Crestron **TPS-12L/15L/17L**

Isys® Wall Mount Touchpanels

Operations Guide

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

CRESTRON

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

Contents

Isys® Wall Mount Touchpanels: TPS-12L/15L/17L

Introduction

The Crestron Isys® TPS-12L, TPS-15L and TPS-17L family of wall mount touchpanels offer high brightness and contrast combined with a super wide viewing angle to deliver crisp, detailed images under all conditions. For simplicity within this guide, these touchpanels are referred to as TPS-12L/15L/17L except where noted. The features and specifications (except for screen size and resolution) for all three touchpanels are identical.

Features and Functions

- 12, 15 and 17 inch (widescreen) active matrix touchscreen displays
- Screen resolutions: TPS-12L 800 x 600, TPS-15L 1024 x 768, TPS-17L 1280 x 768
- 16.7 million colors, 24-bit Isys® graphics with 8-bit alpha channel and Synapse™ image rendering algorithm
- Full-motion video with gamma correction and motion adaptive deinterlacing; full screen video capability
- Built-in time base correction for stable video and graphics
- Supports composite, S-video and component inputs in both NTSC and PAL formats
- Supports QuickMedia™ transport technology, which affords expanded AV connectivity through a streamlined wiring solution
- Supports Crestron Home® CAT5 balanced A/V connectivity
- Up to 4,000 digital and analog signals; up to 999 serial signals
- Built-in biamplified speaker system and microphone
- Stores and plays back WAV sound files
- Stereo headphone jack
- Balanced stereo audio input and output
- 10BaseT/100BaseTX high-speed Ethernet, 802.3U compliant, full duplex, auto switching

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Features and Functions (Continued)

- High speed Cresnet® communications
- Five backlit "softkey" buttons (one reset and four programmable buttons)
- 128 MB of DDR RAM, 32 MB of internal flash (expandable to 160 MB)
- Includes a TPMC-CH-IMC to facilitate A/V connections
- Wall, lectern and rack mounting options
- Available in black with silver accent or white with gray accent

Isys®

Isys power and beauty are infused throughout Crestron's entire touchpanel lineup. Under the hood, the TPS-12L/15L/17L offers vibrant 24-bit color depth to produce incredible 3D graphics, high-res images, translucence, dynamic text and graphics, full-motion animations, multimode objects and dramatic transition effects, all with astonishing speed.

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. And because Synapse is native to the touchpanel, memory requirements and upload time are substantially reduced.

High Performance Video

The TPS-12L/15L/17L can display full-motion video from an external AV source, either full screen or in a scalable window. Motion adaptive deinterlacing brings out the finest detail, minimizing visible scan lines and motion artifacts for a truly remarkable picture. Advanced gamma correction and built-in time base correction ensure accurate color reproduction and a jitter-free image. Two video inputs provide for connectivity to QuickMedia and PVID video distribution switches (such as the CNX-PVID8X3 or CNX-PVID8X4).

High Quality Audio

The high-powered biamplified speaker system provides amplification for external AV sources and supports intercom functionality 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. The TPS-12L/15L/17L touchpanels are also equipped with balanced output for microphone audio that can be connected to a Crestron CNX-BIPAD8 or similar Crestron CAT5 audio receiver.

Crestron Home® CAT5 AV

Connecting audio and video sources to the TPS-12L/15L/17L is facilitated using inexpensive CAT5 wire, enabling direct connection to Crestron's popular CAT5 balanced audio and video distribution switchers. A single video input port accepts signals from composite, S-video and standard definition components sources over wiring distances of up to 750 feet. A bidirectional audio port receives stereo program audio and intercom signals and outputs audio from the internal microphone. To facilitate direct connection of conventional video and audio devices, an external interface module is included.

QuickMedia™

The TPS-12L/15L/17L is also equipped with a single QuickMedia input port. Through QuickMedia (QM), the TPS-12L/15L/17L interfaces directly with Crestron's QM-based MediaManager products using a single CAT5e type cable. Over wiring distances of up to 300 feet, the QM input port accepts video signals from composite, S-video and standard definition component sources along with discrete audio signals from one stereo program source and up to two microphones. For more information on QM applications, refer to the latest revision of the Crestron MediaManager Applications Guide (Doc. 6244) which is available from the Crestron website (http://www.crestron.com/manuals).

NOTE: The TPS-12L/15L/17L does not support RGB.

High-Speed Connectivity

Both Cresnet and high-speed Ethernet are standard on the TPS-12L/15L/17L, providing for easy network integration and seamless communications with Crestron control systems. In addition, a USB port is provided for future applications. The "RS-232 Port for Touch Output" operation transmits touch coordinates to external devices via RS-232 for "Touch-The-PC" and other functions.

Cresnet®

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

Memory

The TPS-12L/15L/17L touchpanels feature 128 MB DDR RAM and 32 MB Flash, with a built-in Compact Flash slot that allows flash memory expansion up to 160 MB.

Versatile Flush-Mount Design

The TPS-12L/15L/17L is designed for flush-mount installation in a wall, lectern or similar flat surface. A variety of mounting accessories is offered including optional back box and 19" rack mount kit. Five backlit pushbuttons are also provided, allowing for quick access to commonly used functions such as volume, home and reset.

Internal Block Diagram

The following diagram represents the switching abilities of the TPS-12L/15L/17L. The diagram depicts the video, audio and connectivity paths available.

Internal Block Diagram of the TPS-12L/15L/17L
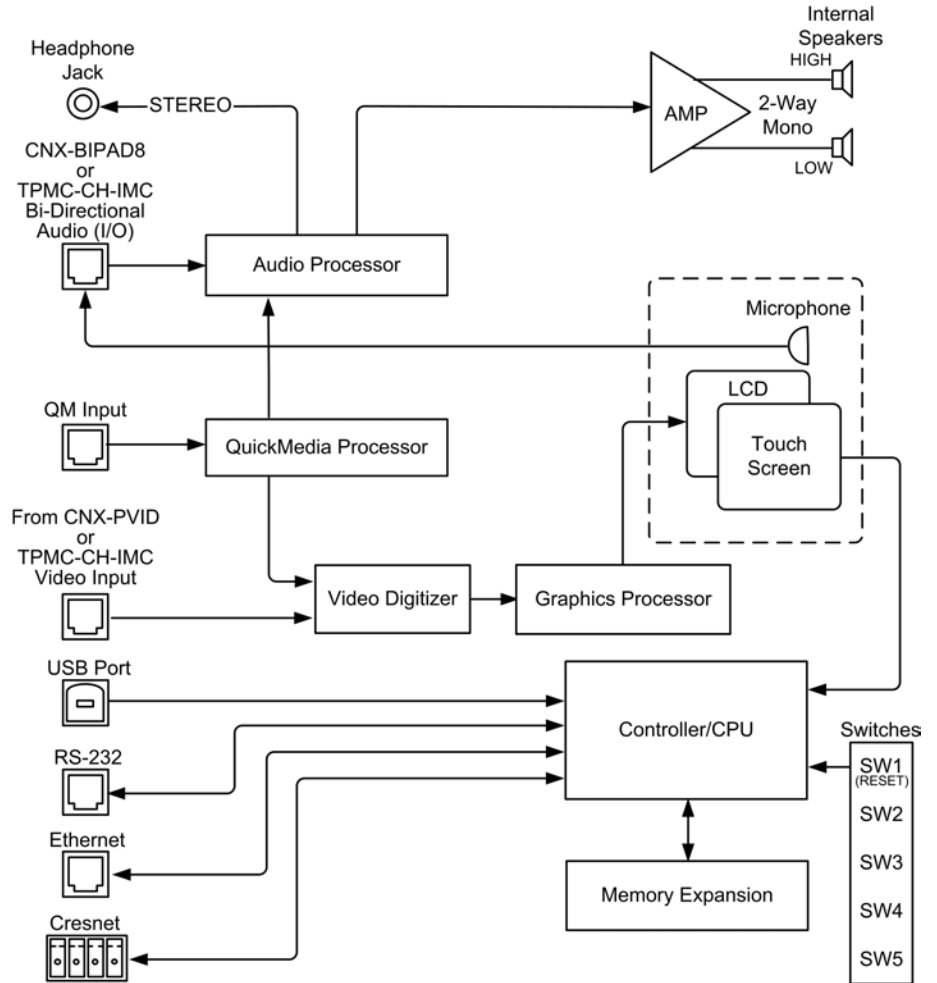
Specifications

Specifications for the TPS-12L/15L/17L are listed in the following table.

TPS-12L/15L/17L Specifications

SPECIFICATION	DETAILS
Touchscreen Display	
Display Type	TFT active matrix color LCD
Size	TPS-12L: 12 inch (30.5 cm) diagonal TPS-15L: 15 inch (38.1 cm) diagonal TPS-17L: 17 inch (43.2 cm) diagonal widescreen
Aspect Ratio	TPS-12L: 4:3 SVGA TPS-15L: 4:3 XGA TPS-17L: 15:9 WXGA
Resolution	TPS-12L: 800 x 600 TPS-15L: 1024 x 768 TPS-17L: 1280 x 768
Brightness	TPS-12L: 400 nits TPS-15L: 400 nits TPS-15L: 350 nits[1] TPS-17L: 450 nits
Contrast	TPS-12L: 300:1 TPS-15L: 300:1 TPS-15L: 700:1[1] TPS-17L: 400:1
Color Depth	TPS-12L: 18-bit, 256k colors TPS-15L: 24-bit, 16.7M colors TPS-17L: 24-bit, 16.7M colors
Illumination	Backlit fluorescent
Viewing Angle	TPS-12L: ±70º horizontal, +45/-55º vertical TPS-15L: ±85º horizontal and vertical TPS-17L: ±88º horizontal and vertical
Touchscreen	Resistive membrane
Processor	
CPU	32-bit Freescale Coldfire® Microprocessor
Processing Speed	410 MIPS (Dhrystone 2.1 benchmark)
Memory	
DDR RAM	128 MB
Flash	32 MB, expandable to 160 MB via compact flash
Graphic Engine	Isys engine, 24-bit non-palette graphics + 8-bit alpha channel translucence, 16.7 million colors, Synapse image rendering algorithm, multi-mode objects, dynamic graphics, full-motion (60 fps) animation, transition effects, color key video windowing
Ethernet	10BaseT/100BaseTX, auto-switching, auto-negotiating, full/half duplex, TCP/IP, UDP/IP, CIP, IEEE 802.3U compliant

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TPS-12L/15L/17L Specifications (Continued)

SPECIFICATION	DETAILS
Video	
Signal Types	Auto-detecting composite, S-video or component
Formats	NTSC 480i or PAL 576i
Color Depth	24-bit, 16.7M colors
Features	Single-window scalable to full-screen, input switching between QM and VIDEO inputs, time base correction, gamma correction, line doubling, motion adaptive deinterlacing, reverse 3:2/2:2 pulldown
Audio	
Hardware Features	Built-in microphone and biamplified speakers, stereo headphone output, internal volume control and audio mixer
Audio Feedback (WAV)	8-bit PCM, mono, 8 kHz sampling rate
D-A Conversion (via QM only)	24-bit, 48 kHz
Amplification	Biamplified, mono, 5 Watts for high frequency, 5 Watts for low frequency
Power Requirements	
Cresnet Power Usage	TPS-12L: 43 Watts (1.8 Amps @ 24 Volts DC) TPS-15L: 65 Watts (2.7 Amps @ 24 Volts DC) TPS-17L: 74 Watts (3.1 Amps @ 24 Volts DC)
Default NET ID	03
Minimum 2-Series Control System Update File[2, 3, 4]	Version 3.137 or later
Timeout	Adjustable from 0 to 120 minutes (Default = 10 minutes)
Signal Join Maximum	4000 Digital, 4000 Analog, 999 Serial
Environmental	
Temperature	41º to 113ºF (5º to 45ºC)
Humidity	10% to 90% RH (non-condensing)
Enclosure	
Construction (all mounting kits sold separately)	TPS-12L: Metal, flush mountable, 8U 19" rack-mountable TPS-15L & TPS-17L: Metal, flush mountable, 9U 19" rack-mountable
Front Bezel	Injection molded plastic; black w/silver accent or white w/gray accent
Dimensions	
Height	TPS-12L: 11.80 in (29.98 cm) TPS-15L: 13.59 in (34.52 cm) TPS-17L: 13.81 in (35.06 cm)
Width	TPS-12L: 13.61 in (34.57 cm) TPS-15L: 14.17 in (35.99 cm) TPS-17L: 16.98 in (43.11 cm)

(Continued on following page)

TPS-12L/15L/17L Specifications (Continued)

SPECIFICATION	DETAILS
Dimensions (Continued)	
Depth	TPS-12L: 3.80 in (9.66 cm) TPS-15L: 3.80 in (9.66 cm) TPS-17L: 3.80 in (9.66 cm)
Weight	TPS-12L: 8.5 lbs (3.86 kg) TPS-15L: 9.4 lbs (4.26 kg) TPS-17L: 12.7 lbs (5.76 kg)
Available Models	
TPS-12LB	Isys 12" Wall Mount Touchpanel, Black
TPS-12LW	Isys 12" Wall Mount Touchpanel, White
TPS-15LB	Isys 15" Wall Mount Touchpanel, Black
TPS-15LW	Isys 15" Wall Mount Touchpanel, White
TPS-17LB	Isys 17" Widescreen Wall Mount Touchpanel, Black
TPS-17LW	Isys 17" Widescreen Wall Mount Touchpanel, White
Included Accessories	
TPMC-CH-IMC[5]	CAT5 Balanced AV Interface Module (refer to TPMC-CH-IMC specifications for complete information)
Available Accessories	
BB-12L/15L/17L	Pre-construction Wall Mount Back Box
PMK-12L/15L/17L	Pre-construction Wall Mount Kit
TMK-12L/15L/17L	Trim Ring
MMK-12L/15L/17L	Mud Ring
WMKT-12L/15L	Lectern or Post-construction Wall Mount Kit with Trim Ring
WMKT-17L	Lectern Mount Kit with Trim Ring
WMKM-12L/15L	Post-construction Wall Mount Kit with Mud Ring
RMK-12L/15L/17L	Rack Mount Kit
TPMC-CH-IMW	CAT5 Balanced AV Interface Wall Plate
TPS/TPMC-CBL-T	Triamese Interface Cables
QM-TX	QuickMedia Transmitter
ST-PK	Programming Cable Kit

1. Applies to part number 6500221 and 6501302 only.

2. The latest software versions can be obtained from the Crestron website. Refer to the NOTE following these footnotes.

3. 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.

4. When loading VisionTools® Pro-e files or firmware through the RS-232 port of the control system, be sure that the baud rate is set to 38400 (Cresnet speed) or lower. Otherwise, Crestron Toolbox™ may post the "Transfer Failed" message.

5. For networks without CAT5 audio and video, the TPMC-CH-IMC is included to convert unbalanced video sent over coax cable and balanced/unbalanced audio sent over shielded, twisted-pair wiring to CAT5 cabling for connection to the touchpanels. The TPMC-CH-IMC is not for use with QuickMedia.

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 TPS-12L/15L/17L.
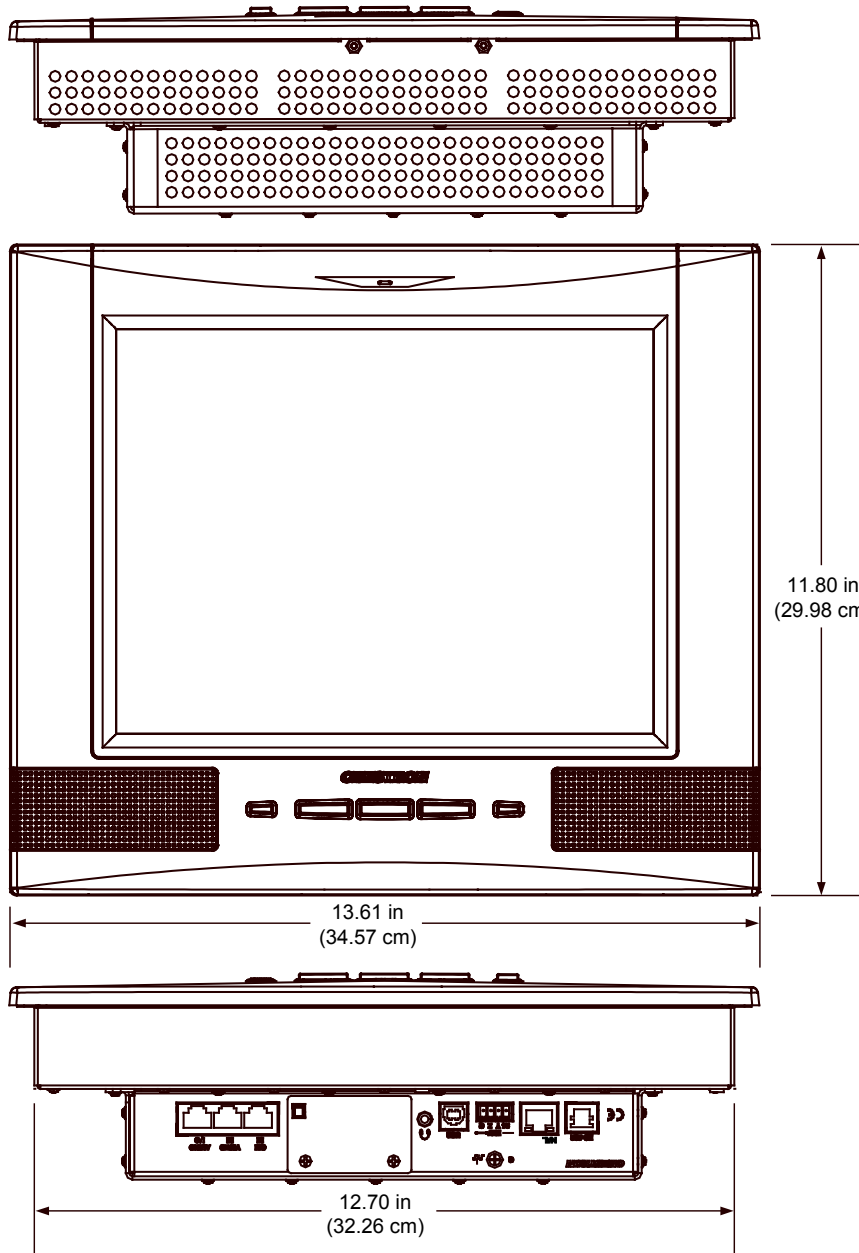
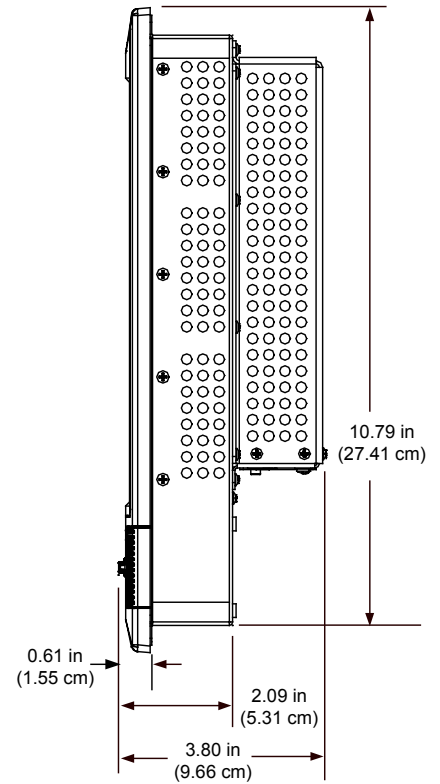*TPS-12L Physical View*
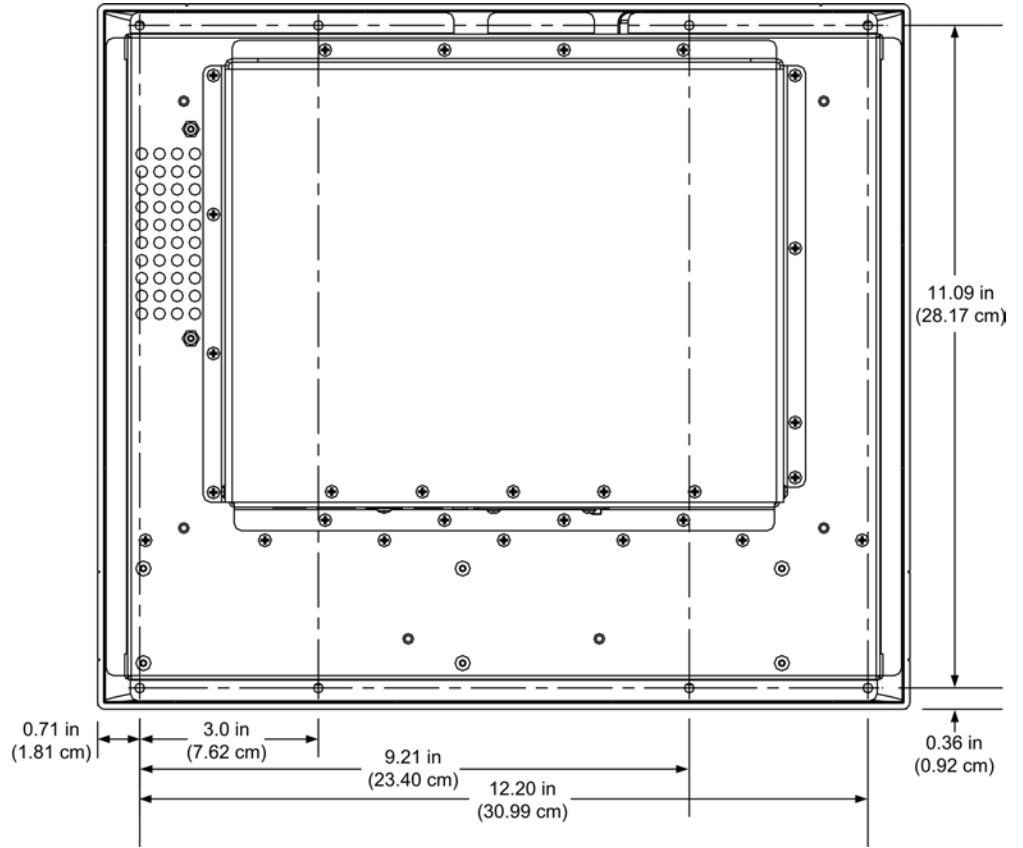
TPS-15L Physical View

TPS-17L Physical View

TPS-12L Overall Dimensions (Top, Front and Bottom View)   *TPS-12L (Side View)*

11.80 in
(29.98 cm)

10.79 in
(27.41 cm)

0.61 in
(1.55 cm)

2.09 in
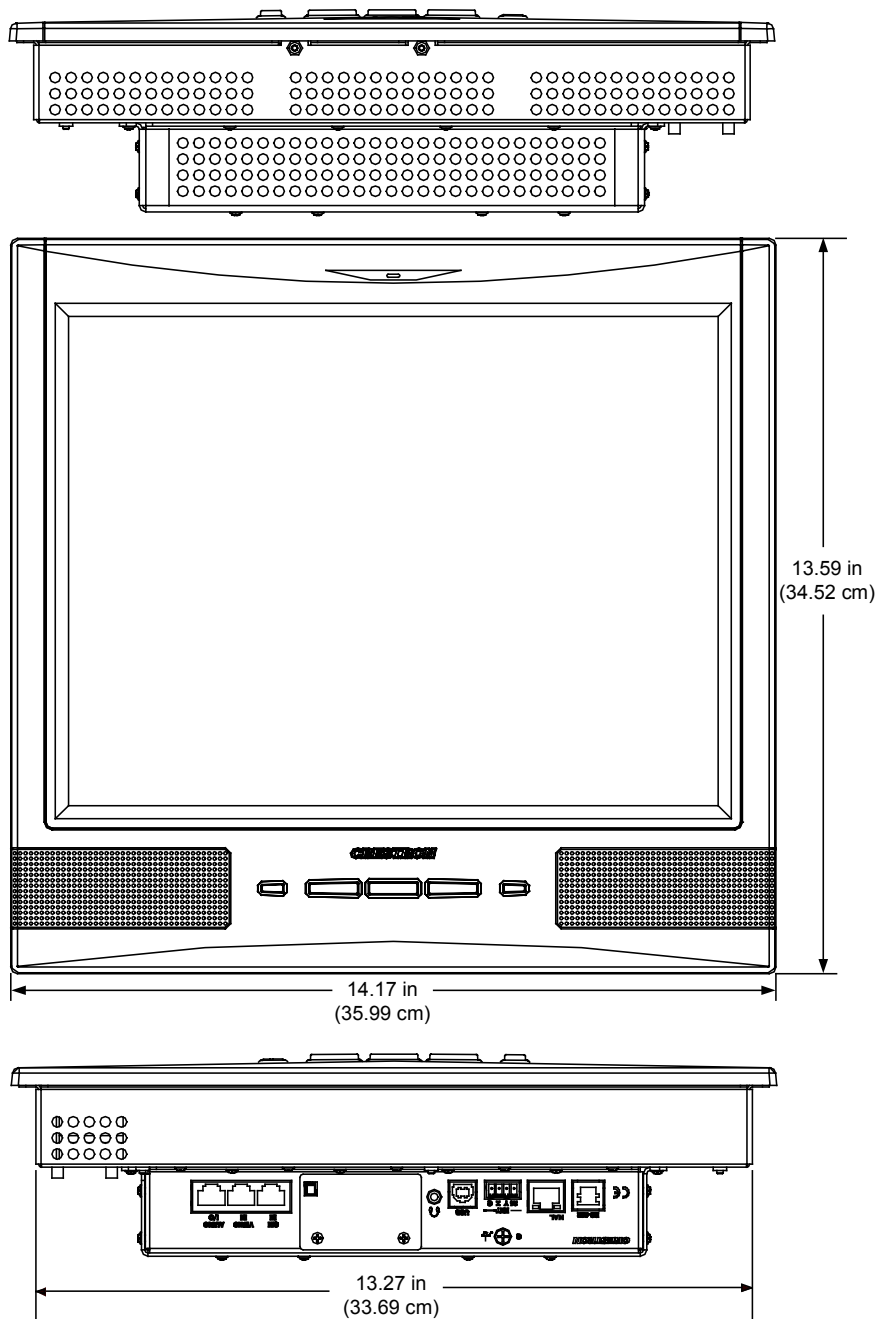(5.31 cm)

3.80 in
(9.66 cm)

13.61 in
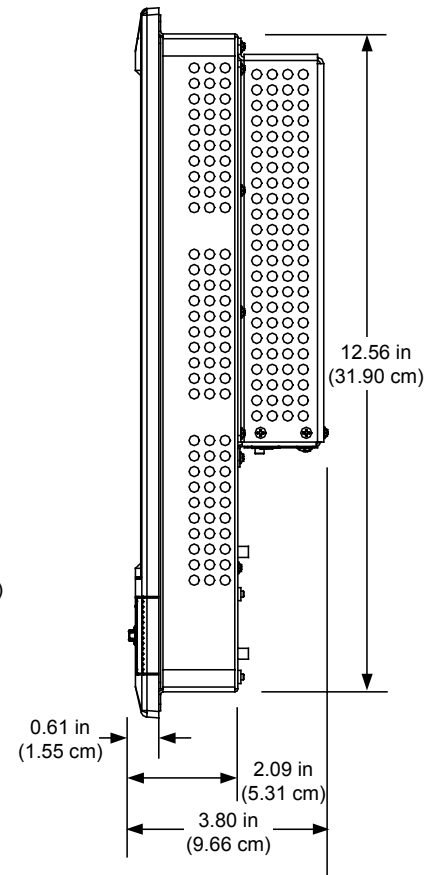(34.57 cm)

12.70 in
(32.26 cm)

TPS-12L Overall Dimensions (Rear View)

TPS-15L Overall Dimensions (Top, Front and Bottom View)   *TPS-15L (Side View)*

13.59 in
(34.52 cm)

12.56 in
(31.90 cm)

0.61 in
(1.55 cm)

2.09 in
(5.31 cm)

3.80 in
(9.66 cm)

14.17 in
(35.99 cm)

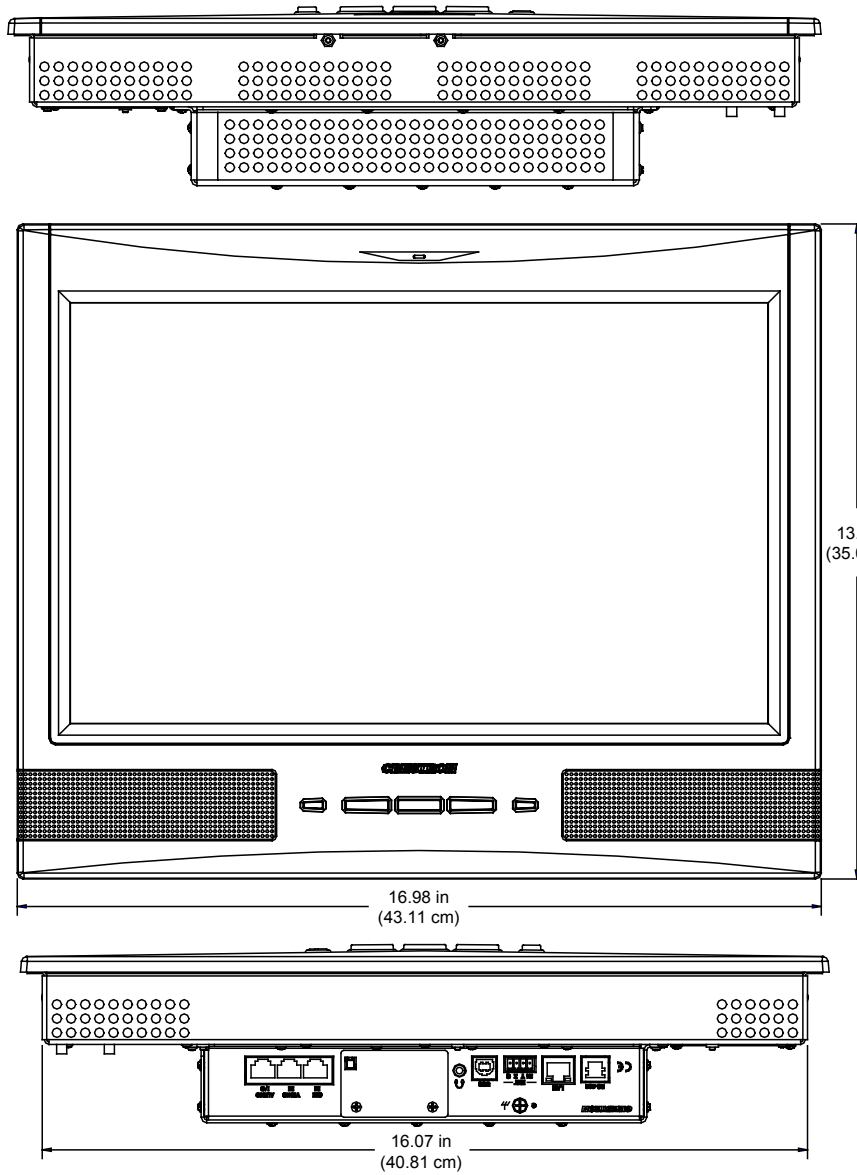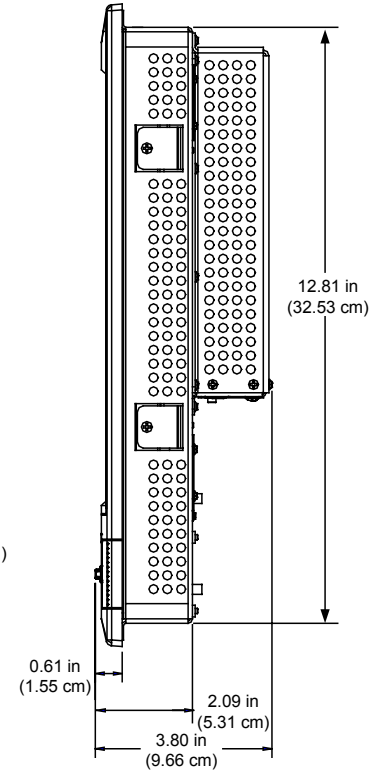13.27 in
(33.69 cm)

TPS-15L Overall Dimensions (Rear View)
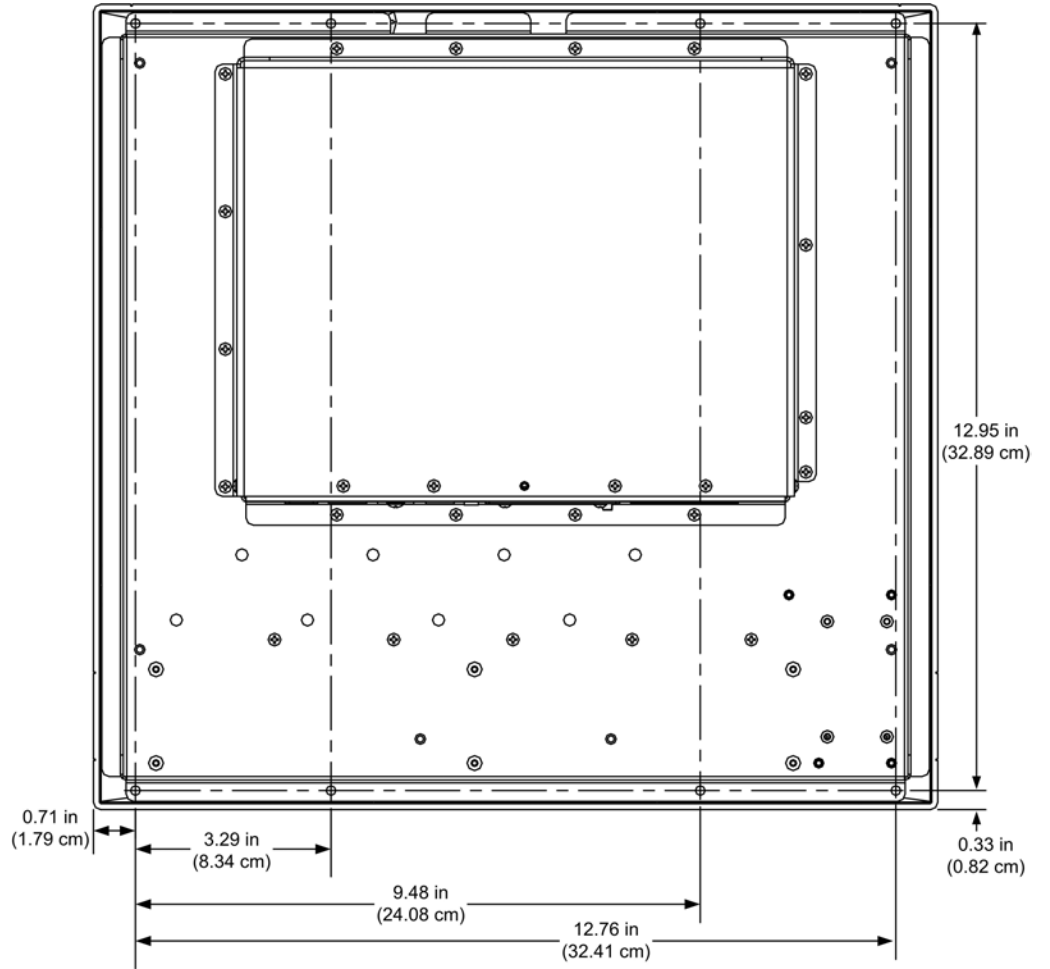
TPS-17L Overall Dimensions (Top, Front and Bottom View)   *TPS-17L (Side View)*

13.81 in
(35.06 cm)

16.98 in
(43.11 cm)

16.07 in
(40.81 cm)

12.81 in
(32.53 cm)

0.61 in
(1.55 cm)

2.09 in
(5.31 cm)

3.80 in
(9.66 cm)

TPS-17L Overall Dimensions (Rear View)

13.21 in
(33.56 cm)

0.71 in
(1.80 cm)

4.69 in
(11.91 cm)

10.88 in
(27.62 cm)

15.57 in
(39.53 cm)

0.30 in
(0.76 cm)
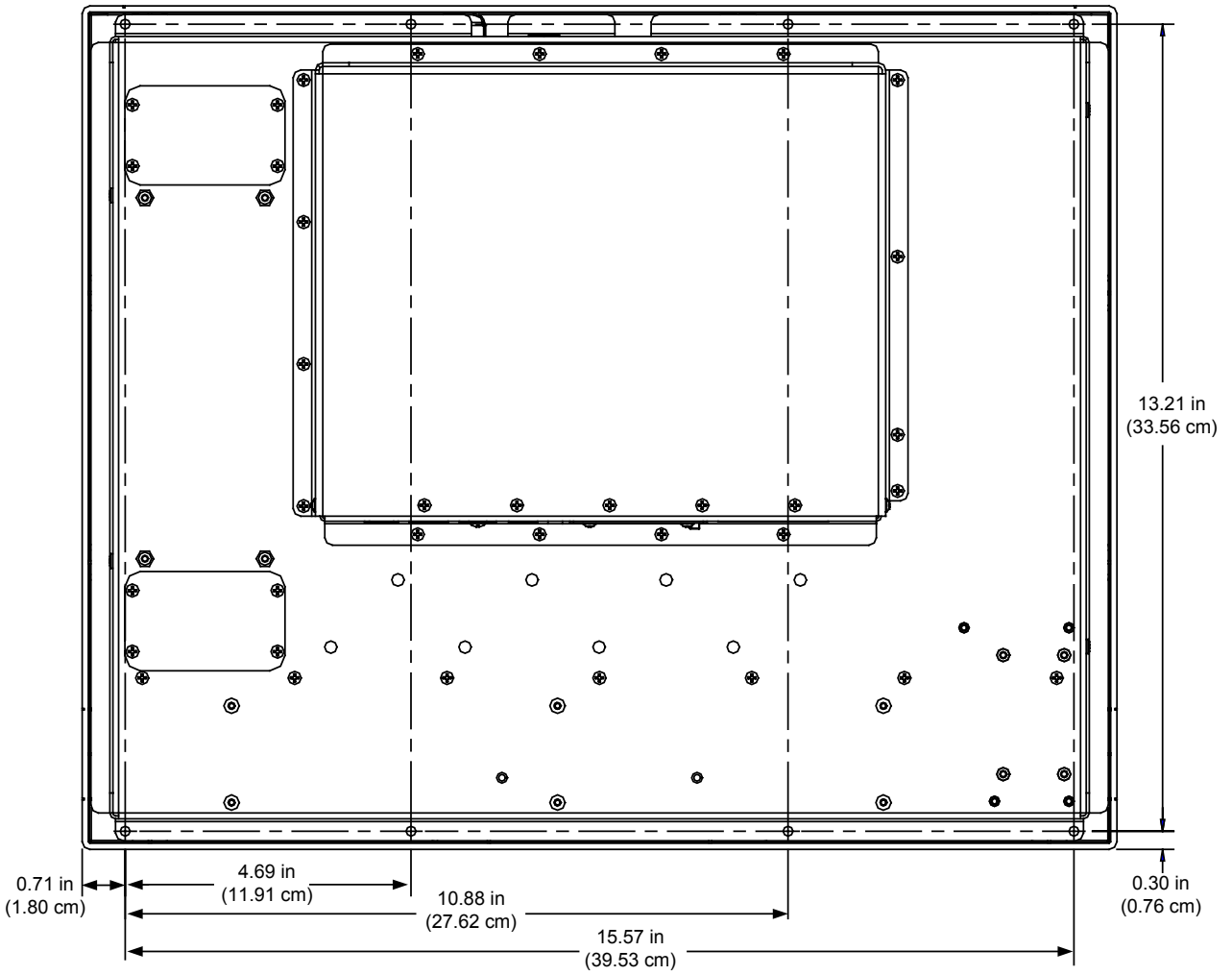
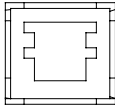*TPS-12L/15L/17L Connectors (TPS-15L Shown)*
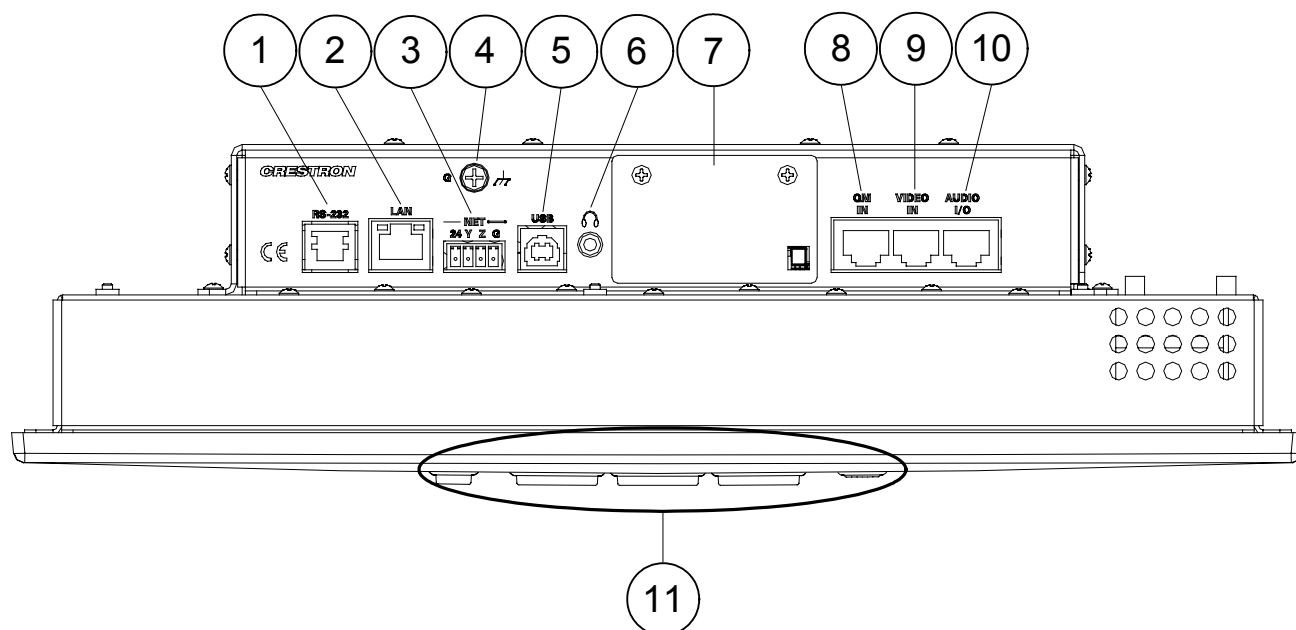
> **NOTE:** All connections to the TPS-12L/15L/17L are made through the ports on the rear panel. These ports are not accessible after the touchpanel is mounted in a wall or in a lectern.

Connectors, Controls & Indicators

#	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
1	RS-232	(1) 6-pin RJ-11 female; Computer console, touch output or mouse/touch input port; Bidirectional RS-232 up to 115.2k baud; Hardware and software handshaking support.

PIN #	DESCRIPTION
1	CTS
2	GND
3	RXD
4	TXD
5	RTS
6	N/C (Not connected)

(Continued on following page)

Connectors, Controls & Indicators (Continued)

| #	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
	RS-232 (Continued)	In the event that modular cables or an RJ-11 to DB9F adapter is not available, the following diagram provides information so that the cable can be fabricated on site. (Alternatively, Crestron cable number STCP-502PC is sold separately.)
2	LAN GREEN LED YELLOW LED PIN 8 PIN 1	(1) 8-wire RJ-45 with two LED indicators; 10BaseT/100BaseTX Ethernet port; Green LED indicates link status; Yellow LED indicates Ethernet activity. <table><tr><th>PIN</th><th>SIGNAL</th><th>PIN</th><th>SIGNAL</th></tr><tr><td>1</td><td>TX +</td><td>5</td><td>N/C</td></tr><tr><td>2</td><td>TX -</td><td>6</td><td>RC -</td></tr><tr><td>3</td><td>RC+</td><td>7</td><td>N/C</td></tr><tr><td>4</td><td>N/C</td><td>8</td><td>N/C</td></tr></table>
3	NET 24 Y Z G	Four-position terminal block connector for data and power. Connects to Cresnet control network. Pin 1 (24) Power Pin 2 (Y) Data Pin 3 (Z) Data Pin 4 (G) Ground
4	G	(1) 6-32 screw, chassis ground lug.
5	USB[2] Pin 2 Pin 1 USB Pin 3 Pin 4	(1) USB Type B female (reserved for future applications) <table><tr><th>PIN</th><th>DESCRIPTION</th></tr><tr><td>1</td><td>+5 VDC</td></tr><tr><td>2</td><td>Data -</td></tr><tr><td>3</td><td>Data +</td></tr><tr><td>4</td><td>Ground</td></tr></table>
6	HEADPHONES[3]	(1) 3.5 mm TRS mini phone jack; Output power: 12 mW per channel; Minimum impedance: 32 Ω.
7	MEMORY SLOT	(1) Type II Compact Flash card slot for memory expansion (up to 160 MB).

(Continued on following page)

Connectors, Controls & Indicators (Continued)

#	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
8	QM IN[4, 5, 6, 7] 1 — 8	(1) 8-wire RJ-45 female, QuickMedia input port; Signal types: Auto-detecting component (YP_bP_r), S-video (Y/C) or composite video with stereo program audio and (2) microphone channels; Video formats: NTSC 480i or PAL 576i; Connects to QM output port of a QM-TX or other QuickMedia device via CresCAT-QM or CresCAT-IM cable; Maximum cable length: 300 feet (aggregate distance from QM origination).
9	VIDEO IN[5, 8, 9] 1 — 8	(1) 8-wire RJ-45 female, CAT5 balanced video input port; Signal types: Auto-detecting component (YP_bP_r), S-video (Y/C) or composite video; Video formats: NTSC 480i or PAL 576i; Input impedance: 100 Ω balanced; Connects to any Crestron CAT5 balanced video source or TPMC-CH-IMC interface module (included) via CresCAT® cable or TPS/TPMC-CBL-T "triamese" cable (sold separately); Maximum cable length: 500 feet (component), 750 feet (S-video or composite).
10	AUDIO I/O[8, 10] 1 — 8	(1) 8-wire RJ-45 female, bidirectional CAT5 balanced audio port; Signal type: receives (1) balanced stereo audio signal and transmits (1) balanced stereo audio signal from internal microphone; Maximum input level: 4 V_{rms}; Maximum output level: 2 V_{rms}; Input/output impedance: 600 Ω; Connects to any other Crestron CAT5 balanced audio port or TPMC-CH-IMC interface module (included) via CresCAT® cable or TPS/TPMC-CBL-T "triamese" cable (sold separately); Maximum cable length: 1000 feet.
11	BUTTONS[11]	(4) Backlit "softkey" buttons, programmable (1) Backlit hard reset button, reboots the touchpanel.

1. Interface connectors for **NET** and some TPMC-CH-IMC ports are provided with the unit.
2. This connector is reserved for future applications.
3. Plugging in headphones will mute the built-in speakers.
4. The QM port is not connected through any "IMC" interface.
5. Only one video source may be displayed at a time.
6. Does not support RGB.

7. The eight-pin RJ-45 QuickMedia transport port accepts CAT5E/CAT6 carrying audio, video and microphone signals. The QM input port conforms to the 568B wiring standard. Refer to the following table for connector pinouts.

RJ-45 PIN NUMBER	WIRE COLORS (EIA 568B)	QM ASSIGNMENT COMPOSITE, S-VIDEO, COMPONENT AND AUDIO
1	WHITE/ORANGE	- CHROMINANCE (- P_r)
2	ORANGE	+ CHROMINANCE (+ P_r)
3	WHITE/GREEN	- LUMINANCE (- Y)
4	BLUE	+ AUDIO
5	WHITE/BLUE	- AUDIO
6	GREEN	+ LUMINANCE (+ Y)
7	WHITE/BROWN	- COMPOSITE (- P_b)
8	BROWN	+ COMPOSITE (+ P_b)

8. Use only the TPMC-CH-IMC Interface Module when connecting this port. Use of other "IMC" products could damage the panel.

9. This eight-pin RJ-45 port provides connectivity to the CNX-PVID or the TPMC-CH-IMC Interface Module. This port provides component, composite or S-video balanced input to the touchpanel over CAT5 wiring. Refer to the following table for connector pinouts.

PIN	WIRE COLORS (568B)	COMPOSITE	S-VIDEO	COMPONENT
1	WHITE/ORANGE	+ Composite	+ Luminance	+ Y
2	ORANGE	- Composite	- Luminance	- Y
3	WHITE/GREEN	N/A	+ Chrominance	+ P_b
4	BLUE	N/A	N/A	+ P_r
5	WHITE/BLUE	N/A	N/A	- P_r
6	GREEN	N/A	- Chrominance	- P_b
7	WHITE/BROWN	N/A	N/A	N/A
8	BROWN	N/A	N/A	N/A

10. This eight-pin RJ-45 port provides connectivity to the CNX-BIPAD or the TPMC-CH-IMC Interface Module. This port uses CAT5 wiring and provides audio input to the touchpanel and output from the touchpanel's built-in microphone. Refer to the following table for connector pinouts.

PIN	WIRE COLORS (568B)	AUDIO I/O
1	WHITE/ORANGE	+ Mic Left Out
2	ORANGE	- Mic Left Out
3	WHITE/GREEN	+ Mic Right Out
4	BLUE	+ Audio Left In
5	WHITE/BLUE	- Audio Left In
6	GREEN	- Mic Right Out
7	WHITE/BROWN	+ Audio Right In
8	BROWN	- Audio Right In

11. Refer to "Hard Button Programming" on page 49 for details.

Industry Compliance

As of the date of manufacture the TPS-12L/15L/17L has been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling.

$$C \epsilon \; \mathcal{C}$$

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

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

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Setup

Network Wiring

When wiring the network, consider the following:

- Use Crestron Certified Wire.

- Use Crestron power supplies for Crestron equipment.

- Provide sufficient power to the system.

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

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

For more details, refer to "Check Network Wiring" on page 55.

Ethernet

The TPS-12L/15L/17L also uses high-speed Ethernet for communications between the device and a control system, computer, digital 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).

CAT5 Wiring

Category 5 (CAT5) wiring is a twisted pair cable designed for Ethernet networks. These networks operate at speeds of up to 100 Megabits per second (Mbps) using the 100BaseT standard. Crestron takes advantage of this specification for a variety of audio and video applications.

Crestron recommends using CresCAT, CresCAT-D or CresCAT-Q wiring solutions.

The following chart shows the maximum recommended cable lengths for various signal formats.

Recommended Maximum Cable Lengths for Audio/Video via Crestron Certified Wire

| FORMAT	MAXIMUM DISTANCE
Composite	750 feet
S-Video	750 feet
Component	500 feet
Audio	1000 feet

For more information, refer to the latest version of the Crestron CAT5 Wiring Reference Guide (Doc. 6137).

QuickMedia Wiring

The Crestron QuickMedia cable (sold under the name "CresCAT-QM") contains one CAT5E cable and one Cresnet cable in Siamese jackets. Installation of any QM device is as simple as installing CresCAT-QM wires from the output of one device to the input of another. Installations are flexible, affordable and fast. For more information, refer to the latest revision of the Crestron MediaManager Applications Guide (Doc. 6244).

CresCAT-QM Cable
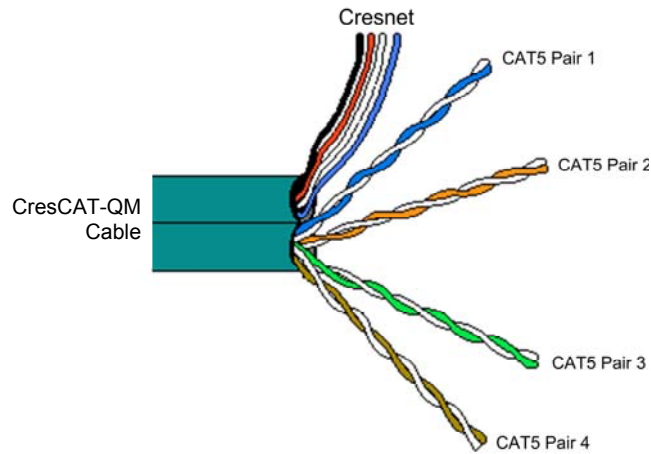
NOTE: Do not untwist the two wires in a single pair for more than 1/3-1/2" (0.84-1.27 cm) when making a connection. The twists are critical to canceling out interference between the wires.

The aggregate cable length of a signal path originating at a QM transmitter and terminating at the TPS-12L/15L/17L must not exceed 300 feet (90 meters). Video signals may experience a loss of quality over very long lengths of cable. This phenomenon is due to the added resistance and capacitance of longer cable lengths and is not peculiar to either Crestron and/or QuickMedia systems. To ensure sufficient bandwidth, the maximum aggregate cable length should not exceed 300 feet. The use of lower-resolution signals may allow increased cable length but must be tested by the installer with the sources to be used. The QM pin assignment is based on the EIA/TIA 568B RJ-45 Jack standard.

NOTE: When using CresCAT-QM wiring, four additional wires are included for making Cresnet® connections.

When connecting multiple QM devices, the route between a QM origination point (transmitter) and a QM endpoint (receiver) cannot have more than two midpoints (e.g. QM-MD7x2 or other QM switchers). Refer to the diagram on the following page when configuring a QM network.

QM Network Topology

Origination Points   Midpoints   Endpoints
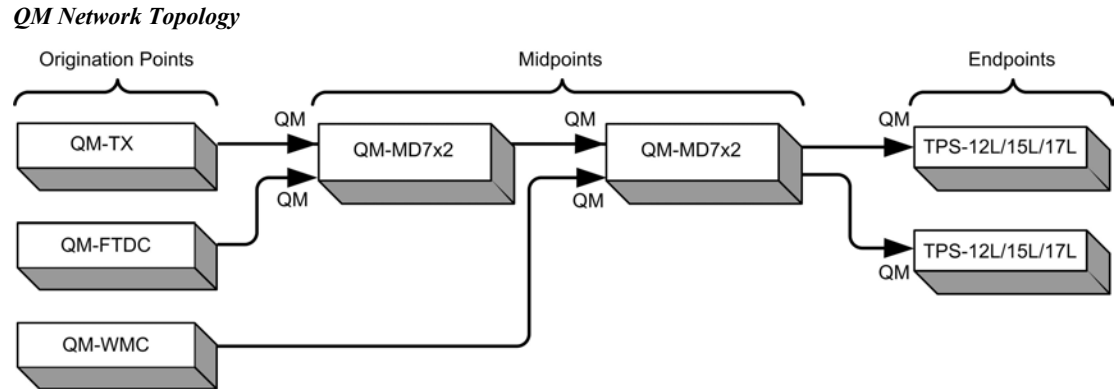
Identity Code

Net ID

The Net ID of the TPS-12L/15L/17L has been factory set to **03**. The Net IDs of multiple TPS-12L/15L/17L devices in the same system must be unique. The Net ID is set using the internal setup menu (refer to "Interface Menu" on page 26). Net ID may also be set from a personal computer (PC) via the Crestron Toolbox™ (refer to "Establishing Communication" on page 51).

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 TPS-12L/15L/17L's table using Crestron Toolbox. For information on setting an IP table, refer to the Crestron Toolbox help file. The IP IDs of multiple TPS-12L/15L/17L 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 (supplied via Cresnet). Refer to "Hardware Hookup" on page 40 for details.

To configure the unit it may be necessary to access a series of setup screens prior to viewing run-time screens that are loaded into the touchpanel for normal operation. The MAIN MENU for configuring the touchpanel appears when a finger is held to the touchscreen as power is applied or after the hardware reset button is pressed and released. Remove your finger when the message "SETUP MODE" briefly appears on the touchscreen.

Upon entering SETUP MODE the MAIN MENU, as shown in the following illustration, displays four buttons: **Touch Screen Calibration**, **Exit and Run Program**, **Setup** and **Diagnostics**.

The **Exit and Run Program** button verifies that all of the setup information has been saved to the EEPROM and displays the main page that has been programmed into your system. The remaining buttons on the MAIN MENU open other menus which are discussed in subsequent paragraphs.

MAIN MENU
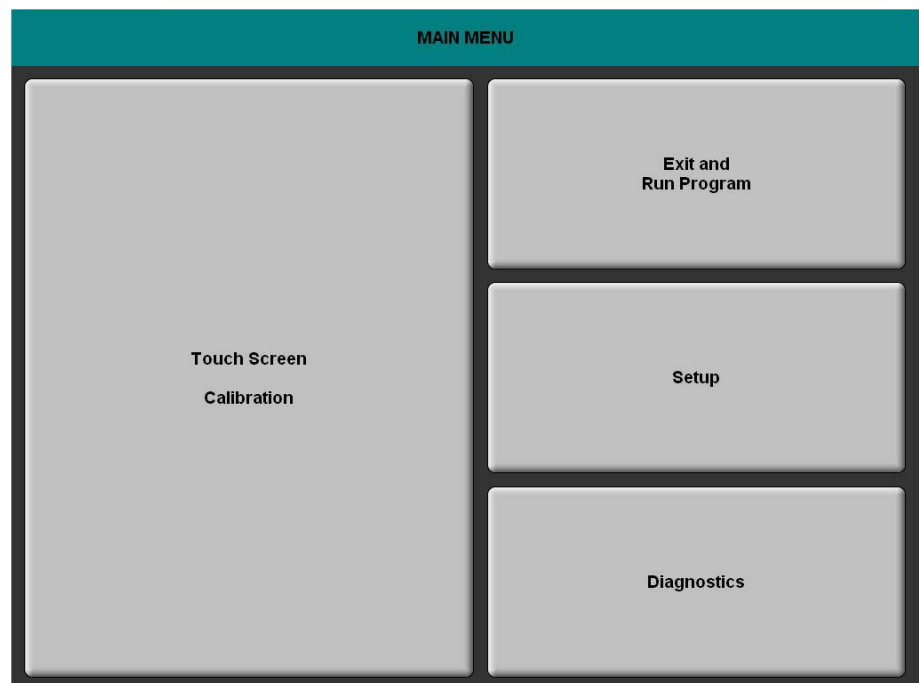
Calibration Menu

CALIBRATION MENU
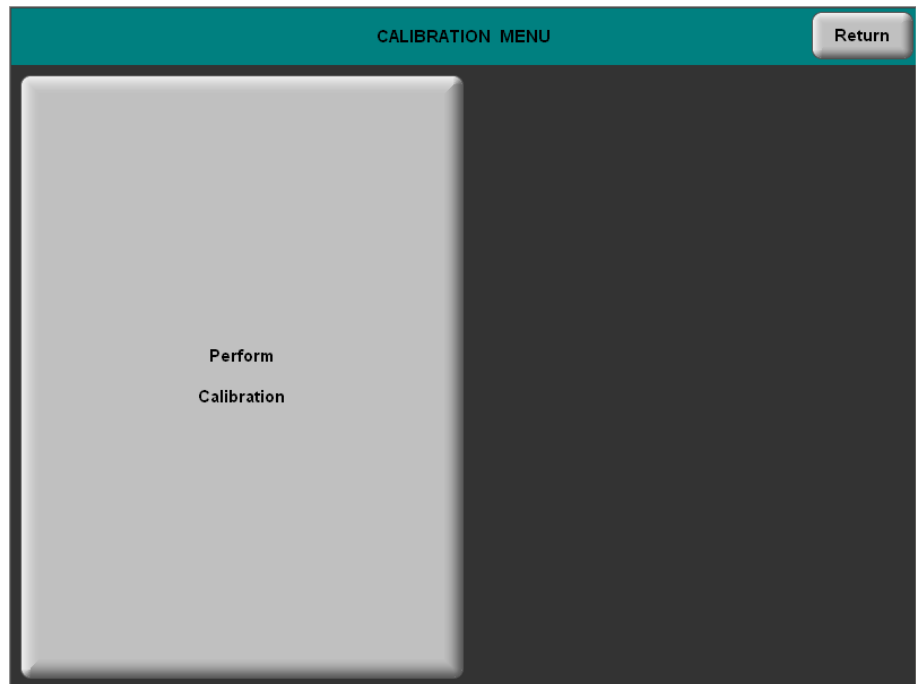
Touch **Perform Calibration**. The message "Touch Upper Left" appears centered on the panel with a cross hair in the upper left corner. Touch the center of the cross hair in the corner of the screen to initiate calibration. Another message, "Touch Upper Right", appears with a cross hair in the correct corner. Touch the center of the cross hair in the corner of the screen. A final message, "Touch Lower Right", appears with a cross hair in the correct corner. Touch the center of the cross hair in the corner of the screen to conclude calibration and return to the CALIBRATION MENU.

NOTE: When touching the screen during calibration be as accurate as possible. Use the tip of a capped pen or the eraser end of a pencil. To cancel calibration and return to the CALIBRATION MENU without saving calibration data, create a calibration error by touching the screen in the same spot three times.

Setup Menu

To obtain the SETUP MENU press the **Setup** button from the MAIN MENU. The SETUP MENU offers a series of buttons which open additional menus and displays and are detailed in subsequent paragraphs. The SETUP MENU also provides **Down**/**Up** buttons to control *Screen Brightness*, *Key Backlight* and *Standby Timeout*. The *Hardkey Test Results* indicators will light when each respective button is pushed on the touchpanel. After setup parameters have been selected, select the **Return** button to return to the MAIN MENU.

NOTE: For convenience the current CRESNET ID setting is displayed in the upper left corner.

NOTE: All touchpanel settings are automatically saved in non-volatile memory.

SETUP MENU
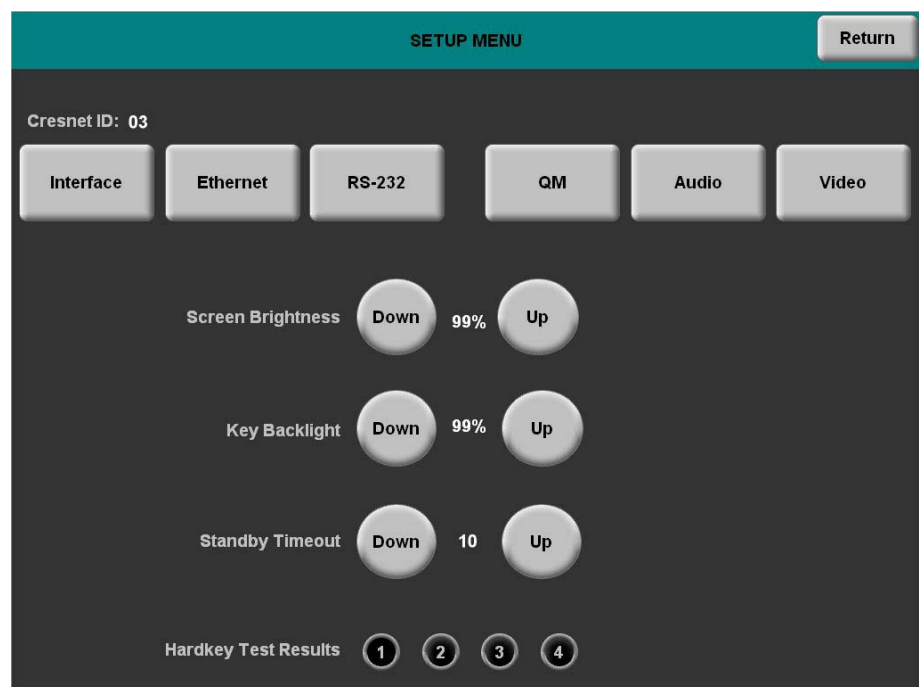
Interface Menu

The touchpanel communicates with a control system to activate commands or to display feedback from components within the system. The communication interface must be correctly specified or communication will not occur. To set communication parameters select the **Interface** button located on the SETUP MENU and display the INTERFACE MENU, shown after this paragraph.

The Cresnet network identity number (CRESNET ID also known as the Net ID) is displayed on the INTERFACE MENU. Net ID is the two-digit hexadecimal number. The hexadecimal number can range from 03 to FE and must correspond to the Net ID set in the SIMPL Windows program of the Cresnet system. Matching IDs between touchpanel and SIMPL Windows program is required if data is to be successfully transferred. Net ID for the TPS-12L/15L/17L is factory set to 03. No two devices in the same system can have the same Net ID.

INTERFACE MENU
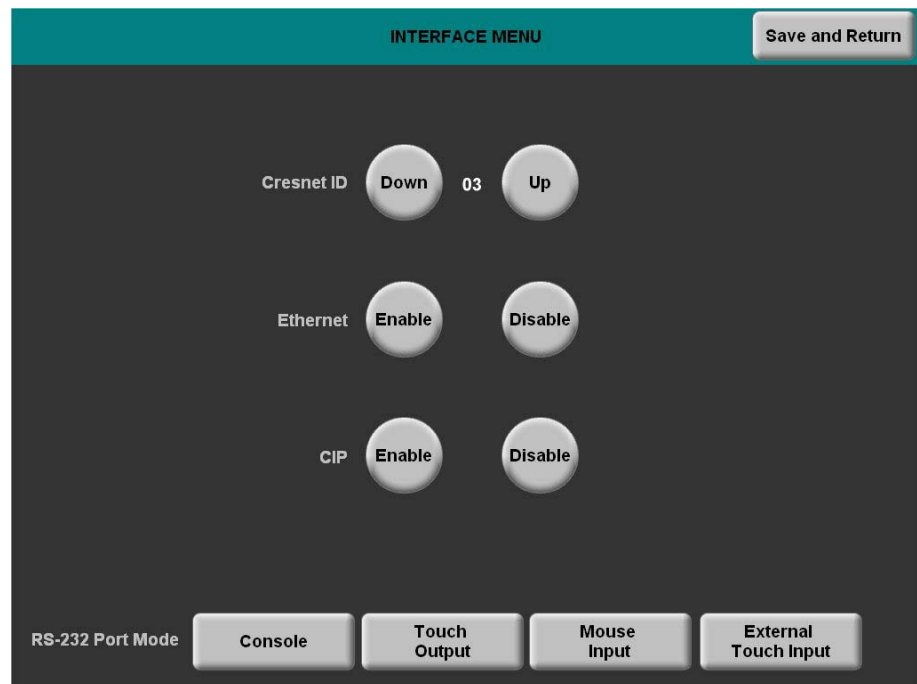
Two buttons adjacent to the hexadecimal display, **DOWN** and **UP**, decrease and increase the Net ID by one, respectively.

The four buttons at the bottom define how the RS-232 port can be used; as a console port (i.e. loading touchpanel projects and firmware), a touch output port (communication of touch coordinates to an external device), a mouse input port (allows a mouse to control the touchpanel) and an external touch input (allows another device to control the touchpanel).

The Ethernet **Enable** and **Disable** buttons determine the status of the touchpanel's Ethernet communications.

NOTE: The TPS-12L/15L/17L does not support a wireless Ethernet connection.

There may be Ethernet devices (i.e. a control system) on the network that communicate with the touchpanel via CIP (Cresnet Internet Protocol). Two buttons located on the INTERFACE MENU determine if the touchpanel is capable of this type of communication. Select **Enable** to permit this protocol recognition and **Disable** to prohibit any CIP connection. CIP must be enabled for the touchpanel to communicate with other Crestron Ethernet devices.

Select the **Save and Return** button located on the INTERFACE MENU to save changes and return to the SETUP MENU.

Ethernet Setup Menu

Selection of the **Ethernet** button from the SETUP MENU displays the ETHERNET SETUP MENU. This menu provides buttons for **Ethernet Status Test** (for details such as the IP Address, Subnet Mask, Default Router, IP Table, etc.), *DHCP* **Enable**/**Disable** and *Static IP Options*. Each of the *Static IP Options* has its own menu, as shown in the illustrations on the following pages. The enable/disable Ethernet feature is provided on the INTERFACE MENU. Ethernet settings are made through Crestron Toolbox. Refer to the TCP/IP Communications section of

"Establishing Communication", which starts on page 51 for additional Ethernet setup details.

ETHERNET SETUP MENU
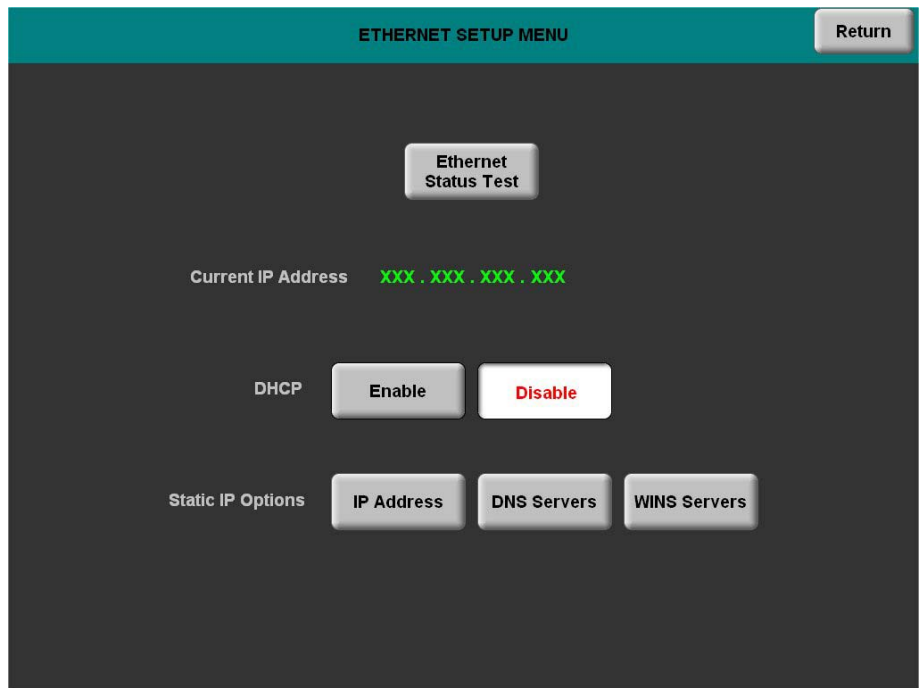
ETHERNET STATIC IP SETTINGS
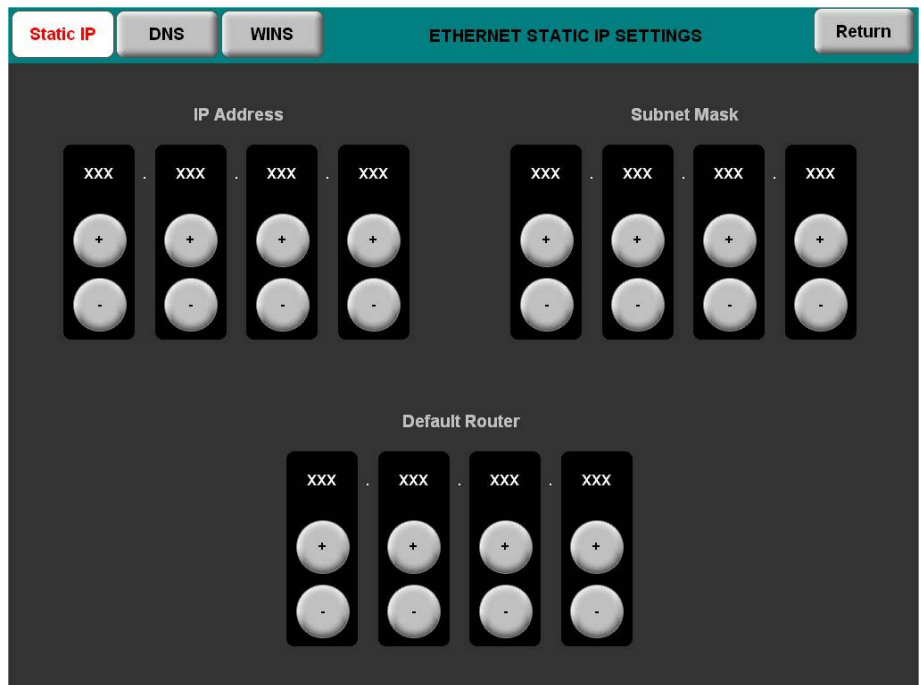
ETHERNET DNS SETTINGS
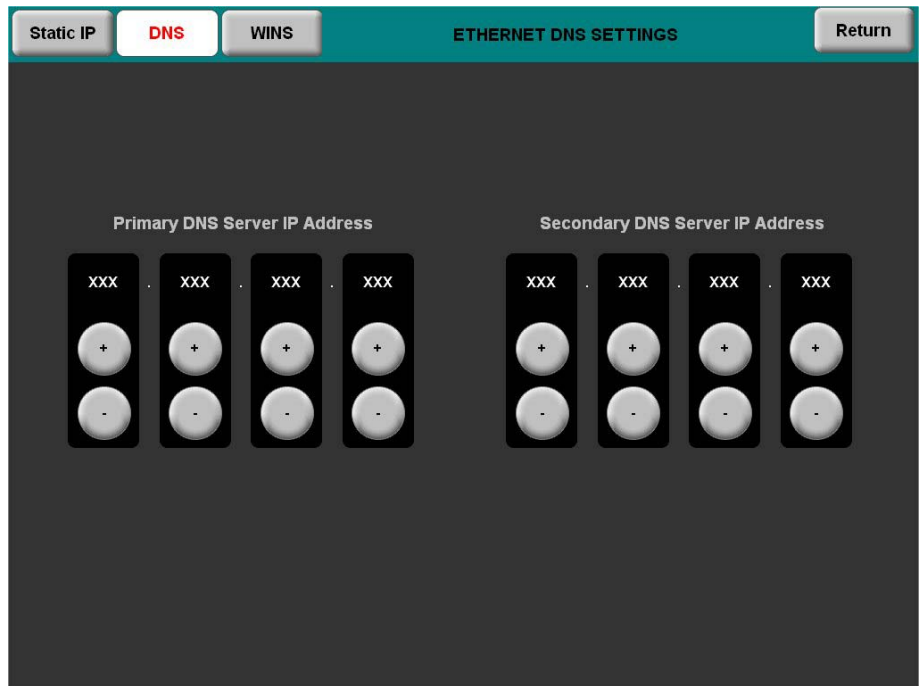
ETHERNET WINS SETTINGS
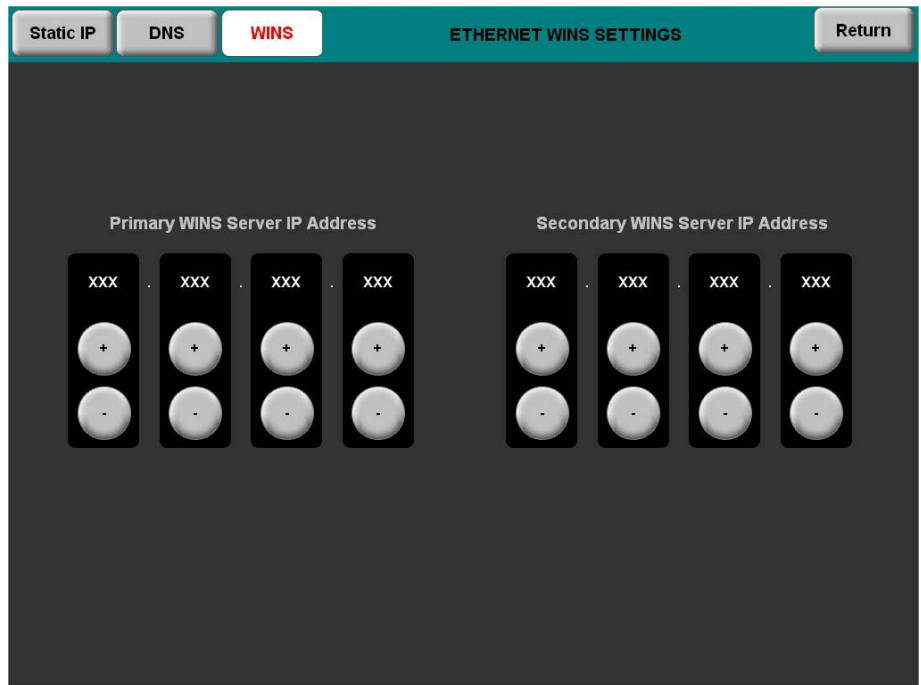
Selection of the DHCP **Enable** button from the ETHERNET SETUP MENU displays the DHCP options **Renew** and **Release**.

ETHERNET SETUP MENU (DHCP ENABLED)
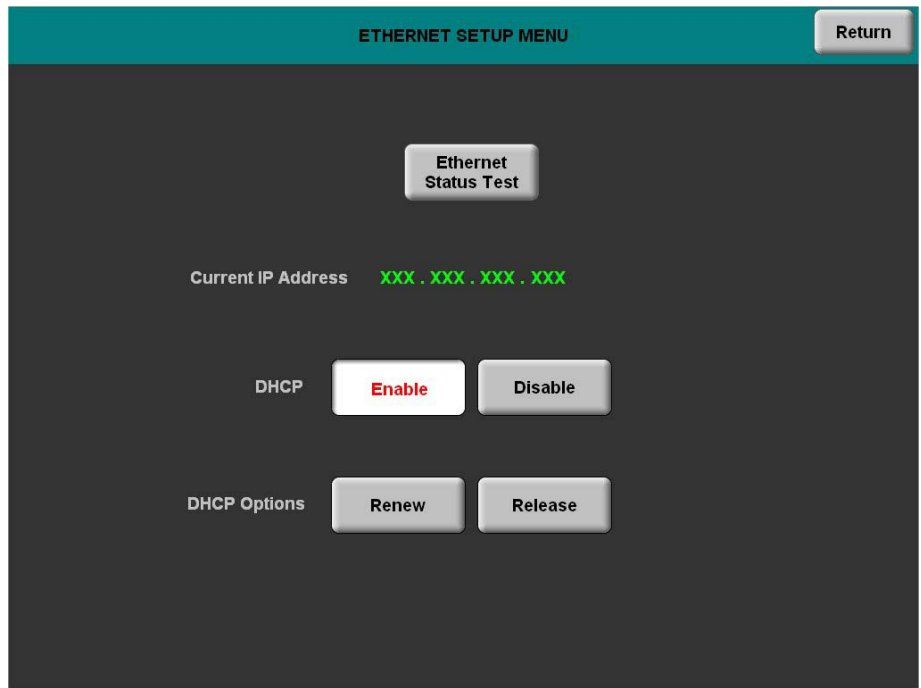
RS-232 Menu

The touchpanel allows for one of four RS-232 communication modes:

- **Console** (i.e. loading projects and firmware)

- **Touch Output** (communication of touch coordinates to an external device)

- **Mouse Input** (allows a mouse to control the touchpanel)

- **External Touch Input** (allows another device to control the touchpanel)

For convenience the RS-232 MENU also permits the selection of the RS-232 communication options Baud Rate, Data Bits, Stop Bits, Parity, RTS On/Off and XON-XOFF On/Off.

Touch the communication option to select communication parameters and then select **Save and Return** to save the RS-232 settings and return to the SETUP MENU.

Default settings: Console mode, Baud Rate: 115200, data bits: 8, stop bits: 1, parity: none, RTS off and XON/XOFF off.

RS-232 MENU
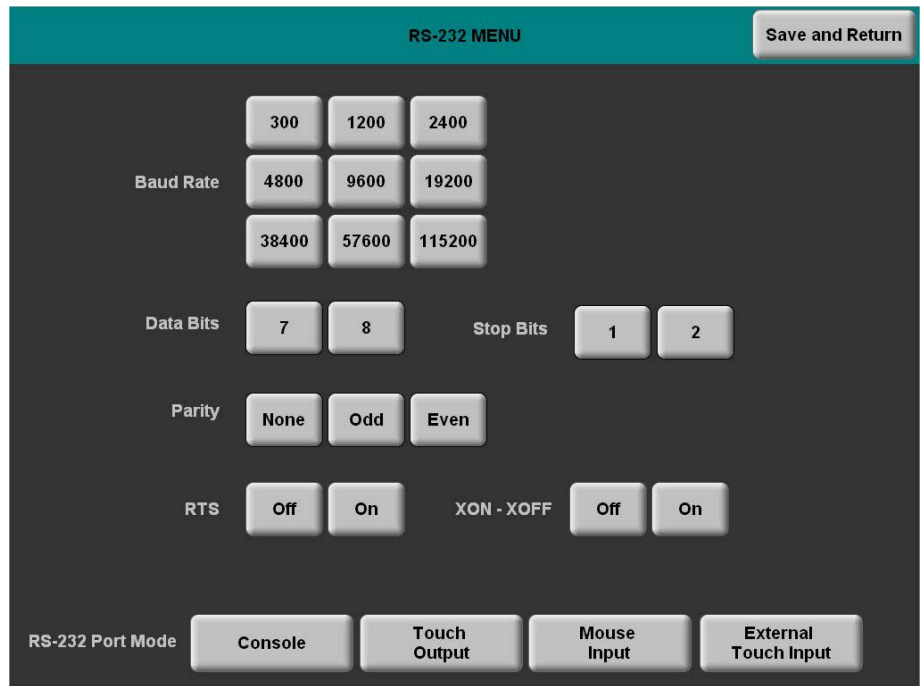
QM Setup

To open the QM SETUP menu, press the **QM** button from the SETUP MENU. The QM SETUP menu offers controls for selecting *Peak* and *Boost* in *Video*, *S-Video* and *Component* modes.

After these parameters have been set, select the **Return** button to return to the SETUP MENU.

QM SETUP
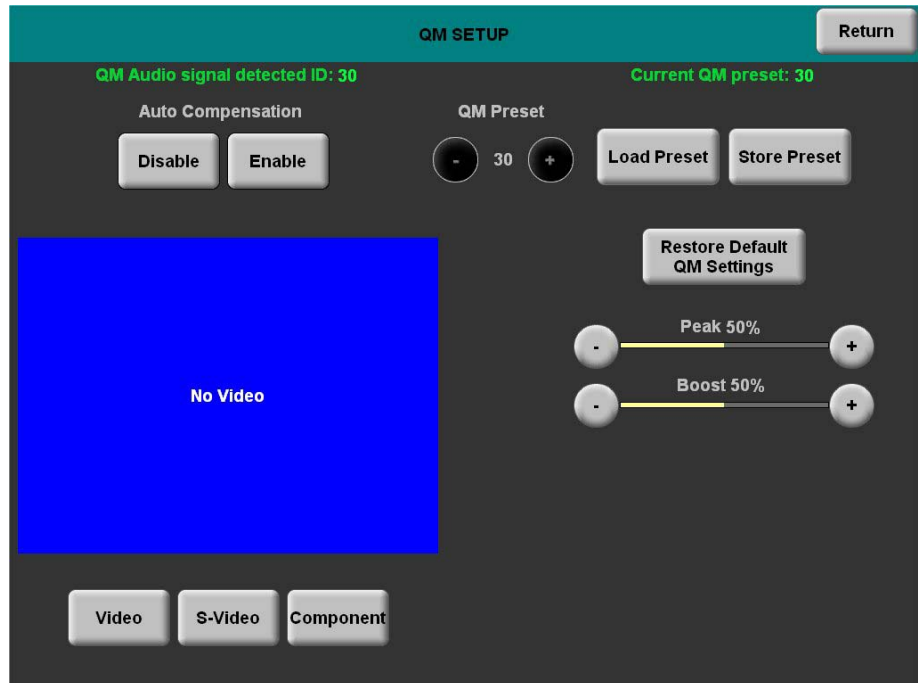
Refer to the following table for additional QM SETUP MENU details.

QM Setup Details

QM SETUP SCREEN CONTROL	DESCRIPTION
Auto Compensation Disable	Turns off auto compensation.
Auto Compensation Enable	Turns on auto compensation. When auto compensation is on, the QM receiving device uses the auto compensation data received from the QM transmitter.
QM Preset	Displays the current QM Preset number. Saved presets can also be called up using this control. The **-** and **+** buttons decrement and increment the displayed value.
Load Preset	Will load the selected QM Preset.
Store Preset	Will store any changes you have made to the QM setup at the displayed preset number.
Restore Default QM Settings	Restores the QM settings to their original defaults.

(Continued on following page)

QM Setup Details (Continued)

QM SETUP SCREEN CONTROLS	DESCRIPTION
Peak	Peak adjusts for high frequency attenuation that can occur over long cable lengths.
Boost	Boost compensates for overall signal loss that can occur over long cable lengths.
Video	Puts the menu in *Video* mode so that you can adjust the peak and boost signals for video.
S-Video	Puts the menu in *S-Video* mode so that you can adjust the peak and boost signals for S-video.
Component	Puts the menu in *Component* mode so that you can adjust the peak and boost signals for component video.

General Audio Setup

To open the GENERAL AUDIO SETUP menu press the **Audio** button from the SETUP MENU. The GENERAL AUDIO SETUP menu offers a series of buttons that adjust the volume level as indicated by the gauges. *Speaker Volume*, *Line Volume*, *Key Click Volume*, *WAV Volume* and *Headphone Volume* are independently adjustable. Controls for *Bass*, *Treble* and *Headphone Balance* are also provided.

The **Play Test WAV File** button plays a short audio file. The **Restore Default Audio Settings** button returns all audio parameters to their default settings. Selection of the **QM Input** button from the GENERAL AUDIO SETUP menu displays the QM AUDIO INPUT SETUP menu. This menu allows adjustment of volume levels for QM audio inputs. After audio parameters have been set, select the **Return** button to return to the SETUP MENU.

GENERAL AUDIO SETUP
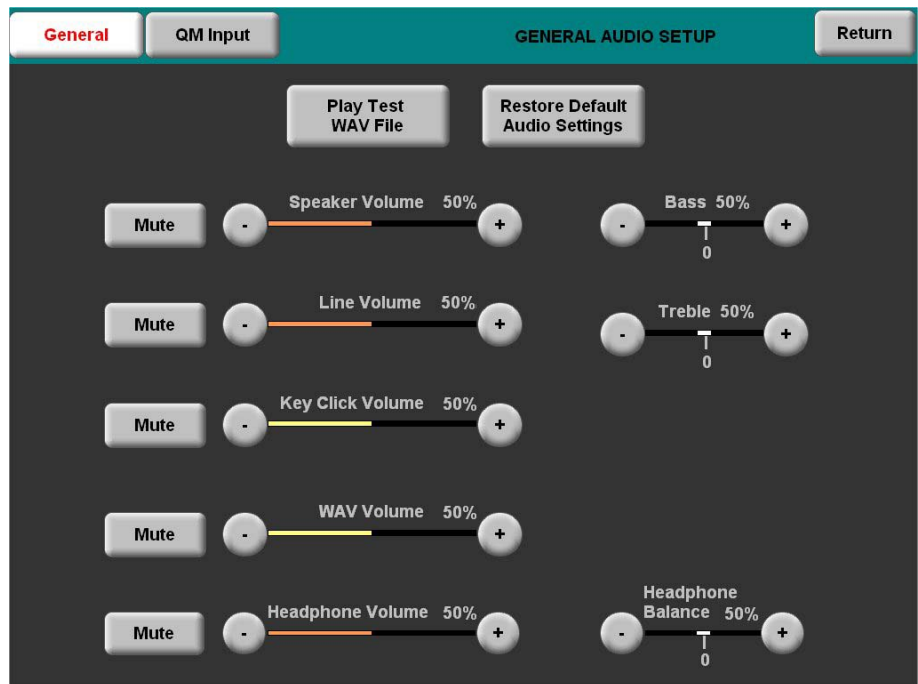
Refer to the following table for additional GENERAL AUDIO SETUP menu details.

General Audio Setup Details

GENERAL AUDIO SETUP SCREEN CONTROL	DESCRIPTION
Play Test WAV File	Plays a short WAV audio file.
Restore Default Audio Settings	Returns audio settings to their factory defaults.
Mute	A separate **Mute** button is provided for each of the volume controls.
Speaker Volume	The volume of all audio inputs (line, key click and WAV) is affected by the Speaker Volume control. If the Speaker Volume control is set to 100% the volume for any audio input is at maximum. If the Speaker Volume is set to 0% the value of all audio inputs is overridden and the touchpanel is silent. If the Speaker Volume is a percentage (say 50%), then all audio inputs can only achieve half their value.
Line Volume	Adjusts line level audio with the **–** and **+** buttons.
Key Click Volume	Adjusts the level of the key click sound with the **–** and **+** buttons.
WAV Volume	Adjusts the volume of the WAV file with the **–** and **+** buttons. Click **Play Test WAV File** button to sample and adjust the volume as a pre-loaded WAV file plays.
Headphone Volume	Adjusts the level of the headphones with the **–** and **+** buttons. (This control is visible only when headphones are connected.)
Bass	Adjusts the overall bass output with the **–** and **+** buttons.
Treble	Adjusts the overall treble output with the **–** and **+** buttons.
Headphone Balance	Adjusts the overall left/right balance of the headphone output with the **–** and **+** buttons. (This control is visible only when headphones are connected.)

QM AUDIO INPUT SETUP
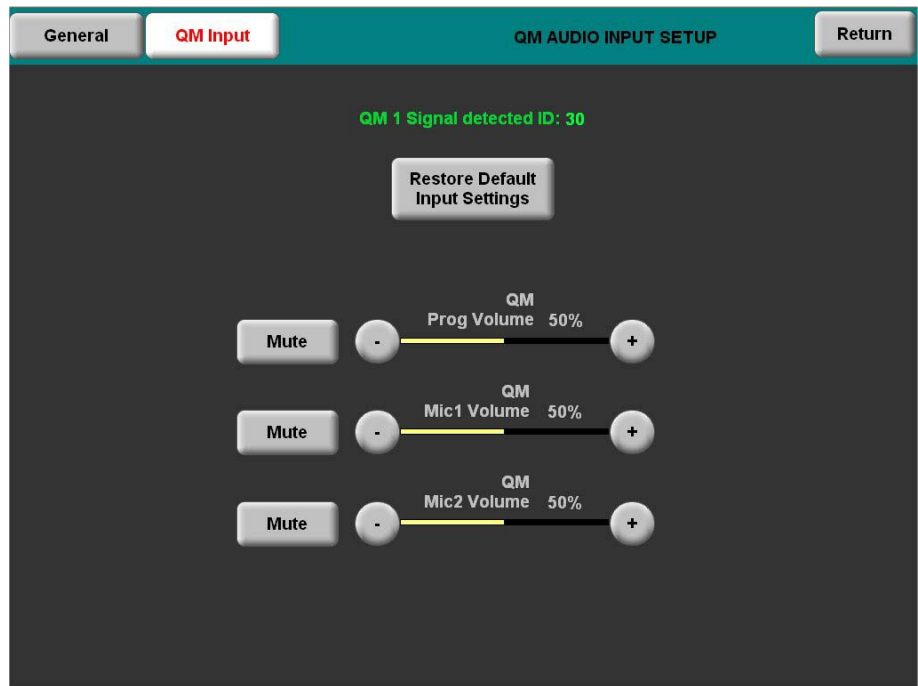
Refer to the following table for additional QM AUDIO INPUT SETUP menu details.

QM Audio Input Setup Details

QM AUDIO INPUT SETUP SCREEN CONTROL	DESCRIPTION
Restore Default Input Settings	Returns audio settings to their factory defaults.
Mute	A separate **Mute** button is provided for each of the three inputs.
Prog Volume	Adjusts program audio with the **–** and **+** buttons.
Mic 1 Volume	Adjusts the level of microphone 1 with the **–** and **+** buttons.
Mic 2 Volume	Adjusts the level of microphone 2 with the **–** and **+** buttons.

Video Setup

The touchpanel can display composite, S-video and component video input from one of the selected sources or from the QM input connector in both NTSC and PAL formats. Select the **Video** button from the SETUP MENU to display the first VIDEO SETUP menu, shown in the following illustration. You can select **Setup QM Video**, **Setup Video** or choose one particular input source.

A second VIDEO SETUP menu provides controls for *Video Preset* (+ and -), **Load Preset** and **Store Preset**. Controls for *Brightness*, *Contrast*, *Saturation* and *Hue* are provided independently for each video source.

The **Restore Default Color Settings** button resets the controls to the factory settings. After video parameters have been set, select the **Return** button to return to the SETUP MENU.

Refer to the following graphics and tables for additional information.

VIDEO SETUP
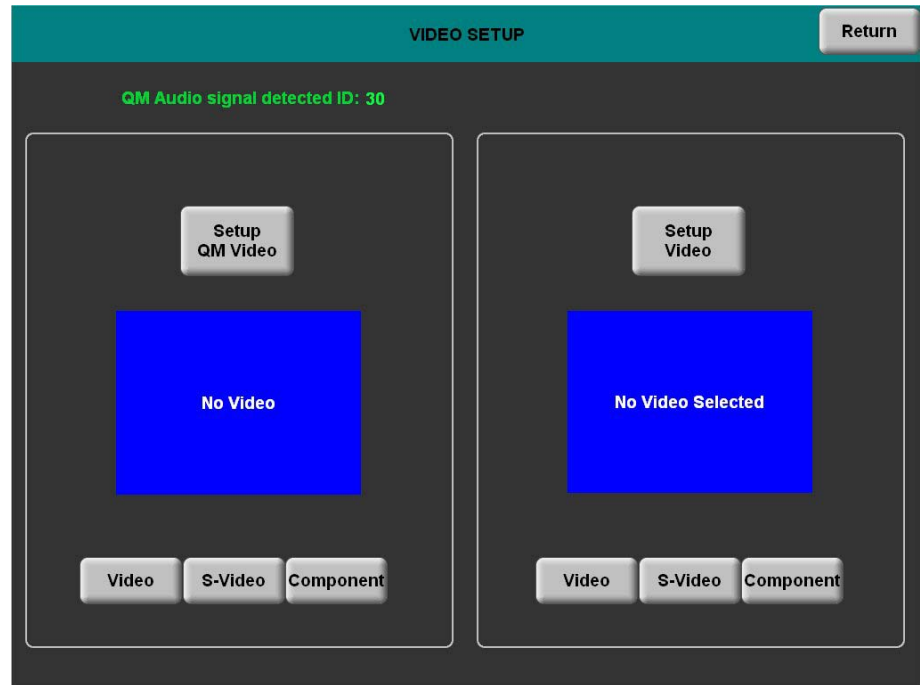
Video Setup Details

VIDEO SETUP SCREEN CONTROL	DESCRIPTION
Setup QM Video	Displays the VIDEO SETUP menu. By default, the VIDEO SETUP menu displays video controls: Brightness, Contrast, Saturation and Hue on the right side of the menu.
Video	Pressing this before pressing the **Setup QM Video** button will open the VIDEO SETUP menu in *Video* mode.
S-Video	Pressing this before pressing the **Setup QM Video** button will open the VIDEO SETUP menu in *S-Video* mode.
Component	Pressing this before pressing the **Setup QM Video** button will open the VIDEO SETUP menu in *Component* mode.
Setup Video	Displays the VIDEO SETUP menu. By default, the VIDEO SETUP menu displays video controls: Brightness, Contrast, Saturation and Hue on the right side of the menu.
Video	Pressing this before pressing the **Setup Video** button will open the VIDEO SETUP menu in *Video* mode.
S-Video	Pressing this before pressing the **Setup Video** button will open the VIDEO SETUP menu in *S-Video* mode.
Component	Pressing this before pressing the **Setup Video** button will open the VIDEO SETUP menu in *Component* mode.

VIDEO SETUP (Second Screen)
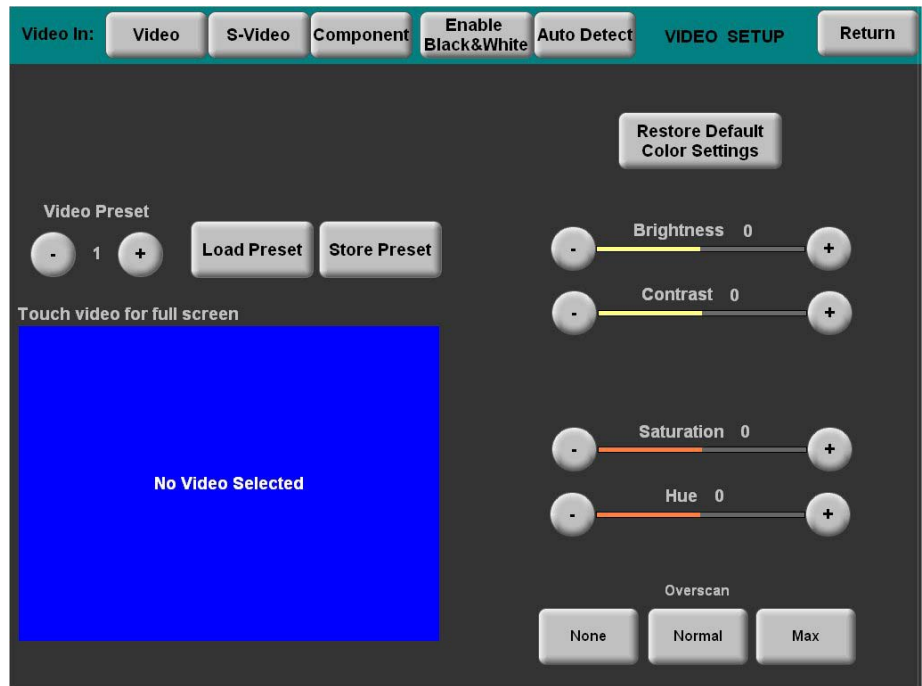
Video Setup Details – Video, S-Video and Component

VIDEO SETUP SCREEN CONTROL	DESCRIPTION
Video	Selects composite video source at *Video In*.
S-Video	Selects S-video at *Video In*.
Component	Selects Component video at *Video In*.
Enable Black & White	Enables display of black & white input signal.
Auto Detect	Enabling the auto-detect mode automatically selects video source connected to the *Video In* input.
Return	Reverts to the previous menu.
Video Preset	Displays the current video preset number. Saved presets can also be called up using this control. The **-** and **+** buttons decrement and increment the displayed value.
Load Preset	Will load the selected video preset.
Store Preset	Will store any changes you have made to the video setup at the displayed preset number.
Restore Default Color Values	Restores the video settings to their original defaults.
Brightness[1, 2]	Adjusts video image brightness with the **–** and **+** buttons.
Contrast[1, 2]	Adjusts video image contrast with the **–** and **+** buttons.
Saturation[1, 2]	Adjusts video image saturation with the **–** and **+** buttons.
Hue[1, 2, 3]	Adjusts video image hue with the **–** and **+** buttons.

(Continued on following page)

Video Setup Details – Video, S-Video and Component (Continued)

VIDEO SETUP SCREEN CONTROL	DESCRIPTION
Overscan	These controls adjust the amount of video information at the edges of the image. This part of the video picture is usually beyond the display capabilities of the screen.
None	Sets the video screen so there is no overscan. The amount of used screen area is smallest in this configuration.
Normal	Sets the video screen for normal overscan. This results in more area of the screen being used.
Max	This sets the video screen area to the maximum. The screen area is largest in this configuration. All video information at the edges is visible.

1. Video default is zero (0) for each of the video parameters (brightness, contrast, saturation and hue).
2. Adjustment applies to the currently selected video source only.
3. Hue is not available with component video.

Diagnostics Menu

The **Diagnostics** button from the MAIN MENU contains controls for diagnostic tools. The diagnostic tools should only be used under supervision from a Crestron customer service representative during telephone support. The options available from the DIAGNOSTICS MENU are numeric in nature and their interpretation is beyond the scope of this manual.

DIAGNOSTICS MENU
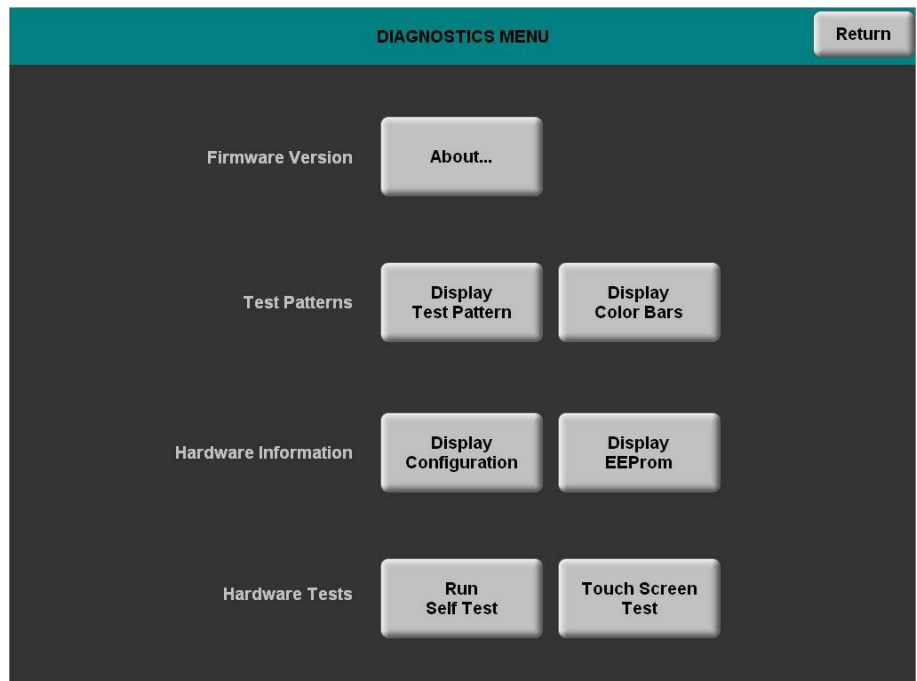
Mounting Options

The TPS-12L/15L/17L 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.

TPS-12L/15L/17L Mounting Options

PRE-CONSTRUCTION OPTION	POST-CONSTRUCTION OPTION	MODEL NUMBER	DOCUMENT NUMBER
Back Box Kit	-	BB-12L	6357
		BB-15L	6362
		BB-17L	6367
Pre-Construction Mount Kit	-	PMK-12L	6358
		PMK-15L	6363
		PMK-17L	6368
Mud Mount Kit (Accessory)	-	MMK-12L	6359
		MMK-15L	6364
		MMK-17L	6369
Trim Mount Kit (Accessory)	-	TMK-12L	6360
		TMK-15L	6365
		TMK-17L	6370
-	Wall Mount Kit - Mud	WMKM-12L	6359
		WMKM-15L	6364
-	Wall Mount Kit - Trim	WMKT-12L	6360
		WMKT-15L	6365
		WMKT-17L	6370

NOTE: Pre-construction refers to framed walls prior to hanging drywall. Post-construction refers to framed walls with drywall hung.

NOTE: Rack mounting kits (RMK-12L and RMK-15L) are also available for these touchpanels. Refer to the latest versions of the RMK-12L and RMK-15L Installation Guides (Docs. 6361 and 6366, respectively).

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" on page 40 for details.

3. Insert the touchpanel (without its bezel) into the mounting option and align the eight screw holes.

4. Insert and tighten the eight 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 the illustration following this step.

Exploded view of Mounting the TPS-12L in the Optional BB-12L Back Box
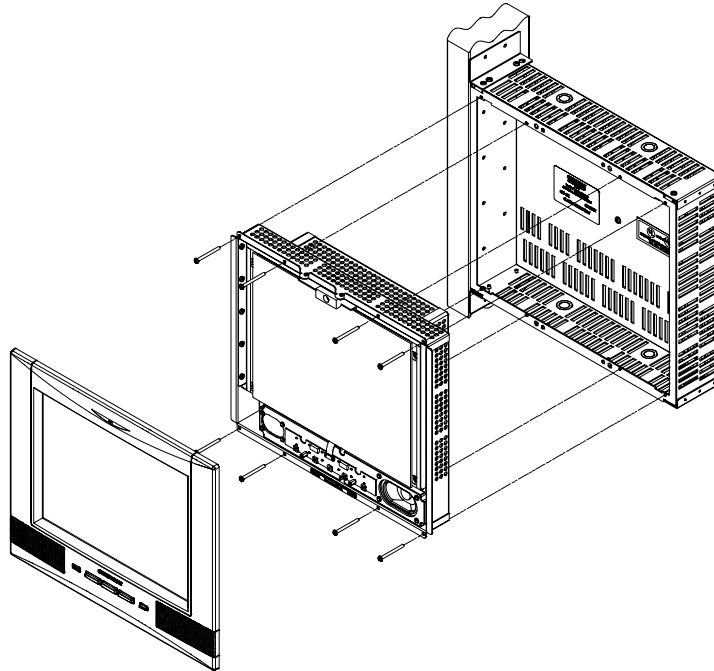
Touchpanel Removal

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 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 TPS-12L/15L/17L should be used in a well-ventilated area. The venting holes should not be obstructed under any circumstances. If the TPS-12L/15L/17L is hot to the touch, consider using forced air ventilation.

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

Connect the Device

Make the necessary connections as called out in the illustration on the following page. Refer to "Network Wiring" on page 21 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

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

NOTE: The maximum continuous current from equipment under any external load conditions shall not exceed a current limit that is suitable for the minimum wire gauge used in interconnecting cables. The ratings on the connecting unit's supply input should be considered to prevent overloading the wiring.

NOTE: The headphone output is for WAV and Line audio only. It does not carry the microphone signal. Use the AUDIO OUT on the TPMC-CH-IMC for the microphone signal.

NOTE: TPS-12L/15L/17L touchpanels include a TPMC-CH-IMC Interface Module for system connection. The TPMC-CH-IMC serves as an interface between the touchpanel, external A/V system, microphone output and the Cresnet system. Refer to the TPMC-CH-IMC Operations Guide (Doc. 6345) for hardware hookup using this interface.

NOTE: For CAT5 and QuickMedia connections, use Crestron Certified Wire.

NOTE: Crestron recommends an independent power supply for the touchpanel.

Hardware Connections for the TPS-12L/15L/17L
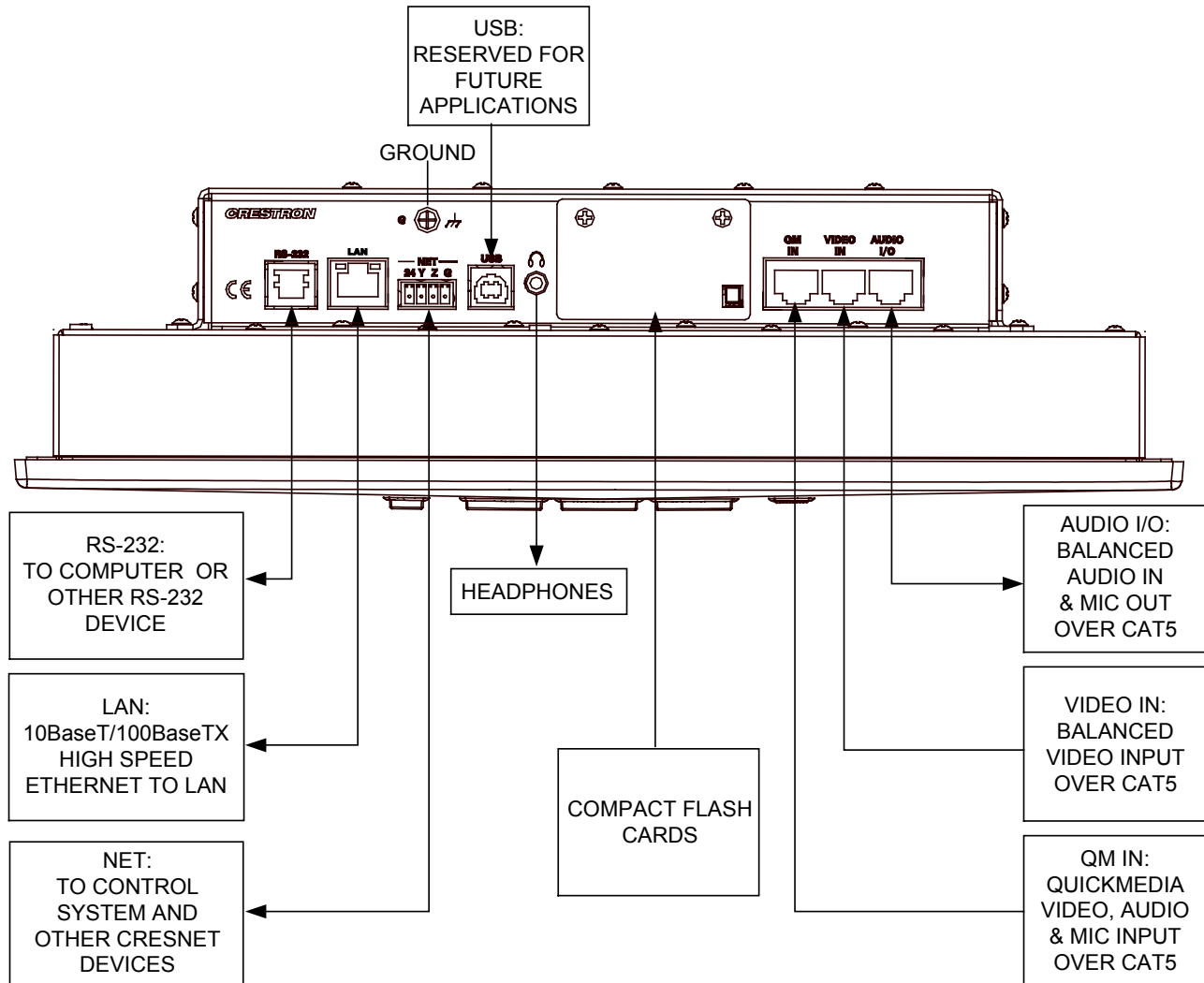
CAUTION: Only use the TPMC-CH-IMC Interface Module when connecting the VIDEO IN and AUDIO I/O ports. The use of other "IMC" products could damage the panel.

NOTE: The QM port is not connected through any "IMC" interface.

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 develop a Cresnet system. The following are the minimum recommended software versions for the PC:

Software

TASK	REQUIRED SOFTWARE VERSION
Program control system to operate TPS-12L/15L/17L.	SIMPL Windows version 2.06.16 or later with Library update 342 or later. Also requires Crestron Database version 17.2.0 or later.
Upload program and firmware.	Crestron Toolbox version 1.0 or later.
For graphical touchscreen design.	Crestron VisionTools® Pro-e version 3.4.0.7 or later.
Program with simple wizards for QuickMedia systems using a TPS-12L/15L/17L (optional but recommended).	Crestron SystemBuilder™ version 2.0 or later (requires SIMPL Windows, VT Pro-e, Crestron Database and Crestron Engraver). Refer to software release notes or Crestron website for other required Crestron software packages.

Programming with Crestron SystemBuilder

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

Programming with SIMPL Windows

NOTE: While SIMPL Windows can be used to program the TPS-12L/15L/17L, it is recommended to use SystemBuilder for configuring and tuning a QuickMedia 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 TPS-12L/15L/17L (Cresnet) into the system, drag the TPS-12L/15L/17L from the Touchpanels | Touchpanels (Cresnet) folder of the *Device Library* and drop it in the *System Views*.

Locating the TPS-12L/15L/17L (Cresnet) in the Device Library
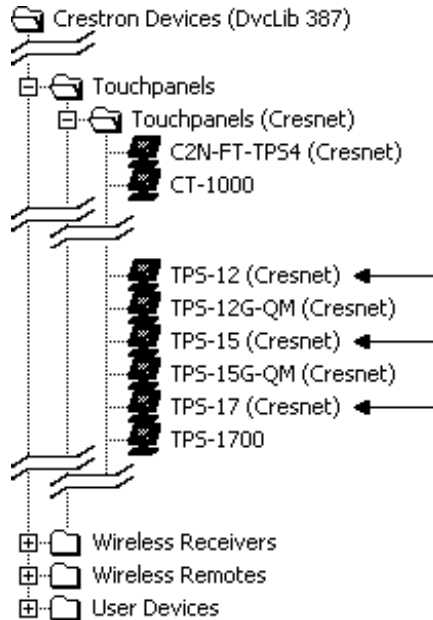
- To incorporate the TPS-12L/15L/17L (Ethernet) into the system, drag the TPS-12L/15L/17L from the Touchpanels | Touchpanels (Ethernet) folder of the *Device Library* and drop it in the *System Views*.

Locating the TPS-12L/15L/17L (Ethernet) in the Device Library

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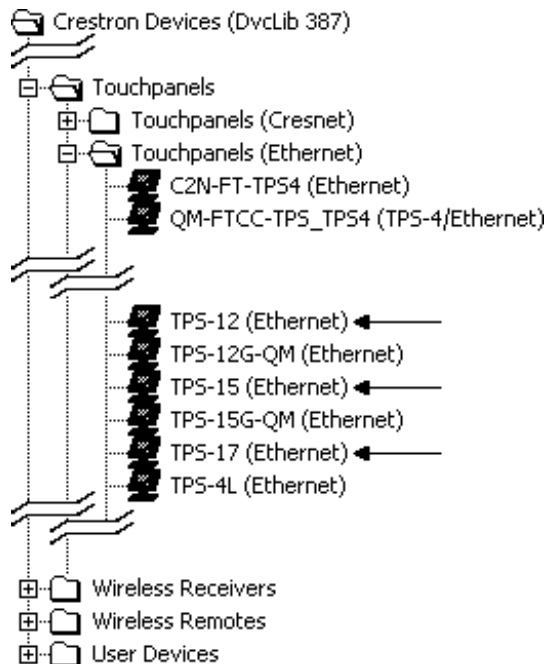
- The system tree of the control system displays the device in the appropriate slot with a default Net ID or IP ID as shown in the following illustration.

NOTE: Observe that there is both an Ethernet device in Slot 8 and a Cresnet device in Slot 9 of the following illustration. It is possible to have both types of device attached to a control system so long as the control system has either a built-in or expansion Ethernet interface.

C2Net Device, Slot 8 and 9
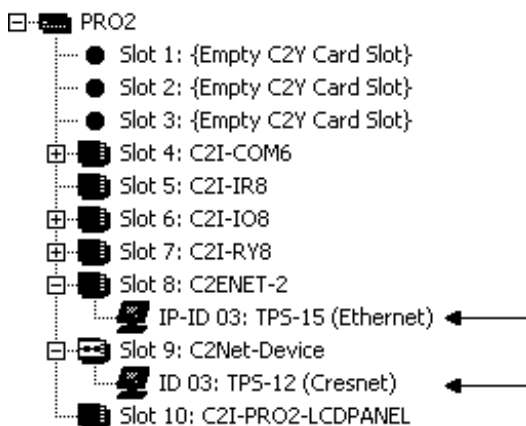
- Additional TPS-12L/15L/17L devices are assigned different Net ID (for Cresnet devices) or IP ID (for Ethernet devices) numbers as they are added.

- 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 figures.

"TPS-12L (Cresnet) Device Settings" Window
(Same as window for TPS-15L and TPS-17L)
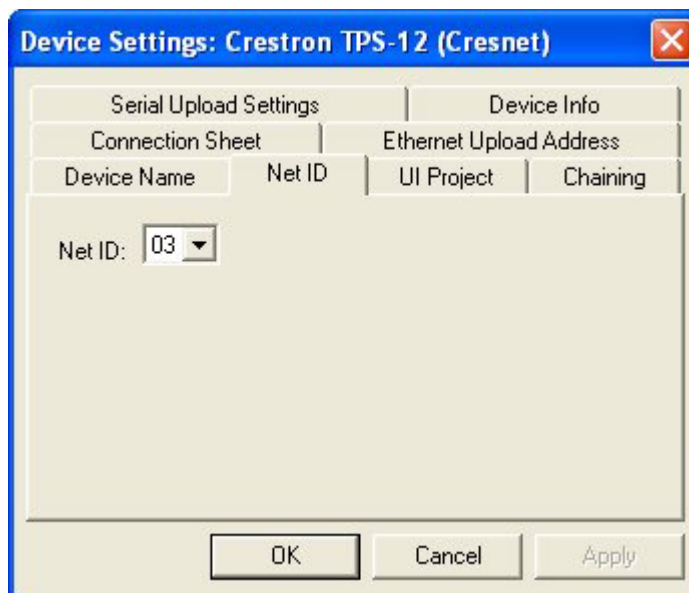
*"TPS-15L (Ethernet) Device Settings" Window
(Same as window for TPS-12L and TPS-17L)*
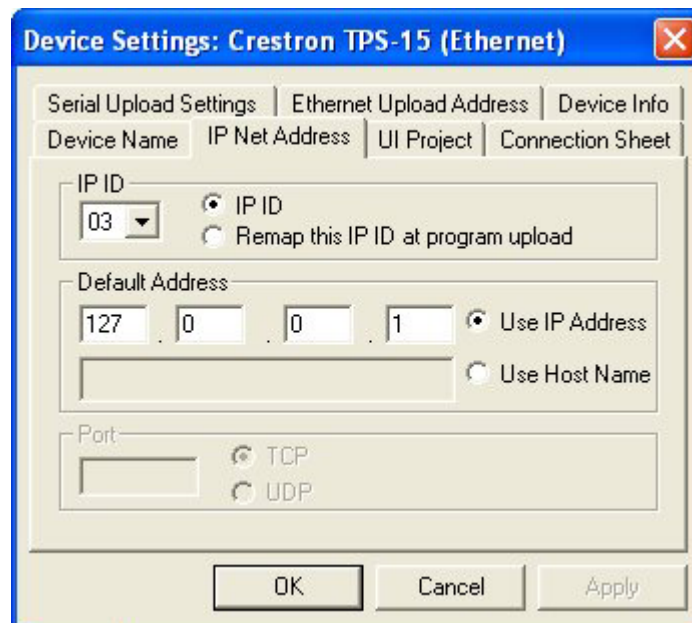
- The ID code specified in the SIMPL Windows program must match the Net ID or IP ID of each unit.

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 to allow 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 TPS-12L/15L/17L 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 TPS-12L/15L/17L 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 http://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 TPS-12L/15L/17L 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™. 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 TPS-12L/15L/17L touchpanels only accept the following WAV file format: **PCM, 8KHz, mono, 8-bit**. 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 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. Various dithering types are available. Refer to the following illustrations.

VT Pro-e "Page Properties" Window – Bit Depth Selection
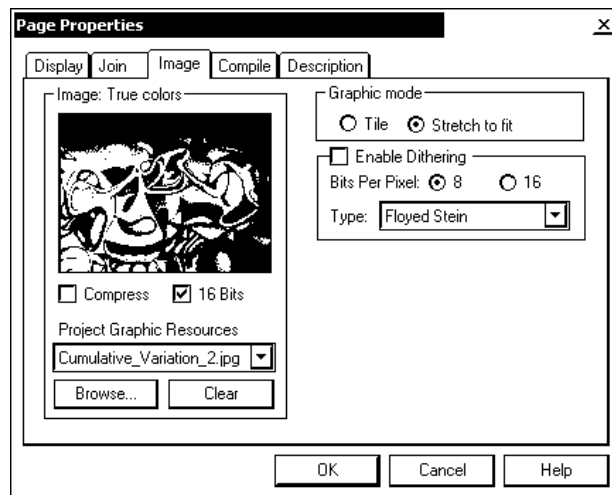
VT Pro-e "Image Properties" Window – Bit Depth Selection
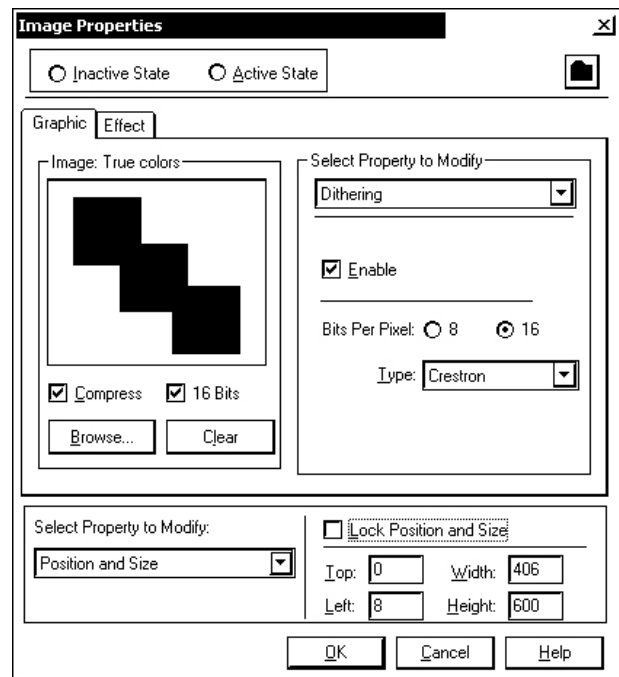
Hard Button Programming

Four of the buttons can be programmed to access any frequently used command. Each button has a permanently fixed digital join number. The sequence of digital join numbers is (left to right) 1 through 4. Refer to the following diagram for their assigned join numbers. A description for each button signal is described in the SIMPL Windows help file (**F1**).

Pushbutton Layout and Join Number Assignment

RESET   JOIN 1   JOIN 2   JOIN 3   JOIN 4
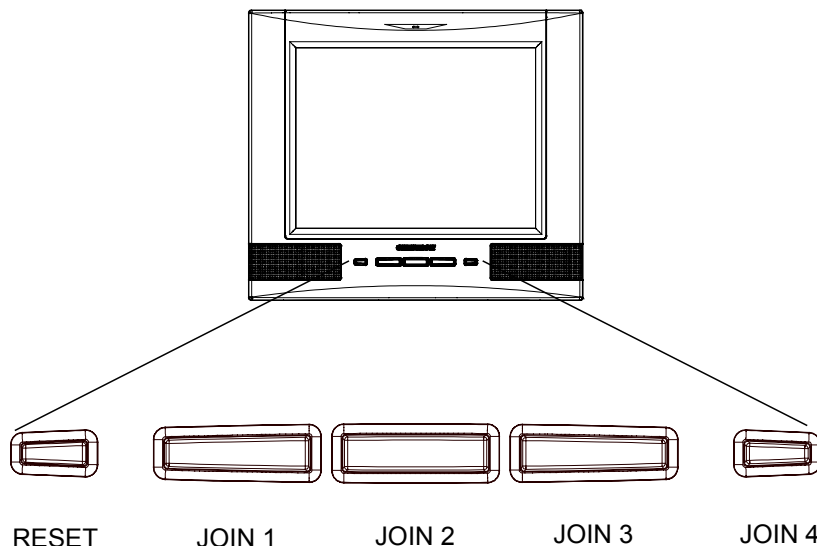
MultiByte International Characters

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 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 is available in many international languages and add-on software is available for other versions of Windows.

Example Program

An example program for the TPS-12L/15L/17L is available from the Crestron website (http://www.crestron.com/exampleprograms).

Uploading and Upgrading

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

Use Crestron Toolbox for communicating with the TPS-12L/15L/17L; refer to the Crestron Toolbox help file for details. There are three methods of communication.

Direct Serial Communication

NOTE: Required for initial setup of Ethernet parameters.

Direct Serial Communication

```
┌─────────────────┐   SERIAL VIA CRESTRON   ┌─────────────────┐
│  PC RUNNING     │ ◄── CABLE STCP-502PC ──► │  TPS-12L/15L/17L │
│ CRESTRON TOOLBOX│     OR EQUIVALENT        │                 │
└─────────────────┘                          └─────────────────┘
```
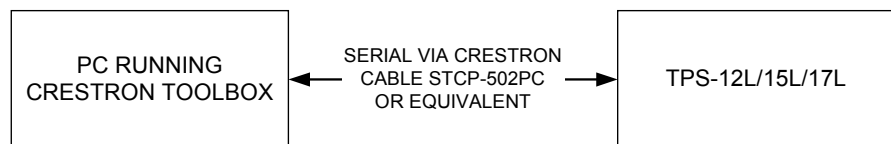
- The **RS-232** port on the TPS-12L/15L/17L connects to the serial port on the PC via a serial cable (Crestron STCP-502PC or equivalent).

- Use the Address Book in Crestron Toolbox to create an entry using the expected serial communication protocol (RS-232, auto-detect baud rate, no parity, 8 data bits, 1 stop bit, XON/XOFF disabled, RTS/CTS disabled).

- Display the TPS-12L/15L/17L's "System Info" window (click the icon); communications are confirmed when the device information is displayed.

Indirect Serial Communication

Indirect Serial Communication

```
┌─────────────────┐           ┌──────────────┐           ┌─────────────────┐
│  PC RUNNING     │ ◄─SERIAL OR─►│ CONTROL SYSTEM│◄─CRESNET─►│ TPS-12L/15L/17L │
│ CRESTRON TOOLBOX│   ETHERNET  │              │           │                 │
└─────────────────┘           └──────────────┘           └─────────────────┘
```

- TPS-12L/15L/17L connects to control system via Cresnet.

- Establish communications between the PC and the control system as described in the latest version of the 2-Series Control Systems Reference Guide (Doc. 6256).

TCP/IP Communication

NOTE: Required for operation with a Crestron control system.

Ethernet Communication

```
┌──────────────────┐                              ┌──────────────────┐
│   PC RUNNING     │◄──────ETHERNET──────►│  TPS-12L/15L/17L │
│ CRESTRON TOOLBOX │                              │                  │
└──────────────────┘                              └──────────────────┘
```

- Establish serial communication between TPS-12L/15L/17L and PC.

- Enter the IP address, IP mask and default router of the TPS-12L/15L/17L via the Crestron Toolbox (**Functions | Ethernet Addressing**); otherwise enable DHCP.
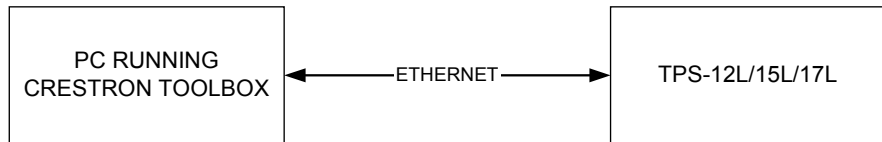
- Confirm Ethernet connections between TPS-12L/15L/17L and PC. If connecting through a hub or router, use CAT5 straight through cables with 8-pin RJ-45 connectors. Alternatively, use a CAT5 crossover cable to connect the two **LAN** ports directly without using a hub or router.

- Use the Address Book in the Crestron Toolbox to create an entry for the TPS-12L/15L/17L with the TPS-12L/15L/17L's TCP/IP communication parameters.

- Display the "System Info" window (click the ▮▮ icon) and select the TPS-12L/15L/17L 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, VisionTools 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 Simple Windows or Crestron Toolbox.

VisionTools Pro-e

Upload the VisionTools Pro-e file to the touchpanel using VisionTools 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 TPS-12L/15L/17L firmware via Crestron Toolbox.

- Establish serial or TCP/IP communications with the TPS-12L/15L/17L and display the "System Info" window.

- Select **Functions | Firmware…** to upgrade the TPS-12L/15L/17L firmware.

Program Checks

Actions that can be performed on the TPS-12L/15L/17L vary depending on whether it is connected via Cresnet or Ethernet.

Cresnet Connections

For Cresnet connections, display the network device tree (**Tools | Network Device Tree**) to show all network devices connected to the control system. Right-click on the TPS-12L/15L/17L to display actions that can be performed on the TPS-12L/15L/17L.

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 TPS-12L/15L/17L.

Be sure to use the Crestron Toolbox to create the TPS-12L/15L/17L IP table.

- Select **Functions | IP Table Setup**.

- Add, modify or delete entries in the IP table. The TPS-12L/15L/17L can have only one IP table entry.

- 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 TPS-12L/15L/17L. The entry should list the TPS-12L/15L/17L's IP ID (specified on the TPS-12L/15L/17L'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.

TPS-12L/15L/17L Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
TPS-12L/15L/17L does not function.	TPS-12L/15L/17L is not receiving power.	Verify power to unit. Use only Crestron power supplies for Crestron equipment.
	Incorrect cable connections.	Follow connection procedures in this guide and inspect connector pins.
	Incorrect firmware/software.	Update firmware/software versions as per those listed in the "Specifications" section.
	Touchpanel is incorrectly calibrated.	Enter "SETUP MODE" and recalibrate.
	Touchpanel is not communicating with the network.	Use Toolbox to poll the network. Verify network connection to the touchpanel.
	Brightness is set too low.	Adjust touchpanel brightness. Refer to "Setup Menu" on page 26.
Touchpanel is not responding.	Incorrect network wiring.	Touch the screen to remove the message and verify correct wiring to all connectors.
	Touchpanel Cresnet ID is not set to match the Net ID in the SIMPL program.	Use Crestron Toolbox to poll the network. Verify the Cresnet ID for the touchpanel is properly set to match the Net ID in the SIMPL program.
	Touchpanel Cresnet ID is not unique; two or more units share the same ID.	Use Crestron Toolbox to poll the network and verify that each ID is used only once.
	ICMP is disabled.	Enable ICMP by typing **ICMP ON** at the command prompt in the Toolbox Text Console.
No video displayed.	Wrong VT Pro-e or SIMPL Windows programs.	Verify correct programs. Verify proper video set up.
	Incorrect input connection.	Verify video input and QM connections.

(Continued on following page)

TPS-12L/15L/17L Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
TPS-12L/15L/17L does not respond to ping command.	IP address not correct (LAN green and amber LEDs are off).	Assign correct IP address to TPS-12L/15L/17L.
	IP mask not correct (LAN green and amber LEDs are on).	Assign correct IP mask.
	The PC and the TPS-12L/15L/17L are not on same subnet.	Ensure that the PC and the TPS-12L/15L/17L are on the same subnet.
Mouse or touchpanel does not work.	Incorrect Touch settings.	Check Touch settings on INTERFACE MENU.
Touchpanel does not communicate with RS-232 devices.	Incorrect RS-232 settings.	Match communication settings of touchpanel to peripheral device.
Touchpanel display is dark.	Standby timeout has elapsed.	Touch the screen to reactivate.
Unexpected response from the touchpanel.	Touchpanel is incorrectly calibrated.	Enter "SETUP MODE" and recalibrate.
Communications via the LAN port not functioning.	Improper Ethernet connection (IEC).	Verify proper connection at touchpanel LAN port.
	Another device set to the same IP address.	Obtain new touchpanel static IP address.

Check Network Wiring

Use the Right Wire

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

Calculate Power

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

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

When calculating the length of wire for a particular Cresnet run, the wire gauge and the Cresnet power usage of each network unit to be connected must be taken into consideration. Use Crestron Certified Wire only. If Cresnet units are to be daisy-chained on the run, the Cresnet power usage of each network unit to be daisy-chained must be added together to determine the Cresnet power usage of the entire chain. If the unit is 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. If Cresnet HP is used for the same run, its length could extend to 1250 feet.

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

Strip and Tin Wire

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

Add Hubs

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

Reference Documents

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

List of Related Reference Documents

DOCUMENT TITLE
2-Series Control Systems Reference Guide
BB-12L Wall Mount Back Box
BB-15L Wall Mount Back Box
BB-17L Wall Mount Back Box
CAT5 Wiring Reference Guide
Creston e-Control Reference Guide
MediaManager Applications Guide
MMK-12L & WMKM-12L Mud Mount Kits
MMK-15L & WMKM-15L Mud Mount Kits
MMK-17L Mud Mount Kit
PKM-12L Pre-Construction Mount Kit
PKM-15L Pre-Construction Mount Kit
PKM-17L Pre-Construction Mount Kit
TMK-12L & WMKT-12L Trim Ring Mount Kits

(Continued on following page)

List of Related Reference Documents (Continued)

DOCUMENT TITLE
TMK-15L & WMKT-15L Trim Ring Mount Kits
TMK-17L & WMKT-17L Trim Ring Mount Kits
TPMC-CH-IMC Interface Module

Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by calling the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876]. For assistance in your local time zone, refer to the Crestron website (http://www.crestron.com/) for a listing of Crestron worldwide offices.

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

Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the TPS-12L/15L/17L, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

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

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