**PRIMUX® Series**

# PRIMUX-16X64
# PRIMUX-8X32
## KVM Matrix Switch via CATx
## Installation and Operation Manual



**PRIMUX-16X64**
**(Front and Rear View)**



**PRIMUX-UZR User Station**
**(sold separately)**



**HA-UNV PS/2 and USB Host**
**Adapter  (sold separately)**

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**CHANGES**

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**FIRMWARE VERSION**

PRIMUX Matrix Firmware Version 1.7

**Please Note:**  **The PRIMUX User Station and Host Adapters used in conjunction with the PRIMUX Matrix Switch must all be running firmware version 2.0 or later in order to be compatible with the PRIMUX Matrix Switch.    For updated firmware with instruction for upgrading, go to** http://www.networktechinc.com/download/d-kvmswitch-cat5.html .

**Typographic Conventions**

The table below offers examples of text format and the meaning when that format is used when the font varies from the standard font (Helvetica) used in this manual.

| Typeface | Meaning | Example |
|---|---|---|
| `AAaaBBaaCCcc123` | `On-screen computer output` | `C:>` |
| **`AAaaBBaaCCcc123`** | `What you type, contrasted with on-screen computer output; keyboard keys to press` | `C:> `**`L`** <br> Press the **`L`** key |

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## INTRODUCTION

The PRIMUX-16X64 KVM Matrix Switch via CAT5 is designed to enable the relocation of up to 16 VGA monitors, PS/2 or USB keyboards and mice from up to 64 non-blocking PS/2, SUN, or USB CPUs by as much as 1000 feet. The PRIMUX is comprised of at least one PRIMUX KVM Matrix Switch (SWITCH), at least one PRIMUX-UZR User Station and at least one Host Adapter (HA-UNV,HA-SUN-MTX, or HA-RS-M) connected to a CPU to be controlled by the user. The PRIMUX-UZR User Station supports PS/2 and USB user keyboard and mouse (devices). This manual describes the installation and operation of these three components.

The PRIMUX Host Adapters and User Stations are connected to the SWITCH with either CAT5 Unshielded Twisted Pair (UTP) or Shielded Twisted Pair (STP) cable, CAT5e cable, or CAT6 cable.

The PRIMUX Series CAT5 KVM Matrix Switch is simple to install and has been thoroughly tested to insure reliable performance. Through the use of CAT5, CAT5e, or CAT6 cable it is possible to economically increase the flexibility of a computer system. Here are some of the features and ways this can benefit any workplace:

- Allows the placement of a monitor, keyboard, and mouse in a location where only these parts are needed without having the CPU there too, taking up valuable space

- Allows any PS/2 , legacy SUN or USB CPU to be accessed by a remote user (up to 1000 feet away)

- Non-blocking control- up to 16 users have a clear path to up to 64 CPUs without "spaghetti" wiring

- Compatible with XGA, VGA, and SVGA systems

- Provides crisp and clear resolution up to 1024x768 /60Hz @ 1000 feet  (using CAT5 UTP cable – see page 62 for details)

- Video quality adjustment is automatic providing optimum image quality

- Allows future expansion - buy what it is needed now, add more later as desired

- Multi-user, multi-platform, multi-rack access

- Ideal for hazardous/unsecured environments. The User Stations can be located up to 1,000 feet from the servers

- Inexpensive CAT5/5e/6 UTP cable replaces bulky KVM cables

- Simple plug-and-play auto-configured installation

- Servers are discovered as they are powered up, and can be accessed immediately by authorized users

- Hot-swap components with no disruption of server operation

- Dedicated microprocessors prevent CPUs from locking up, ensuring reliable control

- Real time power status of connected servers

- Provides connection to servers during power up at the BIOS level

- Platform-specific host adapters (PS/2+USB,SUN, and Serial computers)

- Command and control provided by OSD of connected User Station

- Flash firmware upgrades

**Supported Operating Systems**

The PRIMUX is compatible with:

| | | | |
|---|---|---|---|
| • Win9x | • WinMe | • Windows 7 | • Windows Server 2000,2003,2008 |
| • WinNT | • WinXP | • MAC OS9.x , OSX | • Solaris |
| • Win2K | • WinVista | • Linux | • FREE BSD |

# Materials

**Materials Supplied with this kit:**

**NTI PRIMUX-16x64  or 8x32-Cat5
KVM Matrix Switch**

**Terminating Plug**

**AC Line Cord
Country Specific**

**Manual CD**

**Quick Start
Guide**

**Materials *Not* Supplied, but *REQUIRED*:**

- NTI PRIMUX-UZR User Station
- NTI HA-UNV PS2/USB Host Adapter (**Includes a CT7038 USB-PS2 Adapter**)  / HA-SUN-MTX SUN Host Adapter / HA-RS-M Serial Host Adapter (see pg. 6)
- CAT5/5e/6  unshielded twisted-pair cable(s) terminated with RJ45 connectors wired straight thru- pin 1 to pin 1, etc. (see pg. 63 for proper EIA/TIA 568B wiring method)
- A null modem cable will be required for future software updates (included with your PRIMUX-UZR). See pg. 64 for specifications.
- NTI RJ45MF-RS232-CO serial crossover adapter will be required if an HA-RS-M is installed and connected to a DCE type serial device (see page 8)

*Cables can be purchased from Network Technologies Inc by calling 800-RGB-TECH (800-742-8324) or  (330)-562-7070 or by visiting our website at*  www.networktechinc.com*.*

**Please Note:**  **The PRIMUX User Station and Host Adapters used in conjunction with the PRIMUX Matrix Switch must all be running firmware version 2.0 or later in order to be compatible with the PRIMUX Matrix Switch.    For updated firmware with instruction for upgrading, go to** http://www.networktechinc.com/download/d-kvmswitch-cat5.html .



**Typical Application**

**Front View of PRIMUX-8X32**

**Rear View of PRIMUX-8X32**
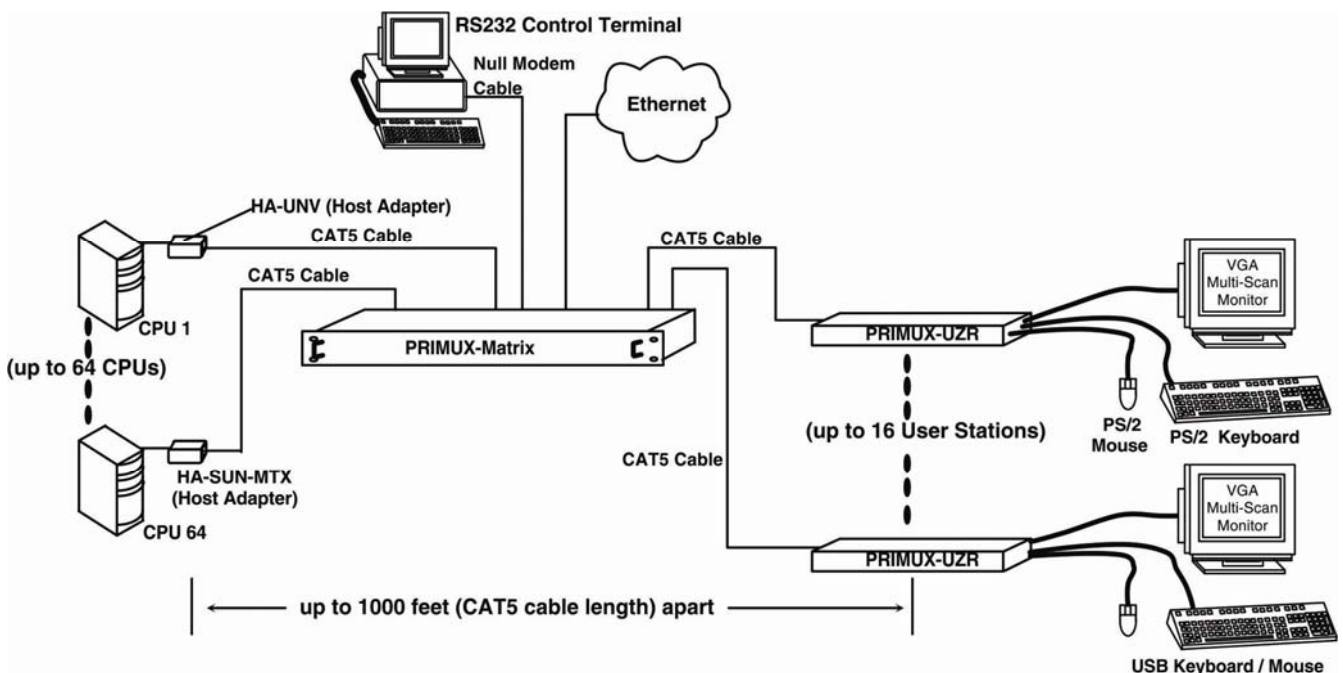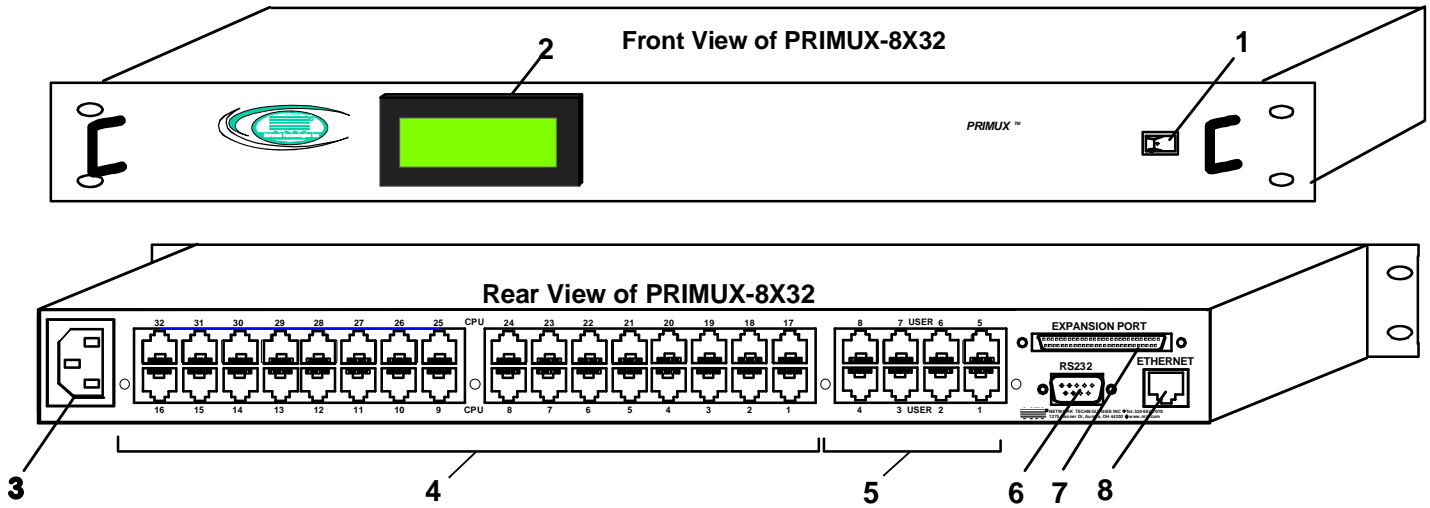
## FEATURES AND FUNCTIONS

**PRIMUX-8x32 Matrix Switch** (above):
1.  **Power ON/OFF switch**
2.  **LCD Display** - for visual indication of connection between User Stations and Host Adapters
3.  **IEC Power connector**
4.  **CPU 1-32**- RJ45 female - for connection of CAT5 cable between Host Adapters and Switch
5.  **USER 1-8**- RJ45 female - for connection of CAT5 cable between User Stations and Switch
6.  **RS232**- DB9 male- serial communication port
7.  **SCSI68** – for stack expansion of the switch (not supported as of this printing)
8.  **ETHERNET**- RJ45 female- for connection of Ethernet cable

**Front View of PRIMUX-UZR (User Station)**

**Rear View of PRIMUX-UZR (User Station)**
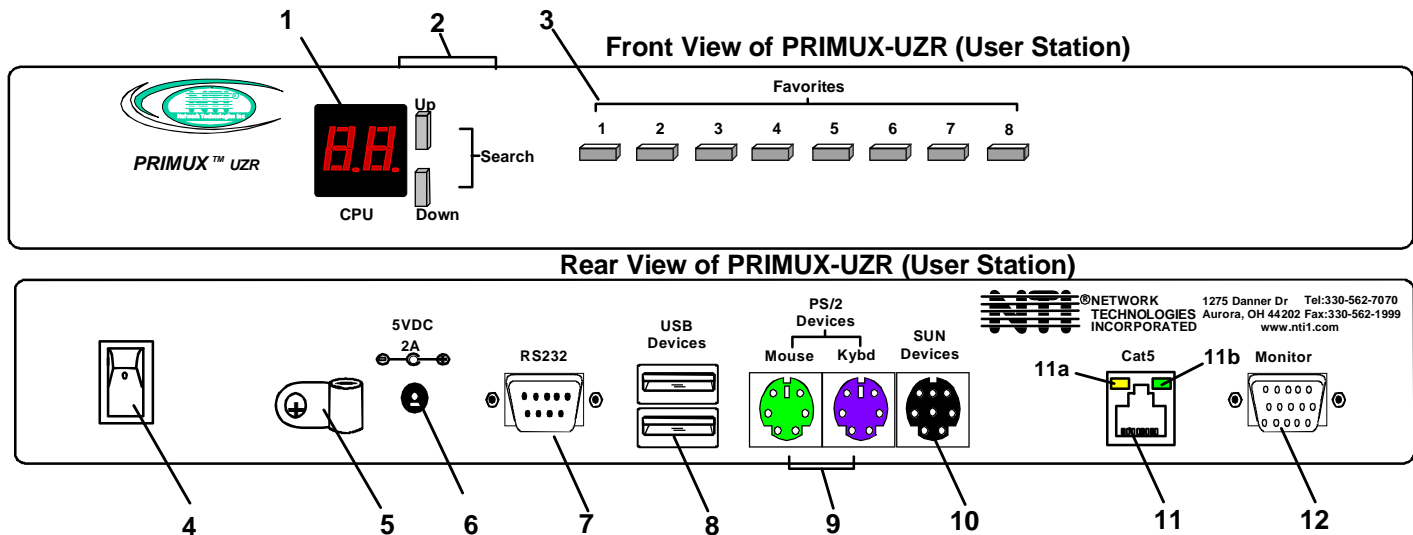
**PRIMUX-UZR User Station (above) and HA-xxx Host Adapter (next page)**:
1.  **LED Display** - for visual indication of which Host Adapter the user is connected to
2.  **Search Buttons**- to enable manual search for desired Host Adapter connection
3.  **Favorite Buttons**- programmable buttons for quick selection of specific Host Adapters
4.  **Power Switch**- to turn User Station On/Off
5.  **Cable restraint**- to secure the cable from the AC adapter
6.  **5VDC 2A**- female power connector- for connection of AC adapter
7.  **RS232**- DB9 male- serial communication port for updating firmware
8.  **USB Devices**- USB Type A female- for connection of USB user devices (keyboard and mouse)
9.  **PS/2 Devices**- green and purple 6mD females- for connection of PS/2 type mouse (green) and keyboard (purple)
10. **SUN Devices**- black 8mD female- for connection of SUN mouse and keyboard (not supported as of this printing)

11. **CAT5** - RJ45 female- for connection of CAT5 cable between Host Adapter and Matrix Switch
    11a**. Yellow LED**- power indicator-  illuminates when power has been supplied to the unit
    11b.  **Green LED**- traffic indicator-  illuminates when there is communication between the User Station and Host Adapter.
12. **Monitor**-  for connecting the video monitor
13. **Video Connector**- blue 15HD male- for connecting to the video port on the CPU
14. **Keyboard Connector**- purple male 6 miniDIN (HA-UNV only)- for connecting to the keyboard port on a PS2 CPU
15. **Device Connector**- male USB Type A (HA-UNV only)- for connecting to a device port on a USB CPU
15a**. PS2 Mouse Adapter Connector**- green male 6 miniDIN to USB Type A female (HA-UNV only)- for connecting to a mouse port on a PS2 CPU
15b. **Device Connector**- orange male 8 miniDIN (HA-SUN-MTX only)- for connecting to a device port on a legacy SUN CPU
15c. **Power and Serial Connectors**-USB Type A and RJ45 male(HA-RS-M only)- for connecting to the serial port on a terminal and powering the Host Adapter
16. **CAT5**- RJ45 female- not used- terminating plug (provided) must be inserted here



HA-UNV (Universal Host Adapter)
(Host Adapter sold separately)
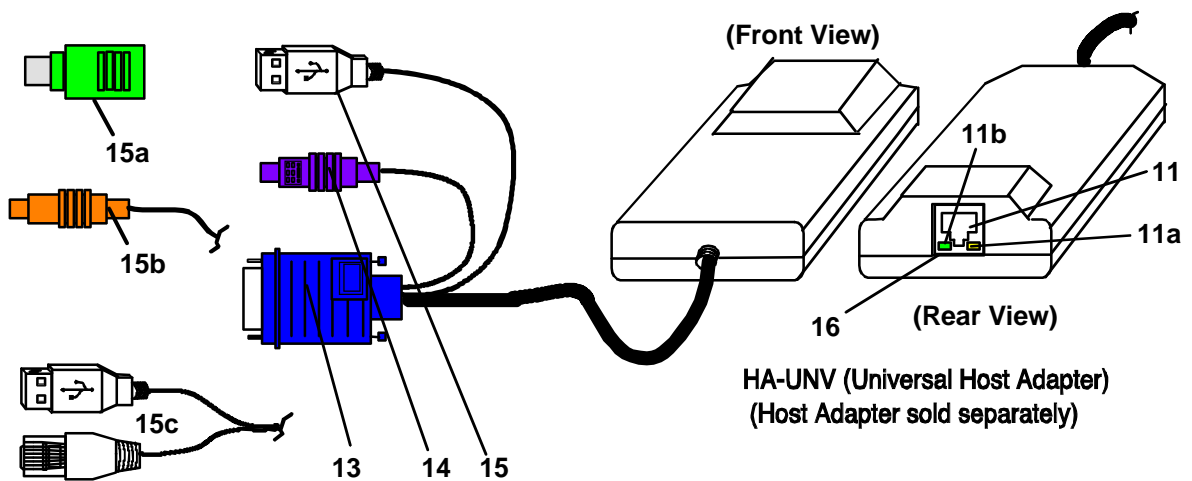
## PREPARATION FOR INSTALLATION

- Choose a secure location for the Matrix Switch, such that cables from User Stations and Host Adapters will reach it. This location should be secure enough to restrict personnel access.

- Choose a location for each User Station such that cables from the keyboard, mouse, and monitor will reach them.

- The CATx cables must be run between the locations where the Host Adapter will be connected and User Station is positioned.  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.) .   **If cables must be routed near sources of magnetic fields or electrical interference, use shielded CATx cable (see table on page 62) for best performance.**

*NOTE: The installer must ensure that all CAT5 cable between Host Adapters and User Stations to the SWITCH is of the straight-through type and <u>not</u> crossed.*

- 120V or 240V electrical supplies (depending on the cord type being used) must be provided close enough to the Matrix Switch positions to plug them into.

- All cables should be installed such 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.

- Properly shut down and disconnect the power from the CPU and devices to be extended.    If other equipment is involved whose connections are being interrupted, be sure to refer to the instruction manuals for that equipment for proper disconnection and re-connection procedures before proceeding.

## INSTALLATION

## Install The Host Adapter

The PRIMUX HA Host Adapter is designed to support  PS/2, SUN and USB CPUs, in addition to serial devices with an RS232 port.  For PS/2 or USB CPUs use HA-UNV, for SUN CPUs use HA-SUN-MTX, and for serially-controlled servers or devices use HA-RS-M.  Before installing or removing a Host Adapter, power down the CPU to be connected/disconnected and disconnect the power cord from the CPU.

*CAUTION! DAMAGE MAY OCCUR TO THE CPU AND HOST ADAPTER IF POWER IS NOT DISCONNECTED BEFORE CONNECTING OR DISCONNECTING CABLES.*

### Installation of a HA-UNV to a PS/2 CPU

Plug the cables of the HA-UNV Host Adapter into the back of the PS/2 CPU after disconnecting the power cord from the CPU.
 (See Figure 1.)

   a)   Connect the green 6 pin miniDIN to USB adapter (provided) to the USB cable
          end and plug it into the mouse port on the back of the CPU.

   b)   Connect the purple 6 pin miniDIN cable end with the keyboard symbol
          on it to the keyboard port on the back of the CPU.

   c)   Connect the blue 15HD cable end to the VGA port on the back of the CPU.

**PS/2 Keyboard**

**6 miniDIN male connectors**

**6 pin miniDIN female connectors**

**PS/2 keyboard (purple)**

**USB-PS/2 Adapter (mouse)**

**HA-UNV (Front View)**

**15HD female video connector**

**Rear View of PS/2 CPU**

**15HD male video connector**

*Note: When hotplugging the mouse and keyboard cables into a PS/2 CPU,  be sure to connect the mouse cable first, then the keyboard cable.   Failure to connect in this order may cause the mouse to not be recognized by the CPU.*
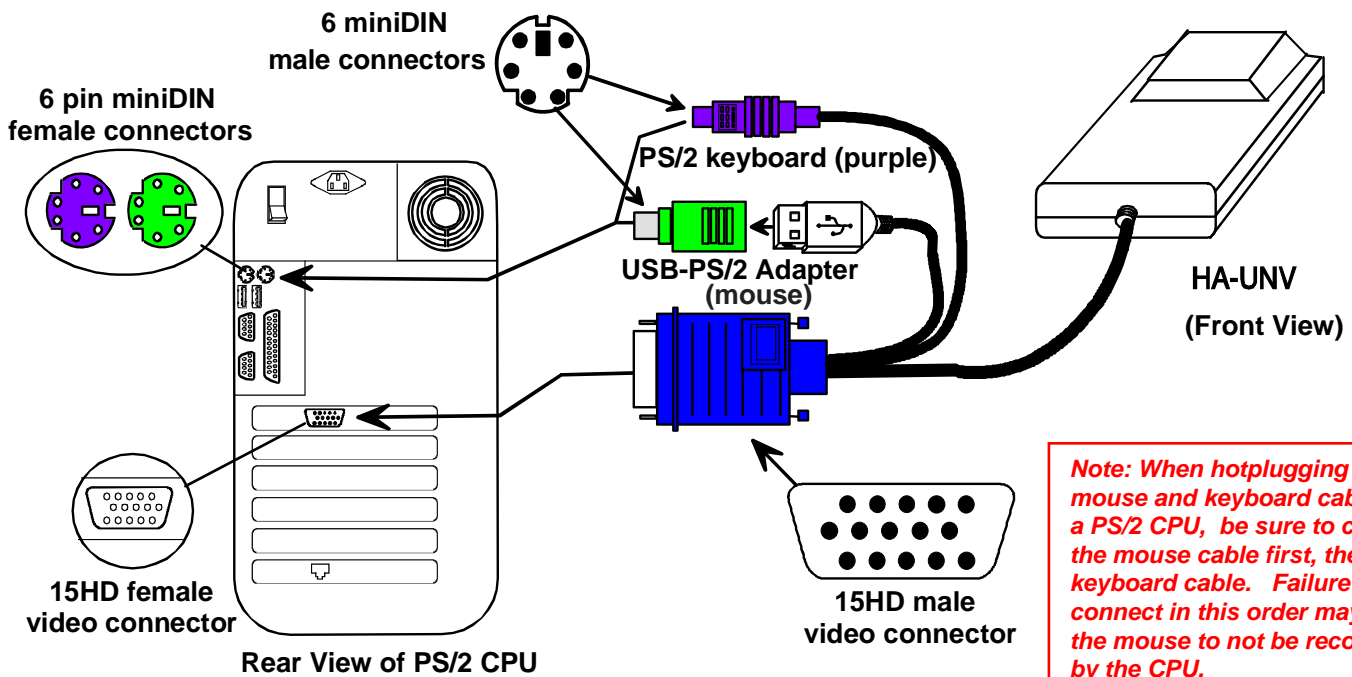
**Figure 1- Connect a HA-UNV Host Adapter to a PS/2 CPU**

## Installation of a HA-UNV to a USB CPU

Plug the cables of the HA-UNV Host Adapter into the back of the USB CPU after disconnecting the power cord from the CPU. (See Figure 2.)

    a)   Connect the cable with the USB Type A male cable end on it to a USB Type A female port on the back of the CPU.

    b)   Connect the blue 15HD cable end to the video connector on the back of the CPU.

*NOTE: The purple keyboard connector cannot be used when the HA-UNV is installed on a USB CPU.  In this installation, the USB connector will carry both the mouse and keyboard communication signals to the CPU.*

**PS/2 Keyboard Connector cannot be used when the USB connector is plugged directly into the USB CPU.**

**USB Type A male**

**USB Type A device port**

**HA-UNV (Front View)**

**15HD female video connector**

**Rear View of USB CPU**

**15HD male video connector**
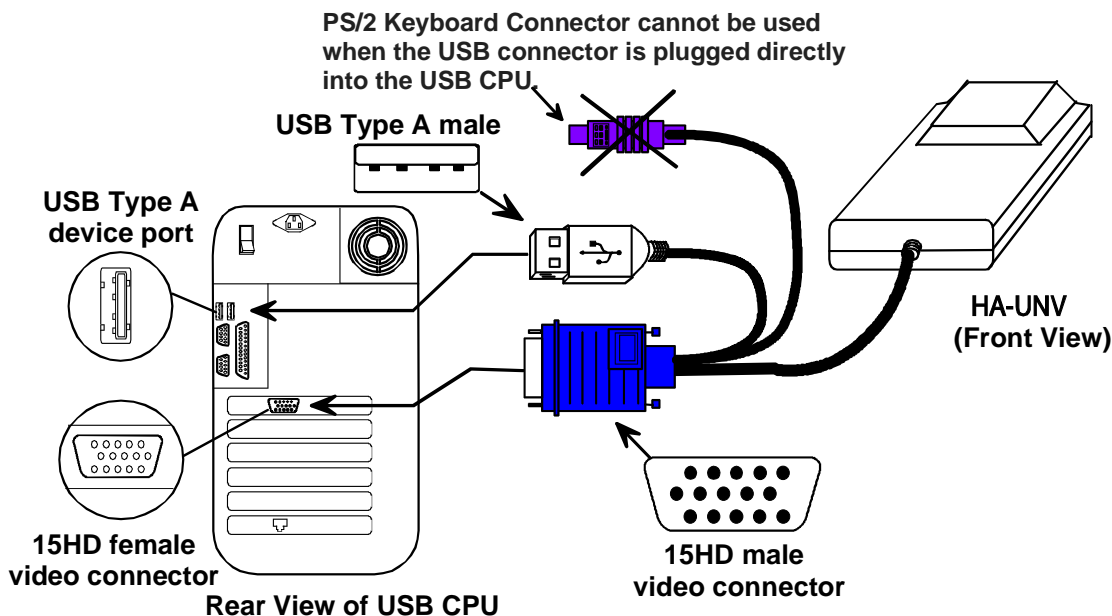
**Figure 2- Connect a HA-UNV Host Adapter to a USB CPU**

## Installation of a Legacy SUN CPU

Plug the cables of the HA-SUN-MTX Host Adapter into the back of the CPU after disconnecting the power cord from the CPU. (See Figure 3.)

    a)   Connect the orange 8 pin miniDIN cable end on it to the devices port on the back of the CPU.

    b)   Connect the blue 15HD cable end to the VGA port on the back of the CPU.

**Rear View of SUN CPU**

**15HD female video connector**

**HA-SUN-MTX (Front View)**

**8 pin miniDIN female connector**

**FYI:  The HA-SUN-MTX Host Adapter does not provide keyboard power-ON support for legacy SUN CPUs.**

**orange-devices**
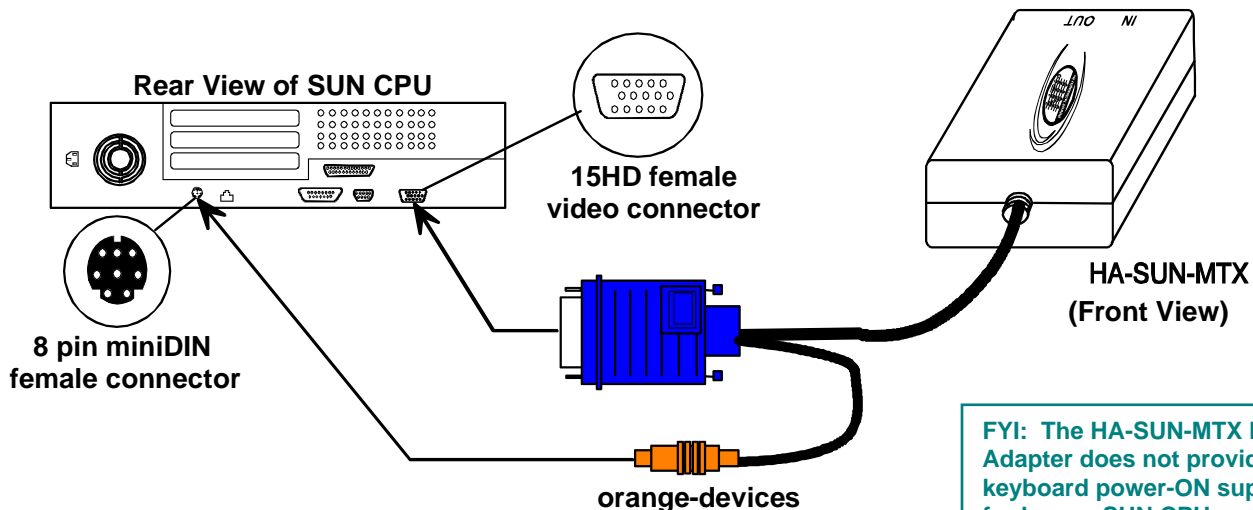
**Figure 3- Connect a HA-SUN-MTX Host Adapter to a Legacy SUN CPU**

## Installation of a Serial-Controlled Server or Device

Plug the cables of the HA-RS-M Host Adapter into the serial port on a server (DTE) or other serially-controlled data terminal equipment (DTE) device.  If the device is a data communication equipment (DCE) type device, a crossover adapter
(NTI RJ45MF-RS232-CO- sold separately) will be required.

a) Connect the RJ45 cable end to the serial control port on the serial device.  A DB9-to-RJ45 console adapter (supplied with the HA-RS-M) may be required to make this connection.
b) Connect the USB Type A cable to any available USB Type A female port.   If the device being controlled does not have a USB port, connect it to any USB Type A port on a device nearby.   Any USB Type A port will do, as the HA-RS-M is only using the power supplied by two of the four terminals in the connector.
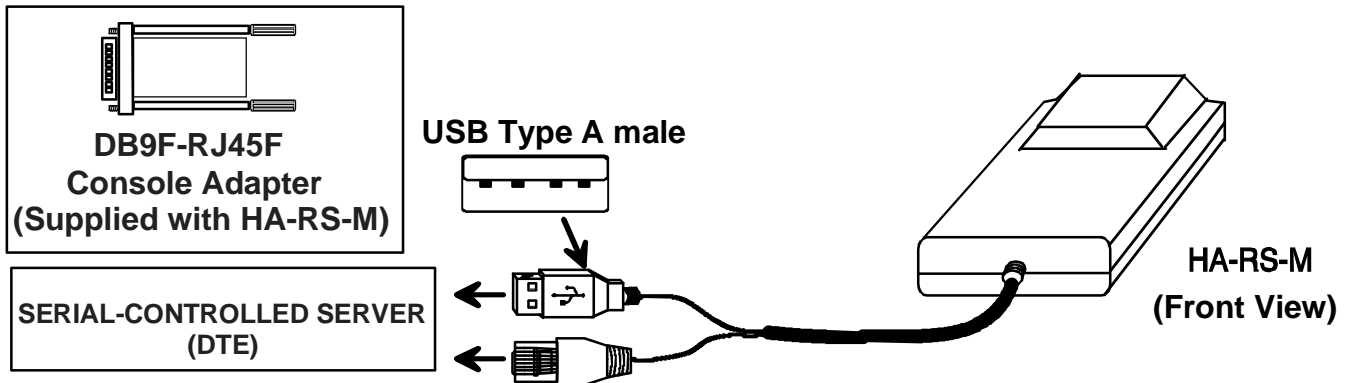
**Figure 4- Connect an HA-RS-M Host Adapter to a server**
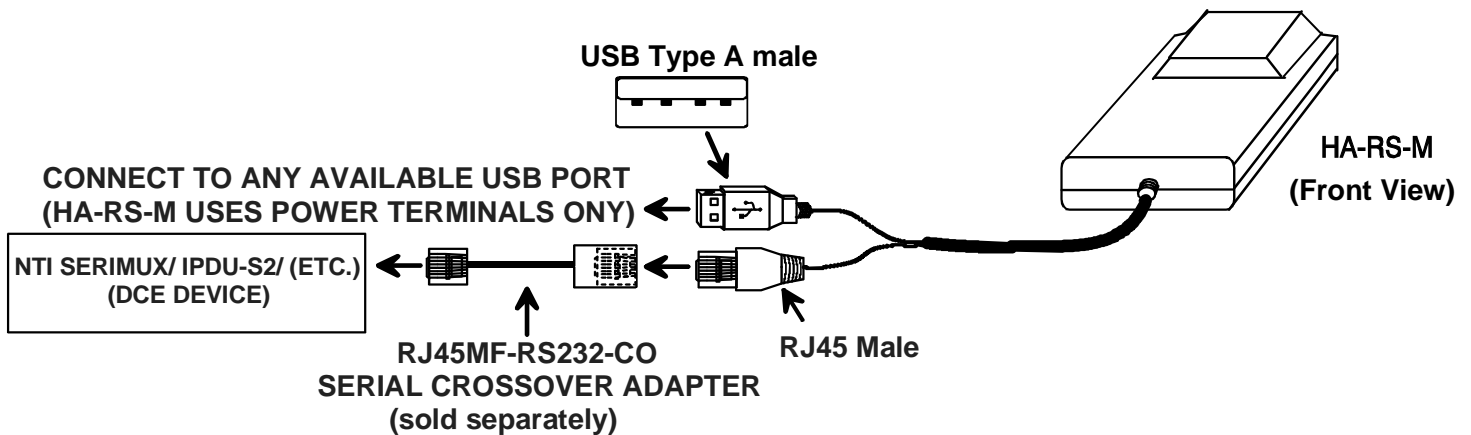
**Figure 5- Connect an HA-RS-M Host Adapter to a DCE type device**

**Pinout for RJ45 Female to RJ45 Male crossover Adapter**

| RJ45-F | | | RJ45-M | |
|---|---|---|---|---|
| **Pin** | **Signal** | | **Pin** | **Signal** |
| 1 | CTS | Connected to | 8 | RTS |
| 2 | DSR | Connected to | 7 | DTR |
| 3 | RxD | Connected to | 6 | TxD |
| 4 | GND | Connected to | 4 | GND |
| 5 | DCD | Connected to | 1 | CTS |
| 6 | TxD | Connected to | 3 | RxD |
| 7 | DTR | Connected to | N/c | |
| 8 | RTS | Connected to | 2 | DSR |
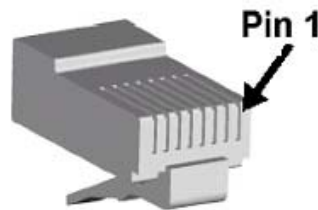
*Note: The serial port on the device must be configured for a maximum baud rate of 115200 bps.*

## Connecting the CAT5 cable to the Host Adapter

Connect CAT5 cable to the "OUT" port on the Host Adapter (Figure 6). When properly inserted, the cable end should snap into place.

*NOTE: If an RJ45 wall outlet is being used, connect the other end of the extension cable to the RJ45 wall outlet.*

⚠ *WARNING: Never connect the PRIMUX Host Adapter to an Ethernet card, Ethernet router, hub or switch or other Ethernet RJ45 connector of an Ethernet device. Damage to devices connected to the Ethernet may result.*

*NOTE: The installer must ensure that all CAT5 cable between the Host Adapter and the Switch is of the straight-through type and not crossed.*

**Cable to CPU**

**HA-UNV (Rear View)**

**CAT5 Cable to Matrix Switch**
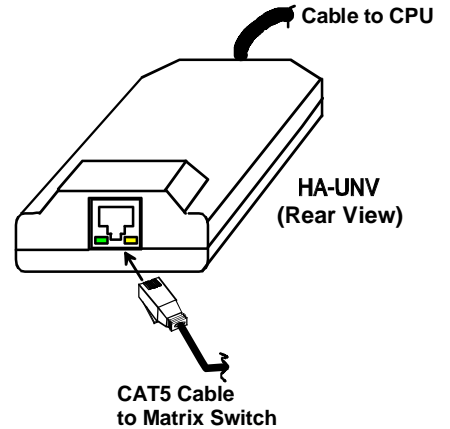
**Figure 6- Connect CAT5 cable to Host Adapter**

*NOTE: HA-SUN-MTX Host Adapters require the insertion of a Terminating Plug (included) into the "IN" port on the Host Adapter. Be sure to insert this plug.*

**Cable to CPU**

IN    OUT

**HA-SUN-MTX (Rear View)**

**Terminating Plug (Supplied)**

**CAT5 Cable to PRIMUX Switch**
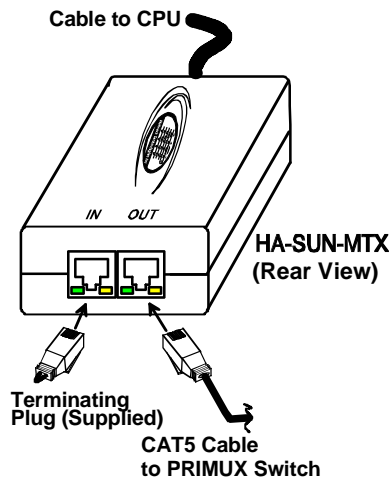
**Figure 7- Add terminating plug to HA-SUN-MTX Host Adapter**

**If cables must be routed near sources of magnetic fields or electrical interference, use shielded CATx cable (see table on page 62) for best performance.**

# Install The User Station

The PRIMUX-UZR User Station can be used with either PS/2 or USB devices.

*NOTE:  If the user keyboard connected is PS/2 (6mD connector), then the mouse must also be PS/2.   If the user keyboard is USB (USB Type A connector), then the mouse must also be USB.*

*Note: Only PRIMUX-UZR User Stations running firmware version 2.0 or later can be used in conjunction with the PRIMUX Matrix Switch.   To upgrade the firmware, download firmware files and instruction from http://www.networktechinc.com/download/d-kvmswitch-cat5.html .*

## Installation with PS/2 devices

1.   Position the User Station such that the CAT5 cable, the monitor cable, device cables, and the AC adapter power connector can each reach the User Station without cable strain.

2.   Connect the monitor cable to the female 15HD video connector on the User Station.

3.   Connect the PS/2 device(s) to the User Station (see **Figure 8**).

   a.   Connect the keyboard to the purple female 6 pin miniDIN connector on the User Station.

   b.   Connect the mouse to the green female 6 pin miniDIN connector on the User Station.
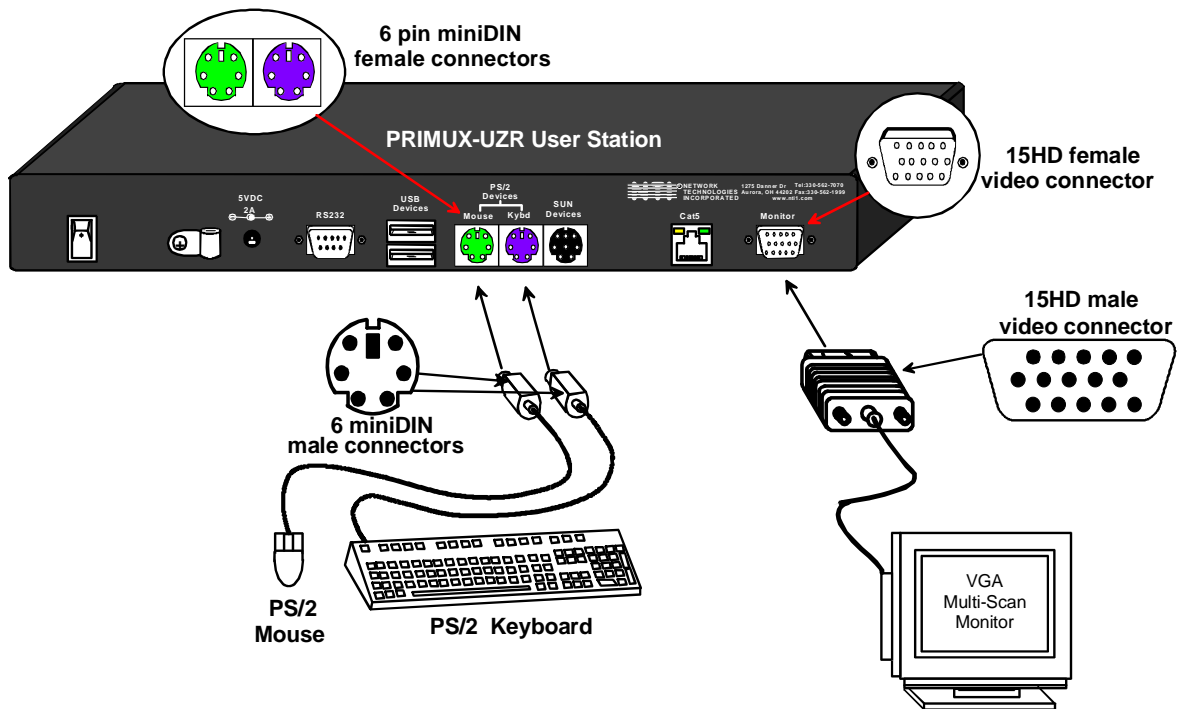


**Figure 8- Connect the extended PS/2 components to the User Station**

## Installation with USB devices

1. Position the User Station such that the CAT5 cable, the monitor cable, device cables, and the AC adapter power connector can each reach the User Station without cable strain.

2. Connect the monitor cable to the female 15HD video connector on the User Station.

3. Connect the USB device(s) to the User Station (see Figure 9).

   a. Connect the keyboard to a USB Type A female connector on the User Station.

   b. Connect the mouse to the other USB Type A female connector on the User Station.
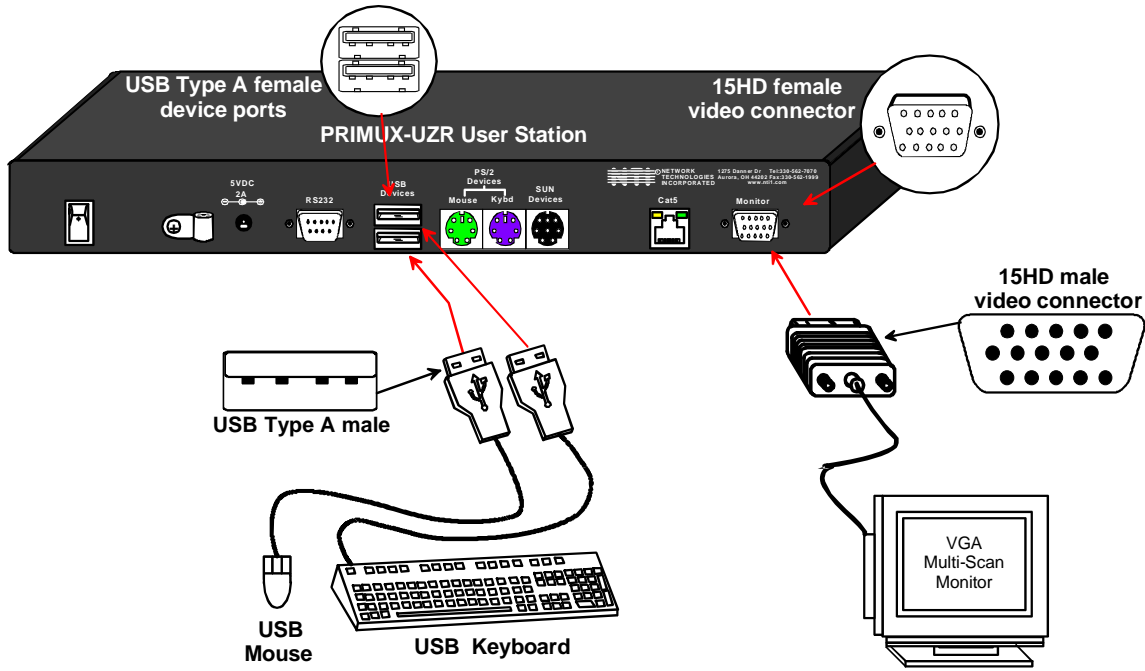


**Figure 9- Connect extended USB components to the User Station**

## Connecting the CAT5 cable to the User Station

Make sure the CAT5 cable has been installed in accordance with the "Preparation for Installation" instructions on page 5. Connect the CAT5 cable to the "Cat 5" port on the User Station. (See Figure 10.)  When properly inserted the CAT5 cable end should snap into place.

> **WARNING:  Never connect the PRIMUX-UZR User Station to an Ethernet card, Ethernet router, hub or switch or other Ethernet RJ45 connector of an Ethernet device.   Damage to devices connected to the Ethernet may result.**
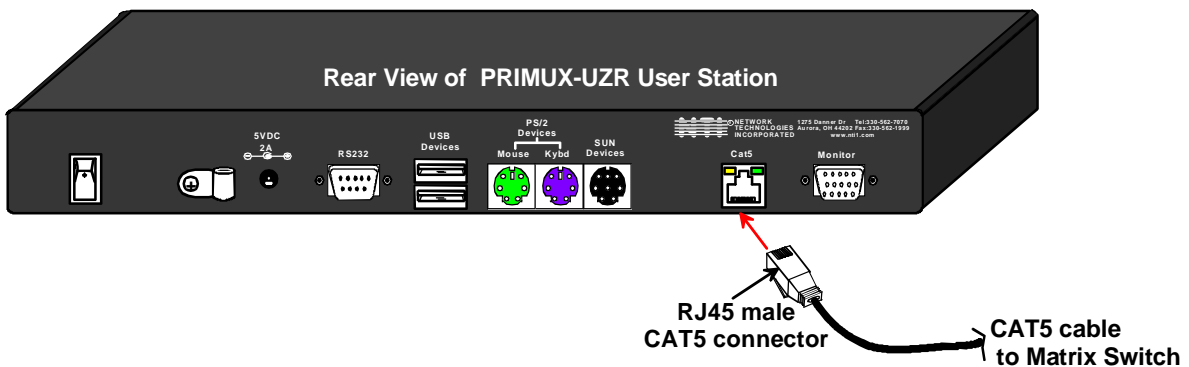


**Figure 10- Connect CAT5 cable to User Station**

# Install The Matrix Switch

The PRIMUX KVM Matrix Switch is designed to connect multiple User Stations to multiple Host Adapters.

## Installation

1. Position the SWITCH such that the CAT5 cables from User Stations and Host Adapters, and the AC power cord can each reach the SWITCH without cable strain. It may be desirable to position the SWITCH in a secure place, accessible only to the administrator and trusted users.
2. Connect the CAT5 cables from User Stations to the SWITCH user ports, starting with the first user port.
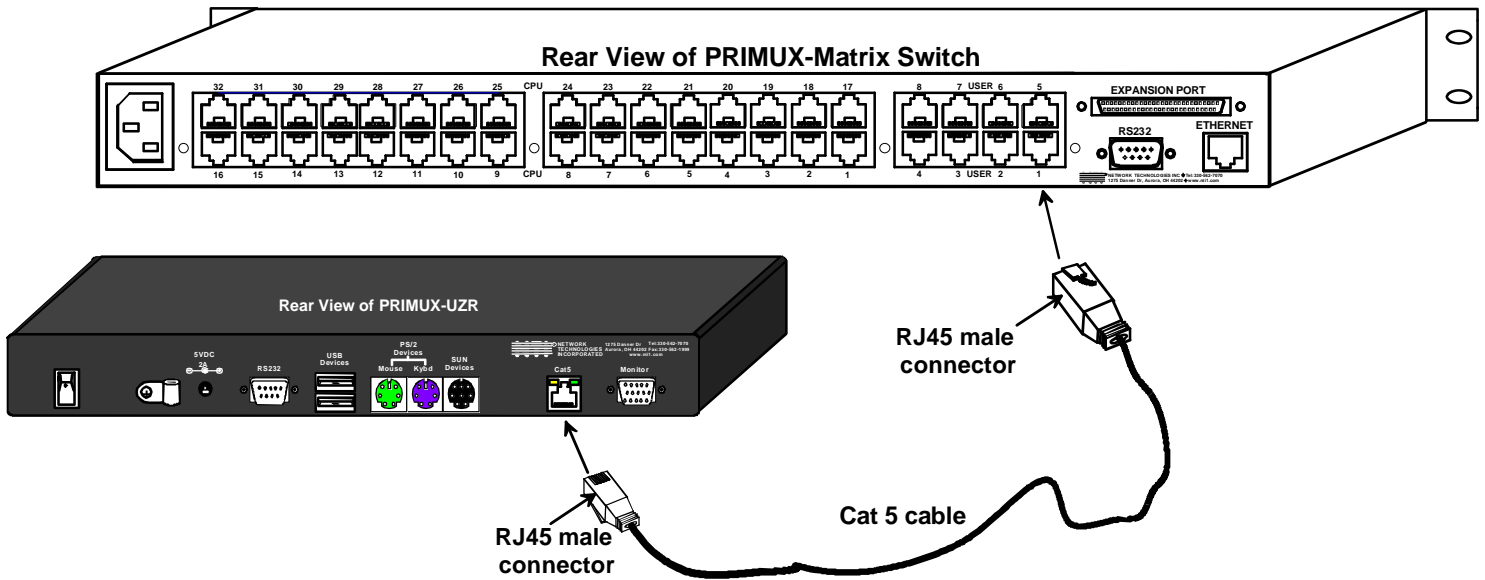


**Figure 11- Connect User Stations to Matrix Switch**

3. Connect the CAT5 cables from Host Adapters to the SWITCH CPU ports.
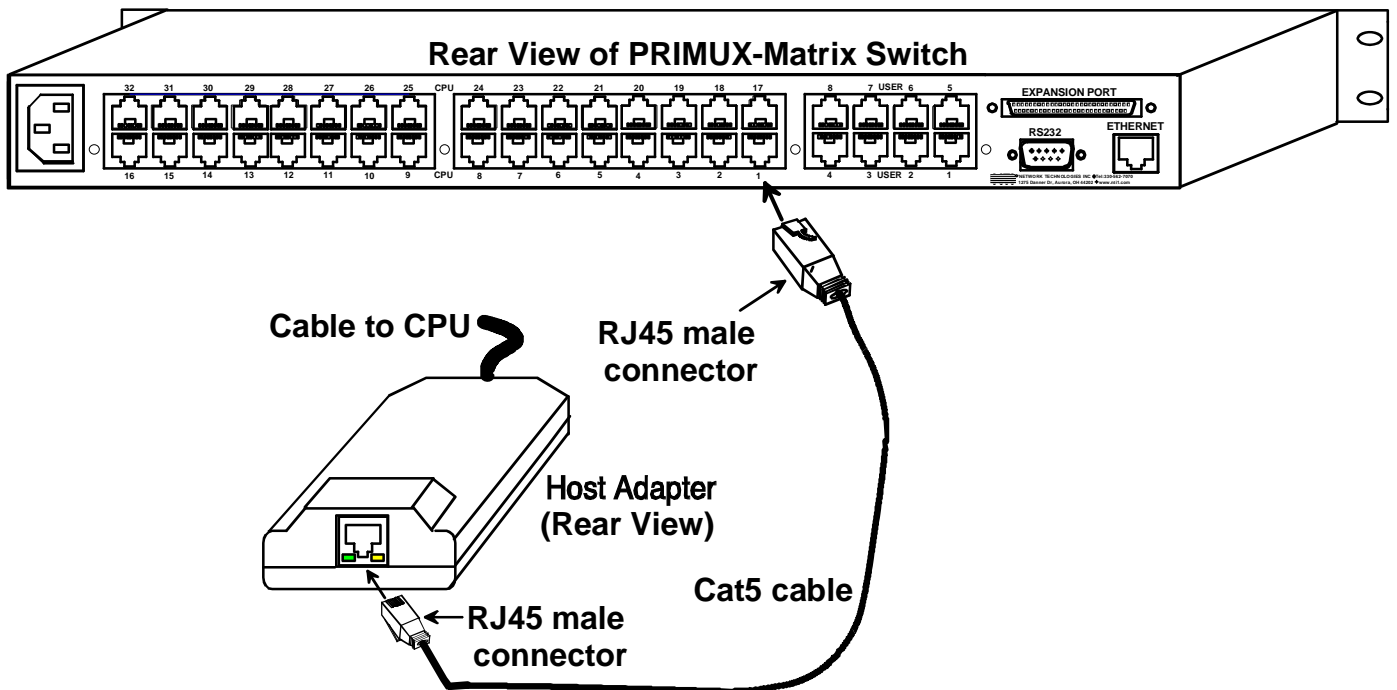


**Figure 12- Connect Host Adapters to Matrix Switch**

4.  To control the Matrix Switch using RS232 serial interface via a control terminal (page 44), connect a serial cable between the control terminal and the "RS232" port on the Matrix Switch.   This cable is supplied with your PRIMUX-UZR (DINT-6-FF) and you can also see page 64 for specifications of the pinout for this cable.
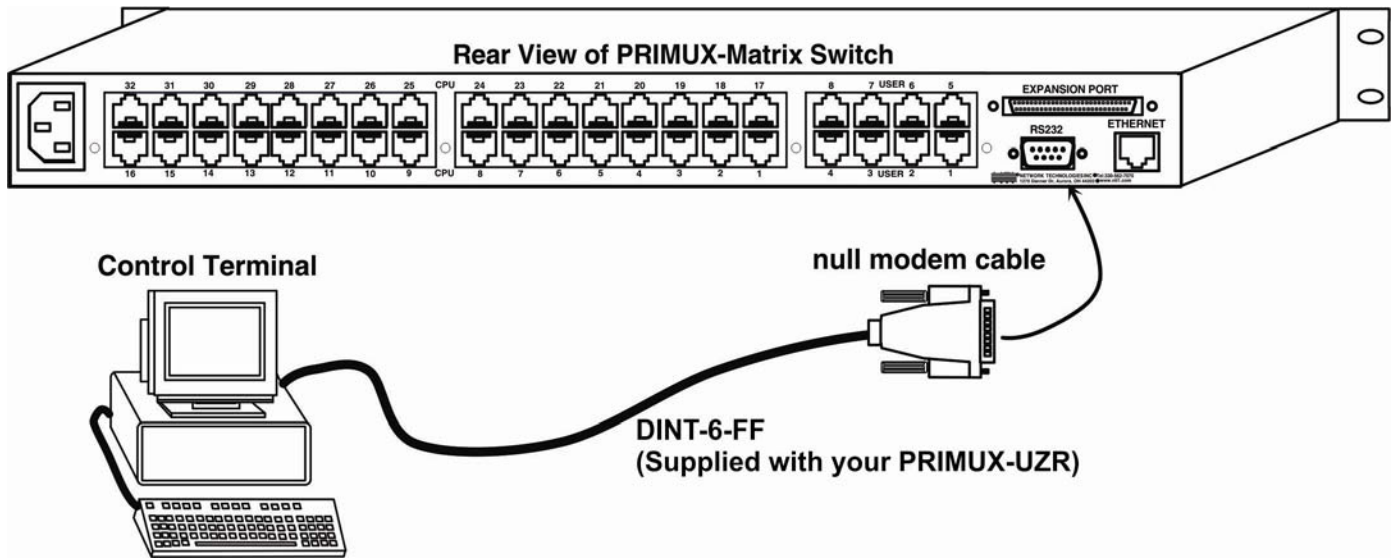


**Figure 13- Connect a terminal to use RS232 serial interface**

5.   Connect a CAT5 patch cable from the local Ethernet network connection (or directly from a PC using a crossover cable-pinout on page 63) to the connector on the Matrix Switch marked "ETHERNET".
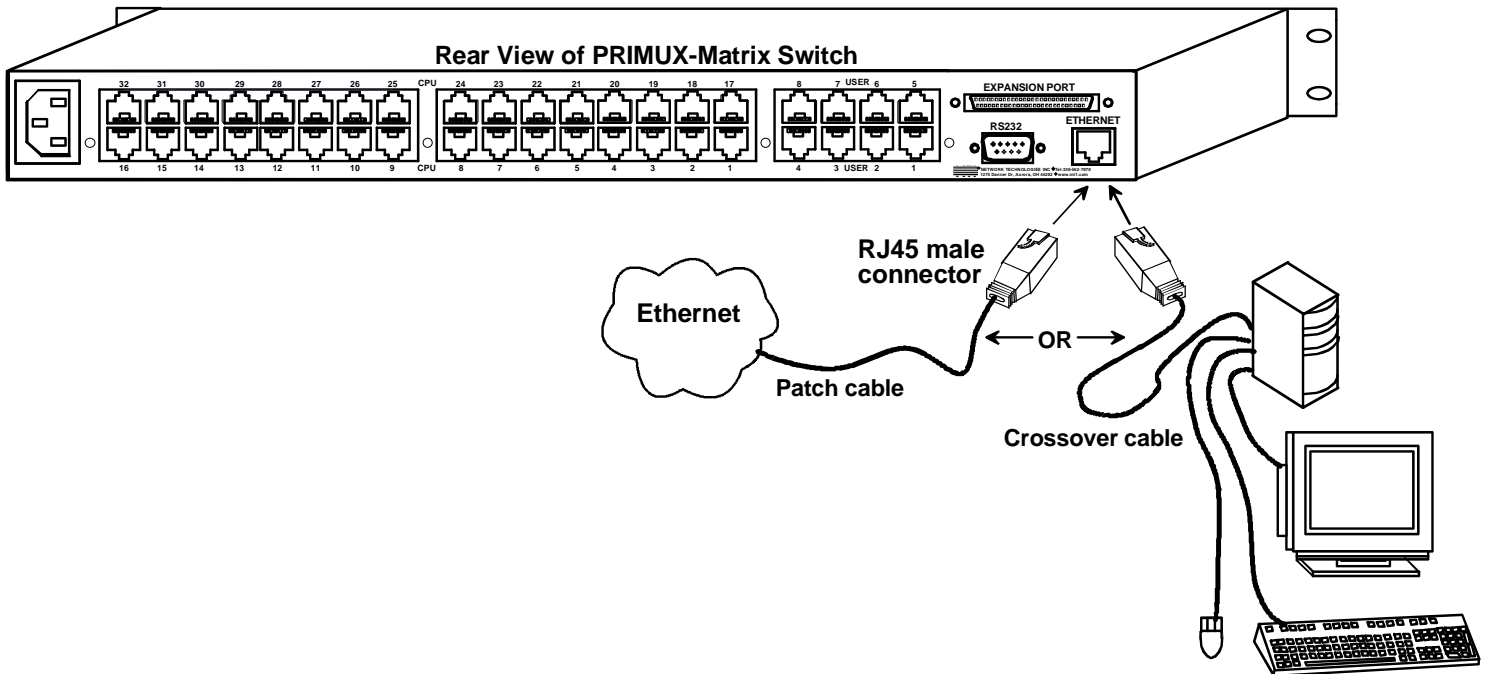


**Figure 14- Connect the Matrix Switch to the Ethernet**

# Power Up for the First Time

*NOTE: The user devices, monitor, and CAT5 cable should already be connected before powering up the User Stations and the Switch.*

1. Connect the AC power cord to the IEC power connector and turn ON the power to the unit. The LCD will display the boot status after approximately 2 seconds.
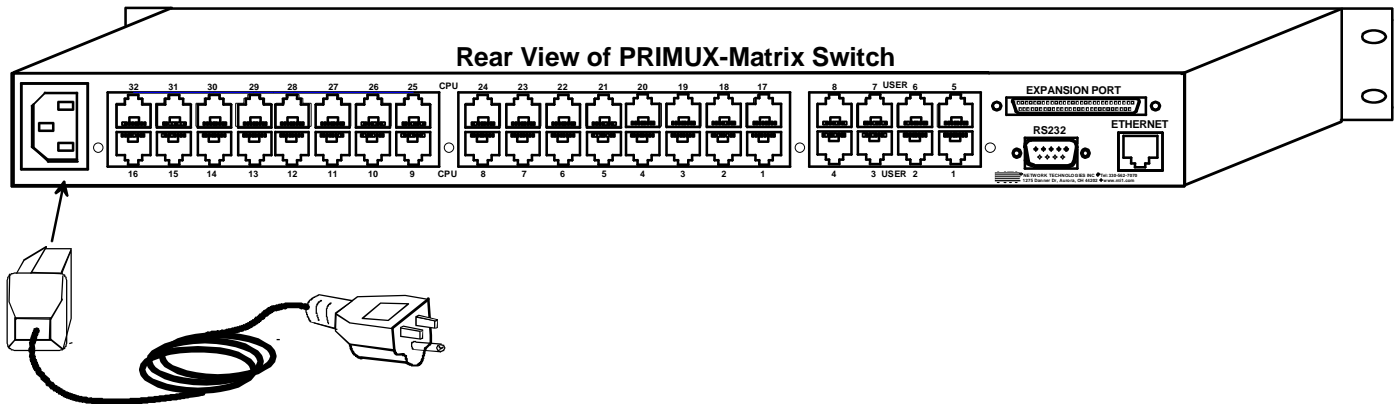


**Figure 15- Connect the IEC power cord to the Matrix Switch**

2. Connect the AC adapter power connector to the 5VDC port on the User Station (see Figure 16).  Plug the AC adapter into a power outlet and turn ON power to the User Station.  The yellow LED on the RJ45 connector of the User Station should illuminate, indicating that a proper power connection has been made to it.
3. Re-connect the power cord to the CPU.

*FYI:   The Host Adapter is powered by the CPU.*
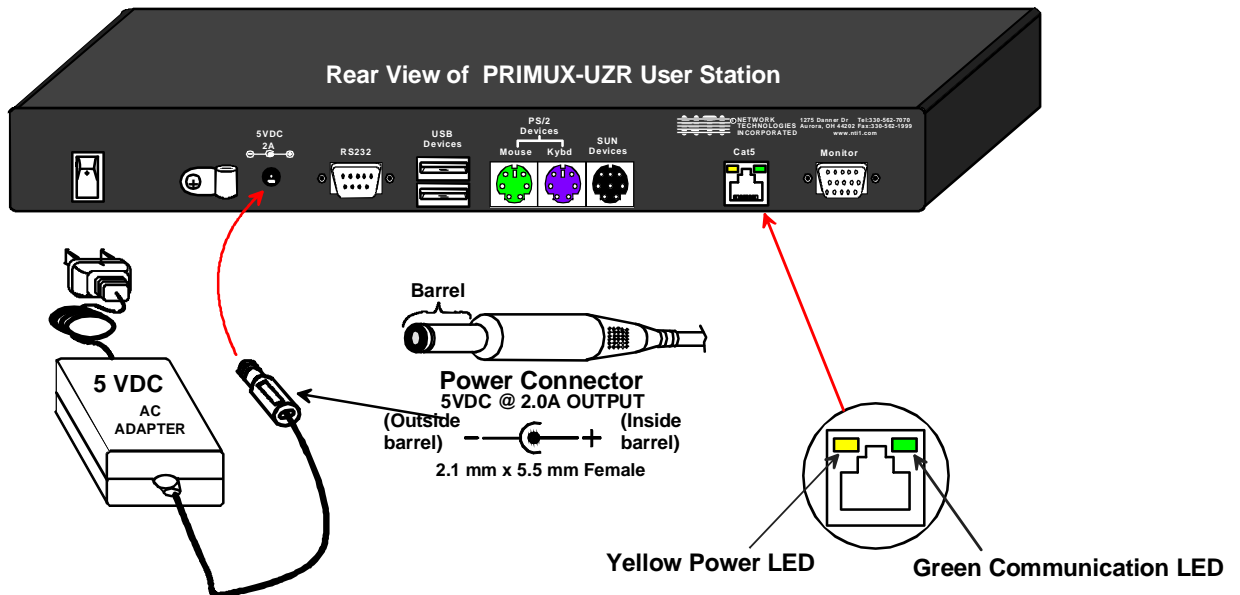


**Figure 16- Connect the AC adapter to the User Station**

4. Power up the monitor.

5. With the Matrix Switch, User Stations and Host Adapters all connected via CAT5 cable, continue now with "USING THE PRIMUX USER STATION" on page 16.    For control using a terminal or remotely via Telnet, see "RS232 or Telnet Connection" on page 44.

## USING THE PRIMUX USER STATION

The NTI PRIMUX Matrix Switch is designed to be controlled either via OSD menus from a PRIMUX-UZR User Station, via RS232, or remotely via Telnet.  The following describes control via a User Station.

The PRIMUX-UZR User Station must first be installed as decribed under "Install the User Station" on page 10.  Control is achieved through the use of either the keypad on the front panel or On Screen Display (OSD) Menus.  Access to one or more CPUs is determined by the security configuration of the PRIMUX as set by the administrator.  Once user access limitations are defined,  the user can select which CPU to connect to using either the OSD menu,  the "Search" buttons on the front of the User Station, or quickly make a selection after programming the "Favorite" buttons.

**Please Note:  The PRIMUX User Station and Host Adapters used in conjunction with the PRIMUX Matrix Switch must all be running firmware version 2.0 or later in order to be compatible with the PRIMUX Matrix Switch.    For updated firmware, go to** http://www.networktechinc.com/download/d-kvmswitch-cat5.html .

## Hot Plugging

The PRIMUX-UZR is designed to emulate the presence of a mouse and keyboard whenever the PRIMUX-UZR is powered ON. As a result, the keyboard and mouse may be hot plugged from the User Station at any time without causing a CPU error.

*Note: Device types cannot be changed when hot plugging.  If the device type is changed (i.e. from PS/2 to USB),  the PRIMUX-UZR must be power cycled  (turned OFF, then ON again) for the device to work properly.*

*Note:  Both devices must be either PS/2 or USB. There cannot be one of each connected to the User Station.*

The PRIMUX Host Adapter may also be hot plugged to a CPU,  provided the CPU <u>and</u> the operating system supports device hot plugging.  (Operating systems known to support PS/2 hot-plugging include Windows 2000 SP3 and higher, Windows XP, Windows Vista, Linux, Windows Server 2000,2003 and 2008, and Windows 7.)    All USB systems support hot-plugging.

*Note: When hot plugging the mouse and keyboard cables into a PS/2 CPU that is known to <u>support</u> hot plugging,  be sure to connect the mouse cable first, then the keyboard cable.   Failure to connect in this order may cause the mouse to not be recognized by the CPU.*

CAT5 cables can be hot plugged.  If the CAT5 cable is disconnected, the User Station will continue to monitor all Host Adapters in the Host Adapter List.

*FYI: Once a Host Adapter is selected by the User Station it will stay connected or attempt to connect forever if the selected Host Adapter is powered OFF or the CAT5 cable is disconnected.  To properly remove a Host Adapter, the user must delete it from the Host Adapter List (page 32).*

## Initial Startup

After installing the User Station, the Matrix Switch and one or more Host Adapters as described on pages 4-8, when first applying power the user named "**root**" will be automatically logged-in and the Command Mode OSD menu will appear.  By default, the root user has full administrator rights and access to all Host Adapters and their connected CPUs.

### User Rights vs. Administrator Rights

The Administrator has full control over the functions of the PRIMUX CAT5 KVM system, while the User has limited control.

**Administrator Rights Include**:

- ➢  Change the Administrator Password
- ➢  Assign, edit, and remove user names and passwords
- ➢  Define user access rights to CPUs
- ➢  Adding and configuring Host Adapters
- ➢  Configure operating parameters of the User Station
- ➢  Update DDC information between the monitor and CPUs
- ➢  The ability to connect the User Station's keyboard, mouse, and monitor to any CPU
- ➢  The ability to enable/disable and configure Scan Mode
- ➢  The ability to assign a list of favorite CPUs
- ➢  The ability to fine tune the video quality

*FYI:  Users can be given full administrative access rights by the administrator (see page 35).*

**User Rights Include**:

> ➢ The ability to connect the Users Station's keyboard, mouse, and monitor to CPUs  (only those CPUs that have been granted access by the administrator).
> ➢ The ability to enable/disable and configure Scan Mode
> ➢ The ability to assign a list of favorite CPUs
> ➢ The ability to fine tune the video quality

## Enable Matrix Mode

Before the User Station will discover Host Adapters connected to the Matrix Switch, the User Station must first be configured for Matrix Mode using the Command Mode OSD menu.    Enter the following command to configure the User Station for Matrix Mode:

Press **<A> -<R>-<M>-<SPACEBAR>-<Y>** ,  then power-cycle the User Station.

This will open the Administration Menu, then the User Station Configuration menu, select the Mode option, toggle the mode setting to "Matrix",  and confirm the selection with a "Yes".  You must power-cycle the User Station to establish communication with the Matrix Switch.     For more User Station Configuration options, see page 37.
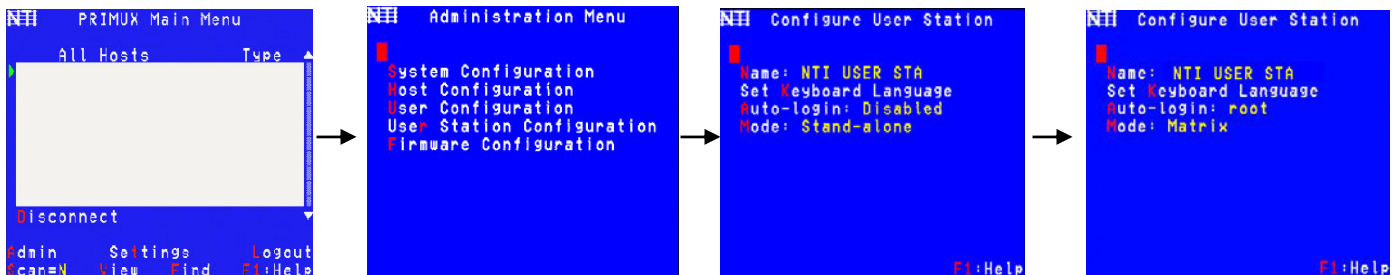


**Menu sequence for Matrix Switch Mode**

*Note: The "Mode" setting should be left as "Stand-alone" whenever the User Station is being used by itself.   Only set it to "Matrix" if the User Station will be used in conjunction with a PRIMUX Matrix Multi-User KVM Switch.    If this setting is changed to "Matrix" by mistake, contact NTI for instruction to return the setting to "Stand-alone".*

Press **<F10>** to return directly to the Command Mode main menu.

## Setup Host Adapter(s)

No initial configuration of the Host Adapter is required for it to be identified by the User Station through the Matrix Switch.    Once discovered, it appears in the list of CPUs in the Command Mode main menu.  The name will appear as "PN:xxxxxxxx" where xxxxxxxx is the number found on the Host Adapter case.  The name can be edited later (see page 32).

*Note: In order for the User Station to identify a Host Adapter and be included in the OSD list of connected CPUs (page 22) , the CPU must be powered-ON at least once.  After the first powered-ON connection, the User Station will indicate the status of the connected CPU, whether it is powered-ON or not..*

## Quick Connect to a CPU

*For OSD menu Navigation guidlelines, see page 19.*

From the Command Mode menu (page 22),  to make connection to any Host Adapter in the daisy-chain,
press **<Up arrow>** or **<Down arrow>** to highlight and select the desired Host Adapter, press
**<Enter>** to connect to it.

*-OR-*

use the mouse to highlight the desired Host Adapter to connect to and left-button-click on it to connect.

Press **<Esc>** to exit Command Mode and use the connected CPU.
Press **<Ctrl>** + **<`>** to return to Command Mode if desired.

## Change or Disable "root" Auto-login

For security purposes, it is recommended that the Auto-login feature either be disabled or the Auto-login user be changed to a user with fewer rights than the administrator.

To **disable** the Auto-login,  from the main menu, press **<A> -<R>-<A>-<N>**.

To **change** the Auto-login,  from the main menu,

- press **<A> -<U>-<A>-<Y>-<F10>** to first establish "**user1**" with no Host Adapter access but no administrative privileges
- press **<A> -<R>-<A>** and select  "**user1**" for Autologon. (Selection can be made using left mouse click or spacebar)
- press **<F10>** to return to the main menu.

Press **<L> - <Y>** to logout and return to a login prompt.
To return to the Command Mode menu via Auto-login,  press **<F1>**.   You will be logged in as "**user1**" .
To login as the administrator,  see below.

*Note: If the PRIMUX is power cycled,  the PRIMUX will now auto-login and open into the Command Mode menu with user1 logged in.*

## Administrator Login and Password

To login as the administrator, from the login prompt, enter the administrator name and default password:

### administrator name  =  <root>
### administrator password   = <nti>

*Note: User names and passwords are case sensitive.*

With a successful login, the administrator can setup additional users (see page 35).

**FYI: The User Station can be configured to Autologon a specific user (page 38) with each User Station power-up or have a Login splash screen appear for the user to login to the User Station.**

*NOTE: In PRIMUX units with firmware version 1.9 and earlier,  the administrator name was "ADMINISTRATOR" and the password was "NTI"   (all upper case letters).   The PRIMUX must be using version 2.0 or later to be compatible with the PRIMUX Matrix Switch.*

# Change the Default Administrator Password

Once the administrator is logged in, it is recommended (for greater security) that the the administrator change the default administrator password.

**To change the administrator password:**

- Press **<A>** (Administration Menu) -  **<U>** (User Configuration)
- Select the user "**root**" to open the "Edit User" menu
- Press **<P>** to open the "password" field.
- Type in a new password (case sensitive, 16 characters maximum,  alphanumeric)
- Press **<Tab>** to open the "confirm" field
- Re-type the new password to confirm
- Press **<Enter>** to finish and save.

*Note:  If you press <Enter> again, you will have to retype the confirmation.*

Press **<Esc>** to exit the menu,  or **<P>** to change it again.

*Note:  In the event the password is forgotten, contact NTI for instruction on how to reset the password to the default "nti".*

*Note: User names and passwords are case sensitive.*

## Guidelines for Navigating OSD Menus

Throughout this manual, various rules apply for navigating the menus used to control and operate the PRIMUX.

- OSD menus can be navigated using the mouse, the up and down arrows on the keyboard, and the `<Page Up>`, `<Page Down>`, `<Home>`,`<Tab>` and `<End>` keys.
  - The up and down arrows increment/decrement one <u>line item</u> at a time
  - `<Page Up>` and `<Page Down>` increment/decrement by one <u>page</u> at a time
  - `<Home>` will jump to the beginning of the list
  - `<Tab>` will jump between selectable fields (on supported screens)
  - `<End>` will jump to the end of the list.
- Alphabetic and numeric characters can be typed in the OSD menu fields, as well as these additional characters:
  ! (exclamation point) , * (asterisk) , ( , ) (left and right parenthesis), - (dash) , _ (underscore), + (plus sign) , = (equal sign) , ; (semicolon) , : (colon), " (quotation mark) , ' (apostrophe) , ? (question mark) , / (forward slash) , comma, and period .
- The <Shift> key must be used to enter an uppercase letter within all OSD menus.
- Functions that are "Administrator Only" are also available to users having administrative rights (see page 35).
- When "+" is shown between keystrokes, it indicates a chorded sequence (press and hold the keys consecutively until all keys in the sequence are pressed).   I.e.  `<Ctrl>+<`>` is a chorded sequence to enter Command Mode.
- When "-" is shown between keystrokes, it indicates to press the keys consecutively (press and release one at a time)
- To exit (and step back 1 menu) from any menu, press `<Esc>` on the keyboard.
- Press `<F10>` to return directly to the Command Mode menu.
- Alphabetic Keys pressed to navigate OSD menus can be upper or lowercase.

**Reference the image below**:
1. Available functions will have white characters with one red character. The red character indicates what corresponding keyboard character is associated with that function.  The background of available functions will become green when the mouse pointer is positioned over the function.
2. When selecting a function spelled with a red letter, press the keyboard key corresponding with that letter on the keyboard or use the mouse to select the function.   Red letter keys are NOT case sensitive.
3. The scroll bar in a list can be used by clicking on the corresponding up and down arrow above and below the scroll bar.
4. The mouse wheel may be used to move the selection bar
5. Placing the mouse over a listed Host Adapter highlighting the listed item with a light blue background "selects" the Host Adapter.  Clicking on it while in Command Mode will connect to that Host Adapter.
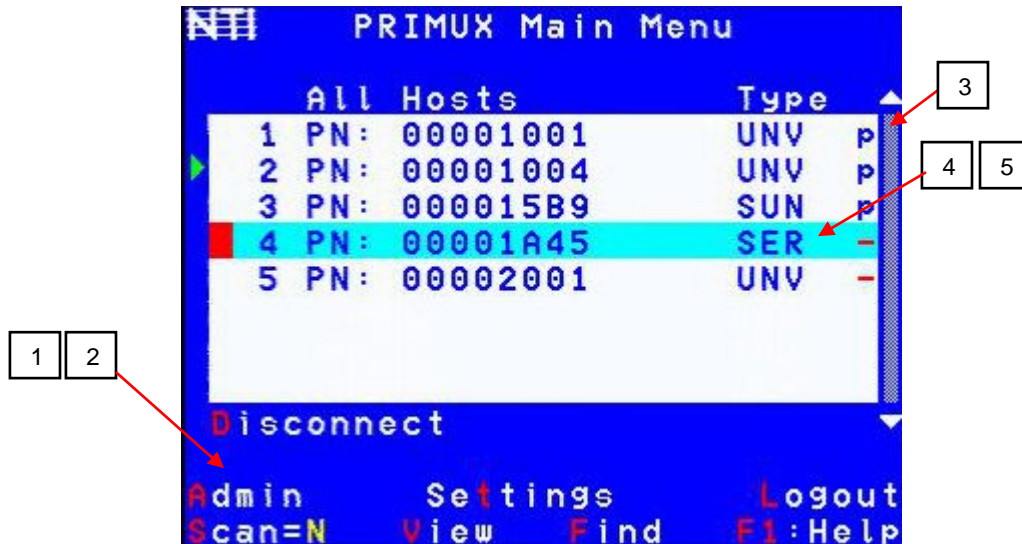


**Figure 17- OSD Menu Navigation**

*FYI: A "Quick-Find Keystroke Table" can be found at the end of this manual (page 65).*
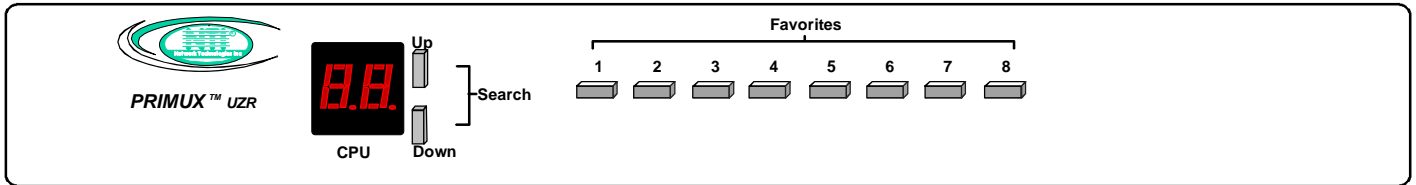
**Figure 18- PRIMUX-UZR front panel**

# Keypad Control

The keypad on the front panel of the PRIMUX User Station enables a user to quickly set the User Station to connect to the desired CPU.    Two seven-segment LEDs illuminate to show the index number of the Host Adapter the user is connected to.   The Up and Down buttons enable the user to search for the desired CPU.   The Favorite buttons, 1-8,  can be programmed for quick selection of the most commonly connected CPUs.   (See Figure 18)

To program a Favorite button,

-    Use the Search buttons to select the desired Host Adapter index number to connect with (or use OSD Command Mode).
-    With the index number in the LED display, press and hold the Favorite button to be associated with it for at least 2 seconds.  The LED will blink when the selection is remembered and until the Favorite button is released.
-    When this button is pressed and released, the User Station will immediately connect to the selected Host Adapter.
-    Repeat for each Favorite button to be programmed.

*Note:  Favorite buttons are not available when PRIMUX is mounted in a RACKMUX-15/17-PRIMUX drawer.  See "Favorite Hosts"   on page 27 to use Favorites through the OSD menu.*

## Security

The PRIMUX CAT5 KVM System is designed with security to prevent unauthorized use of the CPUs connected as determined by the administrator.     Up to 16 users may be given access to the system,  each with individual limitations of use.  Only the administrator or user with administrative privileges can activate or deactivate the security features on each user port.  Finally, the administrator can set a maximum idle time value after which the current user will be logged out and the login splash screen displayed again.  The current security status, idle time out, and scan dwell time are all saved and will be restored whenever power to the User Station is cycled OFF, then ON. To reset the administrator's password, call NTI and have the device serial number of the PRIMUX User Station available.

### Auto-login

By default, the user account  "**root**" has been configured to automatically login at power-up.  The adminstrator may reconfigure the User Station to auto-login a different user (page 38) or have a Login splash screen appear at power-up requiring a user to login, with or without a password.    The auto-login user uses CPUs listed in its Host Access List as configured by the administrator (page 36).  The auto-login user will open the Command Mode menu with a listing of any Host Adapters that user has access to.

### Administrator Login

To access the OSD Command Mode menu from the keyboard press the `<Ctrl>` + `<`>` (accent/tilde key). (An additional alternate OSD key may be defined, see page 31.)  Press `<L>` to logout as a user.  The User Login screen will automatically appear on the monitor.   In order to configure the PRIMUX (the PRIMUX must be powered ON),   the administrator must login with a proper user name and password.   Enter the following;

> **administrator name =  <root>**
> **administrator password =  <nti>**

*FYI:  The name for the administrator ("root" ) cannot be changed.*

### Note: User names and passwords are case sensitive.

Once logged-in, see "Edit Users" on page 35 to change the password.  Once the password is setup, if it is lost or forgotten the administrator will have to contact NTI for assistance on resetting the password.  The administrator can setup each of the users (page 36) and the limitations of their use of the individual CPUs from the Administration Menu.

### User Login

The administrator may configure the User Station to require each user to login using a predefined password to gain access to CPUs and to the features in the OSD menus.   Once logged-in, the user will be directed to the OSD menu where the user can decide what action is to be taken.

Once logged-in, a user can use the Command Mode functions described below and on page 22 to control the CPUs within the limitations as determined by the administrator.

| Function | Keystroke |
|---|---|
| Add a character to the user name/password | **A-Z, 0-9** Max. 16 characters |
| Remove previous character from the user name/password | **Backspace** |
| Tabs to the next field | **Tab** |
| Submit user name/password/data | **Enter** |

**If the password submitted is incorrect, the user will not be able to proceed.**

**If the password submitted is correct, the user will proceed to the Command Mode menu.**



**Figure 19- Login splash screen**

# User OSD Menus

## Command Mode

In order to control the User Station with the keyboard, Command Mode must be enabled.  To enable Command Mode from the keyboard:

Press    **Ctrl**   **+**   **~**   **(ACCENT/TILDE KEY)**

All the status lights on the keyboard will illuminate to indicate that Command Mode is enabled.  At this point, the Command Mode menu will be displayed.

The Command Mode menu (see Figure 20) lists all Host Adapters by name and index number.  Only 8 Host Adapters are listed on the screen at a time. To view the other portions of the list, scroll using the arrow keys on the keyboard or use the mouse to click on the arrows on the scroll bar in the OSD menu.

When the Command Mode main menu is first displayed at login, the first 8 Host Adapters will be displayed, sorted alphabetically.  When the Command Mode main menu is re-displayed to a logged-in user that has been working in a connected CPU, the Host Adapters listed will be those in the same group of 8 as the CPU they are connected to (I.e.,  if they are connected to the Host Adapter in index position 14,  then Host Adapters 9-16 will be displayed when they reopen Command Mode).  Alternatively, the user can display only the Host Adapters they use most often, sorted as "Favorites"  (see next page and page 27).

Only the names of Host Adapters accessible to the user that is logged-in will be displayed.  The access rights for the user logged-in may not include all Host Adapters.

An arrow to the left of an index number in the list indicates the Host Adapter the user is currently connected to. From left to right, the columns display the following:

- Index Number
- Host Adapter Name
- Type of Host Adapter connected (UNV,SUN or SER (RS))
- CPU power status  (where "p" means ON   and   " **-** " means OFF)

> **The CPU connected to a Host Adapter must be powered-ON at least once while connected to the daisy-chain and powered-ON User Station in order to be included in the Command Mode list of CPUs.**
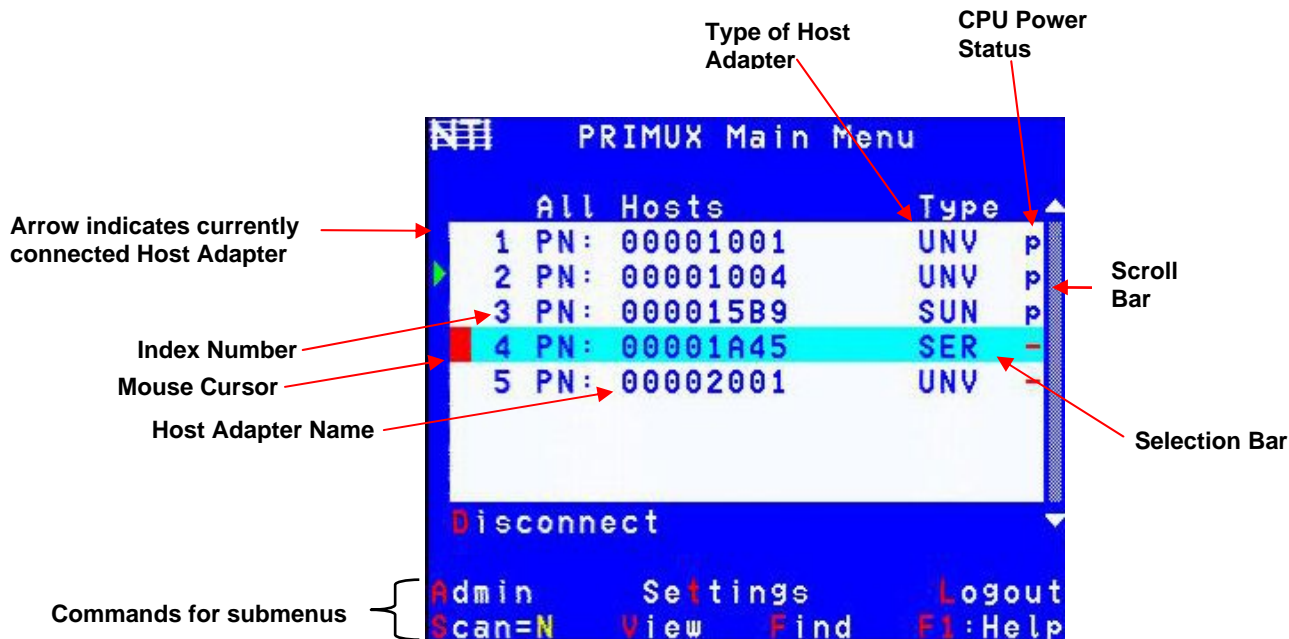


**Figure 20- Command Mode main menu**

The list below describes the command functions available from the keyboard within the OSD mode of control after entering into Command Mode:

| Function | Keystroke |
| --- | --- |
| Select the previous Host Adapter | Up Arrow |
| Select the next Host Adapter | Down Arrow |
| Decreases the menu by 1 page (displays the previous 7 Host Adapters) | Page Up |
| Increases the menu by 1 page (displays the next 7 Host Adapters) | Page Down |

| Function | Keystroke |
|---|:---:|
| Display first 8 Host Adapters and move selection bar to the first | **Home** |
| Display last 8 Host Adapters and move selection bar to the last | **End** |
| Press to toggle enable/disable Scan Mode | **S** |
| Enter Settings Menu | **T** |
| Enter Administration Mode   **(Administrator only- see page 29)** | **A** |
| Find- select Host Adapter by name | **F** |
| Display Command Mode Help Menu | **F1** |
| Connect to the highlighted Host Adapter | **Enter** |
| Toggle between listing all accessible Host Adapters and listing only accessible "Favorite" Host Adapters | **V** |
| Disconnect from the currently connected Host Adapter- no CPU connection will be displayed behind the OSD menu | **D** |
| Log Out the User/Administrator and disconnect from the Host Adapter<br><br>The login screen will appear (page 21) | **L** |
| Exit Command Mode without logging out | **Esc** |

The mouse can also be used to control the User Station Command Mode.

- The scroll wheel can be used to scroll through the Host Adapters list.
- The mouse cursor can be moved to the any of the command fields where the user can click on the left mouse button to select that function.
- Host Adapters listed on the screen can be selected by moving the cursor onto a Host Adapter.
- To connect to a Host Adapter, click on the selected Host Adapter.
- To move through the Host Adapter list, the scroll bar to the right of the list can be used by clicking the up and down arrows.

*Note: Exit Command Mode to enter Normal Mode and control the connected CPU.  To exit Command Mode, press <Esc>.*

## Scan Mode

To activate Scan Mode press **<s>** from the Command Mode menu.

Scan Mode enables the user to scan through selected Host Adapters (unless they are powered-OFF) and to have full device control of the connected powered-ON Host Adapter. From the Settings menu (page 24) the user can edit the list of Host Adapters that can be scanned. A Host Adapter is skipped from the scan cycle if the Host Adapter is not selected in the scan list (page 26).

When switching to a new Host Adapter the Host Adapter name is displayed by OSD for 4 seconds.  When the user moves the mouse or types on the keyboard the scanned Host Adapter becomes active and scanning is stopped.  The switch will resume scanning after a period of user inactivity determined by the **scan dwell time**.  The scan dwell time is programmable from 2 to 255 seconds (default time-out period is 5 seconds).   See Settings Menu (page 24) for configuring the scan dwell time.

*Note: The keyboard and mouse must remain idle for the full scan dwell time before the switch selects the next active Host Adapter.*

## Normal Mode

When the User Station is not in Command or Scan mode and the OSD control menu is not active on the monitor, the user is in Normal Mode, controlling the CPU to which the user is connected through the PRIMUX switch.

## Settings Menu

The Settings Menu provides controls for how the current logged-in user will view and make the best use of the PRIMUX.

*Note: Changes to Video Quality settings will effect all users of this User Station.*

To enter the Settings Menu, press `<T>` from the Command Mode Menu.



**Figure 21- Settings menu**

| Function | Description | Keystroke |
|---|---|---|
| OSD Settings | Enables the user to reposition or resize the OSD menu on the monitor | `O` |
| Host View | Open field to toggle between a listing Host Adapters alphabetically by name or just Favorites by default when opening Command Mode<br><br>• Press `<Spacebar>` to toggle setting<br>• Press `<Enter>` or `<Tab>` to save<br>• Press `<Esc>` to cancel | `H` |
| Scan Dwell Time | Enter field to set change Scan dwell time value | `T` |
| Hosts to Scan | Choose CPUs to be scanned | `S` |
| Favorite Hosts | Open listing of Host Adapters to be designated as Favorites | `F` |
| Video Quality | Adjust the video quality to improve the screen image (must be connected to a Host Adapter to use this) | `V` |
| Help | Open Help window | `F1` |
| Esc | Exit the Settings menu | `Esc` |

## OSD Settings Menu

To enter the OSD Settings Menu, press <O> from the Settings Menu.   (From the Command Mode menu press <T> - <O>.) Using the OSD Settings, the user can resize and reposition the OSD window on the monitor as desired.    Changes to the OSD settings will only affect the logged-in user.



*The default resolution of the OSD menu is much lower than the average CPU display setting.   We recommend adjusting the size of the OSD menu before connecting to a CPU (i.e. make adjustment immediately after powering on the User Station, before connecting to a CPU).   Once a CPU connection is made, the OSD menu will appear smaller due to the higher resolution setting.*

**Figure 22- OSD Settings Menu**

| Function | Description | Keystroke |
|---|---|---|
| Move OSD Window Down | Moves the OSD window down on the monitor | D  or ↓ |
| Move OSD Window Up | Moves the OSD window up on the monitor | U  or ↑ |
| Move OSD Window Right | Moves the OSD window to the right on the monitor | R  or → |
| Move OSD Window Left | Moves the OSD window to the left on the monitor | L or ← |
| Make OSD Window Taller | Makes the OSD window taller on the monitor | T |
| Make OSD Window Shorter | Makes the OSD window shorter on the monitor | S |
| Esc | Exit the OSD Settings menu.   Any changes are automatically saved. | Esc |

## Change Scan Dwell Time

The scan dwell time determines how long the PRIMUX will stay connected to a Host Adapter (in Scan Mode- page 23) while the user is idle before switching to the next Host Adapter.    When the <T> is pressed from the Settings Menu (From the Command Mode menu press <T> - <T>),  a field will appear around the current value for the scan dwell time.  The user can enter any value between 2 and 255 (seconds). The default scan dwell time value is 5 seconds.

| Function | Keystroke |
|---|---|
| Enter value | 002-255 |
| Save the new value | Enter or Tab |
| Exit | Esc |



**Figure 23- Scan Dwell Time field**

## Select Hosts to Scan

From the Settings Menu, press **<S>** for the list of Host Adapters to select for scanning. (From Command Mode press **<T>** - **<S>**)
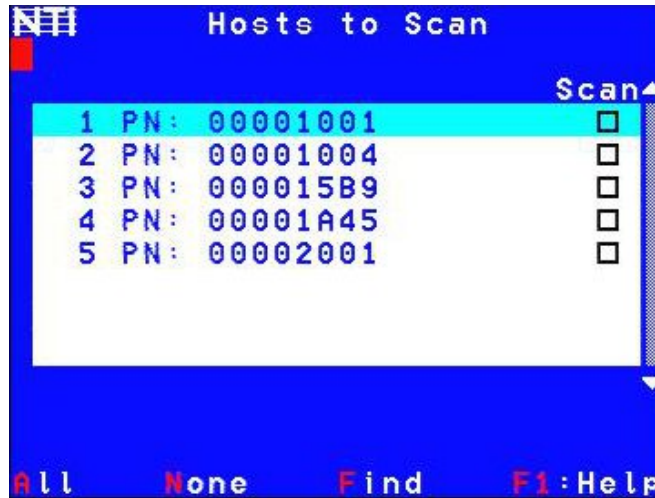


**Figure 24- Host Adapters to Scan list**

Scan Mode enables the user to scan through selected ports and to have full device control of the connected port.  From this menu the user can select the ports that will be scanned.

Only the selected ports will be scanned in Scan Mode (page 23) when the respective user is logged in.  Each user can have a separate scan list.

A check list with all the Host Adapter index numbers and names followed by a check-box will be displayed in the window.
- unchecked box =  the corresponding Host Adapter is **not** in the scan list
- checked box     =  the corresponding Host Adapter **is** in the scan list

 The user can toggle the state of the selected check box by pressing **<Spacebar>** or clicking the Host Adapter with the mouse.

| Function | Description | Keystroke |
|----------|-------------|-----------|
| All | Select all Host Adapters | **A** |
| None | Clear all selected Host Adapters | **N** |
| Find | Locate a Host Adapter by name | **F** |
|  | Display a Help Page for Hosts to Scan | **F1** |
| Exit | Return to the Settings Menu | **Esc** |

The scan selection list is automatically saved.

## Favorite Hosts

From the Settings Menu, press **<F>** for the list of Host Adapters to select as favorites.   (From Command Mode press **<T>** - **<F>**)
The favorite hosts are typically those that a user connects to the most frequently.   All accessible Host Adapters are listed and up
to 8 can be numbered 1-8.  The numbers assigned will determine their order of listing on your Favorites list in the Command Mode
main menu, and which Front Panel buttons (where applicable- see page 20) will be associated with which Host Adapters.
Favorite Host assignments are unique to each user profile.
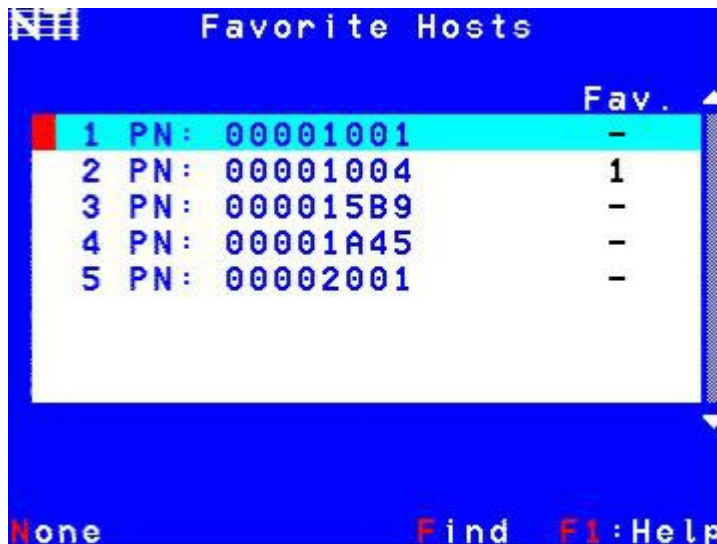


**Figure 25- Favorite Hosts list**

| Function | Description | Keystroke |
|----------|-------------|-----------|
| ---- | Move selection bar up | **Up arrow** |
| ---- | Move selection bar up | **Down arrow** |
| ---- | Assign a position in the Favorite's List or a Favorite button | **1 thru 8** |
| ---- | Remove a position in the Favorites List or a Favorite button | **Backspace** |
| None | Clear all selected Host Adapters | **N** |
| Find | Locate a Host Adapter by name | **F** |
| Help | Display a Help Page for Favorite Hosts | **F1** |
| ---- | Return to the Settings Menu | **Esc** |

*Note: If a number is assigned twice, the first listing with that number will lose its place in the list.*

## Video Quality Adjustment

Video quality adjustment is done automatically to assure the image is as clear as possible.   However, due to the different twisting rates of each pair of wires in the CAT5 cable, variations in the signal delays between the red, green, and blue channels will occur when the cable is longer than 300 feet.  This may also be caused by differences in cable types that can be used (i.e. shielded vs. unshielded cable and CAT5 vs. CAT6 cable).

Video Quality adjustment values are stored on a per Host Adapter-to-User Station basis.  The settings made will apply to all users for that Host Adapter-to-User Station connection.  Adjustment may be necessary for each Host Adapter.

To display the Video Adjustment screen, press `<V>` from the Settings Menu. (From the Command Mode menu press `<T>`-`<V>`.) An image with 5 horizontal bars (video components) will appear.

| FYI:  Video Quality Adjustment may need to be repeated if the CAT5 cable is changed. |  |
|---|---|
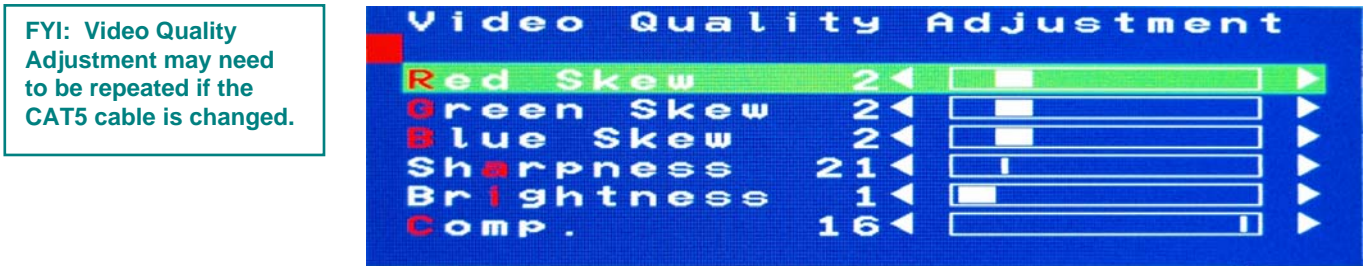
**Figure 26- Video Adjustment Screen**

| Function | Keystroke |
|---|---|
| To move between the scroll bars | `Up Arrow` or `Down Arrow` or `R`, `G`, `B`, `A` or `I` or click on the row |
| To adjust the scroll bar setting | `Left Arrow` or `Right Arrow` or click on the left/right arrow |
| Modify screen position | Move the mouse beyond the image boundaries to drag the image |
| Exit menu and save | `Esc` |

*Note: Changes made to the settings effect the screen image as they are made.*

## Test Patterns for Color Skew Adjustment

 **To verify the need for and effect of color skew adjustment using a test pattern specifically designed for your display setting, browse the CD this manual was found on and click on the "test-pattern-nXm.pdf"  file that matches your current video resolution.   Follow the instructions below to make adjustments as needed.**

The variations in signal delays could cause the colors to be skewed, or out of alignment as they appear on the monitor (i.e. instead of a white vertical line the user will see three vertical lines: red, green, and blue).   These variations may be adjusted by changing the settings of the "Red Skew", "Green Skew", or "Blue Skew"  horizontal scroll bars.  Changing the settings will vary the timing of the signals and ultimately balance them out.

The "Sharpness" scroll bar is used for adjusting the crispness of the images and characters.  This allows the user to "fine tune" the quality of the adjusted video.   *FYI:  Due to the extensive range of this feature, pressing and holding the left or right arrow key down with this bar will move the adjustment slide more rapidly.*

The "Brightness" scroll bar is used to adjust the brightness of the video image coming from the connected CPU through the Host Adapter as it appears on the monitor.  The PRIMUX will automatically set the brightness to a level that should be acceptable, but the slide can be moved left or right if more adjustment for that Host Adapter is desired.

The "Comp."  scroll bar is use to adjust the video quality based on the varying twist rates and lengths of the CATx cable used.

*FYI: For additional quality adjustment, it may be necessary to adjust the brightness and contrast settings of the monitor.*

# Administrator Controls

## Administration Menu

*Note: The Administration menu will only be accessible if the administrator is logged in (page 21) or if the user has administration rights.*

Press <A> from the Command Mode menu (page 22) to display the Administration menu.
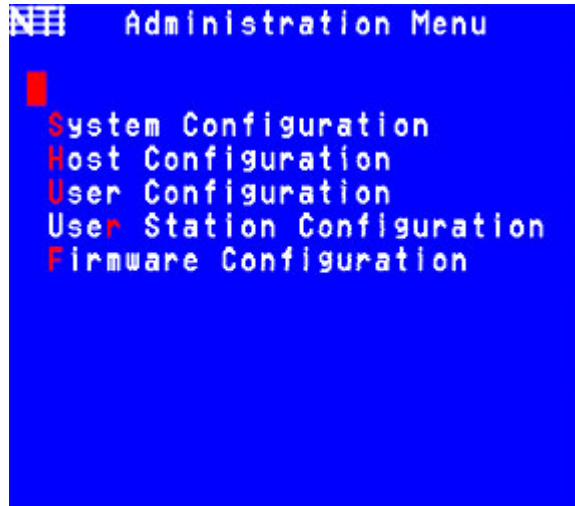


**Figure 27- Administration Menu**

The table below describes the functions of the Administration menu.

| Function | Description | Keystroke |
|---|---|---|
| System Configuration | Edit settings like logoff timeout, alternate OSD key, OSD blank timeout, etc. (page 30) | S |
| Host  Configuration | Edit Host Adapter names and properties (page 32) | H |
| User Configuration | Lists the Users to be edited, shows the status of all users, and provides option to Add/Delete users (page 35) | U |
| User Station Configuration | Set auto-login user, User Station name, keyboard language, etc. (page 37) | R |
| Firmware Configuration | View code version, downloaded code, upgrade Host Adapters (page 39) | F |
| Network Configuration | **shown only in Matrix Mode***(page 37)- Edit the network settings (page 43) of the PRIMUX Matrix | N |
| Esc | Return to the Command Mode menu | Esc |

## System Configuration Menu

Press **<A>** -**<S>** from the Command Mode menu to display the System Configuration menu.



**Figure 28- System Configuration menu**

| Function | Description | Keystroke |
|---|---|---|
| Logoff Timeout | Open an edit field to set the time in minutes after which a user will be logged out of Command Mode due to inactivity.<br><br>Range= 0-255 minutes   (value of 0 disables the feature) | `L – (000-255)` |
| Alternate OSD Key | Define an alternative key to use with `<Ctrl>` to enter Command Mode | `A` |
| OSD Blank Timeout | Set the time in minutes for the OSD screen to blank out due to inactivity-   moving the mouse or pressing a key on the keyboard will redisplay the OSD<br><br>Range= 0-255 minutes (value of 0 disables the feature) | `I` |
| Configure DDC | Opens a Host Adapters list in which DDC can be sent from the monitor to specific host adapters | `D` |
| Delete All Hosts | Deletes all Host Adapters listed-   **requires confirmation** | `H` |
| Delete All Users | Deletes all configured Users-   **requires confirmation** | `U` |
| Sharing Timeout | *__shown only in Matrix Mode__*(page 37)- when a host is in full share mode (page 32) ,  this is the time after which a user will relinquish control so that another user may take control.<br><br>Range= 2-255 seconds | |
| Help | Display topic specific help page | `F1` |

## Alternate OSD Key

This function enables the administrator to assign a key in addition to the `<`>` (accent/tilde key) to use with `<Ctrl>` to enter into OSD Command Mode.  The default factory setting for this option is "Accent" (disabling the option).

To assign an Alternate OSD key press `<A>` from the System Configuration Menu.  (From Command Mode type `<A>-<S>-<A>`.) An edit field will open displaying the current value.   Type a key to be used with the `<Ctrl>` key to open command mode.   Re-enter `<`>` (accent/tilde key) to disable the feature.

*FYI: The Alternate Command Hot Key does not replace the <`> (accent) key, it just works as an additional way to enter into Command Mode. After setting it, the user can enter into Command Mode either with <Ctrl> + <`> or with <Ctrl> + <Alternate OSD Key> combination.*

## Configure DDC-Auto Detect Resolutions

DDC information allows the CPU to automatically select the optimal resolution for the monitor by receiving, at power up, information from the monitor concerning its resolution specifications.

The DDC information is acquired from the monitor by the PRIMUX**.  A monitor with DDC support must be connected to the connector "MONITOR" on the User Station and be powered ON for this to occur**.  The DDC information will be sent to the selected powered Host Adapter to be retrieved by its connected CPU.

*Note:  The CPU connected to the Host Adapter must be powered up to receive the DDC information.*

DDC information is automatically acquired from the monitor by the User Station.   To send DDC information to a powered Host Adapter, press `<D>` from the System Configuration Menu.  (From Command Mode type `<A>-<S>-<D>`.)
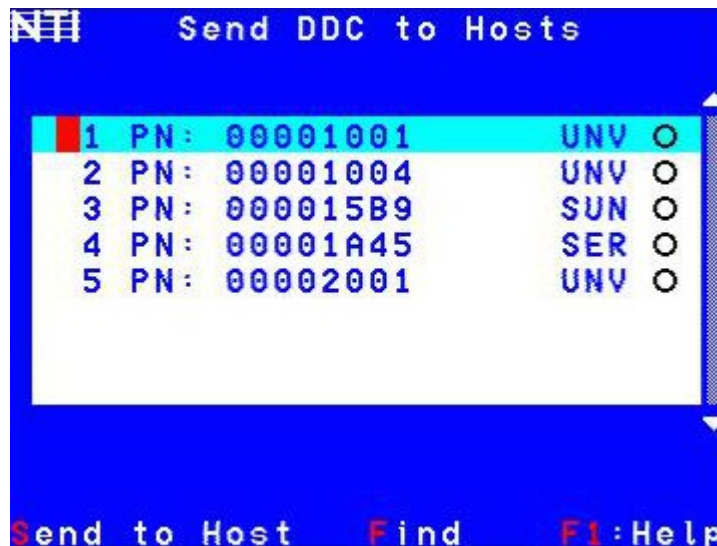


**Figure 29- Configure DDC**

| Description | Keystroke |
|---|---|
| Move the selection bar to the desired Host Adapter | `Up arrow` or `Down arrow` |
| Use the "Find" feature to locate the Host Adapter | `F` |
| Make a selection | `Spacebar` |
| Send DDC information to the selected Host Adapter | `S` |
| View help screen | `F1` |
| Return to the System Configuration menu | `Esc` |

## Configure Host Adapters

From the Administration Menu, press **<H>** to display the Configure Host Adapters menu from which the adminstrator can select Host Adapters to edit (From Command Mode type **<A>** - **<H>**.)
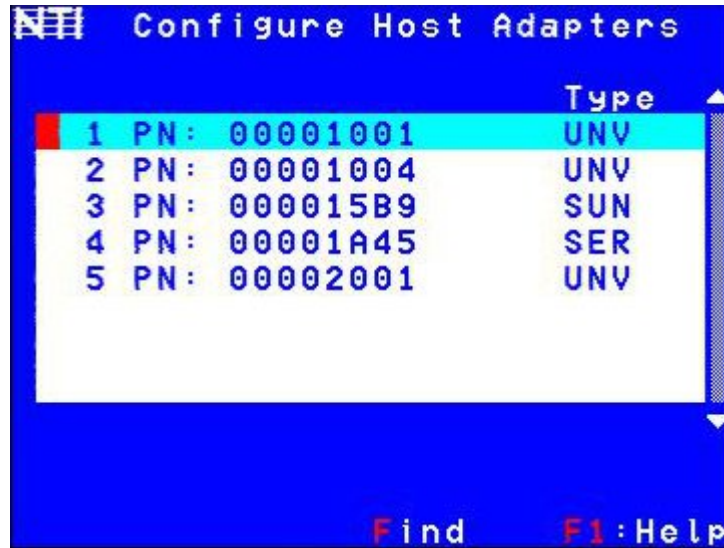


**Figure 30- Host Adapter List**

| Function | Description | Keystroke |
|----------|-------------|-----------|
| Find | Locate a Host Adapter by name | **F** |
| Help | Display topic specific help page | **F1** |
| Exit | Return to the Edit menu | **Esc** |

## Edit Host Adapter

With a Host Adapter selected from the Host Adapter List, press **<Enter>** to bring up the Edit Host Adapter menu. (From Command Mode type **<A>** - **<E>** - **<H>** -**<Enter>**.)



**Figure 31- Edit Host Adapters menu**

To edit the Host Adapter enter the desired parameter values as defined in the chart below:

*Suggestion: Use the <Tab> key to quickly jump between editable fields for easy configuration management.*

| Function | Description | Keystroke |
|---|---|---|
| Name | Modify the name (of the selected Host Adapter)- opens an edit field to enter a character string- 16 characters max., case sensitive.<br><br>Press **<Enter>** or **<Tab>** to save<br><br>Press **<Esc>** to cancel | **N** |
| Mac | Designate a Host Adapter to be connected to a Mac- A checkmark in the box indicates Mac CPU | **M - Spacebar** |
| User Access Controls | Open list of Users to select which users will have access to this Host Adapter | **U** |
| Share Mode | **\*only shown in Matrix Mode\*** (page 37)- Configure sharing for the Host Adapter. Options are None, Limited, and Full. | **S - Spacebar** |
| Delete | Delete Host Adapter from Host Adapters list | **D** |
| Help | Display topic specific help page | **F1** |
| ---- | Return to Host Adapter List | **Esc** |

*FYI:  When modifying the name, the position of that Host Adapter in the Host Adapter list will be adjusted according to its alphabetical order.   Index numbers will adjust accordingly.*

*FYI:  When deleting a Host Adapter,  all configurable settings including DDC information and the MAC configuration will be removed.   If a Host Adapter is deleted while connected,   it must be disconnected from the CPU and reconnected in order to be re-discovered by the User Station.*

## Configure MAC Host Adapters

Designating a Host Adapter for use with a MAC CPU enables the mouse to pass information to a connected USB MAC CPU. This is useful when the user wants to use mouse drivers provided by the mouse vendor, which allows the use of programmable functions for each button. Host Adapters should be configured at installation time or whenever necessary.  After setting, the configuration is stored in non-volatile memory and will be retrieved whenever the PRIMUX-UZR is power ON.  When the Host Adapter is connected to a Windows, SUN, or USB SUN CPU, this configuration SHOULD BE DISABLED. By default, all Host Adapters are configured for connection to non-USB MAC CPUs (Windows and USB SUN).

*FYI: If a Host Adapter is configured as connected to a non-MAC CPU,  but is in fact connected to a MAC CPU,  the mouse will still work as a generic mouse.  No special functions provided by software drivers will be available.*

## User Access Controls

The User Access Controls list enables the administrator to assign which users will have access to a specific Host Adapter.



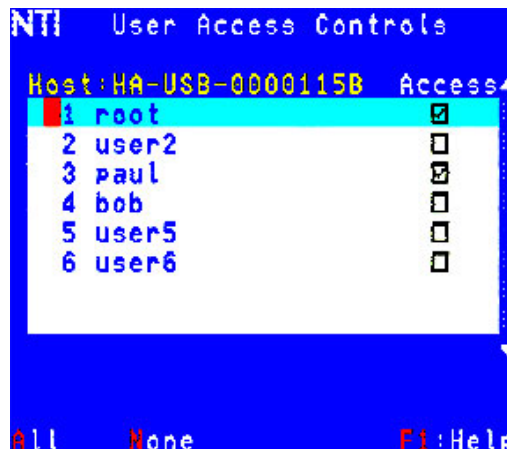**Figure 32- User Access Controls list**

| Function | Description | Keystroke |
|----------|-------------|-----------|
| --- | Move selection Bar bar | Up arrow or Down arrow |
| --- | Select specific user to access the Host Adapter | Spacebar |
| All | Allow All Users to access the Host Adapter | A |
| None | Allow No Users to access the Host Adapter | N |
| Help | Display topic specific help page | F1 |
| Exit | Return to the Edit menu | Esc |

*Note: Changes to these selections will effect the selections made in the Access Controls list for User (page 33).*

*Note: Users with administrative rights automatically have access to all Host Adapters, so access to the user "root" and any users with administrative privileges cannot be de-selected.*

## Share Mode

**Share mode is only available in Matrix Mode** (page 37)

From the Edit Host Adapter menu, press <**s**> to toggle Share Mode between three possible settings:

**None**- only one user can access a host adapter at a time.   Other users that try will receive a "Host in use" error message.

**Limited-** the first user to connect to the Host Adapter will gain control of the keyboard/mouse for the connected CPU until they logout, disconnect from that Host Adapter, or change to a different Host Adapter.  Other users can connect to the Host Adapter to view the video, but no keyboard/mouse control will be allowed unless the first user gives up control.

**Full**- all users with access permission to that Host Adapter may compete for keyboard/mouse control.   A user with control will retain control until their keyboard/mouse is idle for the specified **sharing timeout** period (page 30).  Control is then relinquished and the first user to use their keyboard/mouse will gain control.



**Figure 33- Share Mode Option (Matrix Mode only)**

## Keyboard/Mouse Access Indicators

A mouse and keyboard icon will appear in the upper left corner of the screen for a couple of seconds to indicate the status of the keyboard/mouse control.

The icons will appear green when the user has control over the keyboard/mouse,
yellow when the keyboard/mouse control is available to the user (like in Limited and Full Share Modes),
red when the keyboard/mouse control is not available to the user.

## Configure Users

From the Administration Menu,  press <**U**> to display the Configure Users menu from which the adminstrator can select Users to add or edit  (From Command Mode type <**A**> - <**U**>.)     The Configure User menu displays from left to right  1) the name of each user, 2) whether or not the user has been assigned administrative rights and 3) whether they are enabled to login or not.  From this menu the administrator can also add new users.
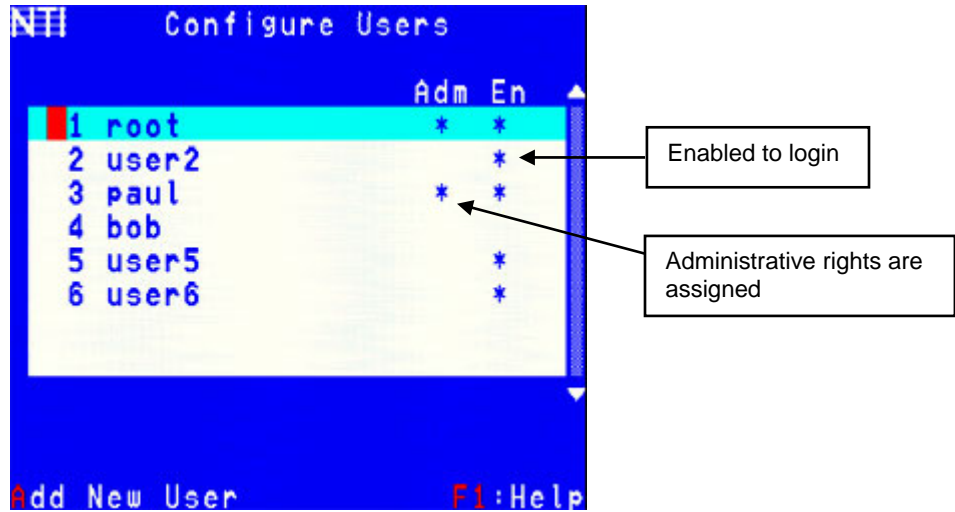


**Figure 34- Configure Users menu**

| Function | Description | Keystroke |
|----------|-------------|-----------|
| ---- | Select User to be edited | **Up arrow  or Down arrow** |
| ---- | Open User Edit menu | **Enter** |
| Add New User | Add new user and open User Edit menu to configure User options-<br><br>**Y / N Confirmation required** | **A - Y/N** |
| Help | Display topic specific help page | **F1** |
| ---- | Return to Administration menu | **Esc** |

## Edit Users

From the Configure Users menu, press <**Enter**> to select a user to edit and bring up the Edit User menu.   (From Command Mode type <**A**>-<**U**>- select a user and press <**Enter**>)



**Figure 35- Edit Users menu**

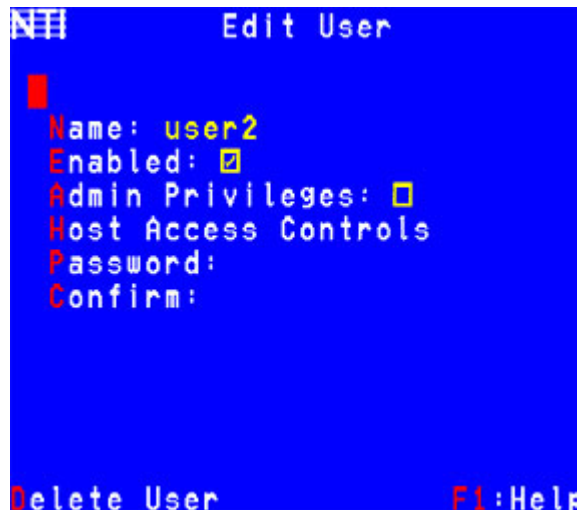| Function | Description | Keystroke |
|----------|-------------|-----------|
| Name | Modify the name (of the selected User)- opens an edit field to enter a character string- 16 characters max., case sensitive. <br><br> Press **\<Enter\>** or **\<Tab\>** to save <br><br> Press **\<Esc\>** to cancel | `N` |
| Enabled | Allows the administrator to enable a user to login or not to login to the User Station.   A checkmark in the box indicates the user is enabled. | `E -`<br>`Spacebar` |
| Admin Privileges | Allows the administrator to assign a user to have administrator rights or not.  A checkmark in the box indicates the user has administrative privileges. | `A -`<br>`Spacebar` |
| Host Access Controls | Brings up a list of Host Adapters to assign user access to | `H` |
| Password | Opens an edit field to enter a password for that user.  16 characters max. - case sensitive- <br>     - Press **\<Enter\>**  to save <br>     - Press **\<Tab\>** to save and move to next field | `P` |
| Confirm | Opens an edit field to re-enter a password for that user.  Must be entered exactly as it was entered in Password field <br>     - Press **\<Enter\>**  to save <br>     - Press **\<Tab\>** to save and move to next field | `C` |
| Delete User | Delete User from Users list-  **Y / N Confirmation required** | `D` |
| Help | Display topic specific help page | `F1` |
| Exit | Return to the Configure Users menu | `Esc` |

- If no password is entered in the "Password" field, a message "Press Enter for blank password" will appear when you open the "Confirm" field.    Press **\<Enter\>** for that user to login without submitting a password at the login prompt.

- If the **\<Esc\>** key is pressed to exit while entering the Password or Confirming, no change to the password will be made.

- If no password is assigned to a user when a user is added, that user will login without the need for a password.

*Note: The user "root"  is special.  Its name, enabled status, privileges, and host access cannot be changed.   Only root's password can be changed from the default "nti".*

## Add New User

From the Configure Users menu press **\<A\>** to add a new user.  (From Command Mode type **\<A\>** - **\<U\>** - **\<A\>**.)   The administrator will be prompted for a "**Y**" or "**N**" answer to "`Are you sure`?" and with a "**Y**" answer the Edit User menu will come up where all of the parameters for a new user can be defined.   When finished, press **\<Esc\>** to exit the menu and the new user "NEW USERx" will have been added to the User List.

By default, a new user will be given no access to Host Adapters.   To change this, the administrator must edit the user host access list as described on page 36.

## Host Access Controls

To define what CPUs a specific user has access to, press **\<H\>** from the Edit User List (page 35).  (From Command Mode press **\<A\>** -**\<U\>** - select a user (other than "root") and press **\<Enter\>** - **\<H\>**.)   The "Host Access Controls" list will be displayed.

*FYI- Access Controls list can also be applied from the User Access Controls menu. (From Command Mode press **\<A\>** - **\<H\>**-Select Host Adapter-**\<Enter\>**-**\<U\>**).    The User Access Controls list includes a list of Users to select to have access to a specific Host Adapter.    Changes made in either access controls menu will effect selections in both menus.*

*Note: Users with administrative rights automatically have access to all Host Adapters, so the Host Access Control list is not present to edit for those users.*

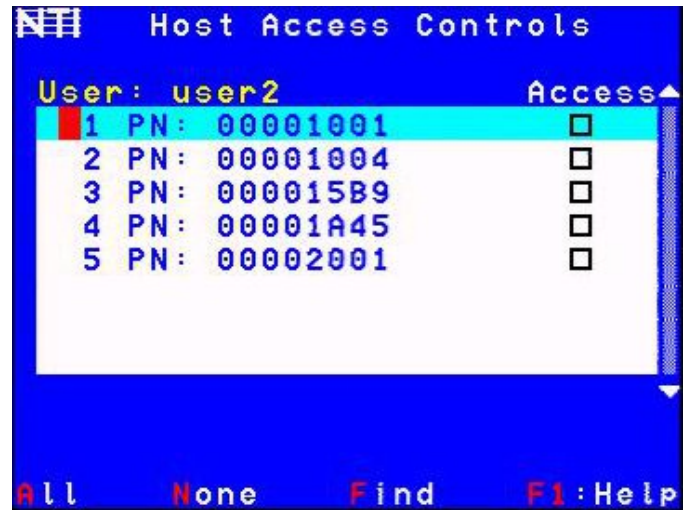| Function | Description | Keystroke |
|---|---|---|
| ---- | Toggle Specific selection | Spacebar |
| Find | Locate Host Adapter by name | F |
| All | Allow user access to all Host Adapters | A |
| None | Allow user access to no Host Adapters | N |
| Help | Display topic specific help page | F1 |
| ---- | Esc | Esc |



**Figure 36- Host Access Controls list**

## User Station Configuration

From the Administration menu (page 29) press <R> to bring up the User Station Configuration menu. (From Command Mode press <A> - <R>.)

*Note: The "Mode" setting should be left as "Stand-alone" whenever the User Station is being used by itself. Only set it to "Matrix" if the User Station will be used in conjunction with a PRIMUX Matrix Multi-User KVM Switch. If a User Station is to be removed from the matrix configuration, be sure to toggle the mode back to "Standalone" before deletingS (page 47).*



**Figure 37- User Station Configuration screen**

To edit the User Station Info use the commands and enter the desired parameter values as defined in the chart below:

*Suggestion: Use the <Tab> key to quickly jump between editable fields for easy configuration management.*

| Function | Description | Keystroke | Parameter Value |
|---|---|---|---|
| Name | Modify the name (this only has a practical purpose when the User Station is in Matrix Mode.) | N | String, 16 characters max., case sensitive |
| Set Keyboard Language | Set the keyboard language for use with the CPU | K | None. Brings up Keyboard Languages menu. Choose from list. |
| Auto-login | Select the Auto-login user to be automatically logged in at power up | A | None. Brings up Select User menu. |
| Mode | Choose User Station mode **See "Note" above** | M + Spacebar | Toggle between "Stand-alone" and "Matrix" **Y / N Confirmation required** |
| Help | Display topic specific help page | F1 | None |
| ---- | Return to Administration Menu | Esc | None |

## Select Auto-login User

From the User Station Configuration menu, press **<A>** to bring up the Auto-login User list.  (From Command Mode type **<A>** - **<R>** - **<A>**.)
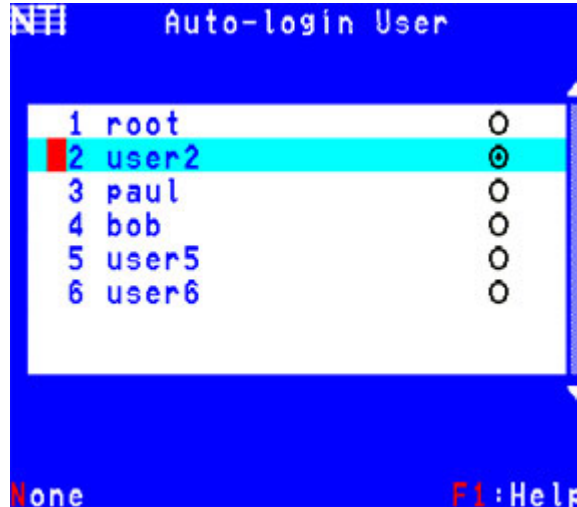


**Figure 38- Select user for Auto-logIn**

To select a user to be automatically logged-in when the User Station is powered-up, choose one of the actions listed below:

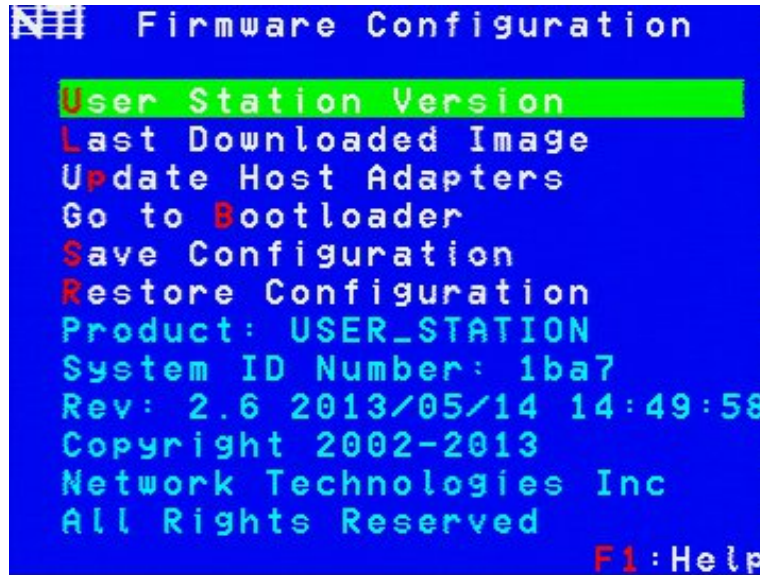| Function | Description | Keystroke |
|---|---|---|
| ---- | Select the user indicated by the selection bar (user2 is selected as the auto-login user in the image above) | **Enter** or **Space** |
| None | Disable auto-login.   A login prompt will be shown at power up instead of Command Mode. | **N** |
| Help | Display topic specific help page | **F1** |
| ---- | Return to User Station Configuration Menu | **Esc** |

*Caution:  Selecting a user with administrative privileges will leave system configuration completely open.*

## Firmware Configuration Menu

The Firmware Configuration Menu is provided to enable the administrator to update the firmware inside the PRIMUX User Station and Host Adapters as new or improved features are available.   The updated code can be downloaded from the NTI website at www.networktechinc.com\kvmswitch-cat5.html .   This section describes how to update the firmware in the User Station and Host Adapters.    To update the firmware in the PRIMUX Matrix, see page 59.

**Please Note:  The PRIMUX User Station and Host Adapters used in conjunction with the PRIMUX Matrix Switch must all be running firmware version 2.0 or later in order to be compatible with the PRIMUX Matrix Switch.    For updated firmware with instruction for upgrading, go to** http://www.networktechinc.com/download/d-kvmswitch-cat5.html .

From the Administration Menu press **<F>** to get to the Firmware Configuration Menu. (From Command Mode press **<A>** - **<F>**.)

**NOTE:
Save and Restore Configuration features do not apply when used with a PRIMUX Matrix Switch**



**Figure 39- Firmware Configuration Menu**

The functions of this menu are as follows:

| Function | Description | Keystroke |
|---|---|---|
| User Station Version | Displays the latest firmware version of this User Station | **U** |
| Last Downloaded Image | Displays the CODE IMAGE info of the last code that was downloaded to the User Station using the Bootloader program | **L** |
| Update Host Adapters | To send the downloaded firmware image to a Host Adapter selected from a list of Host Adapters (page 41) | **P** |
| Go to Bootloader | To leave the OSD menu and activate the Bootloader Program***.    The Bootloader program is used to download firmware images and update the firmware in the User Station.<br><br>**A serial terminal*** must be connected to the "RS232" serial port of the User Station to continue operation**<br><br>Confirmation required- the user will be prompted with a "`Are you sure? (Y/N)`" before acting on the command. Press **<Y>** to continue, or **<N>** to cancel. | **B** |
| Save Configuration | Save the system configuration file to a location on a connected PC using HyperTerminal | **S** |
| Restore Configuration | Restore a saved system configuration file from a location on a connected PC using HyperTerminal | **R** |
| Help | Display topic specific help page | **F1** |
| ---- | Return to the Administration menu | **Esc** |

**Save and Restore does not apply in Matrix Mode**

***See the instructions included with the updated code downloaded from the NTI website (www.networktechinc.com\kvmswitch-cat5.html) for additional information on the Bootloader Program.     Updated code and instructions for using the features above are included with the downloaded file from the NTI website.

## Save and Restore Configuration

| This feature does not apply in Matrix Mode (page 36) |

To use the Save Configuration or Restore Configuration features you must first have a computer with a terminal emulation program (i.e. HyperTerminal) attached to the User Station using the Null Modem cable included with your PRIMUX.   Also, the PRIMUX-UZR must be in Stand-Alone mode (page 37).

1. Attach the DINT-6-FF 9-pin serial null modem cable (supplied with the PRIMUX-UZR) between the serial port on the computer and the SERIAL port on the PRIMUX-UZR.
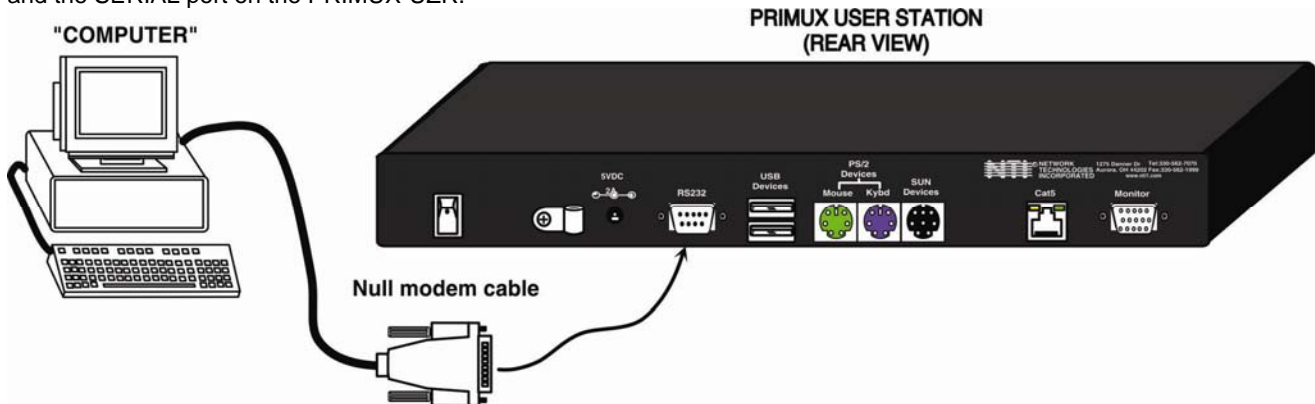


**Figure 40- Connect null modem cable**

2.  Open the terminal emulation program (HyperTerminal) on the computer.
3.  Connect to the User Station through the proper COM port using the following settings: 9600,8,n,1, no flow control.

**To Save the Configuration:**
With a connection made to the PRIMUX-UZR, press <**s**> from the computer with the OSD menu to select "Save Configuration".

From the terminal window, go to the Transfer Menu,  select Receive, and decide where to save the configuration file on the PC (using Xmodem protocol) and then determine what to name the configuration file.     While the file is being saved, the terminal will display a status page and the message (in the OSD screen) "Saving Configuration" will be displayed.  When finished, the message "Configuration Saved" will be displayed.
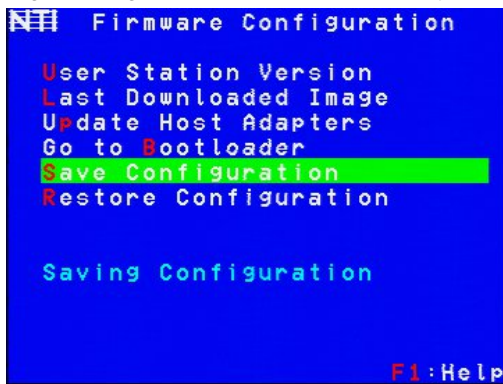


**To Restore the Configuration:**
With a connection made to the PRIMUX-UZR, press <**R**> from the computer with the OSD menu to select "Restore Configuration".

From the terminal window, go to the Transfer Menu, select Send (using Xmodem protocol), and browse to the saved configuration file on the PC.     While the file is being restored, the message "Restoring Configuration" will be displayed.   When finished, the message "Configuration Restored" will be displayed.
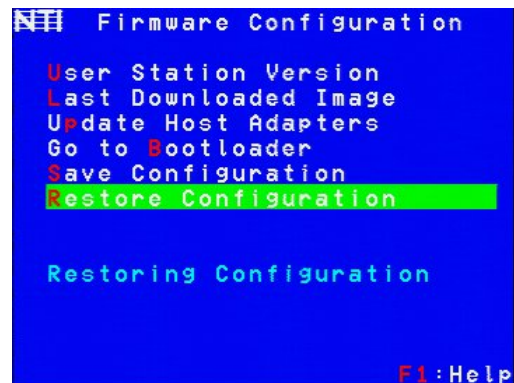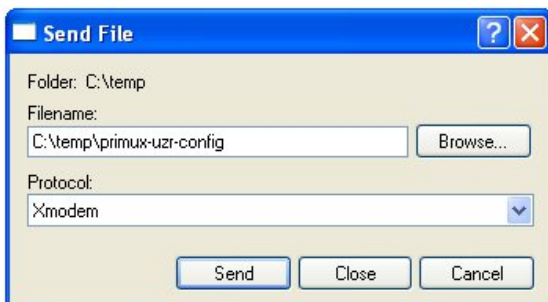
The following error messages may be displayed for the reasons shown:

| Error Message | Reason |
|---|---|
| "Error Saving Configuration" | Took too long to connect to the terminal |
| "Serial Communication Error" | serial cable disconnected |
| "Configuration File Size Error" | wrong file selected to restore |
| "Configuration File Type Error" | wrong file selected to restore |

## Update Host Adapter Firmware

To use the "Update Host Adapters" command, the image downloaded using the bootloader (previous page) must be for either a HA_UNV, HA_SUN, or HA_RS.   The type of image downloaded into the bootloader will be shown.   If the image is not for a Host Adapter, the word "INVALID" will be shown.
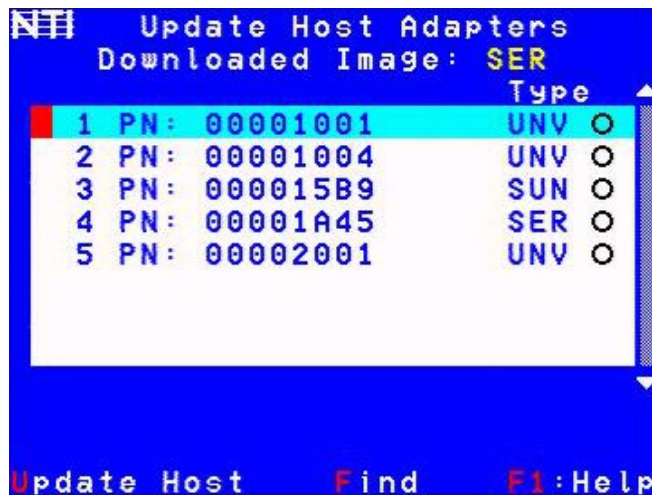


**Figure 41- Update Host Adapters**

When updating a Host Adapter, the downloaded image must match the type of Host Adapter selected:

| Host Adapter Type | Downloaded Image needed (firmware file) |
|---|---|
| UNV | PRIMUX_HA_UNV_x_x.b01 (where x_x is the version) |
| SUN | PRIMUX_HA_SUN_x_x.b01 |
| SER  (RS) | PRIMUX_HA_RS_x_x.b01 |

- Press <P> from the Firmware Configuration menu.    The Host Adapter List will appear.
- Press the <Up arrow> or <Down arrow> to select the Host Adapter to be upgraded (or press <F> to use the "Find" Feature to assist locating the desired Host Adapter).
- Press <Spacebar> to toggle the radio button to lock in the selection.  Make sure the Host Adapter selected matches the type of image downloaded.
- Press <U> for "Update Host" to send the firmware to the selected Host Adapter.   An indication of percentage of transfer will appear.   At 100% the update will be complete.   If the Host Adapter selected is not powered, inaccessible, or just not functioning properly, an error will be displayed.

## Select Keyboard Language

To enter the Select Keyboard Language menu press **<K>** from the User Station Configuration menu (from Command Mode press **<A> - <R> - <K>**).
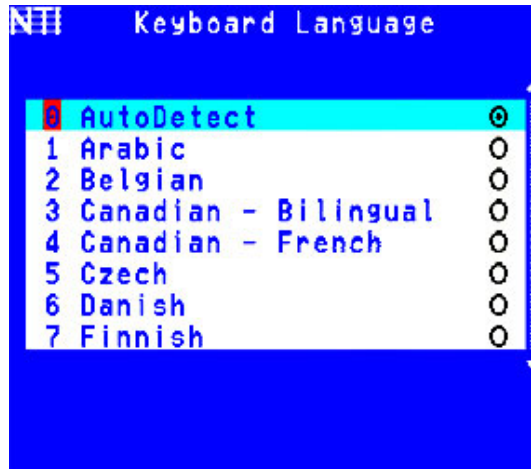


**Figure 42- Select Keyboard Language menu**

The Select Keyboard Language menu enables the user to select a specific language (country code) to be used.   Typically only SUN CPUs require a specific country code to be registered at boot up. (For other types of CPUs this feature may have no effect.) A list of available languages is displayed and can be scrolled using the mouse (scroll wheel) and/or **<up arrow>**, **<down arrow>**, **<Page up>**, **<Page down>**, **<Home>** and **<End>** keys.

The language listing having a radio button with a dot in the center is the currently selected language for the keyboard.

- To manually program a specific keyboard language, select a language and press **<Spacebar>**.

- To have the User Station automatically detect the language of the keyboard, select "AutoDetect" and press **<Spacebar>**. The list will advance to the actual detected keyboard language and that language will be programmed.

Some keyboards don't have a country code. In this case the selection will remain in the "AutoDetect" position and the default country code "00" will be programmed in the Host Adapter. If a specific country code is manually programmed, it will be the country code for the Host Adapter, regardless of the actual country code of the connected keyboard. The programmed country code is saved in memory and restored each time the User Station is powered-ON.  Because the CPUs that use country code (i.e. SUN CPUs) read it at boot time, it is necessary to reboot the CPU(s) after programming the country code.

Press **<Esc>**  to return to the User Station Configuration menu.

## Network Configuration

**This screen is only available in Matrix Mode (applicable when used with a PRIMUX Matrix Multi-User KVM Switch)- see page 37 to change to Matrix Mode.**

From the Administration Menu press <N> to get to the Network Configuration Menu. (From Command Mode press <A> - <N>.)
To enable the PRIMUX Matrix to be accessible via Telnet, the IP Address, Gateway, and DNS settings must first be configured.
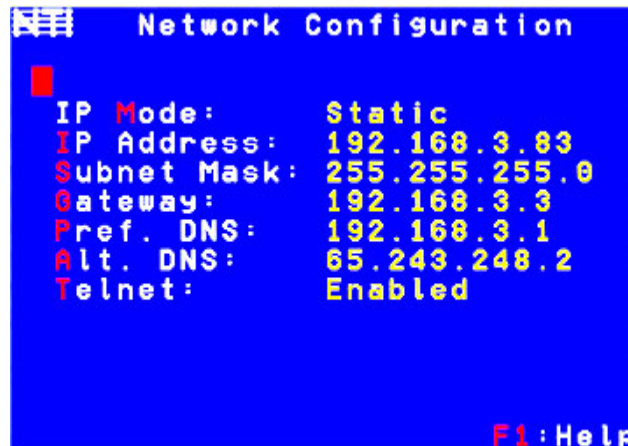


**Figure 43- Network Configuration page**

| Function | Description | Keystroke |
|---|---|---|
| IP Mode | Toggle, using the <Spacebar> between "Static" or "DHCP".<br><br>- In "Static" mode, the user must fill in all appropriate IP settings.<br><br>- In "DHCP" mode, the DHCP server will fill all IP settings in automatically. | **M-Spacebar** |
| IP Address | Open a field to enter an appropriate IP address (default is 192.168.1.22) | **I** |
| Subnet Mask | Open a field to enter an appropriate subnet mask | **S** |
| Gateway | Open a field to enter an appropriate gateway | **G** |
| Preferred DNS | Open a field to enter a preferred DNS address | **P** |
| Alternate DNS | Open a field to enter an alternate DNS address | **A** |
| Telnet | Toggle telnet access between enabled and disabled | **T- Spacebar** |
| Help | Open topic specific help page | **F1** |
| ---- | Exit and return to the Administration Menu | **Esc** |

## RS232 OR TELNET CONNECTION

The NTI PRIMUX Matrix Switch is designed to be controlled either via OSD menus from User Station, via RS232, or remotely via Telnet.  The following describes control via RS232 and Telnet.    For control using the PRIMUX-UZR User Station, see page 16.

## RS232 Connection

This section assumes that a terminal has been connected to the SWITCH as described on page 14 and that both the SWITCH and terminal RS232 ports have been configured (using HyperTerminal in the figure below) to the same port settings.  The default parameters are: 9600 bps, 8-N-1-no flow.  HyperTerminal emulation must be set as VT100 (File menu -> Properties -> Settings). With the HyperTerminal settings set as shown below and the SWITCH powered ON and fuly-booted, press **<Enter>** and the RS232 commands (shown on page 45) will control the SWITCH.

To instead access the Configuration Menu, press **<CF 01> - <Enter>** at the HyperTerminal window and the login screen (page 47) will appear.

*Note: Firmware upgrades can only be initiated with an RS232 type connection and with a baud rate setting of 115200.*
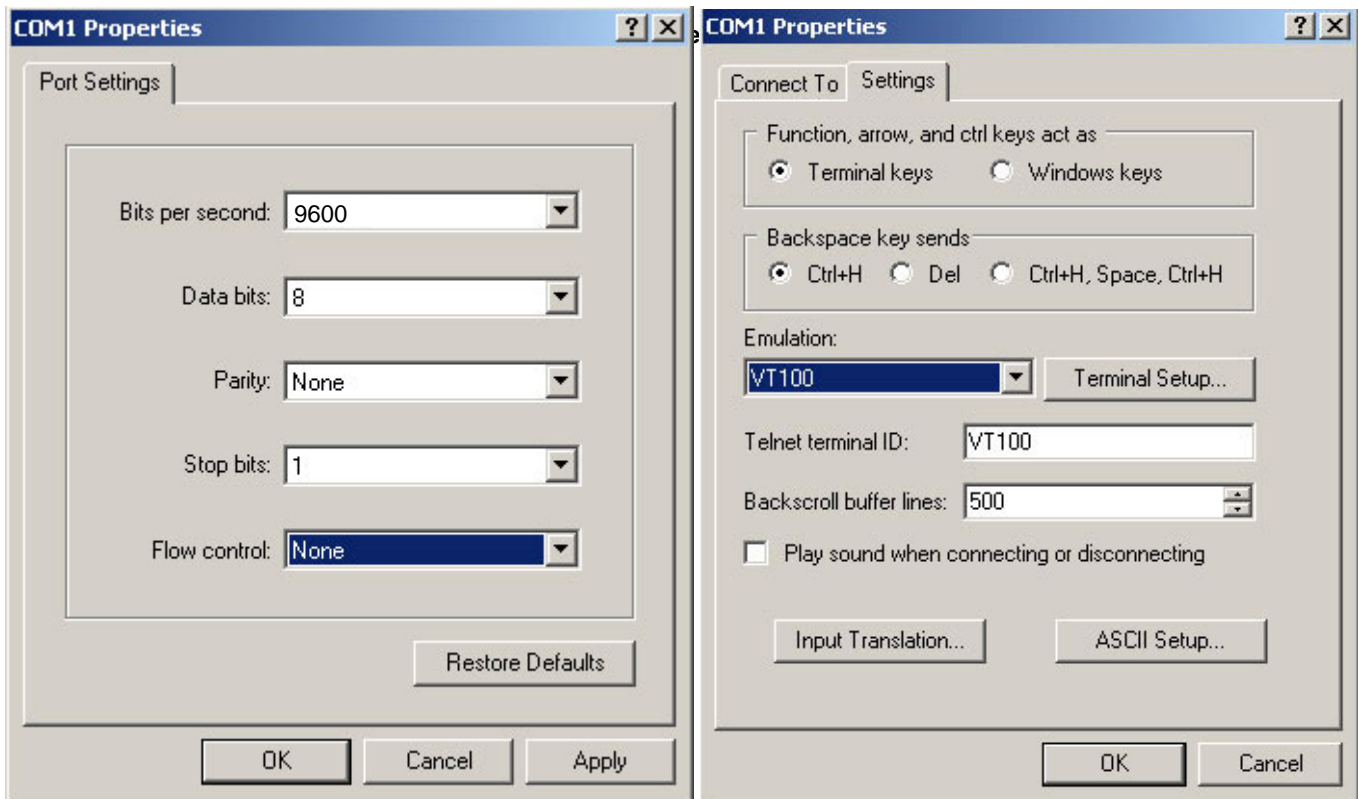
# RS232 Command Protocol

Host controller commands supported by the unit are defined below.

## RS232 Command Protocol Quick Reference

Legend:     (All numbers must be two digits)
BR   :     Baud Rate Code (12,24,48,96,19,38,57,11)     IP     :          Input Port/CPU (01-MAXINPUTS)
OP   :     Output/User Port (01-MAXOUTPUTS)          <CR>:          Carriage Return (Hex 0xD)

| Command String | Good Response | Description |
|---|---|---|
| CF 01 | Login screen appears | Switch to Configuration Menu. |
| CS 01,OP,IP | *<CR> | Connect one User port  To CPU (Host Adapter) port |
| CA 01,IP | *<CR> | Connect all User ports To CPU (Host Adapter) port |
| RO 01,OP | *<CR>IP<CR> | Read Connection For User Port |
| CB 01,BR | None | Change Baud Rate For SWITCH (BR=12 (1200), 24 (2400), 48 (4800), 96 (9600), 19 (19200), 38 (38400), 57 (57600), 11 (115000) baud)  (9600 is the default) |
| RV 01,00 | *<CR>string\0<CR> | Read NTI Version String |
| RU 01 | *<CR>IP,OP<CR> | Read Unit Size |
| GO 01 OP | *<CR>go 01 OP IP<CR> | Report the User port that is connected to the CPU port |
| GM 01,00 | *<CR>go 01 OP IP<CR> (all connections) | List all switch User port connections; all User ports to all CPU ports |
| EA 01,ip | *<CR> | Set the IP address, ip is in xxx.xxx.xxx.xxx format  (number of digits is minimum 1 and maximum 3, leading zeros accepted) |
| RA 01 | *<CR>ip<CR> | Read the IP address |
| EG 01,ip | *<CR> | Set the default gateway, ip is in xxx.xxx.xxx.xxx format  (number of digits is minimum 1 and maximum 3, leading zeros accepted) |
| RG 01 | *<CR>ip<CR> | Read the default gateway |
| EM 01,ip | *<CR> | Set the IP mask, ip is in xxx.xxx.xxx.xxx format (number of digits is minimum 1 and maximum 3, leading zeros accepted) |
| RM 01 | *<CR>ip<CR> | Read the IP mask |
| AC 01,01 | *<CR> | Enable Serial-controlled port switching (port changes issued in Command Mode will be duplicated to NTI switches connected to the PRIMUX-Matrix serial port.) |
| AC 01,00 | *<CR> | Disable Serial-controlled port switching |
| BC 01 | Sending Configuration File using Xmodem Protocol | Use to save the configuration of the Matrix Switch to a file on your PC |
| RC 01 | Restoring Configuration File using Xmodem Protocol | Use to restore the configuration of the Matrix Switch from a file on your PC |

If the first field is not a known command (as listed above) the command will be ignored. If the syntax is wrong after the first two fields (first 4 characters), the switch will answer with ?<CR>.

*Note:  The use of command string AC 01,01/00 requires firmware version 1.4 (or later) and the updated bootloader in version 1.4.*

Syntax example:
**CS 01,02,05<CR>**     (insert the space and commas as shown)
which means "At the switch with unit address 01, connect user port 02  to CPU port 05"
The switch will answer with:
**\*<CR>**

The HEX code representation of example above is:

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 | Byte 8 | Byte 9 |
|---|---|---|---|---|---|---|---|---|
| 'C' (0x43) | 'S' (0x53) | Space (0x20) | Switch – 1st digit (0x30) | Switch – 2nd digit (0x31) | ',' (0x2C) | Output – 1st digit (0x30) | Output – 2nd digit (0x35) | ',' (0x2C) |

| Byte 10 | Byte 11 | Byte 12 |
|---|---|---|
| Input –1st digit (0x30) | Input –2nd digit (0x32) | <CR> (0x0D) |

Response:

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

# Telnet Connection

To use Telnet, the SWITCH must first be installed as described on pages 6-11.

The user may connect to the SWITCH using a Telnet client either 1) through HyperTerminal or 2) from a command prompt. Before Telnet can be used, two conditions must be met:

1.  A terminal must first be connected to the SWITCH through the ETHERNET port (page 14).

2.  Telnet must be enabled.  Telnet is disabled by default,  and can be enabled by first connecting through RS232 (above) and then using Main Menu item 6 (see "Network Configuration" on page 53).  Telnet can also be enabled using the OSD menu through a User Station connection.

Telnet will remain enabled even if power is cycled to the SWITCH.  With Telnet enabled, once the SWITCH is setup it can be accessed remotely.

The Telnet menus and behavior are identical to controlling the SWITCH using the RS232 connection except that the firmware upgrade Bootloader program cannot be accessed through Telnet.

## Telnet via HyperTerminal

Open HyperTerminal and configure the connection to use TCP/IP.  Enter the IP address of the SWITCH (default is 192.168.1.22) and port number 23 (see Figure 45).  Press "OK" to open the connection and be prompted to login to the main menu (page 47).
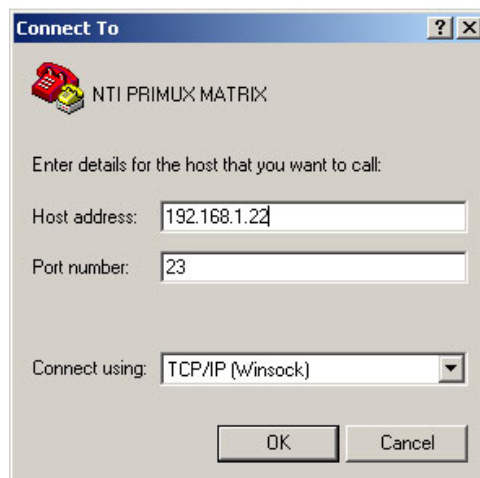


**Figure 45- Telnet connection via HyperTerminal**

## Telnet via Command Prompt

At a **Linux** command prompt , type the following commands to connect to the SWITCH:

**[username@host] $ telnet 192.168.1.22** (or substitute current IP address)

Press **<Enter>** and continue on page 47 under "Login to the Main Menu".

At a **Microsoft DOS** command prompt , type the following command to connect to the SWITCH:

**C:\>telnet** (to open Telnet program)

Press **<Enter>**

The screen will return:

```
Welcome to Microsoft Telnet Client
Escape Character is 'CTRL+]'
Microsoft Telnet>
```

C:\>Microsoft Telnet>**set term vt100**  (to configure Telnet for proper terminal emulation)

Press **<Enter>**

The screen will return:

    Will term type
    Preferred term type is vt100
    Microsoft Telnet>

C:\>Microsoft Telnet> **unset crlf**      (to configure Telnet to handle the **<Enter>** key properly within the menu)

Press **<Enter>**

The screen will return:

    Line feed mode - Causes return key to send CR
    Microsoft Telnet>

C:\>Microsoft Telnet>**open 192.168.1.22 23**     (or substitute current IP address)

Press **<Enter>** and continue below under "Login to the Main Menu".
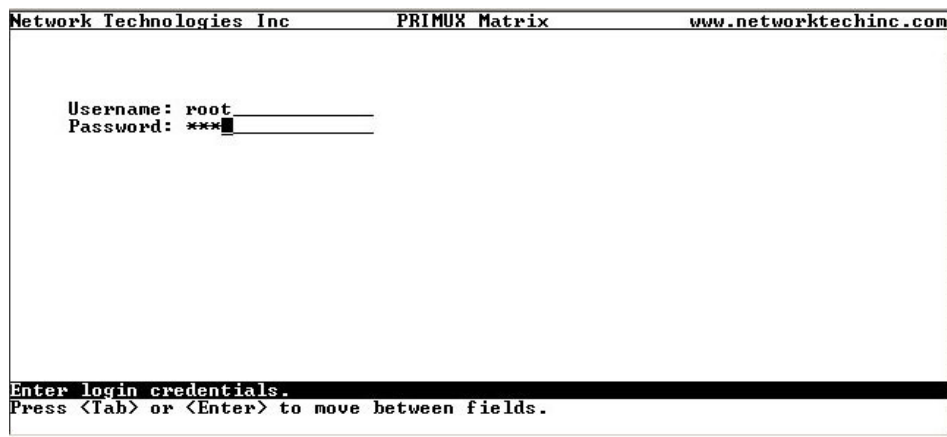
# Log In to the Main Menu



**Figure 46- Telnet-login menu**

A login screen will present itself prompting for a username and password.

Enter the username -   **<root >**
Enter the password-    **<nti>**

Only user "**root**" and other users with administrator rights can access this menu.

Passwords are case sensitive.  The administrator username cannot be changed from "root", but the password should be changed (see page 51).

The Main Menu shown below will be displayed.



**Figure 47- Telnet- Main menu**

# System Configuration Menu

The System Configuration menu provides settings that will effect how the OSD menu system and Host Sharing will behave when the user is not actively using them.    Select "System Configuration" in the Main Menu and press <**Enter**> to open the System Configuration submenu.



**Figure 48- Telnet- System Configuration**

| Function | Description |
|---|---|
| OSD Logoff Timeout | Set the time in minutes after which a user will be logged out of Command Mode due to inactivity. Range= 0-255 minutes   (value of 0 disables the feature) |
| OSD Blank Timeout | Set the time in minutes for the OSD screen to blank out due to inactivity-  moving the mouse or pressing a key on the keyboard will redisplay the OSD Range= 0-255 minutes (value of 0 disables the feature) |
| Sharing Timeout | When a host is in full share mode (page 50), this is the time after which a user will relinquish control so that another user may take control. Range= 2-255 seconds |
| Menu Logoff Timeout | Set the time in minutes after which an idle user will be automatically logged out of a serial or Telnet connection  Range= 0-255 minutes  (value of 0 disables the feature) |

Press the <**Up  arrow**> or <**Down  arrow**> to change a time setting value.
*Tip: Press and hold the arrow keys for rapid valu*
*e changes.*

# Host Configuration Menu

The Configure Hosts menu allows you to configure host adapter settings.  Select "Host Configuration" in the Main Menu and press <Enter> to open the Configure Hosts submenu.

**Figure 49- Telnet- Configure Hosts**

From the Configure Hosts list, move the selection bar (using the up/down arrow keys) to a listing to be edited and press <Enter> to make a selection.  The Edit Host menu will open for that listing.
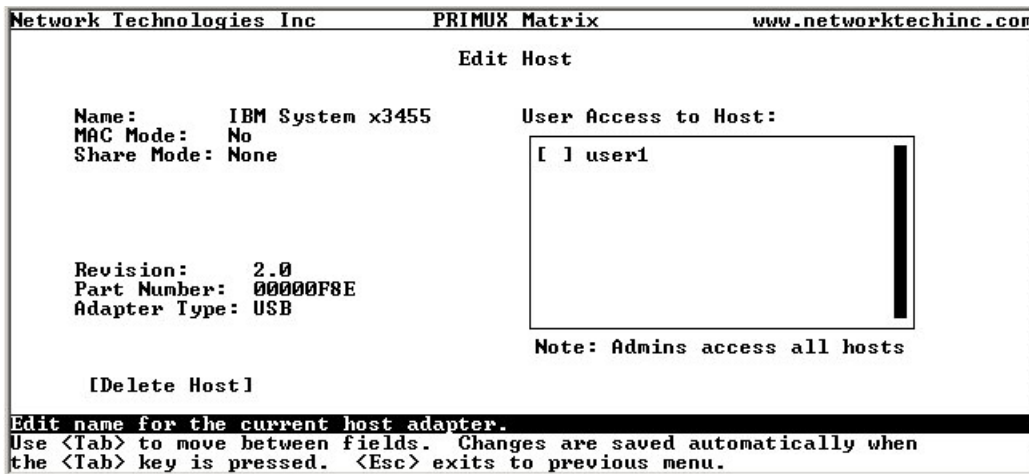
**Figure 50- Telnet- Edit Host**

From the Edit Hosts menu, characteristics for specific Host Adapters can be specified.

| Function | Description |
|---|---|
| Name | Modify the name (of the selected Host Adapter)- enter a character string- 16 characters max., case sensitive. |
| Mac Mode | Designate a Host Adapter to be connected to a Mac Default = No |
| User Access To Host | Select which users will have access to this Host Adapter (By default, no users have access except for "root" and other users with administrative rights.) |
| Share Mode | Configure sharing for the Host Adapter. Options are None, Limited, and Full.     Default = None See more on Share Mode on page 50. |
| Delete | Delete Host Adapter from Host Adapters list **Y / N Confirmation required** |
| Esc | Return to Host Adapter List |

This page also displays the firmware revision of the Host Adapter, the part number (also found on a label on the case of the Host Adapter), and the type of Host Adapter (USB or PS2).

 The part number is used to identify the Host Adapter when it is auto-discovered by the SWITCH.  Until the name is changed, this will be the name displayed in the Host List.

# Share Mode

From the Edit Host Adapter menu, press `<Tab>` to move the cursor to Share Mode and press `<Spacebar>` to toggle between three possible settings:

**None**- only one user can access a host adapter at a time.  Other users that try will receive a "Host in use" error message.

**Limited-** the first user to connect to the Host Adapter will gain control of the keyboard/mouse for the connected CPU until they logout, disconnect from that Host Adapter, or change to a different Host Adapter.  Other users can connect to the Host Adapter to view the video, but no keyboard/mouse control will be allowed unless the first user gives up control.

**Full**- all users with access permission to that Host Adapter may compete for keyboard/mouse control.   A user with control will retain control until their keyboard/mouse is idle for the specified **sharing timeout** period (page 48).  Control is then relinquished and the first user to move their keyboard/mouse will gain control.

**Keyboard/Mouse Access Indicators**

A mouse and keyboard icon will appear in the upper left corner of the OSD screen for a couple of seconds to indicate the status of the keyboard/mouse control.

The icons will appear green when the user has control over the keyboard/mouse,
yellow when the keyboard/mouse control is available to the user (like in Limited and Full Share Modes),
red when the keyboard/mouse control is not available to the user.

## User Configuration Menu

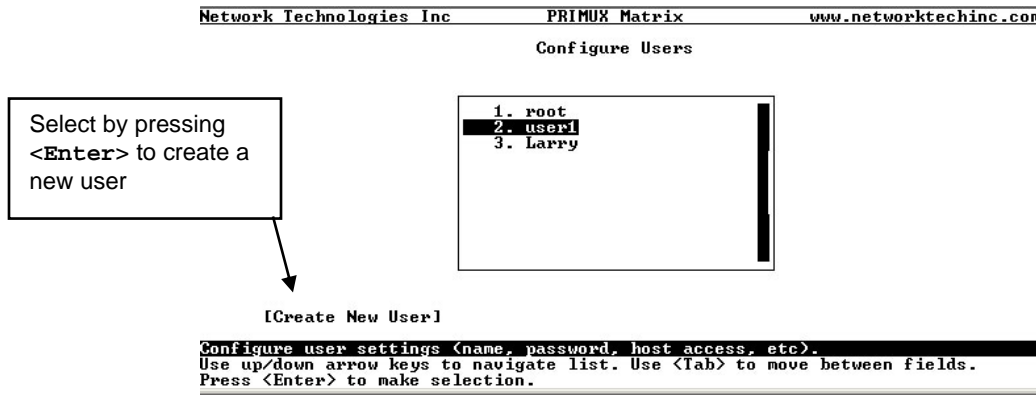Select "User Configuration" in the Main Menu and press **<Enter>** to open the User Configuration submenu.



**Figure 51- Telnet- Configure Users**

From the Configure Users list, move the selection bar (using the up/down arrow keys) to a listing to be edited and press **<Enter>** to make a selection.    Alternatively, to create a new user  (named "userx" where x is the next consecutive user number),  press **<Tab>** to select "Create New User"  and press **<Enter>**.
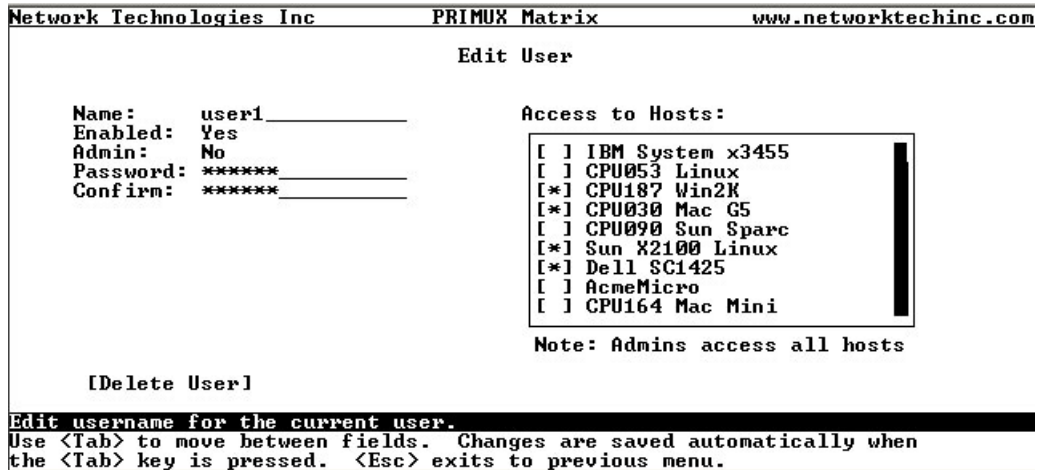


**Figure 52- Telnet- Edit User**

From the Edit Users menu, characteristics for specific users can be specified.

| Function | Description |
|----------|-------------|
| Name | Modify the name (of the selected User)- enter a character string- 16 characters max., case sensitive. |
| Enabled | Allows the administrator to enable a user to login or not to login to the User Station. |
| Admin Privileges | Allows the administrator to assign a user to have administrator rights or not. |
| Access to Hosts | Place an asterisk next to each Host Adapter a user will have access to |
| Password | Enter a password for the user.    16 characters max. -  case sensitive |
| Confirm | Retype the password for the user.   Must match the  password entered above exactly |
| Delete User | Delete the user from the system entirely<br>**Y / N Confirmation required** |

Users with Administrative Privileges automatically have access to all Host Adapters.

## User Station Configuration Menu

Select "User Station Configuration" in the Main Menu and press `<Enter>` to open the User Station Configuration submenu.
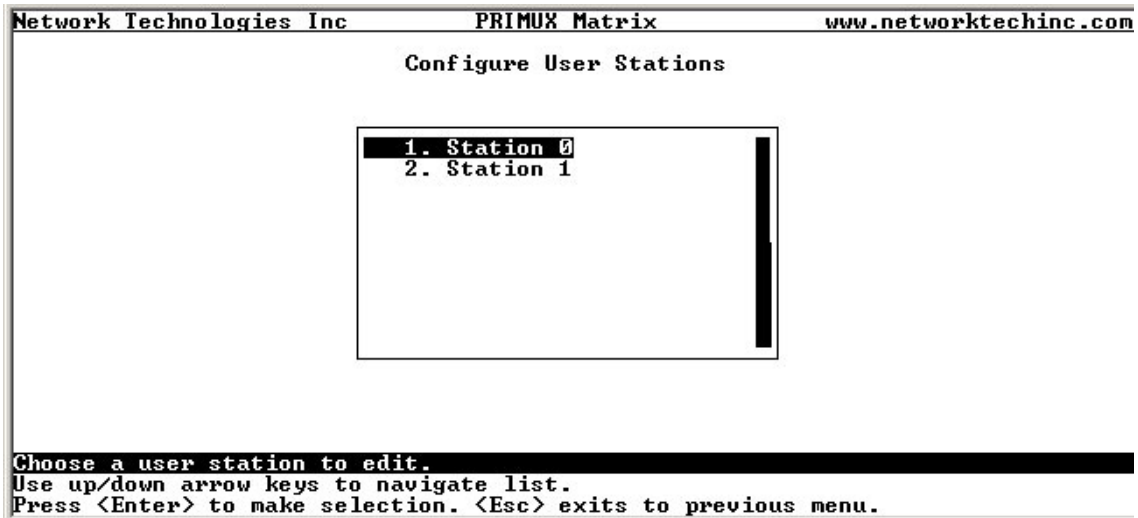


**Figure 53- Telnet- Configure User Station**

From the Configure User Stations list, move the selection bar (using the up/down arrow keys) to a listing to be edited and press `<Enter>` to make a selection.
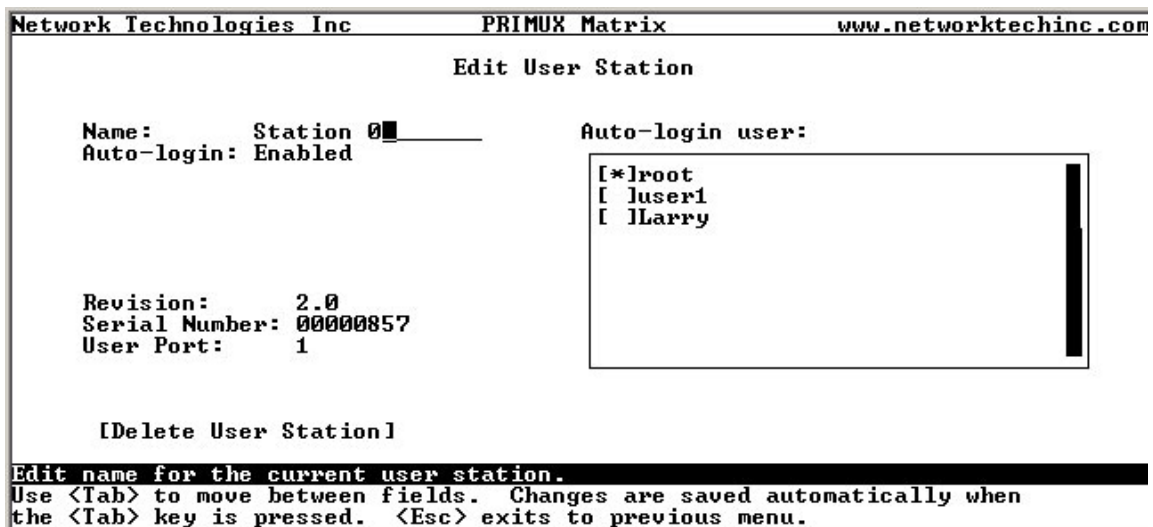


**Figure 54- Telnet- Edit User Station**

| Function | Description |
|---|---|
| Name | Modify the name-enter a character string 16 characters max., case sensitive. |
| Auto-login | Toggle selection to Enable or Disable Auto-login feature- determines if a user will be logged-in when the User Station is powered-ON or when `<F1>` is pressed at the log-in prompt. |
| Auto-login user | Select which user will be the Auto-login user to be automatically logged in at power up |
| Delete User Station | This will delete the selected User Station from the User Stations list, removing all configuration information regarding that User Station. **See Note below** |

*Note:  Before using the "Delete User Station" option, be sure to access the OSD menu of that User Station and change the operating mode from "Matrix" to "Standalone" if the User Station is going to be used as a standalone unit.    See the page 37 for the location of this setting.*

# Firmware Configuration

New improved versions of firmware may become available for the PRIMUX Matrix KVM Switch.   The Firmware Configuration menu is provided to enable the user to initiate a firmware update.   Select  "Firmware Configuration" in the Main Menu and press <Enter>  to open the Firmware Configuration submenu.



**Figure 55- Telnet- Firmware Configuration**

The Firmware Configuration submenu shows the present PRIMUX Matrix firmware code revision number and the date that code was created.  From this menu the user can force the PRIMUX Matrix to reboot which will cause any users to be logged out of the system.  Users must wait for the PRIMUX Matrix to finish rebooting before logging back into the system.

To update the Firmware in the PRIMUX Matrix, refer to page 59 .

# Network Configuration

The Network Configuration menu enables the user to make adjustments to the network settings as needed.  Select "Network Configuration" in the Main Menu and press <Enter> to open the Network Configuration submenu.



**Figure 56- Telnet- Network Configuration**

The IP address mode is set to "Static" by default (user specified IP address, gateway, etc.), but may be set to "DHCP" (settings will be automatically assigned by a network accessible DHCP server).

If the mode is set to "Static", enter suitable settings for the IP address (default is 192.168.1.22), subnet mask, etc...

The Telnet Server must be set to "Enabled" in order to access the PRIMUX Matrix menu over the Ethernet.  By default it is disabled.

Press <Esc> to return to the previous menu and apply the changes made.
*Note:  Changes made may disconnect your session.*

# View KVM Connections

Select "View KVM Connections" in the Main Menu and press **<Enter>** to see a detailed listing of all connections between users and the system. No changes can be made here. This page is for information purposes only.

```
Network Technologies Inc        PRIMUX Matrix        www.networktechinc.com

User Port   User Station       User              CPU Port   Host Adapter
   1        –                   –                   –         –
   2        Station 0           root                –         –
   3        Station 1           root                2         SUN X2100 Linux
   4        –                   –                   –         –
   5        –                   –                   –         –
   6        –                   –                   –         –
   7        –                   –                   –         –
   8        –                   –                   –         ▄

View current KVM connections.
<Esc> exits to previous menu.
```

**Figure 57- Telnet- View KVM Connections**

# View System Info

Select "View System Info" in the Main Menu and press **<Enter>** to see a page detailing the MATRIX Switch firmware code revision number, serial number, and network connection information. No changes can be made here. This page is for information purposes only.

```
Network Technologies Inc        PRIMUX Matrix        www.networktechinc.com

                          System Information

     Product:         PRIMUX MATRIX 8x32
     Revision:        1.0
     Serial Number:   0000000C

     IP Address:      192.168.3.83
     Subnet Mask:     255.255.255.0
     Default Gateway: 192.168.3.3


     COPYRIGHT 2008 NETWORK TECHNOLOGIES INC ALL RIGHTS RESERVED




View system information (serial number, revision, etc).
<Esc> exits to previous menu.
```

**Figure 58- Telnet- System Information**

# Restore Settings to Defaults

Select "Restore Settings to Defaults" in the Main Menu and press **<Enter>**  if you want to remove all custom configuration settings and restore the PRIMUX Matrix Switch back to the settings it came with from the factory.  Before this selection will take effect, you will be prompted (as shown in the image below) to confirm this selection.

To reset settings to factory defaults, select "Yes"  by pressing **<Tab>** first to highlight, then press **<Enter>**.

To cancel the selection, press **<Enter>** for "No".

*Note: Using "Restore Settings to Defaults" will disconnect your telnet session.*

```
Network Technologies Inc          PRIMUX Matrix          www.networktechinc.com
                                     Main Menu

          1. System Configuration
          2. Host Configuration
          3. User Configuration
          4. Userstation Configuration
          5. Fir
          6. Net Restore all settings to defaults - are you sure?
          7. Vie
          8. Vie              [No]    [Yes]
          9. Res

          [Logout]


Restore settings to factory defaults. Use with caution!
Press <Tab> to move between the menu and logout button. Press <Enter> to
select highlighted item.
```

**Figure 59- Telnet- Restore Default Settings**

# HA-RS Configuration

The HA-RS Serial Host Adapter enables a user to remotely connect to a serial device and control the device using the PRIMUX User Station as a terminal.    The HA-RS is compatible with most serial devices with an RS232 port.   The HA-RS emulates a VT100 terminal – converting serial data from an ASCII device into VGA video (800x600 @ 60Hz signal).

*Note: The HA-RS Host Adapter will only work with User Stations programmed with firmware version 2.0 and later.*

When connecting to an HA-RS through Command Mode (page 22) a terminal screen will be presented with a connection to the serial device.   The terminal screen will include available functions for the user interface listed at the bottom.



```
Network Technologies Inc.            HA-RS                Copyright 2009,2010
ASCII Terminal Converter                                 Version 2.00.1
Status: Online        Baud: 115200    Flow: None       Line 05  Col 14  Page 01


Fedora Core release 6 (Zod)
Kernel 2.6.22.14-72.fc6 on an i686


cpu53 login: _




<CTRL-F1> = Help Menu Screen                <CTRL-F3> = Setup Programmable Keys
<CTRL-F2> = Setup Screen                     <CTRL-F4> = View Buffer
<CTRL-S> = Stop output from host             <CTRL-Q> = Resume output from host
```

**Figure 60- HA-RS User Interface**

The user can either communicate to the serial device or use the **<Ctrl>** key in conjunction with **<Fx>** keys to control the colors of the interface, the connection parameters of the HA-RS, or view up to 10 pages of data that has been viewed through the HA-RS from the serial device.  Control options are as follows:

| Key Strokes | Function |
|---|---|
| **<Ctrl>-<F1>** | Help Menu |
| **<Ctrl>-<F2>** | Setup Screen to setup connection parameters |
| **<Ctrl>-<F3>** | Setup Programmable keys |
| **<Ctrl>-<F4>** | View the stored data in the buffer |
| **<Ctrl>-<S>** | Stop displaying output from host (serial device) |
| **<Ctrl>-<Q>** | Resume displaying output from host (serial device) |

## Help Menu

Press <Ctrl>-<F1> to view a list of information that will help you to navigate the features of the HA-RS host adapter.

```
Network Technologies Inc.            HA-RS                Copyright 2009,2010
ASCII Terminal Converter                                     Version 2.00.1
Status: Help            Baud: 115200   Flow: None     Line 01  Col 01  Page 13
                              Help Screen


    On Line Commands
           <CTRL-S>               - Stop Output from serial device
           <CTRL-Q>               - Resume Output from serial device

    Function Keys
           <CTRL-F1>              - Displays the Help Screen
           <CTRL-F2>              - Displays the Communication Setup Screen
           <CTRL-F3>              - Displays the Programmable Keys Screen
           <CTRL-F4>              - Displays the History Screen

    View Buffer
           <Home>/<End>           - Go to first/last page
           <Pg Up>/<Pg Down>      - Go to previous/next page
           <↑>/<↓>/<→>/<←>        - Move cursor
           F5                     - Begin mark text
           F6                     - End mark text and send it to the serial device
           F12                    - Clear the buffer


    <ESC>                         - Return to online mode




<CTRL-F1> = Help Menu Screen                  <CTRL-F3> = Setup Programmable Keys
<CTRL-F2> = Setup Screen                      <CTRL-F4> = View Buffer
<CTRL-S> = Stop output from host              <CTRL-Q> = Resume output from host
```

**Figure 61- HA-RS Help Screen**

## Setup Screen

Press <Ctrl>-<F2> to access a list of connection parameters and window color controls.   The connection information shown must match the required connection criteria of the serial device in order to connect to it.

```
Network Technologies Inc.            HA-RS                Copyright 2009,2010
ASCII Terminal Converter                                     Version 2.00.1
Status: Setup           Baud: 115200   Flow: None     Line 03  Col 26  Page 11
                              Setup Screen


          Baud Rate:      115200
          Data Bits:      8
          Parity:         None
          Stop Bits:      1
          Flow Control:   None


          Send CR as CRLF:      No
          Receive CR as CRLF:   No


          Active window background color:        3f
          Active window text color:              00
          Active window mark color:              fb
          Status/Help window background color:   28
          Status/Help window text color:         3f




      Use <↑> or <↓> to navigate
      Use <→> or <←> to change value
      Use <ENTER> to save new values
      Use <ESC> to return to online mode


<CTRL-F1> = Help Menu Screen                  <CTRL-F3> = Setup Programmable Keys
<CTRL-F2> = Setup Screen                      <CTRL-F4> = View Buffer
<CTRL-S> = Stop output from host              <CTRL-Q> = Resume output from host
```

**Figure 62- HA-RS Setup Screen**

Window color controls are available to change the look of the user interface as desired.

## Programmable Keys

A list of **<Fx>** keys that when used in conjunction with the **<Alt>** key can be programmed to be used as macro keys to send commands to the connected serial device.    When applicable commands are associated with an **<Fx>** key,  pressing **<Alt>-<Fx>** will send that command automatically to the serial device.    In the example below,  pressing **<Alt>-<F1>** will automatically send the "logout" command.



**Figure 63- HA-RS Programmable Keys Screen**

## View the Buffer

Press **<Ctrl>-<F4>** to view the last 10 pages of data that was received from the serial adapter.   Once the buffer is full, the oldest data in history will automatically be deleted to make room for new.  The lines of text can be cleared from the history in their entirety by pressing **<Ctrl>-<F12>** .

## Stop and Resume Output

Press **<Ctrl>-<S>** to stop viewing the data received by the serial device.    This will not stop the device from sending data, it will simply stop you from seeing it.

Press **<Ctrl>-<Q>** to resume viewing the data received by the serial device.

## UPDATE PRIMUX MATRIX SWITCH FIRMWARE

This procedure is provided to enable the administrator to update the firmware inside the PRIMUX Matrix Switch if needed.  The updated code can be downloaded from the NTI website at  www.networktechinc.com\kvmswitch-cat5.html .  Download the latest version of code for the PRIMUX Matrix and unzip it to a location on your computer you will remember (perhaps the Desktop).

The two files you should have are **primux_sys.bin**  and  **primux_fs.bin**.  (If you are using a TFTP server, unzip these files to your server location.)

To update the firmware, the user must first be connected to the SWITCH using a terminal and null modem cable connection through the port labeled "RS232" as described on page 14.

*Note: This procedure has been tested to work properly using Microsoft® HyperTerminal.   We cannot confirm whether other terminal programs will give satisfactory results.*

1. Establish a connection to the SWITCH as described in "RS232 Connection" on page 44 except, **setup for baud rate of 115200** to perform the firmware upgrade.    Then power cycle the SWITCH.

2. Press and hold the **\<Tab\>** on the keyboard until the "PRIMUX-MTX >" prompt appears.  (You have 3 seconds to press **\<Tab\>** before the system will continue booting and you will have power cycle the SWITCH again. )

*Note: To view available commands, at the prompt type \<help\>  or \<?\> (as seen below) .*

```
PRIMUX-MTX >help

Available commands:

run update_system_tftp
 - update system via TFTP

run update_system_serial
 - update system via serial(kermit)

run update_bootloader_serial
 - update bootloader via serial(kermit)

reset
 - reset the system

help
 - view this help
```

3. At the prompt (PRIMUX-MTX >), type  **run update_system_serial**  and press **\<Enter\>**.

4. Send the **primux_sys.bin** file:    Go to  File -> Transfer (use Kermit protocol) -> Send      and locate the **primux_sys.bin** file.

5. When the transfer is complete you will be prompted to send the **primux_fs.bin** file.   Locate it and send it.

The program will download the file, erase the previous version,  and flash the new version automatically.

6. When finished the prompt will reappear.  At  the prompt, type **reset** and press  **\<Enter\>**.   The PRIMUX Matrix will reboot.

Press \<Enter\> to return to the login prompt,  or close HyperTerminal.    The upgrade is complete.

**If you are using a TFTP server**,  the following procedure will be quicker:

1. Performs steps 1 and 2 above,  but be sure to have an Ethernet connection to a TFTP server.

2. At the prompt, type  **run update_system_tftp**   and press \<Enter\>.

3. When prompted, enter the IP address for the TFTP server, and when prompted again enter an IP address to use for the SWITCH for this transfer, and press **\<Enter\>**.  The program will download the files, erase the previous version, and flash the new version automatically.

4. When finished, at the prompt, type **reset** and press \<Enter\>.

## KEYBOARD MAPPING

### Key Equivalents

Using the chart below, find the character needed to be typed on the CPU being accessed, then follow the row across for the equivalent on the keyboard being used.   (See Figure 64 on page 61 for reference.)

| USB 101 | PS/2 (Windows) | MAC (Apple USB) | SUN |
|---|---|---|---|
| L-Ctrl | L-Ctrl | L-Ctrl | L-Ctrl |
| L-Alt | L-Alt | L-Option | L-Alt |
| SB+F12 | Application | SB+F12 | Compose |
| R-Alt | R-Alt | R-Option | Alt-Graph |
| SB+Alt | Windows Logo | Command | Meta |
| SB+R Arrow | SB+R Arrow | Power | Suspend |

SB = Space Bar

L and R = Left and Right keys when two keys are marked the same on a keyboard.

### SUN's 16 Extra Keys

| PS/2, USB Keyboards | SUN Extras |
|---|---|
| SB+F1 | Stop (L1) |
| SB+F2 | Again (L2) |
| SB+F3 | Props (L3) |
| SB+F4 | Undo (L4) |
| SB+F5 | Front (L5) |
| SB+F6 | Copy (L6) |
| SB+F7 | Open (L7) |
| SB+F8 | Paste (L8) |
| SB+F9 | Find (L9) |
| SB+F10 | Cut (L10) |
| SB+F11 | Help |
| SB+F12 | Compose |
| SB + Up Arrow | Vol + |
| SB + Down Arrow | Vol - |
| SB + L Arrow | Mute |
| SB + R Arrow | Suspend |

Use the chart to the left to type SUN's

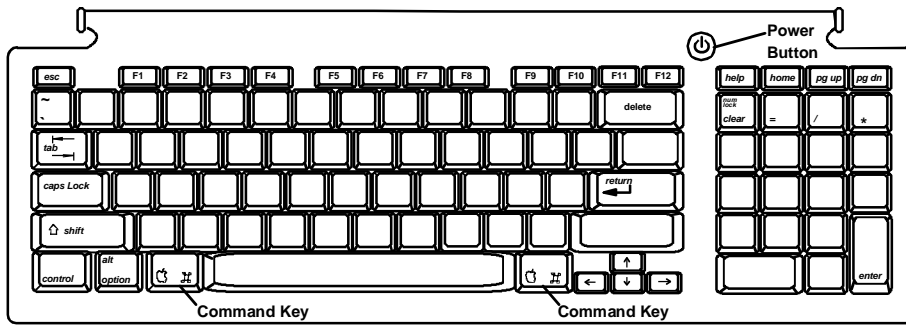additional 16 keys using a PS/2 or

USB keyboard

SB= Space Bar
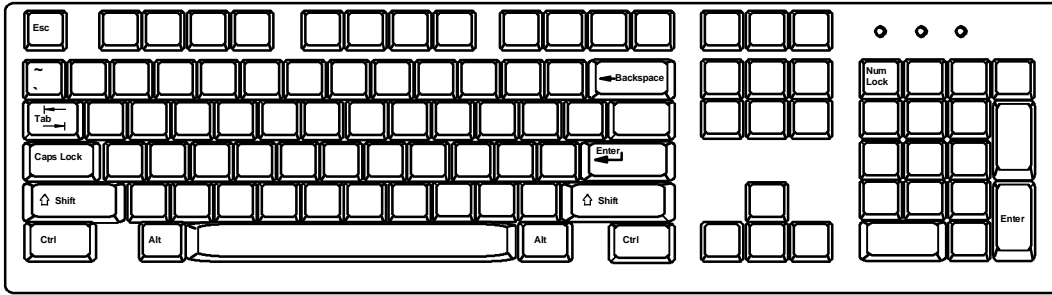
**Typical 101 Keyboard**
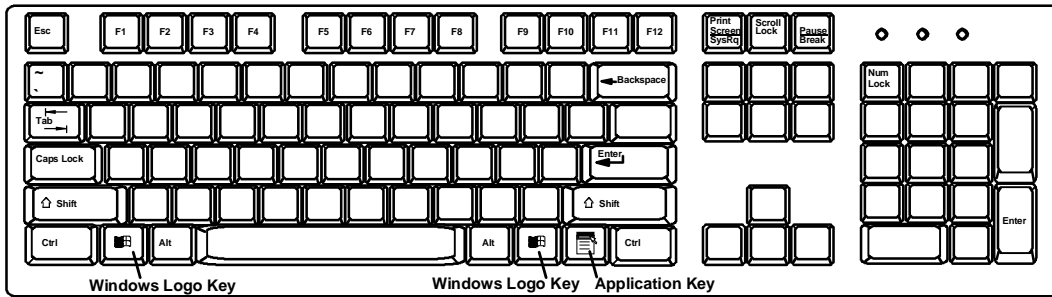
**Windows Keyboard**

**Apple USB Keyboard**

**SUN USB Keyboard**

**Figure 64- Keyboard layouts**

## TECHNICAL SPECIFICATIONS

| Common Specifications | |
|---|---|
| Video Compatibility | SVGA, XGA, VGA |
| Video Quality Adjustment | Automatic, for up to 1000 feet of CAT5 cable |
| Video Coupling | DC |
| Maximum Input/Output Levels | 1.45Vp-p (no offset) |
| Input / Output Impedance | 75 ohms |
| Input Horizontal Frequency Range | 15kHz to 130 kHz |
| Input Vertical Frequency Range | 30 Hz to 150 Hz |
| Sync Types Supported | Separate and composite TTL Level |
| Interconnect Cable | CAT 5/5e/6 Solid UTP/STP EIA/TIA 568 B wiring w/ male RJ45 connectors |
| Operating temperature | 32°F to 100°F (0°C to 38°C) |
| Storage temperature | -20°F to 140°F (-30°C to 60°C) |
| Operating and Storage Relative Humidity | 17 to 90% non-condensing RH |
| **HA-RS Only** | |
| Maximum Baud rate | 115200 bps |
| Support RS232 Signals | TXD,RXD,DSR,DTR,CTS,RTS |
| Terminal emulation | ASCII to VGA (800x600@60Hz, 80 characters wide x 30 lines high)- supports VT100 emulation |
| **Matrix Switch Only** | |
| RS232 Connection | Male DB9 |
| RS232 Port Connection Settings | 115200 bps, 8-N-1-no flow |
| Switch Power | 120V or 240V at 50 or 60Hz AC |
| Switch Size (In.) WxDxH        8X32<br>                                        16X64 | 19x12x1.75<br>19x12x3.5 |
| **User Station Only** | |
| User Station Power | 5VDC/2.0A via 120V or 240V at 50 or 60Hz AC Adapter |
| Mouse and Keyboard Compatibility | Most PS/2 mice and keyboards<br>Most USB mice and keyboards |
| Keyboard and Mouse Current Rating | 500mA maximum |
| User Keyboard/Mouse Connectors | Female 6 pin miniDIN<br>Female USB Type A |
| Video Connectors | HD15 male to CPU<br>HD15 female to monitor |
| User Station Size (In.) WxDxH | 11x11 x 1.75 |
| **Host Adapter Only** | |
| CPU Keyboard/Mouse Connectors | Male 6 pin miniDIN to device port for PS/2 CPU<br>Male USB-Type A to device port for USB CPUs<br>Male 8 pin miniDIN to devices port for Legacy SUN CPU<br>Male RJ45 and USB-Type A to RS232 port and USB port (for power) for serial device/CPU |
| CPU Compatibility | PS/2, legacy SUN, USB SUN,  USB MAC, Serially-controlled devices |
| Host Adapter Power | Powered by CPU |
| Host Adapter Size (In.) WxDxH<br>HA-UNV and HA-RS<br>HA-SUN-MTX | <br>1.5x3.0x0.8<br>2.1x3.7x1.0 |

**Distances and Resolutions for CAT5/CAT5e and CAT6 Cables**

| CABLE | DISTANCE (feet) | RESOLUTION |
|---|---|---|
| CAT5/CAT5e (UTP) | 1000 | 1024x768 at 60Hz |
| CAT5/CAT5e (UTP) | 700 | 1024x768 at 60Hz |
| CAT5/CAT5e (UTP) | 500 | 1280x1024 at 60Hz |
| CAT5/CAT5e (UTP) | 300 | 1600x1200 at 60Hz |
| CAT5/CAT5e (UTP) | 100 | 1920x1440 at 60Hz |
| CAT5/CAT5e (STP) | 600 | 800x600 at 60Hz |
| CAT5/CAT5e (STP) | 500 | 1024x768 at 60Hz |
| CAT5/CAT5e (STP) | 300 | 1280x1024 at 60Hz |
| CAT5/CAT5e (STP) | 100 | 1920x1440 at 60Hz |

**Note:  Actual resolution may vary depending upon the construction of the CAT5 cable used.**

**Distances and Resolutions for CAT5/CAT5e and CAT6 Cables (Continued)**

| CABLE | DISTANCE (feet) | RESOLUTION |
|---|---|---|
| CAT6 (UTP) | 1000 | 1024x768 at 60Hz |
| CAT6 (UTP) | 800 | 1024x768 at 60Hz |
| CAT6 (UTP) | 600 | 1280x1024 at 60Hz |
| CAT6 (UTP) | 500 | 1280x1024 at 60Hz |
| CAT6 (UTP) | 300 | 1600x1200 at 60Hz |
| CAT6 (UTP) | 100 | 1920x1440 at 60Hz |

*Note: The CATx cables must be run between the locations where the Host Adapter will be connected and User Station is positioned. 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.) . If cables must be routed near sources of magnetic fields or electrical interference, use shielded CATx cable (see table above) for best performance.*

## INTERCONNECTION CABLE WIRING METHOD

The connection cable between the Matrix Switch and Host Adapter is terminated with RJ45 connectors and must be wired according to the EIA/TIA 568 B industry standard. (This is also the pinout of a patch cable used to connect the Matrix Switch to a LAN.) Wiring is as per the table and drawing below.

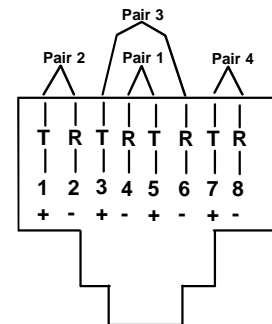| Pin | Wire Color | Pair | Function |
|---|---|---|---|
| 1 | White/Orange | 2 | T |
| 2 | Orange | 2 | R |
| 3 | White/Green | 3 | T |
| 4 | Blue | 1 | R |
| 5 | White/Blue | 1 | T |
| 6 | Green | 3 | R |
| 7 | White/Brown | 4 | T |
| 8 | Brown | 4 | R |
| SH | Drain wire | - | Shield |



**Figure 65- View looking into RJ45 female**

## PC-TO-MATRIX SWITCH CROSSOVER CABLE

In order to make a direct connection between a PC and the ETHERNET connector of the PRIMUX Matrix Switch, a crossover cable must be used. The cable is made with CAT5 cable terminated with RJ45 connectors and 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 |
| Shield | Drain wire | Shield |
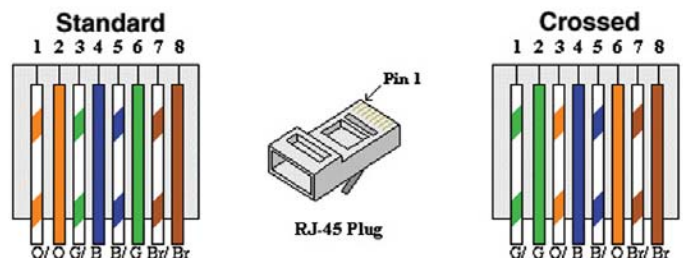
## NULL MODEM CABLE PINOUTS

A 6 foot null modem cable (NTI # DINT-6-FF) was supplied with your PRIMUX User Station.    This cable is also used to connect the PRIMUX Matrix KVM Switch to a terminal.    The information below is provided should you need to make a longer cable.

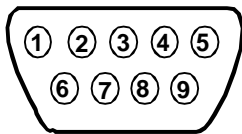**PRIMUX  to Terminal (9 PIN) null modem cable**

| PRIMUX | | Signal Direction | TERIMINAL | |
|---|---|---|---|---|
| 9 pin | | | 9 pin | |
| Function | Pin # | | Pin # | Function |
| RxD | 2 | ← | 3 | TxD |
| TxD | 3 | → | 2 | RxD |
| CTS | 8 | N/C | 7 | RTS |
| RTS | 7 | N/C | 8 | CTS |
| DSR | 6 | N/C | 4 | DTR |
| DTR | 4 | N/C | 6 | DSR |
| DCD | 1 | N/C | 1 | DCD |
| SG | 5 | —— | 5 | SG |

**PRIMUX to Terminal (25 PIN) null modem cable**

| PRIMUX | | Signal Direction | TERMINAL | |
|---|---|---|---|---|
| 9 pin | | | 25 pin | |
| Function | Pin # | | Pin # | Function |
| RxD | 2 | ← | 2 | TxD |
| TxD | 3 | → | 3 | RxD |
| CTS | 8 | N/C | 4 | RTS |
| RTS | 7 | N/C | 5 | CTS |
| DSR | 6 | N/C | 20 | DTR |
| DTR | 4 | N/C | 6 | DSR |
| DCD | 1 | N/C | 8 | DCD |
| SG | 5 | —— | 7 | SG |

N/C= not connected (no cable wire)
In this cable signals CTS and RTS are connected to each other at the connector ends, and signals DSR, DTR, and DCD are connected to each other at the connector ends.

**Mating Face
of 9D
Male Connector**
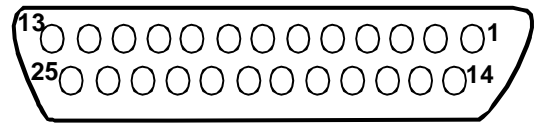
**Mating Face
of 25D
Female Connector**

9D Female                    NTI DINT-6-FF                    9D Female

6 FEET
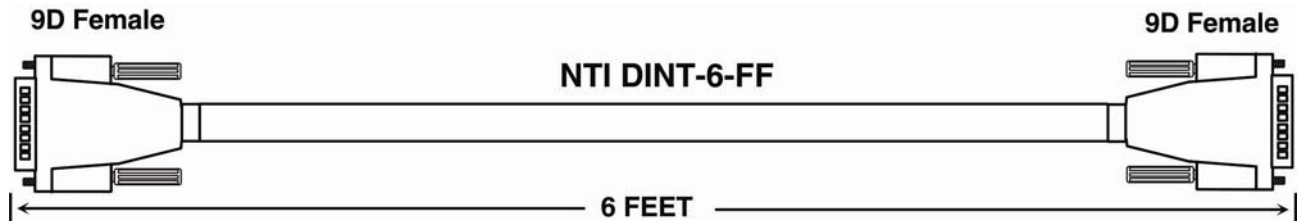
*Note: Cable length not to exceed 15ft.*

# MENU QUICK-FIND KEYSTROKE TABLE

| Function | Source Page | Keystroke Sequence |
|---|---|---|
| Command Mode | 22 | `<Ctrl> + <`>` |
| Return to Command Mode | 19 | `<F10>` |
| Administration Menu | 29 | `<Ctrl> + <`> - <A>` |
| Activate Scan Mode | 23 | `<Ctrl> + <`> - <S>` |
| Settings Menu | 24 | `<Ctrl> + <`> - <T>` |
| OSD Settings Menu | 25 | `<Ctrl> + <`> - <T> - <O>` |
| Host Adapters for scan | 26 | `<Ctrl> + <`> - <T> - <S>` |
| Change scan dwell time | 25 | `<Ctrl> + <`> - <T> - <T>` |
| Favorite Host Adapters selection | 27 | `<Ctrl> + <`> - <T> - <F>` |
| Video Quality Adjustment | 28 | `<Ctrl> + <`> - <T> - <V>` |
| System Configuration Menu | 30 | `<Ctrl> + <`> - <A> - <S>` |
| Change Logoff timeout | 30 | `<Ctrl> + <`> - <A> - <S> - <L>` |
| Set alternate OSD key | 30 | `<Ctrl> + <`> - <A> - <S> - <A>` |
| Configure DDC info | 30 | `<Ctrl> + <`> - <A> - <S> - <D>` |
| Configure Host Adapters | 32 | `<Ctrl> + <`> - <A> - <H>` |
| Edit Host Adapter | 32 | `<Ctrl> + <`> - <A> - <E> - <H> - <Enter>` |
| Configure MAC Host Adapter | 33 | `<Ctrl> + <`> - <A> - <E> - <H> - <Enter> - <M>` |
| User Access Controls | 33 | `<Ctrl> + <`> - <A> - <E> - <H> - <Enter> - <U>` |
| Enable Share Mode (Matrix Only) | 32 | `<Ctrl> + <`> - <A> - <E> - <H> - <Enter> - <S>` |
| Delete Host Adapter | 32 | `<Ctrl> + <`> - <A> - <E> - <H> - <Enter> - <D>` |
| Configure Users | 35 | `<Ctrl> + <`> - <A> - <U>` |
| Edit User | 35 | `<Ctrl> + <`> - <A> - <U> - <Enter>` |
| Edit User/Administrator Password | 35 | `<Ctrl> + <`> - <A> - <U> - <Enter> - <P>` |
| Add New User | 36 | `<Ctrl> + <`> - <A> - <U> - <A>` |
| Host Access Control | 36 | `<Ctrl> + <`> - <A> - <U> - <Enter> - <H>` |
| User Station Configuration | 37 | `<Ctrl> + <`> - <A> - <R>` |
| Configure PRIMUX-UZR for Matrix Mode | 37 | `<Ctrl> + <`> - <A> - <R> - <M>-<Spacebar>-<Y>` |
| Select Auto-login User | 38 | `<Ctrl> + <`> - <A> - <R> - <A>` |
| Firmware Configuration Menu | 39 | `<Ctrl> + <`> - <A> - <F>` |
| Update Host Adapter Firmware | 41 | `<Ctrl> + <`> - <A> - <F> - <U>` |
| Select keyboard language | 42 | `<Ctrl> + <`> - <A> - <R> - <K>` |
| Network Configuration (Matrix Only) | 43 | `<Ctrl> + <`> - <A> - <N>` |

**Please Note:  The PRIMUX User Station and Host Adapters used in conjunction with the PRIMUX Matrix Switch must all be running firmware version 2.0 or later in order to be compatible with the PRIMUX Matrix Switch.    For updated firmware with instruction for upgrading, go to** http://www.networktechinc.com/download/d-kvmswitch-cat5.html .

## 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.

## INDEX