

Crestron Isys™ **TPS-5000**

12 Inch Tilt Touchpanel

Operations Guide



CRESTRON

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12 Inch Tilt Touchpanel: Crestron Isys™ TPS-5000

Introduction

Features and Functions

The TPS-5000 packs all the power and performance of a Crestron Isys™ panel in a stylish tilt model. These units are suitable for tabletop mounting in any Crestron® control system (herein referred to as the Cresnet® system) and are perfect for the conference room or home theater.

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

TPS-5000 Functional Summary

- 12" (30.5 cm) diagonal active matrix color display
- 800 x 600 (SVGA) Native Screen Resolution
- 16 Bit non-palette graphics, over 64,000 colors
- 4 MB of Flash, expandable to 16 or 32 MB with Crestron plug-in memory modules to accommodate larger touchpanel projects & 8 MB of DRAM memory
- Unique modular system allows configuration of capabilities simply by adding expansion cards for video, computer graphics, and Internet
- Displays RGB video at native resolution with optional TPS-XVGA interface card
- Displays one NTSC/PAL/S-video/composite video source with 256,000 colors with optional TPS-VID-1 expansion card
- Displays two NTSC/PAL/composite video (or one S-video) sources with 256,000 colors with optional TPS-VID-2 expansion card
- 10/100 BaseT (full/half duplex) Ethernet capabilities with optional TPS-ENET 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

(continued on next page)

TPS-5000 Functional Summary (continued)

- Local RS-232 port for console control; adds ability to upload firmware or touchpanel projects
- Wireless operation with optional TPS-XTXRF
- Pop-up sub pages 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
- Position lock feature provides durable support of panel at any angle of inclination between 30 and 80 degrees

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

The TPS-5000'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-5000 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-5000 has the ability to transmit touch coordinates when "RS-232 Port for Touch Output" is selected. Currently Telestrator devices are supported on the TPS-5000. Refer to the "RS-232 Menu" section of "Configuring the Touchpanel" on page 13 and "Appendix B: Configuring the RS-232 Port for Use" on page 46 for instructions on selecting this feature.

Specifications

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

Specifications for the TPS-5000 Touchpanel

SPECIFICATION	DETAILS
Power Requirements (without cards) ¹	20 Watts (0.83 Amp @ 24 VDC)
Default Network ID	03
Timeout	Adjustable from 0 to 120 minutes (Default = 15 min.)
Signal Join Maximums	4000 Digital, 4000 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 4.02.4S.UPZ or later ⁶
Audio	<ul style="list-style-type: none"> Balanced (20 kΩ) & unbalanced (10 kΩ) line level stereo input through 6-pin mini-connector. Maximum input level 2 Vrms single ended (unbalanced), 4 Vrms 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-pin mini connector. Maximum output level 1 Vrms single ended, 2 Vrms differential Built-in WAV file (8 & 16 bit PCM mono & stereo, 8 kHz, 11 kHz, 16 kHz, 22 kHz, & 44 kHz) playback capability⁷ Speaker amplification: 2 Watts per channel
Touchpanel Firmware	TPS.V.2.000.0.csf or later
Memory	4 MB internal flash memory (upgradeable to 16 MB or 32 MB), 8 MB of DRAM ⁸
Screen Dimensions	12"/30.5 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

(continued on next page)

Specifications for the TPS-5000 Touchpanel (continued)

SPECIFICATION	DETAILS
Display Type	Touch-sensitive active matrix color LCD
Enclosure	High impact, black molded plastic enclosure
CPU	63MIPs Coldfire processor running Isys generation firmware
Cresnet	Via TPS-IMPC (included) or optional TPS-IMW
RS-232	RJ-11 connector for console, telestrator, etc. Default settings: 115200, 8 bit, parity none, stop bit 1.
Operating Temperature and Humidity	50° to 113° F (10° to 45° C), 10 to 90% Relative Humidity (non-condensing)
Dimensions and Weight	Height: 11.86 in (30.12 cm) Width: 13.26 in (33.69 cm) Depth: 10.56 in (26.81 cm) Weight: 7.64 lbs (3.46 kg)

- 1 The individual power requirements for the expansion cards are:
TPS-ENET: 4 Watts (0.167 Amps @ 24 VDC)
TPS-VID-1: 7 Watts (0.29 Amps @ 24 VDC)
TPS-VID-2: 12 Watts (0.50 Amps @ 24 VDC)
TPS-XVGA: 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, C2N-DVP4DI, CP2, CP2E, MC2E, MC2W, MP2, MP2E, PAC2, PRO2, QM-RMC, QM-RMCRX, 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-5000 when using these control systems, use the RS-232 port on the TPS-5000 or use a direct Ethernet connection to the panel (assuming the TPS-ENET 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 7. 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

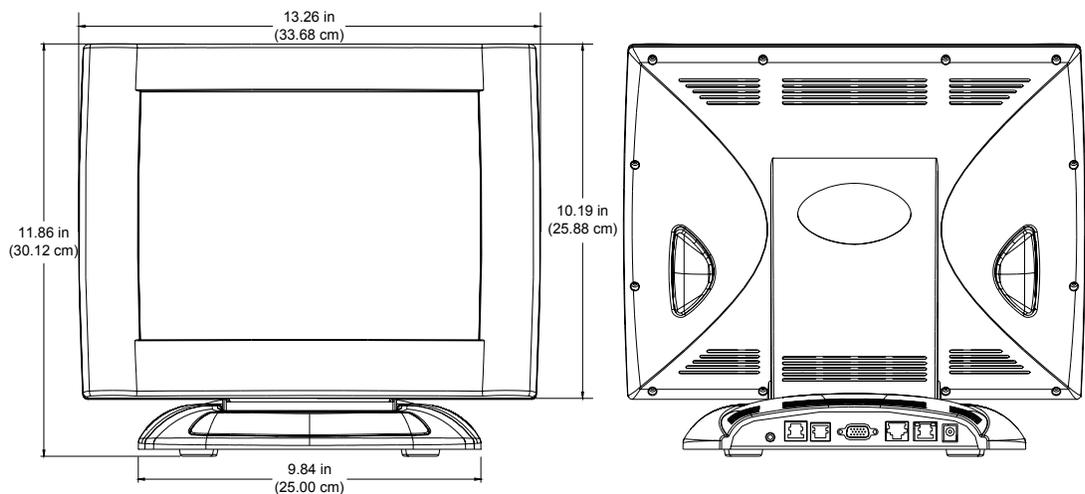
The TPS-5000's 12-inch (30.48 cm) touch sensitive viewing screen is located on the front of the TPS-5000 touchpanel. The electronic hardware is housed in a high impact, black molded plastic enclosure, shown in the following diagram. This touchpanel is designed for placement on a counter. It has a hinged base, which can tilt from 30 to 80 degrees. Refer to "Position Lock Buttons" on page 7 for tilting details. All RS-232, video, network, and power connections are made at the rear panel on the base of the unit.

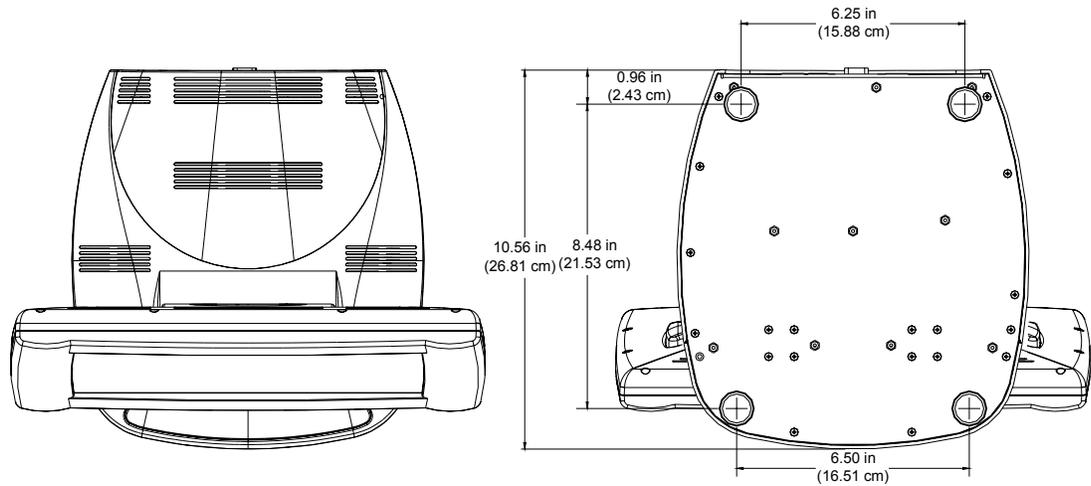
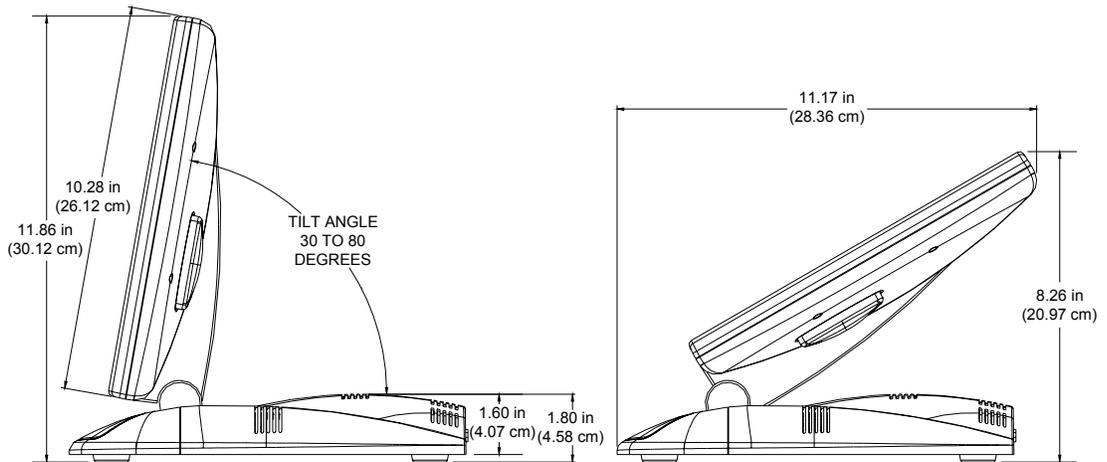
NOTE: Video and network signals are connected to either the TPS-IMPC or TPS-IMW touchpanel interface modules.

TPS-5000, Front View



Physical Views of the TPS-5000 Touchpanel (Front and Back)



Physical Views of the TPS-5000 Touchpanel (Top and Bottom)*Physical Views of the TPS-5000 Touchpanel (Side with Min. and Max. Angle)***Expansion Slots**

The TPS-5000'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-5000 are:

- **TPS-ENET** – a 10/100 BaseT Ethernet card provides Ethernet capability to the touchpanel.
- **TPS-VID-1/TPS-VID-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-VID-2 adds the capability of displaying two composite video sources.
- **TPS-XVGA** – 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-5000 ships with 4 MB of flash and 8 MB 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.

Sound

The TPS-5000 has built-in speakers with power amplifiers. Sound can be generated by the panel by using downloaded wave files (.WAV) or can be mixed in from an external line level audio source. The audio amplifiers output 2 Watts per channel. Refer to “WAV File Audio Messages“ on page 29 for WAV file details. There is a built-in microphone in the touchpanel, which is amplified to produce a line level differential output. The microphone amplifier has two modes, AGC or fixed gain. The AGC is selectable using an internal join number. Refer to “Reserved Join Numbers” on page 31 for more information.

Interface Modules

Connect the TPS-5000 to an outboard interface module, which provides expanded network/video connections for the touchpanel system. A 15-foot connecting cable assembly is supplied. Cable assemblies of other lengths are available from Crestron. There are two interface modules available: TPS-IMPC and TPS-IMW.

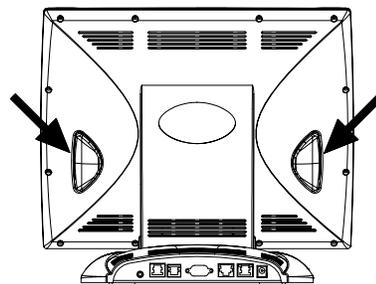
The TPS-IMPC is supplied with every TPS-5000. This module is housed in a black enclosure with a silk-screened top panel and several I/O ports. At the shorter sides of the unit, the enclosure extends to form feet at a right angle to the side. These feet have mounting holes. Consult the latest revision of the TPS-IMPC Operations Guide (Doc. 6162) for more details.

The TPS-IMW is not provided with the TPS-5000; it must be purchased separately. This unit installs into a two-gang electrical box (2.5-inch depth minimum). A Decora®-style wallplate can be mounted over the unit once it is installed to offer a more eye-pleasing appearance. Consult the latest revision of the TPS-IMW Operations & Installation Guide (Doc. 5857) for more details.

Position Lock Buttons

These buttons are used to make angular adjustments to the touchpanel screen. Each incremental angular position is indicated by an audible click (unless the position lock button is held down). Two position lock buttons are located on the backside of the touchscreen, shown after this paragraph. The two buttons function together so that if one is held down, the other is held down as well. This makes tilting the touchpanel comfortable for left and right-hand users. Furthermore, the button's position allows for one-hand tilting.

Location of Position Lock Buttons

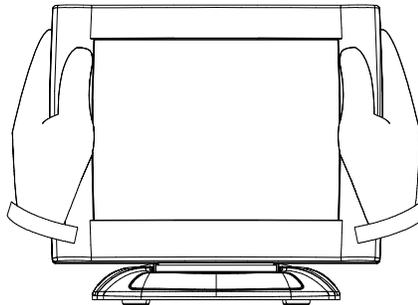


Range of motion is adjustable for user comfort and can vary from 30 to 80 degrees of inclination from the horizon. Thus each user can position the touchscreen to a comfortable angle, just as a microphone can be repositioned to a suitable height for each speaker. The comfortable angle is herein referred to as user position. The position lock guarantees that once a user position is established or locked, the angle will not degrade from repeated presses on the touchscreen.

The touchscreen is free to move up from the nearly horizontal position to a larger incremental angle. Grasp the touchscreen with a hand at each side (or just one hand at either side, as shown after this paragraph) and gently tilt up to a comfortable position. To activate position lock, slightly reverse the motion until the touchpanel stops moving. The touchscreen is now set into user position.

NOTE: If the position lock button is held down as the screen is tilted, there are no audible clicks.

Two-Hand Placement for Tilting a Touchpanel to a Vertical Position



Once in user position, position lock is activated which means the touchscreen cannot be forced to a horizontal position without depressing the position lock button(s). The touchscreen is still free to tilt up; a new user position is established at each increment or audible click.

A position lock button needs to be pressed before the touchscreen can be returned to a more horizontal position. To press the button, slightly position the touchscreen in the vertical direction with one or two hands, avoiding any horizontal movement. The position lock button can then be held down and the touchscreen can be tilted to a more horizontal position.

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

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

CAUTION: Possible equipment damage if miswired.

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).

NOTE: Do not power up system until all wiring is verified. Care should be taken to ensure data (Y, Z) and power (24, G) connections are not crossed.

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 following table).
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 following table.

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) or Cresnet Network Poll Accelerator (C2N-NPA8) 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.

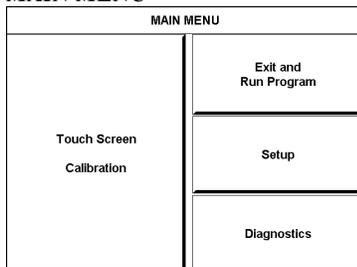
Identity Code

All equipment and user interfaces within the network require a unique identity code (Net ID). These codes are two-digit hexadecimal numbers ranging from 03 to FE. Refer to “Interface Menu” on page 12 for instructions on setting the unit's Net ID. The Net ID of each unit must match an ID code specified in the SIMPL Windows program. Refer to “Setting the Net ID in Device Settings” on page 25 for details of the SIMPL Windows procedure.

Configuring the Touchpanel

NOTE: The only connection required to configure the touchpanel is power (+24V and Ground). Refer to “Hardware Hookup” on page 18 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 MAIN MENU appears.

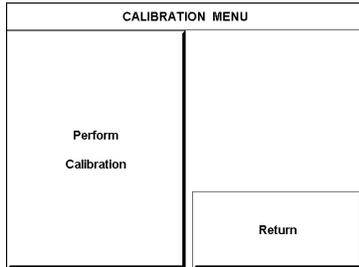
NOTE: The SETUP MODE can also be accessed through the Viewport Utility if the touchpanel is connected directly to a PC by selecting **Functions | Put Touch Panel into Setup Mode...** from the Viewport menu.

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



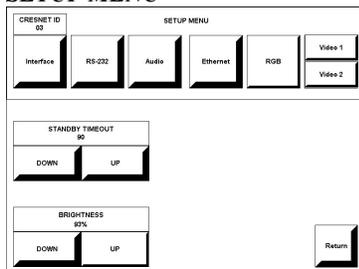
Calibration of the touchscreen is required if the active touch area of a button does not coincide with the button's image. Select the **Touch Screen Calibration** button to display the CALIBRATION MENU, shown to the left. The CALIBRATION MENU offers the choice to initiate calibration with the **Perform 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 upper left corner. Touch the center of the cross hair in the corner of the screen to initiate calibration. Another message, "Touch Upper Right", appears with a cross hair in the correct corner. Touch the center of the cross hair in the corner of the screen. A final message, "Touch Lower Right", appears with a cross hair in the correct corner. Touch the center of the cross hair in the corner of the screen to conclude calibration and return to the 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 the same spot for each calibration point.

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-ENET, TPS-XVGA or TPS-VID-1/2 cards are installed.

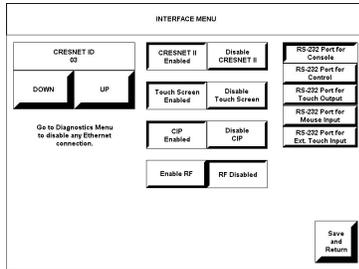
NOTE: If the TPS-VID-2 is installed, two video buttons will be displayed: "Video 1" and "Video 2". Press the button for the respective video source.

The touchpanel display can be turned off (standby mode) when not in active use. **STANDBY TIMEOUT**, located on the left side of the SETUP MENU, can turn off the touchpanel display when the screen has not been touched for a specified time frame (minutes, shown as 90 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., 93% 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. The Net ID for the TPS-5000 is factory set to 03, and no two devices in the same system can have the same Net 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-ENET is properly installed.

NOTE: Refer to “Diagnostics Menu” on page 18 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.

The TPS-5000 is capable of wireless communication with a control system when equipped with the optional TPS-XTXRF Two-Way RF Transceiver Module and TPS-RFGWX Two-Way RF Transceiver. Choosing **Enable RF** (found on TPS-5000 when equipped with the TPS-XTXRF) enables the RF mode. For more information on configuring a touchpanel with an RF interface, refer to the latest revision of the TPS-XTXRF Two-Way RF Transceiver Module Operations and Installation Guide (Doc. 5844).

NOTE: If the TPS-5000 is to be used without an RF connection, the **RF Disabled** button must be selected.

NOTE: If RF is enabled, the RS-232 communication settings cannot be adjusted. Additionally, when RF is enabled, touchpanel projects cannot be downloaded via RS-232. They can only be downloaded through Cresnet or Ethernet. If RS-232 must be used, RF must be disabled.

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

RS-232 Menu

The touchpanel allows for five RS-232 communication methods:

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

RS-232 MENU

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 B: Configuring the RS-232 Port for Use” on page 46.

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 18 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-ENET is properly installed.

NOTE: IP settings are necessary only if the TPS-ENET is installed. Serially connect a PC to the TPS-5000 via the RS-232 connector and refer to the details in the latest revision of the TPS-ENET Operations & Installation Guide (Doc. 6016) to configure the IP settings. Additionally, Viewport can be used to configure the IP settings over Cresnet.

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-ENET Operations & Installation Guide, as stated in the previous note.

Sample Display from Ethernet Button Press

```

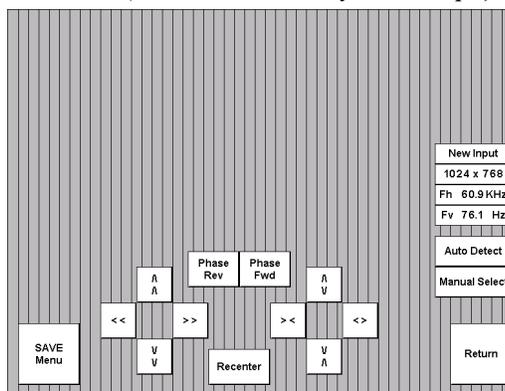
Ethernet Status:
Link Status:      No Link
Link Speed:       10 Mbps
Full Duplex:      No
Ethernet Parameters:
Enabled:          On
MAC Address:      00.10.7d.00.1d.a1
IP Address:       132.132.2.132
Subnet Mask:      255.255.0.0
Def Router:       0.0.0.0
IP Table:        CIP_ID IP Address
    
```

RGB Menu

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

With a TPS-XVGA installed, the TPS-5000 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.

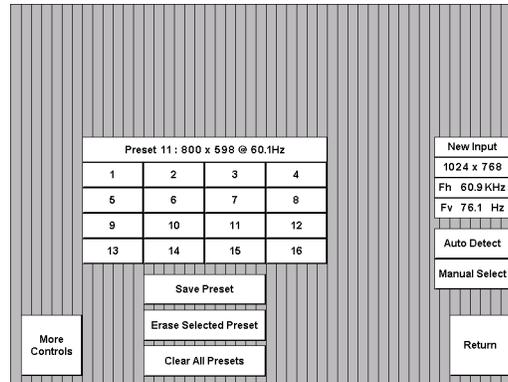
NOTE: Refer to the latest revision of the TPS-XVGA Operations & Installation Guide (Doc. 5944) for signal format specifications.

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.

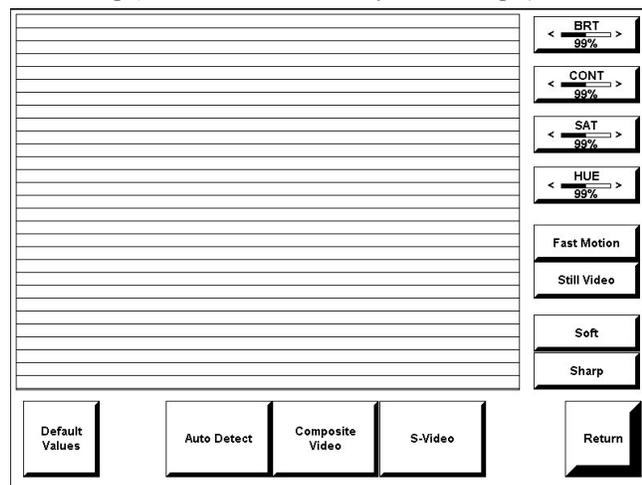
Select the **Return** button, located at the lower right corner of the RGB Menu, after RGB parameters have been set.

Video Menu

NOTE: The **Video** button is displayed on the Setup Menu only if the TPS-VID-1 is properly installed. If the TPS-VID-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-5000 can have up to four different composite video sources connected to either the 6-pin connector or the BNC connectors on the TPS-IMPC when equipped with the TPS-VID-2. However, only two composite video channels can be selected for viewing. Refer to the latest revision of the TPS-VID-1/VID-2 Operations & Installation Guide (Doc. 6059) 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-VID-1 or TPS-VID-2 in S-video configuration) or switch modes automatically after checking the image for colors. Use either the **Composite Video** or **S-Video** buttons to manually control the mode. Use the **Auto Detect** button for automatic control. The text color of the selected button is red rather than black.

NOTE: When configuring the TPS-VID-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 touchpanel equipped with a TPS-VID-2 (two BNC feeds for unbalanced video and two twisted-pair feeds for balanced video). Any combination of balanced and unbalanced video connections are allowed. However, only two composite video channels can be selected for viewing. Specify the connections to use by selecting the

appropriate inputs on the TPS-IMPC. Refer to the latest version of the TPS-IMPC Interface Module Operations Guide (Doc. 6162) for details.

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.

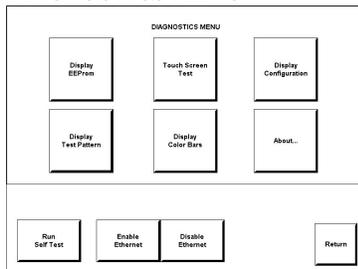
Fast motion mode (if the **Fast Motion** button is selected) reduces motion artifacts and should be used for most video sources. Still video mode (if the **Still Video** button is selected) works best for still pictures. It has a maximum resolution and reduces flicker. However, it suffers from motion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

Diagnosics Menu

DIAGNOSTICS MENU



The **Diagnosics** 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. For more information, refer to “Interface Menu” on page 12.

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

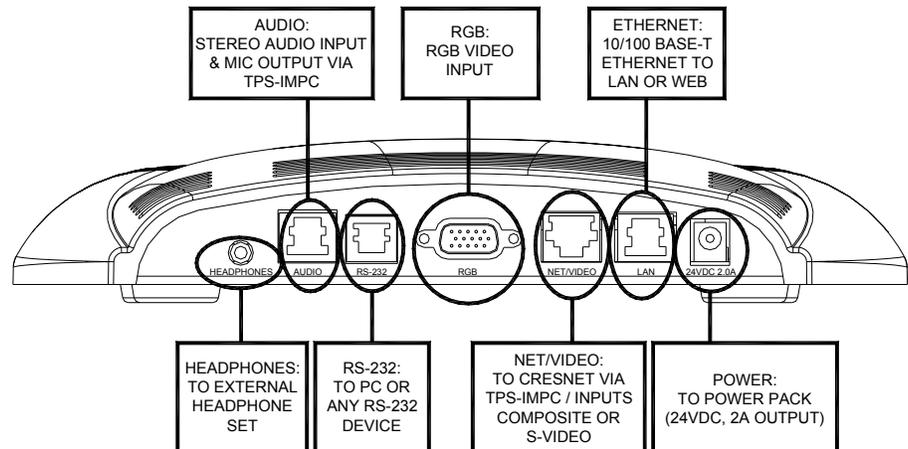
Hardware Hookup

Make the necessary connections as called out in the following illustration. Refer to “Network Wiring” on page 9 before attaching the NET or NET/VIDEO connector. Apply power after all connections have been made.

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

NOTE: Not all ports are active; some require the additional purchase and installation of an expansion card to enable operation.

Hardware Connections for the TPS-5000



HEADPHONES

Connect this standard mini phone jack (12mW, 32 ohms load) to the plug of an external headphone set, not supplied.

AUDIO

This 8-pin, RJ-45 connector mates to an interface module with a supplied cable and provides differential/single ended audio input and output. It also produces line level differential output. Description of the pinouts is shown in the following table.

AUDIO Pinouts

TYPE	PIN	DESIGNATION	DESCRIPTION
	1	L+	Left Input (Positive)
	2	L-	Left Input (Negative)
	3	GND/Shield	Audio Input Ground/Shield
	4	R+	Right Input (Positive)
	5	R-	Right Input (Negative)
	6	GND/Shield	Mic Output Ground/Shield
	7	M+	Mic Output (Positive)
	8	M-	Mic Output (Negative)

To determine the location of pin 1, hold the supplied cable so that the end of the 8-pin RJ45 connector is facing away from you, with the clip side down and the copper side up. The copper contact on the far left is pin 1.

NOTE: When connecting the touchpanel to the interface module, do not confuse the 8-pin audio cable with the 10-pin net/video cable.

RS-232

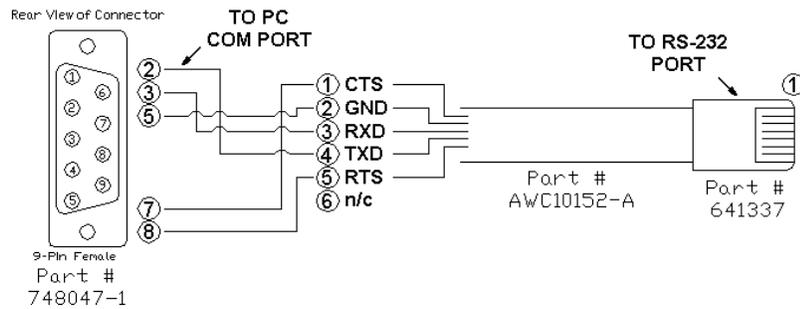
This 6-pin RJ-11 connector mates with a serial port of a PC. The connecting cable is not supplied. Prior to installation, use this port for direct connection between the

touchpanel and a PC to load files to a touchpanel without a network connection. In the event that modular cables or an RJ-11 to DB9F adapter is not available, the following table and diagram provide information so that the cable can be fabricated on site. Refer to “RS-232 Menu” on page 13 for proper RS-232 port configuration settings. Also refer to “Appendix A: RS-232 Protocol” on page 44 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-5000 Cable Specifications (Crestron Cable Number STCP-502PC)



RGB

This port is blank until the TPS-XVGA expansion card is purchased and installed. Consult the latest revision of the TPS-XVGA Operations & Installation Guide (Doc. 5868) for details.

NOTE: RGB connector is only available after installing the expansion card into the TPS-5000 touchpanel.

NET/VIDEO

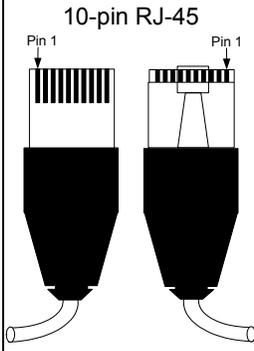
This 10-pin RJ-45 connector mates with the TPS-IMPC or TPS-IMW interface module using a supplied cable and has a dual purpose.

CAUTION: The 15-foot, 10-pin RJ-45 connector cable supplied by Crestron is a custom cable and is the only one that should be used. The end of the cable has a metal shield that is required to protect the equipment. Using non-Crestron cables will result in damage to the product. Other cable lengths are available from Crestron.

NOTE: When connecting the touchpanel to the interface module, do not confuse the 8-pin audio cable with the 10-pin net/video cable.

This 10-pin RJ-45 port provides network connection from the touchpanel to the interface module and network power to the touchpanel. This port also contains the composite and S-video connections if a TPS-VID-1 or TPS-VID-2 is installed in the TPS-5000. Refer to the descriptions and pinout table that follow this paragraph.

Pin Assignments

TYPE	PIN	DESIGNATION	DESCRIPTION
	1	+24V	Power (Network)
	2	GND	Ground (Network)
	3	C+	Chrominance (Positive) /Composite 2
	4	C-	Chrominance (Negative) /Composite 2
	5	Y	Data (Network)
	6	Z	Data (Network)
	7	Y+	Luminance (Positive)/Composite 1
	8	Y-	Luminance (Negative)/Composite 1
	9	GND	Ground (Network)
	10	+24V	Power (Network)

To determine the location of pin 1, hold the cable so that the end of the 10-pin RJ-45 connector is facing away from you, with the clip side down and the copper side up. The copper connector on the far left is pin 1.

NOTE: When using the TPS-VID-1 or TPS-VID-2, pins 3, 4, 7, and 8 are used to transmit video signals from the touchpanel interface to the TPS-5000. Consult the latest revision of the TPS-VID-1/VID-2 Operations & Installation Guide (Doc. 6059) for details.

LAN

This port is activated with the purchase and installation of the TPS-ENET, a 10/100 BaseT Ethernet card. Consult the latest revision of the TPS-ENET Operations & Installation Guide (Doc. 5867) for details.

24 VDC, 2.0A

This female connector is used to supply 24 VDC power to the TPS-5000 from an optional power pack (Crestron model PW-2420RU). If video is to be displayed on the touchpanel, 24 VDC power must be supplied to the TPS-IMPC through either the Cresnet connector or the TPS-IMPCs 24VDC connector.

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

CAUTION: If power is provided to the TPS-5000 from the +24VDC on a Cresnet connector or the optional PW-2420RU to the touchpanel base, power must not be applied to the power input on the TPS-IMPC.

NOTE: Use care in wiring installations to avoid applying 24 VDC power to Cresnet wiring from multiple sources.

Recommended Cleaning

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

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

Programming Software

Have a question or comment about Crestron software?

Answers to frequently asked questions (FAQs) can be viewed in the Online Help section of the Crestron website (www.crestron.com). Go to <http://www.crestron.com/accounts/login.asp> to post your own question or view questions you have submitted to Crestron's True Blue Support. First-time users will need to establish a user account.

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:

- (Optional) 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. Requires SIMPL+ Cross Compiler version 1.1.

- Crestron Database version 14.1 or later. Required by SIMPL Windows and VT Pro-e.
- VisionTools Pro-e version 2.2.0.0 or later. Used for graphical touchscreen design. To use Synapse graphics and multi-byte international characters in a touchpanel screen, VT Pro-e version 3.1.2.0 or later is required. Touchpanel firmware version 2.000.0 or later is also required.

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-5000, 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+)

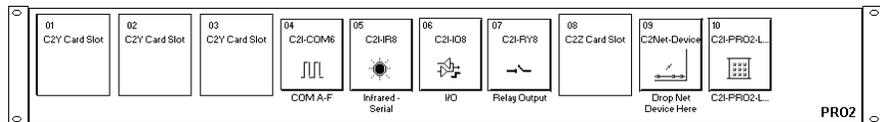
NOTE: In the following description, the PRO2 control system is used.

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-5000 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.

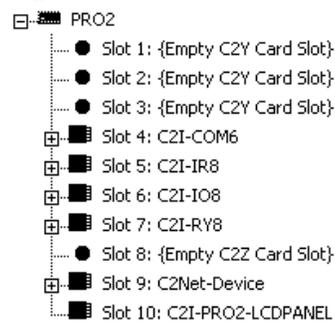
Configuration Manager is where programmers “build” a Crestron control system by selecting hardware from the *Device Library*. In Configuration Manager, drag the PRO2 from the Control Systems folder of the *Device Library* and drop it in the upper pane of the *System Views*. The PRO2 with its associated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

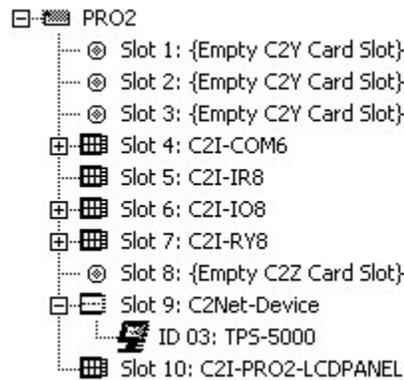


C2Net-Device Slot in Configuration Manager

To incorporate the TPS-5000 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.

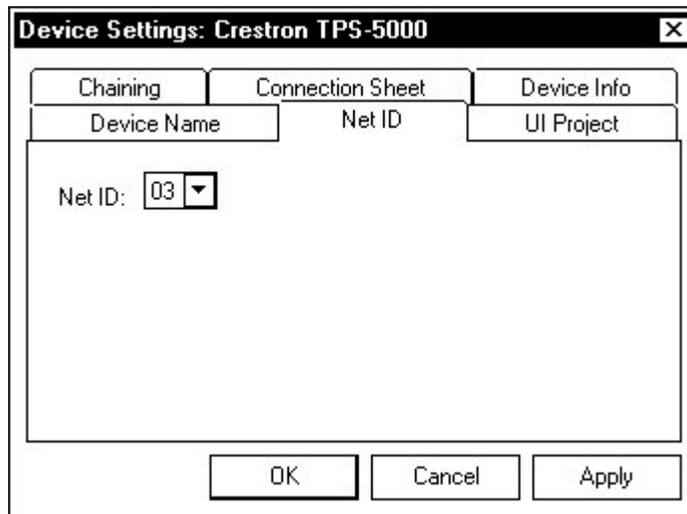
C2Net Device, Slot 9



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.

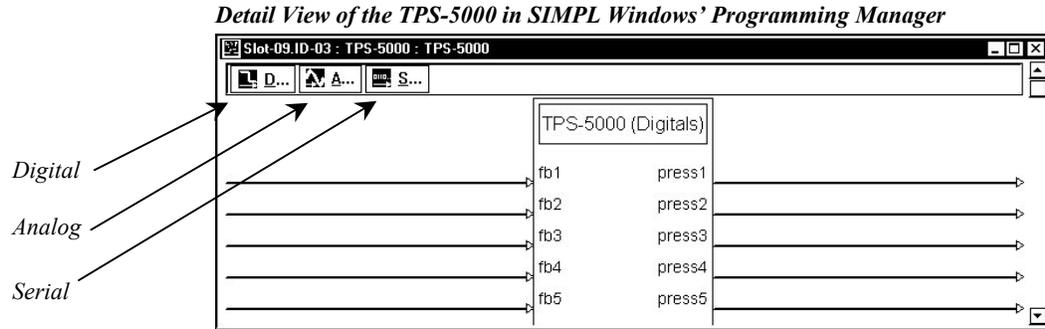
“Device Settings” Window for the TPS-5000



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 12.

TPS-5000 Symbol in Programming Manager

Programming Manager is where programmers “program” a Crestron control system by assigning signals to symbols. The following diagram shows the TPS-5000 symbol in the 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-5000 Input/Output Signals

The TPS-5000 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 *Symbol 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 a button press on the touchpanel screen (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 digital feedback (1 - 4000). This can represent that a touchpanel 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 that produces an analog change (i.e. a moving slider control) (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 feedback (1 - 4000).

Serial Input Signal Descriptions

INPUT	DESCRIPTION
text-01 through text-999	Notifies panel of new dynamic 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-5000 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-5000 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. Projects 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.

Crestron's Synapse image-rendering algorithm supports advanced anti-aliasing for crisper, sharper images, as well as new shaded styles for all objects, new frame styles (neon and raised), and new text styles (embossed, raised, and shadow). The Synapse algorithm allows the touchpanel to process these styles internally, without the use of large bitmap files that increase project size and upload time. Synapse delivers high impact touchpanel graphics more efficiently than ever. To utilize Synapse graphics, you must use VT Pro-e version 3.1.2.0 or later and Isys touchpanel firmware 2.000.0 or later.

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-5000:

.vtp	<i>projectname.vtp</i> (VT Pro-e source file)
.vtz	<i>projectname.vtz</i> (compiled file)

Multi-mode objects offer high-performance programming!

Multi-Mode Objects

The single most-advanced VT Pro-e high-performance programming technique involving the TPS-5000 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-5000 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-5000 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-5000 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.

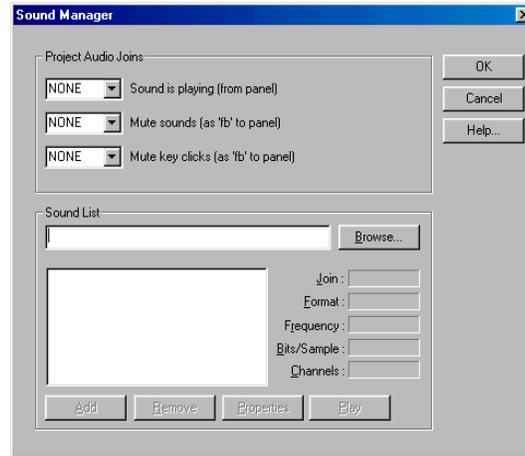
NOTE: WAV files reside in the touchpanel's Flash memory and will affect the amount of available space for touchpanel screens.

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



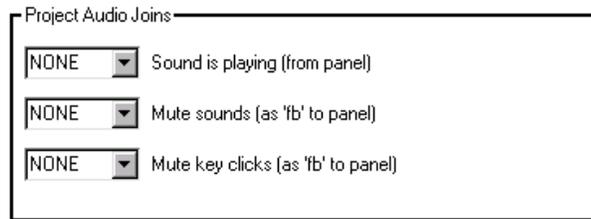
Sound Manager Guidelines

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

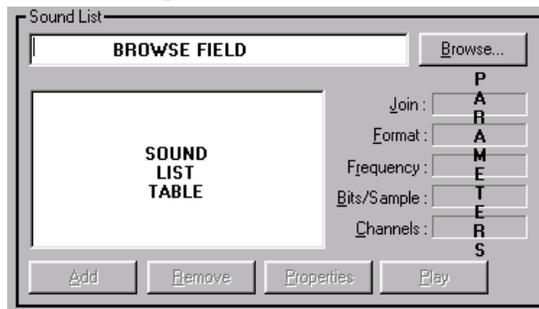
1. Each WAV file must be assigned a unique digital join number. The join number options include none, keyclick, or a number (1 through 4000). The default is none. If the keyclick option is selected, this WAV file becomes the default keyclick sound for all buttons. The other WAV files can be played by 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-5000 target type selected in VT Pro-e. The correct audio format is PCM, 8, 11, 16, 22, or 44kHz, mono or stereo, 8 or 16 bit.
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 touchpanel feature that enables a designer to create a button in VT Pro-e that performs a predetermined function entirely within the touchpanel that is not transmitted to the control system. By assigning a reserved join number to a button, functions such as touchpanel volume control or LCD brightness can easily be created in a touchpanel project without additional programming in SIMPL Windows. The following tables list some reserved join numbers that can be included in a touchpanel project.

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-5000 Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17201	Brightness	LCD Brightness	INPUT/OUTPUT

System Digital Reserved Join Numbers for TPS-5000 Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17216	Brightness	Increase	INPUT
17217	Brightness	Decrease	INPUT
17218	Brightness	High	INPUT
17219	Brightness	Medium	INPUT
17220	Brightness	Low	INPUT
17242	Call up Setup Menu	N/A	INPUT

System Serial Reserved Join Numbers for TPS-5000 Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
32768	Product Name	“TPS-5000”	OUTPUT
32769	Product Version	Firmware Version	OUTPUT

Audio Analog Reserved Join Numbers for TPS-5000 Touchpanels

JOIN #	FUNCTION	VALUE	IN/OUT
17301	Audio Line	Volume	INPUT/OUTPUT
17302	WAV Audio	Volume	INPUT/OUTPUT

Audio Digital Reserved Join Numbers for TPS-5000 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

(continued on next page)

Audio Digital Reserved Join Numbers for TPS-5000 Touchpanels (continued)

JOIN #	FUNCTION	VALUE	IN/OUT
17308	Audio Line Volume	Increase	INPUT
17309	Audio Line Volume	Decrease	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

NOTE: Additional touchpanel functions with reserved join numbers can also be accessed in VT Pro-e or by using Join Number Remapping in a SIMPL Windows program. A listing of available reserved join functions are available when assigning a Digital Press Join in a *Button Properties* window in VT Pro-e or when using Join Number Remapping in SIMPL Windows. For additional information on VT Pro-e, refer to the help file provided with the software. For additional information on Join Number Remapping, refer to “Join Number Remapping” on page 28.

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: The Crestron Viewport is available as a pull-down command from SIMPL Windows and VT Pro-e (**Tools | Viewport**) or as a standalone utility. The Viewport utility performs multiple system tasks, primarily via an RS-232 or TCP/IP connection between the control system and a PC. It is used to observe system processes, upload new operating systems and firmware, change system and network parameters, and communicate with network device consoles and touchpanels, among many other tasks. Viewport can also function as a terminal emulator for generic file transfer. All of these functions are accessed through the commands and options in the Viewport menus. 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-5000 touchpanel. However, before attempting to upload or upgrade, it is necessary to establish communications.

Communication Settings

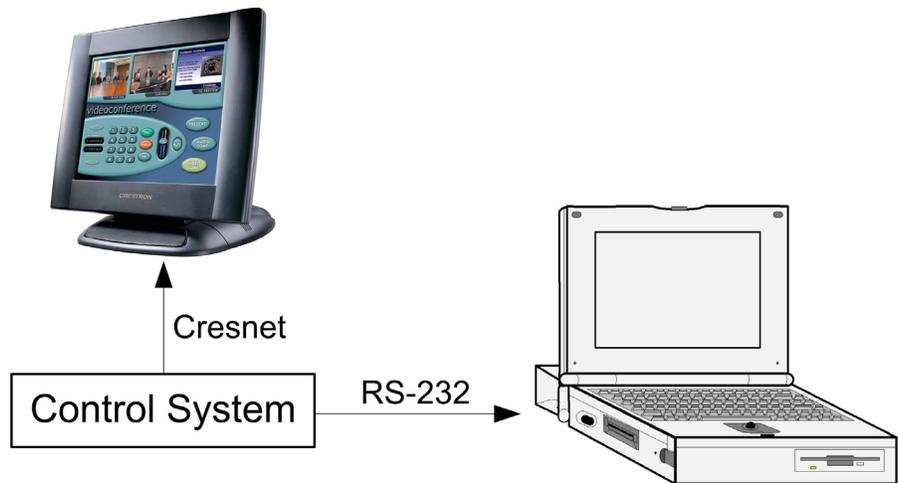
Connection of a PC to the TPS-5000 touchpanel can be direct via the RS-232 port on the touchpanel or through a control system (Cresnet). Both methods of connection provide setup for RS-232 communication.

NOTE: For laptops and other PCs without a built-in RS-232 port, Crestron recommends the use of PCMCIA cards, rather than USB-to-serial adapters. If a USB-to-serial adapter must be used, Crestron has tested the following devices with good results:

Belkin (large model) F5U103
I/O Gear GUC232A
Keyspan USA-19QW

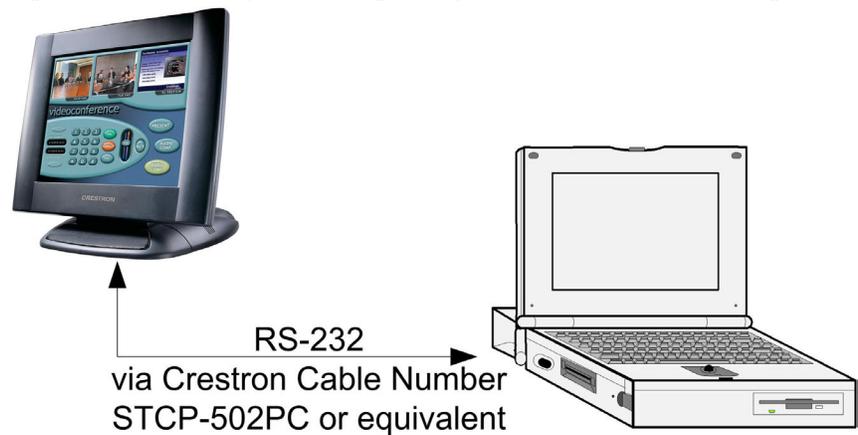
Other models, even from the same manufacturer, may not yield the same results.

To prepare the TPS-5000 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-5000 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 19 for RS-232 cable information.

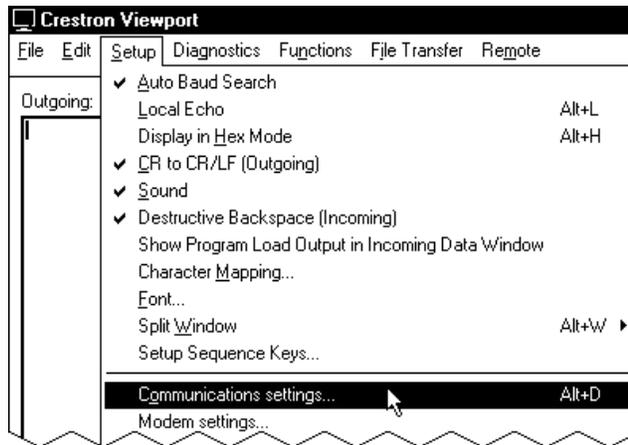
NOTE: Directly connecting to the touchpanel over RS-232 provides a faster transmission speed than Cresnet.

Typical Connection Diagram when Uploading a Project Directly to the Touchpanel

NOTE: For cable pinouts, refer to “RS-232” on page 19.

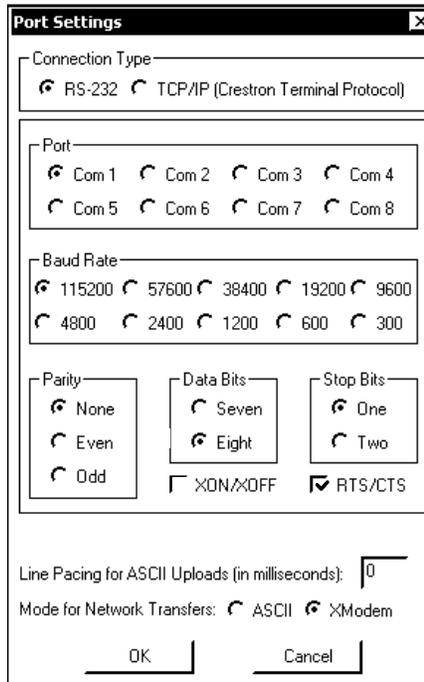
1. Open the Crestron Viewport.
Either launch the stand-alone version of Viewport, or start SIMPL Windows, and from the menu bar, select **Tools | Viewport**.
2. Refer to the following figure. From the Viewport menu, select **Setup | Communications settings** (alternatively, press **Alt+D**) to open the “Port Settings” window.

Setup | Communications Settings Command



3. 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: The parameters shown in the previous illustration are the port settings for a 2-Series control system. Consult the Operations Guide for the control system being used for exact parameter selection.

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.

- To verify communication, select **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.

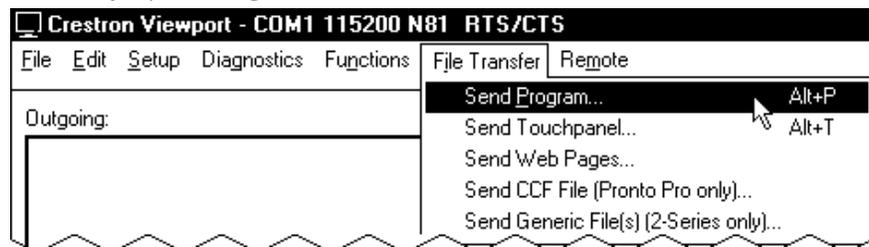
Upload via SIMPL Windows

- Start SIMPL Windows.
- Select **File | Open** to view the “Open” window, navigate to the SIMPL Window file (.smw), and click **Open**.
- Select **Project | Transfer Program**.

Upload via Crestron Viewport

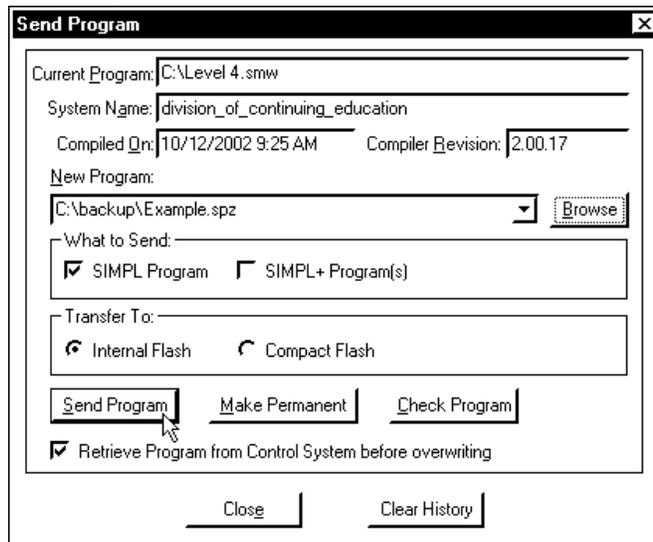
- Verify that the procedure for “Communication Settings” that begins on page 34 has been performed.
- As shown after this step, select **File Transfer | Send Program** (alternatively, press **Alt+P**) from the Viewport menu.

File Transfer | Send Program Command



- 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

- 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-5000 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.

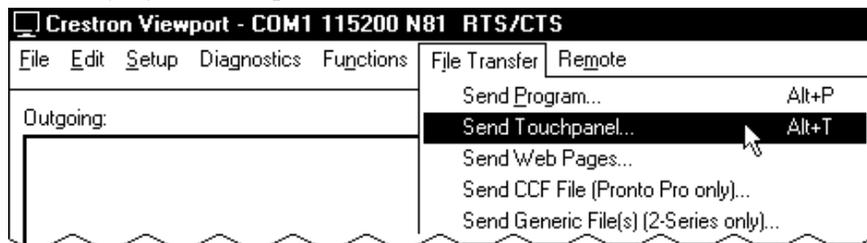
Upload via VT Pro-e

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

Upload via Crestron Viewport

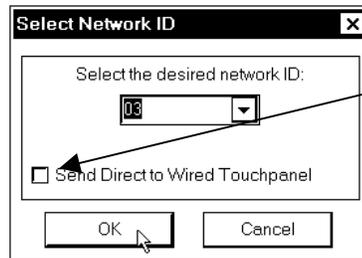
- Verify that the procedure for “Communication Settings” that begins on page 34 has been performed.
- As shown after this step, select **File Transfer | Send Touchpanel** (alternatively, press **Alt+T**) from the Viewport menu.

File Transfer | Send Touchpanel Command



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

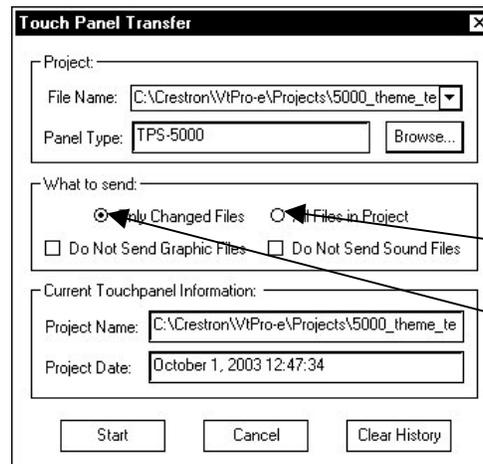
“Select Network ID” Window



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

NOTE: If problems occur 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



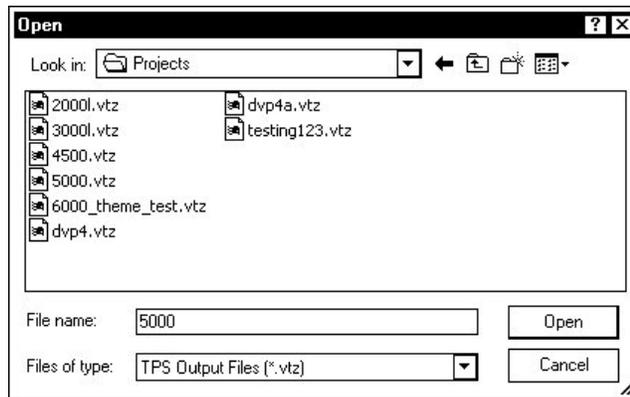
Each time a project is selected using the **Browse** command, that project is added to the **File Name** drop-down list. This makes it convenient to recall projects without need to browse to a directory. To delete the list click **Clear History**.

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.

- 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

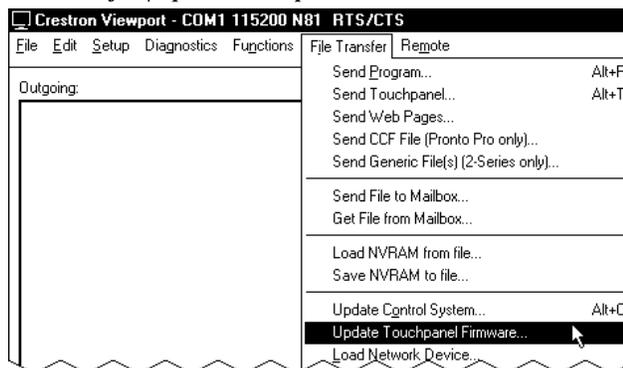
A firmware upgrade file has the extension .csf.

To take advantage of all the TPS-5000 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)

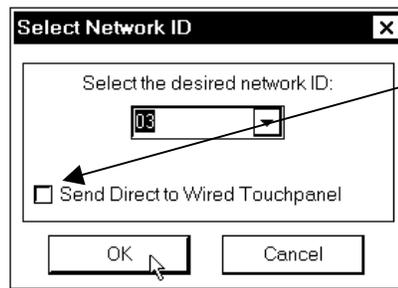
1. Make sure that “Communication Settings” that begins on page 34 has been performed.
2. As shown after this step, select **File Transfer | Update Touchpanel Firmware** from the Viewport menu.

File Transfer | Update Touchpanel Firmware Command



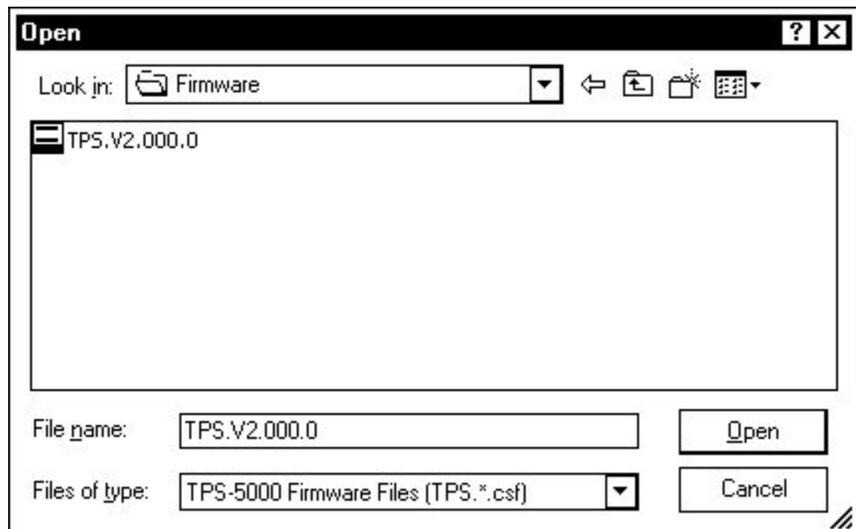
3. As shown after this step, select the Net ID of the TPS-5000 touchpanel and then click **OK**. The “Open” window appears (refer to the subsequent graphic).

“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-5000 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.
Touchpanel does not communicate with RS-232 devices.	TPS-XTXRF is installed and enabled.	Disable RF Power in the Interface Menu.
	Incorrect RS-232 settings.	Match communication settings of touchpanel to peripheral device.

Further Inquiries

If, after reviewing this Operations and Installation Guide, you cannot locate specific information or have questions, please take advantage of Crestron's award winning customer service team in your area. Dial one of the following numbers.

- In the US and Canada, call Crestron's corporate headquarters at 1-888-CRESTRON [1-888-273-7876].
- In Europe, call Crestron International at +32-15-50-99-50.
- In Asia, call Crestron Asia at +852-2341-2016.
- In Latin America, call Crestron Latin America at +5255-5093-2160.
- In Australia and New Zealand, call Crestron Pacific at +613-9480-2999.

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

Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the TPS-5000, 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 relevance. 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-5000 touchpanels support panel operation via a host computer through the RS-232 port. While in this mode, the touchpanel can be used as a stand-alone controller to a host computer running a third party or custom program. 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
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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

The screenshot shows the 'RS-232 MENU' interface. It contains several sections for configuration:

- BAUDRATE:** A grid of buttons for 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200.
- DATA BITS:** Buttons for 7 and 8.
- PARITY:** Buttons for None, Odd, and Even.
- STOP BITS:** Buttons for 1 and 2.
- RS-232 Port Selection:** A vertical stack of buttons: 'RS-232 Port for Console', 'RS-232 Port for Control', 'RS-232 Port for Touch Output', 'RS-232 Port for Mouse Input', and 'RS-232 Port for Ext. Touch Input'. An arrow points to the 'RS-232 Port for Control' button with the text 'To enable this capability, select this button'.
- RTS-CTS:** Buttons for 'On' and 'Off'.
- XON-XOFF:** Buttons for 'On' and 'Off'.
- Save and Return:** A button at the bottom right.

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-5000 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: Configuring the RS-232 Port for Use

To configure the RS-232 port of the TPS-5000, 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 VT Pro-e software.

Obtaining Communications

Refer to “Communication Settings” on page 34 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 44. For details.
- **TOUCHOUT** – touchscreen output sent to RS-232 port. Use for PC mouse control or Telestrator output. Directly connect computer or Telestrator box to RS-232 port on TPS-5000 (i.e., touch screen output). For example, use when an RGB window with tablet overlay on the TPS panel acts as a mouse controller for a PC. In this case, use the latest version of the Crestron Serial Mouse Control Driver, 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 serial mouse input. For use with a Microsoft® Compatible Serial Mouse as a pointing device on the TPS-5000. 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).
- **RF** – RS-232 port exclusively used for RF communications with a Crestron TPS-RFGWX 2-Way RF Transceiver/Wireless Gateway. Requires installation of the TPS-XTXRF Two-Way RF Transceiver Module.

NOTE: When using the RF mode, the RS-232 port is used by the TPS-XTXRF. Viewport communications over RS-232 are disabled. For more information on configuring a touchpanel with an RF interface, refer to the latest revision of the TPS-XTXRF Two-Way RF Transceiver Module Operations and Installation Guide (Doc. 5844).

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-5000 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-5000 responds with the following:

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

5. Enter the following command:

```
reboot
```

6. The TPS-5000 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-5000 are no longer communicating. Assuming that the touchpanel is properly connected for use (as shown in the diagram for “Communication Settings” on page 34) 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-5000 and select **Functions | Put Touch Panel into Setup Mode**. Enter the Net ID and click **OK**.

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