Crestron Isys™ **TPS-5000L**
12 Inch Lectern/Wall Mounted Touchpanel
Operations Guide

CRESTRON

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Contents

12 Inch Lectern/Wall Mount Touchpanel: Crestron Isys™ TPS-5000L

Introduction

Features and Functions

The TPS-5000L series packs all the power and performance of an Isys panel in a stylish lectern or wall-mount model. Its size and capabilities make it perfect for the conference room and home theater.

These touchpanels are available with two different faceplate colors: black, or white. The suffixes 'B' or 'W' respectively denotes color; i.e., TPS-5000LB is a touchpanel with a black faceplate. For simplicity within this guide, color suffix is omitted.

Featuring a 12 inch (30.5 cm) active matrix display the TPS-5000L uses the 65,536-color Isys engine which allows all graphics to be displayed with incredible brightness and depth.

TPS-5000L Functional Summary

- 12" (30.1 cm) diagonal active matrix color display
- 800 x 600 Native Screen Resolution
- 16 Bit non-palette graphics, over 64,000 colors
- 4 Mb of Flash, expandable to 32 Mb with Crestron® plug-in memory modules & 8 Mb of DRAM Memory
- Unique modular system allows configuration of capabilities simply by adding expansion cards for video, graphics and Internet
- Displays SVGA RGB video at native resolution with optional TPS-XVGAL interface card
- Displays one NTSC/PAL/S-video/composite video source with 256,000 colors with optional TPS-VIDL-1 expansion card

(continued on next page)

TPS-5000L Functional Summary (continued)

- Displays two NTSC/PAL/composite video (or one S-video source) with 256,000 colors with optional TPS-VIDL-2 expansion card
- 10/100 BaseT (full/half duplex) Ethernet capabilities with optional TPS-ENETL expansion card. Supports dynamic and static IP addressing
- Up to 4,000 digital and analog signal joins; Up to 999 serial signal joins
- Built-in microphone, mixer, amplifier, stereo speakers, and line-level input/output
- Stores and plays WAV files
- Local RS-232 port for console control
- Pop-up sub panels to reduce memory requirements, providing optimal speed and performance
- Multiple button, slider control, and icon configurations, including multi-mode objects
- Fast graphics performance: imported photographs, drawings, and icons
- Support for downloadable fonts – proportional and non-proportional
- Foreign language text

Multiple graphics can be displayed on the TPS-5000L without any shift in color depth or quality. The touchpanel can support real-time video with the optional TPS-VIDL-1 or TPS-VIDL-2 cards, RGB computer graphics with the optional TPS-XVGAL RGB Interface card, and 10/100 BaseT TCP/IP network communications with the optional TPS-ENETL Ethernet module.

The TPS-5000L's audio capabilities include stereo audio speakers that offer volume control, a built-in microphone with line-level output, built-in WAV sound file capability and line-level input for other audio sources.

The purpose of the TPS-5000L touchpanel is to replace large, complicated hard-wired panels in either a Cresnet® system or an RS-232 system with a series of simpler screens each specific to the control problem at hand. Thus, a very large number of functions can be made available to the user without the confusion associated with hardware panels of that complexity. Icons, graphics, and text can dramatically increase any user's comprehension of the control environment. Devices, functions, and control zones are quickly organized and more easily accessed.

The TPS-5000L has the ability to transmit touch coordinates when "RS-232 Port for Touch Output" is selected. Currently Telestrator devices are supported on the TPS-5000L. Refer to the "RS-232 Menu" section of "Configuring the Touchpanel" on page 11 and “Appendix C: Configuring the RS-232 Port for Use” on page 48 for instructions on selecting this feature.

Specifications

The following provides a summary of specifications for the TPS-5000L touchpanel.

Specifications for the TPS-5000L Touchpanel

SPECIFICATION	DETAILS
Power Requirements (without cards)[1]	20 Watts (0.83 Amp @ 24 VDC)
Default NET ID	03
Timeout	Adjustable from 0 to 120 minutes (Default = 15 min.)
Signal Join Maximums	4000 Digital and Analog, 999 Serial
Control System Update Files[2,3,4]	
2-Series Control System	Version C2-2004.CUZ or later[3]
CEN/CN-TVAV	Version 51130V.UPZ or later[4,5]
CNMSX-AV/PRO	Version 51125X.UPZ or later[4,5]
CNRACKX/-DP	Version 51125W.UPZ or later[4,5]
CNMS, CNRACK, CNLCOMP	Version 3.18.09m, l, c or later[4,6]
ST-CP	Version 4.00.49S.UPZ or later[6]
Audio	• Balanced (20 kΩ) & unbalanced (10 kΩ) line level stereo input through 6-position mini-connector. • Maximum input level 2Vrms single ended (unbalanced), 4Vrms differential (balanced) with internal volume control and two speakers. • Balanced (2.0 Vrms) and unbalanced (1.0 Vrms) line level microphone output with AGC output (3x sensitivity) via 3-position mini connector. • Maximum output level 1Vrms single ended, 2Vrms differential • Built-in WAV file (8 & 16 bit PCM mono & stereo, 8kHz, 11kHz, 16kHz, 22kHz, & 44kHz) playback capability[7] • Speaker amplification: 2 Watts per channel
Memory	4MB internal flash memory (upgradeable to 32MB), 8MB of DRAM[8]
Screen Dimensions	12"/30.1 cm diagonal
Screen Viewing Angles:	Y Dir. (X=0°): +45° (from top), -55° (from bottom) X Dir. (Y=0°): +60° (from right), -60° (from left)
Screen Resolution	800 x 600 pixels
Color	16 Bit non-palette graphics with color key video window capability, 65,536 colors
Display Type	Touch-sensitive active matrix color LCD

(continued on next page)

Specifications for the TPS-5000L Touchpanel (continued)

SPECIFICATION	DETAILS
Enclosure	Black metal enclosure with injection-molded plastic faceplate in black or white.
CPU	63MIPs Coldfire processor running Isys generation firmware
Cresnet	Via 4-position Cresnet connector
RS-232	RJ11 connector for console, telestrator, etc. Default settings: 115200, 8 bit, parity none, stop bit 1.
Operating Temperature and Humidity	50º to 113º F (10º to 45º C), 10 to 90% Relative Humidity (non-condensing)
Dimensions and Weight (with faceplate)	Height: 11.04 in (28.05 cm) Width: 13.43 in (34.11 cm) Depth: 2.70 in (6.85 cm) Weight: 5.9 lbs (2.7 kg)

1 The individual power requirements for the expansion cards are:
TPS-ENETL: 4 Watts (0.167 Amps @ 24 VDC)
TPS-VIDL-1: 7 Watts (0.29 Amps @ 24 VDC)
TPS-VIDL-2: 12 Watts (0.50 Amps @ 24 VDC)
TPS-XVGAL: 10 Watts (0.417 Amps @ 24 VDC)

2 The latest versions can be obtained from the Downloads | Software Updates section of the Crestron website (www.crestron.com). Refer to NOTE after last footnote.

3 Crestron 2-Series control systems include the AV2, CP2, CP2E, MP2, MP2E, PAC2, PRO2, and RACK2.

4 CNX update files are required for either CNMSX-AV/Pro or CNRACKX/-DP. Filenames for CNX update files have a UPZ extension and ST-CP files are in one EXE or zipped UPZ file. To avoid program problems, make certain you are using the update file with the correct suffix letter (e.g., S, V, W, X).

5 When loading VT Pro-e files or firmware through the RS-232 port of the control system, be sure that the baud rate is at 38400 (Cresnet speed) or lower. Otherwise, the Viewport may post the "Transfer Failed" message.

6 These control systems do not support loading of firmware or VT Pro-e files to the TPS-series panels through the RS-232 port of the control system. In order to load these files to the TPS-5000L when using these control systems, either use the RS-232 port on the TPS-5000L or use Ethernet direct to the panel (assuming the TPS-ENETL is installed).

7 WAV files reside in the touchpanel's Flash memory and will affect the amount of available space for touchpanel screens.

8 Additional Flash memory can be purchased, refer to "Memory" on page 6. The complexity of the control screens and the sampling of the WAV files influence memory usage.

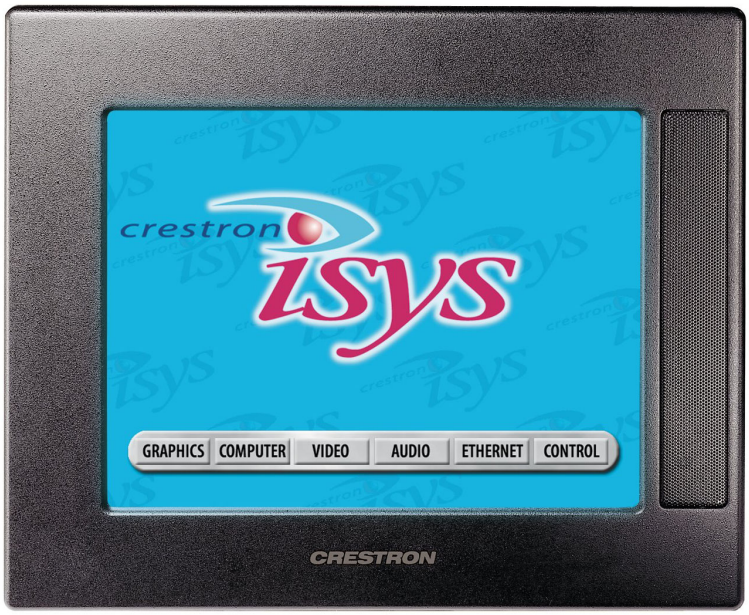
NOTE: Crestron software and any files on the website are for Authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

Physical Description

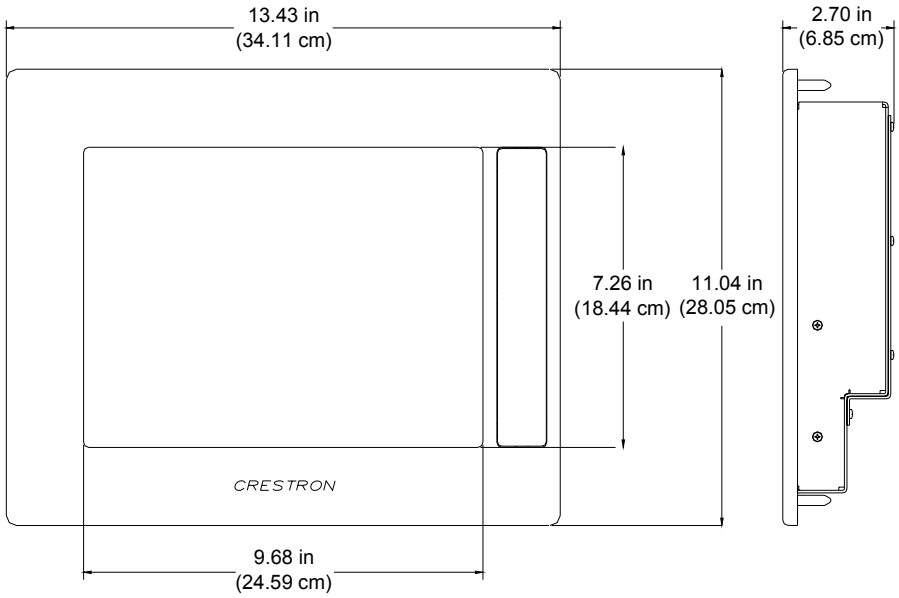
The 12 inch (30.1 cm) touch sensitive viewing screen is located on the front of the TPS-5000L touchpanel, shown after this paragraph. The electronic hardware is housed in a black metal enclosure. All audio, video, Ethernet, RS-232, and network connections are made at the rear of the unit. The grill located on the front of the unit conceals two speakers and a microphone.

NOTE: Video, RGB, and Ethernet connections are available after installing the appropriate expansion card(s) into the TPS-5000L touchpanel.

TPS-5000L shown in black

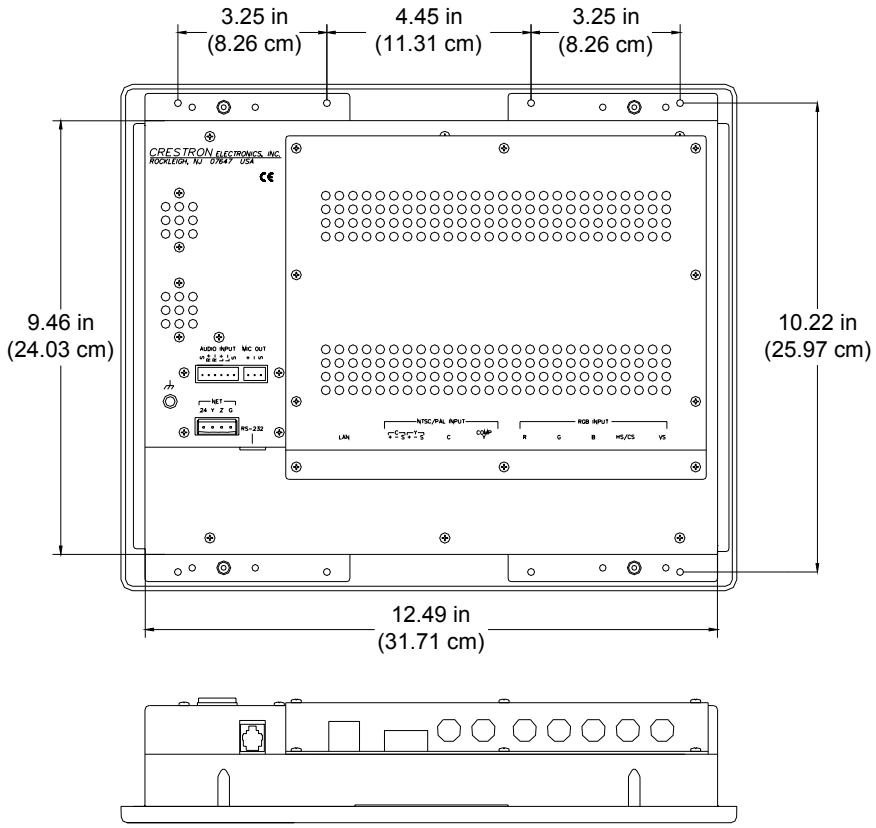


Physical Views of the TPS-5000L Touchpanel (Front & Side)



NOTE: For lectern cutout dimensions, refer to "Appendix B: Cutout Detail of Supplied Template" on page 47.

Physical Views of the TPS-5000L Touchpanel (Rear & Bottom)



Expansion Slots

The TPS-5000L's functionality can be expanded by installing optional cards into the expansion slots. Each card has a specific function and is sold separately. Installation instructions are provided with each card. The available cards for the TPS-5000L are:

- **TPS-ENETL** – a 10/100 BaseT Ethernet card provides Ethernet capability to the touchpanel.
- **TPS-VIDL-1/TPS-VIDL-2** – a TV video digitizer card that allows NTSC/PAL video to be played in a window on the touchpanel or full screen. The TPS-VIDL-2 adds the capability of displaying two composite video sources.
- **TPS-XVGAL** – a RGB digitizer that scan converts a computer source up to 1600 x 1200 at 85 Hz (110 Hz @ 640 x 480) vertical rate to a window on the touchpanel or full screen.

NOTE: The three cards are **NOT** interchangeable and can only be installed in their dedicated expansion slots.

Memory

The TPS-5000L ships with 4MB of flash and 8MB of DRAM. Additional memory by Crestron can be purchased separately and installed in the field. Refer to the latest revision of the Flash Memory for TPS User Interfaces Installation Guide (Doc. 5927) for an installation procedure.

Industry Compliance

As of the date of manufacture, the touchpanel have been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling (N11785).

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

Setup

Network Wiring

NOTE: When installing network wiring, refer to the latest revision of the wiring diagram(s) appropriate to your specific system configuration, available from the Downloads | Product Manuals | Wiring Diagrams section of the Crestron website (www.crestron.com).

When calculating the wire gauge for a particular Cresnet run, the length of the run and the power factor of each Cresnet unit to be connected must be taken into consideration. If Cresnet units are to be daisy-chained on the run, the power factor of each network unit to be daisy-chained must be added together to determine the power factor of the entire chain. The length of the run in feet and the power factor of the run should be used in the following resistance equation to calculate the value on the right side of the equation.

Resistance Equation

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

Where: R = Resistance (refer to table below).
L = Length of run (or chain) in feet.
PF = Power factor of entire run (or chain).

The required wire gauge should be chosen such that the resistance value is less than the value calculated in the resistance equation. Refer to the table after this paragraph.

Wire Gauge Values

RESISTANCE (R)	WIRE GAUGE
4	16
6	18
10	20
15	22
13	Doubled CAT5
8.7	Tripled CAT5

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

NOTE: 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.

NOTE: 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.

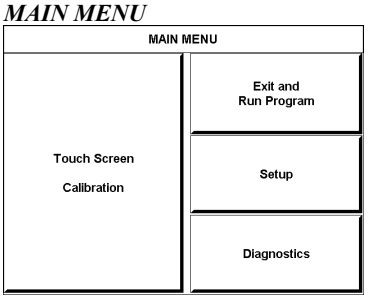
Identity Code

Every equipment and user interface within the network requires a unique Cresnet identity code (NET ID). These codes are recognized by a two-digit hexadecimal number ranging from 03 to FE. Refer to "Interface Menu" on page 10 for instructions on setting the unit's NET ID. The NET ID of the unit must match the NET ID specified in the SIMPL Windows program. Refer to "Setting the Net ID in Device Settings" on page 25 for information about changing the ID in a SIMPL Windows program.

Configuring the Touchpanel

NOTE: The only connection required to configure the touchpanel is power. Refer to "Hardware Hookup" on page 16 for details.

MAIN MENU



This menu can also be obtained via digital reserved join number, 17242.

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. Remove your finger when the message "SETUP MODE" appears on the touchscreen.

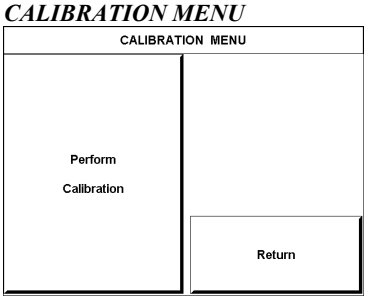
NOTE: The SETUP MODE can also be accessed through the Viewport Utility if the touchpanel is connected directly to a PC.

Upon entering SETUP MODE, the MAIN MENU, shown to the left, 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 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.

Calibration Menu

CALIBRATION MENU



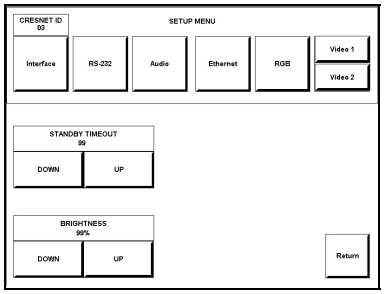
Calibration of the touchscreen is required if the active touch area of a button does not coincide with the button's image. Select the **Touch Screen Calibration** button to display the CALIBRATION MENU, shown to the left. The CALIBRATION MENU offers the choice to initiate calibration with the **Perform Calibration** button or return to the previous screen with the **Return** button. Choose an option by touching the correct button.

If you proceed to calibrate the touchpanel, the screen displays the message "Touch Upper Left" centered on the panel with a cross hair in the corner. Touch 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 corner of the screen. A final message, “Touch Lower Right”, appears with a cross hair in the correct corner. Touch the corner of the screen to conclude calibration and return to the MAIN 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 an area that is opposite from the instructed area.

Setup Menu

SETUP MENU



To access the SETUP MENU, shown to the left, press the **Setup** button from the MAIN MENU. The SETUP MENU offers a series of buttons, which opens additional menus and displays, which are detailed in subsequent paragraphs. Many touchpanel options (i.e., standby timeout and brightness) are available directly from the SETUP MENU and are explained in the following paragraphs. Other setup parameters (i.e., interface, RS-232, audio, RGB, and video) use additional menus and are detailed in subsequent paragraphs as well. After setup parameters have been set, select the **Return** button to return to the MAIN MENU.

NOTE: The current CRESNET ID setting is displayed in the upper left corner of the SETUP MENU.

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

NOTE: The Ethernet, RGB, and Video buttons will only be displayed if the respective TPS-ENETL, TPS-XVGAL or TPS-VIDL-1/2 cards are installed.

NOTE: If the TPS-VIDL-2 is installed, two video buttons will be displayed; “Video 1” and “Video 2”. Press the button for the respective video source.

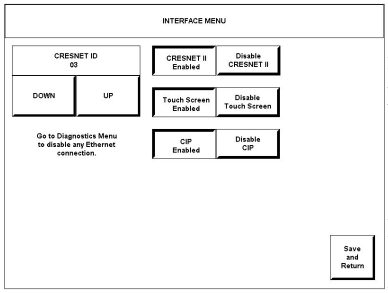
The touchpanel display can be turned off (standby mode) when not in active use. **STANDBY TIMEOUT**, located in the middle of the SETUP MENU, can turn off the touchpanel when it is inactive for a specified time frame (minutes, shown as XXX in the illustration). When the touchpanel is activated, the last screen to be displayed reappears. Minutes can vary from 0 to 120, where 0 disables the timeout. **DOWN** and **UP** buttons decrease and increase the timeout, respectively.

Screen brightness may need to be altered because of ambient light conditions or personal preference. **BRIGHTNESS**, located in the lower left corner of the SETUP

MENU, can change the brightness level of the display. The current brightness setting is shown as a percentage in the SETUP MENU (e.g., 99% brightness is shown in the illustration). Percentage can vary from 0% (low brightness) to 100% (full brightness). **DOWN** and **UP** buttons decrease and increase the brightness, respectively.

Interface 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 to the left.

The Cresnet network identity number (CRESNET ID) is displayed on the INTERFACE MENU. CRESNET 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-5000L is factory set to 03, and no two devices in the same system can have the same ID.

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

The touchpanel usually communicates with a Cresnet system. Occasionally the touchpanel can be used in a demo mode where it merely displays various menus, but does not communicate with a Cresnet system. In demo mode, the directory buttons change pages, but buttons requiring feedback do not work. Two side-by-side buttons to the right of the CRESNET ID, **Enable CRESNET II** and **Disable CRESNET II**, determine communication mode. Select **Enable CRESNET II** for normal Cresnet communication mode and **Disable CRESNET II** to set the touchpanel into demo mode. Text within the selected button changes color from black to red. Communication mode is factory set to **Enable CRESNET II**.

It is possible to maintain touchpanel control (with the **Enable Touch Screen** button) while communicating via RS-232 with the console or non-Crestron device. Otherwise, choose **Disable Touch Screen** to discontinue touchpanel control. Text within the selected button changes color from black to red.

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

NOTE: The CIP control buttons will only be displayed when the TPS-ENETL is properly installed.

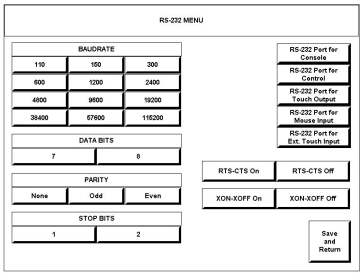
NOTE: Refer to "Diagnostics Menu" on page 16 for instructions on enabling the Ethernet card.

NOTE: If an Ethernet card is installed and enabled, and CIP control is disabled, the touchpanel will not be able to communicate with other Crestron Ethernet devices, but will be able to communicate with utilities such as Viewport via TCP/IP.

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

RS-232 Menu

RS-232 MENU



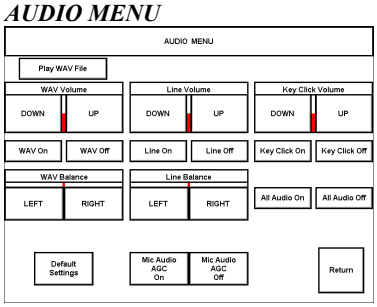
The touchpanel allows for five RS-232 communication methods:

- Console (i.e. loading programs)
- Control (i.e. non-Crestron device)
- Touch output (communication of touch coordinates to an external device)
- Mouse input (allows a mouse to control an external device as a "touch the PC" device)
- External touch screen input.

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. For instructions on selecting the communication method, refer to "Appendix C: Configuring the RS-232 Port for Use" on page 48.

Audio Menu

AUDIO MENU



The **Audio** button, located on the top row of the SETUP MENU, is used to display the AUDIO MENU. Use this screen to activate sounds (recorded WAV files or line level input from an external source), the microphone Automatic Gain Control (AGC), and audible key clicks. This feature is a useful feedback tool or can enhance a custom interface.

Volume (for WAV & line input) is controlled with the **DOWN** and **UP** buttons in the first row. For example, the **WAV File Volume** value is shown as a red bar graph and is controlled with the **DOWN** and **UP** buttons. Line and key click volume is similarly adjusted.

Balance (for each audio type) is controlled with the **LEFT** and **RIGHT** buttons in the third row. For example, the **WAV File Balance** value is shown as a red bar graph and is controlled with the **LEFT** and **RIGHT** buttons. Line balance is similarly adjusted.

The **Play WAV File** button appears beneath AUDIO MENU title block. Select this button to adjust the volume and balance as a pre-loaded WAV file plays. WAV file audio messages can provide that custom interface with a touchpanel, assuming this feature is enabled. To enable this feature, verify that the **WAV On** button is active (red text). An active **WAV Off** button disables the feature. Refer to "WAV File Audio Messages" on page 29 for more information on WAV files.

Line level audio is possible only when enabled and the proper external connections are made. Refer to "Hardware Hookup" on page 16 for information about the **AUDIO INPUT** port. To enable this feature, verify that the **Line On** button is active (red text). An active **Line Off** button disables the feature.

Confirmation of a button press on a touchpanel is acknowledged by an audible click assuming this feature is enabled. To enable this feature, verify that the **Key Click On** button is active (red text). An active **Key Click Off** button disables the feature.

NOTE: If key click is enabled on a touchpanel, each press of the touchpanel results in an audible click. It may be desirable to conceal the key click sound for certain buttons (e.g., if the button triggers playing of a WAV file). Using VT Pro-e, the panel designer has the option to suppress the key click on a button-by-button basis

from the "Button Properties" window.

It is possible to enable/disable all audio types (WAV, line, and key click) with the press of a single button. The **All Audio On** and **All Audio Off** buttons allow for global muting. Select the **All Audio On** button to enable audio; select the **All Audio Off** button to disable audio.

The built-in microphone Automatic Gain Control (AGC) mode can be controlled with two buttons on the AUDIO MENU: **Mic Audio AGC On** and **Mic Audio AGC Off**.

NOTE: AGC is gain control and does not turn off the microphone.

Select the **Default Settings** button to restore all AUDIO MENU buttons and settings to a factory-adjusted preset. Select the **Return** button, located at the lower right corner of the AUDIO MENU, after audio parameters have been set.

Ethernet

NOTE: The **Ethernet** button is displayed on the SETUP MENU only if the TPS-ENETL is properly installed.

NOTE: IP settings are necessary only if the TPS-ENETL is installed. Serially connect a PC to the TPS-5000L via the RS-232 connector and refer to the details in the latest revision of the TPS-ENETL (Doc. 6013).

Selection of the **Ethernet** button from the Setup Menu displays details such as the IP Address, Subnet Mask, Def(ault) Router, IP Table, etc. For example, refer to a sample display shown after this paragraph. The settings can only be viewed from this screen. To enter commands to access/set all Ethernet configurations use the RS-232 connector and refer to the information in the TPS-ENETL Installation & Operations Guide, as stated in the previous note.

Sample Display from Ethernet Button Press

```
Ethernet Status:
  Link Status:      No Link
  Link Speed:       10 Mbps
  Full Duplex:      No
Ethernet Parameters:
  Enabled:     On
  MAC Address: 00.10.7d.00.1d.a1
  IP Address:  132.132.2.132
  Subnet Mask: 255.255.0.0
  Def Router:  0.0.0.0
IP Table:   CIP_ID  IP Address
```

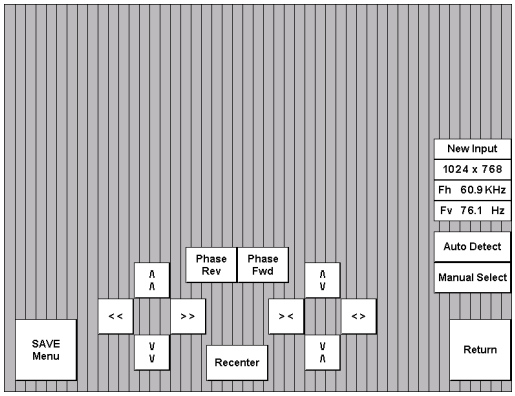
RGB Menu

NOTE: The **RGB** button is displayed on the SETUP MENU only if the TPS-XVGAL is properly installed. Selection of the **RGB** button opens the RGB Menu from which the user can adjust RGB settings.

With a TPS-XVGAL installed, the TPS-5000L can display a computer-generated video signal. The type of format must be selected carefully or the video may appear

unstable or noisy. Selecting the **RGB** button, located to the right on the top row of the SETUP MENU, displays the RGB Menu, shown after this paragraph.

RGB Menu (Vertical Lines Portray RGB Sample)



The user has the option to manually select the incoming format or have the touchpanel detect one automatically. On the rare occasion, the user may want to choose the **Manual Select** button to force an incoming format. Otherwise, choose the **Auto Detect** button to have the touchpanel automatically determine the format of the input signal.

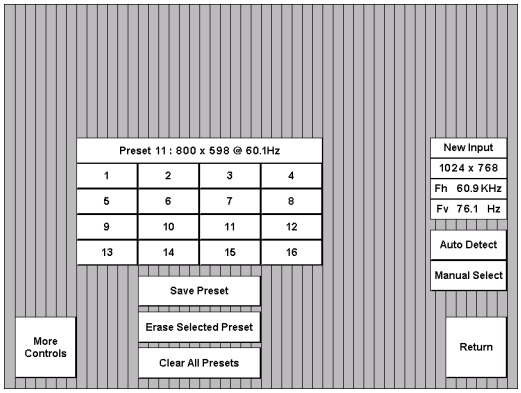
NOTE: Refer to the latest revision of the TPS-XVGAL Operations & Installation Guide (Doc. 5945) for signal format specifications.

The characteristics of the input signal are displayed centrally on the right side of the RGB Menu. For example, in the previous illustration, the input signal has a resolution of 1024 x 768 with a frequency of 60.9 KHz (horizontal) and 76.1 Hz (vertical).

While viewing the sample of the input signal, use the double arrow buttons to the left and then the other set of double arrow buttons to position and compress/expand the sample so that it fills the entire screen. Also, use the **Phase Rev** and **Phase Fwd** buttons to adjust the timing of the sample. The **Recenter** button only needs to be used if the sample disappears from the screen while making adjustments with the double arrow buttons.

The touchpanel is capable of storing 16 VGA formats; the panel is factory set with the presets empty. Select **SAVE Menu** to open the Preset Menu, as shown below. To assign a format to a preset, complete the following steps:

Preset Menu (Vertical Lines Portray RGB Sample)



1. Select a preset button (numbered **1** through **16**). For the sake of this procedure, select **11**.
2. Select the **Return** button in the lower right corner of the Preset Menu to display the RGB Menu.
3. While viewing the sample of the input signal, use the double arrow buttons to the left and then the other set of double arrow buttons to position and compress/expand the sample so that it fills the entire screen.

NOTE: The **Recenter** button only needs to be used if the sample disappears from the screen while making adjustments in step 3.

4. While viewing the sample of the input signal, use the **Phase Rev** and **Phase Fwd** buttons to adjust the timing of the sample.
5. If visually satisfied with the sample at this point, select the **Save Menu** button. Otherwise use the buttons on the screen to make additional adjustments.
6. If necessary, select the **More Controls** button to show additional controls for RGB. At any time, the **Return** button can be selected to return to the Preset Menu.
7. If visually satisfied with the sample, select the **Save Preset** button to store the values of the input into the preset assigned in step 1. Otherwise repeat steps 3, 4, and 6 to make additional adjustments.

There are two buttons on the Preset Menu that influence the storage of format presets. Use the **Erase Selected Preset** button to eliminate the stored format for the highlighted preset. The **Clear All Presets** button eliminates the formats for all presets. The touchpanel prompts the user for confirmation.

NOTE: If no presets are stored or the input does not closely match a stored preset, the panel makes a 'best guess' for image settings.

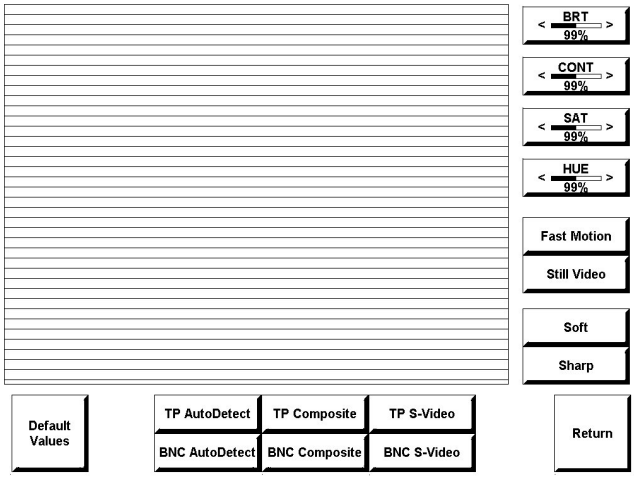
Select the **Return** button, located at the lower right corner of the RGB Menu, after RGB parameters have been set.

Video Menu

NOTE: The **Video** button is displayed on the Setup Menu only if the TPS-VIDL-1 is properly installed. If the TPS-VIDL-2 is installed, two Video buttons labeled **Video 1** and **Video 2** will be displayed. Selection of a **Video** button opens the Video Menu from which the user can adjust video settings.

The TPS-5000L can display video from up to four different composite video sources connected to either the 6-pin connector or the BNC connectors. However, only two composite video channels can be selected for viewing. Refer to the latest revision of the TPS-VIDL-1/VIDL-2 Operations & Installation Guide (Doc. 6070) for details.

Video Setup (Horizontal Lines Portray Video Sample)



Use this screen to select one of the video inputs and adjust the brightness, contrast, saturation, and hue, if necessary. The user has the option to force the video image to a certain mode (i.e., composite video or S-video if using the TPS-VIDL-1 or TPS-VIDL-2 in S-video configuration) or switch modes automatically after checking the image for colors. Use either the **TP Composite** / **BNC Composite** or **TP S-Video** / **BNC S-Video** buttons to manually control the mode. **TP** or **BNC** on the selected button specifies the video input connector. **TP** corresponds to the twisted pair connector (balanced video from a PVID, Room Box, etc.) and **BNC** corresponds to the BNC connectors (unbalanced video from a VCR, DVD, etc.). Use the appropriate **Auto Detect** button for automatic control. The text color of the selected button is red rather than black.

NOTE: When configuring the TPS-VIDL-2, the Video 1 signal type can be automatically detected as long as one signal is sent to the touchpanel.

NOTE: Up to four composite video feeds can be physically connected to a TPS-VIDL-2 (two BNC feeds and two twisted-pair feeds). However, only two composite video channels can be selected for viewing. Specify the connections to use by selecting TP composite, TP S-Video, BNC Composite, or BNC S-Video for each channel.

NOTE: A solid blue screen is displayed in the video window if a video signal is not detected or is very weak. Verify that the video source is functioning and properly connected. If the source is properly connected and functioning, a distribution amplifier may need to be used.

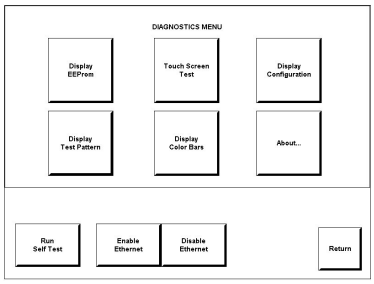
Fast motion mode (if the **Fast Motion** button is selected) reduces motion artifacts and should be used for most video sources. Still video mode (if the **Still Video** button is selected) works best for still pictures. It has a maximum resolution and reduces flicker. However, it suffers from motion artifacts. The text color of the selected button is red rather than black.

Select the **Soft** button for soft mode video. In this mode, video filtering and noise reduction can produce a better image from some sources. Alternatively, select the **Sharp** button for sharp mode video. This mode provides maximum detail, but is more susceptible to noise in source. The text color of the selected button is red rather than black.

Select the **Return** button, located at the lower right corner of the Video Menu, after video parameters have been set.

Diagnostics Menu

DIAGNOSTICS MENU



The **Diagnostics** button from the MAIN MENU contains controls for enabling an Ethernet card (if installed) and 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, shown to the left, are numeric in nature and their interpretation is beyond the scope of this manual.

NOTE: If the **Disable Ethernet** button is selected, the touchpanel will not communicate via TCP/IP or Cresnet Internet Protocol (CIP). Select "Enable Ethernet" to enable the Ethernet card.

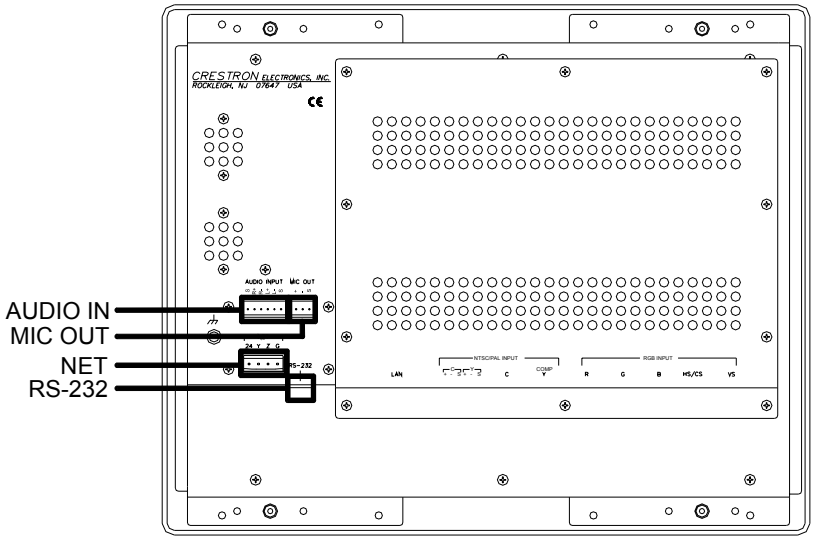
NOTE: The "About…" button will display a screen indicating the current version of firmware residing on the touchpanel.

Hardware Hookup

Make the necessary connections as called out in the illustration that follows this paragraph. Refer to "Network Wiring" on page 7 before attaching the 4-pin connector. Apply power after all connections have been made.

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

Hardware Connections for the TPS-5000L (Back of the Unit is Shown)



AUDIO INPUT

This 6-position, mini- connector provides line level, balanced and unbalanced audio input. The pinouts are shown in the tables after this paragraph.

AUDIO Pinouts-Balanced

PIN #	DESIGNATION	DESCRIPTION
1	S	Shield (no connection)
2	R+	Right Input (Positive)
3	R-	Right Input (Negative)
4	L+	Left Input (Positive)
5	L-	Left Input (Negative)
6	S	Shield (no connection)

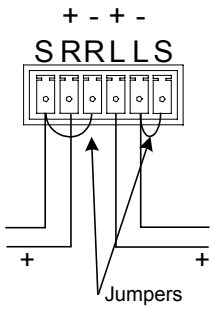
NOTE: When sending balanced audio from a CNX-BIPAD8, only the Positive (+) and Negative (-) wires are to be connected to the touchpanel. Do not connect the Shield (S) wires.

AUDIO Pinouts-Unbalanced

PIN #	DESIGNATION	DESCRIPTION
1	S	Ground
2	R+	Right Input (Positive)
3	R-	Right Ground
4	L+	Left Input (Positive)
5	L-	Left Input Ground
6	S	Ground

NOTE: Using two jumpers, connect R Shield to R – and L Shield to L – respectively at the TPS-5000L Audio Input connector. Refer to the following diagram.

Wiring for Unbalanced Audio



NOTE: The TPS-5000L can receive audio signals over CAT5 wiring. For additional information on audio connections over CAT5, refer to the latest version of the Crestron CAT5 Wiring Reference Guide (Doc. 6137) which is available from the Downloads | Product Manuals section of the Crestron website (www.crestron.com).

MIC OUT

This 3-position mini-connector provides balanced line level microphone output with AGC. A description of the pinouts is shown in the table after this paragraph.

MIC Pinouts-Balanced

PIN #	DESIGNATION	DESCRIPTION
1	M+	Mic Output (Positive)
2	M-	Mic Output (Negative)
3	S	Shield

NOTE: For unbalanced line level microphone output, connect pins 1 & 3. No connection should be made to pin 2.

NET

This 4-position Cresnet connector provides Cresnet network connection from the touchpanel as well as power to the touchpanel. A description of the pinouts is shown in the table after this paragraph. Refer to "Network Wiring" on page 7 for details.

NET Pinouts

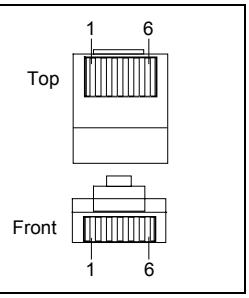
PIN #	DESIGNATION	DESCRIPTION
1	24	Power
2	Y	Data
3	Z	Data
4	G	Ground

RS-232

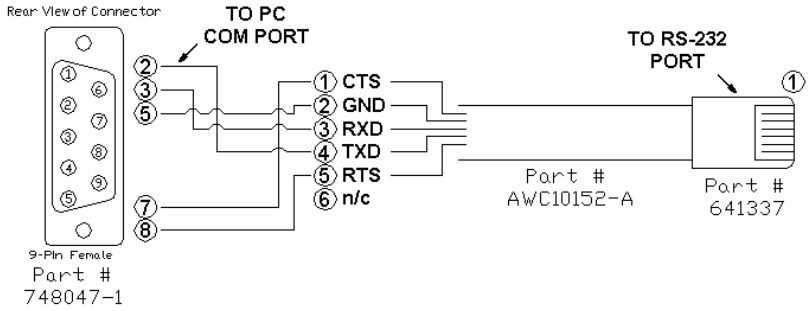
This 6-position RJ11 connector mates with a serial port of a PC. The connecting cable is not supplied. Prior to installation, use this port for direct connection between the touchpanel and a PC to load files to a touchpanel without a network connection. In the event that modular cables or an RJ11 to DB9F adapter is not available, the table below and diagram on the next page provide information so that the cable can be fabricated on site. Refer to "RS-232 Menu" on page 11 for proper RS-232 port configuration settings. Also refer to "Appendix A: RS-232 Protocol" on page 45 for protocol details.

RS-232 Pinouts

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



PC to TPS-5000L Cable Specifications (Crestron Cable Number STCP-502PC)



Other Connections

When using the optional expansion cards, the following optional connectors are available for use:

- **RGB INPUT** – These five connectors allow PC video to be displayed and are made available with the purchase and installation of the TPS-XVGAL, a computer display card. Consult the latest revision of the TPS-XVGAL Operations & Installation Guide (Doc. 5945) for details.
- **NTSC/PAL INPUT** – These three connectors provide for a video source and are made available with the purchase and installation of the TPS-VIDL-1 or TPS-VIDL-2 video module card. Consult the latest revision of the TPS-VIDL-1/VIDL-2 Operations & Installation Guide (Doc. 6070) for details.
- **LAN** – This port provides Ethernet/LAN/WAN communication and is made available with the purchase and installation of the TPS-ENETL, a 10/100 BaseT Ethernet card. Consult the latest revision of the TPS-ENETL Operations & Installation Guide (Doc. 6013) for details.

Touchpanel Mounting Options

Rack Mounting

There is also a rack mount kit for the TPS-5000L (known as RMK-5000). Refer to the latest version of the Installation Guide (Doc. 5852) which is available from the Crestron website (www.crestron.com).

Back Box Mounting

Back box mounting is typically used at new construction sites. The optional back box, BB-5000, includes the necessary hardware, brackets and electrical box, which provides a secure enclosure that can be fastened directly to a stud. The details for this optional mounting method are provided in the latest revision of the BB-5000 Installation Guide (Doc. 5827). After completing the steps in the installation guide, simply mate the four posts of the faceplate with the holes drilled into the mounting surface and firmly press the faceplate over the touchpanel.

NOTE: The mounting hardware and accessories supplied with the TPS-5000L are not required for the back box mounting option.

Direct Mounting

The TPS-5000L is a low-voltage unit that can be installed directly into a mounting surface. Each touchpanel is provided with mounting hardware and accessories, as shown in the table after this paragraph.

TPS-5000L Supplied Mounting Hardware and Accessories

DESCRIPTION	PART NUMBER	QUANTITY
Large Metal Mounting Plate	MTPL02553-1	2
Small Metal Mounting Plte	MTPL02523-1	2
Template	OV40049-1	1
Screw, Pan Phillips, #6-32 x 1"L	SR06-32-1R0000-3	12
Network Connector (4 Pin Cresnet)	JHPS197SG04SR-2	1
Microphone Connector (3 pin)	JHPS138SG03SR-1	1
Audio Input Connector (6 pin)	JHPS138SG06SR-1	1

NOTE: Refer to Appendix B: Cutout Detail of Supplied Template on page 47 for cutout dimensions.

Tools/hardware required

#2 Phillips tip screwdriver

Gypsum board saw (or equivalent)

Drill

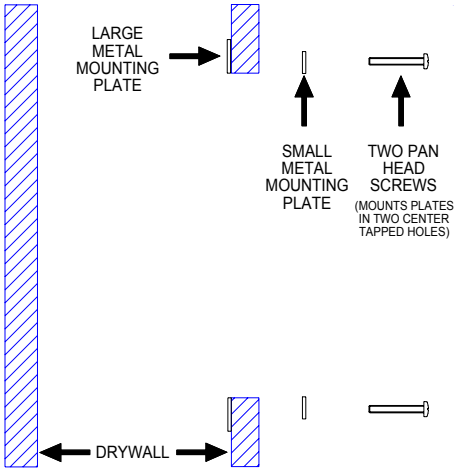
5/16" bit

20 bit

Complete the following installation procedure in the order provided.

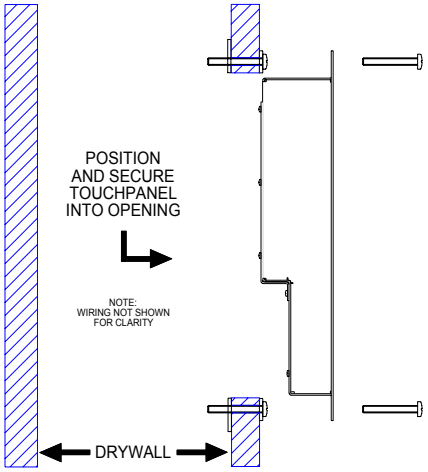
1. Locate an area on the wall that is free of miscellaneous wiring and studs.
2. Make a small hole near the middle of the designated site; verify that the location is suitable.
3. Fasten cutout template (40049, supplied) to mounting surface; verify that the template is level.
4. Cut out and remove the traced shape of the mounting surface.
5. Drill four 5/16" holes as marked on template. Refer to "Appendix B: Cutout Detail of Supplied Template" on page 47 for an illustrative reference.
6. Drill 12 holes marked "A" on template with #20 bit. Refer to "Appendix B: Cutout Detail of Supplied Template" on page 47 for an illustrative reference.
7. Slide one large metal mounting plate through the opening and position it inside along the top horizontal edge.
8. Position one small metal mounting plate along the top horizontal edge so that it covers the two center holes marked "A".
9. Use two pan head screws, supplied, to secure the bracket and plate to the mounting surface. Tighten by hand; do not fully tighten screws.

Securing Two Plates to Top and Bottom Edges of Opening



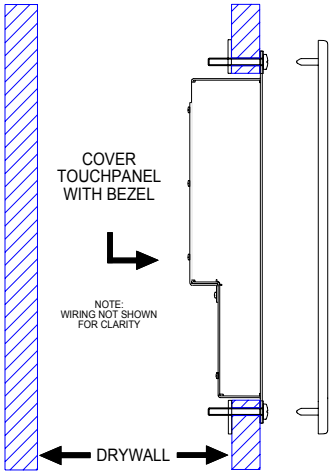
10. Repeat steps 7 through 9 for the bottom horizontal edge of the opening.
11. Attach the network cable and other RS-232, audio, video, or Ethernet cables in the wall to the appropriate connector on the back of the touchpanel. Refer to "Network Wiring" on page 7 for network wiring details. Information about the Net, RS-232, microphone, and audio input connectors are located in "Hardware Hookup" on page 16. For wiring the other connectors, refer to the appropriate Operations & Installation Guide for each expansion card.
12. Position the touchpanel (less the faceplate) into the opening and secure with eight pan head screws, supplied. Tighten by hand; do not fully tighten screws.

Positioning Touchpanel into Opening



13. Use the #2 Phillips screwdriver and fully tighten all 12 pan head screws. Use caution and do not crack or damage mounting surface.
14. Mate the four posts of the faceplate with the holes drilled into the mounting surface and firmly press on the faceplate over the touchpanel.

Cover Touchpanel with Faceplate



NOTE: If it is necessary to remove the touchpanel, secure and label the attached cables before disconnecting them from the back of the touchpanel.

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 plastic cover 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.

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 degrade image quality.

For best cleaning results, use a clean, damp, non-abrasive cloth with any commercially available non-ammonia glass cleaner. The faceplate 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 ingress of moisture beneath panels.

Programming Software

Have a comment about Crestron software?

Direct software related suggestions and/or complaints to Crestron via email (software@crestron.com). Do not forward any queries to this address. Instead refer to "Further Inquiries" on page 44 for assistance.

Setup is easy thanks to Crestron's Windows®-based programming software. Crestron Application Builder™ (AppBuilder) creates a complete project, with no special programming required. Crestron AppBuilder completes all necessary programming for a base system including all touchpanel screens and the control system program. Once Crestron AppBuilder creates the project, the system interfaces and program logic can be customized. It can easily be modified with Crestron development tools (i.e., SIMPL™ Windows® and Crestron VisionTools® Pro-e (VT Pro-e) software packages).

The program output of Crestron AppBuilder is a SIMPL Windows program with much of the functionality encapsulated in macros. Therefore, extending the capabilities of the system is very easy. Crestron AppBuilder and SIMPL Windows are intended for users with different levels of programming knowledge. Crestron AppBuilder is easier to use for the beginning programmer, and much faster for all programmers. However, it does not allow the degree of control and flexibility that SIMPL Windows does. Of course, one can initiate programming using the easiest method (Crestron AppBuilder) and use advanced techniques that are available from SIMPL Windows to customize the job.

Crestron AppBuilder comes with templates for all supported interfaces. If a user wishes to create a touchpanel project using templates with a different look-and-feel this can be accomplished by making a custom template. This custom template can then be used by Crestron AppBuilder to create the final project files to be loaded into the panels. Alternatively, VT Pro-e can be used to tweak projects created with Crestron AppBuilder or develop original touchpanel screen designs.

The following are recommended software version requirements for the PC:

- Application Builder version 1.1.6 or later with Application Builder Templates version 2.12 or later. Requires SIMPL Windows.
- SIMPL Windows version 1.50.05 or later with library update file. Requires SIMPL+ Cross Compiler version 1.1.
- Crestron Database version 14.1 or later. Required by SIMPL Windows.
- VisionTools Pro-e version 2.2.0.0 or later. Used for graphical touchscreen design.

NOTE: The latest versions can be obtained from the Downloads | Software Updates section of the Crestron website (www.crestron.com). 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).

Digital, analog and serial join numbers are a common thread between VT Pro-e and SIMPL Windows. These numbers define how the objects on a touchpanel page of a VT Pro-e project interface to the outside world, specifically the Cresnet system as defined in the SIMPL Windows program. There are digital join numbers that carry out some predetermined function (a logical high or low); analog join numbers for displaying incremental values, sliders, gauges and bar graphs; and serial join numbers that allow for the display of variable text and transmission/reception of serial commands from other manufacturers. Unjoined objects are not interfaced with the system and thus cannot initiate any logic functions (although they can perform page flips).

Programming with the Crestron AppBuilder

The easiest method of programming, but does not offer as much flexibility as SIMPL Windows.

Crestron AppBuilder offers automatic programming for such residential and commercial applications as audio distribution, home theater, video conferencing, and lighting. The interface of this tool guides you through a few basic steps for designating rooms and specifying the control system, touchpanels, devices, and functionality. Crestron AppBuilder then programs the system, including touchpanel projects and control system logic.

Crestron AppBuilder is fully integrated with Crestron's suite of software development tools, including SIMPL Windows, VT Pro-e, and the Crestron Database. Crestron AppBuilder accesses these tools behind the scenes, enabling you to easily create robust systems.

Programming with SIMPL Windows

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

NOTE: The following are acceptable file extensions for programs that include a TPS-5000L, developed for specific control system types:
.smw: *projectname*.smw (SIMPL Windows source file)
.spz: *projectname*.spz (compiled file for 2-series)
.bin: *projectname*.bin (compiled file for CNX generation)
.csz: *projectname*.csz (compiled file for CNX generation with SIMPL+)
.ush: *projectname*.ush (compiled file for CNX generation with SIMPL+ header file)
.usp: *projectname*.usp (source code module for SIMPL+)

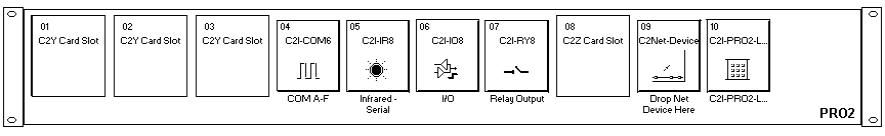
NOTE: In the following description, the PRO2 control system is used.

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

This section describes a sample SIMPL Windows program that includes a TPS-5000L touchpanel. A Join Number Remapping (JNR) program can be written to augment the functionality of the touchpanel by making some of the touchpanel's internal functions available to the SIMPL Windows programmer. Refer to "Join Number Remapping" on page 28 for more information.

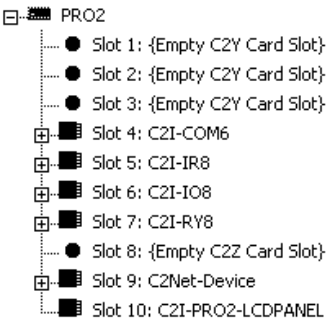
Configuration Manager is where programmers "build" a Crestron control system by selecting hardware from the *Device Library*. In Configuration Manager, drag the PRO2 from the Control Systems folder of the *Device Library* and drop it in the upper pane of the *System Views*. The PRO2 with its associated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

PRO2 System View



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

Expanded PRO2 System Tree

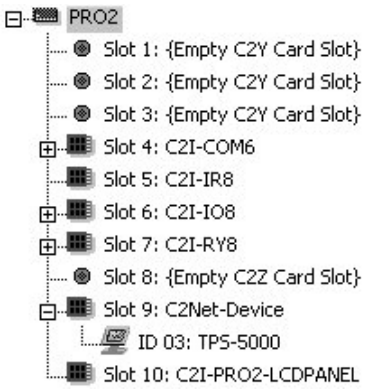


C2Net-Device Slot in Configuration Manager

To incorporate the TPS-5000L touchpanel into the system, drag the TPS-5000 from the Touchpanels | Touchpanels (Cresnet) folder of the *Device Library* and drop it in the *System Views.* The PRO2 system tree displays the touchpanel in slot 9 with a default NET ID of 03 as shown in the following illustration.

NOTE: The first touchpanel in a system is preset with a NET ID of 03, when its symbol is dragged into the upper pane of *System Views*. Additional touchpanels are assigned different NET ID numbers as they are added.

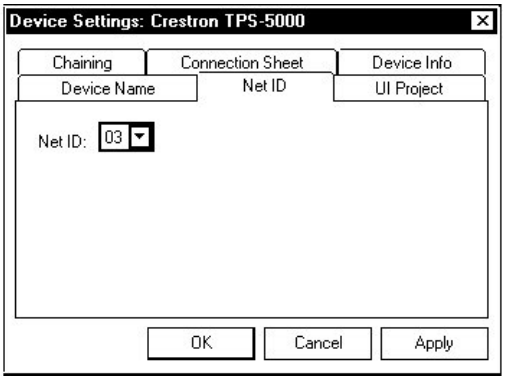
C2Net Device, Slot 9



Setting the Net ID in Device Settings

Double-click the TPS-5000 icon to open the "Device Settings" window. This window displays the TPS-5000 device information. If necessary, select the *Net ID* tab to change the Net ID, as shown in the following figure.

"Device Settings" Window for the TPS-5000L

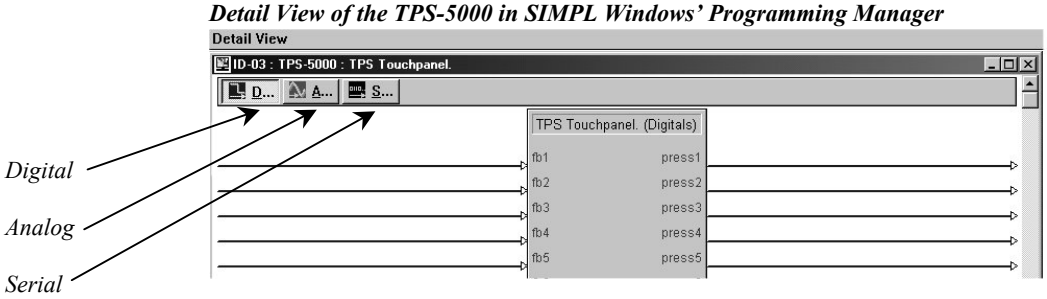


NOTE: SIMPL Windows automatically changes NET ID values of a device added to a program if a duplicate device or a device with the same default NET ID already exists in the program. Always ensure that the hardware and software settings of the NET ID match. For NET ID hardware settings details, refer to "Interface Menu" on page 10.

TPS-5000 Symbol in Programming Manager

Programming Manager is where programmers "program" a Creston control system by assigning signals to symbols. The following diagram shows the TPS-5000 symbol in the SIMPL Windows' Programming Manager.

Detail View of the TPS-5000 in SIMPL Windows' Programming Manager



NOTE: Join numbers are expandable to 4000 digital & analog, 999 serial.

Signal Types

Signals interconnect the various devices and logic symbols that comprise a SIMPL program. Signals can be one of three types: digital, analog, or serial. For any given signal, the signal type is determined by its driving source. That is, if the symbol that drives the signal has an analog output, then, by definition, the connecting signal is analog.

In SIMPL Windows, the signal types are color-coded as follows:

Digital = Blue

Analog = Red

Serial = Black

Undefined/Other = Green

NOTE: "Other" signals are a combination of the three basic types (e.g. many symbols accept either analog or serial signals; the combination is shown as a green signal). The signal type is displayed on the Status Bar when the signal is highlighted.

For additional information, refer to Doc. 6120, Crestron SIMPL Windows Symbol Guide. It may be downloaded from the Downloads | Product Manuals | Software section of the Crestron website (www.crestron.com).

Digital Signals

A digital signal contains one bit of information and usually takes on one of two values: 1 or 0. These two digits can represent the logical values true and false, and they can be represented in an electronic device by the states on/off or high/low, recognized as two voltage levels. (Other common descriptors are active/inactive.)

Analog Signals

Unlike digital signals, analog signals can vary continuously in value, in the same manner as a parameter such as volume, temperature, or pressure. Analog signals contain 16 bits of information, which means that this type of signal can have values ranging from 0 to 65535 (2^{16}-1). This 16-bit property makes analog signals useful for controlling devices that do not have discrete settings, such as volume controllers, pan/tilt head controllers, and lighting dimmers.

Serial Signals

Serial signals are much like analog signals, in that they, too, contain 16 bits of information. However, whereas the value of an analog signal is used directly-to control volume or temperature, for instance–the value of the serial signal is used as a pointer to a location in memory that contains a string of characters. When a serial signal is routed to a symbol, that symbol can identify the signal as serial rather than analog and it will automatically look at the data it points to.

Thus serial signals are used to facilitate the transmission of serial data (strings of characters). These signals can be generated by incoming data on a COM port or by a symbol that has a serial output.

TPS-5000L Input/Output Signals

The TPS-5000L symbol provides up to 4000 digital input and output joins, 4000 analog input and output joins, and up to 999 serial input joins. The programmer selects the signal types by clicking on the appropriate button at the top of the S*ymbol Detail* view when programming the panel.

The following tables list and give functional descriptions for the touchpanel outputs and inputs.

Digital Output Signal Descriptions

OUTPUT	DESCRIPTION
press 1 through press 4000	Notifies control system of button press (1 - 4000). High/1 = Button being pressed Low/0 = Button not being pressed

Digital Input Signal Descriptions

INPUT	DESCRIPTION
fb 1 through fb 4000	Notifies panel of button press (1 - 4000). This can represent that the button was pressed, or can be an actual device feedback, e.g., that power was turned on.

Analog Output Signal Descriptions

OUTPUT	DESCRIPTION
an_act 1 through an_act 4000	Notifies control system of an action (1 - 4000). Any value from 0 through 65535

Analog Input Signal Descriptions

INPUT	DESCRIPTION
an_fb 1 through an_fb 4000	Notifies panel of analog action (1 - 4000).

Serial Input Signal Descriptions

INPUT	DESCRIPTION
text-01 through text-999	Notifies panel of text string (1 - 999). Also called indirect text.

Device Extenders

Device extenders provide additional logic and functionality to a device. The Poll Manager and Sleep/Wake Manager symbols are device extenders for touchpanels. Poll Manager takes the touchpanel on and off line during polling by the control system. Sleep/Wake Manager suspends and restores operation of the touchpanel. For additional information about Device Extenders, refer to the latest version of the Crestron SIMPL Windows Symbol Guide (Doc. 6120), or the on-line help included with SIMPL Windows.

Example Program

An example program for the TPS-5000L is available from the Crestron FTP site (ftp.crestron.com/Examples). Search for the file TPS-5000_SIMPL_Windows_example_(Doc.5863)_TPS-5000L_(Doc. 5783).SMW that contains the example program.

Join Number Remapping

Join Number Remapping (JNR) is a programming concept that allows a TPS Series Panel to use join numbers with values over 4000 (Join Numbers 4001 to 15999 and Reserved Join Numbers) by bringing them within the range of the TPS touchpanel symbol, thereby increasing a touchpanel's functionality. Through JNR, a TPS Series Panel's internal functions become accessible to a control system and can activate the local functions of other touchpanels, route its internal feedback back to the control system, and receive feedback from remote locations. JNR provides the additional capability of managing IP IDs in Ethernet applications where a touchpanel communicates with multiple control systems that have been uploaded with the same program. Refer to the latest version of the Join Number Remapping Reference Guide (Doc. 5969) and the SIMPL Windows help file for more details.

Programming with VisionTools® Pro-e

VT Pro-e, a design and programming Windows®-based software, permits the creation of unlimited control screen variations incorporating two and three-dimensional graphics and text as well as video and sounds (recorded as WAV files). A set of pages, which make up a project, can be designed for each TPS-5000L touchpanel application. Each page contains objects such as custom control graphics, two and three-dimensional buttons, sliders, and digital readouts which allow the user to interface with the control system via join numbers. Unjoined objects are not interfaced with the system and thus cannot initiate any functions. The completed and compiled project is uploaded to the touchpanel and programmed into the flash

PROM via the **File | Upload Project** command. The touchpanel uses the programmed project until another project is uploaded from the PC. Programs cannot be extracted from the touchpanel. The PC may be disconnected from the control system or panel except during reprogramming. VT Pro-e also allows users the option to generate projects destined for web browsers rather than for physical touchpanels.

For additional software information, refer to the help file provided with the software. The latest version of VT Pro-e can be obtained from the Downloads | Software Updates section of the Crestron website (www.crestron.com).

NOTE: The following are acceptable file extensions for programs that include a TPS-5000L:

.vtp	*projectname*.vtp (VT Pro-e source file)
.vtz	*projectname*.vtz (compiled file)

Multi-Mode Objects

Multi-mode objects offer high-performance programming!

The single most-advanced VT Pro-e high-performance programming technique involving the TPS-5000L 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 the MULTI-MODE_OBJECT_EXAMPLES_OF_VTPRO-E_PROJECTS_USE_WITH_ISYS_TOUCHPANELS.ZIP file. It is available from the Crestron FTP site (ftp.crestron.com/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-5000L is 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-5000L touchpanel only accepts the following WAV file format: **PCM, 8, 11, 16, 22, or 44KHz, mono or stereo, 8 or 16 bit**. For more information about how to use Sound Recorder, refer to its User's Guide and extensive help information provided with the software.

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: WAV files (for the TPS-5000L touchpanel) can be obtained from the Crestron FTP site (ftp.crestron.com/Wave LC/).

Since the CT/LC-1000 touchpanel accepts the same WAV file formats, only use those WAV files designated for the CT/LC-1000, TPS-2000L, or TPS-5000 touchpanels. These WAV files are different than those made available for the CNXTA, Crestron CNX Telephone Audio Interface Card.

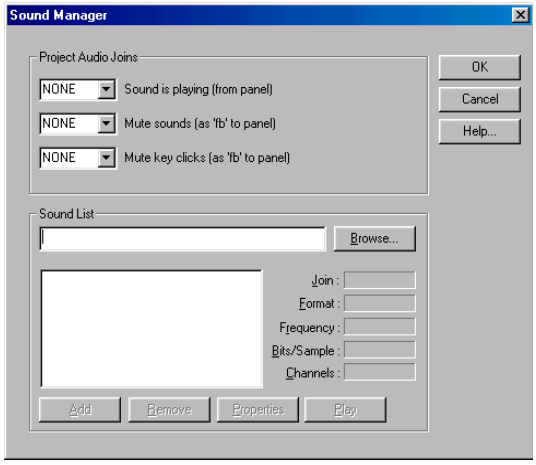
NOTE: WAV files reside in the touchpanel's Flash memory and will affect the amount of available space for touchpanel screens.

Sound Manager

NOTE: If keyclick is enabled on a touchpanel, each press of the touchpanel results in an audible click. It may be desirable to conceal the keyclick sound for certain buttons (e.g., if the button triggers playing of a WAV file). Using VT Pro-e, the panel designer has the option to suppress the keyclick on a button-by-button basis from the "Button Properties" window.

Crestron VT Pro-e (version 2.1.0 and later) contains an audio tool, Sound Manager, which permits the panel designer to attach WAV files to a touchpanel project. Sound Manager is available from the Tools pull-down menu and opens the "Sound Manager" window, shown after this paragraph.

"Sound Manager" Window



Sound Manager Guidelines

There are three things to keep in mind when using Sound Manager.

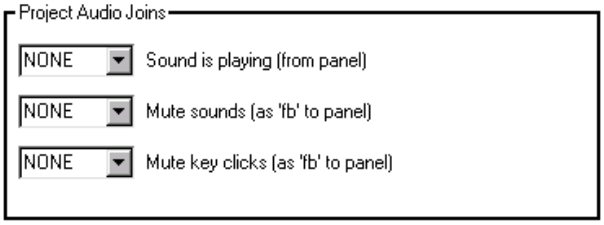
1. Each WAV file must be assigned a unique digital join number. The join number options include none, keyclick, or a number (1 through 4000). The default is none. If the keyclick option is selected, this WAV file becomes the default keyclick sound for all buttons. The other WAV files can be played by having the SIMPL Windows program assert the assigned join number.

2. Each WAV file must have the correct audio format and attributes for the TPS-5000L target type selected in VT Pro-e.
   The correct audio format is PCM, 8 or 16 KHz, 8 bit, mono.
3. There are three system-wide join numbers that the designer can define. The first, sound playing from panel, differs from the other two in that it is triggered from the panel.
   a. Sound Playing from Panel – The signal for this join number goes high when the WAV file plays.
   b. Mute Sounds – All WAV files (except the keyclick) in the project are muted when this join number goes high.
   c. Mute Key Click – The keyclick sound is muted when this join number goes high.

Using Sound Manager

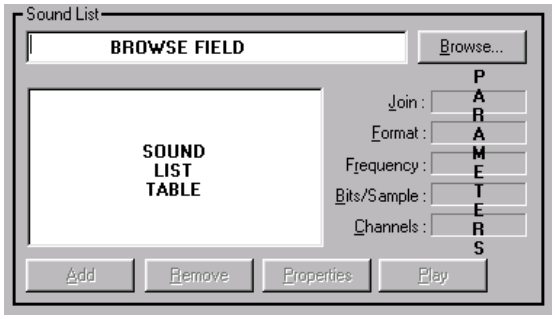
Sound Manager is broken into two distinct components. The *Project Audio Joins* component, shown below, permits the designer to assign the three system-wide join numbers described in the previous section. The three system joins can be assigned automatically with the **Auto** button or by scrolling down to the desired number.

Project Audio Joins Component



The *Sound List* component, shown below, permits the designer to attach WAV files to the touchpanel project. Complete the following steps to attach (add) a WAV file.

Sound List Component



1. Use the **Browse** button to locate the desired WAV files. It should appear in the field adjacent to the **Browse** button.
2. If necessary, select the **Play** button to verify that the file in the browse field is the desired file.
3. Select the **Add** button to transfer the WAV file to the *Sound List* table located below the browse field. The audio parameters of the file also appear to the right of the table.
4. Repeat steps 1 through 3 for each desired WAV file.

NOTE: To remove a WAV file from the *Sound List* table, highlight the file and click on the **Remove** button.

The **Properties** button opens the "Sound Properties" window for a highlighted WAV file in the *Sound List* table. The designer can assign a join number either automatically with the **Auto** button or by scrolling down to the desired number. Select **Description** to enter comments about the WAV file.

Reserved Join Numbers

A reserved join number is a feature of the software that enables a designer to create a button that completes a predetermined function. The tables on the next few pages provide lists of reserved join numbers available within the software.

NOTE: Many touchpanel configuration "shortcuts" are available via the software. A button can be created on a page that either calls up the Preferences Menu, adjusts brightness, etc., via reserved join numbers.

NOTE: Reserved join numbers can also be automatically activated by a control system when using join number remapping. Refer to the latest version of the Join Number Remapping Reference Guide (Doc. 5969) and the SIMPL Windows help file for more details.

System Analog Reserved Join Numbers for TPS-5000L Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17203	System Standby	Time Out	INPUT/OUTPUT

System Digital Reserved Join Numbers for TPS-5000L Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17214	Cresnet ID	Down	INPUT
17215	Cresnet ID	Up	INPUT
17216	Brightness	Increase	INPUT
17217	Brightness	Decrease	INPUT
17218	Brightness	High	INPUT
17219	Brightness	Medium	INPUT
17220	Brightness	Low	INPUT
17231	Standby Timeout	Up	INPUT
17232	Standby Timeout	Down	INPUT
17242	Call up Setup Menu	N/A	INPUT

Audio Analog Reserved Join Numbers for TPS-5000L Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17300	Key Click	Volume	INPUT/OUTPUT
17301	Audio Line	Volume	INPUT/OUTPUT
17302	WAV Audio	Volume	INPUT/OUTPUT
17303	Audio Line	Balance	INPUT/OUTPUT
17304	WAV Audio	Balance	INPUT/OUTPUT

Audio Digital Reserved Join Numbers for TPS-5000L Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17300	Audio	On	INPUT/OUTPUT
17301	Audio	Off	INPUT/OUTPUT
17302	Key Click	On	INPUT/OUTPUT
17303	Key Click	Off	INPUT/OUTPUT
17304	Key Click Volume	Increase	INPUT
17305	Key Click Volume	Decrease	INPUT
17306	Audio Line	On	INPUT/OUTPUT
17307	Audio Line	Off	INPUT/OUTPUT
17308	Audio Line Volume	Increase	INPUT
17309	Audio Line Volume	Decrease	INPUT
17310	Audio Line Balance	Left	INPUT
17311	Audio Line Balance	Right	INPUT
17312	Audio WAV	On	INPUT/OUTPUT
17313	Audio WAV	Off	INPUT/OUTPUT
17314	Audio WAV Volume	Increase	INPUT
17315	Audio WAV Volume	Decrease	INPUT
17316	Audio WAV Balance	Left	INPUT
17317	Audio WAV Balance	Right	INPUT
17318	Audio Mic AGC	On	INPUT/OUTPUT
17319	Audio Mic AGC	Off	INPUT/OUTPUT
17321	Audio	Defaults*	INPUT

* Audio Defaults: Master 88%, Wav 88%, Line 88%, Key Click 29%, All Audio On, Mic AGC On.

Video Analog Reserved Join Numbers for the TPS-5000L Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17100	Video 1[1,2]	Brightness	INPUT/OUTPUT
17101	Video 1[1,2]	Contrast	INPUT/OUTPUT
17102	Video 1[1,2]	Saturation	INPUT/OUTPUT
17103	Video 1[1,2]	Hue	INPUT/OUTPUT
17150	Video 2[2]	Brightness	INPUT/OUTPUT
17151	Video 2[2]	Contrast	INPUT/OUTPUT
17152	Video 2[2]	Saturation	INPUT/OUTPUT
17153	Video 2[2]	Hue	INPUT/OUTPUT

1. Available only when TPS-VIDL-1 is installed.
2. Available only when TPS-VIDL-2 is installed.

Video and XGA Digital Reserved Join Numbers for TPS-5000L Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17101	Video 1[1, 2]	Video Composite TP	INPUT
17102	Video 1[1, 2]	S-Video TP	INPUT
17103	Video 1[1, 2]	Auto Detect TP	INPUT
17104	Video 1[1, 2]	Video Composite BNC	INPUT
17105	Video 1[1, 2]	S-Video BNC	INPUT
17106	Video 1[1, 2]	Auto Detect BNC	INPUT
17107	Video 1[1, 2]	Still	INPUT
17108	Video 1[1, 2]	Motion	INPUT
17109	Video 1[1, 2]	Sharp	INPUT
17110	Video 1[1, 2]	Soft	INPUT
17111	Video 1 Brightness[1, 2]	Increase	INPUT
17112	Video 1 Brightness[1, 2]	Decrease	INPUT
17113	Video 1 Contrast[1, 2]	Increase	INPUT
17114	Video 1 Contrast[1, 2]	Decrease	INPUT
17115	Video 1 Saturation[1, 2]	Increase	INPUT
17116	Video 1 Saturation[1, 2]	Decrease	INPUT
17117	Video 1 Hue[1, 2]	Increase	INPUT
17118	Video 1 Hue[1, 2]	Decrease	INPUT
17119	Video 1[1, 2]	No Input Flag	INPUT
17120	Video 1[1, 2]	AGC On	INPUT
17121	Video 1[1, 2]	AGC Off	INPUT
17122	Video 1[1, 2]	Defaults[3]	INPUT
17151	Video 2[2]	Video Composite TP	INPUT
17152	Video 2[2]	S-Video TP	INPUT
17153	Video 2[2]	Auto Detect TP	INPUT
17154	Video 2[2]	Video Composite BNC	INPUT
17155	Video 2[2]	S-Video BNC	INPUT
17156	Video 2[2]	Auto Detect BNC	INPUT
17157	Video 2[2]	Still	INPUT
17158	Video 2[2]	Motion	INPUT
17159	Video 2[2]	Sharp	INPUT
17160	Video 2[2]	Soft	INPUT
17161	Video 2 Brightness[2]	Increase	INPUT
17162	Video 2 Brightness[2]	Decrease	INPUT
17163	Video 2 Contrast[2]	Increase	INPUT
17164	Video 2 Contrast[2]	Decrease	INPUT
17165	Video 2 Saturation[2]	Increase	INPUT

continued on next page

Video and XGA Digital Reserved Join Numbers for TPS-5000L Touchpanels (continued)

JOIN #	FUNCTION	VALUE	IN/OUT
17166	Video 2 Saturation[2]	Decrease	INPUT
17167	Video 2 Hue[2]	Increase	INPUT
17168	Video 2 Hue[2]	Decrease	INPUT
17169	Video 2[2]	No Input Flag	INPUT
17170	Video 2[2]	AGC On	INPUT
17171	Video 2[2]	AGC Off	INPUT
17172	Video 2[2]	Defaults[3]	INPUT
17011	XGA Auto Detect[4]	On	INPUT
17012	XGA Auto Detect[4]	Off	INPUT
17016	XGA Preset 1[4]	XVGA Preference Setting[5]	INPUT

1. Available only when TPS-VIDL-1 is installed.
2. Available only when TPS-VIDL-2 is installed.
3. Video default is 50% for each of the video parameters (brightness, contrast, saturation, and hue)
4. Join numbers 17011, 17012, and 17016 are available only when TPS-XVGAL is installed.
5. Join numbers 17016 through 17031 corresponds to preset 1 through preset 16 sequentially.

MultiByte International Characters

Most languages use a single byte of 8 bits to represent a character, e.g. English, French, German, Hebrew, Russian, Thai, etc.

Multibyte character fonts require more than the usual 8 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 issues with multibyte characters - static text on buttons and indirect text on buttons. No Isys touchpanel firmware changes are required in either case.

Static text on a button, entered in the standard way in VT Pro-e, always works under Windows 98. Under Windows XP, you must use VT Pro-e 3.0 or later.

Indirect text on a button is entered in VT Pro-e and the actual string to be displayed is entered in SIMPL Windows. You must use VT Pro-e 3.0 or later to guarantee that the full set of characters in the font is stored on the touchpanel. You must use SIMPL Windows 2.03.11 or later to enter Chinese characters directly. 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 character interspersed with numbers. You can enter Chinese characters or numbers in separate strings. Crestron is scheduling time to fix this in the near future and the release notes for SIMPL Windows will mention it.

For now, the workaround of showing a graphic that displays the string can be used, but it is not dynamic.

Uploading and Upgrading

Assuming a PC is properly connected to the entire system, Crestron programming software allows the programmer to upload programs and projects to the system and touchpanel after their development. However, there are times when the files for the program and projects are compiled and not uploaded. Instead, compiled files may be distributed from programmers to installers, from Crestron to dealers, etc. Even firmware upgrades are available from the Crestron website as new features are developed after product releases. In those instances, one has the option to upload via the programming software or to upload and upgrade via the Crestron Viewport.

NOTE: Currently, the Crestron Viewport is only available as a pull-down command from SIMPL Windows and VT Pro-e (**Tools | Viewport**). The Viewport utility accomplishes multiple system tasks, primarily via an RS-232 or TCP/IP connection between the control system and a PC. It is used to observe system processes, upload new operating systems and firmware, change system and network parameters, and communicate with network device consoles and touchpanels, among many other tasks. Viewport can also function as a terminal emulator for generic file transfer. All of these functions are accessed through the commands and options in the Viewport menus. Therefore, for its effectiveness as a support and diagnostic tool, the Crestron Viewport may be preferred over development tools when uploading programs and projects.

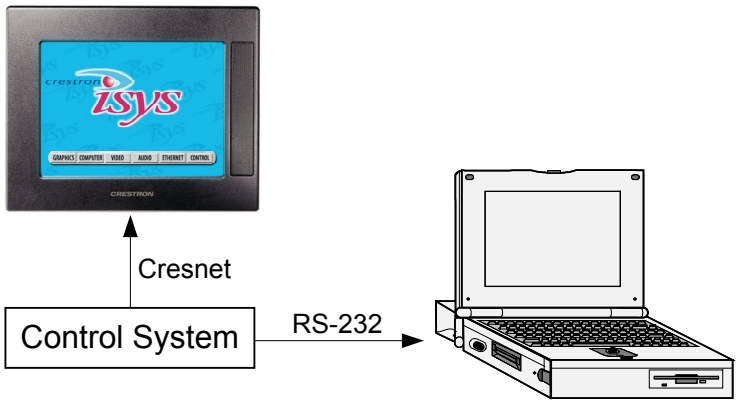
The following sections define how one would upload a SIMPL Windows program, VT Pro-e project or upgrade the firmware of the TPS-5000L touchpanel. However, before attempting to upload or upgrade, it is necessary to establish communications.

Communication Settings

Connection of a PC to the TPS-5000L touchpanel can be direct via the RS-232 port on the touchpanel or through a control system (Cresnet). Both methods of connection provide setup for RS-232 communication.

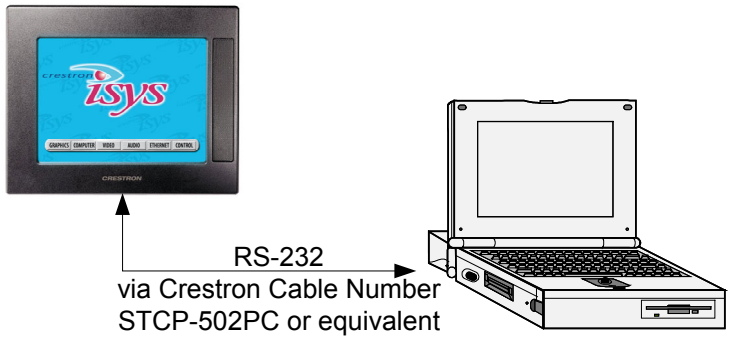
To prepare the TPS-5000L for uploading or upgrading, refer to the following figure for a typical connection diagram.

Typical Connection Diagram when Uploading a Project



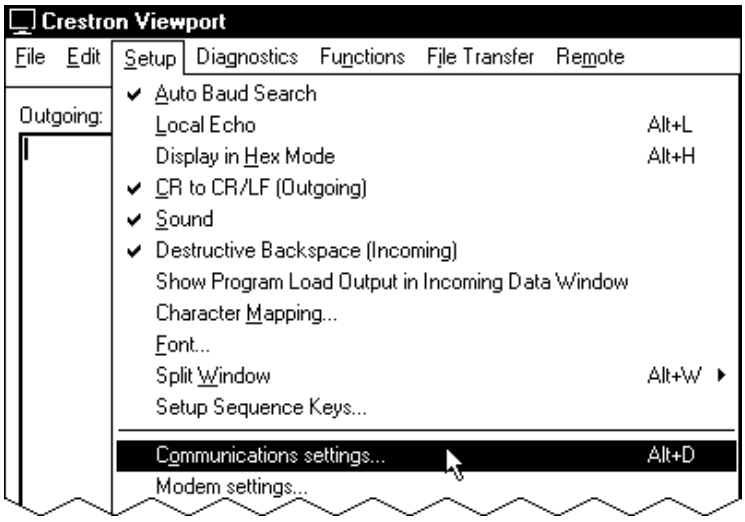
To prepare the TPS-5000L for uploading or upgrading directly from a PC, refer to the following figure. Connect the RS-232 port of the computer directly to the RS-232 port of the touchpanel. Refer to page 18 for RS-232 cable information.

Typical Connection Diagram when Uploading a Project Directly to the Touchpanel



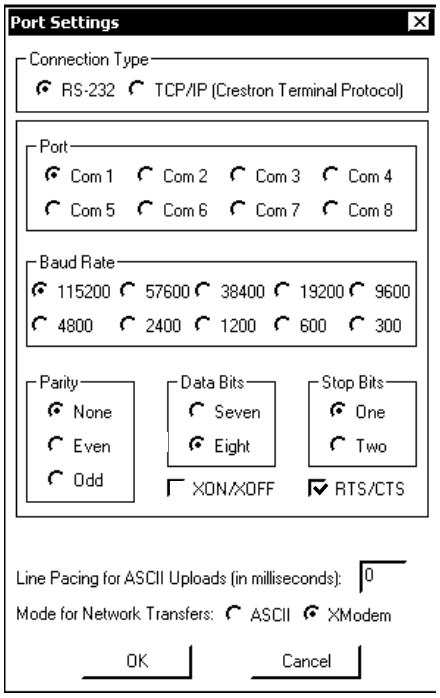
1. Start SIMPL Windows or VT Pro-e.
2. From the menu bar, select **Tools | Viewport** to open the Crestron Viewport. (If communication settings are correct, the prompt should be TPS for direct communications).
3. Refer to the following figure. From the Viewport menu, select **Setup | Communications settings** (alternatively, press **Alt+D**) to open the "Port Settings" window.

Setup | Communications Settings Command



4. Select **RS-232** as the connection type. Verify that an available COM port (COM 1 is shown after this step) is selected, and that all communication parameters and necessary options from the "Port Settings" window are selected as shown after this step. Click the **OK** button to save the settings and close the window.

"Port Settings" Window



NOTE: Different control systems may require different communication settings. Refer to each control system's Operations Guide for proper communication settings.

NOTE: If connecting to the touchpanel through a control system, the baud rate may need to be set to 38400 baud (Cresnet speed) for a successful transfer.

NOTE: If connecting to a touchpanel through a control system, control system communications can be verified by selecting **Diagnostics | Establish Communications (Find Rack)**. This should display a window that gives the COM port and baud rate. If communication cannot be established, refer to the "Troubleshooting Communications" section in the respective Operations Guide for the control system.

Uploading a SIMPL Windows Program

A control system source file has the extension .smw. A compiled SIMPL Windows file has the extension .spz for a 2-Series control system, .bin for CNX generation, and .csz for CNX generation with SIMPL+.

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

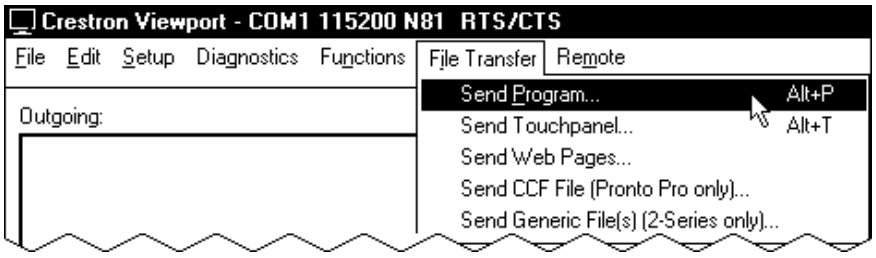
Upload via SIMPL Windows

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

Upload via Crestron Viewport

1. Verify that the procedure for "Communication Settings" that begins on page 36 has been performed.
2. As shown after this step, select **File Transfer | Send Program** (alternatively, press **Alt+P**) from the Viewport menu.

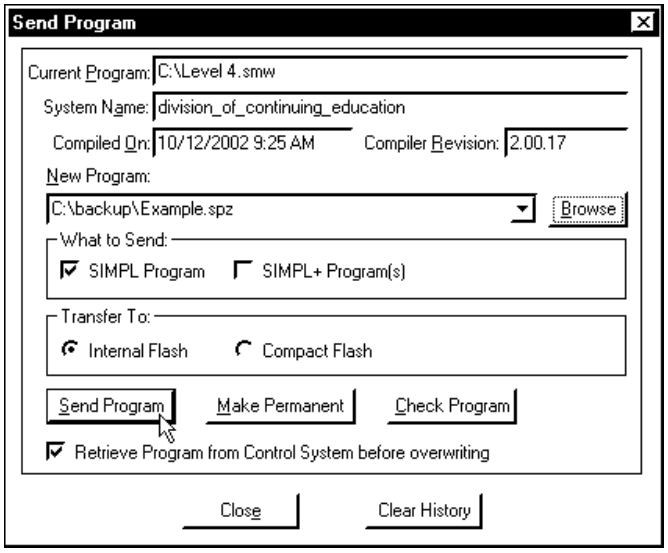
File Transfer | Send Program Command



3. The "Send Program" window appears, as shown after this step. Click **Browse**, locate the compiled file (.spz) and click **Open**. This will display the program's header information and enable one or both of the *What to Send* check boxes. If the program does not contain any SIMPL+ modules, only the *SIMPL Program* check box will be enabled. If it does contain SIMPL+ modules, then the *SIMPL+Program(s)* check box will also be enabled. Select one or both check boxes and then click **Send Program** to begin the transfer.

NOTE: Refer to the respective Operations Guide for the control system for details about the other fields shown on the "Send Program" window.

"Send Program" Window



4. To verify that the program has been transferred successfully, select **Diagnostics | Report Program Information** or press **F7**. This should display a window that provides details about the current program loaded into the control system.

Uploading a VT Pro-e Project

The TPS-5000L touchpanel source file has the extension .vtp. A compiled VT Pro-e file has the extension .vtz.

The VT Pro-e file can be uploaded to the touchpanel using VT Pro-e or via the Crestron Viewport.

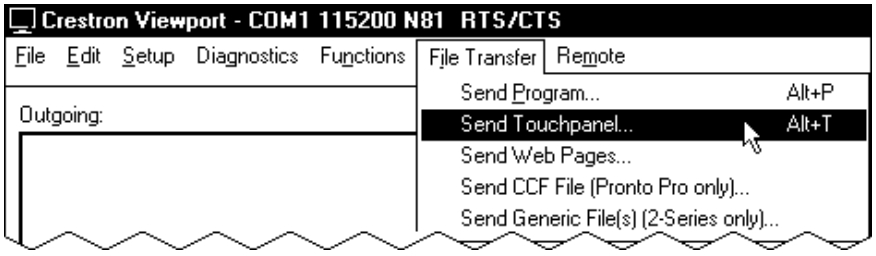
Upload via VT Pro-e

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

Upload via Crestron Viewport

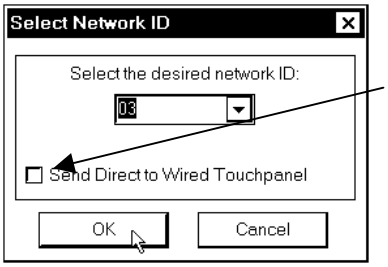
1. Verify that the procedure for "Communication Settings" that begins on page 36 has been performed.
2. As shown after this step, select **File Transfer | Send Touchpanel** (alternatively, press **Alt+T**) from the Viewport menu.

File Transfer | Send Touchpanel Command



3. As shown after this step, select the NET ID of the TPS-5000L touchpanel and then click **OK**. The "Touch Panel Transfer" window appears (refer to the subsequent graphic).

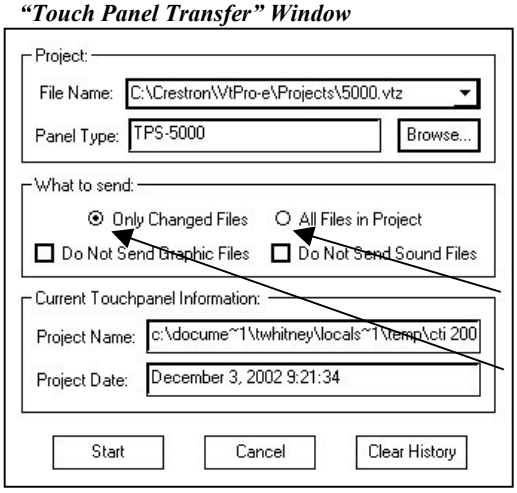
"Select Network ID" Window



Check *Send Direct to Wired Touchpanel* if connected via RS-232 directly to touchpanel.

NOTE: When transferring any Cresnet file (touchpanel project/firmware), lower the port speed baud rate to 38400 to match the Cresnet bus speed when transferring through a control system.

"Touch Panel Transfer" Window



Each time a project is selected using the **Browse** command, that project is added to the **File Name** drop-down list. This makes it convenient to recall projects without need to browse to a directory. To delete the list click **Clear History**.

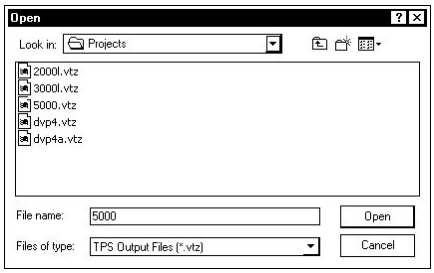
All Files in Project: sends the entire project.

Only Changed Files: sends only the files that are different from those that are currently stored in the panel. Note that if any pages in the panel are not present in the project, those pages will be deleted from the panel.

Additional choices include **Do not send graphic files** and **Do not send sound files**. These are often very large files that take a long time to load.

4. Click **Browse**. The "Open" window appears as shown in the following illustration.

"Open" Window



5. Select the VT Pro-e (.vtz) file and click **Open**. The transfer will complete automatically.

Firmware Upgrade

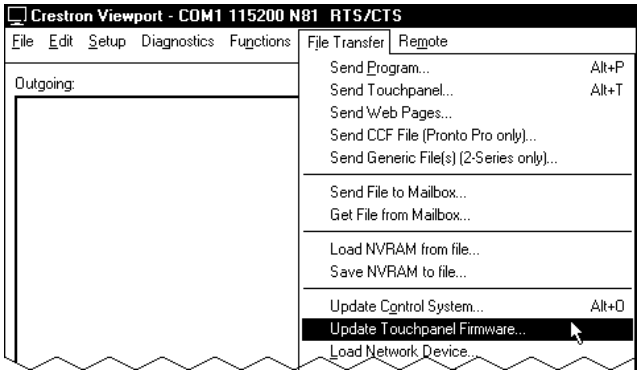
A firmware upgrade file has the extension .csf.

To take advantage of all the TPS-5000L features, it is important that the unit contains the latest firmware available. Therefore, please check the Crestron website (http://www.crestron.com/downloads/software_updates.asp) for the latest version of firmware. Not every product has a firmware upgrade, but as Crestron improves functions, adds new features, and extends the capabilities of its products, firmware upgrades are posted. To upgrade the firmware, complete the following steps.

NOTE: The following is the acceptable file extension for a firmware update file:
.csf *TPS.V.XXXXX.csf* (panel firmware)

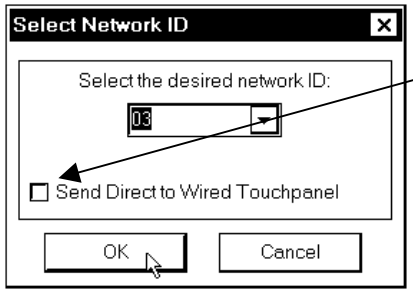
1. Make sure that "Communication Settings" that begins on page 36 has been performed.
2. As shown after this step, select **File Transfer | Update Touchpanel Firmware** from the Viewport menu.

File Transfer | Update Touchpanel Firmware Command



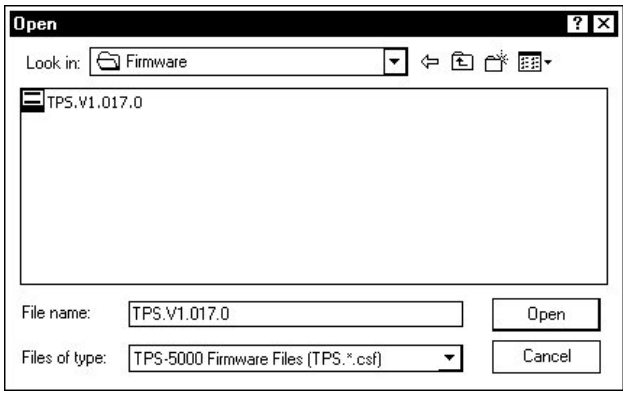
3. As shown after this step, select the NET ID of the TPS-5000L touchpanel and then click OK. The "Open" window appears (refer to the subsequent graphic).

"Select Network ID" Window



Check *Send Direct to Wired Touchpanel* if connected via RS-232 directly to touchpanel.

Select CSF File



4. Browse to the .csf file and click **Open** to begin the transfer.

Problem Solving

Troubleshooting

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

TPS-5000L Touchpanel Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Touchpanel does not function.	Touchpanel is not communicating with the network.	Use Performance Viewport (via SIMPL Windows or VT Pro-e) to poll the network. Verify network connection to the touchpanel.
	Touchpanel is not receiving network power.	Confirm that power is supplied to the network.
	Touchpanel is not receiving power from a Crestron power source.	Use a Crestron control system or an approved Crestron power supply.
	Touchpanel is incorrectly calibrated.	Enter “SETUP MODE” and recalibrate.
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.	Touch the screen to remove the message and enter Performance Viewport (via SIMPL Windows or VT Pro-e) to poll the network. Verify that 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.	Enter Performance Viewport (via SIMPL Windows or VT Pro-e) to poll the network and verify that each ID is used only once.
Touchpanel display is dark.	Standby timeout has elapsed.	Touch the screen to reactivate.
	Screen brightness is improperly set.	Enter “SETUP MODE” and alter screen brightness from the setup menu.
Unexpected response from the touchpanel.	Touchpanel is incorrectly calibrated.	Enter “SETUP MODE” and recalibrate.

Further Inquiries

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

- In the US and Canada, call the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876].
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Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the TPS-5000L, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron website (www.crestron.com) periodically for manual update availability and its subjective value. Updates are available from the Downloads | Product Manuals section and are identified as an "Addendum" in the Download column.

Appendix A: RS-232 Protocol

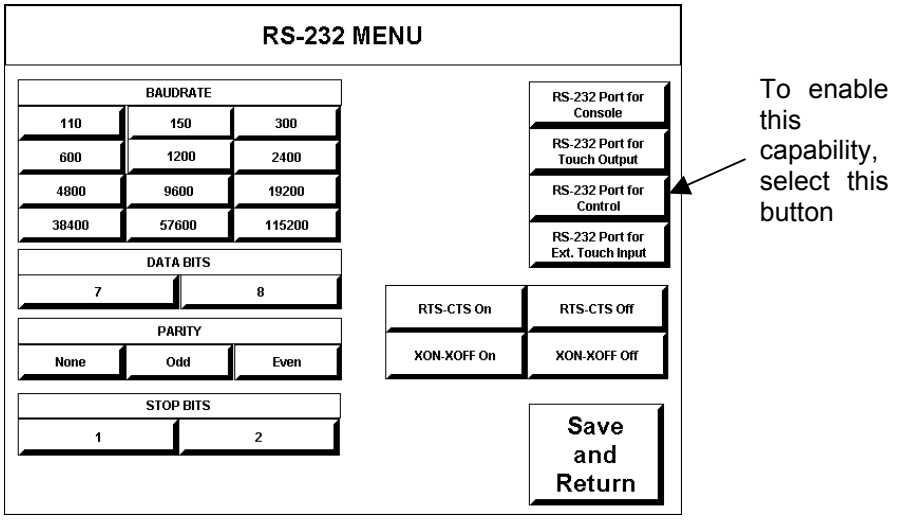
TPS-5000L touchpanels support panel operation via a host computer through the RS-232 port. Crestron recommends that the following serial data format is set.

Suggested Serial Data Format

Baud Rate: 38400	Data Bits: 8	Parity: None	Stop Bits: 1

These settings may be altered via the RS-232 Menu when configuring the touchpanel, however, doing so may prevent Crestron supplied software from operating with the touchpanel. Low baud rates will cause the panel to appear unresponsive. For example, at 300 baud, a single button press (and release) generates 12 characters and requires more than 0.333 of a second to send. Delays as short as 0.1 of a second are generally considered perceptible and somewhat annoying.

RS-232 Menu Button Selection



Command Format - Command format for all items sent to or from the touchpanel is very simple. All items are ASCII strings terminated by a <cr>. Line feed characters are ignored, thus <cr><lf> or <lf><cr> are also acceptable line terminators. When the touchpanel sends a line, it is always terminated with <cr><lf>.

For all strings, the first character determines command type. Numeric arguments, if present, are in decimal and separated by commas. No control characters are embedded in the strings to ease processing the strings with high-level languages. Be careful when using commas in BASIC, because BASIC uses commas for field separators when reading strings from a file using the INPUT # statement. Since we are dealing with complete lines, use the LINE INPUT # statement to cure this problem.

P<#> and R<#> Commands - When in RUN mode, pressing a button (assuming that it has been joined) generates a six-character code in the format P###<cr><lf>, where ### is a three-character decimal number in the range of 1 through 4000, providing for up to 4000 functions. When the button is released, a similar code is generated, with an 'R' in place of the 'P'. Given that only one button may be pressed at a time, an 'R' code always follows a 'P' code. A fixed three-digit format is used to simplify software on the host.

Codes may be sent to the touchpanel in the same form as they are received. The 'P' form turns on a function and the 'R' form turns off a function; sending back information received from the touchpanel (i.e., jumping pins 2 and 3 on the RS-232 port) makes the buttons momentary. Notice that the touchpanel responds to P and R commands even when configured for other interface modes. Selecting an RS-232 interface mode merely enables P and R commands to be issued. In addition, the fixed format is not required for commands sent to the touchpanel; P1, P01, and P001 are all perfectly valid commands.

Compared to running on Cresnet, an RS-232 interface to a personal computer is slower, provides less features (such as tracking, among others), is less noise immune (Cresnet uses balanced transmission for high common mode rejection, RS-232 does not), and requires the user to supply the control logic program in the PC.

V<chan>,<level> Command - Levels in gauge and slider objects may be set through the RS-232 port. The command contains both the object channel number (1-255) and level (0-65535) in decimal separated by a comma. For example, V6,32768 would set channel 6 to level 128, or half way up.

One quick note on baud rate and smooth ramping. Ramping is accomplished by sending successive levels to the object. To do this in 64 levels over three seconds, for example, requires about 576 bytes worth of commands to be sent, and could not be accomplished at any rate less than 2400 baud. Obviously, ramping several objects at once requires a baud rate several times as high.

Indirect Text – TPS-5000L touchpanels support a feature that permits the text field in any user-defined button to be altered on the fly in RUN mode. This is accomplished by substituting a text pointer for the text in the button. The text pointer informs the panel to use the contents of a variable that may be dynamically redefined as the text field for the button. This presents a considerable advantage over other methods in that changing screens does not destroy information and that information may be placed in buttons not currently displayed.

The text pointer is a number in the range of '1' through '127' preceded by the "pound" symbol (#). If [text…] is omitted, the text field is cleared. If [text…] exists, it is added to the text field. For example, consider the following string:

```
#3,Now is the time<cr>
#3,for all good men<cr>
#3,to come to the<cr>
#3,aid of the party<cr>
```

Assuming that a button with an #3 text pointer was being displayed, the contents of the button would be changed to:

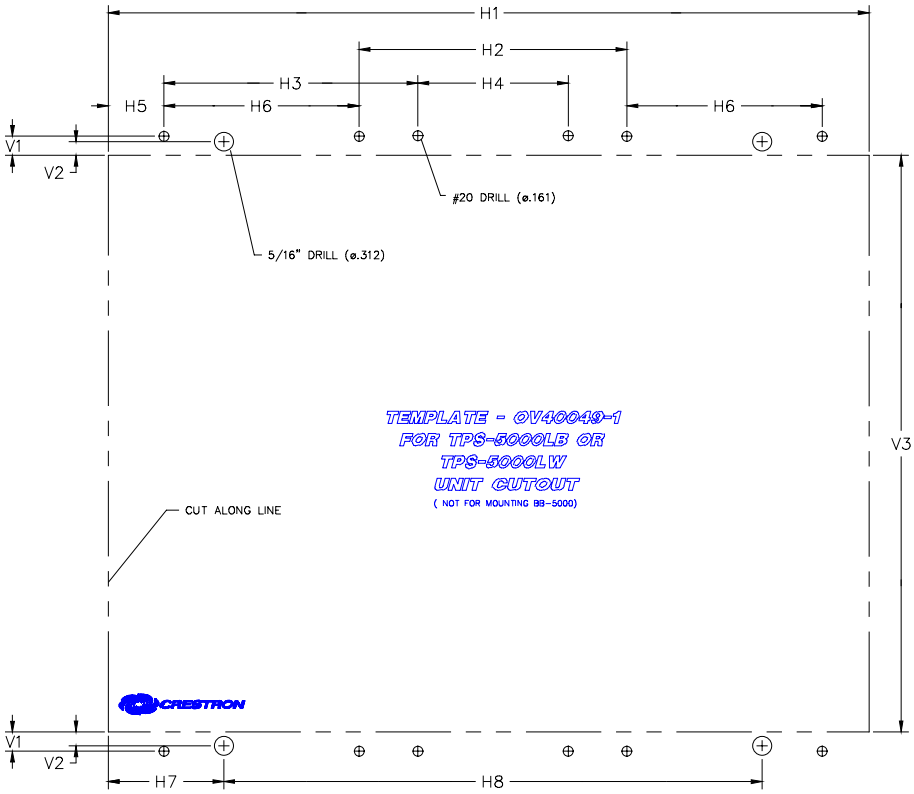
```
Now is the time
for all good men
to come to the
aid of the party
```

NOTE: To clear the text field for this example, type in "#3<cr>".

As each line is entered, the display is updated. Since the text may be placed in several different buttons, no boundary checking is done to see if the text fits in the button. If the text overflows the button/boundaries, it remains centered in the button/boundary.

Appendix B: Cutout Detail of Supplied Template

Use the alphanumeric codes in the illustration and table to obtain the cutout dimensions for the lectern mount models when mounting without the BB-5000. However, Crestron recommends that the supplied template be used to avoid error.



VERTICAL MEASUREMENTS		
V1	=	0.320 in (0.813 cm)
V2	=	0.230 in (0.584 cm)
V3	=	9.583 in (24.341 cm)

HORIZONTAL MEASUREMENTS		
H1	=	12.655 in (32.144 cm)
H2	=	4.452 in (11.308 cm)
H3	=	4.226 in (10.734 cm)
H4	=	2.500 in (6.350 cm)
H5	=	0.923 in (2.344 cm)
H6	=	3.250 in (8.255 cm)
H7	=	1.921 in (4.879 cm)
H8	=	8.954 in (22.743 cm)

Appendix C: Configuring the RS-232 Port for Use

To configure the RS-232 port of the TPS-5000L, a local PC that contains a Crestron Viewport is required. The Viewport is one of the development tools that is part of Crestron SIMPL® Windows® or VisionTools® Pro-e (VT Pro-e) software.

Obtaining Communications

Refer to "Communication Settings" on page 36 for detailed instructions on connecting a PC to the touchpanel.

Configuration Options

There are several RS-232 communication options (at the time of this printing, these were available):

- CONSOLE – console active on RS-232 port. Use to load programs, firmware, or to set configuration. This is the default. Use this configuration if no other option is appropriate.
- CONTROL – activates special control mode. Use for control by non-Crestron device or within a non-Crestron control system. Refer to "Appendix A: RS-232 Protocol" on page 45. For details.
- TOUCHOUT – touchscreen output sent to RS-232 port. Use for serial mouse control or Telestrator output. Directly connect computer or Telestrator box to RS-232 port on TPS-5000L (i.e., touch screen output). For example, use when an RGB window with tablet overlay on the TPS panel acts as a serial mouse controller for a PC. In this case, use the Crestron Serial Mouse Control Driver (tpad.exe), which can be downloaded from the Downloads | Software Updates section of the Crestron website (www.crestron.com). Another use is with the Pointmaker® telestrator. For details, refer to the Telestrator Integration Guide, which can be downloaded from the Downloads | Product Manuals section of the Crestron website (www.crestron.com).
- MOUSE – RS-232 port used for mouse input. For use with a Microsoft® Compatible Serial Mouse as a pointing device on the TPS-5000L. Also known as "Touch the PC".
- EXT_TOUCH – RS-232 port used for external touch screen input (i.e., SMART Matisse Overlay or Microtouch Display).

RS-232 Port Configuration

After establishing communication, the RS-232 can now be configured for communication with an option. Complete the following steps in the order provided.

1. From the "TPS>" prompt, enter the following command:

   ```
   rs232 ?
   ```

2. The TPS-5000L responds with the following:

   ```
   RS232MODE [CONSOLE|CONTROL|RF|TOUCHOUT|MOUSE|EXT_TOUCH]
       CONSOLE - console active on RS232 port
   ```

```
CONTROL – activates special control mode.
RF – RF wireless interface.
TOUCHOUT – touchscreen output sent to RS232 port.
MOUSE – rs232 port used for mouse input
EXT_TOUCH – rs232 port used for ext. touchscreen input
No parameter – display current setting
```

3. Enter a command that chooses one of the RS-232 communication options. Use the same spelling as shown in the last touchpanel response.
4. The TPS-5000L responds with the following:

   ```
   New RS232mode set. Reboot to take effect.
   ```

5. Enter the following command:

   ```
   reboot
   ```

6. The TPS-5000L responds with the following:

   ```
   Rebooting system. Please wait.
   ```

7. From the Viewport, select **Remote | Remote Console | Disconnect**.

At this point, the PC and the TPS-5000L are no longer communicating. Assuming that the touchpanel is properly connected for use (as shown in the diagram for "Communication Settings" on page 36) and the control system is connected to the PC, the setup screens can be displayed to set the NET ID and other configurations.

NOTE: Alternatively, use a Cresnet command from the Viewport (communicating to the control system) to access the setup screens. Verify the NET ID of the TPS-5000L and select **Functions | Put Touch Panel into Setup Mode**. Enter the NET ID and click **OK**.

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3. Return freight charges following repair of items under warranty shall be paid by CRESTRON, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.

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