Crestron **QM-RMC**
Room Media Controller
Operations Guide

CRESTRON

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Contents

Room Media Controller: QM-RMC

Introduction

Features and Functions

The QM-RMC is a low cost IP management tool to help facilities easily control and monitor A/V devices. This powerful, compact control system enables serial, IR, and Ethernet devices such as projectors, switchers, TVs, and other A/V equipment to be controlled over IP networks. QM-RMC is an ideal solution for colleges, universities, and other multi-room installations. It is a full-scale control system with complete support of all Crestron e-Control® 2 and power applications.

Functional Summary

- Powerful 2-Series processor, based on Motorola's ColdFire® technology, with non-volatile memory.

- Native e-mail client

- Supports DHCP, DNS and SSL (refer to the notes following this summary).

- Supports XPanel IE/EXE/PDA control (Crestron e-Control®2).

- Programmable logic via SIMPL Windows, including SIMPL+®

- Flash memory and DRAM.

- Two bi-directional COM ports with built-in serial drivers for controlling devices over RS-232.

- One IR port - compatible with Crestron ST-SPL IR-Splitter, for IR-Control of up to five different devices, programmable via the hundreds of IR device drivers available in the Crestron databases.

- Four digital input ports for direct connection of power sensors, pressure sensors, door sensors, room occupancy sensor, etc.

- A 10/100 Ethernet LAN port with built-in Web server and support for DHCP; and support for all Crestron e-Control power applications and Crestron RoomView™ A/V facility monitoring and management software.

- When used with Crestron RoomView™, provides remote power control and management of A/V devices, including: monitoring lamp life of projectors, device status to ensure proper equipment operations, room occupancy, equipment use log, and device and room security.

NOTE: DHCP (Dynamic Host Configuration Protocol) is a network protocol that enables a DHCP server to automatically assign an IP address to an individual computer's TCP/IP stack software. DHCP assigns a number dynamically from a defined range of numbers (i.e., a scope) configured for a given network.

NOTE: DNS stands for Domain Name Service (or System). Its primary use is to translate, or resolve, the IP number for a computer (e.g., 129.79.5.208) from an alphanumeric name.

NOTE: SSL, or Secure Socket Layer, is the most commonly used protocol for Web security. In addition to providing security for HTTP (Web hypertext) transactions, SSL works with other TCP/IP standards such as IMAP mail and LDAP directory access. For a security standard such as SSL to work, the browser and the Web server must both be configured to use it.

The QM-RMC is a stand-alone processor with all of the capabilities of a 2-Series processor, *without* the Cresnet® port. The QM-RMC is programmed with SIMPL Windows and has a built-in web server, native email client, supports DHCP and DNS, as well as SSL (Secure Socket Layer - Industry standard network security native to all Crestron 2-Series control systems). Versatile enough to operate as a standalone control system, the QM-RMC is also ideally suited for integration with an MP2E, MC2E or the CP2E low-cost room control solutions.

The QM-RMC provides a 10/100 Ethernet port with support for DHCP and a built-in Web server, so users can control serial devices from any computer on the LAN, WAN, or even the Internet. Create customized Web pages using Crestron VisionTools® Pro-e software, eliminating the need for third-party Web page design software.

In fact, the new Crestron e-Control® 2 technology gives Web pages the same look and feel as Crestron's TPS ISYS® touchpanel pages, with almost zero latency. This means you can add multi-mode buttons, gauges, sliders, subpages and high-resolution graphics to your Web page projects, and the runtime performance will be the same as with TPS touchpanels. Crestron e-Control 2 also generates standalone executables allowing users to launch from their Windows® desktop, or Windows XP/Windows, CE StrongARM, XScale, Web Tablet/Handheld PC, or Pocket PC 2002 PDA.

Some applications that QM-RMC can be used to monitor include: remote power control/management of A/V devices, lamp life of projectors, device status to ensure proper equipment operations, room occupancy, and room and/or device security. It can also be used to remotely lock out projector/display controls from unwanted users or to log equipment usage. Combined with the power of Crestron RoomView™ software, hundreds of rooms with QM-RMCs can be centrally monitored as to the status of all the above-mentioned functions by multiple AV-personnel using PC/laptops connected to their LAN/WAN/Internet.

Specifications

Specifications for the QM-RMC are given in the following table.

QM-RMC Specifications

SPECIFICATION	DETAILS
CPU	32-Bit Motorola 5272 ColdFire® Processor
Processor Speed	63 MIPS (Dhrystone 2.1 Benchmark)
Memory	36MB (4MB flash, 32MB SDRAM, 256KB NVRAM)[1]
Ports/Connectors[2]	
LAN	One – RJ-45 10/100 BaseT Ethernet port
INFRARED – Serial Input	One – 2-Position Mini connector IR port (Supports up to five IR devices)
INPUT	One – 5-Position Mini connector (four inputs and GND)
COM (A & B)	Two – DB9 bidirectional serial ports (RS-232) baud rate up to 115,200 bps (Port B is used for initial communication and setup).
12VDC	One – Male receptacle for external power pack (included)
Reset Buttons	
HW-R	Initiates system hardware reset
SW-R	System restart with or without program
Power Requirements	6 W (0.5 Amp @ 12 VDC) power supply included
Initial Firmware Release	3.052
Environmental Temperature	41° to 113°F (5° to 45°C)
Environmental Humidity	10% to 90% RH (non-condensing)
Dimensions & Weight	Height: 1.43 in (3.63 cm) Width: 4.65 in (11.81 cm) Depth: 5.24 in (13.31 cm) Weight: 1.34 lb (0.61 kg)

1. For more information on system memory usage, refer to "Memory" on page 7.
2. For more information on controls, ports, and indicators, refer to "Physical Description" on page 4.

Physical Description

The QM-RMC is housed in a black enclosure with labels on the front and rear panels. On the front of the unit there are six LEDs for indicating the unit's current status, two LEDs on the LAN connector, and two reset buttons. All connections, except for the Ethernet and power connections, are made on the back of the unit. There are four rubber feet on the base of the unit for stability and to prevent slippage. Refer to the physical views shown below.

Front and Rear Views

Physical Dimensions

1.43 in
(3.63 cm)

5.24 in
(13.31 cm)

4.65 in
(11.81 cm)
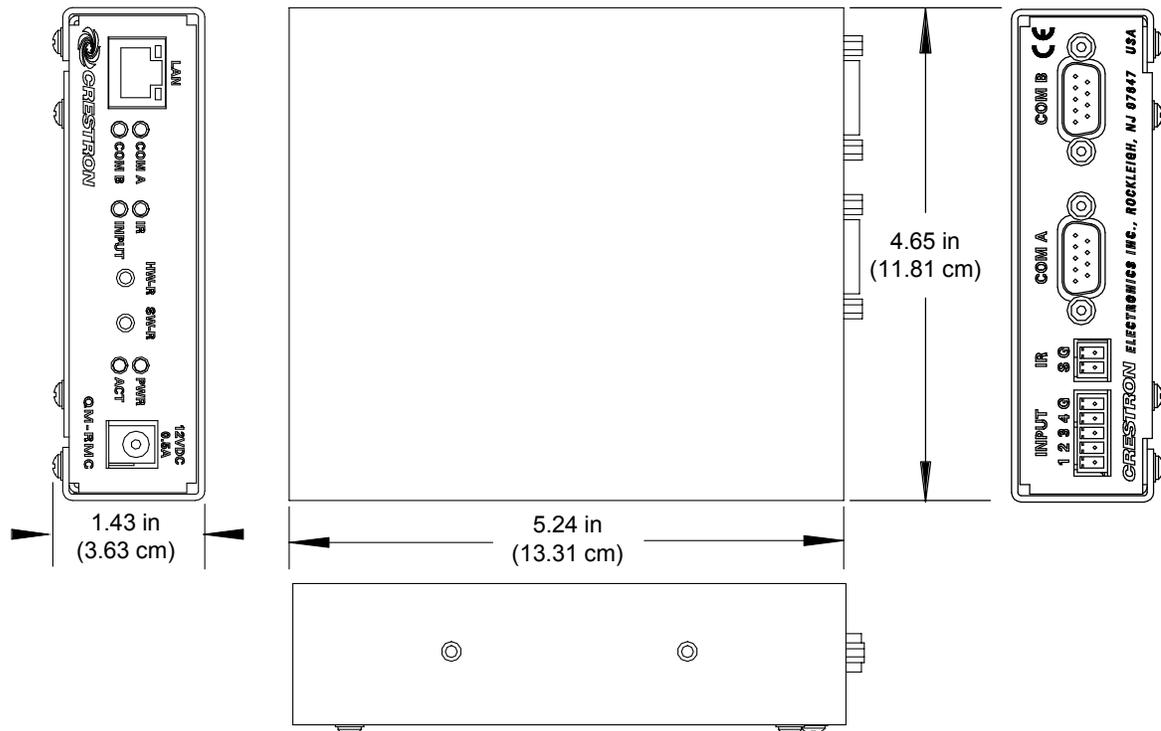
Controls and Indicators

The QM-RMC front panel indicators and controls are described as follows.
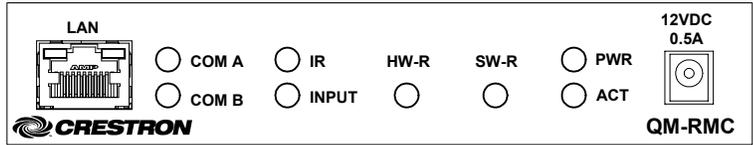
COM A

LED indicates COM A port activity.

COM B

LED indicates COM B port activity. Constant blinking indicates that the port is used for remote console connection.

IR

LED indicates IR port activity.

INPUT

LED indicates input activity.

HW-R

Pressing this button initiates system hardware reset. (Same effect as disconnecting and reconnecting power.)

SW-R

Pressing this button in combination with the **HW-R** button performs a system restart without loading the program (refer to "Troubleshooting Communications" on page 13). Press HW-R momentarily while pressing and holding SW-R to reboot.

Pressing SW-R alone while the system is running restarts the program, and puts the unit at a default IP address. COM B port becomes a remote console connection.

PWR (Power)

This green LED illuminates when the unit is connected to and receives 12 VDC power from an external power pack.

ACT (LAN)

This LED illuminates when the QM-RMC communicates with any device on the network.

Front Panel Ports

The QM-RMC front panel ports are illustrated and described as follows.

LAN

Yellow · Green

8 · 1
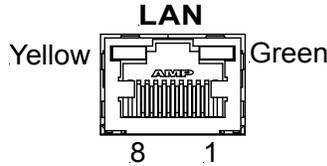
LAN

An 8-position RJ-45 port (labeled **LAN**) is used for connection to the Ethernet, providing local area network or Web access (cable is not supplied). The port also contains two light-emitting diodes (LEDs). The green LED on the right side of the port is a link status LED and illuminates when the card is connected to a working network. The yellow LED on the left side flashes to indicate Ethernet activity. Refer to the following table for the Ethernet connector signals and use an appropriate cable.

LAN 8-Position RJ-45 Connector Specifications

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

PIN 8
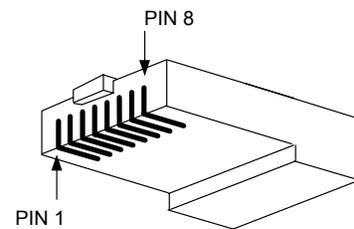
PIN 1

NOTE: To determine the location of pin 1, hold the cable so that the end of the eight pin modular jack is facing away from you, with the clip up and copper side down. Pin 1 is on the far right.

Default Ethernet Ports
80 = Web
41794 = Crestron Com
41795 = Viewport/Debug

12VDC, 0.5A (Power Supply)

This male connector can be used to supply 12 VDC power to the QM-RMC from an external power pack (included).

**12VDC
0.5A**
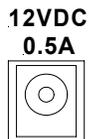
CAUTION: Use only Crestron power supplies for Crestron equipment. Failure to do so could cause equipment damage or void the Crestron warranty.

Rear Panel Ports

The QM-RMC rear panel ports are illustrated and described as follows.
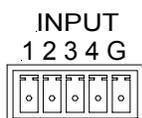
INPUT
1 2 3 4 G

INPUT

This connector provides four software programmable digital inputs. Inputs are Schmidt trigger type (nominal 2.5 V threshold) with 24 V input tolerance. For detailed information, refer to "Slot 2: C21-DI04" on page 21.

Digital inputs are rated 0 – 24 VDC, 20K ohms input impedance.

IR
S G
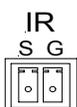
IR

A 2-position mini-connector is a mini-implementation of a single PRO2 IR port. The output is labeled S (signal) and G (ground). Infrared output is rated up to 1.2 MHz, at data rates up to 9600 baud. Serial protocols include one-way RS-232. For detailed information, refer to "Slot 1: C2I-IR1" on page 20.

COM A   COM B
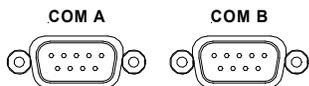
COM (A & B)

These two DB9 (male) software programmable, bi-directional serial ports are available for RS-232 communication, with hardware and software handshaking and modem control. Speeds are rated up to 115,200 bps. COM B is used as the console port.

Standard COM DB9 Pinout

PIN	DIRECTION	DESCRIPTION
1	TO QM-RMC	(DCD) Data Carrier Detect
2	To QM-RMC	(RXD) Receive Data
3	From QM-RMC	(TXD) Transmit Data
4	From QM-RMC	(DTR) Data Terminal Ready
5	Common	(SG) Signal Ground
7	From QM-RMC	(RTS) Request To Send
8	To QM-RMC	(CTS) Clear To Send
9	To QM-RMC	(RI) Ring Indicator

Memory

The QM-RMC has 36MB of built-in memory (non-volatile and volatile). The total of 36MB is specified as follows: 4MB flash (non-volatile), 32MB SDRAM (volatile), and 256KB NVRAM (battery backed up). Flash memory contains the file system inside the 2-Series control engine. Non-volatile memory contains information that is retained after the loss of electrical power. Volatile memory is lost after a power failure. Refer to the following lists for a breakdown of memory usage for program-related information stored in the unit.

Flash

1. SIMPL Program (.smw)

2. SIMPL+ Modules (.usp/.ush)

3. Operating System (.cuz file)

The 4MB flash memory consists of approximately 1.5MB used for firmware, and approximately 2.5MB available for SIMPL, SIMPL+, and Web pages. The files that reside in flash conform to a flat directory structure. The following table presents the structure of the overall file system.

Flash File Structure

TOP LEVEL	SECONDARY LEVEL	DESCRIPTION
\		Root of the file system
	DISPLAY	Legacy directory used in Crestron Isys® panels to hold display lists
	SYS	Contains various system configuration files
	SETUP	Legacy directory used in Crestron Isys® panels to hold display lists
	HTML	Web pages
	SIMPL	Control system program files
	SPLUS	SIMPL+ module files
	USER	Used for user-defined files
	MAILBOX	Directory contains the user mailbox file
	CFØ	The mounting point for the compact flash files.
	\CFØ\DISPLAY	Directory used to hold display files
	\nvram	The mounting point for NVRAM disk files

Although the file system is case insensitive, the case is preserved to maintain file checksums.

Non-volatile

1. SIMPL+ Variables (Default if no options are specified, or using "nonvolatile" qualifier or #DEFAULT_NONVOLATILE)

2. Signals explicitly written to NVRAM* (by symbols such as Analog RAM, Analog RAM from database, Serial RAM, Serial RAM from database, Analog Non-volatile Ramp, Digital RAM, etc.)

   *Commonly used for presets (volume/lighting/dial #s).

3. Portions of the NVRAM may be set aside for implementing an "NVRAM Disk". This can be used to provide file system access from SIMPL+.

> **NOTE:** If you extract NVRAM values to a file (**Viewport**, **File transfer** | **Save NVRAM to File**), to simplify restoring them in the event of file corruption or to distribute to identical control systems, remember that NVRAM values are position sensitive in the program. When saving the NVRAM is crucial to your application, it is recommended to place all symbols and/or modules that use NVRAM at the beginning of your program. When NVRAM (.nvr file) is re-installed, all the values should line up with the program. If the program is modified, and new logic that uses NVRAM is placed before any older symbols using NVRAM, the previously stored values will not line up and your presets will have to be re-entered.

> **NOTE:** The new NVRAMDISK command (available in CUZ files later than 3.030), will fail unless it can determine the amount of NVRAM used by the program, to ensure that the NVRAM is not overwritten. Programs compiled in SIMPL Windows version 2.04.11 or later can provide this information. In the event of a failure of the NVRAMDISK command, ensure that your program has been recompiled in an appropriate version of SIMPL Windows and reloaded.

Volatile (DRAM)

1. Digital, analog and serial signal values

2. SIMPL+ Variables (Default if no options are specified, or if "volatile" qualifier is used, or #DEFAULT_VOLATILE is used)

DRAM is used by the operating system for dynamic storage of variables, signals and other constructs used at runtime. The actual amount of DRAM used at any given time depends on the particular program that is running, i.e., usage is variable, or dynamic, during normal operation.

Industry Compliance

As of the date of manufacture, the QM-RMC has been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling (N11785).

> **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.

Setup

Hardware Hookup

Refer to the following hookup diagram and, aside from attaching power last, complete the connections in any order.

> **NOTE:** To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the specifications table. 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. Contact with thermal insulating materials should be avoided on all sides of the unit.

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.

Front Connections

LAN Connection   Power Connection

Rear Connections
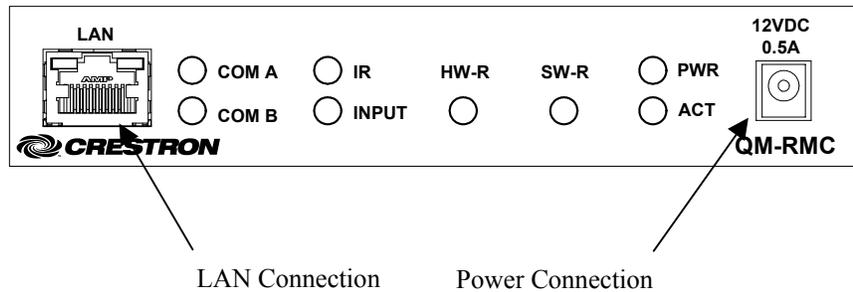
Four Analog/Digital   IR Output   Serial Port
Inputs   Connection   Connections
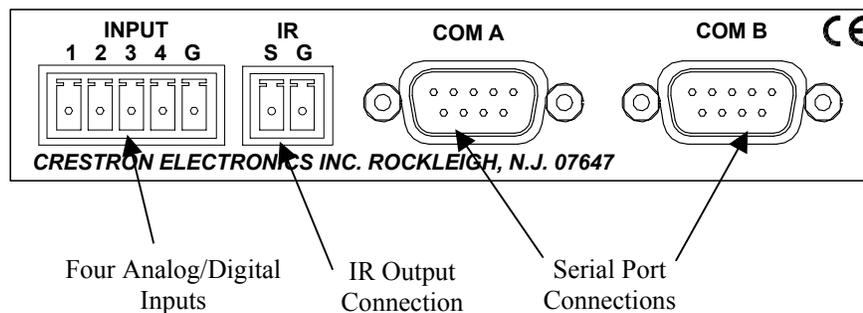
NOTE: COM B is shared for device control and serial console connection.

Establishing Communication with the QM-RMC

Before uploading a program to the QM-RMC or performing diagnostic functions, you must connect the QM-RMC system to the PC. The connection can be either serial or TCP/IP.

NOTE: For laptops and other PCs without a built-in RS-232 port, Crestron recommends the use of PCMCIA cards, rather than USB-to-serial adapters. If a USB-to-serial adapter must be used, Crestron has tested the following devices with good results:

> Belkin (large model) F5U103
> I/O Gear GUC232A
> Keyspan USA-19QW

Other models, even from the same manufacturer, may not yield the same results.

Serial Connection

Connect the COM B port on the QM-RMC control system to one of the COM ports (usually COM 1) on the PC. Use a null-modem RS-232 cable with DB9 female connectors on both ends. Most commercially available cables are

acceptable; they should have at least five pins for transmit, receive, ground, and hardware handshaking (pins 2, 3, 5, 7 and 8).

Serial console connection may be established only if SW-R button is pressed and held during power up, or if pressed and held at the same time HW-R is momentarily pressed.

NOTE: The Viewport utility performs multiple system tasks, primarily via an RS-232 or TCP/IP connection between the control system and a PC. It is used to observe system processes, upload new operating systems and firmware, change system and network parameters, and communicate with network device consoles and touchpanels, among many other tasks. Viewport can also function as a terminal emulator for generic file transfer. All of these functions are accessed through the commands and options in the Viewport menus. Viewport is available through the SIMPL Windows and Crestron VisionTools® (VT Pro-e) software.

Open the Crestron Viewport and click **Setup | Communication Settings** to display the "Port Settings" window. Then click **RS-232** as the connection type.

NOTE: Changes in communication settings are not saved after the QM-RMC is rebooted. It reverts to default settings.

The PC communication settings specified here should match the protocol that the QM-RMC expects. The settings are as follows:

- Port = COM 1 through COM 8. Select the correct COM port on the PC.

- Baud rate = 115200 (You can set the PC and the control system to a different baud rate, by using the **Functions | Set Baud Rate** command.

- Parity = None.

- Number of data bits = 8.

- Number of stop bits = 1.

- Hardware handshaking (RTS/CTS) enabled.

- Software handshaking (XON/XOFF) not enabled.

"Port Settings" Window:
Default PC Settings for RS-232 Communication with the QM-RMC

```
Port Settings                                    [X]
┌─ Connection Type ─────────────────────────────┐
│  ⊙ RS-232   ○ TCP/IP (Crestron Terminal Protocol) │
└───────────────────────────────────────────────┘
┌─ Port ────────────────────────────────────────┐
│  ⊙ Com 1    ○ Com 2    ○ Com 3    ○ Com 4     │
│  ○ Com 5    ○ Com 6    ○ Com 7    ○ Com 8     │
└───────────────────────────────────────────────┘
┌─ Baud Rate ───────────────────────────────────┐
│  ⊙ 115200 ○ 57600 ○ 38400 ○ 19200 ○ 9600     │
│  ○ 4800   ○ 2400  ○ 1200  ○ 600   ○ 300      │
└───────────────────────────────────────────────┘
┌─ Parity ──┐ ┌─ Data Bits ─┐ ┌─ Stop Bits ─┐
│  ⊙ None   │ │  ○ Seven    │ │  ⊙ One       │
│  ○ Even   │ │  ⊙ Eight    │ │  ○ Two       │
│  ○ Odd    │ │ □ XON/XOFF  ☑ RTS/CTS        │
└───────────┘ └─────────────────────────────┘

Line Pacing for ASCII Uploads (in milliseconds): [0]
Mode for Network Transfers:  ○ ASCII  ⊙ XModem
        [   OK   ]        [  Cancel  ]
```

To verify communication, click **Diagnostics | Establish Communications (Find Rack)**. This should display a window that gives the COM port and baud rate.

TCP/IP Connection

Before you can communicate with the QM-RMC over TCP/IP, you must use the RS-232 connection just described to configure the unit's TCP/IP settings. Obtain the static address from the network administrator.

1. Open Viewport and click **Functions | Set Control System IP Information**.

2. Enter the IP address, IP mask and default router in the text fields. All of these terms are explained in detail in the Crestron e-Control Reference Guide, Doc. 6052. The latest version is available as a PDF on the Crestron website (www.crestron.com).

3. Click OK to set the new IP information.

Once you have assigned the IP settings, you can continue to communicate with the QM-RMC using the RS-232 connection, or you can establish a TCP/IP connection.

For TCP/IP, use CAT5 straight through cables with 8-pin RJ-45 connectors to connect the LAN port on the QM-RMC and the LAN port on the PC to the Ethernet hub. Alternatively, you can use a CAT5 crossover cable to connect the two LAN ports directly, without using a hub. The following figure illustrates pinouts for straight through and crossover RJ-45 cables. Pins 4, 5, 7, and 8 are not used.

RJ-45 Pinouts

Crossover Cable			Straight Through Cable	
RJ-45 PIN	RJ-45 PIN		RJ-45 PIN	RJ-45 PIN
1 Rx+	3 Tx+		1 Tx+	1 Rc+
2 Rc-	6 Tx-		2 Tx-	2 Rc-
3 Tx+	1 Rc+		3 Rc+	3 Tx+
6 Tx-	2 Rc-		6 Rc-	6 Tx-

PIN 1

RJ-45M Male
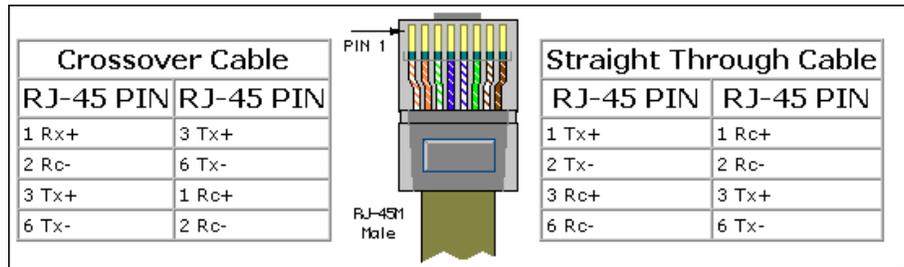
Once the cable connections are made, open the Crestron Viewport and click **Setup | Communication Settings** on the menu to display the "Port Settings" window. Then click **TCP/IP** as the connection type. Enter the IP address of the QM-RMC.

"Port Settings" Window
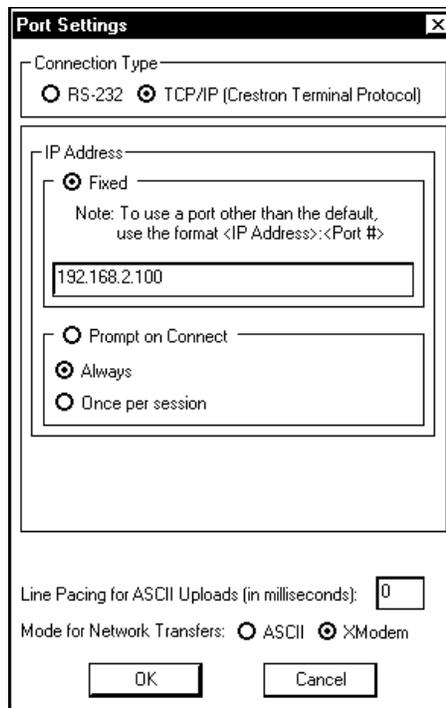
Port Settings

Connection Type
○ RS-232 ⊙ TCP/IP (Crestron Terminal Protocol)

IP Address
⊙ Fixed
   Note: To use a port other than the default,
   use the format <IP Address>:<Port #>

   192.168.2.100

○ Prompt on Connect
⊙ Always
○ Once per session

Line Pacing for ASCII Uploads (in milliseconds): 0

Mode for Network Transfers: ○ ASCII ⊙ XModem

OK   Cancel

To verify communication, click **Diagnostics | Establish Communications (Find Rack).** This should display a window that gives the IP address and port number.

Troubleshooting Communications

Use the following checklist if communication cannot be established with the QM-RMC.

1. Verify that you are using the correct cables. As described previously, an RS-232 connection requires a null modem. TCP/IP connection requires a CAT5 cable with 8-pin RJ-45 connectors.

2. With a serial connection, verify that the correct COM port on the PC has been selected. Some computers have more than one COM port; some may be internal (e.g., for a modem). Consult the

manufacturer's documentation for further information about the COM ports on your PC.

3. Ensure that you have a serial connection to Port B, and reset the control system as follows:

    a. Open Viewport and click **Setup | Communications Settings** to display the "Port Settings" window. Choose **RS-232** as the connection type.

    b. Set the baud rate of the PC to **115200**.

    c. Set the baud rate of the QM-RMC control system to 115200, as follows:

        -   Press and release the **HW-R** button on the unit's front panel.

        -   Press and hold the **SW-R** button for approximately three to five seconds. The Viewport console should display the following message:

    Viewport Message

    QMRMC>
    Control Console
    Changing to default Comm Specs. 115200 N81 RTS/CTS
    Switch to new settings….
    Bypassing Program Load!!!

        -   Release the **SW-R** button.

    d. If communication still cannot be established:

        -   Remove power from the control system.

        -   Press and hold the **SW-R** button on the front panel of the QM-RMC.

        -   Reapply power to the control system.

        -   The Viewport console should display the message shown above.

        -   Release the **SW-R** button.

    e. Select **Set Baud Rate** on the Viewport **Functions** menu (or press **F8**) and choose any baud rate from the drop-down list. This will attempt to establish a connection at the indicated baud rate. If the connection is successful, both the PC and the control system will be set to the new baud rate. The QM-RMC will return to its original communication settings when the program reinitializes.

    f. Reinitialize the unit by recycling the power or pressing the **HW-R** button while pressing and holding the **SW-R** button. If the connection is established, the Viewport console should display some text and the **QMRMC>** prompt.

    g. If communication still cannot be established, contact Crestron customer service.

Compiling and Uploading a Program to the Control System

After you have completed your SIMPL Windows program for the QM-RMC, you must compile and upload the program to the control system.

To compile the program, simply click the **Convert/Compile** button ▢ on the SIMPL Windows toolbar, or select **Project | Convert/Compile** (you can also press **F12**). A status bar indicates the progress of the compile operation. After the operation is complete, a window displays information about the program such as the number and type of signals, and memory usage.

The compiled program is stored as an SPZ file in the same directory as the source file. There are a number of ways to upload an SPZ file to the control system.

1. Immediately after compiling the program you have the option to transfer the file to the control system.

2. Alternatively, click the **Transfer** button ▢ on the SIMPL Windows toolbar, or open Viewport and click **File Transfer | Send Program**.

3. Click **Browse**, locate the SPZ file and click **Open**. This displays the program's header information and enables one or both of the *What to Send* check boxes. If the program does not contain any SIMPL+ modules, only the *SIMPL Program* check box is enabled. If it does contain SIMPL+ modules, then the *SIMPL+ program(s)* check box is also enabled. Select one or both check boxes and then click **Send Program** to begin the transfer.

NOTE: Unlike X-Generation processors, the 2-Series processor does not require a permanent memory image. Also, the 2-Series adds the ability to automatically retrieve the current program from the control system. Simply verify that the *Retrieve Current Program Before Overwriting* check box is selected.

You can also click **Report Program Information** or **F7** from **Diagnostics** in **Viewport** to display the header information of the currently loaded program. Program information is also displayed in the Viewport console whenever power is removed and re-applied to the QM-RMC.

"Send Program" Window

```
Send Program                                              [X]

Current Program: D:\CresnetNetworkDevices\MultiDevices

System Name: Test System

Compiled On: 4/22/2003 11:53 AM    Compiler Revision: 2.00.24

New Program:
E:CresnetNetworkDevices\MultiDevices.Test\QM.spz   [v]  [Browse]

┌─ What to Send: ──────────────────────────────────────┐
│  ☑ SIMPL Program    ☐ SIMPL+ Program(s)              │
└───────────────────────────────────────────────────────┘

┌─ Transfer To: ───────────────────────────────────────┐
│  ⦿ Internal Flash    ○ Compact Flash                 │
└───────────────────────────────────────────────────────┘

[ Send Program ]   [ Make Permanent ]   [ Check Program ]

          [ Close ]          [ Clear History ]
```

Uploading Web pages to the QM-RMC

The QM-RMC provides a built-in Web server for e-Control applications. The QM-RMC allots 2.5 MB of memory for "user files" such as Web pages, mailbox, and the compiled SPZ program file.

VisionTools Pro-e

In most cases, you create a VisionTools Pro-e browser project to generate the Web pages for uploading to the QM-RMC.

For e-Control projects:

When an e-Control browser project is created, VT Pro-e automatically creates a folder with the name of the project and a .web extension. This web project folder itself contains a Java subfolder, in addition to all the HTML files that are sent to the QM-RMC. In VT Pro-e, the target type is BROWSER.

For e-Control 2 projects:

When an e-Control 2 project is created, VT Pro-e automatically creates a folder with the name of the project and a .xweb extension. The web project folder contains all the necessary e-Control 2 files. In VT Pro-e, the target type is XPANEL.

In designing and creating a browser project, keep in mind that you must assign an IP ID to all the project pages and specify the IP address of the QM-RMC. (For further information on this procedure, refer to the VT Pro-e online help file.)

Viewport

To transfer the Web pages to the QM-RMC, use the **File Transfer | Send Web Pages** command.

The options are to send an entire project, only files that have changed, or a single HTML file. With the "Transfer Entire Project" option, click **OK** when

reminded to select a default page, and then browse to the appropriate VT Pro-e .web project folder. Select the file that was designated as the "first" page of the project. This will be the default Web page that is displayed whenever the IP address of the control system is accessed by a Web browser. Click **Open**, and then **OK** to begin the transfer.

If any files in the VT Pro-e project change, the changed files can be transferred to the QM-RMC without resending the entire project by choosing the "Only Transfer Files that have Changed" option. Here again, browse to the .web project folder and select the default page. Click **Open**, and then **OK** to transfer the changed files.

Finally, selecting "Transfer Single File" can send a single HTML file. Browse to the file and click **Open**. Then specify the file's relative path (from the root directory) and click **OK**.

NOTE: For e-Control2, you can choose the default "Main.HTML" name or you can change the name.

SIMPL Windows

For each IP ID in the VT Pro-e browser project, there must be one corresponding e-Control PC Interface symbol defined in the SIMPL Windows program. The PC Interface symbol is one of the Ethernet Modules that can be dropped into the C2ENET-1 card slot.

As with all Ethernet devices, the PC Interface must receive an entry in the IP Table of the QM-RMC. Here the IP ID must match the IP ID that was assigned in VT Pro-e, while the IP address must be set to a loopback: 127.0.0.1, when hosting internal.

Updating the Operating System

As with all 2-Series control systems, operating system files for the QM-RMC have a .cuz extension. You can obtain .cuz updates (when available) from the Downloads | Software Updates section of the Crestron website. To download an update, click the .cuz file, choose the **Save to Disk** option, and then specify the directory where the update is stored.

NOTE: In some cases Microsoft's Internet Explorer may append a .zip extension to a downloaded .cuz file. For example, a file called "C2-1008.cuz" may appear as "C2-1008.cuz.zip." If this happens, rename the file, removing the .zip extension.

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).

To upload the new .cuz to the control system:

1. Open Viewport and select **File** | **Update Control System**.

2. Browse to the .cuz file and click **Open** to start the transfer.

3. After the transfer is complete, the QM-RMC automatically reboots. To confirm the transfer, click **Diagnostics | Check Operating System Version**. The Viewport console should display the new .cuz version number.

Advanced Console Commands

The SIMPL Windows online help file provides a full listing of console commands that are valid for **2-Series** control systems. You can access the QM-RMC console in a variety of ways: via a serial connection (RS-232) with a PC connected to port B, over Ethernet via the LAN port, or through Telnet, among many other methods. It is also possible to issue console commands through logic, by adding a Console symbol to the SIMPL Windows program.

The Console symbol is only visible in the *Symbol Library* when "Special" is selected as the Symbol Set. Click **Edit | Preferences**. In the *Symbol Set* area of the *General* tab, select **Special** as shown in the following graphic.

"SIMPL Windows Preferences" Window
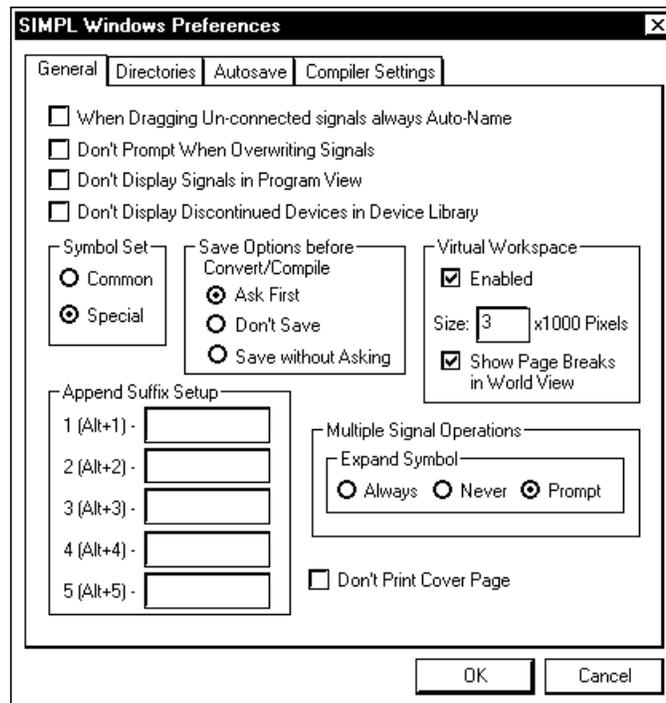
Console commands are provided for advanced programmers. However, most functions and commands can be selected from the various Viewport menus.

NOTE: For more information on console commands, refer to the 2-Series Console Command Reference Guide (Doc. 6002). The latest version can be obtained from the Downloads | Product Manuals section of the Crestron website (www.crestron.com).

Programming the QM-RMC

You can create a program that allows you to control the QM-RMC control system using the Crestron programming tools Crestron Application Builder™ (AppBuilder) and SIMPL Windows. These tools are intended for users with different levels of programming knowledge. The flexibility of each tool is proportional to the degree of programming expertise (i.e., the more flexible, the more a programmer needs to know and account for). Of course, one can initiate programming using the easiest method (Crestron AppBuilder) and use advanced techniques that are available from SIMPL Windows to customize the job.

Following are the minimum software requirements for the PC:

- SIMPL Windows version 2.04.11, with Library Update 234 or later. (Also requires SIMPL+ Cross Compiler version 1.1). Crestron Database version 15.9.9 or later for use with SIMPL Windows.

- (Optional) VisionTools Pro-e software version 3.1.1.7 for designing touchpanel pages.

- (Optional) Crestron Application Builder version 1.2.3 software for automatic residential and commercial programming of the QM-RMC as a control system. As of press time, this version of Crestron Application Builder had not been released. Please check the Crestron FTP site.

- (Optional) DEAL for Windows IR learning software version 3.01

- (Optional) Crestron RoomView™ version 2.0.0.3

Programming with the Crestron AppBuilder

Crestron AppBuilder is easier to use for the beginning programmer, and much faster for all programmers. However it does not allow the degree of flexibility and control that SIMPL Window does.

NOTE: The QM-RMC can be optionally programmed with Crestron Application Builder version 1.2 software for automatic residential and commercial programming of the QM-RMC as a control system. As of press time, this version of Crestron Application Builder had not been released. Please check the Crestron FTP site.

The Crestron AppBuilder interface guides you through a few basic steps for designating rooms and specifying the control system, touchpanels, devices, and functionality. The Crestron AppBuilder then programs the system, including all touchpanel projects and control system logic.

The Crestron AppBuilder is fully integrated with the Crestron suite of software development tools, including SIMPL Windows, VT Pro-e, Crestron Database, User IR Database, and User Modules Directory. The Crestron AppBuilder accesses these tools behind the scenes, enabling you to easily create robust systems.

Programming with SIMPL Windows

NOTE: The following are acceptable file extensions for programs that include a QM-RMC, developed for specific control system types:
projectname.smw (source file)
projectname.spz   (compiled file for 2-Series)
projectname.usp   (source code module for SIMPL+)

SIMPL Windows is the Crestron graphical, Windows-based development tool for programming control systems. The SIMPL Windows interface provides two workspaces: the Configuration Manager, for configuring the control system, touchpanels, and controlled network devices; and Program Manager, for designing the logic and functionality of the control system.

In addition, you can use the powerful Crestron Viewport utility to accomplish multiple system tasks, such as uploading the program to the control system and performing diagnostic functions. Together with the Crestron Database, these tools provide you with the essential components you need to program the QM-RMC. Crestron software is available from the Crestron website (www.crestron.com)—registration is required for downloading.

> **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).

> **NOTE:** The information in this section assumes that the reader has knowledge of SIMPL Windows. If not, refer to the extensive help information provided with the software.

QM-RMC Device Library Symbols

In Configuration Manager, drag the QM-RMC from the Control Systems folder of the *Device Library* to *System Views*.

System View of QM-RMC
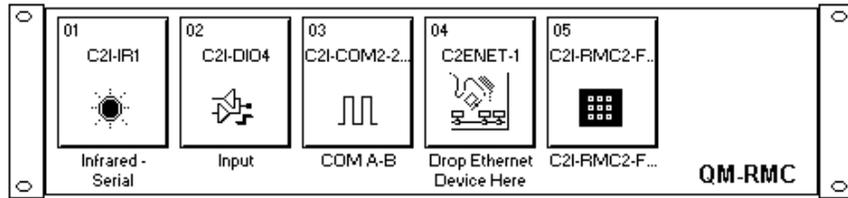
Slot 1: C2I-IR1 Port A

Port A is the only port in Slot 1.
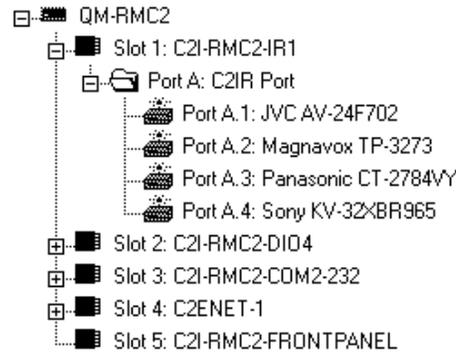
The C2I-IR1 provides one IR output port (A) for controlling devices via IR or one-way RS-232. (Depending on the control format, additional equipment such as IR emitters, splitters, receivers, and remote control transmitters may be required).

To add an IR device, drag the device from the Crestron, Project, or User IR Database to the C2I-IR1 port. The Crestron database contains hundreds of IR driver files, covering most IR devices on the market today. The IR port requires one IRP2 (infrared emitter probe) installed on each IR device. One end of the emitter is installed on or near the IR sensor window of the controlled device while the other end plugs into the C2I-IR1 port.

No more than four IR emitters should be connected to the IR port (the maximum is five emitters when using the ST-SPL resistor/divider). In addition, if more than two emitters are connected to the IR port then a 100 ohm resistor should be placed between signal and ground for each emitter. Thus four emitters would require four resistors.

Alternatively, the ST-MB (master blaster) IR sprayer can "spray" IR signals 90 degrees. It eliminates the need for IR probes and resistors, and can be positioned

---

to reach all devices. It is designed to handle multiple IR codes so that only one sprayer is needed for many devices.

NOTE: The C2I-IR1 port does not support simultaneous IR and RS-232 control. That is, an IR driver cannot be stacked on the port together with a one-way serial driver. The control format must be of one type. Use only one 1-way Serial Driver or up to five IR drivers.

In addition, the IR port does not have negative voltage and thus may not provide the full voltage range required by some RS-232 devices (although nearly all RS-232 devices will operate properly). In these cases the DB9 serial COM ports can be used instead.

Slot 2: C2I-DI04

Slot 2 provides four digital input ports: <**o1**> through <**o4**>

C2I-DIO4 Built-in Digital Input Card

o1
o2
o3
o4
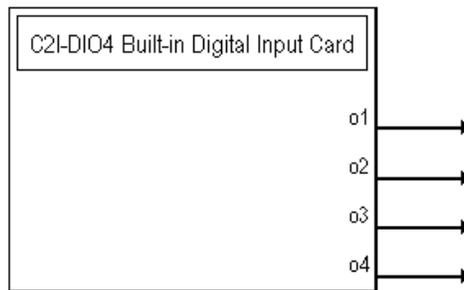
Signals

- Digitals: <o1> through <o4>

Description

The C2I-DIO4 provides four digital inputs for connection of external sensors or other contact closure devices. The <**o**> outputs are a logical high until it detects the presence of a low on the corresponding input.

The built-in port supports dry contact closure to ground.

Slot 3: C2I-COM2-232 - Port A and Port B

The C2I-COM2-232 provides two COM ports (A and B) for controlling serial devices over RS-232.

NOTE: Does not support RS-422 or RS-485.

Each COM port has a built-in two-way serial driver.
To program a serial driver or serial device expand the C2I-COM-2 in *Program View* and drag the item to *Detail View*.
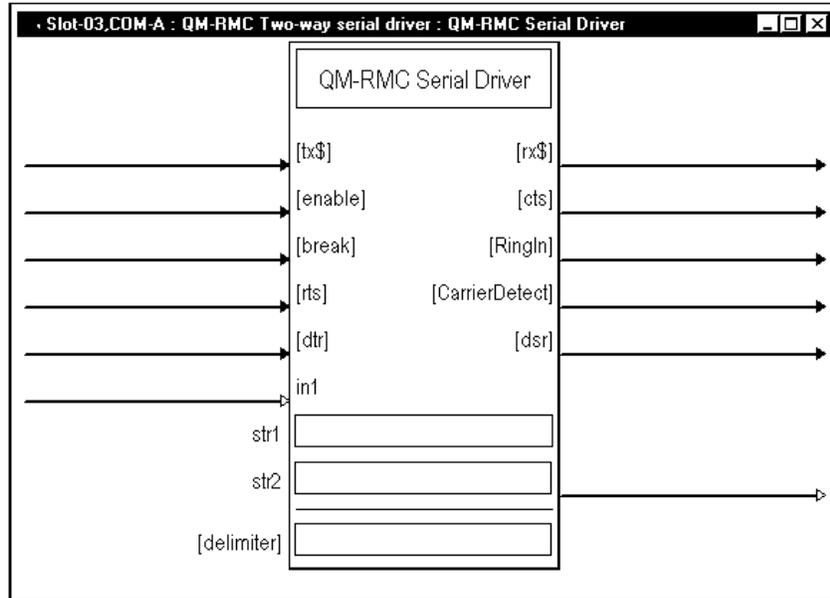
Signals

- Serial input for one-way and two-way serial drivers: <**tx$**> (transmit)

- Serial output for two-way serial drivers: <**rx$**> (receive)

- Digital inputs for two-way serial drivers: <**rts**> (request to send), <**dtr**> (data terminal ready), **<in1>** through **<in2000>** and <**break**>

- Digital output for two-way serial drivers: <**cts**> (clear to send), <**RingIn**> (ring indicator), <**CarrierDetect**>, <**dsr**> (data set ready).

- Digital input: <**enable**>

- Parameters: <**str1**>, <**str2**>, <**delimiter**>

The <**tx$**> (transmit) and <**rx$**> (receive) signals send and receive serial strings using whichever communication format, or protocol, the serial device requires. This protocol is usually described in the manufacturer's documentation and includes the transmission speed (baud rate), error checking (parity), number of data bits and stop bits, and any hardware or software handshaking that may be required to control the flow of data.

Slot 4: C2ENET-1

The C2ENET-1 network interface card provides one LAN port with an RJ-45 connector for connecting the QM-RMC to the Ethernet network.

The card provides 252 IP IDs for Ethernet devices.

To facilitate network functions and diagnostics, SIMPL Windows provides one device extender for the C2ENET-1 card: Device Status.

To add the device extender, right-click the C2ENET-1 card in *Program View*, point to *Insert Device Extender* and click **Device Status**.

To program an Ethernet device or device extender, expand the C2ENET-1 card in *Program View* and drag the item to *Detail View*.
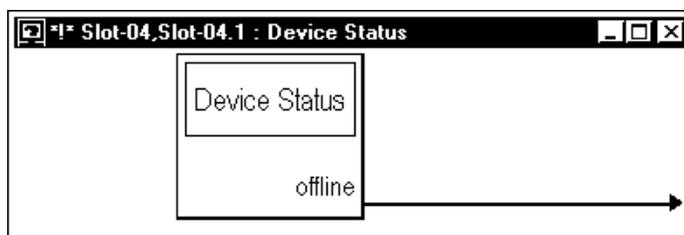
Sub-Slot 4.1 (Device Extender): Device Status

Speed Key Name: devstat

Signal

- Digital output: <**offline**>

Description

The Device Status symbol is a device extender for plug-in control cards, including the C2ENET-1 card. It reports the connection status of the card.

The <**offline**> input goes high for as long as a card is unavailable for polling or is physically disconnected from its Ethernet slot. The <**offline**> input goes low when the card is online.

Slot 5: C21-C2N-RMC2E-FRONTPANEL

The C2I Front Panel is the non-programmable front panel of the QM-RMC and other 2-Series control systems and does not provide an LCD display or push buttons.

Converting Programs and Modules Created for other Systems

A useful feature of SIMPL Windows is that you can convert a program created for another type of control system, simply by changing the target to a QM-RMC.

To do this you first open the program, and then replace the existing control system with the QM-RMC. That is, drag the QM-RMC from the Control Systems folder onto the existing control system in *System Views*, and click **Yes** when prompted to confirm the replacement.

If the program contains SIMPL+ or User modules, the conversion might generate error messages. This is because modules and programs often contain symbols with "ambiguous" signals. For example, the inputs of the Serial to Analog symbol can be defined as either analog or serial. Although X-Generation processors support ambiguous signals, the 2-Series processor requires all signal types to be strictly defined.

If the program you want to convert contains SIMPL+ or User modules, Crestron recommends that you first compile each module before converting the larger program. In this way, the compiler can resolve any ambiguous signals in the modules and minimize errors when the larger program is converted.

Converting SIMPL+ Modules for 2-Series

1. Open the SIMPL+ module you want to convert.

2. Choose the 2-Series processor as the target by clicking the toolbar button, as shown in the following illustration.

SIMPL+ Toolbar

NOTE: Note that you can select both X and 2-Series as the targets, so that the module works for both types of control systems. However, you are limited to SIMPL+ keywords and functions that are supported on both systems. If you do not choose a target, then the module may or may not work, depending on the constructs that are used.

3. Save and compile the module by clicking the **Save and Compile** toolbar button; alternatively, click **Save and Compile** on the **Build** menu (or press **F12**).

Converting User Modules

1. Open the User module you want to convert.

2. Click **Project** | **Edit Program Header**.

3. Click **2-Series** in the *Target Control System Classes* list box.

You can select other types of control systems as well, but then you are limited to symbols that are supported by all of these platforms. The module may still work on unselected control systems so long as unsupported symbols are not used. Selecting a control system means that you are *requiring* the module to work there.

"Module Header Information" Window
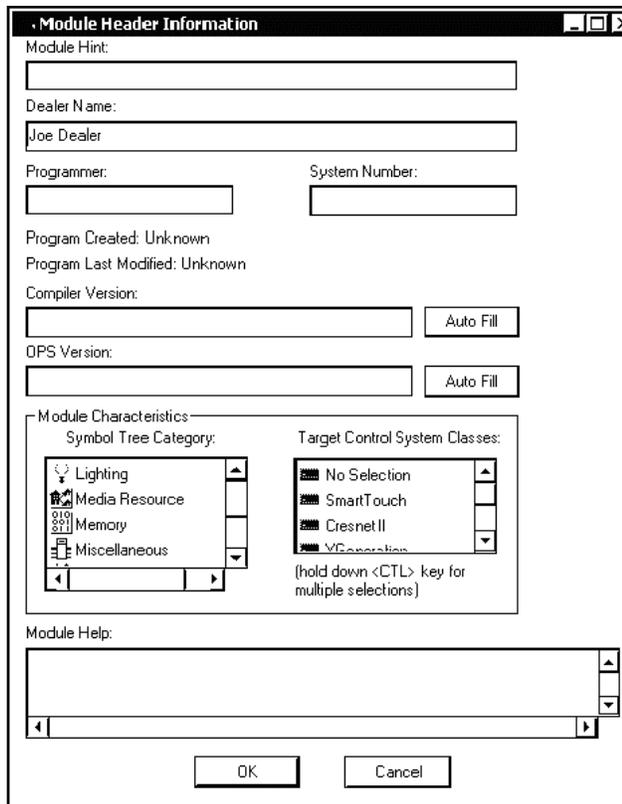
After you convert each module in a program, you can convert the program as described previously: drag the QM-RMC onto the existing control system in *System Views* and click **Yes** to confirm the replacement.

For further information about compile-time errors and detailed explanations about working with modules, refer to the SIMPL Windows online help file.

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-RMC Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
PWR LED does not illuminate.	Control system is not receiving power.	Verify that the DC output plug is properly attached to the control system and that the adaptor is securely plugged into an outlet.
Compilation Error RLCMCVT166 & RLCMCVT177	Poor analog versus serial signal definition in the SIMPL Windows program.	Confirm properly defined signal definition in the program.
System locks up.	Various.	Press front panel **SW-R** and **HW-R** buttons at the same time to bypass program and communicate directly with processor (refer to "Troubleshooting Communications" on page 13).
System does not function.	Various.	Refer to the "System Monitor" procedure following this table.
	Incorrect power supply.	Use a Crestron power supply.
A/V system device does not respond.	IR or serial port not connected properly.	Verify connections and tighten serial cables.
	Used wrong IR/Serial port.	Verify that proper IR or serial port is defined.
	Serial cable miswired.	Verify that serial cable is wired correctly for RS-232.

System Monitor

The System Monitor allows you to reload firmware into the QM-RMC in the event that you cannot load the firmware in the normal mode.

Perform the following procedure to correct the "System does not function" trouble situation (in reference to Corrective Action).

If the system does not function, perform the following procedure:

1. Connect DB9 null-modem RS-232 cable between the PC and QM-RMC COM port B. Refer to "Hardware Hookup" on page 9.

2. Open Viewport and select **Setup | Communication Settings** to open the "Port settings" window.

3. In the window, select **RS-232** (Connection Type), **57600** (Baud Rate), **N** (Parity), **8** (Data Bits), **1** (Stop Bits), **RTS/CTS** On, **XON/XOFF** Off, and click **OK**.

4. Power down the QM-RMC.

5. While powering up the QM-RMC, press and hold **ATL** and **K** on the keyboard until the following text (or similar) appears in Viewport.

   ```
   System Monitor [v1.001 (0001)]

   12-19-01 16:25:23 32MB RAM, 4MB FLASH

   CS>
   ```

NOTE: After this, you can increase the baud rate to 115200 (for faster communication) by pressing **F8** on the keyboard and then selecting 115200 from the "Set Baud Rate" window.

6. At the Viewport prompt, type: **erase** and press **Enter**. The following text appears in Viewport.

   ```
   CS>erase

   ->25%->50%->75%->100%

   Done

   CS>
   ```

7. Press **ALT** and **O** (not zero) on the keyboard. The "Open" window appears. Click: File Transfer | Update Control System.

8. Find and select the correct firmware file (.CUZ) and click **Open**.

9. Once "Completed Successfully" appears in Viewport, type **quit** at the Viewport prompt and press **Enter**.

Battery Replacement

A Lithium battery is used to power the system clock within the QM-RMC. Under normal conditions, it lasts for approximately 10 years. In the event that the clock fails, only an authorized technician should replace it. Refer to the following caution statement.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Passthrough Mode

Passthrough mode enables Viewport access to any serially controlled device on the network. That is, it allows direct communication between the PC and a network device (effectively "passing through" the QM-RMC). While Passthrough mode is running, the program currently in memory is suspended and will not execute. When Passthrough mode is exited, the program resumes operation.

Entering Passthrough mode for COM port B reinitializes it, which clears the data for that port.

To establish communication, click **Functions | Enter Passthrough Mode**. Then select the connection type that exists between the QM-RMC and the device. The

choices are Slot (for devices connected to the control system via one of the card slots on the back panel), or Ethernet. If the connection is through a card slot then select the slot number from the **Slot** drop-down list. For Ethernet, select the IP ID.

NOTE: The IP ID and associated IP address of the Ethernet device must be listed in the IP Table.

Specify the port (Port A or Port B) that the device is connected to, if applicable.

Next, specify the serial protocol that the device expects. The parameters include the baud rate, parity, the number of data bits and stop bits, the protocol (RS-232), and the settings for software or hardware handshaking. This information is provided by the manufacturer's documentation.

"Passthrough Mode" Window
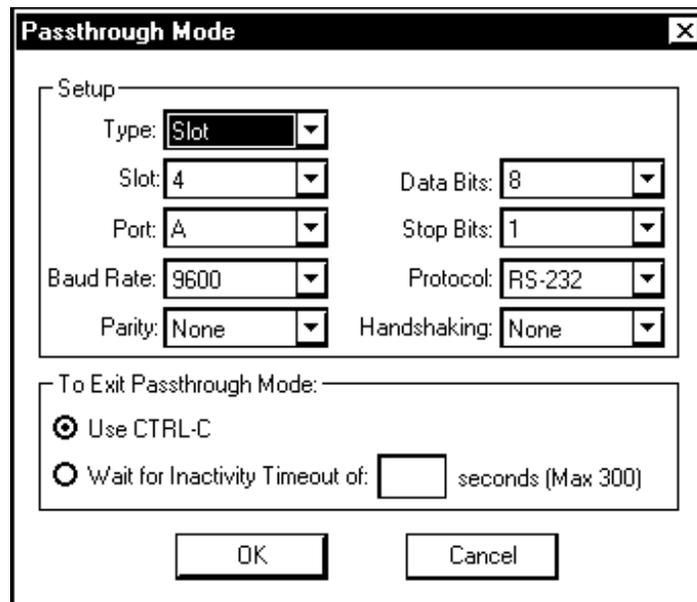
The PC is now communicating directly with the device.

To exit Passthrough mode, simply click **Functions | Exit Passthrough Mode**. A system reboot also exits the Passthrough mode.

Further Inquiries

If after reviewing this Operations Guide, you cannot locate specific information or have questions, please take advantage of the Crestron award winning customer service team by calling:

- In the US and Canada, call the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876].

- In Europe, call Crestron International at +32-15-50-99-50.

- In Asia, call Crestron Asia at +852-2341-2016.

- In Latin America, call Crestron Latin America at +5255-5093-2160.

- In Australia and New Zealand, call Crestron Pacific at +613-9480-2999.

Firmware Upgrades

To take advantage of all the QM-RMC features, it is important that the unit contains the latest firmware available. Therefore, please check the Crestron website (http://www.crestron.com/downloads/software_updates.asp) for the latest version of firmware. Not every product has a firmware upgrade, but as Crestron improves functions, adds new features, and extends the capabilities of its products, firmware upgrades are posted. If you have questions regarding upgrade procedures, contact Crestron customer service.

Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the QM-RMC, 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 (www.crestron.com) periodically for manual update availability and its subjective value. Updates are available from the Downloads | Product Manuals section and are identified as an "Addendum" in the Download column.

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1. No merchandise may be returned for credit, exchange, or service without prior authorization from CRESTRON. To obtain warranty service for CRESTRON products, 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.

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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.

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