

## KEEMUX® Series

# KEEMUX-Px PS/2 KVM Switch Installation and Operation Manual



## 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.

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### **CHANGES**

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## INTRODUCTION

The KEEMUX PS/2 KVM switch (KEEMUX) enables access to several IBM PC-AT, PC-AT Clone or PS/2 CPUs from one monitor, keyboard and PS/2 mouse (up to 32 CPUs as a single switch or 152 CPUs when switches are cascaded). These CPUs can be file servers, network managers, etc. Internal microprocessor driven circuitry allows all CPUs to be booted simultaneously and error free with only one keyboard and mouse present. Port selection is accomplished through front panel push buttons or commands typed on the keyboard. Port status LEDs continuously update on the front panel of the switch.

### Available Options

- Switch models are available in 60 or 50 Hz, and 110 or 220V.
- OSD -On Screen Display feature will superimpose operating menus directly onto the monitor for security administration and control. Add "-O" to the part number (i.e. KEEMUX-Px-O)
- RS232 support for alternative control using RS232 connection Add "-RS" to the part number (i.e. KEEMUX-Px-RS)
- Audio support to enable user to connect stereo speakers to receive audio signals from connected CPUs- add "-A" to the part number (i.e. KEEMUX-Px-A)
- Dual Video option supports CPUs with two video outputs. Add "-DV" to the part number (i.e.KEEMUX-Px-DV)
- DDC Support- for use with DDC enabled monitors. Add "-D" to the part number. (i.e. KEEMUX-Px-D)

See our catalog, visit our website at <http://www.networktechinc.com>, or contact an NTI sales representative at 800-742-8324 (800-RGB TECH) or 330-562-7070 for more details.

### Limitations

- The KEEMUX Px KVM switch is compatible with PS/2 mice and PS/2 CPU ports ONLY. Serial mice cannot be adapted for use with the KEEMUX Px KVM switch.
- Serial ports on CPUs require the NTI VOPEX-IM9D for use with this switch.

## MATERIALS

### Materials Supplied with this kit:

- NTI KEEMUX Px KVM Switch (4,8,12,16,20,24, or 32 port)
- 120VAC or 240VAC at 50 or 60Hz-5VDC/2.0A AC Adapter
- Line cord, country specific
- This owners manual

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

Monitor, keyboard, and mouse interface cables ARE REQUIRED but not supplied.

- |            |   |                                    |
|------------|---|------------------------------------|
| • MONITOR  | - | VEXT-xx-MM for video interface     |
| • KEYBOARD | - | VKEXT-xx-MM for keyboard interface |
| • MOUSE    | - | VKEXT-xx-MM for mouse interface    |

### Optional:

- |                                |   |                                                                |
|--------------------------------|---|----------------------------------------------------------------|
| • KEYBOARD<br><u>and</u> MOUSE | - | VVKINT-xx-MM "Y"-cable for keyboard <u>and</u> mouse interface |
|--------------------------------|---|----------------------------------------------------------------|

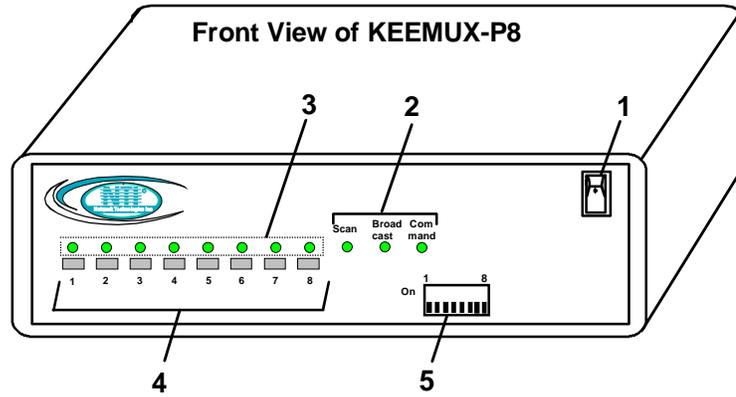
Where:

xx is the length of the cable in feet

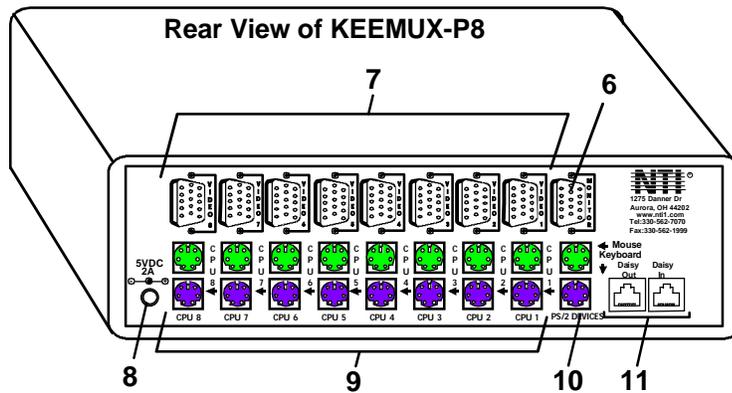
MM indicates male-to-male connector

All cables can be purchased from Network Technologies Inc by calling 800-RGB-TECH (800-742-8324) or (330)-562-7070.

**FEATURES AND FUNCTIONS**



1. Power ON/OFF switch
2. Mode LEDs- for visual indication of switch mode status
3. CPU Status LEDs- for visual indication of connection between the user and a specific CPU.
4. CPU Select Switches- push to manually switch to a specific CPU
5. Dip-switches- for configuring cascaded switches
6. MONITOR- 15HD female connector- for connection of the user monitor
7. VIDEO x- 15HD female connectors- for connecting video cables from CPUs
8. 5VDC- 2.0A- connection jack for the AC adapter
9. CPU x- 6 pin miniDIN female connectors- for connection of device cable(s) from CPU(s)
10. PS/2 DEVICES- 6 pin miniDIN female connectors- for connection of user device(s) (keyboard/mouse)
11. DAISY In/Out- for attaching interface cables (REXT-SR-xx) between slave switches and the master switch



# INSTALLATION

## Prepare To Connect

1. Before connecting the KEEMUX to the CPUs, make sure all CPUs, the monitor, and the KEEMUX are turned OFF.



**WARNING! DAMAGE MAY OCCUR TO THE CPU IF POWER IS NOT DISCONNECTED BEFORE CONNECTING OR DISCONNECTING CABLES.**

2. The dip-switches on the front panel are configurable for several tasks. Switches 1-6 are used for cascading actions (see CASCADING on page 5) and switches 7 and 8 are for keyboard configuration. These keyboard configuration switches come pre-configured with both in the “OFF” position. Do not change these settings, as this will cause the PS/2 keyboard to not work.

*FYI: Should switch 7 or 8 get changed to the “ON” position, it will be necessary to power-down the entire system (including CPUs), change the dip-switches back to the “OFF” position, and then power the system back up. If it is necessary to replace one PS/2 keyboard with another one, the keyboard can be hot-swapped without powering-down. Refer to Fig. 1 for instructions on proper keyboard dip-switch configuration.*

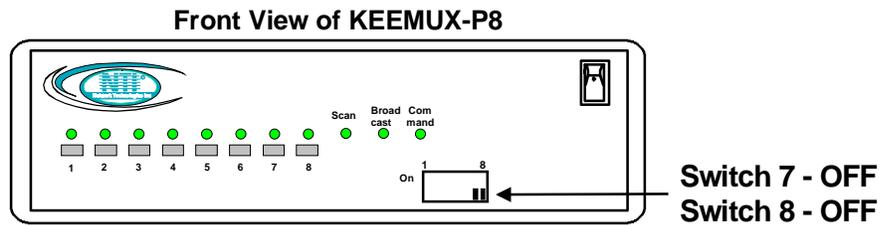


Figure 1- Keyboard dip-switch configuration

## Make Connections

1. Connect the monitor cable to the 15HD female port labeled “MONITOR” on the rear panel of the KEEMUX.

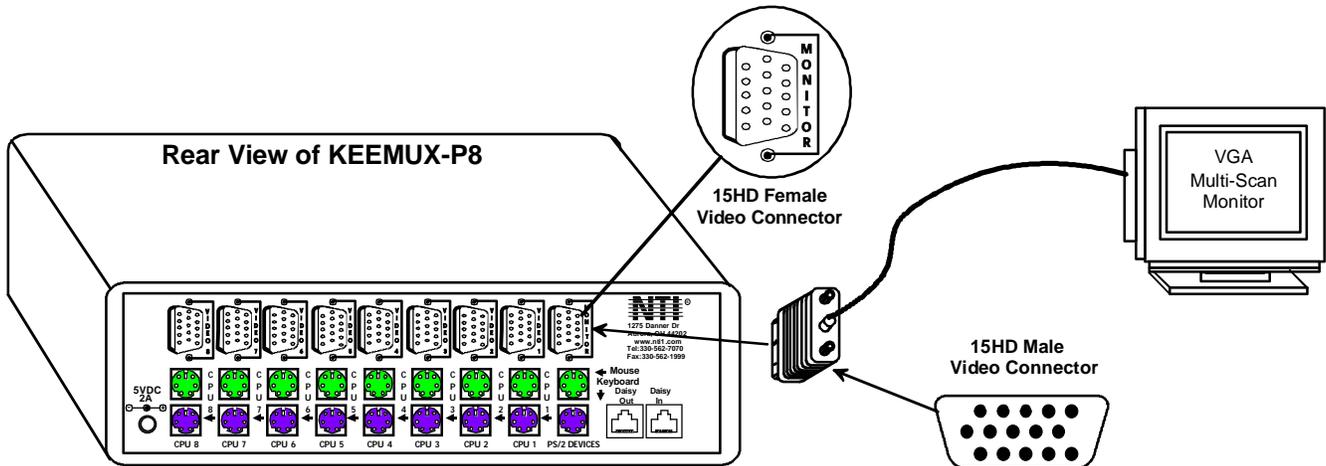


Figure 2- Connect the monitor to the KEEMUX

- Connect the keyboard cable to the 6 pin miniDIN female port labeled "KEYBOARD" on the rear panel of the switch. Connect the mouse cable to the 6 pin miniDIN female port labeled "MOUSE" on the rear panel of the KEEMUX.

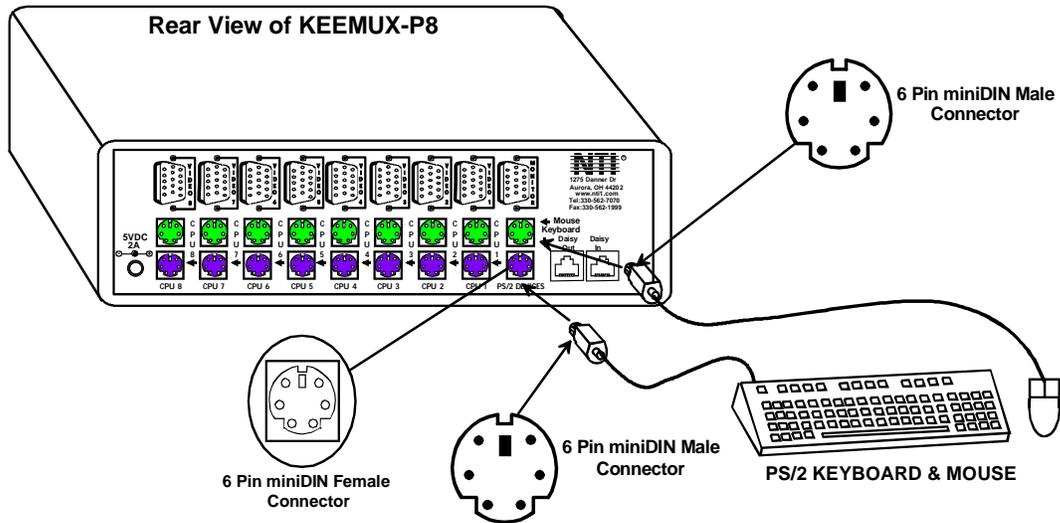
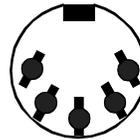


Figure 3- Connect the user keyboard and mouse

- Connect each CPU to the keyboard, monitor and mouse ports using VEXT-xx-MM for the monitor and VKEXT-xx-MM (2) for the mouse and keyboard- REQUIRED (not supplied). See Fig. 4.
  - Group the keyboard, monitor and mouse interface cables from each CPU.
  - Make sure that cables from the first CPU are connected to the VIDEO 1 and CPU 1 MOUSE and KEYBOARD connectors.
  - Cables from the second CPU should connect to the VIDEO 2 and CPU 2 MOUSE and KEYBOARD connectors...etc.

**NOTE:** If an AT style keyboard connector is on a CPU, insert an adapter cable (ADP-5D6MD-R) between the CPU and VKEXT-xx-MM cable.



AT Style Connector

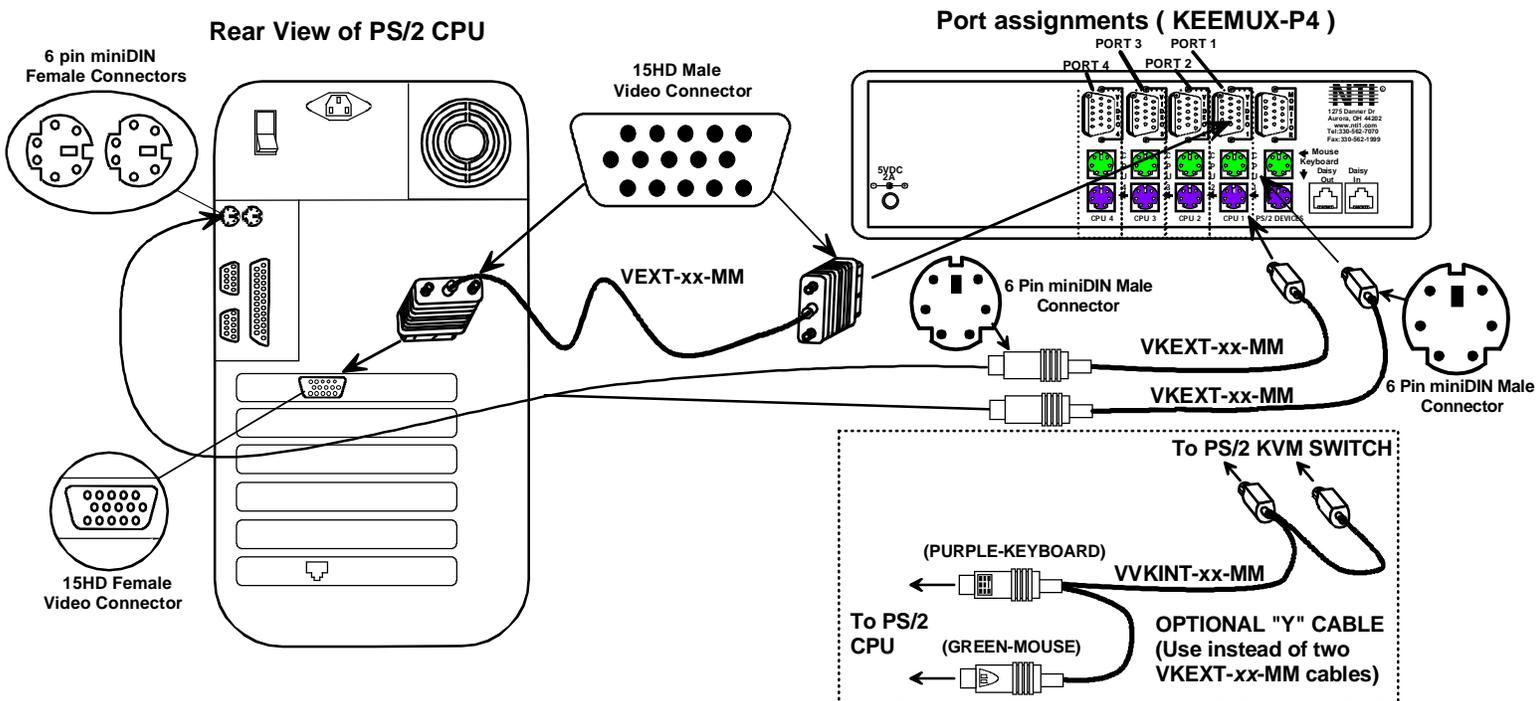


Figure 4- Connect a CPU to the KEEMUX

## Power Up

1. Turn the KEEMUX power ON first. The mode LEDs on the KEEMUX should flash twice.
2. Turn the monitor power ON.
3. Turn any or all of the CPUs ON.

**FYI:** Do not press any port buttons on the front panel until the PORT 1 light on the front panel illuminates.

## CASCADING

The KEEMUX switch can be expanded to access up to 152 CPUs by cascading multiple units together, as illustrated below. The KEEMUX connected to the monitor and keyboard must be configured as the “master unit” (via dip-switches). Any switches connected to the master unit must be configured as “slave units”. All KEEMUXs are fully configurable for this expansion method. The only additional hardware required is a set of keyboard, monitor, mouse, and RMT extension cables for each slave unit (see Fig. 5 below).

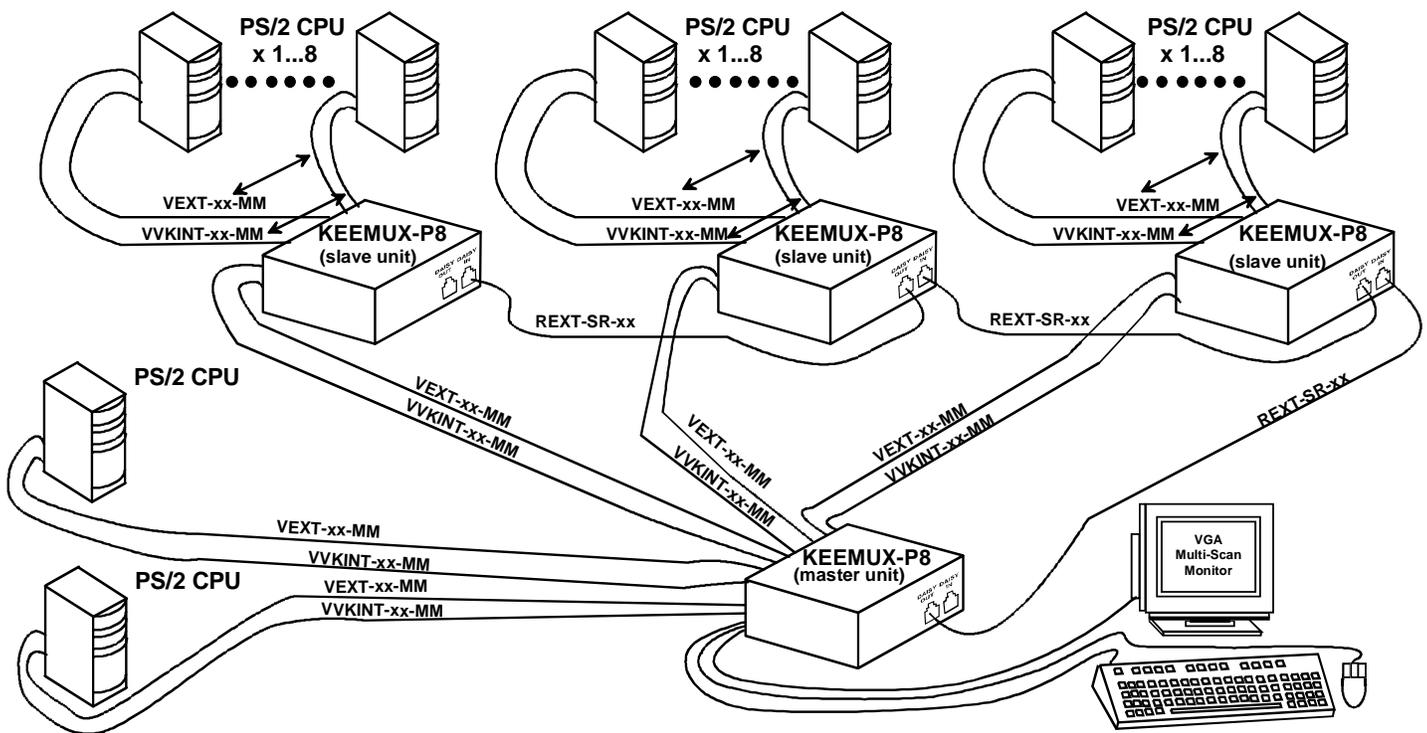


Figure 5- Cascaded configuration

## Limitations

- a. All the slave units must be the same size.
- b. Only 4, 8, or 16-port switches can be used as slave units.
- c. Up to 8 slave units may be connected to form a maximum system size of 152 ports (1 x 32 port master + 8 x 16 port slaves).
- d. Slave units must be added to the master unit in order (slave #1 to master's port 1, slave #2 to master's port 2, etc.).

**FYI:** Port 1 of the master unit (with a 4-port slave unit connected to it) will function and be controlled as ports 1-4 (1-8 for an 8-port slave, 1-16 for a 16-port, etc.). Port 2 of the master unit (with a second 4-port slave unit connected) will function and be controlled as port numbers 5-8 (9-16 for an 8-port slave, 17-32 for a 16-port slave, etc.). See Fig. 6 on page 6.

- e. All units must be powered OFF during configuration and interconnecting.

## Configuration

All 4, 8, and 16-port units are configured using the 8-position dip-switch (located on the front of each unit) according to tables 1 and 2 below.

### Front Panel Configuration Switches

Table 1 * (default settings)			
Switch	SW1	SW5	SW6
STAND-ALONE SWITCH	OFF*	OFF*	OFF*
SLAVE	ON	OFF	OFF
MASTER W/4-PORT SLAVES	OFF	OFF	ON
MASTER W/8-PORT SLAVES	OFF	ON	OFF
MASTER W/16-PORT SLAVES	OFF	ON	ON

Table 2 * (default settings) Master & Slave SW2-4 Settings				
SW2	SW3	SW4	Master with-	Slave Setting
OFF*	OFF*	OFF*	No Slave Attached	N/A
OFF	OFF	OFF	1 Slave attached	Slave Unit #1
OFF	OFF	ON	2 Slaves attached	Slave Unit #2
OFF	ON	OFF	3 Slaves attached	Slave Unit #3
OFF	ON	ON	4 Slaves attached	Slave Unit #4
ON	OFF	OFF	5 Slaves attached	Slave Unit #5
ON	OFF	ON	6 Slaves attached	Slave Unit #6
ON	ON	OFF	7 Slaves attached	Slave Unit #7
ON	ON	ON	8 Slaves attached	Slave Unit #8

#### About Table 2:

These switch settings are used by the slave(s) to establish its identity (i.e. location in the group) to the master.

On a master, the same switches are used to configure the master for how many slaves are attached to it.

## Cascaded Installation

- Attach all slaves consecutively to the master switch.
  - Perform steps 1 and 2 under INSTALLATION on page 4 for each slave unit.
  - Configure each switch as per the tables above under CONFIGURATION before proceeding.
  - With a VEXT-xx-MM cable, connect slave #1 monitor port to master's VIDEO 1 port.
  - With a VVKINT-xx-MM or (2) VKEXT-xx-MMs, connect slave #1's PS/2 DEVICES ports to the master's CPU1 KEYBOARD and MOUSE ports.
  - Repeat steps c and d for each additional slave unit, keeping in mind that each slave will connect to the next available master's port (i.e. slave #2 to master's VIDEO 2 and CPU 2 KEYBOARD and MOUSE, etc.). See Fig. 5 below.

If additional 4-PORT slaves are connected to VIDEO, PS/2 MOU CPU, & PS/2 KBD CPU ports 3 & 4, they will function and be controlled as CPU ports 9-12 and 13-16 respectively.

- OR -

If individual CPUs are connected to ports 3 & 4, they will function and be controlled as CPU ports 9 & 10 respectively.

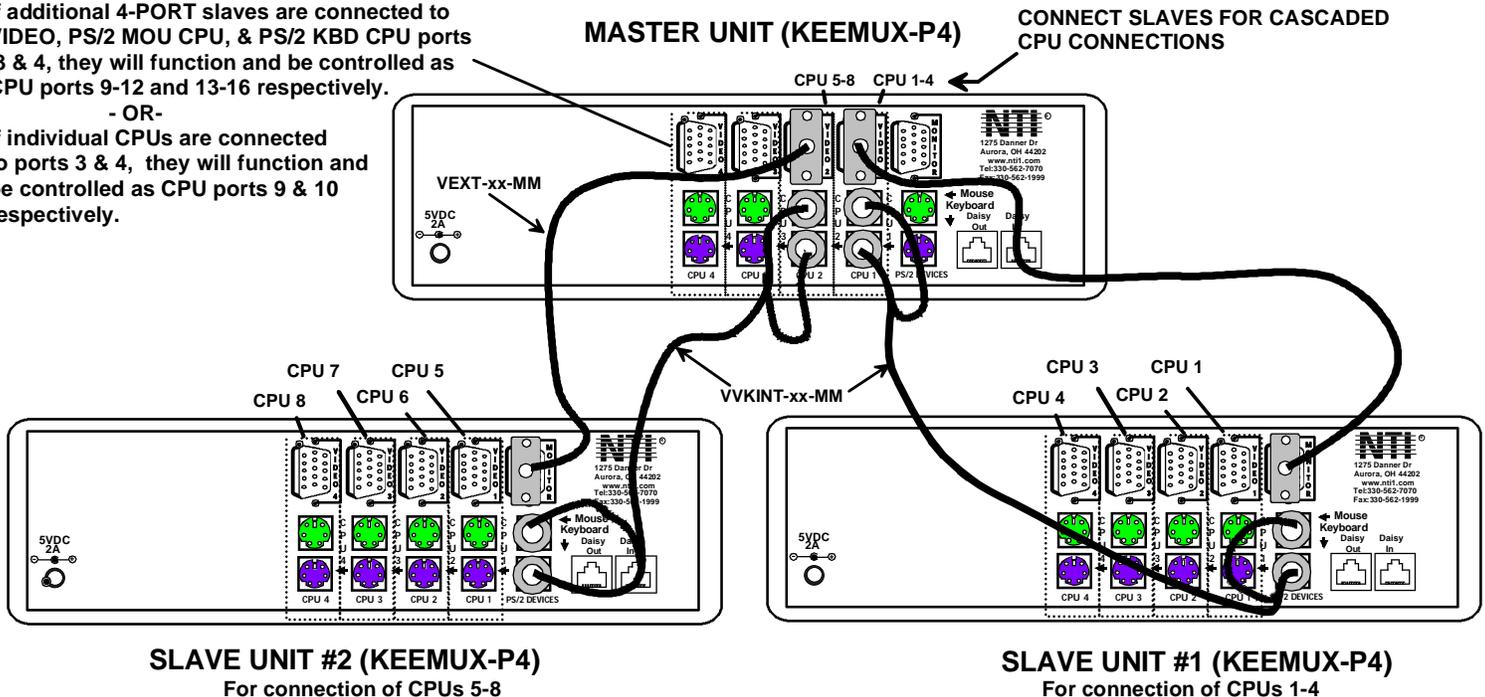


Figure 6- Cable connections for cascading

2. Connect Local CPUs to any remaining consecutive ports on the master as described under INSTALLATION on page 3.
3. Connect the RMT extension cables:
  - a. With an RMT extension cable (REXT-SR-xx), connect the master's "DAISY OUT" port to slave #1's "DAISY IN" port.
  - b. With another RMT extension cable, connect slave #1's "DAISY OUT" port to slave #2's "DAISY IN" port.
  - c. Apply additional RMT extension cables until all slave units are connected together.

**NOTE:** If switches are not being cascaded, then the "DAISY IN" and "DAISY OUT" ports will not be used.

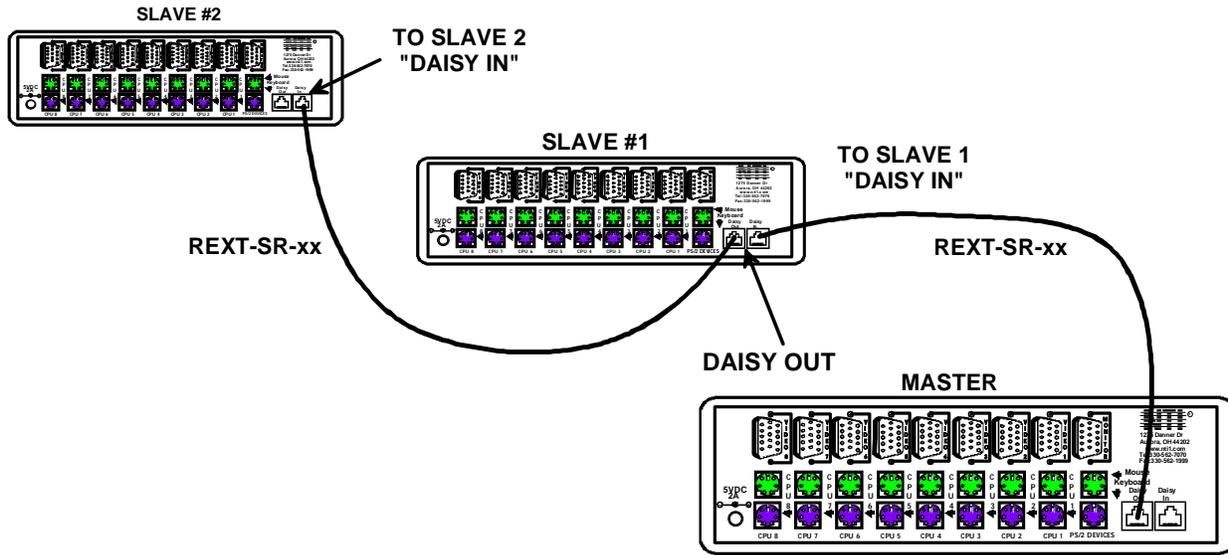


Figure 7- Connect remote extension cables between cascaded units

## USING THE NTI KEEMUX PS/2 KVM SWITCH

Control over the CPUs attached to the NTI KEEMUX is achieved through operation of the KEEMUX. Once the KEEMUX is properly connected, the KEEMUX will enable a connection to be made between the CPUs attached to its CPU x, and VIDEO x ports and the keyboard, monitor, and mouse attached to the PS/2 DEVICES and MONITOR ports. The LEDs on the control panel of the KEEMUX will illuminate depending on which port (and associated CPU) is being connected to the keyboard, monitor, and mouse. The choice of which CPU will be connected to the keyboard, monitor, and mouse is determined by controlling the KEEMUX either through the front control panel on the KEEMUX, by keyboard control, or by optional methods such as RS232 or an On Screen Display (OSD).

### Front Panel Control

There is a touch-switch and LED on the front panel of the KEEMUX for each connected CPU. Pressing any touch-switch on the front panel of the KEEMUX will connect the selected CPU to the keyboard, monitor, and mouse.

Holding down any front panel touch-switch for more than 2 seconds will cause the KEEMUX to cycle through all modes of operation: COMMAND, SCAN, BROADCAST, and NORMAL (described on pages 9 and 10). Three LEDs on the front panel indicate when these modes are enabled. Release the touch-switch when the desired mode is enabled. When no mode LEDs are illuminated the user is in Normal Mode controlling directly the CPU to which the user is connected through the KEEMUX.

## Keyboard Control

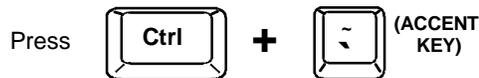
Keyboard control of the KEEMUX can be achieved using either of two methods:

- **Basic Command Mode**- operated strictly by using keyboard commands as instructed below. Basic Command Mode is only applicable if the OSD option is not built into the switch.
- **OSD Command Mode** (optional)- operated using the keyboard and mouse in conjunction with On Screen Display (OSD) menus superimposed onto the monitor. If OSD is built in, use the menus as instructed on page 12.

By pressing <Ctrl> + <`> (accent key), the user can enter Command Mode (either Basic, or OSD). Once in Command Mode, typing a series of commands will cause the KEEMUX to connect the user to any one CPU to which the KEEMUX is attached. Once finished, pressing the <Esc> key will exit Command Mode.

### Basic Command Mode

In order to control the KEEMUX with the keyboard, Command Mode must be enabled. To enter Command Mode from the keyboard:



**NOTE: IF THE OSD FEATURE HAS BEEN INSTALLED, PROCEED DIRECTLY TO “OSD CONTROL” ON PAGE 10. If not, continue with the instructions for controlling the KEEMUX as detailed below.**

When the COMMAND LED is illuminated, all 3 status lights on the keyboard will illuminate to indicate that Command Mode is enabled and the following functions are available: (**NOTE:** The user must exit Command Mode in order to type to a CPU. To exit Command Mode, press <Esc>.)

### Command Functions

Function:	Keystroke:
Increment Port <sup>1</sup>	 or  (select the next higher port ex. 05 → 06)
Decrement Port <sup>1</sup>	 or  (select the next lower port ex. 02 → 01)
Toggle Scan Mode ON and OFF	
Toggle Broadcast Mode ON and OFF	
Sets scan time-out period for each port.	 -  -  -  (xxx from 002 to 255. ie. t 002 would set the time out period for 2 seconds)
Selects a specific port	 -  -  (Pxx would be P01, P02, etc.)
Exit Command Mode	

**KEY SYMBOLS LEGEND:**

**or** PRESS EITHER KEY

**+** CHORDED SEQUENCE- PRESS CONSECUTIVELY AND KEEP KEYS PRESSED UNTIL ALL ARE PRESSED.

**-** PRESS CONSECUTIVELY

<sup>1</sup> If the SCAN LED is ON, pressing → or ← will cause the switch to select the next active port.

**NOTE:** The “port” mentioned in the “Command Functions” above refers to the combination of the video (VIDEO x), mouse and keyboard (CPU x) of like numbers that a CPU is connected to (i.e. the CPU that is connected to VIDEO 1 and CPU 1 will be identified as Port 1 or P01). (See Fig. 8 on page 9.)

## Port assignments ( KEEMUX-P4 )

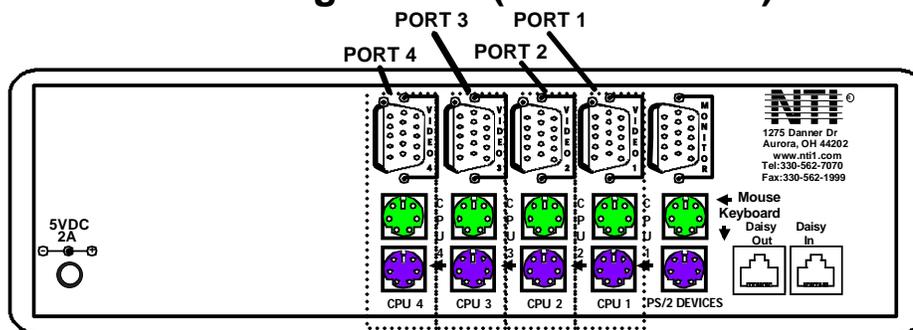


Figure 8- Connections grouped by port number

**Please note: If the switches are being cascaded (such as that illustrated in Fig. 5 on page 5 under “Cascading”), make note of which port each of the CPUs is connected to on each slave and which port each slave is connected to on the master. .**

- The ports on the slave connected to the port 1 port on the master would be numbered 01-04 with multiple KEEMUX-P4s, the ports on the slave connected to port 2 would be numbered 05-08 (with multiple KEEMUX-P8s they would be 01-08, and 09-16, etc.)
- A connection to the CPUs from the keyboard would be achieved by typing the appropriate port number. (See Fig. 6 on page 6.)
- No programming of the KEEMUX is necessary to achieve this control.
- When cascading, if not all of the ports are used on each slave attached to your system, **THE PORT NUMBER(S) ASSOCIATED WITH THE UNUSED PORT(S) WILL NOT BE ACCESSIBLE** when trying to control the switches connected to the system. (I.e. if ports 7 and 8 are not used on the first slave and an attempt is made to connect to ports 7 or 8 while in Command Mode, the KEEMUX will ignore the attempt. )

### Scan Mode

When in Scan Mode the KEEMUX scans each port with a CPU powered-ON. (The SCAN LED on the front panel will illuminate and remain ON while in Scan Mode.) The port with the CPU powered-ON remains active while in use. When the switch becomes idle for the configured time-out period (default time-out period is 5 seconds) the switch will connect to the next powered-ON CPU port. See Command Mode section above for configuring the scan time-out period.

***FYI: The keyboard and mouse must remain idle for the full scan time-out period before the switch will connect to the next active port.***

### Broadcast Mode

**(Use with extreme caution or commands intended for one CPU will be sent to all CPUs)**

Broadcast Mode allows the operator to send keystrokes to all active CPUs simultaneously. However, Broadcast Mode has some critical requirements.

- BROADCAST LED must be OFF when booting any attached CPUs.
- BROADCAST LED must be ON and COMMAND LED must be OFF for keystrokes to reach attached CPUs.

### Normal Mode

When all of the KEEMUX mode LEDs are OFF the user is in Normal Mode, controlling the CPU to which the user is connected through the KEEMUX.

## OSD CONTROL

### (Optional)

OSD superimposes a menu system on the user's video screen with a list of all connected CPUs. OSD allows CPUs to be named (with up to 12-character names). OSD then allows selection of CPUs by that name. Connected CPUs can be listed by name or by port number. OSD Search Mode enables the user to type in the first few characters of the CPU's name and the OSD will locate it. Help screens assist with all OSD functions.

## Security Option

The security option of the OSD Control enables an administrator to control access to the CPU ports for each user. Up to 24 users can be created. These users have controlled access to any CPU. Only the administrator can activate or deactivate the security features. Security can be activated from the Maintenance Mode menu (page 18) with a successful administrator login for verification purposes. Furthermore, the administrator can set a maximum idle time value after which the current user will be logged out and the login screen displayed. This time out does not function while the OSD is active. The current security status, idle time out, and scan dwell time are all saved and will be restored whenever power to the switch is cycled OFF, then ON.

## Enabling the Security Feature

To enable the security feature the administrator must first enter Command Mode from the keyboard using the sequence <Ctrl> + <`> (accent key). The OSD menu will automatically appear on the monitor in addition to illuminating the Command Mode indicator LED on the KVM switch. This provides a visual way to control the KEEMUX using the keyboard, monitor, and mouse.

**The administrator**, when setting the KEEMUX up for the first time, may want to proceed directly to the ADMINISTRATION Mode by typing <CTRL> + <M>, then <A>, and then <Y>.

The factory settings are:

- default user name = ADMINISTRATOR
- default password = ADMINISTRATOR

**FYI: The user name for administrator cannot be changed from "ADMINISTRATOR"**

Once logged-in, follow the instructions on page 14 for setting up users and changing the password. Once the password is setup, if it is lost or forgotten, the administrator will have to contact NTI for assistance on clearing the password and set it up again. Within the ADMINISTRATION Mode the administrator can setup each of the users and the limitations of their use of the individual CPUs on the system.

**When a standard user powers up the system a security screen may appear as setup by the administrator.** The user will need to login to the system by following the instructions below for the USER LOGIN. If the user does not know the appropriate user name and password (setup by the administrator), contact the system administrator for this information. Once logged-in a user can follow the Command Functions described on page 15 to control the system of CPUs within the limitations as set by the administrator.

## User Login Mode

User Login Mode requires a user to login with a user name and password from the list created by the administrator. Access to the functions of the KEEMUX will not be allowed until a user has logged in.

**Function:**

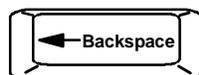
Adds a character to the user name/password

**Keystroke:**



(Type any alphabetical or numeric character)

Removes previous character from the user name/password



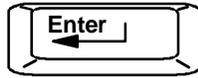
**User Login Mode (Cont'd)**

**Function:**

Submit user name/password

Exit User Login Mode and return to previous mode. This function is only available if security is not currently active.

**Keystroke:**



*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 maintenance menu for additional feature options.*

## Additional Modes Available With Security

**NOTE:** The three modes that follow are only available if the administrator is logged in.

### Administration Mode

Administration Mode allows the administrator to use the following functions:

**Function:**

**Keystroke:**

Change the administrator's password



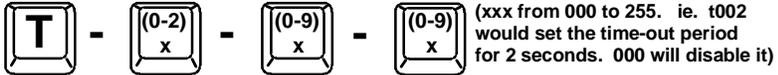
Enter User Name List Mode



Disable security



Selects the idle time in seconds



Exit Administration Mode and return to previous mode



### User Name List

The User Name List displays the list of users and provides control for adding new users, changing or assigning user passwords, and changing access rights for any given user. User names may be up to 12 characters long, may not contain spaces, and are not case sensitive. Passwords may be up to 15 characters long, may not contain spaces, and are case sensitive.

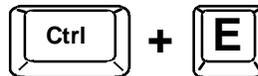
**Function:**

**Keystroke:**

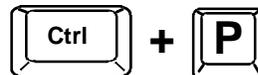
Edit the highlighted user's System Access rights



Enter Edit Mode to add/change/remove users



Change the highlighted user's password



Exit the User Name List and return to previous mode



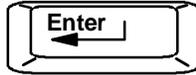
## System Access List

The System Access List displays a list of numbers representing the ports so the administrator can change access rights to the ports for the selected user. The user's name is displayed at the top of the access list. The mouse is used to change access rights by clicking on a given number to toggle a port's status. A user that has access to a port can connect to that port and control the CPU connected to that port when in Normal Mode.

**Function:**

**Keystroke:**

Save the changes to the access list and return to previous mode



Exit the System access list without saving and return to previous mode.



## User Access Functions

### Introduction

The OSD menu enables a user to name the CPUs connected to the KEEMUX 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 control the KEEMUX to cycle through all modes of operation: COMMAND, SCAN, BROADCAST and NORMAL. LEDs on the front panel will illuminate to indicate when these modes are enabled.

### OSD Command Mode

If the OSD option is installed, when entering the Command Mode from the keyboard using the <Ctrl> + <'> (accent key), the On Screen Display menu will automatically appear on the monitor in addition to illuminating the indicator LEDs on the KVM switch. This provides a visual way to control the KEEMUX using the keyboard, monitor, and mouse.

The list below describes the command functions available from the keyboard within the OSD mode of control after entering into Command Mode and while the COMMAND LED is illuminated:

**Function:**

**Keystroke:**

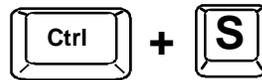
Select the previous port



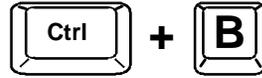
Select the next port



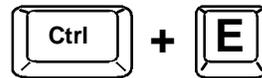
Enable/disable Scan Mode



Enable/disable Broadcast Mode



Enter Edit Mode



Enter Maintenance Mode



Display Help Menu (available with every control mode)



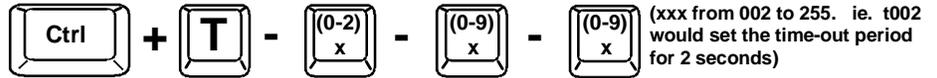
Figure 9- Command Mode menu

**OSD Command Mode (Cont'd)**

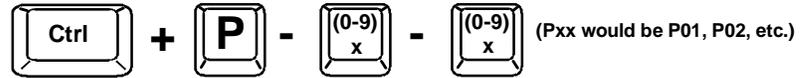
**Function:**

**Keystroke:**

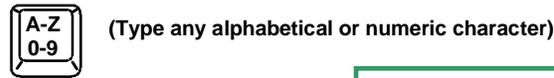
Sets scan time-out on each port



Selects a specific port



Enters Search Mode and adds a character to search string and selects the CPU's name that matches best.



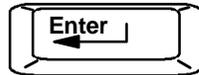
Selects the first port on the switch



Selects the last port on the switch



Switch to a selected port



Exit OSD Command Mode



*Note: The user must exit Command Mode to type to a CPU.*

*To exit Command Mode, either hold down any touch-switch on the front panel for more than 2 seconds, OR press <ESC>.*

The mouse can also be used to control Command Mode. The mouse cursor can be moved to the Scan, Help, and Exit fields where the user can then click on the left mouse button to perform that function. Ports listed on the screen can be selected by moving the cursor onto that port and clicking. Clicking twice on a selected port will switch to that port and exit Command Mode. To change 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- Press <Ctrl> for more functions

**Scan Mode**

When in Scan Mode the switch scans to each port with a CPU powered-ON. (The SCAN LED on the front panel will illuminate and remain ON while in Scan Mode.) To enter Scan Mode press <Ctrl> + <S> from Command Mode. The port with the CPU powered-ON remains active while in use. When the switch becomes idle for the configured time-out period (default time-out period is 5 seconds) the switch will connect to the next powered-ON CPU port. See Command Mode section above for configuring the scan time-out period.

**NOTE: The keyboard and mouse must remain idle for the full scan time-out period before the switch will connect to the next active port.**

## Broadcast Mode

**(Use with extreme caution or commands intended for one CPU will be sent to all CPUs)**

Broadcast Mode allows the operator to send keystrokes to all active CPUs simultaneously (even those CPUs the user cannot connect to due to lack of security access). To enter Broadcast Mode press <Ctrl> + <B> from Command Mode. Broadcast Mode is indicated by the illumination of the BROADCAST LED on the front panel. The BROADCAST LED will remain ON while in Broadcast Mode. However, Broadcast Mode has some critical requirements:

- BROADCAST LED must be OFF when booting any attached CPUs.
- BROADCAST LED must be ON and COMMAND LED must be OFF for keystrokes to reach attached CPUs.

## Normal Mode

When all of the KEEMUX mode LEDs are OFF the user is in Normal Mode, controlling the CPU to which the user is connected through the KEEMUX.

## Edit Mode

Edit Mode allows the user to modify the names of the CPUs connected to the switch. Names of CPUs can be up to 12 characters in length. To enter Edit Mode press <Ctrl> + <E> from Command Mode. When in Edit Mode, multiple keystroke combinations are not valid (<SHIFT>+<P>, <CTRL>+<P>, <ALT>+ <P>, and <P> will all type a "P" to the display - lower case letters cannot be typed). After changes have been made the user will be prompted by the menu to save the changes. Answer "Y" to save changes and answer "N" to continue using previously entered port names.

### Function:

### Keystroke:

Move cursor one position to the right



Move cursor one position to the left



Previous port



Next port



Selects the first port on the switch



Selects the last port on the switch



Toggles between insert and overstrike



(The character either gets inserted and the remainder of the name gets shifted to the right, OR the current character gets overwritten.)

Erase current character



Erase previous character

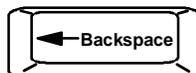


Figure 11- Edit Mode screen

When finished making changes in Edit Mode, press <Enter> and a prompt will appear to press either <Y> to save the changes or <N> to continue making changes without saving the changes just made. If the <ESC> key is pressed instead of <Enter>, all changes made will be cancelled and the display will return to the previous menu.

### Search Mode

Search Mode allows the user to enter and maneuver through a list of CPU names. As the user types, the best matching CPU name is selected. The list of CPUs may also be searched for a specific (or similar) name. From Command Mode, type any alphabetical or numeric character to enter Search Mode. The following commands are valid when the search option has been invoked from Command Mode.

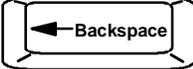
Function:	Keystroke:
Erase previous character in search name	
Move cursor one position to the right in search name	
Move cursor one position to the left in search name	
Select previous port	
Select next port	



Figure 12- Search Mode screen

Add a character to the search string and select the best matching CPU name	 (Type any alphabetical or numeric character)
Exit Search Mode, return to Command Mode	
Switch to selected port	

### Maintenance Mode

Maintenance Mode allows a user to customize the On Screen Display to their requirements. To enter Maintenance Mode press <Ctrl> + <M> from Command Mode.

Function:	Keystroke:
Reset all of the port names	
Toggle between numeric and alphabetic listing of ports	
Move On Screen Display (OSD) window up on monitor	
Move OSD window down on monitor	
Move OSD window to the right	
Move OSD window to the left	



Figure 13- Maintenance Mode screen



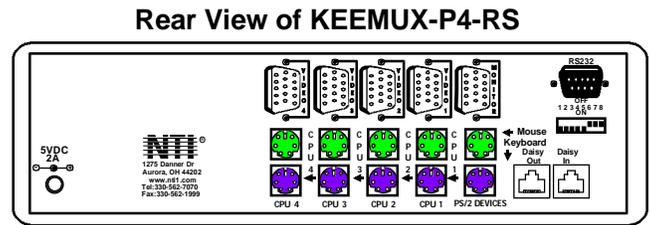
**RS232 CONTROL**

(Optional)

**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 DB-9 connector(s) on the unit is as follows:



**RS232 CONNECTOR (DB-9 FEMALE)**

PIN	SIGNAL	FUNCTION
1	CD	Carrier Detect
2	TXD	Transmit data (RXD at host)
3	RXD	Receive data (TXD at host)
4	DTR	Data terminal ready
5	GND	Signal ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	-	No connection

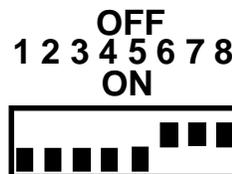
**Note: Security must be disabled or user access granted on the port(s) to be selected by RS-232 control.**

On the DB-9 female connector, pins 1 (DCD), 4 (DTR), and 6 (DSR) are shorted and pins 7 (RTS) and 8 (CTS) are shorted. Therefore, host handshaking is bypassed and TXD and RXD are the only active signals. A straight through DB-9 cable (not null modem) will work for most CPUs. To daisy chain multiple units, a Matrix Y-1 cable is used (see page 18) for each KEEMUX in the chain. The last unit in the chain should have DIP switch 1 ON (see table under "Unit Address and Loop Back" on page 18).

**Baud Rate**

The baud rate can be changed by powering down the unit, changing the 8 position RS232 dip switch on the rear of the KEEMUX, and then powering back up. This table shows how to set the baud rate.

DIP SWITCH			BAUD RATE
4	3	2	
OFF	OFF	OFF	300
OFF	OFF	ON	600
OFF	ON	OFF	1200
OFF	ON	ON	2400
ON	OFF	ON	9600
ON	ON	OFF	
ON	ON	ON	



### Unit Address and Loop Back

To allow multiple units to be controlled from a single CPU port, the RS232 control interface is designed to allow "daisy chaining" up to 15 units. By setting the appropriate RS232 dip switches, each unit can be given a unique address (1-15). Then the unit will only respond to commands on the bus if its address is embedded in the command. Use the table below to set the unit address.

DIP SWITCH				UNIT ADDRESS
8	7	6	5	
OFF	OFF	OFF	OFF	0 (not valid)
OFF	OFF	OFF	ON	1
OFF	OFF	ON	OFF	2
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	4
OFF	ON	OFF	ON	5
OFF	ON	ON	OFF	6
OFF	ON	ON	ON	7
ON	OFF	OFF	OFF	8
ON	OFF	OFF	ON	9
ON	OFF	ON	OFF	10
ON	OFF	ON	ON	11
ON	ON	OFF	OFF	12
ON	ON	OFF	ON	13
ON	ON	ON	OFF	14
ON	ON	ON	ON	15

**Note:** In order to connect multiple KEEMUX units together a Matrix-Y-1 cable must be used. (See Fig. 14.) See Fig. 15 for the pinout of the Matrix-Y-1 cable. The Matrix-Y-1 cable is available from Network Technologies Inc.

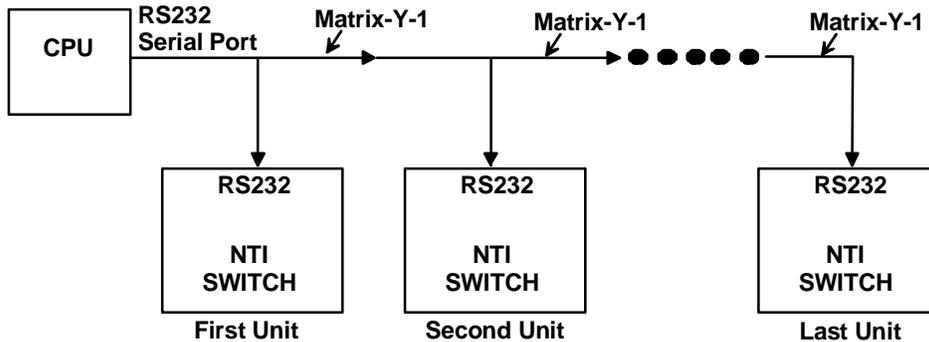


Figure 14- RS232 connection with Matrix-Y-1 cable

### Wiring Schematic of Matrix-Y-1 cable

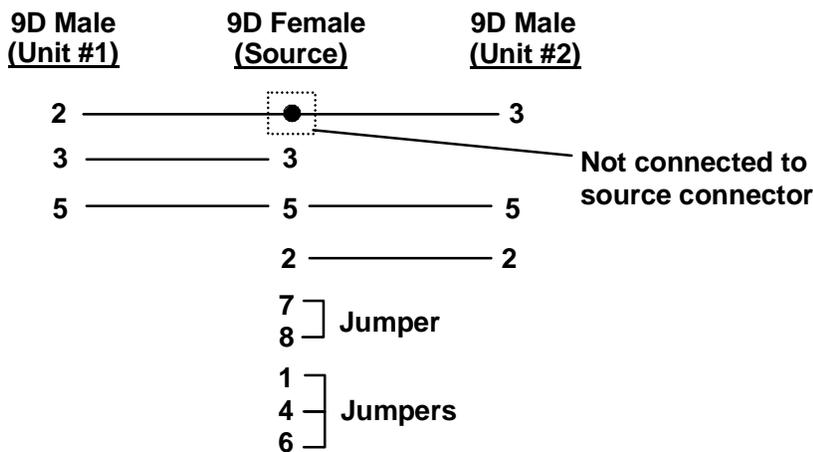


Figure 15- Pinout of Matrix-Y-1 cable

## Command Protocol

Host controller commands supported by the unit are defined below.

### Notes:

- All commands should be terminated with an <Enter> (ASCII 13) denoted by <CR>. When a command is sent, the entire string is echoed back to the CPU along with a response from the addressed unit as shown in the command definitions. Unit response will be sent within 500 msec after <CR>.
- Use a program that will send an entire command line all at once, not character by character. Do not use the program HyperTerminal in WINDOWS, as it sends each character one at a time.
- All characters should be upper case, and all numbers below 10 should have a leading 0 (ex: 1 = 01).
- For units with one USER port, use 01 for the USER select.

#### RS - reset unit(s) to default power-up configuration

FORMAT: RS AA<CR>  
 RS = "reset unit" command followed by at least one space  
 AA = unit address; if 00, all units on the bus will be reset and no response will be returned

RESPONSE: \*<CR> if command received and executed OK  
 -OR-  
 ?<CR> if syntax or transmission error occurred

**Note: The RS command does not change the actual configuration.**

#### CS - change single USER channel

FORMAT: CS AA,XX,YY<CR>  
 CS = "change single output" command followed by at least one space  
 AA = unit address  
 XX = input/CPU to connect  
 YY = output/USER to change

RESPONSE: \*<CR> (command received and executed OK)  
 -OR-  
 ?<CR> (syntax or transmission error occurred)

#### CA - change all output channels

FORMAT: CA AA,XX<CR>  
 CA = "change all outputs" command followed by at least one space  
 AA = unit address  
 XX = input /CPU to connect to all outputs/USERS

RESPONSE: \*<CR> (command received and executed OK)  
 ?<CR> (syntax or transmission error occurred)

RO - read single USER channel

FORMAT: RO AA,XX<CR>

RO = "read output" command followed by at least one space

AA = unit address

XX = output/USER to read

RESPONSE: \*<CR> (command received and executed OK)

XX<CR> (XX = input/CPU connected)

**-OR-**

?<CR> (syntax or transmission error occurred)

RU - read unit size

FORMAT: RU AA<CR>

RU = "read unit size" command followed by at least one space

AA = unit address

RESPONSE: \*<CR> (command received and executed OK)

XX,YY<CR> (XX = # of CPU's, YY = # of USERS)

**-OR-**

?<CR> (syntax or transmission error occurred)

## KEYBOARD MAPPING

The keyboard configuration of each CPU is saved in the KEEMUX. For example, if the CPU attached to Port 4 had CAPS LOCK and NUM LOCK selected the last time that CPU was accessed, then they will automatically be set when Port 4 is accessed again.

## HOW TO DISABLE OPERATING MODES

The operating modes of the KEEMUX can be disabled if a user desires to do so. The Command Mode can be disabled which would also disable the Scan and Broadcast Modes, or, the Scan and/or Broadcast Modes can be individually disabled leaving the other features in Command Mode enabled.

To disable these operating modes, the user must get access to the jumper block. This block is located close to the dip-switches on the circuit board the keyboards plug into (called the digital board) inside the KEEMUX. (See Fig. 16.)

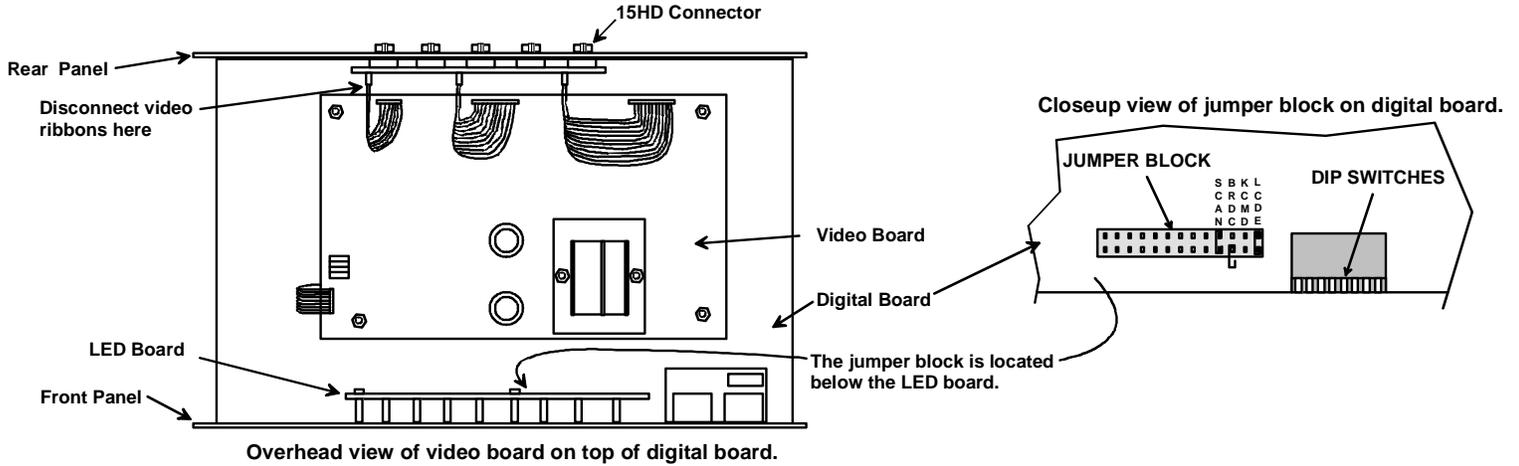


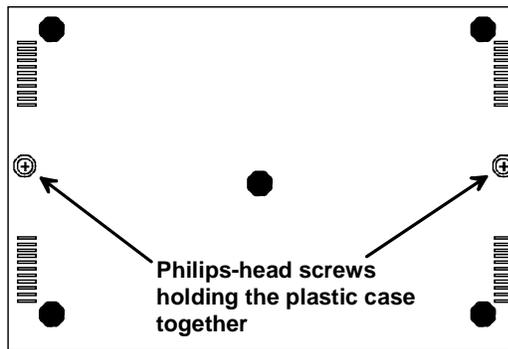
Figure 16- Location of the jumper block

If the unit is a rackmount style, the digital board is located directly beneath the cover of the unit, requiring the user to only remove the 10 screws from the cover to get access. With the cover removed, the jumper block will be easy to locate. Follow the instructions under "CONFIGURING THE JUMPER BLOCK" on page 22 to disable the desired mode(s).

If the unit is in a plastic case, the digital board is located on the bottom of the case, requiring the user to partially disassemble the unit to gain access to the jumper block.

### For models KEEMUX-Px in a plastic case:

1. Make sure the KEEMUX is completely disconnected from all CPU components. Be sure to unplug the KEEMUX from the electrical outlet.
2. Remove the two philips-head screws from the underside of the KEEMUX and set the KEEMUX on a firm and flat surface, bottom down. (See Fig. 17.)



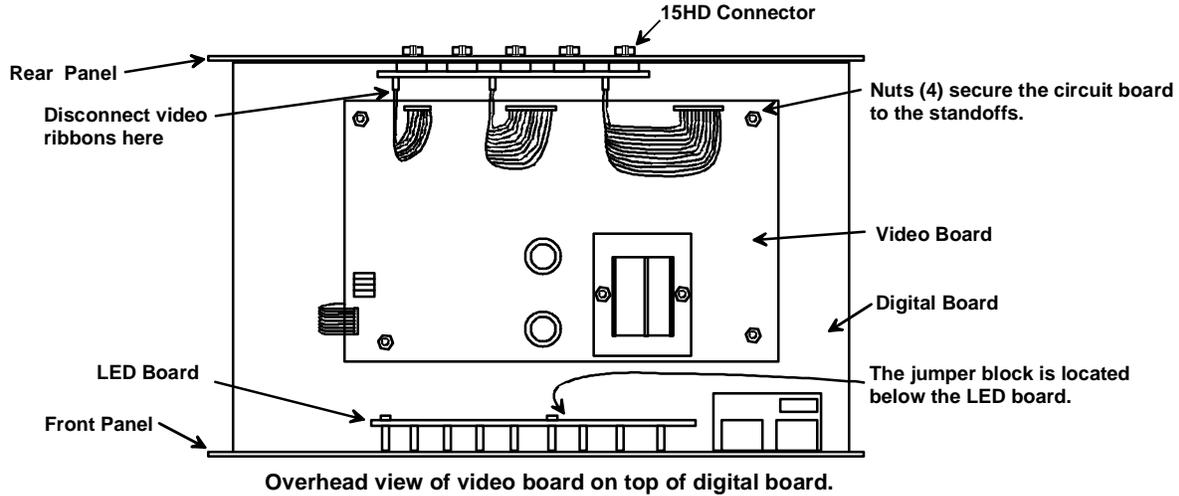
View of bottom of plastic case

Figure 17- Remove screws to open case

3. Remove the top half of the plastic case from the KEEMUX.

**NOTE: Before proceeding, it is important to discharge any static charge you may be carrying by touching any large metal object (away from the KEEMUX).**

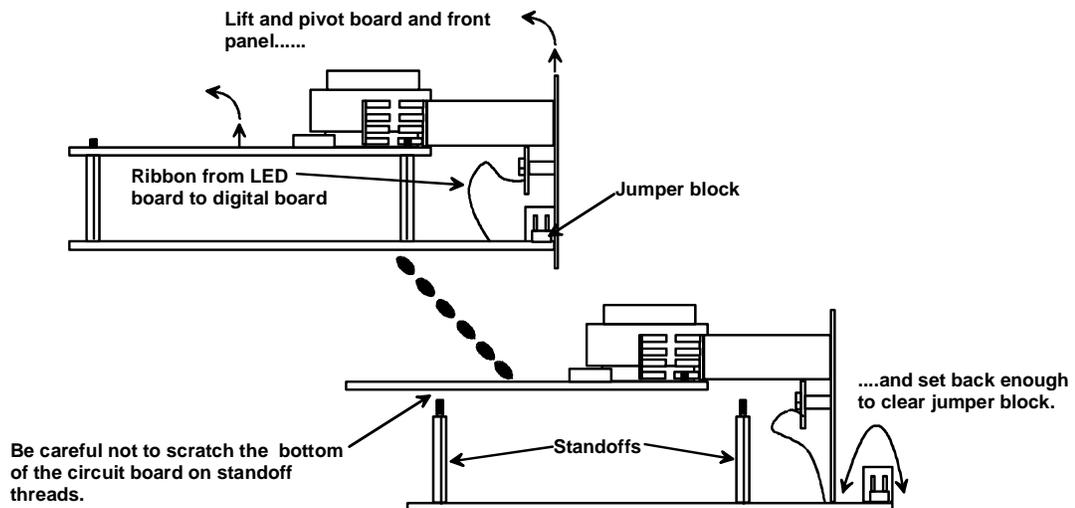
4. The first visible circuit board, the uppermost board, is the video board. Along the back of the video board are between 3 and 5 video ribbons (depending on how many monitors the unit is designed to connect to) connecting the video board to a circuit board on the rear panel with 15HD connectors on it. Disconnect the flat ribbon cables from the video board to each header on the rear panel. Take note as to where they go for re-assembly later. Do not disconnect them from the video board headers. (See Fig. 18.)
5. There are 4 nuts that secure the video board to standoffs. Remove the 4 nuts.



**Figure 18- Overhead view of inside of KEEMUX**

To avoid further more difficult disassembly, the video board and front panel will be removed from the KEEMUX as an assembly.

6. Carefully loosen the video board from the standoffs. With it loosened, grasp firmly the video board and front panel at the same time and slide the front panel up out of the slots in the plastic case that support it. Once clear of the case, pivot the assembly back approximately 1", just enough to expose the jumper block. (See Fig. 19.) Be careful not to dislodge the connection of the ribbon connecting the front panel to the digital board. If it appears to become loose, be sure to reseat the connection before re-assembly. Now follow the instructions under "CONFIGURING THE JUMPER BLOCK" on page 23.



Set video board and front panel assembly back far enough to clear jumper block.

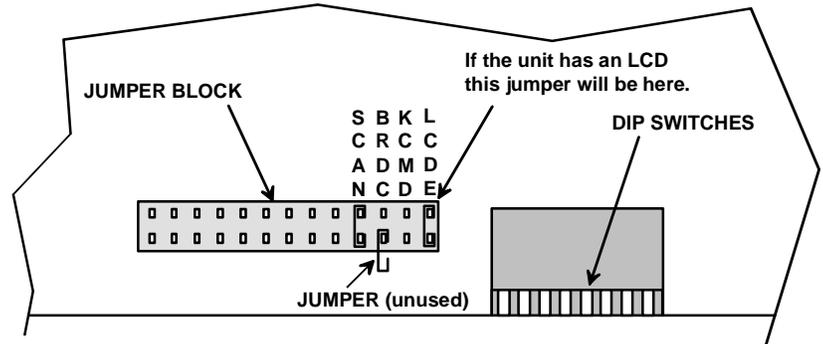
**Figure 19- Clear the jumper block for configuration access**

## Configuring The Jumper Block

Once the jumper block is exposed, apply a jumper across the appropriate pins to disable the desired mode(s) according to the chart below.

Pin Designation	Mode
KCMD	Command Mode*
BRDC	Broadcast Mode
SCAN	Scan Mode

\*Note: Putting a jumper across pins KCMD to disable Command Mode will also disable Broadcast and Scan Modes.



Drawing shows jumper across SCAN pins, disabling Scan Mode. Broadcast Mode is still enabled.

Figure 20- Place jumpers according to desired functionality

Once the desired jumpers are in place, reverse the disassembly process to re-assemble the KEEMUX. Be particularly careful about connecting the ribbons back to the headers they were removed from and to fully insert the ribbons into the headers. Note: The text on the video ribbons should face the right-hand side of the case after insertion. Do not turn the power ON until all connections have been completely and properly made and the unit has been properly re-assembled.

## DDC SUPPORT

### (Optional)

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.

When DDC Support is installed, the DDC information is acquired from the monitor by the KEEMUX when the KEEMUX is powered-up. **A monitor with DDC support must be connected to MONITOR for this to occur.** The DDC information will be made available at every CPU port.

The DDC information can also be acquired by pressing the DDC button located on the front of the switch (when supported). This button allows the monitor configuration to be changed without powering down the switch.

**Note: In order for the CPU to correctly receive the DDC information from the switch at boot-up, the switch must be powered up before all attached CPUs.**

## AUDIO SUPPORT

### (Optional)

Audio support provides the following additional features:

- Audio signals from the same CPU that keyboard, mouse, and video signals are from can be received by the user.
- Audio inputs accept any standard line level audio (1Vrms or 2.5Vp-p).
- Audio outputs are capable of driving an 8 Ohm speaker load with 200mW of continuous RMS power.

Audio signals are switched along with the keyboard, mouse and video signals using the buttons on the KEEMUX switch.

### Rear View of KEEMUX-P4-A

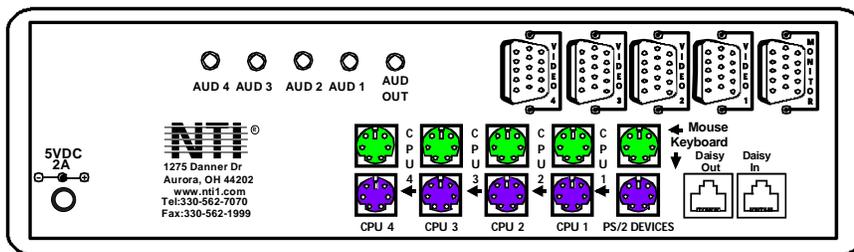


Figure 21- Control CPU audio with KEEMUX-P4-A

## DUAL VIDEO SUPPORT

### (Optional- 4 port models only)

Dual Video support enables CPUs with two video outputs to be connected to the KEEMUX switch and two user monitors to be connected to view both sets of video signals. Both monitors must be of the type VGA multi-scan.

### Rear View of KEEMUX-P4-DV

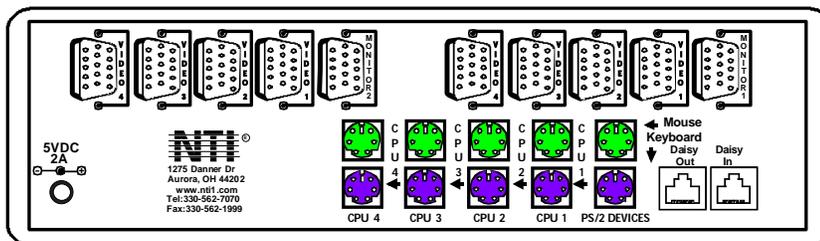


Figure 22- Connections for video cables on the KEEMUX-P4-DV

## TROUBLESHOOTING

If the KEEMUX is not working properly, please look for a solution in the list below:

- PROBLEM:** Keyboard Errors  
**SOLUTION:** Check cable connections on each CPU and the switch.
- PROBLEM:** No Video  
**SOLUTION:** Check cable connections on each CPU and the switch. Verify that keyboard, video, and mouse connect from each CPU to matching ports. After reconnecting, the CPU may need to be re-booted in order to sense the monitor connection.
- PROBLEM:** No Mouse Movement  
**SOLUTION:** Check cable connections on each CPU and the switch. Verify that keyboard, video, and mouse connect from each CPU to matching ports. Verify that the mouse driver was loaded.
- PROBLEM:** No Keyboard Activity after running shutdown program on IBM PowerServer 220  
**SOLUTION:**
  1. Select a different port from the front panel buttons.
  2. Turn power OFF to PowerServer 220.  
 (either step above will enable keyboard)
- PROBLEM:** Monitor shuts down while working with OSD menu  
**SOLUTION:** Disengage or increase time setting of CPU's monitor "sleep" mode from the BIOS and/or control panel display settings. (The CPU does not sense activity while in the OSD menu )

If a solution was not found in the list above, answers may be found in the Frequently Ask Questions (FAQs) section of our website at <http://www.networktechinc.com> or 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.

<p><b>SERIAL NO.:</b> _____</p> <p><b>DATE:</b> _____</p> <p><b>INSPECTED BY:</b> _____</p>	<p><input type="checkbox"/> KEEMUX-P4</p> <p><input type="checkbox"/> KEEMUX-P8</p> <p><input type="checkbox"/> KEEMUX-P12</p> <p><input type="checkbox"/> KEEMUX-P16</p> <p><input type="checkbox"/> KEEMUX-P20</p> <p><input type="checkbox"/> KEEMUX-P24</p> <p><input type="checkbox"/> KEEMUX-P32</p>
---------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

- O OPTION     
  -RS OPTION     
  -A OPTION     
  -DV OPTION