# HD-MD4X4-4KZ-E

## 4x4 4K60 4:4:4 HDR AV Switcher



- *4K60 4:4:4 digital AV switcher*
- *HDR10, HDR10+, and Dolby Vision® video formats*
- *Four HDMI® inputs and four HDMI outputs*
- *EDID management*
- *HDCP 2.3 compliance*
- *HDMI audio de-embedding*
- *Device control via CEC*
- *Enterprise-grade security*
- *Built-in web interface*
- *Compatibility with Crestron® 3-Series® or later control systems*
- *.AV Framework™ technology support*
- *XiO Cloud® service support*
- *1 RU rack-mountable design*
- *PoE+ powered device (optional power pack sold separately)*

The HD-MD4X4-4KZ-E is a 4K60 4:4:4 HDR (High Dynamic Range) AV switcher that provides a cost-effective solution for professional AV applications. Equipped with four HDMI® inputs and four HDMI outputs, the HD-MD4X4-4KZ-E includes features such as EDID management, HDCP 2.3 compliance, enterprise-grade security, and XiO Cloud® service support.

### 4K60 4:4:4 and HDR Support

The HD-MD4X4-4KZ-E supports video resolutions up to 4K60 with 4:4:4 color sampling. HDR10, HDR10+, and Dolby Vision® video formats are also supported.

### EDID Management

The HD-MD4X4-4KZ-E provides comprehensive management of EDID (Extended Display Identification Data) to ensure that every source is displayed at the optimal resolution and format. For applications requiring a custom configuration, the HD-MD4X4-4KZ-E enables assessment of the format and resolution capabilities of any device that is connected to an HDMI output of the switcher. The HD-MD4X4-4KZ-E provides the ability to configure signals appropriately for the most desirable and predictable behavior.

### HDMI Audio De-embedding

Embedded HDMI 2-channel LPCM audio can be extracted from the selected HDMI input and transmitted to either of the two AUX stereo audio outputs. Volume and mute control are configurable for each of the HDMI outputs and for each of the two AUX audio outputs independently.

### Device Control via CEC

Under the management of a control system, CEC (Consumer Electronics Control) over the HDMI connections can control the source and display devices, potentially eliminating the need for dedicated serial cables or IR emitters. CEC over the HDMI outputs can also enable the display devices to be turned on or off automatically without the use of a control system.

### Enterprise-Grade Security

The HD-MD4X4-4KZ-E includes advanced security features and protocols. Using 802.1X authentication, Active Directory® credential management, PKI authentication, TLS, SSH, and HTTPS, the HD-MD4X4-4KZ-E provides a true enterprise-grade AV switcher.

### Built-In Web Interface

Configuration of the HD-MD4X4-4KZ-E 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-MD4X4-4KZ-E units to simplify system installation.

### .AV Framework™ Technology Support

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-MD4X4-4KZ-E. For information about .AV Framework technology and the supported Crestron control systems, visit www.crestron.com/avframework.

### XiO Cloud® Service Support

The HD-MD4X4-4KZ-E is compatible with the XiO Cloud service, which is an IoT (Internet of Things) platform for remotely provisioning, monitoring, and managing Crestron devices across an enterprise or an entire client base. Built on the Microsoft® Azure® software platform and using industry-leading Azure IoT Hub technology, the XiO Cloud 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. Unlike other virtual machine-based cloud solutions, Azure services provide unlimited scalability to suit the ever-growing needs of an enterprise. For more information, visit www.crestron.com/xiocloud.

### 1 RU Rack-Mountable Design

The HD-MD4X4-4KZ-E can be mounted into a 19-inch EIA equipment rack using the included rack ears. The device occupies 1 RU of rack space.

## Specifications

### Video

| | |
|---|---|
| **Input Signal Types** | HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, 4K60 4:4:4: support[1, 2] (DVI and Dual-Mode DisplayPort™ interface compatible[3]) |
| **Output Signal Types** | HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[1, 2] (DVI compatible[4]) |
| **Switcher** | 4x4 digital AV switcher |
| **Copy Protection** | HDCP 2.3 |
| **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 | 36 bit |
| | | 30 Hz | 4:4:4 | 36 bit |
| | | 60 Hz | 4:2:2 | 36 bit |
| | | 60 Hz | 4:4:4 | 24 bit |
| | 2560x1600 WQXGA | 60 Hz | 4:4:4 | 36 bit |
| | 1920x1080 HD 1080p | 60 Hz | 4:4:4 | 36 bit |
| Interlaced (Input Only) | 1920x1080 HD 1080i | 30 Hz | 4:4:4 | 36 bit |

**NOTE:** Custom resolutions that do not exceed 4096 pixels in width and 2160 pixels in height are supported at pixel clock rates up to 600 MHz.

### Audio - General

| | |
|---|---|
| **Digital-to-Analog 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

| | |
|---|---|
| **Input Signal Type** | HDMI (Dual-Mode DisplayPort interface compatible[3]) |
| **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 - 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, Mono, and Stereo |

### Communications

| | |
|---|---|
| **Ethernet** | 100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, DHCP, Web browser setup and control, Crestron control system integration, 802.1X, Secure CIP, Authentication, SSH/SSL, TLS |
| **USB** | For firmware loading and configuration management and to power a USB powered device |

**NOTE:** USB functionality requires use of the PW-2420RU power pack (sold separately).

| | |
|---|---|
| **HDMI** | HDCP 2.3, EDID, CEC |

### Connectors

| | |
|---|---|
| **HDMI IN 1-4** | (4) 19-pin Type A connector, female; HDMI digital video/audio inputs (DVI and Dual-Mode DisplayPort interface compatible[3]) |
| **HDMI OUT 1-4** | (4) 19-pin Type A connector, female; HDMI digital video/audio outputs (DVI compatible[4]) |

| | |
|---|---|
| **AUDIO OUT, AUX 1-2** | (2) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output; Output Impedance: <100 Ohms; Maximum Output Level: 4 Vrms balanced, 2 Vrms unbalanced |
| **LAN PoE+** | (1) 8-pin RJ-45 female; 100BASE-TX/1000BASE-T Ethernet port; IEEE 802.3at Type 2 Class 4 (25.5 W) PoE+ compliant, capable of being powered by PoE+ power sourcing equipment (PSE)[5] |
| **24 VDC 2.5 A** | (1) 2.1 x 5.5 mm DC power connector; 24 VDC power input; PW-2420RU power pack (sold separately) |
| **SERVICE** | 1) USB Type A female; For firmware loading and configuration management; Can also provide up to 5 V 500 mA power to USB powered device |

> **NOTE:** USB functionality of the SERVICE port requires use of the PW-2420RU power pack (sold separately).

| | |
|---|---|
| **G** | (1) 6-32 screw, chassis ground lug |

## Controls and Indicators

| | |
|---|---|
| **PWR** | (1) LED. Amber indicates that the device is booting. Green indicates that the device is operational. |
| **INPUT 1-4** | (4) Push buttons for manual input selection and (4) 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. |
| **OUTPUT 1-4** | (4) Push buttons for manual output selection and (4) LEDs. Green indicates that a display or other destination device is detected and the corresponding output is transmitting video. Amber indicates that a display or other destination device is detected but no video is routed to the corresponding HDMI output. |
| **SETUP** | (1) Red LED and (1) push button for display of IP address on connected HDMI outputs |
| **Ethernet** | (2) LEDs on RJ-45 LAN connector. Link status LED: Green indicates that a 100BASE-TX link is established. Amber indicates that a 1000BASE-T link is established. Ethernet activity LED: Flashing amber indicates Ethernet activity. |

## Power

| | |
|---|---|
| **PoE+** | IEEE 802.3at Type 2 Class 4 (25.5 W) PoE+ compliant, capable of being powered by PoE+ power sourcing equipment (PSE)[5] |
| **Power Pack (Optional)** | Input: 1.3 A (maximum) @ 100-240 VAC, 50/60 Hz; Output: 2.5 A @ 24 VDC; Model: PW-2420RU (sold separately) |

> **NOTE:** The PW-2420RU power pack is required for USB functionality.

| | |
|---|---|
| **Power Consumption** | 17 W typical |

## Environmental

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|---|---|
| **Temperature** | 32° to 104° F (0° to 40° C) |
| **Humidity** | 10% to 90% RH (noncondensing) |
| **Heat Dissipation** | 58 BTU/hr typical |
| **Acoustic Noise** | 33.55 dBA |

## Construction

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|---|---|
| **Chassis** | Metal, black finish, vented sides |
| **Mounting** | 1 RU 19-inch rack-mountable (rack ears included) |

## Dimensions

| | |
|---|---|
| **Height** | 1.72 in. (44 mm) |
| **Width** | 17.33 in. (441 mm) without rack ears |
| **Depth** | 7.02 in. (179 mm) |

## Weight

5.15 lb (2.37 kg)

## Compliance

| | |
|---|---|
| **Regulatory Model** | M201946003 |

Bureau Veritas Listed for US & Canada, IC, CE, FCC Part 15 Class B digital device

## Model

**HD-MD4X4-4KZ-E**
4x4 4K60 4:4:4 HDR AV Switcher

## Available Accessories

**PW-2420RU**
Desktop Power Pack, 24 VDC, 2.5 A, 2.1 mm

**CEN-SWPOE-16**
16-Port Managed PoE Switch

**CBL-HD-1.5**
Crestron Certified HDMI Interface Cable, 18 Gbps,
1.5 ft (0.45 m)

**CBL-HD-3**
Crestron Certified HDMI Interface Cable, 18 Gbps,
3 ft (0.91 m)

**CBL-HD-6**
Crestron Certified HDMI Interface Cable, 18 Gbps,
6 ft (1.8 m)

**CBL-HD-12**
Crestron Certified HDMI Interface Cable, 18 Gbps,
12 ft (3.6 m)

**CBL-HD-20**
Crestron Certified HDMI Interface Cable, 18 Gbps,
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**
Crestron Certified HDMI to DVI Interface Cable, 1.5 ft (0.45 m)

**CBL-HD-DVI-3**
Crestron Certified HDMI to DVI Interface Cable, 3 ft (0.91 m)

**CBL-HD-DVI-6**
Crestron Certified HDMI to DVI Interface Cable, 6 ft (1.8 m)

**CBL-HD-DVI-12**
Crestron Certified HDMI to DVI Interface Cable, 12 ft (3.6 m)

**CBL-HD-DVI-20**
Crestron Certified HDMI to DVI Interface Cable, 20 ft (6.1 m)

**CBL-HD-DVI-30**
Crestron Certified HDMI to DVI Interface Cable, 30 ft (9.1 m)

**CBL-HD-LOCK-2**
Locking High-Speed HDMI Cable, 10.2 Gbps, 2 ft (0.6 m)

**CBL-HD-LOCK-4**
Locking High-Speed HDMI Cable, 10.2 Gbps, 4 ft (1.2 m)

**CBL-HD-LOCK-8**
Locking High-Speed HDMI Cable, 10.2 Gbps, 8 ft (2.4 m)

**CBL-HD-LOCK-16**
Locking High-Speed HDMI Cable, 10.2 Gbps, 16 ft (4.8 m)

**MPI-WP150-120**
Media Presentation Wall Plate – International Version –
HDMI with Mini-TRS Stereo Audio, White

**MPI-WP150-122**
Media Presentation Wall Plate – International Version –
HDMI with Mini-TRS Stereo Audio, Anthracite

**MP-WP152-A**
Media Presentation Wall Plate – HDMI, Almond

**MP-WP152-B**
Media Presentation Wall Plate – HDMI, Black

**MP-WP152-W**
Media Presentation Wall Plate – HDMI, White

Notes:

1. 3D formats are not supported.

2. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.

3. 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.

4. The HDMI output requires an appropriate adapter or interface cable to accommodate a DVI signal. CBL-HDI-DVI interface cables are available separately.

5. In order for the LAN PoE+ port to receive PoE+, the port must be connected to a PoE+ compliant Ethernet switch or to other equipment that has a PoE+ power sourcing equipment (PSE) port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.

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.

Rev 09/16/20

CRESTRON

17.33 in.
(441 mm)

17.17 in.
(437 mm)

1.72 in.
(44 mm)

7.02 in.
(179 mm)

6.83 in.
(174 mm)