Crestron **DM-RMC-100**
DigitalMedia™ Room Controller
& DM® CAT Receiver

Operations & Installation Guide

CRESTRON®

This document was prepared and written by the Technical Documentation department at:

Crestron Electronics, Inc.
15 Volvo Drive
Rockleigh, NJ 07647
1-888-CRESTRON

Regulatory Compliance

As of the date of manufacture, the DM-RMC-100 has been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling.

Federal Communications Commission (FCC) Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following 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

Industry Canada (IC) Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Contents

DigitalMedia™ Room Controller & DM® CAT Receiver: DM-RMC-100

Introduction

The DM-RMC-100 provides a convenient one-box interface solution to support a single display device as part of a complete DigitalMedia™ system. It functions as a DM® CAT receiver and control interface, providing a single HDMI® output along with a variety of control ports. Its compact, low-profile design allows the DM-RMC-100 to be installed discreetly behind a flat panel display or above a ceiling mounted projector.

Features and Functions

- DigitalMedia receiver and display controller
- DM CAT input supports up to 450 foot (137 meter) cable length[1]
- Low-profile surface mount design
- Provides one HDMI® or DVI display output[2]
- Handles HD video with Deep Color and 3D
- Includes USB HID keyboard/mouse port
- Enables device control via CEC, RS-232, IR, or Ethernet

(Continued on following page)

1. For DigitalMedia CAT wiring, use DM-CBL DigitalMedia Cable. Up to two DM Repeaters (model DM-DR, sold separately) may be required. Refer to the latest version of the Creston DigitalMedia Design Guide (Doc. 4789) for complete wiring guidelines. It is available from the Crestron Web site at (www.crestron.com/dmresources).
2. HDMI requires an appropriate adapter or interface cable to accommodate a DVI signal. CBL-HD-DVI interface cable available separately.

Features and Functions

(Continued)

- Provides relay screen/lift control
- Supports a power current sensor or contact closure
- Affords single-wire connection from a DM switcher or transmitter
- Provides 10/100 Ethernet connection for display device or control system
- Easy setup and diagnostics

DigitalMedia

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, office, school, or virtually any other facility.

DigitalMedia distributes uncompressed digital video and audio signals up to 450 feet (137 meters) using DM cable*. 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.

* For DigitalMedia CAT wiring, use DM-CBL DigitalMedia Cable. Up to two DM Repeaters (model DM-DR, sold separately) may be required. Refer to the latest version of the Creston DigitalMedia Design Guide (Doc. 4789) for complete wiring guidelines.

Multimedia Display Interface

A single HDMI digital AV output port is provided on the DM-RMC-100, supporting HDMI with HDCP, Deep Color and 3D, handling WUXGA computer resolutions and 1080p60 HDTV with multi-channel HD lossless audio, all through a single connection. The HDMI output can also handle DVI signals using an appropriate adapter or interface cable[1]. In addition, there are RS-232, IR, and Ethernet control ports provided for controlling the display device, plus two relays for screen and lift control, and a **SENS** input for connection of an optional current sensor or contact closure.

Multiple DM-RMC-100s may be installed to handle each display in a multi-room distribution system, all fed from a central DM series switcher (sold separately). Or, a single DM-RMC-100 can be fed straight from a DM-TX-100 or other DM CAT transmitter (sold separately) to provide a simple solution for extending a computer or AV signal to feed a single display. The connection to the switcher or transmitter requires just one DigitalMedia cable, with a potential cable length up to 450 feet (137 meters)[2]. In lieu of a central DM switcher, the DM-RMC-100's **LAN** port may be used to connect over Ethernet to a 2-Series control system if needed.

1. HDMI requires an appropriate adapter or interface cable to accommodate a DVI signal. CBL-HD-DVI interface cable available separately.
2. For DigitalMedia CAT wiring, use DM-CBL DigitalMedia Cable. Up to two DM Repeaters (model DM-DR, sold separately) may be required. Refer to the latest version of the Creston DigitalMedia Design Guide (Doc. 4789) for complete wiring guidelines.

Keyboard/Mouse Extender

When connected to a DM series switcher or DM-TX-100 transmitter (both sold separately), the DM-RMC-100 functions as a keyboard/mouse extender, allowing a USB HID (Human Interface Device) compliant keyboard and/or mouse to be connected at the display location, and used to control a computer or other host device located at the central equipment rack or some other remote location.

HID devices include mice, keyboards, trackballs and composite devices (e.g. combination keyboard/trackball devices). These devices do not require driver installation on most common operating systems (Windows and Mac OS).

Embedded Device Control

The primary objective of every Crestron system is to enable precisely the control desired for a seamless user experience. The DM-RMC-100 includes built-in RS-232, IR, and Ethernet control ports to allow programmable control of the display device connected to it. It can also provide an alternative to these conventional control methods by harnessing the CEC (Consumer Electronics Control) signal embedded in HDMI. Through its connection to the control system, the DM-RMC-100 provides a gateway for controlling the display device right through the HDMI connection, potentially eliminating the need for any dedicated control wires or IR probes.

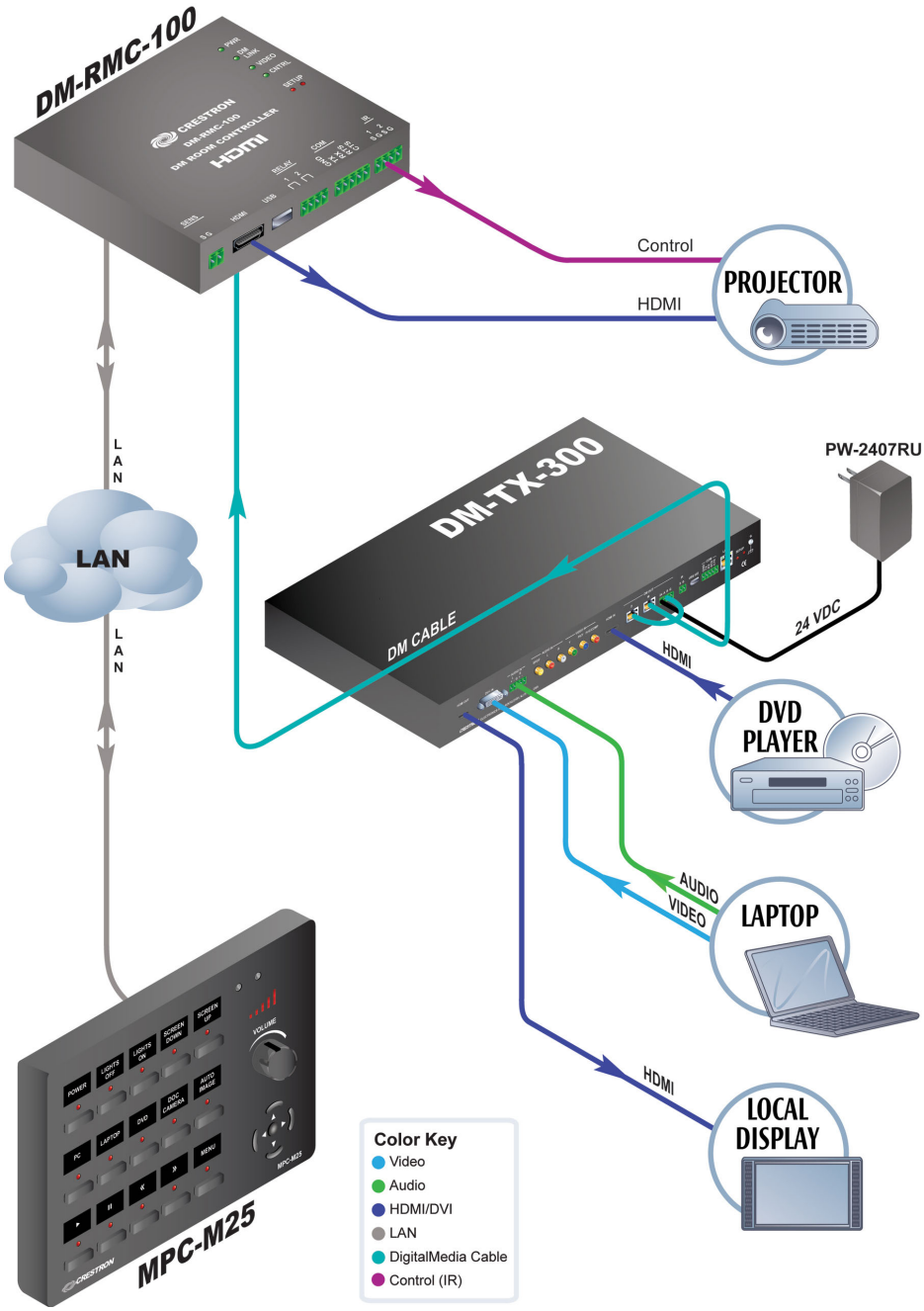
Low-Profile Installation

The DM-RMC-100 mounts to a standard 2-gang, 4" square, or UK electrical box, and sticks out only one inch from the wall surface. Connections to the display are all positioned along the bottom edge of the receiver, allowing cables to be dressed neatly without obstruction. The DM and LAN connection are made behind the unit within the electrical box. An array of indicators on the front of the DM-RMC-100 provide for easy setup and troubleshooting, verifying the status of connections and signal activity at a glance.

Applications

The diagram below shows a DM-RMC-100 in a classroom application.

DM-RMC-100 in a Classroom Application



For more information on this and other DM-RMC-100 applications, refer to the latest revision of the Crestron DigitalMedia Design Guide (Doc. 4789).

Specifications

Specifications for the DM-RMC-100 are listed in the following table.

DM-RMC-100 Specifications

SPECIFICATION	DETAILS
Video	
Input Signal Type	DM CAT (DigitalMedia over twisted-pair copper wire)
Output Signal Types	HDMI, DVI[1]
Formats	HDMI with Deep Color & 3D, DVI, HDCP content protection support
Input Resolutions	
Progressive	640 x 480 @ 60 Hz 720 x 480 @ 60 Hz (480p) 720 x 576 @ 50 Hz (576p) 800 x 600 @ 60 Hz 848 x 480 @ 60 Hz 852 x 480 @ 60 Hz 854 x 480 @ 60 Hz 1024 x 768 @ 60 Hz 1024 x 852 @ 60 Hz 1024 x 1024 @ 60 Hz 1280 x 720 @ 50 Hz (720p50) 1280 x 720 @ 60 Hz (720p60) 1280 x 768 @ 60 Hz 1280 x 800 @ 60 Hz 1280 x 960 @ 60 Hz 1280 x 1024 @ 60 Hz 1360 x 768 @ 60 Hz 1365 x 1024 @ 60 Hz 1366 x 768 @ 60 Hz 1400 x 1050 @ 60 Hz 1440 x 900 @ 60 Hz 1600 x 900 @ 60 Hz 1600 x 1200 @ 60 Hz 1680 x 1050 @ 60 Hz

(Continued on following page)

DM-RMC-100 Specifications (Continued)

SPECIFICATION	DETAILS
Video	
Input Resolutions	
Progressive (Continued)	1920 x 1080 @ 24 Hz (1080p24) 1920 x 1080 @ 25 Hz (1080p25) 1920 x 1080 @ 50 Hz (1080p50) 1920 x 1080 @ 60 Hz (1080p60) 1920 x 1200 @ 60 Hz 2048 x 1080 @ 24 Hz 2048 x 1152 @ 60 Hz plus any other resolution allowed by HDMI up to 165 MHz pixel clock
Interlaced	720 x 480 @ 30 Hz (480i) 720 x 576 @ 25 Hz (576i) 1920 x 1080 @ 25 Hz (1080i25) 1920 x 1080 @ 30 Hz (1080i30) plus any other resolution allowed by HDMI up to 165 MHz pixel clock
Output Resolutions	Matched to input
Audio	
Input Signal Type	DM CAT
Output Signal Type	HDMI
Formats	Dolby® Digital, Dolby Digital EX, Dolby Digital Plus, Dolby True HD, DTS®, DTS-ES, DTS 96/24, DTS-HD High Res, DTS HD Master Audio™, up to 8ch PCM
Communications	
DigitalMedia	DM CAT, DMNet, HDCP management, EDID format management, CEC

(Continued on following page)

DM-RMC-100 Specifications (Continued)

SPECIFICATION	DETAILS
Communications (Continued)	
Ethernet	10BASE-T/100BASE-TX, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, RSTP
USB	Supports USB HID class devices
Power Requirements	
DMNet Power Usage	6 Watts (0.25 Amps @ 24 Volts DC)
Minimum 2-Series Control System Update File[2, 3]	Version 4.001.1040 or later
Environmental	
Temperature	41º to 104º F (5º to 40º C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	21 BTU/Hr
Enclosure	
Chassis	Metal, matte black finish
Mounting	Surface mount (mounting bracket included)
Dimensions	
Height	4.54 in (116 mm)
Width	5.15 in (131 mm)
Depth	1.41 in (36 mm)
Weight	14 oz (392 g)

(Continued on following page)

DM-RMC-100 Specifications (Continued)

SPECIFICATION	DETAILS
Available Accessories	
CBL-HD	Crestron Certified HDMI Interface Cable
CBL-HD-DVI	Crestron Certified HDMI to DVI Interface Cable
CNSP-XX	Custom Serial Interface Cable
CNXRMCS	Current Sensor
DM-CBL	DigitalMedia Cable
DM-CONN	DigitalMedia Cable Connector
DM-DR	DigitalMedia Repeater
IRP2	IR Emitter Probe
MP-WP140	Media Presentation Wall Plate – DVI with Mini-TRS Stereo Audio
MP-WP152	Media Presentation Wall Plate – HDMI
MP-WP185	Media Presentation Wall Plate - Crestron DigitalMedia CAT with DMNet

1. HDMI requires an appropriate adapter or interface cable to accommodate a DVI signal. CBL-HD-DVI interface cable available separately.
2. The latest software versions can be obtained from the Crestron Web site. Refer to the NOTE following these footnotes.
3. 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.

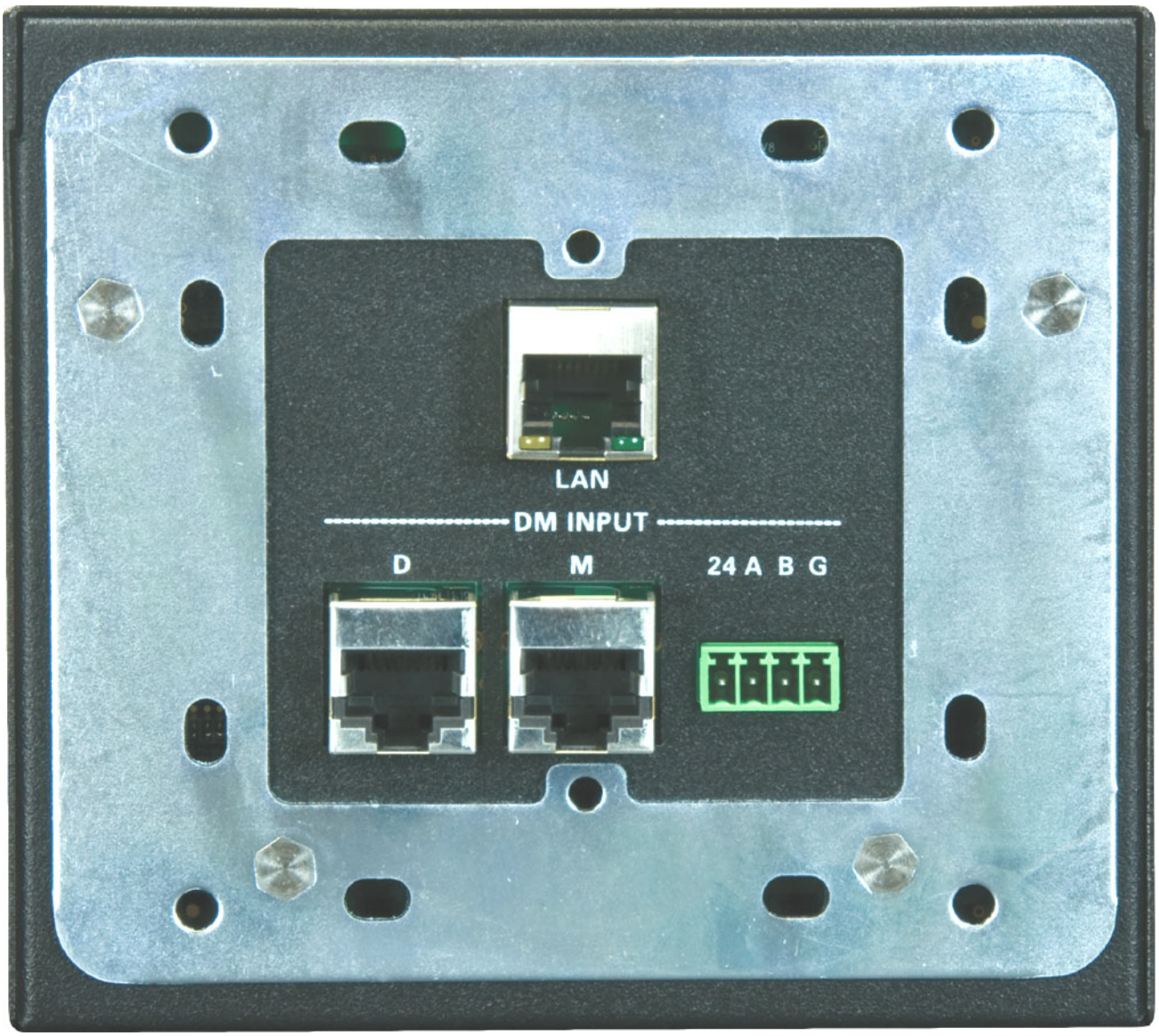
NOTE: Crestron software and any files on the Web site are for authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

Physical Description

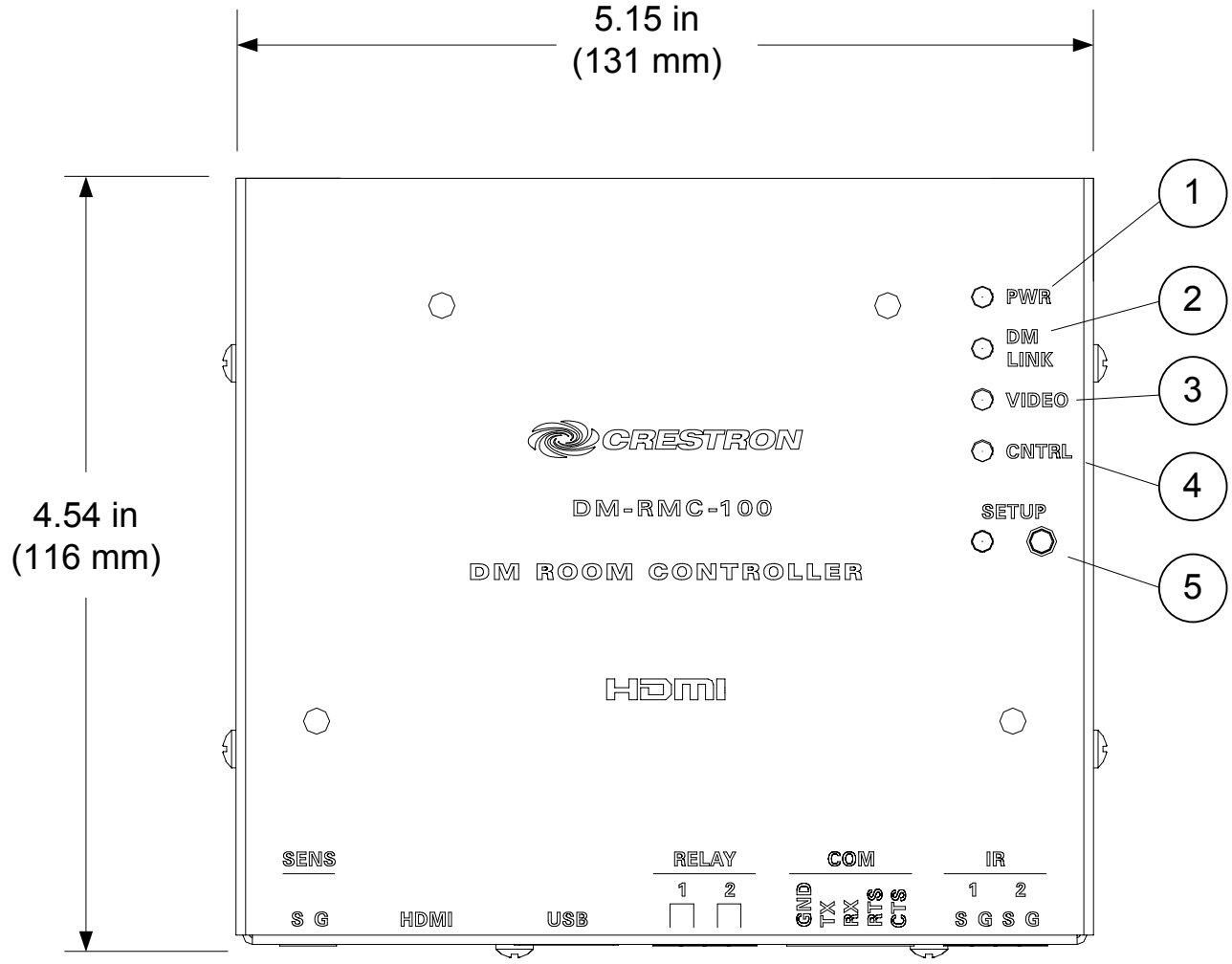
This section provides information on the connections, controls and indicators available on your DM-RMC-100.

DM-RMC-100 Physical View (Front)

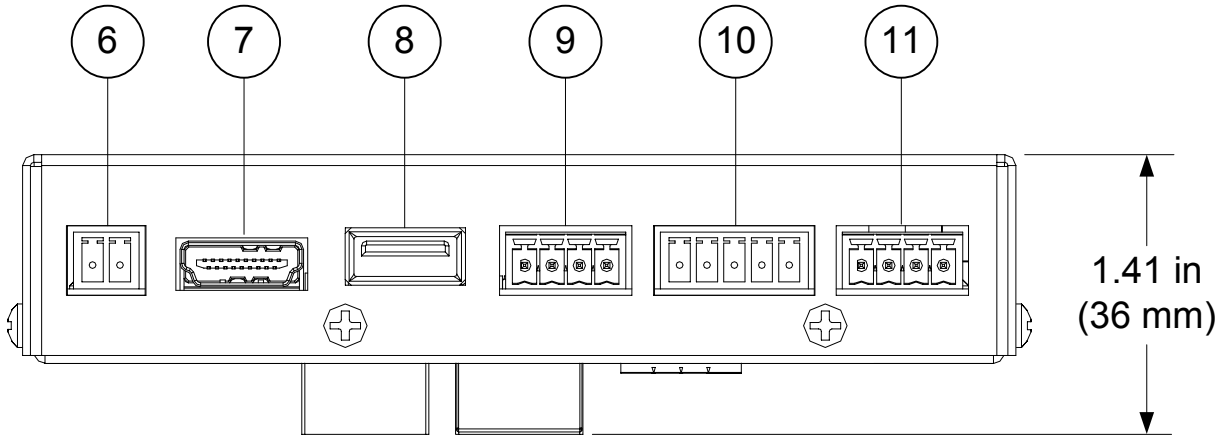
DM-RMC-100 Physical View (Back)



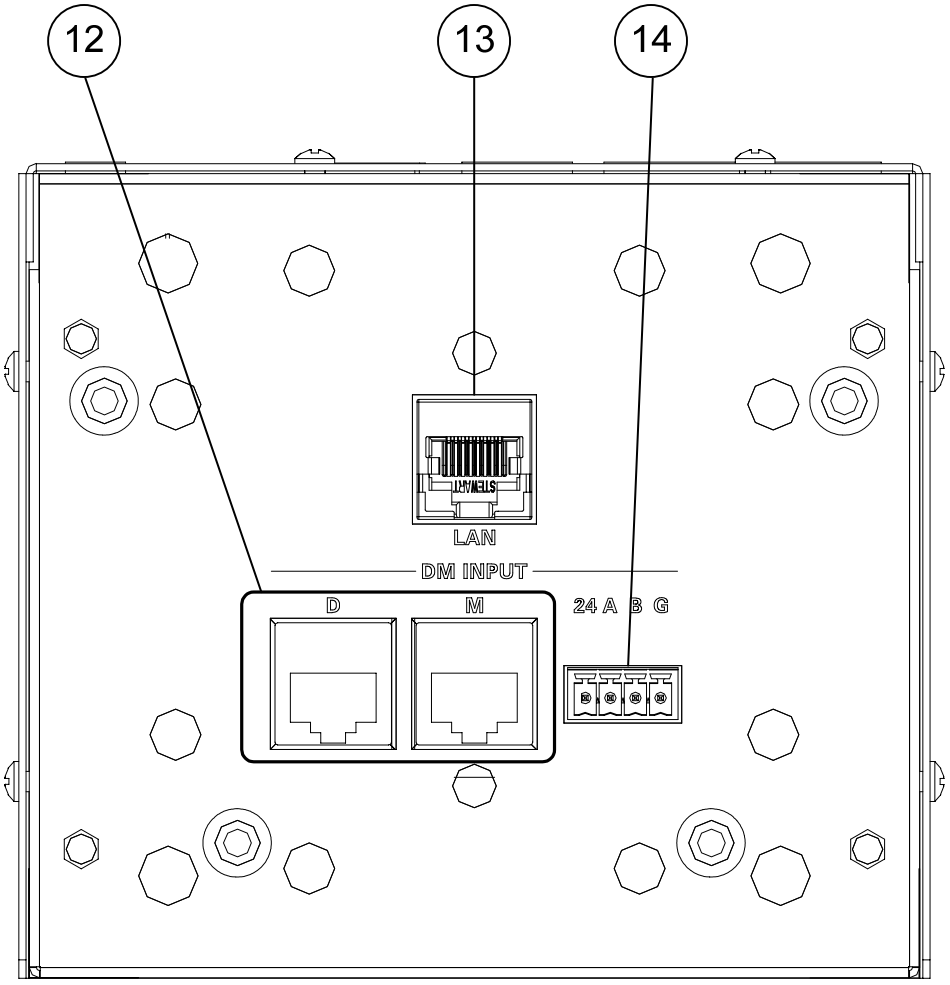
DM-RMC-100 Overall Dimensions (Front View)



DM-RMC-100 Overall Dimensions (Bottom View)



DM-RMC-100 Overall Dimensions (Rear View)



Connectors, Controls & Indicators

#	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
1	PWR LED	(1) Green LED, indicates operating power supplied via DMNet
2	DM LINK LED	(1) Green LED, indicates connection to an upstream DM device

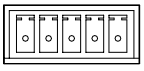
(Continued on following page)

Connectors, Controls & Indicators (Continued)

#	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
3	VIDEO LED	(1) Red/green dual color LED, indicates video signal presence and lock status: **Red** – indicates no video **Green** – indicates the device is receiving video **Blinking Red/Green** – indicates errors in the video stream
4	CNTRL LED	(1) Red/green dual color LED, indicates Ethernet connection and control system communication status: **Red** – indicates no Ethernet link **Green** – indicates Ethernet link and connection to control system **Blinking Red/Green** – indicates Ethernet link but no connection to control system **Blinking Green** - The LED goes out momentarily every time a control command is sent or received (i.e. IR, RS-232, Relay, Sens)
5	SETUP (LED and Button)	(1) Red LED and (1) miniature recessed push button, for Ethernet auto-discovery and default IP address

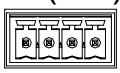
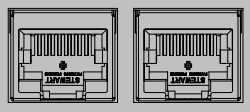
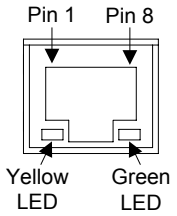
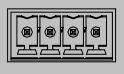
(Continued on following page)

Connectors, Controls & Indicators (Continued)

#	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
6	SENS 	(1) 2-pin 3.5 mm detachable terminal block; Digital/contact closure sensing input; Rated for 0-24 Volts DC, referenced to ground; Input impedance: 2.2k ohms pulled up to 5 Volts DC; Logic threshold: 2.5 Volts DC nominal with 1 Volt hysteresis band
7	HDMI 	(1) 19-pin Type A HDMI female; HDMI digital video/audio output Also supports DVI[2]
8	USB 	(1) USB Type A female; USB 1.1 host port for connection of a mouse, keyboard or other USB HID-compliant device
14	RELAY (1-2) 	(1) 4-pin 3.5 mm detachable terminal block comprising two normally open, isolated relays; Rated 1 Amp, 30 Volts AC/DC; MOV arc suppression across contacts
15	COM 	(1) 5-pin 3.5 mm detachable terminal block, bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support

(Continued on following page)

Connectors, Controls & Indicators (Continued)

#	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
16	IR (1-2) 	(1) 4-pin 3.5 mm detachable terminal block comprising two IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5 Volts) up to 19200 baud[3]
12	DM INPUT[4, 5] 	(1) DM CAT input composed of two 8-pin RJ-45 female, shielded; Connects to DM CAT output of a DM switcher, transmitter, or other DM device via DM-CBL cable[6]
13	LAN[4] 	(1) 8-wire RJ-45 with two LED indicators; 10BASE-T/100BASE-TX Ethernet port; Green LED indicates link status; Yellow LED indicates Ethernet activity
14	24 A B G[7, 8] 	(1) 4-pin 3.5 mm detachable terminal block, DMNet port; Connects to DMNet port of a DM switcher, transmitter, or other DM device via DM-CBL cable[6]

PIN	SIGNAL	PIN	SIGNAL
1	TX +	5	N/C
2	TX -	6	RX -
3	RX +	7	N/C
4	N/C	8	N/C

1. Interface connectors for **24 A B G**, **COM**, **IR, RELAY** and **SENS** ports are provided with the unit.
2. HDMI requires an appropriate adapter or interface cable to accommodate a DVI signal. CBL-HD-DVI interface cable sold separately.
3. Maximum string length for IR commands should be no greater than 40 characters.
4. To determine which is pin 1 on the cable, hold the cable so that the end of the eight pin modular plug is facing away from you, with the clip down and copper side up. Pin 1 is on the far left.
5. The **DM INPUT** port consists of two separate RJ-45 connectors, labeled **D** and **M**. The **D** port carries HDMI signal. The **M** port carries data. Refer to the following table for the connector pinouts.

PIN #	WIRE COLOR	PIN #	WIRE COLOR
1	Orange/White	5	Blue/White
2	Orange	6	Green
3	Green/White	7	Brown/White
4	Blue	8	Brown

6. For DigitalMedia CAT wiring, use DM-CBL DigitalMedia Cable. Up to two DM Repeaters (model DM-DR, sold separately) may be required. Refer to the latest version of the Creston DigitalMedia Design Guide (Doc. 4789) for complete wiring guidelines.
7. Refer to the following table for the **24 A B G** port connector pinouts.

PIN #	SIGNAL	DESCRIPTION	WIRE COLOR
24	24V DC	DC Power	Red
A	DMNet+	DMNet	Orange
B	DMNet-	DMNet	Gray
G	Ground	DC Ground	Black

8. DMNet wiring is not compatible with Cresnet® wiring. DMNet wiring cannot be daisy chained.

Setup

Network Wiring

When wiring the DMNet network, consider the following:

NOTE: DMNet wiring and Cresnet® wiring are not compatible.

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

  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).

- For DigitalMedia CAT wiring, use DM-CBL DigitalMedia Cable. Up to two DM Repeaters (model DM-DR, sold separately) may be required. Refer to the latest revision of the Crestron DigitalMedia Design Guide (Doc. 4789) for complete wiring guidelines.

For more details, refer to “Check Network Wiring” which starts on page 34.

The DM-RMC-100 can also use high-speed Ethernet for communications between the device and a control system, computer, media server 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 from the Crestron Web site (www.crestron.com/manuals).

Identity Code

NOTE: In the SIMPL™ Windows program, when the DM-RMC-100 is dropped onto an output card of a DM switcher, its IP ID is assigned automatically and does not require additional programming. Use the information below when the DM-RMC-100 is dropped directly into an Ethernet slot on the control system in SIMPL Windows, without a DM switcher.

The IP ID is set within the DM-RMC-100's table using Crestron Toolbox™. For information on setting an IP table, refer to the Crestron Toolbox help file. The IP IDs of multiple DM-RMC-100 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

To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications.

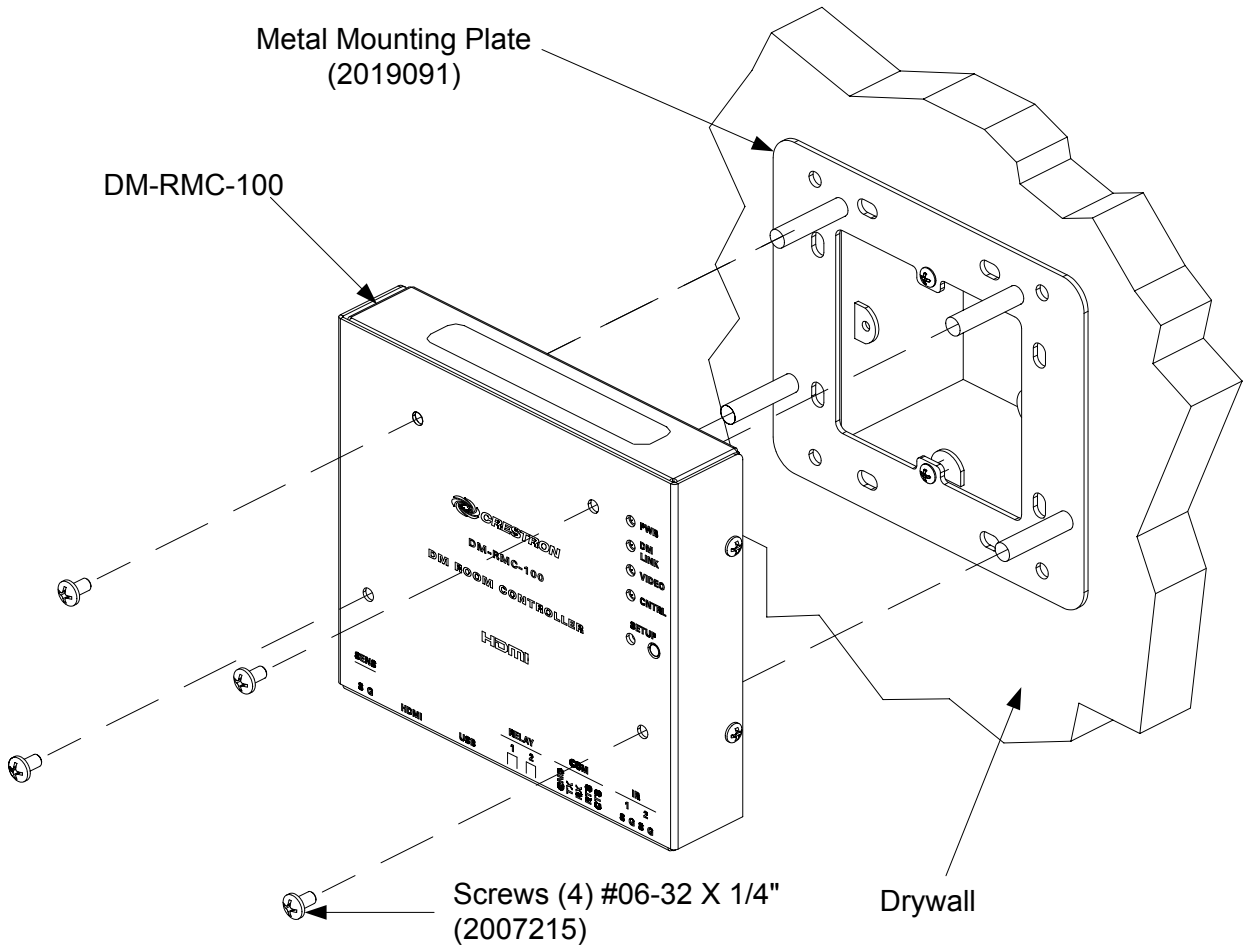
The following tools and accessories are required for installation of a DM-RMC-100:

- DigitalMedia cable (sold separately) terminated with shielded RJ-45 connectors (DM-CONN, not supplied) for media signals and mini-phoenix connector for DMNet signals. Refer to "Network Wiring" on page 18.
- Phillips screwdriver (not supplied)
- Four #06-32 x 1/4" pan head Phillips screws (included)
- Metal mounting plate (included)
- 2-, 4- and 5-pin connector plugs (included)

Use the following procedure to install the DM-RMC-100.

1. Attach supplied connector plugs to the appropriate cables. Refer to "Hardware Hookup" which starts on page 21.
2. Attach the included metal mounting plate (2019091) to the mounting surface using four screws (not supplied).
3. Attach the DM-RMC-100 to the mounting plate using the four included #06-32 x 1/4" Phillips screws (2007215), as shown in the illustration below.

Mounting DM-RMC-100 to Electrical Box

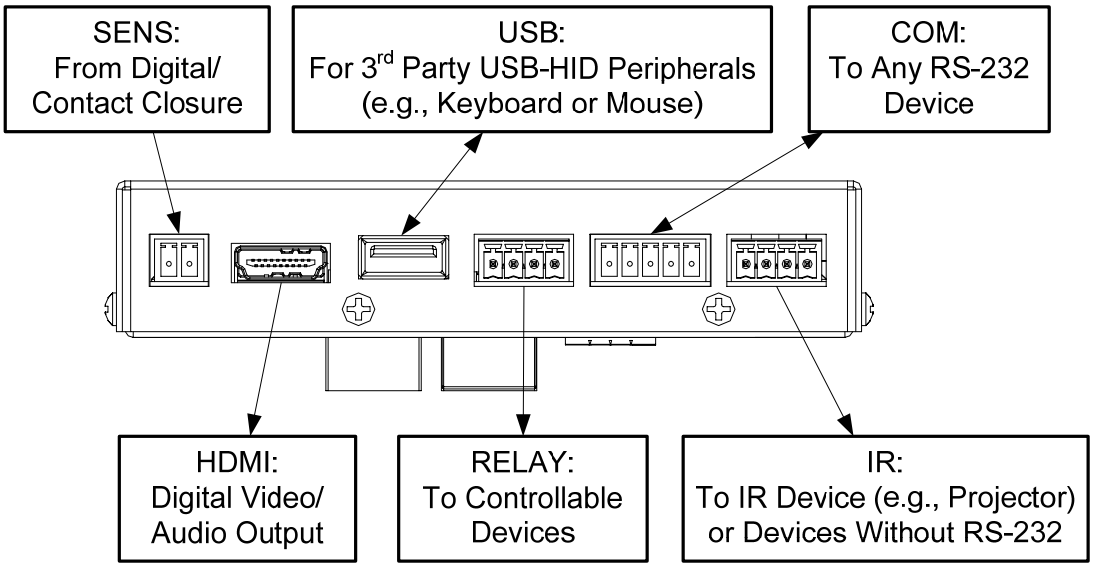


Hardware Hookup

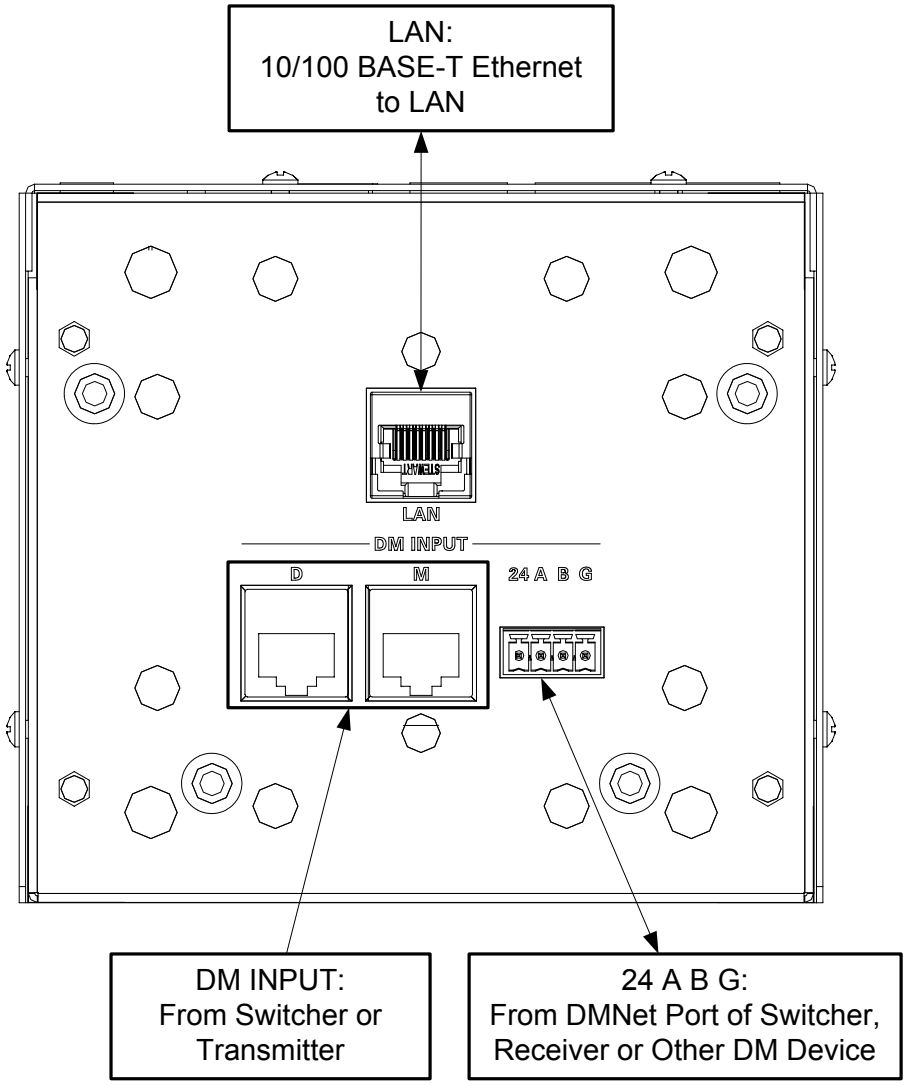
Make the necessary connections as called out in the illustration that follows this paragraph. Refer to "Network Wiring" on page 18. Apply power after all connections have been made.

When making connections to the DM-RMC-100, use Crestron power supplies for Crestron equipment.

Hardware Connections for the DM-RMC-100 (Bottom View)



Hardware Connections for the DM-RMC-100 (Back View)



NOTE: Ensure the unit is properly grounded by mounting it to a metal electrical box or connecting a wire from the unit's ground screw to building/earth ground.

NOTE: For optimum performance, Crestron strongly recommends using DM-CBL DigitalMedia cable, available from Crestron.

NOTE: Minimum recommended length for DM-CBL DigitalMedia cable is 15 feet (~4.6 meters).

Programming Software

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 Web site. 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.

Earliest Version Software Requirements for the PC

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 Web site (www.crestron.com/software).

Crestron has developed an assortment of Windows®-based software tools to develop a customized system. Use Crestron SystemBuilder™ or SIMPL Windows to create a program to control the DM-RMC-100.

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 Web site and examine the extensive help file.

Programming with SIMPL Windows

NOTE: While SIMPL Windows can be used to program the DM-RMC-100, 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 and Program.

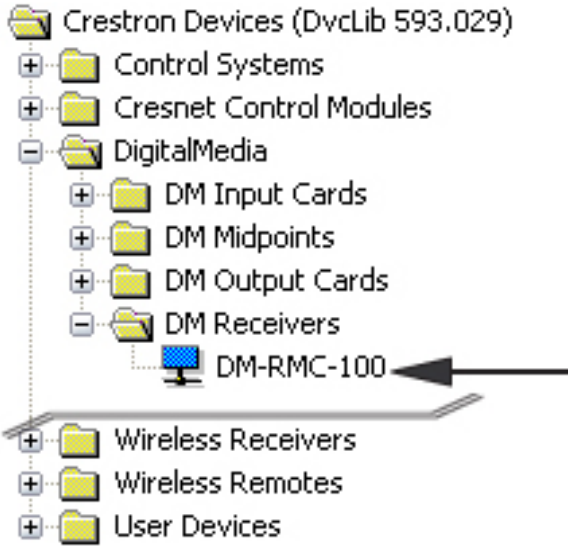
Configuration Manager

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

1. To incorporate the DM-RMC-100 into the system, drag the DM-RMC-100 from the DigitalMedia | DM Receivers folder of the *Device Library* and drop it into either of the following *System Views*:

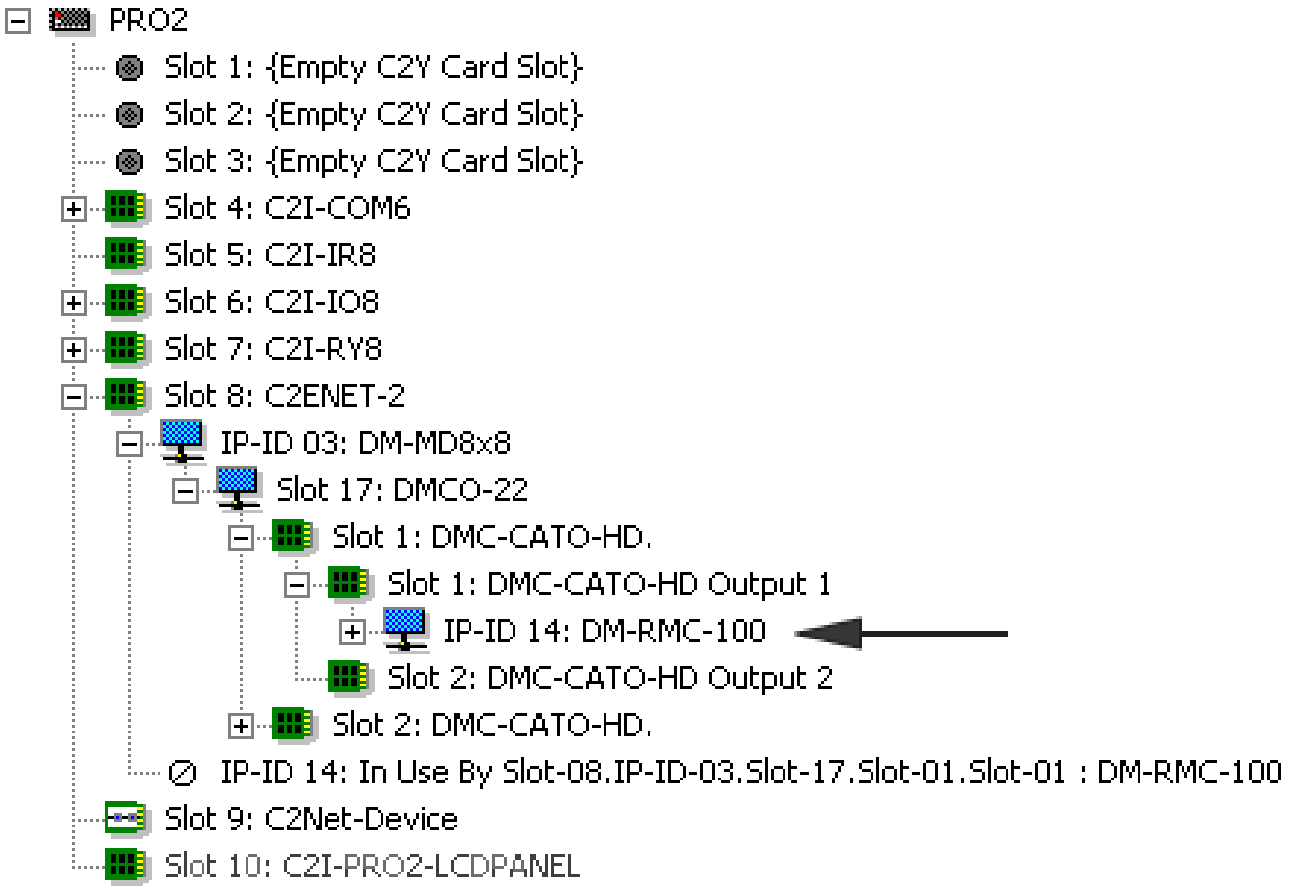
   - A compatible output card of a DM switcher
   - Directly to a card in the Ethernet slot of the control system (used without a DM switcher)

   Locating the DM-RMC-100 in the Device Library

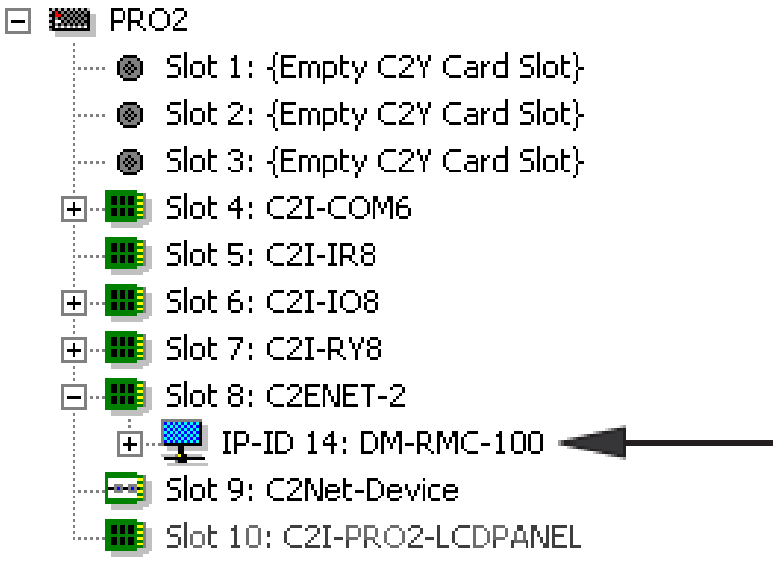


   The system tree of the control system displays the DM-RMC-100 in the appropriate slot with a default IP ID or IP ID as shown in the following illustrations. In the first example, the DM-RMC-100 is used with the DMCO-22 output card in a DM-MD8X8 switcher (both sold separately). In the second example, the DM-RMC-100 is used with the C2ENET-2 card (sold separately) in an Ethernet slot on the control system.

C2ENET-2 Device, Slot 8
(Using Output Card in a DM Switcher)

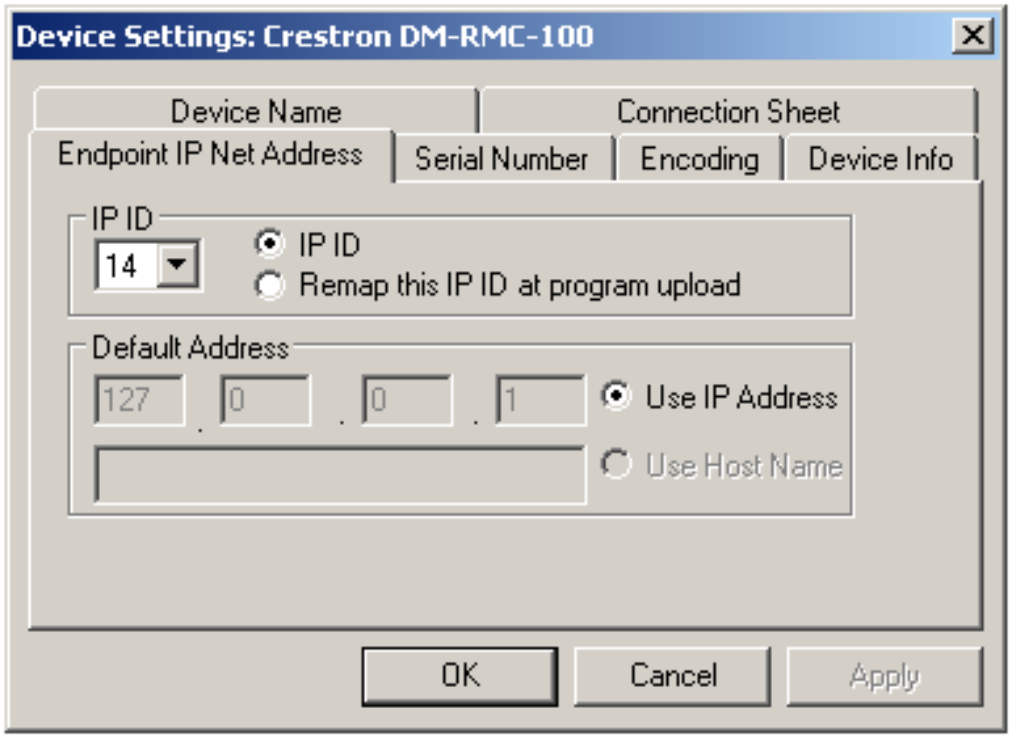


C2ENET-2 Device, Slot 8
(Using Ethernet Slot on Control System)



2. If additional DM-RMC-100 devices are to be added, repeat step 1 for each device. Each DM-RMC-100 is assigned a different IP ID number as it is added.
3. If necessary, double click a device to open the "Device Settings" window and change the IP ID, as shown in the following figure.

"Device Settings: Crestron DM-RMC-100" Window



NOTE: The ID code specified in the SIMPL Windows program must match the IP ID of each unit. Refer to "Identity Code" on page 19.

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**).

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, firmware) can be transferred to the device. Finally, program checks can be performed (such as changing the device ID) to ensure proper functioning.

Establishing Communication

Use Crestron Toolbox for communicating with the DM-RMC-100; refer to the Crestron Toolbox help file for details.

A PC running Crestron Toolbox communicates with the DM-RMC-100 in the following ways:

- Via a DM switcher using TCP/IP or USB communication. TCP/IP provides a faster method of communication than USB.
- Via the **LAN** port of the DM-RMC-100 using TCP/IP communication. In this scenario, the DM-RMC-100 is used in a standalone configuration (i.e. a DM switcher is not used).

Via DM Switcher

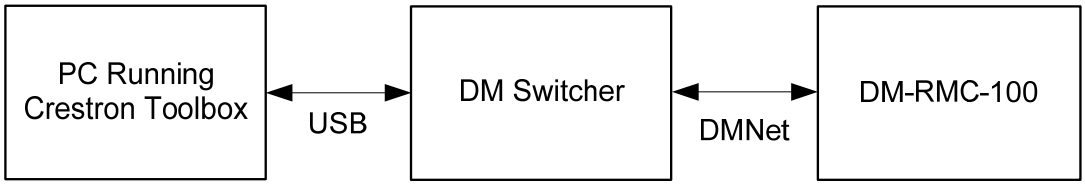
TCP/IP Communication via DM Switcher

To establish TCP/IP communication between the PC and the DM-RMC-100 via a DM switcher:

1. Establish communication between the PC and the DM switcher as described in the latest version of the Digital Media Switchers Operations Guide (Doc. 6755).
2. Use the Device Discovery Tool in Crestron Toolbox to find the IP address of the DM-RMC-100. The tool is available in Toolbox version 1.15.143 or later.

3. Use the Address Book in Crestron Toolbox to create an entry for the DM-RMC-100 using the *TCP* connection type and enter the IP address of the DM-RMC-100.
4. Display the DM-RMC-100's "System Info" window (click the icon); communications are confirmed when the device information is displayed.

USB Communication via DM Switcher

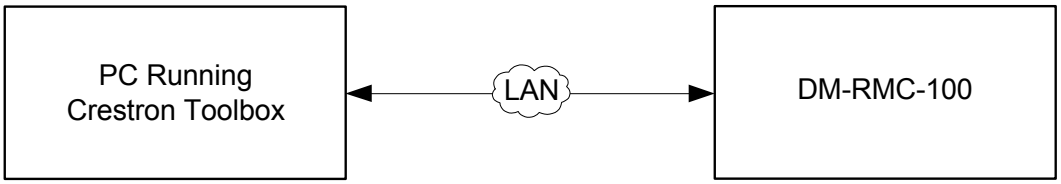


To establish USB communication between the PC and the DM-RMC-100 via a DM switcher:

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 DM switcher by entering "DM-MD8X8", "DM-MD16X16" or "DM-MD32X32" 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 sound in the "System Info" window in the *Ethernet* section of the window, however, communication must be established in order to see this information in the "System Info" window.
2. Display the DM-RMC-100's "System Info" window (click the icon); communications are confirmed when the device information is displayed.

Via LAN Port

TCP/IP Communication via LAN Port of DM-RMC-100



To establish TCP/IP communication between the PC and the DM-RMC-100 via the **LAN** port of the DM-RMC-100:

1. Use the Device Discovery Tool in Crestron Toolbox to find the IP address of the DM-RMC-100. The tool is available in Toolbox version 1.15.143 or later.

   NOTE: When the DM-RMC-100 is used in a standalone configuration (i.e. without a DM switcher), DHCP is enabled by default. If desired, a default IP address (192.168.1.241) can be assigned by holding down its **SETUP** button while applying power. This IP address overwrites any previous settings and remains until it is changed manually.

2. Use the Address Book in Crestron Toolbox to create an entry for the DM-RMC-100 using the *TCP* connection type and enter the IP address of the DM-RMC-100.
3. Display the DM-RMC-100's "System Info" window (click the icon); communications are confirmed when the device information is displayed.
4. (Optional) If additional changes to TCP/IP settings are desired, do the following:
   a. Assign an IP address, IP mask and default router for the DM-RMC-100 via Crestron Toolbox (**Functions** | **Ethernet Addressing**).
   b. Close the "System Info" window.
   c. In Crestron Toolbox, change the Address Book entry for the DM-RMC-100 so that it uses the IP address assigned in step 4a.
   d. Display the DM-RMC-100's "System Info" window (click the icon); communications are confirmed when the device information is displayed.

Firmware

Firmware files may be distributed from programmers to installers or from Crestron to dealers. Firmware upgrades are available from the Crestron Web site as new features are developed after product releases. For details on upgrading, refer to the Crestron Toolbox help file.

Check the Crestron Web site 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.)

To upgrade DM-RMC-100 firmware:

1. Do either of the following:
   - If the DM-RMC-100 is connected to a DM switcher, use the Device Discovery Tool in Crestron Toolbox to find the IP address of the switcher.
   - If the DM-RMC-100 is being used in standalone configuration (i.e. without a DM switcher), use the Device Discovery Tool to find the IP address of the DM-RMC-100.
2. Add the IP address to the Address Book in Toolbox.
3. Download the appropriate .puf file from the Crestron Web site to your PC.
4. Double-click the .puf file. The Toolbox Address Book will open.
5. From the list in the Address Book, select the DM switcher (if the DM-RMC-100 is connected to a switcher) or the DM-RMC-100 (if the DM-RMC-100 is used in a standalone configuration), then click **OK**.

   Either of the following occurs:
   - If the DM switcher was selected, a DM device list is displayed that allows upgrading all DM devices connected to the switcher.
   - If the DM-RMC-100 was selected, a DM device list is displayed that allows upgrading of the DM-RMC-100 only.

   In the DM device lists that are displayed, the checkbox of any item that needs to be upgraded is automatically selected.
6. Click **Update**.
7. After the process is complete, click **Recheck** to verify the upgrade.

IP Configuration

If the DM-RMC-100 is used in a standalone configuration (i.e. without a DM switcher), use Crestron Toolbox to create the IP table entry for the DM-RMC-100.

NOTE: If the DM-RMC-100 is connected directly to a DM switcher, the IP table entry for the DM-RMC-100 is created automatically.

1. Use the Device Discovery Tool in Crestron Toolbox to find the IP address of the DM-RMC-100. Then, display the "System Info" window (click the  icon) and select the DM-RMC-100 entry from the Address Book.
2. Select **Functions** | **IP Table Setup**.
3. Add, modify or delete entries in the IP table. The DM-RMC-100 can have only one IP table entry.
4. A defined IP table can be saved to a file or sent to the device.

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.

DM-RMC-100 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 sufficient power.	Use the Crestron Power Calculator to help calculate how much power is needed for the system.
PWR LED does not illuminate.	Device is not receiving power.	Verify DMNet connections are properly attached.
DM LINK LED does not illuminate.	Device is not receiving DMNet signal.	Verify DMNet connections are properly attached.
VIDEO LED is red.	Device is not receiving video signal.	Ensure proper video signal is routed to device.
VIDEO LED blinks red and green.	Device is receiving video but unable to lock onto it.	Verify 'D' cable connection and that the cable length can support the video data rate.

(Continued on following page)

DM-RMC-100 Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
VIDEO LED is green but video on connected display is black.	HDCP is blanking the video output.	Verify 'M' cable connection.
		If source is routed through DM Switcher, verify that there are enough HDCP keys to support all destinations.
CNTRL LED is red.	Device is not communicating with an Ethernet device.	Verify 'M' cable connections.
		If the device is in a non-DHCP environment, a default IP address (192.168.1.241) can be assigned by holding down its **SETUP** button while applying power. This IP address will overwrite any previous settings and will remain until it is changed.
CNTRL LED flashes red/green.	Device has Ethernet link but is not communicating with control system.	Verify IP table entries match control system.
Loss of functionality due to electrostatic discharge.	Improper grounding.	Check that all ground connections have been made properly.

NOTE: For more advanced diagnostics, use the DM tool in Crestron Toolbox.

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. The **EIG** connector on the DM switcher is used to bring in external power. Additional power is rarely required as switchers provide enough power for most typical configurations. Please use the DMNet Power Calculator to help calculate how much power is needed for the system (www.crestron.com/calculators).

Refer to the following table for commonly used resolutions and maximum DM-CBL cable lengths.

Commonly Used Resolutions and Maximum DM-CBL Cable Lengths

RESOLUTION:	DM-CBL CABLE LENGTH	
	Maximum length without, between, before or after repeaters	Maximum total length using up to 2 repeaters
720p, 1080i, 1080p24	200 ft (60 m)	450 ft (137 m)
1024 x 768 @ 75 Hz	200 ft (60 m)	450 ft (137 m)
1080p60	150 ft (45 m)	450 ft (137 m)
1280 x 1024 @ 75 Hz	150 ft (45 m)	450 ft (137 m)
1920 x 1200 @ 60 Hz	150 ft (45 m)	450 ft (137 m)
1600 x 1200 @ 60 Hz	125 ft (38 m)	375 ft (114 m)
1080p60 Deep Color	50 ft (15 m)	150 ft (45 m)

NOTE: 1080p60 is the most common resolution used in residential installations.

NOTE: All Crestron certified DMNet 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 A conductor and the B conductor.

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron Web site.

List of Related Reference Documents

DOCUMENT TITLE
Crestron DigitalMedia Design Guide (www.crestron.com/dmresources)
Crestron e-Control Reference Guide (www.crestron.com/manuals)
DigitalMedia Switchers Operations Guide (www.crestron.com/manuals)

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 Web site (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 DM-RMC-100, 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 Web site periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.

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.

GNU General Public License

Version 2, June 1991

PREAMBLE

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they too receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program" below refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program and can be reasonably considered independent and separate works in themselves, then this License and its terms do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void and will automatically terminate your rights under this License. However, parties who have received copies or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by

modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Crestron Electronics, Inc.
15 Volvo Drive Rockleigh, NJ 07647
Tel: 888.CRESTRON
Fax: 201.767.7576
www.crestron.com

Operations & Installation Guide – DOC. 6743-1F
(2027682)
02.11
Specifications subject to
change without notice.