



**NETWORK  
TECHNOLOGIES  
INCORPORATED**

1275 Danner Dr    Tel:330-562-7070  
Aurora, OH 44202    Fax:330-562-1999  
www.networktechinc.com

## RACKMUX® Series

# RACKMUX-4K17-N-xHD4K

## Rackmount KVM Drawer with Built-In 4K Video USB KVM Switch Installation Manual



**RACKMUX-4K17-N-16HD4K  
(Front and Rear View)**

**TRADEMARK**

RACKMUX is a registered trademark of Network Technologies Inc in the U.S. and other countries.

**COPYRIGHT**

Copyright © 2011, 2019 by Network Technologies Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written consent of Network Technologies Inc, 1275 Danner Drive, Aurora, Ohio 44202.

**CHANGES**

The material in this guide is for information only and is subject to change without notice. Network Technologies Inc reserves the right to make changes in the product design without reservation and without notification to its users.

## TABLE OF CONTENTS

Introduction.....	1
Materials Included:.....	1
Material <i>Not</i> Supplied, but may need to be ordered.....	1
RACKMUX Single-Person Installation .....	2
Cable Connections .....	6
Connect Video Sources .....	6
Terminal Connection for RS232 .....	7
Connect Extra Device .....	7
Features and Functions.....	8
Control Methods .....	9
Command Mode .....	9
Keyboard Control.....	9
USER ACCESS FUNCTIONS.....	10
Command Mode .....	10
Navigation .....	10
Settings Menu .....	11
Broadcast Mode.....	12
Scan Mode .....	13
Normal Mode .....	14
Administrator Settings.....	15
Port Name List .....	16
RS232 CONTROL.....	17
RS232 Connections and Configuration .....	17
Remote Connection .....	17
Baud Rate .....	17
Command Protocol.....	17
NTI Switch Control Program For Windows 9X, NT, 2000, XP, Vista,7, 8 and 10 .....	19
SerTest- RS232 Interface Test Program .....	19
Main Options.....	19
Firmware Update .....	21
Display Functions .....	23
Standard Controls.....	23
OSD Control Menu- 17 Inch Hi-Definition 4K Monitor .....	23
OSD Main Menu .....	24
Keyboard Functions .....	29
Numeric Keypad .....	29
SAFETY.....	30
Rackmux-KVM Drawer Standard Specifications.....	31
General Specs .....	31
LCD – 17” UHD/4K .....	31
Display Controller: HDMI .....	31
OSD Control Board.....	31
Keyboard.....	31
Touchpad.....	32
Troubleshooting For KVM Drawer.....	33
Index.....	33
Warranty Information.....	33

## TABLE OF FIGURES

Figure 1- Adjustable rail assemblies .....	2
Figure 2- Install the cage nuts.....	3
Figure 3- Install the rail assemblies .....	3
Figure 4- Check spacing of the rails .....	4
Figure 5- Rail guides.....	4
Figure 6- Apply remaining screws to complete installation .....	5
Figure 7- Connect each CPU and video source.....	6
Figure 8- RS232 Terminal Connection.....	7
Figure 9- Connect a USB 1.1 device to the front (optional).....	7
Figure 10- Port List (Main Menu) .....	10
Figure 11- Help Menu .....	11
Figure 12- Settings Menu.....	11
Figure 13- Stop USB Device Reminder warning .....	12
Figure 14- Settings Menu.....	12
Figure 15- Broadcast List.....	13
Figure 16- Settings Menu.....	13
Figure 17- Scan List.....	14
Figure 18- Administrator Settings .....	15
Figure 19- Port Name List.....	16
Figure 20- RS232 Communication Illustrated .....	18
Figure 21- OSD Controls .....	23
Figure 22- U.S. (English) keyboard with numeric keypad .....	29
Figure 23- Keyboard LED Indications .....	29

## INTRODUCTION

The RACKMUX® KVM Drawer with 4K Video USB KVM Switch combines a rackmount 4K LCD monitor, keyboard, and touchpad mouse (RACKMUX) with 4K Video USB KVM switch (UNIMUX) in a space-saving 1RU industrial strength drawer. Available with 4, 8 or 16 port 4K Video USB KVM switch.

### Features Include:

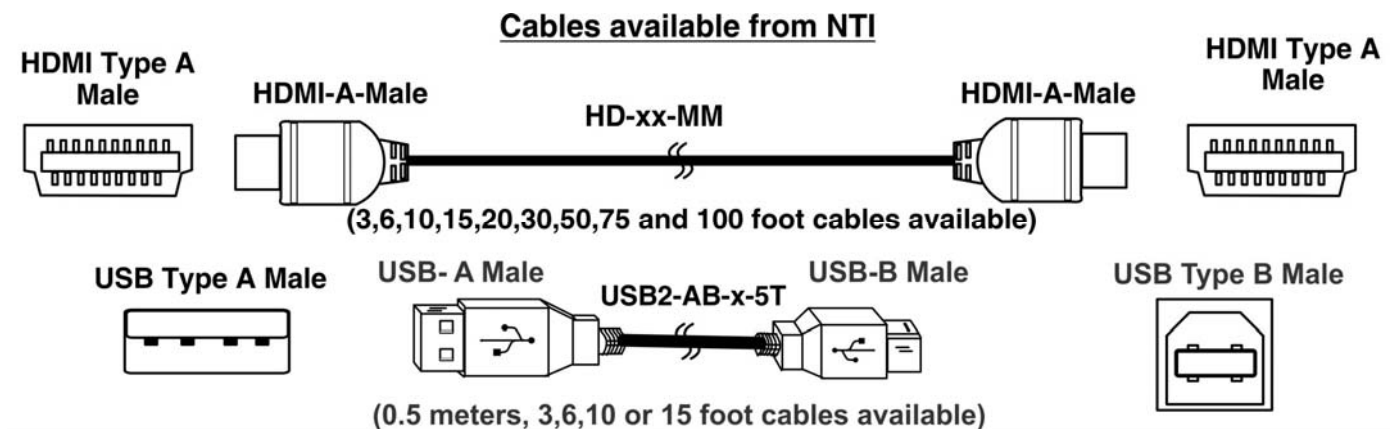
- Available with forward-folding 17.3" Active Matrix LCD HDMI flat panel monitor.
- Video Resolution 3840x2160@30Hz / 1080p@60Hz.
- Integrated 4K Video USB KVM switch.
  - On screen display for controlling switch and modifying settings, uses attached mouse and keyboard.
  - Passes embedded audio
  - HDCP 1.3 Compliant
  - Supports HDMI 1.4
- Control up to 16 USB enabled computers with HDMI outputs.
- Any HDMI source or display can be connected by using HD-xx-MM cable (not included).
- Torque-friction hinges - monitor does not wobble, spring, or slam shut.
- Compact, heavy-duty tactile keyboard with 17-key numeric keypad.
- Rugged steel construction with durable powder coat finish.
- LCD auto-shutoff in closed position.
- Drawer locks into place when open to prevent it from sliding in and out of the rack.

### Materials Included:

- RACKMUX KVM Drawer with integrated UNIMUX switch
- IEC Power cord- country specific
- Single-Person Installation mounting kit
- DB9 Female-to-RJ45 Female adapter
- 5 foot RJ45-to-RJ45 CAT5 patch cable
- URL slip with link to PDF file of this manual

### Material *Not* Supplied, but may need to be ordered

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](http://www.networktechinc.com).



## RACKMUX SINGLE-PERSON INSTALLATION

Your NTI RACKMUX Drawer was designed for easy installation by one person with a minimum of tools and effort. Follow the simple steps below to quickly install your RACKMUX Drawer.

If you would like to see a video of this installation, see the [“single-person-installation”](#) video .

1. Locate and unpack the hardware bag. Your hardware bag will include all items necessary to install the specific RACKMUX model (see the manual that accompanied your RACKMUX drawer), including the following hardware unique to the Single-Person hardware installation:

- 10- #10-32 cage nut
- 2- #10-32 x 1/2” flat-head machine screw
- 8- #10-32 x 3/4” pan-head machine screw



To install the rails you will need only a tape measure and Phillips screwdriver.

2. Unpack the left and right rail assemblies. Each are labeled “Right Front” and “Left Front” to indicate their intended position and orientation. Extend each rail assembly to the dimension required for your rack. Rail assemblies are adjustable to fit within a rack between 24” and 40” in depth.

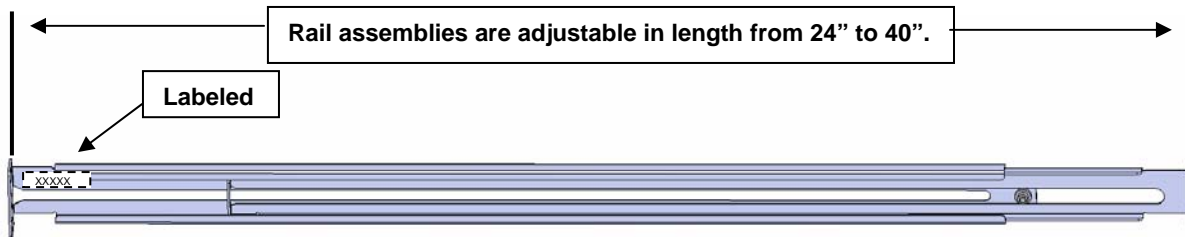


Figure 1- Adjustable rail assemblies

3. Install six #10-32 cage nuts at the front of the rack in positions where the RACKMUX will be mounted (three in each side). Install four more cage nuts at the rear of the rack in positions straight across from the upper and lower cage nuts installed in front.

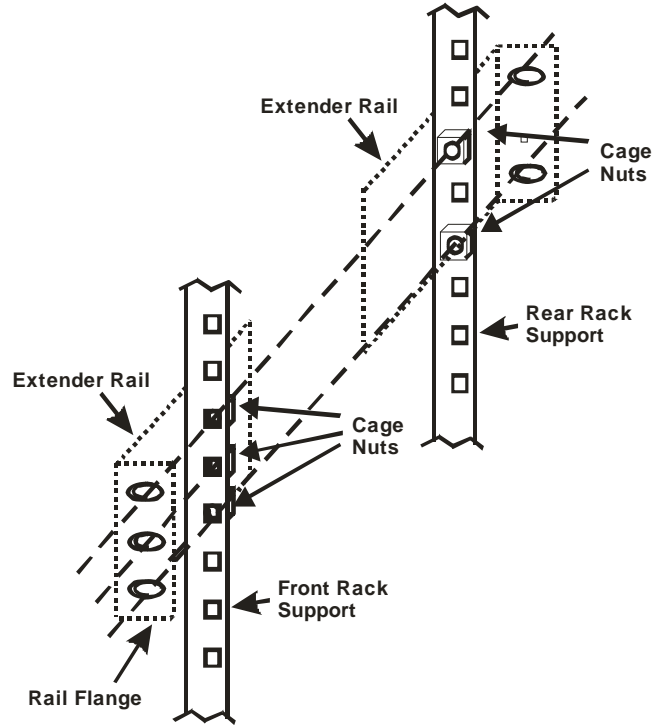


Figure 2- Install the cage nuts

4. Install the right rail assembly. The end with the label “Right Front” mounts to the front rack support. Install only the center screw through the rail flange to the rack support and cage nut using the #10-32 x 1/2” flat head machine screw provided. (See image below.) Do not tighten at this time. Install the left rail assembly in the same fashion. The end with the label “Left Front” mounts to the front rack support.

5. Install two #10-32 x 3/4” pan-head screws in the rear of each rail assembly as shown below. Do not tighten at the time.

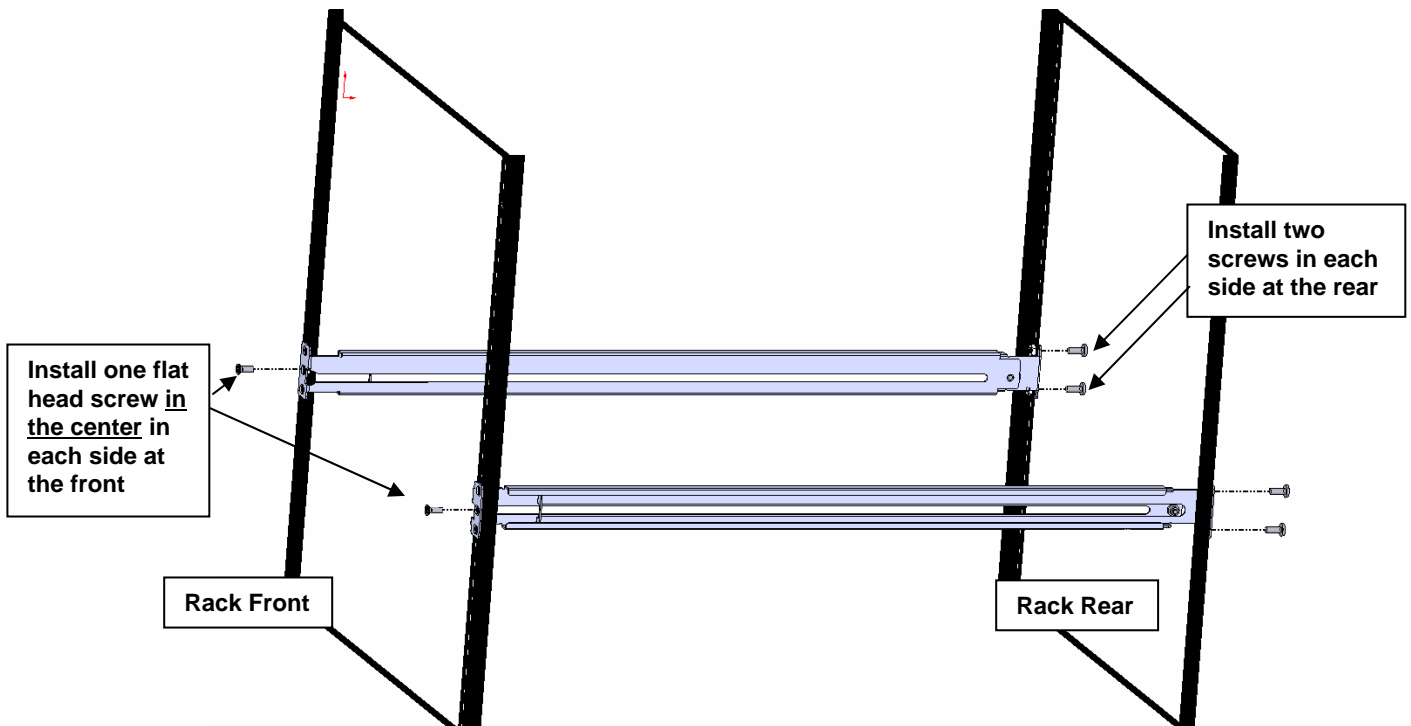


Figure 3- Install the rail assemblies

6. Measure the distance between the inside of the rails at the front of the rack. Adjust the distance to 17-1/4" and tighten the flat-head screws to the rail flanges securely.

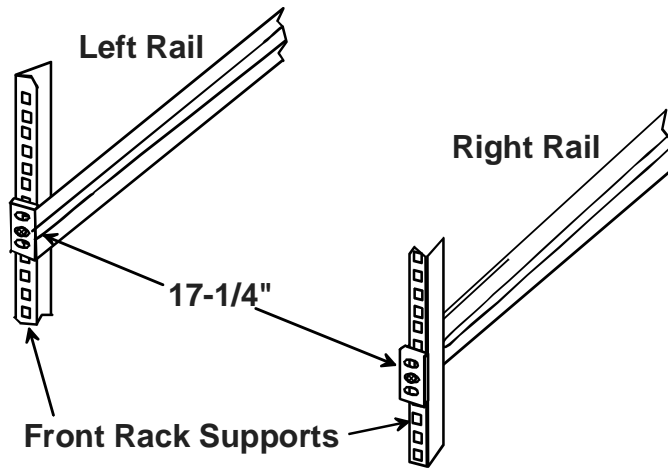
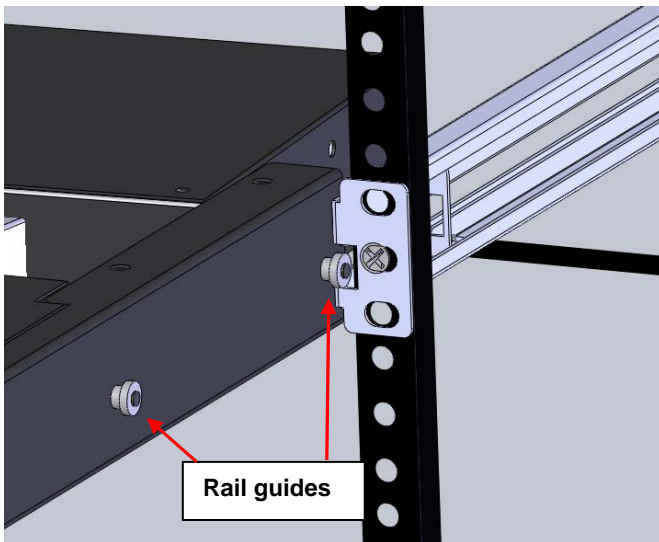
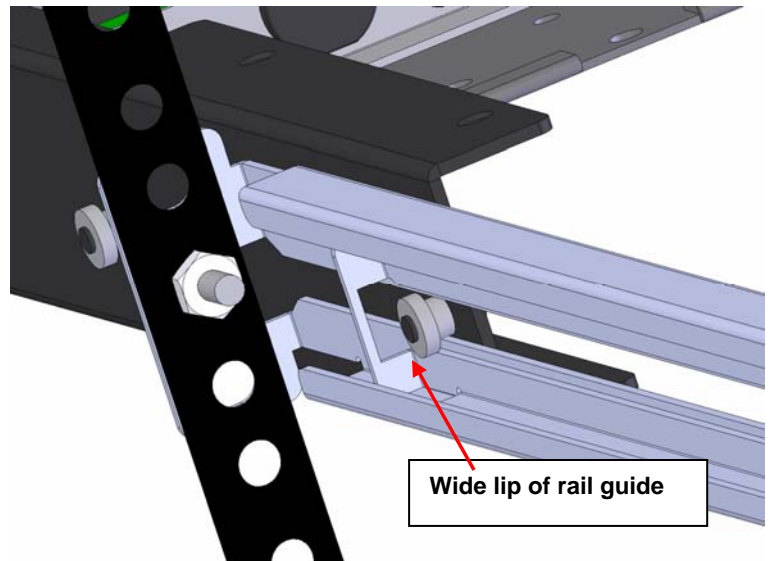


Figure 4- Check spacing of the rails

7. Lineup the rail guides on the RACKMUX drawer with the slots in the front of the left and right rails and slide the drawer into the rack. The rail guides should be positioned such that the wide lip of the guide is on the backside of the rail. Slide the drawer in completely.



View of rail guide from the front of the rack support



View of rail guide from the backside of the rail

Figure 5- Rail guides



8. Apply four more #10-32 x 3/4" pan-head machine screws (two for each) through the holes in the drawer flanges, through the holes in the left and right rails, into the cage nuts in the rack supports. Tighten each securely.

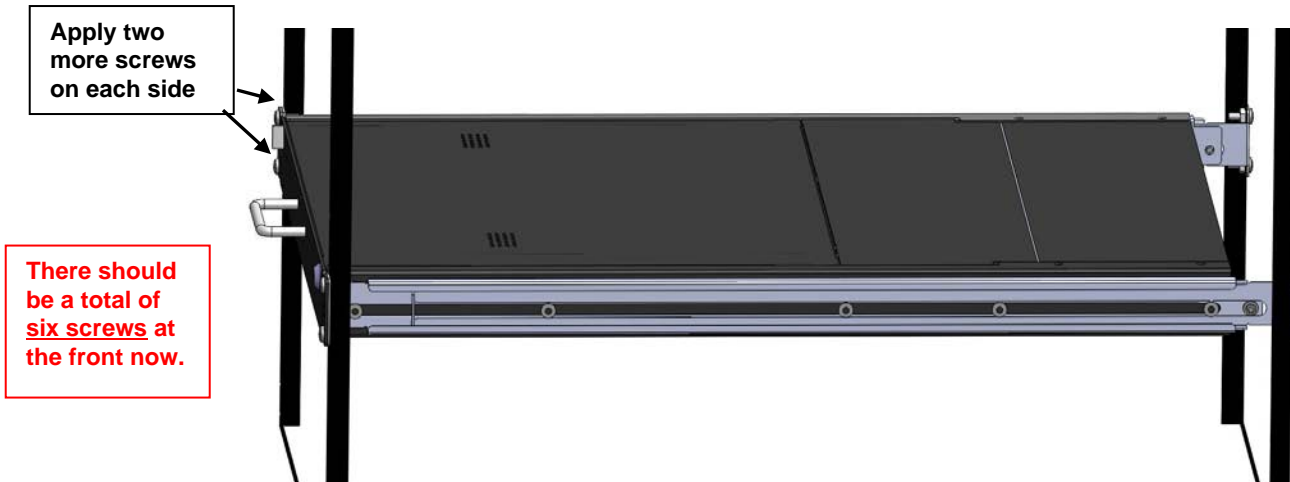


Figure 6- Apply remaining screws to complete installation

9. Tighten securely the four screws applied to the rear rail flanges in step 4.
10. Make your cable connections according to your RACKMUX Drawer instructions.

Your NTI RACKMUX Drawer is now installed and ready for cable connections.

## CABLE CONNECTIONS

### Connect Video Sources

1. Connect each of the HDMI video sources to the ports on UNIMUX marked "HDMI Inx" (x = 1-16).
2. Connect the power cord to the AC input and plug it in.
3. Press the switch to power the RACKMUX ON. In approximately 40 seconds the UNIMUX will boot up and be ready to use.
4. The RACKMUX keyboard provides keyboard control of the OSD menu of the UNIMUX. The UNIMUX supports transparent USB device connection such that the keyboard and touchpad mouse will also control the keyboard and mouse functions on any connected PC.
5. For each video source that is a PC, connect a USB2-AB-0-5M-5T cable (sold separately) between a USB type A female user device port on a CPU and a USB Type B female port on the SPLITMUX.

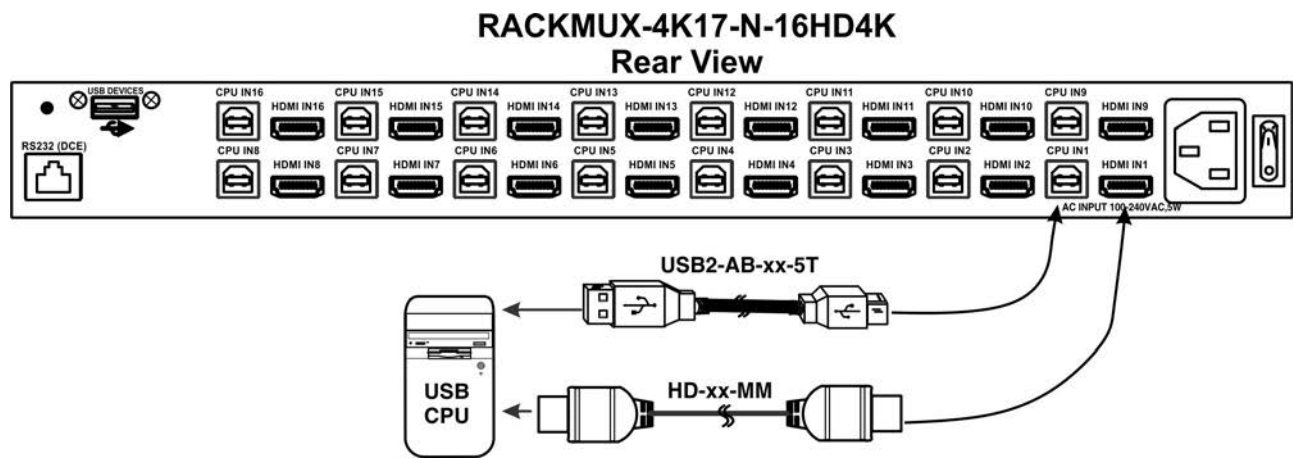


Figure 7- Connect each CPU and video source

6. Power-ON the video sources and CPUs.
  - The CPUs can be powered at any time although if a CPU needs a keyboard and/or mouse at power-ON it should be powered after connecting to and powering-ON the RACKMUX.

**Note:** The order in which the CPUs and switch are powered up does not matter. A power strip can be used.

7. Power-ON the RACKMUX. (The RACKMUX can be powered at any time.)

## Terminal Connection for RS232

If control via serial connection is going to be used, serial control can be achieved by connecting a control terminal to the “RS232” port .

**To use the “RS232” port**, connect one end of a CAT5 patch cable (supplied) to the port labeled “RS232” on the rear of the UNIMUX. Plug the other end of the CAT5 cable into an RJ45-to-DB9F adapter (supplied), and connect the adapter to the RS232 port on the control terminal.

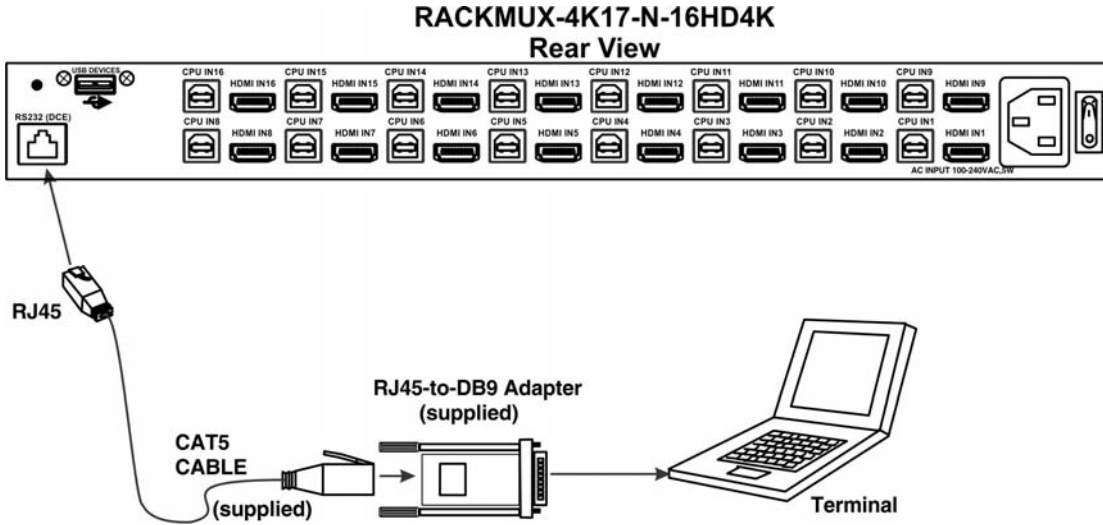


Figure 8- RS232 Terminal Connection

## Connect Extra Device

On the front of the RACKMUX is an additional USB Type A port to be used, if desired, for an extra accessory. Any low or full speed USB device may be connected to this port to be used. This port is fully compliant with USB standard 1.1.

**Note:** In order for the optional USB device port to be usable, the USB port on the rear of the RACKMUX must be connected to a USB enabled CPU (a 2 meter USB cable is supplied).

**Note:** If a USB keyboard or mouse is connected, operation of the RACKMUX keyboard or mouse may cause unpredictable results. Do not try to use both mice or both keyboards at the same time.

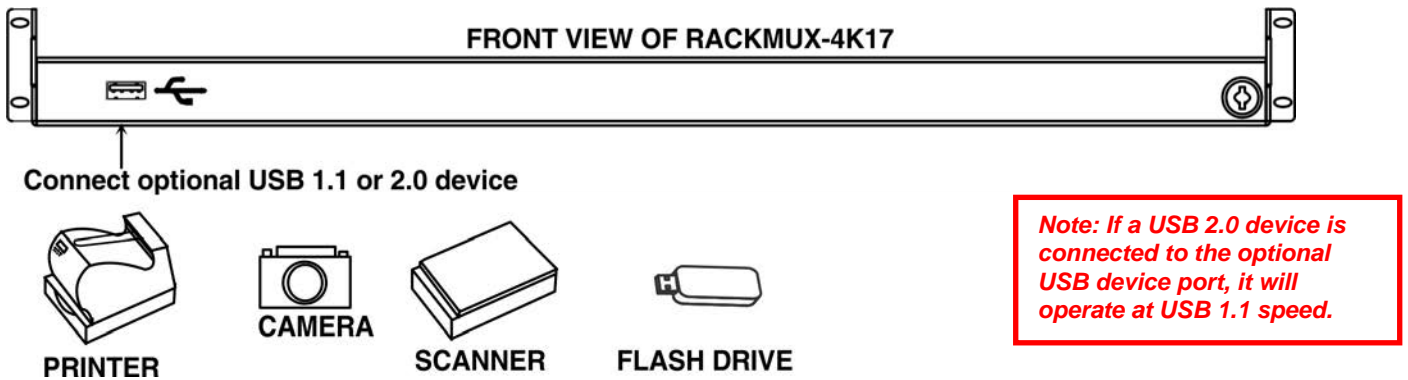
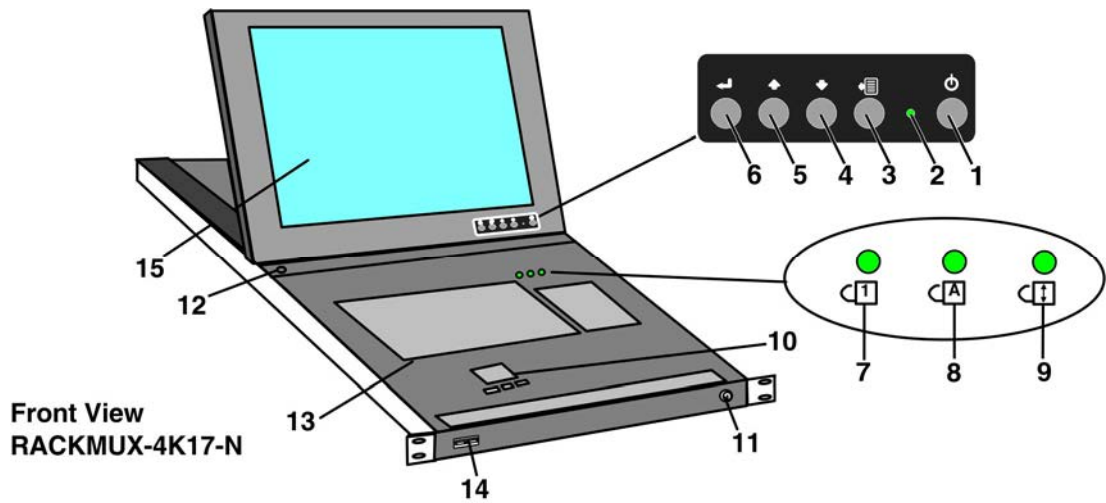
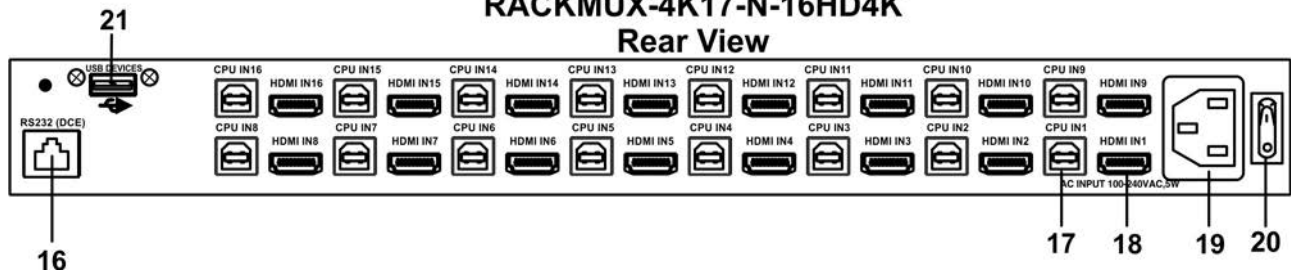


Figure 9- Connect a USB 1.1 device to the front (optional)

**FEATURES AND FUNCTIONS**



**RACKMUX-4K17-N-16HD4K  
Rear View**



#	LABEL	PHYSICAL	DESCRIPTION
1	<b>Power</b>	Button	press to turn only the LCD monitor ON and OFF
2	---	Green/Red LED	Indicates operation status Green = Power-ON, Video Input Signal OK Red = Suspend / Stand-by, or no Video Input Signal
3	<b>Menu</b>	Button	press to turn ON the OSD menu
4	<b>Down Arrow</b>	Button	press to move the cursor in the OSD menu down
5	<b>Up Arrow</b>	Button	press to move the cursor in the OSD menu up
6	<b>Select</b>	Button	press to select a menu item (when OSD menu is ON) or press to auto adjust the video quality (when OSD menu is OFF)
7	<b>NumLock</b>	Green LED	illuminates when the number lock is ON
8	<b>CapsLock</b>	Green LED	illuminates when CapsLock is ON
9	<b>Scroll Lock</b>	Green LED	illuminates when the Scroll Lock keyboard feature is ON.
10	---	3-button mouse	for controlling mouse movements on the monitor and controlling the computer
11	---	Keylock	to prevent unauthorized use of the RACKMUX
12	---	Auto Shut-OFF	switch automatically shuts OFF the LCD display when the monitor is folded down
13	---	Keyboard	for manual data entry and computer control
14	---	USB Type A	for connection of USB 2.0 device (flash drive, printer, CAC reader, etc)
15	---	LCD Display	for viewing the video signal from the connected CPU
16	<b>RS232</b>	RJ45 female	for attaching RS232 interface cable from a CPU to control the functions of one or more switches
17	<b>CPU INx</b>	USB Type B female	for connection of device cables from PCs- to provide control over mouse and keyboard functions
18	<b>HDMI INx</b>	HDMI female	for connection of video cables from video sources supplying Hi-Definition video
19	---	IEC Connector	for attachment of the IEC power cord to power the RACKMUX drawer
20	---	Main Switch	for powering ON and OFF the RACKMUX drawer
21	<b>USB Devices</b>	USB Type A	For connection of additional USB devices to connect to CPUs

## CONTROL METHODS

The UNIMUX, when built into a RACKMUX, can be controlled using any of three methods;

- Command Mode using the local keyboard, and touchpad mouse
- Mouse clicks from within some menus of Command Mode
- Using the Command Line Interface through RS232

### **Command Mode**

Once the UNIMUX is properly connected, the UNIMUX will enable a connection to be made between the CPUs attached to its VIDEO and CPU ports and the RACKMUX user. The RACKMUX keyboard and mouse will, by default, control the PC supplying the active video. The keyboard and mouse can also be used for controlling Standard Mode functions as well as OSD Mode.

### **Keyboard Control**

Keyboard control of the UNIMUX can be achieved using Command Mode - operated using the RACKMUX keyboard and mouse in conjunction with OSD menus superimposed onto the monitor.

By pressing <Ctrl> + < ` > (accent key), the user can enter Command Mode. The NumLock, CapLock and Scroll Lock LEDs will illuminate and stay ON while in Command Mode. Once in Command Mode, typing a series of commands will cause the UNIMUX to connect the user to any one CPU connected to the switch. Pressing the <Esc> key will exit Command Mode.

## USER ACCESS FUNCTIONS

### Introduction

The OSD menu enables a user to name the CPUs connected to the UNIMUX and connect to them using that name from a single keyboard and mouse. The OSD is positioned on the user's monitor, displaying 8 CPU names at a time. The screen can be used for switching as well as editing the CPUs' names. Through the OSD menu, the user can operate the UNIMUX to have the switch cycle through 3 extended modes of operation: COMMAND, BROADCAST, and SCAN .

### Command Mode

When entering the Command Mode from the keyboard using the <Ctrl> + <`> (accent key), the NumLock, CapLock and Scroll Lock LEDs will illuminate and stay ON and the OSD menu will automatically appear on the monitor. This provides a visual way to control the UNIMUX.

### Navigation

Keyboard Key	Action
Up/Down Arrow	Select previous or Next port (while in the Port List)
Page Up/Down	Advance to previous or to the next page of the Port List
Home	Select the first port in the displayed port list
End	Select the last port in the displayed port list
<number>	Select and switch to Port Number
Enter	Execute that selection
Shift-Tab	Move to previous field in the menu
Tab	Move to next field in the menu
Space	Toggle the selection of the highlighted field
F1	Bring up the Help Menu (see Figure 11)
Esc	Back up in the menu to the previous page or Exit the OSD menu

The mouse can also be used to control the UNIMUX within the Command Mode menu.

- The mouse cursor can be moved to anywhere on the OSD menu. Text in blue is selectable. The user can then single-click the left mouse button to make a selection, double-click to perform that function.
- Ports listed on the screen can be selected by moving the cursor onto that port and clicking. If the USB Device Reminder is enabled, an additional press of the <Enter> key will be needed (unless you press <Esc> and cancel the change).
- To scroll through the displayed ports on the screen simply click on the up and down arrows located to the right of the port names displayed.

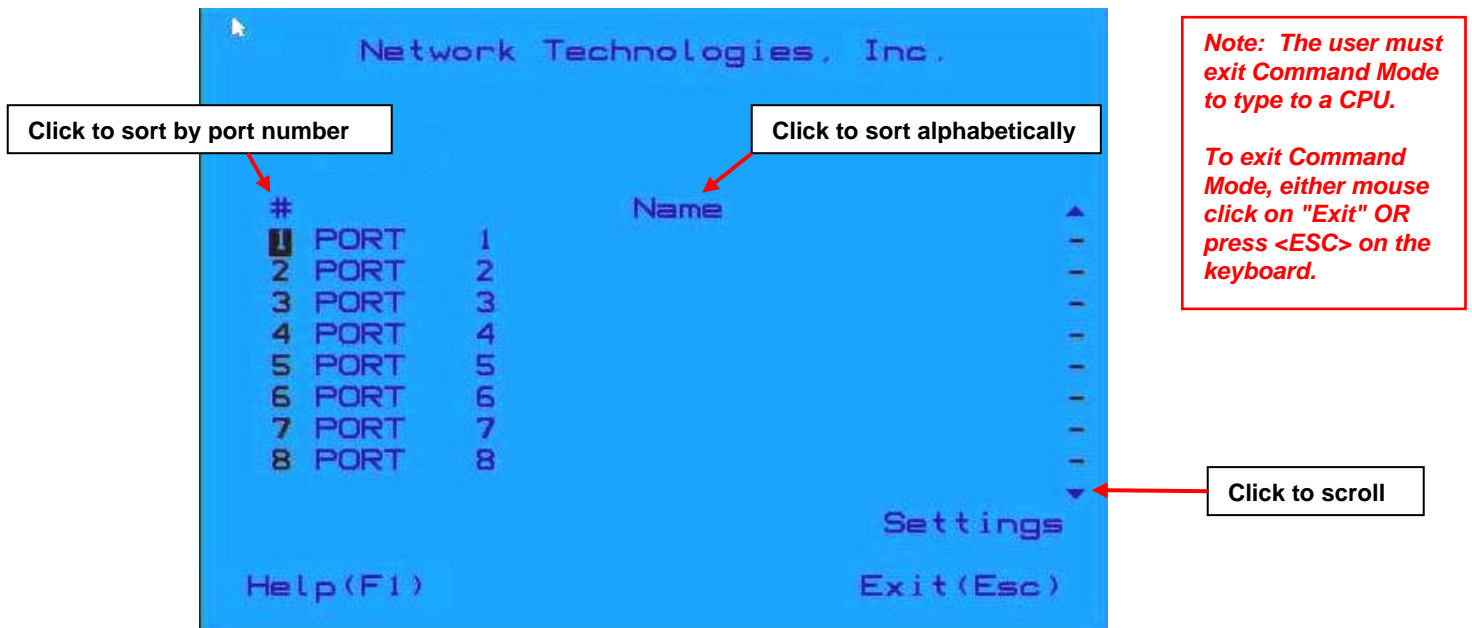


Figure 10- Port List (Main Menu)

To change the way the port list is displayed, the user can click on the "#" sign to have the list displayed numerically, or click in "Name" to have the list displayed alphabetically. If the user decides to rename the ports to something easy to remember, listing the alphabetically may be the most desired setting.

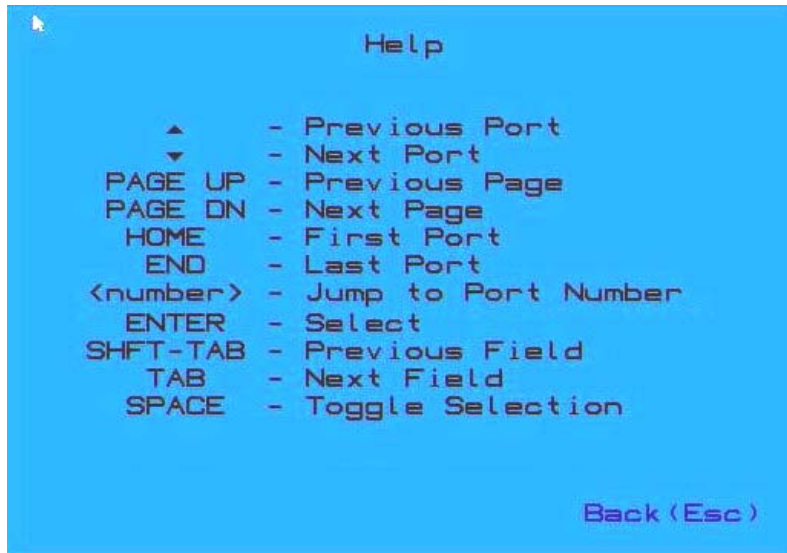


Figure 11- Help Menu

## Settings Menu

From the Settings Menu the user can quickly change the status of the major functions in the UNIMUX.



Figure 12- Settings Menu

The user can change the status of Scan Mode and Broadcast Mode between Disabled (red text) and Enabled (green text). Click on the status indicated to toggle it.

The user can enable or disable the "Stop USB Device" Reminder notice. While enabled, any time the user attempts to change to a different port number, a warning message will pop up forcing a decision to either proceed with or cancel the attempt. This provides opportunity for the user to properly eject a USB flash drive or any other device that may be harmed by an abrupt loss of connection between the user and the PC the flash drive is connected to.

To respond to the Stop USB Device warning, either click "Enter" or "Esc" with the mouse, or use keyboard keys.

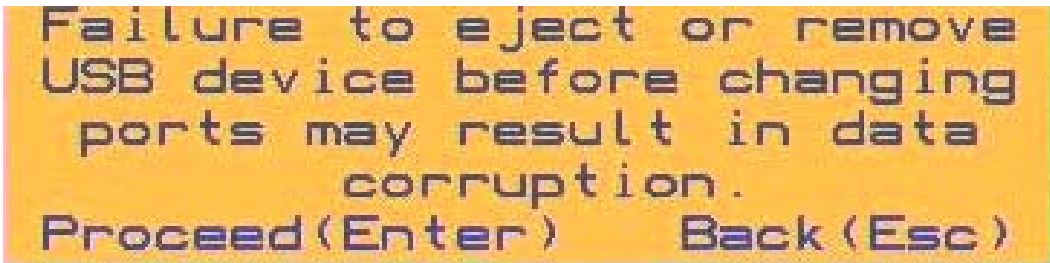


Figure 13- Stop USB Device Reminder warning

From the Setting Menu the user can also toggle the OSD menu to either be Opaque (have solid color) when on the display, or to be translucent (see-through). Click on the setting to toggle it.

**Broadcast Mode**

Broadcast Mode enables the user to select specific ports (see Figure 15) to be active in Broadcast Mode. Only the selected ports will receive keyboard messages in Broadcast Mode.

To activate or deactivate Broadcast Mode from the Command Mode menu, from the main menu click on Settings. From the Settings menu, click to display either Disabled (deactivate) or Enabled (activated).

Broadcast Mode enables the user to type characters to more computers simultaneously. From the Administrator Settings-Broadcast List menu (see page 19) the user can edit the list of ports that receive data in Broadcast Mode. A port doesn't receive broadcast data the port is not in the Broadcast Mode list

*Note: The user must type somewhat slowly when in Broadcast Mode (less than 20 wpm).*

*Note: While in Broadcast Mode the mouse will not work.*



Figure 14- Settings Menu



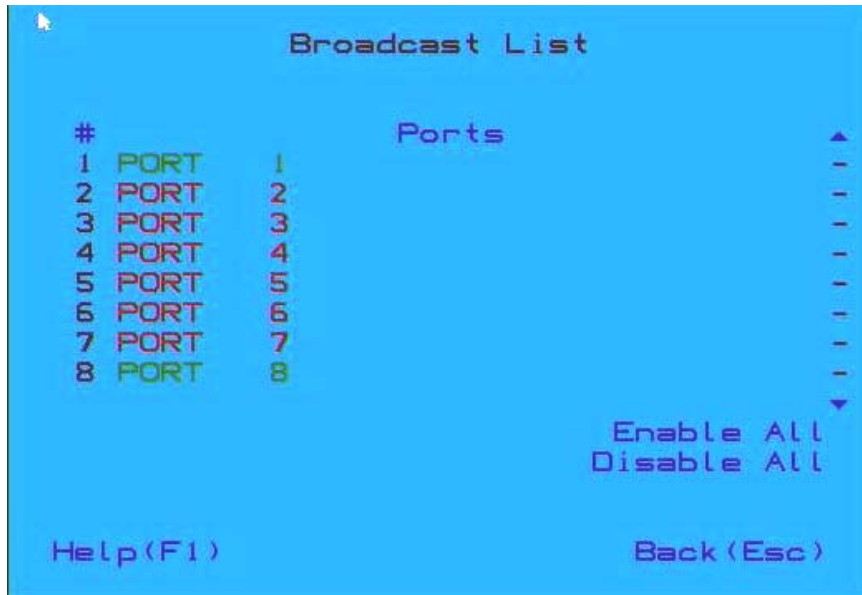


Figure 15- Broadcast List

From the Broadcast List, click on a port number to toggle its status. Ports displayed in green are included in the broadcast, ports in red are not. To quickly select all ports, click on "Enable All". To quickly deselect all ports, click on "Disable All". Selections are automatically saved.

### Scan Mode

Scan Mode enables the user to select specific ports (see Figure 17) to be active in Scan Mode. Only the selected ports will be scanned in Scan Mode.

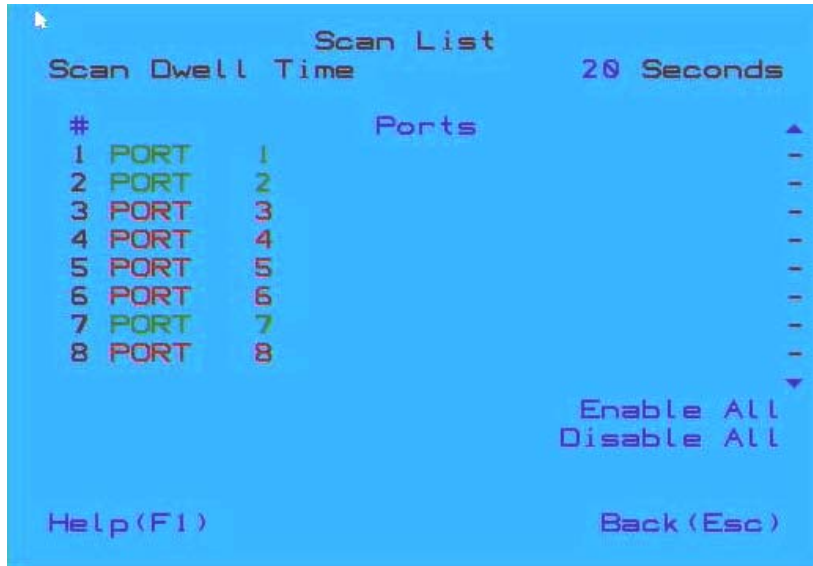
To activate or deactivate Scan Mode from the main menu click on Settings. From the Settings menu, click to display either Disabled (deactivate) or Enabled (activated).



Figure 16- Settings Menu

When in Scan Mode the switch scans to each port selected in the Scan List. Scan Mode will connect to selected ports, whether those ports are powered ON or not. The port with the CPU powered-ON remains active while in use until it becomes idle for the configured dwell time (Figure 17) (default time-out period is 15 seconds) before switching to the next selected CPU port. See Command Mode section above 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 port.



**Figure 17- Scan List**

From the Scan List, click on a port number to toggle its status. Ports displayed in green are included in the scanned, ports in red are not. To quickly select all ports, click on "Enable All". To quickly deselect all ports, click on "Disable All". Selections are automatically saved.

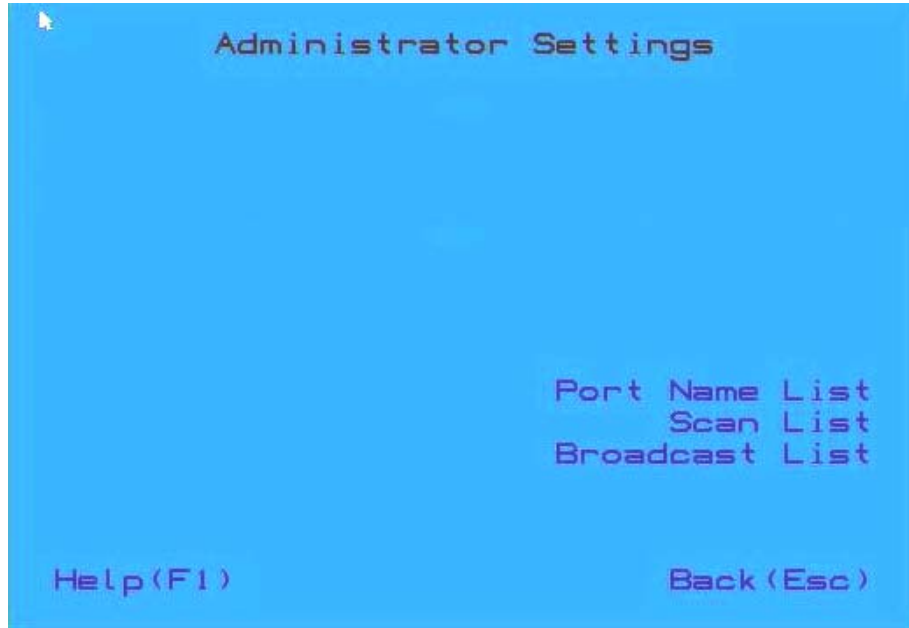
Click on the number across from "Scan Dwell Time" to select the field and enter a number between 0 and 255 (default is 15) to configure the length of time the connection will remain with a CPU before switching to the next CPU while the UNIMUX is in Scan Mode.

**Normal Mode**

When the UNIMUX is not in Command, Broadcast, or Scan mode, the user is in Normal Mode, controlling the CPU to which the user is connected through the USB KVM switch.

## Administrator Settings

The Administrator Settings menu provides access to specific administrative functions of the UNIMUX. From the Main Menu select Settings, then Administrator Settings.



**Figure 18- Administrator Settings**

Click the Port Name List to bring up a page where the names displayed for the UNIMUX and for each port can be edited.

Clicking on the Port Name List or Scan List will bring up the list of ports to be set to be affected by Broadcast and Scan modes (pages 12 and 13)

## Port Name List

The Port Name List is provided to enable the user to edit the names of the ports and switch. Port names and the switch name can be up to 30 characters in length. The user can customize the UNIMUX to make switching to frequently used ports more easily. The Port Name List is accessed from the Administrator Settings menu (page 15).



Figure 19- Port Name List

To quickly return the switch to factory settings for the switch name, port names, and all configured settings, click on "Restore Defaults".

To Edit the Switch name and Port Names:

Using the Keyboard:	Using the Mouse:
1.Press <Tab> to move between fields	1.Click on the field to select it
2.Press <Enter> to select a field to edit	2.Type the text to be used
3.Type the text to be used	3.Press <Enter> to save it
4.Press <Enter> again to save it	

Editing keyboard keys for name fields include: Backspace, Delete, Right Arrow, Left Arrow, Home, End and Insert.

## RS232 CONTROL

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

- a terminal program (e.g. HyperTerminal) from a PC connected to the RJ45 “RS232” port (page 7)
- use the NTI Switch Control Program (page 19)
- use the SerTest program (page 19)

## RS232 Connections and Configuration

### Remote Connection

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

#### RS232 (RJ45) CONNECTOR

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

A 5 foot patch cable and RJ45-to-DB9 adapter has been provided for connection to most CPUs (see page 7).

### Baud Rate

The default application baud rate for the UNIMUX is 115200. This can be changed to 1200,2400,4800,19200,38400,57600 or 115200 using RS232 control commands.

**Note: When performing a firmware upgrade, the baud rate will always be 115200, regardless of what the application baud rate has been set to.**

### Command Protocol

RS232 commands supported by the unit are defined below. All command strings should be terminated with a <CR> (carriage return). When a command is sent, the entire string is echoed back along with a response from the addressed unit as shown in the command definitions. All characters in the command string should be upper case, and all numbers below 10 should have a leading 0 (ex: 1 = 01).

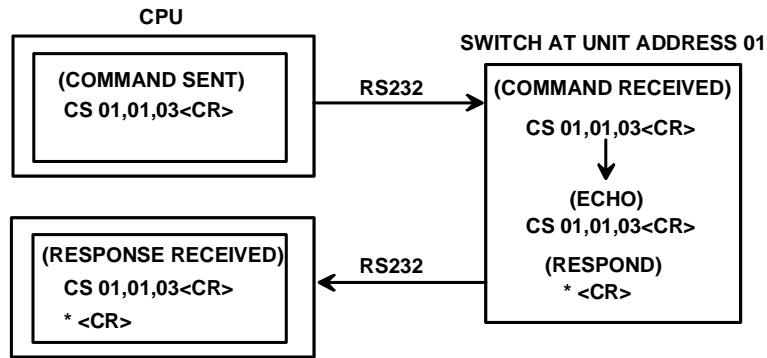


Figure 20- RS232 Communication Illustrated

**Legend:** (All numbers must be two digits)

- OP : Output (User) Port (01)
- IP : Input (CPU) Port (01-MAXINPUTS)
- BR : Baud Rate= **1200,2400,4800,9600,19200,38400,57600 or 115200**
- <CR> : Carriage Return (Hex 0xD)
- 01 : Switch serial address designator (cannot be changed)

**Command Definitions**

Command String	Good Response	Description
CS 01,IP,OP	*<CR>	Connect Input (CPU) Port To specific Output (User) Port
CB 01,BR	*<CR>	Change the baud rate (12=1200, 24= 2400, 48=4800, 96= 9600, 19=19200, 38=38400, 57=57600, 11=115200)
RV 01, 00	*<CR>	Returns firmware version and PROM format
RO 01,OP	*<CR>IP<CR>	Read Connection For Output (User) Port to Input (CPU) Port
RU 01	*<CR>IP,OP<CR>	Read Unit Size

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

**Syntax example:**

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

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

The NTI Switch Control Program is an easy and powerful graphical program that controls NTI switches through an RS232 interface. The NTI Switch Control Program can be downloaded from <http://www.networktechinc.com/download/d-4k-hdmi-usb-kvm-switch.html>.

To install the NTI Switch Control Program after downloading

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

**Note: In order to use the NTI Switch Control Program to control the UNIMUX, the UNIMUX RS232 port must be set at a baud rate of 9600 bps.**

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

To open "MSCP Help" from the Windows desktop

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

## SerTest- RS232 Interface Test Program

This software allows a user to test the functions of an NTI server switch, matrix switch or Multi-user/Multi-platform/Single-user switch RS232 interface. The SerTest program is automatically loaded when installing the NTI Switch Control Program as described above. The SerTest program, located in the NTI program group, generates a main menu with the 4 selections described below:

### Main Options

- Matrix Operations - send commands to the unit.
- Ethernet Operations - set Ethernet connection variables (not applicable to this model)
- Setup Options - set COM port, baud rate, and unit address
- About SerTest - display the program version

If Matrix Operations is selected, the following menu is displayed:

### **SWITCH OPERATIONS**

- 1) Reset Unit (not applicable to this model)
  - send a reset command to the switch
  - the current unit address is displayed in parentheses
- 2) Reset All Units - send an internal reset command to all switches (not applicable to this model)
- 3) Connect Output/User to an Input/CPU
  - connect an output to an input
- 4) Connect All Outputs/Users to an Input/CPU (not applicable to this model)
  - connect all outputs to an input
- 5) Connect Audio Output/User to an Input/CPU (not applicable to this model)
  - connect an output to an input
- 6) Connect All Audio Outputs/Users to an Input/CPU (not applicable to this model)
  - connect all outputs to an input
- 7) Change Mute Status for Audio Output/User (not applicable to this model)
  - mute or un-mute the Audio port output

- 8) Change Volume for Audio Output/User (not applicable to this model)
  - change Audio port output volume
- 9) Read Connection for Output/User
  - read what input is connected to the specified output
- a) Read Connection for Audio Output/User (not applicable to this model)
  - read what input is connected to the specified output
- b) Read Mute Status and Volume for Audio Output/User (not applicable to this model)
  - read the volume and the mute status of the specified output
- c) Read Unit Size
  - read the switch size (number of inputs and outputs)
- d) Read Unit Version/Revision String (not supported by this model)
  - read a string containing the switch version, type, and size
- e) Save I/O Connections into Unit Memory (not applicable to this model)
  - save the connections into switch memory bank
- f) Restore I/O Connections from Unit Memory (not applicable to this model)
  - restore the connections from switch memory bank
- g) Save All Units I/O Connections into Units Memory (not applicable to this model)
  - save the connections into switch memory bank, command for all switches
- h) Restore All Units I/O Connections from Units Memory (not applicable to this model)
  - restore the connections from switch memory bank, command for all switches
- i) Change All Units Baud Rate (9600/COM1) (not applicable to this model)
  - change RS-232 Baud rate of all switches
  - the current baud rate and serial port are displayed in parentheses

### **ETHERNET OPERATIONS (not applicable to this model)**

### **SETUP OPTIONS**

- 1) Select Com port current: (COM1:)
  - select PC serial port
  - the current PC serial port is displayed in parentheses
- 2) Select Baud rate current: (9600)
  - select PC serial port baud rate
  - the current baud rate is displayed in parentheses
- 3) Set unit Address current: (1)
  - select the unit address of the switch to be connected to by this program
  - the current address is displayed in parentheses

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

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



## Firmware Update

RS232 is also used when upgrading the firmware for the UNIMUX. To upgrade the firmware, the user must first access the bootloader menu.

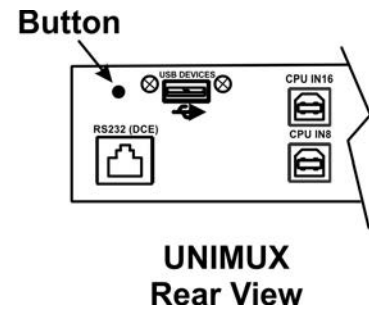
To access the bootloader menu,

1. Power OFF the UNIMUX
2. Press and hold the button to the left of the "USB DEVICES" port on the rear of the UNIMUX. While holding the button, power ON the UNIMUX.
3. When you see the bootloader menu on the PC connected to the RS232 port, release the button.

```

Bootloader Rev. 1.0
Build date: Apr  5 2018 10:02:45
Copyright (C)2018 Network Technologies Inc.
    
```

Press <H> for help...



Type <H> + <Enter> to display the commands menu:

When entering the command character for the desired function, an upper or lowercase character may be used. Simply type the character associated with the function, and press <Enter>.

```

>
>h

  Commands:
  -----

h, H - Display list of commands

a, A - Reset administrator password to default

d, D - Reset configuration to factory default

u, U - Update application firmware

i, I - Load PROM image

x, X - Exit administrator mode

>
    
```

The bootloader menu can be used for updating firmware, resetting the UNIMUX to factory default settings, and resetting the administrator password to default (no password is used as of this printing).

```

>a
Resetting administrator password...

Done
    
```

```
>d
Restoring configuration to default. Please wait.....
.....
```

```
>u

Erasing application memory...
Send .hex file using XModem protocol...

File transfer OK!
```

```
>i

Send .bin file using XModem protocol...
Configuration image file successfully programmed
```

```
>
```

Two files can be updated in the firmware configuration of the UNIMUX. Both files will be downloaded (to the PC that is connected via RS232) with the most current version of code for the firmware download page for this product, <http://www.networktechinc.com/download/d-4k-hdmi-usb-kvm-switch.html>. Filenames will be similar to *prom\_unhd4k\_vx\_xx.bin* and *appupdate\_unhd4k\_vx-xx.hex*. (x-xx = the version number). Check the release notes as to whether one or both files are updated from one version to the next (most of the time the .bin file will not be updated).

When using the u command, you will be prompted to send the .hex file. At the point, from the Terminal program, search for and send the *appupdate\_unhd4k\_vx-xx.hex* using **XMODEM** protocol. When the transfer is complete, you will see the message "File transfer OK!". Now either type <X> or power cycle the UNIMUX.

If the release notes call for updating the .bin file, use the i command in the same fashion. Upon completion, you will receive the message "Configuration image file successfully programmed". Again, either type <X> or power cycle the UNIMUX.

## DISPLAY FUNCTIONS

An NTI RACKMUX with a 17" monitor supports resolutions up to 3840 x 2160 @ 30Hz (1080p @ 60Hz). The quality of the image on the LCD monitor is adjustable using an On Screen Display (OSD) menu using the control buttons on the RACKMUX.

### Standard Controls

The RACKMUX has 5 standard control buttons and a power LED. The 5 standard control buttons operate as follows:

- The **Power** button turns the RACKMUX LCD Monitor and backlight ON and OFF as desired.
- The **Power LED** located immediately to the left of the Power button is a dual color LED. It will illuminate with a green color when the RACKMUX is powered ON and has video sync. It will illuminate with a red color if the RACKMUX is powered ON but there is no input signal detected.
- The **Menu/Select** button is used to bring up the OSD menu where the various settings of the LCD display can be adjusted. Once the OSD screen is displayed, the Menu/Select button is used to make selections within the menus. See "OSD Control Menu" (below) for more on LCD display settings.
- The **Up and Down Arrow** buttons are used to navigate through the menus. Move the cursor up or down as desired to highlight an item for selection. Once an item is highlighted, pressing the Menu button will select it.
- The **Exit/Auto Adjust** button will exit the OSD menu when visible. When the OSD menu is OFF, the button will act as an **Auto Adjust** button to keep the user from having to use the menus to adjust the quality of the image on the monitor.

### OSD Control Menu- 17.3 Inch Hi-Definition 4K Monitor

The OSD (On Screen Display) Menu enables the user to select the desired characteristics of the LCD display. To activate the OSD Menu, press the **Menu** button (below). To turn the Menu back OFF, either press the Exit button or just wait approximately 10 seconds (timing is adjustable) and it will automatically be cleared from the screen. Any changes made before exiting the menu will be saved.

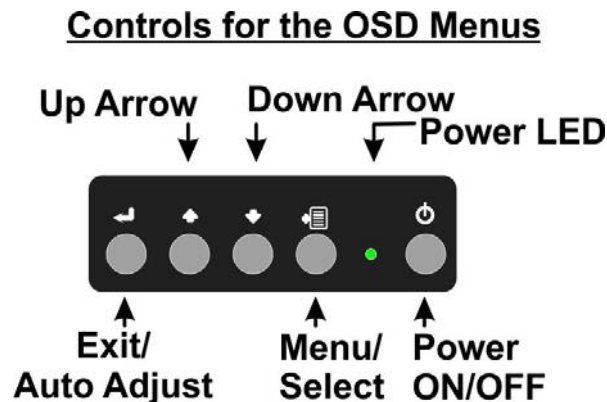


Figure 21- OSD Controls

## OSD Main Menu

The Main Menu is broken into eight sections, Input Source, Brightness/Contrast, Color, Picture Quality, Display, Audio, Multi-Window and Other (Misc). Press one of the arrow buttons to move between them. To select a menu and move to characteristics within them (i.e. VGA, DP OR hdmi2.0 under the Input Source menu), press the **Select** button while the desired menu is displayed.



Note: The input source for this product should always be set to HDMI2.0.

Images of the other menus are provided on the following pages for your reference.

Press the **Exit** button or select "Exit" to exit the OSD menu.

HDMI		Resolution: 1280x720@60Hz
Input Source	Brightness	100
<b>Brightness/Contrast</b>	Contrast	50
Color Setting	DCR	Off
Picture Quality Setting		
Display		
Audio		
Multi-Window		
Other		
	Window1: InputSource: HDMI Resolution: 1280x720@60Hz	Window2: InputSource: Resolution:
	Window3: InputSource: Resolution:	Window4: InputSource: Resolution:

HDMI		Resolution: 1280x720@60Hz
Input Source	Gamma	2.2
Brightness/Contrast	Picture Mode	Standard
<b>Color Setting</b>	Color Temperature	USER
Picture Quality Setting	USER	
Display	Hue/Saturation	
Audio		
Multi-Window		
Other		
	Window1: InputSource: HDMI Resolution: 1280x720@60Hz	Window2: InputSource: Resolution:
	Window3: InputSource: Resolution:	Window4: InputSource: Resolution:

HDMI		Resolution: 1280x720@60Hz
Input Source	Bypass	Off
Brightness/Contrast	Sharpness	50
Color Setting	Response Time	Off
<b>Picture Quality Setting</b>	Noise Reduction	Off
Display	Super Resolution	Off
Audio	Dynamic Luminous Control	Off
Multi-Window		
Other		
	Window1: InputSource: HDMI Resolution: 1280x720@60Hz	Window2: InputSource: Resolution: Window4: InputSource: Resolution:

HDMI		Resolution: 1280x720@60Hz
Input Source	Aspect Ratio	Wide Screen
Brightness/Contrast	H-Position	50
Color Setting	V-Position	50
Picture Quality Setting	Clock	50
<b>Display</b>	Phase	50
Audio	Auto Adjust	
Multi-Window	DP Version	
Other		
	Window1: InputSource: HDMI Resolution: 1280x720@60Hz	Window2: InputSource: Resolution: Window4: InputSource: Resolution:

HDMI		Resolution: 1280x720@60Hz
Input Source	Aspect Ratio	Wide Screen
Brightness/Contrast	H-Position	50
Color Setting	V-Position	50
Picture Quality Setting	Clock	50
<b>Display</b>	Phase	50
Audio	Auto Adjust	
Multi-Window	DP Version	
Other		
<b>Window1:</b> InputSource: HDMI Resolution: 1280x720@60Hz <b>Window3:</b> InputSource: Resolution:		<b>Window2:</b> InputSource: Resolution: <b>Window4:</b> InputSource: Resolution:

HDMI		Resolution: 1280x720@60Hz
Input Source	Mute	On
Brightness/Contrast	Volume	50
Color Setting		
Picture Quality Setting		
Display		
<b>Audio</b>		
Multi-Window		
Other		
<b>Window1:</b> InputSource: HDMI Resolution: 1280x720@60Hz <b>Window3:</b> InputSource: Resolution:		<b>Window2:</b> InputSource: Resolution: <b>Window4:</b> InputSource: Resolution:

Note: the Audio option is not be applicable to this product.

HDMI		Resolution: 1280x720@60Hz
Input Source	Multi-Window	Off
Brightness/Contrast	Sub Win2 Input	HDMI2.0
Color Setting	Sub Win3 Input	HDMI2.0
Picture Quality Setting	Sub Win4 Input	HDMI2.0
Display	PIP Size	Medium
Audio	PIP Position	TopRight
<b>Multi-Window</b>	Swap	
Other		
	<b>Window1:</b> InputSource: HDMI Resolution: 1280x720@60Hz <b>Window3:</b> InputSource: Resolution:	<b>Window2:</b> InputSource: Resolution: <b>Window4:</b> InputSource: Resolution:

Note: the Multi-window option is not be applicable to this product.

HDMI		Resolution: 1280x720@60Hz
Input Source	Language	English
Brightness/Contrast	OSD H-Position	50
Color Setting	OSD V-Position	50
Picture Quality Setting	OSD Transparency	20
Display	OSD Time Out	100
Audio	OSD Rotation	Normal
Multi-Window	Reset	
<b>Other</b>		
	<b>Window1:</b> InputSource: HDMI Resolution: 1280x720@60Hz <b>Window3:</b> InputSource: Resolution:	<b>Window2:</b> InputSource: Resolution: <b>Window4:</b> InputSource: Resolution:



# KEYBOARD FUNCTIONS

## Numeric Keypad

This RACKMUX has a standard Windows keyboard with 17-key numeric keypad.

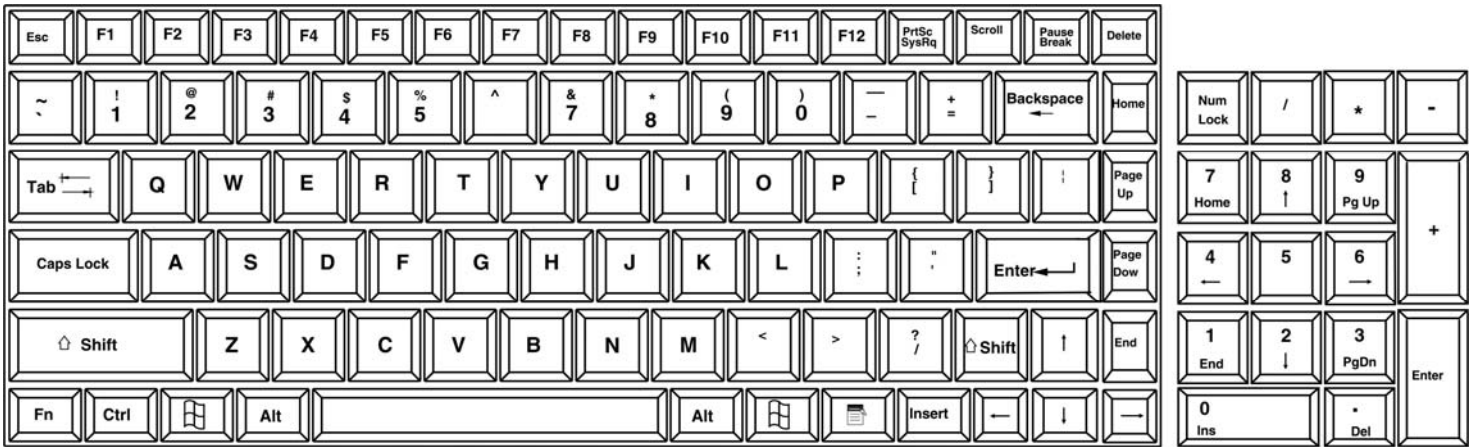


Figure 22- U.S. (English) keyboard with numeric keypad

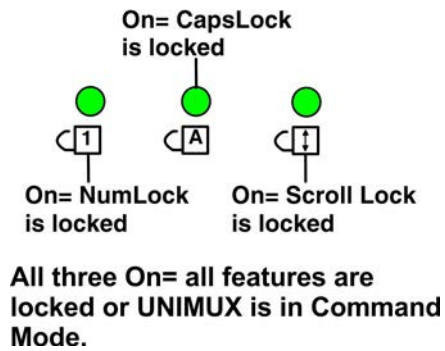


Figure 23- Keyboard LED Indications

## SAFETY

This NTI product has been designed and fully tested with user safety of the utmost importance. As with all electronic devices, this NTI product should be handled and operated with care. In order to avoid possible injury and to reduce any risk of damage to this product, please read and follow each of these safety instructions.

- Follow all instructions found in this manual
- Follow all instructions found on the product
- Do not attempt to perform any service on this product unless specifically instructed to in this manual
- Do not remove covers or disassemble
- Objects that can damage or be spilled on this product should be kept away from this product. Liquids, if spilled, could come into contact with voltage points causing a risk of fire or electrical shock.
- Always unplug this product before cleaning it
- Do not use any liquid or aerosol cleaners to clean this product
- Do not install or use this product near water
- Be sure to mount this product on a solid, stable surface or in a rack (if applicable)
- Route all cables and the power cord away from sharp edges or objects that could cause damage to them
- Use only the power cord or AC adapter that came with this unit or one that meets the requirements specified in this manual
- Use only a properly grounded 3-wire electrical outlet for power connection
- Unplug this product and contact NTI should any of the following conditions occur:
  - The power cord or connection cables have been damaged
  - The product has come into contact with any liquids
  - The product does not operate properly despite having followed all of the instructions
  - The product has been dropped or the case has been damaged in any way
  - The product performs distinctly different than it did when first put into service

**RACKMUX-KVM DRAWER STANDARD SPECIFICATIONS**

**General Specs**

Case Material.....	Electro-galvanized steel black powder coated
Dimensions WxDxH (in.).....	19 x 23.9 x 1.75
Supported Rack Depths.....	Adjustable 24" – 40"
Weight.....	26 lbs.
Input Power.....	AC 100-240V, 50 – 60 Hz
Operating Temperature.....	0-40° C
Storage Temperature.....	-20-60° C
Relative Humidity.....	20-90%, non-condensing
Approvals.....	All parts comply with RoHS

**LCD – 17.3” UHD/4K**

Display area.....	382.1mm (W) x 214.9 (H) (17.3 inch diagonal)
Panel Type.....	TFT Active
Number of Pixels.....	3840 (H) x 2160 (V)
Color Depth.....	8 bit, 16.7M colors
Pixel Pitch.....	0.0995(H) x 0.0995(V)
Brightness.....	340cd/m2 minimum, 400cd/m2 typ
Backlight.....	LED

**Display Controller: HDMI**

Connector.....	HDMI, female
Video Format.....	Up to UHD
Signal Input (from Video Source).....	Digital TMDS
OSD Control.....	Menu, Up, Down, Select, Power (5 keys)
Plug and Play.....	VESA DDC 2B Ver1.3

**OSD Control Board**

OSD Control.....	5 Keys
Power Key.....	Power ON/OFF
Menu Key.....	Activates Menu
Up, Down Keys.....	Navigation Control
Select Key.....	Select (when in Menu); Auto Adjust (not in menu)
LED.....	Indicates Operation Status
.....	Green = Power-ON, Video Input OK
.....	Red = Suspend / Stand-by, or Input Out of Range

**Keyboard**

No. Of Keys.....	104 Keys (US)
Key Switch Type.....	Membrane switch
Keytop Style.....	Rectangular Cylindrical
Operating Force.....	50gf +/- 25gf
Stroke.....	3.0mm +/- .5mm
Tactile.....	20 gf typ.
Height.....	8.5 mm
Operating Life.....	10M operations, minimum
Interface.....	Row and column matrix
Key Switch Bounce.....	10 ms, maximum
Supported Platforms.....	USB, PS/2
CPU Connectors.....	USB Type B (USB);

## Touchpad

Motion Detection Method .....	capacitance sensing
X/Y Position Sensing Resolution .....	40 counts/mm
X/Y Position Reporting.....	Relative (Similar to mouse)
Tracking Speed.....	Up to 1016 mm/sec
Touch Force.....	No Contact pressure required
Lifetime (Plastic Overlay) .....	Minimum 10,000,000 strokes
Sample Rate .....	Up to 100 samples/sec

## TROUBLESHOOTING FOR KVM DRAWER

Each and every piece of every product produced by Network Technologies Inc is 100% tested to exacting specifications. We make every effort to insure trouble-free installation and operation of our products. If problems are experienced while installing this product, please look over the troubleshooting chart below to see if perhaps we can answer any questions that arise. If the answer is not found in the chart, a solution may be found in the knowledgebase on our website at <http://information.networktechinc.com/jive/kbindex.jspa> or please call us directly at **(800) 742-8324 (800-RGB-TECH)** or **(330) 562-7070** and we will be happy to assist in any way we can.

Problem/Message	Cause	Solution
"OUT OF FREQUENCY"	Input signal is outside the supported range	Lower or raise video frequency to be within specified range
"POWER SAVER MODE"	The input signal is not present. This message will disappear after 5 seconds.	Check all cable connections- verify that they are secure and that video is available
"NO SIGNAL"	The input signal is not present immediately after power ON.	Check all cable connections- verify that they are secure
"AUTO CONFIGURATION"	The LCD monitor is configuring itself for proper communication with the CPU.	No action necessary
Keyboard/touchpad not functioning	<ul style="list-style-type: none"> <li>Keyboard is in the incorrect mode</li> <li>Cables are not properly connected</li> </ul>	<ul style="list-style-type: none"> <li>Toggle the keyboard mode from PS/2 to USB. (Press &lt;Ctrl&gt; + &lt;T&gt; keys for 8 seconds)</li> <li>Check all cable connections between the RACKMUX and the computer.</li> </ul>
LCD is not displaying image	<ul style="list-style-type: none"> <li>Image out of range</li> <li>LCD Auto-Shut OFF button is depressed</li> <li>LCD is powered OFF</li> </ul>	<ul style="list-style-type: none"> <li>Lower the resolution</li> <li>Make sure nothing is resting on the button</li> <li>Turn power to LCD ON using button on monitor</li> </ul>

## INDEX

accessory USB port, 7  
 baud rate, 17  
 Broadcast Mode, 12  
 Command Mode, 9  
 Display functions, 21  
 Drawer installation, 2  
 features, 8  
 keyboard control, 9  
 numeric keypad, 24

OSD Controls, 21  
 RS232 commands, 17  
 RS232 Control, 17  
 RS232 pinout, 17  
 Scan Mode, 13  
 SerTest, 19  
 terminal, 7  
 USB port, 7

## 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.