

Crestron **CNX-DVP4**  
Digital Video Processor  
Operations Guide

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**CRESTRON**

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## Getting Started with the CNX-DVP4 – Quick Check List

For a quick reference, the following items allow for immediate setup of the CNX-DVP4. Details for each item are found on the appropriate page of this guide.

**Hardware** (Refer to Hardware Hookup on page 16 and Compact Flash Installation on page 13 for more information) – connect in following order:

1. Connect video source(s); for example, RGB, S-Video, Composite video.
2. Connect RGB video output to display device; for example, an LCD panel or a projector.
3. Connect mouse or touchscreen (optional).
4. Install compact flash (refer to page 13).
5. Connect Cresnet power (refer to page 14).
6. Connect RS-232 (DB9) Computer port for communication between CNX-DVP4 and PC (PC has Viewport installed and open) (refer to page 15).

If the display device functions after power up, go to Video output. If not, follow steps 7-9:

7. Open Viewport and establish communications with the CNX-DVP4 (refer to page 49, Serial Connection for more information).
8. Type **output** at the CNX-DVP4 prompt in Viewport and press **Enter** to view current resolution setting.
9. Set resolution in Viewport to match native resolution of display device (refer to page 28).

**Video output:**

1. Go to Setup (refer to Configuring CNX-DVP4 on page 23 for more information).
2. Select Setup under DVI, RGB and Video, refer to page 28.
3. Select **Check Output**.
4. Select **Grid** and adjust, refer to page 28.
5. Select **Vertical Lines**, refer to page 29.
6. Adjust display as desired.

**RGB video source** (requires a video diagnostic program or pattern generator installed on PC):

1. Select **Select Input**, refer to page 29.
2. Select RGB source (1-4).
3. Open video diagnostic program on the RGB source.
4. Display a grid on the RGB source. Adjust to fill the screen.
5. Display a test pattern of vertical lines (similar to video output vertical lines). Select a Vertical line pattern from a video diagnostic program, refer to page 28.
6. Adjust coarse setting as desired.
7. Adjust fine setting as desired.

**S-/Composite video source (optional):**

1. Select Setup under DVI, RGB and Video, refer to page 28.
2. Select **Select Input**, refer to page 29.
3. Select **Color**.
4. Adjust Brightness, Contrast, Hue, or Saturation as desired.

**Master/Slave mode**

1. Select **Setup** under *System*, refer to page 24.
2. Select **Interface**.
3. Select **Master** or **Slave (Cresnet ID required if in slave mode)**.

Select Stretch to New Size and Position from Options menu under DVI, RGB and Video if you want this effect to be active.

Load programs via Viewport: SPZ (SIMPL Windows) and VTZ (VT Pro-e) files.

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# Digital Video Processor: CNX-DVP4

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## Introduction

### Features and Functions

The CNX-DVP4 Digital Video Processor can simultaneously display four windows, with any combination of high-resolution computer or video sources, on a single large high-resolution monitor, projector or plasma screen, while also operating as an integrated seamless switcher, mouse and touchpanel control.

The CNX-DVP4 accepts both digital and analog inputs with RGB (VGA) resolutions up to 1600x1200, as well as NTSC/PAL Composite or S-Video sources. The output can be scaled from 800x600 to 1600x1200 to match the desired display resolution. Built-in flexibility provides the ability to change window sizes and aspect ratios, as well as simultaneous display of multiple input resolutions. Coupled with its seamless switching, these features make the CNX-DVP4 ideal for information-intensive applications like command and control centers.

#### *Functional Summary*

- Four DVI/analog inputs for RGB computer sources up to 1600x1200
- Four Dual BNC inputs up to eight NTSC/PAL composite or four S-Video sources
- One DVI/analog output for GUI/display
- Output resolution selectable from: 800x600 to 1600x1200 (analog)  
800x600 to 1280x1024 (digital)
- Displays up to four computer/video windows simultaneously
- Four RS-232 outputs for interfacing with serial mouse (for “Touch the PC”), telestrator, or other AV devices
- One RS-232 input for mouse or touch sensitive overlay
- One RS-232 computer console for processor communication
- 10/100 BaseT Ethernet
- Memory upgradeable to 4GB Compact Flash. Ships with a 32MB Compact Flash
- Cresnet master or slave mode capability (ships as slave ID 54)
- 2-Series control engine
- Ethernet capabilities

For flexibility in designing applications, the CNX-DVP4 can be controlled by a variety of pointing devices, including a serial mouse or touch-sensitive screen overlay connected via RS-232.

The breakthrough 2-Series control engine is based on the 257 MIPS, 32-bit Motorola ColdFire<sup>®</sup> processor. The standard 68MB memory (32MB SDRAM, 4MB flash ROM, 32MB compact flash) can be enhanced by replacing the supplied compact flash with a larger flash memory, allowing: an on-board storage of program, room and equipment profiles, upgrades, databases, and schedules.

The internal 10/100 BaseT Ethernet supports static IP and future dynamic addressing, TCP/IP and UDP/IP. The built-in Web Server uses memory storage on a compact flash card for remote access and control.

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**NOTE:** The CNX-DVP4 is a complex device containing a powerful processor, touchpanel and A/V controller. When there are conflicting commands between these functions, the CNX-DVP4 will always allow the controller priority.

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## Specifications

The following table provides a summary of specifications for the CNX-DVP4.

### *CNX-DVP4 Specifications*

SPECIFICATION	DETAILS
Power Requirements	50 Watts <sup>1</sup> (2A @ 24 VDC) Power supply not included
Default Mode	Slave - ID 54
Processor	2-series class processor with built-in compact flash (32Mb)
2-Series Control System Update File for CNX-DVP4	Version CNX-DVP4.2006.CUZ or later for Cresnet Master or Slave
Cresnet	Standard 4-pin
Ethernet	10/100BaseT RJ45 with built in Link/Activity LEDs
Memory	4MB flash (non-volatile), 32MB DRAM (volatile), and 256KB NVRAM. Ships with 32MB Compact Flash
Output Resolutions (DVI-I/RGB adapter included)	800x600 to 1600x1200 (RGB) or 800x600 to 1280x1024 (digital) Output rate selectable from 60Hz to 85Hz (60Hz limit at 1600x1200). Console commands can be used to configure output to most non-interlaced formats from 25MHz to 160MHz clock up to 1600x1200.
RGB Input Interface	4 DVI connectors for RGB/LVDS video (RGBHV, RGBS and RGSB supported)
RGB Input Resolutions (DVI-I/RGB adapters included)	From 640x480 to 1600x1200 analog From 640x480 to 1280x1024 DVI digital
Mouse input	Microsoft compatible serial mouse, 9-pin D connector <sup>2</sup>
Aspect ratio	4 x 3 or 16 x 9
Output Interface	DVI connector for analog RGB and digital LVDS video
Horizontal Frequency	From 15KHz to 100KHz
Vertical Frequency	From 50 to 85Hz
Video Inputs	8 BNC connectors for NTSC/PAL (8 composite, 4 S-Video or any combination)
Video input selection	12 total (4 RGB, 8 composite or 4 S-Video) inputs, any 4 can be displayed simultaneously

*CNX-DVP4 Specifications (continued)*

SPECIFICATION	DETAILS
RS-232 Ports	6 DB-9 connectors: 4 for PC or Control interfacing (DB9F-DCE) 1 for Pointing Device input (DB9M-DTE) 1 for Console (PC) input (DB9F-DCE)
Environmental Temperature	41° to 113°F (5° to 45°C)
Environmental Humidity	10% to 90% RH (non-condensing)
Dimensions and Weight	Height: 3.47 in (8.82 cm) <sup>3</sup> Width: 17.03 in (43.25 cm) Depth: 12.10 in (30.74cm) Weight: 7.8 lb (3.5 kg)

- 1 Crestron recommends that the CNX-DVP4 be the only device connected to the Crestron power supply (CNPWS-75). Do not use a 2-Series system (AV2, PRO2, etc.) as a power source.
- 2 You can also use a Logitech compatible 3-button serial mouse. PS2 (or USB) mouse is incompatible, even with a 9-pin adapter. Refer to “Appendix F: Connecting a Mouse” on page 85 for additional mouse installation information.
- 3 The CNX-DVP4 occupies two rack spaces. Crestron recommends allowing ventilation above and below the unit.

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

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### Minimum Equipment Required for Setup

1. CNPWS-75 75W Power Supply (not included).

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

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2. Serial Mouse (9-pin)/Pointing Device (touch-screen sensitive screen overlay connected to RS-232) for viewing the output of the CNX-DVP4.
3. Display device (projector, monitor, etc.).
4. Sources: Video, computer.
5. Optional touchpanel to control the CNX-DVP4.

### Operation Modes

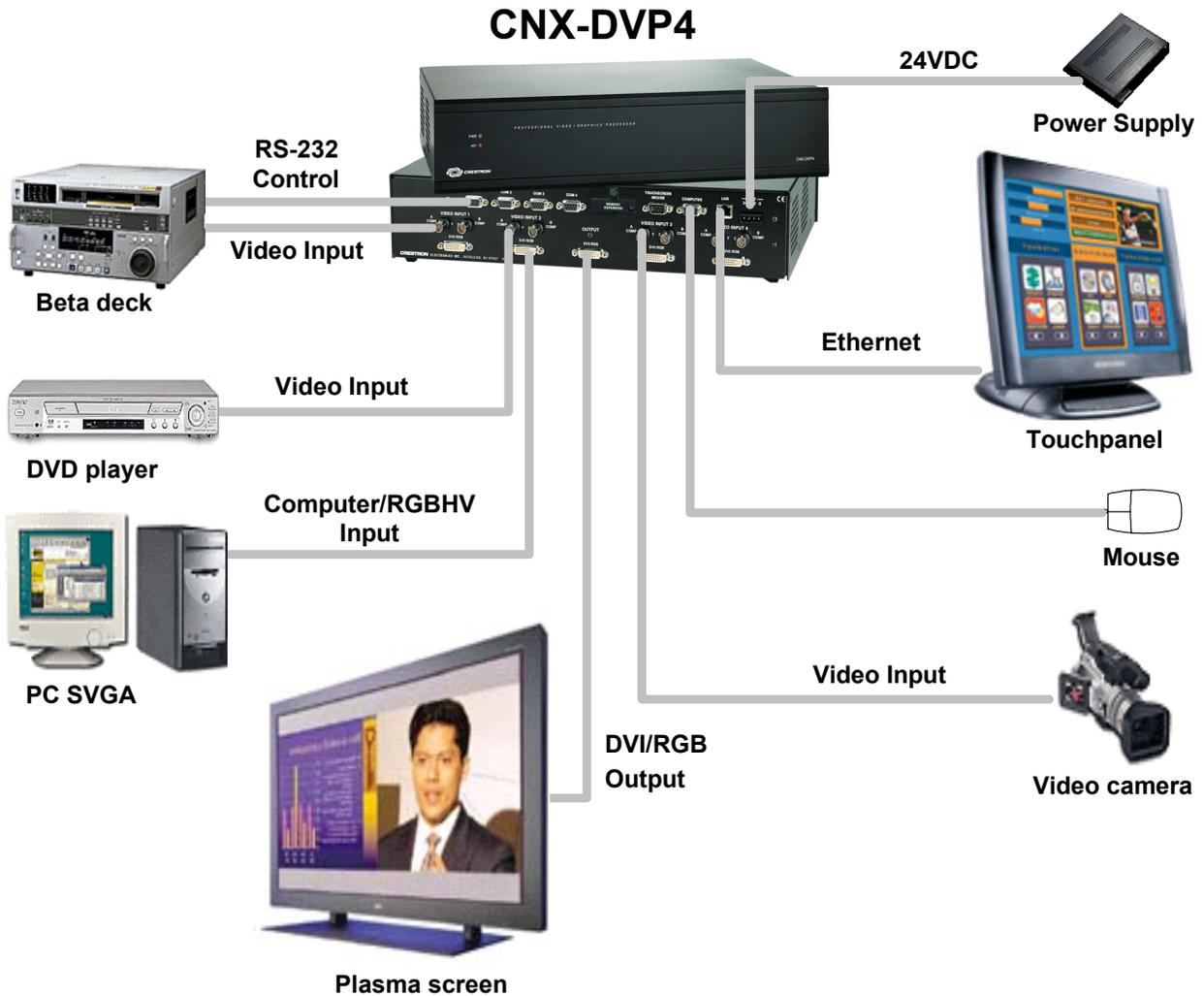
There are two modes of operation for the CNX-DVP4, Master and Slave. In the Master Mode, the CNX-DVP4 is a standalone device. In the Slave Mode, the CNX-DVP4 is either a Cresnet device or an Ethernet device connected to a 2-Series Control System.

MODE OF OPERATION	VIEWPORT PROMPT DISPLAYED
Cresnet Slave Mode	CSLAVE_DVP4
Ethernet Slave Mode	ESLAVE_DVP4
Master Mode	DVP4

**Master Mode**

In Master Mode, the CNX-DVP4 is a standalone 2-Series control system that can control RS-232 serial, Cresnet or Ethernet devices, while still taking advantage of its video effect capabilities. In the simplified example that follows, buttons on the touchpanel control start or stop functions on the Beta deck and the four video input sources displayed on the plasma screen.

*Master Mode Example*



**Slave Mode**

In Slave Mode, the CNX-DVP4 operates as either a Cresnet or Ethernet device as part of a 2-series control system.

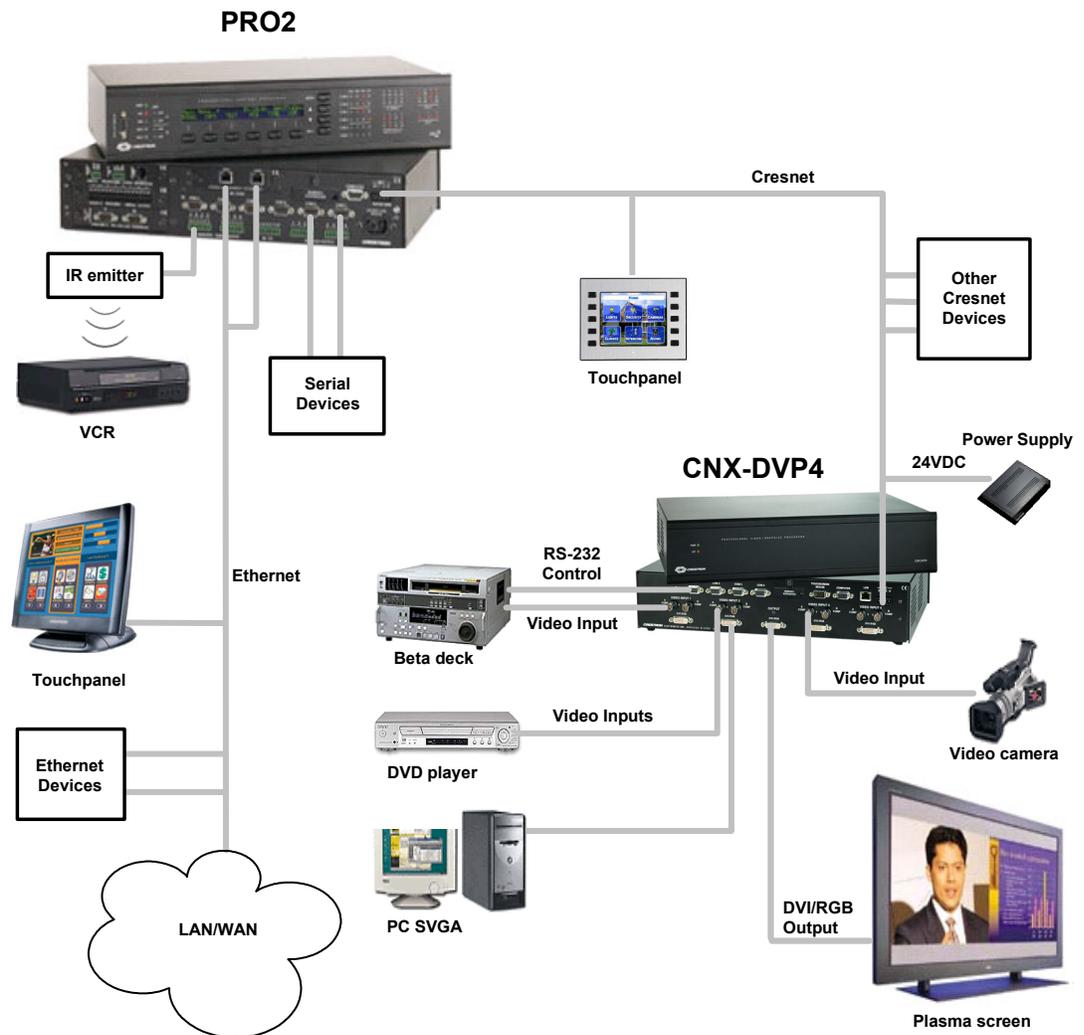
In this simplified example, the CNX-DVP4 is part of a control system that includes IR, RS-232 serial, Cresnet and Ethernet devices. The touchpanels operate the CNX-DVP4 through the PRO2.

**NOTE:** The CNX-DVP4 can only be controlled by a 2-Series control system.

**NOTE:** Host Control System version 2.006 or later is required if the CNX-DVP4 is operated as a slave. If operated as a slave from another CNX-DVP4, then version 2.006 or later is required.

**NOTE:** The slave mode example shows the CNX-DVP4 as a Cresnet device.

*Slave Mode Example*



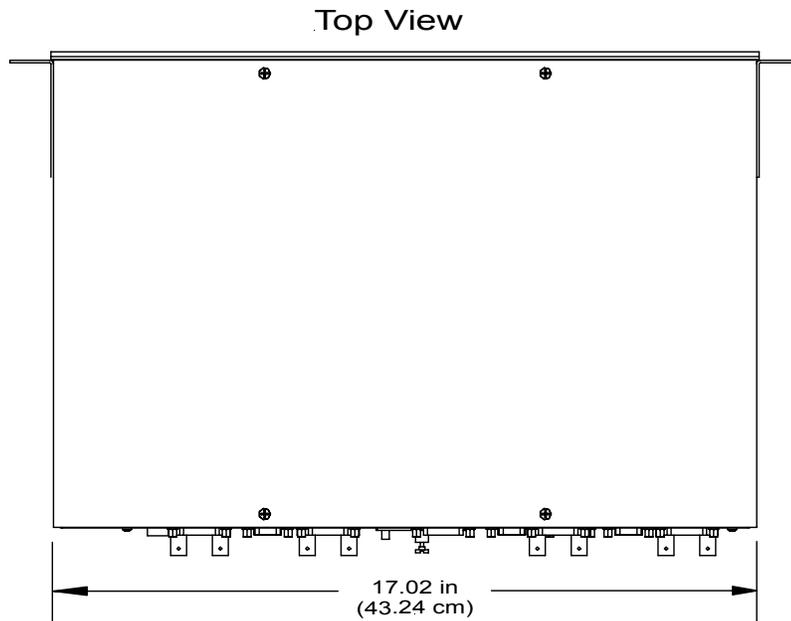
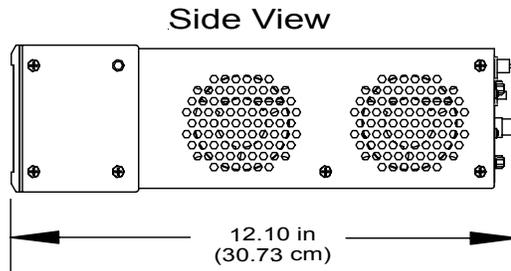
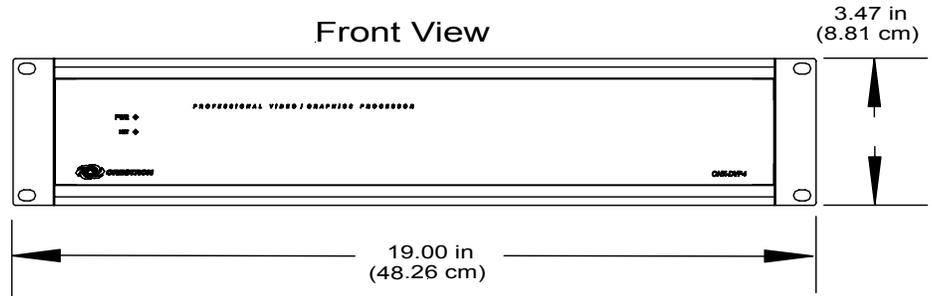
## Physical Description

The CNX-DVP4, shown in the following illustration, is housed in a black metal enclosure. All RS-232, video, LAN, and Cresnet connectors are on the back panel. The supplied racking mounting ears can be attached at the shorter sides of the unit. Two holes per ear are for inserting the rack mounting screws. The ears can be removed to reduce the size of the CNX-DVP4. If the ears are removed, the provided rubber feet can be mounted on the under side to stabilize the unit on a flat surface. The front panel has a PWR (green) LED and a NET (yellow) LED. The PWR LED illuminates when power is applied to the unit. When functioning as a Master, the NET LED blinks when transmitting or receiving data from Cresnet. When functioning as a slave, this LED blinks when the unit is polled. This will generally be frequent enough to appear to be on steady.

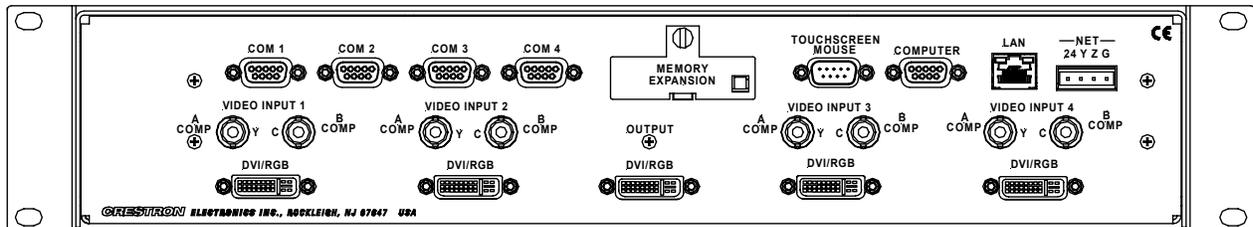
*CNX-DVP4, Front and Back Views*



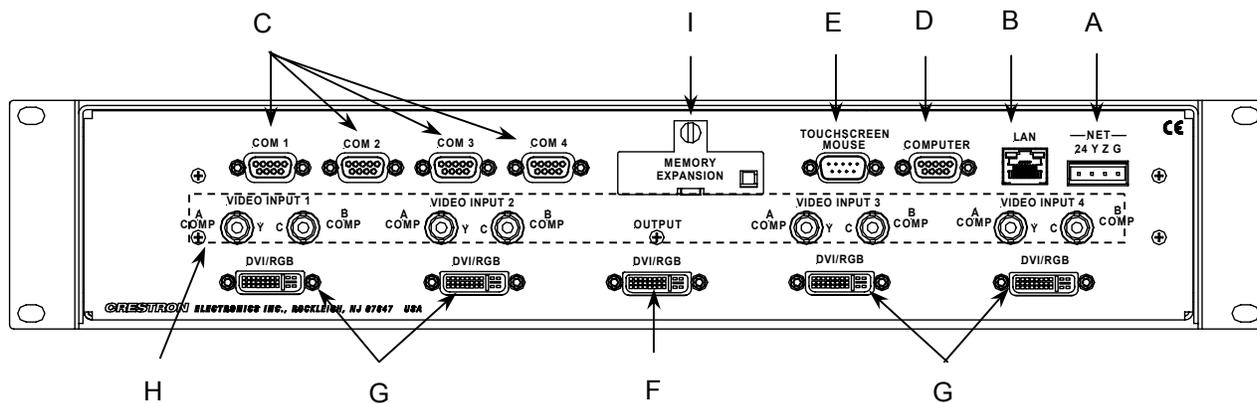
*Physical Views with Ears Attached*



*Back View with Rack Mounting Ears Attached*



*The 22 ports on the CNX-DVP4 Back Panel*

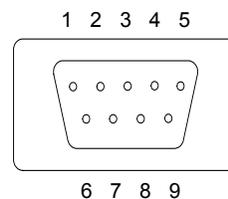


- A. **NET** – provides communication to other Cresnet devices and power to the CNX-DVP4. If making network connections to Cresnet peripherals, refer to “Network Wiring” on page 14.
- B. **LAN** – provides an Ethernet 10/100 base network connection.
- C. **COM1-4 PORTS**– provides only RS-232 communication (DB9, straight-through only for the “Touch The PC” application). For telestrator, or AV device the pinout is device dependent (refer to the COM Port chart). DSR on pin 4 is always high or ON.

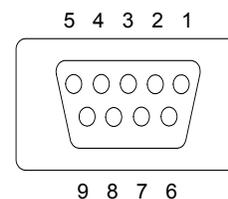
**RS-232 (DB9F - DCE) Pinouts**

PIN	DESCRIPTION
2	TXD
3	RXD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

**Male DB9 Connector**



**Female DB9 Connector**



- D. **COMPUTER PORT**– Provides only RS-232 communication (DB9, straight-through) from a PC for programming and system setup.

**RS-232 (DB9F - DCE) Pinouts**

PIN	DESCRIPTION
2	TXD
3	RXD
5	GND
7	CTS
8	RTS

- E. **TOUCHSCREEN/MOUSE PORT** – Provides RS-232 communication to a touchscreen or mouse (supports only a standard serial mouse). DSR on pin 4 is always high or ON. Refer to “Appendix F: Connecting a Mouse” on page 85 for additional information.

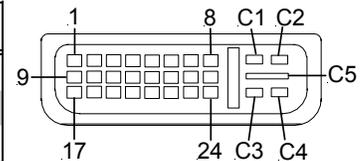
*RS-232 (DB9M - DCE) Pinouts*

PIN	DESCRIPTION
2	TXD
3	RXD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

- F. **OUTPUT DVI-I/RGB (1)** – provides RGB or DVI video output. Output resolution from 800x600 to 1600x1200 (RGB) or 800x600 to 1280x1024 (digital). A DVI-I to RGB adapter for RGB output is supplied. The CNX-DVP4 comes with five DVI/RGB input/output adapters (Crestron P/N JDCMDVI-VGAMF-1). Refer to “Appendix C: Cable Connection Information” on page 80 for additional information.

*DVI-I Connector Input/Output Pinouts*

PIN	DESCRIPTION
1	SD2-
2	SD2+
3	SHIELD2/4
4	SD4-
5	SD4+
6	DDC_CLK
7	DDC_DATA
8	VSYNC
9	SD1-
10	SD1+
11	SHIELD1/3
12	SD3-
13	SD3+
14	+5V
15	DGND
16	HP_DET
17	SDO-
18	SDO+
19	SHIELD0/5
20	SD5-
21	SD5+
22	SHIELD_C
23	SDCLK+
24	SDCLK-
C1	A_RED
C2	A_GREEN
C3	A_BLUE
C4	HSYNC
C5	AGND



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**NOTE:** The Digital Visual Interface (DVI) is a digital video connectivity standard. This standard offers two different connectors: one with 24 pins (DVI-D) that handles digital video signals only, and one with 29 pins (DVI-I) that handles both digital and analog video. The CNX-DVP4 uses the 29-pin DVI-I standard.

**NOTE:** RGB is a computer signal that uses the standard High Density (HD-15) 15-pin connector. It is comprised of three analog video signals: red, green, blue and separate horizontal and vertical syncs. Most computer monitors use RGB (usually called VGA, SVGA, XGA, etc.).

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- G. **INPUT DVI-I/RGB (4)** – allows RGB or DVI video input. Input resolution from 640 x 480 to 1600 x 1200 (RGB) or 640 x 480 to 1280 x 1024 (DVI). RGB to DVI-I adapters (4) for RGB input are supplied.
- H. **VIDEO INPUT 1-4 (dual BNC)** – allows Composite or S-Video input. You may have eight composite video inputs, four S-Video inputs, or some combination of the two. Each S-Video input requires two BNC connectors, for example, if you are using two S-Video inputs, then there are only four composite video inputs remaining.

S-Video inputs must use the same pair of A and B BNC connectors. Refer to “Appendix C: Cable Connection Information” on page 80 for additional information.

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**NOTE:** Composite video is a type of video signal in which all information – the red, green, and blue (horizontal and vertical sync) signals are mixed together. This is the most common type of signal used by video professionals.

**NOTE:** S-Video contains two separate components, luma and chroma (also known as Y and C signals respectively). The luma signal contains brightness, intensity, and signal timing information. This signal contains all picture information except for color. The chroma signal contains only the color information. You can see the complete black and white image, without the chroma, by only feeding the luma signal into a monitor.

**NOTE:** RGBS consists of Red, Green Blue, and a Composite sync. RGBHV consists of Red, Green, Blue, Horizontal sync and Vertical sync.

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- I. **MEMORY EXPANSION** – provides for compact flash memory card. The CNX-DVP4 comes with a 32MB compact flash memory card (Crestron P/N COMFLS-32M-1).

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**NOTE:** A CNXRMCLV or CNXRMC may be added to the system for Infrared control.

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## Memory

The CNX-DVP4 has 36MB of built-in memory (non-volatile and volatile). A total of 36MB is broken down as follows: 4MB flash (non-volatile), 32MB DRAM (volatile), and 256KB NVRAM. The CNX-DVP4 ships with 32MB of compact flash installed. Flash memory contains the file system inside the 2-series control engine. Non-volatile memory contains information that is retained after loss of electrical power. Volatile memory is lost after a power failure. Refer to the following lists for a breakdown of memory usage for program-related information stored in the unit. Refer to “Appendix A: File System” on page 76 for additional information.

### **Flash**

The 4MB flash memory consists of approximately 1.5MB used for firmware, and approximately 2.5MB available for SIMPL and SIMPL+. The files that reside in flash conform to a flat directory structure.

1. SIMPL+ Modules.
2. SIMPL Program.
3. Operating System.

### **Non-volatile (NVRAM)**

1. SIMPL+ Variables (using "nonvolatile" qualifier or #DEFAULT\_NONVOLATILE).
2. Signals explicitly written to NVRAM (by symbols such as Analog RAM, Analog RAM from database, Serial RAM, Serial RAM from database, Analog Non-volatile Ramp, Digital RAM, etc.).

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**NOTE:** If you extract NVRAM values to a file (**Viewport, File transfer | Save NVRAM to File**), to simplify restoring them in the event of file corruption or to distribute to identical control systems, remember that NVRAM values are position sensitive in the program. When saving the NVRAM is crucial to your application, it is recommended to place all symbols and/or modules that use NVRAM at the beginning of your program. When NVRAM (.nvr file) is re-installed, all the values should line up with the program. If the program is modified, and logic is placed before any symbols using NVRAM, the previously stored values will not line up and your presets will have to be re-entered.

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### **Volatile (DRAM)**

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**NOTE:** The DRAM memory runs all bit map files. To maximize loading speed of backgrounds, keep the total page size to a maximum of 32 MB.

**NOTE:** To reduce the size of bit maps, make them 16 bit rather than 24 or 32 bit. This will also reduce the load time of these files.

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1. Digital, analog and serial signal values (except as noted above).
2. SIMPL+ Variables (Default if no options are specified, or if "volatile" qualifier is used, or #DEFAULT\_VOLATILE is used).

DRAM is used by the operating system for dynamic storage of variables, signals, loading of pages and other constructs used at runtime. The actual amount of DRAM used at any given time depends on the particular program that is running, i.e., usage is variable, or dynamic, during normal operation.

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**NOTE:** To check the size of the memory installed in the CNX-DVP4, use Viewport and type the `SHOWHW` command.

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## Industry Compliance

As of the date of manufacture, the CNX-DVP4 have been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling (N11785).



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**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.

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## Setup

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**NOTE:** Some of the following subsections use the Crestron Viewport. Refer to the latest revision of 2-Series Console Commands (Doc. 6002) for console command details.

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## Rack Mounting

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**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:

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- The unit should be mounted at the bottom of the rack if it is the only unit in the rack.
  - 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 (grounding) 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).

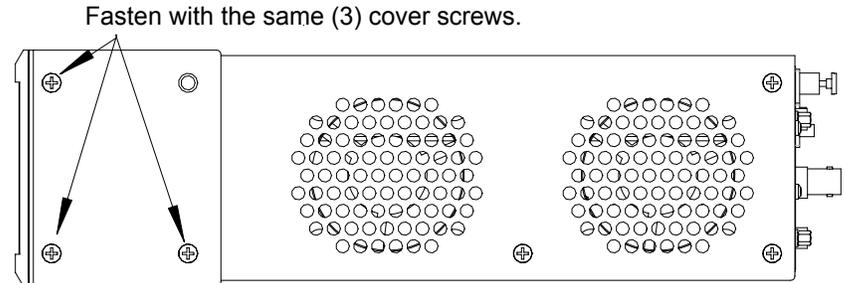
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Two “ears” are provided with the CNX-DVP4 so that the unit can be rack mounted. These ears must be installed prior to mounting. Complete the following procedure to attach ears to the unit. A #2 Phillips screwdriver is required.

1. Using a #2 Phillips screwdriver, remove the three screws closest to the front panel from one side of the unit.

2. Position a rack ear so that its mounting holes align with the holes vacated by the screws in step 1.
3. Attach the ear to the unit with three screws from step 1, as shown in the following illustration.

*Ear Attachment for Rack Mounting*



Right side view of DVP4 with optional rack mounting ears installed.

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

### Compact Flash Installation

The CNX-DVP4’s onboard memory is enhanced with a 4GB expansion slot that supports off-the-shelf Type II compact flash memory (a 32MB compact flash card is provided) and the IBM Microdrive® hard drive. The slot is accessible on the back panel of the unit (Memory Expansion). Complete the following procedure to install the compact flash. Make sure power is disconnected before installing the compact flash. Refer to the illustration following the procedure.

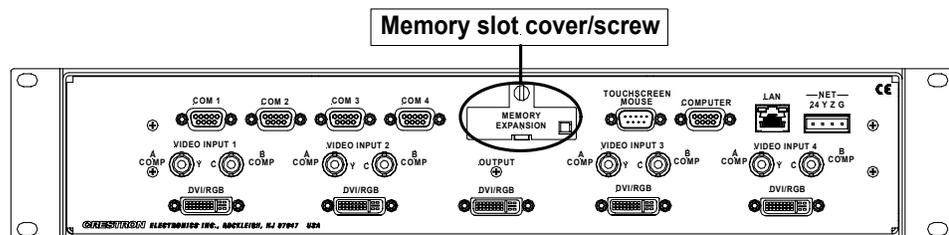
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**NOTE:** Compact flash is a mass storage device contained in a small footprint. A compact flash card is approximately the size of a matchbook.

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1. Loosen the screw and remove the memory expansion cover located on the back panel.
2. Observe handling precautions of the compact flash manufacturer and insert it into the open slot.
3. Align and reposition cover over slot.
4. Tighten the screw.

*Memory Expansion Slot Cover/Screw*



## Network Wiring

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

**CAUTION:** Crestron recommends that the CNX-DVP4 be the only device connected to the Crestron power supply (CNPWS-75). Connecting more devices may overload the power supply.

**NOTE:** When making wire connections, refer to the latest revision of the Cresnet Network Interconnect Drawing (Doc. 5411). The document can be obtained from the Downloads | Product Manuals section of the Crestron website (www.crestron.com). Search for the CRESNET.PDF file.

**NOTE:** For larger networks (i.e., greater than 28 network devices), it may be 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 desirable to add a hub/repeater after only 20 network devices.

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

### Resistance Equation

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

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

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

### Wire Gauge Values

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

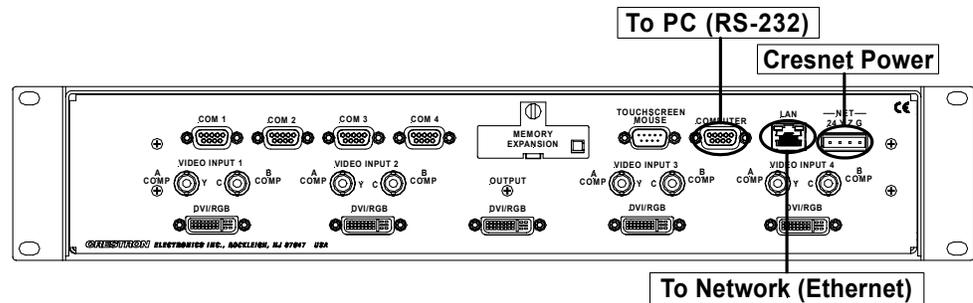
## Cable Connection for Programming

### Cable Hardware

- DB9 RS-232 Cable (male/female, straight-through)
- RJ45 10/100 BaseT Ethernet Cable
- Cresnet Cable (for power)

The CNX-DVP4 may be programmed using the compact flash with the program already written to it, or by downloading the program via serial cable or via Ethernet cable. Refer to "Network Wiring" on page 14 when making network connections. The following is for cable connections only. Refer to the following illustration for typical connections.

### Typical Connections for Programming



1. If not already connected, attach Cresnet cable to NET port and Cresnet power. Ensure that 50 Watts of power is available.
2. If programming using RS-232, attach the RS-232 cable to the Computer port and an available computer COM port of the PC. Refer to "Communication Settings" on page 21.
3. If programming using Ethernet, attach the Ethernet cable to the LAN port and the Ethernet port of the PC. Refer to Ethernet Setup on page 17.

## Identity Code (Slave Mode on Cresnet)

All equipment and user interfaces within the network require a unique identity code (NET ID). A two-digit hexadecimal number ranging from 03 to FE designates these codes. The NET ID of each unit must match an ID code specified in the SIMPL Windows program. The NET ID of the CNX-DVP4 has been factory set to **54**. The NET IDs of multiple CNX-DVP4s in the same system must be unique and changed from a PC via Viewport or from the setup menu of the CNX-DVP4, refer to page 24. Complete the following procedure to change the NET ID.

---

**NOTE:** If configured as a Cresnet Slave (ID 03 – FE) and as an Ethernet Slave with "Set as Master" checked in the IP Table Entry, the Ethernet Slave takes priority.

---

**NOTE:** For detailed information on establishing communication between the PC and Control System, refer to the network's Control System Operations Guide.

---

1. Ensure that the CNX-DVP4 is the only device connected (verify that the software is running) to the control system.
2. Open Viewport.
3. From the Viewport menu, select **Functions | Set Network ID**. The software checks the baud rate and then opens the "Set Network ID" window.
4. In the "Set Network ID" window, select the CNX-DVP4 from the *Current Network Devices* text window.
5. From the *Choose the new network ID for the selected device (Hex):* text box; select the new NET ID for the CNX-DVP4.
6. Click **Set ID** to initiate the change. This will display the "ID command has been sent" window.
7. In the "Command Complete" window, click **OK**.

8. In the “Current Network Devices” text window, verify the new NET ID code.
9. In the "Set Network ID" window, click **Close**.

---

**NOTE:** The new NET ID code may also be verified by selecting **Diagnostic | Report Network Devices** in the Viewport (alternately, press **F4**).

**NOTE:** If multiple CNX-DVP4s are added, and one of them is to stay at ID 54, it should be added last to prevent a Cresnet ID conflict.

---

10. Repeat this procedure for each CNX-DVP4 to be added to the network.

## Hardware Hookup

Refer to the following hookup diagram and complete the connections when needed in any order. Refer to “Appendix D: Cable Connection Information” on page 80 for information about proper cable connections.

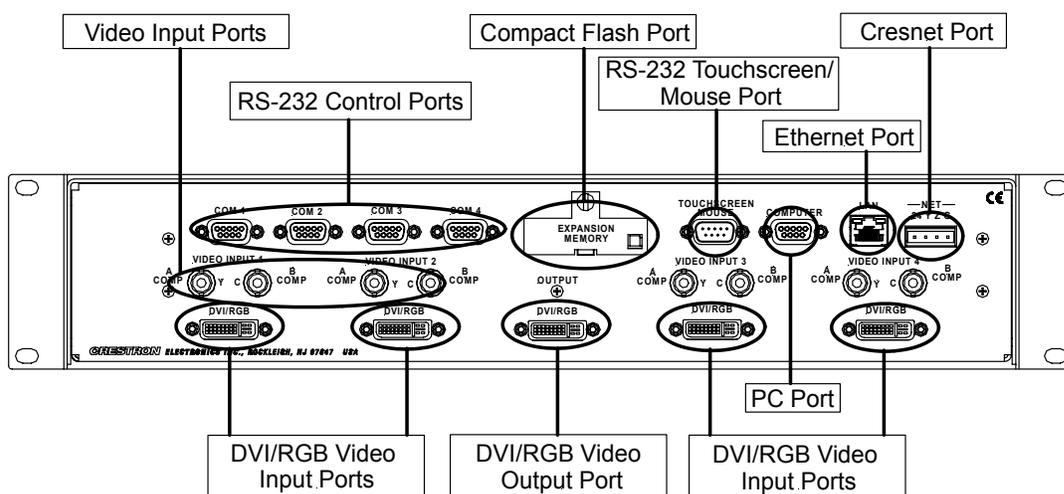
**NOTE:** To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consideration must be given if installed in a closed or multi-unit rack assembly since the operating ambient temperature of the rack environment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

**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:** For additional information on video connections over Cat 5, refer to the latest version of the Crestron Cat 5 Wiring Reference Guide (Doc. 6137) which is available from the Downloads | Product Manuals section of the Crestron website ([www.crestron.com](http://www.crestron.com)).

---

*Hookup Connections for the CNX-DVP4*



---

**NOTE:** For additional cable connection information, refer to “Appendix C: Cable Connection Information” on page 80.

**NOTE:** For additional information about Output DVI Video from PC to CNX-DVP4, refer to “Appendix D: Output DVI Video from PC to CNX-DVP4” on page 82.

---

## Setting the Mouse Input Parameters in Viewport

After connecting a pointing device to the Touchscreen/Mouse port, you must inform the CNX-DVP4 what kind of device has been installed.

To select the input mouse type using Viewport, type: `Touch ?` and press **Enter** at the prompt for a list of input devices (refer to the following graphic).

---

**NOTE:** Selecting 0 disables all other inputs and permits only program control. Refer to “Appendix E: Viewport Commands” on page 83 and “Appendix F: Connecting a Mouse” on page 85 for additional information.

---

```

Crestron Viewport - Connected to
File Edit Setup Diagnostics Functions File Transfer Remote
DVP4>touch ?
TOUCH [input]
where input =
  0 - Program Control
  1 - Microsoft mouse
  2 - Smart (SC3,SC4,SC5)
  3 - Smart (SC6,SC7,...)
  4 - Microtouch
  5 - Dynapro SC3
  6 - Dynapro SC4
  7 - Elo Graphics
  8 - Crestron Tablet
  9 - Mouse Systems Mouse
 10 - Logitech MouseMan
No parameter - current input select:

```

## Ethernet Setup (Master/Slave Mode)

This section explains how to configure a CNX-DVP4 to communicate over Ethernet using TCP/IP. These procedures assume that the CNX-DVP4 has been powered up and connected properly. The screen prompt for Ethernet slave is `ESLAVE_DVP4`, the screen prompt for Cresnet slave is `CSLAVE_DVP4`. Use ID 02 for a master or Ethernet slave, and 03 through FE for a Cresnet slave.

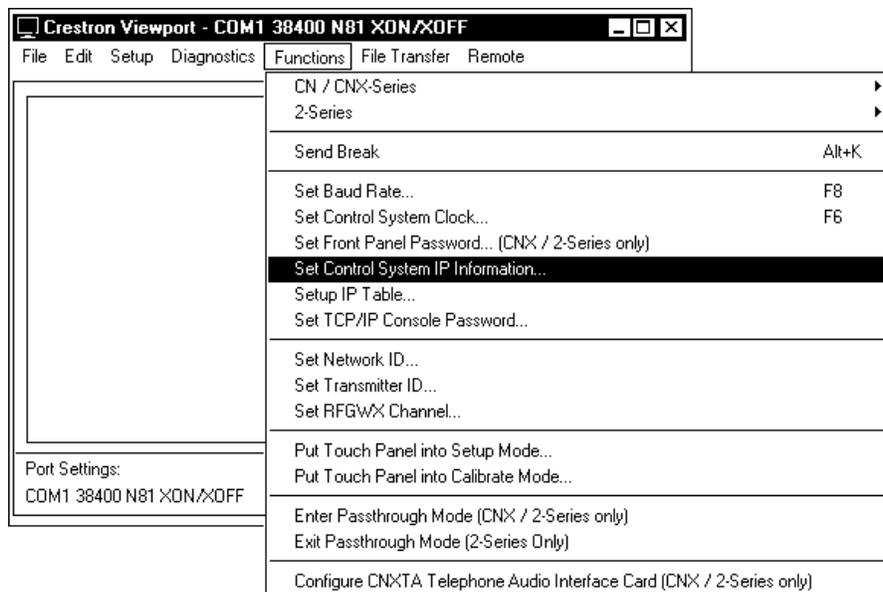
### Initial IP Setup

---

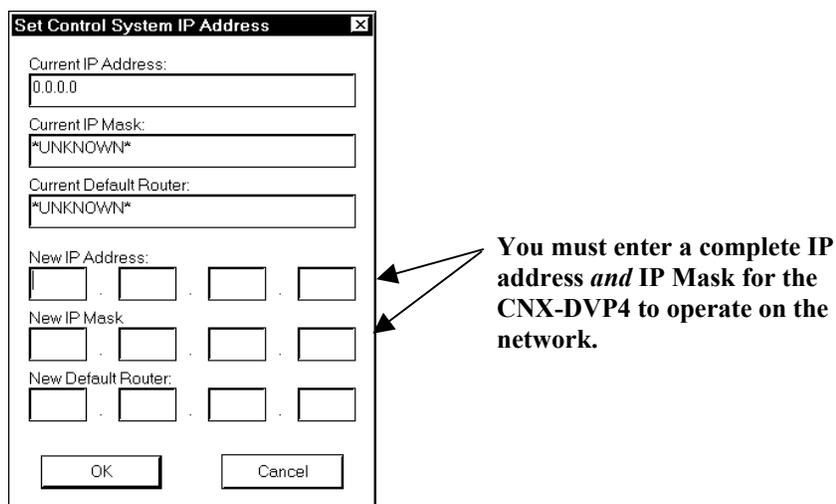
**NOTE:** This initial IP setup *MUST* be done via the RS-232 Computer port. Before performing the procedures in this section, refer to the “Cable Connection for Programming” on page 14 for cabling instructions. Thereafter, communications may be achieved by using the Crestron Viewport to directly connect to the IP address assigned to the CNX-DVP4. It is assumed that the user has communications with the CNX-DVP4 and the appropriate update file has been loaded.

---

1. From the Crestron Viewport, select **Functions | Set Control System IP Information**. The “Set Control System IP Address” window opens.

*Set IP Information Via Viewport*

As shown in the following illustration, the CNX-DVP4 does not have an IP address assigned to it.

*IP Address Window*

2. Refer to the following tables and enter the network IP values.

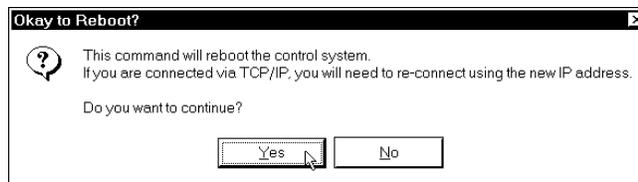
**NOTE:** If an invalid IP address is entered, the subnet mask may be CHANGED AUTOMATICALLY BY THE EQUIPMENT to an appropriate subnet mask.

**NOTE:** To *TURN OFF* the TCP/IP stack, an IP address of **0.0.0.0** can be entered; no IP Mask or Default Router would be required.

<b>SETTINGS FOR NETWORK WITH CRESTRON ONLY EQUIPMENT</b>
<p>If the CNX-DVP4 is being placed on a corporate LAN or a LAN with other equipment besides Crestron equipment, the IP address, IP Mask and Default Router (also known as the Gateway) will be provided from an MIS Department or other network administrator.</p>
<p>Other Crestron IP control devices on this network would require that their IP Address, IP Mask and Default Router also be obtained from the MIS department or other network administrator.</p> <p>If the Network consists of only Crestron equipment, the following Private Address Ranges are recommended for use.</p>
Reference Guidelines
First Octet of Zero and 127 are reserved
<p>Class A: First octet ranges from 1 to 128                      Default Subnet Mask: 255.0.0.0</p>
<p>Class B: First two octet ranges from 128.1 to 191.254                      Default Subnet Mask: 255.255.0.0</p>
<p>Class C: First three octet ranges from 192.0.1 to 233.255.254                      Default Subnet Mask: 255.255.255.0</p>
<p>Class D: 224.0.0.0 to 239.255.255.254                      (Not available for general use, reserved for multicast systems)</p>
<p>Class E: 240.0.0.0 to 255.255.255.254                      (Not available for general use, reserved for multicast systems)</p>

3. On the “Set Control System IP Address” window, click **OK** to set the entered values.
4. The reboot window, as shown in the following graphic, opens. Click **Yes** to reboot the CNX-DVP4 and continue.

**Reboot Window**



5. You will receive a confirmation message that the IP information has been setup. After the system reboots, select **Function | Set Control System IP Information**, to view the IP Information.

---

**NOTE:** If an error message that the Viewport could not setup the IP information appears, verify that the CNX-DVP4 has been updated to the minimum operating system required for Ethernet functionality. If the CNX-DVP4 still cannot set the IP information, contact Crestron customer service for assistance.

---

**IP Table Setup**

Ethernet devices that are addressed by the CNX-DVP4 may have their IP addresses set either in the SIMPL Windows program (default IP Table) or through the Crestron Viewport using a PC. Just as each Cresnet device is assigned a Cresnet NET ID, e.g. 03 through FE, to be used when programming, an Ethernet device is assigned an IP ID that also may range from 03 through FE. Ultimately, each IP ID is converted into an actual IP address through an IP table that exists inside the CNX-DVP4.

**Adding Devices and IP Table Setup in SIMPL Windows**

To add Ethernet devices to your program, in the SIMPL Windows' Configuration Manager, drag an Ethernet device into the program. Drop it on to the "Ethernet

Units" arrow underneath the "Cresnet Units" arrow. (If the arrow is not visible in the System View window, pull the window divider down further.)

1. Double click on the icon and assign an IP ID and a corresponding IP address in the tabbed configuration dialog titled "IP Net Address".
2. In the SIMPL Windows Program Manager, connect signals to the "Virtual Touchpanel" symbol, exactly as you would to a regular wired Touchpanel symbol.

---

**NOTE:** For more detailed information, refer to the SIMPL Windows help file by selecting **Help | Help Topics**. Select the **Index** tab, type in **IP Table**, and then select **Adding Ethernet Devices to a SIMPL Windows Program**.

---

When the SIMPL Windows program is compiled, the compiler creates an IP table consisting of the IP IDs and the IP addresses for the various Ethernet devices. During upload, choose whether to load this IP table or whether to use the table that already exists in the CNX-DVP4.

### ***Changing the IP Table via Viewport***

You can modify the corresponding IP address for any IP ID without changing or reloading the program by changing the IP table directly. From the Crestron Viewport, select **Functions | Setup IP Table** then click the **Retrieve Current IP Table from Control System** button. This will extract the IP table from the CNX-DVP4 and list it in the window. Modify or delete existing entries or add new ones. When all the necessary changes have been made, save the new table to disk and/or load it back into the unit. Do not overwrite the IP table in the CNX-DVP4 the next time the program is uploaded, unless the addresses in the program supercede those in the current IP table.

---

**NOTE:** For more detailed information, refer to the SIMPL Windows help file by selecting **Help | Help Topics**. Select the **Index** tab, type in **IP table**, and then select **Changing IP Addresses without Changing the Program**.

---

#### *About the IP Table*

For the CNX-DVP4 (or any Ethernet-enabled control system) to control devices via Ethernet, the IP ID of the device must be associated with an IP address, and both the IP ID and IP address must be entered into the IP Table of the control system.

You can create an IP Table in two ways. The first method is to double-click the device in Configuration Manager to open the "Device Settings" window. Click the IP Net Address tab and enter the IP address of the device in the IP Address field. Repeat this procedure for all Ethernet devices in your system. This creates what is referred to as a "default" IP Table. When the program is compiled and ready to be uploaded to the control system, you will have the option to upload this default IP Table.

The second method is to use the Crestron Viewport. This method is especially useful on site if you want to change one or more IP addresses without changing the program. Refer to "Ethernet Setup" on page 17 for more information.

1. Select **Functions | Setup IP Table**.
2. Click **Add** and select the IP ID of the device from the drop-down list, then enter the IP address.
3. When all the IP IDs and associated IP addresses have been added to the IP Table, click **Send IP Table to Control System**.

### **Changing the IP Table via Viewport for Ethernet Slave Mode**

As with all 2-Series control systems, the CNX-DVP4 has the capability to function as a peripheral device, or “slave”, in a master/slave arrangement with another control system. Here the IP Table of the CNX-DVP4 must contain just one entry for the master control system.

To access the IP Table of a “slave” CNX-DVP4, use the **Setup IP Table** command on the Viewport **Functions** menu. The settings are as follows:

- Enter the IP ID of the CNX-DVP4 itself, as specified in the program of the master control system and select **OK**. Notice that the “slave” CNX-DVP4 is listed with TRUE in the *Master?* column.
- Enter the IP address of the master control system.
- Click the **Set as Master** check box.

When operating as a slave device, the CNX-DVP4 can accept commands only from one control system. Therefore, there must only be one entry in the IP Table.

For further information about e-Control applications, including basic concepts and terminology, refer to Crestron’s e-Control Reference Guide, Doc. 6052, available in PDF format on the Crestron website ([www.crestron.com](http://www.crestron.com)).

### **Crestron e-control™ IP Table Information**

It is extremely important that the IP ID in the SIMPL Windows program match the IP ID encoded in the Crestron e-control Software Development Kit (SDK) object by the developer of the Web page, Visual Basic® or VisionTools™ Pro-e (VT Pro-e) browser program.

---

**NOTE:** If configured as a Cresnet Slave (ID 03 – FE) and as an Ethernet Slave with “Set as Master” checked in the IP Table Entry, the Ethernet Slave takes priority.

---

If more than one PC uses the same IP ID for a connection (e.g., each loads the same Web page), the CNX Gateway will duplicate all packets that are received from the CNX-DVP4 to each of the identical IP IDs. This is known as touchpanel tracking. The IP address that is typed into the virtual touchpanel devices in the SIMPL Windows program is the IP address of the CNX Gateway, not of the individual PCs (running a web browser or Active CNX application). This is because individual PCs may change, but the CNX Gateway normally does not.

### **Communicating via Ethernet**

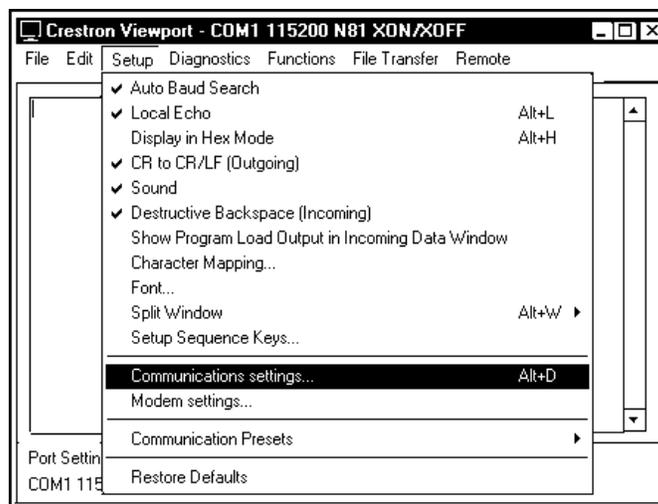
---

**NOTE:** Before performing this procedure, refer to “Establishing Communication with the CNX-DVP4, TCP/IP Connection” on page 50 of this operations guide for cabling instructions.

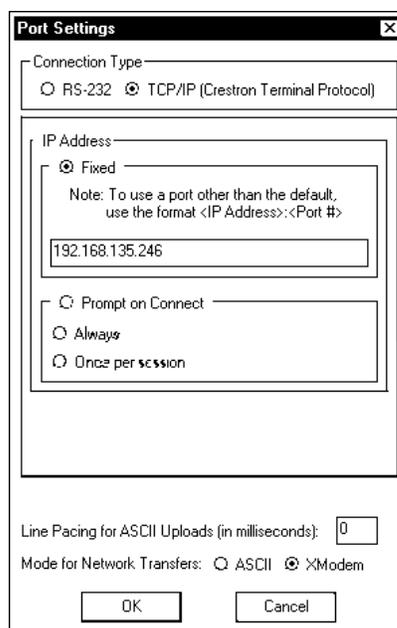
---

The Crestron Viewport may be used to communicate with the CNX-DVP4 via Ethernet. To connect the Viewport to the unit, perform the following procedure.

1. In the Viewport, select **Setup | Communications Settings** as shown to open the “Port Settings” window.

*Viewport Setup | Communications Settings*

2. In the "Port Settings" window, select **TCP/IP** from the *Connection Type* field as shown in the following illustration and select **Fixed** from the *IP Address* field.

*"Port Settings" Window, TCP/IP Selected*

3. Enter the IP address of the configured CNX-DVP4 and click **OK**. The Viewport prompt displays either CNX-DVP4 (master) or CslaveDVP4 (slave).
4. Perform any of the diagnostics and features that Viewport provides.

**Troubleshooting Communications via Ethernet**

You can PING\* the CNX-DVP4 from a MS-DOS<sup>®</sup> prompt (Windows 95/98/Me) or a Command Prompt (Windows NT/2000/XP).

The unit should reply and there should be no packet loss.

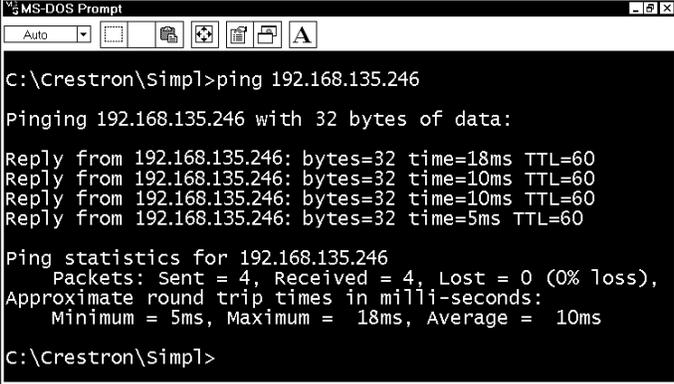
---

**NOTE:** Verify that the IP Settings of the CNX-DVP4 are correct, and that the PC used to ping the unit can ping other devices that are on the CNX-DVP4's subnet.

---

\*Ping means "to get the attention of" or "to check for the presence of" another online device. Ping operates by sending a packet to a designated address and waiting for a response.

#### *MS-DOS or Command Screen*



```

MS-DOS Prompt
Auto
C:\Crestron\Simple>ping 192.168.135.246

Pinging 192.168.135.246 with 32 bytes of data:

Reply from 192.168.135.246: bytes=32 time=18ms TTL=60
Reply from 192.168.135.246: bytes=32 time=10ms TTL=60
Reply from 192.168.135.246: bytes=32 time=10ms TTL=60
Reply from 192.168.135.246: bytes=32 time=5ms TTL=60

Ping statistics for 192.168.135.246
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 5ms, Maximum = 18ms, Average = 10ms

C:\Crestron\Simple>

```

---

## Configuring the CNX-DVP4

To configure the CNX-DVP4, a series of setup screens must be accessed before viewing run-time video windows on a display device (projector, plasma display, etc.). These screens are accessed from the MAIN MENU's Setup option.

---

**NOTE:** Due to the complexities of the CNX-DVP4, it may take approximately 25 seconds to reboot.

---

### *Prerequisites*

- Display device connected to the output DVI/RGB port. If display connector is VGA, 15-pin, use the supplied DVI-I/RGB adapter.
- Minimum of one video input connected to the input DVI/RGB, S-Video or Composite port. If video source connector is VGA, 15-pin, use the supplied DVI-I/RGB adapter.
- Cresnet power (from Cresnet power supply) connected to the Cresnet port.
- A touchscreen mouse is required to use the setup screens.
- Serial mouse connected to the touchscreen/mouse port, if applicable.
- Test pattern screens (third party application).
- PC connected to the CNX-DVP4 with Viewport open.

Open the MAIN MENU by doing one of the following:

- While the CNX-DVP4 is powering up, hold down the left mouse button, or with a touchscreen, hold a finger to the touchscreen until the MAIN MENU screen opens (If using a mouse, the mouse must be moved while the CNX-DVP4 is starting).

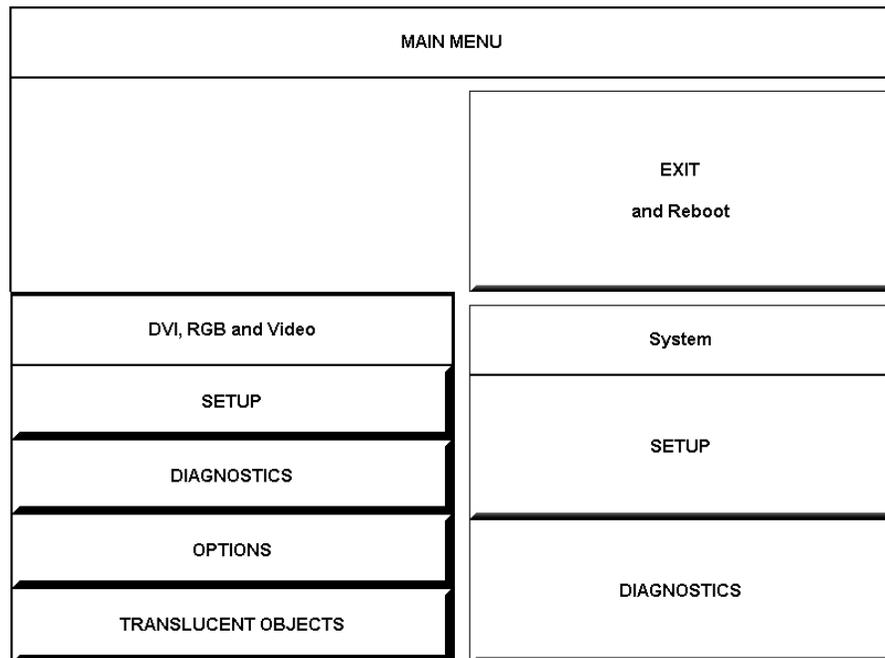
- If the compact flash is not installed or the installed compact flash is blank, you will be prompted to touch (or click with a cursor) the screen to open the MAIN MENU.
- If the compact flash is installed with a loaded program, open Viewport, connect to the CNX-DVP4 (refer to “Establishing Communication with the CNX-DVP4” on page 49) and type **setup** at the >DVP4 (master) prompt, >CSLAVE CNX-DVP4 (slave) prompt, or >ESLAVE CNX-DVP4 (Ethernet slave) prompt.

## Main Menu

The MAIN MENU displays three options: **EXIT and Reboot**, **DVI, RGB and Video** (**SETUP**, **DIAGNOSTICS**, **OPTIONS**, and **TRANSLUCENT OBJECTS**), and System (**SETUP** and **DIAGNOSTICS**).

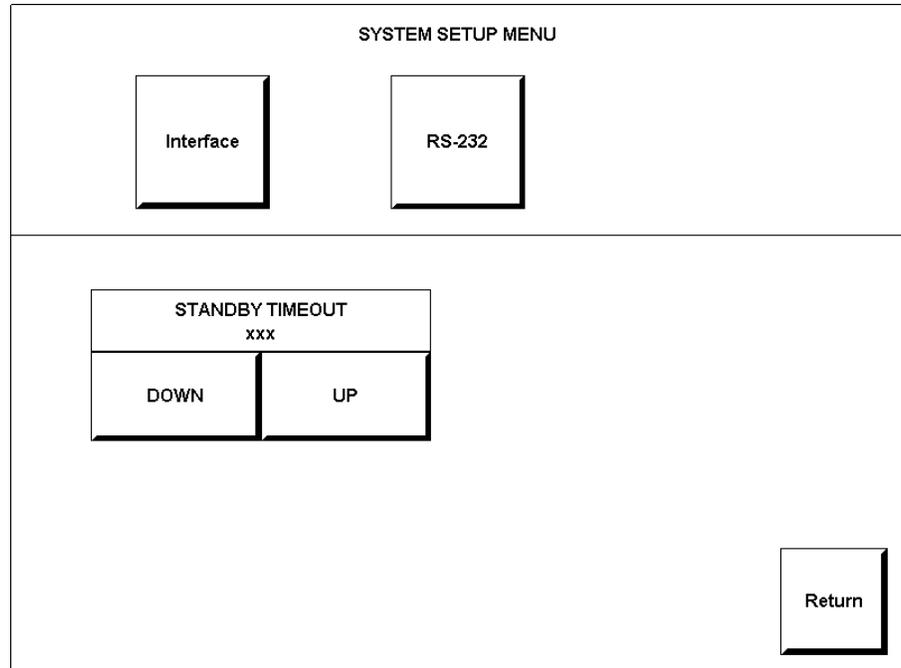
The **EXIT and Reboot** button verifies that all of the setup information has been saved to the EEPROM, reboots the system, and displays the main page that has been programmed into your system.

### *Main Menu*



## System Setup Menu

The SYSTEM SETUP MENU offers a series of buttons that open additional menus and displays. After the setup parameters have been set, select the **Return** button to return to the MAIN MENU.

*System Setup Menu**Interface Menu*

The CNX-DVP4 communicates with a control system to activate other controls or to display feedback from components within the system. The INTERFACE MENU (refer to the following graphic) allows you to set the correct Cresnet ID to communicate with a control system or other Cresnet device. The INTERFACE MENU also allows you to select Master, Ethernet slave mode, or Cresnet Slave mode. Use Master mode when you want the CNX-DVP4 to operate as a control system. Use the Slave mode when you want a control system to operate and control the CNX-DVP4 via Cresnet or Ethernet.

The CRESNET ID is a two-digit hexadecimal number. This number can range from 02 to FE and must correspond to the NET ID set in the SIMPL Windows program of the Cresnet system. Matching IDs between the CNX-DVP4 and SIMPL Windows program is required if data is to be successfully transferred. NET ID is factory set to **54** in Cresnet slave mode. Selecting *Master* sets and locks the NET ID to **02**.

- To set the Cresnet Slave mode, set the Cresnet ID to a number from 03 to FE.
- To set the Master mode, set the Cresnet ID to 02.
- To set the Ethernet (ESLAVE) mode, set the ID to 02 and setup the IP table.
- To remove the ESLAVE mode and return to the Master mode and remove the IP table.

*Interface Menu*

INTERFACE MENU			
MASTER	SLAVE	CRESNET II Enabled	Disable CRESNET II
CRESNET ID 54			
DOWN	UP		
			Save and Return

Two side-by-side buttons beneath the hexadecimal display, **DOWN** and **UP**, decrease and increase the ID by one, respectively.

After interface parameters have been set, select the **Save and Return** button, located at the bottom right corner of the INTERFACE MENU.

**Computer RS-232 Port Menu**

RS-232 parameters for the CNX-DVP4 must be set for communicating with Viewport via an RS-232 port. Options for baud rate, data bits, parity, stop bits, and handshaking are available from COMPUTER RS-232 PORT MENU. Text within the selected button changes color from black to red.

RS-232 settings for the CNX-DVP4 (defaults):

- **Baud Rate:** 115200 (use with new .cuz files, version 3.0.17 and higher)  
57600 (use with older .cuz files)
- **Data Bits:** 8
- **Parity:** None
- **Stop Bits:** 1
- **RTS/CTS:** On
- **XON-XOFF:** Off

*Computer RS-232 Port Menu*

COMPUTER RS-232 PORT MENU		
BAUDRATE		
110	150	300
600	1200	2400
4800	9600	19200
38400	57600	115200
DATA BITS		
7	8	
PARITY		
None	Odd	Even
STOP BITS		
1	2	
RTS-CTS On		RTS-CTS Off
XON-XOFF On		XON-XOFF Off
		Save and Return

**NOTE:** Make sure these settings match the Port Settings for RS-232 in Viewport.

After parameters have been set, select the **Save and Return** button, located at the bottom right corner of the COMPUTER RS-232 PORT MENU.

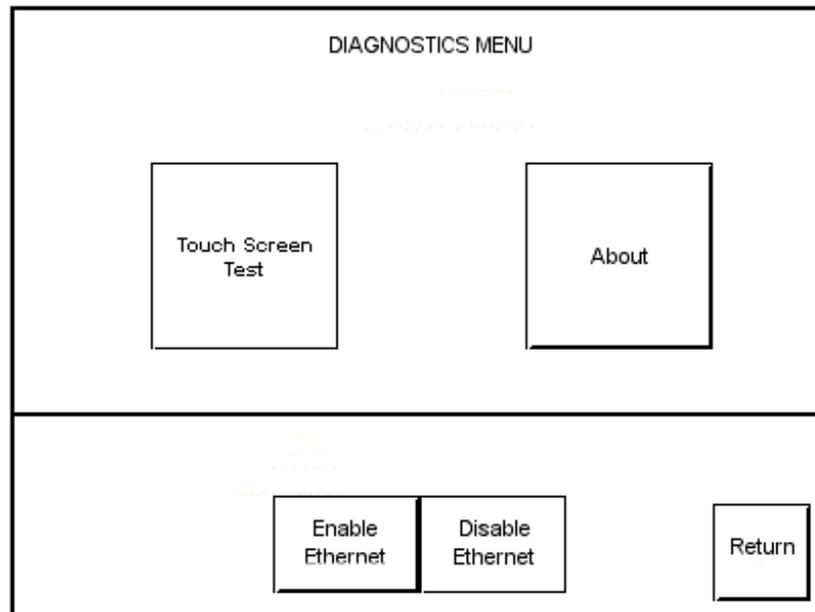
**Standby Timeout**

**STANDBY TIMEOUT**, located at the middle of the SYSTEM SETUP MENU can turn off the display when it is inactive for a specified time frame (minutes). When the display is activated, the last screen shown reappears. Minutes can vary from 0 to 120, where 0 disables the timeout. 0-10 is adjustable in 1-minute increments. 20-120 is adjustable in 10-minute increments. **DOWN** and **UP** buttons decrease and increase the timeout, respectively.

## Diagnostics Menu

Use this menu to initiate the touchscreen test and enable/disable the Ethernet. Press the **About** button to display the current firmware version information.

### Diagnostics Menu



## DVI, RGB and Video

DVI, RGB and Video setup options on the MAIN MENU allow the user to adjust both input (from a video source) and output (to a display device) video for optimal performance. Refer to “Hardware Hookup” on page 16 for proper video connections. Refer to “Appendix D: Output DVI Video from PC to CNX-DVP4” on page 82 for important information on DVI video.

---

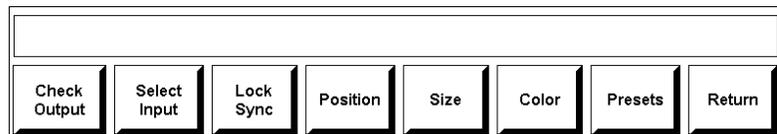
**NOTE:** Crestron recommends setting up the output prior to setting up the inputs.

---

### Video Output Setup Settings

1. Select **DVI, RGB and Video** from the MAIN MENU to open the setup options.

#### Setup Options



2. Select the **Check Output** button to open the RGB/DVI resolution and sync options.

---

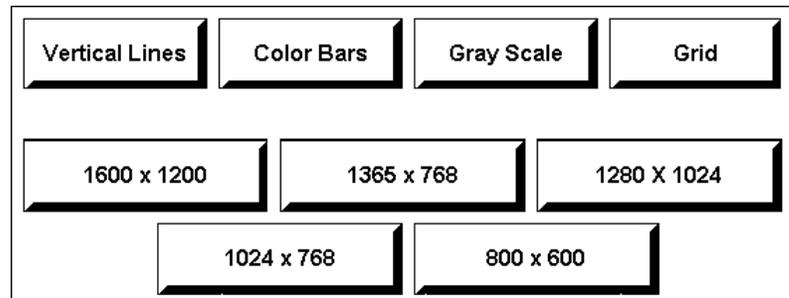
**NOTE:** The **Check Output** button is used to adjust the display device (using grid test patterns) to the CNX-DVP4 output, and to set the CNX-DVP4 output resolution. The output of the CNX-DVP4 should always match the native resolution of the display device.

---

**NOTE:** If you have already set the video resolution, skip step 3 (unless the CNX-DVP4 output does not fill the display).

**NOTE:** Custom resolution is set-up in Viewport. Refer to the section that follows on Video Display Customization.

#### *RGB/DVI Resolution and Sync Options*



3. Select the output resolution that matches the optimal resolution of the display device (optional).

**NOTE:** Most LCD, Plasma and DLP displays are not able to auto sync (fine tune) the incoming video for optimal video performance. The CNX-DVP4 provides setup screens that allow the user to ‘fine tune’ the display device. These screens are accessed by using the **Vertical Lines**, **Color Bars**, **Gray Scale**, or **Grid** buttons.

**NOTE:** Always adjust **Grid** first, then **Vertical Lines**.

**Grid** – most displays have *Horizontal* and *Vertical* sizing and positioning adjustments on the display setup menu. Adjust the display so that grid’s white border is edge-to-edge for optimal resolution.

**Vertical Lines** – most displays have *Coarse* or *Clock* and *Phase* or *Fine Tuning* adjustments on the display setup menu. Adjust as needed. The vertical line test pattern should look uniform. If you see dark vertical bars in the test pattern, adjust *Coarse* or *Clock* to eliminate bands. If you see only horizontal noise, adjust *Phase* or *Fine* to reduce or eliminate noise. You may also need to perform the vertical line adjustment again after changing the size of the display image.

**Color Bars** – most displays have *Brightness*, *Contrast*, *RGB Level* and *Black Level* adjustments on the display setup menu. Adjust as needed.

**Gray Scale** – most displays have *Brightness*, *Contrast*, *RGB Level* and *Black Level* adjustments on the display setup menu. Adjust as needed.

**NOTE:** The output can be adjusted in two ways, from the menu and in Viewport. To access the output command in Viewport, type: **output**

At the prompt, enter the first number for a standard VGA setting, for example, entering 1024 x768:

```
DVP4>OUTPUT 1 1024
```

and press **Enter**

Refer to the following information for customizing the output to a non-standard display.

### **Video Display Customization**

The output of the CNX-DVP4 can be customized to match nearly any output display device through Viewport commands. You *must* know all of the parameters specified

to achieve proper results. Any parameter not specified is inserted by the nearest known standard in memory, which may not function properly with the display device.

---

**NOTE:** You must reboot for changes to take effect.

---

In Viewport, there are 11 adjustable parameters. Horizontal resolution is expressed as pixels; vertical resolution is expressed as lines.

- To display the current settings, type **output** at the CNX-DVP4 prompt:  
CNX-DVP4>**output**
- To display a list of the standard available options, type **output ?**
- To change the settings, type:  
**output<space>parameter number (1-11)<space>new setting**  
and press **Enter**

Example, selecting output 2 and changing the vertical resolution to 600:

```
DVP4>output 2 600
New Custom Output Resolution: 1024 x 600 @ 60 Hz
Reboot to take effect.
```

#### *Adjustable Video Output Parameters*

PARAMETER	DEFINITION
Output Parameter 1: 1024 Active Horizontal Pixels	Actual number of horizontal pixels displayed (Minimum 800, maximum 2000)
Output Parameter 2: 600 Active Vertical Lines	Actual number of vertical pixels displayed (Minimum 600, maximum 1200)
Output Parameter 3: 60 Hz Refresh Rate	Refresh rate depends on resolution, the clock speed settings determine this parameter. Example: If parameter 1 is 1600, the maximum rate is 60 Hz
Output Parameter 4: Negative HSync Polarity	Choose negative or positive
Output Parameter 5: Negative VSync Polarity	Choose negative or positive
Output Parameter 6: 1344 Pixel Clocks Horizontal Total Time	Total number of horizontal pixels. Cannot be less than the sum of parameter 1, plus clock duration, plus back-porch pulse sync width.
Output Parameter 7: 136 Pixel Clocks HSync Duration	Pulse width sync
Output Parameter 8: 160 Pixel Clocks Horizontal Back Porch	Horizontal Back porch
Output Parameter 9: 806 Lines Total Time	Total vertical lines. Cannot be less than the sum of parameter 2, plus front and back-porch
Output Parameter 10: 6 Lines VSync Duration	Lines of vertical sync duration
Output Parameter 11: 29 Lines Vertical Back Porch	Vertical Back-porch

You cannot enter an invalid resolution (less than the minimum).

Example, entering a horizontal resolution of 768:

```
DVP4>output 1 768
Invalid Resolution
```

---

**NOTE:** Type: **output** to display current settings.

Type: **output ?** to display the list of available standard options.

---

The CNX-DVP4 will accept all valid entries. When the CNX-DVP4 encounters a number not in the firmware, the following message is displayed:

Example, entering a horizontal resolution of 875:

```
DVP4>output 875
875 is not in the CNX-DVP4 table of Standard
Horizontal Resolutions.
You can set a Custom Horizontal Resolution by
typing: Output 1 875
```

---

**NOTE:** In this example, the CNX-DVP4 prompts you with the output number (1) for horizontal resolution.

---

But you must know all the other parameters to make it function properly.

### ***Video Input Setup***

---

**NOTE:** Make sure you perform the Video Output Setup procedure first (refer to page 28).

**NOTE:** Crestron recommends that you setup all RGB, S and Composite video sources. For simplicity, the following procedure uses two video sources (VGA input is connected to RGB 1, S-Video input is connected to Video 1) and user supplied video pattern screens.

---

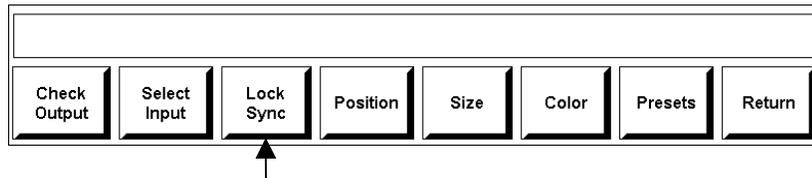
### ***RGB Setup***

---

**NOTE:** RGB video is setup using the **Lock Sync**, **Color**, **Size** and **Position** buttons (bottom of Setup options screen, refer to page 28).

---

**Lock Sync** – a vertical (alternating black/white lines) line pattern screen is recommended.




---

**NOTE:** The **Lock Sync** button only appears for RGB Video

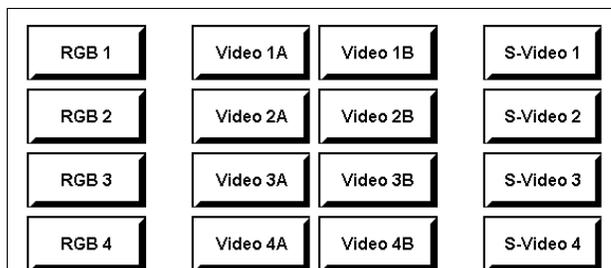
---

**Size** – a vertical/horizontal line grid screen is recommended.

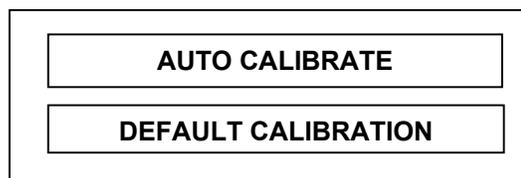
**Position** – a vertical/horizontal line grid screen is recommended.

**Color** – color bar and gray scale screens are recommended.

1. Select the **Select Input** button from the Setup Options screen (refer to page 28). The RGB/Video/S-Video buttons appear (refer to the following graphic).

*RGB/Video/S-Video Buttons*

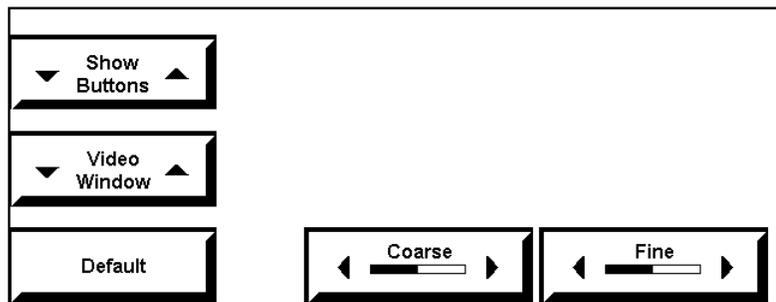
2. Select input **RGB 1, 2, 3** or **4**. The RGB video calibrate screen appears, giving you two choices: **AUTO CALIBRATE** and **DEFAULT CALIBRATION**.

*Calibration Buttons*

**AUTO CALIBRATE** automatically adjusts the input setting. If this selection does not look correct, select **DEFAULT CALIBRATION**.

**DEFAULT CALIBRATION** sets the input setting to the factory defaults. If **AUTO CALIBRATE** or **DEFAULT CALIBRATION** settings are not perfect, select one of the following procedures:

3. Select a vertical line pattern to display in the RGB window, and select **Lock Sync**. The **Lock Sync Coarse** and **Fine** buttons appear (refer to the following illustration).



**NOTE:** For RGB only, the preferred setup method is auto-calibrate.

**NOTE:** If size and position are not correct, perform this step first.

**NOTE:** The vertical line test pattern should look uniform. If you see dark vertical bars in the test pattern, adjust 'Coarse' or 'Clock' to eliminate bands. If you see only horizontal noise, adjust 'Phase' or 'Fine' to reduce or eliminate noise. You may also need to perform the vertical line adjustment again after changing the size of the display image.

**NOTE:** The **Show** button selection cycles: off ▲ half on ▲ full on ▲ off.

**NOTE:** The screen resolution of an older laptop may not allow you to see the complete adjustment. For example, going from 800 to 1200, you may have to scroll the screen to view the entire image.

**NOTE:** Select **Lock Sync** *after* the size and position adjustments.

4. Adjust vertical line pattern to look flat and uniform (no color shades, dark areas, etc.).
5. Select a vertical/horizontal pattern to display in RGB window, and select **Size**. The size buttons appears (refer to the following graphic).

*Size Buttons*



6. Adjust size as desired.

**NOTE:** You may need to perform the Lock Sync adjustments again (steps 4 and 5 above) after adjusting the size.

7. Select a vertical/horizontal line grid to display in RGB window, and select **Position**. The position buttons appear (refer to the following graphic).

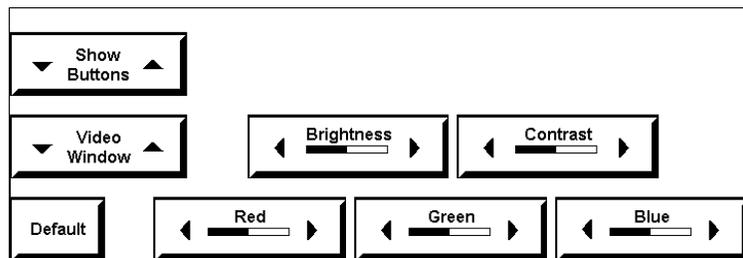
*Position Buttons*



8. Adjust position as desired.
9. Select a color bar to display in RGB window, and select Color. The Color buttons appear (refer to the following graphic).

**NOTE:** You may need to compare color bar and gray scale test patterns (refer to steps 10 and 11) to determine the correct adjustment.

*RGB Color Buttons*



- The **Show Buttons** controls the translucency of the buttons.
- The **Video Window** button resizes the current window so that you can see the edges of the window.

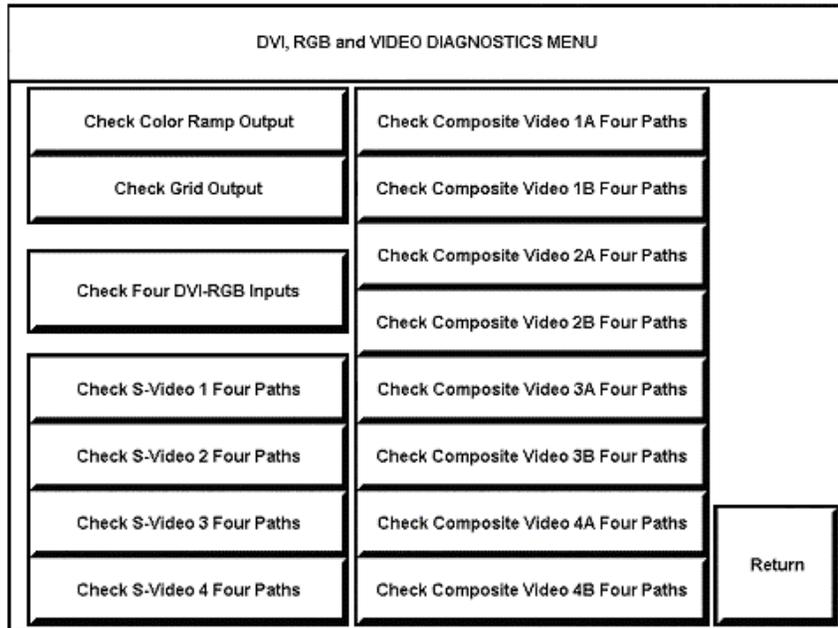
10. Adjust color as desired.

**NOTE:** Creston recommends that you use a gray scale test pattern to check for any color in the gray pattern of the screen.

11. Select a gray scale test pattern to display in RGB window, and check for any color in gray patterns.
12. Adjust as desired, and then return to the MAIN MENU.

**RGB Video Diagnostics**

Select **Diagnostics** from the MAIN MENU to access the RGB Diagnostics menu. Use this menu to test and diagnose the RGB output. Adjust as necessary.

**DVI, RGB and Video Diagnostics Menu**

1. The **Check Color Ramp Output** displays graduated shaded Red, Green, Blue, and gray scale test bars. The bars should appear smoothly graduated.
2. The **Check Grid Output** is a black and white image with two diagonal lines forming an X from one corner of the screen to the other. All grid boxes should appear uniform, the lines perfectly vertical and horizontal, and all the same size. Use this to correct linearity problems, using pincushion, keystone, and trapezoid, controls.
3. The **Check Four DVI-RGB** Inputs displays all four sources in a quad grid simultaneously.
4. The **Check S-Video Path** buttons display the same S-Video source on four windows. All color should match on each channel (refer to the following note).

---

**NOTE:** If any of these inputs are composite, they are displayed in black and white.

---

5. The **Composite Video Four Paths** displays the same composite video source in color, in four windows.

RGB Video Options

Select **OPTIONS** from the Main Menu to access the OPTIONS MENU. The CNX-DVP4 can change the size of a source during a transition if this feature is enabled. However, both the source coming off and going on must match the vertical output frequency of the CNX-DVP4. For example, the CNX-DVP4 and the two input sources must all be 60 Hz to change the size of the screen. If the frequencies do not match, the CNX-DVP4 defaults to a dissolve transition.

Options Menu

OPTIONS MENU	
On Screen to On Screen Effect	Default Video
Fade Down and Then Up for New Size & Position	NTSC    PAL
Stretch to New Size & Position	
Set All RGB Inputs to Match CNX-DVP4 Output Refresh Rate To Enable Stretch	
	Default
	Return

The **Fade Down and Then Up at New Size & Position** button: If the current source is going to change size and position, then this button dissolves down the current source and repositions and sizes the source to the new position.

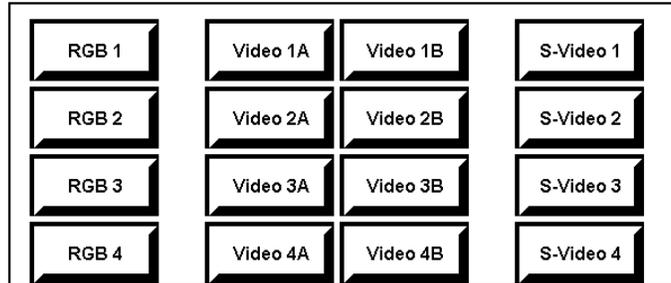
The **Stretch to New Size & Position** button: Stretch allows a seamless transition from small to a large video window. The video window appears to zoom in, even though behind the scenes, the CNX-DVP4 is flipping from a page with a small video window to a page with a larger window. If the source and the CNX-DVP4 have the same vertical frequency (example: 60 Hz for both), then the source on screen will change size in real time. If the frequencies of the CNX-DVP4 and the source do not match, then the source will only dissolve and fade.

S-Video or Composite Video Setup

Setup for S or Composite video input involves adjusting Bright/Contrast and Saturation/Hue.

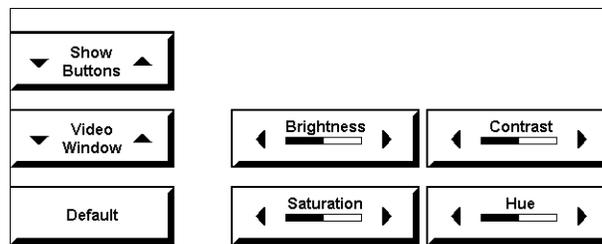
From the MAIN MENU, select **DVI, RGB and Video**. Then click **Select Input**.

*Input Selection Buttons*



1. Select **Video 1A** (Composite video) or **S-Video 1** (SVHS video). The Video adjustment screen appears.
2. Select **Color**. The Video adjustment buttons appear (refer to the following graphic).

*Video 1A Adjustment Buttons*

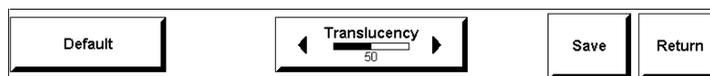


3. Adjust as desired.

**Translucent Objects**

This MAIN MENU option allows the user to change the translucency of displayed buttons. The default is 50% transparent. 100% is invisible, 0% is opaque (refer to following graphic). Buttons must have the translucency property selected for this effect. The button property must also be checked in VT Pro-e.

*Translucency Buttons*



**Programming Software**

*Have a comment about Crestron software?*

*Direct software related suggestions and/or complaints to Crestron via email ([software@crestron.com](mailto:software@crestron.com)). Do not forward any queries to this address. Instead refer to Further Inquiries on page 75 for assistance.*

**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 Downloads | Software Updates section of the Crestron website ([www.crestron.com](http://www.crestron.com)).

The following are the earliest useable software version requirements for the PC:

- SIMPL Windows version 2.02.11, or later. Requires SIMPL+ Cross Compiler version 1.1.
- VT Pro-e version 2.4 or later.
- Crestron Database version 15.7.3 or later.

**NOTE:** This section describes basic programming using both SIMPL Windows and VT Pro-e. Additional programming examples are in “Appendix B: More CNX-DVP4 Features (Master Mode)” on page 77.

Digital, analog and serial join numbers are a common thread between VT Pro-e and SIMPL Windows. These numbers define how the objects on a touchpanel page of a VT Pro-e project interface to the outside world, specifically the Cresnet system as defined in the SIMPL Windows program. There are digital join numbers that carry out some predetermined function (a logical high or low); analog join numbers for displaying incremental values, sliders, gauges and bar graphs; and serial join numbers that allow for the display of variable text and transmission/reception of serial commands from other manufacturers. Unjoined objects are not interfaced with the system and thus cannot initiate any functions.

## Programming with SIMPL Windows

---

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

---

SIMPL Windows is Crestron's software for programming Crestron control systems. It provides a well-designed graphical environment with a number of workspaces (i.e., windows) in which a programmer can select, configure, program, test, and monitor a Crestron control system. SIMPL Windows offers drag and drop functionality in a familiar Windows® environment.

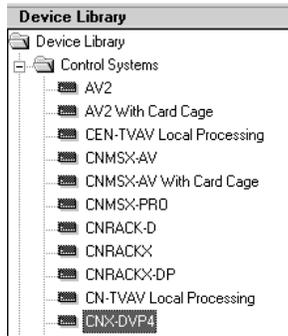
This section explains how to create a SIMPL Windows program that includes a CNX-DVP4 (in master or slave mode).

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

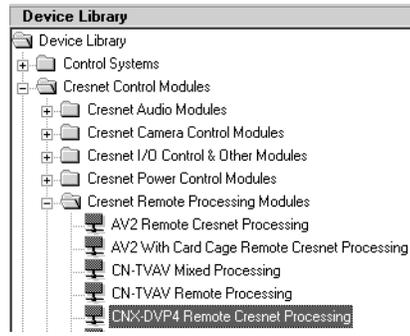
### **Programming Modes**

The CNX-DVP4 may be utilized two ways to perform different functions: Local Processing Mode (Master) or Remote Processing Mode (Cresnet or Ethernet Slave). As shown in the following graphic, the CNX-DVP4 has been added to SIMPL Windows as a master or slave device.

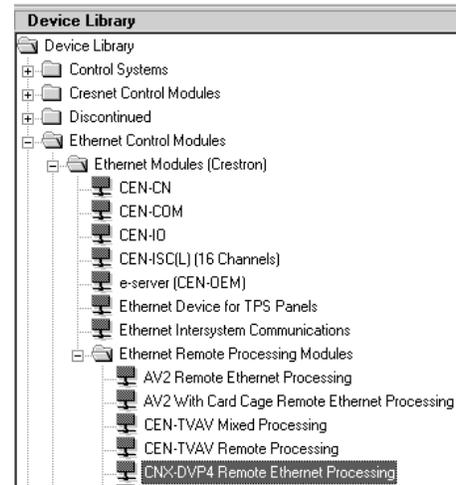
*CNX-DVP4 Master*



*CNX-DVP4 Cresnet Slave*



*CNX-DVP4 Ethernet Slave*



**NOTE:** The CNX-DVP4 is set to Cresnet slave mode (ID 54) by default. SIMPL Windows automatically changes NET ID values of a device added to a program if a duplicate device or a device with the same NET ID already exists in the program. Always ensure that the hardware and software settings of the NET ID match. For NET ID hardware settings and details about changing the unit to master mode or Ethernet slave mode, refer to “Interface Menu” on page 25.

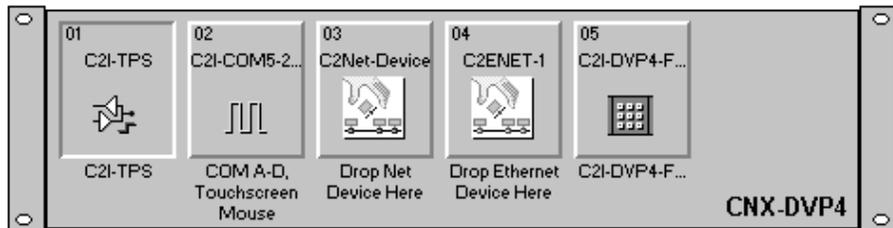
**Local Processing Mode (Master)**

In the Local Processing Mode, the CNX-DVP4 is programmed to access and control its local hardware ports. Use the Configuration Manager workspace (**Project | Configure System**) in SIMPL Windows to select and configure all the devices that need to be included into the system.

CNX-DVP4 Device Library Symbols

In Configuration Manager, drag the CNX-DVP4 from the Control Systems folder of the *Device Library* and drop it in *System Views*.

*CNX-DVP4 in SIMPL Windows’ Configuration Manager*



**Slot 1: C2I-TPS**

The C2I-TPS slot allows the user to program digital, analog, and serial logic for a built-in touchpanel Interface (TPI). Touchpanel projects created in VT Pro-e are loaded into the compact flash through VT Pro-e or Viewport. Two new helper symbols are available for this slot for mouse input and output programming. Refer to “New Helper Symbols” on page 42.

### Slot 2: C2I-COM5-2

The CNX-DVP4 provides four ports that enable and configure RS-232 two-way serial communication and logic, and one port for serial mouse and RS-232 touch sensitive devices. To view the ports, expand Slot 2: C2I-COM5-232 is under the CNX-DVP4 icon on the lower window of *System Views*. Refer to “CNX-DVP4 Symbols in Programming Manager” on page 44.

### Slot 3: C2Net-Device

The C2Net-Device slot enables the CNX-DVP4 to control up to 252 Cresnet devices. Each Cresnet device is assigned a unique identifier called a Net ID, which is a hexadecimal value ranging from 03 to FE.

To view the list of supported devices, expand the control system in the bottom pane of *System Views* and double-click the C2Net-Device slot, or right-click and select **Add Item** from the submenu. Supported devices include network control modules and a variety of Crestron wired touchpanels.

To add a device to the system expand the C2 Net-Device slot and double-click the desired Net ID, or right click and select **Add Item** from the submenu. Then select the device you want to add. Alternatively, you can drag the device from the Cresnet Modules folder onto the Net ID.

In Program Manager, the C2Net-Device symbol contains no signals; to program a controlled Cresnet device, expand the C2Net-Device symbol in *Program View*. Then drag the device to *Detail View*.

### Slot 4: C2ENET-1

The C2ENET-1 port enables the CNX-DVP4 communication through Ethernet to control up to 252 Ethernet devices. Each Ethernet device is assigned a unique identifier called an IP ID, which is a hexadecimal value ranging from 03 to FE.

To view the list of supported devices, expand the control system in the bottom pane of *System Views* and double-click the C2ENET-1 slot. Supported devices include Ethernet control modules, PC and Web browser interfaces, and a variety of Crestron Ethernet touchpanels. To add a device to the system expand the C2ENET-1 slot and double-click the desired IP ID, or right-click and select **Add Item** from the submenu. Then select the device you want to add.

In Program Manager, the C2ENET-1 symbol contains no signals; to program a controlled Ethernet device, expand the C2ENET-1 symbol in *Program View*. Then drag the symbol to *Detail View*. (Alternatively, you can double-click the symbol.)

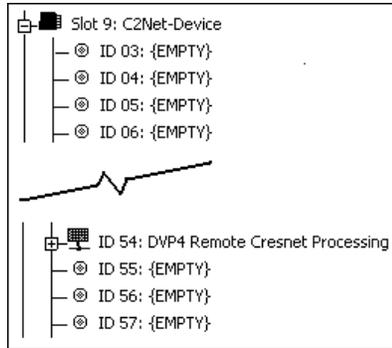
### Slot 5: Front Panel

Slot 5 is a physical representation of the built-in front panel. No programming is required.

### **Remote Processing Mode (Slave mode)**

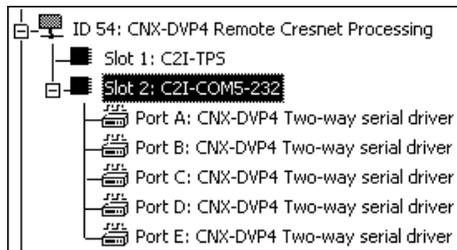
In the Remote Processing Mode, the CNX-DVP4 does not contain a main control system program. The program is installed in a 2-Series control system. The slots and Cresnet devices are accessed solely from the host control system that generates all the proper network packets to control the hardware. For example, to utilize a CNX-DVP4 as a peripheral for a PRO2, CNX-DVP4 Remote Cresnet Processing is dropped on the C2Net slot (09). The CNX-DVP4 device appears in the *Program View* as ID 54 as shown in the following illustration.

*Remote Processing Mode CNX-DVP4 in SIMPL Windows' Program View of the PRO2*



Slot 2: C2I-COM5-232 of ID 54 contains Ports A-E, CNX-DVP4 Two-way serial drivers (A-D are for Com 1-4 ports, E is for Touchscreen/Mouse port). To change RS-232 settings, double-click on a port to open the “Device Settings” window.

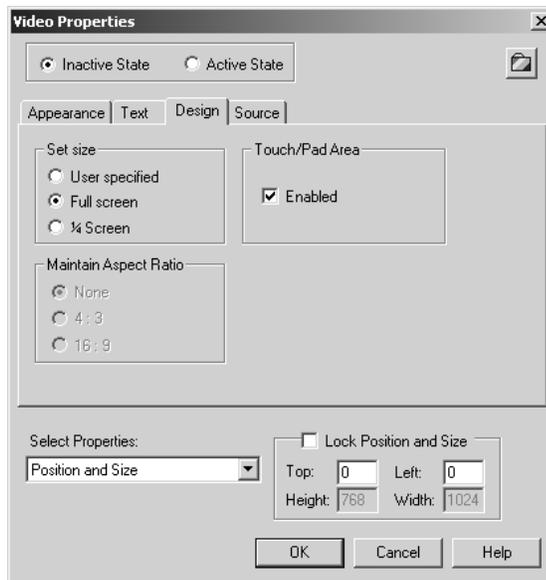
**Slot 2: C2I COM5-232**



**Mouse Awareness**

Any window on the CNX-DVP4 may be made "mouse-aware" by assigning for *PAD-AREA*, just as we already do on existing TPS panels, and enabling the *Touch/Pad Area* check box. Refer to “Appendix F: Connecting a Mouse” on page 85 for additional mouse information.

*Touch/Pad Area Enabled in VT Pro-e “Video Properties” Window*



But the CNX-DVP4 is different, in that there is more than one window being used and the mouse packets must be sent to a PC (or any device with a video or RGB

output and a touch/mouse input) associated with the source being shown in the window, and so cannot be defined on the window itself as we do on the TPS panels.

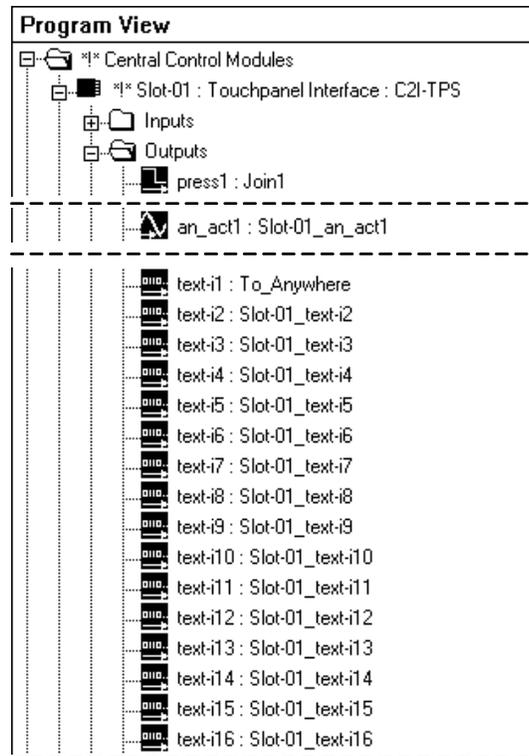
When the window is touched, the mouse command packets generated by the touchpanel will be sent out of one of the first 16 serial join outputs of the CNX-DVP4's embedded TPS symbol, depending on which of the 16 sources is currently being shown in the window (There is already a reserved join number for the window, to tell which source to route there). There are up to 16 possible RGB/video sources on the CNX-DVP4, although they are not all available at the same time. The sources are as follows:

*Serial Output Join Number on C21-TPS Symbol*

SOURCE NUMBER	SOURCE TYPE
1	DVI/RGB 1
2	DVI/RGB 2
3	DVI/RGB 3
4	DVI/RGB 4
5	S-Video Input 1 (Y&C)
6	S-Video Input 2 (Y&C)
7	S-Video Input 3 (Y&C)
8	S-Video Input 4 (Y&C)
9	Video Input 1 A composite
10	Video Input 1 B composite
11	Video Input 2 A composite
12	Video Input 2 B composite
13	Video Input 3 A composite
14	Video Input 3 B composite
15	Video Input 4 A composite
16	Video Input 4 B composite

The first 16 serial outputs of the touchpanel (into the program) will be used for the 16 mouse/telestrator strings, corresponding to the 16 sources, respectively. (e.g., Any window that is showing Source 1 through 16, when touched, generates a mouse or telestrator packet that is sent out of serial join 1, etc.). By default, the packets are mouse-type packets. If one or more must be telestrator-type packets, there is a Device Extender type symbol called "Telestrator/Mouse Configuration" that can be added to the embedded TPS symbol in the CNX-DVP4. Refer to "New Helper Symbols" on page 42.

The programmer will use the SIMPL Windows program to route the mouse packets to the CNX-DVP4 serial ports, or its Ethernet or Cresnet networks.

*Assigning Mouse Packets to Serial Ports in SIMPL Windows*


---

**NOTE:** the "To\_Anywhere" can be to a serial port on the PRO2 or CNX-DVP4, a Cresnet device, an Ethernet device, etc.

---

Advanced users should also note that routing a signal from the Slot 1 TPS serial joins to the COM ports on the CNX-DVP4 appears to ensure that the signal stays internal to the CNX-DVP4, but it does not. Because there is no program in the CNX-DVP4 when it is a slave, the signal must be sent to the PRO2 for interpretation and then re-routed back out to the CNX-DVP4. If this kind of traffic is not desirable, then the PRO2 should contain a program and the CNX-DVP4 should be used as a master (standalone control system) with its own program, and the programs should send any shared data via Ethernet ISC or XSIG. Then the signal stays within the CNX-DVP4. The "To anywhere" has to go through an XSIG, if it leaves the CNX-DVP4.

The advantages of this approach include simplicity, containment of all data within the program and VT Pro-e project, very limited development time, and flexibility.

### ***New Helper Symbols***

Two new device extenders are used on Slot 1 of the CNX-DVP4 for Mouse input and output control. After dropping in a CNX-DVP4 in SIMPL Windows, select **edit | Preferences** and select the *Special Symbol Set*. Choose Mouse/Serial Control for inputs, or Telestrator/Mouse Configuration for outputs.

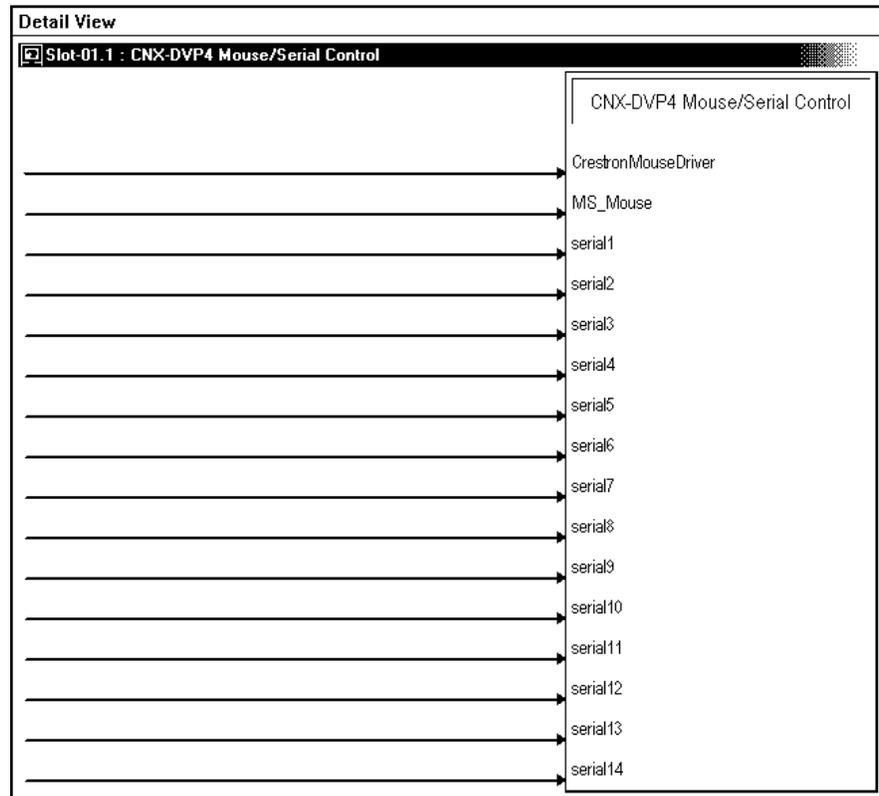
---

**NOTE:** Refer to "Touch the PC" on page 66 and "Appendix F: Connecting a Mouse" on page 85 for additional mouse installation information.

---

### ***Mouse Input Control***

In *Program View*, right click on slot 1 and choose *Insert Device Extender*. Choose Mouse/Serial Control for inputs and open the symbol in *Detail View*.

*Mouse/Serial Control Symbol*

The Mouse/Serial Control helper symbol is provided for input programming for the CNX-DVP4. This prepares the CNX-DVP4 for the proper input string based on the type of pointing device. The two inputs accept touch data in two different formats: Crestron Mouse Driver and Microsoft Serial Mouse Driver.

All of the inputs are serial.

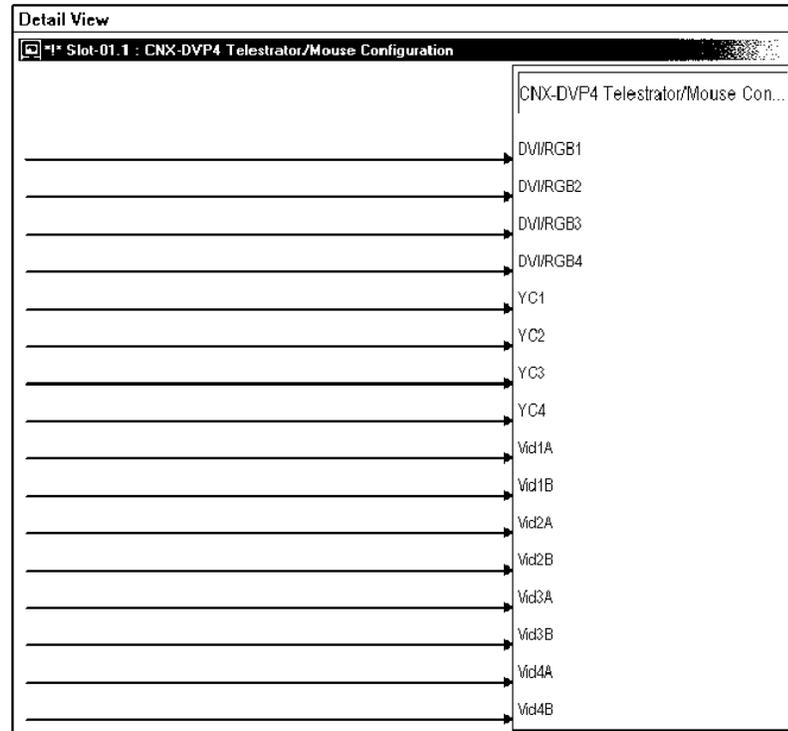
When a string of the given format is issued to the CNX-DVP4 on this helper, control of the mouse cursor on the CNX-DVP4 is allowed. For example, if you want to control the CNX-DVP4's mouse cursor using a CNWM (wireless mouse), you would drop the CNWM onto a CNRFGWA definition. The *data* signal of the mouse is then connected to the **MS\_Mouse** input of the device extender.

The **CrestronMouseDriver** input is used if Crestron's custom serial mouse driver is being used to control the CNX-DVP4. If both the Crestron and Microsoft mice are connected, and the data comes through simultaneously, they both control the motion of the cursor.

Currently only the first two inputs of this symbol are active, a serial string connected to other (undefined) inputs can be safely ignored.

**Mouse Output Control**

In SIMPL Windows, right click on slot 1 of the CNX-DVP4 and select **Insert Device Extender**. Select Telestrator/Mouse Configuration and open the symbol in *Detail View*.

*CNX-DVP4 Telestrator/Mouse Configuration Symbol*

This helper symbol determines the pointing device output and enables the proper formatting of the output string. Output can be via RS-232, Cresnet or Ethernet.

All of the inputs are analog.

Setting a value for one of these joins tells the CNX-DVP4 to output the control strings in a particular format. The strings are issued on Slot 1's Serial List on the CNX-DVP4 definition, on the first 16 outputs, starting at join #1.

The legal decimal values using the analog Init Symbol:

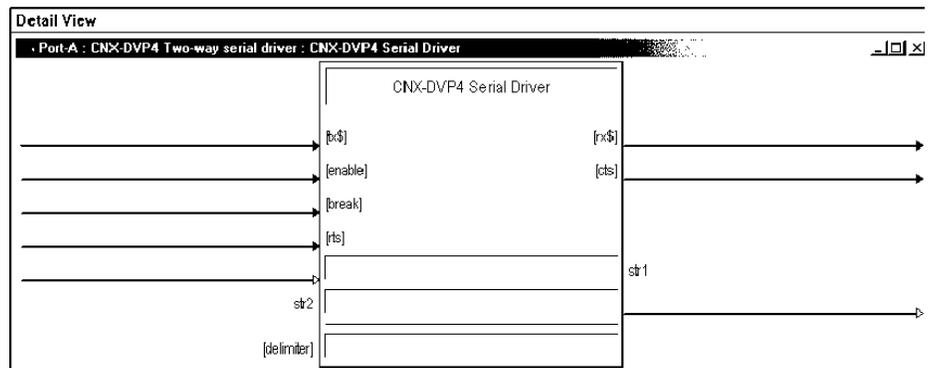
- 0 = Crestron Mouse Driver (this is the default)
- 1 = ELO Driver (for Boekler Telestrator applications)
- 2 = SMART Matisse (older SMART format)
- 3 = SMART Board (newer SMART format)

For example, if **YC1** (S-Video input 1) is set to 0, then when the pad area associated with YC1 is touched, serial string 5 outputs a serial string in the Crestron Mouse Driver format. This serial string is generally routed to one of the CNX-DVP4 built in COM ports for control over a PC or Telestrator.

***CNX-DVP4 Symbols in Programming Manager***

Programming Manager is where programmers “program” a Crestron control system by assigning signals to symbols. The following shows the CNX-DVP4 symbols in the SIMPL Windows’ Programming Manager.

*Detail View of the CNX-DVP4 Two way Serial Driver Symbol in SIMPL Windows' Programming Manager*



Serial Driver symbols enable serial communication between devices on the Cresnet network, using the RS-232 protocol.

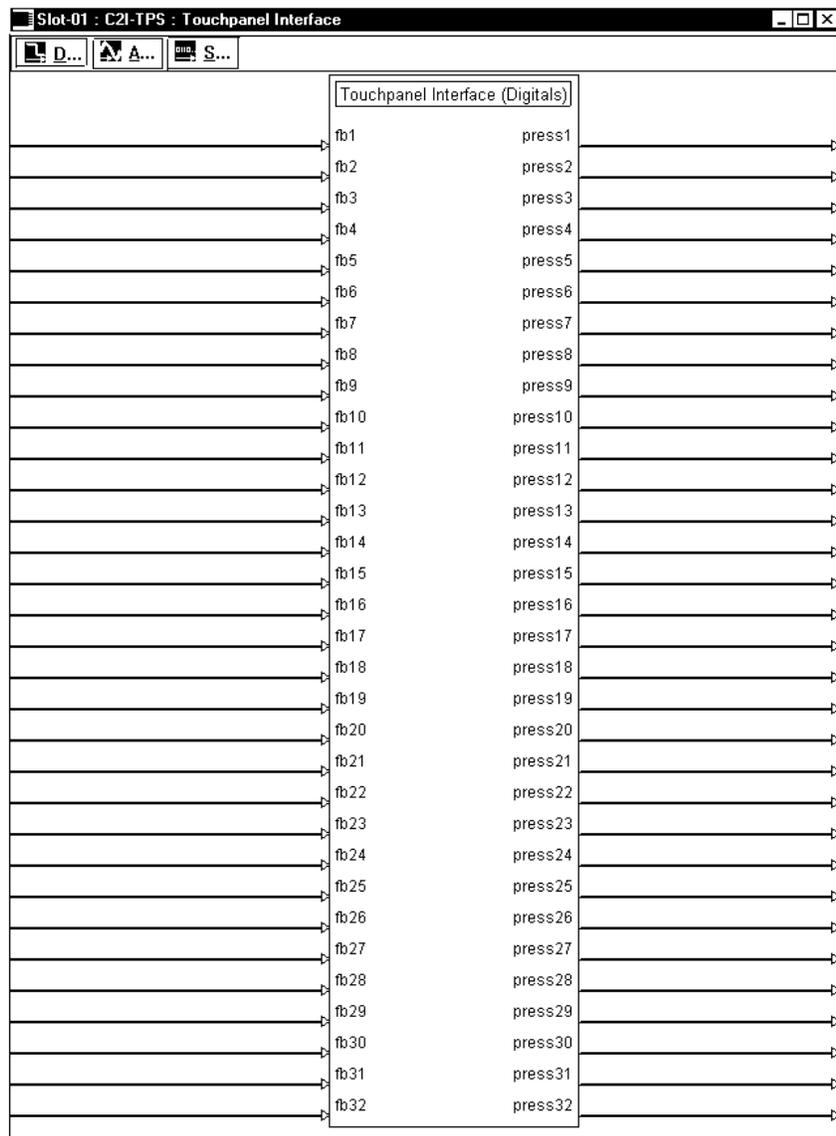
The <tx\$> (transmit) and <rx\$> (receive) signals transmit serial data to and from the COM port in whatever format is specified for the device in Configuration Manager. The protocol that a device expects will be described in the manufacturer's documentation and includes the speed of communication (baud rate), error checking (parity), the number of data bits and stop bits, and any hardware or software handshaking that may be required to control the flow of data between devices.

Some devices require a <break> to enable synchronization. The <break> input drives the transmit pin of the associated COM port low, thus interrupting transmission of data. The CNX-DVP4 sends out approximately 20 bits of logic low to do a break.

The <rts> (request to send) input and the <cts> (clear to send) output are hardware handshaking signals for use in applications where explicit handshaking control is required. These signals are enabled *only* when the Hardware Handshake setting of the device is set to *None* in Configuration Manager.

For more information, refer to the SIMPL Windows help file.

*Detail View of the CNX-DVP4 C2I TPS Symbol in SIMPL Windows' Programming Manager*



The TPS touchpanel symbol defines the signals for Crestron's Ethernet and Cresnet TPS-series touchpanels.

- Maximum Digital Joins: 4000
- Maximum Analog Joins: 4000
- Maximum Serial Joins: 999

Typically, touchscreen layouts are designed in VT Pro-e, where buttons and other objects such as sliders and gauges are assigned join numbers that correspond to their function in the application. The join numbers are equivalent to inputs and outputs, such that when a VT Pro-e project is imported into SIMPL Windows, the previously assigned join numbers appear automatically as defined signals.

## Signal Types

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

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

**Digital = Blue**

**Analog = Red**

**Serial = Black**

**Undefined/Other = Green**

---

**NOTE:** “Other” signals are a combination of the three basic types (e.g., many symbols accept either analog or serial signals where the combination is shown as a green signal). The signal type is displayed on the Status Bar when the signal is highlighted.

---

For additional information, refer to Doc. 6120, Crestron SIMPL Windows Symbol Guide. It may be downloaded from the Downloads | Product Manuals | Software section of the Crestron website ([www.crestron.com](http://www.crestron.com)).

### **Digital Signals (4000 maximum)**

A digital signal contains one bit of information and usually takes on one of two values: 1 or 0. These two digits can represent the logical values true and false, and they can be represented in an electronic device by the states of on/off, high/low, and recognized as two voltage levels (Other common descriptors are active/inactive).

### **Analog Signals (4000 maximum)**

Unlike digital signals, analog signals can vary continuously in value, in the same manner as a parameter such as volume, temperature, or pressure. Analog signals contain 16 bits of information, which means that this type of signal can have values ranging from 0 to 65535 ( $2^{16}-1$ ). This 16-bit property makes analog signals useful for controlling devices that do not have discrete settings, such as volume controllers, pan/tilt head controllers, and lighting dimmers.

### **Serial Signals (999 maximum)**

Serial signals are used to facilitate the transmission of serial data (strings of characters). These signals can be generated by incoming data on a COM port or by a symbol that has a serial output, such as a serial I/O symbol.

## **Converting Programs and Modules Created for Other Systems**

SIMPL Windows can convert a program created for another type of control system by simply changing the target to a CNX-DVP4.

To do this, you can open a SIMPL program that contains a control system other than the CNX-DVP4, and then replace the existing control system with the CNX-DVP4. That is, drag the CNX-DVP4 from the Control Systems folder onto the existing control system in *System Views*, and click **Yes** when prompted to confirm the replacement.

If the program contains SIMPL+ or User modules, the conversion might generate error messages. This is because modules and programs often contain symbols with “ambiguous” signals. For example, the inputs of the Serial to Analog symbol can be

defined as either analog or serial. Although X-Series processors support ambiguous signals, the 2-Series processor requires all signal types to be strictly defined.

If the program you want to convert contains SIMPL+ or User modules, Crestron recommends that you first convert each module before converting the larger program. In this way, the compiler can resolve any ambiguous signals in the modules and minimize errors when the larger program is converted.

If the program contains connections to ports or devices not supported by the CNX-DVP4, the conversion finds network devices that match the port operation. If it does not find a match, it reports an error.

### Converting SIMPL+ Modules

1. Open the SIMPL+ module you want to convert.
2. Choose the 2-Series processor as the target by clicking the toolbar button, as shown in the graphic.

*SIMPL+ Toolbar*




---

**NOTE:** You can select both X and 2-Series as the targets, so that the module will work for both types of control systems. However, you are limited to SIMPL+ keywords and functions that are supported on both systems. If you do not choose a target, then the module may or may not work, depending on the constructs that are used.

---

3. Save and compile the module by clicking the **Save and Compile** toolbar button; alternatively, click **Save and Compile** on the **Build** menu (or press **F12**).

### Converting User Modules

1. Open the User module you want to convert.
2. Click **Project | Edit Program Header**.
3. Click **2-Series** in the *Target Control System Classes* list box.

You can select other types of control systems as well, but then you will be limited to symbols that are supported by all of these platforms. The module may still work on unselected control systems so long as unsupported symbols are not used. Selecting a control system means that you are *requiring* the module to work there.

### Module Header Information

After you convert each module in a program, you can convert the program as described previously: drag the CNX-DVP4 onto the existing control system in *System Views* and click **Yes** to confirm the replacement.

For further information about compile-time errors and detailed explanations about working with modules, refer to the SIMPL Windows online help file.

## Establishing Communication with the Control System

Before uploading a program to the control system or performing diagnostic functions, you must connect the control system to the PC. This connection can be serial or (if an optional Z-Bus card is installed) it can be TCP/IP.

---

**NOTE:** For laptops and other PCs without a built-in RS-232 port, Crestron recommends the use of PCMCIA cards, rather than USB-to-serial adapters. If a USB-to-serial adapter must be used, Crestron has tested the following devices with good results:

Belkin (large model) F5U103  
 I/O Gear GUC232A  
 Keyspan USA-19QW

---

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

### Serial Connection

Connect the COMPUTER port on the CNX-DVP4 to one of the COM ports (usually COM 1) on the PC. Use a straight through RS-232 cable with a DB9 male connector on one end and a DB9 female connector on the other. Most commercially available cables are acceptable; they should have at least 5 pins for transmit, receive, ground, and hardware handshaking.

Open the Crestron Viewport and click **Setup | Communication Settings** to display the “Port Settings” window. Then click **RS-232** as the connection type.

The PC communication settings specified here should match the protocol that the CNX-DVP4 expects. The settings (defaults) are as follows:

- Port = COM 1 through COM 8. Select the correct COM port on the PC.
- Baud rate = 115200 (use with new .cuz files, version 3.0.17 and higher)  
57600 (use with older .cuz files)

You can set the PC and the control system to a different baud rate, by using the **Functions | Set Baud Rate** command.

- Parity = None.
- Number of data bits = 8.
- Number of stop bits = 1.
- Hardware handshaking (RTS/CTS) selected (must be enabled).
- Software handshaking (XON/XOFF) not selected.

**“Port Settings” Window:**

**Default Settings for RS-232 Communication with the CNX-DVP4**

To verify communication, click **Diagnostics | Establish Communications (Find Rack)**. This displays a window that gives the COM port and baud rate.

### TCP/IP Connection

Before you can communicate with the CNX-DVP4 over TCP/IP, you must use the RS-232 connection just described to configure the unit’s TCP/IP settings.

1. Open Viewport and click **Functions | Set Control System IP Information**.
2. Enter the IP address, IP mask and default router in the text fields. (All of these terms are explained in detail in the latest version of Crestron’s e-Control Reference Guide, Doc. 6052, available as a PDF on the Downloads | Product Manual section of the Crestron website ([www.crestron.com](http://www.crestron.com))).
3. Click **OK** to set the new IP information.

Once you have assigned the IP settings, you can continue to communicate with the CNX-DVP4 using the RS-232 connection, or you can establish a TCP/IP connection.

For TCP/IP, use CAT5 cables with 8-pin RJ45 connectors to connect the LAN port on the CNX-DVP4 and the LAN port on the PC to the Ethernet hub. Alternatively,

you can use a CAT5 crossover cable to connect the two LAN ports directly, without using a hub.

Once the cable connections are made, open the Crestron Viewport and click **Setup | Communication Settings** on the menu to display the “Port Settings” window. Then click TCP/IP as the connection type. Enter the IP address of the CNX-DVP4 and click **OK**. Refer to “Communicating via Ethernet” on page 21 for more information.

To verify communication, click **Diagnostics | Establish Communications (Find Rack)**. This should display a window that gives the IP address and port number.

### ***Troubleshooting Communications***

Use the following checklist if communication cannot be established with the CNX-DVP4.

1. Verify that you are using the correct cables. As described previously, an RS-232 connection requires a straight-through serial cable. That is, pin 1 on one end is connected to pin 1 on the other end. Pin 2 connects to pin 2, etc. With a TCP/IP connection, you must use a CAT5 cable with 8-pin RJ45 connectors.
2. With a serial connection, verify that the correct COM port on the PC has been selected. Some computers have more than one COM port; some may be internal (e.g., for a modem). Consult the manufacturer’s documentation for further information about the COM ports on your PC.
3. With a serial connection, reset the control system as follows:
  - a. Open Viewport and click **Setup | Communications Settings** to display the “Port Settings” window. Choose **RS-232** as the connection type.
  - b. Set the baud rate of the PC to **115200** (use with new .cuz files, version 3.0.17 and higher) or **57600** (use with older .cuz files).
  - c. Make sure that RTS/CTS is selected and click **OK**.
  - d. If communication still cannot be established, reinitialize the unit by recycling power (the unit takes approximately 25 seconds to reboot). If the connection is established, the Viewport console should display some text and the **<DVP4>** prompt.
  - e. If communication still cannot be established, contact Crestron Customer Support.
4. Verify that no other software is using the same COM port.

### ***Compiling and Uploading a Program to the Control System***

After you have completed your SIMPL Windows program you must compile and upload the program to the control system.

To compile the program, simply click the **Convert/Compile** button  on the SIMPL Windows toolbar, or select **Project | Convert/Compile** (you can also press **F12**). A status bar will indicate the progress of the compile operation. After the operation is complete, a window will display information about the program such as the number and type of signals, and memory usage.

The compiled program will be stored as an SPZ file in the same directory as the source file. There are several ways to upload an SPZ file to the control system.

1. Immediately after compiling the program you are prompted to transfer the file to the control system.
2. Click the **Transfer** button  on the SIMPL Windows toolbar to open the **Send Program** window (refer to the following graphic). Click **Browse**,

locate the SPZ file and click **Open**. This will display the program's header information and enable one or both of the *What to Send* check boxes. If the program does not contain any SIMPL+ modules only the *SIMPL Program* check box will be enabled. If it does contain SIMPL+ modules, then the *SIMPL+* check box will also be enabled. Select one or both check boxes and then click **Send Program** to begin the transfer.

---

**NOTE:** You can also click **Check Program** to display the header information of the currently loaded program.

---

3. Open Viewport and select **File Transfer | Send Program**.

---

**NOTE:** Unlike X-Series processors, the 2-Series processor does not require a permanent memory image. Also, the 2-Series adds the ability to automatically retrieve the currently compiled program from the control system. Simply verify that the *Retrieve Current Program before overwriting* check box is selected.

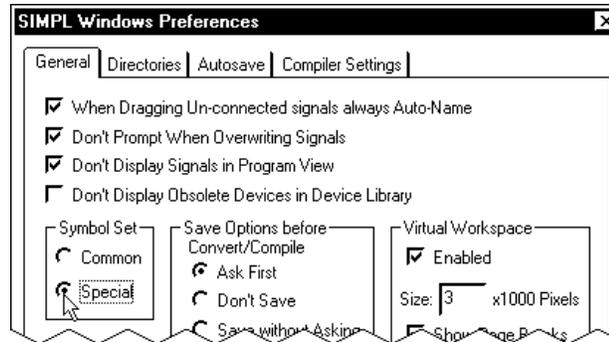
---

#### *“Send Program” Window*

### **Advanced Console Commands**

The SIMPL Windows online help file and the Crestron SIMPL Windows Manual provide a full listing of console commands that are valid for **2-Series** control systems. You can access the CNX-DVP4 console in a variety of ways: via a serial connection (RS-232) with a PC, over Ethernet via the LAN port, or through Telnet. It is also possible to issue console commands through logic, by adding a Console symbol to the SIMPL Windows program.

The Console symbol is visible in the *Symbol Library* only when “Special” is selected as the Symbol Set. Click: **Edit | Preferences**. In the *Symbol Set* area of the *General* tab, select **Special** as shown in the following graphic.

*"SIMPL Windows Preferences" Window*

Console commands are provided for advanced programmers. However, most functions and commands can be selected from the various Viewport menus.

**Example Programs**

Example programs for the CNX-DVP4 are available from the Crestron FTP site (<ftp://ftp.crestron.com>). Select the Examples Folder and search for: SIMPLE\_PAGE\_FLIP-MASTER.ZIP.

**Programming with VT Pro-e**

VT Pro-e permits the creation of control screen variations incorporating two and three-dimensional graphics and text. A set of pages, which make up a project, can be designed for each CNX-DVP4 touch-sensitive screen overlay application. Each page contains objects such as custom control graphics, video windows, two and three-dimensional buttons, sliders, and digital readouts which allow the user to interface with the control system. The project is uploaded into the CNX-DVP4's compact flash. The unit uses the programmed project until another project is uploaded from a PC. VT Pro-e also allows users the option to generate projects destined for web browsers rather than for touch-sensitive screen overlays.

**Configuring Video Windows**

Video windows created on a page can be configured using the Video Properties option. Once a video window is created using the Draw RGB  or Draw Video  options, double-click the video window to open "Video Properties" so you can configure the window. For additional software information, consult the VT Pro-e help file.

**"Video Properties" window description**

- **Joins** – allows the user to select different video sources, transition durations, and transition effects and directions, using *analog* joins to be displayed on one video window (overrides the set defaults in VT Pro-e).
- **Defaults** – allows the user to assign the video source, transition or timing to be used when a page flip, digital logic join or sub page is activated. The selection can be overwritten with analog joins (refer to "Joins" above).
- **Select Properties** – allows the user to select the size and position of a video window, digital feedback joins (used for diagnostics), and allows the user to enter a project description in the *Description* field.

**Selecting a Video Source**

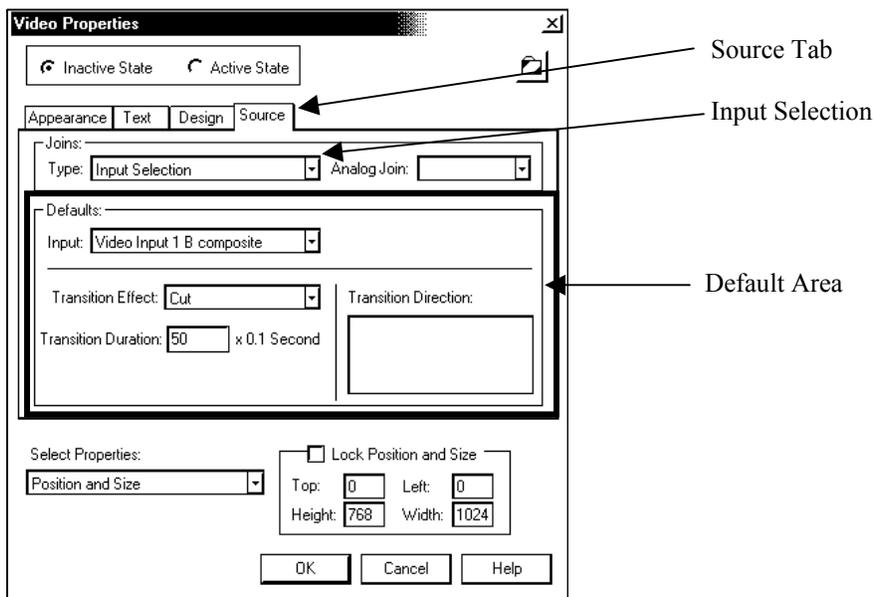
There are two principle ways of selecting a video source.

1. Page flips or sub-pages with video objects on the page.

2. Using analog values to change sources.

The following describes the second method of using analog values to select sources.

**Source Tab in the “Video Properties” Window**



There are three analog join numbers for each video effect.

- **Input Selection** (type of effect)
- **Transition Duration** (time)
- **Transition Effect and Direction** (movement).

The *Source* tab provides options for selecting video sources and controlling how the video window appears on the screen.

The *Default* area lets you specify the default video source from the *Input Selection* List, and the transition effect.

**Analog Values for Input Selection**

When an analog join number is assigned to an input selection, setting the analog joins value at runtime to the following values selects the corresponding input. Returning the value to zero will return to the default input. The following analog values correspond to each input video type.

*Analog Values for Input Selection*

ANALOG VALUE	VIDEO INPUT TYPE	ANALOG VALUE	VIDEO INPUT TYPE
1	DVI/RGB1	9	Video Input 1A
2	DVI/RGB2	10	Video Input 1B
3	DVI/RGB3	11	Video Input 2A
4	DVI/RGB4	12	Video Input 2B
5	S-Video Input 1	13	Video Input 3A
6	S-Video Input 2	14	Video Input 3B
7	S-Video Input 3	15	Video Input 4A
8	S-Video Input 4	16	Video Input 4B

The *Transition Effect* list gives options for the appearance of the video window on the screen. Depending on the chosen effect, you will have additional options for specifying duration and direction. For example, if you select Pan as the transition effect, then you must select a duration and a direction for the panning. This causes the video window to pan across the screen at the specified speed and direction when the video window is drawn.

The default values are overridden by using the *Analog Join* area to set analog join numbers for Input Selection, Transition Effects, Direction and Duration.

First select the join type from the *Type* list, i.e., **Input Selection**. Then assign its analog join number from the Analog Join box. This analog join will appear as an analog feedback signal in the touchpanel definition. The value of the signal determines the video source or transition effect. For example, to select S-Video Input 1 as the video source, the analog join for Input Selection is set to a value of 5d ('5' represents the analog value for S-Video1 and 'd' represents the decimal value). To cause the video window to pan from right to left (east to west), the analog join for **Transition Effect and Duration** is set to a value of 1336d.

### **Video Source Effect/Direction and Duration Join Values**

The primary advantage to using analog value source switching is a much faster switch time compared to loading backgrounds.

Each video effect requires three different analog join numbers:

- An analog join number to specify the Effect (cut, zoom, pan, dissolve, reveal)
- An analog join number to specify the Direction of the effect (compass direction)
- An analog join number to specify the Duration of the effect (seconds)

These unique numbers are assigned in the "Video Properties" window and on the corresponding touchpanel joins for each video effect, each direction, and each duration.

The following describes each CNX-DVP4 video effect. Window movement is selectable for the Pan and Reveal effects only.

---

**NOTE:** A selected direction indicates that the movement or exposing of a window is toward the selected direction. For example, for the Pan effect, selecting N (north) moves the window on screen from south toward the north.

---

#### **Pan**

Moves a video window from off to on screen. The direction of movement is selectable (W, N, or NW). When another page is selected, the movement of the window from on to off screen is in the opposite direction.

W – window moves on screen in an east to west direction

N – window moves on screen in a south to north direction

NW – window moves on screen in a southeast to northwest direction

#### **Dissolve**

Window fades in, and when a different page is selected, the window fades out.

#### **Zoom**

Window spirals in from a tiny dot to the selected size, and when another page is selected, the opposite occurs.

**Reveal**

Window is exposed from a selectable (N, S, E or W) direction. When another page is selected, the window closes in the opposite direction. To illustrate this, the effect would look like you were pulling down a projector screen handle to expose the projector screen.

- N – exposes from the south      E – exposes from the west
- S – exposes from the north      W – exposes from the east

---

**NOTE:** A video source goes off with the same effect that it went on with.

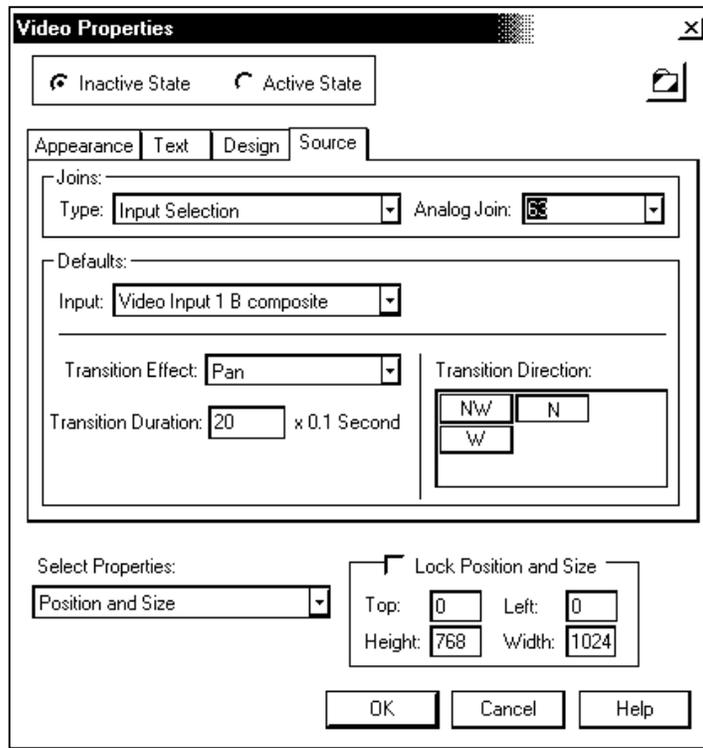
---

**Setting up Video Effects**

The following steps are required to properly set up each video effect. The Pan effect is used as an example.

1. In VT Pro-e, in the “Video Properties” window, under the *Source* tab, select the type of join: **Input Selection**, **Transition Duration**, or **Transition Effect and Direction**.
2. Assign a unique analog join number.

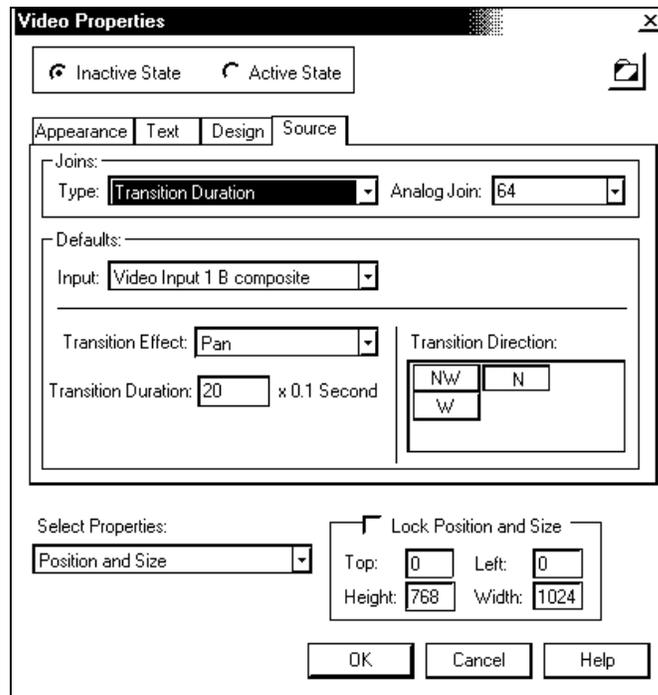
*Join Type Selection (Example: Input Selection, Pan Effect, Join Number 63 Assigned)*



3. Select the **Transition Duration** join and assign a unique analog join number.

*Join Type Selection*

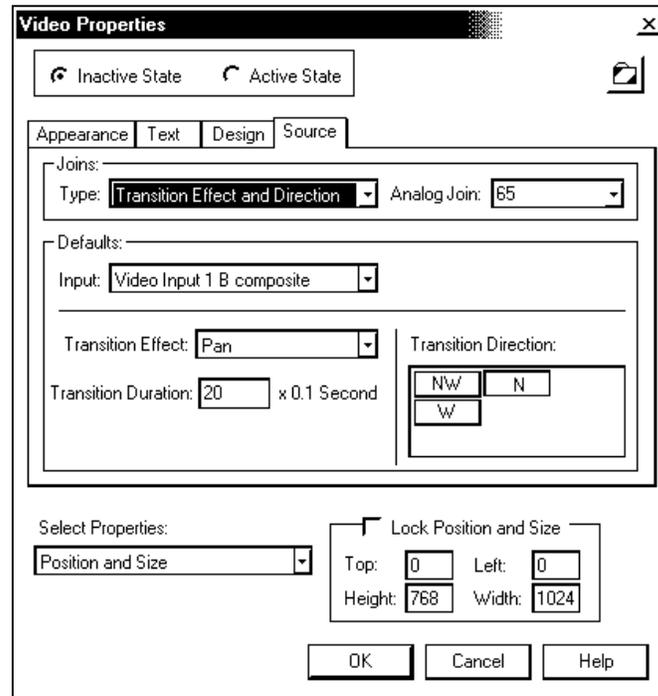
*(Example: Pan Effect, Transition Duration, Join Number 64 Assigned)*



4. Select the **Transition Effect and Direction** and assign a unique analog join number.

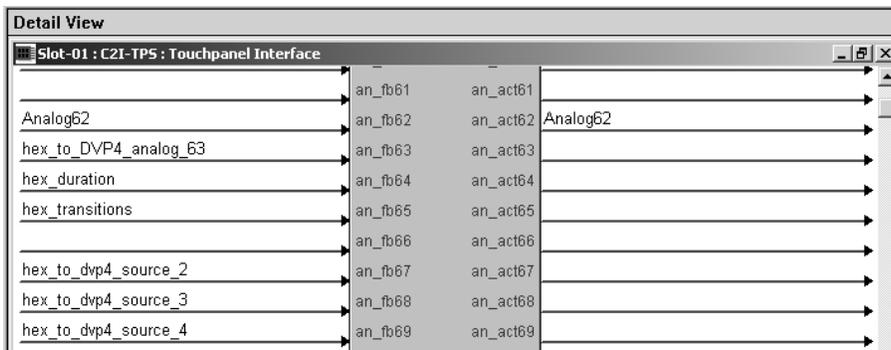
*Join Type Selection*

*(Example: Pan Effect, Transition Effect and Duration, Join Number 65 Assigned)*



5. Assign these analog numbers (63, 64, 65) to the touchpanel.

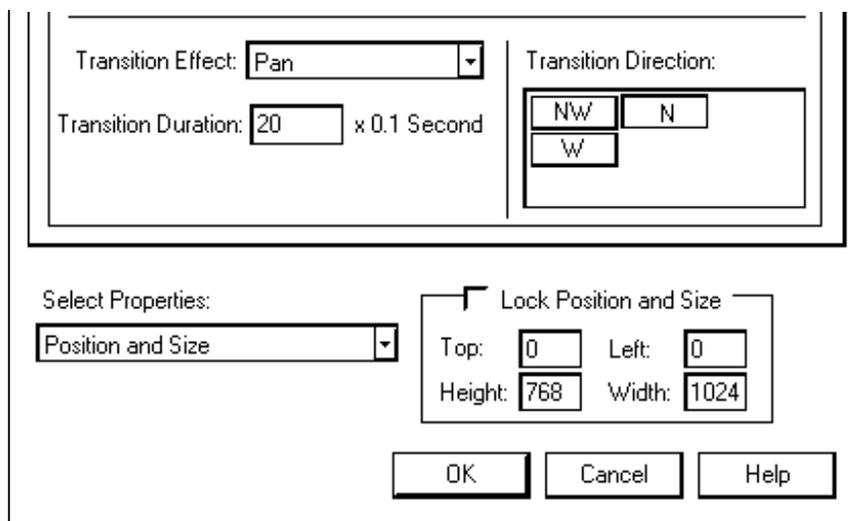
*Touchpanel Symbol with Analog Join Number Assigned for Pan Effect.*



**Video Effect Details**

Pan

*Pan Selection*



The pan effect allows you to set duration and direction.

Increases are made in 1/10 sec. increments, i.e. a value of 50 x 1/10 = 5 sec.

VIDEO SOURCE EFFECT	DIRECTION VALUE	DURATION VALUE
Pan	-	0-100
North	1332	
Northwest	1333	
West	1336	

Cut and Zoom

*Cut and Zoom Selection*

**NOTE:** Cut and zoom are fixed in duration and direction values.

VIDEO SOURCE EFFECT	DIRECTION VALUE	DURATION VALUE
Cut	1000 (fixed)	0 (fixed)
Zoom	1400 (fixed)	50 (fixed)

Dissolve

*Dissolve Selection*

The dissolve effect allows you to set the duration. Increases are made in 1/10 sec. increments, i.e. a value of 50 x 1/10 = 5 sec.

VIDEO SOURCE EFFECT	DIRECTION VALUE	DURATION VALUE
Dissolve	1100 (fixed)	0-100

## Reveal

### Reveal Selection

The reveal effect allows duration and direction settings.

Increases are made in 1/10 sec. increments, i.e. a value of 50 x 1/10 = 5 sec.

VIDEO SOURCE EFFECT	DIRECTION VALUE	DURATION VALUE
Reveal	-	0-100
East	1230	
South	1231	
West	1232	
North	1233	

---

**NOTE:** You can override fixed transitions and durations by assigning an analog join number to the transition or duration in VT Pro-e. Also, in SIMPL Windows, create a project using analog initializers to change the transitions and/or durations. An analog transition or duration does not take effect until a new source is selected or a new page is drawn.

---

## **Rules for Backgrounds, Video Windows, Objects and Subpages**

The following are the rules for layering backgrounds, video windows and objects in a CNX-DVP4 VT Pro-e project.

**Backgrounds** – A background on a page is always the back layer. It cannot be moved in front of video windows or objects.

**Video Windows** – Video windows are always on top of backgrounds. They cannot be moved in front of objects.

**Objects (buttons, etc.)** – Objects are always on top of video windows and backgrounds. They cannot be moved behind video windows and backgrounds.

**Subpages** – A subpage background is always in the back layer. It does not move in front of the video window on the main page, but is in front of the main page's background when it appears. Objects are always on top.

### Reserved Join Numbers

A reserved join number is a feature of the software that enables a designer to create a button on a VT Pro-e page that either calls up the SYSTEM SETUP MENU, adjusts standby timeout, etc. These numbers also allow the control system to trigger touch-sensitive screen overlay functions (i.e., recall RGB preset when source changes). The tables shown on the next three pages provide lists of digital and analog reserved join numbers available within the software.

---

**NOTE:** Join Number Remapping (JNR) is not available on CNX-DVP4.

---

#### System Digital Reserved Join Numbers for the CNX-DVP4

JOIN NUMBER	FUNCTION	VALUE
17214	Cresnet ID	Down
17215	Cresnet ID	Up
17231	Standby Timeout	Up
17232	Standby Timeout	Down
17242	System Setup Menu	Enter Setup
17235	Exit Setup	Exit Setup and Reboot
19017	Exit Calibration	Return to Program

#### Calibration: Input Selection Digital Reserved Join Numbers

JOIN NUMBER	FUNCTION	VALUE
19041	DVI/RGB 1	Selected
19042	DVI/RGB 2	Selected
19043	DVI/RGB 3	Selected
19044	DVI/RGB 4	Selected
19045	S-Video 1 (Y&C)	Selected
19046	S-Video 2 (Y&C)	Selected
19047	S-Video 3 (Y&C)	Selected
19048	S-Video 4 (Y&C)	Selected
19049	Video 1A (Composite)	Selected
19050	Video 1B (Composite)	Selected
19051	Video 2A (Composite)	Selected
19052	Video 2B (Composite)	Selected
19053	Video 3A (Composite)	Selected
19054	Video 3B (Composite)	Selected
19055	Video 4A (Composite)	Selected
19056	Video 4B (Composite)	Selected

---

**NOTE:** First select the desired input above, and then trigger the desired function from the following charts. When done with Calibration, use "Exit Setup" or "Exit Calibration".

---

*Calibration: Position and Size Digital Reserved Join Numbers*

JOIN NUMBER	FUNCTION	VALUE
19201	Horizontal Position	Move Right
19202	Horizontal Position	Move Left
19203	Vertical Position	Move Up
19204	Vertical Position	Move Down
19205	Horizontal Size	Increase
19206	Horizontal Size	Decrease
19207	Vertical Size	Increase
19208	Vertical Size	Decrease
19228	Position	Restore Factory Default
19229	Size	Restore Factory Default

*Calibration: RGB/Video Color Digital Reserved Join Numbers*

JOIN NUMBER	FUNCTION	VALUE
19219	RGB/Video Brightness	Increase
19220	RGB/Video Brightness	Decrease
19221	RGB/Video Contrast	Increase
19222	RGB/Video Contrast	Decrease
19213	RGB Red/Video Saturation	Increase
19214	RGB Red/Video Saturation	Decrease
19215	RGB Green/Video Hue	Increase
19216	RGB Green/Video Hue	Decrease
19217	RGB Blue	Increase
19218	RGB Blue	Decrease
19230	RGB/Video Color	Restore Factory Default

*Calibration: RGB Sync Lock Digital Reserved Join Numbers*

JOIN NUMBER	FUNCTION	VALUE
19209	RGB Coarse Lock	Increase
19210	RGB Coarse Lock	Decrease
19211	RGB Fine Lock	Increase
19212	RGB Fine Lock	Decrease
19227	Sync Lock	Restore Factory Default

*Calibration: Preset Digital Reserved Join Numbers – Join Numbers 19081 through 19112 Correspond to Preset 1 through Preset 32, Sequentially*

JOIN NUMBER	FUNCTION	VALUE
19113	Preset	Recall
19114	Preset	Clear
19115	Preset	Save

*System Analog Reserved Join Numbers for the CNX-DVP4*

JOIN NUMBER	FUNCTION
17203	Standby Timeout
19000	Translucency

*Calibration: Position and Size Analog Reserved Join Numbers*

JOIN NUMBER	FUNCTION
19101	Horizontal Position
19103	Vertical Position
19105	Horizontal Size
19107	Vertical Size

*Calibration: RGB/Video Color Analog Reserved Join Numbers*

JOIN NUMBER	FUNCTION
19119	RGB/Video Brightness
19121	RGB/Video Contrast
19113	RGB Red/Video Saturation
19115	RGB Green/Video Hue
19117	RGB Blue

*Calibration: RGB Sync Lock Analog Reserved Join Numbers*

JOIN NUMBER	FUNCTION
19109	RGB Coarse Lock
19111	RGB Fine Lock

**Example VT Pro-e Program**

The following procedure is designed to demonstrate CNX-DVP4 video effect capabilities. Once the compiled program is loaded in the CNX-DVP4, the main video screen opens with a pan effect; the subsequent screen contains four video windows, each window displaying a different effect. For effect descriptions, refer to “Setting Up Video Effects” on page 56.

**Prerequisites**

For this example, we explicitly need video sources 1A and 2A. We also need RGB sources on DVI/RGB1 and DVI/RGB3.

- Display device connected to the output DVI/RGB port. If display connector is RGB, use the supplied DVI-I/RGB adapter.
- Video inputs connected to the input DVI/RGB, S-Video or Composite ports. If video source connector is RGB, use the supplied DVI-I/RGB adapter.
- Cresnet power (from Cresnet power supply) connected to the Cresnet port.
- Serial mouse connected to the touchscreen/mouse port, if applicable.
- PC connected (using computer com port) to the CNX-DVP4 (VT Pro-e and Viewport open).
- DVP4 in master mode, video input/output setup complete (refer to page 28).

**NOTE:** This procedure uses four different video sources (DVI/RGB 1, DVI/RGB 3, Video Input 1A composite and Video 2A Input composite).

**NOTE:** If more than four video windows are drawn on a page, one of the windows will not display video (only a background image appears). Also, if two video windows have the same RGB video source assigned to them, only one of the windows displays the RGB video source.

1. Open VT-Pro-e and select **New | Project** from the File menu. The "Name New Project" window appears.
2. Select the CNX-DVP4 as panel type.
3. Name the project (we suggest CNX-DVP4) in the *File Name* field and click **Create**. The new project is created.
4. Select **Edit | Project Properties** and select the resolution (for this example 1024 x 768) to match the display device.
5. Select **File | New | Page** to open the "Enter New Page Name" window.
6. Type **Start Page** and click **OK**. The "Start Page" window appears.
7. Click  (**Draw Video** button) and drag the crosshair to open a video window on the *Start* page.
8. Double-click the video window to open the "Video Properties" window.
9. Configure the video window using the following, click **OK** when finished:

DESIGN TAB	SOURCE TAB
Set Size: Full Screen	Input Select: Video Input 1A composite Transition Effect: Pan Transition Duration: 20 Transition Direction: NW

10. Click  (**Draw** button) and drag the crosshair to open a button on the *Start* page.
11. Drag the button and place it in the lower left hand corner of the *Start* page.
12. Double-click the button to open the "Button Properties" window.
13. Configure the button using the following, click **OK** when finished:

DESIGN TAB	SOURCE TAB
Appearance: Color: Face: Transparent	Text: Text Entry: Quad

14. Select **File | New | Page** to open the "Enter New Page Name" window.
15. Type Quad and click **OK**. The "Quad" page appears.
16. Click  (**Draw Video** button) and drag the crosshair to open a video window on the *Quad* page.
17. Double-click the video window to open the "Video Properties" window.
18. Configure the video window using the following, click **OK** when finished:

DESIGN TAB	SOURCE TAB
Set Size: 1/4 Screen	Input Select: Video Input 1A composite Transition Effect: Reveal Transition Duration: 20 Transition Direction: W

19. Place the window in the upper left-hand corner of the page.
20. Select the video window and press **Ctrl C** and **Ctrl V** on the keyboard to copy and paste the window.
21. Place the window in the upper right-hand corner of the page.

22. Double-click the video window to open the “Video Properties” window.
23. Configure the video window using the following, click **OK** when finished:

DESIGN TAB	SOURCE TAB
Set Size: 1/4 Screen	Input Select: DVI/RGB 1 Transition Effect: Dissolve Transition Duration: 20

24. Select a video window and press **Ctrl C** and **Ctrl V** on the keyboard to copy and paste the window.
25. Place the window in the lower left-hand corner of the page.
26. Double-click the video window to open the “Video Properties” window.
27. Configure the video window using the following, click **OK** when finished.

DESIGN TAB	SOURCE TAB
Set Size: 1/4 Screen	Input Select: Video Input 2A composite Transition Effect: Pan Transition Duration: 20 Transition Direction: N

28. Select a video window and press **Ctrl C** and **Ctrl V** on the keyboard to copy and paste the window.
29. Place the window in the lower right-hand corner of the page.
30. Double-click the video window to open the “Video Properties” window.
31. Configure the video window using the following, click **OK** when finished.

DESIGN TAB	SOURCE TAB
Set Size: 1/4 Screen	Input Select: DVI/RGB 3 Transition Effect: Zoom

32. Click  (**Draw** button) and drag the crosshair to open a button on the *Start* page.
33. Drag the button and place it in the lower left hand corner of the *Quad* page.
34. Double-click the button to open the “Button Properties” window.
35. Configure the button using the following, click **OK** when finished:

DESIGN TAB	SOURCE TAB
Appearance: Color: Face: Transparent	Text: Text Entry: Return Select Properties: Page Flip, Page Flip: Return

36. Select the *Start* page.
37. Double click the *Quad* button to open the “Button Properties” window.
38. Make sure the *Start* page is marked as first in the project and select **File | Compile Project**.

### Uploading VT Pro-e Projects to the CNX-DVP4

Since the CNX-DVP4 can operate as a touchpanel interface, you can upload VT Pro-e projects to it. Projects are loaded in the compact flash memory. Compiled projects are contained in VTZ files. You must be connected to another control system to upload projects.

Before uploading, open Viewport and click **Diagnostics | Report Network Devices** to verify that the CNX-DVP4 is being detected by the control system (As with any network device, the CNX-DVP4 must be identified by unique hexadecimal network IDs. These IDs are set in the SIMPL Windows program).

#### To upload a project:

1. Open VT Pro-e and click the **Project | Upload** button  on the toolbar, (or click **File | Upload Project**), or

Open Viewport, establish communication with the CNX-DVP4 (refer to page 49) and click **File Transfer | Send Touchpanel** or press **Alt+T**.

---

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

---

2. Select the network ID of the CNX-DVP4, as set in SIMPL Windows, from the drop-down list.
3. Browse to VTZ file to be uploaded and choose the pages to send to the CNX-DVP4. The choices are as follows:
  - **All Files in Project:** sends the entire project.
  - **Only Changed Files:** sends only those files in the project that have changed. **NOTE** that if any pages in the panel are not present in the project, those pages will be deleted from the panel.
  - Additional choices include **Do not send graphic files** and **Do not send sound files**. These are often very large files that need not be reloaded with every transfer.

## “Touch the PC”

This feature allows a user to remotely control a number of other PC’s cursors and mouse buttons from a touchpanel. When you use a touchpanel, or any display with a pointing device as a monitor for a computer connected to your Crestron system, the Serial Mouse Control Driver lets you control the cursor movement and simulate the functions of a traditional mouse using your finger on the touchpanel to simulate typical computer mouse click and drag functions.

The Serial Mouse Driver operation can be configured to operate via a serial connection (RS-232) between the touchpanel and personal computer (PC), a wired connection through Cresnet, or an Ethernet/local area network (LAN), a local Crestron LAN, or a wide area network (WAN). Ethernet communication allows access to any Crestron Internet protocol (IP) control device, remote diagnostic and upgrade functions, access to Crestron’s network analyzer, and the ability to activate any device connected to the system.

Each video window needs its *Touch/Pad Area* enabled in **Video Properties | Design** of VT Pro-e. In SIMPL Windows, a serial signal must be assigned to the C2I-TPS Touchpanel Interface symbol (slot 1 of the CNX-DVP4 SIMPL Windows symbol)

for each PC and the same signal needs to be assigned to a serial driver symbol for each PC. For more information, refer to “Mouse Awareness” on page 40 and the latest revision of the Serial Mouse Control Driver Software Programmer’s Guide, Doc. 5916 in the Downloads | Product Manuals section of the Crestron website ([www.crestron.com](http://www.crestron.com)).

Refer to “Appendix F: Connecting a Mouse” on page 85 for additional information.

### **Equipment Required for Touch the PC:**

- One CNX-DVP4 Version 3.009 or higher
- One TPS-5000/6000 panel only with RGB card V1.017
- One DVI to RGB adapter supplied by Crestron
- One 24 VDC 75 watt power supply for CNX-DVP4
- One VGA Male cable to VGA Male cable

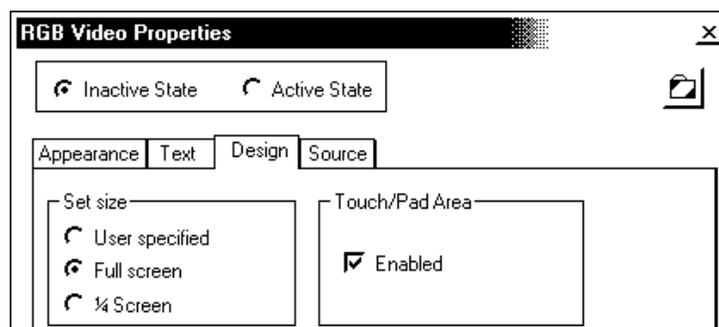
### **Software Required for Touch the PC:**

- SIMPL Windows Version 2.03.11 or higher, Symbol Lib/device 193.001 or higher
- VT Pro-e Version 3.0.0.6 or higher
- Crestron Database 15.8.4 or higher

### **Touch the PC Procedure**

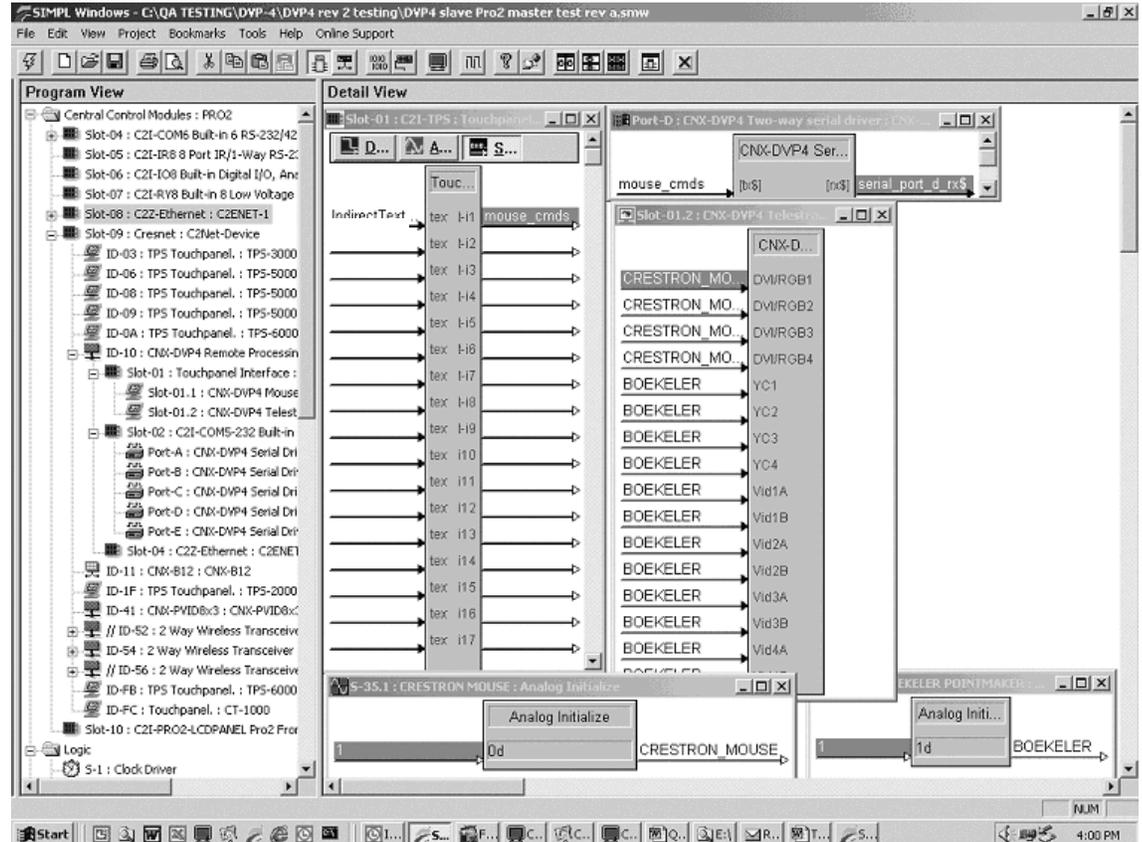
1. Install the serial mouse on the PC to be controlled. Refer to the Software Programmer’s Guide, Doc. 5916 in the Downloads | Product Manuals section of the Crestron website ([www.crestron.com](http://www.crestron.com)).
2. Connect the RS-232 cable from the CNX-DVP4 COM port (A-D) to a computer that has the serial mouse driver installed. Version number must be 2.56.18. Refer to instructions for serial mouse installations.
3. Create a page in VT Pro-e with a full screen RGB window for the CNX-DVP4.
4. In the “RGB Video Properties” window, select the *Design* tab and enable the *Pad* area.

#### **“RGB Video Properties” Window**



5. Save and then download the project to the CNX-DVP4.

## 6. Do the following in SIMPL Windows:

*SIMPL Windows Detail View*

- a. Set the COM port (A-D) for 9600 baud, 8 bits, 1 stop bit, No parity.
- b. Add the MOUSE COMMAND to serial *text-i1* in CNX-DVP4 Slot-01 C21-TPS.

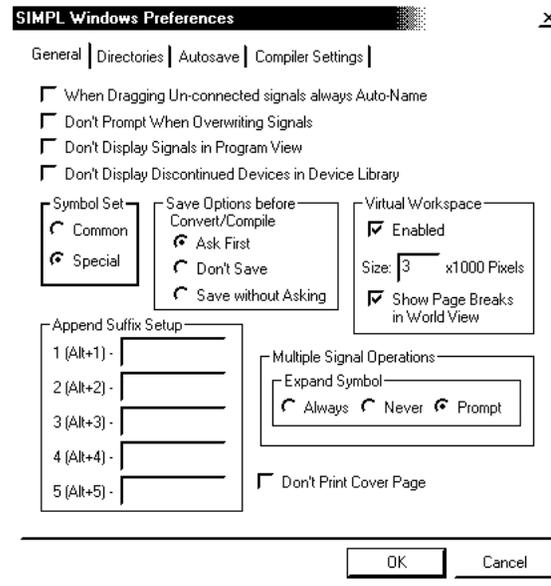
---

**NOTE:** Touchpanel *text-i1* is RGB-1. If you want the mouse command on RGB-2, place serial text on *text-i2*. For RGB-3 place the serial text on *text-i3*, and so on.

---

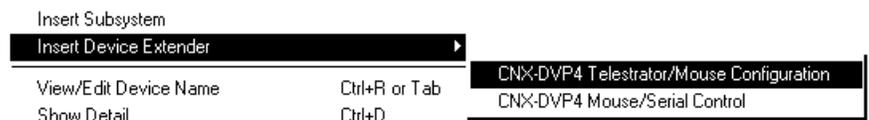
- c. Add the helper symbol to the CNX-DVP4 by using the following procedure:
  - i. Open *Edit Preferences*.
  - ii. Select the *General* tab and select the **Special** mode from the *Symbol* set.

*SIMPL Windows Preferences – Special Symbol Set*



- iii. Drop in a CNX-DVP4 in to the project, then right click on Slot 1 of the CNX-DVP4.

*Select Device Extender*



- iv. Select **Telestrator/Mouse Configuration**.
- v. Add an analog label (Crestron Mouse) to RGB1 for Touch-the-PC to work on RGB input 1.
- vi. Add an analog initialize. Set the analog value to zero and the analog out label (Crestron Mouse). Add a 1 to the digital input.
- vii. Load the program to the CNX-DVP4 or Pro 2, whichever unit is the master.
- d. The “Touch the PC” should be working. If it is proceed to next step, if not proceed to step f.
- e. Perform the Calibration of the Touch-the-PC from the Icon in the Window tray on the computer that has Serial mouse driver installed.
- f. If the mouse movement works but you do not have left mouse clicks. Do the following:
  - i. From the computer that has the Touch the PC driver installed select the Icon in the Windows tray.
  - ii. Select Button mode tab: Edit mode should be **Touch Down Left**
  - iii. Select Events tab: Primary – contact – **Touch Down Left**

## Uploading Web Pages to the CNX-DVP4

The CNX-DVP4 provides a built-in Web server for e-Control applications. The CNX-DVP4 allots Web pages, mailbox, and the compiled SPZ file to be downloaded to compact flash. The only limit is the size of your compact flash card and your project assigned files.

### **VT Pro-e**

In most cases, you create a VT Pro-e browser project to generate the Web pages for uploading to the CNX-DVP4.

#### For e-Control projects:

- When an e-Control browser project is created, VT Pro-e automatically creates a folder with the name of the project and a .web extension. This web project folder itself contains a Java subfolder, in addition to all the HTML files that are sent to the CNX-DVP4. In VT Pro e, the target type is BROWSER.

#### For e-Control 2 projects:

- When an e-Control 2 project is created, VT Pro-e automatically creates a folder with the name of the project and a .xweb extension. The web project folder contains all the necessary e-Control 2 files. In VT Pro e, the target type is XPANEL.

In designing and creating a browser project, keep in mind that you must assign an IP ID to all the project pages and specify the IP address of the CNX-DVP4 (For further information on this procedure, refer to the VT Pro-e online help file).

### **SIMPL Windows**

For each IP ID in the VT Pro-e browser project, there must be one corresponding e-Control PC Interface symbol defined in the SIMPL Windows program. The PC Interface symbol is one of the Ethernet Modules that can be dropped on the C2ENET-1 card slot.

As with all Ethernet devices, the PC Interface must receive an entry in the IP Table of the CNX-DVP4. Here the IP ID must match the IP ID that was assigned in VT Pro-e, while the IP address must be set to local host: 127.0.0.1.

### **Viewport**

To transfer the Web pages to the CNX-DVP4, use the **File Transfer | Send Web Pages** command.

The options are to send an entire project, only files that have changed, or a single HTML file. With the “Transfer Entire Project” option, click **OK** when reminded to select a default page, and then browse to the appropriate VT Pro-e .web project folder. Select the file that was designated as the “first” page of the project. This will be the default Web page that is displayed whenever the IP address of the control system is accessed by a Web browser. Click **Open**, and then **OK** to begin the transfer.

If any files in the VT Pro-e project change, the changed files can be transferred to the CNX-DVP4 without resending the entire project by choosing the “Only Transfer Files that have Changed” option. Here again, browse to the .web project folder and select the default page. Click **Open**, and then **OK** to transfer the changed files.

Finally, selecting **Transfer Single File** can send a single HTML file. Browse to the file and click **Open**. Then specify the file’s relative path (from the root directory) and click **OK**.

## Updating the Operating System

As with all 2-Series control systems, operating system files for the CNX-DVP4 have a .cuz extension. You can obtain .cuz updates (when available) from the Downloads | Software Updates section of the Crestron website ([www.crestron.com](http://www.crestron.com)). To download a firmware update, click the .cuz file and choose the **Save to Disk** option, then specify the directory where the update will be stored.

---

**NOTE:** In some cases Microsoft's Internet Explorer may append a .zip extension to a downloaded .cuz file. For example, a file called "C2-1008.cuz" may appear as "C2-1008.cuz.zip." If this happens, rename the file, removing the .zip extension.

---

To upload the new .cuz to the control system:

1. Open Viewport and establish communication with the CNX-DVP4 (refer to page 49).
2. Select **File Transfer | Update Control System**.
3. Browse to the .cuz file and click **Open** to start the transfer.
4. After the transfer is complete, the CNX-DVP4 will automatically reboot. To confirm the transfer, click **Diagnostics | Check Ops Version**. The Viewport console should display the new .cuz version number.

---

**NOTE:** Store all CUZ files on local hard drive. Do not perform file transfer from a local PC with the upgrade file located on network.

---

## Problem Solving

### Troubleshooting

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

#### *CNX-DVP4 Troubleshooting*

<b>TROUBLE</b>	<b>POSSIBLE CAUSE(S)</b>	<b>CORRECTIVE ACTION</b>
CNX-DVP4 does not function.	CNX-DVP4 is not receiving Cresnet power.	Verify Cresnet power to unit.
	Incorrect firmware/software.	Update firmware/software versions as per those listed in the Specifications section.
	SIMPL Windows program for PRO2 or other 2-Series control system installed on compact flash.	Remove program from compact flash via Viewport.
	Incorrect cable connections.	Follow connection procedures in this guide and inspect connector pins.
	Various (for example, wrong firmware).	Refer to System Monitor procedure on page 73.
	Incorrect power supply	Use a Crestron power supply
No video output displayed.	Incorrect cable connection.	Verify DVI/RGB output cable connection to unit and video display.
	Output resolution incorrect.	Set output resolution via Viewport.
CNX-DVP4 does not boot properly.	Program needs to be reloaded.	Power down unit, remove compact flash card and power back up. After boot up, install compact flash and down load new project(s) using Viewport.
Wrong source or video displayed.	Wrong VT Pro-e or SIMPL Windows programs.	Verify correct programs.
	VT Pro-e project not set up correctly.	Verify proper video set up for each video window displayed.
Video from RGB source is garbled or no output.	Incorrect cable connections.	Verify horizontal/vertical BNC cable connections. Verify 15-pin cable connection.
Incorrect video effect in video window.	VT Pro-e project not set up correctly.	Verify correct video effect selected for video window.

*CNX-DVP4 Troubleshooting (continued)*

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Video effect is different than expected.	Wrong effect selected in "Video Properties".	Select correct effect in "Video Properties".
	Analog join value has been set.	Change analog join value to zero (0).
	Default effect is only effect selected in the CNX-DVP4 Options screen.	Select correct effect in the CNX-DVP4 Setup   Options screen.
Pages do not flip.	Join numbers on "Page Properties" in VT-Pro-e not set.	Set join numbers in "Page Properties".
Cresnet does not work after CNX-DVP4 is plugged into PRO2 control system.	DVP4 is set to master mode.	Set CNX-DVP4 to slave mode via Viewport.
Viewport displays the following message: Warning: another CTP port is open. Type KILLSOCKET CTP1 to kill connection.	Two Viewport sessions are open, or Viewport and Test Manager are open.	Close one session of Viewport or Test Manager.*
CNX-DVP4 does not respond to ping command.	IP address not correct (LAN green and amber LEDs are off).	Assign correct IP address to CNX-DVP4.
	IP mask not correct (LAN green and amber LEDs are on).	Assign correct IP mask.
Mouse or touchpanel does not work.	Incorrect Touch settings.	At CNX-DVP4 prompt in Viewport, type <b>touch</b> to check and adjust settings.
No cursor on screen.	Cursor is set to OFF in Viewport.	At CNX-DVP4 prompt in Viewport, type <b>cursor on</b> to have cursor appear on screen.

\*The Test Manager utility is used for testing and debugging a SIMPL Windows program by monitoring the status of selected signals in real time. For additional information, refer to the SIMPL Windows Help file.

## System Monitor Mode

The System Monitor allows you to reload firmware into the CNX-DVP4 in the event that you cannot load the firmware in the normal mode. Use the monitor mode *only* if you cannot load firmware in the CNX-DVP4 and *only* after tech support has instructed you to perform this function.

Perform the following procedure to correct the "DVP4 does not function" trouble situation on page 72 (in reference to Corrective Action).

1. Power down the CNX-DVP4 and connect DB9 straight-through RS-232 cable between the PC and the CNX-DVP4. Refer to "Cable Connection for Programming" on page 14 for more information.
2. Open Viewport and select **Setup | Communication Settings** to open the "Port Settings" window.
3. In the window, select **RS-232** (Connection Type), **57600** (Baud Rate), **N** (Parity), **8** (Data Bits), **1** (Stop Bits), no handshaking and click **OK**.
4. Power up the CNX-DVP4.

5. While powering up the CNX-DVP4, press and hold **ALT** and **K** on the keyboard until the following text (or similar) appears in Viewport.

```
System Monitor [v1.001 (0001)]  
12-19-01 16:25:23 32MB RAM, 4MB FLASH
```

```
CS>
```

6. At the Viewport prompt, type **erase** and press **Enter**. The following text appears in Viewport:

```
CS>erase  
->25%->50%->75%->100%  
Done  
CS>
```

7. At the Viewport prompt type: **system** and press **Enter**.  
When the letter **C** appears in Viewport, proceed to the next step.
8. Press **ALT+U** on the keyboard.
9. From Viewport, select File Transfer, General file transfer, Xmodem 1K upload.
10. Find and select the correct firmware file (.CSU not .CUZ) and click **Open**.
11. Once “Completed Successfully” appears in Viewport, type **quit** at the Viewport prompt and press **Enter**.
12. Reboot the CNX-DVP4.

---

**NOTE:** After this, increase the baud rate to 115200 (for faster communication) by pressing **F8** on the keyboard and then selecting 115200 from the “Set Baud Rate” window.

Use 115200 with new .cuz files, version 3.0.17 and higher

Use 57600 (use with older .cuz files)

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## Further Inquiries

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

- In the US and Canada, call Crestron's corporate headquarters at 1-888-CRESTRON [1-888-273-7876].
- In Europe, call Crestron International at +32-15-50-99-50.
- In Asia, call Crestron Asia at +852-2341-2016.
- In Latin America, call Crestron Latin America at +5255-5093-2160.
- In Australia and New Zealand, call Creston Pacific at +613-9480-2999

## Firmware Upgrades

To take advantage of all the CNX-DVP4's features, it is important that the unit contains the latest firmware available. Therefore, please check Crestron's website ([http://www.crestron.com/downloads/software\\_updates.asp](http://www.crestron.com/downloads/software_updates.asp)) for the latest version of firmware. Not every product has a firmware upgrade, but as Crestron improves functions, adds new features, and extends the capabilities of its products, firmware upgrades are posted. If you have questions regarding upgrades procedures, contact Crestron customer service.

## Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the CNX-DVP4, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron website ([www.crestron.com](http://www.crestron.com)) periodically for manual update availability and its subjective value. Updates are available from the Download | Product Manuals section and are identified as an "Addendum" in the Download column.

## Appendix A: File System

The file system inside the 2-series control engine can be broken down into two parts. The first part resides on the on-board flash memory and the second resides on the external compact flash/microdrive card. This appendix briefly describes the structure of the file system.

The files that reside in the internal flash conform to a flat directory structure. The compact flash system contains a fully FAT32 compatible file system to allow the same compact flash card to be used in a Windows environment. The following table, presents the structure of the overall file system.

### *File System*

TOP LEVEL	SECONDARY LEVEL	DESCRIPTION
\		Root of the file system
	DISPLAY	Legacy/Unused
	SYS	Contain various system configuration files
	SETUP	Directory used to hold setup files
	HTML	Web pages
	SIMPL	Control system program files
	SPLUS	SIMPL+ module files\
	USER	User defined files
	MAILBOX	User mailbox file
	CFØ	The mounting point for the compact flash files.
	\CFØ\DISPLAY	Directory used to hold display files

Although the file system is case insensitive, the case is preserved to maintain file checksums. The compact flash directory only appears when the compact flash is inserted into the system. To reference files on the compact flash, prefix the “\CFØ” to any fully qualified path from the Windows environment. For example, if the file in Windows is “\MyDirectory\MySubdirectory\MyFile.ext”, the complete 2-series path for a file on the first Compact Flash slot (onboard) is:

```
“\CFØ\MyDirectory\MySubdirectory\MyFile.ext”
```

You do not have to create subdirectories for general files; you can put them in the root of the Compact flash (\CFØ).

The only time subdirectories are required is when putting bootable projects on the Compact Flash (\CFØ\SIMPL, \CFØ\SPLUS), but SIMPL Windows takes care of that for you when you do the File | Copy to CF function. SIMPL Windows makes the appropriate subdirectories. The same is true when you put web pages on the Compact Flash. The tools create the appropriate directories.

## Appendix B: More CNX-DVP4 Features (Master Mode)

This appendix describes projects created in VT Pro-e and SIMPL Windows that more fully demonstrate CNX-DVP4 features in the Master mode. Once the projects are loaded, the user can select from several video sources, displayed one at a time as page flips, with a zoom effect for each source.

### Prerequisites

- Display device connected to the output DVI/RGB port. If display connector is RGB, use the supplied DVI-I/RGB adapter.
- Video inputs connected to the input DVI/RGB, S-Video or Composite ports. If video source connector is VGA (RGB), use the supplied DVI-I/RGB adapter.
- Cresnet connected to the Cresnet port of CNX-DVP4 and TPS-5000.
- PC connected to the CNX-DVP4 (SIMPL Windows, VT Pro-e and Viewport open) using RS-232 or Ethernet.

**NOTE:** The Cresnet ID must be set to **02** for Master mode. To verify this, establish communications with the CNX-DVP4 in Viewport (refer to page 49) and enter *setup* at the CNX-DVP4 prompt. The Setup menu appears on the display device. Select **System Setup | Interface** to view the Interface menu (refer to Interface Menu on page 25). Select the Master button if Cresnet ID is not set to **02**.

### VT Pro-e

Two projects are created and compiled in VT Pro-e: The first project creates the button presses, join numbers, and establishes the background logo page. The second project assigns the various video inputs for page flips and zoom features.

#### Project 1

1. Create a project and name it 'Page Flip for TPS5000' and select TPS-5000 as the panel type using **Name New Project File As**.
2. Create a new page, name it Logo, and select a logo graphic for the background using "Page Properties".
3. Create six buttons, name them and assign digital press join numbers using "Button Properties" (refer to following table). Place buttons at lower part of window.

#### Button Names/Join Numbers

BUTTON NAME	DIGITAL PRESS JOIN NUMBER
Logo Page	1
Camera	2
ST-Tune	3
DVD	4
Power Point	5
Guest Speaker	6

## Project 2

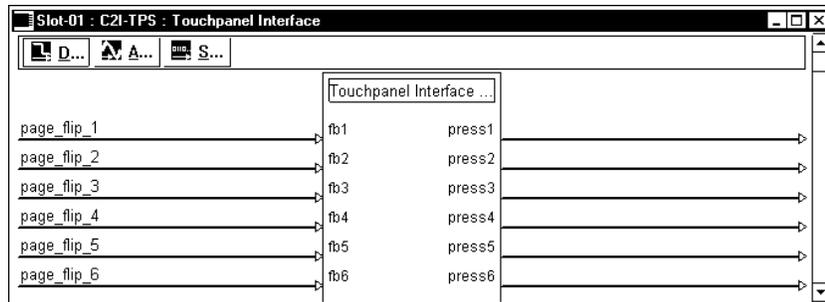
1. Create a project, name it *Page Flip for CNXDVP4* and select CNX-DVP4 as the panel type.
2. Create a new page, name it *Logo*, and select a logo graphic for the background. Assign a Join number of 1 in “Page Properties”.
3. Create Page 2 and name it *Camera Video 1A*.
4. Assign Join number of 2 in “Page Properties”.
5. Place a video window on this page.
6. Select *Full Screen, Video Input 1A* and *Zoom* in “Video Properties”.
7. Create Page 3 name it *Tune Video 1B*.
8. Assign Join number of 3 in “Page Properties”.
9. Place a video window this on page.
10. Select *Full Screen, Video Input 1B* and *Zoom* in “Video Properties”.
11. Create Page 4 and name it *DVD SVHS 2*.
12. Assign a Join number of 4 in “Page Properties”.
13. Place a video window on this page.
14. Select *Full screen, S-Video Input 2* and *Zoom* in “Video Properties”.
15. Create Page 5 and name it *Power Point RGB 1*.
16. Assign Join number of 5 in “Page Properties”.
17. Place a video window on this page.
18. Select *Full Screen, DVI/RGB 1* and *Zoom* in “Video Properties”.
19. Create Page 6 and name it *Guest Speaker RGB 2*.
20. Assign a Join number of 6 in “Page Properties”.
21. Place a video window this on page.
22. Select *Full Screen, DVI/RGB 2* and *Zoom* in “Video Properties”.

## SIMPL Windows

One project is created and compiled in SIMPL Windows. This program establishes the touchpanel interface.

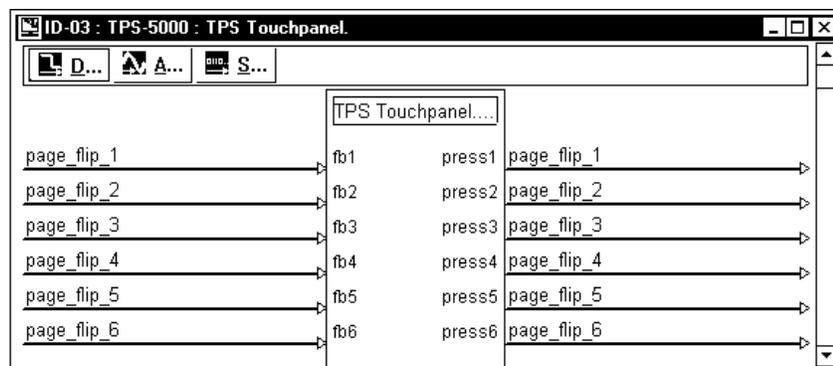
1. Create a project and name it *Page Flip Master Mode*.
2. Drag and drop a CNX-DVP4 from the **Device Library | Control Systems** folder to *System Views*.
3. Drag and drop a TPS-5000 from the Touchpanels folder to Cresnet Units in *System Views*.
4. Click  (Program) to open *Program View*.
5. Double click Slot-01: Touchpanel Interface to open symbol.
6. Program the symbol according to the graphic on next page.

*Touchpanel Interface Symbol*



7. Click Slot-03: Cresnet: C2Net-Device to open TPS Touchpanel.
8. Double click ID:03: TPS Touchpanel to open symbol.
9. Program the symbol according to the following graphic.

*TPS Touchpanel Symbol*



**Advanced Features**

One of the many exciting features of the CNX-DVP4 is its ability to change a video source on a selected page, instead of using page flips as described in the previous projects. This is performed using analog joins. For example, you could add buttons to the VT Pro-e project 1 Logo page that corresponds with all video sources. You then assign analog join numbers to a video page in project 2 (for example, Page 3: ST-Tune video 1B) using **Video Properties | Joins | Types | Input Selection**. The SIMPL Windows project has a digital to analog symbol and support logic symbols added and programmed, and additional programming is added to the TPS and Touchpanel Interface symbols (digital and analog joins). Once the projects are compiled and loaded in the CNX-DVP4, pressing a video button on the touchpanel changes the displayed video source without the need of page flips.

**Examples**

Example projects are available from the Crestron FTP site (<ftp://ftp.crestron.com/Examples>). Search for:

- SIMPLE\_PAGE\_FLIP\_TPS5000.VTZ
- SIMPLE\_PAGE\_FLIP\_ANALOG\_CHANGES.VTZ
- SIMPLE\_PAGE\_FLIP\_MASTER\_MODE.ZIP.

## Appendix C: Cable Connection Information

This appendix contains important cable connection information.

### **RGB to BNC**

A RGB to BNC cable has a RGB DB15 connector on one end and five BNC connectors on the other end. The BNC connectors are Red, Blue, Green, Horizontal and Vertical. The Horizontal and Vertical cables are stamped H and V, respectively. The RGB to BNC connection standards are:

- RGB Sync on Green (Red, Green and Blue only; Horizontal and Vertical not connected)
- RGB H Sync (Red, Green, Blue and Horizontal only; Vertical not connected)
- RGB H Sync/V Sync (Red, Green, Blue, Horizontal and Vertical connected)

---

**NOTE:** If you connect the Horizontal and/or Vertical cables for RGB Sync on Green, no video will be displayed.

---

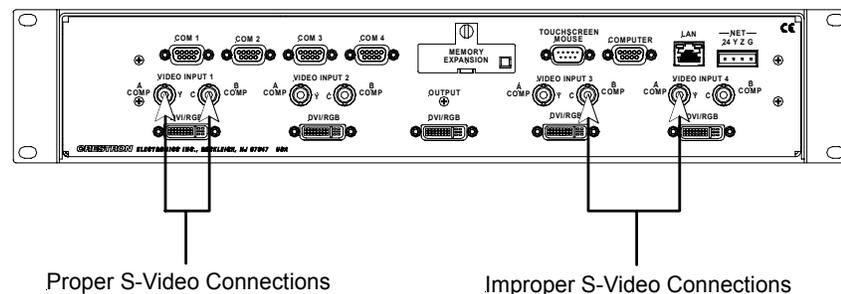
### **S-Video Cable Adapter**

If you are using a 4-pin DIN S-Video cable, you will need to use a 4-pin (female) DIN to BNC adapter (adaptor not included).

### **S-Video Connections**

When connecting S-Video cables to the CNX-DVP4, make sure to connect one set to one input. For example, connect one S-Video set to the Video Input 1 Y and C ports. Do not connect one of the connectors to any other Y or C ports. Refer to following graphic.

#### **S-Video Connections**



### **RS-232 Control and Computer Ports**

Use a DB9 straight-through cable (do not use a non-modem cable).

### **Touchscreen/Mouse**

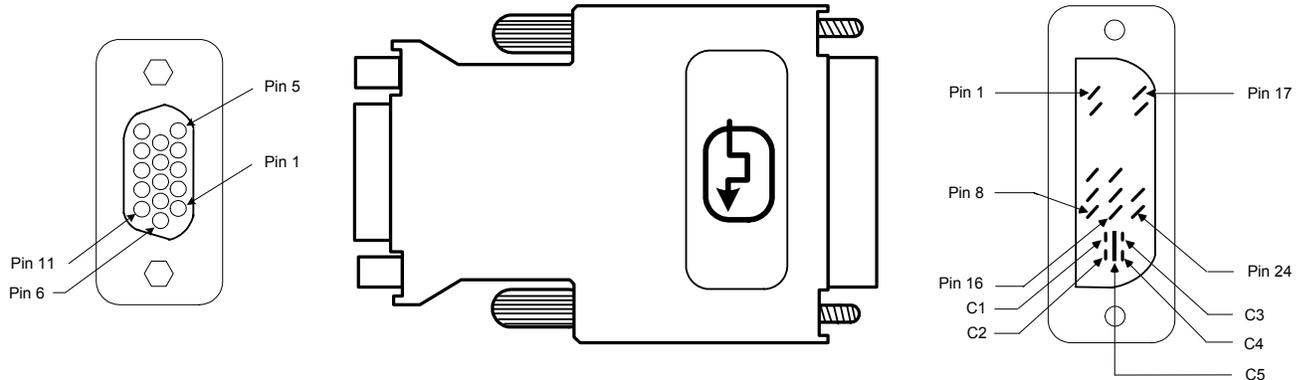
This cable is supplied by the touchscreen or mouse vendor (except for a Matisse cable; refer to “Appendix E: Viewport Commands” on page 83).

**DVI/RGB**

Crestron supplies a 29-pin to 15-pin adapter for VGA analog signals (refer to page 8). Use the 29-pin DVI cable for digital video (six to eight foot maximum length). Refer to the following illustration for adapter pinouts. Refer to the table following the illustration for connection information.

Single Link DVI supports a maximum bandwidth of 165 MHz (1920 x 1080 at 60 Hz, 1280 x 1024 at 85Hz). A single link implementation utilizes 12 of the 24 available pins. Dual Link DVI supports 2 x 165 MHz (2048 x 1536 at 60 Hz, 1920 x 1080 at 85 Hz). A dual link implementation utilizes all 24 of the available pins.

*DVI/RGB Pinouts*



**VGA(F) DVI-A(M)**

*DVI/RGB Connections*

VGA (RGB)	DVI	CABLE FUNCTION
SHIELD	SHIELD	GROUND
PIN R6, G7, B8	C5	ANALOG GROUND
PIN 13	C4	HORIZONTAL SYNC
PIN 3	C3	ANALOG
PIN 2	C2	ANALOG
PIN 1	C1	ANALOG
PIN 5,10	PIN 15	GROUND (+5V & HV SYNC)
PIN 9	PIN 14, 16	POWER +5V/HDT PLUG DETECT
PIN 14	PIN 8	VERTICAL SYNC
PIN 12	PIN 7	DDC DATA
PIN 15	PIN 6	DDC CLOCK

## Appendix D: Output DVI Video from PC to CNX-DVP4

To output DVI video from a Microsoft Windows-based (98/NT/2000) PC to the CNX-DVP4, the current DVI driver on the PC must be updated with a Plug and Play Monitor driver. This is accomplished using **Desktop | Display Properties** on a PC.

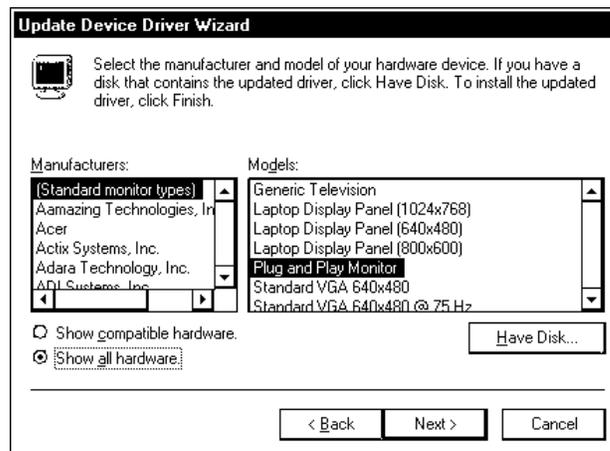
**NOTE:** The following procedure assumes that the PC has a DVI video card and driver installed. Also, a Matrox Graphics™ DVI driver will be used as an example.

1. Right click on the desktop and click **Properties** from the pulldown menu to open the “Display Properties” window.
2. Select the *Settings* tab.
3. Select the Matrox DVI video display driver from the *Display* field.
4. Click **Advanced** to open the Matrox DVI driver window.
5. Select the *Monitor* tab.
6. Click **Change** to open the Update Device Driver Wizard.

**NOTE:** Depending on the type of driver, the **Change** button may reside on a tab other than the *Monitor* tab.

7. Click **Next**.
8. Select *Display a list of all drivers...* and click **Next**.
9. Select *Show All Hardware* to open the hardware fields.
10. Select **(Standard monitor types)** from *Manufacturers* field (refer to the following graphic).
11. Select **Plug and Play Monitor** from the *Models* field (refer to the following graphic).
12. Click **Next** three times.
13. Click **Finish** to return to the DVI driver window.
14. Click **OK**.

### *Update Device Driver Wizard*



---

## Appendix E: Viewport Commands

This appendix contains information about some Viewport commands that are unique to the CNX-DVP4, i.e., they can be accessed only through the CNX-DVP4 prompt in Viewport. To run these commands, establish communications between the PC and the CNX-DVP4 (refer to page 49), open SIMPL Windows or VT Pro-e and select **Tools | Viewport** from the main menu.

### Cursor On/Cursor Off

Allows the user to display or not display the cursor on a display device. The commands are:

**cursor on** - displays cursor.

**cursor off** - does not display cursor.

---

**NOTE:** The default for a mouse connected to the CNX-DVP4 is *cursor on*. The default for a touchscreen connected to the CNX-DVP4 is *cursor off*.

---

### Output

Allows the user to select the output resolution. The commands are:

**output** – Displays the current resolution setting.

**output ?** – Displays the resolution options.

For example, the resolution options are 1600, 1365, 1280, 1024 or 800.

To change the resolution, type **output <resolution>** and press **Enter**. For example, type **output 1280** and press **Enter**. The system prompts you to reboot to accept the change.

### Touch

Allows the user to select the touchscreen or mouse that will be used as a pointing device. The commands are:

**Touch** - displays what is currently selected.

**Touch ?** - displays list of available pointing devices:

- 0 - Program Control (create program in SIMPL Windows to control pointing device)
- 1 - Microsoft Mouse\*
- 2 - Smart (SC3, SC4, SC5) (Touchscreen)
- 3 - Smart (SC6, SC7,..) (Touchscreen)
- 4 - Microtouch (Touchscreen)
- 5 - Dynapro SC3 (Touchscreen)
- 6 - Dynapro SC4 (Touchscreen)
- 7 - Elo Graphics (Touchscreen)
- 8 - Crestron Tablet (TPS serial touchpanel)
- 9 - Mouse Systems Mouse\*
- 10 - Logitech MouseMan\*

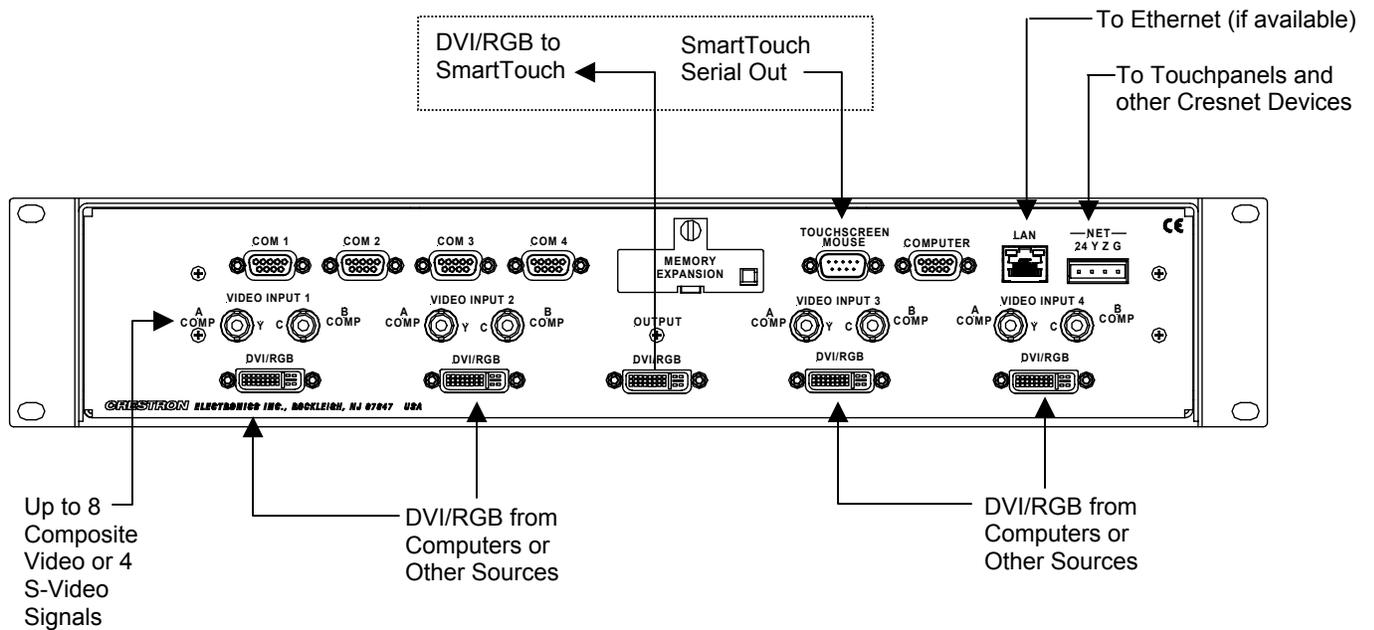
\* Refer to “Specifications” on page 2 for mouse requirements.

---

**NOTE:** Smart (Matisse) requires that the Data Terminal Ready (DTR, pin 6) and Data Set Ready (DSR, pin 4) connections be removed from the DB9 RS-232 cable for proper operation.

---

## SmartTouch Connections



For additional SmartTouch installation instructions, refer to [http://www.smarttech.com/support/pdf/plasma\\_install.pdf](http://www.smarttech.com/support/pdf/plasma_install.pdf)

## Caltouch

Allows user to calibrate the CNX-DVP4 to a touchscreen. Once a touchscreen is connected, typing **caltouch** and pressing **Enter** at the CNX-DVP4 prompt puts the system in the calibration mode. You then follow the screen prompts. You must perform a new calibration for every new touchscreen connected.

---

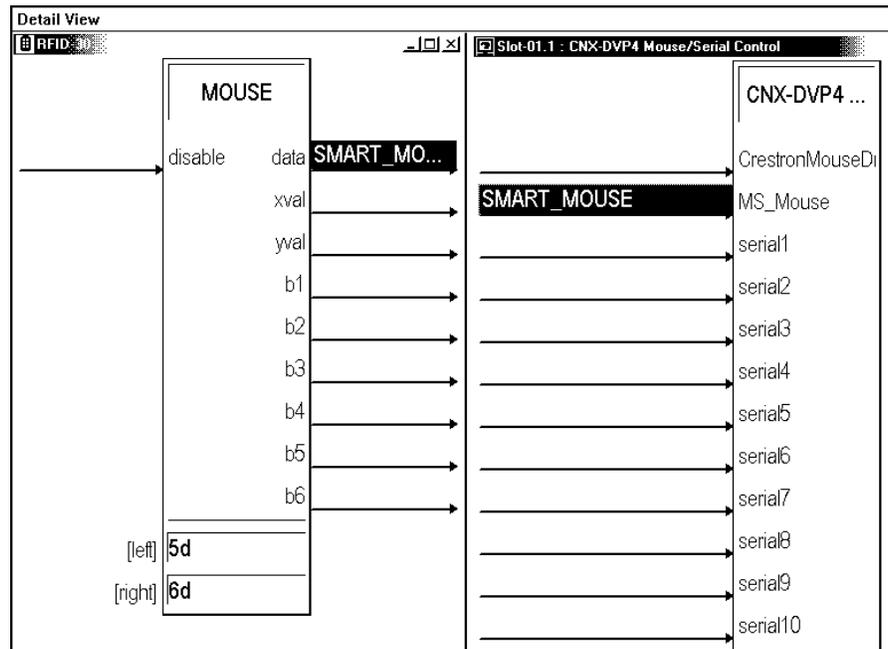
**NOTE:** The first time any touchscreen is selected, it is not operational until it is calibrated. Calibration setting is not lost when switching between mouse and touchscreen. The current calibration setting is lost when a new calibration is performed.

---

## Appendix F: Connecting a Mouse

### Using Crestron Smart Mouse (CNWM) With CNX-DVP4

#### *SIMPL Windows Detail View*

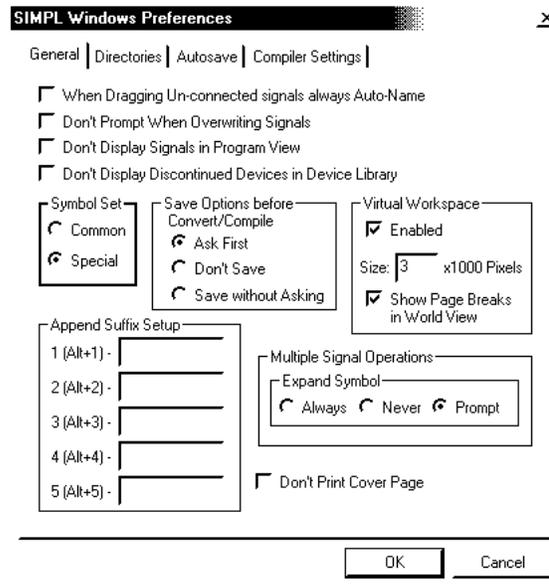


**NOTE:** When you set up for this mode, you can still have another mouse device plugged into the Touchscreen Mouse port and have it control the CNX-DVP4, for example: Micro touch, Elo Touchsystems, Microsoft mouse etc.

#### ***In SIMPL Windows:***

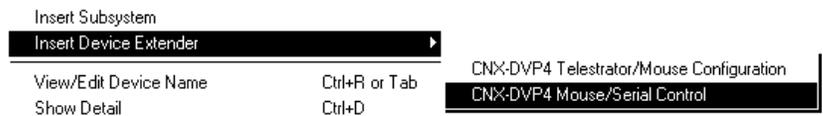
1. Add CNX-DVP4 helper extender symbol CNX-DVP4 Mouse / Serial.
  - i. Open *Edit Preferences*.
  - ii. Select the *General* tab and select the *Special* mode from the *Symbol* set. Refer to “New Helper Symbols” on page 42.

**SIMPL Windows Preferences - Special Symbol Set**



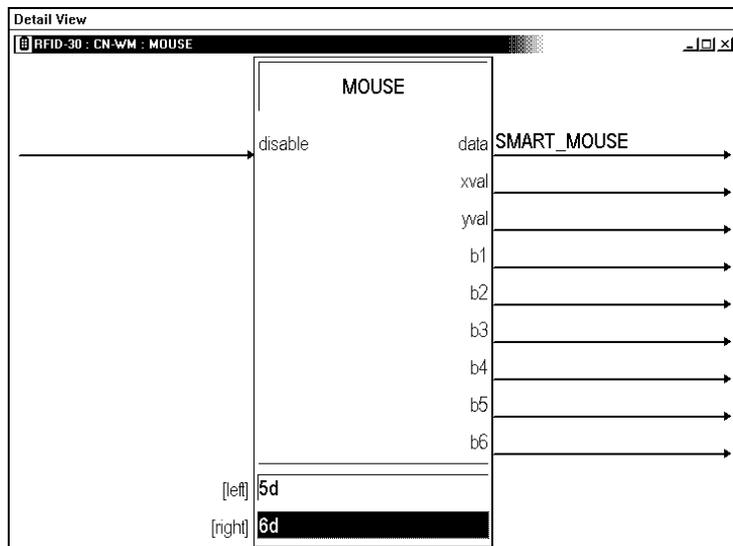
- iii. Drop in a CNX-DVP4 in to the project, then right click on Slot 1 of the CNX-DVP4.

**Insert Device Extender**



- 2. Add the CNRFGWA 433.92 MHz gateway symbol.
- 3. Add the CNWM Crestron Smart Mouse symbol (RF ID 30).

**Smart Mouse Symbol**



- 4. Add a label to RF-ID 30 Data (serial string) symbol to Slot 01.1 on the CNX-DVP4 helper extender Mouse / Serial symbol.
- 5. Add a digital value of 5 to the Crestron Mouse symbol for the left button mouse to work. This is the larger of the black buttons on the Smart mouse.

6. Add a digital value of 6 to the Crestron Mouse symbol for the right button mouse to work. This button is located on the bottom of the Smart mouse.

### ***In Viewport:***

---

**NOTE:** The following setting is only required when using a second pointing device connected to the Touchscreen/Mouse port.

---

1. Set the touch input command to 1, by typing:  
TOUCH <number corresponding to connected device>  
and then press **Enter**.
2. Type: REBOOT and then press **Enter**.

## **Using TPS-5000/6000 as a Touchscreen Mouse Connected via RS-232**

### ***Equipment required:***

- One CNX-DVP4 Version 3.017 or higher
- One TPS-5000/6000 panel only with RGB card V1.017
- One DVI to RGB adapter supplied by Crestron
- One 24 VDC 75 watt power supply for CNX-DVP4
- One RS-232 cable Crestron P/N STPK programming kit
- One VGA Male cable to VGA Male cable
- Cresnet cables

### ***Software Required***

- SIMPL Windows Version 2.03.11 or higher
  - VT Pro-e Version 3.0.0.6 or higher
1. Connect the RS-232 cable from the touchpanel to the CNX-DVP4 touchscreen mouse serial port.
  2. Set up the touchpanel serial port for RS-232 PORT FOR TOUCH OUT.
  3. In VT Pro-e, create a page with full screen RGB window for the TPS-5000/6000.
  4. In RGB window property – select the *Design* tab and select **Pad 1** or **2**. For *Type*, enter MOUSE and for *Communication* select SERIAL.
  6. Send the project to the touchpanel.
  7. From Viewport, set the CNX-DVP4 to Touch command # 8:  
8 - Crestron Tablet (TPS serial touchpanel)

---

**NOTE:** Each time a new touchscreen is connected to the Touchscreen/Mouse port, and each time you switch between touchscreens, you must perform the **CALTOUCH** command.

**NOTE:** **CALTOUCH** is not required when any type of mouse is connected.

**NOTE:** **CALTOUCH** may not always be necessary when “touch 8” is selected, because it is a Crestron touchscreen.

---

## Using TPS-5000/6000 as a Touchscreen Mouse Connected via Ethernet

The advantage of this approach is that the mouse port on the CNX-DVP4 is still available and can be used by another pointing device.

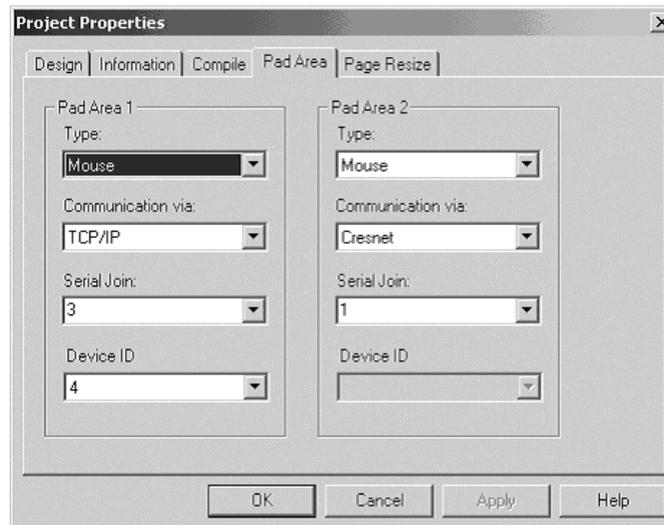
### **Equipment required:**

- One CNX-DVP4 Version 3.017 or higher
- One TPS-5000/6000 panel only with RGB card V1.017
- One DVI to RGB adapter supplied by Crestron
- One 24 VDC 75 watt power supply for CNX-DVP4
- One VGA Male cable to VGA Male cable
- One RS-232 cable Crestron P/N STPK programming kit
- Cresnet cables

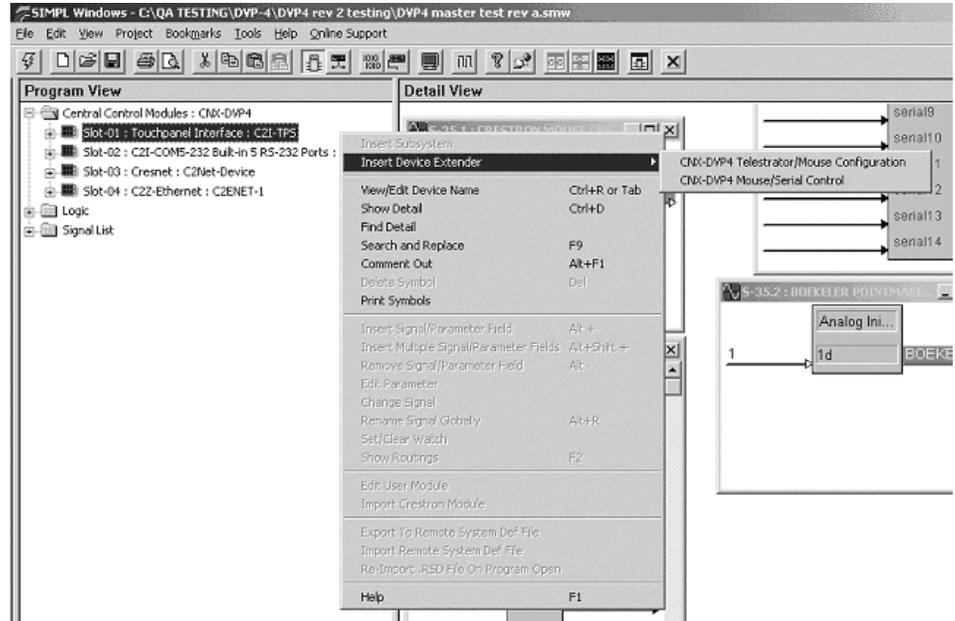
### **Software Required**

- Simple Windows Version 2.03.11 or higher
  - VT Pro-e Version 3.0.0.6 or higher
1. In VT Pro-e create a page with a full screen RGB window.
  2. In RGB window property – select the *Design* tab and select **Pad 1** or **2**.
  3. From “Project Properties” select the *Pad Area* tab and select **Pad 1** or **2**. For *Type*, enter MOUSE and for *Communication* select Ethernet and assign a *Serial Join* number to be used in SIMPL Windows. Assign a *Device ID* number. This ID number must be added to the IPT of the touchpanel.

#### **“Project Properties” Window**



4. Compile (**F12**) the project and load the project to the touchpanel.
5. In SIMPL Windows, add the CNX-DVP4 to the project as either a master or slave.
6. Extend the CNX-DVP4 icon to display the slots.
7. Right click on Slot 1.

*Detail View in SIMPL Windows*

8. Select CNX-DVP4 **Mouse/Serial Control**. This adds the icon to slot 1 Mouse/Serial Control.
9. Assign a label to the touchpanel serial join number assigned in VT Pro-e and to the Slot-01.1 Mouse/Serial Control Crestron Mouse.
10. Compile program and download to control system.
11. Establish communication with the touchpanel in Viewport and add the new Device ID to the IP Table of the touchpanel.

**ADDM 3 134.149.10.142 4**

Where:

**ADDM** is command to add Ethernet devices to the IP Table of the touchpanel.

**3** is the CIP ID address of the touch panel in SIMPL Windows.

**134.149.10.142** is the IP address of the Control system.

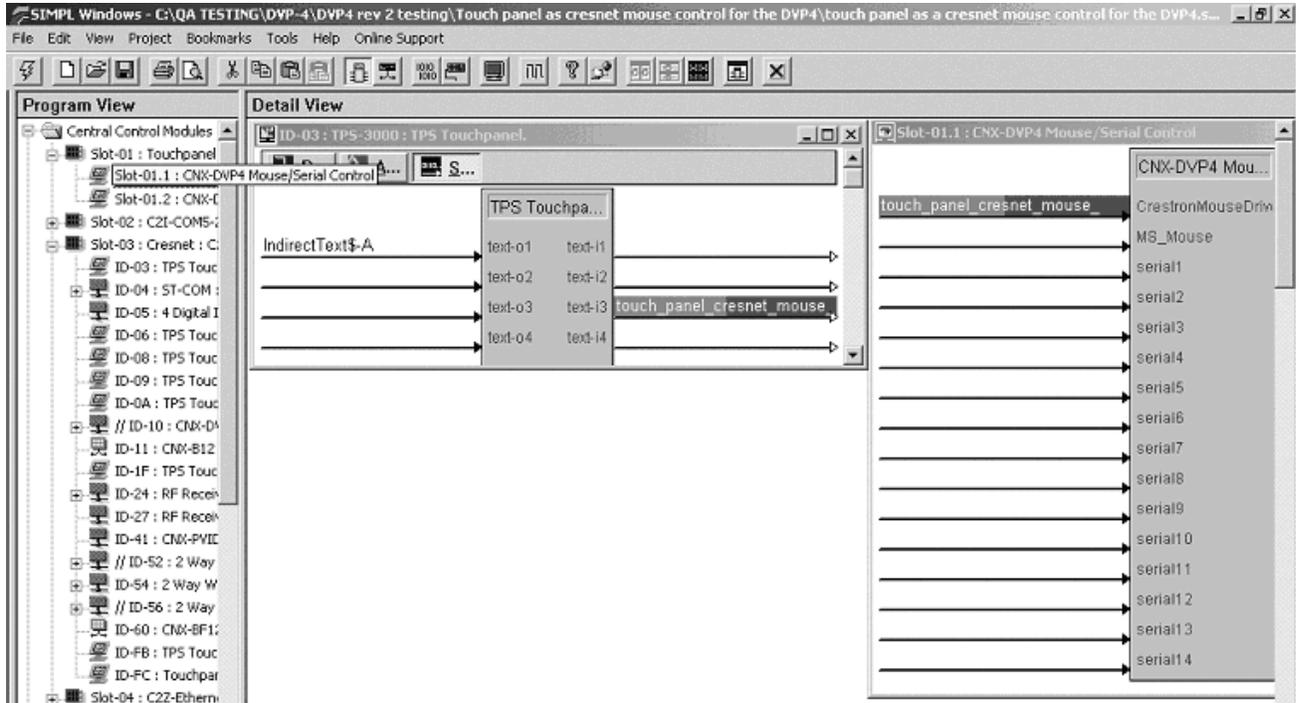
**4** is the Device ID we added in VT Pro-e.

---

**NOTE:** When you set up for this mode, you can still have another mouse device plugged into the Touchscreen Mouse port and have it control the CNX-DVP4, for example: Micro touch, Elo Touchsystems, Microsoft mouse etc.

---

*Mouse/Serial Control Symbol*



## Using TPS-5000/6000 as a Touchscreen Mouse Connected via Cresnet

### ***Equipment required:***

- One DVP4 Version 3.017 or higher
- One TPS-5000/6000 panel with an RGB card V1.017
- One DVI to RGB adapter supplied by Crestron
- One 24 VDC 75 watt power supply for DVP4
- One VGA Male cable to VGA Male cable
- One RS-232 cable Crestron P/N STPK programming kit.
- Cresnet cables

### ***Software Required:***

- Simple Windows Version 2.03.11 or higher
  - VTPro-e Version 3.0.0.6 or higher
1. Connect the RS-232 cable from the touchpanel to the CNX-DVP4 touchscreen/ mouse serial port.
  2. Set up the touchpanel serial port for RS-232 PORT FOR TOUCH OUT.
  3. Create a page In VT Pro-e with a full screen RGB window.
  4. In the “RGB Properties” window, select the *Design* tab and select **Pad 1** or **2**.
  5. From “Project Properties” select *Pad Area* tab and select **Pad 1** or **2** for *Type: MOUSE* and *Communication via: SERIAL*.
  6. Send the project to the touchpanel.
  7. In Viewport, set the CNX-DVP4 to Touch command # 8 (Crestron Tablet).
  8. Perform Calibration from Viewport via the **CALTOUCH** command.

---

**NOTE:** Each time a new touchscreen is connected to the Touchscreen/Mouse port, and each time you switch between touchscreens, you must perform the **CALTOUCH** command.

---

## Appendix G: Application Notes

Crestron CNX-DVP4 and Smart Technologies Sympodium combine to form a unique presentation solution.

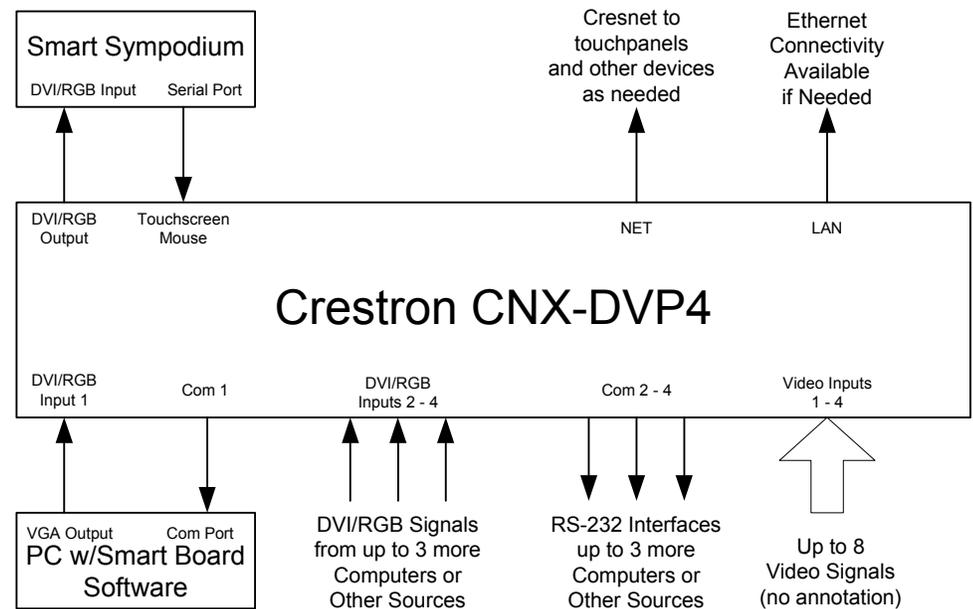
The combination of the Crestron CNX-DVP4 Digital Video Processor and the Smart Technologies Sympodium answers the call for increased functionality in less space, and does it at a reduced cost.

The Sympodium from Smart Technologies provides a 15" color touchscreen surface that allows presenters to annotate over any computer-generated graphics image. By incorporating a Crestron [CNX-DVP4](#) or [TPS-TPI](#) with the [Sympodium](#), the user has the benefit of complete AV control and graphics onscreen as well as annotation without the need of a separate touchpanel. This is especially advantageous where counter space may be limited, or where a single user interface is desired.

The Crestron CNX-DVP4 interfaces directly to the sympodium providing a control system processor and touchscreen interface in one. Using the CNX-DVP4, the GUI displayed on the sympodium looks just like a Crestron Isys™ touchpanel with all of the additional benefits of the CNX-DVP4 like transition and translucence effects. Full operation of the sympodium is conducted using a stylus.

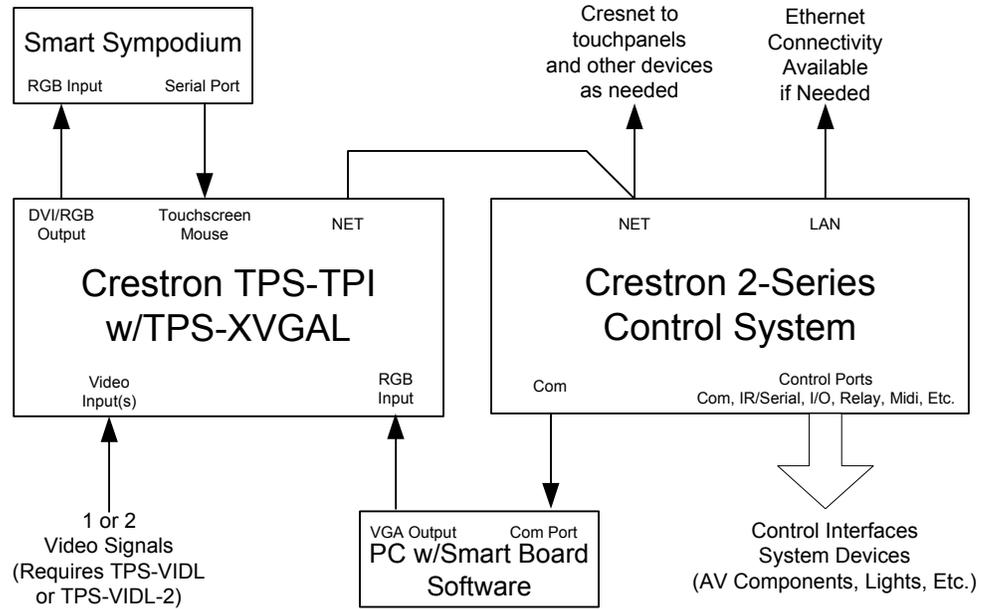
Best of all, in addition to its astounding graphics, the CNX-DVP4 also provides for display of up to 4 high-performance, fully scalable video and computer windows within the control GUI. And with 4 onboard com ports, the CNX-DVP4 can add dramatic expansion capability to the sympodium by enabling both Smart annotation and Crestron "Touch-The-PC" mouse driver capability for four separate computer sources at a time!

### *Smart Sympodium with CNX-DVP4*



The Crestron Isys™ TPS-TPI, in combination with any 2-Series control processor, can provide similar control functionality while permitting display of a single computer window and up to two video windows. This solution allows annotation and "Touch-The-PC" control for only one computer at a time.

*Smart Sympodium with TPS-TPI*



Detailed information for either solution can be found along with software modules/demo programs here:

[www.crestron.com/dealer-tech\\_resources/design\\_center/modules/smart\\_technologies](http://www.crestron.com/dealer-tech_resources/design_center/modules/smart_technologies)

For more information, please contact Crestron's Technical Sales Department by calling 800-237-2041 x294, or email [techsales@crestron.com](mailto:techsales@crestron.com).

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