User Manual

avgear

USER MANUAL

AVG-UDA24-HD70

HDMI V2.0 2x4 Switcher over CAT

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The AVG-UDA24-HD70 supports switching between two video signal and long distribution range up to 4K 70m via CATx, with HDMI loop out for cascading. It supports video resolutions up to 4K@60Hz 4:4:4 8bit and all HDMI audio formats, and down-scaling from 4K to 1080P. Also supports Audio de-embedding, and PoC to power the receiver.

- Supports HDMI V2.0, video resolutions up to 4K@60Hz 4:4:4.
- Transmission distance up to 70m for 4K and 80m for 1080p
- Distributes one of two UHD/4K HDMI inputs to four CATx outputs and one HDMI loop output.
- Comprehensive EDID management
- Video auto-switching based on 5V or TMDS detection.
- SPDIF and L/R audio outputs for audio de-embedding.
- Bi-directional IR pass-through and IR cascade control.
- Controllable via front panel button, IR and RS232.
- 12V PoC to power the receiver.

PLEASE READ THIS PRODUCT MANUAL CAREFULLY BEFORE USING THIS PRODUCT.

This manual is for operational use only, and not to be used for maintenance. The functions described in this version are current as at June 2020. Any changes of functions and operational parameters will be updated in future manual versions. Please refer to your dealer for the latest product details.

Version 1.0 12/01/21

SAFETY OPERATION GUIDE

In order to guarantee the reliable operation of the equipment and safety of the user, please abide by the following procedures in installation, use and maintenance:

1. The system must be earthed properly. Please do not use two blade plugs and ensure the AC power supply ranges from 100v to 240v and from 50Hz to 60Hz.
2. Do not install the switcher in an environment where it will be exposed to extreme hot or cold temperatures.
3. This unit will generate heat during operation, please ensure that you allow adequate ventilation to ensure reliable operation.
4. Please disconnect the unit from mains power if it will be left unused for a long time.
5. Please DO NOT try to open the casing of the equipment, DO NOT attempt to repair the unit. Opening the unit will void the warranty. There are high voltage components in the unit and attempting to repair the unit could result in serious injury.
6. Do not allow the unit to come into contact with any liquid as that could result in personal injury and product failure.

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1. Product Introduction

Thanks for choosing this 2x4 HDMI Switcher Kit over CATx cable. This device distributes either one of two HDMI inputs to one HDMI and four CATx outputs. It is designed with an IR loop out to cascade to more units. It supports video resolutions up to 4K@60Hz 4:4:4 8bit and all HDMI audio formats, and transmits 4K signal to distances up to 70m and 1080p signal to distances up to 80 meters over a single CATx Ethernet cable. The 12V PoC feature allows the receivers to be powered from the Switcher over the Ethernet cables. The unit supports automatic video resolution down-scaling, bi-directional IR pass-through, IR cascading and RS232 control.

1.1 Features

- Supports HDMI V2.0, video resolutions up to 4K@60Hz 4:4:4.
- Distributes one of two UHD/4K HDMI inputs to four CATx outputs and one HDMI loop output.
- Supports cascade connection, distributing video signal to multiple video displays.
- Transmit a 4K signal up to 70m and a 1080P signal up to 80m.
- Comprehensive EDID management, lowest/highest/default resolution can be chosen on the front panel for various applications.
- Supports video resolution down-scaling, the 4K input can be automatically degraded to 1080p output on receiver for compatibility with legacy 1080p display device.
- Video auto-switching based on 5V or TMDS detection.
- SPDIF and L/R audio outputs for audio de-embedding.
- Bi-directional IR pass-through and IR cascade control.
- Controllable via front panel button, IR and RS232.
- Supports 12V PoC, the receiver can be powered by the Switcher.

1.2 What's in the Box

Switcher	• 1x AVG-UDA24T-HD702x4 HDMI Switcher over CATx • 4x Plastic Cushions • 1x RS232 Cable (3-pin to DB9) • 1x IR Cable (3.5mm to 3.5mm, used for IR cascade) • 4x IR Receivers • 1x IR Emitter • 1x Power Adaptor (12V DC 2A)
Receivers	• 4x NPG-EX60R-H2 Receivers • 4x Velcro Strips
	• 1x User Manual

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

2. Technical Specification

2.1 Switcher

Video Input	
Input	(1) HDMI
Input Connector	(1) Female type A HDMI
HDMI Input Resolution	Up to 4K@60Hz 4:4:4 8bit
Video Output	
Output	(1) HDMI, (4) CAT
Output Connector	(1) Female type A HDMI; (4) RJ45
HDMI Output Resolution	Up to 4K@60Hz 4:4:4
CAT Output Resolution	Up to 4K@60Hz 4:4:4 (Signal has been compressed.)
SPDIF Audio Output	
Audio Output	(1) SPDIF
Audio Output Connector	(1) Toslink
Audio Format	LPCM 2ch, Dolby Digital 2ch, 5.1ch, 7.1ch, Dolby Ture HD 7.1ch, DTS 2ch, 5.1ch
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	-90dB
Stereo Balanced L/R Audio Output	
Audio Output	(1) Stereo balanced L/R audio
Audio Output Connector	(1) 5-pin terminal block
Audio Format	PCM
Frequency Response	20Hz ~20kHz, ±1dB
Max output level	2.0Vrms ± 0.5dB.
THD+N	< 0.05%, 20Hz ~20kHz bandwidth, 1kHz sine at 0dBFS level (or max level)
SNR	> 80dB, 20Hz ~20kHz bandwidth
Crosstalk Isolation	> 70 dB, 10kHz sine at 0dBFS level (or max level before clipping)
L-R Level Deviation	< 0.3 dB, 1kHz sine at 0dBFS level (or max level before clipping)
Output Load Capability	1kohm and higher (supports 10x paralleled 10kohm loads)
Noise	- 80dB

Control	
Control port	(1) EDID, (1) FIRMWARE, (1) IR ALL IN, (4) IR IN, (1) IR LOOP OUT, (1) IR OUT, (1) RS232 IN
Control Connector	(1) 3-pin DIP switch, (1) USB-A, (7) 3.5mm mini jacks, (1) 3-pin terminal block
General	
HDMI Standard	2.0
HDCP Version	2.2
PoC	12V PoC power for the receiver
Transmission Distance	4K≤ 70 meters (230ft), 4K/1080p ≤ 70 meters (230ft)
Operation Temperature	-10 ~ +55℃
Storage Temperature	-25~ +70℃
Relative Humidity	10% ~ 90%
AC Adapter Input Power	100V~240V AC, 50/60Hz
Input Power	12V DC 2A
Power Consumption	14.5W (Max)
Dimension (W*H*D)	200mm x 44mm x 130mm
Net Weight	855g

Note: *SPDIF audio output does not support DTS-HD Master Audio and Dolby TrueHD format.*

2.2 Receiver

Video	
Input	(1) CAT
Input Connector	(1) RJ45
Input Resolution	Up to 4K@60Hz 4:2:0
Output	(1) HDMI
Output Connector	(1) Type-A female HDMI
Output Resolution	Up to 4K@60Hz 4:4:4 8bit HDR10
Control	
Control Part	(1) IR In, (1) IR Out
Control Connector	(2) 3.5mm jacks
General	
Bandwidth	18Gbps
HDMI Standard	2.0
HDCP Version	2.2, 1.4 compliant

Bidirectional PoC	Supported
HDMI 2.0 Cable Length	4K@60Hz 4:4:4 ≤ 5m, 4K@60Hz 4:2:0 ≤ 10m, 1080p ≤ 15m
Transmission Distance	4K ≤ 70 meters (230ft), 1080p ≤262 feet (80 meters)
Operation Temperature	-5~ +55℃
Storage Temperature	-25 ~ +70℃
Relative Humidity	10%-90%
Power Supply	Input:100V~240V AC; Output:12V DC 1A
Power Consumption	4W (Max)
Dimension (W*H*D)	80mm x 16.8mm x 80mm
Net Weight	70g

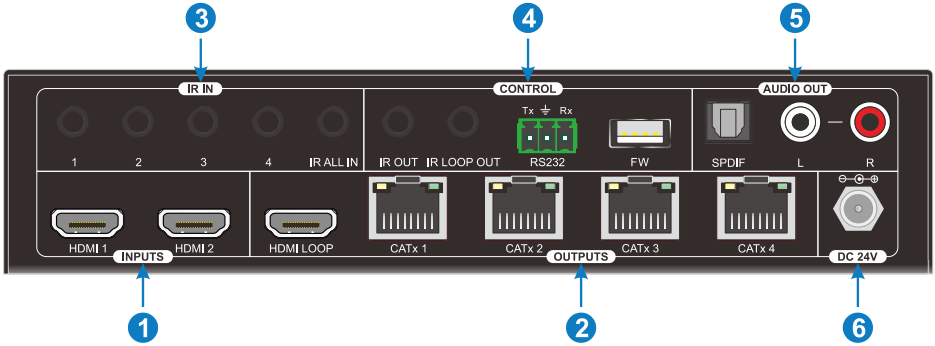
Note: *Please use quality CAT Ethernet cable compliant with CAT5e or higher standard for reliable transmission.*

3. Panel Description

3.1 Switcher Front Panel

1. **POWER LED:**
   - Illuminates green when power is applied.
   - Blinks when the device is in standby mode.
   - Off when power is off.
2. **INPUT LED:**
   - Illuminates green when switches to current input and there is HDMI source input.
   - Blinks when switches to current input but there is no HDMI source.
3. **SELECT Button:**
   - Press to switch to next input source.
   - Press and hold at least three seconds to switch between manual switching mode and automatic switching mode. Please refer to the chapter ***7.RS232 Control*** for more details
4. **EDID:** 3-pin DIP Switch for the Extended Display Identification Data (EDID) value setting. Please refer to the ***8.EDID Management*** for more details.

3.2 Switcher Rear Panel



1. **HDMI INPUT:** Connects to HDMI source device.
2. **OUTPUTS:**
   - HDMI: Type-A female HDMI port to connect local HDMI display device.
   - CATx 1~4: RJ45 port to connect the CATx IN port of receiver by CATx cable. It supports 12V PoC to power the receiver. The orange LED illuminates when there is a valid HDMI signal input. The green LED illuminates when power is applied.
3. **IR IN:** 3.5mm mini jack to connect IR receiver for IR pass-through. IR ALL IN can be connected to IR LOOP OUT of previous Switcher.
4. **CONTROL:**
   - IR OUT: 3.5mm mini jack to connect IR emitter for IR pass-through.
   - IR LOOP OUT: Connects to IR ALL IN port of next Switcher.
   - RS232: Connects to control device (e.g. PC) to control the Switcher or far-end third-party devices by RS232.
5. **AUDIO OUT:**
   - Toslink audio output for audio de-embedding from HDMI output.
   - L/R audio output for audio de-embedding from HDMI output.
6. **DC 12V:** DC connector for the power adapter connection.

3.3 Receiver Panel

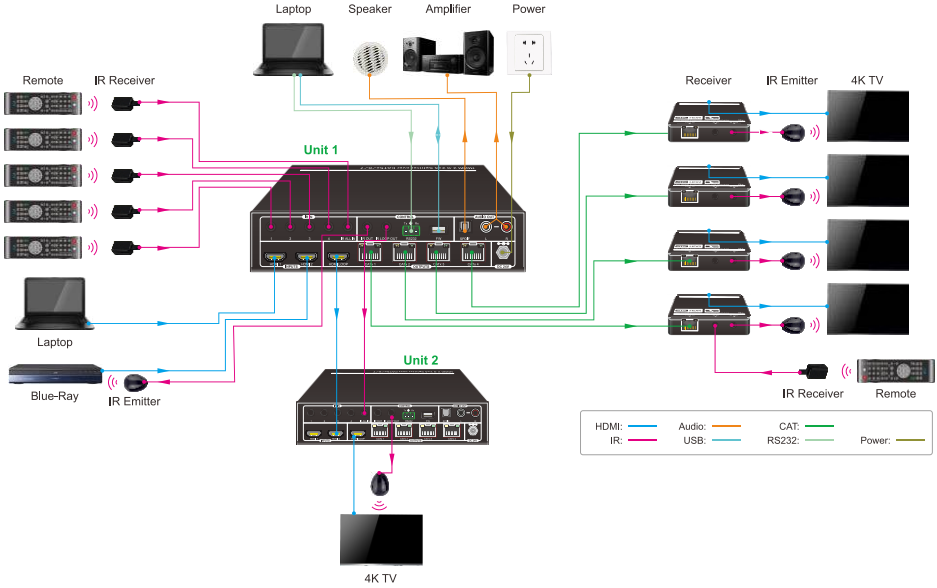
1. **DISPLAY:** Type-A female HDMI port to connect HDMI display device.
2. **CATx IN:** RJ45 port to connect the CATx OUT port of transmitter by CATx cable. It supports 12V PoC and the receiver can be powered from the transmitter. The orange LED illuminates when there is a valid HDMI signal input. The green LED illuminates when power is applied.
3. **IR IN:** 3.5mm mini jack to connect IR receiver for IR pass-through.
4. **IR OUT:** 3.5mm mini jack to connect IR emitter for IR pass-through.

4. System Connection

4.1 Usage Precautions

- Make sure all components and accessories included before installation.
- System should be installed in a clean environment with proper temperature and humidity.
- All of the power switches, plugs, sockets, and power cords should be insulated and safe.
- All devices should be connected before powering on.

4.2 System Diagram



5. Source Switching

1) Press the **SELECT** button to switch to next source device, and then the corresponding input LED will turn green.

2) Press and hold the **SELECT** button at least 3 seconds to enable auto switching mode, and it abides by the following principles:

- *The switcher will switch to the first available active input starting at HDMI IN 1> HDMI IN 2.*
- *New input: Once a new input signal detected, the switcher will automatically switch to this new signal.*
- *Source removed: When an active source is removed, the switcher will switch to the first available active input starting at HDMI IN 1.*
- *Reboot: The switcher can save the last configuration before losing power. If the last switching mode is auto switching, the switcher will automatically enter ino auto switching mode once rebooted, then detect all inputs and memorize their connection status for future rebooting using. If the last selected input source is still available, the switcher will switch to this input. Otherwise, it will switch to the first available active input source starting at HDMI IN 1.*
- *Exit auto switching mode: Press and hold the **SELECT** button for 3 seconds again to exit the auto mode, and the input source will not be changed.*

6. Video Resolution Down-scaling

The product supports video resolution down-scaling on 4 CAT outputs, the 4K input can be automatically degraded to 1080p output for compatibility with 1080p display, shown in the below chart.

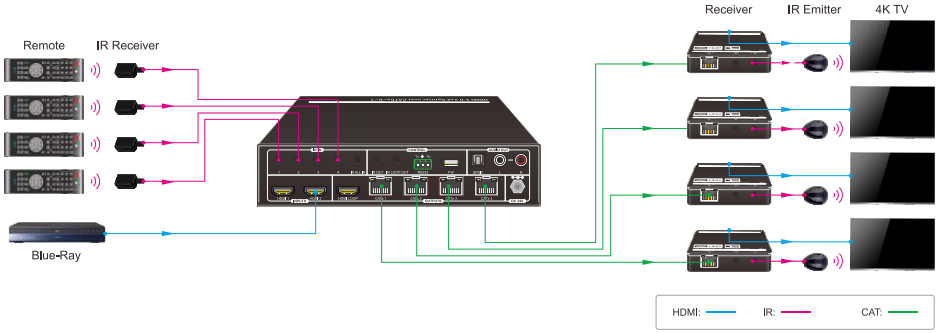
	Input			Output	
#	Resolution	Refresh	Color Space	Downscale	1080p Specs
1	3840x2160	60	4:4:4	Support	1080p@60Hz 4:4:4
2	3840x2160	30	4:4:4	Support	1080p@30Hz 4:4:4
3	3840x2160	24	4:4:4	Support	1080p@24Hz 4:4:4
4	3840x2160	60	4:2:0	Support	1080p@60Hz 4:4:4
5	3840x2160	50	4:2:0	Support	1080p@50Hz 4:4:4
6	3840x2160	60	4:2:2	Support	1080p@60Hz 4:4:4
7	3840x2160	50	4:2:2	Support	1080p@50Hz 4:4:4
8	3840x2160	30	4:2:2	Support	1080p@30Hz 4:4:4
9	3840x2160	24	4:2:2	Support	1080p@24Hz 4:4:4

7. IR Control

The IR receivers and emitters can be connected to the system to allow IR control of remote devices. The bi-directional IR feature provides two-way control, either for the source or display device(s). Below sample connection diagram is provided as reference.

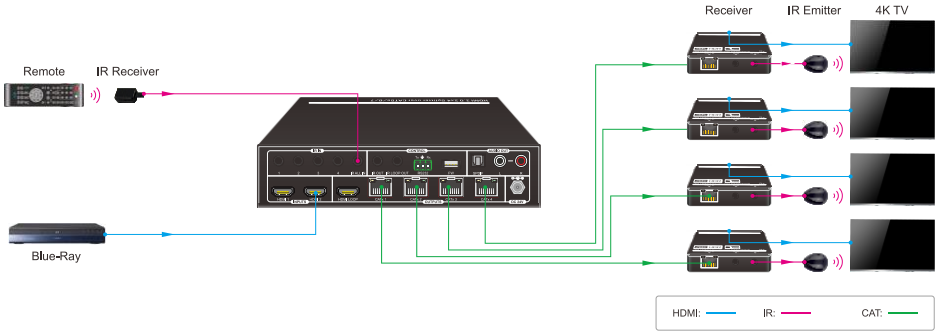
7.1 Controlling the Display Device by IR IN

The four **IR IN** ports of the Switcher can receive IR signals from the remote to control displays. Connecting four IR receiver to **IR IN** ports of the Switcher, and then connecting four IR emitters to **IR OUT** ports on receivers.



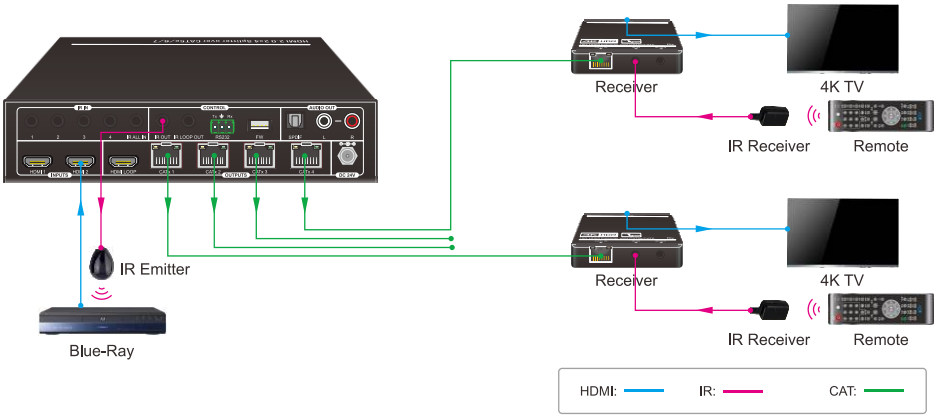
7.2 Controlling the Display Device by IR ALL IN

The **IR ALL IN** port of the Switcher can receive all IR signals from the remote to control displays. Connecting an IR receiver to **IR ALL IN** port of the Switcher, and then connect four IR emitters to **IR OUT** port on receivers.



7.3 Controlling the Source Device

The **IR OUT** port of the Switcher can send all IR signals to control source device. Connect four IR receivers to **IR IN** ports on receivers, and then connect an IR emitter to **IR OUT** port of the Switcher.



8. RS232 Control

The Switcher and compatible receivers features RS232 ports to transmit RS232 signals from computer to control far-end third-party devices by using 3-pin to DB9 cable and a RS232 control software, such as **docklight**. After installing the RS232 control software, please set the parameters of COM number, bound rate, data bit, stop bit and the parity bit correctly. Compatible receivers must be able to communicate at 9600, 19200, 38400, 57600, or 115200 baud. The Switcher requires the following communication protocol parameters:

Baud rate: 9600 (default)

Data bit: 8

Stop bit: 1

Parity bit: none

Note:

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

8.1 System Commands

Command	Function	Command Example and Feedback
>SetDeviceModel:XXXX	Set the product's name.	>SetDeviceModel: NPG-DA24T
		<Model:NPG-DA24T
>GetDeviceModel	Get the product's name.	<Model:NPG-DA24T
>SetDeviceModelRst	Reboot the device	>SetDeviceModelRst
		<DeviceModelRst

8.2 Signal Switching Commands

Command	Function	Command Example and Feedback
>SetVideo [Param]	Switch input source to all outputs. param = 01, 02 01 – HDMI input1	>SetVideo 01
		<Video 01

Command	Function	Command Example and Feedback
	02 – HDMI input2.	
>GetVideo	Get the current input source.	>GetVideo
		<Video 01
>SetAutoSwitch [Param]	Enable or Disable auto switching. Param = On, Off On – Enable Off - Disable	>SetAutoSwitch On
		<AutoSwitch On
>GetAutoSwitch	Get the auto switching status.	>GetAutoSwitch
>SetSignalDetect [Param]	Set signal detection mode. param = 5V, TMDS	>SetSignalDetect 5V
		<SignalDetectMode 5V
>GetSignalDetect	Get signal detection mode.	>GetSignalDetect
		<SignalDetectMode 5V
>SetSystemStandbyMode [Param]	Enable or disable standby mode. param= On, Off	>SetSystemStandbyMode On
		<SystemStandbyMode On
>GetSystemStandbyMode	Get the status of standby mode.	>GetSystemStandbyMode
		<SystemStandbyMode On
>SetSystemStandbyMode Time: [Param]	Set the delay time to send standby commands after input signal removed. param = 1 ~ 10 min	>SetSystemStandbyModeTime: 10
		<SystemStandbyModeTime: 10min
>GetSystemStandbyMode Time	Set the delay time to send standby commands after input signal removed.	>GetSystemStandbyModeTime
		<SystemStandbyModeTime: 10min
>SetSystemPowerMode [Param]	Set system on or standby mode. param= On, Off	>SetSystemPowerMode On
		<SystemPowerMode On
>GetSystemPowerMode	Get the system power status.	>GetSystemPowerMode
		<SystemPowerMode On

Command	Function	Command Example and Feedback
>SetRS232Baud [Param]	Set the baud rate of Switcher. param = 115200 57600 38400 19200 9600	>SetRS232Baud 115200 <SetRS232Baud 115200
>GetRS232Baud	Get the baud rate of Switcher.	<GetRS232Baud

8.3 CEC Commands

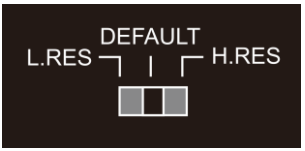
>SetCecSrcMenu [Param]	Send CEC MENU command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcMenu 01 <CecSrcMenu 01
>SetCecSrcUp [Param]	Send CEC UP command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcUp 01 <CecSrcMenu 01
>SetCecSrcDown [Param]	Send CEC DOWN command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcDown 01 <CecSrcDown 01
>SetCecSrcLeft [Param]	Send CEC LEFT command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcLeft 01 <CecSrcLeft 01
>SetCecSrcRight [Param]	Send CEC RIGHT command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcRight 01 <CecSrcRight 01
>SetCecSrcBack [Param]	Send CEC BACK command to source device. Param = 01, 02	>SetCecSrcBack 01 <CecSrcBack 01

	01 – HDMI1 02 – HDMI2	
>SetCecSrcEnter [Param]	Send CEC ENTER command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcEnter 01 <CecSrcEnter 01
>SetCecSrcOn [Param]	Send CEC ON command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcOn 01 <CecSrcOn 01
>SetCecSrcOff [Param]	Send CEC OFF command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcOff 01 <CecSrcOff 01
>SetCecSrcStop [Param]	Send CEC STOP command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcStop 01 <CecSrcStop 01
>SetCecSrcPlay [Param]	Send CEC PLAY command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcPlay 01 <CecSrcPlay 01
>SetCecSrcPause [Param]	Send CEC PAUSE command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcPause 01 <CecSrcPause 01 <CecDisplayOff

>SetCecSrcPrev [Param]	Send CEC PREV command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcPrev 01 <CecSrcPrev 01
>SetCecSrcNext [Param]	Send CEC NEXT command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcNext 01 <CecSrcNext 01
>SetCecSrcRewind [Param]	Send CEC REWIND command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcRewind 01 <CecSrcRewind 01
>SetCecSrcFastForward [Param]	Send CEC Fast-forward command to source device. Param = 01, 02 01 – HDMI1 02 – HDMI2	>SetCecSrcFastForward 01 <CecSrcFastForward 01
>SetCecDisplayOn [Param]	Send CEC ON command to display devices.	>SetCecDisplayOn <CecDisplayOn
>SetCecDisplayOff [Param]	Send CEC OFF command to display devices.	>SetCecDisplayOff

9. EDID Management

The Extended Display Identification Data (EDID) is used by the source device to match its video resolution with the connected display. By default, the source device obtains its EDID from the first connected display. Meanwhile, since the displays with different capabilities are connected to the Switcher, the 3-pin DIP switch on the front panel can be used to set the EDID to a fixed value to ensure the compatibility in video resolution.



Switch Status	Description
L.RES	The Switcher reads all EDID information from all connected displays, and choose the one with lowest resolution passing to the source.
DEFAULT	3840x2160@60Hz Deep Color Stereo Audio
H.RES	The Switcher reads all EDID information from all connected displays, and choose the one with highest resolution passing to the source.

10. Firmware Upgrade

Please follow the below steps to upgrade firmware by the USB-A port:

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