

Crestron HD-MD8X1 & HD-MD8X2  
QuickSwitch HD™ HDMI Switchers

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Operations Guide



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# QuickSwitch HD™ HDMI Switchers: HD-MD8X1 & HD-MD8X2

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## Introduction

QuickSwitch HD switchers from Crestron enable high-performance HDMI signal selection while delivering trouble-free, low-latency switching of all your DVD and Blu-ray Disc™ players, HDTV receivers, media servers, game consoles, multimedia computers, surround processors and high-definition displays. The HD-MD8X1 features eight HDMI 1.3a inputs, and a single HDMI output to feed a video display or processor while the HD-MD8X2 model features eight HDMI 1.3a inputs, and two HDMI outputs to feed one or more video displays, processors, or switchers.

For simplicity within this guide, the term “HD-MD8X1/2” is used except where noted.

## Features and Functions

- Low-latency QuickSwitch HD™ switching technology available with one or two HDMI outputs
- Supports HDMI 1.3a with Deep Color and 7.1 channel HD lossless audio
- Compatible with DVI and DisplayPort Multimode (adapters required)
- Supports video resolutions up to WUXGA 1920x1200 and HD 1080p60
- Detects and reports detailed video and audio input information
- Manages HDCP digital rights management for connected devices
- Performs automatic AV signal format management via EDID
- Includes front panel controls with security lockout
- Allows audio breakaway switching
- Enables device control via CEC
- Simple setup and diagnostics via software
- Native control system integration via Ethernet or Cresnet
- Provides input expansion for the AMS-AIP
- Single-space 19-inch rack-mountable

HDMI is the new standard for interfacing high-definition AV equipment, and it is key to handling the latest HD video and audio formats. Crestron has designed its QuickSwitch HD switchers to provide unparalleled performance, functionality, and custom integration capability. The HD-MD8X1 and HD-MD8X2 support HDMI 1.3a w/Deep Color and HDCP, handling 1080p60 HDTV and WUXGA computer resolutions, and multi-channel HD lossless audio.

### ***QuickSwitch HD™ Technology***

Crestron's QuickSwitch HD technology minimizes switching latency that plagues other 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 the 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.

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.

### ***EDID Format Management***

With HDMI comes a variety of video and audio formats to keep track of, and chances are not every device in a system supports all of the same formats. 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.

Unfortunately, there is no guarantee that EDID will always choose the “preferred” format, and often conflicts arise that can result in disappointing picture and sound quality. The HD-MD8X1 and HD-MD8X2 take full advantage of EDID to prevent conflicts, assessing the formats supported by each HDMI device in the system, allowing the installer to assign only the combinations that work and provide the best results. Input signal information such as resolution, frame rate, aspect ratio, color depth, and audio format can also be sent to the control system and displayed on a touchpanel to allow custom functionality and enhanced diagnostics.

### ***HDCP Key Management***

Another aspect to HDCP is its use of “keys” to manage the handshaking 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 HD-MD8X1 and HD-MD8X2 test 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. The HD-MD8X1 and HD-MD8X2 provide

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 HD-MD8X1 and HD-MD8X2 provide 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, Crestron allows you to take control of each device as you like.

### ***Adagio® Media System Expansion***

The HD-MD8X1 and HD-MD8X2 provide transparent input expansion for the Crestron AMS, increasing its input capacity to 10 full-featured HDMI inputs with all signal routing controlled right through the AMS's front panel and remote. Adding an HD-MD8X1 or HD-MD8X2 to an AMS system is made simple using Adagio Composer software.

### ***Computer Compatibility***

Besides handling every available HDTV format supported by HDMI, the HD-MD8X1 and HD-MD8X2 also support computer resolutions up to 1920 x 1200 WUXGA, and are compatible with DVI and DisplayPort Multimode computer signals using a suitable adapter or dongle (not included).

### ***Audio Breakaway***

Audio signals may be routed independent of video in the HD-MD8X1 and HD-MD8X2, allowing listening to one source while viewing another. For instance, listen to your favorite music from your media server while playing a video game or surfing the Internet on screen.

### ***Front Panel Controls***

The HD-MD8X1 and HD-MD8X2 work right out of the box without requiring any connection to a control system or computer, providing intuitive signal switching via the front panel. The front panel is great for everyday use, or may be used just for initial system testing. Front panel buttons may be locked out to prevent unauthorized tampering or accidental switching, while the LED indicators remain active to show signal routing status. The input and output controls can be labeled easily using Crestron Engraver software or standard 3/8" (10 mm) tape labels.

### ***Native Crestron Control***

Via the choice of Cresnet or high-speed Ethernet, the HD-MD8X1 and HD-MD8X2 allow direct communication with any Crestron 2-Series control system for a fully integrated signal routing solution as part of any high-end home theater, boardroom, classroom, or command center system.

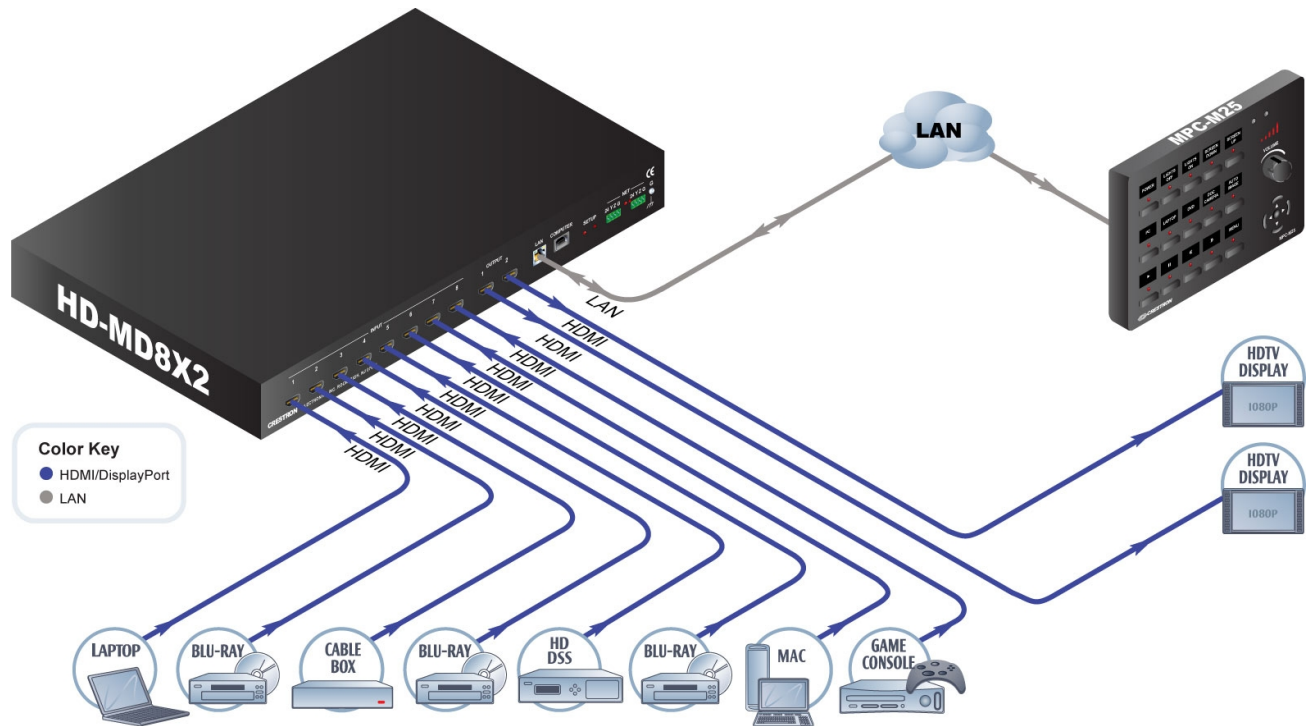
### ***Easy Setup***

Despite their many powerful features and capabilities, the HD-MD8X1 and HD-MD8X2 are simple to set up using Crestron Toolbox™ software. The Toolbox setup tool allows the installer to view information about each HDMI device and easily make intelligent choices to ensure a reliable system setup.

### Applications

The following diagram shows an HD-MD8X2 in a residential application.

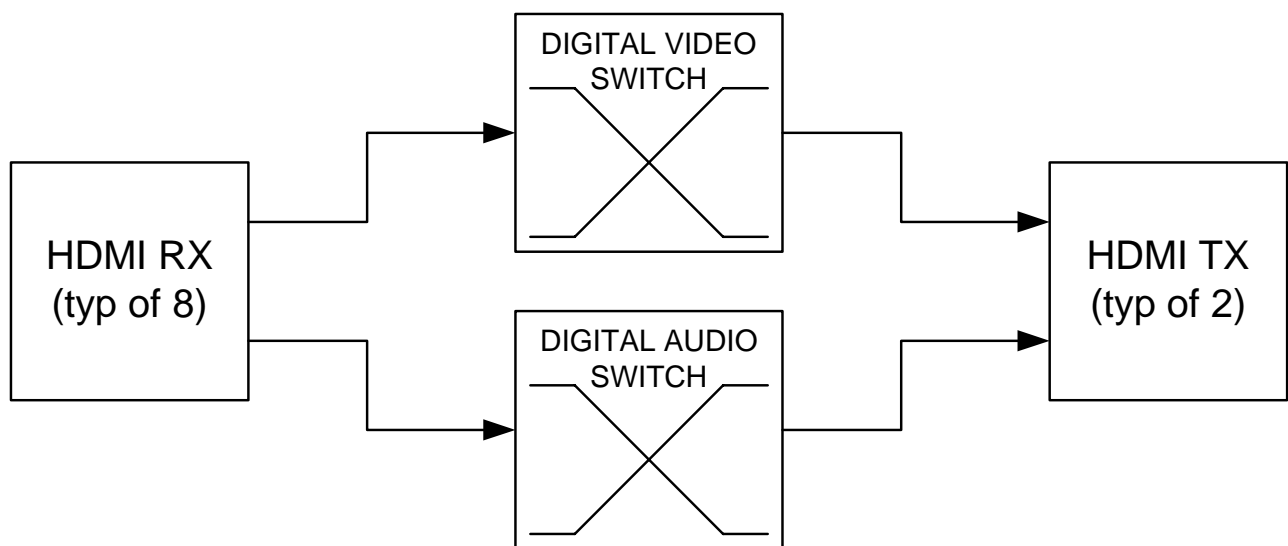
*HD-MD8X2 in a Residential Application*



### Internal Block Diagram

The following diagram represents the switching abilities of the HD-MD8X1/2.

*Internal Block Diagram of the HD-MD8X1/2*





## Specifications

Specifications for the HD-MD8X1/2 are listed in the following table.

### *HD-MD8X1/2 Specifications*

SPECIFICATION	DETAILS
Video	
Switcher	<p><b>HD-MD8X1:</b> 8x1 digital matrix, resolution management, Crestron QuickSwitch HD</p> <p><b>HD-MD8X2:</b> 8x2 digital matrix, resolution management, Crestron QuickSwitch HD</p>
Signal Types	HDMI
Formats	HDMI v.1.3a w/Deep Color, DVI v.1.0, HDCP v.1.2 content protection support
Input Resolutions 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
Interlaced	720x480@30Hz (480i), 720x576@25Hz (576i), 1920x1080@25Hz (1080i25), 1920x1080@30Hz (1080i30), plus any other resolution allowed by HDMI v.1.3a
Output Resolutions	Matched to inputs
Audio	
Switcher	<p><b>HD-MD8X1:</b> 8x1 digital multi-channel matrix switching, audio-follow-video or breakaway</p> <p><b>HD-MD8X2:</b> 8x2 digital multi-channel matrix switching, audio-follow-video or breakaway</p>
Signal Types	HDMI v.1.3a supporting HD lossless multi-channel up to 7.1
Formats	Dolby® TrueHD 7.1, Dolby Digital Plus 7.1, Dolby Digital AC3 5.1, Dolby Digital EX 5.1, DTS-HD Master Audio™ 7.1, DTS-HD High Res 7.1, DTS 5.1, DTS-ES Matrix 5.1, DTS-ES Discrete 6.1, DTS 96/24 5.1, 8ch PCM, 6ch PCM, 2ch PCM

*(Continued on following page)*

*HD-MD8X1/2 Specifications (Continued)*

SPECIFICATION	DETAILS
Ethernet	10BaseT/100BaseTX, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, IEEE 803.U compliant
Power	
Cresnet Power Usage	
HD-MD8X1	15 Watts (0.63 Amps @ 24 Volts DC)
HD-MD8X2	20 Watts (0.83 Amps @ 24 Volts DC)
Default Net ID	33
Minimum 2-Series Control System Update File <sup>1,2</sup>	Version 4.001 or later
Environmental	
Temperature	32° to 104° F (0° to 40° C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	
HD-MD8X1	52 BTU/Hr
HD-MD8X2	68 BTU/Hr
Enclosure	
Chassis	Aluminum, black matte powder coat finish, convection-cooled, vented top and sides
Faceplate	Extruded aluminum, black matte powder coat finish with polycarbonate label overlay
Mounting	Freestanding or 1U 19-inch rack-mountable (adhesive feet and rack ears included)
Dimensions	
Height	1.70 in (4.32 cm) without feet 1.80 in (4.57 cm) with feet
Width	19.0 in (48.26 cm) with ears; 17.03 in (43.25 cm) without ears
Depth	10.06 in (25.54 cm)
Weight	4.1 lbs (1.9 kg)

1. The latest software versions can be obtained from the Crestron website. Refer to the NOTE following these footnotes.
2. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems.

**NOTE:** Crestron software and any files on the website are for authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

### Physical Description

This section provides information on the connections, controls and indicators available on your HD-MD8X1/2.

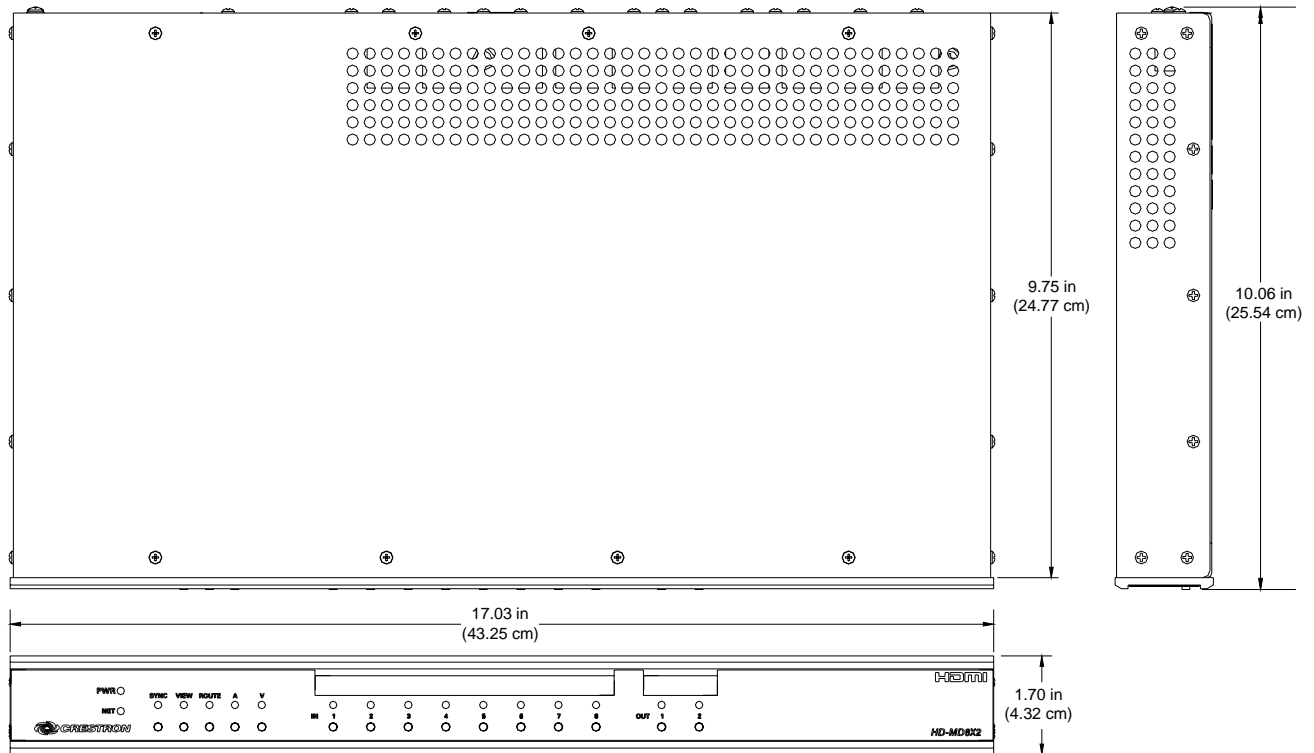
*HD-MD8X1 Physical View (Front - HD-MD8X2 is similar)*



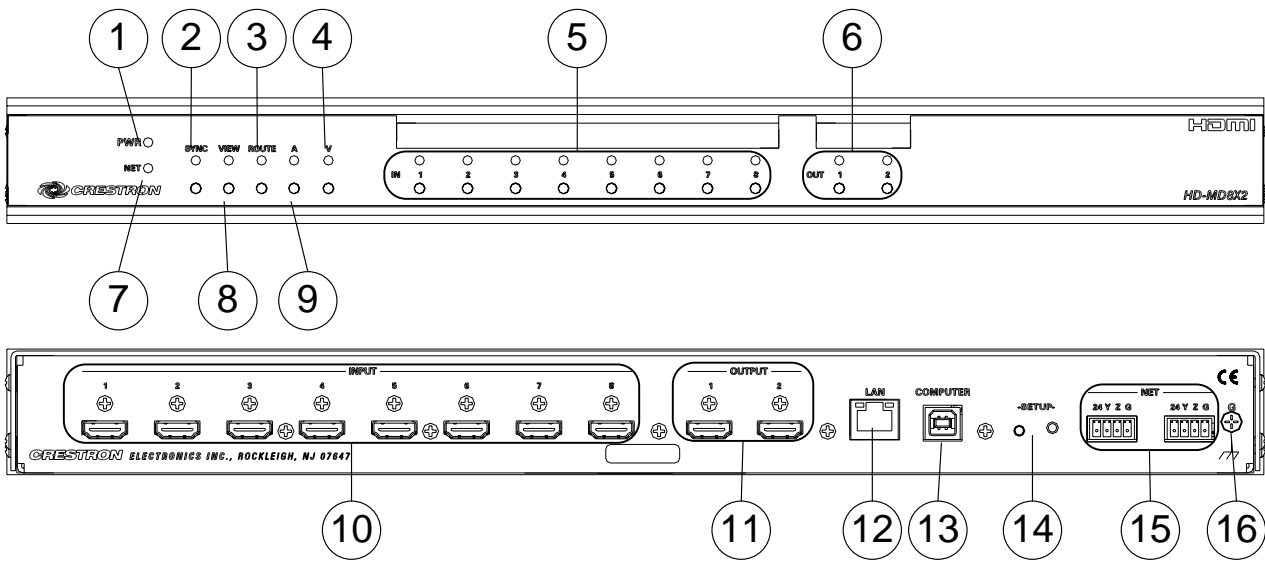
*HD-MD8X1 Physical View (Rear - HD-MD8X2 is similar)*



*HD-MD8X1/2 Overall Dimensions (HD-MD8X2 Shown)*



*HD-MD8X1/2 Buttons & Ports (HD-MD8X2 Shown)*





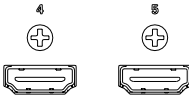
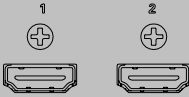
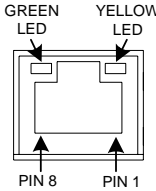





*Connectors, Controls & Indicators*

#	CONNECTORS, CONTROLS & INDICATORS	DESCRIPTION
1	PWR LED	(1) green LED, indicates 24 Volts DC power supplied from Cresnet control network
2	SYNC SYNC ○	(1) recessed pushbutton & red LED, selects <i>Sync</i> mode for viewing input signal sensing
3	ROUTE ROUTE ○	(1) pushbutton and red LED, selects <i>Route</i> mode to allow routing changes
4	V V ○	(1) pushbutton & red LED, selects video routing view
5	IN 1-8 IN 1 ○	(8) pushbuttons and red LEDs, select input for routing
6	OUT OUT 1 ○	<b>HD-MD8X1:</b> (1) pushbutton and red LED <b>HD-MD8X2:</b> (2) pushbuttons and red LEDs Selects output for routing
7	NET LED	(1) amber LED, indicates communication with Cresnet system

*(Continued on following page)*

*Connectors, Controls & Indicators (Continued)*

#	CONNECTORS*, CONTROLS & INDICATORS	DESCRIPTION																				
8	<p>VIEW VIEW</p>  	(1) pushbutton and red LED, selects <i>View</i> mode for viewing current routes																				
9	<p>A A</p>  	(1) pushbutton & red LED, selects audio routing view																				
10	<p>INPUT INPUT</p> 	(8) 19-pin Type A HDMI female HDMI digital video/audio inputs																				
11	<p>OUTPUT OUTPUT</p> 	<b>HD-MD8x1:</b> (1) 19-pin Type A HDMI female <b>HD-MD8x2:</b> (2) 19-pin Type A HDMI female HDMI digital video/audio outputs																				
12	<p>LAN</p> 	(1) 8-wire RJ-45 with two LED indicators; 10BaseT/100BaseTX Ethernet port, Green LED indicates link status; Yellow LED indicates Ethernet activity																				
		<table border="1"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> <th>PIN</th> <th>SIGNAL</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TX +</td> <td>5</td> <td>N/C</td> </tr> <tr> <td>2</td> <td>TX -</td> <td>6</td> <td>RC -</td> </tr> <tr> <td>3</td> <td>RC +</td> <td>7</td> <td>N/C</td> </tr> <tr> <td>4</td> <td>N/C</td> <td>8</td> <td>N/C</td> </tr> </tbody> </table>	PIN	SIGNAL	PIN	SIGNAL	1	TX +	5	N/C	2	TX -	6	RC -	3	RC +	7	N/C	4	N/C	8	N/C
PIN	SIGNAL	PIN	SIGNAL																			
1	TX +	5	N/C																			
2	TX -	6	RC -																			
3	RC +	7	N/C																			
4	N/C	8	N/C																			
13	<p>COMPUTER COMPUTER</p> 	(1) USB Type B female USB 1.1 computer console port (6 ft cable included)																				
14	<p>SETUP (LED and button)</p>	(1) miniature pushbutton & red LED, used for touch-settable ID (TSID) and Ethernet autodiscovery																				
15	<p>NET NET</p> 	(2) 4-pin 3.5mm detachable terminal blocks Cresnet slave ports, paralleled <b>24:</b> Power (24 Volts DC) <b>Y:</b> Data <b>Z:</b> Data <b>G:</b> Ground																				
16	<p>GROUND</p> 	(1) 6-32 screw, chassis ground lug																				

\* Interface connectors for the **NET** ports are provided with the unit.

## Industry Compliance

As of the date of manufacture, the HD-MD8X1 and HD-MD8X2 have been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling.



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### Federal Communications Commission (FCC) Compliance Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

**CAUTION:** Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.
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## Setup

### Network Wiring

When wiring the Cresnet® and Ethernet network, consider the following:

- Use Crestron Certified Wire.
- Use Crestron power supplies for Crestron equipment.
- Provide sufficient power to the system.

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**CAUTION:** Insufficient power can lead to unpredictable results or damage to the equipment. Please use the Crestron Power Calculator to help calculate how much power is needed for the system ([www.crestron.com/calculators](http://www.crestron.com/calculators)).

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#### Cresnet

For networks with 20 or more devices, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

For more details, refer to “Check Network Wiring” on page 26.

#### Ethernet

The HD-MD8X1 and HD-MD8X2 can also use high-speed Ethernet for communications between the control system, computer, and other IP-based devices.

For information on connecting Ethernet devices in a Crestron system, refer to the latest version of the Crestron e-Control® Reference Guide (Doc. 6052), which is available for download from the Crestron website ([www.crestron.com/manuals](http://www.crestron.com/manuals)).

### Identity Code

#### Net ID

The Net ID of the HD-MD8X1/2 has been factory set to **33**. The Net IDs of multiple HD-MD8X1/2 devices in the same system must be unique. Net IDs are changed from a personal computer (PC) via Crestron Toolbox (refer to “Establishing Communication” on page 21).

When setting the Net ID, consider the following:

- The Net ID of each unit must match an ID code specified in the SIMPL™ Windows® program.
- Each network device must have a unique Net ID.

For more details, refer to the Crestron Toolbox help file.

#### IP ID

The IP ID is set within the HD-MD8X1/2’s table using Crestron Toolbox. For information on setting an IP table, refer to the Crestron Toolbox help file. The IP IDs of multiple HD-MD8X1/2 devices in the same system must be unique.

When setting the IP ID, consider the following:

- The IP ID of each unit must match an IP ID specified in the SIMPL Windows program.
- Each device using IP to communicate with a control system must have a unique IP ID.

## Installation

### Ventilation

The HD-MD8X1 and HD-MD8X2 should be used in a well-ventilated area. The venting holes should not be obstructed under any circumstances.

To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consider using forced air ventilation and/or incrementing the spacing between units to reduce overheating. Consideration must be given if installed in a closed or multi-unit rack assembly since the operating ambient temperature of the environment may be greater than the room ambient temperature. Contact with thermal insulating materials should be avoided on all sides of the unit.

### Rack Mounting

The HD-MD8X1 and HD-MD8X2 can be mounted in a rack or stacked with other equipment. Two “ears” are provided with the HD-MD8X1 and the HD-MD8X2 so that they can be rack mounted. These ears must be installed prior to mounting. Complete the following procedure to attach the ears to the unit. The only tool required is a #2 Phillips screwdriver.

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**WARNING:** To prevent bodily injury when mounting or servicing this unit in a rack, take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

**NOTE:** If rack mounting is not required, rubber feet are provided for tabletop mounting or stacking. Apply the feet near the corner edges on the underside of the unit.

**NOTE:** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

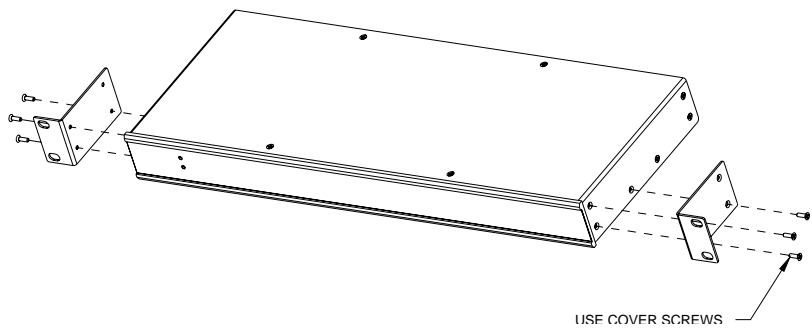
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To install the ears:

1. There are screws that secure each side of the HD-MD8X1/2 top cover. Using a #2 Phillips screwdriver, remove the three screws closest to the front panel from one side of the unit. Refer to the diagram following step 3 for a detailed view.
2. Position a rack ear so that its mounting holes align with the holes vacated by the screws in step 1.
3. Secure the ear to the unit with three screws from step 1, as shown in the following diagram.



*Ear Attachment for Rack Mounting (this image shows a IRU device)*



- Repeat procedure (steps 1 through 3) to attach the remaining ear to the opposite side.

**Stacking**

Four “feet” are provided with the HD-MD8X1 and HD-MD8X2 so that if the unit is not rack mounted, the rubber feet can provide stability when the unit is placed on a flat surface or stacked. These feet should be attached near the corners prior to the hookup procedure.

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**NOTE:** No more than two HD-MD8X1/2 units should be stacked.

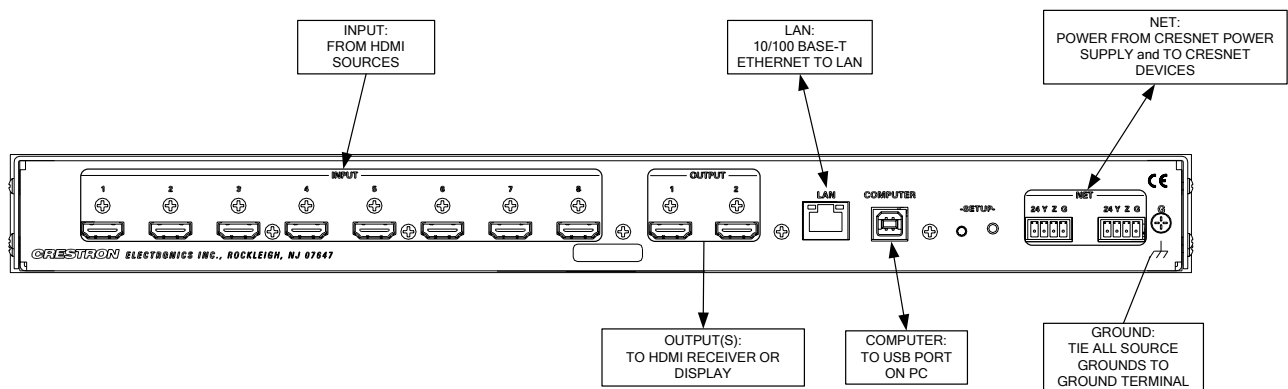
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## Hardware Hookup

**Connect the Device**

Make the necessary connections as called out in the illustration that follows this paragraph. Refer to “Network Wiring” on page 11 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

*Hardware Connections for the HD-MD8X1/2 (HD-MD8X2 Shown)*




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**NOTE:** Ensure the unit is properly grounded.

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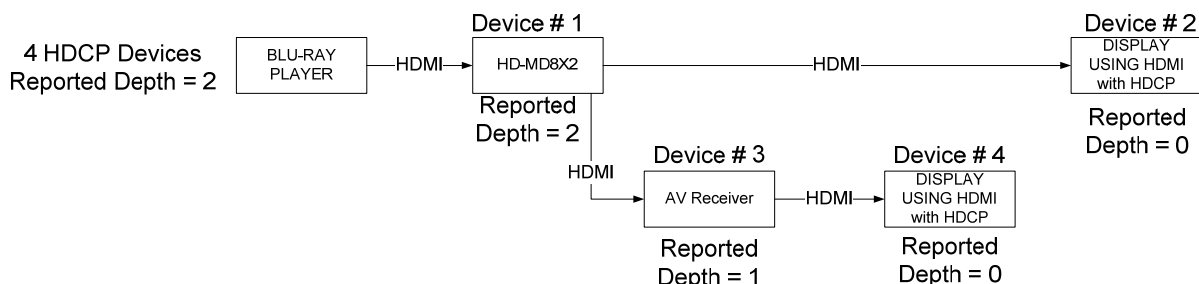
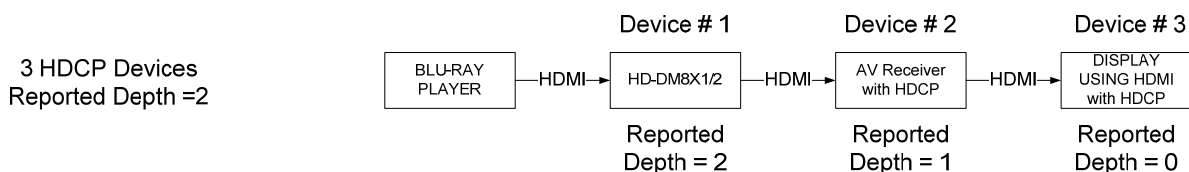
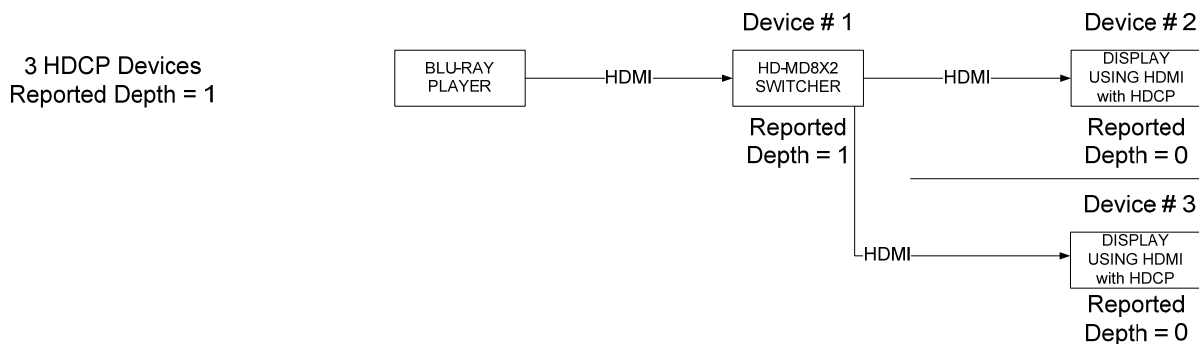
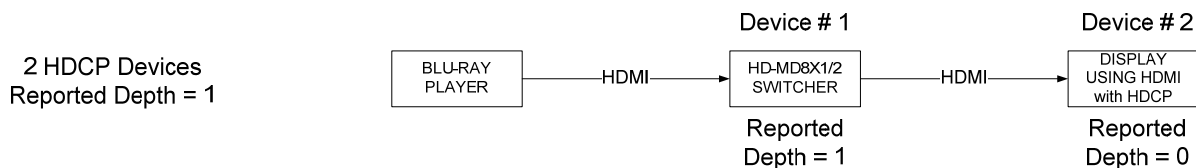
**Label the Buttons**

Use Crestron Engraver software to print custom labels for the HD-MD8X1/2’s front panel buttons and LEDs. Crestron recommends printing on 100-pound paper. Paper weighing less than 100 pounds will tend to crumple while sliding in, while paper weighing more than 100 pounds may not fit.

### HDCP Signal Path

Sources using HDCP limit the number of display devices it can transmit to while simultaneously limiting the depth of devices in the signal path. Too many devices or greater-than-allowed depth in a signal path (from source to display) may create problems with displaying of audio and video content. The HDCP specification states that the maximum depth of devices between source and display is six. Some examples are shown in the following diagram.

*Examples of Reported HDCP Devices and Reported HDCP Depth*



Using Crestron Toolbox, the switcher can test HDMI sources and displays for switching limitations due to HDCP keys. The number of HDCP keys specify the number of display devices that can be connected to a source over HDMI using HDCP authentication. For more information, refer to the Crestron Toolbox help file.

## EDID

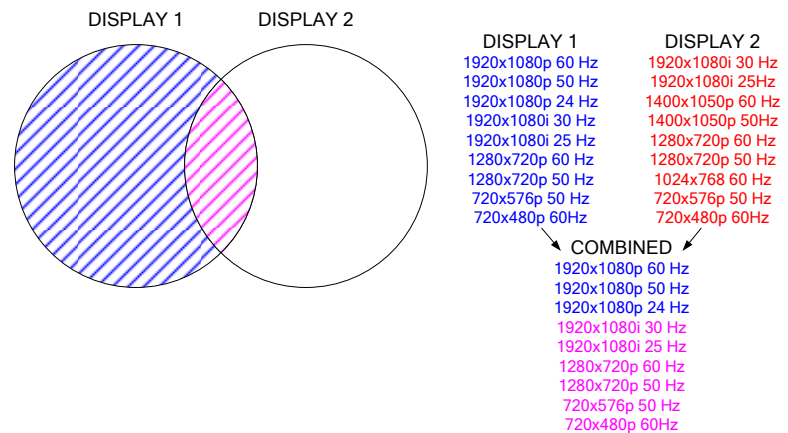
EDID is a piece of data that HDMI receivers use to indicate their capabilities to the HDMI sources.

The HD-MD8X1 and HD-MD8X2 route HDMI signals from any of the eight video inputs to one or two (HD-MD8X2 only) output channels. According to the HDMI standard, HDMI sources are expected to only deliver audio and video formats that are supported by the destination. To do this, the switcher reads the EDID information from devices connected to the outputs and determines the video resolutions and audio format to send to the inputs to program EDID on the inputs.

Using Crestron Toolbox, the switcher can be configured to use several different algorithms to determine what EDID information is sent to each source:

- **Copy Display**

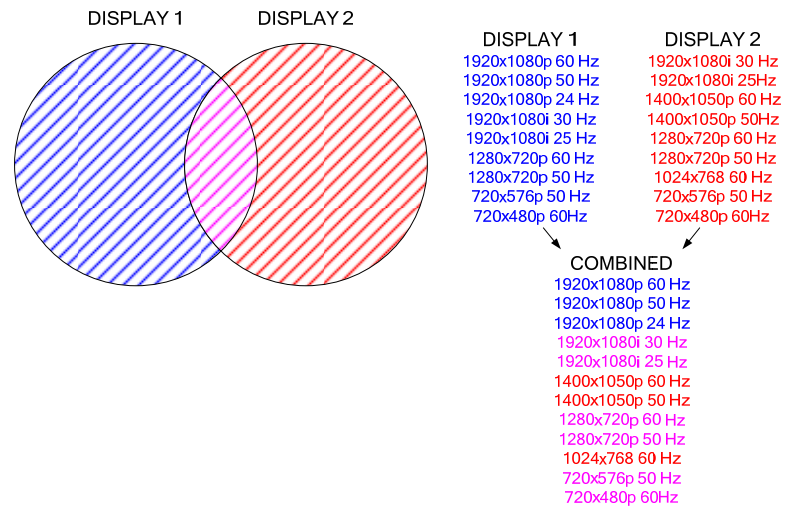
### Copy Display



The EDID information from a DigitalMedia or HDMI output is copied to the input verbatim. This means that all resolution, audio and vendor information will be from that display.

- **Best Common**

*Best Common*



Only resolutions that are available in all of the displays that are connected will be transmitted to the source. This ensures that any video signal coming in from the source will be able to be shown on all displays. If certain resolutions are only available on a subset of the displays, they will be omitted.

- **Manual**

Use Crestron Toolbox to select which resolutions are transmitted to the source.

“Best Common” is initially set to use information from all displays, but can be modified to use information from just a subset of displays by deselecting them in Crestron Toolbox.

By managing which displays are used for the EDID calculations, you can maximize the resolution of each source while ensuring that the source can be shown on each display where it is needed.

The EDID calculations also affect audio formats. Each HDMI receiver sends its supported audio formats to the source in the following format:

<Format> <Maximum # of channels> <sampling freq supported>

For example, a 5.1channel audio processor may have the following audio EDID information:

- Linear PCM, 2ch, 32/44.1/48kHz
- AC3, 6ch, 32/44.1/48kHz
- DTS, 6ch, 32/44.1/48kHz

Under “Best Common”, the same rules apply to audio as video.

For more information, refer to the Crestron Toolbox help file.

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## Programming Software

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### Have a question or comment about Crestron software?

Answers to frequently asked questions (FAQs) can be viewed in the Online Help section of the Crestron website. To post a question or view questions you have submitted to Crestron's True Blue Support, log in at <http://support.crestron.com>. First-time users will need to establish a user account.

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### Earliest Version Software Requirements for the PC

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**NOTE:** Crestron recommends that you use the latest software to take advantage of the most recently released features. The latest software is available from the Crestron website.

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Crestron has developed an assortment of Windows®-based software tools to develop a Cresnet system. For the minimum recommended software versions, visit the Version Tracker page of the Crestron website ([www.crestron.com/versiontracker](http://www.crestron.com/versiontracker)).

### Programming with Crestron SystemBuilder

Crestron SystemBuilder is the easiest method of programming but does not offer as much flexibility as SIMPL Windows. For additional details, download SystemBuilder from the Crestron website and examine the extensive help file.

### Programming with SIMPL Windows

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**NOTE:** While SIMPL Windows can be used to program the HD-MD8X1 and HD-MD8X2, it is recommended to use SystemBuilder for configuring a system.

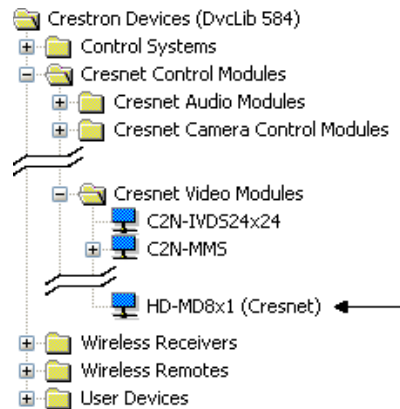
---

SIMPL Windows is Crestron's premier software for programming Crestron control systems. It is organized into two separate but equally important "Managers".

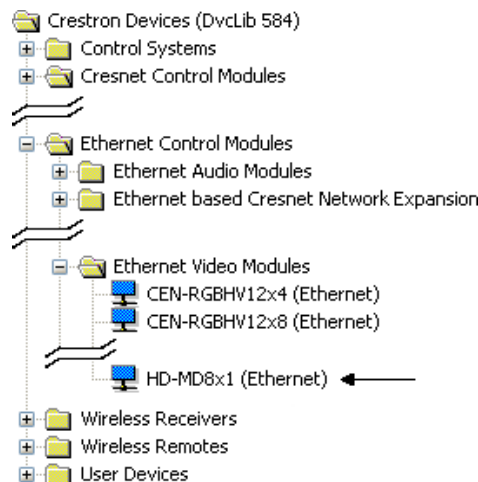
#### Configuration Manager

Configuration Manager is the view where programmers "build" a Crestron control system by selecting hardware from the *Device Library*.

- To incorporate the HD-MD8X1 or HD-MD8X2 into the system, drag the desired device from the Cresnet Control Modules | Cresnet Video Modules folder of the *Device Library* and drop it in the *System Views*.

**Locating the HD-MD8X1/2 in the Device Library**

- To incorporate the HD-MD8X1 or HD-MD8X2 into the system, drag the desired device from the Ethernet Control Modules | Ethernet Video Modules folder of the *Device Library* and drop it in the *System Views*.

**Locating the HD-MD8X1/2 (Ethernet) in the Device Library**

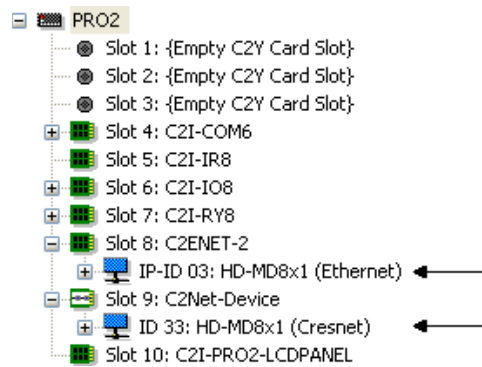
- The system tree of the control system displays the device in the appropriate slot with a default Net ID or IP ID as shown in the following illustration.

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**NOTE:** In the following illustration, there is both an Ethernet device in Slot 8 and a Cresnet device in Slot 9. It is possible to have both types of device attached to a control system as long as the control system has either a built-in or expansion Ethernet interface. If Cresnet operation is desired, the IP table of the HD-MD8X1/2 must be empty.

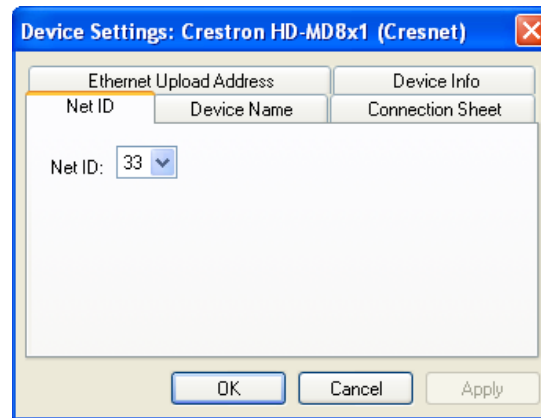
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*C2Net Device, Slot 8 and 9*

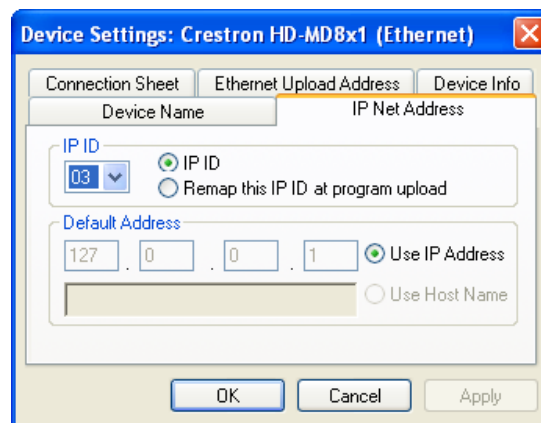


- Additional HD-MD8X1/2 devices are assigned different Net ID or IP ID numbers as they are added.
- If necessary, double click a device to open the “Device Settings” window and change the Net ID or IP ID, as shown in the following figures.

*“Device Settings: Crestron HD-MD8X1/2 (Cresnet)” Window*



*“Device Settings: Crestron HD-MD8X1/2 (Ethernet)” Window*



- The ID code specified in the SIMPL Windows program must match the Net ID or IP ID of each unit. Refer to “Identity Code” on page 11.

**Program Manager**

Program Manager is the view where programmers “program” a Crestron control system by assigning signals to symbols.

The symbol can be viewed by double clicking on the icon or dragging it into *Detail View*. Each signal in the symbol is described in the SIMPL Windows help file (**F1**).

**Example Program**

Example programs for the HD-MD8X1 and HD-MD8X2 are available from the Crestron website ([www.crestron.com/exampleprograms](http://www.crestron.com/exampleprograms)).



## Uploading and Upgrading

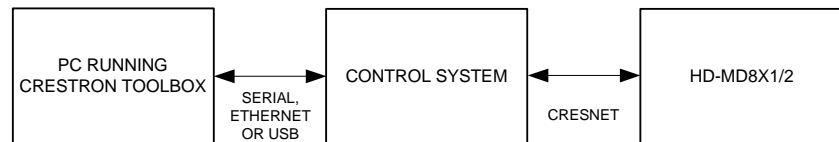
Crestron recommends using the latest programming software and that each device contains the latest firmware to take advantage of the most recently released features. However, before attempting to upload or upgrade it is necessary to establish communication. Once communication has been established, files (for example, programs or firmware) can be transferred to the control system (and/or device). Finally, program checks can be performed (such as changing the device ID or creating an IP table) to ensure proper functioning.

### Establishing Communication


Use Crestron Toolbox for communicating with the HD-MD8X1/2; refer to the Crestron Toolbox help file for details. There are three methods of communication.

#### Indirect

##### Indirect Communication



HD-MD8X1/2 connects to control system via Cresnet:

1. Establish communication between the PC and the control system as described in the latest version of the 2-Series Control Systems Reference Guide (Doc. 6256).
2. Use the Address Book in Crestron Toolbox to create an entry for the HD-MD8X1 or HD-MD8X2 using the expected communication protocol (Indirect). Select the Cresnet ID of the HD-MD8X1 or HD-MD8X2 and the address book entry of the control system that is connected to the HD-MD8X1 or HD-MD8X2.
3. Display the HD-MD8X1 or HD-MD8X2's "System Info" window (click the  icon); communications are confirmed when the device information is displayed.

#### USB

**NOTE:** Required for initial setup of Ethernet parameters.


##### USB Communication



The **COMPUTER** port on the HD-MD8X1 and HD-MD8X2 connects to the USB port on the PC via the included Type A to Type B USB cable:

1. Use the Address Book in Crestron Toolbox to create an entry using the expected communication protocol (USB). When multiple USB devices are connected, identify the HD-MD8X1 or HD-MD8X2 by entering

“HD-MD8X1” or “HD-MD8X2” in the *Model* textbox, the unit’s serial number in the *Serial* textbox or the unit’s hostname in the *Hostname* textbox. The hostname can be found in the “System Info” window in the section marked *Ethernet* however, communications must be established in order to see this information in the “System Info” window.


2. Display the HD-MD8X1 or HD-MD8X2’s “System Info” window (click the  icon); communications are confirmed when the device information is displayed.

### TCP/IP

#### Ethernet Communication



The HD-MD8X1 and HD-MD8X2 connect to a PC via Ethernet:

1. Establish indirect / USB communication between HD-MD8X1 or HD-MD8X2 and PC.
2. Enter the IP address, IP mask and default router of the HD-MD8X1 or HD-MD8X2 via the Crestron Toolbox (**Functions | Ethernet Addressing**); otherwise enable DHCP.
3. Confirm Ethernet connections between HD-MD8X1/2 and PC. If connecting through a hub or router, use CAT5 straight through cables with 8-pin RJ-45 connectors. Alternatively, use a CAT5 crossover cable to connect the two LAN ports directly without using a hub or router.
4. Use the Address Book in Crestron Toolbox to create an entry for the HD-MD8X1/2 with the HD-MD8X1/2’s TCP/IP communication parameters.
5. Display the “System Info” window (click the  icon) and select the HD-MD8X1 or HD-MD8X2 entry.

## Programs and Firmware

Program or firmware files may be distributed from programmers to installers or from Crestron to dealers. Firmware upgrades are available from the Crestron website as new features are developed after product releases. One has the option to upload programs via the programming software or to upload and upgrade via the Crestron Toolbox. For details on uploading and upgrading, refer to the SIMPL Windows help file or the Crestron Toolbox help file.

### SIMPL Windows

If a SIMPL Windows program is provided, it can be uploaded to the control system using SIMPL Windows or Crestron Toolbox.

### Firmware

Check the Crestron website to find the latest firmware. (New users may be required to register to obtain access to certain areas of the site, including the FTP site.)

Upgrade HD-MD8X1/2 firmware via Crestron Toolbox.

1. Establish communication with the HD-MD8X1 or HD-MD8X2 and display the “System Info” window.
2. Select **Functions | Firmware...** to upgrade the HD-MD8X1/2 firmware.


## Program Checks

Actions that can be performed on the HD-MD8X1/2 vary depending on whether it is connected via Cresnet or Ethernet.

### *Cresnet Connections*

For Cresnet connections, using Crestron Toolbox, display the network device tree (**Tools | Network Device Tree**) to show all network devices connected to the control system. Right-click on the HD-MD8X1/2 to display actions that can be performed on the HD-MD8X1/2.

### *Ethernet Connections*

For Ethernet connections, using Crestron Toolbox, display the “System Info window (click the  icon) and select the **Functions** menu to display actions that can be performed on the HD-MD8X1/2.

Be sure to use Crestron Toolbox to create the HD-MD8X1/2 IP table.

1. Select **Functions | IP Table Setup**.
2. Add, modify or delete entries in the IP table. The HD-MD8X1/2 can have only one IP table entry.
3. A defined IP table can be saved to a file or sent to the device.

Edit the control system’s IP table to include an entry for the HD-MD8X1/2. The entry should list the HD-MD8X1/2’s IP ID (specified on the HD-MD8X1/2’s IP table) and the internal gateway IP address 127.0.0.1.

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## Operation

### Operating Modes

The HD-MD8X1 and HD-MD8X2 can operate in either the *Sync*, *View*, or *Route* mode.

#### *Sync Mode*

The *Sync* mode uses the front panel controls to view the presence of video signals on each input. Press the **SYNC** button to activate the *Sync* mode. The **SYNC** LED will light as will the LEDs of any inputs with a video signal present.

#### *View Mode*

The *View* mode uses the front panel controls to view routing information for inputs and outputs.

Routing information for audio, video, and USB portions of an input can be viewed independently. For more information, refer to “*View Mode*” below.

#### *Route Mode*

The *Route* mode uses the front panel controls to route input signals to outputs. Press the **ROUTE** button to activate the *Route* mode.

- When in the *Route* mode, pressing an input button will show the output(s) that are connected to the input.
- Audio and video portions of an input can be routed independently. For more information, refer to “*Route Mode*” on page 25.

### View Mode

Use the *View Mode* to view routing information for the inputs and output(s). To select the *View* mode, press the **VIEW** button. The **VIEW** LED will light.

#### *View Source Routing*

1. Press an input signal button to display all of the outputs that are connected to it.
2. Press **A** or **V** to see where the audio or video portion of an input signal is routed.

#### *View Output Routing*

1. Press an output signal button to display the input signal that is connected.

---

**NOTE:** If the other output on an HD-MD8X2 is connected to the same input, its LED will also light.

---

2. Press **A** or **V** to see the input that is providing the audio or video portion of the output signal.

## Route Mode

Signals coming in to the switcher can be switched to either of the outputs. Additionally, the audio and video portions of an input signal can be switched simultaneously or separately.

To enter the *Route* mode, press the **ROUTE** button. The **ROUTE** LED will light.

### Switch Audio and Video Simultaneously

1. Press the **A** and **V** buttons to select the audio and video portions for switching. The respective LEDs will light.

---

**NOTE:** If an output has different audio or video portions, a new route will cause the audio portion on the output to switch to the newly selected video input.

---

2. Press the button corresponding to the input to be switched. The LED of the selected input will light. To turn off an output, deselect the input.
3. Press the button(s) corresponding to the output(s) to be switched. The LED(s) of the selected output(s) will light and the new route will be connected.
4. Repeat for any other routes to be changed.

### Switch Audio and Video Separately

1. Press the **A** or **V** buttons to select the audio or video portions to be switched. The respective LEDs will light.
2. Press the button corresponding to the input to be switched. The LED of the selected input will light. To turn off an output, deselect the input.
3. Press the button(s) corresponding to the output(s) to be switched. The LED(s) of the selected output(s) will light.
4. Repeat for any other routes to be changed.

## Problem Solving

### Troubleshooting

The following table provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

#### *HD-MD8X1/2 Troubleshooting*

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Device does not function.	Device is not communicating with the network.	Use Crestron Toolbox to poll the network. Verify network connection to the device.
	Device is not receiving power from a Crestron power source.	Use a Crestron power source. Verify connections.
	Device is not receiving sufficient power.	Use the Crestron Power Calculator to help calculate how much power is needed for the system.
<b>PWR</b> LED does not illuminate.	Switcher is not receiving power.	Verify that cables plugged into the <b>NET</b> ports are secure.
<b>NET</b> LED does not illuminate.	Cresnet connection is not used.	Use a Cresnet connection.
	Net ID is not set to match the Net ID of the SIMPL Windows program.	Using Crestron Toolbox, poll the network. Verify that the Net ID for the switcher is set to match the ID specified in the SIMPL Windows program.
Incorrect audio or video displayed.	Audio is routed separately from video.	Reroute audio together with video.
Distorted audio or video.	Source does not match capabilities of destination.	Use Crestron Toolbox to manage EDID capabilities of devices in the system.
Loss of functionality due to electrostatic discharge.	Improper grounding.	Check that all ground connections have been made properly.

### Check Network Wiring

#### *Use the Right Wire*

In order to ensure optimum performance over the full range of your installation topology, Crestron Certified Wire and only Crestron Certified Wire may be used. Failure to do so may incur additional charges if support is required to identify performance deficiencies because of using improper wire.

**Calculate Power**

**CAUTION:** Use only Crestron power supplies for Crestron equipment. Failure to do so could cause equipment damage or void the Crestron warranty.

**CAUTION:** Provide sufficient power to the system. Insufficient power can lead to unpredictable results or damage to the equipment. Please use the Crestron Power Calculator to help calculate how much power is needed for the system ([www.crestron.com/calculators](http://www.crestron.com/calculators)).

When calculating the length of wire for a particular Cresnet run, the wire gauge and the Cresnet power usage of each network unit to be connected must be taken into consideration. Use Crestron Certified Wire only. If Cresnet units are to be daisy-chained on the run, the Cresnet power usage of each network unit to be daisy-chained must be added together to determine the Cresnet power usage of the entire chain. If the unit is home-run from a Crestron system power supply network port, the Cresnet power usage of that unit is the Cresnet power usage of the entire run. The wire gauge and the Cresnet power usage of the run should be used in the following equation to calculate the cable length value on the equation's left side.

**Cable Length Equation**

$$L < \frac{40,000}{R \times P}$$

Where: L = Length of run (or chain) in feet  
 R = 6 Ohms (Crestron Certified Wire: 18 AWG (0.75 MM<sup>2</sup>))  
 or 1.6 Ohms (Cresnet HP: 12 AWG (4 MM<sup>2</sup>))  
 P = Cresnet power usage of entire run (or chain)

Make sure the cable length value is less than the value calculated on the right side of the equation. For example, a Cresnet run using 18 AWG Crestron Certified Wire and drawing 20 watts should not have a length of run more than 333 feet (101 meters). If Cresnet HP is used for the same run, its length could extend to 1250 feet (381 meters).

**NOTE:** All Crestron certified Cresnet wiring must consist of two twisted pairs. One twisted pair is the +24V conductor and the GND conductor and the other twisted pair is the Y conductor and the Z conductor.

**Strip and Tin Wire**

When daisy-chaining Cresnet units, strip the ends of the wires carefully to avoid nicking the conductors. Twist together the ends of the wires that share a pin on the network connector and tin the twisted connection. Apply solder only to the ends of the twisted wires. Avoid tinning too far up the wires or the end becomes brittle. Insert the tinned connection into the Cresnet connector and tighten the retaining screw. Repeat the procedure for the other three conductors.

**Add Hubs**

Use of a Cresnet Hub/Repeater (CNXHUB) is advised whenever the number of Cresnet devices on a network exceeds 20 or when the combined total length of Cresnet cable exceeds 3000 feet (914 meters).

## Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron website ([www.crestron.com/manuals](http://www.crestron.com/manuals)). This link will provide a list of product manuals arranged in alphabetical order by model number.

### *List of Related Reference Documents*

DOCUMENT TITLE
2-Series Control Systems Reference Guide
Crestron e-Control Reference Guide

## Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by calling Crestron at 1-888-CRESTRON [1-888-273-7876].

You can also log onto the online help section of the Crestron website ([www.crestron.com/onlinehelp](http://www.crestron.com/onlinehelp)) to ask questions about Crestron products. First-time users will need to establish a user account to fully benefit from all available features.

## Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the HD-MD8X1/2, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron website periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.



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## Return and Warranty Policies

### Merchandise Returns / Repair Service

1. No merchandise may be returned for credit, exchange or service without prior authorization from CRESTRON. To obtain warranty service for CRESTRON products, contact an authorized CRESTRON dealer. Only authorized CRESTRON dealers may contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number and return address.
2. Products may be returned for credit, exchange or service with a CRESTRON Return Merchandise Authorization (RMA) number. Authorized returns must be shipped freight prepaid to CRESTRON, 6 Volvo Drive, Rockleigh, N.J. or its authorized subsidiaries, with RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. CRESTRON reserves the right in its sole and absolute discretion to charge a 15% restocking fee plus shipping costs on any products returned with an RMA.
3. Return freight charges following repair of items under warranty shall be paid by CRESTRON, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.

### CRESTRON Limited Warranty

CRESTRON ELECTRONICS, Inc. warrants its products to be free from manufacturing defects in materials and workmanship under normal use for a period of three (3) years from the date of purchase from CRESTRON, with the following exceptions: disk drives and any other moving or rotating mechanical parts, pan/tilt heads and power supplies are covered for a period of one (1) year; touchscreen display and overlay components are covered for 90 days; batteries and incandescent lamps are not covered.

This warranty extends to products purchased directly from CRESTRON or an authorized CRESTRON dealer. Purchasers should inquire of the dealer regarding the nature and extent of the dealer's warranty, if any.

CRESTRON shall not be liable to honor the terms of this warranty if the product has been used in any application other than that for which it was intended or if it has been subjected to misuse, accidental damage, modification or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced or removed.

This warranty shall be the sole and exclusive remedy to the original purchaser. In no event shall CRESTRON be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. CRESTRON is not liable for any claim made by a third party or made by the purchaser for a third party.

CRESTRON shall, at its option, repair or replace any product found defective, without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty.

Except as expressly set forth in this warranty, CRESTRON makes no other warranties, expressed or implied, nor authorizes any other party to offer any warranty, including any implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supersedes all previous warranties.

#### Trademark Information

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**Operations Guide – DOC. 6714A**  
**(2023605)**  
**05.09**  
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