User Manual

MHD44

HDMI Matrix Switcher

All Rights Reserved

Version: MHD44_2014V1.0

PTN **www.PTN-electronics.com**

Safety Precautions

In order to guarantee the reliable operation of the equipments and safety of the staff, please abide by the following proceeding in installation, using and maintenance:

1) The system must be earthed properly. Do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.

2) Do not put the switcher in a place of too hot or too cold.

3) As the power generating heat when running, the working environment should be maintained fine ventilation, in case of damage caused by overheat.

4) Cut off the general power switch in humid weather or left unused for long time.

5) Before following operation, ensure that the alternating current wire is pull out of the power supply:

- Take off or reship any components of the equipment.
- Take off or rejoin any pin or other link of the equipment.

6) As to non-professional or without permission, please DO NOT try to open the casing of the equipment, DO NOT repair it on your own, in case of accident or increasing the damage of the equipment.

7) DO NOT splash any chemistry substance or liquid in the equipment or around.

NOTICE: Please read this user manual carefully before using this product. Pictures shown in this manual are for reference only, different model and specifications are subject to real product.

Table of Contents

1. Introduction

1.1 Introduction to MHD44

MHD44 is a high-performance digital matrix switcher for HDMI signals, including 4 HDMI inputs, 4 HDMI outputs. It conforms to HDCP standards, supports HDMI 1.4a, and can handle 1080P 3D signal. It can be controlled via diverse and flexible control methods including front panel buttons, RS232 serial port and IR.

1.2 Features

- Supports HDMI 1.4a, 1080P@60Hz 3D, DVI1.0 compatible
- Supports 6.75Gbps bandwidth
- Intelligent EDID data management
- Supports online upgrade process via USB port on front panel
- LCD screen shows real-time connection status, switching status, whether input/ output signal is with HDCP, and output resolution.
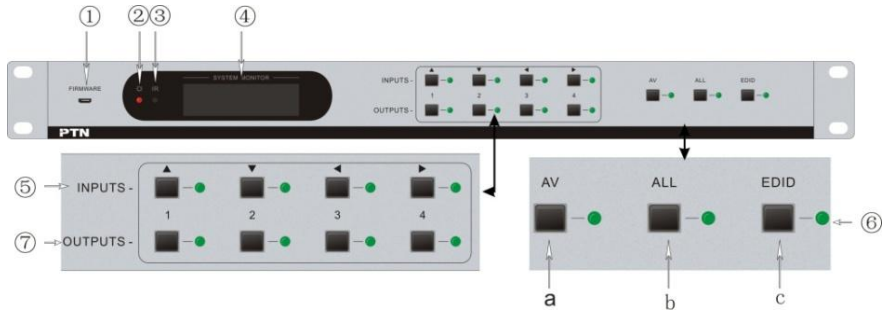
1.3 Package Contents

- 1 x MHD44
- 2 x Mounting ears (6 x Black Screws)
- 1 x RS232 cable
- 4 x Plastic cushions (4 x Screws)
- 1 x Power adapter (12V DC)
- 1 x IR remote
- 1 x IR receiver
- 1 x User manual

Note：Please confirm if the product and the accessories are all included, if not, please contact with the dealers.

2. Product Appearance of MHD44

2.1 Front Panel

No.	Name	Description
①	Firmware	Micro USB port for update firmware.
②	Power Indicator	Keeps light when power on.
③	IR	In-built IR receiver, receives IR signals emitted by IR remote to facilitate remote control.
④	LCD Indicator	Real-time show for system status.
⑤	INPUTS	INPUT1 ~ 4 corresponds 4 HDMI input sources separately. Inquire mode: press "AV" more than 3 seconds to enter this mode to check connection status, switching status, whether input/ output signal is with HDCP and output resolution. Press ◀ ▶ to change different menus, ▲▼ to inquire resolutions of INPUT1~4.
⑥	FUNCTION BUTTONS	➢ AV: to transfer AV and IR signal synchronously by the switcher. ➢ ALL: to transfer one input to all outputs. ➢ EDID: manually capture and study the EDID data from output device to input port. Note: Make sure signal source is set up correctly and can deliver data to display device stably.
⑦	OUTPUTS	OUTPUT1 ~ 4 corresponds 4 HDMI output sources separately.

PTN

2.2 Rear Panel
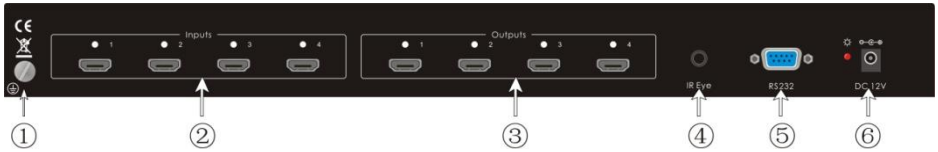
No.	Name	Description
①	GROUND	Connect to grounding, make the unit ground well.
②	INPUTS	4 HDMI input ports, connect with HDMI ports of signal sources.
③	OUTPUTS	4 HDMI output ports, connect with HDMI ports of output source devices.
④	IR EYE	Connect with IR receiver, use the IR remote to control MHD44.
⑤	RS232	The serial port for unit control, 9-pin female connector, connects with control device such as a PC. (Make sure to fill in corresponding communication protocol parameters correctly.)
⑥	Power adapting port	Connect with 12V DC power adaptor. The indicator will turn red and keep light when power on.

3. System Connection

3.1 Usage Precautions

1) System should be installed in a clean environment and has a prop temperature and humidity.

2) All of the power switches, plugs, sockets and power cords should be insulated for safe.

3) All devices should be connected before power on.

3.2 System Diagram
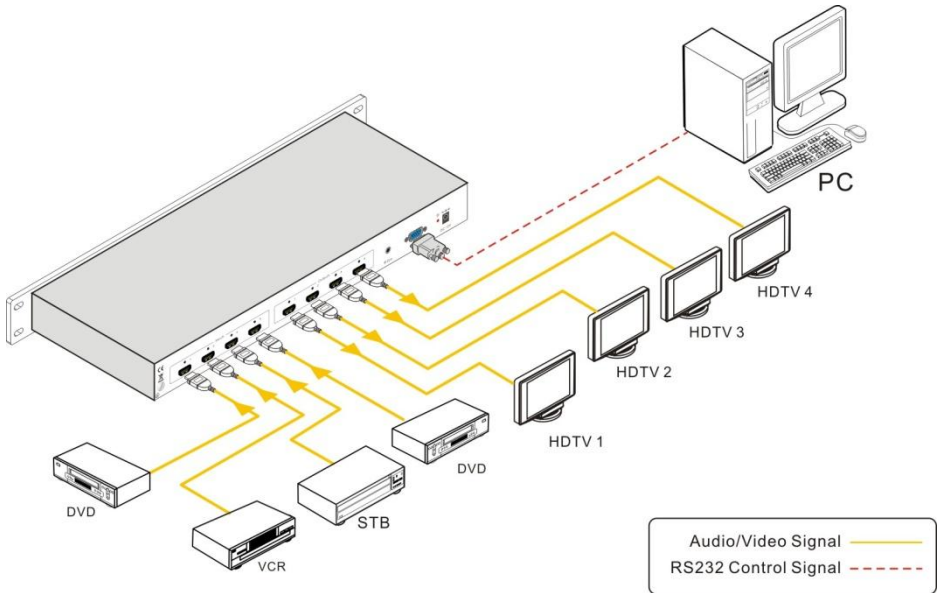
3.3 Connection Procedure

1) Connect HDMI sources (e.g. DVD) to HDMI "INPUTS" of MHD44 with HDMI cables.

2) Connect HDMI displayers to HDMI "OUTPUTS" of MHD44 with HDMI cables.

3) Connect the RS232 port (9 pin female connector) of MHD44 to a control device with a serial cable, and control MHD44 via the control device (e.g. a PC).

4) Connect IR receiver to the IR Eye port.

5) Connect 12V DC power adaptor to MHD44.

3.4 System Applications

With its good performance in control and transmission, MHD44 can be widely used in computer realm, monitoring, large screen displaying, conference system, television education and bank securities institutions etc.

4. System Operations

4.1 Button Control

The operation examples are showed in *2.1 Front Panel.* Here we make a brief introduction to the system inquiry operations.

Keep pressing the button "AV" for 3 seconds, it will enter into system inquire menu. Use ◄ ► to check the previous/next item.

Function Items	Example	Description
Check the connection status of inputs	In 1 2 3 4 Connect Y Y Y Y	Y means the corresponding port is connected with input device, N means not.
Check the connection status of outputs	Out 1 2 3 4 Connect Y Y N N	Y means the corresponding port is connected with output device, N means not.
Correspondence between inputs and outputs	Out 1 2 3 4 Input 1 2 3 3	Shows the correspondence between the 4 inputs and 4 outputs.
Check if the input is with HDCP	In 1 2 3 4 HDCP Y Y Y N	Y means the input signal is with HDCP, N means not.
Check if the output is with HDCP	Out 1 2 3 4 HDCP Y Y Y N	Y means the output signal is with HDCP, N means not.
Check the output resolution	Resolution Out 1 1920×1080	Use ▲▼ to check all the 4 output resolutions.

4.2 IR Control

4.2.1 Usage of IR Remote

Standby button, press it to enter/exit standby mode.

Input channels, range from 1~4.

Menu buttons, **AV**, **ALL** and **EDID** buttons have the same functions as **AV**, **ALL** and **EDID** on the front panel.

THROUGH: to transfer the signals directly to the corresponding output channels.

Example: Press "3", "THROUGH", the result will be IN 3→OUT 3. Press "ALL", "THROUGH", the result will be: 1→1, 2→2, 3→3, 4→4.
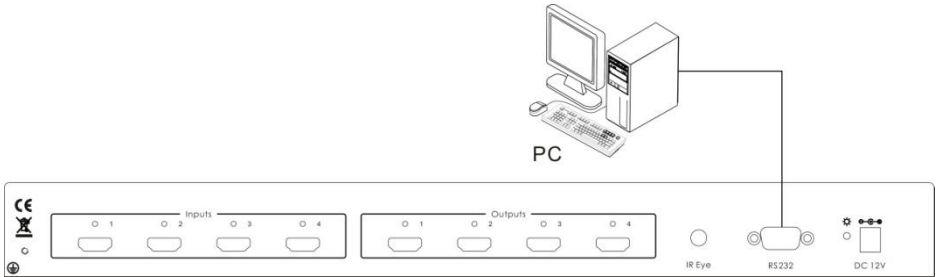
Output channels, ranges from 1~4.

Note: In-built IR or extended IR receiver connected to IR Eye can control the device with this remote control.

4.3 RS232 Control

4.3.1 Control MHD44 via a PC

To control MHD44, you need to connect the 9 pin female RS232 port to a PC's RS232 port. By using RS232 control software and setting right specifications, you are able to control MHD44.

4.3.2 PC RS232 Control Software Setting

Installation: Copy the control software file to the computer which is connected with HDMI Matrix Switcher.

Uninstallation: Delete all the control software files in corresponding file path.

Basic Settings:

Firstly, connect the HDMI Matrix Switcher with all input source devices and output displaying devices needed. Then connect HDMI Matrix Switcher with a computer which is installed with RS232 control software.

Note: Please set the parameters (including COM number, baud rate, data bit, stop bit and the parity bit) correctly, and then you are able to send commands.

4.3.3 RS232 Commands

Communication protocol: RS232 Communication Protocol

Baud rate: 9600   Data bit: 8   Stop bit: 1   Parity bit: None

Command Codes	Functions	Feedback Example
/*Type;	Inquire the models information.	MHD44
/%Lock;	Lock the front panel buttons on the Matrix.	System Locked!
/%Unlock;	Unlock the front panel buttons on the Matrix.	System Unlock!
/^Version;	Inquire the version of firmware	V1.X.X
/:Message Off;	Turn off the feedback command from the com port. It will only show the "Switch OK!".	/:MessageOff;
/:Message On;	Turn on the feedback command from the com port.	/:MessageOn;

PTN

Command Codes	Functions	Feedback Example
Demo.	Switch to the "demo" mode, 1->1, 2->2, 3->3 … and so on .The switching interval is 2 seconds.	Demo Mode
Undo.	To cancel the previous operation.	Undo OK!
[x]All.	Transfer signals from the input channel [x] to all output channels	1 To All.
All#.	Transfer all input signals to the corresponding output channels respectively.	All Through.
All$.	Switch off all the output channels.	All Closed.
[x]#.	Transfer signals from the input channel [x] to the output channel [x].	1 Through.
[x]$.	Switch off the output channel [x].	1 Closed.
[x]@.	Switch on the output channel [x].	1 Open.
All@.	Switch on all output channels.	All Open.
[x1] B[x2].	Transfer the AV signal from the input channel [x1] to the output channel [x2].	01B02
Status[x].	Inquire [x] output statues.	AV: 1-> 1
Status.	Inquire all outputs statues one by one.	AV: 1-> 1 AV: 1-> 1 AV: 2-> 2 AV: 3-> 3 AV: 4-> 4
Save[Y].	Save the present operation to the preset command [Y], ranges from 0 to 9.	Save To F1
Recall[Y].	Recall the preset command [Y].	Recall From F1
Clear[Y].	Clear the preset command [Y].	Clear F1
PWON.	Work in normal mode.	PWON
PWOFF.	Enter into standby mode.	PWOFF
/%[Y]/[X]:[Z].	HDCP management command. [Y] is for input (value: I) or output (value: O). [X] is the number of one port, if the value of X is ALL, it means all ports. [Z] is for HDCP compliance status (value: 1 or 0, 1 stands for "with", 0 stands for "without"). ➢ Y=I & Z=1, means the input port is compliant with HDCP. ➢ Y=O & Z=1, means output with HDCP. ➢ Y=I & Z=0, means the input port is not	/%I/ALL:0.

Command Codes	Functions	Feedback Example
	compliant with HDCP.	
	➢ Y=O & Z=0, means output without HDCP.	
%0800.	Manual HDCP management.	%0800.
%0801.	Automatically HDCP management. If input is with HDCP, so is output.	%0801.
EDIDH[x]B [y].	Input port [y] learns the EDID from output port [x]. If the EDID data is effective and the audio part supports not only PCM mode, then force-set it to PCM mode. If the EDID data is not effective, then set it as initialized EDID data.	EDIDH01B01
DigitAudio ON[x].	DigitAudio	DigitAudio ON with Output 4
DigitAudio OFF[x].	Disable HDMI audio output of port x. ● X=1, 2, 3, 4, disable this one port. ● X=5, disable all the 4 ports.	DigitAudio OFF with Output 4
%0911.	Reset to factory default.	Factory Default
%9961.	Check the system locking status.	PWON /PWOFF
%9962.	Check the status of standby mode.	System Unlock!
%9971.	Check the connection status of the inputs.	In 1 2 3 4 Connect N N N N
%9972.	Check the connection status of the outputs.	Out 1 2 3 4 Connect Y N N N
%9973.	Check the HDCP status of the inputs.	In 1 2 3 4 HDCP N N N N
%9974.	Check the HDCP status of the outputs.	Out 1 2 3 4 HDCP N N N N
%9975.	Check the switching status.	Out 1 2 3 4 In 1 2 3 4
%9976.	Check the output resolution.	
%9977.	Check the status of digital audio of output channels.	Out 1 2 3 4 Audio Y Y Y Y
%9978.	Check whether the input port is compatible with HDCP	In 1 2 3 4 HDCPEN Y Y Y Y
EDIDPCM[x].	Set the audio part of input port [x] to PCM format in EDID database.	EDIDPCM01
EDIDG[x].	Get EDID data from the output and display the	

| Command Codes	Functions	Feedback Example
	output port number of X.	
EDIDMInit.	Recover the factory default EDID data.	EDIDMInit.
EDIDM[X]B[Y].	Manually EDID switching. Learn the EDID data of output[X] to the input[Y].	EDIDM03B01
EDIDUpgrade[x].	Upgrade EDID data via the RS232 port [X] is for input port, when the value of X is 5, it means to upgrade to all input ports. When the switcher gets the command, it will show a message to send EDID file (.bin file). Operations will be canceled after 10 seconds. (Note 1) Please cut off all connections of HDBaseT ports.	Please send the EDID file
UpgradeIntEDID[x].	Select one type of EDID data and upgrade built-in EDID data. Supports 4 types of EDID data: 1. 1080P, 2D, PCM2.0 2. 1080P, 2D, 5.1 (audio) 3. 1080P, 3D, PCM2.0 4. 1080P, 3D, 5.1 (audio) [x] = 1, 2, 3 or 4 When the switcher gets the command, it will show a message to send EDID file (.bin file). Operations will be canceled after 10 seconds.	Please send the EDID file
EDID/[x]/[y].	Set the built-in EDID data of input port [x] to type [y]. The value of [y] is 1, 2, 3, and 4. The EDID data types are same as mentioned above.	EDID/02/01

Note:

1. Please disconnect all the twisted pairs before sending command EDIDUpgrade[X].

2. In above commands, "["and "]" are symbols for easy reading and do not need to be typed in actual operation.

3. Please remember to end the commands with the ending symbols "." or ";".

4. Type the command carefully, it is case-sensitive.

4.4 USB Firmware Updating

To meet with the request of different users or additional functions in future, the firmware of MHD44 can be upgraded via USB. When you need to upgrade it, please download the latest upgrade file and then you are able to upgrade it through the update EXE software. Copy the EXE software to the PC in controlled and double click the program to upgrade the firmware.

Updata_v1.4.1.exe

When the program is running normally, it will enter into the interface (as shown in next figure), please press the button **Open** and choose the upgrade file downloaded, and then press the button **Updata**. Then it starts to upgrade. When all are done, it will appear with a dialog box showing the message Update success.
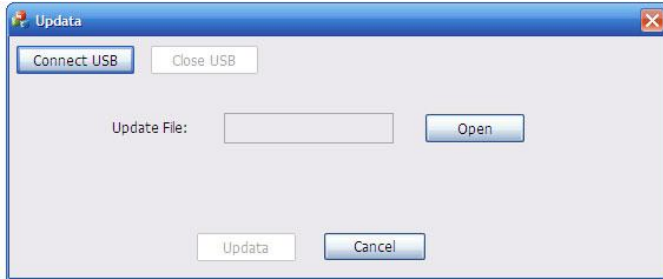

Note: The COM number connected with PC is available only when in 1 to 9.

PTN

5. Specification

Video Input		Video Output	
Input	4 HDMI	Output	4 HDMI
Input Connector	A Type Female HDMI	Output Connector	A Type Female HDMI
Input Level	T.M.D.S. 2.9V~3.3V	Output Level	T.M.D.S. 2.9V~3.3V
Input Impedance	100Ω (Differential)	Output Impedance	100Ω (Differential)
Video General			
Gain	0 dB	Bandwidth	6.75Gbit/s
Video Signal	HDMI (or DVI-D)	Maximum Pixel Clock	225MHz
Resolution Range	Up to 1920 x 1200@60Hz or 1080P@60Hz	Switching Speed	200ns (Max.)
EDID Management	In-built EDID data and manual EDID management		
HDCP	Supports HDCP 1.3, auto and manual HDCP management.		
Control Parts			
Control Ports	1 IR EYE (black) 1 RS232 (9 pin female D)	Panel Control	Front panel buttons
IR	Default IR remote		
General			
Power Supply	DC12V,2A	Dimension (W*H*D)	482.6 x 43.9 x 236.5mm (1U high, full rack wide)
Temperature	-20 ~ +70℃	Humidity	10% ~ 90%

6. Panel Drawing
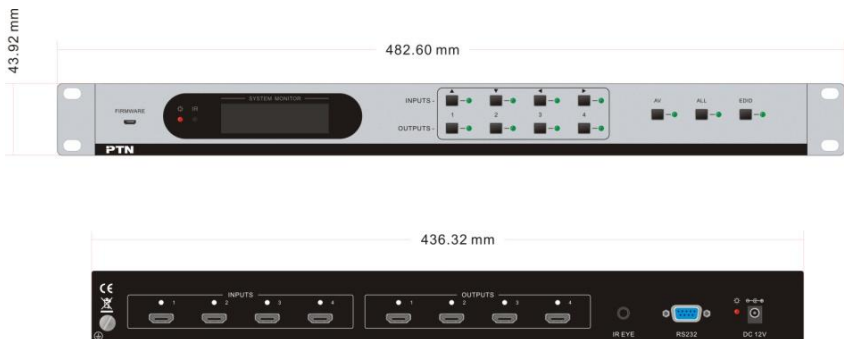
7. Troubleshooting & Maintenance

Problems	Causes	Solutions
Color losing or no video signal output in HDMI display	The connecting cables may not be connected correctly or it may be broken	Check whether the cables are connected correctly and in working condition.
No HDMI signal output in the splitter while local HDMI input is in normal working state		
EDID management does not work normally	the HDMI cable is broken at the output end	Change for another HDMI cable.
No output image when switching	No signal at the input / output end	Check with oscilloscope or multimeter if there is any signal at the output end.
	Fail or loose connection	Make sure the connection is good
	The switcher is broken	Send it to authorized dealer for repairing.
Display device appears with blank screen when switching input/ output source	The displayer does not support the resolution of the video source	Switch again
		Manage the EDID data manually to make the resolution of the video source automatically compliant with the output resolution
Cannot control the switcher by control device (e.g. a PC) through RS232 port	Wrong RS232 communication parameters	Make sure the RS232 communication parameters are correct.
	The device has already been broken	Send it to authorized dealer for repairing.
Static becomes stronger when connecting the	bad grounding	Check the grounding and make sure it is connected

video connectors		well.
Cannot be controlled through RS232 port, front panel buttons or by IR remote	The unit is broken	Send it to authorized dealers for repairing

If your problem persists after following the above troubleshooting steps, seek further help from authorized dealer or our technical support.

8. After-sales Service

1) If there appear some problems when running MHD44, please check and deal with the problems reference to this user manual. Any transport costs are borne by the users during the warranty.

2) You can email to our after-sales department or make a call, please tell us the following information about your cases.

- Product version and name.
- Detailed failure situations.
- The formation of the cases.

3) We offer products for all **three-year warranty**, which starts from the first day you buy this product (The purchase invoice shall prevail).

4) Any problem is same with one of the following cases listed, we will not offer warranty service but offer for charge.

- Beyond the warranty.
- Damage due to incorrectly usage, keeping or repairing.
- Damage due to device assembly operations by the maintenance company non-assigned.
- No certificate or invoice as the proof of warranty.
- The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
- Damage caused by force majeure.

Remarks: For any questions or problems, please try to get help from your local dealer, or to email PTN at: support@PTN-electronics.com.

PTN

www.PTN-electronics.com

PTN Electronics Limited

Tel: +86-755-2846 1819

Fax: +86-755-8471 7796

Email: info@PTN-electronics.com

Website: www.PTN-electronics.com

2 013062 806013