

DSC 401 & DSC 401 A

4K/60 HDMI TO HDMI SCALERS



VECTOR 4K
SCALING

18 Gbps
4K/60 4:4:4

Industry-Leading 4K/60 Scalers with 4:4:4 Signal Processing and Enhanced Features

- ▶ 4K/60 HDMI to HDMI scaling
- ▶ Supported HDMI specification features include data rates up to 18 Gbps, Deep Color, and HD lossless audio formats
- ▶ HDCP 2.3 compliant
- ▶ Advanced 4:4:4 signal processing
- ▶ Accepts HDMI video from 480i up to 4096x2160 @ 4:4:4
- ▶ Selectable output rates from 640x480 up to 4096x2160 @ 4:4:4
- ▶ HDMI audio embedding and de-embedding - DSC 401 A only

Extron

DSC 401

The Extron DSC 401 and DSC 401 A are high-performance scalers capable of converting between HDMI resolutions up to 4K/60 with full 4:4:4 color sampling. They support data rates up to 18 Gbps and incorporate the Extron-exclusive Vector™ 4K scaling technology, which is engineered for critical-quality 4K applications. Both HDCP 2.3-compliant models support 4K/60 signals on a single connection and provide many integrator-friendly features, such as on-screen display, internal test patterns, and status LEDs. Enhanced DSC 401 A integration features include audio embedding and de-embedding, logo image keying and display, input presets, and Ethernet control with PoE. The DSC 401 and DSC 401 A scalers are ideal for locations such as conference rooms, auditoriums, or anywhere high-quality 4K scaling of HDMI signals is required.



18 Gbps
4K/60 4:4:4

HDMI inputs and outputs support data rates up to 18 Gbps, delivering signals up to 4K/60 with 4:4:4 chroma sampling on a single cable. HDCP 2.3 compliance ensures display of content-protected media and interoperability with other HDCP-compliant devices.



The DSC 401 A model includes a convenient two-channel analog audio input for embedding audio onto the HDMI output, as well as a two-channel analog audio output for sending de-embedded audio to a sound system or other audio destination. It also delivers essential audio integration capabilities, including discrete, selectable analog and digital audio muting, analog input gain and attenuation, and output volume control.



Each scaler delivers consistent output resolution and sync to a display for glitch-free performance with upstream switchers. They also support custom EDID and output resolutions and offer a variety of seamless cut and fade transitions for professional-looking presentations. This is more effective and efficient than strictly relying on a display's scaling and sync lock capabilities. For incoming signals, dynamic input detection provides fast, accurate identification of unique resolutions common to military and medical installations and evolving AV source products.

COMMON FEATURES

4K/60 HDMI to HDMI scaling

High quality scaling of HDMI video resolutions and frame rates.

Advanced Extron Vector 4K scaling engine

The Vector 4K scaling engine is specifically designed for critical-quality 4K imagery, with best in class image upscaling and downscaling.

HDCP 2.3 compliant

Ensures display of content-protected media and interoperability with other HDCP-compliant devices.

Advanced 30-bit 4:4:4 signal processing

30-bit 4:4:4 signal processing maintains accuracy and fine picture detail.

Accepts HDMI video from 480i up to 4096x2160 @ 4:4:4

Selectable output rates from 640x480 up to 4096x2160 @ 4:4:4

Supported HDMI specification features include data rates up to 18 Gbps, Deep Color, and HD lossless audio formats

Motion-adaptive deinterlacing for signals up to 1080i

Advanced deinterlacing for all interlaced signals up to 1080i delivers optimized image quality.

Automatic 3:2 and 2:2 pulldown detection

Advanced film mode processing techniques that instantaneously detect and maximize image quality for NTSC, PAL, and 1080i sources that originated from film.

Seamless transitions

Automatically applies a seamless fade or cut when a new source is detected.

Supports custom EDID and output resolutions

User-defined output resolutions up to 600 MHz pixel clock can be supported by uploading custom EDID or capturing it from a display or other destination device.

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.

Scaler Bypass Mode

Allows scaling to be bypassed to support unprocessed transmission of 3D, HDR, and other formats.

Output Standby Mode

Can be set to automatically mute video and sync output to the display when no active input signal is detected. This allows the projector or display to automatically enter into standby mode to save energy and enhance lamp or panel life.

Internal video test patterns for calibration and setup

The scalers offer several video test patterns to facilitate proper system setup and calibration of display devices.

Output volume control

Provides master volume control for the HDMI audio inputs.

Integrated audio delay

The audio output is automatically delayed to compensate for latency introduced by video processing.

Selectable audio muting

Embedded HDMI audio can be muted. The analog audio output on the DSC 401 A can also be independently muted.

Easy setup and commissioning with Extron's PCS - Product Configuration Software

Conveniently configure multiple products using a single software application.

Real-time status LED indicators for troubleshooting and monitoring

LED indicators on the front panel provide visual confirmation of input signal presence, HDCP authentication, and power status.

Automatic input cable equalization

Actively conditions incoming HDMI signals to compensate for signal loss when using long cables, low quality cables, or source devices with poor signal output.

FEATURES EXCLUSIVE TO DSC 401 A

HDMI audio embedding

Audio from the analog input can be embedded onto the HDMI output.

HDMI audio de-embedding

Embedded HDMI two-channel PCM audio can be extracted to the analog output or multi-channel and bitstream formats can be passed to the output.

Logo image keying and display

A logo graphic can be positioned and keyed over live video. Logo graphics in BMP, GIF, JPG, PNG, or TIFF format may be uploaded to the unit. Full-screen images up to 4K resolution can also be displayed to eliminate loss of video between presentations.

Image freeze control

A live image can be frozen using USB or Ethernet control.

Auto Input Memory

When activated, the unit automatically stores size, position, and picture settings based on the incoming signal. When the same signal is detected again, these image settings are automatically recalled from memory.

Picture controls for horizontal and vertical sizing and positioning

Audio input gain and attenuation

Gain and attenuation can be adjusted for the analog audio input.

Pre-recorded audio file playback

Up to 16 pre-recorded messages may be stored and played back over the program audio output. Supported file types include WAV, MP3, AAC, and more.

CEC – Consumer Electronics Control capability

Standard, built in CEC commands can be triggered to control displays or other AV devices connected over HDMI. The ability to control specific functions, such as power on/off, input selection, or volume level, is dependent on implementation by the device manufacturer.

Ethernet monitoring and control

Enables control and proactive monitoring over a LAN or WAN. An intuitive Web interface is included for system monitoring and firmware updates.

Common Features

Front panel configuration port

Allows easy access for system configuration and firmware updates using Extron PCS software.

LED signal status indicators

Provide quick visual confirmation of input signal and HDCP status.

Front panel controls and on-screen display

Allow convenient access to device configuration and status.



HDCP 2.3 compliant

Ensures display of content-protected media and interoperability with other HDCP-compliant devices.

HDMI input and output

Accepts and delivers signals up to 4096x2160/60.

Output Standby Mode

Provides option to mute video and sync output when no active input signal is detected.

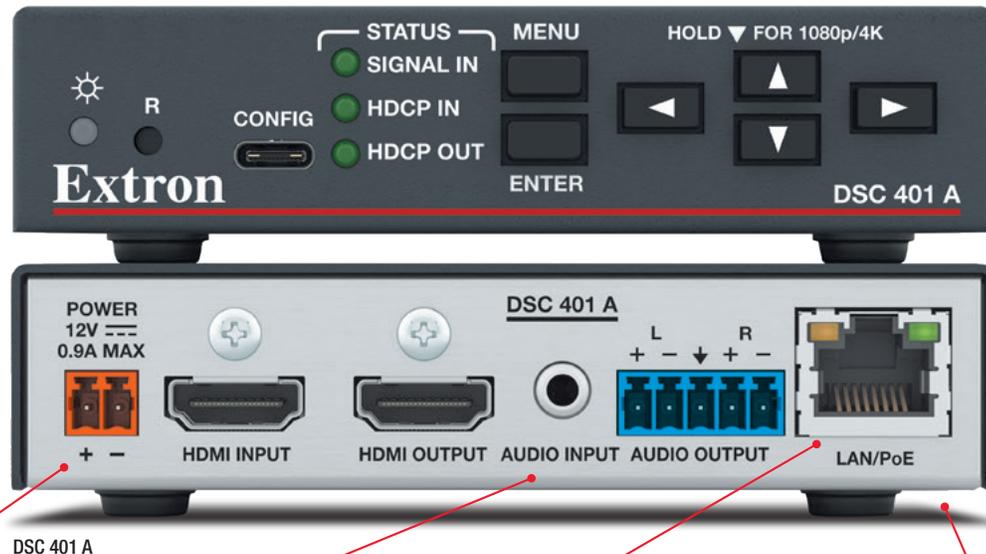
Scaler Bypass Mode

Allows scaling to be bypassed to support unprocessed transmission of 3D, HDR, and other formats.

Seamless Transitions

Automatically applies a seamless fade or cut when a new source is detected.

DSC 401 A Exclusive Features



CEC - Consumer Electronics Control capability

Standard, built in CEC commands can be triggered to control displays or other AV devices connected over HDMI.

Audio input and output

Embed analog audio onto the HDMI output, or de-embed HDMI two-channel PCM audio to the analog output.

Power over Ethernet

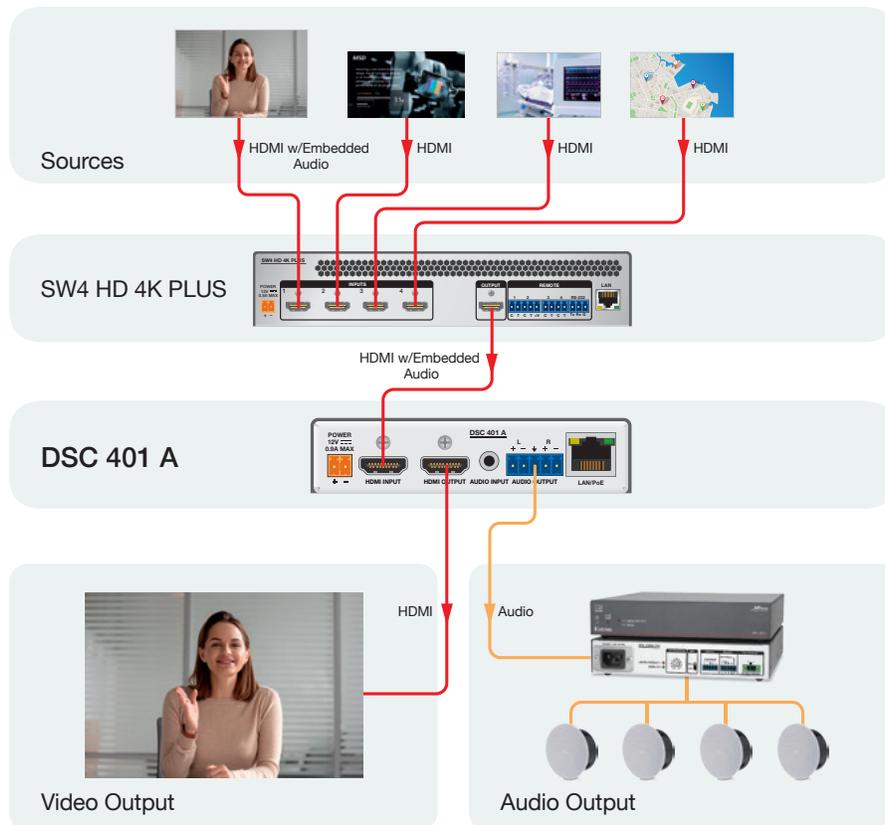
PoE allows the DSC 401 A to receive power and communication over a single Ethernet cable, eliminating the need for a local power supply.

Logo image keying and display

A logo graphic can be positioned and keyed over live video. Logo graphics in BMP, GIF, JPG, PNG, or TIFF format may be uploaded to the unit. Full-screen images up to 4K resolution can also be displayed to eliminate loss of video between presentations.

HDMI Audio Embedding & De-embedding

The DSC 401 A can embed two-channel analog audio on to the HDMI output signal. This feature is ideal for applications requiring a single HDMI feed to carry video and audio signals, such as in press rooms and presentation overflow rooms. Additionally, the DSC 401 A can de-embed audio from HDMI signals, increasing its versatility while streamlining installation.



Audio de-embedding example

Product Comparison

FEATURES	DSC 401	DSC 401 A
4K/60 HDMI inputs and outputs	✓	✓
HDCP 2.3 compliant	✓	✓
Vector 4K scaling	✓	✓
Seamless presentation of upstream devices	✓	✓
Custom EDID / output resolutions	✓	✓
Output Standby Mode	✓	✓
HDMI audio embedding and de-embedding		✓
Logo image keying and display		✓
Image freeze control		✓
Audio file playback		✓
Ethernet control		✓
PoE		✓
CEC capability		✓

The DSC 401 and the DSC 401 A provide high-performance video processing at the source or in a distribution system.

Both models feature Vector 4K scaling, engineered by Extron for the highest quality scaling and signal processing. Additional features such as HDCP 2.3 compliance, EDID Minder, and support for custom output resolutions maintain high-quality images with easy integration.

The DSC 401 A shares the same features as the DSC 401, as well as incorporating HDMI audio embedding and de-embedding, logo image keying and display, Ethernet monitoring and control, PoE, and many more useful capabilities.

VECTOR 4K SCALING

Extron Vector 4K Scaling Technology

For over 25 years, Extron has been engineering scaling and signal processing solutions that deliver uncompromised image quality and performance. As a result, we have become an industry leader in scaling technology, designing best-in-class products renowned for their quality, reliability, and ease of use. We continually refined our technology to keep pace with evolving video formats – from standard definition to high definition signals, and now, 4K. Our patented image processing technologies continue to set industry benchmarks for visual performance and efficiency.

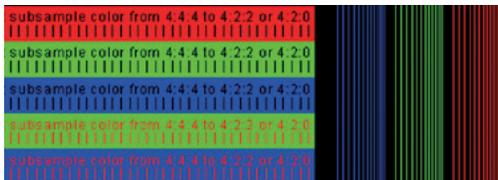
Engineered by Extron from the Ground Up

Vector 4K was developed internally by Extron's expert team of signal processing engineers. In-house development and continuous enhancement of this technology enables us to build products to our own exacting standards for image quality as well as operation and performance. Features such as 4:4:4 chroma sampling and bicubic scaling ensure very high image quality and preserve detail present in the original source material. Best in class scaling technology enables the products themselves to be smaller and available in a wider variety of form factors. They also run cooler, managing power more efficiently. The result is the ability to create cost-effective designs with integrated scalars in a wider offering of Extron products.

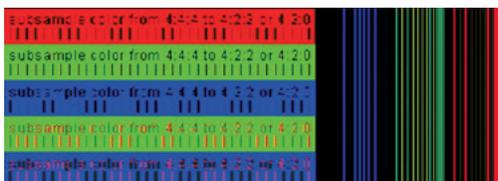


4:4:4 Chroma Sampling

Vector 4K processing is always performed in the RGB domain with full 4:4:4 color bandwidth, which is critical for processing fine image details. Competing 4K scalars commonly process in the component domain, employing 4:2:2 or 4:2:0 chroma



4:4:4 Chroma Sampling

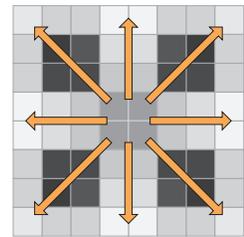


4:2:2 Chroma Subsampling

subsampling. This decreases the bandwidth required to process the signal, at the expense of reduced color detail. Chroma subsampling may be acceptable when processing full-motion video content, but subsampled color negatively impacts the clarity of computer-generated content. Vector 4K 4:4:4 color processing retains the original source's fine color details.

Bicubic Interpolation

The Vector 4K scaling engine incorporates Extron-patented, multi-tap, bicubic interpolation, which creates a new pixel by averaging adjacent pixels above, below, to the sides, and diagonally of the new pixel. This produces sharp, accurate output, preserving single-pixel detail that other scaling methods lack. Vector 4K algorithms continually and dynamically adapt, ensuring optimal processing for upscaling, downscaling, or 1:1 pass-through applications.



Bicubic Interpolation

Dynamic Digital Input Detection

Today's computer video standards allow for signal customization to suit the needs of a particular application or display. Such sources can present a challenge for signal processors that rely solely on fixed lookup tables of common resolutions, which are typically incomplete and quickly become obsolete. Dynamic input detection analyzes incoming digital video signals and accurately identifies the signal parameters before processing them for precise conversion and scaling.



Integration Features

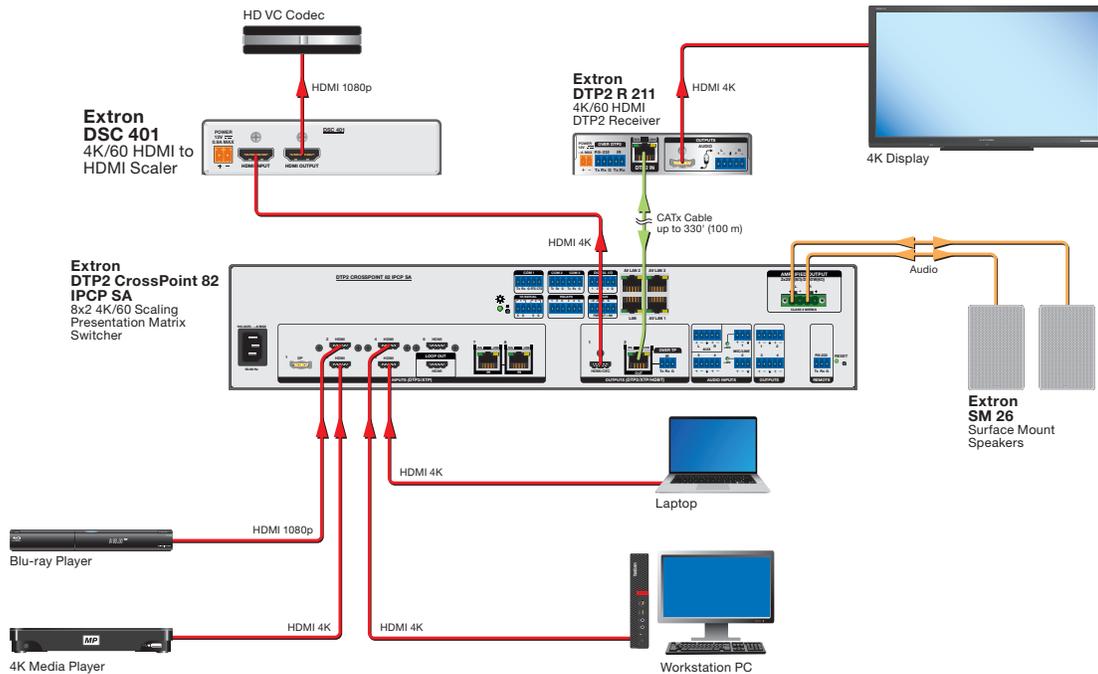
Vector 4K technology also provides features that aid in system integration, such as aspect ratio control, auto-memory and user presets, advanced HDCP management, and more.

Learn More

To learn more, visit www.extron.com/vector4k, where you can see interactive demonstrations of Vector 4K technology, watch a video highlighting key features, and download the brochure.

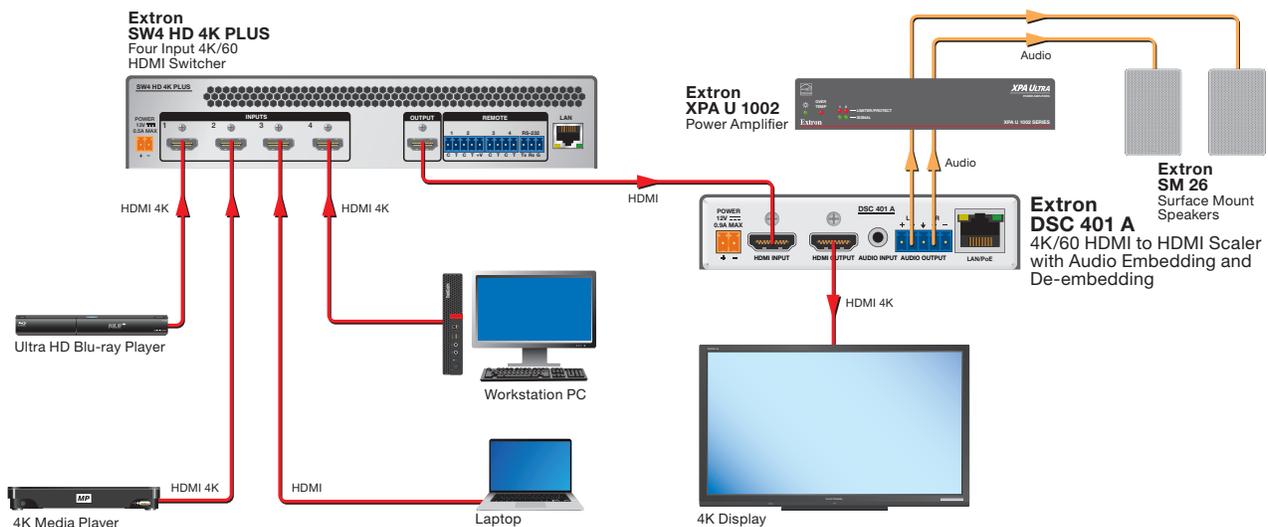
Videoconferencing Room

In a system with a mix of 4K and HD destinations, the DSC 401 is ideal for integrating 4K source signals with 1080p destinations such as streaming media and presentation capture systems and videoconferencing codecs. The DSC 401 is being used to optimize 4K video for the videoconferencing codec in this conference room system. The Vector 4K scaling engine ensures that 4K content is downscaled to 1080p with superior image quality by faithfully rendering detail and integrity of the original source.



Small Meeting Room

Meeting participants can share content or media and switch between any of the four sources, including 1080p and 4K resolutions. The DSC 401 A automatically scales the output from the SW4 HD 4K PLUS switcher to match the native 4K resolution of the display and ensure clean, glitch-free transitions between switches. At the same time, the scaler de-embeds HDMI audio from the sources. Audio is sent to a separate system consisting of an Extron XPA U 1002 power amplifier and two SM 26 surface mount speakers.



SPECIFICATIONS

TRUE 4K SPECIFICATION

Max. 4K Capabilities

Resolution and Refresh Rate	Chroma Sampling	Max Bit Depth per Color
4096 x 2160 at 30 Hz 3840 x 2160 at 30 Hz	4:4:4	10 bit
4096 x 2160 at 60 Hz 3840 x 2160 at 60 Hz		8 bit

Frame rate ¹	24, 25, 30, 50, or 60 fps
Chroma sampling ¹	4:4:4, 4:2:2, or 4:2:0 (4:2:0 supported on input only)
Color bit depth ¹	8 or 10 bits per color
Signal type	DVI 1.0, HDMI 1.4 and 2.0, HDCP 1.4 and 2.3
Max. video data rate	18 Gbps (6 Gbps per color)

NOTE: ¹Subject to the maximum data rate limit. Use our calculator at www.extron.com/8Kdata to determine video parameters supported by this data rate.

VIDEO INPUT

Number/signal type	1 HDMI/DVI (HDCP compliant)
Connector	1 female HDMI A
Horizontal frequency	15 KHz to 270 KHz
Vertical frequency	24 Hz to 240 Hz
Resolution range	640x480 to 4096x2160, 480i, 576i, 480p, 576p, 720p, 1080i, 1080p, 2K, and 3840x2160 to 4096x2160, up to 60 Hz
Standards	DVI 1.0, HDMI 1.4 and 2.0, HDCP 1.4 and 2.3

VIDEO PROCESSING

Digital sampling	8 or 10 bits per color, 600 MHz maximum pixel clock
Colors	1.07 billion (10 bit, 4:4:4 processing)

VIDEO OUTPUT

Number/signal type	1 HDMI/DVI (HDCP compliant)
Connector	1 female HDMI A
Power for active cables	1.1 W max. for the HDMI port
Peripheral device power	250 mA on the HDMI output
Vertical frequency	23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz, 50 Hz, 59.94 Hz, 60 Hz
Scaled resolutions	640x480 ⁸ , 800x600 ⁸ , 1024x768 ⁸ , 1280x768 ⁸ , 1280x800 ⁸ , 1280x1024 ⁸ , 1360x768 ⁸ , 1366x768 ⁸ , 1440x900 ⁸ , 1400x1050 ⁸ , 1600x900 ⁸ , 1680x1050 ⁸ , 1600x1200 ⁸ , 1920x1200 ⁸ , 2560x1080 ⁸ , 2560x1440 ⁸ , 2048x1200 ⁸ , 2048x1536 ⁸ , 2560x1600 ⁸ , 3840x2160 ^{1,2,3,4,5,6,7,8} , 4096x2160 ^{1,2,3,4,5,6,7,8} , and custom 1-5. 480p ^{7,8} , 576p ⁸ , 720p ^{1,2,3,4,5,6,7,8} , 1080i ^{6,7,8} , 1080p ^{1,2,3,4,5,6,7,8} , and 2K (2048x1080) ^{1,2,3,4,5,6,7,8} ¹ = at 23.98 Hz, ² = at 24 Hz, ³ = at 25 Hz, ⁴ = at 29.97 Hz, ⁵ = 30 Hz, ⁶ = at 50 Hz, ⁷ = at 59.94 Hz, ⁸ = at 60 Hz
Standards	DVI 1.0, HDMI 1.4 and 2.0, HDCP 1.4 and 2.3

AUDIO INPUT

Connectors	1 female HDMI A
DSC 401	1 female HDMI A
DSC 401 A	(1) 3.5 mm TRS (Tip – L, Ring – R, Sleeve – Ground)
CMRR	65 dB @ 1 kHz (DSC 401 A only)

AUDIO OUTPUT

Connectors	1 female HDMI A
DSC 401	1 female HDMI A
DSC 401 A	(1) 3.5 mm, 5 pole captive screw

COMMUNICATION

USB control port	1 female USB-C on front panel
Standard	Ethernet over USB (RNDIS)
Ethernet port	— DSC 401A only
Connector	1 female RJ-45
Ethernet default settings	Link speed and duplex: Auto-detected IP address: 192.168.254.254 Subnet mask: 255.255.0.0 Gateway: 0.0.0.0 DHCP: Off

GENERAL

Power supply	External Input: 100-240 VAC, 50-60 Hz
Power input connectors	(1) 2 pole captive screw, 12 VDC 1 RJ-45, PoE 48 VDC (DSC 401 A only)
Enclosure dimensions	1.0" H x 4.25" W x 6.0" D (1" high, quarter-rack wide) (250 mm H x 108 mm W x 152 mm D) (Depth excludes connectors.)
Regulatory compliance	UL, c-UL, CE, C-tick, FCC Class A, ICES, VCCI
Product warranty	3 years parts and labor
Everlast power supply warranty	7 years parts and labor

Model	Version Description	Part number
DSC 401	4K/60 HDMI to HDMI Scaler	60-1878-01
DSC 401 A	4K/60 HDMI to HDMI Scaler w/ Audio	60-1878-02

For complete specifications, please go to www.extron.com
Specifications are subject to change without notice.

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