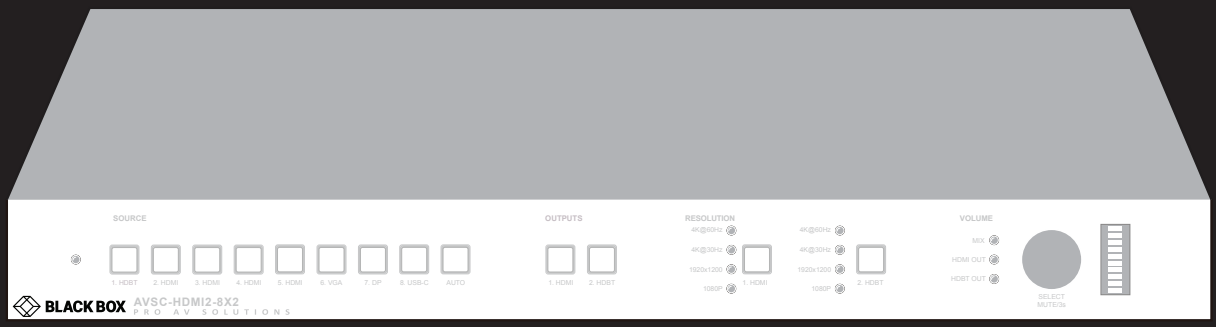
USER MANUAL

AVSC-HDMI2-8X2

VIDEO MATRIX SWITCHER 8X2 HDMI 2.0

24/7 TECHNICAL SUPPORT AT 1.877.877.2269 OR VISIT BLACKBOX.COM



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SAFETY PRECAUTIONS

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

- Unpack the equipment carefully and save the original box and packing material for possible future shipment.
- Follow basic safety precautions to reduce the risk of fire, electrical shock, and injury to persons.
- Do not dismantle the housing or modify the product. This may cauase electrical shock or burn.
- Using supplies or parts not meeting the product's specifications may cause damage, deterioration, or malfunction.
- Refer all servicing to qualified service personnel.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture, or install this product near water.
- Do not put any heavy items on the extension cable in case of extrusion.
- Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.
- Install the device in a location with proper ventilation to avoid damage caused by overheating.
- 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 the housing, unplug the unit immediately.
- Do not twist or pull by force the ends of the cable. It can cause malfunction.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- Unplug the power cord when left unused for a long period of time.
- Information on disposal for scrapped devices: do not burn or mix with general household waste. Treat the product as normal electrical waste.

CHAPTER 1: SPECIFICATIONS

TABLE 1-1. SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Video Input	
Video Input Signal	(1) HDBaseT, (4) HDMI, (1) DisplayPort, (1) VGA, (1) USB-C
Video Input Connector	(1) RJ-45, (4) HDMI Type A female, (1) DisplayPort Type A female, (1) 15-pin VGA female, (1) USB 3.0 Type C
Input Video Resolution	HDBaseT: Up to 4K x 2K @ 60 Hz 4:4:4; HDMI: Up to 4K x 2K @ 60 Hz 4:4:4; DP: Up to 4K x 2K @ 60 Hz 4:4:4; VGA: Up to 1920 x 1200 (50/60 Hz); USB-C: Up to 4K x 2K @ 30 Hz
Video Output	
Video Output	(2) HDMI, (1) HDBaseT
Video Output Connector	(2) HDMI Type A female, (1) RJ-45
Output Video Resolution	HDMI: Up to 4K x 2K @ 60 Hz 4:4:4; HDBaseT: Up to 4K x 2K @ 60 Hz 4:4:4;
HDMI Version	2.0
HDCP Version	2.2
Audio Input	
Audio Input Signal	(1) External balanced audio (L+R) for 1-HDBT input port; (1) External balanced audio (L+R) for 2-HDMI input port; (1) External balanced audio (L+R) for 3-HDMI input port; (1) Stereo auxiliary audio for 6-VGA input port; (1) Balanced MIX audio
Audio Input Connector	(4) 5-pin terminal blocks, (1) 3.5-mm jack
Frequency Response	20 Hz – 20 kHz, ± 3 dB
Max. Input Level	2.0 Vrms ± 0.5 dB. 2V = 16 dB headroom above - 10 dBV (316 mV) nominal consumer line level signal
Input Impedance	> 10 kOhms
Audio Output	
Audio Output Signal	(1) Balanced audio (L+R) for 1-HDMI output audio de-embedding; (1) Digital SPDIF audio (L+R) for 1-HDMI output audio de-embedding; (1) Balanced audio (L+R) for 2-HDBT output audio de-embedding; (1) Digital SPDIF audio (L+R) for 2-HDBT output audio de-embedding
Audio Output Connector	(2) 5-pin terminal blocks, (2) Toslink connectors
Frequency Response	20 Hz – 20 kHz, ± 3 dB
Max. Output Level	2.0 Vrms ± 0.5 dB. 2V = 16 dB headroom above - 10 dBV (316 mV) nominal consumer line level signal
THD+N	< 0.05% (-80dB), 20Hz – 20 kHz bandwidth, 1 kHz sine at 0 dBFS level (or max level)
SNR	> 80 dB, 20 Hz - 20 kHz bandwidth
Crosstalk Isolation	> 70 dB, 10 kHz sine at 0 dBFS level (or max level before clipping)
L-R Level Deviation	< 0.3 dB, 1 kHz sine at 0 dBFS level (or max level before clipping)
Frequency Response Deviation	< ± 0.5 dB 20 Hz - 20 kHz
Output Load Capability	1 k-Ohm and higher (supports 10x paralleled 10 k-Ohm loads)
Stereo Channel Separation	> 70 dB @ 1 kHz
Noise Level	-80 dB

TABLE 1-1 (CONTINUED). SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Control Port	
Control Port	(1) RS-232, (2) RELAY 1-2, (1) IR EYE, (2) IR IN, (1) IR OUT, (1) TCP/IP, (1) FIRMWARE
Control Connector	(3) 3-pin terminal blocks, (4) 3.5-mm jacks, (1) RJ-45, (1) Type-A USB
Power	
AC Adapter Input Power	100 to 240 VAC, 50/60 Hz
Output Power	24 VDC, 6 A
Power Consumption	85 W (max.)
General	
Transmission Mode	HDBaseT
Transmission Distance	HDBaseT Input/Output: 1080p @ 60 Hz ≤ 229 feet (70 meters); 4K @ 60 Hz ≤ 131 feet (40 meters)
Bandwidth	18 Gbps
Operating Temperature	14 to 131° F (-10 to 55° C)
Storage Temperature	-13 to 158° F (-25 to 70° C)
Humidity	10 to 90% relative humidity
Dimensions	1.7" H x 17.1" W x 14.0" D (4.4 x 43.6 x 35.6 cm)
Weight	6.6 lb. (3 kg)

CHAPTER 2: OVERVIEW

2.1 INTRODUCTION

The 8 x 2 Video Matrix Switcher, 18G Seamless Switching, HDMI 2.0 4K 60 Hz 4:4:4 HDR simplifies meeting room and presentation space system integration by providing one HDBaseT input, four HDMI inputs, one VGA input, one DP input, one USB-C input, one HDBaseT output and one HDMI output. It also provides external audio inputs to be embedded in HDBaseT, HDMI and VGA video inputs respectively. Moreover, it provides MIX audio input for global audio.

The matrix switcher provides true 4K scaling up to 4K @ 60 Hz @ 4:4:4. Both inputs and outputs are capable of providing 4K @ 60 Hz @ 4:4:4 signals. The HDBaseT input and output provide an innovative solution with VLC technology, allowing transmission of HDMI 2.0 signals over a CATx cable while ensuring very high, original image quality. It is designed for use with the VX-HDB2-KIT extender kit. The USB-C input is ideal for AV interfacing with newer MacBook, Chromebook, and Windows PC, as well as smart phones and tablets.

The matrix switcher supports auto switching on HDMI, HDBaseT and HDMI loop outputs based on TMDS activity signals sensing. It also allows users to control system functionality via Web GUI, RS-232, IR and CEC. Additionally, users can control a relay device such as the rise and fall of a projector screen over RELAY ports.

The matrix switcher is designed to be the central component of AV system. It is ideal for applications where multiple signals with different resolutions must be optimized for displays. It is also suitable for presentation spaces where two displays are needed.

2.2 FEATURES

- HDMI 2.0 and HDCP 2.2 compliant. The video resolution can be up to 4K @ 60 Hz 4:4:4
- Supports video resolution down-scaling and up-scaling, 1080p, 1920 x 1200p, 4K @ 30 Hz, 4K @ 60 Hz can be selected for HDMI and HDBaseT outputs.
- Supports automatic switching
- Features a mirrored HDMI output for HDBaseT output
- Visually lossless video de-compression and compression for HDMI signals transmission up to 131 feet (40 meters) at 4K and 229 feet (70 meters) at 1080p on HDBaseT input and output
- HDBaseT input and output support 24V PoC
- External balanced audio inputs can be embedded in one HDBaseT input and two HDMI video inputs respectively
- Provides two groups of audio outputs (balanced audio and digital SPDIF audio) for audio de-embedding
- Supports MIX audio input and its volume control
- Supports HDMI output, HDBaseT output audio control
- Controllable via RS-232 local and pass-through, IR local and pass-through, TCP/IP, relay, CEC and on OSD

2.3 WHAT'S INCLUDED

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

- (1) 8 x 2 Video Matrix Switcher, 18 G Seamless Switching, HDMI 2.0 4K 60 Hz 4:4:4 HDR
- (2) mounting ears with (6) screws
- (4) plastic cushions
- (1) IR remote
- (1) IR receiver
- (3) 3-pin terminal blocks
- (7) 5-pin terminal blocks
- (1) Power Adapter (24 VDC, 6 A)

2.4 HARDWARE DESCRIPTION

Figures 2-1 and 2-2 show the front and back panels of the Switcher. Tables 2-1 and 2-2 describe their components.

2.4.1 FRONT PANEL

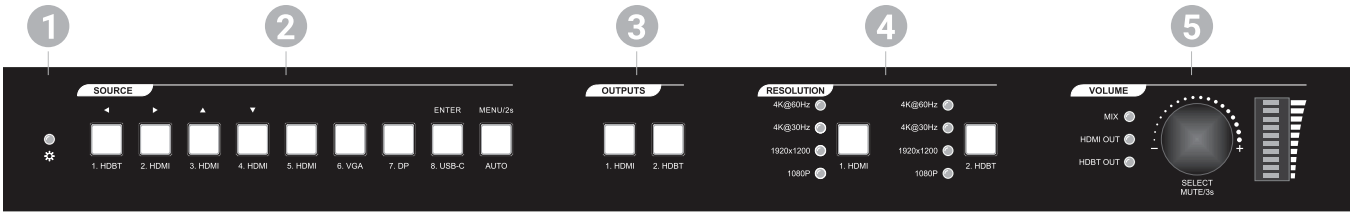

FIGURE 2-1. FRONT PANEL

TABLE 2-1. FRONT-PANEL COMPONENTS

NUMBER IN FIGURE 2-1	COMPONENT	DESCRIPTION
1	Power LED	• Lights green when power is ON • Turns red in standby mode
2	(9) Source buttons with blue backlight	• 1-HDBT input selector/Left Key for On Screen Display control (OSD) • 2-HDMI input selector/Right Key for OSD • 3-HDMI input selector/Up Key for OSD • 4-HDMI input selector/Down Key for OSD • 5-HDMI input selector • 6-VGA input selector • 7-DP input selector • 8-USB-C input selector/Enter key for OSD • Auto switching mode selector. Press this to enter or exit automatic switching mode. Press and hold it at least 2 seconds to enable OSD menu.
3	(2) Output buttons with blue backlight	• 1-HDMI output selector • 2-HDBT output selector
4	(2) Resolution buttons	Press the 1.HDMI or 2.HDBT button repeatedly to cycle through the four video resolutions. You will see a series of four LEDs, one of which illuminates blue to indicate which resolution is selected
5	(1) Volume knob	• Press the volume knob in to toggle among MIX, HDMI OUT and HDBT OUT audio control, and the corresponding LED will illuminate blue. • Rotate the knob to increase or decrease the volume of the selected audio. • Press and hold the knob at least three seconds to mute the selected audio. Rotate the knob to unmute.

2.4.2 BACK PANEL

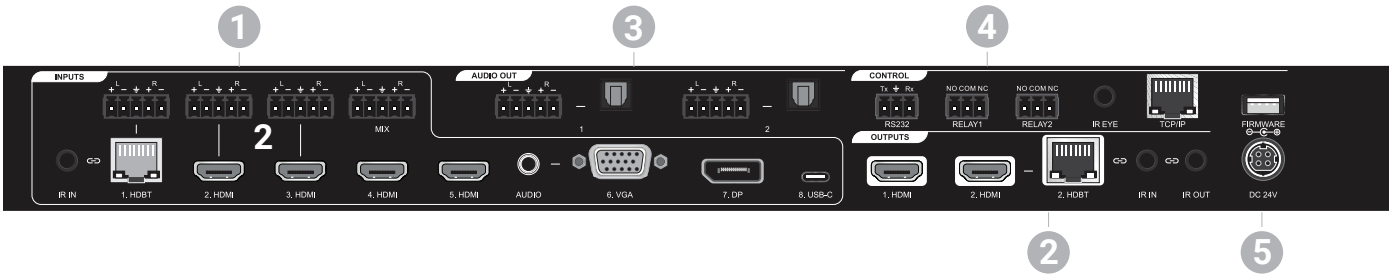

FIGURE 2-2. BACK PANEL

TABLE 2-2. BACK-PANEL COMPONENTS

NUMBER IN FIGURE 2-2	COMPONENT	DESCRIPTION
1	Inputs	INPUT: Total eight video inputs, five audio inputs and one IR input. • 1-HDBT: RJ45 port to connect the VX-HDB2-TX transmitter to receive AV signal, IR and RS-232 control signal, and one external balanced audio input (5-pin) can be embedded in the HDBT video. In addition, the HDBT input supports 24 V PoC. • 2-HDMI: Type-A female HDMI port to connect the HDMI source. One external balanced audio input (5-pin) can be embedded in the HDMI video. • 3-HDMI: Type-A female HDMI port to connect the HDMI source. One external balanced audio input (5-pin) can be embedded in the HDMI video. • 4-HDMI: Type-A female HDMI port to connect the HDMI source. • 5-HDMI: Type-A female HDMI port to connect the HDMI source. • 6-VGA: 15-pin female VGA port to connect the VGA source. One stereo auxiliary audio input (3.5-mm jack) can be embedded in the VGA video. • 7-DP: Type-A female DP port to connect the DP source. • 8-USB-C: Type-C USB port to connect the device with SlimPort output, e.g. Macbook. • IR IN: 3.5-mm jack to connect the IR receiver for IR pass-through. • MIX: 5-pin terminal block to connect the audio source for global audio mixing
2	Outputs	• 1-HDMI: Type-A female HDMI port to connect the video display. • 2-HDMI: Type-A female HDMI port to connect the video display. • 2-HDBT: RJ45 port to connect the TPUH610AR receiver to transmit AV signal, IR and RS-232 control signal. The HDBT output supports 24V PoC. NOTE: The 2-HDMI and 2-HDBT ports output the same signal. • IR IN: 3.5-mm jack to connect the IR receiver for IR pass-through. • IR OUT: 3.5-mm jack to connect the IR emitter for IR pass-through.

TABLE 2-2 (CONTINUED). BACK-PANEL COMPONENTS

NUMBER IN FIGURE 2-2	COMPONENT	DESCRIPTION
3	Audio Output	• 1: One balanced audio output (5-pin) and one digital SPDIF audio output for 1-HDMI output audio de-embedding. • 2: One balanced audio output (5-pin) and one digital SPDIF audio output for 2-HDBT output audio de-embedding.
4	Control	• RS-232: 3-pin terminal block to connect the control device (e.g. PC) to control the switcher by sending RS232 commands. It also supports RS-232 passthrough control. • RELAY 1-2: Two 3-pin terminal blocks to connect the relay devices (e.g. projector screen). • IR EYE: 3.5-mm jack to connect IR receiver to control the switcher by the IR remote. • TCP/IP: RJ-45 port to connect the control device (e.g. PC) to control the switcher by GUI. • FIRMWARE: Type-A USB port for firmware upgrade.
5	24-VDC connector	DC barrel connector for the included power adapter

CHAPTER 3: SYSTEM CONNECTION

3.1 USAGE PRECAUTIONS

- Verify all components and accessories are 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.
- All devices should be connected before power on.

3.2 SYSTEM DIAGRAM

The following diagram illustrates typical input and output connections that can be used with the switcher.

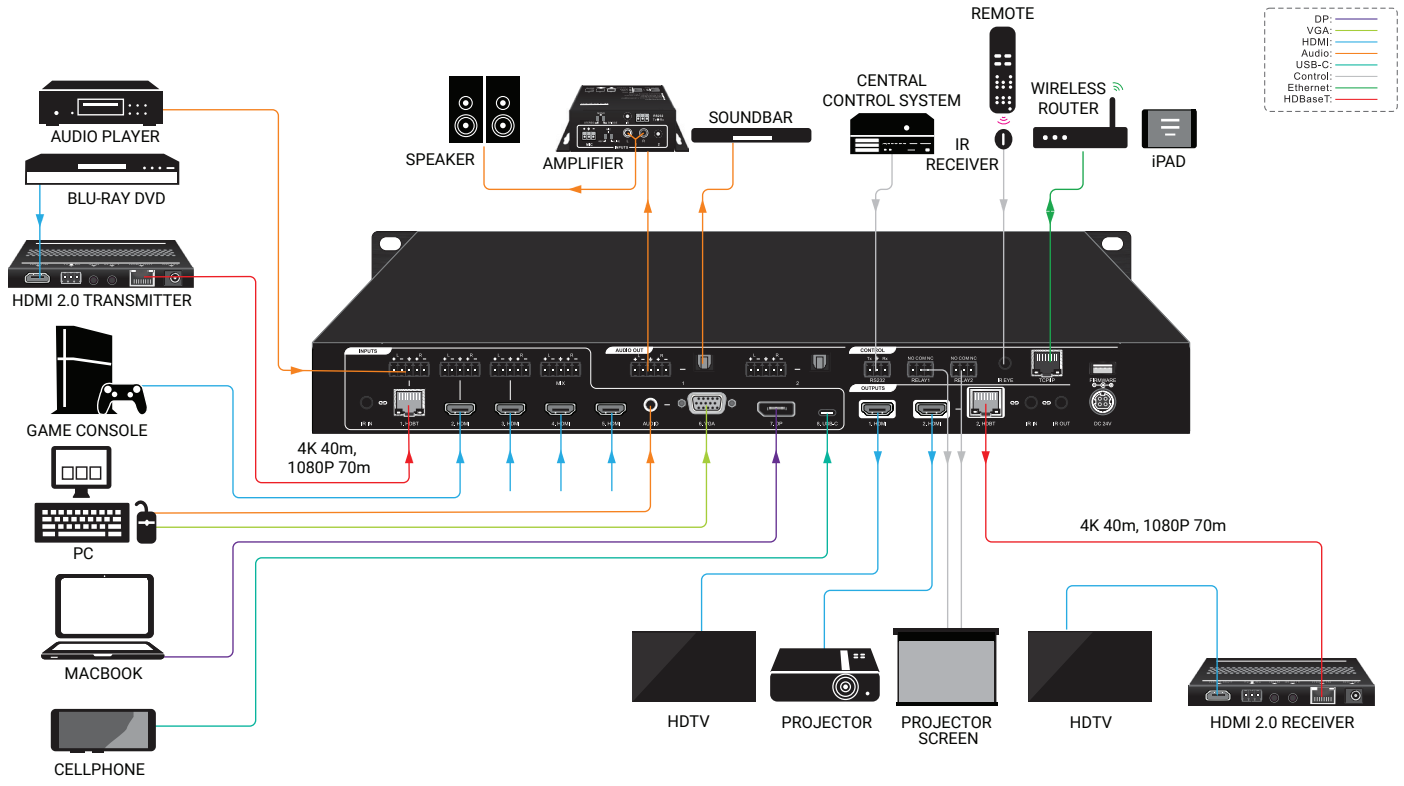

FIGURE 3-1. TYPICAL APPLICATION

CHAPTER 4: BUTTON CONTROL

4.1 MANUAL SWITCHING

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

1. Press any one of eight input buttons to select input source, and the corresponding button LED turns blue.
2. Press either 1-HDMI or 2-HDBT output button to select output channel, and the corresponding button LED turns blue.
3. Press the input button again to confirm switching setting; otherwise, it will automatically confirm after three seconds.

4.2 AUTOMATIC SWITCHING

Follow the steps below to enable auto switching mode for 1-HDMI or 2-HDBT output.

1. Press AUTO, and the button LED turns blue.
2. Press either 1-HDMI or 2-HDBT output button, and the corresponding button LED turns blue.
3. Press the AUTO button again to confirm the setting; otherwise, it will automatically confirm after three seconds.
4. Repeating the above three steps can exit auto mode, but the input source will remain the current setting.

NOTE: The AUTO button LED illuminates blue when the 1-HDMI output is in auto mode or the 2-HDBT output is in auto mode.

When in auto 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 8.
- 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 1-HDBT input.
- In auto mode, the input source also can be switched by the manual switching steps.

4.3 RESOLUTION SELECTION

Press the 1.HDMI or 2.HDBT button on RESOLUTION area repeatedly to cycle through the four video resolutions. You will see a series of four LEDs, one of which illuminates blue to indicate which resolution is selected.

4.4 SOUND VOLUME CONTROL

Press the volume knob to choose the MIX, HDMI OUT or HDBT OUT audio that needs to be adjusted, the corresponding LED will turn blue and stay on.

- Adjust the knob in the clockwise direction to increase the sound volume.
- Adjust the knob in the counter-clockwise direction to decrease the sound volume.
- Press and hold the knob at least three seconds to mute the selected audio. Rotate the knob to unmute.

CHAPTER 5: IR REMOTE CONTROL

Connect the IR receiver to the IR eye port to control the switcher using the IR remote.

1. Select the input source.
2. Select the output channel.
3. Press AUTO to enable automatic switching mode, and then select the output channel.
4. Press BLACK, and then select the output channel to make it output a black screen.
5. Enable/Disable OSD menu.
6. Confirm and Navigation buttons: OK, UP, DOWN, LEFT and RIGHT for OSD menu.
7. Return to the previous OSD menu.
8. MIX input audio control: Mute, Volume Down and Volume Up.
9. HDMI output audio control: Mute, Volume Down and Volume Up.
10. HDBT output audio control: Mute, Volume Down and Volume Up.

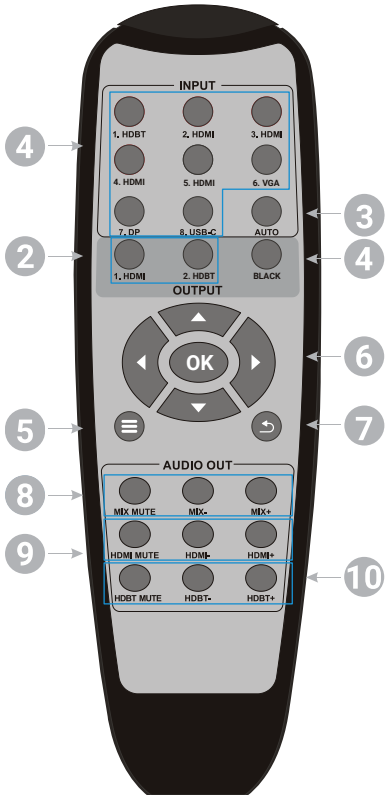

FIGURE 5-1. IR REMOTE CONTROL

CHAPTER 6: GUI CONTROL

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

- IP Address: 192.168.0.178
- Subnet Mask: 255.255.250.0

Type 192.168.0.178 in the internet browser, and you will see the log-in web page.

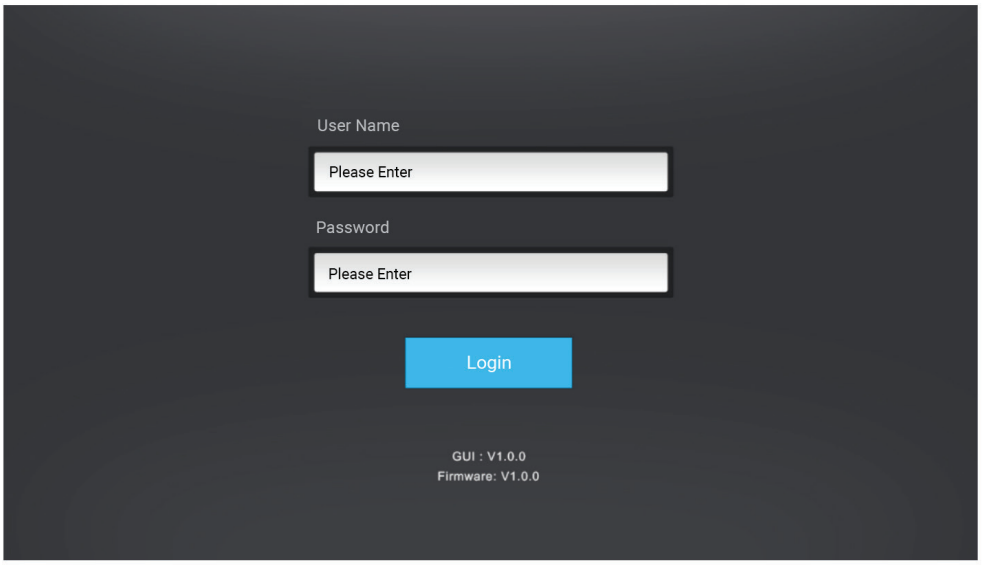

FIGURE 6-1. LOGIN WEB PAGE

6.1 VIDEO SWITCHING

Type the user name and password, and then click Login to enter the section for video switching.

FIGURE 6-2. VIDEO SWITCHING PAGE

- HDMI OUTPUT: Switch the selected input source to HDMI output. Click AUTO to enable/disable automatic switching mode.
- HDBT OUTPUT: Switch the selected input source to HDBT output. Click AUTO to enable/disable automatic switching mode.
- Preset: Save the current routing status to preset 1–5.

6.2 RESOLUTION SELECTION

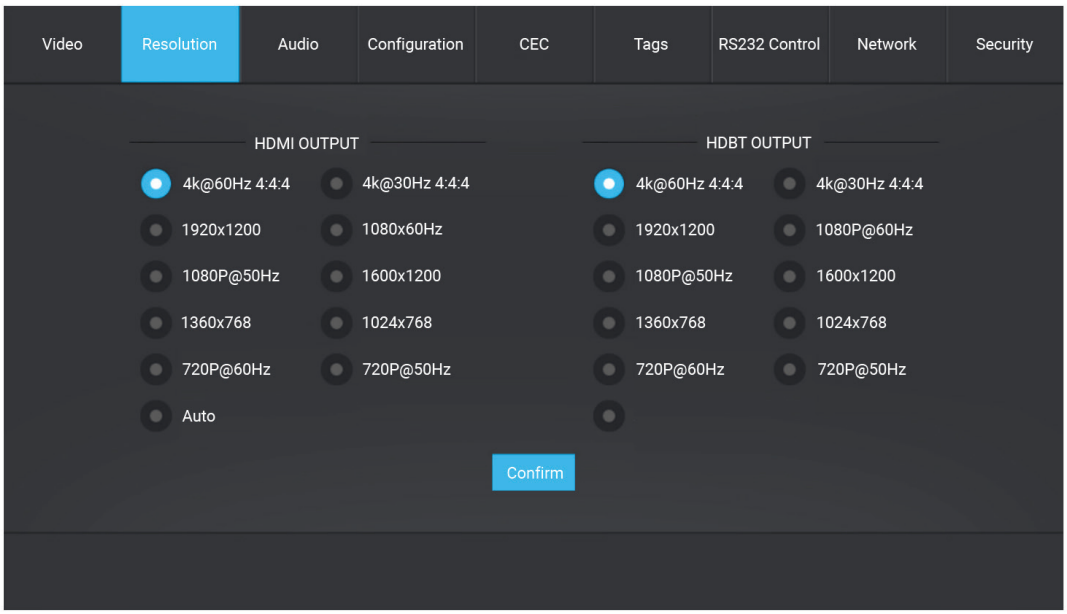

FIGURE 6-3. RESOLUTION SELECTION PAGE

- HDMI OUTPUT: Select the HDMI output video resolution. Press AUTO to automatically select the best output resolution for the connected display.
- HDBT OUTPUT: Select the HDBT output video resolution. Press AUTO to automatically select the best output resolution for the connected display.

NOTE: If EDID communication fails, 1080p @ 60 Hz will be used as the default output resolution.

6.3 AUDIO CONTROL

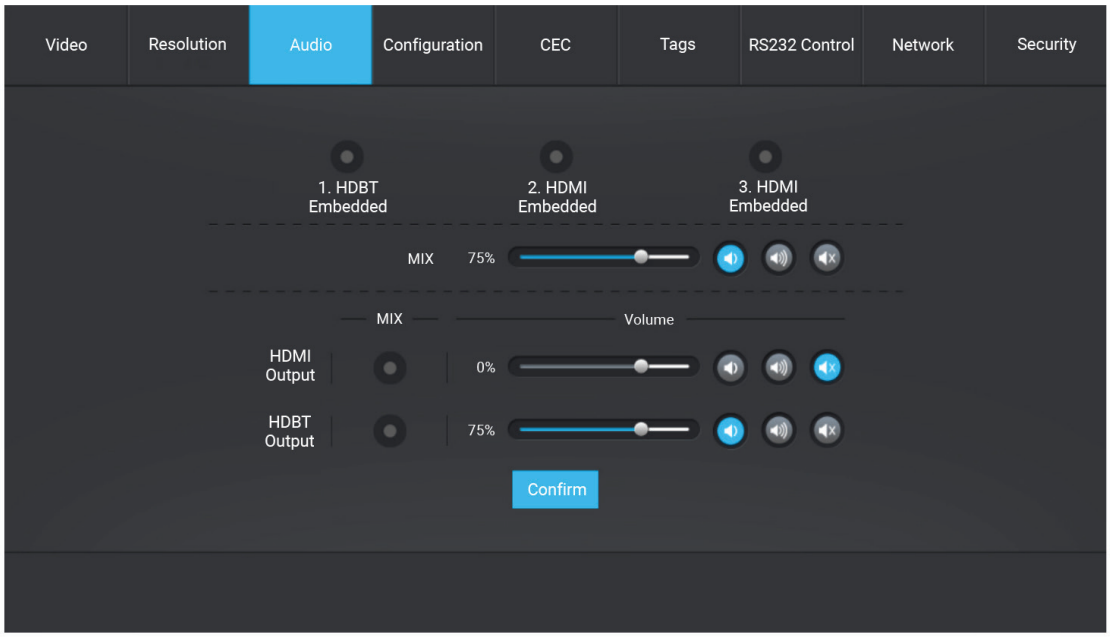

FIGURE 6-4. AUDIO CONTROL PAGE

- 1.HDBT Embedded: Select the external balanced audio (5-pin) to embed in 1.HDBT video input.
- 2.HDMI Embedded: Select the external balanced audio (5-pin) to embed in 2.HDMI video input.
- 3.HDMI Embedded: Select the external balanced audio (5-pin) to embed in 3.HDMI video input.
- MIX: MIX input audio volume control.
- HDMI Output: Select MIX input audio to mix with HDMI output audio, and then control the global output audio by the volume bar and the buttons.
- HDBT Output: Select MIX input audio to mix with HDBT output audio, and then control the global output audio by the volume bar and the buttons.

6.4 CONFIGURATION

6.4.1 POC SETTING

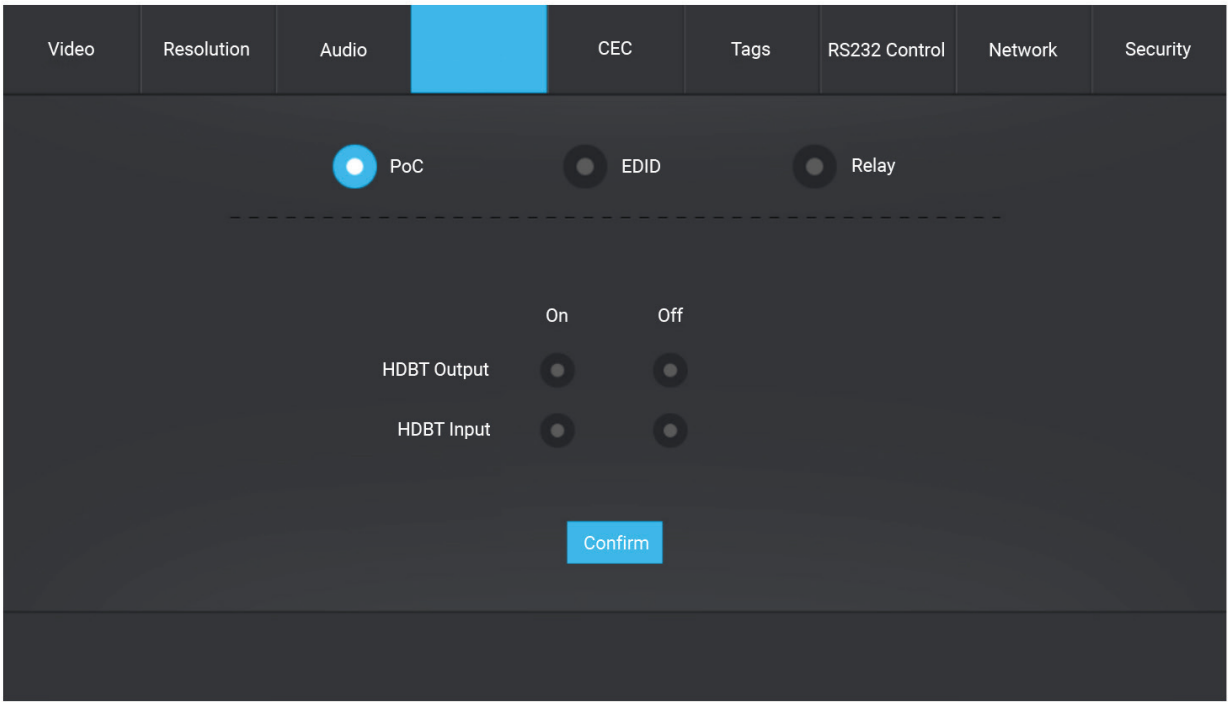

FIGURE 6-5. CONFIGURATION TAB, POC

- Turn on or off PoC for HDBT output port.
- Turn on or off PoC for HDBT input port.

6.4.2 EDID MANAGEMENT

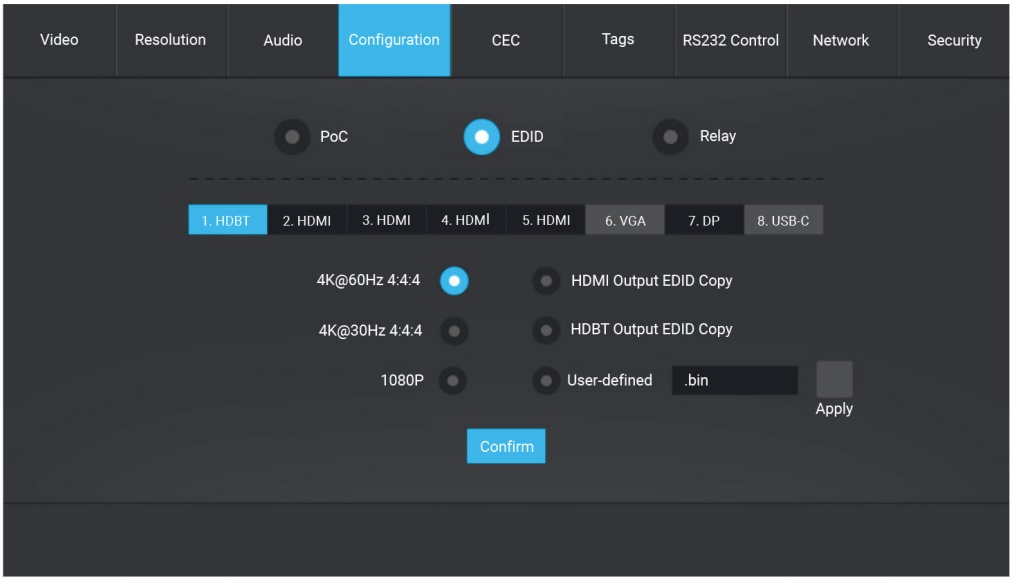

FIGURE 6-6. CONFIGURATION TAB, EDID

- Select the compatible built-in EDID for the selected input source.
- Upload a user-defined EDID.

6.4.3 RELAY CONTROL

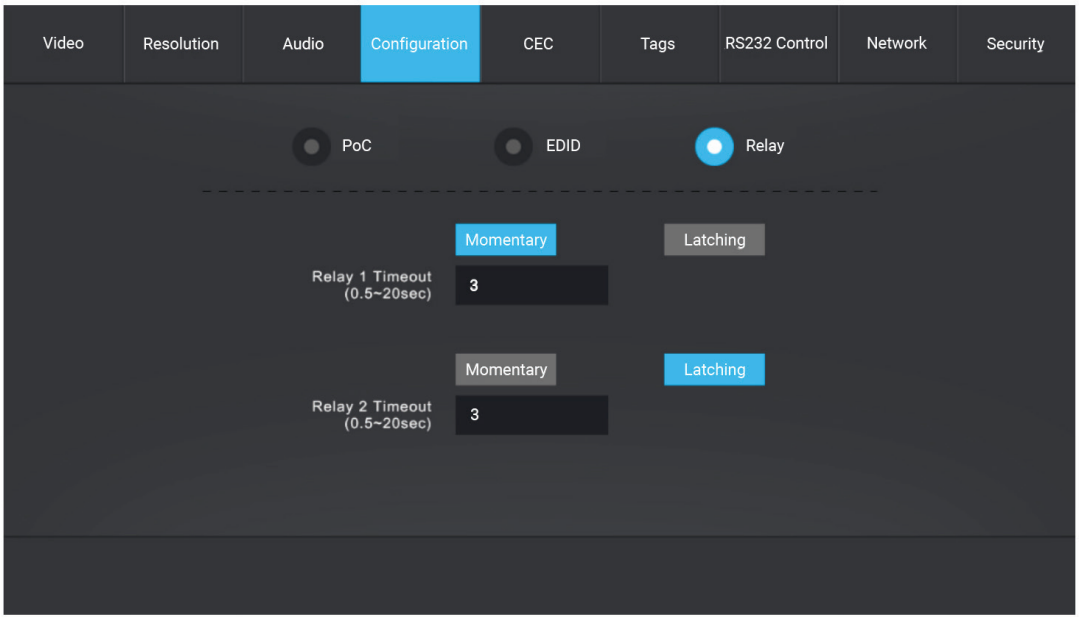

FIGURE 6-7. CONFIGURATION TAB, RELAY CONTROL

- Set Momentary or Latching relay control mode for Relay 1 and Relay 2.
- After setting the auto stop time, click Momentary and the projector screen starts to be rolled up or dropped down until the auto stop time is up.
- Click Latching and the projector screen starts to be rolled up or dropped down, then click Latching again to stop the process.

RELAY 1 and RELAY 2 Ports Definition:

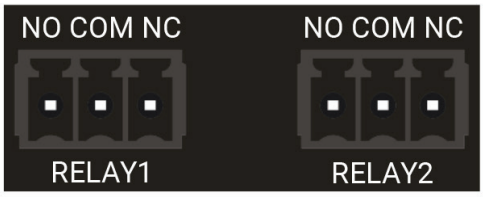

FIGURE 6-8. RELAY PORTS

- When you click Momentary, the NO connection closes, and the NC connection opens.
- When the delay time is up, the NO connection opens, and the NC connection closes.
- When you click Latching, the NO connection closes, and the NC connection opens.
- When the delay time is up, the NO connection opens, and the NC connection closes.

6.5 CEC CONTROL

If the input sources and display support CEC, they can be controlled by the control buttons to the replace IR remote.

1. Source Control

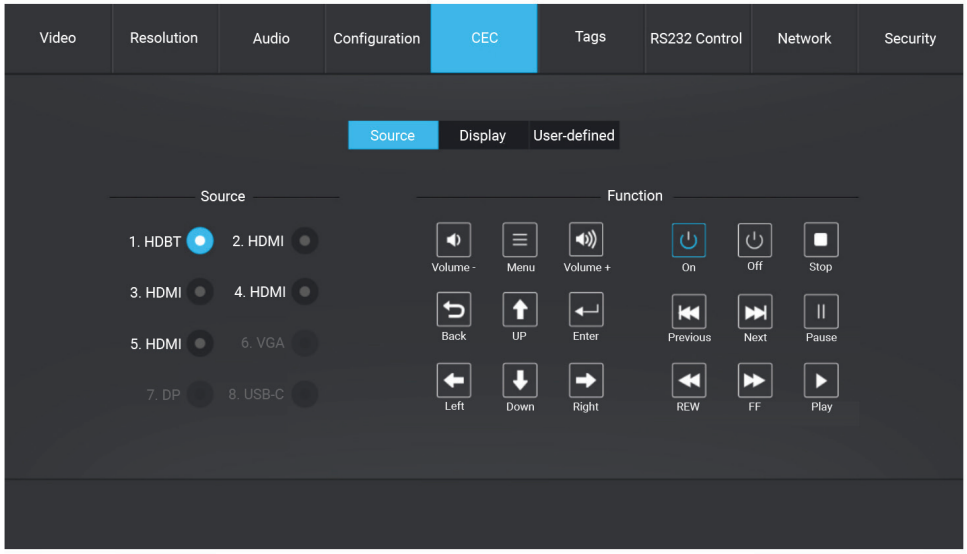

FIGURE 6-9. SOURCE CONTROL PAGE

- Select the input source you want to control, and then press the function button.

2. Display Control

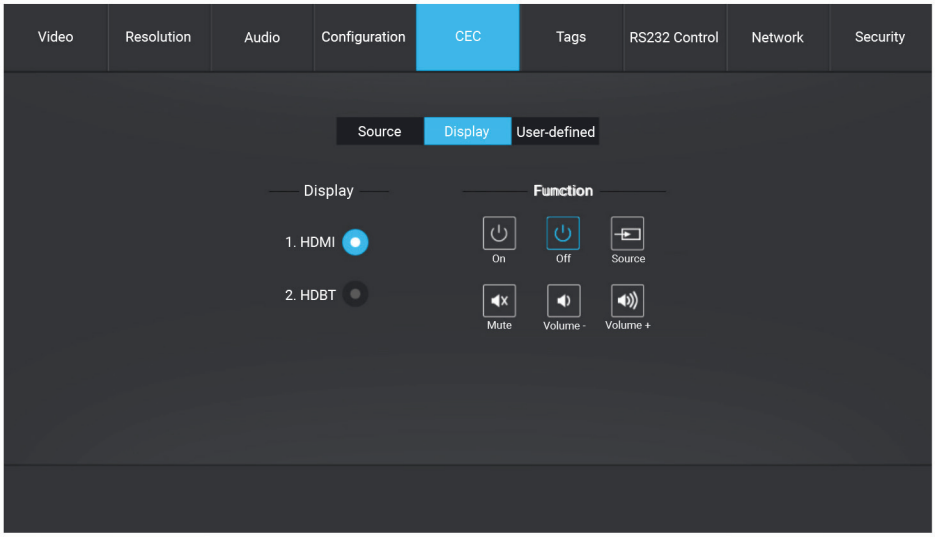

FIGURE 6-10. DISPLAY CONTROL PAGE

- Select the output display you want to control, and then press the function button.

3. User-Defined

The switcher also provides user-defined CEC functions. The CEC command can be edited and saved in the Trigger textbox.

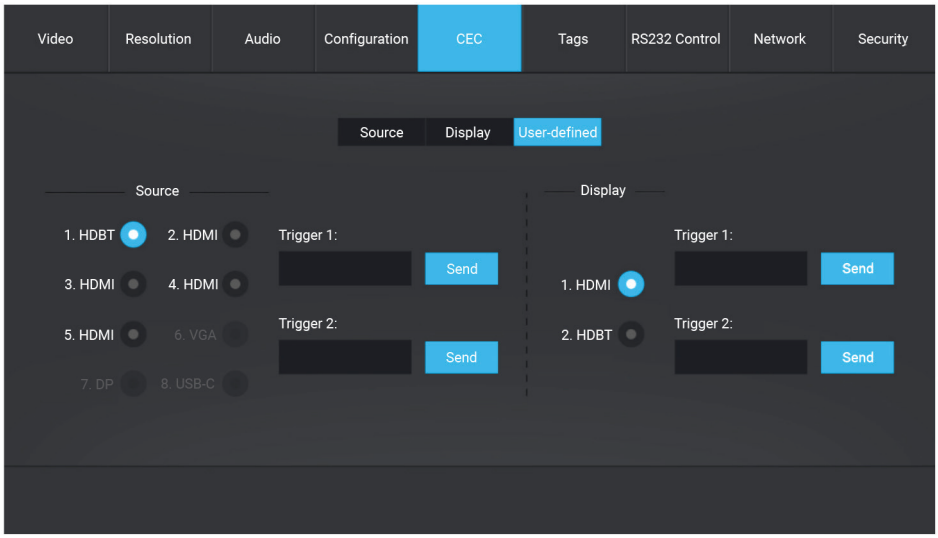

FIGURE 6-12. USER-DEFINED CEC FUNCTIONS

- Select the input source, and then type the CEC command in the Trigger 1 or Trigger 2 box to control the selected source.
- Select the output display, and then type the CEC command in the Trigger 1 or Trigger 2 box to control the selected display.

6.6 TAGS SETTING

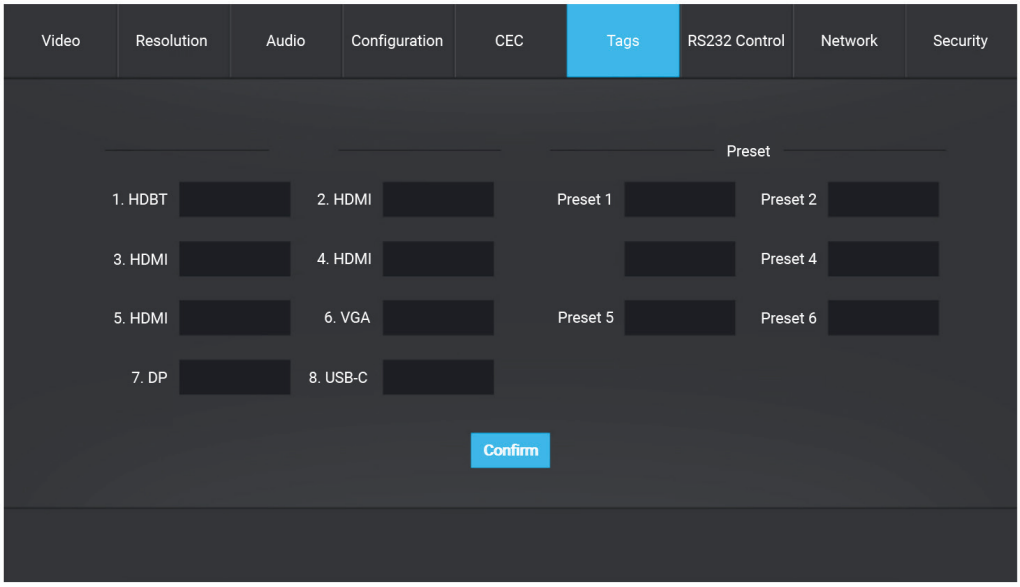

FIGURE 6-13. TAGS SETTING PAGE

- INPUTS: Modify the label of the input sources.
- Preset: Modify the label of the presets.

6.7 RS-232 CONTROL

1. Port Mode

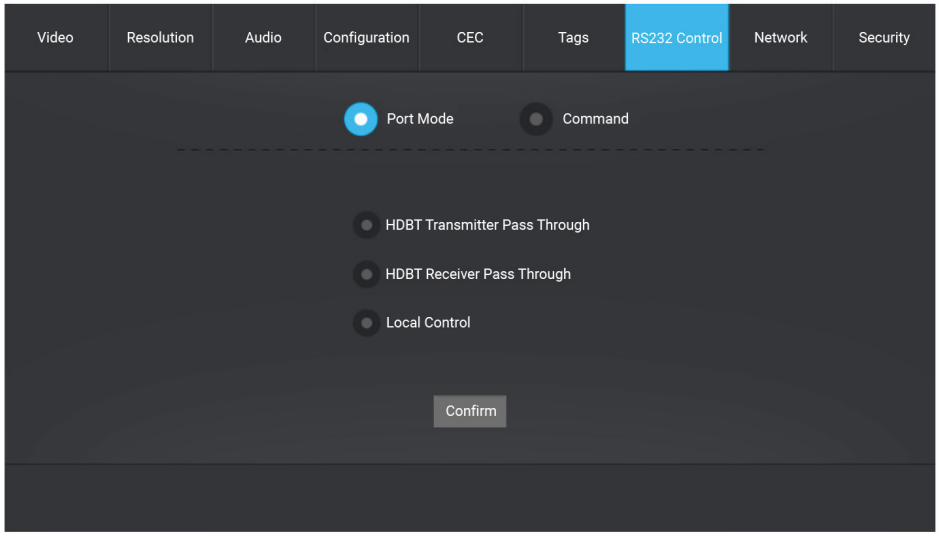

FIGURE 6-14. RS-232 CONTROL, PORT MODE

- HDBT Transmitter Pass Through: Establish RS-232 pass-through communication between the switcher and the HDBaseT transmitter (e.g. VX-HDB2-TX). The RS-232 port of the switcher can be used to transfer commands to control the third-party device that is connected to the HDBaseT transmitter.
- HDBT Receiver Pass Through: Establish RS-232 pass-through communication between the switcher and HDBaseT receiver (e.g., VX-HDB2-RX). The RS-232 port of the switcher can be used to transfer commands to control the third-party device that is connected to the HDBaseT receiver.
- Local Control: The RS-232 port of the switcher is used to connect a control device (e.g. PC) to control the switcher.

2. Command

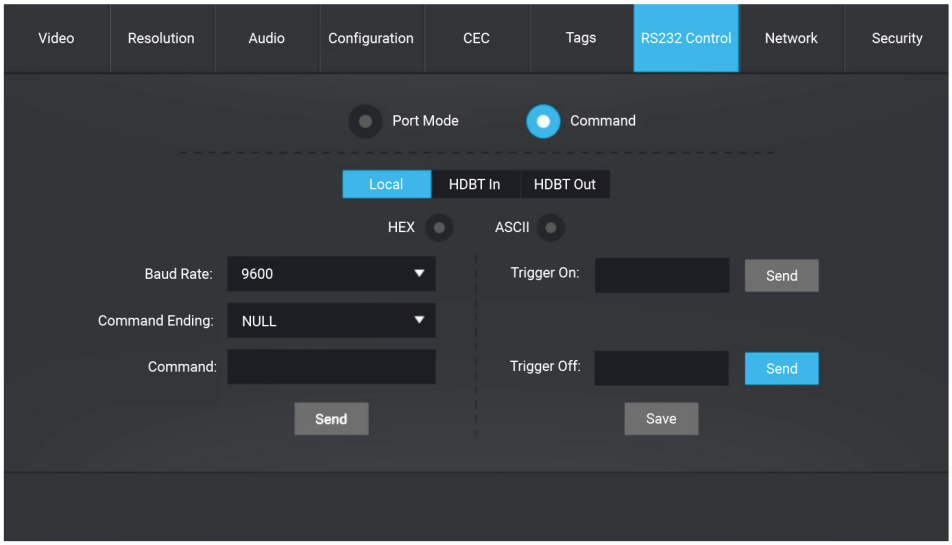

FIGURE 6-15. RS-232 CONTROL, COMMAND

- Select Local, HDBT In or HDBT Out control mode.

  - Local: Send RS-232 commands to control the local third-party that is connected to the RS-232 port of the switcher.

  - HDBT In: Send RS-232 commands to control the far-end third-party that is connected to the RS-232 port of the HDBaseT transmitter.

  - HDBT Out: Send RS-232 commands to control the far-end third-party (e.g. projector) that is connected to the RS-232 port of the HDBaseT receiver.

- Select HEX or ASCII format.
- Baud Rate: Supports 2400, 4800, 9600, 19200, 38400, 57600 or 115200.
- Command Ending: NULL, CR, LF or CR+LF can be chosen.
- Command: Type the command in this textbox to control the third-party device.
- Trigger On: Type the Power On command in this box to turn on the third-party device.
- Trigger Off: Type the Power Off command in this box to turn off the third-party device.

6.8 NETWORK SETTING

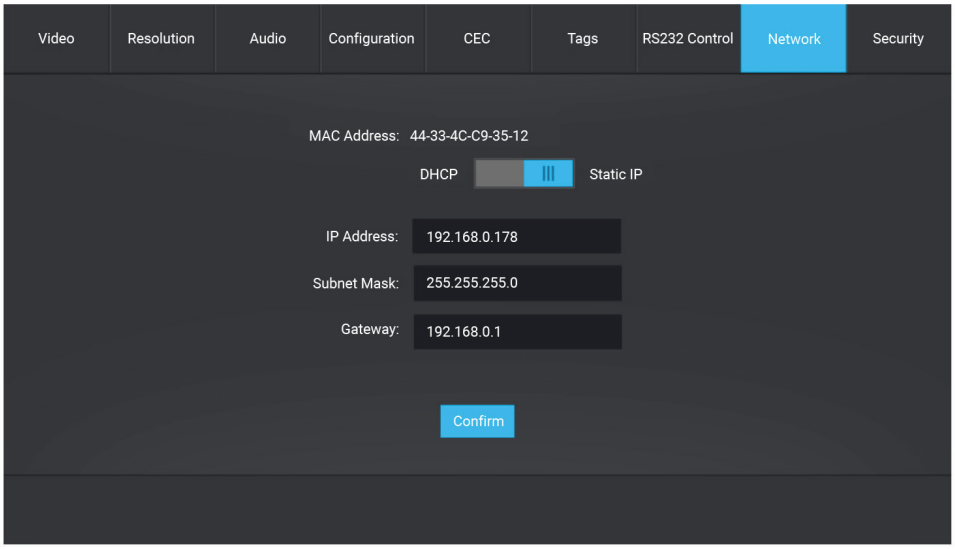

FIGURE 6-16. NETWORK SCREEN

- Static IP or Dynamic Host Configuration Protocol (DHCP).
- Modify the static IP Address, Subnet Mask, and Gateway.

6.9 PASSWORD SETTING

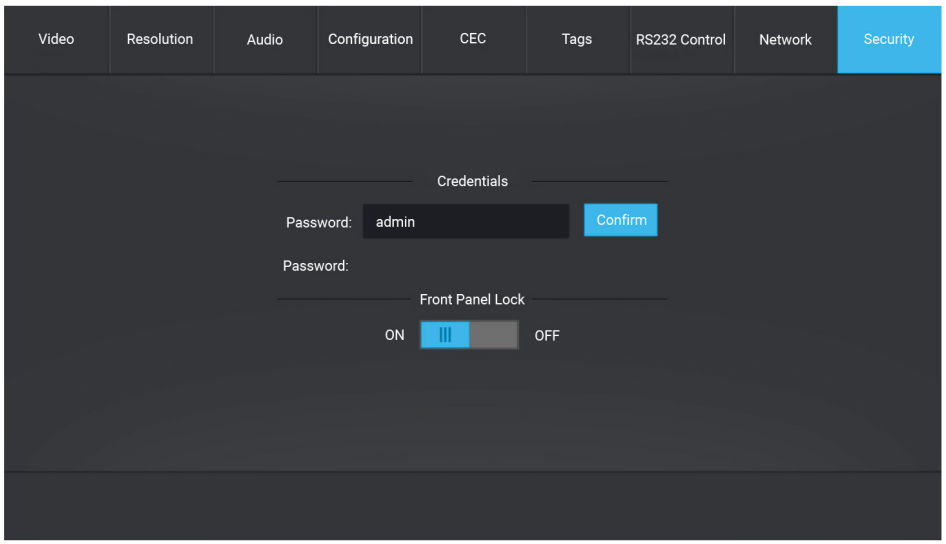

FIGURE 6-17. PASSWORD SETTING SCREEN

- Modify the login password.
- Lock or unlock the front panel buttons.

6.10 GUI UPDATE

Please visit http://192.168.0.178:100 for GUI online upgrade. Type the username and password (the same as the GUI log-in settings, modified password will be available only after rebooting) to log in the configuration interface. After that, click Administration at the source menu to get to Upgrade Firmware as shown below.

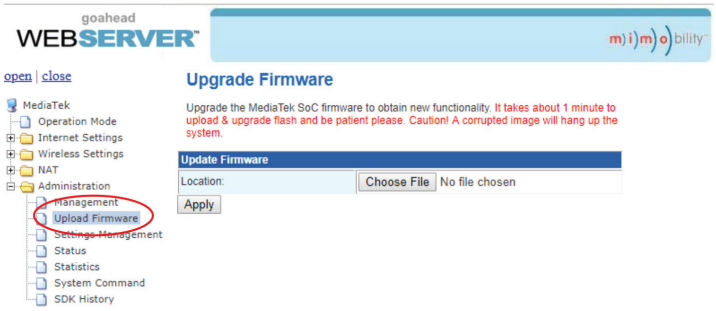

FIGURE 6-18. UPLOAD PROGRAM

Select the desired update file and press Apply. The program will start upgrading.

CHAPTER 7: RS-232 CONTROL

Connect the RS-232 port to control device (e.g. PC) with RS-232 cable. The switcher can be controlled by sending RS-232 commands.

7.1 INSTALLATION/UNINSTALLATION OF RS-232 CONTROL SOFTWARE

- Installation: Copy the control software file to the computer connected with the switcher.
- Uninstallation: Delete all the control software files in corresponding file path.

7.2 BASIC SETTINGS

Connect the switcher to the necessary input devices and output devices. Then, connect it with a PC installed RS-232 control software. Double-click the software icon to run this software.

Here we show an example using the software CommWatch.exe. The icon is shown next.

FIGURE 7-1. COMMWATCH ICON

The interface of the control software is shown next.

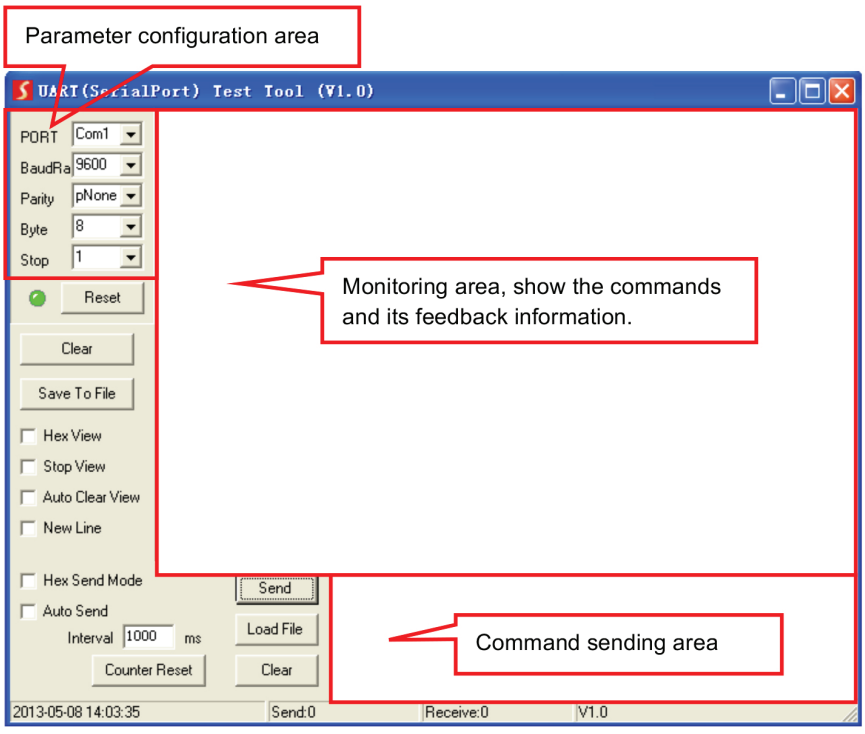

FIGURE 7-2. CONTROL INTERFACE

Set the parameters (baud rate = 9600, data bit = 8, stop bit = 1 and parity bit = none) correctly to ensure reliable RS-232 control.

7.3 RS-232 COMMUNICATION COMMANDS

Communication protocol: RS-232 Communication Protocol

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

NOTES:

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

7.3.1 DEVICE CONTROL

TABLE 7-1. DEVICE CONTROL

COMMAND	DESCRIPTION	FEEDBACK EXAMPLE
PWON.	Power on the system.	PWON
PWOFF.	Power off the system. Turn off the HDBaseT power supply.	PWOFF
STANDBY.	System standby. Press any button to awake.	STANDBY
/*Type;	Report the system model.	AVSC-HDMI2-8X2
/^Version;	Report the firmware version.	V1.0.0
/%Lock;	Lock the front panel buttons.	System Locked
/%Unlock;	Unlock the front panel buttons.	System Unlock!
%9964.	Report the IP address.	IP:192.168.0.178
USBUpdata:[x].	Upgrade the 3458 IC. After successfully upgrading, send the command "SPI:15,0." to turn off the serial communication between the 3458 IC and control PC.	
%9961.	Report the system locking status.	System UnLock/Lock!
%9962.	Report the system power status.	PWON/PWOFF/STANDBY
%9963.	Report the IR carrier mode.	Carrier native
%0911.	Reset to factory default.	

7.3.2 SOURCE SWITCHING

TABLE 7-2. SOURCE SWITCHING

COMMAND	DESCRIPTION	FEEDBACK EXAMPLE
Demo.	Switch to demo testing mode, switch AV 1>1, 2>2 and so on.	Demo Mode AV: AV: 1-> 1 AV: 1-> 2 ... AV: 1-> 7 AV: 1-> 8 AV: 2-> 1 AV: 2-> 2 ... AV: 2-> 7 AV: 2-> 8 Normal Mode
Undo.	Cancel the previous operation.	Undo Ok!
[x]All.	Switch input [x] to HDMI and HDBT outputs. x=1–8.	Example: 8ALL. Feedback: 8 To All
All#.	Switch all input signals to the corresponding output channel. 1->1, 2->2	All Through.
All$.	Turn off all output.	All Closed.
[x]#.	Switch input [x] to output [x]. x=1–2.	1 Through
[x]$.	Turn off output [x]. x=1–2.	1 Closed.
[x]@.	Turn on output [x]. x=1–2.	01 Open.
All@.	Turn on all outputs.	All Open.
VRES/X:Y.	Set the output resolution of port [X] to [Y]. 1) X=9/10: X Ouptut Port 9 HDMI 10 HDBT 2) Y=1~10: Y Resolution 1 4K@60Hz 2 4K@30Hz 3 1920X1200@60Hz 4 1080P@60Hz 5 1080P@50Hz 6 1600x1200@60Hz 7 1360x768@60Hz 8 1024x768@60Hz 9 720P@60Hz 10 720P@50Hz	Outport HDMI:720p@50Hz Outport HDBT:720p@50Hz
%9975.	Report the source switching status.	Out 1 2 In 4 4
Status[x].	Report the output [x] status. x=1–2	AV: 5-> 1
Status.	Report the input channel on output channel one by one.	AV:01->01 AV:01->02
%9971.	Report the connection status of all inputs. Y means the corresponding input port is connected to a source device, N means not.	In 01 02 03 04 Connect Y Y N N In 05 06 07 08 Connect N N N Y

7.3.3 PRESET SETTING

TABLE 7.3 PRESET SETTING

COMMAND	DESCRIPTION	FEEDBACK EXAMPLE
Save[y].	Store the current switching status to preset [y]. y=0– 9.	Save To F0
Recall[y].	Recall the preset [y]. y=0–9.	Recall From F0
Clear[y].	Clear the preset [y].	Clear F0

7.3.4 AUDIO CONTROL

TABLE 7-4. AUDIO CONTROL

COMMAND	DESCRIPTION	FEEDBACK EXAMPLE
Embedded:[x].	Select external balanced audio (L+R) for input [x]. x=1–3.	HDBT1 Embedded
UnEmbedded:[x].	Select internal audio for input [x]. x=1–3.	HDBT1 UnEmbedded
MIXOUT:[x].	The output [x] audio is mixed with MIX audio.	HDMI1 OUT MIX
UnMIXOUT:[x].	The output [x] audio is not mixed with MIX audio.	HDMI1 OUT UnMIX
SetHDMIVol:xx.	Set the HDMI output audio volume to xx. xx=0–60.	Volume of HDMI: 30.
HDMIVolume+.	Increase the HDMI output audio volume.	Volume of HDMI: 31.
HDMIVolume-.	Decrease the HDMI output audio volume.	Volume of HDMI: 29.
HDMIMute.	Mute the HDMI output audio.	HDMI Mute.
HDMIUnmute.	Unmute the HDMI output audio.	HDMI Unmute.
SetHDBTVol:xx..	Set the HDBT output audio volume to xx. xx=0–60.	Volume of HDBT: 30.
HDBTVolume+.	Increase the HDBT output audio volume.	Volume of HDBT: 31.
HDBTVolume-.	Decrease the HDBT output audio volume.	Volume of HDBT: 29.
HDBTMute.	Mute the HDBT output audio.	HDBT Mute.
HDBTUnmute.	Unmute the HDBT output audio.	HDBT Unmute.
SetMIXVol:XXX.	Set the MIX input audio volume to xx. xx=0–60.	Volume of MIX: 30.
MIXVolume+.	Increase the MIX input audio volume.	Volume of MIX: 31.
MIXVolume-.	Decrease the MIX input audio volume.	Volume of MIX: 29..
MIXMute.	Mute the MIX input audio.	MIX Mute.
MIXUnmute.	Unmute the MIX input audio.	MIX Unmute..
%9941.	Report the audio status.	HDBT Unmute. HDMI Mute. MIX Mute.
%9942.	Report the audio volume.	Volume of HDBT: 9. Volume of HDMI: 30. Volume of MIX: 6.
%9943.	Report the external audio status.	HDBT1 UnEmbedded HDMI2 Embedded HDMI3 Embedded

7.3.5 EDID MANAGEMENT

TABLE 7-5. EDID MANAGEMENT

COMMAND	DESCRIPTION	FEEDBACK EXAMPLE
EDID/[x]/[y].	The input [x] invokes built-in EDID [y]. x=1–5, 7. **y EDID** 1 1080p @ 60 Hz 2 4K @ 30 Hz 4:4:4 3 4K @ 60 Hz 4:4:4	EDID/4/1
EDIDUpgrade[x].	Upgrade the EDID data of the input port [x]. x=1–5, 7. When the command is applied, the system prompts to upload the EDID file (.bin). Operation will be cancelled in 10 seconds. Disconnect the HDBT connection before sending this command to ensure the data can be received successfully.	
EDIDM[x]B[y].	Set the EDID data of output [x] to input [y]. x=1–2, y=1–5, 7.	Example: EDIDM1B1. Feedback: Input 1 EDID Upgrade OK By 01 EXT EDID!
EDIDMInit.	Reset the factory default EDID to all input ports.	All Input EDID Set Default 1080P!

7.3.6 RELAY CONTROL

TABLE 7-6. RELAY CONTROL COMMANDS

COMMAND	FUNCTION	FEEDBACK EXAMPLE
RelayON[X].	Turn on relay [X], X=1–2.	
RelayOFF[X].	Turn off relay [X], X=1–2.	
RelayAutomationCtl:[X],[Y].	Set the auto stop time of relay [X] to Y seconds. X=1–2, Y=0–20.	
ToggleRelay[X].	Toggle relay [X], X=1–2.	

7.3.7 VGA OUTPUT IMAGE ADJUSTMENT

When 6-VGA source is selected, you can use the following commands to adjust the output picture.

TABLE 7-7. VGA OUTPUT IMAGE ADJUSTMENT COMMANDS

COMMAND	DESCRIPTION	FEEDBACK EXAMPLE
SetVGAPhase: XX.	Set the phase position to XX. XX=0–100.	
SetVGABrightness: XX.	Set the brightness to XX. XX=0–100.	
SetVGAContrast: XX.	Set the contrast to XX. XX=0–100.	
SetVGAColor: XX.	Set the color to XX. XX=0–100.	
SetVGAAutoSync:X.	X=0, Disable Auto-Sync mode. X=1, Enable Auto-Sync mode.	
SetVGASharpness:XX.	Set the sharpness to XX. XX=0~100.	
SetVGAColorTemp:X.	Auto-adjust the color temperature to X. X=0–3 (Normal/Cool/Warm)	
SetVGAAspectRatio:X.	Set the aspect ratio to X. X=0–2 (16:9/4:3/ auto)	
SetVGAPicMode:X.	Set the image mode to X. X=0–3. (dynamic/standard/mild/user)	

7.3.8 SWITCHER BAUD RATE SETTING

TABLE 7-8. SWITCHER BAUD RATE SETTING

COMMAND	FUNCTION	FEEDBACK EXAMPLE
Baudrate 2400.	Set the RS-232 baud rate of switcher to 2400..	Set Local RS-232 baudrate is 2400!
Baudrate 4800.	Set the RS-232 baud rate of switcher to 4800.	Set Local RS232 baudrate is 4800!
Baudrate 9600.	Set the RS-232 baud rate of switcher to 9600.	Set Local RS232 baudrate is 9600!
Baudrate 19200.	Set the RS-232 baud rate of switcher to 19200.	Set Local RS232 baudrate is 19200!
Baudrate 38400.	Set the RS-232 baud rate of switcher to 38400.	Set Local RS232 baudrate is 38400!
Baudrate 57600.	Set the RS-232 baud rate of switcher to 57600.	Set Local RS232 baudrate is 57600!
Baudrate 115200.	Set the RS-232 baud rate of switcher to 115200.	Set Local RS232 baudrate is 115200!

7.3.9 CEC CONTROL

STEP 1: If the input sources and displays support CEC, they can be controlled by sending CEC commands to replace the IR remote.

TABLE 7-9. CEC CONTROL

COMMAND	DESCRIPTION	FEEDBACK EXAMPLE
CECON.	Enable CEC.	CEC Turn ON!
CECOFF.	Disable CEC	CEC Turn OFF!

STEP 2: Use the following command format to send specific commands to control the input source or display device.

CEC[I/O][port][command].

- The "[I]" represents the input port. The "[O]" represents the output port.
- The "[port]" represents the port number. The input ports are 01–05, and the output ports are 06–07.
- The "[command]" represents the specific command from the table below.

TABLE 7-10. CONTROL THE INPUT SOURCE

COMMAND	DESCRIPTION	EXAMPLE AND FEEDBACK
CECI[port]00.	Confirm operation (Enter).	CECI0100. CEC_IN_01_SEND_SUCCESS!
CECI[port]01.	UP.	CECI0101. CEC_IN_01_SEND_SUCCESS!
CECI[port]02.	DOWN.	CECI0102. CEC_IN_01_SEND_SUCCESS!
CECI[port]03.	LEFT.	CECI0103. CEC_IN_01_SEND_SUCCESS!
CECI[port]04.	RIGHT.	CECI0104 CEC_IN_01_SEND_SUCCESS!
CECI[port]0A.	Enter main menu..	CECI010A. CEC_IN_01_SEND_SUCCESS!
CECI[port]0D.	Exit menu.	CECI010D. CEC_IN_01_SEND_SUCCESS!
CECI[port]41.	Volume up.	CECI0141. CEC_IN_01_SEND_SUCCESS!.
CECI[port]42.	Volume down.	CECI0142. CEC_IN_01_SEND_SUCCESS!.
CECI[port]43.	Mute	CECI0143. CEC_IN_01_SEND_SUCCESS!

TABLE 7-10 (CONTINUED). CONTROL THE INPUT SOURCE

COMMAND	DESCRIPTION	EXAMPLE AND FEEDBACK
CECI[port]44.	Play.	CECI0144. CEC_IN_01_SEND_SUCCESS!
CECI[port]45.	Stop.	CECI0145. CEC_IN_01_SEND_SUCCESS!
CECI[port]46.	Pause.	CECI0146. CEC_IN_01_SEND_SUCCESS!
CECI[port]48.	Rewind.	CECI0148. CEC_IN_01_SEND_SUCCESS!
CECI[port]49.	Fast forward.	CECI0149. CEC_IN_01_SEND_SUCCESS!
CECI[port]4B.	Forward..	CECI014B. CEC_IN_01_SEND_SUCCESS!
CECI[port]4C.	Backward.	CECI014C. CEC_IN_01_SEND_SUCCESS!
CECI[port]6C.	Power off.	CECI016C.. CEC_IN_01_SEND_SUCCESS!.
CECI[port]6D.	Power on.	CECI016D. CEC_IN_01_SEND_SUCCESS!.

TABLE 7-11. CONTROL THE OUTPUT DISPLAY

COMMAND	DESCRIPTION	EXAMPLE AND FEEDBACK
CECO[port]41.	Volume up.	CECO0141. CEC_OUT_01_SEND_SUCCESS!
CECO[port]42.	Volume down.	CECO0142. CEC_OUT_01_SEND_SUCCESS!
CECO[port]43.	Mute.	CECO0143. CEC_OUT_01_SEND_SUCCESS!
CECO[port]6C.	Power off.	CECO016C. CEC_OUT_01_SEND_SUCCESS!
CEO[port]6D.	Power on.	CECO016D. CEC_OUT_01_SEND_SUCCESS!

7.3.10 THIRD-PARTY DEVICE CONTROL

The switcher supports RS-232 pass-through control. A third-party device can be controlled by an RS-232 command, and the command format is shown next.

TABLE 7-12. THIRD-PARTY DEVICE CONTROL

COMMAND	FUNCTION	COMMAND EXAMPLE
UARTPassThrough:Y.	RS-232 mode selection: • Y=0, Local Control: The RS-232 port of the switcher is used to connect a control device (e.g. PC) to control the switcher. • Y=1, HDBT Transmitter Pass Through: Establish RS-232 pass-through communication between the switcher and the HDBaseT transmitter (e.g. VX-HDB2-TX). The RS-232 port of the switcher can be used to transfer commands to control the third-party device that is connected to the HDBaseT transmitter. • Y=2, HDBT Receiver Pass-through: Establish RS-232 pass-through communication between the switcher and HDBaseT receiver (e.g. VX-HDB2-RX). The RS-232 port of the switcher can be used to transfer commands to control the third-party device that is connected to the HDBaseT receiver.	
/+[X]/[Y]:xxx.	xxx: ASCII characters. • Y: Represents the RS-232 port. 1. Y=1: The RS-232 port of switcher. 2. Y=2: The RS-232 port of HDBaseT receiver. 3. Y=3: The RS-232 port of HDBaseT transmitter. • X: Represents the baud rate of the third-party device. 1. X=1, 2400 2. X=2, 4800 3. X=3, 9600 4. X=4, 19200 5. X=5, 38400 6. X=6, 57600 7. X=7, 115200	Send the command “123456” to the third-party device. The baud rate is 9600.

CHAPTER 8: OSD CONTROL

The AVSC-HDMI2-8X2 switcher has a powerful OSD operation menu that contains 3 parts: optional settings, image settings, and system settings.

There are two ways to enter OSD menu:

1. Press the MENU/2s button at least two seconds on the front panel.
2. Press the MENU button on the IR remote.

8.1 OPERATION

1. Press the directional buttons on IR Remote to switch between menu options and menu pages.
2. Press OK on the IR Remote to confirm the selection.

8.2 OSD MENU SETUP

Options include Picture, Sound, Option, System, and Info.

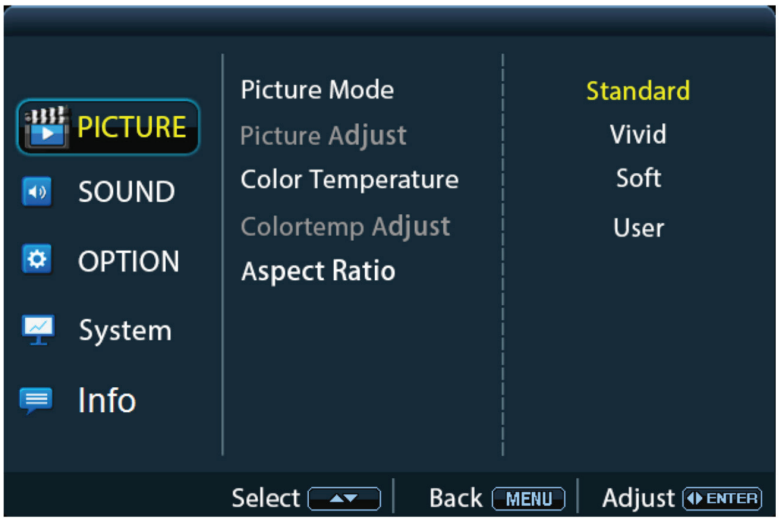

FIGURE 8-1. PICTURE MENU

NOTE: When you set the Picture Mode to User, the Picture Adjust and Colortemp Adjust are available.

CHAPTER 8: OSD CONTROL

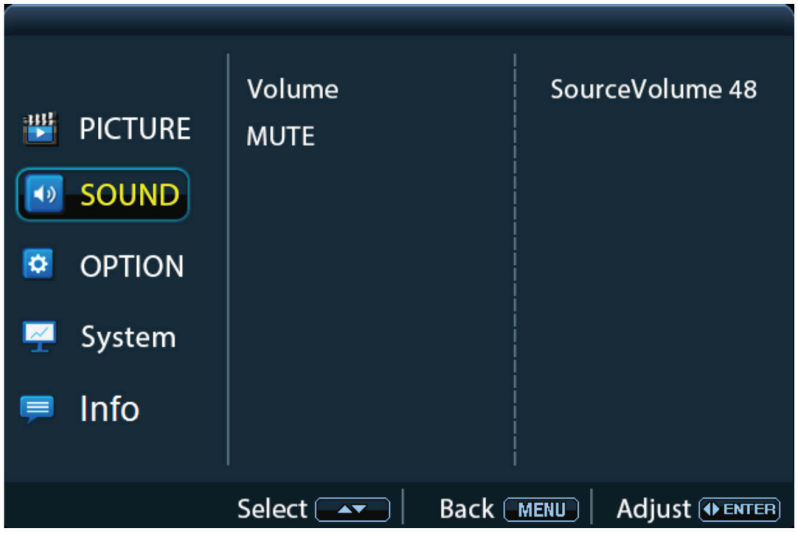

FIGURE 8-2. SOUND MENU

FIGURE 8-3. OPTION MENU

FIGURE 8-4. SYSTEM MENU

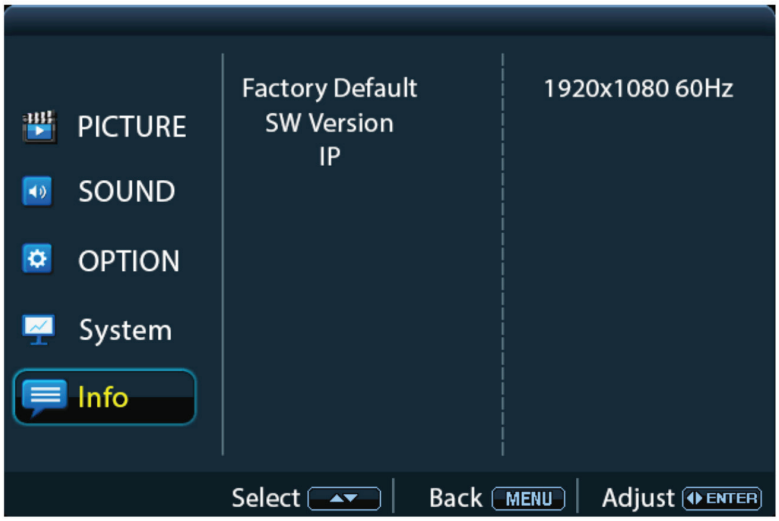

FIGURE 8-5. INFO MENU

CHAPTER 9: DIMENSIONAL DRAWING

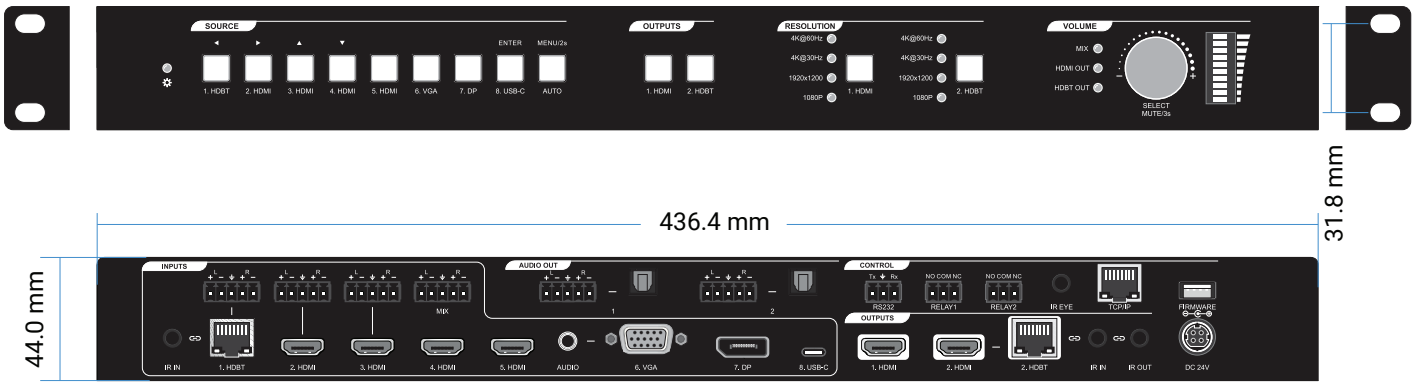

FIGURE 9-1. DIMENSIONAL DIAGRAM

CHAPTER 10: TROUBLESHOOTING

TABLE 10-1. PROBLEMS/CAUSES/SOLUTIONS

PROBLEM	POTENTIAL CAUSE	SOLUTION
Output image with white noise.	1. Poor quality cable. 2. Failed or loose connection.	Try another high quality cable.
No output image when switching	1. No signal at the input/output end. 2. Failed or loose connection. 3. The switcher is broken.	1. Check with an oscilloscope or multimeter if there is any signal at the input/output end. 2. Make sure the connection is good. 3. Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com
Power indicator doesn't work or does not respond to any operation	Failed connection of the power cord.	Make sure the power cord connection is good.
Cannot control the device using a control device (e.g. a PC) through the RS-232 port	1. Wrong RS-232 communication parameters. 2. Broken RS-232 port.	1. Type in the correct RS-232 communication parameters. 2. Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

NOTE: If the problem persists after following the above troubleshooting steps, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

APPENDIX A: REGULATORY INFORMATION

A.1 FCC STATEMENT

Class B Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an experienced radio/TV technician for help.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

A.2 CE AND ROHS2

This product complies with CE and ROHS2 certifications.

APPENDIX A: REGULATORY INFORMATION

A.3 NOM STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparato ha sido tirado o su cubierta ha sido dañada.

APPENDIX B: DISCLAIMER/TRADEMARKS

B.1 DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

B.2 TRADEMARKS USED IN THIS MANUAL

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