DM-MD16X16

16x16 DigitalMedia™ Switcher

Crestron DM Switchers provide the foundation for a complete DigitalMedia system, delivering an advanced, true high-definition multi-room AV signal routing solution that's extremely flexible and installer-friendly. The DM-MD16X16 affords low-latency switching and pure, lossless distribution of HDMI and other signals to support the latest Blu-ray Disc™ players, HDTV receivers, digital media servers, computers, video game consoles, and all your other AV devices.

The DM-MD16X16 is field-configurable to handle up to 16 AV sources of virtually any type. The outputs are factory-configurable to provide up to 16 DM room outputs and/or HDMI outputs in a single chassis, with expansion capability possible for up to 80 outputs using multiple chassis. A full selection of DM switcher input cards, DM transmitters, and DM room controllers provides extensive connectivity throughout the home or office, supporting a complete range of analog and digital signal types — all through one switcher! User-friendly setup and troubleshooting tools are provided through the DM-MD16X16 front panel, or via **Crestron Toolbox™** software, to make setting up a complete multi-room HD system easy.

To configure a DM switcher complete with input and output cards, cables, and other peripherals, please use the **DigitalMedia™ Switcher** Configuration Tool.

DigitalMedia™

You can't talk about AV and home entertainment today without talking about high-definition, and creating a professional HD AV distribution system means handling the challenges that come with HDMI. HDMI is the new standard for interfacing high-definition AV equipment, but despite its many benefits, wasn't developed with multi-room distribution in mind. So, as the leader in HDMI and control system technologies, Crestron has developed DigitalMedia, the first complete HD AV distribution system that takes HDMI to a higher level, and allows virtually any mix of AV sources to be distributed throughout the home from a centralized rack location.

DigitalMedia (DM) distributes uncompressed digital video and audio signals over a choice of CAT5e/6 -based twisted-pair wire or multi-mode fiber. DigitalMedia thoughtfully manages all of the different signals and devices, matching each source's output to the capabilities of the selected display(s) without using scaling or compression. Every signal is preserved in its native video resolution and audio format, ensuring a pure, lossless signal path throughout.

Of course DigitalMedia handles more than just audio and video. Integrated Ethernet and USB HID distribution allows computers, media servers, and video game consoles to be installed out-of-sight and accessed from anywhere in the house. And naturally, Crestron control is also built-in for controlling the displays and other room devices without additional wiring.

Modular Architecture

The DM-MD16X16 features a modular architecture with 16 input card slots. Input cards are field-installable, allowing for easy and flexible system configuration with the ability to make changes to the system as needs change. A wide selection of DM input cards is offered to support a complete range of digital and analog AV signal types.

The outputs on the DM-MD16X16 are factory-configurable to feed up to 16 DM Room Controllers (receivers) using either **DigitalMedia Cable** or **CresFiber** fiber optic cable. DigitalMedia allows for cable lengths up to 450 feet (137 m) using DM cable, or 1000 feet (300 m) using CresFiber. HDMI outputs are also available for direct connection to centralized audio processors and video monitors.

Output Expansion

An HDMI "pass-thru" output is provided on every input card to allow the inputs of up to 5 DM switchers to be daisy-chained, enabling the configuration of very large distribution systems with many DM and HDMI outputs.

Versatile Audio Routing

HDMI is the key to handling all the latest 7.1 surround sound formats like Dolby® TrueHD and DTS-HD Master Audio. Great for your high-end home theater, but how do you share that same source with other audio zones in the house?

DigitalMedia provides the answer, allowing for the simultaneous distribution of multi-channel surround sound and two-channel stereo signals from the same HDMI source. Equipped with a **DMC-HD-DSP** input card, the DM-MD16X16 employs onboard DSP processing to derive a stereo down-mix from the original multi-channel signal. Both signals can be routed separately or simultaneously from any of the switcher's DM outputs, allowing either signal to be selected for output at each DM receiver location.

Back at the switcher, the digital stereo signal is also converted to analog to enable sharing with every other room in the house via an **AAE**, **CNX-PAD8A**, or other multi-room audio distribution system. The DM-MD16X16 also allows bulky surround sound processors and amplifiers to be located centrally instead of at the display location via optional local HDMI outputs.

Computer Compatibility

Besides handling every available HDTV format supported by HDMI, DigitalMedia also supports the distribution of DVI, DisplayPort Multimode*, and RGB computer signals, and is fully compatible with DVI computer monitors up to 1920 x 1200 WUXGA.

Built-in Ethernet Switch

In addition to digital video and audio, DigitalMedia also carries 10/100 Ethernet to each Room Controller, supporting streaming media

for multimedia devices, or just providing LAN connectivity for any room device that requires Ethernet or Internet access. Its Gigabit Ethernet connection to the external LAN helps maximize bandwidth for each network port. Ethernet is also utilized internally by the Crestron control bus to manage all of the DM devices in the system and provide display control in each room.

USB HID Switch
DigitalMedia lets you centralize ALL of your HD sources - not just television receivers and DVD changers, but also media servers, computers, and even video game consoles. Built-in USB HID (Human Interface Device) signal routing allows USB HID compatible keyboards, mice, and game controllers to be connected at a remote display location, conference table or presentation lectern, extending their signals through to the centralized equipment via USB HID ports provided on select switcher input cards.

EDID Format Management
With HDMI comes a slew of confusing video and audio formats to keep track of, and chances are not every device in your system supports all of the same formats. In a typical one-room system, HDMI attempts to resolve this confusion using EDID (Extended Display Identification Data). When two HDMI devices are connected together, the receiving device (a display or surround sound processor) uses EDID to announce its format capabilities to the source device (a TV tuner or video player), which in turn configures itself to output the most effective format that both devices can support.

But, try to distribute a bunch of disparate sources to a house full of different displays and audio systems, and you're likely to experience some serious conflicts and disappointing picture and sound quality. For instance, the Blu-ray player that's feeding your 1080p projector in the theater may restrict itself to a lower resolution, or even shut off completely, if someone decides to view the same signal on the 20" TV in the kitchen. And instead of enjoying the incredible 7.1 Dolby TrueHD format supported by your high-end theater sound system, you may find your listening experience limited to Dolby 5.1, or even plain old stereo.

The DM-MD16X16 takes full advantage of EDID to prevent such conflicts, assessing the formats supported by each system device, and then allowing the installer to assign compatible devices in logical arrangements. Conflicting combinations can be prohibited so only the optimum signal formats get delivered to each display and audio system in the house. All DigitalMedia wiring is also tested for integrity and bandwidth capability, optimizing system operation by instructing sources to output only resolutions and formats that the wiring can reliably handle.

QuickSwitch HD™ Technology
Crestron exclusive QuickSwitch HD technology minimizes the annoying switching latency that plagues typical HDMI switchers. As the move to digital takes hold, more and more movie studios and television service providers are using HDCP (High-bandwidth Digital Content Protection) to protect their DVDs, Blu-ray Discs, and broadcast signals against unauthorized copying. Viewing the HDCP encrypted content in its full high-definition format requires a source device to "authenticate" each display and signal processor in the system through an HDMI connection before delivering an output signal. Normally the authentication process occurs every time any HDMI signal is switched, causing a complete loss of signal for up to 15 seconds whenever a new source or display is selected anywhere in the system.

QuickSwitch HD technology achieves very fast switching of HDMI signals by maintaining a constant HDCP connection with each HDMI device in the system, eliminating the need to re-authenticate each time a different source is selected.

that occurs between any two devices. Every HDMI source device has a limit to how many downstream devices it can support, determined by the number of HDCP keys it has available. Rarely is that limit advertised or specified by the manufacturer or service provider, so connect too many displays or processors and the source will simply stop outputting a signal without warning.

To prevent such surprises, the DM-MD16X16 tests the HDCP limits of each HDMI source, allowing the installer to configure the system around any limitations, or substitute a different component.

CEC Embedded Device Control
The primary objective of every Crestron system is to enable precisely the control desired for a seamless user experience. DigitalMedia provides an alternative to conventional IR and RS-232 device control by harnessing the CEC (Consumer Electronics Control) signal embedded in HDMI. Through its connection to the control system, the DM-MD8X8 provides a gateway for controlling many devices right through their HDMI connections, potentially eliminating the need for any dedicated control wires or IR probes. Through proper CEC signal management, DigitalMedia allows you to take control of each device as you like.

Easy Setup
Via the front panel or using **Crestron Toolbox** software, every step of the DM-MD16X16's setup process is designed to be quick and easy, configuring inputs and outputs automatically while letting the installer make intelligent design decisions along the way. The switcher even tests and measures the length of each DM cable, automatically making the appropriate calibrations for optimal signal transmission to every room. With DigitalMedia, an entire 16x16 system can be commissioned in as little as 15 minutes.

To configure a DM switcher complete with input and output cards, cables, and other peripherals, please use the **DigitalMedia™ Switcher** Configuration Tool.

Please refer to the DigitalMedia Design Guide, Doc. #4789 for additional information.

* *DisplayPort Multimode connectivity is supported via an HDMI or DVI* input port using a suitable adapter or dongle (not included).

> Distributes uncompressed digital video and audio over twisted-pair wire or fiber

> Supports HDMI 1.3a with Deep Color and 7.1 channel HD lossless audio

> Supports video resolutions up to WUXGA 1920x1200 and HD 1080p60

> Allows cable length to 450 feet using DigitalMedia Cable, 1000 feet (300 m) using CresFiber™

> Supports up to 16 DM room controllers with easy expansion for more outputs

> Configurable inputs support a complete range of digital and analog signal types

> Detects and displays detailed video and audio input information

> QuickSwitch HD™ technology achieves low-latency HDMI switching

> Manages HDCP digital rights management for every device
> Performs automatic AV signal format management via

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> Distributes USB HID mouse, keyboard, and game controller signals

> Allows full audio and USB breakaway switching

> Integrates with analog audio distribution systems

> Enables simultaneous output of stereo and surround sound audio

> Includes integrated Ethernet switch with Gigabit LAN port

> Includes built-in power distribution for DM transmitters, repeaters, and room controllers

> Provides easy setup and diagnostics tools via front panel or software

> 7-space 19-inch rack-mountable

SPECIFICATIONS

Video

Switcher: 16x16 digital matrix, modular input cards and factory-configurable outputs, resolution management, Crestron QuickSwitch HD
Input Signal Types: Configurable via modular plug-in cards supporting HDMI, DVI, RGB, component (YPbPr), S-Video (Y/C), composite video, DM CAT, and DM fiber
Output Signal Types: Configurable via factory-installed output cards supporting DM CAT, DM fiber, and HDMI (All input cards also include HDMI pass-thru outputs)
Formats: HDMI v.1.3a w/Deep Color, DVI v.1.0, HDCP v.1.2 content protection support, RGBHV up to UXGA/WUXGA, HDTV up to 1080p60, NTSC or PAL
Input Resolutions, HDMI & DVI, Progressive: 640x480@60Hz, 720x480@60Hz (480p), 720x576@50Hz (576p), 800x600@60Hz, 848x480@60Hz, 852x480@60Hz, 854x480@60Hz, 1024x768@60Hz, 1024x852@60Hz, 1024x1024@60Hz, 1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x768@60Hz, 1280x800@60Hz, 1280x960@60Hz, 1280x1024@60Hz, 1360x768@60Hz, 1365x1024@60Hz, 1366x768@60Hz, 1400x1050@60Hz, 1440x900@60Hz, 1600x900@60Hz, 1600x1200@60Hz, 1680x1050@60Hz, 1920x1080@24Hz (1080p24), 1920x1080@25Hz (1080p25), 1920x1080@50Hz (1080p50), 1920x1080@60Hz (1080p60), 1920x1200@60Hz, 2048x1080@24Hz, 2048x1152@60Hz, plus any other resolution allowed by HDMI v.1.3a
Input Resolutions, HDMI & DVI, Interlaced: 720x480@30Hz (480i), 720x576@25Hz (576i), 1920x1080@25Hz (1080i25), 1920x1080@30Hz (1080i30), plus any other resolution allowed by HDMI v.1.3a
Input Resolutions, RGB: 640x480@60Hz, 720x480@60Hz (480p), 720x576@50Hz (576p), 800x600@60Hz, 848x480@60Hz, 852x480@60Hz, 854x480@60Hz, 1024x768@60Hz, 1024x852@60Hz, 1024x1024@60Hz, 1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x768@60Hz, 1280x800@60Hz, 1280x960@60Hz, 1280x1024@60Hz, 1360x768@60Hz, 1365x1024@60Hz, 1366x768@60Hz, 1400x1050@60Hz, 1440x900@60Hz, 1600x900@60Hz, 1600x1200@60Hz, 1680x1050@60Hz, 1920x1080@24Hz (1080p24), 1920x1080@25Hz (1080p25), 1920x1080@50Hz (1080p50), 1920x1080@60Hz (1080p60), 1920x1200@60Hz, 2048x1080@24Hz, 2048x1152@60Hz
Input Resolutions, Component: 480i, 576i, 480p, 576p, 720p50, 720p60, 1080i25 (1125 lines), 1080i30, 1080p24, 1080p25, 1080p30, 1080p50 (1125 lines), 1080p60
Input Resolutions, Composite and S-Video: 480i, 576i
Output Resolutions: Matched to inputs

Audio

Switcher: 16x16 digital multi-channel audio-follow-video matrix switching, plus independent 16x16 stereo matrix for audio breakaway
Input Signal Types: Configurable via modular plug-in cards supporting HDMI, analog (stereo 2-channel), SPDIF, DM CAT, and DM fiber
Output Signal Types: Configurable via factory-installed output cards supporting DM CAT, DM fiber, HDMI, and analog (stereo 2-channel); (All input cards also include HDMI pass-thru outputs, and some input cards also include analog stereo pass-thru audio outputs)
Formats, HDMI only: Dolby® TrueHD 7.1, Dolby Digital Plus 7.1, DTS-HD Master Audio™ 7.1, DTS-HD High Res 7.1, 6ch PCM, 8ch PCM
Formats, HDMI and SPDIF: Dolby Digital AC3 5.1, Dolby Digital EX 5.1, DTS 5.1, DTS-ES Matrix 5.1, DTS-ES Discrete 6.1, DTS 96/24 5.1, 2ch PCM
Formats, Analog: Stereo 2-Channel

Ethernet

General: 10/100/1000BaseT, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, IEEE 803.U compliant
Switch: (1) 10/100/1000BaseT Gigabit Ethernet port (rear panel);
(33) 10BaseT/100BaseTX Ethernet ports (actual hardware ports are exposed on select outboard devices)

USB

Switcher: 16x16 matrix
Protocols: Supports USB HID class devices

Card Slots

1 - 16: (16) DM switcher input card slots;
Each slot accepts (1) DMC-series input card;
Input cards are field-installable
DM OUTPUTS (SLOT 1 - 2): (2) DM switcher output card slots;
Each slot accepts (1) **DMCO**-series output card;
Output cards require factory installation

Connectors

LAN: (1) 8-wire RJ45 female w/2 LED indicators;
10/100/1000BaseT Ethernet port;
Green LED indicates link status;
Yellow LED indicates Ethernet activity
24ABG / EIG 1 - 8 (SLOT 1 - 2): (16) sets of (1) 4-pin and (1) 3-pin 3.5mm detachable terminal blocks;
Comprises (16) DMNet ports with "EIG" power selection ports, each set associated with a corresponding DM output port on the output card in either output slot;
Each DMNet port provides power and communications for a DM device connected via DM cable;
Each EIG port connects to an external power supply†, or to the internal power source via a jumper, to power the DM device connected to the corresponding DMNet port;
Maximum Load: 75 Watts (3.13 Amps @ 24 Volts DC) per port when connected to external power supply†, otherwise limited to available DMNet power (see "Power Requirements" below)
100-250V~7.0A 50/60Hz: (1) IEC Socket, main power input;
Mates with removable power cord, included
G: (1) 6-32 screw, chassis ground lug
COMPUTER (front): (1) USB Type B female;
USB 1.1 computer console port (6 ft cable included)

LCD Display

Green LCD dot matrix, 128 x 64 resolution, adjustable LED backlight;
Displays inputs/outputs by name, video & audio signal information, Ethernet configuration and setup menus

Controls and Indicators

SOFTKEYS: (4) pushbuttons for activation of LCD driven functions
HW-R: (1) recessed miniature pushbutton for hardware reset, reboots the switcher
ROUTE: (1) pushbutton and red LED, selects ROUTE mode to allow routing changes
VIEW: (1) pushbutton and red LED, selects VIEW mode for viewing current routes

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AUDIO: (1) pushbutton & red LED, selects audio routing view
VIDEO: (1) pushbutton & red LED, selects video routing view
USB: (1) pushbutton & red LED, selects USB routing view
Quick-Adjust Knob: (1) continuous turn rotary encoder, adjusts menu parameters
IN 1 - 16: (16) pushbuttons and red LEDs, select input for routing
OUT 1 - 16: (16) pushbuttons and red LEDs, select output for routing

Power Requirements

Main Power: 7 Amps @ 100-250 Volts AC, 50/60 Hz
Available DMNet Power: 110 Watts (4.6 Amps @ 24 Volts DC) from internal power supply

Environmental

Temperature: 32° to 104°F (0° to 40°C)
Humidity: 10% to 90% RH (non-condensing)
Heat Dissipation: 792 BTU/Hr

Enclosure

Chassis: Steel, black matte powder coat finish, vented sides, fan-cooled
Faceplate: Extruded aluminum, black matte powder coat finish with polycarbonate label overlay
Mounting: Freestanding or 7U 19-inch rack-mountable (adhesive feet and rack ears included)

Dimensions

Height: 12.22 in (31.04 cm) without feet
Width: 17.28 in (43.90 cm), 19.0 in (48.26 cm) with ears
Depth: 18.13 in (46.05 cm) without cards

Weight

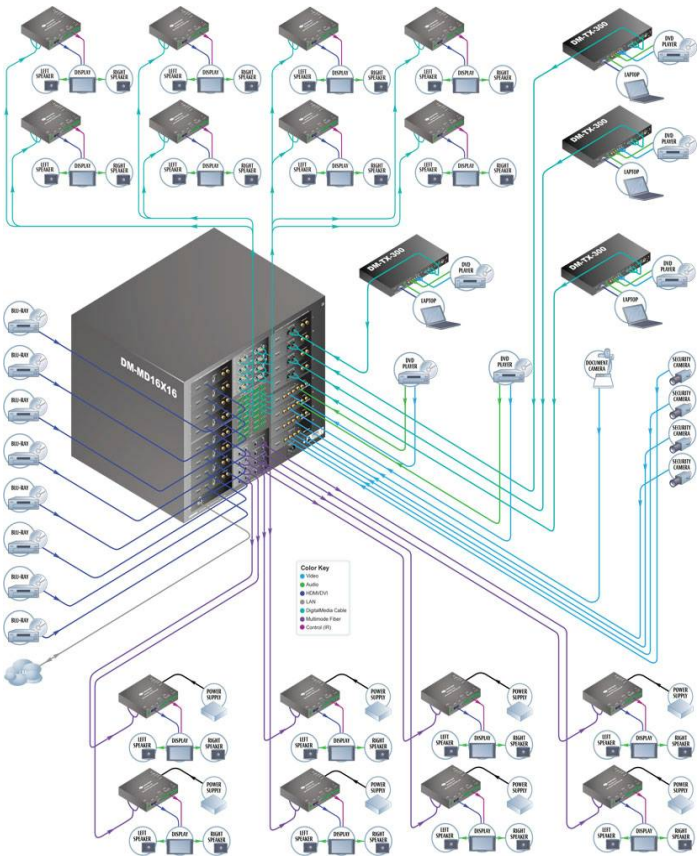
28.4 lb (12.9 kg)

AVAILABLE ACCESSORIES

DMC-HD: HDMI Input Card
DMC-HD-DSP: HDMI Input Card w/DSP
DMC-DVI: DVI/RGB Input Card
DMC-VID-RCA-A: RCA Analog Video Input Card w/Analog Audio
DMC-VID-RCA-D: RCA Analog Video Input Card w/SPDIF Audio
DMC-VID-BNC: BNC Analog Video Input Card
DMC-VID4: Quad Video Input Card
DMC-CAT: DM CAT Input Card
DMC-CAT-DSP: DM CAT Input Card w/DSP
DMC-F: DM Fiber Input Card
DMC-F-DSP: DM Fiber Input Card w/DSP
DMCO Series: Factory-Installed Output Cards for DM-MD16X16
DM-CBL: DigitalMedia™ Cable
DM-CONN: DigitalMedia™ Cable Connector
CRESFIBER: CresFiber™ Fiber Optic Cable
CRESFIBER-CONN-SC50UM: CresFiber™ Fiber Optic Cable Connector, SC 50µm
** DisplayPort Multimode connectivity is supported via an HDMI or DVI input port using a suitable adapter or dongle (not included).*

*†For external DMNet power, use a Crestron **CNPWS-75**, **C2N-SPWS300**, or other Cresnet power supply as required. Do not interconnect DMNet with Cresnet.*

DM-MD16X16 in a Typical Application



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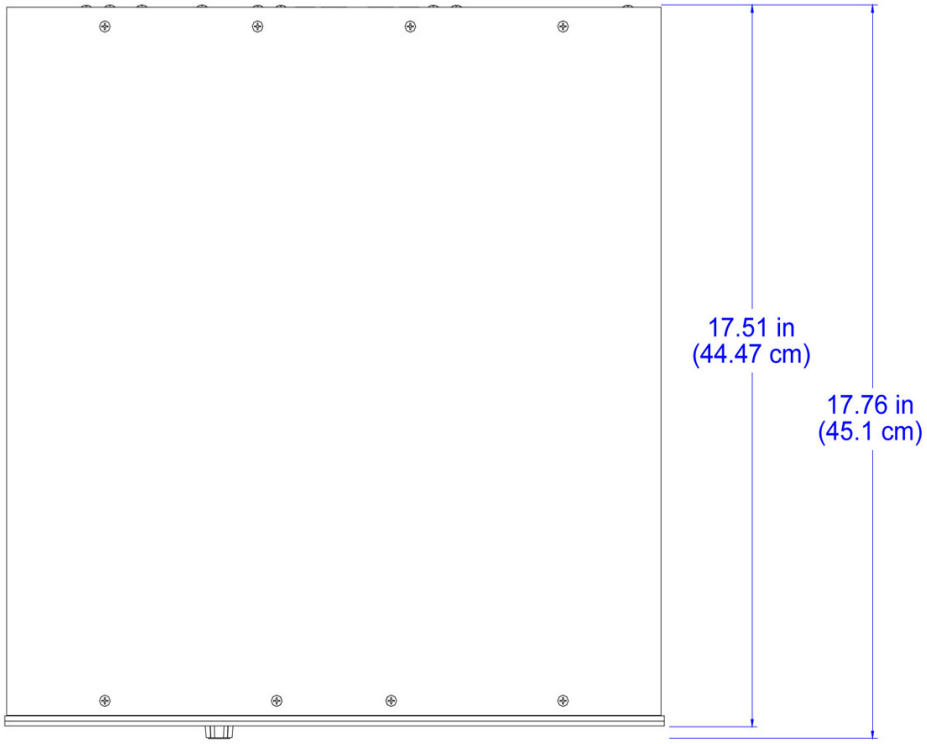

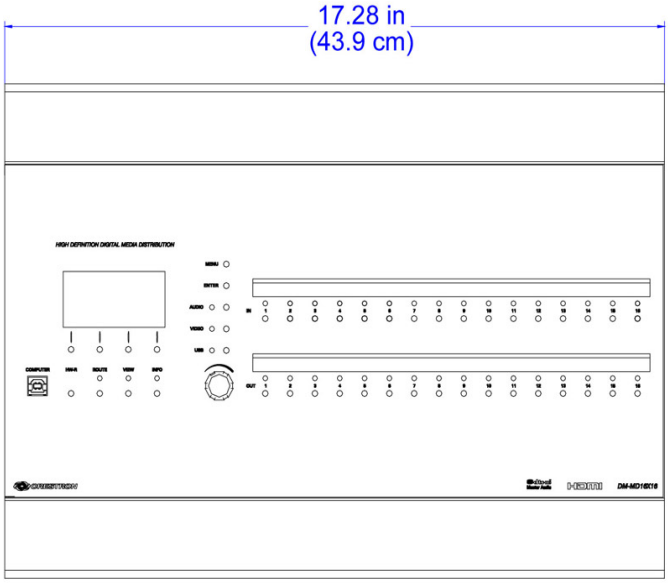

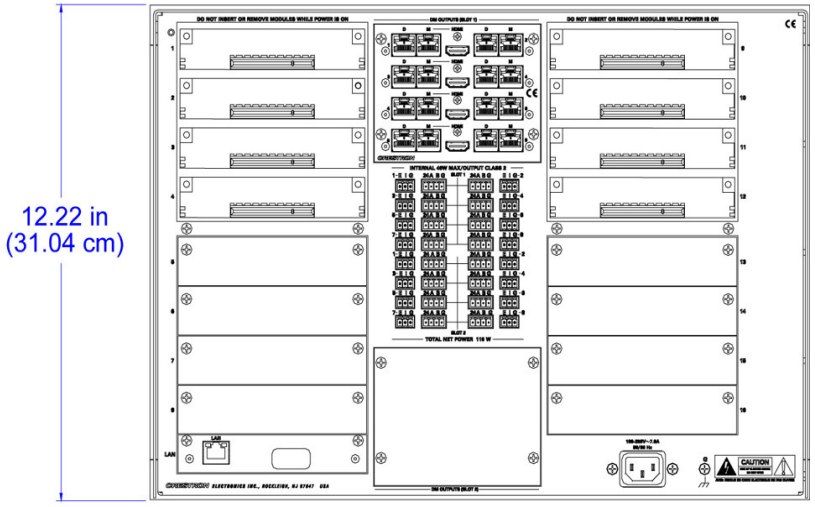

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