Crestron Isys™ **TPS-6000L**
15 Inch Lectern Touchpanel
Operations Guide

CRESTRON
REMOTE CONTROL SYSTEMS

Contents

15 Inch Lectern Touchpanel: Crestron Isys™ TPS-6000L

Description

Functional Description

The Crestron Isys™ TPS-6000L is a 15-inch (38.1-cm) XGA (1024 x 768) display suitable for lectern or 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 or RGB sources with the appropriate expansion card installed, the TPS-6000L can display up to 262,144 colors. There are two TPS-6000L models. The only difference between the two units is that one has a black bezel (TPS-6000LB) and the other has a white bezel (TPS-6000LW).

The purpose of the TPS-6000L 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. The TPS-6000L touchpanels offer:

- Three non-interchangeable card slots for expansion

- Memory upgrade

- Built-in microphone and speakers for sound

- Pop-up sub panels to reduce memory requirements, providing optimal speed and performance

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

- 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

Expansion Slots

Each TPS-6000L has three dedicated slots for additional functionality. The slots are empty with blank cover plates. Cards are purchased separately. Installation instructions are provided with each card. Each card features the following:

- **TPS-ENETL** – a 10/100 BaseT Ethernet card provides Ethernet capability to the touchpanel.

- **TPS-VIDL** – a TV video digitizer card that allows NTSC/PAL video to be played in a window on the touchpanel or full screen.

- **TPS-XVGAL** – a RGB digitizer that scan converts a computer source up to 1280 x 1024 at 60 Hz (110 Hz @ 640 x 480) vertical rate to a window on the touchpanel or full screen.

NOTE: The three cards are **NOT** interchangeable.

Memory

The TPS-6000L ships with 8MB 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.

Sound

The TPS-6000L has four built-in speakers with power amplifiers. Sound can be generated by the panel by using downloaded wave files (.WAV) or can be mixed in from an external line level audio source. The audio amplifiers output two watts per channel. Refer to "Appendix A: WAV File Audio Messages" on page 28 for WAV file details. There is a built-in microphone in the touchpanel, which is amplified to produce a line level differential output. The microphone amplifier has two modes, AGC or fixed gain. The AGC is selectable using an internal join number, refer to "Reserved Join Numbers" on page 24.

I/O Connectors

All totaled, there are 13 potential I/O connectors available on the TPS-6000L. Four of the 13 connectors are resident on the touchpanel as shipped from Crestron. The remaining nine connectors are optional and require the additional purchase and installation of expansion cards.

The resident connectors are:

- 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.

- AUDIO INPUT – The port mates with a six-pin connector, supplied, and provides differential/single ended audio input and output. Description of the pinouts is shown in the table after this paragraph.

AUDIO INPUT Pinouts

PIN	DESCRIPTION
S	Shield
R+	Right Positive
R-	Right Negative
L+	Left Positive
L-	Left Negative
S	Shield

- MIC OUT – The port mates with a three-pin connector, supplied, and produces line level differential output. Description of the pinouts is shown in the table after this paragraph.

MICROPHONE Pinouts

PIN	DESCRIPTION
M+	Positive
M-	Negative
S	Shield

- RS-232 – The port 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 B: RS-232 Protocol" on page 40 for protocol details.

RS-232 Pinouts

PIN	DESCRIPTION
1	CTS
2	GND
3	RXD
4	TXD
5	RTS
6	No Connect (N/C)

PC to TPS-6000L Cable Specifications
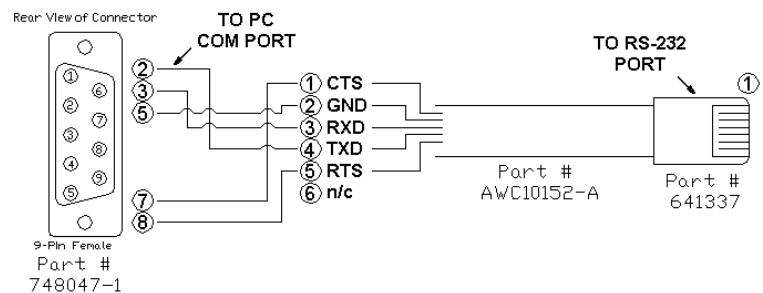
The optional connectors are:

- RGB INPUT – These five connectors are made available with the purchase and installation of the TPS-XVGAL, a scan converter card. Consult the latest revision of the TPS-XVGAL Operations & Installation Guide (Doc. 5828) for details.

- 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.

- LAN – This port is made available with the purchase and installation of the TPS-ENETL, a 10/100 BaseT Ethernet card. Consult the latest revision of the TPS-ENETL Operations & Installation Guide (Doc. 5829) for details.

Physical Description

The 15-inch (38.1-cm) touch sensitive viewing screen is located on the front of the TPS-6000L touchpanel, shown after this paragraph. The electronic hardware is housed in a black metal enclosure. All audio, video, Ethernet, RS-232, and network connections are made at the rear of the unit. Two grills located on the front of the unit conceal four speakers and a microphone.

NOTE: Video, RGB, and Ethernet connections are available after installing the appropriate expansion card into the TPS-6000L touchpanel.

Physical Views of the TPS-6000L Touchpanel (Front & Side)
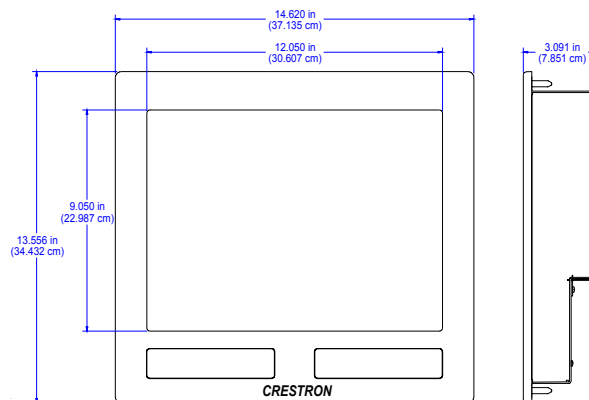
Physical Views of the TPS-6000L Touchpanel (Rear and Side)
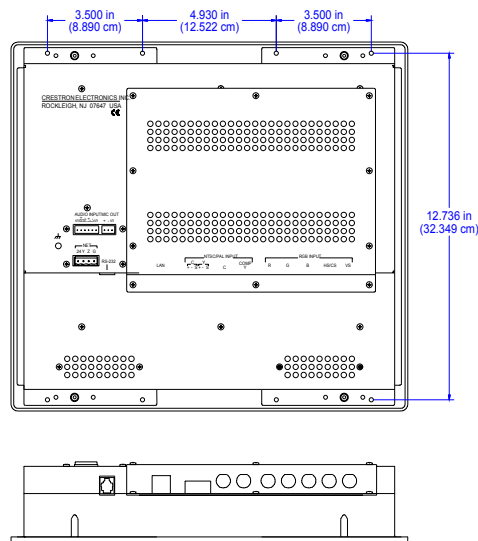
Leading Specifications

The table below provides a summary of leading specifications for the TPS-6000L touchpanels. Dimensions and weight are rounded to the nearest hundredth unit.

Leading Specifications for the TPS-6000L Touchpanel

SPECIFICATION	DETAILS
Power Requirements (without cards)	24 Watts (1 Amp @ 24 VDC)[1]
SIMPL™ Windows®	Version 1.50.05 or later[2]
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 14.1 or later[2]
Memory	8MB of flash; 8MB of DRAM[6]
Speaker Amplification	2 Watts per channel
Microphone Amplification Modes	AGC or fixed gain
Dimensions & Weight - with bezel	Height: 13.56 in (34.43 cm)
	Width: 14.62 in (37.14 cm)
	Depth: 3.09 in (7.85 cm)
	Weight: 8.56 lb (3.89 kg)
View Screen Dimensions	Height: 9.05 in (22.99 cm)
	Width: 12.05 in (30.61 cm)
Screen Viewing Angles	+/-70° for X dir and +/-60° for Y dir
View Screen Resolution	1024 x 768 pixels
View Screen LCD	XGA display
	(16 bit graphics mode - 65,536 colors)
	(262,144 colors with TPS-XVGAL or TPS-XVIDL)
View Screen Illumination	Edgelit Fluorescent
View Screen Touch Screen	Resistive Membrane

1   The individual power requirements for the expansion cards are:
     TPS-ENETL: 4Watts (0.167 Amps @ 24 VDC)
     TPS-VIDL: 8 Watts (0.333 Amps @ 24 VDC)
     TPS-XVGAL: 10 Watts (0.417 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).

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-6000L when using these control systems, either use the RS-232 port on the TPS-6000L or use Ethernet direct to the panel (assuming the TPS-ENETL is installed).

6   Additional memory can be purchased, refer to "Memory" on page 2. The complexity of the control screens and the sampling of the WAV files influence memory usage.

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

C E

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 11 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. Remove bezels to clean entire touchscreen surface. Apply cleaning solution to the cloth rather than the surface of the touchscreen. Wipe touchscreen clean and avoid ingress of moisture within the panels.

Network Wiring

NOTE: When making wire 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 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.

Hardware Hookup

The TPS-6000L touchpanel installs simply and cleanly into existing or newly constructed walls, with back box and drywall mounting options.

Back Box Mounting

Back box mounting is typically used at new construction sites. The optional back box, BB-6000, 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-6000 Installation Guide (Doc. 5826). 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-6000L are not required for the back box mounting option.

Direct Mounting

The TPS-6000L 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-6000L Supplied Mounting Hardware and Accessories

| ITEM	PART NUMBER	QUANTITY
Large Metal Mounting Plate	MTPL02551-1	2
Small Metal Mounting Plate	MTPL02523-1	2
Template	OV40051-1	1
Screw, Pan Phillips	#6-32 x 1" LG	12
Network Connector	JHPS197SG04SR-2	1
Microphone Connector	JHPS135SG03SR-1	1
Audio Input Connector	JHPS135SG06SR-1	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 (40051, 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 C: Cutout Detail of Supplied Template" on page 42 for an illustrative reference.

6. Drill 12 holes marked "A" on template with #20 bit. Refer to "Appendix C: Cutout Detail of Supplied Template" on page 42 for an illustrative reference.

7. Slide one large metal mounting plate through the opening and position it inside along the top horizontal edge.

8. Position one small metal mounting plate along the top horizontal edge so that it covers the two center holes marked "A".

9. Use two pan head screws, supplied, to secure the bracket and plate to the mounting surface. Tighten by hand; do not fully tighten screws.

*Securing Two Plates to Top and Bottom Edges of Opening*
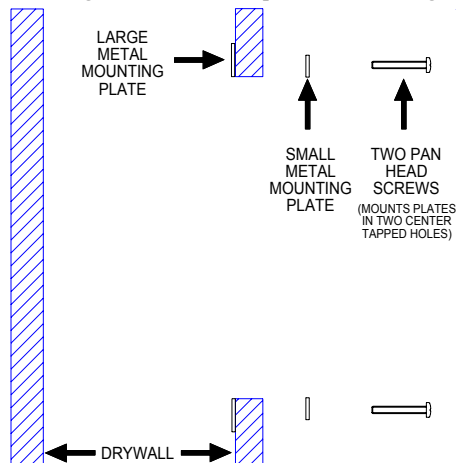
10. Repeat steps 7 through 9 for the bottom horizontal edge of the opening.

11. Attach the network cable and other RS-232, audio, video, or Ethernet cables in the wall to the appropriate connector on the back of the touchpanel. Refer to "Network Wiring" on page 6 for network wiring details. Information about the RS-232, microphone, and audio input connectors are located in "I/O Connectors" on page 2. For wiring the other connectors, refer to the appropriate Operations & Installation Guide for each expansion card.

12. Position the touchpanel (less the faceplate) into the opening and secure with eight pan head screws, supplied. Tighten by hand; do not fully tighten screws.

Positioning Touchpanel into Opening
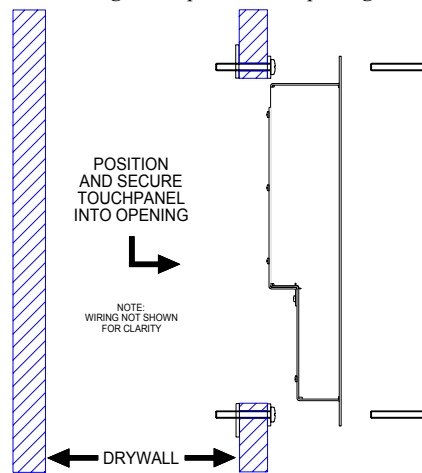
13. Use the #2 Phillips screwdriver and fully tighten all 12 pan head screws. Use caution and do not crack or damage mounting surface.

14. Mate the four posts of the bezel with the holes drilled into the mounting surface and firmly press on the bezel over the touchpanel.

Cover Touchpanel with Bezel
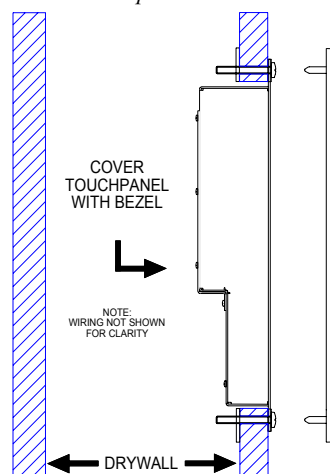
Configuring the Touchpanel

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

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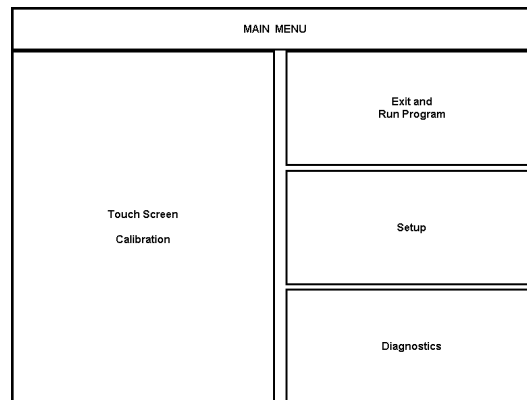
The **Exit and Run Program** button verifies that all of the setup information has been saved to EEPROM and displays the main page that has been programmed into your system. The remaining buttons on the Main Menu open other menus, which are discussed in subsequent paragraphs.

Calibration Menu

Calibration 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

| CALIBRATION MENU	
Perform Calibration	
	Return
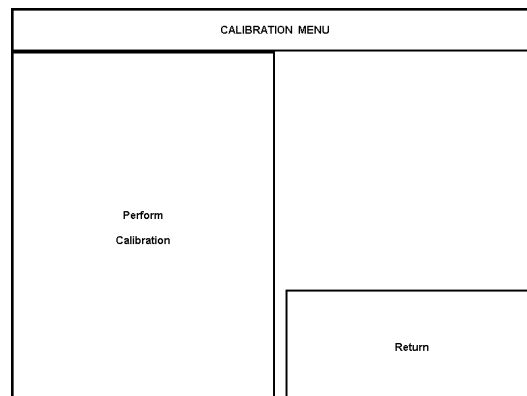
If you proceed to calibrate the touchpanel, the screen prompts you with the message "Touch Upper Left +" nearly centered on the display. A cross hair (+) in the upper left corner indicates the exact location. Touch the cross hair (+) in the upper left corner of the screen to initiate calibration. Another 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
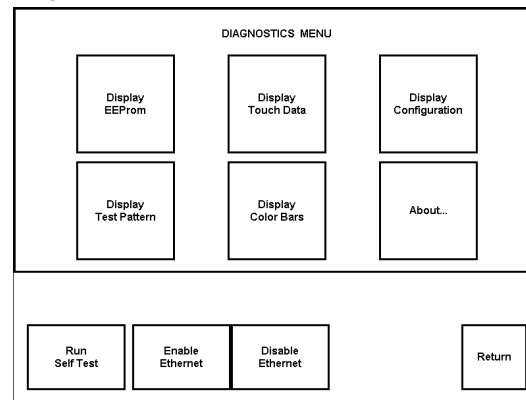
Setup Menu

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, panel tracking, and Ethernet) are available directly from the Setup Menu and are explained in the following paragraphs. Other setup parameters (i.e., interface, RS-232, audio, RGB, and video) use additional menus and are detailed in subsequent paragraphs as well. After setup parameters have been set, select the **Return** button to return to the Main Menu.

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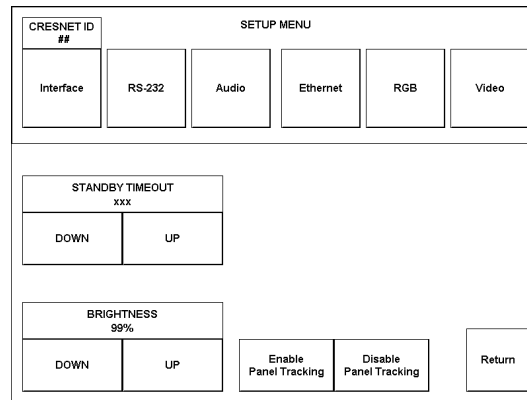
NOTE: All touchpanel settings, except those menus with a **Save and Return** button, are automatically saved in non-volatile memory.

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.

Ethernet

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

> **NOTE:** IP settings are necessary only if the TPS-ENETL is installed. Serially connect a PC to the TPS-6000L via the RS-232 connector and refer to the details in the latest revision of the TPS-ENETL (Doc. 5829).

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

Sample Display from Ethernet Button Press


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

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

The Cresenet network identity number (CRESNET ID) is displayed at the bottom of the left-most column in 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 above 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**.

There may be Ethernet devices on the network that communicate with the control system via CIP (Cresnet Internet Protocol). Two buttons in the top left corner of the Interface Menu determines if the touchpanel is capable of this type of communication. Select **Enable CIP** to permit this protocol recognition and **Disable CIP** to prohibit any CIP connection.

The Interface Menu allows for four RS-232 communication options: console (i.e., loading programs), control (i.e., non-Crestron device), mouse input, or external touch screen input. The four 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 four 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 or perhaps CIP (Ethernet). Some advanced users may combine Control or CIP with Cresnet. Text within selected buttons change color from black to red.
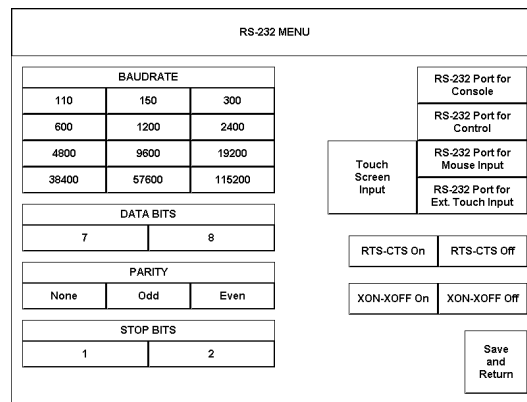
It is possible to maintain touchpanel control (with the **Touch Screen Input** button) while communicating via RS-232 with the console or non-Crestron device. Text within the selected button changes color from black to red. The **Touch Screen Input** button is repeated on the RS-232 Menu for convenience.

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. 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

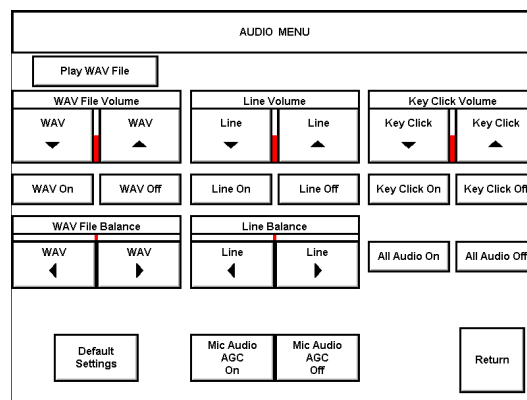| RS-232 MENU				
BAUDRATE				RS-232 Port for Console
110	150	300		RS-232 Port for Control
600	1200	2400		RS-232 Port for Mouse Input
4800	9600	19200	Touch Screen Input	
38400	57600	115200		RS-232 Port for Ext. Touch Input
DATA BITS				
7		8	RTS-CTS On	RTS-CTS Off
PARITY				
None	Odd	Even	XON-XOFF On	XON-XOFF Off
STOP BITS				
1		2		Save and Return

For convenience, the RS-232 Menu also displays the four RS-232 communication options and the **Touch Screen Input** button. 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.

Audio Menu

The **Audio** button, centrally located on the top row of the Setup Menu, is used to display the Audio Menu, shown after this paragraph. Use this screen to activate sounds (recorded WAV files or line level input from an external source) and audible key clicks on each individual touchpanel. This feature is a useful feedback tool or can enhance a custom interface.

Audio Menu

AUDIO MENU					
Play WAV File					
WAV File Volume		**Line Volume**		**Key Click Volume**	
WAV ▼	WAV ▲	Line ▼	Line ▲	Key Click ▼	Key Click ▲
WAV On	WAV Off	Line On	Line Off	Key Click On	Key Click Off
WAV File Balance		**Line Balance**			
WAV ◀	WAV ▶	Line ◀	Line ▶	All Audio On	All Audio Off
	Default Settings	Mic Audio AGC On	Mic Audio AGC Off	Return	

Volume (for each audio type) is controlled with the up and down arrow buttons in the first row. For example, the **WAV File Volume** value is shown as a red bar graph and is controlled with the **WAV** down and **WAV** up arrow buttons. Line and key click volume is similarly adjusted.

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

The **Play WAV File** button appears beneath Audio Menu title block. Select this button to adjust the volume and balance as a pre-loaded WAV file plays. WAV file

audio messages can provide that custom interface with a touchpanel, assuming this feature is enabled. To enable this feature, verify that the **WAV On** button is active (red text). An active **WAV Off** button disables the feature. Refer to "Appendix A: WAV File Audio Messages" on page 28 for WAV files.

Line level audio is possible only when enabled and the proper external connections are made. Refer to "I/O Connectors" on page 2 for information about the **AUDIO INPUT** port. To enable this feature, verify that the **Line On** button is active (red text). An active **Line Off** button disables the feature.

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

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

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

The built-in microphone AGC mode can be controlled with two buttons on the Audio Menu: **Mic Audio AGC On** and **Mic Audio AGC Off**.

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

RGB Menu

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

The TPS-6000L can display a computer-generated video format. The type of format must be selected carefully or the video may appear unstable or noisy. Selecting the **RGB** button, located to the right on the top row of the Setup Menu, displays the RGB Menu, shown after this paragraph.

RGB Menu

The characteristics of the input signal are displayed centrally at the bottom of the RGB Menu. For example, in the above illustration, the input signal has a resolution of 1024 x 768 with a frequency of 60.9 KHz (horizontal) and 76.1 Hz (vertical). If the input signal has the same video (plus or minus some noise) as one of the presets, The **Detected Preset** box shows the value. For the sake of this procedure, **Detected Preset 16** is shown as an example. If there is no preset detected, the box shows **0** as the value.

The touchpanel is capable of storing 16 VGA formats; the panel is factory set with the presets empty. To assign a format to a preset, complete the following steps:

1. Select a preset button (numbered **1** through **16**). For the sake of this procedure, select **11**.

2. Select the **Display RGB** button at the top of the RGB Menu to display the screen after this step.

RGB Controls (Vertical Lines Portray RGB Sample)
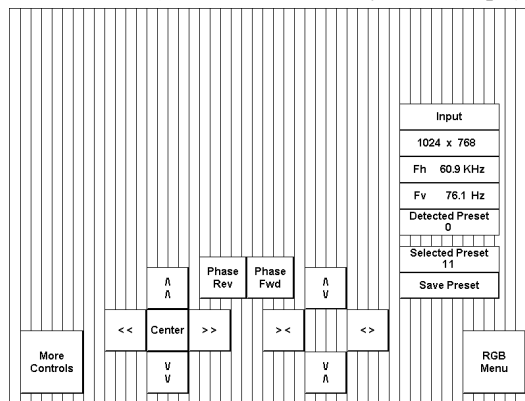
3. While viewing the sample of the input signal, use the arrow buttons around the **Center** button and then the other arrow buttons to position and compress/expand the sample so that it fills the entire screen.

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

4. While viewing the sample of the input signal, use the **Phase Rev** and **Phase Fwd** buttons to adjust the timing of the sample.

5. If necessary, select the **More Controls** button to show additional controls for RGB.

6. In the box beneath the characteristics of the input signal, confirm that the **Selected Preset** number matches the one selected in step 1.

   If **0** appears, no preset was selected in step 1. To correct, perform the following steps (in sequence): 8, 1, and 2. Then continue with the next step.

7. If visually satisfied with the sample, select the **Save Preset** button. Otherwise use the buttons on the screen to make additional adjustments.

8. At any time, the **RGB Menu** button can be selected to return to the RGB Menu.

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

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

The user has the option to manually select a preset for the incoming format or have the touchpanel select one automatically. On the rare occasion, the user may want to choose the **Manual Select** button to force a preset on an incoming format. Otherwise, select the **Auto Select** button to have the touchpanel automatically search through the preset formats for a match to the input signal.

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

Video Menu

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

The TPS-6000L 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
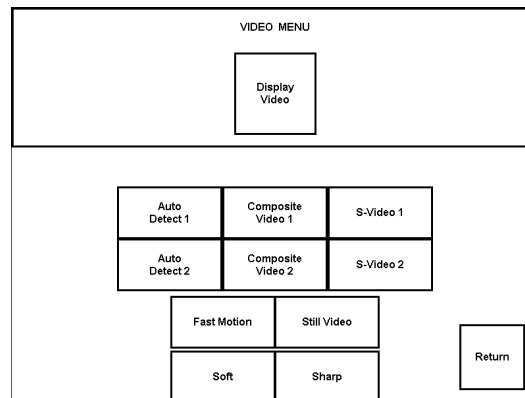
Use this screen to select one of the video inputs and adjust the brightness, contrast, saturation, and hue, if necessary. The user has the option to force the video image to a certain mode (i.e., composite video or S-video) or switch modes automatically after checking the image for colors. Use either the **Composite Video** or **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 **Auto Detect** button for automatic control. The number (1 or 2) on the selected button specifies the video input connector. Number 1 corresponds to the twisted pair connector and number 2 corresponds to the BNC connectors. 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 **Display Video** button to actually display the video input signal. Select the **Return** button, located at the lower right corner of the Video Menu, after video parameters have been set.

VisionTools™ Pro-e (Multi-Mode Objects)

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 27.

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-6000L 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.

Multi-mode objects offer high-performance programming!

The single most-advanced VT Pro-e high-performance programming technique involving the TPS-6000L 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 colors 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 (Multi-Mode Objects)" 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-6000L 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-6000.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-6000L touchpanel SIMPL program is shown after this paragraph in block diagram form. For this example, the TPS-6000L is the user interface in a control system containing a CNMSX-PRO, which has a CNXRY-16 occupying slot 1. Assume that the TPS-6000L 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-6000L
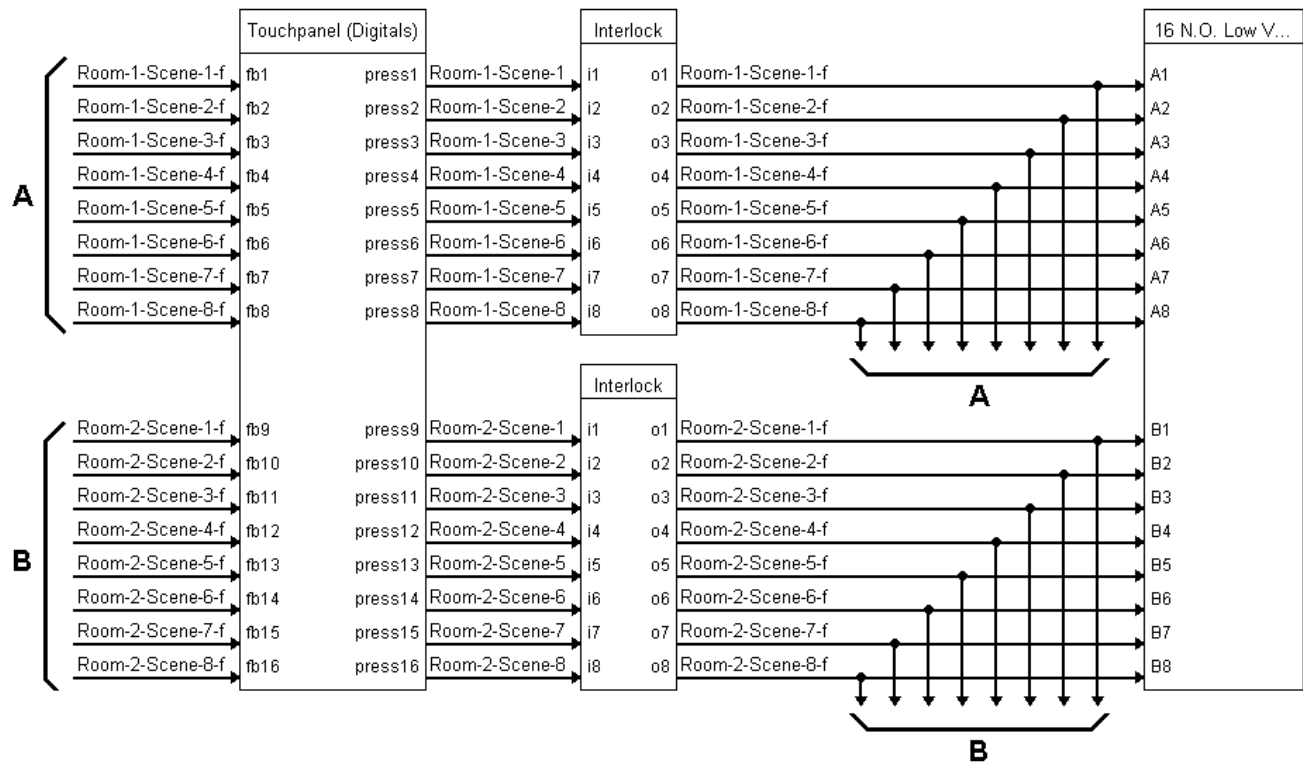
Room 1 uses relays A1 through A8; room 2 uses relays B1 through B8. When the user presses any of the buttons on the TPS-6000L for room 1 (join numbers 1 through 8), the corresponding signal goes high on the input of the Interlock symbol for room 1. The corresponding output of the Interlock latches high. 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

NOTE: SIMPL Windows v1.50.05 or later is required to program the control system containing a TPS-6000L 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.

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-6000L to the system; its NET ID must be set to 03, shown after this paragraph.

System View of the CNXRY-16 and TPS-6000L in SIMPL Windows' Configuration Manager
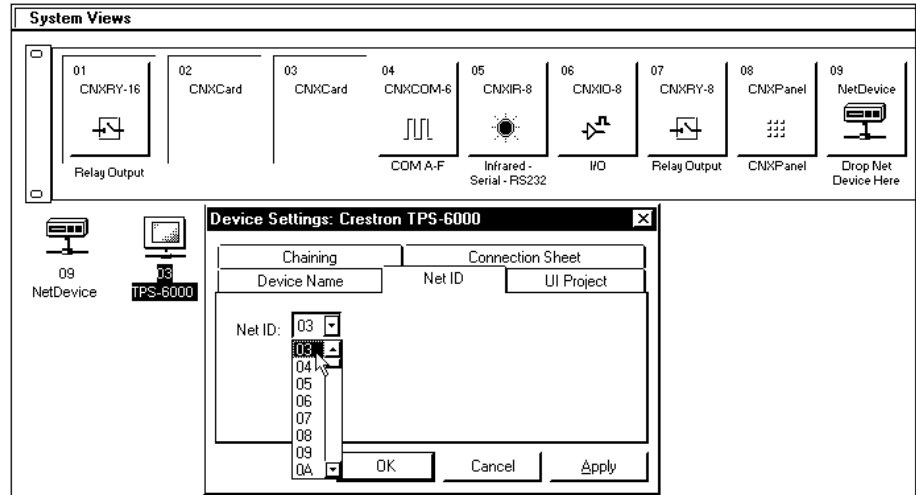
Programming Manager

Use the Programming Manager workspace (**Project | Program System**) in SIMPL Windows to select symbols and assign their respective signals. For this example, a TPS-6000L 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-6000L in SIMPL Windows' Programming Manager
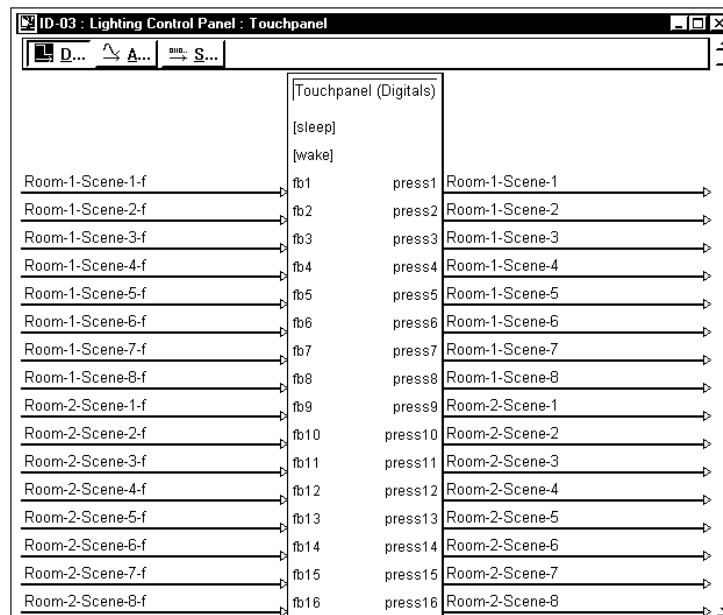
> **NOTE:** For a more descriptive symbol name, as shown in the previous illustration, right mouse click on the touchpanel icon in the Network Modules folder in Program View and select **Edit Symbol Comment** (alternatively, highlight the icon and depress Ctrl+R or Tab). Enter a new descriptive name 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
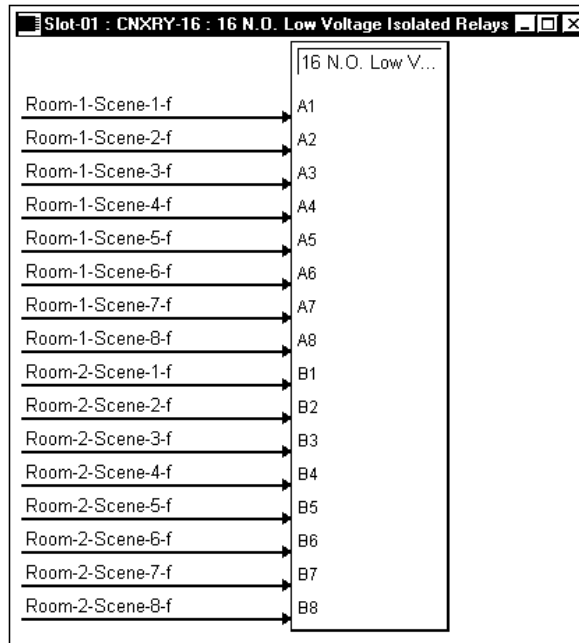
All logic symbols necessary for the SIMPL Windows program must be added from the *Symbol Library* in the Programming Manager workspace. In this example, drag and drop two Interlock symbols from the Memory folder into the Logic folder in *Program View*. Expand the Logic folder and double click on both 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
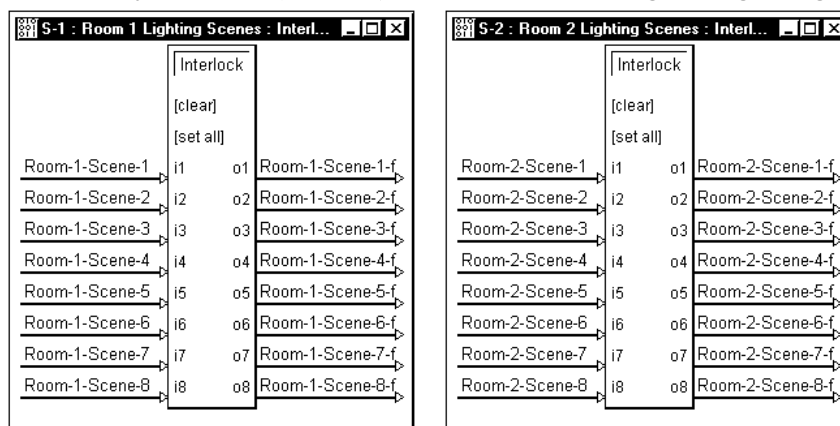
Reserved Join Numbers

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., recall RGB preset when source changes). The tables shown below and on the next two pages provide lists of digital and analog reserved join numbers available within the software.

XGA and Video Digital Reserved Join Numbers for TPS-6000L Touchpanels

JOIN NUMBER	FUNCTION	VALUE
17016*	Preset	Refer to * below
17101	Video	Composite 1
17102	Video	S-Video 1
17103	Video	Auto Detect 1
17104	Video	Composite 2
17105	Video	S-Video 2
17106	Video	Auto Detect 2
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

* Join numbers 17016 through 17031 corresponds to Preset 1 through Preset 16, sequentially.

System Digital Reserved Join Numbers for TPS-6000L 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

Audio Digital Reserved Join Numbers for TPS-6000L Touchpanels

JOIN NUMBER	FUNCTION	VALUE
17300	Audio	On
17301	Audio	Off
17302	Key Click	On
17303	Key Click	Off
17304	Key Click Volume	Increase
17305	Key Click Volume	Decrease
17306	Line Audio	On
17307	Line Audio	Off
17308	Line Audio Volume	Increase
17309	Line Audio Volume	Decrease
17310	Line Audio Balance	Left
17311	Line Audio Balance	Right
17312	WAV Audio	On
17313	WAV Audio	Off
17314	WAV Audio Volume	Increase
17315	WAV Audio Volume	Decrease
17316	WAV Audio Balance	Left
17317	WAV Audio Balance	Right

Ethernet Digital Reserved Join Numbers for TPS-6000L Touchpanels

JOIN NUMBER	FUNCTION	VALUE
17401	Ethernet Port	On
17402	Ethernet Port	Off

RS-232 Digital Reserved Join Numbers for TPS-6000L 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-6000L Touchpanels

JOIN NUMBER	FUNCTION
17100	Video Brightness
17101	Video Contrast
17102	Video Saturation
17103	Video Hue
17203	System Standby Timeout
17300	Key Click Volume
17301	Audio Line Volume
17302	WAV Audio Volume
17303	Audio Line Balance
17304	WAV Audio Balance

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-6000L Touchpanel Toubleshooting

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 13.
	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 responding and screen displays "Network Poll Error" message.	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.

TPS-6000L Touchpanel Toubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
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-6000L touchpanel, you cannot 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 +5255-5093-2160.

- In Australia, call Crestron Pacific at +613-9480-2999.

For local support from exclusive Crestron factory-trained personnel in New Zealand call Amber Technologies at +649-410-8382.

Appendix A: WAV File Audio Messages

The TPS-6000L touchpanel 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/NT™. 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-6000L touchpanel only accepts the following WAV file formats:

- PCM

- 8000, 11025, 16000, 22050, and 44100 Hz

- 8 and 16 Bit

- Mono and Stereo

NOTE: If the Sound Recorder program is not available on the PC, select **Start** | **Help** at the Windows taskbar. Click on the **Index** tab and type in **Sound Recorder**. For Windows 95/NT, double-click the **installing** entry. For Windows 95/98/NT, follow the directions provided to add the Sound Recorder program. (The Sound Recorder is part of the **Multimedia** component). The Windows® install CD is required.

This section mentions the location of the Crestron pre-recorded files and contains descriptions as well as procedures on how to use Sound Recorder to record, edit, and convert WAV file messages. For more information about how to use Sound Recorder, refer to its User's Guide and extensive help information provided with the software. The last section of this appendix describes how to use VT Pro-e to attach WAV files to a touchpanel project.

Downloadable WAV Files

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. "To Create WAV Messages from Individual Files" on page 31 describes how to create custom messages.

NOTE: WAV files (formatted specifically for the TPS-6000L touchpanel) can be obtained from the Downloads page (WAV_ISYS Library) of the Crestron website (www.crestron.com). New users are required to register in order to obtain access to the FTP site.
These WAV files are different than those made available for other Crestron products. Be sure to use only those WAV files designated for the TPS-6000L touchpanel.
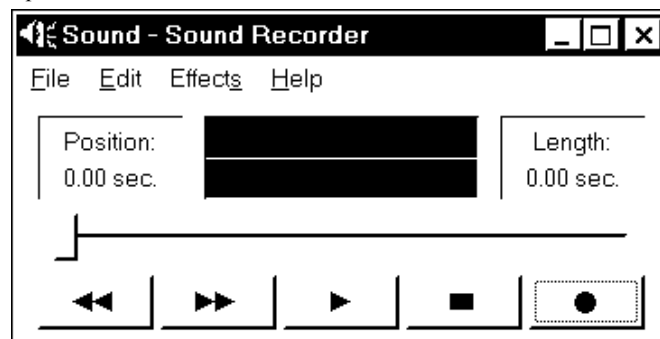
To Record a WAV File Message

NOTE: To record a WAV file, the PC must be equipped with audio capabilities (i.e., a microphone-input jack, a microphone, multimedia speakers, and a recording program such as Microsoft Sound Recorder). The examples in this appendix use Sound Recorder. If another recording program is preferred, consult the manufacturer's directions.

NOTE: Although there are alternative methods for selecting the commands of the application, the following procedure uses the PC mouse and pull-down Menu Bar.

To record a WAV file message, perform the following procedure:

1. At the Windows taskbar, select **Start** | **Programs** | **Accessories**. For Windows 95/NT, select **Multimedia**, for Windows 98, select **Entertainment**. Select **Sound Recorder** and the Sound Recorder opens as shown below.

Open Sound Recorder

2. Select **File** | **New** as shown below.

Create New File to Record
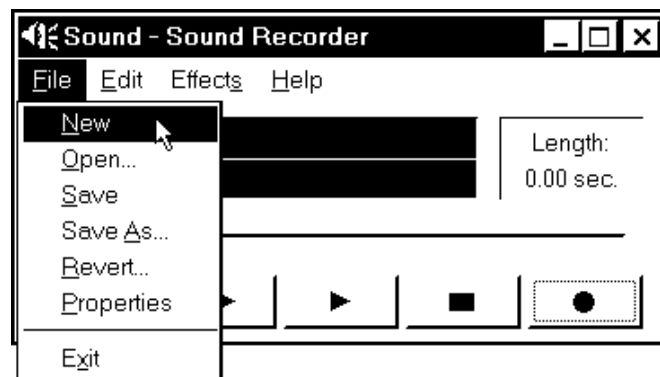
3. Click on the ● button to begin recording and the ■ button to stop recording.

4. Proceed to "Set WAV File or Message Properties, Save, and Exit" on page 34. To record another file, follow that procedure to step 9.

To Convert a WAV File

NOTE: To convert pre-recorded WAV file to an acceptable format, the PC must be equipped with audio capabilities (i.e., a microphone-input jack, a microphone, multimedia speakers, and a recording program such as Microsoft Sound Recorder). The examples in this appendix use Sound Recorder. If another recording program is preferred, consult the manufacturer's directions.

NOTE: Although there are alternative methods for selecting the commands of the application, the following procedure uses the PC mouse and pull-down Menu Bar.

To convert a WAV file, perform the following procedure:

1. At the Windows taskbar, select **Start** | **Programs** | **Accessories**. For Windows 95/NT, select **Multimedia**, for Windows 98, select **Entertainment**. Select **Sound Recorder** and the Sound Recorder opens as shown below.

Open Sound Recorder
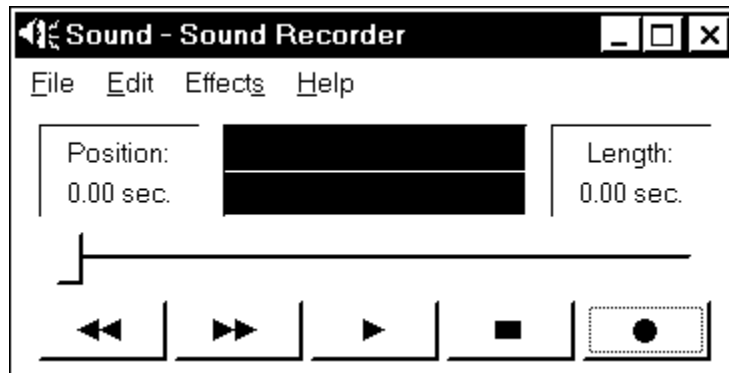
2. Select **File** | **Open**, browse to the directory or folder that contains the file to be converted, and open the file.

Open WAV File to Convert
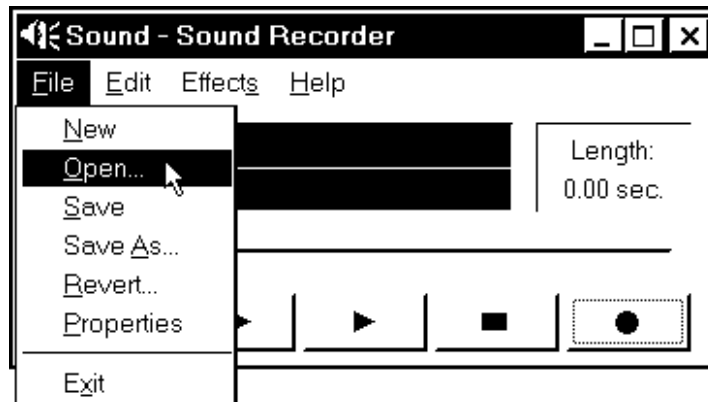
3. Proceed to "Set WAV File or Message Properties, Save, and Exit" on page 34. To convert another file, follow that procedure to step 9.

To Create WAV Messages from Individual Files

NOTE: To create messages by combining individual WAV files, the PC must be equipped with audio capabilities (i.e., a microphone-input jack, a microphone, multimedia speakers, and a recording program such as Microsoft Sound Recorder). The examples in this appendix use Sound Recorder. If another recording program is preferred, consult the manufacturer's directions.

NOTE: Although there are alternative methods for selecting the commands of the application, the following procedure uses the PC mouse and pull-down Menu Bar.

To create messages from individual WAV files, perform the following procedure:

1. At the Windows taskbar, select **Start** | **Programs** | **Accessories**. For Windows 95/NT, select **Multimedia**, for Windows 98, select **Entertainment**. Select **Sound Recorder** and the Sound Recorder opens as shown below.

Open Sound Recorder
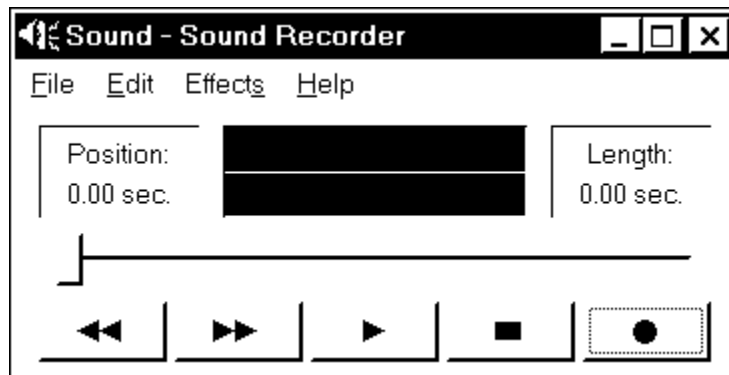
2. Select **File** | **New** as shown below.

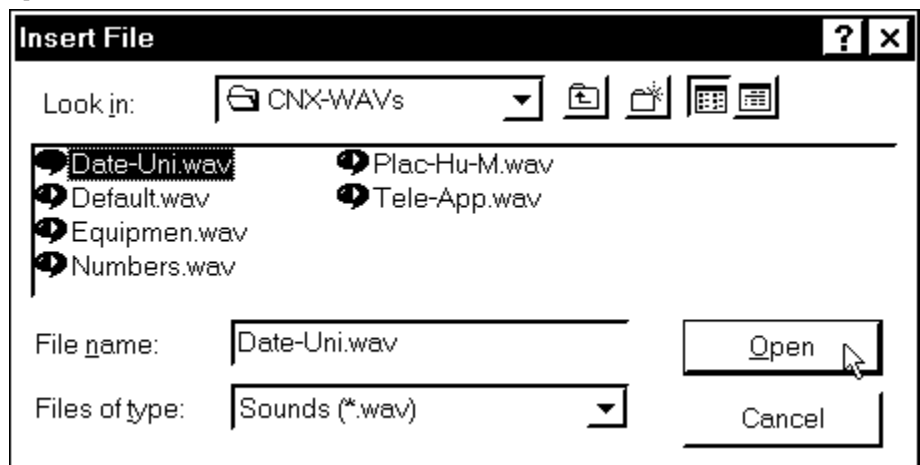*Create New File to Create Message*
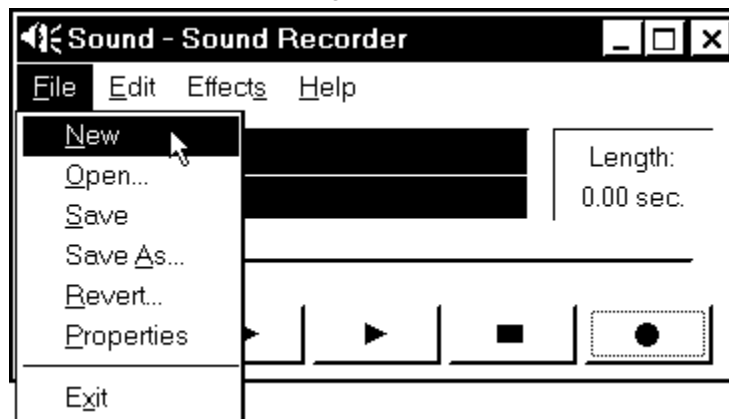
3. Select **Edit** | **Insert File** as shown below.

Insert First WAV File
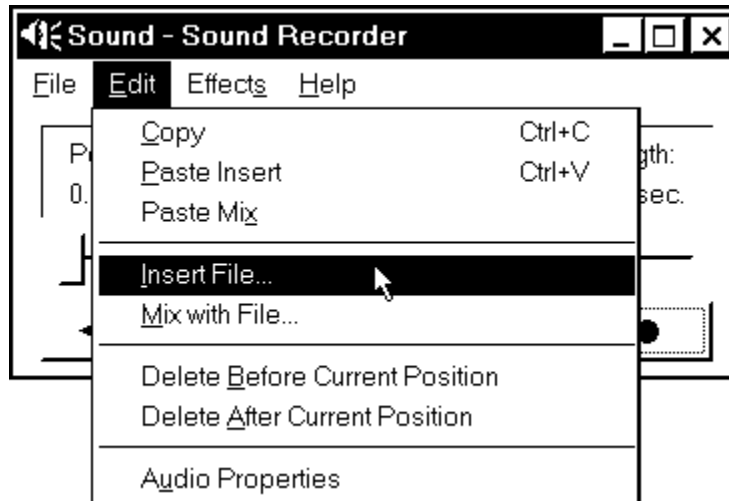
4. From the insert file dialog box shown below, browse to the directory or folder that contains the first WAV file to be inserted, and open the file.
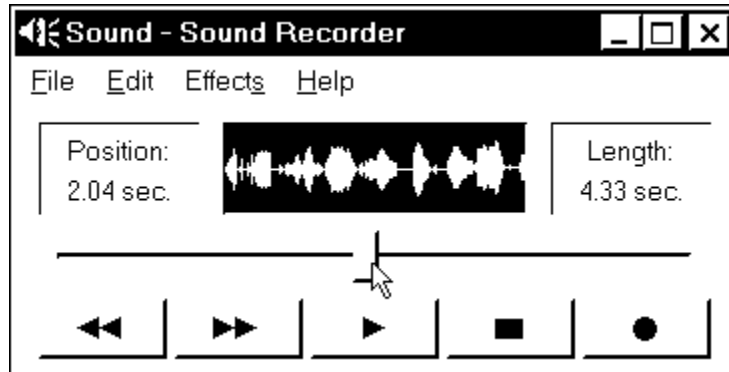
Open First WAV File

5. As shown below, move the file position slider (or click ◄◄ or ►►)
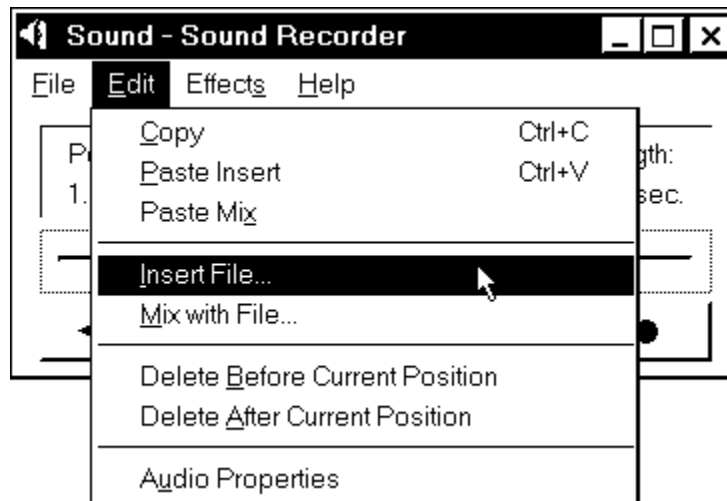   to where to insert another file.

NOTE: The figure below shows the insertion point near the middle of the file. The
most common insertion points are at the end or beginning of the file.

File Insertion Point

6. Again, select **Edit** | **Insert File** as shown below.

Insert Another WAV File

7. Browse to the directory or folder that contains the next WAV file to be
    inserted, and open the file.

8. Repeat the above three steps until all desired files have been inserted.

9. Proceed to "Set WAV File or Message Properties, Save, and Exit" on
    page 34. To create another message, follow that procedure to step 9.

## Set WAV File or Message Properties, Save, and Exit

NOTE: The following procedure assumes that Sound Recorder is open.

NOTE: Although there are alternative methods for selecting the commands of the application, the following procedure uses the PC mouse and pull-down Menu Bar.

To set the WAV file (or message) properties, save the file, and exit Sound Recorder, perform the following procedure:
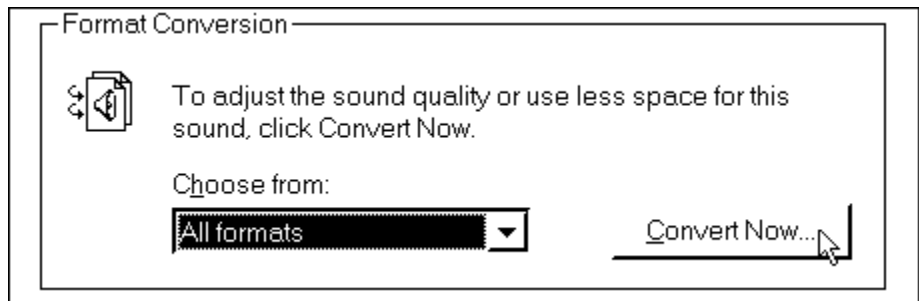
      1.   Select **File** | **Properties** as shown below.

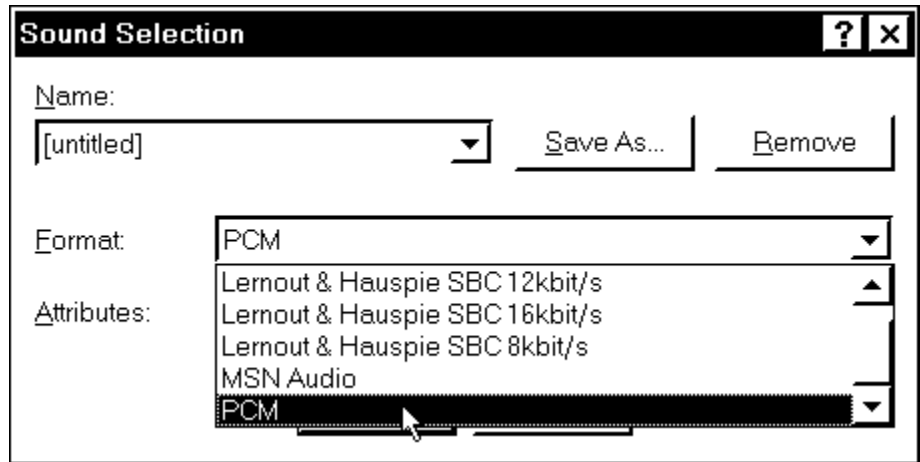*Access File Properties*
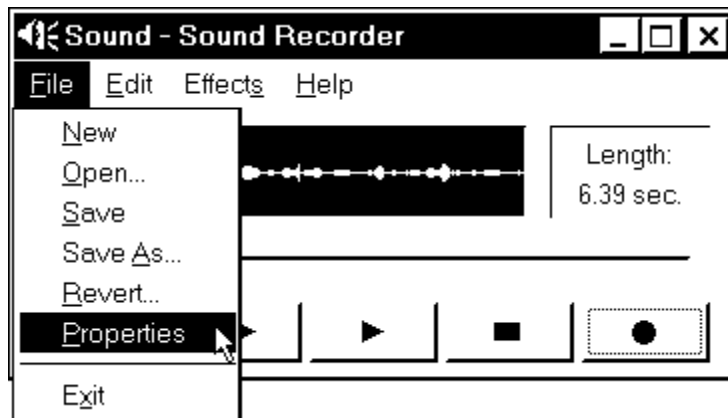
      2.   When the Properties for Sound dialog box opens, click on **Convert Now**.
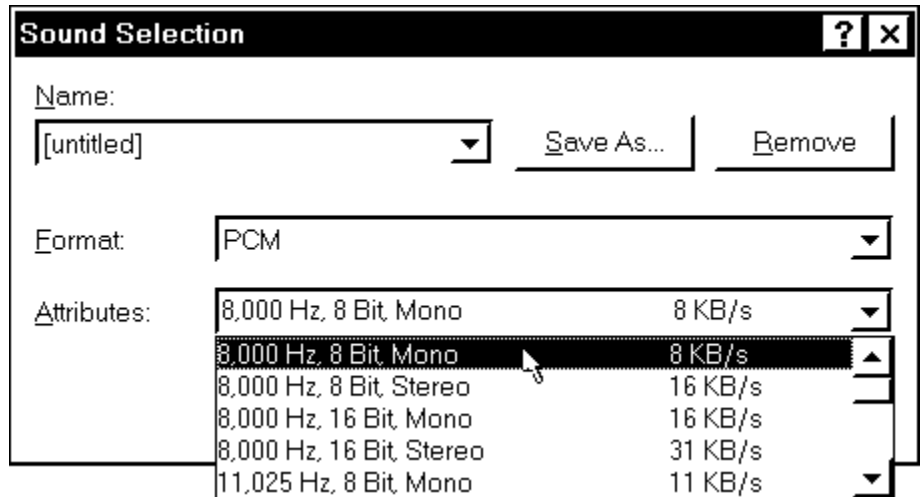
Access File Properties Conversion

3. In the Sound Selection dialog box, make sure that the Format field has **PCM** selected. If not, select it as shown below.

Select File Format

4. Make sure that the Attributes field has a suitable format (i.e., 8,000 Hz, 8 Bit, Mono) selected. If not, select it as shown below.
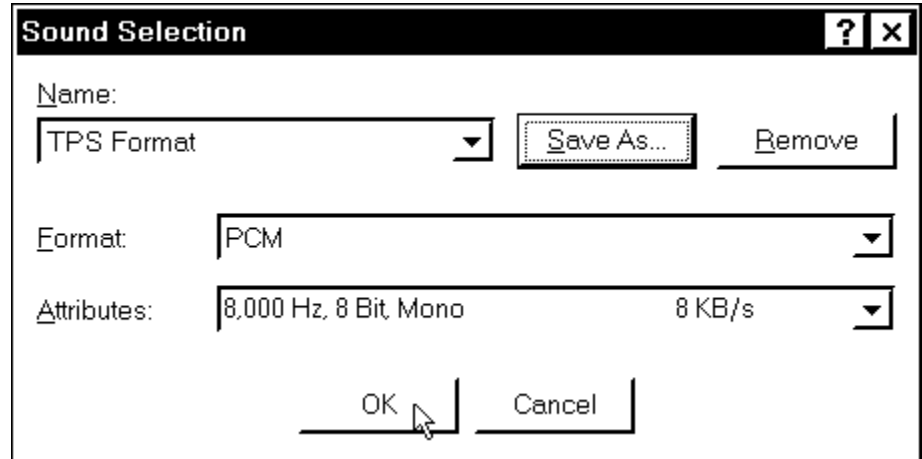
Select File Attributes

NOTE: After the format and attributes have been selected, the conversion format may be saved-as a convenient name such as "TPS Format".
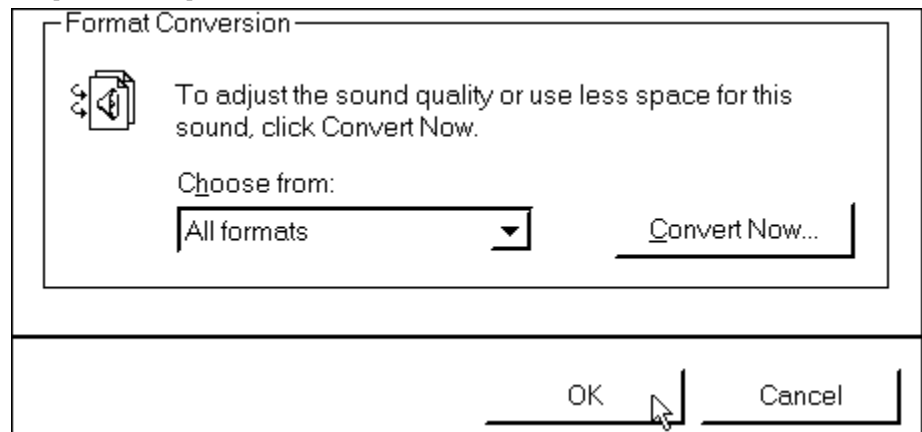
5.   Review the format and attributes then click the **OK** button.

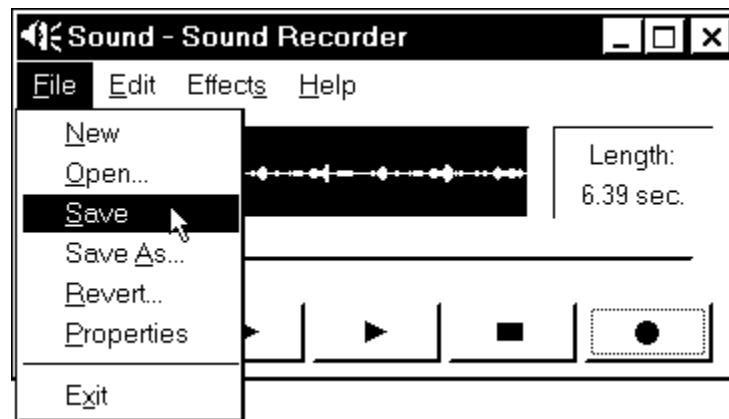*Set the File Properties*

6.   To complete the file properties conversion, click **OK**.
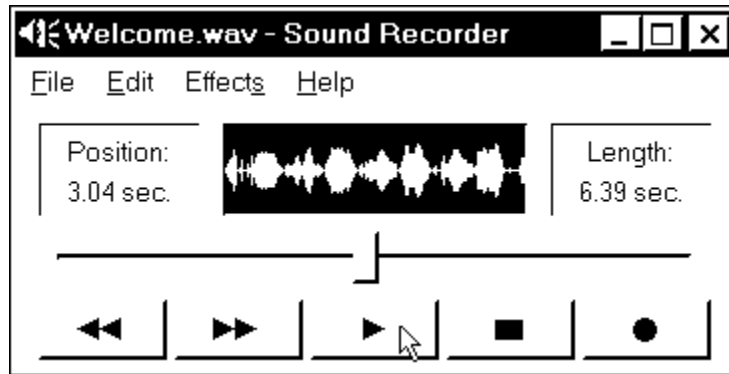
Complete File Properties Conversion

7.   Select **File | Save** (or **Save As** to rename the file) to save the file with
the acceptable format.

Save File

8.   Click on the [▶] button, as shown, to play and review the file.

Play and Review File

9.   To record, convert or create another file or message, return to "To Record a WAV File Message" on page 29, "To Convert a WAV File" on page 30, or "To Create WAV Messages from Individual Files" on page 31, respectively. Otherwise, continue to the next step of this procedure.

10.   Select **File** | **Exit** to exit the Sound Recorder.

Exit Sound Recorder
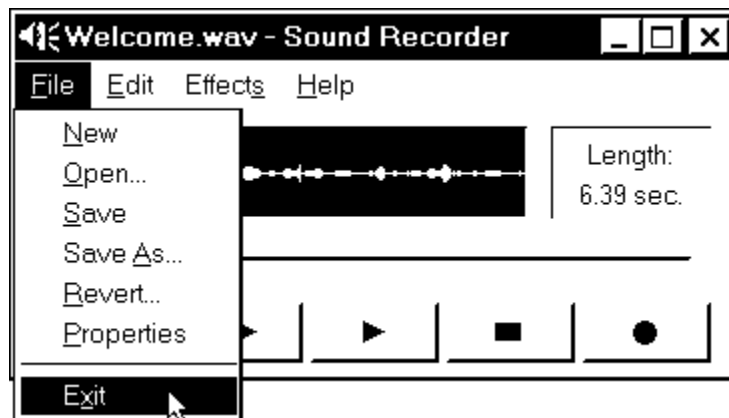
VT Pro-e: Sound Manager

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

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" dialog, shown after this paragraph.

"Sound Manager" Dialog Box
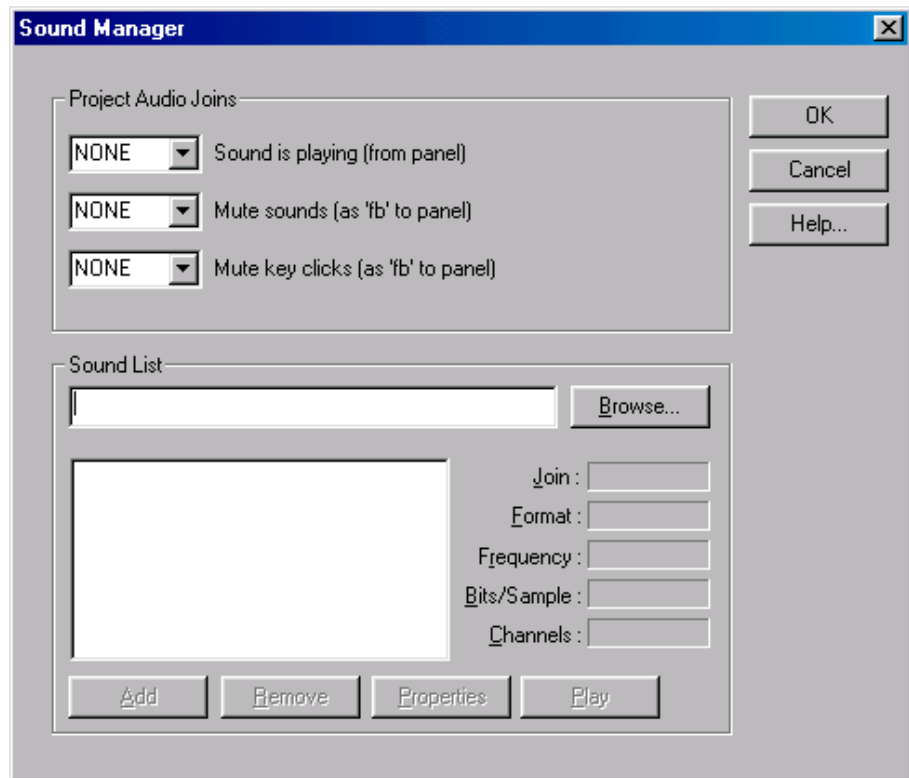
Sound Manager Guidelines

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-6000L target type selected in VT Pro-e.
   Refer to "Appendix A: WAV File Audio Messages" on page 28 for acceptable formats.

3. There are three system-wide join numbers that the designer can define. The first, sound playing from panel, differs from the other two in that it is triggered from the panel.

a. Sound Playing from Panel – The signal for this join number goes high when the WAV file plays.

b. Mute Sounds – All WAV files (except the keyclick) in the project are muted when this join number goes high.

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

Using Sound Manager

Sound Manager is broken into two distinct components. The *System Joins* component, shown after this paragraph, permits the designer to assign the three system-wide join numbers described in the previous section. Assign the three system joins by scrolling down to the desired number.

System 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 browse 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" dialog box 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.

Appendix B: RS-232 Protocol

TPS-6000L 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-6000L 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 C: Cutout Detail of Supplied Template
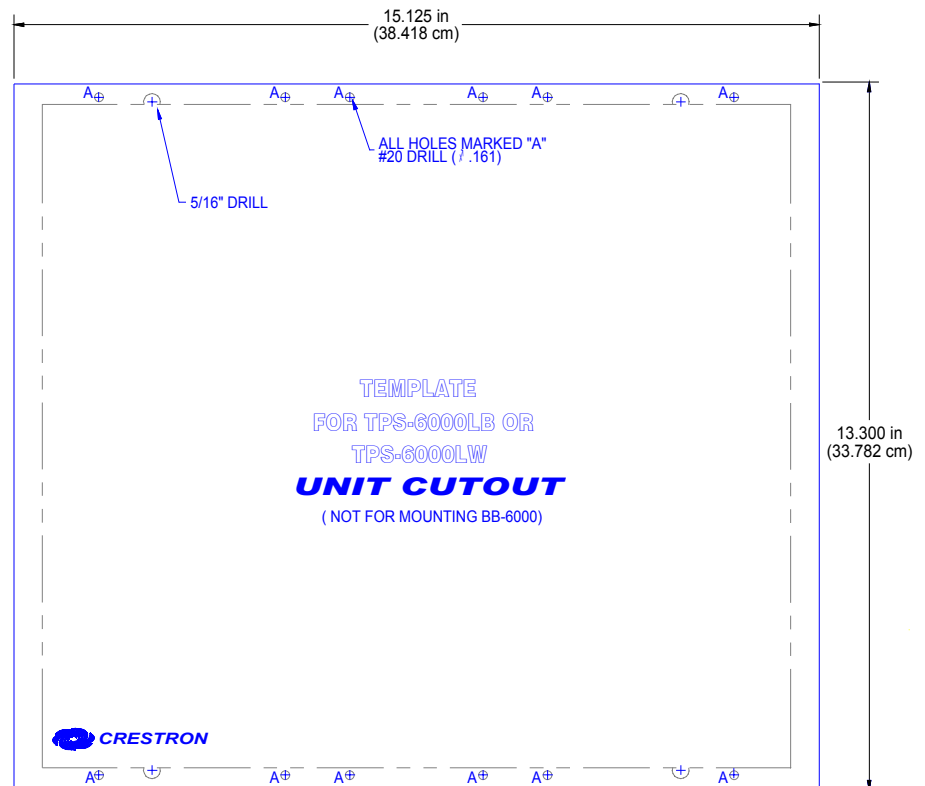
The actual cutout dimensions are 13.800 in. (35.052 cm) wide by 12.100 in. (30.734 cm) high. However, Crestron recommends that the supplied template be used to avoid any error.

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