

# Crestron **QM-DA** QuickMedia™ Distribution Amplifier

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## Operations Guide



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



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# QuickMedia™ Distribution Amplifier: QM-DA

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## Introduction

The QM-DA-4, QM-DA-8 and QM-DA-16 are QuickMedia™ (QM) distribution amplifiers designed to distribute a single QM signal to up to four, eight or 16 QM receivers. (The QM-DA-4 has four outputs, the QM-DA-8 has eight outputs and the QM-DA-16 has 16 outputs.) All signal distribution is provided over inexpensive CAT5e type cable via Crestron's exclusive QM transport, supporting high resolution RGB, video, stereo audio and microphone signals up to a total distance of 450 feet (137 meters).

Up to two QM distribution amplifiers, matrix switchers and distribution centers may be cascaded in a given QM signal path to support versatile system configurations. For instance, a QM-DA-4 may be used to expand the output capacity of a QM-MD4X2 to feed a single output to four different displays. A QM-DA-8 may be used to feed that output to eight different displays and a QM-DA-16 may be used to feed that output to sixteen different displays.

Every QM port on the rear panel is accompanied by a Cresnet® port with 24 VDC power distribution built in to simplify termination of the QM and Cresnet wiring.

On the QM-DA-16 (only), a built-in Cresnet hub provides three isolated segments, each supporting 3000 feet (914 meters) of Cresnet cabling and approximately 25 Cresnet devices.

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**NOTE:** For QM wiring use CresCAT-QM, CresCAT-IM or quality CAT5e/CAT6 cable with a maximum delay skew of 15 ns per 100 m. 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 into a given QM signal path. Exceptions apply; refer to each respective product manual for details.

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For simplicity within this guide, all models will hereinafter collectively be referred to as QM-DA, except where noted.

## Features and Functions

- QuickMedia signal distribution amplifier
  - 1 to 4 in QM-DA-4
  - 1 to 8 in QM-DA-8
  - 1 to 16 in QM-DA-16
- Easy single cable connections
- No control or adjustments necessary
- Single space rack mountable
- Built-in Cresnet® distribution
- Built-in Cresnet hub/repeater (QM-DA-16 only)

## Specifications

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

### *QM-DA Specifications*

SPECIFICATION	DETAILS
Video/RGB DA	Distribution amplifier 1 to 4 in QM-DA-4 1 to 8 in QM-DA-8 1 to 16 in QM-DA-16; distributes QM video input signal to all outputs 4 in QM-DA-4 8 in QM-DA-8 16 in QM-DA-16
Gain	0 dB
Audio DA	Distribution amplifier 1 to 4 in QM-DA-4 1 to 8 in QM-DA-8 1 to 16 in QM-DA-16; distributes QM audio input signal to all outputs 4 in QM-DA-4 8 in QM-DA-8 16 in QM-DA-16
Gain	0 dB
Power Cresnet Power Usage	QM-DA-4: 10 Watts (0.41 Amps @ 24 Volts DC) QM-DA-8: 16 Watts (0.66 Amps @ 24 Volts DC) QM-DA-16: 24 Watts (1.00 Amps @ 24 Volts DC)
Environmental Temperature	41° to 104°F (5° to 40°C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	QM-DA-4: 33 BTU/Hr QM-DA-8: 54 BTU/Hr QM-DA-16: 81 BTU/Hr

*(Continued on following page)*

*QM-DA Specifications (Continued)*

SPECIFICATION	DETAILS
Enclosure	
Chassis	Steel, black matte powder coat finish, convection cooled, vented top and sides
Faceplate	Extruded aluminum, black matte powder coat finish with polycarbonate label overlay
Mounting	Freestanding or 1U 19 inch rack mountable (adhesive feet and rack ears included)
Dimensions	
Height	1.70 in (4.32 cm)
Width	17.03 in (43.25 cm) without ears 19.01 in (48.29 cm) with ears
Depth	QM-DA-4 and QM-DA-8: 6.64 in (16.86 cm) QM-DA-16: 10.14 in (25.75 cm)
Weight	QM-DA-4: 2.82 lbs (1.28 kg) QM-DA-8: 2.88 lbs (1.31 kg) QM-DA-16: 4.77 lbs (2.16 kg)

### Physical Description

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

*QM-DA-4 Front View*



*QM-DA-4 Rear View*



*QM-DA-8 Front View*

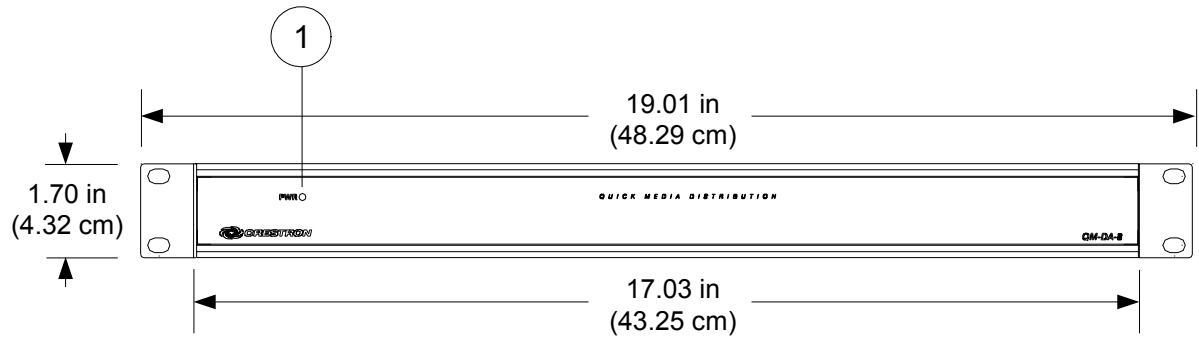


*QM-DA-8 Rear View*

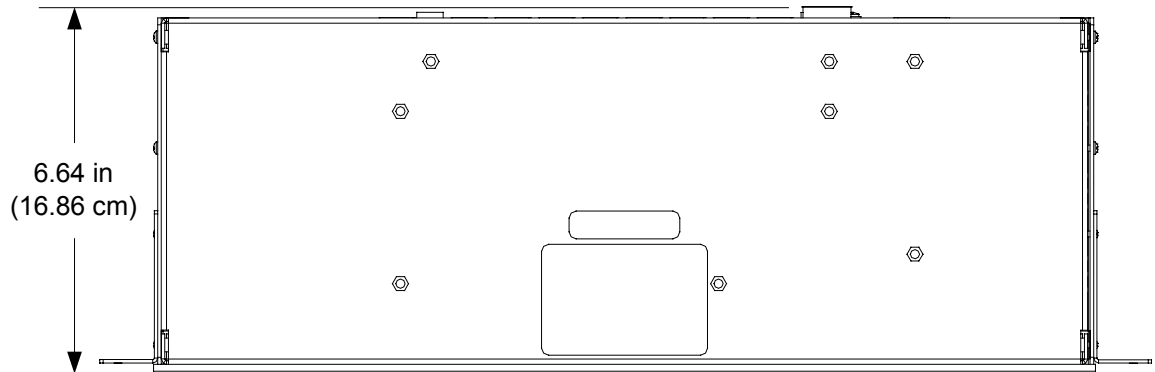


**NOTE:** At the time of printing, photographs of the QM-DA-16 were not available.

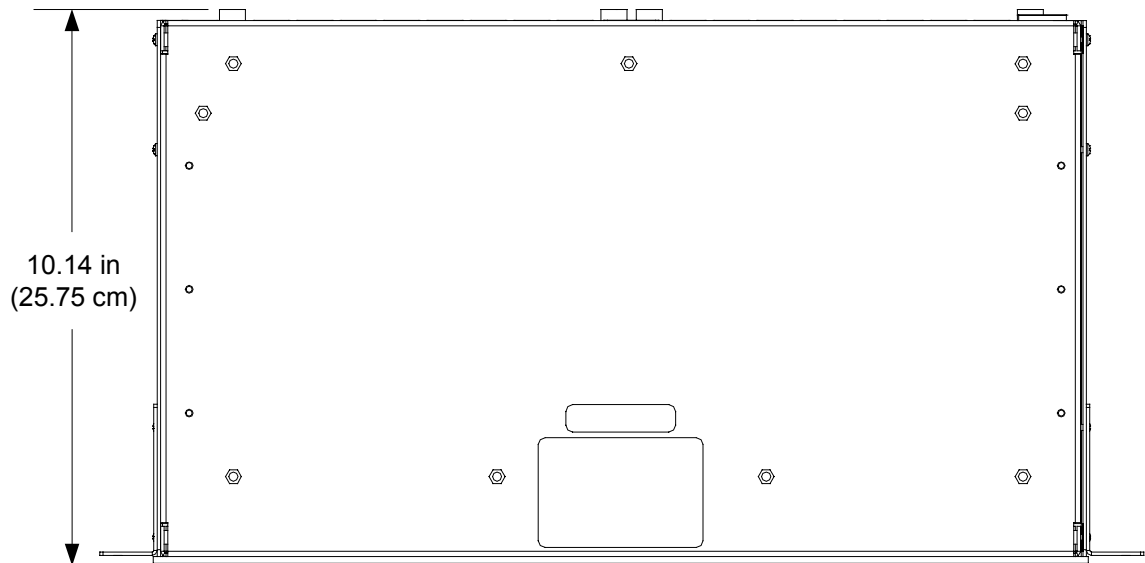
*QM-DA Overall Dimensions (Front View – QM-DA-8 Shown)*



*QM-DA-4 & QM-DA-8 Overall Dimensions (Bottom View - QM-DA-8 Shown)*

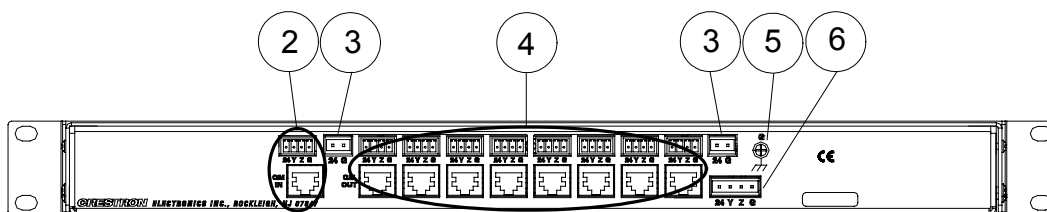


*QM-DA-16 Overall Dimensions (Bottom View)*





*QM-DA (Rear View – QM-DA-8 Shown)*



**Connectors, Controls & Indicators**

#	CONNECTORS <sup>1</sup> , CONTROLS & INDICATORS	DESCRIPTION
1	PWR LED	Indicates 24 Volts DC power supplied from Cresnet control network.
2	QM IN <sup>2, 3</sup>  	(1) 8-wire RJ-45 female and (1) 4-pin 3.5 mm detachable terminal block comprising (1) QuickMedia input port with Cresnet; Connects to Cresnet and QM output port of another QuickMedia device via CresCAT-QM cable. <sup>4</sup>
3	24 G 	(1, 2 or 4) <sup>5</sup> 2-pin 5 mm detachable terminal block(s) providing (1) power connector per every (4) output NET ports; Receives 24 Volts DC from an external Cresnet power supply; Maximum load: 75 Watts
4	QM OUT <sup>2, 3</sup>  	(4, 8 or 16) <sup>6</sup> 8-wire RJ-45 female and (4, 8 or 16) <sup>5</sup> 4-pin 3.5 mm detachable terminal blocks comprising (4, 8 or 16) <sup>5</sup> QuickMedia output ports with Cresnet; Connect to Cresnet and QM input ports of other QuickMedia devices via CresCAT-QM cable. <sup>4</sup>
5	G 	(1) 6-32 screw, chassis ground lug.
6	NET 	(1) 4-pin 5 mm detachable terminal block; Cresnet slave port; connects to Cresnet control network; Power input for QM-DA and input NET port. Pin 1 (24) Power (24 Volts DC) Pin 2 (Y) Data Pin 3 (Z) Data Pin 4 (G) Ground

1. Interface connectors for **24 G** (2-pin) and **NET** (4-pin) ports are provided with the unit.
2. 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 table on the following page 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 <sub>r</sub> )
2	ORANGE	+ RGB RED	+ CHROMINANCE (+ P <sub>r</sub> )
3	WHITE/GREEN	- RGB GREEN	- LUMINANCE (- Y)
4	BLUE	+ DIGITAL AUDIO	+ DIGITAL AUDIO
5	WHITE/BLUE	- DIGITAL AUDIO	- DIGITAL AUDIO
6	GREEN	+ RGB GREEN	+ LUMINANCE (+ Y)
7	WHITE/BROWN	- RGB BLUE	- COMPOSITE (- P <sub>b</sub> )
8	BROWN	+ RGB BLUE	+ COMPOSITE (+ P <sub>b</sub> )

3. To determine which is pin 1 on the cable, hold the cable so that the end of the eight pin modular jack is facing away from you, with the clip down and copper side up. Pin 1 is on the far left.
4. For QM wiring use CresCAT-QM, CresCAT-IM or quality CAT5e/CAT6 cable with a maximum delay skew of 15 ns per 100 m. 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 into a given QM signal path. Exceptions apply; refer to each respective product manual for details.
5. (1) on QM-DA-4, (2) on QM-DA-8, (4) on QM-DA-16.
6. (4) on QM-DA-4, (8) on QM-DA-8, (16) on QM-DA-16.

## Industry Compliance

As of the date of manufacture, the QM-DA 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.

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## 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.

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

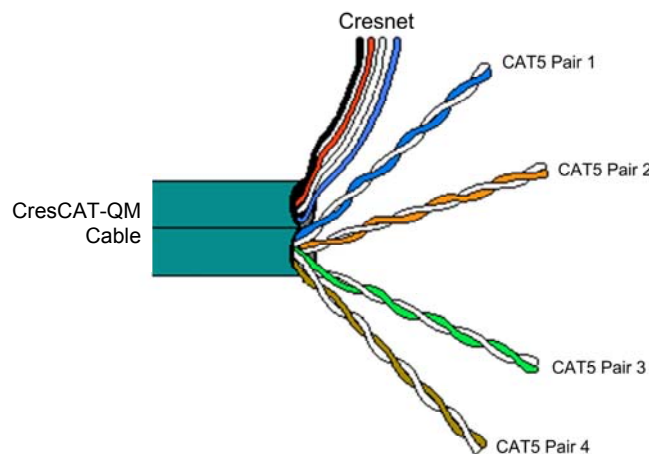
- For larger networks, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

For more details, refer to “Check Network Wiring” on page 13.

### 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](http://www.crestron.com/manuals)).

#### *CresCAT-QM Cable*



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**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.

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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.

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**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.

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

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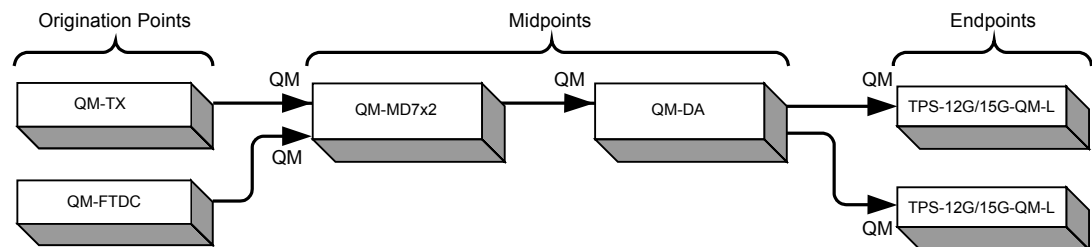
When connecting multiple QM devices, the route between a QM origination point (transmitter) and a QM endpoint (receiver) cannot have more than two midpoints (e.g. QM-MD7x2 or other QM switchers). Refer to the following diagram when configuring a QM network.

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

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### QM Network Topology



## Installation

### Ventilation

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

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

### Rack Mounting

The QM-DA can be mounted in a rack or stacked with other equipment. Two “ears” are provided with the QM-DA 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 #2 Phillips screwdriver.

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

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

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

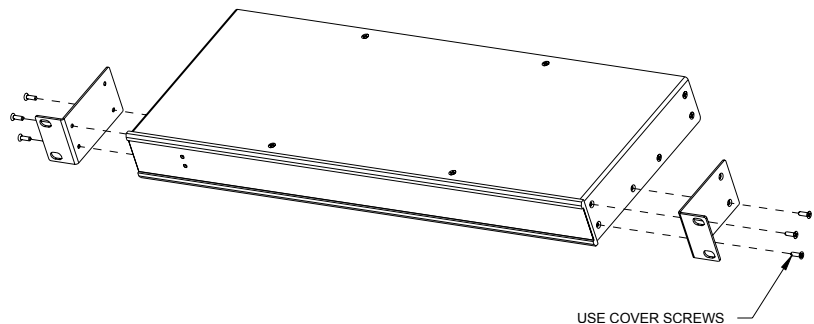
**NOTE:** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

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To install the ears:

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

*Ear Attachment for Rack Mounting (this image shows a 1RU device)*



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

### Stacking

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

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**NOTE:** No more than two QM-DA units should be stacked.

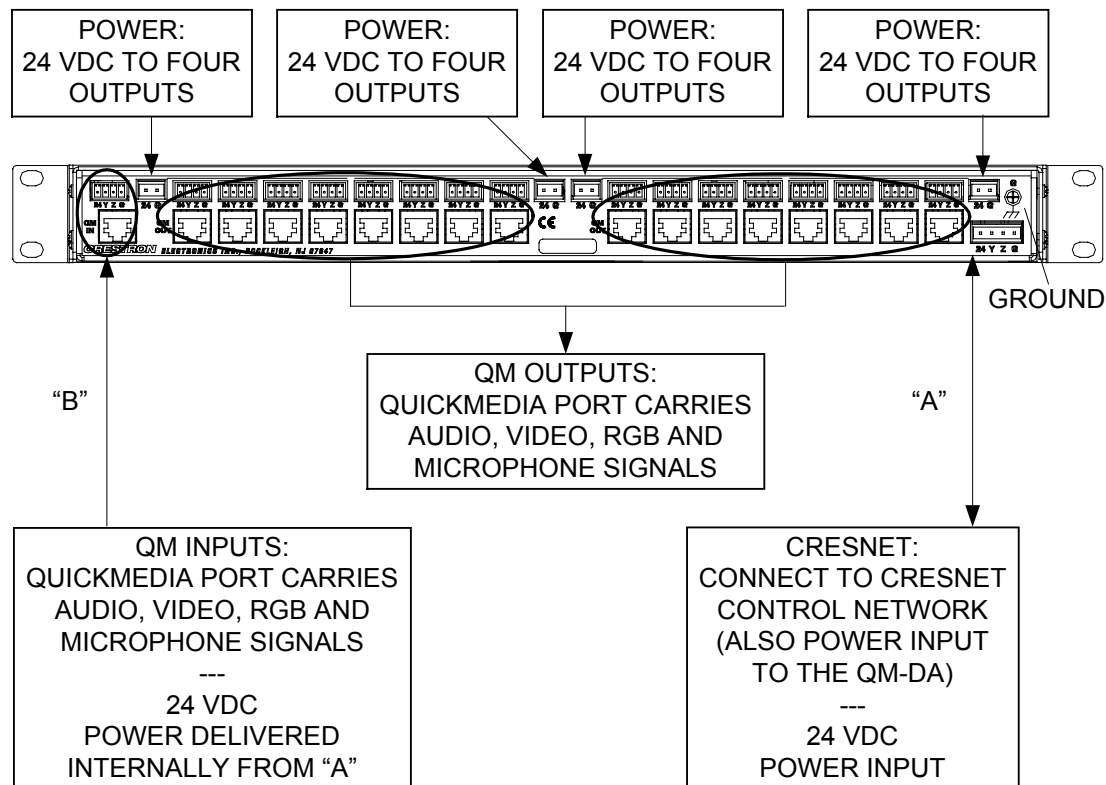
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## Hardware Hookup

Make the necessary connections as called out in the illustration that follows this paragraph. Refer to “Network Wiring” on page 7 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

When making connections to the QM-DA, use Crestron power supplies for Crestron equipment.

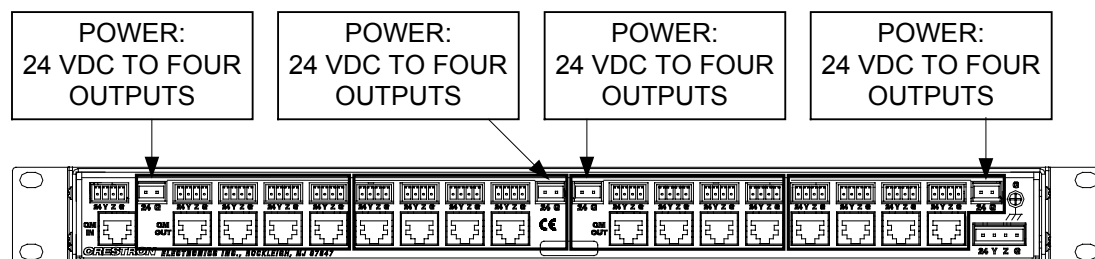
### Hardware Connections for the QM-DA (QM-DA-16 Shown)



**NOTE:** Power available at “B” will be based on the input wattage of the power supply feeding “A” minus 10, 16 or 24 Watts (with the QM-DA-4, QM-DA-8 or QM-DA-16 respectively).

Each 24 Volt DC input port powers its own group of QM output ports, as shown in the following illustration.

### 24 Volt DC Power Input to QM Output Groups (QM-DA-16 Shown)



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

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**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.

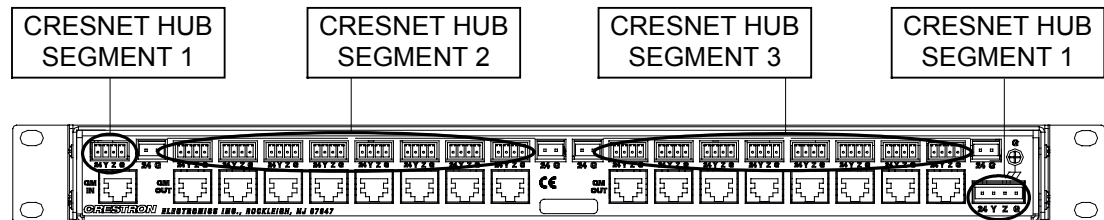
**NOTE:** In the configuration shown, the C2N-SPWS300 can operate in the “PWR ON” position or the “PWR OFF SLAVE” position. For more information, refer to the latest revision of the C2N-SPWS300 System Power Supply Operations Guide (Doc. 8190).

**NOTE:** Power to the QM ports on the QM-DA can be applied using other configurations. The total power usage of each port group must not exceed the port group’s available input power.

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In the QM-DA-16, each of the three Cresnet hub segments operates independent of the others to allow the QM-DA-16 to continue functioning in the event of one hub segment experiencing an electrical short or a device error. (Refer to the following illustration.)

**QM-DA-16 Three Cresnet Hub Segments**



## 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-DA Troubleshooting*

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Device does not function.	Device is not receiving power from a Crestron power source.	Use the provided Crestron power source. Verify connections.
	Device is not receiving sufficient power.	Use the Crestron Power Calculator to help calculate how much power is needed for the system.
	Power is not being supplied via the large 5 mm Cresnet port.	Ensure power is supplied via the large 5 mm Cresnet port.
Power LED does not illuminate.	QM-DA is not receiving power.	Verify cable plugged into the large 5 mm Cresnet port is secure.
Connected QM devices are not receiving power.	Power is not supplied to branch.	Apply sufficient power to branch.
	Faulty Cresnet wiring or Faulty Cresnet device on hub segment.	For QM-DA-16, move Cresnet connections to a port on another hub segment.
		Remove each Cresnet connection on the segment until power is restored to the remaining devices on the segment.
Poor picture or sound quality.	Cables improperly connected.	Verify all QM cables are secure.
	Incorrect skew settings in associated devices.	Use QM Tools software to set correct skew settings for each QM-RMCRX-BA in the system.
Loss of functionality due to electrostatic discharge.	Improper grounding.	Check that all ground connections have been made properly.



## Check Network Wiring

### Use the Right Wire

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

### Calculate Power

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

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

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

### Cable Length Equation

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

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

Make sure the cable length value is less than the value calculated on the right side of the equation. For example, a Cresnet run using 18 AWG Crestron Certified Wire and drawing 20 watts should not have a length of run more than 333 feet. 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 ([www.crestron.com/manuals](http://www.crestron.com/manuals)). This link will provide a list of product manuals arranged in alphabetical order by model number.

### *List of Related Reference Documents*

DOCUMENT TITLE
C2N-SPWS300 System Power Supply Operations 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 the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876]. For assistance in your local time zone, refer to the Crestron website ([www.crestron.com/offices](http://www.crestron.com/offices)) for a listing of Crestron worldwide offices.

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

## Future Updates

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

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

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## Return and Warranty Policies

### Merchandise Returns / Repair Service

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

### CRESTRON Limited Warranty

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

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

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

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

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

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

#### Trademark Information

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