

Crestron **QM-AE1/QM-AE4**
QuickMedia® Audio Extractors

Operations Guide



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Regulatory Compliance

As of the date of manufacture, the QM-AE1 & QM-AE4 have 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.

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QuickMedia® Audio Extractors: QM-AE1/QM-AE4

Introduction

The QM-AE1 provides a solution for extracting stereo program and microphone audio signals from the QuickMedia® (QM) transport to feed a power amplifier or other audio device. It may be inserted anywhere along the QM signal path without affecting the audio, video, and computer signals passing through it. For ultimate flexibility, it can also operate as a QM endpoint, effectively functioning as a QM audio receiver*.

The QM-AE4 is a single-space rack mount unit containing the equivalent of four QM-AE1 QuickMedia Audio Extractors. Its four independent extractors provide the ability to extract the stereo program and microphone audio signals from four separate QuickMedia feeds to drive a power amplifier or other audio device. Each QM Audio Extractor may be inserted anywhere along the QM signal path without affecting the audio, video, and computer signals passing through it. For ultimate flexibility, any of the QM-AE4's extractors may operate as a QM endpoint, effectively functioning as a QM audio receiver*.

For simplicity within this guide, the term "QM-AE1/4" is used except where noted.

Features and Functions

- Extracts QuickMedia audio signals (QM-AE4 provides four independent QM audio extractors)
- Inserts transparently in the QM signal path
- Each extractor functions as a QM midpoint or endpoint device*
- Provides stereo program and two discrete speech outputs per extractor
- Includes built-in digital mixing, signal routing, equalization, and delay processing
- Features professional balanced line-level outputs
- An ideal QM signal interface for any QM-Series 3-channel amplifier (sold separately)
- 1/2-space rack-mountable (QM-AE4 is single-space rack-mountable)

* For QuickMedia wiring use CresCAT-QM, CresCAT-IM, or quality CAT5e/CAT6 cable with a delay skew of ≤ 15 ns per 100m; the maximum aggregate cable length and delay skew between any QM transmitter (origination point) and QM receiver (endpoint) is 450 ft (137 m) and 22 ns; a maximum of two QM midpoint devices may be inserted in a given QM signal path, however the QM-AE1/4 does not count as a midpoint device in this sense.

QuickMedia Transport

The revolutionary QuickMedia transport routes all audio, video, and RGB computer signals over a single inexpensive CAT5e type cable*. Stereo audio and microphone signals are transmitted digitally over QuickMedia with high-performance 24-bit resolution.

High-Performance Audio

The QuickMedia transport carries four channels of 24-bit digital audio comprised of a stereo program signal and two discrete microphone signals. Within any of the individual audio extractors, the two incoming microphone signals are each processed separately by a 4-band speech-optimized graphic equalizer. Versatile 4x4 matrix mixing allows the mic signals and stereo program signal to be precisely adjusted and routed to any of four audio outputs. These outputs are configured as one stereo program channel and two discrete mono speech channels, perfect for feeding a Crestron QM-Series 3-channel amplifier (sold separately) along with other recording and assistive listening equipment. All outputs are balanced line-level for proper integration with professional and semi-pro gear.

Professional DSP

The QM-AE1/4s let you control and optimize your system's audio performance without the need for additional outboard processors. Each output channel includes programmable volume, bass, treble, and mute, plus 10-band graphic equalization and 2-band parametric equalization. In addition, each speech output includes up to 40 ms of delay adjustment for proper ceiling speaker alignment. All audio processing and mixing is performed in the digital domain, adjustable at setup using Crestron QM Tools software (part of Crestron Toolbox™).

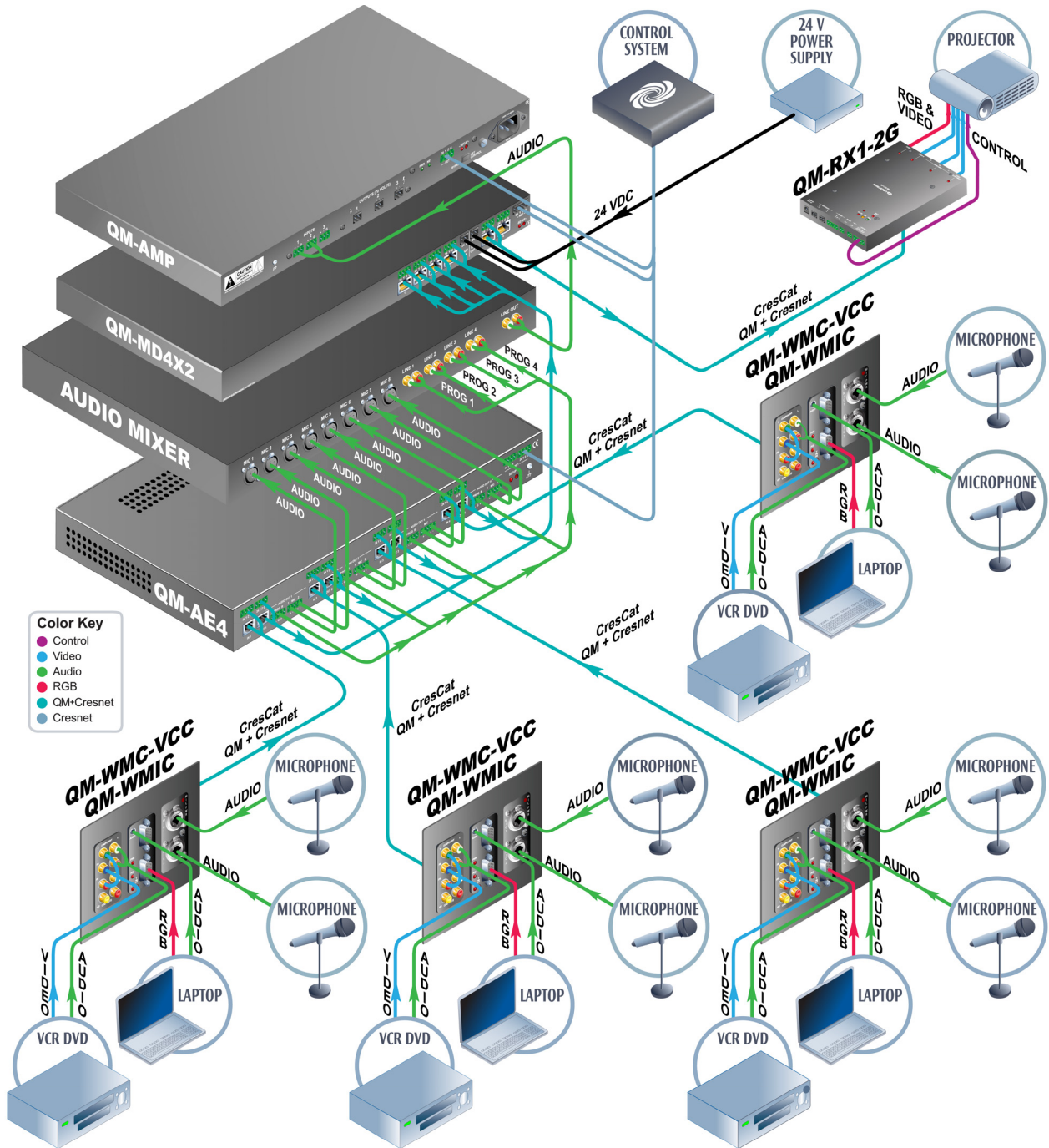
MediaManager System Integration

The QM-AE1/4 affords seamless audio signal routing and control under the command of a MediaManager control system. Many parameters are controllable in real-time from a keypad or touchpanel, and numerous presets can be saved for instant recall. A complete MediaManager system is easy to design, program and adjust from start to finish using Crestron SystemBuilder™ software.

* For QuickMedia wiring use CresCAT-QM, CresCAT-IM, or quality CAT5e/CAT6 cable with a delay skew of ≤ 15 ns per 100m; the maximum aggregate cable length and delay skew between any QM transmitter (origination point) and QM receiver (endpoint) is 450 ft (137 m) and 22 ns; a maximum of two QM midpoint devices may be inserted in a given QM signal path, however the QM-AE1/4 does not count as a midpoint device in this sense.

Applications

The following diagram shows a QM-AE4 in a typical application.

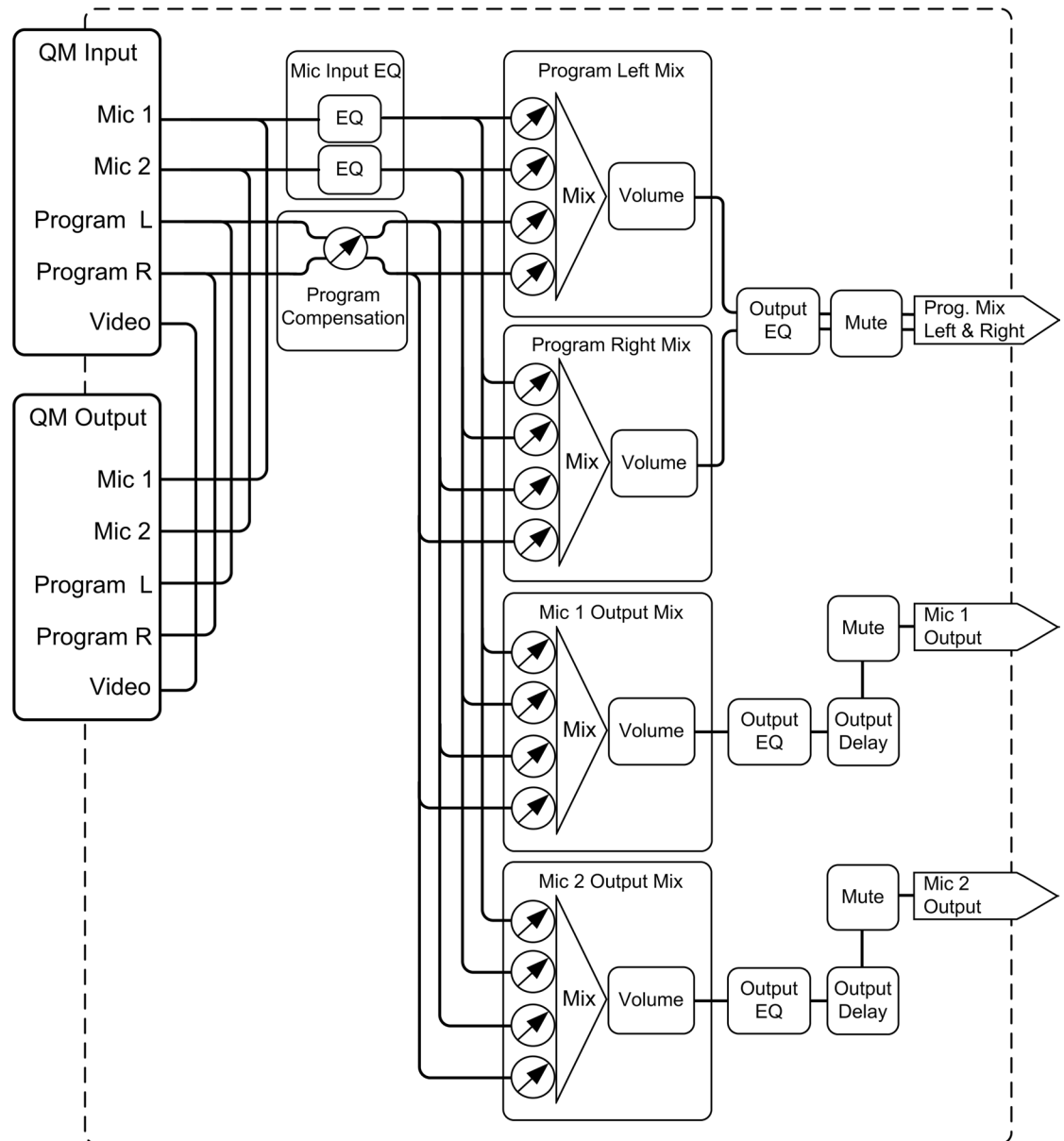


For more information on this and other QM applications, refer to the latest version of the Crestron MediaManager Applications Guide (Doc. 6244), which is available from the Crestron website (www.crestron.com/manuals).

Internal Block Diagram

The following diagram represents the functions of the QM-AE1. The same functionality is provided in each of the four sections of the QM-AE4.

Internal Block Diagram of the QM-AE1



Specifications

Specifications for the QM-AE1 and QM-AE4 are listed in the following table.

QM-AE1 & QM-AE4 Specifications

SPECIFICATION	DETAILS
Audio	
Features	4x4 mic/program matrix, 2-channels mic EQ at input, stereo volume/tone control and EQ on PROG output, mono volume/tone control and EQ/delay on each MIC output
Mixer Volume Range	-80.0 to 0.0 dB per input
Mixer Presets	1 thru 5
Input Compensation	±10 dB per input
Input Compensation Presets	1 thru 256
Mic Input EQ Mode	4-band graphic per mic input
Mic Input EQ Center Frequencies	160, 500, 1.2k, 3k Hz
Mic Input EQ Gain	±12 dB per band
Mic Input EQ Presets	1 thru 10
Output Volume Range	-80 to +20 dB, adjustable from 0% to 100%, plus mute, per output
Bass Control	±15 dB @ 150 Hz shelf per output
Treble Control	±15 dB @ 4 kHz shelf per output
Output EQ Mode	10-band graphic + 2-band parametric per output
Output GEQ Center Frequencies	31, 63, 125, 250, 500, 1k, 2k, 4k, 8k, 16k Hz
Output GEQ Gain	±12 dB per band
Output GEQ Presets	1 thru 10
Output PEQ Types	Low Pass, High Pass, Peaking EQ, Notch, Treble Shelf, Bass Shelf
Output PEQ Center Frequency	25 to 20,000 Hz per band
Output PEQ Gain	±12 dB per band
Output PEQ Bandwidth	0.1 to 3.0 octaves per band
Output PEQ Presets	1 thru 5
Speech Output Delay	0 to 40 ms per MIC output
D-A Conversion	24-bit, 48 kHz
Frequency Response	20 Hz to 20 kHz ±0.25 dB
S/N Ratio	90 dB 20 Hz to 20 kHz A-weighted
THD+N	0.015% 20 Hz to 20 kHz
Video	Provides unbuffered, unprocessed pass-through of video/RGB portion of QM signal; does not affect delay skew, bandwidth, or gain

(Continued on following page)

QM-AE1 & QM-AE4 Specifications (Continued)

SPECIFICATION	DETAILS
Communications QuickMedia	QM midpoint or endpoint device, QM auto-compensation with self-peaking
Cresnet	Cresnet slave device
Power Requirements	QM-AE1: 7 Watts (0.3 Amp @ 24 Volts DC) QM-AE4: 20 Watts (0.83 Amp @ 24 Volts DC)
Default Net ID	21
Minimum 2-Series Control System Update File ^{1,2}	QM-AE1: 1.000.0017 QM-AE4: 1.001.0001
Environmental Temperature	41° to 104°F (5° to 40°C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	QM-AE1: 24 BTU/Hr QM-AE4: 69 BTU/Hr
Enclosure Chassis	Metal, black matte powder coat finish
Faceplate	Extruded aluminum, black matte powder coat finish with polycarbonate label overlay
Mounting	QM-AE1: Freestanding or 1U half-width 19-inch rack-mountable (adhesive feet included, ST-RMK rack kit sold separately) QM-AE4: Freestanding or 1U 19-inch rack-mountable (adhesive feet and mounting "ears" supplied)
Dimensions Height	1.80 in (46 mm); 1.70 in (44 mm) without feet
Width	QM-AE1: 7.07 in (180 mm) QM-AE4: 17.07 in (434 mm)
Depth	QM-AE1: 6.37 in (162 mm) QM-AE4: 8.55 in (217 mm)
Weight	QM-AE1: 1.9 lbs (0.9 kg) QM-AE4: 3.8 lbs (1.7 kg)

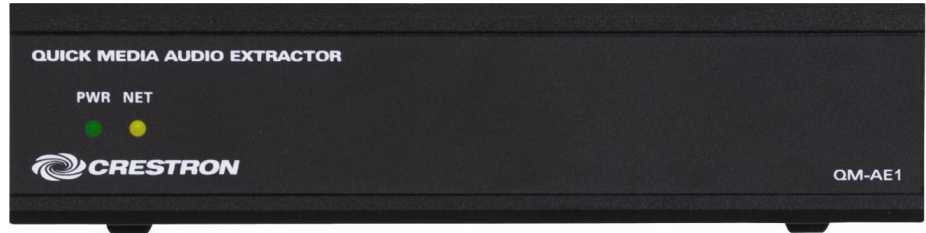
1. The latest software versions can be obtained from the Crestron website. Refer to the NOTE following these footnotes.
2. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems.

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

Physical Description

This section provides information on the connections, controls and indicators available on your QM-AE1 or QM-AE4

QM-AE1 Front View



QM-AE1 Rear View



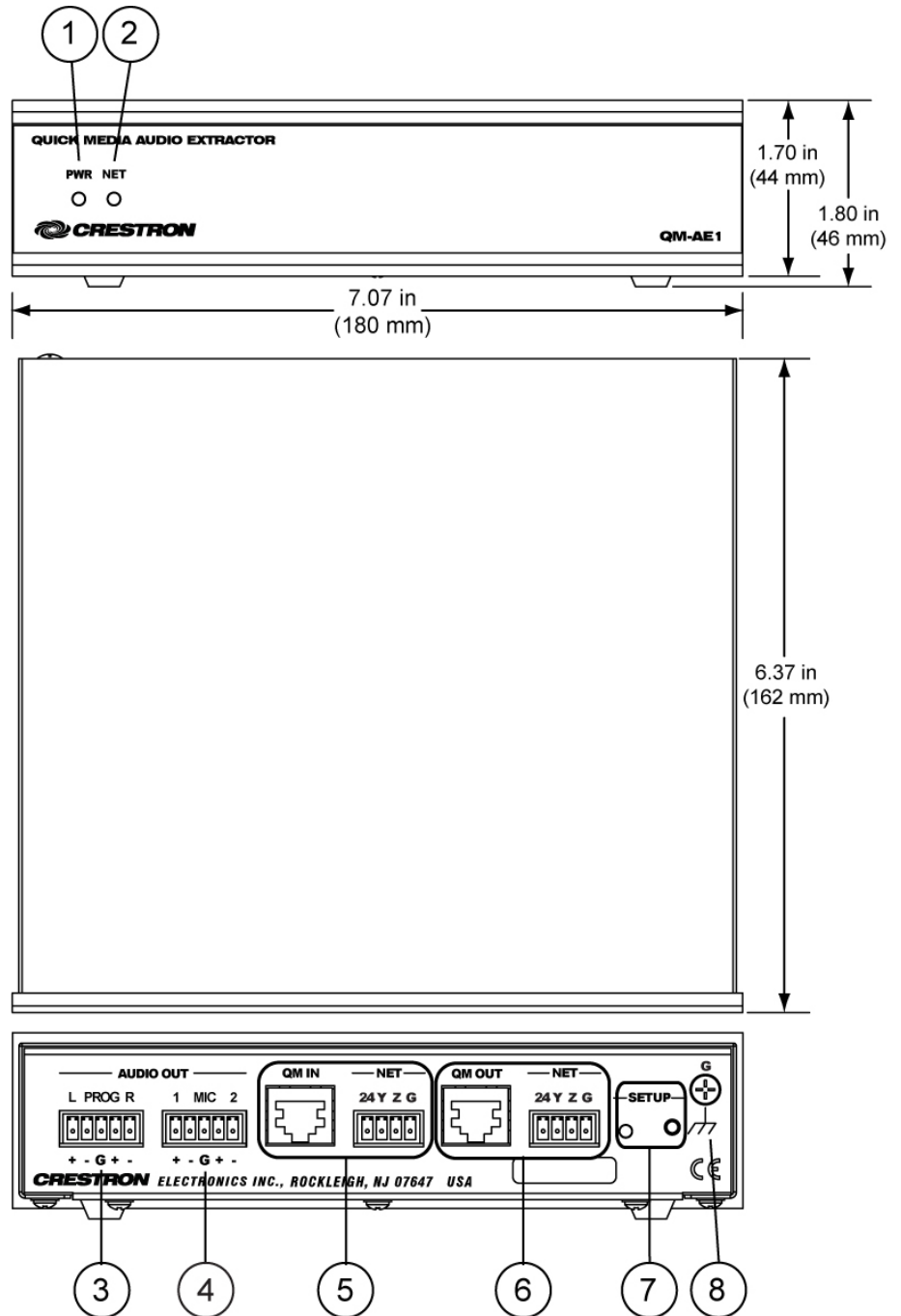
QM-AE4 Front View



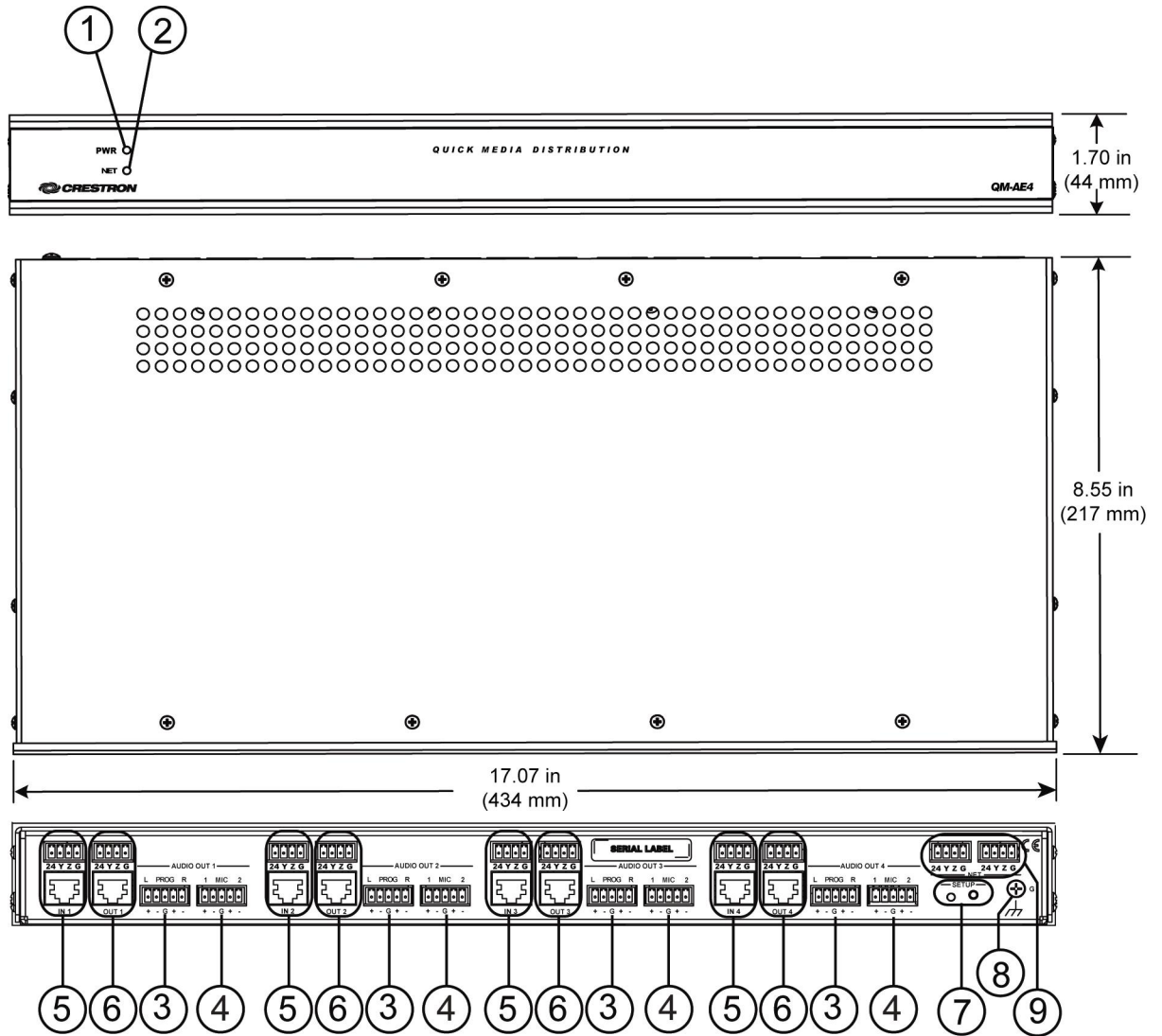
QM-AE4 Rear View



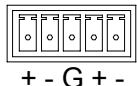


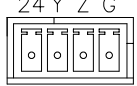

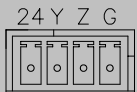

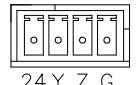
QM-AE1 Overall Dimensions (Front, Top, Rear Views)



QM-AE4 Overall Dimensions (Front, Top, Rear Views)



Connectors, Controls & Indicators

#	CONNECTORS ¹ CONTROLS & INDICATORS	DESCRIPTION
1	PWR	(1) Green LED, indicates 24 Volts DC power supplied from Cresnet control network
2	NET	(1) Amber LED, indicates communication with Cresnet system
3	AUDIO OUT, PROG L PROG R  + - G + -	((1) on QM-AE1, (4) on QM-AE4) 5-pin 3.5 mm detachable terminal block; Stereo “program” balanced line-level audio output; Output Impedance: 200 ohms balanced, 100 ohms unbalanced; Maximum Output Level: 4 V _{rms} balanced, 2 V _{rms} unbalanced
4	AUDIO OUT, MIC L MIC R  + - G + -	((1) on QM-AE1, (4) on QM-AE4) 5-pin 3.5 mm detachable terminal block; Two-channel “speech” balanced line-level audio outputs; Output Impedance: 200 ohms balanced, 100 ohms unbalanced; Maximum Output Level: 4 V _{rms} balanced, 2 V _{rms} unbalanced
5	QM IN and NET ^{2, 3} (IN)   24 Y Z G	((1) on QM-AE1, (4) on QM-AE4) connector pairs comprised of (1) 8-wire RJ-45 ⁴ female (QM) and (1) 4-pin 3.5 mm detachable terminal block (Cresnet); Connects to QM output port of another QuickMedia device via CresCAT-QM cable ⁵
6	QM OUT and NET ^{3, 6} (OUT)   24 Y Z G	((1) on QM-AE1, (4) on QM-AE4), connector pairs comprised of (1) 8-wire RJ-45 ⁴ female (QM) and (1) 4-pin 3.5 mm detachable terminal block (Cresnet); Connects to QM input port of another QuickMedia device via CresCAT-QM cable ⁵
7	SETUP (LED and button)	(1) miniature pushbutton and red LED, used for touch-settable ID (TSID)
8	 G	(1) 6-32 screw, chassis ground lug
9	NET ³  24 Y Z G	(2) 4-pin 3.5mm detachable terminal blocks Cresnet slave ports, paralleled Connect to Cresnet control network via CRESNET cable 24: Power (24 Volts DC) Y: Data Z: Data G: Ground

1. Interface connectors for **NET** and **AUDIO OUT** ports are provided with the unit.
2. On the QM-AE1, these ports are labeled **QM IN** and **NET 24 Y Z G**. On the QM-AE4, these four ports (QuickMedia and Cresnet pairs) are labeled **IN (1-4)** and **24 Y Z G**. These four ports are isolated from each other, and the **24 Y Z G** connectors are isolated from the two **NET 24 Y Z G** connectors.
3. The **NET 24 Y Z G** connectors (only on the QM-AE1) are paralleled. Together they function as a Cresnet slave port with pass-through. Either port can supply power to the QM-AE1 (but not both). The **NET 24 Y Z G** ports (only on the QM-AE4) are paralleled. Either port can supply power to the QM-AE4 (but not both).
4. To determine which is pin 1 on the cable, hold the cable so 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. For QuickMedia wiring use CresCAT-QM, CresCAT-IM, or quality CAT5e/CAT6 cable with a delay skew of ≤ 15 ns per 100m; the maximum aggregate cable length and delay skew between any QM transmitter (origination point) and QM receiver (endpoint) is 450 ft (137 m) and 22 ns. A maximum of two QM midpoint devices may be inserted in a given QM signal path, however the QM-AE1/4 does not count as a midpoint device in this sense.
6. On the QM-AE1, these ports are labeled **QM OUT** and **NET 24 Y Z G**. On the QM-AE4, these four ports (QuickMedia and Cresnet pairs) are labeled **OUT (1-4)** and **24 Y Z G**. These four ports are isolated from each other, and the **24 Y Z G** connectors are isolated from the two **NET 24 Y Z G** connectors.

Setup

Network Wiring

When wiring the Cresnet® 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 (www.crestron.com/calculators).

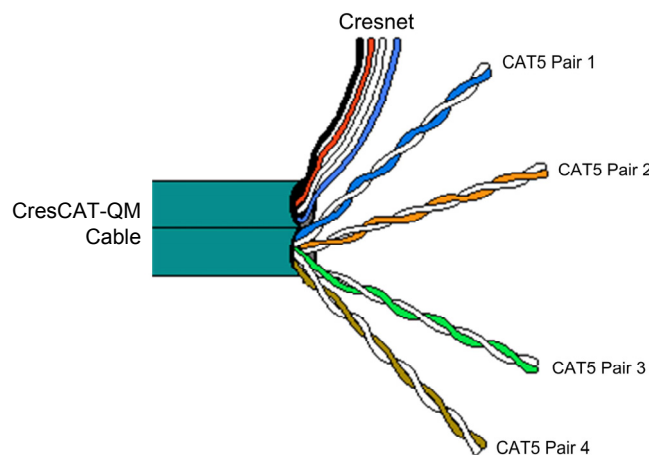
For networks with 20 or more devices, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

For more details, refer to “Check Network Wiring” on page 23.

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 version of the Crestron MediaManager Applications Guide (Doc. 6244).

CresCAT-QM Cable



NOTE: Do not untwist the two wires in a single pair for more than 1/3-1/2” (8-12 mm) 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 transmitter 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.

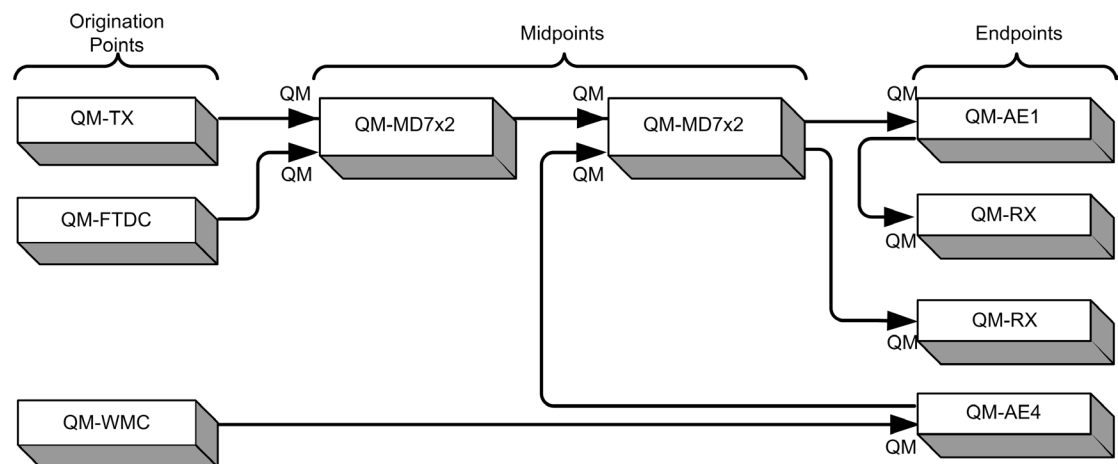
NOTE: When transmitting S-video, luminance uses the green video pathway and chrominance uses the red video pathway. When transmitting composite video, the signal is carried on the blue video pathway.

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 or distribution amplifiers). Refer to the following diagram when configuring a QM network.

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

QM Network Topology



The QM-AE1 or QM-AE4 may be inserted anywhere along the QM signal path without affecting the audio, video, and computer signals passing through it. For ultimate flexibility, it can also operate as a QM endpoint, effectively functioning as a QM audio receiver.

NOTE: The QM-AE1/4 does not count as a midpoint when counting the number of midpoints allowed in a QM route.

Identity Code

The Net ID of the QM-AE1/4 is factory set to **21**. The Net IDs of multiple QM-AE1/4 devices in the same system must be unique. Net IDs are changed from a personal computer (PC) via Crestron Toolbox (refer to “Establishing Communication” on page 21).

When setting the Net ID, consider the following:

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

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

Installation

Ventilation

The QM-AE1/4 should be used in a well-ventilated area. The venting holes should not be obstructed under any circumstances.

To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consider using forced air ventilation to reduce overheating.

Rack Mounting

The QM-AE1/4 can be mounted in a rack or stacked with other equipment. The QM-AE1 requires an ST-RMK Rack Mount Kit (sold separately) for rack mounting. Two “ears” are provided with the QM-AE4 so that the unit can be rack mounted. These ears must be installed prior to mounting. Complete the following procedure to attach the ears to the unit. The only tool required is a #1 or #2 Phillips screwdriver.

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

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

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

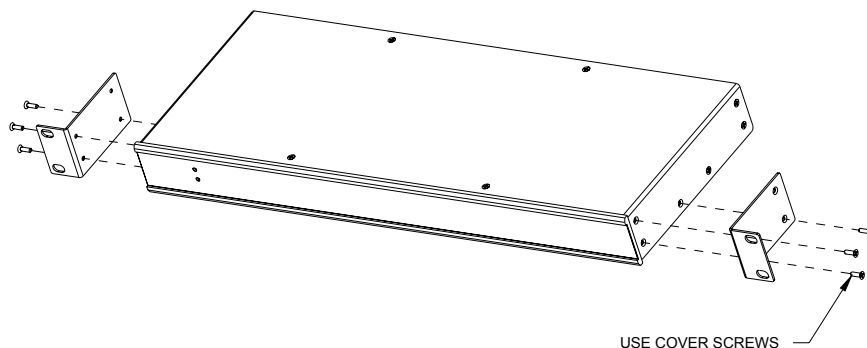
NOTE: Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

To install the ears:

1. There are screws that secure each side of the QM-AE4 top cover. Using a #1 or #2 Phillips screwdriver, remove the three screws closest to the front panel from one side of the unit. Refer to the diagram following step 3 for a detailed view.
2. Position a rack ear so that its mounting holes align with the holes vacated by the screws in step 1.

- Secure the ear to the unit with three screws from step 1, as shown in the following diagram.

Ear Attachment for Rack Mounting (1 RU Devices Shown)



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

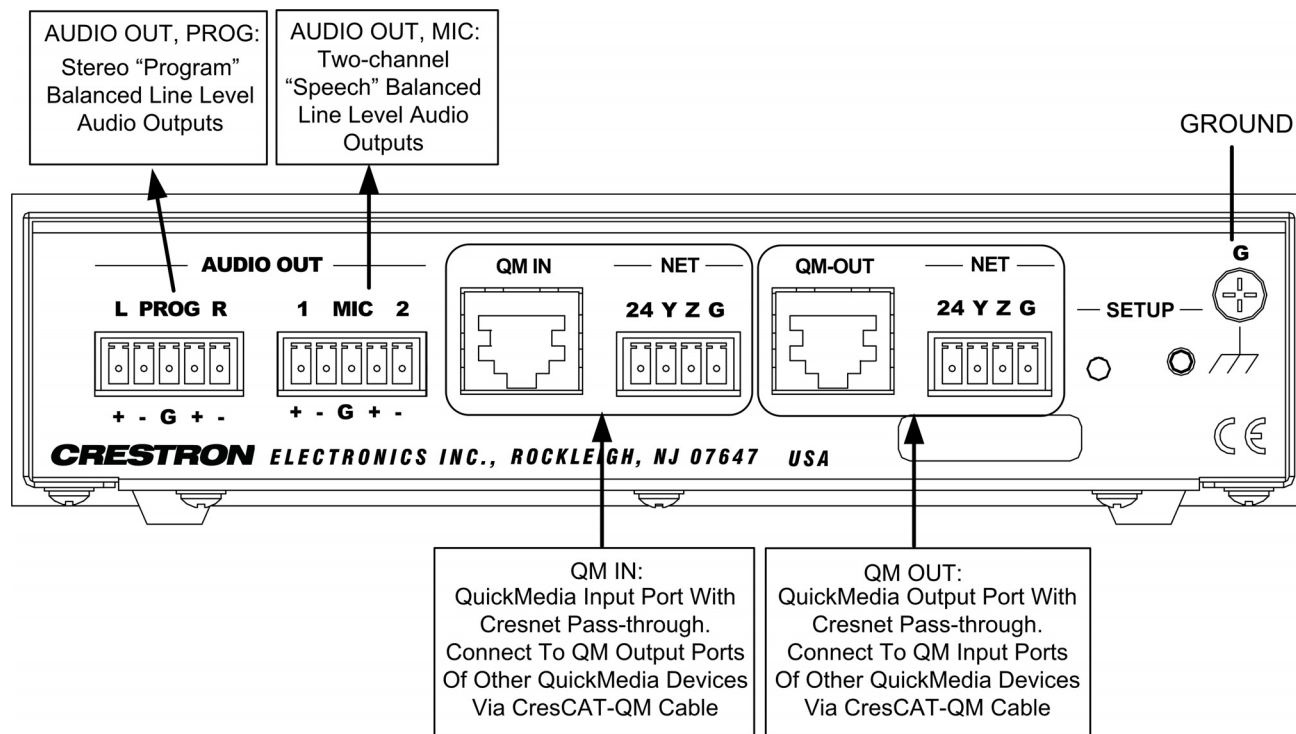
Hardware Hookup

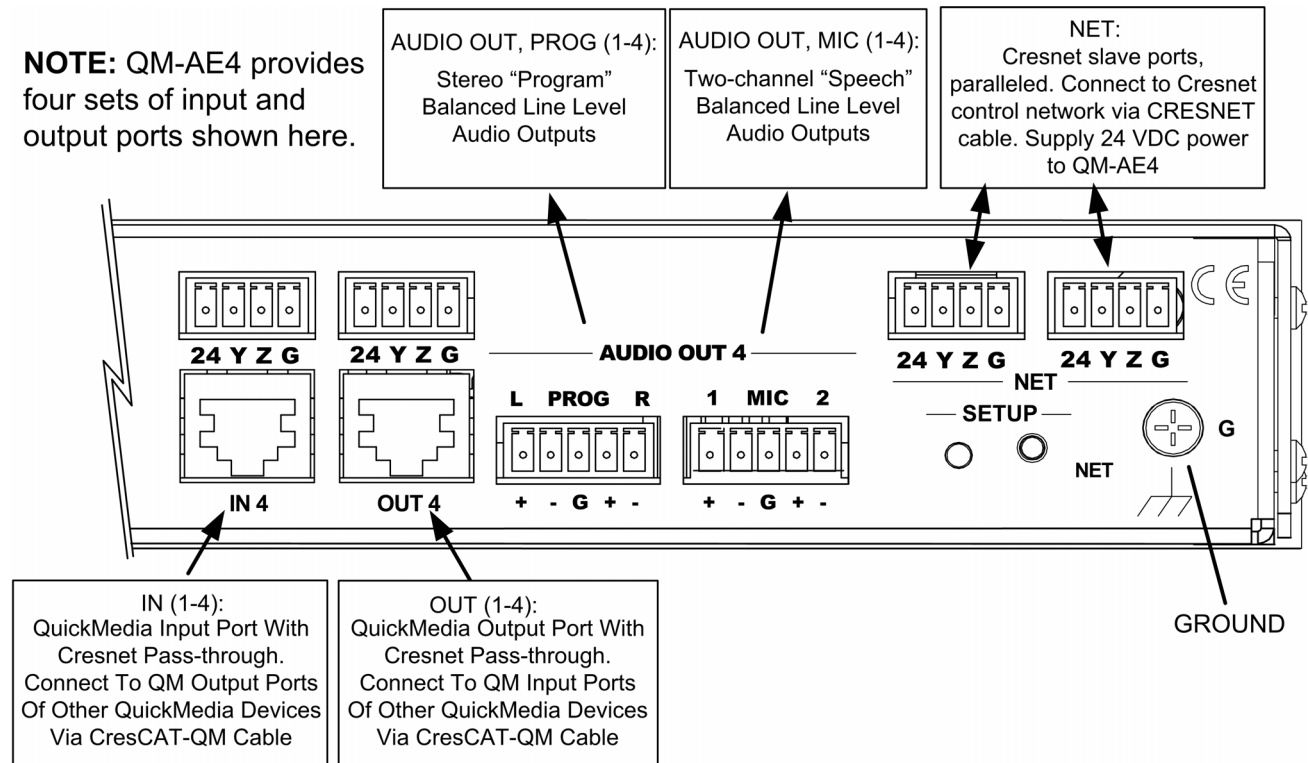
Make the necessary connections as called out in the illustration that follows this paragraph. Refer to “Network Wiring” on page 12 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

When making connections to the QM-AE1/4, note the following:

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

Hardware Connections for the QM-AE1



Hardware Connections for the QM-AE4

NOTE: Ensure the unit is properly grounded by connecting the chassis ground lug to an earth ground (building steel).

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

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 QM-AE4 can only be powered by one of the 4-position terminal block connectors labeled **NET**. Power cannot be supplied from network devices that are connected to the pass-through terminal block connectors. On the QM-AE1, power can be supplied through either of the 4-position terminal block connectors labeled **NET** (but not both).

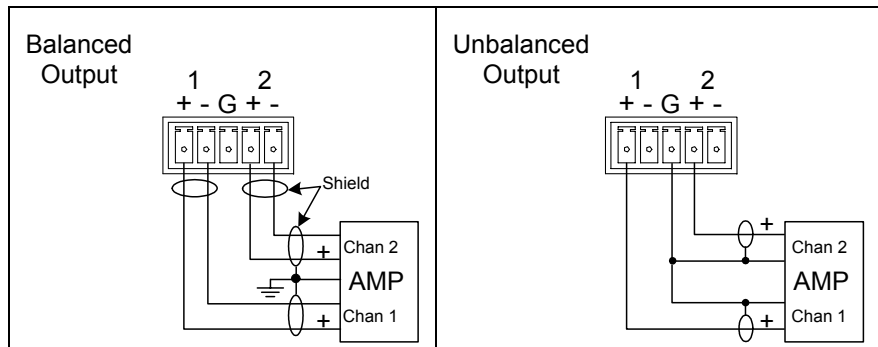
NOTE: The Y and Z Cresnet data lines from the network are connected to the **NET** connector, which is internally wired to the 4-position terminal block connector at each QM connector.

Balanced audio inputs and outputs are provided, (one on QM-AE1, four on QM-AE4) utilizing five-pin terminal block connectors. For connection details, refer to the following table and diagrams.

Audio Connections

SIGNAL NAME	BALANCED AUDIO OUTPUT	UNBALANCED AUDIO OUTPUT
+	1 +	1 + Out
-	1 -	Open
G	Shield/Ground	Common ground
+	2 +	2 + Out
-	2 -	Open

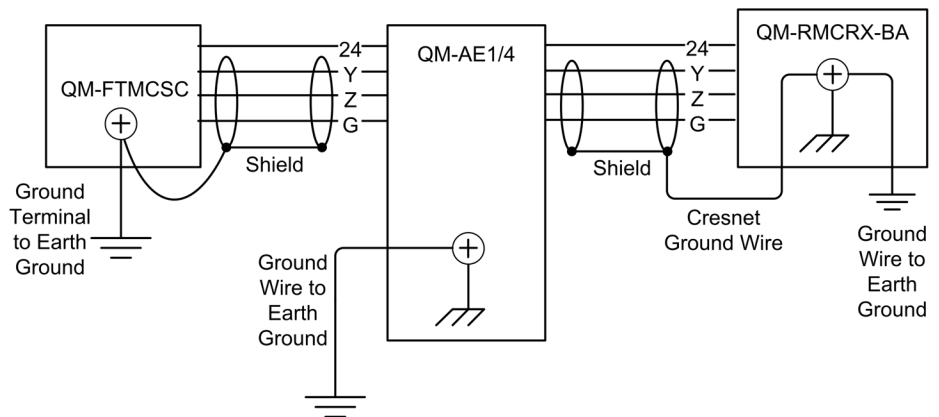
Typical Balanced and Unbalanced Outputs



Ground Wire Connections

Proper grounding is required. Connect the ground from the QM-AE1/4 to earth ground. Connect the Cresnet shield at the QM-RMCRX-BA to the chassis ground provided on the QM-RMCRX-BA. The QM-AE1/4 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-AE1/4.

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 website. To post a question or view questions you have submitted to Crestron's True Blue Support, log in at www.crestron.com/support. 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. For the minimum recommended software versions, visit the Version Tracker page of the Crestron website (www.crestron.com/versiontracker).

Programming with Crestron SystemBuilder

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

Programming with SIMPL Windows

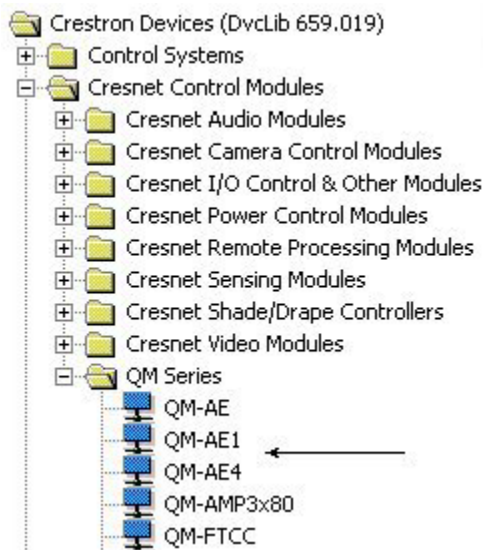
NOTE: While SIMPL Windows can be used to program the QM-AE1/4, it is recommended to use SystemBuilder and Digital Media Tools software for configuring a QuickMedia system.

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

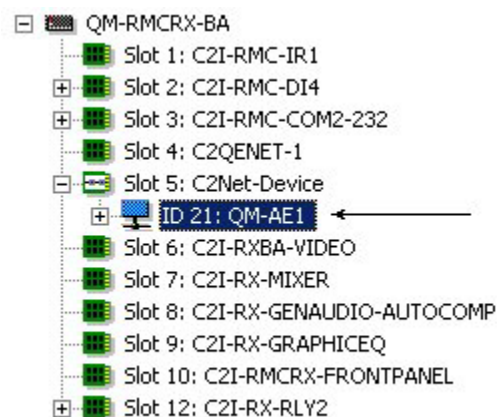
Configuration Manager

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

1. To incorporate the QM-AE1/4 into the system, drag the QM-AE1/4 from the Cresnet Control Modules | QM Series folder of the *Device Library* and drop it in the *System Views*.

Locating the QM-AE1/4 in the Device Library

2. The system tree of the control system displays the device in the appropriate slot with a default Net ID **21** as shown in the following illustration.

C2Net Device, Slot 5

3. Additional QM-AE1/4 devices are assigned different Net ID numbers as they are added.
4. If necessary, double click a device to open the “Device Settings” window and change the Net ID, as shown in the following figure.

“Device Settings: Crestron QM-AE4” Window

5. The ID code specified in the SIMPL Windows program must match the Net ID of each unit. Refer to “Identity Code” on page 14.

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**).

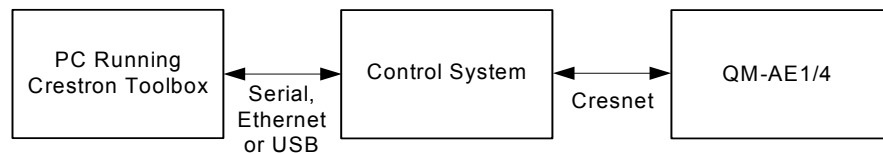
Uploading and Upgrading

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, 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-AE1/4; refer to the Crestron Toolbox help file for details. There is a single method of communication: indirect communication.

Indirect Communication



QM-AE1/4 connects to control system via Cresnet:

1. Establish communication between the PC and the control system as described in the latest version of the 2-Series Control Systems Reference Guide (Doc. 6256).
2. Use the Address Book in Crestron Toolbox to create an entry for the QM-AE1/4 using the expected communication protocol (indirect). Select the Cresnet ID of the QM-AE1/4 and the address book entry of the control system that is connected to the QM-AE1/4.
3. Display the QM-AE1/4'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 website as new features are developed after product releases. One has the option to upload programs via the programming software or to upload and upgrade via the Crestron Toolbox. For details on uploading and upgrading, refer to the SIMPL Windows help file, or the Crestron Toolbox help file.

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-AE1/4 firmware via Crestron Toolbox.

1. Establish communication with the QM-AE1/4 and display the “System Info” window.
2. Select **Functions | Firmware...** to upgrade the QM-AE1/4 firmware.

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-AE1/4 Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
The QM-AE1/4 is not receiving power.	Improper power supply.	Use only Crestron power supplies for Crestron equipment.
PWR LED does not illuminate.	The QM-AE1/4 is not receiving power.	Verify that Cresnet is properly attached.
No audio output.	The audio input or output connection is incorrect.	Verify that the balanced audio output connection is secure. Verify that the QM input connection is secure.

Check Network Wiring

Use the Right Wire

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

Calculate Power

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

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

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 (101 meters). If Cresnet HP is used for the same run, its length could extend to 1250 feet (381 meters).

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

Strip and Tin Wire

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

Add Hubs

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

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron website (www.crestron.com/manuals). 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

Further Inquiries

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

You can also log onto the online help section of the Crestron website (www.crestron.com/onlinehelp) 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-AE1/4, 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: 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 on 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

Inherently, 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 required compensation 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, unequal cable lengths are created. 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.

NOTE: 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 on 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-AE1/4 Audio Extractors

The QM-AE1/4 is an audio-only device. The QM cable loops through the QM-AE1/4 from the input connector to the output connector. The QM-AE1/4 taps only the audio signals of the QM cable. The QM-AE1/4 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 outcomes 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-AE1/4 is a loop-through and is not listed as a transmitter.

NOTE: QM wallplates and fliptop 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							TPMC
		QM-RMCRX	QM-RMCRX-BA*	QM-RX*	QM-MD7X2	QM-MD5X1	QM-AE1/4*	QM-RX1-2G*	
QM TRANSMITTERS	QM-MD8X8	✓	✓	✓	✓	✓	✓	✓	✓
	QM-MD4X2	✓	✓	✓	✓	✓	✓	✓	✓
	QM-MD7X2	1	✓	✓	✓	✓	✓	✓	1
	QM-MD5X1	1	✓	✓	✓	✓	✓	✓	1

Auto Compensation with Audio Breakaway

		QM RECEIVERS							TPMC
		QM-RMCRX	QM-RMCRX-BA*	QM-RX*	QM-MD7X2	QM-MD5X1	QM-AE1/4*	QM-RX1-2G*	
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-RX*	QM-MD7X2	QM-MD5X1	QM-AE1/4*	QM-RX1-2G*	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-RX*	QM-MD7X2	QM-MD5X1	QM-AE1/4*	QM-RX1-2G*	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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Specifications subject to
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