Crestron **C2ENET-1/-2**
2-Series Ethernet Interface Expansion Card
Operations & Installation Guide

CRESTRON®

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

Contents

2-Series Ethernet Interface Expansion Cards: C2ENET-1 & C2ENET-2

Introduction

Features and Functions

The 2-Series Ethernet Interface Expansion Cards, C2ENET-1 and C2ENET-2, are 10/100 BaseT half/full duplex Ethernet cards designed for use in the Z-bus slot of Crestron's AV2, PAC2, PRO2, and RACK2 2-Series control systems. The C2ENET-1 is a single-port WAN/LAN card, while the C2ENET-2 is a dual-port WAN/LAN card that, once installed, activates a control system's built-in firewall, router and network address translator (NAT). Either card allows for remote diagnostics and upgrades, access to Crestron's network analyzer, and the ability to activate any device connected to a local control system via the Internet/Intranet.

Throughout this guide, all references to C2ENET-1/-2 apply to both versions except where noted.

As part of Crestron e-Control®, the C2ENET-1/-2 allows Internet communications to a control system. Web pages created in VisionTools® Pro-e (VT Pro-e) or other web page development tools can be uploaded and stored in the control system's file system. Refer to the latest version of the 2-Series Control System Reference Guide, (Doc. 6256) for more information.

The C2ENET-1/-2 allows up to 30 IP connections to simultaneously communicate with a control system. A control system can be accessed through the World Wide Web using the Microsoft® Internet Explorer browser. For a Crestron e-Control demonstration, go to www.crestron-econtrol.com. Further information and additional Crestron e-Control software can be obtained from the Software Updates section (e-Control subsection) of Crestron's website (www.crestron.com).

Functional Summary

- 10/100 BaseT half/full duplex design
- High-speed Ethernet connectivity
- Dual LAN/WAN ports in C2ENET-2
- Supports all Internet Protocols

Specifications

The following table provides specifications for the C2ENET-1/-2.

Specifications of the C2ENET-1/-2

SPECIFICATION		DETAILS
Power Requirements:	C2ENET-1	2 Watts (0.083 amps @ 24 VDC)
	C2ENET-2	3 Watts (0.125 amps @ 24 VDC)
Network Type		10/100BaseT, half or full duplex
Protocols		TCP/IP, UDP/IP, ICMP (Ping), & HTTP
SIMPL™ Windows®		Version 2.00 or later [1]
VT Pro-e		Version 2.3.3.1 or later [1,2]
2-Series Control System Update File [3]		Version C2-1001.CUZ or later [4]
Internet Explorer		Version 4.0 or later
Netscape Navigator		Version 4.5 or later
IP Address Configuration		Static and dynamic addressing
Dimensions		Height: 0.98 in (2.49 cm)
		Width: 4.28 in (10.86 cm)
		Depth: 4.71 in (11.95 cm)
Weight:	C2ENET-1	2.40 oz (0.07 kg)
	C2ENET-2	2.60 oz (0.08 kg)

1. The latest software versions can be obtained from the Downloads | Software Updates section of the Crestron website (www.crestron.com).
2. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems that are Ethernet-enabled directly or via a C2ENET-1/-2 Ethernet card.

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

Physical Description

The C2ENET-1 and C2ENET-2 (refer to graphics below and on next page) are printed circuit boards (PCBs) fastened to aluminum faceplates. The cards are designed to be installed in a Z-BUS expansion slot on the 2-Series control systems. Two thumbscrews secure the cards.

The C2ENET-1 contains one 8-wire RJ-45 Ethernet/LAN port. The C2ENET-2 contains two 8-wire RJ-45 ports (LAN A and LAN B). The port(s) is used for connection using an Ethernet cable (refer to cable connection example on page 4) to the Ethernet.

C2ENET-1
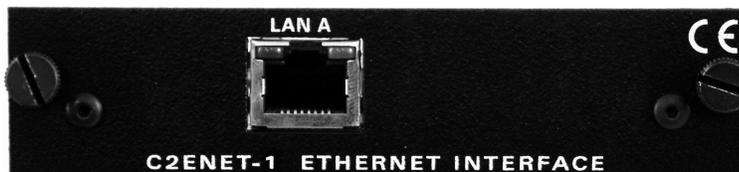
C2ENET-2
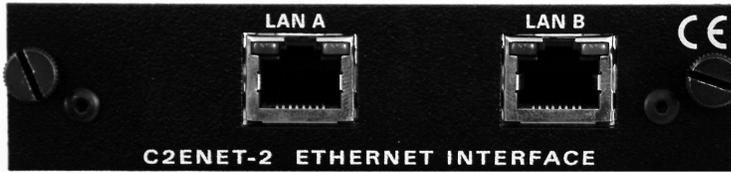
NOTE: When the C2ENET-2 is used as a router, the WAN must be connected to LAN A and the LAN must be connected to LAN B.

As shown in the illustration below, the port(s) contains two light-emitting diodes (LEDs). The green LED in the upper-left corner of the port(s) illuminates when it is connected to a working Ethernet. The yellow LED in the upper-right flashes to indicate Ethernet activity.

C2ENET-1 & C2ENET-2 Faceplates
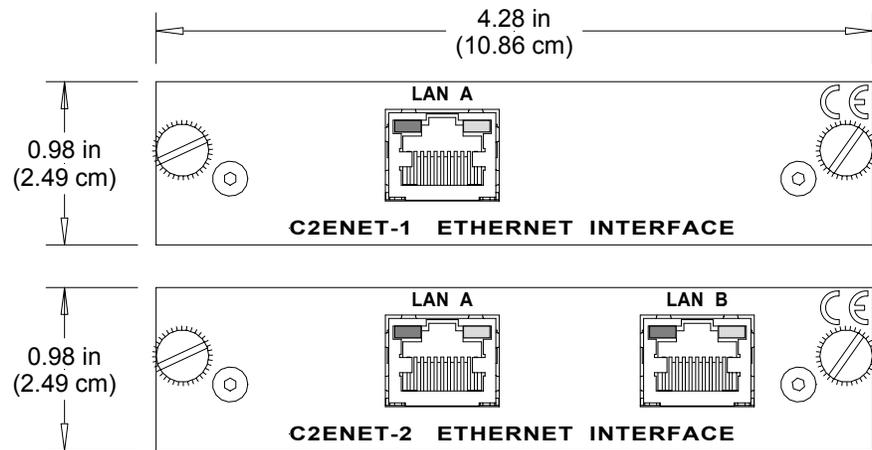
C2ENET-1/-2 Port Indicators
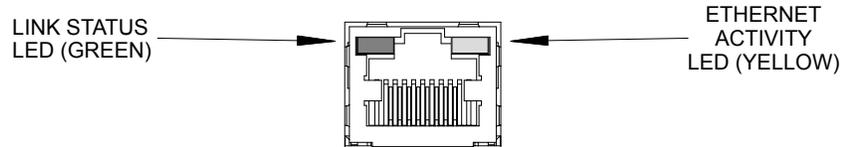
Industry Compliance

As of the date of manufacture, the C2ENET-1/-2 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.

Ethernet Cable Connections

The following illustrates connection examples using a straight-through or crossover Ethernet cable.

Ethernet Cable Connection Example

Hub

Ethernet
Straight-through
Cable

Ethernet
Straight-through
Cable

N I C

C 2 E

PC

Crestron
Control

LAN Connection Example

NIC - Network Inteface Card
C2E - C2ENET-1/-2

N I C

PC

Ethernet
Crossover Cable

C 2 E

Crestron
Control

Local Connection Example
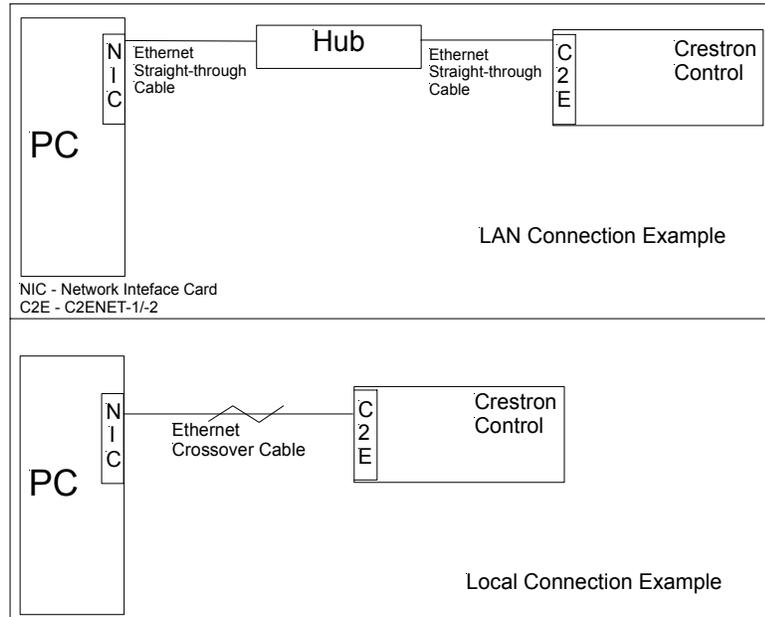
Connection to LAN

If the control system is connected to a larger network via a hub, make sure that a straight (non-crossover type) Ethernet cable is used and that the cable is not connected to the UPLINK port of an Ethernet hub.

Connection to PC

If the system is connected directly to a personal computer (PC) Ethernet card, make sure that the cable between the C2ENET-1/-2 is a crossover type.

RJ-45 Pinouts

The following illustrates pinouts for a straight through and crossover RJ-45 Ethernet cables. Pins 4, 5, 7 and 8 are not used.

RJ-45 Pinouts

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

PIN 1

RJ-45M
Male

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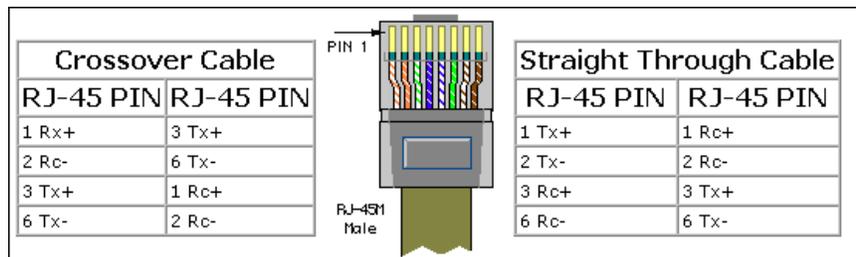
Setup

This section contains hardware installation and IP setup instructions for the C2ENET-1/-2.

Required Tools/Hardware
#1 Phillips screwdriver Grounding strap (recommended) Straight-through RS 232 cable with a male DB9 connector and a female DB9 connector PC with Viewport installed and open Crestron Control System Ethernet cable (straight thru or crossover)

Installation

CAUTION: The C2ENET-1/-2 and the control system contain electro-static discharge (ESD) sensitive devices. Crestron recommends that you wear a grounding strap to avoid damaging the card and/or the control system.

1. Disconnect power and Cresnet cables from the control system.

2. At the control system rear panel, remove the Z-BUS expansion slot blank faceplate. Refer to the following three examples.

AV2 (AV2 with Card Cage & PRO2 Similar) Z-BUS Expansion Slot Example
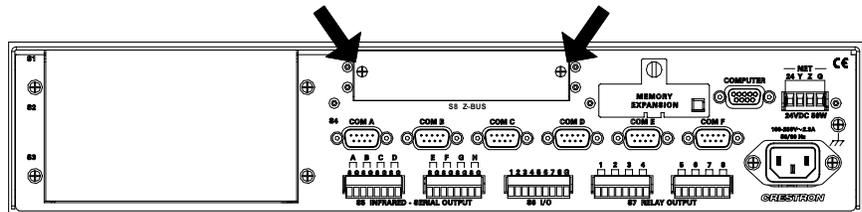
PAC2 Z-BUS Expansion Slot Example
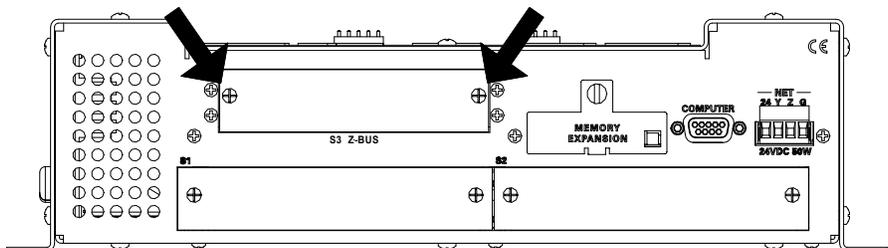
RACK2 Z-BUS Expansion Slot (Slot 1 shown) Example
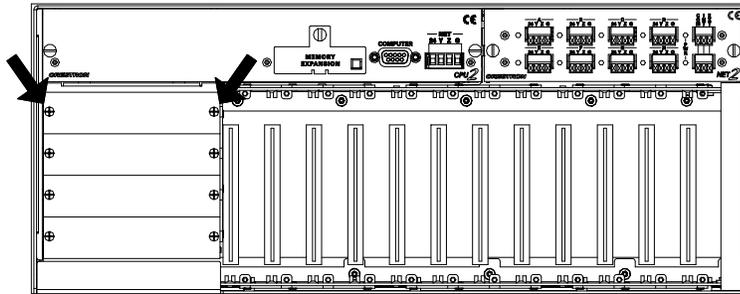
3. Remove the Ethernet card from its packaging.

4. On the Ethernet card, make sure the thumbscrews are extended outward, align the card with the card guides in the open Z-BUS expansion slot, and slide the card into slot.

5. Firmly press both ends of the card faceplate to seat it on the Z-BUS connector.

CAUTION: DO NOT FORCE CARD IN SLOT.

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6. Tighten the thumbscrews to finger-tight to secure the card.

7. Reapply power and connect the Cresnet and Ethernet cables.

IP Setup

This section provides step-by-step instructions to configure a control system to communicate over Ethernet using standard static IP configurations. The following illustration shows a simplified example of a possible IP setup. The control system and router are assigned IP numbers using Viewport. The external router is not configured using Viewport.

IP Setup
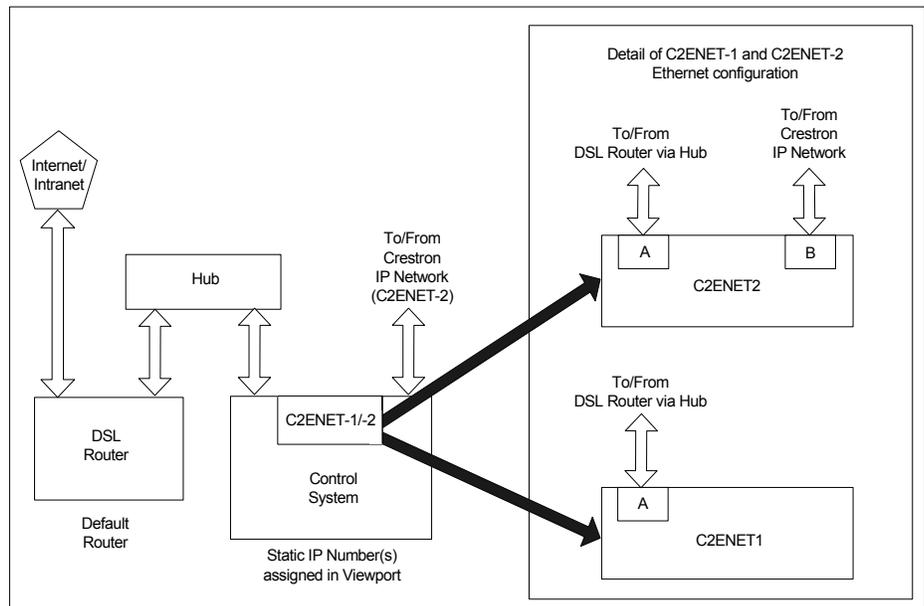
For Static IP Addressing

The following instructions assume that the C2ENET-1/-2 is installed, Viewport is open on the PC, and the control system is powered up.

NOTE: If the PC has a DB25 male connector, obtain a DB9 to DB25 adapter (the adapter has a DB9 male end and a DB25 female end).

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:

> Belkin (large model) F5U103
> Belkin (small model) F5U409
> I/O Gear GUC232A (discontinued)
> Keyspan USA-19QW (discontinued)

Results may vary, depending on the computer being used. Other models, even from the same manufacturer, may not yield the same results.

1. Use the appropriate cable to connect the RS 232 COMPUTER port of the control system and the serial port of the PC.

NOTE: It is assumed that your PC is communicating with the control system and the appropriate update file has been loaded.

2. Obtain appropriate control system static IP and router addresses from the/your network administrator.

NOTE: The next three steps have you verify that the static IP address is not being used by another device.

3. On the PC, select **Start | Run** from the Taskbar to open the "Run" window.

4. Type **command** in the *Open* field and click **OK**. A DOS window appears.

5. At the prompt, type PING and the IP number. Press **Enter**.

   Example: PING 192.168.1.102

NOTE: Make sure you put a space between PING and the IP number.

NOTE: If the system shows a "Request timed out", go to step 6. If the system shows a "Reply from" with a time, the IP number is already in use. Obtain another IP number and repeat step 5.

6. Open the Crestron Viewport and select **Functions | Set Control System IP Information** from the main menu. The "Ethernet Configuration" window opens (refer to following graphics).

Set Control System IP Information
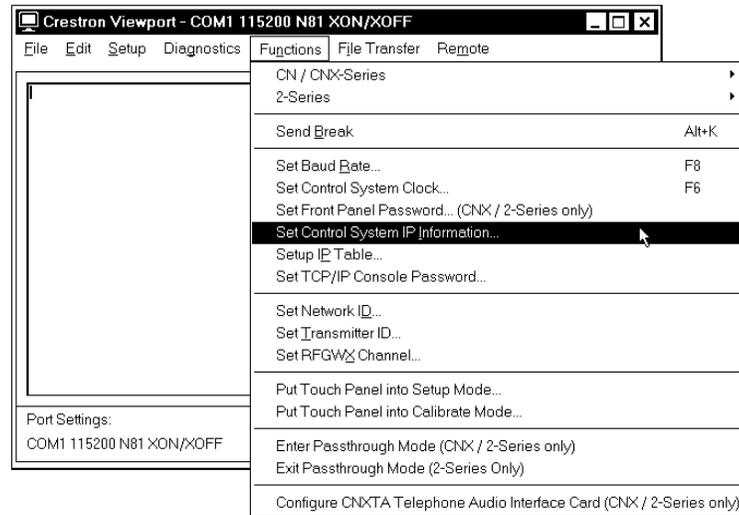
"Ethernet Configuration" Window
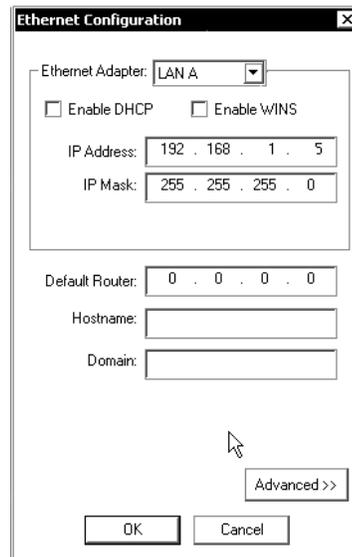
In the above example, the control system is set to the IP address 192.168.1.5. The subnet mask is the default for that address class (Class C), 255.255.255.0, and the default router address is set to 0.0.0.0.

Static values can be set for the LAN B side of the C2ENET-2 card the same way. Simply select **LAN B** from the *Ethernet Adapter* list.

The C2ENET-2 card allows you to create a sub-network within a larger corporate or residential LAN. Here, LAN A is the public side that is visible to users on the larger network, while LAN B is the internal LAN of e-Control devices. In this way, a network administrator would need to provide one static IP address for the public (LAN A) side. Alternatively, the LAN A side can be configured for dynamic IP addressing.

When assigning an IP address for LAN B, it is recommended that you choose from the private IP address classes.

The network addresses of LAN A and LAN B cannot be the same. For example, if the same subnet mask is applied to both IP addresses and the resulting network

address is 192.168.1.0, then an error message will be generated. Refer to the "e-Control Hardware Configuration" section within the latest version of the Crestron e-Control® Reference Guide (Doc. 6052) for more information.

For Dynamic IP Addressing

1. Select the *Enable DHCP* check box to enable DHCP with a Windows 2000/3000 Server; for a Windows NT 4.0 Server, select both the *Enable DHCP* and the *Enable WINS* check boxes. The *IP Address* and *IP Mask* fields will be ignored if either check box is selected. (Refer to VT Pro-e on-line help for more information on DHCP settings.)

2. Enter the hostname of the control system in the *Hostname* field. The hostname identifies the machine on the network and is automatically translated into the numerical IP address. The hostname can consist of up to 64 characters. Valid characters are 0 – 9, A – Z (not case sensitive), and the dash (hyphen character). No other characters are valid. The hostname cannot begin with a dash or number.

3. The IP address of the default router is provided by the DHCP server and thus the *Default Router* field should be left blank.

"Ethernet Configuration" Window
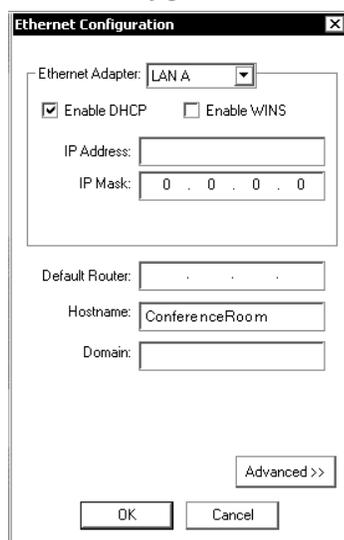
If applicable, enter the domain in the *Domain* field. This is necessary only if you are configuring DHCP on an Ethernet connection to a control system that currently has a static address. The domain name will be used to reconnect to the control system after it reboots. With a serial connection, the domain does not need to be entered.

NOTE: The domain supplied by the DHCP server will overwrite the domain that is indicated in this field.

Advanced Settings (optional):

1. Click the **Advanced** button to set optional parameters. (Refer to the figure on the next page.) You can enter the IP address of the primary DNS server in the *DNS Server 1* field; enter the IP address of the secondary DNS Server in field 2.

If the DHCP server provides the address for the DNS server, it is not necessary to enter these values. Here the DNS server addresses will automatically be filled in.

2. You have the option to change the CIP and CTP port numbers in rare cases where a network conflict may exist with ports 41794 and 41795.

The Web port can be changed for security reasons if no firewall or router is protecting the network. To prevent attacks by hackers the port can be moved to another value. Users on the LAN would then have to specify the port number in the URL, i.e., http//www.crestron.com:49153 where the value after the colon indicates the Web port.

In most cases, the port numbers do not need to be changed.

"Ethernet Configuration" Advanced Settings Window

3. The *Enable Web Server* check box turns the Web server on and off.

4. When you are satisfied with the IP settings click **OK** to reboot the control system.

Once you have set the IP information for the control system, it becomes possible to communicate with the console via TCP/IP.

Click **Communication Settings** on the Viewport **Setup** menu and choose **TCP/IP** as the connection type. Then enter the IP address or fully qualified domain name of the control system.

The Viewport title bar will display the new communication settings, e.g., "Connected to ConferenceRoom.com on Port 41795."

For information on secure sockets layer (SSL) configuration, refer to the latest versions of the Crestron 2-Series Control Systems Reference Guide (Doc. 6256), and the Crestron e-Control Reference Guide (Doc. 6052). They may be downloaded from the Downloads | Product Manuals | Software section of the Crestron website (www.crestron.com).

Verify Communication

1. To verify the C2ENET card communication, open Viewport on your PC and select **Remote | TCP/IP | Connect** from the Taskbar. The "Crestron Viewport TCP/IP Connect" window appears.

Crestron Viewport TCP/IP Connect
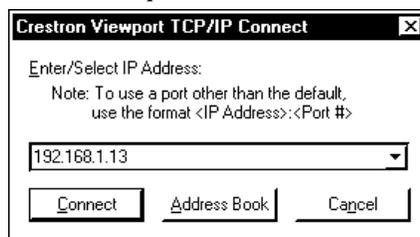
2. Enter the IP number you entered earlier and click **Connect**. The Crestron Viewport confirms the connection.

Crestron Viewport TCP/IP Confirmation
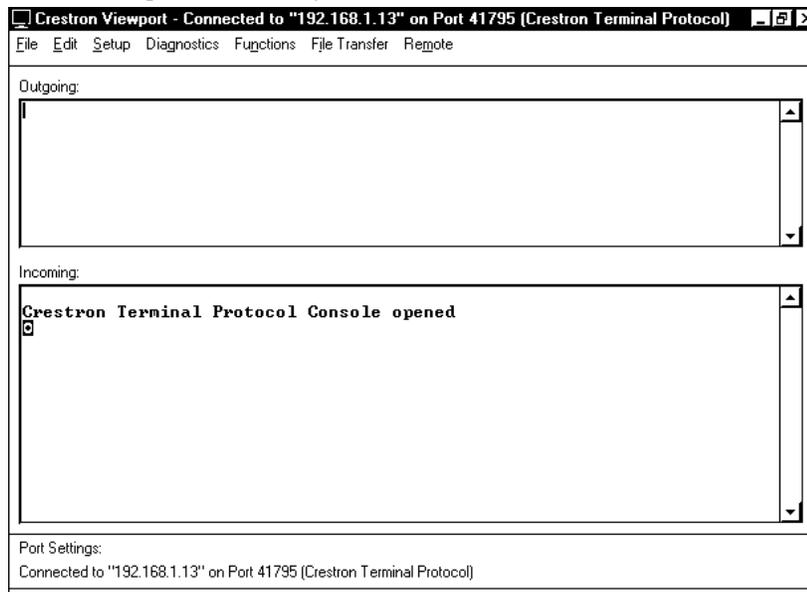
NOTE: If the following Error window opens, verify IP address and repeat steps 1 and 2.

Error Window

```
Communications ERROR                    ☒
  ⚠️   Could Not Connect to 192.168.1.13

              [   OK   ]
```

Setting a Control System Ethernet Password

After establishing communication with a control system via Ethernet, the Viewport may be used to set (or change) a password to limit access to the control system.

NOTE: The Ethernet password protects console communications (file transfer, diagnostics, etc.), it does not prevent users from browsing web pages.

Do the following to set a password:

1. In Viewport, select **Functions | Set TCP/IP Console Password**. The "Enter New Password" window opens (refer to subsequent graphic).

Viewport Set TCP/IP Control Password option

```
☐ Crestron Viewport - COM1 115200 N81 XON/XOFF          _ □ ☒
File   Edit   Setup   Diagnostics   Functions   File Transfer   Remote

                                CN / CNX-Series                              ▶
                                2-Series                                     ▶

                                Send Break                              Alt+K

                                Set Baud Rate...                           F8
                                Set Control System Clock...               F6
                                Set Front Panel Password... (CNX / 2-Series only)
                                Set Control System IP Information...
                                Setup IP Table...
                                Set TCP/IP Console Password...

                                Set Network ID...
                                Set Transmitter ID...
                                Set RFGWX Channel...

                                Put Touch Panel into Setup Mode...
                                Put Touch Panel into Calibrate Mode...

Port Settings:                  Enter Passthrough Mode (CNX / 2-Series only)
COM1 115200 N81 XON/XOFF        Exit Passthrough Mode (2-Series Only)

                                Configure CNXTA Telephone Audio Interface Card (CNX / 2-Series only)
```

2. Enter and verify a new password and click **OK**.

"Enter New Password" Window

```
Enter New Password                      ☒
New Password:
[ ****** ]

Verify New Password:
[ ****** ]

☐ Disable Password

      [   OK   ]    [  Cancel  ]
```

Network Address Translation for Crestron 2-Series Control Systems

Network Address Translation (NAT) is a method of connecting multiple computers on an internal network to the Internet (or any other IP network) using one publicly visible IP address. Current implementation for the Crestron 2-Series control systems includes a combination of the Network Address Port Translator protocol (NAPT) and Bi-Directional NAT. NAT functionality is included in the firmware of Crestron 2-Series control processors, and enabled through a dual port Ethernet Z-bus expansion card (C2ENET-2 only).

For specific details on NAT, including setup and configuration, refer to the latest version of Doc. 6001, Crestron Network Address Translator (NAT) Reference Guide. It is available from the Downloads | Product Manuals | Miscellaneous section of the Crestron website (www.crestron.com).

Enabling the C2ENET Card for e-Control® 2

You must be licensed to use e-Control 2, but the process is simple. *

1. With your PC connected to the control system, open the Viewport and verify communication as described in "Verify Communication" on page 11.

2. From the Viewport menu, select **Functions | e-Control 2 Activation.** The system displays the "e-Control 2 Activation" window. As stated on the screen, submit the displayed Ethernet Card Code to Crestron customer service.

3. Activate e-Control 2 by entering the activation code received from customer service in the *Activation Code:* field and pressing **Activate.**

"e-Control 2 Activation" Window

* This applies only to e-Control projects for XPanel PPC and XPanel HPC.

Programming Software

Have a question or comment about Crestron software?

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

You can create a program that allows you to control a network device through a Crestron control system via a C2ENET-1/-2 card using the Crestron programming tool SIMPL Windows. The following are minimum software version requirements for the PC:

- SIMPL Windows version 2.01.06, or later. Requires SIMPL+ Cross Compiler version 1.1.
- VT Pro-e version 2.4 or later.
- Crestron Database version 15.7.3 or later.

Programming with SIMPL Windows

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

NOTE: In the following description, the PRO2 control system and the C2ENET-2 are used.

SIMPL Windows is Crestron's software for programming Crestron control systems. It provides a well-designed graphical environment with a number of workspaces (i.e., windows) in which a programmer can select, configure, program, test, and monitor a Crestron control system. SIMPL Windows offers drag and drop functionality in a familiar Windows® environment.

This section explains how to create a SIMPL Windows program that includes a C2ENET-1/-2.

Configuration Manager is where programmers "build" a Crestron control system by selecting hardware from the *Device Library*. In Configuration Manager, drag the PRO2 from the Control Systems folder of the *Device Library* and drop it in the upper pane of the *System Views*.

The PRO2 with its associated communication ports is displayed in the *System Views* upper pane.

PRO2 System View
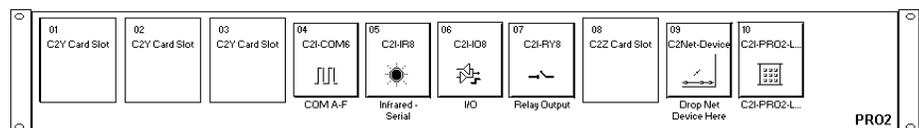
The *System Views* lower pane displays the PRO2 system tree. This tree can be expanded to display and configure the various slots.

Expanded PRO2 System Tree
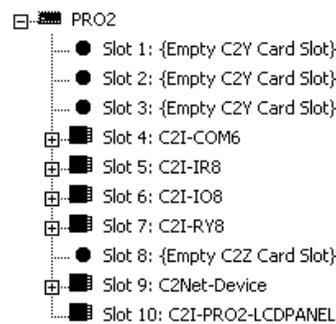
C2Z Card Slot in Configuration Manager

The C2Z Card Slot can accept a C2ENET-2, which enables the PRO2 to address up to 252 Ethernet devices. Each Ethernet device is assigned a unique identifier called an IP ID, which is a hexadecimal value ranging from 03 to FE.

In Configuration Manager, drag a C2ENET-2 from the Plug-in Control Cards | Cards (2-Series Z Bus) folder of the *Device Library* and drop it on the PRO2 C2Z Card Slot in *System Views*. The *System Views* upper pane displays the Ethernet Units icon below the PRO2 graphic.

To view the list of supported devices, expand the control system in the bottom pane of *System Views* and double-click Slot 8: C2ENET-2. Supported devices include Ethernet control modules, PC and Web browser interfaces, and a variety of Crestron Ethernet touchpanels. To add a device to the system, expand the slot and double-click the desired IP ID, or right-click and select **Add Item** from the submenu. Then select the device you want to add.

In Program Manager, the C2ENET-2 symbol contains no signals; to program a controlled Ethernet device, expand the C2ENET-2 symbol in *Program View*. Then drag the symbol to *Detail View*. (Alternatively, you can double-click the symbol.)

About the IP Table

For the PRO2 (or any Ethernet-enabled control system) to control devices via Ethernet, the IP ID (all Cresnet devices are assigned IP IDs) of the device must be associated with an IP address, and both the IP ID and IP address must be entered into the IP table of the control system.

You can create an IP table in two ways. The first method is to double-click the device in Configuration Manager to open the "Device Settings" window. Click the *IP Net Address* tab and enter the IP address of the device in the *IP Address* field. Repeat this procedure for all Ethernet devices in your system. This creates what is referred to as a "default" IP table. When the program is compiled and ready to be uploaded to the control system, you will have the option to upload this default IP table.

The second method is to use the Crestron Viewport. This method is especially useful on site if you want to change one or more IP addresses without changing the program.

Alternatively, as with all 2-Series control systems, the PRO2 also has the capability to function as a peripheral device, or "slave", in a master/slave arrangement with

another control system. Here the IP table of the PRO2 must contain just one entry for the master control system.

Refer to the "Creating an IP Table" section within the latest version of the Crestron e-Control® Reference Guide (Doc. 6052) for more information.

Example Program

An example program for the C2ENET-1/2 is available from the Crestron website (www.crestron.com). Select Downloads | Example Programs | Miscellaneous | e-Control 2.

Uploading a Program
Refer to a 2-Series control system document for uploading information.

TCP/IP Client and TCP/IP Server Symbols

In typical TCP/IP Terminology, a client connects to a server. Our server symbol can handle only one connection to it. Since the sockets are generic TCP/IP, the client can connect to any server (Crestron's TCP/IP Server symbol or any non-Crestron server) and the server can accept a connection from any client (Crestron's TCP/IP Client symbol or any non-Crestron client).

The server symbol "listens" for a connection on a particular socket, and a client symbol is capable of connecting or disconnecting a socket. A socket is comprised of an IP address and a port number. The IP address is specified in the IP table on the IP ID where the symbol resides and the port number is specified in the symbol. For example, if the server symbol is dropped on IP ID 15, and the IP table entry for IP ID 15 is 192.168.1.1, the server will listen for a connection from a 192.168.1.1 on the port number specified in the symbol.

NOTE: An IP address entry of **0.0.0.0** allows connection from any IP address. If the IP table contains valid IP addresses, connection will be allowed only from the specified addresses.

The following diagrams show the TCP/IP Client and the TCP/IP Server symbols in SIMPL Windows.

Detail View of the TCP/IP Client Symbol in SIMPL Windows' Programming Manager
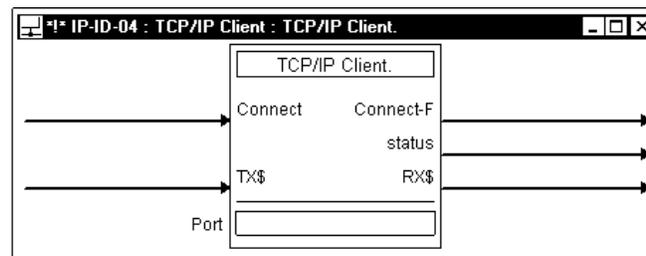
The TCP/IP Client symbol enables TCP/IP communication between the control system and a device that has a TCP/IP port. The symbol must be assigned the IP address of the device, while the port address of the device must be entered in the <**Port**> parameter of the symbol. Both the IP address and port should be found in the manufacturer's documentation.

The symbol initiates the connection on the rising edge of <**Connect**>; when communication is established, <**Connect-F**> goes high. Serial data can then be

transmitted and received via <**TX$**> (transmit) and <**RX$**> (receive) for as long as <**Connect-F**> remains high.

The <**status**> output is used for diagnostics and reports the connection status. The valid values are shown in the following table:

Analog Value	Connection Status
0	Not connected
1	Waiting for connection
2	Connected
3	Connection failed
4	Connection broken remotely
5	Connection broken locally
6	Performing DNS lookup
7	DNS lookup failed

The TCP/IP Client symbol differs from the TCP/IP Server symbol (refer to graphic below) in that the Server symbol can only listen for a connection from a device, whereas the Client symbol can initiate the connection.

Detail View of the TCP/IP Server Symbol in SIMPL Windows' Programming Manager
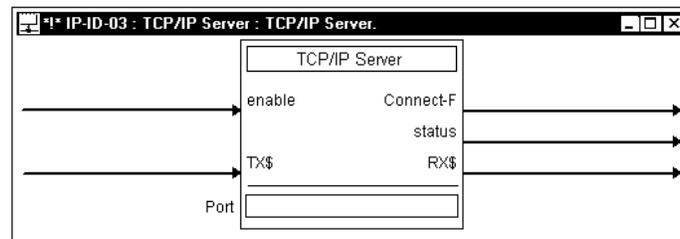
The TCP/IP Server symbol enables TCP/IP communication between any device with a TCP/IP port and the control system. It differs from the TCP/IP Client symbol in that the latter symbol can initiate a connection with a device, whereas the TCP/IP Server symbol can only listen for a connection.

The symbol must be assigned the IP address of the device, while the port address of the device must be entered in the <**Port**> parameter of the symbol. Both the IP address and port should be provided by the manufacturer's documentation.

When the device establishes communication with the symbol, the <**Connect-F>** output goes high. Serial data can then be transferred via <**TX$**> (transmit) and <**RX$**> (receive) for as long as <**Connect-F**> remains high.

The <**status**> output is used for diagnostics and reports the connection status. The valid values are the same as those shown in the previous table.

The optional <**enable**> input has a default value of 1. If <**enable**> is defined and goes low, no connection can be established (and <**status**> will equal 0).

Programming with VT Pro-e

Information on creating web pages using VT Pro-e is in the VT Pro-e help file under the section "Web Browser Projects."

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 MP2E. 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 control system. (For further information on this procedure, refer to the VT Pro-e online help file.)

Uploading Web pages

The AV2/PRO2 provides a built-in Web server for e-Control applications. The AV2/PRO2 allots 2.5 MB of memory for "user files" such as Web pages, mailbox, and the compiled SPZ file. Web pages are loaded in the AV2/PRO2 using Viewport. Refer to the "Uploading Web Pages" section within the latest version of the Crestron e-Control® Reference Guide (Doc. 6052) for more information.

Problem Solving

Troubleshooting

The table below provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

C2ENET-1/-2 Troubleshooting

Trouble	Probable Cause(s)	Corrective Action
Communications via the LAN port is not functioning.	C2ENET-1/-2 improperly installed.	Follow installation procedures in this guide.
	Improper Ethernet connection.	Verify proper connection at Ethernet port.
	Damaged connector pins.	Follow installation procedures in this guide and inspect connector pins.
	Incorrect firmware/software.	Update firmware/software versions per the specifications in this guide.
	Another device on the LAN has the same/conflicting IP address.	Disconnect NET/IP cable from the control system. Ping the IP address of the control system. If a reply occurs, obtain a new static IP address for the control system.
Conflicting IP address window opens after entering IP addresses in new IP address fields.	IP Subnet for LAN A and LAN B match (C2ENET-2 only).	Change LAN B IP address so that WAN and LAN no longer conflict.
Objects on Web page do not draw correctly.	File transfer error.	Reload Web page project.
Cannot communicate with control system through router.	Appropriate port not open through router.	Verify port 80 is open for Web hosting. Verify port 41795 is open for Crestron diagnostics. Verify port 41794 is open for CIP.
Control system runs slow or crashes on LAN.	Potential virus on Web port 80.	Change Web port via Viewport using console commands, or click the **Advanced** button in the *Ethernet Configuration* window. (Refer to "Advanced Settings (optional): on page 9 of this guide.

Further Inquiries

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

- In the US and Canada, call Crestron's 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 Control Solutions at +61-2-9737-8203.

Firmware Upgrades

To take advantage of all the C2ENET's features, it is important that the unit contains the latest firmware available. Therefore, please check Crestron's 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 upgrades procedures, contact Crestron customer service.

Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the C2ENET-1/-2, 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 relevance. Updates are available from the Download | Product Manuals section and are identified as an "Addendum" in the Download column.

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Glossary of Terms

2-SERIES CONTROL SYSTEM

Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems that are Ethernet-enabled directly or via a C2ENET-1/-2 Ethernet card.

CRESNET ID

Cresnet ID, a unique identity code ranging from 03 to FE (in hexadecimal), is given to all devices that communicate using the Cresnet network protocol.

DEFAULT ROUTER

A default router is a router that sends packets within the local network to destinations outside of the local network, or receives them from outside and propagates them onto the local network. It is also referred to as a Gateway.

ETHERNET HUB

Inexpensive four to 16 port devices that provide a way to physically tap into an existing Ethernet connection and expand the plugs available, but do not perform any packet routing.

GATEWAY

See Default Router above.

IP ADDRESS

Internet protocol address is a unique number that is used to represent every single computer in a network. All the computers on the Internet have a unique IP address. The format of the IP address is four numbers separated by dots (e.g., 198.123.456.7).

IP ID

The IP ID is a two-digit hexadecimal number that is used to differentiate a given device from a group of Ethernet devices in a control system with the same IP address. Just as the Net ID is used to distinguish between identical devices within a SIMPL Windows program, the IP address for a specific IP ID in the control system's IP table must be set to the IP address of the given device. Furthermore, the IP ID in the given device's static master table must be set to the IP address of the control system.

IP TABLE

An IP table lists IP IDs and their corresponding IP addresses. This table is maintained inside each control system, though it may be generated by a SIMPL Windows program, or edited manually using the Viewport utility.

NETWORK ADDRESS

A network address is a pattern of bits in IP address format that is shared by all network devices on a given local network. For example, network address 192.168.2.0 describes the local network where all devices have an IP address of 192.168.2.x, where x is any value from 1 to 254.

ROUTER

Router is a communications device which routes data between networks.

SUBNET MASK

A mask simply conceals something. With respect to an IP address, a mask is simply a screen of numbers that reveals a set of numbers on which to focus. For example, consider the IP address 150.215.017.009. Assuming this is part of a Class B network, the first two numbers (150.215) represent the Class B network address, and the second two numbers (017.009) identify a particular host on this network. Therefore, the subnet mask is the network address plus the bits reserved for identifying the sub network. (By convention, the bits for the network address are all set to 1, though it would also work if the bits were set exactly as in the network address.) In this case, therefore, the subnet mask would be 11111111.11111111.11110000.00000000. It's called a mask because it can be used to identify the subnet to which an IP address belongs by performing a bitwise AND operation on the mask and the IP address. The result is the sub network address:

Subnet Mask	255.255.240.000	11111111.11111111.11110000.00000000
IP Address	150.215.017.009	10010110.11010111.00010001.00001001
Subnet Address	150.215.016.000	10010110.11010111.00010000.00000000

The subnet address, therefore, is 150.215.016.000.

TCP/IP

TCP/IP is the acronym for Transmission Control Protocol/Internet Protocol. It is a standard set of protocols that govern the basic workings of the Internet that was implemented in 1982.

The TCP part is all about ensuring that data is transmitted correctly between two computers. If any errors occur these are detected and the data is retransmitted. The data transmitted is split up into small portions referred to as data packets. The IP part of TCP/IP is how these data packets are moved from one point to another. Each computer on the Internet has a unique IP address and the data packets are moved from the source to the destination through many different computers that are controlled via TCP/IP. This protocol is used on the Internet and also by computers that are part of a LAN.

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