

**AVENUE**

Avenue™ signal integration system

# Model 5430/5440 8x1 and 8x8 Digital Video Routers Data Pack

**ENSEMBLE**

D E S I G N S

Revision 3.1 SW v1.1

This data pack provides detailed installation, configuration and operation information for the **5430 8x1 Digital Video Router** and the **5440 8x8 Router** option as part of the Avenue Signal Integration System.

The module information in this data pack is organized into the following sections:

- Module Overviews
- Applications
- Installation
- Cabling
- Module Configuration and Control
- Troubleshooting
- Software Updating
- Warranty and Factory Service
- Specifications
- Appendix A – Serial Control

### MODULE OVERVIEWS

The 5430 8x1 Digital Video Router module provides digital video routing for eight inputs by one output. The 5440 8x8 Digital Video Router module option mounts physically on the 5430 circuit board in the adjacent frame slot to expand the number of outputs to eight (8x8). An analog monitor output is also provided on the 5440 for tracking any of the eight serial output buses. An On Screen Display (OSD) overlay on the monitor output indicates text ID of source and destination and crosspoint configuration.

The router and router option can be controlled through an optional Touch Screen panel, Avenue PC, or an external interfaces such as an Avenue X-Y Router Control Panel available with the routers, GPI control (customer supplied buttons) or serial control with a PC. The X-Y Control panel connects directly to the 15-pin high-density Control D connectors on the rear of the 5430 modules. The GPI control uses nine pins on the Control D connector.

The 5430 module accepts up to eight serial digital inputs fed from BNCs on the rear of the module. The inputs are first equalized then fed to the crosspoint routing circuitry as illustrated in the 5430 Block diagram on the opposite page. Crosspoint control information determines which crosspoint video will be sent to reclocking circuitry before being buffered and fed to two looping BNCs on the rear of the module.

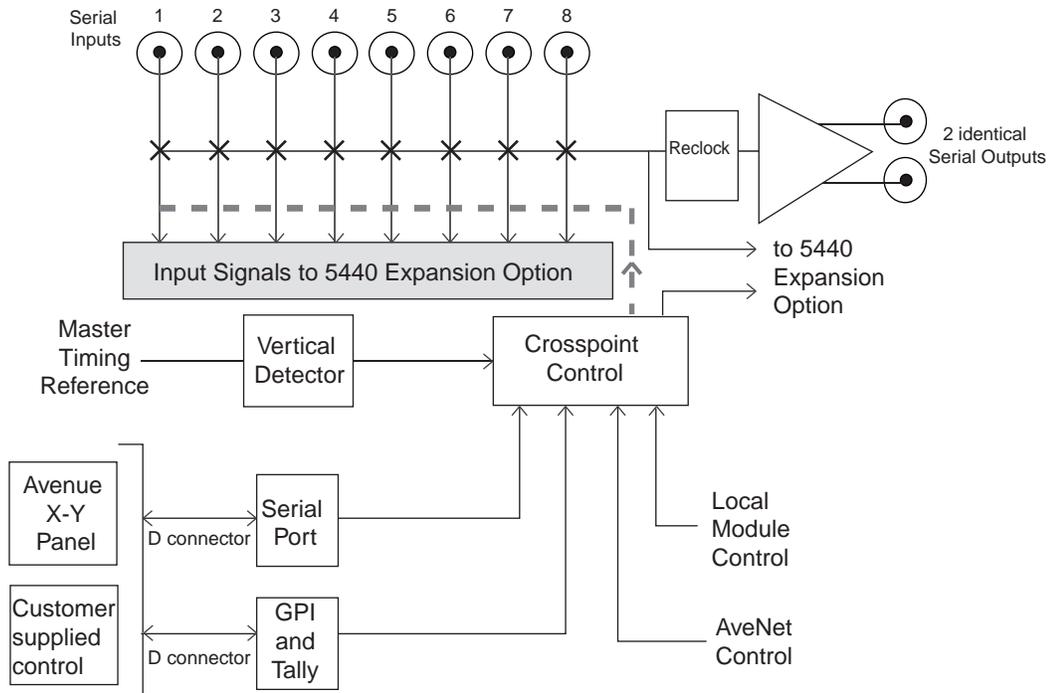
Crosspoint control information is derived from the AveNet control input and the external control device (X-Y Control panel or GPI and Tally) if installed or by local module settings. Vertical interval switching information is input to the crosspoint control from the master timing reference feeding a vertical detector. This allows the router switching to take place during the vertical interval.

The other seven equalized outputs are also sent to a header connector on the 5430 module which connects to the 5440 module when it is installed as shown in the block diagram on the opposite page. This provides the input video sources to the 5440 module. The seven selected crosspoints are fed to the reclocking and buffer circuitry before being buffered and sent to the output BNCs on the rear of the 5440 module.

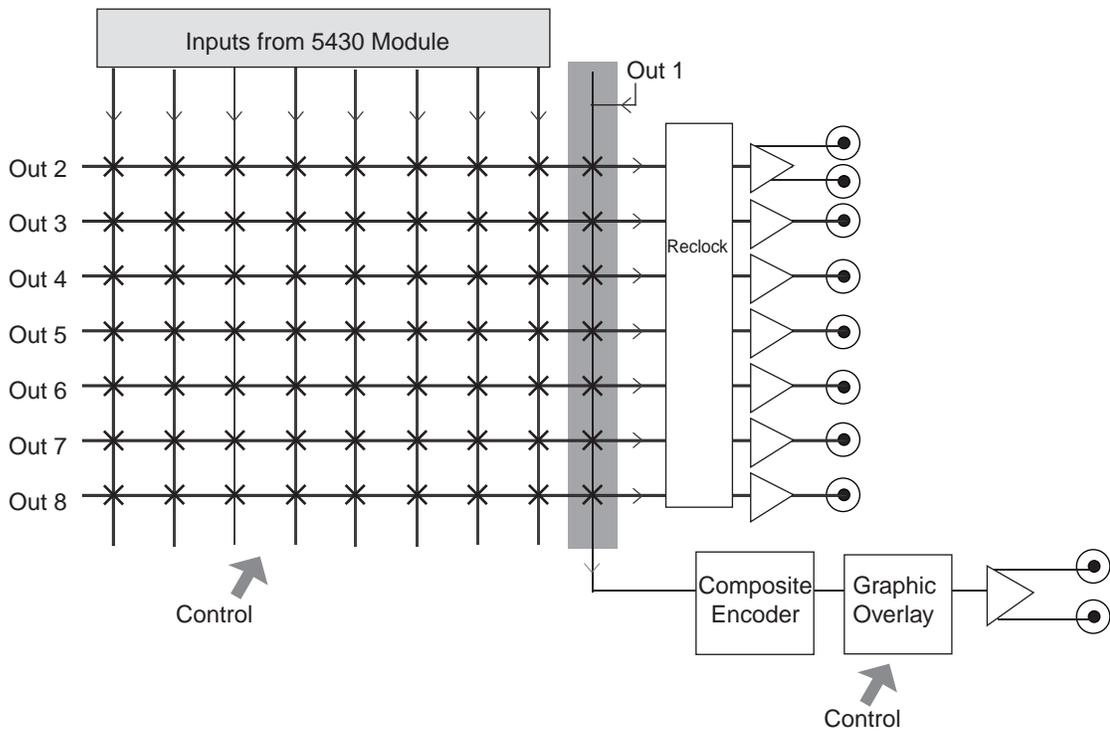
A composite monitor output is provided through two identical BNCs on the rear of the 5440 module to allow a text overlay label for the selected output source and destination.

Power is derived from the  $\pm 12$  volt frame power. It is regulated to the required +5 volts for the module by on-board regulator. The module is fused with a resettable fuse device. If the fuse opens due to an overcurrent condition, the module will lose power. After pulling the module, the fuse will reset automatically requiring no replacement fuse.

Router configuration can be set remotely or locally. The router status can be read from the remote interfaces (Avenue PC or a Touch Screen) or from the LEDs on the front of the 5430 module as explained later in this data pack.



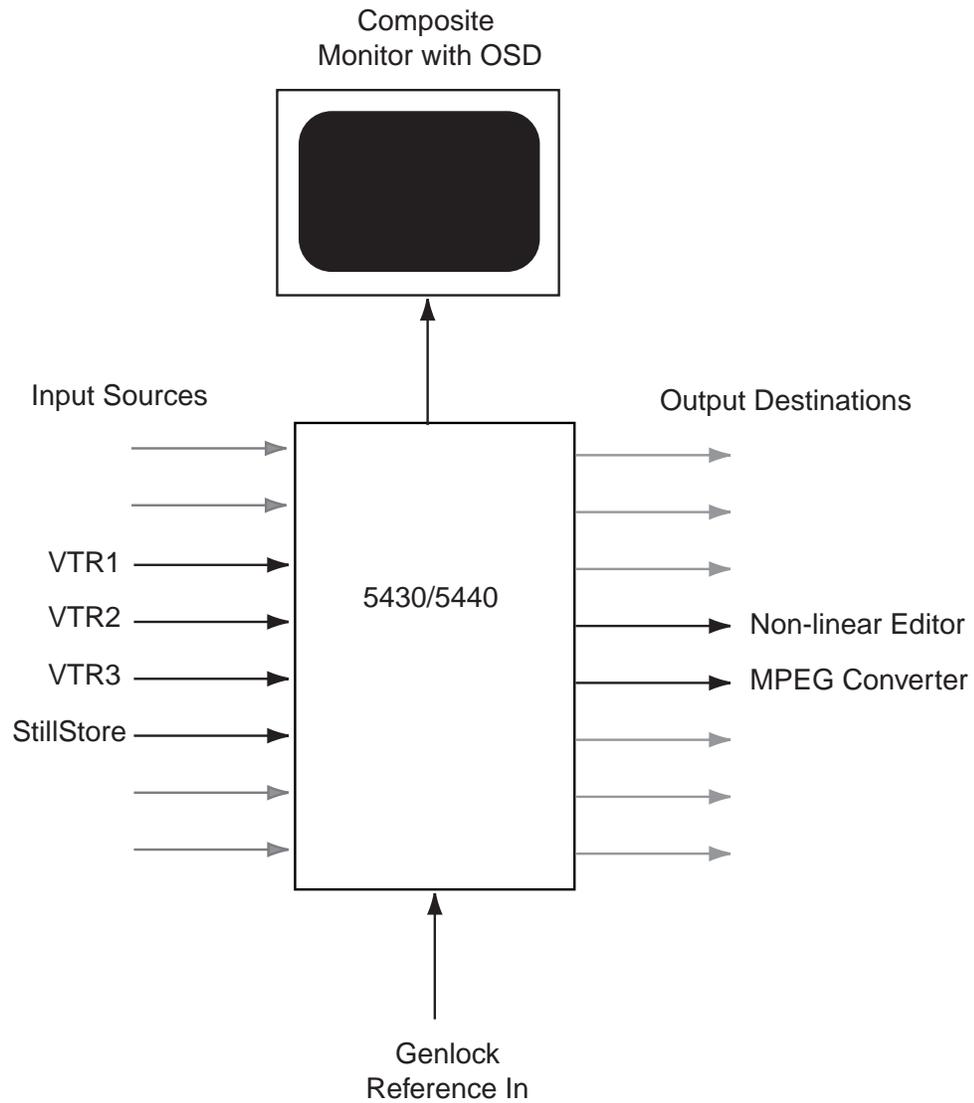
5430 8x1 Digital Video Router Block Diagram



5440 8x8 Digital Video Router Block Diagram

## APPLICATIONS

The 5430/5440 Routers are ideal for smaller routing applications such as monitoring, edit suites and graphics rooms. A typical edit suite application is shown below which utilizes the monitor output with on-screen display (OSD). A genlock reference can feed the router from the frame to synchronize vertical cuts with other equipment.

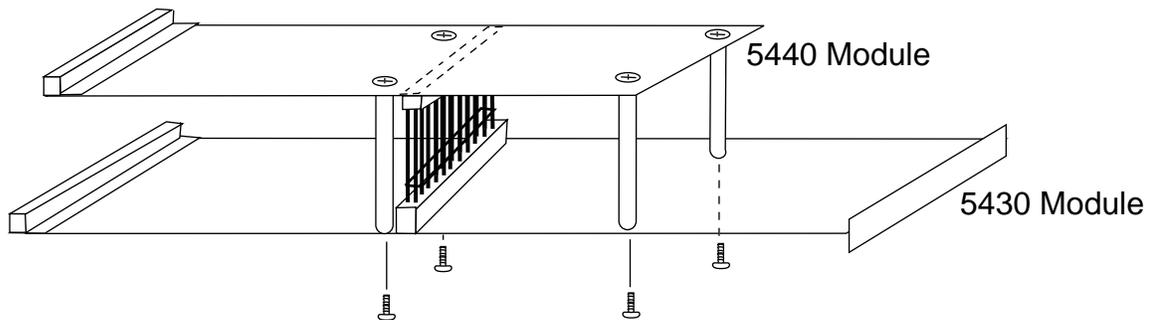


**5430/5440 Router Application**

## INSTALLATION

### 5430 and 5440 Modules

Plug the 5430 module into any one of the slots in the 1 RU or 3 RU frame. If you are also installing a 5440 module (3 RU frame only), first mount the 5440 onto the 5430 by lining up the interface connectors on either module as illustrated in the figure below. Attach the standoff on the 5440 to the holes in the 5430 circuit board with the screws provided. Since the modules will occupy two adjacent slots, the 5430/5440 combination may only be used in a 3 RU frame.



#### Mounting the 5440 to the 5430 Module

Install the plastic overlay provided with each module onto the corresponding group of rear BNC connectors associated with the module locations. Note that the plastic overlay has an optional adhesive backing for securing it to the frame. Use of the adhesive backing is only necessary if you would like the location to be permanent and is not recommended if you need to change module locations.

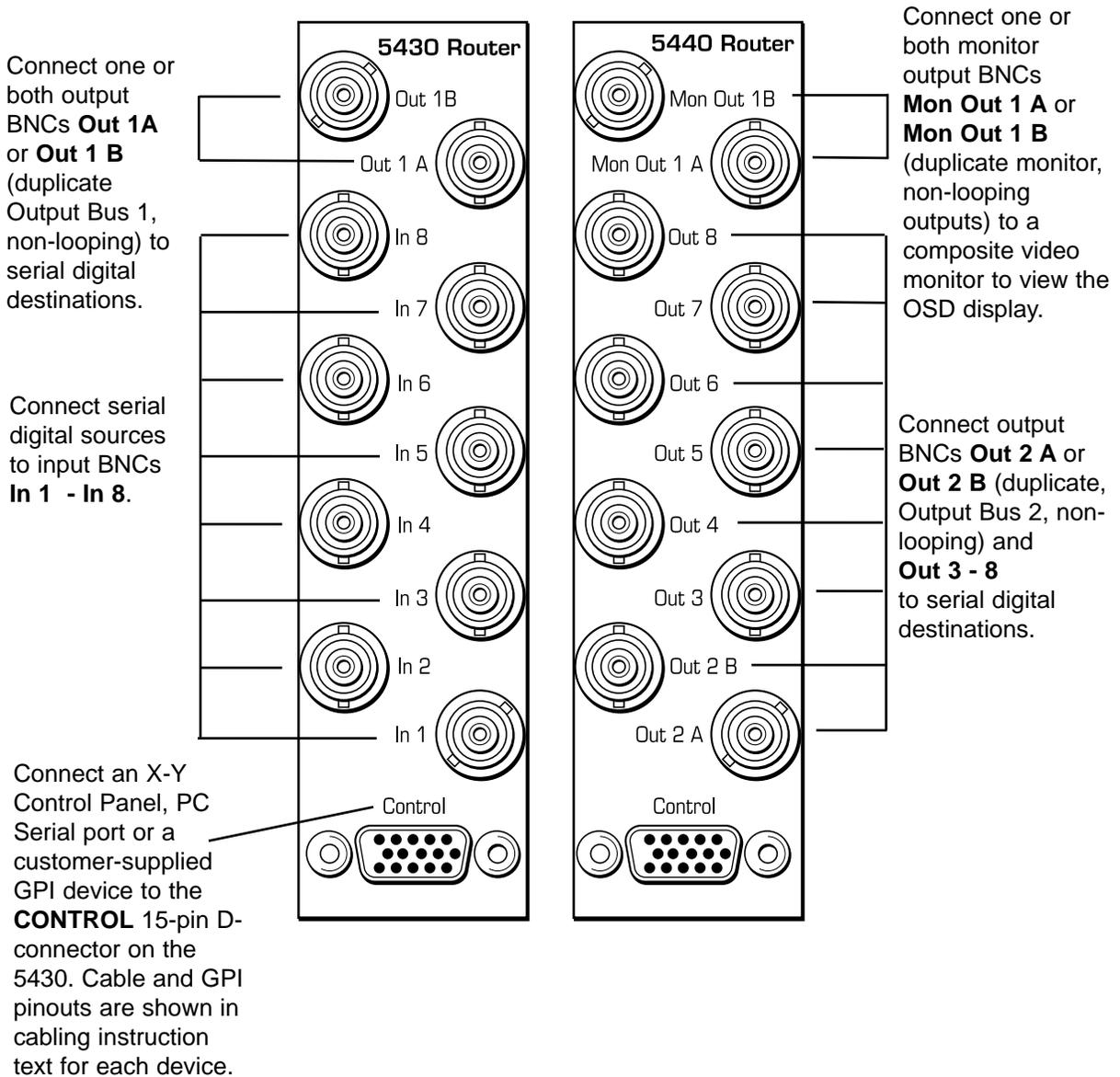
This module may be hot-swapped (inserted or removed) without powering down or disturbing performance of the other modules in the system

## CABLING

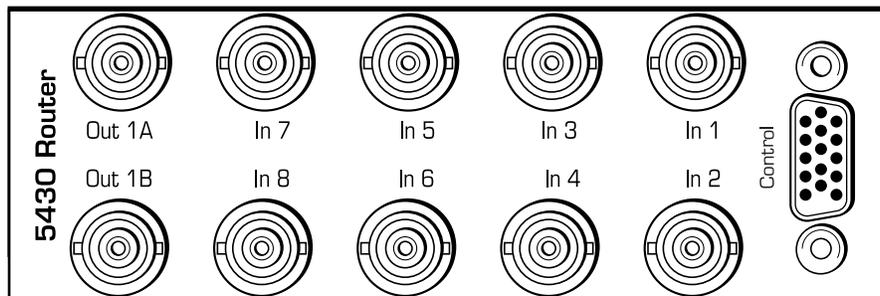
### 5430 and 5440 Modules

Refer to the 5430 3 RU and 1 RU and 5440 3 RU backplane diagrams of the modules on the next page for cabling instructions. Note that unless stated otherwise, the 1 RU cabling explanations are identical to those given in the 3 RU diagram.

3 RU 5430 and 5440 Backplane Diagram

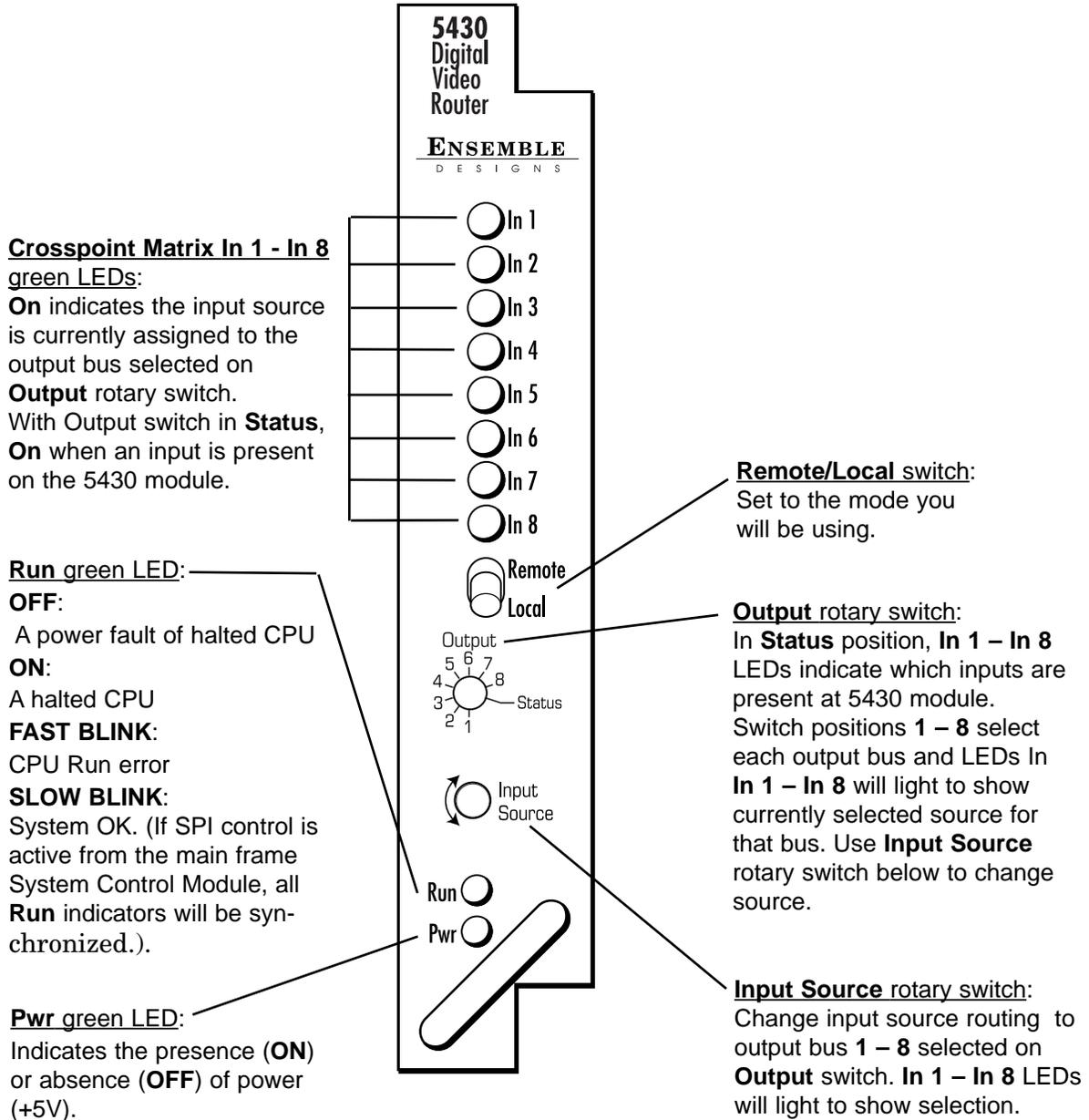


1 RU 5430 Backplane Diagram



## Front Panel Controls and Indicators

Front panel controls and indicators for both the 5430 and 5540 modules are contained on the 5430 module. Each front edge indicator and switch setting is explained in the diagram below.

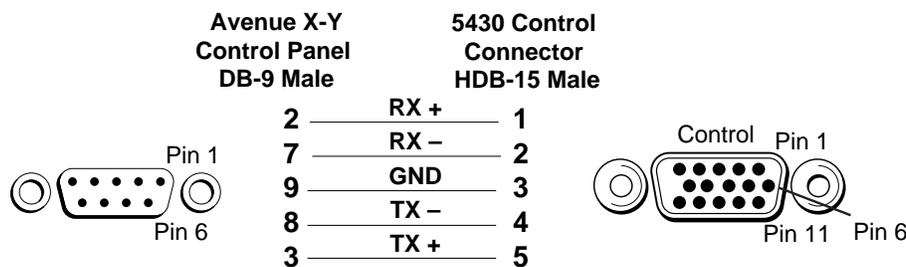


## Control Devices

Three types of devices can control the **5430/5440 Router** modules; the Avenue X-Y Control Panel (or multiple X-Y Control Panels), a customer-supplied GPI device and an external device (such as a PC) using a Serial port connection. Connection of the X-Y Control Panel and the GPI device to the 5430 module and the cable pinouts for each application are given below. Refer to Appendix A for the details for connecting an external device such as a PC, including the serial protocol.

### Avenue X-Y Control Panel

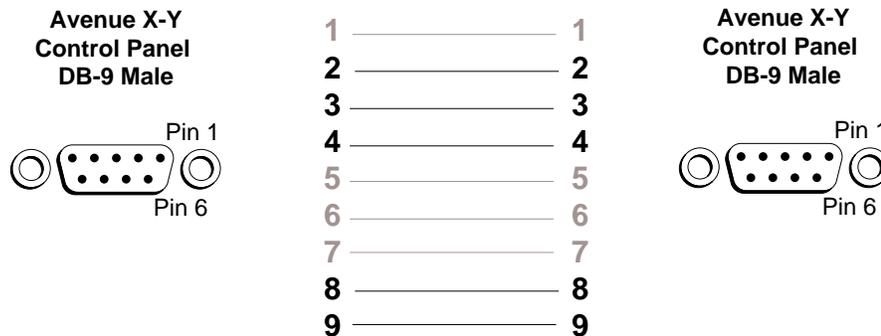
Connect an Avenue X-Y Control Panel from the rear of the control panel (either DB 9-pin male) to the **Control** connector on the rear of the 5430 module (HDB 15-pin male). The pinout for this connecting cable is given in the diagram below.



### Avenue X-Y Panel to Avenue Frame Control Cable Pinout

The X-Y Control Panel can be rack-mounted in a standard 19 inch equipment rack.. Connect the universal in-line power supply provided to the connector at the left rear of the X-Y panel. The power supply is auto-sensing and requires no adjustments.

Up to eight Avenue X-Y Control Panels can be connected in parallel for router control. Panels are connected together via the DB 9-pin loop-through connectors on each panel. The cable to connect each panel is a DB 9-pin male to DB 9-pin male with straight pin-to-pin connections as shown in the illustration below. This cable may be purchased at any electronics supply store or constructed from the diagram. Note not all pins are necessary for control panel connection but all pins can be connected.



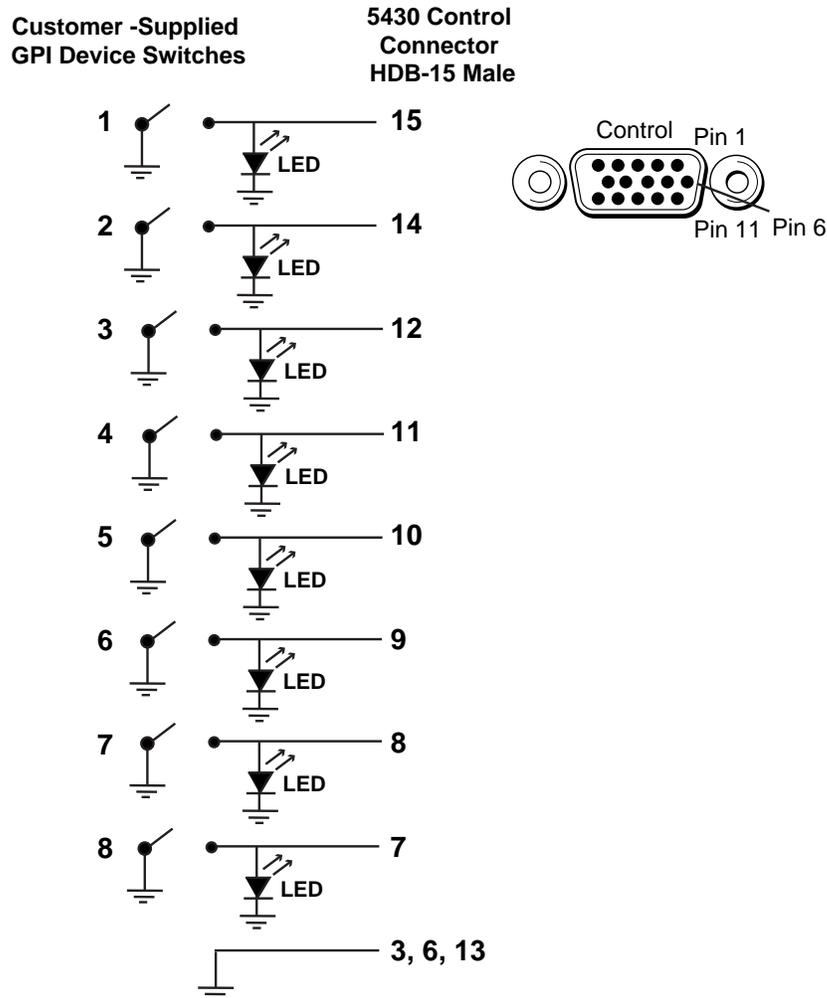
Only bolded pins are necessary for control panel communication, however, all pins may be connected.

### Avenue X-Y Panel Control Loop-Through Pinout

## GPI Control

An external customer-supplied GPI device can be connected to the rear of the 5430 module to control any of the eight output buses. The output bus can be chosen in the 5430/5440 **Config** menu shown later in the Avenue PC or Avenue Touch Screens sections.

Connect the GPI control to the 5430 **Control** connector pins as shown below. Each GPI pushbutton should be wired with closure to ground to trigger a crosspoint. It can also simultaneously output status to light LEDs that are wired to ground as indicated in the diagram below.



GPI Control to Control Connector Pinouts

## MODULE CONFIGURATION AND CONTROL

The configuration parameters for each Avenue module must be selected after installation. This can be done remotely using one of the Avenue remote control options or locally using the module front panel controls. Each module has a **REMOTE/LOCAL** switch on the front edge of the circuit board which must first be set to the control mode you will be using.

The configuration parameter choices for the module will differ between **Remote** and **Local** modes. In **Remote** mode, the choices are made through software and allow more selections. The **5430/5440 Parameter Table** on the following page summarizes and compares the various configuration parameters that can be set remotely or locally and the default/factory settings.

If you are not using an remote control option, the module parameters must be configured from the front panel switches. Parameters that have no front panel control will be set to a default value. The **Local** switches are illustrated in the **Front Panel Controls and Indicators** section following the **5430/5440 Parameter Table**.

Avenue module parameters can be configured and controlled remotely from one or both of the remote control options, the Avenue Touch Screen or the Avenue PC Application. Once the module parameters have been set remotely, the information is stored on the module CPU. This allows the module be moved to a different cell in the frame at your discretion without losing the stored information. Remote configuration will override whatever the switch settings are on the front edge of the module.

For setting the parameters remotely using the Avenue PC option, refer to the **Avenue PC Remote Configuration** section of this document.

For setting the parameters remotely using the Avenue Touch Screen option, refer to the **Avenue Touch Screen Remote Configuration** section of this data pack following Avenue PC.

5430/5440 Parameter Table

CONTROL	LOCAL	REMOTE	DEFAULT/FACTORY
<b>Input Source</b>	Input Source Rotary Switch In 1 – In 8	In 1 – In 8	N/A
<b>Output Destination</b>	Output Rotary Switch Bus 1 – Bus 8 Status	Bus 1 - Bus 8	N/A
<b>Monitor Output</b>	Last Setting	Mon Follow Bus 1 – Bus 8	Bus 1
<b>Input Bus Name</b>	Last Setting	Input Name	Input 1 – Input 8
<b>Output Bus Name</b>	Last Setting	Output Name	Bus 1 – Bus 8
<b>GPI Assign</b>	Last Setting	Bus 1 – Bus 8	Bus 1
<b>Video Mode</b>	Default	Mono Color	Color
<b>Setup</b>	Default	On/Off	
<b>Mon Bkgd</b>	Default	Black Video	Video
<b>Text Mode</b>	Default	None Source Destination Src&Des Matrix X-Y	Src&Des

## Avenue PC Remote Configuration

The Avenue PC remote control menus for these modules are illustrated and explained below. For more information on using Avenue PC, refer to the Avenue PC Control Application Software data pack that came with the option.

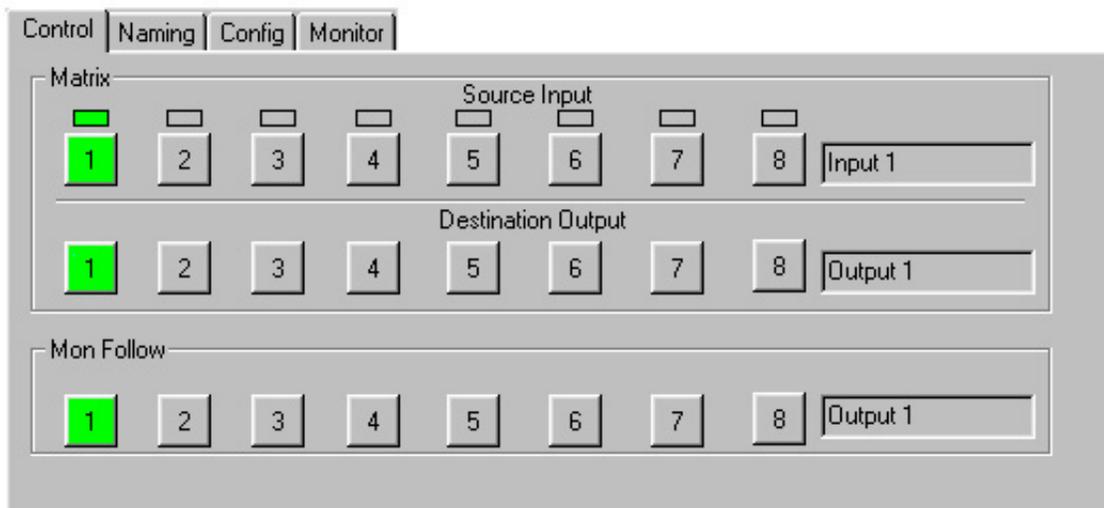
### 5430/5440 Avenue PC Menus

The **Control** menu shown below allows setting up the routing of input source to output bus matrix and the delegation of which output bus the analog monitor output will track .

- **Matrix** – select the **Source Input** from inputs 1 – 8 to be routed to the selected destination output bus currently selected in the **Destination Output** pushbuttons. The green indicator box over each **Source Input** button indicates which source inputs have video. The name of each source and output will appear in the box to the right as each pushbutton is selected.

You may assign these selections as the **Default** matrix settings later in the **Config** menu.

- **Mon Follow** – set which output bus 1 – 8 the Monitor Output on-screen display (OSD) will track (5440 module must be installed).



Use the **Naming** menu shown below to name each input source and output bus.

- **Input No.** – select each input from the pulldown menu and type in the desired name of the source in the **Input Name** box..
- **Output No.** – select each output bus from the pulldown menu and type in the desired name of the output in the **Output Name** box.

The screenshot shows the 'Naming' menu with four sub-sections: 'Input No.', 'Input Name', 'Output No.', and 'Output Name'. Each section contains a pulldown menu and a text input field. The 'Input No.' pulldown is set to 'Input 1', and the 'Input Name' field contains 'Input 1'. The 'Output No.' pulldown is set to 'Bus 1', and the 'Output Name' field contains 'Output 1'. At the top, there are four tabs: 'Control', 'Naming', 'Config', and 'Monitor', with 'Naming' being the active tab.

The **Config** menu shown below provides the following settings:

- **Reference** – indicates the input reference standard to the module.
- **GPI Assign** – select the output bus from the pulldown menu that the Monitor Output will track.
- **Default** – pressing the pushbutton will make the currently selected routing matrix in the **Control** menu the system default settings. The default settings will be stored and saved when the unit is powered down or the module is removed.

The screenshot shows the 'Config' menu with three sub-sections: 'Reference', 'GPI Assign', and 'Default'. The 'Reference' field contains '525 NTSC'. The 'GPI Assign' pulldown menu is set to 'Bus 1'. The 'Default' section contains a square pushbutton. At the top, there are four tabs: 'Control', 'Naming', 'Config', and 'Monitor', with 'Config' being the active tab.

The **Monitor** menu shown below provides the following settings when the 5440 module is installed:

- **Video Mode** – select the composite video mode from **Color** or **Mono**.
- **Setup** – set setup on or off depending on the input standard.
- **Mon Bkgd** – sets the monitor background video to either **Video** or **Black**.
- **Text Mode** – determines the text mode for the OSD to either **None**, **Source** only, **Destination** only, **Src&Des**, **Matrix** (lists source and destination and identifies the currently selected monitor output with **M**) or **X-Y** (shows a crosspoint matrix format and identifies the currently selected monitor output with **M**).
- **Mon Standard** – indicates what line standard the monitor output will be.

The screenshot shows a configuration window with five tabs: Control, Naming, Config, and Monitor. The Monitor tab is active. It contains five settings:

- Video Mode:** A dropdown menu with "Color" selected.
- Setup:** A dropdown menu with "on" selected.
- Mon Bkgd:** A dropdown menu with "Video" selected.
- Text Mode:** A dropdown menu with "Src&Des" selected.
- Mon Standard:** A text input field containing "525 NTSC".

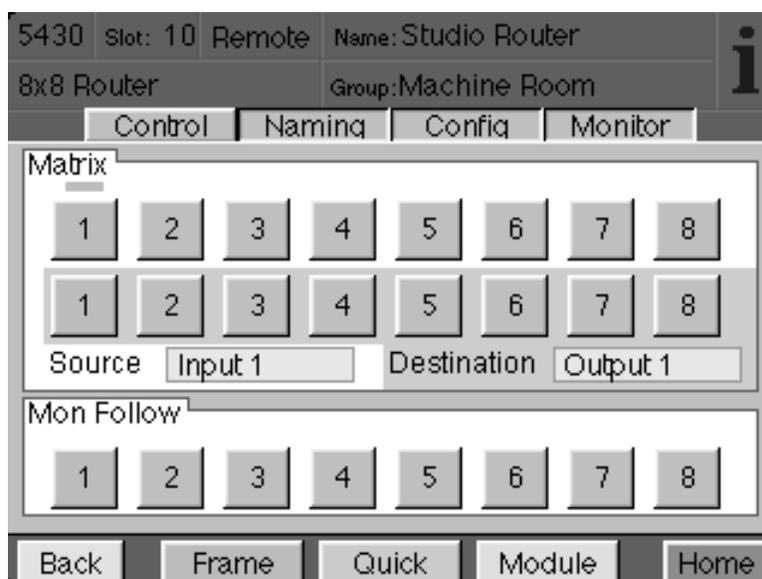
## Avenue Touch Screen Remote Configuration

Avenue Touch Screen remote control menus for this module are illustrated and explained below. For more information on using Avenue Touch Screen, refer to the Avenue Touch Screen data pack that came with the option.

### 5430/5440 Avenue Touch Screen Menus

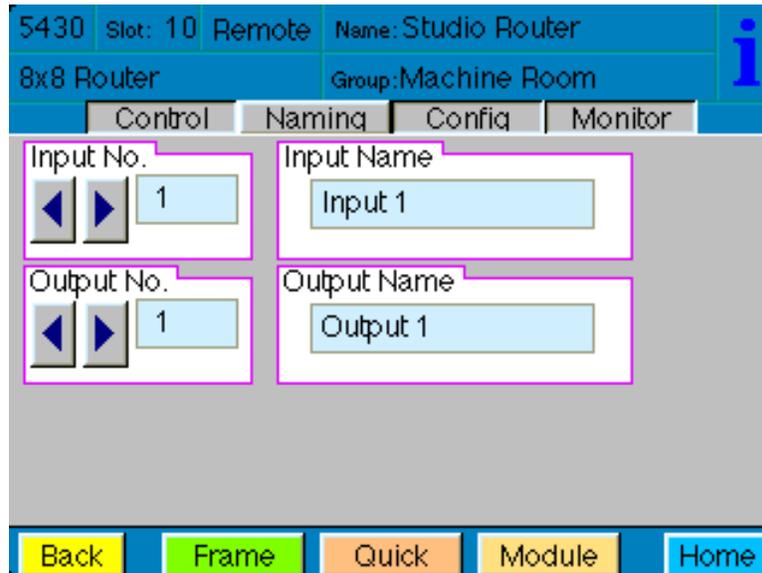
The **Control** menu shown below allows setting up the routing of input source to output bus matrix and the delegation of which output bus the analog monitor output will track .

- **Matrix** – select the **Source Input** from inputs 1 – 8 to be routed to the selected destination output bus currently selected in the **Destination Output** pushbuttons. The green indicator box over each **Source Input** button indicates which source inputs have video. The name of each source and output will appear in the box to the right as each pushbutton is selected.  
You may assign these selections as the **Default** matrix settings later in the **Config** menu.
- **Mon Follow** – set which output bus 1 – 8 the Monitor Output on-screen display (OSD) will track (5440 module must be installed).



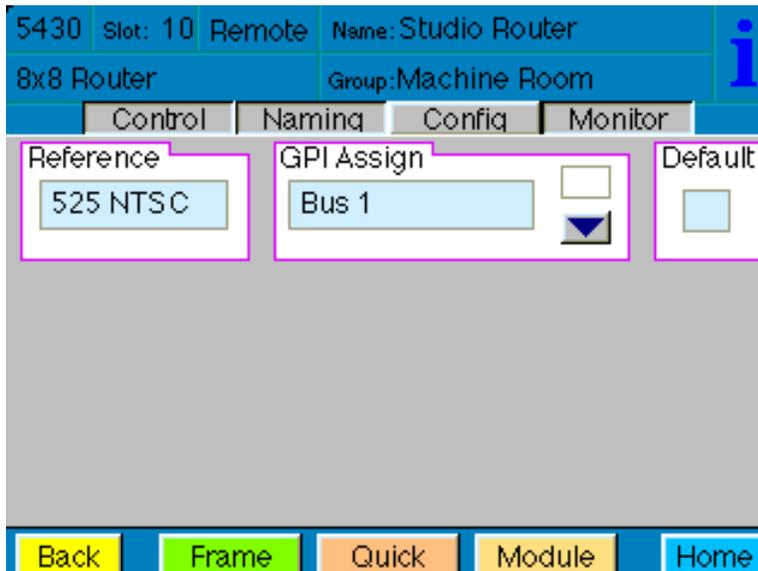
Use the **Naming** menu shown below to name each input source and output bus.

- **Input No.** – select each input using the right and left arrows to scroll through the input numbers then type in the desired name of the source in the **Input Name** box using the alphanumeric keypad that comes up when the screen is pressed.
- **Output No.** – select each output bus with the right and left arrows then type in the desired name of the output in the **Output Name** box with the keypad.



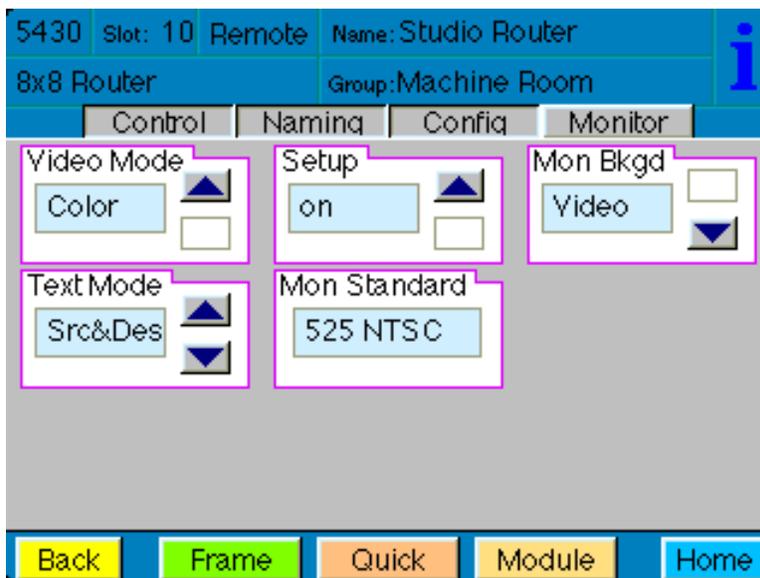
The **Config** menu shown below provides the following settings:

- **Reference** – indicates the input reference standard to the module.
- **GPI Assign** – select the output bus from the pulldown menu that the Monitor Output will track.
- **Default** – pressing the pushbutton will make the currently selected routing matrix in the **Control** menu the system default settings. The default settings will be stored and saved when the unit is powered down or the module removed.



The **Monitor** menu shown below provides the following settings when the 5440 module is installed:

- **Video Mode** – select the composite video mode from **Color** or **Mono**.
- **Setup** – set setup on or off depending on the input standard.
- **Mon Bkgd** – sets the monitor background video to either **Video** or **Black**.
- **Text Mode** – determines the text mode for the OSD to either **None**, **Source** only, **Destination** only, **Src&Des**, **Matrix** (lists source and destination and identifies the currently selected monitor output with **M**) or **X-Y** (shows a crosspoint matrix format and identifies the currently selected monitor output with **M**).
- **Mon Standard** – indicates what line standard the monitor output will be.



## X-Y Control Panel Operation

The 5430/5440 Router modules can be controlled with the Avenue X-Y Control Panel. Up to eight control panels can be installed in parallel as explained earlier in the Installation section of this data pack.

The X-Y Control Panel, shown in the illustration below, allows live control of input to output assignment, monitor output bus assignment and output bus lockout control.

When a pushbutton in the **Output Destination** row is selected, the currently assigned input source in the **Input Source** pushbutton row will light. Selecting a different input source pushbutton will reassign that input source to the output currently selected. To avoid reassigning the input source if that is not desired, use the **Output Destination** bus only to check input status.



Avenue X-Y Control Panel

To assign an output bus to the Monitor Output, select the output bus desired in the **Output Destination** row, then press the **Mon** pushbutton on the far right of the panel. Change this assignment at any time by selecting a different output pushbutton and then selecting the **Mon** pushbutton.

To lock out output destination buses, hold down both the Output Bus 1 and Output Bus 8 pushbuttons for about 5 seconds. This will put the panel into configuration mode. The **Mon** pushbutton will blink and all eight output bus pushbuttons will light to indicate the current settings.

Turn **OFF** the pushbuttons corresponding to the output buses you wish to lock out. Pushbuttons that remain lit can still be controlled from this or any other panel. To change status at any time, re-enter the configuration mode. Press the blinking **Mon** pushbutton to exit the current configuration mode.

Note that these configuration settings only affect this local panel. Other panels will be able to control any of the outputs until they are configured locally.

## TROUBLESHOOTING

As a troubleshooting aid, the signal equalization and presence, power and CPU status can be easily monitored from the front panel of this module using the indicators explained in the previous section.

If using the **Remote** mode, the following status items can be monitored using the Avenue Touch Screen Control Panel or PC Application:

- Input status
- Power status
- Slot ID, Software Version and Board Revision

Refer to the overall troubleshooting tips given below for the **5430/5440** module:

### **No status lights are lit on front panel:**

- Check that frame power is present (green LED{s} on frame power supplies).
- Check that module is firmly seated in frame. Try removing it and plugging it in again.

### **Can't control module:**

- Check status of CPU **Run** green LED. Should be blinking slowly and in unison with other modules if System module is present. If not, try removing it and plugging it in again.
- System module may not be working properly if installed.

### **No signal out of module:**

- Check status of Input green LEDs. Should be lit. If not, check the input signal for presence and quality.
- Check cabling to input of module.
- Check remote cable equalization by switching the module to **Local** using the front panel switch and see if the EQ OK LED comes on.

You may also refer to the technical support section of the Ensemble or Graham-Patten web sites for the latest information on your equipment at the URLs below:

<http://www.ensembledesigns.com/support>

<http://www.grahampatten.com>

## SOFTWARE UPDATING

Software upgrades for each module can be downloaded remotely if the optional System Control module is installed. These can be downloaded onto your PC and then Avenue PC will distribute the update to the individual module. (Refer to the Avenue PC documentation for more information) Periodically updates will be posted on our web site. If you do not have the required System Control Module and Avenue PC, modules can be sent back to the factory for software upgrades.

## **WARRANTY AND FACTORY SERVICE**

### **Warranty**

This Module is covered by a five year limited warranty, as stated in the main Preface of this manual. If you require service (under warranty or not), please contact Ensemble Designs or Graham-Patten Systems and ask for customer service before you return the unit. This will allow the service technician to provide any other suggestions for identifying the problem and recommend possible solutions.

### **Factory Service**

If you return equipment for repair, please get a Return Material Authorization Number (RMA) from the factory first.

Ship the product and a written description of the problem to:

Ensemble Designs, Inc.

Attention: Customer Service RMA #####

870 Gold Flat Rd.

Nevada City, CA. 95959 USA

(530) 478-1830

Fax: (530) 478-1832

service@endes.com

<http://www.ensembledesigns.com>

Be sure to put your RMA number on the outside of the box.

### **OR**

Graham-Patten Systems, Inc.

P.O.Box 1960

Grass Valley, CA 95945

(800) 422-6662 or (530) 273-8412

Fax: (530) 273-7458

service@gpsys.com

<http://www.grahampatten.com>

## SPECIFICATIONS

### 5340/5440 8x1 and 8x8 Digital Video Routers

#### **Input Signal Description:**

Number:	Eight
Signal Type:	Serial Digital (SMPTE 259M)
Impedance:	75 ohm
Return Loss:	
270 Mbs	>15 dB
Maximum Cable Length:	
270 Mbs	200 meters

#### **Output Signal Description:**

Number:	5430–One / 5440–eight
Signal Type:	Serial Digital (SMPTE 259M)
Impedance:	75 ohm
Return Loss:	
270 Mbs	>15 dB
Output DC:	None (AC coupled)

#### **Composite Monitor Output:**

Number:	Two Identical
Signal Type:	NTSC/PAL
Impedance:	75 ohm
Return Loss:	> 40 dB
Output DC:	< ± 200 mV
Response:	± 0.25 dB
	10 KHz to 5.0 MHz
KFactors	< 1.5%

#### **General Specifications:**

Power Consumption:	< 4.0 watts
Temperature Range:	0 to 50 degrees C ambient (all specs met)
Relative Humidity:	0 to 95% noncondensing
Altitude:	0 to 10,000 ft
Fusing:	1.5 Amp PTC resettable fuse

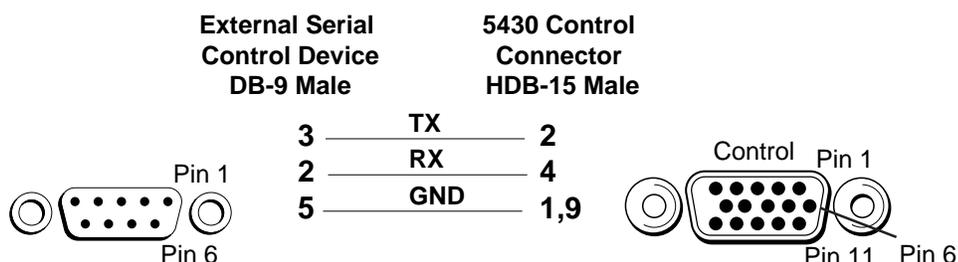
Due to ongoing product development, all specifications subject to change.

## APPENDIX A

### Serial Control

The 5430 Video Router module has a serial interface port which supports a command protocol for remote control of the router bus selections. This serial port is used by the optional Avenue X-Y Control Panels. The port can also be used by external devices such as a PC to control the router.

Refer to the pinout information in the illustration below for the cable needed to connect a PC or other device to the serial port of the module. The port can be cabled to support either RS-422 or RS-232 signaling levels.



#### External Serial Control to Avenue Frame Control Cable Pinout

The details for the serial protocol are outlined in the section below.

The communication standard for this port is as follows:

**Data Rate: 38.4 Kbaud**

**Start Bits: 1**

**Stop Bits: 1**

**Parity: None**

The command and status messages for this port are in plain ASCII form, with each command or message terminated with a carriage return (shown as <cr> below).

Commands to the module are as follows:

#### Crosspoint Select Command

Syntax: T src des <cr>

For both the src and des fields values from 1 through 8 are legal.

Example: T25<cr>

This will select Input #2 on Output Bus #5

#### Monitor Selection Command

Syntax: T M bus <cr>

This command will select the output bus which the analog monitor output will display.

Example: TM3<cr>

This will switch the monitor output to display Output Bus #3

### **Monitor Text Mode Command**

Syntax: MC<cr>

This command will cause the text overlay mode of the analog monitor output to cycle to the next selection. If the text mode is the final choice (X-Y), it will cycle back to the first choice (None).

The choices are the following:

- None**
- Source**
- Destination**
- Source and Destination**
- Matrix**
- X-Y**

The module will respond to commands with a single status message:

Syntax: S bus1 bus2 bus3 bus4 bus5 bus6 bus7 bus8 monbus <cr>

This status message indicates the crosspoint selections on each of the 8 output buses, followed by the bus that the monitor output is displaying.

Example: S256114324<cr>

The following routing assignments are shown by this message:

Bus 1	Input 2
Bus 2	Input 5
Bus 3	Input 6
Bus 4	Input 1
Bus 5	Input 1
Bus 6	Input 4
Bus 7	Input 3
Bus 8	Input 2
Monitor	Bus 4