



NTI® NETWORK
TECHNOLOGIES
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VEEMUX® Series

SM-nXm-15V-LC

Video Matrix Switch

Installation and Operation Manual



TRADEMARK

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CHANGES

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FIRMWARE VERSIONS

Firmware Version 1.0

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INTRODUCTION

The SM-nXm-15V-LC (n = number of inputs (video sources), m = number of outputs (monitors)) video matrix switch (VEEMUX) allows any of up to 8 video sources to output to any or all of up to 8 (8) monitors. The configuration of the VEEMUX is determined at time of order. The bandwidth of the SM-nXm-15V-LC is 160MHz and video resolutions through 1920 x1200 are supported with no degradation. The switch can be controlled with the Front Panel Keypad, RS232 interface, Ethernet, or an Infrared Remote.

The VEEMUX can be ordered in many sizes and with several control options. The base unit includes a user keypad, an RS232 port, and an Ethernet port to make up a complete system. Built-in infrared control allows for maximum user satisfaction in each unique configuration.

Basic Operation

The VEEMUX allows any source to be connected to any destination at any time with no restrictions or limitations.

- Video inputs accept any RGBHV, RGBS, or RGSB signal.
- Video outputs are compatible with any RGBHV or RGBS monitor, regardless of input. (RGSB monitor requires RGSB input)

Supported Web Browsers

Most modern web browsers should be supported. The following browsers have been tested:

- Microsoft Internet Explorer 6.0 or higher
- Netscape 7.0 or higher
- Mozilla FireFox 0.9.2 or higher

Set your browser to always check if there is a newer version of the page than the version stored in cache. This action will ensure that it will display the most up-to-date information.

Ordering Information

The SM-nXm-15V-LC is built to a specific size ranging from 2, 4 or 8 monitors and 4 to 8 video sources. The “n” in the part number represents the number of video sources. Select a switch built for 4 or 8 video sources. The “m” in the part number represents the number of outputs (monitors). A switch built for 2, 4 or 8 monitors may be ordered. It is not necessary to fully populate all of the connectors on the unit (ex. an SM-8x8 switch has the capability of supporting 8 video sources and 8 monitors, but it will operate with only 4 video sources with 2 monitors connected).

SM-nXm-15V-LC

Replace the “n” with 4 or 8

Replace the “m” with either 2, 4 or 8

The following list represents the available sizes that can be ordered:

SM-4x2-15V-LC	SM-8x2-15V-LC
SM-4x4-15V-LC	SM-8x4-15V-LC
	SM-8x8-15V-LC

Materials

Materials Supplied with this kit:

- NTI SM-nXm-15V-LC Video Matrix switch
- IEC Line cord, country specific
- Infrared Remote Control with 2-AAA batteries
- CT6182 DB9 Female-to-RJ45 Female adapter
- CB5021- 5 foot CAT5e-SF-5-Gray patch cable
- 4-#10-32 x 3/4" pan head screws and 10-32 cagenuts (server cabinet mounting hardware)
- CD with: a pdf file of this owner's manual
the NTI Discovery Tool
the NTI Switch Control Program

Cables

All cables are sold separately. The following tables list the available stocked cables with their length in feet. All VGA input and output connectors on Matrix Switches are FEMALE. When using multi-coax high resolution VGA to BNC cables, the BNC connectors are also FEMALE for input and output. Custom cables are available – contact NTI for pricing and distance / resolution limitations.

NTI NAME	DESCRIPTION
VGA	
VEXT-3/6/10/15/25/35/50/75/100-MM	Multi-coax high resolution VGA or SVGA video cable. Connectors are 15HD male-male (used for INPUTS)- 3 thru 100 feet
VEXT-3/6/10/15/25/35/50/75/100	Multi-coax high resolution VGA or SVGA video cable. Connectors are 15HD male-female (used for OUTPUTS)-3 thru 100 feet
VINT-5B-6	Multi-coax high resolution VGA to BNC cable. Connectors are 15HD male to 5 BNC's-6 feet long
RS232	
Matrix-Y-1 or see page 31 for alternative cables	RS232 Interface Cable- Connectors are 9D male- female-female 12" long
CT6182	RJ45F-DB9M Adapter
Contact NTI for various lengths and colors	Cat5 UTP Cable- Connectors are RJ45 male-Stocked cables are 2 thru 100 feet Custom cables must have RJ45 connectors wired straight thru- pin 1 to pin 1, etc.
ETHERNET	
Contact NTI for various lengths and colors	Cat5 UTP Cable- Connectors are RJ45 male-Stocked cables are 2 thru 100 feet Custom cables must have RJ45 connectors wired straight thru- pin 1 to pin 1, etc.

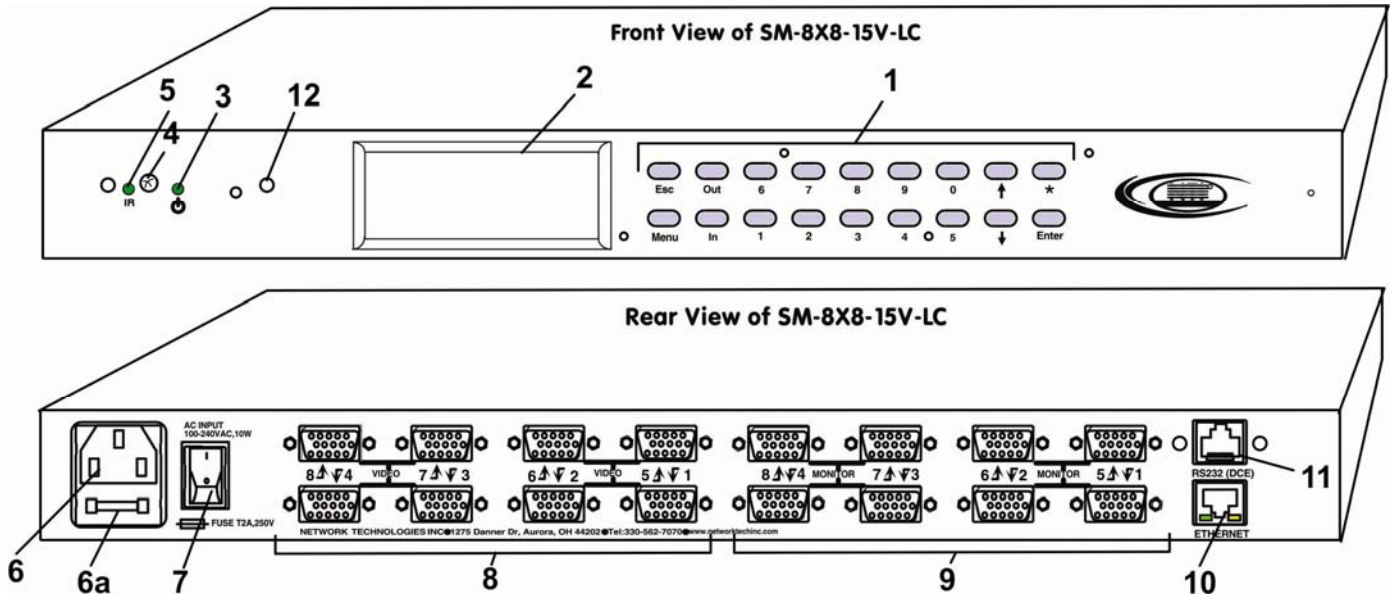
Default User Name and Passwords

The default Telnet password is **nti** (lower case letters only) . For instruction on using Telnet, see page 16.

(No username is required in order to use Telnet. You will only be prompted for a password.)

The default Web Interface user name is **root** (lower case letters only).

The default Web Interface password is **nti** (lower case letters only). For instruction on using the Web Interface, see page 21.



FEATURES AND FUNCTIONS

#	LABEL	CONNECTOR/LED	DESCRIPTION
1	Menu	Buttons	Buttons for navigating LCD menu
2	None	LCD Display	Displays port connections and menu for control of the VEEMUX
3	PWR	Green/Red LED	Illuminates green to indicate proper power to the unit and normal operation Illuminates red during system boot-up or while in standby
4	IR In	Sensor	Receives communication from hand-held remote control
5	IR Activity	Green LED	Illuminates to indicate communication between the hand-held remote control and the VEEMUX
6	AC INPUT	IEC Connector	For attachment of the IEC power cord to power the VEEMUX
6a	Fuse	Fuseholder	For replaceable 2A 240VAC Fast-blo Fuse
7	None	Power Switch	For powering ON and OFF the VEEMUX
8	VIDEO	HD15 Female	For direct connection of VGA video cable from video source
9	MONITOR	HD15 Female	For direct connection of VGA video cable from display device
10	ETHERNET	RJ45 Female	For connection to an Ethernet for remote multi-user control
11	RS232	RJ45 Female	For connection of a PC for serial control
12	System Reset	Button	Press to reset VEEMUX to default settings

INSTALLATION

To Mount to a Rack

1. Attach the ears to the switch using the #6-32x3/16" flat Phillips-head screws (6) provided as shown in the illustration below. The holes in the ears should line up with pre-threaded holes in the sides of the NTI switch. Tighten the screws securely.

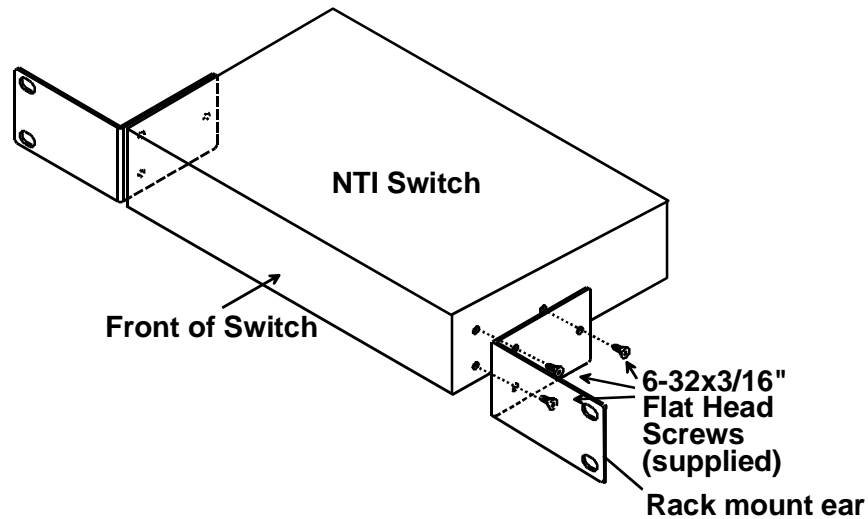


Figure 1- Secure rack mount ears to switch

2. Install 4 cage nuts (supplied) to the rack in locations that line up with the holes in the mounting ear on the NTI switch.
3. Secure the NTI switch to the rack using four #10-32X3/4" screws (supplied). Each screw should be of sufficient length to go completely through the NTI mounting ear, rack frame and fully engage all threads in the cage nut. Be sure to tighten all mounting screws securely.
4. Attach all cables securely to the switch and where necessary supply adequate means of strain relief for cables.

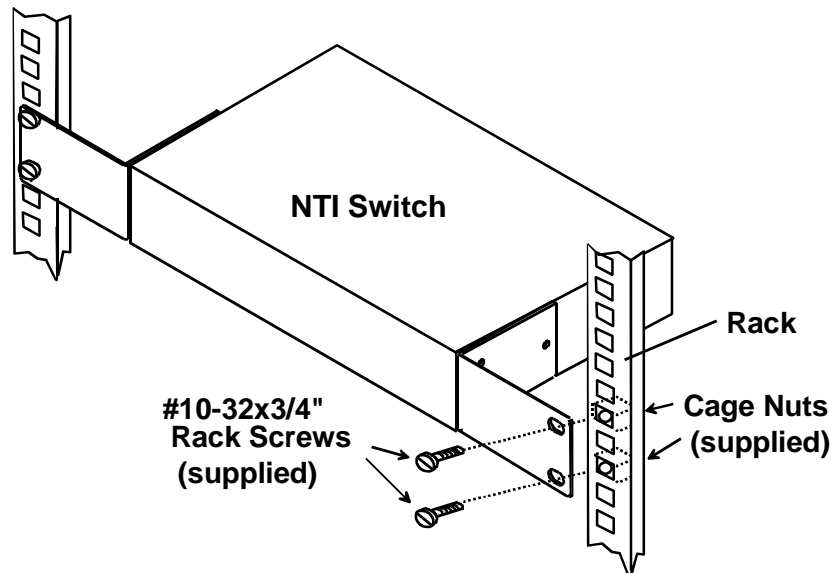


Figure 2- Secure switch to a rack

Connect the Sources and Monitors

1. Turn OFF power to all video sources (inputs) that will be connected to the VEEMUX before connecting or disconnecting any cables.
2. Connect a VEXT-xx-MM cable from the video port of a video source to a 15HD female video connector labeled VIDEO 1 on the VEEMUX. (See Fig. 1)
3. Connect additional video sources to remaining 15HD female VIDEO x connectors as desired.

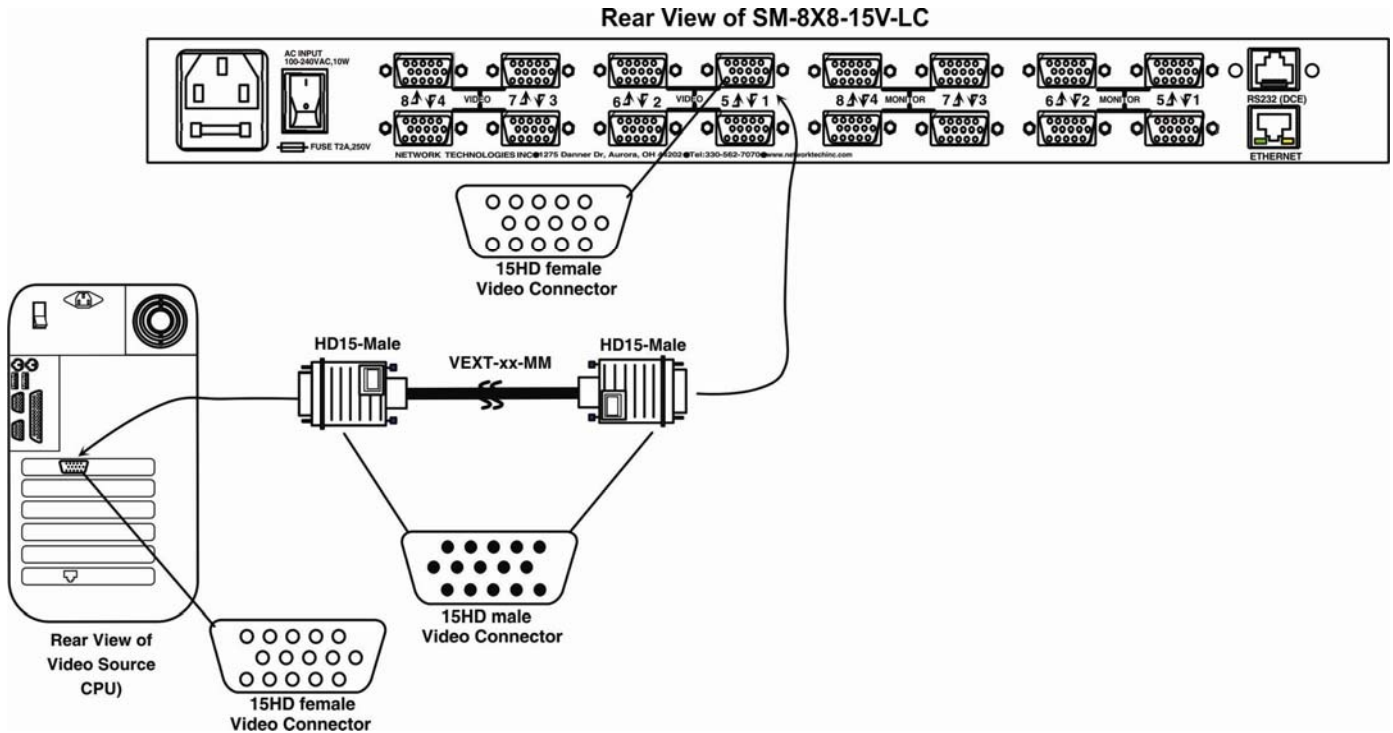


Figure 3- Install Video Source Cables

4. Connect a monitor to the 15HD female connector labeled MONITOR 1 on the rear of the VEEMUX (See Fig. 2).
5. Connect additional monitors to remaining 15HD female MONITOR x connectors as desired.

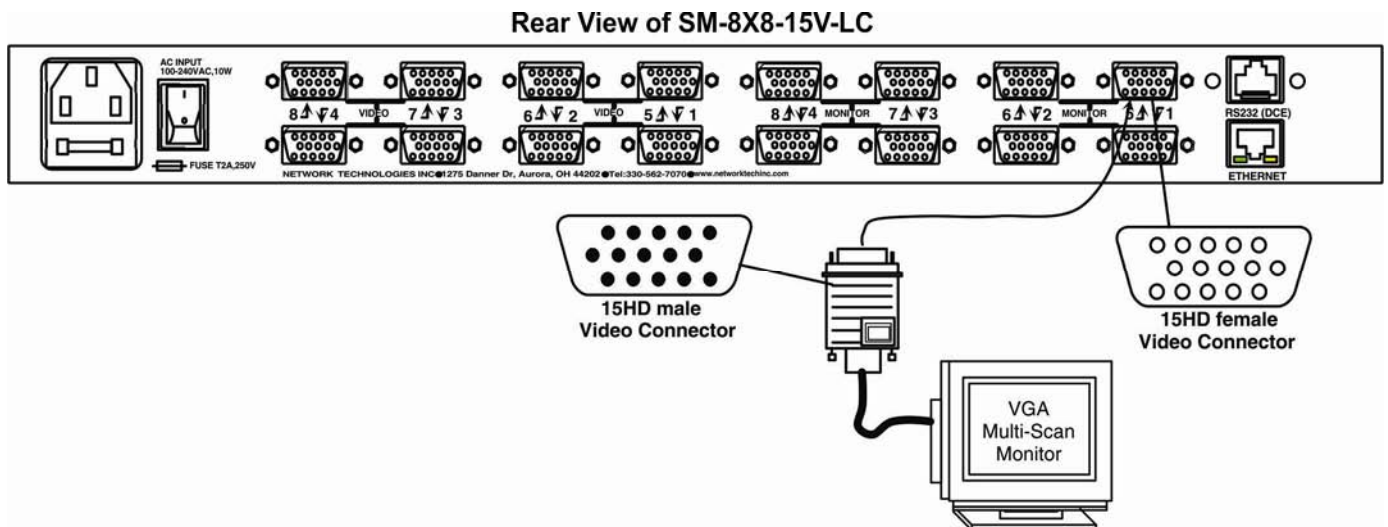


Figure 4- Connect a monitor to the VEEMUX

Connect RS232

RS232 control can be achieved using a separate user terminal or CPU with a terminal program. To make a terminal connection, a DB9M-to-RJ45F adapter and 5 foot CAT5 patch cable have been supplied if needed.

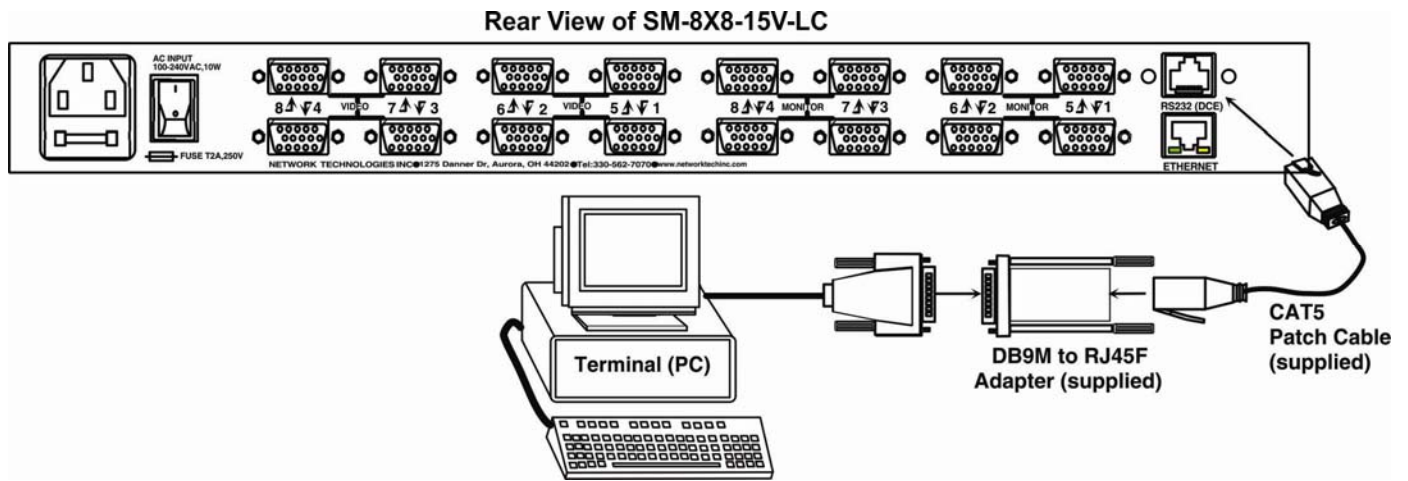


Figure 5- Connect user terminal for RS232 control

Connect to the Ethernet

If the Telnet Interface (page 16) or Web Interface (page 21) will be used, an Ethernet connection to the Local Area Network (LAN) must be made using CAT 5 cable with RJ45 connectors. Wiring between the connectors should be straight through (pin 1 to pin 1, pin 2 to pin 2, etc.) Connect a CAT 5 cable between the connector label "ETHERNET" and the LAN (see Fig. 4).

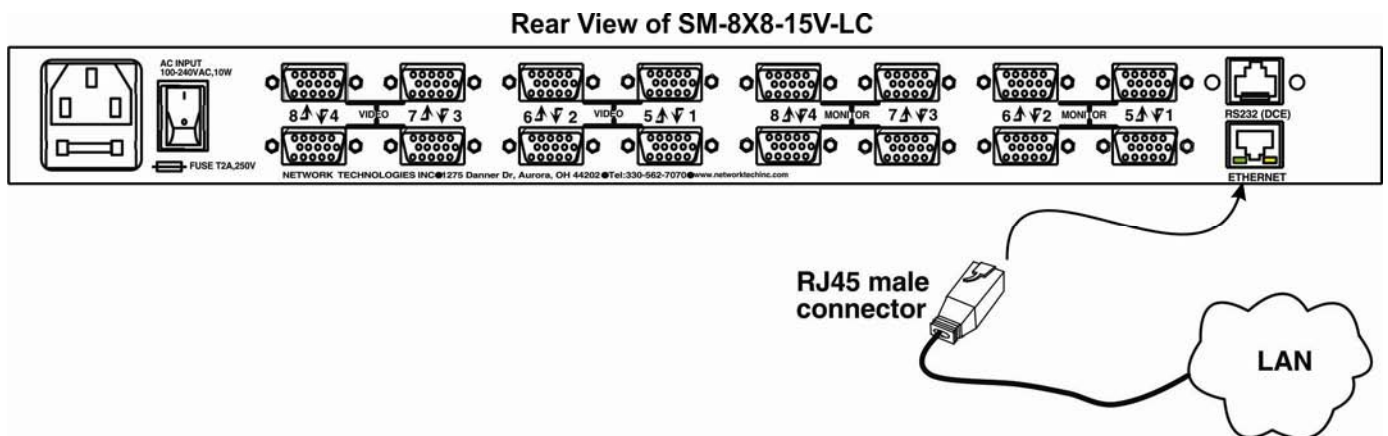


Figure 6- Connect the LAN to the VEEMUX

Power Up

1. Plug the VEEMUX into an AC power outlet.
2. Turn ON power to the VEEMUX.
3. Turn ON power to the video sources and monitors connected to the VEEMUX.

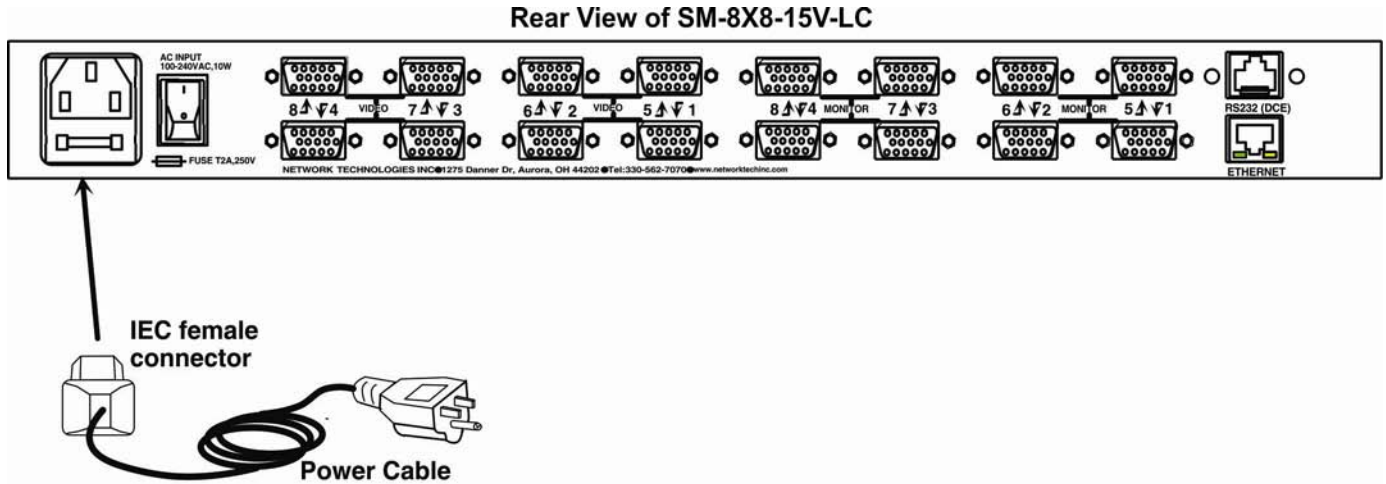


Figure 7- Connect Power to VEEMUX

CONTROL OPTIONS

The VEEMUX video matrix switch has four methods of control:

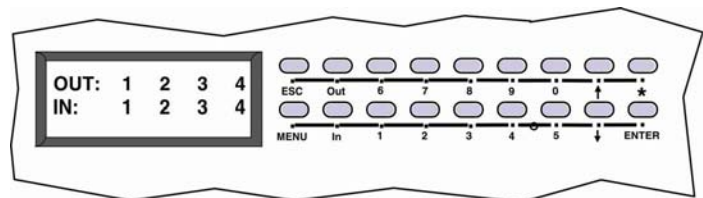
- Front Panel LCD with Keypad
- Directly via an RS232 Interface
- Remotely via Ethernet
- Infrared Remote.

Every unit comes standard with the Front Panel LCD with Keypad, RS232, and Infrared Receiver built in. With the RS232 option, there are no external devices to be purchased. NTI provides software commands as well as a test program to ensure the RS232 functions properly (see page 10 – RS232 Control).

Front Panel LCD with Keypad Control

The front panel LCD and keypad allow the user to monitor switch status and route any user to any video source on the switch. When the unit is powered up, each monitor is automatically connected to the video source of its equal number (i.e. monitor 1 to source 1, monitor 2 to source 2, monitor 3 to source 3, etc.). Along with the routing of the inputs (video sources) to the outputs (monitors) the keypad and LCD allow the users to configure the RS-232 control interface. The keypad buttons perform the following functions.

- ESC Escape back to the main display.
- 0 – 9 Used to enter numbers. (#)
- OUT Precedes the output number
- IN Used following single digit output entries
- ENTER Used following single digit entries and to select menu options
- ▲ Display next 4 outputs and their inputs
- ▼ Display previous 4 outputs and their inputs
- MENU See below for description of the Menu.
- * Connects all outputs to one input (i.e. To set all outputs to one input (*) + (Input #) + (ENTER))



To configure the VEEMUX, use the Menu keys.

Press the **List** button to list your main menu options:

- 1- Serial**
- 2- Ethernet**
- 3- Standby**
- 4- Save Config**
- 5- Load Config**

Use the **Up** and **Down Arrow** keys to scroll through this list.

Use the **Enter** Key to select a menu item.

Press the **Menu** button again to exit the menu.

If, while in a menu, you pause for more than 5 seconds, you will automatically exit the menu.

LCD Menus

1. Under the “Serial” menu are two parameters:

- 1- Baud rate
- 2- Address

These parameters are used when the VEEMUX is controlled through an RS232 connection (page 10). If you select Baud rate, use the arrow keys to toggle through the available baud rates. The baud rate can be set to 115200, 57600, 38400, 19200, 9600, 4800, 2400, or 1200.

If you select Address, use the arrow keys to toggle through the address options (01-15). This is also the switch address used in conjunction with the IR Remote operation (page 39).

2. Under “Ethernet” menu are several parameters:

- 1- Mode
- 2- IP
- 3- Mask
- 4- Gateway
- 5- Primary DNS
- 6- Alt. DNS

The Mode parameter will let you select between a manual IP setting (“Static”) and a “DHCP” assigned dynamic IP address setting. An asterisk indicates which mode is configured, an arrow shows which mode is being selected. To change the configured setting and move the asterisk, select the desired mode and press the **Enter** button.

If you choose a manual IP setting, the IP parameter provides the fields for entering a valid IP address. Use the up and down arrows to advance the numbers, and the **Enter** button to move from field to field. Press **Menu** to exit this screen.

Selections 3, 4 are necessary to apply valid values for your Subnet Mask and Gateway. Navigate these settings as described for setting the IP address.

Selections 5 and 6 are not used at this time and are therefore unnecessary.

3. The third option in the main menu is “Standby”. If you select Standby, the VEEMUX switch will immediately go into a power saver mode and the LCD display will go blank. It will remain in this state until

- 1) any button is pressed on the front panel,
- 2) the Standby button is pressed on the IR Remote Control (page 36), or
- 3) the “Disable Standby” button is pressed in the web interface (page 32)

Save and Load (Recall) Config

The VEEMUX provides the ability to save and recall up to 100 switch configurations using the LCD menu. The switch configurations define the current port connections and video blank status.

Note: The Remote Control can also be used to access these configurations by using the “SAVE” and “RECALL” buttons.

To save a configuration, select “Save Config” from the main menu followed by a numeric button(s) (0-99) corresponding to the memory slot the configuration is to be saved in. Press **Enter** after your selection to force the current configuration to immediately be saved to the selected memory slot.

Configurations can be loaded (recalled) in much the same manner. To recall, select “Load Config” from the main menu followed by the numeric button(s) (0-99) corresponding to the memory slot from which the configuration is to be recalled. Press **Enter** after your selection to immediately force the switch to change the current switch configuration to match that of the configuration recalled.

Configurations that are saved into memory locations via the keypad can be recalled via the web interface (page 22) and vice versa.

RS232 Control

RS232 enables the VEEMUX to be remotely controlled via RS232. To control the VEEMUX via RS232 the user has three options:

- write a program that runs on a PC using the Command Protocol (page 12)
- use the NTI Switch Control Program (page 13) provided on the CD
- use the SerTest program (page 14) provided on the CD

Remote Connection

The RS232 Interface is designed to meet the RS232C standard and can be controlled from any CPU or other controller with an RS232 communications port. The pin-out for the RJ45 connector on the unit is as follows:

RS232 (RJ45) CONNECTOR

PIN	SIGNAL	FUNCTION
1	-	No connection
2	-	No connection
3	RX+	Receive data (TXD at host)
4	GND	Ground
5	-	No connection
6	TX+	Transmit data (RXD at host)
7	-	No connection
8	-	No connection

A 5 foot patch cable and adapter, RJ45-to-DB9, have been provided for connection to most CPUs (see page 6). To daisy chain multiple units, connect a Matrix-Y-1 cable (sold separately) between the CPU and the first switch, and between each switch (as shown in Figure 8).

Baud Rate

The baud rate can be changed by selecting MENU on the front panel keypad, using Telnet commands (page 16) or from the RS232 commands (page 12). The baud rate can be set to 115200, 57600, 38400, 19200, 9600, 4800, 2400, or 1200. A data protocol of 8 data bits, no parity, and 1 stop bit is used for communications. The default baud rate setting is 9600.

Unit Address and Loop Back

To allow multiple units to be controlled from a single host port, the RS232 control interface is designed to allow "daisy chaining" up to 15 units using an NTI Matrix-Y-1 cable. Connect the Matrix-Y-1 cable between the RJ45-to-DB9 serial adapter (provided with the RS232 option) and the CPU as shown in Figure 8. By setting the appropriate unit address (page 9), each unit can be given a unique address (1-15). Then the unit will only respond to commands on the bus if its address is embedded in the command.

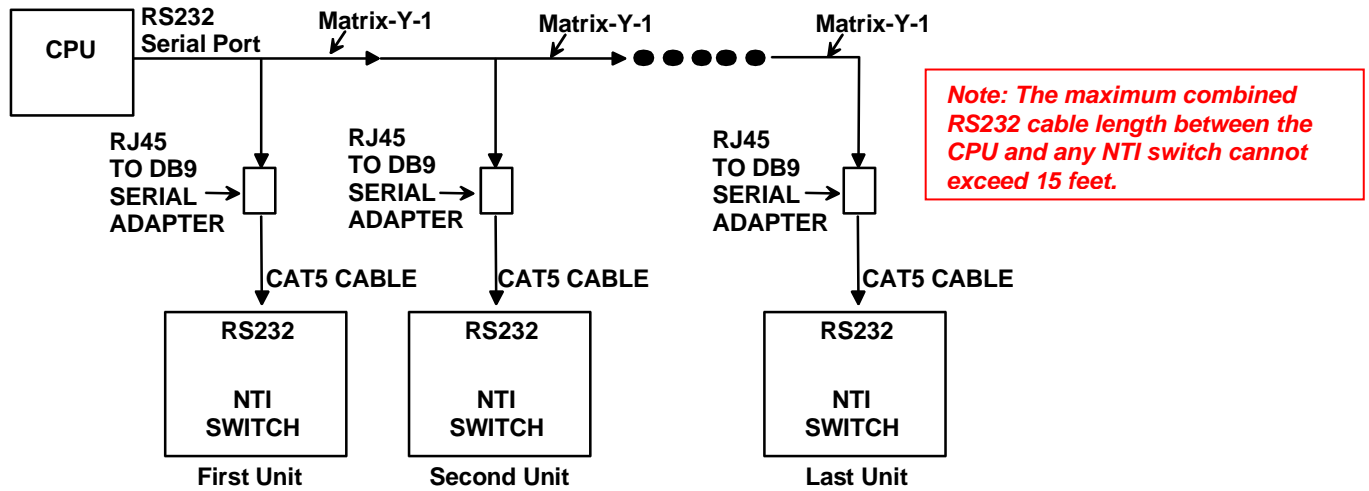


Figure 8- RS232 connection with Matrix-Y-1 cable

Wiring Schematic of Matrix-Y-1 cable

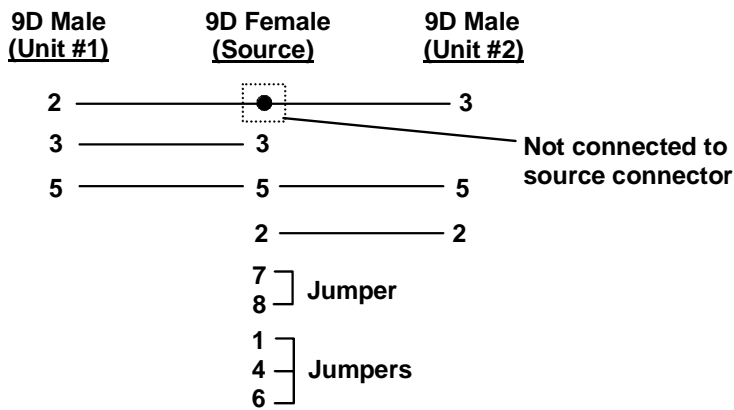


Figure 9- Pinout of Matrix-Y-1 cable

Command Protocol

CPU controller commands supported by the unit are defined below. All commands must be terminated with a <CR> (carriage return). When a command is sent, the entire string is echoed back along with a response from the addressed unit as shown in the Command Definitions table (below). All characters in the command string are case sensitive (see Command Definitions table), and all numbers below 10 must have a leading 0 (ex: 1 = 01).

Legend: (All numbers must be two digits)

SW	:	Switch (01-15) (Unit Address)	MM	:	Save Into Memory Bank (00-99)
BR	:	Baud Rate Code	LL	:	Load From Memory Bank (00-99)
OP	:	Output Port (01-MAXOUTPUTS)	<CR>	:	Carriage Return (Hex 0xD)
IP	:	Input Port (01-MAXINPUTS)	ip	:	IP address

Command Definitions

Command String	Good Response	Description
CS SW,IP,OP	*<CR>	Connect One Output Port To Input Port
CA SW,IP	*<CR>	Connect All Output Ports To Input Port
RO SW,OP	*<CR>IP<CR>	Read Connection For Output/User Port
CC SW,MM	*<CR>MM<CR>	Save Matrix Connections Into Memory Bank xx Xx=00-99
RC SW,LL	*<CR>LL<CR>	Restore Matrix Connections From Memory Bank
CB 00,BR	None	Change baud rate of serial line, BR=11(5200),57(600),38(400),19(200)96(00),48(00),24(00),12(00) Factory default is 9600
RS SW	*<CR>	Internal Reset
RV SW,00	*<CR>string\0<CR>	Read NTI Version String
RU SW	*<CR>IP,OP<CR>	Read Unit Size
EA SW,ip	*<CR>	Set the IP address, ip is in xxx.xxx.xxx.xxx format, number of digits is minimum 1 and maximum 3 for each field Leading zeroes are accepted
EM SW,ip	*<CR>	Set the Subnet mask, ip is in xxx.xxx.xxx.xxx format, number of digits is minimum 1 and maximum 3 for each field. Leading zeroes are accepted
EG SW,ip	*<CR>	Set the default gateway, ip is in xxx.xxx.xxx.xxx format, number of digits is minimum 1 and maximum 3 for each field Leading zeroes are accepted
ET SW,timeout	*<CR>	Set the website timeout; timeout = numeric string of timeout in seconds. Values: 60, 300, 600, 900, 1800, 3600, 7200, 18000, 28800 0 = no timeout
RA SW *	<CR>ip<CR>	Read the IP address, ip is in xxx.xxx.xxx.xxx format, number of digits is minimum 1 and maximum 3 for each field Leading zeroes are accepted
RM SW *	<CR>ip<CR>	Read the Subnet mask, ip is in xxx.xxx.xxx.xxx format, number of digits is minimum 1 and maximum 3 for each field Leading zeroes are accepted
RG SW *	<CR>ip<CR>	Read the default gateway, ip is in xxx.xxx.xxx.xxx format, number of digits is minimum 1 and maximum 3 for each field Leading zeroes are accepted
RT SW *	<CR>timeout<CR>	Read the website timeout; timeout = numeric value in seconds. Values: 60, 300, 600, 900, 1800, 3600, 7200, 18000, 28800 0 = no timeout
SS SW,00	*<CR>	Disable Autostatus feature (see below)
SS SW,01	*<CR>	Enable Autostatus feature (see below)
GO SW,OP	*<CR>go SW,OP:IP<CR>	Read connection of a Output Port to Input Port
GM SW,00	*<CR>go SW,OP:IP (all ports)<CR>	Read connection matrix of all Output ports
Ss SW,OP,DWT	*<CR>	Set Scan Mode dwell time for specific Output port DWT values: 000-255 000= scan disabled See page 8 for more info.

Command Definitions (Continued)

Command String	Good Response	Description
Gs SW,OP	*<CR>DWT<CR>	Read scan mode dwell time setting for an Output port DWT values: 000-255 000= scan is disabled for the port
Sa SW,OP	*<CR>	Set scan list of individual output to all inputs
Sc SW,OP	*<CR>	Clear scan list of individual output
S+ SW,OP,IP	*<CR>	Add individual input to Scan List of output
S- SW,OP,IP	*<CR>	Remove individual input from Scan List of output
Sx SW,OP	*<CR>oooxoxxxooooxxx<CR>	Inspect the Scan List of individual output (o=skip x=don't skip)

If the first field is not a known command (as listed above) or SW field is different from the serial address programmed in the switch memory, the command will be ignored. If the SW field corresponds to the unit address, but the syntax is wrong after this field, the switch will answer with a bad response ?<CR>.

Autostatus

When Autostatus is enabled, any output-to-input connection change in the VEEMUX will cause an Autostatus message to be sent via RS232 to the administrator. The format of the message would be "pc SW,OP:IP<CR>"

Example of an Autostatus message:

pc 01,01:04<CR>

which means "At the switch with unit address 01, the output (01) has changed connection to input 04."

**Notes: Message to the administrator will be delayed by any RS232 traffic being received by the switch from the administrator.
Autostatus must be disabled before using SerTest or the NTI Switch Control Program (below).**

By default, Autostatus is disabled and must be manually enabled. Autostatus is also disabled any time the power to the VEEMUX is interrupted.

NTI Switch Control Program For Windows 9X, NT, 2000, XP, Vista and 7

The NTI Switch Control Program is an easy and powerful graphical program that controls NTI matrix switches through an RS232 interface. The NTI Switch Control Program is included on the CD packaged with the VEEMUX. The NTI Switch Control Program is downloaded by clicking on the link "Download NTI Switch Control Program" found on the web page that appears when you insert the instruction manual CD into your CD ROM drive.

To install the NTI Switch Control Program after downloading

1. Locate the **Setup.exe** in the directory the program was downloaded to and double-click on it
2. Follow the instructions on the screen

The NTI Switch Control Program performs best on monitors set to a screen resolution of at least 800 X 600. Instruction for using the NTI Switch Control Program is available by opening "MSCP Help" in the "NTI" program group once the program has been installed and is open on the screen.

To open "MSCP Help" from the Windows desktop

1. Click on **START**
2. Click on **PROGRAMS**
3. Click on **NTI**
4. Click on **MSCP Help**

SerTest- RS232 Interface Test Program

This software allows a user to test the functions of an NTI server switch, matrix switch or Multi-user/Multi-platform switch RS232 interface. The program SERTEST along with the NTI Switch Control Program (above) is installed from the CD packaged with this switch. SERTEST generates a main menu with the 3 selections described below:

Main Options

- Matrix Operations - send commands to the matrix unit.
- Ethernet Operations - set Ethernet connection variables
- Setup Options - set COM port, baud rate, and unit address
- About SerTest - display the program version

Matrix Operations

Key	Selection	Description
1)	Connect Video Output/User to an Input/CPU	- connect an output to an input
2)	Connect All Video Outputs/Users to an Input/CPU	- connect all outputs to an input
3)	Connect Audio Output/User to an Input/CPU	- connect an output to an input (audio ports only)
4)	Connect All Audio Outputs/Users to an Input	- connect all outputs to an input (audio ports only)
5)	Change Mute Status for Audio Output/User (not applicable to this unit)	- mute or un-mute the Audio port output
6)	Change Volume for Audio Output/User (not applicable to this unit)	- change Audio port output volume
7)	Read Connection for Video Output/User	-read the connection of a specific video output
8)	Read Connection for Audio Output/User	-read the connection of a specific audio output
9)	Read Mute and Volume for Audio Output/User	- read the volume and the mute status of the specified audio output
a)	Save I/O Connections into Unit Memory	-save the connections into switch memory bank
b)	Restore I/O Connections from Unit Memory	-restore the connections from switch memory bank
c)	Change All Units Baud Rate (9600/COM1:)	-change RS-232 Baud rate of all switches -the current baud rate and serial port are displayed in parentheses
d)	Reset Unit	- send a reset command to the switch - the current unit address is displayed in parentheses
e)	Reset All Units	- send an internal reset command to all switches
f)	Read Unit Size	- read the switch size (number of inputs and outputs)
g)	Read Unit Version/Revision String	-read a string containing the switch version, type, and size
h)	Save All Units I/O Connections into Units Memory	-save the connections into switch memory bank, command for all switches
i)	Restore All Units I/O Connections from Units Memory	-restore the connections from switch memory bank, command for all switches

Selections in the "Key" column that are gray are not applicable to this product.

Ethernet Operations

Key	Selection	Description
1)	Set Unit IP Address	- enter the desired IP address in xxx.xxx.xxx.xxx format - number of digits is minimum 1 and maximum 3 for each field. Leading zeroes are accepted
2)	Set Unit Subnet Mask	- enter the desired IP address in xxx.xxx.xxx.xxx format - number of digits is minimum 1 and maximum 3 for each field. Leading zeroes are accepted
3)	Set Unit Default Gateway	- enter the desired default gateway - number of digits is minimum 1 and maximum 3 for each field. Leading zeroes are accepted
4)	Set Unit Website Timeout	- set the website timeout; timeout = numeric string of timeout in seconds - Values: 60, 300, 600, 900, 1800, 3600, 7200, 18000, 28800 0 = no timeout
5)	Read Unit IP Address	- read the unit IP address in xxx.xxx.xxx.xxx format
6)	Read Unit Subnet Mask	- read the unit subnet mask in xxx.xxx.xxx.xxx format
7)	Read Unit Default Gateway	- read the unit default gateway in xxx.xxx.xxx.xxx format
8)	Read Unit Website Timeout	- read the current website timeout period in seconds - Values: 60, 300, 600, 900, 1800, 3600, 7200, 18000, 28800 0 = no timeout

Setup Options

Key	Selection	Description
1)	select Com port current: (COM1:)	- select PC serial port - the current PC serial port is displayed in parentheses
2)	select Baud rate current: (9600)	- select PC serial port baud rate - the current baud rate is displayed in parentheses
3)	set unit Address current: (1)	- select the unit address - the current address is displayed in parentheses

For any selection that requires user input, the user is prompted. When commands are sent to the matrix unit, the command string and matrix unit responses are echoed to the screen. All commands generated by the program are formatted according to the information provided in sections above. If any transmission problems are detected, an error message is displayed.

Press <Esc> or <Enter> to back out to the main menu and press again to exit.

ETHERNET CONTROL

Telnet Interface-Port 2000

The Telnet Interface enables the user to control the switch using telnet client through an Ethernet connection. The telnet server listens on ports 2000 and 2005. Port 2000 is for an operator telnet session (must be enabled-see page 26) while port 2005 is intended for a software control type session (see page 17). For operator telnet control using the telnet interface and the current IP address, type the following in a command shell:

telnet 192.168.1.30 2000

The VEEMUX will prompt the user for a password. The user must enter the password followed by <Enter>.

The factory default password is "nti".

With a proper password sent the VEEMUX will respond with:

**Password Successful
Connection Established**

The following commands are now available:

Command	Reply	Description
H(elp) or h(elp)	Displays the list of commands	Help
CP	User is prompted to introduce the password twice	Change password
CS nn,mm	*<CR>	Connect One Output (User Port) To Input (Video source)
CA nn	*<CR>	Connect All Outputs To Input
RO nn	*<CR>mm<CR>	Read Connection For Output. Returns the number of the input (mm) connected to output nn
CC nn	*<CR>nn<CR>	Save Matrix Connections Into Memory Bank nn nn should be between 00 and 99
RC nn	*<CR>nn<CR>	Restore Matrix Connections From Memory Bank nn nn should be between 00 and 99
CB nn	*<CR>	Change baud rate of serial line, nn=12(00),24(00),48(00),96(00) Factory default is 9,600.
RS	*<CR>	Reset Unit
RV 00	*<CR>string\0<CR>	Read NTI Version String
RU	*<CR>nn,mm<CR>	Read Unit Size Returns the number of inputs(nn) and the number of outputs (mm)
Ss nn,dwt	*<CR>	Set value of Scan Mode dwell time (see pg. 8) for specific Output (nn) dwt = 000-255 (seconds) 000= disable Scan Mode
Gs nn	*<CR> dwt<CR>	Read set Scan Mode dwell time value (dwt) for specific Output (nn) in seconds (see also "Scan Mode" on page 8)
Sa nn,mm	*<CR>	Set scan list of individual output nn to all inputs mm
Sc nn	*<CR>	Clear scan list of individual output nn
S+ nn,mm	*<CR>	Add input mm to Scan List of output nn

S- nn,mm	*<CR>	Remove input mm from Scan List of output nn
Sx nn	*<CR>000x0xxx0000xxx<CR>	Display the Scan List of output nn (o=skip x=don't skip)
<Ctrl>-<X> (see note 4 below)	Good Bye. Connection to host lost.	Quit telnet session

Notes:

1. The commands must be typed exactly as shown in the chart. The commands are case sensitive.
2. If a mistake is made, the user must backspace to the beginning and completely retype the command.
3. If a command is sent that the VEEMUX does not recognize or exceeds the configuration of the switch, the reply "?" may be received. Check the command syntax and try again.
4. To quit the telnet session, press the keyboard keys <Ctrl><X>.

Telnet Interface-Port 2005

For a software control type of telnet interface session (versus operator telnet control through port 2000 as described on page 16), connect to the VEEMUX through the current IP address at port 2005. Use the command set below to control and acquire information from the VEEMUX.

Note After establishing the connection, the unit will answer with *<CR>. If the connection fails or there are already 2 connections established, it will answer with ?<CR>

Legend: (All numbers must be two digits)

- OP : Output Port (01-MAXOUTPUTS)
- IP : Input Port (01-MAXINPUTS)
- <CR> : Carriage Return (Hex 0xD)

Command Summary

Command String	Good Response	Description
RU<CR>	ru IP,OP<CR>	Read unit size
RO OP<CR>	pc OP,IP<CR>	Read connection for OP
CS IP,OP<CR>	*<CR>	Connect OP to IP
CA IP<CR>	*<CR>	Connect all outputs to IP
SS 01<CR>	*<CR>	Enable auto-status mode
SS 00<CR>	*<CR>	Disable auto-status mode
SX<CR>	See details	Examine connections
XX<CR>	*<CR>	Close connection

A <CR> (carriage return, 0x0D) is considered to be the end of the command string. If a string exceeds 16 characters, an end of string will be inserted automatically to avoid buffer overflow. An eventual <LF> (line feed, new line, 0x0A) after a <CR> will be ignored. A bad string will always be responded to with the ASCII character '?' followed by a <CR>.

Command Detail

RU-Read Unit Size

Command:

Byte 1	Byte2	Byte3
'R' (0x52)	'U' (0x55)	<CR> (0x0D)

Response:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
'r' (0x72)	'u' (0x75)	Space (0x20)	Input – 1st digit (0x30...0x32)	Input – 2nd digit (0x30...0x39)	'.' (0x2C)	Output – 1st digit (0x30...0x32)	Output-2nd digit (0x30...0x39)	<CR> (0x0D)

This command will read the size of the unit. The response returns the number of inputs and the number of outputs in two-digit, ASCII code format. If the numbers are smaller than 10, the 1st digit is '0'.

RO-Read Connection for Output Port

Command:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
'R' (0x52)	'O' (0x4F)	Space (0x20)	Output – 1st digit (0x30...0x32)	Output – 2nd digit (0x30...0x39)	<CR> (0x0D)

Response:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
'p' (0x70)	'c' (0x63)	Space (0x20)	Output – 1st digit (0x30...0x32)	Output-2nd digit (0x30...0x39)	'.' (0x2C)	Input – 1st digit (0x30...0x32)	Input – 2nd digit (0x30...0x39)	<CR> (0x0D)

This command will read the connection of an output port. The response returns the output port that is connected to the input port.

CS- Connect Output Port to Input Port

Command:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
'C' (0x43)	'S' (0x53)	Space (0x20)	Input – 1st digit (0x30...0x32)	Input – 2nd digit (0x30...0x39)	'.' (0x2C)	Output – 1st digit (0x30...0x32)	Output – 2nd digit (0x30...0x39)	<CR> (0x0D)

Response:

Byte 1	Byte 2
'*' (0x2A)	<CR> (0x0D)

This command connects the specified input port to the specified output port.

CA- Connect All Output Ports to Input Port

Command:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
'C' (0x43)	'A' (0x41)	Space (0x20)	Input – 1st digit (0x30...0x32)	Input - 2nd digit (0x30...0x39)	<CR> (0x0D)

Response:

Byte 1	Byte 2
'*' (0x2A)	<CR> (0x0D)

This command connects all output ports to the specified input port.

SS_01- Enable Auto Status Mode

Command:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
'S' (0x53)	'S' (0x53)	Space (0x20)	'0' (0x30)	'1' (0x31)	<CR> (0x0D)

Response:

Byte 1	Byte 2
'*' (0x2A)	<CR> (0x0D)

Auto status mode is disabled by default whenever the connection is established, and this command must be entered to enable it. When auto status mode is enabled, a message will be sent whenever an input/output connection changes from any source. The format of this message is given in the table below. The first two numeric digits are the output port number and the two after the colon are the number of the input port that is now connected to it.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
'p' (0x70)	'c' (0x63)	Space (0x20)	Output – 1st digit (0x30...0x32)	Output – 2nd digit (0x30...0x39)	':' (0x3A)	Input – 1st digit (0x30...0x32)	Input – 2nd digit (0x30...0x39)	<CR> (0x0D)

SS_00- Disable Auto Status Mode

Command:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
'S' (0x53)	'S' (0x53)	Space (0x20)	'0' (0x30)	'0' (0x30)	<CR> (0x0D)

Response:

Byte 1	Byte 2
'*' (0x2A)	<CR> (0x0D)

This command disables auto status mode.

SX- Examine connections

Command:

Byte 1	Byte 2	Byte 3
'S' (0x53)	'X' (0x58)	<CR> (0x0D)

Response:

Multiple lines, one line for each output:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
'p' (0x70)	'c' (0x63)	Space (0x20)	Output – 1st digit (0x30...0x32)	Output – 2nd digit (0x30...0x39)	':' (0x3A)	Input – 1st digit (0x30...0x32)	Input – 2nd digit (0x30...0x39)	<CR> (0x0D)

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
'p' (0x70)	'c' (0x63)	Space (0x20)	Output – 1st digit (0x30...0x32)	Output – 2nd digit (0x30...0x39)	':' (0x3A)	Input – 1st digit (0x30...0x32)	Input – 2nd digit (0x30...0x39)	<CR> (0x0D)

Last line:

Byte 1	Byte 2
'*' (0x2A)	<CR> (0x0D)

Terminate telnet session

Command:

Byte 1	Byte 2	Byte 3
'X' (0x58)	'X' (0x58)	<CR> (0x0D)

Response:

Byte 1	Byte 2
'*' (0x2A)	<CR> (0x0D)

The unit will respond with '*'<CR> and close the connection, terminating the telnet session. The unit is then available for future connections.

It is recommended that the **XX** command is used as it will close the Telnet connection with the server immediately. If the **XX** command is not used when the client exits, the server will not close the connection until it times out from inactivity (10 seconds).

- The recommended sequence is:
- 1) Open connection
 - 2) Send a command
 - 3) Close the connection with **XX**

Web Interface

A user may control the connections of the VEEMUX using a Web Interface via any web browser (see page 1 for supported web browsers). With the VEEMUX connected to a LAN through an Ethernet cable, a user can access the web interface controls inside the VEEMUX.

FYI: To quickly locate a VEEMUX on the LAN and edit the IP address settings, use the Device Discovery Tool (page 34).

To access the web interface, type the current IP address into the address bar of the web browser.

Address

To open a SSL-encrypted connection, type:

Address

You will be prompted to accept a certificate. Accept the NTI certificate.

A "Login Page" will appear.

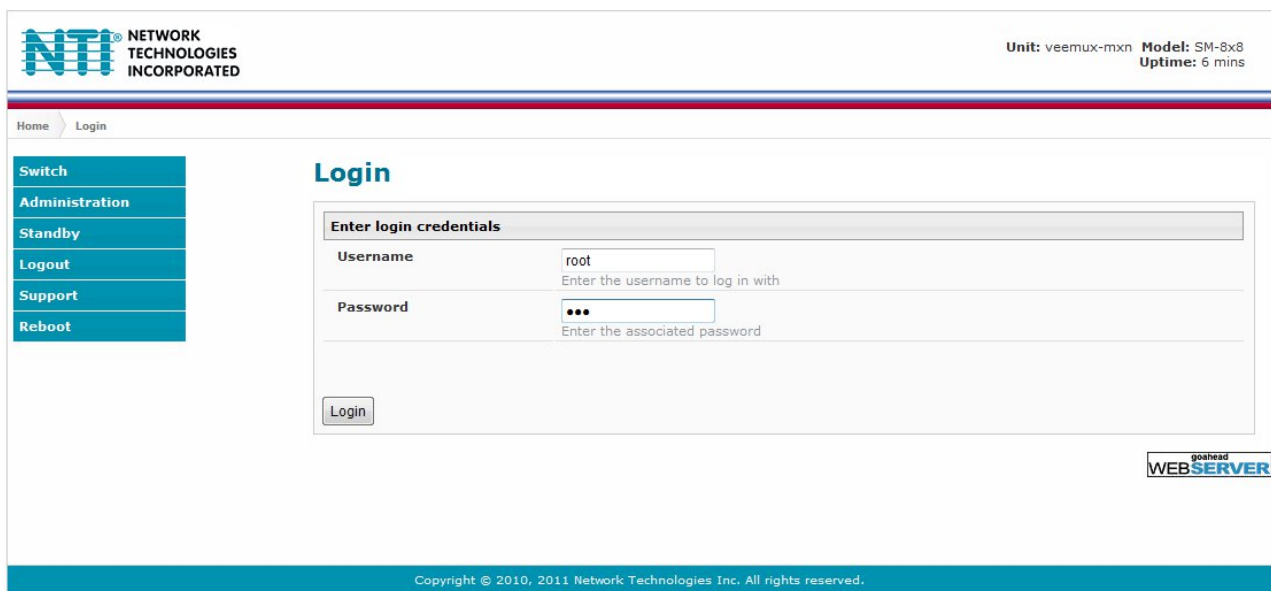


Figure 10- Web interface Login page

Enter the Password

The cursor will be flashing inside the username box. Enter the administrative username (this cannot be changed), then enter the default password:

User Name = root (lower case letters only)

Password = nti (lower case letters only)

To change the password, see page 30.

Note: The browser must be configured to accept cookies in order for the user to successfully make use of the web interface.

With a successful login, the main menu and Video Switch page will appear.

Video Switch

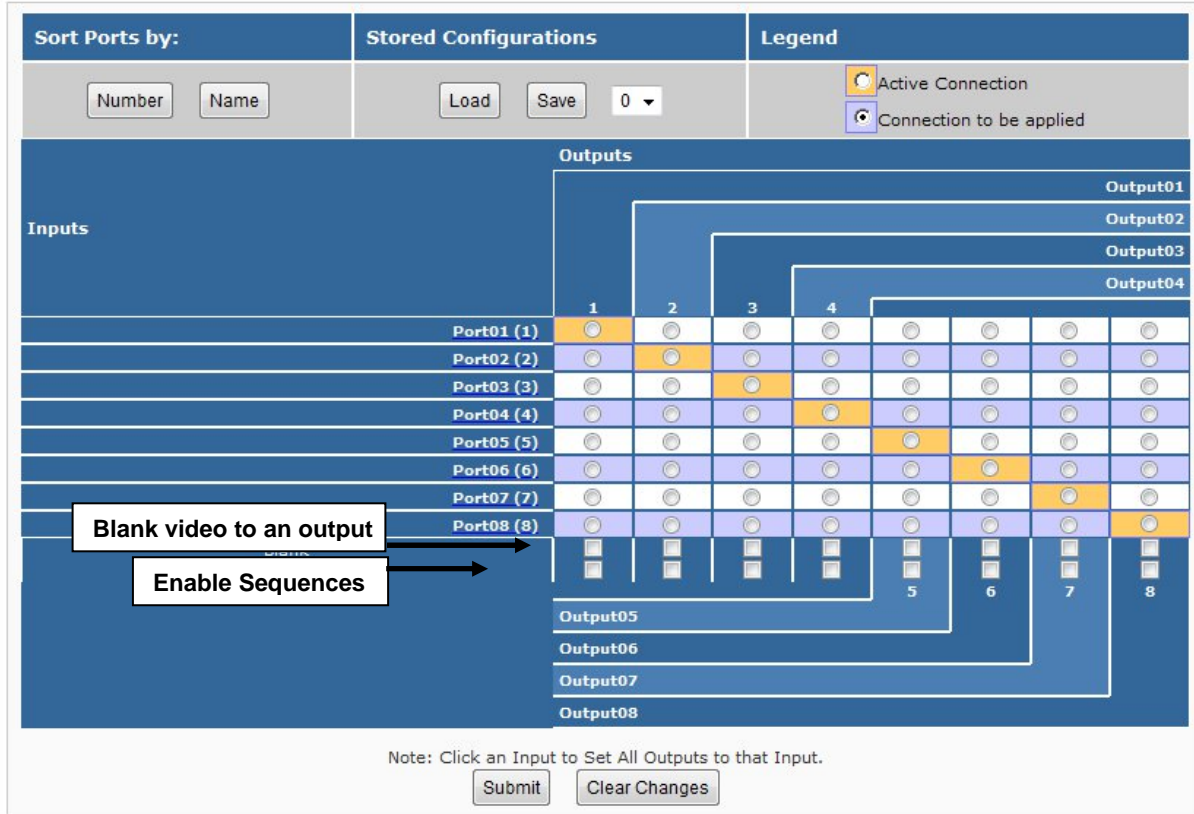


Figure 11- Main menu and Video Switch page

From the menu the user can choose from several links to either view the status of the switch or change the configuration of it. As described on the following pages, each link will enable different areas of control.

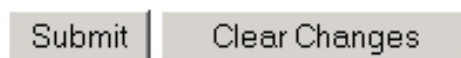
Video Switch Page

The Video Switch page (above) displays the active connections (shown in orange) and enables the user to control the video connections of the VEEMUX. Up to 100 different connection configurations can be saved and later recalled by any connection method. Scanning Sequences (page 28) for each output can also be enabled.

Note: Changes made using the keypad (page 8) or by another user through the web interface will be updated automatically to your browser every 10 seconds.

Note: Configuration 0 will be automatically loaded when the VEEMUX is powered-up.

To change a connection, click on the radio button (square image with circle in the center) that intersects the input and output columns. A black dot will be placed in the circle to indicate the selection. Then press the **Submit** button. The display will be reloaded with the selections changed to orange to indicate they are now active. Multiple connections can be changed simultaneously.

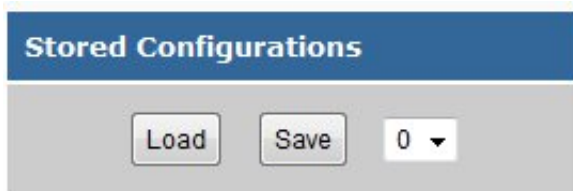


To quickly clear the selected radio buttons press the **Clear Changes** button. This will only work if the **Submit** button has not already been pressed with the selections made.

To quickly connect all outputs to a single input, click on the desired input.

FYI: See page 29 for an example of using the Outputs Scanning Sequences feature.

To save a configuraton, from the **Stored Configurations** user interface, use the drop-down list to select the desired slot (numbers 0-99) to save the active configuration into and press the **Save** button.



Note: This will save the currently active configuration on the VEEMUX. If changes have been made in the web interface without first pressing the Submit button, those changes will not yet be part of the active configuration.

Note: If changes to the active configuration have been made by another user prior to saving the current connection selections, the changes made by the other user will be saved as the configuration.

The webpage configuration that loads after a **Save** is the configuration that was actually saved.

To load a saved configuration, from the **Stored Configurations** user interface, use the drop-down list to select the desired configuration. Then press the **Load** button. The VEEMUX will make the connections and the screen will refresh to show the connections associated with that configuration selection.

To blank the video to a specific output, click the box to the right of "Blank" that corresponds with the desired output to place a checkmark in it. The video going to that output will be disabled.

To enable the scanning sequence configured for an output, configure the automatic scanning sequence of inputs that should be viewed at the output (see page 28) and then click the box to the right of "Sequence Enabled" that corresponds with the desired output to place a checkmark in it. The video viewed from that output will switch from input to input according to the configured sequence.

Administration

The Administration section provides links to pages for all configuration options in the VEEMUX switch. The administration section is broken up into 8 topics:

System	Assign the switch name and serial port communication settings
Network	Assign all network settings for connection to LAN
Video Input Names	Assign port names to each cable connection from video sources for easy reference
Video Output Names	Assign port names to each cable connection from display devices for easy reference
Scanning Sequence	Assign dwell times for each input as it is assigned to each output's scanning sequence
Change Password	Change the password used to access the VEEMUX
Firmware	Update the firmware as new versions become available

System Configuration

On the System Configuration page, under Administration, fields are provided to assign a unique name to the VEEMUX, set the baud rate for serial communications, and the serial address to be used in RS232 commands.

After applying the desired settings, press **“Save”** to finish.

The screenshot displays the NTI Network Technologies web interface for System Configuration. At the top left is the NTI logo and company name. At the top right, it shows 'Unit: veemux-mxn', 'Model: SM-8x8', and 'Uptime: 9 mins'. A breadcrumb trail shows 'Home > System Configuration'. On the left is a navigation menu with 'Administration' selected, containing links for System, Network, Video Input Names, Video Output Names, Scanning Sequence, Change Password, and Firmware. Below that are 'Standby', 'Logout', 'Support', and 'Reboot' options. The main content area is titled 'System Configuration' and contains two sections: 'Unit Settings' and 'Serial Port Settings'. In 'Unit Settings', the 'Name' field is 'veemux-mxn' with a note 'Unique name for this unit'. In 'Serial Port Settings', the 'Baud Rate' is '9600 bps' (with a note 'Baud Rate for RS232 Commands') and the 'Serial Address' is '1' (with a note 'Address for RS232 Commands and System Address for IR Remote'). A 'Save' button is located at the bottom left of the configuration form. The footer contains the copyright notice: 'Copyright © 2010, 2011 Network Technologies Inc. All rights reserved.'

Figure 12- System Configuration page

Network Configuration

ON the Network Configuration page, under Administration, the user can configure the VEEMUX web interface connection. This will provide access to control of the VEEMUX from any web-accessible computer.

The screenshot displays the 'Network Configuration' page. It is divided into two main sections: 'IP Settings' and 'Server Settings'. The 'IP Settings' section includes fields for Mode (set to DHCP), IP Address (192.168.3.104), Subnet Mask (255.255.255.0), Default Gateway (192.168.3.3), Preferred DNS, and Alternate DNS. The 'Server Settings' section includes checkboxes for 'Enable Telnet' (unchecked) and 'Allow HTTP Access' (checked), and input fields for 'HTTP Port' (80), 'HTTPS Port' (443), and 'Web Timeout' (2600). A 'Save' button is located at the bottom left of the form. A copyright notice for Network Technologies Inc. is visible at the bottom of the page.

IP Settings	
Mode	DHCP <small>Method of acquiring IP settings</small>
IP Address	192.168.3.104 <small>Statically assigned IP address</small>
Subnet Mask	255.255.255.0 <small>Statically assigned subnet mask</small>
Default Gateway	192.168.3.3 <small>Statically assigned default gateway</small>
Preferred DNS	 <small>Statically assigned preferred name server</small>
Alternate DNS	 <small>Statically assigned alternate name server</small>
Server Settings	
Enable Telnet	<input type="checkbox"/> <small>Enable access to this device via telnet</small>
Allow HTTP Access	<input checked="" type="checkbox"/> <small>Allow access via standard (non-secure) HTTP requests</small>
HTTP Port	80 <small>Port for standard HTTP requests</small>
HTTPS Port	443 <small>Port for HTTPS requests</small>
Web Timeout	2600 <small>Minutes after which idle web users will be logged out (0 disables idle logout)</small>

Save

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Figure 13- Network Configuration page

Mode – Choose between Static IP assignment and DHCP.

IP Address- If using Static IP assignment, enter a valid IP address to use

Subnet Mask- Enter a valid subnet mask value

Default Gateway- Enter a valid gateway address

Preferred DNS- Enter a valid Domain Name Server address (not required)

Alternate DNS- Enter a valid alternate Domain Name Server address if desired (not required)

This change will take a few seconds and automatically redirect the user to the IP address specified.

If telnet is going to be used to control the VEEMUX, place a checkmark in the “Enable Telnet” block.

If you wish to disable non-secure web access to the VEEMUX, remove the checkmark from “Allow HTTP Access”. With this box empty, only secure shell web access will be allowed.

A standard port number can be assigned for the HTTP (non-secure) and HTTPS (secure) ports, numbers ranging from 0-65535. Default HTTP port is 80, and default HTTPS port is 443.

The Website Timeout option controls how long an inactive web connection will stay logged in. The range is 0-3200 minutes (0 disables it). Any change to the Website Timeout configuration takes effect immediately.

Press the “Save” button to save any changes made.

Video Input Names

From the Administration menu, the Video Input Names page can be displayed. This page enables the Administrator to change the name of the input ports displayed on the Video Switch page.

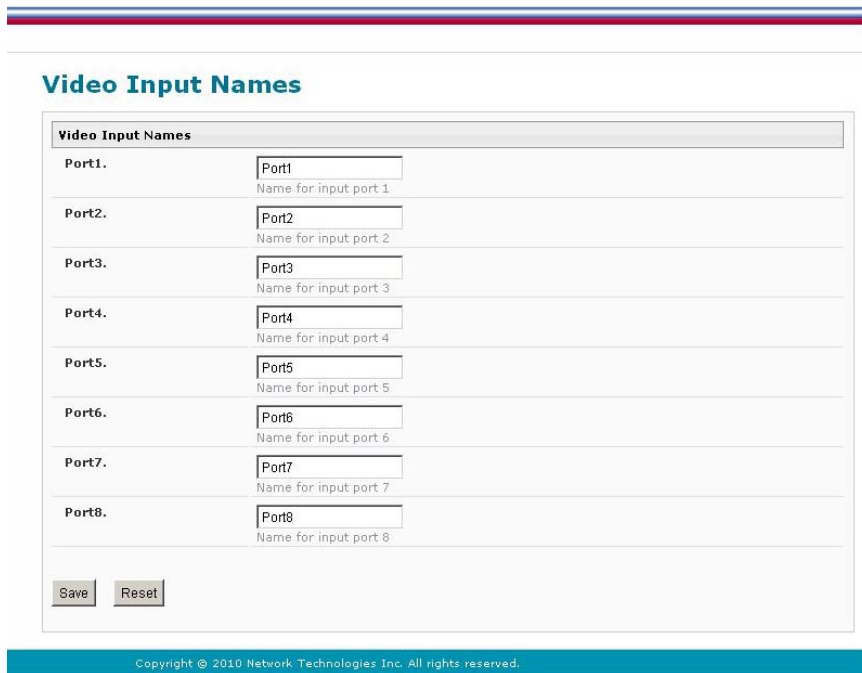


Figure 14- Video Input Names page

To change an Input Name, enter the name of the port for the desired input port number, and press “Save”.

If you make changes and change your mind and want to return the names back to what they were before changing them, press “Reset”. This must be done before pressing the “Save” button, or changes will not be able to be reversed.

Video Output Names

From the Administration menu, the Output Names page can be displayed. This page enables the Administrator to change the names of the output ports displayed on the Switch page.

Video Output Names		
User1.	<input type="text" value="Output1"/>	Name for output port 1
User2.	<input type="text" value="Output2"/>	Name for output port 2
User3.	<input type="text" value="Output3"/>	Name for output port 3
User4.	<input type="text" value="Output4"/>	Name for output port 4
User5.	<input type="text" value="Output5"/>	Name for output port 5
User6.	<input type="text" value="Output6"/>	Name for output port 6
User7.	<input type="text" value="Output7"/>	Name for output port 7
User8.	<input type="text" value="Output8"/>	Name for output port 8

Save Reset

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Figure 15- Video Output Names page

To change an Output Name, enter the name of the port for the desired output port number, and press "**Save**".

If you make changes and change your mind and want to return the names back to what they were before changing them, press "**Reset**". This must be done before pressing the "**Save**" button, or changes will not be able to be reversed.

Scanning Sequences

From the Administration menu, the Scanning Sequence page can be displayed. The Scanning Sequence page displays the configuration of an automatic switching sequence from input (video source) to input for each output (monitor).

The page displays:

- output number being configured
- the Scanning Sequence function status for that output
- the length of time in seconds (dwell time) that each input will be viewed when connected- the dwell time value ranges from 0-255 seconds

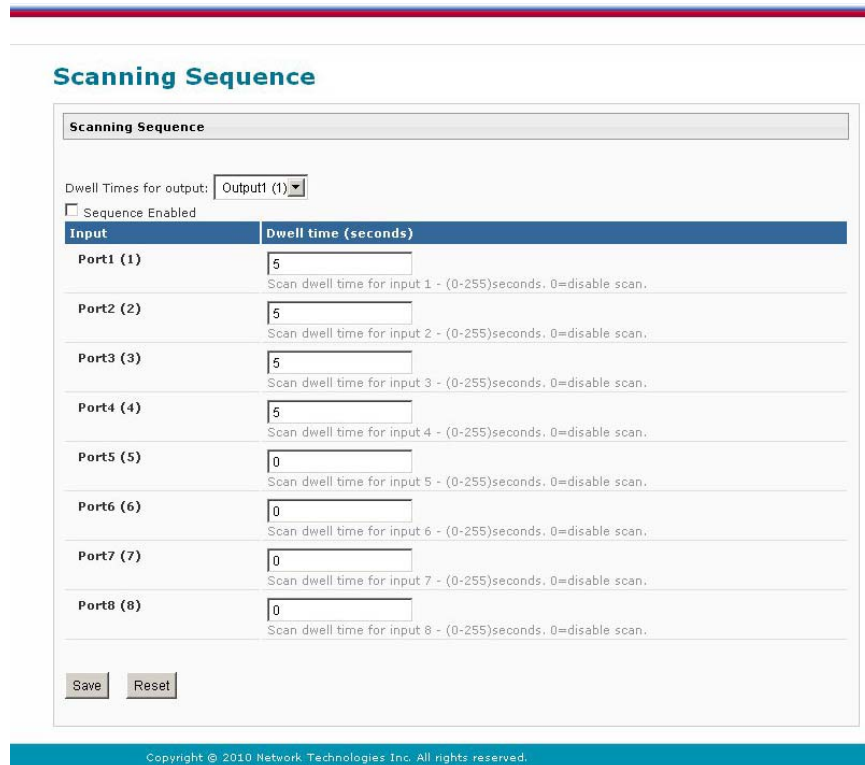


Figure 16- Scanning Sequence page

The output selection at the top of the page can be changed to any output to display the Scan Sequence Input dwell time values for that output.

The inputs and the amount of time that each will be viewed (0-255 seconds) can be set to cycle sequentially for each connected output. If an input is set to 0 seconds, that input will not be viewed and will be skipped from the scanning sequence. To include an input in the sequence, enter a dwell time period from 1-255 seconds, and press **“Save”**.

If you make changes and change your mind and want to return the values back to what they were before changing them, press **“Reset”**. This must be done before pressing the **“Save”** button, or changes will not be able to be reversed.

To enable the scanning sequence for the output shown, place a checkmark in the “Sequence Enabled” block.

Tip: To quickly enable the scan sequence for multiple outputs, use the **“Sequence Enable”** blocks found on the Switch Page (page 29).

Note: If only one input has a dwell time value entered, then the output connection to that input will not end when the Scanning Sequence is enabled.

Example of using Outputs Scanning Sequences

Problem: A synchronous scan is desired for all outputs with a dwell time of 3 minutes per input, and no two outputs should be looking at the same input at any given time.

Solution:

1. Set the dwell time for all inputs listed in each output at 180 seconds (3 minutes). Press **“Save”** each time changes are made to the selected output. .
2. Go to the Video Switch page (page 18) and set each output to an input of the same number (1 to 1, 2 to 2, 3 to 3, etc..). Click on **“Submit”** at the bottom of the Video Switch Page to submit selections and establish a connection and starting point for the scanning sequence. (Blocks shown in yellow in the third image indicate connections made.)
3. Click on the **“Sequence Enable”** box for each output (from the Video Switch Page).
4. Click on **“Submit”** again to begin the scanning sequence for each output.

From the moment the configuration is submitted, a synchronous scan will begin on all outputs. Each output will connect to its respective input for 3 minutes. After 3 minutes, the outputs will each switch to the next consecutive input and remain connected for 3 minutes. This cycle will continue indefinitely until sequencing is disabled.

Scanning Sequence

Scanning Sequence

Dwell Times for output: Output1 (1)

Sequence Enabled

Input	Dwell time (seconds)
Port1 (1)	180
Port2 (2)	180
Port3 (3)	180
Port4 (4)	180

Step 1- setup dwell times

Sort Ports by: Stored Configurations Legend

Active Connection

Step 2- setup starting point for scan and click “Submit”

Inputs	1	2	3	4	5	6	7	8
Port01 (1)	●							
Port02 (2)		●						
Port03 (3)			●					
Port04 (4)				●				
Port05 (5)					●			
Port06 (6)						●		
Port07 (7)							●	
Port08 (8)								●

Blank Sequence Enabled

Output01
Output02
Output03
Output04
Output05
Output06
Output07
Output08

Note: Click an Input to Set All Outputs to that Input.

Submit Clear Changes

Step 3- enable scanning sequences and click “Submit”

Sort Ports by: Stored Configurations Legend

Number Name Load Save 0

Active Connection
Connection to be applied

Step 4- Click on “Submit” to begin

Inputs	1	2	3	4	5	6	7	8
Port01 (1)	●							
Port02 (2)		●						
Port03 (3)			●					
Port04 (4)				●				
Port05 (5)					●			
Port06 (6)						●		
Port07 (7)							●	
Port08 (8)								●

Blank Sequence Enabled

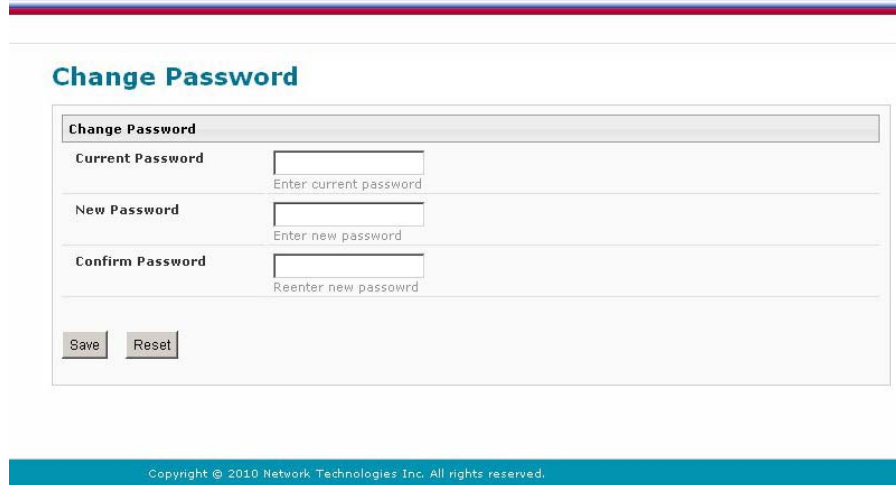
Output01
Output02
Output03
Output04
Output05
Output06
Output07
Output08

Note: Click an Input to Set All Outputs to that Input.

Submit Clear Changes

Change Password

From the Administration menu, the Change Password page can be displayed. This page enables the administrator to change the password used to access the VEEMUX. (This password is also used for the telnet interface.) Be sure to make note of the new password exactly as it is case sensitive. The password must be between 5 and 16 characters in length and can be alphabetical or numeric.



Change Password

Change Password

Current Password
Enter current password

New Password
Enter new password

Confirm Password
Reenter new password

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Figure 17- Change Password page

Once the change is made, press **“Save”** to have it take effect.

Update Firmware

From the Administration menu, the Update Firmware page can be displayed. The Update Firmware page shows the current version of the firmware and enables the Administrator to update the firmware to the latest version available. The latest version can be found at <http://www.networktechinc.com/download/d-vmtx.html>.

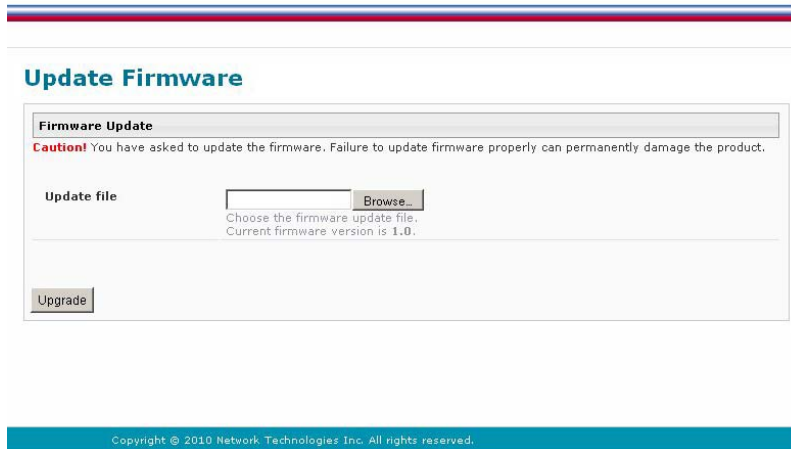


Figure 18- Update Firmware page

WARNING: Failure to carefully follow these directions can permanently damage the VEEMUX. Please read these directions in full before continuing. Do not, under any circumstances, reset or power-down the VEEMUX while the firmware is being updated. Do not attempt to update the firmware if a power-failure is likely.

Note: The Firmware can only be updated from the non-secure (http) website. If you attempt to access this page from the secure (https) website, you will be automatically redirected to the non-secure site.

To update the firmware:

1. Contact NTI for the latest firmware file name `veemux-vga-vx-x.bin` (where x.x is the version number) and copy it to your computer.
2. On the Update Firmware page, in the "Update File" block, browse to the firmware file.
3. Press **Upgrade**.

Note: If an update is attempted using the wrong firmware for the section an error message will be received. No update will occur.

4. The VEEMUX will upload the firmware and then restart itself (this may take up to 4 minutes), logging out all connections. After the restart, approximately 4 more minutes, the VEEMUX will be ready to resume operation.

If a message appears stating that the Upload has failed, or that a non-fatal error has occurred:

1. Ensure that the file being uploaded is the NTI firmware file.
2. Repeat the process from step 2 above.

Note: The following message does not indicate that damage to the product has occurred.

If a message appears stating that there has been a fatal error:

1. **DO NOT RESET OR POWER-DOWN THE VEEMUX.**
2. Repeat the update process from the first step 2 above.
3. If you get another Fatal Error message, call NTI tech-support at 1-800-742-8324 or 330-562-7070.

FYI: The VEEMUX should continue to run normally unless it is reset. However, damage may have occurred to the web server firmware that will prevent the product from starting up correctly.

Standby Mode

From the menu, the user can quickly place the VEEMUX in Standby Mode. When in Standby, the VEEMUX will still be powered-ON but all functions will stop. The VEEMUX will be in a power-saving ready-to-use state.

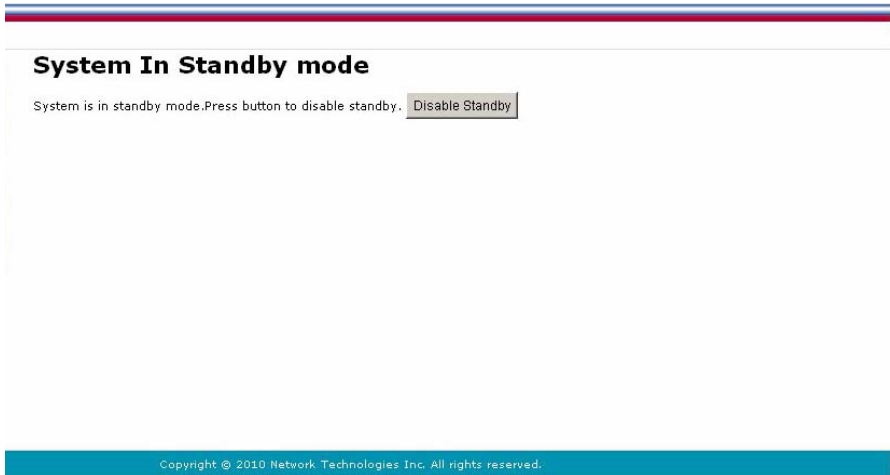


Figure 19- VEEMUX in Standby Mode

By simply selecting “Standby” from the side menu, the VEEMUX is placed in Standby Mode. When in Standby Mode, the VEEMUX is still operating as configured, but cannot be manipulated further until standby is disabled.

Standby Mode can be disabled either

- by pressing “Disable Standby” through the web interface (above),
- by pressing any button on the front panel keypad
- by using the IR Remote control (optional)

Logout

To quickly logout of the web interface, select “Logout” from the menu. You will immediately be logged out and presented with a login screen.

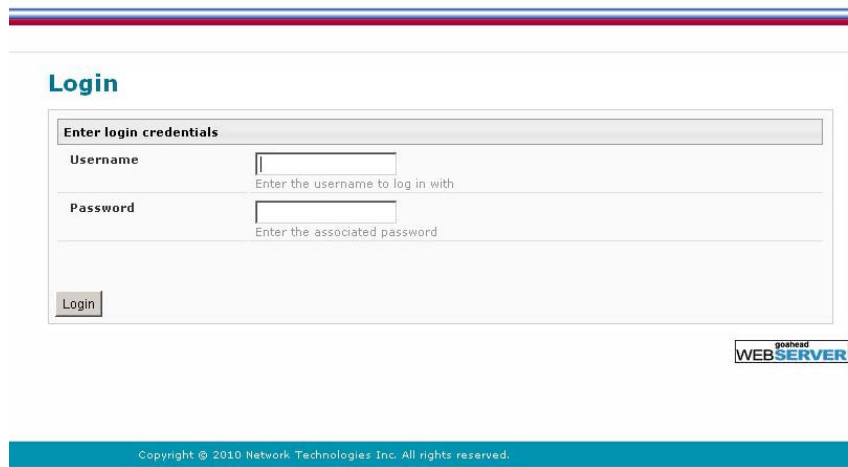


Figure 20- Logout of the VEEMUX web interface

Support

The Support link on the menu drops down to two choices, **Manual** and **Downloads**.

The **Manual** link will open the pdf manual for the VEEMUX.

The **Downloads** link will open the firmware downloads page for the SM-8X8-15V-LC Video Matrix Switch at NTI. From there you can see what versions of firmware are available and determine if the version in your VEEMUX is current or in need of an upgrade (page 31).

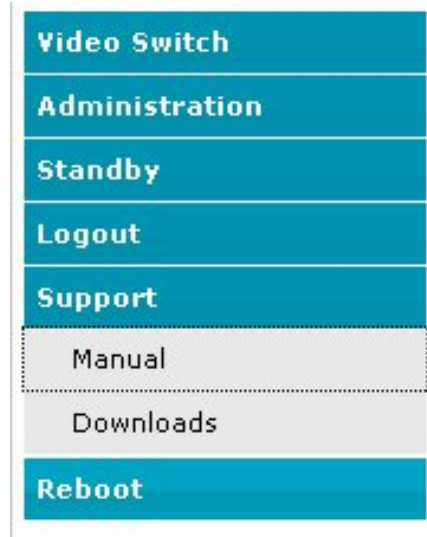


Figure 21- Support Tab

Reboot

To quickly reboot the VEEMUX, select “Reboot” from the side menu. This will force the VEEMUX to power cycle its processor. A reboot will take approximately 45 seconds to occur. Refresh your browser and log back in to the VEEMUX as desired.

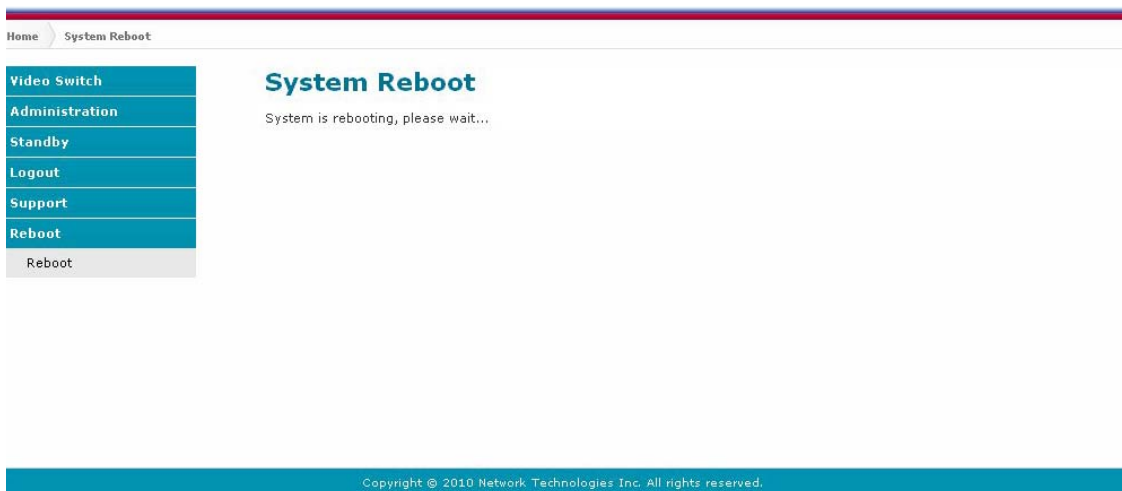


Figure 22- System Reboot

DEVICE DISCOVERY TOOL

In order to easily locate the VEEMUX on a network, or to change network settings, the NTI Device Discovery Tool may be used. A link to the Discovery Tool is provided on the web page that appears when you insert the instruction manual CD provided into your CD ROM drive. Click on the link or browse the CD and click on the file *discover.html*. This will open your browser and display the Device Discovery Tool page.

Note: The Discovery Tool requires the Java Runtime Environment to operate. A link to the web page from which it can be downloaded and installed is provided on the CD.

Note: The computer using the Discovery Tool and the VEEMUX must be connected to the same physical network in order for the Device Discovery Tool to work.

Network Technologies Inc Device Discovery Tool

- **START**
 - When you load this page, the NTI Device Discovery Applet should load. Accept the Certificate to allow this applet access to your network. Press the button entitled **Detect NTI Devices** to start the discovery process. After a short time, the tool will display all NTI devices on your network, along with their network settings.

Note: Do not close this page while the NTI Discovery Tool is running. Close the NTI Device Discovery Application first, then this webpage.
- **How To Use the Discovery Tool**
 - **To Change A Device's Settings**, within the row of the device whose setting you wish to change, type in a new setting and press the **Enter** key or the **Submit** button on that row. You can also press the **Submit All** button to submit all changes at once.
 - **To Refresh the list of devices**, press the **Refresh** button.
 - **To Blink the LEDs of the unit**, press the **Blink LED** button (This feature not supported on all products). The **Blink LED** button will change to a **Blinking...** button. The LEDs of the unit will blink until the **Blinking...** button is pressed, or the NTI Device Discovery Application is closed. The LEDs will automatically cease blinking after 2 hours.
 - **To Stop the LEDs of the unit blinking**, press the **Blinking...** button. The **Blinking...** button will change to a **Blink LED** button.

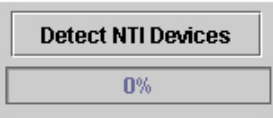


Figure 23- Device Discovery Tool page

Use the Device Discovery Tool to display all NTI VEEMUXs on your network, along with their network settings. Follow the instructions on the Device Discovery Tool page to use the tool and to change the device settings if so desired.

Device	MAC Address	IP Address	Mask	Gateway		
VEEMUX	00:40:9D:24:07:70	65.243.248.18	255.255.255.128	65.243.248.1	Submit	Blink LED
		Submit All	Refresh	Close		

INFRARED REMOTE CONTROL

The IRT-UNV Infrared Remote Control allows the user to remotely and intuitively control up to 15 NTI SM-nXm-15V-LC video matrix switches providing the ability to route connections, save and recall switch configurations, and put the switch into Standby.

Features:

- Routing of video and audio signals together or individually
- Ability to switch one input to all outputs
- Scroll through inputs for a single output by using the Input +/- keys (similar to changing channels)
- Automatically scan through all channels for a single output
- Save or Recall up to 10 matrix switch preset configurations
- Control up to 15 NTI switches (systems) with a single remote
- Put the switch in Standby

Materials

Materials supplied with the IRT-UNV:

- NTI IRT-UNV Infrared Remote Control
- 2- AAA Batteries (installed)

Buttons


The IRT-UNV Infrared Remote Control user interface consists of a keypad with 29 buttons. The buttons have the following functions:



- **Numerical Values (0-9)**
 - Selects port numbers (for IN, OUT)
 - Selects memory locations (for saved configurations)
- *** (Asterisk)**
 - Pressed to select all outputs
- **OUT**
 - Pressed to indicate an output port selection
- **IN**
 - Pressed to indicate an input port selection
- **IN +/-**
 - Cycles through input ports (up or down), connecting to each one (similar to changing channels)

Note: This affects only the selected output port

- **SAVE**
 - Pressed to save the current switch configuration (port connections and volume settings)
 - Up to 10 configurations can be saved (0-9)
- **RECALL**
 - Pressed to recall a switch configuration (port connections and volume settings)
 - Up to 10 configuration can be recalled (0-9)
- **SYS**
 - Pressed to select the desired NTI system to be controlled
 - Only used when controlling multiple systems
 - Must be followed by a system number: 1-15
- **ENTER**
 - Pressed to immediately accept the command (normal delay is approx. 5 seconds).
- **ESC**
 - Pressed to cancel the current command

Note: If the command has not yet been accepted, all button presses in the command sequence will be cleared

- **Standby** 



Pressed to put the unit into or out of standby mode
- **VIDEO** 
 - Pressed prior to entering a port switch command
 - Applies the command to the video signals only
 - (by default, port switch commands are applied to both Audio and Video)
- **BLANK Video** 
 - Turns OFF Video for the selected output
 - Can be used with *(Asterisk button) to turn OFF video for all outputs
 - Video will be turned ON by pressing the Blank Video button again, or by switching ports

Note: Blank and Un-Blank commands are applied only to the selected output



- **SCAN**
 - Pressed to toggle the scan enable/disable feature for the selected port
 - Must be preceded by an output port number (1 or 2 digits), or the * (Asterisk) button to toggle all ports

Note: If the dwell time for a port is set for 0 seconds, it will not be scanned (page 28)

- **AUDIO**  **THIS BUTTON IS NOT USED FOR THIS PRODUCT**
- **VOL +/-** **THIS BUTTON IS NOT USED FOR THIS PRODUCT**
- **MUTE Audio**  **THIS BUTTON IS NOT USED FOR THIS PRODUCT**
- **PREV** -THIS BUTTON IS NOT USED FOR THIS PRODUCT

Operation

Operation of the IRT-UNV is intuitive. The number of button presses required to complete any operation is kept to a minimum. This is accomplished using intelligent software within the NTI Matrix Switch. Additionally, the Matrix Switch allows for multiple ways for the user to complete the same operation – ensuring that the Remote will work as expected, regardless of who uses it.

Note: For models with audio support, these commands will switch the video and audio signals simultaneously. For independent video and audio switching using the IRT-UNV, see “Independent Video and Audio Control” on page Error! Bookmark not defined..

Changing Ports

The first, and most important operational use of the IR Remote is changing ports of the switch. This requires the selection of both input and output ports. There are several methods of control.

Channel Surfing

The “IN +/-” and “SCAN” buttons can be used to surf through input port connections. However, since there are multiple outputs/users, the question becomes “which output connection is being changed?” As a result, it is required that an output be selected prior to using the “IN +/-” buttons.

The output port can be selected in two ways:

- by pressing the “OUT” button before selecting the output port number
- by pressing the “OUT” button after selecting the output port number

In both cases, the user must enter the output port number using the Numeric Keys (0-9). However, when the “OUT” button is pressed prior to selecting the port number, there will be a two (2) second delay after the last digit of the output port is entered that must expire before the output port is accepted. To avoid this delay, press the “ENTER” button to immediately accept the port number.

Once the output port has been accepted, there will be a five (5) second timeout, during which the user must press another button (“IN +,” “IN -,” or “SCAN”). Each subsequent press of “IN+” or “IN-” will renew the timeout, waiting for you to press it again (to advance or go back by one more Input channel). If no new command is sent to the switch before the timeout expires, the switch will forget the selected output, and pressing the “IN +/-” buttons will have no effect.

All output channels can surf inputs at once by pressing the “ * ” button prior to pressing the “IN +/-” buttons.

Examples:

Change connection of Output 1 from Input 1 to Input 3:

<OUT> + <1> + wait 2 seconds + <IN+> + <IN+>

<OUT> + <1> + <ENTER> + <IN+> + <IN+> (must press <IN+> within 5 seconds of pressing <ENTER>)

<1> + <OUT> + <IN+> + <IN+> (must press <IN+> within 5 seconds of pressing <OUT>)

Jump To Input

With the output port selected, a user knowing the desired input port number can enter it using the Numeric keys (0-9). Just as with using the “OUT” button, pressing the “IN” button after the number will force the command immediately. If the “IN” button is pressed prior to the port number, the “ENTER” button must be pressed to avoid a two (2) second delay before the input port is accepted.

Examples:

Quick method to change Output 1 from Input x (any) to Input 8:

<1> + <OUT> + <8> + <IN>

Quick method to change Output 12 from Input x (any) to Input 20:

<1> + <2> + <OUT> + <2> + <0> + <IN>

Jump To Output

Users can also change ports by specifying the input port number first. Similar to selecting the output port first, the “IN” button can be pressed either before or after entering the port number. Once the input port has been selected, the output port can be selected, following the same format as “Jump to Input...”

Expiration of a five (5) second timeout will force the switch to forget the entered input port number.

Example:

Quick method to change Input 1 from Output x (any) to Output 8:

<1> + <IN> + <8> + <OUT> (must enter the <x> + <OUT> command within 5 seconds of pressing <IN>)

Connect All

It may be desirable to broadcast the video (and audio) signals from one input to all of the outputs. In this situation, the user can quickly make all of these connections by using the “*” (asterisk) button which selects all outputs. With the input port selected, pressing the “*” button will immediately force the command to connect all output ports to the selected input.

Example :

Connect all users to Input 2:

<2> + <IN> + <*>

The “*” button can also be pressed prior to selecting the input port. In this case, the command will take effect once the input port has been selected.

<*> + <2> + <IN>

If no command is received before the five (5) second timeout expires, the switch will forget the “*” key-press.

Save and Recall

The SM-8X8-LC-LCD video matrix switches provide the ability to save and recall up to 10 switch configurations. The switch configurations define the current port connections and video blank status. The IRT-UNV IR Remote can be used to access these configurations by using the “SAVE” and “RECALL” buttons.

To save a configuration, press the “SAVE” button followed by Numeric key(s) 0-99 corresponding to the memory slot the configuration is to be saved in. After the numeric key(s) press the “Enter” button. If the “Enter” button is not pressed, after two seconds the function will timeout and the number entered will be saved as that configuration.

Configurations can be recalled in much the same manner. To recall, press the “RECALL” button followed by the numeric key (s) corresponding to the memory slot from which the configuration is to be recalled. After the numeric key(s) press the “Enter” button. If the “Enter” button is not pressed, after two seconds the function will timeout and the number entered will be recalled to the current configuration.

Multiple Switch Control

All compatible NTI matrix switches will work with the same IRT-UNV IR Remote control. As a result, a user with multiple NTI matrix switches may find that, if the switches are installed too close together, both switches may respond to an IR command intended only for one switch. Or, the user may want to control multiple switches with a single remote, instead of having one remote per switch. To accommodate this situation, the IRT-UNV IR Remote provides the “SYS” button, which can be used to select the NTI switch to be controlled.

All switches will have the capability to allow the user to set the switch address (0-15). Each switch to be separately controlled must be set to a different address prior to using the Remote Control. With the addresses set, press the “SYS” button on the IRT-UNV, followed by a two digit number corresponding to the address of the matrix switch to be controlled.

Upon accepting the “SYS” command, the switch with the corresponding address will illuminate the “IR” LED and respond to all IR Remote commands and will blink the “IR” LED on the front of the switch for visual indication. All other switches will ignore any further commands, until the “SYS” button is pressed again. To select a new NTI switch to control, press the “SYS” button again and repeat the process.

Canceling a Command

Considering the number of key presses required for some of the commands, it’s possible that the user may inadvertently press an incorrect button. Should this happen, the user can press the “ESC” button to cancel a command. Provided the command has not been accepted by the system, pressing the “ESC” button will cause the switch to “forget” or “erase” all button commands from the current command sequence. Once the command sequence has been cancelled, the user can begin entering the command again.

Technical Specifications For IRT-UNV

Number of Controllable Systems	Max: 15
Pushbutton Control	29 keys
Power supply	2x AAA Battery
Chassis material	Plastic
Approvals	RoHS

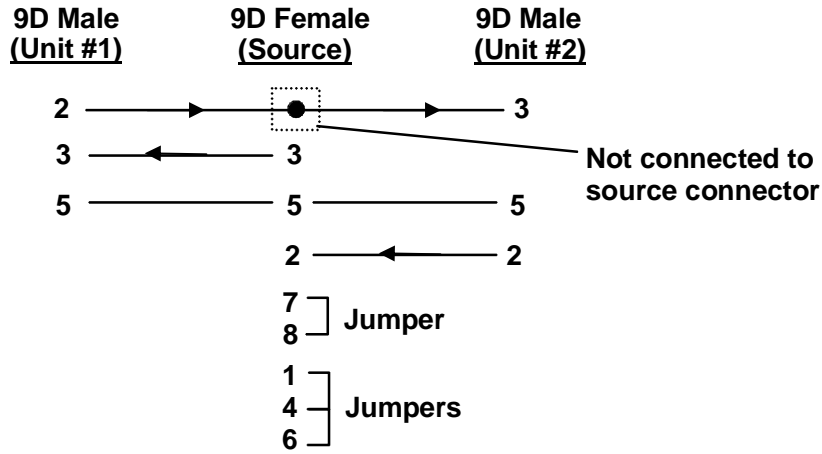
Troubleshooting the IRT-UNV

PROBLEM	SOLUTION
IRT-UNV is not selecting outputs or inputs	<ul style="list-style-type: none"> • Check battery • The IRT-UNV may be configured to control the wrong switch- see “Multiple Switch Control” above.

RS232 CONNECTION CABLE

Pinout for Matrix Y-1 Cable

Wiring Schematic of Matrix-Y-1 cable



Arrows indicate signal direction.

SPECIFICATIONS

General Information

DESCRIPTION	SPECIFICATION
Operating temperature	0°C - 38°C (32°F - 100°F) (17-90% non-condensing RH)
Storage temperature	-30°C - 60°C (-20°F - 140°F) (17-90% non-condensing RH)
Power requirements	110 or 220VAC @ 50 or 60Hz
Fuse protection	2A 240VAC Fast-blo
Video Connectors	15HD female
Maximum Resolution	1920 x 1200 @ 60Hz
Video Signal : Video	RGB analog (75 ohms, 0.7 Vp-p)
Bandwidth	160MHz (typ) or greater
Sync	H/V separated (TTL), composite, sync-on-green
Ethernet Connector	RJ45 female, 10BaseT
RS232 Connector	RJ45 female, 1200-115200 bps

Available Sizes

NTI Part #	Desktop Size (In.) WxDxH	Rack Size (In.) WxDxH
SM-4X2-15V-LC	10.9x6x1.75	19x6x1.75
SM-4X4-15V-LC	10.9x6x1.75	19x6x1.75
SM-8X2-15V-LC	15.3x7.7x1.75	19x7.7x1.75
SM-8X4-15V-LC	15.3x7.7x1.75	19x7.7x1.75
SM-8X8-15V-LC	15.3x7.7x1.75	19x7.7x1.75

TROUBLESHOOTING

Problem	Solution
No Video	<ul style="list-style-type: none"> - Check power – power ON, power cable connected - Check video cabling – make sure cables are secured - Check connections – make sure you're connected to an active input

SAFETY STATEMENTS

Grounding

These products have protective earth ground terminals and are built with full attention to consumer safety. There must be an un-interruptible safety earth ground between the main power source and the product's power cord or supplied power cord set. If ever the possibility exists for the grounding protection to have been reduced in any way, disconnect the power supply until the grounding connection has been fully restored.

Servicing

NTI products are not intended to be serviced in the field and contain no user-serviceable parts. In the event repair is needed, all servicing must be performed by factory trained and authorized service personnel. Only those items specifically identified in this manual (if any) may be adjusted by the user of this product and adjusted only as instructed in this manual.

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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.

Man156 Rev 8/1/12