

# MuxLab

## PRODIGITAL™

### HDMI 4x4 Matrix Switch, 4K/60

### Operation Manual

500444



# SAFETY PRECAUTIONS

To insure the best performance from the product, please read all instructions carefully before using the device. Save this manual for future reference.

- Follow basic safety precautions to reduce the risk of fire, electrical shock and injury.
- Do not dismantle the housing or modify the module. It may result in electrical shock or burn.
- Do not open or remove the housing of the device as you may be exposed to dangerous voltage or other hazards.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture and do not install this product near water. Keep the product away from liquids.
- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.
- Refer all servicing to qualified service personnel.
- Install the device in a place with adequate ventilation to avoid damage caused by overheating.
- Unplug the power when left unused for a long period of time.
- Information on disposal of devices: do not burn or mix with general household waste, please treat them as normal electrical waste.

**NOTICE:** Please read this manual carefully before using this product.

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# 1. Introduction

The HDMI 4x4 Matrix Switch, 4K/60 (500444) connects four HDMI sources to four displays. The matrix supports 1080p @ 60Hz up to 4K @ 60Hz (4:4:4), 3D formats and EDID management. It works with Blu-Ray players, Set-Top Boxes, Media Players, Home Theater PCs, and Game Consoles that connect to an HDMI display. Any source may be connected to any display by selecting it via the supplied IR Remote Control, RS-232, TCP/IP or by using the selection buttons on the front panel.

## 2. Features

- HDMI 2.0 supporting up to a 4K resolution at 60Hz (4:4:4) and 3D formats.
- Deep Color supporting 10 & 12-bit.
- Supports LPCM 7.1CH, Dolby TrueHD, Dolby Digital Plus, Dolby Atmos, DTS-HD Master Audio and DTS:X
- Allows any source to be displayed on multiple displays at the same time.
- Allows any HDMI display to view any HDMI source at any time.
- Each of the 4-input ports support independent EDID.
- Supports Digital Audio output.
- May be controlled via IP, RS-232, Handheld IR Remote and Front Panel Buttons.
- Front-panel LCD display for status feedback.
- HDMI connectors with Locking nuts.
- Locking 2.1mm power connector.

## 3. Package Contents

- One (1) HDMI 4x4 Matrix Switch, 4K/60
- One (1) 12V/5A DC power adapter
- One (1) Operation Manual
- One (1) Handheld IR Remote
- Two (2) Mounting ears
- One (1) IR Sensor cable

**Note:** Please confirm if the product and the accessories are all included. If not, please contact the location at which you purchased the unit.

## 4. Specifications

Video Bandwidth	594MHz
Support Video Resolution	480i,576i,480p,576p,720p,1080i,1080p@ 24/30/50/60Hz, 4K@30/60Hz and 3D formats
Input Ports	Four (4) HDMI Receptacle One (1) RS-232 One (1) Ethernet Port (Control) One (1) IR Sensor 3.5mm Jack
Output Ports	Four (4) HDMI Receptacle Four (4) Digital Audio Output
ESD Protection	Human-body Model: ± 8kV (Air-gap discharge) ± 4kV (Contact discharge)
Power Supply	One (1) 110-240V/12VDC/5A power supply with interchangeable blades
Dimensions	17.20" x 1.69" x 8.86" (437mm x 43mm x 225mm)
Weight	9.69lbs (4.40kg)
Chassis Material	Metal
Silkscreen Color	Black
Temperature & Humidity	Operating: 0° to 40°C          Storage: -20° to 85°C Humidity: Up to 95% non-condensing
Power Consumption	33W (max)
Compliance	Regulatory: FCC, CE, RoHS
Warranty	2 Years
Ordering Information	500444-US HDMI 4x4 Matrix Switch, 4K/60, US 500444-UK HDMI 4x4 Matrix Switch, 4K/60, UK 500444-EU HDMI 4x4 Matrix Switch, 4K/60, EU

# 5. Panel Description and Unit Installation

## 5.1 Front Panel



No.	Name	Description
1	LCD	Show the menu and status of input-output selection, EDID info, IP setup and more.
2	IR	IR sensor for the remote control of the 4x4.
3	HDMI Output	HDMI output selection button 1 to 4: Press to select the output from 1 to 4. ALL button: Press to select all the HDMI outputs from 1 to 4.
4	HDMI Input	HDMI input selection button 1 to 4: Press to select the input from 1 to 4.
5	Menu	Menu button: Press to enter Menu mode. Enter button: Press to confirm and save the setting. UP button: Press to change menu options. Down button: Press to change menu options.

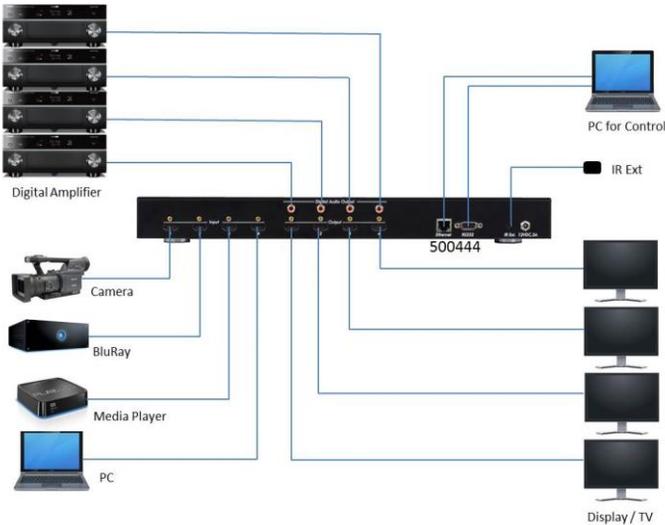
## 5.2 Rear Panel



No.	Name	Description
1	PC Control	Used to manage and provide the status of input-output selection, EDID info and so on. <b>Ethernet:</b> This port is the link for TCP/IP control. Connect to an active Ethernet link with an RJ45 terminated Ethernet cable. <b>RS232:</b> Connect to a PC running terminal emulation or

No.	Name	Description
		control system with 9-pin D-Sub cable for the transmission of RS-232 commands.
2	Power Jack	Use included DC adaptor to power the HDMI matrix switch.
3	IR Ext.	This is a local IR sensor port for extending the IR signal. Connect with an IR Sensor and use a hand held remote control to manage the Matrix Switch.
4	Digital Audio Output	Audio output area, each port is linked to its HDMI output port. For example: the audio signal of Digital Audio Output 1 is coming from HDMI output 1.
5	HDMI Input	Connect HDMI sources.
6	HDMI Output	Output for HDMI displays, AVR, etc.

### 5.3 Matrix Switch Installation



1. Mount the Matrix Switch in its final location, such as on a 19 rack, with the supplied mounting brackets.

2. Make sure all equipment is powered off. Insert and extract cables carefully with the power SWITCHED OFF. Connecting and disconnecting while the unit is powered can result in damage to the equipment.
3. Connect up to 4 sources such as a Blu-Ray player, a media player, a game console, an A/V Receiver, a Cable or Satellite Receiver, etc., to the HDMI inputs on the unit. Note that high-quality HDMI cables are recommended. Respect cable distance specifications.
4. Connect the HDMI output ports to high-definition displays such as an HDTV or an HD projector that uses HDMI inputs. Note that high-quality HDMI cables are recommended. Respect cable distance specifications.
5. For power, plug in the Matrix Switch power jack first, and then plug in the power supply to the wall. The unit automatically turns on, and is ready for operation.
6. Power on each device in the same sequence. At this point each display connected should display the assigned source (input 1 at default when powered on initially), scroll through each of the sources on each display to ensure everything is in working order. Use the front panel display and keypad, or included IR remote to test the switching function. If a display is having difficulty receiving the HDMI signal, access the display's menu and adjust the resolution (lowest to highest until signal is displayed). Please note that a 24 Hz vertical refresh rate may work better than 60 Hz or higher.

## 5.4 Management Options

The Matrix Switch may be operated via the front panel display & keypad, by IR and by IP.

See the “Local Switch Control” chapter for managing the unit via the front panel. Refer to the Handheld Remote Control chapter to manage the Matrix Switch via the supplied Handheld IR Remote. See the RS232 Control chapter to manage the unit remotely via RS232.

## 6. Front Panel Control

### 6.1 Navigating the Menu

The menu is in an idle state by default, and may be activated via the front panel display and keypad by pressing the [Menu] button twice. The first press illuminates the LCD Display and summarizes the connection status, plus the device is ready for connection changes. The second press of the [Menu] button brings up the menu selection.

**Note:**

1. If no buttons are pressed for several seconds, then the menu will return to the idle state.
2. The Matrix Switch may also be managed remotely, which is described in the Remote Control chapter.

The menu has the following main headings:

1	Set Out Scaler	To set the scaler function
2	Select EDID	Set the EDID for each port
3	View IP Config	View the IP Address, Sub Mask and Gateway

Navigate through the menu by pressing the [UP] or [Down] buttons, and use the [Enter] button to select one of the menu headings. Once inside one of the menu headings, pressing the [Menu] button again returns the system to the main menu list.

### 6.2 Menu – Scaler Function per Port

Navigate to the “Set Out Scaler” heading on the Menu, and press the [Enter] button to select one of the scaler settings. Use the [Up] or [Down] buttons to cycle through the Scaler options. Press the [Enter] button to select one of the scalers, and then press the [Up] or [Down] buttons to select which output port (from 1 to 4, or ALL) to apply the scaling, and press [Enter] to set it. Each output port can have its own scaling setting, independent of any other output.

The “Set Out Scaler” menu supports the following options:

1	Bypass	No scaling
2	Auto	Set to auto scaling

3	HDBT C	Scales from 4K/60 (4:4:4) to 4K/60 (4:2:0), for HDBT applications
4	1080p → 2160p	Up-scale from 1080p to 2160p
5	2160p → 1080p	Down-scale from 2160p to 1080p

### 6.3 Menu – Select EDID per Port

Navigate to the “Select EDID” heading on the Menu, and press the [Enter] button to select one of the many EDID settings (see the table below for EDID setting options). Use the [Up] or [Down] buttons to cycle through the EDID options. Press the [Enter] button to select one of the EDID settings, and then press the [Up] or [Down] buttons to select which input port (from 1 to 4, or ALL) to apply the EDID setting, and press [Enter] to set it. Each input port can have its own EDID setting, independent of any other input.

By default the matrix is set to a 1080P EDID, this is to maximize plug and play capability. When using 4K sources, you will want to define a 4K EDID on the given input (or read the EDID from the display).

The “Select EDID” menu has the following options:

Number	EDID Description
0	1080p, 2CH (PCM) Audio (Default)
1	1080p, 6CH Audio
2	1080p, 8CH Audio
3	1080p, 3D, 2CH (PCM) AUDIO
4	1080p, 3D, 6CH Audio
5	1080p, 3D, 8CH Audio
6	4K/30Hz, 3D, 2CH (PCM) Audio
7	4K/30Hz, 3D, 6CH Audio
8	4K/30Hz, 3D, 8CH Audio
9	4K/60Hz (Y420), 3D, 2CH (PCM) Audio
10	4K/60Hz (Y420), 3D, 6CH Audio
11	4K/60Hz (Y420), 3D, 8CH Audio
12	4K/60Hz, 3D, 2CH (PCM) Audio
13	4K/60Hz, 3D, 6CH Audio
14	4K/60Hz, 3D, 8CH Audio

Number	EDID Description
15	1080p, HDR, 2CH (PCM) Audio
16	1080p, HDR, 6CH Audio
17	1080p, HDR, 8CH Audio
18	1080p, 3D, HDR, 2CH (PCM) Audio
19	1080p, 3D, HDR, 6CH Audio
20	1080p, 3D, HDR, 8CH Audio
21	4K/30Hz, 3D, HDR, 2CH (PCM) Audio
22	4K/30Hz, 3D, HDR, 6CH Audio
23	4K/30Hz, 3D, HDR, 8CH Audio
24	4K/60Hz (Y420), 3D, HDR, 2CH (PCM) Audio
25	4K/60Hz (Y420), 3D, HDR, 6CH Audio
26	4K/60Hz (Y420), 3D, HDR, 8CH Audio
27	4K/60Hz, 3D, HDR, 2CH (PCM) Audio
28	4K/60Hz, 3D, HDR, 6CH Audio
29	4K/60Hz, 3D, HDR, 8CH Audio
30	User 1 EDID
31	User 2 EDID
32	User 3 EDID
33	Copy EDID from Output 1
34	Copy EDID from Output 2
35	Copy EDID from Output 3
36	Copy EDID from Output 4

**Note:****1. What is an EDID, and what is it used for?**

Under normal circumstances, the source device will require information about a connected device/display to assess what resolutions and features are available. The source can then configure its output to send only resolutions and features that are compatible with the attached device/display. This information is called EDID (Extended Display Information Data).

Also, a source device can only accept and read one EDID from a

connected device/display. Likewise, the source can only output one resolution for use by a connected device/display.

**2. Why is the EDID so important for the HDMI Matrix?**

The Matrix is a complex piece of technology that replicates and switches between multiple inputs and outputs. Each connected source device will require one EDID to read. EDID management is carefully handled by the HDMI Matrix to provide a single EDID for each source to read.

**3. What options do I have to manage the EDID in the HDMI Matrix?**

First, it is important to note that each source device can only output one video/audio signal type. This includes resolutions and timings. When multiple devices/displays are used, such as with the HDMI Matrix, it is important to use devices/displays that have similar or compatible resolutions/features. This will ensure that the single video/audio signal produced by the source device is accepted by all of the connected output devices/displays. The user has the option, through the EDID management window, to choose how the unit will manage the EDID from multiple HDMI devices/displays. Therefore the user has some control over the resolutions/features that the source devices will output. The HDMI Matrix has multiple EDID management modes that will control how the EDID information from multiple devices/displays are combined, ignored, and routed.

**6.4 Menu – View IP Config**

Navigate to the “View IP Config” heading on the Menu, and press the [Enter] button to select it. Use the [Up] or [Down] buttons to cycle through the available IP parameters to view.

The “View IP Config” menu has the following IP parameters to view:

1	IP Address	Show the Matrix Switch IP Address (default IP address is: 192.168.001.239)
2	TCP Port &	Shows the TCP Port Number, and the DHCP

	DHCP setting	setting (on or off)
3	Gateway	Shows the Gateway Address
4	Subnet Mask	Shows the Subnet Mask

In order to prevent potential IP problems, most IP settings must be managed in the Free PC Software or via the RS-232 commands.

### **Cascade Mode:**

Cascade mode can only be turned On or Off via RS232. When Cascade Mode is turned on, the signal is passed from the switch without reading the EDID or Hot Plug. Many issues can be resolved in the field with this mode, including:

- Invalid or incorrect EDID coming from display (this may happen more often than one would think).
- When you want to manage EDID in a device further down the chain (such as an AVR or Distribution Amp).
- When running one or more output into additional peripherals before the display.

We recommend you **ONLY** use cascade mode if you have exhausted all other trouble shooting options. To toggle Cascade Mode On or Off, use the appropriate RS232 command (see the RS232 command table).

## **6.5 Connectivity Operation**

When making a connection, begin by pressing the Output port (1 to 4, or ALL), then press the Input port (1 to 4, or ALL) to be connected.

### **Note:**

An Input port may be connected to more than one output port.

## 7. IR Handheld Remote Control

The HDMI routing of the matrix can also be controlled by using the IR handheld remote control supplied with the product.

The number labels on the left represent the Output port numbers.

Each Output port has a set of Left and Right Arrow buttons, which are used to select the Input port to connect with. For example, the Left Arrow button decrements to the next lower Input port, and the Right Arrow increments to the next higher Input port.

Number 1 to 4 are for Output port 1 to Output port 4.

### IR Sensor Note

The unit supports an IR sensor on the front panel so that it may be managed via the IR Handheld Remote. However an IR Sensor may also be connected to the IR Ext port on the rear of the unit, in order to extend the IR sensor to a more convenient location for improving line-of-site with the IR handheld remote.



## 8. RS232 Remote Control

The Matrix Switch may be managed via RS232 commands. Connect an RS232 cable between the command terminal (which may be a PC running terminal emulation software) and the Matrix Switch. MuxLab also provides at no charge a control software package that may be downloaded from the MuxLab website, to be used to send RS232 commands to the Matrix Switch.

When connecting the terminal to the Matrix switch, make sure the RS232 cable has the correct termination on both ends for the devices being connected. Note that the Matrix Switch comes with a 9 Pin D-Sub connector with female sockets (the cable will require a 9-Pin D-Sub connector with male pins).

For correct communication, set the RS232 parameters to the following settings:

- 57600 Baud
- 8 Data Bits
- 1 Stop Bit
- No Parity

### RS232 Command Table:

System Address = 00	
Azz: All commands start by prefix System Address zz, where zz=[01-99]	
H	Help
STA	Show global system status
SET RTS	Reset to Factory Defaults
SET ADDR XX	Set System Address to xx {xx=[00~99], (00=Single)}
GET ADDR	Get System Address
GET STA	Get System System Status
Output Setup Commands	
SET OUTx VS INy	Set Output x To Input y{x=[0~4](0=ALL), y=[1~4]}
SET OUTx HDCPy	Set Output HDCP Mode{x=[0~4](0=ALL), y=[0~4](0=AUTO,1=BYPASS,2=Dis,3=H14,4=H22)}
SET OUTx CASCADEy	Set Output CASCADE Mode{x=[0~4](0=ALL), y=[0~1](0=OFF,1=ON)}

SET OUTx VIDEOy	Set Output VIDEO Mode{x=[0~4](0=ALL), y=[0~3](0=AUTO,1=BYPASS,2=2K,3=4K)}
SET OUTx EXA EN/DIS	Set Ex-Audio Output Enable/Disable{x=[0~4](0=ALL)}
GET OUTx VS	Get Output x Video Route{x=[0~4](0=ALL)}
GET OUTx HDCP	Get Output x HDCP Mode{x=[0~4](0=ALL)}
GET OUTx CASCADE	Get Output x CASCADE Mode{x=[0~4](0=ALL)}
GET OUTx VIDEO	Get Output x Video Mode{x=[0~4](0=ALL)}
GET OUTx EDID DATA	Get Output x EDID DATA{x=[1~4]}
GET OUTx EXA	Get Ex-Audio Output Enable/Disable Status{x=[0~4](0=ALL)}
<b>Input Setup Commands</b>	
SET INx EDID y	Set Input x EDID{x=[0~4](0=ALL), y=[0~32]} 0:1080P_2CH                      1:1080P_6CH                      2:1080P_8CH 3:1080P_3D_2CH                      4:1080P_3D_6CH 5:1080P_3D_8CH 6:4K30HZ_3D_2CH                      7:4K30HZ_3D_6CH 8:4K30HZ_3D_8CH 9:4K60HZ(Y420)_3D_2CH                      10:4K60HZ(Y420)_3D_6CH 11:4K60HZ(Y420)_3D_8CH                      12:4K60HZ_3D_2CH 13:4K60HZ_3D_6CH                      14:13:4K60HZ_3D_8CH 15:1080P_2CH(HDR)                      16:1080P_6CH(HDR) 17:1080P_8CH(HDR)                      18:1080P_3D_2CH(HDR) 19:1080P_3D_6CH(HDR)                      20:1080P_3D_8CH(HDR) 21:4K30HZ_3D_2CH(HDR) 22:4K30HZ_3D_6CH(HDR)                      23:4K30HZ_3D_8CH(HDR) 24:4K60HZ(Y420)_3D_2CH(HDR) 25:4K60HZ(Y420)_3D_6CH(HDR) 26:4K60HZ(Y420)_3D_8CH(HDR) 27:4K60HZ_3D_2CH(HDR)                      28:4K60HZ_3D_6CH(HDR) 29:13:4K60HZ_3D_8CH(HDR)                      30:USER1_EDID 31:USER2_EDID                      32:USER3_EDID
SET INx EDID CY OUTy	Copy Output y EDID To Input x(USER1 BUF){x=[0~4](0=ALL), y=[1~4]}

SET INx EDID Uy DATAz	Write EDID To User y Buffer of Input x{x=[0~4](0=ALL), y=[1~3],z=[EDID Data]}
GET INx EDID	Get Input x EDID Index{x=[0~4](0=ALL)}
GET INx EDID y DATA	Get Input x EDID y Data{x=[1~4],y=[0~32]}
Network Setup Command: ( xxx=[000-255], zzzz=[0001~9999]	
SET RIP xxx.xxx.xxx.xxx	Set Route IP Address to xxx.xxx.xxx.xxx
SET HIP xxx.xxx.xxx.xxx	Set Host IP Address to xxx.xxx.xxx.xxx
SET NMK xxx.xxx.xxx.xxx	Set Net Mask to xxx.xxx.xxx.xxx
SET TIP zzzz	Set TCP/IP Port to zzzz
SET DHCP y	Set DHCP {y=[0~1](0=Dis,1=Enable)}
GET RIP	Get Route IP Address
GET HIP	Get Host IP Address
GET NMK	Get Net Mask
GET TIP	Get TCP/IP Port
GET DHCP	Get DHCP Status
GET MAC	Get MAC Address

## 9. Telnet Remote Control

The RS232 commands in the previous section, may also be used via Telnet, allowing the Matrix Switch to be managed over a TCP/IP network. Open a Telnet session, use port 23, and make use of the RS232 commands above.

# Regulatory Compliance

## Disclaimer

Information in this document is subject to change without notice. The manufacturer does not make any representations or warranties (implied or otherwise) regarding the accuracy and completeness of this document and shall in no event be liable for any loss of profit or any other commercial damage, including but not limited to special, incidental, consequential, or other damages.

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## ***CE/FCC & Recycling Information***

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### ***CE Certification***

This equipment complies with the requirements relating to Electromagnetic Compatibility Standards EN55022/EN55024 and the further Standards cited therein. It must be used with shielded cables only. It has been manufactured under the scope of RoHS compliance.

### ***FCC Certification***

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. You are cautioned that changes or modification not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation



### ***WEEE (Waste of Electrical and Electronic Equipment), Recycling of Electronic Products***

In 2006 the European Union introduced regulations (WEEE) for the collection and recycling of all waste electrical and electronic equipment. It is no longer allowable to simply throw away electrical and electronic equipment. Instead, these products must enter the recycling process.

Each individual EU member state has implemented the WEEE regulations into national law in slightly different ways. Please follow your national law when you want to dispose of any electrical or electronic products. More details can be obtained from your national WEEE recycling agency.



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