Crestron **TPMC-8L**
Isys i/O™ 8.4” Wall Mount Touchpanel Media Center
Operations & Installation Guide

CRESTRON®

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Isys i/O™ 8.4” Wall Mount Touchpanel Media Center: TPMC-8L

Introduction

The Isys® i/O TPMC-8L is a stylish wall or lectern mount touchpanel featuring the Windows® XP Embedded OS to deliver a powerful control solution with blazingly fast performance and native capabilities for browsing the Internet, streaming multimedia and much more. A brilliant 8.4" (21.3 cm) active-matrix SVGA display and 16-bit color depth combine to produce stunning 3D graphics using DNav dynamic menu objects, dynamic graphics and text, animations, multimode objects, PNG translucency, and exclusive Synapse™ image rendering - all with astonishing speed.

Features and Functions

- 8.4 in (21.3 cm) active matrix touchscreen display with 800 x 600 resolution
- 16-bit Isys i/O™ graphics with Synapse™ image rendering algorithm
- Windows® SideShow™ enabled
- DNav dynamic menu objects
- Windows® XP Embedded operating system
- Onboard PC applications for Web browsing, streaming media, conferencing, VoIP and remote computer access
- Multi-format streaming video and audio with WAV file audio feedback
- Direct panel-to-panel intercom over IP
- Integrated SIP phone capability
- Built-in microphone and stereo speakers
- Crestron Home® compatible balanced audio output
- Includes faceplate with 16 “hard key” pushbuttons (no button blank faceplate also provided)
- Button engraving available as solid or backlit text
- Built-in biometric fingerprint scanner and light sensor
- 10/100 fast Ethernet communications and rear panel USB ports
- Stylish flush mount design
- Available in almond, black, white or stainless steel
- Wall, lectern and rack mounting options

Isys i/O™ Touchpanel Control

Crestron® touchpanels offer an ideal user interface for multimedia presentation, home automation and much more, providing a wide open canvas for the creation of custom control screens tailored to the needs of the end user. Touchpanels do away with piles of remote controls, cryptic control panels and cluttered wall switches, simultaneously expanding and simplifying control over a broad range of complex devices and systems.

Synapse™

Crestron's exclusive Synapse image rendering algorithm enables system programmers to produce amazing graphics faster and easier. Advanced antialiasing delivers crisper, sharper objects and text. Enhanced 3D effects add new depth and style. Since Synapse is native to the touchpanel, memory requirements and upload time are substantially reduced.

Embedded PC

The power of Isys i/O is in its embedded PC engine, combining rock solid touchpanel performance with built-in Windows Media® Player and RealPlayer®, Internet Explorer, Adobe® Acrobat® Reader and Microsoft Word, Excel and PowerPoint® document viewers. While simultaneously controlling your home, boardroom or lecture hall, the TPMC-8L provides everything needed for enjoying online music and movies, viewing Web pages and accessing most types of digital media without necessitating a separate computer.

Support for Windows® SideShow™ gives the TPMC-8L access to all kinds of PC and Web-based content such as news feeds, sports scores, stock tickers, weather alerts, media guides, email messages and appointment notifications all through the simple network connection to a Windows Vista™ computer.

VNC viewer support delivers enhanced cross-platform interaction with remote computers over the network or Internet, allowing access and control of desktop applications with live presentation capability.

Built on the Windows XP Embedded operating system, the TPMC-8L delivers a powerful and secure platform for touchpanel control with integrated PC capabilities. Programmatic control erases the lines between control system and PC, allowing programmers to customize each application's behavior within the touchpanel environment to create a truly powerful and user-friendly interface.

Streaming Video

For presentation preview, surveillance or pure entertainment, the TPMC-8L makes it easy to view security cameras, movies and other video sources right on the touchscreen. In addition to the wide range of streaming video formats supported by its onboard media player applications, the TPMC-8L also features native support for video over IP from a variety of third-party Web cameras and servers using the motion JPEG format.

Audio Features

Built-in stereo speakers and headphone output provide clear audio for streaming media and internal PC applications and enable 2-way intercom and VoIP communications in combination with the integrated microphone. Customized WAV files can be loaded on the touchpanel to add dimension to the touchscreen graphics with personalized sounds, button feedback and voice prompts.

A balanced line output allows for connection to Adagio® or other multi-room audio distribution systems using CAT5 or conventional wiring, allowing streaming audio content playing on the TPMC-8L to be shared with listeners throughout the home or office. (The line level output carries precisely the same signal as the built-in stereo speakers.)

Intercom and Telephone

Built-in IP intercom capability facilitates direct panel-to-panel intercom and monitoring right over the LAN without requiring any additional AV wiring. New Crestron SIP phone allows 2-way communication between touchpanels as well as with traditional PSTN (public switched telephone network) telephones and other SIP/VoIP phones.

NOTE: SIP Phone requires a high speed LAN and/or broadband connection and a connection to a SIP server or SIP-based Internet phone (VoIP) service provider.

Biometric Scanner

The built-in fingerprint scanner unleashes a whole new level of convenience and security, allowing individual users to be identified instantly and logged on automatically. With just the touch of a fingertip, each user can be presented with a unique graphical interface with its own set of preferences, access privileges and even its own look through the use of touchpanel "skins".

Pushbutton Options

The TPMC-8L features a faceplate containing 16 programmable "hard key" pushbuttons, elegantly trimmed by illuminated button dividers. Integral to the faceplate, the pushbuttons are positioned along the left and right edges of the touchscreen, making it possible to align dynamically changing text and graphics onscreen beside the pushbuttons to support context-sensitive menu functions such as digital media titles, channels or lighting presets. Custom engraving of the buttons is available, with a choice of solid or backlit text. A plain, no-button faceplate is also included, allowing a very clean appearance with no pushbuttons.

Light Sensor

A light sensor is built into the TPMC-8L to automatically adjust the display brightness and button backlight for optimal legibility under varying light conditions.

High Speed Connectivity

High speed Ethernet is standard on the TPMC-8L, providing for easy network integration and seamless communications with Crestron control systems, computers and digital media servers. Two USB 2.0 ports are also included on the rear panel to support a mouse and keyboard and external storage devices.

Versatile Flush Mount Design

The TPMC-8L is designed for easy flush mount installation in a wall, lectern or similar flat surface. A variety of mounting accessories is offered including optional back box and 19-inch rack mount kit.

Specifications

Specifications for the TPMC-8L are listed in the following table.

TPMC-8L Specifications

SPECIFICATION	DETAILS
Touchscreen Display	
Display Type	TFT active matrix color LCD
Size	8.4 inch (21.3 cm) diagonal
Aspect Ratio	4:3 SVGA
Resolution	800 x 600 pixels
Brightness	200 nits
Contrast	500:1
Color Depth	18-bit, 262k colors
Illumination	Edgelit fluorescent
Viewing Angle	±65º horizontal, +65/-45º vertical
Touchscreen	Resistive membrane
Memory	
DDR SDRAM	512 MB
Flash	1 GB
Maximum Project Size	190 MB
Operating System	Microsoft® Windows® XP Embedded
Graphic Engine[1]	Isys i/O engine, 16-bit non-palette graphics; 65,536 colors; Synapse image rendering algorithm; multi-mode objects; DNav dynamic menu objects, dynamic graphics; Windows® SideShow™ support, PNG translucence; full motion (60 fps) animation; transition effects
Embedded PC Applications[2]	Microsoft Internet Explorer w/Macromedia® Flash® plug-in, Windows Media® Player, RealPlayer®, Axis® Media Control, Crestron MJPEG viewer, Crestron IP Intercom, Crestron SIP Phone, NetMeeting®, VNC viewer[3], Remote Desktop, Java™ Runtime, Crestron Keyboard, Adobe® Acrobat® Reader, WordPad, MS Word Viewer 2003, Excel® Viewer 2003, PowerPoint® Viewer 2003
Ethernet	10BASET/100BASETX, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, IEEE 802.3U compliant.
Video	
Streaming/File Formats	MPEG4 and MJPEG via Axis Media Control or Crestron MJPEG Viewer, plus all formats supported by the embedded media player applications[2]

(Continued on following page)

TPMC-8L Specifications (Continued)

SPECIFICATION	DETAILS
Audio	
Hardware Features	Dual onboard microphones, built-in stereo speakers, balanced line-level output[4]
Streaming/File Formats	All formats supported by the embedded media player applications[2]
Audio Feedback (WAV)	8 & 16 bit PCM, mono & stereo, 8 – 44.1 kHz sampling rates
Amplification	Stereo, 1.1 Watts per channel
Power Requirements	
24 VDC	36 Watts (1.5 Amps @ 24 Volts DC); May be powered by Cresnet or dedicated power supply (not included)
Default IP ID[5]	03
Minimum 2-Series Control System Update File[6, 7]	Version 3.137 or later
Environmental	
Temperature	32º to 104ºF (0º to 40ºC)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	123 BTU/Hr
Enclosure	
Construction	Metal chassis, flush mountable, 5U 19" rack-mountable (all mounting kits sold separately)
Faceplate	TPMC-8L(A,B.W)-T: Injection molded plastic, button and no-button faceplates included, optional solid or backlit button engraving sold separately; TPMC-8L-FPAR-S/STEEL-NB: Aluminum with no buttons
Dimensions	
TPMC-8L(A,B,W)-T	
Height	7.48 in (18.98 cm)
Width	10.01 in (25.42 cm)
Depth	1.85 in (4.69 cm)
TPMC-8L-FPAR-S/STEEL-NB	
Height	7.88 in (20.01 cm)
Width	10.38 in (26.36 cm)
Depth	1.88 in (4.77 cm)
Weight	
TPMC-8L(A,B,W)-T	2.9 lbs (1.4 kg)
TPMC-8L-FPAR-S/STEEL-NB	3.5 lbs (1.6 kg)
Available Models	
TPMC-8LA-T	Isys i/O 8.4" Wall Mount Touchpanel Media Center, Almond, Textured
TPMC-8LB-T	Isys i/O 8.4" Wall Mount Touchpanel Media Center, Black, Textured

(Continued on following page)

TPMC-8L Specifications (Continued)

SPECIFICATION	DETAILS
Available Models (continued)	
TPMC-8LW-T	Isys i/O 8.4" Wall Mount Touchpanel Media Center, White, Textured
TPMC-8L-FPAR-S/STEEL-NB	Isys 8.4" Wall Mount Touchpanel Media Center, Architectural Version, Stainless Steel, No Buttons
Included Accessories	
TPMC-8L-FP(A,B,W)-T_BLANK	Button Faceplate w/o Engraving [specify color] (TPMC-8L[A,B,W]-T models only)
TPMC-8L-FP-BKLT-(A,B,W)-T-NB	No-Button Faceplate [specify color] (TPMC-8L[A,B,W]-T models only)
TPMC-FPAR8L-S/STEEL-NB	Architectural Faceplate, Stainless Steel, No Buttons (TPMC-8L-FPAR-S/STEEL-NB model only)
Available Accessories	
BB-8L	Pre-Construction Wall Mount Back Box
MMK-8L	Mud Ring
PMK-8L	Pre-Construction Wall Mount Kit
RMK-8L	Rack Mount Kit
TMK-8L	Trim Ring
TPMC-8L-FP(A,B,W)-T _ENGRAVED	Button Faceplate w/Custom Engraving [specify color]
TPMC-8L-FP-BKLT-(A,B,W)-T _ENGRAVED	Backlit Button Faceplate w/Custom Engraving [specify color]
WMKM-8L	Post-Construction Wall Mount Kit with Mud Ring
WMKT-8L	Lectern or Post-Construction Wall Mount Kit with Trim Ring

1. By design, the panel will not load dynamic graphics if they are located on a password protected FTP or HTTP server.
2. Refer to website or contact Crestron for a current list of compatible devices and embedded applications. To ensure reliable performance, new device drivers and applications are available only from Crestron through firmware updates.
3. The supported VNC viewer is UltraVNC version 1.0.2. Other VNC viewers may work but are not guaranteed.
4. The line level output carries precisely the same signal as the built-in stereo speakers.
5. Refer to "Identity Code" on page 11 for details.
6. The latest software versions can be obtained from the Crestron website. Refer to the NOTE following these footnotes.
7. 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.

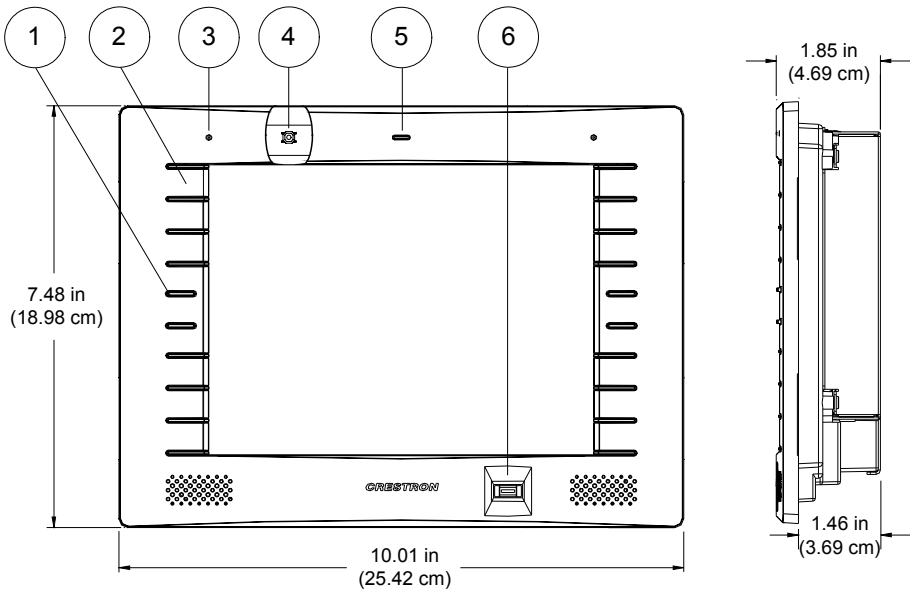
NOTE: Crestron software and any files on the website are for authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

Physical Description

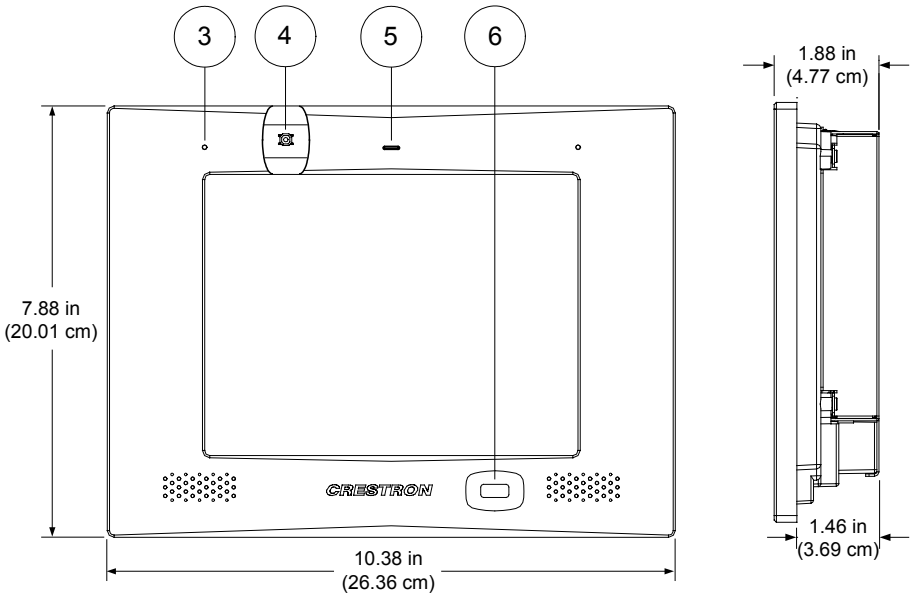
This section provides information on the connections, controls and indicators available on your TPMC-8L.

TPMC-8L Physical View

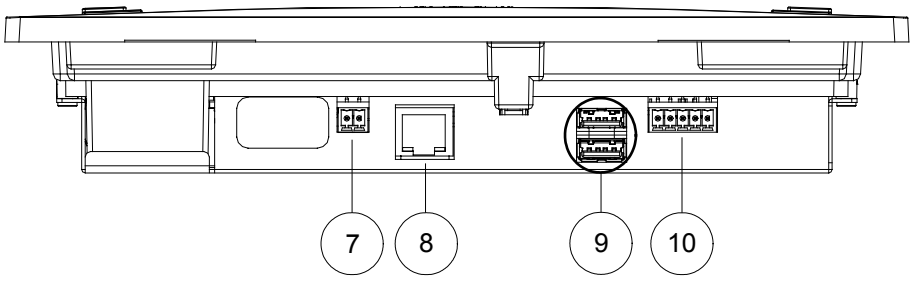
TPMC-8L(A,B,W)-T Overall Dimensions
(Front and Side View with Cutaway Showing Reset Button)



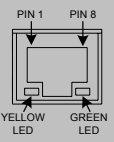
TPMC-8L-FPAR-S/STEEL-NB Overall Dimensions
(Front and Side View with Cutaway Showing Reset Button)



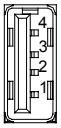
TPMC-8L Overall Dimensions (Bottom View)



Connectors, Controls & Indicators

#	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
1	SMALL HARD KEYS	(4) Optional small backlit pushbuttons, engravable on faceplate (Button models only)
2	LARGE HARD KEYS	(12) Optional large engravable pushbuttons with available backlighting (Button models only)
3	MICROPHONES	(2) Built in microphones behind the bezel support IP based intercom, telephone and conferencing functionality
4	RESET[2]	(1) Miniature pushbutton behind faceplate, used to reset the touchpanel
5	LIGHT SENSOR	Programmable photo sensor for automatic backlight dimming
6	BIOMETRIC SCANNER	AuthenTec EntrePad® 1610 fingerprint scanner; Identifies up to 30 users by fingerprint
7	PWR  	(1) 2-pin 3.5 mm detachable terminal block; 24 Volt DC power input; Wire size: 18 AWG maximum
8	LAN[3]  	(1) 8-wire RJ-45 with 2 LED indicators; 10BASE-T/100BASE-TX Ethernet port; Green LED indicates link status Yellow LED indicates Ethernet activity

PIN	SIGNAL	PIN	SIGNAL
1	TX +	5	N/C
2	TX -	6	RC -
3	RC+	7	N/C
4	N/C	8	N/C

9	USB  	(2) USB Type A female USB 2.0 ports for keyboard, mouse and storage devices[4]

PIN	DESCRIPTION
1	+5 VDC
2	Data -
3	Data +
4	Ground

10	AUDIO OUT  + - G + - L R	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line level audio output

1. Interface connectors for **AUDIO OUT** and **24 VDC** ports are provided with the unit.
2. To access the reset button, remove the bezel and then use a narrow blunt instrument such as the end of a ballpoint pen to press the button.
3. To determine which is pin 1 on the cable, hold the cable so that the end of the eight pin modular jack is facing away from you, with the clip down and copper side up. Pin 1 is on the far left.
4. Only generic USB devices (i.e. simple keyboard, mouse and external storage) should be used with the TPMC-8L. Any complex USB devices (e.g. a storage device with a built-in fingerprint scanner) will not have the proper support on the panel.

CAUTION: Do not attempt to press the reset button by inserting a paper clip or similar device through the small hole in the bezel. This could cause physical damage. Remove bezel to access the reset button.

Industry Compliance

As of the date of manufacture, the TPMC-8L 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

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

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.

Setup

Identity Code

The IP ID is set within the TPMC-8L's table using Crestron Toolbox™. For information on setting an IP table, refer to the Crestron Toolbox help file. The IP IDs of multiple TPMC-8L 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 Touchpanel

NOTE: The only connection required to configure the touchpanel is power. When power is first applied to the touchpanel, the BIOS screen (white text on black background) will be upside down. This will only occur during boot up.

The TPMC-8L is configured from the setup menu.

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

If a project is running, the setup menu can be accessed using one of three methods.

Via the Hard Keys

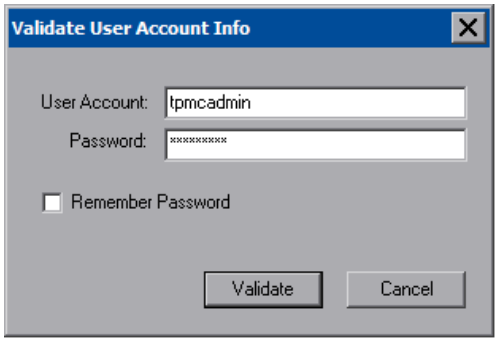
Press the hard keys 1, 2, 3 and 4 in sequence, two times within a 10 second period (i.e. press 1, 2, 3, 4, 1, 2, 3, 4).

NOTE: The hard keys in the column on the left side of the touchpanel screen are numbers 1 through 8 (top to bottom). The hard keys in the column on the right side of the touchpanel screen are numbers 9 through 16 (top to bottom).

Via USB Keyboard

1. Attach a USB keyboard (refer to "Hardware Hookup" which starts on page 41 for details).
2. Open the "Validate User Account Info" window (shown on the following page) by pressing **Ctrl+Alt+Shift** on the keyboard.

"Validate User Account Info" Window

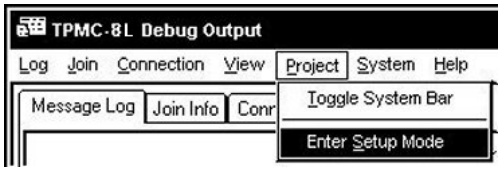


3. Enter the user account *tpmcadmin*, and the password *tpmcadmin* and touch **Validate**.

NOTE: The password is case sensitive. After logging in, the password can be changed from the "Security" window. Refer to "Security" on page 14 for more information.

4. When the "TPMC-8L Debug Output" window appears (shown in the following illustration), select **Project | Enter Setup Mode** to enter the setup menu (refer to "Setup Menu Details" which starts on page 13).

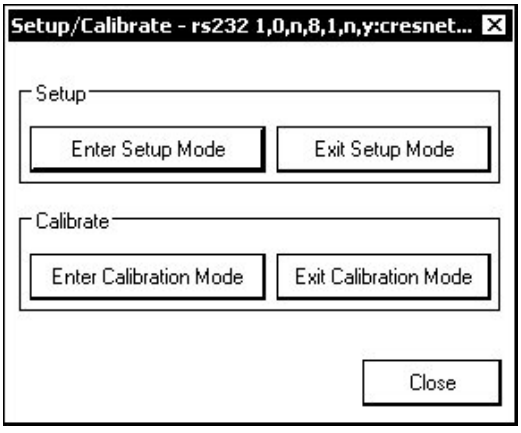
"TPMC-8L Debug Output" Window



Via Crestron Toolbox

1. Establish communication with the touchpanel (refer to "Establishing Communication" on page 52 for details).
2. Right-click on the device and select **Functions | Setup Mode…**.

"Setup/Calibrate" Window



3. Select **Enter Setup Mode**. The setup menu will be displayed as shown in the following diagram.

NOTE: Select **Exit Setup Mode** to exit the setup menu.

TPMC-8L Setup Menu

NOTE: Another way to enter the setup menu (after a project has been loaded) is to touch the screen during boot up when you see the "Preparing to Load Project" message. Maintain touch until after the countdown, when the message will change to "Loading Setup Screen".

The setup menu provides access to all basic functions and parameters. It is divided into *Setup*, *Ethernet*, *Screen Brightness, Light Sensor, Hardkey Backlight, Standby* and *Ethernet Status* sections. There are also buttons for **Install**, **Save & Reboot** and **Exit**.

NOTE: To allow the touchpanel to upload projects, standby is disabled until approximately five minutes after the project is loaded.

NOTE: The **Install** button is reserved for future applications.

To exit the setup menu and return to the program, touch **Exit**, located at the bottom of the setup menu. To save any changes and reboot the touchpanel, touch **Save & Reboot**, located at the bottom of the setup menu.

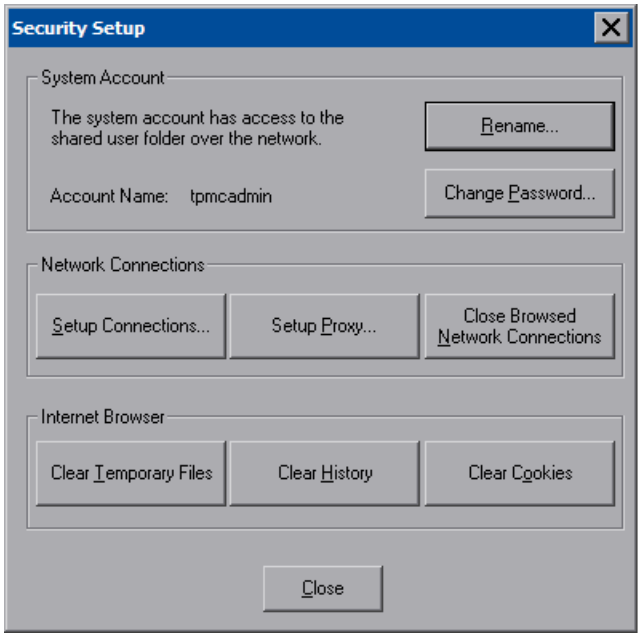
Setup Menu Details

The setup menu allows configuration of the touchpanel's settings for security, touch screen calibration, runtime project, audio, embedded applications, biometrics, hard button programming and diagnostics. The setup menu also has a button that will toggle the on-screen keyboard on and off.

Security

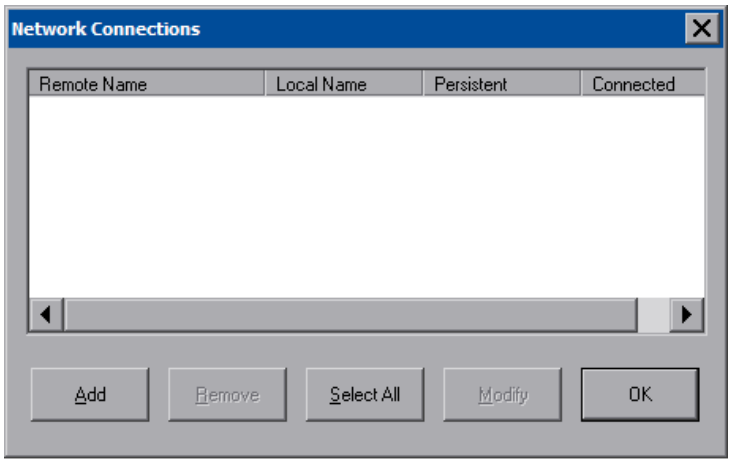
The **Security** button opens the "Security Setup" window, which allows the user to change the username and password of the system account, setup and close network connections and clear cookies.

"Security Setup" Window



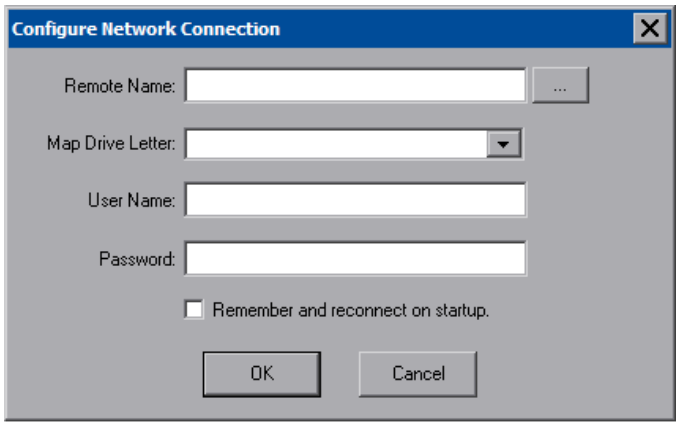
Touch **Setup Connections…** to open the "Network Connections" window. This window is used to map to a network drive. A mapped network drive permits easy access to embedded application files (Word, Excel, PowerPoint, etc.) and provides a location to save files. To further customize the installation, network drives containing compiled touchpanel project files can also be mapped.

"Network Connections" Window



To add a new network connection, touch **Add**.

"Configure Network Connection" Window



To add a network drive, touch ... to browse for the new network connection.

1. Map this connection by selecting a drive letter from the *Map Drive Letter* drop box.
2. Enter a User Name and Password.
3. Touch the *Remember and reconnect on startup* checkbox if so desired.
4. Touch **OK** to enable the new network connection and return to the "Network Connections" window.

Once all changes to network connections have been completed, touch **OK** to return to the setup menu.

Touch Screen

When **Touch Screen** is touched, the calibration screen will be displayed. Touch the screen to begin the calibration process. If the screen is not touched within 10 seconds, the calibration sequence will stop and the screen will again display the setup menu.

If the screen is touched within the 10-second timeout, it displays a series of messages indicating that you should touch the red square in five places around the screen. These messages will appear sequentially starting with "Touch the red square" at the top of the screen toward the upper left corner. Touch and hold the center of the red square to initiate calibration. The message will say "Hold…" for a few seconds, then change to "Lift off to proceed". Touch the displayed squares as prompted everywhere they appear around the screen until the calibration is complete and you are returned to the setup menu.

NOTE: When touching the screen during calibration, be as accurate as possible. Use the tip of the included stylus. To cancel calibration and return to the setup menu without saving calibration data, ignore the "Touch the red square" message. After about 10 seconds, the setup menu will be displayed. If a USB keyboard is attached to the touchpanel, you can also press the Escape key (**Esc**) to cancel calibration and return to the setup menu.

NOTE: The touchpanel's calibration routine can also be accessed through Crestron Toolbox if the touchpanel is connected to a control system via TCP/IP. From the System Info page, select **Functions | Setup Mode…**. Select **Enter Calibration Mode** to begin calibration.

Update Panel

The **Update Panel** button permits the selection of the touchpanel program, a .vtz file. The *Project* tab of the "Project and Firmware" window (refer to illustration below) displays the *Current Loaded Project* and also has a *Load New Project* section.

Current Loaded Project displays the *Name* and *Creation Time* of the current project.

In the *Load New Project* section, touch **Browse** and select the compiled project (i.e. the .vtz file) to be loaded from a network drive, USB device or flash drive. You can choose the location where your uncompressed project files will be stored. The default file location is the internal flash. Touch **Load** to uncompress the project file, place it in the destination selected in *Target Location to Load the Project to* and display it on the touchpanel.

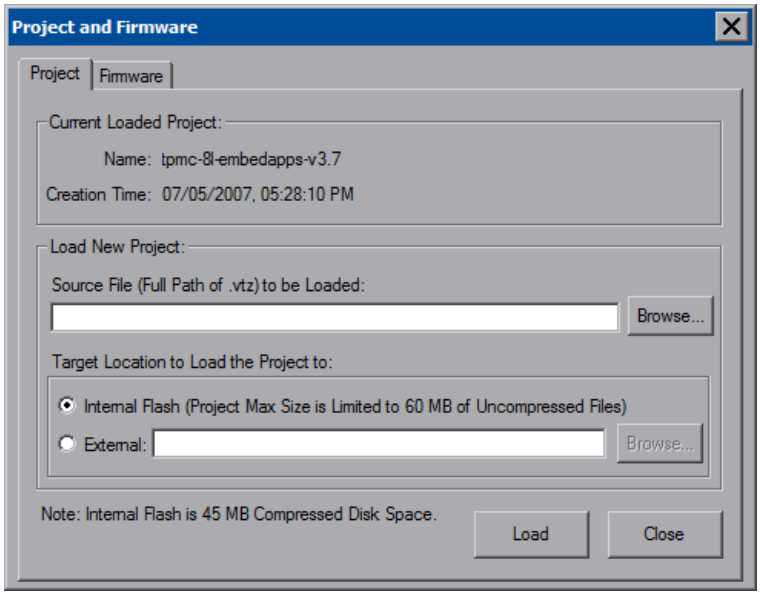
NOTE: If there is a mapped network drive on the touchpanel, the first time you select **Browse**, it may take some time for the "Browse" window to appear.

NOTE: When selecting **Browse**, the contents of the "Recent" folder will not be available.

NOTE: Projects can also be loaded via Crestron Toolbox.

NOTE: If **External** is checked, the display list cannot be viewed via Crestron Toolbox.

"Project and Firmware" Window (Project Tab)



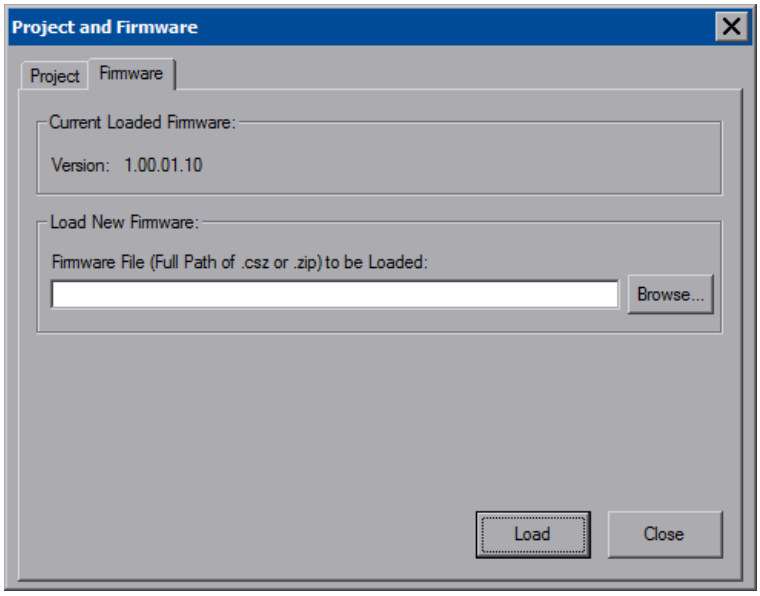
The *Firmware* tab of the "Project and Firmware" window (refer to illustration on the following page) displays the *Current Loaded Firmware* and also has a *Load New Firmware* section.

Current Loaded Firmware displays the *Version* of the current firmware.

In the *Load New Firmware* section, touch **Browse** and select the firmware file (i.e. the .csz or .zip file) to be loaded from a network drive, USB device or flash drive. Touch **Load** to load the new firmware.

NOTE: When selecting **Browse**, the contents of the "Recent" folder will not be available.

"Project and Firmware" Window (Firmware Tab)

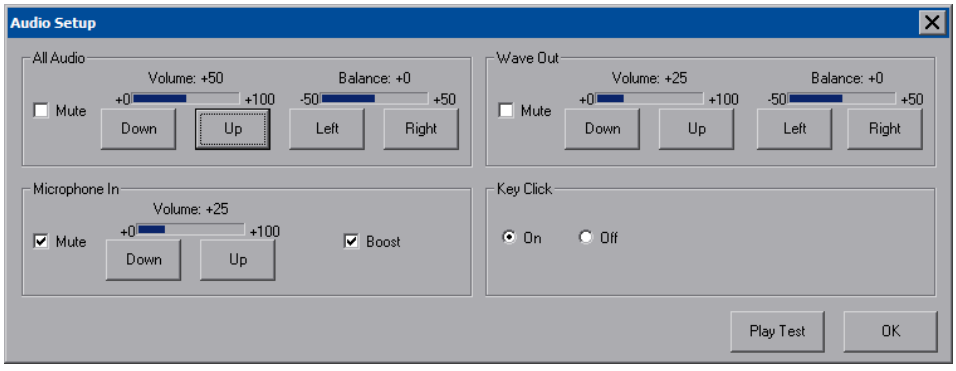


Audio

The **Audio** button opens the "Audio Setup" window. Overall *All Audio* volume and balance controls and a *Mute* checkbox are available as well as volume and balance controls and *Mute* checkboxes for *Wave Out* and *Microphone In*. The *Microphone In* settings also include a **Boost** checkbox, which applies a 20 dB boost to the level of the microphone input. The key click sound can be enabled or disabled with the *Key Click* **On** and **Off** radio buttons.

Touching **Play Test** plays a short internal audio file. Changes to audio settings are made in real time.

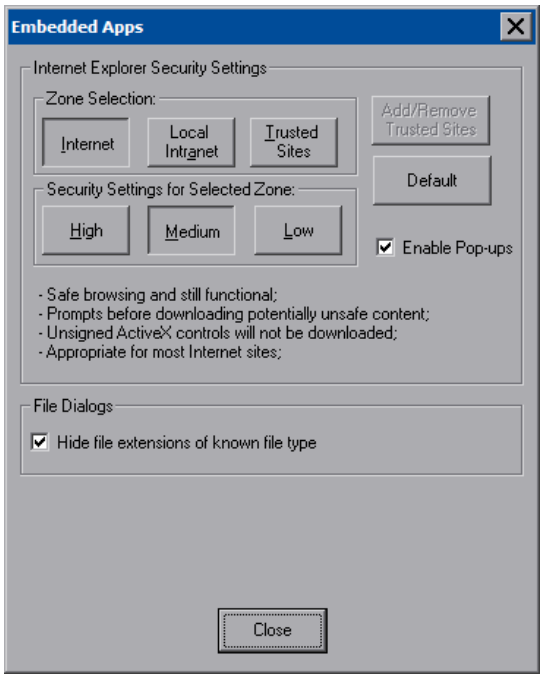
"Audio Setup" Window



Embed Apps (Embedded Applications)

The **Embed Apps** button opens a window that permits you to set internet security to different levels for different types of internet sites.

"Embedded Apps" Window



Three security levels (**High**, **Medium** and **Low**) can be selected for each of the three zones (**Internet**, **Local Intranet**, and **Trusted Sites**). The security levels are defined as:

- **High:** The safest way to browse, but also the least functional. Less secure features are disabled. Appropriate for sites that may have harmful content.
- **Medium:** Safe browsing and still functional. Prompts before downloading potentially unsafe content. Unsigned ActiveX controls will not be downloaded. Appropriate for most internet sites.
- **Low:** Minimal safeguards and warning prompts are provided. Most content is downloaded and run without prompts. All active content can run. Appropriate for sites you absolutely trust.

Touch **Default** to restore the default security settings. By default, security is set to **Medium** for **Internet** and **Local Intranet**, and **Low** for **Trusted Sites**.

The "Embedded Apps" window also permits you to enable the popup windows (child windows) that open when you are in Internet Explorer (not the popup windows of the embedded applications).

NOTE: Refer to the Crestron website (www.crestron.com), online help Answer ID 4190, for information on the latest versions of the software.

Touch **Close** after all changes have been made. The touchpanel must be rebooted for changes to take effect. Refer to "Save & Reboot Details" on page 39 for more information.

A list of trusted sites can be created and edited by touching **Add/Remove Trusted Sites**. Touching this button will open the "Trusted Sites" window. From here, trusted sites can be added and edited. Sites are listed by domain name or IP address. Once all sites have been entered, touch **Close**.

"Trusted Sites" Window

NOTE: Save & Reboot on the setup menu must be selected for Embedded Apps changes to take effect.

NOTE: While browsing the Internet with the TPMC-8L, clicking on a link may cause a message box titled "Restrictions" to appear that contains the text "This operation has been cancelled due to restrictions in effect on this computer. Please contact your system administrator." If this message appears, checking *Enable Popup Windows* in the "Embedded Apps" window may correct this error. Other restrictions may also cause this error, so this may not prevent all occurrences.

NOTE: The TPMC-8L Multi-Language Pack allows the user to view documents written in any of 32 supported international languages by all the embedded apps in the touchpanel. For details, refer to "Appendix: TPMC-8L Multi-Language Pack" on page 58.

NOTE: The TPMC-8L supports automatic connection to the VNC server when the VNC View application is opened. For automatic connection without having to enter the server location and password every time the VNC viewer is opened, launch the application and using a USB mouse, right-click on the VNC viewer window, then select **Save configuration info as…**.

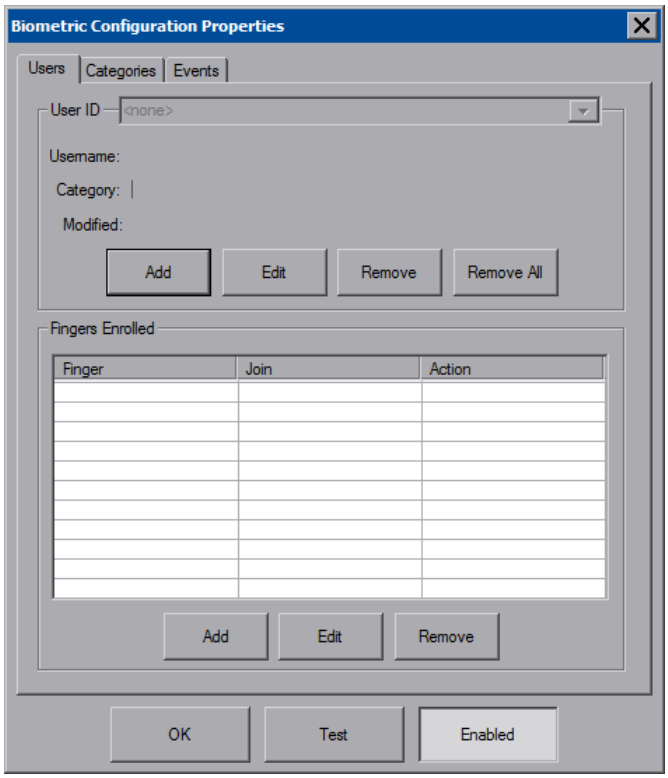
NOTE: Refer to the Crestron website online help Answer ID 4627, for information on how to set up the VNC viewer. Refer to Answer ID 3345 for information on how to program the MJPEG viewer. Refer to Answer ID 4640 for information about default paths for embedded applications and dynamic graphics.

Biometric

The built in fingerprint scanner makes user identification easy. Up to 10 fingers can be scanned for each user. Each finger scan is able to trigger a join and/or an automated action (such as entering setup mode, wake, sleep, etc.).

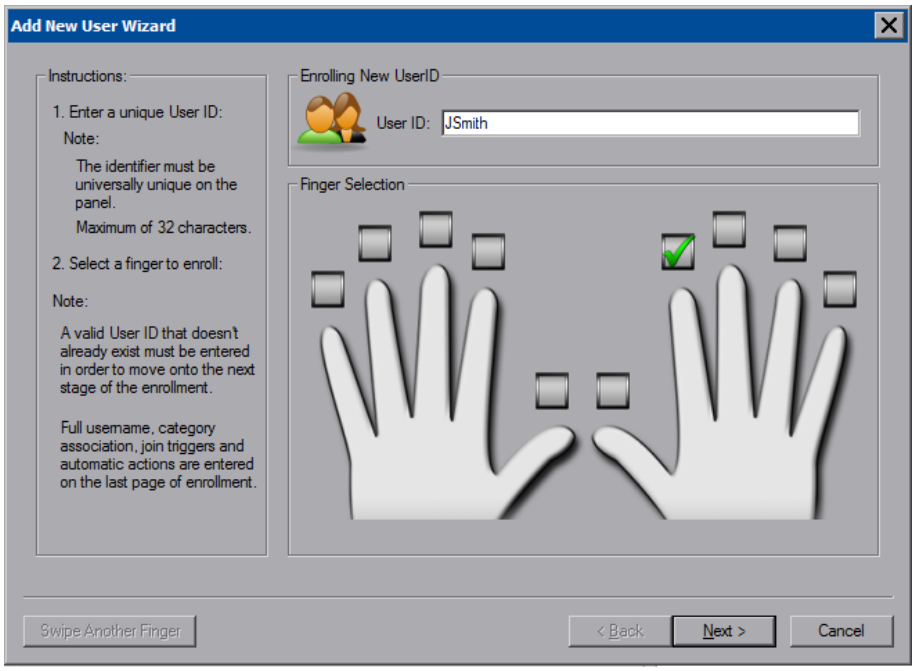
Touching **Biometric** will display the "Biometric Configuration Properties" window. New users can be enrolled from here and the resulting join and/or action for each finger can be edited. The **Enabled** button at the bottom of the window can be used to turn the fingerprint scanner on and off.

"Biometric Configuration Properties" Window (Users)



From the *Users* tab, touch **Add** (in the upper half of the window) to start the "Add New User Wizard".

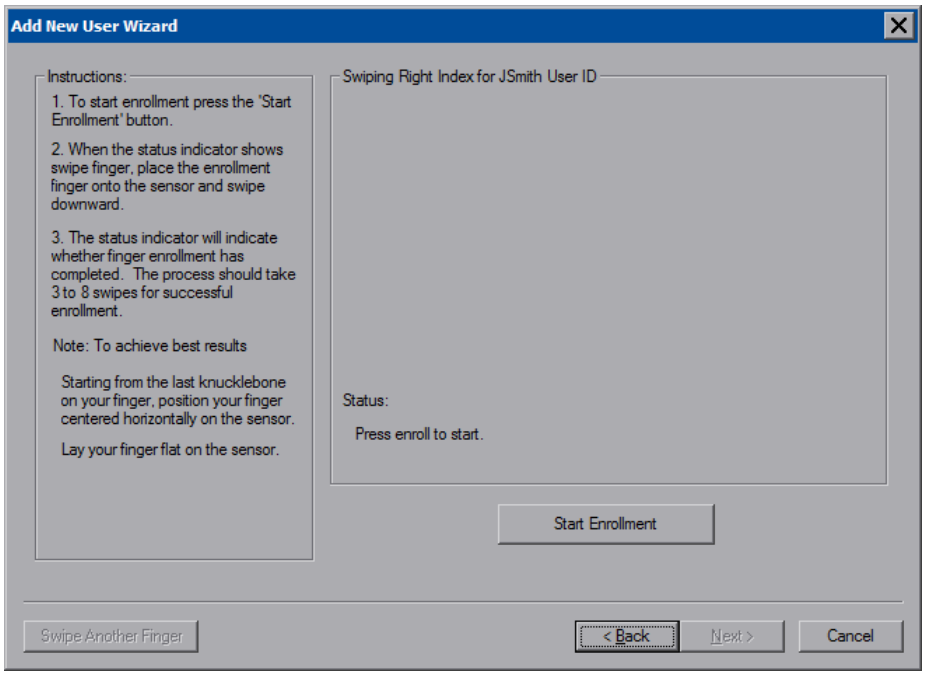
"Add New User Wizard" First Window



After entering a *User ID* and selecting which finger to scan, touch **Next**.

NOTE: A valid *User ID* that does not already exist must be entered in order to move onto the next stage of enrollment. Only one *User ID* should be used per person.

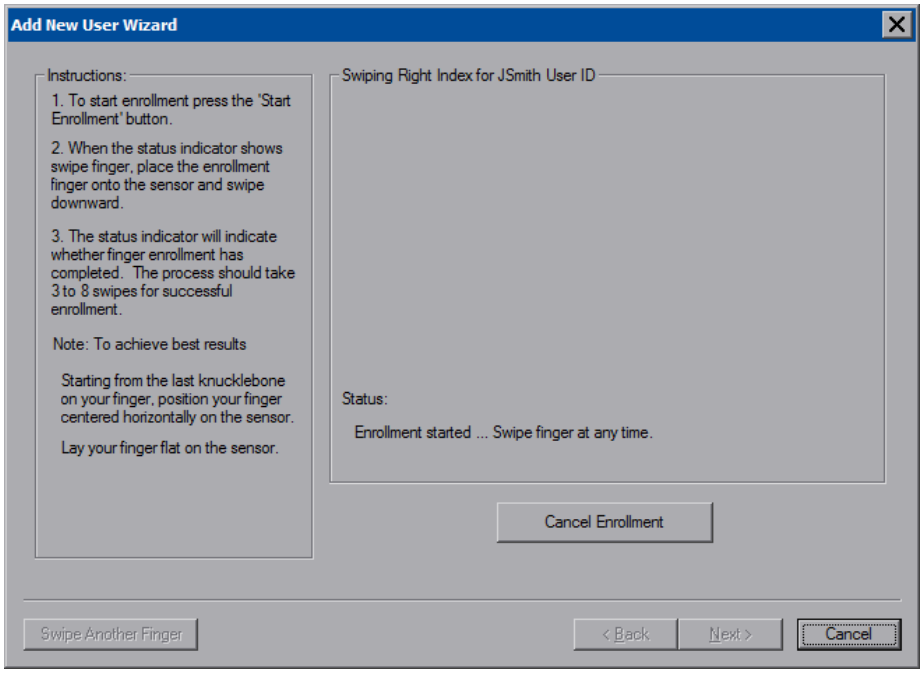
"Add New User Wizard" Second Window



At the next window, touch **Start Enrollment**.

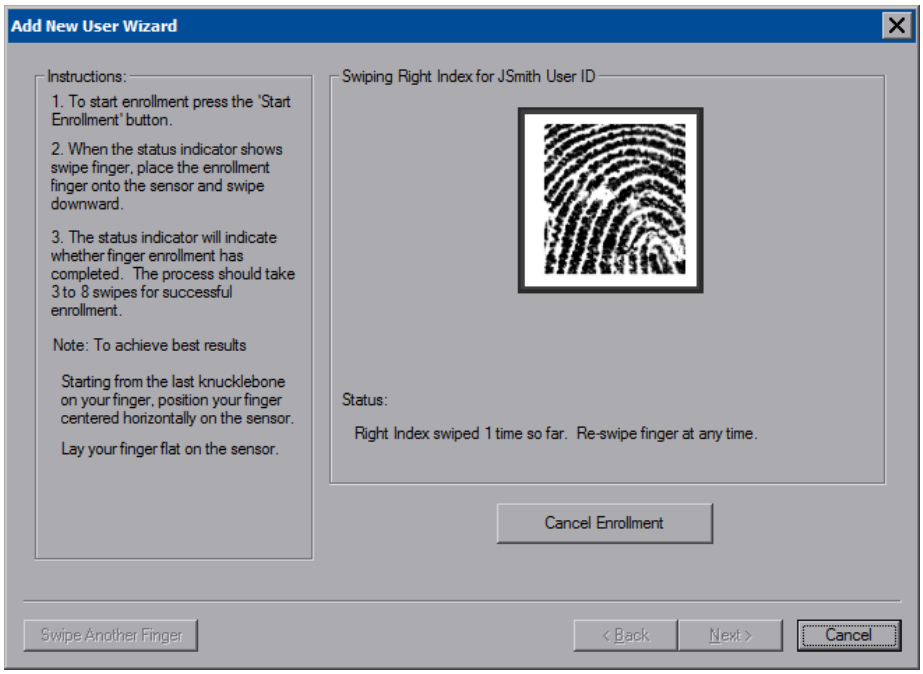
You will be instructed to swipe or slide the selected finger over the sensor.

"Add New User Wizard" Window - Ready For Swipe



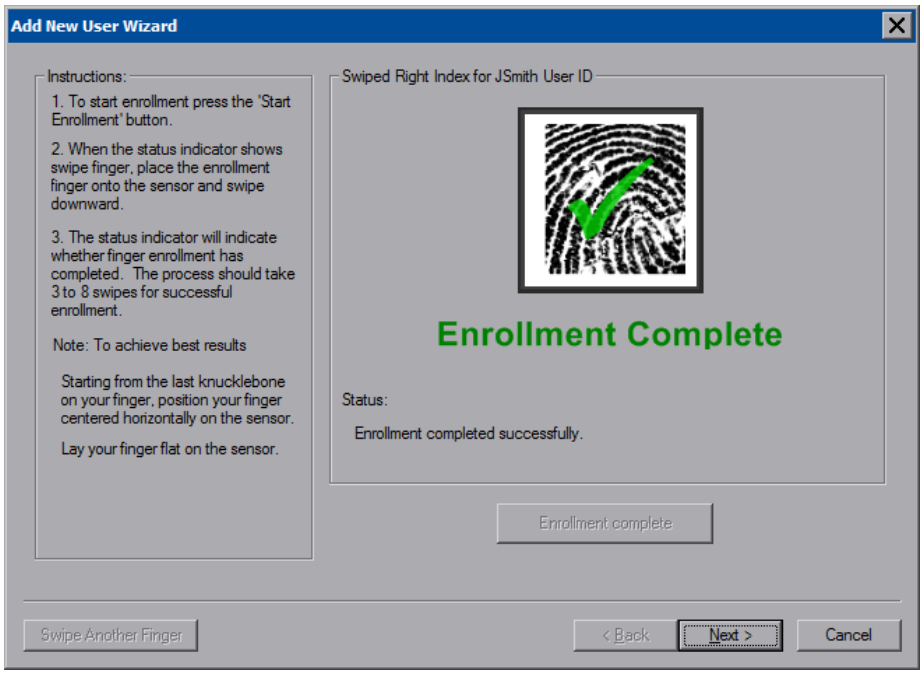
You will need to swipe or slide the selected finger over the sensor a few times and will see a count for how many swipes have occurred. For each swipe, you will see the scanned fingerprint.

"Add New User Wizard" Window - Showing Scanned Fingerprint



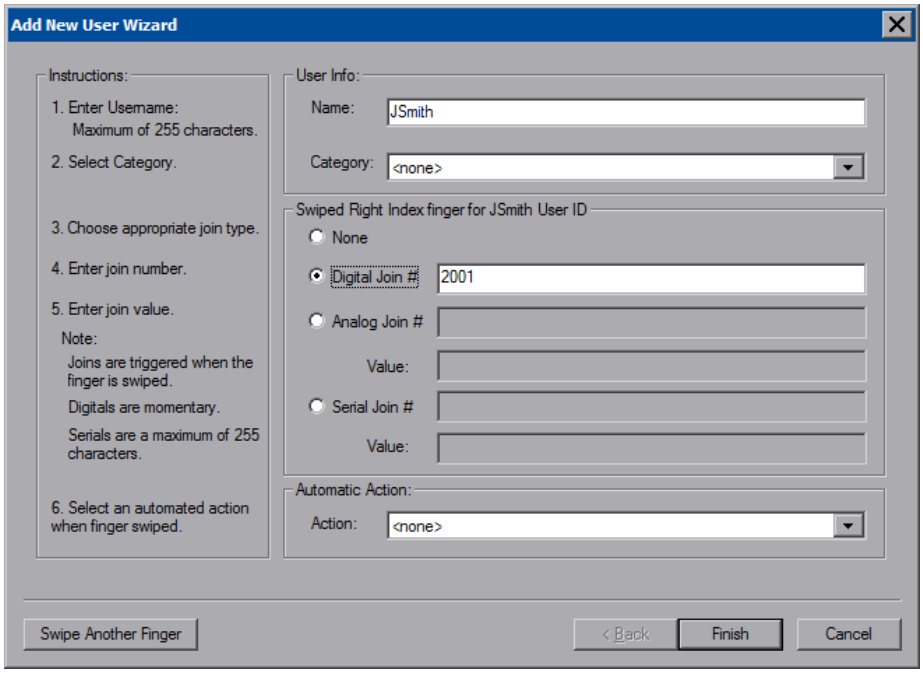
When scanning is complete you will see an "Enrollment Complete". Touch **Next** to proceed.

"Add New User Wizard" Window - Showing "Enrollment Complete" Message



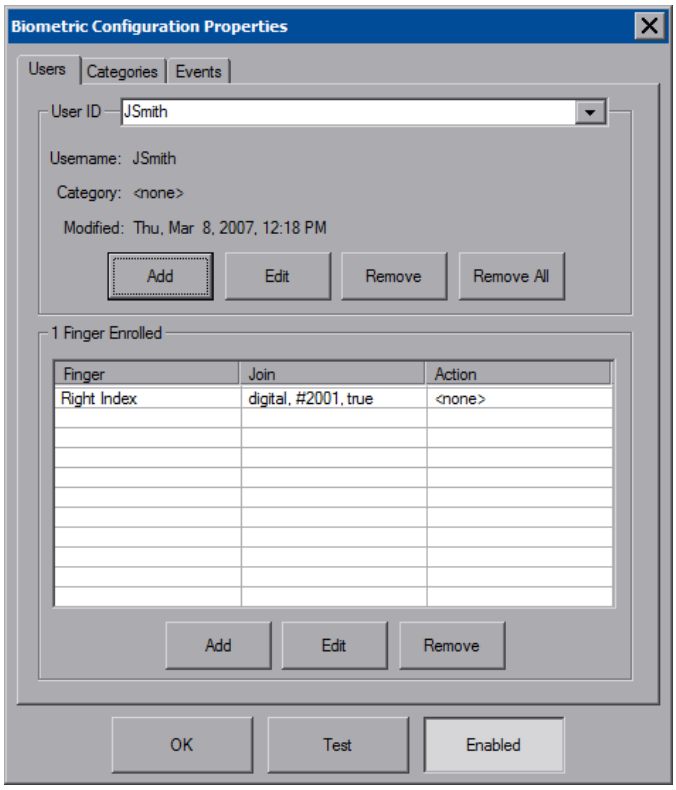
The next window allows you to enter a user name, set a category (i.e. a user defined grouping such as "admin" or "guest", etc.), join number and/or an automated action to associate with the finger scan. These can also be set later in the "Biometric Management" window.

"Add New User Wizard" Window - Showing Options After Scanning



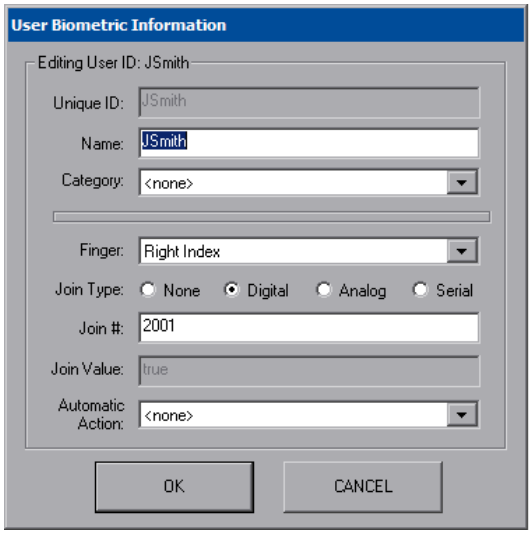
To scan another finger, touch **Swipe Another Finger**. When done, touch **Finish** to return to the "Biometric Configuration Properties" window.

"Biometric Configuration Properties" Window - Showing New User ID and Scan Data



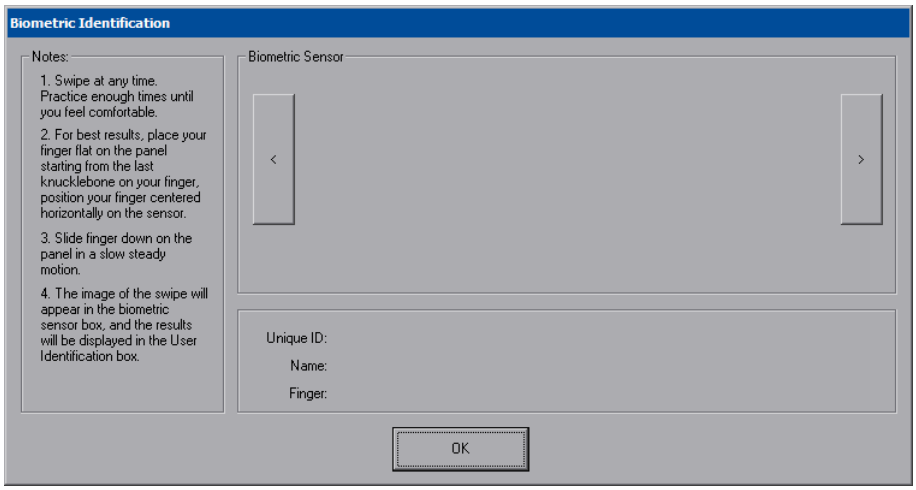
If more than one finger is to be enrolled, touch **Add** (in the lower half of the window). Touch **OK** to return to the setup menu or touch **Edit** (in the lower half of the window) to access the "User Biometric Information" window.

"User Biometric Information" Window



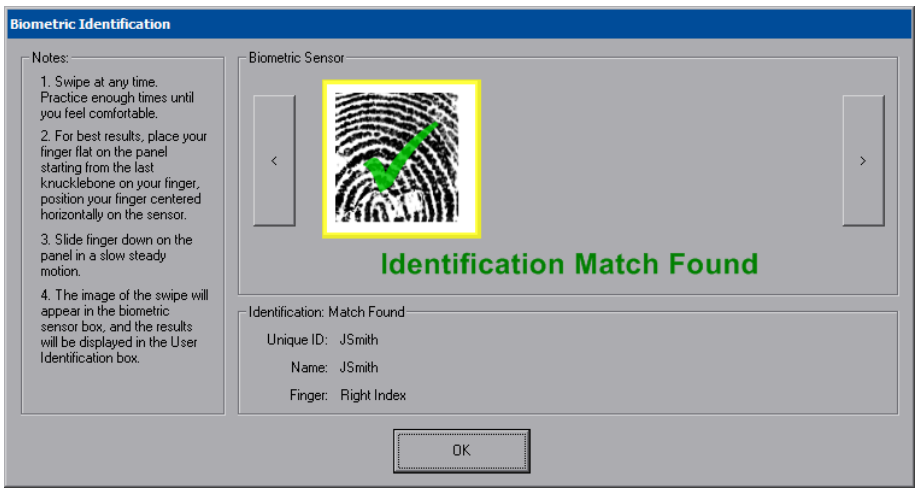
You can also touch **Test** to open the "Biometric Information" window, to practice finger swipes and verify identities. Refer to illustration on the following page.

"Biometric Information" Window



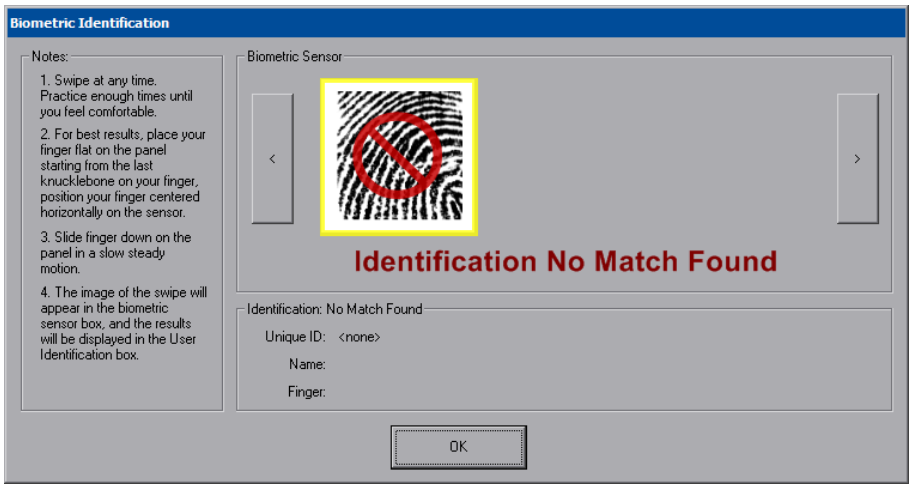
If the finger swipe matches one in the touchpanel's database, it will show an "Identification Match Found" message along with the matching *Unique ID*, *Name* and *Finger*.

"Biometric Information" Window - Showing Match Found



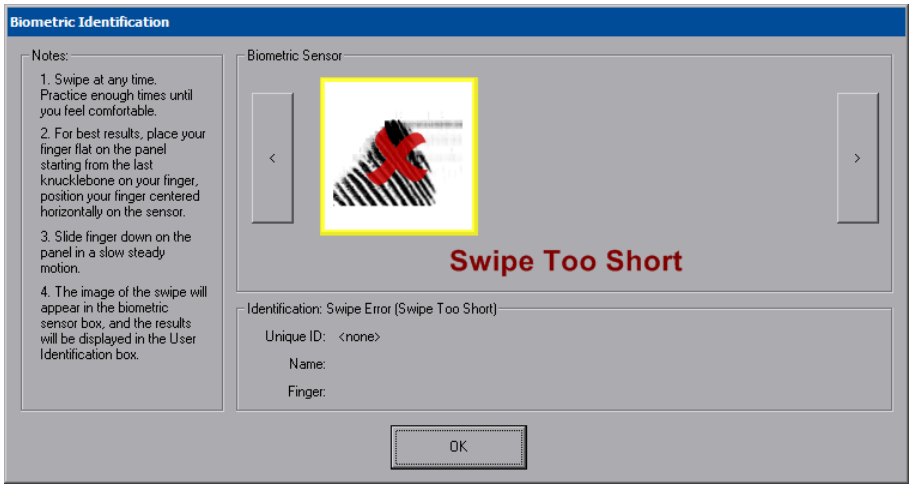
If the finger swipe does not match one in the touchpanel's database, it will show an "Identification No Match Found" message.

"Biometric Information" Window - Showing No Match Found



If the touchpanel is unable to read the finger swipe, it will show a message indicating the type of error. In the example below, it shows the "Swipe Too Short" message.

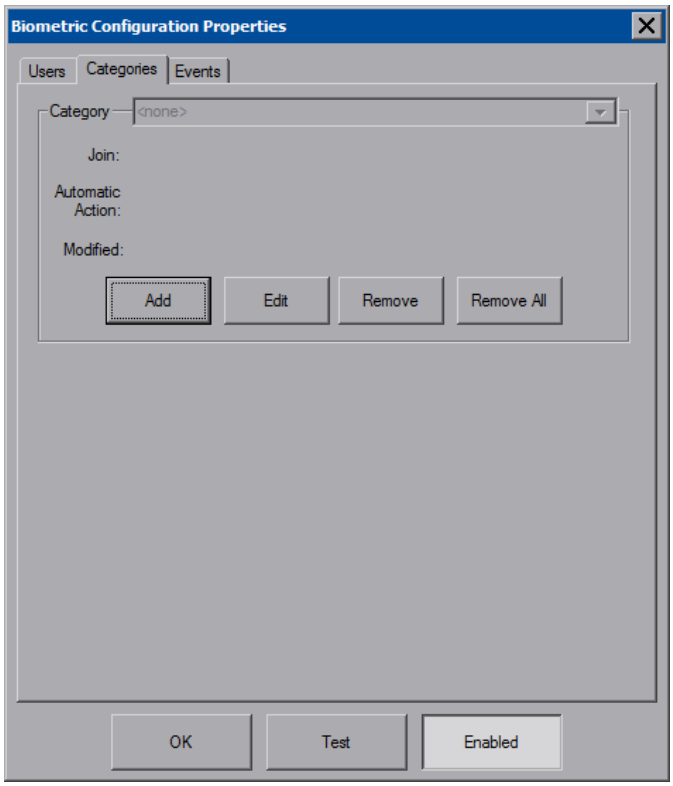
"Biometric Information" Window - Showing Swipe Error



Touch **OK** at any time to return to the "Biometric Configuration Properties" window.

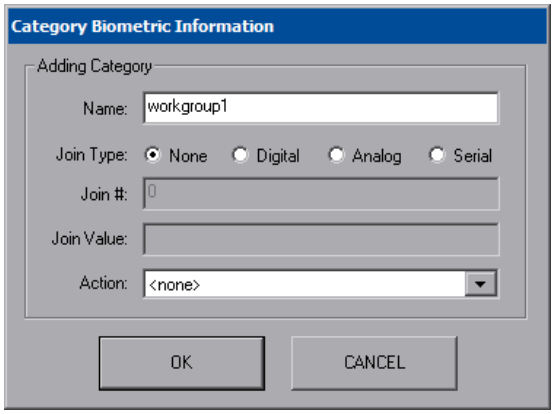
From the *Categories* tab of the "Biometric Configuration Properties" window, you can add, edit or remove categories.

"Biometric Configuration Properties" Window (Categories)



To create a new category, touch **Add** to open the "Category Biometric Information" window.

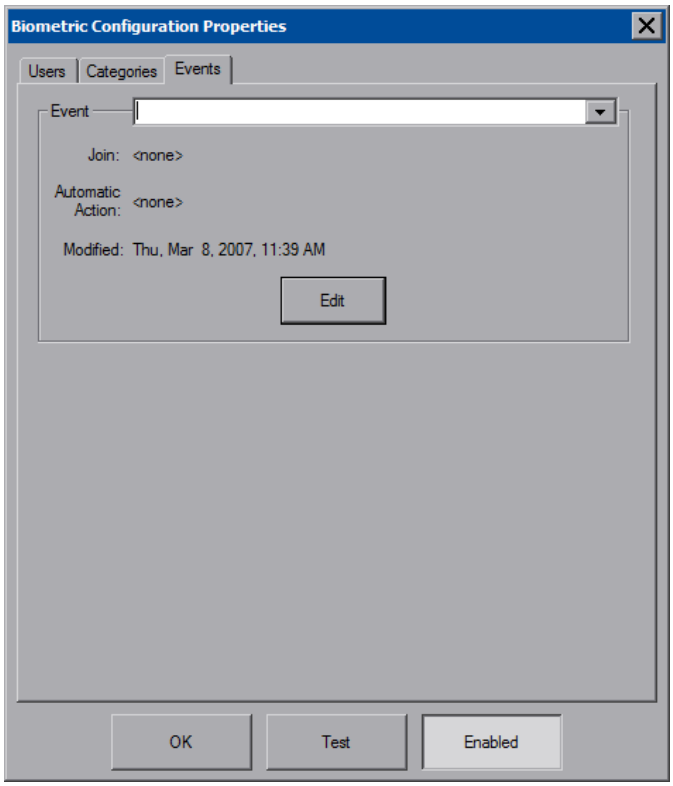
"Category Biometric Information" Window



Touch **OK** to accept (or touch **CANCEL** to cancel) and return to the "Biometric Configuration Properties" window.

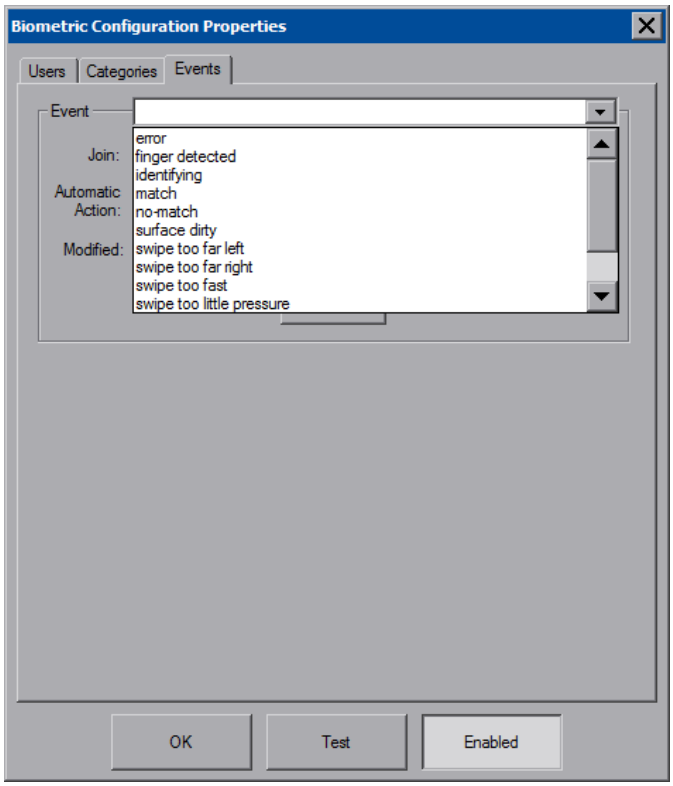
From the *Events* tab of the "Biometric Configuration Properties" window, you can add, edit or remove events.

"Biometric Configuration Properties" Window (Events)



Touching the down arrow will open a drop down list of events.

"Biometric Configuration Properties" Window - Showing Event List (Events)

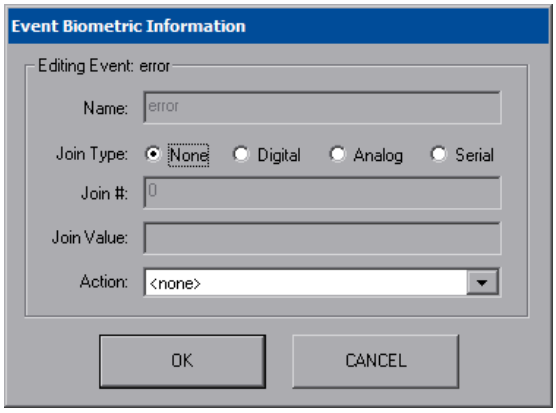


The following are the events that can be selected:

1. **Error:** An error occurred while trying to identify the swiped finger. It could be any of the events listed below from #6 through #13.
2. **Finger detected:** A finger has been detected and identification will start.
3. **Identifying:** The sensor is in the process of identifying.
4. **Match:** Identification has completed and a match has been found.
5. **No-match:** Identification has completed and no match was found in the user database.
6. **Surface dirty:** The surface is too dirty for identification.
7. **Swipe too far left**
8. **Swipe too far right**
9. **Swipe too fast**
10. **Swipe too little pressure**
11. **Swipe too short**
12. **Swipe too skewed**
13. **Swipe too slow**

Select the event you wish to edit and touch **Edit** to open the "Event Biometric Information" window.

"Event Biometric Information" Window

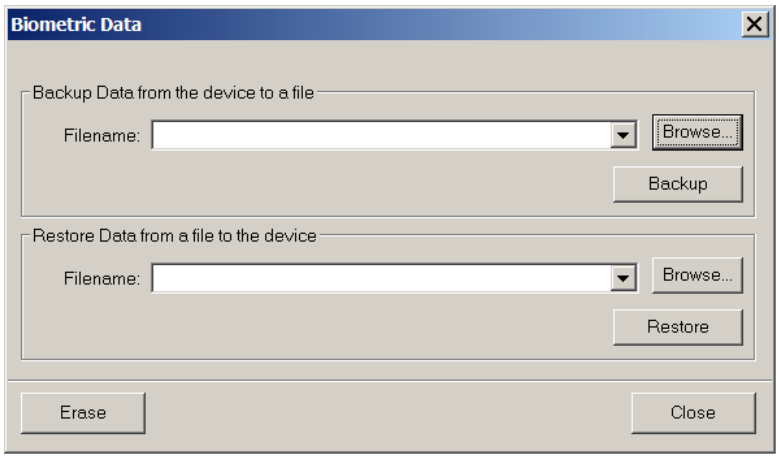


Touch **OK** to accept (or touch **CANCEL** to cancel) and return to the "Biometric Configuration Properties" window. Then touch **OK** to return to the startup menu.

In actual use, a popup window will appear showing if a match was found, if a match was not found or if the scan was no good (for example, too short).

Crestron Toolbox includes a utility that will allow the database from one TPMC-8L to be shared with another, by backing up the database from one touchpanel and restoring it to another. From Toolbox, select **Functions | Biometric Data…** to open the utility, as shown in the illustration on the following page.

"Biometric Data" window in Toolbox



Hard Buttons

Touching **Hard Buttons** will display a screen that provides visual feedback for all button presses. Pressing any of the buttons will result in its corresponding number on the screen illuminating in yellow. By default, hard key number 1 toggles the on-screen keyboard on and off. However, this can be disabled using the **Keyboard** button on the **Hard Buttons** screen. Hard key number 1 can then be used like any of the other buttons. If disabled, it will use the VisionTools® Pro-e (VT Pro-e) project assignment.

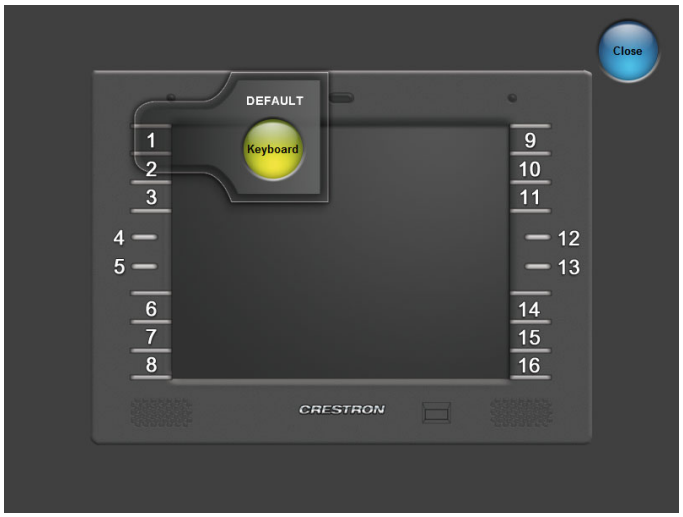
NOTE: The hard keys in the column on the left side of the touchpanel screen are numbers 1 through 8 (top to bottom). The hard keys in the column on the right side of the touchpanel screen are numbers 9 through 16 (top to bottom).

NOTE: Pressing hard keys 1 and 9 for more than four seconds will force the unit to shut down.

Buttons are programmed using VT Pro-e.

Touch **Close** to return to the setup menu.

"Hard Buttons" Window



Keyboard

Touch **Keyboard** to display the on-screen keyboard.

The on-screen keyboard can be used in an identical manner to a physically connected keyboard. It can be used in any of the embedded applications, for example, to enter a web address or to enter data into a spreadsheet, etc.

The on-screen keyboard also has a few special keys:

Volume down

Volume up

Right click: simulates right-click of mouse

Size: toggles on-screen keyboard size (small, medium, large)

Keyboard translucence down: decreases keyboard translucence

Keyboard translucence up: increases keyboard translucence

On-Screen Keyboard

The initial position of the on-screen keyboard is determined by the VT Pro-e program or SIMPL Windows settings. The on-screen keyboard will default to its largest size.

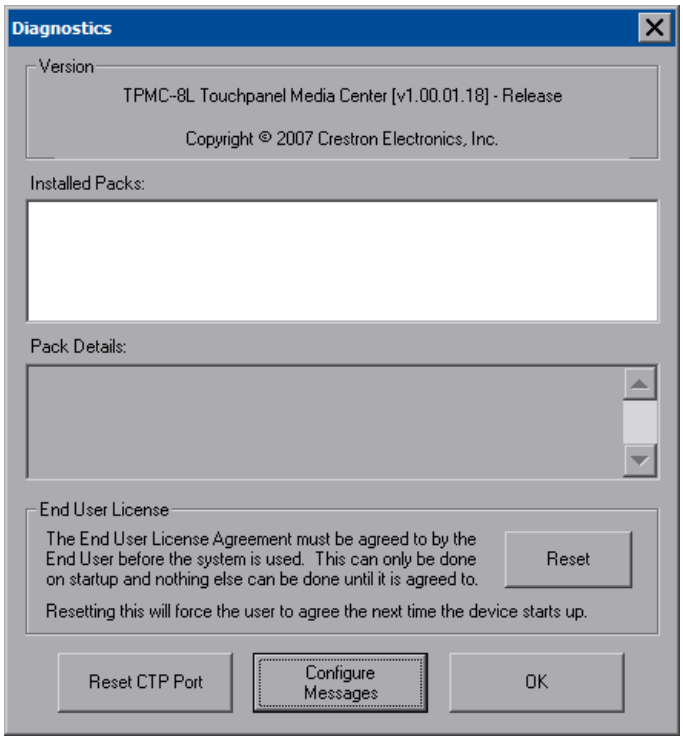
In use, when the on-screen keyboard is moved and/or resized and then closed, it will re-open in the same position it was in and at the same size it was when closed. This position and size will remain in memory until the touchpanel is re-booted or it is re-set by the SIMPL Windows program. After reboot, the position of the on-screen keyboard will revert to the defaults set in the VT Pro-e or SIMPL Windows program. The size will revert to the largest as determined by the firmware installed in the touchpanel.

Exit the on-screen keyboard by selecting **File | Exit** or by touching the "X" close button in the upper right corner of the keyboard window. If hard key number 1 has the keyboard enabled, you can also exit the keyboard by using hard key number 1, a reserve join number in VT Pro-e or a device extender in SIMPL Windows.

Diagnostic

Touch **Diagnostic** to display the firmware version number, view *Installed Packs* and to reset the end user license from the "Diagnostics" window.

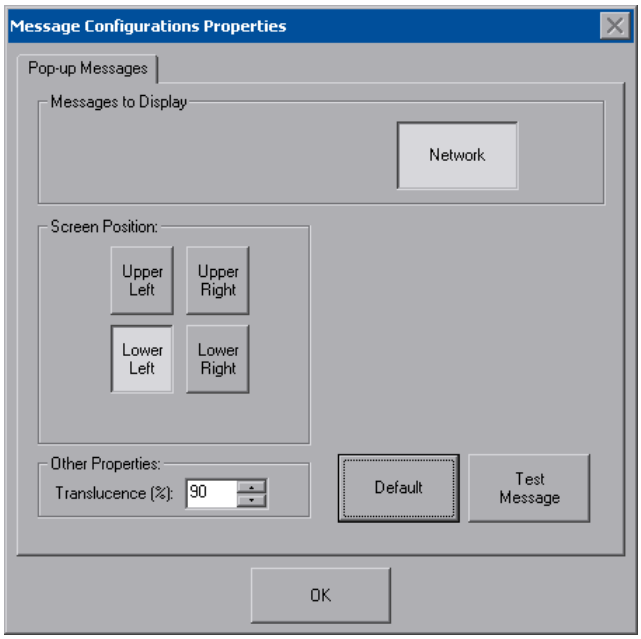
"Diagnostics" Window



Reset CTP Port resets the default value of the CTP port to 41795, for terminal connection using Crestron Toolbox.

To configure the appearance of popup messages and biometric messages, touch **Configure Messages**. The "Message Configurations Properties" window will open.

"Message Popup Configuration" Window



There are three types of **Network** popup messages. Following are definitions of each message type:

- **Connected:** A green popup message appears when the panel is connected to the control system.
- **Checking Connection:** A yellow popup message appears when the panel is experiencing network issues.
- **Disconnected, Trying to Reconnect…:** A red popup message appears when the panel loses connection with the control system.

A control for popup message *Translucence* is also provided. Translucence ranges from 25% to 100%, with a default value of 90%.

The **Default** button restores the original *Screen Position* and *Translucence* settings, as well as enabling display of *Network* messages. A **Test Message** button lets you see the changes to popup message position and translucence. Touch **Close** to close the popup window.

NOTE: The default value for *Screen Position* is **Lower Left**.

Ethernet Details

The Ethernet portion of the setup menu allows configuration of the touchpanel settings for Ethernet communications.

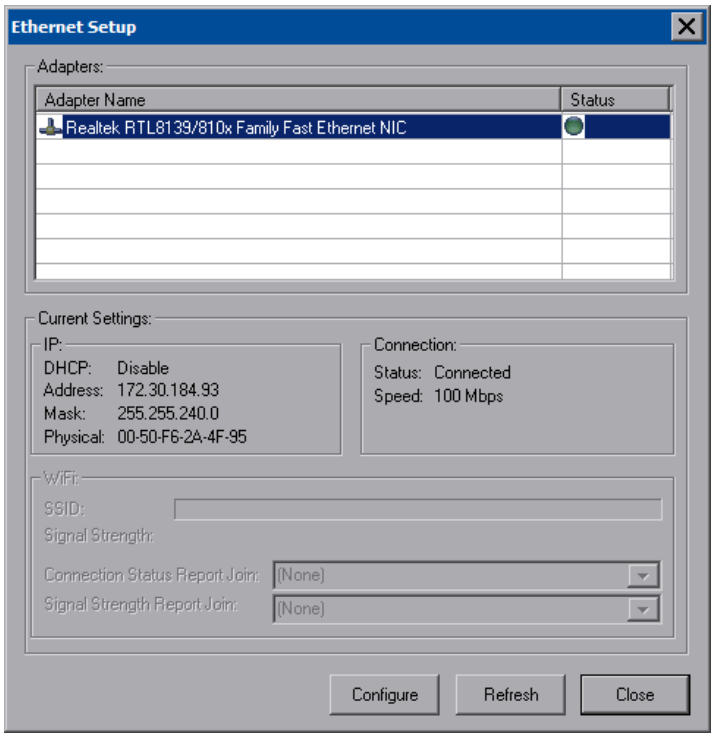
The Crestron Swirl logo at the top of the Ethernet portion of the setup menu illuminates to indicate the status of your connection to the control system(s):

- Green Connected
- Yellow Network trouble
- Orange Connected to some but not all of the control systems (listed in IP table)
- Red Not connected to any control system (listed in the IP table)

Adapters

Touch **Adapters** to access the "Ethernet Setup" window. To save any changes, use the **Save & Reboot** button on the setup menu. The Ethernet address and mask are displayed on this screen.

"Ethernet Setup" Window

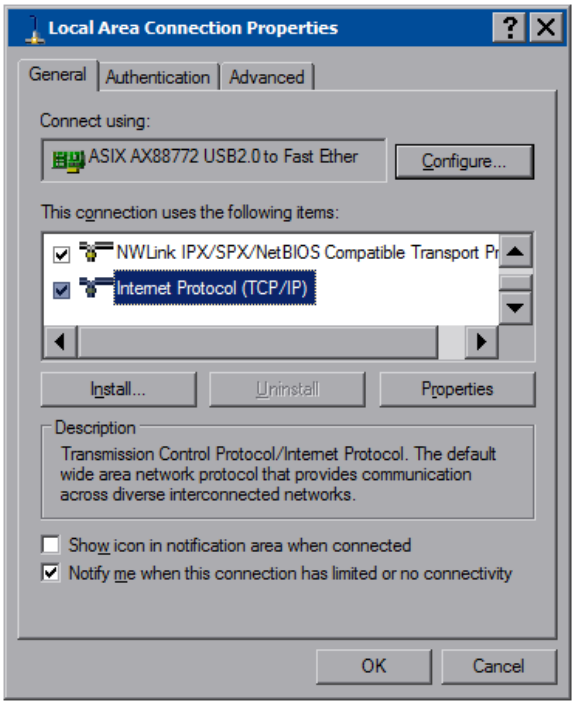


Touch **Configure** to open the "Local Area Connection Properties" window. This window displays the connection and related required items.

NOTE: When configuring an adapter, only one item can be modified at a time. For example, to modify an IP address and also change authentication, touch **Configure** and modify the IP address, then touch **OK** (you must return to the "Ethernet Setup" window). Touch **Configure** again, change authentication, then touch **OK**. The order in which modifications are performed does not matter.

NOTE: Refer to the Crestron website (www.crestron.com), online help Answer ID 4628, for information on how Windows switches between wired Ethernet communications and Wi-Fi.

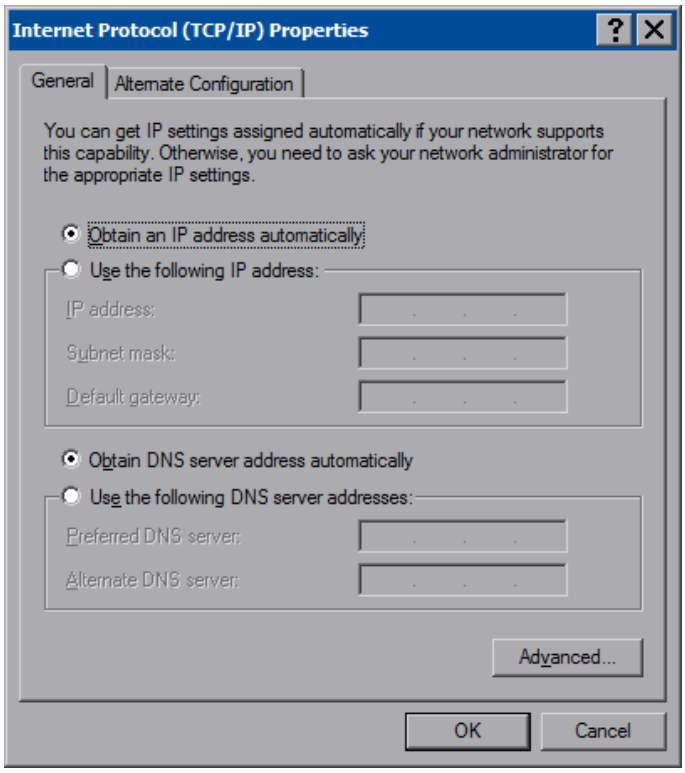
"Local Area Connection Properties" Window



NOTE:
The *Advanced* tab is not supported at this time.

The TPMC-8L is already configured for DHCP. To establish static processing or to switch between DHCP and static IP, use the *General* tab of the "Local Area Connection Properties" window (refer to illustration above), select **Internet Protocol (TCP/IP)** and touch **Properties**.

"Internet Protocol (TCP/IP) Properties" Window



Transmission Control Protocol/Internet Protocol (TCP/IP) is a set of protocols that defines how to transfer data between two computers. TCP monitors and ensures correct transfer of data. IP receives the data from TCP, breaks it up into packets, and ships it off to a network. The IP address is a unique number consisting of four parts separated by dots, e.g., 165.113.245.2.

Dynamic Host Configuration Protocol (DHCP) is a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network. In some systems, the IP address of the device can even change while it is still connected. DHCP also supports a mix of static and dynamic IP addresses.

Dynamic addressing simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. New computers can be added to a network without manually assigning each one a unique IP address.

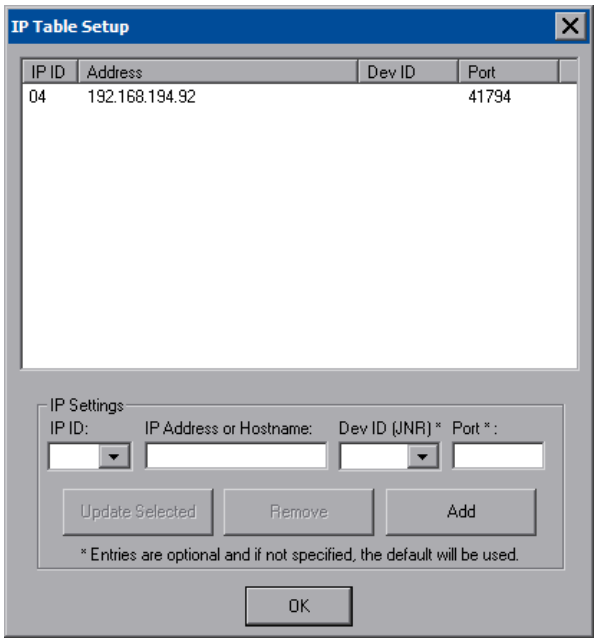
IP Table

Touch **IP Table** on the setup menu to open the "IP Table Setup" window.

Edit, remove or enter a control system's IP address in the IP table to enable communication between the touchpanel and a control system. The touchpanel can communicate with multiple control systems.

For more information on IP tables, refer to the latest version of the Crestron 2-Series Control Systems Reference Guide (Doc. 6256), which is available from the Crestron website (www.crestron.com/manuals).

"IP Table Setup" Window

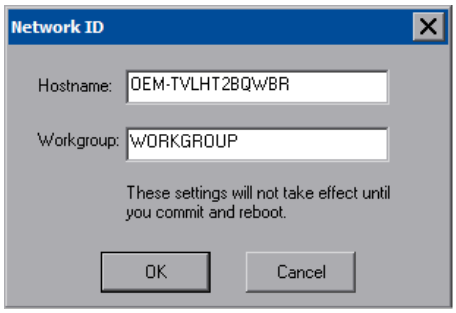


The IP ID is the ID number that is used to identify the touchpanel in the control system's IP table. The IP ID should match the IP ID set in the SIMPL Windows program.

Identity

Touch **Identity** to open the "Network ID" window. The "Network ID" window displays the hostname and workgroup that identify the touchpanel on the network. The hostname may be used when transferring a program over Ethernet using Crestron Toolbox. This window permits editing of the hostname and workgroup.

"Network ID" Window

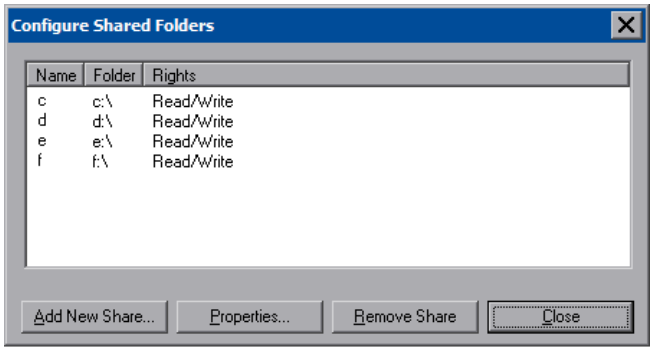


NOTE: The hostname is required for Ethernet communication.

Sharing

Touch **Sharing** to open the "Configure Shared Folders" window. This window is used to set up shared folders. Sharing enables remote computers to view and/or modify files stored on the touchpanel.

"Configure Shared Folders" Window



Touch **Add New Share…** to browse and add directories with permission to read only or read/write. Touch **Close** after adding all folders to be shared.

NOTE: For security reasons, there is no persistence of the shared drive(s) after the panel is rebooted.

Screen Brightness Details

The *Screen Brightness* can be varied from 0 to 100. To increase the brightness, touch **Up**. To decrease the brightness, touch **Down**.

Use the controls to adjust the brightness level of the current brightness as well as the *High Level*, *Medium Level* and *Low Level* presets. Touch **Low**, **Med** or **High** to check each level.

Light Sensor Details

With Auto Brightness set to **On**, the internal light sensor adjusts the display brightness level to accommodate for the ambient lighting conditions. If the light level is above the threshold, the brightness changes to the high setting; if the light level is below the threshold, the brightness changes to the low setting.

With *Auto Brightness* set to **Off**, the screen brightness is determined by the *Screen Brightness* controls.

Use the *Threshold* controls to set the level at which the *Auto Brightness*, if set to **On**, will adjust screen brightness.

Hardkey Backlight Details

Use the **Down** and **Up** buttons to adjust the brightness of the button lights on the bezel. The buttons allow a brightness range from 0 to 100%.

Standby Details

The *Standby* function turns off the backlight when the touchpanel is inactive for a specified time. Use the **Up** and **Down** buttons to set the *Standby* from 0 through 120 minutes, where 0 disables the timeout. Touch the screen to reactivate the touchpanel

from standby mode. When the touchpanel is reactivated, the last screen to be displayed reappears.

NOTE: The pushbuttons will still function when the touchpanel is in standby mode but will not cause it to awaken from standby. You must touch the screen to reactivate the touchpanel.

Ethernet Status Details

The *Ethernet Status* section of the setup menu has an indicator to show when the TPMC-8L is connected via its **LAN** port. IP and Mac addresses are also shown.

Save & Reboot Details

To save any changes and reboot the touchpanel, touch **Save & Reboot**, located in the lower right section of the setup menu.

Exit Details

Touch **Exit** to leave the setup menu and return to the project. If no project has been loaded, the touchpanel will display an error message and return to the setup menu.

Mounting Options

The TPMC-8L touchpanel installs simply and cleanly into existing or newly constructed walls with an assortment of pre- and post-construction mounting options. All mounting options are provided separately from the actual touchpanel. Refer to the following table for a complete list of mounting options and respective Installation Guides for this touchpanel.

Mounting Options for the TPMC-8L

PRE-CONSTRUCTION* OPTION	POST-CONSTRUCTION** OPTION	MODEL NUMBER	DOCUMENT NUMBER
Back Box Kit	-	BB-8L	6589
Pre-Construction Mount Kit	-	PMK-8L	6590
Mud Mount Kit (accessory)	-	MMK-8L	6591
Trim Mount Kit (accessory)	-	TMK-8L	6592
-	Wall Mount Kit – Mud	WMKM-8L	6591
-	Wall Mount Kit – Trim	WMKT-8L	6592

* Pre-construction refers to framed walls prior to hanging drywall.

** Post-construction refers to framed walls with drywall hung.

NOTE: There is also a rack mount kit (RMK-8L) available for the TPMC-8L. Refer to the latest version of the RMK-8L Installation Guide (Doc. 6596).

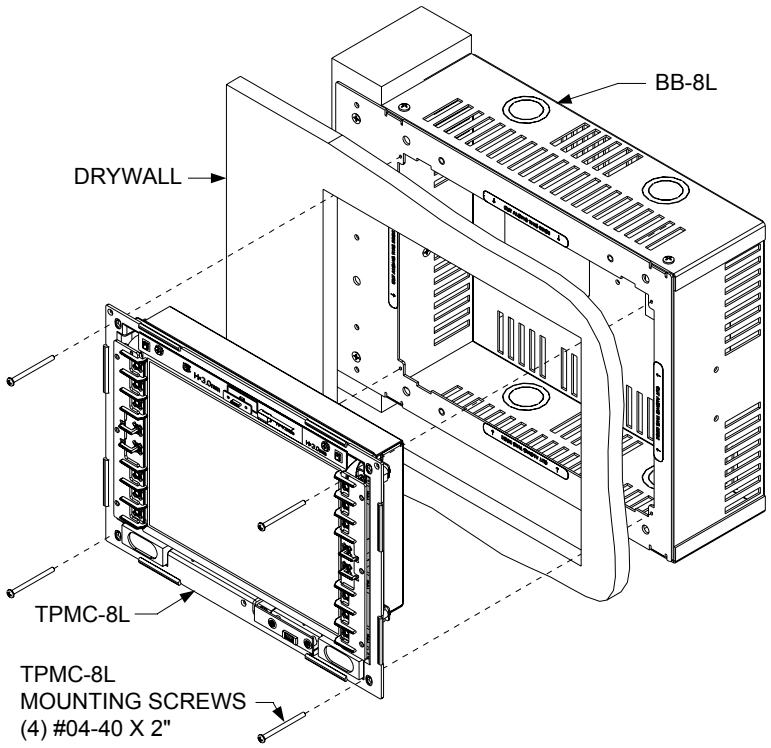
If the BB-8L or PMK-8L are to be used and a touchpanel is not available, the installer can either leave the hole in the mounting surface open (if permitted by local building codes) or attach the cover plate supplied with the mounting kit.

Touchpanel Mounting

Tools Required: #2 Phillips tip screwdriver

1. If the cover plate is attached, use a #2 Phillips screwdriver to loosen and remove the four screws and plate.
2. Connect all required cables to the touchpanel. Refer to "Hardware Hookup" which starts on page 41 for details.
3. Insert the touchpanel (without its bezel) into the mounting option and align the four screw holes.
4. Insert and tighten the four supplied screws (finger tight and then using a #2 Phillips screwdriver, tighten an additional 1/8-turn).
5. Cover the mounted unit with the bezel. Refer to illustration below.

Exploded View for Mounting the TPMC-8L in the Optional BB-8L Back Box



Touchpanel Removal

If it is necessary to remove the touchpanel after it has been installed into a mounting surface, complete the following steps in the order provided to remove the touchpanel. The only tool required is a #2 Phillips tip screwdriver.

1. Lift the bezel off the touchpanel. Do not apply excessive pressure to the touchscreen.
2. Loosen and remove the eight screws that secure touchpanel to the mounting option in use.
3. Using equal pressure, carefully remove the touchpanel from the opening.
4. If necessary, secure and label the attached cables before disconnecting them from the back of the touchpanel.

Hardware Hookup

Ventilation

The TPMC-8L should be used in a well-ventilated area.

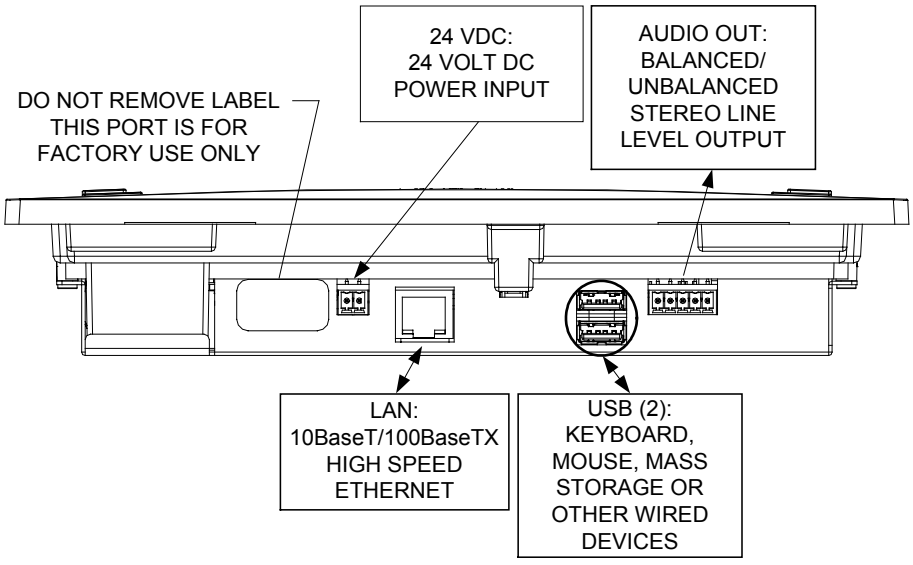
To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consideration must be given if installed in a closed or multi-unit rack assembly since the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Contact with thermal insulating materials should be avoided on all sides of the unit.

Connect the Device

Make the necessary connections as called out in the illustration that follows this paragraph. Apply power after all connections have been made.

When making connections to the TPMC-8L, use Crestron power supplies for Creston equipment.

Hardware Connections for the TPMC-8L



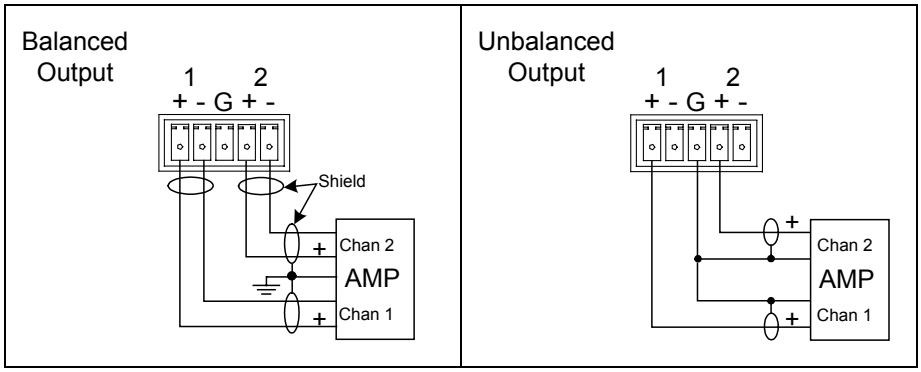
CAUTION: Do not apply excessive pressure to the touchscreen display during handling. Doing so can crack the screen and damage the touchpanel.

A balanced/unbalanced audio output is provided, utilizing a five-pin terminal block connector. For connection details, refer to the following table and diagrams.

Audio Connections

SIGNAL NAME	BALANCED AUDIO OUTPUT	UNBALANCED AUDIO OUTPUT
+	1 +	1 + Out
-	1 -	Open
G	Shield/ground	Common ground
+	2 +	2 + Out
-	2 -	Open

Typical Balanced/Unbalanced Outputs



Recommended Cleaning

Keep the surface of the touchscreen 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 touchscreen. Wipe touchscreen clean and avoid getting moisture beneath the bezels.

Programming Software

Have a question or comment about Crestron software?

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

Earliest Version Software Requirements for the PC

NOTE: Crestron recommends that you use the latest software to take advantage of the most recently released features. The latest software is available from the Crestron website.

Crestron has developed an assortment of Windows®-based software tools to support a controlled system. For the minimum recommended software versions, visit the Version Tracker page of the Crestron website (www.crestron.com/versiontracker).

Programming with Crestron SystemBuilder

Crestron SystemBuilder is the easiest method of programming but does not offer as much flexibility as SIMPL Windows. For additional details, download SystemBuilder from the Crestron website and examine the extensive help file.

Programming with SIMPL Windows

NOTE: While SIMPL Windows can be used to program the TPMC-8L, it is recommended to use SystemBuilder for configuring the system.

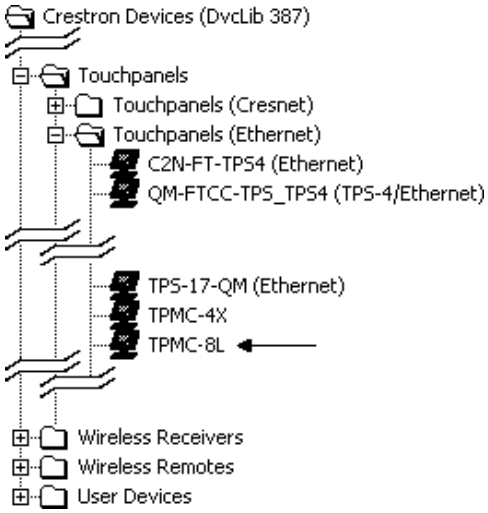
SIMPL Windows is Crestron's premier software for programming Crestron control systems. It is organized into two separate but equally important "Managers".

Configuration Manager

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

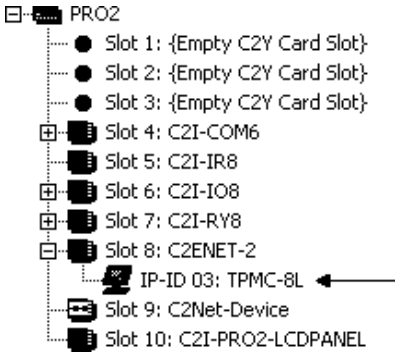
- To incorporate the TPMC-8L into the system, drag the TPMC-8L from the Touchpanels | Touchpanels (Ethernet) folder of the *Device Library* and drop it in the *System Views*.

Locating the TPMC-8L in the Device Library



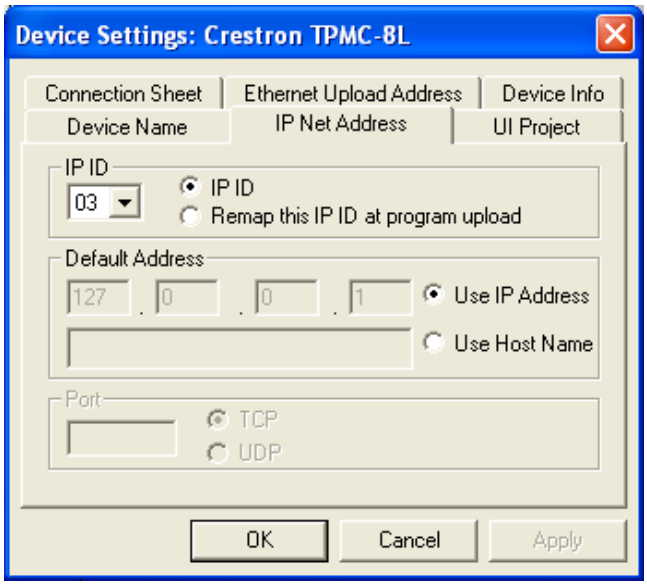
- The system tree of the control system displays the device in the appropriate slot with a default IP ID as shown in the following illustration.

C2Net Device, Slot 8



- Additional TPMC-8L devices are assigned different IP ID numbers as they are added.
- If necessary, double click a device to open the "Device Settings" window and change the IP ID, as shown in the following figure.

"TPMC-8L Device Settings" Window



- The ID code specified in the SIMPL Windows program must match the IP ID of each unit.

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 Pro-e

Touchpanel screens should be created in VisionTools Pro-e (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-8L 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-8L is the concept of multi-mode objects. A multi-mode object (i.e. button, legend, etc.) 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 touchpanel files and SIMPL Windows files that illustrate the high-performance capabilities of multi-mode objects.

WAV File Audio Messages

The TPMC-8L touchpanels 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 95/98/Me/XP/NT/2000/Vista™. 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-8L touchpanels accept the following WAV file format: **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 touchpanel 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 touchpanel directly or may be edited with the Sound Recorder. For example, the individual files can be combined to create custom messages.

NOTE: Touchpanel 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-8L project.

Bit depth refers to the number of memory bits used to store color data for each pixel in a raster image. A touchpanel 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 touchpanels, 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 the 32-bit graphics to a minimum (e.g. for a family photo, etc.), you can create a sophisticated

project that will fit in the memory space provided and have the touchpanel remain very responsive.

Relationship of Bits to Colors

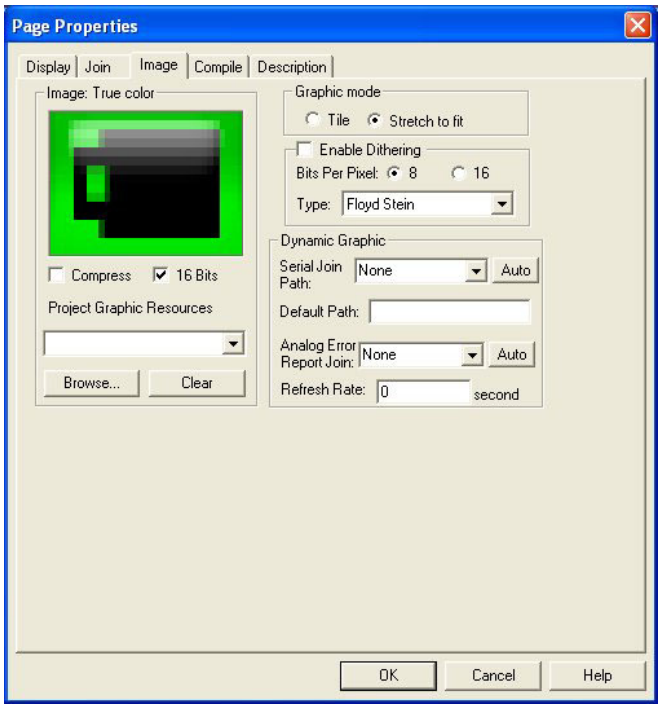
NUMBER OF BITS	NUMBER OF COLORS
1 bit	Black and White
2 bits	4 Colors
4 bits	16 Colors
8 bits	256 Colors
16 bits	65,536 Colors (Highcolor)
24 bits	16.7 million Colors (Truecolor)
32 bits	16.7 million Colors plus Transparency

When creating a VT Pro-e project you can elect to compress and reduce the image size in the "Page Properties" window for the entire page and/or perform the same function of reducing the image size using the "Image Properties" window. A reduction in image size will save a considerable amount of memory space for your project.

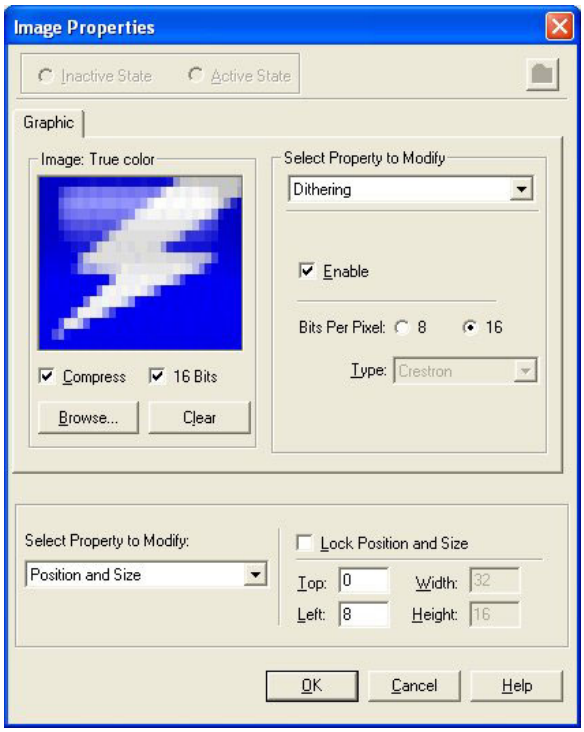
In VT Pro-e, the **Compress** checkbox permits the image to be compressed when compiling. The **16 Bits** checkbox converts a 24-bit or 32-bit image to 16 bits. This conversion to a 16-bit image may cause the loss of some subtle shading. To compensate for this, use the dithering to simulate the original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

Dithering type selection can be accessed from the "Page Properties" or "Image Properties" windows in VT-Pro-e. Refer to the following illustrations.

VT Pro-e "Page Properties" Window – Bit Depth Selection



VT Pro-e "Image Properties" Window – Bit Depth Selection



MultiByte International Characters

Most languages use a single byte of eight bits to represent a character, e.g. English, French, German, Hebrew, Russian, Thai, etc.

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 Isys i/O touchpanel 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 will not be compiled correctly in SIMPL Windows. In other words, you cannot enter Chinese characters interspersed with numbers. You can enter Chinese characters or numbers in separate strings or you can pad each number with "\x00" to make it multibyte and then combine it with Chinese characters in the same string.

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

Embedded Applications

A number of third-party or in-house applications are embedded in a VT Pro-e TPMC-8L project. (Refer to illustration on the following page.)

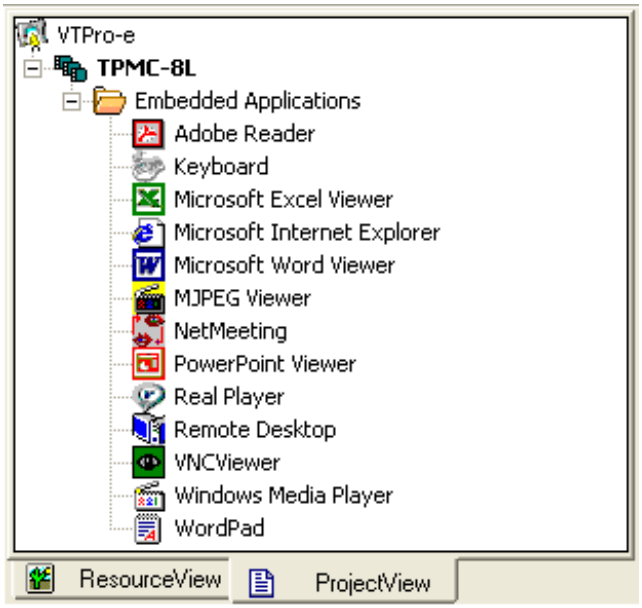
- Adobe Reader
- Microsoft Excel Viewer
- Microsoft Internet Explorer
- Microsoft Word Viewer
- MJPEG Viewer
- NetMeeting
- PowerPoint Viewer
- Real Player
- Remote Desktop
- VNC Viewer
- Windows Media Player
- WordPad

The embedded applications have the following features:

- All embedded applications listed in the VT Pro-e *ProjectView* workspace are created by default for a new TPMC-8L project.
- All applications are created at project-level – one instance per project.
- The static position and size of each application can be viewed from any page.

- Four analog joins can be assigned to each application to dynamically change position and size.
- One digital feedback join or one analog join can be assigned to dynamically show/hide an application.

Embedded Applications in ProjectView



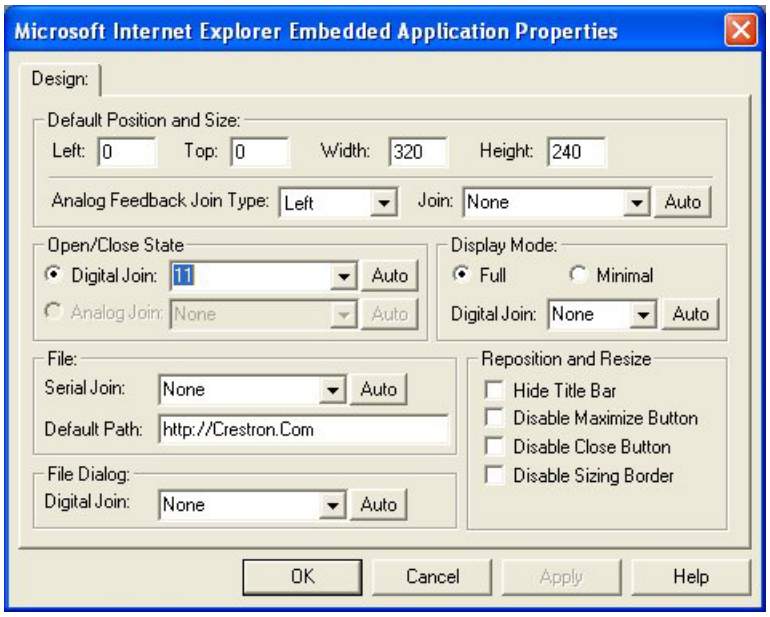
Right-click on any of the applications in the *Project View* and select **Properties** to open the "Embedded Application Property" window (refer to illustration on the following page). This window permits a choice of positions on the screen, assignment of an analog touch join type and number and a show/hide join number.

Defaults for Embedded Windows Applications

Use the *Default Path* text box in the "Embedded Applications Properties" window to enter the default document for the application.

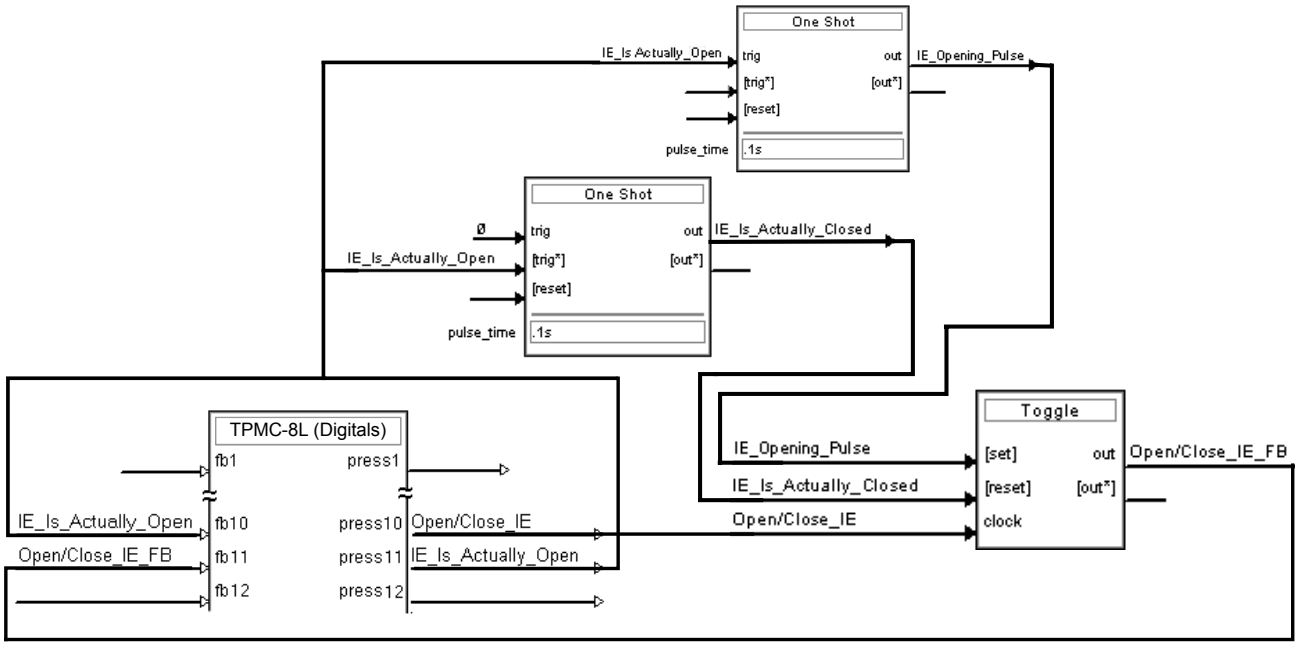
Edit the *Default Position and Size* in the "Embedded Application Properties" window to point to your new location.

Sample of an "Embedded Application Properties" Window



Programming Embedded Windows Applications

The following diagram is an example of a basic SIMPL program that enables you to open/close an embedded application. The example program is discussed following the diagram.



The example has Join #10 assigned to a button that is used to toggle the state of Internet Explorer. Press10 is routed to the clock line of a Toggle symbol. The output of the toggle is routed to fb11. Join #11 is referred to as the "Open/Close State Digital Join." The feedback signal of the Open/Close State Digital Join is used to Open/Close the application. In this example, when fb11 goes high, Internet Explorer opens, and when fb11 goes low, Internet Explorer closes. However, since the

application can also be closed by pressing the "X" in the upper right hand corner of Internet Explorer, we must keep the logic synchronized. If we do not, the toggle will get out of sync. Similarly, using the reserved join to launch the embedded application would result in the application being open, but the state of the toggle remaining low, so a one-shot is used to set the state of the toggle if the embedded application is opened in this way.

For example, the user presses button #10 and the output of the toggle (<**Open/Close_IE_FB**>) is high. If the user presses the "X" on IE, IE closes. The next time they touch button #10, <**Open/Close_IE_FB**> will go low, which tries to close the application. However, the application is already closed. We need to reset the state of the toggle to keep in sync with the actual state of the application.

The "Press" signal of the Open Close State Digital Join can be used to know the true state of the application. When Press11 goes high, in this example, IE is open. When Press11 goes low, IE is closed. Here, we use the falling edge of Press11 through a One-Shot to reset the state of the Toggle symbol. Now the toggle is properly synchronized if the user closes the application from the panel itself.

Example Program

An example program for the TPMC-8L is available from the Crestron website (www.crestron.com/exampleprograms).

Uploading and Upgrading

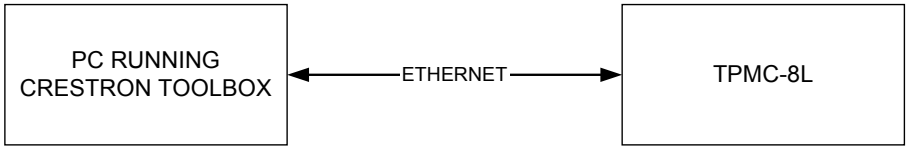
Crestron recommends using the latest programming software and that each device contains the latest firmware to take advantage of the most recently released features. However, before attempting to upload or upgrade it is necessary to establish communication.

Establishing Communication

Use Crestron Toolbox for communicating with the TPMC-8L; refer to the Crestron Toolbox help file for details. There is a single method of communication: TCP/IP communication.

NOTE: Required for operation with a Crestron control system.

Ethernet Communication



The TPMC-8L connects to PC via Ethernet:

1. Enter the *IP address*, *Subnet mask* and *Default gateway* of the TPMC-8L in the "Internet Protocol (TCP/IP) Properties" window (refer to "Ethernet Details" which starts on page 34).
2. Confirm Ethernet connections between TPMC-8L and PC.
3. Use the Address Book in the Crestron Toolbox to create an entry for the TPMC-8L with the TPMC-8L's TCP/IP communication parameters.
4. Display the "System Info" window (click the icon) and select the TPMC-8L entry.

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 website 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.

VisionTools Pro-e

Upload the VT Pro-e file to the touchpanel using VT Pro-e or Crestron Toolbox. If loading a project to a touchpanel that has an external compact flash slot, please use Crestron Toolbox.

Firmware

Check the Crestron website to find the latest firmware. (New users may be required to register to obtain access to certain areas of the site, including the FTP site.)

Upgrade TPMC-8L firmware via Crestron Toolbox.

1. Establish serial or TCP/IP communications with the TPMC-8L and display the "System Info" window.
2. Select **Functions | Firmware…** to upgrade the TPMC-8L firmware.

Program Checks

Be sure to use the Crestron Toolbox to create the TPMC-8L IP table.

1. Select **Functions | IP Table Setup**.
2. Add, modify or delete entries in the IP table. The TPMC-8L can have only one IP table entry.
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-8L. The entry should list the TPMC-8L's IP ID (specified on the TPMC-8L's IP table) and the internal gateway IP address 127.0.0.1.

Operation

Power Modes

The TPMC-8L has three power modes: On, Standby and Off. Refer to the following table for details.

TPMC-8L Power Modes

POWER MODE	DETAILS
On	Normal operating mode.
Standby	Backlight is turned off but processor is still on and pushbuttons are still functional. Initiated with *Standby* function from the setup menu.* Touch the screen to reactivate the TPMC-8L from standby mode.
Off	All power is off. The TPMC-8L is off when no power is applied to the 24 V DC input.

* Standby mode can also be initiated using a reserve join number in VT Pro-e and the Device Extender function in SIMPL Windows. For details, refer to the respective help files in these programs.

NOTE: When power is first applied to the touchpanel, the BIOS screen (white text on black background) will be upside down. This will only occur during boot up.

Security Infrastructure

Since the TPMC-8L does not use a traditional hard drive but rather an image that gets restored every time the touchpanel is rebooted, any virus infection is cleared immediately after a reboot. However, using the currently available tools and techniques, Crestron has provided an infrastructure that protects against possible virus infections.

1. Executables/Scripts brought in on external media
   The implementation of the TPMC-8L has restrictions on starting any application or script. The only applications that can be started are those allowed by Crestron and these can only be started from the Crestron project.
2. Downloaded Program/Script
   The browser is customized in such a way that files cannot be downloaded. The only files the browser can open are the files it has plug-ins for, such as PDF, etc. The user cannot change the options, as this dialog box has been disabled.
3. Browser Hijack and Browser vulnerability
   Crestron has patched all currently known hijacks and vulnerabilities. Future updates can be downloaded from the Crestron website.
4. Email Viruses
   There is no e-mail client installed on the TPMC-8L, so email-based viruses cannot be executed.
5. Viruses that attack web/FTP servers
   The TPMC-8L does not run a web or FTP server and is therefore not listening to port 21 or 80. The only ports the system listens to are the ports registered to Crestron.
6. Virus from other machines on the network
   Since drives on the TPMC-8L can be shared on the network, it is possible that a virus can write itself to files/folders on these shares. Our recommendation therefore is to share as "Read-Only," so that viruses cannot attach themselves to files on the TPMC-8L.
7. ActiveX and Java
   The TPMC-8L has ActiveX disabled and has no Java Virtual Machine installed. These applets cannot run on the TPMC-8L.

NOTE: While browsing the Internet with the TPMC-8L, clicking on a link may cause a message box titled "Restrictions" to appear that contains the text "This operation has been cancelled due to restrictions in effect on this computer. Please contact your system administrator." If this message appears, checking Enable Popup Windows in the "Embedded Apps" section of the setup menu may correct this error. Other restrictions may also cause this error, so this may not prevent all occurrences.

NOTE: Security settings and restrictions can be changed via the **Embed Apps** button on the setup menu. Refer to "Embed Apps (Embedded Applications)" which starts on page 18 for details.

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-8L Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Cannot upload VT Pro-e project or firmware from Toolbox.	TPMC-8L is off or has no power.	Verify that TPMC-8L has power and is on or in standby mode.
	No IP address configured/obtained on the TPMC-8L.	Refer to "Ethernet Details" which starts on page 34 to define IP addresses. If the TPMC-8L is set up to use DHCP (not recommended), you can use the IP section of the "Ethernet Setup" window box to verity the IP address provided. If the number is invalid for your subnet or no number is present, verify that the DHCP server is working properly.
TPMC-8L does not show feedback and/or does not control any devices.	No IP address configured/obtained on the TPMC-8L.	Refer to "Ethernet Details" which starts on page 34 to define IP addresses. If the TPMC-8L is set up to use DHCP (not recommended), you can use the IP section of the "Ethernet Setup" window box to verity the IP address provided. If the number is invalid for your subnet or no number is present, verify that the DHCP server is working properly.
	Invalid control system IP address / IP ID set up on TPMC-8L.	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 "IP Table" which starts on page 36 to define IP addresses.
TPMC-8L 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.

Reference Documents

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

List of Related Reference Documents

DOCUMENT TITLE
2-Series Control Systems Reference Guide
BB-8L Wall Mount Back Box
MMK-8L & WMKM-8L Mud Mount Kits
PMK-8L Pre-Construction Mount Kit
RMK-8L Rack Mount Kit
TMK-8L & WMKT-8L Trim Ring Mount Kits

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 Crestron at 1-888-CRESTRON [1-888-273-7876].

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

Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the TPMC-8L, 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: TPMC-8L Multi-Language Pack

The TPMC-8L Multi-Language Pack adds support for 32 international languages in addition to the default English language support in the TPMC-8L. This allows the user to view documents written in those languages by all the embedded apps in the touchpanel.

The 32 international languages added by the Multi-Language Pack are:
Arabic, Chinese (simplified), Chinese (traditional), Croatian, Czech, Danish, Dutch, Estonian, Finnish, French, German, Greek, Hebrew, Hungarian, Icelandic, Indonesian, Italian, Japanese, Korean, Latvian, Lithuanian, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian, Slovak, Slovenian, Spanish, Swedish and Turkish.

The Multi-Language Pack is available as a special firmware build (TPMC-8X_MLP_1.0.zip or later) for the TPMC-8L. For details on how to upgrade firmware, refer to "Programs, Projects and Firmware" which starts on page 52.

NOTE: Once installed, the TPMC-8L Multi-Language Pack cannot be removed without sending the TPMC-8L back to Crestron.

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