Crestron **2-Series Control Systems**

Reference Guide

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

Crestron Electronics, Inc.
15 Volvo Drive
Rockleigh, NJ 07647
1-888-CRESTRON

Contents

2-Series Control Systems

Introduction

Crestron® control systems are at the center of every Crestron facility control system. The 2-Series line of control systems share commonality across the product line and offer a variety of development tools and techniques previously unavailable in previous Crestron control systems. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of all 2-Series control systems.

The common architecture shared by 2-Series control systems allows similar programming tools, console commands, programming methods, and other practices to be used across the product line. This document will discuss many of the tools, features, and techniques used to program and troubleshoot a Crestron control system:

- Programming Tools & Utilities
- Establishing Communications with the Control System
- Troubleshooting Communications
- 2-Series Console Commands
- 2-Series Memory & Directory Structure
- 2-Series Control System Error Messages
- Master-Slave Modes
- Dynamic Host Configuration Protocol (DHCP)
- Secure Sockets Layer (SSL)
- Uploading & Using Web Pages
- Compiling and Uploading a Program
- Uploading Touchpanel Projects
- Firmware Upgrade
- Updating the Operating System
- Test Manager
- Network Analyzer
- Super-Debugger
- C2N-NPA8 Network Poll Accelerator

Each of the 2-Series control systems has unique features to meet a variety of system requirements. The following table lists all of the Crestron 2-Series control systems and their key features.

2-Series Control Systems and Features

	PRO2	AV2	RACK2	CP2E	CP2	MC2E	MC2W	MP2E	MP2	QM-RMC	QM-RMCRX(-BA)	CNX-DVP4 C2N-DVP4I	PAC2	
Processor:														
2-Series Engine and Dual-bus Architecture	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	
4GB Compact Flash Memory Card Slot	**X**	**X**	**X**									**X**	**X**	
Cresnet:														
Cresnet Port (Master/Slave)	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	
Integrated Cresnet Network Hub			**X**										**X**	
C2N-NPA8 Support via Com Port	**X**	**X**		**X**	**X**	**X**	**X**	**X**	**X**					
C2N-NPA8 Support via Ethernet Port	(a)	(a)	(a)	**X**		**X**		**X**				**X**	(a)	
Ethernet:														
10/100 Ethernet Port w/SSL & DHCP	(a)	(a)	(a)	**X**		**X**		**X**		**X**	**X**	**X**	(a)	
e-Control 2 Enabled	(a)	(a)	(a)	**X**		**X**		**X**		**X**	**X**	**X**	(a)	
Built-in Firewall, NAT and Router	(a)	(a)	(a)										(a)	
Integrated Control Ports:														
Com (RS-232/422/485)	**6+**	**6+**	(b)	**3**	**3**	**2**	**2**	**2**	**2**				(b)	
Com (RS-232 Only)										**2**	**2**	**4**		
IR/Serial	**8+**	**8+**	(b)	**8**	**8**	**4**	**4**	**4**	**4**	**1**	**1**		(b)	
Versiport I/O	**8+**	**8+**	(b)	**8**	**8**	**4**	**4**	**4**	**4**				**8+**	
Digital Input										**4**	**4**			
Low-Voltage Relay	**8+**	**8+**	(b)	**8**	**8**	**4**	**4**	**4**	**4**				**8+**	
Control Card Expansion Slots:														
Y-Bus	**3**	(c)	**12**										**2**	
Z-Bus	**1**	**1**	**4**										**1**	
Built-in Wireless:														
1-way 418 or 434 MHz 1-way RF							**X**							
38 kHz RC5 Infrared (IR) via CNXRMIRD						**X**	**X**	**X**	**X**					
Audio, Video and RGB:														
Integrated AV Switcher/Processor								**X**	**X**		**X**			
Integrated QuickMedia Transport											**X**			
Integrated Digital Video Processor												**X**		
Power Supply:														
Internal Univeral Power Supply	**X**	**X**											**X**	
External Power Supply Included						**X**	**X**	**X**	**X**	**X**	**X**			
Separate Power Supply Required			**X**	**X**	**X**							**X**		
Mounting:														
EIA Rack Units (Ears Included)	**2**	**2**	**4**	**1**	**1**	**1**	**1**	**1**	**1**			**2**		
Non-Rack Mount										(d)	(d)		(e)	

Notes:

a. Requires appropriate Z-bus card

b. Requires appropriate Y-bus card(s)

c. 3 Y-bus slots, requires optional CAGE2

d. Optional projector pole mount available

e. Installs in CAEN automation cabinets

Programming Tools & Utilities

Many of the activities discussed in this document require the use of Crestron's suite of programming tools and utilities. They include:

- SIMPL™ Windows®
- VisionTools® Pro-e
- Crestron Toolbox
- Test Manager
- Viewport (limited use)

The latest versions can be obtained from the Crestron website (www.crestron.com/updates).

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).

SIMPL Windows

SIMPL Windows is Crestron's software for programming Crestron control systems. It provides a well-designed graphical environment with a number of 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.

VisionTools Pro-e

Crestron VisionTools Pro-e (also referred to as VT Pro-e) Windows-based software is for drawing touchscreen pages by using two and three-dimensional graphics and text as well as video and sounds (recorded as WAV files). A set of pages make up a project. Each of these "projects" can be loaded in a Crestron touchpanel or used as a set of web pages stored on a control system for remote access to control system functions.

Crestron Toolbox

Crestron Toolbox is a replacement for Crestron Viewport. Crestron Toolbox is a broad-based software package that accomplishes multiple system tasks, primarily using an RS-232 or TCP/IP connection between a PC and one or more Crestron control systems.

You can use Crestron Toolbox to:

- Observe system processes.
- Upload operating systems and firmware.
- Upload programs and touchpanel projects.
- Set or change device Network IDs.
- Change the serial number reported by a device.

- Run scripts to automate tasks.
- Perform system diagnostics, and much more.

Crestron Toolbox allows you to perform these functions using simple graphical views and click and drag methods.

Crestron Toolbox also contains the Network Analyzer and Test Manager (expected 2Q 2006) utilities.

Network Analyzer

The Network Analyzer utility helps to identify Cresnet® network problems that can be caused by faulty devices, electrical shorts, or breaks in network wiring. Network Analyzer takes a sample of the voltage levels on the Cresnet "Y" and "Z" wires.

Network Analyzer is launched from within Crestron Toolbox by clicking the Network Analyzer icon  .

For more information on Network Analyzer, refer to “Network Analyzer” on page 75.

Test Manager

The Test Manager is a utility for testing and debugging a SIMPL Windows program, by monitoring the status of selected signals in real time. Test Manager can test any program that has been compiled and uploaded to the control system.

Test Manager is launched from within SIMPL Windows by clicking the **Test Manager** button or by selecting **Tools | Test Manager**. Test Manager can also be opened as a standalone program.

For more information on Test Manager, refer to “Test Manager” on page 71.

Viewport (Limited Use)

Where noted in this guide, the Crestron Viewport can be used to perform certain functions

Viewport is available as a pull-down command from SIMPL Windows and VT Pro-e (**Tools | Viewport**) or as a standalone utility. 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.

NOTE: Except where noted, Crestron Toolbox should be used.

Establishing Communications with the Control System

Whether uploading programs, troubleshooting, or performing diagnostics communication between the control system and a PC must be established.

In electronic terms, a "console" provides a means of communication between an operator and the central processing unit of a computer. Crestron Toolbox lets you talk to the console of a 2-Series dual bus control system. Crestron Toolbox allows the operator to establish, monitor, and troubleshoot communications directly with the control system.

Depending on the control system's capabilities, the following communication protocols may be used to communicate with a control system:

- Serial communication (RS-232) with a PC via the **COMPUTER** port on the control system
- Ethernet communication via CTP (Crestron Terminal Protocol – reserved port number, default port is 41795) *
- Ethernet communication via Secure CTP over a SSL connection to port 41797 at the IP address of the processor*
- Telnet (default port is 23)*
- Cresnet for processors operating in the Cresnet slave mode (refer to "Master-Slave Modes" on page 32)

* These methods are only available if the control system supports Ethernet.

Whether the intent is to use RS-232 or Ethernet, these methods initially require connection of the control system to a PC via RS-232.

Another method for submitting a command to the console is to use the "Console" or "User Program Commands " symbols in SIMPL Windows in the control system program. The Console symbol transmits and receives serial data to and from the control system's console. The User Program Commands symbol allows data typed at the console to be sent to the program. For more information on the Console symbol, refer to "Console Logic Symbol" on page 16. For more information on the User Program Commands symbol, refer to "User Program Commands Symbol" on page 17.

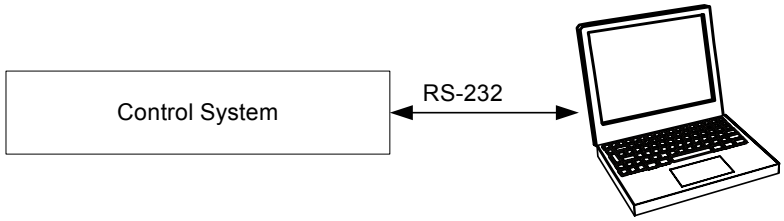
Serial Connection

Complete the following steps to establish a serial connection between a PC and a control system.

1. As shown in the following diagram, connect the **COMPUTER** port on the control system to one of the COM ports (usually COM 1) on the PC. Use a straight-through RS-232 cable with a DB9 male connector on one end and a DB9 female connector on the other. 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, 8).

   NOTE: Most of the Crestron 2-Series control systems use a straight-through RS-232 cable. However, some models use a null-modem cable. Refer to your control system's Operations Guide for cable details.

Typical Connection Diagram for Establishing Communication



NOTE: Certain control systems do not have a **COMPUTER** port and require an alternate method for establishing serial communications. Refer to your control system's Operations Guide if the control system does not have a **COMPUTER** port.

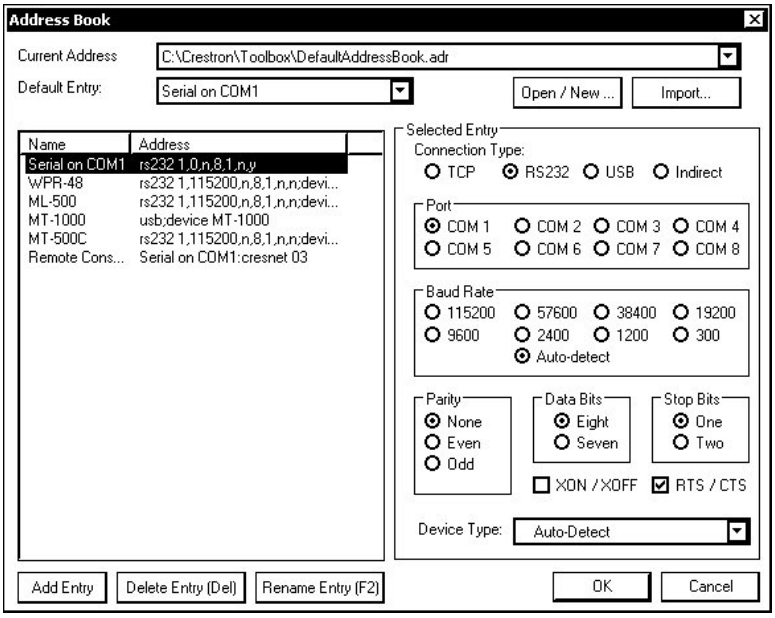
2. Open Crestron Toolbox and click **Tools | Manage Address Book** to display a list of available devices. Select a connection to a control system (if an entry for one exists), or **Serial on COM1** as the connection type. **Serial on COM1** is an address book entry for PC-to-control system communications that is included with Crestron Toolbox.

   The default settings for the **Serial on COM1** entry, which will work with most 2-Series control systems, are as follows:

   - Port = COM 1. If the PC is to communicate with a control system through a different serial port, select the correct COM port (COM1 through COM8) to be used.
   - Baud rate = Auto-detect.
   - Parity = None.
   - Number of data bits = 8.
   - Number of stop bits = 1.
   - Hardware handshaking (RTS/CTS) enabled.
   - Software handshaking (XON/XOFF) not enabled.

NOTE: If using a direct serial connection, an 8-bit serial connection must be used when transferring a binary file. If a 7-bit serial connection is used, the transfer will fail.

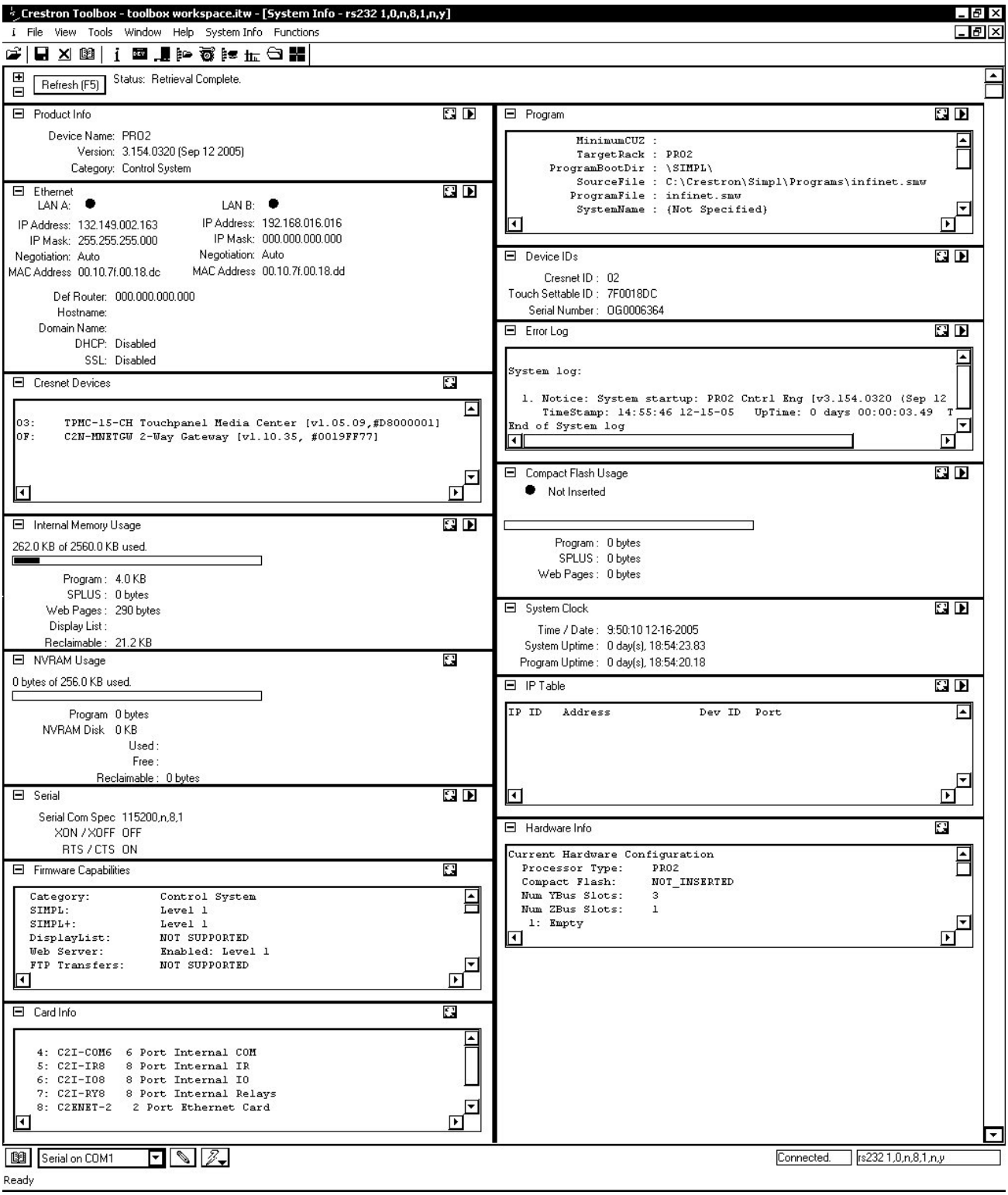
"Address Book" Window – Serial Setup



3. After setting the correct parameters, click **OK** to return to the Crestron Toolbox main window.

4. Click the  icon to display the control system information. Select the entry for the control system or **Serial on COM1** from the drop down list (located on the bottom of the screen) if it is not already selected. If communication is successful, the control system's information is displayed as shown in the following diagram.

"System Info" Window for PRO2



Once the system information is displayed a variety of functions are available to the user. For more information, refer to the Crestron Toolbox help file.

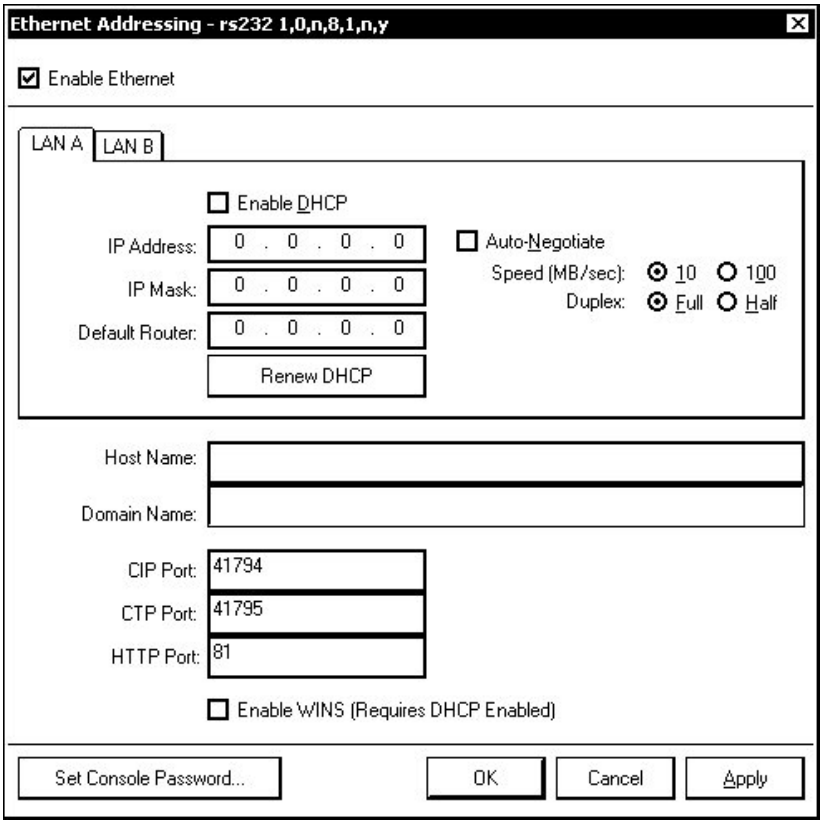
NOTE: Crestron Toolbox displays a customized list of functions depending on the type of device with which it is communicating.

TCP/IP Connection

Before communicating with an Ethernet-enabled control system over TCP/IP, a static IP address or the address/host name of the DHCP server (if DHCP is to be used) must be obtained from the network administrator. The RS-232 connection previously described must be used to configure the unit's TCP/IP settings. After configuring the IP information of the control system, further communications can be done over TCP/IP. For more information, refer to the latest version of the Crestron e-Control Reference Guide (Doc. 6052). The guide is available from the Crestron website (www.crestron.com/manuals).

1. Select **Functions | Ethernet Addressing…** to open the "Ethernet Addressing" window

"Ethernet Addressing" Window



2. Enable TCP/IP communications by checking **Enable Ethernet** and configure for static or dynamic IP operation.

   a) Static IP Operation

      i. Clear (de-select) the **Enable DHCP** check box.

      ii. Enter the static IP address and address mask in the address fields. If applicable, enter the default gateway address. (If data will not be routed outside the LAN, the default gateway can be left blank.)

The IP addresses of LAN A and LAN B cannot be the same.

iii. Enter the hostname in the **Host Name** field. The host name identifies the control system on the network and is automatically translated into the numerical IP address. The host name 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 host name cannot begin with a dash or number.

If a host name is specified, you can enter this host name instead of the IP address in the Address Book.

iv. The **Domain Name** is an additional qualifier that some networks may need to resolve the name properly.

b) Dynamic IP Operation

i. Select the **Enable DHCP** check box to enable DHCP for Windows 2000 Server.

ii. Select both the **Enable DHCP** and **Enable WINS** check boxes for Windows NT 4.0 Server. The address of the WINS server will be provided by the DHCP server.

iii. Enter the fully-qualified domain name (FQDN) of the control system into the **Host Name** field. The host name identifies the control system on the network and is automatically translated into the numerical IP address. The host name 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 host name cannot begin with a dash or number.

iv. If applicable, enter the domain into the **Domain Name** field. This is only necessary 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 name does not need to be entered.

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

v. To request a new IP address from the DHCP server click the **Renew DHCP** button.

NOTE: Other settings can be configured as well. Refer to the Crestron Toolbox help file for more information.

3. Click **OK** to reboot the control system and set the new IP information.

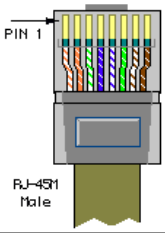
Once the IP settings have been assigned, the control system can communicate using the RS-232 connection or a TCP/IP connection.

For TCP/IP, use CAT5 straight through cables with 8-pin RJ-45 connectors to connect the LAN port on the control system 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

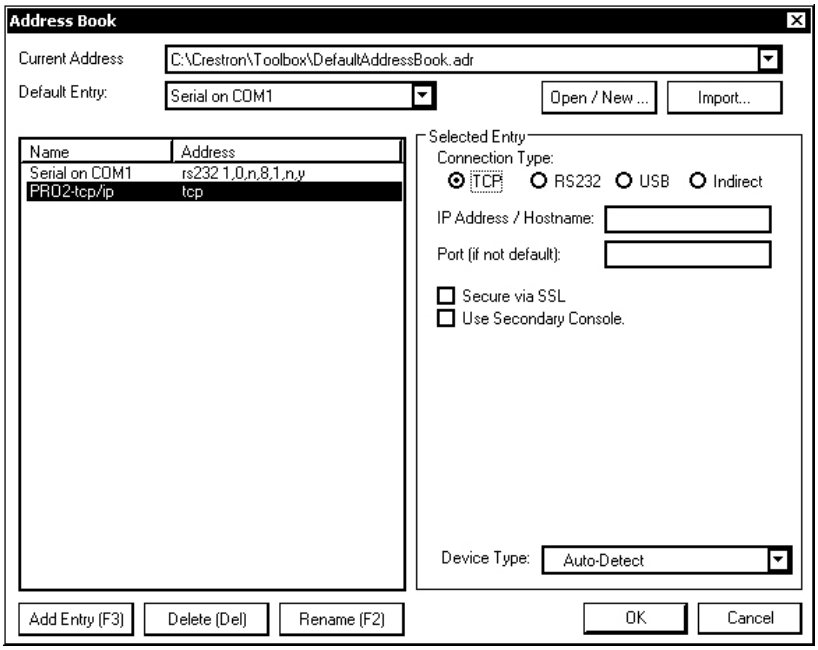
Crossover Cable	
RJ-45 PIN	RJ-45 PIN
1 Rx+	3 Tx+
2 Rc-	6 Tx-
3 Tx+	1 Rc+
6 Tx-	2 Rc-



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-

4. Open the address book in Crestron Toolbox by selecting **Tools** | **Manage Address Book** or clicking .
5. Create a new entry for the control system by clicking **Add Entry** or pressing **F3**.
6. Enter a name for the control system connection and select **TCP** as the connection type.

"Address Book" Window - Entering New TCP-IP Entry



7. Enter the IP address or hostname of the control system that was created on page 10.
8. Click **OK** to save the address book entry.
9. To verify the connection, click the icon. If the settings are correct, the "System Info" window will be displayed.

Modem Connection

In applications where remote access to a control system is required but a serial or Ethernet connection cannot be used, a modem can be connected to the control system for communication with a PC console over a standard telephone line.

NOTE: This procedure requires the use of the Crestron Viewport.

For detailed instructions and information, refer to "Appendix A: Interfacing a Control System with a Modem" on page 82.

Passthrough Mode (Viewport Only)

Viewport can be used to communicate with devices that are attached to a control system's serial port. For more information, refer to "Appendix B: Passthrough Mode" on page 89.

Troubleshooting Communications

Use the following checklist if communication cannot be established with the control system.

1. If possible remove any cards that are in the card cage, Cresnet devices and the Ethernet card (if applicable).
2. Verify that you are using the correct cables. As described previously, most RS-232 connections between a control system and a PC require a straight-through serial cable. That is, pin 1 on one end is connected to pin 1 on the other end. Pin 2 connects to pin 2, etc. With a TCP/IP connection, a CAT5 cable with 8-pin RJ-45 connectors and the wiring shown on page 11 must be used.

   NOTE: If you are using a serial adapter, Crestron Toolbox should be used to establish PC-to-control system communications.

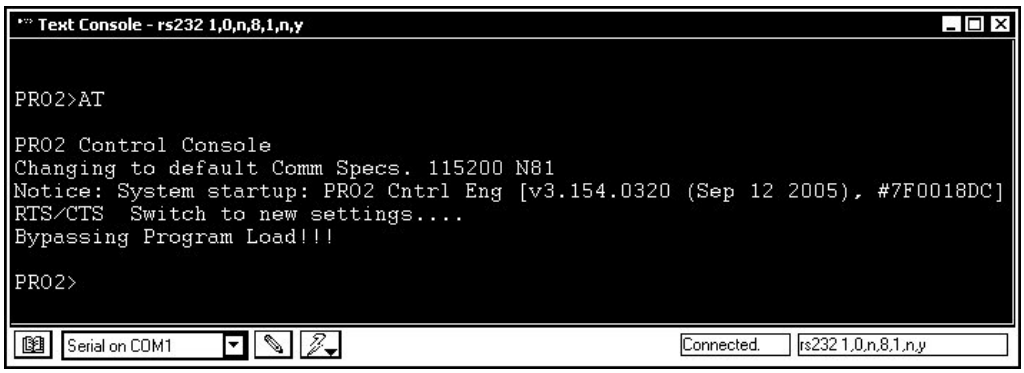
3. If using a serial connection, verify that the correct COM port on the PC has been selected. Some computers have more than one COM port; some may be internal (e.g., for a modem). Consult the manufacturer's documentation for further information about the COM ports on your PC.
4. Check the **MSG / ERR** LED indicator on the front panel of the control system. If this LED is illuminated before a program is loaded, unplug the unit and reapply power after a few seconds. If the LED illuminates again, call Crestron customer service.
5. With a serial connection, reset the control system as follows:
   a. Open Crestron Toolbox and open a text console connection to the control system by clicking and selecting the entry for the control system's serial connection from the dropdown list on the bottom of the page.

      NOTE: The address book entry for the serial connection should specify a 115200 baud rate. Do not select "Auto-Detect".

   b. Set the baud rate of the control system to 115200, as follows:

      - Press and release the **HW-R** button on the unit's front panel.
      - Immediately press and hold the **SW-R** button for approximately ten seconds. The Crestron Toolbox text console should display the following message:

Crestron Toolbox Message (PRO2 Shown)



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

c. If communication still cannot be established or the console is displaying a <CS> prompt:

- Remove power from the control system.
- Press and hold the **SW-R** button on the front panel of the control system.
- Reapply power to the control system while still holding the **SW-R** button.
- The console should display the message previously shown.
- Release the **SW-R** button.

d. If communication still cannot be established, use the System Monitor as described in the following paragraph.

If after performing all of the troubleshooting steps described in "Troubleshooting Communications", communication can still not be established or the control system is still locked-up, perform the following to reload the control system's firmware.

To erase and reinstall the control system firmware:

NOTE: This procedure will erase the control system's firmware and reinstall it. If problems persist before a SIMPL Windows program is loaded, contact Crestron's True Blue Technical Support Group. If the system locks up after a SIMPL Windows program is loaded, there is probably an issue with the SIMPL Windows program.

1. Connect a serial cable (If using the QM-RMC or the QM-RMCRX(-BA), use a null modem cable) from the control system to a PC.
2. Open the address book in Crestron Toolbox by selecting **Tools** | **Manage Address Book** or clicking .
3. Create a new address book entry with the following settings:
   - Port = COM 1. If the PC is to communicate with a control system through a different serial port, select the correct COM port (COM1 through COM8) to be used.
   - Baud rate = 57600.
   - Parity = None.

- Number of data bits = 8.
- Number of stop bits = 1.
- Hardware handshaking (RTS/CTS) enabled.
- Software handshaking (XON/XOFF) not enabled.

4. Power down the control system.
5. In Crestron Toolbox, open a text console to the new address book entry.
6. While powering up the control system, press and hold **ALT** + **K** on the keyboard (for the QM-RMC and QM-RMCRX(-BA), press **Enter** after pressing **ALT + K**) until the following text (or similar) appears in the Crestron Toolbox text console:

```
System Monitor [v1.001 (0001)]
12-19-01 16:25:23 32 MB RAM, 4MB FLASH

CS>
```

7. Increase the baud rate to 115200 by opening the "System Info" window, selecting **Functions | Serial Communications,** and selecting **115200** as the new baud rate. Click **OK** or **Apply** to set the new baud rate.

NOTE: Crestron Toolbox will automatically change the baud rate it uses to communicate with the control system for the current session to ensure that communications are maintained.

8. From the text console window, adjust the baud rate of the PC to control system connection by clicking  and selecting 115200 as the new baud rate.
9. At the control system prompt, type **erase** and press **Enter**. The following text appears in the console window.

```
CS>erase
->25%->50%->75%->100%
Done
CS>
```

10. Send the new firmware file as described in "Firmware Upgrade" on page 67.

NOTE: The following processor firmware versions require the selection of a CE*.CSU file that can be extracted from the .CUZ file using WinZip or other ZIP file extraction tool:

- CNX-DVP4/C2N-DVP4DI: 2.006, 3.017
- MP2/MP2E: 3.016
- QM-RMC: 3.052

After extracting the CSU file, select it and click **Open**.

Once "Completed Successfully" appears in the text console window, close the text console window.

2-Series Console Commands

Introduction

The 2-Series processor is capable of understanding and responding to a set of recognizable words known as console commands. The processor, in essence, is a computer capable of interpreting commands received by the console via different methods. Methods include:

- Serial communication (RS-232) with a PC via the **COMPUTER** port on the control system
- Ethernet communication via CTP (Crestron Terminal Protocol – reserved port number, default port is 41795) *
- Ethernet communication via Secure CTP over a SSL connection to port 41797 at the IP address of the processor*
- Telnet (default port is 23)*
- Cresnet for processors operating in the Cresnet slave mode (refer to "Master-Slave Modes" on page 32)

* These methods are only available if the control system supports Ethernet.

Another method for submitting a command to the console is to use the "Console" or "User Program Commands " symbols in SIMPL Windows in the control system program. The Console symbol transmits and receives serial data to and from the control system's console. The User Program Commands symbol allows data typed at the console to be sent to the program.

NOTE: The method of transmitting each command to the control system varies from command to command. Refer to "Appendix C: Console Command Listing" on page 91 for a complete list of commands and their possible sources.

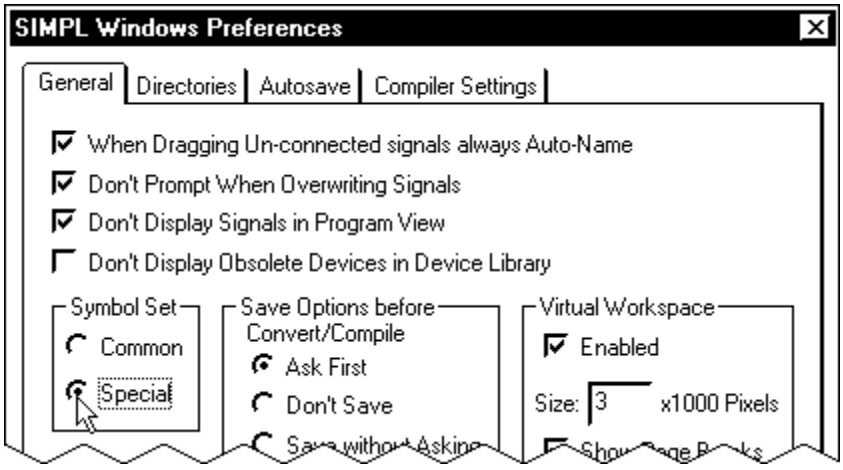
SIMPL Windows Symbols

Console Logic Symbol

Use the Console logic symbol to activate console commands via the SIMPL Windows program. This feature is available for advanced programmers of SIMPL Windows.

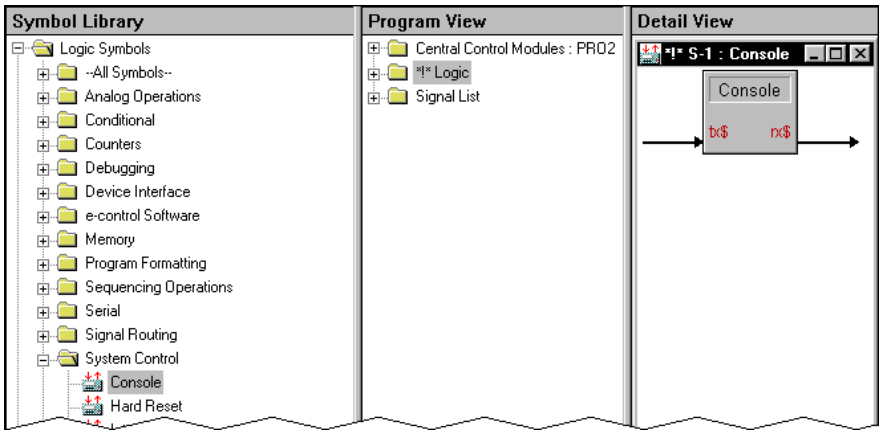
The Console logic symbol only appears in the System Control folder in the *Symbol Library*, after enabling a special symbol set for display. To enable this set while in SIMPL Windows, select **Edit | Preferences**, which opens the "SIMPL Windows Preferences" window. In the *Symbol Set* area of the *General* tab, select **Special** as shown in the following diagram.

"SIMPL Windows Preferences" Window



After enabling viewing of special symbols, the Console symbol can be viewed as shown in the following diagram.

The Console Logic Symbol in SIMPL Windows



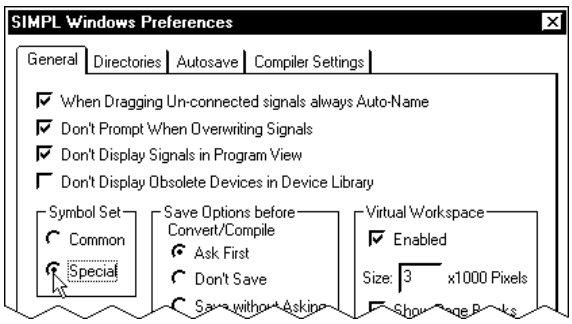
When the program sends data on the TX$ signal of the Console symbol, the control system interprets the console command just as if it was received via the RS-232 or Ethernet console and outputs a serial string to the RX$ signal of the console symbol which can be programatically interpreted.

User Program Commands Symbol

Use the User Program Commands symbol to send data typed at the console to the program. This feature is available for advanced programmers of SIMPL Windows.

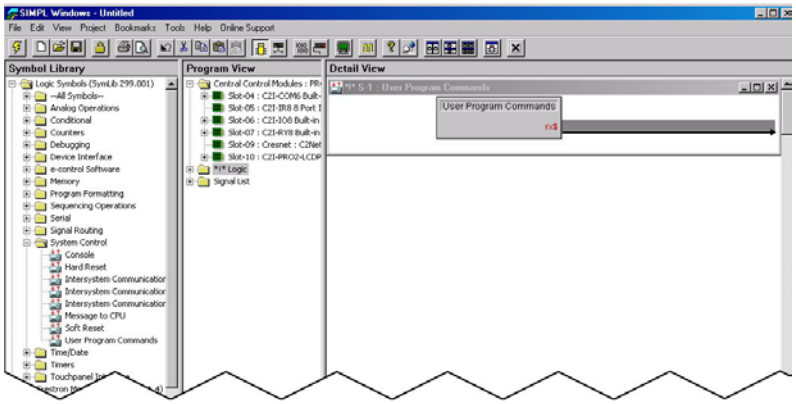
The User Program Commands logic symbol only appears in the System Control folder in the *Symbol Library*, after enabling a special symbol set for display. To enable this set while in SIMPL Windows, select **Edit | Preferences**, which opens the "SIMPL Windows Preferences" window. In the *Symbol Set* area of the *General* tab, select **Special** as shown in the following diagram.

"SIMPL Windows Preferences" Window



After enabling viewing of special symbols, the Console symbol can be viewed as shown in the following diagram.

The User Program Commands Symbol in SIMPL Windows



The User Program Commands symbol receives data entered at the 2-Series console prompt using the USERPROGCMD command. The syntax of the console command requires double-quotes before and after the command string. The string may include escape codes such as "\x".

The double quotes are stripped off and any escape codes are processed before passing the string to the User Program Commands symbol. For example, if the user types:

```
>USERPROGCMD "TURN ON DEBUG"
```

The string TURN ON DEBUG (without the double quotes) will be passed to the User Program Commands symbol. The string can then be processed as desired.

Command Groups

Console commands are grouped logically. If the operator enters "help" from the console, the 2-Series processor responds with a list of categories. It is possible to find the same command in more than one category. Categories include:

- All – all 2-series console commands.
- Device – pertains to the unit itself.
- Ethernet – govern parameters that involve the Ethernet port(s).
- File – influence the internal file system.
- System – sets system-wide parameters.

Commands are case insensitive and can be entered from the appropriate prompt (i.e., AV2, PRO2, DVP4DI, etc.). Help on individual commands is available by typing the command followed by a "?" (i.e., **ADDMASTER ?**). The following table lists acceptable commands alphabetically and provides a brief description of each command. Refer to "Appendix C: Console Command Listing" on page 91 for detailed information.

NOTE: The commands listed are not applicable to every processor. Refer to "Appendix C: Console Command Listing" on page 91 to determine if the command is applicable to your processor.

List of Acceptable Commands for the 2-Series Dual Bus Control System

COMMAND	DESCRIPTION
ADDDNS	Add a DNS server to the static list
ADDMASTER	Add an entry to IP table to act as a master to the current system
ADDPORTMAP	Add a port map to the NAT table
ADDSLAVE	Add an entry to IP table to act as a peer or slave to the current system
AUTONEGOT	Set auto negotiation for Ethernet device
BROADCAST	Enable/disable the broadcasting of error messages
BYE	Close user session
CALTOUCH	Start DVP4 touchscreen calibration
CARDS	Display cards detected in system
CD	Change the file directory
CFAUTORUN	Enables an automatic start of programs when compact flash is inserted or extracted
CFLOGERR	Enable logging errors to compact flash
CFPROJDIRS	Display a list of project directories on compact flash
CFTRANSFER	Transfer a project to/from compact flash
CIPPORT	Specify the port for the CIP interface
CLEARERR	Clears the current error log
CNETID	Set the Cresnet ID of the system
COMPACT	Remove invalid files from system
COMCONSOLEMODE	Sets operating mode of COM B
CTPPORT	Specify the port for the CTP console
CURSOR	Set the cursor option for the DVP4
DEFROUTER	Set default router
DELETE	Delete file(s)
DHCP	Enable/disable dynamic IP address via DHCP
DIR	Display files in directory
DOMAINNAME	Enter a domain name to be used in DHCP
ECHO	Enable/disable character echoing
EEPROM	Displays the parameters stored in EEPROM
ERRLOG	Prints the current error log
ESTATUS	Displays the status and parameters for the Ethernet card
ETHERNET	Enable/disable Ethernet
ETHERTEST	Perform diagnostic test on the Ethernet card
FPPASSWORD	Set front panel password
FREE	Show available file space
GETCODE	Retrieve the code needed for e-Control2 activation
GETFPLINE	Show LCD front panel display on the console
HEAPFREE	Show available RAM space
HELP	Display help screens

(continued on next page)

List of Acceptable Commands for the 2-Series Dual Bus Control System (Continued)

COMMAND	DESCRIPTION
HOSTNAME	Set the host name to be used in a DNS/DHCP environment
I2CERROR	Enable reporting of I2C errors
ICMP	Enable/disable response to ICMP ping requests
INFO	Print software capabilities
INITIALIZE	Clear internal file system
INPUT	Set the DVP4 input resolution
IPADDRESS	Set IP address
IPMASK	Set IP subnet mask
IPTABLE	Display IP table
ISDIR	Check to see if path is a directory
KILLSOCKET	Terminate a TCP console connection
LISTDNS	Displays a list of DNS servers
MAKEDIR	Create a file directory on compact flash
MESSAGE	Display a message on front panel screen
MODEMINITSTRING	Displays and changes the modem initialization string
NATENABLE	Enable/disable Network Address Translator (NAT)
NATREMOTE	Enable/disable configuring the Network Address Translator (NAT) from the WAN (LAN A) port
NPA	Access Network Poll Accelerator Utilities
NVRAMCLEAR	Clear the program portion of NVRAM
NVRAMDISK	Establish and format a file disk in NVRAM
NVRAMGET	Retrieve the contents of NVRAM using XMODEM from the system
NVRAMPUT	Load the contents of NVRAM using XMODEM to the system
NVRAMREBOOT	Enables/disables storing special reboot information when the processor unexpectedly reboots.
OUTPUT	Set the DVP4 output resolution
PASSWORD	Set console password
PING	Perform IP ping test on remote node
PROGRESET	Reloads and restarts the program
PROGUPTIME	Display the amount of time the program has been running
RAMFREE	Show available file space in the ram file system
REBOOT	Perform system reboot
REMDNS	Remove a DNS server from the list
REMMASTER	Remove a master entry from IP table
REMOVEDIR	Delete a file directory on compact flash
REMPORTMAP	Remove a port map from the NAT table
REMSLAVE	Remove a peer/slave entry from the IP table
REPORTCRESNET	Show all devices on the main Cresnet leg
RESTORE	Restore factory defaults
RTSCTS	Set/clear hardware handshaking
SAVEPARAM	Save system parameters
SDEBUG	Monitor packets to/from logic
SECURECIPPORT	Set the secure (SSL) port for CIP
SECURECTPPORT	Set the secure (SSL) port for CTP
SECUREWEBPORT	Set the secure (SSL) webserver port
SELFTEST	Initiate the self test procedure
SENDKEY	Add e-Control2 activation key
SENDMODEMINITSTRING	Sets/clears modem initialization
SERIAL	Set serial communication parameters
SETUP	Enter the DVP4 setup pages

(continued on next page)

List of Acceptable Commands for the 2-Series Dual Bus Control System (Continued)

COMMAND	DESCRIPTION
SHOWEXTRAERRORS	Enables extended error reporting
SHOWHW	Display hardware configuration
SHOWPORTMAP	Display the portmap from the NAT table
SSL	Configure the SSL options
STANDBY	Put the DVP4 into standby mode
STBYTO	Set the standby timeout for DVP4
SYSTEM	Xmodem download new firmware
TELNETPORT	Enable/disable connections on the Telnet port (23)
TESTDNS	Perform a DNS lookup on a given name
TIMEDATE	Set the time and date
TOUCH	Set the touch input for a DVP4
TYPE	Display file contents
UPLOAD	Load file into cresnet device
UPTIME	Display the amount of time the system has been running
USERPROGCMD	Send a string from the console to the user program
USERPASSWORD	Enter the password to protect user pages
VERSION	Print version to console
WEBINIT	Initialize Webserver default file
WEBPORT	Specify the port for the Webserver
WEBSERVER	Enable/disable Webserver
WHO	Display a list of the active console and gateway connections
XGETFILE	Use Xmodem to retrieve file from system
XONXOFF	Set/clear software handshaking
XPUTFILE	Use Xmodem to transfer file to ROM

Processor Groups

At the time this document was released, Crestron offered 14 different 2-Series processors. Selection of a processor depends on the application of the system. Commands may only be supported on a 'subset' of 2-Series processors or *processor group*. The table below lists the specific processors that belong to a processor group.

Breakdown of Processor Groups

PROCESSOR GROUP	SPECIFIC PROCESSORS*
All 2-Series Processors	PRO2, AV2, PAC2, RACK2, CP2, CP2E, MP2, MP2E, MC2W, MC2E, CNX-DVP4, C2N-DVP4DI, QM-RMC, and QM-RMCRX(-BA)
Audio Processors	MP2 and MP2E
Ethernet Processors	PRO2, AV2, PAC2, RACK2, CP2E, MP2E, CNX-DVP4, C2N-DVP4DI, QM-RMC, and QM-RMCRX
Dual Ethernet Processors	PRO2, AV2, PAC2, and RACK2
Compact Flash Processors	PRO2, AV2, PAC2, RACK2, CNX-DVP4, and C2N-DVP4DI
Cresnet Processors	PRO2, AV2, PAC2, RACK2, CP2, CP2E, MP2, MP2E, MC2W, MC2E, CNX-DVP4, C2N-DVP4DI, and QM-RMCRX(-BA)
Display Processors	CNX-DVP4 and C2N-DVP4DI
Plug-in Card Processors	PRO2, AV2 (with card cage), PAC2, and RACK2
Front Panel Processors	PRO2 and RACK2
QuickMedia Processors	QM-RMC and QM-RMCRX(-BA)

* While not considered a 2-Series processor, there are console commands that can only be used when a C2N-NPA8 is attached to the control system.

Command Structure

Details about each of the acceptable commands that can be interpreted by the 2-Series Dual Bus Control System can be found in "Appendix C: Console Command Listing" on page 91. Commands are listed alphabetically. Each listing includes a description of the command, a list of help menus that contain the command, the proper syntax for entering the command, definitions of parameters that may be included in the syntax, a list of possible sources[1] for the command, the minimum CUZ with which the command is recognized by the processor, and the specific processor group[2] that supports the command. For a description of each detail listed for a given command, refer to the SAMPLE COMMAND table shown below.

1. Possible sources refers to the methods by which console commands are delivered to the control system, as explained on page 16.
2. Processor groups are defined in more detail with "Processor Groups" on page 21.

SAMPLE COMMAND

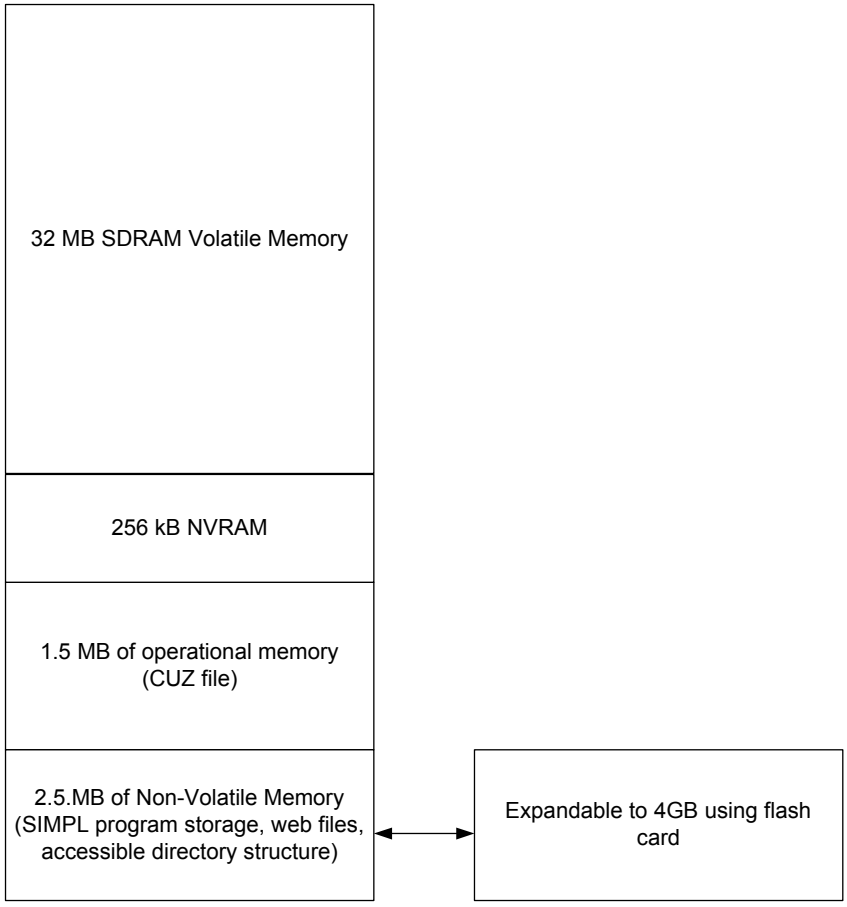
Description:	Provides a textual description of the command.
Help Menu(s):	Provides the category, which is used with the console HELP command.
Syntax:	Provides the text characters required to execute the command.
Parameters:	Provides a description of each parameter used in the syntax.
Possible Source:	Indicates the method of console connection used for the sample command. Connection methods include: RS-232 - a Crestron Toolbox connection to the computer port of the 2-Series processor. CTP - an Ethernet connection to port 41795 at the IP address of the 2-Series processor. Telnet - an Ethernet connection to port 23 at the IP address of the 2-Series processor. User Program - a command entered using the SIMPL Windows Console symbol. Secure CTP - SSL connection to port 41797 at the IP address of the 2-Series processor.
Minimum CUZ:	Indicates the first version of firmware that supported the command. CUZ is the extension name for the zipped file that holds the updated operating system for the 2-Series processor. As new features or improvements are developed, the capabilities of the operating system are enhanced and the changes are reflected in a later CUZ version number.
Processor Group:	Since the 2-Series line has such a diverse feature set, some processors may not support all the commands. This detail indicates the group to which the command belongs. Refer to the table in "Processor Groups" on page 21 of this guide for the specific processors that belong to a processor group.

2-Series Memory & Directory Structure

Introduction

A 2-Series control system has 36MB of built-in memory (non-volatile and volatile). The following diagram illustrates the memory structure of the 2-Series Control System.

2-Series Memory Structure



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 lists below for a breakdown of memory usage for program-related information stored in the unit.

Flash

1. SIMPL Program
2. SIMPL+ Modules
3. Operating System (.cuz file)

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

The directory structure of the 2-series control system can be broken down into two parts. The first part resides on the on-board flash memory (and discretionary NVRAM memory when the NVRAMDISK option is enabled) and the second resides on the optional external compact flash/microdrive card. Programs, data files, and data can be stored in the on-board flash or on the compact flash card (if installed). This section briefly describes the structure of the file system.

The files that reside in the internal flash/NVRAM conform to a flat directory structure while the compact flash system contains a fully FAT32 compatible file system to allow the same compact flash card to be used in a Windows environment. The table, shown after this paragraph, presents the structure of the overall file system.

Control System Directory 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	Directory for NAT configuration Web pages
	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
	CF0	The mounting point for the compact flash files; the 0 (or zero) refers to the on-board compact flash slot
	NVRAM	NVRAM disk is enabled

Although the file system names are case insensitive, the case is preserved to maintain file checksums. The compact flash directory only appears when a compact flash card is inserted into the system. The NVRAM directory only appears if an NVRAM disk has been created. To reference files on the compact flash, prefix the "\CF0\" to any fully qualified path from the Windows environment. For example, if the file in Windows is "\MyDirectory\MySubdirectory\MyFile.ext", the complete 2-Series path for a file on the first compact flash slot (onboard) is:

"\CF0\MyDirectory\MySubdirectory\MyFile.ext"

When the SIMPL Windows program is stored on the compact flash, the files reside in the directories \CF0\SIMPL and \CF0\SPLUS. When web pages are stored on the compact flash, the directory is \CF0\HTML. Storing the program or web pages on the compact flash gives those files precedence over files stored on internal flash. That is to say, if you have different programs stored in both internal flash and compact flash, the program on compact flash runs at boot-up.

Non-volatile (NVRAM)

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.)

Volatile (SDRAM)

1. Digital, analog and serial signal values

2. SIMPL+ Variables (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.

NOTE: SDRAM is internal to operations and is not available to the programmer.

Non-Volatile Random Access Memory (NVRAM) Disk

2-Series control systems are equipped with Non-Volatile Random Access Memory (NVRAM). NVRAM contains information that is retained after the loss of electrical power. Information that can be stored in NVRAM includes:

- SIMPL+ Global Variables (using "nonvolatile" qualifier or #DEFAULT_NONVOLATILE)

- 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.)

- 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: 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 the program. When NVRAM (.nvr file) is restored, 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 presets will have to be re-entered. To avoid concerns regarding the position of values within NVRAM, values can be stored on a file on the NVRAM disk by writing a SIMPL+ module to read and write the values to the file.

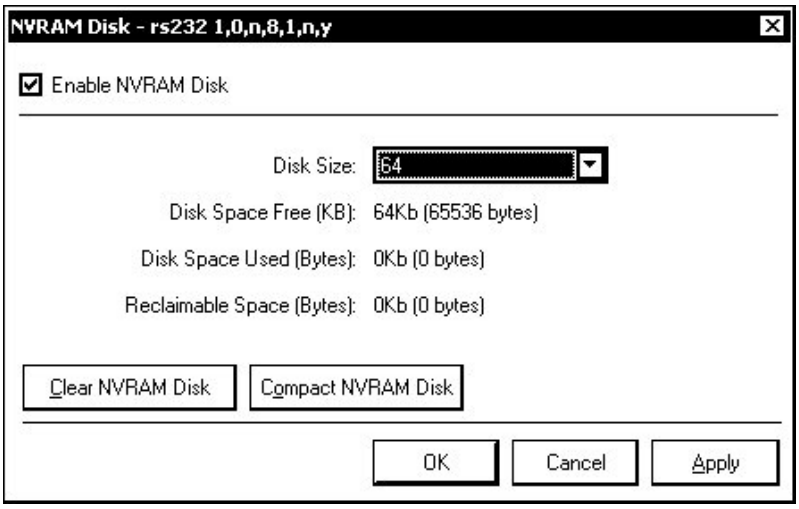
Setting Up an NVRAM Disk

Use Crestron Toolbox to set up a NVRAM disk on the processor. NVRAM disk provides compact flash (CF) type file storage on systems without a CF slot. It also works on systems with CF. The NVRAM disk’s storage capacity is limited in size. Any space allocated to the NVRAM disk is not accessible by the SIMPL Windows NVRAM symbols or SIMPL+ non-volatile variables.

To set up an NVRAM disk, perform the following.

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | NVRAM Disk…** to open the "NVRAM Disk" window.

"NVRAM Disk" Window



3. Enable the NVRAM Disk by selecting **Enable NVRAM Disk**.
4. Select the size of the NVRAM Disk.
5. Click **OK** or **Apply** to create the NVRAM Disk.

Files stored in NVRAM disk are accessed in the \NVRAM directory of the file system. Entering the command without a parameter displays the current setting.

Each time the NVRAMDISK is enabled, the contents of the NVRAM disk are wiped clean.

NOTE: The NVRAMDISK function (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.

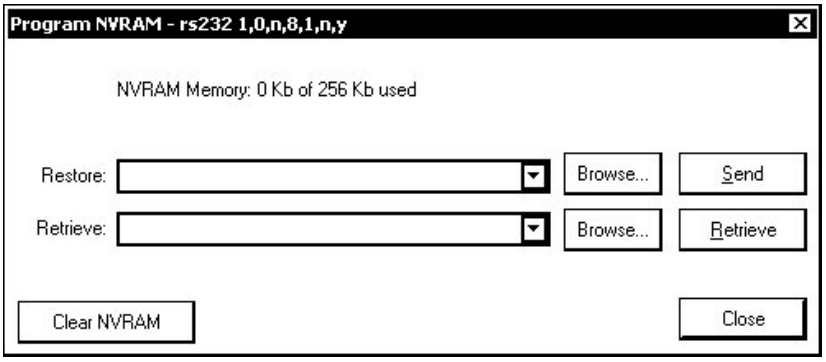
For more information on the NVRAMDISK command and other NVRAM-related functions, refer to "Appendix C: Console Command Listing" on page 91.

Retrieving NVRAM Files from the NVRAM Disk

NVRAM files can be retrieved from the processor and saved to a local disk. To retrieve NVRAM data from the processor and save to a file:

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | Program NVRAM…** to open the "Program NVRAM" window.

"Program NVRAM" Window



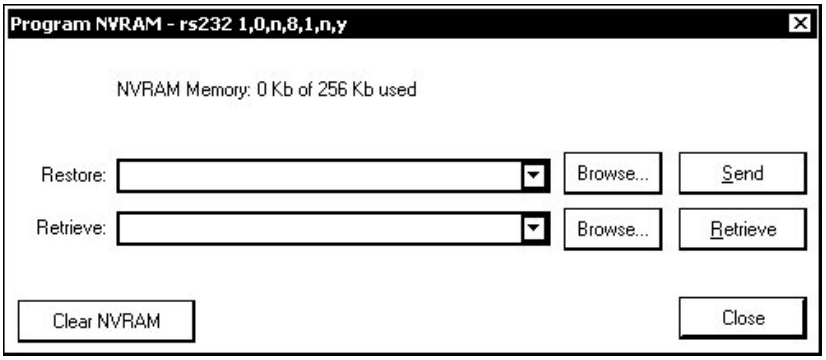
3. Click the **Browse** button next to the **Retrieve** button and specify the name and location of the file to be saved.
4. Click **Retrieve**. A status bar will display the progress of the file transfer.

Restoring NVRAM Files to the Control System

NVRAM files can be restored to the control system from a saved file. To restore NVRAM data to the control system from a saved file:

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | Program NVRAM…** to open the "Program NVRAM" window.

"Program NVRAM" Window



3. Click the **Browse** button next to the **Send** button and specify the name and location of the file to be restored.
4. Click **Send**. A status bar will display the progress of the file transfer.

NVRAMREBOOT

When a control system unexpectedly reboots, the error that caused the reboot is not stored to the error log since the log is erased when the control system reboots. However, the information contained in the error log can be written to NVRAM by using the NVRAMREBOOT command.

To use NVRAMREBOOT:

1. Use Crestron Toolbox to establish communications with the control system as described on page 5.

2. Open a text console window and type **NVRAMREBOOT ON**. This command will write messages created during rebooting to NVRAM. If an anomaly exists, this command will save the error even though the control system has rebooted.
3. To view the contents of NVRAM, retrieve the file from NVRAM as described in "Retrieving NVRAM Files from the NVRAM Disk" on page 26 and open the error log as described in "Viewing Error Messages with Crestron Toolbox" on page 30. After the error log has been captured, turn off the NVRAMREBOOT command by typing **NVRAMREBOOT OFF**.

Running Programs from Compact Flash

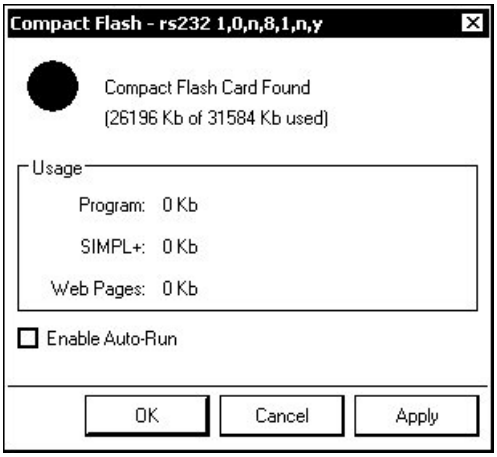
Certain 2-series control systems are equipped with a compact flash slot. On power-up or a hardware reset (**HW-R**), the control system first checks for a program on compact flash (if installed) and then internal flash.

Crestron Toolbox can be used to control the actions of the control system when a compact flash card is inserted into a running system.

To determine how the control system operates with a compact flash card installed:

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | Compact Flash** to display the "Compact Flash" window.

"Compact Flash" Window



3. Click the Enable Auto-Run check box to enable the *Auto-Run* mode.

   When operating in the *Auto-Run* mode, the control system will automatically reset and run the Compact Flash program when the Compact Flash card is inserted into the CF slot. If the Compact Flash is removed, the program in internal Flash will automatically run.

   When auto-run mode is disabled, a Program Reset must be sent to the control system after the Compact Flash card is inserted or removed to run the program.
4. Click **OK** or **Apply** for changes to the *Auto-Run* mode to take effect.

NOTE: Control systems are shipped with the *Auto-Run* mode enabled by default.

2-Series Control System Error Messages

Introduction

This section provides a brief description of 2-Series error messages that one may encounter. Error messages may be the result of hardware or software failure, hardware incompatibility with software definitions, or a programming error. An error is indicated by the **MSG / ERR** LED on the front panel of the control system.

Error messages created by the control system are written to an error log that is stored in the control system's RAM. If power is recycled or the processor is rebooted, the error log will be erased. The error log can be saved to a compact flash card on processors that can use a compact flash card.

NOTE: To save the error log in non-volatile memory, use the NVRAMREBOOT console command to have the error log write to NVRAM. For more information, refer to "**NVRAMREBOOT**" on page 27.

There are two ways to display the error log. Either use the front panel (if the 2-Series control system is equipped with one) or use Crestron Toolbox.

Viewing Error Messages with the Front Panel

The front panels of select 2-Series control systems incorporate a reverse mode (yellow on black) LCD screen, shown below. Access the error log by pressing the **MSG** menu function button on the Main Menu (default LCD display).

Front Panel Displaying Main Menu

As shown in the sample below, the top line of the LCD screen provides a single error message from the error log. The message indicates that the system expects a card to be inserted into slot 1. The bottom line of the LCD screen provides commands. The user can use **NEXT** or **PREV** to scroll through the entire error log. Some messages may be too long to be displayed across the top line of the LCD screen; use **<<** and **>>** to scroll left and right, respectively.

The **CLEAR** button can to used to empty the error log and extinguish the **MSG / ERR** front panel LED. A security message prompts the user to confirm the command.

MSG Submenu with Sample Message

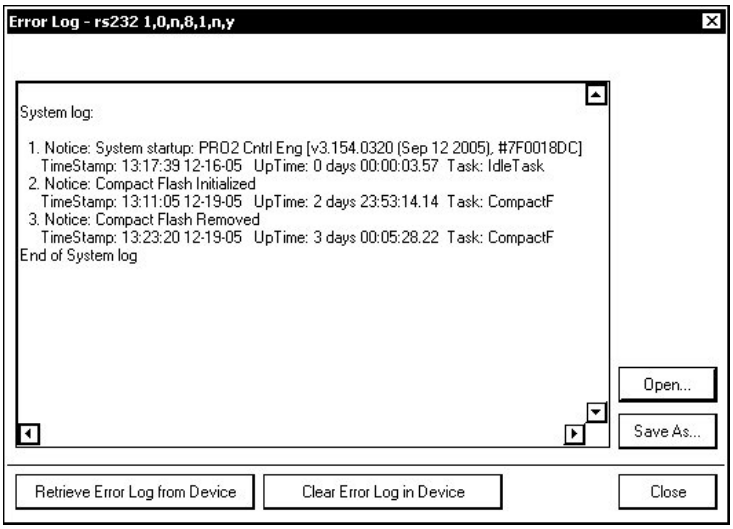
Viewing Error Messages with Crestron Toolbox

Crestron Toolbox can be used with any 2-Series control system to view messages stored in the error log.

To manage the Error Log with Crestron Toolbox:

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | Error Log** to open the "Error Log" window.

"Error Log" Window



The "Error Log" window opens with the latest version of the error log on the control system.

To refresh the error log, click **Retrieve Error Log from Device**.

To clear the error log, click **Clear Error Log in Device**. The **MSG / ERR** LED on the front panel (if present) will extinguish.

To save the error log, click **Save As…**, select a filename and directory, and click **OK.**

To retrieve a saved error log, select **Open…**, select the file to be opened, and click **OK**.

Error Levels

The following table lists and defines the four levels of error messages that may appear.

Error Message Levels

TYPE	DEFINITION
Notice	An event has occurred that is noteworthy, but will not affect program operation. The **MSG/ERR** LED on the front panel does not illuminate when Notice-level errors occur.
Warning	An event has occurred that could affect program operation, but the program can still run normally. The **MSG/ERR** LED on the front panel will illuminate when a Warning-level error occurs.
Error	An event has occurred that indicates that the program is not operating as expected. The **MSG/ERR** LED on the front panel will illuminate when a Error-level error occurs.
Fatal	An event has occurred that will prevent the program from running. The **MSG/ERR** LED on the front panel will illuminate when a Fatal-level error occurs.

Error Format

Each error message has the following format:

```
Level: Message
```

Some messages have a suffix with additional information in parenthesis:

```
(Error#:Extended Error#:Reserved#)
```

Only the first two items (level and message) within the error format are of any immediate value to the programmer.

- Level – defined on previous page.
- Message – varied and defined in "Appendix D: Error Message Definitions" on page 123.
- Error# – unique identifier for Crestron use.
- Extended Error# – unique identifier for Crestron use.
- Reserved# – not yet defined; for future use.

NOTE: It is important to report the exact error message to a Crestron customer service representative, as well as any Error# and Extended Error#. Also, try to be as specific as possible regarding the events that lead to the error (i.e., pressing a certain sequence of buttons, etc). Finally, provide the specific .cuz used.

For a detailed list of all error messages, refer to "Appendix D: Error Message Definitions" on page 123.

Master-Slave Modes

Introduction

Master-Slave mode is a network configuration that allows a Crestron 2-Series control system to access ports on other Crestron 2-Series control systems over Cresnet or Ethernet. By attaching a "slave" control system to a "master" control system, the master control system can use ports it may not normally have (I/O, IR, RF, etc.).

In a master-slave environment, the master control system contains the SIMPL Windows program that controls all Cresnet and Ethernet devices attached to it. The slave control system turns off its processing capabilities and behaves exactly like any other Cresnet or Ethernet device. It obeys the program in the master control system, making its ports available for control by the master. By using slave systems, only one master program has to be written to control multiple slave systems.

NOTE: If there is a need for a control system to run its own program but be able to communicate with other control systems, use the Intersystem Communications symbol for peer-to-peer communications between control systems over Ethernet or serial communications. For more information on the Intersystem Communications symbol, refer to the SIMPL Windows help file.

Depending on a control system's communications capabilities, a control system may function as a Cresnet master, a Cresnet slave, an Ethernet master, or an Ethernet slave.

Definitions

Cresnet Master

When in the Cresnet master mode (the default mode for most control systems), a master control system can control Cresnet and Ethernet devices (if equipped with Ethernet capabilities) as well as control systems operating in the Cresnet slave mode.

Control systems with Cresnet and Ethernet capabilities can function as a Cresnet master and Ethernet master simultaneously.

Cresnet Slave

A control system operating in the Cresnet slave mode operates as a Cresnet device and makes its built-in ports (except for Cresnet and Ethernet) available to a master control system. While operating in the Cresnet slave mode, any program that is loaded into the control system will not run. When operating in Cresnet slave mode, a control system can address any installed hardware, but it cannot address Cresnet or Ethernet network devices.

Slave control systems with Cresnet and Ethernet abilities can be configured to operate as either Cresnet or Ethernet slaves, not both. If a slave system is accidentally configured as both, it will operate in the Cresnet slave mode.

Ethernet Master

When operating as an Ethernet master, a master control system can control Ethernet and Cresnet devices (if equipped with Cresnet capabilities) as well as control systems operating in the Ethernet slave mode.

Control systems with Ethernet and Cresnet capabilities can function as an Ethernet master and a Cresnet master simultaneously.

Ethernet Slave

A control system operating in the Ethernet slave mode operates as an Ethernet device and makes its built-in ports (except for Ethernet and Cresnet) available to a master control system. While operating in the Ethernet slave mode, any program that is loaded into the control system will not run. When operating in the Ethernet slave mode, the control system can address any installed hardware, but it cannot address Cresnet or Ethernet network devices.

Slave control systems with Ethernet and Cresnet abilities can be configured to operate as either Ethernet or Cresnet slaves, not both. If a slave system is configured as both, it will operate in the Cresnet slave mode.

Master-Slave Operating Guidelines

Following are some general rules for master-slave configurations:

- A slave device cannot have its own network (Cresnet or Ethernet).
- 2-Series slave systems can only be controlled by a 2-Series master system.
- A control system with both Cresnet and Ethernet capabilities can operate as an Ethernet master and a Cresnet master simultaneously.
- A control system with both Cresnet and Ethernet capabilities can be either an Ethernet slave or a Cresnet slave. It cannot be both simultaneously. If it is configured as both, it will operate in the Cresnet slave mode.
- A slave can be controlled by only one master control system. Only one Cresnet master can exist in a network. Multiple Ethernet master systems can exist in a network. However, an Ethernet slave only responds to one master.
- Any program loaded into a control system will not execute while a control system is in the slave mode.
- While operating in the slave mode, Crestron Toolbox functions such as firmware upgrades can still be performed. Passthrough mode operations from Viewport can also be used on the slave control system.

NOTE: All control systems ship in the master mode except for the C2N-DVP4DI and CNX-DVP4, which ship in the Cresnet slave setting.

Configuring the Control System

System Requirements

To operate a control system as a master or slave device, the following control system update files and programming software are required:

Software Requirements for Master-Slave Operations

SOFTWARE*	VERSION NUMBER	SUPPORTED MODES
2-Series Control System Update Files		
AV2	Version 3.044 or later	Cresnet or Ethernet
C2N-DVP4DI	Version 3.060 or later	Cresnet or Ethernet
CNX-DVP4	Version 2.006 or later	Cresnet or Ethernet
CP2	Version 3.044 or later	Cresnet
CP2E	Version 3.044 or later	Cresnet or Ethernet
MC2E	Version 3.050 or later	Cresnet or Ethernet
MC2W	Version 3.050 or later	Cresnet
MP2	Version 3.050 or later	Cresnet
MP2E	Version 3.050 or later	Cresnet or Ethernet
PAC2	Version 3.044 or later	Cresnet or Ethernet
PRO2	Version 3.044 or later	Cresnet or Ethernet
QM-RMC	Version 3.052 or later	Ethernet
QM-RMCRX(-BA)	Version 3.052 or later	Cresnet or Ethernet
RACK2	Version 3.044 or later	Cresnet or Ethernet
SIMPL Windows	Version 2.04.11 with library update 232 or version 2.04.14 or later	N/A
Crestron Toolbox	Version 1.01.06 or later	N/A

* The latest versions can be obtained from the Crestron website. Refer to NOTE which follows.

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).

Cresnet Master-Slave Modes

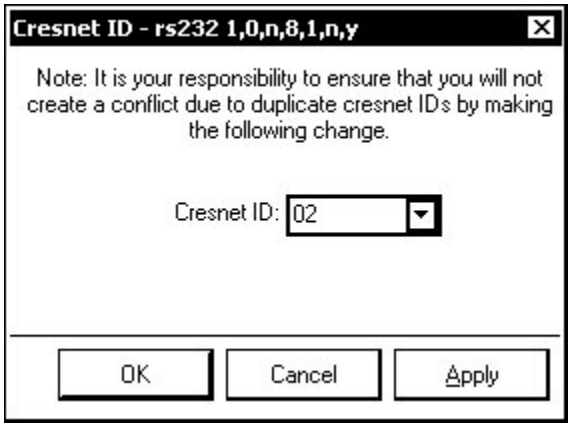
Every device (including a control system) is assigned a unique Cresnet ID (Net ID). Master control systems always use Net ID **02.** If a control system is to be used as a slave device, its Net ID must be changed to a hexadecimal value ranging from 03 to FE.

Use Crestron Toolbox to establish communications between the control system and your PC as described on page 5. After establishing communications, Crestron Toolbox can be used to set the Net ID and change a control system from a master system to slave device, and back.

Cresnet Master Mode

After establishing communications with the control system, select **Functions | Cresnet ID…** to open the "Cresnet ID" window.

"Cresnet ID" Window



Select Cresnet ID 02 to set the control system to the *Cresnet Master* mode and click **OK** or **Apply**. The control system will automatically reboot.

NOTE: The control system must be detached from Cresnet before changing a slave to a master.

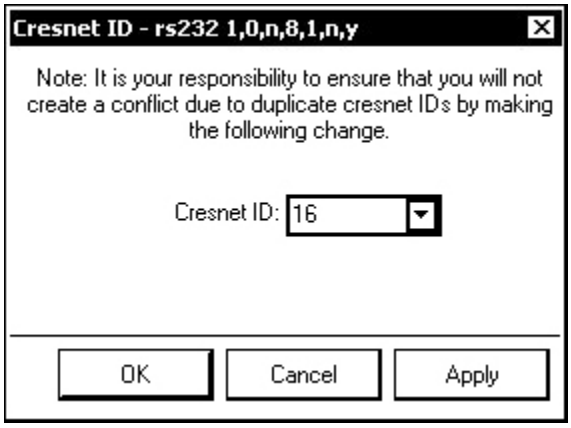
NOTE: If a control system is operating in the *Cresnet Master* mode, the *Device IDs* section of the "System Information" window will indicate a Cresnet ID value of **02**.

NOTE: Only one Cresnet master control system can exist in a network.

Cresnet Slave Mode

After establishing communications with the control system, select **Functions | Cresnet ID…** to open the "Cresnet ID" window.

"Cresnet ID" Window



Select any Cresnet ID from 03 to FE to set the control system to the *Cresnet Slave* mode and click **OK** or **Apply**. The control system will automatically reboot.

NOTE: The control system must be detached from Cresnet before changing the master to a slave.

NOTE: If a control system is operating in the *Cresnet Slave* mode, the *Product Info* section of the "System Information" window will indicate the control system as a "Cslave". The *Device IDs* section of the "System Information" window will indicate

the new Cresnet ID value. The *Program Info* section is not displayed as the slave control system does not have a program that is running.

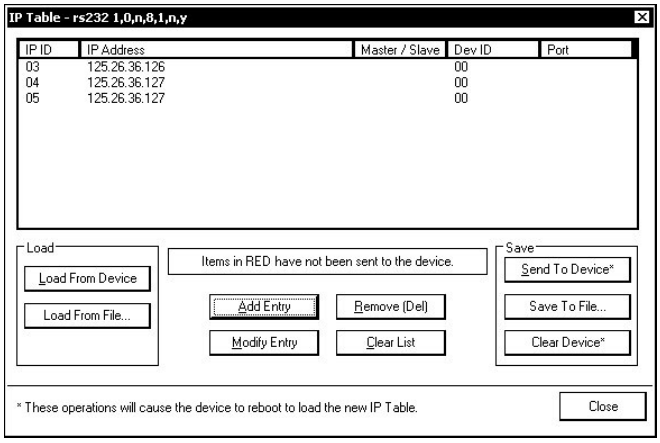
Ethernet Master-Slave Modes

The contents of a control system's IP table and SIMPL Windows programming determine whether a control system is operating as a master control system or a slave device. If a control system's IP table entry lists a "master" device, the control system is operating in the *Slave* mode to the master control system listed in the IP table. For more information on IP table entries, refer to the latest revision of the Crestron e-Control® Reference Guide (Doc. 6052) which can be downloaded from the Crestron website.

Use Crestron Toolbox to make changes to a control system's IP table.

To view a control system's IP table, establish communication with the control system as described on page 5 and select **Functions | IP Table Setup…** to open the "IP Table" window.

"IP Table" Window



Ethernet Master Mode

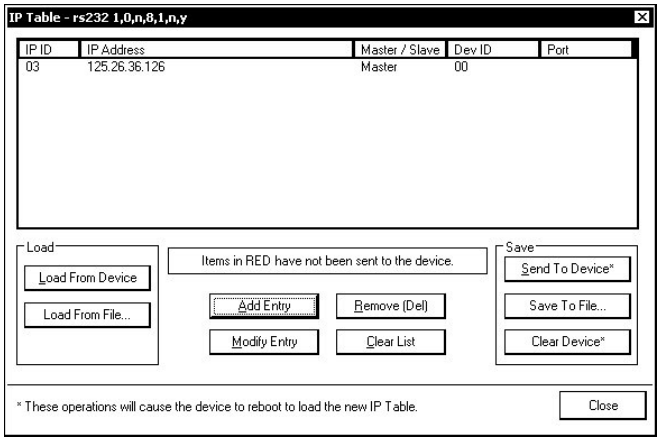
To designate a control system as an Ethernet master, there must be no "master" entries in the control system's IP table. Removing a master entry automatically configures a control system as an Ethernet master when it reboots (unless it is also configured as a Cresnet slave). Refer to the previous diagram for a sample IP table of a master control system.

The IP IDs listed above can represent Ethernet devices and Ethernet slave devices.

Ethernet Slave Mode

To designate a control system as an Ethernet slave, there must be an entry for a "master" control system in the Ethernet slave's IP table. Once a master control system is listed in the slave's IP table, other entries are ignored, as a slave device cannot have its own network. Refer to the following diagram for a sample IP table on a slave control system.

Slave Control System's IP Table



NOTE: The slave device's IP table can only be loaded into the slave device through Crestron Toolbox with a PC directly connected to the slave control system. SIMPL Windows cannot override the slave device's IP table when loading a program onto a master control system.

NOTE: If a control system is operating in the *Ethernet Slave* mode, the *Product Info* section of the "System Information" window will indicate the control system as a "Eslave". The *Program Info* section is not displayed as the slave control system does not have a program that is running.

NOTE: After changing the IP table, the control system will reboot.

Configuration and Programming

Use SIMPL Windows to configure master-slave relationships between control systems in a network and to program the master control system using slave devices.

NOTE: Each port on the master and slave system that requires configuration must be individually configured. In our example, a COM port on Slot 6 of the slave system must be configured separately from any COM port on Slot 4 of the master system.

Configuring a Control System as a Master Control System

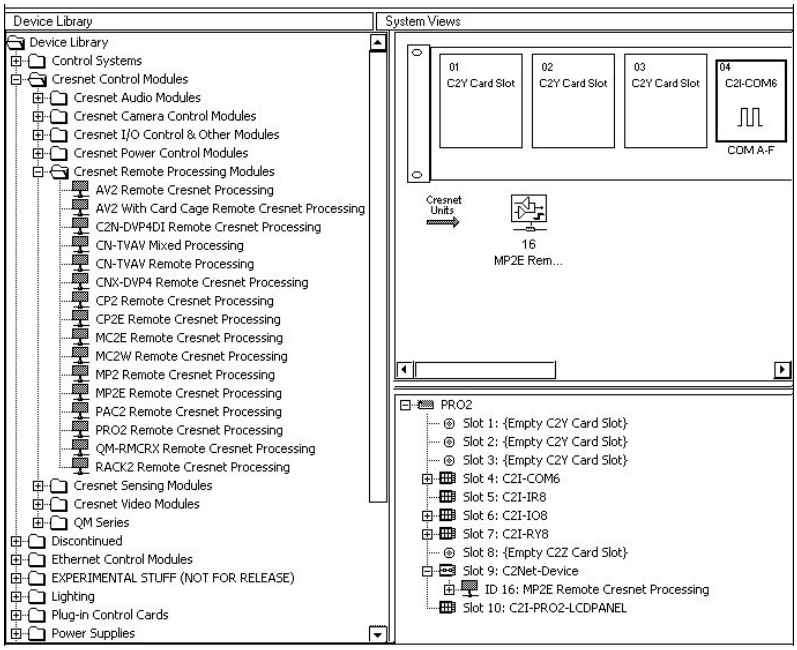
There are no special SIMPL Windows procedures for configuring a control system to operate in the master mode.

NOTE: If Ethernet slave devices are to be added, an Ethernet port must be present on the master control system.

Configuring a Control System as a Cresnet Slave Device

To incorporate a control system as a Cresnet system slave, drag the Remote Cresnet Processing symbol for the control system to be added from the Cresnet Control Modules | Cresnet Remote Processing Modules folder of the *Device Library* and drop it in the *System Views*. In this example, we are using a PRO2 as the master and an MP2E as a slave device. The PRO2 *System Views* shows the MP2E as a slave device in slot 9 with its default Net ID (assuming that no other C2Net devices are present as shown in the following illustration). A slave control system must have a Net ID of 03 or higher to be a slave device.

C2Net-Device

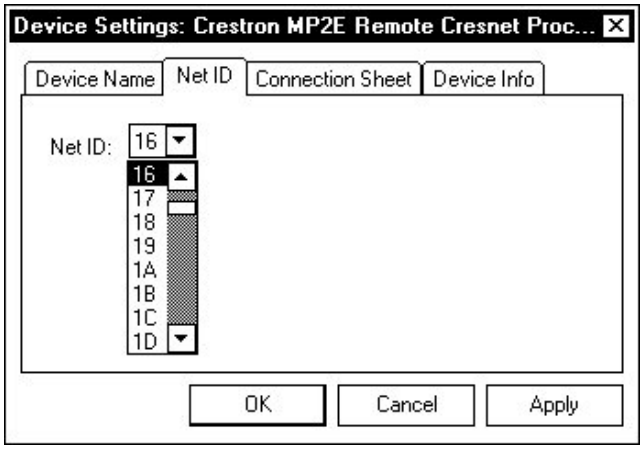


NOTE: Each Cresnet device has a unique Net ID in the program. If the Net ID is in use by another device, SIMPL Windows will look for an available Net ID starting at 03.

Setting the Net ID in Device Settings

Double-click the MP2E icon to open the "Device Settings" window. This window displays the MP2E device information. If necessary, select the *Net ID* tab to change the Net ID, as shown in the following figure.

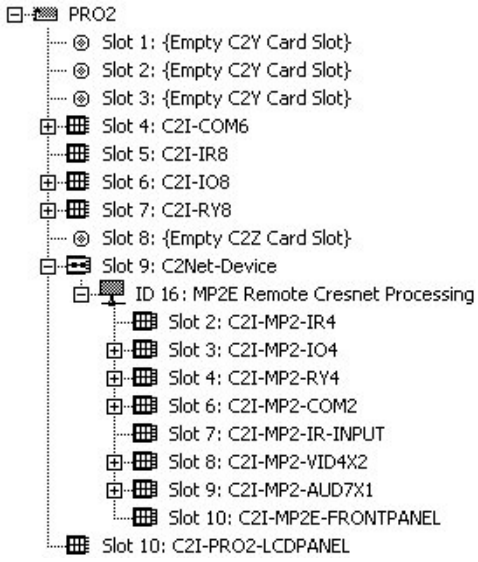
"Device Settings" Window for the MP2E



NOTE: SIMPL Windows automatically changes Net ID values of a device added to a program if a duplicate device or a device with the same default Net ID already exists in the program. Always ensure that the hardware and software settings of the Net ID match. For Net ID hardware settings details, refer to "Cresnet Slave Mode" on page 35.

Expand the device to view the available slots in the MP2/MP2E remote processing symbol. The following diagram shows the available slots of an MP2E operating in slave mode.

Device Detail

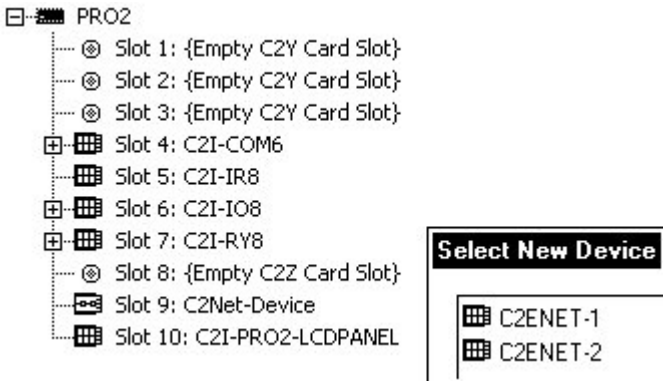


NOTE: The C2Net-Device and C2ENET-Device slots are never available on a control system operating in slave mode. All other slots may be configured as described in the slave system's respective manual. Slave devices do not control networks.

Configuring a Control System as an Ethernet Slave Device

Continuing with our PRO2 example, add an Ethernet card to the Z-Bus by right-clicking slot 8. Select **Add item to: "C2Z Card Slot"** and add a C2ENET-1 or C2ENET-2 as shown in the following diagram.

Adding a C2ENET Card

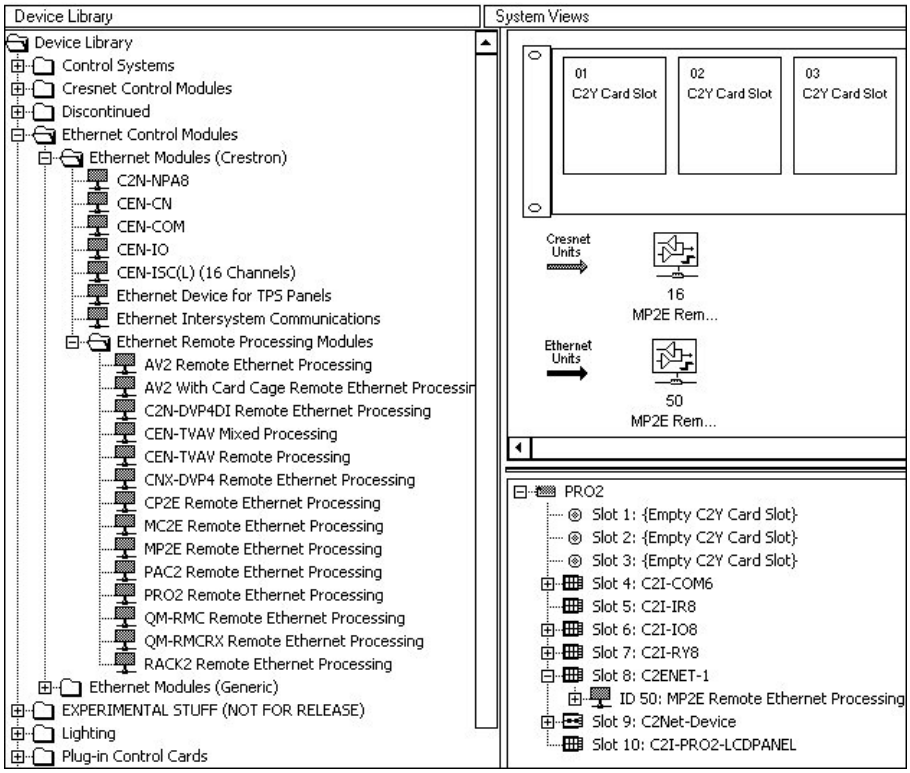


To incorporate a control system as an Ethernet system slave, drag the Remote Ethernet Processing symbol for the control system to be added from the Ethernet Control Modules | Ethernet Modules (Crestron) | Ethernet Remote Processing Modules folder of the *Device Library* and drop it in the *System Views*.

The *System Views* shows the MP2E as a slave device in slot 8 with an IP ID of 50 (assuming that no other C2ENET devices are present as shown in the following

illustration). The IP ID for the MP2E must be 03 or higher to be a slave device. The IP ID must also match the IP ID set in the master control system's IP table.

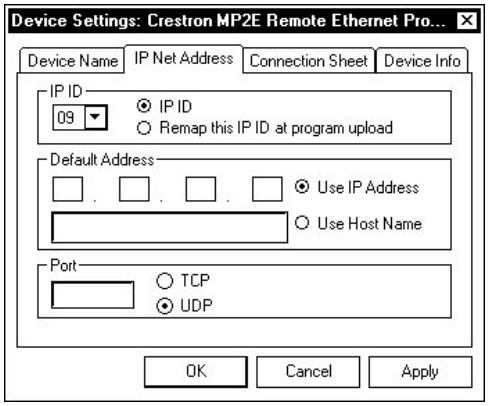
C2ENET Device



Setting the IP ID in Device Settings

Double-click the MP2E icon to open the "Device Settings" window. This window displays the MP2E device information. If necessary, select the *IP Net Address* tab to change the IP ID and other IP information, as shown in the following figure.

"Device Settings" Window for the MP2E



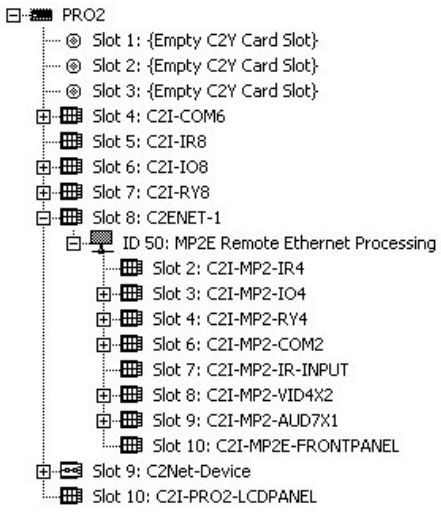
SIMPL Windows will create a default IP table based on the IP IDs assigned in *System View*. If selected, the default IP table can be uploaded to the control system after the SIMPL Windows program has been uploaded to the control system.

NOTE: SIMPL Windows automatically changes IP ID values of a device added to a program if a duplicate device or a device with the same default IP ID already exists in the program. Always ensure that the IP table listings on the slave device and

software settings for the IP ID match. For IP ID hardware settings details, refer to "Ethernet Slave Mode" on page 36.

Expand the device to view the available slots in the MP2/MP2E remote processing symbol. The following diagram shows the available slots of an MP2E operating in slave mode.

Device Detail



NOTE: Each Ethernet device has a unique IP ID in the program. If the IP ID is in use by another device, SIMPL Windows will look for an available IP ID starting at 03.

NOTE: The C2Net-Device and C2ENET-Device slots are never available on a control system operating in slave mode. All other slots may be configured as described in the slave system's respective manual. Slave devices do not control other network devices.

Programming a Control System as a Master Control System

There are no special procedures for programming a control system that is operating in the master mode. Refer to the control system's Operations Guide for programming instructions.

Programming a Control System as a Slave Device

The slots on a slave device are programmed as described in the slave device's Operations Guide.

Uploading

After completing the program in SIMPL Windows, upload the program to the master control system. A slave device's configuration information will be automatically transferred by the master control system. Additionally, the default IP table can be uploaded after the SIMPL Windows program has been uploaded to the control system.

Dynamic Host Configuration Protocol (DHCP)

Introduction

Crestron's 2-Series control systems support DHCP (**D**ynamic **H**ost **C**onfiguration **P**rotocol) in a Windows 2000 Server or Windows NT 4.0 Server environment.

When using DHCP, a dynamic IP address is automatically assigned to a device on the network. These IP addresses are called "dynamic" because they are only temporarily assigned, or leased, to the device. After a certain time they expire and may change. When a device connects to the network (or the Internet) and its dynamic IP address has expired, the DHCP server will assign it a new dynamic IP address.

The purpose of DHCP is to let network administrators centrally manage and automate the assignment of IP addresses in an organization's network. DHCP greatly reduces the work necessary to administer a large IP network. Without DHCP, the administrator has to manually configure the IP address each time a computer is added to the network or moves to a different location.

DHCP provides integration with a DNS (**D**omain **N**ame **S**ystem) service. This system allows hosts to have both domain name addresses (such as ftp.crestron.com) and IP addresses (such as 65.206.113.4). The domain name address is easier for people to remember and is automatically translated into the numerical IP address.

The domain name address (also called the **F**ully-**Q**ualified **D**omain **N**ame, or FQDN) identifies the owner of that address in a hierarchical format: *server.organization.type*. For example, ftp.crestron.com identifies the FTP server at Crestron, with ".com" signifying a commercial organization.

A DNS server, also called a **name server**, maintains a database containing the host computers and their corresponding IP addresses. Presented with the domain name address ftp.crestron.com, for example, the DNS server would return the IP address 65.206.113.4.

Another name-resolution service is WINS (**W**indows **I**nternet **N**aming **S**ervice). WINS is used in conjunction with DNS and DHCP in a Windows NT 4.0 Server environment.

Windows DHCP/DNS Server Configuration

Crestron's 2-Series control systems (minimum CUZ 3.041) support DHCP in the following environments:

- Windows 2000 Server with DHCP Server and DNS Server (Dynamic DNS enabled)
- Windows NT 4.0 Server with DHCP Server and WINS Server

In the following configuration requirements, a *scope* defines the range of IP addresses for the network. Typically a scope defines a single physical subnet on the network. Scopes provide the primary way for the DHCP server to manage distribution and assignment of IP addresses and any related configuration parameters to clients on the network.

Scope options are client configuration parameters applied specifically to all clients that obtain a lease within a particular scope. Some commonly used options include IP addresses for default gateways (routers), WINS servers, and DNS servers.

The network administrator should configure the Windows Server as follows:

Configuration 1: DHCP + Dynamic DNS (Windows 2000 only)

The network administrator should configure the DHCP scope to include the following scope options:

- 003 - Router
- 006 - DNS Servers
- 015 - Domain Name

The DHCP scope should also have the following options enabled:

- Always dynamically update all nodes
- Enable updating of nodes that do not support dynamic DNS

The DNS Server should have the following option enabled:

- Enable WINS Resolution (Windows (NT 4.0)
- Enable WINS Forward Lookup (Windows 2000)

Configuration 2: DHCP + DNS + WINS (Windows NT 4.0 and Windows 2000)

The network administrator should configure the DHCP scope to include the following scope options:

- 003 - Router
- 006 - DNS Servers
- 015 - Domain Name
- 044 - WINS/NBNS Servers
- 046 - WINS/NBT Node Type (set value to "0x2")

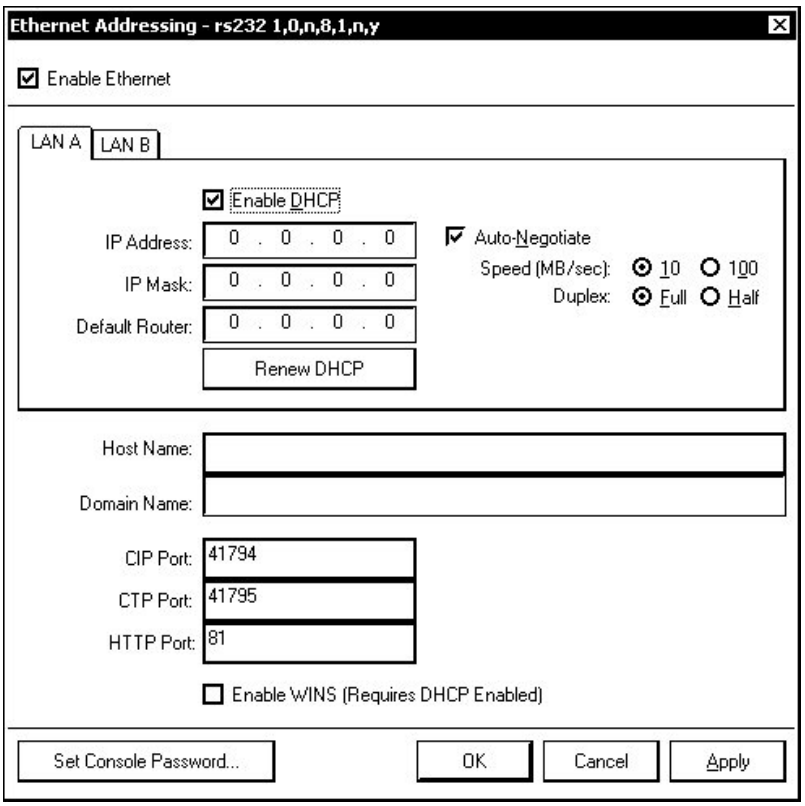
The DNS Server should have the following option enabled:

- Handle Dynamic Updates (Windows 2000 only)

Control System Configuration

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | Ethernet Addressing…** to open the "Ethernet Addressing" window.

"Ethernet Addressing" Window



3. Select the *Enable DHCP* check box to enable DHCP with Windows 2000 Server; for Windows NT 4.0 Server, select 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.)
4. Enter the host name of the control system in the *Host Name* field. The hostname identifies the control system 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.
5. If applicable, enter the domain in the *Domain Name* field. This is only necessary 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.

6. Once all settings are made, click **OK** to store the settings and reboot the control system.

Other Settings (optional):

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.

Once the IP information for the control system has been set, it becomes possible to communicate with the control system via TCP/IP.

Secure Sockets Layer (SSL)

Introduction

Ethernet-enabled control systems provide built-in support for **S**ecure **S**ockets **L**ayer (SSL), the de facto standard for protecting Web-based communication between clients and servers. SSL is a protocol that provides a secure channel for communication between two machines. The secure channel is transparent, which means that it passes the data through, unchanged. The data is encrypted between the client and the server, but the data that one end writes is exactly what the other end reads. The SSL protocol uses TCP as the medium of transport.

SSL ensures that the connection between a Web browser and Web server is secure by providing **authentication** and **encryption**. Authentication confirms that servers, and sometimes clients, are who they say they are. Encryption creates a secure "tunnel" between the two, which prevents unauthorized access to the system.

The secure tunnel that SSL creates is an encrypted connection that ensures that all information sent between the client and server remains private. SSL also provides a mechanism for detecting if someone has altered the data in transit. If at any point SSL detects that a connection is not secure, it will terminate the connection and the client and server will have to establish a new, secure connection.

SSL uses both **public-key** and **symmetric-key** encryption techniques. Public keys are a component of public-key cryptographic systems. The sender of a message uses a public key to encrypt data; the recipient of the message can only decrypt the data with the corresponding private key. Public keys are known to everybody, while private keys are secret and only known to the recipient of the message. Since only the server has access to its private key, only the server can decrypt the information. This is how the information remains confidential and tamper-proof while in transit across the network.

An SSL transaction consists of two distinct parts: the key exchange, and the bulk data transfer. The SSL Handshake Protocol handles key exchange and the SSL Record Protocol handles the bulk data transfer.

The key exchange (SSL handshake protocol) begins with an exchange of messages called the SSL handshake. During the handshake, the server authenticates itself to the client using public-key encryption techniques. Then the client and the server create a set of symmetric keys that they use during that session to encrypt and decrypt data and to detect if someone has tampered with the data. Symmetric key encryption is much faster than public-key encryption, while public-key encryption provides strong authentication techniques.

Once the key exchange is complete, the client and the server use this session key to encrypt all communication between them. They do this encryption with a **cipher**, or symmetric key encryption algorithm, such as RC4 or DES. This is the function of the SSL Record Protocol. There are two types of ciphers, symmetric and asymmetric. Symmetric ciphers require the same key for encryption and decryption, whereas with asymmetric ciphers, data can be encrypted using a public key, but decrypted using a private key.

SSL supports a variety of ciphers that it uses for authentication, transmission of certificates, and establishing session keys. SSL-enabled devices can be configured to support different sets of ciphers, called **cipher suites**.

Crestron's implementation of SSL is based on OpenSSL (www.openssl.org), version 0.9.6a. The encryption algorithms and the key lengths supported in the 2-Series processor are as follows:

Supported Encryption Algorithms and Key Lengths for 2-Series Processors

NAME	TYPE	SESSION KEY LENGTHS (BITS)	IN/OUT
DES	Symmetric	56	DES
3DES	Symmetric	168	3DES
RC2	Symmetric	128	RC2
RC4	Symmetric	128	RC4
DH	Asymmetric	512	DH
RSA	Asymmetric	512	RSA

SSL-enabled clients and servers confirm each other's identities using **digital certificates**. Digital certificates are issued by trusted third-party enterprises called Certificate Authorities, or CAs. From the certificate, the sender can verify the recipient's claimed identity and recover their public key. By validating digital certificates, both parties can ensure that an imposter has not intercepted a transmission and provided a false public key for which they have the correct private key.

A CA-signed certificate provides several important capabilities for a Web server:

- Browsers will automatically recognize the certificate and allow a secure connection to be made, without prompting the user. (If a browser encounters a certificate whose authorizing CA is not in its list of trusted CAs, the browser will prompt the user to accept or decline the connection.)
- When a CA issues a signed certificate, they are guaranteeing the identity of the organization that is providing the Web pages to the browser.

Alternatively, **self-signed certificates** can be generated for secure Web servers, but self-signed certificates do not provide the same functionality as CA-signed certificates. Browsers will not automatically recognize a self-signed certificate; and a self-signed certificate does not provide any guarantee concerning the identity of the organization that is providing the server.

In addition, handshaking is much faster in the case of CA-signed certificates because the process of creating private/public keys is CPU intensive. With self-signed certificates, these keys are created at every instance of a handshake, whereas with CA-signed certificates the keys are already loaded. A CA-signed certificate thus provides many important capabilities for a secure server.

There are various Certificate Authorities, notable among them being Thawte and Verisign. For a fee, a CA investigates the organization hosting the server and issues a certificate vouching for the identity of the server. The procedure for obtaining/enrolling for a CA-signed certificate varies with each CA and is described on their websites (i.e. www.thawte.com or www.verisign.com). However, all CAs require a CSR, or **C**ertificate **S**igning **R**equest. The CSR can be copied and pasted to the online enrollment form or sent via e-mail to the CA, along with any other pertinent information the CA requires. The CA then issues the certificate, usually via e-mail. The Crestron Viewport provides all the certificate management tools necessary to generate a CSR and upload the certificate to the 2-Series processor.

The CA-signed certificate is an ASCII "base64" encoded text (*.CER) file, which the 2-Series processor converts to a binary file called \\SYS\srv_cert.der. As a part of the CSR process, a private key is also created as \\SYS\srv_key.der. It is extremely

important to back up the private key, as it is unique to each CSR. If the private key is lost the certificate is useless and it would be necessary to begin the enrollment process all over again.

Here is a description of an SSL transaction:

1. The browser sends a request for an SSL session to the Web server.
2. The Web server sends the browser its digital certificate. The certificate contains information about the server, including the server's public key.
3. The browser verifies that the certificate is valid and that a trusted CA issued it.
4. The browser generates a "master secret" that is encrypted using the server's public key and sent to the Web server.
5. The Web server decrypts the master secret using the server's private key.
6. Now that both the browser and the Web server have the same master secret, they use this master secret to create keys for the encryption and MAC (message authentication code) algorithms used in the bulk-data process of SSL. Since both participants used the same master key, they now have the same encryption and MAC keys.
7. The browser and Web server use the SSL encryption and authentication algorithms to create an encrypted tunnel. Through this encrypted tunnel, they can pass data securely through the network.

Though the authentication and encryption process may seem involved, the user generally does not even know it is taking place. However, the user will be able to tell when the secure tunnel has been established since most SSL-enabled Web browsers will display a small closed lock at the bottom (or top) of their screen when the connection is secure. Users can also identify secure websites by looking at the website address; a secure website's address will begin with https:// rather than the usual http://. The Web server listens for a secure connection on the well-known port 443.

SSL Configuration

This section describes the steps required to enable a 2-Series Web server for SSL and obtaining a digital certificate from a Certificate Authority. The steps are summarized as follows (each step is described in detail later):

- Establish a serial connection to the 2-Series control system.
- Enable SSL using a self-signed certificate.
- Create an encryption public/private key pair and a certificate-signing request (CSR) based on the public key.
- Back up the private key.
- Send the CSR to a Certificate Authority such as Thawte or Verisign, who will verify the identity of the requestor and issue a signed certificate.
- Install the CA-signed certificate and optionally, the root certificate, to the 2-Series control system.
- Enable SSL using the CA-signed certificate.

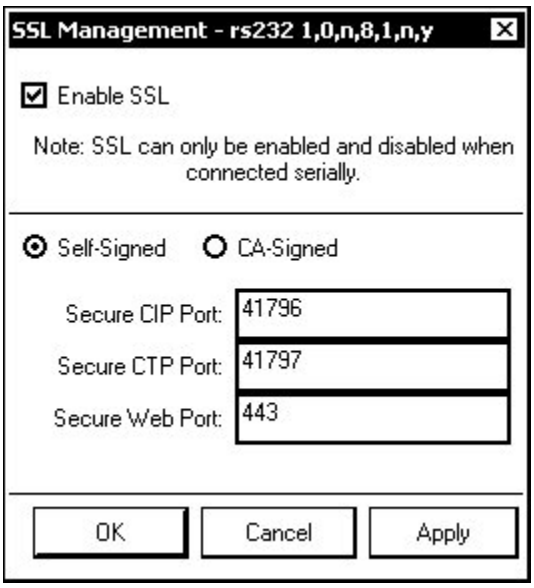
2-Series Control System Requirements

- CUZ: 3.055 or later
- Crestron Toolbox: 1.01.06 or later
- Viewport: 3.53 or later
- SIMPL Windows: 2.04.11 or later

Enable SSL with a self-signed certificate

1. Establish a serial connection to the 2-Series control system as described in "Serial Connection" on page 5.
2. Select **Functions | SSL Management…** to open the "SSL Management" Window.

"SSL Management" Window



3. Check *Enable SSL.*
4. Select **Self-Signed** and click **OK.** The control system will reboot.

This generates a self-signed certificate that can be temporarily used while a CA-signed certificate is obtained. Alternatively, the self-signed certificate can still be used so long as the client is interested only in data encryption and not server identity.

Generate a Certificate Signing Request (CSR)

NOTE: The following requires the use of Viewport version 3.53 or later.

1. Open Viewport and select **File Transfer|Generate Certificate Request|Generate Certificate.**

"Certificate Information" Window

2. Enter the information of the organization requesting the certificate. As shown in the previous diagram, the information includes the domain name of the organization, the e-mail address and department of the contact person making the request, the company name, city and state, and the two-letter country code.

   The domain name is not transferable, and thus must be the one that will actually be used by clients. The domain name must be officially registered to the company; otherwise the certificate request will be rejected.

3. Click **OK**. Viewport will generate the CSR and private key. The files will be automatically saved in the \SYS directory of the control system. In addition, Viewport will prompt you to save the CSR file to a directory on your hard drive: Locate the target directory and click **Save**.

   As described earlier, the CSR file is an ASCII text file that is saved in the \SYS directory as: **\\sys\request.csr**. The private key is also saved in the \SYS directory with a .der extension as: **\\sys\srv_key.der**. The procedure for backing up the private key is described in the next section.

   The .csr text file is in the following format:

   -----BEGIN NEW CERTIFICATE REQUEST----

   MIIBZzCCARECAQAwgZQxCzAJBgNVBAYTAlVTMRIwEAYDVQQIEwlob3
   N0c3RhdGUxETAPBgNVBAcTCGhvc3RjaXR5MRUwEwYDVQQKEwxob3N0b
   mFtZSBpbmMxCjAIBgEAEwNNSVMxGTAXBgNVBAMTEHd3dy5ob3N0bmFt
   ZS5jb20xIDAeBgkqhkiG9w0BCQEWEWhvc3RAaG9zdG5hbWUuY29tMFwwDQ
   YJKoZIhvcNAQEBBQADSwAwSAJBAMxVTzjNPVWjOHUtMzEsOEWRMIQ
   WvilIYliVNtK7jTbyB8WUmucwz3JGfP1LZ5AvT5OQsz8tDsILYItGGliC2tcCAw
   EAAaAXMBUGCSqGSIb3DQEJBzEIEwZleHRyYTEwDQYJKoZIhvcNAQEEBQ
   ADQQDLIuRV1NBOrlLr3XWI5XiHRHCfQ8gpDOP5MDCdVFgDPvxi5TpQSFV
   /3PPUAm6BKAiZxmdpX8BUaEsRdQqNfof3

   -----END NEW CERTIFICATE REQUEST-----

NOTE: When sending the CSR to a Certificate Authority it may be necessary to cut and paste the text between the "Begin new certificate request" and "End new certificate request" delimiters. To do this you can open the CSR file in a text editor such as Notepad.

Backup the Private Key

1. Before backing up the private key, the control system's \SYS directory should be the active directory so that Viewport can locate the file:

   On the Viewport command line, go to the \SYS directory by typing "**cd \sys**". To open the directory type "**dir**". This will display a list of files in the \SYS directory, including the CSR (**request.csr**) and the private key (**srv_key.der**).

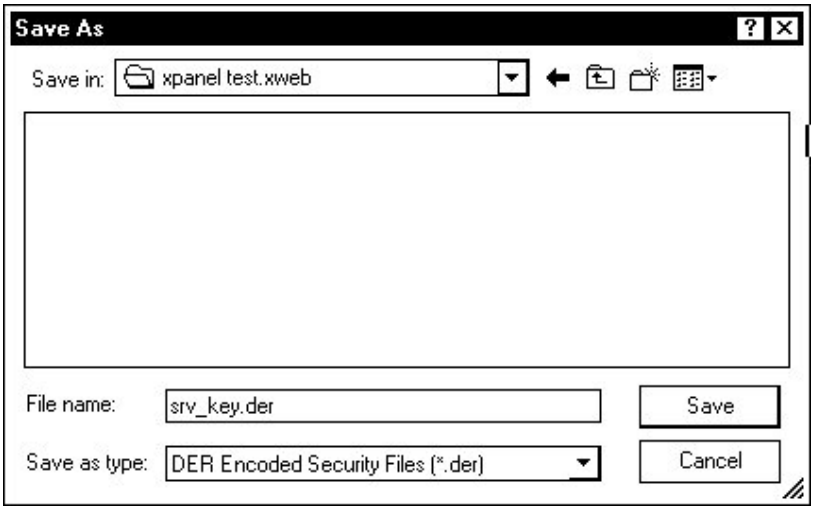
   "\SYS" Directory (PRO2 Shown)

```
PRO2>cd \sys
PRO2>dir
Directory of \SYS
     592   7-21-03 13:08:14 request.csr
     144   7-21-03 13:08:14 srv_key.der
     272   7-21-03 12:46:10 ~.nat.cfg
     159   3-28-03 10:56:18 ~.iptable.dip
      20  12-12-02 12:18:56 ~.iptable.sys
      67  12-12-02 19:14:40 ~.pptable.cfg

PRO2>|
```

2. Now that \SYS is the active directory, select **File Transfer | Generate Certificate Request | Backup Key**. Viewport will automatically locate the **srv_key.der** file.

   Save DER File



3. Browse to the location where the .der file is to be stored and click **Save**. Since the private key is unique to each CSR, it is a good idea to back up the file to secure media.

Obtaining the Certificate

As described earlier, the exact procedure for obtaining a certificate differs depending on the CA, but in all cases you have to submit the CSR along with all verifying information that the CA requires. Here it may be necessary to open the CSR file in a text editor such as Notepad and copy and paste the text between the "Begin new certificate request" and "End new certificate request" delimiters before sending the file to the CA.

The time it takes to receive the certificate will vary based on how quickly the CA receives the required documentation.

Upload the CA-Signed Certificate

Once the CA validates the CSR, the CA issues the certificate. The certificate is usually sent to the requester via e-mail, in the following format:

-----BEGIN CERTIFICATE-----
MIIBZzCCARECAQAwgZQxCzAJBgNVBAYTAlVTMRIwEAYDVQQIEwlob3N0c3RhdG
UxETAPBgNVBAcTCGhvc3RjaXR5MRUwEwYDVQQKEwxob3N0bmFtZSBpbmMxCjAI
BgEAEwNNSVMxGTAXBgNVBAMTEHd3dy5ob3N0bmFtZS5jb20xIDAeBgkqhkiG9w0B
CQEWEWhvc3RAaG9zdG5hbWUuY29tMFwwDQYJKoZIhvcNAQEBBQADSwAwSAJBA
MxVTzjNPVWjOHUtMzEsOEWRMIQWvillYliVNtK7jTbyB8WUmucwz3JGfP1LZ5AvT5
OQsz8tDsILYItGGliC2tcCAwEAAaAXMBUGCSqGSIb3DQEP/LxbucXaasoh0M1TrU/Rhj
N2wsGVWtKpjnoeXcVZn15OS0adpQtbR4NtmEvL/gXgX+pGkRImUGzYTjVAMjeau48j4
mNW6emf//dWmEHxo2LF2ReHfM3LYM5lh47Wi9Hu/fk87QQTn4lq1aHx0vyCtlMOlRXdc
TptuFywnNTZ1qTctoMbDn+e4M6ILlvyETEnvta0HcMjMOYujNm3SPXOu0shek/Czupy7sr
OvMdjV9hmZaGJ2PBpGAfPUqJh5Gb9VOThRbdomlyA==
-----END CERTIFICATE-----

1. Copy and paste the text between the "Begin Certificate" and "End Certificate" delimiters to a text file using a text editor such as Notepad.
2. Save the file on your hard drive and name the file **srv_cert.cer**.
3. In Viewport, select **File Transfer | Generate Certificate Request | Upload Signed Certificate**.
4. Locate the directory where you saved srv_cert.cer and click **Open**. This will upload the signed certificate to the \SYS directory of the 2-Series control system in DER format, i.e., **sys\srv_cert.der**.

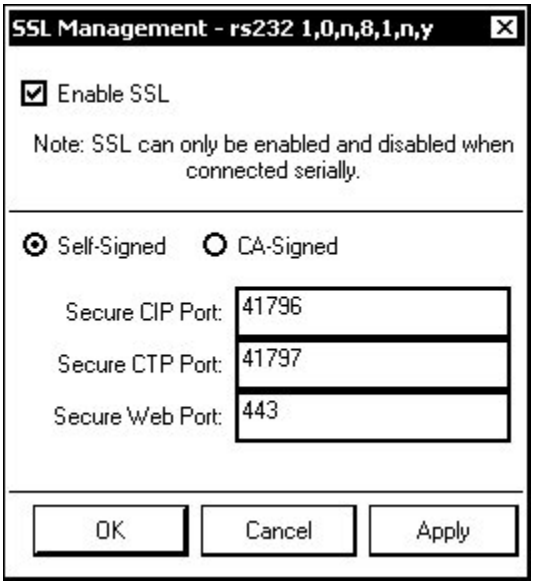
Upload Root Certificate

Along with the signed certificate, all CAs also electronically give access to what is called a **root certificate**. A root certificate is a document that validates the CA itself. At the time of sending the signed certificate, most CAs provide a URL to where their root certificate is stored. The buyer of the signed certificate may then download the root certificate onto the server. Uploading the root certificate is identical to the procedure for uploading signed certificate. The only difference is that the root certificate is stored as: **sys\ rootCA_cert.der**.

Enable SSL with CA-signed certificate

1. Open Crestron Toolbox and establish a serial connection to the 2-Series control system as described in "Serial Connection" on page 5.
2. Select **Functions | SSL Management…** to open the "SSL Management" Window.

"SSL Management" Window



3. Check *Enable SSL*.
4. Select **CA-Signed** and click **OK.** The control system will reboot.

The processor is now SSL protected with a CA-signed certificate. Any Web browser attempting to communicate with the server will display a locked icon on their screen.

Uploading & Using Web Pages

Ethernet-enabled 2-Series control systems provide a built-in Web server for Crestron e-Control applications. Consult your control system's Operations Guide for information on the amount of memory that is allocated for "user files" such as Web pages, mailbox, and the compiled SPZ program files.

NOTE: The default HTTP/web host port is 80. The web port needs to "talk" to the Crestron port running with the program (CIP port 41794).

Crestron VisionTools Pro-e

In most cases, a Crestron VisionTools Pro-e browser project is created to generate the Web pages to be uploaded to the control system.

For Crestron e-Control projects:

When a Crestron 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 contains all the HTML files that are sent to the control system and a Java subfolder. When creating the project in VT Pro-e, the target type should be set to **BROWSER**.

NOTE: The **BROWSER** project type should only be used to open older existing projects. For all new projects, e-Control2 (XPANEL) should be used.

For Crestron e-Control2 projects:

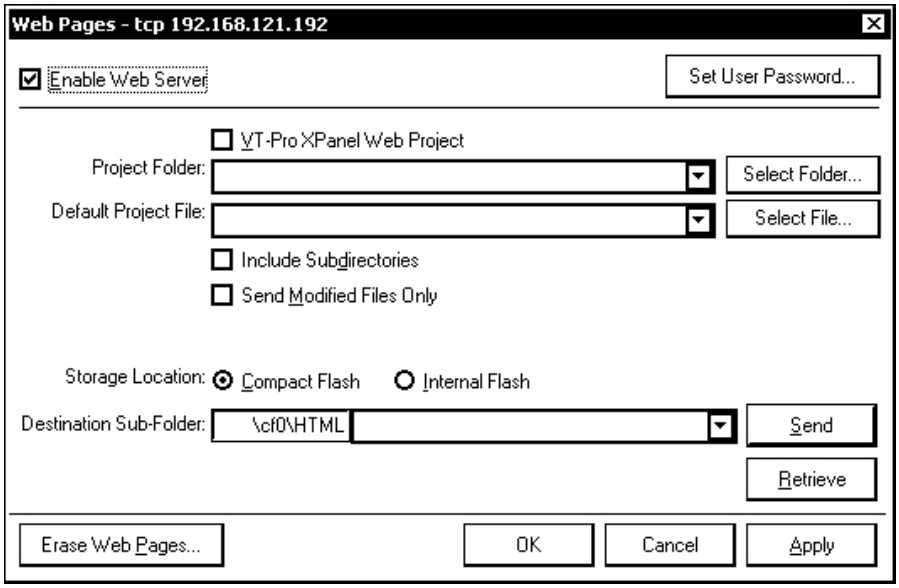
When a Crestron e-Control2 project is created, VT Pro-e automatically creates a folder with the name of the project and a .xweb extension. The web project folder contains all the necessary Crestron e-Control2 files. In VT Pro-e, the target type should be set to **XPANEL**.

An IP ID must be assigned to an e-Control2 project. Additionally, an IP address must be specified in the project's properties. For further information on this procedure, refer to the VT Pro-e online help file.

Crestron Toolbox

To transfer the Web pages to the control system and manage the user password, use the **Fucntions | Web Pages…** command to open the "Web Pages" window shown in the following diagram.

"Web Pages" Window



From this window, the developer can choose to send an entire project, only files that have changed, or a single HTML file. Files can be sent to either the control system's internal flash memory or a compact flash card (if installed). The developer can also set and/or change the user password for web pages served by the control system.

To set the control system to act as a web server, select the *Enable Web Server* check box and click **Apply**.

To transfer Web pages:

1. If the Web page project is a VTPro-e project, select the *VTPro-e XPanel Web Project* check box and locate the project folder. The default page list will be grayed out because the default page has already been specified in the VTPro-e project.

   If the Web page project is not a VTPro-e project, clear the check box and locate the project folder. Then specify the default page. The default page is the first page to be displayed upon connecting to the Web server.

2. Click the *Include Subdirectories* check box to transfer the default page along with all other pages and subfolders that are in the project folder.

   Click the *Send Modified Files Only* check box to transfer only new or changed files in the project folder.

3. Select the *Storage Location*: **Internal Flash** or **Compact Flash**.

   If you select Compact Flash, type the name of the subfolder that will store the Web project. This subfolder will be under the \HTML directory.

4. Click **Send** to start the transfer. The Crestron Toolbox will first compact the file system to free reclaimable space. Then a status bar will display the progress of the transfer operation.

If the Web server contains files that are not present in the project being sent, those files will be deleted from the Web server.

To erase the contents of the Web server, click the **Erase Web Pages** button.

To retrieve the current Web project, click the **Retrieve** button. This allows you to save the project on the hard drive before transferring a new project to the Web server.

NOTE: Crestron e-Control 2 projects can use the default "Main.HTML" name or a user-selectable file name.

To set the user password, refer to "Setting the User Password" on page 56.

SIMPL Windows

For each IP ID in the VT Pro-e browser project, there must be one corresponding Crestron 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 or C2ENET-2 card slot.

As with all Ethernet devices, each PC Interface must have an entry in the control system's IP table. 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.

Web Page Basics

User pages are served by directing a web browser to the IP address or the URL of the control system (i.e. http://www.myprocessor.com).

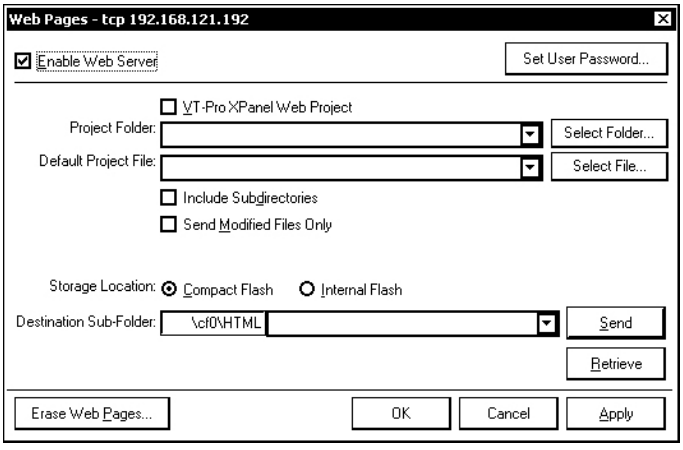
The setup pages are served by directing a web browser to the IP address or the URL of the control systems administrator interface (i.e. http://www.myprocessor.com/setup/admin.ssi)

Passwords should be set for the user and administration pages for system security.

Setting the User Password

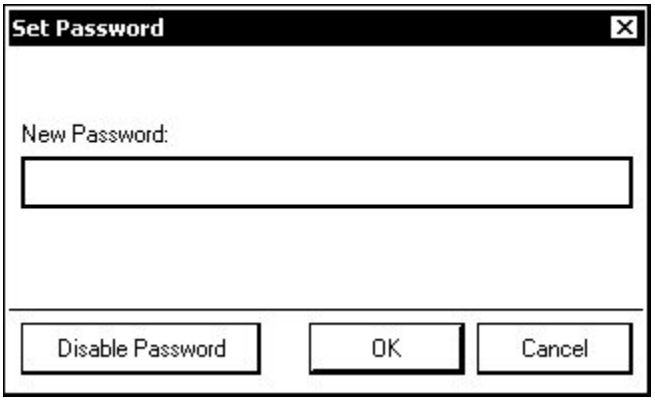
1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Fucntions | Web Pages** to open the "Web Pages" window.

"Web Pages" Window



3. Click **Set User Password…** to open the "Set Password" window.

"Set Password" Window



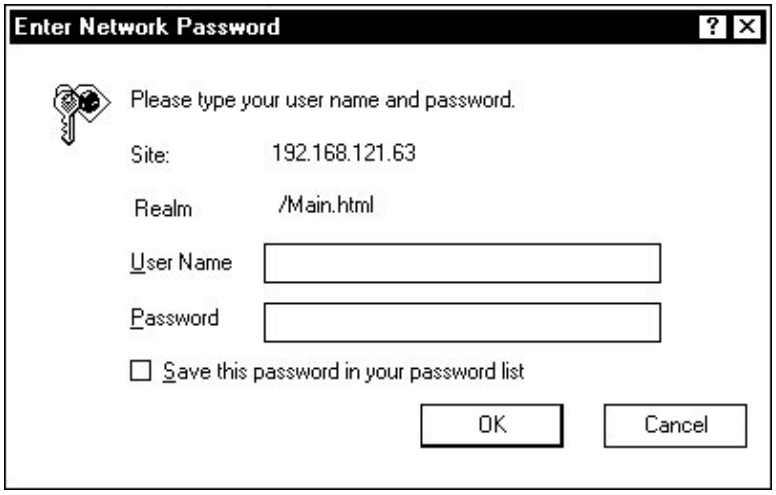
4. Type in a new password and click **OK** to set the user password.

   The password can also be disabled by clicking **Disable Password**.

Using the User Password

If the user password is set, the login screen shown in the following diagram will be displayed.

User Login Screen



Enter "user" in the *User Name* field, the appropriate password, and click **OK** to access the user pages.

If a user password has not been set, the login screen will not be displayed and the browser will display the default user page.

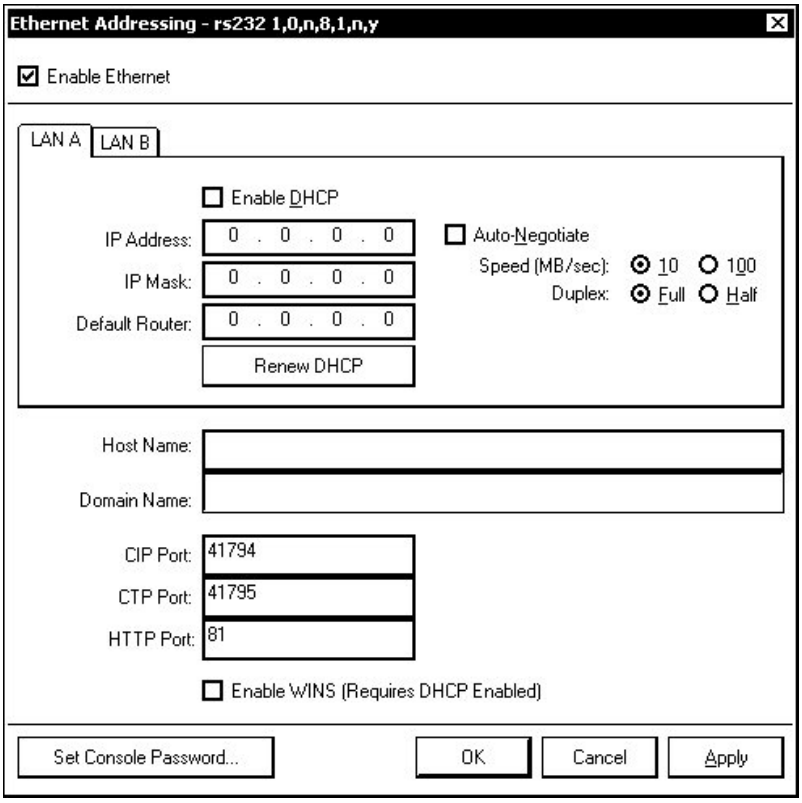
NOTE: CUZ versions 3.112 and later require the name "user" and the correct user password to browse the user pages. CUZ versions prior to 3.112 provide a lower level of security than that provided by version 3.112.

Setting the Admin Password

Use Crestron Toolbox to set the admin password for accessing the control system's setup pages for Ethernet configuration and Network Address Translator (NAT) operation. The admin password is the same as the TCP/IP console password.

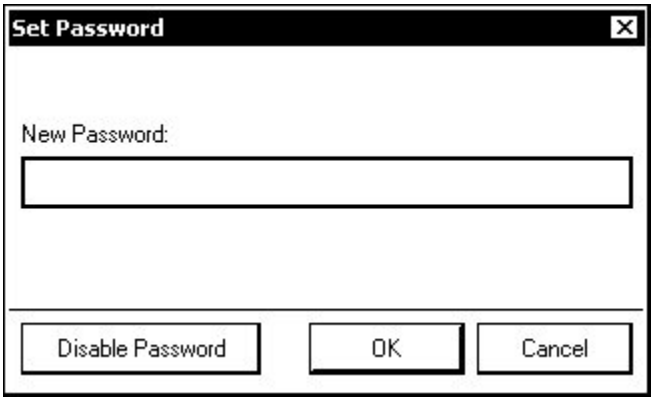
1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | Ethernet Addressing…** to open the "Ethernet Addressing" window.

"Ethernet Addressing" Window



3. Click **Set Console Password…** to set a new password.

"Set Password" Window



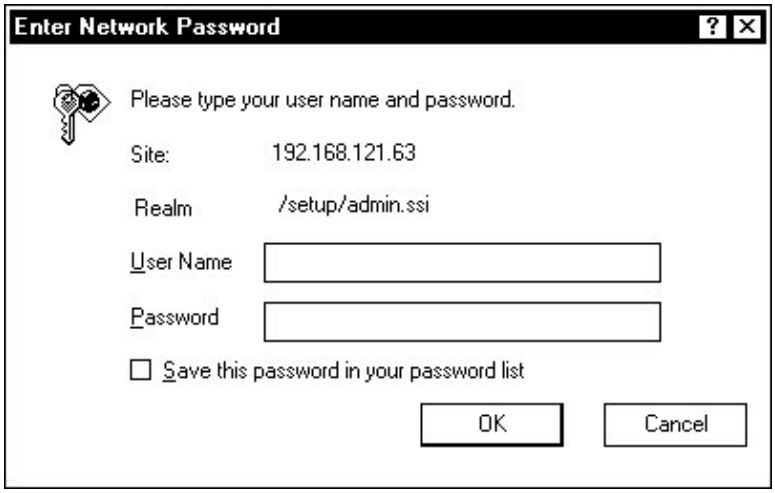
4. Type in a new password and click **OK** to set the admin password.

   The password can also be disabled by clicking **Disable Password**.

Using the Admin Password

If the admin password is set, the login screen shown in the following diagram will be displayed.

Admin Login Screen



Enter the admin name and password and click **OK** to access the setup pages.

If an admin password has not been set, the login screen will not be displayed and the browser will display the setup page.

NOTE: CUZ versions 3.112 and later require the name "user" and the correct user password to browse the user pages. To access the setup pages, the user name "admin" and the correct admin password must be used. CUZ versions prior to 3.112 provide a lower level of security than that provided by version 3.112.

Compiling and Uploading a Program

After a SIMPL Windows program has been completed, the program must be compiled and uploaded to the control system.

Compiling a Program in SIMPL Windows

To compile the program in SIMPL Windows, 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.

Uploading a SIMPL Windows Program

The SIMPL Windows file can be uploaded to the control system using SIMPL Windows or via Crestron Toolbox.

Upload via SIMPL Windows

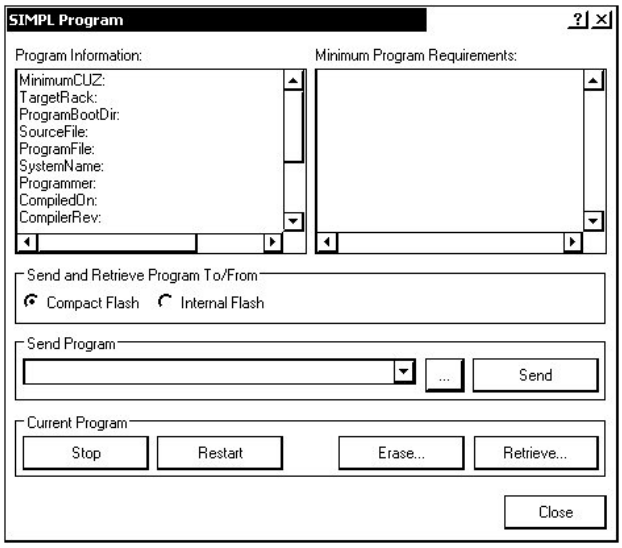
1. Start SIMPL Windows.
2. Select **File | Open** to view the "Open" window, navigate to the SIMPL Window file (.smw), and click **Open**.
3. Select **Project | Transfer Program**.

Upload via Crestron Toolbox

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | SIMPL Program**.

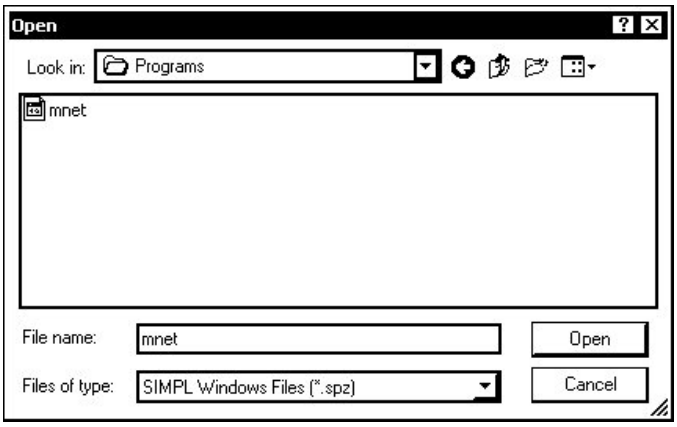
   The "SIMPL Program" window contains information about the currently loaded SIMPL program (if any), and permits you to stop, start, erase, retrieve, and upload a SIMPL program. This menu also permits you to upload to compact flash or internal flash.

"SIMPL Program" Window



3. Click the ... button to browse for a new compiled (.spz) program.

"Open" Window



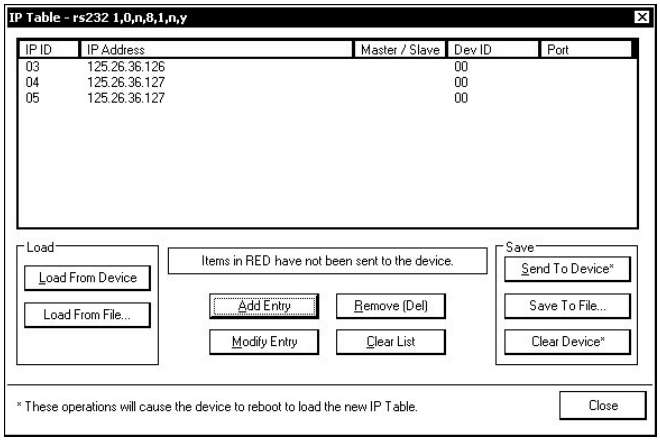
4. Select a file and click **Open.** When the "SIMPL Program" window re-opens click **Send**.

IP Tables

Control systems that run programs using Ethernet communication between the control system and Ethernet-enabled network devices require an IP table to enable the control system to identify and communicate with Ethernet equipment on an IP network. Each controlled Ethernet device has an IP table, also known as a master list. The master list specifies the IP ID of the controlled device and the IP address or FQDN of the control system(s) that will send it commands.

The control system's IP table lists the IP address/fully-qualified domain name and the IP ID of every device in the network. The IP ID is a hexadecimal value that must be unique and ranges from 03 to FE.

Control System IP Table



IP table information can be entered in one of two ways. The first method creates what is referred to as a "default" IP table based on information given in the SIMPL Windows program. The second method uses Crestron Toolbox to manage the IP table.

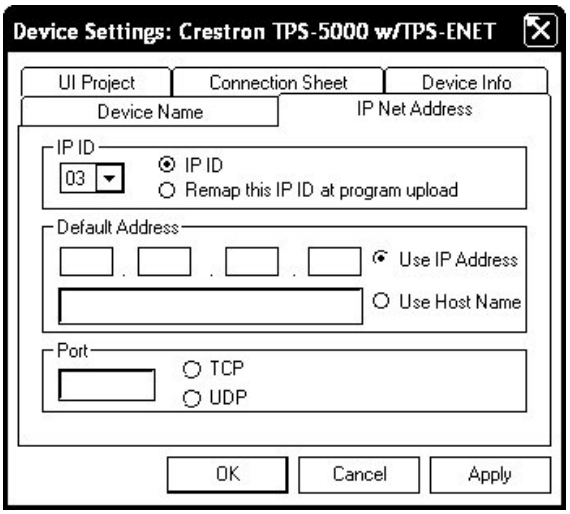
NOTE: IP tables used in Ethernet-based Master-Slave applications have their own IP table requirements. Refer to "Ethernet Master-Slave Modes" on page 36 for details.

Creating the Default IP Table from SIMPL Windows

While adding Ethernet devices (Ethernet slave processors, Ethernet-enabled touchpanels, Ethernet devices, or Ethernet modules), the IP information for each device must be entered in Configuration Manager to determine the information contained in the default IP table.

1. Double-click the Ethernet device in the SIMPL Windows Configuration Manager screen to open the "Device Settings" window.
2. Select the *IP Net Address* tab.

   Device Settings Window



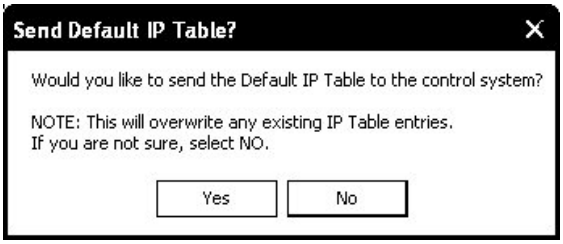
3. Click the **IP ID** button and select the hexadecimal IP ID from the list (The **Remap IP ID at program upload** option is reserved for future use.)

4. Enter the IP address of the device or click **Use Host Name** to enter the fully-qualified domain name of the device and click **OK**.
5. Repeat for every Ethernet-enabled device in the network.

NOTE: If IP information (IP address/hostname) was not entered for all of the network devices when creating the program, the default IP table will not be created. The IP table must then be created from Crestron Toolbox. If IP addresses for the devices are missing, the IP table can be edited from Crestron Toolbox.

6. After completing the SIMPL Windows logic program, compile and upload the program. To upload the default IP table, click **Yes** when prompted with the "Send Default IP Table" window.

Send Default IP Table



The default IP table will be automatically created and uploaded using the IP information supplied for each network device.

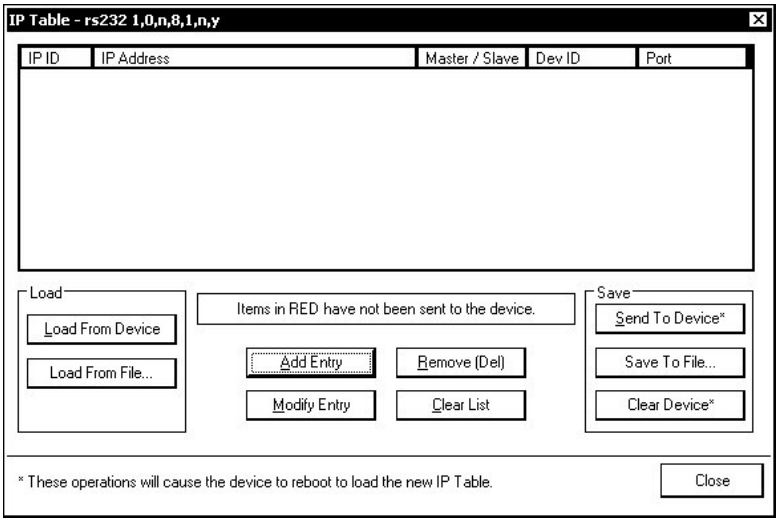
To create a custom IP table with Crestron Toolbox, click **No**.

Creating and Modifying IP Tables with Crestron Toolbox

Crestron Toolbox can be used to create and modify a control system's IP table. Use Crestron Toolbox to create, modify, or send a control system's IP table to the control system without recompiling or transferring a SIMPL Windows program.

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Funtions | IP Table …**. This will open the "IP Table" window.

"IP Table" Window



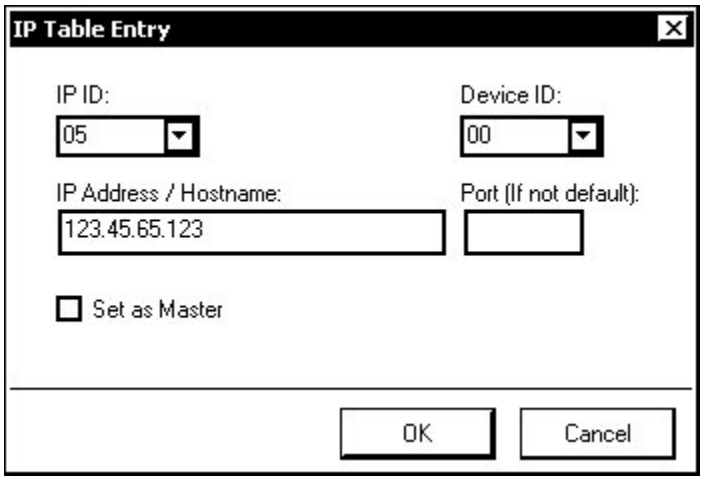
3. If the control system already has an IP table that is to be modified, click **Load From Device** to retrieve the IP table that is stored on the control system.
4. To add a new table entry, click **Add Entry**. Existing entries can be modified by selecting an entry from the list and clicking **Modify Entry**. Click **Remove (Del)** to remove a selected IP entry or click **Clear List** to remove all of the entries from the IP table.

To Add an IP table entry:

a) Click **Add Entry**. The "IP Table Entry" window will open.

b) As shown in the following diagram, select the hexadecimal IP ID of the device from the *IP ID* list. The IP ID of the device must match the IP ID that is specified for the device in the SIMPL Windows program.

"IP Table Entry" Window



c) In the *IP Address/Hostname* field, enter the static IP address of the Ethernet device, or if the device is DHCP-enabled, its fully-qualified domain name.

d) After entering all of the information, click **OK** to add the device to the IP table.

e) Repeat this procedure for all the Ethernet devices in the program.

5. Once all of the devices have been listed, click **Send to Device*** to upload the IP table to the control system.

Whenever an IP table is sent to the control system, it will overwrite the previously loaded IP table and reboot the control system.

For Remote Ethernet Processing (Ethernet Slave Processors):

For information on IP table entries on Ethernet slave processors, refer to "Ethernet Master-Slave Modes" on page 36.

For Other Ethernet Enabled Devices

The procedure for setting the IP information is different for each Ethernet enabled device and is described in each device's manual.

Uploading Touchpanel Projects

Using the network connection to the control system, compiled VisionTools Pro-e (VT Pro-e) projects can be relayed through the control system to any Cresnet touchpanel on the network. VT Pro-e projects can also be directly uploaded via a touchpanel's serial port or Ethernet port (if equipped).

The compiled VT Pro-e project file can be uploaded to a touchpanel using VT Pro-e or Crestron Toolbox. If loading a project to a touchpanel that has an internal compact flash slot, use Crestron Toolbox.

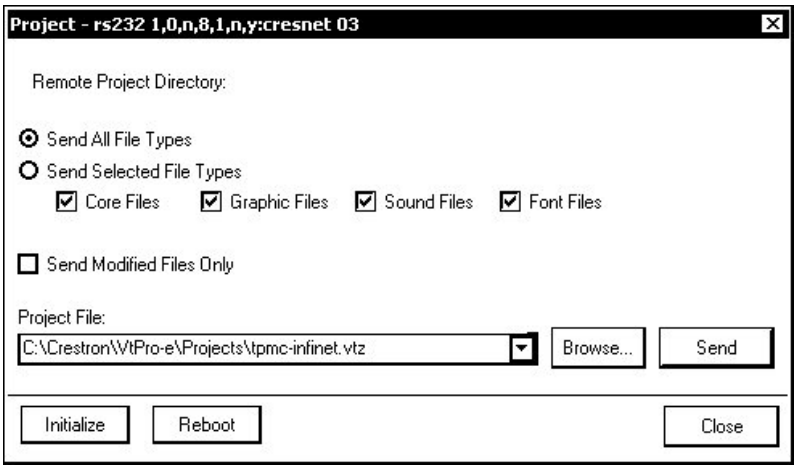
Upload via VT Pro-e

1. Start VT Pro-e.
2. Select **File | Open | Project** to view the "Open" window, navigate to the VT Pro-e file (.vtp), and click **Open**.
3. Select **File | Upload Project**. This automatically selects the compiled .vtz file.

Upload via Crestron Toolbox

1. Open Crestron Toolbox and establish communications with the touchpanel as described in the touchpanels operations guide.
2. Select **Functions | Project**.
3. The "Project" window is used to select the project to be uploaded to the touchpanel.

"Project" Window



Each time a project is selected using the **Browse…** command, that project is added to the *Project File* drop-down list. This makes it convenient to recall projects without need to browse to a directory.

Selecting **Send All Files** sends the entire project.

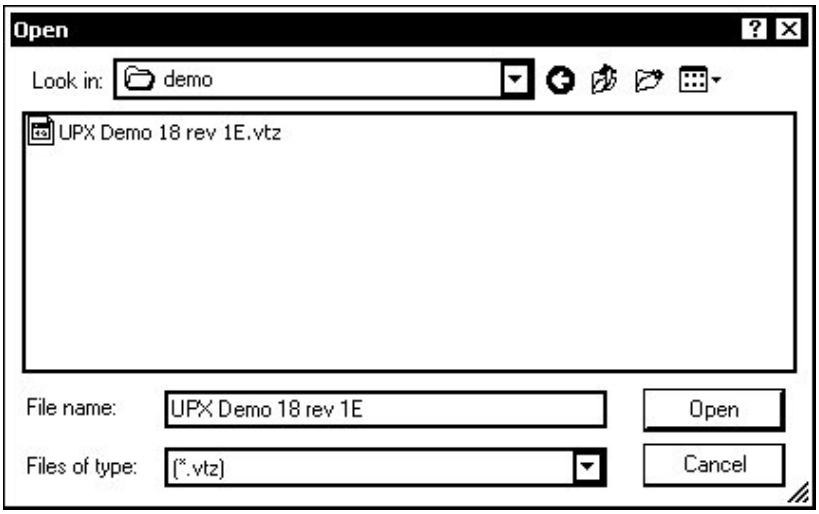
Selecting **Send Selected File Types** sends only the file types that are selected. *Core Files* are files that include touchpanel logic, join number remapping, and other files related to touchpanel functionality. *Graphic Files* are graphics that are displayed on the touchpanel display. *Sound Files* are

WAV files that are assigned within a touchpanel project. *Font Files* are fonts that are part of a touchpanel project.

Selecting *Send Modified Files Only* will only send files that are different from those that are currently stored in the touchpanel. Note that if any pages in the touchpanel are not present in the project, those pages will be deleted from the touchpanel.

4. Click the **Browse…** button to browse for a new compiled (.vtz) program.

"Open" Window



5. Select a file and click **Open.** When the "Project" window re-opens click **Send** to send the project to the touchpanel.

   To verify that the project has been transferred successfully, select **Tools | System Info**. The new project information will appear in the upper left corner of the "System Info" window.

Firmware Upgrade

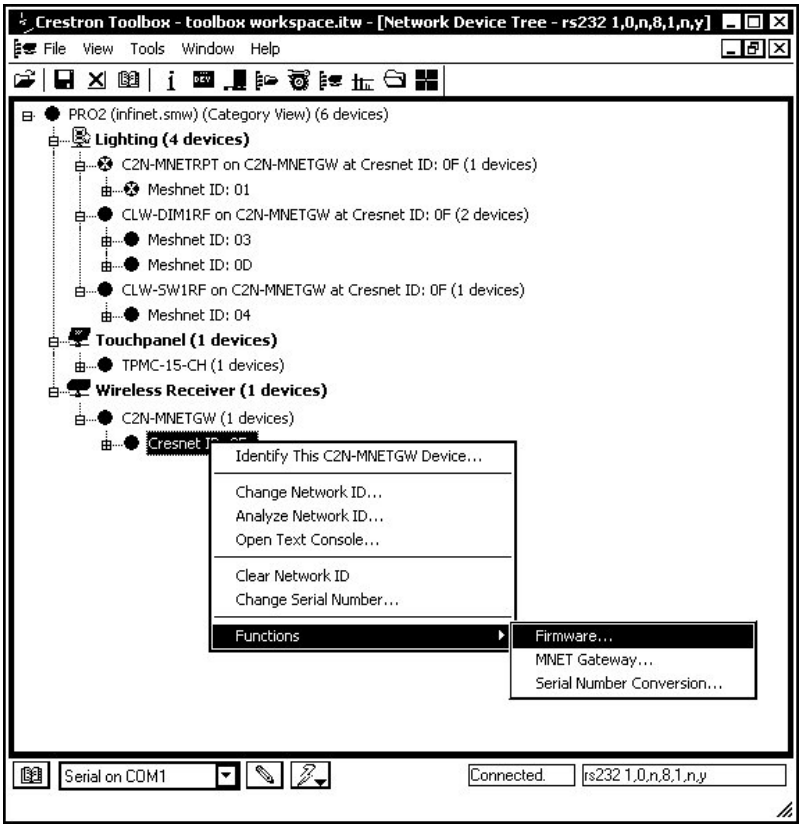
To take advantage of all the device features, it is important that the unit contains the latest firmware available. Please check the Crestron website for the latest version of firmware. Not every product has a firmware upgrade, but as Crestron improves functions, adds new features, and extends the capabilities of its products, firmware upgrades are posted. To upgrade the firmware, complete the following steps.

1. Open Crestron Toolbox and establish communications with the control system as described on page 5.

2. Select **Tools | Network Device Tree** to open the Network Device Tree.

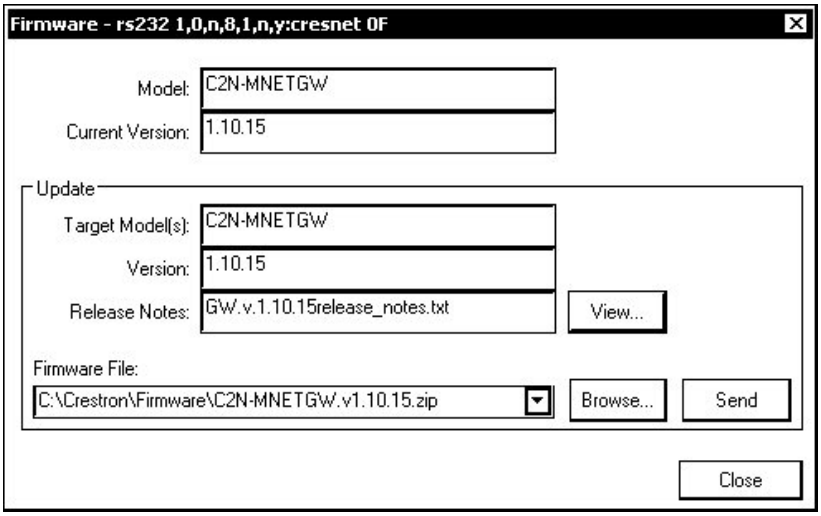
3. Right-click on the device whose firmware is to be upgraded and select **Functions | Firmware**.

   "Network Device Tree" Window – Right-Click Sub Menu



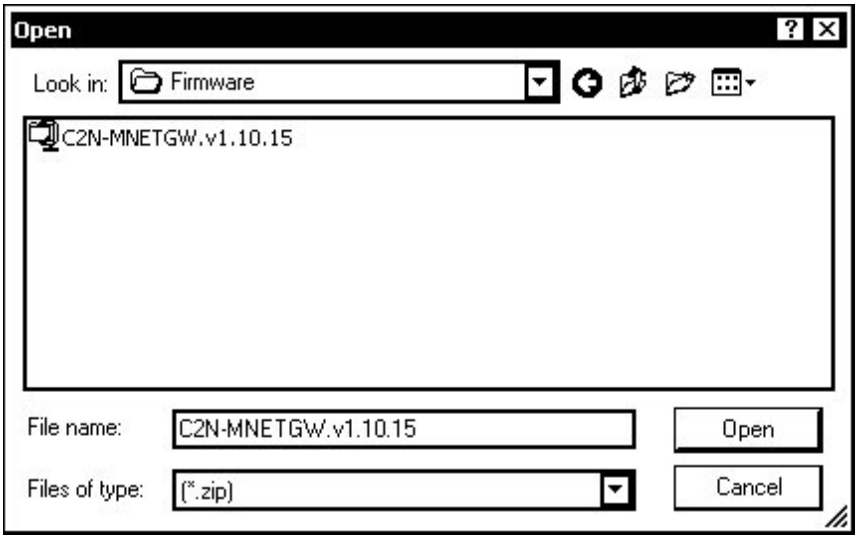
4. The "Firmware" window displays the model and current firmware version. Click **Browse…** to find a new firmware file to upload.

"Firmware" Window



5. When the following screen appears, browse to locate the firmware (.upg or .zip) file.

Locate Firmware in the "Open" Window



6. Click **Open** to select the file.

7. The "Firmware" window reopens indicating the new firmware version to be uploaded. ZIP files may contain release notes that can be viewed by clicking **View…** in the "Firmware" window. Click **Send** to transfer the new firmware to the device. Click **Close** after the firmware has been transferred.

Updating the Operating System

Introduction

All 2-Series control systems have an operating system file with a .cuz extension. CUZ update files are used to introduce new features and are occasionally required to support new devices. CUZ files are enclosed in a zip file that is available for download from the Crestron website.

To download an update, click the appropriate zip file, choose the **Save to Disk** option, and then specify the directory where the update is stored.

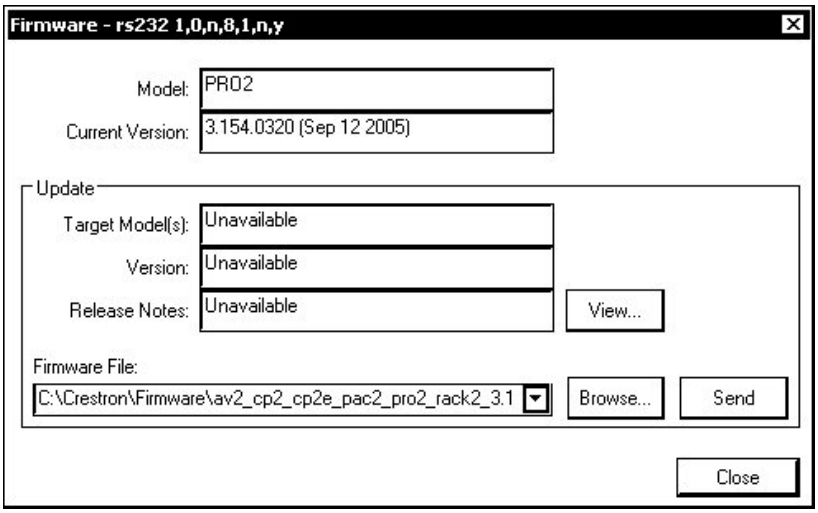
NOTE: Crestron software and any files on the website are for Authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

Procedure

To upload the new .cuz to the control system:

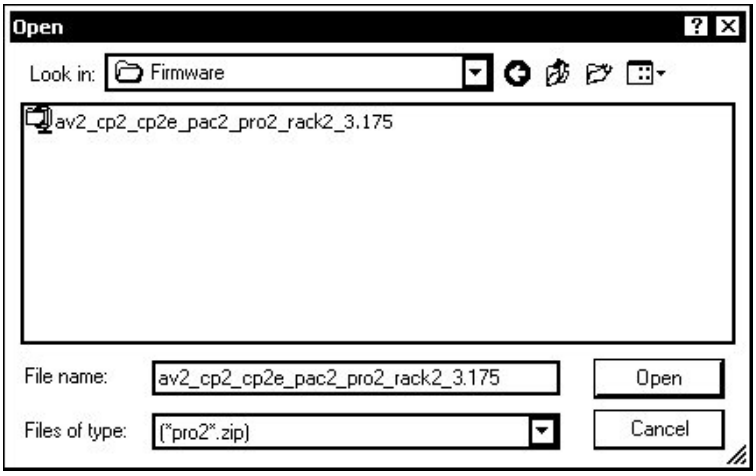
1. Open Crestron Toolbox and establish communications with the control system as described on page 5.
2. Select **Functions | Firmware…**.
3. The "Firmware" window displays the model and current firmware version. Click **Browse…** to find a new firmware file to upload.

   "Firmware" Window



4. When the following screen appears, browse to locate the firmware (.zip) file.

Locate Firmware in the "Open" Window



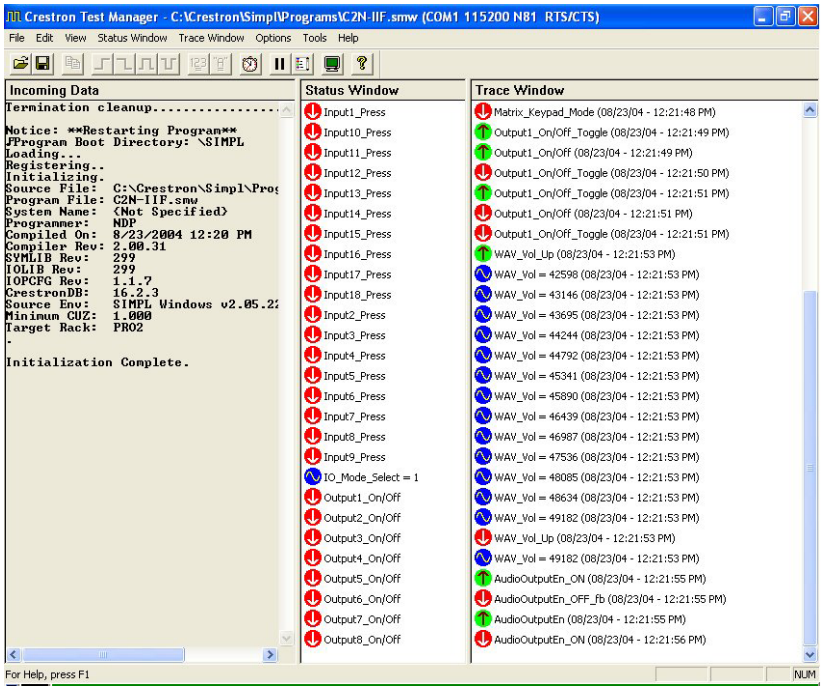
5. Click **Open** to select the file.
6. The "Firmware" window reopens indicating the new firmware version to be uploaded. ZIP files may contain release notes that can be viewed by clicking **View…** in the "Firmware" window. Click **Send** to transfer the new firmware to the device. Click **Close** after the firmware has been transferred.

Test Manager

The Test Manager is a utility for testing and debugging a SIMPL Windows program, by monitoring the status of selected signals in real time. Test Manager can test any program that has been compiled and uploaded to the control system.

Test Manager is launched from within SIMPL Windows by clicking the **Test Manager** button or by selecting **Tools | Test Manager**. Test Manager can also be opened as a standalone program.

The Test Manager Program



The Test Manager program is broken down into three windows:

- *Incoming Data*
- *Status Window*
- *Trace Window*

Incoming Data

The *Incoming Data* window displays information received from the control system and is unrelated to signal monitoring. This is the same data that is shown in the *Incoming Data* window of the Crestron Viewport.

Control system data can be saved to disk by selecting **Save Incoming Data** on the **Edit** menu. The data will be saved as an ASCII text file with the extension .tmi.

Text in the *Incoming Data* window can be copied to the clipboard by selecting **Copy** from the **Edit** menu.

To clear the contents of the *Incoming Data* window, select **Clear Incoming Data** from the **Edit** menu.

Status Window

The *Status Window* contains a list of signals that are selected for monitoring. The *Status Window* displays the following information for each signal:

- The type of signal: for analog, for serial, for high digital, and for low digital.
- The signal name.
- Analog signal values, in decimal (default) or percent format. (To specify percent format, select **Show Analogs as Percent** from the **Options** menu.)
- Serial signal values, in ASCII (default) or hexadecimal notation. (To specify hex, select **Show Serials as HEX** from the **Options** menu.)

As digital signals transition in real time, the icon next to the signal will change to reflect the new state. With analog and serial signals, the new value will overwrite the previous value.

Signals can be added to the *Status Window* in a number of ways:

From Test Manager

- Select **Add Signal** from the **Status Window** menu. This will display the list of all signals in the program. Select the signal(s) of interest and click **Add**.
- Select the signal(s) of interest in the *Trace Window* and select **Add Selected Signals from Trace Window** from the **Status Window** menu.
- Select the signal(s) of interest in the *Trace Window* and select **Add Signals to Status Window**.

To remove signals from the *Status Window*, select the signal and click **Remove Signal**, or click **Remove All Signals** to clear the *Status Window*.

From SIMPL Windows

- In *Detail View*, right-click the signal and select **Set Watch**.
- In *Program View*, right-click the signal and select **Set/Clear Watch**.

The signal name will appear in bold, indicating that it has been added to the watch list and will be displayed in the *Status Window*.

To remove signals from the watch list, right-click the signal and select **Clear Watch** if in *Detail View*, or select **Set/Clear Watch** if in *Program View*. This will un-bold the signal name.

Saving Status Window Data

To save the contents of the *Status Window* to disk, click **Save to Disk** from the **Status Window** menu. The data will be saved as an ASCII text file with the extension .tms.

Bookmarks

Test Manager allows signals in the *Status Window* to be bookmarked. Select **Status Window | Bookmarks | Add** and enter a name for the bookmark. To recall the bookmark point to **Bookmarks** and click the name of the bookmark.

The Bookmarks **submenu** can also be used to overwrite a bookmark or remove existing bookmarks.

Forcing Signal Transitions

Test Manager provides several commands for changing the states and values of signals in the *Status Window* without need to physically press buttons on a device. These commands are available on the Test Manager toolbar or the **Status Window** menu.

Digital Signals

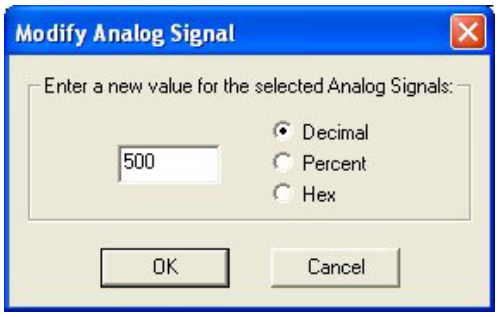
To change the state of a digital signal, select the signal in the *Status Window* and click the desired action on the toolbar. Here the commands are only enabled for "jammable" digital signals, such as button presses or the outputs of buffers.

- Click (or Assert Signals) to drive the signal high.
- Click (or De-Assert Signals) to drive the signal low.
- Click (or Positive Pulse Signals) to pulse the signal high
- Click (or Negative Pulse Signals) to pulse the signal low.

Analog Signals

To change the value of an analog signal, select the signal in the *Status Window* and click the **Analog** button, or select **Modify Analog Signal** from the **Status Window** menu. Enter the new value and set the numeric format to **Decimal**, **Percent** or **Hex** as shown in the following diagram.

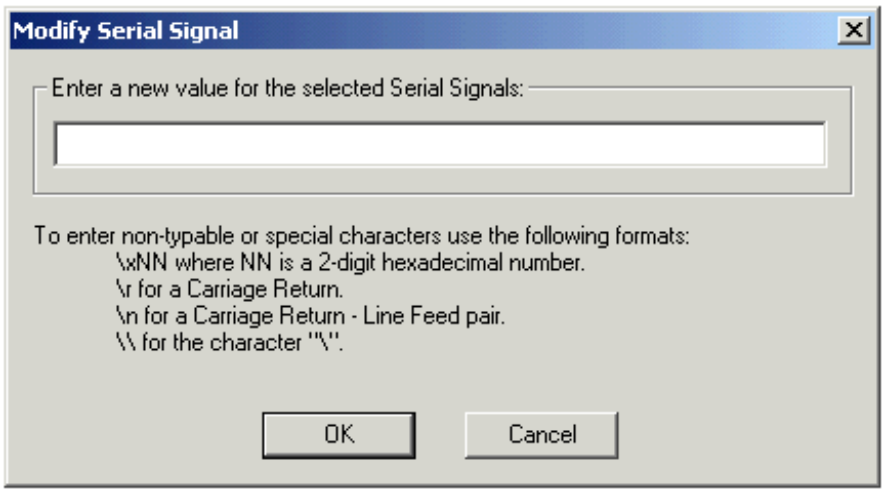
"Modify Analog Signal" Window



Serial Signals

To change the value of a serial signal, select the signal in the *Status Window* and click the **Serial** button, or select **Modify Serial Signal** from the **Status Window** menu and enter the new value. As shown in the following diagram, Test Manager supports escape codes for non-printable characters such as carriage return/line feed.

"Modify Serial Signal" Window



Trace Window

The *Trace Window* displays the status of the monitored signals. The *Trace Window* displays the following information for each signal:

- The type of signal: for analog, for serial, for high digital, and for low digital.
- The signal name.
- Analog signal values, in decimal (default) or percent format. (To specify percent format, select **Show Analogs as Percent** from the **Options** menu.)
- Serial signal values, in ASCII (default) or hexadecimal notation. (To specify hex, select **Show Serials as HEX** from the **Options** menu.)

Additionally, the *Trace Window* includes the date and time (to the nearest second) of each signal transition. An additional time stamp can be inserted at any point in the debugging process by clicking the **Time Stamp** button.

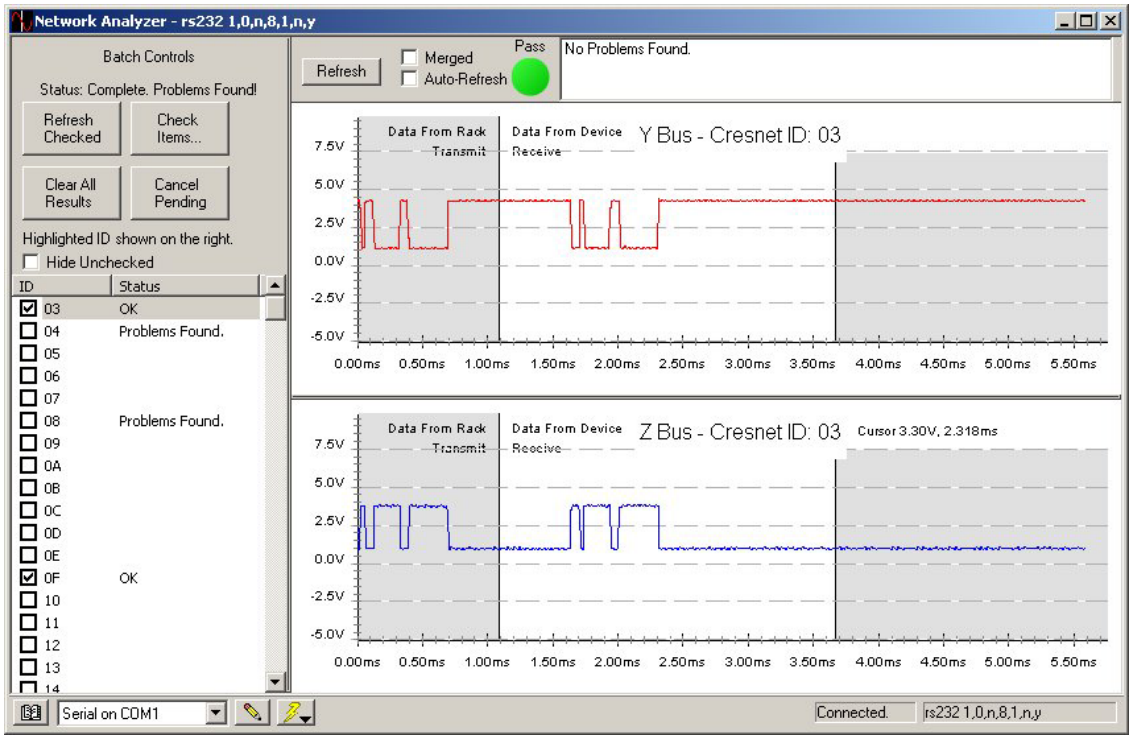
Network Analyzer

The Network Analyzer utility helps to identify Cresnet network problems that can be caused by faulty devices, electrical shorts, or breaks in network wiring. Network Analyzer takes a sample of the voltage levels on the Cresnet "Y" and "Z" wires for a specified Net ID.

Network Analyzer is launched from Crestron Toolbox by selecting **Tools | Network Analyzer**.

For detailed instructions on using Network Analyzer, refer to the extensive help file by pressing **F1.**

Network Analyzer Application



Super-Debugger

Super-debugger is a logic analysis tool that shows all data packets coming in and out of the logic processor. This includes “direct wire access”-type packets from NTX, DPM, SDPM, IPSDPM, Broadcast from SIMPL and SendToCresnet() from SIMPL+, as well as startup commands from logic.

The Super-debugger utility will not show packets that are not directed to logic (for example, CIP keep alive, Cresnet discovery & response, etc.). These packets can be debugged with the **DEBUG** command at the console.

Super-debugger can perform the following tasks and can be used for any device that is being debugged:

- Show transmitted packets.
- Show received packets.
- Show received packets in raw mode.
- Show received packets in interpreted mode.
- Show transmitted packets in raw mode.
- Show transmitted packets in interpreted mode.

These tasks can be used independent of each other.

Packets that are viewed in the raw mode are shown in HEX. Packets that are viewed in the interpreted mode are shown in printable ASCII. “Broadcast”-type packets may or may not be shown.

“Direct-to-wire” packets (i.e. from NTX, etc.) are handled in a special way. If the ID of the direct-to-wire packet is in the program, it will be subject to being picked apart and interpreted according to the operating mode. If the direct-to-wire packet's ID is not in the program, it will only be displayed in raw form. The handling of “unresolvable” packets (those whose ID is not in the program) can be turned on or off.

The debugger can also turn off console output and log data to compact flash instead.

For a complete list of Super Debugger commands, refer to “Appendix E: Super-Debugger Command Listing” on page 152.

C2N-NPA8 Network Poll Accelerator

The Network Poll Accelerator (C2N-NPA8) is a device that maintains high data throughput and low data latency via Cresnet when a large number of Cresnet devices communicate with a single 2-Series control system. When connected to select Crestron 2-Series control systems via a high speed serial or Ethernet connection, the C2N-NPA8 can provide reliable, high-speed communications between the control system and up to 252 Cresnet devices.

Placing a large number of Cresnet devices on a control system can slow down polling time as each Cresnet device is polled sequentially by the control system. By breaking down the Cresnet system into segments, multiple segments can be polled simultaneously by the control system, hence improving response time.

Similarly, high-traffic devices such as touchpanels, camera controls, and other devices require more network bandwidth as they transmit and receive larger amounts of data. By placing these devices on their own segments, other segments can be used for low-traffic devices such as wall keypads allowing Cresnet traffic to flow more efficiently.

The C2N-NPA8 is typically recommended for networks with 20 or more devices (not including button panels). Consult with Crestron's True Blue Support to determine if a C2N-NPA8 would be beneficial to your system.

The C2N-NPA8 is comprised of 32 Cresnet connectors spread over eight segments (NET A – NET H). These segments, along with the Cresnet port on the control system allow the connection of up to 252 Cresnet devices.

For information on configuring a network with a C2N-NPA8, refer to the latest revision of the C2N-NPA8 Operations Guide (Doc. 6087) which can be downloaded from the Crestron website.

The C2N-NPA8 is compatible with several 2-Series control systems. However, not all of the 2-Series products are compatible with the C2N-NPA8. The following table lists 2-Series control systems (that are currently available as of this writing) that are compatible with the C2N-NPA8 as well as the communication methods that can be used.

Processor Compatibility

PROCESSOR	SERIAL	ETHERNET
AV2	YES[1]	YES[3]
C2N-DVP4DI	NO	YES
CNX-DVP4	NO	YES
CP2	YES[2]	NO
CP2E	YES[2]	YES
MC2E	YES[2]	YES
MC2W	YES[2]	NO
MP2	YES[2]	NO
MP2E	YES[2]	YES
PAC2	NO	YES[3]
PRO2	YES[1]	YES[3]
QM-RMC	NO	NO
QM-RMCRX(-BA)	NO	NO
RACK2	NO	YES[3]

1. COM ports C through F are poll accelerator-ready
2. COM ports A and B are poll accelerator-ready
3. Requires installation of C2ENET-1 or C2ENET-2 Ethernet card

NOTE: Control systems cannot use a plug in serial card (i.e. a C2COM-3) to communicate with the C2N-NPA8.

For detailed information on the C2N-NPA8, refer to the latest version of the C2N-NPA8 Operations Guide (Doc. 6087) which is available for download from the Crestron website.

Support Information

Frequently Asked Questions

Following are some frequently asked questions that arise when using a 2-Series control system:

Frequently Asked Questions

QUESTION	ANSWER
My control system is not functioning as desired. I.e. relays not closing, IR signals are not emitted, etc. However, I am able to establish communications with the control system. How can I determine if the control system is functioning?	Use Crestron Toolbox to establish communications with the control system as described on page 5. Open a text console window and type **SELFTEST**. This command executes the system self test procedure and provides feedback that indicates the status of the control systems outputs.
How do I restore my 2-Series control system to the initial factory default settings?	Use Crestron Toolbox to establish a serial connection with the control system as described on page 5. Open a text console window and type **INITIALIZE**. This command erases the entire flash file system (internal or compact flash) and IP information, Upon completion, type the command **RESTORE**. This command restores the system parameters to the factory default settings. It will erase any stored program, web pages and IP information. Type the **REBOOT** command to execute a reboot sequence.
After uploading a program to my 2-Series control system, the control system continually reboots. How do I stabilize the control system?	Use Crestron Toolbox to establish a serial connection with the control system as described on page 5. Open a text console window and type **STOPPROGRAM**. This command will prevent the program from running. The console will display: Stopping Program..... **Program Stopped** **NOTE:** To restart the program, type **REBOOT** or press/release the HWR button on the control system.
The **MSG/ERR** LED on the front of my 2-Series control system is lit. How do I view and/or clear the message?	Refer to "2-Series Control System Error Messages" on page 29 for instructions on reading and clearing messages.
When I attempt to upload my program, I get the error message "Failed to Initialize NVRAM"? What can I do to fix this?	You have configured your system to store run time data on NVRAM but the NVRAM disk size was never specified. Refer to "Setting Up an NVRAM Disk" on page 25 for instructions.
How do I find the MAC address of my control system's Ethernet card?	Use Crestron Toolbox to establish a communications with the control system as described on page 5. The MAC address information is contained in the *Ethernet* section of the "System Information" window.

(continued on following page)

Frequently Asked Questions (continued)

QUESTION	ANSWER
My 2-Series control system reboots unexpectedly. I don't know if the cause is a hardware/software anomaly or induced externally (power failure). I have no error logs because the reboot sequence cleared out the error log. What do I do?	Use Crestron Toolbox to establish communications with the control system as described on page 5. Open a text console window and type **NVRAMREBOOT ON**. This command will write rebooting messages to NVRAM. If an anomaly exists, this command will save the error even though the control system has rebooted. To view the contents of NVRAM, open the error log as described on page 30. After you have captured the error log, turn off the NVRAMREBOOT command by typing **NVRAMREBOOT OFF**.

Watchdog Protection

Crestron 2-Series control systems are equipped with "Watchdog Protection" to monitor internal registers on the processor as well as software processes.

The hardware watchdog monitors internal registers on a 2-Series control system that require periodic writing. If the registers are not being written to as required, the watchdog will send a message to the error log and reboot the control system.

The software watchdog monitors the processor to ensure that no single process in the system monopolizes the central processing unit. A 2-Series control system requires certain low-level tasks to run on a regular basis. If the control system is so busy that one of the low-level tasks is held off for a period of time, the watchdog will send a message to the error log and reboot the control system.

Capturing Watchdog Messages

When either watchdog triggers a reboot, the processor will display information about what caused the reboot on the serial port and write the information to the error log. This information allows engineers at Crestron to track down the cause of the reboot.

If a PC is connected to the control system's serial port, the information can be received through a serial connection to the control system console.

When a PC is not connected to a control system's serial port, the NVRAMREBOOT function can be used to store error logs containing watchdog messages in NVRAM before the control system reboots. For information on the NVRAMREBOOT command, refer to "NVRAMREBOOT" on page 27.

Unexpected reboots are not considered part of normal operation. If your control system reboots without apparent reason, please capture the watchdog messages in the error log to NVRAM using the NVRAMREBOOT feature. All messages contained in the error log should be forwarded to Crestron for further analysis, as workarounds may be available to prevent future reboots. Your assistance in providing this information is greatly appreciated.

Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by calling the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876]. For assistance in your local time zone, refer to the Crestron website (www.crestron.com) 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 its products, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

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

Appendix A: Interfacing a Control System with a Modem

NOTE: The 2-Series control system must have CUZ version 3.129 or later installed to ensure proper modem communications. For a general guide to operations, refer to the "Quick Guide" setup described below. For further details on cabling and other modem operations, refer to the sections after the "Quick Guide". The instructions in this appendix use a modem that can be configured with DIP switches.

NOTE: This procedure requires Crestron Viewport.

Quick Guide

The following are required to interface a PC with a control system via modem:

- Rack Modem: A Hayes compatible (AT command set) modem with DIP switches that can be set to the required settings. This is the modem that is to be connected to the control system.
- PC Modem: A Hayes compatible (AT command set) modem that can be addressed on a COM port, for use with the Viewport utility on the PC.
- Proper equipment to connect the PC modem to the PC (refer to modem manufacturer's instructions for this).
- Control system-to-modem cable:
  - ⇒ If the control system is a PRO2, AV2, RACK2, PAC2, CP2, CP2E, MC2, MC2E, or MC2W, use a DB25M-to-DB9M straight through cable or a DB25F-to-DB25M (or DB9F- to-DB9M) cable with a null modem adapter
  - ⇒ If the control system is a QM-RMC or a QM-RMCRX(-BA) use a DB25M-to-DB9M straight-through cable with a DB9F-to-DB9F gender changer.
- 2-Series control system

Perform the following procedure:

1. Make sure all equipment is powered off.
2. Set the rack modem DIP switches as shown in the following table. Note that the following table describes the DIP switches of a U.S. Robotics 33.6K Sportster FAX modem. Most Hayes compatible modems should have similar switching options.

Rack Modem Switch Settings

SWITCH NUMBER	REQUIRED SETTING	POSITION	DEFINITION
1	Down	Up	DTR normal
		Down	DTR override (always high)
2	Either	Up	Verbal result codes
		Down	Numeric result codes

(continued on following page)

Rack Modem Switch Settings (continued)

SWITCH NUMBER	REQUIRED SETTING	POSITION	DEFINITION
3	Up	Up	Suppress result codes
		Down	Display result codes
4	Down	Up	Echo offline commands
		Down	No echo of offline commands
5	Up	Up	Auto answer on first ring, or higher if specified in NVRAM
		Down	No auto answer
6	Either	Up	Carrier detect normal
		Down	Carrier detect override (always high)
7	Up	Up	Load NVRAM defaults
		Down	Load factory defaults
8	Down	Up	Dumb mode
		Down	Smart mode

3. Connect the rack modem to the power supply provided by the manufacturer.

For the PRO2, AV2, RACK2, PAC2, CP2, CP2E, MC2, MC2E, MC2W:

4. Plug the null modem adapter into the proper end of the DB25M-to-DB9M straight-through cable.
5. Plug the DB9M end of the cable into the **COMPUTER** port on the control system and continue to step 6.

For the QM-RMC or QM-RMCRX(-BA):

4. Plug the DB9F-to-DB9F gender changer adapter into the DB9M end of the DB25M-to-DB9M straight-through cable.
5. Plug the other end of the DB9F adapter into the **COMPUTER** port of the control system.
6. Plug DB25M end of the cable into the rack modem.
7. Connect the rack modem to an analog telephone line.
8. Turn on the rack modem.
9. Turn on the control system.
10. Verify that the PC modem is connected to an analog telephone line and functioning per the manufacturer's instructions.
11. Open the Viewport and select **Setup | Communication Settings…**(alternatively, press **ALT+D)** to configure the connection to the PC modem. Make sure *RTS/CTS* is checked, and *XON/XOFF* is not checked.
12. To dial the "Rack Modem", select **Remote | Modem | Dial**.
13. Enter the phone number of the Rack modem in the, and click **OK**.

The PC modem will be connected to the Rack modem and can perform any operation as if the PC were plugged directly into the console.

Cable Requirements (2-Series Control System to Modem)

The cable used to connect a 2-Series processor's RS-232 computer port to a modem is a standard DB9 female to DB25 male with a null modem adapter attached. The null modem adapter can either be DB9F-DB9M or DB25F-DB25M. These parts are commercially available and do not require custom fabrication.

The pin assignments for the DB9 male-to-DB25 male straight-through cable are listed in the following table:

Pin Assignments for DB9 Male-to-DB25 Male Straight-Through Cable

DB9 MALE		DB25 MALE	
PIN	**NAME**	**PIN**	**NAME**
1	CD	8	CD
2	RX	3	RX
3	TX	2	TX
4	DTR	20	DTR
5	Ground	7	Ground
6	DSR	6	DSR
7	RTS	4	RTS
8	CTS	5	CTS
9	RI	22	RI

The pin assignments for the DB9 female-to-DB25 male straight-through cable are listed in the following table:

Pin Assignments for DB9 Female-to-DB25 Male Straight-Through Cable

DB9 FEMALE		DB25 MALE	
PIN	**NAME**	**PIN**	**NAME**
1	CD	4	DTR
2	RX	3	TX
3	TX	2	RX
4	DTR	1	CD
4	DTR	6	DSR
5	Ground	5	GND
6	DSR	4	DTR
7	RTS	8	CTS
8	CTS	7	RTS
9	RI	-	N/A
-	N/A	9	RI

The pin assignments for the DB25 female-to-DB25 male straight-through cable are listed in the following table:

Pin Assignments for DB25 Female-to-DB25 Male Straight-Through Cable

DB25 FEMALE		DB25 MALE	
PIN	**NAME**	**PIN**	**NAME**
2	TX	3	RX
3	RX	2	TX
4	RTS	5	CTS
5	CTS	4	RTS
6	DSR	20	DTR
7	GND	7	GND
8	CD	20	DTR
20	DTR	6	DSR
20	DTR	8	CD
22	RI	-	N/A
-	N/A	22	RI

The pin assignments for the DB9 male-to-DB25 male gender changer cable are listed in the following table:

Pin Assignments for DB9 Male-to-DB25 Male Gender Changer Cable

DB9 MALE		DB25 MALE	
PIN	**NAME**	**PIN**	**NAME**
1	CD	8	CD
2	RX	3	RX
3	TX	2	TX
4	DTR	20	DTR
5	GND	7	GND
6	DSR	6	DSR
7	RTS	4	RTS
8	CTS	5	CTS
9	RI	22	RI

Cable Requirements (PC to Modem)

The modem on the PC can be either internal or external. There are no special requirements or cabling required (i.e. it can be either USB or serial). Follow the guidelines in the modem manufacturer's handbook to determine any cable requirements.

Modem Configuration (Control System Modem)

In order to support out-of-the box communications with a modem, the modem must have DIP switches to activate and/or deactivate certain functions. The DIP switch settings are described in “Quick Guide” on page 82. Any compatible modem can be used as long as it has the same settings.

Crestron does support modems without DIP switches (software-configurable). However, the modem may support commands that mimic the DIP switch settings described in “Quick Guide” on page 82. This type of modem must first be configured first plugging it into a PC, and as such, is not “out of the box” compatible.

The control system must have operating system version 3.129 or later to support out-of-the-box modem communications. When the control system is rebooted (i.e. powered up, **HW-R** pressed and released, **REBOOT** command issued at console),

the control system will output the **AT** command, followed by a carriage return/linefeed (\x0D\x0A). It will then wait three seconds, and then continue with the normal bootup sequence. The **AT** command will only be seen on the serial console. It will not be seen on any other system console.

Once the modem is connected to the control system and powered on, it is necessary to reboot the control system (i.e. cycling power, **HW-R** pressed and released, or **REBOOT** command issued at console) in order for the **AT** command to be sent out.

When the control system sends the **AT** command to the modem, the modem will synchronize its serial port baud rate to the serial port baud rate of the **COMPUTER** port of the 2-Series control system.

Modem Communications Speed

The final connection speed modem connection is only as fast as the slowest link. There are three links in a modem connection:

- PC to modem.
- Modem to modem.
- Modem to 2-Series control system.

PC to Modem

The PC modem is required to support communications through a COM port. Although it has not been tested by Crestron, a USB modem that provides Microsoft Windows® driver-level support for treating the modem as if it were on a COM port should also work. A COM interface is required, since communications to the control system for uploading programs, etc. is done through the viewport, which only works through a COM port.

It is recommended to set the Viewport (press **ALT+D**) to 115200 baud, no parity, 8 data bits, 1 stop bit, and RTS/CTS: ON for communications.

Modem to Modem

The speed between modems can vary greatly depending on the quality of the phone lines and other factors that are dependent on the telephone system.

Modem to Control System

It is recommended to leave the serial port baud rate of the 2-Series control system at 115200 baud, no parity, 8 data 1its, 1 stop bit, and RTS/CTS: ON to achieve maximum throughput.

Handshaking is enabled on both serial connections (PC to modem and modem to 2-Series control system). Therefore, no matter how fast the link, proper hardware handshaking ensures that there will be no overrun conditions.

Notes for QM-RMC and QM-RMCRX(-BA)

The QM-RMC and QM-RMCRX(-BA) do not have dedicated console ports. The **COM B** port is used as both a console port and a program addressable COM port.

When either system is first powered up out of the box, **COM B** will operate in the console mode. If there is no program loaded on to the system, **COM B** will operate in the console mode. When a program is loaded and the control system reboots (i.e.

by pressing **HW-R** or cycling power, NOT typing "reboot" at the console in this case.), **COM B** will act as a program addressable COM port.

To keep the **COM B** operating in the console mode permanently, use the **COMCONSOLEMODE ON** command in Viewport. For further details, refer to "2-Series Console Commands for Modem Configuration" below.

2-Series Console Commands for Modem Configuration

The modem initialization command can be changed with the console command **MODEMINITSTRING**. However, the initialization generally is not changed unless a modem is being used.

MODEMINITSTRING Console Commands

```
PRO2> MODEMINITSTRING

Current Init String: AT[0D][0A]

PRO2> MODEMINITSTRING ?

MODEMINITSTRING "{init string}"

    {init string}:  String to send to modem.  64
    characters Max.

    No Arguments:   Shows current init string
```

By default, the modem initialization string (and subsequent three second delay) is sent at bootup. To turn this off and prevent the three second delay, use the **SENDMODEMINITSTRING** command. This feature can be used when a modem is not being used and the developer wants to shorten the control system's startup time.

SENDMODEMINITSTRING Console Commands

```
PRO2> SENDMODEMINITSTRING ?

SENDMODEMINITSTRING {ON|OFF}

    ON:  Sends the modem init string at startup.

    OFF:  Does not send the modem init string at
    startup.

    No Arguments:  Show current setting.

PRO2>SENDMODEMINITSTRING OFF

New Setting:  OFF
```

To change the default state of the QM-RMC or QM-RMCRX's shared console port, the **COMCONSOLEMODE** command can be used:

COMCONSOLEMODE Console Commands

```
QM-RMC> COMCONSOLEMODE ?

COMCONSOLEMODE {ON|OFF}

    ON:   Lock COM B to console mode.

    OFF:  Restore default COM B behavior.

    No Arguments:  Show current state.

QM-RMC>COMCONSOLEMODE

    COMCONSOLEMODE:  Current state is OFF.

QM-RMC>COMCONSOLEMODE ON

    New COMCONSOLEMODE saved.  Reboot to take
    effect.
```

Appendix B: Passthrough Mode

NOTE: This procedure requires the use of the Crestron Viewport.

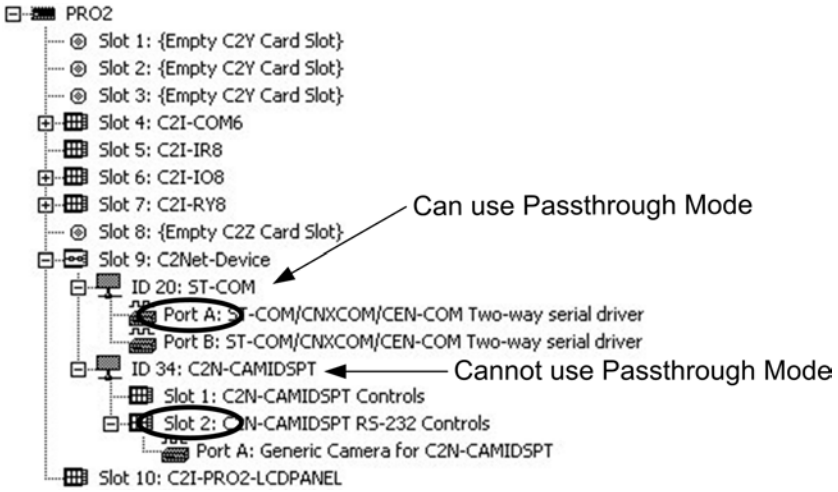
Passthrough Mode allows a control system to act as a conduit to a device that is serially connected to the Crestron system. Viewport can then serially communicate with a controlled device separate from the control system program. This aids in troubleshooting a serial device that is connected to the network by isolating the device from the system or the program running in the control system without moving any wiring.

NOTE: Before using the Passthrough Mode to connect to a serial port on an Ethernet device, the IP ID and associated IP address of the Ethernet device must be listed in the control system's IP table.

The Passthrough Mode cannot be used with Cresnet devices that utilize slots in the SIMPL Windows programming symbol. For example the COM port on the C2N-CAMIDSPT is designated as Slot 2, Port A. The Passthrough Mode cannot be used to access this COM port. The COM ports on the ST-COM are not within slots and can use Passthrough for these COM ports.

The *System Views* of SIMPL Windows shows the programmer if a COM port is a port on a device or a port within a slot on a device. The following diagram shows the *System Views* for a system with a ST-COM RS-232/422 COM Module and a C2N-CAMIDSPT Digital Servo Pan/Tilt Head.

System View of ST-COM and C2N-CAMIDSPT

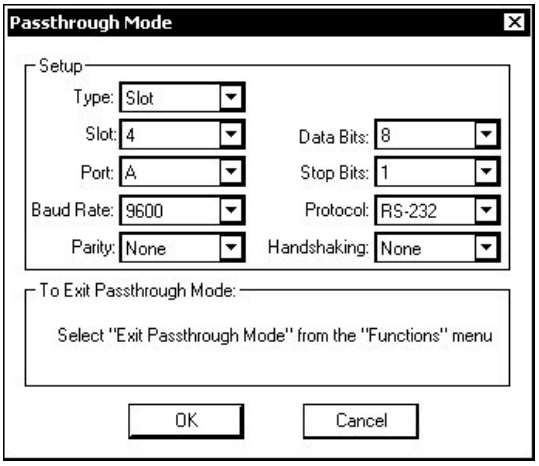


To enter the Passthrough Mode for connecting to serial devices:

1. After using Viewport to establish communication with the processor, select **Functions | Enter Passthrough Mode (CNX / 2-Series only)**.

   NOTE: For instructions on establishing communications with the control system, refer to the Viewport help file.

"Passthrough Mode" Window



2. Select the type of connection the serial-equipped device has to the control system: Slot (card slot on a control system), Cresnet, or Ethernet).
3. Select the card slot number (1 through 16 on a control system), Cresnet ID (for Cresnet devices), or IP ID (for Ethernet devices).
4. Specify the port (Port A through Port F) where the serial device is connected.
5. 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, RS-422 or RS-485), and the settings for software or hardware handshaking. This information is provided by the unit's documentation.
6. Verify communications with the serial peripheral by sending commands using the device's serial protocol.
7. Exit the Passthrough Mode by selecting **Functions | Exit Passthrough Mode (2-Series Only)**.

Appendix C: Console Command Listing

Details about each of the acceptable commands that can be interpreted by the 2-Series dual bus control system are described in the following tables. Commands are listed alphabetically. Each listing includes a description of the command, a list of help menus[1] that contain the command, the proper syntax for entering the command, definitions of parameters that may be included in the syntax, a list of possible sources[2] for the command, the minimum CUZ with which the command is recognized by the processor, and the specific processor group[3] that supports the command. For a description of each detail listed for a given command, refer to the SAMPLE COMMAND on page 22.

1. Help menus are defined in more detail with "Command Groups" on page 18.
2. Possible sources refers to the methods by which console commands are delivered to the control system, as explained on page 16.
3. Processor groups are defined in more detail with "Processor Groups" on page 21.

NOTE: The entire command name (i.e., ADDMaster) may not need to be entered for recognition. The capitalized letters of the command name listed in the syntax (i.e., ADDM) are all that is required to interpret the command. However, as more commands are added to the list over time, it may be necessary to expand the recognizable abbreviation required for a command. Therefore, to avoid confusion in the future, it is highly recommended to use the full command name if automating commands or implementing the SIMPL Windows Console logic symbol.

NOTE: Not all parameters listed in the syntax are necessary. Parameters that are contained within brackets "[…]" are optional. Furthermore (for the sake of the commands shown in this appendix), parameters in lower case represent a placeholder for some value or variable. Upper case parameters separated by a vertical mark "|" (i.e., ON | OFF) are mutually exclusive of each other. Enter only one of the available upper case parameters verbatim (interpretation is case insensitive). If the parameter is listed in lower and upper case, only the upper case portion of the parameter is necessary for interpretation.

2-Series Console Commands

ADDDNS

Description:	This command adds a Domain Name Service (DNS) server to the processor's search list. The processor can hold a list of two DNS servers in order to resolve name references to IP address.
Help Menu(s):	Ethernet
Syntax:	ADDDns ip_address
Parameters:	ip_address - the Internet Protocol (IP) address of the DNS server in dot decimal format (eg. 255.255.255.255)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.006
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

ADDMASTER

Description:	This command adds a master CIP node to the system's IP table. By adding a master to the IP table, the processor becomes an Ethernet slave to the node specified in the master entry. A CIP node is completely specified by its CIP ID number and the IP addresses/site name of each end. The new IP table is stored in permanent memory for retrieval. The system should be rebooted to recognize the new node. There can only be one master.
Help Menu(s):	Ethernet, Main
Syntax:	ADDMaster cip_id ip_address [device_id]
Parameters:	cip_id - the IP ID of the node in hexadecimal notation ip_address/name - the Internet Protocol (IP) address of the remote node in dot decimal format (eg. 255.255.255.255) or a site name to be resolved by DNS device_id - optional ID used in join number remapping (not needed for most 2-Series systems)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001 (for peer-to-peer), 3.044 (for Master entry capability)
Processor Group:	Ethernet Processors

ADDPORTMAP

Description:	This command adds a portmap to the Network Address Translator (NAT) table. The external port number, internal port number, IP address, and protocol define a portmap. Requires the C2ENET-2.
Help Menu(s):	Ethernet
Syntax:	ADDPortmap ext_port int_port ip_address protocol
Parameters:	ext_port - port number on the WAN side of NAT int_port - port number on the LAN side of NAT ip_address - IP address (in dot decimal notation) of the device on the LAN side of NAT protocol - IP protocol for the portmap service (TCP | UDP | Both)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Dual Ethernet Processors

ADDSLAVE

Description:	This command adds a peer/slave CIP node to the system's IP table. This command was added to differentiate for the ADDMASTER command when slave mode was fully supported. A CIP node is completely specified by its CIP ID number and the IP addresses/site name of each end. The new IP table is stored in permanent memory for retrieval. The system should be rebooted to recognize the new node.
Help Menu(s):	Ethernet, Main
Syntax:	ADDSlave cip_id ip_address [device_id]
Parameters:	cip_id - the ID of the node in hexadecimal notation ip_address/name - the Internet Protocol (IP) address of the remote node in dot decimal format (eg. 255.255.255.255) or a site name to be resolved by DNS device_id - optional ID used in join number remapping (not needed for most 2-Series systems). Refer to “Appendix F: Join Number Remapping (JNR)” on page 154.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.015 (for Master entry capability)
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

AUTONEGOT

Description:	This command sets the state of the autonegotiation process on the Ethernet device(s). Autonegotiation is the process of automatically determining the speed of the Ethernet network. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	AUTONEGOT [device_num (ON | 10HALF | 10FULL | 100HALF | 100FULL)]
Parameters:	device_num - number of the Ethernet device to set (0 or 1)
	ON - autonegotiation is on (default)
	10HALF - autonegotiation is OFF, use 10mps, half duplex
	10FULL - autonegotiation is OFF, use 10mps, full duplex
	100HALF - autonegotiation is OFF, use 100mps, half duplex
	100FULL - autonegotiation is OFF, use 100mps, full duplex
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

BROADCAST

Description:	This command enables/disables the broadcasting of error messages. The messages will be logged whether or not they are broadcast. Entering the command without a parameter displays the current state.
Help Menu(s):	System
Syntax:	BROADcast [ON | OFF]
Parameters:	ON - turns on broadcasting of error messages (default)
	OFF - turns off broadcasting of error messages
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

BYE

Description:	This command cancels a connection over the Ethernet, whether to the Telnet or CTP ports. If password protection is enabled, the password has to be re-entered before connection is re-established.
Help Menu(s):	System
Syntax:	BYE
Parameters:	none
Possible Source:	CTP, Telnet
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

CALTOUCH

Description:	This command puts the CNX-DVP4/C2N-DVP4DI into touch screen calibration mode.
Help Menu(s):	Device
Syntax:	CALTOUCH
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.017
Processor Group:	Display Processors

(continued on next page)

2-Series Console Commands (continued)

CARDS

Description:	This command displays the cards in the system.
Help Menu(s):	Main, System
Syntax:	CARDS
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

CD

Description:	This command changes the current working file directory. Refer to "File System" in this Reference Guide for details. The parameter to this command can be relative or absolute. Entering the command without a parameter displays the current setting.
Help Menu(s):	File
Syntax:	CD [directory]
Parameters:	directory – ASCII string representing the desired directory
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

CFAUTORUN

Description:	This command enables/disables the autorun feature of compact flash. If enabled, the program residing on the compact flash is immediately started when the compact flash card is inserted into the system. Also, any web pages that reside on the compact flash are immediately active. If autorun is enabled when the compact flash is extracted and the system is currently running a programfrom the compact flash, the processor stops the currently running program and restarts with the program stored on internal flash. Entering the command without a parameter displays the current setting.
Help Menu(s):	File
Syntax:	CFAUTOrun [ON | OFF]
Parameters:	ON - turns on compact flash autorun
	OFF - turns off compact flash autorun (default)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Compact Flash Processors

CFLOGERR

Description:	This command enables/disables logging errors to compact flash. The errors are written to a file in the root of compact flash named ErrorLog.Txt. This command can be used to protect the error log from a processor report (which would clear the normal error log). Entering the command without a parameter displays the current setting.
Help Menu(s):	File
Syntax:	CFLOGerr [ON | OFF]
Parameters:	ON - turns on compact flash error logging
	OFF - turns off compact flash error logging (default)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Compact Flash Processors

(continued on next page)

2-Series Console Commands (continued)

CFPROJDIRS

Description:	This command displays the project directories on the compact flash. A "project directory" is a directory that contains SIMPL and SPLUS subdirectories. This command should be used in tandem with CFTRANSFER.
Help Menu(s):	File
Syntax:	CFPROJdirs
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Compact Flash Processors

CFTRANSFER

Description:	This command transfers project to/from compact flash from/to internal flash. There is only one destination in internal flash for the project, but there can be multiple destinations on the compact flash. The CFPROJDIRS command can help specify the valid locations. This command will not create a project directory if it does not exist.
Help Menu(s):	File
Syntax:	CFTRANSfer FROM|TO path
Parameters:	FROM|TO - indicates whether transfering from/to compact flash path - path for the project on compact flash (Refer to "File System" in this Reference Guide for details.)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Compact Flash Processors

CIPPORT

Description:	This command specifies the port number to be used for the CIP interface. It should only be used in the few cases where there is a conflict and used with extreme caution. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	CIPPORT [portnumber]
Parameters:	portnumber - port number for CIP activity (default: 41794)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

CLEARERR

Description:	This command clears the error log. The last 100 entries to the log are kept by the system.
Help Menu(s):	System
Syntax:	CLEARERR
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

CNETID

Description:	This command changes the Cresnet ID for the processor. Changing the ID to anything other than 2 configures the processor as a Cresnet slave. Entering the command without a parameter displays the current setting.
Help Menu(s):	System
Syntax:	CNETid [id]
Parameters:	id - the ID of the system in hexadecimal notation (default: 2)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.017 (CNX-DVP4, 3.044 (all others)
Processor Group:	Cresnet Processors

COMCONSOLEMODE

Description:	This command changes the default state of the QM-RMC or QM-RMCRX(-BA)'s shared console port. The shared console port can operate as a console port for PC-to-Console communications or as a serial port. Entering the command without a parameter displays the current setting.
Help Menu(s):	System
Syntax:	COMCONSOLEMODE
Parameters:	ON – Locks COM B to console mode
	OFF – Restore default COM B behavior
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.129
Processor Group:	QuickMedia Processors

COMPACT

Description:	This command reclaims internal flash file space by removing invalid (deleted) files from the system. The file system is compacted to remove the holes left by the invalid files. The rest of the flash file space is cleared to accept new files. The FREE command can be used to display the amount of file space that would be reclaimed by the COMPACT command. Normally, the user need not initiate the COMPACT command. The Crestron Viewport manages its usage.
Help Menu(s):	File
Syntax:	COMPACT
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

CTPPORT

Description:	This command specifies the port number to be used for the CTP (Crestron Terminal Protocol) console interface. It should only be used in the few cases where there is a conflict and used with extreme caution. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	CTPPORT [portnumber]
Parameters:	portnumber – port number for console connection (default: 41795)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

CURSOR

Description:	This command sets the cursor options on the CNX-DVP4/ C2N-DVP4DI. Entering the command without a parameter displays the current setting.
Help Menu(s):	Device
Syntax:	CURSOR [ON | OFF]
Parameters:	ON – turns the display cursor on (default) OFF – turns the display cursor off
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.017
Processor Group:	Display Processors

DEFROUTER

Description:	This command sets the IP address of the default router on the system. It is only necessary on networks without automatic routing. The value is stored in permanent memory and requires a reboot before it is recognized. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	DEFRouter [device_num ip_address]
Parameters:	device_num – indicates device to be set (must be 0 for backwards compatibility) ip_address – the Internet Protocol (IP) address of the router node in dot decimal format (eg. 255.255.255.255)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

DELETE

Description:	This command deletes file(s) from the file system. Wildcards are accepted and can be in the form of (*file, **file, and file**). **NOTE:** Compact flash directories can only use the standard DOS file wildcards.
Help Menu(s):	File
Syntax:	DELete filespec
Parameters:	filespec – ASCII string contains the file name and/or wildcards
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

DHCP

Description:	This command selects whether dynamic IP addressing is supported using the DHCP protocol. If enabled, a HOSTNAME should also be entered. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	DHCP [ON | OFF | STATUS | REL_RENEW]
Parameters:	ON – enables DHCP operation OFF – disables DHCP operation (default) STATUS – display the DHCP status REL_RENEW – perform a release and renew function on the DHCP connection
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.044
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

DIR

Description:	This command lists information about file(s) from the file system. Wildcards are accepted and can be in the form of (*file, **file, and file**). If no parameter is entered, all files are listed. **NOTE:** Compact flash directories can only use the standard DOS file wildcards.
Help Menu(s):	File
Syntax:	DIR [filespec]
Parameters:	filespec – ASCII string contains the file name and/or wildcards
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

DOMAINNAME

Description:	This command sets the domain name to be used in a DHCP environment. It is used to re-establish the connection to the processor when DHCP is enabled through the NAT configuration pages. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	DOMAINNAME domainname
Parameters:	domainname – ASCII string contains the domain in which the processor is a part (characters are limited to A-Z, a-z and '-')
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.044
Processor Group:	Ethernet Processors

ECHO

Description:	This command enables/disables character echoing on the console connection. If no parameter is entered, the current state is displayed. Echo is also available if an empty command string is sent to the console. Entering the command without a parameter displays the current setting.
Help Menu(s):	System
Syntax:	ECHO [ON | OFF]
Parameters:	ON – enables character echoing OFF – diables character echoing (default)
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	1.001
Processor Group:	All Processors

EEPROM

Description:	This command displays the current parameters stored in EEPROM.
Help Menu(s):	Device
Syntax:	Eeprom
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

ERRLOG

Description:	This command prints a list of the most recent errors. It wraps around at 100 so only the last 100 entries into the log are displayed. **NOTE:** Refer to "Appendix D: Error Message Definitions" on page 123 for a list and description of error messages that can be generated by a 2-Series control system.
Help Menu(s):	System
Syntax:	ERRlog
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

ESTATUS

Description:	This command displays the status of the Ethernet link (Link on/off, link speed, full duplex on/off). Also it displays the settings for the Ethernet card.
Help Menu(s):	Ethernet, System
Syntax:	ESTatus
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

ETHERNET

Description:	This command enables/disables the Ethernet card. A reboot is required before the command is effective. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet, System
Syntax:	ETHERNET [ON | OFF]
Parameters:	ON – enables the Ethernet card (default) OFF – disables the Ethernet card
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

ETHERTEST

Description:	This command runs the various diagnostic tests for the Ethernet card. It should only be run when there is a problem with the Ethernet data. The test reports its status as it executes.
Help Menu(s):	Ethernet, System
Syntax:	ETHERTEST [RESET | REGTEST | MEMTEST | LOOPBACK | MMUTEST | INTTEST | EETEST | FULL | EXTLOOP | REGMAP | SHOWTX | SHOWRX | EEDUMP | MMURESET]
Parameters:	RESET – reset Ethernet chip REGTEST – perform register test MEMTEST – perform memory test LOOPBACK – perform local loopback test MMUTEST – perform memory management unit test INTTEST – perform interrupt test EETEST – perform EEPROM test FULL – perform all the above tests EXTLOOP – perform external loopback test REGMAP – display all the registers SHOWTX – display the last transmitted packet SHOWRX – display the last received packet EEDUMP – perform EEPROM test MMURESET – reset the MMU of the processor
Possible Source:	RS-232
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

FPPASSWORD

Description:	The front panel password is set with this command.
Help Menu(s):	Main, System
Syntax:	FPPASSWORD password
Parameters:	password – four digit numerical string using digits 1 through 6.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

FREE

Description:	This command displays the space remaining in the file system. If the current directory is on internal flash, the amount of space left on the internal flash is displayed. The maximum amount in internal flash depends on the system. If the current directory is on compact flash, then the free space on compact flash is displayed. If the current directory is the NVRAM disk, the free space in the NVRAM disk is shown.
Help Menu(s):	File
Syntax:	FREE
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001 (for internal space), 2.004 (compact flash), 3.044 (NVRAM disk)
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

GETCODE

Description:	This command retrieves the code necessary for e-Control2 activation. The response of this command should be sent to Crestron to generate the activation key for the particular system.
Help Menu(s):	Ethernet
Syntax:	GETCODE
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.015
Processor Group:	Ethernet Processors

GETFPLINE

Description:	This command displays the information that appears on the PRO2/RACK2 front panel onto the current console.
Help Menu(s):	Device
Syntax:	GETFPLAINE [1 | 2]
Parameters:	1 – display the top line of the LCD panel 2 – display the bottom line No arguments displays both lines
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.015
Processor Group:	Front Panel Processors

HEAPFREE

Description:	This command displays the space remaining in the memory heap, which is primarily for program use. The maximum amount of space depends on the firmware. This space is the available RAM in the system.
Help Menu(s):	File
Syntax:	HEAPfree
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

HELP

Description:	This command lists the commands for the console grouped by function.
Help Menu(s):	Main
Syntax:	HELP [ALL | DEVice | ETHERnet | FILE | SYStem]
Parameters:	ALL – shows all the commands for the control system DEVice – displays commands specific to a control system device ETHERnet – shows the commands for Ethernet control FILE – displays the commands for the file system SYStem – list of general system commands
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

HOSTNAME

Description:	This command sets the host name of the system. This name is used to register the system with a DNS server. If no parameter is entered, the current state is displayed. The host name shall be displayed when a TCP console connection is established. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	HOSTname [name]
Parameters:	name – ASCII string containing the name of the host in the local domain. Characters are limited to A-Z, a-z, and '-'. This name is combined to the domain name to uniquely identify the system to the world (I.e., mysystem.crestron.com). It must be unique to the domain. Host names are case-insensitive.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.044
Processor Group:	Ethernet Processors

I2CERROR

Description:	This command enables/disables the logging of errors on the internal I2C bus to the error log. These errors indicate recovery procedures occurred. The system functions normally even if these errors occur. This command gives the user the ability to ignore these errors and not turn on the error light. Entering the command without a parameter displays the current setting.
Help Menu(s):	Device
Syntax:	I2CERRor [ON | OFF]
Parameters:	ON – enables the logging of I2C errors OFF – disables the logging of I2C errors (default)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.015
Processor Group:	All Processors

ICMP

Description:	This command can be used to disable a response to the ICMP ping command for the Ethernet port. This action makes it more difficult to detect the system on the network. If it is disabled, it is also hard to debug networking problems. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	ICMP [ON | OFF]
Parameters:	ON – enables response to ICMP pings (default) OFF – disables response to ICMP pings
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.061
Processor Group:	Ethernet Processors

INFO

Description:	This command prints the various capabilities (or software features) of the firmware.
Help Menu(s):	Main, System
Syntax:	INFO
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

INITIALIZE

Description:	This command erases the entire internal flash file system. It should only be used if the internal system has been corrupted. Progress status messages appear until the command has completed. This command should be used with caution and will clear the SIMPL Windows/SIMPL+ program and IP settings of the system.
Help Menu(s):	File
Syntax:	INITIALIZE
Parameters:	none
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	1.001
Processor Group:	All Processors

INPUT

Description:	This command sets the input resolution for the selected CNX-DVP4/C2N-DVP4DI RGB input. Entering the command without a parameter displays the current setting.
Help Menu(s):	Device
Syntax:	INPUT [input_select value|A|D|N|L]
Parameters:	input_select – indicates which input to select value – resolution value from 320 to 1920 A – auto calibrate this input D – use default for this input N – no HDTV Overscan for this input L – lock Auto Calibrate On for this input
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.017
Processor Group:	Display Processors

IPADDRESS

Description:	This command sets the IP address of the control system. The value is stored in permanent memory and requires a reboot before it is recognized. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	IPAddress [device_num ip_address]
Parameters:	device_num – indicates device to be set (0 = LanA, 1 = LanB) ip_address – the Internet Protocol (IP) address of the control system in dot decimal format (eg. 255.255.255.255)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

IPMASK

Description:	This command sets the subnet mask for the local area network to which the system is attached. The value is stored in permanent memory and requires a reboot before it is recognized. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	IPMASK [device_num ip_mask]
Parameters:	device_num – indicates device to be set (0 = LanA, 1 = LanB) ip_mask – the subnet mask of the LAN in dot decimal format (eg. 255.255.0.0). 0.0.0.0 is an invalid entry and will be rejected.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

IPTABLE

Description: This command displays the current IP table for the CIP interface on the control system.

Descriptions of each field in the IP table is as follows:

- **CIP_ID** – This is the ID assigned to the node which matches the device in the SIMPL Windows program.
- **Type** – This indicates the type of device in the program. Valid entries are:
  - CIP - Ethernet peer control system or touchpanel
  - Eslav – Ethernet slave control system
  - Emstr – Ethernet master control system (only on Ethernet slaves)
  - Gway – Xpanel, ActiveCNX or RoomView connection (gateway connections)
  - Client – TCP/IP client device
  - Server – TCP/IP server device
  - UDP – communication device using UDP as its protocol
- **Status** – This indicates the current status of the connection.
  - NOT_REG – the device is not registered in the SIMPL Windows program.
  - UPD_PEND – in a DHCP environment, the device is waiting for an acknowledgement that it has updated the remote node with its new IP address.
  - ONLINE – the device is available and an active communication link exists.
  - UNKNOWN – the device is unavailable. In this state, the system attempts to re-establish communication at specific intervals.
  - DNS_LOOKUP – the node has been referenced by name and the system is attempting to resolve the name to an IP address.
  - NO_NETWORK – the DHCP system has been forced to release its address by the server. All nodes on that network are currently unavailable.
  - OFFLINE – the device has failed to acknowledge the last packet sent or has not connected in the case of gateway nodes.
  - NO CONNECT – the client/server device has its connect/enable line held low.
  - WAITING – the client/server is waiting for a connection.
  - CONNECTED – the client/server has an active TCP/IP connection established with a remote node.
  - CON FAILED – the client/server connection attempt has failed.
  - BRKN REM – the client/server connection was broken from the remote side.
  - BRKN LOCAL – the client/server connection was broken from the local side.
  - BAD LOOKUP – the DNS lookup for a client node has failed.
  - ENABLED – indicates that the UDP communications device is enabled.
  - DISABLED – indicates that the UDP communications device is disabled.
- **DevID** – This is an alternative ID to use for matching the deivce in the program (not currently implemented).
- **PortNumber** – For TCP/IP clients and servers as well as UDP devices, this is the port programmed for the device in the SIMPL Windows program. For other nodes, this is a placeholder for a future feature that will allow adjustments to the port for a CIP node.
- **IPAddress/ SiteName** – This is the address to find the remote node. If a sitename is entered, the resolved address is listed in parenthesis "()".

Help Menu(s):	Ethernet
Syntax:	IPTable
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

ISDIR

Description:	This command checks the specified path to see if it is a directory.
Help Menu(s):	Ethernet
Syntax:	ISDIR directory
Parameters:	directory – string containing the path to check (can be absolute or relative)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	All Processors

KILLSOCKET

Description:	This command terminates an active TCP console connection. It can be used to reset a connection where the control system thinks it is connected, but the Viewport does not. If more than one CTP or Telnet console exists, use the WHO command to determine the IP address of each.
Help Menu(s):	Ethernet
Syntax:	KILLSOCKET [CTP1 | CTP2 | TELNET1 | TELNET2]
Parameters:	CTP1 – terminate the first CTP console CTP2 – terminate the second CTP console TELNET1 – terminate the first Telnet console TELNET2 – terminate the second Telnet console
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Ethernet Processors

LISTDNS

Description:	This command displays the current list of Domain Name Service (DNS) servers in the processor's search list. The system allows up to two servers to be used. The DNS servers resolve IP addresses associated with a given name.
Help Menu(s):	Ethernet
Syntax:	LISTDNS
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.006
Processor Group:	Ethernet Processors

MAKEDIR

Description:	This command creates the specified path on compact flash.
Help Menu(s):	Ethernet
Syntax:	MAKEDIR directory
Parameters:	directory – string containing the path of the directory being created (can be absolute or relative)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Compact Flash Processors

(continued on next page)

2-Series Console Commands (continued)

MESSAGE

Description:	This command displays a message on the front panel screen. It will be used to display informational messages during downloads.
Help Menu(s):	Device
Syntax:	MESSAGE [message_string]
Parameters:	message_string – ASCII string to display on panel screen No parameter clears message from screen and restores display page.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Front Panel Processors

MODEMINITSTRING

Description:	This command changes the modem initialization string that is sent by the control system at startup. Entering the command without a parameter displays the current initialization string setting.
Help Menu(s):	File
Syntax:	MODEMINITSTRING
Parameters:	Init string – String to send to modem. 64 characters Max. No parameter shows current init string.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.129
Processor Group:	All Processors

NATENABLE

Description:	This command enables the Network Address Translator (NAT). Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	NATENAble [ON | OFF]
Parameters:	ON – enables the NAT OFF – disables the NAT (default)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Ethernet Processors

NATREMOTE

Description:	This command enables configuration of the Network Address Translator (NAT) from the WAN (LAN A) port. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	NATREMote [ON | OFF]
Parameters:	ON – enables the NAT configuration for the WAN port (default) OFF – disables the NAT configuration for the WAN port
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

NPA

Description:	This command configures the Network Poll Accelerator.
Help Menu(s):	Main, Device
Syntax:	NPA ADD [SLOT num | COM portid | IPID id]
	NPA DELETE
	NPA TEST num_repeats
	NPA BAUD rate
	NPA MODE RS232 | RS422
	NPA PING
	NPA VERBOSE
Parameters:	ADD – connect to NPA
	SLOT – the next number specifies the slot number for the NPA com connection
	COM – the next parameter specifies which internal com port for the NPA connection (A – F)
	IPID – the next number specifies the ID in the IP table for the NPA entry
	DELETE - deletes the current NPA setting
	TEST – tests the poll accelerator for the specified number of repeats
	BAUD – the next parameter specifies the baud rate for the NPA connection
	MODE – the next parameter specifies the protocol for the com connection
	PING - pings the remote NPA
	VERBOSE – display extended status
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.3.085
Processor Group:	Cresnet Processors, C2N-NPA8

NVRAMCLEAR

Description:	This command clears the program contents of NVRAM. The user is prompted to confirm the clear operation. If an NVRAM disk has been set up, its contents are preserved. This command provides a quick method to set the NVRAM contents to a known state.
Help Menu(s):	System
Syntax:	NVRAMCLEAR
Parameters:	none
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	2.004
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

NVRAMDISK

Description:	This command sets up a NVRAM disk on the processor. NVRAM disk provides compact flash (CF) type file storage on systems without a CF slot. It also works on systems with CF. The storage is limited in size. Any space allocated to the NVRAM disk is not accessible by the SIMPL Windows NVRAM symbols or SIMPL+ non-volatile variables. Each time this command is issued, the contents of the NVRAM disk is wiped clean. For that reason, the user must confirm the operation. Files stored in NVRAM disk are accessed in the \NVRAM directory of the file system. Entering the command without a parameter displays the current setting.
Help Menu(s):	File
Syntax:	NVRAMDISK [0 | 64K | 128K]
Parameters:	0 – disables NVRAM disk (default) 64K – sets up a NVRAM disk that is 64 Kbytes in size 128K – sets up a NVRAM disk that is 128 Kbytes in size
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.004
Processor Group:	All Processors

NVRAMGET

Description:	This command retrieves the contents of NVRAM using Xmodem. It is mainly used by the Viewport.
Help Menu(s):	System
Syntax:	NVRAMGET [PROGRAM | DISK]
Parameters:	PROGRAM – the program contents of NVRAM are retrieved (default is no parameters are specified) DISK – the contents of the NVRAM disk are retrieved
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	1.001, 3.044 (with NVRAM disk support)
Processor Group:	All Processors

NVRAMPUT

Description:	This command loads the contents of NVRAM to the control system using Xmodem. It is mainly used by the Viewport.
Help Menu(s):	System
Syntax:	NVRAMPUT [PROGRAM | DISK]
Parameters:	PROGRAM – the program contents of NVRAM are loaded (default is no parameters are specified) DISK – the contents of the NVRAM disk are loaded
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	1.001, 3.044 (with NVRAM disk support)
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

NVRAMREBOOT

Description:	This command enables/disables storing special reboot information when the processor unexpectedly reboots. The information will then be placed in the error log when the system restarts. The information occupies the last 256 bytes of NVRAM.
Help Menu(s):	Debug
Syntax:	NVRAMREBOOT [ON | OFF | SHOW]
Parameters:	ON - enables the storing the reboot info in NVRAM OFF -disables the storing the reboot info in NVRAM (default). SHOW - displays the last reboot info. This can be used in the case where the error log has received more than 100 errors and the initial information is lost.
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	2.017
Processor Group:	All Processors

OUTPUT

Description:	This command sets the output resolution for the selected CNX-DVP4/C2N-DVP4DI output. Entering the command without a parameter displays the current setting.
Help Menu(s):	Device
Syntax:	OUTPUT [value | 720P | 1 custom_value]
Parameters:	value – standard output resolution (800, 1024, 1152, 1280, 1365, or 1600) 720P – HDTV resolution custom_value – custom resolution
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.007
Processor Group:	Display Processors

PASSWORD

Description:	This command is used to set the password for console connection over the Internet. The user is prompted for the password and once again to verify the password. The password feature can be disabled by simply pressing <RETURN> at each prompt. The RS-232 and Cresnet console connections do not have password protection, which allows the password to be changed if it is forgotten.
Help Menu(s):	Main, System
Syntax:	PASSWORD
Parameters:	none, user is prompted for password
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

PING

Description:	This command executes the standard ping test on a remote node.
Help Menu(s):	Ethernet
Syntax:	PING ip_address
Parameters:	ip_address – the Internet Protocol (IP) address of the remote node in dot decimal format (eg. 255.255.255.255)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

PROGRESET

Description:	This command reloads and restarts the program.
Help Menu(s):	System
Syntax:	PROGRESet
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

PROGUPTIME

Description:	This command displays the amount of time the current program has been running.
Help Menu(s):	System
Syntax:	PROGUPTIME
Parameters:	none
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	3.030
Processor Group:	All Processors

RAMFREE

Description:	This command displays the space remaining in the ram file system. The ram file system was originally designated for the storage of temporary files such as decompressed graphic files.
Help Menu(s):	File
Syntax:	RAMFree
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

REBOOT

Description:	This command causes the system to execute a reboot sequence.
Help Menu(s):	Main, System
Syntax:	REBOOT
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

REMDNS

Description:	This command removes a Domain Name Service (DNS) server from the list. The system allows up to two servers to be used. The DNS servers resolve IP addresses associated with a given name. A server is required if the SIMPL+ email routines refer to the server by name.
Help Menu(s):	Ethernet
Syntax:	REMDns ip_address
Parameters:	ip_address – the Internet Protocol (IP) address of the DNS server in dot decimal format (eg. 255.255.255.255)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.006
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

REMMASTER

Description:	This command removes a CIP node from the system's IP table. A CIP node is completely specified by its CIP ID number and the IP addresses of each end. The new IP table is then stored in permanent memory for retrieval. The system should be rebooted so that the old node will not be recognized.
Help Menu(s):	Ethernet, Main
Syntax:	REMMaster cip_id ip_address
Parameters:	cip_id – the ID of the node in hexadecimal notation ip_address – the Internet Protocol (IP) address of the remote node in dot decimal format (eg. 255.255.255.255)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Ethernet Processors

REMOVEDIR

Description:	This command deletes the specified path on compact flash.
Help Menu(s):	Ethernet
Syntax:	REMOVEDIR directory
Parameters:	directory – string containing the path of the directory being deleted (can be absolute or relative)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Compact Flash Processors

REMPORTMAP

Description:	This command removes a portmap from the Network Address Translator (NAT) table. The external port number, internal port number, IP address, and protocol define a portmap. The portmap is immediately removed from the NAT table.
Help Menu(s):	Ethernet
Syntax:	REMPortmap ext_port int_port ip_address protocol
Parameters:	ext_port – port number on the WAN side of NAT int_port – port number on the LAN side of NAT ip_address – IP address (in dot decimal notation) of the device on the LAN side of NAT protocol – IP protocol for the portmap service (TCP | UDP | Both)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Dual Ethernet Processors

REMSLAVE

Description:	This command removes a slave CIP node from the system's IP table. A CIP node is completely specified by its CIP ID number and the IP addresses of each end. The new IP table is stored in permanent memory for retrieval. The system should be rebooted so that the old node is not recognized.
Help Menu(s):	Ethernet, Main
Syntax:	REMSlave cip_id ip_address
Parameters:	cip_id – the ID of the node in hexadecimal notation ip_address – the Internet Protocol (IP) address of the remote node in dot decimal format (eg. 255.255.255.255)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.015 (for Master entry capability)
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

REPORTCRESNET

Description:	This command shows all devices on the main Cresnet leg.
Help Menu(s):	System
Syntax:	REPORTCRESNET
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	Cresnet Processors

RESTORE

Description:	This command restores system setup parameters to the factory defaults. It erases any stored program, web pages, and IP tables. **NOTE:** Version 3.015 and earlier of the 2-Series control system update file does not erase the SIMPL Windows/SIMPL+ program and IP table when activating this command. Contact a member of the Crestron customer service team to verify the action of this command for later versions.
Help Menu(s):	System
Syntax:	RESTORE
Parameters:	none
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	1.001
Processor Group:	All Processors

RTSCTS

Description:	This command enables/disables the hardware handshaking on the RS-232 port. If no parameter is entered, the current state is displayed.
Help Menu(s):	System
Syntax:	RTScts [ON | OFF]
Parameters:	ON – enables the RTS/CTS handshaking (default) OFF – disables the RTS/CTS handshaking
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

SAVEPARAM

Description:	This command forces a system parameter save to EEPROM.
Help Menu(s):	Main, System
Syntax:	SAVEPARAM
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

SDEBUG

Description:	This command monitors packets to/from logic.
Help Menu(s):	Main
Syntax:	SDEBUG {parameters}
Parameters:	Refer to “Appendix E: Super-Debugger Command Listing” on page 152 for command details.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.083
Processor Group:	All Processors

SECURECIPPORT

Description:	This command specifies the port number to be used for the secure (SSL) CIP interface. It should only be used in the few cases where there is a conflict. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	SECURECIpport [portnumber]
Parameters:	portnumber – port number for secure CIP activity (default = 41796)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.061
Processor Group:	Ethernet Processors

SECURECTPPORT

Description:	This command specifies the port number to be used for the secure (SSL) CTP console interface. It should only be used in the few cases where there is a conflict. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	SECURECTpport [portnumber]
Parameters:	portnumber – port number for secure CTP console (default = 41797)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.061
Processor Group:	Ethernet Processors

SECUREWEBPORT

Description:	This command specifies the port number to be used for the secure (SSL) web server. Changing the port can protect the system from attacks to the well know SSL web server port 443. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	SECUREWEbport [portnumber]
Parameters:	portnumber – port number for web server connections (default = 443)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.061
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

SELFTEST

Description:	This command executes the system self test procedure. Feedback is provided.
Help Menu(s):	Device
Syntax:	SELFTEST
Parameters:	none
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	1.001
Processor Group:	All Processors

SENDKEY

Description:	This command stores the e-Control2 activation key. The key should be obtained from Crestron. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	SENDKEY [key]
Parameters:	key – the e-Control2 activation code obtained from Crestron
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.015
Processor Group:	Ethernet Processors

SENDMODEMINITSTRING

Description:	This command determines whether the modem initialization string is sent at startup. Entering the command without a parameter displays the current setting.
Help Menu(s):	File
Syntax:	SENDMODEMINITSTRING
Parameters:	ON – Sends the modem init string at startup. OFF – Does not send the modem init string at startup.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.129
Processor Group:	All Processors

SERIAL

Description:	This command sets the communication parameters for the **COMPUTER** (RS-232) port. New settings are effective immediately. Entering the command without a parameter displays the current setting.
Help Menu(s):	System
Syntax:	SERial [baud,parity,databits,stopbits]
Parameters:	baud – desired baud rate for the RS-232 port (110 through 115200) parity – desired parity for the port (N, E, O) databits – desired number of data bits (7,8) stopbits – desired number of stop bits (1,2)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

SETUP

Description:	This command puts the CNX-DVP4/C2N-DVP4DI processor into setup mode.
Help Menu(s):	Device
Syntax:	SETUP
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.017
Processor Group:	Display Processors

SHOWEXTRAERRORS

Description:	This command enables the logging extended error messages into the error log. The extended errors are: • Connection/disconnection of TCP/IP Client and Server • Connection/disconnection of Gateway nodes • Connection/disconnection to Console port • Connection to webserver • Update requests
Help Menu(s):	System
Syntax:	SHOWEXTRAerrors [OFF|ON]
Parameters:	OFF – disable extended error logging (default) ON – enable extended error logging
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.015
Processor Group:	All Processors

SHOWHW

Description:	This command displays the current hardware configuration as well as the current Internet settings.
Help Menu(s):	Main, System
Syntax:	SHOWHW
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

SHOWPORTMAP

Description:	This command displays the portmaps configured for the NAT.
Help Menu(s):	Ethernet
Syntax:	SHOWPORTMAP
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Dual Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

SSL

Description:	This command enables SSL protection on the processor. Entering the command without a parameter displays the current setting.
Help Menu(s):	Main, System
Syntax:	SSL [OFF|SELF|CA]
Parameters:	OFF – disable SSL on the processor (default) SELF – enables SSL using self-signed certificates CA - enables SSL using certificate from a certifying authority (CA)
Possible Source:	RS-232
Minimum CUZ:	3.061
Processor Group:	Ethernet Processors

STANDBY

Description:	This command puts the panel into/out of standby mode. The panel goes blank during standby.
Help Menu(s):	Device
Syntax:	STANDBY [ON|OFF]
Parameters:	ON – enables standby (backlight off) OFF – disables standby (backlight on) **NOTE:** No parameter enables standby.
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.017
Processor Group:	Display Processors

STBYTO

Description:	This command sets the standby timeout for the panel. Entering the command without a parameter displays the current setting.
Help Menu(s):	Device, Main
Syntax:	STBYTO [timeout]
Parameters:	timeout – number of seconds of inactivity before the panel enters standby (0 – 65535, where 0 (default) disables the timeout)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.017
Processor Group:	Display Processors

SYSTEM

Description:	This command initiates a firmware upgrade using Xmodem to transfer the new firmware to the system. The user is prompted to start the Xmodem transfer (not allowed over a Telnet connection).
Help Menu(s):	File, System
Syntax:	SYSTEM
Parameters:	none
Possible Source:	RS-232, CTP
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

TELNETPORT

Description:	This command enables/disables listening for a Telnet connection. It can be used to make the system less vulnerable to unauthorized access. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	TELNETport [ON|OFF]
Parameters:	ON – enables Telnet connection (default) OFF – disables Telent connection
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.030
Processor Group:	Ethernet Processors

TESTDNS

Description:	This command performs a lookup of a given site. It is used to test that the Domain Name Service (DNS) servers are properly configured.
Help Menu(s):	Ethernet
Syntax:	TESTDNS remote_host
Parameters:	remote_host – ASCII string containing host name
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.044
Processor Group:	Ethernet Processors

TIMEDATE

Description:	This command sets the time and date of the control system real-time clock. If no parameter is entered, the current time/date is displayed.
Help Menu(s):	Main, System
Syntax:	TIMEdate [HH:MM:SS MM/DD/YYYY]
Parameters:	HH:MM:SS – time in hours (use 24 hour), minutes, and seconds MM/DD/YYYY – date in months (1 through 12), day (1 through 31), and year
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

TOUCH

Description:	This command selects the touch input driver for the CNX-DVP4/C2N-DVP4DI. Entering the command without a parameter displays the current setting.
Help Menu(s):	Device
Syntax:	TOUCH [input]
Parameters:	input – set to a numeric variable from 0 to 12, where: 0 – Program Control 1 – Microsoft mouse (default) 2 – Smart (SC3,SC4,SC5) 3 – Smart (SC6,SC7,..) 4 – Microtouch 5 – Dynapro SC3 6 – Dynapro SC4 7 – Elo Graphics 8 – Crestron Tablet 9 – Mouse Systems Mouse 10 – Logitech MouseMan 11 – Wacom Tablet 12 – QTC Touch Controller
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.017
Processor Group:	Display Processors

TYPE

Description:	This command displays the contents of a file (only works for files under 20K bytes in size).
Help Menu(s):	File
Syntax:	TYPE filename
Parameters:	filename – name of the file to be displayed
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	All Processors

UPLOAD

Description:	This command loads a file into a Cresnet touchpanel device. The user starts an Xmodem transfer with the desired file for the network device (either display or firmware).
Help Menu(s):	System
Syntax:	UPLOAD [DISPLAY | FIRMWARE] net_id
Parameters:	DISPLAY – indicates that the file is a display list for a touchpanel FIRMWARE – indicates that the file is a firmware upgrade net_id – Cresnet ID of the touchpanel device (in hexadecimal)
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

UPTIME

Description:	This command displays length of time the system has been running since the last reboot.
Help Menu(s):	System
Syntax:	UPTIME
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

USERPROGCMD

Description:	The User Program Commands symbol receives data entered at the 2-Series console prompt using the USERPROGCMD command. The syntax of the console command requires double-quotes before and after the command string. The string may include escape codes such as “\x”.
Help Menu(s):	System
Syntax:	USERPROGCMD quoted_string
Parameters:	quoted_string – a string of characters enclosed in double quotes
Possible Source:	RS-232, CTP, Telnet
Minimum CUZ:	3.044
Processor Group:	All Processors

USERPASSWORD

Description:	This command is used to set the password for user web pages. Before the project web pages (both e-Control 1 and 2) are served by the processor, the user is prompted with the standard browser login page. The user should enter “USER” as the user name and the password set with this command.
Help Menu(s):	System
Syntax:	USERPASSWORD
Parameters:	none (user is prompted for password)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	3.061
Processor Group:	Ethernet Processors

VERSION

Description:	This command displays firmware version information.
Help Menu(s):	Main, System
Syntax:	VERsion
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

WEBINIT

Description:	This command sets the main page for the web pages. It looks for a special file, which contains the name of the default page.
Help Menu(s):	Ethernet, System
Syntax:	WEBINIT
Parameters:	None
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

(continued on next page)

2-Series Console Commands (continued)

WEBPORT

Description:	This command specifies the port number on which the web server listens. Changing the port (from the well-known web server port 80) can protect the system from attacks. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	WEBPORT [portnumber]
Parameters:	portnumber – port number for CIP activity (default:80)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

WEBSERVER

Description:	This command enables/disables the webserver for the control system. System must be rebooted to take effect. Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet, System
Syntax:	WEBSERVer [ON | OFF]
Parameters:	ON – enables webserver (default) OFF – disables webserver
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

WHO

Description:	This command displays a list of the active TCP console and gateway connections.
Help Menu(s):	Ethernet
Syntax:	WHO
Parameters:	none
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	All Processors

WINS

Description:	This command enables the WINS client for the processor. It is used in a DHCP environment that does not handle dynamic DNS (such as Windows NT Server 4). Entering the command without a parameter displays the current setting.
Help Menu(s):	Ethernet
Syntax:	WINS [ON | OFF]
Parameters:	ON – enables the WINS client OFF – disables the WINS client (default)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	2.004
Processor Group:	Ethernet Processors

(continued on next page)

2-Series Console Commands (continued)

XGETFILE

Description:	This command uses Xmodem to retrieve a file(s) from the system. Wildcards are accepted and can be in the form of (*file, **file, and file**). **NOTE:** Compact flash directories can only use the standard DOS file wildcards.
Help Menu(s):	File, Main
Syntax:	XGETfile filespec
Parameters:	filespec – ASCII string contains the file name and/or wildcards
Possible Source:	RS-232, CTP
Minimum CUZ:	1.001
Processor Group:	All Processors

XONXOFF

Description:	This command enables/disables the software handshaking on the RS-232 port. If no parameter is entered, the current state is displayed.
Help Menu(s):	System
Syntax:	XONxoff [ON | OFF]
Parameters:	ON – enables the XON/XOFF handshaking OFF – disables the XON/XOFF handshaking (default)
Possible Source:	RS-232, CTP, Telnet, User Program
Minimum CUZ:	1.001
Processor Group:	All Processors

XPUTFILE

Description:	This command uses Xmodem to send a file to the system. All information is retrieved from the file. No parameters are needed for files created by Crestron tools. Other files require that parameters be used. In addition, when transferring to compact flash, the parameters are required.
Help Menu(s):	File, Main
Syntax:	XPUTfile [size date time name]
Parameters:	size – size of the file in bytes date – date of the file (MM-DD-YY) time – time of the file (HH:MM:SS) name – name of the file (can include spaces)
Possible Source:	RS-232, CTP
Minimum CUZ:	1.001
Processor Group:	All Processors

Appendix D: Error Message Definitions

Definitions for each error message are logically grouped first by level (Notice, Warning, Error, and Fatal) and then alphabetically. Refer to the following tables.

NOTE: Words or phrases shown in *italics* are replaced in the actual message with specific information. For example, *Symbol/Device#* might be replaced by something such as S-5 or Slot-9.ID-06.

NOTE: Errors with the "Internal system error. Contact Crestron." Definition cannot be resolved without assistance from a Crestron customer service representative. Refer to "Further Inquiries" on page 80 for details.

Notice-Level Messages

The following table lists notice-level messages. A notice-level message is displayed when an event has occurred that is noteworthy, but will not affect program operation.

Notice-Level Messages

MESSAGE	DEFINITION
CIP device nn: back ONLINE.	CIP device nn has come back on line.
Compact Flash Initialized.	The compact flash has been initialized and is ready for use.
Compact Flash Removed.	The compact flash was extracted from the system.
Link established on LAN A/B.	The system detected a new Ethernet link on LAN A or B.
No previously defined Serial RAM symbol for FIFO Queue *Symbol/Device#*. (001A:####:001A)	If the FIFO Queue (QUE) symbol is using serial data, it requires a Serial RAM symbol defined before it to operate. The FIFO Queue symbol is sometimes used for a push/pop stack (queuing up numbers, not names) and the Serial RAM is not required for this; however this is a rare usage. As such, the message can be ignored.
No Program Present. (001D:####:001D)	This message is issued when the system starts and no program is loaded.

Warning-Level Messages

The following table lists warning-level messages. A warning-level message is displayed when an event has occurred that could affect program operation, but the program can still run normally.

Warning-Level Messages

MESSAGE	DEFINITION
Could not allocate memory for Serial Binary to Hex *symbol/device#*. (0039:####:0039)	Internal system error. Contact Crestron.

(continued on next page)

Warning-Level Messages (continued)

MESSAGE	DEFINITION
Could not solve logic within #### waves. (0004:####:0004)	An entire solution must be no greater than a specific number of waves. Currently, this is set to 1000 waves. If there is circular logic in a program (i.e. logic that loops back on itself and keeps changing) then this message can be issued.
Ethernet Device name Not Responding (IP = nn.nn.nn.nn). Device Offline	A timeout has occurred trying to transmit data to a CIP device. The device is offline.
EtherTask: DHCP failed (Status = -290)	Processor was unable to obtain a DHCP address from a DHCP server. Possible causes are: 1. The processor is not connected to a LAN. When using a Ethernet card with two LAN ports (such as the C2ENET-2 card), the LAN should be connected to LAN A when using a DHCP server. 2. There is no DHCP server running on the network. 3. The DHCP server has no more addresses to give out.
CIP Node Offline: ID nn, IP = nn.nn.nn.nn	A timeout has occurred trying to transmit data to a CIP device. The device is offline.
Disk Insertion error. Please try again.	An error occurred initializing the compact flash. Remove the disk and re-insert it.
Invalid delay time of zero in Logic Wave Delay Symbol/Device#. Assuming value of one (1). (002A:####:002A)	A logic wave delay must be timed for at least one wave. This message indicates that the symbol had a value of 0 put in it. Under this condition, the system assumes one wave delay.
Invalid format #### in Serial to Indirect Text Symbol/Device#. Assuming no format. (0040:####:0040)	The Serial Send only has a specific number of formats (refer to the SIMPL Windows help file). If a format that does not exist is specified, it defaults to format 0d (no format).
Invalid mode #### specified for Text Append symbol Symbol/Device#, assuming mode ####. (005A:####:005A)	The Text Append symbol only has specific modes, and an invalid mode was specified on the input analog. If an invalid analog input is given for the mode, the specified mode is used instead. Consult the SIMPL Windows help file for specifics on the Text Append symbol.
Invalid post-processor data. (0003:####:0003)	Internal system error. Contact Crestron.
Invalid pulse time of zero in Logic Wave Pulse Symbol/Device#. Assuming value of one (1). (0055:####:0055)	Since there is no such thing as a 0 time pulse, the symbol converts a “0” time logic wave pulse into a 1 logic wave pulse. This would be the same as if the user typed 1d in the parameter field of the given logic wave pulse symbol.
Invalid Slave configuration packet received by Symbol/Device# (Packet Printout). (0060:####:0060)	Internal system error. Contact Crestron.

(continued on next page)

Warning-Level Messages (continued)

MESSAGE	DEFINITION
Lost Ethernet link on LAN A/B	The system detected that the Ethernet link on LAN A or B was broken.
Module xxxx : xxxx at line nnn: No digital/analog/serial signal defined at ArrayName[nn] on symbol wrapper.	The Simpl+ module has access the array with a valid index but the symbol wrapper in Simpl does not have a signal defined at that output. The array has not been expanded that far. The IsSignalDefined() function call can be used to see if the index has a valid signal.
Module xxxx : xxxx at line nnn: No digital/analog/serial signal defined at nn on symbol wrapper	The Simpl+ module has access the array with a valid index but the symbol wrapper in Simpl does not have a signal defined at that output. The array has not been expanded that far. The IsSignalDefined() function call can be used to see if the index has a valid signal.
Pesa Switch Command *Symbol/Device#* input 1 must be 999 or less (current value is ####). (003C:####:003C)	The analog values for the Pesa Switch command are 1-999. The protocol used only allows for three digits.
String too big in Serial Demultiplexor *Symbol/Device#* - maximum intermediate string size is 255 bytes. (0037:####:0037)	Format 1 of the Serial Demultiplexor uses embedded characters to signify the start and end of a string. The largest supported string supported between the start and stop is 255 bytes.
Symbol *symbol/device#* (Type #### [####]) is unknown. (000F:####:000F)	The symbol specified is not recognized in this operating system. Usually this happens if a program was created in version of SIMPL Windows utilizing a symbol that was not in existence for the CUZ that is currently in the system. The symbol number is given in decimal and in hex; Crestron can track the meaning of the actual number.
Timeout engaging slave mode for *Symbol/Device#*. (0061:####:0061)	Command indicates an error trying to configure a slave 2-Series control system. This usually means there is a network problem talking to the slave system or such severe latency that it is exceeding the timeout (currently 20 seconds, subject to change).
Timeout waiting for response from slave *Symbol/Device#*. (0062:####:0062)	Command indicates an error trying to configure a slave 2-Series control system. This usually means there is a network problem talking to the slave system or such severe latency that it is exceeding the timeout (currently 20 seconds, subject to change).
Unexpected packet encountered from: *Symbol/Device# (printout of packet)*. (0009:####:0009)	Devices are coded to expect only certain types of packets. If a device receives a packet it does not understand, this message will be printed along with a fragment of the packet. This can happen if the device hooked up physically differs from the one in the program or there is more than one device at the same ID.
Unexpected Parameter type ## encountered while instantiating S-5. (000E:####:000E)	Internal system error. Contact Crestron.
Unknown control packet type ## received. (0010:####:0010)	Internal system error. Contact Crestron.

(continued on next page)

Warning-Level Messages (continued)

MESSAGE	DEFINITION
Unknown packet type #### encountered from *Symbol/Device#* (*Packet Printout*). (0036:####:0036)	The packet type does not match any known Cresnet packet types. This is usually a network problem (i.e. faulty wiring, devices on the same ID), or the device specified is not properly supported by CUZ that is currently in the system. Generally the control system advisor in the Viewport should know when the CUZ in the control system is too old to properly support the program that is uploaded. The *Packet Printout* can be potentially useful to Crestron in determining the issue.

Error-Level Messages

The following table lists error-level messages. An error-level message is displayed when an event has occurred that indicates that the program is not operating as expected.

There are a large number of error-level messages. To facilitate your search for the definition to a specific error-level message, these messages are arranged alphabetically, but with multiple tables (one of each letter). For example, the first table lists error-level messages that begin with a symbol, the second table contains messages that begin with the letter 'A', etc. Refer to the list of letters and their respective start pages below.

Symbols

MESSAGE	DEFINITION
~CActiveSocket: unable to close socket.	Internal system error. Contact Crestron.
~CTP_ListenSocket: unable to close socket.	Internal system error. Contact Crestron.

A

MESSAGE	DEFINITION
AddActiveSocket: Unable to allocate active socket.	Internal system error. Contact Crestron.
AddEntryToMasterList: Error allocating new node.	Internal system error. Contact Crestron.
AddEntryToMasterList: Node already on list.	An attempt was made to add a duplicate entry to the IP table.
AddGatewayLink: unable to allocate gateway link class.	Internal system error. Contact Crestron.
AddListenSocket: Unable to allocate Listen socket.	Internal system error. Contact Crestron.
AddListenSocket: Unable to create Listen socket.	Internal system error. Contact Crestron.
Analog Ramp (Bounds Limited) *Symbol/Device#* requires lower/upper bounds to be from 0 to 65535 or -32768 to 32767 (006D:####:006D)	Since analogs are defined as a 16b number, the range of the ramp may either be 0 to 65535 if it is treated as an unsigned 16b number, or -32768 to 32767 if it is treated as a signed analog number. If this error message is issued, this version of the ramp will NOT perform any processing in response to transitions on its inputs.

(continued on next page)

Error Level Messages, A (continued)

MESSAGE	DEFINITION
Analog Scaler with I/O Limits Symbol/Device# requires Input/Output Lower/Upper bounds to be from 0 to 65535 or -32768 to 32767. Current InputLowerBound=####, InputUpperBound=####, OutputLowerBound=####, OutputUpperBound=####. (0070:####:0070)	Since analogs are defined as a 16b number, the range of the scaler's bounds may either be 0 to 65535 if it is treated as an unsigned 16b number, or -32768 to 32767 if it is treated as a signed analog number. If this error message is issued, this version of the ramp will NOT perform any processing in response to transitions on its inputs.
Analog Scaler with I/O Limits Symbol/Device# requires InputLowerBound to be <= InputUpperBound. Current InputLowerBound=####, InputUpperBound=####. (0071:####:0071)	On the scaler, it is a requirement that the lower bound of the input is less than or equal to the upper bound of the input for scaling to be correctly performed.

B

MESSAGE	DEFINITION
Bad time/date format.	Bad time and/or date format. Value is ignored.
BusTimeoutLISR: Cardslot nn - Bus Timeout Occurred.	The system detected a timeout has occurred on the bus. The bus peripheral did not respond within the time allotted.
BusTimeoutLISR: Cardslot nn - High Speed Bus Timeout Occurred.	The system detected a timeout has occurred on the bus. The bus peripheral did not respond within the time allotted.
BusTimeoutLISR: CNXCOM-6 Card Timeout Occurred.	The system detected a timeout has occurred on the bus. The bus peripheral did not respond within the time allotted.
BusTimeoutLISR: Front Panel Card Timeout Occurred.	The system detected a timeout has occurred on the bus. The bus peripheral did not respond within the time allotted.
BusTimeoutLISR: High Speed Bus Timeout Occurred.	The system detected a timeout has occurred on the bus. The bus peripheral did not respond within the time allotted.
BusTimeoutLISR: IO/IR Card Timeout Occurred.	The system detected a timeout has occurred on the bus. The bus peripheral did not respond within the time allotted.
BusTimeoutLISR: Removable Media Timeout Occurred.	The system detected a timeout has occurred on the bus. The bus peripheral did not respond within the time allotted.

C

MESSAGE	DEFINITION
CActiveSocket: unable to clear active socket flag	Internal system error. Contact Crestron.
CActiveSocket: unable to set active socket flag	Internal system error. Contact Crestron.
CActiveSocket::Read Data: Error echoing data	Internal system error. Contact Crestron.
Cannot create CSMSC111_Device.	Internal system error. Contact Crestron.
Cannot create pipe for Serial Pacer *Symbol/Device#*. (0064:####:0064)	Internal system error. Contact Crestron.
Cannot find any Control Crosspoint Routing symbols for Equipment Crosspoint Routing symbols to connect to. (004E:####:004E)	For Equipment Crosspoint symbols to work, there must be at least one Connection Crosspoint routing symbol in the program.
Cannot find any Equipment Crosspoint Routing symbols for Control Crosspoint Routing symbols to connect to. (004D:####:004D)	For Connection Crosspoint symbols to work, there must be at least one Equipment Crosspoint routing symbol in the program.
Cannot move *[up|down|left|right]* greater than #### pixels in Mouse String *Symbol/Device#*. (0045:####:0045)	The mouse can only move a certain number of specified pixels in the specified direction. The analog input to the mouse symbol is attempting to drive it beyond the bounds.
Cannot Start Task. (0013:####:0013)	Internal system error. Contact Crestron.
Cannot transmit packet: *(partial packet printout)* to *symbol/device#*. Packet is too large. (0012:####:0012)	This message is rare and usually will result if you have deep levels of hierarchy in a program or large serial strings being sent to a device that is under hierarchy (such as a ST-COM that is connected to the Cresnet port of a CEN-TVAV that is an Ethernet slave).
Can't add NULL device to *symbol/device#*. (0008:####:0008)	Internal system error. Contact Crestron.
CClientConnectionTask: Unable to connect to TCP server	The TCP client was unable to establish a connection with its designated TCP server.
CClientConnectionTask: Unable to create socket	The connection task for a TCP client device was unable to create a socket for the connection.

(continued on next page)

Error Level Messages, C (continued)

MESSAGE	DEFINITION
CClientConnectionTask: Unable to disable Nagle algoritm.	Internal system error. Contact Crestron.
CClientServerDriver::SendPacket: error creating connection task	Internal system error. Contact Crestron.
CClientServerDriver::UpdateConnectionStatus: error creating connection task	Internal system error. Contact Crestron.
CConsoleRxHISR: UART2 Rx Pipe Overflow.	Internal system error. Contact Crestron.
CConsoleRxHISR: UART2 Rx Pipe Overflow. Status: xx, Space was =nn	Internal system error. Contact Crestron.
CEEParams: Invalid signature. Restoring factory defaults	An invalid EEPROM signature was found. The factory defaults are restored. This should only happen at the factory.
CFileSystemUser: Unable to become a file user	Internal system error. Contact Crestron.
ChangeWorkingDirectoryString: Current task not a registered file user	The calling task has not registered as a file user. Should call StartFileOperations if SimpPlus.
CheckForDisk: Can't reset to root of disk	The system could not reset the current directory to the root after a new compact flash was inserted.
CheckForDisk: Unable to open disk C:	Internal system error. Contact Crestron.
CheckForDisk: Unable to set current directory	Internal system error. Contact Crestron.
CheckForDisk: Unable to set default drive	Internal system error. Contact Crestron.
CMasterList::RegisterNode: error setting NODE_ADDED flag: nn	Internal system error. Contact Crestron.
CMasterListEntry::Register: unable to allocate output packet	Internal system error. Contact Crestron.
CMasterListEntry::Register: unable to create output pipe	Internal system error. Contact Crestron.
CompleteConnection: unable to Reject new socket.	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, C (continued)

MESSAGE	DEFINITION
Console Port: RS232 break detected.	System detected a break on the Console port.
Console Port: RS232 framing error.	System detected framing error on the Console port.
Console Port: RS232 overrun error.	System detected an overrun condition on the Console port.
Console Port: RS232 parity error.	System detected parity error on the Console port.
ConsoleRxHISR: Error sending XOFF.	Internal system error. Contact Crestron.
ConsoleUartRead: Bad Status from uart2_rxchar: xx.	Internal system error. Contact Crestron.
Could not allocate memory buffer for Keyboard Scan Code Converter *symbol/device#*. (002B:####:002B).	Internal system error. Contact Crestron.
Could not allocate memory for Duple Encoder string buffer in *symbol/device#*. (0022:####:0022).	Internal system error. Contact Crestron.
Could not allocate memory for Duple Decoder *symbol/device#*. (0024:####:0024).	Internal system error. Contact Crestron.
Could not allocate memory for *symbol/device#*. (000D:####:000D).	Internal system error. Contact Crestron.
Could not allocate memory for Transmit Analog string buffer in *symbol/device#*. (001E:####:001E).	Internal system error. Contact Crestron.
Could not allocate memory pool for Compact.	Internal system error. Contact Crestron.
Could not allocate space on transient heap for serial strings. (0016:####:0016).	The transient heap is 100K, and is used during a logic solution to store transient strings issued from symbols such as a Serial Send. If amount of data exceeds 100K from all active strings during a solution, this error is issued.
Could not clear the CF_DISK_INSERTED flag.	Internal system error. Contact Crestron.
Could not create MainDone Event.	Internal system error. Contact Crestron.
Could not create MainStarted Event.	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, C (continued)

MESSAGE	DEFINITION
Could not find device driver for Slot-09.ID-05. (0031:####:0031).	Internal system error. Contact Crestron.
Could not find SIMPL+ module *modulename* in S-1. (0026:####:0026).	Internal system error. Contact Crestron.
Could not get Timer info.	Internal system error. Contact Crestron.
Could not instantiate SIMPL+ module *modulename* in S-1. (0025:####:0025)	Internal system error. Contact Crestron.
Could not instantiate SIMPL+ modules. (0027:####:0027)	Internal system error. Contact Crestron.
Could not obtain GPTRList semaphore. Status: ####. (005E:####:005E)	Internal system error. Contact Crestron.
Could not register String/Buffer input. No memory.	Internal system error. Contact Crestron.
Could not retrieve the CF_DISK_INITIALIZED flag.	Internal system error. Contact Crestron.
Could not retrieve the CF_DISK_INSERTED flag.	Internal system error. Contact Crestron.
Could not retrieve the CF_DISK_REMOVED flag.	Internal system error. Contact Crestron.
Could not retrieve TIMER_DONE flag in destructor.	Internal system error. Contact Crestron.
Could not retrieve TimerDone flag in WaitEventTask.	Internal system error. Contact Crestron.
Could not send message to RemoveWaitTask.	Internal system error. Contact Crestron.
Could not send signal to event handler.	Internal system error. Contact Crestron.
Could not set TaskDone flag in WaitEventTask.	Internal system error. Contact Crestron.
Could not set the CF_DISK_INITIALIZED flag.	Internal system error. Contact Crestron.
Could not set the CF_DISK_INSERTED flag.	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, C (continued)

MESSAGE	DEFINITION
Could not set the CF_DISK_REMOVED flag.	Internal system error. Contact Crestron.
Could not set the current directory.	Internal system error. Contact Crestron.
Could not set the default drive.	Internal system error. Contact Crestron.
Could not set TimerDone flag in RetimeWait.	Internal system error. Contact Crestron.
Could not set TimerDone flag in WaitEventTimer.	Internal system error. Contact Crestron.
CreateMasterListFromEE: out of memory.	Internal system error. Contact Crestron.
CreateSortedFilesArray: unable to obtain filelist semaphore.	Internal system error. Contact Crestron.
CSimplPlusEventHandler: could not wait for MainStarted.	Internal system error. Contact Crestron.
Current task not a registered file user.	The calling task has not registered as a file user. Should call StartFileOperations if SimpPlus.

D

MESSAGE	DEFINITION
DeleteFile: unable to obtain filelist semaphore.	Internal system error. Contact Crestron.
Device ID for *symbol/device#* needs to be specified before it can be added to parent *symbol/device#*. (000C:####:000C)	Internal system error. Contact Crestron.
dirname is not a directory.	The specified directory is not a valid directory path.
Divide by Zero in Analog DivMod Symbol/Device#. (001B:####:001B)	Dividing by zero is illegal. The symbol will perform the computation using 1 as the divisor instead of 0.

E

MESSAGE	DEFINITION
Error creating CSMSC111_Driver class.	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, E (continued)

MESSAGE	DEFINITION
Error creating internal signal in *Symbol/Device#*. (0029:####:0029)	Internal system error. Contact Crestron.
Error obtaining RamFileAreaSemaphore.	Internal system error. Contact Crestron.
Error #### sending packet to Slot-09.ID-0A (0032:####:0032)	This error is a general timeout. Error –1 may be seen once before an error issued that a device has gone offline. This error is not typically seen in 2.004 CUZ or later; however it was more common in older CUZ files. If Error –50 is seen for Cresnet devices, this is typically some form of a timeout caused by problematic wiring or devices on the same ID code. This error can still occur in later CUZ files, although internal error recovery is greatly improved.
Error parsing integer parameter in config file.	Internal system error. Contact Crestron.
Error parsing string parameter in config file.	Internal system error. Contact Crestron.
Error reading the IP table.	The system use not able to read the IP table. The table could be corrupted.
Error registering *Symbol/Device#*. Ethernet Initialization failed. Confirm correct IP Address and Subnet Mask. (0054:####:0054)	The system was not able to initialize Ethernet. The most common causes, as stated, are an invalid IP address and/or subnet mask.
Error registering *Symbol/Device#*. Make sure there is an IP table entry for IP ID ####. (004F:####:004F)	There is a device in the program with the given IP ID # (as given by the Symbol/Device#), but there is no corresponding entry in the IP table. There must be an IP table entry for the device to function correctly.
Error registering *Symbol/Device#*. No card found at this location. (0052:####:0052)	The program is referencing a card in a particular slot, but there is no card in the given slot.
Error registering *Symbol/Device#*. No ethernet card present or ethernet is disabled. (0050:####:0050)	There is no Ethernet card in the system or Ethernet has been turned off. It must be present/enabled for Ethernet devices to be registered properly.
Error registering *Symbol/Device#*. There is already a device at IPID ####. (0051:####:0051)	This would not happen in standard practice, as SIMPL Windows prevents duplicate devices at a given ID.
Error registering *Symbol/Device#*. Wrong card found at this location. (0053:####:0053)	The program is referencing a card in a given slot, but that card is not in the slot (a different card is). There are occasions where a different card may be in the slot (different than what the program expects) but no error is issued, such as a CNXCOM-2 card defined in the program and a C2COM-3 card is present.

(continued on next page)

Error Level Messages, E (continued)

MESSAGE	DEFINITION
Error sending signal transition to SIMPL+ module *modulename* in *modulenumber*. (0028:####:0028)	Internal system error. Contact Crestron.
Error setting default directory for console.	Internal system error. Contact Crestron.
Error skipping past header. (0059:####:0059)	Internal system error. Contact Crestron.
EtherDisconnect: unable to close socket.	Internal system error. Contact Crestron.
EtherTask: Error setting default router	The parameter used for the default router is incorrect. The default router should be on the same subnet as the system (LAN A for C2ENET-2 cards).
EtherTask: Error setting DEVICE_INIT flag	Internal system error. Contact Crestron.
EtherTask: Listen socket never created.	Internal system error. Contact Crestron.
EtherTask: NU_Init_Devices failed.	Internal system error. Contact Crestron.
EtherTask: NU_Init_Net failed.	Internal system error. Contact Crestron.
EtherTask: WARNING! Single Ethernet Device: NAT is non functional.	The system detected that NAT was enabled but could not be started because there is only an C2ENET-1 card in the system.
EtherTask:error at call to NAT_Portmap at device 0.	An error occurred initializing the port mapping for the NAT. Check the port map parameters.

F

MESSAGE	DEFINITION
File Writing not currently supported to internal flash.	The user attempted to open a file for write access on the internal flash. This is not currently supported. Only compact flash can be accessed to write files. However, internal flash can be used to read files.
FindFile: unable to obtain/release directory semaphore.	Internal system error. Contact Crestron.
FindFirst: Unable to create a File info block.	Internal system error. Contact Crestron.

G

MESSAGE	DEFINITION
Get_file_Xmodem: max file size exceeded.	The file received is too big for the internal buffer. Unable to send file to internal flash.
GetCurrentDirectory: Current task not a registered file user.	The calling task has not registered as a file user. Should call StartFileOperations if SimpPlus.
GetListSemaphore: Error Obtaining Semaphore.	Internal system error. Contact Crestron.
GetNewHandle: Could not allocate m_pNodeArrary.	Internal system error. Contact Crestron.

I

MESSAGE	DEFINITION
I2C problem.	Internal system error. Contact Crestron.
Illegal #chars parameter value for Serial RAM *Symbol/Device#*. (003A:####:003A)	Serial RAM (SMEM) symbols require a parameter value of 1 or greater. This message is issued if 0 is used.
Illegal queue_size value for Serial Queue *Symbol/Device#*. Value will be truncated to ####. (003D:####:003D)	The Serial Queue symbol can only take in a maximum amount of characters, which is specified in the error message. If the parameter is too large, the parameter is truncated at the specified value.
In CIP Transmission *Symbol/Device#* IP ID #### is not defined in the IP table. (0048:####:0048)	The specified IP ID does not match any entry in the IP table.
InitializeEthernetFrom File: Illegal Portmap Number.	A NAT port map number was detected in the file. The maximum number of portmaps allowed is 32.
Internal buffer length of #### exceeded in Serial Pacer *Symbol/Device#*. (0046:####:0046)	The serial pacer symbol has a buffer of the specified number of characters internal to it for holding data while it is pacing characters to its output. If more data comes into the symbol than the temporary buffer can hold, this error is issued. The existing data is kept, and the new data that was to be added is dropped.
Internal Buffer Overflow in Serial Queue *Symbol/Device#*. (003E:####:003E)	Too many characters have come into the input of the specified Serial Queue, and the internal buffer created cannot hold that many. The buffer needs to be cleared before more characters can be added, using the clear input on this symbol. If this error occurs, the current contents will stay and the new input is discarded.
Invalid date format #### in *Symbol/Device#*. (0035:####:0035)	The Serialize Date symbol specified has a format parameter that is out of the legal range. Consult the SIMPL Windows help file for the legal values.
Invalid DST format #### in *Symbol/Device#*. (0034:####:0034)	The Clock Driver symbol specified has a Daylight Savings Time parameter that is out of the legal range. Consult the SIMPL Windows help file for the legal values.

(continued on next page)

Error Level Messages, I (continued)

MESSAGE	DEFINITION
Invalid Error Message ####. (0020:####:0020)	Internal system error. Contact Crestron.
Invalid format for Limit Scaler *Symbol/Device#*. Valid formats are #### through ####. (006E:####:006E)	The Limit Scaler only accepts formats as shown in the error message. If an invalid format is entered, this error message is issued. IF this error message is issued, the Limit Scaler will NOT perform any processing in response to transitions on its inputs.
Invalid IP ID #### in CIP Transmission *Symbol/Device#*. (0047:####:0047)	The IP ID must be between 03 and FE (hex).
Invalid IR Data Index for *Symbol/Device#*. (0030:####:0030)	Internal system error. Contact Crestron.
Invalid join number #### in *ProtocolName* (0011:####:0011)	Internal system error. Contact Crestron.
Invalid Parameter #### in Symbol *Symbol/Device#*. (001C:####:001C)	The specified parameter (starting at 0 and increasing linearly) is considered invalid for the symbol. This can happen in a Serial Demultiplexor (SDEMUX) symbol if the parameter is not in a valid range. It can also happen if a SIMPL+ module has no internal name specified (this should not happen; if it did it would be a system or compilation error).
Invalid Signal Number #### in Receive of Intersystem Communications *Symbol/Device#*. (004C:####:004C)	If an XSIG receives a signal that does not fit on its list, it will generate this error. For example, the fiftieth digital input of an XSIG goes high, but the receiving XSIG only has five outputs. This error was removed in CUZ 3.000 and later due to the fact that it is perfectly valid that an XSIG may receive an out-of-bounds signal due to the use of the "Offset" option.
Invalid String ID #### detected while parsing input to Serial Demultiplexor (special) *Symbol/Device#*. (0044:####:0044)	The ID on the input string received does not match any ID byte in the parameter field of the symbol.
Invalid String received by Duple Decoder *Symbol/Device#* (String: ABCD). (0023:####:0023)	The Duple Decoder checks to see if the incoming string is a properly duple encoded string. If it does not match the proper format, the error is issued along with the string received for decoding. The valid Duple format is in the SIMPL Windows help for the Duple Encoder/Decoder.
Invalid time stored. Setting defaults.	The time stored in the real-time clock chip is invalid. The default time is restored.
Invalid Transmit Analog format #### in *Symbol/Device#*. (001F:####:001F)	The Transmit Analog symbol (TXA) has only a certain number of valid formats. If the format is outside the legal range, this message is printed.
InvalidateFile: failed to (un)lock flash.	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, I (continued)

MESSAGE	DEFINITION
IR Queue Overflow on *Symbol/Device#*. (005B:####:005B)	IR devices (cards or network devices) have only a specific number of commands that can be queued up. Since IR commands are relatively slow to generate compared to how fast the user may want to generate them, a queuing mechanism is needed. The queue is currently 32 commands deep (32 "start" IR commands and 32 "stop" IR commands; a typical button press and release to generate IR is two commands, a start and stop). If greater than this number of commands is queued, the current queue is dumped and the new command is considered the first command.

J

MESSAGE	DEFINITION
Jog Time parameters for *Symbol/Device#* must be 2.55s or less, clamping to 2.55s. (0066:####:0066)	This error refers specifically to the CLX-1MC4 Motor Control module. Even though a broad range of times can be entered for the Max Time/Jog Time/Lockout Time parameters in SIMPL Windows, there is a run-time restriction that is enforced when the system initializes. If the time for a particular parameter is too large, it will lock it to the specified maximum value.

L

MESSAGE	DEFINITION
Lockout Time parameters for *Symbol/Device#* must be 2.55s or less, clamping to 2.55s. (0067:####:0067)	This error refers specifically to the CLX-1MC4 Motor Control module. Even though a broad range of times can be entered for the Max Time/Jog Time/Lockout Time parameters in SIMPL Windows, there is a run-time restriction that is enforced when the system initializes. If the time for a particular parameter is too large, it will lock it to the specified maximum value.
Lower and upper bounds must be greater than 0 in LogAntilog *Symbol/Device#*. (006C:####:006C)	The log/antilog symbol may not have 0 as either the upper or lower bound, as this will result in a divide by zero error. If this error message is issued, the log/antilog symbol will NOT perform any processing in response to transitions on its inputs.

M

MESSAGE	DEFINITION
Max Time parameters for *Symbol/Device#* must be 655.35s or less, clamping to 655.35s. (0065:####:0065)	This error refers specifically to the CLX-1MC4 Motor Control module. Even though a broad range of times can be entered for the Max Time/Jog Time/Lockout Time parameters in SIMPL Windows, there is a run-time restriction that is enforced when the system initializes. If the time for a particular parameter is too large, it will lock it to the specified maximum value.
Memory allocation error in ReadSplus.	Internal system error. Contact Crestron.
Message from device *Symbol/Device#*: *{message}* (0056:####:0056)	If a device has a specific error to give back (such as a device on Cresnet or Ethernet), it is put into this message. Examples are framing errors from ST-COMs or any error message generated in a slave 2-Series control system. In a slave, error message are also locally stored in the slave's error log in addition to being put in the master's error log.

(continued on next page)

Error Level Messages, M (continued)

MESSAGE	DEFINITION
Module xxxx : xxxx at line nnn: Destination string *StringName* overflow. CurLen = nn MaxLen = mm.	A string function is overflowing its destination string. Check the inputs to the string function.
Module xxxx : xxxx at line nnn: Divide by Zero.	The Simpl+ module has attempted a divide by 0. The result is set to 0 but is invalid.
Module xxxx : xxxx at line nnn: FindNext called before FindFirst.	The FindNext Simpl+ function was called before the FindFirst function. Check the Simpl+ module.
Module xxxx : xxxx at line nnn: Input/Output Array *ArrayName* overflow. Index = nn. Bounds = bb.	The Simpl+ module has accessed an input/output array with an invalid index, nn. Valid indices are 1 to bb.
Module xxxx : xxxx at line nnn: Integer Array *IntArrayName* overflow. Col = nn. Bounds = nn.	The Simpl+ module has accessed a one-dimensional integer array with an invalid index, nn. Valid indices are 0 to bb.
Module xxxx : xxxx at line nnn: Integer Array *IntArrayName* overflow. Row,Col = rr,cc. Bounds = bb,dd.	The Simpl+ module has accessed a two-dimensional integer array with an invalid row (rr) or column (cc). Valid indices are 0 to bb, 0 to dd.
Module xxxx : xxxx at line nnn: LongInteger Array *IntArrayName* overflow. Col = nn. Bounds = bb.	The Simpl+ module has accessed a one-dimensional long integer array with an invalid index, nn. Valid indices are 0 to bb.
Module xxxx : xxxx at line nnn: LongInteger Array *IntArrayName* overflow. Row,Col = rr,cc. Bounds = bb,dd.	The Simpl+ module has accessed a two-dimensional long integer array with an invalid row (rr) or column (cc). Valid indices are 0 to bb, 0 to dd.
Module xxxx : xxxx at line nnn: No format string specified.	Makestring was called with an invalid format specifier.
Module xxxx : xxxx at line nnn: Null Array Pointer.	An invalid array was used.
Module xxxx : xxxx at line nnn: NULL destination in makestring.	An invalid destination string was specified as the target of a Makestring function call.
Module xxxx : xxxx at line nnn: String Array *StringArrayName* overflow. Element = nn. Bounds = bb.	The Simpl+ module has accessed a string array with an invalid index, nn. Valid indices are 0 to bb.

(continued on next page)

Error Level Messages, M (continued)

MESSAGE	DEFINITION
Module xxxx : xxxx at line nnn: String Output Array *StringOutputArrayName* overflow. Element = nn. Bounds = 1 to bb.	The Simpl+ module has accessed a string array with an invalid index, nn. Valid indices are 1 to bb.
Module xxxx : xxxx at line nnn: String StringName overflow. Index = nn. Bounds = bb	The Simpl+ module has accessed a string array with an invalid index, nn. Valid indices are 1 to bb.
Module xxxx : xxxx at line nnn: String *StringName* overflow. NewLen = nn. MaxLen = mm.	The Simpl+ module has attempted to write more data into a STRING variable than it can hold. Only the data that fits will be written to the destination string.
Module xxxx : xxxx at line nnn: Structure Array S*tructureArrayName* overflow. Element = nn. Bounds = bb.	The Simpl+ module has accessed a sturcture array with an invalid index, nn. Valid indices are 0 to bb.
Mute level #### specified in Analog Ramp (Bounds Limited) Symbol/Device# must fall between #### and ####. (006F:####:006F)	The user-specified mute level parameter on the Analog Ramp (Bounds Limited) symbol must fall between the upper and lower bounds. If this error is issued, this version of the ramp will NOT perform any processing in response to transitions on its inputs.

N

MESSAGE	DEFINITION
No device protocol specified for *symbol/device#*. (0005:####:0005)	Internal system error. Contact Crestron.
No matching ID byte in parameter to transmit string input #### for Serial Multiplexor (special) *Symbol/Device#*. (0041:####:0041)	For each input string, there must be a corresponding “ID” byte to build the output string in the Serial Multiplexor (special). For example, if there are five input strings, there must be five ID bytes. If not, this error is issued.
No NVRAM allocated by the compiler for Simpl+ module *NAME* in *Symbol/Device#*. (005F:####:005F)	Internal system error. Contact Crestron.
No Parent for slave device *Symbol/Device#*. (005C:####:005C)	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, N (continued)

MESSAGE	DEFINITION
No parent for symbol in slave - invalid parent index (####) received. (0063:####:0063)	Internal system error. Contact Crestron.
No parent or driver for *symbol/device#*. (0006:####:0006)	Internal system error. Contact Crestron.
Node Reset: Error reseting pipe.	Internal system error. Contact Crestron.
Not a project directory.	The specified directory is not a project directory. It does not have SIMPL and SPLUS directories.

O

MESSAGE	DEFINITION
Out of memory adding device symbol/device# to symbol/device#. (0007:####:0007)	Internal system error. Contact Crestron.

P

MESSAGE	DEFINITION
Parameter in Serial Demultiplexor (special) *Symbol/Device#* is invalid. (0043:####:0043)	The parameter of this symbol must be at least three bytes long – a two-byte ID string plus at least one ID byte.
PingTask: error retrieving NODE_ADDED flag: nn	Internal system error. Contact Crestron.
PingTask: error retrieving SOCKET_CREATED flag: nn	Internal system error. Contact Crestron.
Problem reading Simpl+ file: *filename*	The Simpl+ file was corrupted. The program should be recompiled and resent.
ProcessCIP_Packet: Error adding new node.	Internal system error. Contact Crestron.
ProcessCIP_Packet: Error reading stored message.	Internal system error. Contact Crestron.
ProcessCIP_Packet: Error sending Add Master Response	Internal system error. Contact Crestron.
ProcessCIP_Packet: Error sending Cresnet Data Response	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, P (continued)

MESSAGE	DEFINITION
ProcessCIP_Packet: Error sending Cresnet Request Reject	Internal system error. Contact Crestron.
ProcessCIP_Packet: Error sending Master Query Response	Internal system error. Contact Crestron.
ProcessCIP_Packet: Error sending Revision Response	Internal system error. Contact Crestron.
ProcessCommand: Error writing to Console RxPipe.	Internal system error. Contact Crestron.
ProcessGatewayData: No room for packet. Data lost.	Data overrun error. The logic processor is not keeping up with the web page.
ProcessGatewayData: Out of handles for this socket	A web page link established too many connections on one TCP port.(>1024)
ProcessNewChar: Error writing to captured Rx pipe. Status=xxx	Internal system error. Contact Crestron.
Project will not fit on destination.	There is not enough room for the project transfer.

Q

MESSAGE	DEFINITION
Que Error: CeventSchedulerHelper::Entry() (0015:####:0015)	Internal system error. Contact Crestron.
Que is Full: Could not add signal "1" to the Logic Processor (0014:####:0014)	Internal system error. Contact Crestron.
Que is Full: TimerExpired() (0014:####:0014)	Internal system error. Contact Crestron.
Que is Full: Too many transitions in a single logic wave. (0014:####:0014)	The maximum number of signals that can change in a single wave is 5000. (a signal transition is a new value for a digital/analog/serial signal)

R

MESSAGE	DEFINITION
ReadData: Too many characters to echo.	The Ethernet port received too many characters in one packet to echo back.
ReadSplus: File *filename* not found.	The system could not find the Simpl+ file specified. The program should be resent.
ReadSplus: Incorrect file format.	The Simpl+ file was corrupted. The program should be recompiled and resent.

(continued on next page)

Error Level Messages, R (continued)

MESSAGE	DEFINITION
ReadSplus: Incorrect number of Loadable program segments: nn.	The Simpl+ file was corrupted. The program should be recompiled and resent.
ReadSplus: Simpl+ Module too large: nn.	The amount of space for all Simpl+ modules has exceeded the space allotted in the control system.
RegisterTaskAsFlash User: Error creating new node.	Internal system error. Contact Crestron.
RejectSocketConnecti on: unable to close new socket.	Internal system error. Contact Crestron.
ReleaseInputStream: unable to release semaphore.	Internal system error. Contact Crestron.
ReleaseSemaphore: Error Releasing Semaphore.	Internal system error. Contact Crestron.
RemoveEntryFrom MasterList: Node not found.	An attempt was made to remove an entry from the IP table that did not exist.
RemoveGatewayLink: node not found.	Internal system error. Contact Crestron.
RetransmitTimer: error retrieving NODE_ADDED flag: nn.	Internal system error. Contact Crestron.
RomAppendFile: failed to (un)lock flash.	Internal system error. Contact Crestron.
RomAppendFile: failed to write new file.	An internal file write operation to the internal flash failed.
RomAppendFile: not enough free flash space.	The internal flash file system is full. A “COMPACT” operation may free up room to allow the file to be stored.
RxConsoleData: Error sending to pipe.	Internal system error. Contact Crestron.

S

MESSAGE	DEFINITION
SaveList: Error opening file.	Internal system error. Contact Crestron.
SaveList: Not enough space to store IP table.	The file system was full and could not store the new IP settings. Run “COMPACT” command from console.
SendCaptured OutputMsg: Error transmitting message	Internal system error. Contact Crestron.
SendCaptured OutputMsg: invalid source.	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, S (continued)

MESSAGE	DEFINITION
SendCompactFlash FileXmodem: Error reading from file.	An error occurred reading from the compact flash.
SendCompactFlash FileXmodem: unable to allocate buffer for Xmodem xfer.	Internal system error. Contact Crestron.
SendCresnetPacket ViaCIP: Problem Writing to Pipe.	Internal system error. Contact Crestron.
SendInitialConnect: Error sending Update Request Packet.	Internal system error. Contact Crestron.
SendPingMsg: Error sending Ping Msg Packet: nn	Internal system error. Contact Crestron.
Signal Mismatch in Receive of Intersystem Communications *Symbol/Device#*. (004B:####:004B)	When an XSIG symbol transmits an analog/digital/serial signal, the receiving XSIG must have the same signal type at the same signal position on the output of the XSIG. For example, if the tenth input on an XSIG's input is an analog signal, the tenth output on the receiving XSIG's output list must also be an analog.
StartFileOperations: Unable to become a file user.	This could occur if there are already too many concurrent users of the files. Check for reentrant events accessing files.
String argument cannot be greater than #### characters in Serial Send *Symbol/Device#* (003F:####:003F)	No longer used, this used to be part of very early CUZ files. It would happen if the Serial Send tried to output greater than the specified number of characters. This now has been incorporated into the messages about packets too big to send on the network.
String input #### of Serial Multiplexor (special) *Symbol/Device#* is too long (250 characters maximum, #### specified). (0042:####:0042)	The Serial Multiplexor (special) has some overhead on the output string that it builds, which is five bytes. Therefore, the longest input string can be 250 bytes.
String Length #### Exceeded in Serial Gather *Symbol/Device#*. (0019:####:0019)	The Serial Gather (GATHER) symbol has a user-defined length of a temporary internal buffer. The symbol has received more than this many characters without receiving the terminator character, and the internal buffer has overflowed. If the overflow occurs, the internal buffer is cleared.
Symbol *Symbol/Device#* text field #### exceeds indirect text packet length. (006B:####:006B)	When an indirect text packet is created (such as from a serial string that is routed to a touchpanel's serial inputs), there is overhead introduced into the final Cresnet packet as a result of indirect text formatting information. This overhead is dependent upon the indirect text field number (i.e. text field 1 has less overhead than text field 15 or 150, for example) and the number of embedded carriage returns in the input serial string.
Symbol Queue Overflow for symbol *Symbol/Device#*. (005D:####:005D)	While this is not an error that a user can do anything about, there are known issues with CUZ files before 3.008 that can cause this error.

(continued on next page)

Error Level Messages, S (continued)

MESSAGE	DEFINITION
SystemUpgrade: Attempt to load invalid software	An attempt was made to upgrade the system with a file that was not compatible with the current hardware.
SystemUpgrade: File loaded does not support current flash.	An attempt was modified to load a version of the firmware that does not support the flash in the system. This happens when an older version of firmware is sent to the system.

T

MESSAGE	DEFINITION
TCP_ListenTask: unable to set listen socket flag.	Internal system error. Contact Crestron.
TCP_Read: error closing socket.	Internal system error. Contact Crestron.
TCP_Send: problem writing data: nn.	Internal system error. Contact Crestron.
TCP_Send: socket broken, disconnecting.	A broken socket was detected during a TCP send.
TCP_Task: unable to disable Nagle algoritm.	Internal system error. Contact Crestron.
Timeout waiting for SIMPL+ event task to start in Module *Symbol/Device#*. (004A:####:004A)	Internal system error. Contact Crestron.
Too many calls to SMSC111_Open.	Internal system error. Contact Crestron.
TPS_FileClose: Attempt to close an unopened file.	An attempt to close an unopened file. Bad file handle.
TPS_FileOpen: No free file structures.	Too many files are currently open.
TPS_FindFirst: Current task not a registered file user.	The calling task has not registered as a file user. Should call StartFileOperations if SimpPlus.
TPS_FindFirst: Illegal Wildcard String. ? not supported.	The ? wildcard character is not supported in the 2-series.
TPS_FindFirst: Invalid Wildcard String. Too many Wildcards.	The file system only supports a maximum of 2 wildcards in a file specification.
Transient strings cannot be used with Serial RAM *Symbol/Device#*. (003B:####:003B)	Generally, a transient string (such as from a Serial Send) will be automatically converted to a permanent string when connected to a Serial RAM. However, if a 0 is put on the string input/output of a Serial RAM, this error message can still occur. This is commonly seen when a macro is programmed and a 0 is placed on a macro input/output that ends up driving the string input/output.
TransmitPacket: Error sending to CIP Node. Status: nn.	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, T (continued)

MESSAGE	DEFINITION
TransmitPacket: Error sending to Ethernet device *name*. Status: nn.	Internal system error. Contact Crestron.
TxConsoleData: Error writing to Tx2Pipe.	Internal system error. Contact Crestron.

U

MESSAGE	DEFINITION
UDP_ListenTask: Bad Socket Retured from NU_Socket.	Internal system error. Contact Crestron.
UDP_ListenTask: bad status from NU_Recv_From: nn.	Internal system error. Contact Crestron.
UDP_ListenTask: Error setting UDP_CREATED flag.	Internal system error. Contact Crestron.
UDP_ListenTask: Unable to allocate memory for CIP address struct.	Internal system error. Contact Crestron.
UDP_ListenTask: Unable to allocate memory for FromAddr struct.	Internal system error. Contact Crestron.
UDP_ListenTask: Unable to close socket.	Internal system error. Contact Crestron.
UDP_Task: Error allocating buffer memory.	Internal system error. Contact Crestron.
UDP_Task: Error waiting for Ethernet init done.	Internal system error. Contact Crestron.
Unable to create EventHandler.	Internal system error. Contact Crestron.
Unable to create InputStringChanged Event.	Internal system error. Contact Crestron.
Unable to create PulseTimer.	Internal system error. Contact Crestron.
Unable to create WaitEvent *waitname.*	Internal system error. Contact Crestron.
Unable to create *waitname* WaitEventGroup.	Internal system error. Contact Crestron.
Unable to create *waitname* WaitEventTask.	Internal system error. Contact Crestron.

(continued on next page)

Error Level Messages, U (continued)

MESSAGE	DEFINITION
Unable to create *waitname* WaitEventTimer.	Internal system error. Contact Crestron.
Unable to destination open file: *filename.*	The system is unable to open file *filename* for writing.
Unable to find WaitEvent *waitname.*	This error is generated when the wait event has already expired or the wrong name is used.
Unable to pause WaitEvent *name.*	This error is generated when the wait event has already expired or the wrong name is used.
Unable to remove WaitEvent *name* from list.	This error is generated when the wait event has already expired or the wrong name is used.
Unable to resume WaitEvent *name.*	This error is generated when the wait event has already expired or the wrong name is used.
Unable to retime WaitEvent *name.*	This error is generated when the wait event has already expired or the wrong name is used.
Unable to send Packet in CIP Transmission *Symbol/Device#.* (0049:####:0049)	This is a general failure attempting to send the packet.
Unable to source open file: *filename.*	The system is unable to open file *filename* for reading.
Unable to start WaitEvent *waitname.*	Internal system error. Contact Crestron.
Unknown subtype #### for packet type 18 - Internal Control Packet. (0038:####:0038)	Internal system error. Contact Crestron.
Unsupported console command (*string*) detected in *Symbol/Device#.* (0033:####:0033)	The Message to Computer Port (TMSG) and Console symbols attempt to interpret some old-style ESC commands from the X generation and older control systems. The only ESC commands that are supported are the ESC X C and ESC X M commands, for compatibility with Crestron Macros that are written to use these commands.
UpdateFTE: attempt to overwrite SETUP file.	An attempt was made to overwrite a read-only file in the \SETUP directory.
UpdateFTE: exceeded maximum files allowed.	The maximum number of files for the internal flash system has been exceeded.
UpdateFTE: unable to obtain filelist semaphore.	Internal system error. Contact Crestron.

W

MESSAGE	DEFINITION
Wait Event name too long.	The name given to the Simpl+ event is greater than 256 characters. Use a shorter name.

(continued on next page)

Error Level Messages, W (continued)

MESSAGE	DEFINITION
WaitForNewDisk: Unable to open disk.	An error occurred in the WaitForNewDisk routine when trying to initialize the new disk.
WakeListenTask: unable to close temporary socket.	Internal system error. Contact Crestron.
WakeListenTask: Unable to connect to wake up socket.	Internal system error. Contact Crestron.
WakeListenTask: Unable to open wakeup socket.	Internal system error. Contact Crestron.
WakeReadTask: Error sending to wakeup node: nn.	Internal system error. Contact Crestron.
WriteData: invalid destination.	Internal system error. Contact Crestron.

X

MESSAGE	DEFINITION
XmodemPurgePipe: Error Resetting the pipe.	Internal system error. Contact Crestron.
XmodemPutChar: invalid source.	Internal system error. Contact Crestron.
XmodemToCompact Flash: error writing to file.	An error occurred writing to the compact flash.
XmodemToCompact Flash: unable to allocate buffer for Xmodem xfer.	Internal system error. Contact Crestron.

Z

MESSAGE	DEFINITION
Zero length packet encountered from *Symbol/Device#* (*Packet Printout*). (0068:####:0068)	This type of error is generally not seen, as lower-level driver layers will prevent zero length packets from reaching logic. However, if there is a network error (such as two devices with the same ID on Cresnet, or a bad wiring problem) there is potential that this could be seen. Two Masters on the same Cresnet network can also cause errors like this.

Fatal Error Messages

The following table lists fatal error messages. Fatal error messages report events that will prevent the program from running.

Fatal Error Messages

MESSAGE	DEFINITION
Attempt to delete CSchedulerData - Both Pointers Non-NULL. (006A:####:006A)	Internal system error. Contact Crestron.
Attempt to delete CSchedulerData - Both Pointers NULL. (0069:####:0069)	Internal system error. Contact Crestron.
Could not allocate memory (0001:####:0001)	Internal system error. Contact Crestron.
Could not allocate memory for Signal Routing objects. (002E:####:002E)	Internal system error. Contact Crestron.
Could not become a file user. (0057:####:0057)	Internal system error. Contact Crestron.
Could not launch primary control system task. (0000:####:0000)	Internal system error. Contact Crestron.
Could not obtain synchronization semaphore. (0002:####:0002)	Internal system error. Contact Crestron.
Could not open file "{*filename*}". (000A:####:000A)	Internal system error. Contact Crestron.
CreateSortedFiles Array: Illegal file size. Run INITIALIZE.	During a program bypass, the system discovered an invalid file system. The user MUST run the “INITIALIZE” command from the console to restore the file system.
Error changing the current directory. (0058:####:0058)	Internal system error. Contact Crestron.
Error in compaction. Initialize file system.	The compaction routine detected an error and the file system is invalid. The user MUST run the “INITIALIZE” command from the console to restore the file system.
Flash File system is invalid. Run INITIALIZE to correct the problem.	During a program bypass, the system discovered an invalid file system. The user MUST run the “INITIALIZE” command from the console to restore the file system.
Invalid IR Data File. (002F:####:002F)	Internal system error. Contact Crestron.
Invalid route file. (002D:####:002D)	Internal system error. Contact Crestron.

(continued on next page)

Fatal Error Messages (continued)

MESSAGE	DEFINITION
No route filename specified, cannot load program. (002C:####:002C)	Internal system error. Contact Crestron.
Program Restart failed. Please Reboot the Control System. (0018:####:0018)	This message is issued from the "Soft Reset (RESET1)" symbol if it was unable to restart the program for any reason.
RomAppendFile: FILE SYSTEM IS CORRUPTED.	During a program bypass, the system discovered an invalid file system. The user MUST run the “INITIALIZE” command from the console to restore the file system.
Symbol Load Failure. (000B:####:000B)	Internal system error. Contact Crestron.

Appendix E: Super-Debugger Command Listing

The following table lists all of the available debugging tools contained in the Super-Debugger utility.

Super Debugger Command Listing

-D[ON|OFF]	
Description:	Set device to have its debug info printed (ON) or not (OFF).
Followed by:	R: Turn on/off debug flag for all registered devices. C: Turn on/off debug flag for all top-level Cresnet devices. C##: Turn on/off debug flag for top-level Cresnet ID ##. E: Turn on/off debug flag for all top-level Ethernet devices. E##: Turn on/off debug flag for top-level Ethernet ID ##. S: Turn on/off debug flag for all top-level Slots. S##: Turn on/off debug flag for Slot ##. D##: Turn on/off debug flag for Device ##. ## may be specified in decimal (i.e. 10) or in hex notation (i.e. 0x0A). For example, -Don C0x03 will turn on debugging for Cresnet ID 0x03.
Notes:	The console commands ISTAT REG or ISTAT REGDEV can be used to list device numbers, or the correlation between device numbers and symbol handles can be read from the map file generated by the SIMPL Windows compiler (see later in the document). In most cases, users will want to specify a Cresnet ID, Slot Number, or IP ID directly.
-TXR[on|off] **-RXR[on|off]**	
Description:	Turns the display of raw packets on or off. Used for Transmit and Receive (respectively)
-TXI[on|off] **-RXI[on|off]**	
Description:	Turns the interpreted display of raw packets on or off. Used for Transmit and Receive (respectively) ON is “Human” readable packet display. The interpreted form is subject to the -TXF, -RXF commands. In interpreted mode, the interpretation shows join numbers rather than the channel number in packets. For example, digital channels start at 0. Rather than show this, "Join 1" is shown rather than "Join 0" so it better correlates with the way that SIMPL Windows shows a value.
-TXF[0|1] **-RXF[0|1]**	
Description:	Sets the format of the interpreted display. Turns the display of raw packets on or off. Used for Transmit and Receive (respectively) Form 0 is considered machine parseable. The output contains less data and is not subject to change in future CUZ revisions. Form 1 is human readable, which is a much more verbose output and may change in future CUZ revisions if consensus says a different phrasing of the output would be more readable.
-PR[on|off]	
Description:	Turn on/off Show Printable characters when printing raw packets. The only printable characters that are interpreted are from string-type packets (type 12, indirect text, etc.)
-PI[on|off]	
Description:	Turn on/off Show Printable characters when interpreting packets. The only printable characters that are interpreted are from string-type packets (type 12, indirect text, etc.)
-O[on|off]	
Description:	Shows line status of a device – Online or Offline. If packet interpretation for that device is on, the device's online/offline status will be shown even if this flag is OFF.
-SB[on|off]	
Description:	Suppress showing broadcast packets (Packet ID is 0xFF) in any form - raw or interpreted - if set to ON.
-SU[on|off]	
Description:	Suppresses showing unresolvable packets if set to ON. An unresolvable packet is one that has an ID that is not in the program. Such packets can be generated from SIMPL+'s SendToCresnet() command, NTX, SDPM, SDPMB, IPSDPM, BROADCAST, and startup commands.

(continued on next page)

Super Debugger Command Listing (continued)

-S[0|1]	
Description:	Shows current debug settings. This will list devices that have their debug flag turned on, and list the state of all debug flags. Form 0 shows a form that is more machine parseable, while form 1 shows a format that is more verbose.
-OP[#]	
Description:	Sets a Quick Profile (up to three) using the current parameters. Quick Profiles are built-in sequences of flags to set up commonly used options for the super debugger. Using "-QP?" will show current parameters of the three stored profiles: -QP1: -TXRON, -TXIOFF, -TXF0, -RXRON, -RXIOFF, -RXF0, -PROFF, -PIOFF, -SBON, -SUON, -OOFF, -CONON, -CFOFF, -STON, -SDON -QP2: -TXROFF, -TXION, -TXF0, -RXROFF, -RXION, -RXF0, -PROFF, -PION, -SBOFF, -SUOFF, -OON, -CONON, -CFOFF, -STON, -SDON -QP3: -TXROFF, -TXION, -TXF1, -RXROFF, -RXION, -RXF1, -PROFF, -SBOFF, -SUOFF, -OON, -CONON, -CFOFF, -STON, -SDON
-CON[on|off]	
Description:	Writes the debug output to the console. By default, this option is on, Turn this feature off when logging data to compact flash without being actively connected to the console.
-CF[on|off]	
Description:	When set to ON, the super-debugger output is logged to the compact flash file \CF0\sdebug.txt.
-ST[on|off]	
Description:	When set to ON, a time stamp is printed before the packet.
-SD[on|off]	
Description:	When set to ON, data is shown when the time is printed. This command requires the -ST option to be ON.

Appendix F: Join Number Remapping (JNR)

Introduction

Join Number Remapping (JNR) is a programming concept that allows a Crestron Isys touchpanel (aka TPS-Series panel) to use join numbers with values over 4000 (join numbers 4001 to 15999 and Reserved Join Numbers) by bringing them within the range of the TPS touchpanel symbol, thereby increasing a touchpanel's functionality. Through JNR, a TPS-Series panel can make its internal functions become accessible to a control system, can route screen touches to multiple control systems, can route its internal feedback back to a control system, and can receive feedback from remote locations. JNR provides the additional capability of managing IP IDs in Ethernet applications where a touchpanel communicates with multiple control systems that have been uploaded with the same program or different programs.

With standard programming techniques, developers had access to only 4000 digital and analog join numbers, 999 serial join numbers to the touchpanel, and 127 serial join numbers from the touchpanel. With JNR, a programmer can access up to 16000 digital and analog join numbers, 999 serial join numbers to the touchpanel, and 127 serial join numbers from the touchpanel as well as allowing a control system to access a touchpanel's internal functions.

Join Number Remapping (JNR) allows the designer/programmer to load a very simple JNR Routing Table to an Isys touchpanel, in effect, making the touchpanel more powerful. Although logic is not permitted in the JNR Routing Table, the available signal routing offers incredible flexibility when used in conjunction with SIMPL Windows (version 2.03.18 and later) and Crestron VisionTools (VT Pro-e) (version 2.3 and later). To utilize JNR, an Isys touchpanel must have TPS firmware version 1.017 or later.

When using JNR, inputs to the touchpanel result in the touchpanel performing a specific function. Additionally, the touchpanel is capable of providing output commands serially (via RS-232), over Cresnet®, or over Ethernet. There are no provisions for the touchpanel to act as an external signal router that is capable of accepting commands from an external connection and passing them through unchanged to another external connection (i.e. Cresnet to Ethernet, Ethernet to Ethernet, Serial to Ethernet). Even though SIMPL Windows allows such signals to be put into the JNR program, the signals will not function.. A JNR program can only route signals internally within the touchpanel.

Specific examples of a use for JNR include a touchpanel button press/release that can be sent to one or more destinations under program control. Also, a new JNR program can direct a command from a touchpanel over Cresnet, Ethernet, or serial communication and receive feedback from any or all destinations. In summary, JNR allows:

- Touchpanel acts as a peripheral: Programming with JNR permits a single Isys touchpanel to be a touchpanel for multiple control systems.
- Reserved join number enhancement: With JNR, the Isys touchpanel can designate as many external join numbers as desired to control internal setup features previously not controllable from a control system. As a result, reserved join numbers can be integrated into a SIMPL program.

NOTE: Reserved join number enhancement can only be used on TPS touchpanels.

Programming

Creating a JNR Program

To create a program that uses JNR, the following firmware and software requirements must be met:

- Isys touchpanel firmware (version 1.017 or later)
- 2-Series CUZ file (version 3.015 or later)
- SIMPL Windows (version 2.03.18 or later)
- VT Pro-e (version 2.3 or later)
- Crestron Toolbox (version 1.01.06 or later)

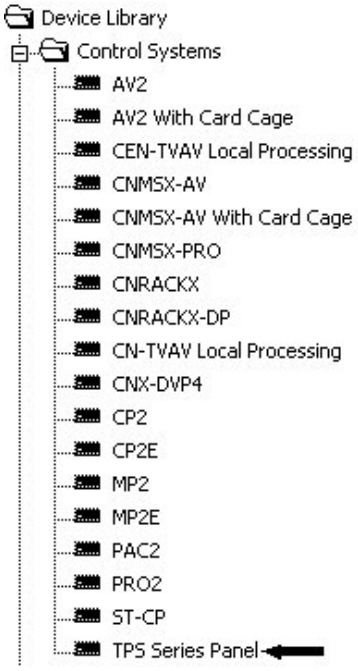
NOTE: To determine the firmware version on the touchpanel, refer to the "Diagnostics Menu" section of the Isys touchpanel operations guide.

NOTE: The latest software and firmware versions can be obtained from the Crestron website. 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).

Once the latest versions are loaded, create a SIMPL Windows program with the Isys touchpanel as the control system. This will be the JNR Routing Table. SIMPL Windows is the optimum environment for creating a JNR Routing Table as SIMPL Windows is already used to route signals in a conventional control system program.

From the Control Systems folder in the *Device Library* of Configuration Manager, select TPS Series Panel as shown in the following diagram, and drag it to *System Views*.

Choosing an Isys Touchpanel within the Control System Folder

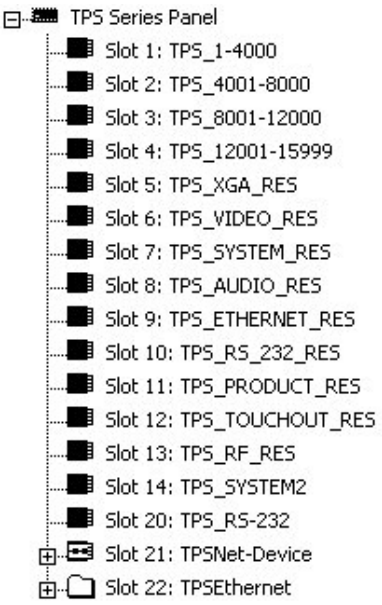


Slots

A representation of the Isys panel appears in *System Views*. This representation is broken down into a number of "slots". Each slot depicts a bank of join numbers (or possible functions of the panel). Crestron touchpanels prior to JNR were capable of performing up to 4,000 functions. A simple scan of the Isys panel representation in *System Views* reveals that those 4,000 functions are now available in the first slot alone. Two additional banks of 4,000 functions reside in slots 2 and 3 and 3,999 functions reside in slot 4, giving a total of 15,999 digital join numbers to use.

Reserved join numbers allow for the activation of pre-assigned touchpanel functions. Certain reserved join numbers are published in a touchpanel manual while other join numbers are not published as they may not be relevant to everyday touchpanel programming. With a SIMPL Windows program using JNR, many reserved join numbers, published and unpublished, are available for use. Slots 5 through 12 are set aside for reserved join numbers. Similar functions have been grouped together by slot. For example, all audio functions with reserved join numbers are grouped into slot 8. Refer to the following diagram for a system view.

System View of Slots on TPS Series Panel Control System



A complete listing of all available reserved join functions (grouped by similar functions) are provided in each slot when in *Program View*.

NOTE: For a complete list of available reserved join numbers that can be used, refer to the SIMPL Windows help file for each slot's representative symbol.

Screen Slots

Slots 1 through 12 are defined as TPS Screen Interfaces. That is, if the panel is thought of as a stand-alone control system, the inputs and outputs of that control system for these designated slots are by way of the touchpanel screen. For slots 1 through 4, a physical press of a button on the panel screen is the output of the TPS Screen Interface. The input of the TPS Screen Interface is the active state of the button (or feedback as displayed on the panel). The I/O interactions for slots 5 through 12 are different due to their predefined functionality. Outputs of the TPS Screen Interface for these slots have fixed functionality and are initiated by a

matching input or in the absence of any input may be prompted during bootup of the panel. Inputs to slots 5 through 12 may be received from a button press on the panel or are commands sent over Cresnet, Ethernet, or the RS-232 port.

Communication Slots

Slots 20, 21, and 22 are referred to as communication slots because they depict the three physical communication ports on an Isys panel with an Ethernet card installed. In all cases, the input and output of the symbol representing these communication slots can be thought of as signals arriving to and leaving the physical port. Therefore, inputs and outputs from the Cresnet symbol are received from and delivered to all connected Cresnet devices. Inputs and outputs on the RS-232 interface enter and leave the panel via the RS-232 port to an RS-232 device connected to the system. Likewise, the Ethernet interface is capable of transferring signals to and from Ethernet devices assuming the Ethernet card has been installed into the touchpanel.

NOTE: The touchpanel's RS-232 port must be in the Control mode to route signals to and from the RS-232 port. Refer to the latest revision of the touchpanel operations guide for instructions on selecting the control mode.

NOTE: Prior to adding any Ethernet devices to the system, a designer must add an "Ethernet Device for TPS Panels" to the Ethernet slot. From the *Device Library* in Configuration Manager, drag and drop the 'Ethernet Device for TPS Panels' from the *Ethernet Control Modules* folder to slot 22.

The Remap Program

The purpose of remapping is to add Isys touchpanel features to a control system program or to easily expand existing networked control systems. Programmers of a brand new system have the advantage of starting from a "clean slate". The programmer can design the SIMPL Windows programs for the Crestron control system and Isys panel simultaneously. This is important because they do not have to worry about the remap program conflicting with the original program in the control system. Even so, all programmers should be aware of a default behavior that accompanies remapping. The default behavior of a JNR program states that an unassigned touchpanel button press (no signal name in the remap program) will be sent out over Cresnet, RS-232 (if available), and to each address in the touchpanel's IP table.

If a system already exists and new features are to be added using remapping, the designer needs to be cautious. Use of remapping with join numbers already utilized in an existing program can undermine the existing program. The programmer should verify that no pre-existing functions are unintentionally lost while remapping assigned join numbers. It is safer to implement remapping with previously unused join numbers.

NOTE: In a program without remapping, a button press or a slider operation (analog) sends the join to Cresnet and all entries in an IP table. Once a signal is defined in a JNR Routing Table, the default functionality is removed and must be accounted for in the control system program's touchpanel symbol to achieve a desired result (i.e. feedback).

In Programming Manager, the TPS Screen Interfaces (slots 1 through 12) and the TPS RS-232 Interface (slot 20) are available from the *Central Control Modules* folder in *Program View*. The TPS Cresnet Interface (slot 21) is part of the *Network Modules* folder. If the Ethernet card has been installed into the panel and the Ethernet Device for TPS Panels has been added, the TPS Ethernet Interface can be found in the *Ethernet* folder. Notice that the *Logic* folder is commented out. Logic is not

permitted. Route signals from the touchpanel's input and output join numbers (digital, analog, and serial) to the various destinations (i.e., reserved join numbers, Cresnet, various Ethernet IP IDs, and the serial port).

When creating a JNR program, signals that originate in the touchpanel can only be routed to destinations outside of the touchpanel and vice-versa. The touchpanel cannot be used to route signals internally.

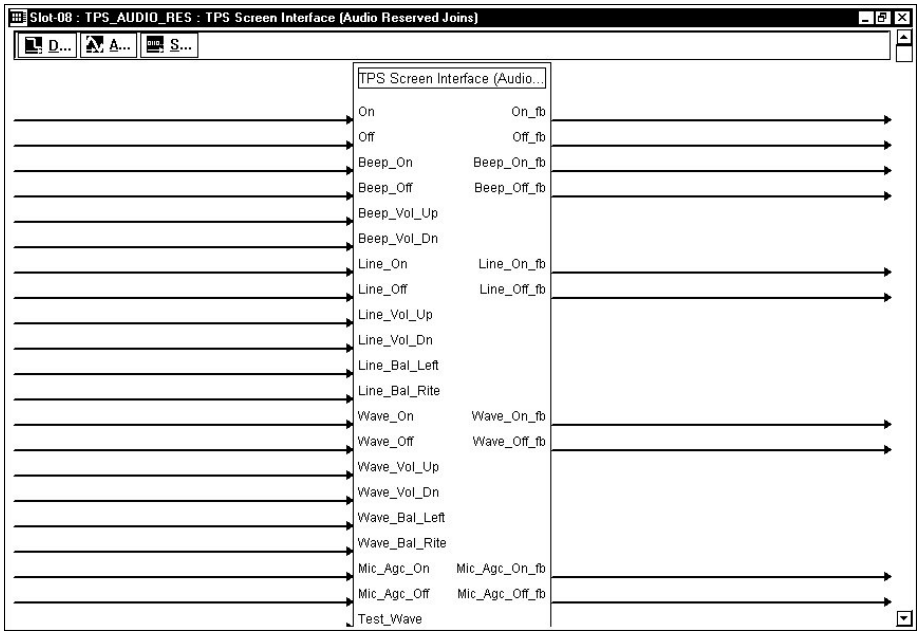
NOTE: The following sections are intended to provide the reader with some examples with respect to remapping. Since each programming scenario is different, it is not intended to teach the reader how to program.

Reserved Join Numbers

Reserved join numbers are associated with a fixed touchpanel function. For example, the following illustration shows the SIMPL Windows symbol for the Audio Reserved Joins. Each signal name corresponds to a reserved join number. Inputs are defined as signals that the panel receives. Outputs are signals generated by the panel. The first output with a signal name for the Audio Reserved Joins is labeled On_fb and has join number 17300 assigned. This output goes high when the touchpanel audio is set to "On". This signal can be remapped in SIMPL Windows to an accessible touchpanel symbol join number (1 to 4000) for feedback as a status indicator or Cresnet for further processing by the control system. With JNR, reserved join numbers can now be used by the control system program (as opposed to creating a button with a reserved join number in VT Pro-e).

NOTE: For a complete list of available reserved join numbers that can be remapped, refer to the SIMPL Windows help file for each slot's representative symbol (i.e., press **F1** while viewing the touchpanel symbol).

Touchpanel Symbol in Programming Manager Illustrating Audio Reserved Join Numbers



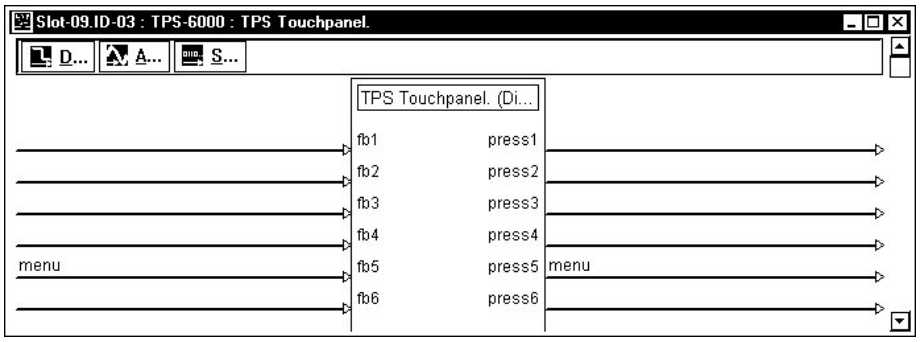
Reserved Join Number Example:

NOTE: This example has been compiled into a usable program that can be downloaded from the *Examples* folder of the Crestron FTP site

(ftp://ftp.crestron.com/Examples/). Download and extract the ZIP files "JNR_Example_2SERIES_Frame_example_old.zip", "JNR_Touch_Panel_Example.zip" and "jnr_large_tps_panel_example.zip" for a program that was written using JNR to access Reserved Join Numbers.

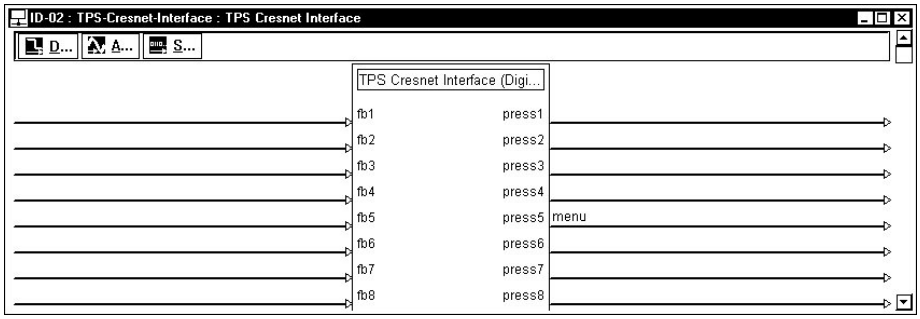
To put the touchpanel in the Setup Mode using a JNR program, a button press must be created in the touchpanel symbol of the control system program.

TPS-6000 in Slot 9 of a PRO2 Control System

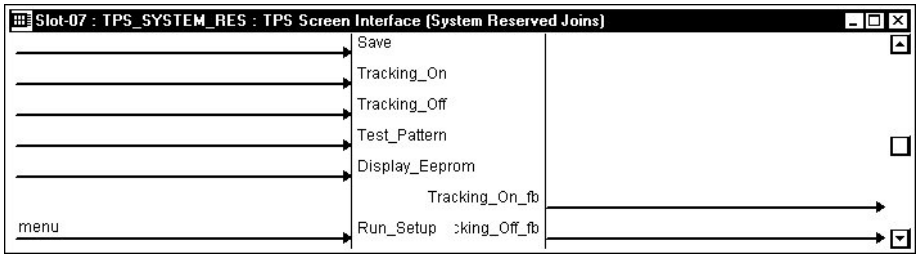


In the JNR program, the press number used in the control system's touchpanel symbol must be matched to the corresponding press number on the TPS Cresnet Interface symbol. The Cresnet Interface press is then connected to the **Run_Setup** line (reserved join number 17242) on the System Reserved Joins symbol.

TPS Cresnet Interface Symbol



TPS Screen Interface (System Reserved Joins) Symbol

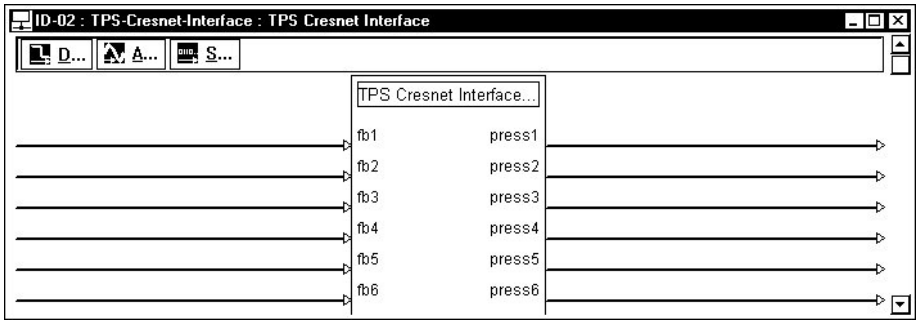


Cresnet

When using Cresnet for carrying signals to and from the touchpanel, the remap program must have a TPS Cresnet Interface symbol. This symbol, as shown after this paragraph, is identical to the TPS Screen Interface symbol. The important distinction to be made is that the TPS Cresnet Interface symbol provides communication (inputs and outputs) via the Cresnet port, whereas the TPS Screen Interface symbol relates the physical press and feedback shown on the touchpanel screen. Therefore, assuming Cresnet communication with feedback, a physical button press on the

panel is an output from the TPS Screen Interface symbol and a corresponding input to the TPS Cresnet Interface symbol. Due to the default behavior of remapping, the remap program does not need the inputs and outputs of the touchpanel in the PRO2 program, just the inputs and outputs that are to be remapped.

TPS Cresnet Interface Symbol

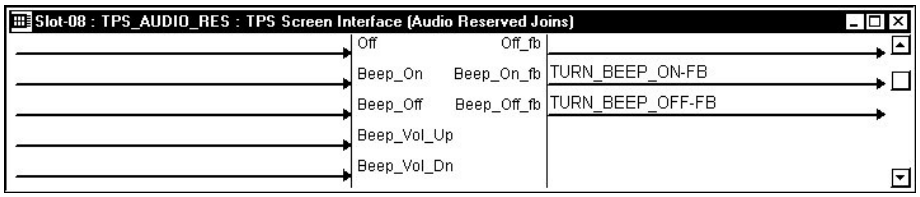


NOTE: In the Cresnet Interface Symbol, fb signals are sent by the touchpanel over Cresnet and press signals are received by the touchpanel over Cresnet.

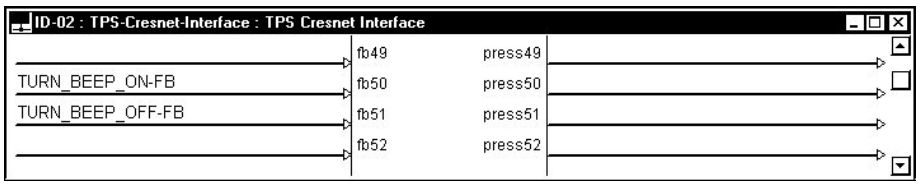
Cresnet Example 1:

To send a signal to a control system over Cresnet that indicates that the remote touchpanel's key-click function is on, connect the **BEEP_ON-FB** signal of the Audio Reserved Joins symbol to an **fb** input on the TPS Cresnet Interface. Refer to the following illustrations.

TPS Screen Interface (Audio Reserved Joins) Symbol

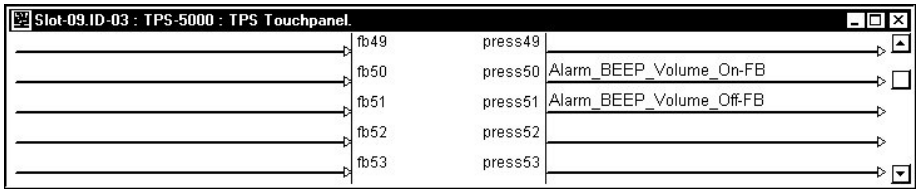


TPS Cresnet Interface Symbol



In the control system program, a signal must be put on press50 of each touchpanel in the Cresnet system as shown in the following diagram. The press and feedback numbers of the TPS Cresnet Interface Symbol **must** match the respective press and feedback numbers of touchpanels in the control system program. Signal names do not have to match.

TPS Touchpanel Interface Symbol in a Control System

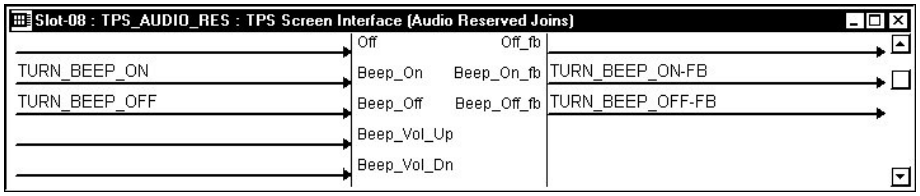


NOTE: For purposes of illustration, the above images are condensed versions of the actual symbols used in SIMPL Windows.

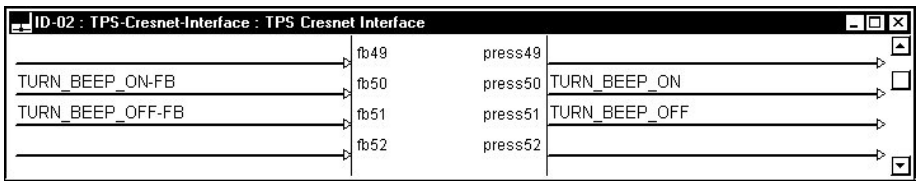
Cresnet Example 2:

To disable the sound of a (remote) touchpanel key click via Cresnet, connect a **press** output of the TPS Cresnet Interface symbol to the **BEEP_OFF** input of the Audio Reserved Joins symbol. Connect the **BEEP_OFF-FB** output of the Audio Reserved Joins symbol to the **fb** input of the TPS Cresnet Interface symbol. Refer to the following illustrations.

TPS Screen Interface (Audio Reserved Joins) Symbol



TPS Cresnet Interface Symbol



NOTE: For purposes of illustration, the above images are condensed versions of the actual symbols used in SIMPL Windows.

In the control system's program, digital joins 50 and 51 on the touchpanel will turn the key click on and off.

Ethernet

Join number remapping can also be used to control multiple control systems over Ethernet without rewriting the program for each controlled system.

In a system where the PRO2 (or any Ethernet-enabled control system) is used to control devices via Ethernet, the IP ID of the device being controlled 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. Conversely, the IP table of the controlled device must also contain its own IP ID and the IP address of the control system that controls it.

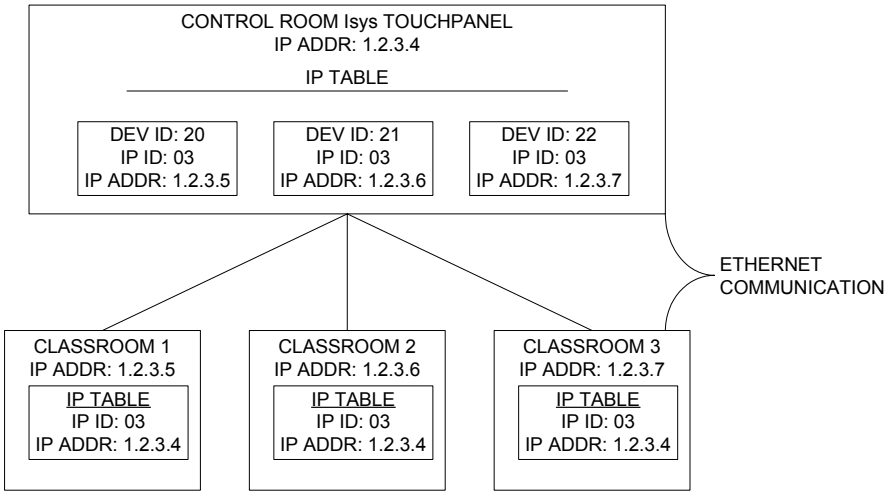
Similarly, when the Isys panel is used as a control system communicating via Ethernet, another level of identification is necessary.

Remapping via Ethernet requires the completion of an IP table for the Isys panel. A programmer must assign the Device ID, IP ID, and IP address for each Ethernet interface in the remap program. For example, assume the Isys panel communicates over Ethernet with multiple control systems, as shown in the illustration after this paragraph. The device ID is used to distinguish which control system is communicating with the Isys panel. Normally, the Device ID is the same as the IP ID. However, when multiple control systems communicate with a touchpanel, the IP addresses must be put in different IP IDs. To avoid having to change the touchpanel IP IDs (so that each touchpanel has its own IP ID), in each control system, the touchpanel uses the Device ID internally to pick up the IP address, but uses the IP ID

when communicating externally with the control system. The touchpanel "remaps" the Device ID to the IP ID. Notice how the Device ID bundles the IP ID and IP address for each Ethernet interface in the remap program.

NOTE: In some Crestron documentation, the device ID is called the "remap ID".

Isys Touchpanel Communicating to Multiple Control Systems via Ethernet



NOTE: When an Ethernet touchpanel is functioning as a peripheral to several control systems, additional setup is required. Normally, when a touchpanel comes online, it issues an update request to its control system, clears all join number values, and waits for the control system to resend all values. When the touchpanel is attached to several control systems, the touchpanel may clear all values when it should not. To prevent this from happening, type the command **ALLCLEAR SELECTIVE** from the touchpanel console (the opposite is **ALLCLEAR NORMAL**). The control system will tell the touchpanel to clear all digital and analog join numbers within the range used by that control system. The SIMPL Windows programmer **must** be careful to use non-overlapping ranges of join numbers for communicating with each control system.

Setting the IP Table in the Control System

Besides configuring the control system to communicate over Ethernet, it is assumed that a C2ENET Ethernet Expansion Card is installed into the control system. Ethernet devices that are addressed by the control system may have their IP IDs set either in the SIMPL Windows program or through Crestron Toolbox using a PC. Refer to "IP Tables" on page 61 for IP table setting details.

Setting the IP Table in the Isys Touchpanel

Furthermore, the IP ID in the controlled device's static master table must be set to the IP address of the controlling system. Use Crestron Toolbox while communicating over Cresnet or Ethernet to enter IP addresses. Over Cresnet, use Crestron Toolbox to establish communication with the touchpanel and select **Functions | IP Table Setup…**. The "IP Table" window appears. Refer to the Crestron Toolbox help file for instructions using this feature. Add an entry for each device that communicates with the touchpanel.

NOTE: Prior to adding any Ethernet devices to the system, a programmer must add an "Ethernet Device for TPS Panels" for each Ethernet device to the Ethernet slot of the TPS-Series Panel. From the *Device Library* in Configuration Manager, drag and drop the "Ethernet Device for TPS Panels" from the *Ethernet Control Modules* folder to slot 22.

Ethernet Example:

The following example demonstrates how a JNR program can be used to allow a master control system with its own touchpanel to control several other control systems without maintaining the control system program for each classroom.

NOTE: This example has been compiled into a usable program that can be downloaded from the *Examples* folder of the Crestron FTP site (ftp://ftp.crestron.com/Examples/). Download and extract the ZIP file "JNR_Example_2SERIES_Frame_example.zip" for a multi-room control program that was written with and without JNR.

In this example, a system is comprised of three classrooms and a control room.

Each classroom has:

- A PRO2 control system with a C2ENET-1 Ethernet card
- A TPS-5000 with a TPS-VID-1 video card.
- A CPC-CAMI pan/tilt camera head with Pan/Tilt/Focus/Zoom control and Presets
- A distribution amplifier for sending video signals from the camera to the TPS-5000 and the control room.

The control room has:

- A PRO2 control system with a C2ENET-1 Ethernet card
- A TPS-5000 with a TPS-VID-1 video card and a TPS-ENET Ethernet card.
- A C2N-MMS Professional Multimedia Switch for switching between the video signals for each classroom.

Each classroom controls a local camera from the TPS-5000 panel. The TPS-5000 receives video from the camera through the distribution amplifier.

The control room touchpanel communicates via Ethernet to the PRO2 control systems in each classroom. It can control any of the cameras in those rooms by communicating directly with the control system in the room. The control room switches the video feed from the room to itself by using the PRO2 and C2N-MMS located in the control room.

The IP addresses for the Ethernet devices used in the network are:

Network IP Addresses

DEVICE	IP ADDRESS
PRO2 in classroom 1	192.168.1.10
PRO2 in classroom 2	192.168.1.11
PRO2 in classroom 3	192.168.1.12
TPS-5000 in control room	192.168.1.14
PRO2 in control room	192.168.1.15

Without JNR

The TPS-5000 in the control room must have three IP table entries (one for each room) as well as the IP address for the control system. Following is a sample IP table for the TPS-5000 in the control room.

IP Table:	CIP_ID	DeviceID	IP Address/SiteName
	3		192.168.001.010
	4		192.168.001.011
	5		192.168.001.012
	6		192.168.001.015

For each IP table entry, there must be a corresponding device in each classroom control system's IP table. For example, in the control system IP table for classroom 1, there must be a TPS-5000 located at IP ID 03. In the control system IP table for classroom 2, there must be a TPS-5000 located at IP ID 04. In the control system IP table for classroom 3, there must be a TPS-5000 located at IP ID 05.

Classroom 1

CIP_ID	Status	DevID	Port	IP Address/SiteName
3		ONLINE	41794	192.168.1.14

Classroom 2

CIP_ID	Status	DevID	Port	IP Address/SiteName
4		ONLINE	41794	192.168.1.14

Classroom 3

CIP_ID	Status	DevID	Port	IP Address/SiteName
5		ONLINE	41794	192.168.1.14

Control Room

CIP_ID	Status	DevID	Port	IP Address/SiteName
6		ONLINE	41794	192.168.1.14

Without JNR, the system becomes difficult to maintain, as the programs for classrooms 1, 2, and 3 must be different by virtue of the fact that the ID for the touchpanel in each system has a different IP ID. Additionally each control system must communicate to the panel using a different range of join numbers. When a button is pressed on a panel, the signal on the corresponding join number will be sent to every entry in the IP table. In our example, when join number 1 is pressed, it is sent to IP ID 3, 4, 5, and 6. The goal is to make sure that each IP ID only responds to a particular set of join numbers.

Without JNR, the control room would have to control each classroom by using a different range of join numbers for each room. Any changes made in one room would have to be made in all rooms. Maintenance and improvements become labor intensive and impractical.

With JNR

Join Number Remapping allows a join number on a touchpanel screen (in our case, the control room) to be routed out of the touchpanel on an IP ID with a different join number.

For example, join number 1 on the control room touchpanel, which activates Preset 1 in classroom 1, can be sent as join number 1 to classroom 1. Join number 16 on the control room touchpanel, which activates Preset 1 in classroom 2 can be sent as join number 1 to classroom 2. The same can be said for the return path; Join number 1 from classroom 1 can be mapped to feedback 1 on the control room touchpanel and join number 1 from classroom 2 can be mapped to feedback 16 on the control room touchpanel.

Ultimately, the program for each classroom can have the same set of join numbers that go to and from the control room touchpanel; Only the control room touchpanel must use different join numbers.

In the JNR program that resides on the control room touchpanel, join numbers 1 through 15 in classroom 1 (IP ID 3) can be mapped to join numbers 1 through 15 on the control room touchpanel, join numbers 1 through 15 in classroom 2 (IP ID 4) can be mapped to join numbers 16 through 30 on the control room touchpanel, and join numbers 1 through 15 in classroom 3 (IP ID 5) can be mapped to join numbers 31 through 45 on the control room touchpanel.

Since the IP ID for each room program is the same, a “Device ID” can be used in the control room touchpanel’s IP table to individually address each IP ID. A Device ID is comprised of an IP ID and an IP address. A set of entries in the IP table can share the same IP ID as long as a Device ID is used to differentiate between them. This allows us to say that "Device ID 20" really means "IP ID 03 on 192.168.1.10" and "Device ID 21" really means "IP ID 03 on 192.168.1.11". The Device ID is arbitrarily chosen; the only thing to keep in mind is that the Device ID in the remap project must also be configured in the IP table of the TPS panel. Following are sample Device ID definitions for each classroom:

For Classroom 1:

Device ID 20 is made up of data to/from IP ID 03 from IP Address 192.168.1.10

For Classroom 2:

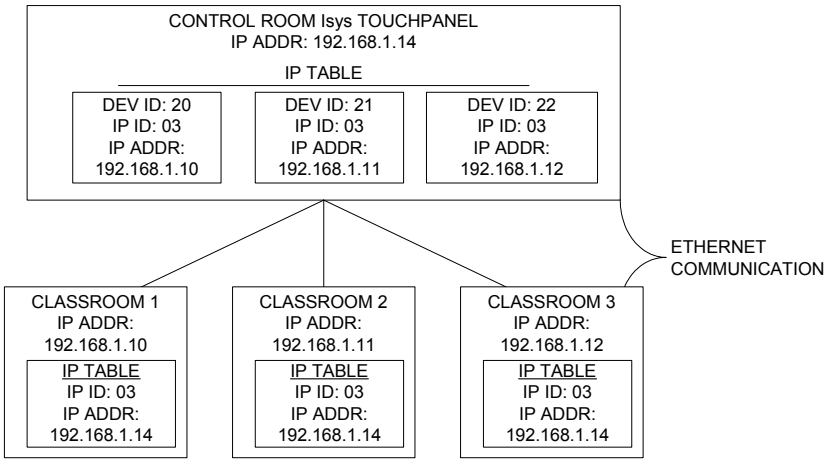
Device ID 21 is made up of data to/from IP ID 03 from IP Address 192.168.1.11

For Classroom 3:

Device ID 22 is made up of data to/from IP ID 03 from IP Address 192.168.1.12

Following is a graphical representation of the network.

Isys Touchpanel Communicating to Multiple Control Systems via Ethernet



By using Device ID, each classroom program can use the same IP ID. The control room touchpanel (with the help of Device ID and the JNR Program) will direct the presses from the control room touchpanel to the correct classroom and route feedback from each classroom to the appropriate join number on the control room touchpanel.

Added benefits include ease of maintenance by using only one program to control the classrooms (as opposed to three), and easy scalability when adding more rooms. If a room needs to be added, all that needs to be done is the addition of another IP table entry in the control room touchpanel and the required screens. New rooms just receive the same program file used in the original classrooms.

Implementing JNR for Ethernet Applications

Using the theories for implementing JNR in an Ethernet application, the following demonstrates how this would be programmed in SIMPL Windows.

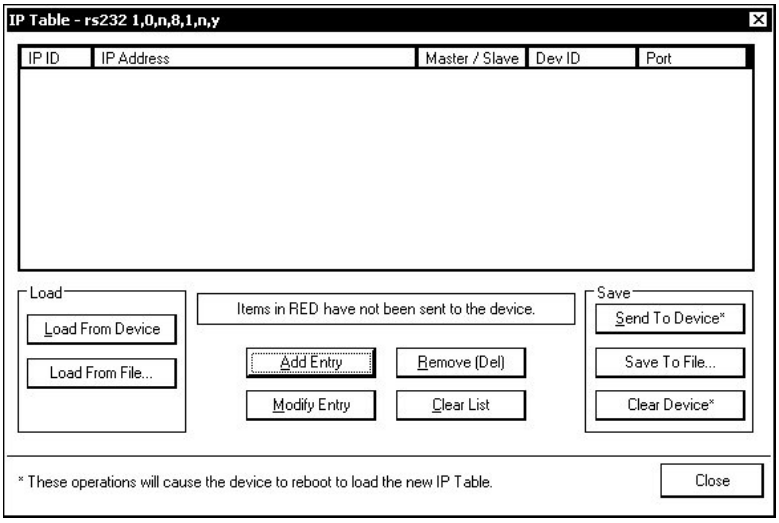
The IP Table

Before any programming can take place, the IP table in the control room touchpanel must be created.

To create an entry:

1. Use Crestron Toolbox to establish communication with the touchpanel and select **Functions | IP Table Setup…**. For instructions on establishing communication with a touchpanel, refer to the touchpanels Operations Guide.

   IP Table Setup Window



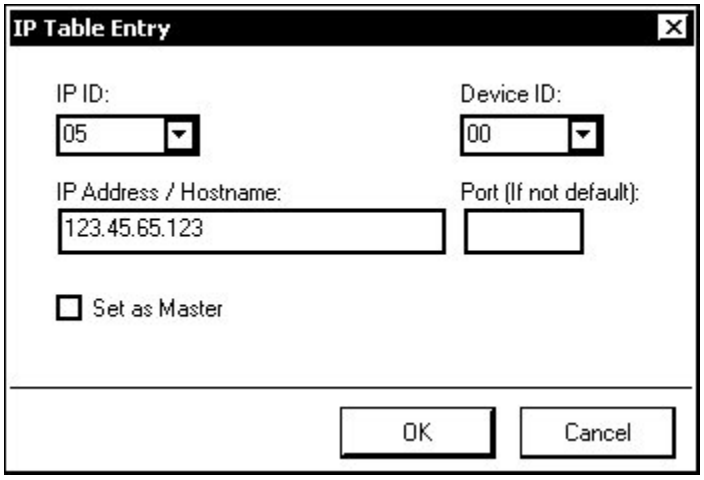
2. If the touchpanel already has an IP table that is to be modified, click **Load From Device** to retrieve the IP table that is stored on the touchpanel.
3. To add a new table entry, click **Add Entry**. Existing entries can be modified by selecting an entry from the list and clicking **Modify Entry**. Click **Remove (Del)** to remove a selected IP entry or click **Clear List** to remove all of the entries from the IP table.

To Add an IP Table Entry

a) Click **Add Entry** to add a new IP table entry for a control system. The "IP Table Entry" window will open.

b) As shown in the following diagram, select the hexadecimal IP ID of the control system from the *IP ID* list. The IP ID of the control system must match the IP ID that is specified for the control system in the SIMPL Windows program.

"IP Table Entry" Window



c) In the *IP Address/Hostname* field, enter the static IP address of the control system, or if the device is DHCP-enabled, its fully-qualified domain name.

d) After entering all of the information, click **OK** to add the control system to the IP table.

4. Repeat this procedure for all the control systems in the program.
5. Once all of the control systems have been listed, click **Send to Device*** to upload the IP table to the touchpanel.

Whenever an IP table is sent to the touchpanel, it will overwrite the previously loaded IP table and reboot the touchpanel.

For this example, the complete IP table in the control room touchpanel will contain:

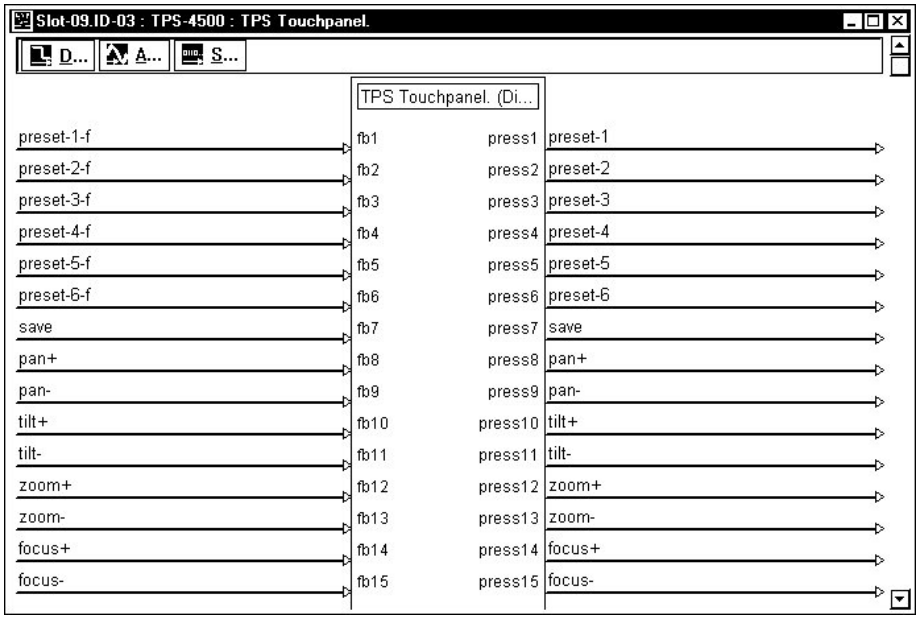
IP Table:	CIP_ID	DeviceID	IP Address/SiteName
	3	20	192.168.001.010
	3	21	192.168.001.011
	3	22	192.168.001.012
	6		192.168.001.015

Where Device ID 20 is classroom 1, Device ID 21 is classroom 2, and device ID 22 is classroom 3. Note that CIP ID 6 is the control system located in the control room. This control system does not require a Device ID.

The Classroom Program

Each classroom has the same program that uses join numbers 1 through 15 to operate the camera tilt-head. Refer to the following diagram for a view of joins 1 through 15.

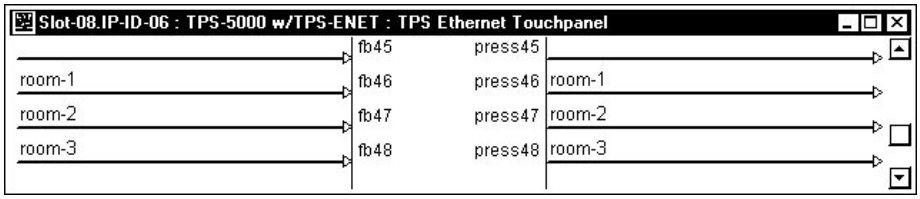
Room Camera Head Control Program



The Control Room Program

The touchpanel connected to the C2ENET-1 device in slot 8 is used to select the classroom to be controlled (press numbers 46, 47, and 48). Refer to the following diagram. The individual camera head presses and feedbacks for each classroom reside in the JNR program.

Room Selection Presses and Feedback on Control Room Touchpanel



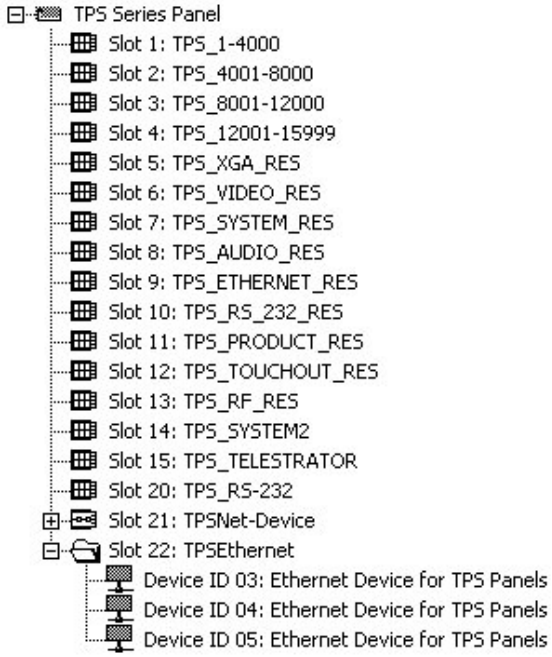
The JNR Program

The JNR program will be used to route touchpanel presses 1 through 15 to Device ID 20, 16 through 30 to Device ID 21, and 21 through 45 to Device ID 22.

System Configuration

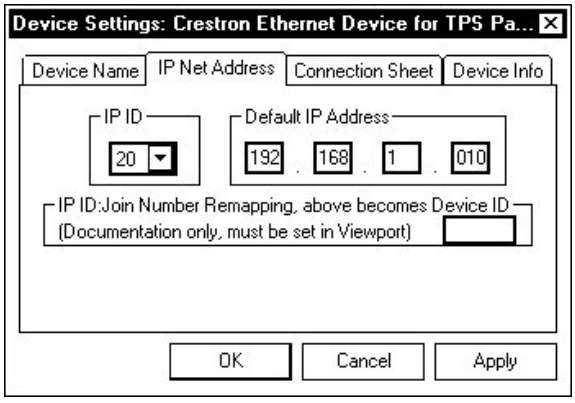
In Configuration Manager, add an Ethernet Device for TPS Panels for each classroom to slot 22 of the TPS Series Panel control system. Refer to the following diagram.

System View of TPS Series Panel Control Systems with Three Ethernet Devices



Double-click on an Ethernet Device to rename the device and set the Device ID.

Device Settings for Ethernet Device for TPS Panels



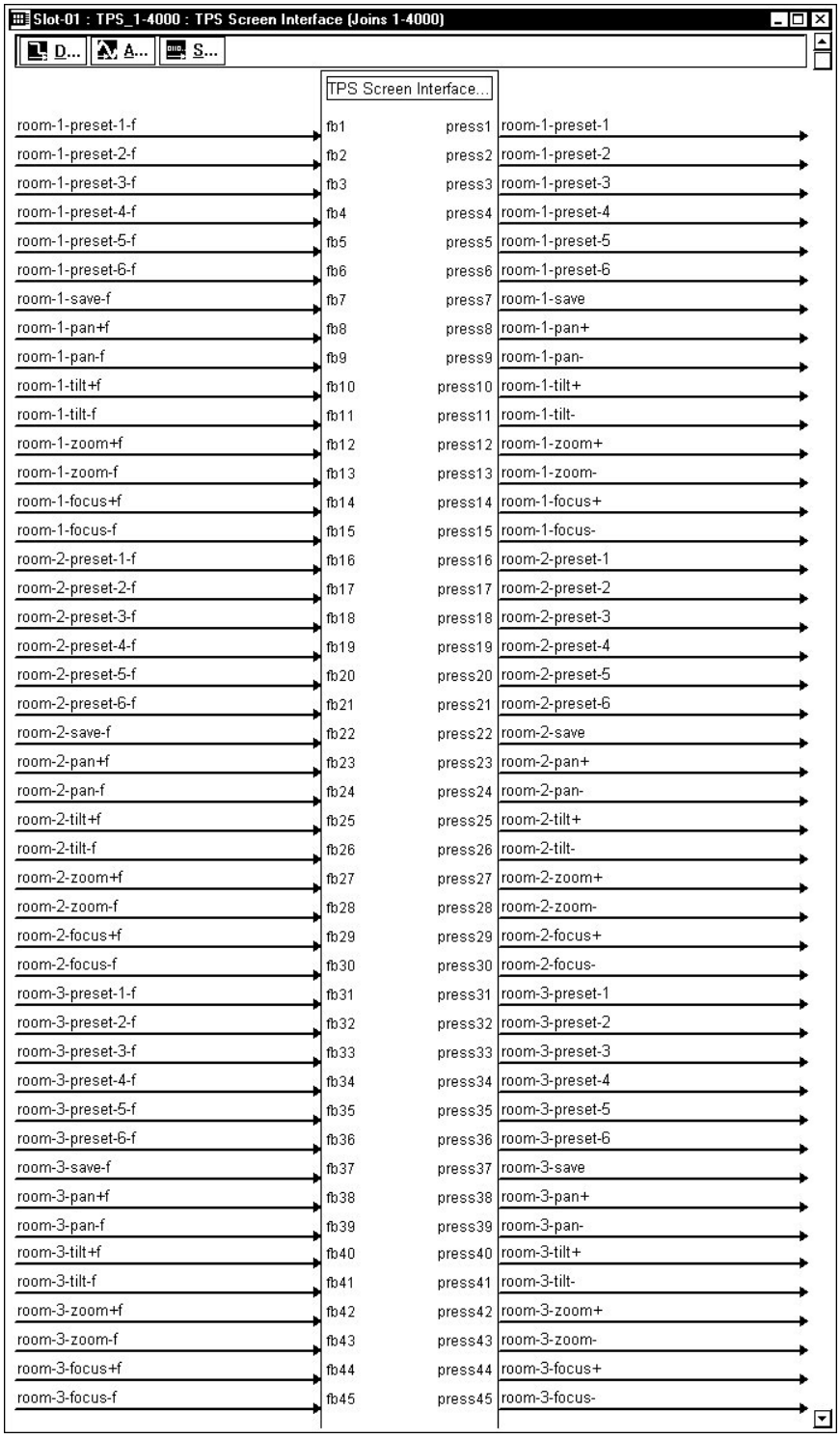
Select an IP ID and enter the IP address for the classroom control system that will be communicating with the touchpanel. Repeat this for each Ethernet device that will communicate with the control room touchpanel.

NOTE: When used for Join Number Remapping, IP ID becomes the Device ID. An IP ID may be entered in the above window for documentation purposes only. The IP ID **must** be set in the IP table from Crestron Toolbox.

Signals

The press and feedback signals for each of the classrooms are present on the symbol for Slot 1 of the TPS Series Panel Control System as shown in the following diagram. These signals are used to receive physical presses on the control room touchpanel and provide feedback when a button is pressed on the touchpanel.

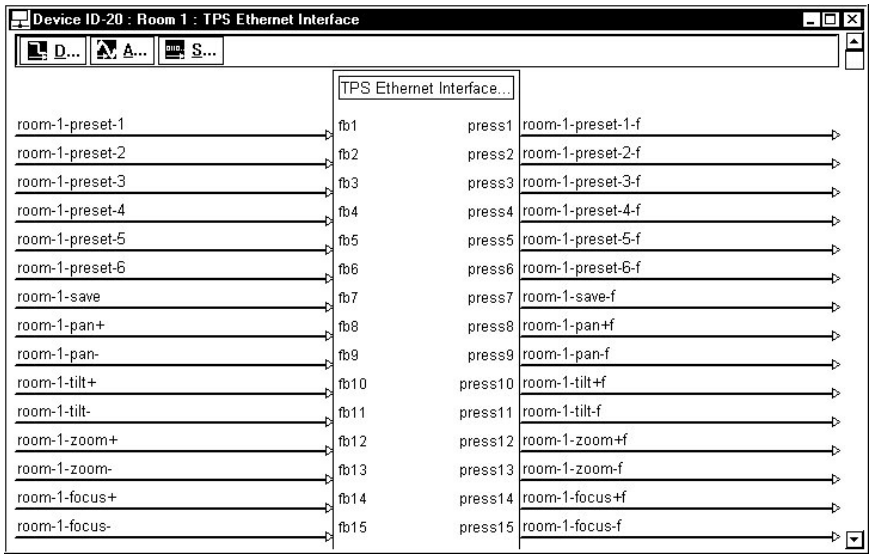
Slot 1 of TPS Series Panel Control System (Joins 1 through 4000)



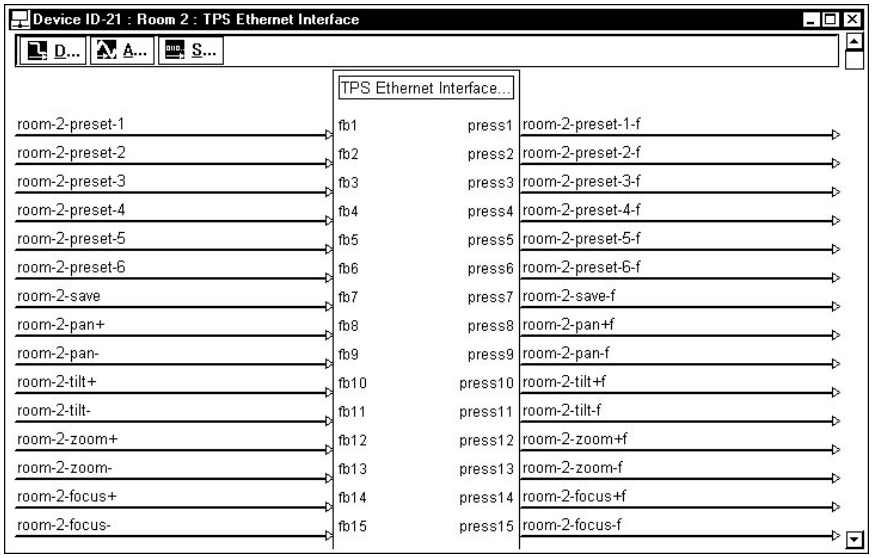
In the remap program, each of the touchpanel press and feedbacks must be routed to an Ethernet device. In this case, joins 1 through 15 are remapped to joins 1 through 15 on Device ID 20 (Ethernet device in classroom one), joins 16 through 30 are remapped to joins 1 through 15 on Device ID 21 (Ethernet device in classroom two), joins 31 through 45 are remapped to joins 1 through 15 on Device ID 22 (Ethernet

device in classroom three). The following diagrams show the signal joins for each classroom.

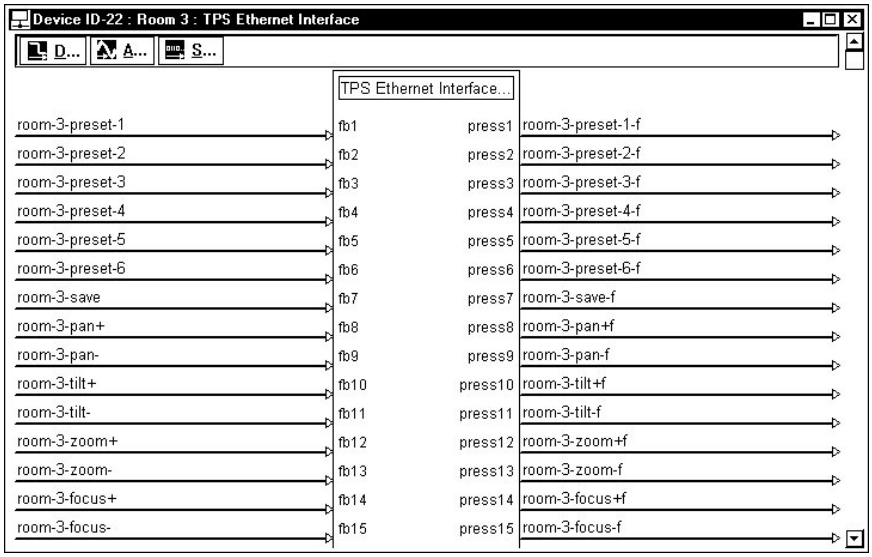
Symbol for Device ID 20 (Room 1)



Symbol for Device ID 21 (Room 2)



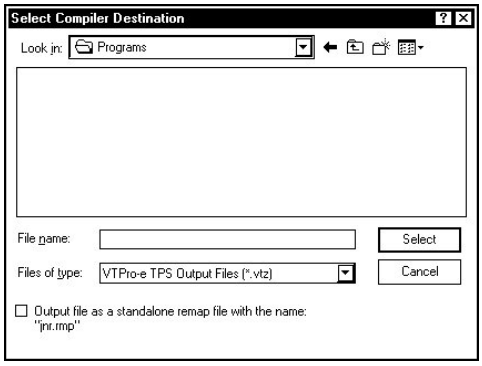
Symbol for Device ID 22 (Room 3)



Uploading

The remap program is generated during a SIMPL Windows compile and has a .rmp extension. The file must be combined with the VT Pro-e project (.vtz extension) and uploaded to the touchpanel. In SIMPL Windows select **Project | Convert/Compile** to open the "Select Compiler Destination" window, as shown after this paragraph, and initiate a compile.

"Select Compiler Destination" Window



The programmer has two options when combining the remap program with the VT Pro-e project. First, if the .vtz file is available, either enter its name in the *File name:* field or use the window to navigate to its location. Clicking on the **Select** button places the .rmp into the selected .vtz file. The other option applies when the .vtz file is not readily available (i.e., saved on another PC). If faced with this situation, the remap file can be saved as a standalone file, which can be inserted into the .vtz at the programmer's convenience. Simply check the box at the bottom of the "Select Compiler Destination" window and click on the **Select** button. SIMPL Windows completes the compilation and outputs the .rmp file to the folder shown in the *Look in:* field. When it comes time to combine the two files select **File | Insert Remap File** from an open TPS project in VT Pro-e. Upload the project (with embedded .rmp) to the Isys touchpanel using VT Pro-e (select **File | Upload Project**) or Crestron Toolbox's "System Info" window (select **Functions | Project**).

Index

E

F

G

H

I

V

W

X

Software License Agreement

This License Agreement ("Agreement") is a legal contract between you (either an individual or a single business entity) and Crestron Electronics, Inc. ("Crestron") for software referenced in this guide, which includes computer software and, as applicable, associated media, printed materials, and "online" or electronic documentation (the "Software").

BY INSTALLING, COPYING, OR OTHERWISE USING THE SOFTWARE, YOU REPRESENT THAT YOU ARE AN AUTHORIZED DEALER OF CRESTRON PRODUCTS OR A CRESTRON AUTHORIZED INDEPENDENT PROGRAMMER AND YOU AGREE TO BE BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, DO NOT INSTALL OR USE THE SOFTWARE.

IF YOU HAVE PAID A FEE FOR THIS LICENSE AND DO NOT ACCEPT THE TERMS OF THIS AGREEMENT, CRESTRON WILL REFUND THE FEE TO YOU PROVIDED YOU (1) CLICK THE DO NOT ACCEPT BUTTON, (2) DO NOT INSTALL THE SOFTWARE AND (3) RETURN ALL SOFTWARE, MEDIA AND OTHER DOCUMENTATION AND MATERIALS PROVIDED WITH THE SOFTWARE TO CRESTRON AT: CRESTRON ELECTRONICS, INC., 15 VOLVO DRIVE, ROCKLEIGH, NEW JERSEY 07647, WITHIN 30 DAYS OF PAYMENT.

LICENSE TERMS

Crestron hereby grants You and You accept a nonexclusive, nontransferable license to use the Software (a) in machine readable object code together with the related explanatory written materials provided by Creston (b) on a central processing unit ("CPU") owned or leased or otherwise controlled exclusively by You, and (c) only as authorized in this Agreement and the related explanatory files and written materials provided by Crestron.

If this software requires payment for a license, you may make one backup copy of the Software, provided Yo*u*r backup copy is not installed or used on any CPU. You may not transfer the rights of this Agreement to a backup copy unless the installed copy of the Software is destroyed or otherwise inoperable and You transfer all rights in the Software.

You may not transfer the license granted pursuant to this Agreement or assign this Agreement without the express written consent of Crestron.

If this software requires payment for a license, the total number of CPU's on which all versions of the Software are installed may not exceed one per license fee (1) and no concurrent, server or network use of the Software (including any permitted back-up copies) is permitted, including but not limited to using the Software (a) either directly or through commands, data or instructions from or to another computer (b) for local, campus or wide area network, internet or web hosting services; or (c) pursuant to any rental, sharing or "service bureau" arrangement.

The Software is designed as a software development and customization tool. As such Crestron cannot and does not guarantee any results of use of the Software or that the Software will operate error free and You acknowledge that any development that You perform using the Software or Host Application is done entirely at Your own risk.

The Software is licensed and not sold. Crestron retains ownership of the Software and all copies of the Software and reserves all rights not expressly granted in writing.

OTHER LIMITATIONS

You must be an Authorized Dealer of Crestron products or a Crestron Authorized Independent Programmer to install or use the Software. If Your status as a Crestron Authorized Dealer or Crestron Authorized Independent Programmer is terminated, Your license is also terminated.

You may not rent, lease, lend, sublicense, distribute or otherwise transfer or assign any interest in or to the Software.

You may not reverse engineer, decompile, or disassemble the Software.

You agree that the Software will not be shipped, transferred or exported into any country or used in any manner prohibited by the United States Export Administration Act or any other export laws, restrictions or regulations ("Export Laws"). By downloading or installing the Software You (a) are certifying that You are not a national of Cuba, Iran, Iraq, Libya, North Korea, Sudan, or Syria or any country to which the United States embargoes goods (b) are certifying that You are not otherwise prohibited from receiving the Software and (c) You agree to comply with the Export Laws.

If any part of this Agreement is found void and unenforceable, it will not affect the validity of the balance of the Agreement, which shall remain valid and enforceable according to its terms. This Agreement may only be modified by a writing signed by an authorized officer of Crestron. Updates may be licensed to You by Crestron with additional or different terms. This is the entire agreement between Crestron and You relating to the Software and it supersedes any prior representations, discussions, undertakings, communications or advertising relating to the Software. The failure of either party to enforce any right or take any action in the event of a breach hereunder shall constitute a waiver unless expressly acknowledged and set forth in writing by the party alleged to have provided such waiver.

If You are a business or organization, You agree that upon request from Crestron or its authorized agent, You will within thirty (30) days fully document and certify that use of any and all Software at the time of the request is in conformity with Your valid licenses from Crestron of its authorized agent.

Without prejudice to any other rights, Crestron may terminate this Agreement immediately upon notice if you fail to comply with the terms and conditions of this Agreement. In such event, you must destroy all copies of the Software and all of its component parts.

PROPRIETARY RIGHTS

Copyright. All title and copyrights in and to the Software (including, without limitation, any images, photographs, animations, video, audio, music, text, and "applets" incorporated into the Software), the accompanying media and printed materials, and any copies of the Software are owned by Crestron or its suppliers. The Software is protected by copyright laws and international treaty provisions. Therefore, you must treat the Software like any other copyrighted material, subject to the provisions of this Agreement.

Submissions. Should you decide to transmit to Crestron's website by any means or by any media any materials or other information (including, without limitation, ideas, concepts or techniques for new or improved services and products), whether as information, feedback, data, questions, comments, suggestions or the like, you agree such submissions are unrestricted and shall be deemed non-confidential and you automatically grant Crestron and its assigns a non-exclusive, royalty-tree, worldwide, perpetual, irrevocable license, with the right to sublicense, to use, copy, transmit, distribute, create derivative works of, display and perform the same.

Trademarks. CRESTRON and the Swirl Logo are registered trademarks of Crestron Electronics, Inc. You shall not remove or conceal any trademark or proprietary notice of Crestron from the Software including any back-up copy.

GOVERNING LAW

This Agreement shall be governed by the laws of the State of New Jersey, without regard to conflicts of laws principles. Any disputes between the parties to the Agreement shall be brought in the state courts in Bergen County, New Jersey or the federal courts located in the District of New Jersey. The United Nations Convention on Contracts for the International Sale of Goods, shall not apply to this Agreement.

CRESTRON LIMITED WARRANTY

CRESTRON warrants that: (a) the Software will perform substantially in accordance with the published specifications for a period of ninety (90) days from the date of receipt, and (b) that any hardware accompanying the Software will be subject to its own limited warranty as stated in its accompanying written material. Crestron shall, at its option, repair or replace or refund the license fee for any Software found defective by Crestron if notified by you within the warranty period. The foregoing remedy shall be your exclusive remedy for any claim or loss arising from the Software.

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

Notwithstanding any agreement to maintain or correct errors or defects Crestron, shall have no obligation to service or correct any error or defect that is not reproducible by Crestron or is deemed in Crestron's reasonable discretion to have resulted from (1) accident; unusual stress; neglect; misuse; failure of electric power, operation of the Software with other media not meeting or not maintained in accordance with the manufacturer's specifications; or causes other than ordinary use; (2) improper installation by anyone other than Crestron or its authorized agents of the Software that deviates from any operating procedures established by Crestron in the material and files provided to You by Crestron or its authorized agent; (3) use of the Software on unauthorized hardware; or (4) modification of, alteration of, or additions to the Software undertaken by persons other than Crestron or Crestron's authorized agents.

ANY LIABILITY OF CRESTRON FOR A DEFECTIVE COPY OF THE SOFTWARE WILL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF YOUR COPY OF THE SOFTWARE WITH ANOTHER COPY OR REFUND OF THE INITIAL LICENSE FEE CRESTRON RECEIVED FROM YOU FOR THE DEFECTIVE COPY OF THE PRODUCT. THIS WARRANTY SHALL BE THE SOLE AND EXCLUSIVE REMEDY TO YOU. IN NO EVENT SHALL CRESTRON BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND (PROPERTY OR ECONOMIC DAMAGES INCLUSIVE), EVEN IF A CRESTRON REPRESENTATIVE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR OF ANY CLAIM BY ANY THIRD PARTY. CRESTRON MAKES NO WARRANTIES, EXPRESS OR IMPLIED, AS TO TITLE OR INFRINGEMENT OF THIRD-PARTY RIGHTS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTIES, NOR AUTHORIZES ANY OTHER PARTY TO OFFER ANY WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY FOR THIS PRODUCT. THIS WARRANTY STATEMENT SUPERSEDES ALL PREVIOUS WARRANTIES.

Crestron Electronics, Inc.
15 Volvo Drive Rockleigh, NJ 07647
Tel: 888.CRESTRON
Fax: 201.767.7576
www.crestron.com

Reference Guide – DOC. 6256A
(2011624)
03.06