

USP 405

UNIVERSAL SIGNAL PROCESSOR

- ▶ Everything in, anything out video processor
- ▶ All-in-one scaler, scan converter, transconverter, format converter, switcher and transcoder
- ▶ 35 scaled output rates, including HDTV
- ▶ Five video inputs including optional SDI (Serial Digital Interface)
- ▶ Six video outputs including optional SDI
- ▶ Buffered loop-throughs
- ▶ 3:2 and 2:2 pulldown detection

The one-box solution for all your video conversion needs



Extron® Electronics

USP 405 – Universal Signal Processor

The Everything In, Anything Out System Solution

The Extron **USP 405** Universal Signal Processor is a powerful, all-in-one video signal converter with a wide array of application possibilities. Its versatility makes it a trustworthy problem solver in rental and staging environments, boardrooms, classrooms, conference rooms, auditoriums, and virtually any other A/V setting. This one-box solution includes a high-performance scaler, scan converter, transconverter, format converter, switcher and transcoder. The USP 405 is able to take in a wide range of video signal formats, process them, and output them all in one format directly to a digital display, projector, or editing device. The USP 405 simplifies system integration by eliminating the need for additional components. Consequently, operations are more efficient while further A/V expenses are reduced.



The USP 405's versatility streamlines Rental & Staging applications

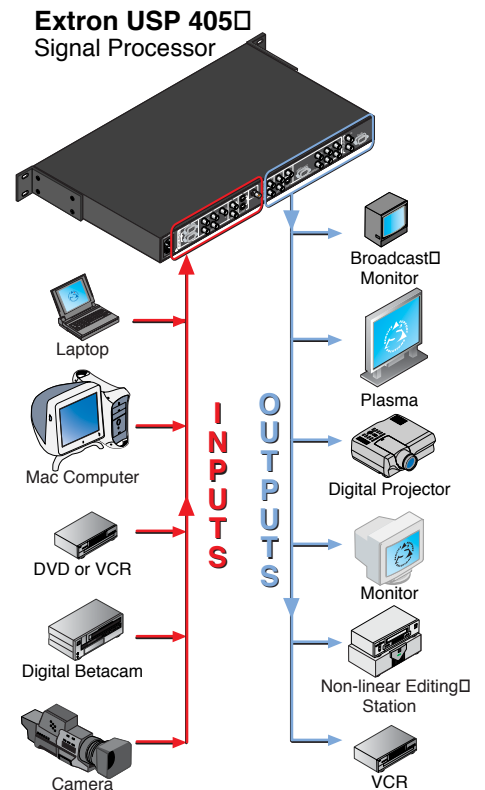
As a standalone signal processor in small environments or as part of an enhanced A/V system in larger environments, the flexibility of the USP 405 is especially useful for converting a number of video and computer signals either up

The USP 405 solves conversion and compatibility issues in video production studios



or down. The USP 405 is the perfect solution for converting RGB, HDTV, component, S-video, composite (NTSC and PAL), and optional SDI (Serial Digital Interface) signals into a single video format and maintaining maximum image quality. RGB signals that are input to the USP 405 are subjected to one of two signal conversion processes: they can be scaled to one of 35 output resolutions, or they can be scan converted to component, S-video, composite, and SDI video signal formats—either NTSC or PAL. Video signals that are input as component, S-video, composite, and SDI can be transcoded and output on all video connectors in each format simultaneously. These video signals can also be scaled to one of 35 resolutions and output on 15-pin HD connectors and BNCs. Available in four configurations, the USP 405 is the best way to ensure that every new signal introduced to a system can be optimally utilized.

- | | |
|---|------------------|
| USP 405 | 60-369-01 |
| USP 405 DI (with SDI In) | 60-369-02 |
| USP 405 DO (with SDI Out) | 60-369-03 |
| USP 405 DI/O (with SDI In & Out) | 60-369-04 |



USP 405 Universal Signal Processor

Freeze button

Any input of the USP 405 can be frozen using the freeze button on the front panel. This feature allows the USP 405 to capture a frame of video to display for an extended period of time, even after the source has been removed.

Back-lit Input Selection buttons

Input selection buttons are easily identifiable using back-lit buttons with clear overlay labels, enabling simple front panel operation.

Intuitive LCD interface

The easy-to-read LCD menu simplifies operation and control.

Easy adjustment of all set-up parameters

Sizing, centering, contrast, and zoom can all be easily fine tuned with image control adjustment knobs.



Front Panel

IR Control

An optional IR 801 remote control can be used with the USP 405. The IR 801 allows for input switching and picture adjustments such as color, tint, contrast, brightness, sizing, positioning, zoom, and filtering.

Picture Adjustments

Brightness, contrast, centering, color, tint, detail, size, and zoom can all be adjusted through the front panel. With the zoom feature, images can be enlarged up to 200%, as well as panned. Direct access to these picture controls provides a quick and efficient set-up of the image.

Menu & Next

The Menu button steps through set-up menus, while the Next button moves through the sub-menus.

Rugged metal enclosure

Built to withstand everyday handling in real-world environments.

RS-232 control

RS-232 utilizes Extron's exclusive Simple Instruction Set (SIS™) via third party control or Extron's Windows®-based control program. RS-232 is a convenient alternative to controlling basic operations and functions.

Optional SDI input/output

SDI options facilitate integration of SDI sources or destinations into analog A/V systems.



Rear Panel

Buffered loop-throughs for RGB, S-video, and composite video

This enables a signal to be easily monitored or distributed without using a distribution amplifier.

Simultaneous RGB outputs

RGB outputs on a 15-pin HD and BNCs enable direct connection to two RGB destinations.

Genlock

All video outputs (NTSC & PAL) can be synchronized to an external reference signal. Genlock capabilities make transitions cleaner in a timed system.

WHAT'S INSIDE the USP 405

Technologies

Dynamic Motion Interpolation (DMI™)

Dynamic Motion Interpolation (DMI™) is Extron's proprietary de-interlacing technology that enables the USP 405 to measure and compensate for motion artifacts, such as jaggies, that can distort an image when video is de-interlaced.



without DMI technology

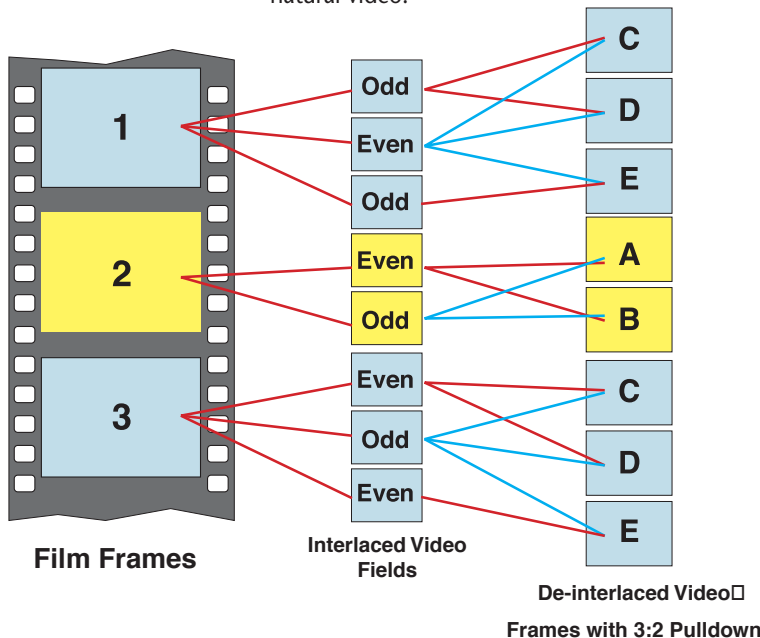


with DMI technology

The DMI process delivers the best aspects of still and motion algorithms and introduces a new level of image enhancement capability without compromising image fidelity. Utilizing DMI, the USP 405 is able to provide superior image quality.

3:2 and 2:2 pulldown detection

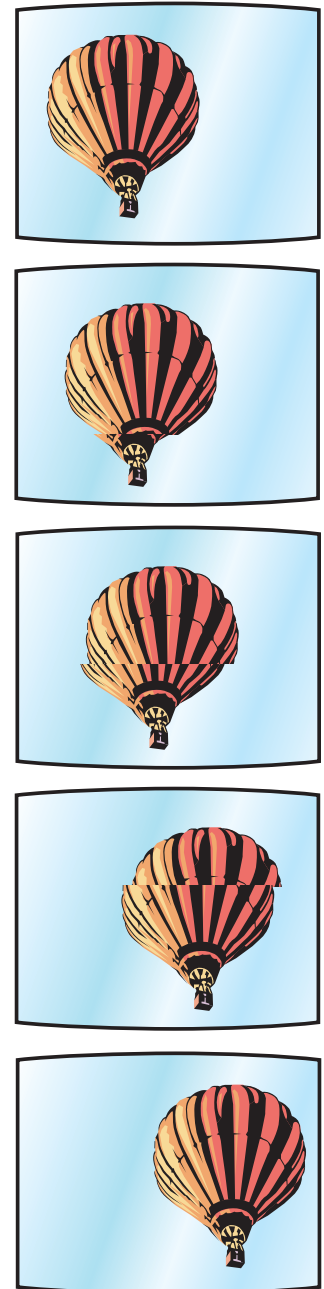
3:2 pulldown detection for NTSC and 2:2 film detection for PAL is an advanced film mode processing technique. It helps maximize image detail and sharpness for NTSC or PAL sources that originated from film. The USP 405 uses pulldown and film detection to match film to video frame rates for smoother and more natural video.



Accu-RATE Frame Lock (AFL™)

Accu-RATE Frame Lock (AFL™) is a patented Extron technology that solves frame rate conversion issues experienced by video scalars. When video input and output refresh rates differ, there are certain points in time when the two rates cross over each other. The result is a glitch or image freeze on the display. AFL solves this problem by locking the output frame rate to the input frame rate.

Without AFL, image tearing is present in this series of images



WHAT'S INSIDE the USP 405

Features

	SDI IN	SDI OUT
USP 405		
USP 405 DI	•	
USP 405 DO		•
USP 405 DI/O	•	•

SDI Options

The Serial Digital Interface input and/or output card option is a 10-bit broadcast quality digital video interface that re-clocks and equalizes to maintain signal integrity over long cable runs. The USP 405's SDI option is SMPTE (Society of Motion Picture and Television Engineers) 259 compliant, and allows for easy transition between analog and digital applications.

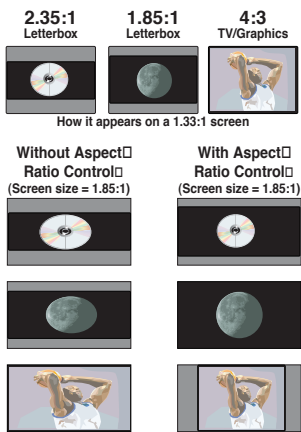
Memory Presets

Inputs one and two each support 30 auto recall memories, based on the incoming horizontal and vertical frequencies. These memories save sizing, centering, detail, contrast, and brightness information for each source. Automatic recall of presets can save an enormous amount of time and effort in fine-tuning displayed images.



Aspect Ratio Conversion

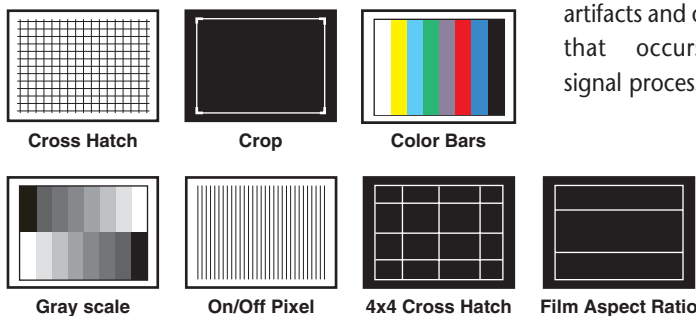
The USP 405's scaling capabilities are able to convert a video's aspect ratio to suit practically any display format. In addition to meeting the TV standard of 4:3, the USP 405 can resize the image to fit plasma or widescreen formats of 16:9. The built-in scaler in the USP 405 is able to horizontally and vertically resize the video image to match a specified aspect ratio, filling the display, and improving the overall perception of the displayed image.



Test Patterns

The USP 405 has ten test patterns including a crop pattern, cross hatch, 16 bar gray scale, color bars, alternating on/off pixels, ramp, 4 x 4 cross hatch for use with video walls, and three aspect ratio patterns for setting up letter-box DVDs. Test patterns aid in preliminary picture set-up, helping to maximize the potential of the image while

minimizing image artifacts and other noise that occurs during signal processing.



Genlock Capabilities

Genlocking provides synchronization of video signals of one device with those from another video source. Using the USP 405's genlocking capabilities provides the ability to create transitions between sources that are clean and precise.



International Video Decoding Compatibility

The USP 405 uses a digital, four-line adaptive comb filter to decode NTSC 3.58, NTSC 4.43, PAL, and SECAM. By providing a wide spectrum of video decoding capabilities, the USP 405 can be integrated into systems all over the world.

Output Rates

To ensure maximum compatibility, the USP 405 offers 35 scaled output rates, including these popular computer-video, plasma, and HDTV rates:

640 x 480	1024 x 768	720p
800 x 600	1280 x 768	1080p
832 x 624	1280 x 1024	1080i
848 x 480	1360 x 765	
852 x 480	1365 x 1024	

Output Per Input

This special feature allows each of the inputs to be configured to a different output rate. As a global setting, this feature is particularly useful when looping back various video signals through a matrix switcher to match the resolution of any given display device. Output rates are predetermined using Extron's software and the need for additional programming is eliminated.

RS-232 and IR Control

Using Extron's Simple Instruction Set (SIS™), RS-232 operates via third-party control or Extron's Windows®-based control program. The USP 405 can also be controlled with an optional Extron IR 801 remote control.



APPLICATIONS for the USP 405



Scan Converter

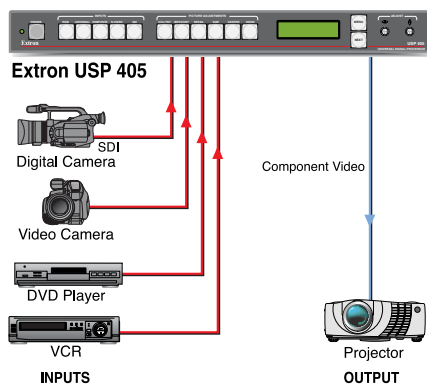
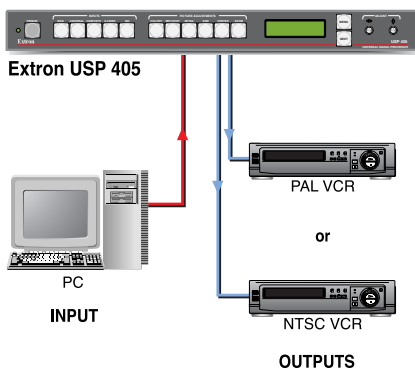
The USP 405 can take high-resolution RGB computer-video down to low-resolution NTSC or PAL, whether your requirements are component, S-video, composite, or SDI signals—all while maintaining the highest possible image quality. Scan converters are widely used in videoconferencing, presentation, or where speakers are interacting with computer-generated graphics that will be edited onto video tapes.

Transcoder

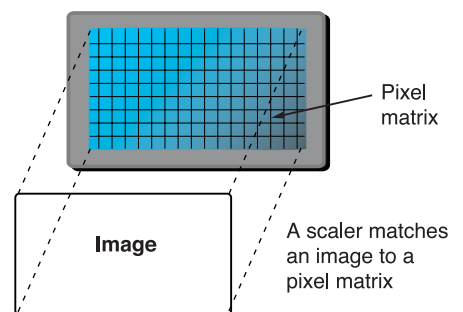
The USP 405 can take one video format and transcode it into another video format. In one instance, you may have an analog composite signal and want to convert it to a digital component signal. The process is interchangeable between all video formats, including the conversion of analog to digital (SDI) or digital (SDI) to analog. The USP 405's transcoding abilities would, for example, be extremely useful in a non-linear editing suite where a variety of source signals from analog composite to RGB need to be introduced into the digital program material. The transcoding feature of the USP 405 can accomplish this.

Scaler

As a scaler, the USP 405 is able to accept low-resolution signals, such as NTSC, PAL and SECAM composite signals, and scale them up to high-resolution RGB video for viewing on display devices. By allowing the USP 405 to convert various signal types into a standard RGB cabling configuration, the need for additional cabling is eliminated and routing is simplified. The scaler can also match the output rate of the digital display's internal pixel map processor, allowing for a properly-sized, sharper image.



Digital display device

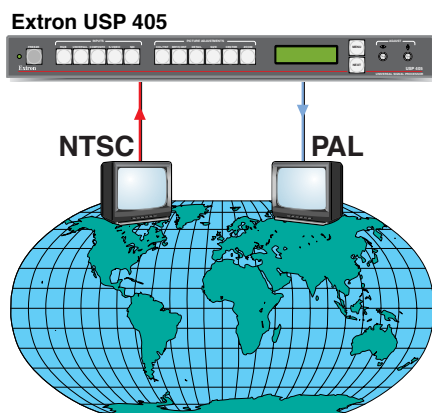


APPLICATIONS for the USP 405



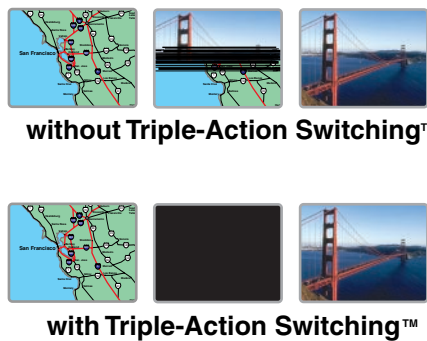
Standards Converter

As a standards converter, the USP 405 uses a quad standard decoder to convert NTSC 3.58, NTSC 4.43, PAL, or SECAM to NTSC 3.58 or PAL. In one scenario, a presenter in the United States may purchase a multi-standard VCR for playing videos in NTSC, PAL, and SECAM; however, he will not be able to display the videos unless he also has a multi-standard television set or monitor. A video tape of any standard played on a multi-standard VCR can be connected to a USP 405 for conversion and guarantees viewing on a PAL or NTSC display device. The USP 405 bridges the gap between the world's many video standards.



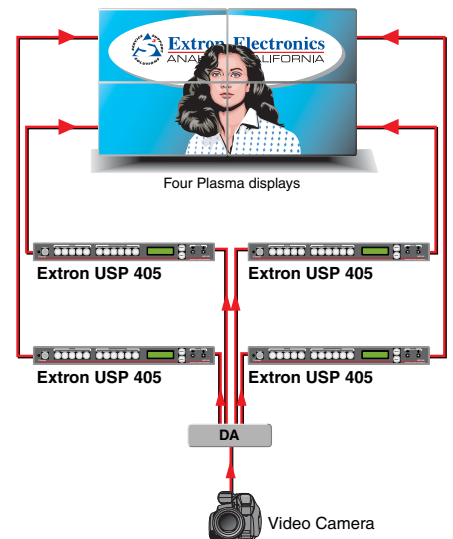
Switcher

In small, one-projector environments, the USP 405 can also be used as a five input switcher. Since all signals are converted up or down into one format by the USP 405, signal routing is simplified. To facilitate the process, the USP 405 employs Extron's own Triple-Action Switching™ technique. Triple-Action Switching is a three-step RGB video switching sequence that minimizes picture scrambling and glitches by removing video before switching sync signals. This allows the display device a brief period to lock onto a different sync timing. The video signal is then reapplied after the display has locked. This feature smoothes switching transitions and gives the overall result a professional look and appearance.



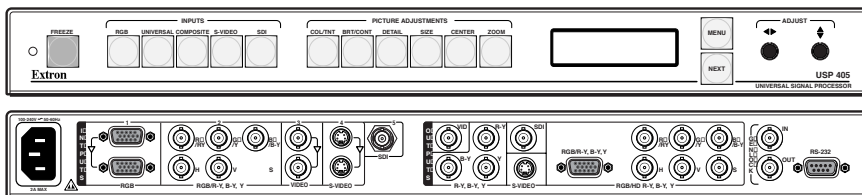
Zooming and Panning

The USP 405 can zoom an image up to 200% and allow panning across the screen. The image can be zoomed in and out up to 200% while keeping the image in its original aspect ratio. With its zooming capabilities, a single video signal can be ran through four USP 405s and divided into quadrants to create a professional video wall effect across four display devices.



Specifications

USP 405



Front and rear panel

VIDEO

Gain	Unity
Differential phase error.....	0.01°, 0 to 10 MHz
Differential gain error	0.01%, 0 to 10 MHz
Crosstalk.....	-50dB @ 5 MHz

VIDEO INPUT

Number/signal type	1 RGBHV/RGBS/RGB computer video with 1 local monitor loop-through 1 RGBHV/RGBS/RGB computer video, component video, S-video, or composite video 1 S-video 1 composite video 1 SDI (optional)
Connectors	
2 15-pin HD female	RGB computer video input and loop-through
1 x 5 BNC female.....	RGB computer video, component, S-video, or composite video input
2 BNC female.....	composite video input and loop-through
2, 4-pin mini-DIN female	S-video input and loop-through
1 BNC female.....	SDI input (optional)
Minimum/maximum levels	Analog — 0.3V to 2V p-p with no offset
Impedance	75 ohms
Horizontal frequency.....	15 kHz to 100 kHz
Vertical frequency	30 Hz to 120 Hz
Resolution range.....	Autoscan 720 x 525 to 1600 x 1200
Return loss	-30dB @ 5 MHz
Maximum DC offset	1.5V
External sync (genlock).....	0.3V to 1.0V p-p

VIDEO PROCESSING

Decoder	9 bit digital
Encoder.....	10-bit digital
Digital sampling	24 bit, 8 bits per color; 140 MHz
Colors	16.78 million
Horizontal filtering	4 levels
Vertical filtering	8 levels

VIDEO OUTPUT

Number/signal type	6 RGBHV, RGBS, component video, digital component video (CCIR 601/ITU-R BT.601), S-video, composite video
Connectors	1 x 6 BNC female (RGB, HD component video) 1 15-pin HD female (RGB, HD component video) 3 BNC female (component video) 1 4-pin mini-DIN (S-video) 1 BNC female (composite video) 1 BNC female (optional SDI digital component video)
Minimum/maximum levels	0V to 2.0V p-p
Impedance	75 ohms

VIDEO OUTPUT (continued)

Output resolutions	640x480 ^{1,3,4,5} , 800x600 ^{1,3,4,5} , 832x624 ^{3,4,5} , 848x480 ³ , 852x480 ³ , 1024x768 ^{1,3,4,5} , 1280x768 ³ , 1280x1024 ^{1,3,5} , 1360x765 ³ , 1365x1024 ^{3,5} , 480p ^{3,5} , 720p ^{3,5} , 1080i ^{3,5}
	¹ = at 50 Hz, ² = at 56 Hz, ³ = at 60 Hz, ⁴ = at 75 Hz, ⁵ = locked to the current input's vertical refresh rate
Return loss	-30dB @ 5 MHz
DC offset.....	±5mV maximum with input at 0 offset
Switching type	Triple-Action

SYNC

Input type	Autodetect RGBHV, RGBS, RGBS
Output type	Autodetect RGBHV, RGBS
Standards	NTSC 3.58, NTSC 4.43, PAL, and SECAM
Input level.....	0V to 5V p-p
Output level	0V to 5V p-p
Input impedance.....	510 ohms
Output impedance	75 ohms
Max input voltage	5V p-p
Max. propagation delay	20 ns
Polarity	Positive or negative (selectable)

CONTROL/REMOTE — SWITCHER/SCALER

Serial control port.....	RS-232, 9-pin female D connector
Contact closure.....	9-pin female D connector
IR controller module	IR 801 (optional)
Program control	Extron's control program for Windows® Extron's Simple Instruction Set (SIS™)

GENERAL

Power	100VAC to 240VAC, 50/60 Hz, 30 watts, internal, auto-switchable
Temperature/humidity	
Storage	-40° to +158°F (-40° to +70°C) / 10% to 90%, non-condensing
Operating.....	+32° to +122°F (0° to +50°C) / 10% to 90%, non-condensing
Rack mount	Yes
Enclosure type	Metal
Enclosure dimensions	1.75" H x 17.5" W x 12" D 4.4 cm H x 44.5 cm W x 30.5 cm D (Depth excludes connectors and knobs. Width excludes rack ears.)
Shipping weight	11 lbs (5 kg)
Vibration	ISTA/NSTA 1A in carton (International Safe Transit Association)
Approvals	UL, CUL, CE, FCC Class A
MTBF	30,000 hours
Warranty.....	3 years parts and labor

MODEL	PART NUMBER
USP 405	60-369-01
USP 405 DI (with SDI In)	60-369-02
USP 405 DO (with SDI Out)	60-369-03
USP 405 DI/O (with SDI In & Out)	60-369-04

For a complete list of product specifications, please visit www.extron.com/usp405



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