User Manual

VIVOLINK™
PROFESSIONAL AV SOLUTIONS

VLHDMIMAT2X4RS

4x2 HDMI 2.0 Presentation Switcher with Matrix Outputs

All Rights Reserved

Version: VLHDMIMAT2X4RS_2019V1.0

Table of Contents

1. Product Introduction

Thank you for choosing the VLHDMIMAT2X4RS 4x2 HDMI 2.0 presentation switcher with matrix outputs. The switcher consists of four HDMI inputs, two HDMI matrix outputs and full HDMI 2.0 support. The product offers SPDIF and 3.5mm output for dual HDMI OUT audio extraction and dual HDMI OUT ARC along with 4K to 1080p down-scaling functionality. The VLHDMIMAT2X4RS features a wide range of control flexibility via Web, RS232, IR and smart EDID management.

1.1 Features

- 4x2 HDMI presentation switcher with matrix outputs.
- HDMI 2.0b, 4K@60Hz 4:4:4 8bit, HDR 10, HDCP 2.2.
- 4K to 1080p down-scaling.
- SPDIF and 3.5mm output for dual HDMI OUT audio extraction and dual HDMI OUT ARC.
- RS232, IR and TCP/IP control.
- Smart EDID management.

1.2 Package List

- 1x VLHDMIMAT2X4RS 4x2 HDMI 2.0 presentation switcher
- 2x Mounting Ears with 4 Screws
- 4x Plastic Cushions
- 1x IR Remote
- 1x IR Receiver
- 1x 3-pin Terminal Block
- 1 x Power Adapter (12V DC,1A)
- 1x User Manual

Note: *Please contact your distributor immediately if any damage or defect in the components is found.*

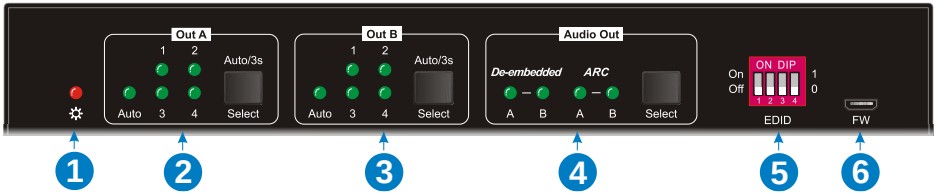
2. Specification

Video Input	
Video Input	(4) HDMI
Video Input Connector	(4) Type-A female HDMI
Video Input Video Resolution	Up to 4K@60Hz 4:4:4 8bit
HDMI Audio Format	Supports Dolby Atmos, Dolby TrueHD, Dolby Digital Plus, Dolby Digital, DTS-X, DTS-HD Master Audio, DTS 5.1, 2 - 8Ch PCM 32-192KHz 16-24 bits；2 - 8Ch PCM 32-192kHz 16-24 bits.
HDMI Input Cable	4K@60Hz 4:4:4 ≤ 3meters, other ≤ 5meters
Video Output	
Video Output	(2) HDMI
Video Output Connector	(2) Type-A Female HDMI
Video output Video Resolution	OUT A: Up to 4K@60Hz 4:4:4 8bit, HDR10, Dolby Vision, supports color space 4:2:2/4:2:0 to 4:4:4, 4K to 1080p down-scaling.
	OUT B: Up to 4K@60Hz 4:4:4 8bit, HDR, Dolby Vision
HDMI Output Cable	≤ 5 meters
HDMI Version	Up to 2.0
HDCP Version	Up to 2.2
Digital SPDIF Audio Output	
Audio Output	(1) Digital SPDIF audio
Audio Output Connector	(1) Toslink connector
Output level	±0.05dBFS
Frequency Response	20Hz~20KHz, ±1dB
THD+N	< 0.05%, 20Hz~20KHz bandwidth, 1KHz sine at 0dBFS level (or max level)
SNR	> 90dB, 20Hz~20KHz bandwidth
Crosstalk isolation	< -70dB, 10KHz sine at 0dBFS level (or max level before clipping)
Noise Level	- 90dB
Unbalanced analog Audio Output	
Audio Output	(1) Unbalanced analog audio
Audio Output Connector	(1) 3.5mm jack
Frequency Response	20Hz~20KHz, ±1dB
Max output level	2.0Vrms ± 0.5dB. 2V=16dB headroom above-10dBV (316 mV) nominal consumer line level signal
THD+N	< 0.05%, 20Hz~20KHz bandwidth, 1KHz sine at 0dBFS level (or max level)
SNR	> 80dB, 20Hz~20KHz bandwidth

Crosstalk isolation	< -80dB, 10KHz sine at 0dBFS level (or max level before clipping)
L-R level deviation	< 0.05dB, 1KHz sine at 0dBFS level (or max level before clipping)
Output load capability	1Kohm and higher (supports 10x paralleled 10Kohm loads)
Noise Level	-80dB
Control Part	
Control Port	(1) EDID Switch, (1) FW, (1) RS232, (1) IR IN, (1) TCP/IP
Control Connector	(1) 4-pin DIP Switch, (1) Micro-USB, (1) 3-pin terminal block, (1) 3.5mm jack, (1) RJ45
General	
Bandwidth	18Gbps
Operation Temperature	-5℃ ~ +55℃
Storage Temperature	-25℃ ~ +70℃
Relative Humidity	10%-90%
External Power Supply	Input: AC 100~240V, 50/60Hz; Output: 12V DC 1A
Power Consumption	7.5W (Max)
Dimension (W*H*D)	200mm x 28.5mm x 100mm
Net Weight	605g

3. Panel Description

3.1 Front Panel



① **Power LED:** Illuminates solid red when the device is powered on.

② **Out A:**

- **1-4:** Four HDMI input LEDs, one of which illuminates green to indicate which source is selected.
- **Auto LED:** Illuminates green in auto switching mode.
- **Select/Auto/3s:** Press the button repeatedly to cycle through the four video inputs. Press and hold the button for 3 seconds to enter or exit auto switching mode.

③ **Out B:**

- **1-4:** Four HDMI input LEDs, one of which illuminates green to indicate which source is selected.
- **Auto LED:** Illuminates green in auto switching mode.
- **Select/Auto/3s:** Press the button repeatedly to cycle through the four video inputs. Press and hold the button for 3 seconds to enter or exit auto switching mode.

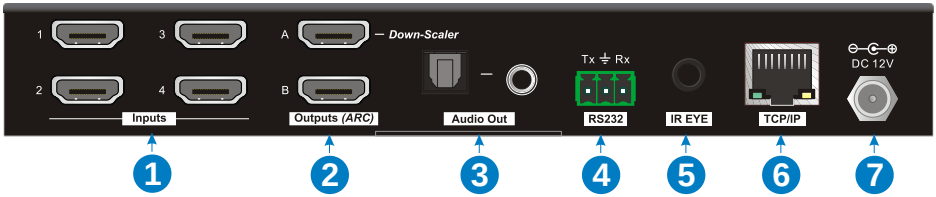
④ **Audio Out:**

- **De-embedded:** Two HDMI de-embedded audio source LEDs, one of which illuminates green to indicate output A or output B de-embedded audio source is selected for audio output.
- **ARC:** Two ARC audio source LEDs, one of which illuminates green to indicate output A or output B ARC audio source is selected for audio output.
- **Select:** Press the button to select audio source.

⑤ **EDID:** 4-pin DIP switch for EDID setting.

⑥ **FW:** Micro-USB port for firmware upgrade.

3.2 Rear Panel



① **Inputs 1~4:** Connect HDMI sources.

② **Outputs (ARC) A~B:** Connect display devices. They supports ARC, and only the output A port supports color space 4:2:2/4:2:0 to 4:4:4 and 4K to 1080p down-scaling function for compatibility with more display devices.

③ **Audio Out:** Toslink connector and 3.5mm jack for audio output. There are four audio can be selected: output A de-embedded audio, output B de-embedded audio, output A ARC audio or output B ARC audio.

④ **RS232:** Connect control device (e.g. PC) to control the switcher by sending RS232 commands.

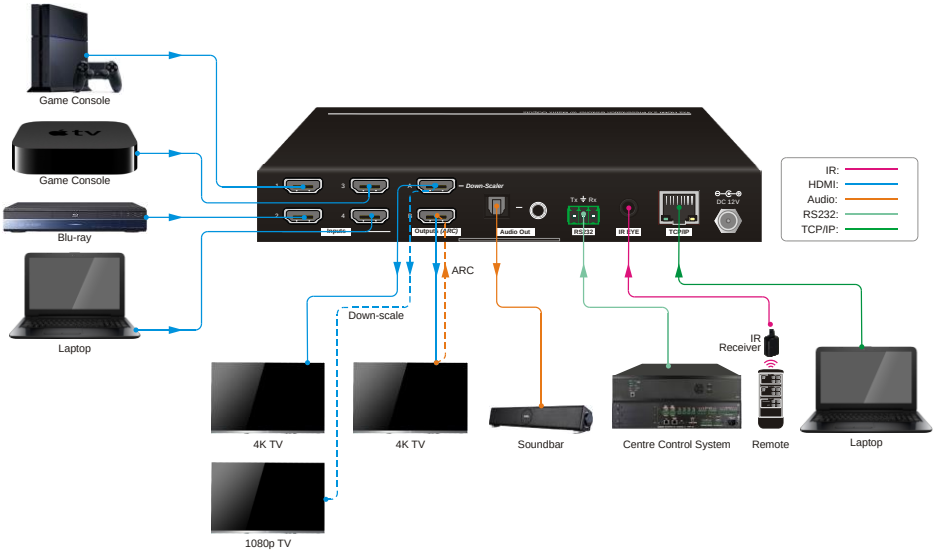
⑤ **IR EYE:** Connect IR receiver to control the switcher by the IR remote.

⑥ **TCP/IP:** Connect the control device (e.g. PC) to control the switcher by Web.

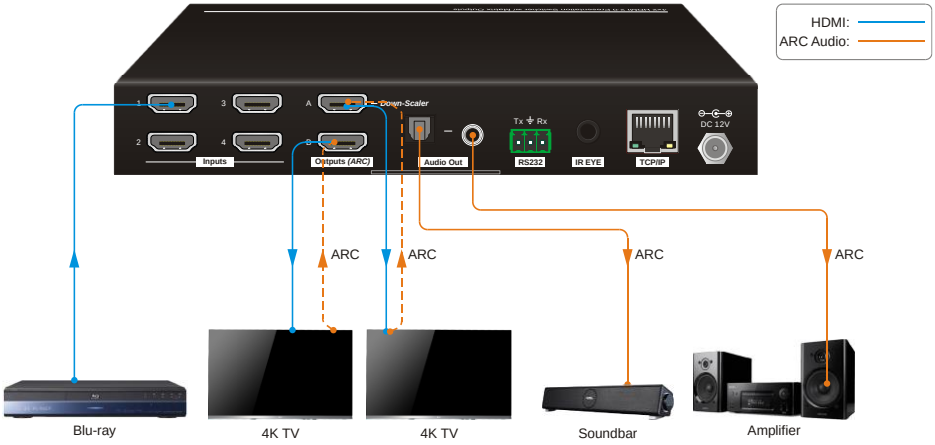
⑦ **DC 12V:** DC connector for the power adapter connection.

4. System Connection

The following diagram illustrates the typical input and output connection of the switcher:



ARC Connection:



5. Button Control

5.1 Manual Switching

When the switcher is in manual switching mode, the **AUTO** button LED goes out. Please follow the below steps to switch input source to output channel.

1) Press **Select** button at **Out A** block to select input source for output A, and the corresponding source LED turns green.
2) Press **Select** button at **Out B** block to select input source for output B, and the corresponding source LED turns green.

5.2 Auto Switching

Press and hold **Select** button at least 3 seconds at **Out A** block to enable auto switching mode for output A, and then the **Auto** LED will turns green.

Press and hold **Select** button at least 3 seconds at **Out B** block to enable auto switching mode for output B, and then the **Auto** LED will turns green.

When in auto switching mode, the switcher will switch according to the following rules:

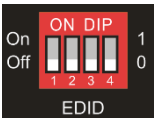
- *The switcher will switch to the first available active input starting at input 1 to 4.*
- *New input: The switcher will automatically select the new input once detecting a new input.*
- *Reboot: If power is restored to the switcher, it will automatically reconnect the input before powered off.*
- *Source removed: When an active source is removed, the switcher will switch to the first available active input starting at HDMI input 1.*
- *Detection method: TMDS or 5V (The default is 5V and it can be selected by RS232 commands).*
- *Press the **Select** button can switch to next input source, and the switcher doesn't exit the auto switching mode.*

***Note:** In auto switching mode, press and hold the **Select** button at least 3 seconds to enable manual switching mode, but the input source will not be switched.*

5.3 EDID Setting

The Extended Display Identification Data (EDID) is used by the source device to match its video resolution with the connected display. The 4-pin DIP switch on the front panel can be used to set the EDID to a fixed value to ensure the compatibility in the video resolution.

The switch represents "**0**" when in the lower (**OFF**) position, and it represents "**1**" while putting the switch in the upper (**ON**) position.



Switch 1~3 are used for built-in EDID setting, and switch 4 is used for mode setting.

The DIP switch status and its corresponding setting are shown as below chart.

Switch 1~3 Status	Video Resolution	Audio Format
000	Pass-through	Pass-through
001	1920x1080@60Hz 8bit	Stereo
010	3840x2160@30Hz 8bit	Stereo
011	3840x2160@30Hz 8bit HDR	Stereo
100	3840x2160@30Hz Deep Color HDR	PCM 5.1
101	3840x2160@60Hz 8bit	Stereo
110	3840x2160@60Hz Deep Color HDR	PCM 5.1
111	User-defined EDID	
Switch 4 Status	**Mode**	
0	Global Mode.	
1	Out B Private Mode.	

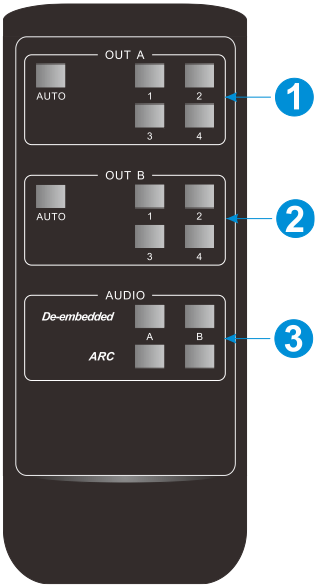
EDID setting rules:

When switching one input to output A and output B, the switcher is used as a 1x2 splitter, the input source device obtains its EDID from the output display with priority output B>output A. If video switching fails in EDID pass-through mode, set the built-in EDID to 1080p.

1) When the specifications of output A and output B display devices are same, set the EDID to **Global Mode**. When switch same input to output A and output B, because the supported resolution (4K@60Hz 4:4:4) of two outputs are same, the input source device will not reread the EDID of display device to ensure non-flash screen.
2) When the specifications of output A and output B display devices are different, set the EDID to **Out B Private Mode**, and the Out A is in **Pass-through** mode.
   - ✓ When switching the input source of output A to output B, because the input source device will first learn the EDID from output B, so the two output displays will flash before the image appears.
   - ✓ When switching the input source of output B to the output A, because the input source device will first learn the EDID from output B, so the display device of output B doesn't flash, but the display device of output A will flash before the image appears.

6. IR Remote Control

Connect IR receiver to the **IR EYE** port, the switcher can be controlled by the following IR remote.



① **1-4:** Press 1-4 button to select corresponding input source for OUT A.

AUTO: Press the button to enable auto switching mode for OUT A.

② **1-4:** Press 1-4 button to select corresponding input source for OUT B.

AUTO: Press the button to enable auto switching mode for OUT B.

③ **De-embedded:** Press A or B button to select output A or output B de-embedded audio for audio output.

ARC: Press A or B button to select output A or output B ARC audio for audio output.

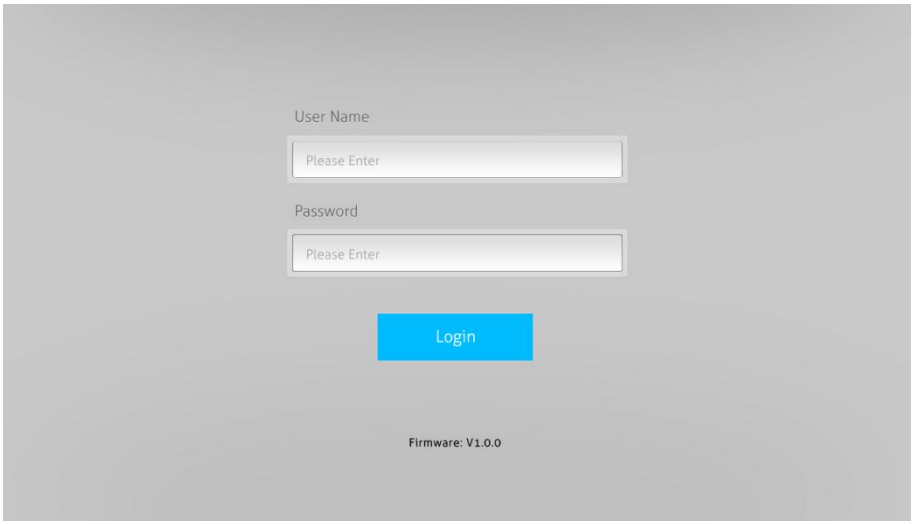
7. Web Control

The switcher can be controlled via TCP/IP. The default IP settings are:

IP Address: 192.168.0.178

Subnet Mask: 255.255.255.0

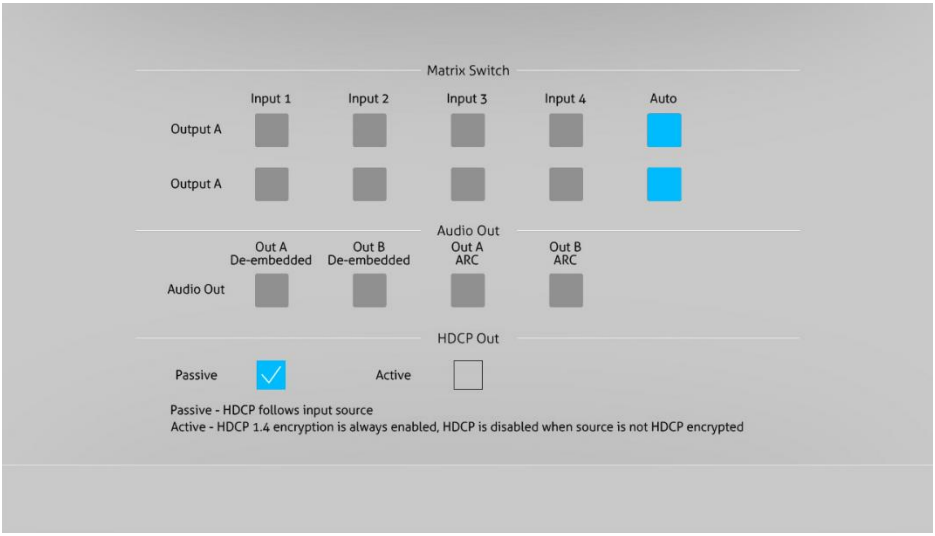
Type ***192.168.0.178*** in the internet browser, it will enter the below log-in webpage:



Username: admin

Password: admin

Type the user name and password, and then click **Login** to enter the below control tab.



- **Matrix Switch:** Select **Input 1~4** for output A or output B to build matrix switching. Select **AUTO** to enable auto switching mode for output A or output B.
- **Audio Out:** Select **output A de-embedded audio**, **output B de-embedded audio**, **output A ARC audio** or **output B ARC audio** for Toslink and 3.5mm jack audio outputs.
- **HDCP Out:** Select **Passive** or **Active** mode.

8. RS232 Control

Connect the RS232 port to control device (e.g. PC) with RS232 cable. The switcher can be controlled by sending RS232 commands.

RS232 Commands:

The command lists are used to control the switcher. The RS232 control software (e.g. docklight) needs to be installed on the control PC to send RS232 commands.

Communication protocol: RS232 Communication Protocol
Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Note:

- *All commands needs to be ended with "<CR><LF>".*
- *In the commands, "["and "]" are symbols for easy reading and do not need to be typed in actual operation.*
- *Type the command carefully, it is case-sensitive.*

8.1 System Control Commands

Command	Description	Command Example and Feedback
>SetPowerOn Dis	System standby.	<PowerOn False
>SetPowerOn En	System on.	<PowerOn True
>GetPowerOn	Get the system power status.	<PowerOn True
		<PowerOn False
>GetFirmwareVersion	Get firmware version.	<V1.0.0
>SetFactoryReset	Reset to factory default.	<FactoryReset_True
>SetReboot	System reboot.	<Reboot_True
>GetStatus	Get device status.	
>SetIpAddr XXX.XXX.XXX.XXX	Set static IP address to XXX.XXX.XXX.XXX	<IpAddr 192.168.0.178
>GetIpAddr	Get IP address.	<IpAddr 192.168.0.178

<table>
<tr><th>Command</th><th>Description</th><th>Command Example and Feedback</th></tr>
<tr><td rowspan="2">>SetRS232Baudrate [PARAM]</td><td rowspan="2">Set the baud rate of switcher to [PARAM].
[PARAM]=1~7.
<table><tr><th>[PARAM]</th><th>Baud Rate</th></tr><tr><td>1</td><td>115200</td></tr><tr><td>2</td><td>57600</td></tr><tr><td>3</td><td>38400</td></tr><tr><td>4</td><td>19200</td></tr><tr><td>5</td><td>9600</td></tr><tr><td>6</td><td>4800</td></tr><tr><td>6</td><td>2400</td></tr></table></td><td>>SetRS232Baudrate 5</td></tr>
<tr><td><RS232Baudrate 9600</td></tr>
<tr><td>>GetRS233Baudrate</td><td>Get the baud rate of switcher.</td><td><RS232Baudrate 2400</td></tr>
<tr><td rowspan="2">>SetKeyboardLock [PARAM]</td><td rowspan="2">Unlock/lock front panel buttons and IR remote buttons.
[PARAM]=Dis, En
Dis: Unlock; En: Lock</td><td>>SetKeyboardLock Dis</td></tr>
<tr><td><KeyboardLock False</td></tr>
<tr><td>>GetKeyboardLock</td><td>Get the buttons locking status.</td><td><KeyboardLock True</td></tr>
<tr><td rowspan="2">>SetDhcp [PARAM]</td><td rowspan="2">Enable or disable DHCP.
[PARAM]=En, Dis
En: Enable DHCP, the switcher automatically get IP.
Dis: Disable DHCP, Manually set the IP of switcher.
After reset the switcher, the DHCP is enabled, and the switcher will automatically get IP again.</td><td>>SetDhcp En</td></tr>
<tr><td><Dhcp True</td></tr>
<tr><td>>GetDhcp</td><td>Get DHCP status.</td><td><Dhcp True</td></tr>
<tr><td>>SetSubnetMask XXX.XXX.XXX.XXX</td><td>Set subnet mask to XXX.XXX.XXX.XXX.</td><td><SubnetMask 255.255.255.0</td></tr>
<tr><td>>GetSubnetMask</td><td>Get subnet mask.</td><td><SubnetMask 255.255.255.0</td></tr>
<tr><td>>SetGateWay XXX.XXX.XXX.XXX</td><td>Set gateway to XXX.XXX.XXX.XXX.</td><td><GateWay 192.168.0.1</td></tr>
<tr><td>>GetGateWay</td><td>Get gateway.</td><td><GateWay 192.168.0.1</td></tr>
</table>

Command	Description	Command Example and Feedback
>SetMacAddr XX:XX:XX:XX:XX:XX	Set the MAC address to XX:XX:XX:XX:XX:XX.	<MacAddr 1A:23:34:45:56:67
>GetMacAddr	Get the MAC address.	<MacAddr 1A:23:34:45:56:67

8.2 Signal Switching Commands

Command	Description	Command Example and Feedback
>SetAV [PARAM1] [PARAM2]	Switch HDMI input [PARAM2] to output [PARAM1]. [PARAM1]=A, B [PARAM2] = H1, H2, H3, H4	>SetAV B H1 <AV OutB H1
>GetAV	Get the input channel on output channel one by one.	<AV OutA H1 <AV OutB H1
>SetAutoSwitch [PARAM1] [PARAM2]	Enable/disable the auto switching mode for the output A or output B. [PARAM1] = A,B [PARAM2]= En, Dis En: Enable auto switching mode. Dis: Disable auto switching mode.	>SetAutoSwitch B En <AutoSwitch OutB True
>GetAutoSwitch	Get the auto switching mode of output A and output B.	<AutoSwitch OutA False <AutoSwitch OutB True
>SetSignalDet [PARAM]	Set the signal auto detection method to [PARAM]. [PARAM]= 5V, TMDS. The default detection method is 5V.	>SetSignalDet 5V <SignalDetMode 5V
>GetSignalDet	Get the signal auto detection method.	<SignalDetMode 5V
>SetDownScaler [PARAM]	Enable/disable down-scaling function of output A. [PARAM]=En, Dis En: Enable down-scaling function. Dis: Disable down-scaling function.	>SetDownScaler En <Downscale True
>GetDownScaler	Get the down-scaling function of output A.	<Downscale True
>SetHdcpOutput	Set HDCP output mode.	>SetHdcpOutput Passive

[PARAM]	[PARAM]= Passive, Active Passive: The HDCP version of output follows the HDCP of input source. Active: The HDCP version of output is up to 1.4	<HdcpOutput Passive
>GetHdcpOutput	Get HDCP output mode.	<HdcpHdmiOutput Passive

8.3 EDID Setting Commands

Command	Description	Command Example and Feedback
>SetUpdateEdid	Upload user-defined EDID. The EDID DIP switch should be set as “1111”.	<User EDID ready Please send EDID data within 10 seconds ... <UpdateEdid True

8.4 Audio Setting Commands

Command	Description	Command Example and Feedback
>SetAudioSrc [PARAM]	Set the audio source of analog audio and SPDIF audio. [PARAM]= 1, 2, 3, 4 1: OUTA de-embedded 2: OUTB de-embedded 3: OUTA ARC 4: OUTB ARC	>SetAudioSrc 1 <AudioSrc OutA De-embedded
>SetSpdif [PARAM]	Mute/unmute the SPDIF audio output. [PARAM]=Mute, UnMute.	>SetSpdif Mute <Spdif Mute
>SetIis [PARAM]	Mute/unmute the analog audio output (3.5mm jack). [PARAM]=Mute, UnMute.	>SetIis UnMute <Iis UnMute
>GetAudioSta	Get audio status.	<AudioSrc OutA De-embedded <Iis UnMute <Spdif Mute

9. Firmware Upgrade

Please follow the steps below to upgrade the firmware by the **FW** port on the front panel:

1) Prepare the latest upgrade file (.bin) and rename it as “FW_MERG.bin”.
2) Connect the switcher to the PC with USB to Micro USB cable, and then power on the switcher. The PC will automatically detect a U-disk named of “BOOTDISK”.
3) Double-click the U-disk, a file named of “READY.TXT” would be showed.
4) Directly copy the latest upgrade file (.bin) to the “BOOTDISK” U-disk.
5) Reopen the U-disk to check the filename “READY.TXT” whether automatically becomes “SUCCESS.TXT”, if yes, the firmware was updated successfully, otherwise, the firmware updating is fail, the name of upgrade file (.bin) should be confirm again, and then follow the above steps to update again.
6) Remove the USB to Micro USB cable after firmware upgrade, and reboot the switcher.