

# SMP 351

## H.264 STREAMING MEDIA PROCESSOR

Multipurpose Adaptable Platform  
for Streaming and Recording  
AV Presentations

- ▶ Stream and record simultaneously
- ▶ Process two high resolution AV sources from up to five available input signals
- ▶ High quality scaling with flexible two-window source management
- ▶ Produce MP4 media files that are compatible with virtually any media player
- ▶ Flexible I/O ports for advanced AV system automation
- ▶ License-free operation contributes to a low cost of ownership



**Extron Electronics**  
INTERFACING, SWITCHING AND CONTROL

# Introduction

The convergence of AV and IT continues to create new opportunities for AV systems. The scale, flexibility, and reach of IP networks offer an incredible opportunity to extend live presentations to individuals that are unable to attend an event due to time, distance or other physical barriers. Streaming and recording are effective methods for organizations to communicate and educate, by capturing the presentation experience and delivering the same information and insight that a local participant receives.

## Streaming Solutions Require Flexibility

Any organization with a network and an AV presentation system can benefit from streaming. Today's streaming systems must be compatible with high resolution source signals, including high definition cameras. They must reliably interface, switch, and combine video with digital imagery and data to enhance a user's insight into the live experience. Streaming products must also conform to different network policies and operating requirements by supporting multiple transport protocols and session management methods. Additionally, streaming at more than one resolution and bit rate concurrently adds important flexibility, ensuring that media can be delivered to destinations with different viewing requirements or network bandwidth.

## Recording Requirements for Presentations

To efficiently produce, manage, and distribute recorded presentations, a variety of requirements must be met. Effective systems record media that can be easily processed and transferred to a variety of storage formats. The recorded media must be

efficiently processed with rights-managed user access, operating within an organization's standard network services and conforming to their IT policies. Lastly, the media must be published in a format that can be easily delivered and consumed.

## Extron Streaming and Recording Processor

The **SMP 351** is an H.264 streaming and recording processor for capturing and distributing AV sources and presentations as live streaming or recorded media. It provides a wide range of processing, streaming, recording, and control features that simplify integration. Additionally, Extron's **FlexOS** operating system and uploadable applications make the SMP 351 highly adaptable to a variety of requirements. This diverse set of capabilities make the SMP 351 the ideal product for the streaming and recording of AV sources and presentations.

## Easy to Use and Manage from an AV System

The SMP 351 can be easily managed from front panel controls in stand-alone applications. It can also be controlled from an AV system, where flexible configuration options, layout, and streaming presets make system programming simple.

## Low Cost of Ownership

The SMP 351 does not require any ongoing licensing fees. Integrating the SMP 351 into your organization's presentation system will yield an advanced streaming and recording solution with a low cost of ownership.

## Many Applications Benefit from Streaming and Recording

The SMP 351 is ideal for use in virtually any professional environment where AV sources can be streamed live or recorded for future reference. Streaming and recording AV presentations allows an organization to communicate and train employees and students that cannot be locally present at an event. Recording the event provides everyone with the opportunity to review and gain insight into the live experience. The SMP 351 can be adapted to many applications, documenting virtually any meeting, conference, or activity that uses an AV source as a reference. The SMP 351 is ideal for use in corporate, education, government, healthcare, courtroom, house of worship, and rental and staging applications.

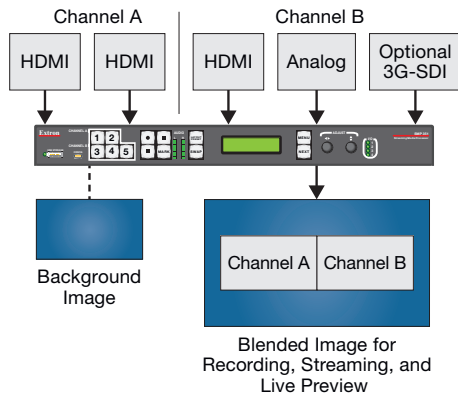
## Applications include:

- Presentation Streaming
- Corporate Training Systems
- Lecture Capture
- Meeting and Conference Recording
- Visual Data Recording
- Rehearsal Systems



# Presentation Recording & Streaming

The SMP 351 provides a comprehensive combination of signal processing, switching, scaling, and control features that simplify the integration of streaming and recording into AV systems. The versatility of the FlexOS platform makes the SMP 351 adaptable to many requirements and its broad feature set delivers quality and performance, making it a superior choice for streaming and recording applications.



The SMP 351 provides AV signal processing that produces high quality recorded media and live streaming.

## Flexible Source Inputs

The SMP 351 processes two high resolution AV sources from up to five available connections. One of two HDMI signals can be selected from Channel A along with analog or HDMI-embedded stereo audio. Channel A also provides a loop through HDMI and audio connection, which can be passed directly to a presentation display. Channel B inputs support common camera formats including composite, component HD, and HDMI. A second model, the SMP 351 3G-SDI,

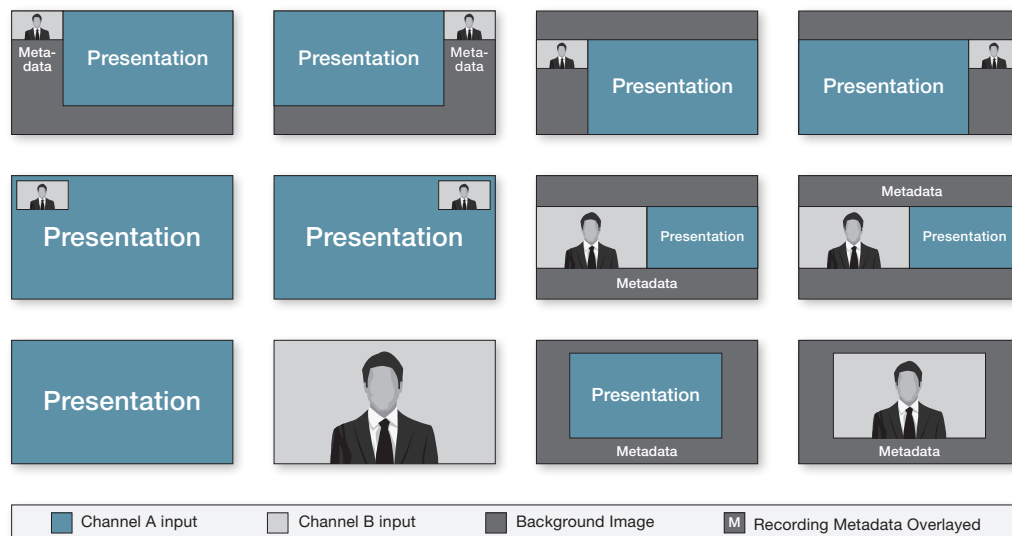
accepts serial digital video signals supplied by cameras and other professional video sources. The Channel A and B input connections both support computer-video formats from 640x480 to 1920x1200, and video formats from 480p to 1080p/60. They can be switched live during a presentation.

## Signal Processing Simplifies Source Management and Produces High Quality Content

The SMP 351's comprehensive scaling, picture control, aspect ratio management, and HDCP-compliant signal management features ensure that AV sources are presented with quality and accuracy. Advanced de-interlacing and scaling produce high quality video for both standard definition and high resolution sources as they are scaled up or down. The recording format and HDMI output can be scaled to selectable resolutions from 480p to 1080p/30, and streaming resolutions are available from 512x288 to 1080p/30 supporting use of the optimal resolution for many different applications.

## Multi-Source Window Processing

The SMP 351 offers highly flexible source presentation options. The Channel A and B input signals can be presented on the output individually at full screen or together in any two-window display arrangement including side-by-side. Up to sixteen customized window presets can be prepared, combining the Channel A and B inputs with a PNG background image and metadata. These flexible, multi-source processing features makes it easy to recreate the live presentation experience. They also provide viewers with greater insight into the event's context, facilitating interpretation and retention of the information presented.



Up to sixteen customizable window layout presets can be saved in the SMP 351 and quickly recalled from the front panel or an AV control system. Twelve are shown here.

# Presentation Recording & Streaming

## Quality Multi-Source Audio Processing

The SMP 351 offers audio mixing and DSP features that simplify audio management and provide a high quality output. It selects or mixes the analog or digital signals from Channel A and B sources, based on the input configuration and the source layout. Audio signals are adjusted automatically during source switches, eliminating clicks, pops, and undesired effects, producing a quality audio experience without using external processing equipment.

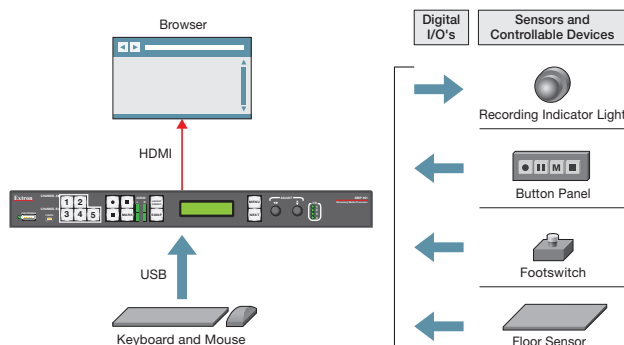
## Effective User Control and Integration Options

The SMP 351 offers several control options. The front panel controls and LCD display provide an effective interface for configuring and controlling the unit. The RS-232 port can be used to interface with a control system, and the Ethernet port is available as an additional control interface.

## Versatility Delivered by the FlexOS Platform

The Extron FlexOS embedded operating system makes the SMP 351 highly adaptable to a multitude of streaming, recording, processing, and control requirements. It provides a platform from which applications can be installed and operated. An integrated web browser application can be viewed and managed using the SMP 351 HDMI output and USB keyboard and mouse connections. This browser application serves as a convenient method to access the SMP 351 embedded web page.

Extron FlexOS control applications can also be installed on the SMP 351 to automate system operation. These programs interface with four digital I/O ports, accepting triggers from push button controls and sensors to manage specific functions, such as enabling recording sessions or marking a chapter in a recording. The ports can also be used to manage digitally controlled devices such as a recording indicator light.



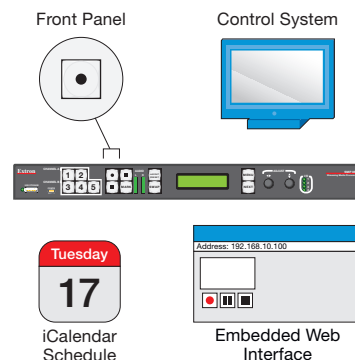
The SMP 351 can be directly controlled using a USB keyboard and mouse. Custom applications can be uploaded to the SMP 351 for managing four digital I/O ports that interface with digitally controlled devices.

## Powerful Tools for Scheduling, Monitoring, and Management

Recording schedules can be automatically updated by configuring the SMP 351 to periodically upload a centrally managed iCalendar file. Simple Network Management Protocol – SNMP traps, email, and Simple Mail Transfer Protocol – SMTP can deliver messages to support staff or monitoring systems when signal errors or encrypted sources are detected, or when storage nears capacity, allowing for proactive service. Operational system data is logged continually, detailing recording sessions, storage directory use, file names, metadata, and storage capacity. This information provides valuable data for evaluating usage patterns and operating concerns.

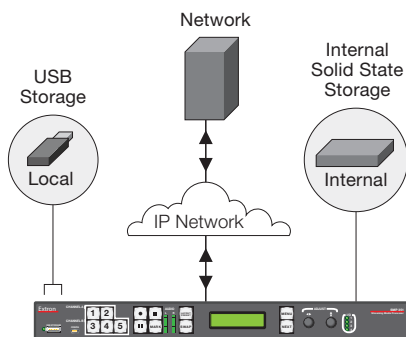
## Recorded Media Enhanced with Data

The SMP 351 produces an MP4 (M4V) file, which can be played from virtually any software media player application or mobile device with a web browser. It can record at 480p, 720p, or 1080p video resolutions as well as 1024x768 and 1280x1024 computer-video resolutions at rates from 1 to 30 frames per second. MP4 files can be recorded at video bit rates from 200 kbps to 10 Mbps, defined using a wide variety of encoding parameters.



Recording sessions can be initiated from the front panel, a control system, the embedded web page, or automatic recording can be scheduled using the iCalendar format.

SMP 351 recorded file packages include metadata that identifies information such as: Title, Creator, Subject, Description, Publisher, Contributor, and Date. This information makes it easier to search and manage media files. In addition, chapter and event marks can be inserted into recordings, supporting efficient searching and scanning during playback from a media player. JPEG thumbnail images are captured periodically for every chapter or event mark, providing a “snapshot” preview of the video at that point in the timeline. Time-synchronized thumbnails enable efficient scanning and preview of content. They are integrated into the user interface of the **Extron Media Player**, a browser-based media player that is used for play back of media recorded by the SMP 351.



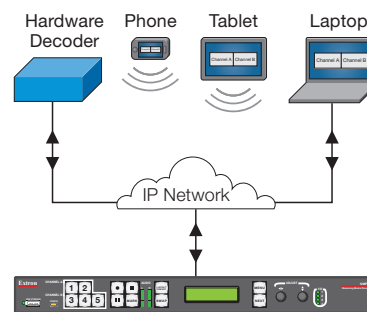
The SMP 351 can save AV recordings to internal solid state storage, a locally connected USB storage device or it can transfer files to a network storage directory

### Storage Options Serve Different Applications

Presentations recorded by the SMP 351 can be saved to the internal solid state storage, an external USB storage device, and a defined network storage directory. It can also be configured to limit storage to specific destinations. Configuration permits storage restrictions to only the internal SSD drive, USB only, or Dual Recording to both devices simultaneously. When network storage is defined, reliable capture is ensured by first saving the recording internally before transferring it to a file server.

### Content Management and Publishing Capabilities

Extron's **Streaming Content Manager – SCM** is used to process the MP4 media files, metadata and JPEG thumbnail images produced by the SMP 351 into file packages that produce a data-rich playback experience from the Extron Media Player. SCM processes media produced by the SMP 351 during impromptu recording sessions using a unique user identifier such as an email address taken from an AV control system that is bundled with the recording package. This email address is also used to notify the user that the file package can be accessed from the SCM web portal.



The SMP 351 can stream at resolutions from 512x288 to 1080p/30 supporting efficient use with a wide variety of viewing platforms and applications.

The SMP 351 integrates directly with the Opencast Matterhorn content management system, a system used by many higher education institutions. SMP 351 recordings can also be manually uploaded to third party content management systems such as Kaltura, iTunes-U, Blackboard LMS, SharePoint, CaptionSync, YouTube, Moodle, and RSS feeds.

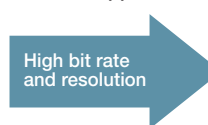
### Extensive Streaming Capabilities

The SMP 351 offers extensive streaming capabilities. It can record and stream simultaneously. It can also stream at two different resolutions and bit rates concurrently. High resolution, high bit rate encoding delivers superior quality for large screen overflow applications. Lower bit rates and lower resolutions are more efficient for streaming distribution or confidence viewing applications. Streaming bit rates can range from 200 kbps to 10 Mbps for video and 16 kbps to 384 kbps for audio. The SMP 351 supports both push and pull streaming session management, and a range of streaming transport protocols can be used to support unique decoding or network requirements.



Transmission Method	Streaming Protocols	
	Transport	Session Management
<ul style="list-style-type: none"> <li>Unicast</li> <li>Multiple Unicast</li> <li>Multicast</li> </ul>	<ul style="list-style-type: none"> <li>RTP</li> <li>RTSP Interleaved</li> <li>HTTP Tunnelled</li> <li>TS/UDP</li> <li>TS/RTP/UDP</li> </ul>	<ul style="list-style-type: none"> <li>RTSP</li> <li>SAP</li> <li>SDP</li> </ul>

#### Overflow Applications



#### Large Flat Panel Display

#### Projector

#### Distribution and Confidence Streaming



#### Desktop PC

#### Laptop

#### Tablet

The SMP 351 can support unicast and multicast streaming applications and can apply a variety of streaming transport protocols and session management methods supporting use with a wide variety of viewing applications, decoding devices and network conditions.

# Features

## **Supports input signal resolutions up to 1920x1200, including HDTV 1080p/60**

The SMP 351 supports a wide range of input resolutions, from standard definition up to the high resolutions commonly used for computer video and HDTV.

## **High Quality Scaling and De-interlacing**

The SMP 351 uses advanced de-interlacing and signal processing to create high quality images. The encoded output signals can be scaled to selectable resolutions from 640x480 to 1080p/30.

## **Flexible scaling and two window processing**

Display one or two high resolution sources in user-defined window arrangements, including side-by-side for optimal interpretation.

## **Clean switching**

Switch with a clean transition free of visual jumps, glitches, and distortion commonly experienced switching between computer and video signals.

## **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-compliant input and output signal management**

Encrypted signals can be viewed on compliant displays connected to the SMP 351 loop through, but cannot be recorded. A green signal and HDCP warning message are presented on non-compliant displays and encoded media.

## **Supports HDMI-embedded audio or analog stereo audio**

AV input connections are directly compatible with digital and analog audio signals.

## **Auto Input Memory**

Automatically store size, position, and picture settings based on the incoming signal and recall these settings when the source is reconnected.

## **EDID Minder®**

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.

## **Integrated audio mixing and DSP**

Produce a high quality audio experience without requiring the use of external mixing and DSP equipment.

## **Schedule streaming and recording using iCalendar**

Upload a recording schedule manually, or automatically using the iCalendar format.

## **Internal test patterns for setup**

The SMP 351 offers 15 test patterns as well as on-screen display - OSD data overlay including timestamp, average bit rate, frame rate, time and date, and system information to aid in calibration and setup of the encoder.

## **Extron FlexOS applications automate system operation**

Install Extron FlexOS applications onto the SMP 351 that automate system operation using four digital I/O ports interfaced to push button controls, sensors or digitally controlled devices.

## **Daily recording logs**

Provide usage and operating data to aid in system diagnostics and troubleshooting.

## **Front panel security lockout**

This feature locks out all front panel functions except for input selection; all functions however, are available through RS-232 control.

## **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, even while recording and streaming.

## **Encoding presets for quick recall of specific compression and streaming configurations**

Sixteen presets are available for saving specific encoding and streaming settings such as H.264 profile, resolution, GOP, and bit rate, session management configurations, transport protocols, and other network settings.

## **Standards-based H.264/ MPEG-4 AVC video compression**

The SMP 351 supports use of the Baseline, Main, or High Profiles at Levels 5, 4.x, or 3.x providing the ability to optimize video encoding for use with various types of applications and decoding devices.

## **AAC audio encoding**

AAC audio compression is compatible with virtually any media player and can be adapted to a range of quality and bit rate requirements.

## **Streaming protocol and session management options**

Apply pull or push session management options and use a variety of transport protocols in unicast or multicast configurations based on system requirements or network conditions.

## **Adjustable recording and streaming bit rates**

Select video bit rates from 200 kbps to 10 Mbps for video and 16 kbps to 384 kbps for audio based on the storage, streaming, or network requirements.

## **Metadata text overlay**

Data such as title, presenter, course date and time can be presented and embedded within the source layout.

## **On screen status display**

Present device information and operating data to aid in system testing and troubleshooting.

## **Video time stamping**

Insert a time reference (HH:MM:SS format) in the on-screen display to document time and aid navigation during playback sessions.

## **HDCP Visual Confirmation**

A green signal and message are displayed when HDCP-encrypted content is supplied to a non-compliant display, encoded media, and the preview output.

## **Publish directly to Opencast Matterhorn**

Recorded media can be published directly to the Opencast Matterhorn lecture capture AV 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.

# Overview

## Front-mounted USB port

Front-panel USB port makes connecting portable storage devices easy for "capture and carry" recording sessions.

## Front panel recording controls

Start, stop, and pause recordings using the front panel transport controls. Identify notable events using the Mark button to aid the search, playback and review of recordings.

## Audio level indicator

Left and right channel indicators provide a visual reference for signal level and aid in troubleshooting.

## LCD control interface, direct access buttons and precise rotary controls

An intuitive LCD interface, direct access buttons, and precise rotary controls simplify system setup.

## Layout preset button

Select one of sixteen blended source arrangements, presenting Channel A, Channel B, metadata, and background image.



SMP 351 - Front

## Configuration port

The front panel USB port provides convenient access to control the SMP 351 directly from a PC.

## Input select buttons

Select the channel A and B source signals that are processed and displayed.

## SWAP button

Quickly swap Channel A and Channel B source positions in the selected recording layout.

## Internal solid state storage

Save recorded content to internal solid state storage and reliably transfer media files to USB or network storage.

## Digital I/O LED indicators

Highly visual front panel LEDs provide a quick indication of individual port status.

## Digital I/O connection

Interface with simple push button controls, sensors, or digitally controlled devices to manage recording and streaming applications or AV devices.

## Rear USB storage port

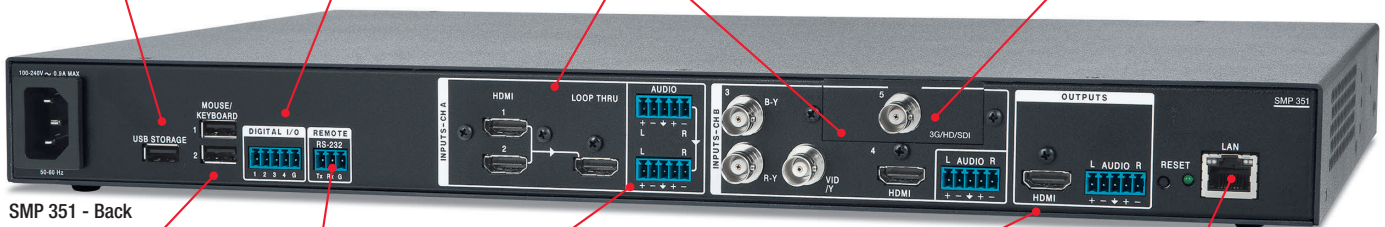
USB port provides no-fuss connection for rack-mounted storage devices.

## HDMI, component HD, and composite inputs

SMP 351 source signal options provide compatibility with commonly used AV and camera signals, and benefit from clean switching transitions across input signals.

## Optional 3G-SDI input

The SMP 351 3G-SDI model accepts serial digital video signals supplied by cameras and other professional video sources.



SMP 351 - Back

## USB keyboard and mouse connectors

Direct keyboard and mouse connections provide the means to directly control and configure the SMP 351 while viewing the embedded web page from the HDMI output.

## Loop through connections

Loop through connections allow for easy integration of presentation sources into AV systems without the need for additional equipment.

## HDMI output

Provides a local preview of the blended source layout that is recorded and streamed.

## Ethernet port

Multi-purpose Ethernet port for streaming transport and transfer of recordings to network storage directories. It also serves as the interface for AV control systems and the embedded web interface.

## RS-232 serial port

Control and manage the SMP 351 from AV control systems and serial RS-232 devices in real-time.

## HDCP-compliant signal management

Present encrypted sources on HDCP compliant displays. A green screen and HDCP message is presented if the destination is encoded media, the preview output, or a display that is not HDCP-compliant.

# Content Management

## STREAMING CONTENT MANAGER

Extron **Streaming Content Manager – SCM** is multi-purpose software that manages the MP4 file, metadata, and JPEG thumbnails produced during SMP 351 recording sessions. SCM processes this media into file packages, which provide a rich data experience when played back from the **Extron Media Player – EMP**. SCM also manages recording packages, user groups, and access rights, and provides summary data to the administrator and users. SCM interfaces with standard network directory services to integrate users and access rights into the system.

### Managing the Recording Workflow

A typical SCM recording session starts with a user entering a unique identifier, such as an email address, into an AV control system touchpanel. This information is transferred to the SMP 351 and included with the recording metadata.

When the recording session is complete, the media is transferred to a network storage directory where it is processed by SCM. Once SCM has processed the recording package, it is stored on a content server and user access permissions are applied.

Lastly, the email address obtained during the initiation of the recording session is used to notify the user that the recording package has been processed and is available for retrieval.

Users have access to recordings they've produced or to which they have group access privileges. Users can sort recordings based on filename, date and time, recording device, and processing status.



Recording packages produced by the SMP 351 are accessed using the Streaming Content Manager web portal.

### Administering Users and Recording Assets

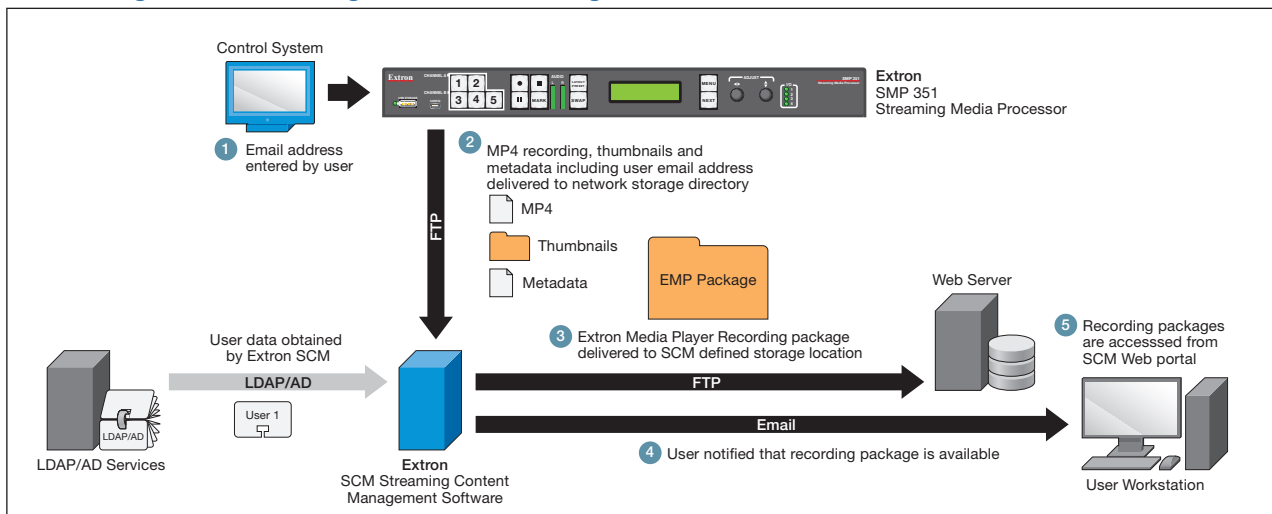
SCM simplifies management of recorded media, operating within IT systems by leveraging existing network directory services.

Administrators can establish user access permissions using data obtained from standard network Lightweight Directory Access Protocol/Active Directory - LDAP/AD services.

SCM can also define custom local user identifications and passwords to manage applications with special user groups that must operate separately from standard network services.

SCM provides summary recording data to administrators, including processing activity, user activity, filenames, storage locations, recording dates, and login activity.

## Streaming Content Manager File Processing



Extron Streaming Content Manager processes recordings produced by the SMP 351. It prepares them into file packages for playback by Extron EMP, applies access rights and notifies the user that the recording package can be accessed from the SCM Web Portal.

# Media Playback

## EXTRON MEDIA PLAYER

The **Extron Media Player – EMP**, is a browser-based media player that has been developed to provide an enhanced playback experience for recordings produced by the SMP 351. EMP requires no software installation and can be operated from any computer or mobile device using a wide variety of browser applications. The EMP user interface incorporates metadata, time-synchronized thumbnail images, and playback controls that support efficient navigation and review of recorded material. EMP is used exclusively with recording file packages that have been processed by Extron SCM software.

### Customization and Accessibility

User interface components of the EMP such as the video playback window, transport controls, and the title banner can be repositioned and customized within the application to meet specific user requirements. The EMP also offers keyboard controls and assistive technology that fulfills Section 508 accessibility standards for individuals with physical impairments and disabilities. Alternative color palettes, high contrast, and zoom modes are available to improve content legibility and visibility, and the EMP can interface with screen reader software.

#### Standard and Customizable Player Templates

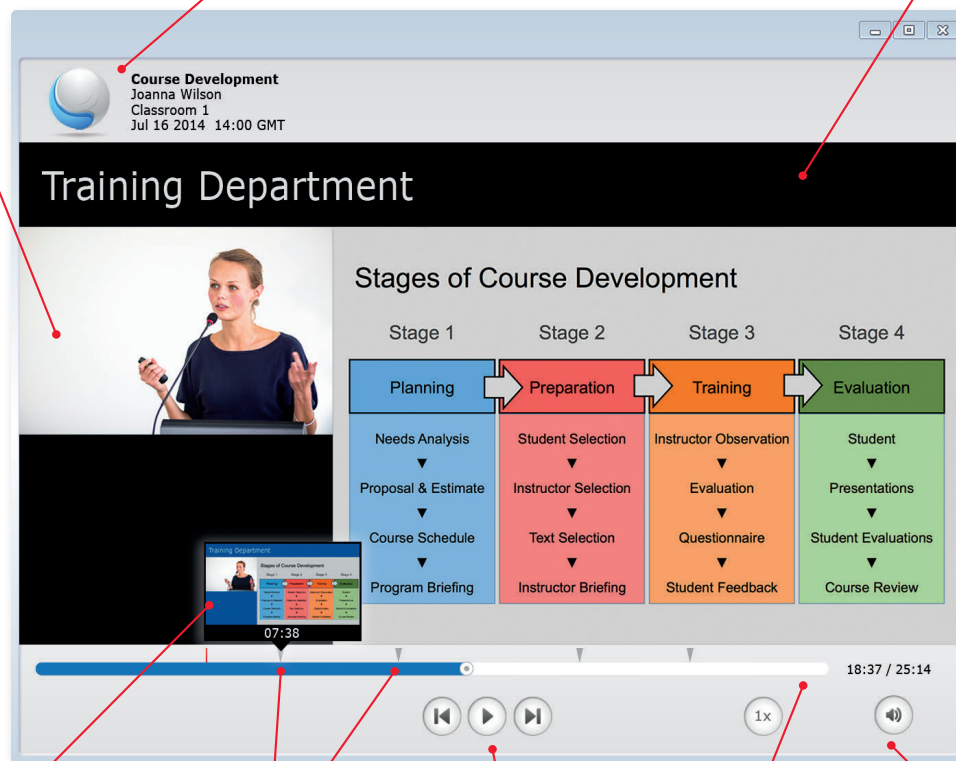
EMP layouts and player elements can be modified to conform to specific application requirements.

#### Title, Metadata and Banner Area

Present information that provides context to the recorded event such as the presenter, location, date, event title or course name. Identify and present branding for the organization or department.

#### Video Playback Window

EMP augments the video playback window with metadata and advanced playback controls.



#### Time-synchronized thumbnail images

A thumbnail image with time reference becomes visible when a user's mouse is placed at any position along the playback bar.

#### Chapter and Event Marks

Chapter and event marks are inserted into SMP 351 recordings to help identify notable points in time. They aid in efficient file navigation.

#### Playback bar

The playback bar identifies the current time and duration of a media file and allows a user to quickly change position by moving the slider throughout the timeline.

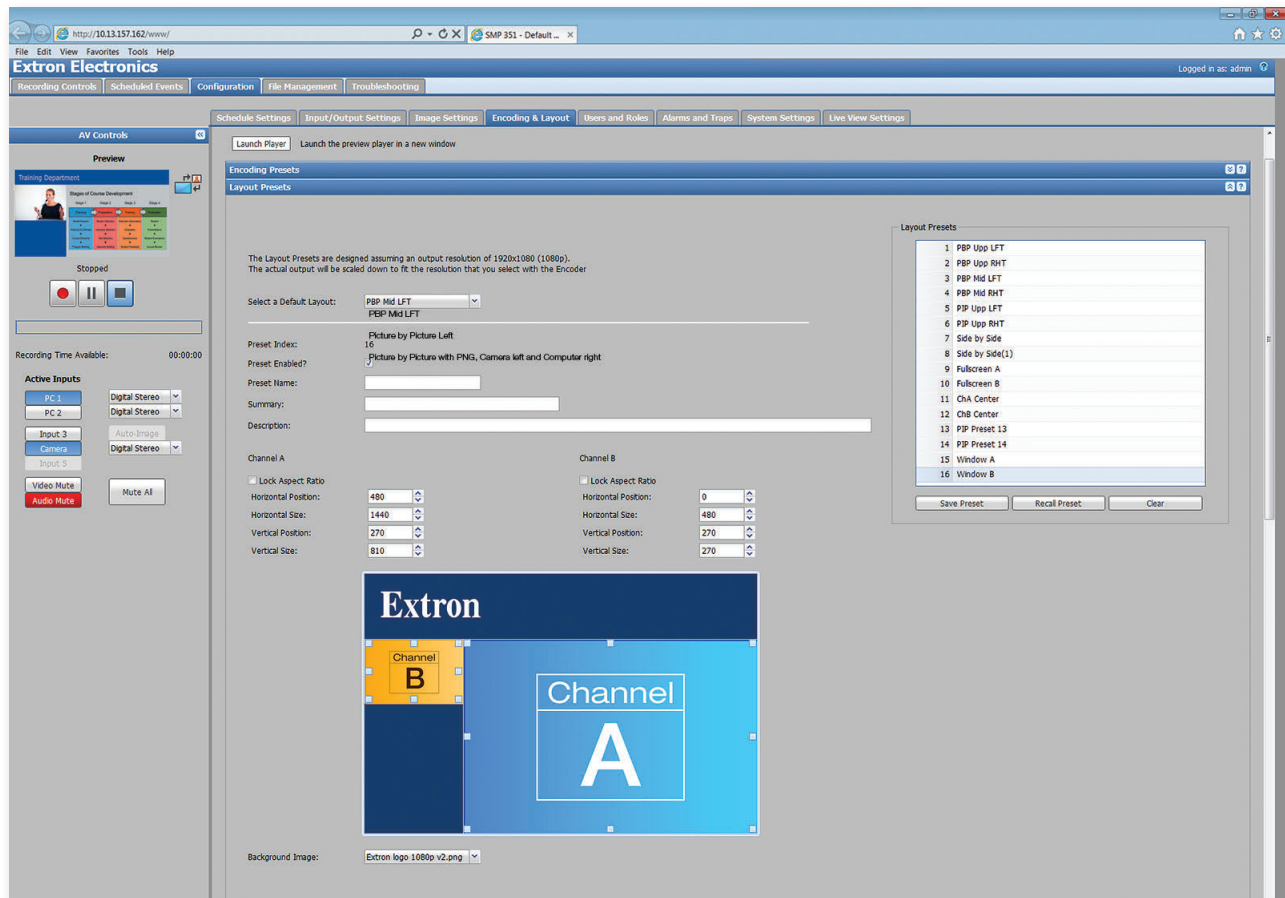
#### Transport Controls

Manage efficient playback using play, stop, chapter/mark advance and variable speed playback controls.

#### Audio Controls

Mute audio and adjust volume.

# Embedded Web Page



Source layouts are created from the embedded web page that integrate the channel A and B inputs with a background PNG image and metadata.

## Intuitive Interface for Configuration

The SMP 351 features an embedded web interface, which makes navigating and configuring the SMP 351's wide array of signal processing, recording, streaming, scheduling, and control functions simple. The embedded web page provides a visual overview of recording activity and session schedules. It is used to configure publishing and file transfer parameters and provides valuable tools for managing, monitoring, and troubleshooting. The embedded web page makes it easy for AV support staff and IT departments to control and manage the SMP 351.

## Efficient Signal Management and Source Switching

The SMP 351 embedded web page interface clearly presents the controls for managing input and output signals. It identifies the signal type, resolution, AV format, and encryption status for all input signals and the output signal. Intuitive controls adjust brightness, contrast, and overscan values, and custom sampling values can be entered for analog sources as required. Additional signal processing controls are provided for: aspect ratio management, signal and format detection, and audio levels. A small preview window in the embedded web page decodes a live view of the current source

layout. The preview window is accompanied by an arrangement of buttons for selecting input signals, analog or digital audio formats, and audio mixing configurations.

## Preparing Layouts to Capture Effective Presentations

The recording layout page features the adjustments that produce the largest visual impact for the SMP 351. Up to sixteen layouts can be customized and saved from this page.

Channel A and Channel B source windows are easily positioned and sized using a mouse, or by entering numeric values from a keyboard. Previously uploaded PNG image files can be selected to serve as the background image. Six common metadata element positions can be selected, typically near the sides, top, or bottom of the output image so the text does not distract from critical visual content.

A media player window can be launched from the layout page that decodes a live stream from the SMP 351. This provides the user with a live view of the source layout during system programming and testing activities.

# Embedded Web Page

## Encoding Presets Simplify Streaming Management

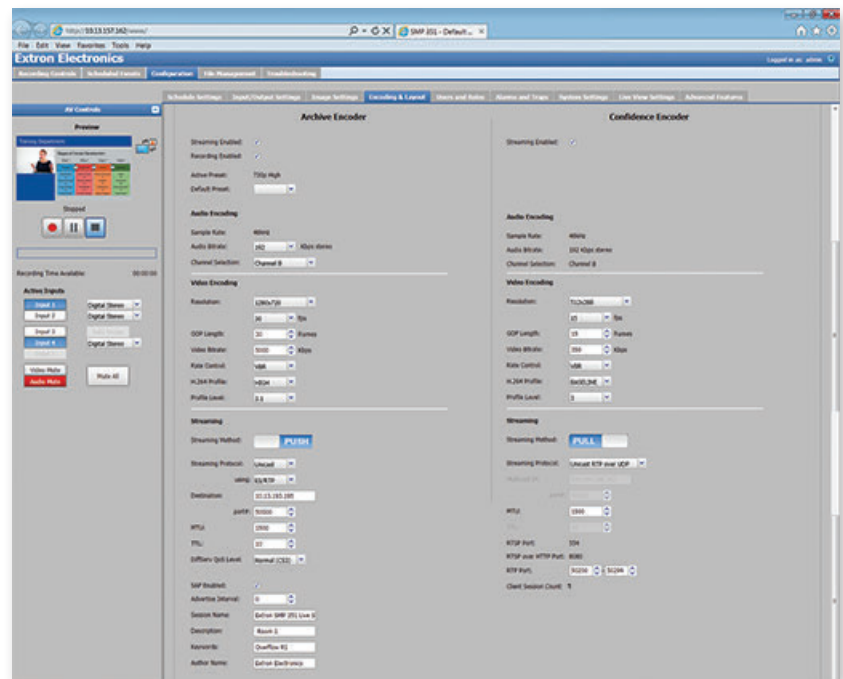
The many encoding parameters and protocols used in streaming applications can introduce undesirable complexity for system programmers. The SMP 351 embedded web page provides a simple interface to define two separate channels of live streaming. The Archive Encoder uses the same resolution and bit rate as the recording session. The Confidence Encoder typically uses a lower resolution and bit rate. Independent values can be defined for bit rate, frame rate, H.264 profile and level, and Group of Pictures – GOP for each encoder.

Unique menus define pull and push streaming configurations. Both must define unicast or multicast operation, transport protocol, maximum transmission unit – MTU, destination addresses, and application ports, where appropriate. The pull streaming menu also identifies the number of active client sessions. The push streaming menu provides additional configuration for Session Description Protocol – SDP and Session Announcement Protocol – SAP, Quality of Service – QoS, and Time to Live - TTL.

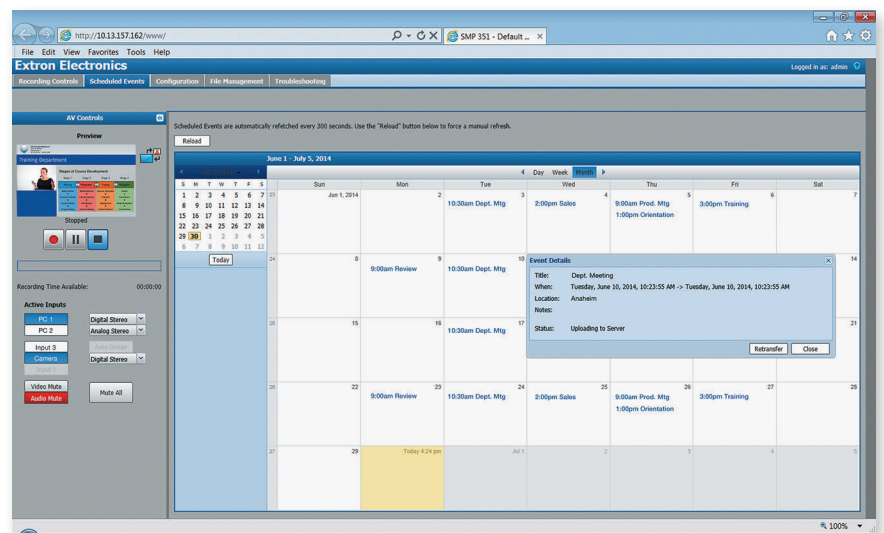
The encoding parameters are saved in a preset which can be recalled from an external control system, streamlining the number of variables to be managed by control systems.

## Session Scheduling and Publishing Configuration

The SMP 351 embedded web interface includes an internal calendar, which identifies future recording sessions and references all past sessions. Recording schedules can be manually or periodically uploaded using the iCalendar file format with File Transfer Protocol - FTP from a defined file and pathname. The SMP 351 scheduling menu is also used to integrate with Opencast Matterhorn.



Parameters for two different streaming configurations are defined from the encoding preset page.



The embedded web page of the SMP 351 includes a calendar that identifies all past and future recording sessions.

## System Data and Diagnostics Support Efficient Management from the Network

Diagnostic tools provided by the embedded web page aid AV and IT staff with support and troubleshooting activities. Daily system logs document recording sessions, usage conditions, and operating concerns, such as recording starts, or storage errors.

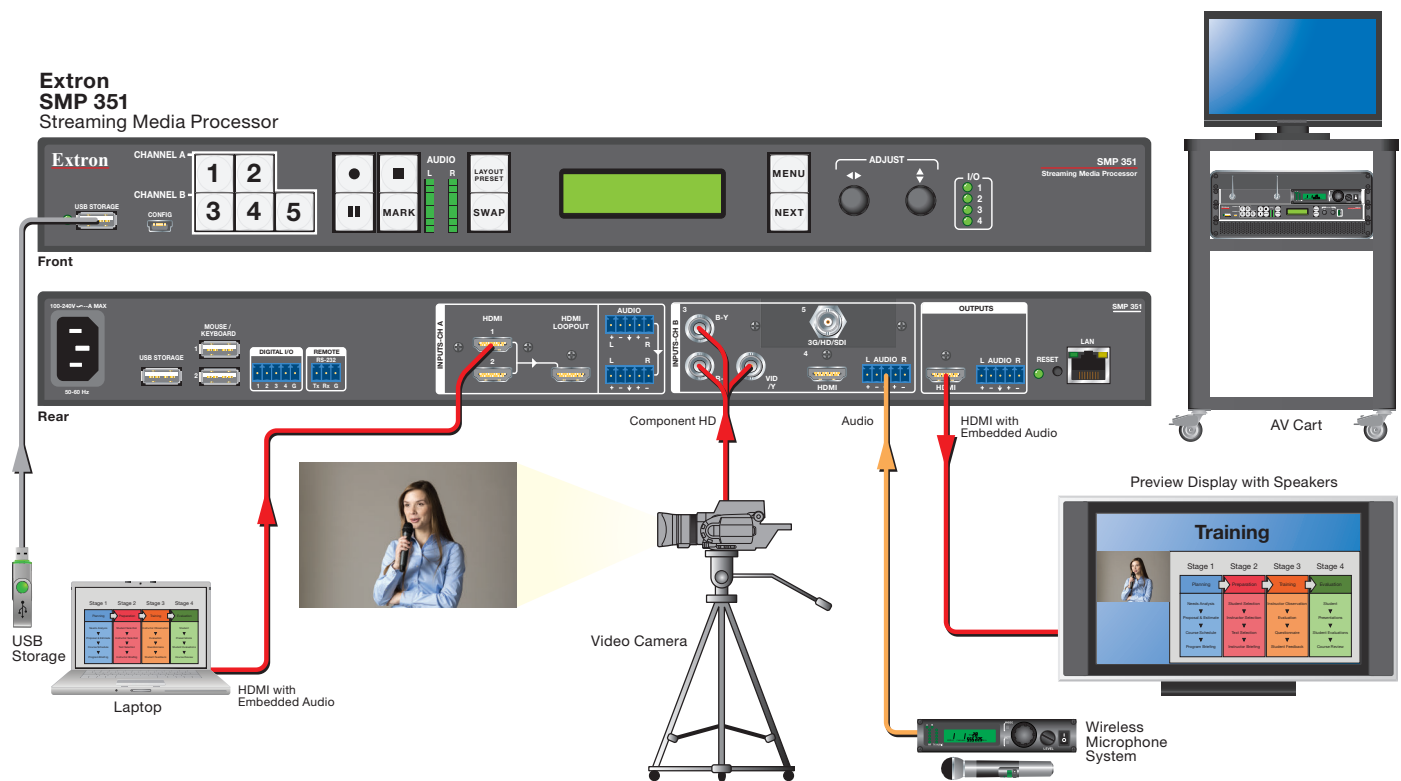
The SMP 351 embedded web page presents real-time streaming bit rates, and offers ICMP ping and traceroute diagnostics, giving AV and IT staff powerful tools and data for diagnosing network issues. Proactive service and maintenance activities can be supported by system alarms delivered to support staff or monitoring systems using email, SNMP traps or SMTP protocol.

# Applications

## PORTABLE AV RECORDING SYSTEM

Presentations that use AV sources can occur virtually anywhere within a building, however it may not be practical to install an AV recorder in every location a presentation may be held. An **SMP 351** can be combined with a microphone, wireless receiver and a small, flat panel display into a recording system that can accept a variety of source inputs and be moved from location to location on an AV cart.

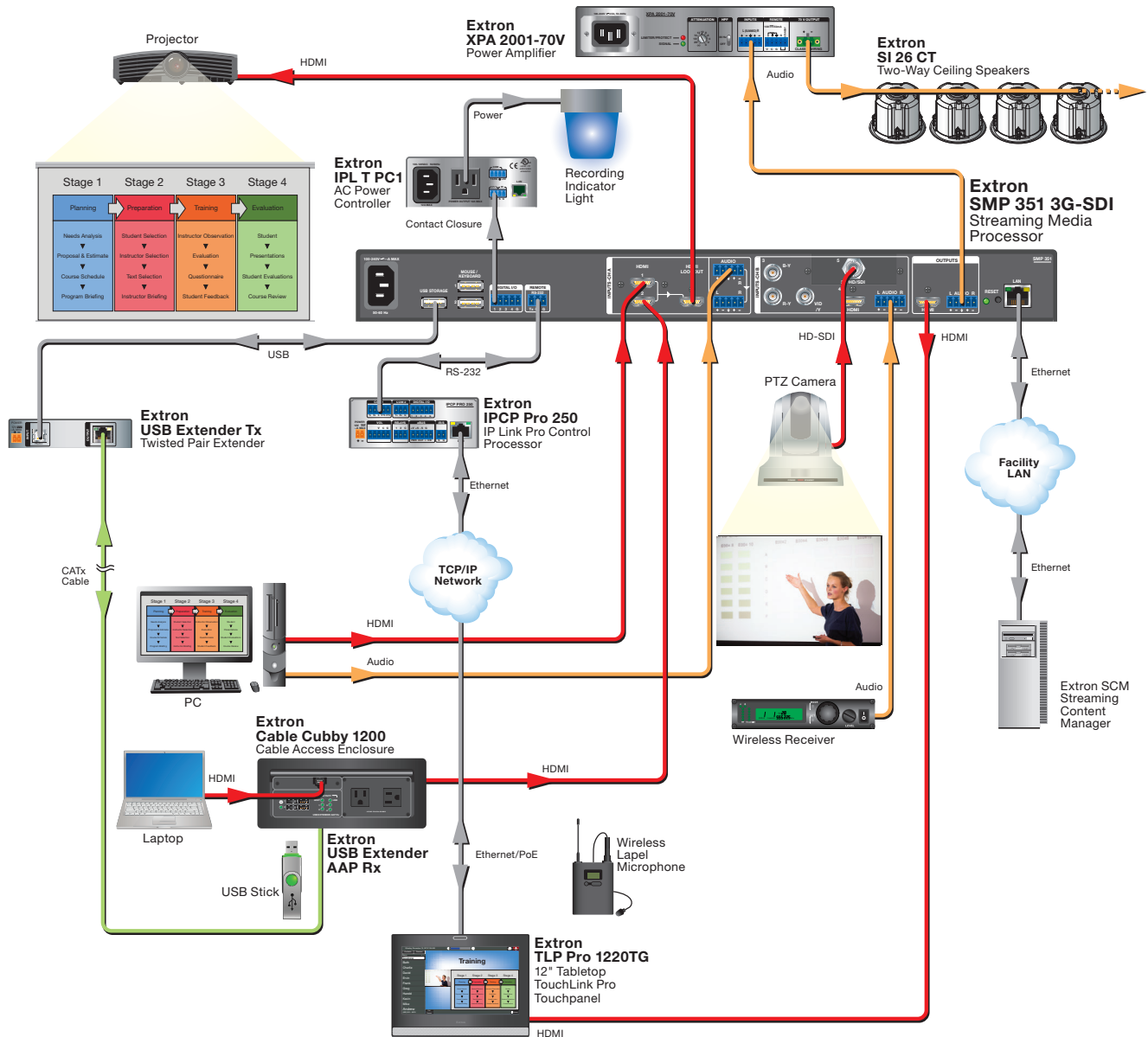
The advanced AV signal processing, front panel controls, and HDMI confidence output from the SMP 351 make it an effective product to use in a portable recording system. It will quickly capture and process video and audio signals from computers, personal devices, cameras or AV systems. The portable system illustrated in this diagram has been connected to a laptop and camera to record a presentation from a guest speaker. When the presentation is complete, an MP4 file is saved to a USB storage device connected to the front panel. It can be immediately removed and replayed for others. A different source combination may be used for the next event.



# Applications

## AV PRESENTATION AND RECORDING SYSTEM

The **SMP 351** can serve as the central switching and processing device for an AV system. This system uses the **SMP 351 3G-SDI** to manage AV sources and record an HD-SDI camera, together with a PC or laptop source connected through an Extron **Cable Cubby 1200** enclosure. An Extron **TLP Pro 1220TG** touchpanel and **IPCP Pro 250** control processor provide an interface for the user to select the AV source to present and blended layout that will be used during a recording session. The HDMI output from the SMP-351 3G-SDI displays a preview of the recording layout. It is connected to the HDMI input on the TLP Pro 1220TG touchpanel. An Extron FlexOS application has been installed on the SMP 351 for managing a recording indicator light. The FlexOS application interfaces with the digital I/O port and triggers an Extron **IPL T PC1** power controller, supplying power to the light during a recording session. Mixed, processed audio is supplied from the SMP 351 to an Extron **XPA 2001-70V** amplifier and **SI 26CT** speakers. Users have the option to save MP4 files directly to a USB thumb drive, or they are processed by the Extron Streaming Content Manager – **SCM** software and saved to a network storage directory. SCM notifies the presenter that the recording package is available for retrieval using an email address that is obtained from the AV control system during preparation for the recording session. The recording package is accessed over the network through the SCM web portal.



# Applications

## CLASSROOM PRESENTATION, RECORDING, AND STREAMING SYSTEM



The **SMP 351** Streaming Media Processor can be a valuable asset for any sizable classroom or auditorium. Live streaming and on-demand playback of recorded presentations and courses can capture and share an experience for individuals who cannot be present at the live event. This AV system includes a lectern that houses an Extron **SMP 351** and an Extron **DTP CrossPoint 84 IPCP MA 70V**. Together, they manage the AV presentation system for local participants and distant observers. Lectures and presentations are recorded and manually uploaded to a content management system for on-demand access.

Presenters select from a variety of source devices to present supporting media from a Blu-ray player, a media player, and a PC. Additionally, support for

personal devices is facilitated by an HDMI connection from an Extron **Cable Cubby 1200** located at the lectern. A high-definition camera with PTZ control provides a visual of the presenter and an Extron **DTP HDMI 330 D Rx** is used to extend the camera signal to the CrossPoint 84. Any source can be routed to the classroom projector through the CrossPoint 84 using an Extron **DTP HDMI 230 D Tx** extender. Two HDMI source signals are routed from the Crosspoint 84 to the SMP 351 to be processed, recorded and streamed.

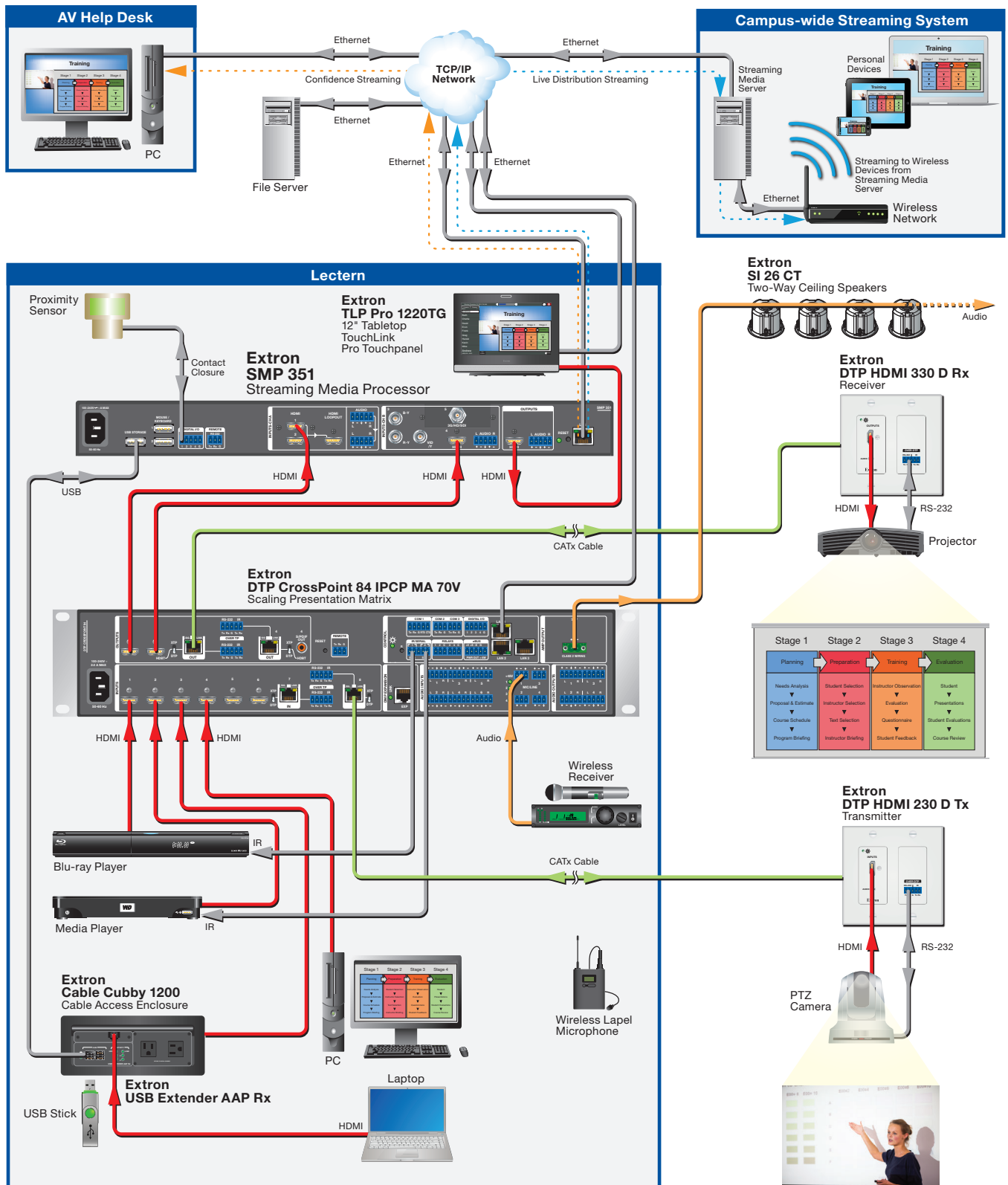
The CrossPoint 84 manages audio from the HDMI input connections and from a wireless microphone receiver incorporating lavalier or handheld microphones. The active audio signal is supplied to the internal amplifier, which distributes the signal to several Extron **SI 26CT** speakers equipped with 70V transformers. This audio signal is also embedded into one of the two HDMI signals fed to the SMP 351.

An iCalendar file with the classroom recording schedule is periodically uploaded to the SMP 351. This schedule initiates recording sessions during meetings and training courses. The SMP 351 receives two HDMI signals with embedded audio from the DTP CrossPoint 84, and creates a composited image with these two video sources and an organizational background image in PNG format. Typically, a PowerPoint presentation is placed in a large window and camera video of the presenter is placed in a smaller window arranged in a picture-by-picture or picture-in-picture layout. The blended layout is recorded as a 720p MP4 file. When the recording session is complete, a file package is prepared, which includes the MP4 file, metadata, and a folder with JPEG thumbnail images. This file package is then transferred to a defined storage directory on a file server. A custom application uploaded to the SMP 351 interfaces with a room sensor to ensure that recording is not initiated if a presenter is not detected.

The SMP 351 also streams AV presentations to a media server at 720p for live unicast streaming to other meeting rooms or individuals across campus who could not attend the event. Live streaming is typically viewed from PCs or personal devices. IT and AV support staff can also access live streaming at a lower resolution, such as 512x288, to verify that the system is functioning properly. While HDCP-encrypted sources can be presented locally in the classroom from the CrossPoint 84, the SMP 351 will not stream or record HDCP-encrypted signals. Encrypted sources will appear as a green screen with an HDCP message indicating that the source image cannot be presented.

A **TLP Pro 1220TG** touchpanel serves as the user interface for this AV system. It provides source selection, source control, and other functions in addition to presenting a live preview of the SMP 351 encoded source layout. Thumb drives or portable USB storage devices can connect to the SMP 351 via the Cable Cubby 1200, giving presenters the ability easily “capture and carry” their presentations directly from the lectern rather than saving them to a file server.

# Applications



# Specifications

INPUT	
Number/signal type	3 HDMI digital video (HDCP compliant), 1 component video (Y, R-Y, B-Y; interlaced, progressive, HD), or composite video Optional: 1 SDI, HD-SDI, or 3G-SDI digital component video
Resolution range	640x480 to 1920x1200 (reduced blanking), 480p, 480i, 576p, 720p, 1080i, 1080p, NTSC, and PAL, sampled pixel for pixel
VIDEO PROCESSING	
Analog sampling	12 bits per color, 13.5 MHz standard (low resolution video), 165 MHz standard (RGB, YUVp, DVI)
Digital sampling	8-, 10-, or 12-bits per channel
Digital processing	4:2:2, 8-bits per color
Compression	H.264/AVC (ITU H.264, ISO/IEC 14496-10) 4:2:0, 8-bit color Encoding profiles: High, Main, Baseline; Encoding levels: 4.1, 4.0, 3.2, 3.1, 3.0; configurable GOP
Bit rate	200 kbps to 10 Mbps
Bit rate control	Selectable (variable, constrained, or constant)
Latency	130 msec* (encode), 600 msec* (encode/decode) *Indicates minimum latency. Encoder, decoder, and network dependencies apply.
VIDEO OUTPUT	
Number/signal type	2 H.264/AVC digital video over Ethernet 1 HDMI digital video (HDCP compliant)
Scaled resolution	Archive/record: 480p, 720p, 1080p, 1024x768, 1280x1024 Confidence: 480p, 720p, 1080p, 1024x768, 1280x1024, 512x288
Frame rate	Up to 30 fps for all output rates
Formats	H.264/AVC (Profile type: High, Main, Baseline. Profile level: 4.1, 4.0, 3.2, 3.1, 3.0)
RECORDING AND STORAGE	
File system for USB storage	FAT32, VFAT long file name extensions, EXT2, EXT3, EXT4
File types	H.264 and AAC in an MP4 container, JPEG, JSON, XML
File transfer protocols	FTP, SFTP, CIFS
Network file share protocols	CIFS/SMB, NFS
Internal storage capacity	80 GB (75 GB for recording files) or 400 GB (400 GB for recording files)
External USB ports	1 (front panel), 1 (rear panel), USB 2.0 (Each port current limited to 1.5 A.)
Background image format	PNG
AUDIO INPUT	
Analog	
Number/signal type	2 stereo, analog, balanced or unbalanced, 1 with loop-through
Digital	
Number/signal type	3 stereo, digital de-embedded from HDMI 1 loop-through from HDMI
AUDIO PROCESSING	
Sampling rate	16 bit, 48 kHz or 44.1 kHz sampling
Compression	AAC-LC MPEG-4 (ISO/IEC 14496-3:2005)

Bit rate	80 kbps to 320 kbps, stereo	
AUDIO OUTPUT — ANALOG		
Number/signal type	1 stereo, balanced/unbalanced	
AUDIO OUTPUT — DIGITAL		
Number/signal type	1 stereo, HDMI (re-embedded local preview) 1 AAC-LC digital audio over Ethernet	
DIGITAL I/O CONTROL		
Number/signal type	4 digital input/output (configurable)	
Digital inputs		
Input voltage range	0 to 24 VDC, clamped at +30 VDC	
COMMUNICATION		
USB		
USB configuration ports	1 front panel female mini USB B	
Mouse and keyboard port	2 rear panel USB type A	
USB standards	USB 1.1, USB 2.0, high/full/low speed hosts	
Serial control		
Serial control port	1 bidirectional RS-232, rear panel 3.5 mm captive screw connector, 3-pole	
Ethernet control		
Ethernet host port	1 female RJ-45	
Ethernet data rate	10/100/1000Base-T, half/full duplex with autotdetect	
Protocols		
Streaming	Pull:RTP/RTCP (RFC 3550), RTSP (RFC 2326), Interleaved RTSP (RTP/RTSP), RTP/RTSP tunneled through HTTP unicast or multicast Push:MPEG2-TS/UDP* (ISO/IEC 13818-1), MPEG2-TS/ RTP* (RFC 2250, IPTV-ID-0087, ETSI TS 102 034), Direct RTP (RFC 3984), SAP (RFC2974), SDP (RFC4566), unicast or multicast	
Transport	TCP, UDP, multicast IGMPv3 (RFC 3376) or unicast	
All supported	IGMPv3 (RFC 3376), IP, UDP, SSL, DHCP, HTTP, HTTPS, RTP, RTSP, SNMP V2 (RFC 1213), SAP (RFC2974), SDP (RFC4566), QoS (RFC 2474), NTPv4 (RFC 4330)	
GENERAL		
Power supply	Internal Input: 100-240 VAC, 50-60 Hz	
Power consumption	30 watts typical	
Thermal dissipation	96 BTU/hr	
Enclosure dimensions	1.7" H x 17.5" W x 11.5" D (1U high, full rack wide) (4.3 cm H x 44.4 cm W x 29.2 cm D) (Depth excludes connectors.)	
Regulatory compliance		
Safety	CE, c-UL, UL	
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI	
Model	Version Description	Part number
SMP 351	Standard Version — 80 GB SSD	60-1324-01
SMP 351 3G-SDI	with 3G-SDI Input — 80 GB SSD	60-1324-02
SMP 351	Standard Version — 400 GB SSD	60-1324-11
SMP 351 3G SDI	with 3G-SDI Input — 400 GB SSD	60-1324-12
EMP	Extron Media Player	79-583-01
SCM	Streaming Content Manager	79-584-01

For complete specifications, please go to [www.extron.com](http://www.extron.com)  
Specifications are subject to change without notice.

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