

**Audio 8x8 Matrix Switch
500210**



Installation Guide

P/N: 94-000759-A

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This product uses an unmodified version of FreeRTOS V6.0.0. The source code is available at www.freertos.com.

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1. Overview

1.1. Description

MuxLab's Audio 8x8 Matrix Switch (500210), allows 8 analog or digital sources to be switched/distributed to up to 8 remote receivers via unshielded twisted pair (UTP) for cost-efficient connectivity. Remote receivers can be connected up to via MuxLab analog balun (500028) or digital balun (500020). An expansion port is available to add 8 or 16 analog ports only.

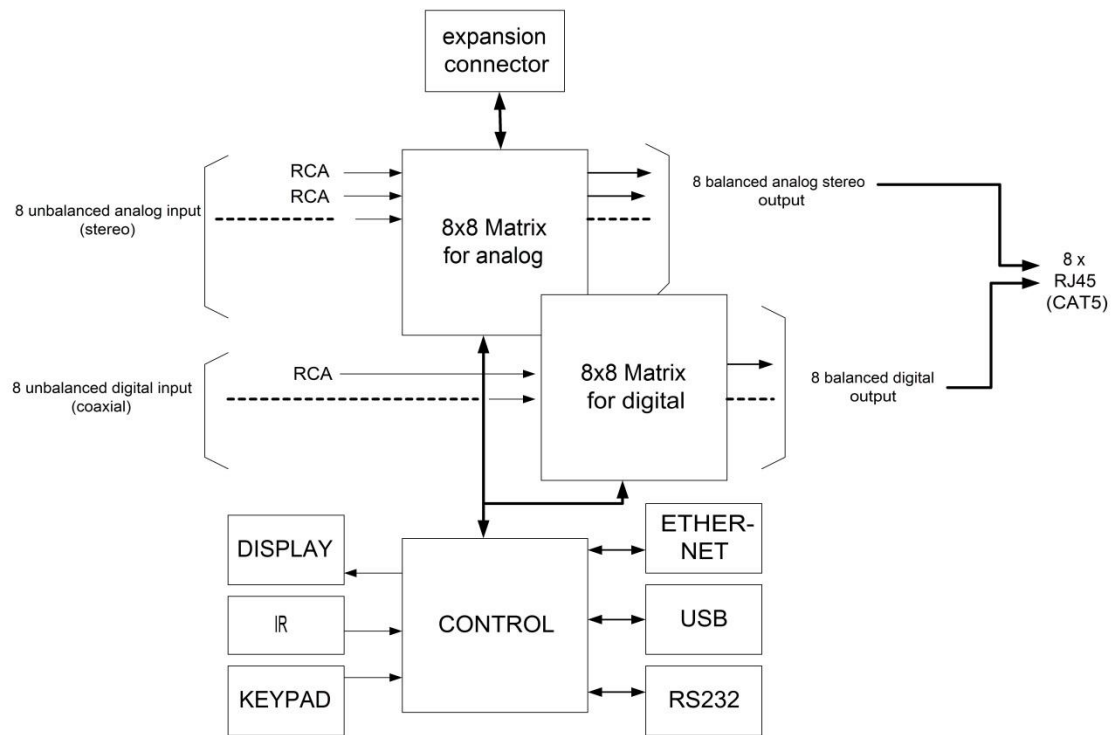


Figure 1: Block Diagram

Applications include commercial and residential audio systems, boardroom systems, multi-room systems, classroom training, retail systems, and medical information systems.

1.2. Features

- Single modular RJ45 jacks.
- UTP extension for analog (stereo channel) and digital (SPDIF) via eight RJ45 jacks and Cat 5e/6 UTP cables.
- Seamless integration with MuxLab analog balun (500028) or digital balun (500020).
- Web interface.
- RS232 and USB CDC control.
- Firmware is field upgradable.
- Touch pad on front panel for manual control.
- Device control over HTTP protocol.
- 1U rackmount unit.

2.

Technical Specifications

8x8 Audio Matrix Switch	
Environment	Stereo, Analog, SPDIF, Digital
Devices	DVD and Blu-Ray players, home theatre systems, home theater PCs, game consoles.
Transmission	Transparent to the user
Input	Eight (8) analog, eight (8) digital, and one (1) expansion port
Output	Eight (8) analog/digital, one (1) expansion port, and one (1) monitor.
Connectivity	Ethernet LAN (RJ45), USB (Type B) and RS232 (DB9)
Maximum Distance	UTP Cat 5e/6 output port: 3000 ft (900 m) analog and 600 ft (180 m) digital
Cables	Cat 5e/6 UTP
Power	12 VDC, 1 A
Matrix Switching Time	Instantaneous
LED Diagnostics	Power (Blue) Channel Overload (Blue) LAN (Link (Green) and Activity (Yellow))
Temperature	Operating: 0°C to 40°C Storage: -20°C to 85°C Humidity: Up to 95% non-condensing
Dimensions	1U Rack Mountable: 16.9 x 8.7 x 1.8 in (43.0 x 22.0 x 4.5 cm)
Accessories Included	Power supply, 2 mounting brackets, 6 rubber feet
Accessories not Included	Hi-Fi Analog Balun 500028. Note the 500019, 500027 & 500030 can be used but with reduced performance. Digital Balun 500020.
Shipping Weight	10 lb (4.5 kg)
Regulatory	FCC, CE, RoHS, WEEE
Warranty	Two (2) years
Order Information	500210 Audio 8x8 Matrix Switch

Table 1: Technical Specifications

3. **Installation Procedure**

3.1. Parts List

The Audio 8x8 Matrix Switch (500210) comes with the following parts:

- Base unit with two (2) brackets
- One (1) 110-240V/12VDC, 1 A Power Supply
- One (1) Quick Reference Sheet

Please verify that all parts are present before proceeding.

3.2. Product Overview

The external connections and connection indicators of the Audio 8x8 Matrix Switch are detailed in Figure 2 and Figure 3 (mounting brackets not shown). Please familiarize yourself with them before installing the unit.

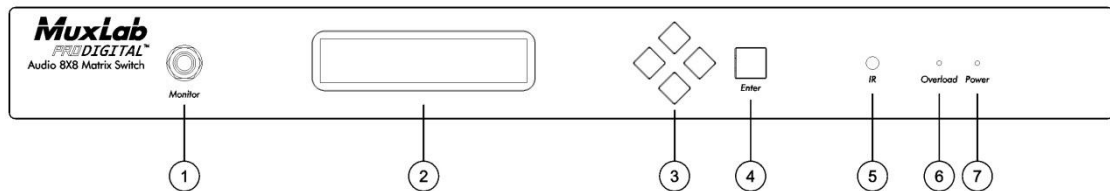


Figure 2: Front Panel

Front Panel Legend

1. Monitor port
2. Display
3. Navigation pushbuttons
4. Enter pushbutton
5. IR sensor
6. Overload indicator (blue LED)
7. Power indicator (blue LED)

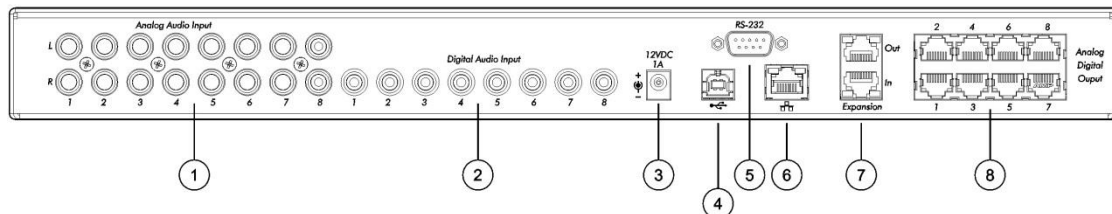


Figure 3: Back Panel

Back Panel Legend

1. Analog audio input ports (RCA connector)
2. Digital audio input ports (RCA connector)
3. Power supply port (2.1 MM barrel connector)
4. Remote interface port (USB)
5. Remote interface port (RS-232)
6. Remote interface port (RJ45)
7. Expansion input/output ports (RJ45)
8. Analog digital output ports (RJ45)

3.3. Pre-Installation Checklist

The Audio 8x8 Matrix Switch provides a centralized switching center via UTP cables.

1. The Matrix Switch is used in conjunction with MuxLab hi-fi analog balun (500028) and digital balun (500020).
2. The Matrix Switch is typically installed in a remote telecom room and is connected to multiple video sources and display devices via Cat 5e/6 UTP. A MuxLab balun is installed at each receiver/amplifier/audio source to support the connection to the Matrix Switch via a Cat 5e/6 cable.

3.4. Physical Installation

MuxLab's Audio 8x8 Matrix Switch comes with mounting brackets for standard 19" rack mounting. Select the final destination for the product and install the unit using standard rack-mount screws (Figure 4).

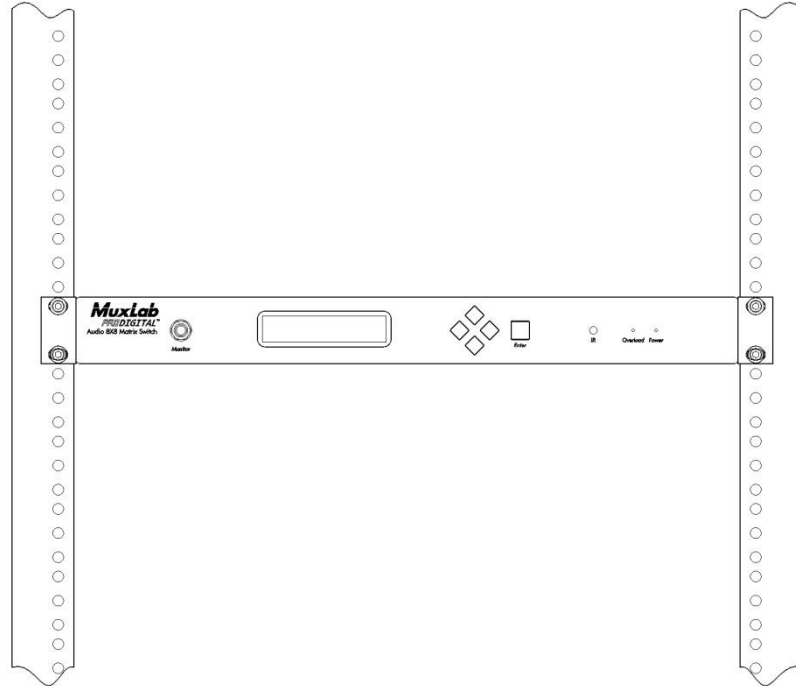


Figure 4: Setup for Rackmount Installation

For set-top installation, the side mounting brackets may be removed, and the included rubber feet placed on the bottom of the unit. When removing the mounting brackets, be careful to keep and reinstall the four screws on each side of the unit (Figure 5).

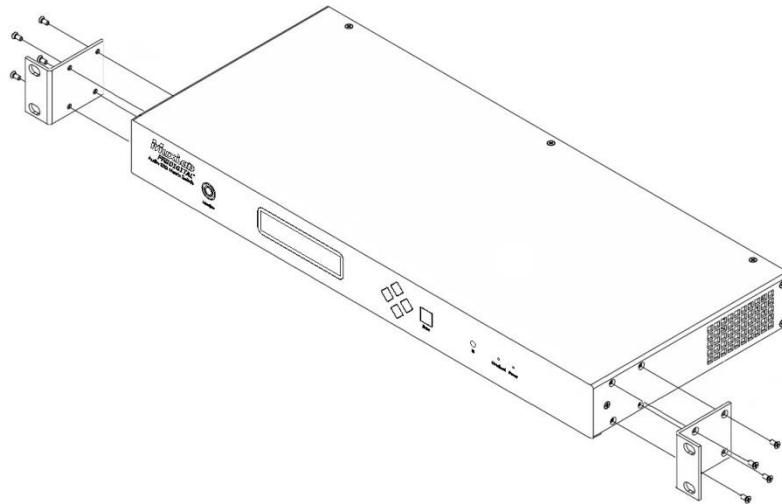


Figure 5: Setup for Set-top Installation

3.5. Installation Procedure

In order to install the Audio 8x8 Matrix Switch, please follow the steps below:

1. Place the Matrix Switch in its final location (see Section 3.4 Physical Installation).
2. Ensure that power is OFF on all sources and outputs.
3. Connect all sources and outputs to the Matrix Switch.
4. Connect the external 12 VDC power supply to the Matrix Switch and plug the power supply into an AC power outlet.
5. Power up all equipment.
6. Figures 6 and 7 show some typical configurations.

The Matrix Switch is now ready to use. See Section 3.7 Manual Control for instructions on usage.

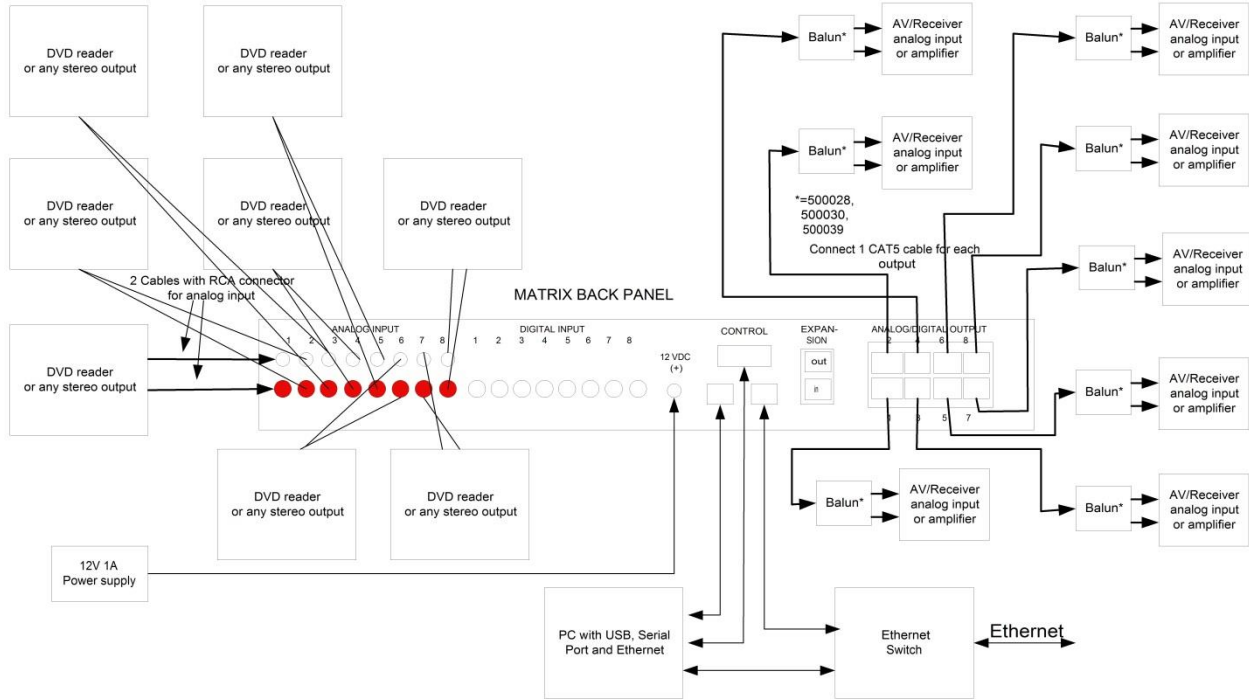


Figure 6: Typical Configuration: Analog Signal (Stereo)

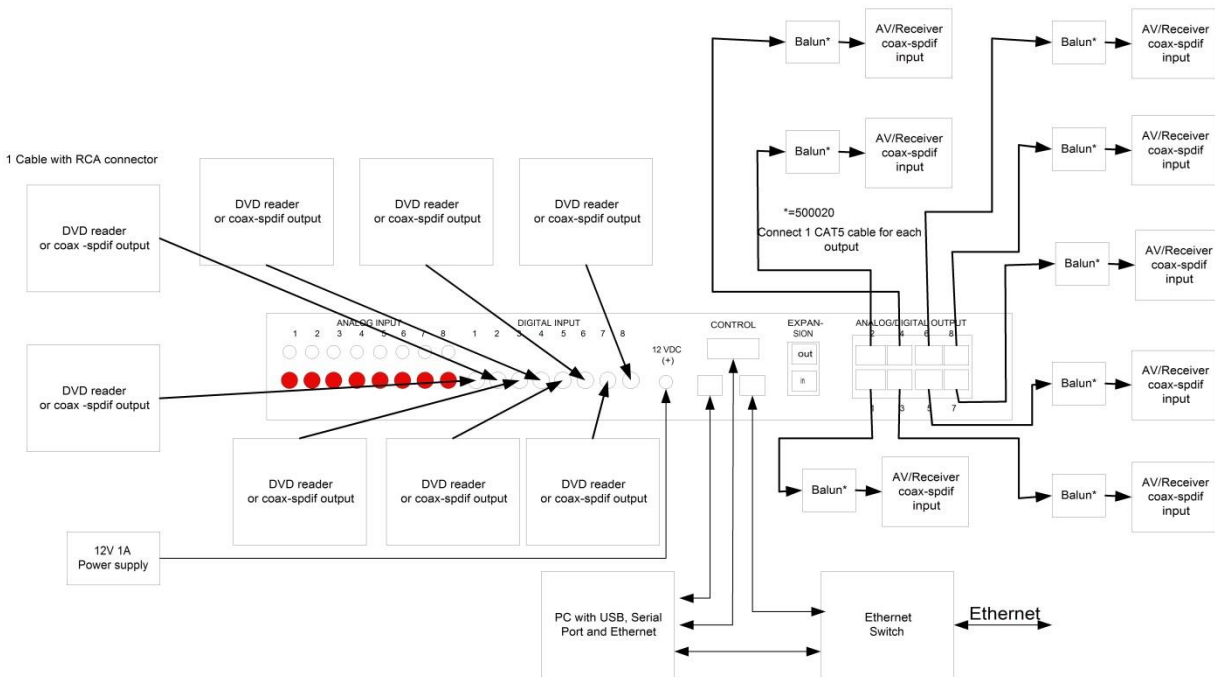


Figure 7: Typical Configuration: Digital Signal (SPDIF – Coaxial)

3.6. Manual Control of Matrix Switch

The Audio 8x8 Matrix Switch may be manually controlled by using pushbuttons on its front panel (Figure 8). It can also be controlled remotely via a keyboard.

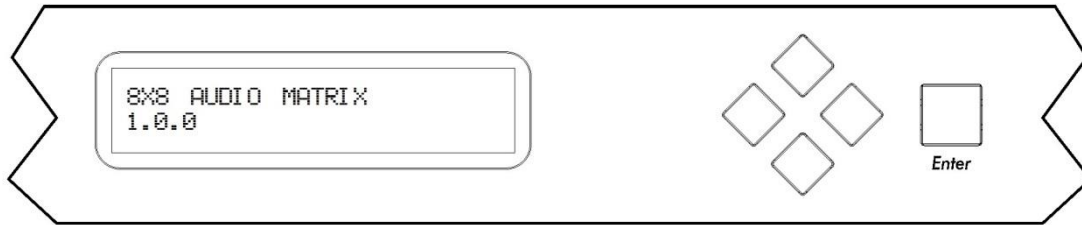


Figure 8: Front Panel Display Screen and Controls

There is one display screen and five controls pushbuttons on the front panel of the Matrix Switch. The display screen is a blue LCD screen that presents the user with menus for controlling the Matrix Switch. Of the five control pushbuttons, four are navigation controls (Up, Down, Left, Right) arranged in a lozenge formation that enable the user to navigate the menus shown on the LCD screen. The fifth control pushbutton, a large square labeled **Enter**, allows the user to select the current entry shown on the LCD screen.

Upon powering up, the LCD screen displays two lines of text:

8X8 AUDIO MATRIX	[Product name]
1.0.0	[Software version]

If no control pushbutton is pressed for 3 seconds, the LCD screen will display all 8 channel connections in sequence:

OUTPUT_CH1	[Name of output channel 1 (or default name)]
INPUT_CH1	[Name of input connected to output channel , NO INPUT or TEST TONE]

If any control pushbutton is pressed, the LCD screen will switch to Parameters mode and display the following:

**MAIN FUNCTION:
SELECT INPUT CHANNEL**

By pressing the Up or Down control pushbuttons, the LCD screen will switch to Parameters mode and display the following menu sub-options:

**MAIN FUNCTION:
MONITOR CHANNEL**

or

**MAIN FUNCTION:
OUTPUT VOLUME**

or

**MAIN FUNCTION:
OTHER FUNCTIONS**

If the Enter pushbutton is pressed, the LCD screen will display the selected menu sub-option.

If the Enter pushbutton is not pressed, the LCD screen will revert back to displaying all 8 channel connections in sequence.

SELECT INPUT CHANNEL Sub-menu

- Use the Up and Down pushbuttons to select output channels.
- Use the Left and Right pushbuttons to select input channels (the monitor connector on the front panel will provide the sound connected to a given input channel).
- Press the Enter pushbutton once to save your selections.
- Press the Enter pushbutton a second time to return to the top level menu.
- Do not press any pushbuttons in order to return to the top level menu without making changes.

MONITOR Sub-menu

- Use the Up and Down pushbuttons to select the input channel to monitor via the monitor connector on the front panel.
- Press the Enter pushbutton once to save your selections.
- Press the Enter pushbutton a second time to return to the top level menu.
- Do not press any pushbuttons in order to return to the top level menu without making changes.

OUTPUT VOLUME Sub-menu

- Use the Up and Down pushbuttons to select the output channel volume to modify.
- Use the Left and Right pushbuttons to change the attenuation (in dB) of the selected output channel.
- Press the Enter pushbutton once to save your selections.
- Press the Enter pushbutton a second time to return to the top level menu.
- Do not press any pushbuttons in order to return to the top level menu without making changes.

OTHER FUNCTIONS Sub-menu

- Use the Up and Down pushbuttons to select version display, IP address, MASTER/SLAVE CLOCK mode and number of EXTERNAL PORT.
- Press the Enter pushbutton to return to the top level menu.

3.7. Remote Control of Matrix Switch

The Matrix Switch can be controlled by a remote (not included). For a list of IR codes, refer to Appendix C.

3.8. Cascadability

Two Audio 8x8 Matrix Switches can be cascaded using the expansion port (Figure 9) on the back panel of each unit. To cascade two units, one unit must be configured as the master and the other as the slave, which is done via the internal jumper P4 pin 1-2.

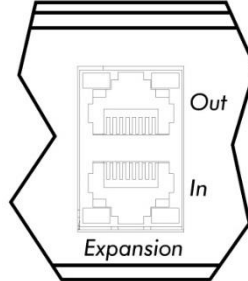


Figure 9: Expansion Port (Back Panel)

Figures 10 and 11 illustrate two possible configurations for cascading two Audio 8x8 Matrix Switches.

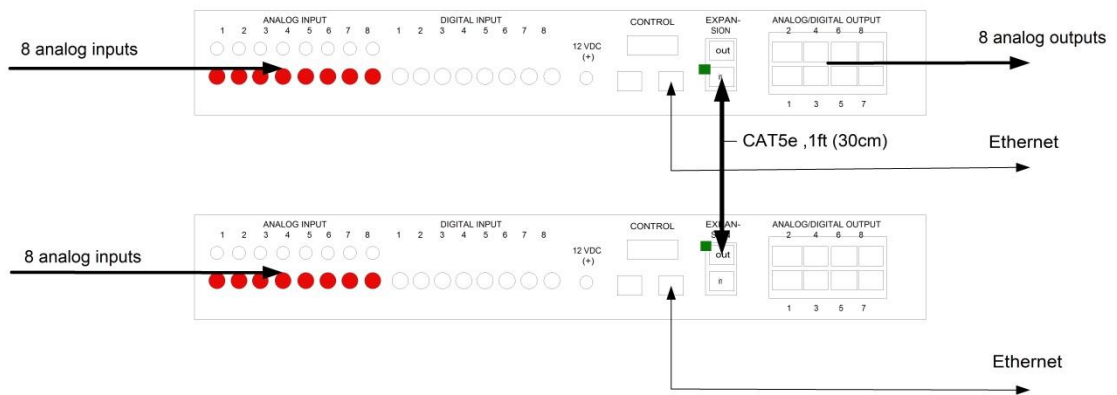


Figure 10: Cascade Configuration 8x16

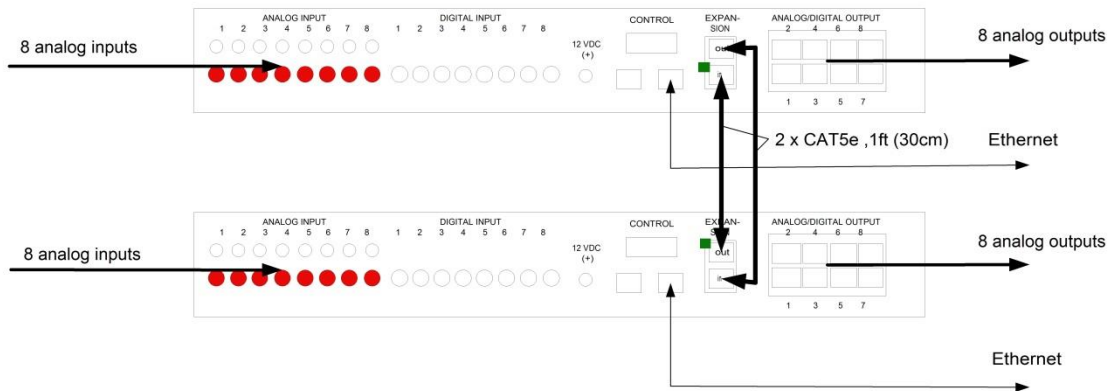


Figure 11: Cascade Configuration 16x16

3.9. Port Control Operation

MuxLab 4x4 Matrix Switch, HDBT may be controlled in the following two ways:

1. RS-232 Control
2. USB CDC Control

1. RS-232 Control

The Matrix Switch features built-in firmware that allows commands from an ASCII terminal to be sent directly to the device via an RS-232 connection. Ensure that the RS-232 cable has the straight-through configuration shown in Figure 12.

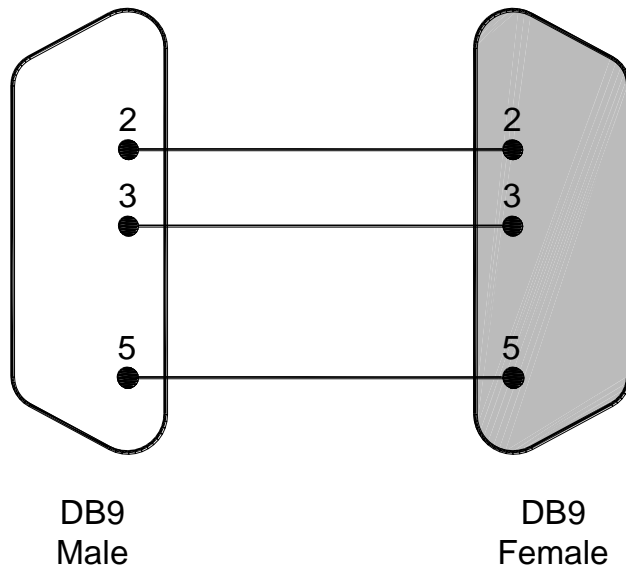


Figure 12: RS-232 Cable Configuration

Please note that the use of USB to RS232 converter cables may result in problems, depending on the quality of the converters.

2. USB CDC Control

Commands from an ASCII terminal may also be sent directly to the device via a USB connection. Maintenance can be performed with a terminal emulator, such as the one available under windows with the ASCII Command set described in the Appendix of this manual.

3.10. USB Driver Setup

When interfacing a MuxLab device with the USB port on Windows XP, Windows 7, or Windows 8 operating systems, a driver setup file will be required. For Linux and Mac OS X operating systems, no driver is necessary.

To install the USB serial driver, download the SC-000032-A USB to serial driver file from the MuxLab website and save it to the local hard drive. NOTE: If the downloaded file is compressed, it will have to be uncompressed before using it.

Plug the USB cable between the device and the PC, and power up the device. The **Found New Hardware** wizard will open (Figure 13). Select **Locate and install driver software (recommended)**.



Figure 13: Found New Hardware Wizard

A new dialog box will open (Figure 14). Select **Browse my computer for driver software (advanced)**.

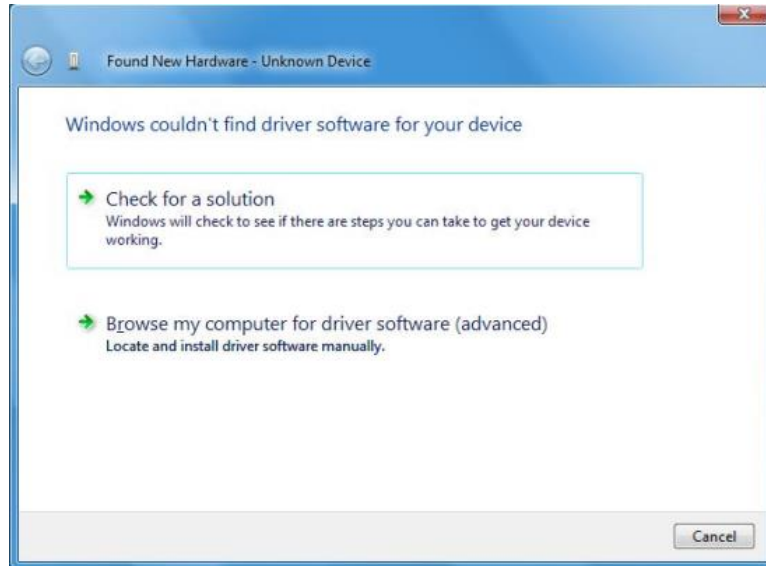


Figure 14: Found New Hardware Dialog Box

Another dialog box will open (Figure 15). Click **Browse** and locate the SC-000032-A USB to serial driver file downloaded earlier. Once found, click **Next**.

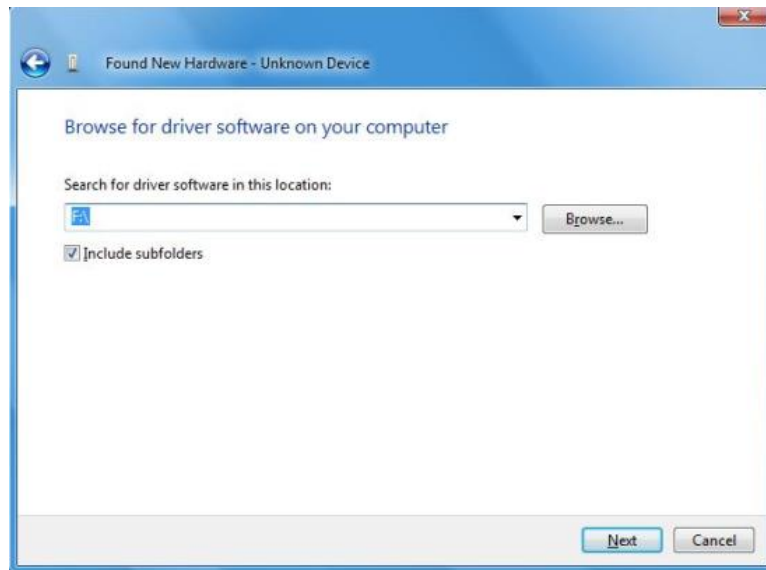


Figure 15: Browsing for Unknown Device

A security window will now appear, indicating that the driver software is unsigned (Figure 16). Select **I**nstall this driver software anyway.



Figure 16: Windows Security

A window will appear instructing that the software for the driver has been successfully installed (Figure 17). Click **C**lose.

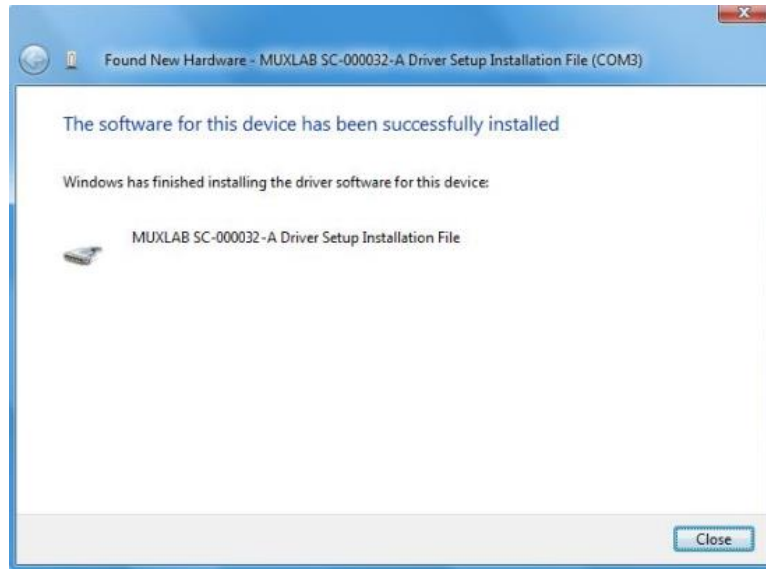


Figure 17: Successful Installation Dialog Box

3.11. Ethernet Web Interface

MuxLab offers users an Ethernet Web interface that provides the same functionality as manual control, with speeds of 10 Mbps or 100 Mbps.

To use the Ethernet Web interface, the Matrix Switch must first be physically connected to an Ethernet network. To do this, locate the RJ45 Ethernet jack on the back panel of the Matrix Switch, then connect it to an Ethernet network using a straight UTP cable (maximum length: 328 feet [100 meters]). There are two LEDs at the bottom of the RJ45 Ethernet jack: A green LED will go on if a link is detected, and a yellow LED will blink if Ethernet activity is detected.

Once the Matrix Switch has been physically connected to an Ethernet network, go to <http://AAA.BBB.CCC.DDD>, where AAA.BBB.CCC.DDD is the device IP address. (NOTE: The device IP address can be obtained by pressing the Info button on the front panel.)

The **Login** screen is the first screen to appear (Figure 18).

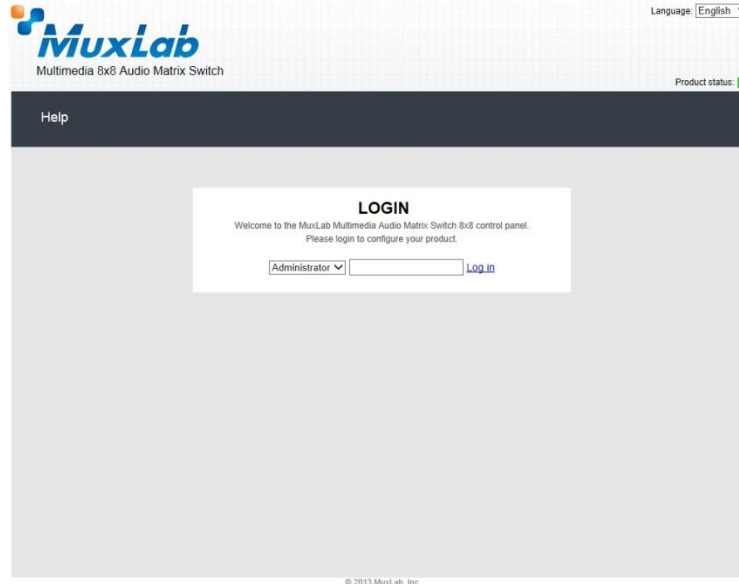


Figure 18: Ethernet Web Interface Login Screen

The default password for administrators is **admin**. The default password for regular users is **user**.

NOTE: Users who have previously logged in and chosen a password, but have subsequently forgotten it, may connect to the device using the RS232 or USB and reset their password using a terminal emulator.

Three items are presented to the user at the top right of every Ethernet Web interface screen:

- Logout option
- Language option
- Product status

The **Logout** hyperlink logs the user out of the system.

The **Language** drop-down list provides the user with three interface languages: English, French, and Spanish. English is used by default.

The **Product status** indicator provides a quick indication of device status by means of a colored box (green, orange, red) to indicate various product statuses:

- Green = Okay
- Orange = Warning
- Red = Error

The user can configure the **Product status** indicator to display different statuses depending on various device conditions (internal temperature, fan speed, etc.). This configuration is performed in the **Alarm** tab of the **Setup** submenu.

After logging in, the main screen appears (Figure 19). It contains three submenus:

- (1) Port Management
- (2) Setup
- (3) Help

(1) Port Management

The **Port Management** submenu (Figure 19) appears after the user has successfully logged in.

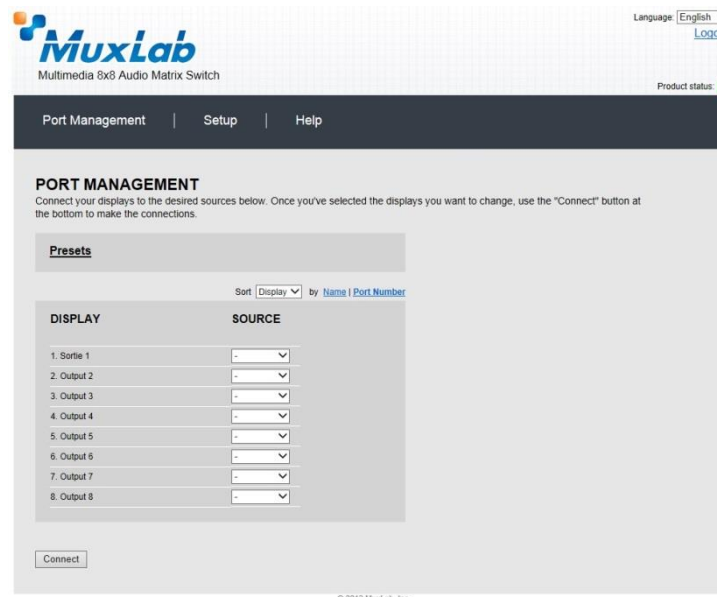


Figure 19: Port Management Submenu

The **Port Management** submenu manages the connection configurations of displays and sources.

A connection configuration is a specific set of mapping instructions between all displays and devices. A saved connection configuration is known as a preset.

The **Port Management** submenu allows the user to make individual connections between specific displays and sources, or wholesale connections between all displays and sources by means of presets. Sources and displays are presented to the user in any one of four ways:

- By source name
- By source number
- By display name
- By display number

Figure 19 illustrates sources and displays presented by display number. The user can make changes to the connection configuration of the device by selecting any option in the drop-down boxes in the **Source** column. Once any change is made, the given row will change color to indicate that a change has taken place. Once all selections have been made, the user clicks on the **Connect** button to apply those selections.

Presets are pre-established connection configurations that are used to apply wholesale mapping instructions between all displays and sources (see Figure 20). The user can load any one of eight presets to the device. Once a preset is selected from the **Preset** drop-down menu, the user clicks on **Load Preset** to show the connection configuration of the given preset. To apply the preset, the user clicks on **Make Connections**.

To modify a given preset, its name must first appear in the **Preset** drop-down menu. The user then makes changes to the connections between displays and sources (any change will result in a highlighted row). Once all changes are made, the user clicks on **Save Preset**. This effectively modifies the connection configuration of the given preset.

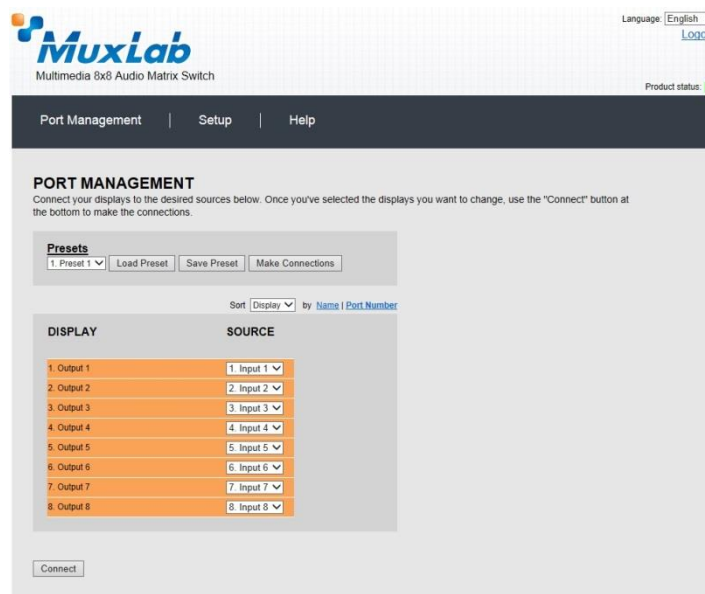


Figure 20: Port Management Submenu – Presets

(2) Setup

The **Setup** submenu (Figure 21) is used to perform the following tasks:

- Modify port names
- Modify present names
- Modify network connections and passwords
- Modify RS232 connections
- Modify alarm settings
- Upgrade firmware

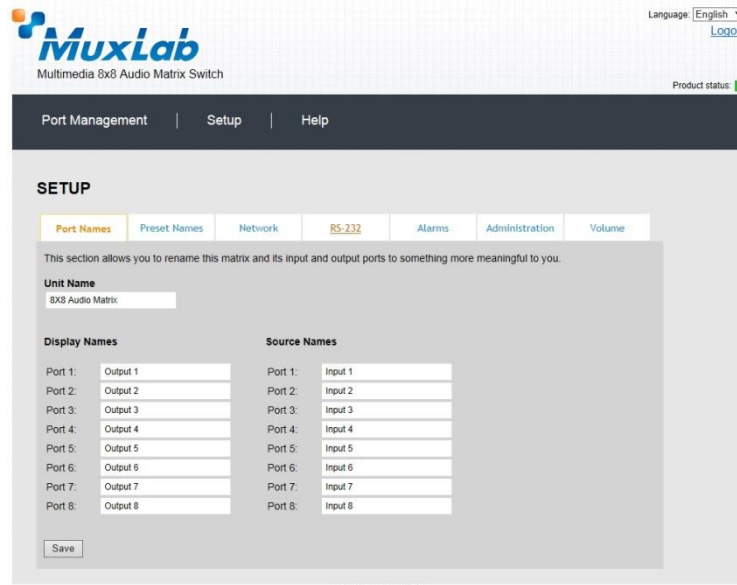


Figure 21: Setup Submenu – Port Names Tab

In the **Port Names** tab, the user can modify port names in the **Display Names** and **Source Names** columns, and then click on **Save** to save these modifications. The user can also modify the name of the entire device by changing the text that appears in the **Unit Name** box and clicking on **Save**.

The length of all names is limited to 20 characters each.

In the **Preset Names** tab (Figure 22), the user can modify the names of presets.

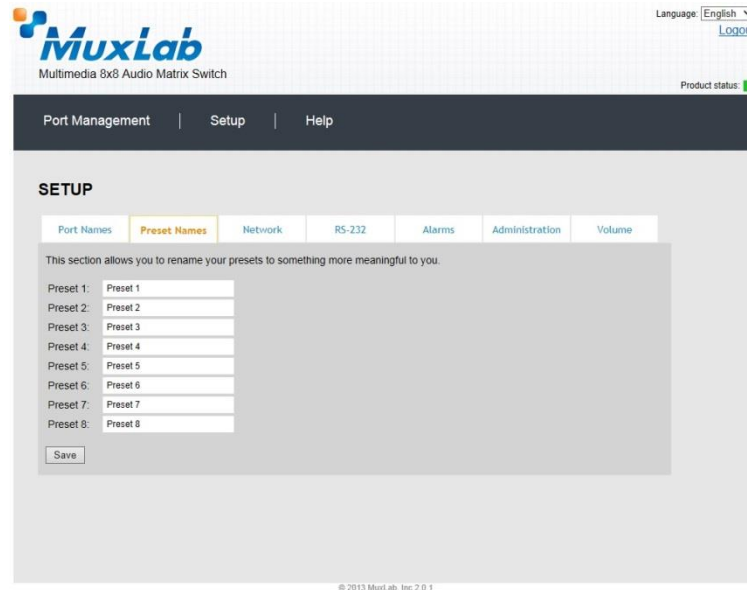


Figure 22: Setup Submenu – Preset Names Tab

After preset names are modified, the user clicks on **Save** to save these modifications.

The length of preset names is limited to 20 characters each.

In the **Network** tab (Figure 23), the user can modify network settings and passwords for users and (if applicable) administrators.

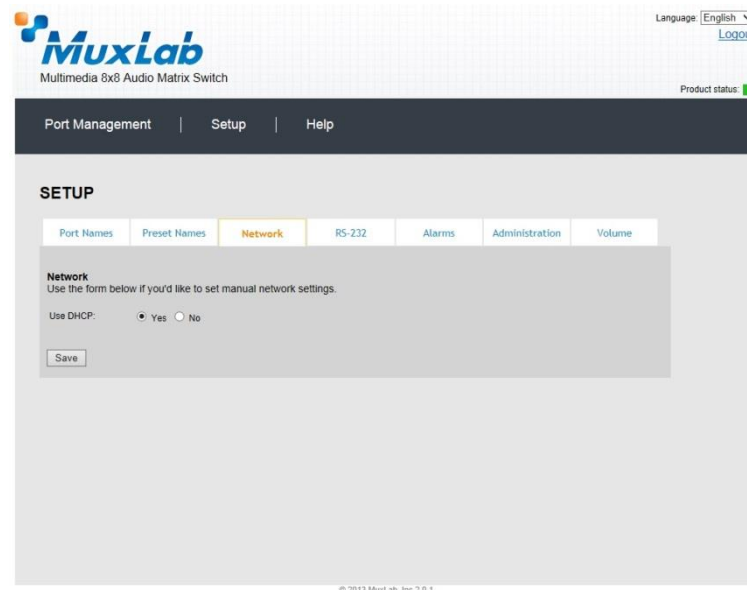


Figure 23: Setup Submenu – Network Tab

To implement network modifications, the user makes changes to the **IP address**, **Network mask**, or **Router** fields and then clicks on **Save**. The user also has the option of using DHCP.

To implement password modifications, an administrator makes changes to the **Administrator Password** and/or the **User Password**, and then clicks on the corresponding **Save** button. Regular users can only make changes to the **User Password**.

In the **RS-232** tab (Figure 24), the user can modify RS-232 settings.

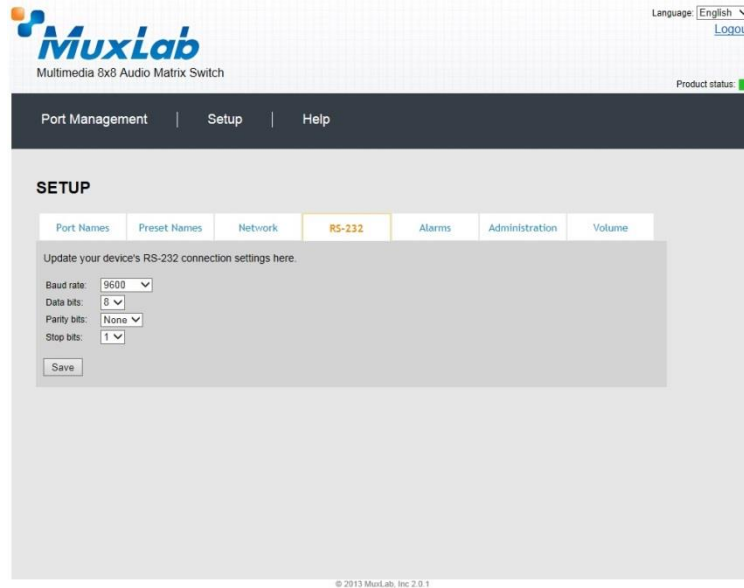


Figure 24: Setup Submenu – RS-232 Tab

To implement RS-232 modifications, the user selects options in the drop-down boxes for **Baud rate**, **Data bits**, **Parity bits**, or **Stop bits** and then clicks on **Save**.

In the **Alarms** tab (Figure 25), the user can modify the settings that dictate when an alarm will be triggered.

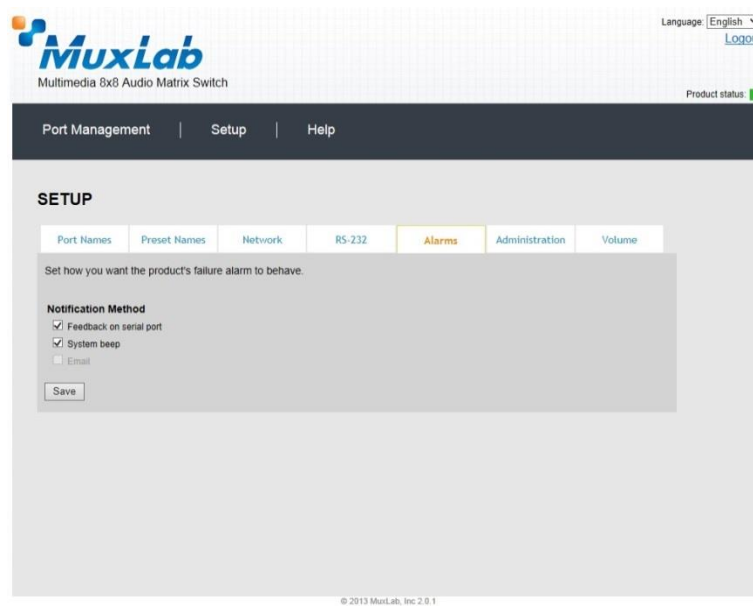


Figure 25: Setup Submenu – Alarms Tab

Minimum and maximum temperatures are understood to be in degrees Celsius (°C). Once all modifications have been made, the user clicks on **Save**.

In the **Administration** tab (Figure 26), the user can modify passwords for users and (if applicable) administrators, select and install new firmware, restore or backup data and reset the unit to factory settings.

The screenshot displays the MuxLab web interface for the Administration tab. At the top, the MuxLab logo and 'Multimedia 8x8 Audio Matrix Switch' are visible. A navigation bar includes 'Port Management', 'Setup', and 'Help'. The 'SETUP' section has tabs for 'Port Names', 'Preset Names', 'Network', 'RS-232', 'Alarms', 'Administration' (selected), and 'Volume'. The 'Administration' section contains several functional areas:

- Passwords:** A section for changing passwords. It includes a 'Current Administrator password' field and two columns for 'Administrator Password' and 'User Password', each with 'New password' and 'Confirm new password' fields. 'Save' buttons are provided for each.
- Firmware Upgrade:** A section to update the device's firmware. It includes a 'Specify file:' field with a 'Browse...' button and an 'Upload' button. A note indicates the current version is 2.0.1.
- Restore data:** A section to restore the unit with a selected data file. It includes a 'Specify file:' field with a 'Browse...' button and a 'Restore' button.
- Backup data:** A section to backup the data and save it in a file. It includes a 'Backup' button.
- Reset to factory settings:** A section to reset the unit and apply factory settings. It includes a 'Reset' button.

Figure 26: Setup Submenu – Administration Tab

To implement password modifications, an administrator makes changes to the **Administrator Password** and/or the **User Password**, and then clicks on the corresponding **Save** button. Regular users can only make changes to the **User Password**.

The file for upgrading the firmware must be located on the PC. The user clicks on **Choose File** to browse for the file, and then installs it by clicking on **Upload**.

It is recommended, before upgrading to a new firmware to do a **Backup** of all the data configurations, such as port names, presets, alarms, network settings etc. And then **Restore** these data after the firmware upgrade.

To do so, click on the “**Backup**” button and you will be asked to save the data configuration file. Then perform the firmware upgrade. After the unit is upgraded, go to the Administration tab, in the “Restore data” section, select the data configuration file previously saved on you PC, then click on the “Restore” button.

Finally, you can reset the unit and apply all the factory settings by clicking on the “Reset” button.

In the **Volume** tab (Figure 27), the user can set the volume attenuation at any output from 0 to 127 dB.

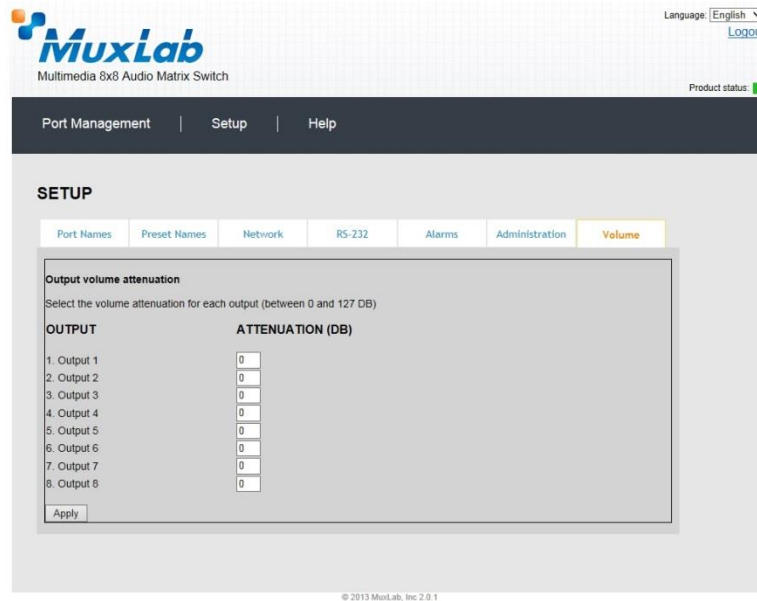


Figure 27: Setup Submenu – Volume Tab

(3) Help

The **Help** submenu (Figure 28) provides the user with contact and support information.

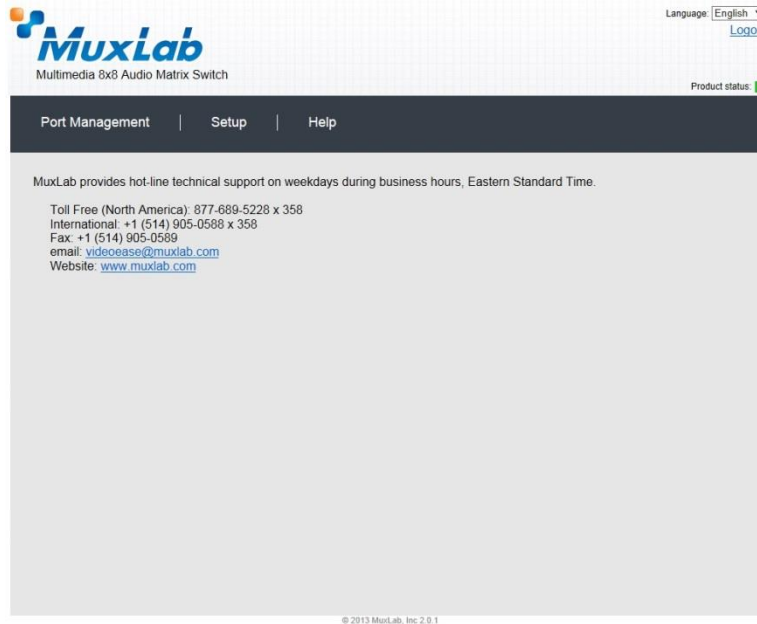


Figure 28: Help Submenu

4. Troubleshooting

Table 2 lists common problems that affect image quality, as well as their possible causes and solutions. If the information below does not solve the problem, the technical support contact information can be found at the end of this section.

PROBLEM	POSSIBLE SOLUTIONS
No Sound	Check power on all units
No Sound	Attenuation set to maximum. Slave mode select (must be master mode).
No Sound	Check Matrix Switch connections. An internal 1 kHz test tone is available from the LCD menu to test each output section individually.
Overload LED on	Reduce volume at the source or defective cable.
Choppy Sound (digital only)	Check that distance does not exceed 600 ft (180 m)
Loss of High Frequency Sound (analog only)	Check that distance does not exceed 3000 ft (900 m)
Hum or buzz in sound (analog only)	Ground loop or defective cable. If cable is not defective, connect equipment to electrical ground (green wire).

Table 2: Troubleshooting

When contacting your nearest MuxLab dealer or MuxLab Technical Support at 877-689-5228 (toll free in North America) or (+1) 514-905-0588 (International), please have the following information ready:

- Unit model number.
- Cabling layout. Please include the model of the HDMI source and receiver, cable length and type.
- Description of problem.
- List of tests performed.

5. Appendix

A. ASCII Command Set

Ensure that the terminal emulation program parameters are set to the following:

BAUD Rate:	9600
Data bits:	8
Stop bits:	1
Parity:	None
Flow control:	None

It should be noted that commands are case sensitive and arguments must be separated by a single space. Commands must be entered in the following way and ended with a carriage return.

B. Serial/USB Port Commands

1. Connection

connect -i <input port #> **-o** <output port #>

Description: Connect a specific input to a specific output

Arguments: <input port #>: 1 to 8
<output port #>: 1 to 8

Example: Connect input 2 to output 4

connect -i 2 -o 4

Response: **[0,0,0,2,0,0,0,0]**
(or an error message if the command failed)

connect -i <input port #> **-o all**

Description: Connect a specific input to all outputs

Arguments: <input port #>: 1 to 8

Example: Connect input 2 to all outputs

connect -i 2 -o all

Response: **[2,2,2,2,2,2,2,2]**
(or an error message if the command failed)

connect -i <input port #> **-o** <from output port #>..**<to output port #>**

Description: Connect a specific input to a consecutive range of outputs

Arguments: <input port #>: 1 to 8
<from output port #>: 1 to 8
<to output port #>: 1 to 8
<from output port #> shall be inferior or equal to <to output port #>

Example: Connect input 2 to outputs 1, 2, and 3

connect -i 2 -o 1..3

Response: **[2,2,2,0,0,0,0,0]**
(or an error message if the command failed)

connect -json “[<input port #1>,<input port #2>,..., <output port #8>]”

Description: Make 8 connections/disconnections in one command using json format

Arguments: <input port #>: 1 to 8 to specify the input port to connect to, or 0 to disconnect it

Example: Connect input 2 to outputs 1, 2, and connect input 3 to output 4, and disconnect all other outputs.

connect -json “[2,2,0,3,0,0,0,0]”

Response: **[2,2,0,3,0,0,0,0]**
(or an error message if the command failed)

connect -p <preset #>

Description: Apply all connections defined in the selected preset #

Arguments: <preset #>: 1 to 8 to specify the preset to use

Example: Apply the connections defined in preset 7

connect -p 7

Response: **[2,0,0,3,0,0,0,0]**
(or an error message if the command failed)

2. Disconnection

disconnect -i <input port #>

Description: Disconnect a specific input port from all output ports connected to it

Arguments: <input port #>: 1 to 8

Example: Disconnect input 3 from all outputs connected to it

disconnect -i 3

Response: [2,0,2,2,0,0,0,0]

(or an error message if the command failed)

disconnect -o <output port #>

Description: Disconnect a specific output port from the input ports connected to it

Arguments: <output port #>: 1 to 8

Example: Disconnect output 3 from the input connected to it

disconnect -o 3

Response: [2,0,0,0,0,0,0,0]

(or an error message if the command failed)

disconnect -all

Description: Disconnect all output ports

Arguments: <none>

Example: Disconnect all outputs

disconnect -all

Response: [0,0,0,0,0,0,0,0]

(or an error message if the command failed)

3. Get

get -i <input port #>

Description: Get the connection state of a specific input port

Arguments: <input port #>: 1 to 8

Example: Get connection state of input port 2

get -i 2

Response: **Input 02 connected to: 01**

(or an error message if the command failed)

get -i

Description: Get the connection state of all input ports

Arguments: <none>

Example: Get connection state of all input ports

get -i

Response: **Input 01 connected to: none**

Input 02 connected to: 01

Input 03 connected to: none

...{and so on}

(or an error message if the command failed)

get -json

Description: Get all the output connection states in json format

Arguments: <none>

Example: Get all output connections states in json format.

get -json

Response: **[3,7,0,0,0,0,0]**

(or an error message if the command failed)

get -o <output port #>

Description: Get the connection state of a specific output port

Arguments: <output port #>: 1 to 8

Example: Get connection state of output port 4

get -o 4

Response: **Output 04 connected to: 1**

(or an error message if the command failed)

get -o

Description: Get the connection state of all output ports

Arguments: <none>

Example: Get connection state of all output ports

get -o

Response: **Output 01 connected to: 03**

Output 02 connected to: 04

Output 03 connected to: none

...{and so on}

(or an error message if the command failed)

4. Help**help or ?**

Description: Display all the command list definition available

Arguments: <none>

Example: Display all the command list

help

?

Response: connect

connect -i <input port #> -o <output port #> {Connect 1 input port to 1 output port}

connect -i <input port #> -o all {Connect 1 input port to all output port}

connect -i <input port #> -o <from output port #>..<to output port #> {Connect 1 input port to a specific range of output port}

disconnect

disconnect -i <input port #> {Disconnect 1 input port}

disconnect -o <output port #> {Disconnect 1 output port}

disconnect -all {Disconnect all input/output port}

... {and so on}

version

version <no parameters> {Get the current firmware version}

5. Name

name -i <input port #> "<name>"

Description: Set a name for the selected input port

Arguments: <input port #>: 1 to 8
<name>: up to 20 characters

Example: Set name "My DVD Player" for input port 4

name -i 4 "My DVD Player"

Response: **Input Names: ["Input 1", "Input 2", "Input 3", "My DVD Player", "Input 5", "Input 6", "Input 7", "Input 8"]**

(or an error message if the command failed)

name -i

Description: Get a list of all the input port names

Arguments: <none>

Example: Get list of all input port names

name -i

Response: **Input Names: ["Input 1", "Input 2", "Input 3", "My DVD Player", "Input 5", "Input 6", "Input 7", "Input 8"]**

(or an error message if the command failed)

name -o <output port #> "<name>"

Description: Set a name for the selected output port

Arguments: <output port #>: 1 to 8
<name>: up to 20 characters

Example: Set the name "Kitchen TV" for output port 4

name -o 4 "Kitchen TV"

Response: **Output Names: ["Output 1", "Output 2", "Output 3", "Kitchen TV", "Output 5", "Output 6", "Output 7", "Output 8"]**

(or an error message if the command failed)

name -o

Description: Get a list of all the output port names

Arguments: <none>

Example: Get list of all output port names

name -o

Response: **Output Names: ["Output 1", "Output 2", "Output 3", "Kitchen TV", "Output 5", "Output 6", "Output 7", "Output 8"]**

(or an error message if the command failed)

name -preset <preset #> "<name>"

Description: Set a name for the selected preset number

Arguments: <preset #>: 1 to 8
<name>: up to 20 characters

Example: Set name "Week-end" for preset 7

name -preset 7 "Weekend"

Response: **Preset Names: ["Preset 1", "Preset 2", "Preset 3", "Preset 4", "Preset 5", "Preset 6", "Weekend", "Preset 8"]**

(or an error message if the command failed)

name -preset

Description: Get a list of all the preset names

Arguments: <none>

Example: Get list of all preset names

name -preset

Response: **Preset Names: ["Preset 1", "Preset 2", "Preset 3", "Preset 4", "Preset 5", "Preset 6", "Week-end", "Preset 8"]**

(or an error message if the command failed)

name -unit <name>

Description: Set a name for the unit

Arguments: <name>: up to 20 characters

Example: Set the name "MuxLab Switch" for the unit

name -unit "MuxLab Switch"

Response: **Unit Name: ["MuxLab Switch"]**

(or an error message if the command failed)

name -unit

Description: Get the unit name

Arguments: <none>

Example: Get the unit name

name -unit

Response: **Unit Name: ["MuxLab Switch"]**

(or an error message if the command failed)

6. Network**network**

Description: Get the network address values (IP, mask and gateway)

Arguments: <none>

Example: Get network address values

network

Response: **IP: 10.0.1.101**

MASK: 255.255.0.0

GATEWAY: 10.0.0.1

DHCP: ON

(or an error message if the command failed)

Network -ip <ip address>

Description: Set a specific IP address (note that DHCP must be disabled to perform this action)

Arguments: <ip address>: #.#.#.#

Example: Set the IP address to 192.25.80.13

Network -ip 192.25.80.13

Response: **IP: 192.25.80.13**

MASK: 255.255.0.0

GATEWAY: 10.0.0.1

DHCP: OFF

(or an error message if the command failed)

Network -m <mask address>

Description: Set a specific mask address (note that DHCP must be disabled to perform this action)

Arguments: <mask address>: #.#.#.#

Example: Set the mask address to 255.255.255.0

Network -m 255.255.255.0

Response: **IP: 192.25.80.13**

MASK: 255.255.255.0

GATEWAY: 10.0.0.1

DHCP: OFF

(or an error message if the command failed)

Network -g <gateway address>

Description: Set a specific gateway address (note that DHCP must be disabled to perform this action)

Arguments: <gateway address>: #.#.#.#

Example: Set the gateway address to 10.101.1.5

Network -g 10.101.1.5

Response: **IP: 192.25.80.13**

MASK: 255.255.255.0

GATEWAY: 10.101.1.5

DHCP: OFF

(or an error message if the command failed)

Network -dhcp <dhcp state>

Description: Enable/disable DHCP feature

Arguments: <dhcp state>: on or off

Example: Enable the DHCP feature

Network -dhcp on

Response: **IP: 10.0.1.101**

MASK: 255.255.0.0

GATEWAY: 10.101.1.5

DHCP: ON

(or an error message if the command failed)

7. Password

password -wadmin <web admin password>

Description: Set the web server 'Admin' password

Arguments: <web admin password>: alphanumeric (max. length 20)

Example: Change the web admin password to new123

password -wadmin new123

Response: **Web server Admin password set successfully**

(or an error message if the command failed)

password -wuser <web user password>

Description: Set the web server 'User' password

Arguments: <web user password>: alphanumeric (max. length 20)

Example: Change the web user password to new123

password -wuser new123

Response: **Web server User password set successfully**

(or an error message if the command failed)

8. Preset**preset -s** <preset #>

Description: Save the current connection in the selected preset

Arguments: <preset #>: 1 to 8

Example: Save current connection in preset 5

preset -s 5

Response: **preset 5 saved successfully**

(or an error message if the command failed)

9. Reset**reset -f**

Description: Reset the unit and restore it to its factory settings

Arguments: <none>

Example: Reset unit and restore to factory settings

reset -f

Response: "Clearing flash memory..."

Rebooting..."

(or an error message if the command failed)

10. Volume**volume**

Description: Display all the output volume attenuation values

Arguments: <none>

Response: [10,0,0,0,0,0,0,0]

volume -o ##

Description: Set output volume attenuation value (0 to 127 dB)

Arguments: < output #>< attenuation>

Response: [10,0,0,0,0,0,0,0]

volume -m #

Description: Mutes a specific output

Arguments: < output #>

Response: [10,0,0,0,0,0,0,0]

volume -u #

Description: Unmutes a specific output

Arguments: < output #>

Response: [10,0,0,0,0,0,0,0]

11. Serial Port

serial

Description: Get all RS-232 settings

Arguments: <none>

Example: Get all RS-232 settings

serial

Response: **Baud Rate: 9600**

Data bits: 8

Stop bit: 1

Parity: NONE

(or an error message if the command failed)

serial -b <baud rate>

Description: Set the RS-232 baud rate

Arguments: <baud rate>: 9600, 19200, 38400, 57600 or 115200

Example: Set the RS-232 baud rate to 115200

serial -b 115200

Response: **Baud Rate: 115200**

Data bits: 8

Stop bit: 1

Parity: NONE

(or an error message if the command failed)

serial -o <data bits> <parity> <stop bits>

Description: Modify other RS-232 settings

Arguments: <data bits>: 7 or 8

<parity>: e, o or n (i.e: even, odd, none)

<stop bits>: 1 or 2

Example: Set the RS-232 settings to 8 data bits, no parity and 1 stop bit

serial -o 8 n 1

Response: **Baud Rate: 115200**

Data bits: 8

Stop bit: 1

Parity: NONE

(or an error message if the command failed)

serial -b <baud rate> -o <data bits> <parity> <stop bits>

Description: Modify all RS-232 settings

Arguments: <baud rate>: 9600, 19200, 38400, 57600 or 115200

<data bits>: 7 or 8

<parity>: e, o or n (i.e: even, odd, none)

<stop bits>: 1 or 2

Example: Set the RS-232 settings to a baud rate of 9600, 8 data bits, no parity and 1 stop bit

serial -b 9600 -o 8 n 1

Response: **Baud Rate: 9600**

Data bits: 8

Stop bit: 1

Parity: NONE

(or an error message if the command failed)

12. Status

status

Description: Display the unit status

Arguments: <none>

Example: *Display the unit status*

status

13. Version

version

Description: Get the current firmware version

Arguments: <none>

Example: *Get current firmware version*

version

Response: **Master firmware version: 1.0.0**
(or an error message if the command failed)

C. IP Control Commands

1. Notice

This section is provided for informational purposes only, and should only be used by software developers with a thorough understanding of the HTTP and JSON specifications.

2. Introduction

The Matrix Switch can be controlled using basic IP commands. These commands are based on the JSON format and are sent and received in standard TCP/IP packets. To learn more about JSON, visit <http://www.json.org>.

Only four types of JSON arrays are used to control the product:

Array of a single integer: [2]
Array of multiple integers: [1,2,3,4]
Array of a single string: ["A Name"]
Array of multiple strings: ["Name 1", "Name 2", "Name 3", "Name 4"]

Any other notation is not permitted. Also, "null" values are not permitted. Use 0 instead.

3. Basic Usage

All read and write operations are performed via HTTP GET and HTTP POST commands, respectively. While you can perform a GET at any time, a POST command will require prior authentication.

4. Basic Authentication

Authentication is performed in three simple steps:

1. Obtain a Session ID

Perform a **GET** request on **/var/session.json** to obtain a new session ID. The return value will be a JSON array of a single integer, for example **[12345]**. From then on, simply append the session to any new IP requests to use this session, e.g., **GET /var/conn.json?sid=12345**

2. Open a Session ID That Will Not Expire

Perform a **GET** request on **/var/session.json** to obtain a new session ID *that will not expire*. The return value will be a JSON array of a single integer, for example **[12345]**. From then on, simply append the session to any new IP requests to use this session, e.g., **GET /var/conn.json?sid=12345**

3. Obtain Credentials for that Session ID

There are three permission levels that can be used to read/modify properties. These are:

- 0 – Guest: Can read all values. Cannot write or make changes.
- 1 – User: Same as Guest, but can change matrix video connections.
- 2 – Admin: Can perform any command without restriction.

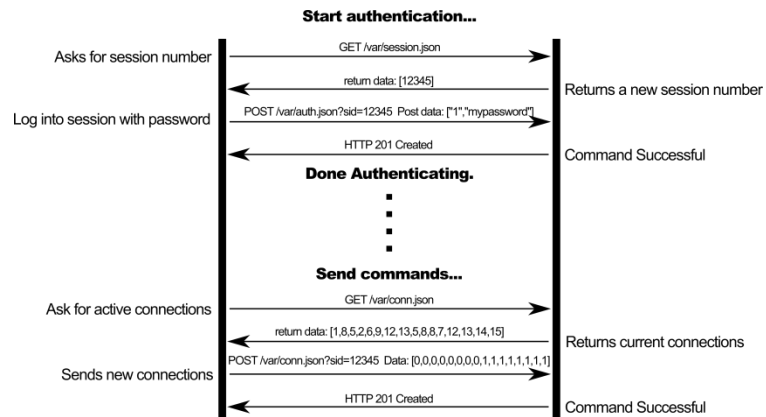
To obtain credentials, you will need to POST an array of two strings to **/var/auth.json**: the userlevel, and the password associated to that user. For example:

POST /var/auth.json?sid=12345

POST data: **[“2”, “mypassword”]**

If successful, you will receive an **HTTP 201 Created** response.

Sessions will automatically close after 5 minutes of inactivity. They may also be closed at any time by a **GET /var/logout.json**.



4. GET Commands

URL	Response
/var/conn.json	Array of 4 integers. Contains 4 items for the 4 displays. Each number is the source connected to the associated display. 0 means a display is disconnected. In the example below, Display 1 is disconnected, Display 2 is connected to Source 3, etc. Example: [0,3,2,4]
/var/pre1.json /var/pre2.json /var/pre3.json /var/pre4.json /var/pre5.json /var/pre6.json /var/pre7.json /var/pre8.json	Array of 4 integers. Provide the connections state of the corresponding preset. Contains 4 items for the 4 displays. Each number is the source connected to the associated display. 0 means a display is disconnected. In the example below, Display 1 is disconnected; Display 2 is connected to Source 3, etc. Example: [0,3,2,4]
/var/boxname.json	Array of a single string. Contains the name of the box. Example: ["Classroom B Matrix"]
/var/sources.json	Array of 4 strings. Contains the names of all 4 input ports. Example: ["Cable Box", "Satellite Receiver", "Demo Reel", ...]
/var/displays.json	Array of 4 strings. Contains the names of all 4 output ports. Example: ["Conference Room", "Cafeteria", ...]
/var/presetnames.json	Array of 8 strings. Contains the names of all 8 presets Example: ["Preset 1", "Preset 2", "week end", ...]
/var/dhcp.json	Array of a single integer. Indicate if dhcp is ON (1) or OFF (0) Example: [1]
/var/auth.json	Array of a single integer. Contains an integer representing the current user level, from 0 to 2. Example: [2]
/var/session.json	Array of a single integer. Represents a new session ID Example: [3847534]
/var/logout.json	None. Destroys current session.
/var/mon_status.json	Array of a single integer. Represents the matrix status. 0 => Ok; 1 => fault; 2 => critical Example: [1]
/var/serial.json	Array of 4 integers. Contains the current serial port settings: baud rate, data bits(7 or 8), parity (0=>Even; 1=>Odd; 4=>None) ,stop bits (0=>1 stop bit; 2=>2 stop bits) Example: [9600,8,4,0]
/var/ip.json	Array of 4 integers. Contains the saved IP address (Not the current IP address being used) Example: [10,0,101,96]
/var/netmask.json	Array of 4 integers. Contains the saved mask address (Not the current mask address being used) Example: [255,255,0,0]
/var/router.json	Array of 4 integers. Contains the saved gateway address (Not the current one being used) Example: [10,0,1,1]
/var/fwVersion.json	Array of 2 strings. Contains master firmware version Example: ["1.0.0", "0"]

5. POST Commands

POST commands will always return 1 of 5 HTTP headers:

HTTP 201 Created	Command was successful
HTTP 400 Bad Request	Received argument was malformed
HTTP 403 Forbidden	User does not have sufficient privileges
HTTP 404 Not Found	URL is incorrect
HTTP 501 Not Implemented	URL does not support receiving POST data

URL	Argument
/var/conn.json	Array of connections. (Same as GET above) Example: [0,1,2,3]
/var/connio.json	Single connection JSON data = [input#, output #] Example: [2,3] (to connect input #2 to output #3)
/var/pre1.json /var/pre2.json /var/pre3.json /var/pre4.json /var/pre5.json /var/pre6.json /var/pre7.json /var/pre8.json	Array of connections for a preset (Same as GET above) Example: [0,1,2,3]
/var/boxname.json	Array of a single string. Contains the name of the box, limited to 20 characters Example: ["Classroom B Matrix"]
/var/sources.json	Array of 4 strings. Contains the names of all 4 input ports. Example: ["Cable Box", "Satellite Receiver", "Demo Reel", ...]
/var/displays.json	Array of 4 strings. Contains the names of all 4 output ports. Example: ["Conference Room", "Cafeteria", ...]
/var/presetnames.json	Array of 8 strings. Contains the names of all 8 presets to be set Example: ["Preset 1", "Preset 2", "week end", ...]
/var/auth.json	Array of 2 strings. Contains a single digit string representing the user level requested, and a second string representing the password. Example: ["2", "myAdminPassword"]
/var/serial.json	Array of 4 integers. Set the following serial port settings: baud rate, data bits(7 or 8), parity (0=>Even; 1=>Odd; 4=>None), stop bits (0=>1 stop bit; 2=>2 stop bits) Example: [9600,8,4,0]
/var/ip.json	Array of 4 integers. Set the IP address Example: [10,0,101,96] WARNING! This request will actually take effect after the DHCP request will be sent
/var/netmask.json	Array of 4 integers. Set the mask address Example: [255,255,0,0] WARNING! This request will actually take effect after the DHCP request will be sent
/var/router.json	Array of 4 integers. Set the gateway address Example: [10,0,1,1] WARNING! This request will actually take effect after the DHCP request will be sent
/var/dhcp.json	Array of a single integer. Set the DHCP state ON ([1]) or OFF ([0]) Example: [1]
var/pass_admin.json	Array of 2 strings. Set the web administrator password Example: ["old admin password", "new admin password"]
var/pass_user.json	Array of 2 strings. Set the web user password Example: ["old admin password", "new user password"]
var/reset	Reset the unit to factory settings

D. Infrared Remote Control Codes

Remote control codes must follow NEC code standards

Custom Code: 00FF

Code (hex)	Identification	
	Button	Description
00	Enter	For Navigating Front Panel LCD Menu
0D	Up	
15	Down	
10	Left	
12	Right	
21	Output #1	For Selecting Outputs Directly
22	Output #2	
23	Output #3	
24	Output #4	
25	Output #5	
26	Output #6	
27	Output #7	
28	Output #8	
40	[NONE]	N/A
41	Input #1	For Selecting Inputs Directly
42	Input #2	
43	Input #3	
44	Input #4	
45	Input #5	
46	Input #6	
47	Input #7	
48	Input #8	
51	External Input #1	For Selecting External Inputs Directly
52	External Input #2	
53	External Input #3	
54	External Input #4	
55	External Input #5	
56	External Input #6	
57	External Input #7	
58	External Input #8	
59	External Input #9	
5A	External Input #10	
5B	External Input #11	
5C	External Input #12	
5D	External Input #13	
5E	External Input #14	
5F	External Input #15	
60	External Input #16	
61	Test Tone	For Sending a 1 kHz Tone at -20 dBFS to Selected Output
80	0 dB	For Selecting Attenuation (Volume) of Given Output
81	1 dB	
.	.	
.	.	
FF	127 dB	

6. Product Warranty Policy

Items Under Warranty - Company Policy

MuxLab guarantees its products to be free of defects in manufacturing and workmanship for the warranty period from the date of purchase. If this product fails to give satisfactory performance during this warranty period, MuxLab will either repair or replace this product at no additional charge, except as set forth below. Repair and replacement parts will be furnished on an exchange basis and will be either reconditioned or new. All replaced parts and products become the property of MuxLab. This limited warranty does not include repair services for damage to the product resulting from accident, disaster, misuse, abuse, or unauthorized modifications or normal decay of battery driven devices. Batteries, if included with the product, are not covered under this warranty.

Limited warranty service can be obtained by delivering the product during the warranty period to the authorized MuxLab dealer from whom you purchased the product, or by sending it to MuxLab. MuxLab will not accept any such product for repair without a Return Material Authorization number (RMA#) issued by its Customer Service Department and a proof of purchase date. If this product is delivered to MuxLab by mail, you agree to assume risk of loss or damage in transit, to prepay shipping charges to the warranty service location, and to use the original shipping container or equivalent.

THE ABOVE LIMITED WARRANTY IS THE ONLY WARRANTY COVERING YOUR MUXLAB PRODUCT. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW LIMITATIONS ON IMPLIED WARRANTIES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

IF THIS PRODUCT IS NOT IN GOOD WORKING ORDER, YOUR SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT AS PROVIDED FOR ABOVE. IN NO EVENT SHALL MuxLab BE LIABLE TO YOU FOR ANY DAMAGES, INCLUDING ANY LOSS OF PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF OR INABILITY TO USE THIS PRODUCT, EVEN IF MUXLAB OR AN AUTHORIZED MuxLab DEALER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES; NOR WILL MUXLAB BE LIABLE FOR ANY CLAIM BY ANY OTHER PARTY. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR CONSUMER PRODUCTS, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

Warranty Periods

Any product found to be defective within three (3) months of invoice, including one (1) month shelf life, may be returned for replacement by a new unit or a satisfactory repair within one (1) month of receiving any returned product. The customer must provide MuxLab with the serial number and proof of purchase of the defective unit being returned. All R.M.A.'s issued are subject to inspection by MuxLab, and will be returned to customer if not properly package – units must be returned in original container or equivalent. MuxLab will not accept any such product for repair without an authorization for its Technical Support department and without a return authorization number issued by MuxLab Customer Service department. For credit & replace R.M.A., customer will be liable to pay replacement invoice if defective products are not returned. Product more than six months old, including shelf life.

The defective unit must be returned prepaid to MuxLab and then the unit will be repaired or if repair is not possible, replaced by an equivalent unit and returned to the customer within one (1) month of receiving any returned product. There is no charge for repair (parts and labor) during the full warranty period.

Items Defective and not under Warranty

For products which are no longer under warranty the policy is repair and return. An amount of 25% of the products published list price at the time of purchase will be charged. Customer must issue a purchase order to cover the cost of repair. Each unit will be returned to the customer within one (1) month from receipt of the unit by MuxLab. The defective unit must be returned prepaid to MuxLab. The repaired unit will be returned to the customer FOB MuxLab. The repaired unit has a 90 day warranty.



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