



**NTI[®] NETWORK
TECHNOLOGIES
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VEEMUX[®] Series

SM-4X4-DVI

SM-8X8-DVI

DVI Video Matrix Switch

Installation and Operation Manual



TRADEMARK

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INTRODUCTION

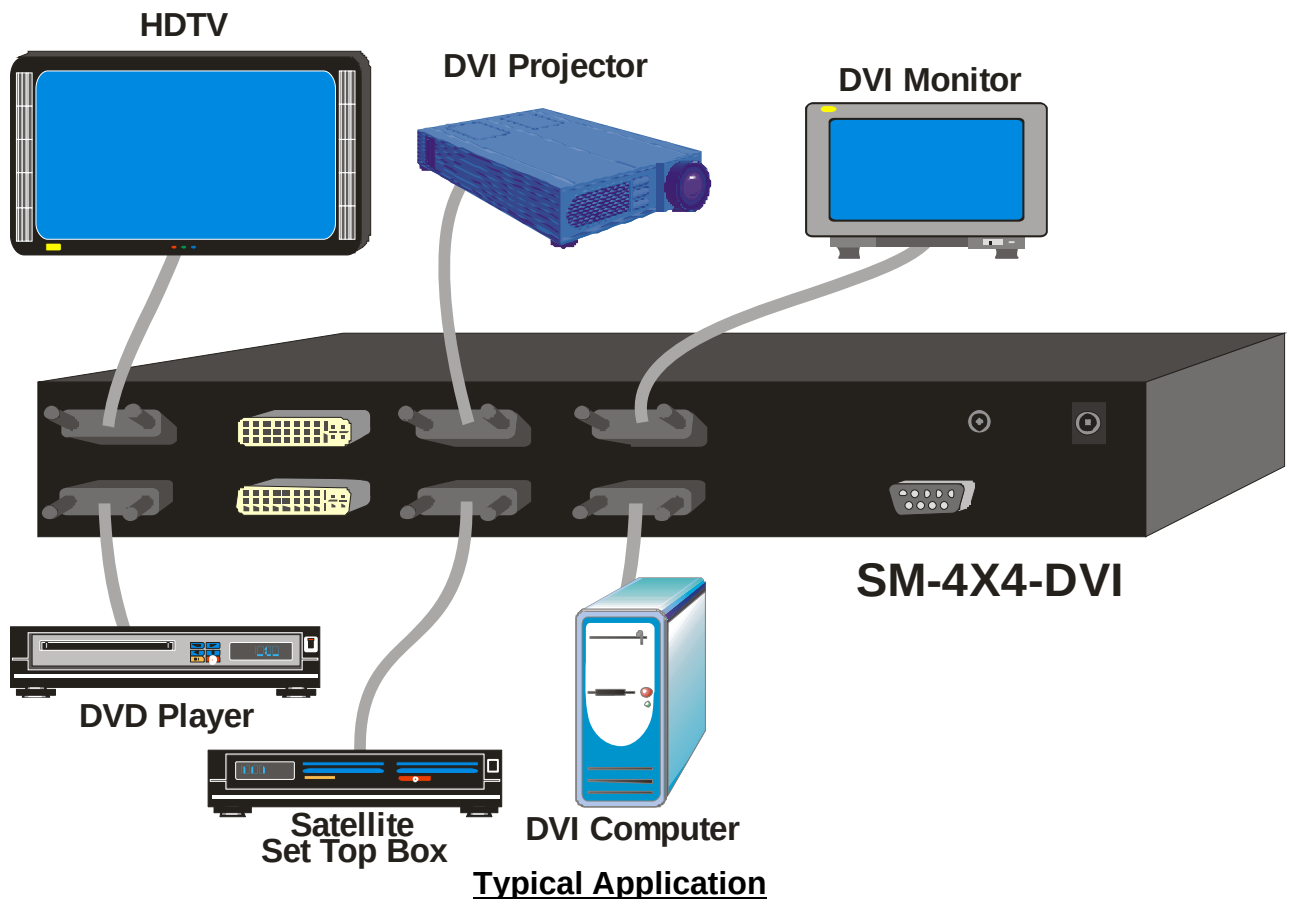
The VEEMUX® 4x4 DVI video matrix switch (VEEMUX) provides non-blocking access to four single link digital DVI video sources from four displays. Locate computers up to 19 feet away from displays, enabling easy access to multiple servers in various locations.

Also available:

SM-8X8-DVI- provides non-blocking access to 8 single link digital DVI video sources from 8 eight displays

Features:

- Configure and control the switch through serial port, or front panel buttons.
- Supports DVI-D interface for crisp and clear video quality on flat panel displays.
- Supports DVI operation at the maximum TMDS rate of 2 x 1.65 Gb/second
- Silent fanless operation.
- Provides high digital resolution up to 1920x1200 for monitors and 1080p for HDTV displays.
- EDID learning for the support of any DVI display device.
- Built in default EDID configuration tables for both PC and Mac.
- Each output provides one video signal.
- Each input can be independently connected to any or all outputs.



MATERIALS

Materials supplied with this kit:

- NTI SM-4X4-DVI or SM-8X8-DVI DVI Video Matrix Switch
- 100-240VAC at 50 or 60Hz-5VDC/3.0A (4x4) or 4.0A (8x8) AC Adapter
- CD containing pdf of this manual and control software

Materials *Not* supplied but **REQUIRED**:

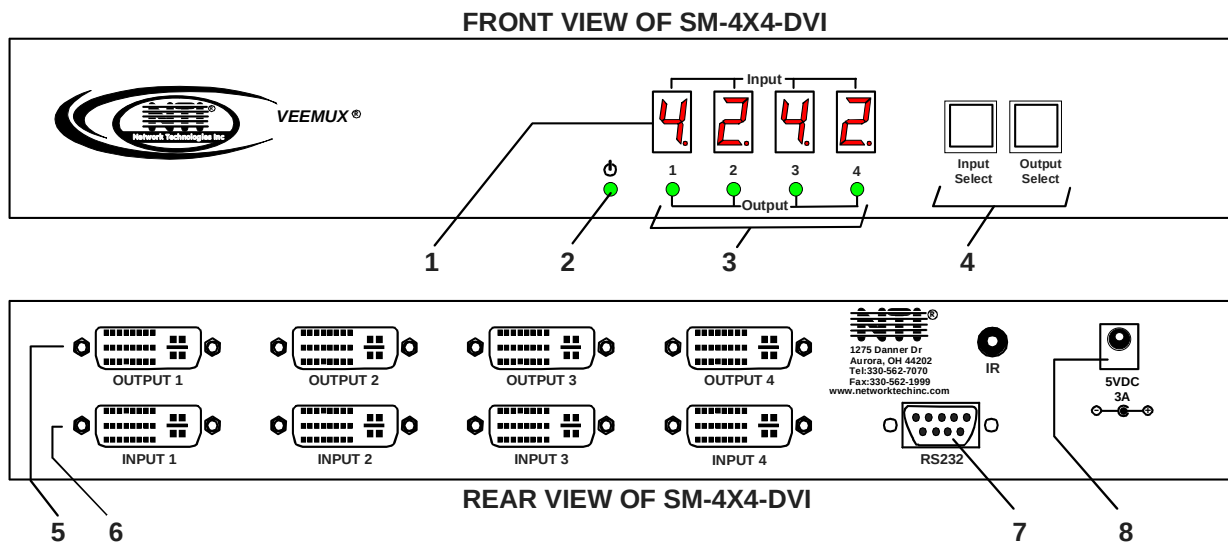
- DVI-IS-xx-MM cable for each monitor and CPU being connected to the switch- available in 3, 6,10, and 15 foot lengths

where:

xx is the length of the cable in feet

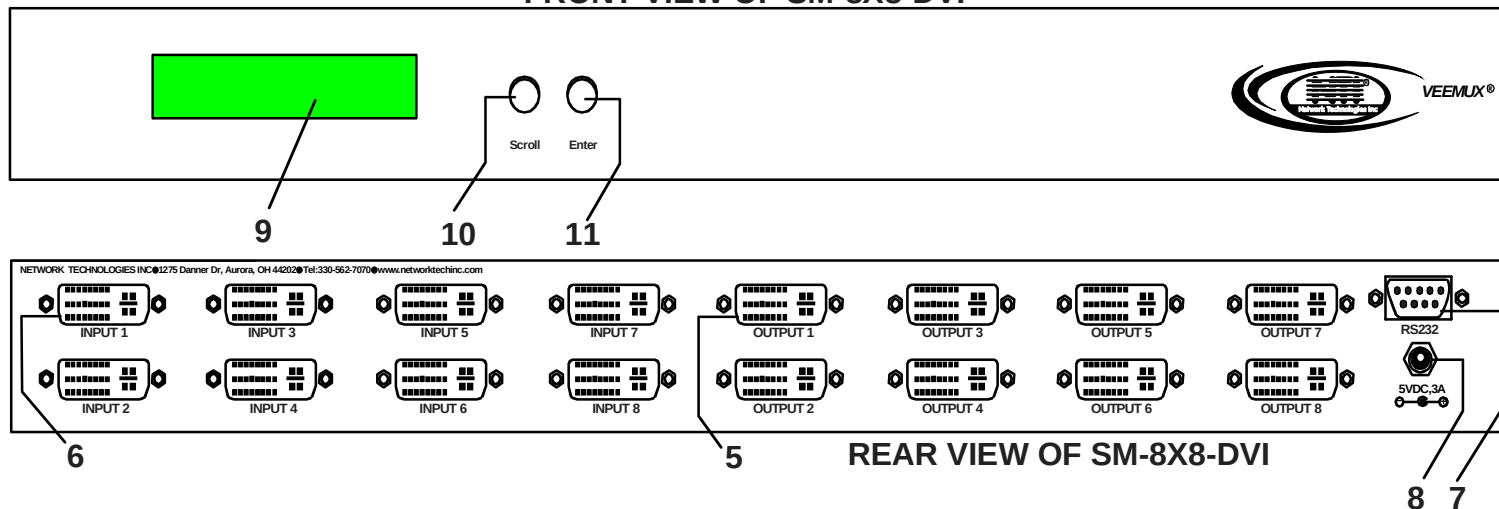
MM indicates male-to-male connector

FEATURES AND FUNCTIONS



1. **Seven-segment Input LEDs**- for indicating what inputs (video sources) are connected to the labeled output (display device) and Learn Mode indicator
2. **Power LED**- for indicating that power has been supplied to the unit
3. **Output LEDs**- for indicating which output is being configured when "Input Select" is pressed
4. **Selection buttons**- for manually changing connections between the inputs and outputs
5. **OUTPUTx**- female DVI connector- for connecting DVI cable from display device
6. **INPUTx**- female DVI connector- for connecting DVI cable from video source
7. **RS232 connector**- 9D male- for connecting the user's RS232 control cable
8. **5VDC**- power input connector for attachment of power supply

FRONT VIEW OF SM-8X8-DVI



9. **LCD Display**- for indicating which input is connected to which output

10. **Scroll**- used to and scroll though the LCD control menu options and enable the manual configuration setup

11. **Enter**- used to select LCD control menu options and to select the output channel when changing connections manually

CONNECT CABLES

1. Connect a DVI male cable between each video source and an "Input" connector on the rear of the VEEMUX.
2. Connect a DVI male cable between each display device and an "Output" connector on the rear of the VEEMUX.
3. If the VEEMUX will be controlled using RS232, then connect a DB9 cable between the "RS232" port on the VEEMUX and a serial port on a PC.
4. Connect the AC adapter to the VEEMUX and plug it in to power the VEEMUX ON.
5. Power ON the video sources and the display devices.

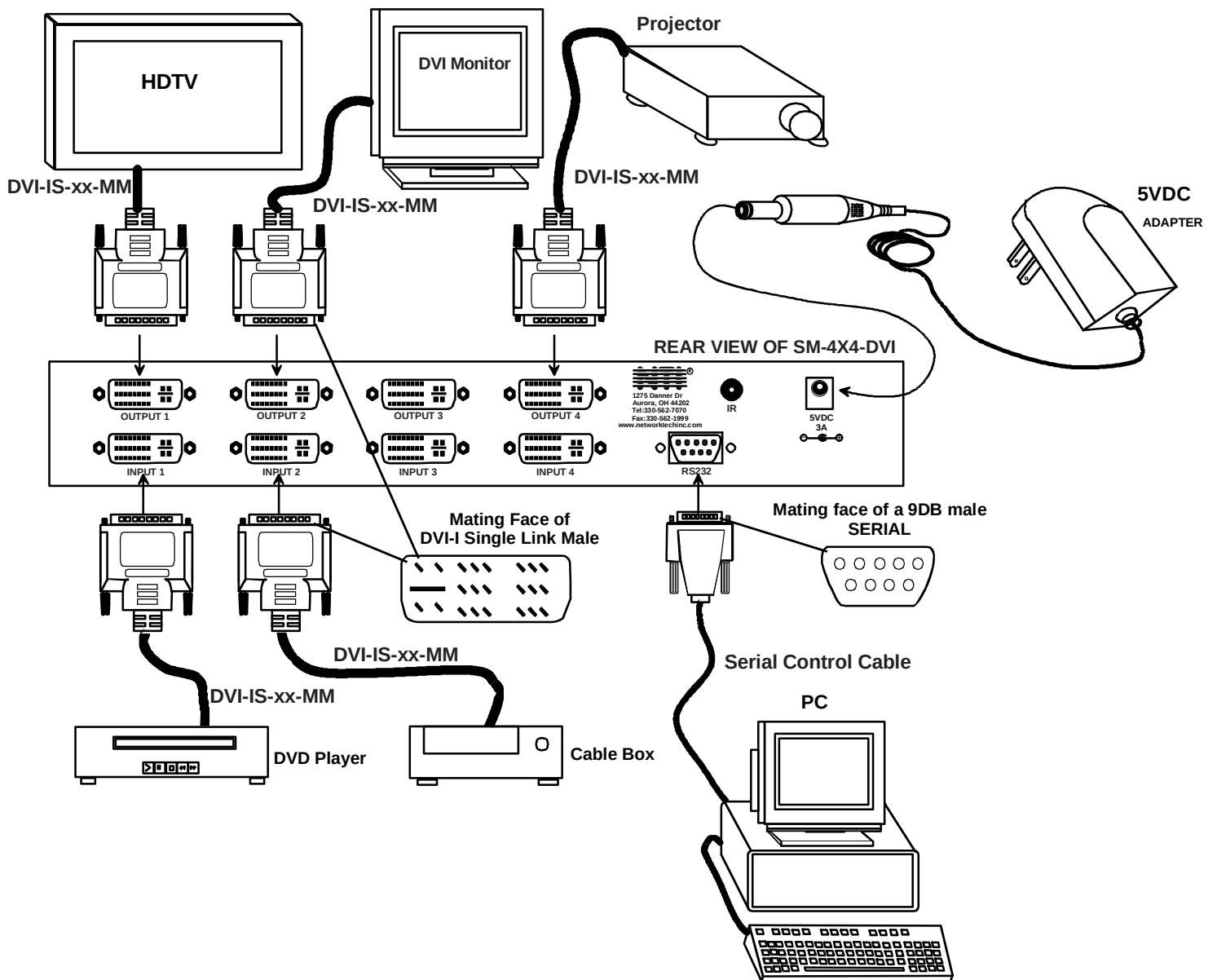


Figure 1- Connect devices and sources to VEEMUX

OPERATING THE SM-4X4-DVI

Learn Mode

The VEEMUX is able to emulate a monitor for a connected video source, whether a monitor is actually connected or not. To do this, the VEEMUX must first learn the specifications of a display device. To make the VEEMUX learn the specifications, use “Learn Mode”.

Enter Learn Mode

1. Press and hold both front panel buttons simultaneously for 2 seconds.
2. The letters **L-E-R-N** will appear on the Input LEDs.
3. Pressing the “Input Select” button will scroll through each of three learning options, indicated by changing letters on the Input LEDs:
 - L-E-S** = learn the specifications of any monitor connected to “Output 1”
 - L-E-P** = use the built-in specifications of a PC monitor
 - L-E-A** = use the built-in specifications of an Apple monitor
4. When the desired learning mode is displayed, press the “Output Select” button to execute the learning feature and return to normal operation.

Change Connections Manually

Two buttons are provided on the front of the VEEMUX for quickly making connections between video sources and display devices. To connect an Input (video source) to an Output (display device):

1. Press the “Output Select” button until the desired Output LED illuminates.
2. Press the “Input Select “ button to change the Input LED above the selected Output until the desired Input number is shown.
3. Press the “Output Select” button again to change a different Output-to Input connection

One video source can be set to display on all 4 display devices if so desired.

OPERATING THE SM-8X8-DVI

Accessing the Setup Menu

1. Simultaneously press and hold both front panel buttons for at least three (3) seconds, then release.
2. The LCD should display:

```
SETUP MENU V: x.x
DDC <n> : yy
```

Where: x.x is the version number,
 <n> indicates the current setting: P=PC, M=MAC, S=SCREEN;
 yy indicates the setting selection: PC, MAC, SCREEN.

3. Use the front panel "Scroll" button to select the menu function.

Setup Menu Functions

For each function, press "Enter" button to select or press "Scroll" button to skip to the next function

FUNCTION	DESCRIPTION
PC	Use the built in PC display DDC table. (factory default)
MAC	Use the built in MAC display DDC table.
SCREEN	Read, save, and use the DDC table from the display connected to Output 1
Factory Reset, Y?	Press "Enter" to restore factory settings
Memory Recall, x?	N= Use default matrix setting on power up Y= Use last configured matrix setting on power up (Press "Enter" button to toggle between Y or N, press "Scroll" button to select and go to the next function.)
Exit	Press "Enter" button to exit the Setup Menu

The Setup Menu will time out approximately 30 seconds after the last button press and return to normal mode.

Change Connections Manually

Two buttons are provided on the front of the VEEMUX for quickly making connections between video sources and display devices. To connect an Input (video source) to an Output (display device):

1. Press and hold the "Scroll" button for a few seconds until the cursor starts blinking. Release the Scroll button.
2. Press the "Enter" button until the desired Output channel is selected.
3. Press the "Scroll" button until the desired Input channel is selected. The change is immediate.

The manual selection mode will timeout approximately 15 seconds after the last button press and the cursor will stop blinking.

One video source can be set to display on all 8 display devices if so desired.

CHANGE CONNECTIONS VIA RS232

Connections can be changed from a terminal located away from the VEEMUX, connected serially using RS232. To change connections using the RS232 port, a control computer must first be setup.

Setup Control Computer

1. Install the control software (found on the CD this manual is on) to a PC. Browse the CD for the file "veemux-dvi-control-vx-x-x_Installer.exe" and double-click it to install.
2. Connect a serial cable from the VEEMUX to the PC where the control software was just installed. The default VEEMUX-DVI port setup is 9600bps, 8 data bits, no parity, 1 stop bit. If the PC COM port is setup differently, you will need to change the PC COM port configuration (see table below).

Com Port Settings:

Baud Rate	9600
Start Bits	1
Data Bits	8
Parity	None
Stop Bits	1

3. Locate the "VEEMUX-DVI-Control" program in your programs list, and select it. The following screen will be displayed.

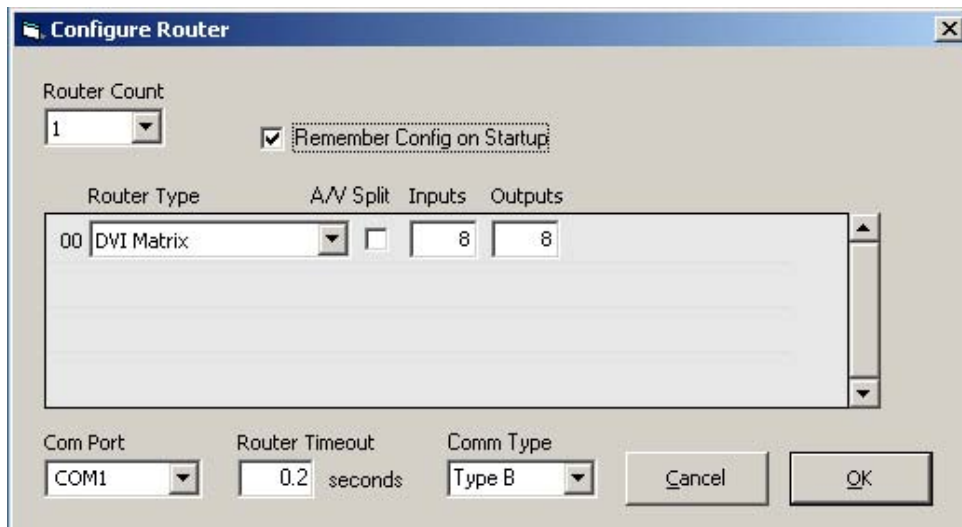


Figure 2- Configure the VEEMUX-DVI-Control Software

- Under "Router Count", select the number of VEEMUXs to be controlled.
- Under "Router Type", select "DVI Matrix". Enter the correct number of Inputs and Outputs in their respective fields.
- Under "Com Port", select the Com Port that the RS232 cable is connected to.
- Under "Comm Type", select "Type B".

Note: To set this configuration as the default startup configuration, make sure the "Remember Config on Startup" check box is checked.

4. Click the “OK” button. The following image (or one similar) will appear. Blue dots will appear wherever the connections have been made between outputs (top row) and inputs (left column).

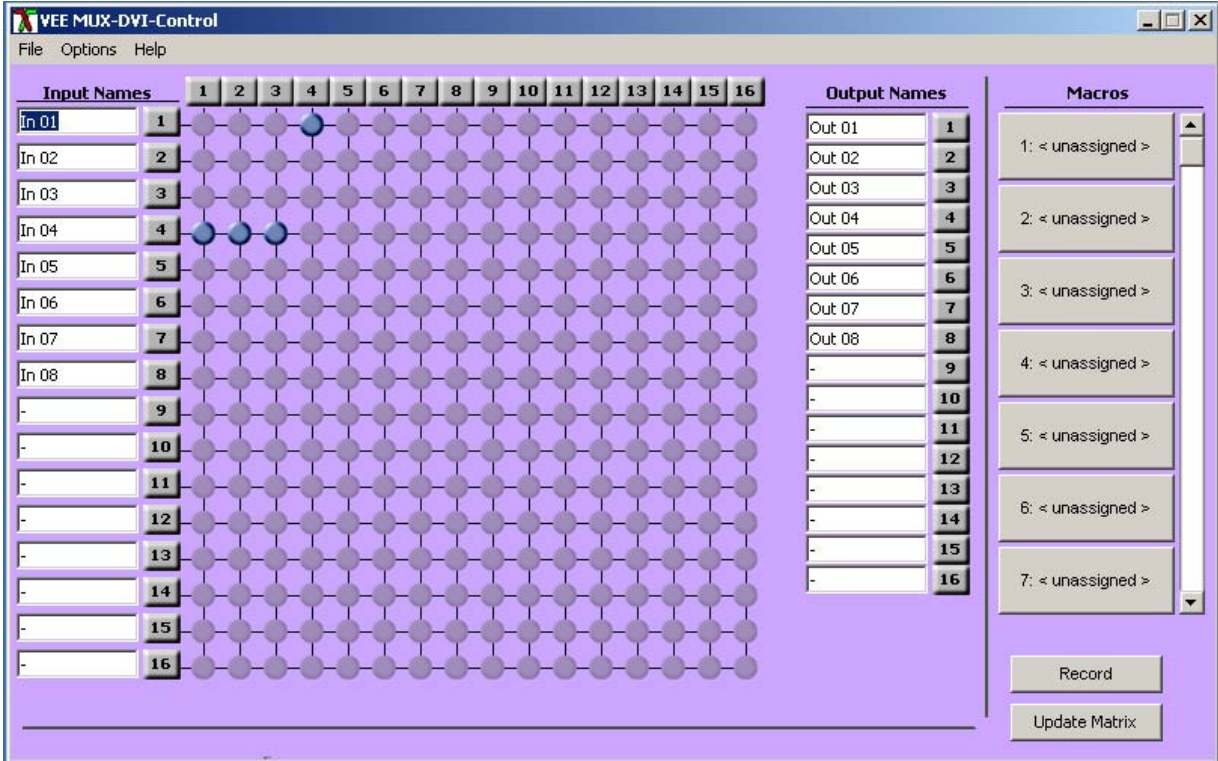


Figure 3- VEEMUX-DVI-Control Connection Display

- 5. To change a connection, simply click on the point where the desired input intersects the desired output. The blue dot will move accordingly and the connection change will be made.
- 6. You can return to the Configure Router screen from the **File** pull-down menu.
- 7. You can save and load configurations from the **File** pull-down menu.
- 8. RS-232 error checking can be controlled from the **Options** pull-down menu (“CRC”). CRC should be ON when using the VEEMUX-DVI-Control software.

RS232 Protocol

Commands can alternatively be sent using a terminal emulator program that supports macros.
The following section lists the available commands.

Embedded Commands

The VEEMUX can be controlled using connection commands embedded in serial programs. Applicable RS232 commands are listed below:

TABLE OF COMMANDS FOR SM-4X4-DVI

Command:	ASCII	HEX
input 1 output 1	/ / F 0 0 M 0 1 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 31 42 0D
input 2 output 1	/ / F 0 0 M 0 1 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 32 41 0D
input 3 output 1	/ / F 0 0 M 0 1 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 33 40 0D
input 4 output 1	/ / F 0 0 M 0 1 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 34 47 0D
input 1 output 2	/ / F 0 0 M 0 2 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 31 41 0D
input 2 output 2	/ / F 0 0 M 0 2 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 32 42 0D
input 3 output 2	/ / F 0 0 M 0 2 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 33 43 0D
input 4 output 2	/ / F 0 0 M 0 2 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 34 44 0D
input 1 output 3	/ / F 0 0 M 0 3 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 31 40 0D
input 2 output 3	/ / F 0 0 M 0 3 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 32 43 0D
input 3 output 3	/ / F 0 0 M 0 3 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 33 42 0D
input 4 output 3	/ / F 0 0 M 0 3 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 34 45 0D
input 1 output 4	/ / F 0 0 M 0 4 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 31 47 0D
input 2 output 4	/ / F 0 0 M 0 4 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 32 44 0D
input 3 output 4	/ / F 0 0 M 0 4 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 33 45 0D
input 4 output 4	/ / F 0 0 M 0 4 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 34 42 0D
Query Current Matrix	/ / F 0 0 U <CHK> <CR>	2F 2F 46 30 30 55 13 0D
Input 1 – All Outputs	/ / F 0 0 M 0 0 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 30 49 30 31 43 0D
Input 2 – All Outputs	/ / F 0 0 M 0 0 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 30 49 30 32 40 0D
Input 3 – All Outputs	/ / F 0 0 M 0 0 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 30 49 30 33 41 0D
Input 4 – All Outputs	/ / F 0 0 M 0 0 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 30 49 30 34 46 0D

TABLE OF COMMANDS FOR SM-8X8-DVI

Command:	ASCII	HEX
input 1 output 1	/ / F 0 0 M 0 1 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 31 42 0D
input 2 output 1	/ / F 0 0 M 0 1 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 32 41 0D
input 3 output 1	/ / F 0 0 M 0 1 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 33 40 0D
input 4 output 1	/ / F 0 0 M 0 1 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 34 47 0D
input 5 output 1	/ / F 0 0 M 0 1 0 5 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 35 46 0D
input 6 output 1	/ / F 0 0 M 0 1 0 6 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 36 45 0D
input 7 output 1	/ / F 0 0 M 0 1 0 7 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 37 44 0D
input 8 output 1	/ / F 0 0 M 0 1 0 8 <CHK> <CR>	2F 2F 46 30 30 4D 30 31 49 30 38 4B 0D
input 1 output 2	/ / F 0 0 M 0 2 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 31 41 0D
input 2 output 2	/ / F 0 0 M 0 2 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 32 42 0D
input 3 output 2	/ / F 0 0 M 0 2 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 33 43 0D
input 4 output 2	/ / F 0 0 M 0 2 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 34 44 0D
input 5 output 2	/ / F 0 0 M 0 2 0 5 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 35 45 0D
input 6 output 2	/ / F 0 0 M 0 2 0 6 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 36 46 0D
input 7 output 2	/ / F 0 0 M 0 2 0 7 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 37 47 0D
input 8 output 2	/ / F 0 0 M 0 2 0 8 <CHK> <CR>	2F 2F 46 30 30 4D 30 32 49 30 38 48 0D
input 1 output 3	/ / F 0 0 M 0 3 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 31 40 0D
input 2 output 3	/ / F 0 0 M 0 3 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 32 43 0D
input 3 output 3	/ / F 0 0 M 0 3 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 33 42 0D

TABLE OF COMMANDS FOR SM-8X8-DVI (Continued)

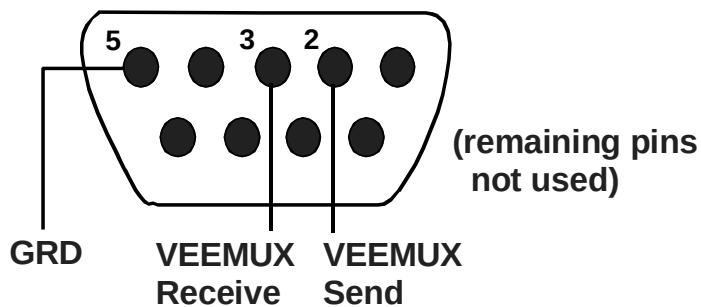
Command:	ASCII	HEX
input 4 output 3	/ / F 0 0 M 0 3 I 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 34 45 0D
input 5 output 3	/ / F 0 0 M 0 3 I 0 5 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 35 44 0D
input 6 output 3	/ / F 0 0 M 0 3 I 0 6 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 36 47 0D
input 7 output 3	/ / F 0 0 M 0 3 I 0 7 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 37 46 0D
input 8 output 3	/ / F 0 0 M 0 3 I 0 8 <CHK> <CR>	2F 2F 46 30 30 4D 30 33 49 30 38 49 0D
input 1 output 4	/ / F 0 0 M 0 4 I 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 31 47 0D
input 2 output 4	/ / F 0 0 M 0 4 I 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 32 44 0D
input 3 output 4	/ / F 0 0 M 0 4 I 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 33 45 0D
input 4 output 4	/ / F 0 0 M 0 4 I 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 34 42 0D
input 5 output 4	/ / F 0 0 M 0 4 I 0 5 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 35 43 0D
input 6 output 4	/ / F 0 0 M 0 4 I 0 6 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 36 40 0D
input 7 output 4	/ / F 0 0 M 0 4 I 0 7 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 37 41 0D
input 8 output 4	/ / F 0 0 M 0 4 I 0 8 <CHK> <CR>	2F 2F 46 30 30 4D 30 34 49 30 38 4E 0D
input 1 output 5	/ / F 0 0 M 0 5 I 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 35 49 30 31 46 0D
input 2 output 5	/ / F 0 0 M 0 5 I 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 35 49 30 32 45 0D
input 3 output 5	/ / F 0 0 M 0 5 I 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 35 49 30 33 44 0D
input 4 output 5	/ / F 0 0 M 0 5 I 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 35 49 30 34 43 0D
input 5 output 5	/ / F 0 0 M 0 5 I 0 5 <CHK> <CR>	2F 2F 46 30 30 4D 30 35 49 30 35 42 0D
input 6 output 5	/ / F 0 0 M 0 5 I 0 6 <CHK> <CR>	2F 2F 46 30 30 4D 30 35 49 30 36 41 0D
input 7 output 5	/ / F 0 0 M 0 5 I 0 7 <CHK> <CR>	2F 2F 46 30 30 4D 30 35 49 30 37 40 0D
input 8 output 5	/ / F 0 0 M 0 5 I 0 8 <CHK> <CR>	2F 2F 46 30 30 4D 30 35 49 30 38 4F 0D
input 1 output 6	/ / F 0 0 M 0 6 I 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 36 49 30 31 45 0D
input 2 output 6	/ / F 0 0 M 0 6 I 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 36 49 30 32 46 0D
input 3 output 6	/ / F 0 0 M 0 6 I 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 36 49 30 33 47 0D
input 4 output 6	/ / F 0 0 M 0 6 I 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 36 49 30 34 40 0D
input 5 output 6	/ / F 0 0 M 0 6 I 0 5 <CHK> <CR>	2F 2F 46 30 30 4D 30 36 49 30 35 41 0D
input 6 output 6	/ / F 0 0 M 0 6 I 0 6 <CHK> <CR>	2F 2F 46 30 30 4D 30 36 49 30 36 42 0D
input 7 output 6	/ / F 0 0 M 0 6 I 0 7 <CHK> <CR>	2F 2F 46 30 30 4D 30 36 49 30 37 43 0D
input 8 output 6	/ / F 0 0 M 0 6 I 0 8 <CHK> <CR>	2F 2F 46 30 30 4D 30 36 49 30 38 4F 0D
input 1 output 7	/ / F 0 0 M 0 7 I 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 37 49 30 31 44 0D
input 2 output 7	/ / F 0 0 M 0 7 I 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 37 49 30 32 47 0D
input 3 output 7	/ / F 0 0 M 0 7 I 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 37 49 30 33 46 0D
input 4 output 7	/ / F 0 0 M 0 7 I 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 37 49 30 34 41 0D
input 5 output 7	/ / F 0 0 M 0 7 I 0 5 <CHK> <CR>	2F 2F 46 30 30 4D 30 37 49 30 35 40 0D
input 6 output 7	/ / F 0 0 M 0 7 I 0 6 <CHK> <CR>	2F 2F 46 30 30 4D 30 37 49 30 36 43 0D
input 7 output 7	/ / F 0 0 M 0 7 I 0 7 <CHK> <CR>	2F 2F 46 30 30 4D 30 37 49 30 37 42 0D
input 8 output 7	/ / F 0 0 M 0 7 I 0 8 <CHK> <CR>	2F 2F 46 30 30 4D 30 37 49 30 38 40 0D
input 1 output 8	/ / F 0 0 M 0 8 I 0 1 <CHK> <CR>	2F 2F 46 30 30 4D 30 38 49 30 31 4B 0D
input 2 output 8	/ / F 0 0 M 0 8 I 0 2 <CHK> <CR>	2F 2F 46 30 30 4D 30 38 49 30 32 48 0D
input 3 output 8	/ / F 0 0 M 0 8 I 0 3 <CHK> <CR>	2F 2F 46 30 30 4D 30 38 49 30 33 49 0D
input 4 output 8	/ / F 0 0 M 0 8 I 0 4 <CHK> <CR>	2F 2F 46 30 30 4D 30 38 49 30 34 4E 0D
input 5 output 8	/ / F 0 0 M 0 8 I 0 5 <CHK> <CR>	2F 2F 46 30 30 4D 30 38 49 30 35 4F 0D
input 6 output 8	/ / F 0 0 M 0 8 I 0 6 <CHK> <CR>	2F 2F 46 30 30 4D 30 38 49 30 36 4C 0D
input 7 output 8	/ / F 0 0 M 0 8 I 0 7 <CHK> <CR>	2F 2F 46 30 30 4D 30 38 49 30 37 4D 0D
input 8 output 8	/ / F 0 0 M 0 8 I 0 8 <CHK> <CR>	2F 2F 46 30 30 4D 30 38 49 30 38 42 0D
Query Current Matrix	/ / F 0 0 U <CHK> <CR>	2F 2F 46 30 30 55 13 0D

TECHNICAL SPECIFICATIONS

Video		
Video Amplifier Bandwidth		165MHz
Input Video Signal		1.2 volts p-p
Input DDC Signal		5 volts p-p (TTL)
Single Link Range		1080p/1920 x 1200
DVI Connector		DVI-I 29 pin female
Control		
Serial Controls		RS232, DB9 female connector
Power		
Power Supply-4X4		100- 240VAC at 50 or 60Hz-5VDC/3.0A AC Adapter
Power Supply-8X8		100- 240VAC at 50 or 60Hz-5VDC/4.0A AC Adapter
Physical		
Dimensions WxDxH (In.)		
SM-4X4-DVI		12x6.5x1.75
SM-8X8-DVI		17x7x1.75
Weight	4x4	4.1 lbs
	8x8	2.5 lbs

Serial Cable DB9 Pin Connections		
At VEEMUX (DCE)	Signal Direction	At PC (DTE)
2	→	2
3	←	3
5	-----	5

Mating face of a DB9 female RS232 Connector at VEEMUX



WARRANTY INFORMATION

The warranty period on this product (parts and labor) is two (2) years from the date of purchase. Please contact Network Technologies Inc at **(800) 742-8324** (800-RGB-TECH) or **(330) 562-7070** or visit our website at <http://www.networktechinc.com> for information regarding repairs and/or returns. A return authorization number is required for all repairs/returns.