Crestron Isys® **TPS-2000L**
5 Inch Lectern/Wall Mounted Touchpanel
Operations Guide

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Contents

5 Inch Lectern/Wall Mount Touchpanel: TPS-2000L

Introduction

Features and Functions

The TPS-2000L, compact video touchpanel, is a 5-inch (12.7-cm) active matrix color display panel with 320 x 234 resolution and 16-bit non-palette graphics. The purpose of this unit is to provide a single, compact touchpanel that ends the age of walls cluttered with switches, control panels, thermostats, etc. These wall-mounted panels can be fully customized for any control environment – graphic icons and 10 programmable "quick" pushbuttons let users easily select and control any function. The table after this paragraph provides a functional summary of the TPS-2000L.

TPS-2000L Functional Summary

- 5" (12.7 cm) active color matrix display
- 320 x 234 screen resolution
- 16 Bit non-palette graphics
- 2 Mb of Flash & 8 Mb of DRAM memory
- Built-in time-based correction for stable video & graphics
- Balanced/unbalanced composite video input; supports NTSC/PAL formats
- Full screen video capability
- Up to 4,000 digital and analog signals; up to 999 serial signals
- Built-in microphone & two speakers (half duplex intercom capable)
- Stores WAV sound files
- Automatic light sensor
- Capable of inverting image
- Ten pushbuttons that can be programmed for quick access to regularly used functions*

* Custom engraved keys can be ordered separately by using the Crestron Engraver Software. Version 2.0.0.9 or later is available from the Downloads | Software Updates section of the Crestron website (www.crestron.com).

The touchpanel is capable of replacing large, complicated panels with a series of simpler screens; each can monitor and control a specific function. The panel features balanced and unbalanced composite video input supporting both NTSC/PAL

formats. The unit has a single video input and can display multiple windows when using a third party display splitter. A light sensor brightens or dims automatically with changing room light conditions for easy viewing. The result is an outstanding picture ideal for watching TV, previewing DVDs or checking security cameras. An optional water-resistant cover provides protection around damp rooms such as the pool or spa.

The exclusive "virtual pan and zoom" feature in these new Isys® panels is useful and fun to use. Crestron implemented advanced digital video processor circuitry so that a touch of the screen with a finger can allow panning across the video picture and zooming in for the best view – even with standard security cameras.

The audio capabilities of these new Isys wall-mounted touchpanels allow for WAV sound file storage and playback delivering instantaneous audio feedback, from sound effects to the sound of one's own voice. A microphone, amplifier and speakers allow talking with guests, as they are viewed on the security cameras, and adjustments for volume, bass and treble provide for clear audio.

Specifications

The table below and on the next page provides a summary of specifications for the TPS-2000L touchpanel.

Specifications for TPS-2000L Touchpanel

SPECIFICATION	DETAILS
Power Requirements	13 Watts (0.54 Amp @ 24 VDC)
Default NET ID	03
Timeout	Adjustable from 0 to 120 minutes (Default = 10 min.)
Signal Join Maximums	4000 Digital and Analog, 999 Serial
Control System Update Files[1,2,3]	
2-Series Control System	Version C2-1008.CUZ or later
CEN/CN-TVAV	Version 5.12.63V.UPZ or later
CNMSX-AV/PRO	Version 5.12.63X.UPZ or later
CNRACKX/-DP	Version 5.12.63W.UPZ or later
ST-CP	Version 4.01.04S.UPZ or later
Acceptable File Extensions[4]	
SIMPL Windows	
.smw	*projectname*.smw (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+)
VT Pro-e	
.vtp	*projectname*.vtp (source file)
.vtz	*projectname*.vtz (compiled file)
Firmware	
.csf	TPS-2000.v.xxxxxx.csf (panel firmware)

(continued on next page)

Specifications for the TPS-2000L Touchpanel (Continued)

SPECIFICATION	DETAILS
Video	• Balanced (CAT5) video (via CNX-PVID or CNX-RMCLV device) or unbalanced composite video input through 8-position mini connector (1 V_{pp}). • Built-in time base correction for stable video and graphics • Video can be displayed full screen or in a window • NTSC and PAL supported • Adjustments for brightness, contrast, hue and saturation available
Audio	• Balanced (2.0 V_{RMS}) and unbalanced (1.0 V_{RMS}) line level microphone with AGC output (3x sensitivity) via 8-position mini connector. • Balanced (4.0 V_{RMS}) (via CNX-BIPAD or CNX-RMCLV device) & unbalanced (2.0 V_{RMS}) line level mono input through 8-position mini connector. • Speaker amplification: 2 Watts per channel • WAV Audio Capacity > 3 minutes[5]
Memory	2MB internal flash memory (1.5MB for user display lists), 8MB of DRAM
Screen Dimensions	5"/12.7 cm diagonal (2.9 in/7.5 cm High x 4.0 in/10.1 cm Wide)
Screen Viewing Angles[6]:	Y Dir. (X=0°): +40° (from top), -65° (from bottom) X Dir. (Y=0°): +65° (from right), -65° (from left)
Screen Resolution	320 x 234 pixels
Color	16 Bit non-palette graphics, 65,536 colors
Display Type	Touch-sensitive active matrix color LCD
Enclosure	Plastic enclosure with injection-molded plastic faceplate and keys in white.
CPU	63MIPs Coldfire processor running Isys generation firmware
Cresnet	Via 4-position mini-Cresnet connector
Operating Temperature and Humidity	41° to 113° F (5° to 45° C), 10 to 90% Relative Humidity (non-condensing)
Dimensions and Weight (with faceplate)	Height: 4.77 in (12.10cm) Width: 6.73 in (17.10 cm) Depth: 3.43 in (8.71 cm) Weight: 1.41 lb (0.64 kg)
Programmable Pushbuttons	10 with fixed join numbers. Join numbers are 1 to 5 (top to bottom) on the left side and 6 to 10 (top to bottom) on the right side, regardless of screen orientation. Custom engraved buttons can be ordered separately from Crestron.

1. 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.

2. Crestron 2-Series control systems include the AV2, CP2, CP2E, MP2, MP2E, PAC2, PRO2, and RACK2.
3. 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).
4. Extension requires a prefix specific to the touchpanel type. In DETAILS, *projectname* represents the assigned project name, and xxxxxx represents a version number.
5. The exact audio capacity is influenced by the complexity of the control screens and the sampling of the WAV files.
6. Images displayed on the touchpanel can be inverted. Best video viewing is seen from the top when the orientation of the screen setting is set to **Upright**. Use the setup menus to assign screen orientation. Refer to Screen Settings on page 10 for details.

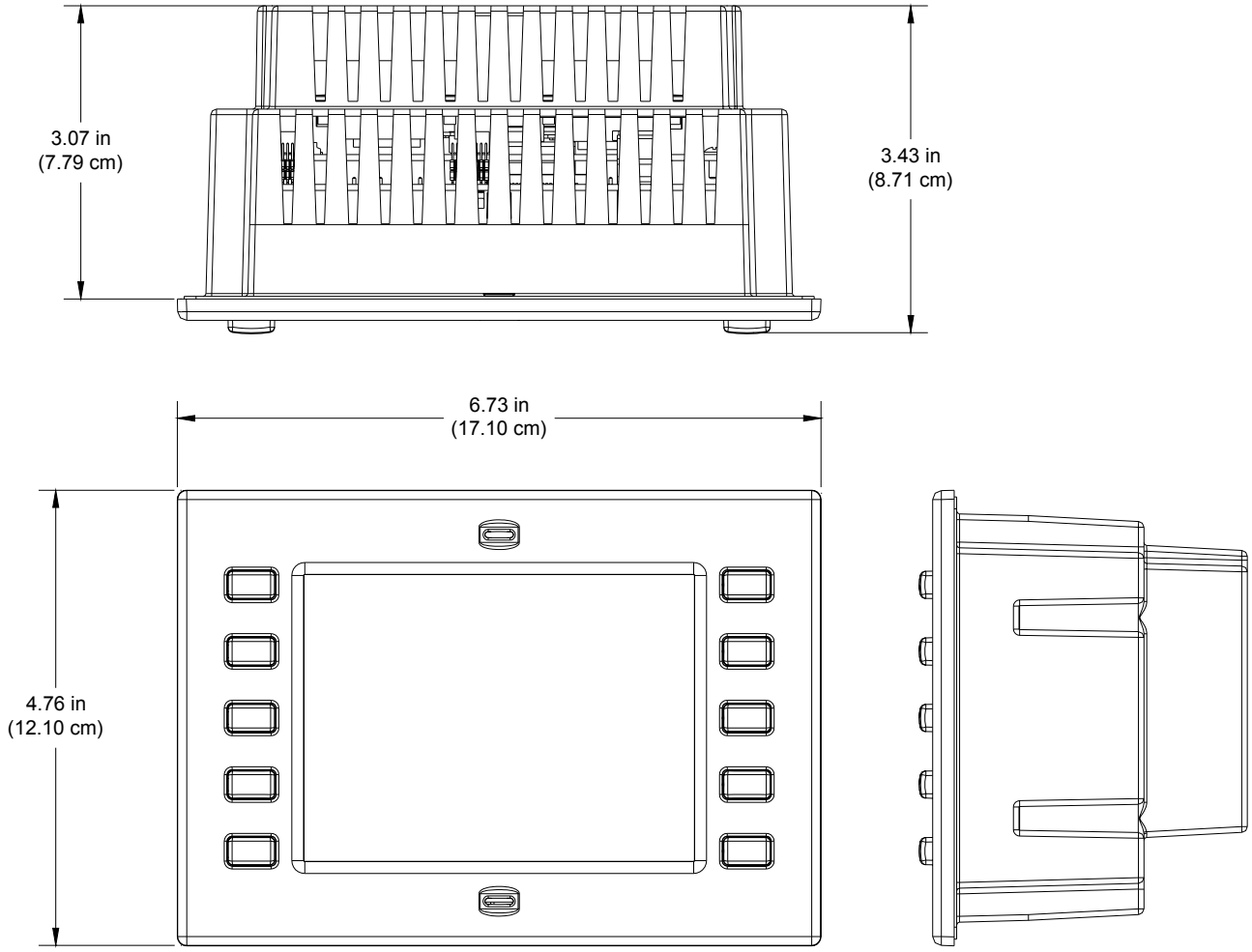
NOTE: Crestron software and any files on the website are for Authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

Physical Description

The 5.0 inch (12.7 cm) touch sensitive viewing screen is located on the front of the TPS-2000L touchpanel. The electronic hardware is housed in a high impact, molded plastic enclosure, shown after this paragraph. A 4-pin network port and 8-pin audio/video port are located at the rear of the unit. The speakers are also located on the back of the unit to project sound from the stored WAV audio files or an external audio source (line level).

TPS-2000L Shown with Optional Gold Faceplate

Physical Views of TPS-2000L Touchpanel



The TPS-2000L touchpanel has 10 engraveable hard buttons (real buttons, not simulated buttons on the touchpanel membrane), that allow easy access to the most common functions such as lights, volume, drapes, and screen controls with the added benefits of touchpanel flexibility incorporated right into one panel. Refer to ""Quick" Pushbuttons" on page 26 for programming information. Custom engraved keys can be ordered separately by using the Crestron Engraver Software. Version 2.0.0.9 or later is available from the Downloads | Software Updates section of the Crestron website (www.crestron.com). A photosensor on the front panel permits the exclusive light-sensing display to switch from daytime super bright to evening soft glow. The front panel also has an LED that serves as a beacon for the touchpanel when the screen is in standby mode and the room is dark.

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

Setup

Network Wiring

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

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

Resistance Equation

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

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

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

Wire Gauge Values

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

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

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

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

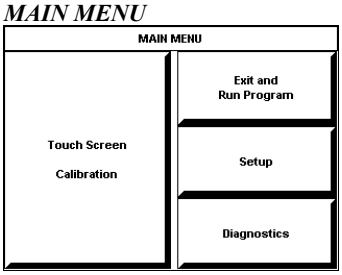
Identity Code

Every equipment and user interface within the network requires a unique Cresnet identity code (Cresnet ID). These codes are recognized by a two-digit hexadecimal number from 03 to FE. Refer to "Interface Menu" on page 8 for instructions on setting the unit's Cresnet ID. The Cresnet ID of the unit must match the NET ID specified in the SIMPL Windows program. Refer to "Setting the Net ID in Device Settings" on page 18 for information about changing the ID in a SIMPL Windows program.

Configuring the Touchpanel

NOTE: The only connection required to configure the touchpanel is power. Refer to "Hardware Hookup" on page 12 for details.

MAIN MENU



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

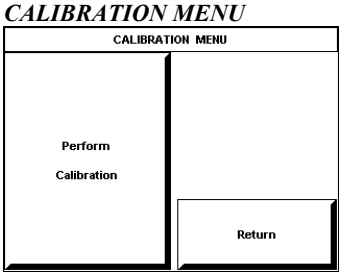
To configure the unit, it may be necessary to access a series of setup screens prior to viewing run-time screens that are loaded into the touchpanel for normal operation. The MAIN MENU for configuring the touchpanel appears when a finger is held to the touchscreen as power is applied. Remove your finger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

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.

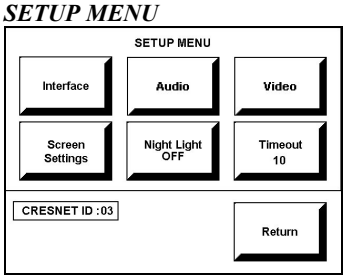
If you proceed to calibrate the touchpanel, the screen displays the message "Touch Lower Right" centered on the panel with a cross hair in the lower right corner. Touch the cross hair in the corner of the screen to initiate calibration. Another message, "Touch Lower Left", appears with a cross hair in the correct corner. Touch the corner of the screen. A final message, "Touch Upper Left", appears with a cross hair in the correct corner. Touch the corner of the screen to conclude calibration and return to the MAIN MENU.

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

calibration error by touching the screen in an area that is opposite from the instructed area.

Setup Menu

SETUP MENU



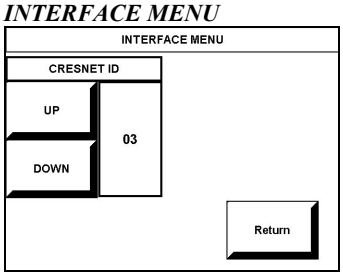
To obtain the SETUP MENU, shown to the left, press the **Setup** button from the MAIN MENU. The SETUP MENU offers a series of buttons, which opens additional menus and displays, which are detailed in subsequent paragraphs. After setup parameters have been set, select the **Return** button to return to the MAIN MENU.

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

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

Interface Menu

INTERFACE MENU



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

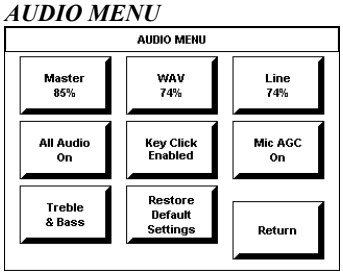
The Cresnet network identity number (CRESNET ID) is displayed on the INTERFACE MENU. CRESNET ID is the two-digit hexadecimal number. The hexadecimal number can range from 03 to FE and must correspond to the NET ID set in the SIMPL Windows program of the Cresnet system. Matching IDs between touchpanel and SIMPL Windows program is required if data is to be successfully transferred. NET ID for the TPS-2000L is factory set to 03.

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

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

Audio Menu

AUDIO MENU



Audio is a useful feedback tool and it can be used to enhance a custom interface. To obtain the AUDIO MENU, shown to the left, press the **Audio** button from the SETUP MENU. The AUDIO MENU offers a series of buttons, which opens additional screens and each is detailed in a table after this paragraph. Two of the buttons on the AUDIO MENU perform a function directly. The **Restore Default Settings** button returns all audio parameters to their default settings when the button is selected. After audio parameters have been set, select the **Return** button to return to the SETUP MENU.

Audio Setup Details

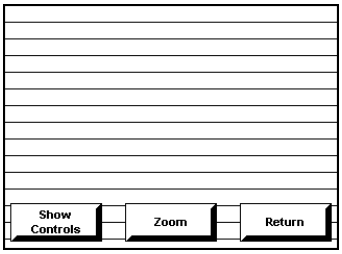
AUDIO MENU BUTTON*	AUDIO SETUP SCREEN	DESCRIPTION**
Master 85%	Master Volume	The volume of all audio types (WAV, line, and key click) is rectified by Master Volume. If Master Volume is set to 100%, the volume value for a given audio type is its full value. If Master Volume is set to 0%, the volume of all audio types is overridden and the touchpanel is silent. If Master Volume is a percentage (say 50%), then all audio types can achieve only half their value.
WAV 74% (On)	WAV	Enable WAV files with the **WAV On** button. The **WAV Off** button disables this feature. Adjust volume with the **UP** and **DOWN** buttons. Select the **Play WAV File** to sample and adjust the volume as a pre-loaded WAV file plays.
Line 74% (On)	Line	Enable line level audio with the **Line On** button. The **Line Off** button disables this feature. Adjust volume with the **UP** and **DOWN** buttons.
All Audio On	All Audio Control	It is possible to disable all audio types with the press of single button. Select the **All Audio On** button to enable audio; select the **All Audio Off** button to activate global muting.
Key Click Enabled (Vol. 29%)	Key Click	Enable the key click with the **Click On** button. The **Click Off** button disables this feature. Adjust volume with the **UP** and **DOWN** buttons.
Mic AGC On	AGC	The built-in microphone AGC (Automatic Gain Control) mode can be controlled with two buttons: **Mic Audio AGC On** and **Mic Audio AGC Off**.
Treble & Bass (53%)	Treble & Bass	Two **UP** and two **DOWN** buttons allow the treble and bass to be adjusted independently.

* The button text shown in this column demonstrates the default audio setting for the given button. The items in parenthesis are also default values, but are seen in subsequent screens.

** Each screen has its own **Return** button to revert back to the AUDIO MENU. Selected buttons are shown in red text on the touchpanel.

Video

Video Screen



The TPS-2000L can display balanced and unbalanced composite video input supporting both NTSC/PAL formats. Select the **Video** button from the SETUP MENU to display the video screen, shown to the left. The panel has built-in time-based correction so video and graphics are always stable. The size of the video window depends on the settings made using VT Pro-e. Use the **Zoom** button (or its associated reserved join number, 17123) to zoom in on a region of video (2:1). The initial zoom is centered on the image (shown as horizontal lines in the illustration). Touch and drag a finger on the screen to pan to a desired area of the image. Selection of the **Return** button (or its associated reserved join number, 17124) in the lower right corner of the zoomed image returns the display to a 1:1 image. There is a digital reserved join number (17125) that permits a toggle function for zoom.

The **Show Controls** button on the video screen offers another screen with a series of buttons, each is detailed in a table after this paragraph. After video parameters have been set, select the **Return** button to return to the SETUP MENU.

Video Setup Details

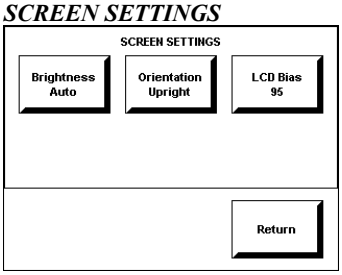
VIDEO SCREEN BUTTONS	DESCRIPTION*
Brightness	This button allows for an increase (**UP** button) and decrease (**DOWN** button) in the video image brightness.
Contrast	This button allows for an increase (**UP** button) and decrease (**DOWN** button) in the video image contrast.
Saturation	This button allows for an increase (**UP** button) and decrease (**DOWN** button) in the video image saturation.
Hue	This button allows for an increase (**UP** button) and decrease (**DOWN** button) in the video image hue.
Hide Controls	This button returns the display to the video screen.
Default	Touchpanel responds with a prompt, "ARE YOU SURE?" Select **YES!** to reset video parameters to their defaults**. Select **NO!** to return to the previous screen.
Return	This button reverts back to the SETUP MENU.

* Each screen has its own **Return** button to revert back to the SETUP MENU.

** Video default is 50% for each of the video parameters (brightness, contrast, saturation, and hue).

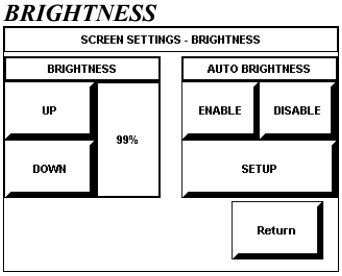
Screen Settings

SCREEN SETTINGS



Screen brightness, orientation, and quality may need to be adjusted because of ambient light conditions or personal preference. These screen attributes may be automatically set via programming or be altered manually by selects made from the SCREEN SETTINGS display, shown to the left. Press the **Screen Settings** button from the SETUP MENU to access this screen. To return to the SETUP MENU and save screen settings, select the **Return** button on the SCREEN SETTINGS display. Screen settings are factory set to **Brightness Auto**, **Orientation Upright**, and **LCD Bias 95**. Alterations to brightness, orientation, and LCD bias are performed on subsequent screens after selecting the appropriate button.

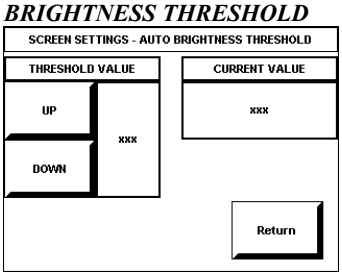
SCREEN SETTINGS - BRIGHTNESS



BRIGHTNESS

Press the **Brightness** button to open the SCREEN SETTINGS – BRIGHTNESS display. Manual controls are located on the left side and automatic controls are located on the right side. Two buttons, **ENABLE** and **DISABLE**, are used to determine whether the touchpanel brightness is controlled manually or automatically via thresholds. Select the **ENABLE** button for automatic settings. Notice that a 'net' covers the manual controls on the left. The **DISABLE** button removes the 'net' to permit manual advancements (use the **UP** button) and reductions (use the DOWN button) to the screen brightness.

SCREEN SETTINGS – AUTO BRIGHTNESS THRESHOLD

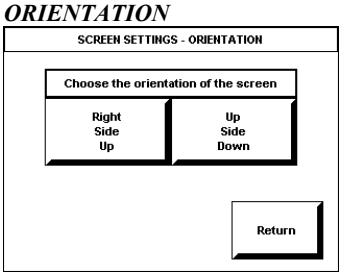


Choose the **SETUP** button on the SCREEN SETTINGS – BRIGHTNESS display to open the SCREEN SETTINGS – AUTO BRIGHTNESS THRESHOLD display, shown to the left. A photosensor on the front panel permits this exclusive light-sensing touchpanel to automatically determine if the amount of light sensed exceeds a set threshold value. This threshold value allows the touchpanel to switch between daytime super bright (high brightness) and evening soft glow (low brightness) automatically. The right side of this display shows the CURRENT VALUE as detected by the photosensor. This value, represented by xxx in the illustration, can range from 0% (dark) to 100% (very bright). The THRESHOLD VALUE located on the left side of the display needs to be set to automatically adjust brightness. The numerical value, represented by xxx in the illustration, can range from 0% (dark) to 100% (very bright). Use the **UP** and **DOWN** buttons to increase and decrease the THRESHOLD VALUE, respectively.

If the CURRENT VALUE has exceeded the THRESHOLD VALUE, the screen switches to high brightness. When the CURRENT VALUE is less than the THRESHOLD VALUE, the screen switches to low brightness.

ORIENTATION

SCREEN SETTINGS - ORIENTATION



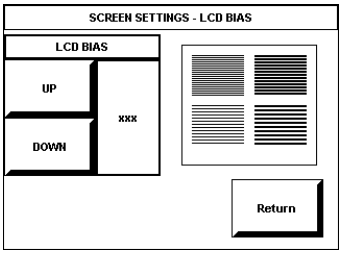
There is no 'top' or 'bottom' when installing the TPS-2000L. Press the **Orientation** button to open the SCREEN SETTINGS – ORIENTATION display, shown to the left. This setup feature allows the orientation of the display to be rotated 180° with the press of a button. Therefore, if the touchpanel was inadvertently installed upside down, the display can be rotated without removing the unit from the mounting surface. However, keep in mind that the best viewing angle is seen from the top when the orientation of the screen is set to **Upright**.

Two buttons, **Right Side Up** and **Up Side Down**, are used to set the orientation of the screen. The selected button appears in red text. By definition, the **Right Side Up** button displays the screen with connectors at the bottom of the touchpanel and as a result, the term **Orientation Upright** appears on the SCREEN SETTINGS display's center button. The **Up Side Down** button displays the screen with connectors at the top of the touchpanel and the term **Orientation Inverted** appears on the SCREEN SETTINGS display's center button. Use the **Return** button to get back to the SCREEN SETTINGS display.

NOTE: Whether the touchpanel screen orientation is set to **Upright** or **Inverted** the sequence of digital join numbers (1 through 5 on the left side and 6 through 10 on the right side) is consistent.

LCD BIAS

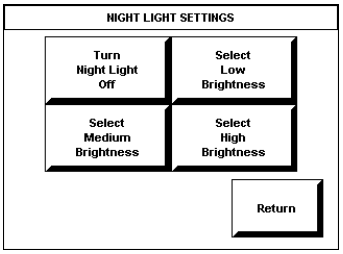
SCREEN SETTINGS – LCD BIAS



The quality of the image displayed on the touchpanel can be adjusted from the SCREEN SETTINGS - LCD BIAS display, which appears after selecting the **LCD Bias** button from the SCREEN SETTINGS display. To adjust the quality, examine the box containing horizontal lines on the SCREEN SETTINGS - LCD BIAS display. If the lines in the box flicker, use the **UP** and **DOWN** buttons to eliminate the flicker. If the lines appear without flicker, no adjustments are necessary. Adjustments can range between 1 and 255. Typically, the quality of the image is best when the LCD bias is set between 90 and 110 (default is 105). Use the **Return** button to get back to the SCREEN SETTINGS display.

Night Light Settings

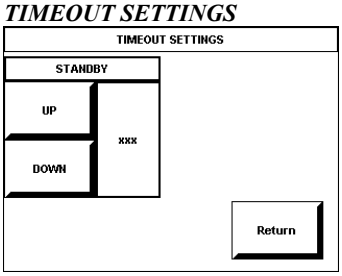
NIGHT LIGHT SETTINGS



An LED on the front panel (same end as the two connectors) serves as a beacon for the touchpanel. When activated, it allows a user to find the touchpanel in standby mode in a completely dark room. Press the **Night Light** button on the SETUP MENU to open the NIGHT LIGHT SETTINGS display, shown to the left. Four buttons, **Turn Night Light Off**, **Select Low Brightness**, **Select Medium Brightness**, and **Select High Brightness**, are used to determine whether the night light is off or on with some preset brightness. The selected button appears in red text with slightly altered wording. To return to the SETUP MENU and save the night light setting, select the **Return** button. Notice that the state of the night light setting is shown on the **Night Light** button on the SETUP MENU.

Timeout Menu

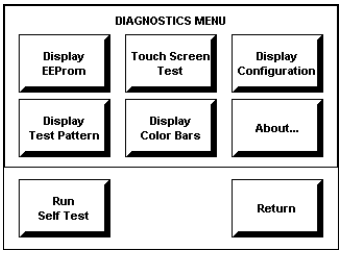
TIMEOUT SETTINGS



The touchpanel display can be turned off (standby mode) when not in active use. Select the **Timeout** button on the SETUP MENU to reveal the TIMEOUT SETTINGS display, shown to the left. This setting turns the display off when the touchpanel is inactive for a specified time. Touch the screen to awaken the touchpanel and the last screen to be displayed reappears. The time value, represented by xxx in the illustration, can range from 0 (disables the timeout) to 120 (minutes). Two buttons, **UP** and **DOWN**, increase and decrease the timeout, respectively. Select the **Return** button to save the timeout setting and return to the SETUP MENU.

Diagnostics Menu

DIAGNOSTICS MENU



The **Diagnostics** button from the MAIN MENU 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: The "About…" button will display a screen indicating the current version of firmware residing on the touchpanel.

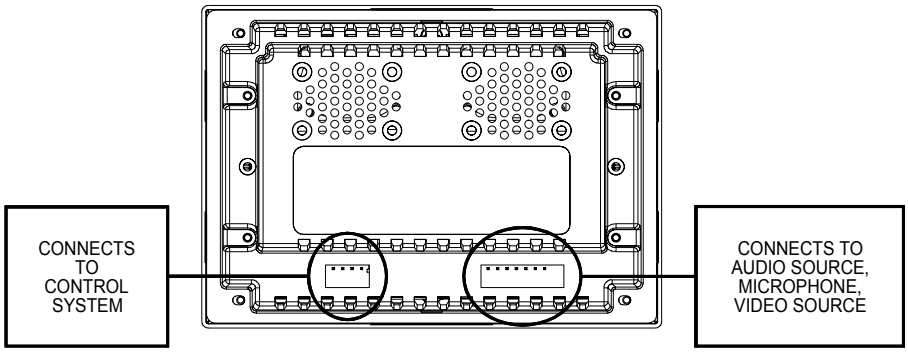
Hardware Hookup

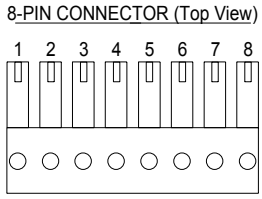
CAUTION: Do not remove the tape that covers the photosensor. Doing so can short the board and damage the touchpanel.

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

Make the necessary connections as called out in the illustration that follows this paragraph. Refer to "Network Wiring" on page 6 before attaching the 4-pin connector. Apply power last.

Hardware Connections for the TPS-2000L (Back of the Unit is Shown)





The 8-pin connector on the unit provides balanced/unbalanced audio and video (supporting both NTSC/PAL formats). Refer to the pinout after this paragraph for details. The left most columns provide a signal name for each pin. For a balanced audio/video system refer to the **BALANCED AUDIO & VIDEO** column centered in the table. Balanced video format is typically used when distributing video via CAT 5 (i.e., from a Crestron CNX-PVID8x3 or 8x4). To obtain unbalanced audio or video, attach jumpers to designated pins and make connections as described in the three right-most columns. Unbalanced video format is typically used when distributing video via coaxial cable. Mixed systems (i.e., balanced audio with unbalanced video and unbalanced audio with balanced video) are permitted; only make those connections that are necessary.

NOTE: Distribution of balanced video should not exceed 500 feet (152.4 meters) and the distribution for unbalanced video should not exceed 100 feet (30.5 meters). For distances greater than these specified lengths use a distribution amplifier.

Pinout Connections for the TPS-2000L

PIN	SIGNAL NAME	BALANCED AUDIO & VIDEO	UNBALANCED AUDIO IN*	UNBALANCED AUDIO OUT	UNBALANCED VIDEO**
1	Audio In +	Audio In +	Audio In +		
2	Audio In -	Audio In -	Audio Ground		
3	Ground/ Shield	N/C	Audio Ground		
4	Mic Out +	Mic Out +		Mic Out +	
5	Mic Out -	Mic Out -		N/C	
6	Ground/ Shield	N/C		Mic Ground	Video Ground
7	Video In +	Video In +			Video In +
8	Video In -	Video In -			Video Ground

where N/C = No Connection

* Jumper pins 2 & 3

** Jumper pins 6 & 8

NOTE: Balanced sources can be received from CNX-PVID (video), CNX-BIPAD (audio), or CNXRMCLV (audio and video) devices.

Mounting Options

The TPS-2000L touchpanel installs simply and cleanly into existing or newly constructed walls, with an assortment of pre- and post-construction mounting options. All mounting options are provided separately from the actual touchpanel. Refer to the table after this paragraph for a complete list of mounting options and respective Installation Guides for the TPS-2000L.

NOTE: Observe the procedure in the respective Installation Guide and mount the touchpanel to a surface with one of the many mounting options. A cutout measuring $6\ ^{3}/_{8}$" (16.159 cm) wide by $4\ ^{7}/_{16}$" (11.283 cm) high can safely be made into the mounting surface for all applications. Depending on which mounting option is chosen, some trimming of the cutout may need to be done during installation. For exact cutout measurements, consult the latest revision of the applicable Installation Guides listed in the following table.

Mounting Options for the TPS-2000L

PRE-CONSTRUCTION* OPTION	POST-CONSTRUCTION** OPTION	MODEL NUMBER	DOCUMENT NUMBER
Back Box Kit	-	BB-2000L	5973
Pre-Construction Mount Kit	-	PMK-2000L	6018
Mud Mount Kit (accessory)	-	MMK-2000L	6025
Trim Mount Kit (accessory)	-	TMK-2000L	6026
-	Wall Mount Kit - Mud	WMKM-2000L	6025
-	Wall Mount Kit - Trim	WMKT-2000L	6026
-	Water Resistant Cover	TPS-WPK	5993

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

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

If the BB-2000L or PMK-2000L are to be used and a touchpanel is not available, the installer can either leave the hole in the mounting surface open (if permitted by local building codes) or attach the cover plate supplied with the mounting kit.

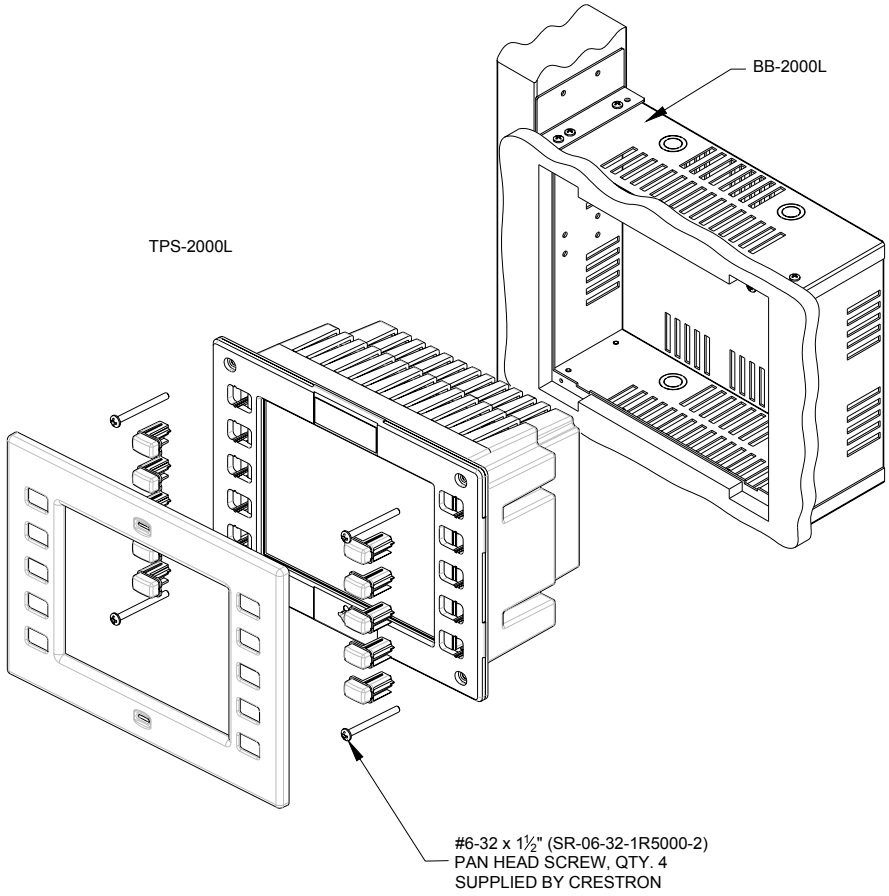
Touchpanel Mounting

Required Tools

- ❑ #1 Phillips tip screwdriver

1. If the cover plate is attached, use a #1 Phillips screwdriver to loosen and remove the four screws and plate.
2. Connect all required cables to the touchpanel.
3. Insert the touchpanel (without its faceplate) into the mounting option and align the four screw holes.
4. Insert and tighten the four supplied screws (finger tight and then using a #1 Phillips screwdriver, tighten an additional 1/8-turn).
5. Insert the ten buttons. If the buttons are engraved, verify that the placement of the each button matches the programming.
6. Cover the mounted unit with the faceplate. Refer to the illustration after this paragraph for guidance.

Exploded View for Mounting the TPS-2000L in the Optional BB-2000L Back Box



The stylish, elegant design accommodates painting and custom laser engraving of its faceplate and keys. There are even plastic faceplates that accept metal and non-metal inlays for that custom contemporary appearance. Call a Crestron customer support representative for the specific details.

Optional custom engraved keys can be ordered separately by using the Crestron Engraver Software. Version 2.0.0.9 or later is available from the Downloads | Software Updates section of the Crestron website (www.crestron.com).

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

Touchpanel Removal

If it is necessary to remove the touchpanel after it has been installed into a mounting surface, complete the following steps in the order provided to remove the touchpanel. The only tool required is a #1 Phillips tip screwdriver.

1. Lift the plastic cover off the touchpanel.
2. Remove the plastic buttons from the touchpanel. If buttons are engraved, be sure to record button engraving with button location so that the buttons can be properly returned.

3. Loosen and remove four screws that secure touchpanel to mounting option.
4. Using equal pressure, carefully remove the touchpanel from the opening.
5. If necessary, secure attached cables before disconnecting them from the back of the touchpanel.

Recommended Cleaning

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

Programming Software

Have a comment about Crestron software?

Direct software related suggestions and/or complaints to Crestron via email (software@crestron.com). Do not forward any queries to this address. Instead refer to "Further Inquiries" on page 38 for assistance.

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

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

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

The following are recommended software version requirements for the PC:

- Application Builder version 1.1.6 or later with Application Builder Templates version 2.12 or later. Requires SIMPL Windows.
- SIMPL Windows version 2.02.11 or later with library update file 143. Requires SIMPL+ Cross Compiler version 1.1.
- Crestron Database version 15.8.6 or later. Required by SIMPL Windows.

- VisionTools Pro-e version 2.4 or later. Used for graphical touchscreen design.
- Crestron Engraver 2.0.0.9 or later.

NOTE: The TPS-2000L touchpanel is supplied with 10 blank pushbuttons. Optional custom engraved keys can be ordered separately by using the Crestron Engraver Software. Version 2.0.0.9 or later is available from the Downloads | Software Updates section of the Crestron website (www.crestron.com).

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 from a button press and release (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

Easiest method of programming that by itself does not offer the greatest amount of flexibility.

The 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. The Crestron AppBuilder then programs the system, including all touchpanel projects and control system logic.

The Crestron AppBuilder is fully integrated with Crestron's suite of software development tools, including SIMPL Windows, VT Pro-e, Crestron Database, User IR Database, and User Modules Directory. The 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.

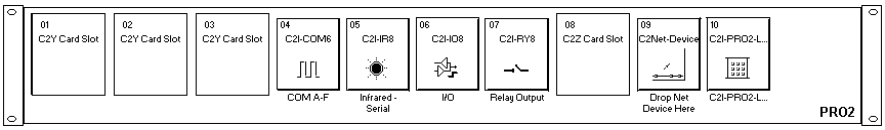
NOTE: In the following description, the PRO2 control system is used.

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-2000L touchpanel.

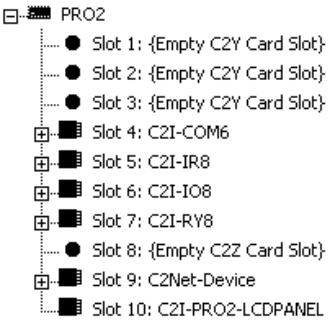
Configuration Manager is where programmers “build” a Crestron control system by selecting hardware from the *Device Library*. In Configuration Manager, drag the PRO2 from the Control Systems folder of the *Device Library* and drop it in the upper pane of the *System Views*. The PRO2 with its associated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

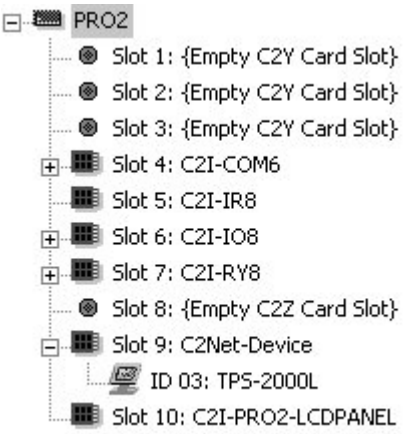


C2Net-Device Slot in Configuration Manager

To incorporate the TPS-2000L touchpanel into the system, drag the TPS-2000 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.

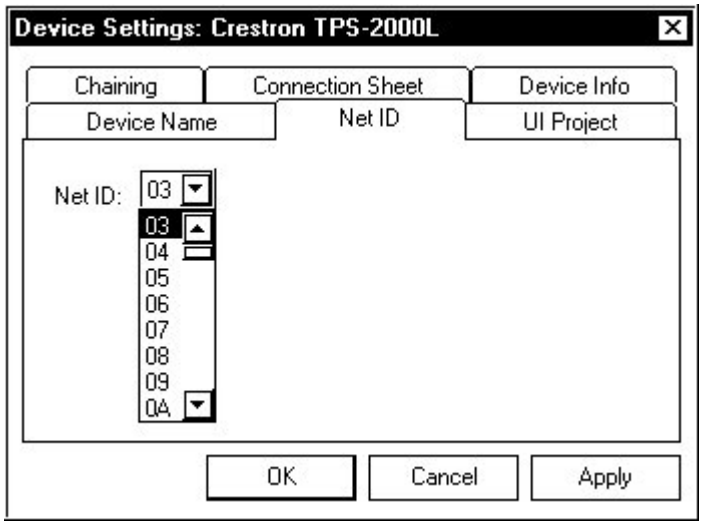
C2Net Device, Slot 9



Setting the Net ID in Device Settings

Double-click the TPS-2000L icon to open the "Device Settings" window. This window displays the TPS-2000L 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-2000L

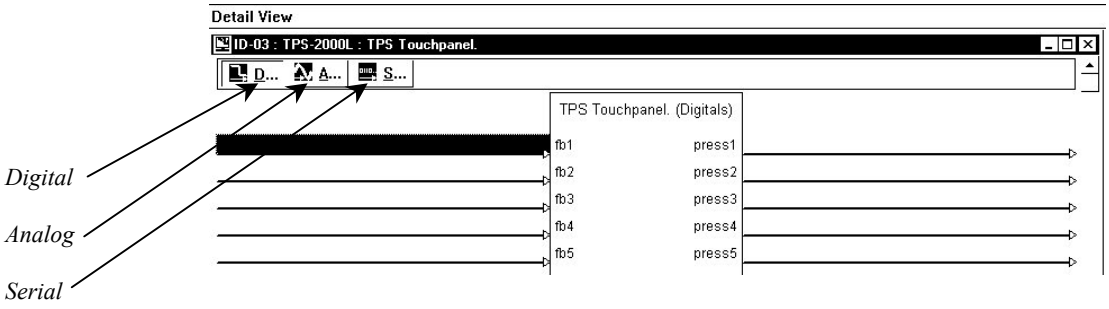


NOTE: SIMPL Windows automatically changes NET ID values of a device added to a program if a duplicate device or a device with the same default NET ID already exists in the program. Always ensure that the hardware and software settings of the NET ID match. For NET ID hardware settings details, refer to "Interface Menu" on page 8.

TPS-2000L Symbol in Programming Manager

Programming Manager is where programmers "program" a Creston control system by assigning signals to symbols. The following diagram shows the TPS-2000L symbol in the SIMPL Windows' Programming Manager.

Detail View of the TPS-2000L in SIMPL Windows' Programming Manager



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

Signal Types

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

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

Digital = Blue

Analog = Red

Serial = Black

Undefined/Other = Green

NOTE: "Other" signals are a combination of the three basic types (e.g. many symbols accept either analog or serial signals where 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-2000L Input/Output Signals

The TPS-2000L symbol provides up to 4000 digital input and output joins, 4000 analog input and output joins, and up to 999 serial input joins. The programmer selects the signal types by clicking on the appropriate button at the top of the S*ymbol Detail* view when programming the panel.

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

Digital Output Signal Descriptions

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

Digital Input Signal Descriptions

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

Analog Output Signal Descriptions

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

Analog Input Signal Descriptions

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

Serial Input Signal Descriptions

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

Device Extenders

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

Example Program

An example program for the TPS-2000L is available from the Crestron FTP site (ftp://ftp.crestron.com/Examples). Search for the file TPS2000L.ZIP that contains the example program, associated files and a README.TXT file that describes the program.

Programming with Crestron VisionTools® Pro-e

Crestron VisionTools® Pro-e (VT Pro-e), a Windows®-based software for designing touchpanel screens, permits the creation of unlimited control screen variations incorporating two and three-dimensional graphics and text as well as sounds (recorded as WAV files). A set of pages, which make up a project, can be designed for each TPS-2000L 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 set is uploaded from the PC. The PC may be disconnected from the rack or panel except during reprogramming. VT Pro-e also allows users the option to generate projects destined for web browsers rather than for physical touchpanels.

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

Multi-Mode Objects

Multi-mode objects offer high-performance programming!

The single most-advanced VT Pro-e high-performance programming technique involving the TPS-2000L 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://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-2000L 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-2000L touchpanel only accepts the following WAV file format: **PCM, 8KHz, mono, 8 bit**. For more information about how to use Sound Recorder, refer to its User's Guide and extensive help information provided with the software. Also refer to the help file in VT Pro-e to learn how to use its audio tool, Sound Manager, to attach WAV files to a touchpanel project.

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

NOTE: WAV files (for the TPS-2000L touchpanel) can be obtained from the Wave LC Library of the Crestron FTP site (ftp://ftp.crestron.com/Wave LC/).

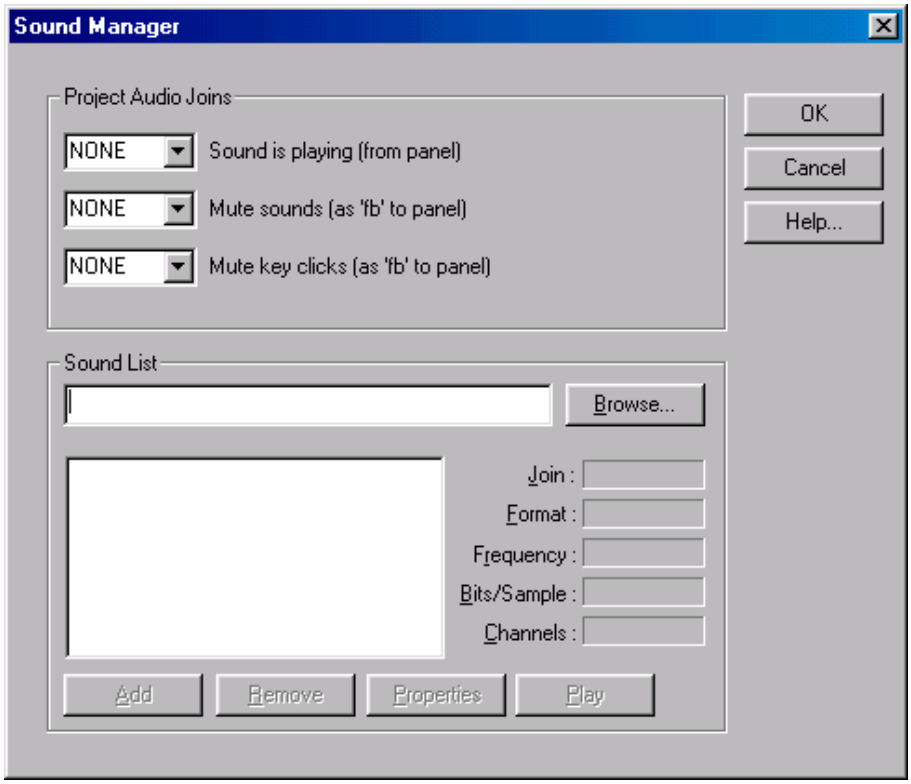
Since the CT/LC-1000 touchpanel accepts the same WAV file formats, only use those WAV files designated for the CT/LC-1000, TPS-2000L, or TPS-3000 touchpanels. These WAV files are different than those made available for the CNXTA, Crestron CNX Telephone Audio Interface Card.

Sound Manager

NOTE: If keyclick is enabled on a touchpanel, each press of the touchpanel screen 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-2000L target type selected in VT Pro-e.
   The correct audio format is PCM, 8 or 16 KHz, 8 bit, mono.
3. There are three system-wide join numbers that the designer can define. The first, sound playing from panel, differs from the other two in that it is triggered from the panel.
   a. Sound Playing from Panel – The signal for this join number goes high when the WAV file plays.
   b. Mute Sounds – All WAV files (except the keyclick) in the project are muted when this join number goes high.

c. Mute Key Click – The keyclick sound is muted when this join number goes high.

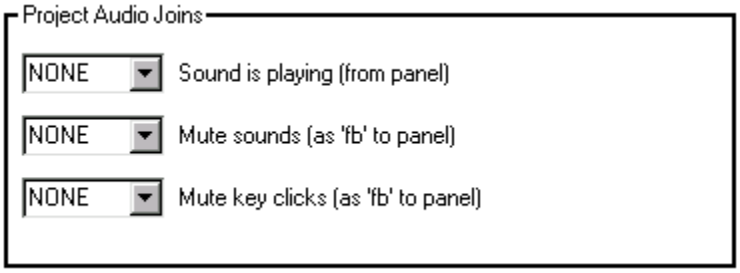
NOTE: If a join number is not assigned ("NONE") for an Audio parameter, then the audio parameter is enabled.

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.

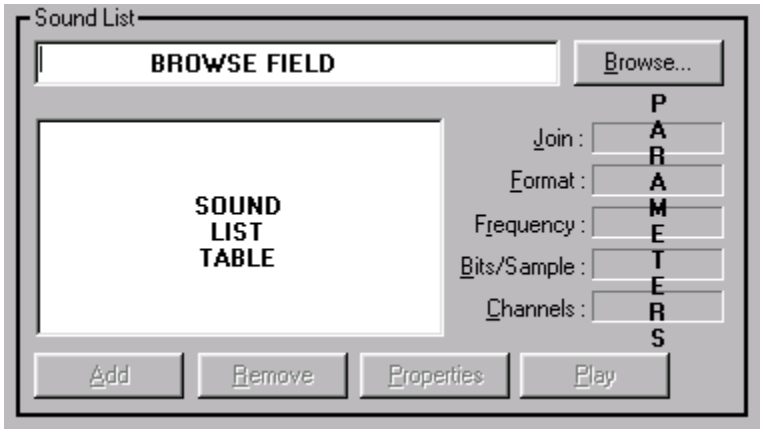
NOTE: If a join number is not assigned ("NONE") for an Audio parameter, then the audio parameter is enabled.

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.

Virtual Pan and Zoom Feature

The exclusive virtual pan and zoom feature is useful and fun to use. With the touch of the screen one can zoom in for the best view and pan across the video picture. Use VT Pro-e to create this feature. Overlap a video window with a slider that has the appropriate property settings. The procedure that follows this paragraph provides a quick overview of the steps required to realize this feature. Consult the VT Pro-e help file for details about unfamiliar terms used in the steps. These steps provide general instructions to obtain a viable pan and zoom feature within a VT Pro-e project. The steps omit actions to make the page aesthetically pleasing.

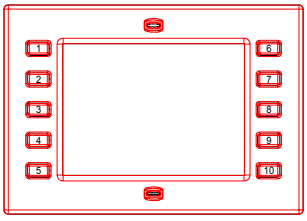
NOTE: This procedure utilizes reserved join numbers, which are listed in "Reserved Join Numbers" beginning on page 26.

1. On a new page in a VT Pro-e project, create a video window. The window could cover the entire page or a portion of it.
2. Create a slider over the video window. To be able to pan over the entire video image, the slider and the video window should be the same size.
3. Access the "Slider Properties" window and complete the items in steps 4 through 10.
4. From the *Design* tab, set the *Indicator Type* to **None** and the *Dimension* to **2-D**.
5. From the *Appearance* tab, set the *Face Color* to **TRANSPARENT** and the *Frame Color* to **VIDEO**.
6. From the *Select Properties* field, select **Analog Touch/Feedback Join**.
7. Enter **17104** into the join number field. This analog join number relates the physical movement of one's touch across the screen into horizontal panning of the video image. Notice that **17105** appears in the *Second Join* field. This analog join number relates the physical movement of one's touch up and down on the screen into vertical panning of the video image. Together these two analog join numbers convert the user's gliding touch on the screen to a smooth pan in any direction within a zoomed (2:1) video image.
8. From the *Select Properties* field, select **Digital Feedback Join**.
9. Enter **17126** into the join number field. This digital join number permits the pan feature. Changing the analog join number values assigned in step 7 are meaningless until this digital join number is activated.
10. Select **OK** to close the "Slider Properties" window.

11. On the same page, create a button. The button can be located anywhere on the page.
12. Access the "Button Properties" window and complete the items in steps 13 through 16.
13. From the *Text* tab, assign the *Text Entry* (i.e., **Toggle Zoom**).
14. From the *Select Properties* field, select **Digital Feedback Join**.
15. Enter **17125** into the join number field. This digital join number allows the user to switch back and forth from a 1:1 video image and a zoomed image (2:1).
16. Select **OK** to close the "Button Properties" window.
17. On the same page, create a button. The button can be located anywhere on the page.
18. Access the "Button Properties" window and complete the items in steps 19 through 21.
19. From the *Text* tab, assign the *Text Entry* (i.e., **Return**).
20. From the *Select Properties* field, select **Page Flip**.
21. From the *Page Flip* field, select **Return** or choose a page from the list. Selecting **Return** results in a flip back to the previous screen. Selecting an existing page from the list forces a jump to that page.
22. Select **OK** to close the "Button Properties" window.

"Quick" Pushbuttons

Pushbutton Layout and Join Number Assignment



There are 10 "quick" pushbuttons that flank the LCD display. These buttons are used to access any frequently used commands. Each button has a permanently fixed digital join number, refer to the illustration shown to the left. The sequence of digital join numbers (1 through 5 on the left side and 6 through 10 on the right side) is consistent whether the touchpanel screen orientation is set to **Upright** or **Inverted**.

NOTE: There is no access to digital join numbers 1 through 10 in VT Pro-e to assign the panel's 10 hard buttons. Use SIMPL Windows and do a 'logical' page flip.

NOTE: A VT Pro-e sample project, TPS-2000.VTP, is available from the VT Pro-e section of the Crestron FTP site (ftp://ftp.crestron.com/VTPro-E/). This project provides guides for panel designers so that they can line up objects with the five "quick" pushbuttons that flank the LCD display. New users are required to register in order to obtain access to the FTP site.

Reserved Join Numbers

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

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

NOTE: Reserved join numbers can also be automatically activated by a control system when using join number remapping. Contact Crestron Customer Service for more information.

Video Digital Reserved Join Numbers for TPS-2000L Touchpanels

JOIN NUMBER	FUNCTION	VALUE	DIRECTION
17111	Video Brightness	Increase	I
17112	Video Brightness	Decrease	I
17113	Video Contrast	Increase	I
17114	Video Contrast	Decrease	I
17115	Video Saturation	Increase	I
17116	Video Saturation	Decrease	I
17117	Video Hue	Increase	I
17118	Video Hue	Decrease	I
17122	Defaults	Reset Video to Defaults	I
17123	Zoom	Displays Video Image 2:1	I/O
17124	Zoom	Displays Video Image 1:1	I/O
17125	Zoom	Toggles Video Image (2:1 & 1:1)	I/O
17126	Zoom	Permits the Pan Feature when the video is zoomed, 2:1 (refer to analog joins 17104 and 17105 for direction)	I/O

System Digital Reserved Join Numbers for TPS-2000L Touchpanels

JOIN NUMBER	FUNCTION	VALUE	DIRECTION
17214	Cresnet ID	Down	I/O
17215	Cresnet ID	Up	I/O
17216	Brightness	Increase	I
17217	Brightness	Decrease	I
17221	Brightness	Auto	I/O
17222	Perform Calibration	Not Applicable	I
17231	Standby Timeout	Up	I
17232	Standby Timeout	Down	I
17233	Power Down Timeout	Up	I
17234	Power Down Timeout	Down	I
17235	Exit Setup Mode & Run Program	Not Applicable	I
17242	Call up Setup Menu	Not Applicable	I
17291	Screen Orientation	Inverted	I/O
17292	Screen Orientation	Upright	I/O
17293	Screen LCD Bias	Up	I/O
17294	Screen LCD Bias	Down	I/O
17295	Auto Brightness Threshold	Disable	I/O
17296	Auto Brightness Threshold	Up	I/O
17297	Auto Brightness Threshold	Down	I/O
17900	Night Light Setting	Off	I/O
17901	Night Light Setting	Low	I/O
17902	Night Light Setting	Medium	I/O
17903	Night Light Setting	High	I/O

Audio Digital Reserved Join Numbers for TPS-2000L Touchpanels

JOIN NUMBER	FUNCTION	VALUE	DIRECTION
17300	Audio	On	I/O
17301	Audio	Off	I/O
17302	Key Click	On	I/O
17303	Key Click	Off	I/O
17304	Key Click Volume	Up	I
17305	Key Click Volume	Down	I
17306	Line Audio	On	I/O
17307	Line Audio	Off	I/O
17308	Line Audio Volume	Up	I
17309	Line Audio Volume	Down	I
17312	WAV Audio	On	I/O
17313	WAV Audio	Off	I/O
17314	Internal Volume	Increase	I
17315	Internal Volume	Decrease	I
17318	Microphone AGC Setting	AGC On	I/O
17319	Microphone AGC Setting	AGC Off	I/O
17320	WAV File	Play	I
17325	Audio Bass	Up	I
17326	Audio Bass	Down	I
17327	Audio Treble	Up	I
17328	Audio Treble	Down	I
17329	Master Volume	Up	I
17330	Master Volume	Down	I

Analog Reserved Join Numbers for TPS-2000L Touchpanels

NUMBER	FUNCTION	DIRECTION
17100	Video Brightness	I/O
17101	Video Contrast	I/O
17102	Video Saturation	I/O
17103	Video Hue	I/O
17104	Horizontal Pan of Video Image (change the value with the physical movement of one's touch on the screen)	I/O
17105	Vertical Pan of Video Image (change the value with the physical movement of one's touch on the screen)	I/O
17200	System Cresnet ID	I/O
17202	System Power Down Timeout	I/O
17203	System Standby Timeout	I/O
17217	Screen LCD Bias	I/O
17218	Auto Brightness Threshold	I/O
17219	Auto Brightness Current Value	I/O
17300	Key Click Volume	I/O
17301	Audio Line Volume	I/O
17302	Internal Volume	I/O
17305	Audio Bass	I/O
17306	Audio Treble	I/O
17307	Master Volume	I/O

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.

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.

Of course, you can always use the workaround of showing a graphic that displays the string, but it is not dynamic.

Uploading and Upgrading

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

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

The following sections define how one would upload a SIMPL Windows program, VT Pro-e project or upgrade the firmware of the TPS-2000L touchpanel. However, before attempting to upload or upgrade, it is necessary to establish communications.

Communication Settings

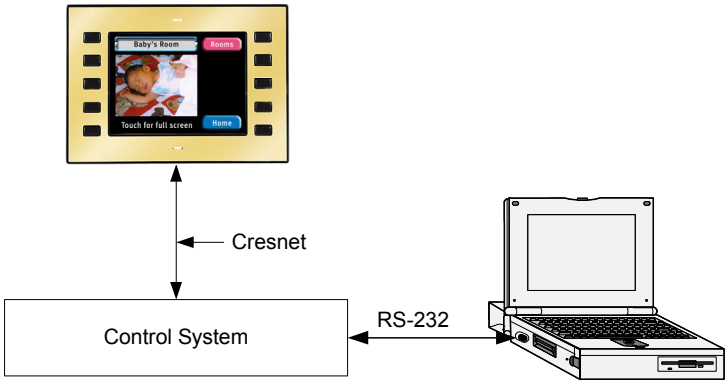
Connection of a PC to the TPS-2000L touchpanel is provided through a control system (Cresnet). To prepare the TPS-2000L for uploading or upgrading, refer to the following figure for a typical connection diagram.

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

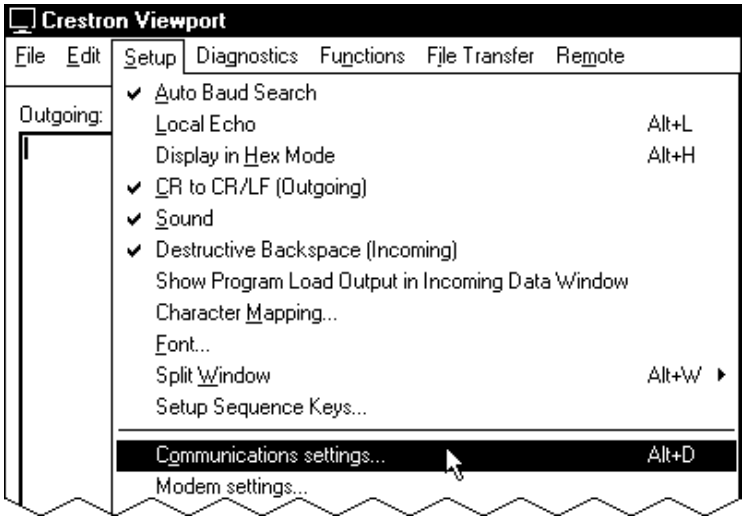
Other models, even from the same manufacturer, may not yield the same results.

Typical Connection Diagram when Uploading a Project



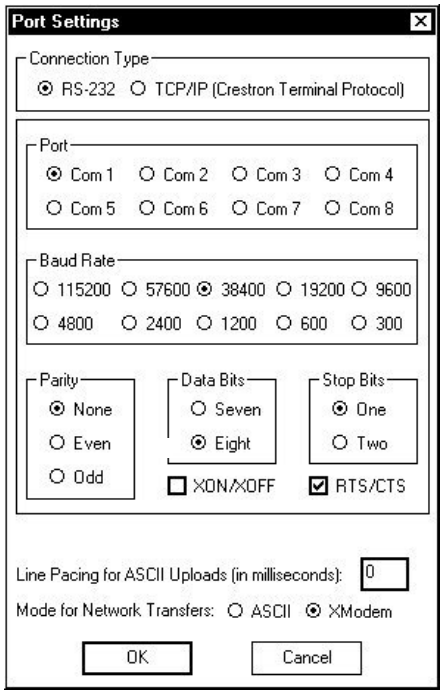
1. Start SIMPL Windows or VT Pro-e.
2. From the menu bar, select **Tools | Viewport** to open the Crestron Viewport. (If communication settings are correct, the prompt should be TPS for direct communications).
3. Refer to the following figure. From the Viewport menu, select **Setup | Communications settings**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

Setup | Communications Settings Command



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

"Port Settings" Window



NOTE: The settings shown above represent the optimum RS-232 settings for loading to all Cresnet devices.

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

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

Uploading a SIMPL Windows Program

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

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

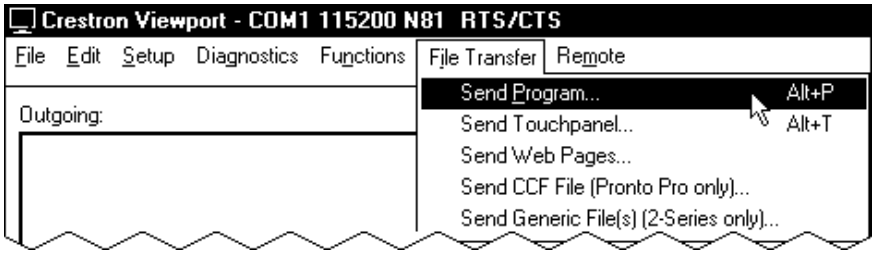
Upload via SIMPL Windows

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

Upload via Crestron Viewport

1. Verify that the procedure for "Communication Settings" that begins on page 30 has been performed.
2. As shown after this step, select **File Transfer | Send Program** (alternatively, press **Alt+P**) from the Viewport menu.

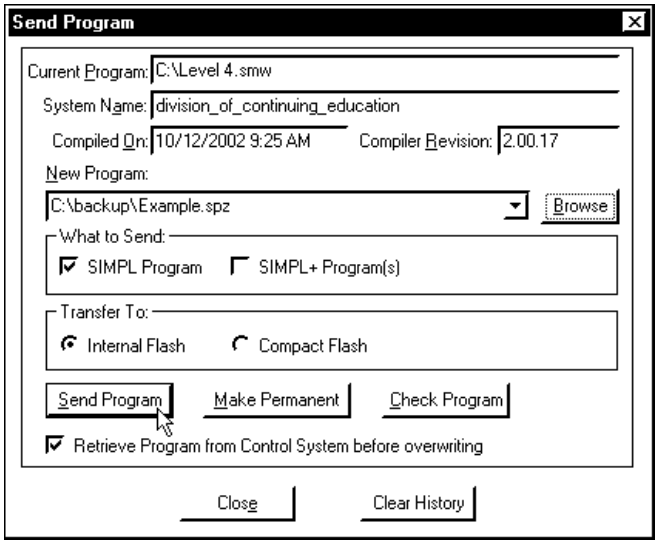
File Transfer | Send Program Command



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

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

"Send Program" Window



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

Uploading a VT Pro-e Project

The TPS-2000L touchpanel source file has the extension .vtp. A compiled VT Pro-e file has the extension .vtz.

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

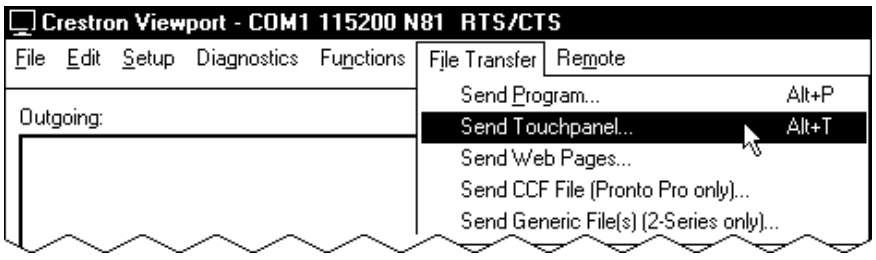
Upload via VT Pro-e

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

Upload via Crestron Viewport

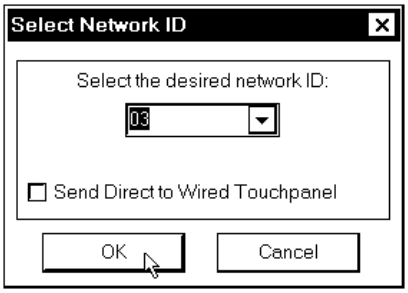
1. Verify that the procedure for "Communication Settings" that begins on page 30 has been performed.
2. As shown after this step, select **File Transfer | Send Touchpanel** (alternatively, press **Alt+T**) from the Viewport menu.

File Transfer | Send Touchpanel Command



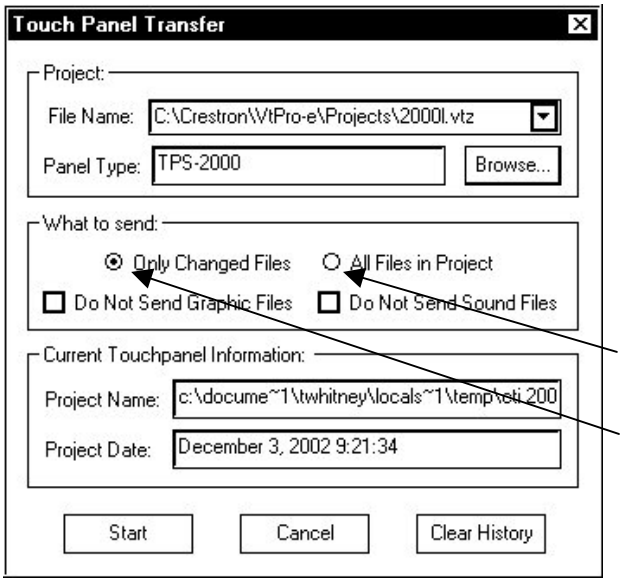
3. As shown after this step, select the NET ID of the TPS-2000L touchpanel and then click **OK**. The "Touch Panel Transfer" window appears (refer to the subsequent graphic).

"Select Network ID" Window



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

"Touch Panel Transfer" Window



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

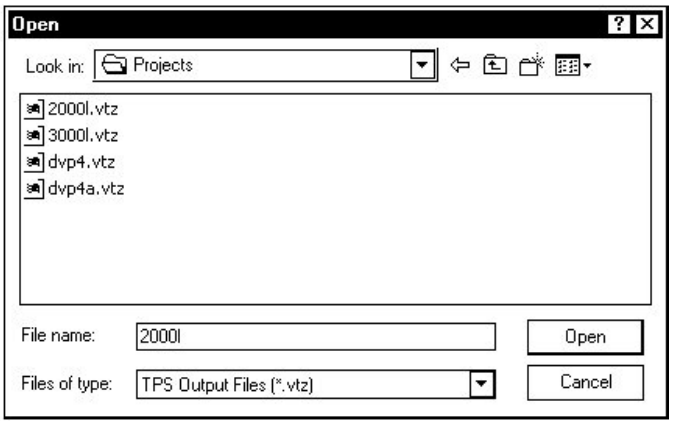
All Files in Project: sends the entire project.

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

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

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

"Open" Window



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

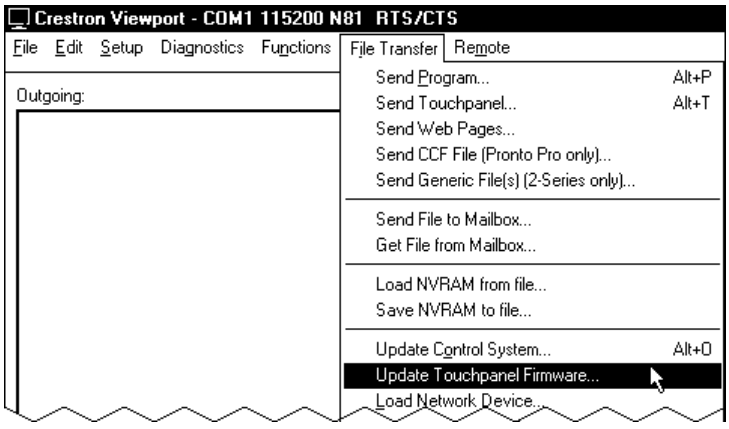
Firmware Upgrade

A firmware upgrade file has the extension .csf.

To take advantage of all the TPS-2000L 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.

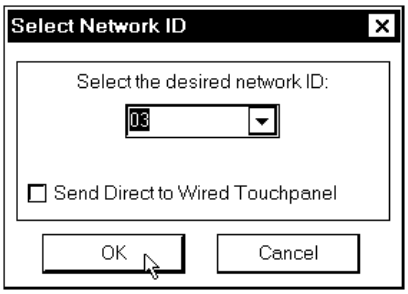
1. Make sure that "Communication Settings" that begins on page 30 has been performed.
2. As shown after this step, select **File Transfer | Update Touchpanel Firmware** from the Viewport menu.

File Transfer | Update Touchpanel Firmware Command



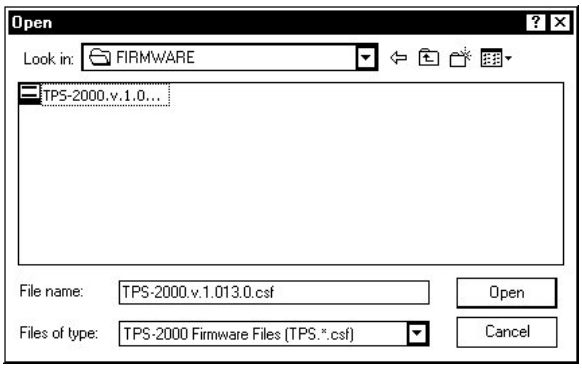
3. As shown after this step, select the NET ID of the TPS-2000L touchpanel and then click OK. The "Open" window appears (refer to the subsequent graphic).

"Select Network ID" Window



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

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-2000L 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 incorrectly calibrated.	Enter “SETUP MODE” and recalibrate.
	Touchpanel is not receiving power from a Crestron power source.	Use a Crestron control system or an approved Crestron power supply.
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.
Blue Screen displayed in a video window.	Nonexistent or weak video signal.	Verify that video source is functioning and connected properly. Balanced video cable length should not exceed 500 feet (152.4 meters). Unbalanced video cable length should not exceed 100 feet (30.5 meters).

Further Inquiries

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

- In the US and Canada, call the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876].
- 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 Control Solutions at +61-2-9737-8203.

Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the TPS-2000L, 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.

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