*Multimedia 16x16 Matrix Switch, 4K/60*
**500480**



# *Installation and Operation Manual*

**MuxLab**
**PRODIGITAL™**

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# 1. Overview

## 1.1. Description

The MuxLab 500480 Multimedia 16x16 Matrix Switch, 4K/60 allows 16 multimedia sources to be switched/distributed to up to 16 local displays via HDMI modular cards or up to 16 remote displays via HDBaseT (HDBT) modular cards supporting unshielded twisted pair (UTP) cables or shielded twisted pair (STP) cables. A mix of local and remote displays may be supported depending on the modular I/O cards installed in the Multimedia 16x16 Matrix Switch chassis. Remote displays can be connected up to 330ft (100m) at resolutions up to 3840x2160 @ 60Hz. The Multimedia 16x16 Matrix Switch works in conjunction with MuxLab's HDMI Receivers (500451-RX, 500451-PoE-RX, 500454-RX, or 500454-PoE-RX).
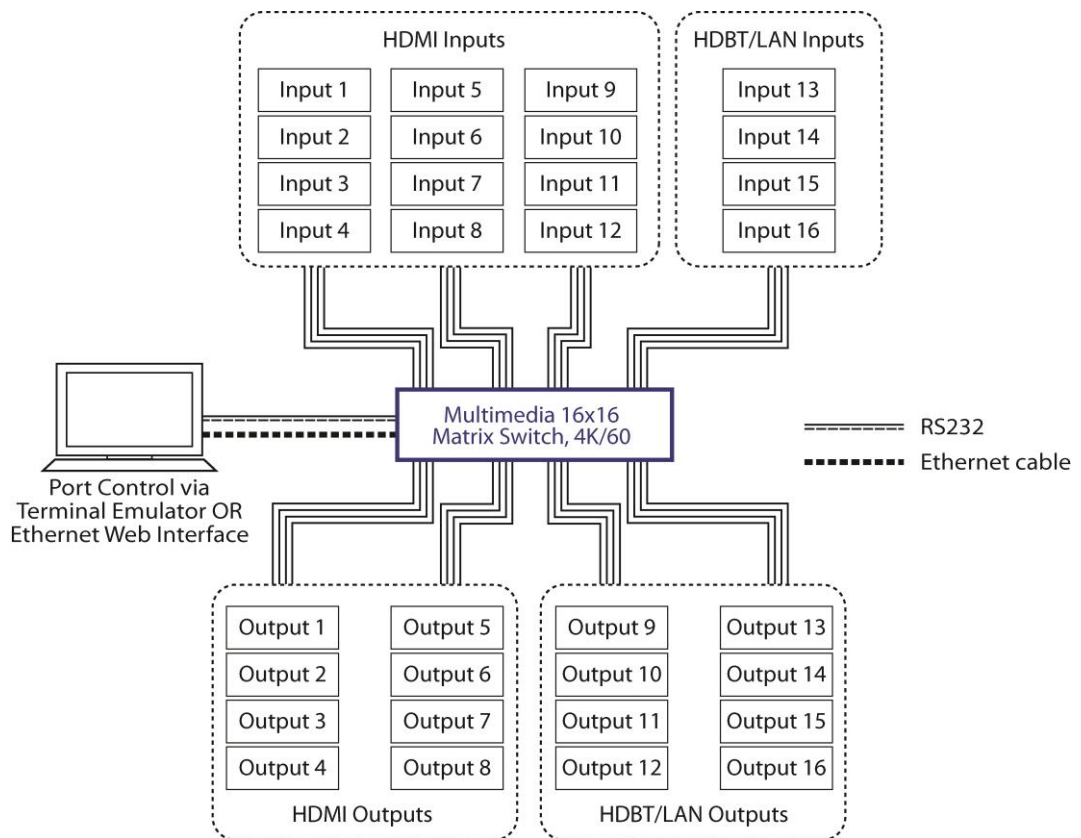


**Figure 1: System Overview**

Applications include commercial and residential AV systems, classroom projector systems, digital signage, boardroom systems, multi-room systems, classroom training, retail systems, collaborative PC systems, and medical information systems.

## 1.2.    Features

- 16x16 switching matrix

- Modular design supporting hot swappable input and output cards

- HDMI supported with resolution up to 3840x2160 @ 60Hz (4:4:4)

- HDBT supported resolution up to 3840x2160 @ 30Hz (4:4:4), and limited support for 3840x2160 @ 60Hz (4:2:0)

- UTP/STP extension up to 230ft (70m) for HDBT card, and up to 330ft (100m) for HDBT/LAN card via Cat 5e/6 UTP/STP Cables

- Seamless integration with MuxLab's HDMI Receivers (500450-RX, 500451-RX, 500451-PoE-RX, 500453-RX, 500454-RX, 500454-PoE-RX, and 500456-RX). (NOTE: See specifications of each receiver for information on supported standards, functionality and specifications.)

- Configurable EDID settings

- Front panel touch screen for local unit management

- Remote management via Ethernet Web interface, RS232, and IR

- Supports transmission of RS232 and IR for control over end devices

- Firmware is field upgradable

- Device control over HTTP and Telnet protocols

- 6U rackmount unit

# 2.
# Technical Specifications

| Multimedia 16x16 Matrix Switch Chassis, 4K/60 | |
|---|---|
| **Environment** | HDMI 1.4A, HDMI 2.0A, HDBT |
| **Devices** | LCD and Plasma TVs, DVD and Blu-Ray players, monitors, projectors, PCs, laptops, home theatre systems, home theater PCs, game consoles. |
| **Transmission** | Transparent to the user |
| **Bandwidth** | 18Gbps |
| **Input Slot** | 4 slots supporting 4-port modular input card; HDMI, HDBT |
| **Output Slot** | 4 slots supporting 4-port modular output card; HDMI, HDBT |
| **Audio Slot** | 2 slots supporting 8-port modular matrix audio card for a maximum of 16x16 – (coming soon). |
| **Connectivity** | Ethernet LAN (RJ45), RS232 (DB9), Contact Relay (Terminal Block), Video Monitoring (HDMI), Audio Monitoring (3.5mm Stereo Jack), USB Device (USB Type A) and Infrared Sensor. |
| **Display** | 7" TFT Display with Touch Screen |
| **Management** | Front panel LCD touch screen, RS232, IR, Webserver and 3rd party drivers |
| **Maximum HDBT Port Distance** | UTP/STP Cat 5e/6 Output port: 230ft (70m) HDBT card or 330ft (100m) HDBT/LAN card |
| **Cables** | Cat 5e/6 UTP/STP cables (or better) required for HDBT ports |
| **Power** | AC 100-240V 50/60Hz |
| **Power Supply** | Dual Redundant Power Supplies (secondary/redundant power supply sold separately) 100-240VAC to 12VDC @ 25A (300W) |
| **LED Diagnostics** | LAN (Link (Green) and Activity (Yellow)) |
| **Temperature** | Operating:        0ºC to 50ºC<br>Storage:        − 20ºC to 85ºC<br>Humidity:        Up to 95% non-condensing |
| **Dimensions** | 6U 19" Rack Mountable: 19.0" x 10.5" x 14.6" (483mm x 267mm x 370mm) |
| **Weight** | 25lbs (11kg) |
| **Regulatory** | FCC, CE, RoHS, WEEE |
| **Safety** | UL, CUL |
| **Warranty** | Two (2) years |
| **Order Information** | 500480-US   Multimedia 16x16 Matrix Switch Chassis with one Controller and one Power Supply Unit (500478 and US/Canada power cord)<br><br>500480-UK   Multimedia 16x16 Matrix Switch Chassis with one Controller and one Power Supply Unit (500478 and UK power cord)<br><br>500480-EU   Multimedia 16x16 Matrix Switch Chassis with one Controller and one Power Supply Unit (500478 and EU power cord)<br><br>500478       Replacement Power Supply Unit for 500470 and 500480 |

**Table 1: Chassis Specifications**

| HDMI / RS232 Input and Output Cards (4K/30) | |
|---|---|
| **Environment** | HDMI 1.3A, HDMI 1.4A, HDCP 1.4 |
| **Devices** | LCD and Plasma TVs, DVD and Blu-Ray players, monitors, projectors, PCs, laptops, home theatre systems, home theater PCs, game consoles. |
| **Transmission** | Transparent to the user |
| **Bandwidth** | 10.2Gbps |
| **Video Resolution** | Up to 3840x2160 @ 30Hz (4:4:4) |
| **Audio** | Stereo Analog Audio (Insertion or Extraction) |
| **IR Emitter** | 30KHz to 60KHz |
| **Connectivity** | 4-port HDMI connectors, RS232 (terminal block), IR Emitter (3.5mm Mono Jack) & audio de-embedded output or audio embedded input (3.5mm Stereo Jack) |
| **HDMI Standard Distance** | HDMI: 16ft (5m) |
| **Cables** | HDMI Cable |
| **LED Diagnostics** | Video (Green) and Audio (Green) |
| **Temperature** | Operating: 0ºC to 50ºC<br>Storage: − 20ºC to 85ºC<br>Humidity: Up to 95% non-condensing |
| **Dimensions** | 7.1" x 7.1" x 1.2" (180mm x 180mm x 30mm) |
| **Weight** | 1.22lbs (0.55kg) |
| **Regulatory** | FCC, CE, RoHS, WEEE |
| **Warranty** | Two (2) years |
| **Order Information** | 500481-I  4 Channel HDMI/RS232 Input Card, UHD-4K<br>500481-O  4 Channel HDMI/RS232 Output Card, UHD-4K |

**Table 2: HDMI Card Specifications (4K/30)**

| HDMI 2.0A Input and Output Cards (4K/60) – (coming soon) | |
|---|---|
| **Environment** | HDMI 2.0A, HDCP 1.4, HDCP 2.2 |
| **Devices** | LCD and Plasma TVs, DVD and Ultra Blu-Ray players, monitors, projectors, PCs, laptops, home theatre systems, home theater PCs |
| **Transmission** | Transparent to the user |
| **Bandwidth** | 18Gbps |
| **Video Resolution** | Up to 3840x2160, 60Hz (4:4:4) |
| **Audio** | Stereo Analog Audio (Insertion or Extraction) |
| **IR Emitter** | 30KHz to 60KHz |
| **Connectivity** | 4-port HDMI connectors, RS232 (terminal block), IR Emitter (3.5mm Mono Jack) & audio de-embedded output or audio embedded input (3.5mm Stereo Jack) |
| **HDMI 2.0A Standard Distance** | HDMI: 10ft (3m) |
| **Cables** | HDMI Cable |
| **LED Diagnostics** | Video (Green) and Audio (Green) |
| **Temperature** | Operating: 0ºC to 50ºC<br>Storage: − 20ºC to 85ºC<br>Humidity: Up to 95% non-condensing |
| **Dimensions** | 7.1" x 7.1" x 1.2" (180mm x 180mm x 30mm) |
| **Weight** | 1.22lbs (0.55kg) |
| **Regulatory** | FCC, CE, RoHS, WEEE |
| **Warranty** | Two (2) years |
| **Order Information** | 500484-I  4 Channel HDMI/RS232 Input Card, 4K/60 – (coming soon)<br>500484-O  4 Channel HDMI/RS232 Output Card, 4K/60 – (coming soon) |

**Table 3: HDMI 2.0A Card Specifications (4K/60)**

| HDBT/LAN Input and Output Cards (4K/30) | |
|---|---|
| Environment | HDBT, HDCP 1.4 |
| Devices | Compatible with HDBT Extender Receivers (500450-RX, 500451-RX, 500451-PoE-RX, 500453-RX, 500454-RX, 500454-PoE-RX, and 500456-RX) |
| Transmission | Transparent to the user |
| Bandwidth | 10.2Gbps |
| Video Resolution | Up to 3840x2160 @ 30Hz, and limited support for 3840x2160 @ 60Hz (4:2:0) |
| Audio | Stereo Analog Audio (Insertion or Extraction) |
| Ethernet | Up to 10/100Mbps |
| Connectivity | 4-port RJ45 connector & Audio (3.5mm Stereo Jack) |
| Maximum Distance | UTP/STP Cat 5e/6:  330ft (100m) up to 1080P Deep Color<br>230ft (70m) for 4K/30 |
| Cables | Cat 5e/6 UTP/STP cables (or better) |
| LED Diagnostics | Link (Blue), Video (Blue) and Audio (Blue) |
| Temperature | Operating:      0ºC to 50ºC<br>Storage:       − 20ºC to 85ºC<br>Humidity:      Up to 95% non-condensing |
| Dimensions | 7.1" x 7.1" x 1.2"  (180mm x 180mm x 30mm) |
| Weight | 1.50lbs (0.68 kg) |
| Regulatory | FCC, CE, RoHS, WEEE |
| Warranty | Two (2) years |
| Order Information | 500482-I    4 Channel HDBT/LAN Input Card, UHD-4K<br>500482-O   4 Channel HDBT/LAN Output Card, UHD-4K |

**Table 4: HDBT/LAN Card Specifications (4K/30)**

| HDBT Input and Output Cards (4K/30) | |
|---|---|
| Environment | HDBT, HDCP 1.4 |
| Devices | Compatible with HDBT Extender Receivers (500450-RX, 500451-RX, 500451-PoE-RX, 500453-RX, 500454-RX, 500454-PoE-RX, and 500456-RX) |
| Transmission | Transparent to the user |
| Bandwidth | 10.2Gbps |
| Video Resolution | Up to 3840x2160 @ 30Hz, and limited support for 3840x2160 @ 60Hz (4:2:0) |
| Audio | Stereo Analog Audio (Insertion or Extraction) |
| Connectivity | 4-port RJ45 connector & Audio (3.5mm Stereo Jack) |
| Maximum Distance | UTP/STP Cat 5e/6   230ft (70m) up to 1080P Deep Color<br>115ft (35m) for 4K/30 |
| Cables | Cat 5e/6 UTP/STP cables (or better) |
| LED Diagnostics | Link (Blue), Video (Blue) and Audio (Blue) |
| Temperature | Operating:      0ºC to 50ºC<br>Storage:       − 20ºC to 85ºC<br>Humidity:      Up to 95% non-condensing |
| Dimensions | 7.1" x 7.1" x 1.2"  (180mm x 180mm x 30mm) |
| Weight | 1.50 lb (0.68 kg) |
| Regulatory | FCC, CE, RoHS, WEEE |
| Warranty | Two (2) years |
| Order Information | 500483-I    4 Channel HDBT Input Card, UHD-4K<br>500483-O   4 Channel HDBT Output Card, UHD-4K |

**Table 5: HDBT Card Specifications (4K/30)**

# 3.
# Installation Procedure and Operation

## 3.1.    Part List

The Multimedia 16x16 Matrix Switch, 4K/60 (500480) includes the following components:

- • Multimedia 16x16 Matrix Switch, 4K/60 Chassis
     One Power Supply Unit
     One Controller
- • Power Cord (US, EU or UK)
- • One (1) RS232 Cable
- • 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 Multimedia 16x16 Matrix Switch, 4K/60 are detailed in Figures 2 through 13. Please familiarize yourself with them before installing the unit.
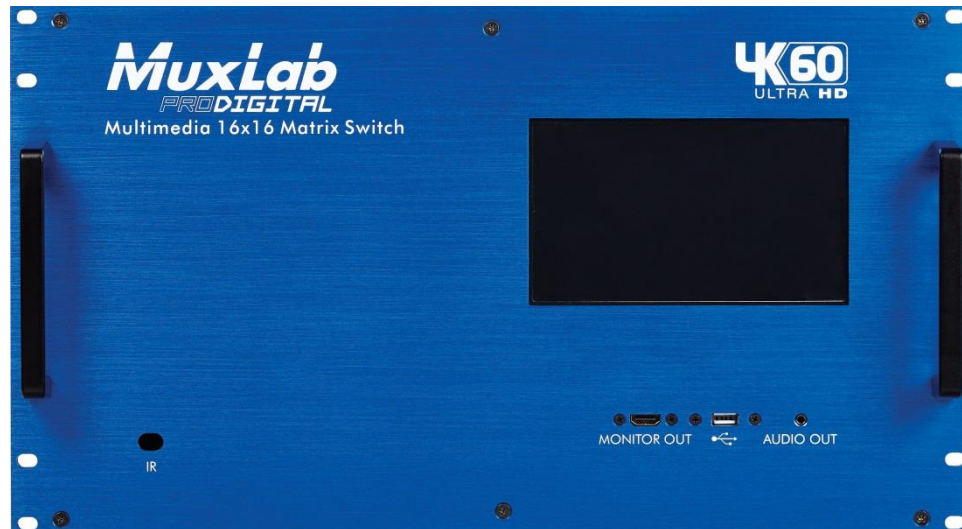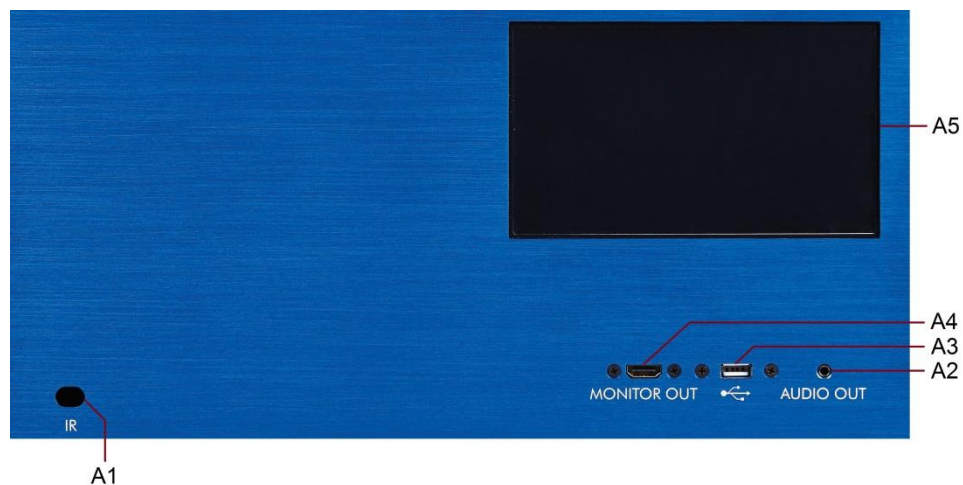


**Figure 2: Front Panel**



**Figure 3: Front Panel Controls**

A1 = Infrared Receiver Port
A2 = Audio Out Port (3.5mm stereo jack)
A3 = USB Port
A4 = Monitor Out Port (HDMI)
A5 = Touch Screen

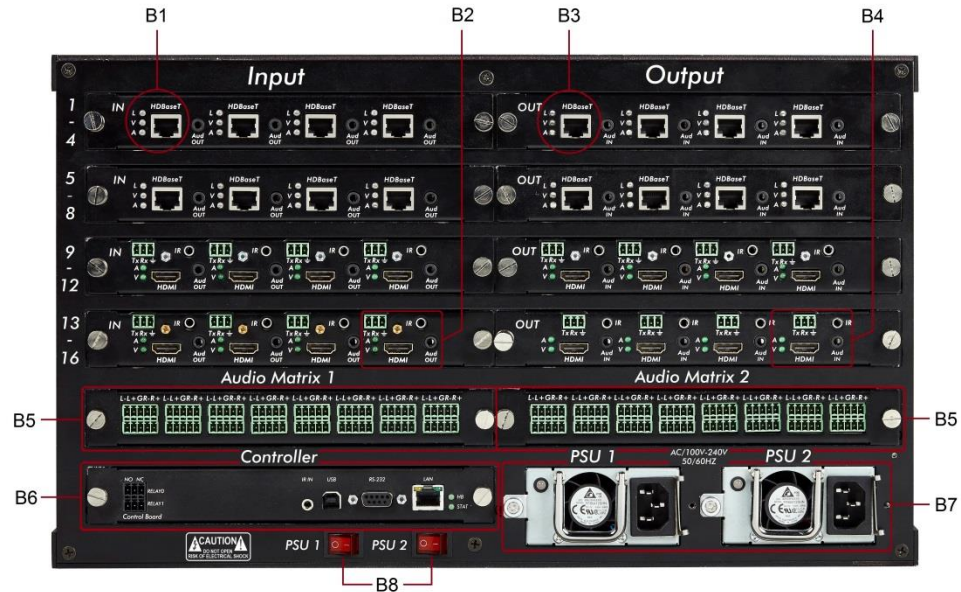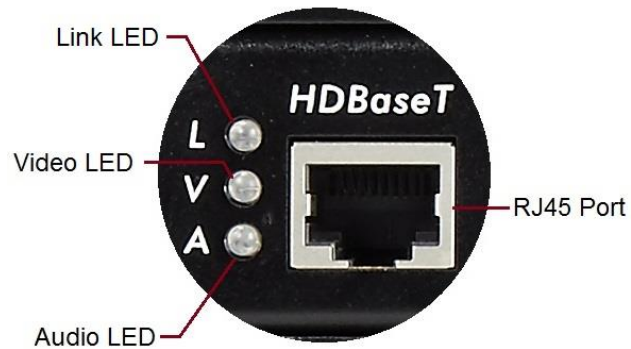**Figure 4: Back Panel**



**Figure 5: Back Panel Detail B1 (Input Port 1)**
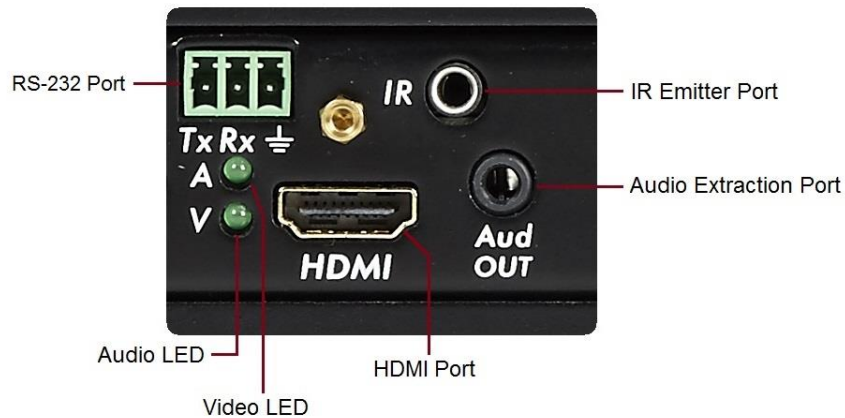


**Figure 6: Back Panel Detail B2 (Input Port 16)**

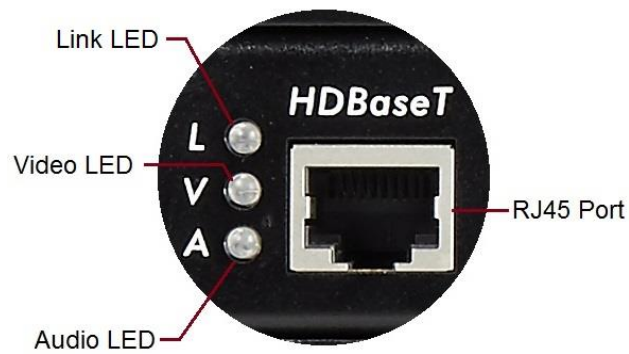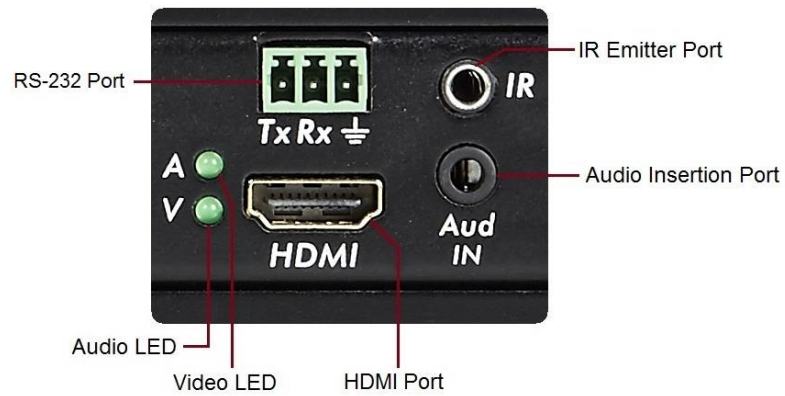**Figure 7: Back Panel Detail B3 (Output Port 1)**



**Figure 8: Back Panel Detail B4 (Output Port 16)**
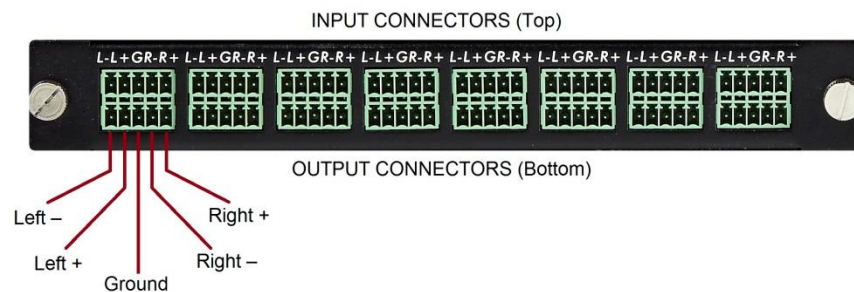


**Figure 9: Back Panel Detail B5 (Audio Matrix) – (coming soon)**
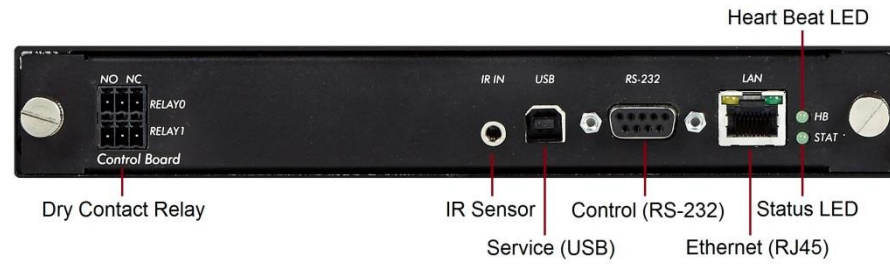
**Figure 10: Back Panel Detail B6 (Controller)**
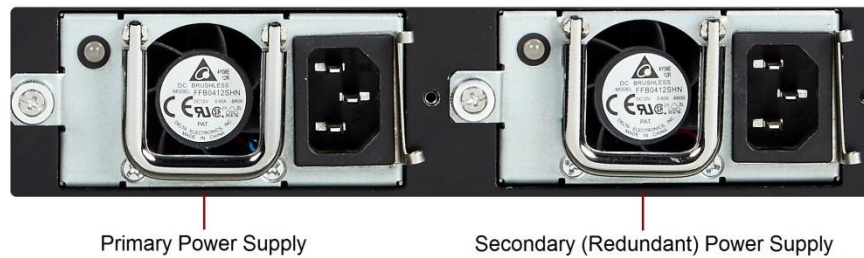


**Figure 11: Back Panel Detail B7 (Power Supplies)**
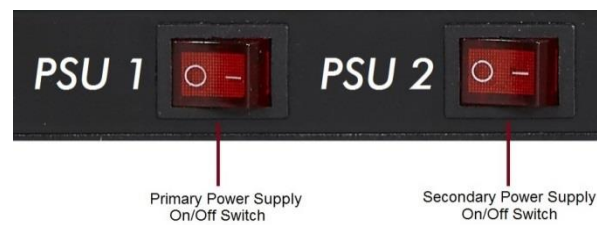


**Figure 12: Back Panel Detail B8 (Power Supply On/Off Switches)**

**Figure 13: Input and Output Card Modules (Sold Separately)**

## 3.3.    Pre-Installation Checklist

The Multimedia 16x16 Matrix Switch, 4K/60 provides a centralized HDMI switching center via HDMI or UTP/STP cables.

1. The Matrix Switch can be used in conjunction with MuxLab's UTP/STP HDMI Receivers (500450-RX, 500451-RX, 500451-PoE-RX, 500453-RX, 500454-RX, 500454-PoE-RX, and 500456-RX).

2. The Matrix Switch is typically installed in a remote telecom room/closet and is connected to multiple video sources and display devices via Cat 5e/6 UTP/STP or HDMI cables. HDMI ports on the Matrix Switch are connected directly to local source and display devices via HDMI cables. A MuxLab Receiver is installed at each remote source and display to support connections to HDBT ports on the Matrix Switch via a Cat 5e/6 cable.

## 3.4.    Physical Installation

MuxLab's Multimedia 16x16 Matrix Switch, 4K/60 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.

Once positioned in the rack, secure the unit by fastening the front panel to the rack with four screws. Four additional screws may be used to further secure the front panel to the rack. See Figure 14 for an illustration of a completed installation (front view).
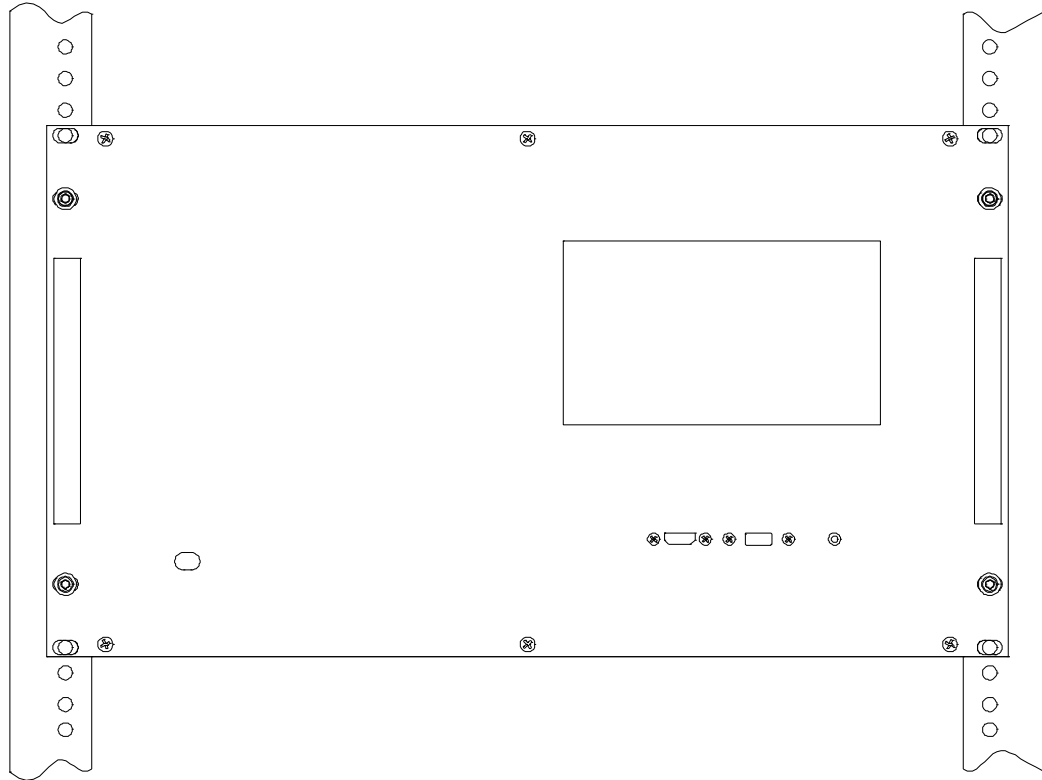
**Figure 14: Setup for a 19" Rackmount Installation**

## 3.5.    Installation Procedure

In order to install the Multimedia 16x16 Matrix Switch, 4K/60, please follow the steps below:

1.  Place the Multimedia 16x16 Matrix Switch, 4K/60 in its final location (see Section 3.4 Physical Installation).

2.  If a second power supply unit is required for redundancy, install it (see Section 3.7 Power Supply Unit Installation). Note that the secondary (redundant) power supply (PN: 500478) is sold separately.

3.  Install the input and output cards modules (sold separately). Input card modules fit into the four slots on the left side of the back panel, and output card modules fit into the four slots on the right side of the back panel (see Section 3.6 Card Module Installation).

4.  Connect the source(s) to the Matrix Switch via ports on the input card modules located on the back panel. Ensure that power is turned Off at the source(s). For HDBT inputs, MuxLab HDBT Transmitters must be installed at each source (see MuxLab HDBT Transmitter Installation Guide for more information).

5.  Connect the display(s) to the Matrix Switch via ports on the output card modules located on the back panel. Ensure that the display(s) are turned Off. For HDBT outputs, MuxLab HDBT Receivers must be installed at each display (see MuxLab HDBT Receiver Installation Guide for more information).

6.  Power up the equipment.

7.  Figure 15 illustrates a typical configuration.

The Matrix Switch is now ready to use. See Section 3.8 Manual Control for instructions on local unit usage.
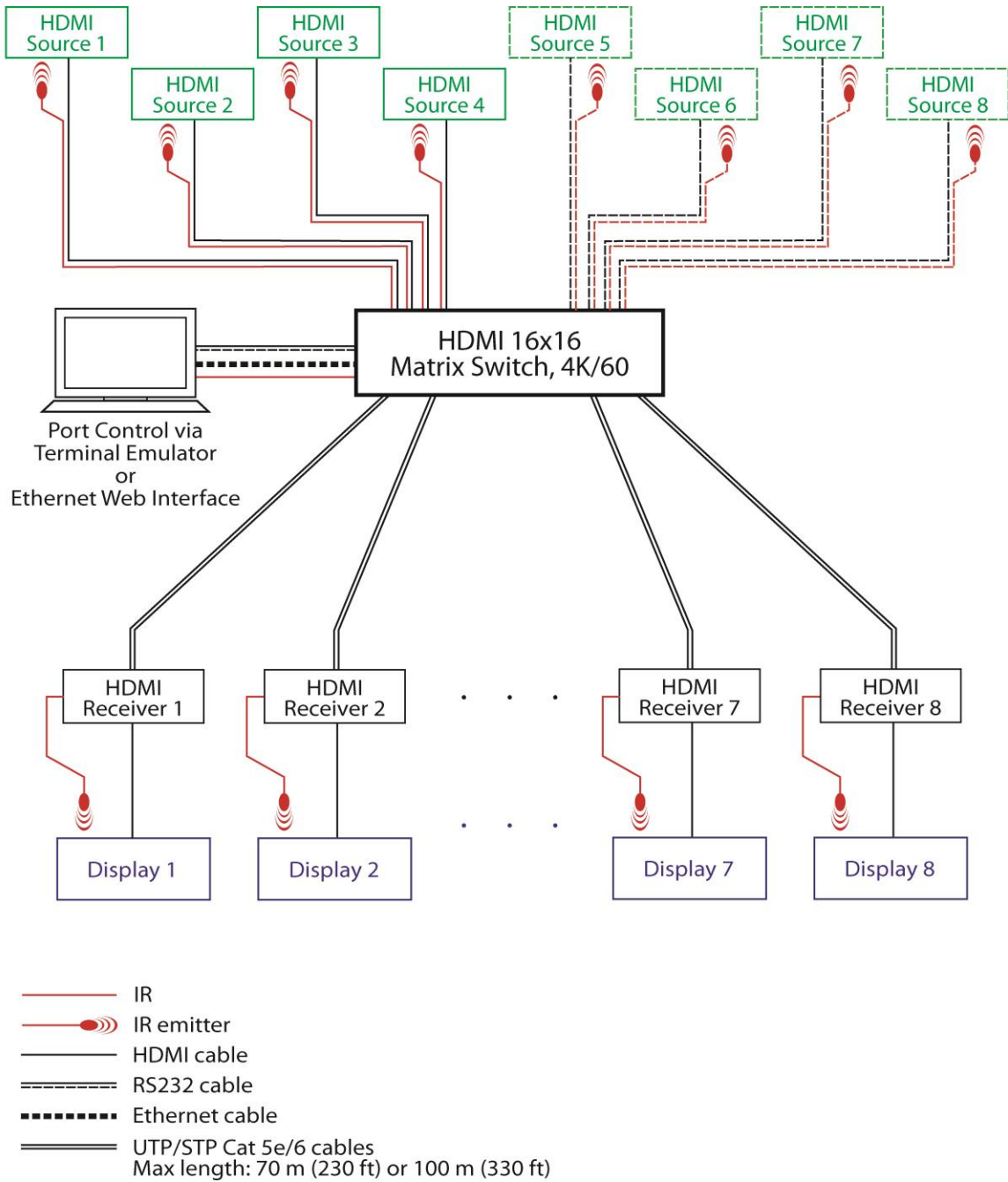
**Figure 15: Typical Configuration**

## 3.6.    Card Module Installation

To install a card module in the Multimedia 16x16 Matrix Switch, 4K/60, please follow the steps below:

1. Align the card module with the plastic rail found in the given slot at the back of the Matrix Switch.

2. Gently slide the card module into the slot. A hard stop should be felt when the connector interface of the card module is flush with the outside surface of the back panel.

3. Tighten both thumbscrews to secure the card module to the back panel of the Matrix Switch.

   NOTE: Card modules are hot-swappable, meaning that they can be added or removed while the Matrix Switch is powered ON. **When hot-swapping a card module NEVER pull a card out and then quickly re-insert it, you must wait 30 seconds before attempting to re-insert it.** Follow all standard safety precautions for working with live circuitry. Also ground yourself by touching a metal surface before manipulating a card module to avoid damaging the card with static electricity.



**Figure 16: Card Module Installation**

## 3.7.     Power Supply Unit Installation

To install a power supply unit in the Multimedia 16x16 Matrix Switch, 4K/60, please follow the steps below:

1.  Holding the power supply unit with both hands (one on the chrome handle and the other on the top clip), align the power supply unit with the sliding rail found in the given power supply slot at the back of the Matrix Switch.

2.  Gently slide the power supply unit into the slot. A hard stop should be felt when the power supply unit back surface is flush with the outside surface of the back panel.

3.  Tighten the thumbscrew at the power supply unit back surface.

4.  Plug the power cord into the power supply unit socket and secure it with the clip. Power On the power supply via the appropriate power On switch.

    NOTE: Power supply units are hot-swappable, meaning that they can be added while the Matrix Switch is powered On. If only one power supply is installed and it needs to be removed, then first power the Matrix Switch Off before removing/replacing the power supply. When hot-swapping a power supply unit, follow all standard safety precautions for working with live circuitry. Also ground yourself by touching a metal surface before manipulating a card module to avoid damaging the card with static electricity.
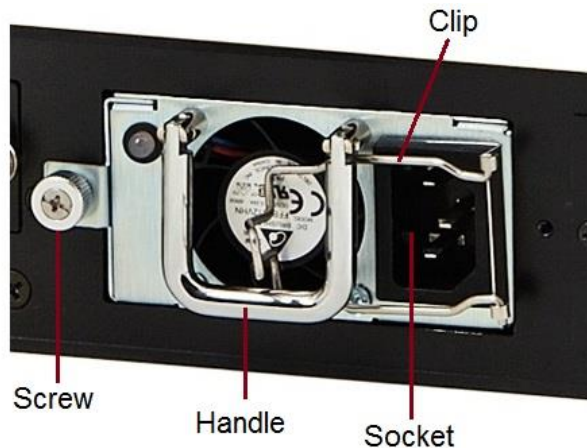


**Figure 17: Power Supply Unit Installation**

## 3.8.    Matrix Switch Local Control

The Startup screen is the default screen that appears when the Multimedia 16x16 Matrix Switch, 4K/60 is powered up. It displays the MuxLab logo at the top, product name at the bottom, six navigation keys in the middle, and six navigation icons on the extreme right of the screen. At the top right of the screen is a home key, which returns the user to the Startup screen.



**Figure 18: Startup Screen**

The navigation keys are as follows:

 **Matrix Connect:** Navigates to the Matrix Connect screen, where the user can view and modify input to output connectivity.

 **EDID Mgmt:** Navigates to the EDID Management screen, where the user can view and modify EDID settings of input and output devices.
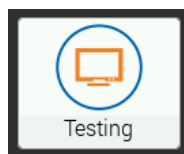
 **Testing:** Navigates to the Testing screen, where the user can run video test patterns and audio test signals on various outputs.
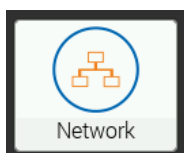
 **Network:** Navigates to the Network screen, where the user can configure the Ethernet network.
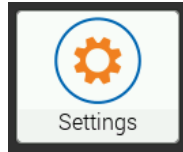
**Settings:** Navigates to the Settings screen, where the user can modify Matrix Switch operational settings.
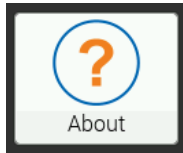
**About:** Navigates to the About screen, where firmware version information is displayed.

1.  **Matrix Connect Screen**
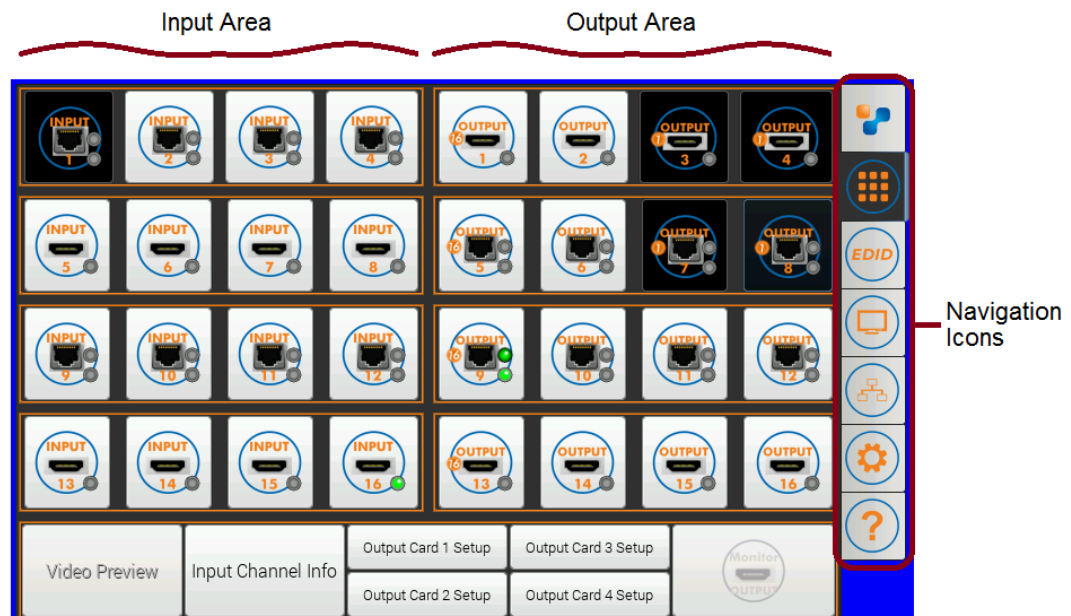


**Figure 19: Matrix Connect Screen**

The Matrix Connect screen allows users to view how inputs and outputs are currently connected, and to connect/disconnect inputs to outputs.

The screen is sub-divided into two main areas: Input Area (left) and Output Area (right). At the bottom of the screen are various buttons (Video Preview, Input Channel Info, and Output Card Setup) that allow the user to view and configure certain properties of input and output ports. At the extreme right are navigation icons.

**Input Area**
The input area contains 16 input icons labeled 1 through 16, one for each input port on the Matrix Switch.

Input icons can be either selected (dark background) or deselected (light background), although only one input icon can be selected at a time. A selected input icon means that outputs in the outputs area can be connected to or disconnected from the given input simply by pressing on them. While an input is selected, all outputs that are in the selected state indicate that they are connected to the given input, while all outputs that are in the deselected state indicate that they are not connected. When an input icon is selected, pressing on a deselected output icon will connect it to the selected input, and conversely pressing on a selected output icon will disconnect it.
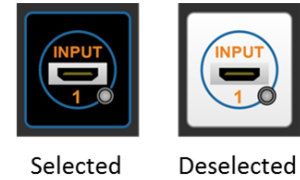
Note: When all input icons are deselected, the output icons that show up in the selected state indicate that they are connected to inputs, while output ports that are in the deselected state indicate that they are not connected to any input.

Each input icon indicates the *type* of input to which it corresponds:

1. HDMI or
2. HDBT

1. HDMI input icons show an HDMI connector in a blue circle, along with the input port number (1 to 16) and a status indicator LED that can be green (On) or grey (Off).

- A green status indicator LED (On) indicates that the given HDMI input of the Matrix Switch is physically connected to a powered HDMI source. Note that this condition does not necessarily mean that an active signal is being sent from a source to this input, only that an active signal *can* be sent (the source must be powered, but may be in an Off/Standby state).

- A grey status indicator LED (Off) indicates that the given HDMI input of the Matrix Switch is not physically connected to an HDMI source OR that the given HDMI input of the Matrix Switch is physically connected to an HDMI source, but that the given source is not powered.
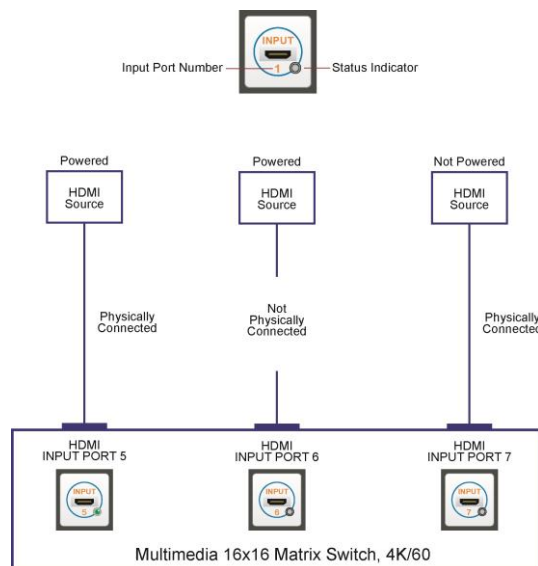


**Figure 20: HDMI Input Icons**

2. HDBT input icons show an RJ45 connector in a blue circle, along with the input port number (1 to 16) and two LEDs (upper and lower) that relate the link status and signal status, respectively, of the connection between the given HDBT input and a MuxLab HDBT Transmitter on the input end. Each LED can be green (On) or grey (Off).

*Upper LED – Link Status*
The upper LED indicates the status of the connection between the given HDBT input of the Matrix Switch and a MuxLab HDBT Transmitter.

• A green (On) link status LED indicates that the given HDBT input of the Matrix Switch is physically connected to a powered MuxLab HDBT Transmitter and that a link has been established between the two.

• A grey (Off) link status LED indicates that the given HDBT input of the Matrix Switch is not connected to a MuxLab HDBT Transmitter OR that the given HDBT input of the Matrix Switch is physically connected to a MuxLab HDBT Transmitter, but that this Transmitter is not powered, meaning that no link has been established between the two connected devices.

*Lower LED – Signal Status*
The lower LED indicates the status of the signal between the given HDBT input of the Matrix Switch and the powered MuxLab HDBT Transmitter to which it is connected.

• A green (On) signal status LED indicates that the given HDBT input of the Matrix Switch is receiving an active signal from the powered MuxLab HDBT Transmitter to which it is connected. (Please note that a green signal status LED necessarily means a green link status LED, since an active signal can only be received from a MuxLab HDBT Transmitter when it is connected to the Matrix Switch and powered.)

• A grey (Off) signal status LED indicates that the given HDBT input of the Matrix Switch is not receiving an active signal from the powered MuxLab HDBT Transmitter to which it is connected.
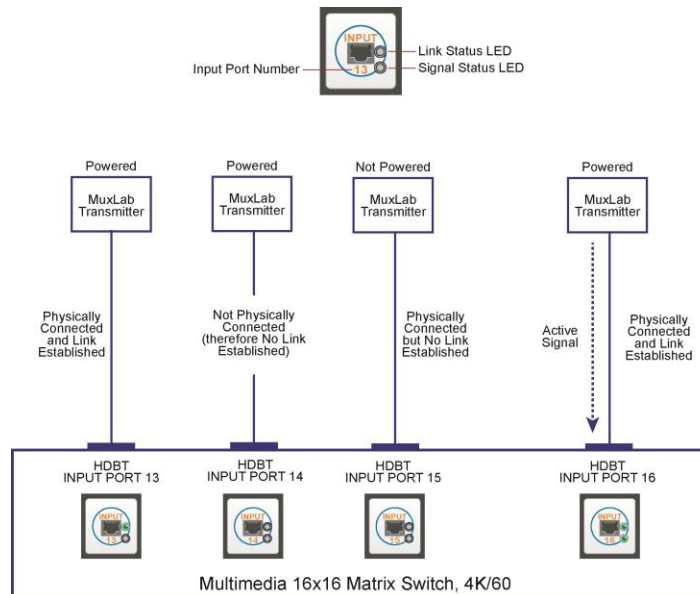


**Figure 21: HDBT Input Icons**

**Output Area**

The output area contains 16 output icons labeled 1 through 16, one for each output port on the Matrix Switch.

Output icons can be either selected (dark background) or deselected (light background), and many output icons can be selected at any given time. A selected output icon means that the given output is connected to the selected input icon appearing and selected in the input area. When an output icon is selected, pressing it will disconnect it from the selected input icon appearing in the input area. When an output icon is deselected, pressing it will connect it to the selected input icon appearing in the input area (if no selected icon appears in the input area, pressing a deselected output icon will do nothing). Note that when no selected input icons appear in the input area, *all* output icons that are connected to an input will display as selected.
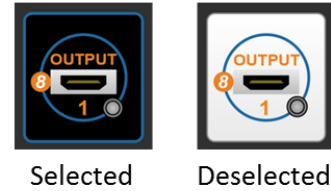
If connected to an input, an output icon will display the number of that input in an orange filled circle.

Each output icon indicates the *type* of input to which it corresponds:

1. HDMI or
2. HDBT

1. HDMI output icons show an HDMI connector in a blue circle, along with the output port number (1 to 16), the number of the connected input (if applicable), and a status indicator LED that can be green (On) or grey (Off).

- A green status indicator LED (On) indicates that a given HDMI display is connected and power on. Note that this condition does not necessarily mean that an active signal is being sent from a display or end device to this output, only that an active signal *can* be sent (the display must be powered, but may be in an Off/Standby state).
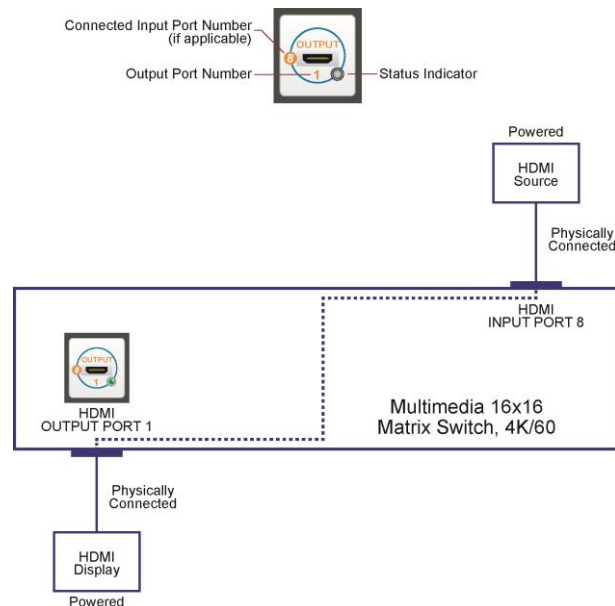


**Figure 22: HDMI Output Icons**

2. HDBT output icons show an RJ45 connector in a blue circle, along with the output port number (1 to 16), the number of the connected input (if applicable), and two LEDs (upper and lower) that relate the link status and signal status, respectively, of the connection between the given HDBT output and a MuxLab HDBT Receiver on the output end. Each LED can be green (On) or grey (Off).

*Upper LED – Link Status*
The upper LED indicates the status of the connection between the given HDBT output of the Matrix Switch and a MuxLab HDBT Receiver.

• A green (On) link status LED indicates that the given HDBT output of the Matrix Switch is physically connected to a powered MuxLab HDBT Receiver and that a link has been established between the two.

• A grey (Off) link status LED indicates that the given HDBT output of the Matrix Switch is not connected to a MuxLab HDBT Receiver OR that the given HDBT output of the Matrix Switch is physically connected to a MuxLab HDBT Receiver, but that this Receiver is not powered, meaning that no link has been established between the two.

*Lower LED – Signal Status*
The lower LED indicates the status of the signal between the given HDBT output of the Matrix Switch and the powered MuxLab HDBT Receiver to which it is connected.

• A green (On) signal status LED indicates that the given HDBT output of the Matrix Switch is receiving an active signal from the display connected to the powered MuxLab HDBT Receiver. (Please note that a green signal status LED necessarily means a green link status LED, since an active signal can only be received from a MuxLab HDBT Receiver when it is connected to the Matrix Switch and powered.)

• A grey (Off) signal status LED indicates that the given HDBT output of the Matrix Switch is not receiving an active signal from the display connected to the powered MuxLab HDBT Receiver.
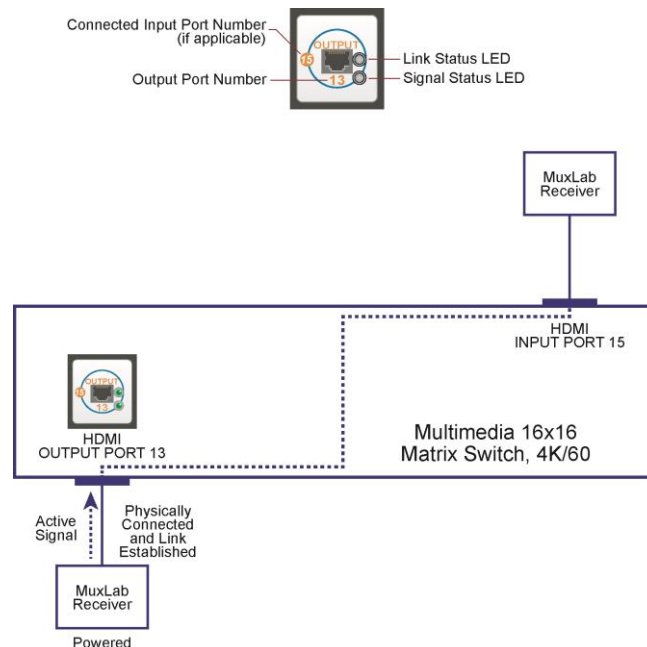


**Figure 23: HDBT Output Icons**

**Input Information**

Pressing the **Input Channel Info** button when any single input icon is selected turns the button blue.
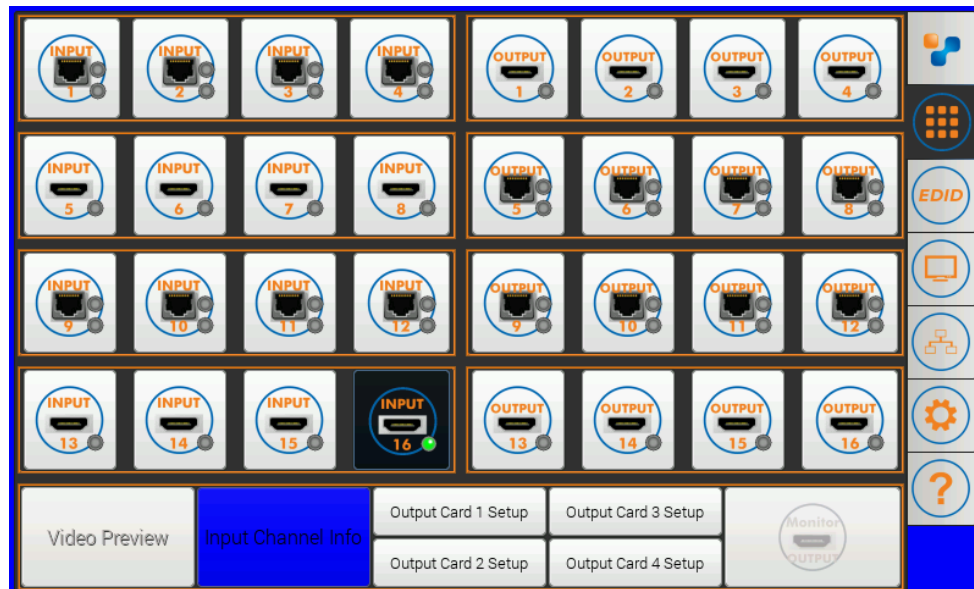


**Figure 24: Input Channel Info Button**

The Channel Info Input dialog then appears, which provides additional information for the given input that is not shown within the icon itself (including Link Type, Frame Rate, Color Mode, etc.). It also allows the user to configure certain properties of the given input.
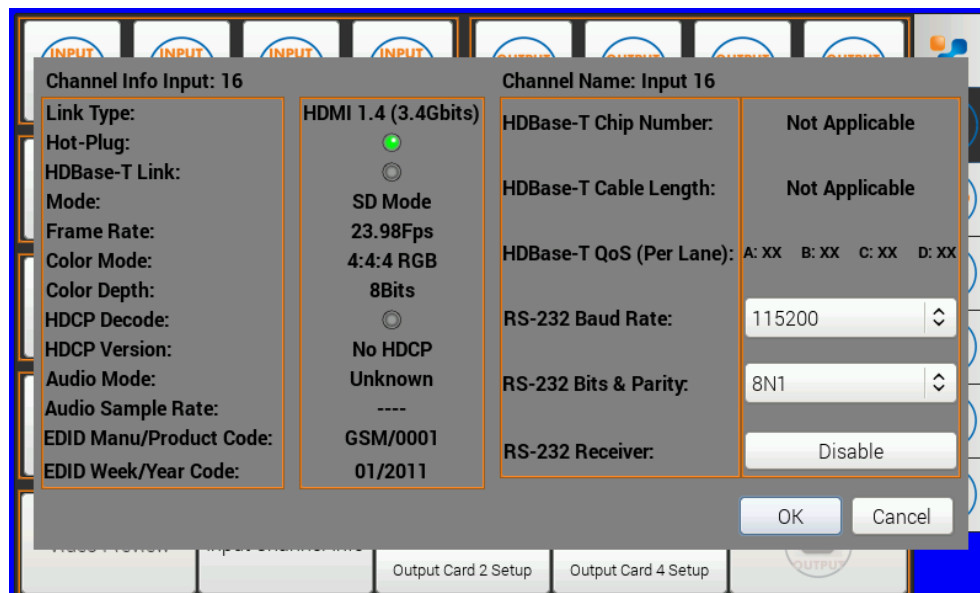


**Figure 25: Channel Info Input Dialog**

**Output Information**
The Matrix Switch is equipped with four output cards (1, 2, 3, 4), information for each of which can be viewed at a glance by pressing the **Output Card X Setup** button (where X corresponds to the output card number), which turns blue. Note that the state of the output icon(s), highlighted or not, does not affect what is displayed by the Output Card X Setup dialog.



**Figure 26: Output Card X Setup Button**

The Output Card X Setup dialog then appears, which provides information for all the outputs on the given card. It also allows the user to configure certain properties of the outputs on the given card.



**Figure 27: Output Card X Setup Dialog**

## 2. EDID Management Screen
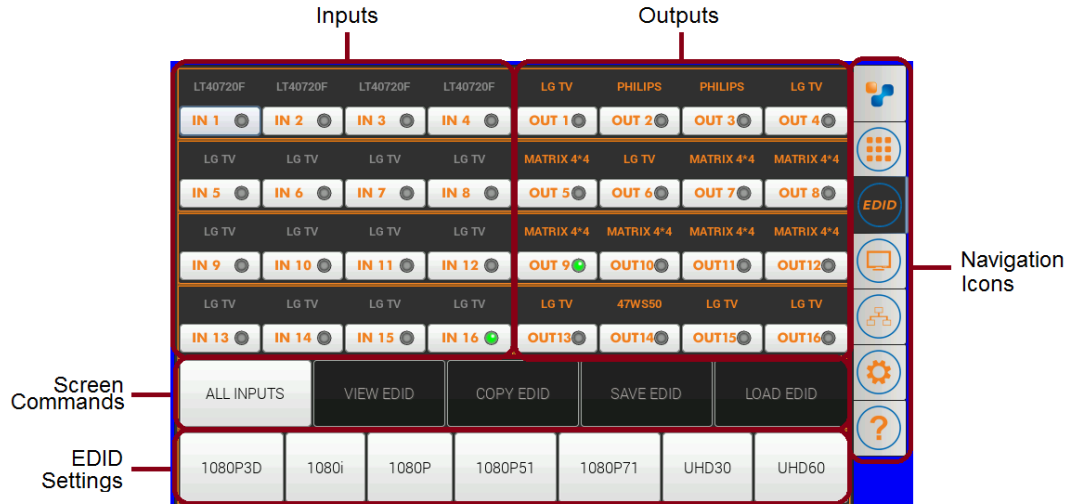


**Figure 28: EDID Management Screen**

The EDID Management screen allows users to view and modify the EDID settings of inputs.

Inputs are shown on the left, outputs on the right, predefined EDID settings on the bottom row, and screen commands above the bottom row. Navigation icons are shown on the extreme right.

Selecting an input or output changes its foreground color to grey. An input port EDID can be set to the EDID of an output port or to a preset EDID from the EDID Settings section. Select the input port to change



and the EDID to copy and press Copy EDID. Currently supported Screen Commands and EDID Settings have a white background when deselected, and a gray background when selected. Those with a black background are not currently supports as of this writing. An icon with a green LED means that a powered device is connected to that port.

## 3. Testing Screen
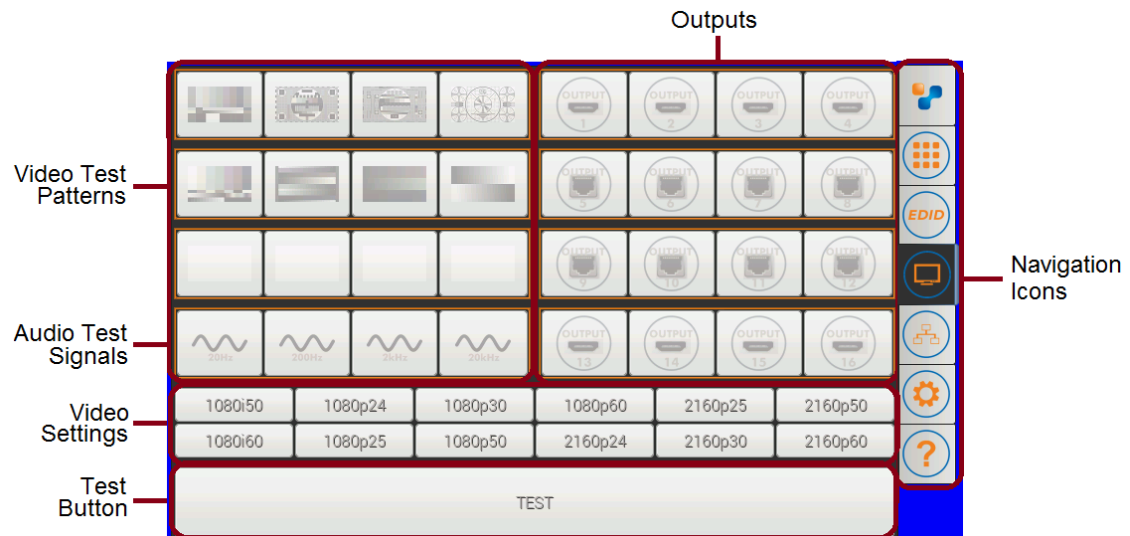


**Figure 29: Testing Screen**

The Testing screen allows users to apply various visual test patterns and audio test signals to one or more outputs (displays) to ensure the setup is working as expected.

Video test patterns and audio test signals are shown on the left, output icons on the right, video settings above the bottom row, and the Test button on the bottom row.

By highlighting a video test pattern or audio test signal, a video setting, and one or more output icons, the user can send the test pattern to the given output(s) by pressing the Test button. A second press of the Test button stops an ongoing test, as does leaving the Test Screen.

## 4.  Network Screen
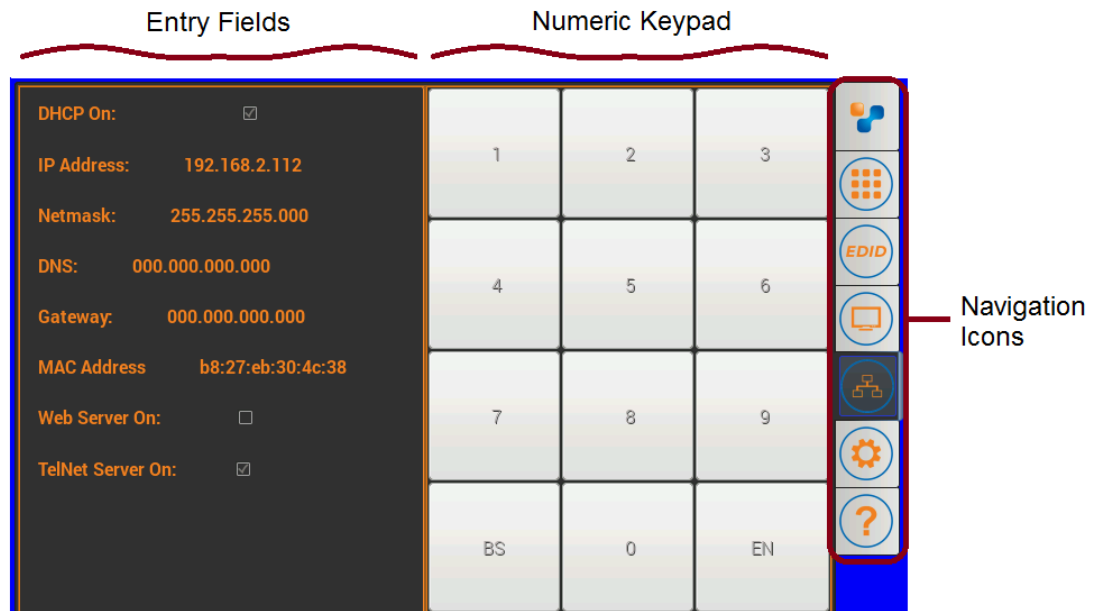


**Figure 30: Network Screen**

The Network screen allows users to configure the Matrix Switch Ethernet network setting. The screen is divided into three parts: Entry fields on the left, virtual keypad on the right, and navigation icons on the extreme right.

Entry fields consist of three check boxes and five address fields, all of which enable the user to completely define the Matrix Switch Ethernet network settings.

Check boxes include the following:
- DHCP On/Off
- Web Server On/Off
- TelNet Server On/Off

Address fields include the following:
- IP Address
- Netmask
- DNS
- Gateway
- Mac Address (read only)

Touching on the check boxes checks and unchecks them, while touching on the address fields and using the virtual keypad fills them in.

**5. Settings Screen**
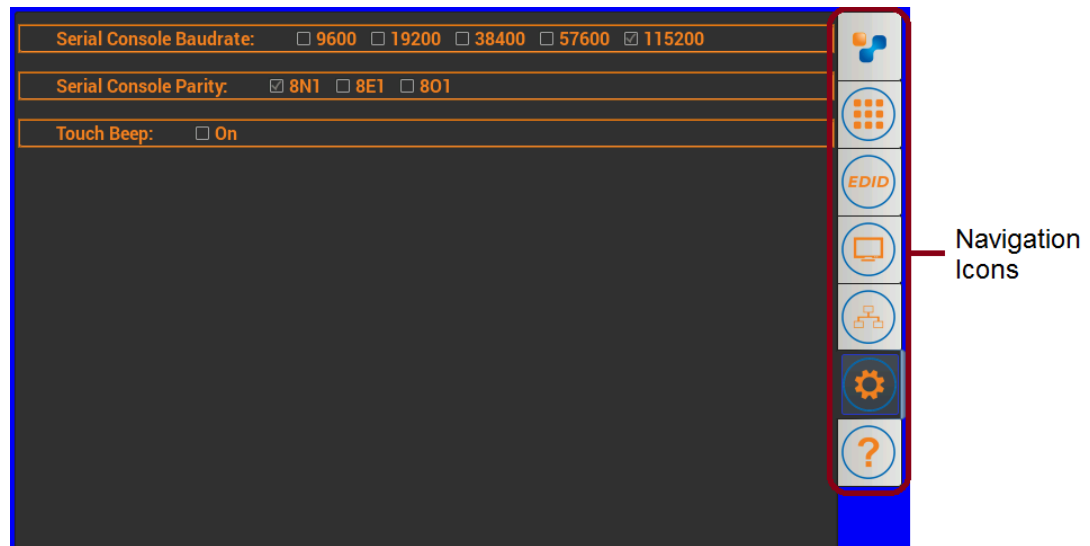


**Figure 31: Settings Screen**

The Settings screen allows users to configure the Matrix Switch. The screen is divided into two parts: Settings in the middle and navigation icons on the extreme right.

Settings consist of the following, which can all be configurable through check boxes:

- Serial Console Baudrate: To set the RS232 port transfer data rate.
- Serial Console Parity: To set the RS232 port number of bits and parity.
- Touch Beep: To enable or disable the screen touch beep sound.

**6. About Screen**



**Figure 32: About Screen**

The About screen provides the user with software/firmware version information and also allows the user to upgrade the Matrix Switch software/firmware.

To update the Matrix Switch software/firmware, follow the procedure below:

1. Download the latest Matrix Switch (500480) software/firmware to a USB memory stick. The software/firmware is available on the MuxLab website under "Support".

2. Insert the USB memory stick into either the front or rear USB port.

3. Either (a) power Off and On (power cycle) the Matrix Switch, or (b) Press the "Upgrade Matrix Firmware" button, and the upgrade will begin automatically.

4. Once the upgrade is complete, remove the memory stick.

5. Open the About Screen and verify the software/firmware versions to confirm that the update was successful.

## 3.9.    Matrix Switch Remote Control

In addition to the touch screen for local control of the Multimedia 16x16 Matrix Switch, the unit supports remote control via RS232, Telnet, IP and a web interface. Depending on the software used for remote control, automation may also be possible.

Control commands for the Matrix Switch are listed in the Appendix, including ASCII commands to be sent over an RS232 and Telnet interface, and IP commands over an Ethernet network. The web interface is described further down within this section.

**RS232 Control and Connectivity**

An ASCII terminal or computer running terminal emulation software is required to issue ASCII commands to the Matrix Switch via RS232. Connect the terminal or computer to the Multimedia 16x16 Matrix Switch via an RS232 cable that has a straight-through configuration as shown in Figure 33. (Note: The Matrix Switch supports a DB9 Female connector.)
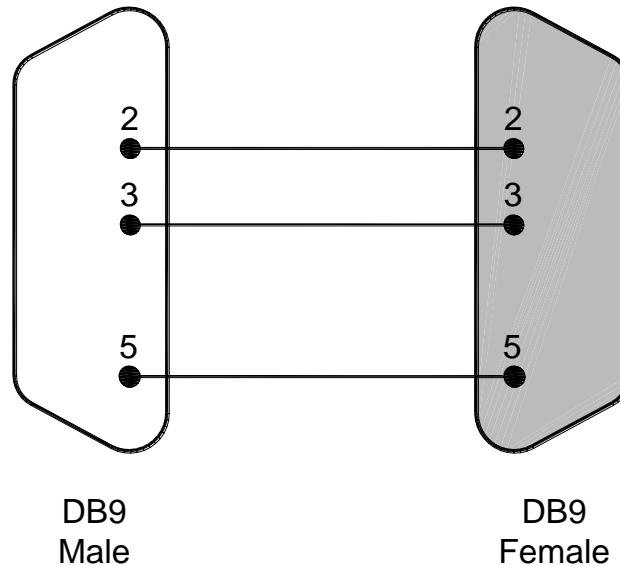


**Figure 33: RS-232 Cable Configuration**

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

**Telnet Control and Connectivity**

MuxLab offers users a Telnet interface option that provides the same functionality as RS232 control, with speeds of 10 Mbps or 100 Mbps.

To use the Telnet interface, the Matrix Switch must first be physically connected to an Ethernet network. To do this, locate the RJ45 Ethernet jack on the controller card at the rear of the Matrix Switch, then connect it to an Ethernet network using a straight UTP cable, with a maximum length of 330ft (100m). Use a standard Ethernet pinout as shown in Figure 34.

**RJ45 Link**
Pin 1 (R)  Pin 2 (T)
Pin 3 (R)  Pin 6 (T)
Pin 4 (R)  Pin 5 (T)
Pin 7 (R)  Pin 8 (T)
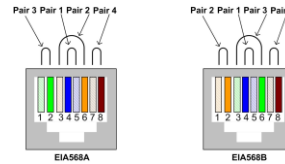
**Figure 34: Ethernet Cable Configuration**

There are two LEDs at the top of the RJ45 Ethernet jack: A yellow LED will illuminate if a link is detected, and a green LED will flash if Ethernet activity is detected.

Once the Matrix Switch has been physically connected to an Ethernet network, use the IP address AAA.BBB.CCC.DDD in your Telnet software to access and take control over the Matrix Switch. (NOTE: The device IP address can be obtained by going to the Network Screen on the front touch panel display.).

Once connected and setup, ASCII commands (as found in the Appendix) can be sent via the Telnet interface to manage the Matrix Switch.

**IP Control and Connectivity**

The Multimedia 16x16 Matrix Switch may be controlled via IP commands transmitted over an Ethernet IP network. The Matrix Switch must be connected to an Ethernet network using an Ethernet cable as described above in the Telnet case (see Figure 34). (NOTE: The device IP address can be obtained by going to the Network Screen on the front touch panel display.).

Third party software can execute the IP commands listed in the Appendix to remotely manage the Matrix Switch.

**Web Interface Control and Connectivity**

The Multimedia 16x16 Matrix Switch also offers a web interface for remote control over an Ethernet network. The Matrix Switch must be connected to an Ethernet network using an Ethernet cable as described above in both the Telnet and IP cases.

An Internet browser is required to access the Matrix Switch web interface. Enter the Multimedia 16x16 Matrix Switch IP address into the Internet browser to take control of the unit. (NOTE: The device IP address can be obtained by going to the Network Screen on the front touch panel display.).

The web interface presents the operator with two main screens, a Setup screen and a Matrix/Connectivity screen.

The Setup screen allows the operator to view and name all installed input and output ports, as shown in Figure 35. The port type (either HDMI or HDBT) is displayed, and the operator is informed of which ports are mounted.

The Matrix/Connectivity screen lists all installed input and output ports and allows the operator to connect/disconnect any input port to/from any output port, as shown in

Figure 36. Presets of predefined connectivity setups can be easily loaded to quickly reconfigure the Matrix Switch connectivity arrangements. The operator is also able to create and save new presets, or modify existing ones.



**Figure 35: Web Interface – Information and Setup Screen**

**Figure 36: Web Interface – Matrix/Connectivity Screen**

## 3.10.   Remote Control of Sources and Displays

The unit features built-in firmware that allows a set of ASCII (via RS232 & Telnet) and IP commands to be sent to the Multimedia 16x16 Matrix Switch, which in turn are redirected through the IR and RS232 ports to control source and display devices. Source and display devices do not have to be controlled at their physical location. Using the IR Emitters or RS232 ports of a Matrix Switch HDMI card, or the IR Emitter or RS232 port of a MuxLab HDBT Extender, each source and display located at different physical locations can be remotely controlled.

**IR Source Control**
To use ASCII (via RS232 & Telnet) or IP commands for IR Emitter source control, ensure that the IR emitter cables leading from the *IR Emitter* ports of the HDMI Input Cards or the MuxLab HDBT Transmitter Extenders have their emitter ends placed in front of the IR sensors of the sources. Do this for all ports of all sources (see Table 6). The Matrix Switch input cards support IR control of up to 16 sources, when fully populated.

IR source control is accomplished via a set of ASCII (via RS232 & Telnet) and IP commands that are redirected to the IR Emitter ports. The applicable ASCII and IP commands can be found in the Appendix.

| Matrix/Extender – *IR Emitter* Ports | IR Emitter Cable | IR Sensor on Sources |
|:---:|:---:|:---:|
| 1 | Jack End --------------- Emitter End | 1 |
| 2 | Jack End --------------- Emitter End | 2 |
| 3 | Jack End --------------- Emitter End | 3 |
| 4 | Jack End --------------- Emitter End | 4 |
| 5 | Jack End --------------- Emitter End | 5 |
| 6 | Jack End --------------- Emitter End | 6 |
| 7 | Jack End --------------- Emitter End | 7 |
| 8 | Jack End --------------- Emitter End | 8 |
| 9 | Jack End --------------- Emitter End | 9 |
| 10 | Jack End --------------- Emitter End | 10 |
| 11 | Jack End --------------- Emitter End | 11 |
| 12 | Jack End --------------- Emitter End | 12 |
| 13 | Jack End --------------- Emitter End | 13 |
| 14 | Jack End --------------- Emitter End | 14 |
| 15 | Jack End --------------- Emitter End | 15 |
| 16 | Jack End --------------- Emitter End | 16 |

**Table 6: IR Source Control Configuration**

**IR Display Control**
To use ASCII (via RS232 & Telnet) or IP commands for IR Emitter display control, ensure that the IR emitter cables leading from the *IR Emitter* ports of the HDMI Output Cards or the MuxLab HDBT Receiver Extenders have their emitter ends placed in front of the IR sensors on the displays. Do this for all ports of all displays (see Table 7). The Matrix Switch output cards support IR control of up to 16 displays, when fully populated.

IR display control is accomplished via a set of ASCII (via RS232 & Telnet) and IP commands that are redirected to the IR Emitter ports. The applicable ASCII and IP commands can be found in the Appendix.

| Matrix/Extender – *IR Emitter* Ports | IR Emitter Cable | IR Sensor on Displays |
|:---:|:---:|:---:|
| 1 | Jack End -------------- Emitter End | 1 |
| 2 | Jack End -------------- Emitter End | 2 |
| 3 | Jack End -------------- Emitter End | 3 |
| 4 | Jack End -------------- Emitter End | 4 |
| 5 | Jack End -------------- Emitter End | 5 |
| 6 | Jack End -------------- Emitter End | 6 |
| 7 | Jack End -------------- Emitter End | 7 |
| 8 | Jack End -------------- Emitter End | 8 |
| 9 | Jack End -------------- Emitter End | 9 |
| 10 | Jack End -------------- Emitter End | 10 |
| 11 | Jack End -------------- Emitter End | 11 |
| 12 | Jack End -------------- Emitter End | 12 |
| 13 | Jack End -------------- Emitter End | 13 |
| 14 | Jack End -------------- Emitter End | 14 |
| 15 | Jack End -------------- Emitter End | 15 |
| 16 | Jack End -------------- Emitter End | 16 |

**Table 7: IR Display Control Configuration**

### RS232 Source and Display Control

To use ASCII (via RS232 & Telnet) or IP commands for RS232 port source and/or display control, ensure that the RS232 cables leading from the RS232 ports of the HDMI Input and Output Cards or the MuxLab HDBT Transmitter and Receiver Extenders are connected to the source and display devices. See Figure 33 for more details on the RS232 cable specifications. Do this for all ports of all sources and displays. The Matrix Switch input and output cards support RS232 based control of up to 16 sources and 16 displays, when fully populated.

RS232 control is accomplished via a set of ASCII (via RS232 & Telnet) and IP commands. ASCII via Telnet commands and IP commands are redirected to the RS232 ports. The applicable ASCII and IP commands can be found in the Appendix. Note that Telnet is an interface that sends ASCII commands over an Ethernet network.

# 4.
# Troubleshooting

Table 8 lists common problems that affect image quality, as well as their possible causes and solutions.

| PROBLEM | POSSIBLE SOLUTIONS |
|---|---|
| No Image | Check the matrix connection status |
| No Image | Verify that the cables are properly connected |
| No Image | Verify that the source devices are powered up. |
| No Image | Verify that the source resolution matches the Matrix Switch Card and Extender resolution capabilities/specifications. |
| No Image | Verify that the display supports HDCP. |
| White Dots in Image Flickering Image Choppy Sound | If using an extender, verify that the cable distance is within specifications. For UTP/STP, the distance limit is 230ft (70m) for HDBT card, and up to 330ft (100m) for HDBT/LAN card. |
| Wrong Image Appears | Check matrix connection |
| Not All Display Devices Work | Check that the display supports the source resolution. |

**Table 8: Troubleshooting**

If the information above does not solve the problem, contact 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 models of the HDMI sources and displays, as well as HDBT Transmitters and Receivers (if any), 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 syntax as described below and must end with a carriage return.

## Serial/Telnet 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 16* |
| | *<output port #>: 1 to 16* |
| *Example:* | *Connect input 2 to output 4* |
| | **connect -i 2 -o 4** |
| *Response:* | **[0,0,0,2,0,0,0,0,0,0,0,0,0,0,0,0]** |
| | (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 16* |
| *Example:* | *Connect input 2 to all outputs* |
| | **connect -i 2 -o all** |
| *Response:* | **[2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2]** |
| | (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 16*<br>*<from output port #>: 1 to 16*<br>*<to output port #>: 1 to 16*<br>*<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:* | **[2,2,2,0,0,0,0,0,0,0,0,0,0,0,0,0]** |
| | (or an error message if the command failed) |

**connect -json** "[*<input port #1>,<input port #2>,…, <output port #16>*]"

| | |
|---|---|
| *Description:* | Make 8 connections/disconnections in one command using json format |
| *Arguments:* | *<input port #>: 1 to 16 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 outputs 4 , and disconnect all other outputs.* |
| | **connect -json "[2,2,0,3,0,0,0,0,0,0,0,0,0,0,0,0]"** |
| *Response:* | **[2,2,0,3,0,0,0,0,0,0,0,0,0,0,0,0]** |
| | (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:* | **[2,0,0,3,0,0,0,0,0,0,0,0,0,0,0,0]** |
| | (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 16* |
| *Example:* | *Disconnect input 3 from all outputs connected to it* |
| | **disconnect -i 3** |
| *Response:* | **[2,2,2,2,2,2,0,2,2,2,2,2,2,2,2,2]** |
| | (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 16* |
| *Example:* | *Disconnect output 3 from the input connected to it* |
| | **disconnect -o 3** |
| *Response:* | **[2,2,0,2,2,2,2,2,2,2,2,2,2,2,2,2]** |
| | (or an error message if the command failed) |

**disconnect -all**

| | |
|---|---|
| *Description:* | Disconnect all output ports |
| *Arguments:* | *<none>* |
| *Example:* | *Disconnect all outputs* |
| | **disconnect -all** |
| *Response:* | **[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0]** |
| | (or an error message if the command failed) |

**3. EDID**

**edidcopy –p** *<predefined edid>*

| | |
|---|---|
| *Description:* | Copy the specified predefined EDID values to all input ports |
| *Arguments:* | *<predefined edid>: 1080p3d, 1080p, 1080i, 1080p51, 1080p71, uhd30, uhd60* |
| *Example:* | Copy the specified predefined EDID 1080p to all input ports |
| | **edidcopy –p 1080p** |
| *Response:* | **EDID:["input all","1080p"]** |

**edidcopy –o** *<output port #>* **–i** *<input port #>*

| | |
|---|---|
| *Description:* | Copy EDID from the specified output port to the specified input port |
| *Arguments:* | *<input port #>: 1 to 16* |
| | *<output port #>: 1 to 16* |
| *Example:* | Copy EDID from the output port # 3 to the input port # 1 |
| | **edidcopy –o 3 –i 1** |
| *Response:* | **EDID:["input 1","output 3"]** |

### 3. EDID (Continued)

**edidcopy –o** *<output port #>*

| | |
|---|---|
| *Description:* | Copy EDID from the specified output port to all input ports |
| *Arguments:* | *<output port #>: 1 to 16* |
| *Example:* | Copy EDID from the output port # 2 to all input ports |
| | **edidcopy –o 2** |
| *Response:* | **EDID:["input all","output 2"]** |

**edidread –i** *<input port #>*

| | |
|---|---|
| *Description:* | Read EDID from the specified input port |
| *Arguments:* | <input *port #>: 1 to 16* |
| *Example:* | Read EDID from the input port # 2 |
| | **edidread –i 2** |
| *Response:* | **EDID Input Channel: 2**<br>**Monitor's Name: MUX1080P**<br>**Manufacture: MUX**<br>**Product Code: 0001**<br>**Week of Manufacture: 08**<br>**Year of Manufacture: 2008** |

**edidread –o** *<output port #>*

| | |
|---|---|
| *Description:* | Read EDID from the specified output port |
| *Arguments:* | *<output port #>: 1 to 16* |
| *Example:* | Read EDID from the output port # 3 |
| | **edidread –o 3** |
| *Response:* | **EDID Output Channel: 3**<br>**Monitor's Name: LGTV**<br>**Manufacture: MSG**<br>**Product Code: 0001**<br>**Week of Manufacture: 23**<br>**Year of Manufacture: 2012** |

**edidsave –i** *<input port #>* **–l "***<filename>" or* **–d "***<filename>"*

| | |
|---|---|
| *Description:* | Save EDID from the specified input port to the local internal drive or USB Device |
| *Arguments:* | *<input port #>: 1 to 16*<br>*<filename>: (-l: Local Drive, -d: USB Memory stick)* |
| *Example:* | Save EDID from the input port # 1 to the USB Memory Key |
| | **edidsave –i 1 –d "Port 1 EDID"** |
| *Response:* | **EDID from Input Channel 1 saved…** |

**edidsave –o** *<output port #>* **–l "***<filename>" or* **–d "***<filename>"*

| | |
|---|---|
| *Description:* | Save EDID from the specified output port to the local internal drive or USB Device |
| *Arguments:* | *<output port #>: 1 to 16*<br>*<filename>: (-l: Local Drive, -d: USB Memory stick)* |
| *Example:* | Save EDID from the output port # 2 to the local internal drive |
| | **edidsave –i 2 –l "Port 2 EDID"** |
| *Response:* | **EDID from Output Channel 2 saved…** |

### 3. EDID (Continued)

**edidload –i** *<input port #>* **–l "***<filename>"** or **–d "***<filename>"*

| | |
|---|---|
| *Description:* | Load EDID from the specified input port from the local internal drive or USB Device |
| *Arguments:* | *<input port #>: 1 to 16*<br>*<filename>: (-l: Local Drive, -d: USB Memory stick)* |
| *Example:* | Load EDID to the input port # 3 from the USB Memory Key |
| | **edidload –i 3 –d "Port 3 EDID"** |
| *Response:* | **EDID Loaded and Assigned to Input Channel 3** |

### 4. Get

**get -i** *<input port #>*

| | |
|---|---|
| *Description:* | Get the connection state of a specific input port |
| *Arguments:* | *<input port #>: 1 to 16* |
| *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:* | **[3,7,0,0,0,0,0,0,0,0,0,0,0,0,0,0]** |
| | (or an error message if the command failed) |

**4. Get (Continued)**

**get -o** *<output port #>*

| | |
|---|---|
| *Description:* | Get the connection state of a specific output port |
| *Arguments:* | *<output port #>: 1 to 16* |
| *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) |

### 5. Help

**help** *or* **?**

| | |
|---|---|
| *Description:* | Display all the command list definition available |
| *Arguments:* | *<none>* |
| *Example:* | *Display all the command list* |
| | **help** |
| | **?** |
| *Response:* | Available Commands: |

    alarm -f -t -n

    connect -i -o -json -p

    disconnect -i -o -all

    edidcopy -p -o -i

    get -i -o -json

    help -c

    name -i -o -preset -unit

    network -ip -m -g -dhcp

    password -wadmin -wuser

    preset -s -l

    reset -f

    senddata -i -o -b -d

    serialdata -i -o

    serial -b -o

    status

    version

    ? -c

    audioinsert -o

    edidread -i -o

    edidsave -i -o -l -d

    edidload -i -l –d

**help –c** *<command>*

| | |
|---|---|
| *Description:* | Display additional information about a specific command |
| *Arguments:* | *<command>* |
| *Example:* | *Display additional information about the command connect* |
| | **help –c connect** |
| *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}

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

           {Connect 1 input port to a specific range of output port}

    connect -p <preset #> {Update the Connection Matrix with a preset}

    connect -json "[<input port #1>,<input port #2>,…, <output port #16>]"

           {Make 16 connections/disconnections in one command using JSON format}

**6. Name**

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

| | |
|---|---|
| *Description:* | Set a name for the selected input port |
| *Arguments:* | *<input port #>: 1 to 16*<br>*<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"…]** |
| | (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"…]** |
| | (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 16*<br>*<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 16*<br>*<name>: up to 20 characters* |
| *Example:* | *Set name "Week-end" for preset 7* |
| | **name -preset 7 "Week-end"** |
| *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) |

### 6. Name (Continued)

#### name -preset

| | |
|---|---|
| *Description:* | Get a list of all the preset names |
| *Arguments:* | *&lt;none&gt;* |
| *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 "*&lt;name&gt;*"

| | |
|---|---|
| *Description:* | Set a name for the unit |
| *Arguments:* | *&lt;name&gt;: 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:* | *&lt;none&gt;* |
| *Example:* | Get the unit name |
| | **name -unit** |
| *Response:* | **Unit Name:["MuxLab Switch"]** |
| | (or an error message if the command failed) |

**7. 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) |

**7. Network (Continued)**

**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) |

**8. 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) |

**9. Preset**

**preset -s** *<preset #>*

| | |
|---|---|
| *Description:* | Save the current connection in the selected preset |
| *Arguments:* | *<preset #>: 1 to 16* |
| *Example:* | *Save current connection in preset 5* |
| | **preset -s 5** |
| *Response:* | **preset 5 saved successfully** |
| | (or an error message if the command failed) |

**9. Preset (Continue)**

**preset -l**

| | |
|---|---|
| *Description:* | List the current connection of all the preset |
| *Arguments:* | *<none>* |
| *Example:* | Get the preset connection list |
| | **preset -l** |
| *Response:* | ["Preset 1",1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16] |
| | ["Preset 2",1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1] |
| | ["Preset 3",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 4",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 5",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 6",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 7",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 8",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 9",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 10",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 11",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 12",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 13",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 14",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 15",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |
| | ["Preset 16",0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0] |

(or an error message if the command failed)

**10. Reset**

**reset -f**

| | |
|---|---|
| *Description:* | Reset the unit and restore it to its factory settings |
| *Arguments:* | *<none>* |
| *Example:* | *Reset unit and restore it to factory settings* |
| | **reset -f** |
| *Response:* | "Clearing flash memory... |
| | Rebooting..." |
| | (or an error message if the command failed) |

**11. Sending Data**

**senddata –i** *<input port #>* **-b** *<baud rate>* **-d** "*<data to send >*"

| | |
|---|---|
| *Description:* | Send pass through data to a specific input port |
| *Arguments:* | *<port # >: 1 to 16* |
| | *<baud rate>: 9600, 19200, 38400, 57600 or 115200* |
| | *<data to send>: Hex string (max 80 characters)* |
| *Example:* | Send the following 4 bytes to input port #3 0xA1, 0x55, 0xF2, and 0xC8 |
| | **senddata –i 3 –b 9600 –d "A155F2C8"** |
| *Response:* | **["I0304A1B2C3D4"]** |
| | *Where:* |

        I = input port number

        03 = port number

        04 = Data length that follows (max value 0x28 bytes.)

        A1B2C3D4 = data in hexadecimal (0xA1, 0XB2, 0xC3, 0xD4)

**Command performed successfully**

(or an error message if the command failed)

**senddata –o** *<output port #>* **-b** *<baud rate>* **-d** "*<data to send >*"

| | |
|---|---|
| *Description:* | Send pass through data to a specific output port |
| *Arguments:* | *<port # >: 1 to 16* |
| | *<baud rate>: 9600, 19200, 38400, 57600 or 115200* |
| | *<data to send>: Hex string (max 80 characters)* |
| *Example:* | Send the following 4 bytes to output port #1 0x1C, 0x44, 0xD2, and 0xFF |
| | **senddata –i 1 –b 9600 –d "1C44D2FF"** |
| *Response:* | **["O01041C44D2FF"]** |
| | *Where:* |

        0 = output port number

        01 = port number

        04 = Data length that follows (max value 0x28 bytes.)

        1C44D2FF = data in hexadecimal (0x1C, 0X44, 0xD2, 0xFF)

**Command performed successfully**

(or an error message if the command failed)

**12. Serial Data**

**serialdata -i** *<input port #> <state>*

| | |
|---|---|
| *Description:* | Set input serial port status |
| *Arguments:* | *<input port # >: 1 to 16* |
| | *<state>: ON or OFF* |
| *Example:* | Disable the serial port of input 4 |
| | **serialdata –i 4 OFF** |
| *Response:* | Serial Data Status: **[1,1,1,0,1,1,1,1,1,1,1,1,1,1,1,1]** |

**serialdata -o** *<output port #> <state>*

| | |
|---|---|
| *Description:* | Set output serial port status |
| *Arguments:* | *<output port # >: 1 to 16* |
| | *<state>: ON or OFF* |
| *Example:* | Disable the serial port of output 3 |
| | **serialdata –o 3 OFF** |
| *Response:* | Serial Data Status: **[1,1,0,1,1,1,1,1,1,1,1,1,1,1,1,1]** |

**serialdata -i**

| | |
|---|---|
| *Description:* | Get output serial port status |
| *Arguments:* | *<none>* |
| *Example:* | Get all output serial port status data |
| | **Serialdata -i** |
| *Response:* | Serial Data Status: **[1,1,1,0,1,1,1,1,1,1,1,1,1,1,1,1]** |

**serialdata -o**

| | |
|---|---|
| *Description:* | Get output serial port status |
| *Arguments:* | *<none>* |
| *Example:* | Get all output serial port status data |
| | **Serialdata -o** |
| *Response:* | Serial Data Status: **[1,1,0,1,1,1,1,1,1,1,1,1,1,1,1,1]** |

## 13. Audio Insert

**audioinsert -o** *<output port #> <state>*

| | |
|---|---|
| *Description:* | Set audio insert port status |
| *Arguments:* | *<output port # >: 1 to 16* |
| | *<state>: ON or OFF* |
| *Example:* | Enable audio insert of output 3 |
| | **audioinsert –o 3 ON** |
| *Response:* | Audio Insert Status: **[0,0,1,0,0,1,1,1,1,1,1,1,1,1,1,1]** |

**audioinsert -o**

| | |
|---|---|
| *Description:* | Get output audio insert port status |
| *Arguments:* | *<none>* |
| *Example:* | Get all output audio insert port status data |
| | **Audioinsert -o** |
| *Response:* | Audio Insert Status: **[0,0,1,0,0,1,1,1,1,1,1,1,1,1,1,1]** |

## 14. 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) |

## 15. Version

### version

| | |
|---|---|
| *Description:* | Get the current firmware version |
| *Arguments:* | *<none>* |
| *Example:* | *Get current firmware version* |
| | **version** |
| *Response:* | **Equinops V2.00 - 16x16 HDMI 2.0 Switch Matrix** |
| | **2015 (c) Muxlab Inc.** |
| | **Server Firmware Version: 0.0.5, Revision: A (Nov 11th, 2015)** |
| | **Main Application Version: 0.0.1** |
| | **Unit Name:** |
| | **Serial: 00E10C4900A5** |
| | |
| | **Backplane Generation: 6.0 Gbits/sec Per Lane (HDMI 2.0)** |
| | **Controller Firmware Version: 0.1.3** |
| | **Input Card 1 Firmware Version : 0.1.4** |
| | **Input Card 2 Firmware Version : 0.1.4** |
| | **Input Card 3 Firmware Version : 0.1.4** |
| | **Input Card 4 Firmware Version : 0.1.4** |
| | **Output Card 1 Firmware Version : 0.1.4** |
| | **Output Card 2 Firmware Version : 0.1.4** |
| | **Output Card 3 Firmware Version : 0.1.4** |
| | **Output Card 4 Firmware Version : 0.1.4** |
| | |
| | (or an error message if the command failed) |

# 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 OR FROM PROVINCE TO PROVINCE.

**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 packaged – units must be returned in original container or equivalent. MuxLab will not accept any such product for repair without an authorization from 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.*

*For 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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