

Crestron **TPS-GA-TPI** Isys[®] G-Series Touchpanel Interface

Operations Guide



This document was prepared and written by the Technical Documentation department at:



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Isys® G-Series Touchpanel Interface: TPS-GA-TPI

Introduction

Features and Functions

- High-performance touchpanel interface.
- 24-Bit Isys® graphics.
- Synapse image rendering algorithm.
- Dual-window HD video and RGB display.
- Built-in real-time annotation.
- High-speed Ethernet and Cresnet® communications.
- Single-space rack-mountable.

The TPS-GA-TPI is designed to allow for the integration of non-Crestron® touchscreens into the Crestron control system. The TPS-GA-TPI transforms a third-party display device into a full-featured Isys G-Series touchpanel, producing stunning control graphics with dual-window display of HD video and high-res RGB signals. It is perfect for use with any plasma display equipped with a touch-sensitive overlay, as well as a variety of LCD touchscreen monitors and interactive pen displays.

Versatile Touchpanel Interface

To serve a wide range of touchpanel applications from multimedia presentation to interactive kiosks, the TPS-GA-TPI works with numerous touchscreen and pen display products from 3M/Microtouch®, SMART Technologies®, Wacom® and many others. Alternately, its output can be displayed on any high-resolution monitor or large screen projector, providing a graphical interface that is fully navigable using an onscreen mouse-driven cursor. Even without a touchscreen or mouse attached, the TPS-GA-TPI makes an exceptional high-resolution graphics/display generator perfect for voting systems, command centers, public information, and more.

Isys[®]

The TPS-GA-TPI offers vibrant 24-bit color depth with 8-bit alpha channel transparency to produce incredible 3D graphics and high-res images. The Isys engine supports dynamic graphics and text, full-motion animations, multimode objects, and PNG translucency - all with astonishing speed.

Synapse[™]

Crestron's exclusive Synapse Image Rendering Algorithm enables system programmers to produce amazing graphics - faster and easier. Advanced antialiasing delivers crisper, sharper objects and text. Enhanced 3D effects add new depth and style. And because Synapse is native to the touchpanel, memory requirements and upload time are substantially reduced.

Dual-Window HD Video and RGB

The TPS-GA-TPI can simultaneously display two fully-scalable, full-motion video windows, each supporting standard video, HDTV, and high-resolution RGB signals from external AV and computer sources. Discrete video scalers with motion adaptive deinterlacing bring out the highest detail, minimizing visible scan lines and motion artifacts for a truly remarkable picture. Advanced gamma correction and built-in time base correction ensure accurate color reproduction and a jitter-free image.

Touch-the-PC

Crestron's exclusive "Touch-the-PC" technology allows real-time touchpanel navigation of any Windows[®] PC through a direct high-speed serial connection.

Built-in Annotation

Built-in annotation capability allows presenters to write or draw over computer and video images on the touchscreen using a finger or stylus, and output the image live for audience display.

Audio Features

An audio output is provided for connection to the display device or separate amplified speakers, supporting customizable button feedback, personalized sounds, and voice prompts.

QuickMedia[™] Output

A QuickMedia output port is included, allowing for output of the touchscreen image to feed a remote display device. QuickMedia provides a single-cable solution for routing the TPS-GA-TPI's display output and audio signals up to 450 feet.

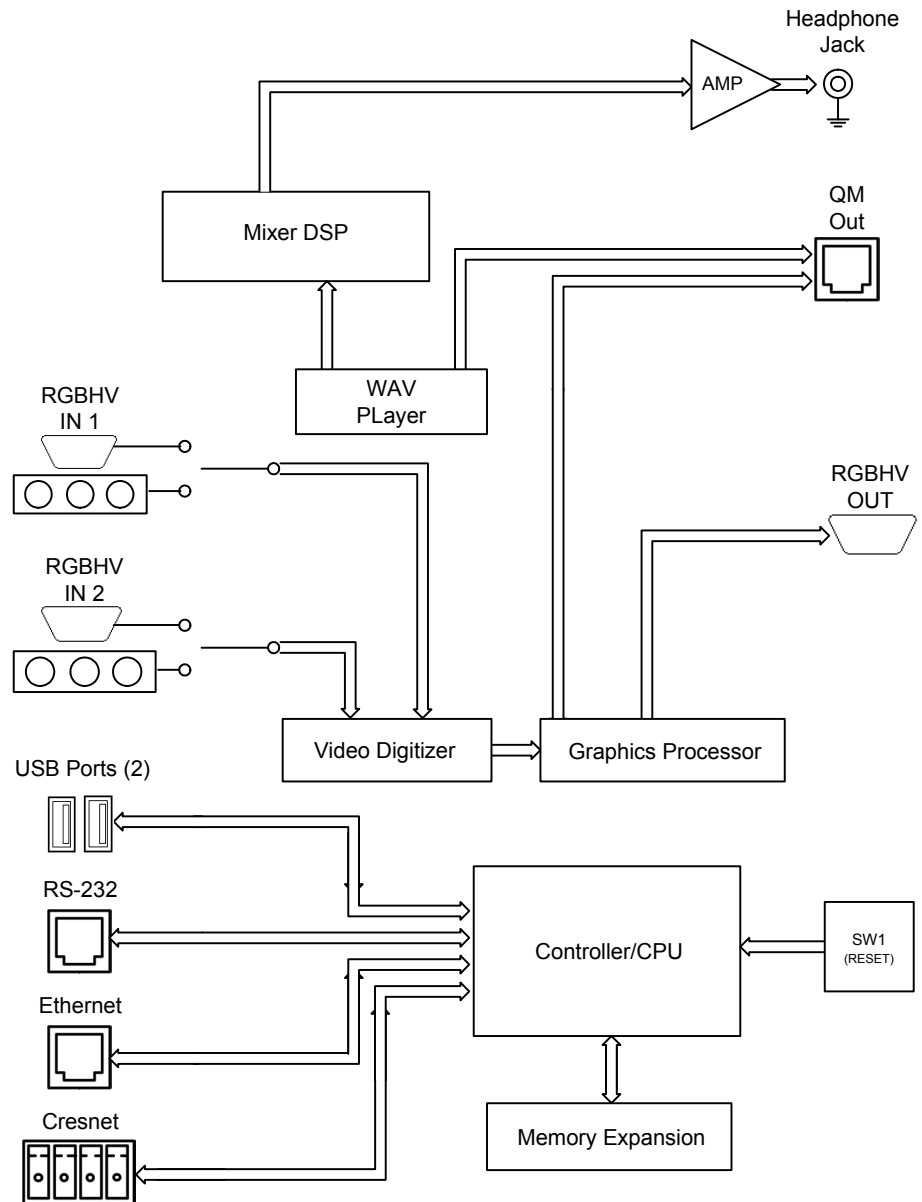
High-Speed Connectivity

Both Cresnet and high-speed Ethernet are standard on the TPS-GA-TPI, providing for easy network integration and seamless communications with Crestron control systems.

Internal Block Diagram

The following diagram represents the internal configuration of the TPS-GA-TPI. These units feature two RGBHV inputs to receive RGBS and RGsB from a computer and two sets of three BNC connectors to receive video and HDTV (composite, S-video, and component) inputs. There is also a QM output for connection to a QM receiver or switcher. For more information, refer to “QuickMedia Wiring” on page 12.

Internal Block Diagram of the TPS-GA-TPI



Specifications

Specifications for the TPS-GA-TPI are listed in the following table.

TPS-GA-TPI Specifications

SPECIFICATION	DETAILS
Device Support Mouse Touchscreen/Pen Display	Microsoft Serial Mouse, Kensington Serial Mouse, Generic USB Mouse 3M Dynapro SC3, 3M Microtouch, CyberTouch, DisplayMate, Elo TouchSystems, SMART Technologies, Wacom ¹
Processor CPU Processing Speed	32-bit Freescale ColdFire [®] Microprocessor 410 MIPS (Dhrystone 2.1 benchmark)
Memory DDR RAM Flash Compact Flash Max. Project Size	128 Mb 64 Mb 4 Gb Type II CF (not included) 145 to 160 Mb ²
Graphic Engine	Isys engine, 24-bit non-palette graphics + 8-bit alpha channel transparency, 16.7 million colors, Synapse image rendering algorithm, multi-mode objects, dynamic graphics, PNG translucency, full-motion (60 fps) animation, transition effects, color key video windowing
Ethernet	10BaseT/100BaseTX, auto-switching, auto-negotiating, full/half duplex, TCP/IP, UDP/IP, CIP, IEEE 802.3U compliant
Video/RGB Input Signal Types Input Formats Color Depth Features	RGB and auto-detecting composite, S-video, or component video SDTV 480i (NTSC) & 576i (PAL), EDTV 480p & 576p, HDTV 720p & 1080i; RGB VGA (640 x 480) up to UXGA 1600 x 1200 24-bit, 16.7M colors Dual-window each scalable to full-screen, time base correction, gamma correction, line doubling, motion adaptive deinterlacing, reverse 3:2:2:2 pulldown
Audio Hardware Features Audio Feedback (WAV) D-A Conversion (QM)	Stereo headphone/line-level audio output, internal volume control and audio mixer 8-bit PCM, mono, 8 kHz sampling rate 24-bit, 48 kHz

(Continued on following page)

TPS-GA-TPI Specifications (Continued)

SPECIFICATION	DETAILS
Power Requirements ³ Power Supply (sold separately) Cresnet Power Usage	PW-2420RU 45 Watts (1.875 Amps @ 24 Volts DC)
Default NET ID	03
Minimum 2-Series Control System Update File ^{4, 5, 6}	Version 3.155.1143 or later
Environmental Temperature Humidity	50° to 113°F (10° to 45°C) 10% to 90% RH (non-condensing)
Enclosure Construction	Black metal, 1U 19-inch rack-mountable (rack ears included)
Dimensions Height Width Depth	1.80 in (4.57 cm) with feet, 1.70 in (4.32 cm) without feet 19.0 in (48.26 cm) with ears, 17.03 in (43.24 cm) without ears 10.68 in (27.13 cm)
Weight Available Accessories PW-2420RU ST-PK	4.8 lbs (2.2 kg) Power Supply Programming Cable Kit

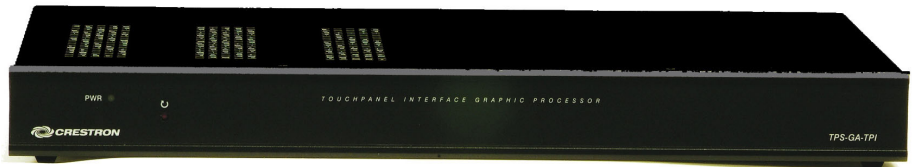
1. Specific models and protocols subject to verification; refer to the Crestron website or contact factory for latest device support.
2. Depends on screen resolution.
3. Power should only be applied to the 24VDC power jack OR the **NET** port, not both.
4. The latest software versions can be obtained from the Crestron website. Refer to the NOTE following these footnotes.
5. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems.
6. When loading VisionTools (VT) Pro-e files or firmware through the RS-232 port of the control system, be sure that the baud rate is at 38400 (Cresnet speed) or lower. Otherwise, Toolbox may post the "Transfer Failed" message.

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

Physical Description

This section provides information on the connections, controls and indicators available on your TPS-GA-TPI.

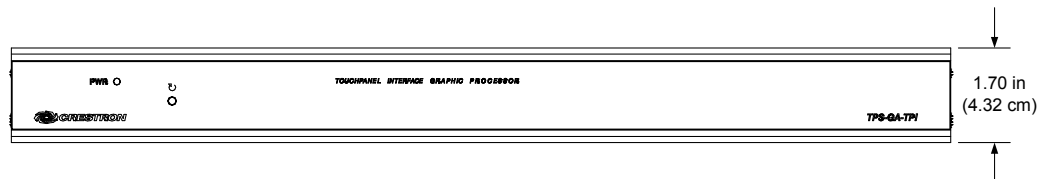
TPS-GA-TPI Front View



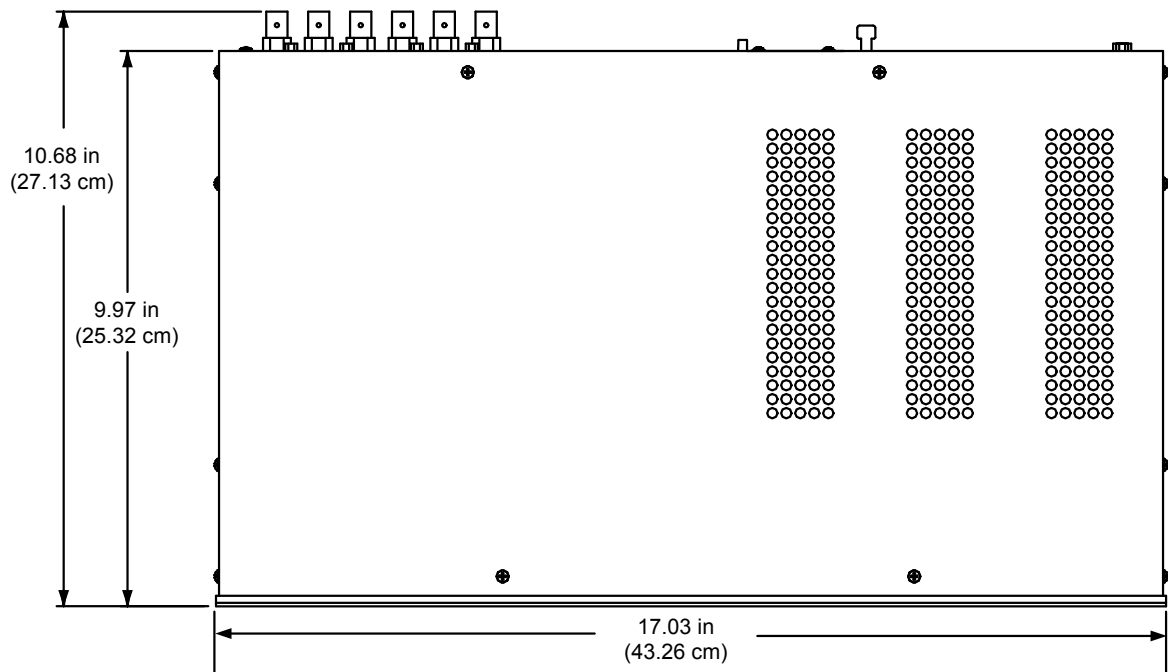
TPS-GA-TPI Rear View



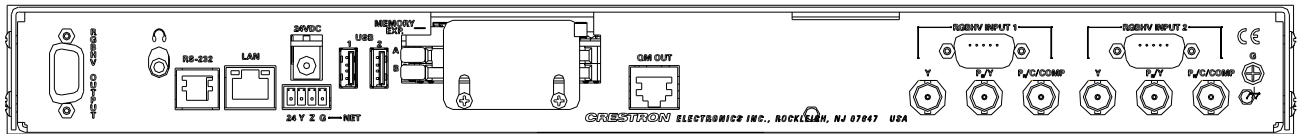
TPS-GA-TPI Physical View – Front



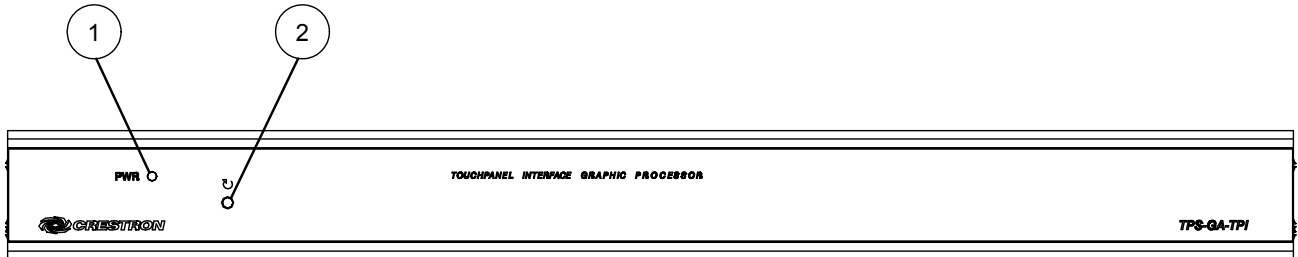
TPS-GA-TPI Physical View – Top



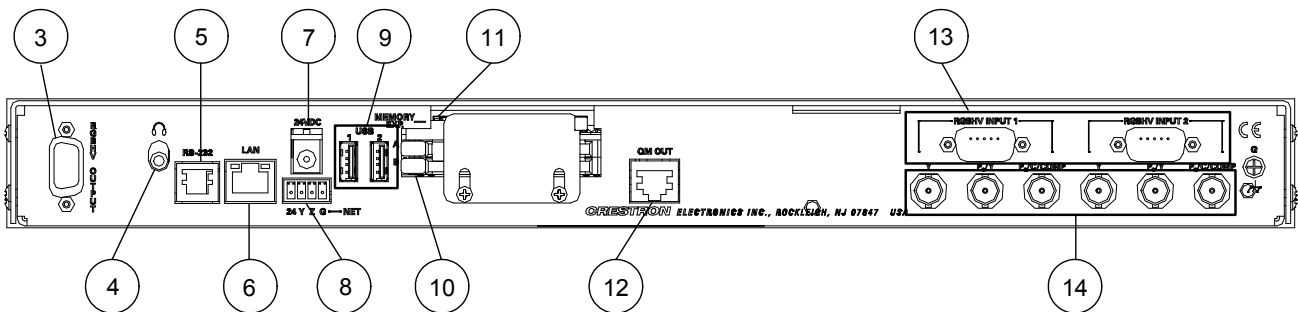
TPS-GA-TPI Physical View – Rear



Location of Connections, Controls and Indicators (Front)



Location of Connections, Controls and Indicators (Rear)

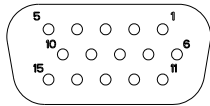

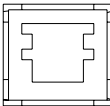
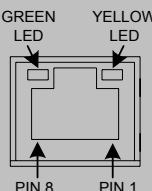


Connectors, Controls & Indicators

#	CONNECTORS ¹ , CONTROLS & INDICATORS	DESCRIPTION
1	PWR LED	(1) Green LED, indicates DC power applied to NET port or 24VDC jack.
2	RESET BUTTON	(1) Recessed miniature pushbutton, reboots the touchpanel interface.


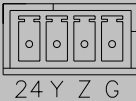

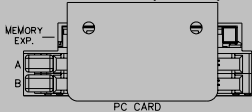

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Connectors, Controls & Indicators (Continued)

#	CONNECTORS ¹ , CONTROLS & INDICATORS	DESCRIPTION																																				
3	<p>RGBHV OUT</p> 	<p>(1) DB15 HD female, RGB (VGA) output; Analog Format: RGBHV; Output Resolution: Software programmable 800x600, 1024x768, 1280x768, 1366x768, 1152x864, 1280x1024 Sync Output Type: RGBHV Sync Output Level: TTL, 4.0 V_{p-p} Vertical Frequency: 60Hz fixed</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> <th>PIN</th> <th>SIGNAL</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Red</td> <td>9</td> <td>No Connect</td> </tr> <tr> <td>2</td> <td>Green</td> <td>10</td> <td>Ground</td> </tr> <tr> <td>3</td> <td>Blue</td> <td>11</td> <td>No Connect</td> </tr> <tr> <td>4</td> <td>Reserved</td> <td>12</td> <td>No Connect</td> </tr> <tr> <td>5</td> <td>Ground</td> <td>13</td> <td>Horizontal Sync</td> </tr> <tr> <td>6</td> <td>Red Ground</td> <td>14</td> <td>Vertical Sync</td> </tr> <tr> <td>7</td> <td>Green Ground</td> <td>15</td> <td>No Connect</td> </tr> <tr> <td>8</td> <td>Blue Ground</td> <td></td> <td></td> </tr> </tbody> </table>	PIN	SIGNAL	PIN	SIGNAL	1	Red	9	No Connect	2	Green	10	Ground	3	Blue	11	No Connect	4	Reserved	12	No Connect	5	Ground	13	Horizontal Sync	6	Red Ground	14	Vertical Sync	7	Green Ground	15	No Connect	8	Blue Ground		
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8	Blue Ground																																					
4	<p>HEADPHONES</p> 	<p>(1) 3.5 mm TRS mini phone jack; Stereo headphone or unbalanced stereo line-level audio output; Output power: 12mW per channel; Minimum Impedance: 32 ohms</p>																																				
5	<p>RS-232</p> 	<p>(1) 6-pin RJ-11 female; Computer console or mouse/touchscreen input port²; Bidirectional RS-232 up to 115.2k baud; Hardware and software handshaking support</p>																																				
6	<p>LAN</p> 	<p>(1) 8-wire RJ-45 with two LED indicators; 10BaseT/100BaseTX Ethernet port; Green LED indicates link status; Yellow LED indicates Ethernet activity</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> <th>PIN</th> <th>SIGNAL</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TX +</td> <td>5</td> <td>N/C</td> </tr> <tr> <td>2</td> <td>TX -</td> <td>6</td> <td>RC -</td> </tr> <tr> <td>3</td> <td>RC+</td> <td>7</td> <td>N/C</td> </tr> <tr> <td>4</td> <td>N/C</td> <td>8</td> <td>N/C</td> </tr> </tbody> </table>	PIN	SIGNAL	PIN	SIGNAL	1	TX +	5	N/C	2	TX -	6	RC -	3	RC+	7	N/C	4	N/C	8	N/C																
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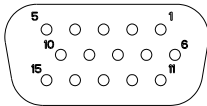

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Connectors, Controls & Indicators (Continued)

#	CONNECTORS ¹ , CONTROLS & INDICATORS	DESCRIPTION
7	24VDC ³ 	(1) 2 mm barrel DC power jack, 24 Volt DC power input; (PW-2420RU power supply sold separately).
8	NET ³ 	Four-position terminal block connector for data and power. Connects to Cresnet control network. Pin 1 (24) Power Pin 2 (Y) Data Pin 3 (Z) Data Pin 4 (G) Ground
9	USB 	(2) USB 1.1 Type A female for mouse or touchscreen input ²
10/ 11	MEMORY EXP./ PC CARD (A – B) 	(2) Type II PC Card slots (reserved for future applications) ² (1) Type II Compact Flash card slot for memory expansion (up to 4 Gb)
12	QM OUT ⁴ 	(1) 8-wire RJ-45 female, QuickMedia output port containing RGB (same as RGBHV OUTPUT) and WAV file audio; Format: RGBHV; Output Resolution: Software programmable 800x600, 1024x768, 1280x768, 1366x768, 1152x864, 1280x1024 Connects to QM input port of any QuickMedia device via CresCAT-QM or CresCAT-IM cable

(Continued on following page)

Connectors, Controls & Indicators (Continued)

#	CONNECTORS ¹ , CONTROLS & INDICATORS	DESCRIPTION																																		
13	RGBHV IN (1 – 2) 	(2) DB15HD female, RGB (VGA) inputs; Analog Formats: RGBHV, RGBS and RGsB Input Resolution, Non-interlaced: 640x480 minimum to 1600x1200 maximum; Horizontal Frequency: 31.5 to 100 kHz Vertical Frequency: 60 to 85 Hz (60 Hz limit at 1600x1200) Standard HD15 connector configured to optimize performance. ² <table border="1" data-bbox="976 632 1187 1150"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> </tr> </thead> <tbody> <tr><td>1</td><td>Red</td></tr> <tr><td>2</td><td>Green</td></tr> <tr><td>3</td><td>Blue</td></tr> <tr><td>4</td><td>Reserved</td></tr> <tr><td>5</td><td>Ground</td></tr> <tr><td>6</td><td>Red Ground</td></tr> <tr><td>7</td><td>Green Ground</td></tr> <tr><td>8</td><td>Blue Ground</td></tr> </tbody> </table> <table border="1" data-bbox="1240 632 1468 1087"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> </tr> </thead> <tbody> <tr><td>9</td><td>No Connect</td></tr> <tr><td>10</td><td>Ground</td></tr> <tr><td>11</td><td>No Connect</td></tr> <tr><td>12</td><td>Monitor Sense</td></tr> <tr><td>13</td><td>Horizontal Synch</td></tr> <tr><td>14</td><td>Vertical Synch</td></tr> <tr><td>15</td><td>Monitor Sense Clock</td></tr> </tbody> </table>	PIN	SIGNAL	1	Red	2	Green	3	Blue	4	Reserved	5	Ground	6	Red Ground	7	Green Ground	8	Blue Ground	PIN	SIGNAL	9	No Connect	10	Ground	11	No Connect	12	Monitor Sense	13	Horizontal Synch	14	Vertical Synch	15	Monitor Sense Clock
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14	VIDEO IN (1 – 2) 	(2) sets of (3) BNC female connectors comprises (2) video inputs, Dynamically configurable under system control as (1) auto-detecting component (YPbPr), S-Video (Y/C), or composite video input Formats: 480i (NTSC), 576i (PAL), 480p, 576p, 720p and 1080i; Horizontal Frequency: 15 to 45 kHz Vertical Frequency: 50 to 60 Hz																																		

1. Interface connectors for **NET** port is provided with the unit.
2. Refer to the Crestron website or contact Crestron for the latest firmware capabilities and device support. Connect to external touchscreen via part number 4501251 (supplied) or CNSP-602, CNSP-616, CNSP-617, CNSP-621 or CNSP-622 (available separately—call Crestron).
3. The TPS-GA-TPI can be powered via the **24 VDC** jack OR the **NET** port. Be sure to use a Crestron approved power supply as another may cause damage.

4. The eight-pin RJ-45 QuickMedia transport port accepts CAT5E/CAT6 carrying audio, video and microphone signals. The QM output port conforms to the 568B wiring standard. Refer to the following table for connector pinouts.

RJ-45 PIN NUMBER	WIRE COLORS (EIA 568B)	QM ASSIGNMENT: RGB	QM ASSIGNMENT: COMPOSITE, S-VIDEO, COMPONENT AND AUDIO
1	WHITE/ORANGE	- RGB RED	- CHROMINANCE (- P _r)
2	ORANGE	+ RGB RED	+ CHROMINANCE (+ P _r)
3	WHITE/GREEN	- RGB GREEN	- LUMINANCE (- Y)
4	BLUE	+ DIGITAL AUDIO	+ AUDIO
5	WHITE/BLUE	- DIGITAL AUDIO	- AUDIO
6	GREEN	+ RGB GREEN	+ LUMINANCE (+ Y)
7	WHITE/BROWN	- RGB BLUE	- COMPOSITE (- P _b)
8	BROWN	+ RGB BLUE	+ COMPOSITE (+ P _b)

Industry Compliance

As of the date of manufacture, the TPS-GA-TPI, has been tested and found to comply with specifications for CE marking and standards per EMC and Radio communications Compliance Labeling.



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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Setup

Network Wiring

When wiring the network, consider the following:

- Use Crestron Certified Wire.
- Use Crestron power supplies for Crestron equipment.
- Provide sufficient power to the system.

CAUTION: Insufficient power can lead to unpredictable results or damage to the equipment. Please use the Crestron Power Calculator to help calculate how much power is needed for the system (<http://www.crestron.com/calculators>).

- For larger networks, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

For more details, refer to “Check Network Wiring” on page 45.

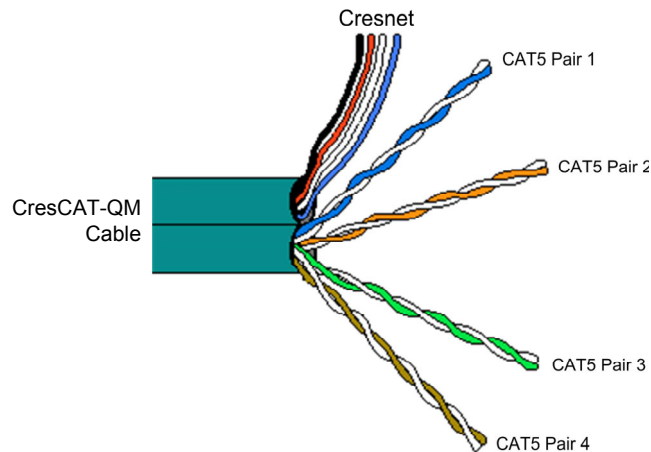
Ethernet

The TPS-GA-TPI also uses high-speed Ethernet for communications between the device and a control system, computer, digital media server and other IP-based devices.

For information on connecting Ethernet devices in a Crestron system, refer to the latest version of the Crestron e-Control® Reference Guide (Doc. 6052), which is available for download from the Crestron website (www.crestron.com/manuals).

QuickMedia Wiring

The Crestron QuickMedia cable (sold under the name “CresCAT-QM”) contains one CAT5E cable and one Cresnet cable in Siamese jackets. Installation of any QM device is as simple as installing CresCAT-QM wires from the output of one device to the input of another. Installations are flexible, affordable and fast. For more information, refer to the latest revision of the Crestron MediaManager Applications Guide (Doc. 6244), which is available for download from the Crestron website.

CresCAT-QM Cable

NOTE: Do not untwist the two wires in a single pair for more than 1/3-1/2” (0.84-1.27 cm) when making a connection. The twists are critical to canceling out interference between the wires.

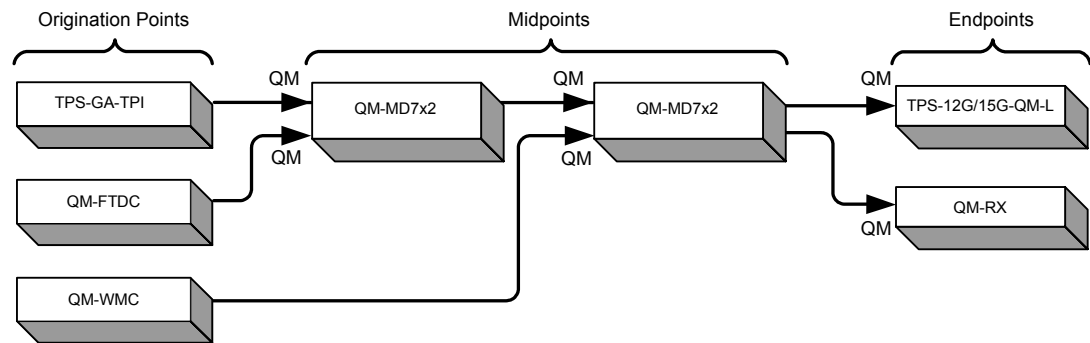
The aggregate cable length of a signal path originating at the TPS-GA-TPI and terminating at QM endpoint such as a TPS-12G/15G-QM-L must not exceed 450 feet (137 meters). Video signals may experience a loss of quality over very long lengths of cable. This phenomenon is due to the added resistance and capacitance of longer cable lengths and is not peculiar to either Crestron and/or QuickMedia systems. To ensure sufficient bandwidth, the maximum aggregate cable length should not exceed 450 feet. The use of lower-resolution signals may allow increased cable length but must be tested by the installer with the sources to be used. The QM pin assignment is based on the EIA/TIA 568B RJ-45 Jack standard.

NOTE: When transmitting S-video, luminance uses the green video pathway and chrominance uses the red video pathway. When transmitting composite video, the signal is carried on the blue video pathway.

NOTE: When using CresCAT-QM wiring, four additional wires are included for making Cresnet connections.

When connecting multiple QM devices, the route between a QM origination point (transmitter) and a QM endpoint (receiver) cannot have more than two midpoints (e.g. QM-MD7x2 or other QM switchers). Refer to the following diagram when configuring a QM network.

NOTE: The aggregate length from transmitter to receiver cannot have a delay skew or more than 22 ns.

QM Network Topology

The TPS-GA-TPI is an origination point. Therefore, in a QM system, it would be positioned as shown above.

Identity Code

Net ID

The Net ID of the TPS-GA-TPI has been factory set to **03**. The Net IDs of multiple TPS-GA-TPI devices in the same system must be unique. Net IDs are changed from a personal computer (PC) via the Crestron Toolbox™ (refer to “Establishing Communication” on page 41).

When setting the Net ID, consider the following:

- The Net ID of each unit must match an ID code specified in the SIMPL Windows program.
- Each network device must have a unique Net ID.

For more details, refer to the Crestron Toolbox help file.

IP ID

The IP ID is set within the TPS-GA-TPI’s table using Crestron Toolbox. For information on setting an IP table, refer to the Crestron Toolbox help file. The IP IDs of multiple TPS-GA-TPI devices in the same system must be unique.

When setting the IP ID, consider the following:

- The IP ID of each unit must match an IP ID specified in the SIMPL Windows program.
- Each device using IP to communicate with a control system must have a unique IP ID.

Configuring the Touchpanel Interface

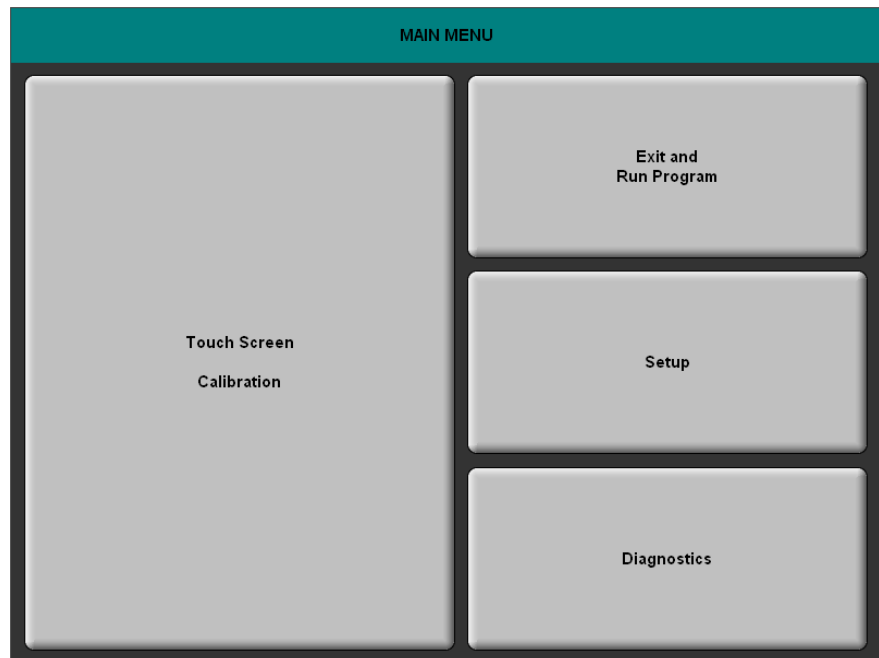
NOTE: In order to configure the TPS-GA-TPI interface, power (supplied via Cresnet) and a connection to an external touchpanel or other video device are required. Refer to “Hardware Hookup” on page 31 for details.

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 interface for normal operation. The MAIN MENU for configuring the interface appears when a finger is held to the connected touchscreen as power is applied, or after the hardware reset button is pressed and released. Remove your finger when the message "SETUP MODE" briefly appears on the touchscreen.

Upon entering SETUP MODE, the MAIN MENU, as shown in the following illustration, displays four buttons: **Touch Screen Calibration**, **Exit and Run Program**, **Setup**, and **Diagnostics**.

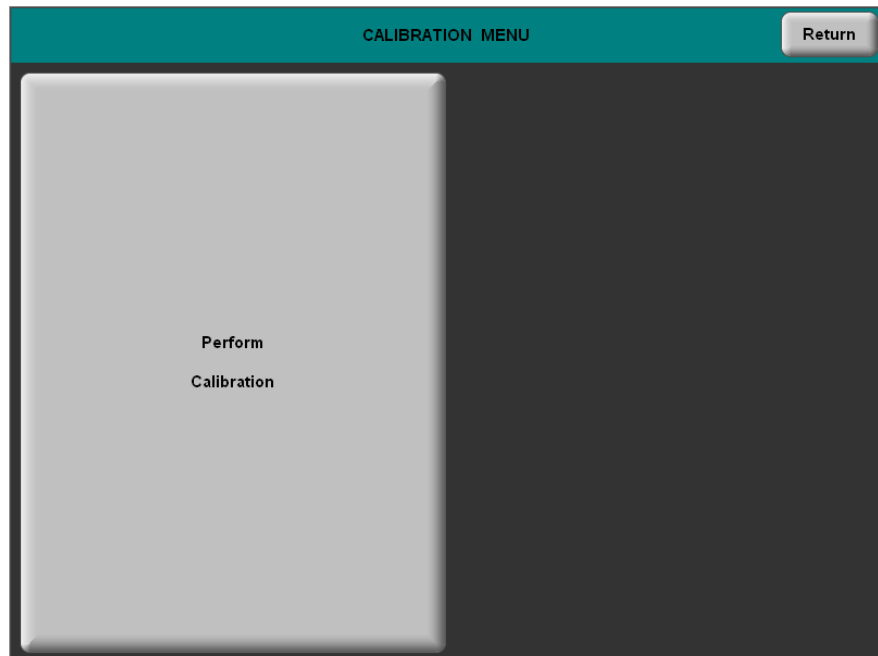
The **Exit and Run Program** button verifies that all of the setup information has been saved to the EEPROM and displays the main page that has been programmed into your system. The remaining buttons on the MAIN MENU open other menus, which are discussed in subsequent paragraphs.

MAIN MENU



Calibration Menu

CALIBRATION MENU



Touch **Touchscreen Calibration** on the MAIN MENU and then **Perform Calibration** on the CALIBRATION MENU. The message “Touch Upper Left” appears centered on the panel with a cross hair in the upper left corner. Touch the center of the cross hair in the corner of the screen to initiate calibration. Another message, “Touch Upper Right”, appears with a cross hair in the correct corner. Touch the center of the cross hair in the corner of the screen. A final message, “Touch Lower Right”, appears with a cross hair in the correct corner. Touch the center of the cross hair in the corner of the screen to conclude calibration and return to the MAIN MENU.

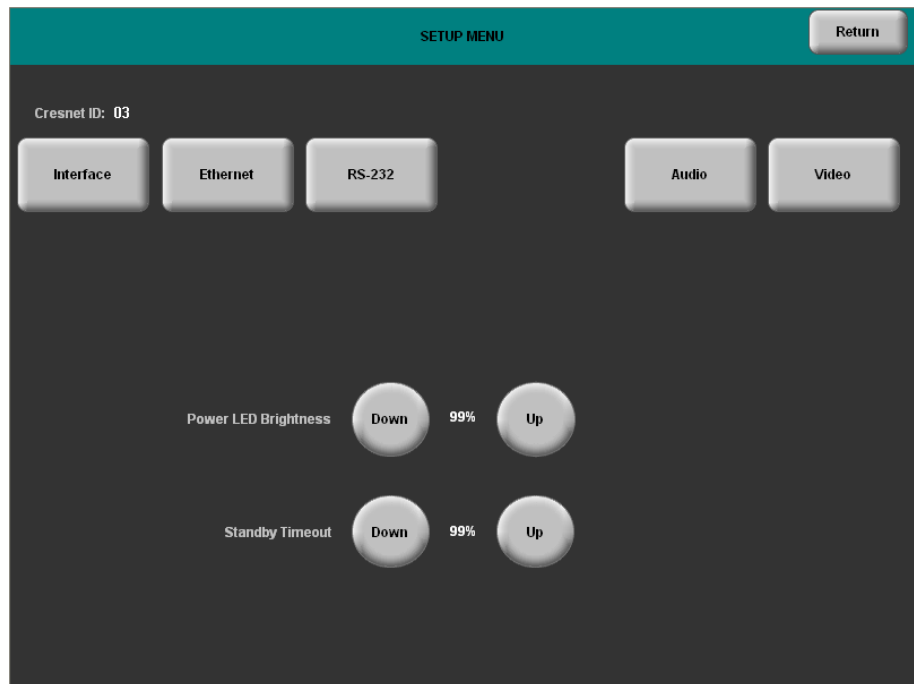
NOTE: When touching the screen during calibration, be as accurate as possible. Use the tip of a capped pen or the eraser end of a pencil. To cancel calibration and return to the CALIBRATION MENU without saving calibration data, create a calibration error by touching the screen in the same spot three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

Setup Menu

To obtain the SETUP MENU, press the **Setup** button from the MAIN MENU. The SETUP MENU offers a series of buttons, which open additional menus and displays, and are detailed in subsequent paragraphs. The SETUP MENU also provides the Power LED brightness control and the standby timeout setting. After setup parameters have been selected, select the **Return** button to return to the MAIN MENU.

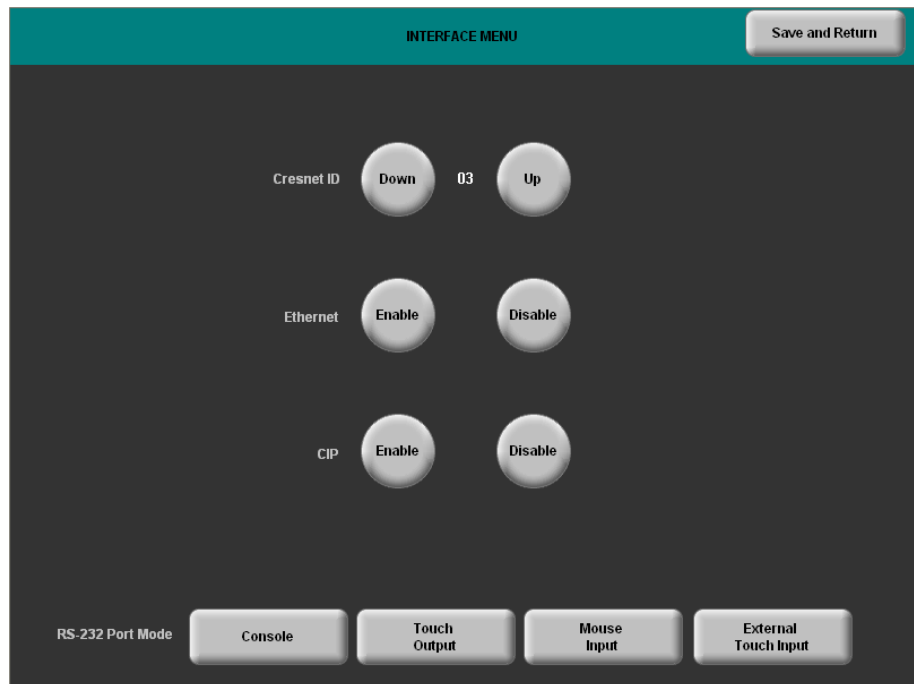
NOTE: For convenience, the current CRESNET ID setting is displayed in the upper left corner.

NOTE: All TPS-GA-TPI interface settings are automatically saved in non-volatile memory.

SETUP MENU*Interface Menu*

The TPS-GA-TPI communicates with a control system to activate commands or to display feedback from components within the system. The communication interface must be correctly configured or communication will not occur. To set communication parameters select the **Interface** button located on the SETUP MENU and display the INTERFACE MENU.

The Cresnet network identity number (Cresnet ID also known as the Net ID) is displayed on the INTERFACE MENU. Cresnet ID is the two-digit hexadecimal number. The hexadecimal number can range from 03 to FE and must correspond to the Net ID set in the SIMPL Windows program of the Cresnet system. Matching IDs between the TPS-GA-TPI and the SIMPL Windows program is required if data is to be successfully transferred. Net ID for the TPS-GA-TPI is factory set to 03. No two devices in the same system can have the same Net ID.

INTERFACE MENU

Two buttons adjacent to the Cresnet ID and its displayed hexadecimal number, **Down** and **Up**, decrease and increase the Cresnet ID by one, respectively.

The Ethernet **Enable** and **Disable** buttons determine the status of the interface's Ethernet communications.

NOTE: The TPS-GA-TPI does not support wireless Ethernet.

There may be Ethernet devices (i.e., a control system) on the network that communicate with the TPS-GA-TPI via CIP (Cresnet Internet Protocol). The CIP buttons, located on the INTERFACE MENU, determine if the TPS-GA-TPI is capable of this type of communication. Select **Enable** to permit this protocol recognition and **Disable** to prohibit any CIP connection. CIP must be enabled for the TPS-GA-TPI to communicate with other Crestron Ethernet devices.

The four buttons on the bottom define how the RS-232 port can be used; as a console port (i.e., loading TPS-GA-TPI projects and firmware), a touch output port (communication of touch coordinates to an external device), a mouse input port (allows a mouse to control the interface) and an external touch input (allows another device to control the touchscreen)

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

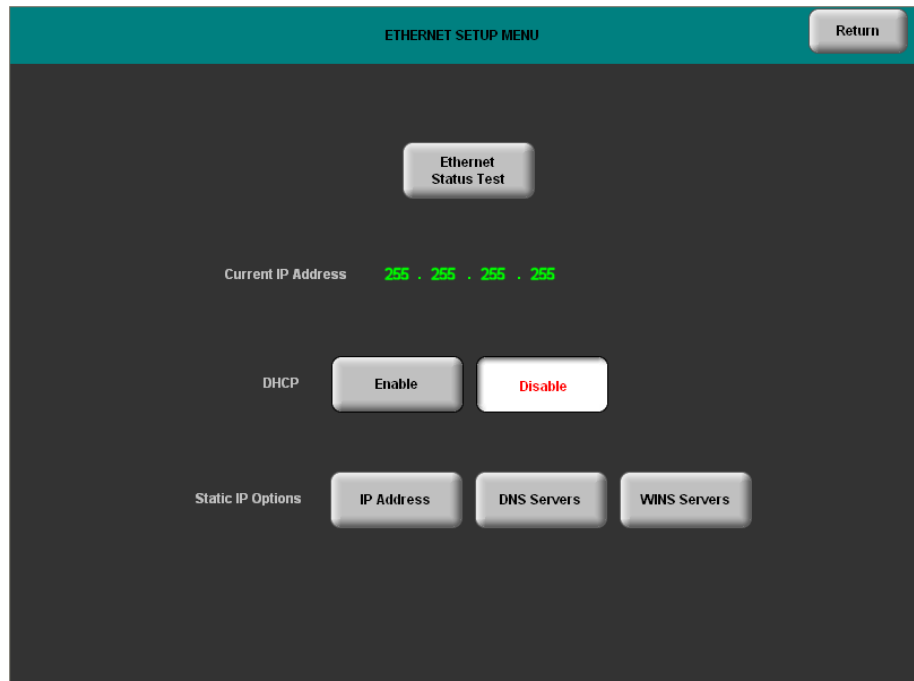
Ethernet Setup Menu

Selection of the **Ethernet** button from the SETUP MENU displays the ETHERNET SETUP MENU. This menu provides buttons for **Ethernet Status Test** (for details such as the IP Address, Subnet Mask, Default Router, IP Table, etc.), **DHCP Enable/Disable** and **Static IP Options**. Each of the *Static IP Options* has its own menu, as shown in the illustrations on the following pages. The enable/disable Ethernet feature is provided on the INTERFACE MENU. Ethernet settings are made through Crestron Toolbox. Refer to the TCP/IP Communications section of

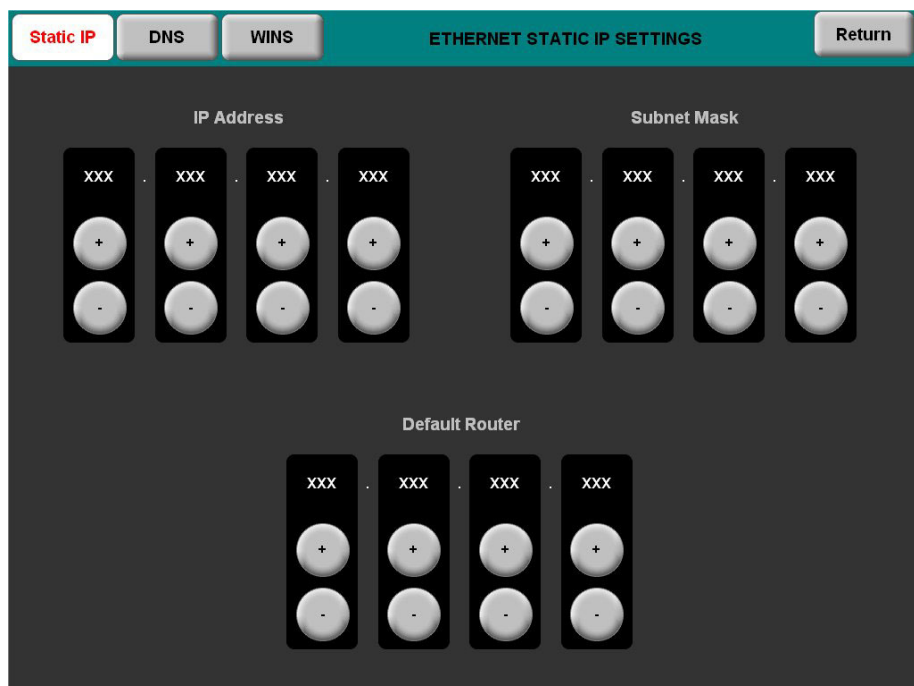
“Establishing Communication”, which starts on page 41 for additional Ethernet setup details.

NOTE: The address shown for the *Current IP Address* is only representative. It does not reflect a real or suggested address.

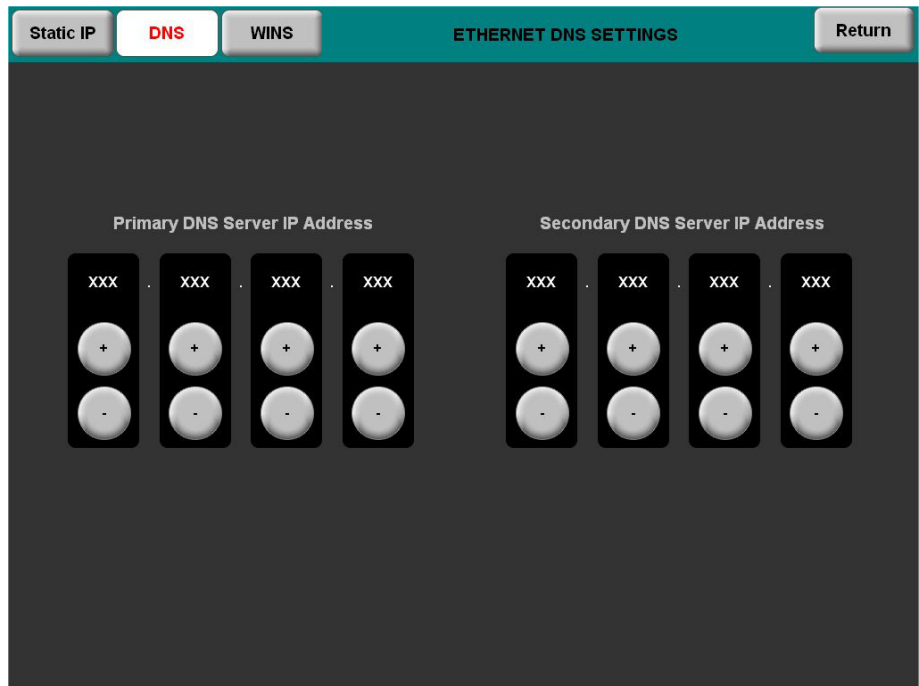
ETHERNET SETUP MENU (STATIC)



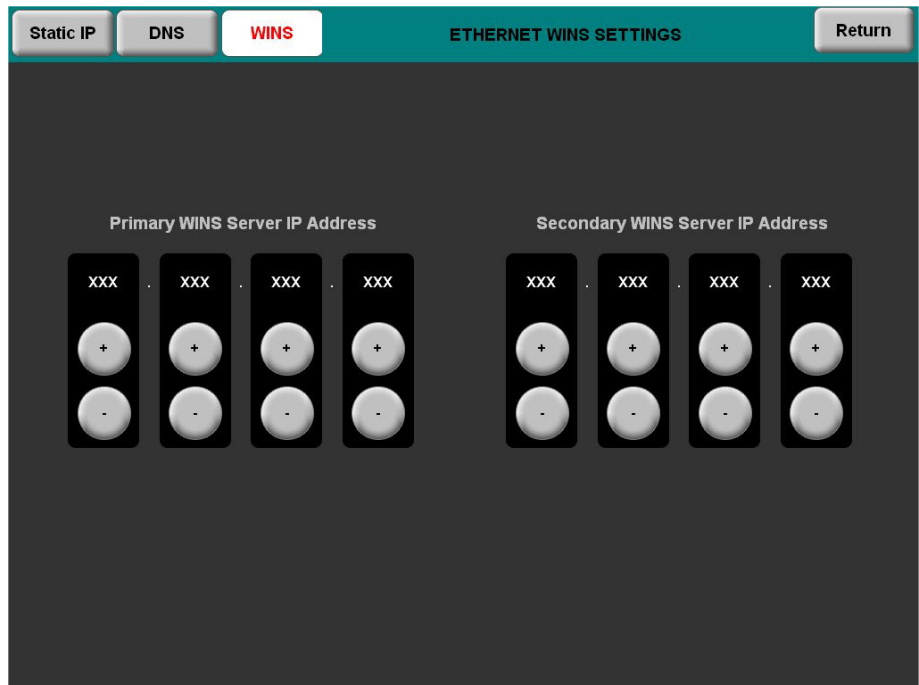
ETHERNET STATIC IP SETTINGS



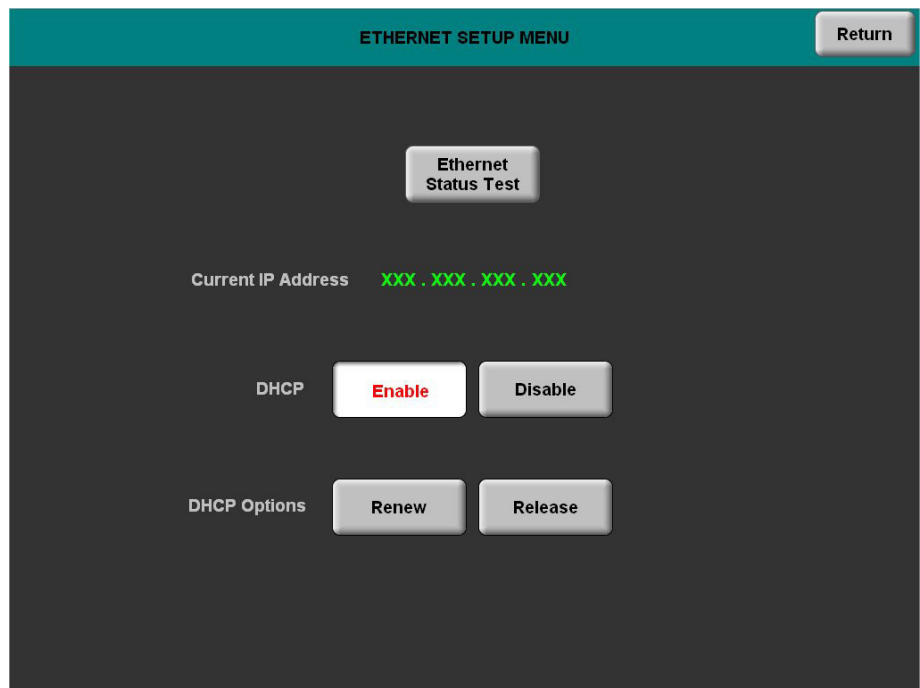
ETHERNET DNS SETTINGS



ETHERNET WINS SETTINGS



Selection of the DHCP **Enable** button from the ETHERNET SETUP MENU displays the DHCP options **Renew** and **Release**.

ETHERNET SETUP MENU (DHCP ENABLED)*RS-232 Menu*

The TPS-GA-TPI interface allows for one of four RS-232 communication modes:

- **Console** (i.e., loading TPS-GA-TPI interface projects and firmware)
- **Touch Output** (communication of touch coordinates to an external device)
- **Mouse Input** (allows a mouse to control the interface)
- **External Touch Input** (allows another device to control the interface).

For convenience, the RS-232 MENU Console Port Mode also permits the selection of the RS-232 communication options, Baud Rate, Data Bits, Stop Bits, Parity, RTS On/Off and XON-XOFF On/Off.

Touch the communication option to select communication parameters and then select **Save and Return** to save the RS-232 settings and return to the SETUP MENU.

Default settings: Console mode, Baud rate: 115200, data bits: 8 bit, stop bit: 1, parity: none, RTS off and XON/XOFF off.

RS-232 MENU

The screenshot displays the RS-232 MENU interface with the following settings and options:

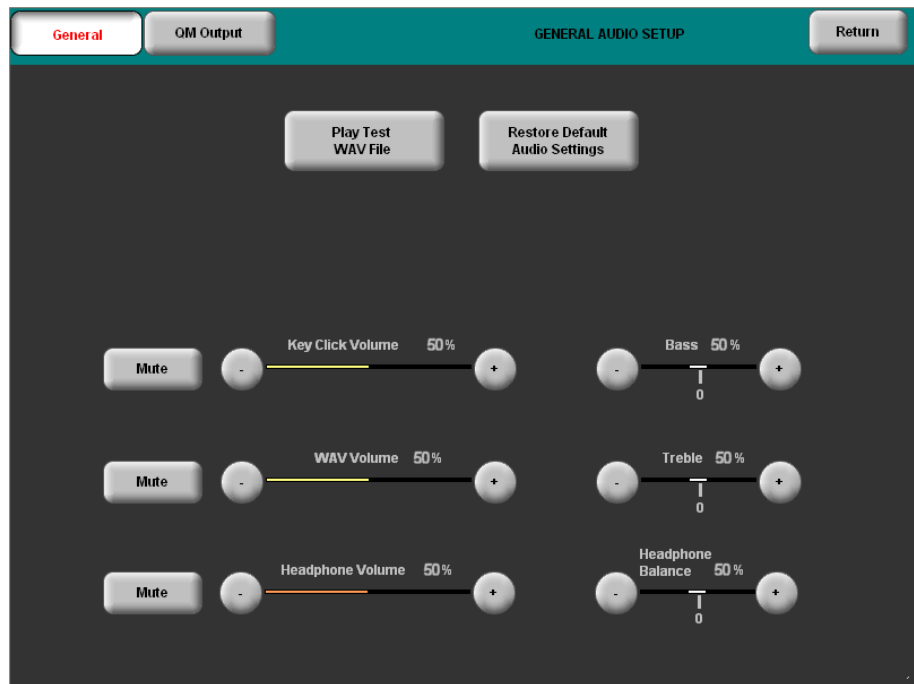
- RS-232 MENU** (Title bar)
- Save and Return** (Button)
- Baud Rate**: 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- Data Bits**: 7, 8
- Stop Bits**: 1, 2
- Parity**: None, Odd, Even
- RTS**: Off, On
- XON - XOFF**: Off, On
- RS-232 Port Mode**: Console, Touch Output, Mouse Input, External Touch Input

General Audio Setup

To open the GENERAL AUDIO SETUP menu, press the **Audio** button from the SETUP MENU. The GENERAL AUDIO SETUP menu offers a series of buttons that adjust the volume as indicated by the gauges. These controls allow you to precisely control key click, WAV and headphone volume, bass and treble and headphone balance in the audio mix.

The **Play Test WAV File** button plays a short audio file, while the **Restore Default Audio Settings** button returns all audio parameters on this menu to their default settings. After these general audio parameters have been set, select the **Return** button to return to the SETUP MENU.

GENERAL AUDIO SETUP MENU



Refer to the following table for additional GENERAL AUDIO SETUP menu details.

General Audio Setup Details

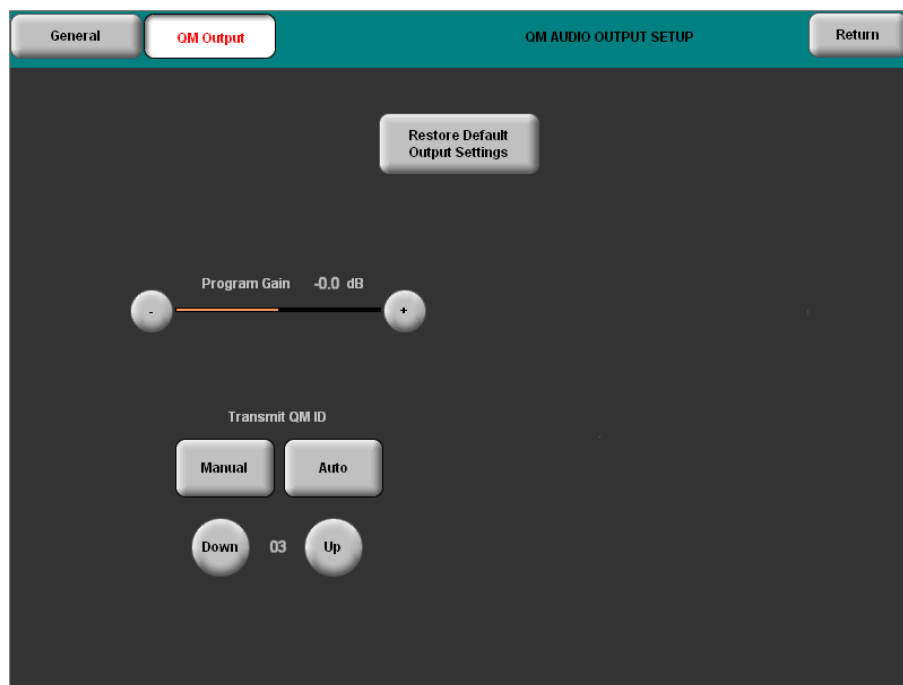
GENERAL AUDIO SETUP SCREEN CONTROLS	DESCRIPTION
QM Output	Displays the QM AUDIO OUTPUT SETUP menu.
Play Test WAV File	Plays a short WAV audio file.
Restore Default Audio Settings	Returns the settings on this menu to their factory defaults.
Mute	A separate Mute button is supplied for each of the volume controls.
Key Click Volume	Adjusts the level of the key click sound with the - and + buttons.
WAV Volume	Adjusts the volume of the WAV file with the - and + buttons. Click Play Test WAV File button to sample and adjust the volume as a pre-loaded WAV file plays.
Headphone Volume*	Adjusts the volume of the Key Click and WAV at the headphone output with the - and + buttons.
Bass	Adjusts the overall bass output with the - and + buttons.
Treble	Adjusts the overall treble output with the - and + buttons.
Headphone Balance*	Adjusts the left/right balance of the audio signal at the headphone output with the - and + buttons.

* This control is visible only when headphones are connected.

To open the QM AUDIO OUTPUT SETUP menu, press the **QM Output** button on the GENERAL AUDIO SETUP menu. The QM AUDIO OUTPUT SETUP menu offers a series of buttons that adjust the program gain and Transmit QM ID.

The **Restore Default Output Settings** button returns all audio parameters on this menu to their default settings. **Program Gain** buttons and Transmit QM ID **Manual** and **Auto** buttons are provided to adjust QM audio output. After these parameters have been set, select the **Return** button to return to the SETUP MENU.

QM AUDIO OUTPUT SETUP MENU



Refer to the following table for additional QM AUDIO OUTPUT SETUP menu details.

QM Audio Output Setup Details

QM AUDIO OUTPUT SETUP SCREEN CONTROLS	DESCRIPTION
Restore Default Output Settings	Returns the settings on this menu to their factory defaults.
Program Gain	This controls the volume of the QM Program audio sent to the QM output with the – and + buttons.
Transmit QM ID	Allows transmission of touchpanel’s QM ID for use in QM systems utilizing auto compensation*. Manual will transmit a specific QM ID, adjustable with the Down and Up Buttons. Auto , the default setting, will transmit the Cresnet ID as the QM ID.

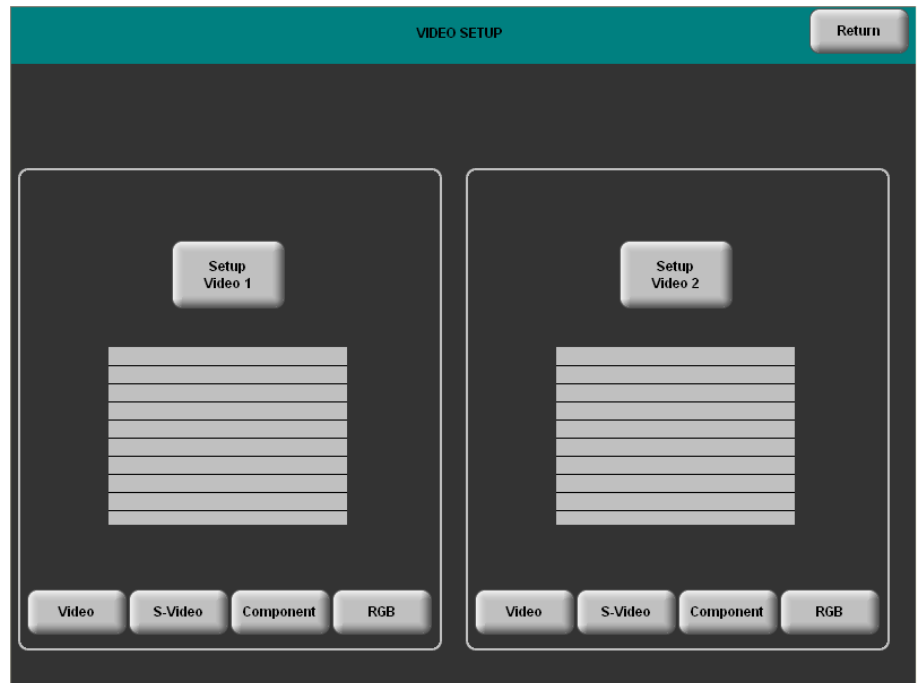
* Auto compensation automatically recalls program gain settings when acting as an origination point.

Video Setup

The TPS-GA-TPI can display two fully-scalable and movable, full motion video windows, each supporting standard video, HDTV and high-resolution RGB signals from external AV and computer sources. These units use auto-detect for composite, S-video, component or RGBHV. They support SDTV (NTSC and PAL), EDTV, HDTV and RGB (VGA) up to UXGA (1600 x 1200). Two video inputs provide signals that can be routed to **QM OUT**.

A table describing the video menu controls follows the illustrations. Touching on the **Video** button on the SETUP MENU, will open the screen shown below. From here, you can enter the setup screens for both Video 1 and Video 2 by touching their respective buttons.

VIDEO SETUP



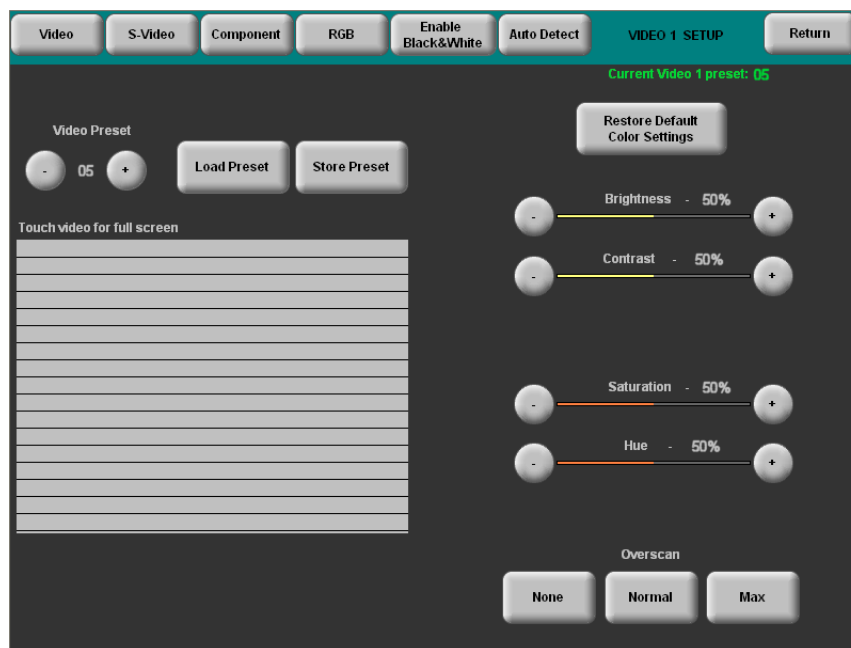
Refer to the following table for additional VIDEO SETUP menu details.

Video Setup Details

VIDEO SETUP SCREEN CONTROLS	DESCRIPTION
Setup Video 1 Video S-Video Component RGB	Displays the VIDEO 1 SETUP menu. By default, the VIDEO 1 SETUP menu displays video controls: Brightness, Contrast, Saturation and Hue on the right side of the menu. Pressing this before pressing the Setup Video 1 button will open the VIDEO 1 SETUP menu in <i>Video</i> mode. Pressing this before pressing the Setup Video 1 button will open the VIDEO 1 SETUP menu in <i>S-Video</i> mode. Pressing this before pressing the Setup Video 1 button will open the VIDEO 1 SETUP menu in <i>Component</i> mode. Pressing this before pressing the Setup Video 1 button will open the VIDEO 1 SETUP menu in <i>RGB</i> mode.
Setup Video 2 Video S-Video Component RGB	Displays the VIDEO 2 SETUP menu. By default, the VIDEO 2 SETUP menu displays video controls: Brightness, Contrast, Saturation and Hue on the right side of the menu. Pressing this before pressing the Setup Video 2 button will open the VIDEO 2 SETUP menu in <i>Video</i> mode. Pressing this before pressing the Setup Video 2 button will open the VIDEO 2 SETUP menu in <i>S-Video</i> mode. Pressing this before pressing the Setup Video 2 button will open the VIDEO 2 SETUP menu in <i>Component</i> mode. Pressing this before pressing the Setup Video 2 button will open the VIDEO 2 SETUP menu in <i>RGB</i> mode.

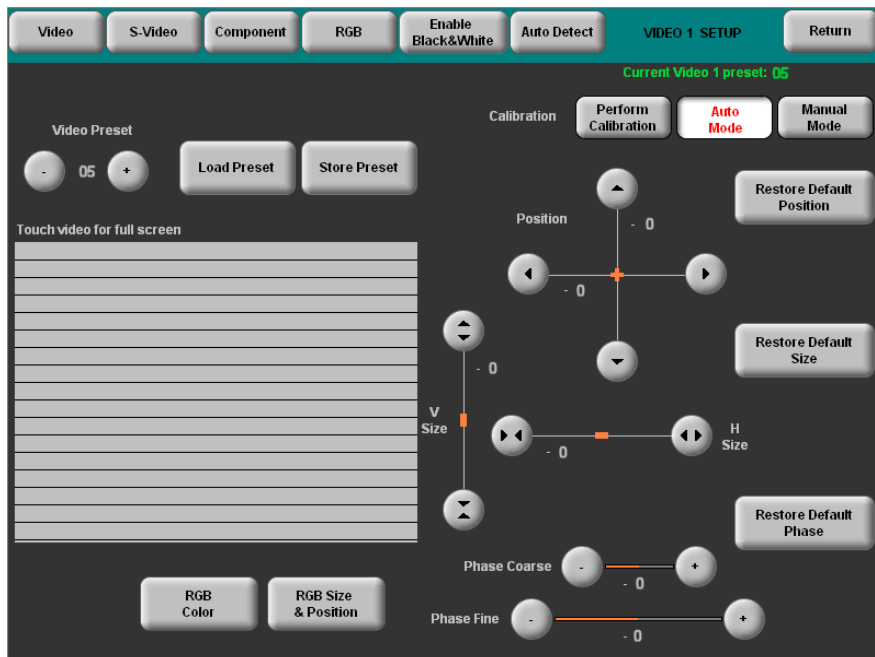
The following screen is displayed when **Video**, **S-Video** or **Component** are selected.

VIDEO 1 SETUP (Video, S-Video and Component)



The video menu for RGB controls consists of preset controls, color and size & position submenus. Touching the **RGB Color** button enables controls for brightness, contrast, red, green, and blue. Touching the **RGB Size & Position** button enables position, size and phase controls.

VIDEO 1 SETUP RGB (Size and position shown)



Refer to the following table for additional VIDEO 1 SETUP details.

Video 1 Setup Details – Video, S-Video, Component and RGB

VIDEO 1 SETUP SCREEN CONTROLS	DESCRIPTION
Current Video Preset	Displays the current Video Preset number. Saved presets can also be called up using this control. The – and + buttons decrement and increment the displayed value.
Load Preset	Will load the selected Video Preset.
Store Preset	Will store any changes you have made to the video setup at the displayed preset number.
Restore Default Color Settings	Restores the video settings to their original defaults.
Color Control	When Video, S-Video or Component is selected as the video type, these controls are available. The Restore Default Color Settings button places the controls at their midpoint.
Brightness ^{1,2}	Adjusts video image brightness with the – and + buttons.
Contrast ^{1,2}	Adjusts video image contrast with the – and + buttons.
Saturation ³	Adjusts video image saturation with the – and + buttons.
Hue ³	Adjusts video image hue with the – and + buttons.
Red ^{1,2}	Adjusts the amount of red in the video signal. Available when the RGB Color button is selected.

(Continued on following page)

Video 1 Setup Details – Video, S-Video, Component and RGB (Continued)

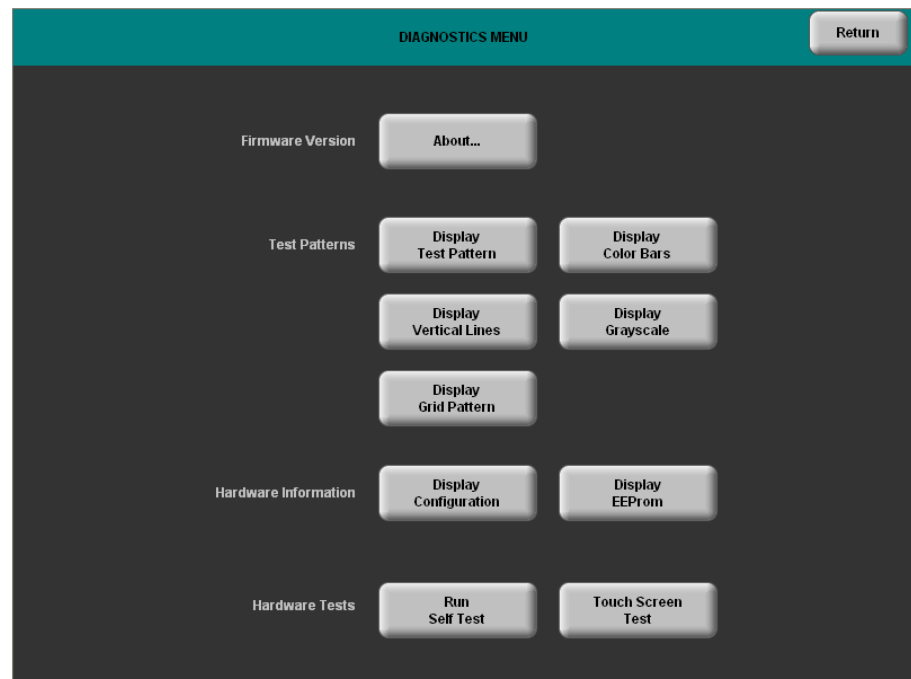
VIDEO 1 SETUP SCREEN CONTROLS	DESCRIPTION
Color Control (Continued) Green ^{1,2} Blue ^{1,2}	Adjusts the amount of green in the video signal. Available when the RGB Color button is selected. Adjusts the amount of blue in the video signal. Available when the RGB Color button is selected.
Overscan ³ None ³ Normal ³ Max ³	These controls adjust the amount of video information at the edges of the image. This part of the video picture is usually beyond the display capabilities of the screen. Sets the video screen so there is no overscan. The amount of used screen area is smallest in this configuration. Sets the video screen for normal overscan. This results in more area of the screen being used. This sets the video screen area to the maximum. The screen area is largest in this configuration. All video information at the edges is visible.
Size and Position Calibration Position Restore Default Position Size Restore Default Size Phase Restore Default Phase	When RGB is selected as the video source, these controls are available when the RGB Size and Position button has been pressed. When Perform Calibration button is pressed, the device attempts to center the current video signal and find the correct clock and phase settings. When Auto Mode is pressed, the device first looks for a preset that matches the current video characteristics (e.g., resolution, refresh rate, etc.). If one is found, it is loaded. If one is not found, an automatic calibration is performed. Manual Mode button allows manual adjustment. This control allows you to set the position of the video screen on the touchscreen. The arrow buttons move the screen along the X and Y axis. Returns the video screen to its original position on the touchscreen. Allows you to set the size of the video screen in both the vertical and horizontal directions. Returns the video screen to its original size on the touchscreen. These controls adjust the phase of the RGB signal. Controls are shown for both coarse and fine adjustments. Returns the video signal to its original default phase.

1. Video default is zero (0) for each of the video parameters (brightness, contrast, red, green and blue).
2. Adjustment applies to the currently selected video source only.
3. These controls are available only in *Video*, *S-Video* and *Component* modes. In *RGB* mode they are analogous to the *Position*, *V Size* and *H Size* controls.

Diagnosics Menu

The **Diagnosics** button from the MAIN MENU contains controls for diagnostic tools. The diagnostic tools should only be used under supervision from a Crestron customer service representative during telephone support. The options available from the DIAGNOSTICS MENU are numeric in nature and their interpretation is beyond the scope of this manual.

DIAGNOSTICS MENU



Installation

Ventilation

The TPS-GA-TPI should be used in a well-ventilated area. The venting holes should not be obstructed under any circumstances. If the TPS-GA-TPI is hot to the touch, consider using forced air ventilation and/or incrementing the spacing between units.

To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consideration must be given if installed in a closed or multi-unit rack assembly since the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Contact with thermal insulating materials should be avoided on all sides of the unit.

Rack Mounting

The TPS-GA-TPI can be mounted in a rack or stacked with other equipment. Two “ears” are provided with the TPS-GA-TPI so that the unit can be rack mounted. These ears must be installed prior to mounting. Complete the following procedure to attach the ears to the unit. The only tool required is a #2 Phillips screwdriver.

WARNING: To prevent bodily injury when mounting or servicing this unit in a rack, take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.

- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

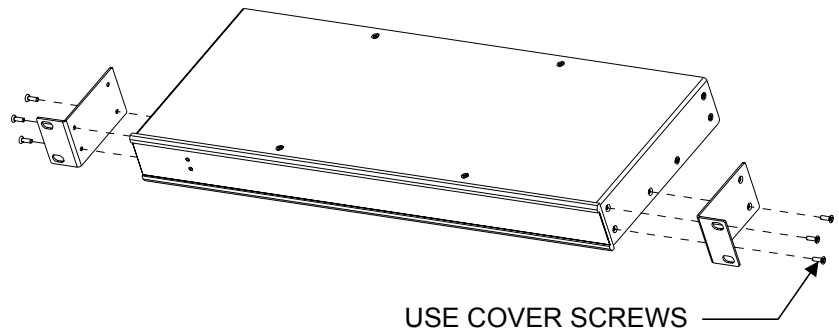
NOTE: If rack mounting is not required, rubber feet are provided for tabletop mounting or stacking. Apply the feet near the corner edges on the underside of the unit.

NOTE: Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

To install the ears:

1. There are screws that secure each side of the TPS-GA-TPI top cover. Using a #2 Phillips screwdriver, remove the three screws closest to the front panel from one side of the unit. Refer to the diagram following step 3 for a detailed view.
2. Position a rack ear so that its mounting holes align with the holes vacated by the screws in step 1.
3. Secure the ear to the unit with three screws from step 1, as shown in the following diagram.

Ear Attachment for Rack Mounting (this image shows a IRU device)

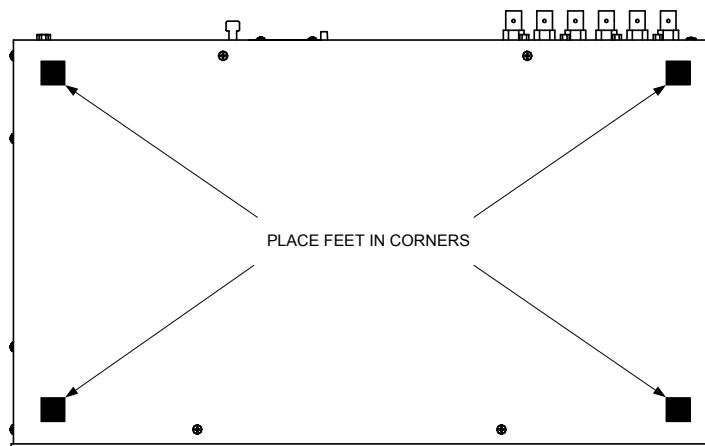


4. Repeat procedure (steps 1 through 3) to attach the remaining ear to the opposite side.

Stacking

Four “feet” are provided with the TPS-GA-TPI so that if the unit is not rack mounted, the rubber feet can provide stability when the unit is placed on a flat surface or stacked. These feet should be attached prior to the hookup procedure by removing the adhesive backing and pressing them onto the bottom of the device. Refer to the following illustration for placement of the feet.

Foot Placement for the TPS-GA-TPI

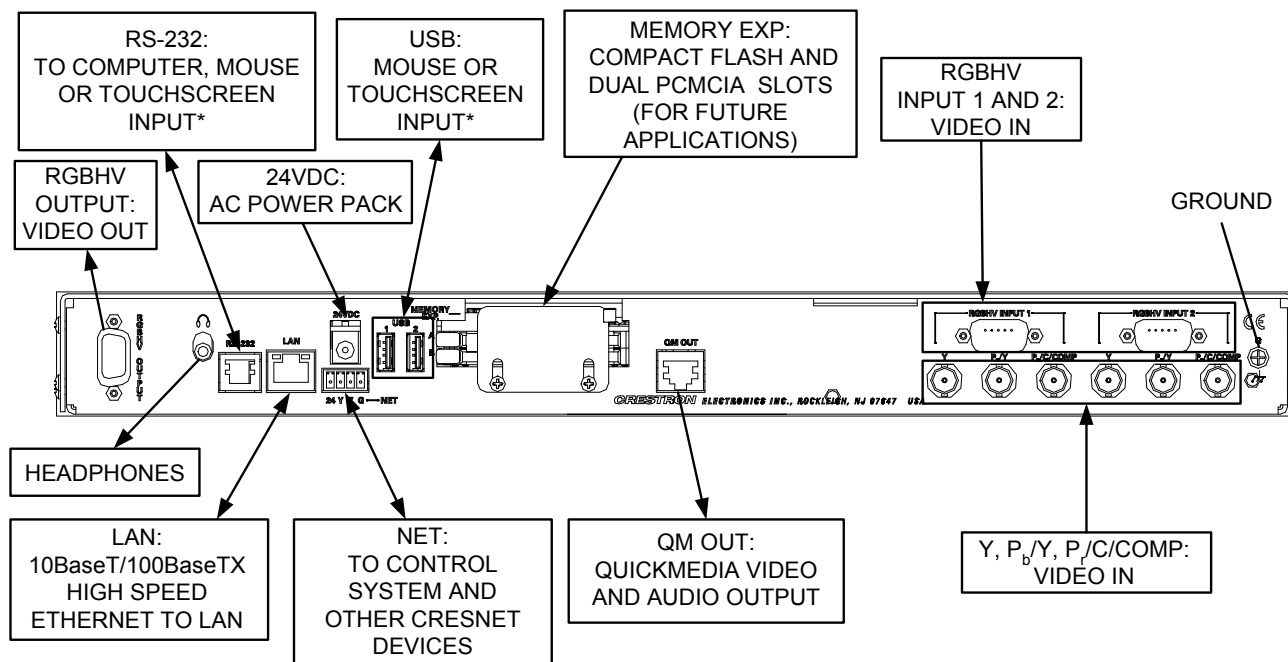


Hardware Hookup

Make the necessary connections as called out in the illustration that follows this paragraph. Refer to “Network Wiring” on page 12 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

When making connections to the TPS-GA-TPI, use Crestron power supplies for Crestron equipment.

Hardware Connections for the TPS-GA-TPI



* Refer to “External Touchscreen” on page 32 for touchscreen input connections.

CAUTION: The TPS-GA-TPI can be powered by either the 24VDC power jack **OR** the 4-position terminal block connector labeled **NET**. Not both. Damage to the unit may result.

NOTE: Crestron recommends an independent power supply for the TPS-GA-TPI when Cresnet power is not available.

NOTE: For optimum performance, Crestron strongly recommends using Crestron Certified CresCAT-QM cable, available from Crestron. Other high-quality/low skew CAT5e/CAT6 wiring may also be used with varying performance.

NOTE: The maximum continuous current from equipment under any external load conditions shall not exceed a current limit that is suitable for the minimum wire gauge used in interconnecting cables. The ratings on the connecting unit's supply input should be considered to prevent overloading the wiring.

NOTE: Sound in downloaded WAV format and key click are sent to the headphone and QuickMedia output.

External Touchscreen

There are six external non-Crestron touchscreens that will work with the TPS-GA-TPI. Each can be connected via serial connection or USB. The connection procedures are similar for all of them.

There are two commands that must be executed at the command line interface provided by the Toolbox Text Console.

Text Console Commands

COMMAND	COMMAND SYNTAX	DESCRIPTION
EXTTOUCH	EXTT <value>	Allows you to specify the external touchscreen being used. Valid values are: SMART = Smart Series ELO = ELO Graphics MICROT = Microtouch DISPLAYMATE = Displaymate/SC3 WACOM = Wacom SMART2 = Smart DTT770 Entering EXTT without parameter returns currently installed touchscreen.
TPIMODE	TPIMODE <mode>	Allows you to set the output screen resolution. Valid values are: 0 = 1024H x 768V (Default) 1 = 800H x 600V 2 = 1280H x 768V 3 = 1152H x 864V 4 = 1280H x 1024V 5 = 1366H x 768V

NOTE: Be sure to download and read Crestron Serial Mouse Control Driver Software Programmer's Guide (Doc 5916A) and Crestron Touch the PC Driver Software Programmer's Guide (Doc 5961B).

Serial Connection

1. Connect the **RGBHV OUT** to the RGB in on the touchscreen.
2. Connect to the TPS-GA-TPI via USB or TCP/IP communication as described in “Establishing Communication” on page 41.
3. Using the Toolbox Text Console, enter the **EXTT** command to set the TPS-GA-TPI for the touchscreen you have connected.
4. Using the Toolbox Text Console, enter the **TPIMODE** command to set the TPS-GA-TPI to the native resolution of the touchscreen. Refer to the touchscreen documentation to determine its native resolution.
5. Confirm that RS-232 is set to **External Touch Input**. Refer to “RS-232 Menu” on page 21.
6. Attach a serial cable assembly between the touchscreen and the TPS-GA-TPI.
7. Reboot the TPS-GA-TPI and the touchscreen.

CAUTION: Make sure the USB mouse is not attached when you calibrate the touchscreen. Calibrating the touchscreen with the mouse attached may cause the system to become unstable.

NOTE: Some non-Crestron touchscreens require that the “pen” supplied with the touchscreen be used during calibration. Simply touching the screen with your finger will not work.

8. Calibrate the touchscreen by selecting **Functions | Setup Mode | Enter Calibration Mode** in the Toolbox System Info window.

USB Connection

1. Connect the **RGBHV OUT** to the RGB in on the touchscreen.
2. Connect to the TPS-GA-TPI via serial or TCP/IP communication as described in “Establishing Communication” on page 41.
3. Using the Toolbox Text Console, enter the **EXTT** command to set the TPS-GA-TPI for the touchscreen you have connected.
4. Using the Toolbox Text Console, enter the **TPIMODE** command to set the TPS-GA-TPI to the native resolution of the touchscreen. Refer to the touchscreen documentation to determine its native resolution.
5. Attach a USB cable assembly between the touchscreen and the TPS-GA-TPI.
6. Reboot the TPS-GA-TPI and the touchscreen.
7. Calibrate the touchscreen by selecting **Functions | Setup Mode | Enter Calibration Mode** in the Toolbox System Info window.

Programming Software

Have a question or comment about Crestron software?

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

Earliest Version Software Requirements for the PC

NOTE: Crestron recommends that you use the latest software to take advantage of the most recently released features. The latest software is available from the Crestron website.

Crestron has developed an assortment of Windows®-based software tools to develop a Cresnet system. The following are the minimum recommended software versions for the PC:

Software

TASK	REQUIRED SOFTWARE VERSION
Program control system to operate TPS-GA-TPI.	SIMPL Windows version 2.06.16 or later with SIMPL+ Cross Compiler version 1.1 or later and Library update 453 or later. Also requires Crestron Database version 18.5.0 or later.
Upload program and firmware.	Crestron Toolbox 1.04.15 or later.
For graphical touchscreen design.	Crestron VisionTools® Pro-e version 3.4.0.7 or later.

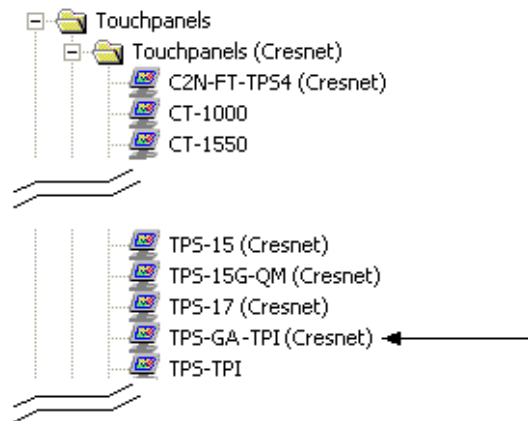
Programming with SIMPL Windows

SIMPL Windows is Crestron's premier software for programming Crestron control systems. It is organized into two separate but equally important "Managers".

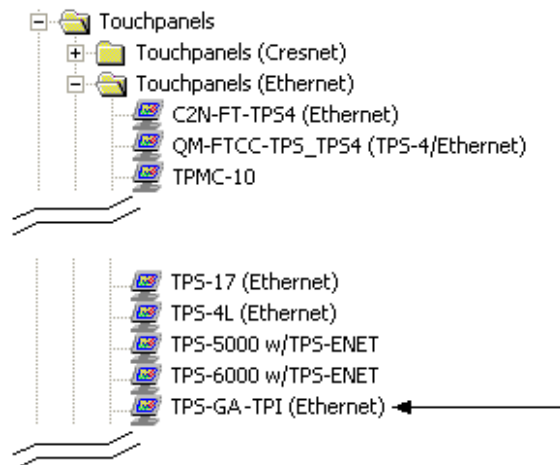
Configuration Manager

Configuration Manager is the view where programmers "build" a Crestron control system by selecting hardware from the *Device Library*.

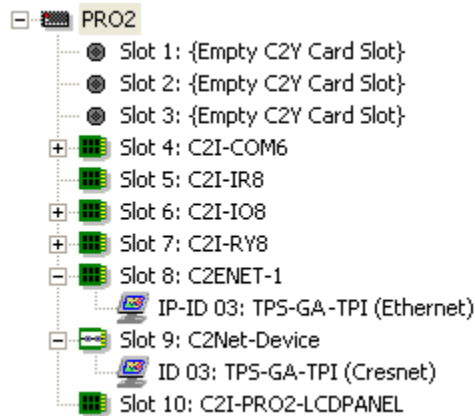
- To incorporate the TPS-GA-TPI (Cresnet) into the system, drag the TPS-GA-TPI from the Touchpanels|Touchpanels (Cresnet) folder of the *Device Library* and drop it in the *System Views*.

Locating the TPS-GA-TPI (Cresnet) in the Device Library

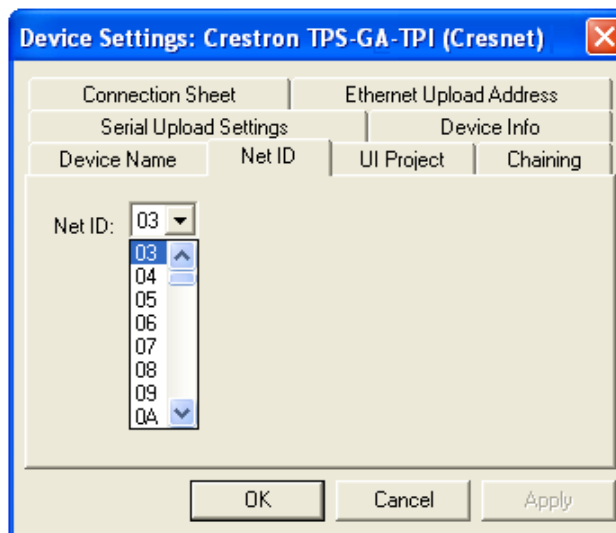
- To incorporate the TPS-GA-TPI (Ethernet) into the system, drag the TPS-GA-TPI from the Touchpanels|Touchpanels (Ethernet) folder of the *Device Library* and drop it in the *System Views*.

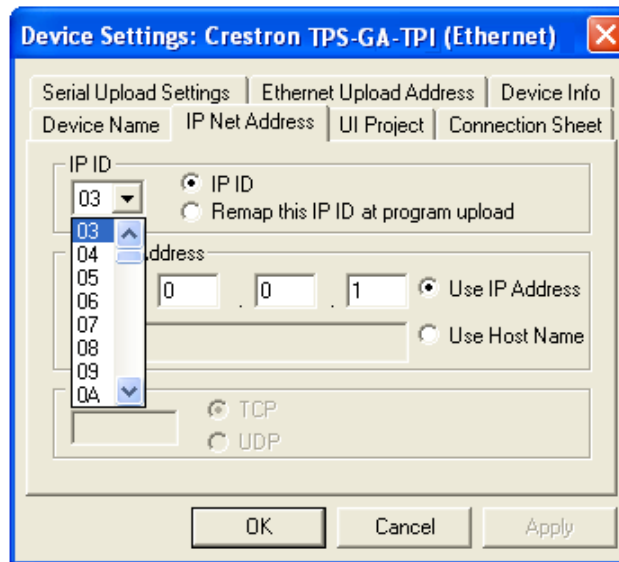
Locating the TPS-GA-TPI (Ethernet) in the Device Library

- The system tree of the control system displays the device in the appropriate slot with a default Net ID or IP ID as shown in the following illustration.

C2Net Device, Slots 8 and 9

- Additional TPS-GA-TPI devices are assigned different Net ID (for Cresnet devices) or IP ID (for Ethernet devices) numbers as they are added.
- If necessary, double click a device to open the “Device Settings” window and change the Net ID or IP ID, as shown in the following figures.

“TPS-GA-TPI Cresnet Device Settings” Window

“TPS-GA-TPI Ethernet Device Settings” Window

- The ID code specified in the SIMPL Windows program must match the Net ID or IP ID of each unit.

Program Manager

Program Manager is the view where programmers “program” a Crestron control system by assigning signals to symbols. The symbol can be viewed by double clicking on the icon or dragging it into *Detail View*. Each signal in the symbol is described in the SIMPL Windows help file (F1).

Programming with VisionTools Pro-e

Touchpanel or display screens should be created in VT Pro-e to allow accessing the embedded applications, switching of source signals to desired outputs as well as selection of the system mode. There are no special programming requirements to use the functions of the TPS-GA-TPI in a room-control system.

Multi-Mode Objects

Multi-mode objects offer high-performance programming!

The single most-advanced VT Pro-e high-performance programming technique involving the TPS-GA-TPI is the concept of multi-mode objects. A multi-mode object (i.e., button, legend, etc.) is an object drawn on a VT Pro-e page that can have one or more active and inactive visible settings (*modes*).

For examples, refer to http://www.crestron.com/downloads/example_programs.asp and search for Multi-mode object examples. This file contains the VT Pro-e interface files and SIMPL Windows files that illustrate the high-performance capabilities of multi-mode objects.

WAV File Audio Messages

The TPS-GA-TPI interfaces are capable of producing (via headphone jack) or transmitting (via QuickMedia) audio messages as system prompts and responses. These files are recorded as WAV files on a PC using an audio utility such as Sound Recorder that is packaged with Microsoft Windows 95/98/Me/XP/NT/ 2000™. Files from other sources may also be converted to an acceptable format by using this or a similar utility. Many other audio utilities are available commercially or as shareware. The TPS-GA-TPI interfaces only accept the following WAV file format: **PCM, 8KHz, mono, 8-bit**. For more information about how to use Sound Recorder, refer

to its User's Guide and extensive help information provided with the software. Also refer to the help file in VT Pro-e to learn how to use its audio tool, Sound Manager, to attach WAV files to an interface project.

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

NOTE: Interface WAV files can be obtained from the Wave LC Library of the Crestron FTP site.

Bit Depth and File Size

A bit depth refers to the number of memory bits used to store color data for each pixel in a raster image. A TPS-GA-TPI raster image consists of a rectangular grid of picture elements (pixels). Each pixel uses the same amount of memory to store its color data. The amount of memory is called the bit depth of the image.

Greater bit depths are required to represent finer gradations of color. Increasing bit depth necessarily increases file size. A black and white drawing requires only one bit per pixel to store all the available color information. Using a 32-bit per pixel bit depth for a black and white image increases the file size 32 times, without adding anything to the black and white image quality.

In an 8-bit per pixel system, the associated 8-bits of video memory for every screen pixel, contains a value referring to a location in an 8-bit color table. In this way, any one of the specific 256 color table locations is assigned to a pixel.

A 16-bit highcolor system is considered sufficient to provide life-like colors. It is encoded using 5-bits to represent red, 5-bits to represent blue, but (since the human eye is more sensitive to the color green) 6-bits to represent 64 levels of green. These can therefore be combined to provide 65,536 mixed colors ($32 \times 32 \times 64 = 65,536$).

In a 24-bit graphics display, the video memory allocates 24 bits for each pixel on the screen, enabling each pixel to take on any one of a possible 16.7 million colors. Each 24-bit value is composed of 8-bits for red, 8-bits for green, and 8-bits for blue. These triplets of 8-bit values are also referred to as the red, green, and blue color planes. A 24-bit image is actually composed of three component images, which combine to create the truecolor picture. The reason this is called truecolor is that this is around the maximum number of colors the human eye is able to detect.

Truecolor images are sometimes represented by a 32-bit value. The extra 8-bits do not enhance the precision of the color representation, but act as an alpha channel that represents pixel translucency. The 32-bit truecolor has become popular on the computer desktop to provide effects such as translucent windows, fading menus, and shadows.

In graphics intensive applications, raising or lowering the color depth of the displayed graphics can achieve a balance of performance and quality. Lower color depths do not require as much frame buffer memory or display bandwidth, allowing them to be generated and displayed more quickly. Increasing color depth results in higher color quality at the expense of display speed and responsiveness. By using a majority of 8-bit or 16-bit graphics, and holding the 32-bit graphics to a minimum (ex. for a family photo, etc.), you can create a sophisticated project that will fit in the memory space provided, and have the interface remain very responsive.

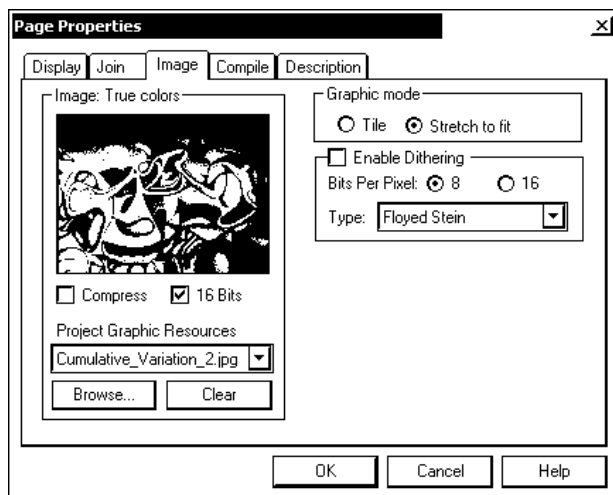
Relationship of Bits to Colors

NUMBER OF BITS	NUMBER OF COLORS
1 bit	Black and White
2 bits	4 Colors
4 bits	16 Colors
8 bits	256 Colors
16 bits	65,536 Colors (Highcolor)
24 bits	16.7 million Colors (Truicolor)
32 bits	16.7 million Colors plus Transparency

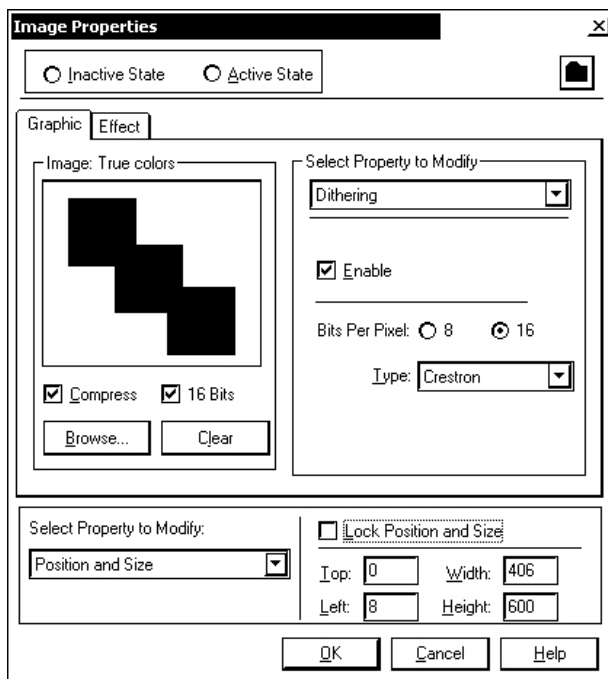
When creating a VT Pro-e project, you can elect to compress and reduce the image size in the “Page Properties” window for the entire page, and/or perform the same function of reducing the image size using the “Image Properties” window. A reduction in image size will save a considerable amount of memory space for your project.

In VT Pro-e, the **Compress** checkbox permits the image to be compressed when compiling. The **16 Bits** checkbox converts a 24-bit or 32-bit image to 16 bits. This conversion to a 16-bit image may cause the loss of some subtle shading. To compensate for this, use the dithering to simulate the original shading. Various dithering types are available. Refer to the following illustrations.

VT Pro-e “Page Properties” Window – Bit Depth Selection



VT Pro-e “Image Properties” Window – Bit Depth Selection



MultiByte International Characters

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

Multibyte character fonts require more than the usual eight bits to specify a character. This occurs when a language has more than 256 characters (2⁸) in a font.

For example, Chinese fonts contain several thousand characters. Other multibyte languages include Japanese and Korean.

There are two separate applications with multibyte characters – static text on buttons and indirect text on buttons. No Isys touchpanel or interface firmware changes are required in either case.

Indirect text on a button is entered in VT Pro-e and the actual string to be displayed is entered in SIMPL Windows. As of this publication date only completely single byte or completely multibyte strings may be entered or they will not be compiled correctly in SIMPL Windows. In other words, you cannot enter Chinese characters interspersed with numbers. You can enter Chinese characters or numbers in separate strings or you can pad each number with “\x00” to make it multibyte and then combine it with Chinese characters in the same string.

Of course you can always use the workaround of showing a graphic that displays the string but it is not dynamic. To compile and use multibyte characters it is essential that the operating system understand the language. Windows XP is available in many international languages and add-on software is available for other versions of Windows.

Example Program

An example program for the TPS-GA-TPI is available from the Crestron website (<http://www.crestron.com/exampleprograms>).

Uploading and Upgrading

Crestron recommends using the latest programming software and that each device contains the latest firmware to take advantage of the most recently released features. However, before attempting to upload or upgrade it is necessary to establish communication. Once communication has been established, files (for example, programs, projects or firmware) can be transferred to the control system (and/or device). Finally, program checks can be performed (such as changing the device ID or creating an IP table) to ensure proper functioning.

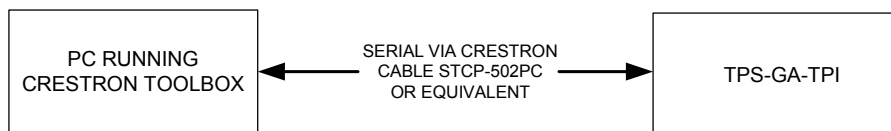
Establishing Communication


Use Crestron Toolbox for communicating with the TPS-GA-TPI; refer to the Crestron Toolbox help file for details. There are three methods of communication.

Direct Serial Communication

NOTE: Required for initial setup of Ethernet parameters.

Direct Serial Communication



- The **RS-232** port on the TPS-GA-TPI connects to the serial port on the PC via a serial cable (Crestron STCP-502PC or equivalent).
- Use the Address Book in Crestron Toolbox to create an entry using the expected serial communication protocol (RS-232, auto-detect baud rate, no parity, 8 data bits, 1 stop bit, XON/XOFF disabled, RTS/CTS disabled).
- Display the TPS-GA-TPI's "System Info" window (click the  icon); communications are confirmed when the device information is displayed.

Indirect Serial Communication

Indirect Serial Communication




- TPS-GA-TPI connects to control system via Cresnet.
- Establish communications between the PC and the control system as described in the latest version of the 2-Series Control Systems Reference Guide (Doc. 6256).

TCP/IP Communication

NOTE: Required for operation with a Crestron control system.

Ethernet Communication

- Establish serial communication between TPS-GA-TPI and PC.
- Enter the IP address, IP mask and default router of the TPS-GA-TPI via the Crestron Toolbox (**Functions | Ethernet Addressing**); otherwise enable DHCP.
- Confirm Ethernet connections between TPS-GA-TPI and PC. If connecting through a hub or router, use CAT5 straight through cables with 8-pin RJ-45 connectors. Alternatively, use a CAT5 crossover cable to connect the two LAN ports directly without using a hub or router.
- Use the Address Book in the Crestron Toolbox to create an entry for the TPS-GA-TPI with the TPS-GA-TPI's TCP/IP communication parameters.
- Display the "System Info" window (click the  icon) and select the TPS-GA-TPI entry.

Programs, Projects and Firmware

Program, project or firmware files may be distributed from programmers to installers or from Crestron to dealers. Firmware upgrades are available from the Crestron website as new features are developed after product releases. One has the option to upload programs and projects via the programming software or to upload and upgrade via the Crestron Toolbox. For details on uploading and upgrading, refer to the SIMPL Windows help file, VisionTools Pro-e help file, or the Crestron Toolbox help file.

SIMPL Windows

If a SIMPL Windows program is provided, it can be uploaded to the control system using Simple Windows or Crestron Toolbox.

VisionTools Pro-e

Upload the VisionTools Pro-e file to the touchpanel interface using VisionTools Pro-e or Crestron Toolbox. If loading a project to a touchpanel interface that has an external compact flash slot, please use Crestron Toolbox.

Firmware

Check the Crestron website to find the latest firmware. (New users may be required to register to obtain access to certain areas of the site, including the FTP site.)

Upgrade TPS-GA-TPI firmware via Crestron Toolbox.

- Establish serial or TCP/IP communications with the TPS-GA-TPI and display the "System Info" window.
- Select **Functions | Firmware...** to upgrade the TPS-GA-TPI firmware.


Program Checks

Actions that can be performed on the TPS-GA-TPI vary depending on whether it is connected via Cresnet or Ethernet.

Cresnet Connections

For Cresnet connections, display the network device tree (**Tools | Network Device Tree**) to show all network devices connected to the control system. Right-click on the TPS-GA-TPI to display actions that can be performed on the TPS-GA-TPI.

Ethernet Connections

For Ethernet connections, display the “System Info window (click the  icon) and select the **Functions** menu to display actions that can be performed on the TPS-GA-TPI.

Be sure to use the Crestron Toolbox to create the TPS-GA-TPI IP table.

- Select **Functions | IP Table Setup**.
- Add, modify or delete entries in the IP table. The TPS-GA-TPI can have only one IP table entry.
- A defined IP table can be saved to a file or sent to the device.

Edit the control system’s IP table to include an entry for the TPS-GA-TPI. The entry should list the TPS-GA-TPI’s IP ID (specified on the TPS-GA-TPI’s IP table) and the internal gateway IP address 127.0.0.1.

Problem Solving

Troubleshooting

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

TPS-GA-TPI Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
TPS-GA-TPI interface does not function.	TPS-GA-TPI is not receiving power.	Verify power to unit. Use only Crestron power supplies for Crestron equipment.
	Incorrect cable connections.	Follow connection procedures in this guide and inspect connector pins.
	Incorrect firmware/software.	Update firmware/software versions via Crestron Toolbox.
	Interface is incorrectly calibrated.	Enter "SETUP MODE" and recalibrate.
		If calibration fails, use the Toolbox Text Console and run the RESTORE command. RESTORE resets all system settings to factory defaults and erases all files in internal flash memory.
Interface is not communicating with the Cresnet network.	Use Toolbox to poll the network. Verify Cresnet connection to the interface.	
	Verify interface is in "CRESNET MODE" as defined in the "Interface Menu" on page 17.	
Interface is not responding to Cresnet.	Incorrect network wiring.	Touch the screen to remove the message and verify correct wiring to all connectors.
	Incorrect configuration parameters.	Enter Setup and verify parameters.
	Interface Cresnet ID is not set to match the Net ID in the SIMPL program.	Use Crestron Toolbox to poll the network. Verify that the Cresnet ID for the interface is properly set to match the Net ID in the SIMPL program.
	Interface Cresnet ID is not unique, two or more units share the same ID.	Use Crestron Toolbox to poll the network and verify that each ID is used only once.

(Continued on the following page)

TPS-GA-TPI Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Interface is not responding to Cresnet.	ICMP is disabled.	Enable ICMP by typing ICMP ON at the command prompt in the Toolbox Text Console.
No video displayed.	Wrong VT Pro-e or SIMPL Windows programs.	Verify correct programs. Verify proper video set up.
	Incorrect input connection.	Verify video input and QM connections.
TPS-GA-TPI does not respond to ping command.	IP address not correct (LAN green and amber LEDs are off).	Assign correct IP address to TPS-G-TPI.
	IP mask not correct (LAN green and amber LEDs are on).	Assign correct IP mask.
	PC and TPS-GA-TPI not on same subnet.	Ensure that the PC and the TPS-GA-TPI are on the same subnet.
Mouse or attached touchpanel does not work.	Incorrect Touch settings.	Check Touch settings on INTERFACE MENU .
	Incorrect Calibration.	Use Toolbox function Setup Mode to perform calibration.
Interface does not communicate with RS-232 devices.	Incorrect RS-232 settings.	Match communication settings of interface to peripheral device.
Attached interface display is dark.	Standby timeout has elapsed.	Touch the screen to reactivate.
Unexpected response from the interface.	Interface is incorrectly calibrated.	Enter "SETUP MODE" and recalibrate.
Communications via the LAN port is not functioning.	Improper Ethernet connection.	Verify proper connection at interface LAN port.
	Another device set to the same IP address.	Obtain new interface static IP address.

Check Network Wiring**Use the Right Wire**

In order to ensure optimum performance over the full range of your installation topology, Crestron Certified Wire and only Crestron Certified Wire may be used. Failure to do so may incur additional charges if support is required to identify performance deficiencies because of using improper wire.

Calculate Power

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

CAUTION: Provide sufficient power to the system. Insufficient power can lead to unpredictable results or damage to the equipment. Please use the Crestron Power Calculator to help calculate how much power is needed for the system (<http://www.crestron.com/calculators>).

When calculating the length of wire for a particular Cresnet run, the wire gauge and the Cresnet power usage of each network unit to be connected must be taken into consideration. Use Crestron Certified Wire only. If Cresnet units are to be daisy-chained on the run, the Cresnet power usage of each network unit to be daisy-chained must be added together to determine the Cresnet power usage of the entire chain. If the unit is home-run from a Crestron system power supply network port, the Cresnet power usage of that unit is the Cresnet power usage of the entire run. The wire gauge and the Cresnet power usage of the run should be used in the following equation to calculate the cable length value on the equation's left side.

Cable Length Equation

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

Where: L = Length of run (or chain) in feet
 R = 6 Ohms (Crestron Certified Wire: 18 AWG (0.75 MM²))
 or 1.6 Ohms (Cresnet HP: 12 AWG (4 MM²))
 P = Cresnet power usage of entire run (or chain)

Make sure the cable length value is less than the value calculated on the right side of the equation. For example, a Cresnet run using 18 AWG Crestron Certified Wire and drawing 20 watts should not have a length of run more than 333 feet. If Cresnet HP is used for the same run, its length could extend to 1250 feet.

NOTE: All Crestron certified Cresnet 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.

Strip and Tin Wire

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.

Add Hubs

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

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron website (<http://www.crestron.com/manuals>). This link will provide a list of product manuals arranged in alphabetical order by model number.

List of Related Reference Documents

DOCUMENT TITLE
2-Series Control Systems Reference Guide
CAT5 Wiring Reference Guide
Crestron e-Control Reference Guide
MediaManager Applications Guide
Touch the PC V1 Serial Mouse Control Driver
Touch the PC V2 Touch the PC Driver

Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by calling the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876]. For assistance in your local time zone, refer to the Crestron website (<http://www.crestron.com/>) for a listing of Crestron worldwide offices.

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

Future Updates

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

Check the Crestron website periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.

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Merchandise Returns / Repair Service

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

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CRESTRON shall not be liable to honor the terms of this warranty 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.

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