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PRODUCTS
INCORPORATED**

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ETH-4X1-G / 2X1-G / 2X1

Manual Ethernet Switch

Installation and Operation Manual



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CHANGES

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INTRODUCTION

The NTI ETH-4X1-G Manual Ethernet Switch was designed to enable the connection between a common DEVICE or NETWORK and one of up to four DEVICES or NETWORKS using standard Ethernet cable. The ETH-4x1-G is a switch that provides reliable physical signal separation between connected devices while supporting 10Base-T, 100Base-T, and 1000Base-T connections. Push buttons on the switch provide easy user control over the ETH-4X1-G to make a single connection active between two Ethernet-based devices at a time.

Available Options

- Manual Ethernet Switch with 2 user selectable connection ports rather than 4 (ETH-2X1-G)
- 2-Port Manual Ethernet Switch with support for only 10Base-T and 100Base-T connections.(ETH-2X1)
- RS232 control to change connections in the Ethernet switch via a serial stream (ETH-4X1-RS-G or ETH-2X1-RS-G)

Glossary

CPU- Computer for user access

DEVICE- CPU or other data entry/acquisition equipment

NETWORK- Local Area Network (LAN)* , File server, DSL internet connection

MDI- Media Dependent Interface

MDIX- Media Dependent Interface Crossover

COMMON- A DEVICE or NETWORK that is to be commonly connected to the selected NETWORK or DEVICE (up to 4) through the ETH-4X1-G Manual Ethernet Switch

SELECTABLE- Any NETWORKS or DEVICES (up to 4) that will be plugged into the user selectable ports (1-4) and connected to the COMMON through the ETH-4X1-G Manual Ethernet Switch

****Note: The ETH-4X1-G Manual Ethernet Switch cannot differentiate between LANs and cable/DSL modems. For the purposes of this manual they will be considered to be identical.***

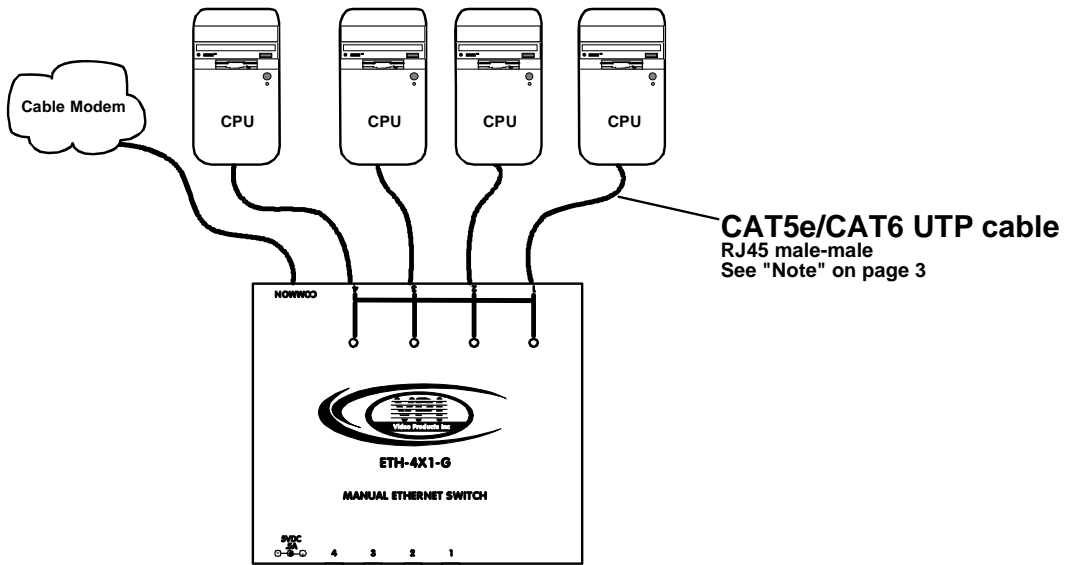
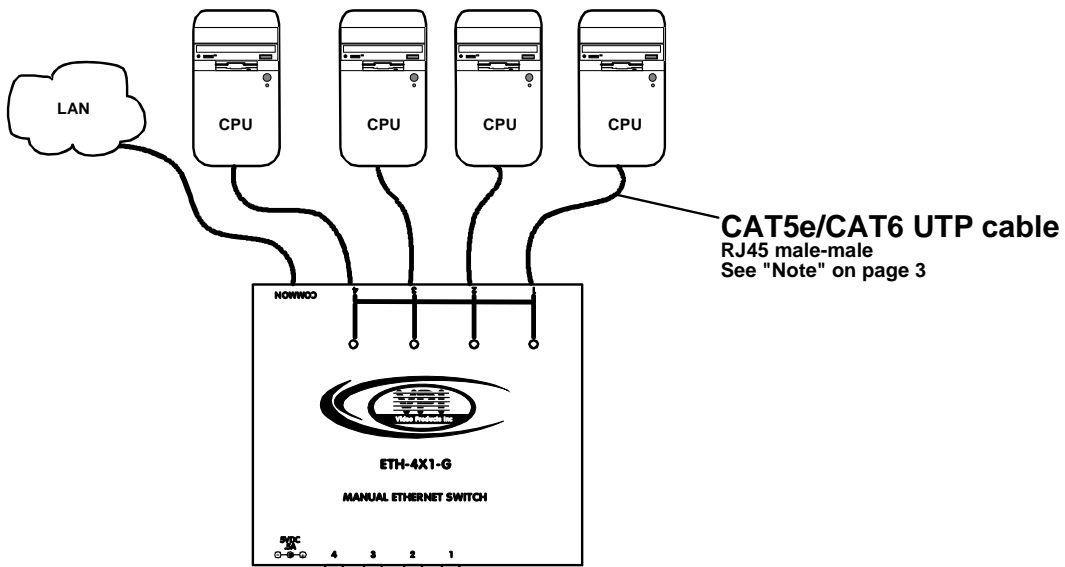
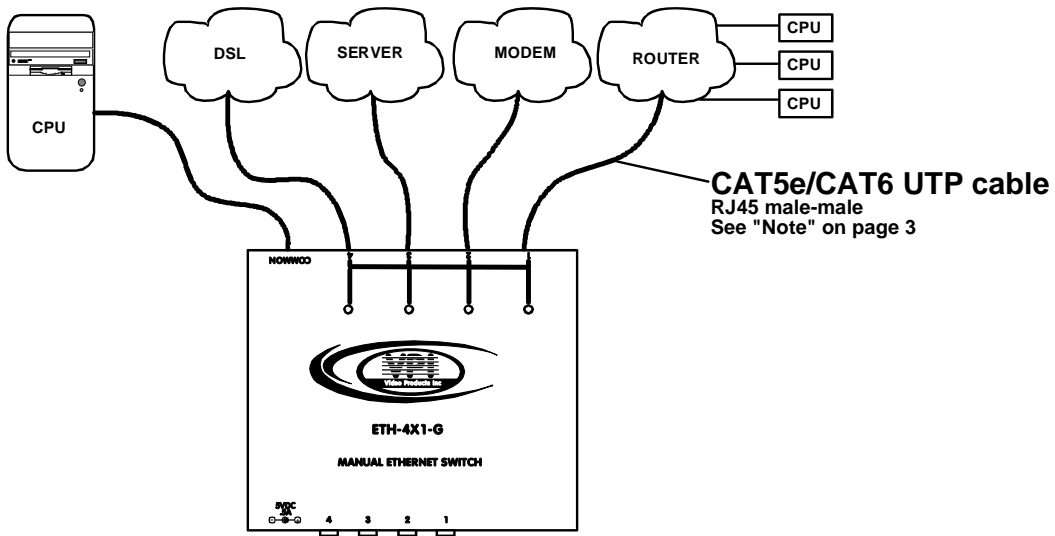
Supported Device Types

- Routers
- HUBS
- ETHERNET Switches (Managed / UN-managed)
- PC's
- Network Appliances
- IEEE 802.3 Supported Devices

Supported Operating Systems

Any IEEE 802.3 compliant operating system

APPLICATION EXAMPLES



MATERIALS

Materials Supplied with this kit:

- NTI ETH-4X1-G / ETH-2X1-G Manual Ethernet Switch
- 120 VAC at 60 Hz 5VDC/.5A AC Adapter

Materials Not Supplied, BUT REQUIRED:

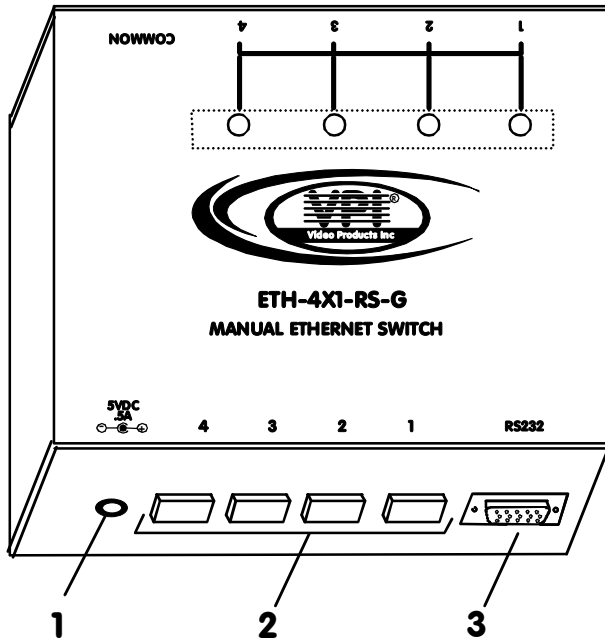
- Ethernet Cables- Cat5e/Cat6 UTP cable with male-male connectors, either wired straight-thru or crossover, depending upon the connected component. See note below.

Note: A crossover cable may be required if any connected components (NETWORK or DEVICE) do not support Auto MDI/MDIX cable selection. Once a component is properly connected and powered ON, a link LED should illuminate to indicate communication with another component. If it does not illuminate, a crossover cable may be required. See pages 9 and 10 for cable pinouts.

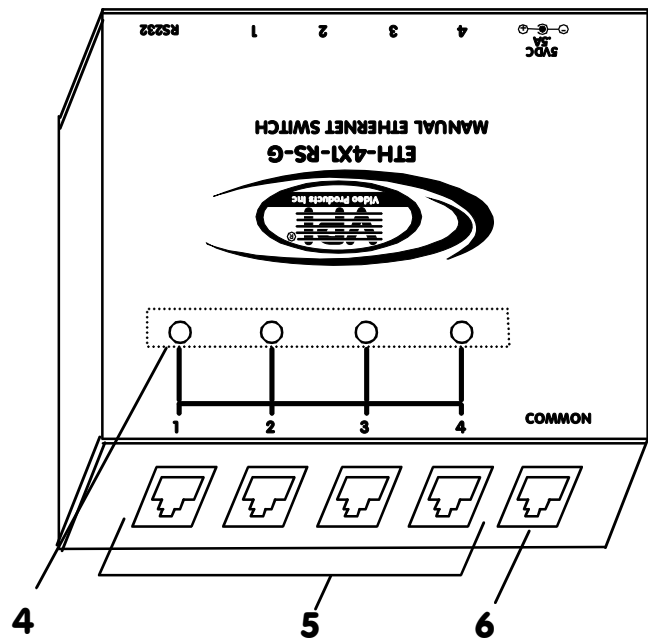
PREPARATION FOR INSTALLATION

- A location should be chosen for the ETH-4X1-G such that the Ethernet cable from each supported device will reach it.
- The Ethernet cables must be run to the locations where the ETH-4X1-G switch, COMMON, and the SELECTABLE(s) will be mounted. Be careful to route the cables away from any sources of magnetic fields or electrical interference that might reduce the quality of the signal (i.e. AC motors, welding equipment, etc.).
- A 120V electrical outlet must be available close enough to the mounting location of the ETH-4X1-G to plug the AC adapter into.
- All cables should be installed in such a way that they do not cause stress on their connections to the equipment. Extended lengths of cable hanging from a connection may interfere with the quality of that connection. Secure cables as needed to minimize this.

Front View of ETH-4X1-RS-G



Rear View of ETH-4X1-RS-G



FEATURES AND FUNCTIONS

1. 5VDC .5A- male connection jack for the AC adapter
2. Port Select Switches- (1-4)- for manual control of "COMMON"* and user selectable ports (1-4)

Note: ETH-2x1-G Switch has only 1 Port Select switch that toggles between ports when pressed.

3. RS232- 9 pin DIN male (optional)- for computer control of "COMMON"* and user selectable ports (1-4) (only on models with RS232 option)
4. Status LEDs- for visual indication of switch connection between the "COMMON"* and the user selectable ports (1-4)
5. User Selectable Ports (1-4)- RJ45 female- for connection of SELECTABLEs*

Note: ETH-2x1-G Switch has only 2 user selectable ports.

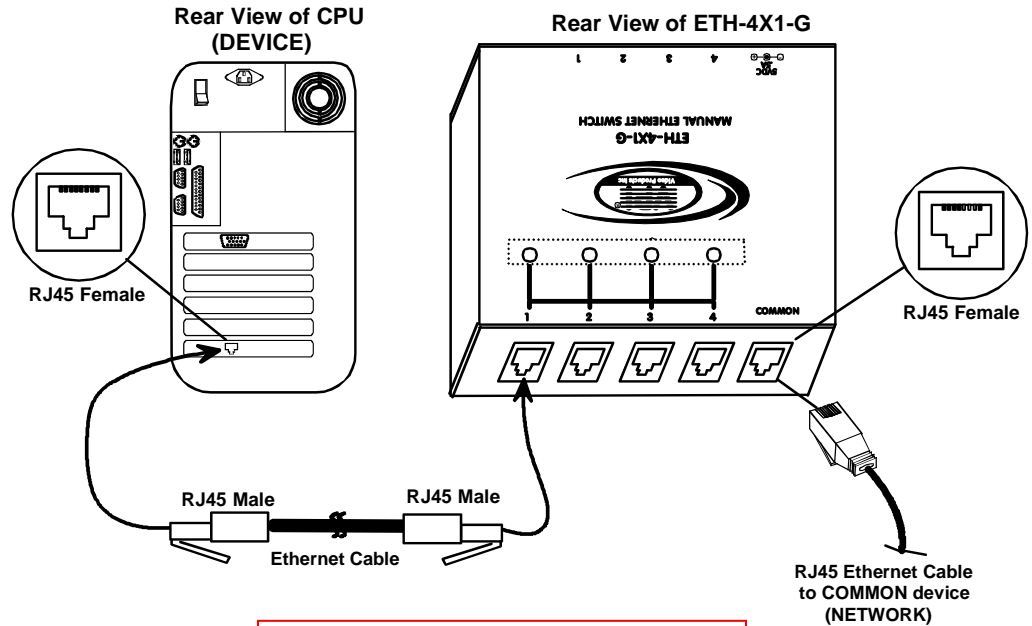
6. COMMON port- RJ45 female- for connection of COMMON*

*See Glossary (page 1) for explanation of "COMMON" and "SELECTABLE".

INSTALLATION

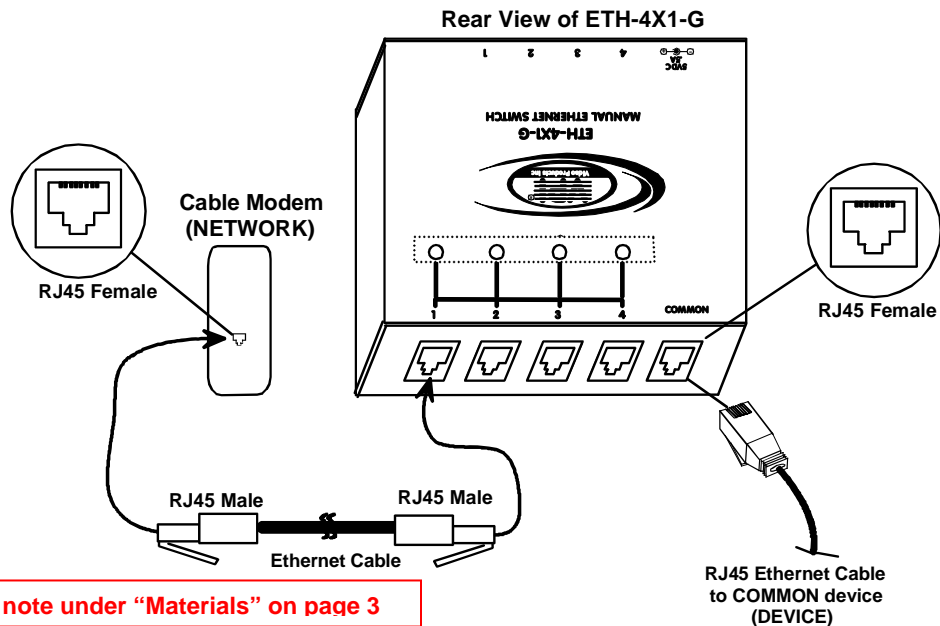
Connect the Cables

1. Position the ETH-4X1-G such that the Ethernet cable from the COMMON , the AC adapter power cable, and the Ethernet cables from the SELECTABLEs can reach the ETH-4X1-G.
2. Connect one end of an Ethernet cable to the COMMON (See Fig.1.) Connect the other end of that cable to the "COMMON" port on the ETH-4X1-G.
3. Connect another Ethernet cable between each SELECTABLE and the user selectable ports (1-4) on the ETH-4X1-G. (See Figs.1 and 2.)



See note under "Materials" on page 3

Figure 1- Connect DEVICE to switch



See note under "Materials" on page 3

Figure 2- Connect NETWORK to switch

Plug-in and Boot Up

1. Connect the AC adapter power connector to the 5VDC port on the ETH-4X1-G. Make sure the power connector is properly inserted. (See Fig. 3.)
2. Plug the AC adapter into a power outlet. The status LED for SELECTABLE port 1 will illuminate indicating a proper power connection has been made.

Note: An illuminated Status LED also indicates a connection between the "COMMON" port and the associated user selectable port.

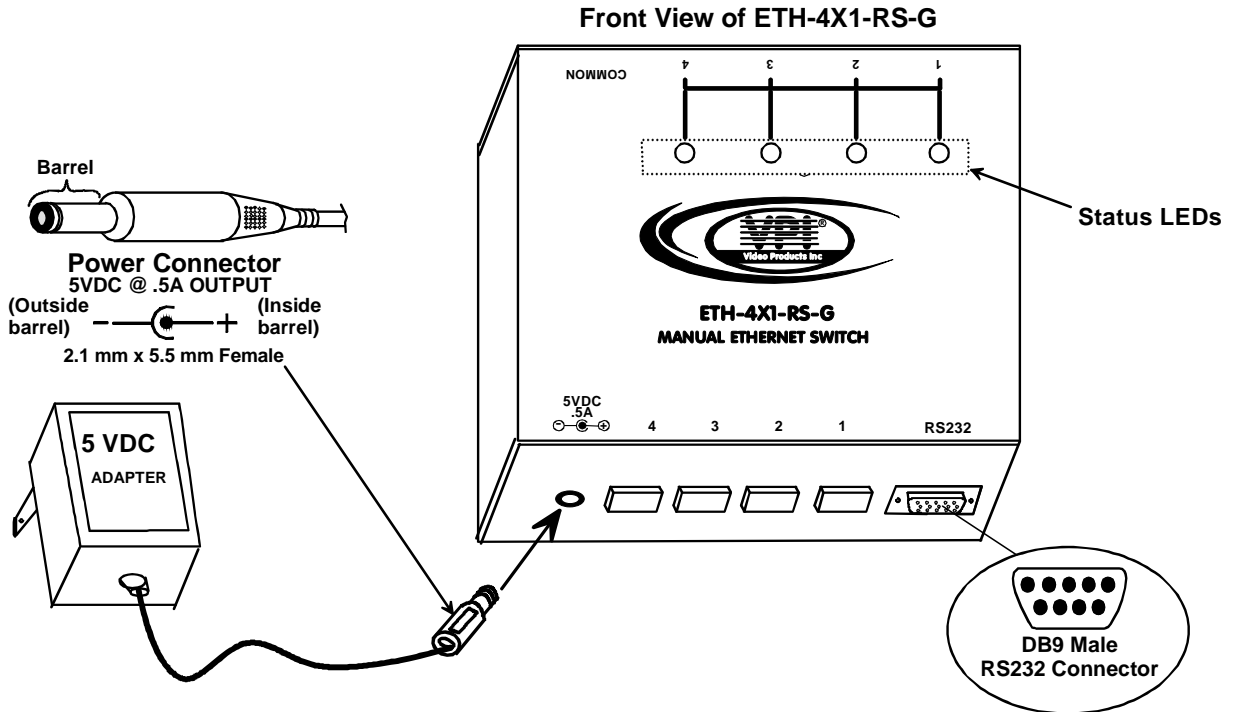


Figure 3- Connect the AC adapter

3. Power up the COMMON and SELECTABLE device(s). The COMMON device should react as if it were directly connected to the SELECTABLE device plugged into user selectable port 1.

RS232 Control

RS232 (optional) enables the ETH-4X1-RS-G to be remotely controlled via RS232. To control the ETH-4X1-RS-G via RS232 the user has three options:

- write a program that runs on a PC using the Command Protocol (below)
- use the NTI Switch Control Program (page 8) provided on the CD
- use the SerTest program (page 8) provided on the CD

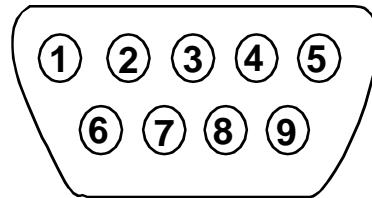
Remote Connection

The RS232 Interface is designed to control the switch via serial (RS232) connection from any host computer or other controller with an RS232 communications port. To use the RS232 port, connect a crossed female serial cable from a CPU serial port to the DB9 pin male RS232 port on the ETH-4X1-RS-G. Connections are as follows:

RS232 Connector (DB9 Male)

Pins at ETH-4X1-RS-G	Signal	Pins at CPU
2	RxD	3
3	TxD	2
5	GND	5

"RS232" Connector



Mating Face of DB9 Male

RS232 program setup parameters:

- 9600 baud
- 8 bit data
- 1 stop bit
- no parity
- no flow control

Command Protocol

CPU controller commands supported by the unit are defined below. Commands may be sent using any RS232 communication program (i.e. Windows HyperTerminal). All commands should 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 should be upper case, and all numbers below 10 should have a leading 0 (ex: 1 = 01). As command strings are sent, the inner character delay cannot exceed 500 milliseconds.

The following commands are supported.

LEGEND	ALL NUMBERS MUST BE TWO DIGITS
SW:	SWITCH UNIT ADDRESS- this is 01 and cannot be changed)
OP:	OUTPUT (COMMON) PORT -this is 01 and cannot be changed
IP:	INPUT NETWORK PORT (01-MAXINPUTS) (MAXINPUTS = 02 or 04)
<CR>:	CARRIAGE RETURN (Hex 0x0D)

Command String	Good Response	Description
CS SW,IP,OP	*<CR>	Connect COMMON Port To Input/SELECTABLE Port
RO SW,OP	*<CR>IP<CR>	Read Connection For Output/COMMON Port
RU SW	*<CR>IP,OP<CR>	Read Unit Size
RV SW,00	*<CR>string\0<CR>	Read NTI Version String (Short Version)
RV SW,01	*<CR>string<CR>	Read NTI Version String (Long Version)

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 (01), 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>.

NTI Switch Control Program For Windows 9X, NT, 2000,Vista, XP, 7, 8 AND 10

The NTI Switch Control Program is an easy and powerful graphical program that controls NTI switches through an RS232 interface. The NTI Switch Control Program can be downloaded from <https://www.vpi.us/network-devices/gigabit-ethernet-switch-1044>.

To install the NTI Switch Control Program after downloading it to your computer from the manual CD:

1. Locate the **Setup.exe** in the directory the program was downloaded to and double-click on it
2. Follow the installation 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, Ethernet 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 4 selections described below:

Main Options

- Switch Operations - send commands to the ETH-4X1-RS-G
- Ethernet Operations - set Ethernet connection variables (**not applicable to this switch**)
- Setup Options - set COM port, baud rate, and unit address
- About SerTest - display the program version

Switch Operations

Key	Selection	Description
1)	Connect Video Output/User to an Input/CPU	- connect an output (COMMON) to an input(SELECTABLE)
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 (COMMON (01))
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.

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 switch, the command string and switch 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.

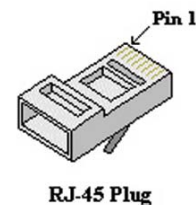
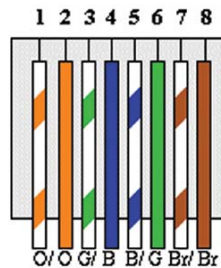
TECHNICAL SPECIFICATIONS

Interconnect Cable	CAT5e/CAT6 UTP Male-Male cables (see note under "Materials" on page 3)
Power	120VAC @ 60Hz 5VDC / .5A AC Adapter (provided)
ETH-4X1-G current draw	< 0.2A @ 5VDC
Dimensions WxDxH (in.)	5.25 x 4.375 x 1.375

Interconnection Cable Wiring Method- Straight Thru

In order to make a direct connection between two devices that support Auto MDI/MDIX, a cable wired straight-thru can be used. The cable is made with CAT5e/CAT6 UTP cable terminated with male RJ45 connectors and wired according to the EIA /TIA 568A industry standard. Both ends are wired as per the table and the drawing below.

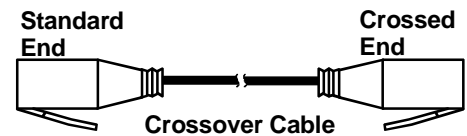
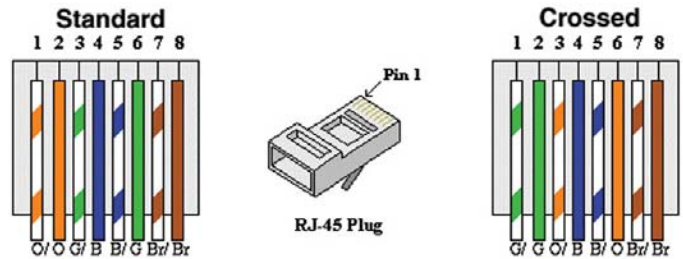
Pin #	Wire Color
1	White/Orange
2	Orange
3	White/Green
4	Blue
5	White/Blue
6	Green
7	White/Brown
8	Brown



Interconnection Cable Wiring Method- Crossover

In order to make a direct connection between two devices that do not support Auto MDI/MDIX, a crossover cable must be used either at the SELECTABLE port end or at the COMMON port. The cable is made with CAT5 cable terminated with male RJ45 connectors and wired according to the EIA /TIA 568A industry standard. The cable is wired according to the chart below.

Pin assignment at Standard End	Wire Color	Pin assignment at Crossed End
1	White/Orange	3
2	Orange	6
3	White/Green	1
4	Blue	4
5	White/Blue	5
6	Green	2
7	White/Brown	7
8	Brown	8



TROUBLESHOOTING

Each and every piece of every product produced by Video Products Inc is 100% tested to exacting specifications. We make every effort to insure trouble-free installation and operation of our products. If problems are encountered while installing this product, please look over the troubleshooting chart below. If an answer is not found in the chart, check the FAQs (Frequently Asked Questions) at our website at <http://www.vpi.us> or contact VPI directly for help at 800-626-7801 in US & Canada or 330-562-2622 (worldwide). We will be happy to assist in any way we can.

Problem	Cause	Solution
Status LEDs do not illuminate	<ul style="list-style-type: none"> Power supply is not connected or plugged-in. 	<ul style="list-style-type: none"> Make sure outlet is live and AC adapter is plugged in. Also make sure power jack is fully connected to the switch.
NETWORKS(s) will not communicate with DEVICE(s) (no link light(s) ON)	<ul style="list-style-type: none"> Poor Connection Wrong Ethernet cable 	<ul style="list-style-type: none"> Make sure all Ethernet cables are inserted completely, snapping into RJ45 sockets Cable must be CAT5e/6 - see note under "Materials" on page 3

WARRANTY INFORMATION

The warranty period on this product (parts and labor) is one (1) year from the date of purchase. Please contact Video Products Incorporated at (800) 626-7801 or (330) 562-2622 for information regarding repairs and/or returns. A return authorization number is required for all repairs/returns.

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