enable

X621 = SNMP contact name text, up to 64 characters (default="`Not Specified`")

X622 = SNMP location, up to 64 characters (default="`Not Specified`")

X623 = SNMP public community string, up to 64 characters (default="`public`")

X624 = SNMP private community string, up to 64 characters (default="`private`")

NOTE: SNMP names and community strings can be up to 64 alphanumeric characters including hyphens, underscores and periods.

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 **SMP 351 Rear Panel Reset** on page 16) was executed and the default factory firmware is running. An exclamation point (!) indicates corrupted firmware.			
Firmware version	`Q or 1Q`	X11↵	Firmware version to 2 decimal places (`1.ØØ`)
Firmware and build version	`*Q/q`	X11↵	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`	X11 ↵	The bootstrap firmware is not user replaceable but you may need this information for troubleshooting.
Factory Firmware Version	`3Q`	X11 plus Web ver.-desc-UL date/time↵	Factory installed firmware is not user replaceable. This firmware is the version the SMP 351 reverts to after a mode 1 reset.
Example:	`3Q`	`1.ØØ.ØØØØ-b2325(1.81LX-SMP 351 -Sat, Ø1 Nov 2Ø14 2Ø:1Ø UTC)`↵	
Updated firmware version	`4Q`	X11 plus Web ver.-desc-UL date/time↵	Use this command to find out which version of firmware has been uploaded into the SMP 351.
Example:	`4Q`	`1.ØØ.ØØØ4-b2635*(1.81LX-SMP 351 -Sun, Ø2 Nov 2Ø14 ØØ:12 UTC)`↵	
Query part number	`N`	`6Ø-1324-Ø1`↵	`6Ø-1324-Ø1`: SMP 351 or `6Ø-1324-Ø2`: SMP 351 3G-SDI
Query model name	`1I`	`SMP•351`↵	SMP 351 or SMP 351 3G-SDI
Query model description	`2I`	`Streaming•Media•Processor` ↵	
Query system memory usage	`3I`	#Bytes used out of #KBytes↵	
View number of connected users	`1ØI`	*NN*↵	# 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 link status	`13I`	Current link state `(up/down)*` speed in MB `(1Ø/1ØØ/1ØØØ)*` mode `(full/half)`	
View file transfer config	`38I`		in json format
View active alarms	`39I`	`[name:alarm_name],[level:alarm_level]...]`	

NOTES: X11 = Version number — Firmware version number to second decimal place (**x.xx**); Version and Build number adds four digits (**x.xx.xxxx**) to the Version number

Command and Response Tables (continued)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Set unit name	Esc X12 CN ←	Ipn X12 ↵	
Set unit name to default	Esc • CN ←	Ipn X100 ↵	
View unit name	Esc CN ←	X12 ↵	
View Telnet connections	Esc CC ←	*n* ↵ Icc*n* ↵	*n*=number of active IP connections. Verbose mode 2/3
Set verbose mode	Esc X22 CV ←	Vrb X22 ↵	
View verbose mode	Esc CV ←	X22 ↵	
System Commands			
Backup/Restore			
Save configuration	Esc 1* X10 XF ←	Cfg1* X10 ↵	Save configuration to file location (/nortxe-backup).
Restore configuration	Esc Ø* X10 XF ←	CfgØ* X10 ↵	Load configuration from file location (/nortxe-backup).
Resets			
Reboot system	Esc 1BOOT ←	Boot1 ↵	Complete system reboot.
Restart the network	Esc 2BOOT ←	Boot2 ↵	
Reset flash	Esc ZFFF ←	Zpf ↵	Reset flash memory (excludes recording files).
System Reset (factory defaults)	Esc ZXXX ←	Zpx ↵	Resets device to default and deletes recorded files.
Reset all device settings and delete recording files	Esc ZY ←	Zpy ↵	Reset to default except IP address, delete all user and recorded 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**, plus returns the IP address and subnet mask to defaults.
Front panel lock (executive mode)			
Set Executive mode	X51 X	Exe X51 ↵	
View Executive mode	X	X51 ↵	

NOTES:

X10 = Configuration type
Ø = IP config (ip.cfg)
2 = Box specific parameters (box.cfg)

X12 = Unit name
Unit name is a text string of up to 63 characters drawn from the alphabet (A-Z), digits (0-9), and the minus sign/hyphen (-). The first character must be an alpha character. The last character must not be a minus.

X22 = Verbose/Response mode
0=clear/none (default for Telnet connections)
1=verbose mode (default for USB and RS-232 host control)
2=tagged responses for queries
3=verbose mode and tagged responses for queries
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 ↵)

X51 = Executive mode
0=Off
1=complete lockout (no front panel control)
2=menu lockout
3=Allow recording controls only

X100 = Default name
Combination of model name and last three pairs of MAC address
(Example: SMP-351-07-8C-EC)

Command and Response Tables (continued)

Command	SIS Command (host to unit)	Response (unit 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 1Ø24 or higher (unless resetting to the default port number or disabling the port by setting it to Ø).			
Telnet port			
Set Telnet port map	Esc [port#]MT ↵	Pmt[port#]↵	
Reset Telnet port map	Esc 23MT ↵	PmtØØ23↵	Reset the Telnet port to the default value (23).
Disable Telnet port	Esc ØMT ↵	PmtØØØØ↵	
View Telnet port map	Esc MT ↵	[port#]↵	
Web port			
Set Web port map	Esc [port#]MH ↵	Pmh[port#]↵	
Reset Web port map	Esc 8ØMH ↵	PmhØØ8Ø↵	Reset the Web port to the default value (80).
Disable Web port	Esc ØMH ↵	PmhØØØØ↵	
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 ↵	PmapAØØ161↵	Reset the SNMP port to the default value (161).
Disable SNMP port	Esc AØPMAP ↵	PmapAØØØØ↵	
View SNMP port map	Esc APMAP ↵	[port#]↵	
SSH port			
Set SSH port map	Esc B[port#]PMAP ↵	PmapB[port#]↵	
Reset SSH port map	Esc B22Ø23PMAP ↵	PmapB22Ø23↵	Reset the SSH port to the default value (22023).
Disable SSH port	Esc BØPMAP ↵	PmapBØØØØ↵	
View SSH port map	Esc BPMAP ↵	[port#]↵	
SSL port			
Set SSL port map	Esc S[port#]PMAP ↵	PmapS[port#]↵	
Reset SSL port map	Esc S443PMAP ↵	PmapSØØ443↵	Reset the SSL port to the default value (443).
Disable SSL port	Esc SØPMAP ↵	PmapSØØØØ↵	
View SSL port map	Esc SPMAP ↵	[port#]↵	

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
SNMP (Simple Network Management Protocol)			
SNMP unit contact			
Set unit contact	Esc C X621 SNMP ←	SnmpC* X621 ↵	Sets the unit contact to X621.
Set unit contact to default	Esc C • SNMP ←	SnmpC*Not•Specified ↵	Sets the unit contact to the default setting.
View unit contact	Esc CSNMP ←	X621 ↵	View the unit contact.
SNMP unit location			
Set unit location	Esc L X622 SNMP ←	SnmpL* X622 ↵	Sets the unit location to X622.
Set unit location to default	Esc L•SNMP ←	SnmpL*Not•Specified ↵	Sets the unit location to the default setting.
View unit location	Esc LSNMP ←	X622 ↵	View the unit location.
SNMP community strings			
Set public community string	Esc P X623 SNMP ←	SnmpP* X623 ↵	Sets public community string to X623.
Set public community string to default	Esc P•SNMP ←	SnmpP*public ↵	Sets community string to the default.
View public community string	Esc PSNMP ←	X623 ↵	View the public community string.
Set private community string	Esc X X624 SNMP ←	SnmpX* X624 ↵	Sets private community string to X624.
Set private community string to default	Esc X•SNMP ←	SnmpX*private ↵	Sets private community string to the default setting.
View private community string	Esc XSNMP ←	X624 ↵	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 ←	X620 ↵	View the SNMP access setting.

NOTES:

X620 = Ø = Off or disable (default)
1 = On or enable

X621 = SNMP contact name text, up to 64 alphanumeric characters, hyphens, underscores and period. default="Not Specified")

X622 = SNMP location, up to 64 alphanumeric characters, hyphens, underscores and period. default="Not Specified")

X623 = SNMP public community string, up to 64 alphanumeric characters, hyphens, underscores and period. (default="public")

X624 = SNMP private community string, up to 64 alphanumeric characters, hyphens, underscores and period. (default="private")

Command and Response Tables (continued)

Command	SIS Command (host to unit)	Response (unit to host)	Additional Description
IP Setup Commands			
Set date/time	Esc MM/DD/YY-HH:MM:SS CT ←	Ipt•X13↵	Set the date and time.
View date/time	Esc CT ←	X13↵	View the date and time.
Set time zone Example:	Esc X14 * TZON ← Esc PST * TZON ←	Tzon•X14*X15↵ Tzon•PST*(UTC-08:00) Pacific Time↵	
View time zone Example:	Esc TZON ←	X14*X15↵ PST*(UTC-08:00) Pacific Time↵	Verbose mode 2/3 response adds Tzon• to beginning of string
View all time zones	Esc * TZON ←	X14*X15↵… X14*X15↵↵	Repeats for all time zones Verbose mode 2/3 adds Tzon• to beginning of string
Set DHCP on	Esc 1DH ←	Idh1↵	Sets DHCP to on.
Set DHCP off	Esc ØDH ←	IdhØ↵	Sets DHCP to off.
View DHCP mode	Esc DH ←	X9↵	Ø=DHCP off (default) 1=DHCP on.
Set IP address, subnet mask, gateway	Esc 1*X16*X17*X16 CISG←	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 X16 CI ←	Ipi•X16↵	
View IP address	Esc CI ←	X16↵	
View hardware MAC address	Esc CH ←	X18↵ Iph•X18↵	View the hardware MAC address of the unit. In verbose mode 2/3
Set subnet mask	Esc X17 CS ←	Ips•X17↵	
View subnet mask	Esc CS ←	X17↵	
Set gateway IP address	Esc X16 CG ←	Ipg•X16↵	Set the gateway IP address.
View gateway IP address	Esc CG ←	X16↵	View the gateway IP address.
Set DNS server IP address	Esc X16 DI ←	Ipd•X16↵	Set the DNS server IP address (default: Ø.Ø.Ø.Ø).
View DNS server IP address	Esc DI ←	X16↵	View the DNS server IP address.
Set current port timeout	Esc Ø * X69 TC ←	PtiØ*X69↵	
View current port timeout	Esc Ø TC ←	X69↵	
Set global IP port timeout	Esc 1 * X69 TC←	Pti1*X69↵	
View global IP port timeout	Esc 1 TC←	X69↵	

Command and Response Tables (continued)

Command	SIS Command (host to unit)	Response (unit to host)	Additional Description
RS-232 Port			
Configure serial port parameters	Esc 1*X25,X26,X27,X28CP↵	CpnØ1•CcpX25,X26,X27,X28↵	
Reset serial port	Esc 1*96ØØ,n,8,1CP↵	CpnØ1•CcpX25,X26,X27,X28↵	
View serial port settings	Esc 1CP↵	X25,X26,X27,X28↵	
Set serial receive timeout	Esc 1*X19*X20*X22*X21CE↵	CpnØ1•CceX19,X20,X22,X21↵	
View serial port receive timeout	Esc 1CE↵	X19,X20,X22,X21↵	

NOTES:

X9 = On/off — Ø=disabled/unassigned/off/unmuted; 1=enabled/assigned/on/muted

X13 = Local date/time — Set: MM/DD/YY-HH:MM:SS. Read: day of week, date, month, year HH:MM:SS (for instance; Fri, 21 Jun 2ØØ2 1Ø:54:ØØ)

X14 = Time Zone — Acronym (2 to 6 letters) Example: PST for Pacific Standard Time

X15 = Time zone offset — GMT offset value (–12:ØØ to 14:ØØ) representing hours and minutes (HH:MM) local time is offset from GMT time and includes the time zone name. Example: PST*(UTC-Ø8:ØØ) Pacific Time

X16 = IP Address — default IP address: 192.168.254.254; default Gateway: Ø.Ø.Ø.Ø; default DNS: Ø.Ø.Ø.Ø

X17 = Subnet Mask — default: 255.255.Ø.Ø

X18 = Hardware MAC address — ØØ-Ø5-A6-xx-xx-xx

X19 = Port timeout — Time in tens of milliseconds to wait for characters coming into a serial port before terminating (min=Ø, max=32767, default: 1Ø = 1ØØ ms). The response is returned with leading zeros.

X20 = Intercharacter timeout — Time in tens of milliseconds to wait between characters coming into a serial port before terminating (min=Ø, max=32767. Default: 2 = 2Ø ms). The response is returned with leading zeros. Commands using both X19 and X20 must have both values = Ø or both set to non-zero.

X21 = Primary port status — Parameter to set either the **L**ength of message to receive, or the **D**elimiter value. L=#=byte count (min=Ø, max=32767. Default=ØL=Ø 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.

X22 = Length delimiter — Priority status for receiving timeouts: Ø=use Send data string command parameters when available. 1=use Configure receive timeout command parameters (default=Ø).

X25 = RS-232 baud rate — 9600 (default), 19200, 38400, 57600, 115200 bps

X26 = RS-232 parity — **O**dd, **E**ven, **N**one (default), **M**ark, **S**pace

X27 = RS-232 data bits — 7, 8 (default)

X28 = RS-232 stop bits — 1 (default), 2

X69 = Port timeout — In tens of seconds, zero padded (Default: ØØØ3Ø = 3ØØ seconds)

Command and Response Tables (continued)

Command	ASCtII command (host to device)	Response (device to host)	Additional description
Password and Security Settings			
Set administrator password	Esc X33 CA ↵	Ipa • X33 ↵	X33 = Up to 12 alpha-numeric characters
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 X33 CU ↵	Ipu • X33 ↵	X33 = Up to 12 alpha-numeric characters.
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
File Commands			
Change or create 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 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 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: X33 = Password: maximum length 12 characters. All alpha-numeric characters and ASCII symbols permitted except \ , / , | , "space", and "*"

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Input Selection			
Select input	X501*X502!	InX501*X502↵	Switches channel X502 to input X501.
View selected input	X502!	X501↵	View the input source X501 for channel X502.
Set input 3 format	3*X504\	Typ3*X504↵	
View input 3 format	3\	X504↵	
Set input name	EscX501,X514NI←	NmiX501,X514↵	Set the input source X501 name to X514.
View input name	EscX501NI←	X514↵	
View input selection/channel	32I	ChAX501*ChBX501↵	
Input Configuration			
Input video aspect ratio			
Set to fill	EscX501*1ASPR←	AsprX501*Ø1↵	Sets input X501 to fill.
Set to follow	EscX501*2ASPR←	AsprX501*Ø2↵	Sets input X501 to follow.
Set to fit (zoom)	EscX501*3ASPR←	AsprX501*Ø3↵	Sets input X501 to fit.
View aspect setting	EscX501ASPR←	X49↵	
Auto-Image and Memory			
Enable/disable Auto-Image per input	X501*X9A	ImgX501*X9↵	
View Auto-Image	X501*A	X9↵	
Performs Auto-Image to current output	X502A	ImgX502↵	Performs Auto-Image to the current input selection of output X502.
Set Auto Memory on	Esc1AMEM←	Amem1↵	
Set Auto Memory off	EscØAMEM←	AmemØ↵	
View Auto Memory	EscAMEM←	X9↵	
Audio			
View front panel audio level indicators Example:	34I	X581*X581↵ -58*-63↵	left*right Verbose 2/3 mode adds: Inf34

NOTES:

X9 = On/off	Ø=disabled/unassigned/off/unmuted 1=enabled/assigned/on/muted
X49 = Aspect ratio	Ø1=Fill (the input automatically fills the entire output raster; default) Ø2=Follow (the input is displayed in its native aspect ratio) Ø3=Fit (the input is zoomed in to fill the entire output raster while maintaining its aspect ratio)
X501 = Input number	1 to 5
X502 = Output channel	1=A (Input 1 and 2) 2=B (Input 3, 4, and 5)
X504 = Input video format	1 to 3 (see page 94)
X514 = Input name	Name (up to 16 characters) Default is "Input *X*" where "*X*" is the input number
X581 = Front panel audio level	left*right (see page 95)

Command and Response Tables (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Recording			
Stop recording	Esc YØ RCDR↵	RcdrYØ↵	
Start recording	Esc Y1 RCDR↵	RcdrY1↵	
Pause recording	Esc Y2 RCDR↵	RcdrY2↵	
View record status	Esc Y RCDR↵	X540↵	
Extend record time	Esc E X541 RCDR↵	RcdrE X541↵	For scheduled recordings only, extend by X541 minutes.
Add chapter marker	Esc B RCDR↵	RcdrB↵	
Execute Swap	%	Tke↵	Swap channel A and channel B positions.
Recording status (Dual recording disabled)	I	<ChA X501 * ChB X501> * <X540>*<free space in KBytes> * <time record> * <time remain>↵	
Recording status (Dual recording enabled)	I	<ChA X501 * ChB X501>*<X540>*<internal*secondary destination> * <internal free space*external free space> * <time record>*<time remain_internal*time external>↵	
View recording duration/elapsed time of recording	35I	HH:MM:SS↵	Verbose 2/3 mode adds: Inf35 Displays ØØ:ØØ:ØØ when not recording
View record time remaining (dual recording disabled)	36I	X542 HH:MM:SS↵	Verbose 2/3 mode adds: Inf36 ØØ:ØØ:ØØ when not recording
View record time remaining (dual recording enabled)	36I	Internal HH:MM:SS* X542 HH:MM:SS↵	Verbose 2/3 mode: Inf36*HH:MM:SS ØØ:ØØ:ØØ when not recording
View record destination	37I	X542↵	Dual recording disabled. Verbose 2/3 mode adds: Inf37
View record destination	37I	Internal * X542↵	Dual recording enabled Verbose 2/3 mode adds: Inf37
Metadata commands			
Set output metadata	Esc M X538 * X539 RCDR↵	RcdrM X538 * X539↵	
Example:	Esc M2*ProfessorX RCDR↵	RcdrM2*ProfessorX↵	
View output metadata	Esc M X538 RCDR↵	X539↵	
Example:	Esc M2 RCDR↵	ProfessorX↵	

NOTES:

X501	= Input number	1 to 5
X538	= Metadata parameter	See page 95.
X539	= Metadata value	Up to 127 alpha-numeric characters. All metadata values are cleared to be ready for the next recording session when it is initiated.
X540	= Recorder status	Ø=stop 1=record 2=pause
X541	= Time	MM (0 to 60 minutes)
X542	= Record destination	Auto Internal usbfront/*VOLUMEn* usbrear/*VOLUMEn* N/A (not available)

Metadata cannot be updated once the recording starts. New metadata is applied to the next recording.

Command and Response Tables (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Presets			
User Presets			
Recall user preset	1*X502*X530.	1RprX502*X530↵	Set channel X502 to preset number X530.
Save user preset	1*X502*X530,	1SprX502*X530↵	
Set user name	Esc1*X530,X531PNAM←	Pnam1*X530,X531↵	Set preset number X530 to name X531.
View user name	Esc1*X530PNAM←	X531↵	
View user presets	52*X501#	X9[1] X9[2] X9[3...] X9[16]↵ PreUX501X9[1] X9[2] X9[3...] X9[16]↵	Verbose mode 1 Verbose mode 2/3
Input Presets			
Recall preset	2*X501*X532.	2RprX501*X532↵	
Save preset	2*X501*X532,	2SprX501*X532↵	
Set preset name	Esc2*X532,X531PNAM←	Pnam2*X532,X531↵	
View preset name	Esc2*X532PNAM←	X531↵	
Delete input preset	EscX2*X532PRST←	PrstX2*X532↵	
View input presets	51#	X9[1] X9[2] X9[3...] X9[128]↵ PreIX9[1] X9[2] X9[3...] X9[128]↵	Verbose mode 0/1 Verbose mode 2/3.
Encoder Presets			
Recall preset	4*X500*X530.	4RprX500*X530↵	
Save preset	4*X500*X530,	4SprX500*X530↵	
Set preset name	Esc4*X530,X531PNAM←	Pnam4*X530,X531↵	Set encoder preset number X530 to name X531.
View encoder preset name	Esc4*X530PNAM←	X531↵	
Reset encoder preset to default	EscX4*X530PRST←	PrstX4*X530↵	
Layout Presets			
Save layout preset	7*X530,	7SprX530↵	Save layout preset to X530.
Recall layout preset	7*X530.	7RprX530↵	Recall layout preset X530 including input selections.
Recall layout preset	8*X530.	8RprX530↵	Recall layout preset X530 without input selections.
Set preset name	Esc7*X530*X531PNAM←	Pnam7*X530,X531↵	Set X530 to X531.
View preset name	Esc7*X530PNAM←	X531↵	
Reset layout preset to defaults	EscX7*X530PRST←	PrstX7*X530↵	Reset X530 to defaults

NOTES:

X9 = Assigned or unassigned	Ø=disabled or unassigned 1=enabled or assigned
X500 = Stream selection	1 = Archive 3 = Confidence
X501 = Input number	1 to 5
X502 = Output channel	1=A 2=B
X530 = User/Encoder/Layout Preset Number	1 to 16
X531 = Preset Name	Up to 16 characters
X532 = Input preset number	1 to 128

Command and Response Tables (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Description
Input adjustments (Input 3 only)			
Pixel Phase			
Set pixel phase	Esc 3*X603 PHAS←	Phas3*X603↵	Set input 3 to pixel phase X603
Increment pixel phase value	Esc 3+PHAS←	Phas3*X603↵	Increment pixel phase of input 3
Decrement pixel phase value	Esc 3-PHAS←	Phas3*X603↵	Decrement pixel phase of input 3
View value	Esc 3 PHAS←	X603↵	View pixel phase X603 of input 3
Total Pixels			
Set total pixels value	Esc 3*X605 TPIX←	Tpix3*X605↵	Set total pixels (per line) for input 3 to X605.
Increment total pixels value	Esc 3+TPIX←	Tpix3*X605↵	Increment the total pixels X605 for input 3 by one pixel.
Decrement total pixels value	Esc 3-TPIX←	Tpix3*X605↵	Decrement the total pixels X605 for input 3 by one pixel.
View total pixels	Esc 3 TPIX←	X605↵	View total pixels for input 3.
Horizontal Start			
Set horizontal start	Esc 3*X604 HSRT←	Hsrt3*X604↵	Set the horizontal start value for input 3 to X604.
Increment horizontal start	Esc 3+HSRT←	Hsrt3*X604↵	Increment the horizontal start value X604 for input 3 by one pixel.
Decrement horizontal start	Esc 3-HSRT←	Hsrt3*X604↵	Decrement the horizontal start value X604 for input 3 by one pixel.
View horizontal start	Esc 3 HSRT←	X604↵	View the horizontal start value X604 of input 3.
Vertical Start			
Set vertical start	Esc 3*X604 VSRT←	Vsrt3*X604↵	Set the vertical start value of input 3 to X604.
Increment vertical start	Esc 3+VSRT←	Vsrt3*X604↵	Increment the vertical start value X604 for input 3 by one pixel.
Decrement vertical start value	Esc 3-VSRT←	Vsrt3*X604↵	Decrement the vertical start value X604 for input 3 by one pixel.
View vertical start	Esc 3 VSRT←	X604↵	View the vertical start value X604 of input 3.

NOTES:

X603 = Pixel phase	Ø to 63 (default: 32)
X604 = Horizontal and vertical start	Ø to 255 (default: 128)
X605 = Total pixels	Up to ±512 of the default value for the detected range

Command and Response Tables (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Description
Active Pixels			
Set active pixels	Esc 3*X607APIX↵	Apix3*X607↵	Set the active pixels per line for input 3 to X607.
Increment active pixels	Esc 3+APIX↵	Apix3*X607↵	Increment the active pixels X607 for input 3 by one pixel.
Decrement active pixels	Esc 3-APIX↵	Apix3*X607↵	Decrement the active pixels X607 for input 3 by one pixel.
View active pixels	Esc 3APIX↵	X607↵	View the active pixels value X607 of input 3.
Active Lines			
Set active lines	Esc 3*X606ALIN↵	Alin3*X606↵	Set active lines for input 3 to X606.
Increment active lines	Esc 3+ALIN↵	Alin3*X606↵	Increment the active lines X606 for input 3 by one pixel.
Decrement active lines	Esc 3-ALIN↵	Alin3*X606↵	Decrement the active lines X606 for input 3 by one pixel.
View active lines	Esc 3ALIN↵	X606↵	View the active lines value X606 of input 3.

NOTES: X606 = Active lines — Up to ±256 of the default value for the detected resolution
X607 = Active pixels — Up to ±512 of the default value for the detected resolution

Command and Response Tables (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Picture adjustments			
Color (NTSC and PAL inputs only)			
Specify a value	Esc X502 * X608 COLR ←	Colr X502 * X608 ↵	Sets color level to X608.
Increment value	Esc X502 + COLR ←	Colr X502 * X608 ↵	Increments color level.
Decrement value	Esc X502 – COLR ←	Colr X502 * X608 ↵	Decrements color level.
View	Esc X502 COLR ←	X608 ↵	View current setting.
Tint (NTSC input only)			
Specify a value	Esc X502 * X608 TINT ←	Tint X502 * X608 ↵	Sets tint level to X608.
Increment value	Esc X502 + TINT ←	Tint X502 * X608 ↵	Increments tint level.
Decrement value	Esc X502 – TINT ←	Tint X502 * X608 ↵	Decrements tint level.
View	Esc X502 TINT ←	X608 ↵	View current setting.
Contrast			
Specify a value	Esc X502 * X608 CONT ←	Cont X502 * X608 ↵	Sets contrast level to X608.
Increment value	Esc X502 + CONT ←	Cont X502 * X608 ↵	Increments contrast level.
Decrement value	Esc X502 – CONT ←	Cont X502 * X608 ↵	Decrements contrast level.
View	Esc X502 CONT ←	X608 ↵	View current setting.
Brightness			
Specify a value	Esc X502 * X608 BRIT ←	Brit X502 * X608 ↵	Sets brightness level to X608.
Increment value	Esc X502 + BRIT ←	Brit X502 * X608 ↵	Increments brightness level.
Decrement value	Esc X502 – BRIT ←	Brit X502 * X608 ↵	Decrements brightness level.
View	Esc X502 BRIT ←	X608 ↵	View current setting.
Horizontal centering			
Specify a value	Esc 1 * X502 * X609 HCTR ←	Hctr X502 * X609 ↵	Set horizontal centering to X609.
Increment value	Esc 1 * X502 + HCTR ←	Hctr X502 * X609 ↵	Shift window right.
Decrement value	Esc 1 * X502 – HCTR ←	Hctr X502 * X609 ↵	Shift window left.
View	Esc 1 * X502 HCTR ←	X609 ↵	View current setting.
Horizontal size			
Specify a value	Esc 1 * X502 * X612 HSIZ ←	Hsiz X502 * X612 ↵	Set horizontal size (width) to X612.
Increment value	Esc 1 * X502 + HSIZ ←	Hsiz X502 * X612 ↵	Increase the width of the window.
Decrement value	Esc 1 * X502 – HSIZ ←	Hsiz X502 * X612 ↵	Decrease the width of the window.
View	Esc 1 * X502 HSIZ ←	X612 ↵	View current setting.

NOTES:

X502 = Output channel	Ø1=A Ø2=B
X608 = Picture adjust	ØØØ to 127, default: Ø64 (3-digit response)
X609 = Horizontal centering	The value corresponds to the horizontal position of the left edge of the window. The range varies such that the window never goes completely off-screen (5-digit response).
X612 = Horizontal size	ØØ12Ø to Ø4Ø96 (5-digit response).

NOTE: Horizontal centering and horizontal size 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.

Command and Response Tables (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Vertical Centering			
Specify a value	Esc 1*X502*X611VCTR ←	VctrX502*X611 ↵	Set vertical centering to X611.
Increment value	Esc 1*X502+VCTR ←	VctrX502*X611 ↵	Shift window down.
Decrement value	Esc 1*X502–VCTR ←	VctrX502*X611 ↵	Shift window up.
View	Esc 1*X502VCTR ←	X611 ↵	View current setting.
Vertical size			
Specify a value	Esc 1*X502*X613VSIZ ←	VsizX502*X613 ↵	Set vertical size (height) to X613.
Increment value	Esc 1*X502+VSIZ ←	VsizX502*X613 ↵	Increase the height of the window.
Decrement value	Esc 1*X502–VSIZ ←	VsizX502*X613 ↵	Decrease the height of the window.
View	Esc 1*X502VSIZ ←	X613 ↵	View current setting.
Video Mute			
Mute output to black	X502* 1B	VmtX502*Ø1 ↵	Mute channel X502 output.
Unmute output	X502* ØB	VmtX502* ØØ ↵	Unmute channel X502 output.
View video mute status	X502B	X9 ↵	ØØ=unmuted Ø1=muted
EDID Minder			
Assign EDID to specific input	EscAX501*X68EDID ←	EdidAX501*X68 ↵	X501 = video inputs 1, 2, and 4 X68 = See the **EDID Values** table on page 110)
View EDID assignment	EscAX501EDID ←	X68 ↵	
Import EDID to user location	EscIX67,[*filename*]EDID ←	EdidI ↵	Import a 128 or 256-Byte binary EDID file to the user loaded EDID location [39 to 41].
Save EDID to user location	EscSX502*X67EDID ←	EdidSX67 ↵	Save output X502 EDID to user slot X67.
Export EDID in binary format	EscEX68,[filename] EDID ←	EdidE ↵	Export a 128 or 256-Byte binary EDID file from EDID location X68. [filename] can optionally carry a full path name. The EDID file is a .bin file, carrying 128 or 256 bytes of binary data.

NOTES:

X9 = On/off	Ø=disabled/unassigned/off/unmuted 1=enabled/assigned/on/muted
X67 = EDID User loaded slots	1, 2, and 3
X68 = EDID number	See the **EDID Values** table on page 110)
X501 = Input number	1 to 5
X502 = Output channel	1=A 2=B
X611 = Vertical centering	The value corresponds to the vertical position of the top edge of the window. The range varies such that the window never goes completely off-screen (5-digit response)..
X613 = Vertical size	ØØ064 to Ø4Ø96 (5-digit response).

NOTE: Vertical centering and 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.

Table 1. EDID Values

X68	Resolution	Refresh	Rate Type	Video Format	Audio
1	800 x 600	60 Hz	PC	DVI	N/A
2	1024 x 768	60 Hz	PC	DVI	N/A
3	1280 x 720	60 Hz	PC	DVI	N/A
4	1280 x 768	60 Hz	PC	DVI	N/A
5	1280 x 800	60 Hz	PC	DVI	N/A
6	1280 x 1024	60 Hz	PC	DVI	N/A
7	1360 x 768	60 Hz	PC	DVI	N/A
8	1366 x 768	60 Hz	PC	DVI	N/A
9	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

Command and Response Tables (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Encoder Settings (Archive Encode and Recording)			
Stream Enable/Disable			
Stream enable	Esc X500*1 STRC ←	Strc X500*1 ↵	Enable stream X500.
Stream disable	Esc X500*Ø STRC ←	Strc X500*Ø ↵	Disable stream X500.
View stream setting	Esc X500 STRC ←	X9 ↵	1=enabled Ø=disabled
Record Enable/Disable			
Single recording enable	Esc X1*1RCDR ←	RcdrXØ1*Ø1 ↵	Enable single recording (internal or external).
Single recording disable	Esc X1*ØRCDR ←	RcdrXØ1*ØØ ↵	Disable recording.
Dual recording enable	Esc X1*2RCDR ←	RcdrXØ1*Ø2 ↵	Enable dual recording (internal or external).
Dual recording disable	Esc X1*ØRCDR ←	RcdrXØ1*ØØ ↵	Disable recording.
View record status	Esc X1RCDR ←	X544 ↵	
Encoder profile			
Set profile	Esc 1*X40 EPRO ←	Epro1 X40 ↵	Set encode profile to X40.
View profile	Esc 1 EPRO ←	X40 ↵	View encode profile X40.
Set output mode	Esc 1*X41 SMOD ←	Smod1 X41 ↵	Set output mode to X41.
View output mode	Esc 1 SMOD ←	X41 ↵	View output mode X41.
Bit rate control			
Set bit rate control type	Esc 1*X42 BRCT ←	Brct1*X42 ↵	Set bit rate control type to X42.
View bit rate control type	Esc 1BRCT ←	X42 ↵	
Video bit rate			
Set video bit rate	Esc V1*X43 BITR ←	BitrV1*X43 ↵	Set video bit rate to X43.
View video bit rate	Esc V1BITR ←	X43 ↵	
Audio bit rate			
Set audio bit rate	Esc A1*X44 BITR ←	BitrA1*X44 ↵	Set audio bit rate to X44.
View audio bit rate	Esc A1BITR ←	X44 ↵	

NOTES:

X9 = On/off
- Ø=disabled/unassigned/off/unmuted
- 1=enabled/assigned/on/muted

X40 = Encode profile
- 1=base
- 2=main
- 3=high

X41 = Output mode
- 1=video and audio
- 2=video only

X42 = bit rate control type
- Ø=VBR
- 1=CVBR
- 2=CBR

X43 = Video bit rate — ØØ2ØØ to 1ØØØØ (5-digit response)

X44 = Audio bit rate — 8Ø, 96, 128, 192, 256, 32Ø

X45 = GOP length — 1 to 3Ø

X500 = Stream selection
- 1=Archive stream
- 3=Confidence stream

X544 = Recording mode
- Ø=Recording disabled
- 1=single recording enabled
- 2=dual recording enabled

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Group of Pictures (GOP) Length			
Set GOP length	Esc 1*X45GOPL ←	Gopl1*X45 ↵	Set GOP length to X45.
View GOP length	Esc 1GOPL ←	X45 ↵	
Record resolution and frame rate			
Set record resolution	Esc 1*X46VRES ←	Vres1*X46 ↵	
View record resolution	Esc 1 VRES ←	X46 ↵	
Set record frame rate	Esc 1*X47VFRM ←	Vfrm1*X47 ↵	
View record frame rate	Esc 1VFRM ←	X47 ↵	
View record resolution and frame rate	33I	Horz resolution x Vert resolution*Frame rate ↵	
View current recording information	1*I	<ChAX502*ChBX501>*<X50> <<X47>*<X543>*<X43>↵	Verbose mode 2/3 adds Inf
Recording thumbnail size			
Set thumbnail size	Esc TX545RCDR ←	RcdrTX545 ↵	
View recording thumbnail size	Esc TRCDR ←	X545 ↵	
Preview output refresh rate			
Set preview output refresh rate	Esc X48RATE ←	RateX48 ↵	
View output refresh rate	Esc RATE ←	X48 ↵	

NOTES:

X43 = Video bit rate — 200 to 10000

X46 = Record resolution (short)
- -1=other
- 1=480p
- 2=720p
- 3=1080p

X47 = Record frame rate
- 1=30
- 2=25
- 3=24
- 4=15
- 5=12.5
- 6=12
- 7=10
- 8=5

X48 = Output refresh rate
- 1=60 Hz (default)
- 2=50 Hz

X50 = Record resolution (full)
- Custom
- 848x480
- 1024x768
- 1280x720
- 1280x1024
- 1920x1080

X501 = Input number — 1 to 5

X502 = Output channel
- 1=A
- 2=B

X543 = File size — File size in MB

X545 = Thumbnail size
- 0=normal (default)
- 1=follows archive resolution

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Advanced Configuration			
Overscan mode			
Set overscan mode	Esc X504 * X510 OSCN ←	Oscn X504 * X510 ↵	Sets input type X504 to overscan mode X510.
View overscan mode	Esc X504 OSCN ←	X510 ↵	View the current overscan X510 for input type X504.
Test Pattern			
Set test pattern	Esc X565 TEST ←	Test X565 ↵	
View test pattern	Esc TEST ←	X565 ↵	
HDCP Settings (HDMI Inputs only)			
View input HDCP status	Esc I X501 HDCP ←	X511 ↵	
Set input HDCP authorization on	Esc E1 * X501 HDCP ←	HdcpE X501 *1 ↵	Turn HDCP authorized device on for input X501
Set input HDCP authorization off	Esc EØ * X501 HDCP ←	HdcpE X501 *Ø ↵	Turn HDCP authorized device off for input X501 (default)
View input HDCP authorization	Esc E X501 HDCP ←	X9 ↵	
Enable HDCP notification	Esc N1 HDCP ←	HdcpN1 ↵	Enable green screen HDCP notification
Disable HDCP notification	Esc NØ HDCP ←	HdcpNØ ↵	Disable green screen HDCP notification
View HDCP notification	Esc NHDCP ←	X512 ↵	
Background Image			
Select background filename	Esc *filename* RF ←	Imr *filename* ↵	
View background filename	Esc RF ←	"*filename*" ↵	
Mute background image	Esc ØRF ←	ImrØ ↵	

NOTES:

X9 =	Ø=disabled/unassigned/off/unmuted 1=enabled/assigned/on/muted
X501 = Input number	1 to 5
X504 = Input video format	1=YUVp/HDTV (default) 2=YUVi 3=Composite
X510 = Overscan	Ø=Ø% (default: HDMI inputs) 1=2.5% (default: YUVp input) 3=5.Ø% (default: YUVi and composite inputs)
X511 = HDCP status	Ø=no sink/source detected 1=sink/source detected with HDCP 2=sink/source detected but no HDCP
X512 = HDCP notification	Ø=off (mute output to black) 1=on (green HDCP notification-screen) default
X565 = Test patterns	Ø to 8 (see page 95)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Audio			
Audio delay			
NOTE: Set the audio delay to zero to disable it.			
Set audio delay	Esc 1 * X564 ADLY ←	Adly1* X564 ↵	
View	Esc 1 ADLY ←	X564 ↵	View audio delay value.
Audio Mute			
Mute audio channel	Esc M X506 * 1 AU ←	DsM X506 * 1 ↵	Mute audio channel X506.
Unmute audio channel	Esc M X506 * Ø AU ←	DsM X506 * Ø ↵	Unmute audio channel X506.
View audio channel mute status	Esc M X506 AU ←	X9 ↵	Ø=Off (unmuted) 1=On (muted)
Audio Level			
Set input audio level	Esc G X506 * X507 AU ←	DsG X506 * X507 ↵	Set audio input channel X506 to level X507.
Example:	Esc G 4ØØØØ * 1ØØ AU ←	DsG4ØØØØ * 1ØØ ↵	Set analog audio input A (left) to +10 dB
View input audio level	Esc G X506 AU ←	X507 ↵	View input audio channel X506 level X507.
Example:	Esc G 4ØØØØ AU ←	1ØØ ↵	Analog audio input A (left) is set to +10 dB

NOTES:

- X9 = On/off — Ø=disabled/unassigned/off/unmuted; 1=enabled/assigned/on/muted
- X506 = Audio selection — See page 92.
- X507 = Audio level — Audio level in 0.1 dB steps (-18Ø to 24Ø = -18.Ø to +24.Ø dB)
- X564 = Audio delay — ØØØ to 999 ms (default Ø ms, 3-digit response)

Reference Information

This section provides information about:

Mounting the SMP 351

The 1U high, full rack width, 11.5 inch deep SMP 351 Streaming Media Decoder can be:

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

See the SMP 351 product page at **www.extron.com** for compatible mounting kits.

Tabletop Use

The SMP 351 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 SMP 351 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 SMP 351 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 SMP 351 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 SMP 351 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 (e.g. use of power strips).

Supported File Types, Drive Formats, Browsers, and Browser Plugins

File Formats

The SMP 351 and SMP 351 3G-SDI create *.m4v video and audio files, and *.jpg thumbnail and chapter marker images. They use still image files for background material. Optional fonts can be used for on-screen displays.

Recording File Types

- mp4 (as m4v)

Still Image File Types

- png (for background images)
- jpg (for SMP-created thumbnails and chapter markers)

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 SMP.

Drive Formats

The SMP 351 supports FAT32, VFAT long file names, EXT2, EXT3 and EXT4 formats for USB drives that are used for file storage.

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

Browsers

In order to view the SMP 351 embedded Web pages, use one of the supported Web browsers (and versions) listed below.

- Google Chrome version 37 or higher

  NOTE: Chrome version 42 disables many plugins. For the SMP this means that the preview video in the AV Controls panel is not supported by Chrome version 42 or higher. To see a preview of the current stream you can either:

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

- Mozilla Firefox version 35 or higher
- Microsoft Internet Explorer version 9 or higher (for Windows operating systems)

  NOTE: If you are using Internet Explorer, compatibility mode must be turned off (see **Turning Off Compatibility Mode** on page 48).

- Apple Safari version 8 or higher (for Mac OS X operating systems)

  NOTE: Apple Safari is the preferred browser for an Apple- and Macintosh-based computer platform.

Browser Plugins

Supported Web browser streaming player plugins for use with the embedded web pages include the following:

- Extron Streaming Media Player (SMP) for Windows
- VideoLAN VLC
- Apple QuickTime

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 SMP 351.

Start the Dataviewer program

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

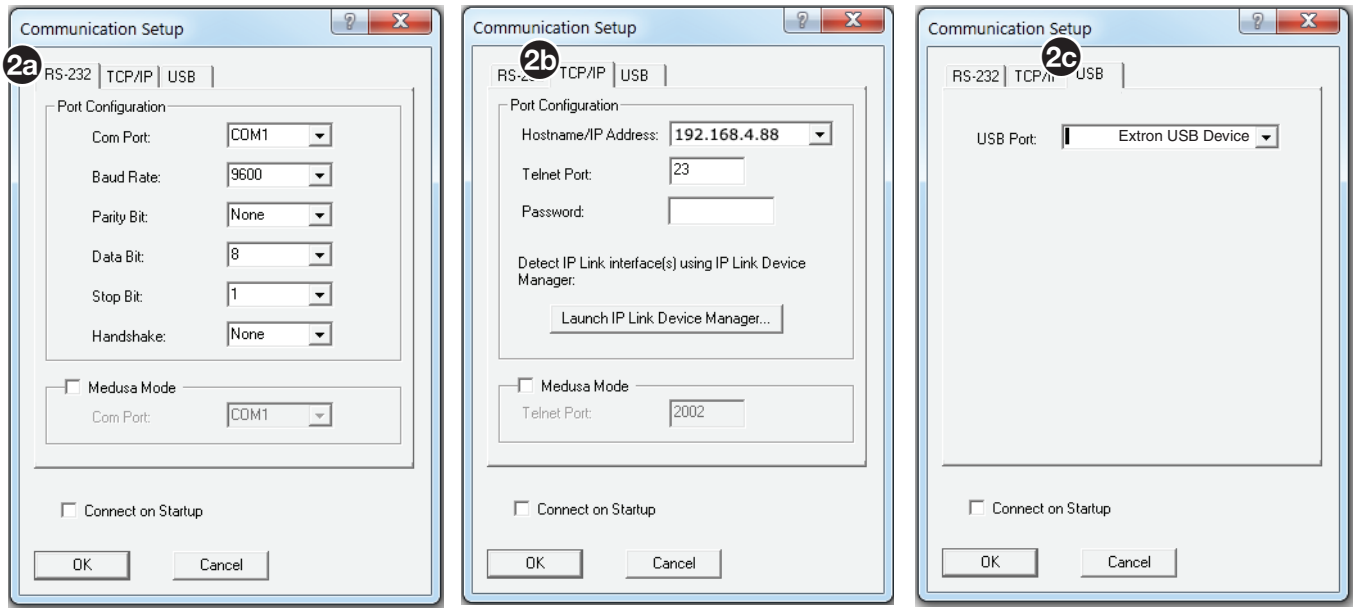


Figure 63. Communications Dialogs

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

   NOTE: To automatically connect to the SMP 351, select **Connect on startup**.

4. Click **OK** to connect to the SMP 351 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 SMP 351. Use an RJ-45 cable to connect the control PC to the network.
2. Start the DataViewer program (see **Start the Dataviewer program** on page 119) and follow the steps to connect to the SMP 351 via TCP/IP.
3. On the **Communication Setup** window (see figure 63 on the previous page):
   a. Select the **TCP/IP** tab.
   b. Enter the IP address of the SMP 351 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 SMP 351 is port 23.

4. Click **OK**. The **Communication Setup** dialog closes.
5. The main DataViewer dialog opens and the SMP 351 responds with a copyright statement containing the model number, part number, and current firmware version of the connected SMP 351, along with the date (see figure 64, ❷).

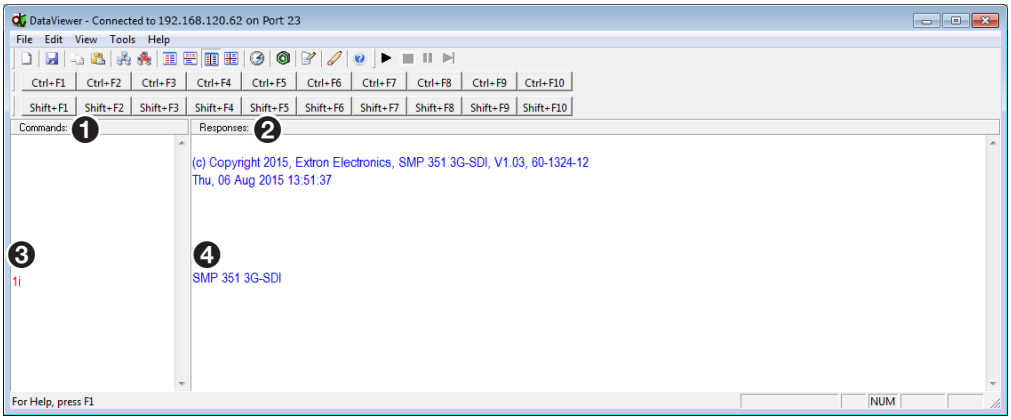


Figure 64. Enter Commands and View Responses

6. Use the **Commands** field to enter SIS commands (see figure 64, 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 number of the connected device.

IP Addressing

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 0 to 255) separated by dots, (for example, 198.123.34.240). 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	0.0.0.1 to 127.255.255.254	*NNN.HHH.HHH.HHH*
Class B	128.0.0.1 through 191.255.255.254	*NNN.NNN.HHH.HHH*
Class C	192.0.0.1 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 above 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 – 169.254.255.255
- 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 SMP 351 uses 239.199.188.138 as the default multicast address for the archive stream and 239.199.188.142 as the confidence stream default.

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 SMP 351 uses specific ports, but can be configured to meet most requirements. In addition to the default ports, any port in the available range (1024 to 65535) can be used.

NOTE: Ports previously assigned and currently in use by the SMP 351 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. Archive and confidence 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 SMP 351 ports are configured, only the initial port is entered by the user. The SMP 351 firmware then assigns the multiple port numbers based on the initial port number.

Choosing an IP Address

If the SMP 351 and other devices are connected via an independent network, then follow the guidelines below when choosing IP addresses. However, if the SMP 351 and other devices are being connected to an existing network, advise the network administrator and ask them to assign suitable addresses.

On an independent network, nearly any type of address can be used (in theory). However, it is generally recommended that class C addresses are used (192.0.0.1 through 223.255.255.253).

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	208.132.180.41	255.255.255.0
Device 2	208.132.180.42	255.255.255.0
Device 3	208.132.180.43	255.255.255.0

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	208.132.180.41	255.255.255.0
Device 2	192.157.180.42	255.255.255.0
Device 3	208.132.180.41	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 a Windows-based computer and another device on the same network.

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 85).

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 122 and **What is an IP Address?** on page 121 to select the subnet mask class that matches the IP address class.

Multicast IP Addressing for Multiple SMP 351 Installations

When multiple SMP 351 devices are installed in a system (when the multicast address is used for push or pull streaming) the streams are managed by the SMP 351 to avoid conflicts.

Pull streaming (RTSP)

The SMP 351 can use one of two multicast streaming IP address assignment methods.

If multicast IP addresses for a network are limited, the various SMP 351 devices can each use unassigned port numbers within the available range (1024 to 65535).

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 SMP 351.

The following table shows a typical port assignment for multiple SMP 351 devices using a single multicast IP address (RTSP pull streams require four sequential ports).

Device	SMP IP	Multicast IP	Multicast Port
SMP1	192.168.254.10	239.199.188.138	12340 to 12343
SMP2	192.168.254.11	239.199.188.138	12344 to 12347
SMP3	192.168.254.12	239.199.188.138	12348 to 12351

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 (12340) as shown in the next table.

Device	SMP IP	Multicast IP	Multicast Port
SMP1	192.168.254.10	239.199.188.138	12340
SMP2	192.168.254.11	239.199.188.139	12340
SMP3	192.168.254.12	239.199.188.140	12340

NOTE: The SMP 351 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 SMP 351 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 SMP 351 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 SMP 351 capability. The following transport layer protocols can be used for SMP 351 streaming.

Pull		**Push**	
Unicast	**Multicast**	**Unicast**	**Multicast**
RTP (RTP over UDP)	RTP (RTP over UDP)	TS/UDP	TS/UDP
		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 SMP 351 transport protocol, see the **Streaming** section on page 32.

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 SMP 351 uses a variety of streaming protocols to send data to a multicast group. Using multicasting, the SMP 351 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 network must be configured to pass multicast broadcasts.

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 SMP 351 waits for viewing devices to request the stream before broadcasting.

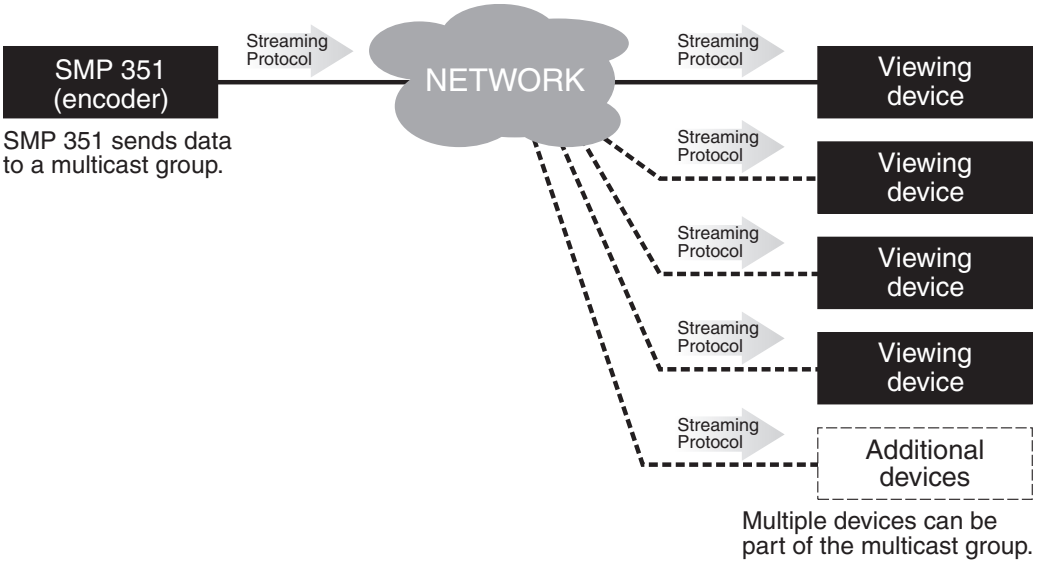


Figure 65. Multicast Streaming

NOTE: IGMP multicast protocol is used by routers and switches to deliver streams to subscribing endpoints. The SMP 351 delivers packets and frames onto the network that are identified as multicast. An IGMP multicast conserves network bandwidth because the SMP 351 will only send data when a connection is made by a user. All network switches and routing equipment must be properly configured to support IGMP snooping and IGMP query 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 (SMP 351 to single viewing device), but can be configured to use multiple active connections.

Unicast streaming can use push or pull streaming. It can push the data to individual or multiple viewing devices, or it can use pull steaming, where the SMP 351 waits for an individual viewing device to request the stream before broadcasting.

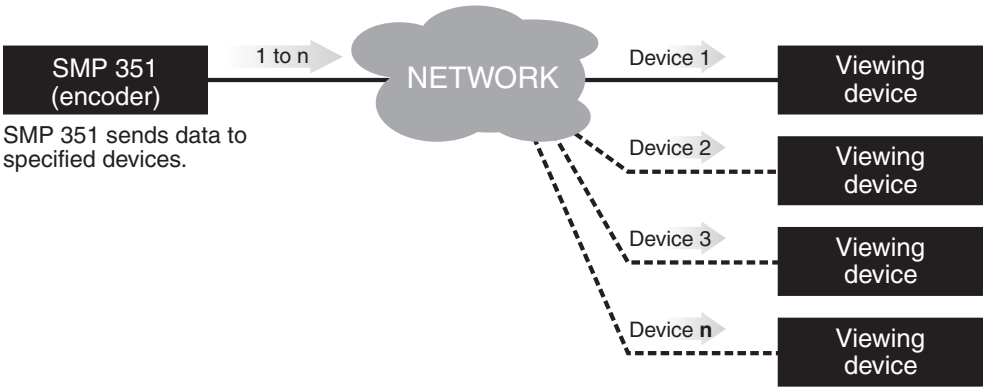


Figure 66. Unicast Streaming

NOTES:

- When unicast streaming, the SMP 351 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 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 SMP 351 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 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 a video to it (pull streaming).

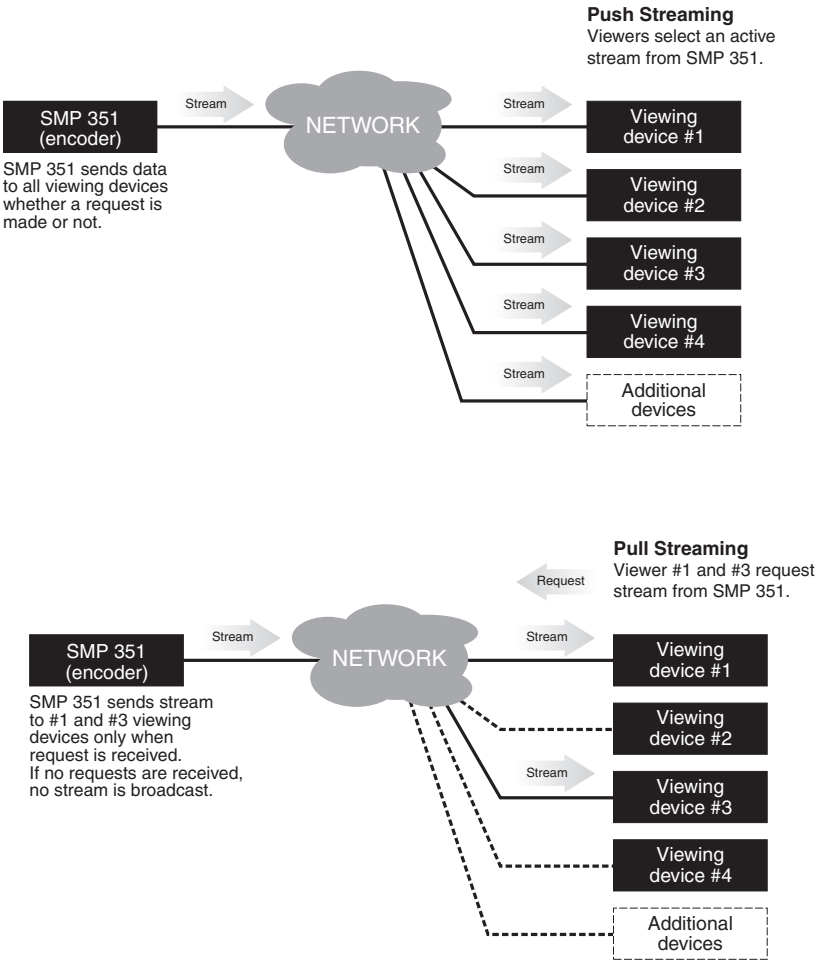


Figure 67. Push and Pull Streaming

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 VLC Media Player** starting on page 131). Substitute the SMP 351 IP address for `<SMP351_IP>`. Substitute the destination IP address and port number for `<DESTINATION_IP>:DESTINATION_PORT`.

Pull Stream URLs	
PULL Streaming:	**URL**
RTSP Unicast (Archive)	`rtsp://<SMP351_IP>/extron1`
RTSP Unicast (Confidence)	`rtsp://<SMP351_IP>/extron3`

RTSP Multicast (Archive)	`rtsp://<SMP351_IP>/extron1`
	`or`
	`HTTP://<SMP351_IP>/live/pull/multicast1.sdp`

RTSP Multicast (Confidence)	`rtsp://<SMP351_IP>/extron3`
	`or`
	`HTTP://<SMP351_IP>/multicast3.sdp`

Push Stream URLs		
PUSH Streaming:		
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 (archive)	`HTTP://<SMP351_IP>/live/push/unicast1.sdp`
	ES/RTP (confidence)	`HTTP://<SMP351_IP>/live/push/unicast3.sdp`
Multicast (Destination IP must be multicast IP address)		
	TS/UDP	`UDP://@<DESTINATION_IP>:DESTINATION_PORT`
	TS/RTP	`RTP://@<DESTINATION_IP>:DESTINATION_PORT`
	ES/RTP (archive)	`HTTP://<SMP351_IP>/live/push/multicast1.sdp`
	ES/RTP (confidence)	`HTTP://<SMP351_IP>/live/push/multicast3.sdp`

NOTES:

- `<SMP351_IP>` is the IP address of the SMP 351.
- For push URLs, the Destination Port is the lowest port in the "Port Range" set from the Web page.
- `UDP://@:DESTINATION_PORT` default is `UDP://@:12340` .
- Some dependencies may apply with certain versions of VLC.
- For ES/RTP, SAP is available in "Video only" stream mode.

Streaming Capabilities and System Scalability

The following tables detail the streaming capabilities of the SMP 351. 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 Archive encoder with one pull unicast confidence stream. Recording while streaming does **not** reduce the maximum number of pull streams.

Available Unicast Streams

Video resolution and bit rate affect the total number of unicast streams (Archive and Confidence) the SMP 351 can broadcast. 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.

Pull Stream Method

Unicast		
Resolution (Pixels x Lines @ frame rate)	**Video Bit Rate** (Kbps)	**Approximate Number of Pull Streams**
848x480 @ 15	1500	40
1024x768 @ 15	2500	32
1280x1024 @ 30	3500	29
1280x720 @ 30	5000	23
1920x1080 @ 30	8000	16

NOTE: The following configuration options were set on the SMP 351:

- **Stream Type = VBR**
- **GOP Length = 30**
- **Stream Mode = Video/Audio**
- **Layout = Full screen with high motion content**
- **Archive Pull Streaming Method = Unicast RTP**
- **Confidence Pull Streaming Method = Unicast RTP at default setting**

Push Stream Method

The number of push unicast streams is one per encoder (the SMP 351 has two encoders, Archive and Confidence).

Available Multicast Streams

The SMP 351 uses the IGMP multicast protocol to push or pull streams. The IGMP multicast protocol provides increased bandwidth efficiency because the SMP 351 only sends data when a connection is made by the user. All network switches and routing equipment must be properly configured to support IGMP snooping and IGMP query to avoid flooding all endpoints with unnecessary streaming traffic.

The table below indicates the approximate number of multicast streams supported by the SMP 351 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.

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 SMP 351:

- **Stream Type = VBR**
- **GOP Length = 3Ø**
- **Stream Mode = Video/Audio**
- **Layout = Full screen with high motion content**
- **Archive Pull Streaming Method = Multicast UDP**
- **Confidence Pull Streaming Method = Uniicast 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.

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 SMP 351 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 SMP 351 (see **Accessing the Web-Based User Interface** on page 49).

   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.

2. The `Recording Controls` page opens. In the `Stream URL` panel, if the archive and confidence streams are set to **`Pull`** (see **Push Stream and Pull Stream Playback URLs** on page 128), the box displays the URL necessary to request a stream from the SMP 351. Note the full URL for later reference (in figure 68, the url is `rtsp://192.168.13.1/extron1`).

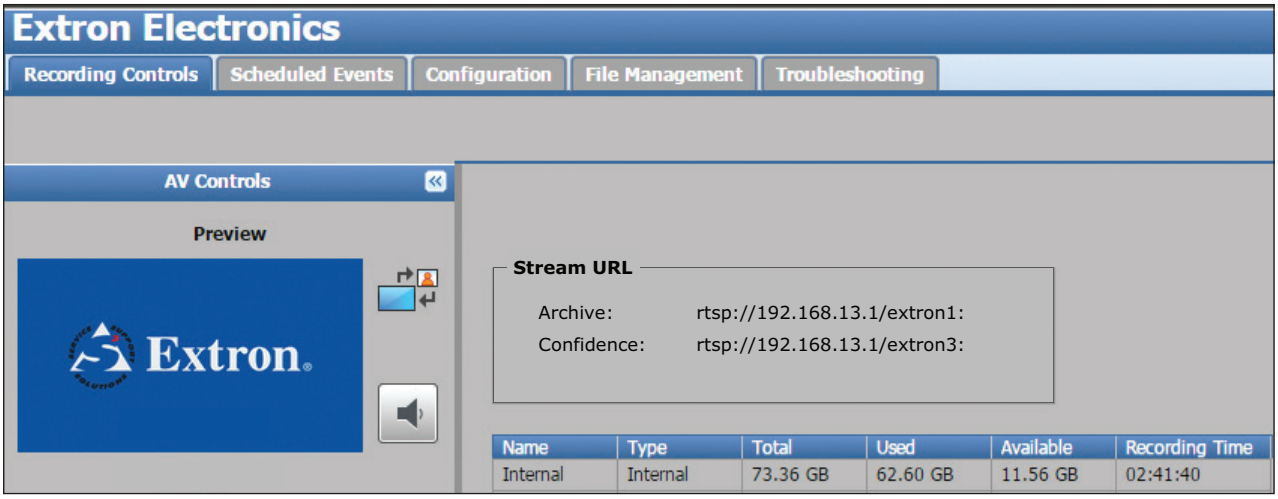


Figure 68. Recording Controls Page

3. Run the VLC media player.

The media player opens.

4. Select **Media > Open Network Stream** (see figure 69).

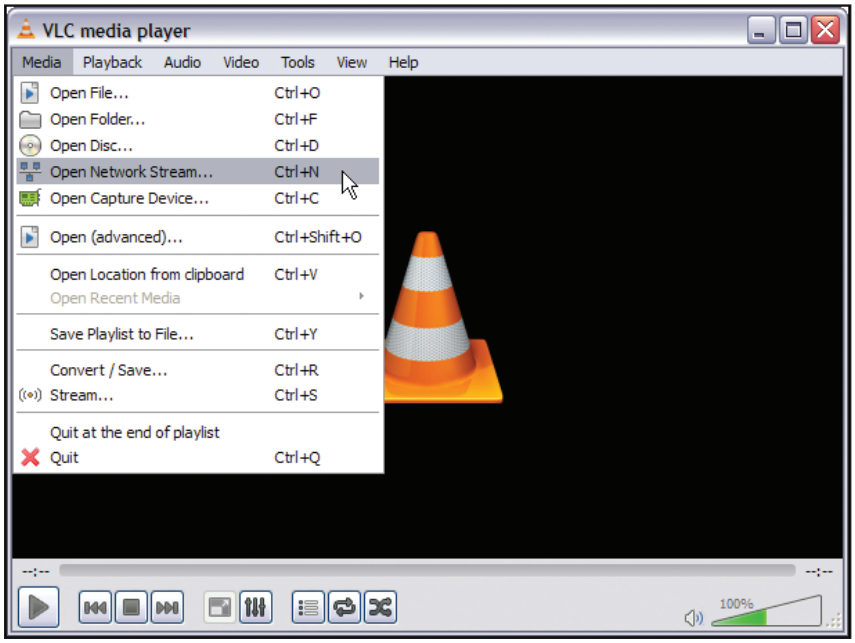


Figure 69. VLC Media Player — Open a Network Stream

5. The Open Network Media dialog box opens. Using the stream URL that was noted in step 2 on the previous page (`rtsp://192.168.13.1/extron1`), enter it into the **Please enter a network URL:** field (see figure 70, ❶).

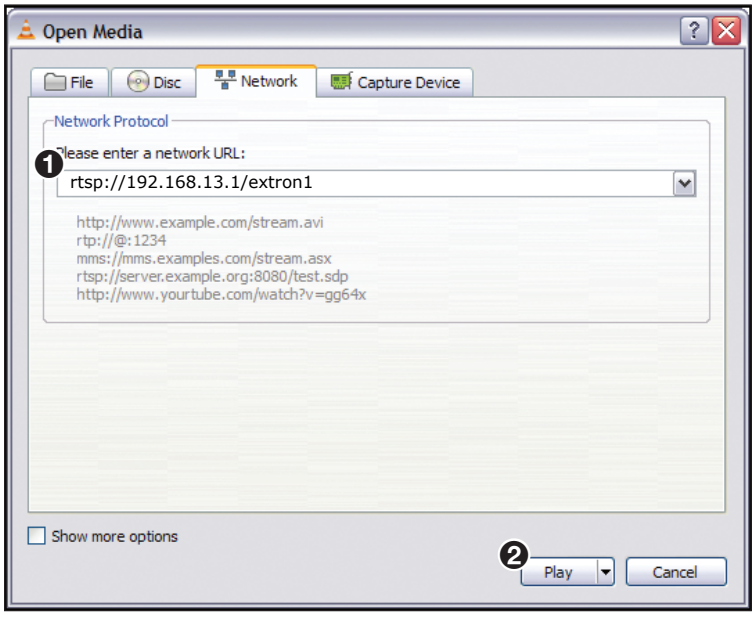


Figure 70. Enter Stream URL Information and Play

6. Click **Play** (❷). After a few seconds, the media streaming from the SMP 351 plays on the VLC media player.

NOTE: 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.

Playing a Push Stream Using Stream Announcement Protocol (SAP)

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

1. Open VLC. From the **View** menu, select **Playlist** (see figure 71).

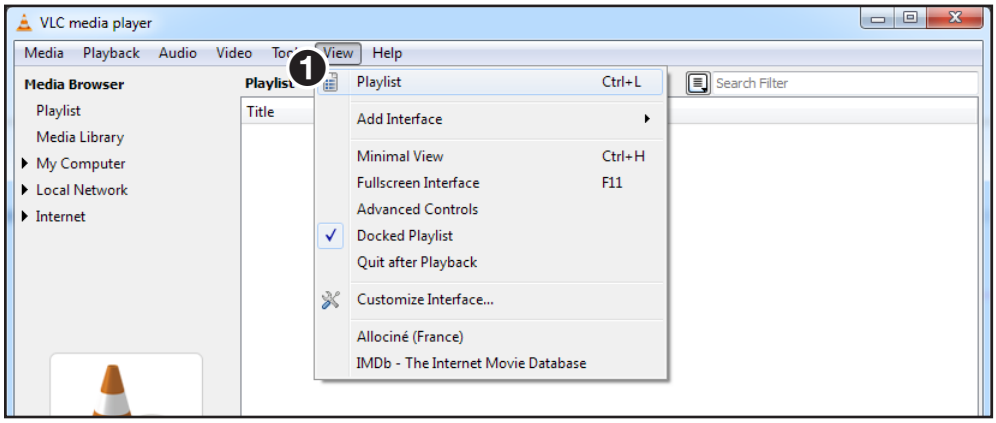


Figure 71. VLC Playlist

2. From the left menu column, select **Local Network** (see figure 72, ❷).
3. Select **Network streams (SAP)** (❸).

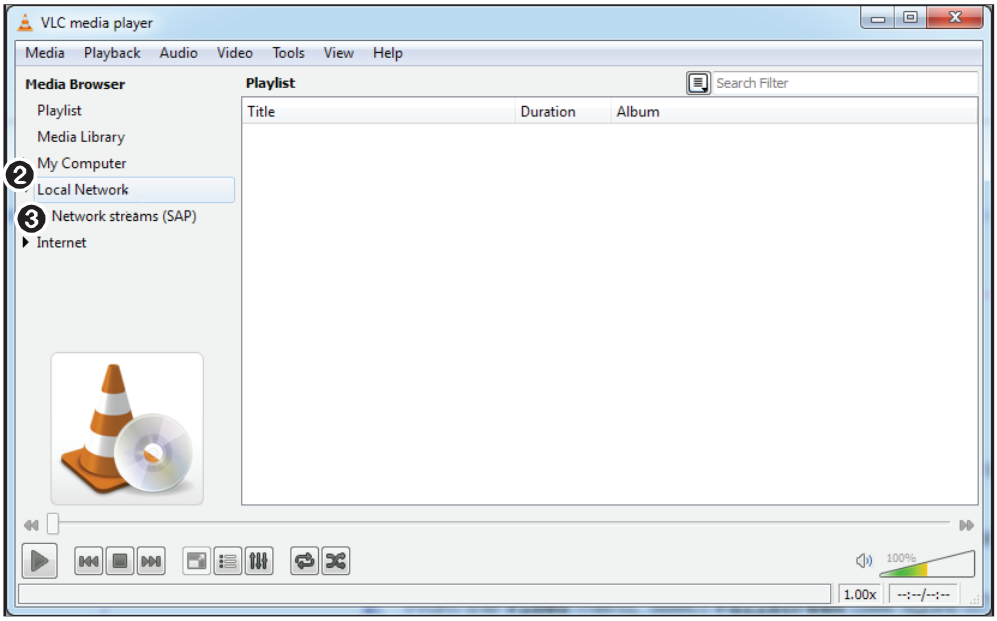


Figure 72. Select Local Network Streams

4. VLC populates the playlist with all streams that contain SAP information. If a folder is shown, open it to view the SAP streams inside (see figure 73, ❶).

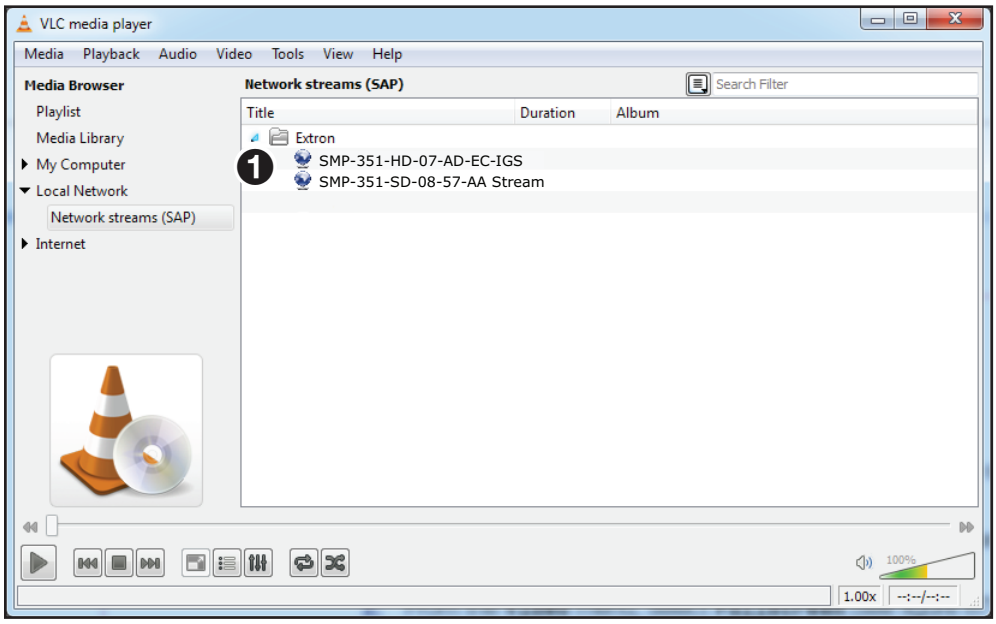


Figure 73. VLC - Select a Stream

5. 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 announcement frequency, it may take several moments before the SAP streams appear.

Playing a Stream Using QuickTime Media Player

Use the following procedure to playback and view SMP 351 streams on the QuickTime player program.

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 SMP 351 (see **Accessing the Web-Based User Interface** on page 49).

   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.

2. The `Recording Controls` page opens (see figure 74).

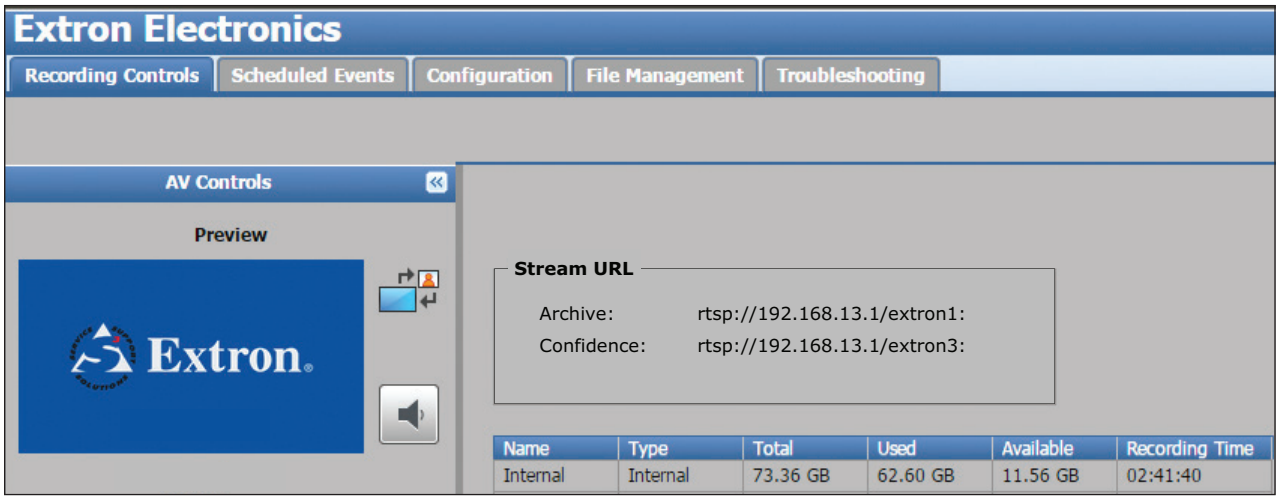


Figure 74. Recording Controls Page

3. Note the **`Archive:`** URL in the `Stream URL` panel.
4. Run QuickTime player. From the desktop, select **`Start`** > **`All Programs`** > **`QuickTime`** > **`QuickTime Player`**.
5. The QuickTime media player opens. From the **`File`** menu, select **`Open URL`** (see figure 75, ❶).

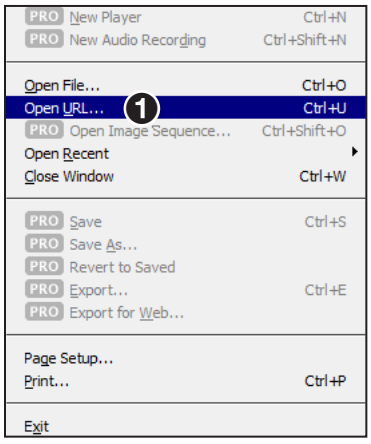


Figure 75. QuickTime Player Menu — Open URL

The **Open URL** dialog opens (see figure 76).

6. In the **Enter an Internet URL to open:** field, enter the stream URL that was noted in step 3 on the previous page (❶).

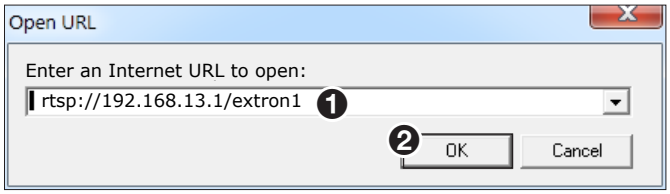


Figure 76. Enter Stream URL Information

7. Click **OK** (❷). After a few seconds, the media stream from the SMP 351 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.

Estimating Storage Requirements for a Recording

Estimating Storage per Recording Hour

You need to know video and audio bit rates configured in your Extron SMP 351. For these examples, the calculations assume that the bit rates remain constant during the recording; if you are using VBR (variable bit rate, which is the default) then the actual bit rates are often slightly lower than this estimate. In some cases they can be higher.

To estimate storage per recording hour:

1. Find the SMP 351 video bit rate and audio bit rate, which are in kbps (kilobits per second) .
2. Insert those bit rates into the following equation:

   [(video bit rate + audio bit rate) *3600 seconds per hour] / 8 bits per byte*1000 = x MBph (megabytes per hour)

Example:

Using the default “720p High” encoder preset, with

- Video bit rate = 5000 kbps
- Audio bit rate = 192 kbps

  For a 1-hour recording (3600 seconds),

  - ([5000 + 192] * 3600) / 8000 = 2336.4 MBph or 2.34 GBph

For the default encoder presets of an SMP 351, the following are the estimated storage requirements for each hour of recording:

Estimated Storage Requirements				
Encoder Preset	**Video bit rate (kbps)**	**Audio bit rate (kbps)**	**MB per hour**	**GB per hour**
1080p High	8000	320	3744.0	3.74
1080p Low	6000	128	2757.6	2.76
720p High	5000	192	2336.4	2.34
720p Low	3000	128	1470.6	1.41
480p High	2500	128	1182.6	1.18
480p Low	1500	80	711.0	0.71
VGA High	3500	128	1632.6	1.63
VGA Low	2500	128	1182.6	1.18
SMP 351 max. rates	10000	320	4644.0	4.64
SMP 351 min. rates	200	80	126.0	0.13

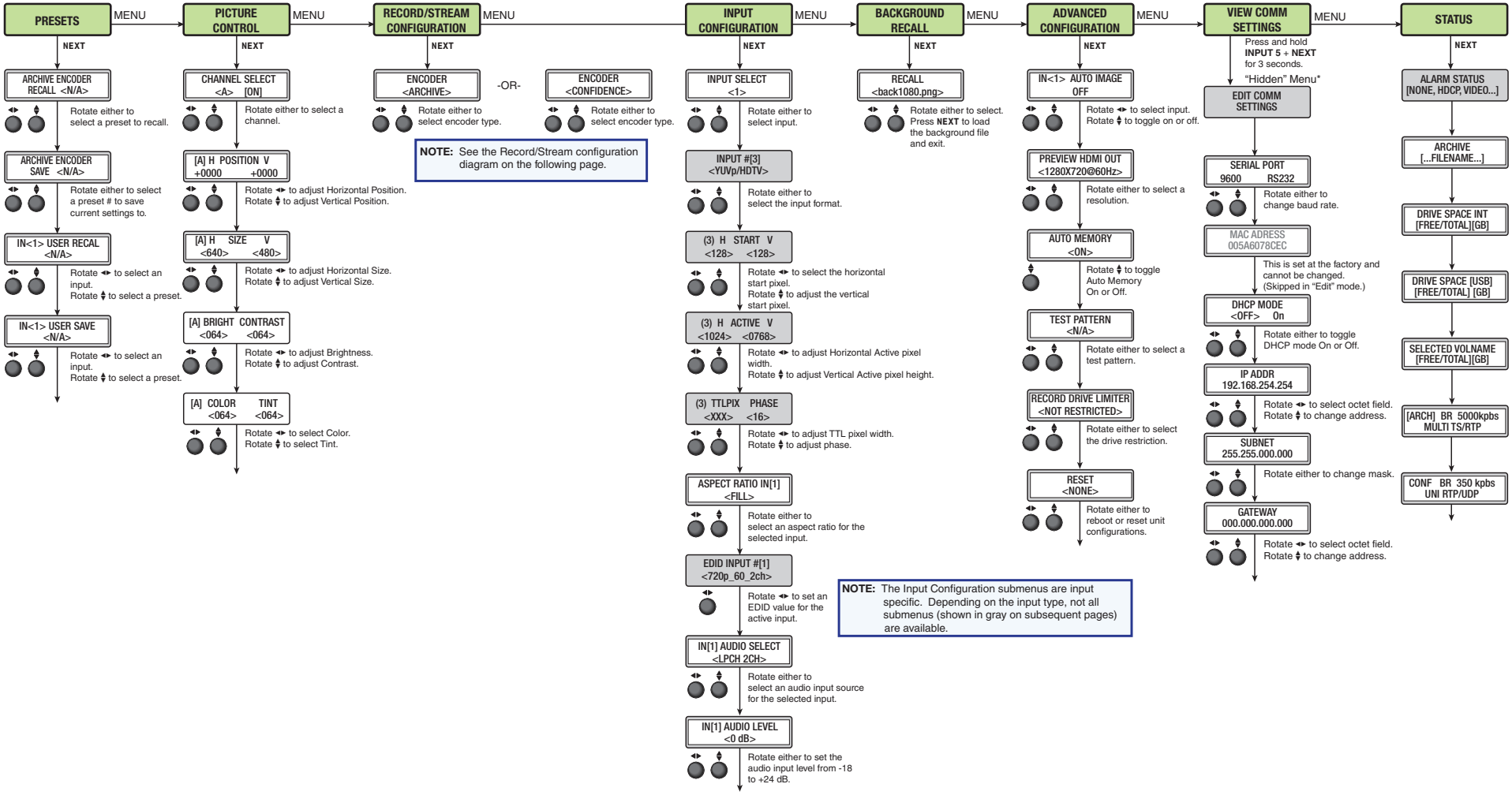
NOTE: If you choose from one of several encoding rates, do the above calculation for each of the possible rates. You will also need to estimate how often each of the encoding rates is selected.

To estimate the number of hours of recordings that can be stored on a specific size of hard drive:

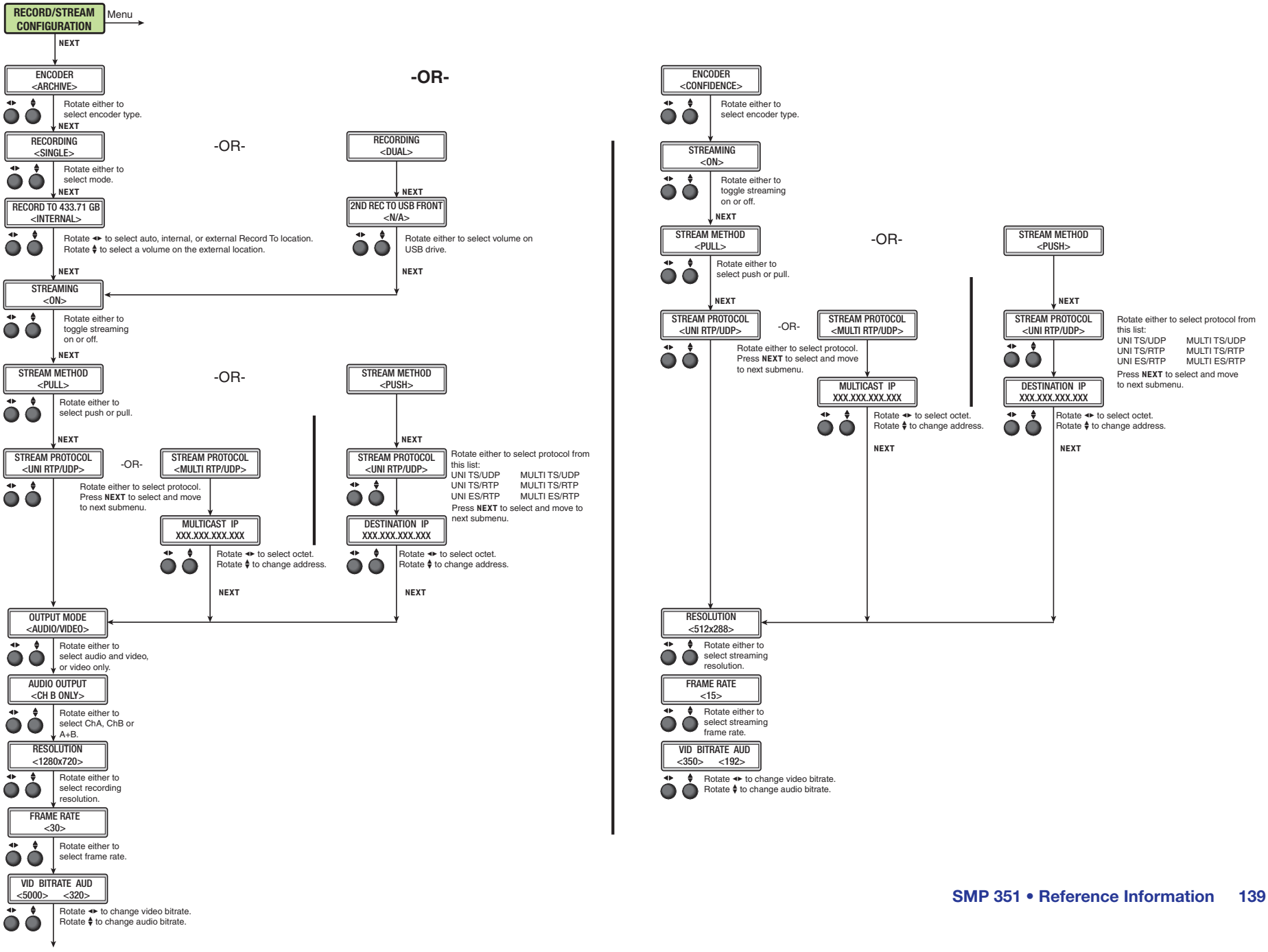
- Determine the SMP 351 video bitrate and audio bitrate, in kbps (kiobits per second)
- Insert those bitrates into the following equation:

  [(hard drive size in GB * 8,000,000,000) / (video bitrate +audio bitrate)]/60= x hours.

Front Panel Menu Diagrams



Front Panel Menu Diagrams (Record/Stream Configuration)



Glossary

Ad hoc recording — An ad hoc recording session is one that has been set up for a specific occasion or task without being previously scheduled.

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 SMP 351 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 142).

Address Resolution Protocol (ARP) — A protocol for assigning an **IP address** (see page 143) to a device based on the device **MAC (Media Access Control)** (see page 143)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 — Bi-directionally predictive coded picture. Contains predictive, difference information from the preceding and following I- or P-frame within a **GOP** (see page 142). 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 146) 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)** (see page 142) video or raw **AAC** audio (see page 140), 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 SMP 351 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). Also see **Secure File Transport Protocol (SFTP)** for more information.

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 143) containing the full spatial resolution and data of a video frame. Predictive frames (**P-frames**) (see page 144) follow `I`-frames and contain data that has changed from the preceding `I`-frame. Bi-predictive frames (**B-frames**) (see page 140) 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 SMP 351 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.

When the SMP 351 is connected to a streaming media server, the IGMP multicast protocol is used to pull RTSP streams. The IGMP multicast protocol conserves network bandwidth because the streaming media server only connects to the SMP 351 when the connection to the streaming media server is made by the user. All network switches and routing equipment must be properly configured to support IGMP snooping and IGMP query 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 145) or dynamic (see **DHCP** on page 141).

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 packet size allowed in a network data packet.

Media Access Control (MAC) — 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 140) relates the IP address of the device to its corresponding physical address on the LAN. 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 using the most efficient strategy 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 143).

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 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.

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.

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. The SAP periodically broadcasts 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.

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.

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 141).

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

Streaming Media Player (SMP) Web browser plugin — The Extron SMP Web browser plugin (V1.0) provides the best streaming features to display from Extron streaming media devices.

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 meant.

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

Time To Live (TTL) — A value that specifies the number of router hops multicast traffic can make between routed domains when it exits a source.

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.

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

The SMP 351 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 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.

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.

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.

Wowza® Media Server® — Wowza Media Server is software developed by Wowza Media Systems (**www.wowza.com**) 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).

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.

Extron Headquarters
+1.800.633.9876 (Inside USA/Canada Only)
Extron USA - West
+1.714.491.1500
+1.714.491.1517 FAX
Extron USA - East
+1.919.850.1000
+1.919.850.1001 FAX

Extron Europe
+800.3987.6673
(Inside Europe Only)
+31.33.453.4040
+31.33.453.4050 FAX

Extron Asia
+65.6383.4400
+65.6383.4664 FAX

Extron Japan
+81.3.3511.7655
+81.3.3511.7656 FAX

Extron China
+86.21.3760.1568
+86.21.3760.1566 FAX

Extron Middle East
+971.4.299.1800
+971.4.299.1880 FAX

Extron Korea
+82.2.3444.1571
+82.2.3444.1575 FAX

Extron India
1800.3070.3777
(Inside India Only)
+91.80.3055.3777
+91.80.3055.3737 FAX