Streaming AV Products

SMP 351
Streaming Media Processor

Extron Electronics
INTERFACING, SWITCHING AND CONTROL

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

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

> **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**
- **About the SMP 351**
- **General Product Overview**
- **Features**

About this Guide

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

- "SMP" or "SMP 351" refers to either model. Where a difference occurs, it will be 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.

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.
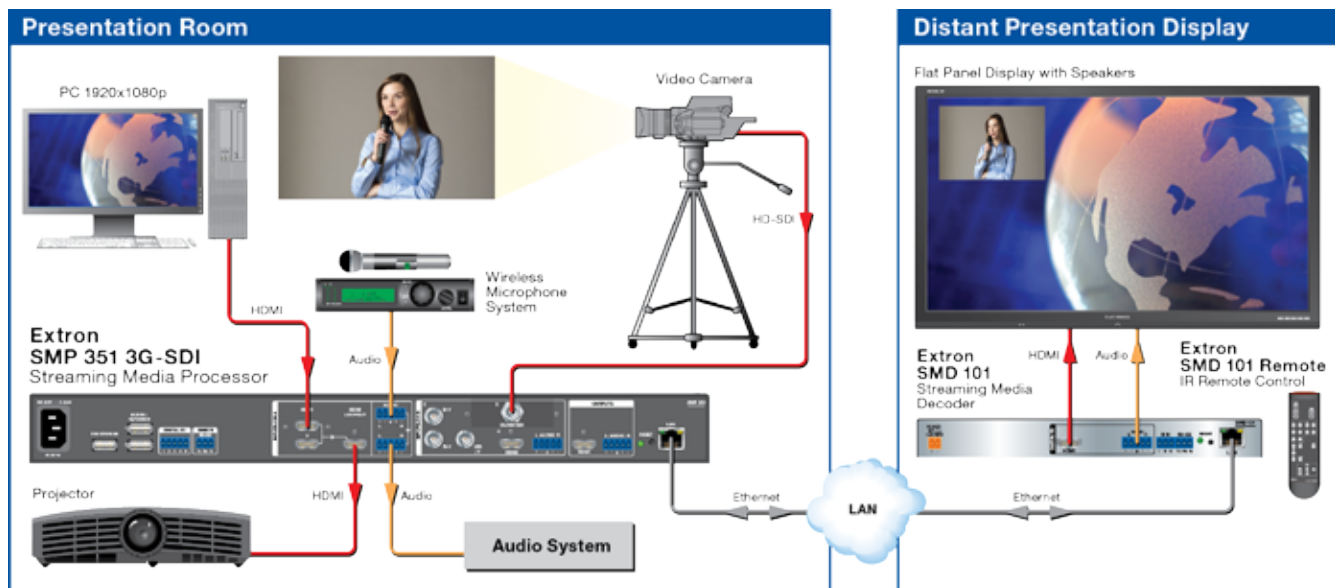
Figure 1. **Typical SMP 351 Application**

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 41 or higher)
  - Mozilla® Firefox® (version 35 or higher)
  - 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:
- Google Chrome is the preferred browser for Windows-based computer platforms.
- Apple Safari is the preferred browser for Apple- and Mac-based computer platforms.

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

Licensed Third-party Software Used in the SMP 351			
Package	**License**	**Package**	**License**
ifplugd	GPLv2	psmisc	GPLv2
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, 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.

- Inputs 1 (HDMI) and 2 (HDMI) are grouped as channel A.
- Inputs 3 (component or composite video), 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 Overview** on page 90 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.
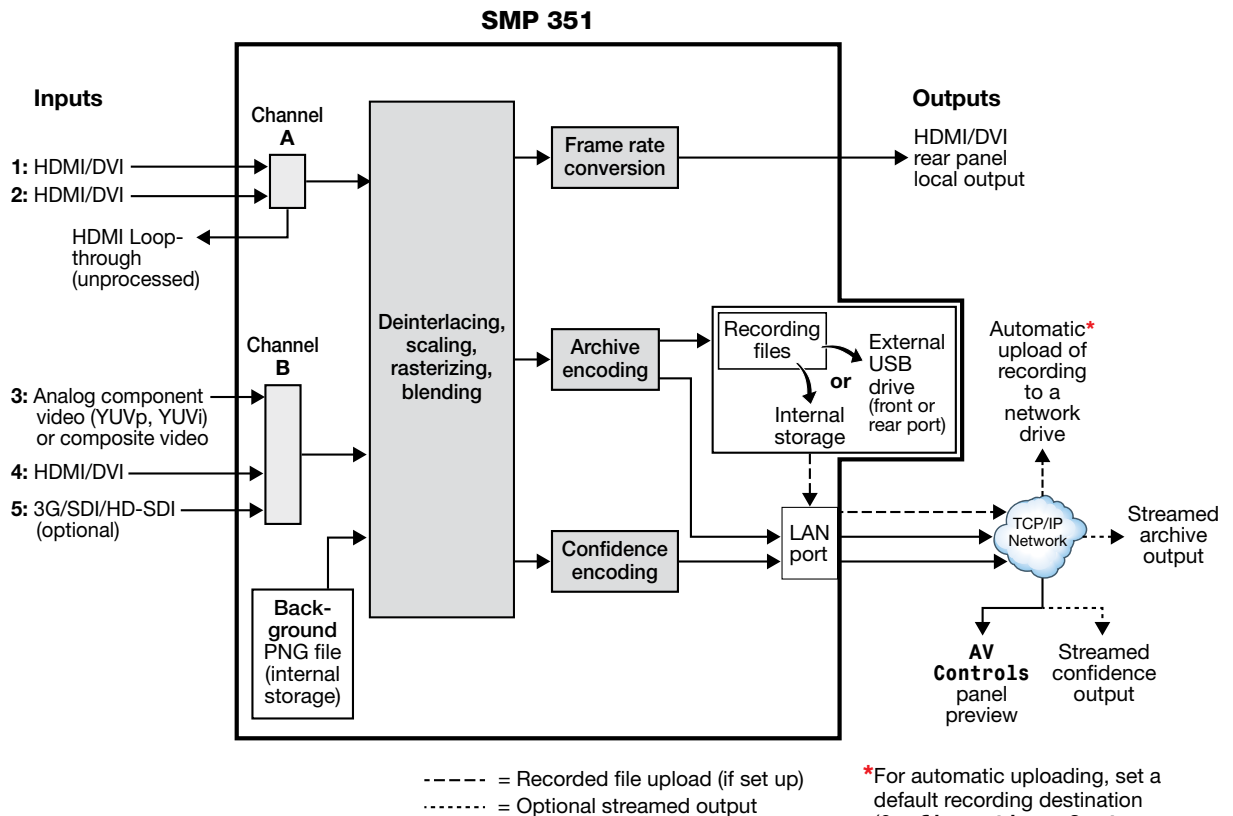
Figure 2.   SMP 351 Block Diagram

File Storage

Internal storage is available for storing background image files and storing recordings that will be uploaded to a file server.

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 136). 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 or an RS-232 (via rear panel Remote captive screw connector or front panel Config USB port) connection
- SMP 351 embedded Web pages via Ethernet connection

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 (if using an Opencast server scheduling system). See **Schedule Settings** on page 68 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 99)

- Encoding the content and layout into two encoding streams (archive and confidence) as configured by the encoding presets (see **Encoder Settings and Layout Presets Overview** on page 90)

- 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 destination** on page 117 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 **Set a default recording file name** on page 120 for details).

Output and share recordings

Recording files can be saved in the SMP 351 internal memory or 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 (see **Scheduling with an Opencast server** on page 71).
> - To upload recordings for other scheduling or integration methods, specify a FTP, SFTP, or CIFS/Windows Net Share server folder during system setup (see **Add a Network Share** on page 136).

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 of 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.

- **80 GB Internal Solid State Storage** — Save recorded data to reliable, internal storage, before transferring it to external destinations. Up to sixteen 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 183), then choose an appropriate mounting option.

Make all external device connections before applying power.

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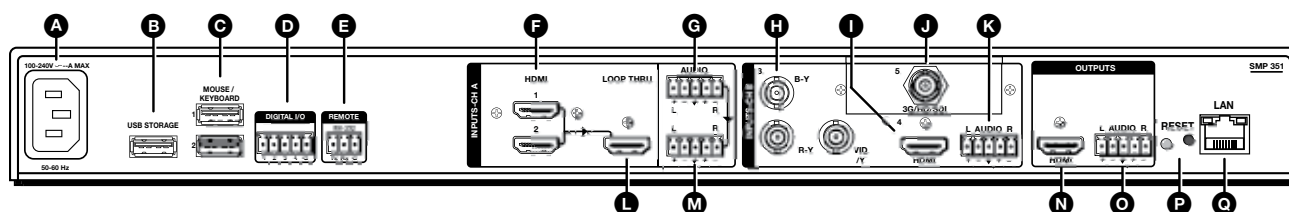
Figure 3.   SMP 351 Rear Panel (SMP 351 3G-SDI shown)

Ⓐ **100-240 VAC IEC connector** for power input

Ⓑ **Type A USB connector** for external storage

Ⓒ (2) Type A USB connectors for **mouse and keyboard connection**

Ⓓ 3.5 mm, 5-pole captive screw connector for **digital I/O**

Ⓔ 3.5 mm, 3-pole captive screw connector for **SIS control over RS-232**

Ⓕ **HDMI inputs 1 and 2**

Ⓖ 3.5 mm, 5-pole captive screw connector for **channel A analog stereo audio input**

Ⓗ 3 BNC connectors for component or composite **video input 3**

Ⓘ **HDMI input 4**

Ⓙ **3G/HD/SDI input card (input 5)**, SMP 351 3G-SDI only

Ⓚ 3.5 mm, 5-pole captive screw connector for **channel B analog stereo audio input**

Ⓛ **HDMI loop thru from input 1 or 2**

Ⓜ 3.5 mm, 5-pole captive screw connector for **channel A analog stereo audio loop thru output**

Ⓝ **HDMI preview output**

Ⓞ 3.5 mm, 5-pole captive screw connector for **analog stereo audio output**

Ⓟ **Reset button and LED**

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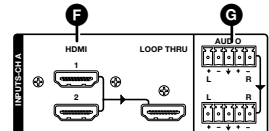
Ⓖ Channel A analog audio input – Connect a balanced or unbalanced stereo line level audio device to this 5-pole, 3.5 mm captive screw connector. Channel A audio can be selected for output with HDMI inputs 1 and 2 instead of the embedded audio. Wire the connector as shown in figure 4.
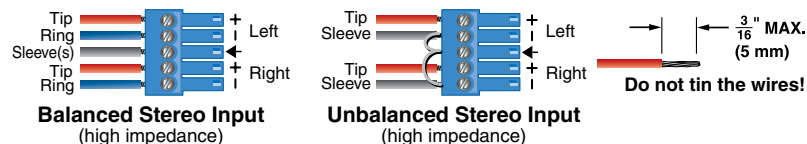
Figure 4. Audio Input Captive Screw Connector Wiring

Ⓗ 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.
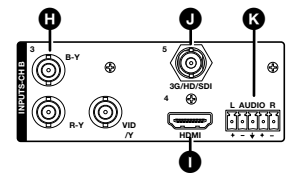
Output Connections

Ⓛ 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.

Ⓜ 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**, Ⓜ on page 12). Wire the connector as shown in figure 5. Audio is always from audio input Ⓖ.

> **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 (–).

Balanced Audio Output   **Unbalanced Audio Output**
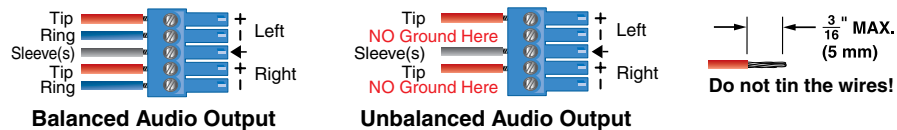
Figure 5.   **Audio Output Captive Screw Connector Wiring**

> **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.

Ⓝ 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.

Ⓞ 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 3**, **Ⓝ**) 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 149).

Ⓔ **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 156).

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 148).
> - For information on resetting the SMP 351 using SIS commands, see **Resets** on page 165.
> - 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.
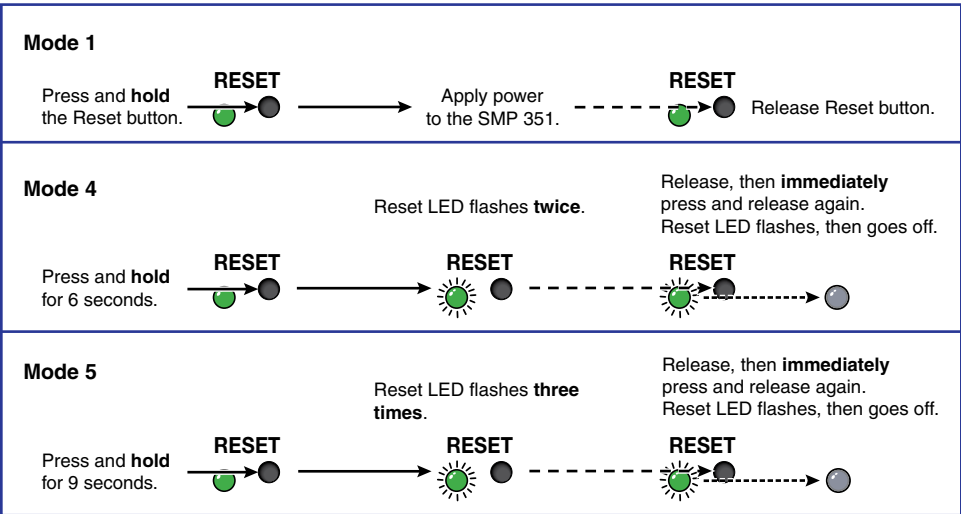
Figure 6.   Resetting the SMP 351

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 165).

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)**

Front Panel Features
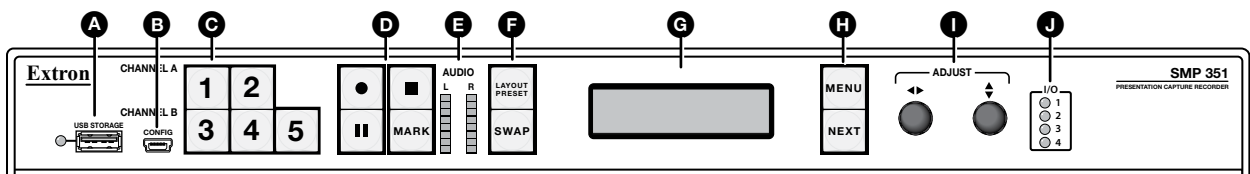
Figure 8.   SMP 351 Front Panel

A   Type A USB connector and activity LED for **external storage**

B   Mini Type A USB 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.

> **NOTES:**
> - 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 156).

© **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 ⬚ 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 5 minute internals.

Ⓔ **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.

Ⓕ **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. 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 menu system.

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 149).

Layout Presets

Layout presets define which input or inputs are selected and where they are placed on the output screen. There are 12 preconfigured and 4 user presets for custom layout configurations.
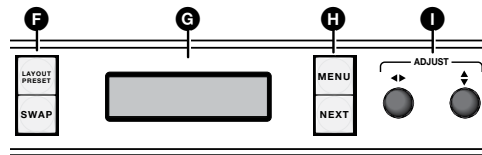
Figure 10. **Front Panel Layout Preset and Swap (F)**

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.
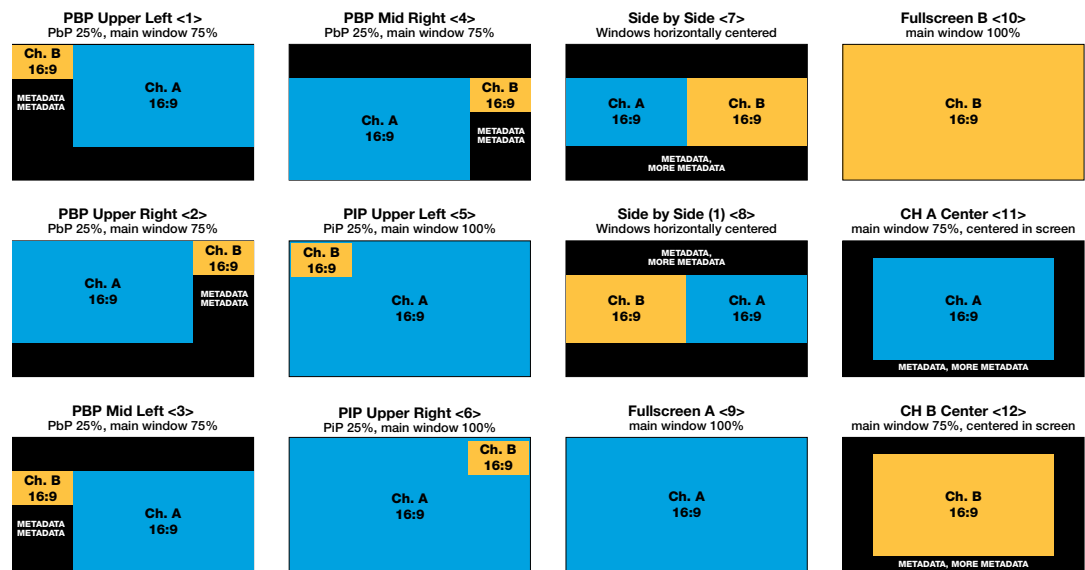
Figure 11. **Layout Presets**

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.
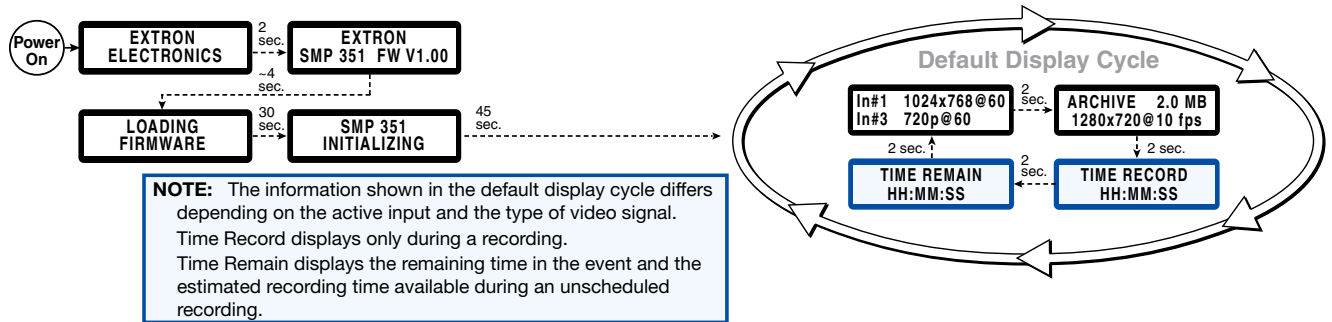
Figure 12. Boot Sequence and Default Display Cycle

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 (see the **NOTE** in figure 11, above).

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 156), 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 a16x2 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.
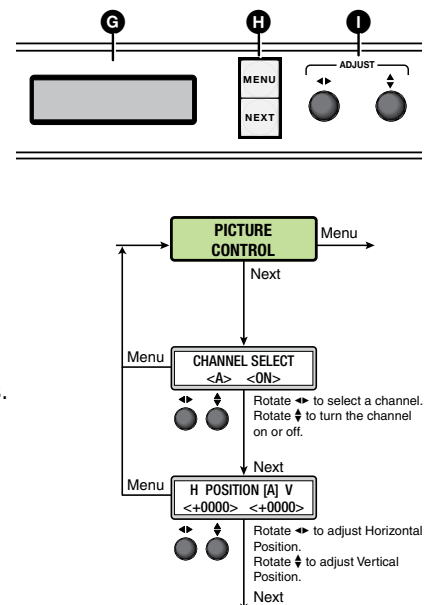
Menu Overview

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.
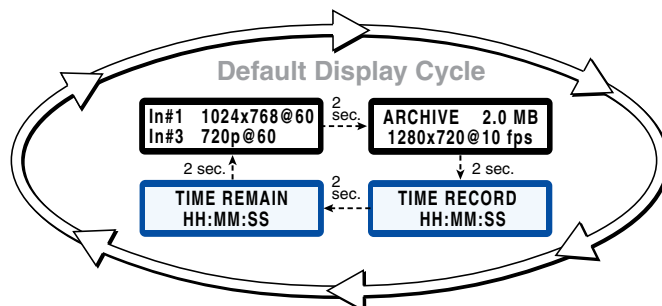
Figure 13. Default Display Cycle

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.
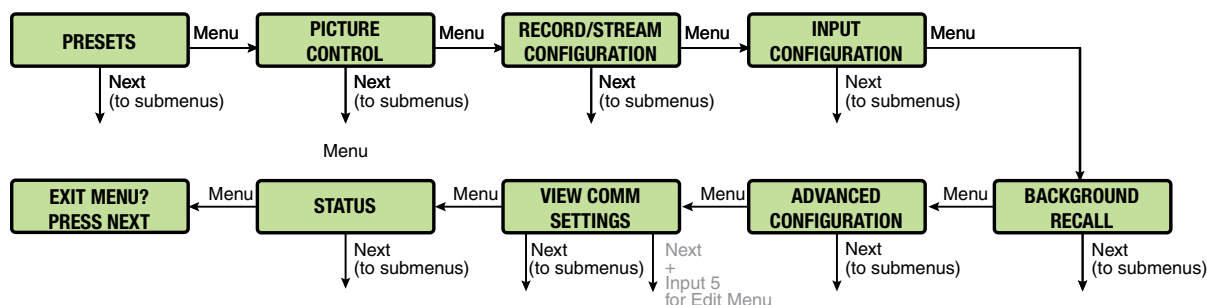
Figure 14. Top Level Menus

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 are on the following pages. A complete schematic of the menus and submenus is in the reference section (see **Front Panel Menu Diagrams** on page 205).

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.
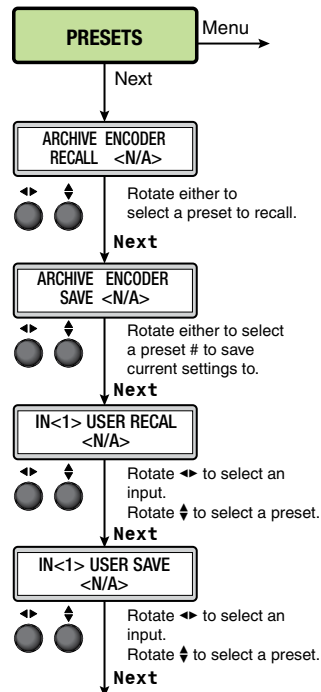
Figure 15. Presets Menu

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.
- Recalling default encoder preset 9 to the archive encoder subsittues the default confidence resolution 512x288 with the minimum available resolution for the archive encoder: 848x480.

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
- Presetname
- Aspect ratio
- Brightness

Next

IN<1> USER RECAL
<N/A>

Rotate ◄► to select an input.
Rotate ↕ to select a preset.

Next

IN<1> USER SAVE
<N/A>

Rotate ◄► to select an input.
Rotate ↕ to select a preset.
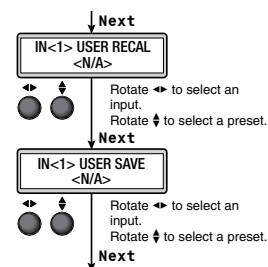
Next

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 like color, tint, brightness, and contrast of the picture. 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 on or off 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).

```
        PICTURE      Menu
        CONTROL
          │ Next

      CHANNEL SELECT
        <A>   ON
      ◄►    ♦     Rotate either to select a
                  channel.
          │ Next

      [A] H  POSITION  V
      +0000       +0000
      ◄►    ♦     Rotate ◄► to adjust Horizontal Position.
                  Rotate ♦ to adjust Vertical Position.
          │ Next

      [A] H   SIZE    V
        <640>      <480>
      ◄►    ♦     Rotate ◄► to adjust Horizontal Size.
                  Rotate ♦ to adjust Vertical Size.
          │ Next

      [A] BRIGHT  CONTRAST
        <064>      <064>
      ◄►    ♦     Rotate ◄► to adjust Brightness.
                  Rotate ♦ to adjust Contrast.
          │ Next

      [A] COLOR    TINT
        <064>      <064>
      ◄►    ♦     Rotate ◄► to select Color.
                  Rotate ♦ to select Tint.
          │ Next
```

	Range	YUVp/ HDTV	YUVi	Composite Video	HDMI
Position	*	X	X	X	X
Size	64 to 4096	X	X	X	X
Brightness	0 to 127	X	X	X	X
Contrast	0 to 127	X	X	X	X
Color	0 to 127		X	X	
Tint	0 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

The position 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 the window stays on the screen. A small window (for example, 300 pixels wide) cannot go far into the negative.

To use this 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 0000.

- 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 0000.

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.

RECORD/STREAM CONFIGURATION — Menu
NEXT

ENCODER <ARCHIVE> — Rotate either to select encoder type. NEXT
-OR-
ENCODER <CONFIDENCE> — Rotate either to select encoder type. NEXT

RECORDING <ON> — Rotate either to select mode. NEXT
STREAMING <ON> — Rotate either to select mode. NEXT

RECORD TO 71.75 GB <INTERNAL> — Rotate ◄► to select internal or external location. Rotate ↕ to select a volume on the external location. NEXT
STREAM METHOD <PULL> — Rotate either to select push or pull streaming. NEXT

STREAMING <ON> — Rotate either to select mode. NEXT
STREAM PROTOCOL <UNI RTP/UDP> — Rotate either to select protocol to follow stream method. NEXT

STREAM METHOD <PULL> — Rotate either to select push or pull streaming. NEXT
DESTINATION IP XXX.XXX.XXX.XXX — Rotate ◄► to select octet. Rotate ↕ to change address. NEXT

STREAM PROTOCOL <MULTI RTP/UDP> — Rotate either to select protocol to follow stream method. NEXT
RESOLUTION <512x288> — Rotate either to select streaming resolution. NEXT

MULTICAST IP XXX.XXX.XXX.XXX — Rotate ◄► to select octet. Rotate ↕ to change address. NEXT
FRAME RATE <15> — Rotate either to select streaming frame rate. NEXT

OUTPUT MODE <AUDIO/VIDEO> — Rotate either to select audio and video, or video only. NEXT
VID BITRATE AUD <350> <192> — Rotate ◄► to change video bitrate. Rotate ↕ to change audio bitrate. NEXT

AUDIO OUTPUT <CH B ONLY> — Rotate either to select ChA, ChB or A+B. NEXT

RESOLUTION <1280x720> — Rotate either to select recording resolution. NEXT

FRAME RATE <30> — Rotate either to select frame rate. NEXT

VID BITRATE AUD <5000> <384> — Rotate ◄► to change video bitrate. Rotate ↕ to change audio bitrate. NEXT

Recording and streaming mode

The encoder mode submenu is the second submenu in the **Record/Stream Configuration** menu. The displayed name is based on the encoder purpose selected in the **Encoder** submenu.

- **Recording** (for archive only) – On or off.
- **Streaming** – On or off.
- **Off** – Streaming and recording (when available) can be shut off separately.

For Archive, the default selection is Recording **On**, Streaming **On**.

For Confidence, the Streaming selection is **On** (default) or **Off**.

Subsequent submenus are available based on the encoder select and encoder mode selections.

Record To (archive only)

The `Record To` submenu is available when the encoder selection is **`Archive`** and encoder mode is **`Recording On`**. This submenu allows you to define the drive the recorded video is stored to in Single Recording mode. When Dual Recording is enabled, the recording files are saved in the internal SSD drive and the external USB destination selected on the Web page (see **Setting the default recording destination** on page 117). It also displays the total drive space.

> **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.

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.

> **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.

Auto mode uses a hiearchy to choose from attached devices and internal memory as follows:

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).

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.
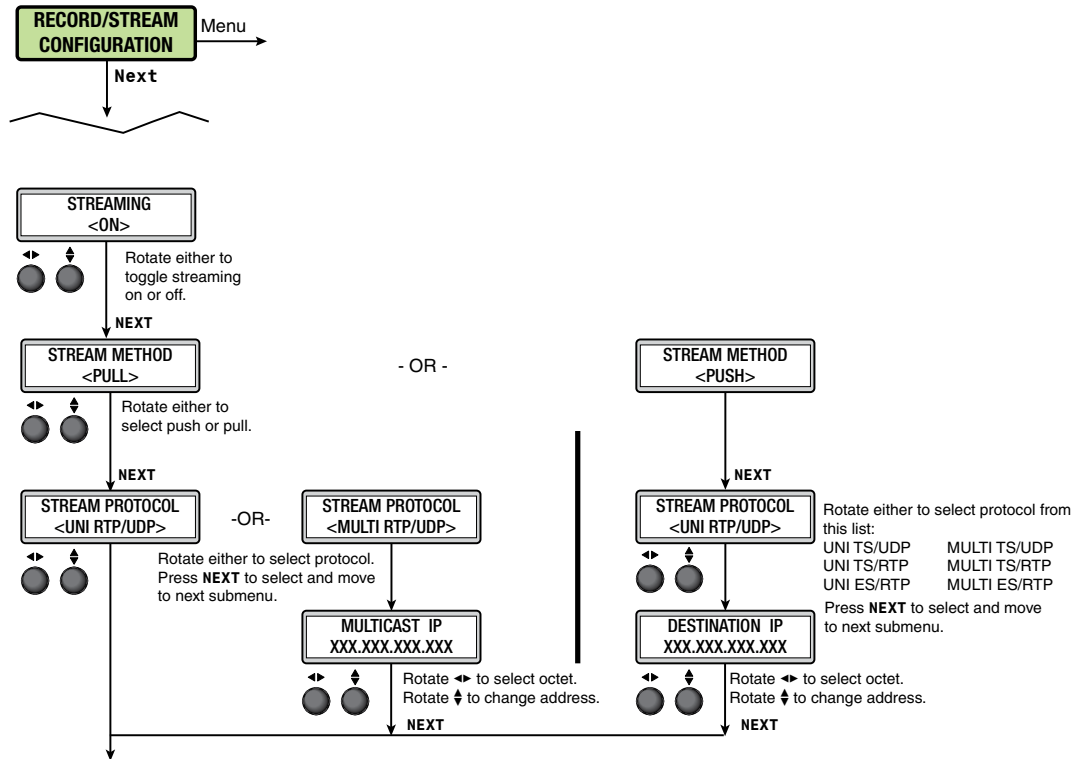
Figure 16. Streaming Submenus

The following submenus appear only when the streaming 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.

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 encodes have independent resolution settings.

The selections are:

- **512x288**
- **848x48Ø**
- **1Ø24x768**
- **128Øx72Ø** (default)
- **128Øx1Ø24**
- **192Øx1Ø8Ø**

There are three types of encodes - Archive/Record, Confidence, and Custom (see **Configure and save custom encoding presets** on page 93).

	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

* for confidence stream only

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.
- 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:

- **3Ø** (default)
- **25**
- **24**
- **15**

- **12.5**
- **12**
- **1Ø**
- **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 **2ØØ** kbps to **1ØØØØ** kbps (default **5ØØØ** 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:

- **8Ø**
- **192** (default)

- **96**
- **256**

- **128**
- **32Ø**

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.
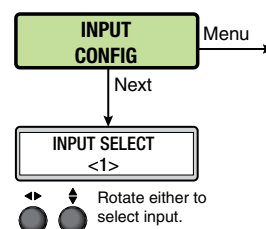
Input format

The next submenu selects the input signal format (see image at right).
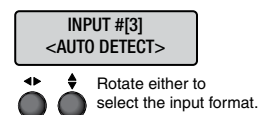
INPUT #1	INPUT #2	INPUT 3	INPUT 4	**INPUT 5
*HDMI	*HDMI	*YUVp/HDTV	*HDMI	*Auto-SDI
		YUVi		3G-SDI
		Composite		HD-SDI
				SDI

*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.

```
(3) H    START    V
<128>         <128>
```
Rotate ◄► to select the horizontal start pixel.
Rotate ↕ to adjust the vertical start pixel.

- **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.

```
(3) H    ACTIVE    V
<1024>        <0768>
```
Rotate ◄► to adjust Horizontal Active pixel width.
Rotate ↕ to adjust Vertical Active pixel height.

```
(3) TTLPIX    PHASE
<XXX>        <16>
```
Rotate ◄► to adjust TTL pixel width.
Rotate ↕ to adjust phase.

- **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 Ø00 to Ø63. The default is Ø32.
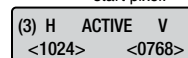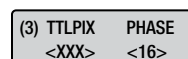
Aspect Ratio

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**).

```
ASPECT RATIO IN[1]
<FILL>
```
Rotate either to select an aspect ratio for the selected input.

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 INPUT #[1]
<720p_60_2ch>

Rotate ◄► to set an EDID value for the active input.

| 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 four inputs five for the SMP 351 3G-SDI) 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:

```
┌─────────────────────┐
│  IN[1] AUDIO SELECT  │
│     <LPCM 2CH>       │
└─────────────────────┘
◄►   ⬍    Rotate either to
○    ○    select an audio input source
          for the selected input.
```

- **LPCM 2CH** — for embedded digital audio (default)

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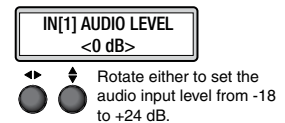
- **OFF** — for no audio

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
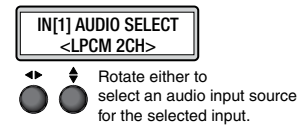
Audio level

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

```
┌─────────────────────┐
│  IN[1] AUDIO LEVEL   │
│      <0 dB>          │
└─────────────────────┘
◄►   ⬍    Rotate either to set the
○    ○    audio input level from -18
          to +24 dB.
```

Background Recall Menu

A background can be selected to record with the channel and B inputs. Background files must be PNG format and uploaded to the `Background` folder the SMP 351 using the embedded Web pages or an SFTP client (see **Upload a File to the SMP 351** on page 131).

```
           ┌──────────────┐
MENU ───→  │  BACKGROUND  │ MENU ─→ A
           │    RECALL     │        in
           └──────────────┘        of
                 │ NEXT
                 ▼
           ┌──────────────┐
           │    RECALL     │
           │ <default.png> │
           └──────────────┘
           ◄►   ⬍    Rotate either to select.
           ○    ○    Press NEXT to load
                     the background file
                     and exit.
```

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.
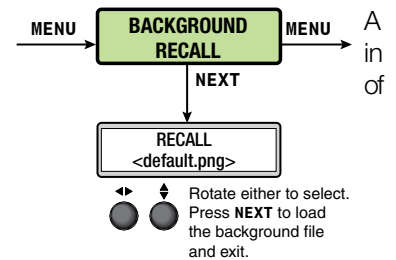
Advanced Configuration Menu

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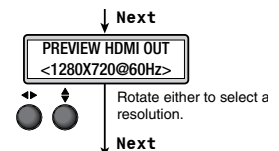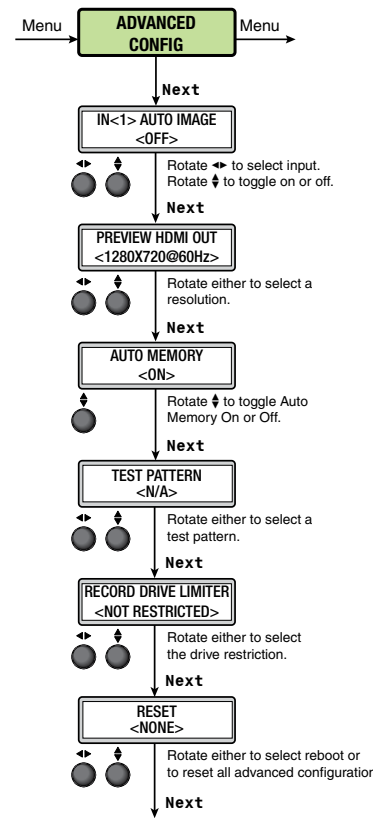
Press **NEXT** to select the input value and move to the next submenu.

> **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 171).

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.

Menu → **ADVANCED CONFIG** ← Menu

↓ **Next**

IN<1> AUTO IMAGE <OFF>
Rotate ◄► to select input.
Rotate ♦ to toggle on or off.

Next

PREVIEW HDMI OUT <1280X720@60Hz>
Rotate either to select a resolution.

Next

AUTO MEMORY <ON>
Rotate ♦ to toggle Auto Memory On or Off.

Next

TEST PATTERN <N/A>
Rotate either to select a test pattern.

Next

RECORD DRIVE LIMITER <NOT RESTRICTED>
Rotate either to select the drive restriction.

Next

RESET <NONE>
Rotate either to select reboot or to reset all advanced configuration

↓ **Next**

↓ **Next**

PREVIEW HDMI OUT <1280X720@60Hz>
Rotate either to select a resolution.

↓ **Next**

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.
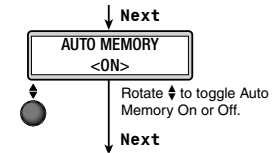
Test Patterns

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.
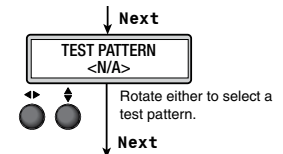

Color Bars Time Stamp Pulse Crop

Aspect Ratio 1.33:1 Aspect Ratio 1.78:1 Aspect Ratio 1.85:1 Universal OSD

Figure 17. 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 80).

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 pattern is selected, **Off** is selected from the **Test Pattern** drop-down list, or unit power is recycled.

Record Drive Limiter

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

The following limitations can be selected:

- **NOT RESTRICTED** (default) – Allows recording to internal memory and any connected drives.
- **AUTO** – See **Record To (archive only)** on page 30.
- **INTERNAL ONLY** – Records only to the internal storage.
- **FRONT USB ONLY** – Records to a device connected to the front USB port only.
- **REAR USB ONLY** – Records to a device connected to the rear USB port only.

Based on the top level selection, the **REC LOCATION** submenu under `Record/Stream Config` offers different record drive options.
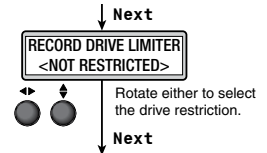
> **NOTE:** Recordings are saved to the designated destination only (for example: the **FRONT USB ONLY** selection limits the recording location to the front USB port even if the drive is disconnected or fails.

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 164). 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.
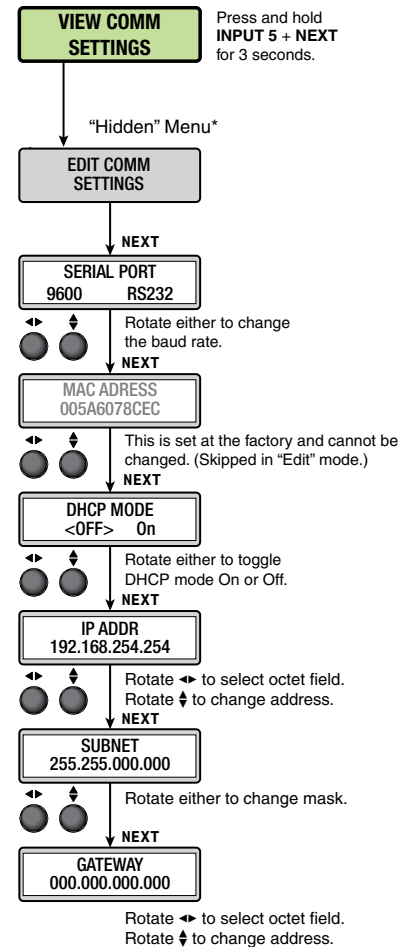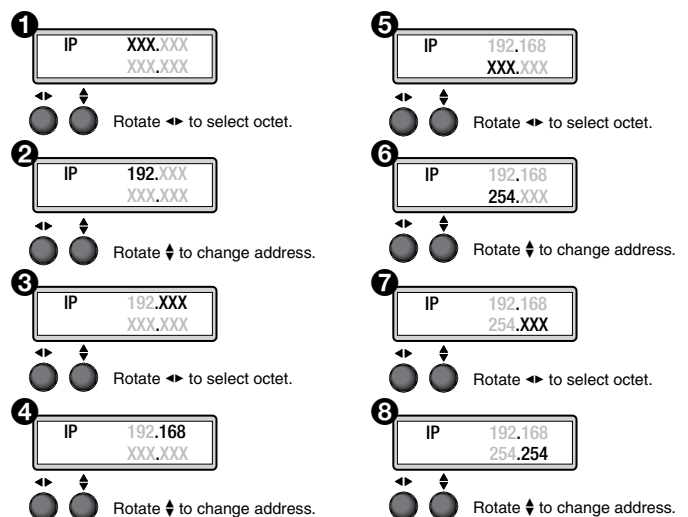
The VIEW COMM SETTINGS submenu is read-only. To make changes, press and hold **NEXT** and **INPUT 5** simultaneously for 3 seconds in the `VIEW COMM SETTINGS` menu or any of the submenus. The `VIEW COMM SETTINGS` menu changes to the `EDIT COMM SETTINGS` menu.

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 lower right).

2. Change the selected octet value using the right (♦) **ADJUST** knob.

3. Make the next octet selection with the left (◄►) **ADJUST** knob. The selected octet blinks (shown in **Bold** in the illustration at lower right).

4. Change the selected octet value using the right (♦) **ADJUST** knob.

5. Make the next octet selection with the left (◄►) **ADJUST** knob. The selected octet blinks (shown in **Bold** in the illustration at right).

6. Change the selected octet value using the right (♦) **ADJUST** knob.

7. Make the next octet selection with the left (◄►) **ADJUST** knob. The selected octet blinks (shown in **Bold** in the illustration at right).

8. Change the selected octet value using the right (♦) **ADJUST** knob.

VIEW COMM SETTINGS

Press and hold **INPUT 5** + **NEXT** for 3 seconds.

"Hidden" Menu*

EDIT COMM SETTINGS

NEXT

SERIAL PORT
9600   RS232

Rotate either to change the baud rate.

NEXT

MAC ADRESS
005A6078CEC

This is set at the factory and cannot be changed. (Skipped in "Edit" mode.)

NEXT

DHCP MODE
<OFF>   On

Rotate either to toggle DHCP mode On or Off.

NEXT

IP ADDR
192.168.254.254

Rotate ◄► to select octet field.
Rotate ♦ to change address.

NEXT

SUBNET
255.255.000.000

Rotate either to change mask.

NEXT

GATEWAY
000.000.000.000

Rotate ◄► to select octet field.
Rotate ♦ to change address.

---

❶ IP   XXX.XXX
            XXX.XXX

Rotate ◄► to select octet.

❷ IP   192.XXX
            XXX.XXX

Rotate ♦ to change address.

❸ IP   192.XXX
            XXX.XXX

Rotate ◄► to select octet.

❹ IP   192.168
            XXX.XXX

Rotate ♦ to change address.

❺ IP   192.168
            XXX.XXX

Rotate ◄► to select octet.

❻ IP   192.168
            254.XXX

Rotate ♦ to change address.

❼ IP   192.168
            254.XXX

Rotate ◄► to select octet.

❽ IP   192.168
            254.254

Rotate ♦ to change address.

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

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.
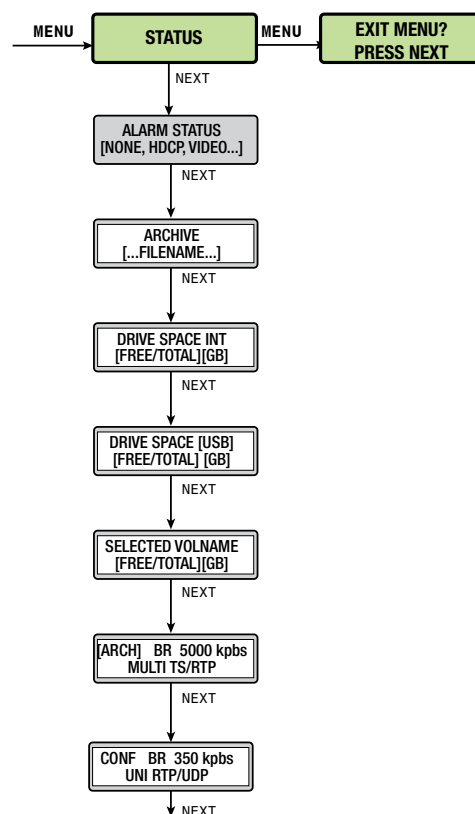
Exit Menu

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.

MENU → STATUS → MENU → EXIT MENU? PRESS NEXT

NEXT

ALARM STATUS [NONE, HDCP, VIDEO...]

NEXT

ARCHIVE [...FILENAME...]

NEXT

DRIVE SPACE INT [FREE/TOTAL][GB]

NEXT

DRIVE SPACE [USB] [FREE/TOTAL] [GB]

NEXT

SELECTED VOLNAME [FREE/TOTAL][GB]

NEXT

[ARCH]   BR 5000 kpbs MULTI TS/RTP

NEXT

CONF   BR 350 kpbs UNI RTP/UDP

NEXT

Front Panel Lockout (Executive Modes)

To prevent accidental changes to 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 156).

Executive mode OFF

```
          DEFAULT
           CYCLE
             │ Press MENU+MARK
             │ for 3 seconds.
             ▼
  SELECT EXE MODE       SELECT EXE MODE       SELECT EXE MODE       SELECT EXE MODE
  <COMPLETE LOCK>       <MENU LOCKOUT>        <RECORD CTRL ONLY>    <OFF>
```

Rotate either to select from the four modes.

NEXT to enter Executive mode 1.

NEXT to enter Executive mode 2.

NEXT to enter Executive mode 3.

NEXT to turn Executive mode off and exit.

MODE 1: COMPLETE LOCK
All front panel controls disabled.

MODE 2: MENU LOCKOUT
No access to the front panel menus. Selection buttons are active.

MODE 3: RECORD CTRL ONLY
Record, Pause, Stop, and Mark buttons are available.

MODE 4: OFF
Executive mode is disabled (default).

Figure 18. 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 142). 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 110)
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 (see **Setting the date and time** on page 113) 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 110).
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.

Web-Based User Interface

This section provides information about:

- **Overview of the Web-Based User Interface**
- **Accessing the Web-Based User Interface**
- **Page Overview**
- **Logging Out and Logging In**
- **AV Controls Panel**
- **Recording Controls**
- **Scheduled Events**
- **Configuration Overview**
- **File Management**
- **Troubleshooting**

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.
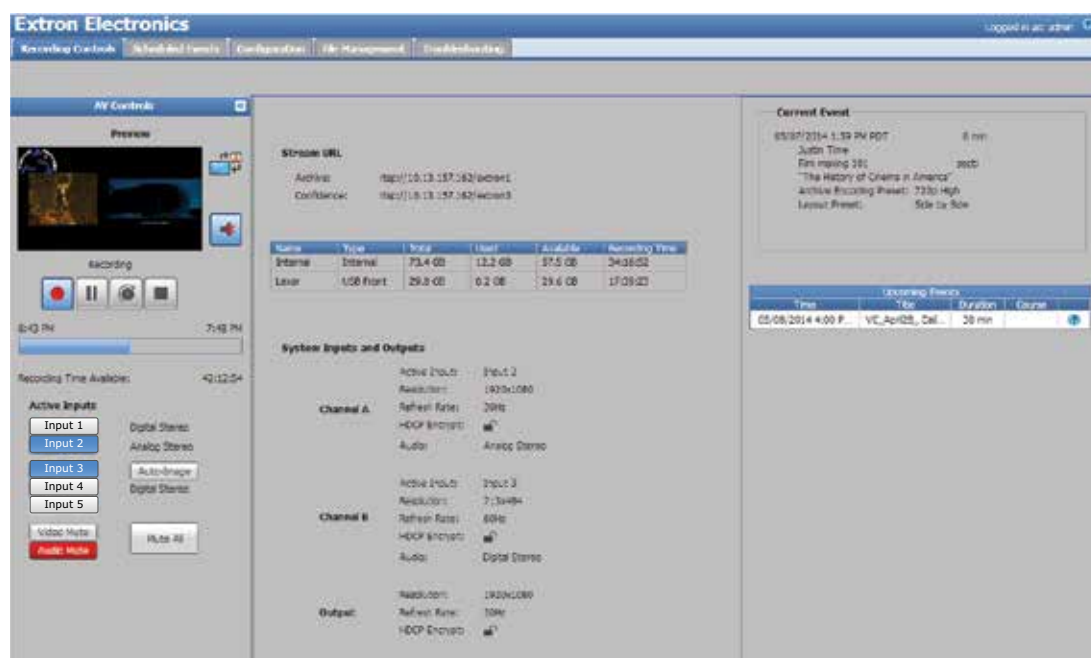
Figure 19. SMP 351 Embedded Web Pages

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
- 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)

> **NOTES:**
> - Google Chrome is the preferred browser for Windows-based computer platforms.
> - Apple Safari is the preferred browser for Apple- and Mac-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.

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. Select a tab to open the desired page.

Figure 20. **Web-based User Interface, Main Page Tabs**

Page Overview

The SMP 351 Web pages are organized by function and further organized within the main functions.

Tabs

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

Figure 21. Five Main Function Tabs

Recording Controls (see **Recording Controls** on page 60) — 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 64) — This page provides a calendar view of previous and upcoming recording events.

Configuration (see **Configuration Overview** on page 67) — 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, or obtain presentation schedules. 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 129) — 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 138) — 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 > Schedule Settings** shown selected).

Figure 22. Sub-tabs Within Pages

Sub-tabs can be hidden to fit the information into the available screen width. To access sub-tabs within the **Configuration** tab, click the tab scroll arrow buttons (see figure 23, Ⓐ and Ⓑ) on each side of the sub-tabs to move the sub-tabs right and left.
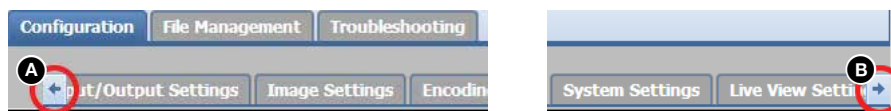

Figure 23. **Tab Scroll Arrows**

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 servers as the main interface for operating the SMP 351 . 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** (Ⓐ) arrow button on the right side of a pane. The pane opens to expand it.

Click the **Collapse** (Ⓑ) arrow button at the top corner of a pane to collapse it. This hides the controls and provides additional room for other panes.
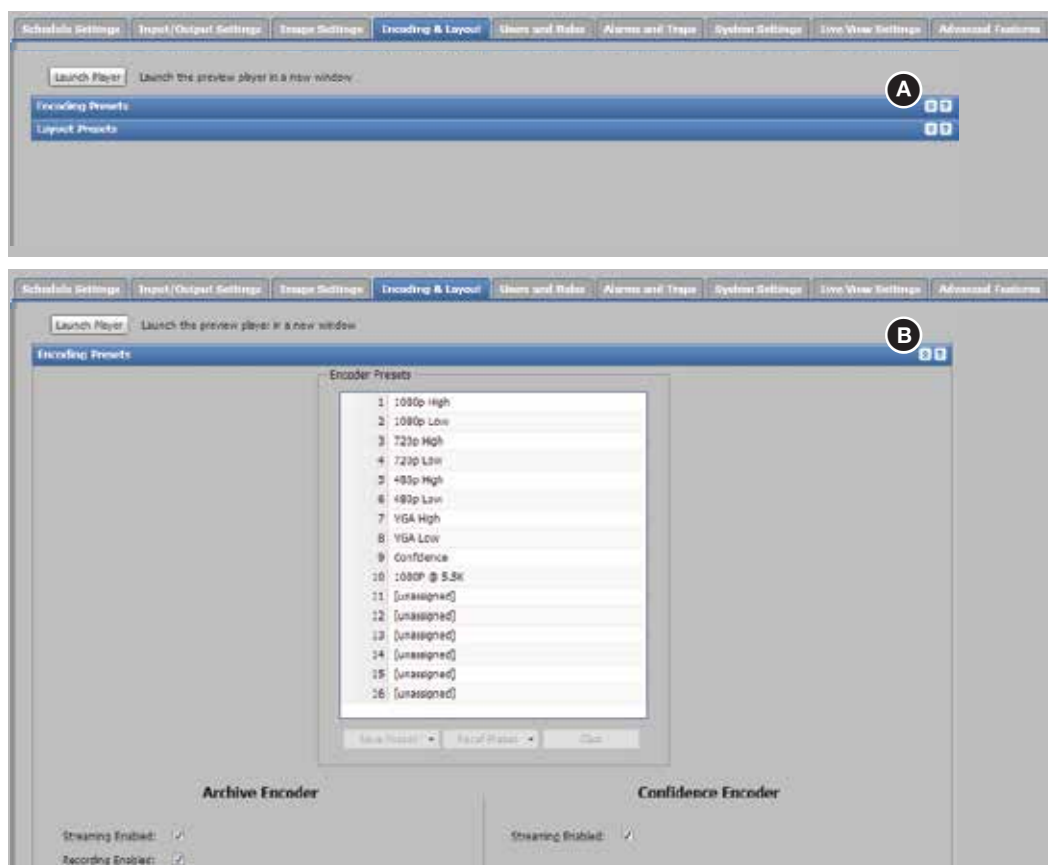
Figure 24. **Collapsed and Expanded Panes**

> **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:

Idle

Communication with the device is being temporarily suspended to conserve resources.
Please press "Resume" to continue.
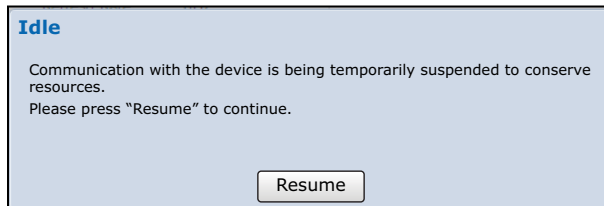
[Resume]

Figure 25.   Communication Suspended Warning Dialog

The idle status does not affect the recording stream or the output AV stream, 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 its network connection, the connection to its 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 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:

Logged in as: user   Logout
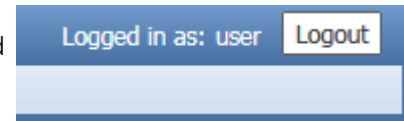
The **Logout** button appears only if one or more passwords is active.

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.

   Logout   ✕

   Are you sure you want to logout?
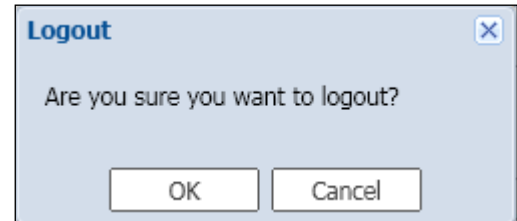
   [OK]   [Cancel]

   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.

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 on the next page), and `Windows Security` for Internet Explorer (see figure 28 on the next page) `Login` dialog box opens.
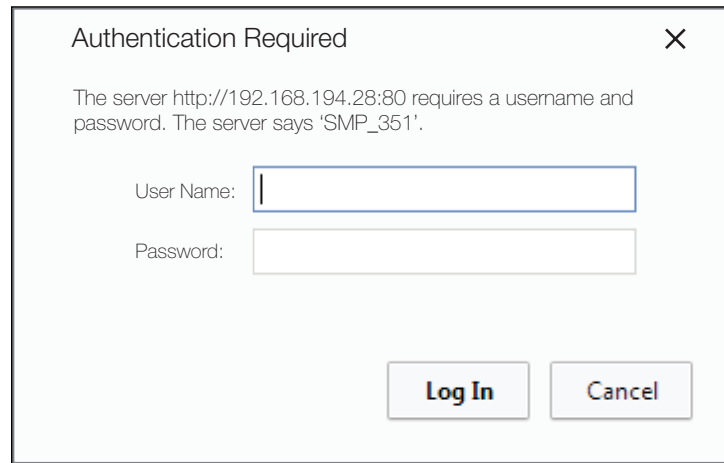
   Authentication Required   ✕

   The server http://192.168.194.28:80 requires a username and password. The server says 'SMP_351'.

   User Name: [   ]

   Password: [   ]

   [Log In]   [Cancel]

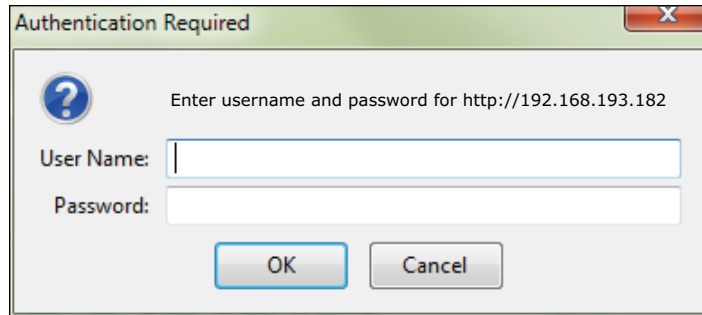**Figure 26.   Chrome Authentication Dialog**

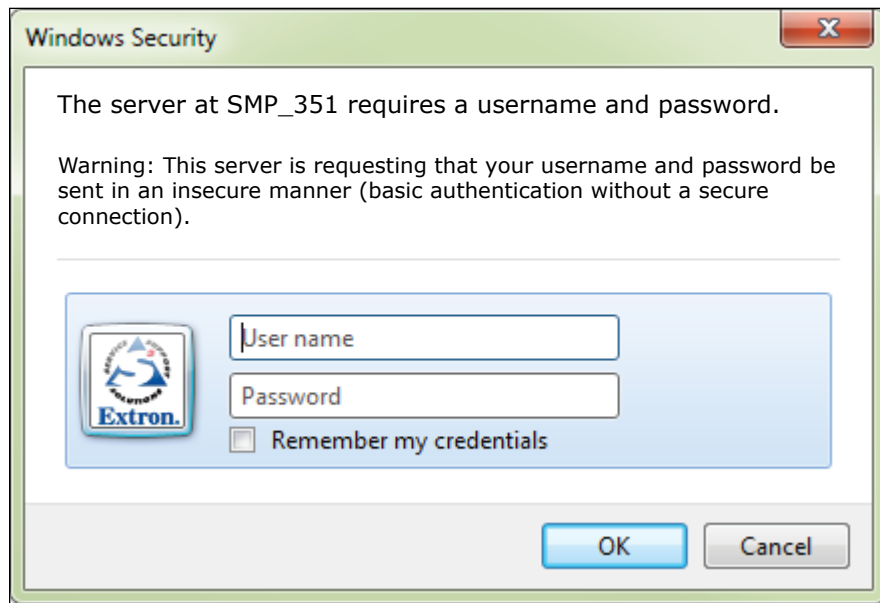**Figure 27.** Firefox Authentication Dialog

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 **Ⓐ**, at right) provides a small, live stream view of the output video that is a visual representation of the recording. To make the embedded Web pages faster to refresh, the confidence stream for this live view can be disabled and an icon displayed here in place of the streamed image. The recording (archive) stream continues 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 Overview** on page 90). The confidence stream for the preview can also be disabled using front panel controls (see **Front Panel Menu Operation** on page 22).

Swap

Click the **SWAP** icon (**Ⓑ**) 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 (**Ⓒ**) to change from muted (default) to unmuted:
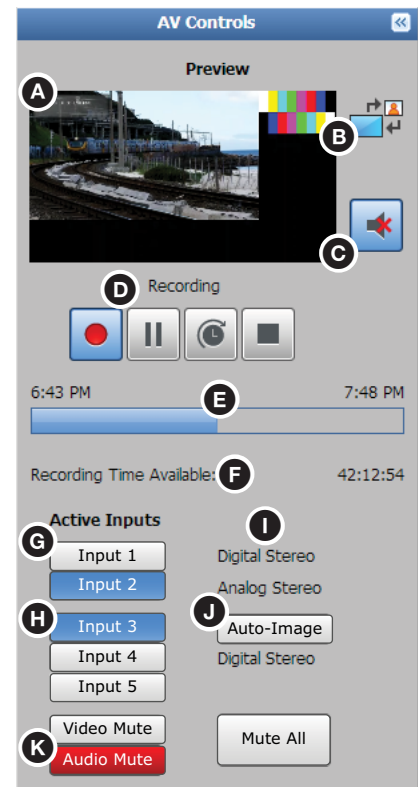
Recording controls

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.

  > **NOTE:** An ad hoc recording session is set up for a specific occasion without being scheduled.

- **Pause** — Pause recording.

- **Extend** — Extend the duration of a recording event beyond the scheduled end time.

- **Stop** — Stop recording and end the recording session.

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
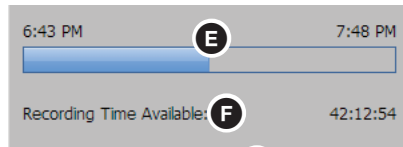
A progress bar (**E**) below the recording control buttons is a horizontal bar graph that shows how much recording time has elapsed and, if it is a scheduled session rather than an ad hoc recording, how long the presentation is expected to last.

Recording time available

Available recording time (**F**) is indicated below the progress bar. How much time is available is based on the combination of available storage space and the current stream resolution and bit rate.

Input selection

Inputs are grouped into two channels:

- Input 1 (HDMI) and input 2 (HDMI) form channel A (**G**)
- Input 3 (component/composite), input 4 (HDMI), and optional input 5 (3G/HD/SDI) form channel B (**H**).

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 (**I**).
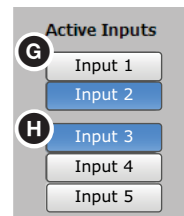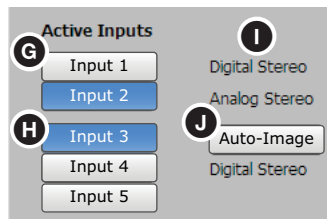
Audio mode (digital stereo or analog stereo) must be configured in the `Input/Output Settings` page (see **Input/Output Settings** on page 75).

- By default these input buttons are labeled Input 1, Input 2, Input 3 , Input 4, and Input 5. To change the button text, see **Input/Output Settings** on page 75.
- Video input types are fixed per input, except for the format of component or composite video input for input 3 (see **Configuring inputs** on page 76).
- Buttons for active inputs are blue. Buttons for inactive inputs are gray.

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 and reflect in the preview.
2. To apply Auto-Image to input 3, click **Auto-Image** to the right of Input 3 (**J**). Auto-Image automatically sizes and centers the selected input to match the channel B window.

Mute buttons — Click the desired button (**K**) 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.

Click a mute button to unmute the selection. When unmuted, the button changes from red to gray.

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

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 destination** on page 117) within `Configuration > System Settings` for more information about single and dual recording modes.
> - If the unit is set for restricted mode, users do not have the option to select different storage location. The storage location or location are preselected and connot be changed from the following dialog box.
> - If the recording is restricted to a USB device with multiple partitions, then partition selection within the USB drive is still available.

To start an ad hoc recording:

1. In the `AV Controls` panel, select the desired active inputs (see **AV Controls Panel** on page 54) for recording.

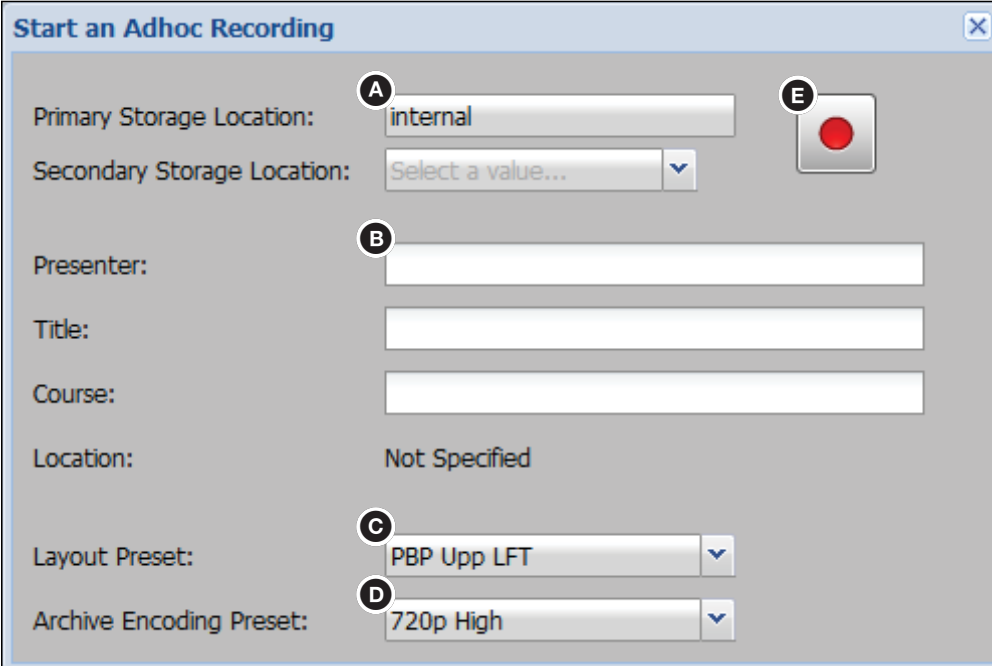2. Click **Record**. The `Start an Adhoc Recording` dialog opens.

Figure 29.   Ad hoc Recording Dialog

If the SMP 351 is set for single storage mode (recordings are saved to only one storage location set by the admin), the dialog box opens to figure 29.

3. If not set for restricted mode, a drop-down list of the storage locations is available. Select a storage option (see **figure 29**, **Ⓐ** on the previous page) from the **Primary Storage Location:** drop-down list to specify where the recorded file will be stored.

- **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 **Primary Storage Location:** 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.

  In the example below, there are four volumes in the USB drive attached to the rear port. When **Auto** is selected, only VOLUME2 is selected to store a recording.

Start an Adhoc Recording

Primary Storage Location:	auto ▾
	auto
	internal
	usbrear/VOLUME2/
	usbrear/VOLUME1/
	usbrear/NEW_VOLUME/
	usbrear/FAT32_130G/

To record to another volume on the device, you must manually select the target location rather than using the auto option.

- **Internal** — The recording is saved in the internal memory of the SMP 351 .

- **usbfront**/*volume1*, **usbfront**/*volume2*, **usbfront**/*volume3*, **and so on** — The recording is stored to the selected 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 .

4. If set for Dual Storage, recordings are saved to two storage locations simultaneously. If the SMP 351 is set for restricted mode, 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 **Primary Storage Location:** drop-down list.

Start an Adhoc Recording

Primary Storage Location:	internal
Secondary Storage Location:	Select a value... ▾
	usbrear/VOLUME2/
	usbrear/VOLUME1/
	usbrear/VOLUME3/
	usbrear/STORAGE/

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

In dual mode, the recording is always saved to the internal drive as the primary storage location. Only the secondary location can be selected.

- 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 Storage Location drop-down list displays **n/a** (not available or not applicable) as the only option in the list.

- 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).

5. If desired, enter text in the **Presenter**, **Title**, and **Course** fields (see **figure 29** on page 56, **B**).

   - This text appears in the `Current Event` section of the `Recording Controls` page when the recording starts.

   - This text forms part of the metadata that can be displayed over the background locations, depending on the selected layout preset, during the presentation.

   - On-screen metadata is included in the recorded video and is displayed on playback.

Presenter:	Justin Time
Title:	The History of Cinema in America
Course:	Film making 101

   - The metadata from these fields can also be used to create the default file name for the recording if the SMP is configured to use up to two of the fields in the recording name (see **System Settings** on page 112). If the metadata is part of the recording file name, you can find it easily in the SMP embedded File Management web page using this data. The file name and the metadata for the presenter, title, and course are retained if the file is uploaded to a server-based application such as the Extron Streaming Content Manager or an Opencast server scheduling system.

> **NOTE:** The text shown in the **Location:** field is drawn from the location name specified in `Configuration > System Settings > Unit Identification` or from the **Capture Agent Name** field within `Configuration > Schedule Settings > Schedule Source > Opencast Scheduling`.

6. Select a preset for the layout and the `Preview` window in the `AV Controls` panel from the **Layout Preset** drop-down list (see **figure 29**, on page 56, **C**). For examples of the options, see **Layout presets** on page 99.

7. Select presets for the archive encoding (the stored recording) from the corresponding drop-down list (see **figure 29**,on page 56, ❶). For details on encoding presets, see **Encoder Settings and Layout Presets Overview** on page 90.

Archive Encoding Preset Options		
1080p High	480p High	Confidence
1080p Low	480p Low	
720p High	VGA High	
720p Low	VGA Low	

> **NOTE:** The resolution of the confidence encoding preset cannot be larger than that of the archive encoding preset.

8. Click **Record** (see figure 29, ❸). The `Start an Adhoc Recording` dialog closes and recording begins. In the `AV Controls` panel, the **Record** button is blue to indicate active recording.

To pause recording, click **Pause** (𝄇). Recording is suspended, but the preview and output streams continue. To resume recording, click **Pause** or **Record**.

To end a recording, click **Stop** (▪).

Once the recording has started, you can use the controls in `Configuration` > `Encoding & Layout Presets` to select a different layout preset or to change the layout on-demand by selecting and dragging or resizing the representations of windows for channels A and B in the layout area.

> **NOTE:** The **Extend Recording** button (◉) only applies to scheduled recordings.

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 this 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
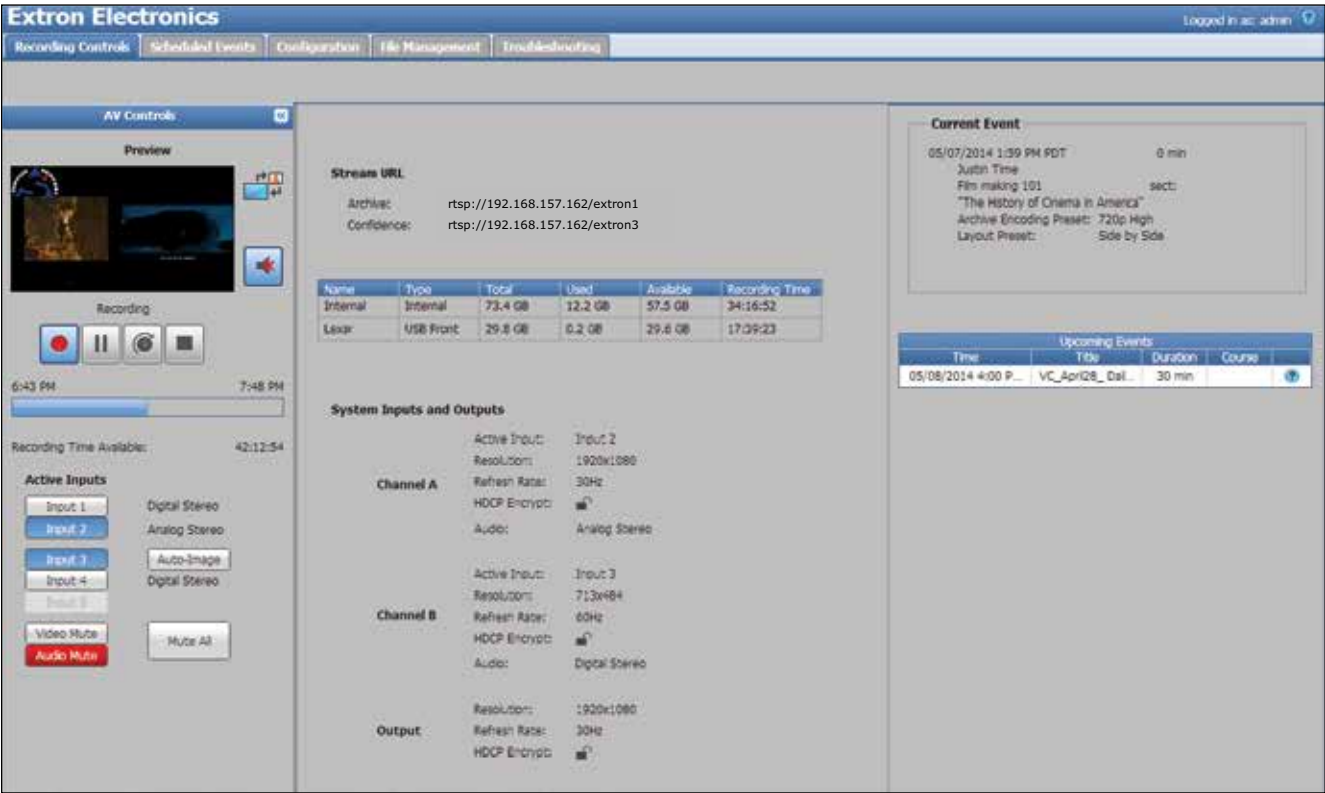- Upcoming Events

Figure 30. 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.

Stream URLs

This panel displays the URLs (addresses) for each encoded stream: **Archive** (recording) and **Confidence** (preview window).
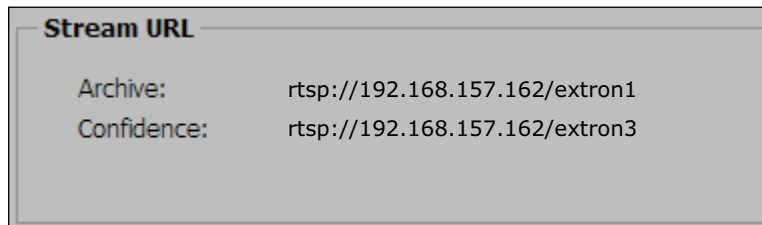

Figure 31. **Recording Controls, Stream URLs**

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.

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

Figure 32. **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 destination** on page 117 and **Scheduling with an Opencast server** on page 71). 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 (see **Automatic Recording Deletion** on page 134). 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.

System Inputs and Outputs

This panel displays information about the names, resolutions, refresh rates, HDCP status, and audio status for the two active inputs. It also displays the resolution, refresh rate, and HDCP status of the archive stream.
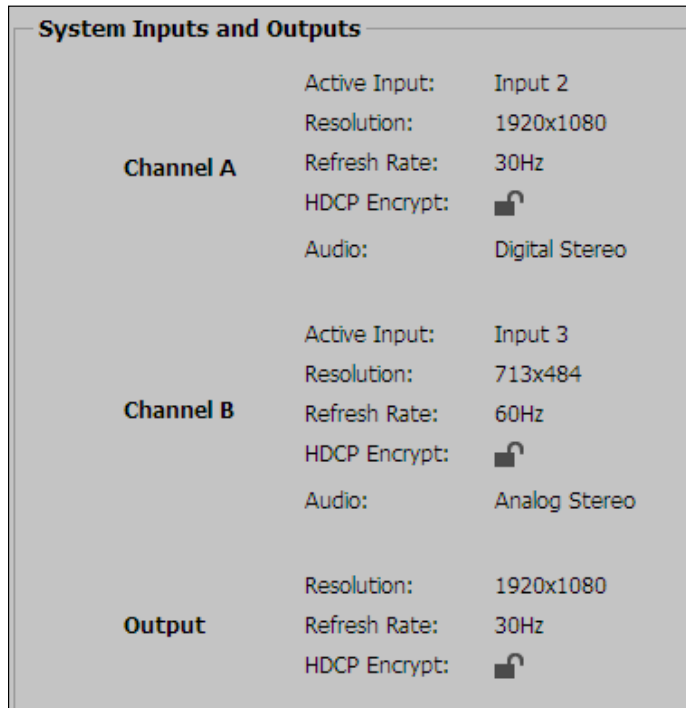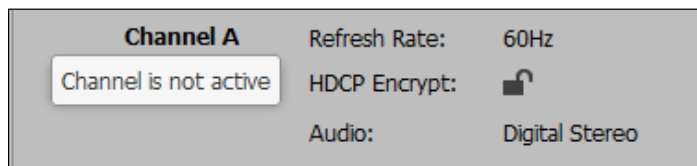

Figure 33. Recording Controls, System Input and Output Information

If the currently selected screen layout features the signal from only one channel at a time (such as the Fullscreen A or Fullscreen B layouts), a note is displayed on-screen that the channel that is not selected is not active:

HDCP status is indicated by the icons.

Input	Symbol	Status
HDCP Encrypted	🔒 HDCP	Signal is HDCP Encrypted
No Signal	No Signal	No Signal
Not Encrypted	🔓	Signal is Not Encrypted

Output	Symbol	Tooltip
HDCP Compliant	🔒✓	Display is HDCP Compliant
Not Compliant	🔒✗	Display is Not HDCP Compliant
No Display	No Display	No Display

Current Event

This panel displays information about the in-progress presentation. It includes:

- Current date and time

- Elapsed recording time

- Labels specific to the presentation content (name of the presenter, course name and section, presentation title) — These labels are created during schedule setup or when an ad hoc recording (see **Start an Ad Hoc Recording** on page 56) is started via the `AV Controls` panel in the SMP 351 embedded Web pages.

- Archive and Web encoding preset names or numbers

- Layout preset name or number
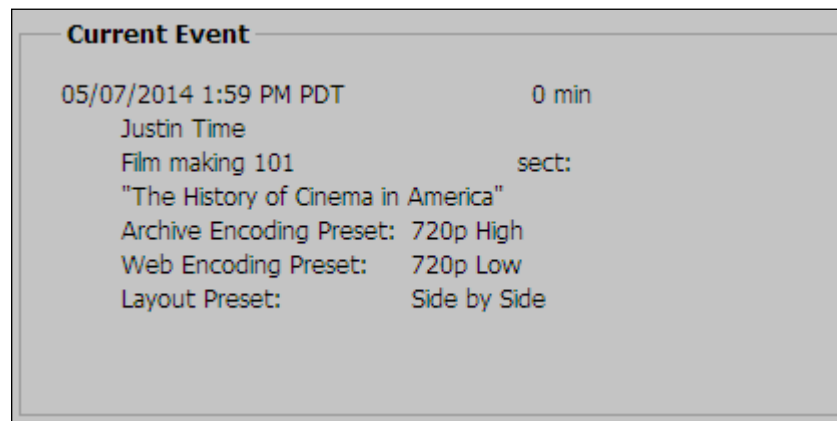

Figure 34.   Recording Controls, Current Event Panel

Upcoming Events

This panel displays a list of the current day upcoming scheduled events in a table format. Events are listed in order of scheduled recording time.

Figure 35. Recording Controls, Upcoming Events Dialog

To display more details about an upcoming event, click the question mark in the rightmost column.

Scheduled Events

The `Scheduled Events` page lists all presentations (in-progress events, upcoming scheduled events, and presentations that have already taken place) in a calendar format. Events are listed by date and title. You can see a detailed view about each specific event from this page. Also, if 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 here.

Information on this page updates every 300 seconds. Click **Reload** (above the calendar) to refresh manually. Contents of this page are read-only and displayed for all users.
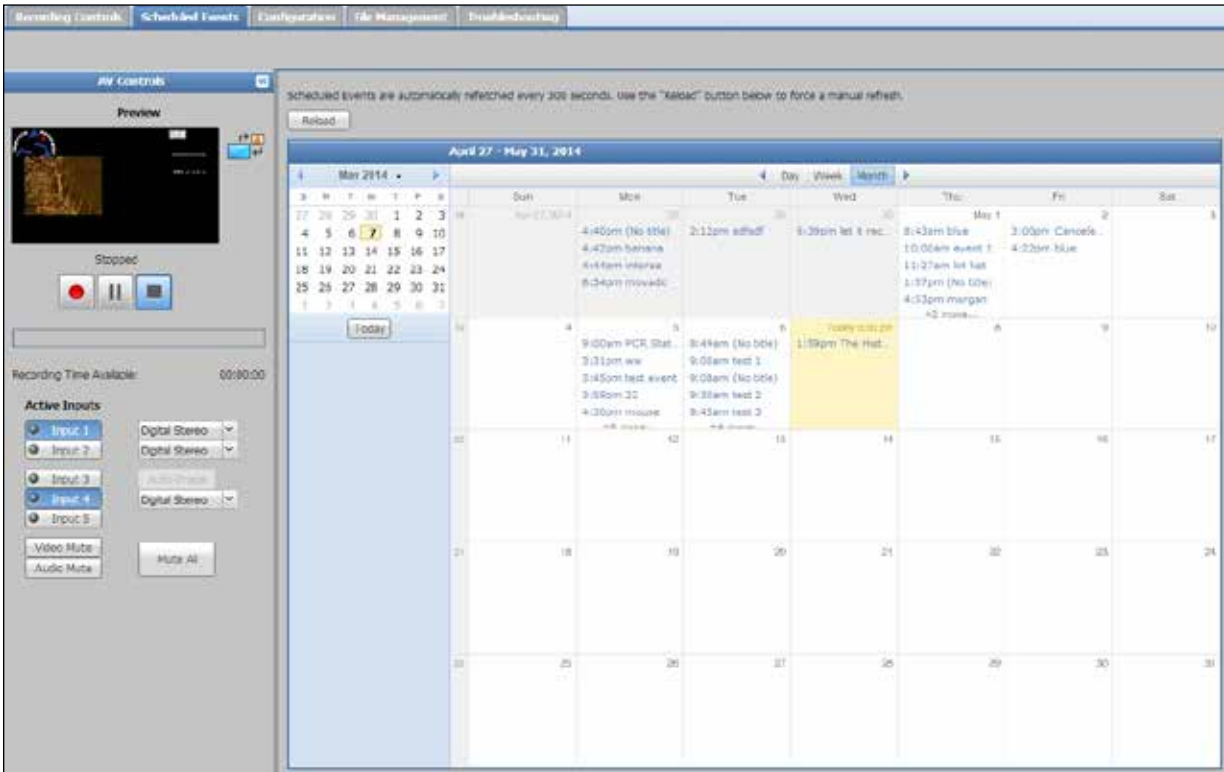
Figure 36. **Recording Controls, Scheduled Events Calendar**

Display Information About an Event

To display a summary of any event shown in the `Scheduled Events` calendar:

1. Click on the event. The `Event Details` dialog opens, displaying the event identification (ID) number, presentation title, date and time, location, and any notes available in the metadata for the presentation.
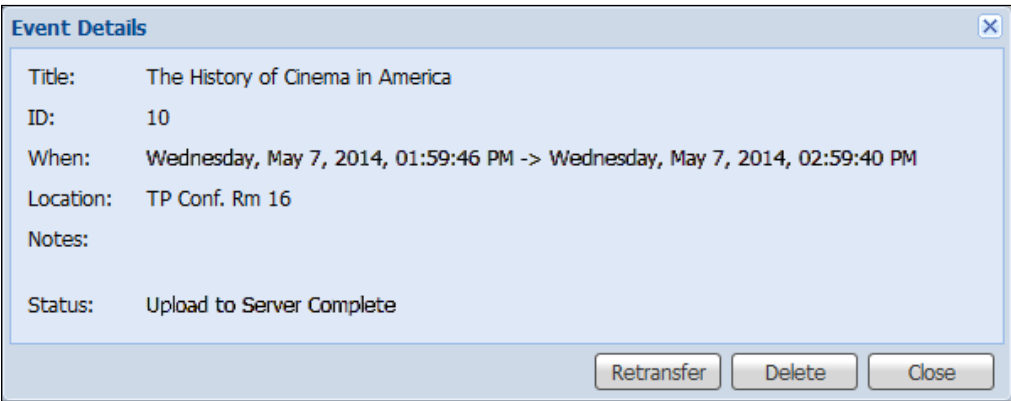

Figure 37. **Event Calendar, Event Details**

The status of the recording, indicated near the bottom of the dialog, can include options
such as:

- Recording Scheduled
- Recording Now
- Recording Finalized
- Upload Failed to Start
- Admin Requested Reupload
- Uploading to Server
- Upload Retries Failed
- Upload to Server Complete

2. Click **Close** to close the dialog. If you do not click **Close**, the dialog box remains open
    indefinitely.

Re-upload Files to a Server

Recordings stored in internal memory of the SMP 351 can be automatically uploaded
to a network server folder if you specify the network location in the `System Settings`
page (see **System Settings** on page 112). If the uploading process does not start or is
interrupted, or the files are not uploaded for other reasons, you can manually start the file
transfer again.

To manually upload an event recording to the specified network server:

1. Click on the **Scheduled Events** tab to open the calendar.

2. Click on the desired event (one that has already occurred, not a current or scheduled
    recording). The `Event Details` dialog opens.

3. Click **Retransfer** (see figure 38, **A**). The status changes first to `Admin Requested`
    `Reupload`, then to `Uploading to Server`.
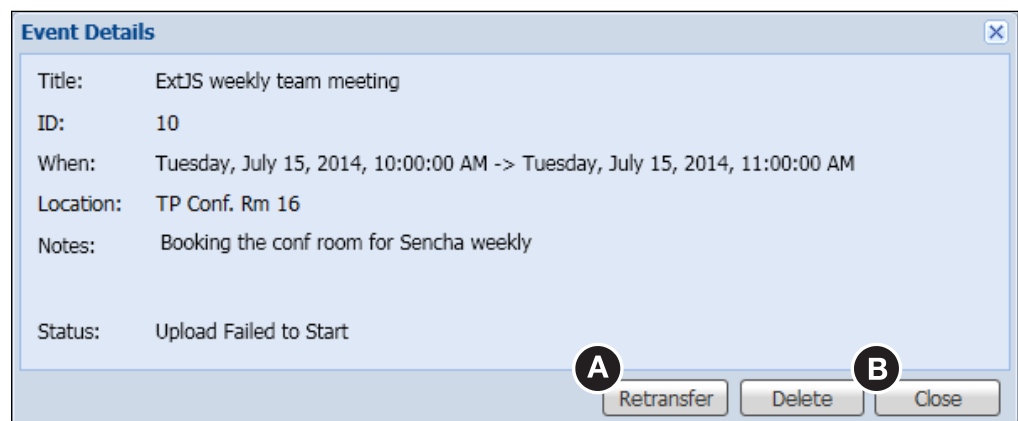
Figure 38.   Event Details Dialog

4. If the process fails, the status is `Upload Retries Failed`. Click **Retransfer** again
    to retry uploading the files. Once the recording package has been uploaded to the
    server, the status changes to `Upload to Server Complete`.

5. At any time after clicking **Retransfer** you can click **Close** (**B**) to close the dialog
    box. If you do not click **Close**, the dialog box remains open indefinitely.

Delete a Recording

There are two methods for deleting recordings: one automatic (see **Automatic Recording Deletion** on page 134), and one manual via the `Event Details` dialog box (see **figure 38** on page 64) in the `Scheduled Events` page. This manual method is described as follows.

To delete a recording from the `Event Details` dialog box:

1. Click the **Scheduled Events** tab at the top of the SMP 351 embedded web page to open the calendar.

2. In the calendar, locate and double-click on the recording you want to delete. The `Event Details` dialog box opens.

3. Click **Delete**.

4. A `Confirm` dialog box opens and asks you to confirm that you want to delete the event. If the recording was marked as locked in the `File Management` page, the `Confirm` dialog box notifies you that the file is protected and asks you to confirm that you want to delete the event.

5. Click **Yes** to delete the recording or **No** to cancel deletion.

> **NOTE:** Recordings cannot be deleted from within the `File Management` page.

Configuration Overview

The nine 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 set up how to obtain presentation schedules, 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.
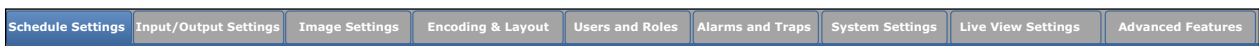
Schedule Settings	Input/Output Settings	Image Settings	Encoding & Layout	Users and Roles	Alarms and Traps	System Settings	Live View Settings	Advanced Features

Figure 39.   Configuration Pages

Configuration Tab Features

The pages within `Configuration` include the following:

- **Schedule Settings** — Determine how to obtain presentation schedules and, if appropriate, import calendars or connect to an Opencast server scheduling system.

- **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), date and time, and where and how to upload recordings. 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.

Schedule Settings

The `Schedule Settings` page within **Configuration** 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.

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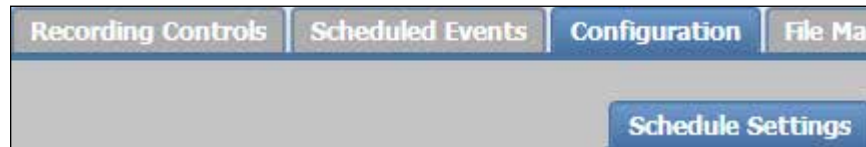

Figure 40. **Configuration Page, Schedule Settings Tab**

The `Schedule Settings` page opens, showing the `Schedule Source` panel.

Figure 41. **Schedule Source Panel**

Select one of four options for scheduling presentations:

Active Schedule Source Radio Button Selection	Corresponding Tab
No centralized schedules (ad hoc events only) *This is the default option.	**No Scheduling**
Manually import iCalendar one time	**Manual Calendar Import**
Import iCalendar data periodically	**Periodic Calendar Import**
Centralized Scheduling via Opencast server	**Opencast Scheduling**

By default, the SMP 351 is set for ad hoc events only. If **No centralized schedules (ad hoc events only)** is selected, there is nothing to configure for scheduling. The four selections are mutually exclusive. To set up any of the other options for importing schedules, see the instructions below.

An iCalendar (iCal®) file is a file containing schedule, task, or meeting information in a standard format. iCalendar files work independently of transport protocol and can be used cross-platform to share calendar data. Meetings, appointments, or events can be saved to an iCalendar file from most e-mail client programs including Microsoft® Outlook®, Google™ Calendar™, Apple Calendar, IBM® Lotus® Notes®, and Mozilla® Thunderbird®, and Yahoo® Calendar.

iCalendar event schedule importing

To import an iCalendar or `.ics` event schedule on a one-time basis:

1. From the `Schedule Settings` page, select **Manually import iCalendar one time**. The `Active Schedule Source` dialog opens.

Active Schedule Source

You are about to switch scheduling sources. All existing scheduled events will be deleted from the device's calendar, and only events from the new scheduling source will be available.
Are you sure you want to proceed?

OK   Cancel
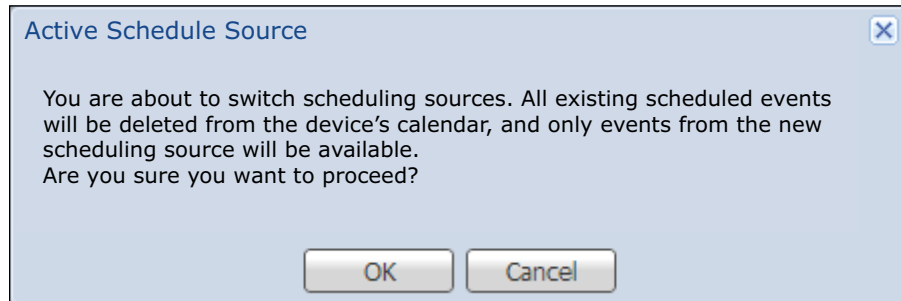
Figure 42.   Active Schedule Source Dialog

2. Click **OK** to proceed. The **Manual Calendar Import** tab opens.
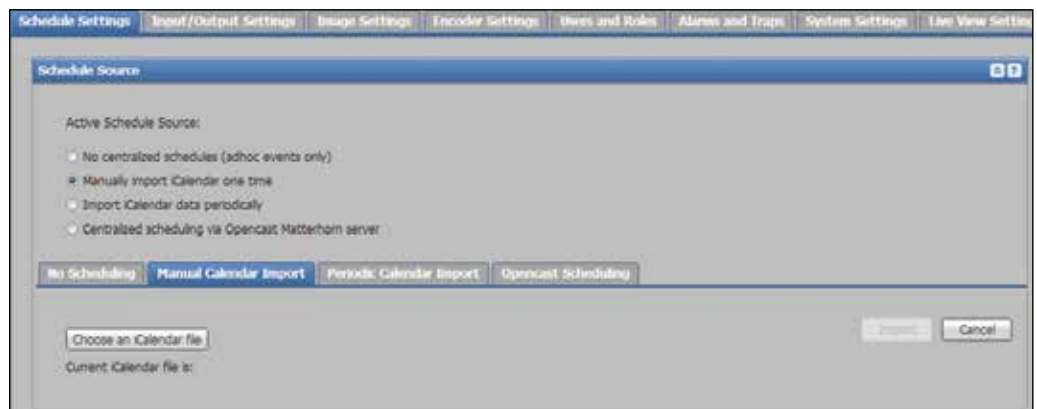
Figure 43.   Manual Calendar Import Tab

3. Click **Choose an iCalendar file**. An `Open` window opens.

4. Locate and select the iCalendar file for import. The file must have a `.ics` file extension.

5. Click **Open**. The `Open` window closes and the file name is displayed within the `Manual Calendar Import` panel area. The **Import** button is active.

6. Click **Import**. The event schedule is added to the scheduled events and appears in the calendar on the `Scheduled Events` page.

Import iCalendar schedules periodically

To import iCalendar event schedules automatically from an FTP server on a recurring basis:

1. From the `Schedule Settings` page, select the **Import iCalendar data periodically** radio button or click the **Periodic Calendar Import** tab. The `Active Schedule Source` dialog box opens.

Active Schedule Source   ☒

> You are about to switch scheduling sources. All existing scheduled events will be deleted from the device's calendar, and only events from the new scheduling source will be available.
> Are you sure you want to proceed?

[OK]   [Cancel]

Figure 44.   Active Schedule Source Dialog

2. Click **OK** to proceed.

3. Click the **Periodic Calendar Import** tab.

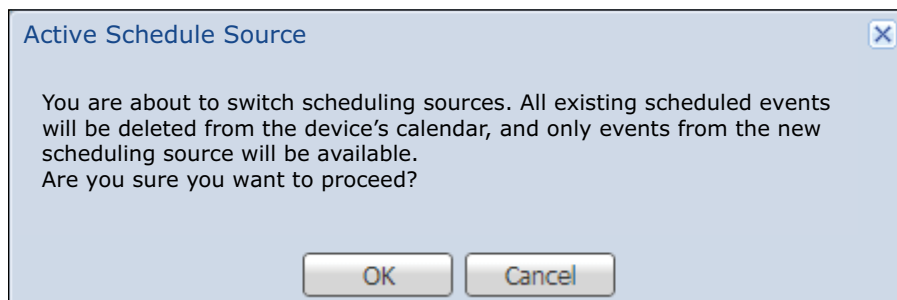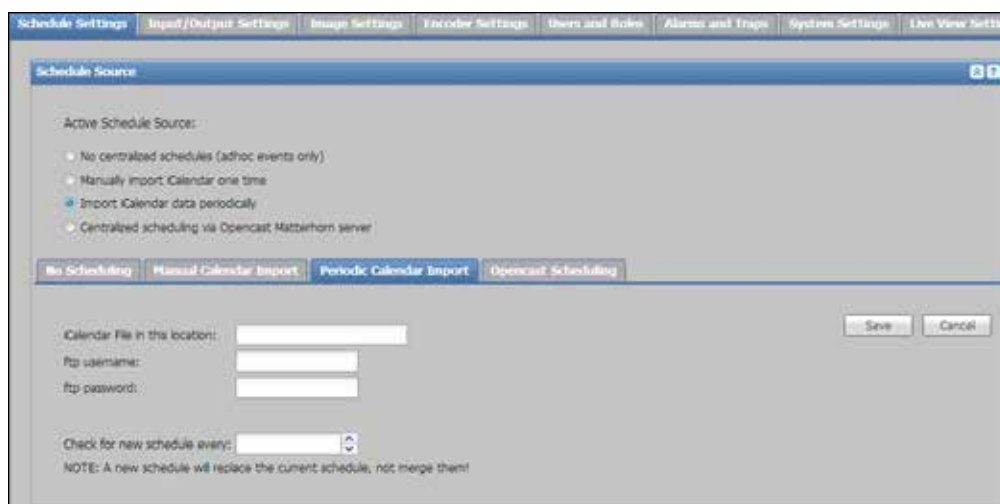**Figure 45.   Periodic Calendar Import Tab**

4. Type the location of the file into the **iCalendar file in this location** field. Use the full path of the FTP folder where the calendar file stored and the file name. Including "ftp://" is optional.

   The following are examples of locations:

   • `ftp://`<servername or IP address>/<share name>/<calendar file name>`.ics`

   • `ftp://192.168.23.16/ScheduleImports/SMP351Import.ics`

5. In the **FTP username:** field, type the username for access to the FTP server.

6. In the **FTP password:** field, type the password for that account.

7. Specify how often to check the server for new schedules by entering the interval (in number of seconds) into the **Check for new schedule every:** field, or click an **Up** or **Down** arrow to select a value.

8. Click **Save** to save the settings and start the periodic schedule importation. Click **Cancel** to discard the settings.

Once the periodic import settings are saved, the SMP 351 checks the server for new calendar files and imports them automatically. The imported events appear in the calendar on the `Scheduled Events` page.

Scheduling with an Opencast server

To use an Opencast server to import event schedules automatically on an ongoing basis:

1. Install and set up the Opencast server system.

2. Write down the Opencast server system security digest user name and password, and the public URL of the Opencast server system in the form of the server IP address or fully qualified domain name and port number.

> **TIP:** The security digest credentials and public URL of the Opencast server installation can be found in the `config.properties` file typically located in the `etc` folder of the Opencast server installation directory.

3. From the SMP 351 `Schedule Settings` page, select the **Centralized scheduling via Opencast server** radio button or click the **Opencast Scheduling** tab. The `Active Schedule Source` dialog box opens (see **figure 44** on page 70).

4. Click **OK** to proceed.

5. Click the **Opencast Scheduling** tab.

Figure 46.   **Opencast Scheduling Tab**

6. In the **`Capture Agent Name:`** field, enter the SMP 351 unit name to appear on the Opencast server list of capture agents. By default, this is the same as the location name of the SMP 351 as set up in the **`System Name`** field within the `Unit Identification` panel (see **Setting the system (unit) name and location** on page 113). Changing the name of the SMP here changes the name in the `System Settings` page.

Capture Agent Name:	My_SMP351
User Name:	Matterhorn User 1
Password:	Matterhorn_Password
Matterhorn Core Address:	http://11.11.11.1111:8080

Figure 47.   Capture Agent Panel

> **NOTES:**
> - The **`Capture Agent Name:`** must match the SMP 351 **`Unit Location:`** name (see **Setting the system (unit) name and location** on page 113) for the SMP 351 to register with the Opencast server.
> - To simplify setup, the SMP 351 unit name updates when a new capture agent name is assigned. However, changing the SMP 351 name does not automatically update the capture agent name.

7. Enter the user name of the Opencast server account, as noted in step 2, into the **`User Name:`** field.

8. Enter the password required by the Opencast system account into the **`Password:`** field.

9. Enter the IP address or fully qualified domain name of the server that hosts the system into the **`Matterhorn Core Address:`** field.

> **NOTE:**   If using a fully qualified domain name, ensure that a valid DNS server address is configured in the `Networking` panel of the `System Settings` page.

10. If desired, in the **`Track Flavor`** field, change or modify the Opencast server "flavor" to use to categorize the recordings.
    "Flavors" are labels that the Opencast server system uses to route and process the workflow of ingested files. According to the Opencast server **wiki**, "flavors help with the integration of capture client, processing pipeline and player." You can associate or configure specific workflow operations with certain flavors of files. The Opencast server **release documentation** says, "...You will typically use */source flavors at this point, indicating that this is raw material that was not processed yet. The typical flavors are presenter/source for a regular video and presentation/source for the vga recording." ..."you can create your own flavors like audience/source or documentcamera/source. The presentation and presenter flavors are supported by the default workflows[;] for any other flavor you will need to create your own workflows."

11. To allow recordings comprised of several files to upload to the system, select (check) the **`Enable Multi-File Ingest`** check box. Long recordings can span multiple video files. If this control is not enabled, only the first video file in the recording package will be uploaded to the Opencast server system.

    Opencast server version 1.5 added the concat operation handler, which allows concatenating multiple video files into a single file. The workflow should have multiple concat operations defined in order to accommodate a variable number of recording files, unless the Opencast server build supports the concept of "optional" flavors in

the concat operation as introduced in release 1.6. In order to determine which of the concat operations will be executed for a given recording event in release 1.5, conditional branching can be achieved using the x Files workflow parameter (see below) sent by the SMP. More details on concat workflow can be found in the Opencast wiki page (**https://opencast.jira.com/wiki/display/MHTRUNK/Concat+workflow+operatio n+handler**).

When multi-file ingestion is selected, the SMP 351 sends a workflow parameter based on the number of recording files that are being uploaded, such as x Files:true where x = total number of m4v files in the recording. For example, the SMP 351 sends out "3Files:true" when three m4v files are saved in a single recording. If only a single m4v file is generated, the SMP 351 sends out "1Files:true". The flavor of each additional recording video file after the first m4v file is suffixed with -1, -2, -3, and so forth, for as many recording files as were created. For example, if the administrator configures the SMP 351 to use the flavor "presenter/source" and the recording event spanned across three m4v files, the SMP 351 sends the following:
…S1R1.m4v as presenter/source
…S1R2.m4v as presenter/source-1
…S1R3.m4v as presenter/source-2

This ensures each recording file can be processed independently and in the correct order.

12. The default Uniform Resource Locator (URL) values in the rest of the fields on this page can be left unchanged unless your Opencast server installation uses customized settings. Contact your system administrator for details on whether customization is necessary. If changes are needed, enter the customized URL into the appropriate URL field.

13. If desired, change the update or query intervals (in seconds) for the following items:

   - **Status URL: Status Updated Every:** — Determines how often the SMP 351 sends its current operations status (capturing, uploading, idle, offline, and so on) to the Opencast server server.

   - **Recording URL: Status Updated Every:** — Determines how often the SMP 351 sends the status of individual recordings to the Opencast server server.

   - **Capture Agent Config URL: Config Posted Every:** — Sets how often the SMP 351 sends its configuration settings (current encoding/layout presets, firmware version) to the Opencast server server.

   - **Opencast server Schedule URL: Checked Every:** — Sets how often the SMP 351 checks for schedule updates on the server.

   To change the intervals, enter a value within the corresponding field or click the **Up** and **Down** arrows alongside the field to change the value.

14. Click **Save** to save and apply the settings. Alternatively, click **Reset** to set all fields to the default values or **Cancel** to discard all changes.

15. Verify that the SMP 351 has been correctly configured for use with Opencast server:

   a. Log in to the Web interface of the Opencast server server.

   b. Select the **Administrative Tools** option.

   c. Click on the **Capture Agents** tab. The name of the SMP 351 that was set in **step 6** must appear in the list of capture agents within a few minutes of saving the settings within the SMP 351.

d. If the SMP 351 does not appear in the capture agents list, verify that the Opencast server system user name, password, and core address are correct in the settings in the **Opencast Scheduling** tab of the `Schedule Settings` page in the SMP 351. Confirm whether the other URLs (for status, recordings, configuration, schedule, and so forth) require custom settings and update the URLs if needed.

e. Click **Save**. The unit name of the SMP now appears in the list of capture agents in the Opencast server system.

A Note on Using the SMP 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 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 server issues a new ETag, and the SMP updates its schedules.

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. The page is divided into three panes:

- **Input/Output Configuration** – Change the name for each input, select the video format for input 3 (and for input 5 on 3G-SDI models), select an aspect ratio type, enable and disable Auto-Image, Auto Memory, HDCP authorization, and audio gain for each HDMI input

- **Preview Output Configuration** – Provides a way to set the refresh rate for the local output

- **OSD Configuration** – Select and output one of several video test patterns for use during setup, set up the content of the universal on-screen display, select a font for the input switching OSD and universal OSD, and set a display period for the input switching OSD.

To open this page, click the **Configuration** tab at the top of the SMP 351 embedded Web pages and click the **Input/Output Settings** tab on the second tier of tabs.
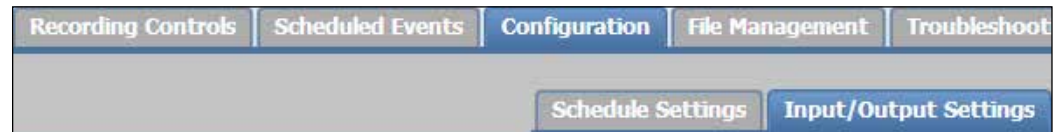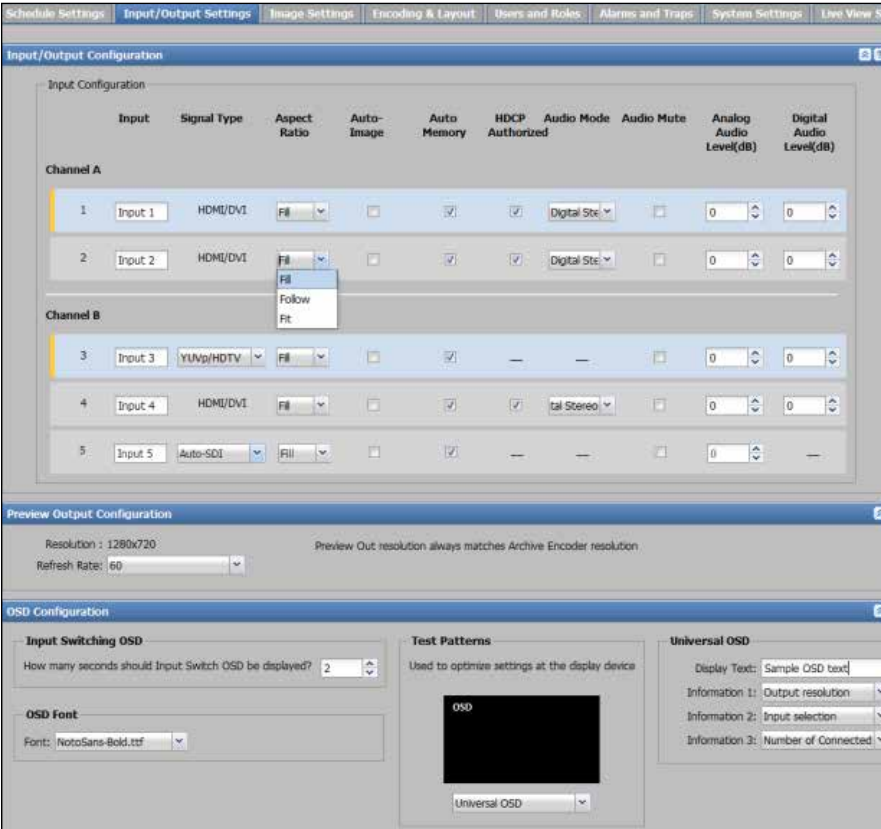
Figure 48. **Input/Output Settings Tab**

The `Input/Output Settings` page opens.

Figure 49. **Input/Output Configuration Page**

Rows for currently selected inputs are highlighted in blue with a yellow bar on the left side.

Except for input naming and HDCP authorization, all other controls and adjustments can be configured using the front panel menu and controls.

Configuring inputs

The `Input Configuration` panel of the `Input/Output Settings` page provides a way to rename inputs, configure their settings, and select the component video format for input 3 or the SDI format for input 5 (for the SMP 351 3G-SDI). It also provides controls to configure settings for each input for aspect ratio, Auto-Image, auto memory, HDCP authorization, audio mode, mute, and audio gain.
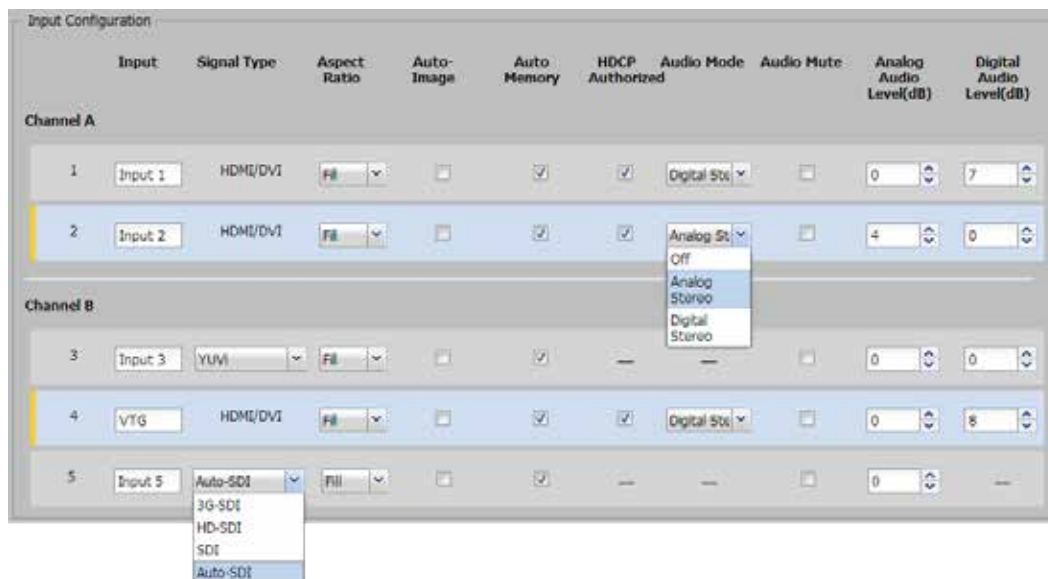
Figure 50. **Input Configuration Panel**

> **NOTE:** Controls for Input 5 are enabled only for the SMP 351 3G-SDI models.

To configure each input on the SMP 351:

1. Open the `Input/Output Settings` page.

2. To change the names of the **Input** buttons (active controls only) within the `AV Controls` panel, in the `Input Configuration` panel, rename each input. Click in the appropriate **Input** field and replace *Input n* with the desired text. Although you can enter more, only about eight characters are visible on the buttons.

3. For input 3, select the video type (**YUVp/HDTV**, **YUVi**, or **Composite**) from the **Signal Type** drop-down list (part of figure 50, shown below).
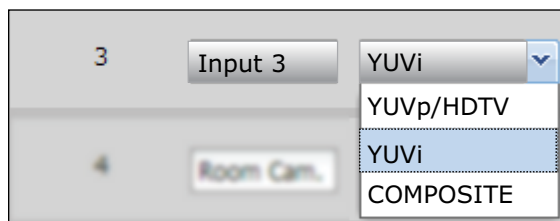
Video types are not configurable for inputs 1, 2, and 4.

4. For input 5 of the SMP 351 3G-SDI model, select the digital video type (**3G-SDI**, **HD-SDI**, **SDI**, or **Auto-SDI**) from the **Signal Type** drop-down list that is appropriate for the connected source signal.

5. For each input, select an aspect ratio from the **`Aspect Ratio`** drop-down list (part of figure 50, shown below).
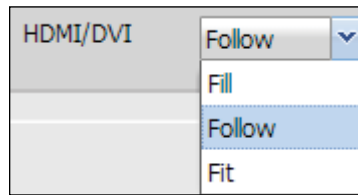
Fill — Scales the input signal to fill the entire video output.

Follow — Follows the source signal aspect ratio, with respect to the current output resolution setting. A black letter box or pillar box bars is applied for aspect ratio compensation.

Fit — Scales the signal up. Some of the image at either the top and bottom or the left and right is cropped in order to fit the screen.

> **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.

6. Select (**`enable`**) or deselect (**`disable`**) the following check boxes for each input:

   • **Auto-Image** — Select the check box to apply Auto-Image one time to the input. When selected, Auto-Image is applied whenever there is a change in the input sync. Auto-Image automatically sizes and centers the selected input. The processor measures the sync frequencies of an incoming video source and uses an internal table to set the active image area, total image area, and the sampling frequency.

   > **NOTE:** When overscan is enabled, default values for the detected signal type are used. When overscan is disabled, alternate timings can be detected.

   • **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.

To compare settings saved by Auto Memory with settings that are saved for input presets and user presets, see the table in Presets (see **Input and user presets** on page 85).

- **HDCP Authorized** — Select this check box for digital inputs 1, 2, and 4 in order to have the input report as an HDCP Authorized device. If the box is not selected the source will output unencrypted video (if the content is not encrypted). This allows the SMP 351 to record more content.

> **NOTE:** The HDCP Authorized option is available only for HDMI inputs.

- **Audio Mute** — Select this check box to mute the input audio.

7. Configure the audio settings for each input as applicable:
   - From the **Audio Mode** drop-down list, select the type of audio (**Off** [none], **Analog Stereo**, or **Digital Stereo**) .
   - Set the analog and digital audio gain — Enter the amount of audio gain or attenuation (from -18 dB to +24 dB) in the appropriate field (**Analog Audio Level (dB)** or **Digital Audio Level (dB)**) or use the **Up** and **Down** arrows to increment or decrement the value.

HDMI preview output refresh rate

To set the refresh rate for the local HDMI preview output:

1. Open the **Input/Output Settings** page.
2. Expand the **Preview Output Configuration** panel.
3. Select the output refresh rate (either 50 Hz or 60 Hz) from the **Refresh Rate** drop-down list in the `Preview Output Configuration` panel.

> **NOTE:** The resolution of the local (preview) output follows (is based on) the archive encoding resolution.

Configuring the On-screen Displays

In the `OSD Configuration` panel you can change a variety of settings for both the input switching OSD and the universal OSD, which can be selected as a "test pattern" and displayed over the other images.

Input switching OSD duration

When a new input is selected for either channel, the SMP 351 can briefly display the names of the active inputs on screen. The input switching OSD is a gray rectangle with white text overlaid atop the source video content. It appears in the upper left of the screen and includes text such as "Input 1 active" on the first line and "Input 3 active" on the second line, depending on which inputs are currently selected.

To set the length of time to show the input switching OSD:

1. Open the **Input/Output Settings** page.
2. Expand the **OSD Configuration** panel and look in the `Input Switching` OSD panel.
3. Enter the desired number of seconds into the **How many seconds should Input Switch OSD be displayed?** field or click the **Up** and **Down** arrows to adjust the value.

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/fonts**.

> **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 Uploading a File to the SMP 351).
> - The user is responsible for obtaining any 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 105).

To select a different font:

1. Open the `Input/Output Settings` page (see **Input/Output Settings** on page 75).

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.
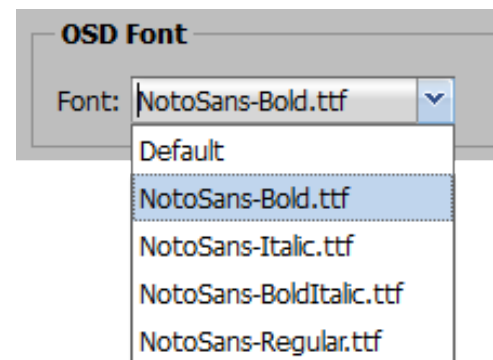
Outputting and using a video test pattern

> **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:

Color Bars   Time Stamp   Pulse   Crop

Aspect Ratio 1.33:1   Aspect Ratio 1.78:1   Aspect Ratio 1.85:1   Universal OSD
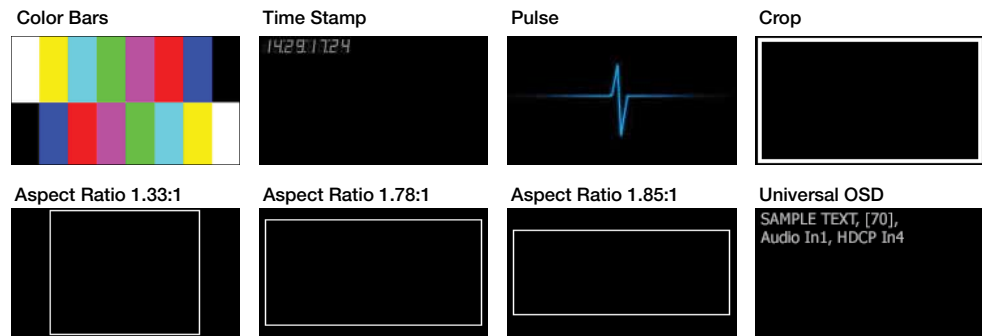
Figure 51.   Test Patterns

- 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 Overview** on page 90 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.
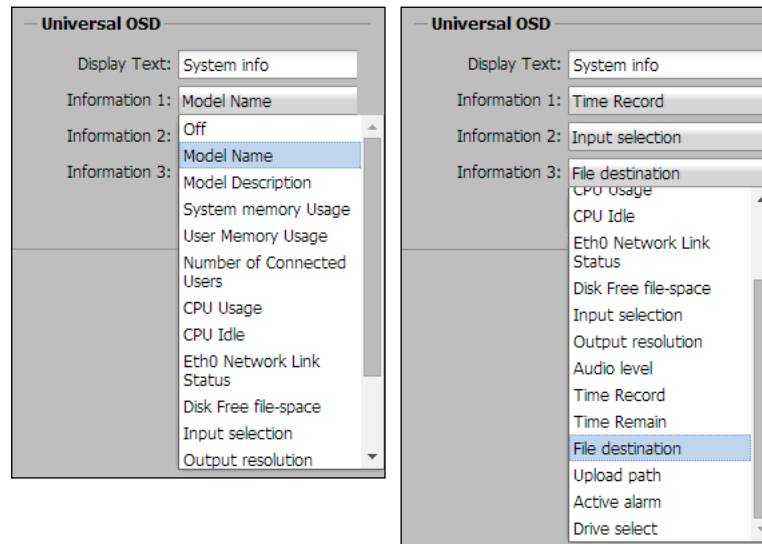
Figure 52. Universal OSD Information Selection

As an example, if **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 164.

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 53 has examples of how the configuration settings (on the left) translate to the universal OSD (on the right).
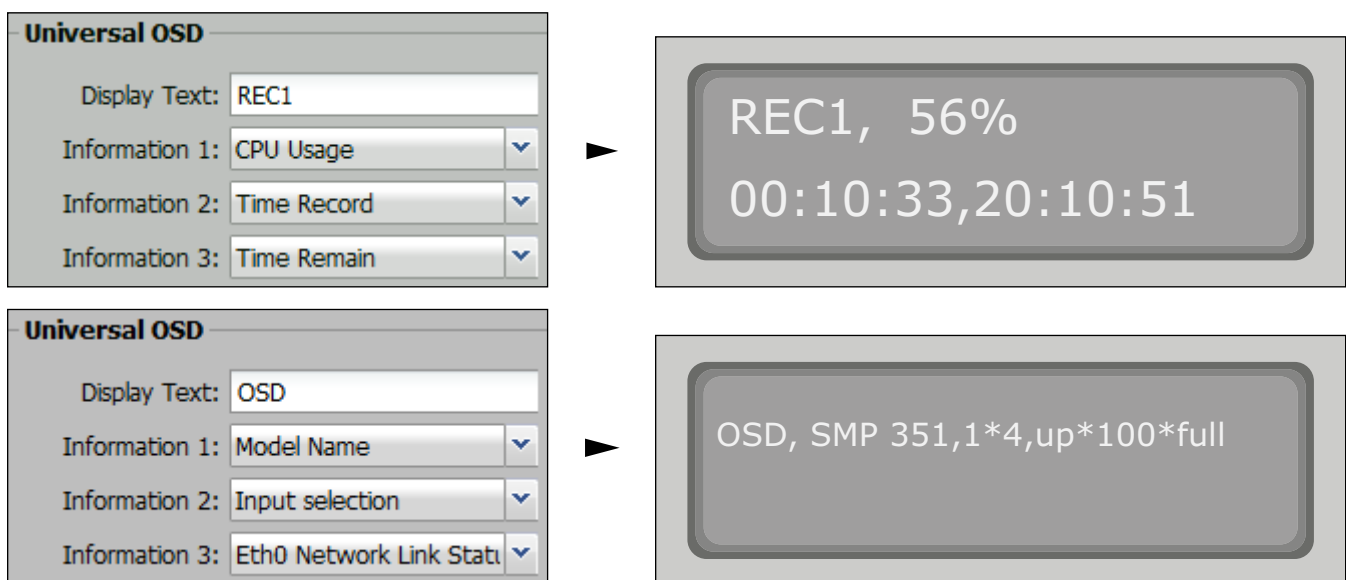
Figure 53. Universal OSD Information Selection

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.
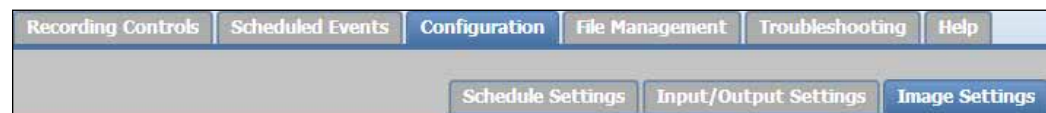
The `Image Settings` page opens.
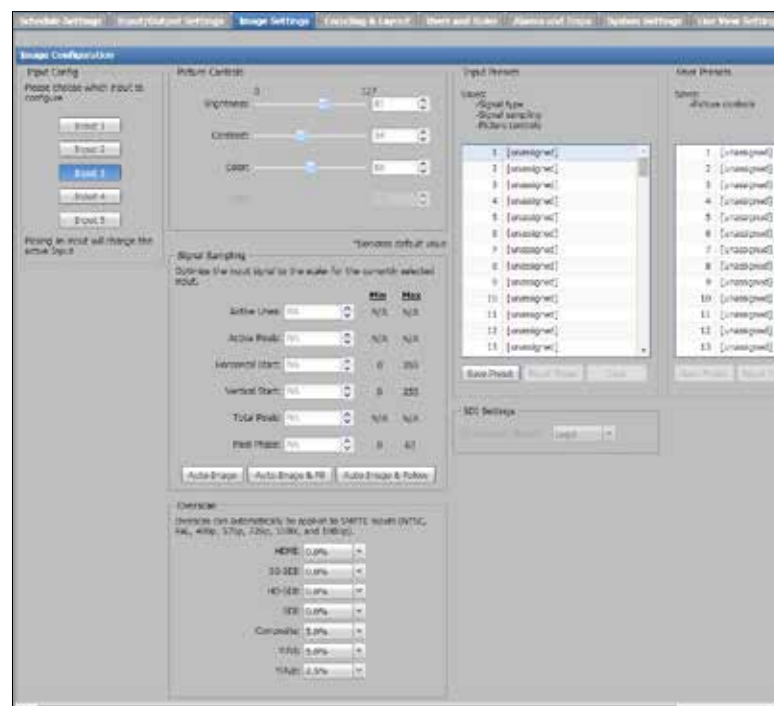
Figure 54.   Image Settings Page

Except for the overscan settings and input preset saving and recalling, all 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.

Adjusting picture controls

The `Picture Controls` panel has brightness, contrast, color, and tint settings that are adjusted and then applied to the currently selected input. These include:

- Brightness
- Contrast
- Color
- Tint
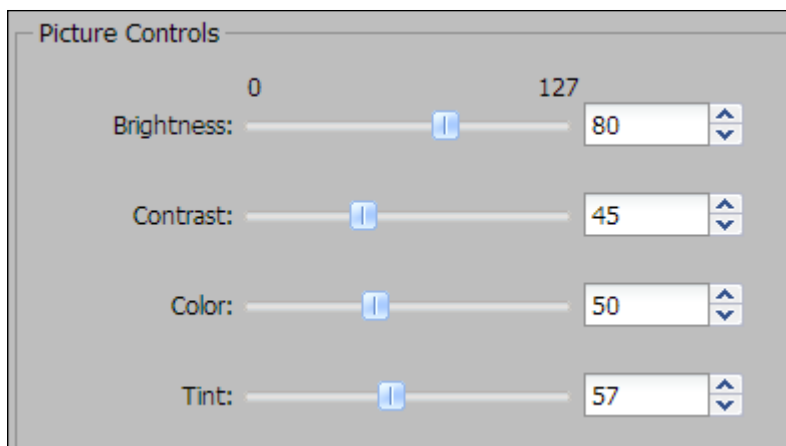
Figure 55. **Configuration Settings, Picture Controls**

To adjust picture controls for the currently selected input:

- **Click and drag** the associated handle of the slider for any image setting to the desired value.

- Alternatively, to change the value in the field, enter a value within the field associated with the image setting, or click the **Up** and **Down** arrows alongside the associated field.

Observe the picture on the display and adjust settings as necessary.

Position and size an image

The `Signal Sampling` panel of the `Image Settings` page provides two options to size or crop and to set the location and aspect ratio of the currently selected input:

- **Manual** – Set each individual detailed parameter using direct entry or the **Up** and **Down** arrows.

- **Automatic** – Select one of three Auto-Image options (**Auto-Image**, **Auto-Image & Fill**, **Auto-Image & Follow**) and let the SMP 351 make the adjustments.

Figure 56. Signal Sampling Panel

To set up each signal sampling parameter for the active input, for each field in the `Signal Sampling` panel either enter a number into the field or use the **Up** and **Down** arrows to select a number within the range for each adjustment. Minimum and maximum values for each setting are shown to the right of each field.

> **NOTE:**   An asterisk beside a chosen value for a signal sampling setting indicates that it is a default value for the applied input signal.

To automatically apply signal sampling for the active input:

In the Signal Sampling panel, click one of the following buttons to select the option:

Auto-Image — Applies Auto-Image one time to the input. This setting is for analog input signals. When selected, Auto-Image is applied whenever there is a change in the input sync. Auto-Image automatically sizes and centers the selected input. The processor measures the sync frequencies of an incoming video source and uses an internal table to set the active image area, total image area, and the sampling frequency.

> **NOTE:**   Issuing an Auto-Image with overscan enabled recalls the default values of the detected input rate. To apply Auto-Image on an ongoing basis instead of a one-time basis, see the setting in the `Input/Output Settings` page (see **Input/Output Settings** on page 75).

Auto-Image & Fill— Fills the entire output window.

Auto-Image & Follow — Maintains the aspect ratio of the input for the output video.

> **NOTE:** If overscan is applied, executing Auto-Image recalls default values for the detected resolution from an internal table. When overscan is set to 0%, Auto-Image attempts to detect sampling rates that differ from those in the table. Overscan can then be reapplied once the image has been sized and centered properly.

Apply overscanning

The `Overscan` panel sets the amount (**Ø, 2.5%,** or **5%**) of picture enlargement applied to each video signal type for any SMPTE standard input.

Overscan is specific to each input signal type. This mode zooms and crops SMPTE inputs to mask edge effects and ancillary data that are common in broadcast signals. If you execute an Auto-Image with overscan enabled, the SMP 351 recalls the default values of the detected input rate.

Figure 57. **Overscan Settings Panel**

To set the overscan:

In the `Overscan` panel select an overscan percentage (**Ø.Ø%**, **2.5%**, or **5.Ø%**) from the drop-down list associated with an input signal type (**HDMI**, **3G-SDI**, **HD-SDI**, **SDI**, **composite video**, **YUVi**, and **YUVp**).

Input and user presets

The `Input Presets` and `User Presets` panels within the `Image Settings` page saves the currently applied image settings for later use, or to recall and apply previously saved settings.

> **NOTE:** Input presets work when Auto Memory and Auto-Image are both off (disabled).

See the table below for information stored in each preset type:

Setting	Input Presets	User Presets	Auto Memory
Horizontal and Vertical Start	Yes	——	Yes
Active Pixels (H Active)	Yes	——	Yes
Active Lines (V Active)	Yes	——	Yes
Total Pixels	Yes	——	Yes
Pixel Phase	Yes	——	Yes
Horizontal and Vertical Size	Yes	Yes	Yes
Horizontal and Vertical Position	Yes	Yes	Yes
Aspect Ratio	Yes	Yes	——
Brightness and Contrast	Yes	Yes	Yes
Color and Tint	Yes	Yes	Yes
Input Type	Yes	——	——
Audio Input Gain and Attenuation	Yes	——	——
Preset Name	Yes	Yes	——
Presets Available	128 global	16 per input channel	32 per input channel
Recall Location	Any input supporting the input type saved in the preset	Current input	Automatically recalled based on incoming signal

Input presets

In this section of the `Image Settings` page, create up to 128 global input presets. These contain user-defined sets of input and picture control settings saved for each source within a system for recall whenever the source is selected.

> **NOTE:** An input preset can be recalled on any input supporting the input type that was active when the preset was saved.

Unlike user presets, input presets save parameters for any input supporting the input type that was active when the preset was saved. However, input presets apply only to the input resolution that was present when the preset was saved.

Figure 58.   Input Presets

To create and save an input preset:

1. Select the desired input (see **Image Settings** on page 82).

2. Adjust the signal sampling, picture control, and size settings as desired.

3. Select a preset number from the preset number list in the `Input Presets` panel.

4. In the **Preset Name** field, enter a name for the preset.

5. Click **Save Preset**. If an input preset already exists in this location, a confirmation dialog box opens. In the dialog box, click **Overwrite** to overwrite the previous preset.

The settings are saved to the selected preset location for recall at a later time.

To recall an input preset:

1. From the preset number list in the `Input Presets` panel, **select** the preset to recall.

2. Click **Recall Preset** (located at the bottom of the same panel).
   A confirmation dialog box opens.

3. In the dialog box, click **Recall**.

> **NOTES:**
> - A preset can also be recalled by right clicking on it and selecting **Recall**.
> - Recalling a preset overwrites any adjustments to the current input settings.

To clear an input preset:

1. Select the applicable preset and click **Clear**. A confirmation dialog box opens.

2. In the dialog box, click **Clear**. The preset name is removed and the preset is cleared from the SMP 351 .

> **NOTE:** A preset can also be cleared by right clicking on it and selecting **Clear**.

To rename an input preset:

1. Select and double-click the applicable preset.

2. In the **Presets Name** field, enter the new name.

3. Click on another part of the screen, or if applying any other changes to the preset, click **Save**, then click **Overwrite**. The preset is saved with the new name.

User presets

In this panel of the `Image Settings` page, the user can save or recall up to 16 user presets per input channel for the currently active input. The user presets contain only picture control properties.
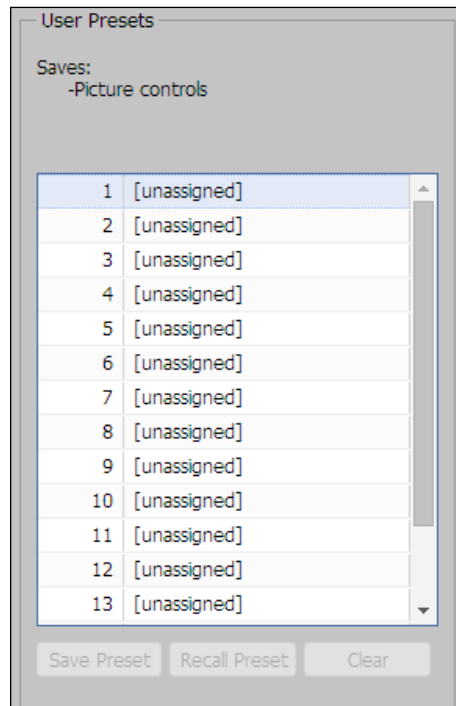
Figure 59.   User Presets

To create and save a user preset:

1. Select the applicable input (see **Image Settings** on page 82).
2. Adjust the picture controls as desired (see **Adjusting picture controls** on page 83).
3. Select a preset number from the preset number list in the `User Presets` panel.
4. In the `Preset Name` field, enter a name for the preset.
5. Click `Save Preset`. If an input preset already exists in this location, a confirmation dialog box opens. In the dialog box, click `Overwrite` to overwrite the previous preset.

The settings save to the selected preset location for recall at a later time.

Recall and clear an existing user preset

User presets can be recalled only on the input that was active when the preset was saved. For example, a user preset saved when input 2 was active can be recalled only for input 2.

To recall a user preset:

1. Select the applicable input (see **Image Settings** on page 82).
2. Select a preset number from the preset number list in the `User Presets` panel.
3. Click `Recall Preset`. A confirmation dialog box opens.
4. In the dialog box, click **Recall**.

> **NOTES:**
> - A preset can also be recalled by right-clicking on it and selecting `Recall`.
> - Recalling a preset overwrites the current input settings.

To clear a user preset:

1. Select the applicable preset and click `Clear`. A confirmation dialog box opens.
2. In the dialog box, click `Clear`. The preset name is removed and the preset is cleared.

> **NOTE:**   A preset can also be cleared by right clicking on it and selecting `Clear`.

To rename a user preset:

1. Double-click the applicable preset.
2. In the `Preset Name` field, enter the new name.
3. Click on another part of the screen, or if applying any other changes to the preset, click `Save`, then click `Overwrite`. The preset is saved with the new name.

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:

SDI Settings

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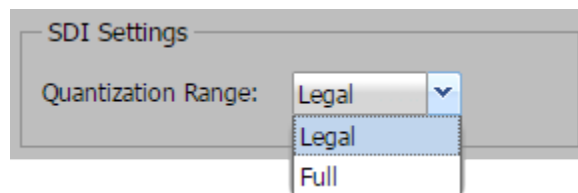
Legal — Select this option when the YCbCr video data of the SDI source (input 5) is within the "legal" range (64-940 for luma and 64-960 for chroma).

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 Overview

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.
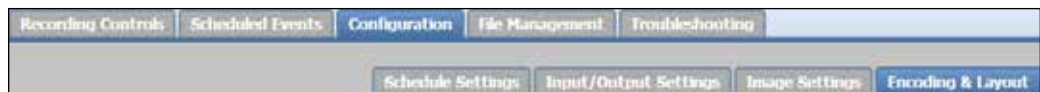
Figure 60.   Configuration Tab, Encoding & Layout

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.

Figure 61.   Encoder & Layout Tab, Presets Collapsed

Each pane can be expanded by clicking the **Expand** (⌄) arrow button or collapsed by clicking the **Collapse** (⌃) arrow button at the top right corner of the pane. If one pane is expanded, the other automatically collapses.

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 164). Layout presets are set up in this Web page or via the front panel menu.

Click the **Launch Player** button (above the two panes) to open a larger, stand-alone version of the `AV Controls` panel `Preview` window in a new browser window. The player displays the archive encoding stream. The `AV Controls` panel preview window uses the confidence encoding stream.

NOTE: The archive encoding stream must have the streaming method set to **Pull** to be able to launch the separate player window.

Encoding Presets

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

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 encoding must always be higher than that of the confidence encoding.

Any of the default encoding presets or user-created presets are recalled and applied to a recording session (archive encoding) 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 as the recording is being made. 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 types of encoding for the SMP 351 can be used for multiple purposes. It can be useful to understand how each encode is typically used and the differences.

Encoding Stream	Uses	Conditions or Differences	Comment
Archive Encoding	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 encoding 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 Encoding	Preview window in the `AV Controls` panel		Must always be lower resolution than archive encoding
	Live stream via the LAN port and network if using a decoder application		

Recall encoding presets

To recall an encoding preset:

1. Click **Configuration > Encoding & Layout** at the top of the SMP 351 embedded Web pages.

2. If it is not already expanded, click the **down** arrow to expand `Encoding Presets`.

3. In the `Encoder Presets` panel (see below), **select** (click on **Ⓐ**) a saved preset in the list and click **Recall Preset** (**Ⓑ**).
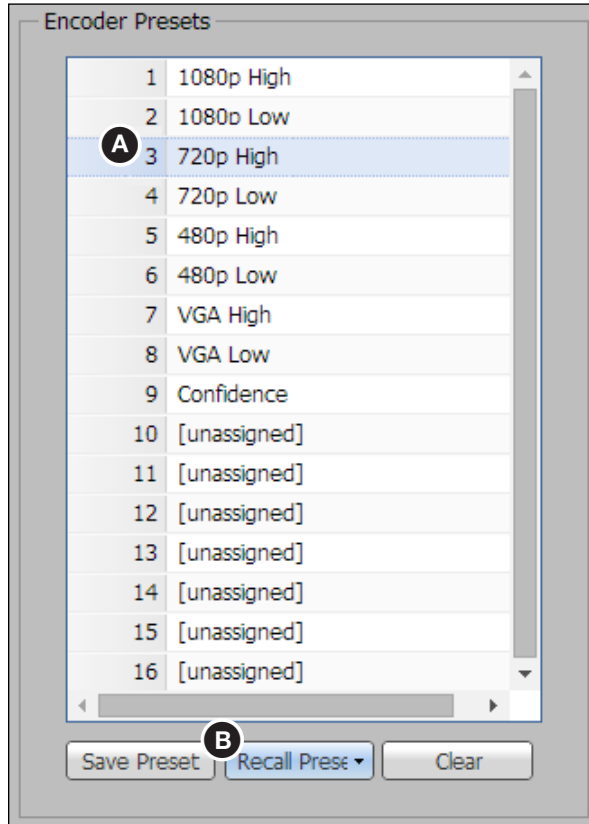
4. Select a stream encoding type:
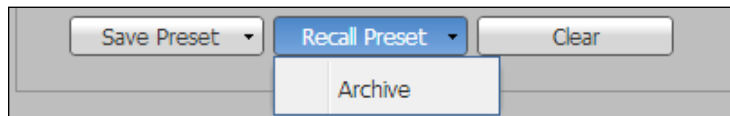
Archive — Archive is the highest quality of encoding and also applied to the recording.

A dialog box opens requesting confirmation that you want to recall the selected preset.
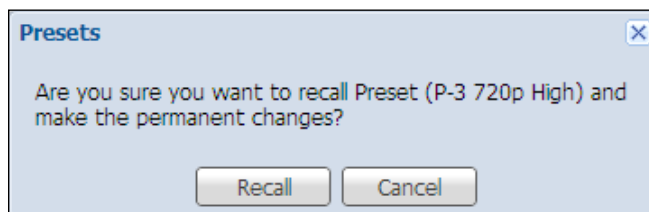
5. Click **Recall** to recall the preset and immediately apply it to the selected stream (archive or recording, confidence or preview) or click **Cancel** to discard the change and use the previously selected settings.

Configure and save custom encoding presets

Configure and save a user-defined encoding preset:

1. Click the **Configuration** tab at the top of the SMP 351 embedded Web pages.

2. Click the **Encoding & Layout** tab on the second tier of tabs.
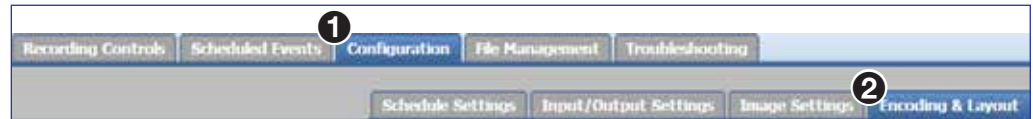
The Encoding & Layout page opens.

3. Click the **Expand** arrow button (⌄) to expand the Encoding Presets pane. The Encoding Presets pane opens.
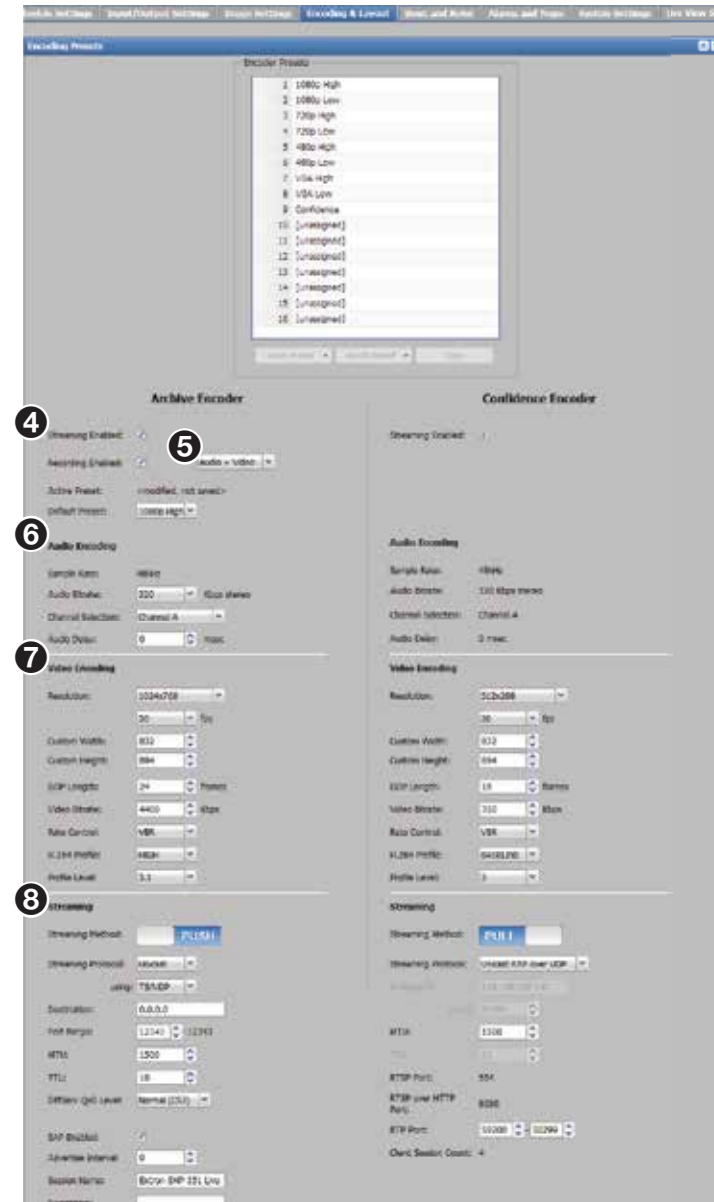
Figure 62. **Encoding & Layout, Encoding Presets**

4. Enable streaming (for both encoding types) and recording (for archive encoding) as desired by checking the **Streaming Enabled** or **Recording Enabled** check boxes.

5. For recording (in the `Archive Encoder` column) select **Audio + Video** or **Video Only** from the **Recording Enabled** drop-down list and select an option from the **Default Preset** drop-down list.

6. Configure audio encoding (see **Configure Video Encoding** on page 94).

7. Configure video encoding (see **Configure Video Encoding** on page 94).

8. Configure streaming settings (see **Configure Streaming** on page 97).

9. In the **Encoder Presets** panel (figure 63, **A**), select (click on) an unassigned preset.

10. Click **Save Preset** (**B**) and select **Archive** from the pop-up list to save the corresponding parameters. The **Preset Name** field is now editable and changes from "`[unassigned]`" to "ENCODER PRESET *nn*," (**C**) the default name for that preset number.
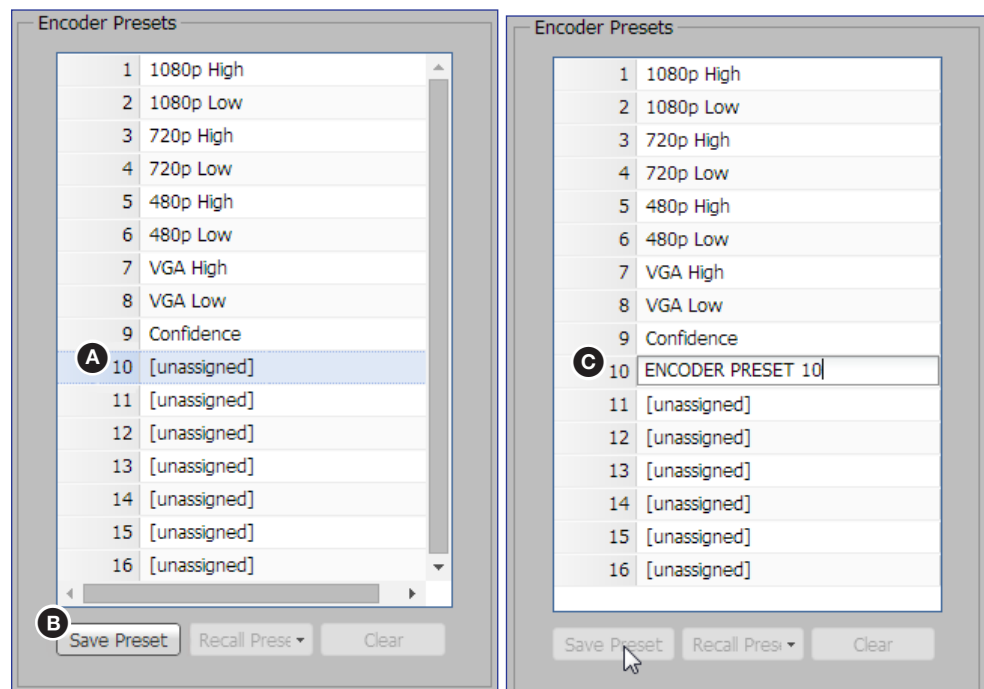
Figure 63.   Encoder Presets, Save Preset

> **NOTE:**   Any of the presets, including the factory default presets, can be changed, renamed, and saved.

11. Use the default preset name or enter a new name.

12. Click anywhere else in the Web page to save the preset name.

Configure Video Encoding

To configure video encoding settings for a preset:

1. Check the **Streaming Enabled** or **Recording Enabled** box to enable streaming (for both encoding types) and recording (for archive encoding) as desired.

2. In the `Video Encoding` panel (part of **figure 62**, shown below), select a video resolution from the **Resolution** drop-down list.
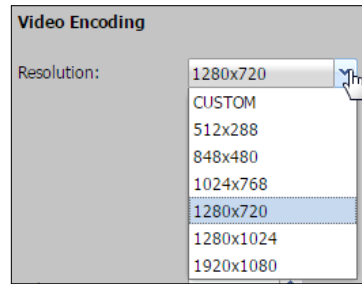
NOTE:

- If you want to select **Custom** for video resolution, you must specify the **Custom Width** and **Custom Height** (see figure 62, ❼). Selecting **Custom** from the **Resolution** drop-down list simply applies the custom resolution; it does not specify the dimensions.

3. Select a frame rate (in frames per second) from the **Resolution** drop-down list (part of **figure 62**, shown below).
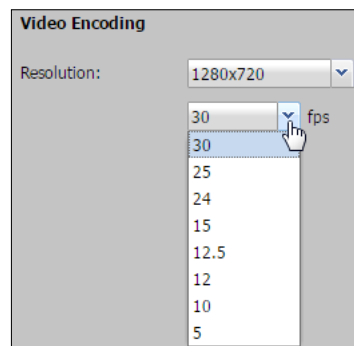
4. If you will be using the Custom resolution, type the desired pixel width and height values into the **Custom Width** field and **Custom Height** field, or by use the **Up** and **Down** arrows to change the value for each field. Width can be changed in increments of 32 pixels. Height can be changed in increments of 2 pixels.

5. Enter a number (from 1 to 30) in the **GOP Length** field or use the **Up** and **Down** arrows to change the value for the field to set a "group of pictures" (GOP) length. The default value is **30**.

A GOP is a group of successive pictures (frames) within a coded video stream. The video frames appear in a defined order. Some (known as I frames) contain a full set of data, others (P frames and B frames) contain a sampled subset of data. GOPs make it possible to compress the video stream by defining the relationship between and among frames and then removing duplicated information from each group. The smaller the GOP length, the more editable the video is, but a higher the bit rate is needed to transmit the video.

6. Set the video bit rate (in kbps) by entering a number (from 200 to 10000) into the **Video Bitrate** field or use the **Up** and **Down** arrows to change the value for that field.

7. Select the type of bit rate control from the **Rate Control** drop-down list. Options are:

   - **VBR** (variable bit rate) — Produces a better quality-to-space ratio compared to a CBR file of the same data because it includes more bits for complex segments of the AV stream and fewer bits for simpler segments. However, it is difficult to predict the size of the resulting file.

   - **CBR** (constant bit rate) — Creates a file of predictable size and stream rate, but of variable quality depending on the complexity and motion content of the video.

   - **VCBR** (constrained variable bit rate) — Limits the maximum bit rate and sometimes the buffer size to create a stream of the best possible quality within a specified (constrained) bit rate compression limit similar to VBR.

8. Select an encoding compression level from the **H.264 Encoding Profile** drop-down list.

   - **High** — Offers a higher level of compression and better quality for the selected bit rate but is more processor intensive to decode.

   - **Baseline** — Offer the lowest compression level and is less processor intensive to decode.

   - **Main** — Offers mid-range compression and performance.

9. Select an encoding profile level from the **Profile Level** drop-down list (part of **figure 62**, shown below). This sets the upper limits of resolution, bit rate, and frame size. Settings are from 3.0 (for lower limits) to 4.1 (for higher limits).
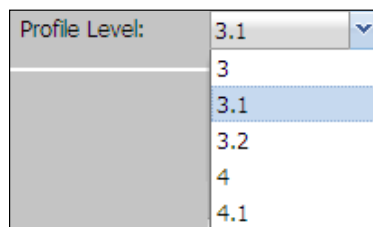
10. Configure audio encoding (in the `Audio Encoding` panel of the `Archive Encoder` column):

    - Select the audio bit rate from the **Audio Bitrate** drop-down list. The SMP supports rates of 80, 96, 128, 192, 256, and 320 bits per second (bps) for stereo audio.

    - Select the audio channel (**A**, **B**, or **dual channe**l) to use from the **Channel Selection** drop-down list.

    - If desired, set a delay period for the audio to follow video. Type the number of miliseconds (from **Ø** to **999**) into the **Audio Delay** field or click the **Up** and **Down** arrows to adjust the period.

    > **NOTE:** The confidence encoding stream uses the same audio encoding settings as the archive encoding stream.

Configure Streaming

> **NOTE:** Streaming configurations are not saved to a preset.

To configure streaming settings, first select the streaming method (**Push** or **Pull**). Click and slide the **Streaming Method** control to the left or right to expose the name of the desired method. The streaming options below the **Streaming Method** control change depending on the selected option.

To configure push streaming:

Figure 64. Streaming Method, Push Streaming Configuration

1. Slide the **Streaming Method:** control to **Push**.

2. Select the streaming protocol type (**Unicast** or **Multicast**) from the **Streaming Protocol:** drop-down list.

3. Select the protocol (**TS/UDP**, **TS/RTP**, or **ES/RTP**) from the **using:** drop-down list.

4. In the **Destination:** field, specify the IP address of the destination device. If necessary, specify the virtual port number by entering the number into the **Port Range:** field or using the using the **Up** and **Down** arrows to change the value for that field.

> **NOTES:**
> - For multicast protocol, the archive stream and the confidence stream **must be set to different destination IP addresses**. Multicast protocol operates on IP addresses, not port numbers. If both streams use the same IP address, both are routed to any device that joins one of the streams, wasting the bandwidth for the unwanted stream.
> - For unicast protocol, the archive stream and the confidence stream can be set to the same IP address as long as the port numbers differ. This makes it possible to use unicast push streams with a Wowza® Media Server® or similar system.

5. Set the MTU (maximum transmission unit length in bytes), the maximum network packet size (in bytes) that the protocol and network layer can pass onward. Enter a number in the **MTU:** field or use the **Up** and **Down** arrows to change the value.
The default is 15ØØ bytes.

6. Enter the time to live (TTL) directly into the **TTL:** field or use the **Up** and **Down** arrows to change the value for that field.

7. Select a quality of service (QoS) level from the **DiffServe QoS Level:** drop-down list. Choices range from **Best Effort** (unmanaged network traffic, lower quality streams) to **Highest (CS5)** (with managed network traffic and higher quality streams).

8. Enable or disable SAP (Session Announcement Protocol) by selecting or deselecting the **SAP Enabled:** check box. When SAP is enabled, the SMP 351 publicizes the availability of a stream to decoder/players. SAP periodically multicasts session description information on an industry standard multicast address and port, which makes setting up a receiving decoder easier.

9. If SAP is enabled, specify an advertising interval (in seconds) by entering a number into the **Advertise Interval:** field or using the using the **Up** and **Down** arrows to change the value.

10. If desired enter descriptive text of your choice in the **Session Name:**, **Description:**, **Keywords:**, and **Author Name:** fields.

To configure pull streaming:

Figure 65.   Streaming Method, Pull Streaming Configuration

1. Slide the **Streaming Method:** control to **Pull**.

2. Select the streaming protocol type (**Unicast RTP over UDP** or **Multicast over UDP**) from the **Streaming Protocol:** drop-down list.

3. If you selected **Multicast over UDP**:

   • Enter the IP address in the **Multicast IP:** field.

   • Enter the time to live (TTL) in the **TTL:** field or use the **Up** and **Down** arrows to change the value for that field.

4. Select the virtual port number for the stream by typing a number into the **Port Range:** field or use the **Up** and **Down** arrows to change the value. The default port number is 6ØØØ.

5. Set the MTU (maximum transmission unit length), the maximum network packet size (in bytes) that the protocol and network layer can pass onwards. Enter a number into the **MTU:** field or use the **Up** and **Down** arrows to change the value.
The default is 15ØØ bytes.

6. Set the port numbers as needed in the following fields:

   • **RTSP**   • **RTSP over HTTP**   • **RTP**

   Enter a number in each field or use the **Up** and **Down** arrows to change the values. See the streaming reference section (**Streaming Method Overview**) starting on page 192 for more information.

Layout presets

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

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.

To open the `Layout Presets` pane:

1. Click the **Configuration** tab at the top of the SMP 351 embedded Web pages.

2. Click the **Encoding & Layout** tab on the second tier of tabs.
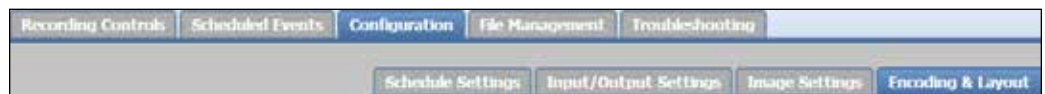
The `Encoding & Layout` page opens.

3. If needed, click the **Collapse** arrow button to collapse the `Encoding Presets` pane.

4. Click the **Expand** arrow button to expand the `Layout Presets` pane.

Set the default layout

By default, the SMP 351 uses layout preset 1 (PBP Upp LFT) as the layout automatically applied for scheduled recordings. To choose a different layout preset for scheduled recordings:

1. Open the **Layout Presets** panel.

2. Select one of the available presets from the **Select a Default Layout** drop-down list.

Recalling Layout Presets

To recall a layout preset:

1. Open the **Layout Presets** pane.

2. In the `Layout Presets` panel at the right of the page, **select** (click on) a saved preset in the list (see figure 66, **Ⓐ**). The selection is highlighted.
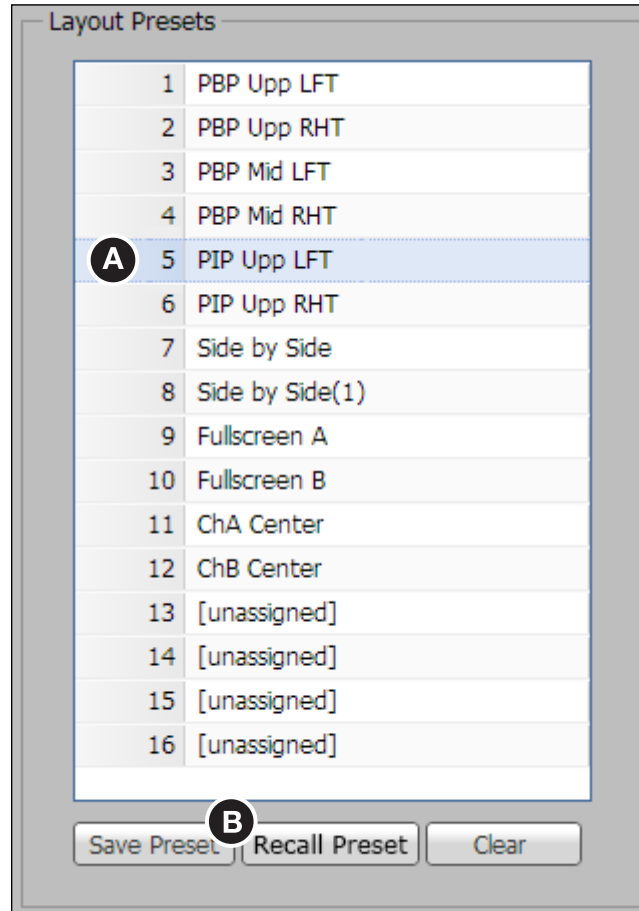
Figure 66.   Layout Presets

See the layout preset diagrams on the next page for the display appearance of each layout.

PBP Upp LFT — picture behind (separate from) picture, channel B on upper left; metadata at left

PbP Upper Left
PbP 25%, main window 75%

Ch. B
16:9

METADATA
METADATA

Ch. A
16:9

PBP Mid LFT — picture behind (separate from) picture, mid-screen, channel B on left; metadata at left

PbP Mid Left
PbP 25%, main window 75%

Ch. B
16:9

METADATA
METADATA

Ch. A
16:9

PIP Upp LFT — picture in (on top of) picture, channel B on upper left

PiP Upper Left
PiP 25%, main window 100%

Ch. B
16:9

Ch. A
16:9

PBP Upp RHT — picture behind (separate from) picture, channel B on upper right; metadata at right

PbP Upper Right
PbP 25%, main window 75%

Ch. B
16:9

Ch. A
16:9

METADATA
METADATA

PBP Mid RHT — picture behind (separate from) picture, mid-screen, channel B on right, metadata at right

PbP Mid Right
PbP 25%, main window 75%

Ch. B
16:9

Ch. A
16:9

METADATA
METADATA

PIP Upp RHT — picture in (on top of) picture, channel B on upper right

PiP Upper Right
PiP 25%, main window 100%

Ch. B
16:9

Ch. A
16:9

Side by Side —adjacent, equal size windows, mid-screen, channel A at left; metadata at bottom

Side by Side
Windows horizontally centered

Ch. A
16:9

Ch. B
16:9

METADATA,
MORE METADATA

Fullscreen A — single window, channel A fills the screen

Fullscreen A
main window 100%

Ch. A
16:9

ChA Center — single window, channel A centered in the screen; metadata along bottom

Ch. A Center
main window 75%, centered in screen

Ch. A
16:9

METADATA, MORE METADATA

Side by Side(1) — adjacent, equal size windows, mid-screen, channel B at left; metadata at top

Side by Side (1)
Windows horizontally centered

METADATA,
MORE METADATA

Ch. B
16:9

Ch. A
16:9

Fullscreen B — single window, channel B fills the screen

Fullscreen B
main window 100%

Ch. B
16:9

ChB Center — single window, channel B centered in the screen; metadata along bottom

Ch. B Center
main window 75%, centered in screen

Ch. B
16:9

METADATA, MORE METADATA

Figure 67. **Available Layout Presets (1 to 12)**

3. Click **Recall Preset** (see **figure 66**, **Ⓑ** on page 100). A confirmation dialog box opens.

Presets   ☒

Are you sure you want to recall Preset (P-1 PBP Upp LFT) and make the permanent changes?
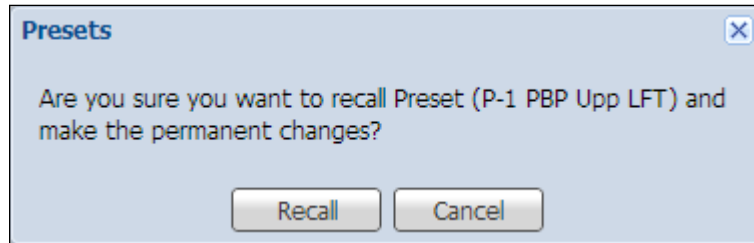
[Recall]   [Cancel]

4. Click **Recall** to recall the preset and immediately apply it to all of the streams (archive/recording and confidence/preview) or click **Cancel** to discard the change and use the previously selected layout.

5. If desired, click the **Launch Player** button at the top of the `Encoding & Layout` page to open a stand-alone preview stream window.

NOTE: In order to preserve the aspect ratios of the windows, layouts may have slightly different spacing at lower resolution. The spacing can be changed by changing the layout manually (see **Configure and save layout presets** on page 103)

Configure and save layout presets

To configure and save a layout preset:

1. Open the `Layout Presets` pane.

Figure 68.   Layout Presets

2. In the `Layout Presets` panel (❷), **select** (click on) a saved preset in the list.

3. From the **Select a Default Layout** drop-down list (❸), choose a factory default layout pattern to use for scheduled recordings.

4. If desired, select the **Preset Enabled?** check box (❹) to make the layout preset available to users.

5. Enter text in the field for **`Preset Name`** (which appears in the `Layout Presets` panel).

6. Enter text in the fields for **`Summary and Description`** (which appear in various places within these embedded Web pages) to provide information about the selected layout preset.

7. Select or deselect the **`Lock Aspect Ratio`** check box (❼) for channel A and for channel B to enable or disable aspect ratio locking. If the aspect ratio is locked, the window for that channel retains its aspect ratio.

8. Set the horizontal position and size and vertical position and size (in pixels) (❽) for the window for each channel by typing numbers in the corresponding fields or click the **Up** and **Down** arrows to change the values. If you select **`Lock Aspect Ratio`** (❼) in the previous step, changes to either position or size automatically affect the other position or size respectively.

   An example of the layout appears below these fields for reference.

   > **NOTE:** The configured sizes are tied to the archive encoding. The entire layout is scaled for the confidence encoding which may not preserve the aspect ratio.

9. If desired, select a file from the **`Background Image`** drop-down list (❾) to include a background image behind the channel A and B windows instead of a plain black field.

   > **NOTE:** If only the default background file appears in the drop-down list, use the File Upload utility in the `File Management` Web page (see **File Management** on page 129) to upload a .PNG file to the backgrounds folder within the SMP 351 . Background files must be in the .PNG format only, and they must be stored within the backgrounds folder or they will not be recognized and accessed by layouts.

   To use a plain black field instead of an image, select **None**.

   > **NOTE:** The SMP 351 front panel menus and controls allow you to select "no background", which provides a black background instead of an image.

10. Set the location where metadata elements appear in the layout. Choose an option from the **`Metadata Location:`** drop-down list in the `Metadata Elements` panel.
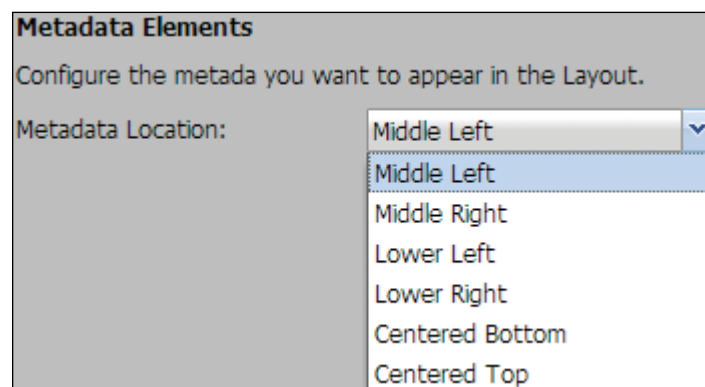
11. In the `Layout Presets` panel, **`select`** (click on) an unassigned preset in the list and click **`Save Preset`**. The `Preset Name` field is now editable and changes from "[**`unassigned`**]" (left panel in the figure below) to "**PIP PRESET***nn*," (right panel in the figure on the next page) the default name for that preset number.
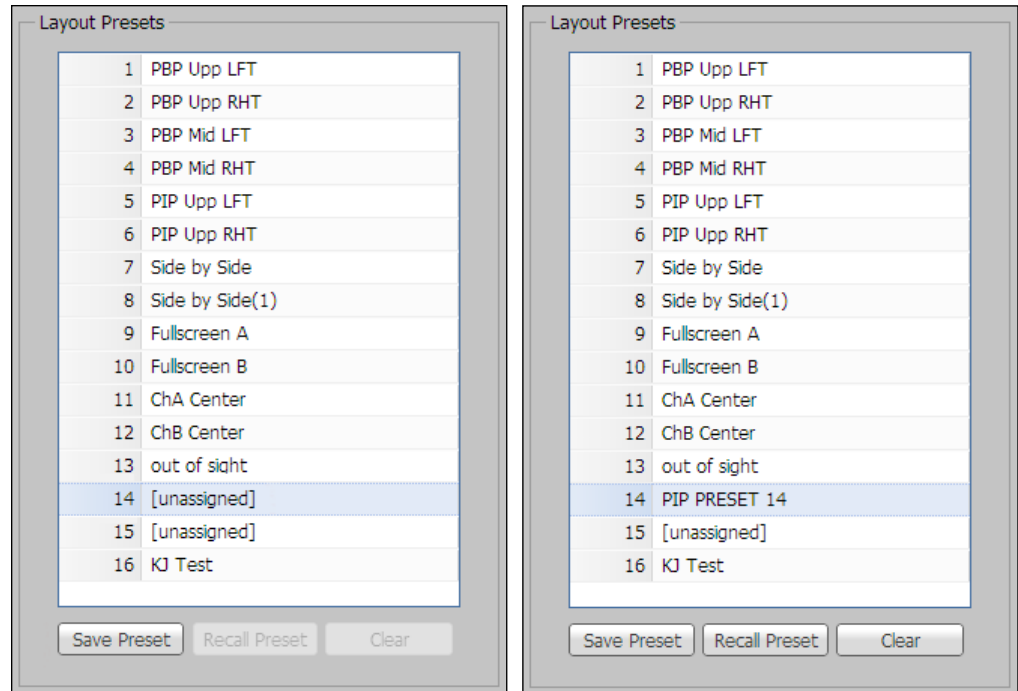
The preset saves the settings for the arrangement, size, aspect ratios, and locations of windows. Layout presets do not include background files or metadata content.

> **NOTE:** Any of the presets including the factory defaults, can be changed, renamed, and saved.

12. Use the default preset name or double-click the default preset name and replace it by entering the desired text.

13. Click anywhere else in the Web page to save the preset name.

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 (see **Upload a File to the SMP 351** on page 131).
> - 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 79).

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

To select a different font:

1. Open the `Encoding & Layout` page.

2. Expand the `Layout Presets` pane.

3. Navigate to the `Metadata Elements` panel and select an available font from the **`Metadata Font`** drop-down list. The selected font is immediately applied to the metadata overlay that is incorporated into the video.
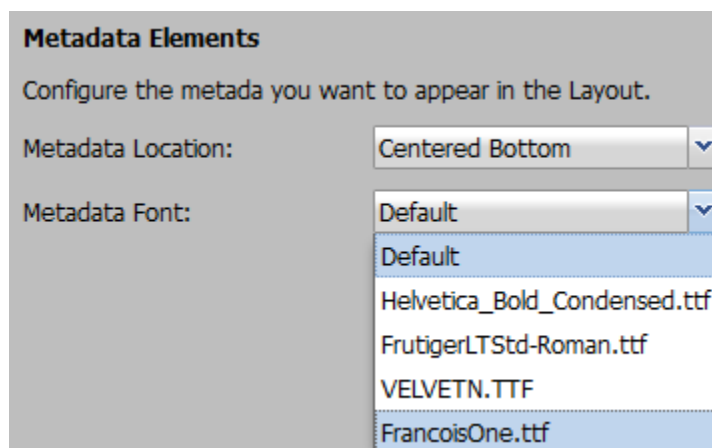
Change the text used for Metadata:

If desired, select and configure up to four fields of metadata text to appear in the layout. Metadata elements are used not only in layouts, but they are also used as part of stand-alone OSDs, as part of the current events, and upcoming events shown on the **`Recording Controls`** pane. On-screen metadata is captured in the recording, and metadata is saved as part of the manifest for the recording. Metadata settings are not saved in the layout presets.

> **NOTE:** Metadata cannot be updated in the streamed or recorded content once a recording is underway. Any changes made to metadata while a recording is in progress are applied to the next recording, not the current recording.

1. Select the type of metadata from the **`Field:`** drop-down list. Options in this list correspond to the 15 elements that comprise the Dublin Core® Metadata Element Set.

   For additional, more detailed information on these specific metatdata field types, see **http://dublincore.org/documents/dces/#DCTERMS**. For an abbreviated summary of the Dublin Core metadata, see the table that follows on the next page.

2. Select the **`Enable:`** check box to have the corresponding line of metadata appear in the layout. Deselect it to omit that type of metadata.

3. If desired, enter the default text for each metadata type in the **`Default Value:`** field. For example, if the field type is **`META_PUBLISHER`**, the default text might be `Springfield University` or `XYZ Corporation`. Default text for META_CONTRIBUTOR might be the name of a staff member whom regularly gives presentations from the room where the SMP is installed, such as `Dr. Jane Smith`.
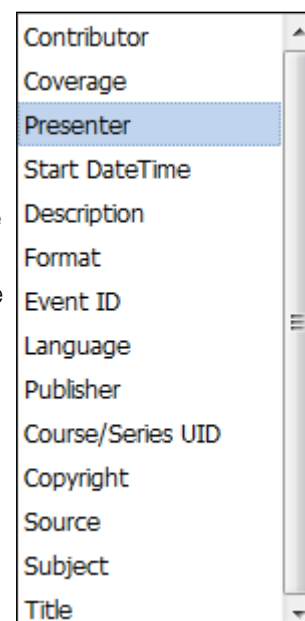
4. Select the **Schedule overrides Default?** check box to have the corresponding content from an *ad hoc* recording or scheduled presentation replace the default text. For example, if information from the schedule overrides default text, for the **Contributor** field, `Dr. Jane Smith` could be replaced by `P.D.Q. Bach,` MSW, if that is who is scheduled for a given presentation. Or text for **Subject** could change from a default of `History 101` to `Computer Science 10` if the facilities are scheduled to be used by different departments.

Metadata Type (Label)	Metadata Description
`Contributor`	An entity responsible for making contributions to the resource. A person, an organization, or a service. Typically, the name of a contributor.
`Copyright`	Information about rights held in and over the resource. Typically, rights information includes a statement about various property rights associated with the resource, including intellectual property rights.
`Course/Series UID`	The unique identifier for a related resource, such as the course or series to which this recording event belongs.
`Coverage`	The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant. A named place or a location specified by geographic coordinates. A named period, date, or date range. A named administrative entity or a geographic place to which the resource applies.
`Description`	An account of the resource. Description may include but is not limited to an abstract, a table of contents, a graphical representation, or a free-text account of the resource.
`Format`	The file format, physical medium, or dimensions of the resource. Examples of dimensions include size and duration. Recommended best practice is to use a controlled vocabulary such as the list of Internet Media Types [MIME].
`Identifier`	An unambiguous reference to the resource within a given context. Recommended best practice is to identify the resource by means of a string conforming to a formal identification system.
`Language`	A language of the resource.
`Presenter`	An entity primarily responsible for making the resource. Typically a person, an organization, or a service.
`Publisher`	An entity responsible for making the resource available, typically a person, an organization, or a service.
`Source`	A related resource from which the described resource is derived, in whole or in part.
`Start DateTime`	A point or period of time associated with an event in the lifecycle of the resource.
`Subject`	The topic of the resource, represented using keywords, key phrases, or classification codes.
`Title`	A name given to the resource, typically one by which the resource is formally known.

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 page or using SIS commands (see **Remote Communication and Control** on page 156). 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.
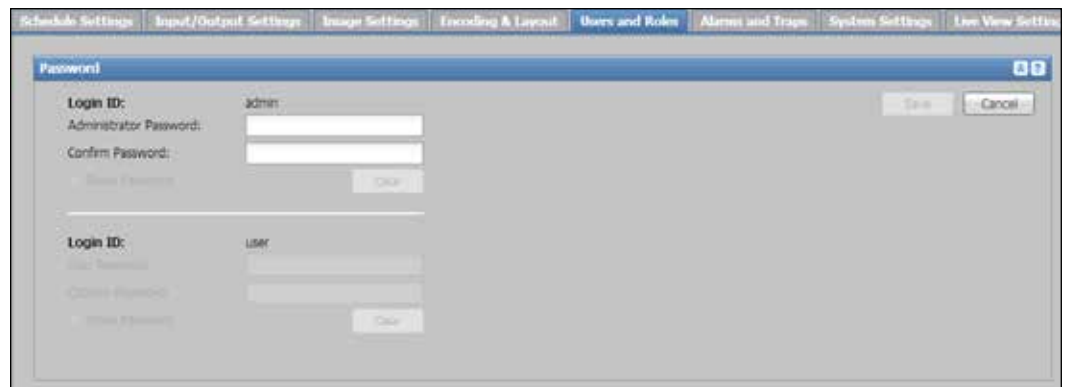
Figure 69. Password Panel

Setting passwords

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

- **Set an administrator level password only** — This option allows only administrators to access the 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.
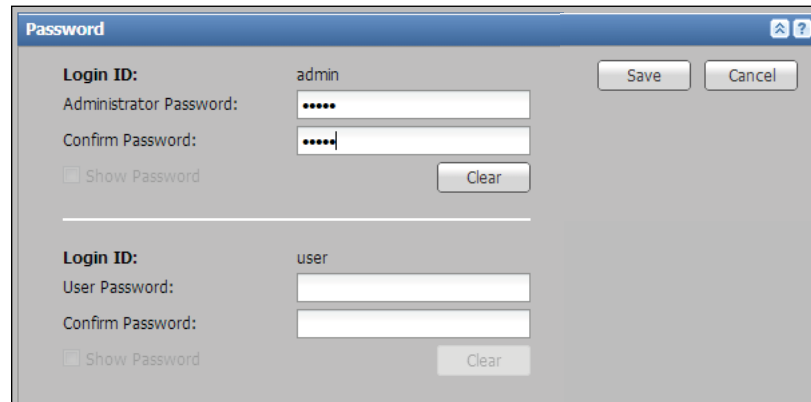
Figure 70.   Password Panel Closeup

3. If no user password is set, click **Save** in the upper right of the `Password` panel. To set a user password, complete steps 4 through 6.

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

Alarm levels can be set via this page. They cannot be set via the front panel.

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

The `Alarms and Traps` page opens.

Figure 71.   Alarms and Traps Page

Alarm notification e-mail settings

In order to send selected alarms notifications to a recipient, designate the originating e-mail address, the email address of the recipient, the address of the mail server the SMP 351 uses, and other settings within the `Alarm Notifier Destinations` panel.

To configure the e-mail settings:

1. In the `Alarm Notifier Destinations` pane, enter a valid email address into the **"From" User ID:** field to specify the e-mail address the SMP 351 uses to send notifications.

2. Specify the e-mail address of the person who receives notifications by typing a valid email address into the **"To" User ID:** field.

3. Enter the address of the e-mail server into the **Email Server Address:** field.

4. Select an encryption option from the **Use Encryption** drop-down list.

   - **None** – Notification e-mails do not use encryption.
   - **TLS** – Notification e-mails are sent using TLS encryption.
   - **SSL** – Notification e-mails are sent using SSL encryption.

5. Set the TCP port number by entering the number into the **TCP Port:** field. The port is typically 25, 465, or 587.

6. In the **Username:** field type the user name for the e-mail account entered in step 1. This name is displayed in the outgoing notification emails.

7. In the **Password:** field type the password for the e-mail account entered in step 1.

   - Passwords must consist of alphanumeric characters (letters and numbers) only. Special characters and punctuation are not allowed.
   - Passwords are case-sensitive.

8. In the **Options:** field type in any required options for the e-mail account.

9. Click **Test** to send an e-mail from the SMP 351 to the designated recipient. An Email Test Results dialog box opens indicating the status of the e-mail test.

10. Click **Re-Test** to send the e-mail again or click **Close** to close the dialog box.

11. If the test e-mail does not arrive, change settings within the Alarm Notifier Destinations pane as needed and click **Test** again. Repeat if necessary.

Configuring alarms

The Alarm Message List pane features a list of the available types of alarms (types of SNMP traps). To configure each alarm in the list, select the radio button corresponding to the desired option in the **Severity** columns.

- **Notify** — This option sends an e-mail to the designated recipient each time the corresponding alarm is triggered. The alarm is also displayed and logged.
  This is **High** priority, shown with "alert" severity.

- **Display** — This option displays a notice of the alarm condition within the SMP 351 embedded Web pages and the front panel display when the corresponding alarm condition occurs. No e-mail is sent. The event is logged.
  This is **Normal** priority, shown with "notice" severity.

- **Log** — This option tells the SMP 351 to list the corresponding alarm in the events log, accessed by clicking **Troubleshooting > Logs** tab. No e-mail is sent.
  This is **Low** priority, shown with "info" severity.

- **Disabled** — If this option is selected, the SMP 351 will not create a log, front panel display, or notification for the corresponding alarm type, though it will still appear in the alarms list within **Troubleshooting > Alarms**.

Alarm Priority	Alarms and Traps Severity Level	Troubleshooting Log Severity Level	Comments
High	Notify	Alert	• Sends an e-mail to the specified recipient when the alarm is triggered • Displays the alert on the SMP 351 front panel. • Logs the alarm condition.
Normal	Display	Notice	• Displays the alert on the SMP 351 front panel. • Logs the alarm condition.
Low	Log	Info	• Logs the alarm condition.

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 **Setting the default recording destination** on page 117 and **Scheduling with an Opencast server** on page 71), 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 (see **Automatic Recording Deletion** on page 134).

System Settings

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

To open this page, click the `Configuration` tab at the top of the SMP 351 embedded Web pages and then click the `System Settings` tab on the second tier of tabs.
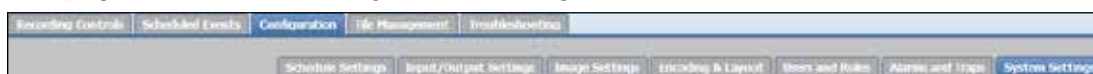
The `System Settings` page opens. It features nine panes, each with its own panel:

- **Unit Identification** – Set the system (unit) name and a descriptive name for its location.
- **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.
- **Default Recording Destination** – Choose where a recording is saved during its creation, select the protocol for uploading presentation recordings to a server, configure settings for the default FTP server, and test the connection.
- **Default Recording File Names** – Choose the type of information used to compose names of recordings.
- **Serial** – Set the mode of use, baud rate, and protocol for the rear panel remote control serial port.
- **Firmware Loader** – Upload firmware to the unit.
- **Backup and Restore** – Upload a previously-saved configuration file to the unit.
- **Executive Mode** – Enable or disable various levels of front panel lock-out to limit access to the controls and functions of the SMP 351.

Figure 72. System Settings-Collapsed

Click the **Expand** button (⊗) on the top-right of the pane to expand it, or click the **Collapse** button (⊗)to collapse it.

Some of the settings can also be set using the front panel menu and controls or using SIS commands. Many system setup tasks must be performed within this page.

Setting the system (unit) name and location

1. In the `System Settings` page, click the **Expand** button for the `Unit Identification` pane. The pane opens.

2. In the **System Name:** field, enter the name for this specific SMP 351 unit. This name can appear in metadata for recordings and also in device properties in a scheduling system. By default, the name is the product model and last six characters of the MAC address.

> **NOTE:** Changing the name of the SMP 351 in the **Capture Agent Name** field of the **Opencast Scheduling** tab (see **Scheduling with an Opencast server** on page 71), changes the unit location name here. The name must be the same in both places.

3. In the **Location:** field, type a short, descriptive name for the room or building where the SMP 351 is located. This location name is saved in metadata for recordings.

4. Click **Save** to save the changes or **Cancel** to revert to the previously saved values.

Setting the date and time

Click the **Expand** button to access the **Date and Time** panel in the `System Settings` page. The pane opens.

There are three options within the `System Settings` page for setting the date and time:

*   Sync the unit with the connected computer
*   Manually set the date, time, and time zone
*   Sync the unit with an external server-based source using NTP (network time protocol).
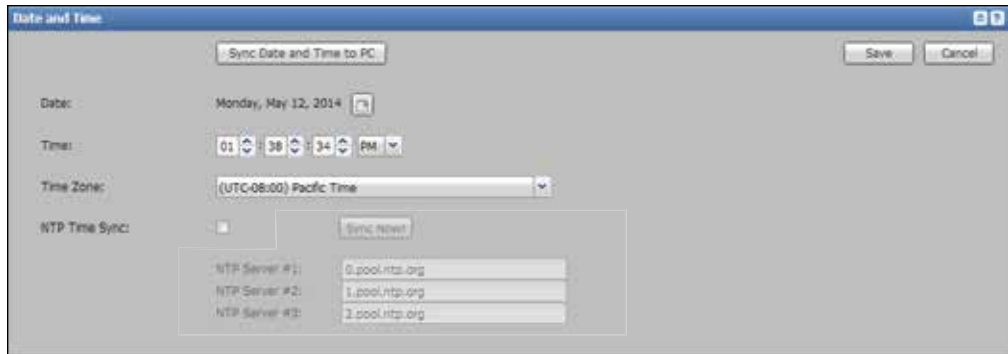
Figure 73. Date and Time Panel

To sync the unit with the connected computer:

1. Click **Sync Date and Time to PC**. This sets the date, time, and time zone for the SMP 351 automatically, based on the date and time of the connected computer. The date and time settings are automatically updated.

2. Click **Save**.

To manually set the date, time, and time zone:

1. Click the calendar icon (📅) beside the date line to open a pop-up calendar. Select a specific date or click **Today** to select the current date.

2. Click anywhere outside the calendar to exit the calendar. The new date is in the text adjacent to the calendar button.

3. In the **Time:** fields, type in numbers for the hour, minutes, and seconds or use the **Up** and **Down** arrows to change the values. Select **AM** or **PM** from the drop-down list.

4. Select the appropriate zone from the **Time Zone** drop-down list.

5. Click **Save**.

> **NOTE:** It is recommended to reboot the device after manually adjusting the system time (see **System Resets** on page 148).

To sync the unit with an NTP server:

1. Select (check) the **NTP Time Sync** check box. The controls are now accessible (no longer grayed out). At the same time the options for manual settings and PC synchronization become inaccessible.

2. Type the URLs of the NTP servers used for time reference into one or more of the NTP Server fields. A resource for NTP servers is **http://pool.ntp.org/**, which lists pools of NTP servers, grouped by region, to which you can link computers or devices to synchronize time.

> **NOTE:** A valid DNS server must be configured in order to resolve an NTP server by its domain name. Alternatively, an IP address can be used.

3. Click **Sync Now!**. The unit checks one or more of the specified servers or server pools and updates the date and time settings.

4. Click **Save**.

> **NOTE:** After the unit is configured to sync with NTP servers, the **Troubleshooting Status** page displays the configured NTP server URLs and the date and time when the unit was last synced to the servers.

Setting the IP address, port numbers, and other network settings

In the `Networking` pane you 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.

> **NOTE:** Changes to any setting in this page are not applied and saved until you click `Save`.

To configure network settings:

1. In the `System Settings` page, click the **Expand** button for the `Networking` pane. The pane opens.
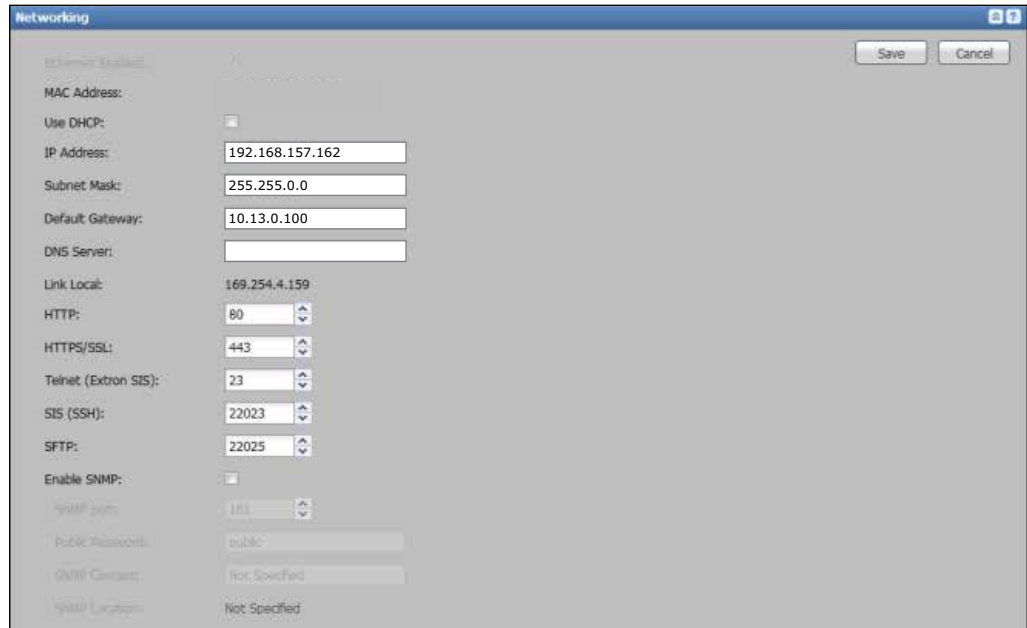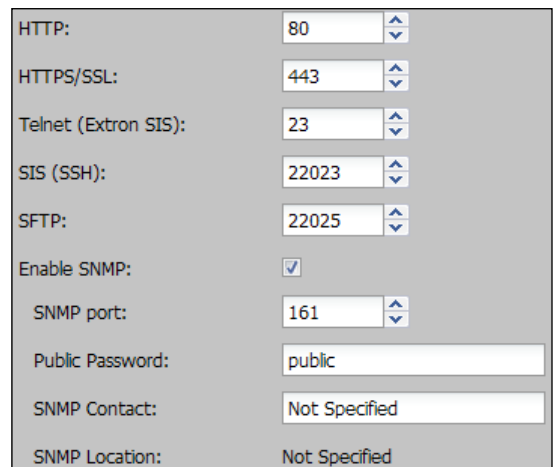
Figure 74. System Settings, Networking Panel

2. To use DHCP to automatically assign an IP address and related settings, select (check) the **Use DHCP:** check box. The fields for setting the **IP address**, **Subnet Mask**, **Default Gateway**, and **DNS Server** address are inaccessible (grayed out). Proceed to step 4.

3. If not using DHCP, type the appropriate values for the corresponding IP addresses and mask into the **IP Address**, **Subnet Mask**, **Default Gateway**, and **DNS Server** fields.

4. To change port numbers for the protocols listed in the lower portion of this panel (**SFTP**, **SSH**, **Telnet**, **HTTP**, **SNMP**, or **HTTPS/SSL**), type the new number into the desired field or use the **Up** and **Down** arrows to change the values. The standard (default) port numbers are shown in the image at right.

> **NOTE:** The Telnet port is used by Extron DataViewer software and for Extron SIS communication and programming.

5. If it will be used, configure Simple Network Management Protocol (SNMP). SNMP facilitates the exchange of basic network management information between network devices. It helps in monitoring of operations and factors such as bandwidth, memory usage, remote password resets, and collection of error information. The text that is specified in the SNMP-related fields is seen by the network community when the unit is queried.

   a. Select the **Enable SNMP** check box. When checked, the unit allows SNMP communication. If unchecked (clear), the unit does not use SNMP.

   b. If desired, type a new port number into the **SNMP port:** field or use the **Up** and **Down** arrows to change the value.

   c. To set a password for network management that will be publicly accessible, enter a password in the **Public Password:** field. The password can be any alphanumeric name of 4 to 12 characters. Letters, numbers, and hyphens are allowed. Spaces, slashes, and symbols are not permitted.

   > **NOTE:** The public password is also referred to as the Public Community String.

   d. If desired, in the **SNMP Contact:** field, enter the name of the person who can be contacted for assistance with this SMP 351 unit in case someone (such as a network administrator) has questions about this specific device.

   e. The SNMP location description cannot be changed from within this panel. To change the location description, click the Save button within this panel to save the network settings, navigate to the `Configuration > System Settings > Unit Identification` pane, enter a new location description in the **Location** field, and click **Save**. Once the Web pages are refreshed or reloaded, the revised location name appears in the SNMP section of the **Networking** pane.

6. Click **Save**.

About the link local IP address

The **Networking** pane displays a "Link Local" IP address. This address cannot be changed by users. It is negotiated automatically by the SMP 351. This address provides a way for the unit to communicate on the network in a peer-to-peer fashion in the event that a DHCP server is unavailable.

Regular, private IP addresses are assigned by a local network administrator either on a static basis or automatically (using a DHCP server that has been set up with an assigned range of addresses). This is one form of a client-server system.

Many routers come from the manufacturer configured with a commonly-used range of private addresses (for IPv4, the address range is `169.254.0.0` to `169.254.0.16`) that can be assigned using DHCP. In systems without a network administrator, the router can assign numbers from that default range of addresses to devices on the LAN. This is another way to set up a client-server system.

If a network has neither of the previous two options, individual devices (PCs, codecs, decoders) generate and use their own link local addresses (for IPv4, the address range is `169.254.0.0` to `169.254.0.16`). This method requires no network configuration of the device, and it works using peer-to-peer communication rather than a client-server system.

Link local IP addresses use a separate range of addresses from those assigned by a DHCP server so they cannot conflict with the server-assigned addresses.
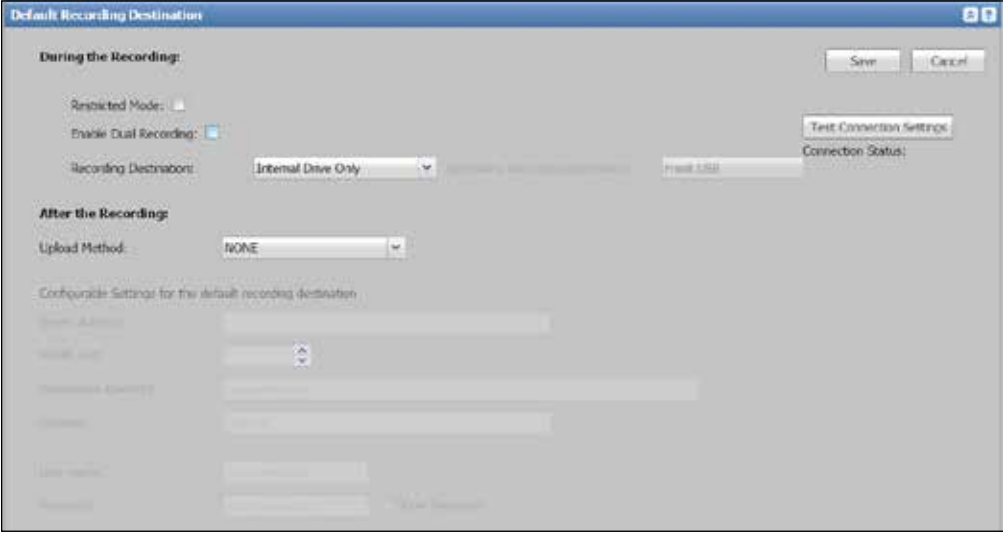
Signals from devices using link local IP addresses are not routed by routers and gateways. They stay within the local network. That makes it possible for many different LANs to use the same range of link local IP addresses without creating conflicts.

Each LAN must use Network Address Translation (NAT) to hide private addresses and present only one or few public addresses to other or larger networks.

Setting the default recording destination

To choose where the recording is saved during its creation and to select the protocol for uploading presentation recordings to a server, do the following:

1. In the `System Settings` page, click the **Expand** button (⊗) for the `Default Recording Destination` pane. The pane opens.

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.

   • 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 using just the one 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 **Restricted Mode** check box.

> **NOTE:** If restricted mode is enabled (the **Restricted Mode:** check box is selected and the setting is saved by clicking the **Save** button within the `Default Recording Destination` panel) you cannot change any recording destination settings or enable or disable dual recording mode until the restricted mode is disabled and that setting is saved. Once restricted mode is disabled, then you can make changes to the other settings, which are applied once they are saved.

5. Select the protocol or method to use for uploading completed recording files to a server from the **Upload Method** drop-down list. Available choices are **FTP**, **SFTP**, **CIFS/Windows Net Share**, and **None** (default).

- If you select **None**, click **Save**.

- If you select any other option, proceed to step 6.

6. Type the address of the destination server into the **Server Address:** field.

- For **FTP and SFTP servers**, the server address must be given as the resolvable address of the server itself (for example, ftp.extron.com/ or 192.168.25.41). This serves as the home level of the FTP server. It is an address that already exists on the server and that the SMP 351 has permission to access. The destination directory (see step 8) will be configured for a subdirectory within the home level of the FTP server. The subdirectory must already have been created, and the SMP 351 must have permission to read, write, and delete files in that location.

Figure 75. Default Recording Destination Panel - FTP

- For **CIFS servers**, the server address can be an exact subfolder that already exists, or it can be a root directory, and the subfolder can be created on demand based on the destination directory entry in step 8 below. A CIFS server requires a full path to be specified here. This portion of the address must exist prior to connecting the SMP 351, and the SMP 351 must have permission to read, write, and delete files in that location.

Figure 76.   Default Recording Destination Panel - CIFS

7. Enter a port number in the **FTP port**, **SFTP port**, or **CIFS port** field, or use the **Up** and **Down** arrows to change the value.

8. Enter the name of the target directory (subdirectory) for the recording files into the **Destination Directory** field. This is the directory to which files are uploaded.

    - **For FTP and SFTP servers**, this subdirectory must preexist connection to the SMP 351, and the SMP 351 must have permission to read, write, and delete files in this location.

    - **For CIFS servers**, this directory can be one that was created prior to SMP 351 connection, or it can be created on demand.

9. Enter the name of the primary operator of this SMP 351 unit into the **User name:** field.

10. Enter the password for that user into the **Password** field. To display text instead of dots for the password, select (check) the **Show Password** check box.

11. Enter a bit rate (in Kbps) in the **Transfer Max Bitrate** field, or use the **Up** and **Down** arrows to change the value.

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

13. If desired, click **Test Connection Settings** to make sure the settings you entered in steps 3 through 12 work correctly. The status of the connection to the server and directory are indicated below the button. A working connection is indicated by a check (tick) mark within a green disk.
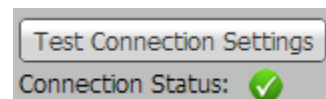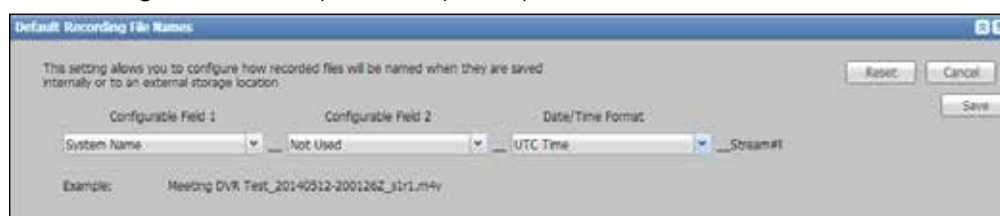
If you attempt to connect to a CIFS/Windows Net Share server with a Microsoft Windows 7 operating system, you may receive a drive mounting error message indicating that the system cannot allocate memory. To resolve the error and make it possible to connect to the server, do the following:

1. Reset two registry keys on the Windows-based server:

   a. Set `HKLM\SYSTEM\CurrentControlSet\Control\Session Manager\Memory Management\LargeSystemCache` to **1**.

   b. Set `HKLM\SYSTEM\CurrentControlSet\Services\LanmanServer\Parameters\Size` to **3**.

2. Restart the server hardware or restart the Windows Server service.

Set a default recording file name

The SMP 351 uses a combination of information from fields defined in this pane to create the file name for each recording. To set the default recording names:

1. In the `System Settings` page, click the **Expand** button (⌄) for the `Default Recording File Names` pane. The pane opens.

2. Select a type of information or metadata from the **Configurable Field 1** and **Configurable Field 2** drop-down lists. Available options are:

   - **Not Used**
   - **Event Course Name**
   - **Event Instructor Name**
   - **Event Title**
   - **System Location**
   - **System Name**

   - Event course name, event instructor name, and event title draw information from the corresponding metadata fields as defined during *ad hoc* recording setup or in imported recording schedules.

   - System location and system name information are set in the `Unit Identification` pane within the `System Settings` page.

   > **NOTE:** Configurable Field 1 cannot be blank. If **Not Used** is selected, the field is automatically populated with "**Adhoc**" for unscheduled recordings, or "**Sched**" for scheduled recordings.

   The pane provides an example file name below the fields:

3. Select either **UTC Time** or **Local Time** from the **Date/Time Format** drop-down list.

4. Click **Save** to save the settings, click **Reset** to set the fields back to the factory default settings, or click **Cancel** to discard the changes.

Rear panel serial port setup

Although the SMP 351 is typically controlled using the embedded Web pages [via network (LAN) connection] and the front panel controls, it can also be controlled by sending SIS commands via the rear panel Remote RS-232 port.

To configure the port for serial control:

1. In the `System Settings` page, click the **Expand** button (⌄) for the **Serial** pane. The pane opens.

2. Select the baud rate and protocol settings supported by the computer that is connected to the Remote RS-232 port.

    *   **Baud Rate** — Select **9600**, **19200**, **38400**, **57600**, or **115200** baud.
    *   **Stop Bits** — Select **1** or **2** stop bits.
    *   **Bits** — Select **7** or **8** data bits per byte.
    *   **Parity** — Select **None**, **Odd**, or **Even** parity checking.

3. Click **Save** to save the settings, **Reset** to clear pending choices and start over using the default settings, or **Cancel** to discard the settings. Clicking **Reset** opens a dialog box asking to confirm that you want to discard changes and reset the options back to the factory default. The other two options simply save or cancel the changes without requiring confirmation.

Updating firmware
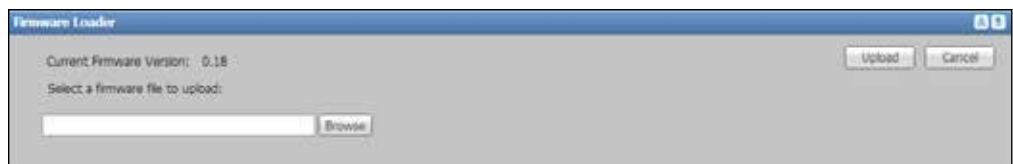
The **Firmware Loader** pane makes it possible to load new firmware to the unit.

> **NOTES:**
> *   Use a network connection (the LAN port) to upload firmware. Firmware uploads are not permitted via serial connections (rear panel RS-232 port or front or rear panel USB ports).
> *   Firmware updates are available on the SMP 351 product page at **www.extron.com**.
> *   A link on the **Troubleshooting Status** page (see page 139) automatically searches the Extron site for new firmware updates for the SMP 351.

To update firmware:

1. Download the firmware from the product page to a folder on the control PC.

2. In the `System Settings` page, click the **Expand** button (⌄) for the `Firmware Loader` pane. The pane opens.

3. Click **Browse**. The `Open` dialog opens.

4. Browse to and select the file downloaded from the product page, which must be in `.eff` (Extron firmware file) format.

5. Click **Open**. The dialog box closes and the file name appears in the **Select a firmware file to upload** field.

6. Click **Upload**. It takes a few minutes for the firmware to upload. When the upload is complete, the unit reboots. Refresh the browser window after the power cycle to reestablish communication and use the embedded Web pages again.

Saving and restoring configurations

The `Backup and Restore` pane makes it possible to save the current IP settings or the entire unit configuration (everything that can be set up within the **Configuration** tab) to a file, and also to upload a previously-saved configuration file to the unit. A configuration file can be saved for use as a backup, or it can be uploaded to one or more other units to streamline the configuration process.

Save a Configuration

To save an SMP 351 configuration:

1. In the `System Settings` page, click the **Expand** button (⊗) for the `Backup and Restore` pane. The pane opens.
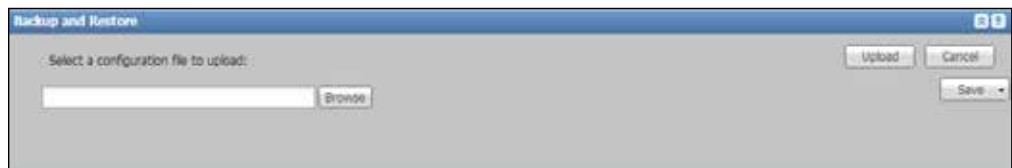
2. Click **Save** and select an option from the drop-down list:
   - **Box Config** — Select this to save all the configuration settings from this unit to a file named Box.cfg. This option saves input and output settings, image settings, encoder settings, layout settings, user names and passwords, alarm settings, system settings (including IP settings), and live view settings.
   - **IP Config** — Select this to save only IP settings from this unit to a file named ip.cfg.

   The selected type of configuration file downloads to the default download file location on the computer.

3. Retrieve the `*.cfg` file and store it in a desired location.

Restore a Configuration

To restore a configuration file or to load a configuration saved from another SMP 351:

1. In the `System Settings` page, click the **Expand** arrow button for the `Backup and Restore` pane. The pane opens.

2. Click **Browse**. The `Open` dialog box opens.

3. Browse to and **select** the desired file, which must be `IP.cfg` or `Box.cfg` from an Extron SMP 351 .

4. Click **Open**. The dialog box closes and the file name appears in the **Select a configuration file to upload:** field.

5. Click **Upload**. It takes a few moments for the configuration upload to the SMP 351. The unit reboots upon completion. A dialog box may appear to remind you to reload the Web pages in the browser.

6. If the configuration file is from a different unit connected to the same network, set the IP address of this SMP 351 to a different number (see **Setting the IP address, port numbers, and other network settings** on page 115) so there are no network conflicts.

Executive modes (Front Panel Lock-out)

Use of front panel controls and functions can be limited or completely disabled by setting one of the levels of front panel lock-out, also known as executive modes. To limit or disable front panel control:

1. In the `System Settings` page, click the **Expand** arrow button (⊻) for the `Executive Mode` pane. The pane opens.
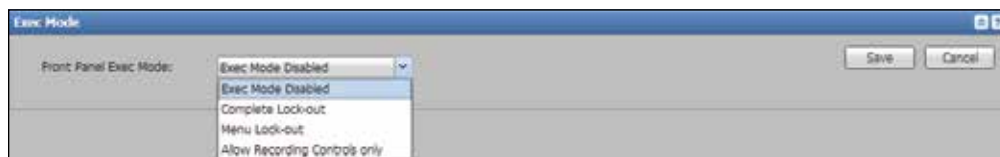
2. Select an option from the **Front Panel Exec Mode** drop-down list:

   • **Exec Mode Disabled** — Executive mode is off. All front panel controls are active and accessible.

   • **Complete Lock-out** — Executive mode 1 is active. All front panel controls are disabled.

   • **Menu Lock-out** — Executive mode 2 is active. Menu access is disabled, but input switching, capture preset, swap and recording controls are available.

   • **Allow Recording Controls only** — Executive mode 3 is active. All front panel controls are disabled except the **Record**, **Pause**, **Stop**, and **Mark** buttons.

3. Click **Save** to activate the selection or click **Cancel** to discard the change.

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 via the front panel.

Configure the Live Preview Player

To configure the player and streaming method used in the `Preview` window:

1. Click the **Configuration** tab at the top of the embedded Web pages and then click the **Live View Settings** tab on the second tier of tabs.

   The `Live View Settings` page opens, showing the `Player` pane.
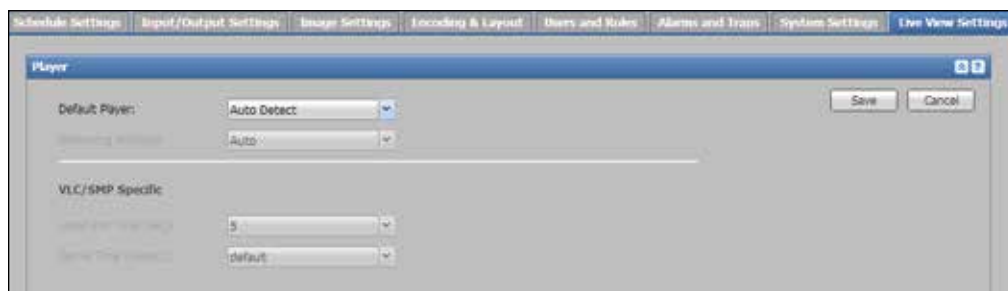
2. Select the media player program from the **Default Player:** drop-down list. By default, **Auto Detect** is selected, allowing use of an installed and accessible player. Additional options include the following:

   - **VLC** — The VideoLAN™ opensource VLC™ media player, available from **http://www.videolan.org/vlc/index.html**.

   - **SMP** — The Extron Streaming Media Player (SMP) Web browser plugin provides the best streaming features to display streams from Extron streaming media devices.

   - **Quicktime** — Apple® QuickTime® player, available from **http://www.apple.com/quicktime/**

3. If you selected **SMP** in step 2, the **Streaming Methods** drop-down list is accessible. Select an option from the drop down list: **Auto** (automatic selection by the SMP), **RTP**, **RTP/RTSP**, or **RTP/RTSP/HTTP**. Go to step 5.

4. If you selected **VLC** or **SMP** in step 2:

   - Select a video initiation period (from 0 to 60 seconds) from the **Video Init Time (sec):** drop-down list. This control sets the time to initialize stream playback or recording. It is the delay between selecting a new input or unmuting video and reflecting the change in the recording and the Preview window in the AV Controls panel.

     > **NOTE:** "Init" time determines how long you see "Initializing" when the page first loads. This helps ensure the stream is stable before it is displayed. If you are using low frame rates and high GOP lengths, you should use longer initialization times to ensure that an I-frame has been received before displaying the stream.

   - Select a cache period (from 200 to 5000 milliseconds) from the **Cache Time (milisec):** drop-down list. The cache period is the amount of jitter buffer time for the encoded stream. For example, if 5 is selected, making a change such as swapping windows or changing layout presets forces the unit to wait during the cache period before displaying the changed stream.

5. Click **Save**. The Live View Settings dialog box opens.

6. Click **Refresh now** to refresh the embedded Web pages and apply the new settings to the Player window. The Live View dialog box closes and the Web page is refreshed.

   - If the selected browser plugin is installed on the computer, the Preview window displays the live view stream.

   - If the selected browser plugin is not installed, a note appears directly below the Preview window indicating the plugin is not available. The note includes a link to the Web page (as noted in step 2) where you can obtain the plugin.

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.
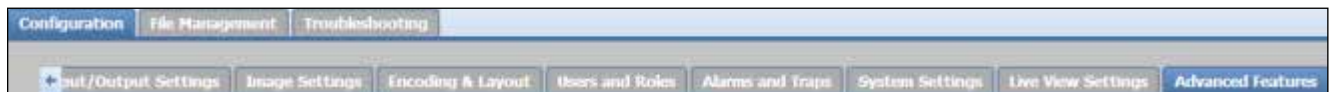
The **Advanced Features** page opens, showing the `Browser Client` and `Apps` panes.
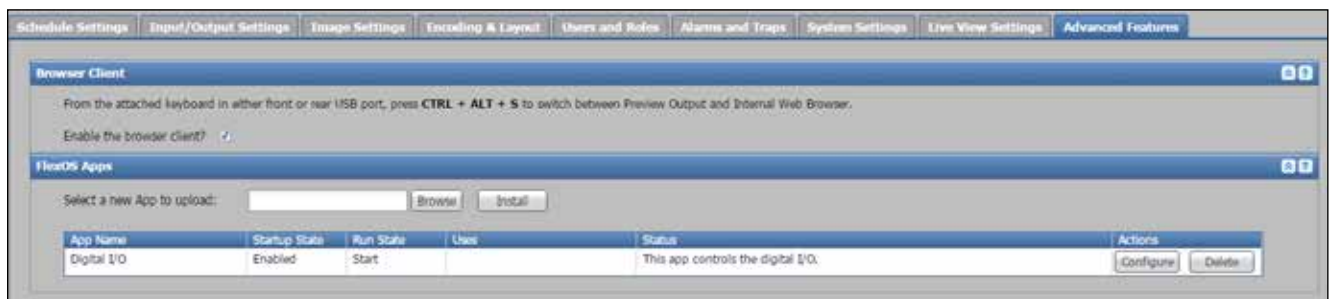
Figure 77. Advanced Features Page

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` panel.

> **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 output 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.

To add an app to the embedded Web pages:

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

1. Open a Web browser and navigate to the SMP 351 product page at **www.extron.com**.

2. Within the product page, click on the `Downloads` tab.

3. In the Software listing section, locate the link for the desired plug-in and click on the link to start the download process.

4. Complete the information form if requested to do so, then click **Download** and follow the on-screen instructions.

5. Note the name of the plug-in and location on the computer where it was downloaded.

6. In another Web browser tab or window, type the IP address of the SMP 351 into the address field and open its Web pages.

7. Click `Configuration > Advanced Features` at the top of the SMP 351 embedded Web pages.

8. In the `Apps` panel, click `Browse`. An `Open` dialog box opens.

9. Navigate to the location of the downloaded file and select the file.

10. Click `Open`. The `Open` dialog box closes.

11. Click `Install`. The file uploads to the SMP 351. Once it is installed, the name of the application is listed in the table within the `Apps` panel, along with its settings for start-up state, current running state (running or stopped and ready to start), and status (purpose).

12. If desired, you can sort the applications list by clicking on a column title (such as **App Name**) and selecting the desired option: `Sort Ascending` or `Sort Descending`.

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 **Flex I/O Applications** on page 149.

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

Open and use an application

To open and use an application that has been uploaded to the SMP 351:

1. Click **Configuration > Advanced Features** on the embedded Web pages. The **Advanced Features** page opens.

2. Within the **Apps** panel, click the **Configure** button corresponding to the desired application in the **Actions** column. The application opens in a new window.

3. Change settings for the features covered by that plug-in as desired. For example, select input or output and select or deselect a pull-up resistor for a digital I/O port.

4. Click **Apply** or **Save** to save the configuration settings and close the application window, or click **Cancel** to discard the settings and close the window. Details about the features and use of each plug-in may be covered by a help file specific to the plug-in.

5. Close the plug-in window. You may be prompted to save changes before closing the window.

6. Specify whether to run the application when the SMP 351 starts up or upon reboot. To do so:

    a. Click in the **Startup State** column of the **Apps** panel to access the drop-down list.

    b. Select either **Enabled** (default, run the app upon unit start up) or **Disabled** (do not run the app upon start up).
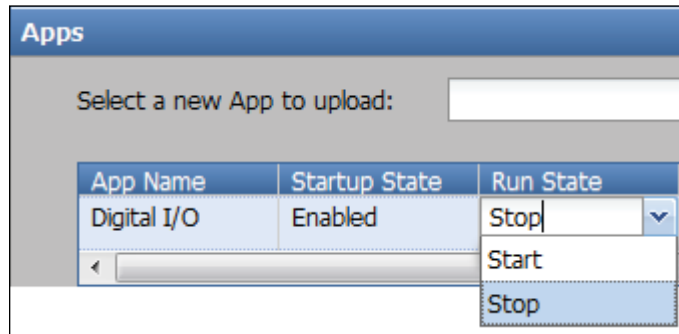
> **NOTE:**   Each application has its own help file that describes how to use the app.

Stop an application from running

By default, each application is set to start and run once it has been installed and configured. You can stop the application at any time as follows:

1. Click in the **Run State** column in the row for that app to access the **Run State** drop-down menu.

2. Change the setting from **Start** (default, run or start once configured) to **Stop** (stop or stopped).

3. To resume running the application, select **Start** again.

Remove an application

To remove an application from the SMP 351:

1. In the `Advanced Features` > `Apps` pane, click **Delete** corresponding to the desired application in the **Actions** column. A confirmation dialog box opens asking you to confirm the deletion.

2. Click **Delete** to remove the app, click **Cancel** to leave the app installed on the unit.

File Management

The `File Management` page 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 in this page.

To open this page, click the File Management tab at the top of the SMP 351 embedded web page:

| Recording Controls | Scheduled Events | Configuration | **File Management** | Troubleshooting |

The `File Management` page opens showing the `File Directory` and the `File Upload Utility` panels:
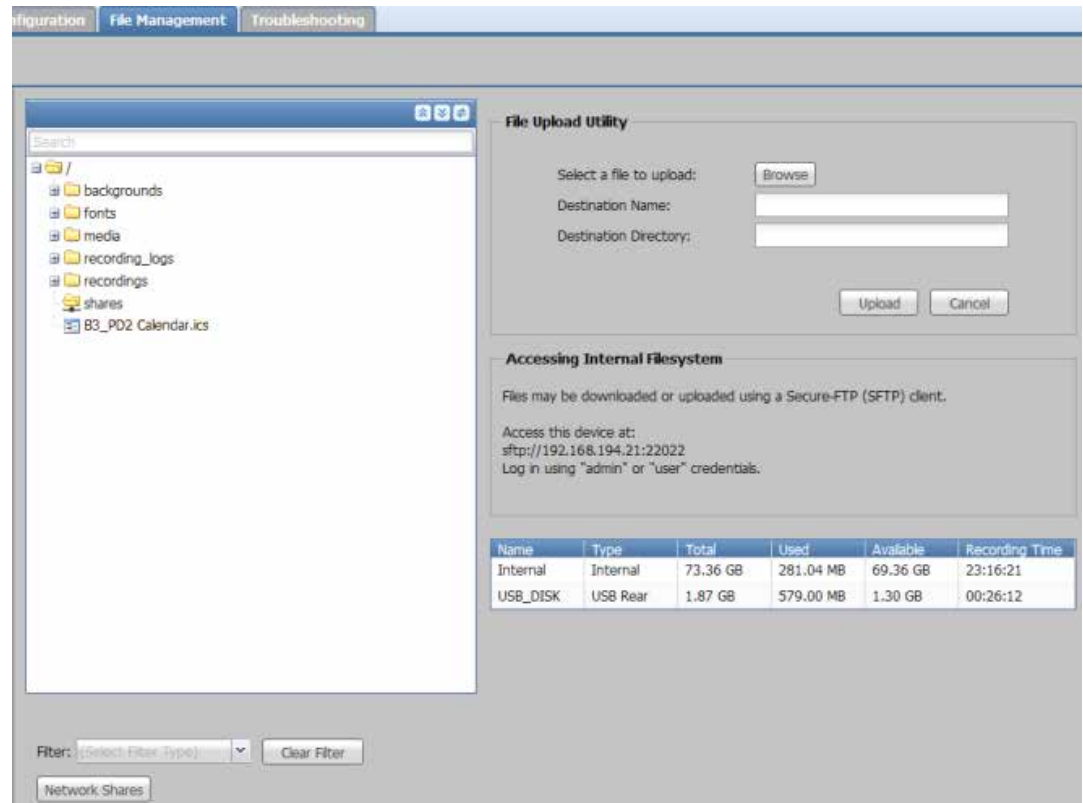
Figure 78. **Configuration, File Management Tab**

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.

> **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.

Expanding Folders to View File Lists

To view available files expand a specific folder in the `File Directory` panel by clicking the **+** adjacent to it.

> **NOTE:** If many files are stored in the unit or if the unit is connected to shared network drives, it is best not to expand all folders at once because loading the full file list can require additional processing and network resources.

The **Collapse** (⊼) and **Expand** (⊻) arrow buttons for the `File Directory` panel work differently from those of other panels within these Web pages. Instead of collapsing or expanding the panel, these buttons expand or collapse the folders and file lists <u>within</u> the panel. The folder list in figure 74 (shown on the left) expands to the entire folder and file listings (right).
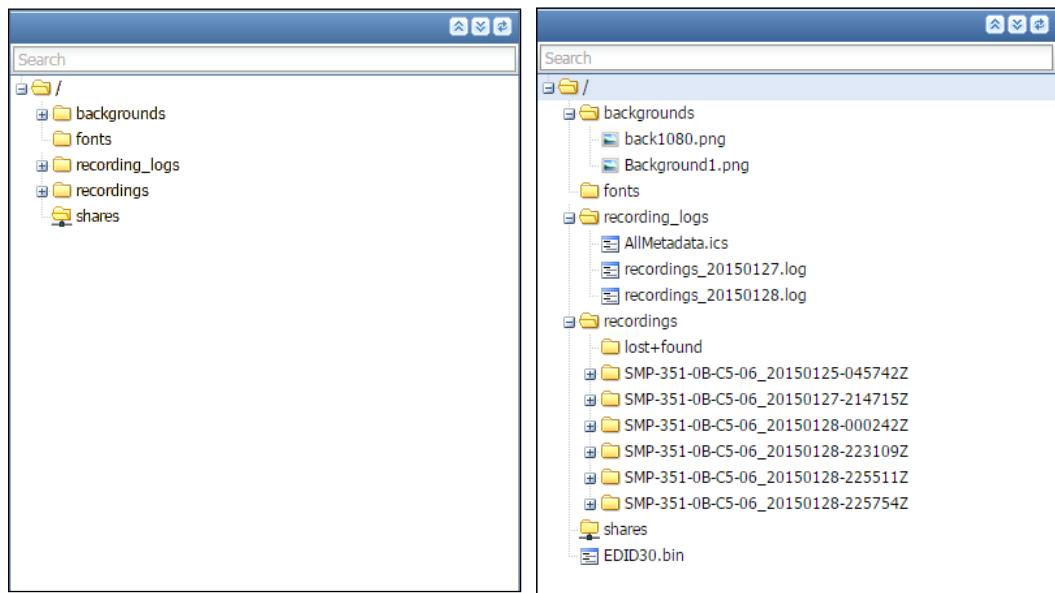
Figure 79. File Folders

Finding Files

To find a file, do one of the following:

- Expand folders in the `File Directory` panel (as described above) and browse through the file list. If desired, narrow the list of files to a specific type (such as images) by applying a filter to the directory.

- Use the search feature.

To apply a filter:

Select an option from the **Filter** drop-down list below the `File Directory` panel.
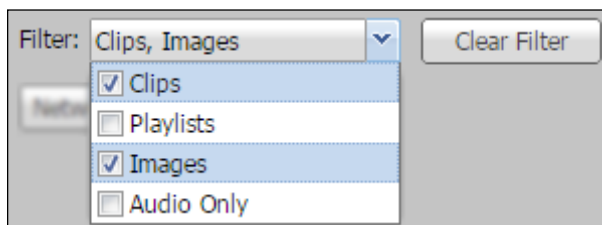
Options include **Clips**, **Playlists**, **Images**, and **Audio Only**. The file list displays only files of that type (such as images for backgrounds) until you click **Clear Filter**.

To search for a file:

1. Click in the **Search** field at the top of the `File Directory` panel.

2. Enter all or part of the file name. The SMP 351 searches the list of files and folders. A list of files containing that text string is directly below the **Search** field.
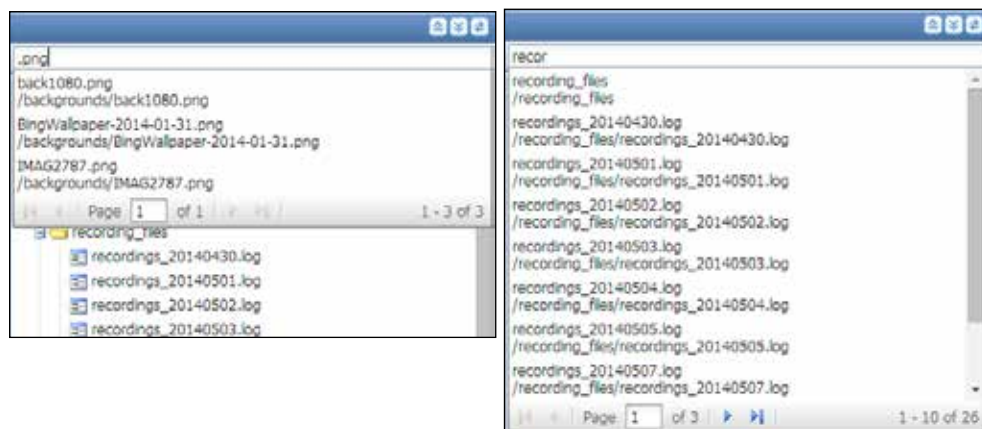
Figure 80.   File Search

- Each item in the list includes the name of the file or folder and its directory path.

- Folders are listed first, followed by files.

- If many files or folders match the entered text, navigation controls within the search results pane allow you to scroll through the results or select a specific page of search results.

3. Click on a file or folder name in the list to select that item.

Upload a File to the SMP 351

> **NOTES:**
> - The SMP 351 supports TrueType™ (.ttf) and OpenType® (.otf) fonts.
> - The user is responsible for obtaining necessary font licenses before uploading fonts to the SMP 351.

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

To add a file to the SMP 351 for use as a background image or a font (for on-screen display text):

1. Click the **File Management** tab at the top of the embedded Web page.

2. In the `File Upload Utility` panel, click **Browse**.

3. In the `Open` dialog box, browse to and select the desired file:
   - Background images must be in `.png` file format.
   - Font files must be in `.ttf` or `.otf` file format.
4. Click **Open**. The dialog box closes. The file name is in the **Destination Name:** field.
5. If desired, edit the text in the **Destination Name:** field. The destination name is the file name and extension, not a directory path.
6. Perform one of the following:
   - Enter the name of the directory folder in which the file will be stored into the **Destination Directory:** field.
   - Click on the desired folder in the `File Directory` panel. The directory (folder) name appears in the **Destination Directory:** field.

   > **NOTE:** For fonts, select **fonts** as the destination directory.

   File Upload Utility

Select a file to upload:	Browse
Destination Name:	IMAG2787.png
Destination Directory:	backgrounds

   Upload   Cancel

   File Upload Utility

Select a file to upload:	Browse
Destination Name:	FrancoisOne.ttf
Destination Directory:	fonts

   Upload   Cancel

7. Click **Upload**. The file is copied into the designated folder.

Delete a File or Folder

Once a file folder or a file, such as a background image or font, is stored in the SMP, you can remove it as follows:

> **NOTE:** Folders and files in the /recordings/ folder are read-only and cannot be deleted from the File Management page. Recordings must be deleted via the Scheduled Events page.

1. In the `File Directory` panel, click the **+** adjacent to a folder to expand it and locate the desired file or folder.
2. Right-click the file or folder and select **Delete**. The `Permanently Delete Confirmation` dialog box opens.
3. Click **Delete** to permanently remove the file or folder.

Locking and Unlocking a Recording Package Folder

Folders containing recording packages can be designated as "locked" in order to do the following:

Make it more difficult to accidentally delete a recording via the Event Details dialog box in the Scheduled Events page (discussed in Deleting a Recording within Scheduled Events).

Exclude the recording from automatic disk cleanup (detailed in Automatic Recording Deletion in this section).

To "lock" a recording:

1. Click the **File Management** tab at the top of the SMP 351 embedded web page.

2. In the **File Directory** panel, click the **+** adjacent to expand the recordings folder and locate the folder for the recording you want to lock.

3. Right-click the folder for the desired recording and select **Lock** from the pop-up list (see figure 81, **A**).
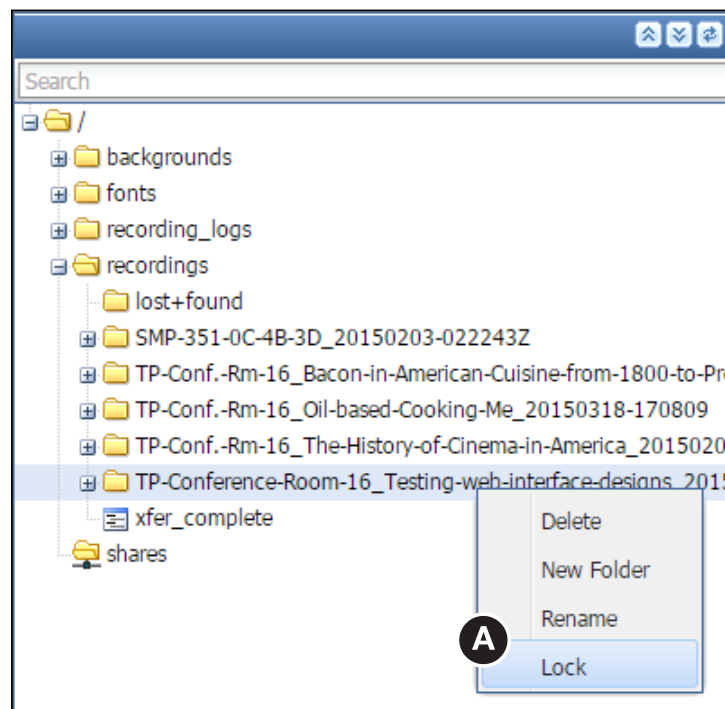
Figure 81.   File Directory Panel

The list closes and a symbol of a locked padlock appears on the folder for that recording to indicate that it is locked and the recording will not be deleted during automatic disk cleanup.

To "unlock" a recording:

Follow the procedure above for locking a recording, but in step 3 select **Unlock** from the pop-up list. The list closes, and the padlock symbol is removed from the folder. The recording is now eligible for deletion using automatic disk cleanup.

Deleting Recordings

There are two methods for deleting recording packages: automatic and manual.

> **NOTE:**   You cannot delete a recording from within the File Management page.

Automatic Recording Deletion

If internal storage space is nearly full, the SMP 351 uses an automatic disk cleanup to make room for new recordings. As the need arises, the unit automatically deletes old recordings.

- If the SMP is set up to automatically upload recordings to a server (see **Setting the default recording destination** on page 117 and **Scheduling with an Opencast server** on page 71), and if the recordings have been successfuly uploaded to the server, the unit deletes recordings (beginning with the oldest) until there is sufficient free space on the disk.

- If the SMP has been set up to upload recordings to a server, but some recordings were not successfully uploaded, then successfully uploaded recordings are deleted first. Then, if more space is still needed, the SMP deletes recordings that have not been uploaded.

- If there is no upload method configured, the SMP deletes the oldest files first and then deletes newer files until enough space is available.

> **NOTE:** Recordings can be marked as "locked" to prevent them from being removed by automatic disk cleanup (see **Locking and Unlocking a Recording Package Folder** on page 133).

Manual Recording Deletion

To delete a recording from the `Event Details` dialog box:

1. Click the `Scheduled Events` tab at the top of the embedded Web page to open the calendar.

2. In the calendar, locate and double-click on the recording you want to delete. The `Event Details` dialog box opens.

3. Click **Delete**.

4. A `Confirm` dialog box opens and asks you to confirm that you want to delete the event. If the recording was marked as locked in the `File Management` page, the `Confirm` dialog box notifies you that the file is protected and asks you to confirm that you want to delete the event.

5. Click **Yes** to delete the recording or **No** to cancel deletion.

Rename a File or Folder

> **NOTE:** Folders and files in the `/recordings` folder are read-only and cannot be deleted or renamed.

To change the name of a file or folder stored in the SMP 351, do the following:

1. In the `File Directory` panel, click the **+** adjacent to a folder to expand it, then locate the desired file or folder.

2. Right-click the file or folder and select **Rename**. The file or folder name is displayed within a field.

3. Edit the name.

4. Click anywhere else on the screen. The field disappears and the new name is saved.

Create a New Folder

If storage space is available, you can create a folder for storing background images or recordings.

To create a folder:

1. Click the **File Management** tab at the top of the SMP 351 embedded Web page.

2. Right-click the folder or subfolder within which you want to create the new folder. A small dialog box opens.

> **NOTE:** You cannot create a new folder within shares (network attached storage devices) using this method. New folders on a shared network device must be created separately, outside of the embedded Web pages.

3. Select **New Folder** from the dialog box.
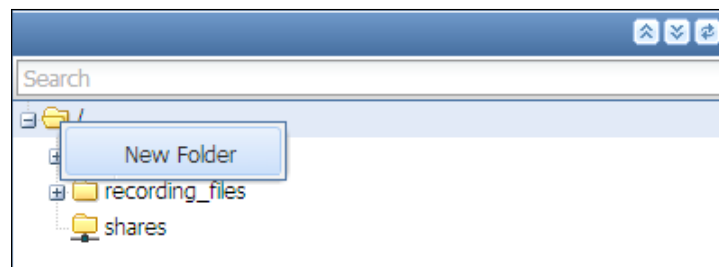
Figure 82.   New Folder Selection

4. Type a folder name in the **Name:** field. Do not use spaces or special characters.
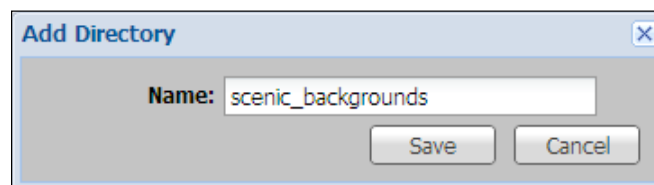
Figure 83.   Add Directory Dialog

5. Click **Save**. The new folder is added to the bottom of the file list. It automatically moves into alphabetical order within that level of folders the next time the page or the **File Directory** panel is refreshed.

Copying or Moving a File or Folder

Files can be moved or copied to or from internal storage folders, external (USB) storage, or network-attached storage drives (see **Add a Network Share** on page 136). Recordings can be copied, but not moved from the SMP 351 .

To move a file or folder from any folder shown in the file management list to another folder in the list:

1. In the **File Directory** panel, expand a folder if needed by clicking the adjacent **+**.

2. Select one or more files or folders: click on a single item to select one file or folder, or <Shift> + click on the first and last items in a range of adjacent files or folders to select several.

3. Click on the selected item or items and drag them to the destination folder. The item or items are moved to that location.

> **NOTE:** Whether you are moving or copying a file, a translucent notice appears near the pointer tool while it passes over potential destination files and folders. A small icon in the corner of the notice indicates whether the file can be placed in that destination. For example:
>
> - A red circle with a diagonal line through it indicates that the file cannot be copied or moved to itself.
> - A green circle with a white arrow inside it indicates that the file can be moved to the folder.
> - A small directory icon indicates that the file will be moved or copied to that location within the directory tree.

To copy a file or folder from any folder shown in the list to any folder in the list:

1. In the `File Directory` panel, click the **+** adjacent to a folder to expand it if needed to locate the desired file or folder.

2. Select one or more files or folders: click on a single item to select one file or folder, or <Shift> + click on the first and last items in a range of adjacent files or folders to select several.

3. Press <Ctrl> while clicking on the selected items and drag them to the destination folder (<Ctrl> + click + drag). The item or items are copied to that location.
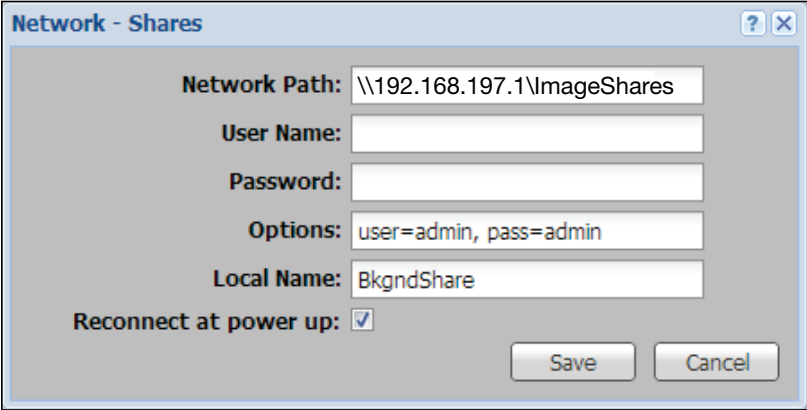
Add a Network Share

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.

To add a network share for the SMP 351 to access:

1. Click the `File Management` tab at the top of the SMP 351 embedded Web page.

2. Click **Network Shares** at the bottom of the page. A `Network-Shares` dialog box opens.

3. In the `Network - Shares` dialog enter the appropriate information as follows:

Figure 84.   Network - Shares Dialog

- **Network Path:** — An entry is required in this field. Enter the network path or URL in one of the following forms:
  `\\share_IP_address\share_name\optional_directory` or

  `\\ServerHostName\SharedFolderName`

  For additional information on the network path format, options, and allowed characters, click the **?** button in the upper right corner of the `Network - Shares` dialog, as shown.

- **User Name: and Password:** — Entries in these fields are optional and used only if a network share requires password log-in information. Use either these two fields OR the `Options:` field, not both.

- **Options:** — Entries in this field are optional and are used only if a network share requires password log-in information. The format is `user= username`, `pass= password`. Include a space between the user name and password entries. Use either this field OR the `User Name:` and `Password:` fields, but not both. They serve the same function.

- **Local Name:** — This field can be left blank or you can enter a descriptive name (without spaces or special characters), which appears in the list in the `Files` tab.

4. Click `Save` to save the information and add the network share to the files list. The `Network - Shares` dialog closes and the link to the new network share is listed in the `Shares` folder.
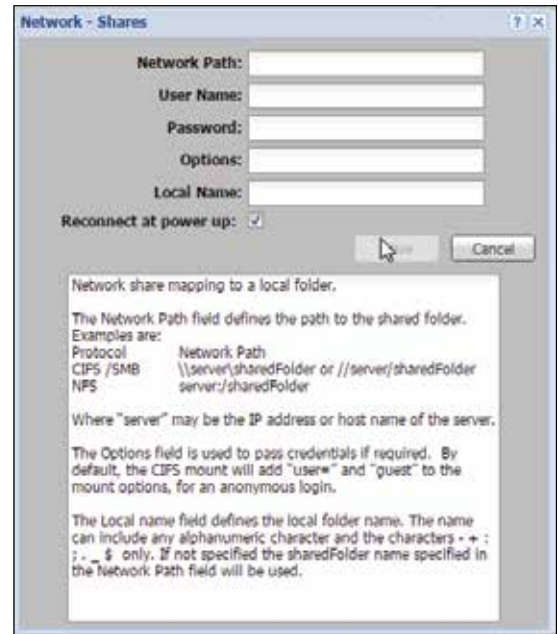
> **NOTE:** The `Shares` folder is is created automatically if it was not present before you added a network share.

To view the network path of the share after it has been added, right-click the name of the share and select `Shares Info` from the pop-up dialog box.

To remove a network share, right-click on the name of the share and select `Unmount share` from the pop-up dialog.

Upload Files to and Download Files From the SMP Using an SFTP Client

Automatic file uploading to a network location (see **Setting the default recording destination** on page 117 or **Scheduling with an Opencast server** on page 71), 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 `22022`) of the LAN port. For example, `sftp://192.168.194.28:22022`.

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

Troubleshooting Overview

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 85. **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 encoding 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 triggered alarms. The list can be sorted, filtered, or exported to a CSV file. Individual alarms can be cleared.

Diagnostic Tools — Provides a convenient way to test network connections using a ping utility or a trace route (tracert) function.

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 164) 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.

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

Figure 86. 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 (see **Setting the date and time** on page 113).

Logs

The `Logs` page within **Troubleshooting** displays a list (log) of alerts and notices for any event set up for any status other than **Disabled** in `Configuration` > `Alarms` and `Traps` > `Alarm Message` panels. 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.

| Recording Controls | Scheduled Events | Configuration | File Management | Troubleshooting | Help |

| Status | Logs | Alarms | Diagnostic Tools | System Resets |

The **Logs** page opens, showing filtering controls and the log list.
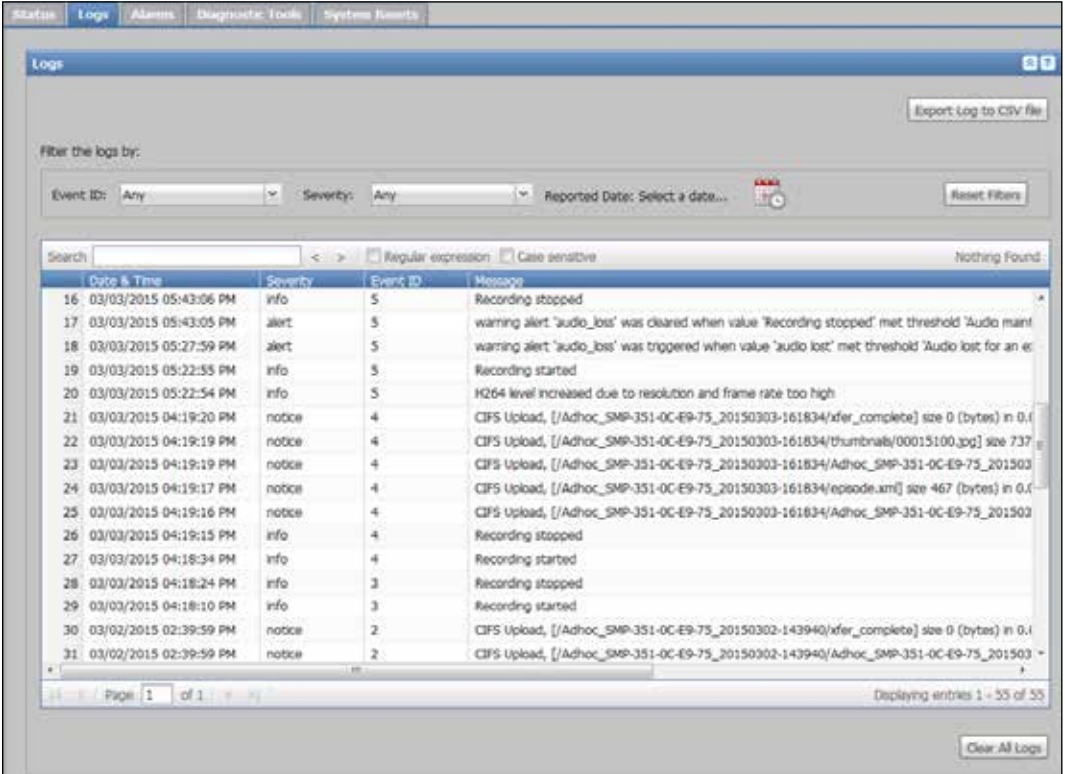
Figure 87. Troubleshooting, Logs Page

Sorting (ordering) log entries

By default the log entries are listed in chronological order with the most recent items at the top. The list can be sorted by date and time, severity, event ID number, or message type.

To sort the log, click on the corresponding column heading or hover the mouse pointer over the column heading, click the arrow that appears at the right side of the column, and select whether to sort the list in ascending or descending order.
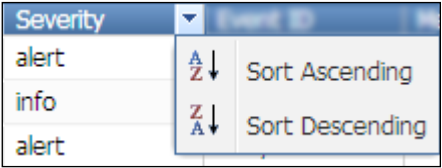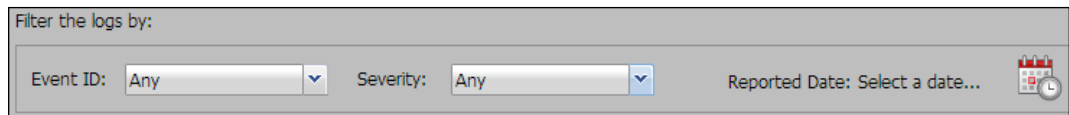
NOTE: Event ID is the database identification number of a scheduled recording event. The number appears in the event details within the **Scheduled Events** page.

To determine the event ID for a recording event, click the **Scheduled Events** tab, then locate and click on the event in the calendar. The ID number appears in the **Event Details** dialog box.

Filtering the logs

The log list can be reduced to a subset of entries using filters. Select options within the `Filter the logs by:` panel. The changes take place immediately upon selection of the option. Multiple filters can be applied.

To display entries for one particular recording event, select the desired event number from the **Event ID** drop-down list, or select **Any** to show all logs for all events.

To display logs of one specific level of severity, click **alert**, **info**, or **notice** from the **Severity** drop-down list, or select **Any** to show all logs of all severity levels.

Alarm Priority	Alarms and Traps Severity Level	Troubleshooting Log Severity Level	Comments
High	Notify	Alert	• Sends an e-mail to the specified recipient when the alarm is triggered • Displays the alert on the SMP 351 front panel. • Logs the alarm condition.
Normal	Display	Notice	• Displays the alert on the SMP 351 front panel. • Logs the alarm condition.
Low	Log	Info	• Logs the alarm condition

To restrict the list to a specific date, click on the **Reported Date: Select a date...** calendar icon and select a date from the pop-up calendar. Click anywhere outside the calendar to close the calendar.

Click **Reset Filters** to clear the filters. This is the only way to reset the date filter from one specific day to any day.

Searching for a log entry

To search for a specific log or for logs with specific characteristics:

1. Enter text (for example, "`Audio`") into the **Search** field. Log text matching that entry are highlighted in yellow.

2. If desired, select additional parameters by clicking the corresponding check box.

   • **Regular expression** — If this is selected,you can use "regular expression" (regex) characters and syntax to create more complex or advanced searches. Regex searches use standard characters and syntax and allow you to include some items and exclude others.

   • **Case sensitive** — If selected, the search results must match the capitalization of the text in the **Search** field.

3. Click the **Find Next Row** arrow (**>**) to the right of the **Search** field to move down to the next log row containing the search term or click the **Find Previous Row** arrow (**<**) to move back through the list to the previous row containing the term.

4. When you have finished searching, delete all text from the **Search** field to clear the search.

NOTE: To search multiple pages instead of just the current, visible page, first export the logs to a file (see the following page).

Exporting the log list to a file

To store a record of logged events as a file on a computer, click **Export Log to CSV file**. This creates a comma-delimited file of the log list and automatically downloads it to the default download folder on your computer.

Alarms

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

To open this page, click the **Troubleshooting** tab at the top of the SMP 351 embedded Web pages, then click the **Alarms** tab on the second tier of tabs.
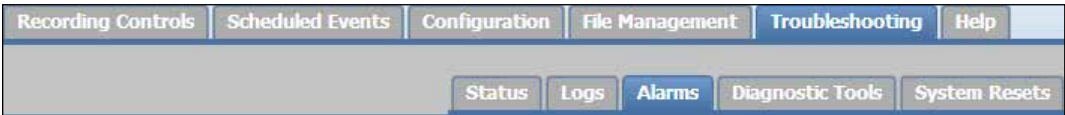
The `Alarms` page opens, showing filtering controls and the alarm history list.
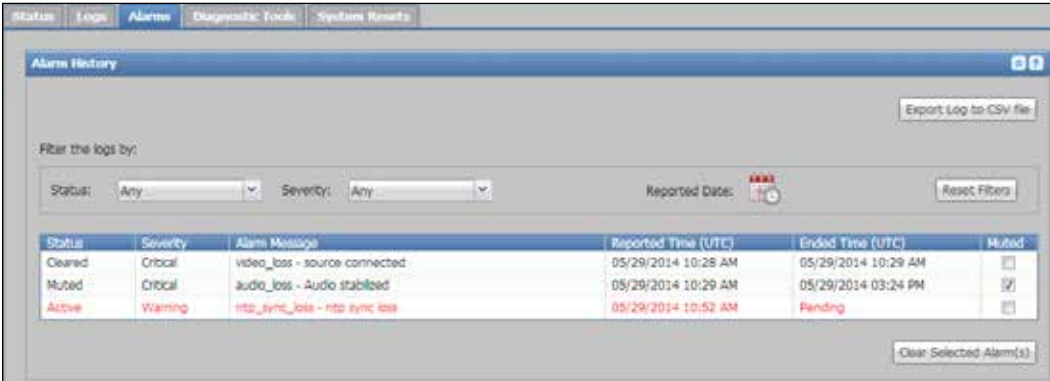
- Active, unresolved alarms are displayed as red text.

- 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.

Sorting (ordering) alarm entries
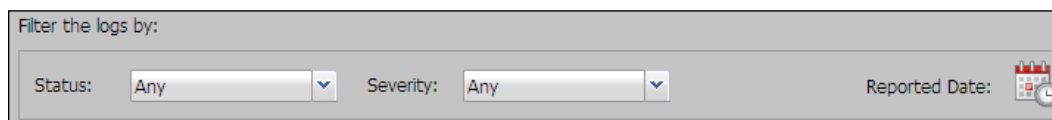
By default alarms are listed in chronological order with the most recent items at the top. The list can be sorted by status, severity, message type, date and time the alarm was reported, or ending time of the alarm.

To sort the list, click the corresponding column heading or hover the mouse pointer over the column heading, click the arrow that appears at the right side of the column, and select whether to sort the list in ascending or descending order.
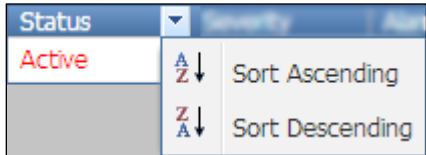
Filtering the alarm list

The alarms list can be reduced to a subset of entries using filters. Select options within the `Filter the logs by:` panel. Changes take place immediately upon selection of each option. Multiple filters can be applied at the same time.

To filter the list by status, select an option from the **Status** drop-down list:

- **Cleared** (resolved alarms)
- **Active** (unresolved alarms)
- **Any** (all alarms)

To filter the list by alarm severity, select an option from the **Severity** drop-down list:

- **Warning**
- **Critical**
- **Any** (all alarms)

To restrict the list to a specific date, Click the **Reported Date:** calendar icon ( ) and select a date from the pop-up calendar. Click anywhere outside the calendar to close the calendar.

Click **Reset Filters** to clear the filters. This is the only way to reset the date filter from one specific day to any day.
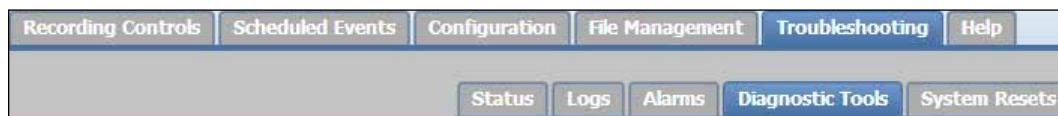
Exporting the log list to a file

To store a record of alarms as a file on a computer, click the **Export Log to CSV file** button. A comma-delimited file of the alarm list is created and automatically downloads to the default download folder on your computer.

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 system.

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

The `Diagnostic Tools` page opens, showing the **Diagnostic Tools** panel.

Figure 88. Troubleshooting, Diagnostic Tools

Ping Test

To test whether a particular device is connected to and communicating on a network, and how fast it is communicating, perform a ping test. This type of test sends an echo request ICMP packet to a designated IP address and "listens" for replies. Ping tests are used to determine whether a network share server is online, for example.

To perform a ping test on a device:

1. Enter the IP address for the device into the **Address to Ping:** field (see figure 88).

2. Click **Ping**.

   The results are displayed in a `Network Ping Results` dialog box (see figure 89 on the next page).

   • If there is no reply, the device is either not part of that network or is not communicating. It may be powered off or incorrectly configured.

   • If there is a reply, the device is connected and active. The reported time (the round trip time for the ping to be sent and received) gives an indication of how fast or slow the network connection is.

The dialog box displays the IP address, bytes transmitted, time to live (TTL), and the total time to send the ping and receive a reply.
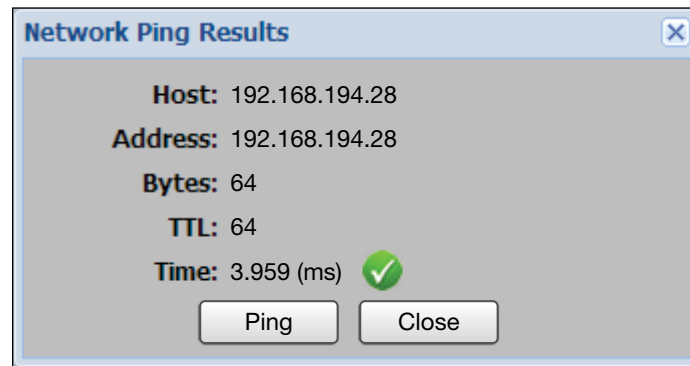
Figure 89. Network Ping Results Dialog

3. To retest the connection, click **Ping**. To finish the test and return to the `Diagnostic Tools` page, click **Close**.

Trace Route (Tracert) Test

Trace route follows the path to a destination IP address by sending a few packets of information in successive rounds with increasing time-to-live (TTL) values. It reports the network "hops" required to reach the IP address and how long the test took. Also, if the device at that IP address fails to respond, the trace route test reports the path of the last router that forwarded the test packets. This type of test is useful to determine where in the network the longest transmission delays occur or where the transmission fails.

To perform a trace route test:

1. Enter the IP address for the device you want to check into the **Address to Trace** field (see **figure 88** on page 144).

2. Click **Trace**. The test can take a full minute to process. Results display in the `Network Trace Results` dialog box.
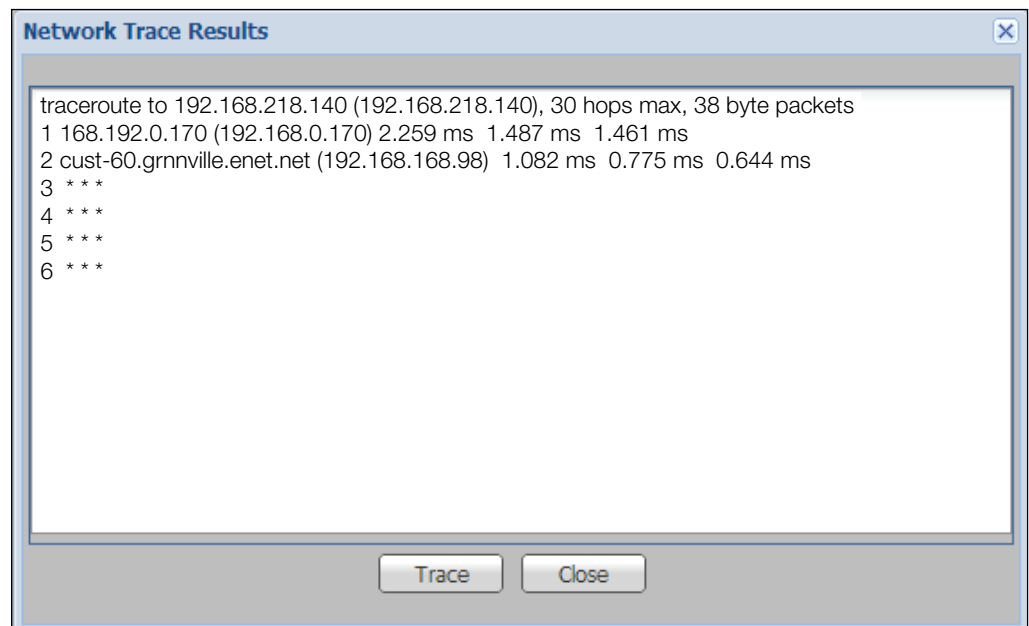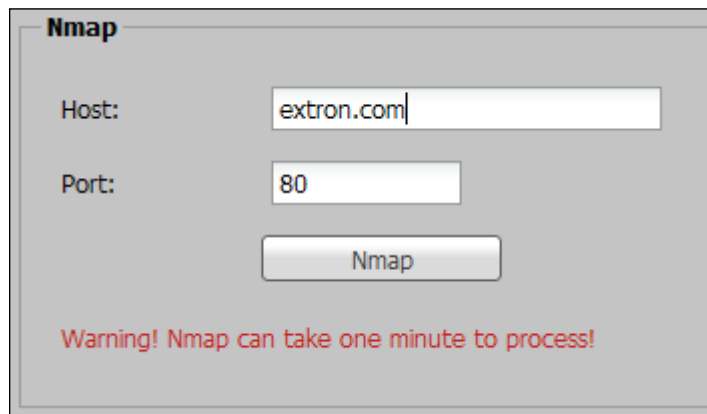
3. To retest the connection, click **Trace**. To finish the test and return to the `Diagnostic Tools` page, click **Close**.

Nmap network discovery test

Nmap is an open source tool for network discovery that determines if a host device is on a network, what the latency period is, what services the device runs on which port, and whether there are filters or firewalls preventing access to it. Details about Nmap are available at **http://nmap.org/** .

To perform an Nmap test:

1. Enter the URL or IP address for the desired host device into the **Host:** field (in **Diagnostic Tools > Nmap**).
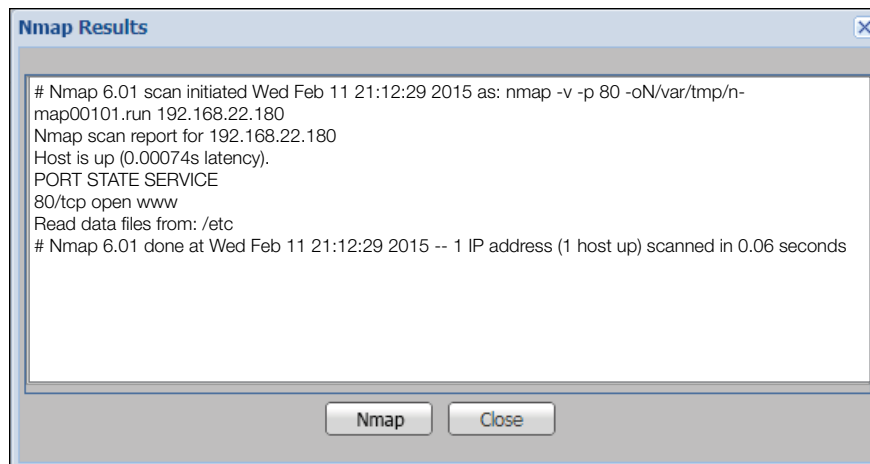
2. Click **Nmap**. The test may take a full minute to process.

Results are displayed in an `Nmap Results` dialog box.

3. To retest the connection click **Nmap**. To return to the `Diagnostic Tools` page, click **Close**.

Generating and retrieving a log file

For additional assistance troubleshooting an issue with the SMP 351 or with the network or system the SMP 351 is a part of, contact the Extron Technical Support Hotline. See **http://www.extron.com/company/contactus.aspx** for the phone number for your regional office. If additional information is needed to troubleshoot the problem, an applications engineer might request a log file.

To create and access this log file, do the following:

1. Click the **Troubleshooting** tab then click the **Diagnostic Tools** tab.
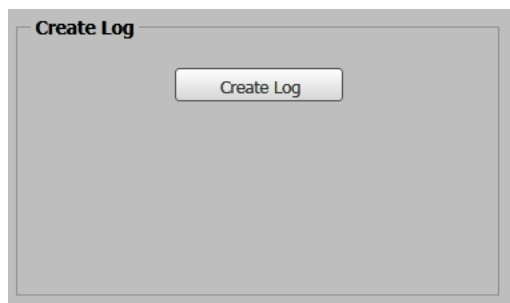
2. In the `Create Log` panel, click **Create Log**. The SMP 351 creates an encrypted file called "log_collector" containing details about the unit, its system settings, and lists of logs and alarms and stores it in the "debug" folder within the SMP 351.

    > **NOTE:**   You might not receive any feedback that the file has been created.

3. Verify that the log file was created by clicking the **File Management** tab, expanding the debug folder in the file list, and looking for the log_collector file. If there is no file within the debug folder, repeat steps 1 and 2. If the log_collector file was created and stored, proceed to step 4.

4. Open an SFTP client program and use it to access and copy the log_collector file from the SMP 351 debug folder to your computer (see **File Management** on page 129).

5. If needed, e-mail the log file to the Extron support representative.

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.
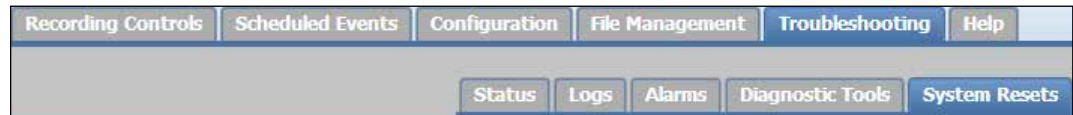
The `System Resets` page opens to the `Reset` pane.
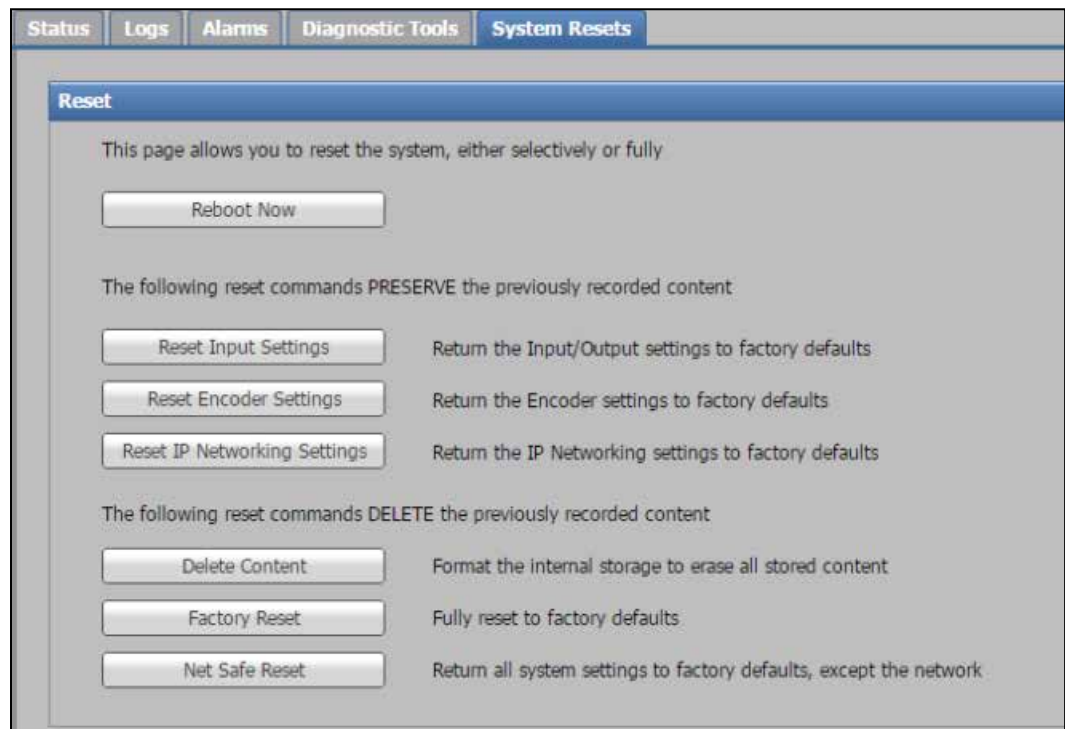
Figure 90. System Resets Page

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 **Setting the IP address, port numbers, and other network settings** on page 115).

Flex I/O Applications

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

- **About the FlexOS App - Digital I/O Configurator**
- **Access the Application**

When an app is downloaded and installed (see **Advanced Features** on page 125), a user must have administrator privileges to access the Advanced Features page and to use these applications. The apps are available on the SMP 351product 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.

Below are basic instructions on how to use the Digital I/O Configuration plug-in application (app) available for the SMP 351 once it has been downloaded and installed. A user must have administrator privileges to access the Advanced Features page of the SMP 351 embedded Web pages and to use this application.

Access the Application

To access the Digital I/O Configuration app:

1. Open the SMP 351 embedded Web pages:

    a. Open a Web browser.

    b. Enter the SMP 351 IP address into the address field and navigate to the unit. If no passwords are set for the unit, the embedded Web pages open automatically to the `Recording Controls` page. If one or more passwords are set for the SMP 351 , a dialog box opens and prompts the user to enter a user name and password.

    c. If necessary, enter an administrator level user name and password.

    d. Click **Log In** or **OK**. The SMP 351 embedded Web page opens to the `Recording Controls` page.

2. Click the **Configuration** tab at the top of the SMP 351 embedded Web pages.

3. Click the **Advanced Features** tab on the second tier of tabs. 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 to the `Browser Client` and `Apps` panes.

4. Within the `Apps` pane, click the **Configure** button corresponding to the Digital I/O application in the Actions column. The application opens in a new window.

Configuring and Labeling the Digital I/O Ports

To configure the ports:

1. Within the `Apps` panel of the `Advanced Features` page, click **Configure** in the row for the app named "Digital I/O". The `Configure Digital I/O` window opens, with the **Config** tab selected. The table contains one row for each of the four digital I/O ports on the SMP 351 (see image below).
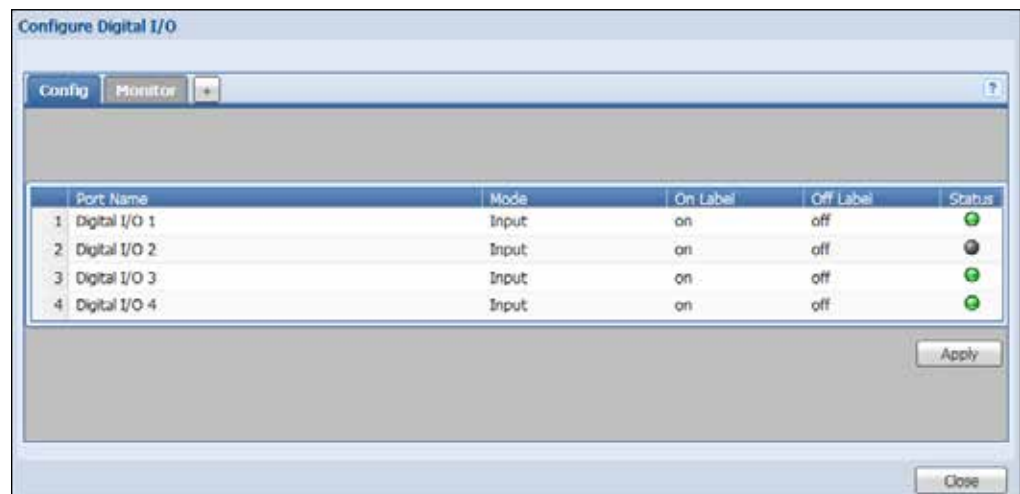
2. Change the settings and labels for each port as desired:

   • **Port Name** — To change the port name, open the **Port Name** field by clicking in the **Port Name** column for the desired port, then edit or replace the existing text.

   • **Mode** — To change the digital input/output mode, click in the **Mode** column for the desired port to activate the drop-down list, then select an option: **Output**, **Input**, **Input with Pull-up**, or **Output with Pull-up**.

   • **"On" state label** and **"off" state label** — By default, when a digital I/O port is active (on, closed), it is labeled as "**on**", and when it is inactive (off, open), it is labeled as "**off**". To change the labels for the on and off states, open the text editing field by clicking in the appropriate column (**On Label** or **Off Label**), then edit or replace the existing text.

For example, "**on**" could be replaced by "**press**" or "**start**", and "**off**" could be replaced by "**release**" or "**stop**" if that port is connected to a push-button control.

	Port Name	Mode	On Label	Off Label	Status
1	light control	Output	on	off	⬤
2	Pushbutton recording control	Input	Start	Stop	🟢
3	Digital I/O 3	Input with Pullup	on	off	🟢
4	Digital I/O 4	Output with Pullup	on	off	🟢

Apply

> **NOTE:** The current state of each port is indicated by an LED icon in the Status column for your reference. A green icon indicates that the port is on, a black icon indicates the port is off.

3. Click **Apply** to save the port settings.

4. If you want to create condition monitors for these ports, proceed to the instructions below. If you are finished with configuration and do not want to create condition monitors, click **Close**. In the `Save Changes?` dialog box, click **Yes** to save the configuration.

Monitoring the Digital I/O Ports and Other Conditions

A monitor consists of a set of 1 to 3 conditions that must be met at the same time and 1 to 3 actions that the unit takes when all the listed conditions are met. Conditions include states of each I/O port, the recording mode, various mute states, and system alarms. Actions the unit can take when the conditions are met include changing the output port state, changing the recording mode, muting and unmuting audio or video, changing inputs, swapping video channels, and inserting chapter markers.

You can create up to a total of 16 monitors. For each condition, such as a single I/O port, create different monitors for each state (such as On or Off). If you assign multiple states of the same condition to a single monitor, the states conflict and the monitor will not work as desired. The best practice is to create one monitor per state. For example:

•   Monitor 1 conditions: Digital I/O 2 = **On**
    Monitor 1 actions: Record Mode = Record, A/V Mute = **Off**

•   Monitor 2 conditions: Digital I/O 2 = **Off**.
    Monitor 2 actions: Record Mode = **Stop**

To create monitors:

1. From within the digital I/O configuration app, click the **Monitor** tab. You are prompted to either save (click **Yes**) or discard (click **No**) any changes made within the `Config` page. The `Monitor` page (shown below), allows you to select up to three specific conditions for the SMP 351 to monitor and up to three actions for the unit to take when the conditions occur.

2. For each condition, select a condition from the drop-down list on the left, then select the appropriate state from the drop-down list on the right. Options for conditions and states are listed in the following table.

Conditions	States or Options	Notes
`Digital I/O` *n*	`On`	
	`Off`	
	`Inactivity >`	0 to 600 minutes
	`Inactivity <`	0 to 600 minutes

`Record Mode`	`Recording`
	`Stopped`
	`Paused`	

`Audio Mute Channel A`	`On` `Off`	
`Audio Mute Channel B`	`On` `Off`	
`Video Mute Channel A`	`On` `Off`	
`Video Mute Channel B`	`On` `Off`	
`A/V Mute`	`On` `Off`	

`Active Alarm`	`Audio Loss`
	`Disk Space`
	`Disk Error`
	`HDCP Video`
	`Record Halt`
	`Video Loss`	

`Inactive Alarm`	`Audio Loss`
	`Disk Space`
	`Disk Error`
	`HDCP Video`
	`Record Halt`
	`Video Loss`	

3. By default, the SMP 351 monitors only the first condition (condition 1). To have the unit monitor conditions 2 or 3, select (check) the check box adjacent to each desired condition. If you set up condition 2 or condition 3 but decide not to monitor it, deselect the corresponding check box. Condition 1 and action 1 are automatically selected and cannot be deselected or deactivated.

> **NOTE:** All selections for condition or action 2 or 3 are cleared once its check box is deselected. Re-selecting the check box does not restore the previously selected choices for the condition or action.

4. Set up the action or actions the SMP 351 will take when it detects all the monitored conditions. To do so, select an action from the drop-down list on the left, then select the appropriate state from the drop-down list on the right. Options for actions and states are listed below.

Actions	States or Options	Notes

`Digital I/O n`	`On`
	`Off`
	`Pulse`
	`Toggle`
		This is only an option if the digital I/O port is set for output, or output with pull-up.

`Record Mode`	`Record`
	`Stop`
	`Pause`
	`Extend by 10 minutes`
		Identical to the AV Controls panel options (see **AV Controls Panel** on page 54)

`Audio Mute Channel A`	`On` `Off`	
`Audio Mute Channel B`	`On` `Off`	
`Video Mute Channel A`	`On` `Off`	
`Video Mute Channel B`	`On` `Off`	
`A/V Mute`	`On` `Off`	

`Input Switch`	`1`
	`2`
	`3`
	`4`
	`5 (3G-SDI model only)`
		Select the number of the input to switch to.

`Swap`		Swap video from channel A and channel B.
`Chapter Marker`		Insert a chapter marker into the recorded video.

5. By default, the SMP 351 applies only the first action (action 1). To apply action 2 or 3, select (check) the check box adjacent to each desired action.

6. Click **Apply** to save the configuration.

> **NOTE:** An error is returned if attempting to save a monitor without at least one condition and one action.

7. To have the SMP monitor an additional combination of conditions, click the **+** tab. A new **Monitor *n*** tab is created.

8. Click the **Monitor *n*** tab. The Monitor *n* page opens.

9. Configure the new monitor as described in steps 1-6.

10. If desired, rename the monitor:

    a. Double-click on the **Monitor *n*** tab. A field replaces the tab label.

    b. Edit or type in text as desired.

    c. Click outside the tab. The new text replaces the default text on the tab. Only about 11 characters appear on the tab.

11. If desired, create additional monitors for a total of up to 16 monitors.

12. When you are finished creating monitors, click **Close**. In the `Save Changes?` dialog box, click **Yes** to save and apply the monitors and configurations to the unit and to close the pop-up box.

> **NOTE:** Any monitor except monitor 1 can be deleted by clicking the "x" in the upper right corner of a monitor tab, then clicking `Yes` in the **Delete Monitor?** dialog box.
>
> If you do not want to use monitor 1, you can stop the application from running (Exit the application). In the `Configuration` > `Advanced Features` > Apps panel select **Stop** from the **Run State** drop-down list for that application, (see image below).
>
>
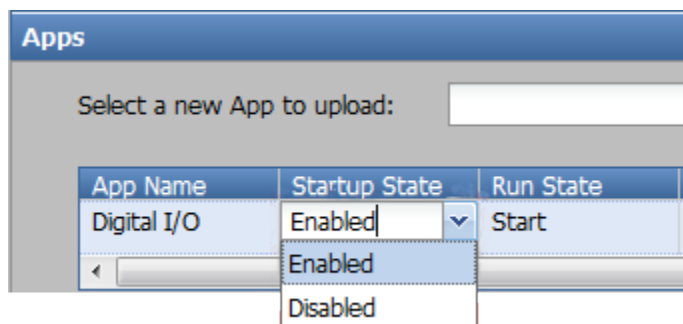
Set the Startup State for the Application

If desired, specify whether to run the application when the SMP starts up or upon reboot. You must do this within the SMP 351 embedded Web pages, in the `Configuration` > `Advanced Features` > `Apps` panel, not within the application.

To set the startup state for an application:

1. Click in the **`Startup State`** column of the `Apps` panel to access the drop-down list.

2. Select **`Enabled`** (default, run the app upon unit startup) or **`Disabled`** (do not run the app upon startup).

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**.

<u>RS-232 protocol defaults:</u>

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

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

<u>USB port details:</u>
The Extron USB driver must be installed before use (see **Front Panel Configuration Port** on page 157) .

<u>LAN port defaults:</u>

DHCP: `off`

SMP 351 IP address: `192.168.254.254`

Subnet mask: `255.255.Ø.Ø`

Gateway IP address: `Ø.Ø.Ø.Ø`

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 159).

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 186).

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 91.   Found New Hardware Wizard

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

3. Click `Next`.

The following dialog opens:
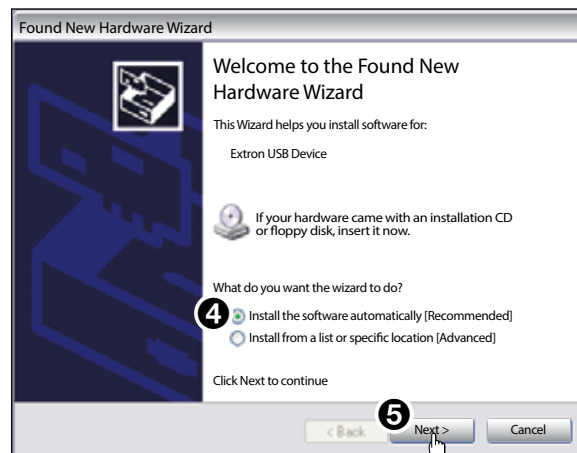
Figure 92.   Install the Software Automatically

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.

Pins:
1 2 3 4 5 6 7 8

Insert Twisted
Pair Wires

**RJ-45
Connector**

	Crossover Cable (for direct connection to a PC)			
	End 1		**End 2**	
Pin	**Wire Color**	**Pin**	**Wire Color**	
1	white-orange	1	white-green	
2	orange	2	green	
3	white-green	3	white-orange	
4	blue	4	blue	
5	white-blue	5	white-blue	
6	green	6	orange	
7	white-brown	7	white-brown	
8	brown	8	brown	
	T568B		**T568A**	

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

	Straight-through Cable (for connection to a switch, hub, or router)			
	End 1		**End 2**	
Pin	**Wire Color**	**Pin**	**Wire Color**	
1	white-orange	1	white-orange	
2	orange	2	orange	
3	white-green	3	white-green	
4	blue	4	blue	
5	white-blue	5	white-blue	
6	green	6	green	
7	white-brown	7	white-brown	
8	brown	8	brown	
	T568B		**T568B**	

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

Figure 93. **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 2014, Extron Electronics, SMP 351, V*n.nn*, 60—1324-01↵
Day, DD MMM YYYY HH:MM:SS↵

or

↵© Copyright 2014, Extron Electronics, SMP 351 3G-SDI, V*n.nn*, 60—1324-02↵
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 164. 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						Esc	1B	CR	ØD	LF	ØA
Space →	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(| 28 |)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	4Ø	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	5Ø	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	6Ø	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	7Ø	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	I	7C	}	7D	~	7E	DEL	7F

Figure 94. **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=00255. 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)

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 **178**)

X69 = Port timeout in tens of seconds (zero padded. Default: **ØØØ3Ø** = **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
2 = 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 = Recording drive
`Auto`
`Internal`
`usbfront/`*VOLUMEn*
`usbrear/`*VOLUMEn*

X543 = Filesize (in megaBytes)

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
`-1500` to `0`
full bars =`0`,
no bars = $\leq$`-600`
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 $\pm$ 512 of the default value for the detected rate

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

X607 = Active pixels: up to $\pm$ 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 = `0` = 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.

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
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 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 ↵ Iccn ↵	n=number of active IP connections. Verbose mode 3 returns Iccn
Set verbose mode	`Esc` `X22` CV ←	Vrb `X22` ↵	
View verbose mode	`Esc` CV ←	`X22` ↵	

System Commands
Backup/Restore

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
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

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
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.

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Absolute reset	`Esc` ZQQQ ←	Zpq ↵	Same as **System Reset**, plus returns the IP address and subnet mask to defaults.

Front panel lock (executive mode)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
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 `1024` or higher (unless resetting to the default port number or disabling the port by setting it to `0`).			
Telnet port			
Set Telnet port map	`Esc` `[port#]MT` ←	`Pmt[port#]` ↵	
Reset Telnet port map	`Esc` `23MT` ←	`Pmt00023` ↵	Reset the Telnet port to the default value (23).
Disable Telnet port	`Esc` `0MT` ←	`Pmt00000` ↵	
View Telnet port map	`Esc` `MT` ←	`[port#]` ↵	
Web port			
Set Web port map	`Esc` `[port#]MH` ←	`Pmh[port#]` ↵	
Reset Web port map	`Esc` `80MH` ←	`Pmh00080` ↵	Reset the Web port to the default value (80).
Disable Web port	`Esc` `0MH` ←	`Pmh00000` ↵	
View Web port map	`Esc` `MH` ←	`[port#]` ↵	
SNMP port			
Set SNMP port map	`Esc` `A[port#]PMAP` ←	`PmapA[port#]` ↵	
Reset SNMP port map	`Esc` `A161PMAP` ←	`PmapA00161` ↵	Reset the SNMP port to the default value (161).
Disable SNMP port	`Esc` `A0PMAP` ←	`PmapA00000` ↵	
View SNMP port map	`Esc` `A PMAP` ←	`[port#]` ↵	
SSH port			
Set SSH port map	`Esc` `B[port#]PMAP` ←	`PmapB[port#]` ↵	
Reset SSH port map	`Esc` `B22023PMAP` ←	`PmapB22023` ↵	Reset the SSH port to the default value (22023).
Disable SSH port	`Esc` `B0PMAP` ←	`PmapB00000` ↵	
View SSH port map	`Esc` `B PMAP` ←	`[port#]` ↵	
SSL port			
Set SSL port map	`Esc` `S[port#]PMAP` ←	`PmapS[port#]` ↵	
Reset SSL port map	`Esc` `S443PMAP` ←	`PmapS00443` ↵	Reset the SSL port to the default value (443).
Disable SSL port	`Esc` `S0PMAP` ←	`PmapS00000` ↵	
View SSL port map	`Esc` `S PMAP` ←	`[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.

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
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:SSCT←	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 Example:	`Esc`1CISG←	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`ØTC←	`X69`↵	
Set global IP port timeout	`Esc`1*TC←	Pti1*`X69`↵	
View global IP port timeout	`Esc`1TC←	`X69`↵	

Command	SIS Command (host to unit)	Response (unit to host)	Additional Description
RS-232 Port			
Configure serial port parameters	`Esc`1*`X25`,`X26`,`X27`,`X28`CP←	Cpn 1●Ccp`X25`,`X26`,`X27`,`X28`↵	
Reset serial port	`Esc`1*96ØØ,n,8,1CP ←	Cpn 1●Ccp`X25`,`X26`,`X27`,`X28`↵	
View serial port settings	`Esc`1CP ←	`X25`,`X26`,`X27`,`X28`↵	
Set serial receive timeout	`Esc`1*`X19`,`X20`,`X22`,`X21`CE←	CpnØ1●Cce`X19`,`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)	
`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 !	In X501 * 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	Esc X501 , X514 NI ←	Nmi X501 , X514 ↵	Set the input source X501 name to X514.
View input name	Esc X501 NI ←	X514 ↵	
View input selection per channel	32I	ChA X501 *ChB X501 ↵	
Input Configuration			
Input video aspect ratio			
Set to fill	Esc X501 *1ASPR ←	Aspr X501 *Ø1 ↵	Sets input X501 to fill.
Set to follow	Esc X501 *2ASPR ←	Aspr X501 *Ø2 ↵	Sets input X501 to follow.
Set to fit (zoom)	Esc X501 *3ASPR ←	Aspr X501 *Ø3 ↵	Sets input X501 to fit.
View aspect setting	Esc X501 ASPR ←	X49 ↵	View video aspect ratio of input X501.
Auto-Image and Memory			
Enable Auto-Image per input	X501 *1A	Img X501 *Ø1 ↵	Set input X501 to Auto-Image.
Disable Auto-Image per input	X501 *ØA	Img X501 *ØØ ↵	Disable input X501 Auto-Image.
View Auto-Image	X501 *A	X9 ↵	ØØ=Auto-Image disabled Ø1=Auto-Image enabled
Performs Auto-Image to current output	X502 A	Img X502 ↵	Performs Auto-Image to the current input selection of output X502.
Set Auto Memory on	Esc 1AMEM ←	Amem1 ↵	
Set Auto Memory off	Esc ØAMEM ←	AmemØ ↵	
View Auto Memory	Esc AMEM ←	X9 ↵	ØØ=Auto Memory disabled Ø1=Auto Memory enabled (default)

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 161)
X514	= Input name	Name (up to 16 characters) Default is "Input X" where "X" is the input number

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Audio			
View front panel audio level indictors	34I	`X581`↵ Verbose 2/3 mode: `Inf34*` `X581`↵	`left*right` Example: -58*-63
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	I	`<ChA` `X501` `* ChB` `X501` `> * <rec status> * <rec destination> * <free space in KBytes> * <time record> * <time remain>`↵	
View recording duration/elapsed time of recording	35I	`HH:MM:SS`↵	Verbose 2/3 mode: `Inf35*HH:MM:SS` Displays `ØØ:ØØ:ØØ` when not recording
View record time remaining	36I	`HH:MM:SS`↵	Verbose 2/3 mode: `Inf36*HH:MM:SS` Displays `ØØ:ØØ:ØØ` when not recording
View record destination	37I	`X542`↵	
Metadata commands			
Set output metadata	`Esc` M `X538` * `X539` RCDR←	`RcdrM` `X538` * `X539`↵	
Example:	`Esc` M2*ProfessorXRCDR←	`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 **171**.
- `X539` = Metadata value — 127 alpha-numeric characters. All metadata values are cleared to be ready for the next recording session when the next recording is initiated.
- `X540` = Recorder status — Ø=stop / 1=record / 2=pause
- `X541` = Time — MM (0 to 99 minutes)
- `X542` = Selected recording drive — `Auto` / `Internal` / `usbfront`/*VOLUMEn* / `usbrear`/*VOLUMEn*
- `X581` = Front panel audio level — `left*right` (see page **155**)

NOTE: 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
User Presets			
Recall user preset	1 * X502 * X530 .	1Rpr X502 * X530 ↵	Set channel X502 to preset number X530.
Save user preset	1 * X502 * X530 ,	1Spr X502 * X530 ↵	
Set user preset name	Esc 1 * X530 , X531 PNAM ←	Pnam1 * X530 , X531 ↵	Set preset number X530 to name X531.
View user preset name	Esc 1 * X530 PNAM ←	X531 ↵	
View user presets	52 * X501 #	X9¹ X9² X9³... X9¹⁶ ↵ PreU X501 X9¹ X9² X9³... X9¹⁶ ↵	Verbose mode 1 Verbose mode 2/3
Input Presets			
Recall input preset	2 * X502 * X532 .	2Rpr X502 * X532 ↵	Recall input preset X532 per channel X502.
Save input preset	2 * X502 * X532 ,	2Spr X502 * X532 ↵	
Set input preset name	Esc 2 * X532 , X531 PNAM ←	Pnam2 * X532 , X531 ↵	Set preset number X532 to name X531.
View input preset name	Esc 2 * X532 PNAM ←	X531 ↵	
Delete input preset	Esc X2 * X532 PRST ←	PrstX2 * X532 ↵	
View input presets	51#	PreI X9¹ X9² X9³... X9¹²⁸ ↵	Verbose mode 2/3.
Encoder Presets			
Recall encoder preset	4 * 1 * X530 .	4RprØ1 * X530 ↵	Recall preset number X530.
Save encoder preset	4 * 1 * X530 ,	4SprØ1 * X530 ↵	
Set encoder preset name	Esc 4 * X530 , X531 PNAM ←	Pnam4 * X530 , X531 ↵	Set encoder preset number X530 to name X531.
View encoder preset name	Esc 4 * X530 PNAM ←	X531 ↵	
Reset encoder preset to default	Esc X4 * X530 PRST ←	PrstX4 * X530 ↵	
Layout Presets			
Save layout preset	7 * X530 ,	7Spr X530 ↵	Save layout preset to X530.
Recall layout preset	7 * X530 .	7Rpr X530 ↵	Recall layout preset X530 including input selections.
Recall layout preset	8 * X530 .	8Rpr X530 ↵	Recall layout preset X530 without input selections.
Set layout preset name	Esc 7 * X530 * X531 PNAM ←	Pnam7 * X530 , X531 ↵	Set X530 to X531.
View layout preset name	Esc 7 * X530 PNAM ←	X531 ↵	
Reset layout preset to defaults	Esc X7 * X530 PRST ←	PrstX7 * X530 ↵	Reset X530 to defaults

NOTES: X9 = Assigned or unassigned   Ø=disabled or unassigned
                                           1=enabled or assigned
           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 pixel phase 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 value	`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*`X607`APIX←	`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*`X606`ALIN←	`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	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	Ø to 127, default: 64	
`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.	
`X612` = Horizontal size	12Ø to 4Ø96	

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Vertical Centering			
Specify a value	Esc 1 * X502 * X611 VCTR ←	Vctr X502 * X611 ↵	Set vertical centering to X611.
Increment value	Esc 1 * X502 + VCTR ←	Vctr X502 * X611 ↵	Shift window down.
Decrement value	Esc 1 * X502 – VCTR ←	Vctr X502 * X611 ↵	Shift window up.
View	Esc 1 * X502 VCTR ←	X611 ↵	View current setting.
Vertical size			
Specify a value	Esc 1 * X502 * X613 VSIZ ←	Vsiz X502 * X613 ↵	Set vertical size (height) to X613.
Increment value	Esc 1 * X502 + VSIZ ←	Vsiz X502 * X613 ↵	Increase the height of the window.
Decrement value	Esc 1 * X502 – VSIZ ←	Vsiz X502 * X613 ↵	Decrease the height of the window.
View	Esc 1 * X502 VSIZ ←	X613 ↵	View current setting.
Video Mute			
Mute output to black	X502 * 1B	Vmt X502 * Ø1 ↵	Mute channel X502 output.
Unmute output	X502 * ØB	Vmt X502 * ØØ ↵	Unmute channel X502 output.
View video mute status	X502 B	X9 ↵	ØØ=unmuted Ø1=muted
EDID Minder			
Assign EDID to specific input	Esc A X501 * X68 EDID ←	EdidA X501 * X68 ↵	X501 = video inputs 1, 2, and 4 X68 = See the **EDID Values** table on page 178)
View EDID assignment	Esc A X501 EDID ←	X68 ↵	
Import EDID to user location	Esc I X67 ,[*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	Esc S X502 * X67 EDID←	EdidS X502 * X67 ↵	Save output X502 EDID to user slot X67.
Export EDID in binary format	Esc E X68 ,[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 178)
	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.
	X613 = Vertical size	64 to 4Ø96

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				

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` `*1STRC` ←	`Strc` `X500` `*1` ↵	Enable stream `X500`.
Stream disable	`Esc` `X500` `*ØSTRC` ←	`Strc` `X500` `*Ø` ↵	Disable stream `X500`.
View stream setting	`Esc` `X500` `STRC` ←	`X9` ↵	1=enabled Ø=disabled
Record Enable/Disable			
Record enable	`Esc` `X1*1RCDR` ←	`Rcdr X*1` ↵	Enable recording.
Record disable	`Esc` `X1*ØRCDR` ←	`Rcdr X*Ø` ↵	Disable recording.
View record setting	`Esc` `X1RCDR` ←	`X9` ↵	1=enabled Ø=disabled
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` ↵	
Group of Pictures (GOP) Length			
Set GOP length	`Esc` `1*` `X45` `GOPL` ←	`Gopl1*` `X45` ↵	Set GOP length to `X45`.
View GOP length	`Esc` `1GOPL` ←	`X45` ↵	

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
2ØØ to 1ØØØØ

`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

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Record resolution and frame rate			
Set record resolution	`Esc` 1 * `X46` VRES ←	`Vres1*``X46`↵	Set record resolution to `X46`.
View record resolution	`Esc` 1 VRES ←	`X46`↵	
Set record frame rate	`Esc` 1 * `X47` VFRM ←	`Vfrm1*``X47`↵	Set record frame rate to `X47`.
View record frame rate	`Esc` 1VFRM ←	`X47`↵	
View record resolution and frame rate	33I	`<Horz resolution>*<Vert resolution>``*<Frame rate>`↵	
View current recording information	1 * I	`Inf*<ChA`​`X502`​`*ChB`​`X501`​`>*<`​`X50`​`>``*<`​`X47`​`>* <`​`X543`​`>*<`​`X43`​`>`↵	
Preview output refresh rate			
Set preview output refresh rate	`Esc` `X48` RATE ←	`Rate``X48`↵	Set preview output to `X48`. (50 Hz or 60 Hz)
View output refresh rate	`Esc` RATE ←	`X48`↵	

NOTES:

`X43` = Video bit rate — 2ØØ to 1ØØØØ

`X46` = Record resolution (short)
```
-1=other
1=48Øp
2=72Øp
3=1Ø8Øp
```

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

`X48` = Output refresh rate
```
1=6Ø Hz (default)
2=5Ø Hz
```

`X50` = Record resolution (full)
```
Custom
848x48Ø
1Ø24x768
128Øx72Ø
128Øx1Ø24
192Øx1Ø8Ø
```

`X501` = Input number — 1 to 5

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

`X543` = File size — File size in MB

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` `←`	`HdcpE` `X501` `*` `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` `N` `HDCP` `←`	`X512` `↵`	
Background Image			
Select background filename	`Esc` *filename* `RF` `←`	`Imr` *filename* `↵`	
View background filename	`Esc` `RF` `←`	*filename* `↵`	
Mute background image	`Esc` `Ø` `RF` `←`	`ImrØ` *filename* `↵`	

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 155)

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` ↵	Set audio delay (Ø to **999** msec).
View	`Esc` 1 ADLY ←	`X564` ↵	View audio delay value.
Audio Mute			
Mute audio channel	`Esc` M `X506` *1AU ←	`DsM` `X506` *1 ↵	Mute audio channel `X506`.
Unmute audio channel	`Esc` M `X506` *ØAU ←	`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*1ØØAU ←	`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 4ØØØØAU ←	`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 **155**.
	`X507` = Audio level	Audio level in 0.1 dB steps (-**18Ø** to **24Ø** = -**18.Ø** to +**24.Ø** dB)
	`X564` = Audio delay	Ø to **999** ms (default Ø ms)

Reference Information

This section provides information about:

- **Mounting the SMP 351**
- **Supported File Types, Drive Formats, Browsers, and Browser Plugins**
- **DataViewer**
- **Glossary**

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 may be used for on-screen displays.

Recording File Types

• mp4 (including mp4, 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.

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

• 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)

> **NOTES:**
> • Google Chrome is the preferred browser for a Windows-based computer platform.
> • 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 the 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.
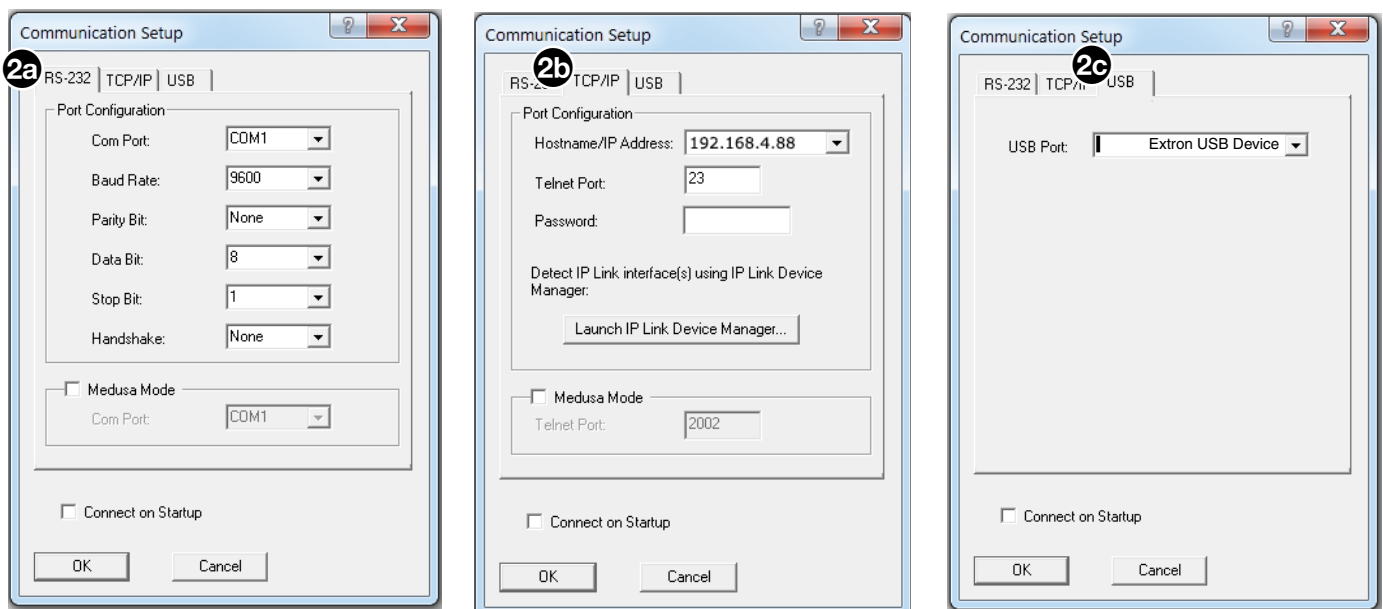
Figure 95. Communications Dialogs

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 186) and follow the steps to connect to the SMP 351 via TCP/IP.

3. On the `Communication Setup` window (see figure 86 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 window 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.
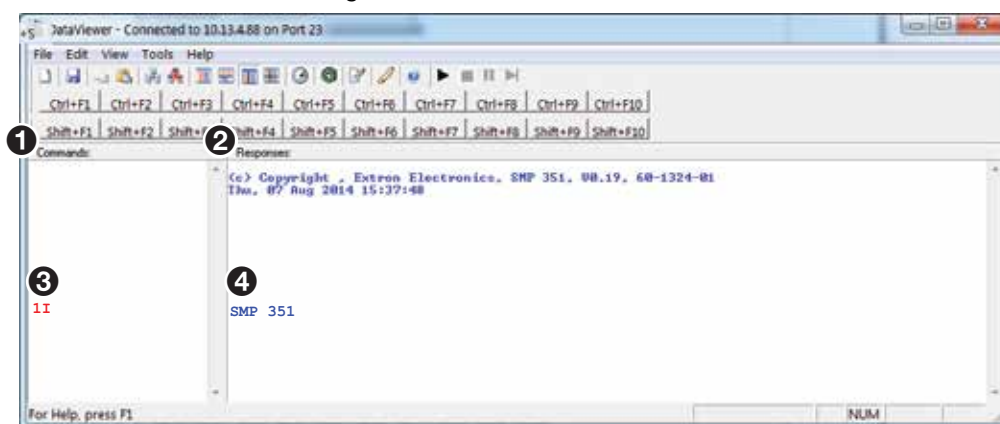
Figure 96.   Enter Commands and View Responses

6. Use the **Commands** field to enter SIS commands (see figure 96, ❶). View the responses in the **Responses** field (see figure 96, ❷).

   For example, enter **1I**, the command to display the model name, in the **Commands:** field (see figure 96, ❸). The **Responses:** field (see figure 96, 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	`Ø.Ø.Ø.1` to `127.255.255.254`	*NNN.HHH.HHH.HHH*
Class B	`128.Ø.Ø.1` through `191.255.255.254`	*NNN.NNN.HHH.HHH*
Class C	`192.Ø.Ø.1` through `223.255.255.254`	*NNN.NNN.NNN.HHH*
NOTES:		

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

Private and Public Address Ranges

Within each of the 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.

- `1Ø.Ø.Ø.Ø – 1Ø.255.255.255`
- `172.16.Ø.Ø – 172.31.255.255`
- `169.254.Ø.Ø – 169.254.255.255`
- `192.168.Ø.Ø – 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.Ø.Ø.Ø – 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 page 188 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	2Ø8.132.18Ø.41	255.255.255.Ø
Device 2	2Ø8.132.18Ø.42	255.255.255.Ø
Device 3	2Ø8.132.18Ø.43	255.255.255.Ø

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

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

Device	IP Address	Subnet Mask
Device 1	2Ø8.132.18Ø.41	255.255.255.Ø
Device 2	192.157.18Ø.42	255.255.255.Ø
Device 3	2Ø8.132.18Ø.41	255.255.255.Ø

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 (see **Ping Test** on page 144) 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 143).

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 2Ø8.132.18Ø.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 2Ø8.132.18Ø.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 189 and **What is an IP Address?** on page 188 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	192.168.254.1Ø	239.199.188.138	1234Ø 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	192.168.254.1Ø	239.199.188.138	1234Ø
SMP2	192.168.254.11	239.199.188.139	1234Ø
SMP3	192.168.254.12	239.199.188.14Ø	1234Ø

To change the SMP 351 port number for multicast pull streaming, see **Configure Streaming** on page 97.

> **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 (see **Configure Streaming** on page 97).

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 31.

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.
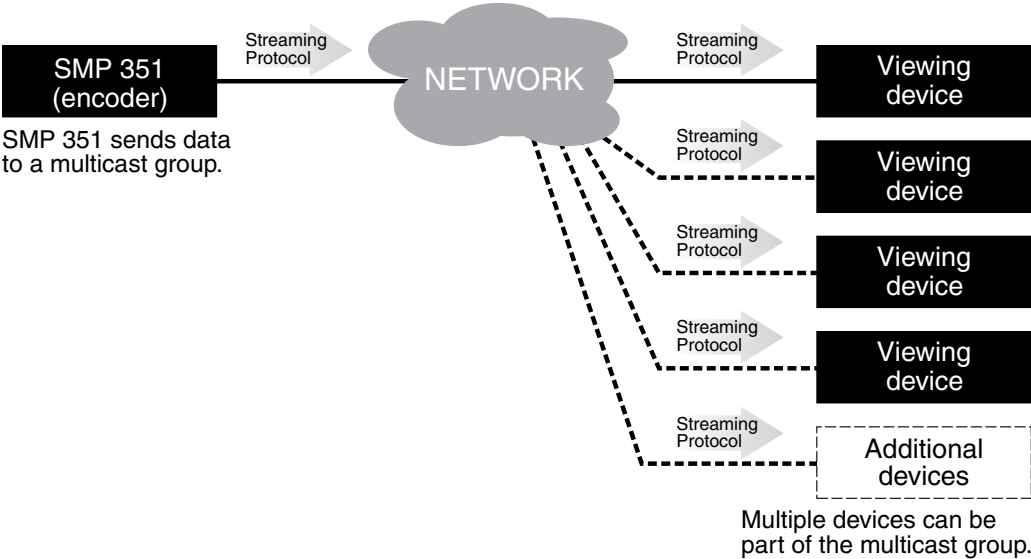
Figure 97. Multicast Streaming

> **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.
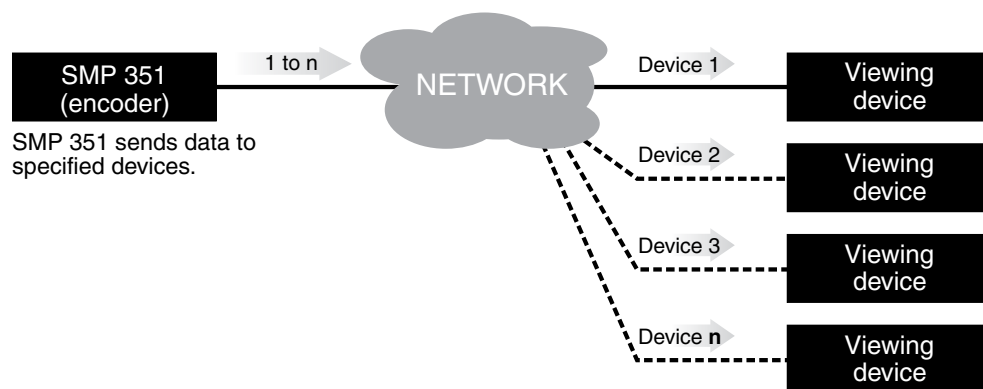
Figure 98. **Unicast Streaming**

> **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).
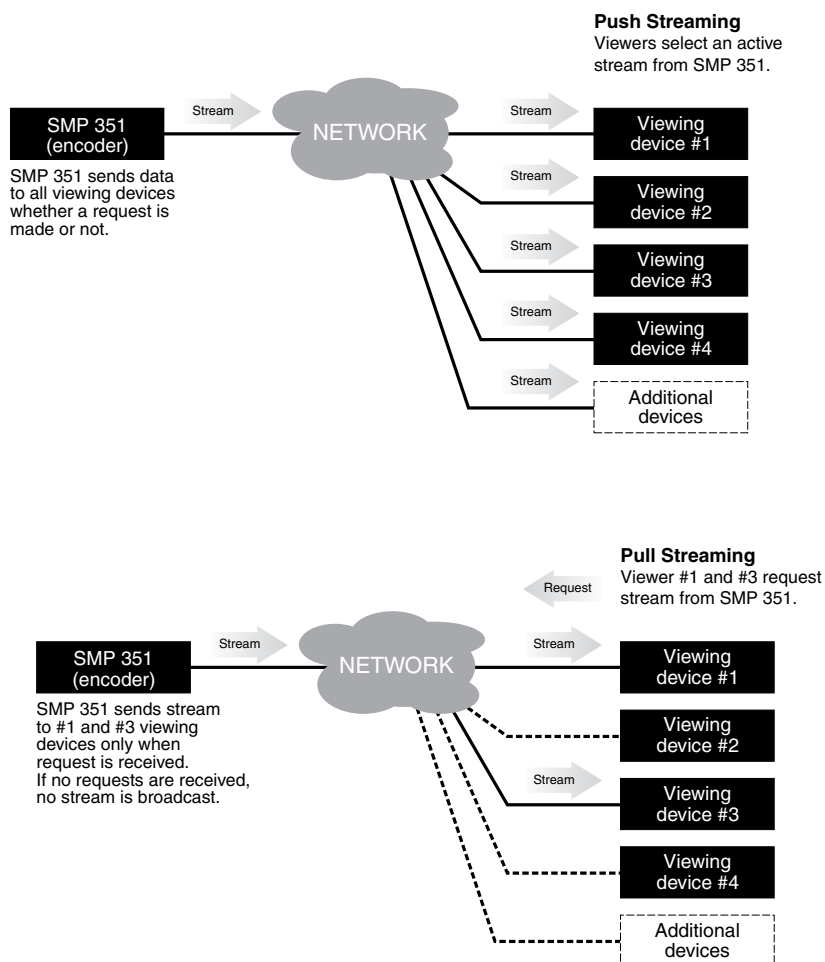
Figure 99. Push and Pull Streaming

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** on page 198). 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 (see **Configure Streaming** on page 97).
- `UDP://@:DESTINATION_PORT` default is `UDP://@:1234Ø` .
- 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 encode 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**
848 x 480 @ 15	1500	40
1024 x 768 @ 15	2500	32
1280 x 1024 @ 30	3500	29
1280 x 720 @ 30	5000	23
1920 x 1080 @ 30	8000	16

> **NOTE:** 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 = Unicast RTP`
> - `Confidence Pull Streaming Method = Unicast RTP at default setting`

Push Stream Method

The number of push unicast streams is one per encode (the SMP 351 has two encodes, 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 48).

> **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 195), the box displays the URL necessary to request a stream from the SMP 351. Note the full URL for later reference.
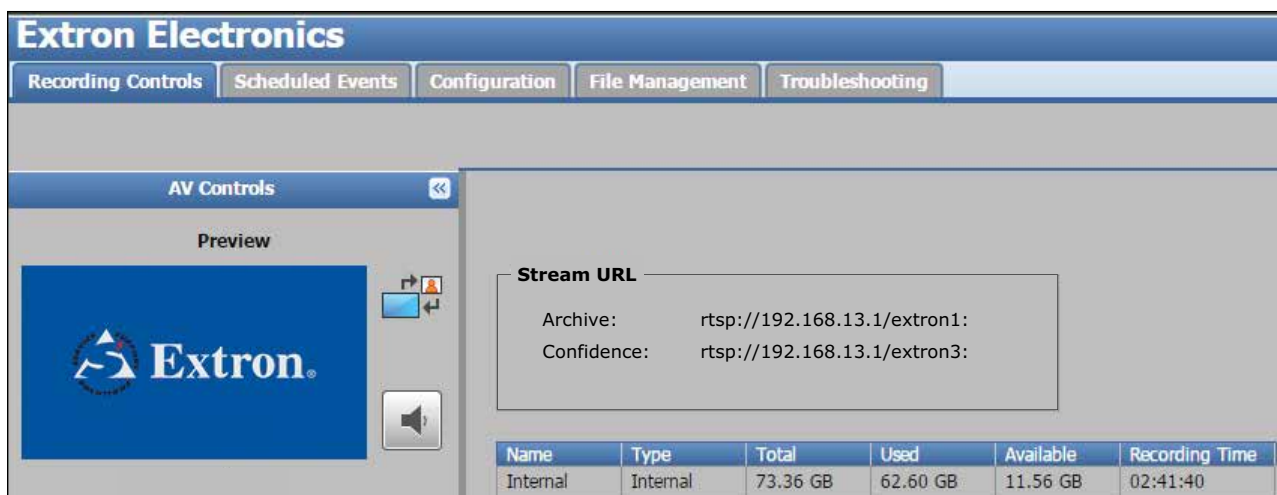
Figure 100. Recording Controls Page

3. Run the VLC media player.

4. The media player opens. Select **`Media > Open Network Stream`** (see figure 101).
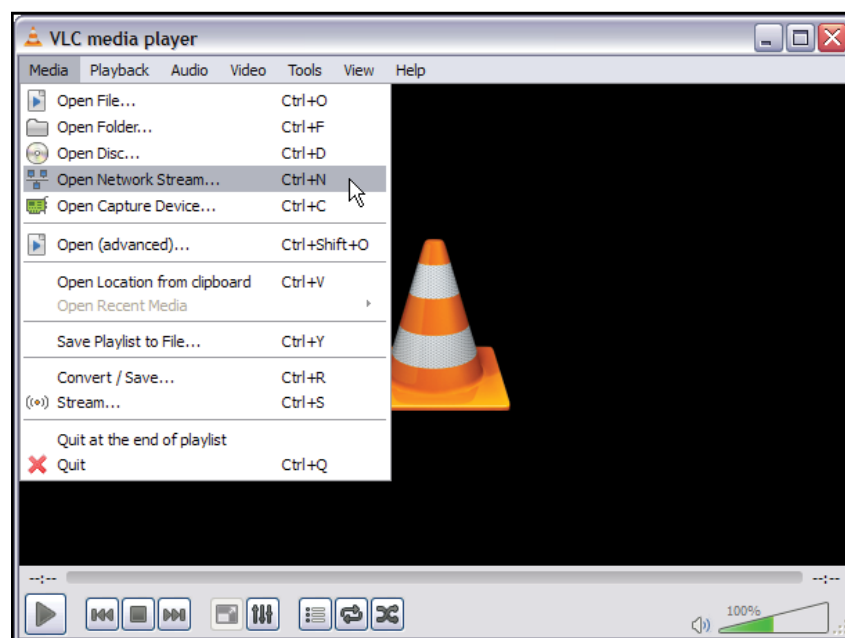
Figure 101. VLC Media Player — Open a Network Stream

5. The `Open Network Media` dialog box opens. Enter the stream URL that was noted in step 2 on the previous page, in the **Please enter a network URL:** field (❶).
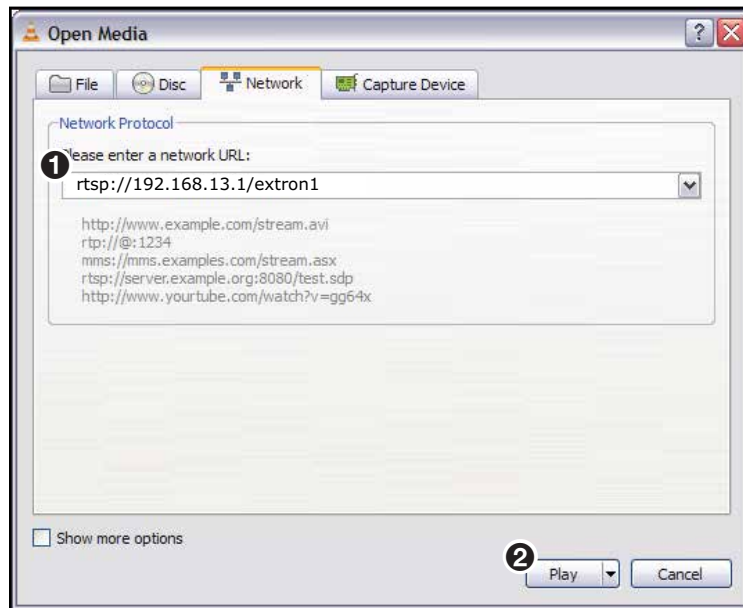
Figure 102.   Enter Stream URL Information and Play

6. Click **Play** (❷). After a few seconds, the media streaming from the SMP 351 is begins playing 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 103).
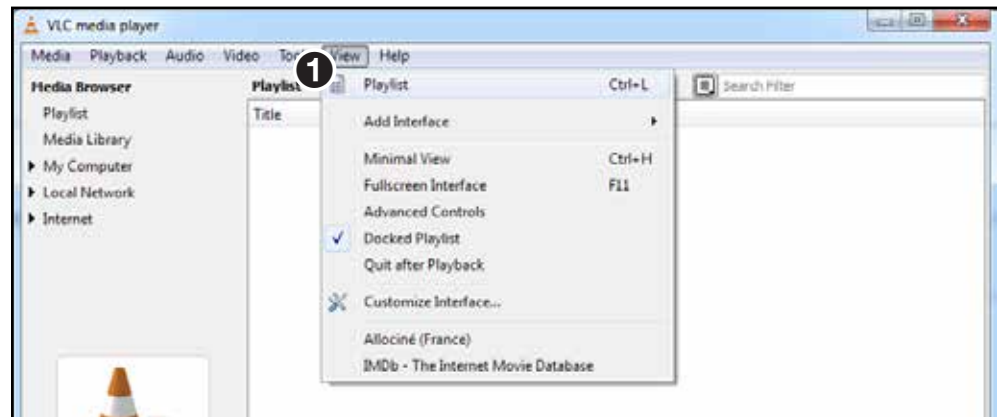
Figure 103. VLC Playlist

2. From the left menu column, select **Local Network** (see figure 104, ❷).

3. Select **Network streams (SAP)** (❸).

Figure 104. 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 105, ❶)).
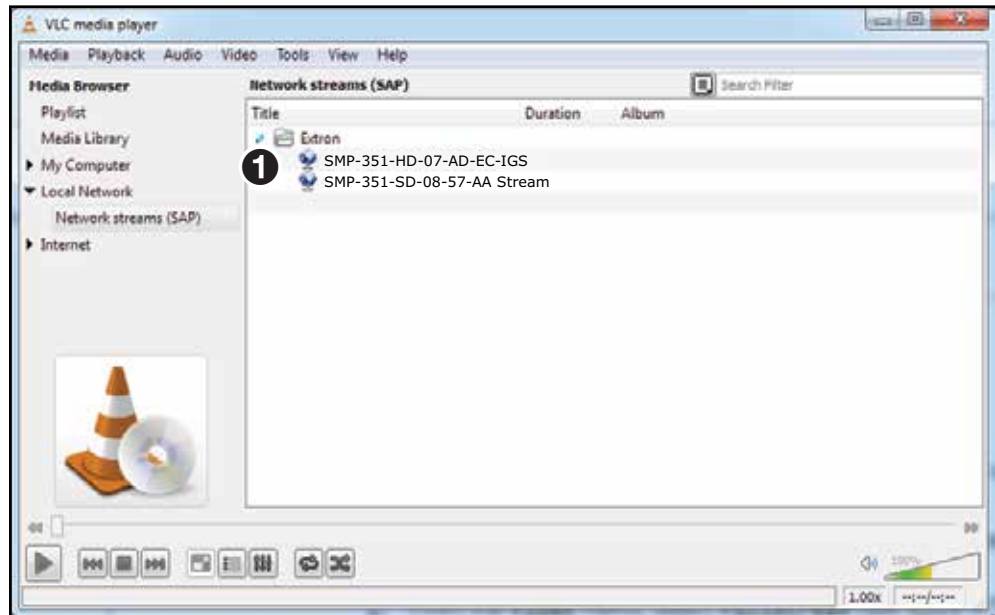
Figure 105. VLC - Select a Stream

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 48).

   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 106).
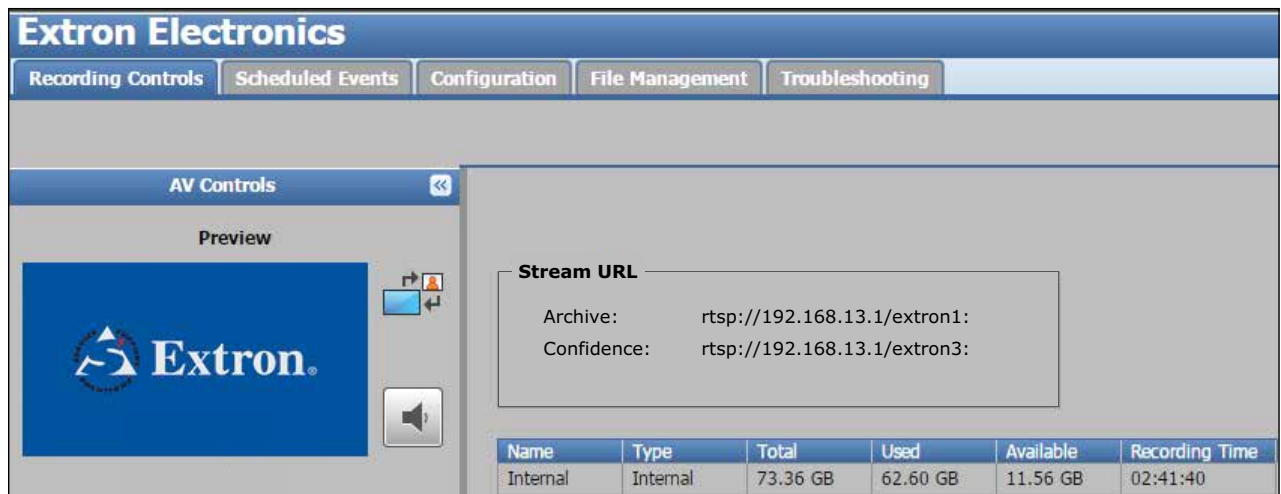
Figure 106. Recording Controls Page

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** .
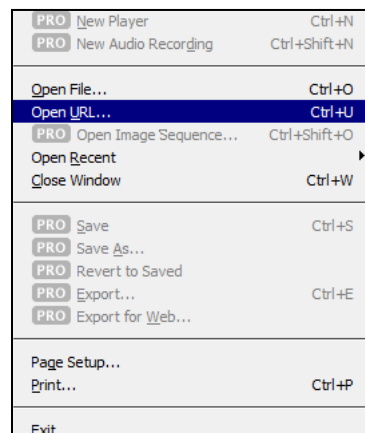
Figure 107. QuickTime Player Menu — Open URL

6. The `Open URL` dialog opens (see figure 108). In the **`Enter an Internet URL to open:`** field, enter the stream URL that was noted in step 3 on the previous page.
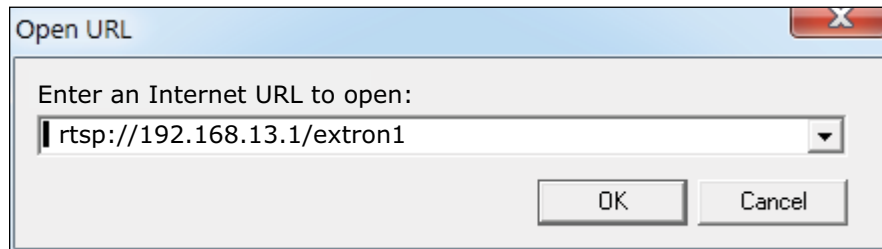
Figure 108. **Enter Stream URL Information**

7. Click **OK**. 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.

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 will be slightly lower than this estimate.

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)(see **Configure Video Encoding** on page 94).

2. Insert those bit rates into the following equation:

   [(video bit rate + audio bit rate) *3600 seconds per hour] / 8 = x kBph (kilobytes per hour)

3. Use the kBph value to calculate MBph and GBph:

   - (x kBph / 1024) = y MBph (megabytes per hour)

   - (x kBph / 1048576) = z GBph (gigabytes 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) / 8 = 2336400 kBph

   - 2336400 kBph / 1024 = 2281.64 MBph

   - 2336400 kBph / 1048576 = 2.23 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	3656.25	3.57
1080p Low	6000	128	2692.97	2.63
720p High	5000	192	2281.64	2.23
720p Low	3000	128	1374.61	1.34
480p High	2500	128	1154.88	1.13
480p Low	1500	80	694.34	0.68
VGA High	3500	128	1594.34	1.56
VGA Low	2500	128	1154.88	1.13
SMP 351 max. rates	10000	320	4535.16	4.43
SMP 351 min. rates	200	80	123.05	0.12

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.

Front Panel Menu Diagrams

| PRESETS | MENU | PICTURE CONTROL | MENU | RECORD/STREAM CONFIGURATION | MENU | INPUT CONFIGURATION | MENU | BACKGROUND RECALL | MENU | ADVANCED CONFIGURATION | MENU | VIEW COMM SETTINGS | MENU | STATUS |

PRESETS → MENU

NEXT

ARCHIVE ENCODER RECALL <N/A>
Rotate either to select a preset to recall.

ARCHIVE ENCODER SAVE <N/A>
Rotate either to select a preset # to save current settings to.

IN<1> USER RECAL <N/A>
Rotate ◄► to select an input.
Rotate ↕ to select a preset.

IN<1> USER SAVE <N/A>
Rotate ◄► to select an input.
Rotate ↕ to select a preset.

PICTURE CONTROL → MENU

NEXT

CHANNEL SELECT <A> [ON]
Rotate either to select a channel.

[A] H POSITION V +0000 +0000
Rotate ◄► to adjust Horizontal Position.
Rotate ↕ to adjust Vertical Position.

[A] H SIZE V <640> <480>
Rotate ◄► to adjust Horizontal Size.
Rotate ↕ to adjust Vertical Size.

[A] BRIGHT CONTRAST <064> <064>
Rotate ◄► to adjust Brightness.
Rotate ↕ to adjust Contrast.

[A] COLOR TINT <064> <064>
Rotate ◄► to select Color.
Rotate ↕ to select Tint.

RECORD/STREAM CONFIGURATION → MENU

NEXT

ENCODER <ARCHIVE>
Rotate either to select encoder type.

-OR-

ENCODER <CONFIDENCE>
Rotate either to select encoder type.

> **NOTE:** See the Record/Stream configuration diagram on the following page.

INPUT CONFIGURATION → MENU

NEXT

INPUT SELECT <1>
Rotate either to select input.

INPUT #[3] <YUVp/HDTV>
Rotate either to select the input format.

(3) H START V <128> <128>
Rotate ◄► to select the horizontal start pixel.
Rotate ↕ to adjust the vertical start pixel.

(3) H ACTIVE V <1024> <0768>
Rotate ◄► to adjust Horizontal Active pixel width.
Rotate ↕ to adjust Vertical Active pixel height.

(3) TTLPIX PHASE <XXX> <16>
Rotate ◄► to adjust TTL pixel width.
Rotate ↕ to adjust phase.

ASPECT RATIO IN[1] <FILL>
Rotate either to select an aspect ratio for the selected input.

EDID INPUT #[1] <720p_60_2ch>
Rotate ◄► to set an EDID value for the active input.

IN[1] AUDIO SELECT <LPCH 2CH>
Rotate either to select an audio input source for the selected input.

IN[1] AUDIO LEVEL <0 dB>
Rotate either to set the audio input level from -18 to +24 dB.

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

BACKGROUND RECALL → MENU

NEXT

RECALL <back1080.png>
Rotate either to select. Press **NEXT** to load the background file and exit.

ADVANCED CONFIGURATION → MENU

NEXT

IN<1> AUTO IMAGE OFF
Rotate ◄► to select input.
Rotate ↕ to toggle on or off.

PREVIEW HDMI OUT <1280X720@60Hz>
Rotate either to select a resolution.

AUTO MEMORY <ON>
Rotate ↕ to toggle Auto Memory On or Off.

TEST PATTERN <N/A>
Rotate either to select a test pattern.

RECORD DRIVE LIMITER <NOT RESTRICTED>
Rotate either to select the drive restriction.

RESET <NONE>
Rotate either to reboot or reset unit configurations.

VIEW COMM SETTINGS → MENU

Press and hold **INPUT 5 + NEXT** for 3 seconds.
"Hidden" Menu*

EDIT COMM SETTINGS

SERIAL PORT 9600 RS232
Rotate either to change baud rate.

MAC ADRESS 005A6078CEC
This is set at the factory and cannot be changed. (Skipped in "Edit" mode.)

DHCP MODE <OFF> On
Rotate either to toggle DHCP mode On or Off.

IP ADDR 192.168.254.254
Rotate ◄► to select octet field.
Rotate ↕ to change address.

SUBNET 255.255.000.000
Rotate either to change mask.

GATEWAY 000.000.000.000
Rotate ◄► to select octet field.
Rotate ↕ to change address.

STATUS → MENU

NEXT

ALARM STATUS [NONE, HDCP, VIDEO...]

ARCHIVE [...FILENAME...]

DRIVE SPACE INT [FREE/TOTAL][GB]

DRIVE SPACE [USB] [FREE/TOTAL] [GB]

SELECTED VOLNAME [FREE/TOTAL][GB]

[ARCH] BR 5000kpbs MULTI TS/RTP

CONF BR 350 kpbs UNI RTP/UDP

Front Panel Menu Diagrams (Record/Stream Configuration)

RECORD/STREAM CONFIGURATION — Menu →

NEXT

ENCODER
<ARCHIVE>

Rotate either to select encoder type.

NEXT

RECORDING
<ON>

Rotate either to select mode.

NEXT

RECORD TO 433.71 GB
<INTERNAL>

Rotate ◄► to select internal or external location.
Rotate ↕ to select a volume on the external location.

NEXT

STREAMING
<ON>

Rotate either to toggle streaming on or off.

NEXT

STREAM METHOD
<PULL>

Rotate either to select push or pull.

NEXT

-OR-

STREAM PROTOCOL
<UNI RTP/UDP>

Rotate either to select protocol.
Press **NEXT** to select and move to next submenu.

-OR-

STREAM PROTOCOL
<MULTI RTP/UDP>

MULTICAST IP
XXX.XXX.XXX.XXX

Rotate ◄► to select octet.
Rotate ↕ to change address.

NEXT

STREAM METHOD
<PUSH>

NEXT

STREAM PROTOCOL
<UNI RTP/UDP>

Rotate either to select protocol from this list:
UNI TS/UDP   MULTI TS/UDP
UNI TS/RTP   MULTI TS/RTP
UNI ES/RTP   MULTI ES/RTP

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

DESTINATION IP
XXX.XXX.XXX.XXX

Rotate ◄► to select octet.
Rotate ↕ to change address.

NEXT

OUTPUT MODE
<AUDIO/VIDEO>

Rotate either to select audio and video, or video only.

AUDIO OUTPUT
<CH B ONLY>

Rotate either to select ChA, ChB or A+B.

RESOLUTION
<1280x720>

Rotate either to select recording resolution.

FRAME RATE
<30>

Rotate either to select frame rate.

VID BITRATE AUD
<5000>   <320>

Rotate ◄► to change video bitrate.
Rotate ↕ to change audio bitrate.

-OR-

ENCODER
<CONFIDENCE>

Rotate either to select encoder type.

NEXT

STREAMING
<ON>

Rotate either to toggle streaming on or off.

NEXT

STREAM METHOD
<PULL>

Rotate either to select push or pull.

NEXT

STREAM PROTOCOL
<UNI RTP/UDP>

Rotate either to select protocol.
Press **NEXT** to select and move to next submenu.

-OR-

STREAM PROTOCOL
<MULTI RTP/UDP>

MULTICAST IP
XXX.XXX.XXX.XXX

Rotate ◄► to select octet.
Rotate ↕ to change address.

NEXT

STREAM METHOD
<PUSH>

NEXT

STREAM PROTOCOL
<UNI RTP/UDP>

Rotate either to select protocol from this list:
UNI TS/UDP   MULTI TS/UDP
UNI TS/RTP   MULTI TS/RTP
UNI ES/RTP   MULTI ES/RTP

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

DESTINATION IP
XXX.XXX.XXX.XXX

Rotate ◄► to select octet.
Rotate ↕ to change address.

NEXT

RESOLUTION
<512x288>

Rotate either to select streaming resolution.

FRAME RATE
<15>

Rotate either to select streaming frame rate.

VID BITRATE AUD
<350>   <192>

Rotate ◄► to change video bitrate.
Rotate ↕ to change audio bitrate.

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 209).

Address Resolution Protocol (ARP) — A protocol for assigning an **IP address** (see page 210) to a device based on the device **MAC (Media Access Control)** (see page 210)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 209). 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 213) 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 209) video or raw **AAC** audio (see page 207), 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 210) containing the full spatial resolution and data of a video frame. Predictive frames (**P-frames**) (see page 211) follow `I`-frames and contain data that has changed from the preceding `I`-frame. Bi-predictive frames (**B-frames**) (see page 207) 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 212) or dynamic (see **DHCP** on page 208).

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 207) relates the IP address of the device to its corresponding physical (see **MAC** on page 210) address on the **LAN** (see page 210). This protocol allows for several terminals or network nodes to communicate within a multi-point network, typically a local area network (LAN).

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 210).

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 208).

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).

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>
> **USA**: 714.491.1500 or 800.633.9876   **Europe**: 31.33.453.4040
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