

Crestron **CP2 & CP2E**  
2-Series Compact Control System

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Operations Guide



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# 2-Series Compact Control System: CP2 & CP2E

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## Introduction

### Features and Functions

- 2-Series engine
- 36 MB of Internal Memory<sup>1</sup>
- Powerful 257 MIPS, 32-bit Motorola Coldfire<sup>®</sup> Processor
- Cresnet<sup>®</sup> port – master/slave selectable
- 10/100 Ethernet with SSL encryption<sup>2</sup>
- Crestron e-Control<sup>®2</sup> enabled<sup>2</sup>
- RoomView<sup>®</sup> enabled<sup>2</sup>
- Three Com ports (RS-232/422/485)
- Eight IR/serial ports
- Eight Versiport I/O ports
- Eight Low-voltage relay ports
- Single-space EIA rack-mountable

1. For more information on internal memory, refer to “2-Series Memory & Directory Structure” in the latest version of the Crestron 2-Series Control System Reference Guide (Doc. 6256), which is available from the Crestron website (<http://www.crestron.com/manuals>).

2. CP2E only.

### **2-Series Engine**

At the heart of the CP2 & CP2E is the powerful 32-bit Freescale ColdFire<sup>®</sup> processor. Crestron's exclusive enhanced real-time operating system makes the CP2 & CP2E the fastest, most reliable control systems available.

### **Cresnet<sup>®</sup>**

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

***Cresnet Slave Mode***

Selectable Cresnet Slave Mode enables the CP2 & CP2E to be configured as Cresnet slave devices, effectively transforming them into Cresnet expansion modules. Such flexibility can offer a cost-effective solution for system expansion, providing a host of additional control ports in a single module.

***Ethernet (CP2E only)***

Crestron pioneered the IP-based control system to harness the vast possibilities of Ethernet and the Internet for remote control, monitoring, programming and diagnostics. The CP2E is designed to deliver the world's most advanced IP control solution. A choice of single or dual port Ethernet cards enables a full-duplex 10/100 Ethernet connection with built-in Web server and email client and support for both static and dynamic IP addressing.

***Crestron e-Control<sup>®</sup> 2 (CP2E only)***

Crestron's award-winning e-Control 2 XPanel solutions offer the most flexible range of IP control possibilities available. Using a Windows<sup>®</sup> computer or CE/PocketPC<sup>™</sup> PDA device, e-Control 2 provides an amazing control GUI that looks and behaves just like a Crestron Isys<sup>®</sup> touchpanel.

***Crestron RoomView<sup>®</sup> (CP2E only)***

Every Ethernet-enabled 2-Series control system works directly with Crestron's exclusive RoomView Help Desk software for the industry's most comprehensive facility-wide asset management solution.

***SSL (CP2E only)***

All Ethernet-enabled 2-Series control systems support SSL (Secure Sockets Layer), the industry standard for protecting sensitive network communications.

## Specifications

Specifications for the CP2 & CP2E are listed in the following table.

### CP2 & CP2E Specifications

SPECIFICATION	DETAILS
Processor	
CPU	32-bit Freescale Coldfire <sup>®</sup> Microprocessor
Processing Speed	257 MIPS (Dhrystone 2.1 benchmark)
Memory	
SDRAM	32 MB
NVRAM	256 kB
Flash	4 MB
Operating System	Real-time preemptive multi-threaded/multitasking kernel; FAT32 file system with long names; supports SIMPL Windows and SIMPL+ <sup>®</sup>
Ethernet (CP2E only)	10/100BaseT, auto-negotiating, full/half duplex, static IP or DHCP/DNS, SSL, TCP/IP, UDP/IP, CIP, SMTP, built-in Web server and e-mail client; supports Crestron e-Control <sup>®</sup> 2 Xpanel and RoomView <sup>®</sup> applications
Power Requirements	24 Watts (1 Amp) @ 24 Volts DC (PW-2420RU power supply sold separately)
Available Cresnet Power	26 Watts using PW-2420RU (sold separately)
Cresnet Power Usage	24 Watts (1 Amp @ 24 Volts DC) with no power supply connected to the 24VDC connector
Environmental	
Temperature	41° to 113°F (5° to 45°C)
Humidity	10% to 90% RH (non-condensing)
Enclosure	Black metal, 1U 19" rack-mountable (rack ears included)
Dimensions	
Height	1.70 in (4.32 cm)
Width	19.00 in (48.26 cm) with ears; 17.03 in (43.25 cm) without ears
Depth	6.64 in (16.86 cm)
Weight	3.54 lbs (1.61 kg)
Available Accessories	
PW-2420RU	50 Watt Regulated Universal Power Supply
C2N-HBLOCK	Cresnet Network Distribution Block
CNSP-XX	Custom Serial Interface Cable
IRP2	IR Probe

## Physical Description

This section provides information on the connections, controls and indicators available on your CP2 & CP2E.

### *CP2 Physical Views*

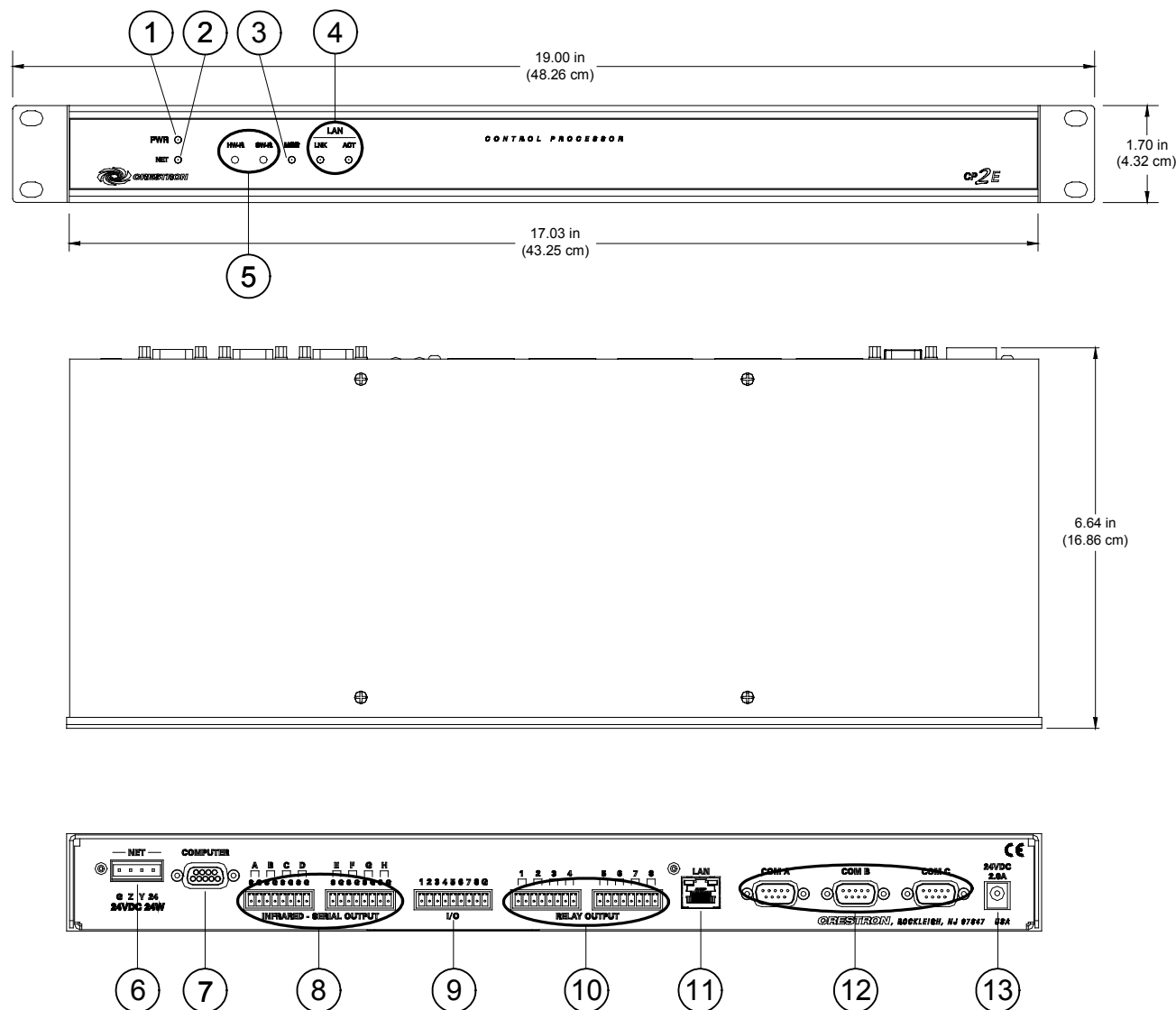


### *CP2E Physical Views*





CP2 & CP2E Overall Dimensions


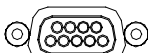

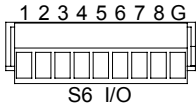
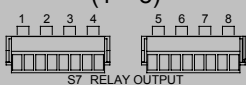



Connectors, Controls & Indicators

#	CONNECTORS <sup>1</sup> , CONTROLS & INDICATORS	DESCRIPTION
1	PWR LED	Indicates 24 Volts DC power supplied from Cresnet control network.
2	NET LED	Indicates communication with Cresnet System.
3	MSG LED <sup>2</sup>	Illuminates when a message is detected. To decipher content, examine the message through the Crestron Toolbox™.
4	LAN LEDs <sup>3</sup>	LNK – Indicates when there is a connection to the rear panel LAN port. ACT – Indicates communication (activity) at the rear panel LAN port.

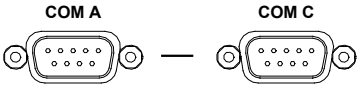

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Connectors, Controls & Indicators (Continued)

#	CONNECTORS <sup>1</sup> , CONTROLS & INDICATORS	DESCRIPTION																				
5	RESET BUTTONS	HW-R - Initiates system hardware reset. SR-R - Pressing this in combination with HW-R button performs a system restart without loading the program. Pressing it alone while the system is running restarts the program.																				
6	<p>NET<sup>4,5</sup></p>  <p>G Z Y 24 24VDC 24W</p>	<p>Four-position terminal block connector for data and power. Connects to Cresnet control network.</p> <p>Pin 1 (24) Power Pin 2 (Y) Data Pin 3 (Z) Data Pin 4 (G) Ground</p>																				
7	<p>COMPUTER</p> 	(1) DB9 female, RS-232 computer console port. Connector is used when programming with a PC. The port is modem compatible (modem and PC cables not included).																				
8	<p>INFRARED-SERIAL OUTPUT (A – H)<sup>6</sup></p>  <p>INFRARED - SERIAL OUTPUT</p>	(8) 2-pin 3.5 mm detachable terminal blocks IR/Serial output ports. IR output up to 1.2 MHz; 1-way serial TTL/RS-232 (0-5 Volts) up to 115.2k baud. Individual signal generator per port, allowing simultaneous firing of all ports.																				
9	<p>I/O (1 – 8)<sup>7</sup></p>  <p>S6 I/O</p>	<p>(1) 9-pin 3.5 mm detachable terminal block comprising (8) digital input/output or analog input ports (referenced to GND);</p> <p>Digital Input: Rated for 0-24 Volts DC, input impedance 20 kΩ, logic threshold 1.24 Volts DC;</p> <p>Digital Output; 250 mA sync from maximum 24 Volts DC, catch diodes for use with “real world” loads;</p> <p>Analog Input: Rated for 0-10 Volts DC, protected to 24 Volts DC maximum, input impedance 20 kΩ;</p> <p>Programmable 5 Volts, 2 kΩ pull-up resistor per pin.</p>																				
10	<p>RELAY OUTPUT (1 – 8)</p>  <p>S7 RELAY OUTPUT</p>	(2) 8-pin 3.5 mm detachable terminal blocks comprising (8) normally open, isolated relays; Rated 1 Amp, 30 Volts AC/DC, MOV arc suppression across contacts.																				
11	<p>LAN<sup>3</sup></p> 	<p>(1) 8-wire RJ-45 with 2 LED indicators; 10/100BaseT Ethernet port; Green LED indicates link status Yellow LED indicates Ethernet activity.</p> <table border="1"> <thead> <tr> <th>TYPE</th> <th>PIN</th> <th>SIGNALS</th> </tr> </thead> <tbody> <tr> <td rowspan="8">8-Position RJ-45</td> <td>1</td> <td>TD+</td> </tr> <tr> <td>2</td> <td>TD-</td> </tr> <tr> <td>3</td> <td>RD+</td> </tr> <tr> <td>4</td> <td>Connected to pin 5</td> </tr> <tr> <td>5</td> <td>Connected to pin 4</td> </tr> <tr> <td>6</td> <td>RD-</td> </tr> <tr> <td>7</td> <td>Connected to pin 8</td> </tr> <tr> <td>8</td> <td>Connected to pin 7</td> </tr> </tbody> </table>	TYPE	PIN	SIGNALS	8-Position RJ-45	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
TYPE	PIN	SIGNALS																				
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Connectors, Controls & Indicators (Continued)

#	CONNECTORS <sup>1</sup> , CONTROLS & INDICATORS	DESCRIPTION																														
12	<p>COM (A – C)<sup>8, 9, 10</sup></p> 	<p>(3) DB9 male, bidirectional RS-232/422/485 ports. Up to 115.2k baud, hardware and software handshaking support. All ports support C2N-NPA8 Network Poll Accelerator<sup>11</sup>.</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>DIRECTION</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1*</td> <td>To CP2 or CP2E</td> <td>(RXD-) RS-422 Receive Data (Idles low)</td> </tr> <tr> <td>2</td> <td>To CP2 or CP2E</td> <td>(RXD) RS-232 Received Data</td> </tr> <tr> <td>3</td> <td>From CP2 or CP2E</td> <td>(TXD) RS-232 Transmitted Data</td> </tr> <tr> <td>4</td> <td>From CP2 or CP2E</td> <td>(TXD+) RS-422 Transmit Data (Idles high)</td> </tr> <tr> <td>5</td> <td></td> <td>RS-232 and RS-422 Signal Common</td> </tr> <tr> <td>6</td> <td>To CP2 or CP2E</td> <td>(RXD+) RS-422 Receive Data (Idles high)</td> </tr> <tr> <td>7</td> <td>From CP2 or CP2E</td> <td>(RTS) RS-232 Request to Send</td> </tr> <tr> <td>8</td> <td>To CP2 or CP2E</td> <td>(CTS) RS-232 Clear to Send</td> </tr> <tr> <td>9</td> <td>From CP2 or CP2E</td> <td>(TXD-) RS-422 Transmit Data (Idles low)</td> </tr> </tbody> </table> <p>* RS-422 transmit and receive are balanced signals requiring two lines plus a ground in each direction. RXD+ and TXD+ should idle high (going low at start of data transmission). RXD- and TXD- should idle low (going high at start of data transmission). If necessary, RXD+/RXD- and TXD+/TXD- may be swapped to maintain correct signal levels.</p>	PIN	DIRECTION	DESCRIPTION	1*	To CP2 or CP2E	(RXD-) RS-422 Receive Data (Idles low)	2	To CP2 or CP2E	(RXD) RS-232 Received Data	3	From CP2 or CP2E	(TXD) RS-232 Transmitted Data	4	From CP2 or CP2E	(TXD+) RS-422 Transmit Data (Idles high)	5		RS-232 and RS-422 Signal Common	6	To CP2 or CP2E	(RXD+) RS-422 Receive Data (Idles high)	7	From CP2 or CP2E	(RTS) RS-232 Request to Send	8	To CP2 or CP2E	(CTS) RS-232 Clear to Send	9	From CP2 or CP2E	(TXD-) RS-422 Transmit Data (Idles low)
PIN	DIRECTION	DESCRIPTION																														
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9	From CP2 or CP2E	(TXD-) RS-422 Transmit Data (Idles low)																														
13	<p>24 VDC<sup>5</sup></p> <p>24VDC 2.0A</p> 	<p>(1) 2 mm barrel DC power jack, 24 Volt DC power input; (PW-2420RU power supply sold separately); Passes through to NET port to power Cresnet devices.</p>																														

- Interface connectors for NET, Infrared-Serial, I/O and Relay Output ports are provided with the unit.
- This LED was labeled “ERR” on units manufactured prior to 2005. It is functionally the same; only the labeling has changed.
- CP2E only.
- The orientation of this connector is “upside down” compared to other Crestron network devices (e.g. CNX-BIPAD8, CNX-RMCLV). To avoid damage to the CP2 or CP2E unit, be sure the mating Cresnet cable connector is properly aligned before attempting to insert it.
- Use care in wiring installations to avoid applying 24 VDC to Cresnet wiring from an AC power pack as well as from a system device that contains its own power supply. Although this condition should not cause any damage, Crestron does not recommend it. In those network configurations that require more power than can be supplied by the primary power supply alone, disconnect the +24 VDC Cresnet wire from those devices that will be powered by an AC power pack.
- Transmission levels on the infrared–serial output connectors are in the 0 to +5 VDC range, which may not be compatible with all RS-232 devices.
- Digital outputs are TTL values and may not work with devices requiring a “dry” contact closure (e.g. low voltage motor controllers).
- The pinout of each 9-pin port is non-standard; it contains RS-422 pins in addition to RS-232. This may result in a conflict with some equipment and therefore all nine pins should **not** be used. Only the required pins for each communication type should be connected. For RS-232 and –422, pins 2, 3, 5, 7 and 8 are wired straight through.
- Data Set Ready (DSR) and Data Terminal Ready (DTR) are not supported.
- To support RS-485, tie pin 1 (RXD-) to pin 9 (TXD-) and pin 4 (TXD+) to pin 6 (RXD+) in the cable. (Refer to table at right.)

COM (DB9) CONNECTOR	RS-485 BUS
Tie Pins 1 & 9	-
Tie Pins 4 & 6	+
Pin 5	G

- The Cresnet Poll Accelerator effectively increases the network speed, fan-out and device addresses by a factor of 8 for each Poll Accelerator added to the system.

## Industry Compliance

As of the date of manufacture, the CP2 & CP2E have been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling.



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

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

For more details, refer to “Check Network Wiring” on page 18.

### Identity Code

#### Net ID

The Net IDs of the CP2 & CP2E have been factory set to **02**. This Net ID is defined as the “Master” control system. The Net IDs of multiple CP2 & CP2E devices in the same system must be unique; this means there will be a master/slave relationship between units (only the Net ID of the master will be left at **02**). Net IDs are changed from a personal computer (PC) via the Crestron Toolbox™. 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.

#### IP ID

The IP ID is set within the CP2’s or CP2E’s table using Crestron Toolbox. For information on setting an IP table, refer to the Crestron Toolbox help file.

The IP IDs of multiple CP2 & CP2E devices in the same system must be unique. When setting the IP ID, consider the following:

- The IP ID of each unit must match an IP ID specified in the SIMPL Windows program.
- Each device using IP to communicate with a control system must have a unique IP ID.

### Hardware Hookup

#### Ventilation

To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consideration must be given if installed in a closed or multi-unit rack assembly 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 CP2 & CP2E can be mounted in a rack or stacked with other equipment. Two “ears” are provided with the CP2 & CP2E 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.

**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:

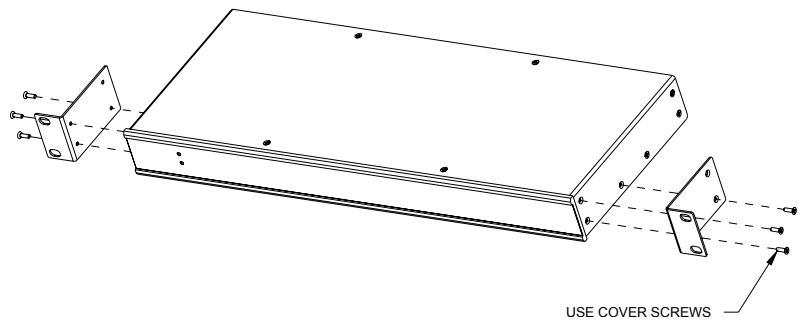
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

**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 CP2 & CP2E 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**

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

**Bussing Strip Installation**

The 2-Series integrated dual bus control system is supplied with two brass bussing strips to facilitate commoning (linking) of multiple terminal block connections. The bussing strips are constructed with four terminal block positions and may be trimmed to size for various applications or different devices. One strip is supplied for each 8-position terminal block.

1. To utilize the bussing strip, determine the number of relays to be commoned for the equipment being installed. If less than four, the strip can be trimmed to size with a pair of scissors or wire snips.
2. Loosen the terminal block screws and insert the first leg of the bussing strip into the first common position of the terminal block. The strip engages the other common positions automatically.
3. Remove approximately 1/8” of the jacket from the common wire and insert the conductor into one of the terminal block common positions. Tighten the terminal block screws to lock the wire and bussing strip into place. Insulate the strip by folding a piece of 3/4” wide vinyl electrical tape (such as Scotch 33+) over the spine and as much of the individual legs as possible. Excess tape at each end of the strip should be pressed closed, then trimmed to within approximately 1/16” of the end of the strip.
4. When wiring the remaining conductors, remove approximately 1/8” of the jacket and insert the wires into the proper terminal block positions. To prevent the possibility of electrical shorts, it is essential that these conductors do not touch any uninsulated portion of the bussing strip.
5. Securing a tie wrap around the bussing strip is a useful way to provide strain relief for the wires connected to the terminal block.

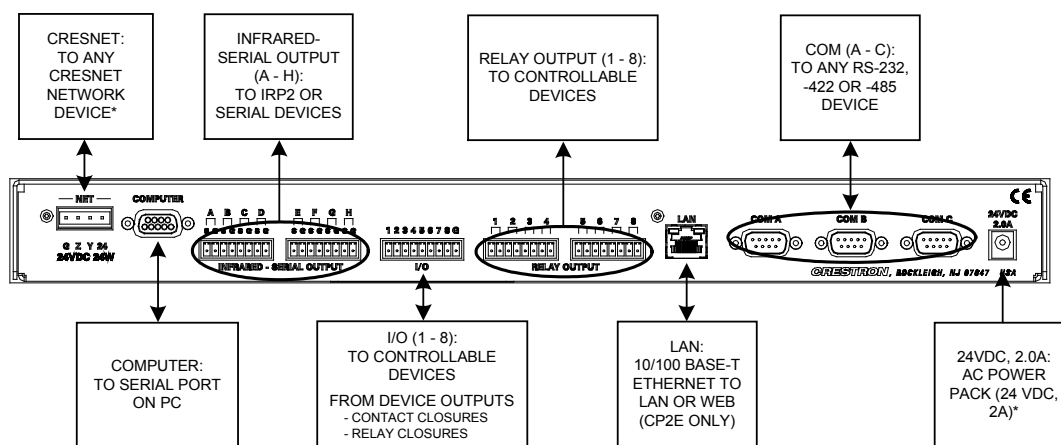
**Connect the Device**

Make the necessary connections as called out in the illustration that follows this paragraph. Refer to “Network Wiring” on page 9 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

When making connections to the CP2 & CP2E, consider the following:

- Use Crestron power supplies for Crestron equipment.

**Hardware Connections for the CP2 & CP2E**



\* The units can be powered through the NET network connector or by an optional AC power pack (purchased separately). If an external power supply is to be used, Crestron recommends its CNPWS-75 External Power Supply or PW-2420RU Universal Power Pack or equivalent.

**NOTE:** Use care in wiring installations to avoid applying 24 VDC power to Cresnet wiring from an AC power pack as well as from a system device that contains its own power supply. Although this condition should not cause any damage, Crestron does not recommend it. In those network configurations that require more power than can be supplied by Crestron’s Power Control Unit alone, disconnect the +24VDC Cresnet wire from those devices that will be powered by an AC power pack.

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## Programming Software

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### Have a question or comment about Crestron software?

Answers to frequently asked questions (FAQs) can be viewed in the Online Help section of the Crestron website. To post a question or view questions you have submitted to Crestron's True Blue Support, log in at <http://support.crestron.com>. First-time users will need to establish a user account.

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### Earliest Version Software Requirements for the PC

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**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.

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

#### *Software*

TASK	REQUIRED SOFTWARE VERSION
Program control system to operate CP2 & CP2E.	SIMPL Windows version 2.02.08 or later with SIMPL+ Cross Compiler version 1.1 or later and Library update 145 or later; Also requires Crestron Database version 15.6.2 or later.
Upload program and firmware.	Crestron Toolbox 1.01.06 or later.
Program with simple wizards (optional but recommended).	Crestron SystemBuilder™ version 2.0.6 or later. Refer to software release notes or Crestron website for other required Crestron software packages.

### 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

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**NOTE:** While SIMPL Windows can be used to program the CP2 & CP2E, it is recommended to use SystemBuilder for configuring a system.

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

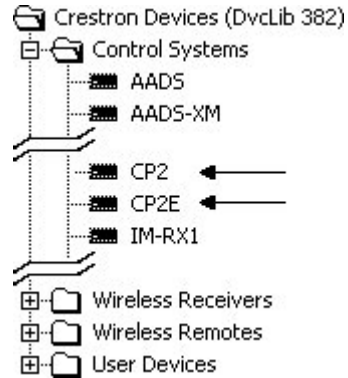
#### *Configuration Manager*

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



- To incorporate the CP2 or CP2E into the system, drag the CP2 or CP2E from the Control Systems folder of the *Device Library* and drop it in the *System Views*.

#### Locating the CP2 & CP2E in the Device Library



#### Programming Manager

Programming 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*. A description for each signal in the symbol is described in the SIMPL Windows help file (**F1**).

### Example Program

An example program for the CP2 & CP2E is available from the Crestron website (<http://www.crestron.com/exampleprograms>).

## 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.

While the next section provides an overview for communication, refer to “Establishing Communications with the Control System” in the Crestron 2-Series Control System Reference Guide (Doc. 6256) for serial and TCP/IP connection details. If communications cannot be established, refer to “Troubleshooting Communications” in the same guide.

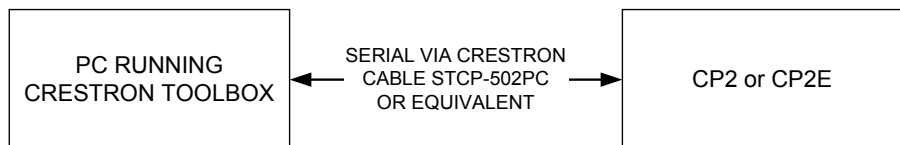
### Establishing Communication


Use Crestron Toolbox for communicating with the CP2 & CP2E; refer to the Crestron Toolbox help file for details. With the CP2, this connection to the computer must be a direct serial connection; with the CP2E the connection can be either serial or TCP/IP.

#### Direct Serial Communication

**NOTE:** Required for initial setup of Ethernet parameters.

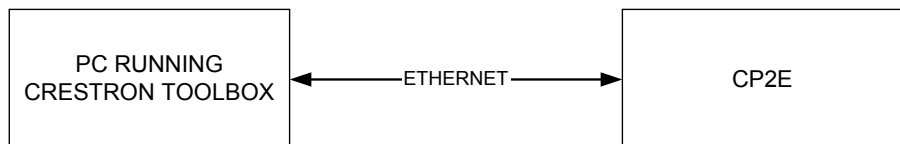
#### Direct Serial Communication



- The **COMPUTER** port on the CP2 & CP2E connects to the serial port on the PC via a serial cable (Crestron STCP-502PC or equivalent).
- Use the Address Book in Crestron Toolbox to create an entry using the expected serial communication protocol (RS232, auto-detect baud rate, no parity, 8 data bits, 1 stop bit, XON/XOFF disabled, RTS/CTS enabled).
- Display the CP2's or CP2E's "System Info" window (click the  icon); communications are confirmed when the device information is displayed.


#### TCP/IP Communication

#### Ethernet Communication (CP2E only)



- Establish direct serial communication between CP2E and PC.
- Enter the IP address, IP mask, and default router of the CP2E via the Crestron Toolbox (**Functions | Ethernet Addressing**); otherwise enable DHCP.
- Confirm Ethernet connections between CP2E and PC. If connecting through a hub or router, use CAT5 straight through cables with 8-pin RJ-45

connectors. Alternatively, use a CAT5 crossover cable to connect the two LAN ports directly, without using a hub or router.

- Use the Address Book in the Crestron Toolbox to create an entry for the CP2E with the CP2E's TCP/IP communication parameters.
- Display the “System Info” window (click the  icon) and select the CP2E entry.
- Use the Crestron Toolbox to create the CP2E IP table.
  - ⇒ Select **Functions | IP Table Setup**.
  - ⇒ Either add, modify, or delete entries in the IP table. The CP2E can have only one IP table entry.
  - ⇒ A defined IP table can be saved to a file or sent to the device.
- When using the CP2E as a “slave”, edit the “master” control system's IP table to include an entry for the CP2E. The entry should list the CP2E's IP ID (specified on the CP2E's IP table) and the internal gateway IP address 127.0.0.1.

## Programs and Firmware

- Display the network device tree (**Tools | Network Device Tree**) to show all network devices connected to the control system. Right-click on the CP2 or CP2E to display actions that can be performed on the CP2 or CP2E:
  - ⇒ Upgrade firmware
  - ⇒ Change Net ID
- Upload the SIMPL Windows file to the control system using SIMPL Windows or Crestron Toolbox.
- Upgrade CP2 & CP2E firmware via Crestron Toolbox.
  - ⇒ Establish serial or TCP/IP communications with the CP2 (serial only) or CP2E and display the “System Info” window.
  - ⇒ Select **Functions | Firmware...** to upgrade the CP2 or CP2E firmware.

For details on uploading and upgrading, refer to the SIMPL Windows help file or the Crestron Toolbox help file.

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## Operation

Crestron 2-Series Control Systems are the brain of a complete integrated audio/visual or automation solution, serving as the central processor and I/O interface. Every audio, video and environmental element of the home, boardroom, classroom or command center becomes integrated and accessible through the control system. No matter how complex or basic, Crestron control systems are entirely custom-programmable to attain the exact functionality required.

The CP2 and CP2E are compact control systems designed for small to medium sized residential and commercial control applications. Additional control ports may be added using Cresnet expansion modules or by “slaving” additional control processors (e.g. CP2, CP2E or QM-RMC).

The CP2 and CP2E employ the identical processing engine to that in Crestron’s larger control systems and support Crestron’s full range of touchpanels, keypads and Cresnet peripherals. Either is ideal as the master control processor for a stand-alone boardroom or home theater system and serves equally well slaved to another 2-Series control processor to expand the number of control ports as part of a larger control system.

The CP2E’s built-in high-speed Ethernet port and Web server provide full connectivity and e-Control 2 Xpanel support for extensive IP-based control capability, remote programming and diagnostics and seamless integration into very large control networks.

The CP2 and CP2E both require 24 watts of power to operate. Therefore, if you use a PW-2420RU power supply (rated at 50 watts), you will have 26 watts of power left over to run additional Cresnet devices. As long as the sum total of the devices on Cresnet does not exceed 26 watts, you will be fine. If the application requires more than 26 watts of network power, use a CNPWS-75 in place of the PW-2420RU.

## 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.

#### CP2 & CP2E Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Unexpected response from control system.	Network devices are not communicating with the control system.	Use Crestron Toolbox to poll the network. Verify network connection to the device.
<b>PWR</b> LED does not illuminate.	Control system is not receiving power.	If power is supplied through an AC adapter, verify the DC output plug is properly attached to the control system and that the adapter is securely plugged into an outlet. If power is supplied through Cresnet cabling, ensure the cable is securely plugged into the <b>NET</b> connector.
<b>MSG</b> LED illuminates.	Hardware or software failure, hardware incompatibility with software definitions or programming error.	Verify that hardware configuration matches software configuration. Use Crestron Toolbox to display the error log. Refer to "Error Message Definitions" in the latest version of the Crestron 2-Series Control System Reference Guide (Doc. 6256) for more details.
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 <b>SW-R</b> and <b>HW-R</b> buttons at the same time to bypass program and communicate directly with the processor. (Refer to "Troubleshooting Communications" in the Crestron 2-Series Control System Reference Guide (Doc. 6256) for more details.
Cresnet device does not respond.	Device not wired correctly.	Verify Cresnet wiring.
	Improper NET ID used.	Verify that device ID matches NET ID in the program.

*(Continued on following page)*

*CP2 & CP2E Troubleshooting (Continued)*

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
A/V system device does not respond.	IRP2 or serial port not placed properly.	Verify placement of IRP2 (hold phosphor card under IRP2 while pressing button) and tighten serial cables.
	Used wrong IR/serial port.	Verify that proper IR or serial port is defined.
	Serial cable not wired correctly.	Verify that serial cable is wired correctly for RS-232, 422 or 485.
	Device is not receiving sufficient power.	Use the Crestron Power Calculator to help calculate how much power is needed for the system.

**NOTE:** If communication cannot be established or the control system is locked-up, refer to “Troubleshooting Communications” in the Crestron 2-Series Control System Reference Guide (Doc. 6256).

**NOTE:** *Passthrough Mode* enables Viewport access to any serial controlled device on the network. This aids in troubleshooting by allowing direct communication between the PC and a network device (effectively “passing through” the CP2 or CP2E). For information pertaining to Passthrough Mode, refer to “Passthrough Mode” in the Crestron 2-Series Control System Reference Guide (Doc. 6256)

### **Network Analyzer**

To assist with troubleshooting, the unit contains Crestron’s patent-pending network analyzer to continuously monitor the integrity of the Cresnet network for wiring faults and marginal system performance or other network errors. For more information on how to use the network analyzer, refer to the Crestron Toolbox help file and use the index to search for “Network Analyzer”.

### **Battery Replacement**

A Lithium battery is used to power the system clock within the CP2 & CP2E. Under normal conditions, it will last for approximately 10 years. In the event that the clock fails, only an authorized technician should replace it. Refer to caution statement below.

**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.

### **Check Network Wiring**

#### *Use the Right Wire*

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

#### *Calculate Power*

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

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

When calculating the length of wire for a particular Cresnet run, the wire gauge and the Cresnet power usage of each network unit to be connected must be taken into consideration. Use Crestron Certified Wire only. If Cresnet units are to be daisy-chained on the run, the Cresnet power usage of each network unit to be daisy-chained must be added together to determine the Cresnet power usage of the entire chain. If the unit is a 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

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

<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)</p>
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Make sure the cable length value is less than the value calculated on the right side of the equation. For example, a Cresnet run using 18 AWG Crestron Certified Wire and drawing 20 watts should not have a length of run more than 333 feet. If Cresnet HP is used for the same run, its length could extend to 1250 feet.

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

#### Strip and Tin Wire

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

#### Add Hubs

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

## Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron website (<http://www.crestron.com/manuals>). This link will provide a list of product manuals arranged in alphabetical order by model number.

#### List of Related Reference Documents

DOCUMENT TITLE
2-Series Control Systems Reference Guide

## Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by

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

You can also log onto the online help section of the Crestron website to ask questions about Crestron products. First-time users will need to establish a user account to fully benefit from all available features.

## **Future Updates**

As Crestron improves functions, adds new features and extends the capabilities of the CP2 & CP2E, 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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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.

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