

Crestron Isys™ **TPS-4500 & TPS-4500L**
12 Inch Tilt & Lectern Touchpanels

Operations Guide



CRESTRON

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12 Inch Tilt/Lectern Touchpanels: TPS-4500 & TPS-4500L

Description

Functional Description

The TPS-4500 and TPS-4500L (known collectively as the TPS-4500/L) are 12-inch (30.5-cm) active matrix SVGA (800 x 600) displays that accept an expansion card that contains a NTCS video input. These units are suitable for either tabletop mounting or a lectern/wall mount in any Crestron remote control system (herein referred to as the Cresnet system). The unit operates in a 16-bit graphics mode (65,536 colors); palettes are not required. When displaying video sources with the appropriate expansion card installed, the TPS-4500/L can display up to 262,144 colors.

The purpose of the TPS-4500/L 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, 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. These touchpanels offer:

- Optional video card slot for expansion
- Memory upgrade
- Pop-up sub panels to reduce memory requirements, providing optimal speed and performance
- Multiple button, slider control, and icon configurations, including multi-mode objects
- Up to 4,000 functions and unlimited screens
- 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.

*Multi-mode objects are here!
Refer to "VisionTools™ Pro-e (New
Features)" on page 19 for details about
this high-performance innovation!*

Video Card Expansion Slot

The TPS-4500/L has a dedicated expansion slot for the TPS-VID or TPS-VIDL (TV video digitizer card). This card allows NTSC/PAL video to be played in a window on the touchpanel or full screen.

The slot in the TPS-4500L is completely empty with only a blank cover plate to occupy its location. In the TPS-4500, the connector for the card resides on the touchpanel motherboard. However, the connector is only active if the card has been installed. Cards are purchased separately. Installation instructions are provided with the card.

Memory

The TPS-4500/L ships with 4MB of flash and 8MB of DRAM. Additional memory (purchased separately) can be installed in the field. The flash can be replaced with modules of up to 64MB. The DRAM module can be replaced with modules up to 32MB. Installation instructions are provided with each memory module. Contact a Crestron customer service representative for details and pricing.

Interface Modules (TPS-4500 only)

Connect the TPS-4500 to an outboard interface module, which provides expanded network/video connections for the touchpanel system. The connecting cable assemblies are supplied. There are two interface modules available: TPS-4500IMC and TPS-4500IMW.

The TPS-4500IMC is supplied with every TPS-4500. This module is housed in a black enclosure with a silk-screened top panel and a number of 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-4500IMC Operations Guide (Doc. 5890) for more details.

The TPS-4500IMW is not provided with each TPS-4500; it must be purchased separately. This unit installs into a one-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 compared to the TPS-4500IMC. Consult the latest revision of the TPS-4500IMW Operations & Installation Guide (Doc. 5913) for more details.

I/O Connectors

The number of I/O ports on each model differs. There are five I/O ports available on the TPS-4500L and three on the TPS-4500. Not all ports are active; some require the additional purchase and installation of the video expansion card to enable operation.

TPS-4500L Connectors:

- **NET** – The port mates with a four-pin connector, supplied, and is used to connect the touchpanel to other four-wire devices in the Cresnet system. If making network connections to the Cresnet peripherals, refer to the latest revision of the Cresnet Network Interconnect Drawing (Doc. 5411). This document can be obtained from the Downloads page (CABLES and MANUAL Libraries) of the Crestron website (www.crestron.com). Search for CRESNET.PDF.
- **RS-232** – This 6-position RJ11 mates with a serial port of a PC; connecting cable is not supplied. Use this port for direct connection to the PC to load files to a touchpanel without a network connection. In the event that modular cables or an RJ11 to DB9F adapter is not

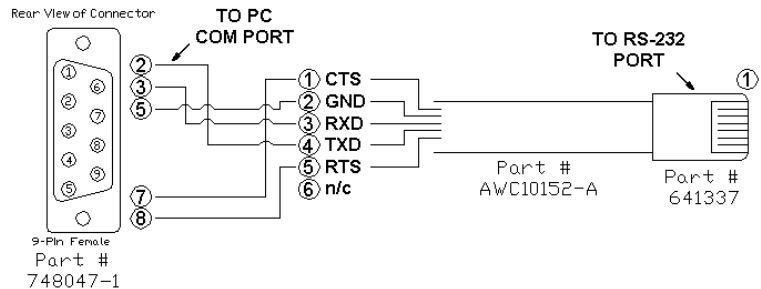
available, the table and diagram below provides information so that the cable can be fabricated on site. Refer to "Appendix A: RS-232 Protocol" on page 27 for protocol details.

RS-232 Pinouts

PIN	DESCRIPTION
1	CTS
2	GND
3	RXD

PIN	DESCRIPTION
4	TXD
5	RTS
6	No Connect (N/C)

PC to TPS-4500/L Cable Specifications



- **NTSC/PAL INPUT** – These three connectors are made available with the purchase and installation of the TPS-VIDL, composite and S-video input for TV video card. Consult the latest revision of the TPS-VIDL Operations & Installation Guide (Doc. 5830) for details.

TPS-4500 Connectors:

- **RS-232** – This 6-position RJ11 connector provides the same functions as the RS-232 connector described for the TPS-4500L, above.
- **NET/VIDEO** – This 10-position RJ45 mates with an interface module and has a dual purpose. Refer to the descriptions and pinout table that follow this paragraph.

1. This port provides network connection from the touchpanel to the interface module.

2. This port also makes available composite or S-video input for TV video card (with the purchase and installation of the TPS-VID). Consult the latest revision of the TPS-VID Operations & Installation Guide (Doc. 5869) for details.

NET/VIDEO Pinouts

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

- 24VDC 2.0A – This direct current (DC) power socket connector is used to supply power via the external power pack. Crestron recommends the Crestron **PW-2420RU** for the TPS-4500. If a power pack other than this crestron model is obtained, verify that it meets the required specifications and polarity as shown after this paragraph.

Power Pack Specifications

CRESTRON POWER PACK	OUTPUT SPECS
PW-2420RU	24VDC 2A, regulated

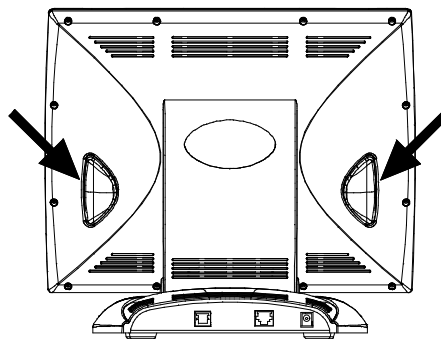
Power Pack Output Connector Polarity



Position Lock Buttons (TPS-4500 only)

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, button position allows for one-hand tilting.

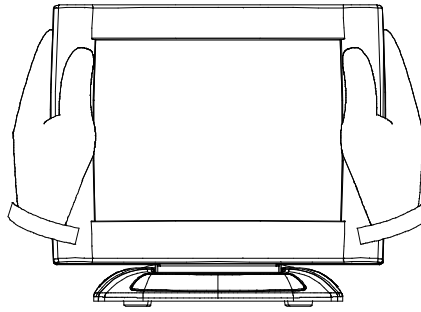
Location of Position Lock Buttons



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. Two-hand placement is shown after this paragraph. 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 can not 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.

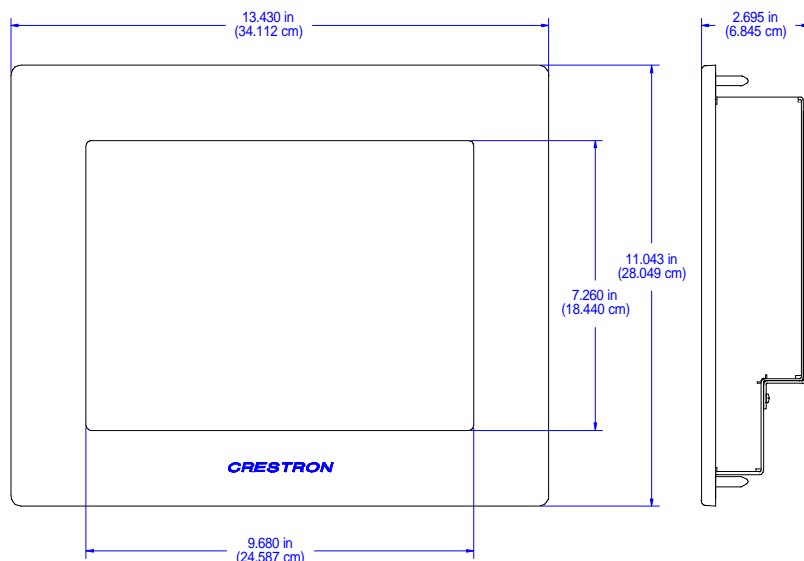
A position lock button needs to be depressed before the touchscreen can be returned to a more horizontal position. To depress the button, slightly position the touchscreen in the vertical direction with one or two hands, avoiding any horizontal movement. The position lock button can then be held down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

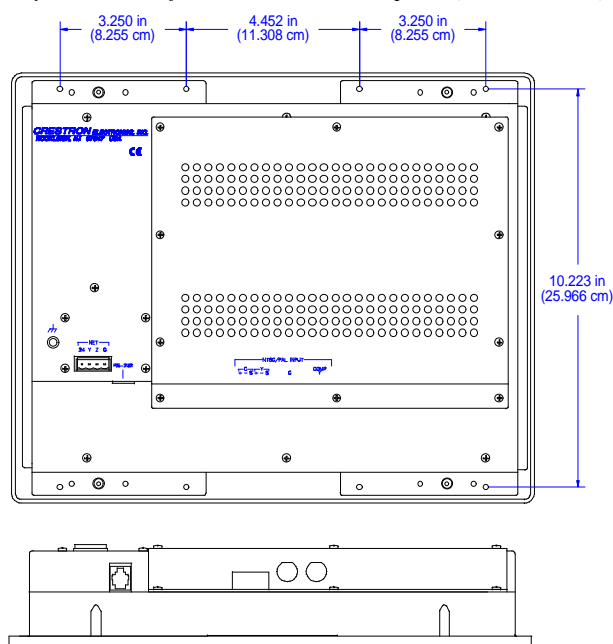
Physical Description

TPS-4500L

The 12-inch (30.5-cm) touch sensitive viewing screen is located on the front of the TPS-4500L touchpanel, shown below and on the next page. The electronic hardware is housed in a black metal enclosure. All video, RS-232, and network connections are made at the rear of the unit. Two color bezels are available: black (TPS-4500LB) and white (TPS-4500LW).

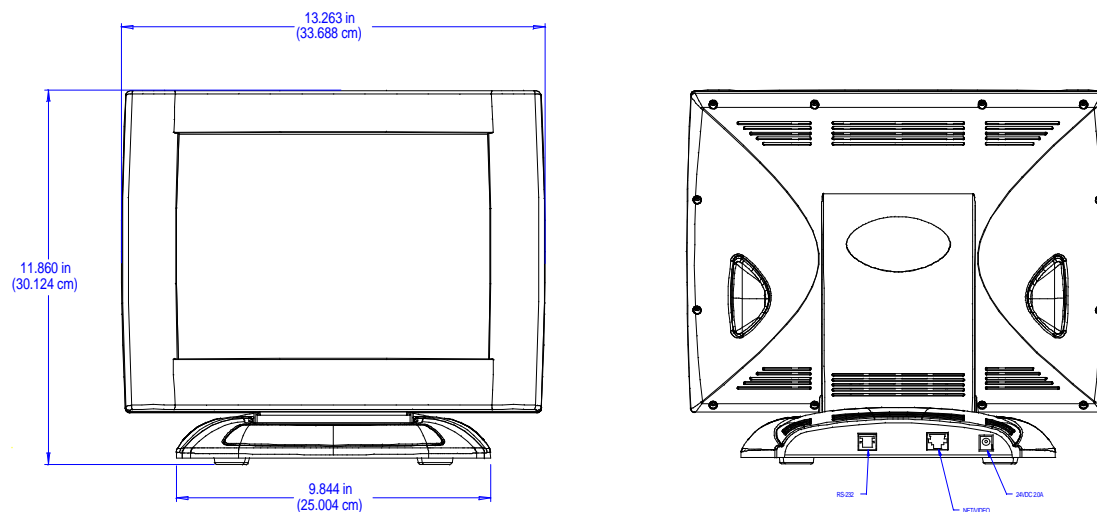
NOTE: Video connections are available after installing the TPS-VIDL into the TPS-4500L touchpanel.

Physical Views of the TPS-4500L Touchpanel (Front & Side)

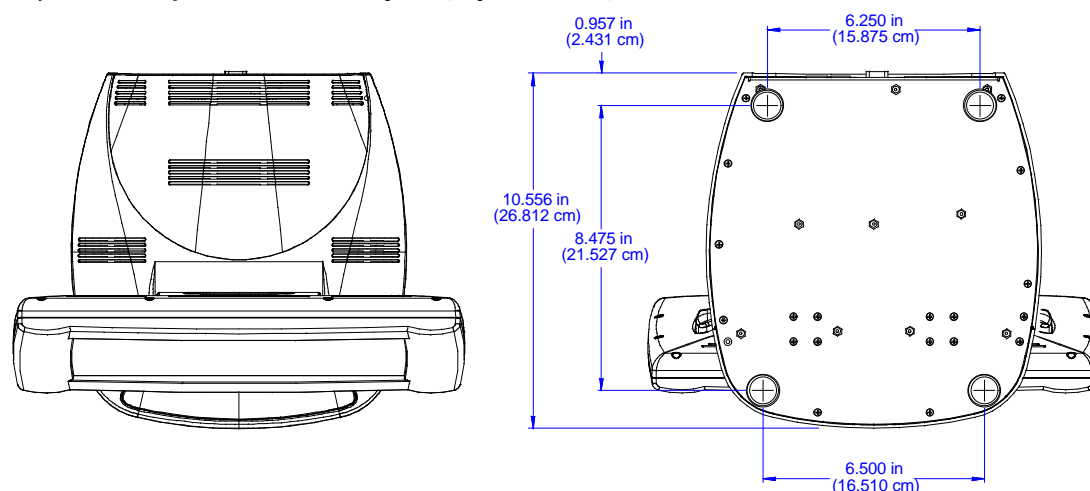
Physical Views of the TPS-4500L Touchpanel (Rear and Side)**TPS-4500**

The 12-inch (30.5-cm) touch sensitive viewing screen is located on the front of the TPS-4500 touchpanel. The electronic hardware is housed in a high impact, black molded plastic enclosure, shown below and on the next page. This touchpanel is designed for placement on a counter. It possesses a hinged base, which can tilt from 30 to 80 degrees. Refer to "Position Lock Buttons (TPS-4500 only)" on page 4 for tilting details. All RS-232, video, network, and power connections are made at the rear panel on the base of the unit.

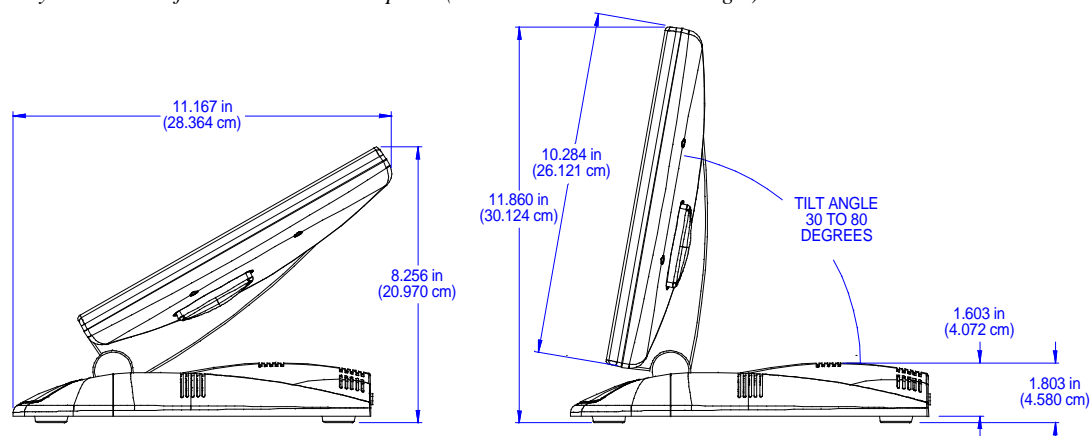
NOTE: The video connector resides on the motherboard; the TPS-VID must be installed for the connector to be operational for video.

Physical Views of the TPS-4500 Touchpanel (Front and Back)

Physical Views of the TPS-4500 Touchpanel (Top and Bottom)



Physical Views of the TPS-4500 Touchpanel (Side with Min. and Max. Angle)



Leading Specifications

The table below and on the next page provides a summary of leading specifications for the TPS-4500/L touchpanel. Dimensions and weight are rounded to the nearest hundredth unit.

Leading Specifications for the TPS-4500/L Touchpanel

SPECIFICATION	DETAILS
Power Requirements (without cards)	20 Watts (0.83 Amp @ 24 VDC) ¹
SIMPL TM Windows [®]	Version 1.52.01 or later ²

¹ The power requirement for the TPS-VID/L is 8 Watts (0.333 Amps @ 24 VDC)

² The latest software versions can be obtained from the Downloads page (SIMPLWIN, TOUCHPNL, VTPRO-E, or CRESDB Libraries) of the Crestron website (www.crestron.com).

Leading Specifications for the TPS-4500/L Touchpanel (Continued)

SPECIFICATION	DETAILS
CNMSX-AV/PRO Upgrade File (.upz)	Version 51125X or later ^{3 & 4}
CNRACKX-DP Upgrade File (.upz)	Version 51125W or later ^{3 & 4}
CEN/CN-TVAV Upgrade File (.upz)	Version 51130V or later ^{3 & 4}
CNMS, CNRACK, CNLCOMP Operating System	Version 3.18.09m, l, c or later ^{3 & 5}
ST-CP Operating System	Version 4.00.49 or later ^{3 & 5}
ST-CP Monitor	Version 1.29 or later ³
VisionTools™ Pro-e (VT Pro-e)	Version 2.2.0.0 or later ²
Crestron Database	Version 14.4 or later ²
Touchpanel Firmware	Version 1.000.0 <1145> ⁶
Memory	4MB of flash; 8MB of DRAM ⁷
Dimensions & Weight TPS-4500L - with bezel	Height: 11.04 in (28.05 cm) Width: 13.43 in (34.11 cm) Depth: 2.70 in (6.85 cm) Weight: 5.90 lb (2.70 kg)
Dimensions & Weight TPS-4500	Height: 11.86 in (30.12 cm) Width: 13.26 in (33.69 cm) Depth: 11.17 in (28.36 cm) Weight: 7.64 lb (3.46 kg)
View Screen Dimensions	Height: 7.26 in (18.44 cm) Width: 9.68 in (24.59 cm)
Screen Viewing Angles	+/-60° for X dir and +45/-55° for Y dir
View Screen Resolution	800 x 600 pixels
View Screen LCD	SVGA display (16 bit graphics mode - 65,536 colors) (262,144 colors with TPS-VID/L)
View Screen Illumination	Edgelit Fluorescent
View Screen Touch Screen	Resistive Membrane

3 CNX upgrade files are required for either CNMSX-AV/Pro or CNRACKX-DP. Filenames for CNX upgrade files have a UPZ extension and SmarTouch files are in one EXE. All can be obtained from the Downloads page (OPSYS Library) of the Crestron website.

4 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 57600 or lower. Otherwise, the Viewport may post the "Transfer Failed" message.

5 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-4500/L when using these control systems use the RS-232 port on the TPS-4500/L.

6 Touchpanels with later versions of firmware may include features not mentioned in this guide. Check the MANUAL Library on the Crestron FTP site for newer versions of this guide or contact a Crestron technical support representative.

7 Additional memory can be purchased, refer to "Memory" on page 2. The complexity of the control screens influence memory usage.

As of the date of manufacture, the touchpanel has been tested and found to comply with specifications for CE marking.



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.

Installation/Setup

Identity Code

Every equipment and user interface within the network requires a unique identity code (NET ID). These codes are assigned a two-digit hexadecimal number from 03 to FE. Refer to "Setup Menu" on page 14 for instructions on setting the unit's NET ID. The NET ID of the unit must match the NET ID specified in the SIMPL Windows program. Refer to "Programming with SIMPL™ Windows®" on page 20 for a sample.

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.

Network Wiring

NOTE: When making four-wire network connections, refer to the latest revision of the Cresnet Network Interconnect Drawing (Doc. 5411). The document can be obtained from the Downloads page (CABLES and MANUAL Libraries) of the Crestron website (www.crestron.com). Search for the CRESNET.PDF files.

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 load factor of each network unit to be daisy-chained must be added together to determine the load factor of the entire chain. The length of the run in feet and the load 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

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

Where: R = Resistance (refer to table below).
L = Length of run (or chain) in feet.
LF = Load 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	24 (Doubled-CAT 5)

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 network units, always twist the ends of the incoming wire and outgoing wire which share a pin on the network connector. After twisting the ends, tin the twisted connection with solder. Apply solder only to the ends of the twisted wires. Avoid tinning too far up or the tinned end becomes brittle and breaks. After tinning the twisted ends, insert the tinned connection into the network connector and tighten the retaining screw. Repeat the procedure for the other three network conductors.

Hardware Hookup

Due to physical differences, the lectern and tilt models require different hookup procedures. Furthermore, the lectern model installs simply and cleanly into existing or newly constructed walls, with back box and drywall options.

Back Box Mounting of the TPS-4500L

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

NOTE: The mounting hardware and accessories supplied with the TPS-4500L are not required for the back box mounting option.

Direct Mounting of the TPS-4500L

The TPS-4500L is a low-voltage unit that can be installed directly into a mounting surface. Each touchpanel is provided with mounting hardware and accessories, as shown in the table after this paragraph.

TPS-4500L Supplied Mounting Hardware and Accessories

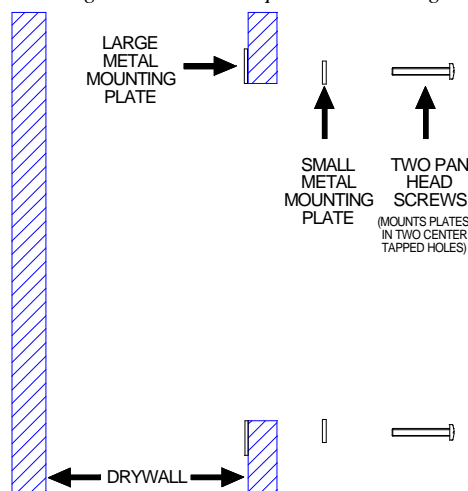
ITEM	PART NUMBER	QUANTITY
Large Metal Mounting Plate	MTPL02553-1	2
Small Metal Mounting Plate	MTPL02523-1	2
Template	OV40049-1	1
Screw, Pan Phillips	#6-32 x 1" LG	12
Connector	JHPS197SG04SR-2	1

Complete the following installation procedure in the order provided. The only tools required are a gypsum board saw (or equivalent), a #2 Phillips tip screwdriver, a drill, a 5/16" bit, and a #20 bit. Complete the following installation procedure in the order provided.

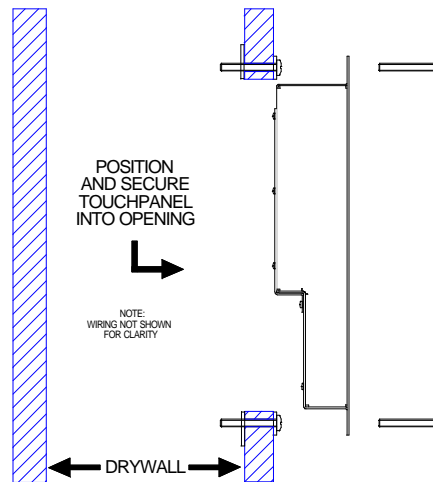
1. Locate an area on the wall that is free of miscellaneous wiring and studs.

2. Make a small hole near the middle of the designated site; verify that the location is suitable.
3. Fasten cutout template (40049, supplied) to mounting surface; verify that the template is level.
4. Cut out and remove the traced shape of the mounting surface.
5. Drill four 5/16" holes as marked on template. Refer to "Appendix B: Cutout Detail of Supplied Template" on page 29 for an illustrative reference.
6. Drill 12 holes marked "A" on template with #20 bit. Refer to "Appendix B: Cutout Detail of Supplied Template" on page 29 for an illustrative reference.
7. Slide one large metal mounting plate through the opening and position it inside along the top horizontal edge.
8. Position one small metal mounting plate along the top horizontal edge so that it covers the two center holes marked "A".
9. Use two pan head screws, supplied, to secure the bracket and plate to the mounting surface. Tighten by hand; do not fully tighten screws.

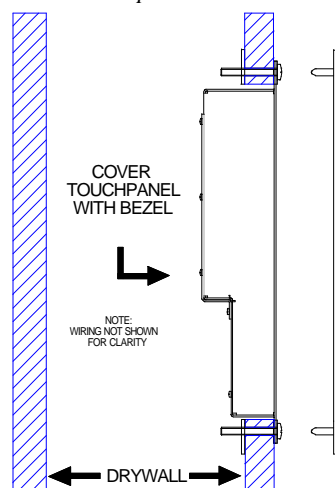
Securing Two Plates to Top and Bottom Edges of Opening



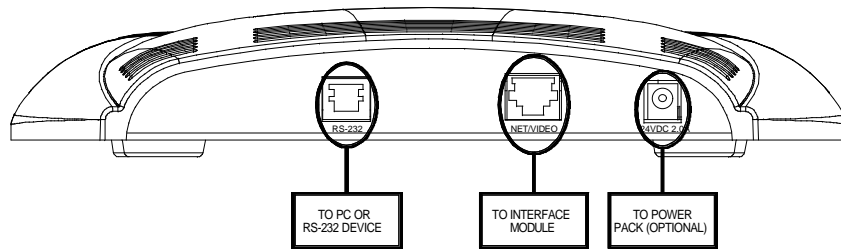
10. Repeat steps 7 through 9 for the bottom horizontal edge of the opening.
11. Attach the network cable and other cables (i.e., RS-232 or video) in the wall to the appropriate connector on the back of the touchpanel. Refer to "Network Wiring" on page 9 for network wiring details. Information about the RS-232 connector is located in "I/O Connectors" on page 2. For wiring the video connector, refer to the latest version of the TPS-VIDL Operations & Installation Guide (Doc. 5830).
12. Position the touchpanel (less the faceplate) into the opening and secure with eight pan head screws, supplied. Tighten by hand; do not fully tighten screws.

Positioning Touchpanel into Opening

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

Cover Touchpanel with Bezel**Connecting the TPS-4500**

The TPS-4500 touchpanel has rubber pads on the underside of its base so that it can rest on a horizontal surface. Make the necessary connections as called out in the illustration of the touchpanel base that follows this paragraph. Not all connectors may be used. Installation of the TPS-VID is required to play video on the panel. Pinouts for the connectors are provided in "I/O Connectors" on page 2. Apply power last.

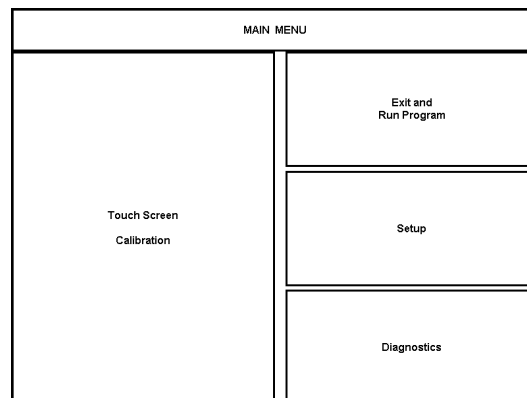
Hardware Connections for the TPS-4500

Configuring the Touchpanel

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. Holding a finger to the touchscreen for five seconds after the "SETUP MODE" message is displayed sets the brightness to high.

Upon entering SETUP MODE, the Main Menu, shown after this paragraph, displays four buttons: **Touch Screen Calibration**, **Exit and Run Program**, **Setup**, and **Diagnostics**.

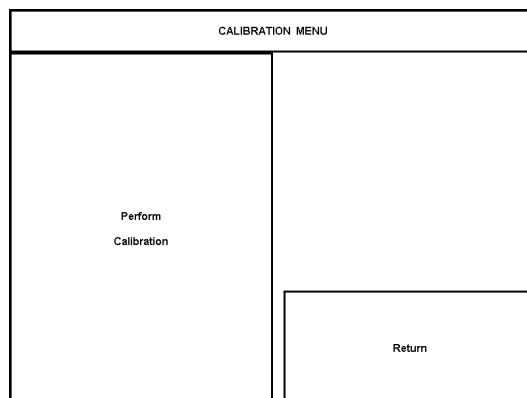
Main Menu



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 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 after this paragraph. 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.

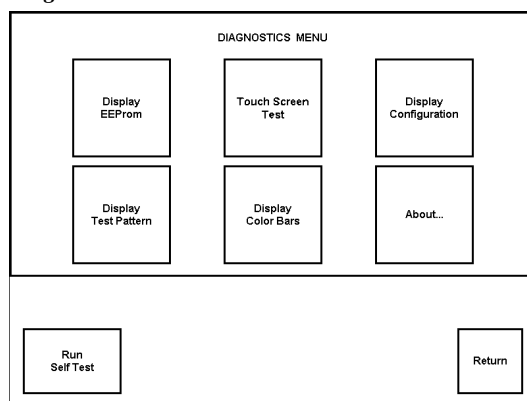
Calibration Menu

If you proceed to calibrate the touchpanel, the screen prompts you with the message "Touch Upper Left +" nearly centered on the display. A cross hair (+) in the upper left corner indicates the exact location. Touch the cross hair (+) in the upper left corner of the screen to initiate calibration. Another message, "Touch Upper Right +", appears on the display. Touch the cross hair in the upper right corner. Another message, "Touch Lower Right +", appears on the display. Touch the cross hair in the lower right corner of the screen to return to the Main Menu.

NOTE: When touching the screen during calibration, be as accurate as possible.

Diagnostics Menu

The **Diagnostics** button from the Main Menu should only be used under supervision from a Crestron technical support representative during telephone support. Most of the options available from the Diagnostics Menu, shown after this paragraph, are numeric in nature and their interpretation is beyond the scope of this manual.

Diagnostics Menu**Setup Menu**

To obtain the Setup Menu, shown after this paragraph, select the **Setup** button from the Main Menu. Many touchpanel options (i.e., standby timeout, brightness, and panel tracking) are available directly from the Setup Menu and are explained in the following paragraphs. Other setup parameters (i.e., interface, RS-232, 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.

Setup Menu

CRESNET ID ##		SETUP MENU		
Interface	RS-232			Video
STANDBY TIMEOUT xxx				
DOWN		UP		
BRIGHTNESS 99%				
DOWN		UP		
		Enable Panel Tracking	Disable Panel Tracking	Return

NOTE: All touchpanel settings, except those menus with a **Save and Return** button, are automatically saved in non-volatile memory.

Standby Timeout

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

Brightness

Screen brightness may need to be altered because of ambient light conditions or personal preference. **BRIGHTNESS**, located in the lower left corner of the Setup Menu, can change the brightness level of the display. The current brightness setting is shown as a percentage in the Setup Menu (e.g., 99% brightness is shown in the illustration). Percentage can vary from 0% (low brightness) to 100% (full brightness). **DOWN** and **UP** buttons decrease and increase the brightness, respectively.

Panel Tracking

Panel tracking is a useful communication feature between touchpanels when more than one touchpanel exists on the network. Two buttons centrally located in the bottom row of the Setup Menu control panel tracking. Button selection is indicated by red text. When the **Enable Panel Tracking** button is selected, a given touchpanel maintains communication in such a way that a page change to any touchpanel on the network forces the same page change to all enabled touchpanels. Panel tracking is disabled for a given touchpanel when the **Disable Panel Tracking** button is selected. When disabled a given touchpanel does not respond to page changes made to other touchpanels on the network. Panel tracking is factory set with the **Disable Panel Tracking** button selected.

Return

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

Interface Menu

The touchpanel communicates with a control system to activate other controls 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 in the upper left corner of the Setup Menu and display the Interface Menu, shown after this paragraph.

Interface Menu

INTERFACE MENU			
CRESNET ID 03	Enable CRESNET II	Disable CRESNET II	RS-232 Port for Console
DOWN			RS-232 Port for Control
UP	Enable Touch Screen	Disable Touch Screen	RS-232 Port for Touch Output
			RS-232 Port for Mouse Input
			RS-232 Port for Ext. Touch Input
			Save and Return

The Cresnet network identity number (CRESNET ID) is displayed in the left corner of the Interface Menu. CRESNET ID is the two-digit hexadecimal number represented by ## in the figure for illustrative purposes. 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 is factory set to 03.

Two side-by-side buttons beneath the hexadecimal display, **DOWN** and **UP**, decrease and increase the 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 Cresnet II 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.

The Interface Menu allows for five RS-232 communication options: console (i.e., loading programs), control (i.e., non-Crestron device), touch output, mouse input, or external touch screen input. The five buttons in the upper right corner of the menu are available for selection.

Crestron suggests that even if there is no intent to use the RS-232 port, the user should select one of the five RS-232 communication options. Crestron recommends the default, **RS-232 Port for Console**, if the port is not being used. If the panel is not operating within a Cresnet system, it is possible to use Control. Text within selected buttons change color from black to red.

Select the **Save and Return** button, located at the bottom right corner of the Interface Menu, after interface parameters have been set.

RS-232 Menu

RS-232 parameters, shown after this paragraph, must be set when communicating via the RS-232 port for RS-232 console and control communication. Options for baud rate, data bits, parity, stop bits, and handshaking are available. Text within the selected button changes color from black to red.

RS-232 Menu

RS-232 MENU				
BAUDRATE		<div style="display: flex; flex-direction: column; gap: 5px;"> <div>RS-232 Port for Console</div> <div>RS-232 Port for Control</div> <div>RS-232 Port for Touch Output</div> <div>RS-232 Port for Mouse Input</div> <div>RS-232 Port for Ext. Touch Input</div> </div>		
110	150			300
600	1200			2400
4800	9600			19200
38400	57600			115200
DATA BITS		<div style="display: flex; flex-direction: column; gap: 5px;"> <div>RTS-CTS On</div> <div>RTS-CTS Off</div> <div>XON-XOFF On</div> <div>XON-XOFF Off</div> </div>		
7	8			
PARITY				
None	Odd			Even
STOP BITS		<div style="display: flex; align-items: center; justify-content: center; gap: 20px;"> <div>Save and Return</div> </div>		
1	2			

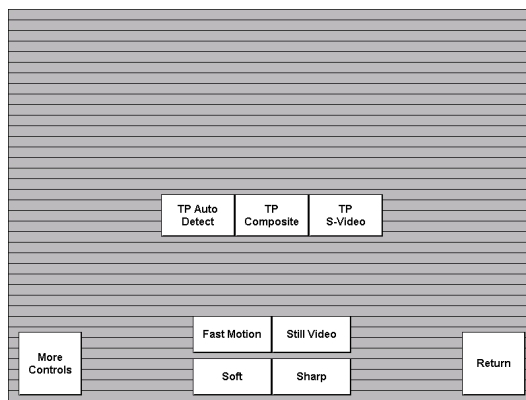
For convenience, the RS-232 Menu also displays the five RS-232 communication options. These five buttons in the upper right corner of the menu were also available on the Interface Menu. A description of their functionality can be found in the Interface Menu paragraph.

Select the **Save and Return** button, located at the bottom right corner of the RS-232 Menu, after parameters have been set.

Video Menu

NOTE: The **Video** button is displayed on the Setup Menu only if the TPS-VID/L is properly installed. Selection of the **Video** button opens the Video Menu from which the user can adjust video settings.

The TPS-4500/L can display video from up to two different video sources. Both of these signals are automatically set up as NTSC or PAL, composite or S-Video. Selecting the **Video** button, located to the right on the top row of the Setup Menu, displays the Video Menu, shown after this paragraph.

Video Menu

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) or switch modes automatically after checking the image for colors. Use either the **TP Composite** or **TP S-Video** buttons to manually control the mode. Composite video mode uses a single video signal for luminance and chrominance. S-Video mode uses separate signals for luminance and chrominance, which results in superior resolution and color fidelity. Use the **TP Auto Detect** button for automatic control. The text color of the selected button is red rather than black.

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.

Use the **More Controls** button to view controls for brightness (BRT), contrast (CONT), saturation (SAT), and hue (HUE). Arrow buttons (< and >) are available to decrease or increase the value of each video control. The **Default** button opens a screen that prompts the user to verify the request for default controls. Select the **Return** button, located at the lower right corner of the Video Menu, after video parameters have been set.

VisionTools™ Pro-e (New Features)

*Have a comment about
Crestron's 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 26.*

*Multi-mode objects offer high-
performance programming!*

VisionTools™ Pro-e (VT Pro-e), a design and programming Windows®-based software, permits the creation of control screen variations incorporating two and three-dimensional graphics and text. A set of pages, which make up a project, can be designed for each TPS-4500/L 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. The project is uploaded to the touchpanel and programmed into the flash PROM. The touchpanel uses the programmed project until another set is uploaded from the PC. VT Pro-e also allows users the option to generate projects destined for web browsers rather than for physical touchpanels. For additional software information, consult the VT Pro-e help file.

The single most-advanced VT Pro-e high-performance programming technique involving the TPS-4500/L 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*). Each multi-mode object has a minimum of one inactive analog join; buttons and legends have a digital join with an active and inactive analog join. There are actually 100 possible *modes* for each active and inactive analog join. In other Crestron touchpanels, these settings are limited to two visible settings. One setting is the active object's face, frame and text color. The second setting is the inactive object's face, frame and text color.

Multi-mode objects offer power and versatility with simplicity. These three attributes of a multi-mode are definitely intertwined. For example, assume a user wanted a touchpanel page to display an object that changed color and associated graphic/text based on the state of an analog join number controlled by a Crestron control system. This example is analogous to a traffic light that changes color as well as controlling the text on a walk/don't walk sign. Using single-state objects, the user would have to draw and manage five objects and three digital join numbers: one 3-D border, one animation object, and three transparent buttons with active and inactive text color.

However, using a single multi-mode object, the programmer gets the same result with less effort. All that is needed is one multi-mode button having an inactive state with three *modes*. Furthermore, if the project needs to be edited, only one "Object Properties" window needs to be accessed. And when it is time to recompile and upload the file to the touchpanel, time is saved as well. VT Pro-e reworks only those parts of the project that have changed since the last compile and upload. Programmers no longer have to wait while each unedited graphic in a graphic-intensive project is recompiled. It is plain to see that multi-modes are a programmer's dream, come true. For more examples including the one described in this Operations Guide, refer to the MULT-MOD.ZIP file. It is available from the Downloads page (EXAMPLES Library) on the Crestron website (www.crestron.com). This file contains the VT Pro-e touchpanel files and SIMPL Windows files that illustrate the high-performance capabilities of multi-mode objects.

Not every VT-Pro-e object possesses the multi-mode feature. Only those objects that lend themselves to valid applications are capable of multiple modes. These objects include:

- Border – Permits multiple indirect text, text position, font, frame, and color.
- Button – Same as a border for inactive states as well as active states, multiple graphic and graphic positions.
- Clock – Permits multiple formats and colors.

- Digital Gauge - Permits multiple formats and colors.
- Gauge – Same as digital gauge as well as line, bars, and 2-D lines.
- Legend – Same as borders for inactive and active states.
- Percent – Permits multiple formats.
- Slider – Same as gauge.
- Time - Permits multiple formats, colors, and styles.

Programming with SIMPL™ Windows®

NOTE: VisionTools Pro-e (VT Pro-e) is a Windows compatible software package for creating Crestron touchpanel screen designs. Refer to "VisionTools™ Pro-e (New Features)" on page 19 for additional details regarding VT Pro-e.

SIMPL (Symbol Intensive Master Programming Language) is an easy-to-use programming language that is completely integrated and compatible with all Crestron system hardware. The objects that are used in SIMPL are called symbols. SIMPL Windows offers drag and drop functionality in a familiar Windows® environment.

SIMPL Windows is Crestron Electronics' 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.

The next two subsections describe a sample SIMPL Windows program that utilizes a TPS-4500/L touchpanel. The first subsection details how the sample program works with a textual description and block diagram. The second subsection provides a broad description of how to actually create the SIMPL Windows program.

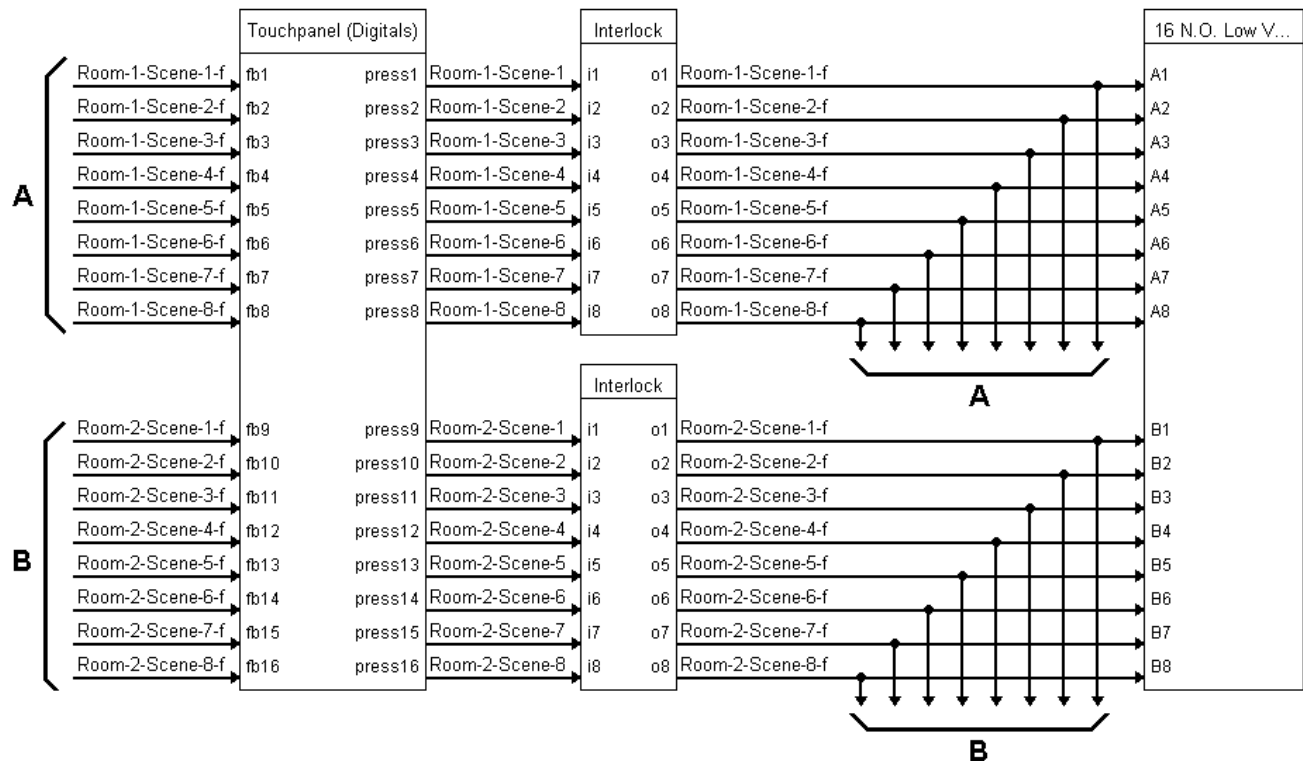
NOTE: The following description assumes that the reader has knowledge of SIMPL Windows. If not, please refer to the extensive help information provided with the software.

NOTE: There is no need to recreate the sample SIMPL Windows program. A similar copy of this program is available from Crestron's ControlCD (version 6.2 and later). Search for the TPS-4500.SMW project in the SIMPL Windows Example Base. A copy can also be obtained from the Downloads page (EXAMPLES Library) of the Crestron website (www.crestron.com). New users are required to register in order to obtain access to the FTP site.

How the Program Works

A basic TPS-4500/L touchpanel SIMPL program is shown after this paragraph in block diagram form. For this example, the TPS-4500 is the user interface in a control system containing a CNMSX-PRO, which has a CNXRY-16 occupying slot 1. Assume that the TPS-4500 is used to control a lighting system via relays in two rooms. Each room can have up to eight scenes of lighting. A scene is engaged by latching a relay. Only one scene can be activated in a room at a time.

Block Diagram of System Incorporating a TPS-4500



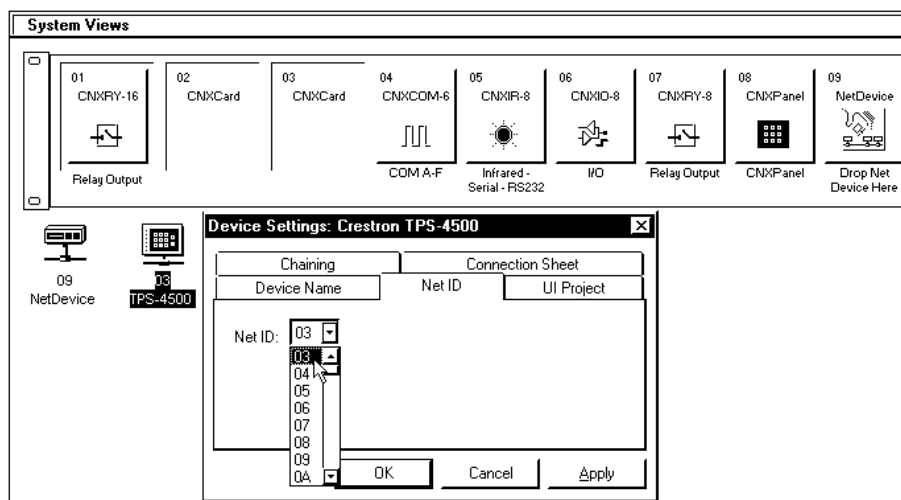
Room 1 uses relays A1 through A8; room 2 uses relays B1 through B8. When the user presses any of the buttons on the TPS-4500 for room 1 (join numbers 1 through 8), the corresponding signal goes high on the input of the Interlock symbol for room 1. The corresponding output of the Interlock latches high. Since the Interlock is mutually exclusive, only that output is high. The corresponding relay then latches high on the CNXRY-16 card.

How to Create the Program

Configuration Manager

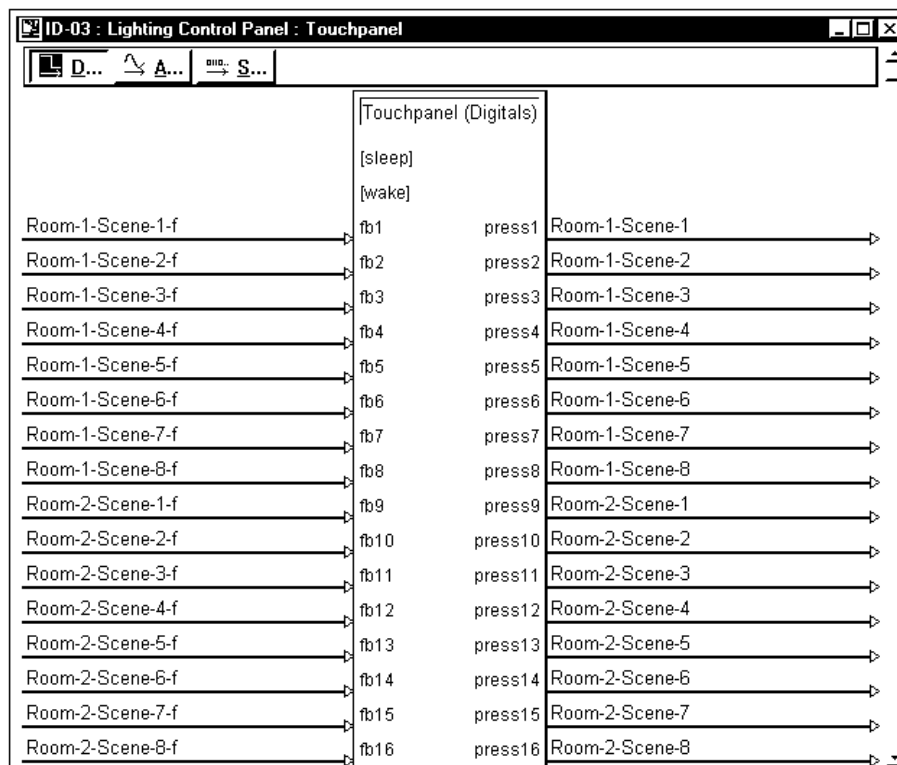
Use the Configuration Manager workspace (**Project | Configure System**) in SIMPL Windows to select and configure all the devices that need to be included into the system. For this example, add a CNXRY-16 to slot #1 of the CNMSX-PRO. Also add a TPS-4500 to the system; its NET ID must be set to 03, shown after this paragraph.

NOTE: SIMPL Windows v1.52.01 or later is required to program the control system containing a TPS-4500 touchpanel. If using an earlier version of SIMPL Windows, Crestron recommends a SIMPL Windows and operating system upgrade. The latest version can be obtained from the Downloads page (SIMPLWIN Library) of the Crestron website (www.crestron.com). New users are required to register in order to obtain access to the FTP site.

System View of the CNXRY-16 and TPS-4500 in SIMPL Windows' Configuration Manager

Programming Manager

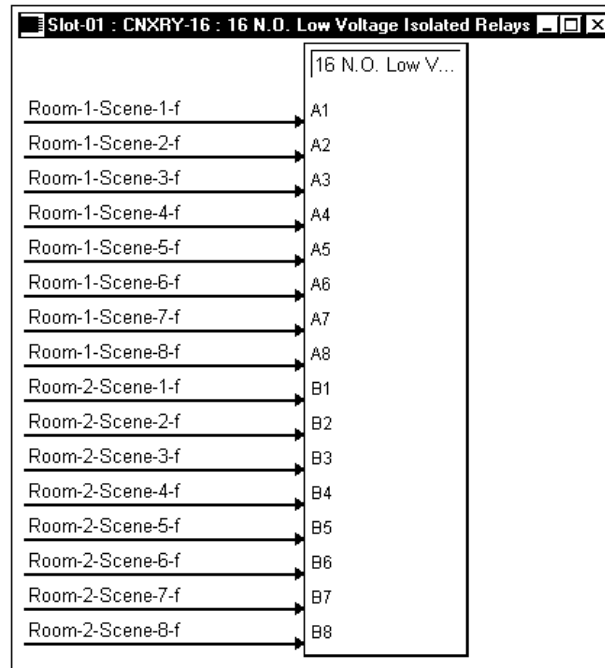
Use the Programming Manager workspace (**Project | Program System**) in SIMPL Windows to select symbols and assign their respective signals. For this example, a TPS-4500 and CNXRY-16 symbols were added automatically when the devices were added to the system in the Configuration Manager workspace. Expand the Network Modules folder and double click on the touchpanel for a detail view (alternatively CTRL+D or drag and drop into Detail View). Assign signals as shown after this paragraph.

Detail View of the TPS-4500 in SIMPL Windows' Programming Manager

NOTE: For a more descriptive symbol name, as shown in the previous illustration, right mouse click on the touchpanel icon in the Network Modules folder in Program View and select **Edit Symbol Comment** (alternatively, highlight the icon and depress Ctrl+R or Tab). Enter a new descriptive name in the “Enter Symbol Comment” dialog box and click OK.

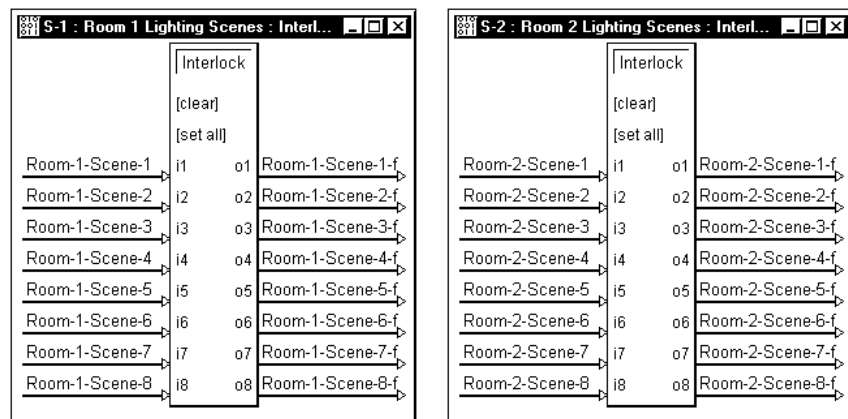
Expand the Central Control Modules folder and double click on the CNXRY-16 for a detail view (alternatively CTRL+D or drag and drop into Detail View). Assign signals as shown after this paragraph.

Detail View of the CNXRY-16 in SIMPL Windows’ Programming Manager



All logic symbols necessary for the SIMPL Windows program must be added from the *Symbol Library* in the Programming Manager workspace. In this example, drag and drop two Interlock symbols from the Memory folder into the Logic folder in *Program View*. Expand the Logic folder and double click on both Interlock icons for a detail view (alternatively CTRL+D or drag and drop into Detail View). Assign signals as shown after this paragraph.

Detail View of a Interlocks (S-1 & S-2) in SIMPL Windows’ Programming Manager



Reserved Join Numbers

A reserved join number is a feature of the software that enables a designer to create a button on a touchpanel page that either calls up the Setup Menu, alters brightness, etc. These numbers also allow the control system to trigger touchpanel functions (i.e., adjust brightness). The tables shown below and on the next page provide lists of digital and analog reserved join numbers available within the software.

XGA and Video Digital Reserved Join Numbers for TPS-4500/L Touchpanels

JOIN NUMBER	FUNCTION	VALUE
17101	Video	Composite 1
17102	Video	S-Video 1
17103	Video	Auto Detect 1
17111	Video Brightness	Increase
17112	Video Brightness	Decrease
17113	Video Contrast	Increase
17114	Video Contrast	Decrease
17115	Video Saturation	Increase
17116	Video Saturation	Decrease
17117	Video Hue	Increase
17118	Video Hue	Decrease

System Digital Reserved Join Numbers for TPS-4500/L Touchpanels

JOIN NUMBER	FUNCTION	VALUE
17210	Cresnet Mode	On
17211	Cresnet Mode	Off
17214	Cresnet ID	Down
17215	Cresnet ID	Up
17216	Brightness	Increase
17217	Brightness	Decrease
17218	Brightness	High
17219	Brightness	Medium
17220	Brightness	Low
17221	Brightness	Auto
17231	Standby Timeout	Up
17232	Standby Timeout	Down
17237	Panel Tracking	Enabled
17238	Panel Tracking	Disabled
17242	Call up Setup Menu	Not Applicable

RS-232 Digital Reserved Join Numbers for TPS-4500/L Touchpanels

JOIN NUMBER	FUNCTION	VALUE
17600	RS-232 Port Baud Rate	115200
17601	RS-232 Port Baud Rate	57600
17602	RS-232 Port Baud Rate	38400
17603	RS-232 Port Baud Rate	19200
17604	RS-232 Port Baud Rate	9600
17605	RS-232 Port Baud Rate	4800
17606	RS-232 Port Baud Rate	2400
17607	RS-232 Port Baud Rate	1200
17608	RS-232 Port Baud Rate	600
17609	RS-232 Port Baud Rate	300

Analog Reserved Join Numbers for TPS-4500/L Touchpanels

JOIN NUMBER	FUNCTION
17100	Video Brightness
17101	Video Contrast
17102	Video Saturation
17103	Video Hue
17203	System Standby Timeout

Problem Solving

Troubleshooting

The table below and on the next page provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

TPS-4500/L Touchpanel Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Touchpanel does not function.	Touchpanel is not communicating to the network.	Use Performance Viewport (via SIMPL Windows or VT Pro-e) to poll the network. Verify network connection to the touchpanel.
		Verify touchpanel is in "CRESNET MODE" as defined in "Interface Menu", page 16.
	Touchpanel is not receiving network power.	Confirm that power is supplied to the network.
	Touchpanel is incorrectly calibrated.	Enter "SETUP MODE" and recalibrate.

TPS-4500/L Touchpanel Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Touchpanel is not responding.	Incorrect network wiring.	Touch screen to remove message and verify correct wiring to all connectors.
	Touchpanel Cresnet ID is not set to match the Net ID in the SIMPL program.	Touch screen to remove 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 not unique, two or more units share same ID.	Enter Performance Viewport (via SIMPL Windows or VT Pro-e) to poll the network. Verify that each ID is used once.
Touchpanel display is dark.	Standby timeout has elapsed.	Touch screen to reactivate.
	Screen brightness is improperly set.	Enter "SETUP MODE" and alter screen brightness from the Setup Menu.
Unexpected response from touchpanel.	Touchpanel is incorrectly calibrated.	Enter "SETUP MODE" and recalibrate.

Further Inquiries

If after reviewing this Operations Guide for the TPS-4500/L touchpanel, you can not locate specific information or have questions, please take advantage of Crestron's award winning customer service team by calling:

- In the US and Canada, call Crestron's corporate headquarters at 1-888-CRESTRON [1-888-273-7876] or 1-201-767-3400.
- 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 +525-260-4336.

For local support from exclusive Crestron factory-trained personnel call:

- In Australia, call Soundcorp at +613-9488-1555.
- In New Zealand, call Amber Technologies at +649-410-8382.

Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the TPS-4500/L, 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.

The Downloads page of the Crestron website (www.crestron.com) directs the reader to the location and description of each update. Check the site periodically for update availability and its subjective value.

Appendix A: RS-232 Protocol

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

Suggested Serial Data Format

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

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

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 999, providing for up to 999 functions. When the button is released, a similar code is generated, with an 'R' in place of the 'P'. Given that only one button may be pressed at a time, an 'R' code always follows a 'P' code. A fixed three-digit format is used to simplify software on the host.

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

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

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

One quick note on baud rate and smooth ramping. Ramping is accomplished by sending successive levels to the object. To do this in 64 levels over three seconds, for example, requires about 576 bytes worth of commands to be sent, and could not be

accomplished at any rate less than 2400 baud. Obviously, ramping several objects at once requires a baud rate several times as high.

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

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

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

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

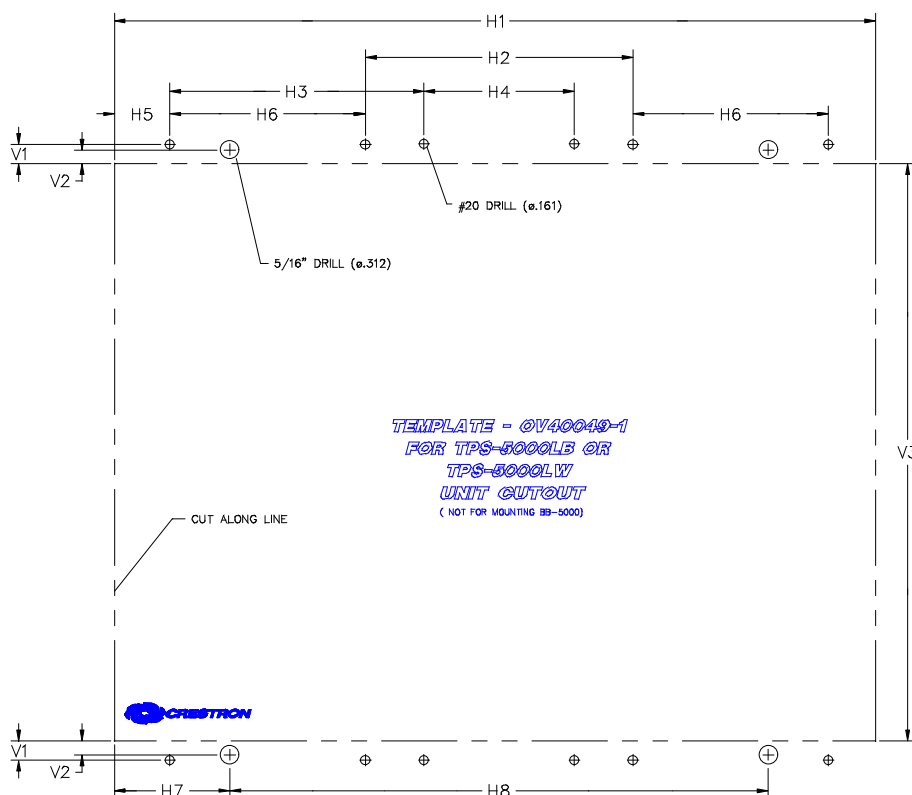
```
Now is the time
for all good men
to come to the
aid of the party.
```

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

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

Appendix B: Cutout Detail of Supplied Template

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



VERTICAL MEASUREMENTS

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

HORIZONTAL MEASUREMENTS

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

Return and Warranty Policies

Merchandise Returns / Repair Service

1. No merchandise may be returned for credit, exchange, or service without prior authorization from CRESTRON. To obtain warranty service for CRESTRON products, contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number, and return address.
2. Products may be returned for credit, exchange, or service with a CRESTRON Return Merchandise Authorization (RMA) number. Authorized returns must be shipped freight prepaid to CRESTRON, Cresskill, N.J., or its authorized subsidiaries, with RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. CRESTRON reserves the right in its sole and absolute discretion to charge a 15% restocking fee, plus shipping costs, on any products returned with an RMA.
3. Return freight charges following repair of items under warranty shall be paid by CRESTRON, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.

CRESTRON Limited Warranty

CRESTRON ELECTRONICS, Inc. warrants its Cresnet products, denoted by a "CN" prefix model number, to be free from manufacturing defects in materials and workmanship for a period of three (3) years from the date of shipment to purchaser. Disk drives and any other moving or rotating mechanical parts are covered for a period of one (1) year. CRESTRON warrants all its other products for a period of one year from the defects mentioned above, excluding touchscreen display components which are covered for 90 days. Incandescent lamps are completely excluded from Crestron's Limited Warranty. CRESTRON shall, at its option, repair or replace any product found defective without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty.

CRESTRON shall not be liable to honor warranty terms if the product has been used in any application other than that for which it was intended, or if it has been subjected to misuse, accidental damage, modification, or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced, or removed.

This warranty shall be the sole and exclusive remedy to the purchaser. In no event shall CRESTRON be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. CRESTRON makes no other warranties nor authorizes any other party to offer any warranty, expressed or implied, including warranties of merchantability for this product. This warranty statement supersedes all previous warranties.

Trademark Information

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Operations Guide – DOC. 5891
12.00

Specifications subject to
change without notice.