Crestron **TPMC-9**

9" Tilt Touch Screen

Operations Guide

CRESTRON®

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

Regulatory Compliance

As of the date of manufacture, the TPMC-9 has been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling.

Federal Communications Commission (FCC) Compliance Statement

CAUTION: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Industry Canada (IC) Compliance Statement

CAN ICES-3(B)/NMB-3(B)

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9” Tilt Touch Screen: TPMC-9

Introduction

The TPMC-9 Tilt Touch Screen from Crestron® delivers high end style and performance in a striking tabletop design. Sleek and compact, the TPMC-9 features a generous 9” (~229 mm) widescreen display with advanced Core 3 UI™ touch screen graphics, IP intercom and high performance H.264 video.

Features and Functions

- Sleek, contoured design for tabletop use
- Elegant smooth black or white or textured black finishes
- Generous 9” (~229 mm) widescreen color touch screen
- 16-bit color graphics powered by Core 3™
- 800 x 480 WVGA display resolution
- Native H.264 streaming video for viewing Web cameras and HD sources
- Wired composite video input
- Crestron IP intercom
- Customizable audio feedback
- Built-in microphone and speakers
- Crestron Home® CAT5 video connectivity
- High speed Ethernet and Cresnet® communications
- Built-in USB port for direct program upload
- Up to 45 degree tilt adjustment*
- Low profile single wire connection

* The tilt angle must be set to a fixed position for normal use. Adjustment of the tilt angle requires a 5/32” hex wrench (included).

Advanced Touch Screen Control

A Crestron touch screen offers an ideal user interface for controlling all the technology in a home, boardroom, classroom, courtroom or command center. Touch screens do away with piles of remote controls, cluttered wall switches and cryptic computer screens, simplifying and enhancing the technology. For controlling home theater, multimedia presentation, audio, video, lighting, HVAC and other systems, Crestron touch screens are fully customizable with easy to use controls and icons, true feedback and real time status display, full-motion video windows and advanced navigation of digital media servers, tuners and other devices.

Powered by Core 3

Crestron touch screens have always offered the ultimate user experience. With Core 3 UI, they also deliver the ultimate value, enabling the creation of dynamically rich user interfaces with incredible efficiency and unparalleled functionality. User Core 3 UI, programmers can swiftly integrate fluid gesture-driven controls, animated feedback, metadata, embedded apps and full-motion video for a deeply engaging and ultra-intuitive touch screen experience.

Some Core 3 UI enhancements:

- Cool looking graphical buttons, sliders, knobs and gauges are intuitive and fun to use.
- Kinetic effects enhance the feeling of realism with lists and toolbars that scroll with momentum at the flick of a fingertip.
- Drag and drop objects snap into place offering an easy way to assign assets to rooms.
- Desktop widgets personalize the touch screen with animated clocks, calendars, weather, news and other information.
- Customizable themes allow a completely different look and feel for every user, event or season.
- Fully developed SmartObjects™ enable sophisticated control over complex devices with minimal programming.
- Smart Sizing™ scales objects perfectly and instantly for faster GUI development, even across different sized touch screens.

Integrated Video

High performance streaming video capability makes it possible to view security cameras and other video sources over the network right on the touch screen. Native support for H.264 and MJPEG formats allows the TPMC-9 to display live video images from Web cameras and servers such as the Crestron CEN-NVS200 Network Video Streamer (sold separately). A wired video input is also provided to allow viewing of a composite video source. Video images can be displayed full frame or in fully scalable windows anywhere on the touch screen.

IP Intercom

Equipped with integrated speakers and microphone, the TPMC-9 allows touch screen to touch screen voice communication and room monitoring via IP over Ethernet, eliminating the need for any special audio wiring, switchers or programming.

Audio Feedback

Customized audio files can be loaded on the TPMC-9 to add another dimension to the touch screen graphics using personalized sounds, button feedback and voice prompts.

High Speed Connectivity

Both Cresnet® and Ethernet are standard on the TPMC-9, providing for easy network integration and seamless communications with Crestron control systems and other network devices.

Versatile Install Options

With its integral tilting base, the TPMC-9 provides a very clean and stylish touch screen solution for small countertops, desks, podiums and bedside tables. The screen tilt is installer adjustable at up to a 45 degree angle for optimal viewing and operation.[1]

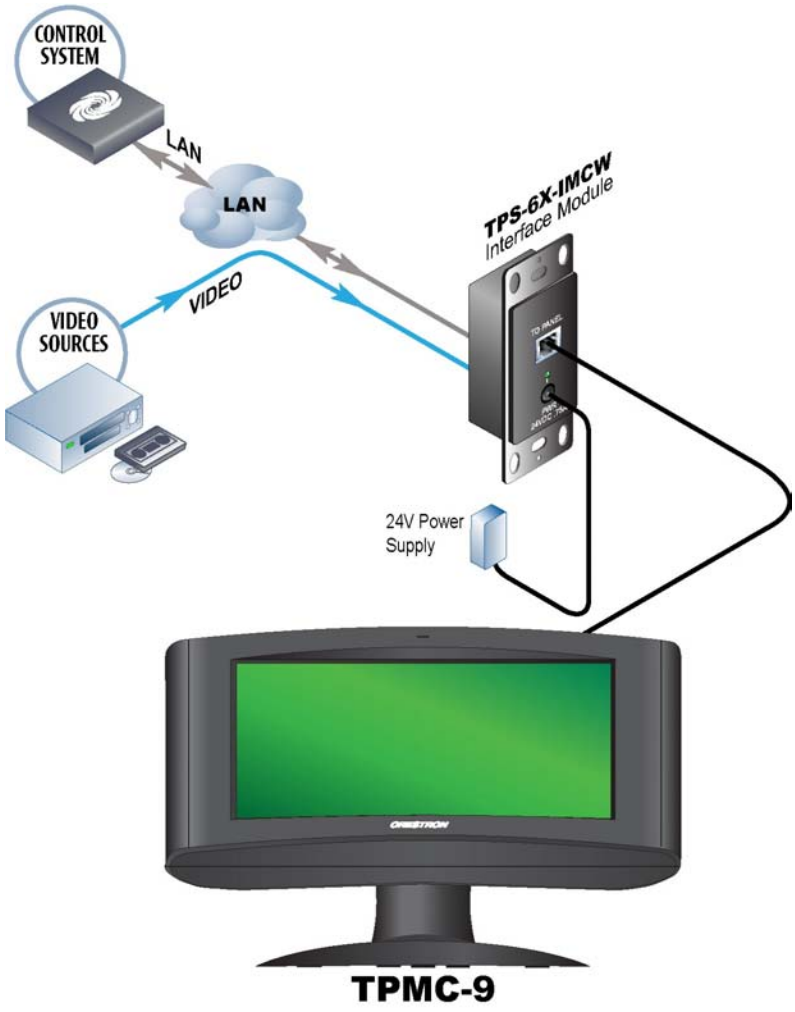
A single cable exits the rear of the base. The 10 foot (3 meter) cable extends to a separate interface module (TPS-6X-IMCW[2]), which may be discreetly mounted on a flat surface or in a flush wall box, providing full connectivity for power, communications and video signals. Control system communication is afforded through Cresnet and Ethernet ports. Wired video connectivity is handled through a choice of balanced or unbalanced composite inputs, allowing compatibility with both conventional coaxial and Crestron Home® Balanced AV distribution systems.

1. The tilt angle must be set to a fixed position for normal use. Adjustment of the tilt angle requires a 5/32” hex wrench (included).
2. Item included, refer to product specifications for additional information.

Applications

The following diagram shows a TPMC-9 in a typical application.

TPMC-9 in a Typical Application



Specifications

Specifications for the TPMC-9 are listed in the following table.

TPMC-9 Specifications

SPECIFICATION	DETAILS
Touch Screen Display	
Display Type	TFT active matrix color LCD
Size	9 inch (229 mm) diagonal
Aspect Ratio	15:9 WVGA
Resolution	800 x 480 pixels
Brightness	350 nits
Contrast	700:1
Color Depth	24-bit, 16.7 M colors
Illumination	Edgelit fluorescent
Viewing Angle	± 88º horizontal, ± 88º vertical
Touch Screen	Resistive membrane
Memory	
DDR SDRAM	256 MB
Flash	2 GB
Maximum Project Size	60 MB
Graphic Engine	Core 3 UI, 16-bit supports pre-Core 3 UI projects
Communications	
Ethernet	10/100, auto-switching, auto-negotiating, auto-discovery, full/half duplex, DHCP, for control and console
Cresnet	Cresnet slave mode for control and console
USB	USB client for console
Video	
Analog Input Signal Types	Composite
Analog Formats	NTSC 480i or PAL 576i
Analog Color Depth	24-bit, 16.7 M colors
Streaming Formats	H.264 (MPEG-4 part 10 AVC, MJPEG
Audio	
Features	Built-in microphone and speakers, Crestron IP Intercom
Audio Feedback	MP3 (or WAV via non-Core 3 UI) only
Power Requirements	
Power Pack	0.75 amps @ 24 Vdc; 100 – 240 Vac, 50/60 Hz power pack included
Cresnet Power Usage	18 watts (0.75 amps @ 24 Vdc) including TPS-6X-IMCW interface module[1, 2]
Default IP ID[3]	03
Minimum 2-Series Control System Update File[4, 5]	Version 3.155.1240 or later

(Continued on following page)

TPMC-9 Specifications (Continued)

SPECIFICATION	DETAILS
Environmental	
Temperature	32º to 95º F (0º to 35º C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	61 Btu/h
Enclosure	Plastic, 0° to 45° adjustable tilt mechanism[6], low profile base, integral 10 foot (3 meter) cable assembly
Dimensions	
Height	7.09 in (180 mm) maximum 6.91 in (176 mm) minimum
Width	10.72 in (273 mm)
Depth	7.02 in (179 mm), 6.48 in (165 mm) without grommet
Weight	4.1 lbs (1.9 kg)
Available Models	
TPMC-9-B	9” Tilt Touch Screen, Black Smooth
TPMC-9-B-T	9” Tilt Touch Screen, Black Textured
TPMC-9-W-S	9” Tilt Touch Screen, White Smooth
Included Accessories	
Power Pack	24 Volt Power Pack, Universal
TPS-6X-IMCW	Interface Module
Available Accessories	
CEN-NVS200	Network Video Streamer
CRESCAT®	Crestron Home® CAT5 AV Cable
CRESNET	Cresnet Control Cable
VMK-WIN	Touchpoint® Virtual Mouse & Keyboard Software for Windows®

1. Item included; refer to product specifications for additional information.
2. May be powered by power pack or Cresnet network power but not both. All power connections are made via the included TPS-6X-IMCW interface module.
3. Refer to “Identity Code” on page 10 for details.
4. The latest software versions can be obtained from the Crestron Web site. Refer to the NOTE following these footnotes.
5. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems.
6. The tilt angle must be set to a fixed position for normal use. Adjustment of the tilt angle requires a 5/32” hex wrench (included).

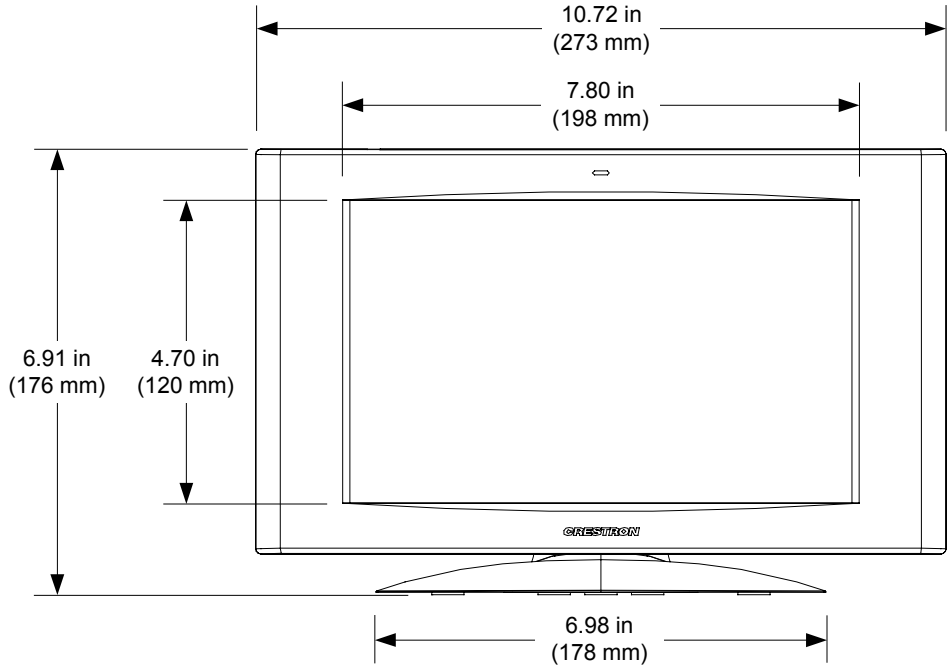
NOTE: Crestron software and any files on the Web site are for authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIPs) only. New users must register to obtain access to certain areas of the site (including the FTP site).

Physical Description

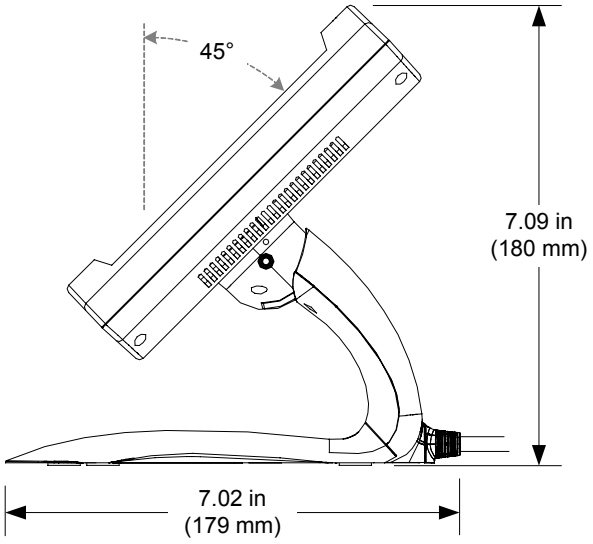
This section provides information on the connections, controls and indicators available on the TPMC-9.

TPMC-9 Physical View

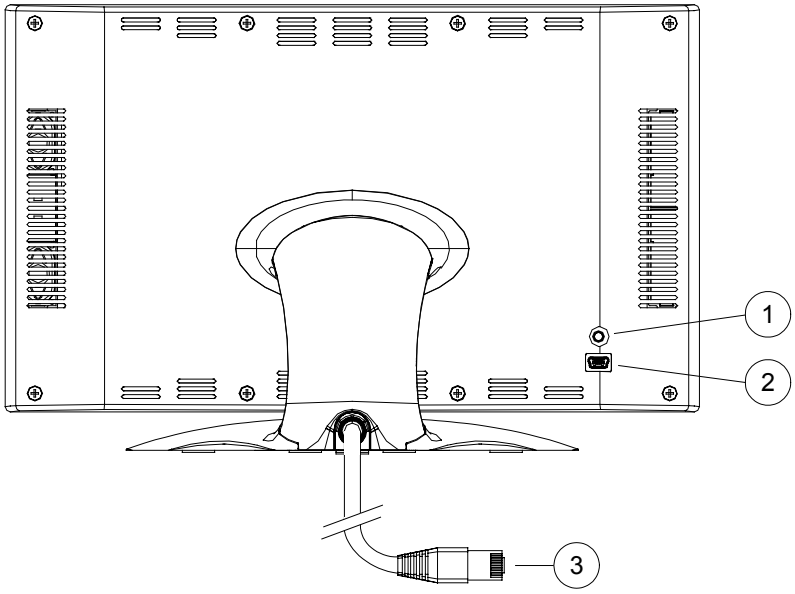
TPMC-9 Overall Dimensions (Front View)



TPMC-9 Overall Dimensions (Side View)



TPMC-9 Overall Dimensions (Rear View)



Connectors, Controls & Indicators

#	CONNECTORS, CONTROLS & INDICATORS	DESCRIPTION
1	Reset Button	(1) Miniature push button for hardware reset, on rear
2	USB	(1) Mini-B USB console port, on rear; Mini-B to A USB cable included
3	To Module	Integral 10 foot (3 meter) cable with 10-pin RJ-50 male connector; Connects to included TPS-6X-IMCW interface module; Refer to TPS-6X-IMCW interface module specifications for other connectors and additional information

Setup

Network Wiring

When wiring the Cresnet network, consider the following:

- Use Crestron Certified Wire.
- Use Crestron power supplies for Crestron equipment.
- Provide sufficient power to the system.

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

For networks with 20 or more devices, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

For more details, refer to “Check Network Wiring” which starts on page 36.

The TPMC-9 can also use high-speed Ethernet for communications between the device and a control system, computer, media server and other IP-based devices.

For information on connecting Ethernet devices in a Crestron system, refer to the latest version of the Crestron e-Control® Reference Guide (Doc. 6052), which is available from the Crestron Web site (www.crestron.com/manuals).

Identity Code

Net ID

The Net ID of the TPMC-9 has been factory set to **03**. The Net IDs of multiple TPMC-9 devices in the same system must be unique. The Net ID is set using the internal setup menu (refer to “Cresnet” on page 18). Net ID may also be set from a personal computer (PC) via Crestron Toolbox™ (refer to “Establishing Communication” which starts on page 32).

When setting the Net ID, consider the following:

- The Net ID of each unit must match an ID code specified in the SIMPL Windows program.
- Each network device must have a unique Net ID.

For more details, refer to the Crestron Toolbox help file.

IP ID

The IP ID is set within the TPMC-9’s IP table using the internal setup menu (refer to “IP Table” which starts on page 14). IP ID may also be set from a PC via Crestron Toolbox. For information on setting an IP table, refer to the Crestron Toolbox help file. The IP IDs of multiple TPMC-9 devices in the same system must be unique.

When setting the IP ID, consider the following:

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

Configuring the Touch Screen

The TPMC-9 is configured from the setup menu.

NOTE: The only connection required to configure the touch screen is power. Refer to “Hardware Hookup” which starts on page 22 for details.

NOTE: The TPMC-9 can take up to 45 seconds to boot to a display after initial power up.

NOTE: If no project has been loaded or if an invalid project has been loaded, the touch screen displays an error message and defaults to the setup menu screen.

The setup screens allow basic configuration procedures prior to regular operation of the touch screen. To enter the setup screens, touch the panel while applying power to the unit. The setup screens can also be entered by touching the upper left corner, lower left corner, upper right corner and lower right corner of the panel twice in sequence (upper left, lower left, upper right, lower right, upper left, lower left, upper right, lower right). This sequence must be performed within five seconds and touches must be all the way in the corners.

The main “Setup” menu opens, as shown in the illustration that follows. The functions provided by each button are detailed in subsequent paragraphs.

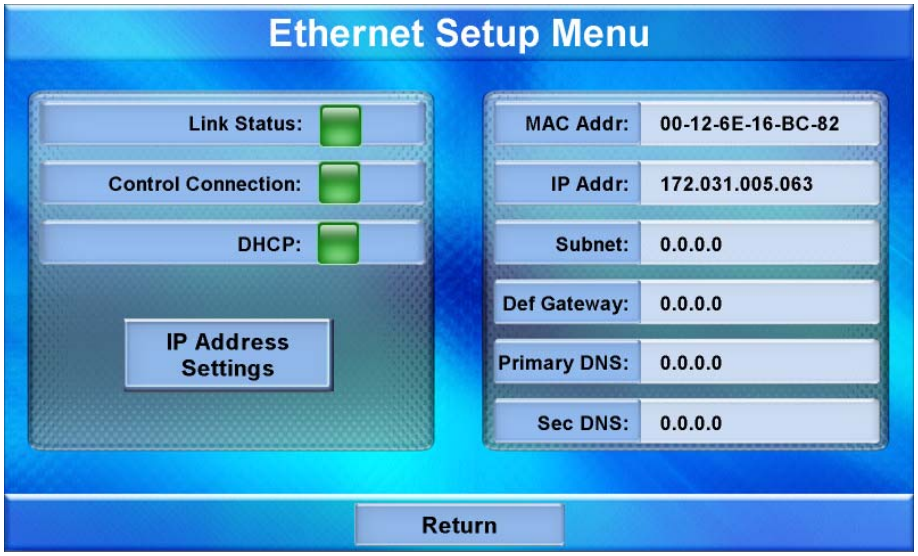
TPMC-9 “Setup” Menu

The “Setup” menu provides access to all basic functions and parameters. There are buttons for **Ethernet**, **IP Table**, **Video**, **Audio**, **Cresnet**, **Diagnostics** and **About**. There are also buttons to increase and decrease *Screen Brightness* and *Standby Timeout* as well as a button to enable/disable system messages and a **Save & Reboot** button to save settings and reboot the touch screen.

Ethernet

Touch **Ethernet** to enter the “Ethernet Setup Menu”, shown in the illustration below.

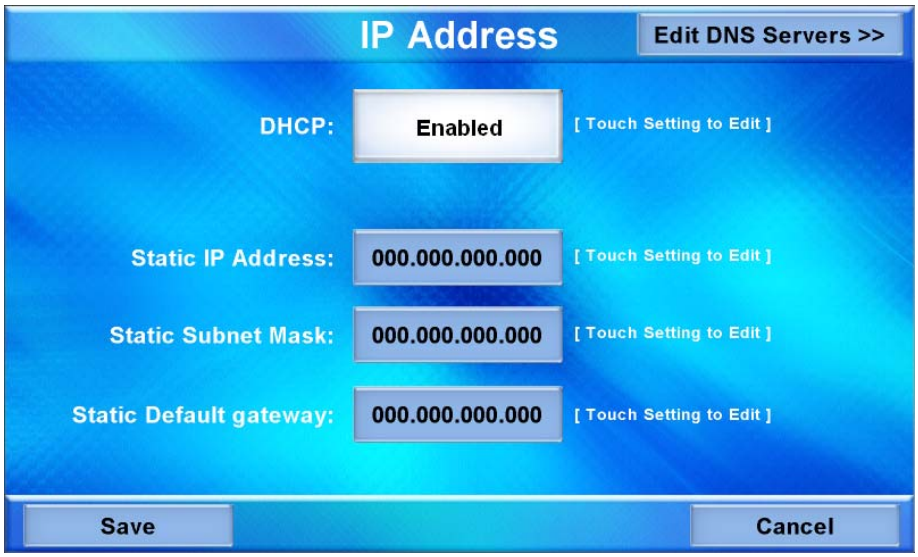
“Ethernet Setup Menu”



The “Ethernet Setup Menu” displays information about the *Link Status*, *Control Connection*, *DHCP*, MAC address, IP address, subnet, default gateway, primary DNS and secondary DNS. It also has an **IP Address Settings** button used to access the submenus for setting up IP address and DNS servers.

Touch **IP Address Settings** to enter the “IP Address” screen, shown in the illustration below. Touch **Return** to go back to the main “Setup” menu.

“IP Address” Screen



DHCP is enabled by default. To enter a *Static IP Address*, *Static Subnet Mask* or *Static Default gateway*, first touch the *DHCP* **Enabled** button. The button text changes to **Disabled**. Then touch the appropriate button for the address to be entered (or changed). A numeric keypad opens, as shown in the illustration that follows.

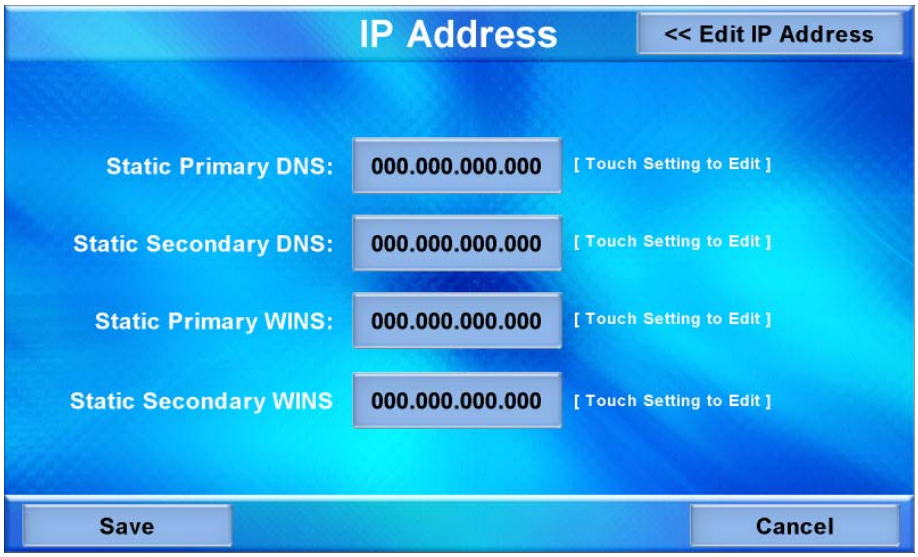
Numeric Keypad

Touch **CLEAR** to remove any previous entry. Then enter the address required. Touch **OK** to accept the entry or **CANCEL** to cancel the entry. This hides the numeric keypad and returns the display to the “IP Address” screen.

On the “IP Address” screen, touch **Save** to keep the change or **Cancel** to cancel the change and return to the “Ethernet Setup Menu”.

To enter (or change) the *Static Primary DNS*, *Static Secondary DNS*, *Static Primary WINS* or *Static Secondary WINS*, touch **Edit DNS Servers >>** on the “IP Address” screen. The “IP Address” screen changes to show these addresses, as shown in the illustration below.

“IP Address” Screen (Showing DNS and WINS Servers)



Touch the appropriate button for the address to be entered (or changed). The numeric keypad opens.

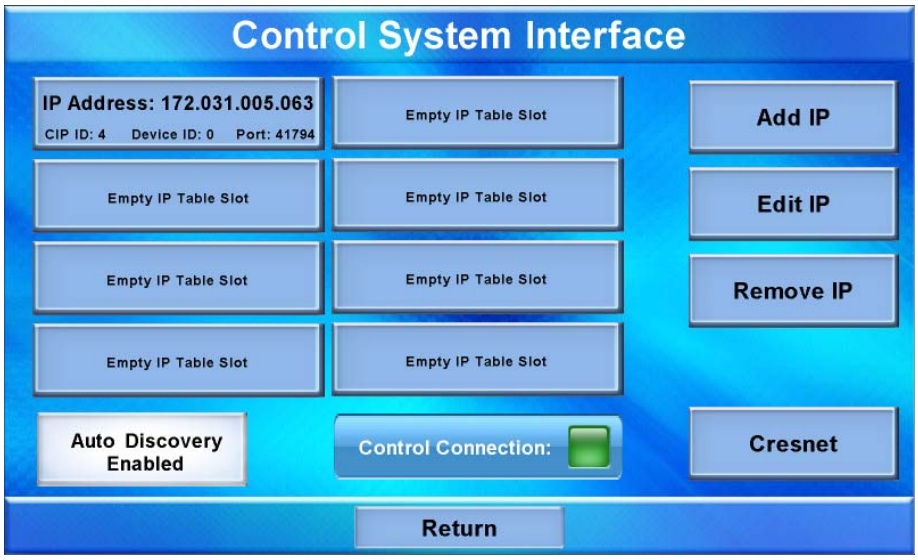
Touch **CLEAR** to remove any previous entry. Then enter the address required. Touch **OK** to accept the entry or **CANCEL** to cancel the entry. This hides the numeric keypad and returns the display to the “IP Address” screen.

On the “IP Address” screen, touch **Save** to keep the change or **Cancel** to cancel the change and return to the “Ethernet Setup Menu”. Touch **<< Edit IP Address** to return to the previous “IP Address” screen.

IP Table

From the main “Setup” menu, touch **IP Table** to enter the “Control System Interface” menu, shown in the illustration below.

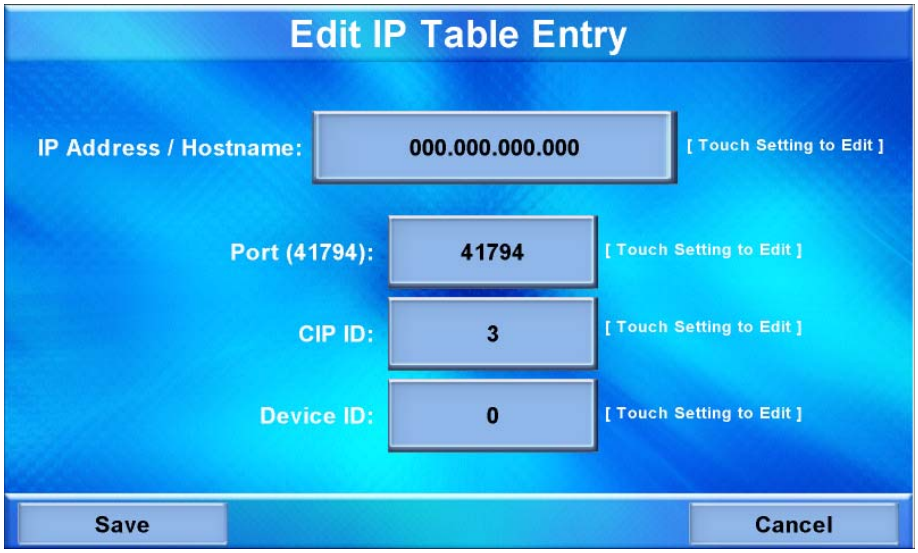
“Control System Interface” Menu



The “Control System Interface” menu contains buttons for eight IP Table slots as well as **Add IP**, **Edit IP** and **Remove IP** buttons to facilitate editing entries. Touch the **Auto Discovery Enabled** button to toggle to **Auto Discover Disabled**. A *Control Connection* indicator lights in green to show a control system connection. Touch **Cresnet** to enter a *Cresnet ID* and to enable or disable Cresnet. (Refer to “Cresnet” on page 18 for details.)

To add an IP entry to a blank slot, first touch one of the **Empty IP Table Slot** buttons, then touch **Add IP**. The “Edit IP Table Entry” screen is displayed, as shown below.

“Edit IP Table Entry” Screen



Touch the *IP Address / Hostname* button. The on-screen keyboard opens, as shown in the illustration below.

On-Screen Keyboard

Touch **CLEAR** to remove any previous entry. Then enter the address required. Touch **OK** to accept the entry or **CANCEL** to cancel the entry. This hides the on-screen keyboard and returns the display to the “Edit IP Table Entry” screen.

On the “Edit IP Table Entry” screen, touch **Save** to keep the change or **Cancel** to cancel the change and return to the “Control System Interface” menu.

To edit the port, *CIP ID* or *Device ID*, touch the appropriate button. Touching the *Port (41794)* button opens the numeric keypad. Touching the *CIP ID* or *Device ID* buttons opens a hex keypad, shown in the illustration below.

Hex Keypad

Touch **CLEAR** to remove any previous entry. Then enter the ID required. Touch **OK** to accept the entry or **CANCEL** to cancel the entry. This hides the hex keypad and returns the display to the “Edit IP Table Entry” screen.

From the “Control System Interface” menu, to edit or remove an IP entry, first touch the appropriate button containing the entry. Then touch **Edit IP** or **Remove IP** as appropriate. Editing an entry displays the “Edit IP Table Entry” screen (refer to illustration on page 14). Removing an entry displays a message saying *Please*

Confirm IP Table Entry Removal By Pressing the OK Button, as shown in the illustration below.

Confirm IP Table Entry Removal Screen

Touch **OK** to confirm the removal or touch **CANCEL** to cancel the removal. The display returns to the “Control System Interface” menu (refer to illustration on page 14).

On the “Control System Interface” menu, touch **Return** to go back to the main “Setup” menu.

Video

From the main “Setup” menu, touch **Video** to enter the “Video Setup” screen, shown in the illustration below.

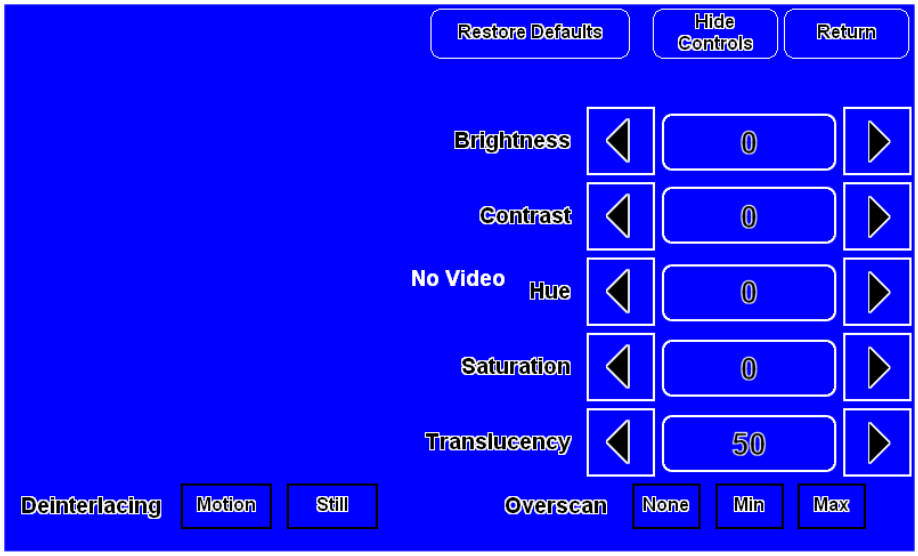
“Video Setup” Screen

The “Video Setup” screen contains buttons for adjustment of *Brightness*, *Contrast*, *Hue*, *Saturation*, *Translucency*, type of *Deinterlacing* and amount of *Overscan*.

There is also a **Restore Defaults** button to return to factory settings and a window to display video.

Touch the video window for a full screen video display, as shown in the illustration below.

Full Screen Video Display



Touch **Hide Controls** to remove the controls. The button text changes to **Show Controls**. Touch **Return** to go back to the "Video Setup" screen. From the "Video Setup" screen, touch **Return** to go back to the main "Setup" menu.

Audio

From the main "Setup" menu, touch **Audio** to enter the "Audio Setup" screen, shown in the illustration below.

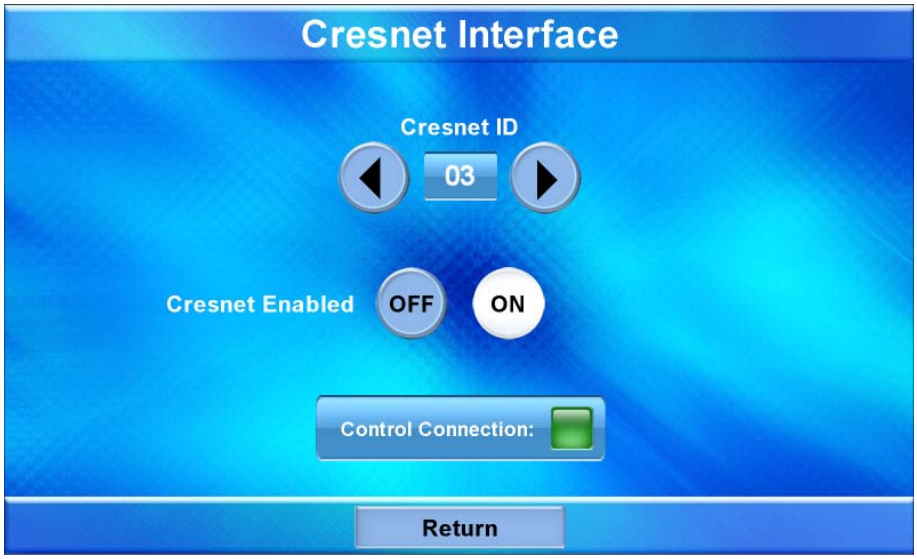
"Audio Setup" Screen

The “Audio Setup” screen contains buttons for adjustment or muting of *Master Volume*, *Wave Volume*, *KeyClick Volume* and *Intercom Volume*. There is also a **Play Test Wave** button. Touch **Return** to go back to the main “Setup” menu.

Cresnet

From the main “Setup” menu, touch **Cresnet** to enter the “Cresnet Interface” screen, shown in the illustration below.

“Cresnet Interface” Screen

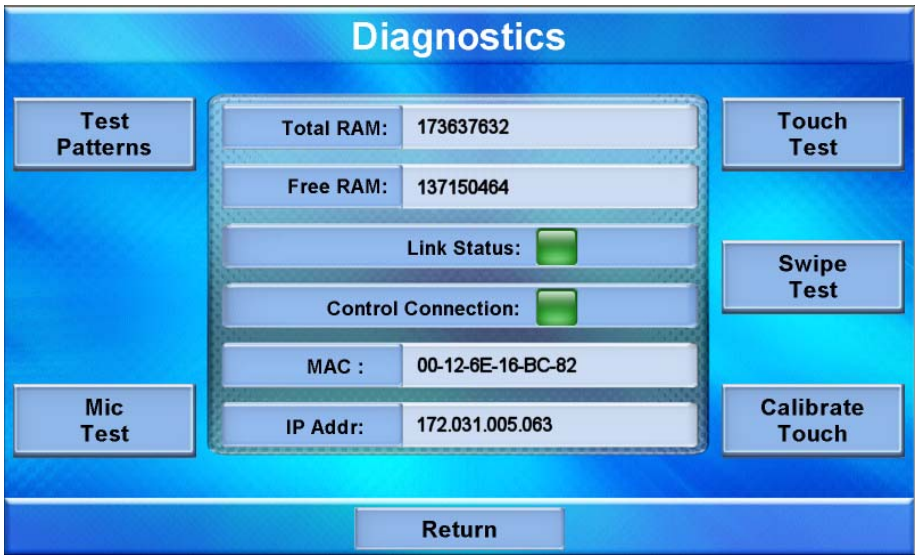


The “Cresnet Interface” screen contains buttons for setting the *Cresnet ID* and for enabling or disabling Cresnet. A *Control Connection* indicator lights in green to show a control system connection. Touch **Return** to go back to the main “Setup” menu.

Diagnostics

From the main "Setup" menu, touch **Diagnostics** to enter the "Diagnostics" menu, shown in the illustration below.

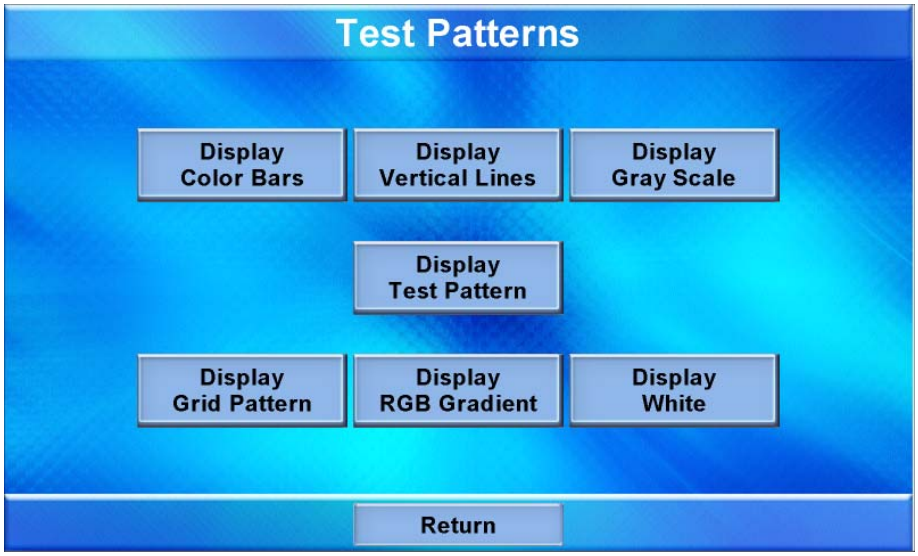
"Diagnostics" Menu



The "Diagnostics" menu contains buttons for **Test Patterns**, **Touch Test**, **Swipe Test**, **Mic Test** and **Calibrate Touch**. This screen also displays *Total RAM*, *Free RAM*, as well as the current MAC and IP addresses. A *Link Status* indicator lights in green to show Ethernet activity and a *Control Connection* indicator lights in green to show a control system connection.

Touch **Test Patterns** to display a selection of test pattern options, as shown in the illustration below.

"Test Patterns" Menu

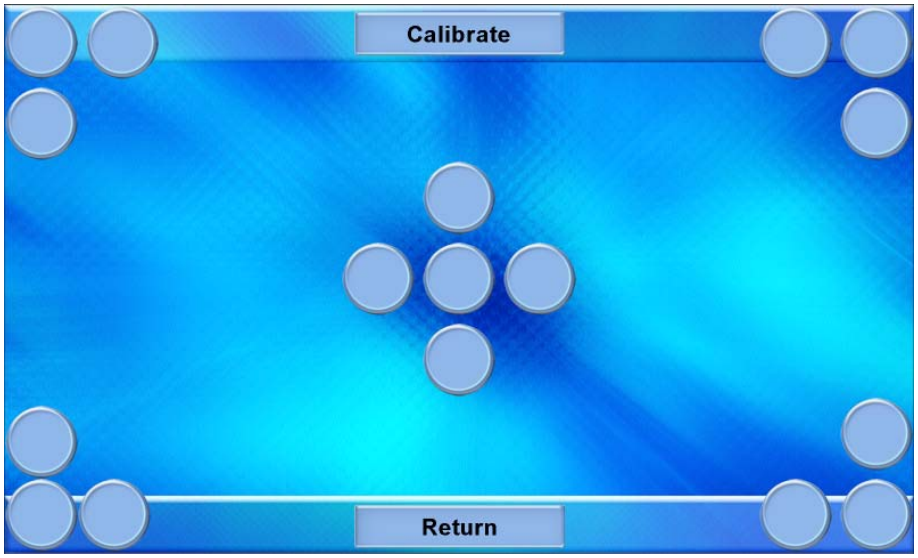


Test pattern options include **Display Color Bars**, **Display Vertical Lines**, **Display Gray Scale**, **Display Test Pattern**, **Display Grid Pattern**, **Display RGB Gradient** and **Display White**. From any of these, touch the screen to return to the "Test

Patterns” menu. From the “Test Patterns” menu, touch **Return** to go back to the “Diagnostics” menu.

From the “Diagnostics” menu, touch **Touch Test** to access touch screen calibration controls, as shown in the illustration below.

Touch Test Screen



Touch **Calibrate** to initiate touch screen calibration. During touch screen calibration, a crosshair appears at the center of the screen. Touch the center of the crosshair, which then moves to the upper left part of the screen. Touch the center of the crosshair and it moves to another part of the screen. Continue touching the center of the crosshair at each new location until calibration is complete. After calibration, the display returns to the screen shown above. Touch **Return** to go back to the “Diagnostics” menu.

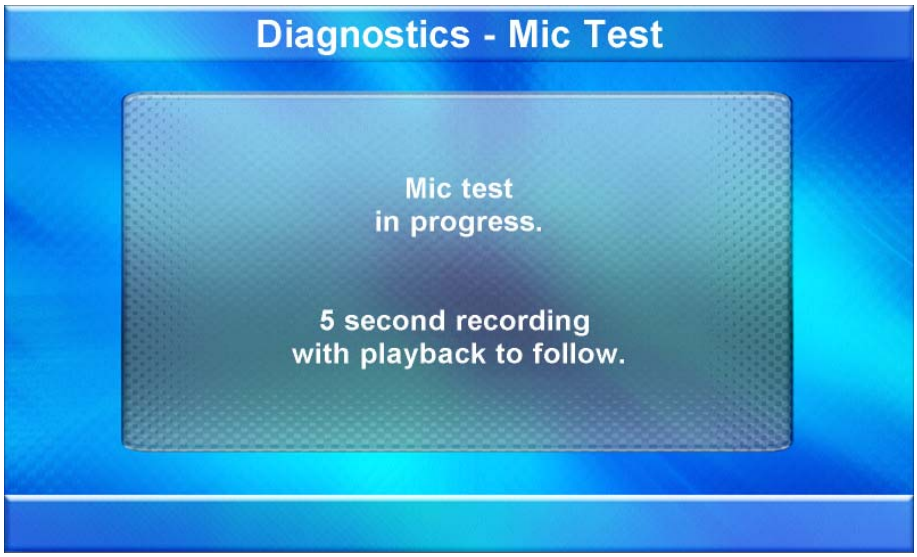
From the “Diagnostics” menu, touch **Swipe Test** to display the “Swipe Test” screen, as shown in the illustration below.

“Swipe Test” Screen

Swiping a finger on screen, left to right, right to left, top to bottom or bottom to top lights the appropriate indicator, showing the swipe was recognized. For more information on swiping, refer to “Swipe Gestures” on page 31. Touch **Return** to go back to the “Diagnostics” menu.

From the “Diagnostics” menu, touch **Mic Test** to display the “Diagnostics - Mic Test” screen, as shown in the illustration below.

“Diagnostics – Mic Test” Screen



This screen performs a test of the TPMC-9’s built-in microphone. The touch screen records audio for five seconds and then plays back the recorded sound. Speak into the microphone on the front of the TPMC-9 and the recording is played back to confirm the microphone is functioning. When playback is finished, the display goes back to the “Diagnostics” menu.

The **Calibrate Touch** button on the “Diagnostics” menu initiates touch screen calibration, as does the **Calibrate** button on the Touch Test screen (refer to “Touch Test Screen” on page 20).

From the “Diagnostics” menu, touch **Return** to go back to the main “Setup” menu.

About

From the main “Setup” menu, touch **About** to display the firmware version and operating system image version currently loaded on the TPMC-9. Touch **Return** to go back to the main “Setup” menu.

Save & Reboot

From the main “Setup” menu, touch **Save & Reboot** to save all settings, exit the setup screens and return to the main project.

Hardware Hookup

Ventilation

The TPMC-9 should be used in a well-ventilated area.

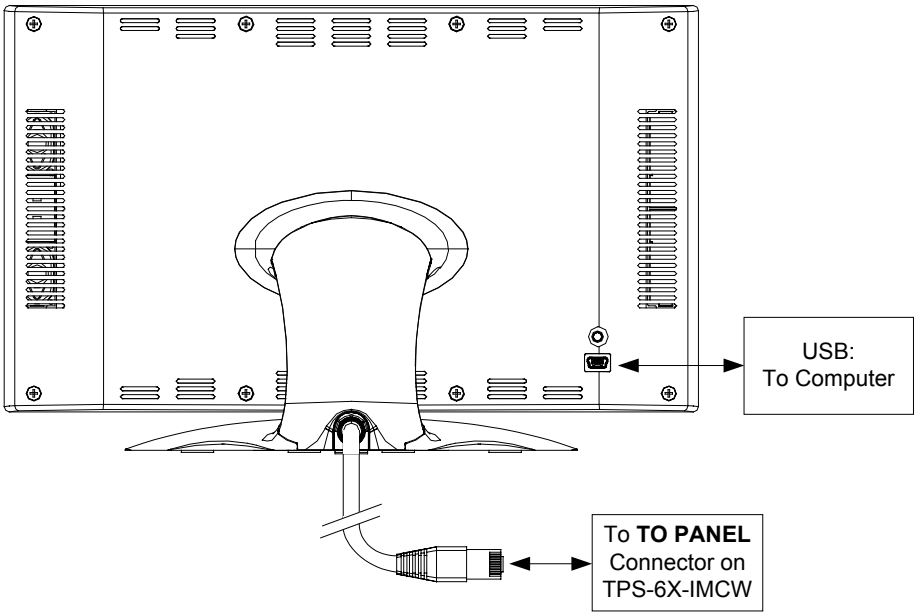
To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications.

Connect the Device

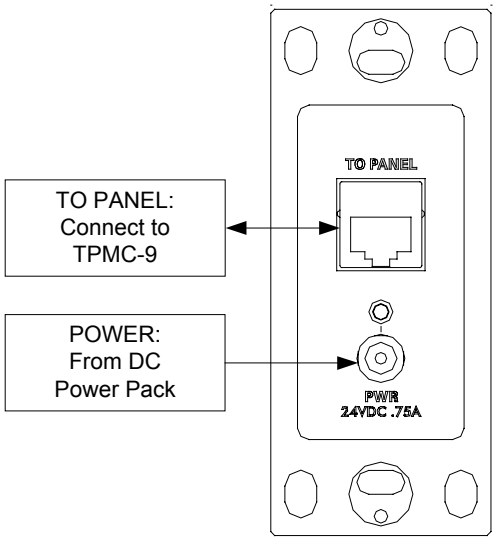
When making connections to the TPMC-9, consider the following:

1. Use the included Crestron power supply for these devices.
2. The power supply cable cannot be extended.

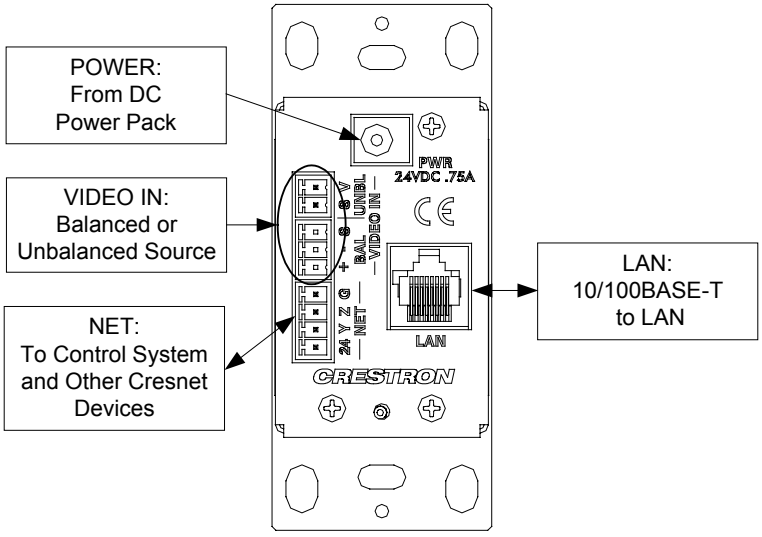
Hardware Connections for the TPMC-9



Hardware Connections for the TPS-6X-IMCW (Front)



Hardware Connections for the TPS-6X-IMCW (Rear)



NOTE: Ensure the TPS-6X-IMCW is properly grounded.

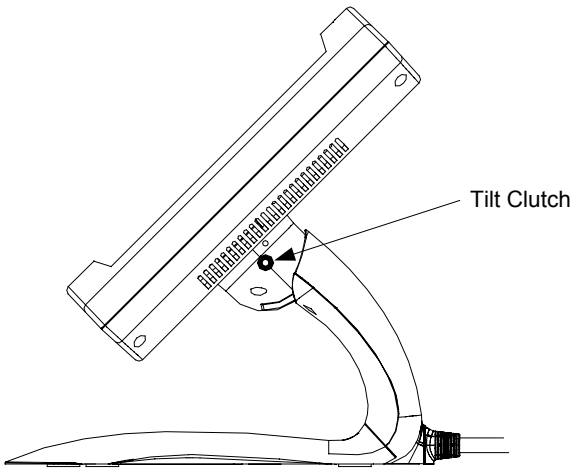
NOTE: To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications.

NOTE: The TPS-6X-IMCW can be powered via the **24 VDC** jack on either the front or the back of the unit if the **NET** port is not being used to power the module.

Tilt Adjustment

The head of the TPMC-9 pedestal can be tilted 45 degrees from vertical. The tilt angle must be set to a fixed position for normal use. The tilt mechanism can be adjusted by loosening the tilt clutch using the 5/32” hex wrench included with the touch screen. Adjust to desired tilt angle, then lock the mechanism by tightening the tilt clutch. Refer to the illustration below.

Touch Screen Tilt Clutch Adjustment



Recommended Cleaning

Touch Screen

Keep the surface of the touch screen free of dirt, dust or other materials that could degrade optical properties. Long-term contact with abrasive materials can scratch the surface, which may detrimentally affect image quality.

For best cleaning results, use a clean, damp, non-abrasive cloth with any commercially available non-ammonia glass cleaner. Bezels may not provide a complete watertight seal. Therefore, apply cleaning solution to the cloth rather than the surface of the touch screen. Wipe touch screen clean and avoid getting moisture beneath the bezels.

CAUTION: Do not apply excessive pressure to the touch screen display during handling. Doing so can crack the screen and damage the touch screen.

Enclosure

The soft felt bag the TPMC-9 came shipped in can be used to clean the bezel and the rest of the touch screen enclosure.

Programming Software

Have a question or comment about Crestron software?

Answers to frequently asked questions (FAQs) can be viewed in the Online Help section of the Crestron Web site. To post a question or view questions submitted to Crestron’s True Blue Support, log in at www.crestron.com/onlinehelp. First-time users must establish a user account to fully benefit from all available features.

Software Requirements for the PC

NOTE: The latest software can be downloaded from the Crestron Web site (www.crestron.com/software).

Crestron provides an assortment of Windows®-based software tools to develop a customized system. Use SystemBuilder™ or SIMPL Windows to create a program to control the TPMC-9.

Programming with Crestron SystemBuilder

SystemBuilder is a comprehensive programming environment. Appropriate for most systems, it can quickly and easily generate a complete working program including both control processor logic and touch screen graphics.

Programming with SIMPL Windows

NOTE: While SIMPL Windows can be used to program the TPMC-9, it is recommended to use SystemBuilder for configuring a system.

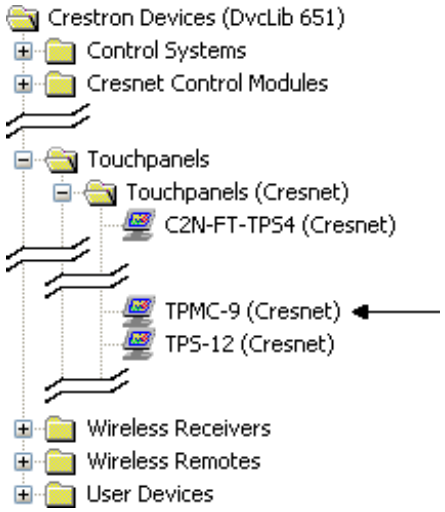
SIMPL Windows is Crestron’s premier software for programming Crestron control systems. It is organized into two separate but equally important “Managers”: Configuration and Program.

Configuration Manager

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

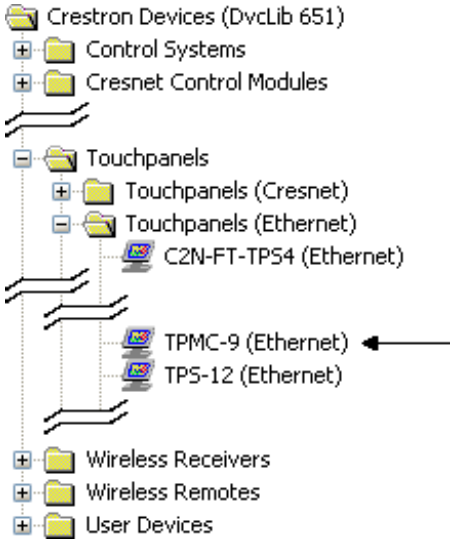
1. The TPMC-9 must first be incorporated into the system.
   a. To incorporate the TPMC-9 (Cresnet) into the system, drag the TPMC-9 from the Touchpanels | Touchpanels (Cresnet) folder of the *Device Library* and drop it in the *System Views*.

Locating the TPMC-9 (Cresnet) in the Device Library



b. To incorporate the TPMC-9 (Ethernet) into the system, drag the TPMC-9 from the Touchpanels | Touchpanels (Ethernet) folder of the *Device Library* and drop it in the *System Views.*

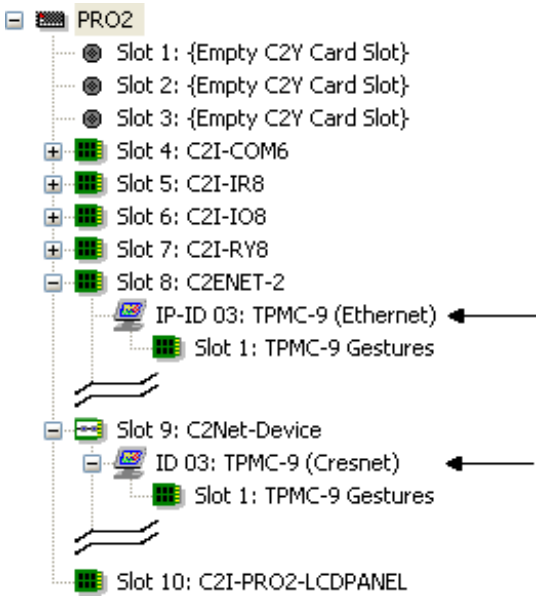
Locating the TPMC-9 (Ethernet) in the Device Library



The system tree of the control system displays the device in the appropriate slot(s) with a default Net ID or IP ID as shown in the following illustration. Below the TPMC-9 in the illustration, the “TPMC-9 Gestures” extender is visible. The extender provides a set of signals that allow programmers to quickly identify gesture input on the touch screen.

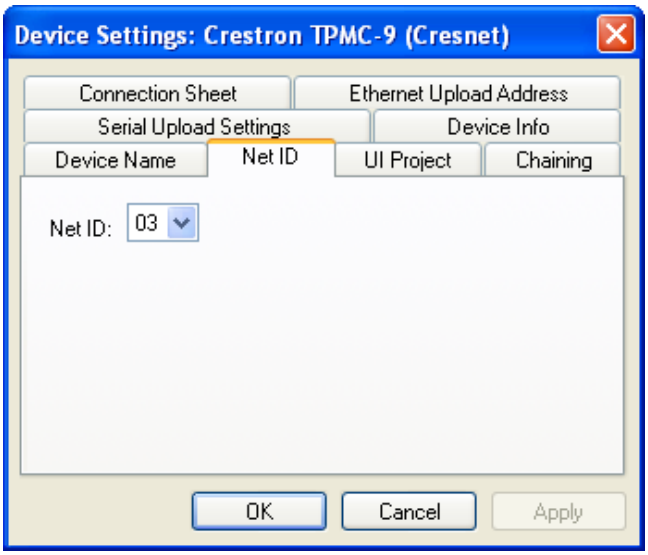
NOTE: In the following illustration, there is both an Ethernet device in Slot 8 and a Cresnet device in Slot 9. It is possible to have both types of device attached to a control system as long as the control system has either a built-in or expansion Ethernet interface. If Cresnet operation is desired, the IP table for the TPMC-9 must be empty.

C2ENET-2 and C2Net Devices, Slot 8 and 9

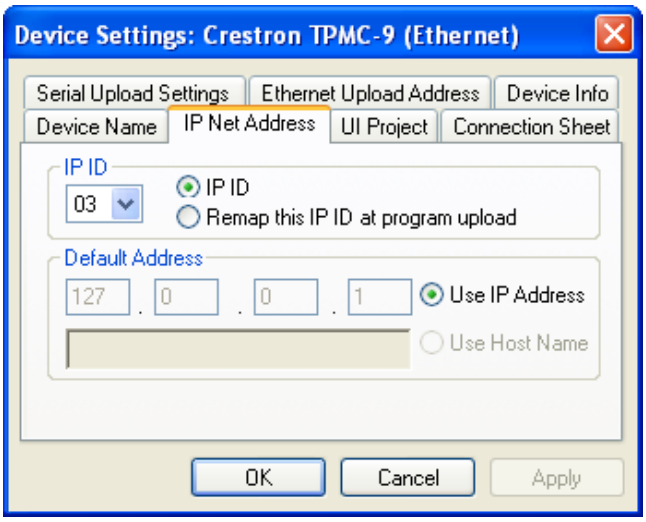


2. If additional TPMC-9 devices are to be added, repeat step 1 for each device. Each TPMC-9 is assigned a different Net ID or IP ID number as it is added.
3. If necessary, double click a device to open the "Device Settings" window and change the Net ID or IP ID, as shown in the following illustrations.

"Device Settings: Crestron TPMC-9 (Cresnet)" Window



"Device Settings: Crestron TPMC-9 (Ethernet)" Window



NOTE: The ID code specified in the SIMPL Windows program must match the Net ID or IP ID of each unit. Refer to "Identity Code" on page 10.

Program Manager

Program Manager is the view where programmers "program" a Crestron control system by assigning signals to symbols.

The symbol can be viewed by double clicking on the icon or dragging it into *Detail View*. Each signal in the symbol is described in the SIMPL Windows help file (**F1**).

Programming with VisionTools

Touch screen pages should be created in Crestron VisionTools® (VT Pro-e®) to allow accessing the embedded applications, switching of source signals to desired outputs as well as selection of the system mode. There are no special programming requirements to use the functions of the TPMC-9 in a room-control system.

Multi-Mode Objects

Multi-mode objects offer high-performance programming!

The single most-advanced VT Pro-e high-performance programming technique involving the TPMC-9 is the concept of multi-mode objects. A multi-mode object (such as a button or legend) is an object drawn on a VT Pro-e page that can have one or more active and inactive visible settings (*modes*).

For examples, refer to www.crestron.com/exampleprograms and search for multi-mode object examples. This file contains the VT Pro-e touch screen files and SIMPL Windows files that illustrate the high-performance capabilities of multi-mode objects.

WAV File Audio Messages

The TPMC-9 touch screens are capable of playing audio messages as system prompts and responses. These files are recorded as WAV files on a PC using an audio utility such as Sound Recorder that is packaged with Microsoft® Windows. Files from other sources may also be converted to an acceptable format by using this or a similar utility. Many other audio utilities are available commercially or as shareware. The TPMC-9 touch screens accept the following WAV file formats: **PCM, 8 & 16 bit, 8 – 44.1 kHz, mono & stereo**. For more information about how

to use Sound Recorder, refer to its User's Guide and extensive help information provided with the software. Also refer to the help file in VT Pro-e to learn how to use its audio tool, Sound Manager, to attach WAV files to a touch screen project.

Pre-recorded WAV files for voice prompts and responses are available from Crestron. These files can be stored into and programmed for use in the touch screen directly or may be edited with the Sound Recorder. For example, the individual files can be combined to create custom messages.

NOTE: Touch screen WAV files can be obtained from the Wave LC Library of the Crestron FTP site.

Bit Depth and File Size

A balance of performance and quality can be achieved by using VT Pro-e to configure the size of graphics in a project. Read this section to learn about bit depth and how to maximize the quality and performance of a TPMC-9 project.

Bit depth refers to the number of memory bits used to store color data for each pixel in a raster image. A touch screen raster image consists of a rectangular grid of picture elements (pixels). Each pixel uses the same amount of memory to store its color data. The amount of memory is called the bit depth of the image.

Greater bit depths are required to represent finer gradations of color. Increasing bit depth necessarily increases file size. A black and white drawing requires only one bit per pixel to store all the available color information. Using a 32-bit per pixel bit depth for a black and white image increases the file size 32 times without adding anything to the black and white image quality.

In an 8-bit per pixel system, the associated 8-bits of video memory for every screen pixel contain a value referring to a location in an 8-bit color table. In this way any one of the specific 256 color table locations is assigned to a pixel.

A 16-bit highcolor system is considered sufficient to provide life-like colors. It is encoded using 5-bits to represent red, 5-bits to represent blue and (since the human eye is more sensitive to the color green) 6-bits to represent 64 levels of green. These can therefore be combined to provide 65,536 mixed colors (32 x 32 x 64 = 65,536).

In a 24-bit graphics display, the video memory allocates 24 bits for each pixel on the screen enabling each pixel to take on any one of a possible 16.7 million colors. Each 24-bit value is composed of 8-bits for red, 8-bits for green and 8-bits for blue. These triplets of 8-bit values are also referred to as the red, green and blue color planes. A 24-bit image is actually composed of three component images which combine to create the truecolor picture. The reason this is called truecolor is that this is near the maximum number of colors the human eye is able to detect.

Truecolor images are sometimes represented by a 32-bit value. The extra 8-bits do not enhance the precision of the color representation but act as an alpha channel that represents pixel translucence. The 32-bit truecolor has become popular on the computer desktop to provide effects such as translucent windows, fading menus and shadows.

In graphics intensive applications such as touch screens, raising or lowering the color depth of the displayed graphics can achieve a balance of performance and quality. Lower color depths do not require as much frame buffer memory or display bandwidth, allowing them to be generated and displayed more quickly. Increasing color depth results in higher color quality at the expense of display speed and responsiveness. By using mostly 8-bit or 16-bit graphics and holding 32-bit graphics to a minimum (for example, for a family photo), a sophisticated project can be created that fits in the memory space provided while the touch screen remains very responsive.

Relationship of Bits to Colors

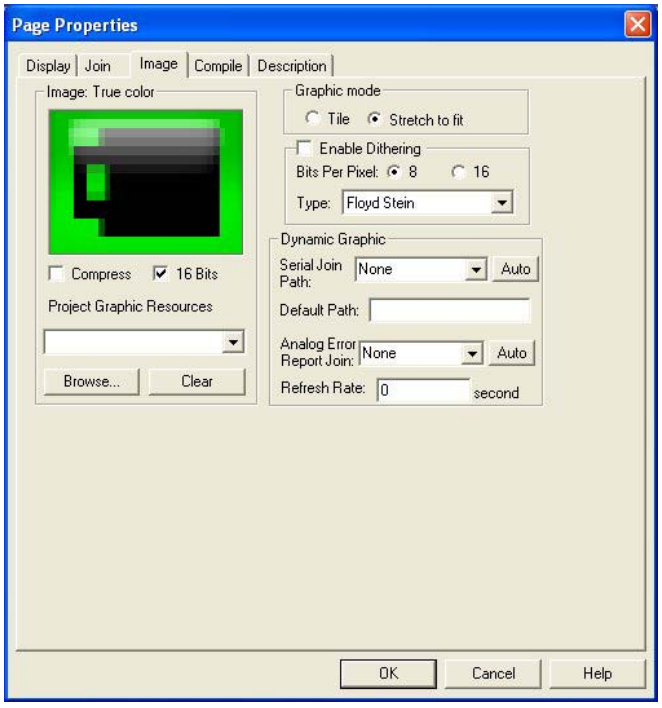
NUMBER OF BITS	NUMBER OF COLORS
1 bit	Black and White
2 bits	4 Colors
4 bits	16 Colors
8 bits	256 Colors
16 bits	65,536 Colors (Highcolor)
24 bits	16.7 million Colors (Truecolor)
32 bits	16.7 million Colors plus Transparency

When creating a VT Pro-e project, the image size can be compressed and reduced in the “Page Properties” dialog box for the entire page. The image size can also be compressed and reduced using the “Image Properties” dialog box. A reduction in image size saves a considerable amount of memory space for the project.

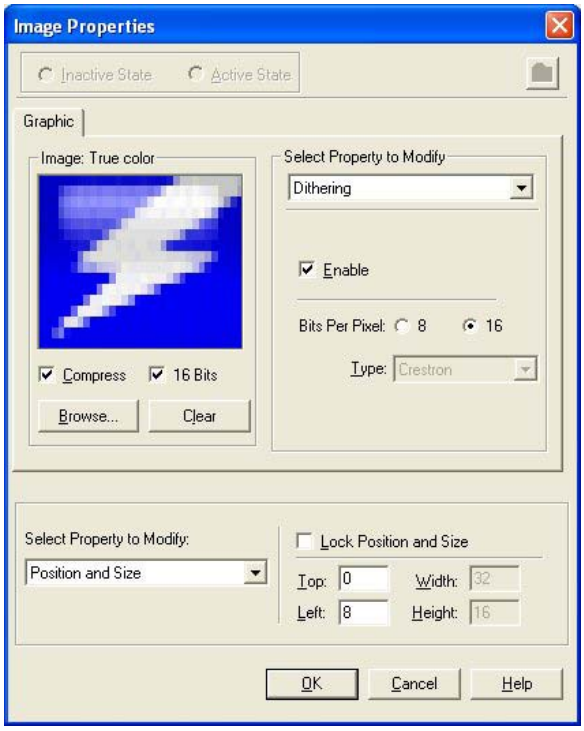
In VT Pro-e, the **Compress** checkbox permits the image to be compressed when compiling. The **16 Bits** checkbox converts a 24-bit or 32-bit image to 16 bits. This conversion to a 16-bit image may cause the loss of some subtle shading. To compensate for this, use the dithering to simulate the original shading. Check the image with each of the available dithering types to determine which delivers the best quality image.

Dithering type selection can be accessed from the “Page Properties” or “Image Properties” dialog boxes in VT-Pro-e. Refer to the following illustrations.

VT Pro-e “Page Properties” Dialog Box – Bit Depth Selection



VT Pro-e “Image Properties” Dialog Box – Bit Depth Selection



MultiByte International Characters

Most languages use a single byte of eight bits to represent a character, for example, English, French, German, Hebrew, Russian and Thai.

Multibyte character fonts require more than the usual eight bits to specify a character. This occurs when a language has more than 256 characters (2^8) in a font. For example, Chinese fonts contain several thousand characters. Other multibyte languages include Japanese and Korean.

There are two separate applications with multibyte characters – static text on buttons and indirect text on buttons. No touch screen firmware changes are required in either case.

Indirect text on a button is entered in VT Pro-e and the actual string to be displayed is entered in SIMPL Windows. As of this publication date only completely single byte or completely multibyte strings may be entered or they can not be compiled correctly in SIMPL Windows. In other words, Chinese characters cannot be interspersed with numbers. Enter Chinese characters or numbers in separate strings or pad each number with “\x00” to make it multibyte and then combine it with Chinese characters in the same string.

Of course, the workaround of showing a graphic that displays the string but which is not dynamic, can always be used. To compile and use multibyte characters it is essential that the operating system understand the language. Some versions of Windows are available in many international languages and add-on software is available for other versions.

Swipe Gestures

Swipe gestures are assigned using the “Hard Button Manager” in VT Pro-e. They can be assigned at the project level or at the individual page level. As with regular buttons, whether virtual ones on the screen or physical hard buttons, these can be assigned joins or local page flips.

When programming for swipe gestures, it is a good idea to leave an area of the screen free of touchable objects (for example, buttons, sliders or other controls). Swipe gestures can not work over touchable objects, which take precedence over swipes.

Uploading and Upgrading

Crestron recommends using the latest programming software and that each device contains the latest firmware to take advantage of the most recently released features. However, before attempting to upload or upgrade it is necessary to establish communication. Once communication has been established, files (for example, programs, projects or firmware) can be transferred to the control system (and/or device). Finally, program checks can be performed (such as changing the device ID or creating an IP table) to ensure proper functioning.

Establishing Communication

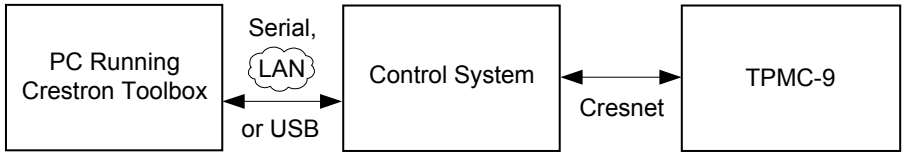
NOTE: For PCs running Windows 2000 or XP, ActiveSync 4.5 or later is required for Toolbox to communicate with the TPMC-9 via USB to upload firmware and display lists. Download and install ActiveSync from the Microsoft Web site (www.microsoft.com/windowsmobile/en-us/help/synchronize/device-synch.mspx).

PCs running Windows Vista or 7 require Windows Mobile Device Center for communication with Toolbox. Download and install Windows Mobile Device Center (WMDC) from the Microsoft Web site (www.microsoft.com/windowsmobile/devicecenter.mspx).

Use Crestron Toolbox for communicating with the TPMC-9; refer to the Crestron Toolbox help file for details. There are three methods of communication: indirect, TCP/IP and USB.

Indirect

Indirect Communication

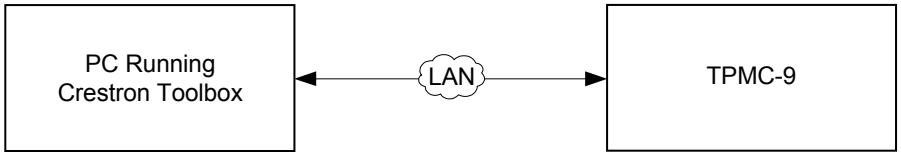


TPMC-9 connects to control system via Cresnet:

1. Establish communication between the PC and the control system as described in the latest version of the 2-Series Control Systems Reference Guide (Doc. 6256).
2. Use the Address Book in Crestron Toolbox to create an entry for the TPMC-9 using the expected communication protocol (Indirect). Select the Cresnet ID of the TPMC-9 and the address book entry of the control system that is connected to the TPMC-9.
3. Display the TPMC-9’s “System Info” window (click the icon); communications are confirmed when the device information is displayed.

TCP/IP

Ethernet Communication

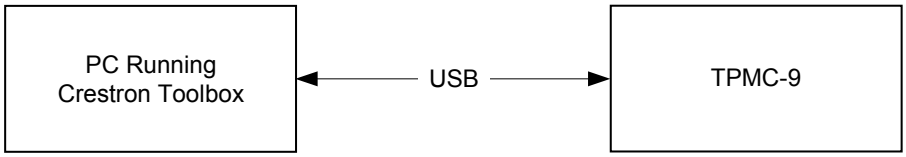


The TPMC-9 connects to PC via Ethernet:

1. Confirm Ethernet connections between TPMC-9 and PC. If connecting through a hub or router, use CAT5 straight through cables with 8-pin RJ-45 connectors. Alternatively, use a CAT5 crossover cable to connect the two **LAN** ports directly without using a hub or router.
2. Use the Device Discovery Tool in Crestron Toolbox to detect all Ethernet devices on the network and their IP configuration. The tool is available in Toolbox version 1.15.143 or later.
3. Use the Address Book in Crestron Toolbox to create an entry for the TPMC-9 with the TPMC-9's TCP/IP communication parameters.
4. Display the "System Info" window (click the icon) and select the TPMC-9 entry from the Address Book or the Address Book drop-down menu.

USB

USB Communication



The **USB** port on the TPMC-9 connects to the USB port on the PC:

1. Use a USB cable to connect the TPMC-9 to a PC running the Crestron Toolbox.
2. Open the "System Info" window; click the "**Enter an address …**" icon (pencil) to display the "Edit Address" window.
3. Select USB as the connection type, and select "TPMC-9" from the *Device Type* drop down list (click **OK** when the "Warning" notice appears).

Programs, Projects and Firmware

Program, project or firmware files may be distributed from programmers to installers or from Crestron to dealers. Firmware upgrades are available from the Crestron Web site as new features are developed after product releases. One has the option to upload programs and projects via the programming software or to upload and upgrade via the Crestron Toolbox. For details on uploading and upgrading, refer to the SIMPL Windows help file, VT Pro-e help file or the Crestron Toolbox help file.

SIMPL Windows

If a SIMPL Windows program is provided, it can be uploaded to the control system using SIMPL Windows or Crestron Toolbox.

VT Pro-e

Upload the VT Pro-e file to the touch screen using VT Pro-e or Crestron Toolbox.

Firmware

Check the Crestron Web site to find the latest firmware. (New users must register to obtain access to certain areas of the site, including the FTP site.)

Upgrade TPMC-9 firmware via Crestron Toolbox.

1. Establish communication with the TPMC-9 and display the “System Info” window.
2. Select **Functions | Firmware…** to upgrade the TPMC-9 firmware.

Program Checks

Actions that can be performed on the TPMC-9 vary depending on whether it is connected via Cresnet or Ethernet.

Cresnet Connections

For Cresnet connections, using Crestron Toolbox, display the network device tree (**Tools | Network Device Tree View**) to show all network devices connected to the control system. Right-click on the TPMC-9 to display actions that can be performed on the TPMC-9.

Ethernet Connections

For Ethernet connections, display the “System Info” window (click the  icon) and select the **Functions** menu to display actions that can be performed on the TPMC-9.

Be sure to use the internal setup menu (refer to “IP Table” which starts on page 14) or Crestron Toolbox to create the TPMC-9 IP table. In Toolbox:

1. Select **Functions | IP Table Setup**.
2. Add, modify or delete entries in the IP table.
3. A defined IP table can be saved to a file or sent to the device.

Edit the control system’s IP table to include an entry for the TPMC-9. The entry should list the TPMC-9’s IP ID (specified on the TPMC-9’s IP table) and the internal gateway IP address 127.0.0.1.

Problem Solving

Troubleshooting

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

TPMC-9 Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Device does not function.	TPMC-9 is not receiving power.	Verify power to (included) TPS-6X-IMCW Interface Module.
	Device is not communicating with the network.	Use Crestron Toolbox to poll the network. Verify network connection to the device.
	Device is not receiving power from a Crestron power source.	Use the provided Crestron power source. Verify connections.
	Device is not receiving sufficient power.	Use the Crestron Power Calculator to help calculate how much power is needed for the system.
Touch screen is not responding.	Touch screen Net ID is not set to match the Net ID in the SIMPL program.	Use Crestron Toolbox to poll the network. Verify the Net ID for the touch screen is properly set to match the Net ID in the SIMPL program.
	Touch screen Net ID is not unique; two or more units share the same ID.	Use Crestron Toolbox to poll the network and verity that each ID is used only once.
	No IP address configured/obtained on the TPMC-9.	Use the internal setup menu (refer to “IP Table” which starts on page 14) or Crestron Toolbox to create/verify Ethernet settings.
	Invalid control system IP address / IP ID set up on the TPMC-9.	The IP address (or host name) for the control system is invalid or the IP ID does not match the one defined in the SIMPL program. Refer to “Ethernet” which starts on page 12 and to “IP Table” which starts on page 14 to define IP addresses.
Touch screen display is dark.	Standby timeout has elapsed.	Touch the screen to reactivate.

(Continued on following page)

TPMC-9 Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Unexpected response from touch screen.	Touch screen is incorrectly calibrated.	Recalibrate the touch screen (refer to “Diagnostics” which starts on page 19).
TPMC-9 boots up in setup screens every time.	Invalid VT Pro-e project or no VT Pro-e project is loaded.	Load/reload VT Pro-e project using the Toolbox.

Check Network Wiring

Use the Right Wire

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

Calculate Power

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

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

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

Cable Length Equation

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

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

Make sure the cable length value is less than the value calculated on the right side of the equation. For example, a Cresnet run using 18 AWG Crestron Certified Wire and drawing 20 watts should not have a length of run more than 333 feet (101 meters). If Cresnet HP is used for the same run, its length could extend to 1250 feet (381 meters).

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

Strip and Tin Wire

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

Add Hubs

Use of a Cresnet Hub/Repeater (CNXHUB) is advised whenever the number of Cresnet devices on a network exceeds 20 or when the combined total length of Cresnet cable exceeds 3000 feet (914 meters).

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron Web site (www.crestron.com/manuals).

List of Related Reference Documents

DOCUMENT TITLE
2-Series Control Systems Reference Guide
Crestron e-Control Reference Guide

Further Inquiries

To locate specific information or resolve questions after reviewing this guide, contact Crestron's True Blue Support at 1-888-CRESTRON [1-888-273-7876] or refer to the listing of Crestron worldwide offices on the Crestron Web site (www.crestron.com/offices) for assistance within a particular geographic region.

To post a question about Crestron products, log onto the Online Help section of the Crestron Web site (www.crestron.com/onlinehelp). First-time users must establish a user account to fully benefit from all available features.

Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the TPMC-9, 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 Web site periodically for manual update availability and its relevance. Updates are identified as an "Addendum" in the Download column.

Return and Warranty Policies

Merchandise Returns / Repair Service

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

Crestron Limited Warranty

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

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

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

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

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

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

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Operations Guide – DOC. 6965D
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Specifications subject to
change without notice.