

Crestron **QM-FTMC**
QuickMedia™ FlipTop Media Center

Operations & Installation Guide



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QuickMedia™ FlipTop Media Center: QM-FTMC

Introduction

Features and Functions

The QM-FTMC FlipTop Media Center is part of the Crestron MediaManager™ line of network devices, room control systems and signal routing solutions. It is available in six different models.

Models

DESCRIPTION	MODEL NUMBER	COLOR
Domestic Models with Keypad	QM-FTMC-B	Black
	QM-FTMC-BALUM	Brushed Aluminum
Domestic Models without Keypad	QM-FTMC-NB-B	Black
	QM-FTMC-NB-BALUM	Brushed Aluminum
International Models with Keypad	QMI-FTMC-B	Black
	QMI-FTMC-BALUM	Brushed Aluminum

The international models accommodate a wide variety of international AC adaptors. For simplicity within this guide, the color/button suffix and international designation are omitted and QM-FTMC is used except where noted.

- Stylish flush-mount FlipTop housing
- Built-in engravable* keypad with 10 to 20 buttons and LEDs and dual bargraphs (keypad models only)
- Composite, S-video, Computer RGB and stereo audio inputs
- Support for component video via the Computer input
- Signal sensing for RGB, component, composite and S-video
- 3 x 1 video switch (one composite, one S-video and one RGBHV connector)
- 3 x 1 audio switch (two stereo RCA, one stereo 1/8" mini jack) with audio breakaway

(Continued on following page)

Features and Functions (Continued)

- One RJ-45 Ethernet pass through connector
- One AC power pass through
- Two mic inputs with phantom power (on the bottom)
- One QuickMedia™ RJ-45 connector (on the bottom)
- Two Cresnet® connectors (on the bottom)
- Low-cost, quick and easy installation
- Easy setup using Crestron SystemBuilder™ software
- Optional cable management kit

* As an option, custom-engraved buttons can be designed and obtained by using the Crestron Engraver software. Version 2.2.2.3 and Crestron Database 16.3.4 or later are available from the Crestron website (at <http://www.crestron.com>).

FlipTop Housing

Handsomely finished in either black anodized or brushed aluminum, the QM-FTMC mounts flush in any tabletop surface for a clean, professional appearance. The sleek design of the “FlipTop” lid features an integrated keypad (keypad models only) to provide programmable pushbutton control at every interface location. Wiring for the QM-FTMC is extremely simple requiring just a single CresCAT™-QM cable (sold separately).

Multimedia Interface

Individual inputs are provided for composite, S-video and RGB/component signals, each with corresponding stereo audio, to accept connections from portable AV devices and computers. For complete connectivity, the QM-FTMC also includes an RJ-45 LAN pass through connector and AC power receptacle.

Integrated Keypad (optional)

The QM-FTMC can be ordered with or without a keypad. This customizable keypad provides 10 to 20 programmable pushbuttons for control of AV, lighting and other functions. All button caps are engravable and include LED feedback indicators. Two LED bargraphs are also provided to display level settings and other parameters. To prevent accidental button presses, the keypad is automatically disabled whenever the lid is not fully opened.

AV Switcher and Mic Preamp

The built-in 3 x 1 switcher includes audio breakaway to allow the three program audio inputs to be switched independent of the video and RGB inputs. Additionally, two gated microphone inputs are included via terminal block connectors located below the table surface. Both dynamic and condenser type microphones are supported with software switchable 48V phantom power available at both microphone inputs. Balanced or unbalanced line level sources such as wireless microphones can also be accommodated. Input gain and gating controls for each microphone/line input are fully adjustable at setup and can also be controlled in real time from a keypad or touchpanel.

QuickMedia™ Transport

Using Crestron’s revolutionary QuickMedia transport, all input signals are transmitted from the QM-FTMC to any QuickMedia Receiver or Distribution Center over a single inexpensive CAT5e type cable. Computer resolutions up to 1920 x 1200 pixels at 60 Hz are supported over cable runs up to 450 feet (137 meters). Audio signals are transmitted digitally with high performance 24-bit resolution.

QuickMedia dramatically simplifies system design and installation, affording a higher level of performance at a lower overall cost.

NOTE: For QuickMedia wiring use CresCAT-QM, CresCAT-IM or quality Cat5e/CAT6 cable. The maximum aggregate cable length and delay skew between any QM transmitter (origination point) and QM receiver (endpoint) is 450 feet (137 meters) and 22 ns. A maximum of two QM midpoint devices may be inserted in a given QM signal path (exceptions apply, refer to each respective product manual for full details).

MediaManager™ System Integration

Whether using just one FlipTop box or several, complete system operation can be made transparent to the end user with all signal routing occurring smoothly under the command of the MediaManager control system. Built-in video sensing on every video/RGB input can be utilized to trigger automatic input selection and power control. Complete MediaManager systems are easy to design, program and adjust from start to finish using Crestron SystemBuilder™ software.

Cresnet®

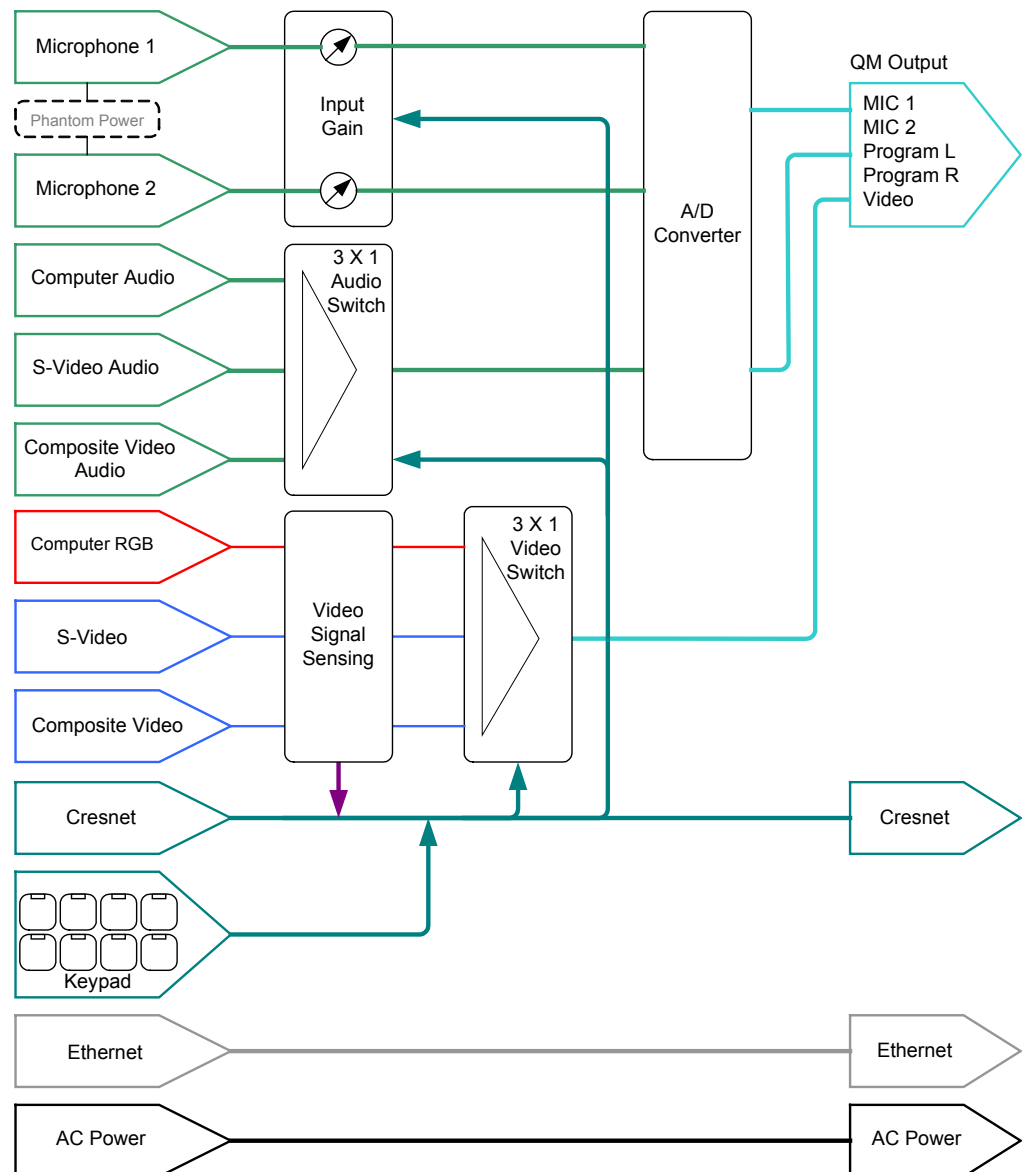
Cresnet is the communications backbone for many Crestron touchpanels, keypads, lighting controls and other devices. The Cresnet bus is a simple, yet flexible 4-wire network that provides rock-solid bidirectional communication and power for up to 252 Cresnet devices.

Internal Block Diagram

The following diagram represents the interfacing abilities of the QM-FTMC. This Cresnet device uses QuickMedia technology to facilitate simplified connection of audio, video and computer equipment. All media and control signals are routed via a single QuickMedia cable for easy installation. A complete integrated room solution is created with the addition of a QuickMedia receiver (such as the QM-RMCRX-BA, sold separately) and optional keypads or touchpanels.

NOTE: The QM-FTMC is compatible with 2-Series control systems only.

Internal Block Diagram of the QM-FTMC



Specifications

Specifications for the QM-FTMC are listed in the following table.

QM-FTMC Specifications

SPECIFICATION	DETAILS
RGB/Video Signal Types RGB Formats Video/HDTV Formats Gain Maximum Resolution	RGB and composite, S-video or component video ¹ RGBHV, RGBS or RG _s B NTSC or PAL, HDTV up to 1080i/1080p ¹ 0 dB (75 ohm termination) 1920 x 1200 @ 60 Hz (at unity gain) with maximum cable length of 450 feet (137 meters) and maximum compensation at receiver
Audio Features Mic Input Gain Gate Level (Threshold) Attack Decay (Release) A-D Conversion Frequency Response	3 x 1 stereo audio switcher, 2-channel gated mic preamp 0 to 100% (40 dB range) plus mute 0 to 100% 0 to 100 ms 0 to 5000 ms Burr Brown 24-bit, 48 kHz 20 Hz to 20 kHz
Power Requirements Cresnet Power Usage	8 Watts (0.33 Amp @ 24 Volts DC)
Default Net ID	0A
Minimum 2-Series Control System Update File ^{2,3}	Version 3.137 (for QM-RMCRX-BA) or later
Environmental Temperature Humidity	41° to 104°F (5° to 40°C) 10% to 90% RH (non-condensing)
Enclosure	Black painted metal with black anodized or brushed aluminum cover; flush tabletop mountable
Dimensions (Domestic Models) Height Width Depth Dimensions (International Models) Height Width Depth	5.39 in (13.69 cm) – with lid closed 6.75 in (17.14 cm) 5.71 in (14.50 cm) – without mounting brackets 5.58 in (14.17 cm) – with lid closed 8.50 in (21.58 cm) 6.67 in (16.95 cm) – without mounting brackets

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QM-FTMC Specifications (Continued)

SPECIFICATION	DETAILS
Weight (Domestic Models)	4.05 lbs (1.84 kg)
Weight (International Models)	4.80 lbs (2.18 kg)
Available Models (Domestic)	
QM-FTMC-B	QuickMedia FlipTop Media Center with Keypad, Black Anodized
QM-FTMC-BALUM	QuickMedia FlipTop Media Center with Keypad, Brushed Aluminum
QM-FTMC-NB-B	QuickMedia FlipTop Media Center, no Keypad, Black Anodized
QM-FTMC-NB-BALUM	QuickMedia FlipTop Media Center, no Keypad, Brushed Aluminum
Available Models (International)	
QMI-FTMC-B	QuickMedia FlipTop Media Center with Keypad, Black Anodized
QMI-FTMC-BALUM	QuickMedia FlipTop Media Center with Keypad, Brushed Aluminum
Available Accessories	
FT-BTNB-L	(1) Large engravable button cap ⁴
FT-BTNB-S	(2) Small engravable button caps ⁴
QM-FTCMK	FlipTop Cable Management Kit
QMI-FTCMK	FlipTop Cable Management Kit (International version)
International Adaptors for QMI-FTMC models	Refer to "Appendix A: International Receptacles" on page 37.

1. Component video or HDTV may require a suitable VGA-to-component adaptor or breakout cable (not included).
2. The latest software versions can be obtained from the Crestron website. 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.
4. Keypad models only.

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

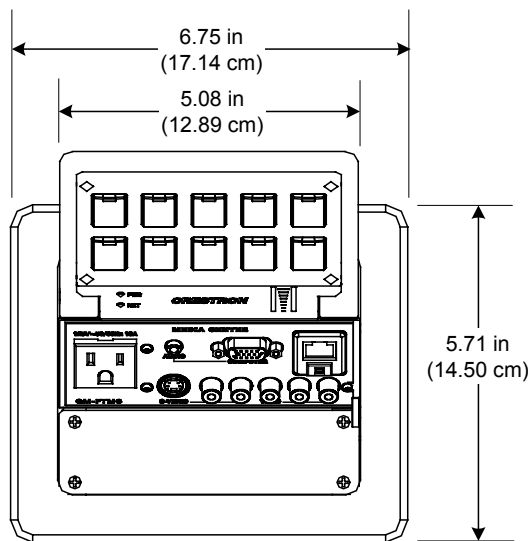
This section provides information on the connections, controls and indicators available on your QM-FTMC.

Refer to the physical views shown below.

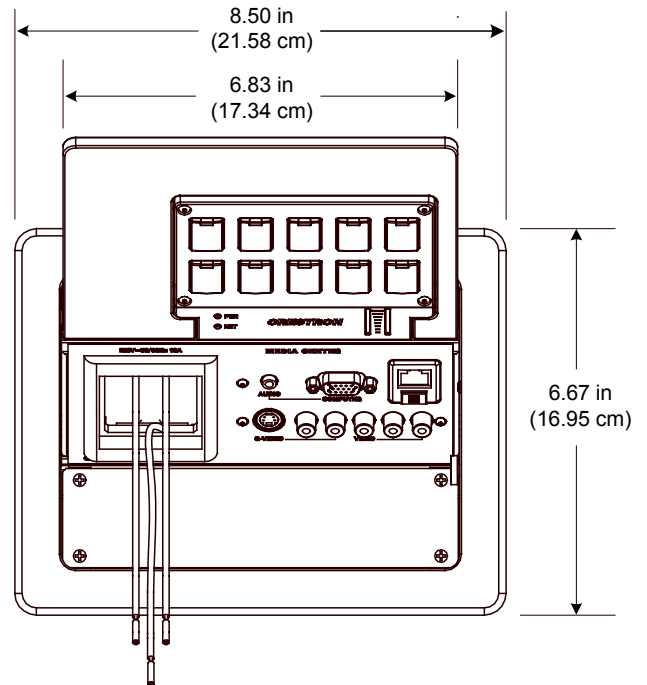
QM-FTMC Physical View (Top Open)



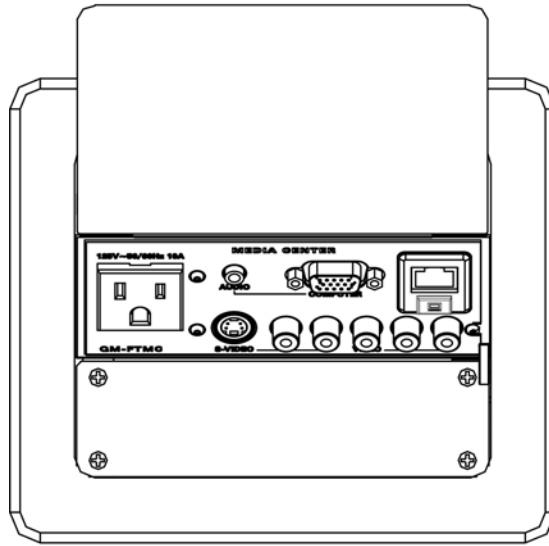
QM-FTMC Overall Dimensions (Top View)



QMI-FTMC Overall Dimensions (Top View)

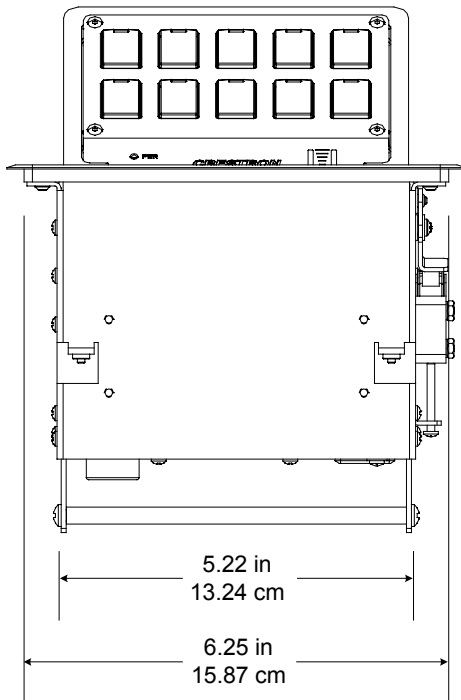


QM-FTMC-NB (Top View)

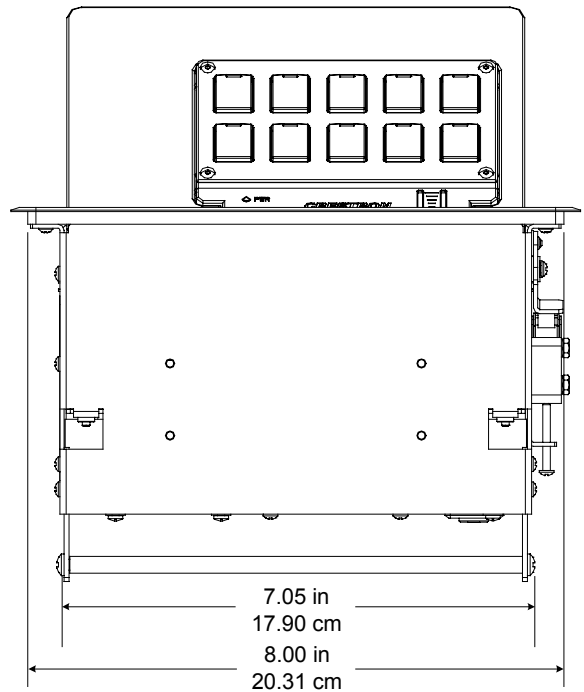


NOTE: The physical dimensions of the NB models are identical to the models with keypad.

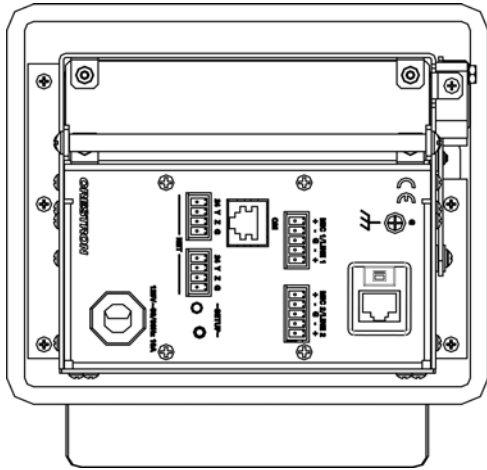
QM-FTMC Overall Dimensions (Front View)



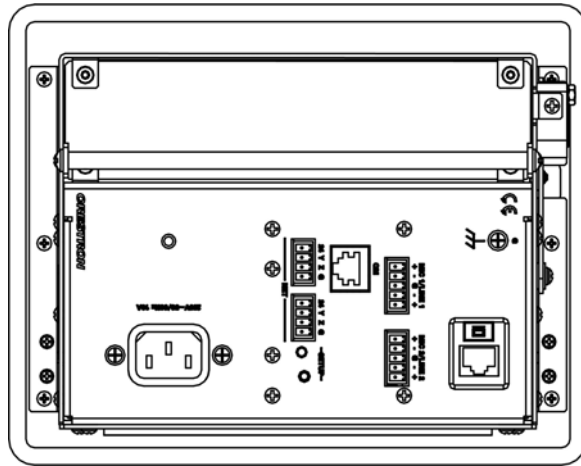
QMI-FTMC Overall Dimensions (Front View)



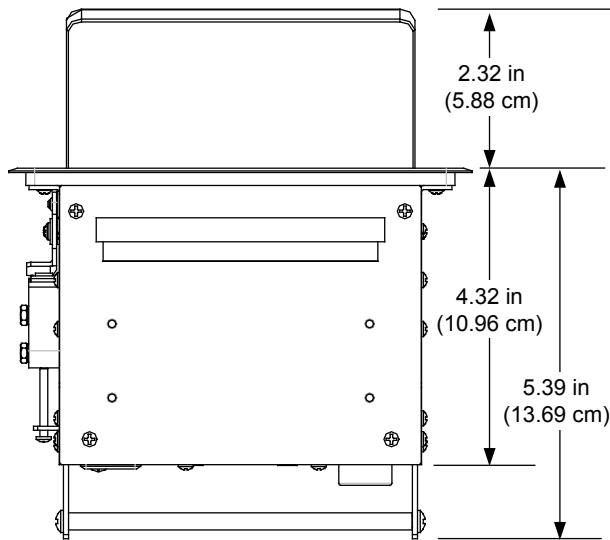
QM-FTMC (Bottom View)



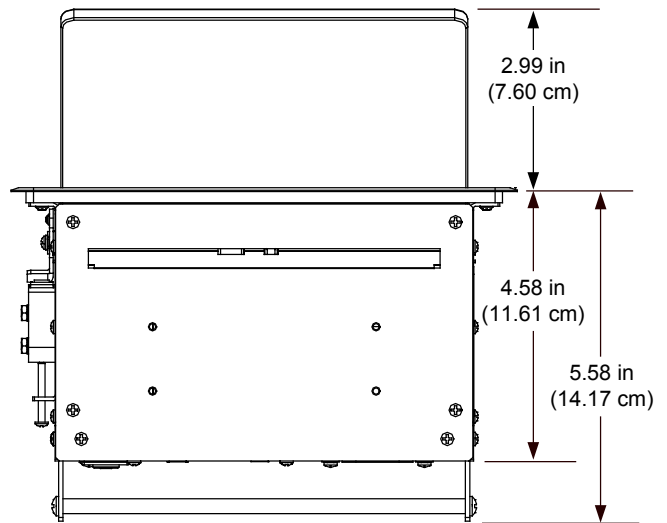
QMI-FTMC (Bottom View)



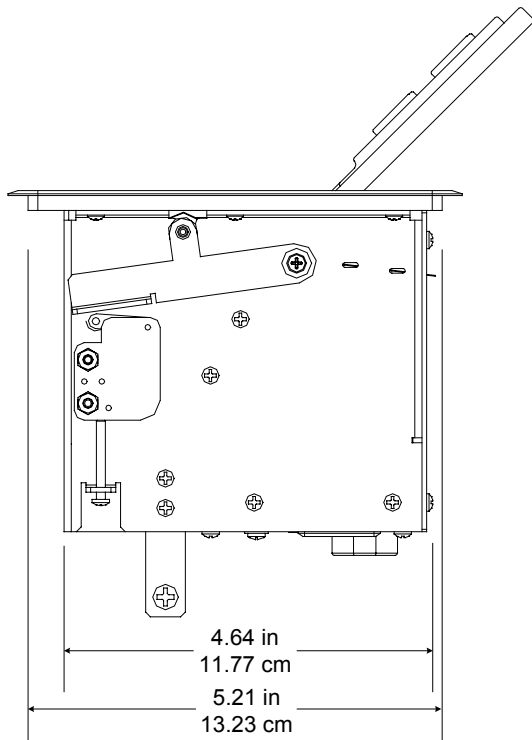
QM-FTMC Overall Dimensions (Rear View)



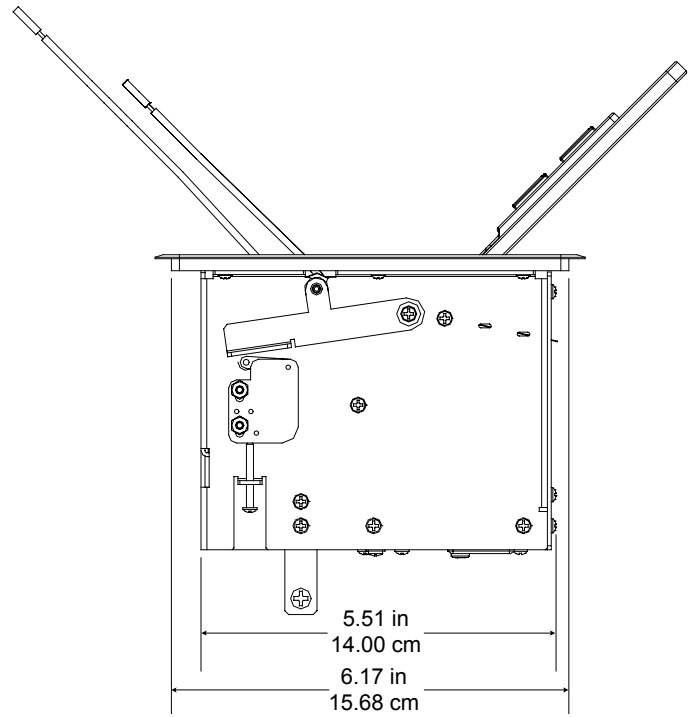
QMI-FTMC Overall Dimensions (Rear View)



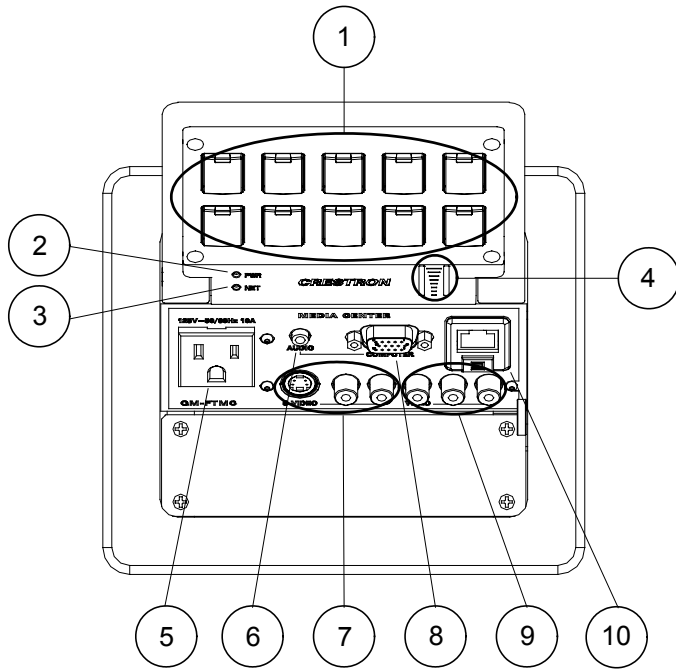
QM-FTMC Overall Dimensions (Side View)



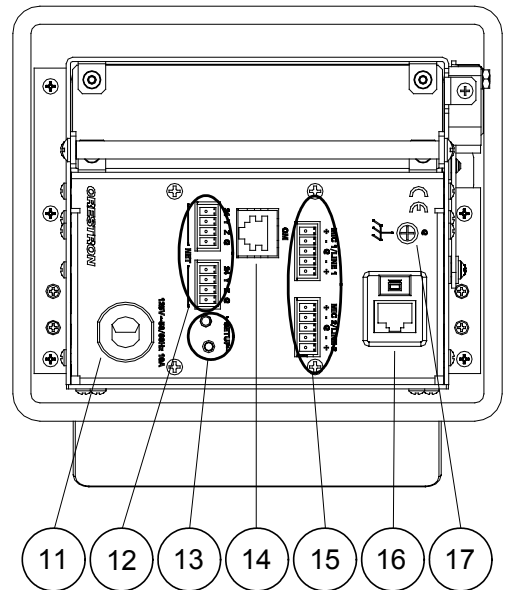
QMI-FTMC Overall Dimensions (Side View)



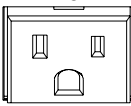
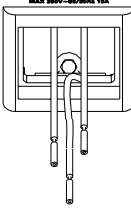

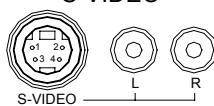
QM-FTMC Connectors, Controls & Indicators (Top View)



QM-FTMC Connectors, Controls & Indicators (Bottom View)

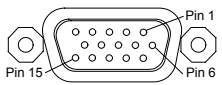
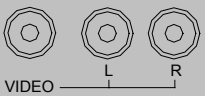
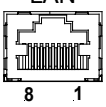

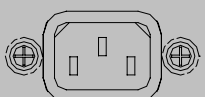
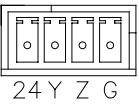


Connectors, Controls & Indicators

#	CONNECTORS ¹ , CONTROLS & INDICATORS	DESCRIPTION										
1	KEYPAD ²	Programmable keypad allowing variable combinations of large and small engravable buttons, 10 minimum (all large) to 20 maximum (all small); ships with 10 large buttons (small buttons and engraving sold separately) (1) red LED per button, programmable										
2	PWR LED ²	(1) green LED, indicates 24 Volts DC power supplied from Cresnet control network										
3	NET LED ²	(1) yellow LED, indicates communication with Cresnet system										
4	BARGRAPHS ²	(2) red 8-segment LED bargraphs, programmable										
5 (QM)	125V 	(1) grounded AC socket, AC power pass-through outlet Maximum load: 10 Amps @ 125 Volts AC, 50/60 Hz										
5 (QMI)	MAX 250V 	(1) grounded AC socket, AC power pass-through outlet Specify socket type: PWR-AU-B (Australia/China), PWR-EU-B (Europe "Schuko"), PWR-FR-B (France), PWR-IT-B (Italy) or PWR-UK-B (UK) Maximum load: 10 Amps @ 250 Volts AC, 50/60 Hz										
6	AUDIO 	(1) 3.5 mm TRS mini phone jack Unbalanced stereo line-level audio input Input impedance: 10k ohms Minimum input level: 1 V _{rms}										
7	S-VIDEO  AUDIO (S-VIDEO)	(1) 4-pin mini DIN female, S-video (Y/C) input Input impedance: 75 ohms Maximum input level: 1 V _{p-p} Signal sensing on Y <i>S-video DIN connector pin assignments</i> <table border="1"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Ground</td> </tr> <tr> <td>2</td> <td>Ground</td> </tr> <tr> <td>3</td> <td>Luminance</td> </tr> <tr> <td>4</td> <td>Chrominance</td> </tr> </tbody> </table> (2) RCA female Unbalanced stereo line level audio input Input impedance: 10k ohms Maximum input level: 2 V _{rms}	PIN	DESCRIPTION	1	Ground	2	Ground	3	Luminance	4	Chrominance
PIN	DESCRIPTION											
1	Ground											
2	Ground											
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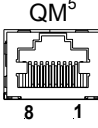
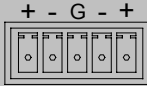
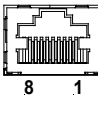

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Connectors, Controls & Indicators (Continued)

#	CONNECTORS ¹ , CONTROLS & INDICATORS	DESCRIPTION																		
8	<p>COMPUTER³</p> 	<p>(1) DB15HD female RGB(VGA)/component video⁴ input Formats: RGBHV, RGBS, RG_sB, YP_bP_r Input impedance: 75 ohms H/V sync impedance: 1k ohms Maximum input level: 1 V_{p-p} Maximum H/V sync level 5 V_{p-p} Signal detection on H, Y and G_s</p>																		
9	<p>VIDEO</p>  <p>AUDIO (VIDEO)</p>	<p>(1) RCA female, composite video input Input impedance: 75 ohms Maximum input level: 1 V_{p-p} Includes signal sensing</p> <p>(2) RCA female Unbalanced stereo line level audio input Input impedance: 10k ohms Maximum input level: 2 V_{rms}</p>																		
10	<p>LAN</p> 	<p>(1) 8-pin RJ-45 female, Ethernet LAN pass-through jack for connection to Ethernet, providing local area network or Web access (cable not included)</p> <table border="1" data-bbox="966 966 1356 1239"> <thead> <tr> <th>PIN</th> <th>SIGNALS</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TD+</td> </tr> <tr> <td>2</td> <td>TD-</td> </tr> <tr> <td>3</td> <td>RD+</td> </tr> <tr> <td>4</td> <td>Connected to pin 5</td> </tr> <tr> <td>5</td> <td>Connected to pin 4</td> </tr> <tr> <td>6</td> <td>RD-</td> </tr> <tr> <td>7</td> <td>Connected to pin 8</td> </tr> <tr> <td>8</td> <td>Connected to pin 7</td> </tr> </tbody> </table>	PIN	SIGNALS	1	TD+	2	TD-	3	RD+	4	Connected to pin 5	5	Connected to pin 4	6	RD-	7	Connected to pin 8	8	Connected to pin 7
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3	RD+																			
4	Connected to pin 5																			
5	Connected to pin 4																			
6	RD-																			
7	Connected to pin 8																			
8	Connected to pin 7																			
11 (QM)	<p>125 V</p> 	<p>(1) 6 foot grounded AC line cord Passes through to front panel AC power outlet</p>																		
11 (QMI)	<p>MAX 250 V</p> 	<p>(1) IEC socket Passes through to front panel AC power outlet</p>																		
12	<p>NET</p> 	<p>Four-position terminal block connector for data and power. Connects to Cresnet control network.</p> <p>Pin 1 (24) Power Pin 2 (Y) Data Pin 3 (Z) Data Pin 4 (G) Ground</p>																		
13	<p>SETUP LED & BUTTON</p>	<p>(1) red LED and miniature pushbutton, used for touch-settable ID (TSID) Used for setting network ID during initial configuration or when the device is being added/replaced.</p>																		

(Continued on following page)

Connectors, Controls & Indicators (Continued)

#	CONNECTORS ¹ , CONTROLS & INDICATORS	DESCRIPTION																		
14	 <p>QM⁵</p>	<p>(1) 8-wire RJ-45 female, QuickMedia output port Connects to QM input port of any QuickMedia device via CresCAT-QM or CresCAT-IM cable⁶</p>																		
15	 <p>MIC/LINE (1 – 2)</p>	<p>(2) 5-pin 3.5 mm detachable terminal blocks (2) balanced microphone/line inputs Balanced mic input level: -60 to -20 dBV nominal Balanced line input level: -28 to +12 dBV; 4 V_{rms} maximum Unbalanced line input level: -34 to +6 dBV; 2 V_{rms} maximum Mic input impedance: 10k ohms, accepts 60 to 600 ohm source Line input impedance: 22k ohms balanced, 11k ohms unbalanced Phantom power: 10 mA (total) @ 48 Volts DC, software enabled to both MIC inputs</p>																		
16	 <p>LAN</p>	<p>(1) 8-pin RJ-45 female, Ethernet LAN pass-through to front panel LAN port (cable not included)</p> <table border="1" data-bbox="966 1018 1356 1291"> <thead> <tr> <th>PIN</th> <th>SIGNALS</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TD+</td> </tr> <tr> <td>2</td> <td>TD-</td> </tr> <tr> <td>3</td> <td>RD+</td> </tr> <tr> <td>4</td> <td>Connected to pin 5</td> </tr> <tr> <td>5</td> <td>Connected to pin 4</td> </tr> <tr> <td>6</td> <td>RD-</td> </tr> <tr> <td>7</td> <td>Connected to pin 8</td> </tr> <tr> <td>8</td> <td>Connected to pin 7</td> </tr> </tbody> </table>	PIN	SIGNALS	1	TD+	2	TD-	3	RD+	4	Connected to pin 5	5	Connected to pin 4	6	RD-	7	Connected to pin 8	8	Connected to pin 7
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4	Connected to pin 5																			
5	Connected to pin 4																			
6	RD-																			
7	Connected to pin 8																			
8	Connected to pin 7																			
17	 <p>GROUND</p>	<p>(1) 6-32 screw, chassis ground lug</p>																		

1. Interface connectors for NET and MIC/LINE ports are provided with the unit.
2. Keypad models only.
3. Refer to the following table for RGB DB15HD pin assignments:

PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	Red Video	6	Red Ground	11	No Connect
2	Green Video	7	Green Ground	12	Monitor Sense 1
3	Blue Video	8	Blue Ground	13	Horizontal Sync
4	Reserved	9	No Connect	14	Vertical Sync
5	Ground	10	Ground	15	Monitor Sense 2

4. Component video or HDTV may require a suitable VGA-to-component adapter or breakout cable (not included).

5. The eight-pin RJ-45 QuickMedia transport port accepts CAT5E/CAT6 carrying audio, video and microphone signals. The QM input port conforms to the 568B wiring standard. Refer to the following table for connector pinouts.

RJ-45 PIN NUMBER	WIRE COLORS (EIA 568B)	QM ASSIGNMENT: RGB	QM ASSIGNMENT: COMPOSITE, S-VIDEO, COMPONENT AND AUDIO
1	WHITE/ORANGE	- RGB RED	- CHROMINANCE (- P _r)
2	ORANGE	+ RGB RED	+ CHROMINANCE (+ P _r)
3	WHITE/GREEN	- RGB GREEN	- LUMINANCE (- Y)
4	BLUE	+ DIGITAL AUDIO	+ AUDIO
5	WHITE/BLUE	- DIGITAL AUDIO	- AUDIO
6	GREEN	+ RGB GREEN	+ LUMINANCE (+ Y)
7	WHITE/BROWN	- RGB BLUE	- COMPOSITE (- P _b)
8	BROWN	+ RGB BLUE	+ COMPOSITE (+ P _b)

6. For QuickMedia wiring use CresCAT-QM, CresCAT-IM or quality CAT5e/CAT6 cable; the maximum aggregate cable length and delay skew between any QM transmitter (origination point) and receiver (endpoint) is 450 feet (137 meters) and 22 ns; a maximum of two QM midpoint devices may be inserted in a given QM signal path (exceptions apply, refer to each respective product manual for full details).

Industry Compliance

This product (QM- only) is Listed to applicable UL Standards and requirements by Underwriters Laboratories Inc.



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



NOTE: 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.

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.
-

Setup

Network Wiring

When wiring the network, consider the following:

- 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

(<http://www.crestron.com/calculators>).

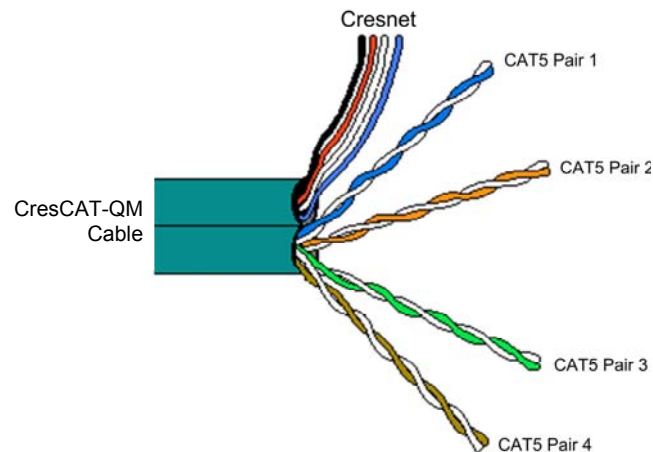
- For larger networks, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

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

QuickMedia Wiring

The Crestron QuickMedia cable (sold under the name “CresCAT-QM”) contains one CAT5E cable and one Cresnet cable in Siamese jackets. Installation of any QM device is as simple as installing CresCAT-QM wires from the output of one device to the input of another. Installations are flexible, affordable and fast. For more information, refer to the latest revision of the Crestron MediaManager Applications Guide (Doc. 6244), which is available for download from the Crestron website (www.crestron.com/manuals).

CresCAT-QM Cable



NOTE: Do not untwist the two wires in a single pair for more than 1/3-1/2” (0.84-1.27 cm) when making a connection. The twists are critical to canceling out interference between the wires.

The aggregate cable length of a signal path originating at a QM-FTMC and terminating at a QM receiver must not exceed 450 feet (137 meters). Video signals may experience a loss of quality over very long lengths of cable. This phenomenon is due to the added resistance and capacitance of longer cable lengths and is not peculiar to either Crestron and/or QuickMedia systems. To ensure sufficient bandwidth, the maximum aggregate cable length should not exceed 450 feet. The use of lower-resolution signals may allow increased cable length but must be tested by the installer with the sources to be used. The QM pin assignment is based on the EIA/TIA 568B RJ-45 Jack standard.

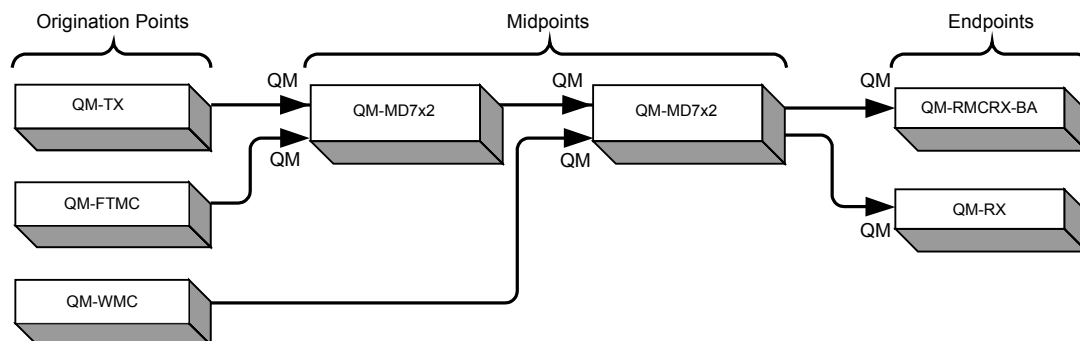
NOTE: When using CresCAT-QM wiring, four additional wires are included for making Cresnet connections.

When connecting multiple QM devices, the route between a QM origination point (transmitter) and a QM endpoint (receiver) cannot have more than two midpoints (e.g. QM-MD7x2 or other QM switchers). Refer to the following diagram when configuring a QM network.

NOTE: The aggregate length from transmitter to receiver cannot have a delay skew or more than 22 ns.

NOTE: When used with a QM-RMCRX, delay skew should not exceed 15 ns.

QM Network Topology



Identity Code

The Net ID of the QM-FTMC has been factory set to **0A**. The Net IDs of multiple QM-FTMC devices in the same system must be unique. Net IDs are changed from a personal computer (PC) via the Crestron Toolbox™ (refer to “Establishing Communication” on page 31).

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.

Installation

NOTE: To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consideration must be given if installed in a closed or multi-unit rack assembly, inside a closed desk or in a closed podium since the operating ambient temperature of these environments may be greater than the room ambient temperature. Contact with thermal insulating materials should be avoided on all sides of the unit.

NOTE: The following section does not apply to NB models. If you have an NB model, please skip to “QM-FTCMK Cable Management Plate” on page 19.

Button Installation

The QM-FTMC is shipped with ten large blank buttons. You can order a variety of button kits (sold separately) to add as many as 20 engraved or blank buttons.

Button Kits

KIT NUMBER	DESCRIPTION
FT-BTNB-L	One large button engraved as desired
FT-BTNB-L-BLANK	One large button not engraved
FT-BTNB-S	Two small buttons with divider engraved as desired
FT-BTNB-S-BLANK	Two small buttons with divider, not engraved

To replace the large buttons with small buttons, follow this procedure.

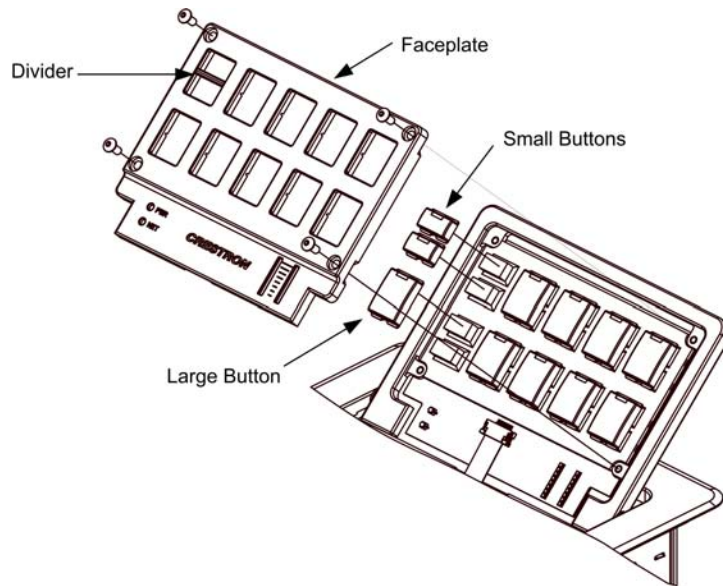
A 1/16" Allen (hexhead) wrench is required to remove the button faceplate.

1. Remove the four Allen screws that secure the button faceplate.
2. While holding adjacent buttons in place, carefully pull the button(s) to be replaced from the rubber membrane.
3. Carefully press the two small replacement buttons in place, making sure LED window faces up. Use care not to dislodge the membrane and circuit board.

NOTE: The removable buttons fit snugly on the rubber membrane. Remove carefully to avoid pulling the membrane from the unit.

4. The divider bar slips into the slots on the back of the faceplate.
5. Replace the faceplate.

Button Installation



QM-FTCMK Cable Management Plate

The QM-FTMC is shipped with a blank bottom plate. A cable management plate is available to provide a pullout cable solution for the computer input and LAN pass-through cables. The kit contains two 6-foot cables (computer and computer audio).

- Order the QM-FTCMK Cable Management Kit for domestic models.
- Order the QMI-FTCMK Cable Management Kit for international models.

Parts Supplied with Optional Cable Management Kit

PART DESCRIPTION	QUANTITY
Small Cable Bushing, 5/16 inch ID, 0.5 inch OD	4
Large cable Bushing, 0.55 inch ID, 0.80 inch OD	2
Cable Support Plate	1
Tie Wrap	3
Computer RGB Cable, VGA to VGA, 6 ft long	1
Computer Audio Cable, 3.5 mm Stereo, 6 ft long	1

Tools required:

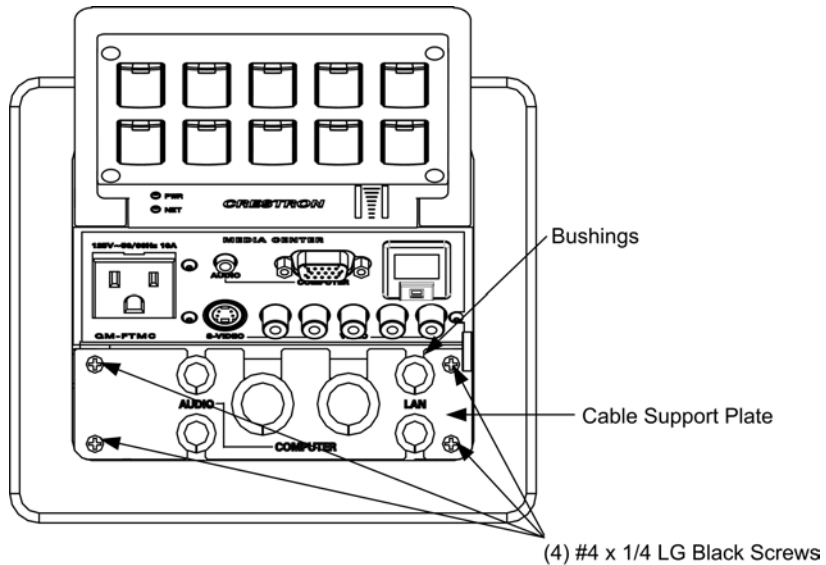
- Phillips screwdriver
- Small flat-blade screwdriver (for connecting the VGA cable)

The cable support plate must be installed before mounting the QM-FTMC to a surface. The cables are looped through the cable support plate.

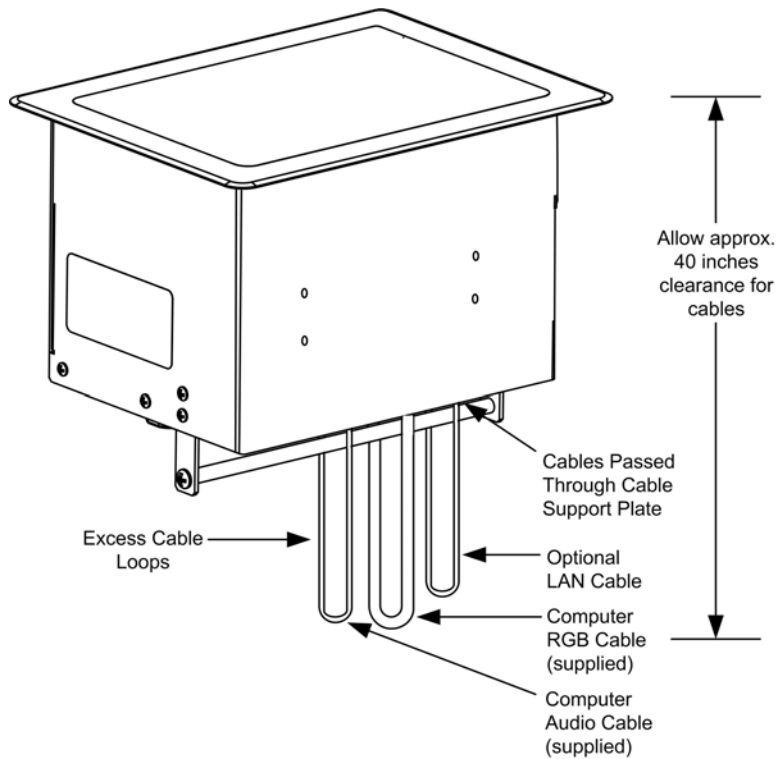
1. Remove the blank bottom plate and retain the four #4 x ¼ LG black mounting screws (the QMI-FTCMK includes four #4 x ¼ screws).
2. Place the bushings on the cables (six bushings supplied). Use the large bushing for the VGA cable.
3. Thread the cables through the appropriate slot on the plate.
4. Snap the bushings into the plate slots.

5. Feed all the excess cable through the opening.
6. Attach the plate using the four #4 x ¼ LG black mounting screws retained in step 1 (use the four #4 x ¼ screws included with the QMI-FTCMK).
7. Connect the cables to the appropriate connector on the front of the QM-FTMC.
8. The cables may be secured to the bottom bar using the supplied tie wraps.

Cable Mounting Plate Installation



Cable Loops Through the Cable Plate



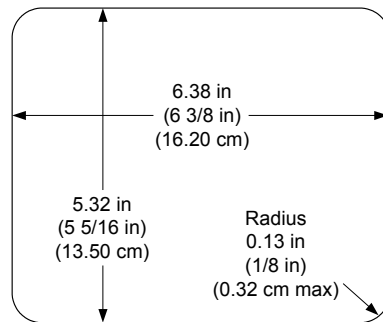
NOTE: Ensure that the cables have sufficient clearance to enable smooth movement. Allow approximately 40 inches (102 cm) from the top surface of the FlipTop box.

Mounting to Surface

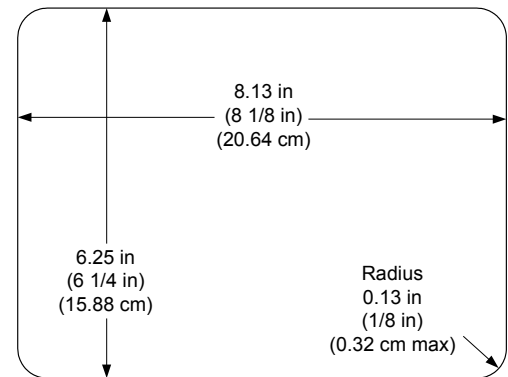
The QM-FTMC is designed to mount in a horizontal surface, such as a desk top, lectern or podium. The following diagram illustrates the required opening size to accommodate the QM-FTMC. A cutout template (4006405 or 4006874) is included.

Cutout Dimensions

QM-FTMC (4006405)



QMI-FTMC (4006874)

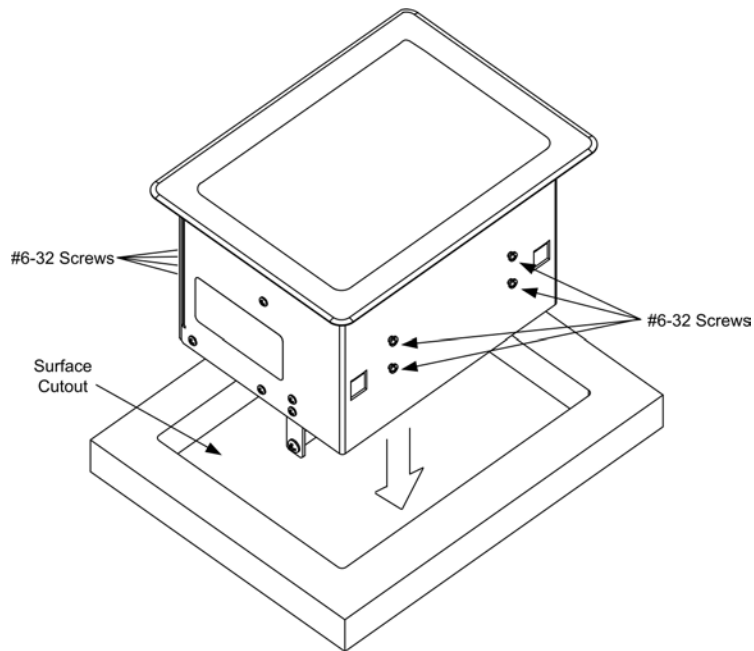


NOTE: Before inserting the QM-FTMC in the mounting hole, ensure that all required cables have been installed.

Mounting Parts Supplied with the QM-FTMC

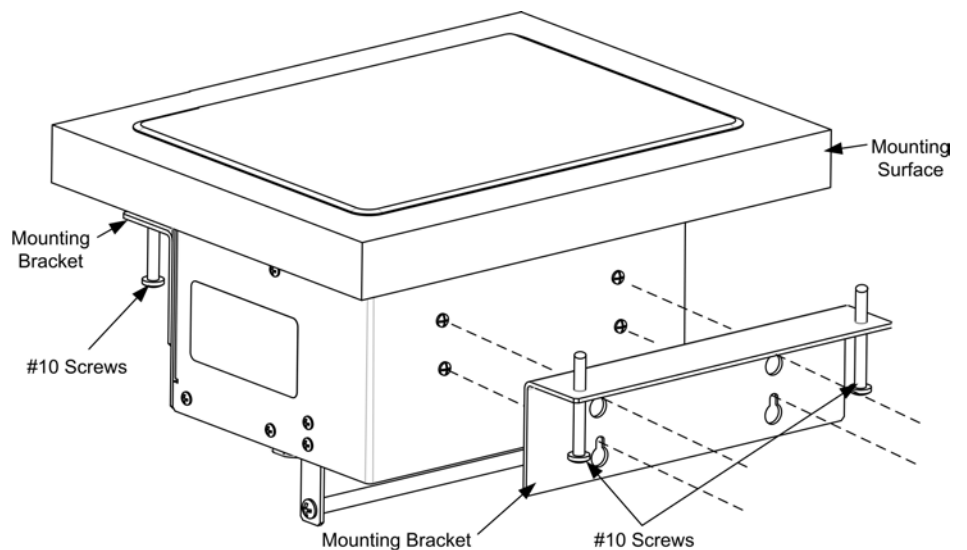
PART DESCRIPTION	QUANTITY
Screw #6-32, Pan Head, Phillips	4
Screw #10, Pan Head, Phillips	4
Mounting Bracket	2

1. Install the eight supplied #6-32 screws, but do not tighten (four on the front and four on the rear, which are already installed). These will be used to secure the front and rear mounting brackets.
2. Position the QM-FTMC in the mounting hole.

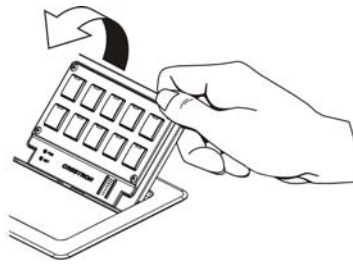
Mounting Bracket Screw Locations

3. Install the four #10 screws in the mounting brackets (two screws per bracket). Refer to the following diagram.
4. Slide the mounting brackets over the #6-32 screws and tighten the #6-32 screws.
5. Turn the four #10 screws equally until they contact the underside of the mounting surface.

NOTE: Do not over-tighten the #10 screws as this may damage the surface and/or the unit.

Mounting Bracket Installation

NOTE: Be careful not to press the buttons while closing the FlipTop, even though the buttons are disabled when the FlipTop begins to close and all pressed buttons are released.



Hardware Hookup

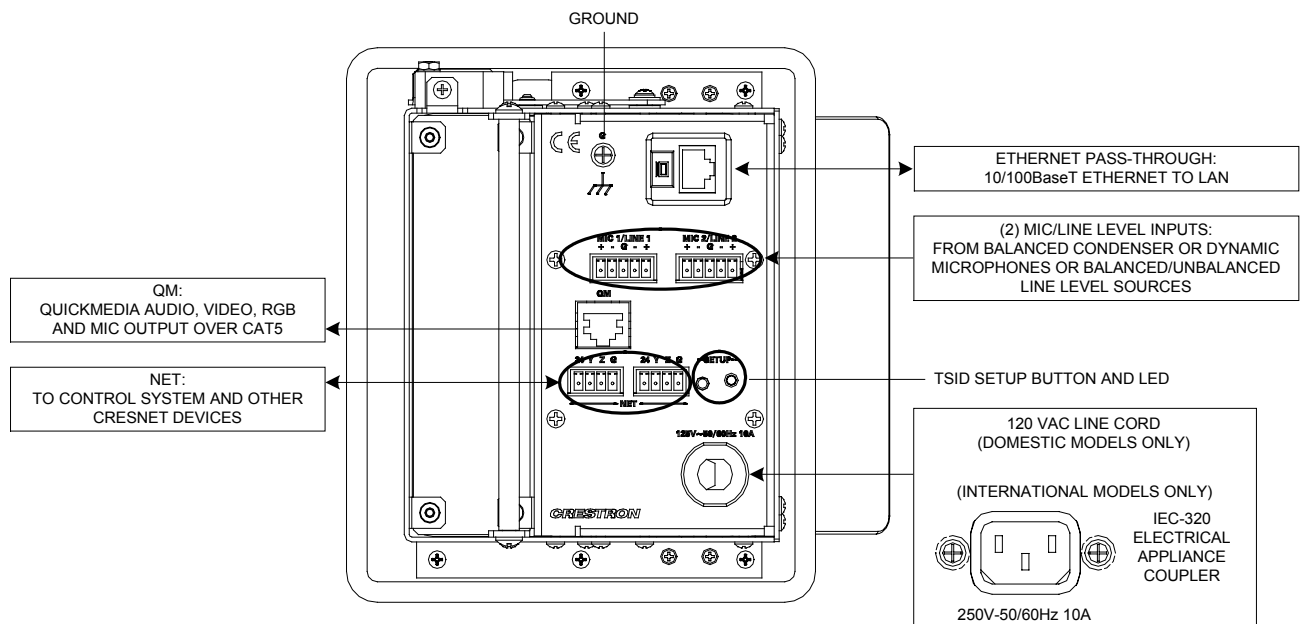
Connect the Device

Make the necessary connections as called out in the illustration that follows this paragraph. Refer to “Network Wiring” on page 16 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

When making connections to the QM-FTMC, consider the following:

- Use Crestron power supplies for Crestron equipment.
- The included cable (domestic units only) cannot be extended.

Underside Hardware Connections for the QM-FTMC



NOTE: For optimum performance, Crestron strongly recommends using CresCAT-QM cable, available from Crestron. Other high-quality/low skew CAT5e/CAT6 wiring may also be used with varying performance.

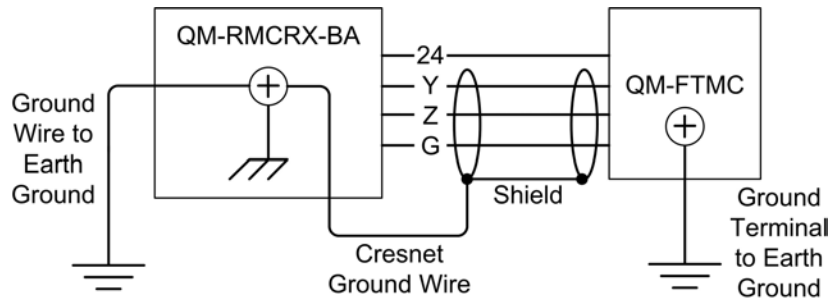
NOTE: The maximum continuous current from equipment under any external load conditions shall not exceed a current limit that is suitable for the minimum wire

gauge used in interconnecting cables. The ratings on the connecting unit's supply input should be considered to prevent overloading the wiring.

Ground Wire Connections

Proper grounding is required. Connect the ground from the QM transmitter (QM-FTMC) to earth ground. Connect the Cresnet shield at the QM-RMCRX-BA to the chassis ground provided on the QM-RMCRX-BA. The QM-RMCRX-BA chassis must also be connected to an earth ground (building steel). Refer to the following grounding diagram.

Ground Wire Connections



NOTE: Do not connect the shield to earth ground at the QM-FTMC.

Configuration 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 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.

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 website.

Crestron has developed an assortment of Windows[®]-based software tools to develop a Cresnet system. The following are the minimum recommended software versions for the PC:

Software

TASK	REQUIRED SOFTWARE VERSION
Program control system to operate QM-FTMC.	SIMPL Windows version 2.06 or later with SIMPL+ Cross Compiler version 1.1 or later and Library update 332 or later (Library 346 or later for NB models). Also requires Crestron Database version 17.2 or later (17.3 or later for NB models).
Upload program and firmware.	Crestron Toolbox 1.0 or later.
Program with simple wizards for QuickMedia systems using a QM-FTMC (optional but recommended).	Crestron SystemBuilder™ version 2.0 or later (requires SIMPL Windows, VisionTools Pro-e, Crestron Database and Crestron Engraver). Refer to software release notes or Crestron website for other required Crestron software packages.
Create labels for front panel buttons.	Crestron Engraver 2.3.3 or later.
Manage QM-FTMC systems within a facility (optional)	RoomView [®] 6.0 Enterprise or later (required for room management).

NOTE: The NB models may be programmed with the regular QM FlipTop devices but will not match during SystemBuilder verification procedure in the finish stage.

Configuring with 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.

Configuring with SIMPL Windows

NOTE: While SIMPL Windows can be used to program the QM-FTMC, it is recommended to use SystemBuilder for configuring a QuickMedia system.

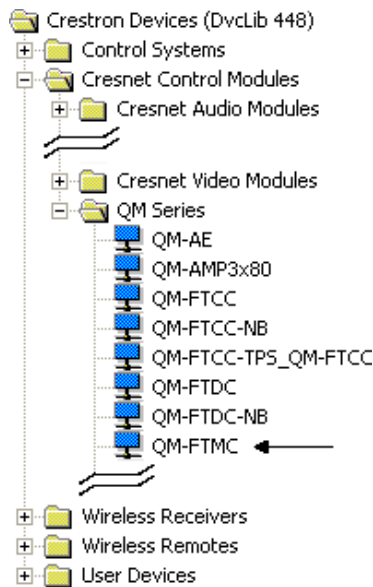
SIMPL Windows is Crestron’s premier software for programming Crestron control systems. It is organized into two separate but equally important “Managers”.

Configuration Manager

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

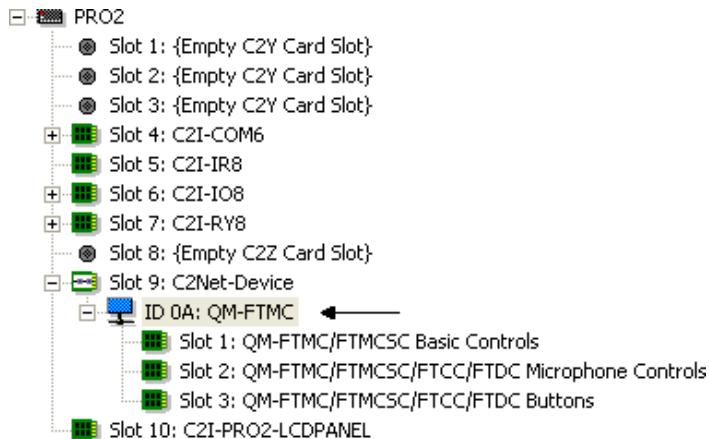
- To incorporate the QM-FTMC into the system, drag the QM-FTMC from the Cresnet Control Modules | QM Series folder of the *Device Library* and drop it in the *System Views*.

Locating the QM-FTMC in the Device Library



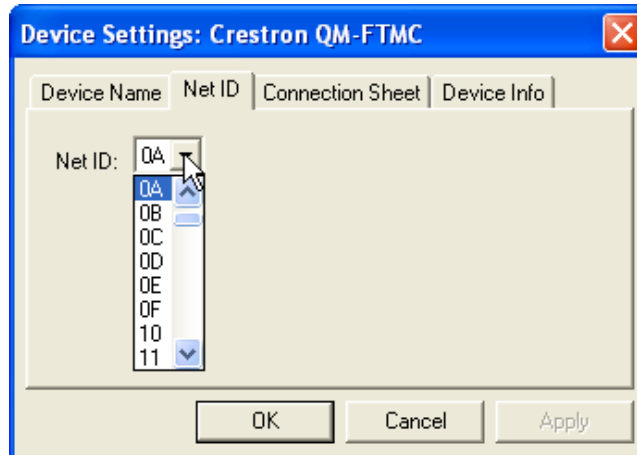
- The system tree of the control system displays the device in the appropriate slot with a default Net as shown in the following illustration.

C2Net Device, Slot 9



- Additional QM-FTMC devices are assigned different Net ID numbers as they are added.
- If necessary, double click a device to open the “Device Settings” window and change the Net ID, as shown in the following figure.

“QM-FTMC Device Settings” Window



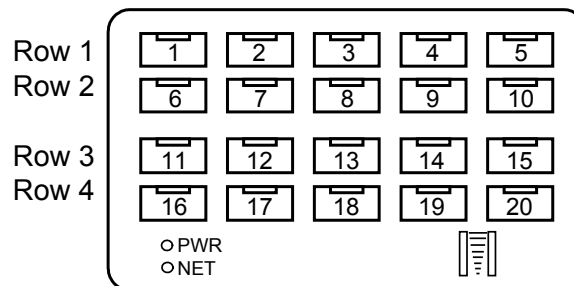
- The ID code specified in the SIMPL Windows program must match the Net ID of each unit. Refer to “Identity Code” on page 17.

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).

The buttons module is built into slot 03 of the QM-FTMC (refer to “C2Net Device, Slot 9” on page 26). It consists of a keypad that provides 10 to 20 buttons with LED indicators, and two bargraphs. The button presses are fixed and map to <press> outputs on the symbol detail, as follows:



NOTE: Numbers in this illustration are for programming purposes only.

NOTE: Not applicable to NB models.

The buttons on rows 1 and 2 can be combined vertically to form one larger button. For example, the button caps for buttons #1 and #6 can be replaced with one larger button cap. Similarly, the vertical pairs on rows 3 and 4 can be combined to form one larger button. For example, buttons #13 and #18 can be combined. No other combinations are valid. That is, two buttons cannot be combined horizontally; the buttons on rows 2 and 3 cannot be combined.

Example Program

An example program for the QM-FTMC is available from the Crestron website (<http://www.crestron.com/exampleprograms>).

Adjusting the QM-FTMC Microphone Inputs

Once a QM-FTMC is installed and configured, settings for gain, gating level, attack time and decay time should be set using the SystemBuilder finish tab.

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.

Definitions

The QM-FTMC allows adjustments of the microphone input signals. The following are definitions of terms that are commonly used when making adjustments.

Attack Time

The time it takes (in milliseconds) from when an input signal rises above the gating level until the microphone output signal is enabled.

Clipping

An overload condition in which signal level exceeds the maximum level a circuit can process. This is usually caused by excessive gain settings.

Decay Time

The time (in milliseconds) from when an input signal falls below the gating level until the microphone output signal is muted.

Gain

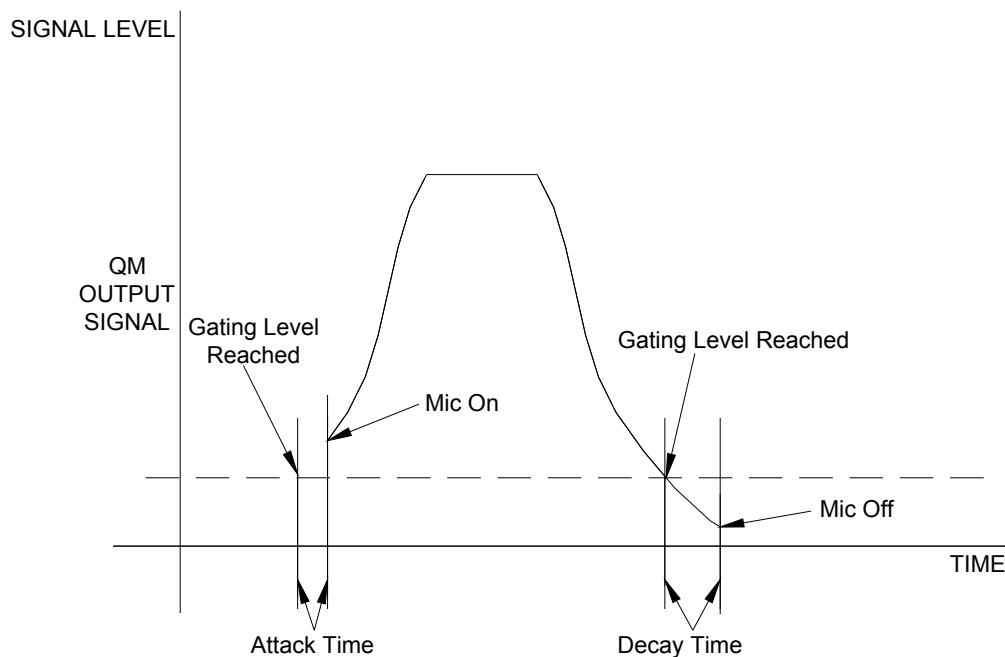
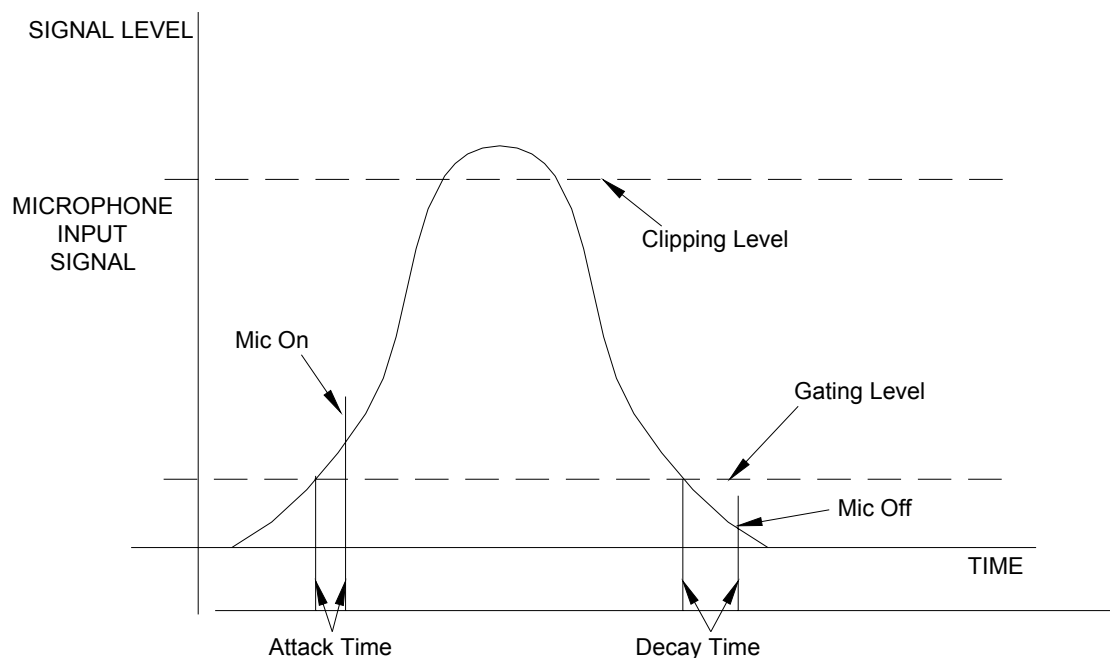
An amplification adjustment designed to accommodate varying input signal levels.

Gating

Gating is a function that mutes a microphone signal when the input sound level is below a user-set threshold (gating level).

The following diagram demonstrates attack time, clipping, decay time and gating level.

Visual Representation of Gating Level, Clipping Level, Attack Time and Decay Time



Setting Microphone Gain

The QM-FTMC provides variable gain for the microphone inputs. The following procedure is used to set the optimal gain for a microphone input.

Use the Realtime Mode in SystemBuilder to control phantom power, gain and gate settings and to monitor the gate, normal and clip level indicators. For information on using SystemBuilder software, refer to the extensive help information provided with the software.

NOTE: The input gain is independent of the system’s output volume level.

1. To adjust the input gain, set the gain and noise gate to their lowest settings. Disable the “Mute” function by removing the check from the *Mute* checkbox.
2. Connect a microphone and enable phantom power if required.
3. Increase the gain while providing a “normal” sound level input to the microphone. When the “Norm” indicator shows fairly consistent activity, you have reached a good signal level for the QM-FTMC.

NOTE: The “clip” indicator shows that the signal is clipping. Let your ears be the judge but when the clip indicator is active, you are approaching or have reached distortion in your QM-FTMC signal. Occasional clip indications on loud input are expected but constant clip indicator activity is a sign that the gain may be set too high.

4. Set the system output volume to a desirable listening level and verify the gain settings by listening to the system output. Some minor gain adjustment may be required for the “best sound” in any specific configuration.

Setting the Gating Level

The QM-FTMC provides an input level gating function that will mute a microphone signal when the input sound level is below a user-set threshold. This function can be enabled or disabled via software commands.

Use the Realtime Mode in SystemBuilder to control phantom power, gain and gate settings and to monitor the gate, normal and clip level indicators. For information on using SystemBuilder software, refer to the extensive help information provided with the software.

The following procedure sets the optimal “gate level” for the microphone inputs:

1. Follow the “Setting Microphone Gain” procedure (refer to page 29) to set the gain for each microphone input.
2. Set the noise gate level, attack and decay times to minimum. Disable the “Mute” function by removing the check from the *Mute* checkbox.
3. While providing a level to the microphone that is equivalent to the background noise that should be gated out, increase the noise gate level until the Gated indicator turns off. When the input sound levels are at or below the established noise gate level, the microphone output signal will be gated off.
4. Set the “attack time” to the minimum level and the “decay time” to the maximum level. These settings provide the shortest time to enable the microphone output when an input is above the gating level and the longest time before disabling the microphone after such an input.

NOTE: The “attack” and “decay times” are applied to both microphone inputs.

5. Set the system output volume to a desirable listening level. While providing realistic voice input and background noise levels, adjust the gating level and attack/decay times to eliminate undesired input while providing the best content quality.

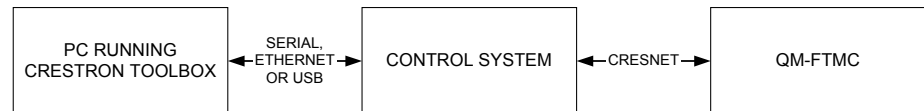
Uploading and Upgrading


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 QM-FTMC; refer to the Crestron Toolbox help file for details. There is a single method of communication: indirect communication.

Indirect Communication



- QM-FTMC connects to control system via Cresnet.
- 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).
- Use the Address Book in Crestron Toolbox to create an entry for the QM-FTMC using the expected communication protocol (Indirect). Select the Cresnet ID of the QM-FTMC and the address book entry of the control system that is connected to the QM-FTMC.
- Display the QM-FTMC's "System Info" window (click the  icon); communications are confirmed when the device information is displayed.

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 and projects 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 QM-FTMC firmware via Crestron Toolbox.

- Establish communication with the QM-FTMC and display the "System Info" window.
- Select **Functions | Firmware...** to upgrade the QM-FTMC firmware.

Program Checks

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 QM-FTMC to display actions that can be performed on the QM-FTMC.

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.

QM-FTMC Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
QM-FTMC is not functioning.	Net ID is not correct.	Verify the Net ID in Toolbox.
	Net ID is not set to match the Net ID specified in SIMPL Windows.	Verify SIMPL Windows program for setting Net ID.
	Net ID is the same as another device's Net ID.	Assign a different Net ID.
PWR LED does not illuminate.	Not receiving power.	Verify that Cresnet is properly attached.
No video output displayed.	Incorrect cable connection.	Verify RGB, video, S-video output cable connection.
		Verify QM input cable connection is secure.
Wrong source or video displayed.	Wrong SystemBuilder or SIMPL Windows programs.	Verify and upload correct programs.
	SystemBuilder project not set up correctly.	Verify proper video set up for each video input.
Video from RGB source is garbled or no output.	Incorrect cable connections.	Verify 15-pin output cable connection. Verify QM input cable connections.
	Signal skew due to cable length or unequal pair length.	Verify maximum QM cable length and compensation for skew.
Poor RGB or video image quality.	Incorrect peak and/or boost setting.	Adjust SystemBuilder peak or boost controls until image quality is improved.
Hum on audio and/or mic.	Grounding problem.	Refer to ground wire connection instructions which start on page 24.
Intermittent or no audio/mic output.	Incorrect peak setting.	Adjust SystemBuilder peak control until audio is restored.

(Continued on following page)

QM-FTMC Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Microphone does not produce sound.	Microphone requires phantom power or cannot use phantom power.	Enable or disable phantom power as necessary using controls created in the SystemBuilder project.
	Incorrect gain, gating level, attack time or decay time settings.	Adjust gain, gating level, attack time, or decay time settings as required.
	Incorrect volume and/or mixer settings on QM-RMCRX-BA.	Adjust volume and/or mixer settings on QM-RMCRX-BA as required.
Intermittent microphone output.	Incorrect peak setting.	Adjust QM-RMCRX-BA peak control until audio is restored. For more information refer to the latest version of the QM-RMCRX-BA Operations Guide (Doc. 6332).
	Poor cable connection.	Verify all cable connections.
	Gating setting too high.	Adjust gating level.
Microphone produces harsh, distorted sound.	Input gain is set too high.	Lower microphone input gain.
Buttons do not function when pressed.	Net ID incorrect or does not match SIMPL Windows program.	In Toolbox, check Functions CresnetID to verify Net ID. Verify SIMPL Windows program ID.
Button press yields incorrect result.	Incorrect programming.	Verify SIMPL Windows program.
Button LED does not illuminate.	Feedback signal names incorrect in SIMPL Windows.	Verify SIMPL Windows feedback signal names.

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 (<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 MM²))
 or 1.6 Ohms (Cresnet HP: 12 AWG (4 MM²))
 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. If Cresnet HP is used for the same run, its length could extend to 1250 feet.

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

For larger networks (i.e., greater than 28 network devices), it may become necessary to add a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality throughout the network. Also, for networks with lengthy cable runs it may be necessary to add a Hub/Repeater after only 20 devices.

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron website (<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
MediaManager Applications Guide
QM-RMCRX-BA QuickMedia Receiver/Processor

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 the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876]. For assistance in your local time zone, refer to the Crestron website (<http://www.crestron.com/>) for a listing of Crestron worldwide offices.

You can also log onto the online help section of the Crestron website 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 QM-FTMC, 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.

Appendix A: International Receptacles

PART NUMBER	DESCRIPTION	COUNTRIES
6003287 6501271	PWR-AU-B POWER RECEPTACLE, AUSTRALIA, 250V, 10A, BLK	Australia, Fiji, New Zealand, Papua New Guinea
6003288 6501272	PWR-EU-B POWER RECEPTACLE, EUROPE "SCHUKO", 250V, 16A, BLK	Austria, Azerbaijan, Belarus, Bosnia and Herzegovina, Brunei, Bulgaria, Burundi, Cape Verde, Chad, Croatia, Czech Republic, Egypt, Eritrea, Finland, Georgia, Germany, Greece, Greenland, Guinea-Bissau, Hungary, Iceland, Jordan, Kazakhstan, Korea (South), Kyrgyzstan, Liechtenstein, Luxemburg, Macedonia, Monaco, Montserrat, Morocco, Mozambique, Netherlands, Netherlands Antilles, New Caledonia, Norway, Poland, Portugal, Reunion, Romania, Russia, San Marino, Senegal, Serbia and Montenegro, Slovenia, Spain, Suriname, Sweden, Syria, Tunisia, Turkey, Ukraine, Vietnam
6003289 6500643	PWR-IT-B POWER RECEPTACLE, ITALY, 250V, 16A, BLK	Chile, Ethiopia, Italy, Libya
6003290 6501273	PWR-UK- POWER RECEPTACLE, UK, 250V, 13A, BLK	Anguilla, Bahrain, Botswana, Burma (Myanmar), Cyprus, Dominica, Falkland Islands (Malvinas), Gambia, Ghana, Gibraltar, Hong Kong, Iraq, Ireland, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Mauritius, Nigeria, Northern Ireland, Oman, Qatar, St. Kitts-Nevis, St. Lucia, St. Vincent, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania, Uganda, United Arab Emirates, United Kingdom, Yemen, Zambia, Zimbabwe
6003291 6501274	PWR-FR-B POWER RECEPTACLE, FRANCE, 250V, 16A, BLK	Algeria, Belgium, Cameroon, Central African Republic, Comoros, Congo Democratic Republic, Djibouti, France, French Guiana, Gabon, Guadeloupe, Guinea, Indonesia, Madagascar, Mali, Martinique, Togo

Appendix B: QuickMedia Installation and Compensation

Installation Notes

You must pass audio through from transmitters to receivers even if you are not using the audio signal. The information required for auto-compensation is transmitted along with the audio. In addition, the QM Link signal indicates that the QM cable is connected and that an audio signal is present on the cable. If a unit does not receive an audio signal, the QM Link signal will not go high and a valid QM Link connection cannot be detected (video can still be displayed if auto compensation is not used).

Certain devices terminate and re-initialize the audio path within the unit however, they pass the video untouched. This creates different path lengths for the video and audio. This difference in path length creates different peak and boost levels for audio and video. When audio-breakaway is implemented, the audio and video paths are likely to be different.

Compensation

Twisted pair cables experience a loss of bandwidth and signal strength over distance. When the loss is within certain limits, the reduced signal can be restored through peak and boost compensation adjustments. The amount of compensation required is directly dependent on the length of the cable. Therefore, each device in a network requires a specific amount of compensation.

Manual Compensation

In a manual compensation system, the compensation parameters, along with microphone equalization settings, are stored in the receiver in a *preset* file. When the program switches to a new transmitter, the program recalls the compensation settings associated with the new transmitter. In large systems containing multiple transmitters and receivers, these parameters must be stored in multiple locations, creating a complex arrangement.

Auto Compensation

In a system utilizing auto compensation, the peak and boost values are stored in a *preset* file at the receiver. The transmitter stores the input compensation and microphone EQ settings. When the program switches to a new transmitter, the transmitter ID, input compensation and microphone EQ settings are sent over the audio channel of the QM cable to the receiver. The receiver is equipped with a hunt algorithm to search for the proper peak and boost settings. Once the receiver acquires a QM Link signal, it can receive the audio signal containing the transmitter ID, input compensation and microphone EQ settings. After receiving the transmitter ID, the receiver recalls the peak and boost preset and uses these values to properly adjust the video signal.

NOTE: If auto compensation is used in your QM system, all QM devices must use it. If it is not used in your QM system, it must not be used for any of the QM devices.

Auto Compensation with a Self-Peaking Receiver

Crestron's innovative self-peaking audio circuit eliminates the need to peak the audio signal.

Without self-peaking, the same peak and boost values are applied equally to the video and audio signals. When these signals travel the same path, this arrangement is satisfactory. However, when video and audio travel to a receiver from different paths, cable lengths are unequal. The self-peaking feature eliminates the need to hunt for peak and boost values by allowing the receiver to read the ID, input compensation and microphone EQ from the audio channel regardless of the peaking and boost values applied. Then using the transmitter ID, the receiver recalls the preset containing the proper peak and boost settings for the video and implements the correct input compensation and microphone EQ settings.

QM devices that do not have self-peaking include:

- QM-RMCRX
- QM-MD7x2
- QM-MD5x1
- TPMC-15-QM
- TPMC-17-QM

Switchers

The QM-MD7x2 and the QM-MD5x1 terminate and re-initialize the audio path within the unit, however, they pass the video untouched. This creates different path lengths for the video and audio. This difference in path length creates different peak and boost levels for audio and video. In the initial QM receivers the video and audio circuits, peak/boost have the same settings for the audio and video. The initial QM receivers cannot accommodate different settings and may experience difficulties resolving the signals.

The QM-MD8x8 and QM-MD4x2 are simply analog switches. When audio-breakaway is implemented, the audio and video paths are likely to be different. For receivers without self-peaking audio, a probable conflict exists. For receivers with self-peaking, auto compensation is still problematic when audio-breakaway is done since the transmitter ID is that of the audio source and the video source is from a different device with a different transmitter ID.

The self-peaking audio circuit resolves the problem of unequal cable lengths. Because no audio setting is required, the video can have an independent peak/boost as set by the program.

QM-AE Audio Extractor

The QM-AE is an audio-only device. The QM cable loops through the QM-AE from the input connector to the output connector. The QM-AE taps only the audio signals of the QM cable. The QM-AE is a self-peaking receiver, so peaking is not required.

Compatibility Charts

Under certain circumstances, the audio and video may be acceptably peaked even though the audio and video path lengths are different. Because the audio signal is digital and more forgiving than the video signal, it may be possible to peak the video and have functioning audio. It is difficult to predict an outcome because it is dependent on the difference in cable lengths, the video rates and acceptable video quality.

The following Auto Compensation and Audio Breakaway compatibility charts are arranged with transmitters listed on the left and receivers listed across the top. The QM cable exits the transmitter and the QM cable enters the receiver.

NOTE: The cable exiting the QM-AE is a loop-through and is not listed as a transmitter.

NOTE: QM wall plates and flip-top boxes are not included because the audio and video cable lengths are always equal.

KEY: ✓ = Good operation.

1. = Operation depends on video rates and if the audio and video cable lengths are closely matched.

2. = In these cases, if the audio and video (although from different sources) switch together consistently, the system will operate normally. If the audio and video switch inconsistently, operation then depends on the video rates and how closely the audio and video cable lengths match.

* = Device with self-peaking.

Auto Compensation without Audio Breakaway

		QM RECEIVERS							
		QM-RMCRX	QM-RMCRX-BA*	QM-RXA*	QM-MD7x2	QM-MD5x1	QM-AE*	QM-RX*	TPMC
QM TRANSMITTERS	QM-MD8x8	✓	✓	✓	✓	✓	✓	✓	✓
	QM-MD4x2	✓	✓	✓	✓	✓	✓	✓	✓
	QM-MD7x2	1	✓	✓	✓	✓	✓	✓	1
	QM-MD5x1	1	✓	✓	✓	✓	✓	✓	1

Auto Compensation with Audio Breakaway

		QM RECEIVERS							
		QM-RMCRX	QM-RMCRX-BA*	QM-RXA*	QM-MD7x2	QM-MD5x1	QM-AE*	QM-RX*	TPMC
QM TRANSMITTERS	QM-MD8x8	1	2	2	✓	✓	✓	2	1
	QM-MD4x2	1	2	2	✓	✓	✓	2	1
	QM-MD7x2	1	✓	✓	✓	✓	✓	✓	1
	QM-MD5x1	1	✓	✓	✓	✓	✓	✓	1

KEY: ✓ = Good operation.

- 1. = Operation depends on video rates and if the audio and video cable lengths are closely matched.
- 2. = In these cases, if the audio and video (although from different sources) switch together consistently, the system will operate normally. If the audio and video switch inconsistently, operation then depends on the video rates and how closely the audio and video cable lengths match.

* = Device with self-peaking.

Manual Compensation without Audio Breakaway

		QM RECEIVERS							
		QM-RMCRX	QM-RMCRX-BA*	QM-RXA*	QM-MD7x2	QM-MD5x1	QM-AE*	QM-RX*	TPMC
QM TRANSMITTERS	QM-MD8x8	✓	✓	✓	✓	✓	✓	✓	✓
	QM-MD4x2	✓	✓	✓	✓	✓	✓	✓	✓
	QM-MD7x2	1	✓	✓	✓	✓	✓	✓	1
	QM-MD5x1	1	✓	✓	✓	✓	✓	✓	1

Manual Compensation with Audio Breakaway

		QM RECEIVERS							
		QM-RMCRX	QM-RMCRX-BA*	QM-RXA*	QM-MD7x2	QM-MD5x1	QM-AE*	QM-RX*	TPMC
QM TRANSMITTERS	QM-MD8x8	1	✓	✓	✓	✓	✓	✓	1
	QM-MD4x2	1	✓	✓	✓	✓	✓	✓	1
	QM-MD7x2	1	✓	✓	✓	✓	✓	✓	1
	QM-MD5x1	1	✓	✓	✓	✓	✓	✓	1

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.

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