quick guide to

Touchpanel Connections

CRESTRON®

Crestron Electronics, Inc.
15 Volvo Drive
Rockleigh, NJ 07647
1-888-CRESTRON

All brand names, product names and trademarks are the property of their respective owners.
Windows® and Windows® XP are registered trademarks of Microsoft Corporation in the United States and other countries.
©2009 Crestron Electronics, Inc.

Contents

INTRODUCTION 1
TPMC-8L 2
TPMC-8X 4
TPMC-8X-DSW 5
TPMC-8T 7
TPMC-12, TPS-15, AND TPS-17 9
TPS-12G-QM AND TPS-15G-QM 14
TPMC-CH-IMC TOUCHPANEL INTERFACE 18
TPS-3000 AND TPS-4000 22
TPS-IMPC TOUCHPANEL INTERFACE 24
TPS-4L 29
TPS-6L 30
TPS-6X-DS AND TPS 6X-DSW 33
TPS-6X-IMCW 35
V-PANELS 36
DIGITAL GRAPHICS ENGINES DGE-1 AND DGE-2 37
TPMC-4SM 40
CRESNET TOUCHPANEL POWER Q&A 41
EXAMPLE HOOKUP AND APPLICATION DIAGRAMS 43
APPENDIX A: QUICKMEDIA INSTALLATION NOTES 54
FURTHER INQUIRIES 54

Introduction

This document contains detailed hookup information for the current line of Crestron touchpanels.

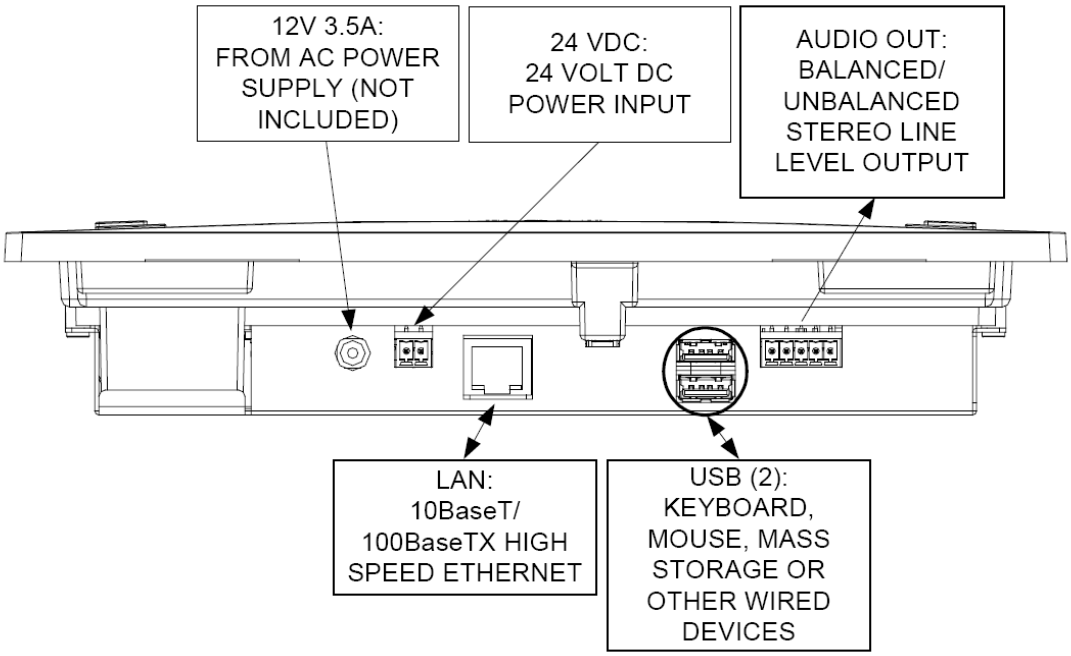
Additional information may be found in the specific operations manual for each product, refer to the Crestron website (www.crestron.com).

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

NOTE: To prevent overheating, do not operate this product in an area that exceeds the environmental range: Temperature: 41° to 113°F (5° to 45°C), Humidity: 10% to 90% RH (non-condensing). 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.

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.

TPMC-8L



Power

One 2.5 mm barrel DC power jack; 12 Volt DC power input (power supply not included).

12V 3.5A

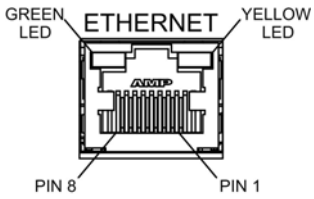
One 2-pin 3.5 mm detachable terminal block
24 Volt DC power input; Wire size: 18 AWG maximum

24 VDC

LAN

One 8-wire RJ-45 with 2 LED indicators
10/100BaseT Ethernet port
Green LED indicates link status
Yellow LED indicates Ethernet activity

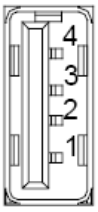
PIN	SIGNAL	PIN	SIGNAL
1	TX +	5	N/C
2	TX -	6	RC -
3	RC+	7	N/C
4	N/C	8	N/C



USB

USB is a connectivity specification developed by the USB Implementers Forum that provides a single, simple, standardized way to connect up to 127 devices to a computer. USB shielded cables contain two wires for power +5 volts (red) and ground (brown) and a twisted pair of wires (yellow and blue) that carry data. The USB standard supports data transfer rates of 12 Mbps (megabits per second). USB devices can be connected or disconnected without restarting the computer. Two USB 2.0 Type A female USB 2.0 ports for keyboard, mouse and external storage devices.

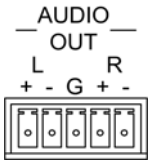
PIN	DESCRIPTION
1	+5 VDC
2	Data -
3	Data +
4	Ground

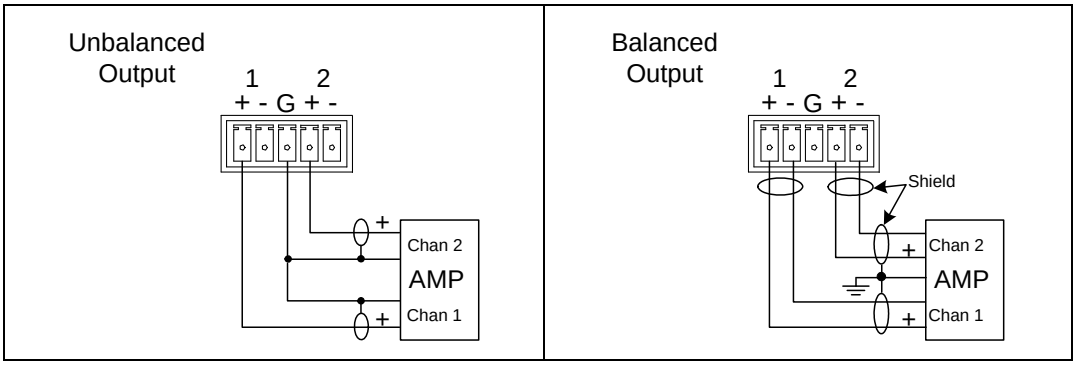


AUDIO OUT

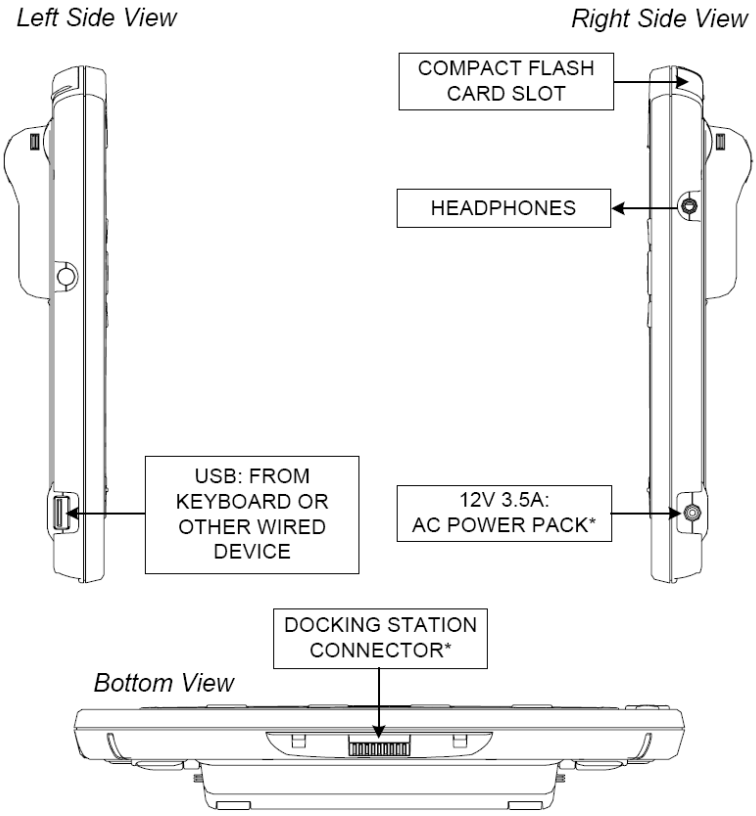
(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line level audio output.

PIN	DESCRIPTION
L +	Left Positive
L -	Left Negative
G	Ground
R +	Right Positive
R -	Right Negative





TPMC-8X



NOTE: When inserting a Compact Flash card, orient the card so that the small lip at the top of the card is facing away from the touchpanel.

The TPMC-8X should be used in a well-ventilated area. To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications.

When making connections to the TPMC-8X, consider the following: Use the included Crestron power supply for these devices. The power supply cable cannot be extended.

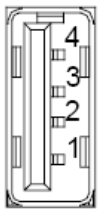
HEADPHONES

(1) 3.5 mm TRS mini phone jack; Output power: 12 mW per channel; Minimum impedance: 32 Ω

USB

One USB 2.0 Type A female USB 2.0 port for keyboard, mouse and external storage devices.

PIN	DESCRIPTION
1	+5 VDC
2	Data -
3	Data +
4	Ground



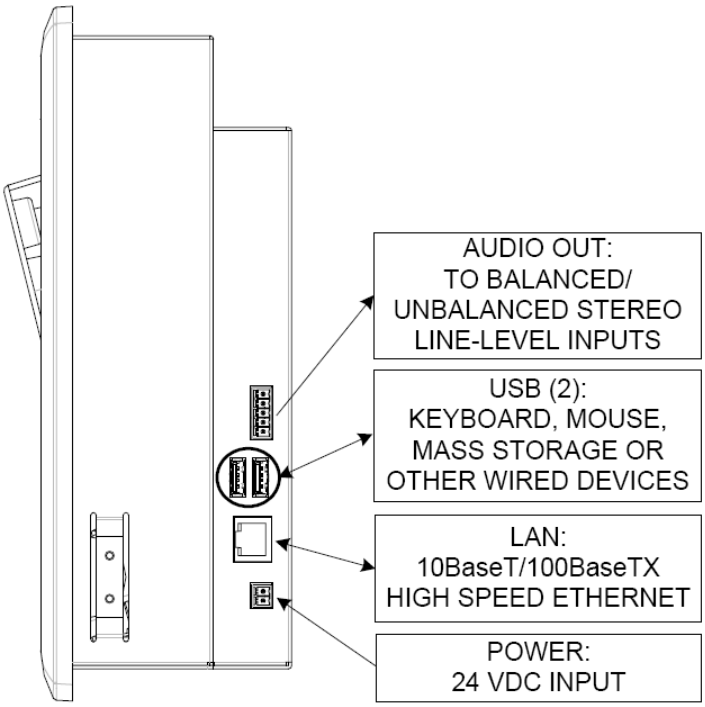
POWER

One DC power jack (power pack included); power pack can also be used to charge internal battery.

DOCKING STATION CONNECTOR

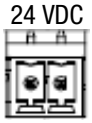
Mates with TPMC-8X-DS or TPMC-8X-DSW Docking Station/Charger (sold separately).

TPMC-8X-DSW



POWER

One 2-pin 3.5 mm detachable terminal block
24 Volt DC power input
Wire size: 18 AWG maximum



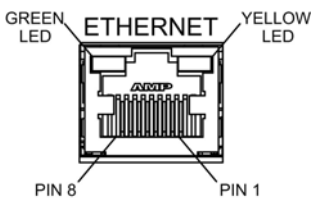
NOTE: If the TPMC-8X-DSW is to be fed power from a Cresnet bus (the 24 and G lines), be sure that the Cresnet data lines (Y and Z) are not connected to the TPMC-8X-DSW, nor shorted together, to ground or to any metal surface. Be sure to isolate them properly and prevent them from shorting to anything.

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.

LAN

One 8-wire RJ-45 with 2 LED indicators
10/100BaseT Ethernet port
Green LED indicates link status
Yellow LED indicates Ethernet activity.

PIN	SIGNAL	PIN	SIGNAL
1	TX +	5	N/C
2	TX -	6	RC -
3	RC+	7	N/C
4	N/C	8	N/C

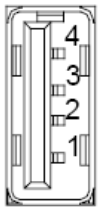


USB

USB is a connectivity specification developed by the USB Implementers Forum that provides a single, simple, standardized way to connect up to 127 devices to a computer. USB shielded cables contain two wires for power +5 volts (red) and ground (brown) and a twisted pair of wires (yellow and blue) that carry data. The USB standard supports data transfer rates of 12 Mbps (megabits per second). USB devices can be connected or disconnected without restarting the computer.

Two USB 2.0 Type A female USB 2.0 ports for keyboard, mouse and external storage devices.

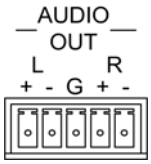
PIN	DESCRIPTION
1	+5 VDC
2	Data -
3	Data +
4	Ground

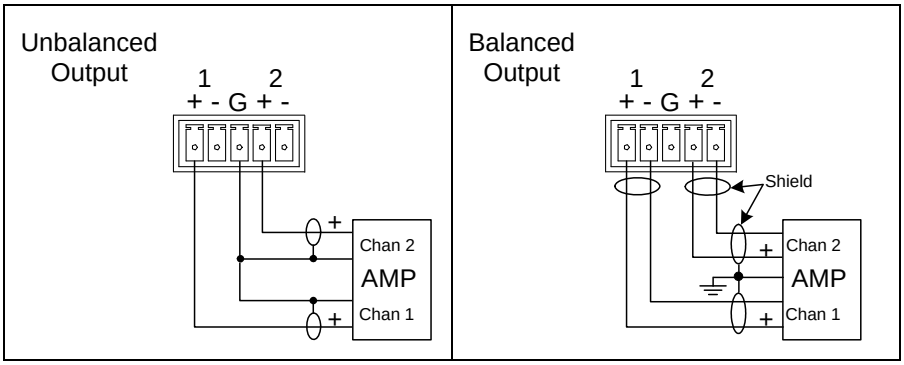


AUDIO OUT

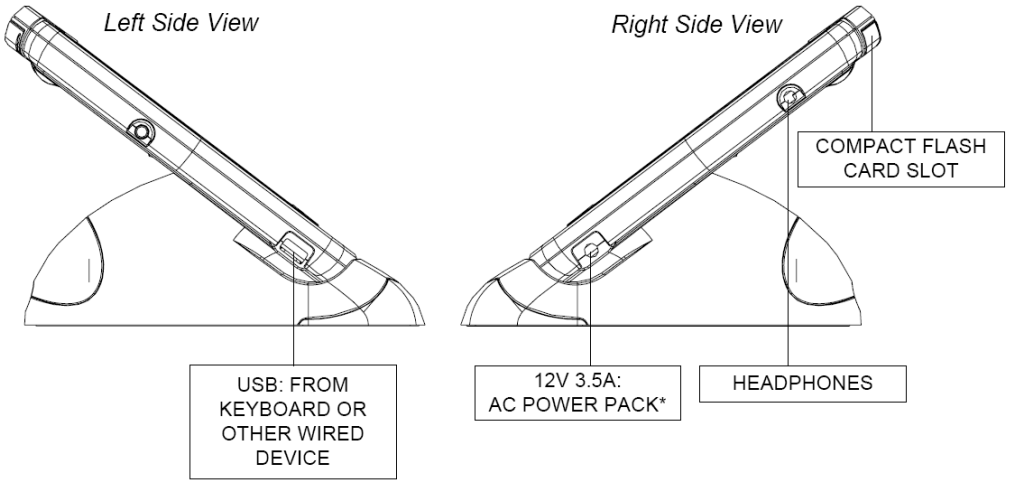
(1) 5-pin 3.5 mm detachable terminal block
Balanced/unbalanced stereo line level audio output.

PIN	DESCRIPTION
L +	Left Positive
L -	Left Negative
G	Ground
R +	Right Positive
R -	Right Negative

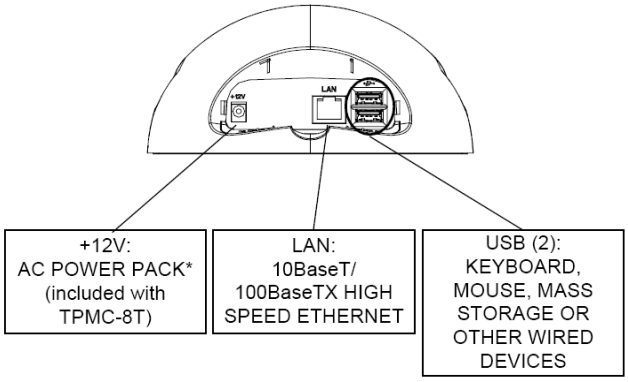




TPMC-8T



Rear View of Base (with cover removed)



* Crestron recommends using either the power jack on the base or on the side of the panel but not both at the same time.

POWER

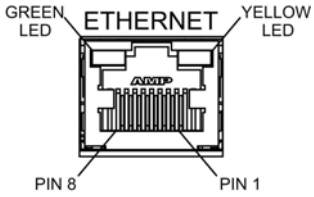
12V 3.5A Power jack (Power pack included)

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

LAN

One 8-wire RJ-45 with 2 LED indicators
10/100BaseT Ethernet port
Green LED indicates link status
Yellow LED indicates Ethernet activity.

PIN	SIGNAL	PIN	SIGNAL
1	TX +	5	N/C
2	TX -	6	RC -
3	RC+	7	N/C
4	N/C	8	N/C

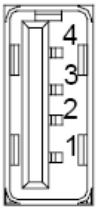


USB

USB is a connectivity specification developed by the USB Implementers Forum that provides a single, simple, standardized way to connect up to 127 devices to a computer. USB shielded cables contain two wires for power +5 volts (red) and ground (brown) and a twisted pair of wires (yellow and blue) that carry data. The USB standard supports data transfer rates of 12 Mbps (megabits per second). USB devices can be connected or disconnected without restarting the computer.

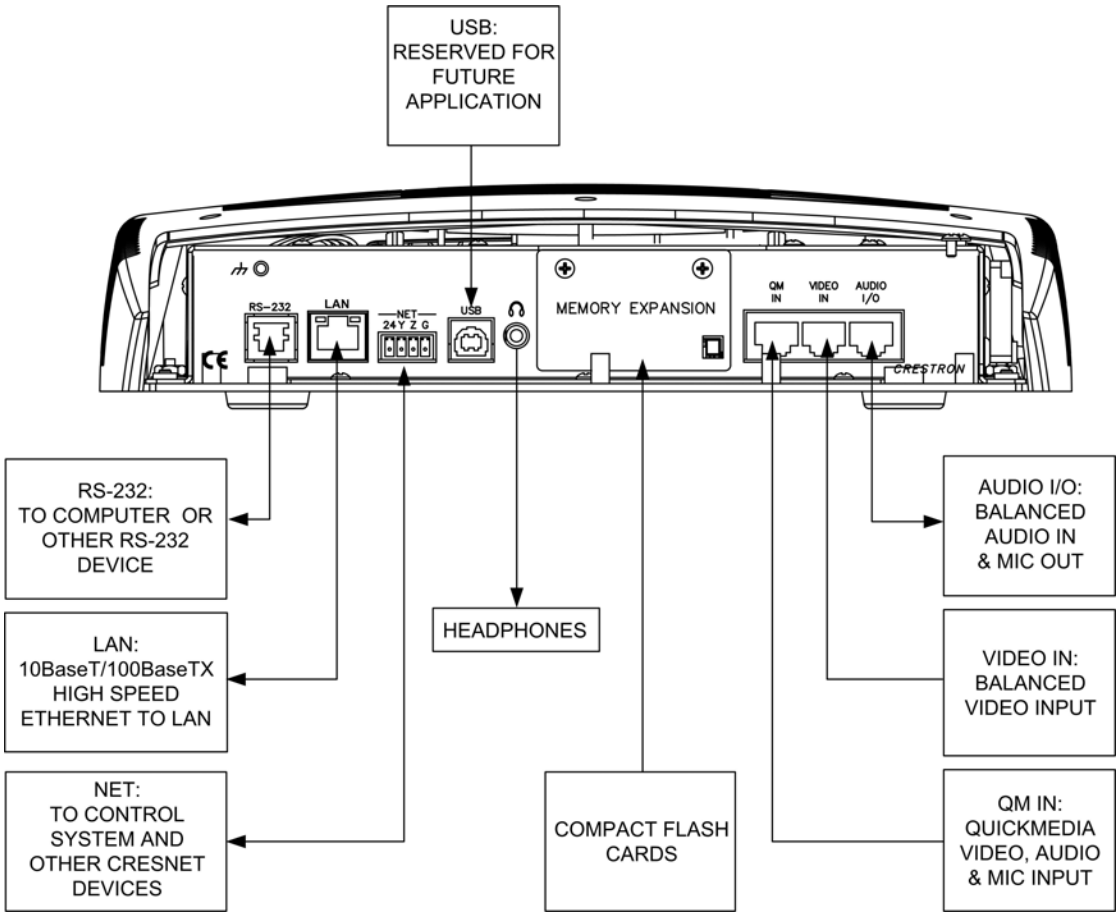
Two USB 2.0 Type A female USB 2.0 ports for keyboard, mouse and external storage devices.

PIN	DESCRIPTION
1	+5 VDC
2	Data -
3	Data +
4	Ground

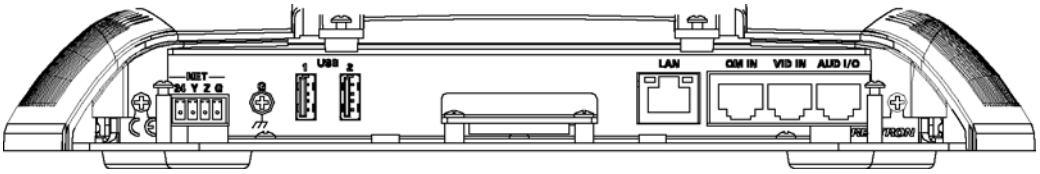


TPMC-12, TPS-15, and TPS-17

TPS-15 and TPS-17



TPMC-12



RS-232

This 6-pin RJ-11 connector mates with a 9-pin serial port of a PC. The connecting cable is not supplied. Use this port to establish a direct connection between the touchpanel and a PC without a control system or network connection. Once the direct connection is established, touchpanel files and firmware updates can be uploaded to the touchpanel. Additionally, the touchpanel diagnostic tools can be accessed over the direct connection.

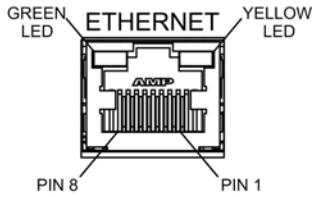
PIN	DESCRIPTION
1	CTS
2	GND
3	RXD
4	TXD
5	RTS
6	N/C (Not connected)

LAN

One 8-wire RJ-45 connector with two LED indicators:
The green LED indicates network speed
The yellow LED indicates Ethernet activity

This connector provides an Ethernet 10baseT/100baseTX, full duplex, IEEE 802.3U compliant network connection.

PIN	SIGNAL	PIN	SIGNAL
1	TX +	5	N/C
2	TX -	6	RC -
3	RC+	7	N/C
4	N/C	8	N/C



NET

The four-pin 5 mm detachable terminal block provides communication with and power from a Cresnet control network.

Pins 24 and G provide 24 VDC and ground.

Pins Y and Z provide communications (data).

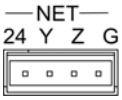
Cresnet® Power Usage
Not including TPMC-CH-IMC (1.0W)

TPMC-12 = 43 W (1.8 A @ 24 V)

TPS-15 = 65 W (2.7 A @ 24 V)

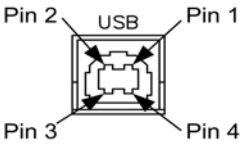
TPS-17 = 74 W (3.08 A @ 24 V)

Crestron recommends an independent power supply for these touchpanels.



USB

One Universal Serial Bus (USB) "B" connector provides a communications link. USB is a connectivity specification developed by the USB Implementers Forum that provides a single, simple, standardized way to connect devices to a computer. USB shielded cables contain two wires for power +5 volts (red) and ground (brown) and a twisted pair of wires (yellow and blue) that carry data.



PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5 VDC	3	Data +
2	Data -	4	Ground

NOTE: This connector is reserved for future applications.

PHONE

Connect this standard mini phone jack (12 mW, 32 ohm load) to the plug of a 3.5 mm external headphone set plug (not supplied).

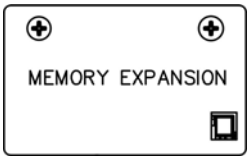
Plugging in the headphone cuts off the speakers.

The headphone output is for WAV and Line audio only. It does not carry the microphone signal.

Use the AUDIO OUT on the TPMC-CH-IMC for the microphone signal.

MEMORY EXPANSION

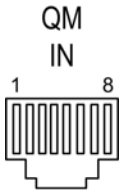
The onboard memory may be enhanced with the addition of a Type II compact flash memory (up to 160 MB).



The flash memory slot is accessible on the rear panel of the unit.

QM IN (QuickMedia Input)

The eight-pin RJ-45 QuickMedia transport port accepts Crestron Certified Wiring carrying audio, video, and microphone signals.



The QM input port conforms to the 568B wiring standard. Refer to the following table for connector pinouts.

NOTE: The QM port is not connected through any "IMC" interface.

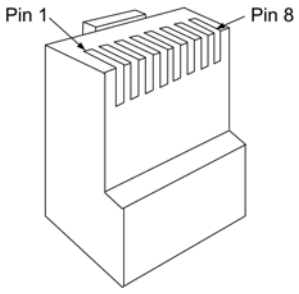
NOTE: Only one video source may be displayed on the touchpanel at a time.

NOTE: TPMC-12, TPS-15, and TPS-17 touchpanels do not support RGB.

RJ-45 QuickMedia Connector Pin Assignments

RJ-45 Pin Number	Wire colors (EIA 568B)	QM ASSIGNMENT COMPOSITE, S-VIDEO, COMPONENT and AUDIO
1	WHITE/ORANGE	- CHROMINANCE (- P_R)
2	ORANGE	+ CHROMINANCE (+ P_R)
3	WHITE/GREEN	- LUMINANCE (- Y)
4	BLUE	+ AUDIO
5	WHITE/BLUE	- AUDIO
6	GREEN	+ LUMINANCE (+ Y)
7	WHITE/BROWN	- COMPOSITE (- P_B)
8	BROWN	+ COMPOSITE (+ P_B)

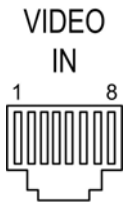
RJ-45 MALE CONNECTOR



VIDEO IN

This eight-pin RJ-45 connection provides connectivity to the CNX-PVID or the TPMC-CH-IMC interface module.

This port provides component, composite or S-video balanced input to the touchpanel over Crestron Certified Wiring. Description of the pinouts is shown in the following table. A cable for this connection is provided with the touchpanel.



CAUTION: Only use the TPMC-CH-IMC Interface Module when connecting this port. Use of other "IMC" products could damage the panel. Earlier IMC modules were equipped with a proprietary 10-pin RJ cable. If this is inadvertently connected to the 8-pin RJ-45 connector the panel will be damaged.

NOTE: Only one video source may be displayed at a time.

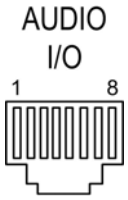
Video In Pin Assignments

PIN	WIRE COLORS (568B)	COMPOSITE	S-VIDEO	COMPONENT
1	WHITE/ORANGE	+ Composite	+ Luminance	+ Y
2	ORANGE	- Composite	- Luminance	- Y
3	WHITE/GREEN	N/A	+ Chrominance	+ P_B
4	BLUE	N/A	N/A	+ P_R
5	WHITE/BLUE	N/A	N/A	- P_R
6	GREEN	N/A	- Chrominance	- P_B
7	WHITE/BROWN	N/A	N/A	N/A
8	BROWN	N/A	N/A	N/A

AUDIO I/O

This 8-pin RJ-45 connector provides connectivity to the CNX-BIPAD or with the TPMC-CH-IMC interface module.

This port uses Crestron Certified Wiring and provides audio input to the touchpanel and microphone output from the touchpanel. A description of the pinouts is shown in the following table.

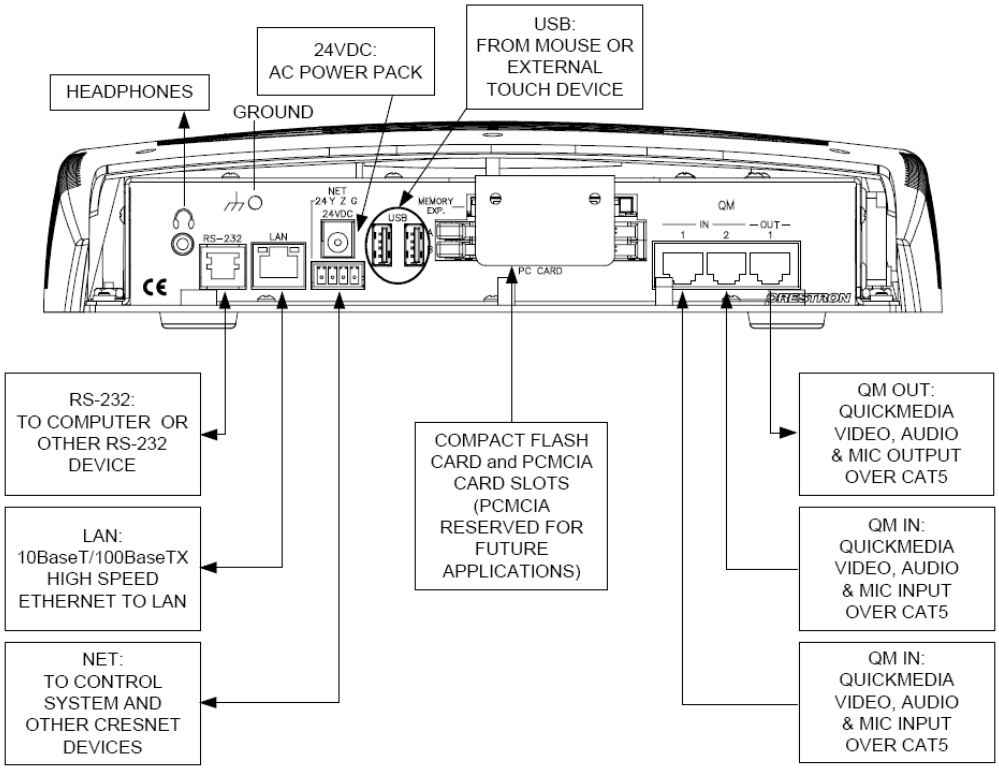


CAUTION: Only use the TPMC-CH-IMC Interface Module when connecting this port. Use of other "IMC" products could damage the panel.

Audio In/Out Pin Assignments

PIN	WIRE COLORS (568B)	AUDIO I/O	PIN	WIRE COLORS (568B)	AUDIO I/O
1	WHITE/ORANGE	+ Mic Left Out	5	WHITE/BLUE	- Audio Left In
2	ORANGE	- Mic Left Out	6	GREEN	- Mic Right Out
3	WHITE/GREEN	+ Mic Right Out	7	WHITE/BROWN	+ Audio Right In
4	BLUE	+ Audio Left In	8	BROWN	- Audio Right In

TPS-12G-QM and TPS-15G-QM



RS-232

This 6-pin RJ-11 connector mates with a 9-pin serial port of a PC. The connecting cable is not supplied. Use this port to establish a direct connection between the touchpanel and a PC without a control system or network connection. Once the direct connection is established, touchpanel files and firmware updates can be uploaded to the touchpanel. Additionally, the touchpanel's diagnostic tools can be accessed over the direct connection.

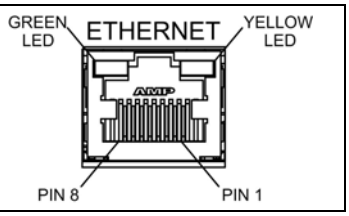
PIN	DESCRIPTION
1	CTS
2	GND
3	RXD
4	TXD
5	RTS
6	N/C (Not connected)

LAN

One 8-wire RJ-45 connector with two LED indicators:
The green LED indicates network speed
The yellow LED indicates Ethernet activity

This connector provides an Ethernet 10baseT/100baseTX, full duplex, IEEE 802.3U compliant network connection.

PIN	SIGNAL	PIN	SIGNAL
1	TX +	5	N/C
2	TX -	6	RC -
3	RC+	7	N/C
4	N/C	8	N/C



NET

The four-pin 5 mm detachable terminal block provides communication with and power from a Cresnet control network.

Pins 24 and G provide 24 VDC and ground.

Pins Y and Z provide communications (data).

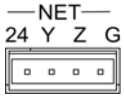
Cresnet® Power Usage
Not including TPMC-CH-IMC (1.0W)

TPS-12G-QM: 50 Watts (2.08 Amps @ 24 Volts DC)

TPS-15G-QM: 75 Watts (3.13 Amps @ 24 Volts DC)

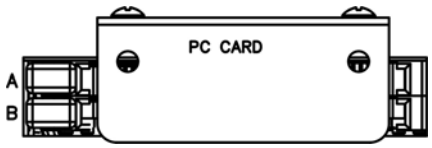
TPS-12G-QM: PW-2420RU

TPS-15G-QM: must use Cresnet power supply



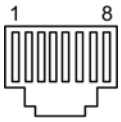
PC CARD

Two Type II PCMCIA Card slots used for memory expansion up to 4GB or more, VT Pro-e project uploads, or installation of a wireless network card.
A cover is secured over the slots to protect the electronics. Use a #1 Phillips screwdriver to remove the cover. The plate can be flipped and secured if only one slot needs to be accessed.



CAUTION: PCMCIA cards are installed face down.

QM IN 1 and 2 (QuickMedia Inputs)



Two 8-wire RJ-45 female, QuickMedia input ports; Signal types: Dynamically configurable under system control as:

- One RGB (VGA) input with stereo program audio and two mic channels or
- One auto-detecting component (YP_bP_r), S-video (Y/C) or composite video input with stereo program audio and two mic channels

RGB format: RGBHV; RGB input resolution, non-interlaced: 640 x 480 minimum to 1600 x 1200 maximum (60 Hz limit at 1600 x 1200);
Video/HDTV formats: 480i (NTSC), 576i (PAL), 480p, 576p, 720p and 1080i;
Horizontal frequency: 15 - 100 kHz;
Vertical frequency: 50 - 85 Hz;
Delay skew compensation: 0 - 22 nS (**QM IN 1** only, none on **QM IN 2**);
Connects to QM output port of a QM-TX or other QuickMedia device (sold separately) via CresCAT-QM or CresCAT-IM cable;
Maximum cable length:

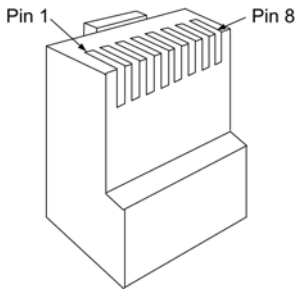
QM IN 1: 328 feet (aggregate distance from QM origination);
QM IN 2: (Video/HDTV) 300 feet (aggregate distance from QM origination); (RGB @ 60 Hz) 216 feet for 640 x 480, 136 feet for 800 x 600, 84 feet for 1024 x 768, 50 feet for 1280 x 1024, 20 feet for 1600 x 1200 (using CresCAT-QM or CresCAT-IM cable)

NOTE: The QM port is not connected through any "IMC" interface

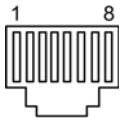
RJ-45 QuickMedia Connector Pin Assignments

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

RJ-45 MALE CONNECTOR



QM OUT (QuickMedia Output



One 8-wire RJ-45 female, QuickMedia output port containing RGB (same as touchscreen), WAV file audio and internal microphone signals; RGB format: RGBHV; RGB output resolution, non-interlaced (@ 60 Hz):

TPS-12G-QM: 800 x 600 pixels
TPS-15G-QM: 1024 x 768 pixels

Connects to QM input port of any QuickMedia device via CresCAT-QM or CresCAT-IM cable.

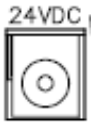
PHONE

Connect this standard mini phone jack to the plug of an external headphone set, not supplied.

105 mW per channel, 8 ohm load

PWR (Power)

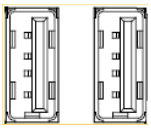
(1) 2.1 mm barrel DC power jack, 24 Volt DC power input; Passes through to NET port to power Cresnet devices.



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

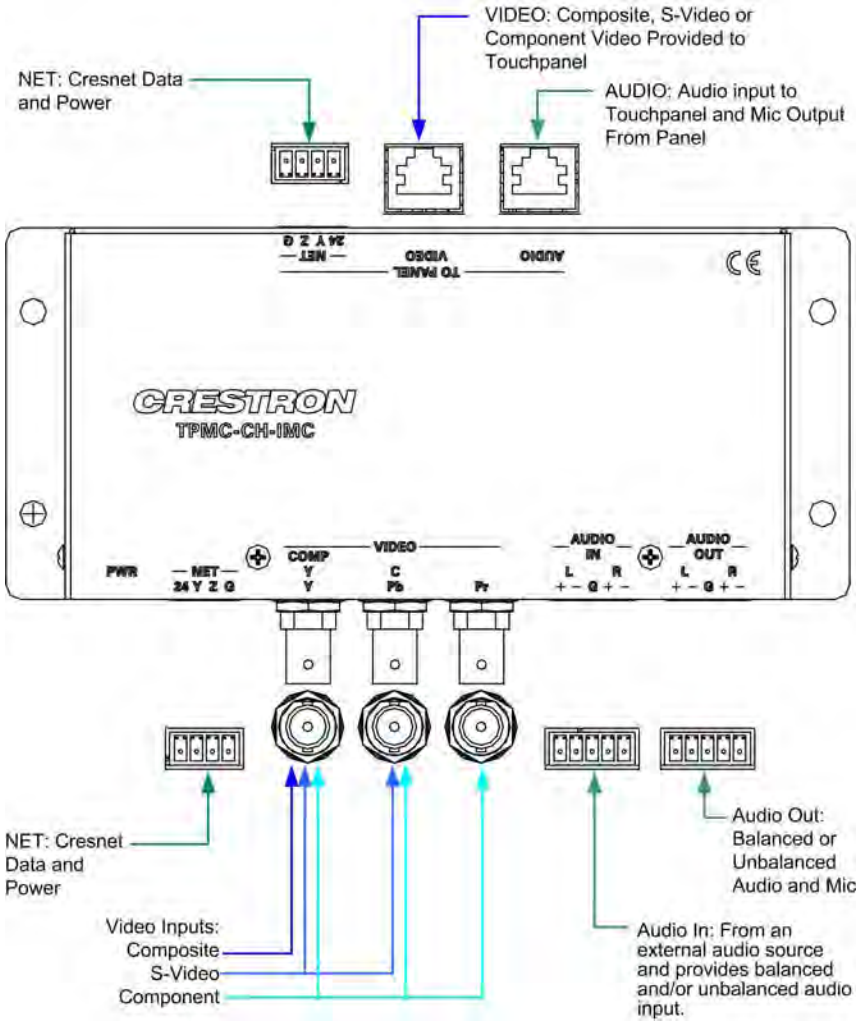
USB Ports

Two USB Type A female, USB 1.1 ports for mouse or other external pointing device

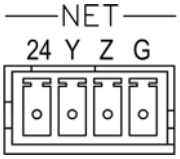


PIN	DESCRIPTION
1	+5 VDC
2	Data -
3	Data +
4	Ground

TPMC-CH-IMC Touchpanel Interface



NET



This 4-position mini-terminal block connector is used to connect to other Cresnet peripherals in a system.

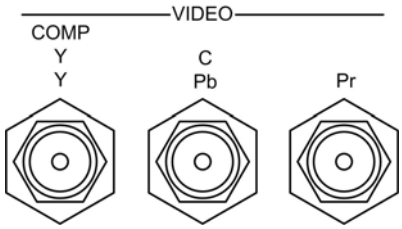
Another NET connector is located on the other side of the module. Data and power for the TPMC-CH-IMC are provided via either connection.

Pins 24 and G provide 24 VDC and ground.

Pins Y and Z provide communications (data).

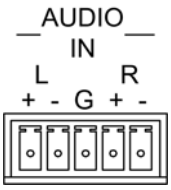
VIDEO

The video input consists of three BNC connectors for unbalanced video signals. The component, composite or S-video input signal from an external video source is connected to these ports.



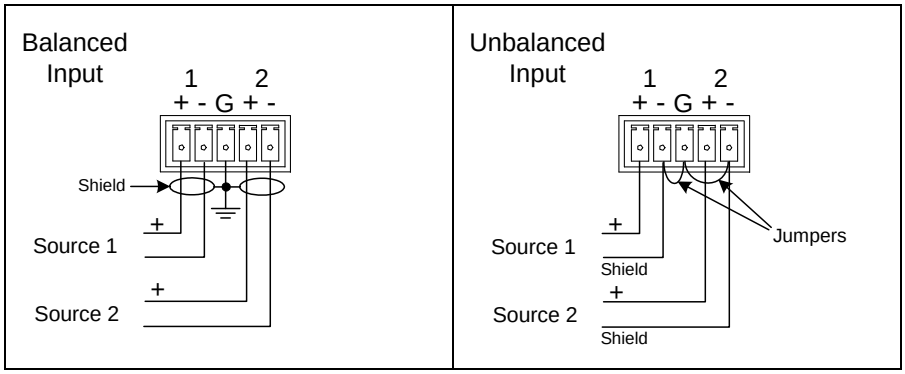
AUDIO IN

The 5-position mini-terminal block connector is wired to an external audio source and provides balanced and/or unbalanced audio input.



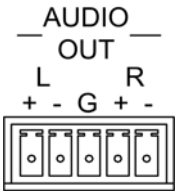
AUDIO IN Pinouts

PIN	DESCRIPTION
L +	Left Positive
L -	Left Negative
G	Ground
R +	Right Positive
R -	Right Negative



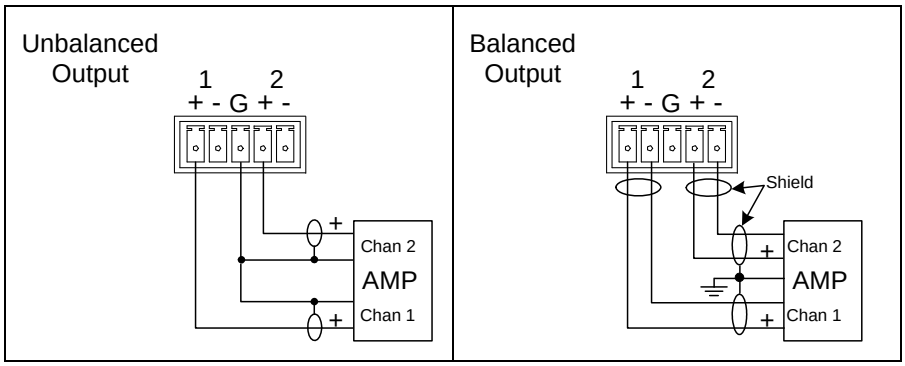
AUDIO OUT

The 5-position mini-terminal block connector mates with the included connector and provides balanced and/or unbalanced microphone output.



AUDIO OUT Pinouts

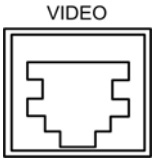
PIN	DESCRIPTION
L +	Left Positive
L -	Left Negative
G	Ground
R +	Right Positive
R -	Right Negative



VIDEO (To Panel)

This RJ-45 connection mates with the TPMC-15-CH or TPMC-17-CH touchpanel.

This port provides component, composite or S-video input to the touchpanel over CAT5 wiring.



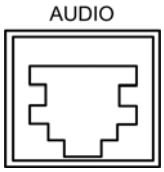
Video RJ-45

PIN	WIRE COLORS (568B)	WIRE COLORS (568A)	COMPOSITE	S-VIDEO	COMPONENT
1	WHITE/ORANGE	WHITE/GREEN	+ Composite	+ Luminance	+ Y
2	ORANGE	GREEN	- Composite	- Luminance	- Y
3	WHITE/GREEN	WHITE/ORANGE	N/A	+ Chrominance	+ PB
4	BLUE	BLUE	N/A	N/A	+ PR
5	WHITE/BLUE	WHITE/BLUE	N/A	N/A	- PR
6	GREEN	ORANGE	N/A	- Chrominance	- PB
7	WHITE/BROWN	WHITE/BROWN	N/A	N/A	N/A
8	BROWN	BROWN	N/A	N/A	N/A

AUDIO (To Panel)

This 8-pin RJ-45 connector mates with the TPMC-15-CH or TPMC-17-CH touchpanel.

This port uses CAT5 wiring and provides audio input to the touchpanel and microphone output from the touchpanel.



Audio In/Out

PIN	WIRE COLORS (568B)	WIRE COLORS (568A)	AUDIO I/O
1	WHITE/ORANGE	WHITE/GREEN	+ Mic Left Out
2	ORANGE	GREEN	- Mic Left Out
3	WHITE/GREEN	WHITE/ORANGE	+ Mic Right Out
4	BLUE	BLUE	+ Audio Left In
5	WHITE/BLUE	WHITE/BLUE	- Audio Left In
6	GREEN	ORANGE	- Mic Right Out
7	WHITE/BROWN	WHITE/BROWN	+ Audio Right In
8	BROWN	BROWN	- Audio Right In

The following chart shows the maximum recommended cable lengths for various signal formats.

Recommended Maximum Cable Lengths for Audio/Video via CAT5

FORMAT	MAXIMUM DISTANCE
Composite	750 feet
S-Video	750 feet
Component	500 feet
Audio	1000 feet (balanced)

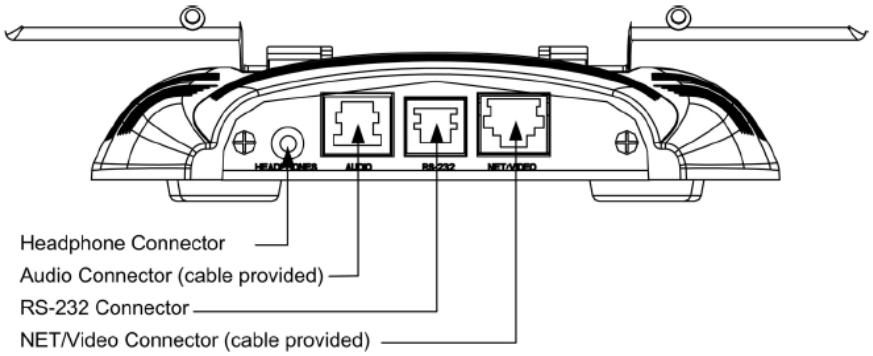
- The maximum distance for CAT5 audio is limited to approximately 15 feet when connecting the AUDIO OUT port to a device with an unbalanced input.
- If the AUDIO OUT port connects to a device with balanced inputs or no device is connected, the maximum cable length for CAT5 audio is 1000 feet.

TPS-3000 and TPS-4000

NOTE: TPS-3000 and TPS-4000 include a TPS-IMPC Interface Module for system connection. Refer to page 24 for hookup details.

NOTE: The audio connectors are color-coded blue.

Hardware connections for the TPS-3000 and TPS-4000 (Back of the base is shown)



HEADPHONES

Connect this standard mini phone jack (12 mW, 32 ohms load) to the plug of an external headphone set, not supplied. The headphone output is for WAV and Line only. It does not send out the microphone signal. Use the MIC OUT on the TPS-IMPC for the microphone signal.

NOTE: The headphone jack is unavailable after the HBK-3000 Hatchback option is installed.

AUDIO

This 8-position, RJ-45 connector (color coded blue) mates with the TPS-IMPC interface module and provides differential/single ended audio input and output. It also produces line level differential output. Pinout description is shown in the following table.

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

RS-232

This 6-pin RJ-11 connector mates with a 9-pin serial port of a PC. The connecting cable is not supplied. Use this port to establish a direct connection between the touchpanel and a PC without a control system or network connection. Once the direct connection is established, touchpanel files and firmware updates can be uploaded to the touchpanel. Additionally, the touchpanel's diagnostic tools can be accessed over the direct connection.

PIN	DESCRIPTION
1	CTS
2	GND
3	RXD
4	TXD
5	RTS
6	N/C (Not connected)

NET/VIDEO

This 10-position RJ-45 port provides network connection from the touchpanel to the interface module and network power to the touchpanel. This port also contains the composite and S-video inputs. Refer to the pinout and descriptions in the following table.

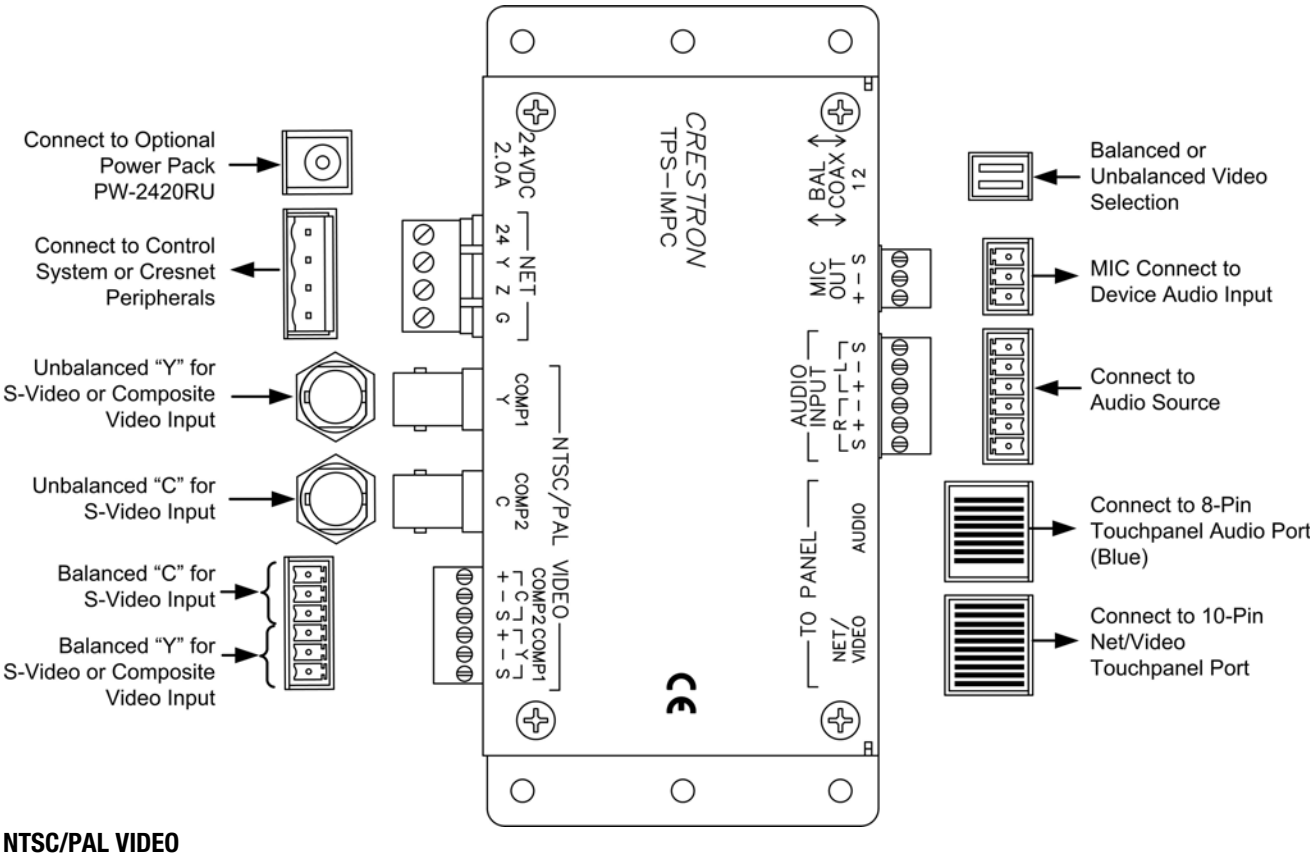
CAUTION: The 10-pin RJ-45 connector cable supplied by Crestron is a custom cable and is the only one that should be used. The end of the cable has a metal shield that is required to protect the equipment. Using non-Crestron cables will result in damage to the product.

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

TPS-IMPC Touchpanel Interface

The TPS-IMPC is designed specifically to serve as an interface module for the Crestron tilt touchpanel. It is supplied with every Isys®-tilt touchpanel that includes audio capability. A network connector and video input connectors are located on one side of the unit. The opposite side offers audio input, microphone output (600 Ohms balanced and 300 Ohms unbalanced MIC OUT), and audio and network/video connections to the touchpanel.

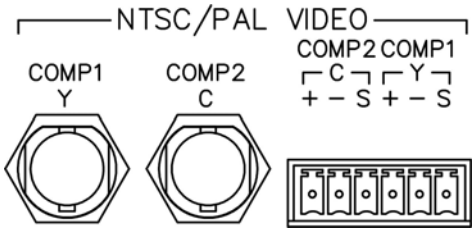
Cresnet Power Usage: <1 Watt @ 24 Volts DC – not including touchpanel. If power is applied to the 24 VDC jack and the NET port simultaneously, power will be drawn from whichever is highest.



NTSC/PAL VIDEO

The NTSC/PAL video input consists of three connectors; two BNC connectors for unbalanced video signals and one 6-pin mini-connector for twisted pair wiring of balanced video signals.

The video signal is connected to these ports and requires a TPS-3000 or installation of the TPS-VID-1 or TPS-VID-2 video card in a TPS-5000 or TPS-6000 touchpanel to display video.



Consult the latest revision of the TPS-3000 Operations Guide (Doc. 6076) or TPS-VID-1/2 Operations & Installation Guide (Doc. 6059) for details. Use either the two BNC connectors or the six-pin connector for twisted pair wiring when connecting a video source.

NOTE: The TPS-IMPC allows the use of either balanced or unbalanced signals for video input. To select the signal type to be used, the DIP switches located next to the MIC port must be set in the correct position.

BAL/COAX DIP Switches

These DIP switches are used to select which video connections (balanced or unbalanced) to use when receiving video signals.

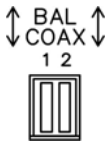
When used with a TPS-VID-2, each composite video signal can come in on either the twisted pair (balanced) or coaxial (unbalanced) connector.

When used with a TPS-VID-1, the video signal (S-video or composite) can be received over the twisted pair (balanced) or coaxial (unbalanced) connectors.

As long as a switch is in the appropriate position, a signal can be connected to either the BNC or twisted-pair connector.

To select the twisted pair connector for balanced video, the DIP switch for the respective video source must be in the "UP" position.

To use the coaxial connector(s) for unbalanced video, the DIP switch must be in the "DOWN" position.

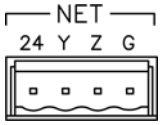


NET

This four-pin connector is used to connect to other Cresnet peripherals in a system and provide network power to the touchpanel if an external power pack is not used.

Pins 24 and G provide 24 VDC and ground.

Pins Y and Z provide communications (data).



24 VDC, 2.0A (Power Supply)

This female connector is used to supply 24 VDC power to the TPS-IMPC and the touchpanel from an optional power pack (Crestron model PW-2420RU).

When power is supplied to the TPS-IMPC through this connector, a Cresnet power connection on the NET connector is not required to display video on the touchpanel.

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

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

NOTE: When power is supplied through this connector, Crestron recommends disconnecting the +24 VDC on the Cresnet connector (if it is connected).

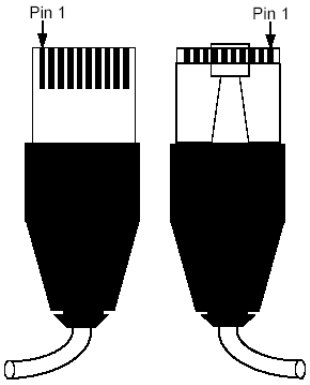
NOTE: Use care in wiring installations to avoid applying 24 VDC power to Cresnet wiring from multiple sources.

NET/VIDEO (To Panel)

This 10-pin RJ-45 connection mates with the TPS-3000, TPS-5000, or TPS-6000 touchpanel.

Refer to the descriptions and pinout table that follow this paragraph. The 10-pin net/video cable assembly to connect the touchpanel to the TPS-IMPC is supplied. This port provides the Cresnet connection to the touchpanel.

This port also provides composite or S-video input for the built-in video card (with the purchase of a TPS-3000 or installation of the TPS-VID-1/2 in a TPS-5000 or TPS-6000 touchpanel).



CAUTION: It is possible to mistakenly insert the 8-pin audio cable into this port.

Consult the latest revision of the TPS-3000 Operations Guide (Doc. 6076) or TPS-VID-1/2 Operations & Installation Guide (Doc. 6059) for details.

NET/VIDEO

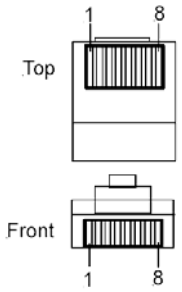
PIN	DESIGNATION	DESCRIPTION
1	+24V	Power (Network)
2	GND	Ground (Network)
3	C +	Chrominance (Positive) /Composite 2
4	C -	Chrominance (Negative) /Composite 2
5	Y	Data (Network)
6	Z	Data (Network)
7	Y +	Luminance (Positive) /Composite 1
8	Y -	Luminance (Negative) /Composite 1
9	GND	Ground (Network)
10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

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

CAUTION: The 10-pin RJ-45 net/video connector cable supplied by Crestron is a custom cable and is the only one that should be used. The end of the cable has a metal shield that is required to protect the equipment. Using non-Crestron cables will result in damage to the product.

AUDIO (To Panel)

This 8-pin RJ-45 mates with the TPS-3000, TPS-5000, or TPS-6000 touchpanel. The 8-pin audio cable assembly is supplied. Even though the 10-pin net/video cable may fit into the port, do not use it. This port provides audio input to the touchpanel and microphone output from the touchpanel. A description of the pinouts is shown in the following table. To determine the location of pin 1, hold the cable so that the end of the 8-pin RJ-45 connector is facing away from you, with the clip side down and the copper side up.
The copper connector on the far left is pin 1.



AUDIO (To Panel)

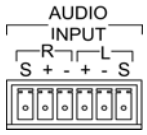
PIN	DESIGNATION	DESCRIPTION
1	L+	Left Input (Positive)
2	L -	Left Input (Negative)
3	GND/Shield	Audio Input Ground/Shield
4	R+	Right Input (Positive)
5	R -	Right Input (Negative)
6	GND/Shield	Mic Output Ground/Shield
7	M+	Mic Output (Positive)
8	M -	Mic Output (Negative)

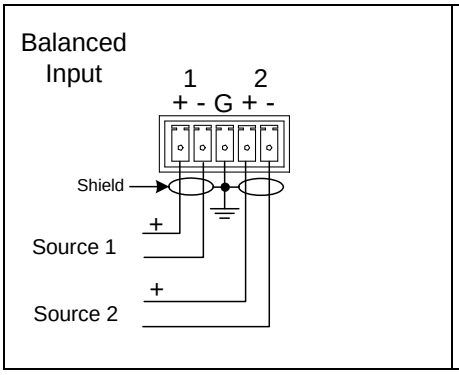
AUDIO INPUT

The port mates with a six-pin connector (supplied) and provides balanced and/or unbalanced audio input.

AUDIO INPUT

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





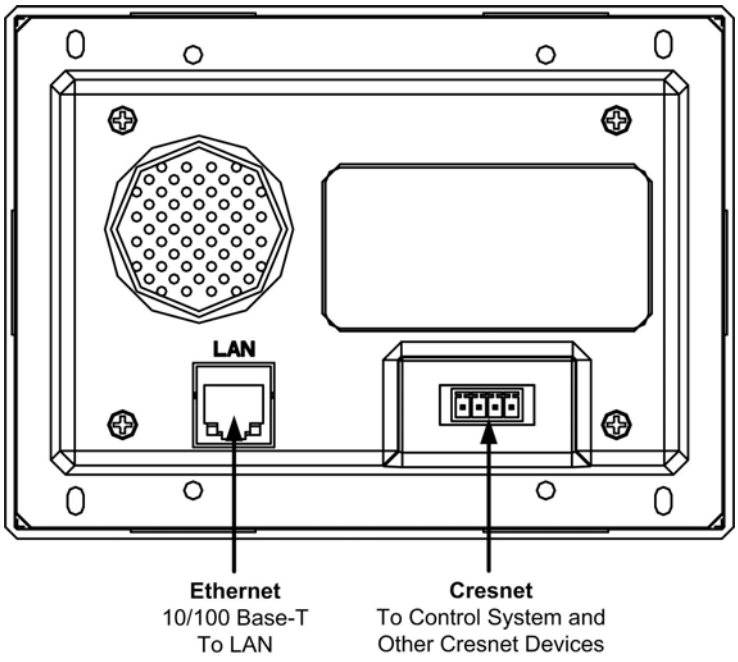
MIC OUT

The port mates with a three-pin connector (supplied) and produces line level differential output.

MIC OUT Pinouts

PIN	DESCRIPTION
+	Positive
-	Negative
S	Shield

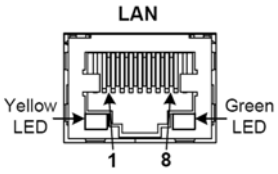
TPS-4L



LAN (Ethernet)

One 8-wire RJ-45 connector with two LED indicators (green LED indicates network speed, yellow LED indicates Ethernet activity).

This connector provides an Ethernet 10baseT/100baseTX, full duplex, IEEE 802.3U compliant network connection.



NOTE: This port does not support a wireless Ethernet connection.

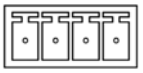
LAN Connector Pinouts

PIN	SIGNALS	PIN	SIGNALS
1	TX +	5	N/C
2	TX -	6	RC -
3	RC +	7	N/C
4	N/C	8	N/C

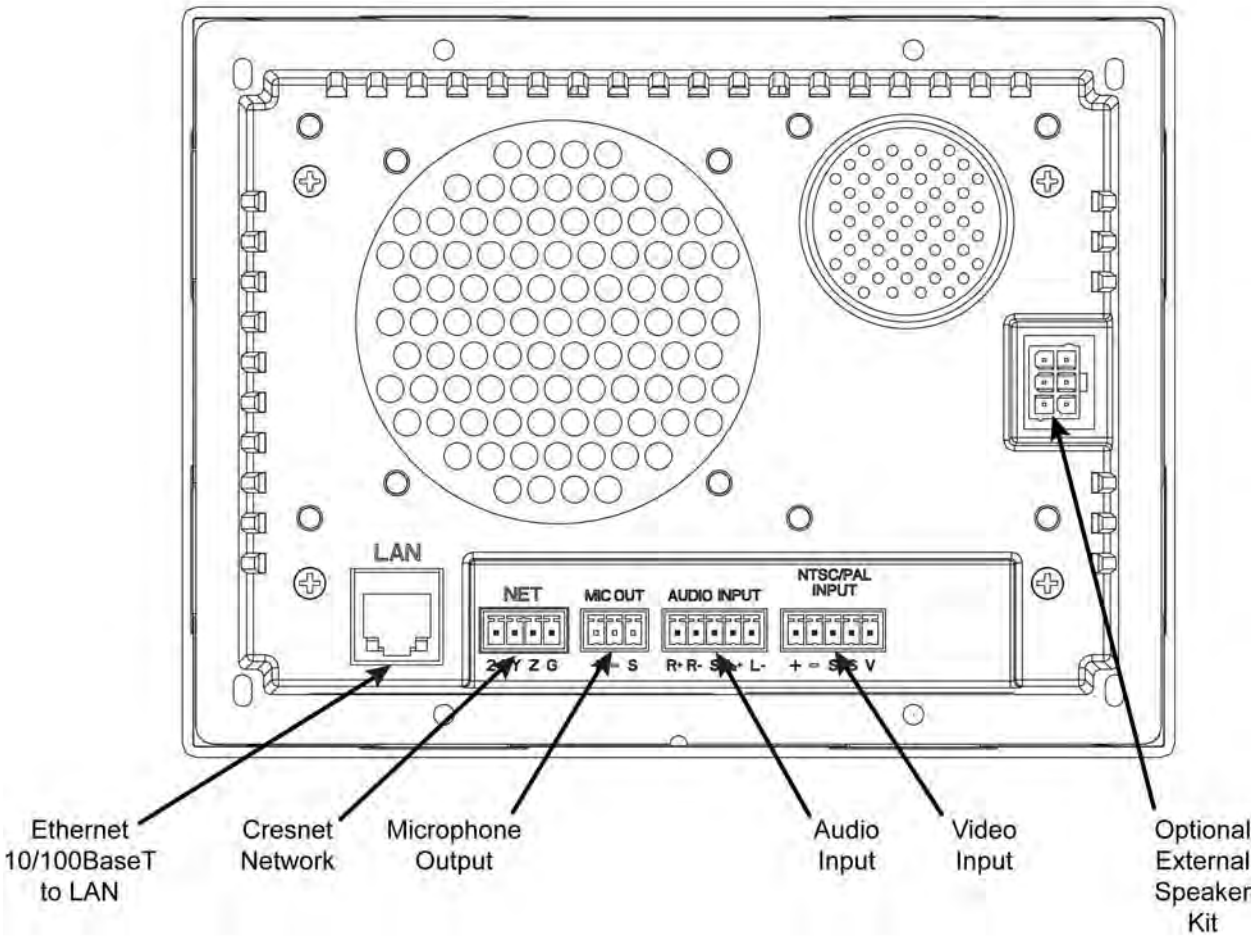
NET

This 4-position mini-terminal block connector provides Cresnet network connection from the touchpanel as well as power to the touchpanel.

- Pins 24 and G provide 24 VDC and ground.
- Pins Y and Z provide communications (data)

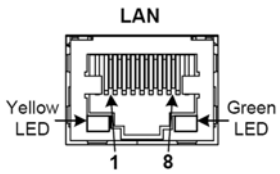


TPS-6L



LAN (Ethernet)

One 8-wire RJ-45 connector with two LED indicators (green LED indicates network speed, yellow LED indicates Ethernet activity). This connector provides an Ethernet 10baseT/100baseTX, full duplex, IEEE 802.3U compliant network connection.

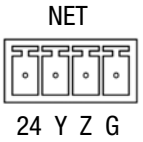


LAN Connector Pinouts

PIN	SIGNALS	PIN	SIGNALS
1	TX +	5	N/C
2	TX -	6	RC -
3	RC +	7	N/C
4	N/C	8	N/C

NET

This 4-position mini-terminal block connector provides Cresnet network connection from the touchpanel as well as power to the touchpanel.



- Pins 24 and G provide 24 VDC and ground.
- Pins Y and Z provide communications (data)

MIC OUT

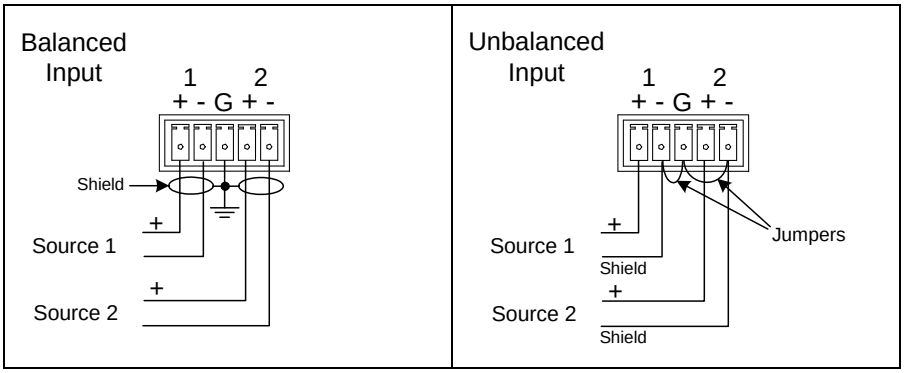
This 3-position mini-terminal block connector provides balanced line level microphone output with AGC.

PIN #	DESIGNATION	DESCRIPTION
1	+	Mic Output (Positive)
2	-	Mic Output (Negative)
3	S	Shield

AUDIO INPUT

One 5-pin 3.5mm detachable terminal block Balanced/unbalanced stereo (summed to mono) line-level input (requires SPK-6L); Input Impedance: 10k ohms balanced, 5k ohms unbalanced; Maximum Input Level: 2 V_{rms} balanced/unbalanced; Normally connects to a Crestron CAT5 balanced audio source via CresCAT cable; Maximum CAT5 Cable Length: 1000 feet.

PIN #	DESIGNATION	DESCRIPTION
1	R+	Right Input (Positive)
2	R -	Right Input (Negative)
3	S	Shield
4	L+	Left Input (Positive)
5	L -	Left Input (Negative)



NTSC/PAL INPUT

One 5-pin 3.5mm detachable terminal block
Balanced (CAT5) or unbalanced (coaxial) composite video inputs

Formats: NTSC 480i or PAL 576i

Input Impedance: 100 ohms balanced, 75 ohms unbalanced

Input Level: 1 V_{p-p} nominal

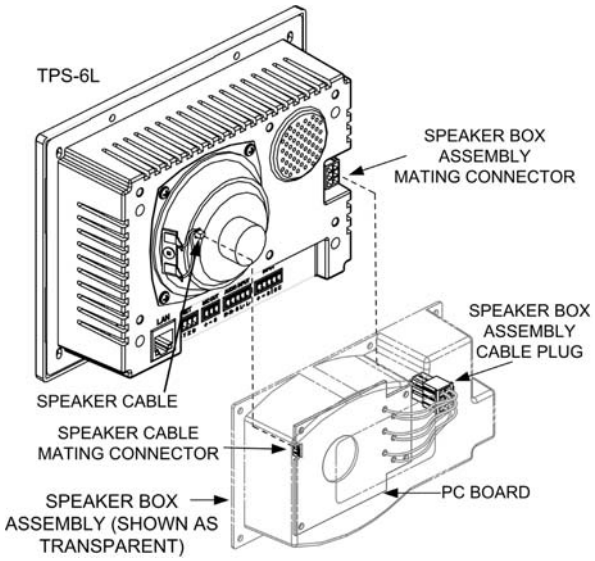
Balanced input normally connects to a Crestron CAT5 balanced video source via CresCAT cable, using +, -, and S connections.

Unbalanced video uses S (shield) and C connections.

Maximum CAT5 Cable Length: 750 feet.

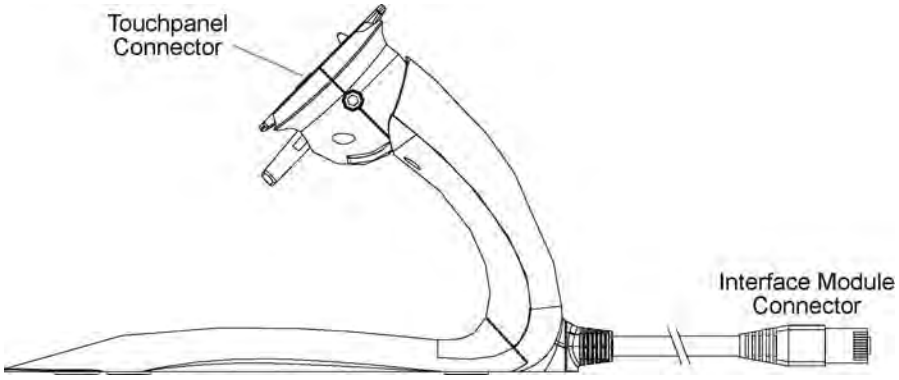
Optional External Speaker

One six-pin (2x3) rectangular connector for optional external speaker kit (SPK-6L, sold separately).



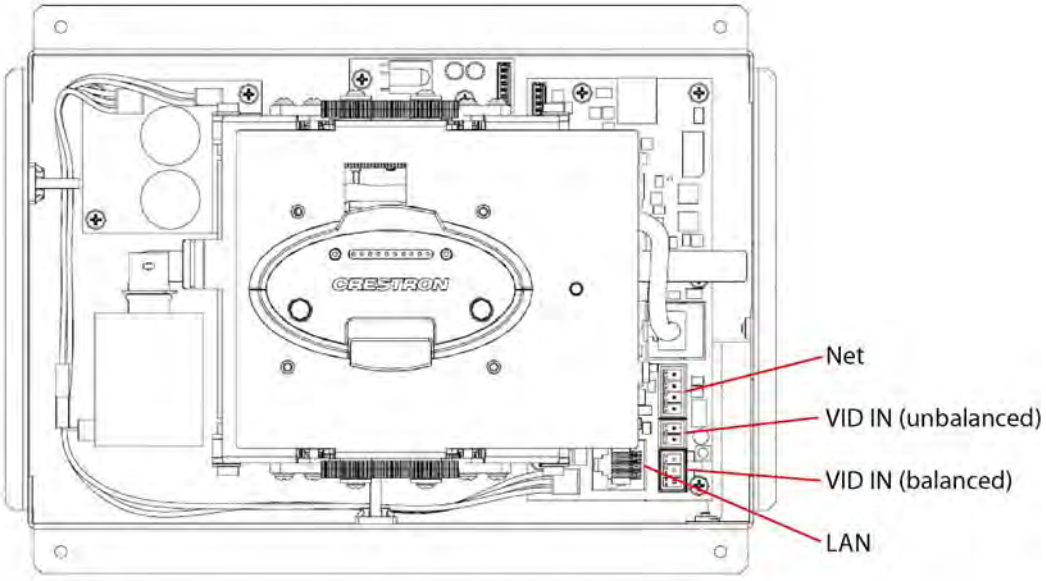
TPS-6X-DS and TPS 6X-DSW

TPS-6X-DS



TYPE	PIN	Color	SIGNAL
Interface Module Connector (to TPS-6X-IMCW) 10-Position RJ-50	1	Gray	Ground
	2	Orange/White	Ethernet TX+
	3	Orange	Ethernet TX-
	4	Green/White	Ethernet RX+
	5	Blue	Cresnet Y
	6	Blue/White	Cresnet Z
	7	Green	Ethernet RX-
	8	Brown/White	Diff Video +
	9	Brown	Diff Video -
	10	Gray/White	Power 12VDC/24VDC

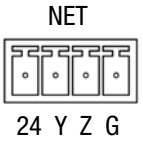
TPS-6X-DSW



NET

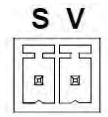
This 4-position mini-terminal block connector provides Cresnet network connection from the touchpanel as well as power to the touchpanel.

- Pins 24 and G provide 24 VDC and ground.
- Pins Y and Z provide communications (data)



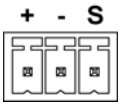
VID IN (unbalanced)

Unbalanced composite video input
Input impedance: 75 Ω nominal
Input level: 1 V_{p-p} nominal, 1.5 V_{p-p} maximum
Maximum DC offset: ±2 Volts
Connects to any conventional coax video source (S=shield)



VID IN (balanced)

Balanced composite video input
Input impedance: 100 Ω nominal
Input level: 1 V_{p-p} nominal, 1.5 V_{p-p} maximum
Maximum DC offset: ±2 Volts
Connects to any Crestron CH CAT5 Video Out port via CresCAT® cable (S=shield)

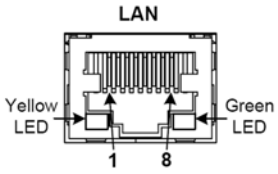


LAN (Ethernet)

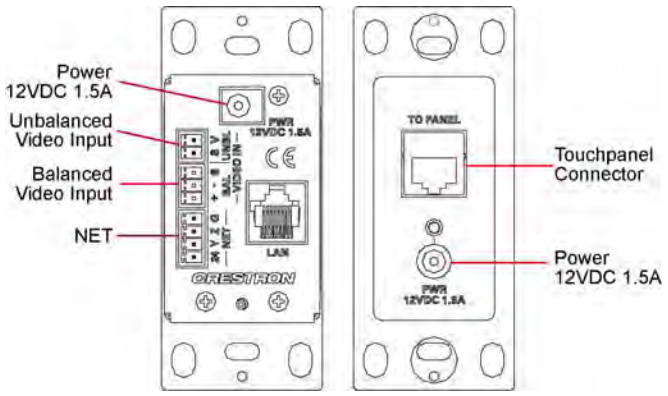
One 8-wire RJ-45 connector provides an Ethernet 10baseT/100baseTX, full duplex, IEEE 802.3U compliant network connection.

LAN Connector

PIN	SIGNALS	PIN	SIGNALS
1	TX +	5	N/C
2	TX -	6	RC -
3	RC +	7	N/C
4	N/C	8	N/C



TPS-6X-IMCW

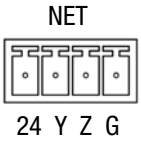


TYPE	PIN	Color	SIGNAL
Interface Module Connector (to TPS-6X-IMCW) 10-Position RJ-50	1	Gray	Ground
	2	Orange/White	Ethernet TX+
	3	Orange	Ethernet TX-
	4	Green/White	Ethernet RX+
	5	Blue	Cresnet Y
	6	Blue/White	Cresnet Z
	7	Green	Ethernet RX-
	8	Brown/White	Diff Video +
	9	Brown	Diff Video -
	10	Gray/White	Power 12VDC/24VDC

NET

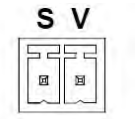
This 4-position mini-terminal block connector provides Cresnet network connection from the touchpanel as well as power to the touchpanel.

- Pins 24 and G provide 24 VDC and ground
- Pins Y and Z provide communications (data)



VID IN (unbalanced)

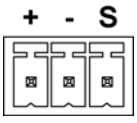
Unbalanced composite video input
Input impedance: 75 Ω nominal
Input level: 1 V_{p-p} nominal, 1.5 V_{p-p} maximum
Maximum DC offset: ±2 Volts
Connects to any conventional coax video source (S=shield)



VID IN (balanced)

Balanced composite video input
Input impedance: 100 Ω nominal
Input level: 1 V_{p-p} nominal, 1.5 V_{p-p} maximum
Maximum DC offset: ±2 Volts

Connects to any Crestron CH CAT5 Video Out port via CresCAT® cable (S=shield)

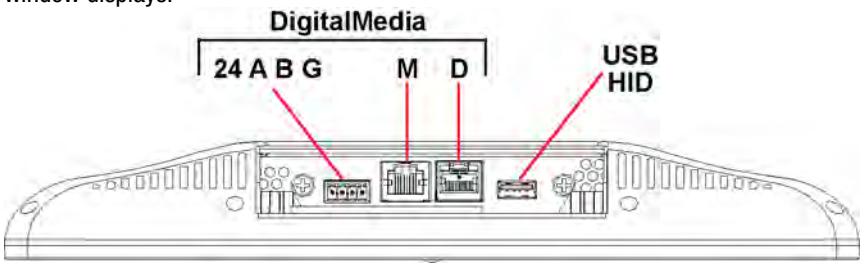


Power

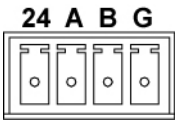
One on front panel and one on back panel. 2.5 mm barrel DC power jack, 12 Volt DC power input; (PW-1215 or PWI-1215 power supply sold separately); Passes through panel port to power TPS-6X.

V-Panels

Available as 12" and widescreen 15" displays in black or white. V-Panel displays are ultra-thin and may be installed flush mount, on a standard VESA mount or a desktop tiltcase. The new sleek design is accomplished by separating the Digital Graphics Engine (DGE), which is rack mounted up to 200 feet away. Either the DGE-1 or DGE-2 may be combined with a V-Panel display and feature a Windows Embedded platform to deliver PC applications, Web browsing, streaming media, VoIP and onscreen annotation. DGE-1 provides one scalable analog video window display, and the DGE-2 delivers two scalable 1080p HD video window displays.



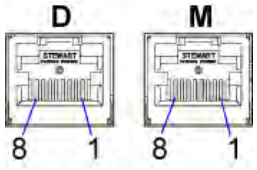
DMNet Port Connections



NOTE: DMNet™ uses the same physical connectors as Cresnet®, but the two protocols are not compatible. Be sure you do not cross-wire DMNet and Cresnet.

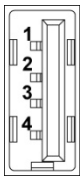
PIN Number	Signal	Wire Color
24	+24VDC	Red
A	Data	Orange
B	Data	Grey
G	Ground	Black

D and M Port Connections



PIN Number	Color	PIN Number	Color
1	White/Orange	5	White/Blue
2	Orange	6	Green
3	White/Green	7	White/Brown
4	Blue	8	Brown

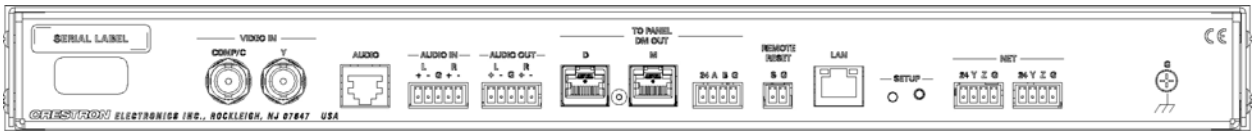
USB Type A female, USB 1.1 ports for mouse or touchscreen input



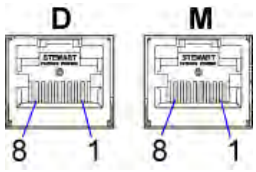
PIN	DESCRIPTION
1	+5 VDC
2	Data -
3	Data +
4	Ground

Digital Graphics Engines DGE-1 and DGE-2

DGE-1

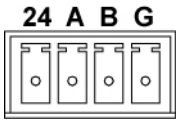


D and M Ports



PIN	WIRE COLOR
1	Orange/White
2	Orange
3	Green/White
4	Blue
5	Blue/White
6	Green
7	Brown/White
8	Brown

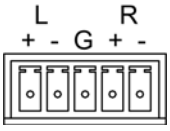
24 A B G Port



PIN	SIGNAL	DESCRIPTION	WIRE COLOR
24	+24 VDC	DC Power	Red
A	DM_NET+	DMNet	Orange
B	DM_NET-	DMNet	Grey
G	GND	DC Ground	Black

NOTE: DMNet uses the same physical connectors as Cresnet, but the two protocols are not compatible. Be sure that you do not cross-wire DMNet and Cresnet

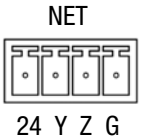
AUDIO IN/OUT



PIN #	DESIGNATION	DESCRIPTION
1	R+	Right Input (Positive)
2	R -	Right Input (Negative)
3	S	Shield
4	L+	Left Input (Positive)
5	L -	Left Input (Negative)

NET

Two 4-position mini-terminal block connectors provides Cresnet network connection.

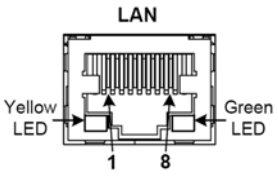


- Pins 24 and G provide 24 VDC and ground.
- Pins Y and Z provide communications (data)

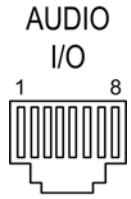
LAN (Ethernet)

One 8-wire RJ-45 connector provides an Ethernet 10baseT/100baseTX, full duplex, IEEE 802.3U compliant network connection.

PIN	SIGNALS	PIN	SIGNALS
1	TX +	5	N/C
2	TX -	6	RC -
3	RC +	7	N/C
4	N/C	8	N/C

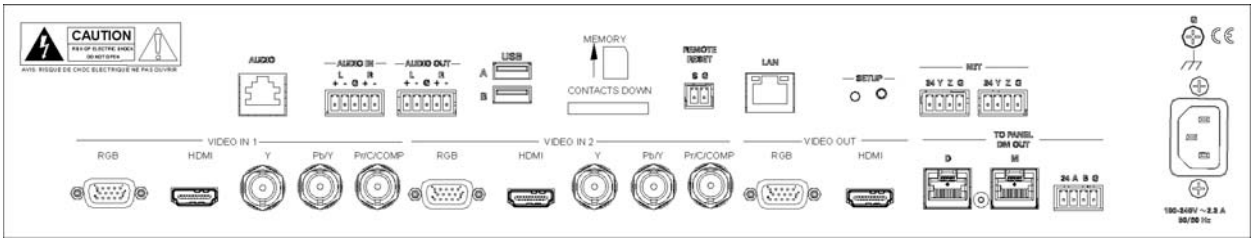


Audio I/O

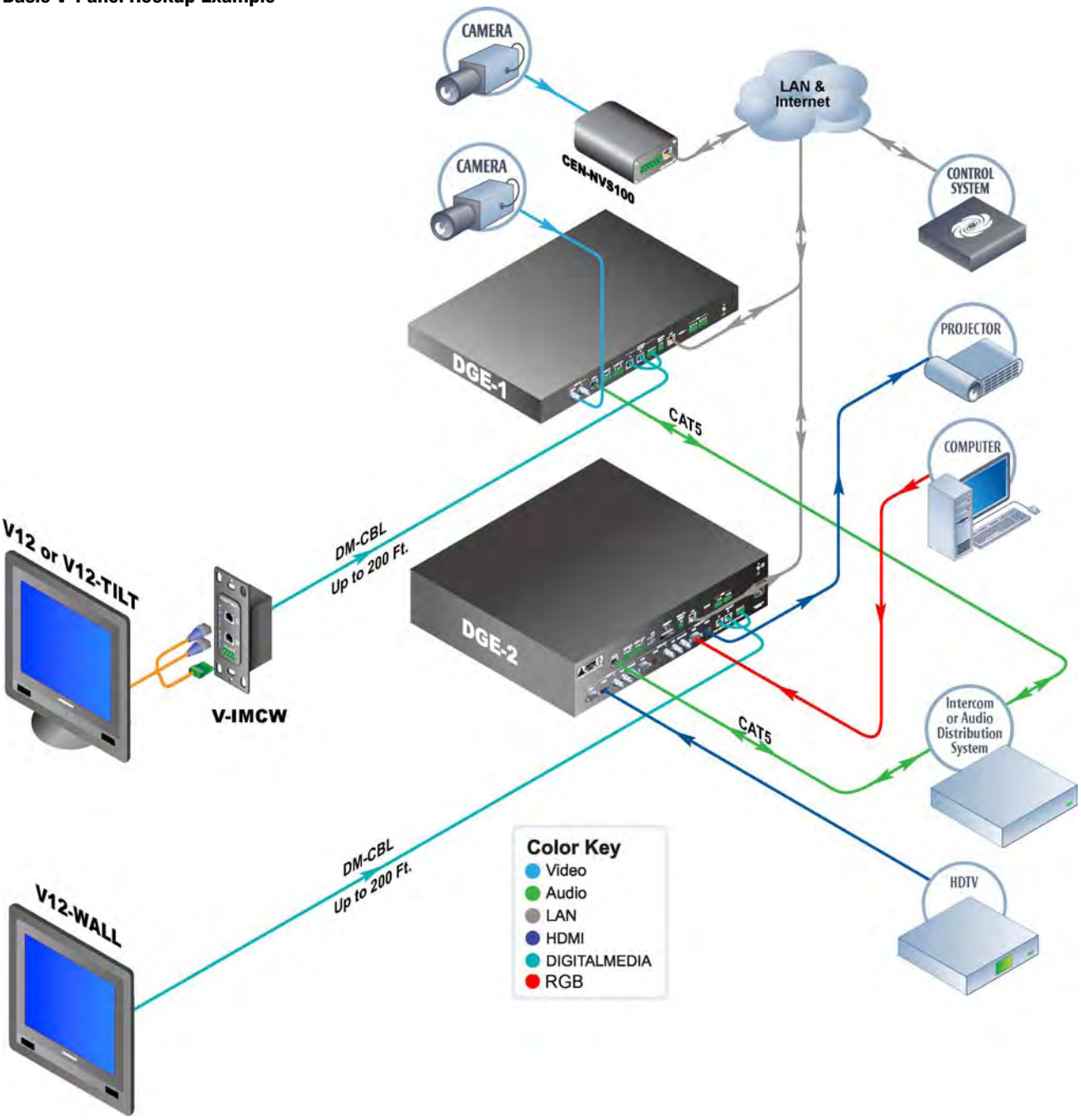


PIN	WIRE COLORS (568B)	AUDIO I/O	PIN	WIRE COLORS (568B)	AUDIO I/O
1	WHITE/ORANGE	+ Mic Left Out	5	WHITE/BLUE	- Audio Left In
2	ORANGE	- Mic Left Out	6	GREEN	- Mic Right Out
3	WHITE/GREEN	+ Mic Right Out	7	WHITE/BROWN	+ Audio Right In
4	BLUE	+ Audio Left In	8	BROWN	- Audio Right In

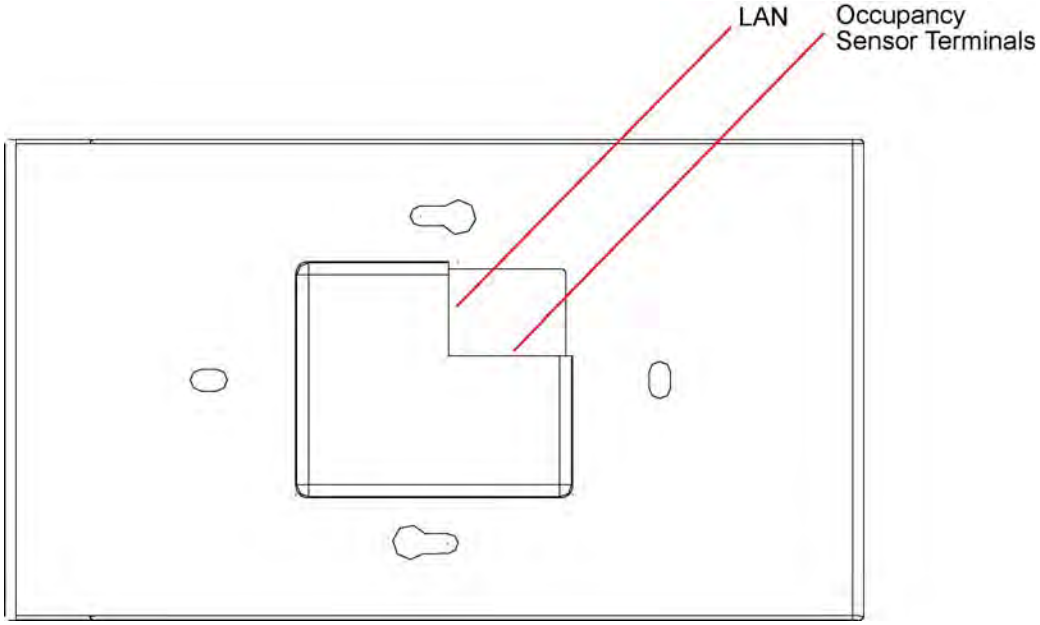
DGE-2



Basic V-Panel Hookup Example



TPMC-4SM

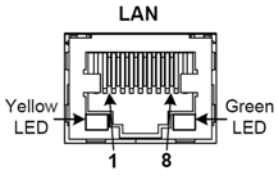


LAN (Ethernet)

One 8-wire RJ-45 connector provides an Ethernet 10baseT/100baseTX, full duplex, IEEE 802.3U compliant network connection.

LAN Connector

PIN	SIGNALS	PIN	SIGNALS
1	TX +	5	N/C
2	TX -	6	RC -
3	RC +	7	N/C
4	N/C	8	N/C



OCCUPANCY SENSOR INPUT

(4) Captive screw terminals comprising (2) voltage sensing inputs (referenced to ground) with 24 Volt DC power output

Input voltage range: 0-30 Volts DC

Sensing threshold: ≥ 4.5 Volts DC active, ≤ 1 Volt DC inactive

Maximum DC load: 4 Watts @ 24 Volts DC, provides operating power for up to (4) Crestron GLS Series occupancy sensors

Cresnet Touchpanel Power Q&A

Q.

We prefer to place Cresnet power supplies in our "Head End" equipment rack for large residential systems. It has come to our attention that many of the newer touchpanels draw considerably more Cresnet power then their predecessors. (For instance, the TPS-15G-QM draws 75 watts of Cresnet power.)

Considering power loss (due to resistance) in cable, and the 75 Watt maximum output of Crestron power supplies, it appears that the maximum distance between a power supply and a newer touchpanels will be much less than previous.

1. Why does the TPMC-15/17 (CH/QM) come with its own 12.5 Volt power supply, instead of using Cresnet power?
2. Is there any possibility of producing a larger power supply to deal with the incresed Cresnet power consumption?
3. Does Crestron have any recommendations or guidelines regarding power delivery over Cresnet (and other) cable?

A.

1. The higher resolution, brightness, and added capabilities of the new Crestron touchpanels have come at a price. More power is needed to drive these devices. This is especially true for the wired "TPMC" panels. Their embedded computer capabilities draw a great deal of power. Their power draw makes it impractical to drive them with 24 Volt Cresnet power. A dedicated 12.5 Volt power supply was chosen as the best way to supply power.

TPMC-15CH/QM-(L) and TPMC-17CH/QM-(L) panels are shipped with an interface module called a TPMC-L-IMC. This interface is used to convert the power from the panels power supply to two wires, allowing for extensions in distance between the power supply and the panel. The following chart illustrates cable-length limitations:

Recommended wire lengths between TPMC-L-IMC and TPMC touchpanel.

WIRE GAUGE	SINGLE WIRE	DOUBLE WIRE
14awg (2.5mm)	30ft	60ft
16awg (1.5mm)	20ft	40ft

2. The answer is "no". The National Electrical Code prohibits running more than 75 Watts of Cresnet power through low-voltage wiring. Larger power supplies could present a fire hazard.
3. When "sizing up" an installation, pay attention to the touchpanel sizes and their distance from the main equipment rack. In many cases, it may be best to locate a power supply local to the touchpanel. In multi-story projects, utility closet locations should be noted as a possible site for Cresnet power supplies on that floor.

In some cases, it may make sense to use larger gauge wiring for Cresnet power on long runs.

Use the following formula to determine the maximum length of wire that you can use to send power from a dedicated 75 Watt power supply to a specific touchpanel.

L < 40,000/(PF x R)

Where: "L"= length in feet, "PF"= Crestron 'Power Factor', "R"= Cable "Resistance"

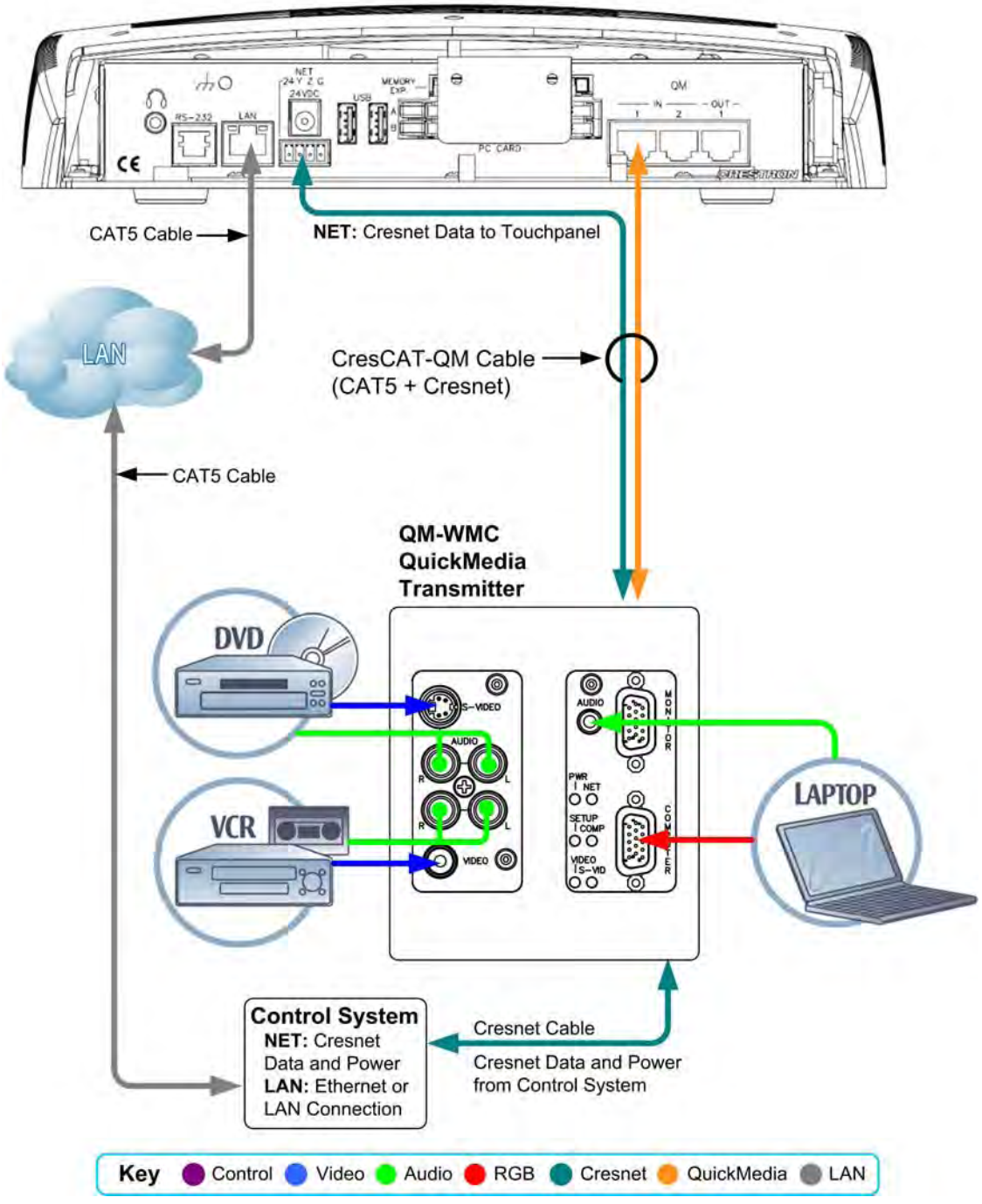
Refer to the following table for maximum cable lengths.

Maximum Cable Lengths for TPS panels using 75 watts of Cresnet Power

	Cresnet (18 awg R=6)	16 awg (R=4)	CAT5 (2-cond R=13)	12 awg (R=1.6)
TPS-12 (L)	155’	232’	71’	580’
TPS-15 (L)	102’	153’	47’	384’
TPS-17 (L)	88’	135’	40’	333’
TPS-12G-QM (L)	133’	200’	61’	500’
TPS-15G-QM (L)	88’	133’	40’	333’

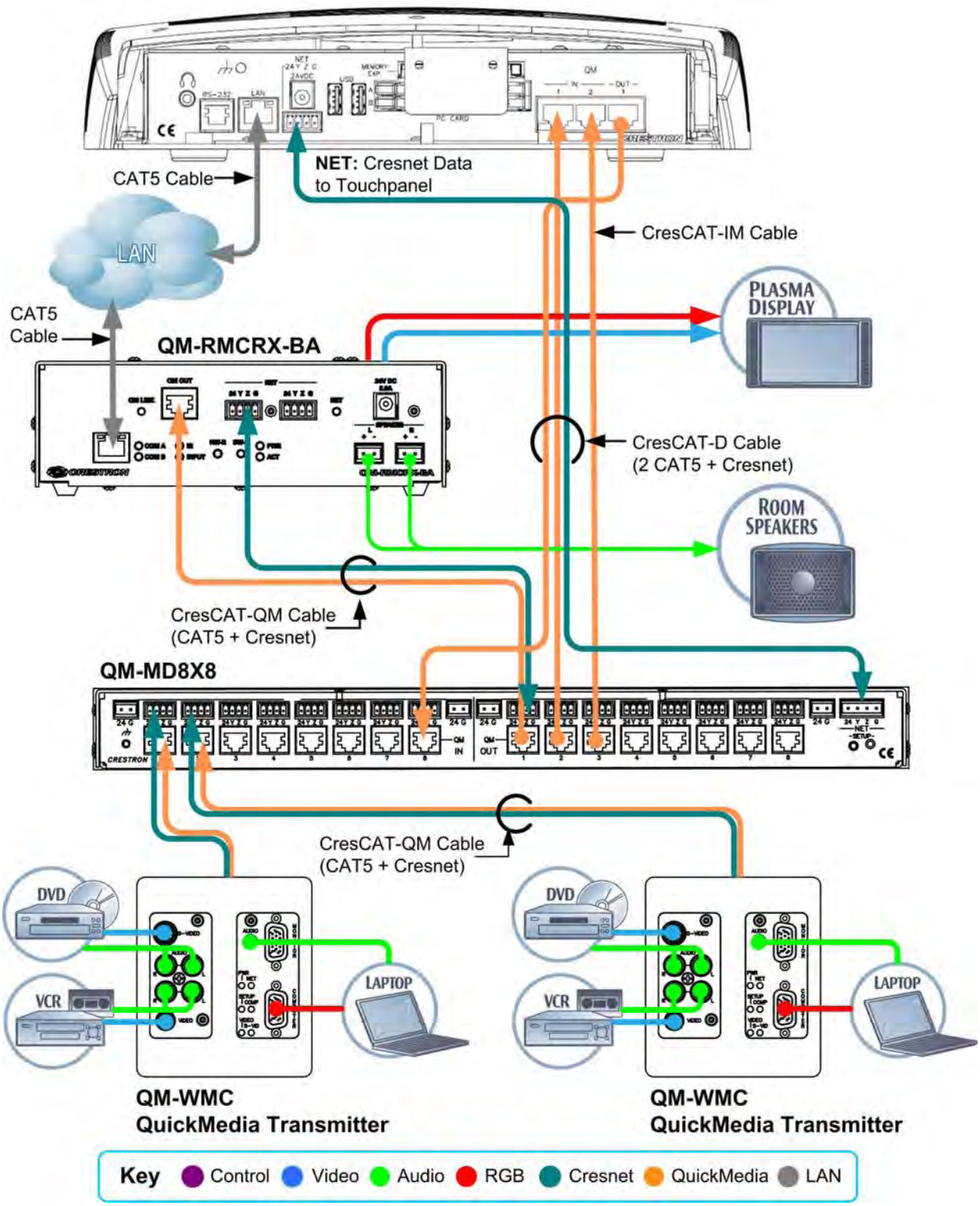
Example Hookup and Application Diagrams

TPS-12G-QM and TPS-15G-QM Interface: QuickMedia Device

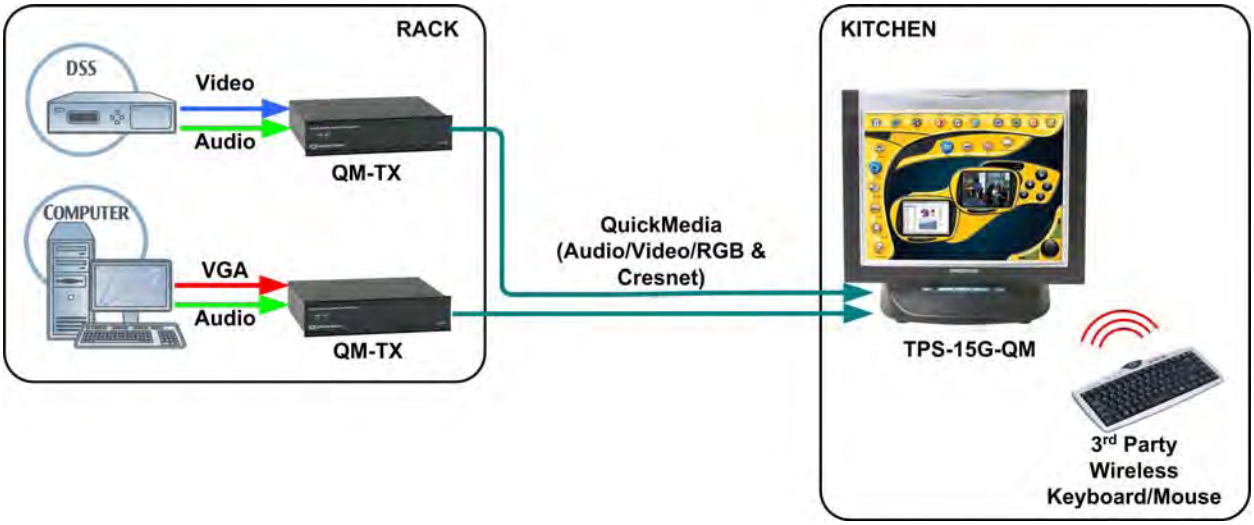


TPS-12G-QM and TPS-15G-QM Interface: Extended Application

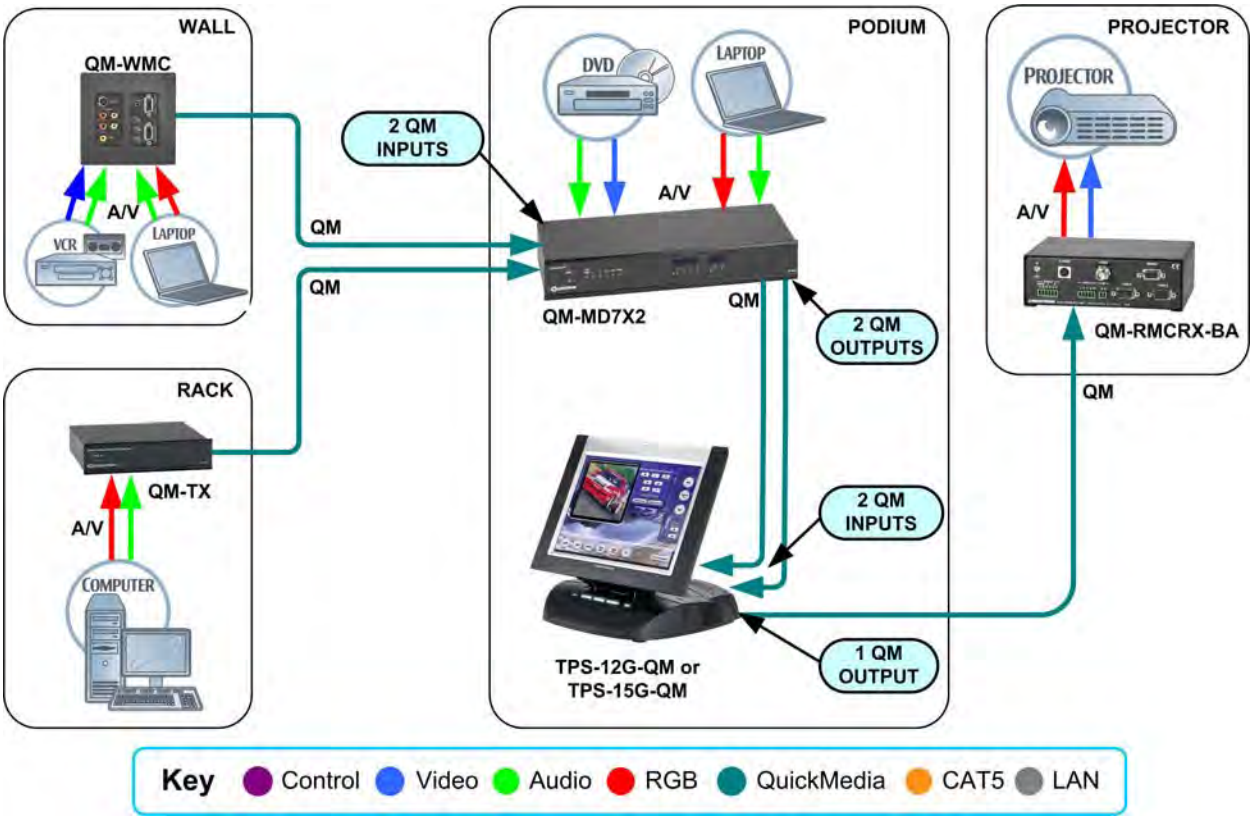
Dual Video/RGB Windows and Audience Presentation



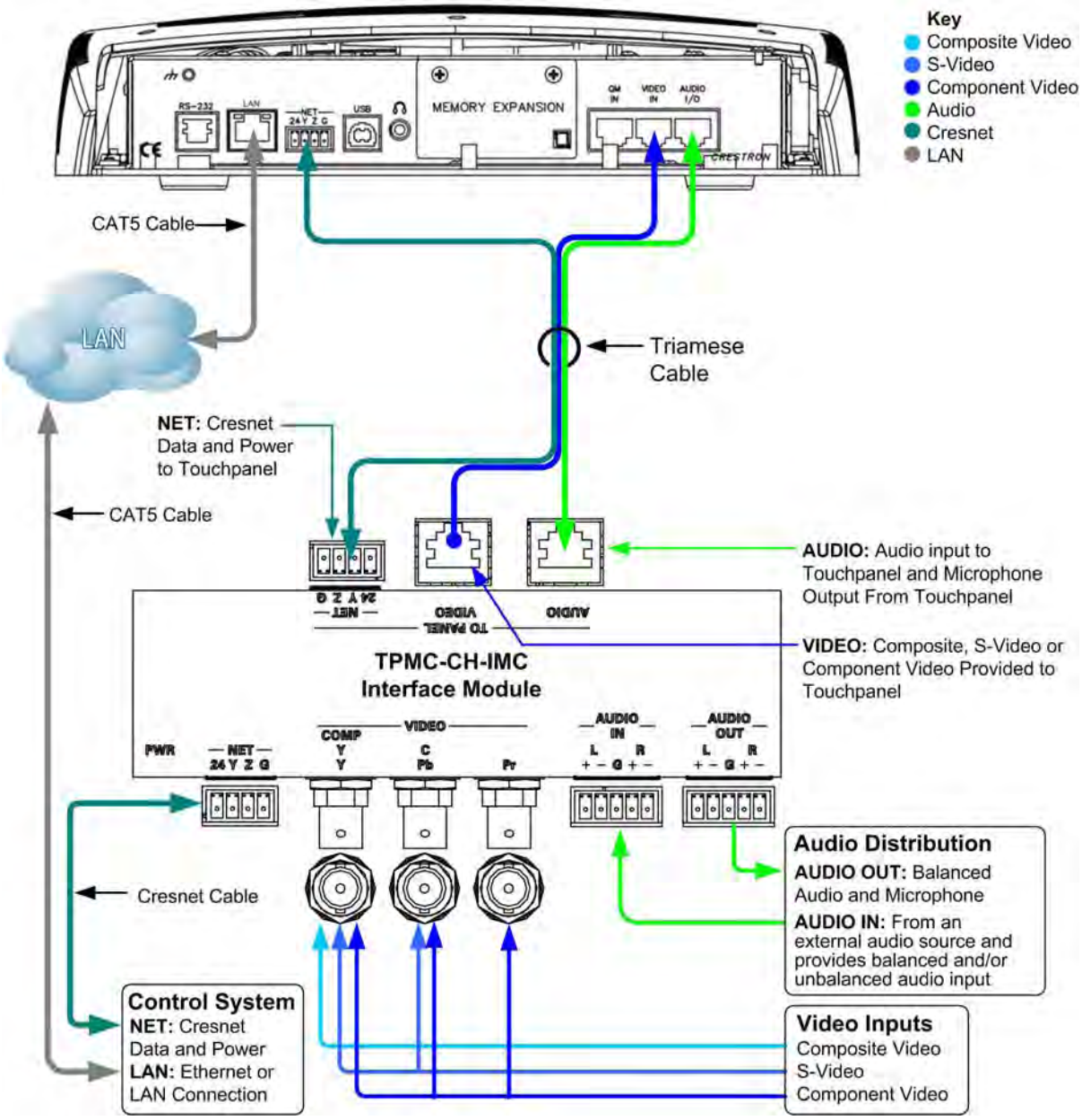
TPS-12G-QM and TPS-15G-QM Kitchen Control Application



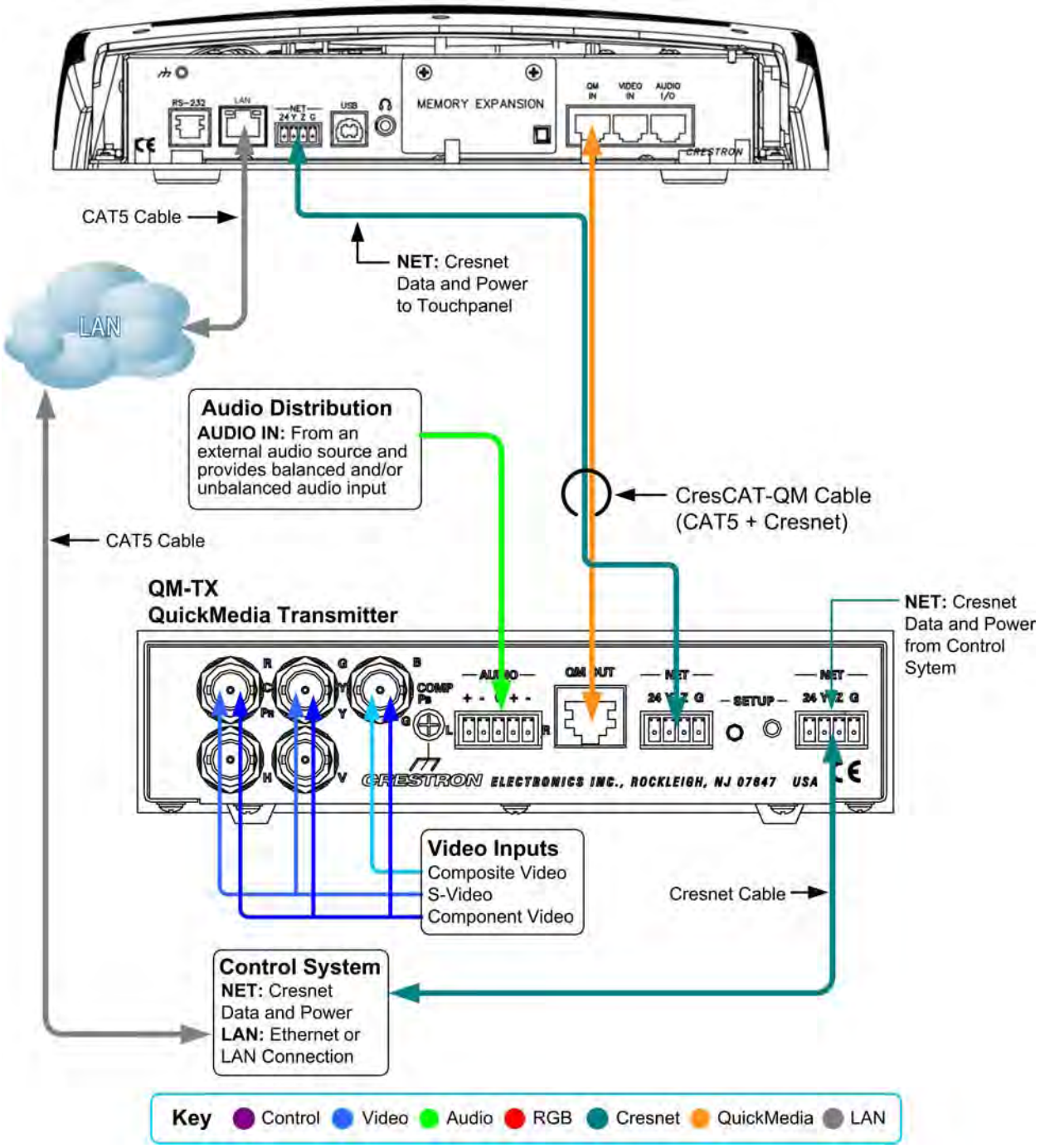
TPS-12G-QM or TPS-15G-QM Podium Application – with QM-MD7X2 Switcher for Multiple AV Inputs



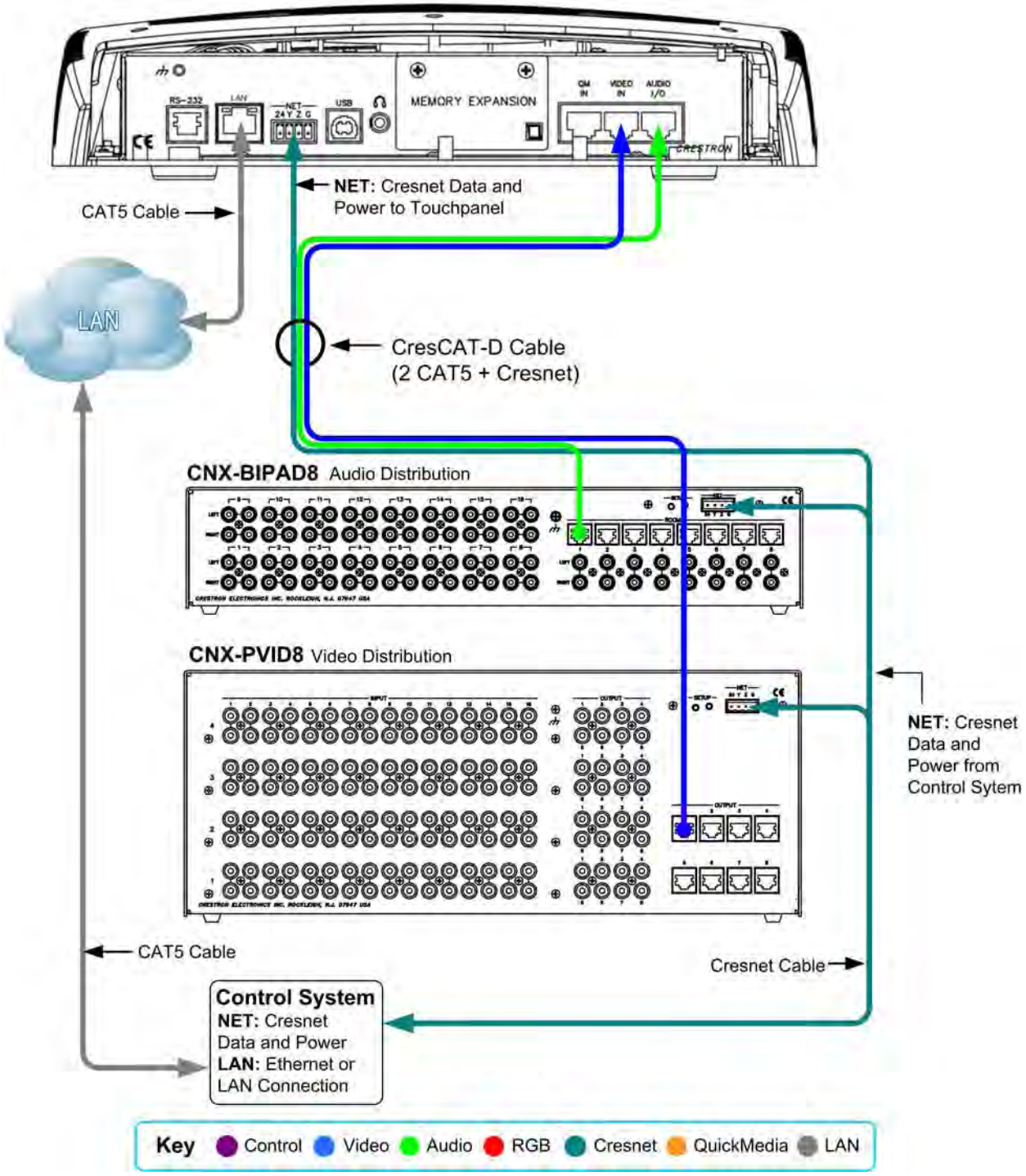
TPMC-CH-IMC Interface Connections for TPS-12, TPS-15, and TPS-17



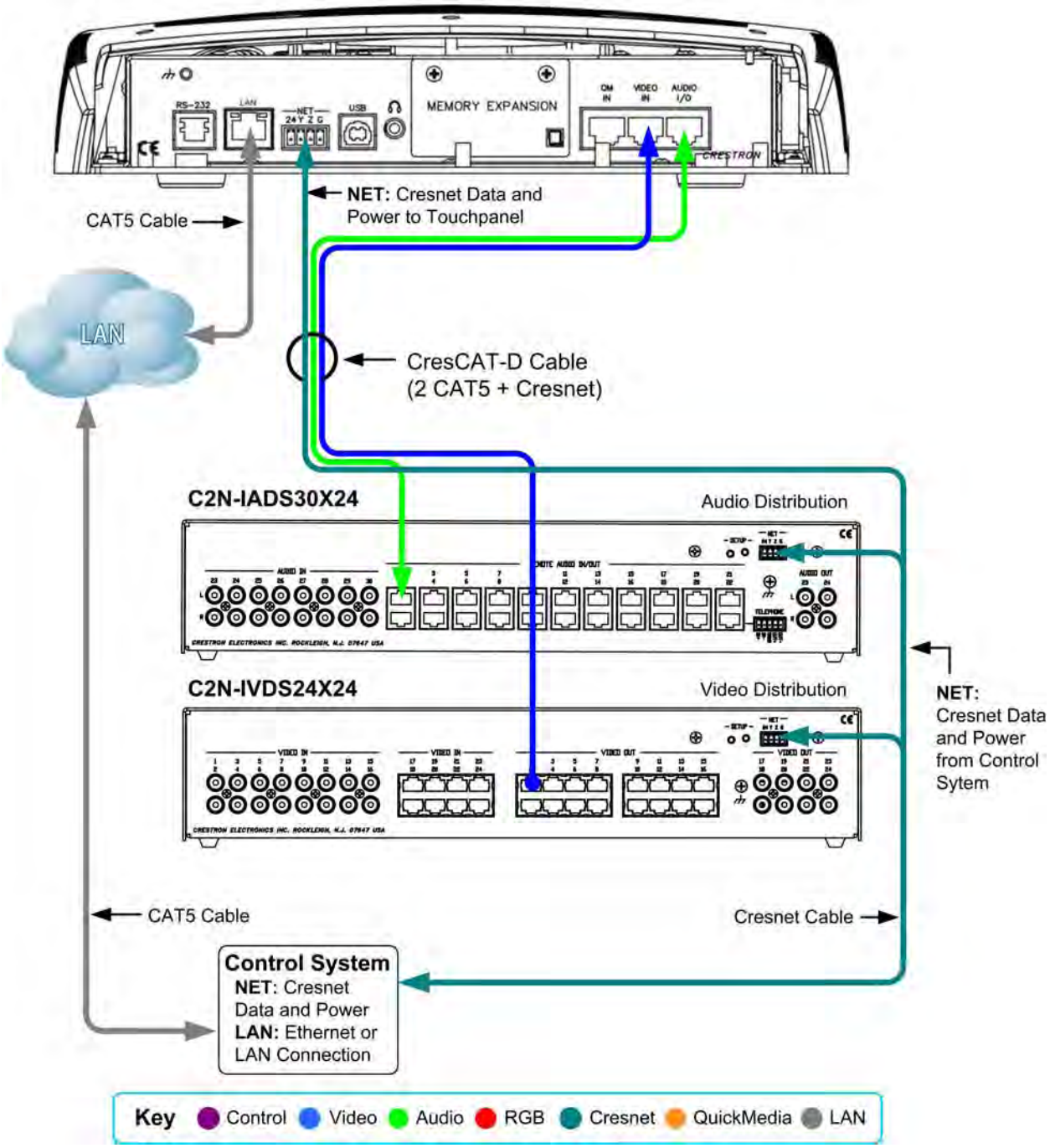
QuickMedia Interface Connections for TPS-12, TPS-15, and TPS-17



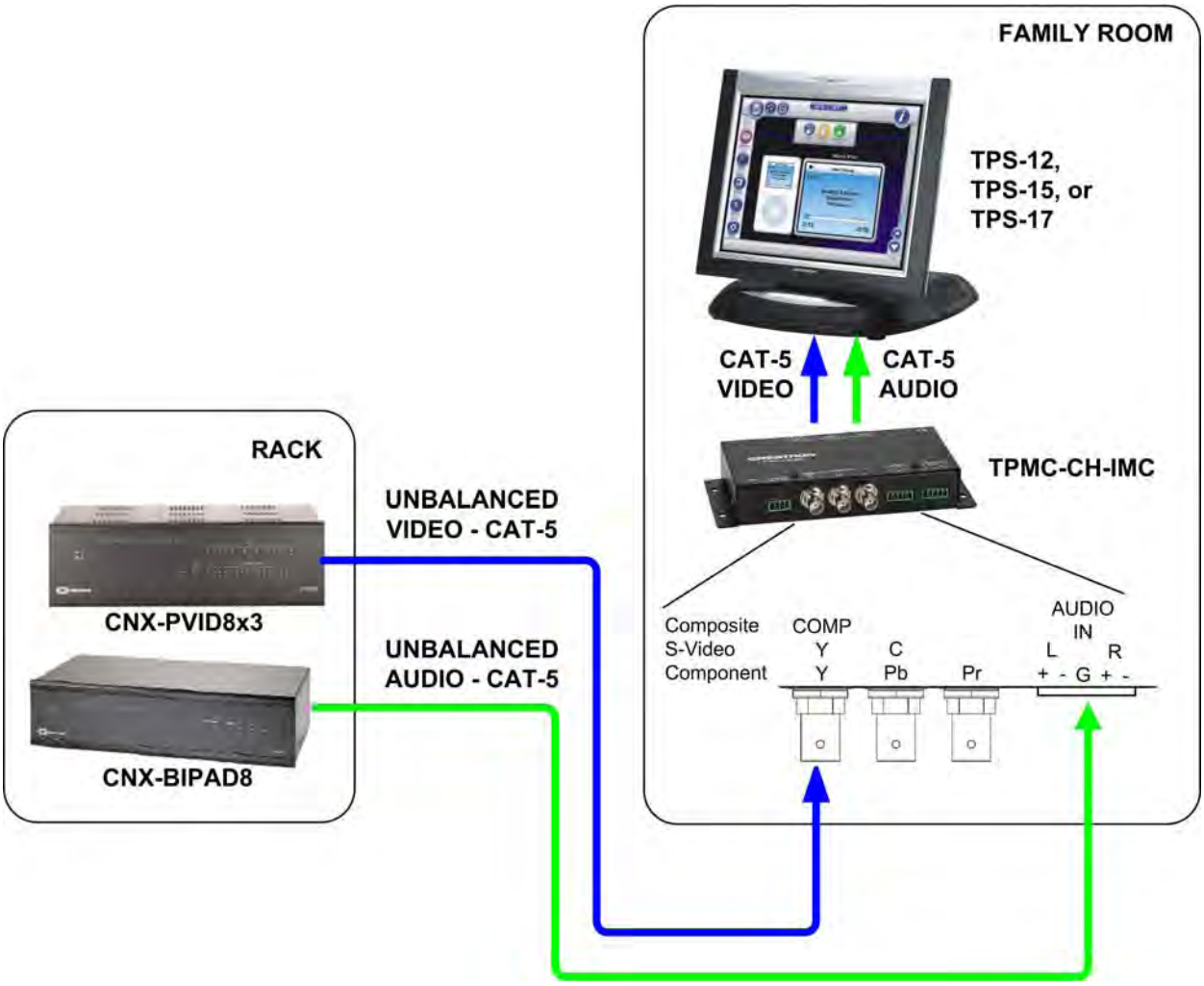
Balanced AV Distribution Connections for TPS-12, TPS-15, and TPS-17 (CNX-BIPAD8 and CNX-PVID8)



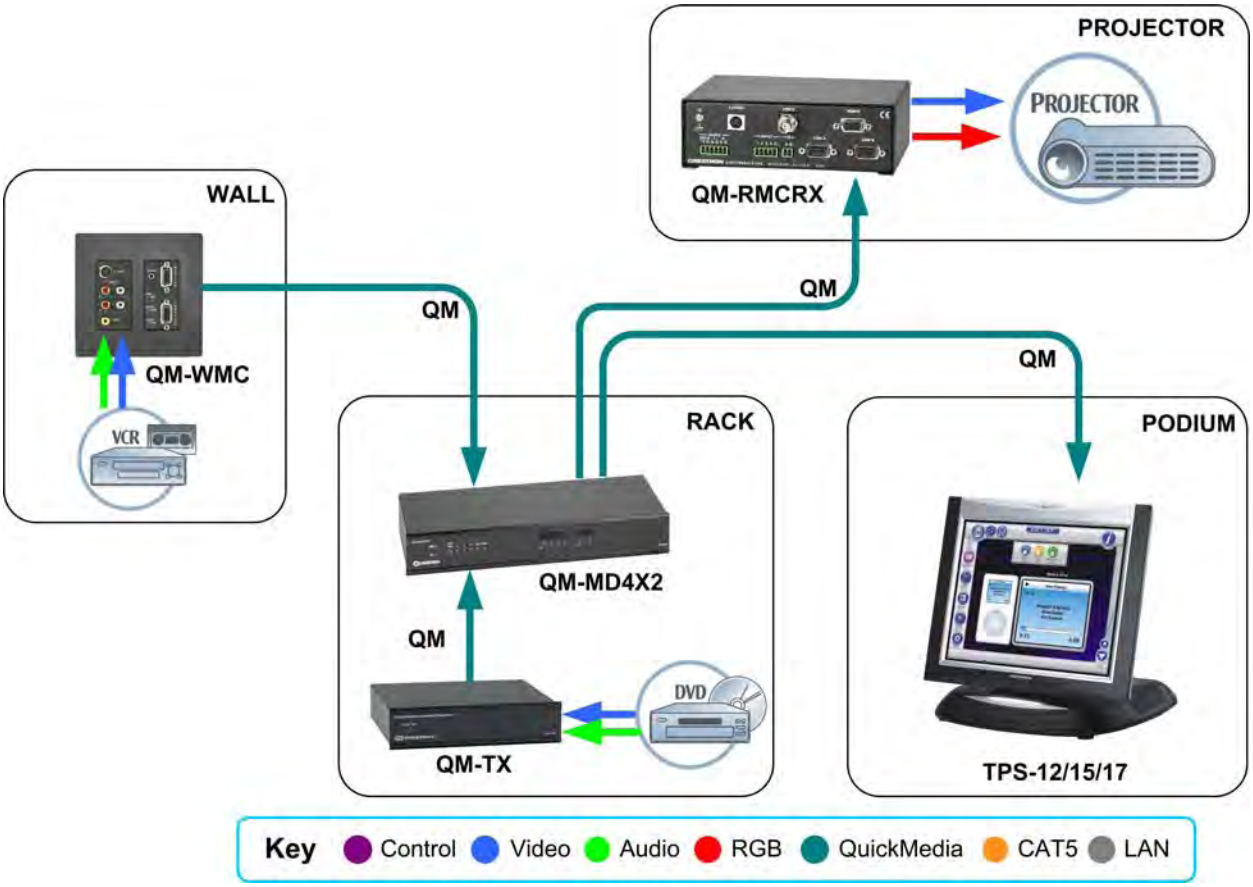
Balanced CAT5 AV Distribution Connections for TPS-12, TPS-15, and TPS-17 (C2N-IADS30X24 and C2N-IVDS24X24)



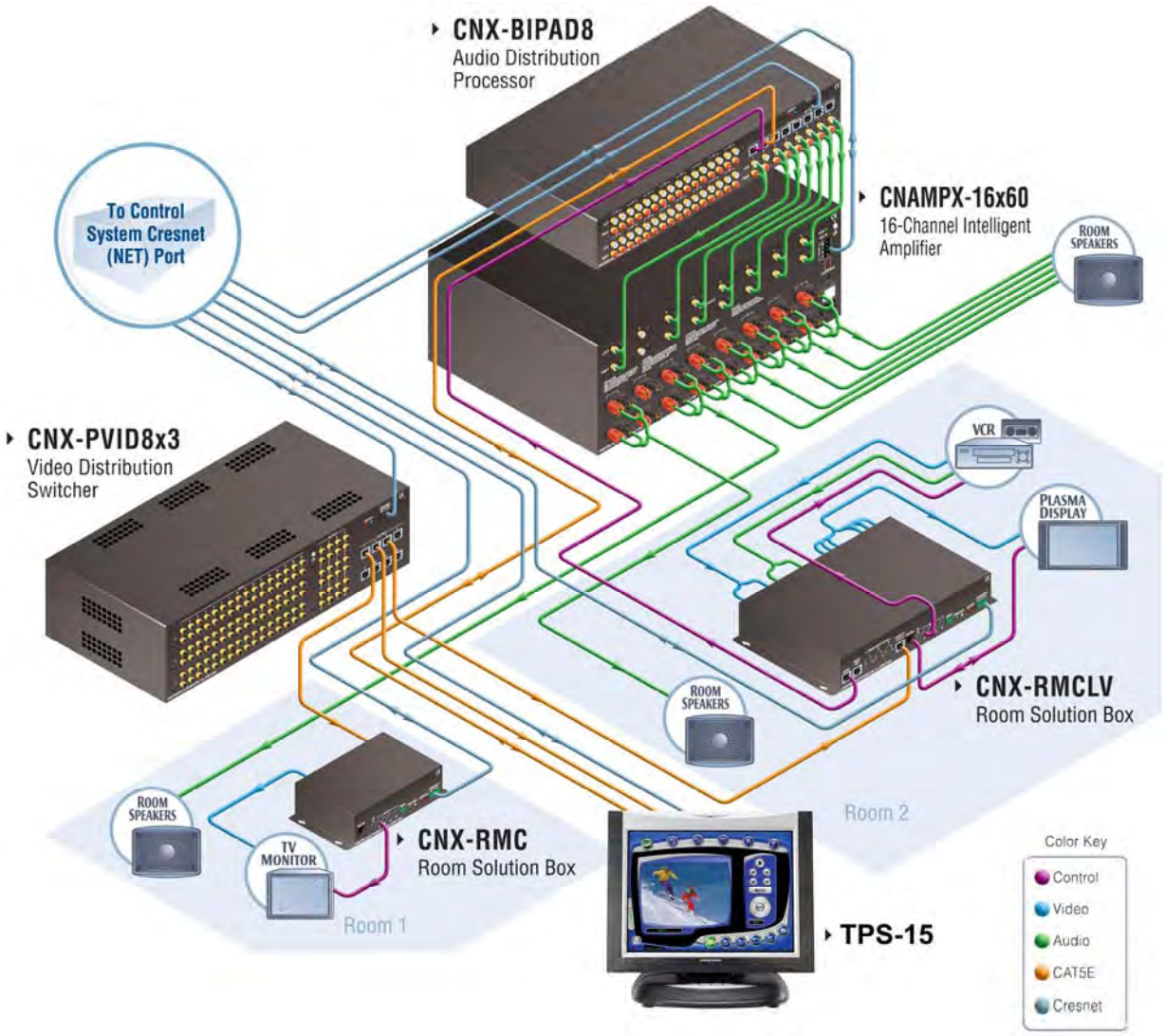
TPS-12, TPS-15, or TPS-17 Family Room Application – with Audio and Video Distribution



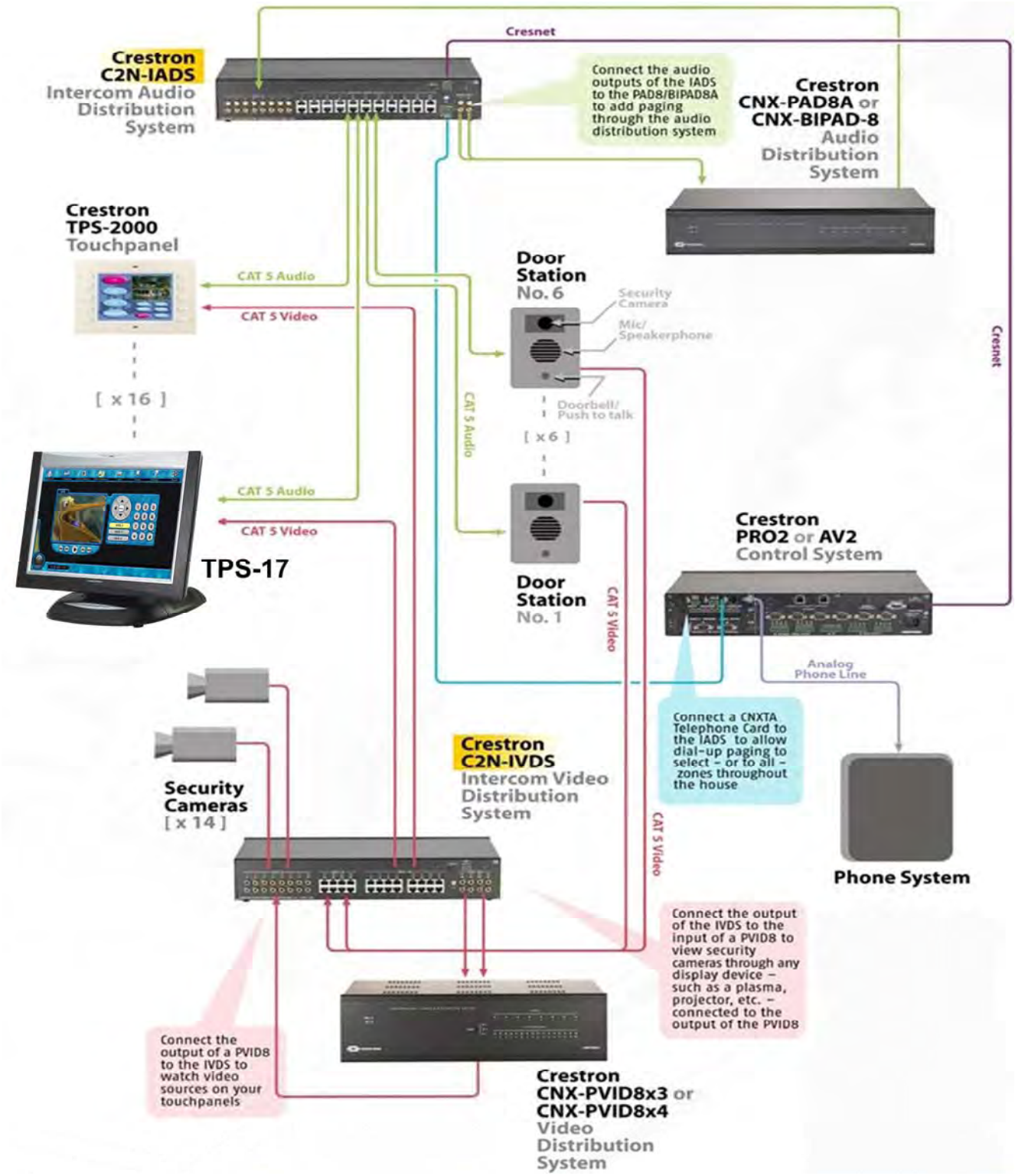
TPS-12, TPS-15, or TPS-17 Application – Podium Control with QM-MD4X2 Switcher for Dual AV Input



TPS-15 Application with CNX-BIPAD8 and CNX-PVID8X3



TPS-17 Application – with Intercom, Audio Distribution, Video Distribution, Security, and Phone System



Appendix A: QuickMedia Installation Notes

The QuickMedia transport mechanism performs delay compensation on each video input to compensate for signal skew, and frequency/bandwidth compensation for cable length. Signal skew occurs when part of the signal is delayed with respect to other signal components. The amount of skew largely depends on the length and design of the wire. Because CAT5 consists of twisted pairs that are twisted together in the cable, unequal wire lengths are created.

The maximum aggregate cable length from QM transmitter to QM receiver is limited by the loss of bandwidth over long distances and the amount of available skew compensation. A cable rated at 15 ns of skew per 100 meters (328 ft.) means that a cable will have no more than a 15 ns difference between the fastest and slowest RGB signals over 100 meters of cable.

To determine the allowable maximum length of installed cable, the installer must first perform a calculation based on the skew rating of the cable. The use of low-resolution signals may allow increased cable length but must be tested with the sources to be used. To ensure sufficient bandwidth to support signal resolutions up to 1600 x 1200, the maximum aggregate cable length should not exceed 328 feet. Skew compensation is primarily relevant to RGB sources; however, any/all video or VGA 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 particular to either Crestron and/or QuickMedia systems.

The total accumulated skew from QM transmitter to QM receiver must not exceed 15 ns (nanoseconds). Crestron recommends a cable with a rating of less than or equal to 15 ns over its entire length. For example, if using a cable with a rating of 15 ns/100 meters (100 meters = 328 feet), connecting the QM-FTCC transmitter with 150 feet of cable to a QM-MD7x2 switcher, and then using another 150 feet to connect the QM-RMCRX-BA receiver, the accumulated skew over the entire 300 feet should not exceed 15 ns.

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 (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.

Crestron Electronics, Inc.
15 Volvo Drive Rockleigh, NJ 07647
Tel: 888.CRESTRON
Fax: 201.767.7576
www.crestron.com

Quick Guide to Touchpanel Connections
Doc. 4903B
12.09
Specifications subject to
change without notice.