

HD-MD421

6x1 4K60 4:2:0 Multiformat AV Switcher



- 4K60 4:2:0 multiformat AV switcher
- Four HDMI® and two DM Lite® inputs with automatic switching
- One mirrored HDMI and DM Lite output
- 4K scaler
- EDID management
- HDCP 2.2 compliance
- One mono microphone input and three stereo line level audio inputs
- HDMI audio de-embedding
- 100BASE-TX Ethernet connectivity
- USB power port
- Device control
- Built-in web interface for easy configuration and monitoring
- Compatibility with Crestron® 3-Series® or later control systems
- .AV Framework™ technology support (coming soon)
- 1 RU rack-mountable design
- Universal 100-240VAC power pack included

The HD-MD421 is a 4K60 4:2:0 multiformat AV switcher that provides a cost-effective solution for professional AV applications. The HD-MD421 includes four HDMI® inputs, two DM Lite® inputs, and one mirrored HDMI and DM Lite output. The DM Lite output extends HDMI® signals over a CATx (CAT5e or higher) twisted pair cable. For HD 1080p, WUXGA, and 2K signals, a CATx cable length of up to 230 ft (70 m) is supported. For UHD and 4K signals, a CATx cable length of up to 130 ft (40 m) is supported.¹

Automatic Switching of Inputs

Automatic switching among the HDMI and DM Lite inputs occurs based on the last connected input or on the routing priority assigned to each input. An input can be routed to the mirrored HDMI and DM Lite output, which displays the same image.

Switching behavior is configurable using the web interface and is programmable using a Crestron control system. In addition, input selection push buttons on the front panel of the HD-MD421 enable the desired inputs to be selected manually.

4K Scaler

The mirrored HDMI and DM Lite output share a single 4K scaler. 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.

HDMI Audio De-embedding

Embedded HDMI 2-channel LPCM audio can be extracted from the selected HDMI or DM Lite input and transmitted to the AUX stereo audio output. Volume and mute control are configurable for the mirrored HDMI and DM Lite output, and the AUX audio output independently.

USB Power Port

A USB power port is included on the HD-MD421 to power USB powered devices (500mA maximum).

NOTE: No USB data is passed through the USB power port. The port cannot be used to extend USB data, video, or audio signals.

Automatic Display Power

The COM (RS-232) port can enable the display device to be turned on or off automatically without the use of a control system. The port also enables full programmable control of any device with the use of a control system. 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. For more information, see [Online Help Answer ID 1000921](#).

Built-In Web Interface

Configuration of the HD-MD421 can be accomplished by using the built-in web interface. The configuration of a single unit can be downloaded to a computer or mobile device and then uploaded to multiple HD-MD421 units to simplify system installation.

.AV Framework™ Technology Support (Coming Soon)

In addition to a built-in web interface and control system programming, built-in .AV Framework technology of a Crestron control system can be used to configure and control the HD-MD421. For information about .AV Framework technology and the supported Crestron control systems, visit www.crestron.com/avframework.

HD-MD421

6x1 4K60 4:2:0 Multiformat AV Switcher

1 RU Rack-Mountable Design

The HD-MD421 can be mounted into a 19-inch equipment rack using the included rack mount brackets. The device occupies 1 RU of rack space.

Specifications

Video

Switcher	6x1 auto-switching or manual, audio-follows-video, Crestron Auto-Locking® and QuickSwitch HD™ technologies
Input Signal Types	HDMI with Deep Color, 3D and 4K (DVI and Dual-Mode DisplayPort™ interface compatible ³)
Output Signal Types	HDMI and DM Lite with Deep Color, 3D and 4K60 4:2:0 support ^{1,2} (DVI compatible ³)
Copy Protection	HDCP 2.2
Maximum Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
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
1920x1080 HD 1080p	60 Hz	4:4:4	36 bit	

NOTES:

- Custom resolutions are supported at pixel clock rates up to 300 MHz.
- Interlaced video sources are not supported.

Scaler Output Resolutions, HDMI and DM Lite

Auto-HDMI Output (EDID preferred)

Auto-DM Lite Output (EDID preferred)

1280x720p@50Hz (720p50)

1280x720p@60Hz (720p60)

1920x1080p@24Hz (1080p24)

1920x1080p@25Hz (1080p25)

1920x1080p@30Hz (1080p30)

1920x1080p@50Hz (1080p50)

1920x1080p@60Hz (1080p60)

3840x2160p@24Hz

3840x2160p@25Hz

3840x2160p@30Hz

3840x2160p@50Hz

3840x2160p@60Hz

4096x2160p@24Hz

4096x2160p@25Hz

4096x2160p@30Hz

4096x2160p@50Hz

4096x2160p@60Hz

Audio - General

Digital-to-Analog Conversion 24-bit 48 kHz

Analog-to-Digital Conversion 24-bit 48 kHz

Frequency Response ±0.5 dB, 20 Hz to 20 kHz

THD+N <0.005%, 1 kHz, 10 dBV

S/N Ratio >95 dB, 10 dBV, 20 Hz to 20 KHz, A-weighted

Crosstalk ≤90 dB, 1 KHz, for multiple inputs only

Stereo Separation ≤80 dB, 20 Hz to 20 kHz

Audio - Source Inputs

Four HDMI and two DM Lite inputs (HDMI 1-4 and DM Lite 5-6)

Input Signal Types HDMI (Dual-Mode DisplayPort interface compatible³), DM Lite

Formats Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby® TrueHD, Dolby Atmos®, DTS®, DTS-ES, DTS 96/24, DTS HD® High Res, DTS-HD Master Audio, DTS:X®, LPCM up to 8 channels

Audio - Line Inputs

Three 2-channel line unbalanced inputs (LINE IN 1-3)

Input Signal Type Stereo analog

HD-MD421

6x1 4K60 4:2:0 Multiformat AV Switcher

Audio – Microphone Input

One single-channel microphone input

Input Signal Type	Mono analog
Gain Range	25 dB
Input Impedance	13.6K Ohms unbalanced
Phantom Power	+48VDC, 12mA, software enabled or disabled

Audio - Digital Output

Output Signal Type	HDMI
Formats	Dolby Digital, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS, DTS-ES, DTS 96/24, DTS HD High Res, DTS-HD Master Audio, DTS:X, LPCM up to 8 channels
Source	-80 dB to +20 dB adjustment range plus Mute
Master Volume	-80 dB to +20 dB adjustment range plus Mute

Audio - Analog Line Output

Output Signal Type/Format	Stereo 2-channel
Volume Control	-80 dB to +20 dB adjustment range plus Mute

Communications

Ethernet	100 Mbps, auto-negotiating, auto-discovery, full/half duplex, DHCP, web browser setup and control, Crestron control system integration
DM Lite	HDCP 2.2 and EDID
USB	To power a USB powered device
HDMI	HDCP 2.2 and EDID

Connectors

HDMI INPUT 1-4	(4) 19-pin Type A connector, female; HDMI digital video/audio inputs (DVI and Dual Mode DisplayPort interface compatible ³)
DM LITE INPUT 5-6	(2) 8-pin RJ-45 yellow connector, female, shielded DM Lite input ports for connection to a DM Lite transmitter ⁴

HDMI OUTPUT	(1) 19-pin Type A connector, female; HDMI digital video/audio output (DVI compatible ³); Mirrored with DM LITE output
DM LITE OUTPUT	(1) 8-pin RJ-45 yellow connector, female, shielded; DM Lite output port for connection to a DM Lite receiver ⁵ ; Mirrored with HDMI output
MIC	(1) 3-pin 3.5 mm detachable terminal block; Unbalanced microphone level audio input
LINE IN 1-3	(3) 3-pin 3.5 mm detachable terminal block; Unbalanced stereo line-level audio input; Input Impedance: >10K Ohms; Maximum Output Level: 2 Vrms unbalanced
AUX OUT	(1) 5-pin 3.5 mm detachable terminal block; Balanced stereo line-level audio output; Output Impedance: <100 Ohms; Maximum Output Level: 4 Vrms balanced
COM	(1) 3-pin 3.5 mm detachable terminal block; RS-232 port, for TX only; 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 fully programmable control of any device with a control system.

Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX Ethernet port
24V 4.0A	(1) 2.1 x 10 mm DC power connector; 24VDC power input; Power pack included (model TBA)
SERVICE	(1) USB Type A female; Provides up to 5V 500mA power to USB powered device

Controls and Indicators

PWR	(1) LED. Amber indicates that the device is booting. Green indicates that the device is operational.
INPUT 1-6	(6) Push buttons for manual input selection and (6) LEDs. Green indicates that the corresponding input is routed to an output. Amber indicates that a source is detected at the corresponding input but is not routed to an output.
AUTO	(1) Push button to enable or disable automatic switching, and (1) green LED to indicate that automatic switching is enabled

HD-MD421

6x1 4K60 4:2:0 Multiformat AV Switcher

SETUP	(1) Red LED and (1) push button for display of IP address on connected HDMI and DM Lite output
DM Lite 5-6 INPUT	(2) LEDs on RJ-45 connector; Green indicates that a DM Lite link is established. Flashing amber indicates non-HDCP video. Solid amber indicates HDCP video.
DM Lite OUTPUT	(2) LEDs on RJ-45 connector; Green indicates that a DM Lite link is established. Flashing amber indicates non-HDCP video. Solid amber indicates HDCP video
Ethernet	(2) LEDs on RJ-45 connector; Green indicates that a 100BASE-TX link is established. Flashing amber indicates Ethernet activity.

Power

Power Pack (Included)	4.0A @ 24VDC; 100-240VAC, 50/60 Hz; Model: TBA
------------------------------	--

NOTE: This power connection powers the HD-MD421 and all devices connected to the DM Lite input and output ports. Power should not be connected to the HD-MD421 and DM Lite devices simultaneously.

Power Consumption	35 W typical
--------------------------	--------------

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	119 BTU/hr typical
Acoustic Noise	Not applicable (fanless)

Construction

Chassis	Metal, black finish, vented top and bottom
Mounting	Freestanding or 1 RU 19-inch rack-mountable (rack mount brackets included)

Dimensions

Height	1.72 in. (44 mm)
Width	17.32 in. (440 mm)
Depth	7.06 in. (180 mm)

Weight

5.3 lb (2.35 kg)

Compliance

Regulatory Model: M202028002
CE, IC, FCC Part 15 Class B digital device

Model

HD-MD421
6x1 4K60 4:2:0 Multiformat AV Switcher

Available Accessories

For a list of available accessories, visit the [HD-MD421](#) product page.

Notes:

- For DM Lite connections, 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 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.
- 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.
- The HDMI output requires an appropriate adapter or interface cable to accommodate a DVI signal. CBL-HDI-DVI interface cables are available separately.
- Only the [HD-TX-101-C-E](#) and [HD-TX-101-C-1G-E](#) DM Lite transmitters are supported.
- Only the [HD-RX-101-C-E](#), [HD-RXC-101-C-E](#), [HD-RX-101-C-1G-E](#), and [HD-RXC-101-C-1G-E](#) DM Lite receivers are supported.

When connected to the DM Lite output ports, the following devices support extension of audio and video signals only: [HD-RX-201-C-E](#), [HD-RX-4K-210-C-E](#), [HD-RX-4K-210-C-E-POE](#), [HD-RX-4K-410-C-E](#), [HD-RX-4K-410-C-E-SW4](#), [HD-RX-4K-510-C-E](#), and [HD-RX-4K-510-C-E-SW4](#). The HD-MD402 user interface does not support configuration of those devices. They require a separate LAN connection and must be configured through their own web interface.

HD-MD421

6x1 4K60 4:2:0 Multiformat AV Switcher

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 contact us for additional information by visiting <https://www.crestron.com/contact/our-locations> for your local contact.

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.

Crestron, the Crestron logo, .AV Framework, 3-Series, Auto-Locking, DigitalMedia, DigitalMedia 8G, DM Lite, and QuickSwitch HD are either trademarks or registered trademarks of Crestron Electronics, Inc. in the United States and/or other countries. Dolby, Dolby Atmos, and Dolby Digital are either trademarks or registered trademarks of Dolby Laboratories in the United States and/or other countries. DTS, DTS-HD, and DTS:X are either trademarks or registered trademarks of DTS, Inc. in the United States and/or other countries. HDBaseT is either a trademark or registered trademark of the HDBaseT Alliance in the United States and/or other countries. HDMI and the HDMI logo are either trademarks or registered trademarks of HDMI Licensing LLC in the United States and/or other countries. DisplayPort is either a trademark or registered trademark of Video Electronics Standards Association in the United States and/or other countries. Other trademarks, registered trademarks, and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Crestron disclaims any proprietary interest in the marks and names of others. Crestron is not responsible for errors in typography or photography.

HDMI

Specifications are subject to change without notice.

©2022 Crestron Electronics, Inc.

Rev 04/01/22

HD-MD421

6x1 4K60 4:2:0 Multiformat AV Switcher

