AVMATRIX®

SHARK H4M

ALL-IN-ONE 4-CH HDMI AUDIO & VIDEO SWITCHER

USING THE UNIT SAFELY

Before using this unit, please read below warning and precautions which provide important information concerning the proper operation of the unit. Besides, to assure that you have gained a good grasp of every feature of your new unit, read below manual. This manual should be saved and kept on hand for further convenient reference.

Warning And Cautions

※ Operate unit only on the specified supply voltage.

※ Disconnect power cord by connector only. Do not pull on cable portion.

※ Do not place or drop heavy or sharp-edged objects on power cord. A damaged cord can cause fire or electrical shock hazards. Regularly check power cord for excessive wear or damage to avoid possible fire / electrical hazards.

※ Ensure unit is properly grounded at all times to prevent electrical shock hazard.

※ Do not operate unit in hazardous or potentially explosive atmospheres. Doing so could result in fire, explosion, or other dangerous results.

※ Handle with care to avoid shocks in transit. Shocks may cause malfunction. When you need to transport the unit, use the original packing materials or alternate adequate packing.

※ Do not remove covers, panels, casing, or access circuitry with power applied to the unit! Turn power off and disconnect power cord prior to removal. Internal servicing / adjustment of unit should only be performed by qualified personnel.

※ Turn off the unit if an abnormality or malfunction occurs. Disconnect everything before moving the unit.

Please select the best installation position

※ Do not cover the air inlet and outlet of the unit, make sure that there is sufficient space around the ventilation holes on both sides to avoid blockage of ventilation.

※ To avoid falling or damage, please do not place this unit on an unstable cart, stand, or table. Make sure install this unit on a very stable horizontal surface for use.

※ Do not use this unit in a humid, dusty location or near water. Avoid liquids, metal pieces or other foreign materials to enter the unit.

※ Do not use this unit in an environment where the temperature is too cold or too hot.

※ Avoid placing this unit in direct sunlight or in a place where hot air from other products can blow.

Note: due to constant effort to improve products and product features, specifications may change without notice

CONTENTS

1. Introduction

1.1. Overview

The SHARK H4M is a professional video switcher and audio mixer, designed to meet the demands of fast-paced and complex production needs. The SHARK H4M can switch signal sources in real-time while live streaming, supporting a variety of transition effects, chroma key, DSK, USB/SD card recording, USB Type-C capture, RTMP/SRT streaming, and more. In terms of audio processing, each input channel features high-quality preamp gain, 2 band EQ, low-cut filter, stereo audio switching, digital effect processor and volume adjustment. This   all-in-one device seamlessly integrates the functions of a professional video switcher and an audio mixer, making it an ideal tool for live streaming and content creation.

1.2. Main Features

- All-in-one portable audio video switcher

- 6×microphone & 2×stereo inputs, 4-CH input embeded audio

- Balanced XLR outputs + TRS monitoring

- Gain control, signal indicator lamp, 2-band tones, low cut filter

- Mono/Stereo switch, volume adjustment function

- 99 DSP effect processor modes

- Separate bluetooth player

- MP3 recorder/player/USB sound card

- 48V phantom power supply for XLR

- 2×HDMI & 2×SDI inputs

- 2×HDMI PGM outputs, 1×HDMI multiview output, 1×USB type-C

- RTMP/SRT streaming via LAN port or USB capture streaming

- SD card recording or USB Disk recording

- Luma key, Chroma key, PIP×2/POP, DSK and LOGO overlay

- T-bar/AUTO/CUT; various effects: WIPE/MIX/DIP

2. Interface

2.1. Interface Overview

1	SD card slot（for recording)
2	MIC IN × 1
3	HDMI IN× 4
4	PGM(AUX）OUT × 2
5	Multiview (AUX) OUT × 1
6	USB REC（for recording）
7	USB OUT × 1 (UVC capture)
8	LAN Port（for PC control; video streaming; firmware update）
9	GPIO（tally Port）
10	DC 12V Input × 1
11	USB type-A × 1（insert U disk to import images and LOGO; firmware upgrade）

| 1	XLR/TRS，MIC / Balanced audio input
2	TRS, 6.35mm balanced stereo audio input
3	MAIN OUT, XLR（for powered speakers, power amplifiers, or other audio equipment）
4	TRS, 6.35mm PHONE OUT
5	+48V PEAK Indicator
6	+48V phantom power switch
7	MIX OUT (for all audio inputs from audio mixer)

● 48V Phantom Power Switch/ PEAK Indicator

Press this switch to turn on the 48V phantom power indicator, and DC 48V phantom power will be supplied to the XLR connector for condenser microphones.

Caution:

Before pressing this switch, ensure that the volume knob of the microphone input channel is set to the minimum position. Otherwise, a loud pop may occur, potentially causing damage to the power amplifier or speakers.

When using phantom power, please ensure that you are using a condenser microphone and that it is connected in a balanced configuration for maximum dynamic response. Connecting non-condenser microphones to the XLR connector with phantom power turned on may cause equipment damage.

2.2. Tally PIN
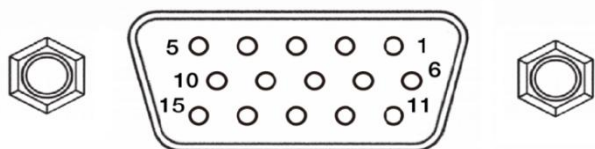
PIN	Definition	PIN	Definition
11	PGM-IN1	6	PVW-IN1
12	PGM-IN2	7	PVW-IN2
13	PGM-IN3	8	PVW-IN3
14	PGM-IN4	9	PVW-IN4
15	NC	10	NC
3	NC	4	NC
5	GND		

3. Specification

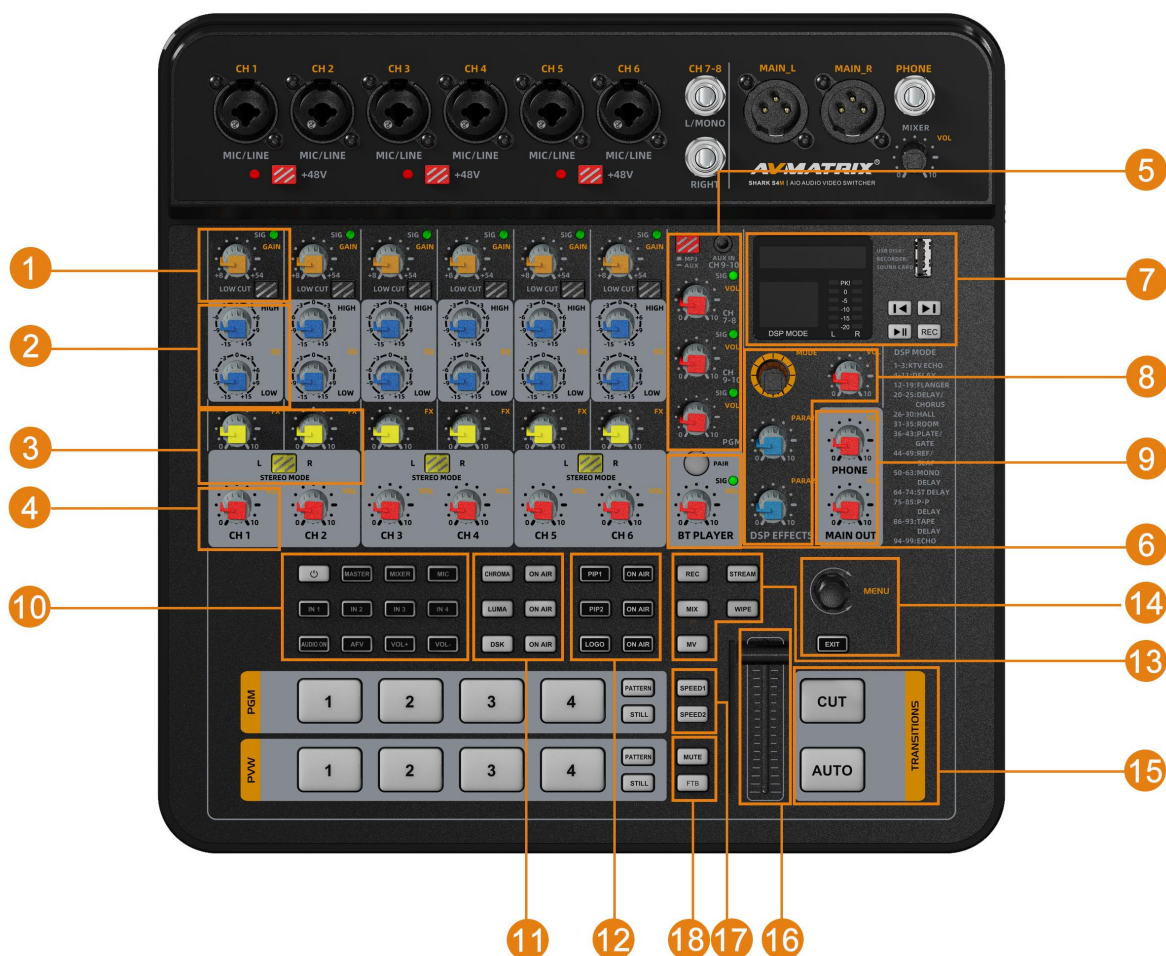| VIDEO	
CONNECTION	
Video In	HDMI type-A ×4
Video Out	HDMI type-A PGM ×2 HDMI type-A Multiview Output ×1 USB Capture: USB type-C × 1

LAN Port	LAN ×1 (web control, video streaming, firmware upgrade)
Media Library	USB type-A ×1(import/export configuration, images and LOGO; firmware upgrade)
Tally Port	DB-15 ×1
Power In	DC 12V 2A ×1
Record	SD Card /U-Disk

Function

Transitions	T-Bar/ AUTO/ CUT
Effects	Wipe (11×3 patterns)/ Mix/ DIP/ Still(freeze)/ MUTE/ FTB
Layouts	Horizontal and vertical layouts
Keys	Upstream Key: Luma Key × 1/ Chroma Key × 1/ PIP ×2/ POP Downstream Key: DSK × 1/ Logo × 1
Media	Default image: 39 preset patterns Local image: up to 16 imported images Capture image: up to 16 captured images
Generators	Pattern generator × 1 Color generators ×2

STANDARDS

HDMI In Format Support	1080p 60/ 59.94/ 50/ 30/ 29.97/ 25/ 24/ 23.98 1080i 50/ 59.94/ 60 720p 60/ 59.94 /50/ 30/ 29.97/ 25/ 24/ 23.98 576i 50, 576p 50, 480p 59.94/ 60, 480i 59.94/ 60
HDMI PGM Out	1080p 60/ 59.94/ 50/ 48/ 47.95/ 30/ 29.97/ 25/ 24/ 23.98; 1080i 60/ 59.94/ 50
HDMI Multiview Out	1080p 60/ 59.94/ 50/ 48/ 47.95/ 30/ 29.97/ 25/ 24/ 23.98; 1080i 60/ 59.94/ 50
HDMI Color Space	RGB/ YUV
USB Capture Out	Up to 1080p 60
Media Format	USB disk format support:: FAT32, Ext3, Ext4, up to 256GB Image format support: png, bmp, jpg, gif, jpeg, ppm, pbm, tif, jps, tgaLogo format support: png, bmp, jpg, gif, jpeg, ppm, pbm, tif, jps, tga Logo size support: 10× 10 pixel to 600×600 pixel

AUDIO

Connection

Audio Input Channel	Mono (MIC/LINE) ×6 Stereo (LINE) ×2 USB Player/Bluetooth ×1
Audio Output Channel	MAIN L/R OUT ×2

	PHONES ×1
	MIXER OUT ×1
Function	
Audio Mixer	XLR×6, TRS×2, HDMI×4
	Audio delay: 0-500ms
CH1-6 MIC/LINE	Gain:-14~+40 dB
	Mic input CH 2 band EQ, 80Hz/12KHz, ±15dB
	48V phantom power supply with indicator
	Peak Level LED
Stereo Input	Audio input sensitivity adjustment
	Stereo balance control
Main Output Level Meter	2-channel 6-segment LED display
Maximum Input Level	MIC+10 dBu /Line +22 dBu
Input impedance	XLR: 10k Ω
	MIC: 15k Ω
Maximum Output Level	XLR+22dBu
	TRS+20 dBu
Output impedance	XLR: 600 Ω
	Phones: 10 Ω
Frequency Response range	±1 dB, 20-22KHz
Dynamic Range	102 dB
Total Harmonic Distortion @ 1KHz	＜0.05%（MIX out）
Stereo Separation	＞80 dB
Other	
Power	12V 2A
Operating power	≤18W
Dimension (LWD)	287.7 × 286.7 × 83.2mm
Weight	Net: 2500g; Gross:3140g
Temperature	Working: -20℃~60℃, Storage: -30℃~70℃
Warranty	2 Year

4. Front Panel

4.1. Overview

1	Gain control&Low cut filter
2	2-band tones for the audio input channels
3	Effect send volume knob & switch button
4	Volume knob for the microphone input channel
5	Volume adjustment for audio input channels 7-8 and 9-10 and PGM(The PGM knob is the volume knob that sends the mixer audio + video audio mix to the main outputs)
6	Bluetooth Audio Receiver Pairing Button&Volume adjustment for Bluetooth audio
7	MP3 recording & MP3 player & USB sound card
8	DSP sound mode selection and effect adjustment
9	Adjustment of output volume

10	Power & Audio
11	USK & DSK
12	PIP/ LOGO
13	MV & Transition effect & Stream&REC
14	MENU
15	CUT/ AUTO
16	T-Bar
17	SPEED
18	MUTE/ FTB

4.2. Front Control Panel

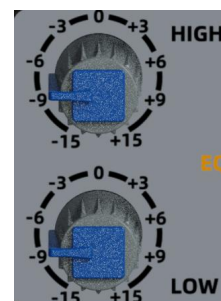|	
1.Gain control&Low cut filter **Gain control**：Adjust the preamplifier gain. When inputting normal voice or music, adjust it until the signal reaches -10dbu when the SIG indicator light flashes slightly, which is the best state. **Low cut filter**：Significantly cuts signals below 60Hz.	
2.2-band tones for the audio input channels High-quality, sensitive 2-band equalizer adjusts the overall tone of the channel. The bass and treble equalizer adjusts the wave forms in a broom shape, affecting sounds above 12KHz and below 80Hz, respectively, and adjusting the decibels above -15 and below +15.	
3.Effect send volume knob & switch button Effect send volume knob： Adjusts the volume of this channel sent to the digital effects processor. switch button：Press this button to enter the mono mode, and the signals of the two adjacent MIC channels are sent to the L/R main mix evenly. Pop up this button to enter the stereo mode, and the signal of the left channel is mixed to the left channel of the main mix, and the signal of the right channel is mixed to the right channel of the main mix.	
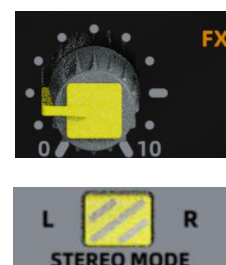
4.Volume knob for the microphone input channel

Adjusts the final volume of the channel signal in the overall mix.
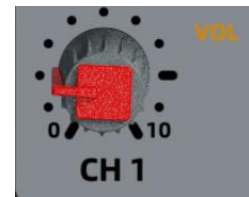
5.Volume adjustment for audio input channels 7-8 and 9-10 and PGM

MP3&AUX：Press this button, CH9-10 channel is AUX audio input, pop up this button, it is MP3 player/USB sound card audio input, with CH9-10 knob you can adjust the volume of the channel. When the signal reaches -10dbu the SIG indicator starts to flash.

CH9-10 AUX IN: 3.5mm TRRS audio auxiliary input interface.

T R R S   T=LEFT, R=RIGHT, R=GND, S=MIC
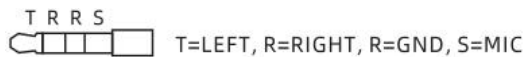
CH7-8 VOL Knob: Adjust the volume of audio input channels 7-8. When the signal reaches -10dbu, the SIG indicator starts to flash.

CH9-10 VOL Knob: Adjust the volume of audio input channels 9-10. When the signal reaches -10dbu, the SIG indicator starts to flash.

PGM VOLKnob: Adjust the volume of the mixer's audio and video audio mixes sent to the main outputs so that the SIG indicator begins to flash when the signal reaches -10dbu.
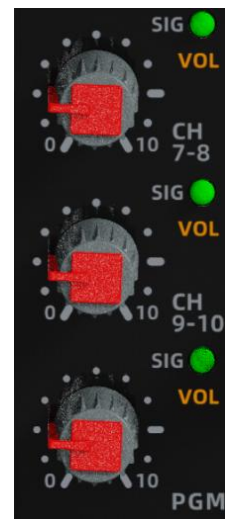
6.Bluetooth Audio Receiver Pairing Button&Volume adjustment for Bluetooth audio

PAIR: Bluetooth Audio Receiver Pairing Button

Short press the button, the bluetooth receiver enters the search state, this button blinks quickly; after connecting successfully, the button is long light;

When the Bluetooth receiver is playing, the button blinks slowly.

When the Bluetooth receiver is playing or paused, short press the button to turn off the Bluetooth receiver, the button does not light up, long press the button to clear the current connection and re-enter the search state, Bluetooth receiver name: Video Switcher.

BT PLAYER VOL Knob: The BTPLAYER VOL knob adjusts the final volume of the Bluetooth audio receiver signal in the total mix. The SIG indicator begins to flash when the signal reaches -10dbu.

7.MP3 recording & MP3 player & USB sound card

With USB interface, support USB disk MP3 playback, local USB disk recording, USB sound card function (use USB A to USB A 2.0 cable to connect to computer use).
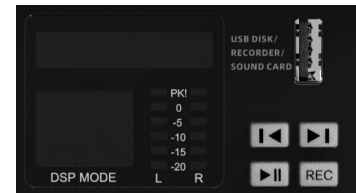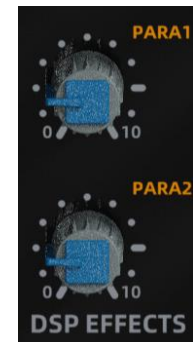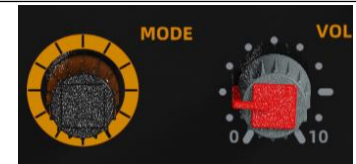

8.DSP sound mode selection and effect adjustment

MODE Button Knob:Mode Selection and Determination Knobs for Digital Effects Processors

VOL Knob：Adjusting the Volume of a DSP Digital Effects Processor in the Main Mix

PARA1 Knob:Adjusting the echo of a DSP effects processor

PARA2 Knob:Adjusting the Latency of a DSP Effects Processor

9.Adjustment of output volume

PHONE Knob：Adjusting the output volume of audio and other amplifier equipment

MAIN OUT Knob:Adjusting the volume of the main output

10.Power&Audio

Power：Press power to start the machine; press for 3 seconds to shut down the system.

MASTER: PGM Digital Audio Mixing Channel

MIXER: Analog Console Mixing Channel

MIC: 3.5mm microphone channel on the back of the switcher

IN1-IN4: Video input 1-4 embedded audio channels

AUDIO ON: Mixing output function button, the light is on to indicate that the currently selected channel participates in mixing to PGM

AFV: The audio follow button lights up to indicate that the audio follow function is enabled for the currently selected channel. The audio of this

channel will be mixed into PGM only when the image is switched to PGM output.

VOL+/-: The volume adjustment button is used to adjust the mixing volume of the selected channel (when the menu is not open, the volume can be quickly adjusted using the menu knob after selecting a channel).

Operation Logic: First press the channel button to be adjusted, the indicator light of the selected channel button flashes, at this time, the function buttons below take effect, you can adjust the mixing switch and mixing volume level. Please note the relationship between AFV and AUDIO ON, only when AUDIO ON is on can AFV take effect.

11.USK&DSK

CHROMA: Enable the Chroma Key

LUMA: Enable the Luma Key

DSK: Enable the downstream key

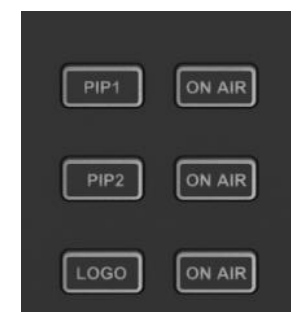**ON AIR**: Make the Chroma/Luma/DSK on PGM

12.PIP/LOGO

PIP1/PIP2: Enable two group of Picture in Picture. Size and position can be set via Menu.

LOGO: Add logo bin from USB flash disk, enable the logo overlay

ON AIR: Make the corresponding Chroma/Luma/PIP/Logo on air.


13.MV & Transition effect & Stream&REC

REC：Recording switch button, press it to start recording. Press it again during recording to stop recording and store the video.

STREAM ：Streaming switch button, press the flashing light to start connecting to the server, the light stays on to start streaming, press it again to turn off the light during streaming to stop streaming. Streaming related parameters are in the menu or recommended to be set on the web page.

WIPE: Transition from one source to another,press to light up
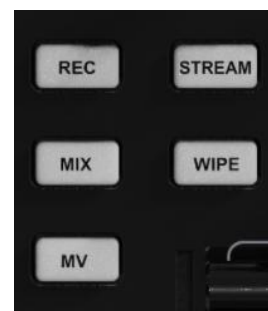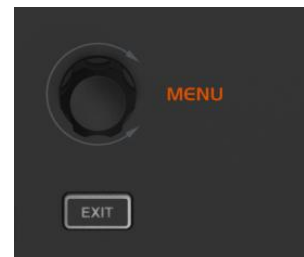
MIX: Selects a basic A/B dissolve for the next transition,press to light up

MV: Default lighted multi-picture output port and self-screen output multi-picture, press to extinguish the light to switch to the output menu settings of the multi-picture output signal source. Applicable to multi-picture monitors one-key full-screen monitoring such as PGM and other sources
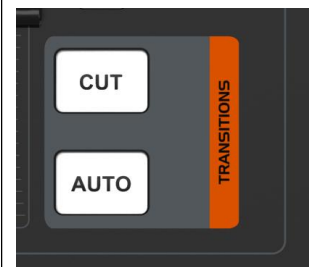
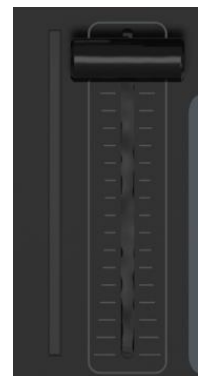|	
14.MENU For menu control, configure different parameter,Quickly adjust the mix volume to match the audio channel when the menu is not open.	
15.CUT/ AUTO **CUT**: Performs a simple immediate switch between PGM and PVW. **AUTO**: Automatically switch between PGM and PVW according to the set rate and transition effect.	
16.T-Bar Switch the PVW and PGM through T-Bar	
17.SPEED SPEED1-2: Preset transition rate, default 0.5 sec and 1 sec. Pressing will light up and user can choose auto key to switch the rate of transition automatically. The value can be changed in the menu from 0.1 to 8 seconds.	

18.MUTE/ FTB

MUTE: One-touch mute, the red light will flash after it takes effect, and it will be muted after broadcasting, use for emergency operation.

FTB: One-touch FTB, the red light will flash after it takes effect, and FTB will occur after the broadcast, use for emergency operations.

5.MP3 Player/Recorder/USB Sound Card Operating Instructions

5.1.Definition of keys

A: Shortly press：Previous one; long press: reduce the volume

B: Shortly press：the next one；long press：increase the volume

C:Shortly press：Play/Pause;long press：Select playback mode

D:Shortly press：Start recording;long press：End the recording and go back to the playback page to play the just-recorded audio clip

5.2.Use of MP3 player functions

A:Insert a USB disk into the USB interface, the playback function will be enabled automatically, and the display will be shown as follows.Short press ◄◄ ►► the button to select the track to be played forward or backward, and short press ►|| to pause and play;

B:When playing on a USB disk,long press the button ►|| , to select playback mode，Switch between loop all, loop one song and random play. Display as follows:

全部循环   当前曲目单曲循环   随机播放

5.3.Use of Recording Function

Short press the button ▶❚❚ ,The REC button in the upper right corner lights up, and the 8 in the middle shows 00:00, indicating the initial recording time, and the device is in a waiting state.


Short press the button ▶❚❚ , Start recording, the word REC in the upper right corner flashes, and the number 8 in the middle shows the length of the recording time.

During recording ， Short press the button ▶❚❚ ,To pause the recording, the word REC in the upper right corner stops flashing and the 8 characters in the center show that the recording timer is paused. Short press to resume recording again.

During recording,long press the button REC ,Ends the recording and goes back to the playback screen to play the just recorded audio clip.

5.4 USB Sound Card Function

PC mode, after connecting to the computer with the USB cable, enter the USB sound card working mode, as shown below. Set "USBAudio2.0" as the current device in your computer's recording and playback software to record and playback.

After connecting to the computer, open the sound menu of the computer system and select Speaker in the Playback option, it can be used as a USB sound card to play music.

Open the sound menu of your computer system and select Microphone in the Record option, it can be used to capture the main audio output from the audio/video switcher to your computer.

6.Power Switch

Connect your video sources and the output devices, plug the power adapter, the video switcher start to work.

Press the power button for about 3 seconds when you want to power off the switcher, select YES in the prompt box to shut down the system.

7.Multiview

This switcher has three HDMI outputs (PGM/Multi-view). Users can define these three HDMI ports according to their needs and application scenarios as IN1-IN4/PGM/Clean PGM/PVW/Color Bar/Multi-view. onnect the HDMI multi-view output to a display, and users can see the following multi-view interface. In the multi-view interface, there are PVW, PGM, IN 1/IN 2/IN 3/IN 4, and status/menu page information as shown in the figure below.


7.1 Status Page

In the status page, there are status information of FTB (Fade to Black), P-PVW (Pattern in PVW row), P-PGM (Pattern in PGM row), Logo, Still, Audio, Transition Effect, Transition Speed, USK (Upstream Key), DSK (Downstream Key),streaming time, recording time, USB disk / SD card status, encoding format and System Time. See below image.

The information of user name, working time, CPU working temperature, system time keeps displaying in the bottom of the Status/Menu page.

The information on the status page will be updated in real time as the settings are changed. It is clear and visible for the user to know the current situation and settings.Pressing the menu button on the switcher will switch the status page to the menu page. See below image.
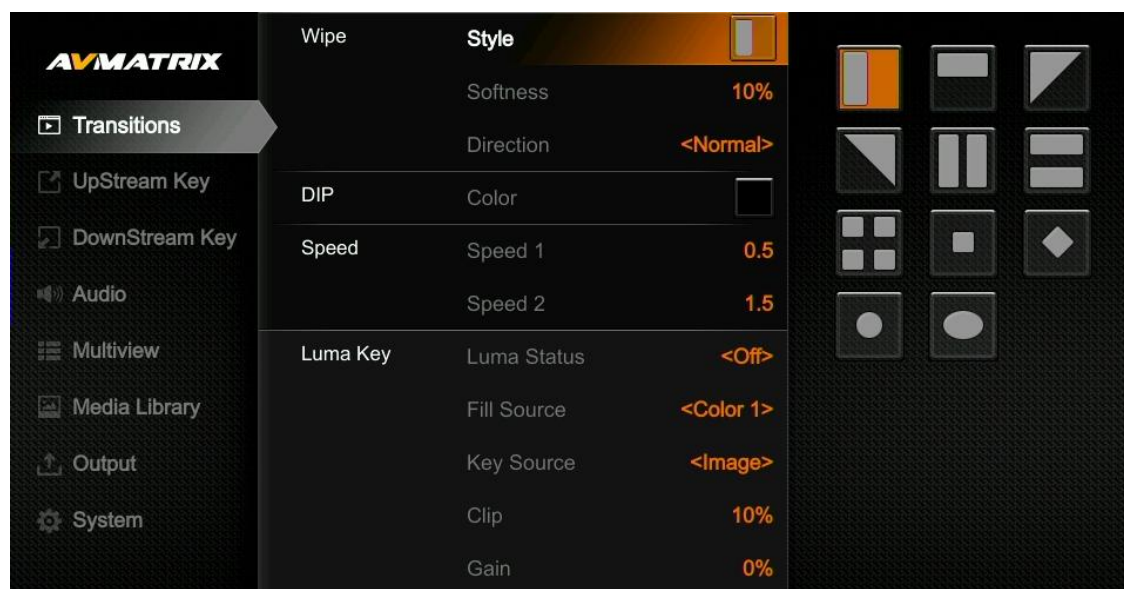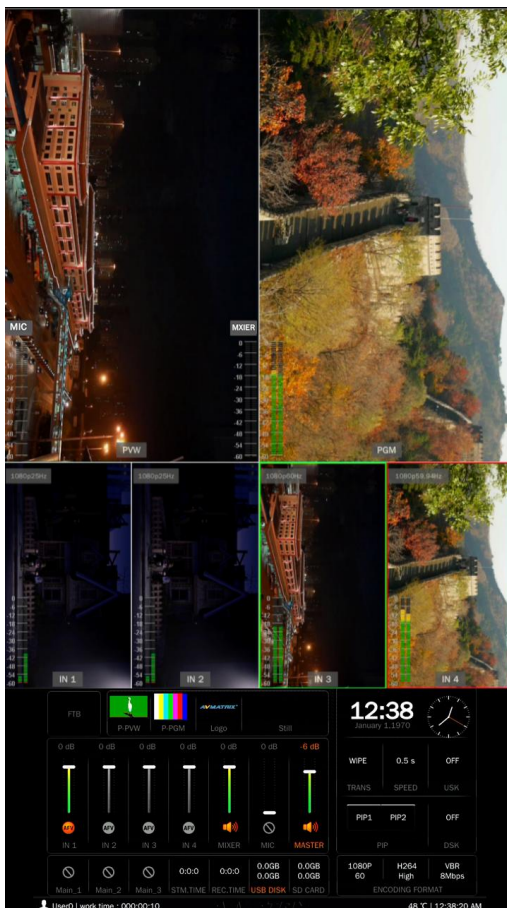

7.2 Layouts

There are two Multiview layouts that can be switched from the horizontal layout to the vertical layout from the menu, as shown in the images below.-

- Horizontal layout:


- Vertical Layout:

7.3. Audio Meter

There are audio meters in each windows of Multiview, including IN1-IN4, MIC, MIXER to show the audio status of each audio.

The audio meter of the MIXER is displayed on the right side of the preview window. Users can open/close all or each audio meter through the menu. The position of the audio meter can be chosen

on the right or left side of each window as shown in the figure below.
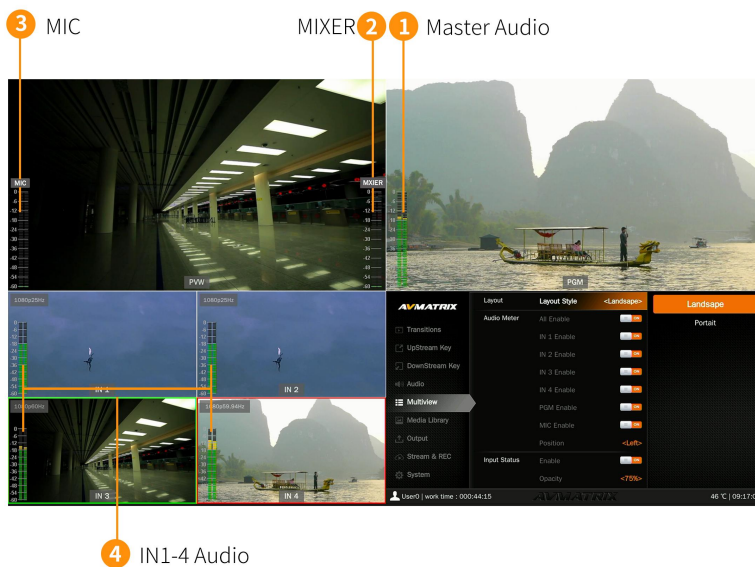
Playback Audio Level Meter: This meter indicates the current volume level of the video. Ideally, the volume should be maintained around the yellow region. Prolonged exposure to the red region should be avoided to prevent audio clipping.

MIXER Audio Level Meter: This meter indicates the output volume after the analog mixing console's mixing process. The volume level can be adjusted to an appropriate level using the mixer knob located in the upper right corner of the panel.

MIC Audio Level Indicator: This meter indicates the audio amplitude of the signal input from the 3.5mm port . The volume can be turned on and adjusted in the menu or the buttons on the audio area. Please note that you can select the corresponding mode in the menu depending on whether the connected device is a line audio or microphone device.

The Embedded Audio Level Meters of 4-Channel Input Video: These meters indicate the mixing volume levels for the four input video channels.

7.4. Input Information

Each window of IN1-IN4 can display the HDMI/SDI input signal format. It can be set in the menu whether to display, opacity (50%, 75%, 100%), size (small/medium/large), X and Y positions (1-100), text color, and background color.
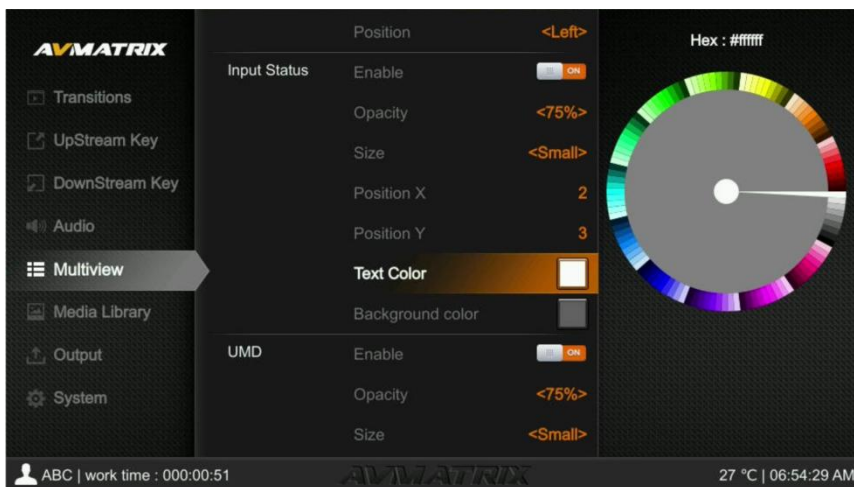
7.5.UMD Setting

The UMD of the four input ports is default to IN1, IN2, IN3, IN4. Users can turn on/off UMD in each window.

In addition, users can set the opacity (50%, 75%, 100%), size (small/medium/large), X and Y positions (1-100), foreground color, and background color of the overlay.
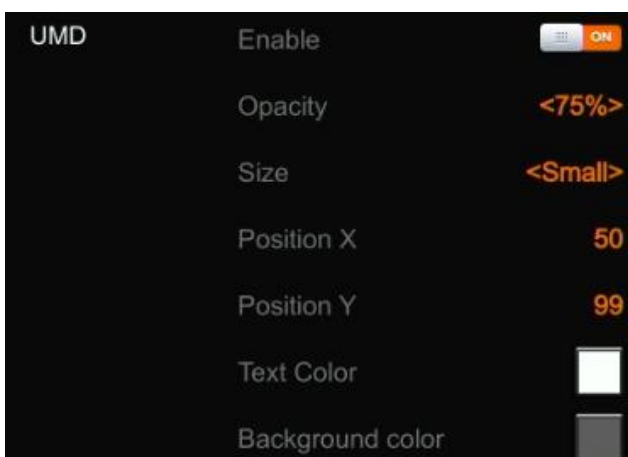
The UMD string content of the four inputs can be set from the menu. Users can rename the UMD

content for each window through the virtual keyboard and the rotation button. Up to 10 characters of UMD content input are supported. For example, IN 1 is renamed to CAM1 as shown in the figure below.
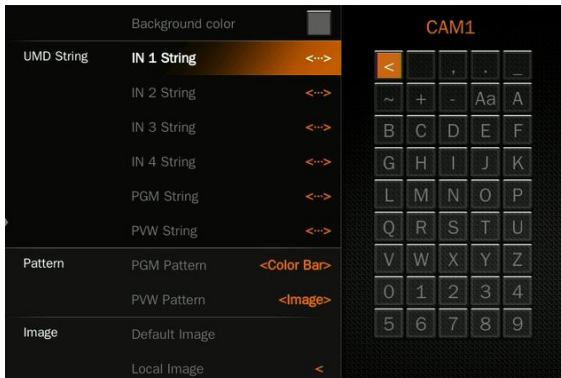
8.PGM PVW Switching

8.1PGM PVW Channel Selection

On the front panel, choose PGM and PVW sources from PGM, PVW row, and PATTERN (different patterns can be configured on the menu; see Part 13.1). The selected button for PGM will light up red, and the selected button for PVW will light up green. The PGM source will be circled in red, and the PVW source will be circled in green.
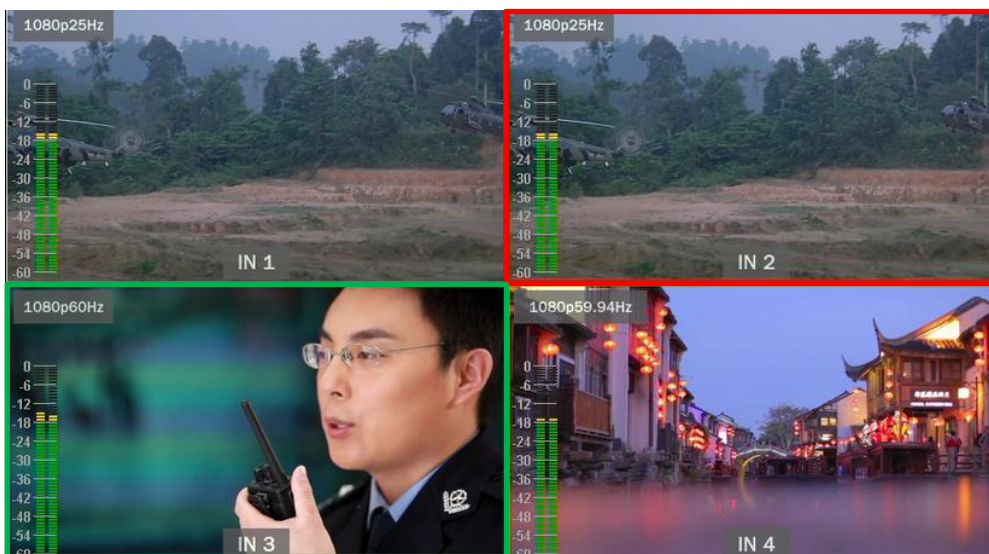
8.2 STILL

The video switcher supports STILL function, which user can freeze the input sources. Press the channel

you want to freeze in the PGM or PVW row, then press the STILL button to make the input source freeze. User can freeze all the four inputs if they need. Press the input channel and STILL again to unfreeze.

8.3.Transition: CUT/ AUTO/ T-BAR

There are two transition control types for this video switcher: Transition without effects (CUT) and Transition with effects (AUTO, T-Bar).

CUT performs a simple immediate switch between Preview and Program. This is no delay seamless switching and the selected transition effect WIPE, MIX or DIP is not used.

AUTO performs an automated switch between Preview and Program views. The timing of the transition can be set by speed button. The transition effects WIPE, DIP, MIX will also be used.

T-BAR manual transition performs similar to AUTO, but it is more flexible that the timing of the transition depends on the speed of the manual switch.

9.Transition Effect

The video switcher provides various transition effects and types for user's choice, including WIPE, DIP, MIX.

9.1 WIPE

Press the WIPE button to perform the wipe transition effect. User can choose different styles of WIPE through menu; as well as set the softness of edge. Select the direction from Normal/ Invert/ Flip-Flop when use AUTO transition.

Press the INV button to invert the selected wipe so it acts in the opposite direction.

Flip-Flop to invert between Normal and Invert.

9.2 DIP

Press the DIP button to perform the DIP transition effect. User can select the various color for DIP from the palette on menu. The default color is black.

DIP to Black (fade out):

DIP to White (fade out):

9.3 MIX

Press the MIX button to perform the MIX transition effect.

9.4Transition Speed Setting

The user can set two transition speeds on the menu, and the defined speed values will be saved and correspond to the Speed 1 and Speed 2 buttons. The higher the value, the slower the transition speed. A total of 0.1s-8.0s are available to choose from.

10.Upstream Key

Upstream Key essentially means that these are keys that are included as part of the transition, so in the transition from whatever on Preview to Program, anything that's an Upstream Key is going to be transitioned with it.

10.1 Luma Key

Key Source = Fill Source

Key source　　　　Fill source　　　　Bacground　　　　Combined output

Key Source ≠ Fill Source

Key source　　　　Fill source　　　　Bacground　　　　Combined output

Luma key provides a way to composite a Text clip over a background clip based on the luminance levels in the video. Turn on the Luma Key, a color from the key source will be removed, revealing another background image behind it.

Clip: Adjust the threshold at which the key cuts its hole. When decrease the clip degree, more of the background will appear. If the background video is completely black then the clip value is too low.

Gain: Adjusts the performance of the chroma key in light or white areas. Apply more Key Gain if the light areas are becoming too transparent.

Invert Key: Inverts the key signal.

Mask: Configure the Mask for the Key area

LUMA button ON: Luma key shows on PVW

ON AIR button ON: Luma Key available on PGM

LUMA and ON AIR button both ON: Luma Key available on both PVW and PGM. Corresponding status in menu is <KEY & ON AIR>

Luma key menu interface and parameter setting as below:

Menu	Sub-menu	Item	Parameter	Default
Upstream Key	Luma Key	Luma Status	OFF/ KEY (PVW)/ ON AIR (PGM)/ KEY & ON AIR	OFF
		Fill Source	Black/ Color Bar/ Color 1/ Color 2/ IN 1/ IN 2/ IN 3/ IN 4/ Image	Color1

		Key Source	Black/ Color Bar/ Color 1/ Color 2/ IN 1/ IN 2/ IN 3/ IN 4/ Image	Image
		Clip	0%-100%	10%
		Gain	0%-100%	0%
		Invert Key	On/Off	Off
		Mask Enable	On/Off	Off
		Mask Left	0%-100%	0%
		Mask Top	0%-100%	0%
		Mask Right	0%-100%	50%
		Mask Bottom	0%-100%	50%

10.2 Chroma Key

Chroma Key is a visual-effects and post-production technique for compositing (layering)
two images or video streams together based on color hues (chroma range). The technique has been
used in many fields to remove a background from the subject of a photo or video, particularly
the newscasting, motion picture, and video game industries.

key source　　　　+　　　Background　　　=　　　Combined output

key source　　　　+　　　Background　　　=　　　Combined output

Clip: Adjust the threshold at which the key cuts its hole. When decrease the clip degree, more of the background will appear. If the background video is completely black then the clip value is too low.

Gain: Adjusts the performance of the chroma key in light or white areas. Apply more Key Gain if the light areas are becoming too transparent.

Invert Key: Inverts the key signal.

Mask: Configure the Mask for the Key area

CHROMA button ON: Chroma key shows on PVW.

ON AIR button ON: Chroma Key available on PGM

CHROMA and **ON AIR** button both ON: Chroma Key available on both PVW and PGM. Corresponding status in menu is <KEY & ON AIR>

Chroma Key detailed parameters setting as below table:

Menu	Sub-menu	Item	Parameter	Default
Upstream Key	Chroma Key	Chroma Status	OFF/ KEY (PVW)/ ON AIR (PGM)/ KEY & ON AIR	Off
		Key Source	Black/ Color Bar/ Color 1/ Color 2/ IN 1/ IN 2/ IN 3/ IN 4/ Image	Image
		Key Color R	0~255	0
		Key Color G	0~255	255
		Key Color B	0~255	0
		Fetch Color		0
		Key Color Type	Red/Green/Blue/Custom	Green
		Similarity	0-1000	409
		Smoothness	0-1000	82
		Brightness	0%-100%	50%
		Contrast	0%-100%	50%
		Saturation	0%-100%	50%
		Default	Off/Reset Default	Off
		Mask Enable	On/Off	Off
		Mask Left	0%-100%	0%
		Mask Top	0%-100%	0%
		Mask Right	0%-100%	50%
		Mask Bottom	0%-100%	50%

10.3 PIP & POP

PIP1　　　+　　　PIP2　　　+　　　Background　　　→　　　Background

The video switcher supports two groups PIP or one POP. When press PIP1 or PIP2 button, there will be a small image display on the top left corner of PVW window. Press the Menu knob and choose the PIP setting interface, user can set parameters including position, size, border etc. Press ON AIR button next to PIP1 and PIP2 to put the PIP into effect on PGM.

PIP1/ PIP2 button ON: PIP1 or PIP2 shows on PVW.

ON AIR button ON: PIP1 or PIP2 Key available on PGM.

PIP1/ PIP2 and **ON AIR** button both ON: PIP1 or PIP2 available on both PVW and PGM. Corresponding status in menu is <KEY & ON AIR>

Set the POP same on menu, when POP are working, PIP is inoperative.

PIP & POP detailed parameters as below:

Menu	Sub-Menu	Item	Parameter	Default
Upstream Key	PIP/POP	Border Color	Color	White
		Border Width	0~15	2
		PIP1 Status	OFF/ KEY (PVW)/ ON AIR (PGM)/ KEY & ON AIR	Off
		PIP1 Source	Black/ Color Bar/ Color 1/ Color 2/ IN 1/ IN 2/ IN 3/ IN 4/ Image	IN 1
		PIP1 Size	1/2 1/4 1/8	1/4
		PIP1 Position X	0~100	0
		PIP1 Position Y	0~100	0
		PIP2 Status	OFF/ KEY (PVW)/ ON AIR (PGM)/ KEY & ON AIR	Off
		PIP2 Source	Black/ Color Bar/ Color 1/ Color 2/ IN 1/ IN 2/ IN 3/ IN 4/ Image	IN 2
		PIP2 Size	1/2/1/4/1/8	1/4
		PIP2 Position X	0~100	100
		PIP2 Position Y	0~100	0
		POP Status	OFF/ KEY (PVW)/ ON AIR (PGM)/ KEY & ON AIR	off
		POP Source 1	Black/ Color Bar/ Color 1/ Color 2/ IN 1/ IN 2/ IN 3/ IN 4/ Image	IN 1

		POP Source 2	Black/ Color Bar/ Color 1/ Color 2/ IN 1/ IN 2/ IN 3/ IN 4/ Image	IN 2

11.Downstream Key

11.1 DSK

Key source　+　Fill source　+　Bacground　=　Combined output

Downstream keys are the last layers of keying, so they overlay all video switched to the main program output. They operate independently to what's selected as the "background", whatever you place on a Downstream key is going to stay on screen, no matter what you are doing with your transitions. Downstream key is ideal for bringing animated bugs or logos on screen.

User can set the source (Fill Source, Key Source), Clip, Gain and mask (Mask Enable, Mask Left, Mask Top, Mask Right, Mask Bottom) of DSK can be set from menu. Parameters as below. Press the ON AIR button next to the DSK button to enable the KEY on PGM. Using AUTO or T-Bar to switch the PVW and DSK to PGM. The Key will not be changed when switching been the PVW and PGM.

Press ON AIR button next to DSK button to put the downstream key into effect on PGM.

DSK button ON: DSK key shows on PVW.

ON AIR button ON: DSK Key available on PGM.

DSK and **ON AIR** button both ON: Downstream Key available on both PVW and PGM. Corresponding status in menu is <KEY & ON AIR>

Downstream Key detailed parameters as below:

Menu	Sub-Menu	Item	Parameter	Default
Downstream Key	DSK	DSK Status	OFF/ KEY (PVW)/ ON AIR (PGM)/ KEY & ON AIR	Off
		Fill Source	Black/ Color Bar/ Color 1/ Color 2/IN 1/ IN 2/ IN 3/ IN 4/Image	Black
		Key Source	A. Black/ Color Bar/ Color 1/ Color 2/ IN 1/ IN 2/ IN 3/ IN 4/Image	Black

Clip	0%-100%	0%
Gain	0%-100%	0%
Invert Key	On/Off	Off
Mask Enable	On/Off	Off
Mask Left	0%-100%	0
Mask Top	0%-100%	0
Mask Right	0%-100%	0
Mask Bottom	0%-100%	0

11.2 LOGO

This switcher allows users to import logos. Press the menu button to select the logo settings interface, where users can choose logos from the media pool on a USB flash drive, and set the position, size, and opacity. Rotate the menu knob to select the logo, and then press the menu knob to select and delete the logo.

Logo format support:: png, bmp, jpg, gif, jpeg, ppm, pbm, tif, jps, mpo, tga

Logo size support: 10×10 pixel to 600×600 pixel

LOGO button ON：LOGO shows on PVW.

ON AIR button ON：LOGO shows on PGM

ON AIR and **LOGO** button both ON：DSK available on both PVW and PGM. Corresponding status in menu is <KEY & ON AIR>

Background　　　　　LOGO　　　　　Combined output
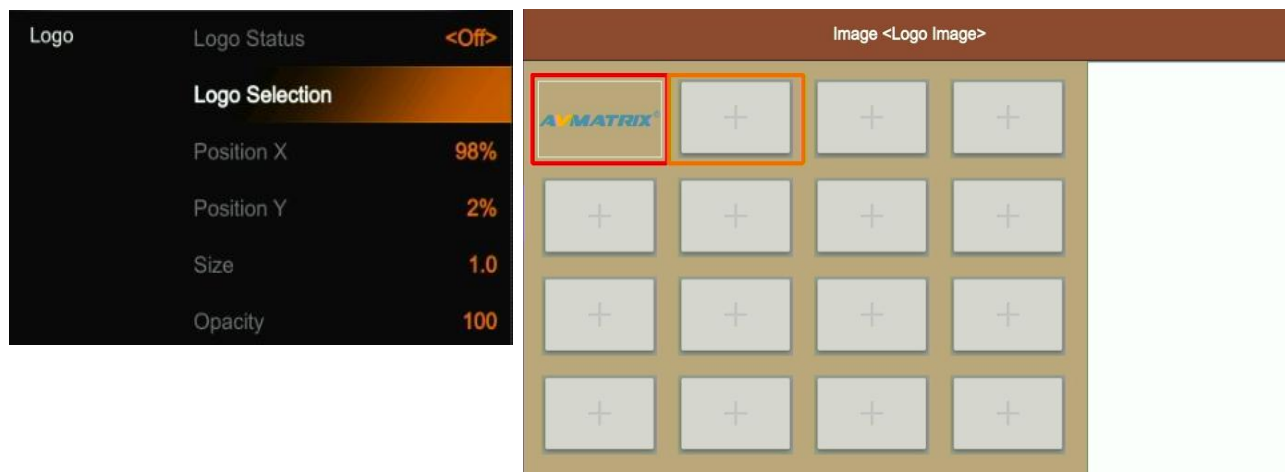
12.Output Setting

12.1 Output Interfaces
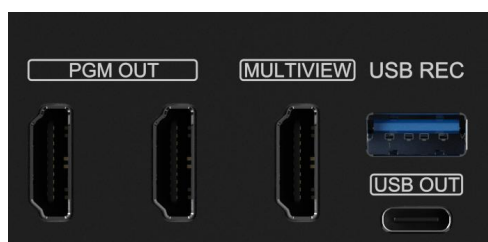
SHARK H4M has 4 outputs. There are default as 1 Multiview out,2 PGM out and 1 USB out. All outputs also can be defined as an AUX OUT from IN 1,IN 2, IN 3, IN 4, PVW, PGM, Clean PGM, Color Bar 和 Multiview out。

12.2 Multiview Out

The defaulted output of multiview port is the Multiview, the LED indicator of MV button in the front panel is green. User can connect it to an additional LCD display to monitor the SDI and HDMI inputs, PVW, PGM and status interface clearly. User can also configure the output of multiview port to other options according to their application requirement. When Multiview output is defined as other output, for example IN 1, user can press the MV button to quickly switch the output between multiview out and configured IN 1.

 : LED indicator on, multiview output port shows the Multiview.

 : LED indicator off, multiview output port shows the configured other output.

12.3 PGM Out

When one of the outputs is defined as the program output, users can connect it to other LCD displays to monitor the program output video. The program output video includes the video with overlaid images from the USK and DSK. PGM Clean is the clean program video, which is the video feed after removing downstream key (subtitles, logos, etc.) overlay layers.

12.4 USB Out

Switching the stream port as USB Out and connecting the USB output to a PC with a type-C USB2.0 cable, users can use software like OBS, PotPlayer, VMix, etc. to play or store the captured USB Out video and audio on live streaming platforms like Zoom,Teams, Skype, etc. The USB output is based on UVC (USB video class) and UAC (USB audio class) standard. No additional drivers need be installed. The relevant video and audio devices will be detected in the Windows Device Manager as below:

• **Under Imaging Devices:** USB Capture Video

• **Under Audio inputs and outputs:** USB Capture Audio

The video source of USB out defaults to PGM output.User can also configure it as IN 1, IN 2, IN 3, IN 4, PVW or Clean PGM.Users can live streaming directly to the live platform via webpage.

12.4.1.PGM Image Setting

Users can set the brightness, contrast, and saturation of the PGM output in the menu. The setting range is 0%-100%. The default setting is 50%.

12.4.2.PGM and Multiview Formats

The switcher supports up/ down scaling output. Besides, user can switch the Frame Rate Mode between Integer or Decimal. When the Frame Rate Mode is integer, there are 1080i50、1080i60、1080p24、1080p25、1080p30、1080p48、1080p50、1080p60 for option. When the Frame Rate Mode is Decimal，there are 1080i50、1080i59.94、1080p23.98、1080p25、1080p29.97、1080p47.95、1080p50、1080p59.94for

option. The default format of PGM and Multiview is 1080p60.

12.4.3..PGM and Multiview Color Space

There are YUV, RGB Full, RGB Limit color space options for PGM and Multiview out. The default color space of the output is YUV.

12.5.FTB

The FTB (Fade to Black) feature is usually used for emergency situations when using the switcher for an event. When you press the FTB button, the PGM will be faded to black to hide all other layers. The FTB button will keep flashing until you press the button again to stop the FTB.

Note: When the PGM window display black and keep black even after transition, please check if the FTB button flashing.
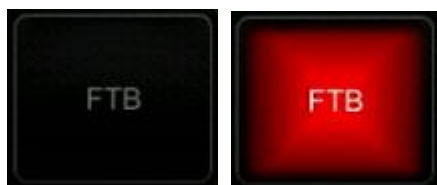
(1) Set the FTB and Mute speed

The speed of FTB and MUTE can also be adjusted from 0 to 3 seconds in the menu. The speed setting controls the duration of the entire FTB and MUTE transition. For example, if the speed is set to 2.5s, the PGM video will fade to black and the audio will MUTE gradually over 2.5 seconds.

(2) FTB with MUTE

FTB can also be used with MUTE. Press the MUTE button or enable the FTB with MUTE function from the menu to fade the PGM to black with mute.

13.Audio Setting

All audio status show in the status page of Multiview, and in each Multiview window there is an audio meter for monitoring all the audio status.

 =Audio off;   =Audio on, AFV off;

 =Audio on, AFV on & activated;   =Audio on, AFV on & non activated

13.1.Master Audio

Master audio is an audio control for PGM output. It can be mixed audio or AFV audio. User can turn on/off the master audio or adjust audio volume.

13.2.Audio On

There are a total of 6 audio sources, including 4 HDMI embedded audio channels and Mixer audio inputs. Users can independently turn on/off or adjust the volume of each audio source (IN 1, IN 2, IN 3, IN 4, Mixer).
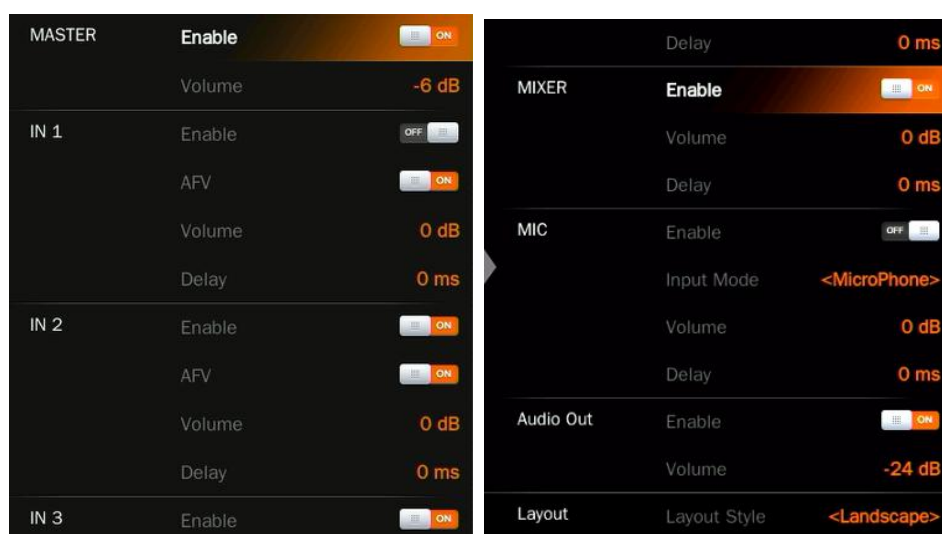
13.3.AFV(Audio-Follow-Video)

Each channel of the 4 HDMI embedded audios can be set to AFV (Audio-Follow-Video). When one IN

audio is set to AFV mode, then the audio will be turned on only when the PGM switches to this channel video source.

For example, IN 1 audio is set to AFV mode, the IN 1 embedded audio will be turn on only when the switcher switch HDMI 1 as the video source of PGM.

13.4.Audio Delay

In the menu there is an audio delay setting for IN1, IN 2, IN 3, IN 4, Mixer. User can adjust the audio delay to make the audio and video synchronization. The audio can be delayed by a maximum of 500ms.

13.5 Audio Keyboard Configuration

The audio not only can be configured by the menu but also can be configured by the keyboard control of the switcher. The keyboard includes two parts as below image.

Part A is for selecting one audio to be configured, including Master, MIC 1,INI 1,IN 2, IN 3 and IN 4.

Part B is for setting audio functions, including AUDIO ON, AFV, VOL+ and VOL-.
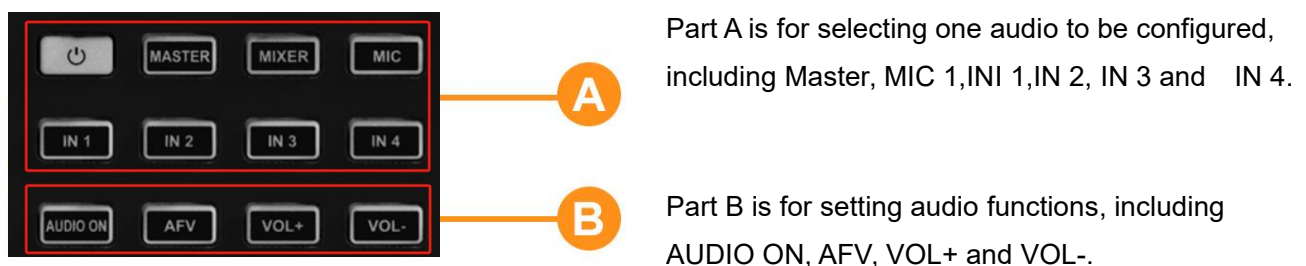
13.5.1 Audio Indicator
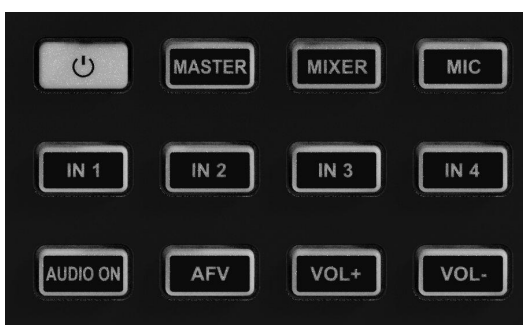
When the indicator of button in Part A is on in green means the corresponding audio is on. When the indicator is off means the corresponding audio is off.

Taking the image as an example, after pressing the IN1 button, the indicator of IN 1 keeps blinking, while the indicator of AUDIO ON button is green and the indicator of AFV button is green, i.e., audio of IN1 is on and AFV of IN1 is off.

After pressing one Part A button, the indicator of button in Part B is on in green means the corresponding audio function is on. When the indicator is off means the corresponding function is off.

13.5.2.Audio Configuration Steps

Step 1. Press one button from Part A to select the audio for configuration, the LED indicator of the button will keep flashing, which means it is available to make configuration.

Step 2. Press AUDIO ON button from Part B to turn on the audio, then LED indicator turns to green, and press AFV button to set the audio following video, and LED indicator turns green. Press the AUDIO ON/ AFV double times to turn it off and indicator turns off too. Press button VOL+/ VOL- to adjust the audio volume. Note: AFV button is not available for MASTER.

Step 3. The selected button from Part A in Step 1 is still flashing, press it again to finish the configuration and the indicator stops flashing. Or when Part A button is flashing press another button from Part A to select the next audio to configurate it in the same way, and when finish all configuration of audio, press again the flashing button from Part A to finish all configuration and stop the flashing indicator.

13.5.3.Mute

The switcher has a MUTE button in the row of PVW keyboard. It is quick and easy for user to press the button to make the Master audio turn off. When MUTE turns on the LED indicator keeps flashing which means the PGM audio is being mute. Besides, the speed of MUTE can be set from menu (Refers to Part 11.12)

14.Media Library

14.1.PVW Pattern & PGM Pattern

This switcher PVW and PGM can be set to customized patterns. The PVW and PGM pattern source can be selected from black FTB/color bar/color 1/color 2/ IN1/IN2/IN 3/IN 4/Image.
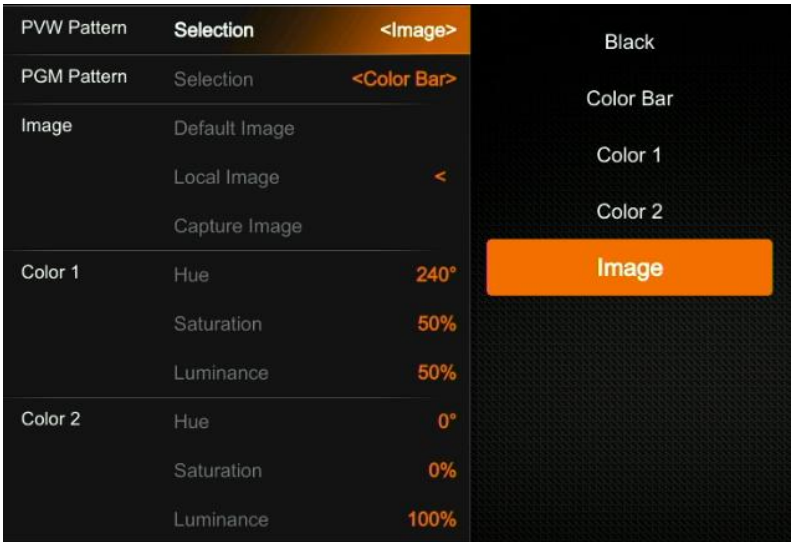
14.2.User-defined Color Pattern

There are two color patterns Color 1 and Color 2 for user-definition. User can set the hue, saturation, and luminance to generate the color pattern for Color 1 and Color 2. See below image.
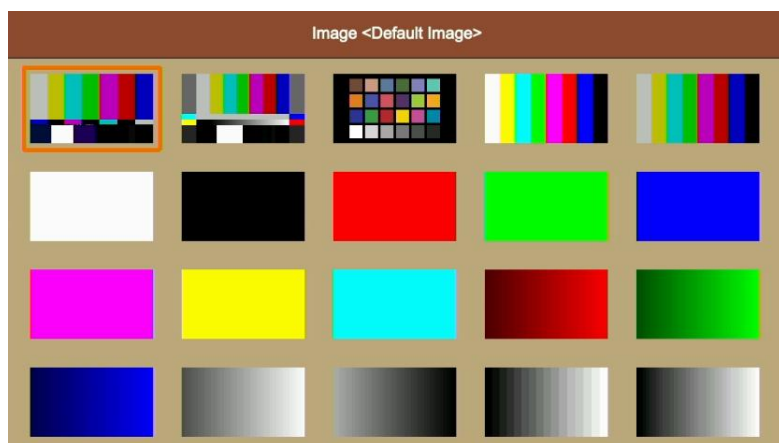

14.3.Image Setting

Users can use images as PVW and PGM patterns. Users can select image source from default image, local image or captured image.

14.3.1Default Image

The default image is the preset image in the switcher. The user can use the knob to select an image from the default image as the source of the PVW or PGM pattern.

14.3.2.Local Image

The local images are the images which you upload from USB disk. When you plug in a USB disk, a USB icon will appear in the bottom of the Status/Menu page. The image list from USB disk can be viewed on the menu. Select one image to upload it into the switcher. The uploaded image will be listed in the media list. User can press the rotary button to select the uploaded image as source for PVW/PGM pattern by selecting the option Select. User can delete the uploaded image from the menu. Up to 16 images can be imported. See below images.
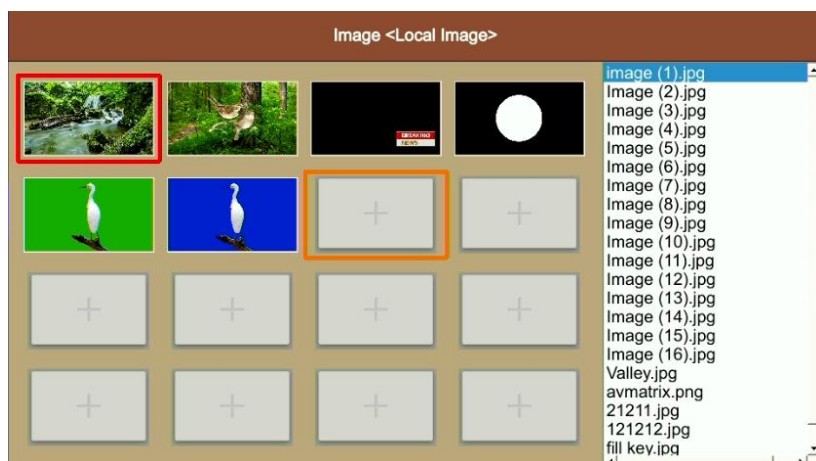
14.3.3.Capture Image

Capture images from IN1, IN 2, IN3, IN 4, Clean PGM, PGM screenshots. The captured images will be listed in the media list. Up to 16 captured images are supported. User can select the captured image as preview/ PGM pattern source by knob selection. User can delete the captured image from the menu. See below images.

15. Streaming and Recording

15.1.Streaming

The switcher has two live streaming methods: via USB or Ethernet. Users can select the output method in the output settings.
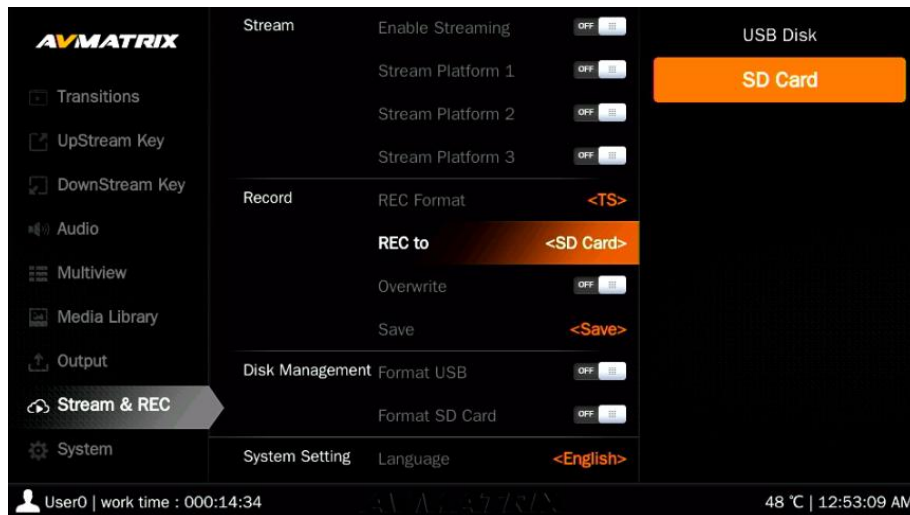
With the USB Type-C port, users can capture video to a computer and stream it live through streaming software such as OBS, PotPlayer, etc.

Using the LAN port, users can directly broadcast live on the live streaming platform via IP address.

Network streaming：

Open the streaming settings of the streaming platform to get the streaming URL and streaming key of the live platform. Use the LAN port to log in to the IP website, select "Streaming Settings", copy the streaming URL and streaming key to the URL, and check " √ ", click "Start "Streaming" to realize the streaming , and users can go to the live streaming platform to watch. The following is an example of how to streaming.

Step1: Access the switcher's web page by entering its IP address (192.168.1.215) into a web browser and login the account (Name: admin, Password: admin), select "Stream settings" section.
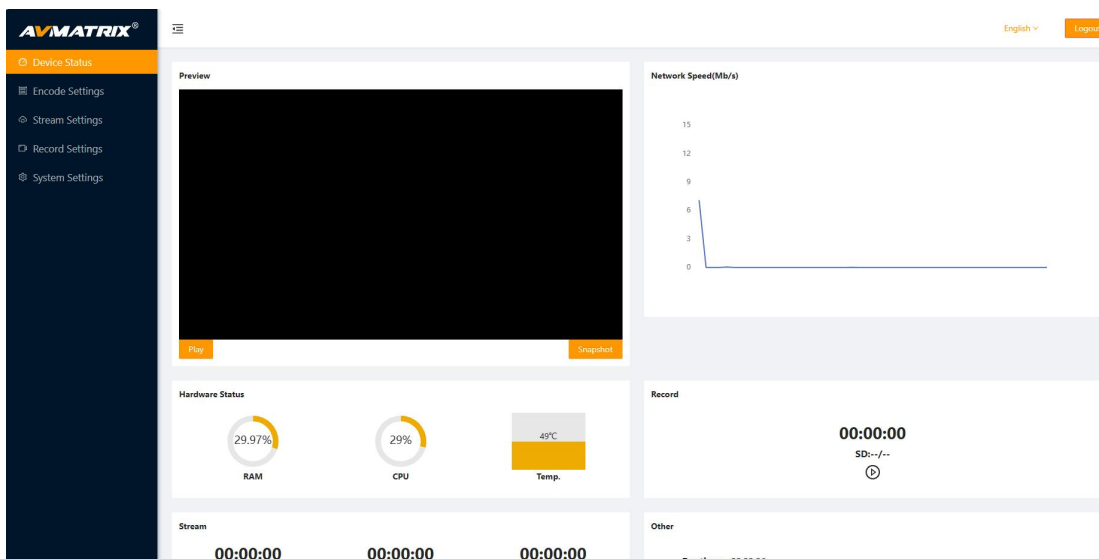
Step2: Users can customize the Bitrate, Rate control, Encoder, Resolution, FPS of the live video based on operating environment in the encode settings, and click "Save" after the settings. For example, if the network speed is slow, the Bitrate Control can be switched from CBR to VBR and adjust the Bitrate. Users can also set up from the web page.

Step3: Access the live streaming settings of the stream platform and obtain and copy the Stream URL and streaming key.

Sept4：Open the stream settings window, and users can select the desired streaming platform. After selecting the platform, paste the streaming key into the designated field. Enable the "Start" option and click "Save & Apply" to initiate the live stream. Users can customize the main stream and sub-stream names as needed. If the desired streaming platform is not available in the menu, users can select the custom mode or open the URL editing mode, enter the streaming key and stream URL to start streaming.
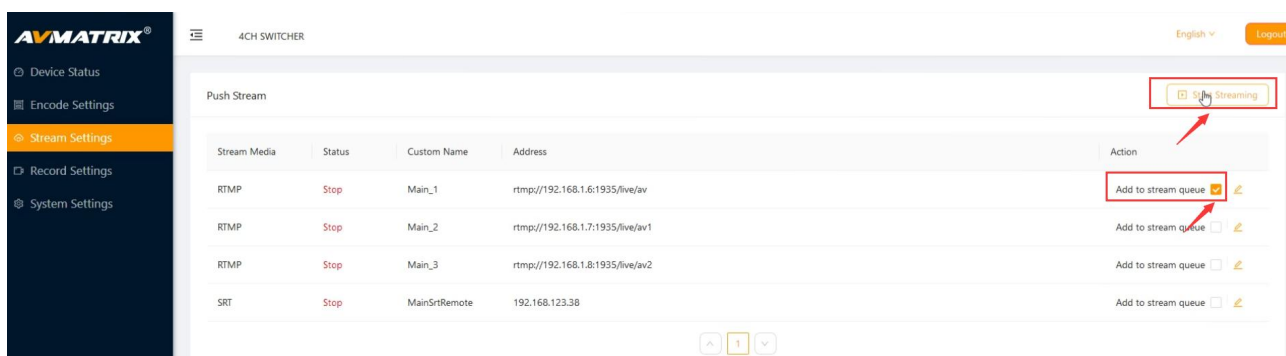
When the streaming status in the multiview turns green, and the streaming time on the menu status page start to count , it means the live streaming starts.

When the streaming status in the multiview turns orange, this means the state of being connected.

When the streaming status in the multiview turns grey, this means the connection failed.

When the icon is shown disabled, it means the menu is not enabled for streaming.
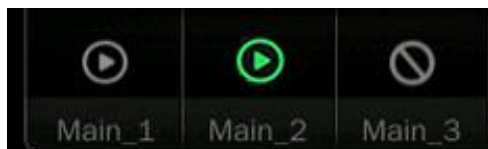
Note: Streaming to the server requires a network connection. When using domain name resolution, check whether the local DNS configuration is valid. It is recommended to select automatic IP acquisition, and the router will assign the correct IP and DNS server.

The bitrate of the streaming is closely related to the network bandwidth. When the network upload bandwidth is low, the bitrate of the streaming should be appropriately reduced. An unstable network may cause packet loss, resulting in interruption or freeze of the streaming.
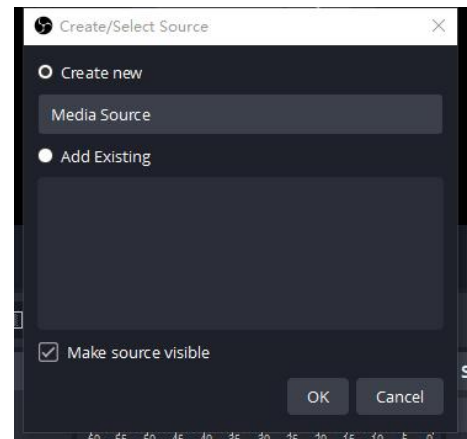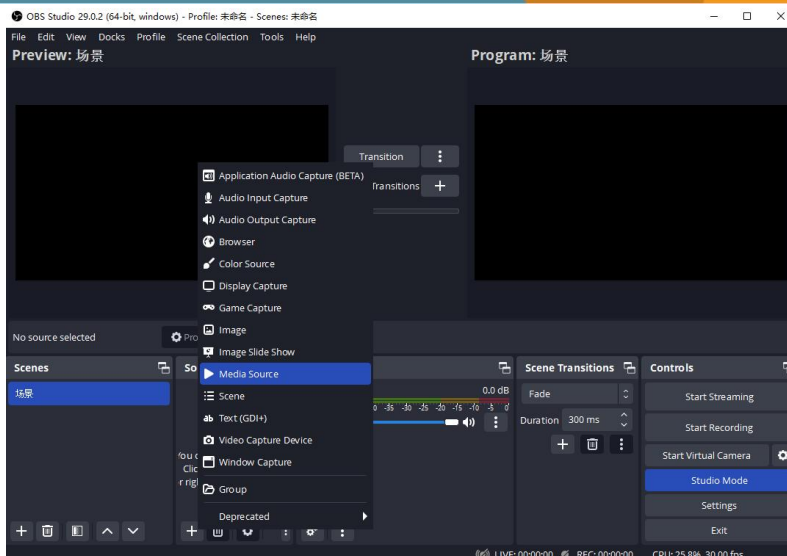
Local pull streaming:

Login to the IP site, select "Stream settings", get the local address, open a video player such as OBS, PotPlayer, etc., and open the copied "local address URL" link to finish local streaming.
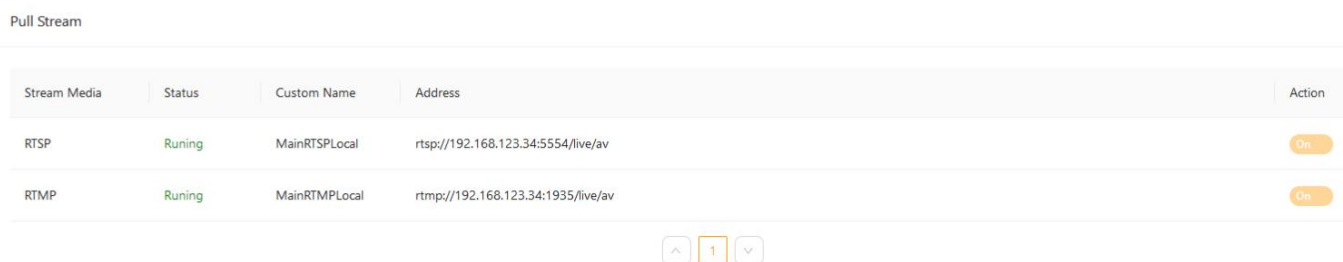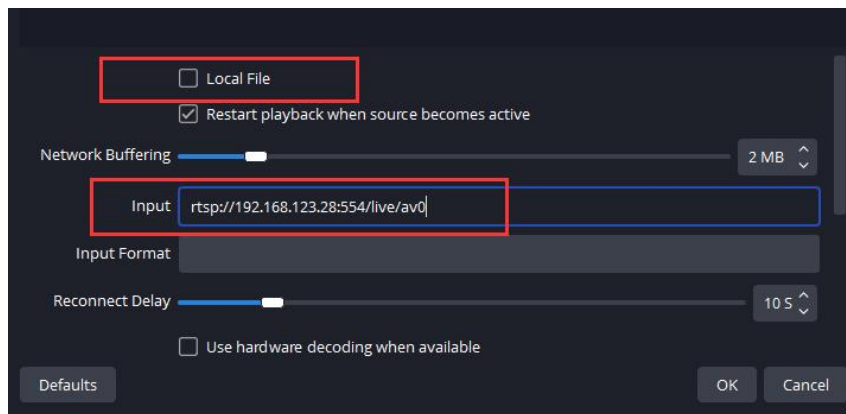

Using OBS as an example.

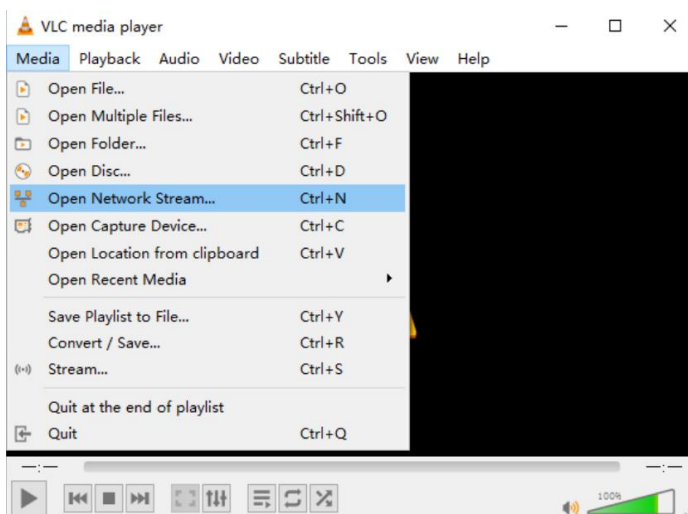Step1: Open OBS studio, click "+" key in the sources, create a new Media source.

Step 2: Cancel the local file setting, add "local address URL" in the "input", and then click "OK" .to finish local streaming.
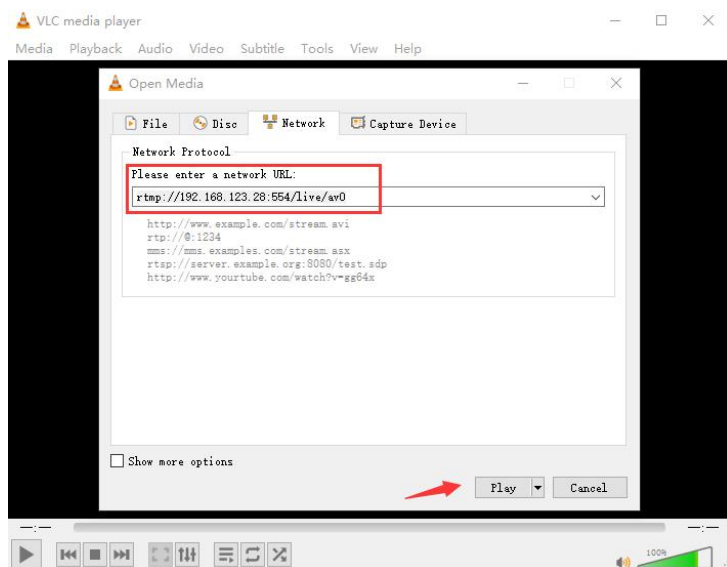

How to play the RTSP Stream by the VLC Player:

Step 1: Open the VLC Player, and click "Open Network" key in the Media.

<u>Step 2:</u> Obtain Pull stream from IP site, "Stream settings"－" Pull Stream".(Refers to 14.1 Local pull streaming)

<u>Step 3:</u> Please enter the RTSP address (av0 means main stream; av1 means sub stream)

15.2.Recording

The switcher has two recording methods, one is recording through USB disk and the other is recording through SD card.

Insert the USB disk or SD card, select the recording device in the record settings according to user's need, and then click "Save" and press the REC button on the panel to start recording, the status will show the device information. Users can also select the recording format between MP4 and TS through the record settings.
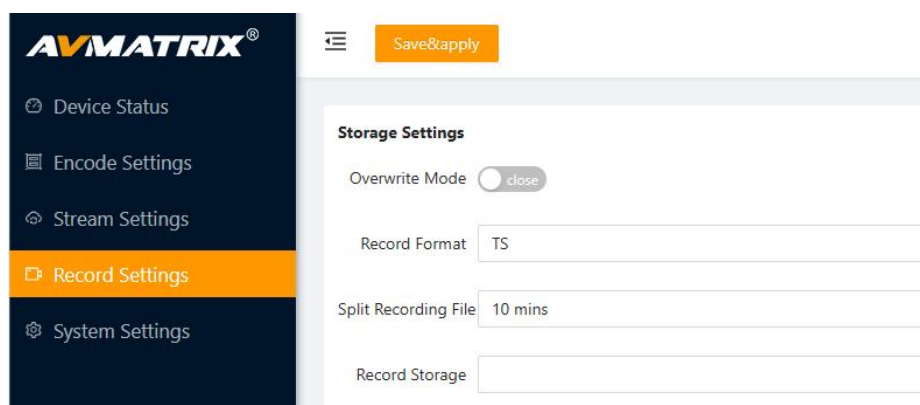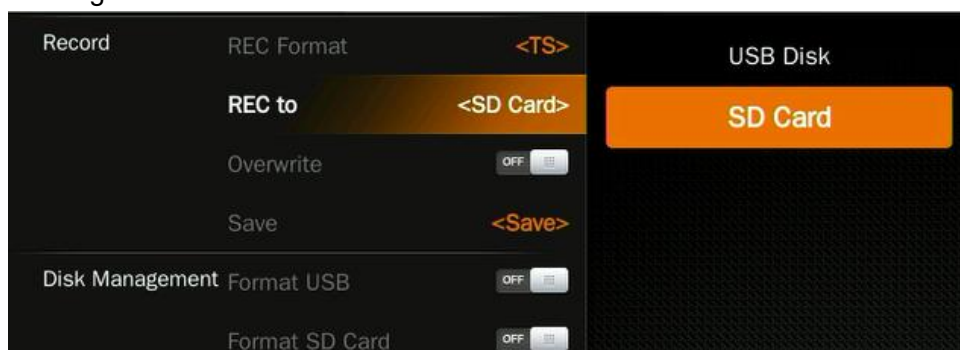
Press the REC button on the panel, when the recording time starts to count in multiview, it means the

video recording has been started. Press REC again to end recording. In addition, the recording status will also show the recording time and SD card/U disk status to make it easy for users to view.
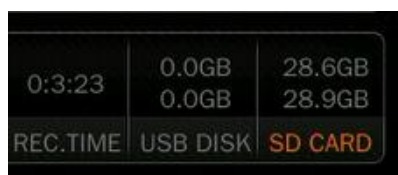
- **overwrite**

At the same time, the switcher recording has an overwrite function that will automatically delete and overwrite the previously recorded content and re-record the new content when the SD card and USB disk memory is full, user can enable/disable the overwrite function in the menu and click " Save " to complete the setup.

Note: When the recording format is set to MP4, abnormal operations such as power outages and removal of storage devices during recording will cause the currently recorded video file to be unable to play. This problem will not occur if the TS format is selected.

15.3.Format

Users can format their USB disk or SD card through the menu. In the recording menu, select "Format USB" or "Format SD Card" to start formatting the corresponding storage device, and the format is exFAT by default. Formatting will permanently erase all data on the disk, so please back up important data beforehand.

16.System Settings

16.1.Language

Entering system settings from the menu to switch the system language between English and Chinese.

16.2.Fan Setting

Setting the cooling fan speed to control the temperature and noise of the switcher. There are 3 options, AUTO/ OFF/ ON.

The default setting of the fan is in AUTO mode that the speed of the fan is adjusted automatically depending on the switcher's operating temperature. If the working environment requires special quiet for a special application, the user can turn off the fan manually from the menu. And when the switcher's operating temperature is increasing and reaching a preset value (57 Degrees Celsius), the words in the bottom of the Status/Menu page will turn to Orange color to warning. And when the operating temperature reach to 60 Degrees Celsius, the fan will be auto turned on in a high speed to cool down the CPU quickly and switch the fan to AUTO mode at the same time. If the switcher is working in a high temperature environment, the auto fan setting cannot meet the cooling requirement, then user can select the fan

setting to ON option to keep the fan in high speed.

16.3.System Reset

- Reset Preferences: Restore settings to default Settings but remain the part of settings including the Media library, Time, Network, Language, Fan and User Setting.

- Factory Reset: Restore all settings to default Factory Settings.

16.4.Website Download

The video switcher supports PC control software control. Users can connect the switcher to a WINDOWS operating system computer via the LAN port and download the control software for control.

Download website：https://www.avmatrix.com/download/

16.5.Version

Check the switcher's Software Version, FPGA Version, MCU Version, PCB Version.

16.6.Time Setting

16.6.1Setting Time Manually

User can set Year/ Month/ Day/ Hour/ Minute directly through the Menu. The time format can be set to 12h and 24h. The default setting is 12h.

16.6.2.Time Synchronization

Connect video switcher to a PC (windows OS) via Ethernet and use the control software to search the video switcher. The time will be automatically synchronized once the video switcher be searched on the network.

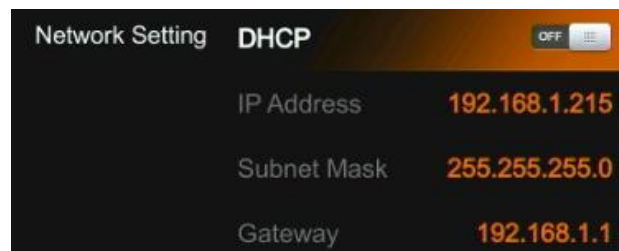| Time Setting	Year	2020
	Month	1
	Day	1
	Hour	20
	Minute	17
	Format	<12h>

16.7.Network Setting

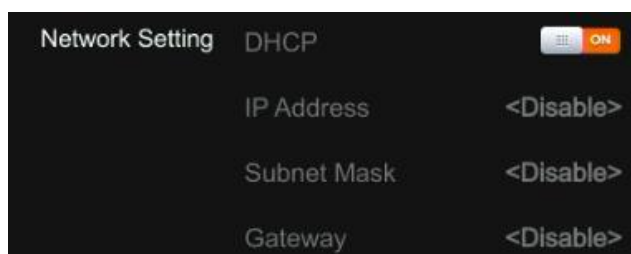There are two methods to acquire the IP: Dynamic (IP configured by router) and Static (set IP freely by yourself). Select the method you need by menu. The default setting is Dynamic.

Dynamic: Connecting the video switcher with a router with DHCP features, then it will auto obtain an IP address automatically. Make sure that the video switcher and PC are in the same local area network.   If

the network segment is 1, you can access the web site either from its assigned IP or from .1.100.

Static: Select static IP acquire method when the PC is without DHCP. Connect the video switcher with PC via network cable, set the PC's IP address to the same IP range as video switcher (the video switcher's default IP address 192.168.1.215), or set the switcher's IP address to the same range as PC's IP Address.In case of unassigned IP the default will be assigned.1.215.

Network Setting	DHCP	ON
	IP Address	\<Disable>
	Subnet Mask	\<Disable>
	Gateway	\<Disable>

Network Setting	DHCP	OFF
	IP Address	192.168.1.215
	Subnet Mask	255.255.255.0
	Gateway	192.168.1.1

16.8.User Setting

User can save all current settings into an account in the switcher. Adding a new user account, renaming the account, switching between accounts, deleting the account or even user can import or export the account to a USB flash disk.

Users Setting	Switch
	New
	Rename
	Delete
	Import
	Export
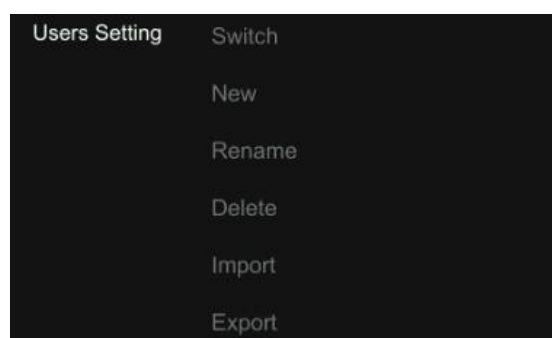
16.8.1.New

Adding a new user account and save all current settings to the account. Input the name through a virtual keyboard from the menu.

16.8.2.Rename

Rename the current user account name.

16.8.3.Switch

Switch to another saved user account to have the saved settings easily and quickly. Meanwhile, the User name will be updated in the bottom of the Status/Menu page after switching.

👤 User0	work time : 000:16:41	AVMATRIX	53 ℃	06:31:29 AM

16.8.4.Delete

Delete a saved user account which you will never use again.

16.8.5.Import

Import the current user account and settings to USB flash disk.

16.8.7.Export

Export the user account and settings saved in USB flash disk.