

4K 4x1 Scaling Auto-Switcher and DM Lite® Extender over CATx Cable



- 4K/60 4:2:0 capability
- Transmitter and receiver with 4x1 AV switching, scaling, and signal extension functionality
- Two HDMI® inputs and one VGA input on transmitter and an additional HDMI input on receiver
- One 4K scaling HDMI output on receiver
- Automatic switching of inputs
- Signal extension of video, audio, and power over a CATx cable—up to 230 ft (70 m) for resolutions up to 2K or up to 130 ft (40 m) for higher resolutions up to 4K
- EDID management
- HDCP management
- Stereo audio de-embedding via the analog audio output
- IR, RS-232, relay, and I/O control ports
- CEC (Consumer Electronics Control) capability
- Gigabit Ethernet connectivity
- USB connection to Crestron® TT-100 Series Cable Caddy (sold separately)
- Built-in web interface for easy configuration and monitoring
- Compatibility with Crestron® 3-Series® or later control systems
- .AV Framework™ technology support
- Crestron XiO Cloud™ service support
- Low-profile installation
- 100-240 VAC power pack included

The Crestron® HD-MD-4K-400 provides a cost-effective multimedia presentation solution for classrooms and meeting spaces. Consisting of a transmitter (HD-TX-301-C-E) and receiver (HD-RX-4K-210-C-E), the HD-MD-4K-400 extends an HDMI® or VGA signal over a CATx (CAT5e or higher) twisted pair cable. For resolutions up to 2K, the maximum transmission distance is 230 ft (70 m). For higher resolutions up to 4K, the maximum transmission distance is 130 ft (40 m).¹

NOTE: Power is transmitted over the CATx cable that connects the transmitter to the receiver.

The transmitter provides two HDMI and one VGA input with a complementary stereo analog audio input. The receiver provides an additional HDMI input that can be connected to a local AV source or to an optional Crestron media presentation wall plate ([MP-WP152](#), sold separately).

Automatic Switching of Inputs

Automatic switching among the HDMI and VGA inputs on the transmitter and the HDMI input on the receiver can occur based on the last connected input or on the routing priority assigned to each input. Switching behavior is configurable using the web interface or programmable using a Crestron control system. In addition to automatic switching, input selection push buttons on the transmitter and receiver enable the desired input to be selected manually.

NOTE: The analog audio input on the transmitter is switched in tandem with the VGA input and cannot be paired with an HDMI input. The analog audio input can also be used with an audio-only source with no video source connected.

HDMI Output with 4K Scaler

A single HDMI output with a built-in scaler connects the receiver to a display or other device with an HDMI input. Input resolutions are automatically scaled to match the native resolution of the display device, resulting in optimal image quality. For applications requiring comprehensive EDID management, the web interface can be used to ensure that every input is displayed at its optimal resolution and format. Input resolutions up to 4K60 4:2:0 are supported.

Audio De-embedding

The analog audio output on the receiver enables the HD-MD-4K-400 to extract the stereo audio signal from digital sources to feed a sound bar, amplified speakers, or a separate sound system. The analog audio output is active only when the input is receiving a 2-channel stereo signal from the analog input or an HDMI input.

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Device Control

Equipped with onboard control ports, the receiver can control various devices in a room. The COM (RS-232) port and CEC over the HDMI output can enable the display device to be turned on or off automatically without the use of a control system. With the use of a control system, the IR port can also control the display device. Two relay ports are provided for controlling a projection screen and other low-voltage contact closure activated equipment. Two Versiport I/O ports enable the integration of devices such as power sensors and motion detectors. An Ethernet port connection to a LAN also provides control by enabling use of the built-in web interface as well as connection to a control system.

NOTE: The COM, IR, and Ethernet ports cannot be used to extend signals over the CATx cable connection between the receiver and the transmitter.

.AV Framework™ Technology Support

In addition to a built-in web interface and control system programming, the built-in .AV Framework technology of the [MPC3-201](#) and [MPC3-302](#) control systems can be used to control the HD-RX-4K-210-C-E as a switcher. (For information about .AV Framework technology, visit www.crestron.com/avframework.)

Crestron XiO Cloud™ Service Support

The HD-MD-4K-400 is compatible with the Crestron XiO Cloud service, which is a platform for remotely provisioning, monitoring, and managing Crestron devices across an enterprise or an entire client base. The service enables installers and IT managers to deploy and manage thousands of devices in the amount of time it previously took to manage a single device. For more information, visit www.crestron.com/xiocloud.

Low-Profile Installation

The transmitter and receiver can be placed on or attached to a flat surface. The transmitter can fit discreetly inside a presentation lectern or be attached to the underside of a table. The receiver can be mounted onto a wall behind a display or onto a ceiling above a projector. The devices can also be attached to a rack rail of an equipment cabinet.

Specifications

Video

Switcher 4x1 (3 inputs at transmitter plus 1 input at receiver x 1 output at receiver) auto-switching or manual, audio-follows-video, Crestron Auto-Locking® and QuickSwitch HD™ technologies

Scaler, HDMI Output 4K video scaler with intelligent frame rate conversion, Deep Color support, content-adaptive noise reduction, 3:2/2:2 pull-down detection and recovery

Input Signal Types HDMI with Deep Color and 4K (DVI and Dual-Mode DisplayPort™ interface compatible²), VGA/RGB (RGBHV, RGBS, RGsB), component (YPbPr)³

Output Signal Types HDMI with Deep Color and 4K (DVI compatible⁴)

Copy Protection Transmitter: HDCP 1.4
Receiver: HDCP 2.2

Maximum Resolutions Common resolutions are listed in the following table.

Input Type	Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
HDMI	Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	24 Hz	4:4:4	30 bit
			30 Hz	4:4:4	24 bit
			30 Hz	4:2:2	36 bit
			60 Hz	4:2:0	24 bit
		2560x1600 WQXGA	60 Hz	4:4:4	36 bit
VGA/RGB	Progressive	1600x1200 UXGA	60 Hz	—	—
		1920x1200 WUXGA	60Hz	—	—
Component	Progressive	1920x1080 HD 1080p	60Hz	—	—

NOTES:

- Custom resolutions are supported at pixel clock rates up to 300 MHz for HDMI input and up to 165 MHz for VGA input.
- Interlaced video sources are not supported.

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Scaler Resolutions, HDMI Output

Auto (EDID preferred)	3840x2160p@24Hz
1280x720p@50Hz (720p50)	3840x2160p@25Hz
1280x720p@60Hz (720p60)	3840x2160p@30Hz
1920x1080i@25Hz (1080i25)	4096x2160p@24Hz
1920x1080i@30Hz (1080i30)	4096x2160p@25Hz
1920x1080p@30Hz (1080p30)	4096x2160p@30Hz
1920x1080p@25Hz (1080p25)	3840x2160p@50Hz
1920x1080p@24Hz (1080p24)	3840x2160p@60Hz
1920x1080p@50Hz (1080p50)	4096x2160p@50Hz
1920x1080p@60Hz (1080p60)	4096x2160p@60Hz

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible ²), analog stereo
Output Signal Types	HDMI, analog stereo
Digital Formats	2-channel LPCM
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
Output Impedance	200 ohms balanced, 100 ohms unbalanced
Maximum Output Level	4 Vrms balanced, 2 Vrms unbalanced
Output Volume	-80 to +20 dB level adjustment range plus Mute
Mute	Enable or disable independently for HDMI and analog audio output
Analog Input Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB S/N Ratio: >93 dB, 20 Hz to 20 kHz, A-weighted THD+N: <0.005% @ 1 kHz Stereo Separation: >80 dB
Analog Output Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB S/N Ratio: >95 dB @ 10 dBV, 20 Hz to 20 kHz, A-weighted THD+N: <0.005% @ 1 kHz and 10 dBV Stereo Separation: 20 Hz to 20 kHz ≤80 dB
Acoustic Noise	Not applicable (fanless)

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, CIP, DHCP, web browser setup and control
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking
IR	1-way device control via infrared up to 60 kHz
HDMI	Transmitter: HDCP 1.4, EDID Receiver: HDCP 2.2, EDID, CEC
USB	USB host for one Crestron TT-100 Series Cable Caddy (sold separately)
DM Lite	HDCP 2.2, EDID

Connectors - Transmitter (HD-TX-301-C-E)

HDMI 1 - 2 INPUT	(2) HDMI Type A connectors, female; HDMI digital video/audio inputs (DVI and Dual-Mode DisplayPort interface compatible ²)
VGA 3 INPUT	(1) HD15 connector, female; RGB (VGA) or component video input; ³ Formats: RGBHV, RGBS, RGsB, YPbPr
AUDIO INPUT	(1) 3.5 mm TRS mini phone jack; Unbalanced stereo line-level audio input; Maximum Input Level: 2 Vrms; Input Impedance: 44k Ohms

NOTE: The analog audio input is switched in tandem with the VGA input and cannot be paired with an HDMI input. The analog audio input can also be used with an audio-only source with no video source connected.

TO RX (DM Lite)	(1) 8-pin RJ-45 connector, female, shielded; DM Lite® link port for connection to the HD-RX-4K-210-C-E receiver ¹
24 VDC 1.25A	(1) 2x1 x 5.5 mm DC power connector; 24 VDC power input; PW-2412WU power pack included
SERVICE	(1) USB Type A connector, female; USB host port for connection of a Crestron TT-100 Series Cable Caddy (sold separately)

NOTE: The power pack can power both the transmitter and the connected HD-RX-4K-210-C-E receiver. A power pack must not be connected to both devices simultaneously.

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Connectors - Receiver (HD-RX-4K-210-C-E)

HDMI INPUT 1 (1) HDMI Type A connector, female; HDMI digital video/audio input (DVI and Dual-Mode DisplayPort interface compatible²)

DM Lite INPUT 2 (1) 8-pin RJ-45 yellow connector, female, shielded; DM Lite link port for connection to the HD-TX-301-C-E transmitter¹

HDMI OUTPUT (1) HDMI Type A connector, female; HDMI digital video/audio output (DVI compatible⁴)

NOTE: CEC over the HDMI output provides Power On/Off control of the display device without a control system or full programmable control of any device with a control system.

AUDIO L/R (1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output; Maximum Output Level: 4 Vrms balanced, 2 Vrms unbalanced; Output Impedance: 200 ohms balanced, 100 ohms unbalanced

Ethernet (1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port

I/O 1-2 (2) 2-pin detachable terminal blocks; Comprised of 2 Versiport digital input/output or analog input ports (referenced to GND); Digital Input: Rated to 0-24 VDC, input impedance 20k ohms, logic threshold >3.125 V low/0 and <1.875 V high/1; Digital Output: 250 mA sink from maximum 24 VDC, catch diodes for use with real world loads; Analog Input: Rated for 0-10 VDC, protected to 24 VDC maximum, input impedance 21k ohms with pull-up resistor disabled; Programmable 5 V, 2k ohms pull-up resistor per pin

RELAY 1-2 (2) 2-pin detachable terminal blocks; Comprised of 2 normally open, isolated relays; Rated 1 A, 30 VAC/VDC; MOV arc suppression across contacts

IR (1) 2-pin 3.5 mm detachable terminal block; IR output control port; Supports IR up to 60 kHz; IRP2 emitter sold separately

NOTE: The IR port provides Power On/Off control of the display device with the use of a control system.

COM (1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Supports RS-232 up to 115.2k baud with hardware and software handshaking

NOTE: The COM port provides Power On/Off control of the display device without a control system or full programmable control of any device with a control system.

24V 1.25A (1) 2.1 x 5.5 mm DC power connector; 24 VDC power input; [PW-2412WU](#) power pack included

NOTE: The power pack can power both the HD-RX-4K-210-C-E receiver and the HD-TX-301-C-E transmitter. A power pack must not be connected to both devices simultaneously.

SERVICE (1) USB Type A connector, female; For factory use only

Controls and Indicators - Transmitter (HD-TX-301-C-E)

TO RX (DM Lite) (2) LEDs on RJ-45 connector. Green LED indicates DM Lite link status. Amber LED indicates a valid video signal.

PWR (1) LED, indicates that power is being applied to the HD-TX-301-C-E from the power pack connected to either the HD-TX-301-C-E or the receiver. Amber indicates that the HD-TX-301-C-E is booting. Green indicates that the HD-TX-301-C-E is operational.

AUTO (1) Push button to enable or disable automatic switching and (1) green LED to indicate that automatic switching is enabled

INPUT 1-3 (3) Push buttons for manual input selection and (3) bi-color green/amber LEDs to indicate the current active input and signal presence at each corresponding input

SETUP (1) Red LED and (1) recessed push button for Ethernet setup

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Controls and Indicators - Receiver (HD-RX-4K-210-C-E)

PWR	(1) LED, indicates that power is being applied to the HD-RX-4K-210-C-E from the power pack connected to either the HD-RX-4K-210-C-E or the transmitter. Amber indicates that the HD-RX-4K-210-C-E is booting. Green indicates that the HD-RX-4K-210-C-E is operational.
INPUT 1-2	(2) Push buttons for manual input selection and (2) LEDs. Green indicates that video is switched. Amber indicates that video is detected but is not switched.
AUTO	(1) Push button to enable or disable automatic switching and (1) green LED to indicate that automatic switching is enabled
SETUP	(1) Red LED and (1) push button for display of IP address on the HDMI output
DM Lite	(2) LEDs on RJ-45 connector. Green indicates that a DM Lite link is established. Flashing amber indicates non-HDCP video, and solid amber indicates HDCP video.
Ethernet	(2) LEDs on RJ-45 connector. Green indicates that an Ethernet link is established. Flashing amber indicates Ethernet activity.

Power

Power Pack (Included with Transmitter and Receiver)	Input: 100-240 VAC, 50/60 Hz Output: 1.25 A @ 24 VDC Model: PW-2412WU
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NOTE: A single power pack powers both the transmitter and receiver. A power pack must not be connected to both devices simultaneously.

Power Consumption	18.5 W typical
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Environmental

Temperature	32° to 104° F (0° to 40° C)
Humidity	Transmitter: 20% to 90% RH (non-condensing); Receiver: 10% to 90% RH (non-condensing)
Heat Dissipation	63.1 BTU/hr

Enclosure

Chassis	Metal, black finish, vented sides, 2 mounting flanges
Mounting	Surface or rack rail mount

Dimensions - Transmitter (HD-TX-301-C-E)

Height	1.11 in. (28 mm)
Width	7.70 in. (196 mm) with integral mounting flanges
Depth	5.12 in. (130 mm)

Dimensions - Receiver (HD-RX-4K-210-C-E)

Height	5.11 in. (130 mm)
Width	10.53 in. (268 mm) with mounting flanges attached
Depth	1.10 in. (28 mm)

Weight

Transmitter	20.0 oz (567 g)
Receiver	2.3 lb (1.05 kg)

Compliance

UL® Listed for US and Canada, CE, IC, FCC Part 15 Class B digital device

Model

HD-MD-4K-400
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Included Accessories

PW-2412WU
(2) Wall Mount Power Pack, 24 VDC, 1.25 A, 2.1 mm, Universal

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Available Accessories

AMP-X300

X Series Amplifier

AMP-150-70

Single-Channel Modular Power Amplifier, 50 W, 70 V

AMP-150-100

Single-Channel Modular Power Amplifier, 50 W, 100 V

AMP-2100

Dual-Channel Modular Power Amplifier, 100W/Ch., 4/8Ω

AMP-2100-70

Dual-Channel Modular Power Amplifier, 100W/Ch., 70 V

AMP-2100-100

Dual-Channel Modular Power Amplifier, 100W/Ch., 100 V

AMP-225

Dual-Channel Modular Power Amplifier, 25 W/Ch., 4/8 Ω

AMP-X50MP

X Series Media Presentation Amplifier

SAROS SB-200-P-B

Saros® Sound Bar 200, Powered, Black

IRP2

IR Emitter Probe with Terminal Block Connector

AM-200

AirMedia® Presentation System 200

MPC3-201-B

3-Series® Media Presentation Controller 201, Black

MPC3-302-B, -W

3-Series Media Presentation Controller 302, Black or White

CBL-HD-1.5, -3, -6, -12, -20

Crestron Certified HDMI Interface Cable, 18 Gbps, 1.5 ft (0.45 m), 3 ft (0.91 m), 6 ft (1.8 m), 12 ft (3.6 m), or 20 ft (6.1 m)

CBL-HD-30

Crestron Certified HDMI Interface Cable, 10.2 Gbps, 30 ft (9.1 m)

CBL-HD-DVI-1.5, -3, -6, -12, -20, -30

Crestron Certified HDMI to DVI Interface Cable, 1.5 ft, 3 ft, 6 ft, 12 ft, 20 ft, or 30 ft

CBL-HD-LOCK-2, -4, -8, -16

Locking High-Speed HDMI Cable, 10.2 Gbps, 2 ft (0.6 m), 4 ft (1.2 m), 8 ft (2.4 m), or 16 ft (4.8 m)

CBL-HD-THIN-HS-6

HDMI Cable, Thin, Type A Male-to-Male, 6 ft (1.83 m)

CBL-4K-DP-HD-6, -12

Active Converter Cable, DisplayPort to HDMI, 18 Gbps, 6 ft (1.8 m) or 12 ft (3.6 m)

CBL-4K-MDP-HD-6, -12

Active Converter Cable, Mini DisplayPort to HDMI, 18 Gbps, 6 ft (1.8 m) or 12 ft (3.6 m)

CBL-VGA-1.5, -3, -6, -12, -25

Crestron Certified Mini-TRS Stereo Audio Interface Cable, 1.5 ft, 3 ft, 6 ft, 12 ft, or 25 ft

CBL-VGA-AUD-3, -6, -12, -25

Crestron Certified Computer VGA Interface Cable with Audio, 3 ft, 6 ft, 12 ft, or 25 ft

CBL-AUDIO-1.5, -3, -6, -12

Crestron Certified Mini-TRS Stereo Audio Interface Cable, 1.5 ft, 3 ft, 6 ft, or 12 ft

DM-8G-CONN-WG-100

Connectors with Wire Guide for DM-CBL-8G DigitalMedia 8G™ Cable, 100-Pack

DM-8G-CRIMP-WG

Crimping Tool for DM-8G-CONN-WG

DM-CBL-8G-NP-SP1000

DigitalMedia 8G™ Cable, non-plenum, 1000 ft spool

DM-CBL-8G-P-SP1000

DigitalMedia 8G Cable, plenum, 1000 ft spool

DM-CBL-ULTRA-LSZH-SP1000

DigitalMedia™ Ultra Cable, Low Smoke Zero Halogen, 1000 ft spool (Available only in Europe)

DM-CBL-ULTRA-NP-SP1000

DigitalMedia Ultra Cable, Non-Plenum Type CMR, 1000 ft spool

DM-CBL-ULTRA-PC-5, -50

DigitalMedia Ultra Patch Cable, 5 ft (1.5 m) or 50 ft (15 m)

DM-CBL-ULTRA-P-SP1000

DigitalMedia Ultra Cable, Plenum Type CMP, 1000 ft spool

DM-CONN-20

Connectors for DM-CBL DigitalMedia Cable and DM-CBL-ULTRA DigitalMedia Ultra Cable, 20-Pack

DM-CONN-ULTRA-RECP-20

DigitalMedia Ultra Keystone RJ45 Jack, 20-Pack with Termination Tool

DM-RPP-K24

DigitalMedia 24-Port Keystone Patch Panel

MP-WP152-B, -W, -A

Media Presentation Wall Plate – HDMI Connectivity, Black, White, or Almond

TT-100-B-T, -GRY-T

Crestron Connect It™ Cable Caddy with 120 V Outlet, No Cables, Black Textured or Gray Textured

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TT-101-B-T, -GRY-T

Crestron Connect It Cable Caddy with Cables and 120 V Outlet, Black Textured or Gray Textured

TT-110-B-T, -GRY-T

Crestron Connect It Cable Caddy, No Cables or Outlet, Black Textured or Gray Textured

TT-111-B-T, -GRY-T

Crestron Connect It Cable Caddy with Cables, No Outlet, Black Textured or Gray Textured

Notes

1. For the DM Lite CATx cable connection, use Crestron DM-CBL-8G, Crestron DM-CBL-ULTRA, or third-party CAT5e or higher cable. To safeguard against unpredictable environmental electrical noise that may impact performance at resolutions above 1080p, shielded cable and connectors are recommended for all applications and are required when bundling multiple cables in a wire run. Wire and cables are sold separately. DM Lite ports are not compatible with DigitalMedia 8G+®, HDBaseT®, PoE, or PoDM technology or any other type of CATx based interface or network.
2. The HDMI input requires an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HDI-DVI interface cables are available separately.
3. The VGA input requires an appropriate breakout cable or adapter to accommodate an RGB or component video signal.
4. The HDMI output requires an appropriate adapter or interface cable to accommodate a DVI signal. CBL-HDI-DVI interface cables are available separately.

This product may be purchased from select authorized Crestron dealers and distributors. To find a dealer or distributor, please contact the Crestron sales representative for your area. A list of sales representatives is available online at www.crestron.com/How-To-Buy/Find-a-Representative or by calling 855-263-8754.

This product is covered under the Crestron standard limited warranty. Refer to www.crestron.com/warranty for full details.

The specific patents that cover Crestron products are listed online at patents.crestron.com.

Certain Crestron products contain open source software. For specific information, please visit www.crestron.com/opensource.

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