

PVS0403U

4-CH SDI&HDMI VIDEO SWITCHER

AVMATRIX[®]



PVS0403U

**ALL IN ONE MICRO 4-CH SDI&HDMI LIVE
STREAM MULTI-FORMAT 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.

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1. BRIEF INTRODUCTION

1.1. Overview

PVS0403U is a 4-channel HDMI&SDI multi-format video Switcher with a 10.1 inch FHD IPS LCD monitor. It supports various functions including video switching, audio mixing, PGM/ multiview/ Aux out, different transition effects, Luma Key Chroma Key, DSK, LOGO, PIP/ POP, media library, pattern and color generator, etc. Inputs support multi-format, PGM output can be scaled, compatible with a variety of equipment. The unit supports stream performances and presentations on PC through the USB-C port. User can also customize different settings and import or export the configuration quickly for various scenarios. It's a powerful and professional video switcher for your choices.



1.2. Main Features

- 2 channel auto-detected HDMI inputs and 2 SDI inputs
- 2×HDMI PGM output, 1×HDMI multiview out, 1×USB type-C output
- AUX output configurable and assignable
- 10.1 inch FHD IPS LCD monitor
- USB for capturing and streaming on PC
- Upstream key: Luma key, Chroma key, PIP×2/ POP
- Downstream key and LOGO overlay
- T-bar/ Auto/ Cut transitions; various effects: WIPE(11×2 patterns) / MIX/ DIP
- Audio mixer: 2×SDI, 2×HDMI embedded audio and 2×MIC/line In; audio delay available
- Media library: 39 default patterns, 16 imported images, 16 captured images, 2 color generators
- LAN port for PC software remote control
- FTB/ MUTE/ STILL/ GPIO for tally

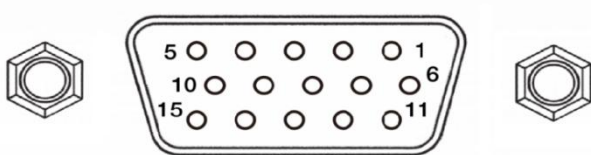
2. INTERFACES

2.1. Interface Overview



1	MIC/Line level IN × 2
2	SDI IN × 2
3	HDMI IN × 2
4	PGM(AUX) OUT × 2
5	MULTIVIEW(AUX) OUT × 1
6	USB OUT × 1 (for live streaming on PC)
7	LAN port for PC software control
8	GPIO (for tally)
9	DC 12V IN × 1
10	Earphone OUT × 1
11	USB × 1 (insert U disk to import images and LOGO; firmware upgrade)

2.2. Tally PIN Definition



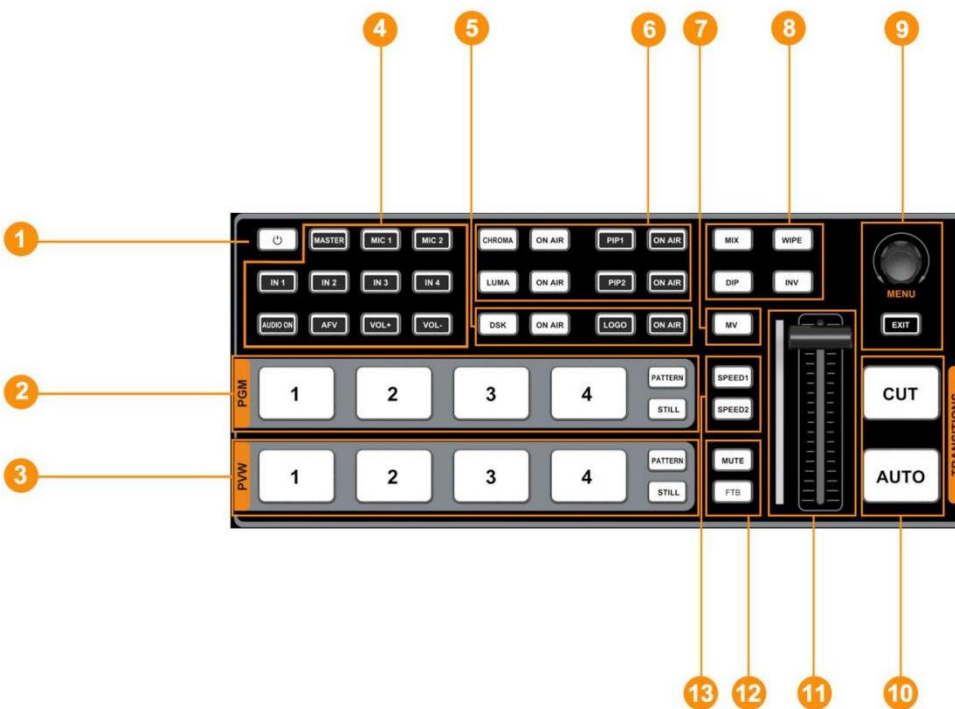
PIN	Definition	PIN	Definition
11	PGM-IN1	6	PVW-IN1
12	PGM-IN2	7	PVW-IN2
13	PGM-IN3	8	PVW-IN3
14	PGM-IN4	9	PVW-IN4
15	NC	10	NC
3	NC	4	NC
5	GND		

3. SPECIFICATION

CONNECTION	
Video In	HDMI type-A ×2, SDI×2
Video Out	HDMI type-A PGM ×2 HDMI type-A Multiview ×1 USB2.0 type C ×1 (Streaming on PC) Assignable SDI 1~2, HDMI3~4, PGM, Clean PGM, PVW, Color bar, Multiview
Audio In	MIC/ Line level (3.5mm stereo audio) ×2
PC Control Port	LAN×1(For PC remote control)
Media Library	USB type-A ×1(USB disk port for image import and firmware upgrade)
Tally Port	DB-15 ×1
Power In	DC 12V ×1
FUNCTIONS	
Transitions	T-Bar/AUTO/ CUT
Effects	Wipe (11×2 patterns)/ Mix/ DIP/ Still(freeze)/ MUTE/ FTB
Layouts	2 styles of Multiview layout (6 windows and status)
Keys	Upstream Key: Luma Key ×1/ Chroma Key ×1/ PIP ×2/ POP Downstream Key: DSK ×1/ Logo ×1
Audio Mixer	HDMI ×2, SDI×2 and MIC/ Line level ×2; Audio delay: 0-500ms
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/ 25/ 24 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
SDI In Format Support	1080p 60/59.94/50/30/29.97/25/24/23.98 1080psF 30/29.97/25/24/23.98

	1080i 60/59.94/50 720p 60/59.94/50/30/29.97/25/24/23.98 625i 50 PAL, 525i 59.94 NTSC
SDI Color Space	YUV
USB Capture Out	MJPEG, 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, mpo, tga Logo format support: png, bmp, jpg, gif, jpeg, ppm, pbm, tif, jps, mpo, tga Logo size support: 10×10 pixel to 600×600 pixel
OTHERS	
Power	Wide voltage: 7~24V; Operating power:12W (12V 1.8A)
Dimension (LWD)	261.4×193.9×58mm
Weight	1673.5g
Temperature	Working: -20℃~60℃, Storage: -30℃~70℃
Accessories	Power supply (12V 2A) × 1; USB cable (type A-C) × 1; Tally connector (DB-15) × 1

4. FRONT CONTROL PANEL



1	Power	Press the power to start the device; Press 3s to shut down the system
2	PGM:1-4	Selecting the signal source for Program. PATTERN for setting a pattern to PGM, STILL for freezing the input source.

		Note: different patterns can be set including Black/Color Bar/Color1 /Color2/ SDI In1/SDI In2/HDMI In3/HDMI In4/Image. (Refers to Part 13.1)
3	PVW:1-4	Selecting the signal source for Preview. PATTERN for setting a pattern to PVW (Refers to Part 13.1), STILL for freezing the input source (Refers to Part 7.2).
4	AUDIO	User can configure the audio of each channel in this area, including AFV or audio mix mode, audio source selecting, adjust volume + & volume -
5	DSK	DSK: Enable the downstream key ON AIR: make the DSK on air
6	CHROMA KEY LUMA KEY	CHROMA: Enable the Chroma Key LUMA: Enable the Luma Key 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.
7	MV	MV: quickly switch between Multiview and the configured multiview out (Refers to Part 11.2)
8	Transition Effects	WIPE: Transition from one source to another INV: Invert the direction of selected wipe transition MIX: Selects a basic A/B dissolve for the next transition DIP: Gradual transition that transitions from one source to another.
9	MENU	MENU: For menu control, configure different parameter
10	CUT/ AUTO	CUT: Performs a simple immediate switch between Program and Preview. AUTO: Performs an automated switch between Program and Preview.
11	T-Bar	Switch the PVW and PGM through T-Bar
12	MUTE/ FTB	MUTE: Mute the master audio FTB: Fade to Black, used for emergency.
13	SPEED	SPEED1-2: Control transition rate, speed can be configured on Menu.

5. POWER ON/ OFF

Shutdown the System Now ?

No

Yes

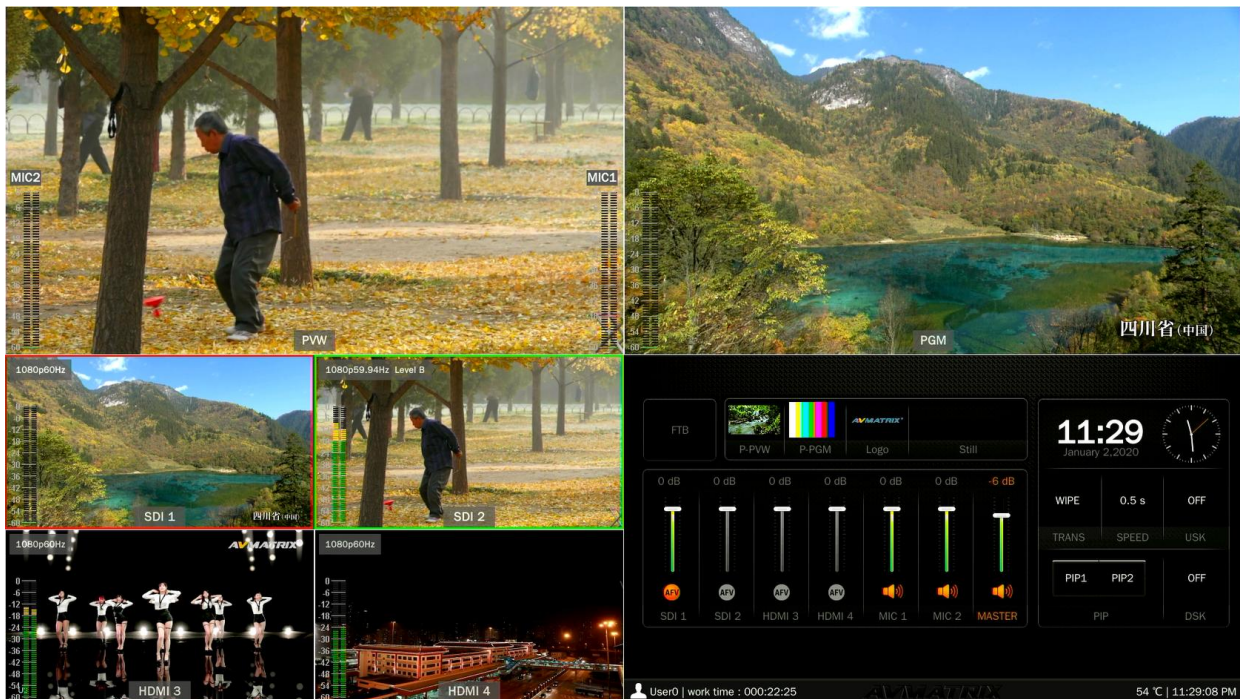
Connect your video sources and the output devices, plug the power adapter. Press the power button in the front panel to get the video

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.

6. MULTIVIEW

The switcher has three HDMI outputs (2PGM/Multiview). The three HDMI ports are both the AUX out that user can define it as output of SDI1/ SDI2/ HDMI3/ HDMI4/ PGM/ Clean PGM/ PVW/ Color Bar/ Multiview (Refer to part 11). Connecting the HDMI Multiview out to an additional monitor, user will get the multiview image. In the Multiview there are windows of PVW, PGM, SDI1, SDI2, HDMI3, HDMI4 and Status/Menu page. See below image.



6.1. 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 (UpstreamKey), DSK (DownstreamKey), and System Time. See below image.



The information of user name, working time, USB connection, 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 changed. It's clear and visible for user to know the current situation and settings.

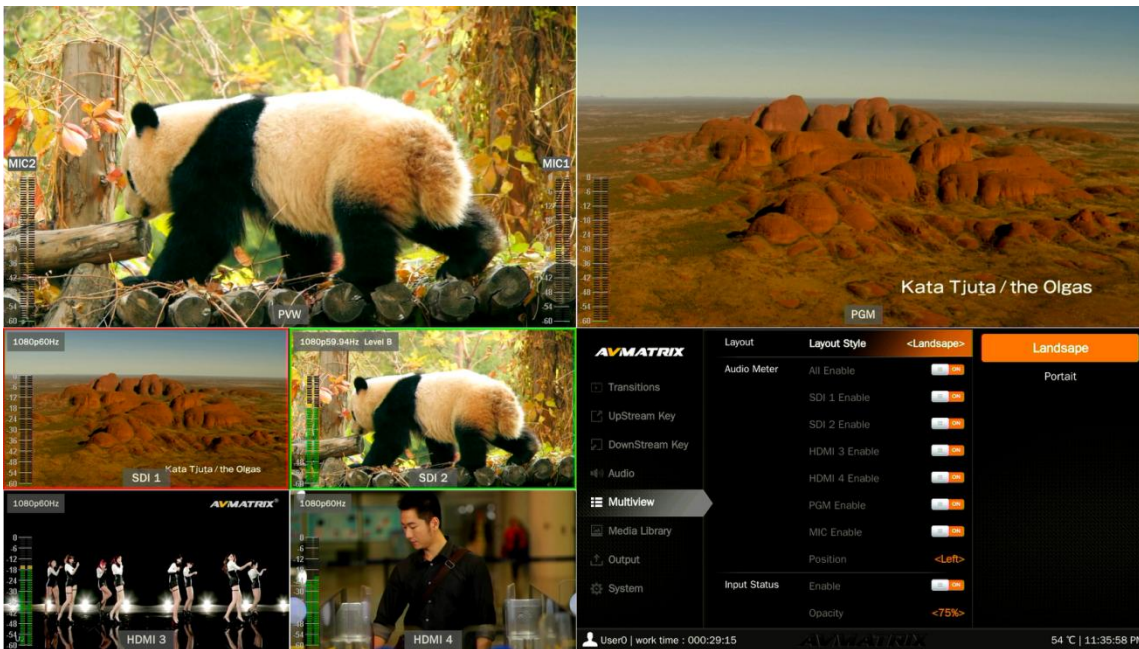
Pressing menu button of the switcher, the status page will go to the menu page. See below image.



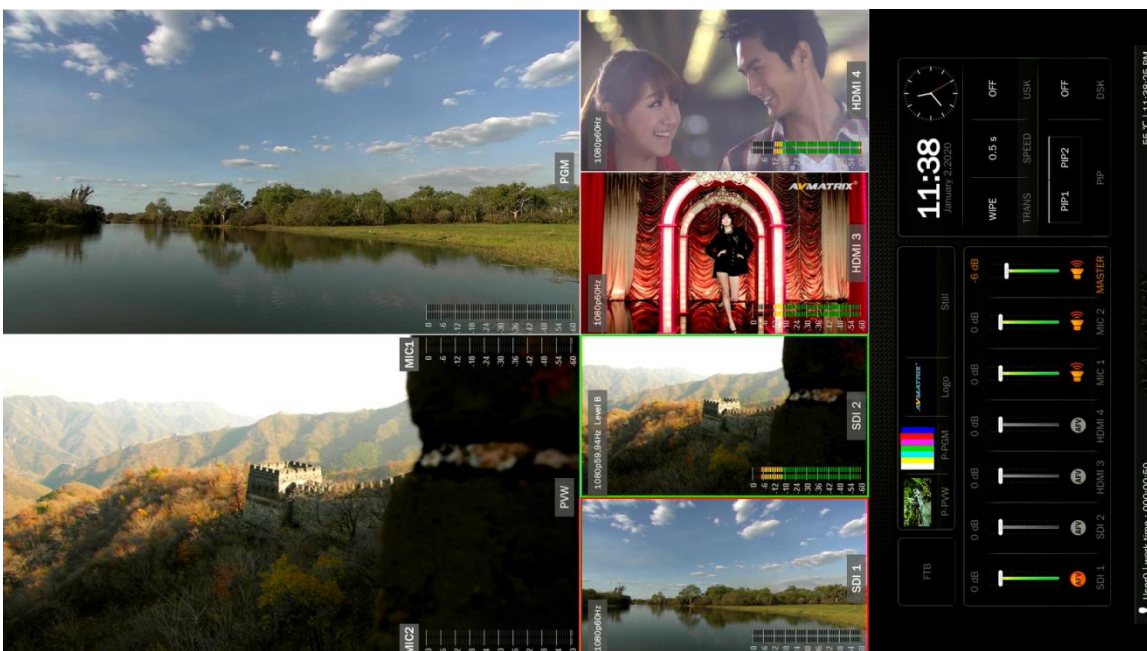
6.2. Layouts

There are two Multiview layouts which can be switch between the horizontal layout and vertical layout from menu as below images.

- Horizontal layout:



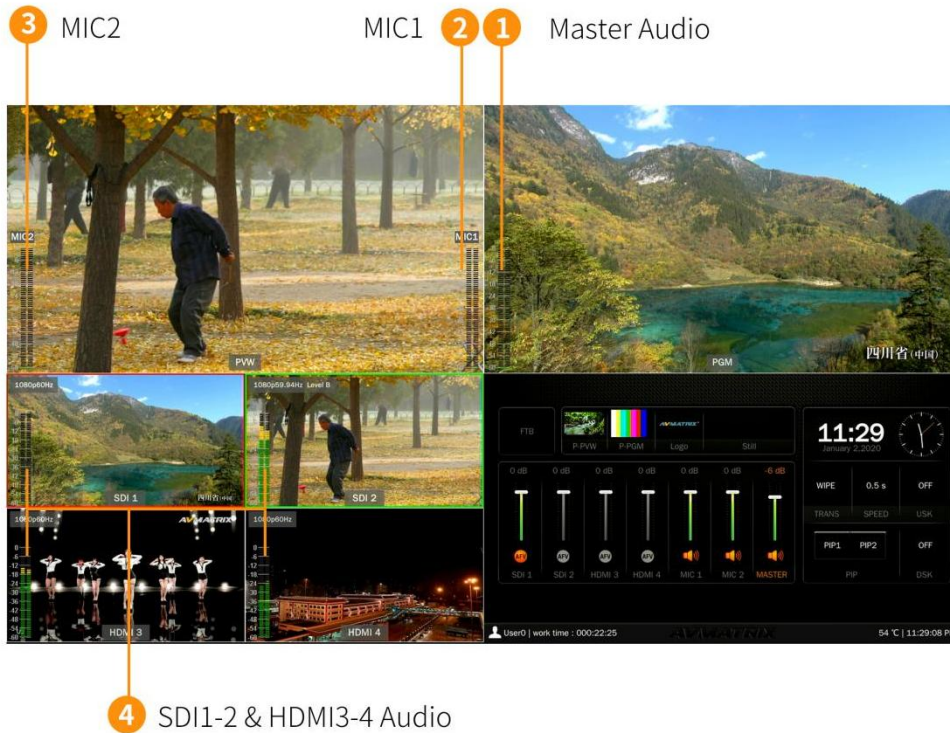
- Vertical Layout:



6.3. Audio Meter

There are audio meters in each windows of Multiview, including SDI 1-2 ,HDM3-4, PGM and MIC to show the audio status of each audio. The audio meters of MIC 1 and MIC 2 show in the left and right of PVW window. User can turn on/ off All or each audio meter from the menu. The audio meter position can be in

the right or left of each window. See below image.



6.4. Input Information

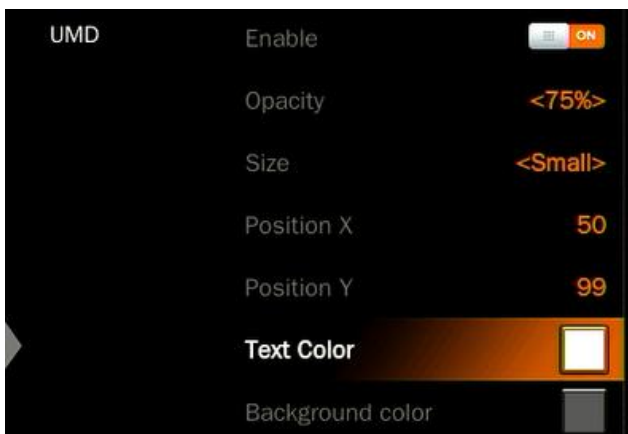
There is an overlay in each window of the SDI1-2,HDMI3-4. The overlay shows the resolution and frame rate of HDMI input. User can turn on/off overlay in each input window. Besides, user can set the overlay Opacity (50%, 75%, 100%), Size (Small/Medium/Large), Position X&Y (1-100), Text color and Background Color. See below image.



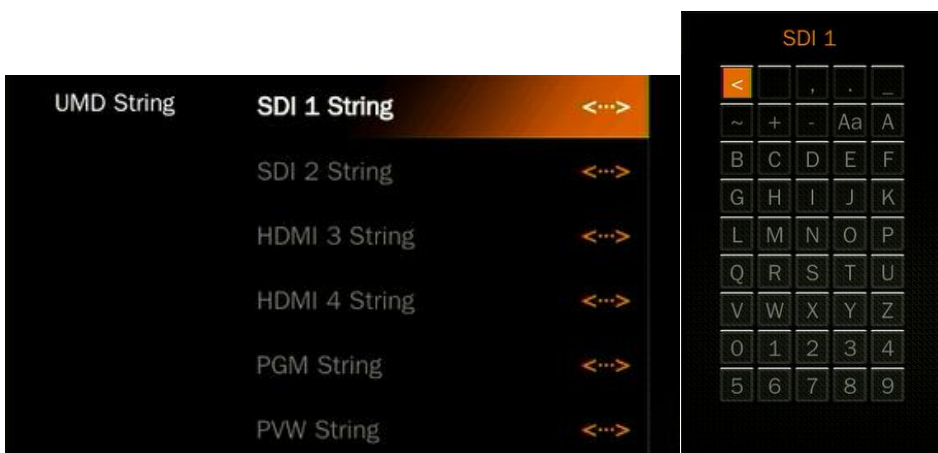


6.5. UMD Settings

The default UMD of the four inputs are SDI1, SDI2, HDMI3, HDMI4. User can turn on/off the UMD in each window. Besides, user can set the overlay Opacity (50%, 75%, 100%), Size (Small/Medium/Large), Position X & Y (1-100), Text color and Background Color. See below image.



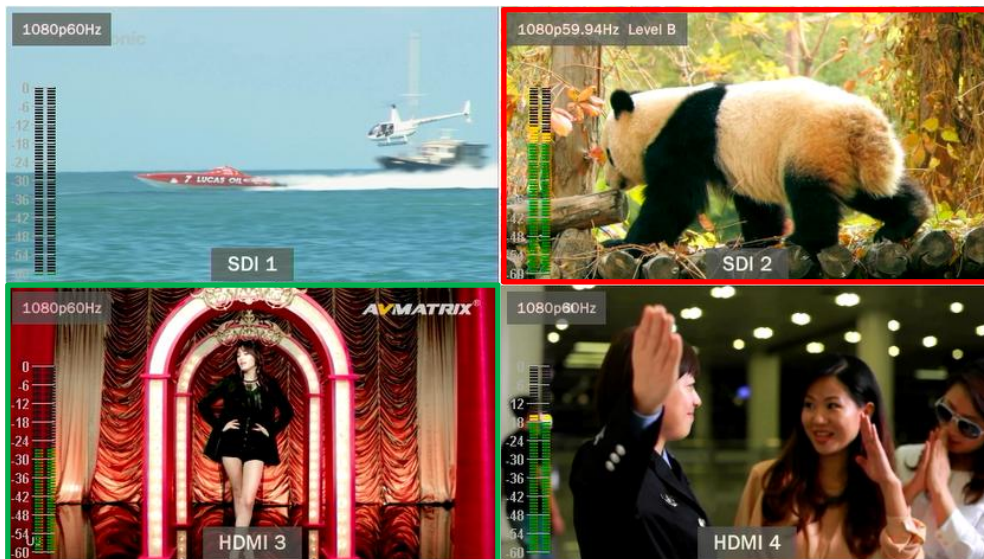
The UMD string content for 2SDI and 2HDMI inputs can be set from menu. User can rename the UMD content for each window by using a virtual keyboard and rotary button. It supports input max 10 characters for the UMD content. Below image as an example, rename the SDI1 to CAM1.



7. PGM PVW SWITCHING

7.1. PGM PVW Channel Selection

Choose PGM and PVW source from PGM, PVW row and PATTERN (different pattern can be configured on menu, refers to Part 13.1) in the front panel. The selected button for PGM will turn on to red LED, and the selected button for PVW will turn on to green LED. The PGM source will be circled with red border, while the PVW source will be circled with green border.



7.2. 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.

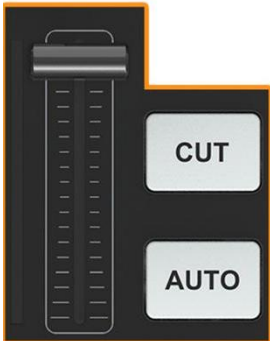
7.3. Transition: CUT/ AUTO/ T-BAR

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.



8. TRANSITION EFFECT

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

8.1. WIPE

Press the WIPE button to perform the wipe transition effect. User can choose different style 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.



8.2. 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):



8.3. MIX

Press the MIX button to perform the MIX transition effect.



8.4. Transition Speed Setting

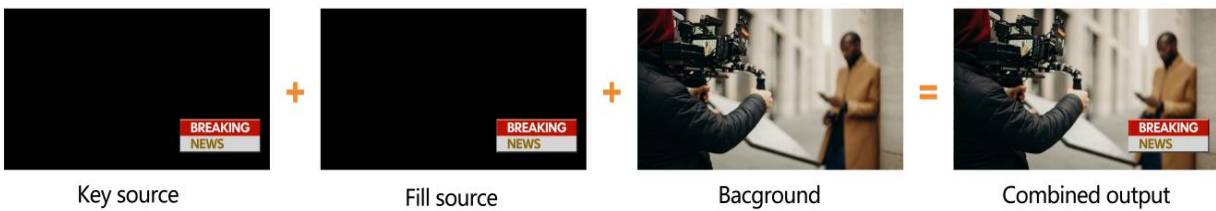
User can set two speed of transition on menu, and the defined speed value will be saved and corresponds to Speed 1 and Speed 2 button. The higher value, the slower the transition speed, total 0.1s-8.0s for choice.

9. 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.

9.1. Luma Key

Key Source = Fill Source



Key Source ≠ Fill Source



Luma keys provide 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.

Switching a video with background to PVW window, and turn on the Luma Key. Press the menu knob to enter the setting interface. Under Luma Key sub-menu, user can assign the fill and key source from various options including **Black/ Color Bar/ Color1/ Color 2/ SDI1/ SDI2/ HDMI3/ HDMI4/ Image (import from USB disk)**. Configure and adjust the Key parameters including Clip/Gain/mask to achieve the effect needed.

Press ON AIR button, the ON AIR button will be on, and the Key effect will show on PGM.

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/ SDI 1/ SDI 2/ HDMI 3/ HDMI 4/ Image	Color1
		Key Source	Black/ Color Bar/ Color 1/ Color 2/ SDI 1/ SDI 2/ HDMI 3/ HDMI 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%

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.

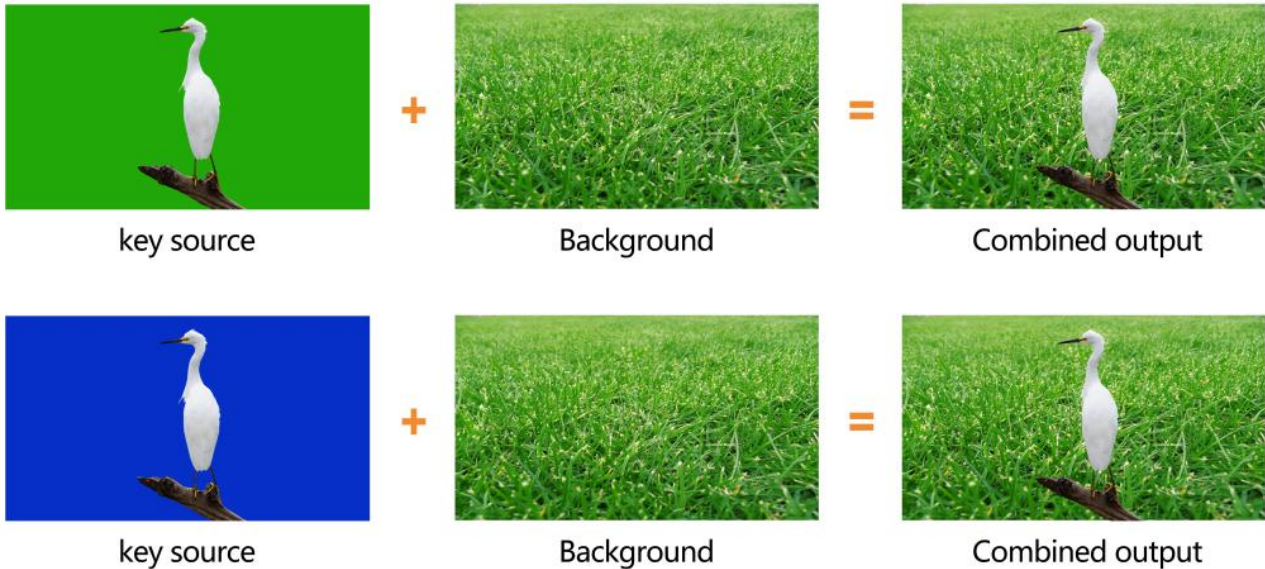
Gain: Adjusts the performance of the chroma key in light or white areas. Apply more Key Gain if the light areas are becoming too transparent.

Invert Key: Inverts the key signal.

Mask: Configure the Mask for the Key area

9.2. 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.

User can configure the effect of Chroma Key, including the key source, Key color, Clip, Gain, key Fetch and mask, etc. in the menu page.



Press the ON AIR button next to the CHROMA button to enable the KEY on PGM.

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/ SDI 1/ SDI 2/ HDMI 3/ HDMI 4/ Image	Image
		Key Color R	0~255	0
		Key Color G	0~255	255
		Key Color B	0~255	0
		Fetch Color		0
		Fetch Width	0~50%	5
		Clip	0%-100%	40%
		Gain	0%-100%	10%
		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%

9.3. PIP & POP



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.

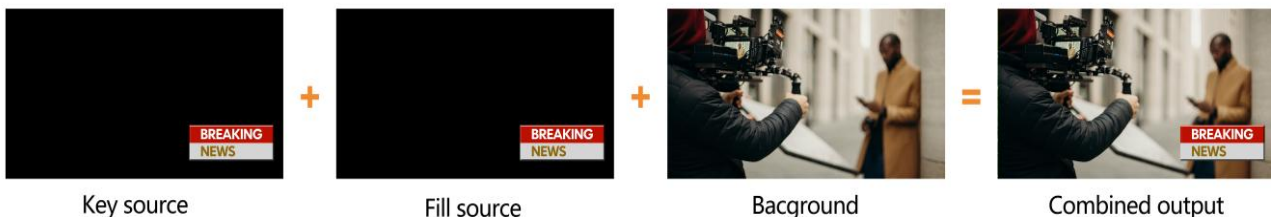
PIP & POP detailed parameters as below:

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/ SDI 1/ SDI 2/ HDMI 3 /HDMI 4/ Image	SDI 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/ SDI 1/ SDI 2/ HDMI 3 /HDMI 4/ Image	SDI 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/ SDI 1/ SDI 2/ HDMI 3 /HDMI 4/ Image	SDI 1
	POP Source 2	Black/ Color Bar/ Color 1/ Color 2/ SDI 1/ SDI 2/ HDMI 3 /HDMI 4/ Image	SDI 2

10. DOWNSTREAM KEY

10.1. DSK



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 between 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/ SDI 1/ SDI 2/ HDMI 3 /HDMI 4/ Image	Black
		Key Source	Black/ Color Bar/ Color 1/ Color 2/ SDI 1/ SDI 2/ HDMI 3 /HDMI 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

10.2. LOGO

The switcher allows user to import logo. Press the menu knob and choose the logo setting interface, where user can choose the logo from the media pool in the USB disk, set the position, size and opacity. Rotate the menu knob to choose the logo, press the Menu knob to select and delete a logo. User can view the logo effect in PVW.

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

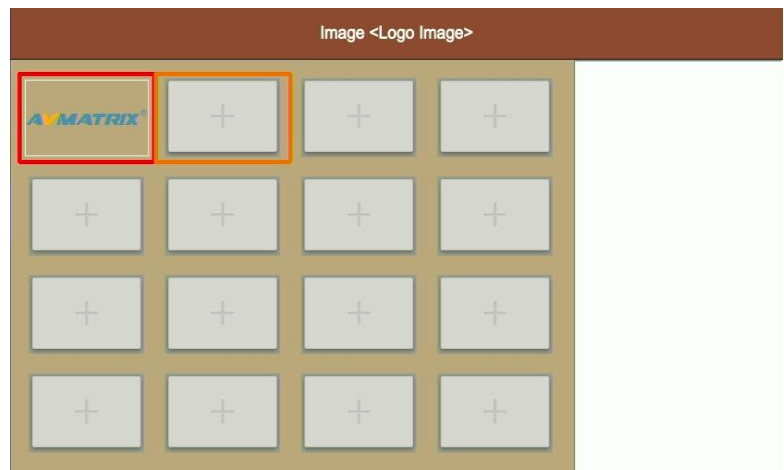
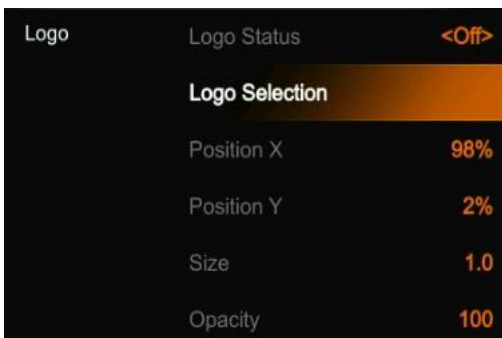
Logo size support: 10×10 pixel to 600×600 pixel

Press ON AIR button next to LOGO button to make it take effect.

LOGO button ON: DSK key shows on PVW.

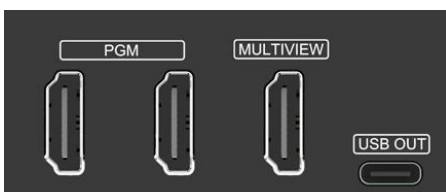
ON AIR button ON: DSK Key available on PGM

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



11. OUTPUT SETTING

11.1. Output Interfaces



PVS0403U has 4 output interfaces. They are default as 2PGM Out, Multiview Out and USB Out. All the 3 outputs also can be defined as an AUX OUT from SDI1, SDI2, HDMI3, HDMI4, PVW, PGM, Clean

PGM, Color Bar and Multiview out.

11.2. 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 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 SDI 1, user can press the MV button to quickly switch the output between multiview out and configured SDI 1.



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



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

Interfaces	Multiview Out	<SDI 1>	SDI 1
	PGM Out	<PGM>	SDI 2
	USB Out	<PGM>	HDMI 3
Format	Frame Rate Mode	<Integer>	HDMI 4
	PGM Format	<1080p60>	PGM
	Multiview Format	<1080p60>	Clean PGM
	PGM Color Space	<YUV>	PVW
	MV Color Space	<YUV>	Color Bar
	Brightness	50%	Multiview
	Contrast	50%	
	Saturation	50%	

11.3. PGM Out

When one of outputs defined as PGM out, user can connect it to an additional LCD display to monitor the PGM out video. The PGM out video is the program video including the overlay images from USK and DSK. PGM Clean out is the program video removing the overlay images from DSK.

11.4. USB Out

Connecting the USB output to a PC with a type-C USB2.0 cable, user can use software like OBS, PotPlayer, VMix, etc. to play or store the captured USB Out video and audio on live streaming platforms like YouTube, Facebook, Twitter, etc. The USB2.0 streaming 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

Besides, the video source of USB not only can be the PGM output but also can be SDI1, SDI2, HDMI3, HDMI4, PVW or Clean PGM output. It means that user can capture any source for live streaming in various applications.



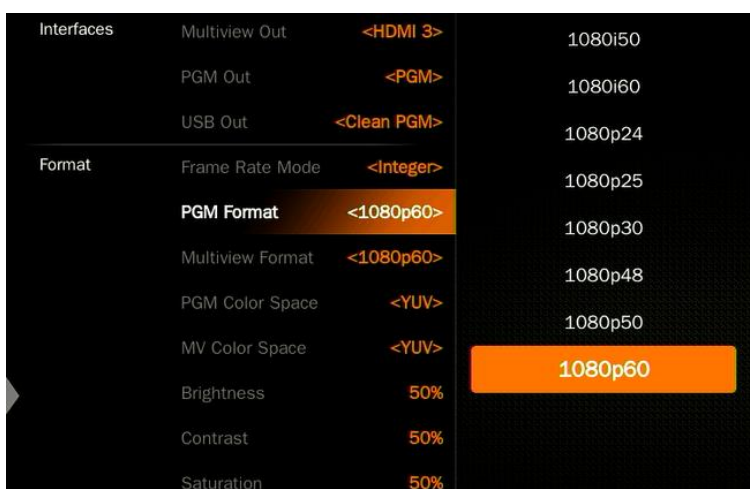
11.5. Output Format Setting

11.5.1. PGM Image Setting

User can set Brightness, Contrast, Saturation of PGM output in the menu. The setting range is from 0%-100%. The default setting is 50%.

11.5.2. PGM and Multiview Format

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 options available. When the Frame Rate Mode is Decimal, there are 1080i50, 1080i59.94, 1080p23.98, 1080p25, 1080p29.97, 1080p47.95, 1080p50, 1080p59.94 options available. The default format of PGM and Multiview is 1080p60.



11.5.3. PGM and Multiview Color Space

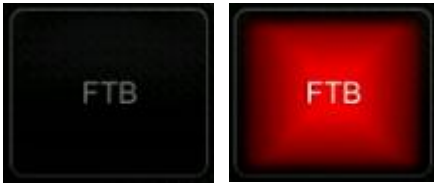
There are YUV, RGB Full, RGB Limit color space options for PGM and Multiview out. The default color

space of the output is YUV.

11.6. FTB

FTB (Fade to black) feature is usually for some emergent situation when user the switcher for an event. When press FTB button the PGM will be faded to black screen to hide all other layers, and the FTB button will keep flashing until user 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

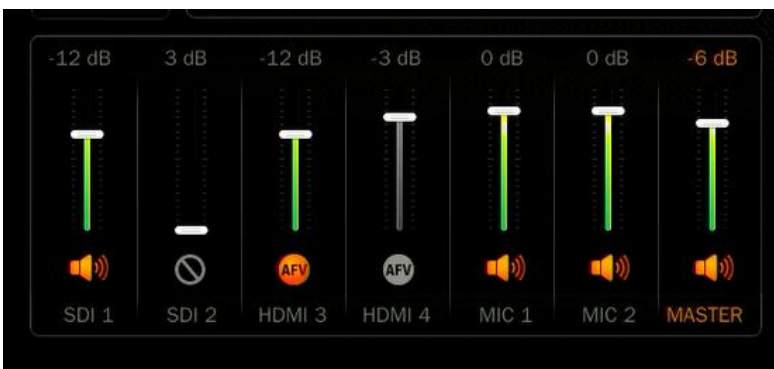
Besides, the speed of FTB / MUTE can be adjusted from 0-3s in the menu. The speed is the time of whole transition for FTB and MUTE. For example, if the speed set to 2.5s the PGM video will be fading to black with audio becoming mute gradually in 2.5s.

(2) FTB with MUTE

FTB can be also with MUTE. Press the MUTE button or turn on the FTB with MUTE function from menu, then the PGM will be faded to black with mute.

12. AUDIO SETTING

All audio status shows 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 & nonactivated;

12.1. 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.

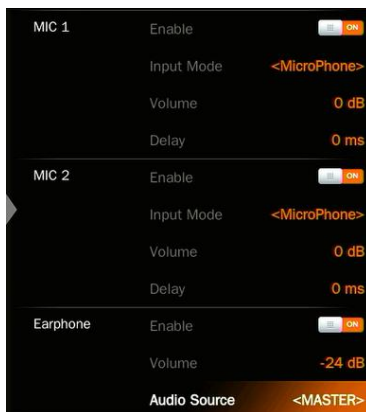
12.2. Audio On (MIX)

There is total 6 audios as the audio source, including 2SDI&2HDMI embedded audios and 2 MIC audio inputs. User can turn on/off or adjust volume for each audio of SDI 1, SDI 2, HDMI 3, HDMI 4, MIC 1 and MIC 2 independently. When an audio turns on, the audio will be permanently mixed into the PGM output.



12.3. AFV(Audio-Follow-Video)

Each channel of the 2HDMI & 2SDI embedded audios can be set to AFV (Audio-Follow-Video). When one HDMI audio is set to AFV mode, then the audio will be turned on only when PGM switch to this channel video source.



For example, HDMI 3 audio is set to AFV mode, the HDMI 3 embedded audio will be turn on only when the switcher switch HDMI 3 as the video source of PGM.

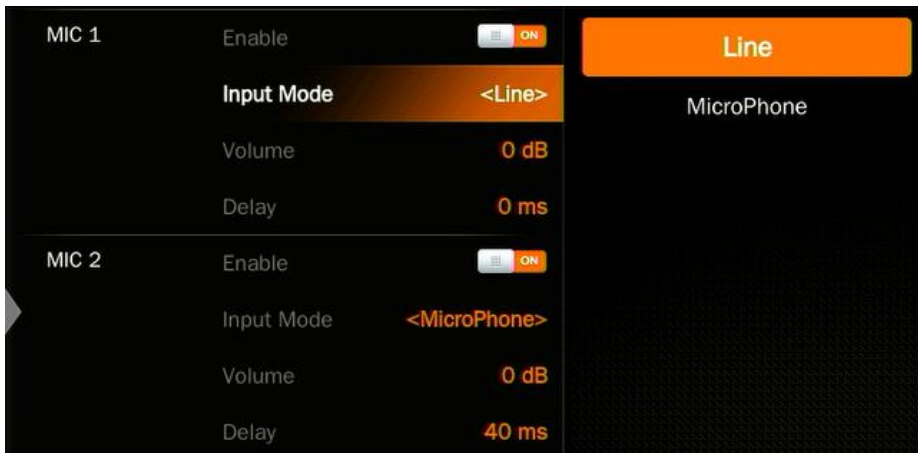
12.4. Audio Delay

In the menu there is an audio delay setting for SDI 1, SDI 2, HDMI 3, HDMI 4, MIC 1 and MIC 2. User can adjust the audio delay to make the audio and video synchronization. One level of the audio delay setting equal 5ms. The audio can be delayed max 500ms.



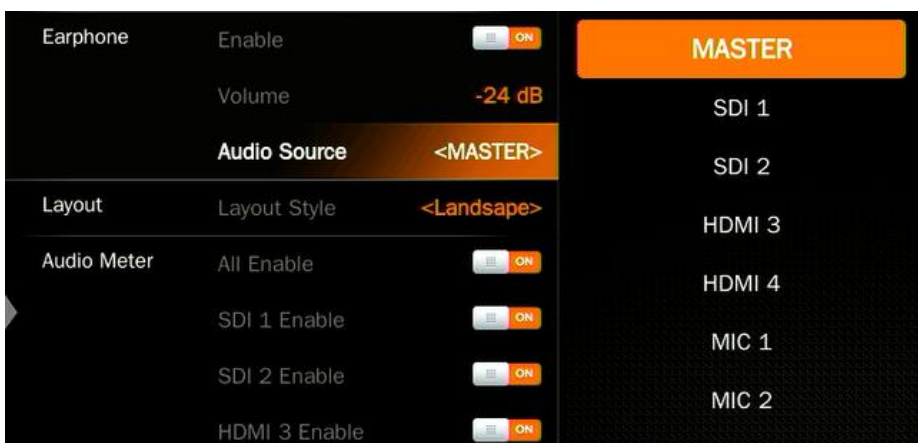
12.5. MIC

The switcher has two MIC inputs that user can connect it with a line-level or a microphone device, and turn on/off, adjust the audio volume and delay level.



12.6. Earphone

The switcher has an earphone output for monitoring each audio. User can choose one audio source for Earphone from Master audio, 2SDI & 2HDMI embedded audios, and 2 MIC audios. User can turn on/off the Earphone or adjust audio volume.



12.7. 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.

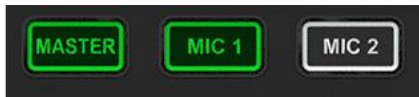


Part A is for selecting one audio to be configured, including Master, MIC 1, MIC 2, SDI 1, SDI 2, HDMI 3 and HDMI 4.

Part B is for setting audio functions, including AUDIO ON, AFV, VOL+ and VOL-.

12.7.1. Audio Indicator

The LED indicator of buttons shows the current audio status.



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.

The image as an example, when the indicators of MASTER, MIC 1, SDI 2, HDMI 3 are on, the corresponding audios are on. The indicators of MIC 2, SDI1, HDMI 4 are off, the corresponding audios are 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.

The image as an example, after pressing SDI 1 button the indicator of SDI keeping flashing, and the indicator of AUDIO ON button is on in green and indicator of AFV button is off, which means the audio of SDI 1 is on and the AFV of SDI 1 is off.

12.7.2. 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 configure 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.

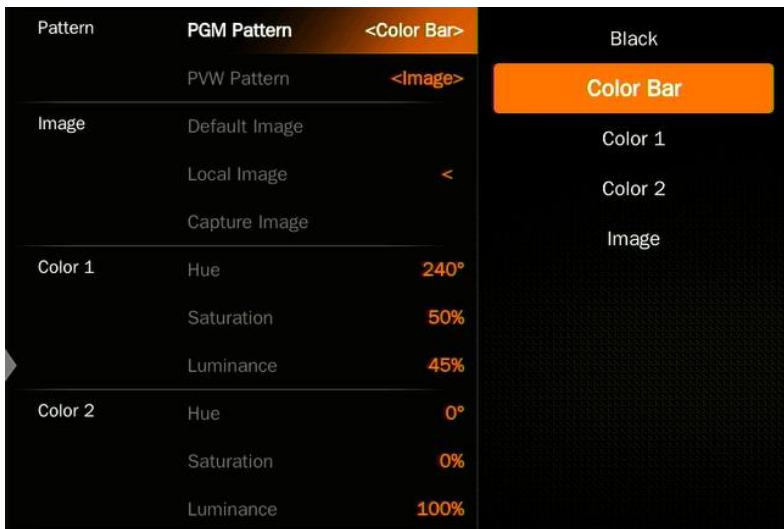
12.8. Mute

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 12.8)

13. MEDIA LIBRARY

13.1. PVW Pattern & PGM Pattern

The switcher can generate patterns itself for PVW and PGM. The PVW/PGM pattern source can be selected from the Color Bar, Black, Color 1, Color 2 and Image.



13.2. 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.

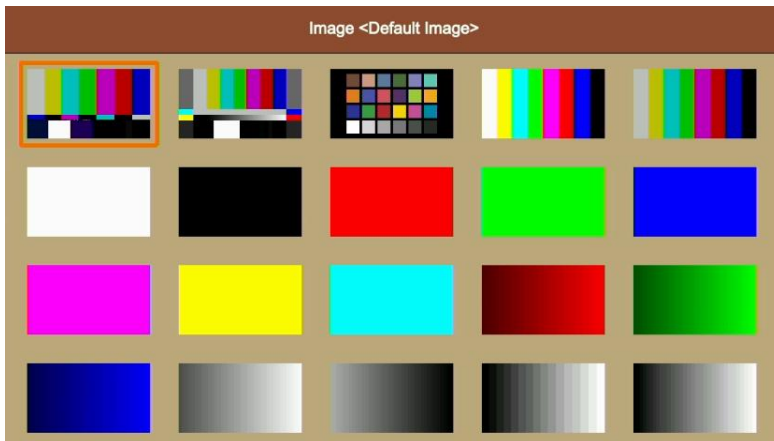


13.3. Image Setting


The Image as one of sources for PVW Pattern and PGM Pattern. User can choose the Image source from Default Image, Local Image or Capture Image. The selected image is the last selection from Default image, Local Image, and Capture Image.

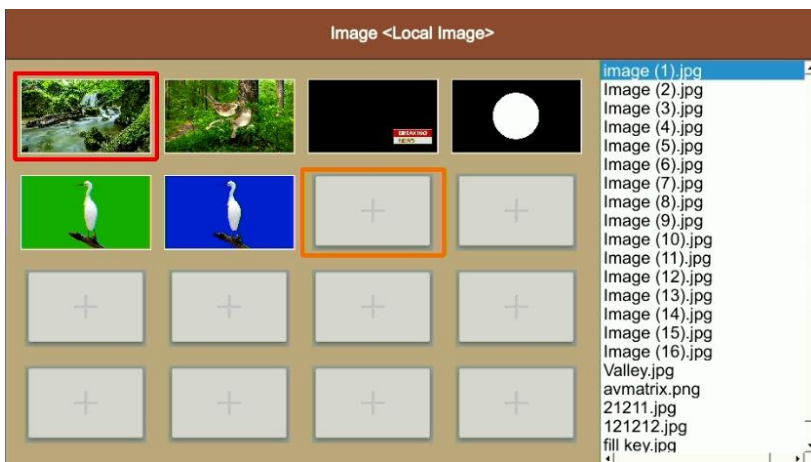
13.3.1. Default Image

The default images are the images preset in the switcher. User can use rotary button to select one of images from the Default Image as the source for PVW or PGM pattern. Total 39 default images for choice.



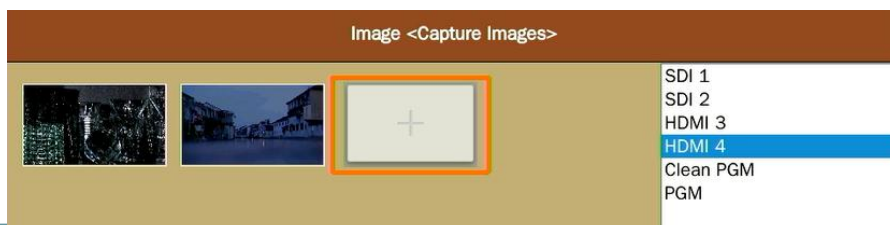
13.3.2. Local Image

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.



13.3.3. Capture Image

The capture image comes from screenshot of SDI 1, SDI 2, HDMI3, HDMI 4, Clean PGM, PGM. The captured image will be listed in the media list. Up to 16 captured images supported. User can press the rotary button to select the captured image as source for PVW/ PGM pattern by selecting the option Select. User can delete the captured image from the menu. See below images.



14. SYSTEM SETTING

14.1. Language

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

14.2. 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.

14.3. 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.

14.4. Download



The switcher comes with a free PC control software. User can connect the switcher with a windows OS computer via LAN port to have remote control. The software and user manual can be downloaded from website: <https://www.avmatrix.net/download/> , or through scanning below QR code in the menu.

14.5. Version

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

14.6. Time Setting

14.6.1. Setting 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.

14.6.2. Time Synchronization

Connect video switcher to a PC (windows OS) via LAN port 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>

14.7. Network Setting

There is a switch for DHCP from the menu. When turn on the DHCP, the switcher can obtain an IP address automatically after connecting the switcher in a network with DHCP.

When turn off the DHCP, user can set the IP address, Subnet Mask, Gate way from menu manually. The default IP address of the switcher is 192.168.1.215.

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	

14.8. 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	

14.8.1. New

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

keyboard from the menu.

14.8.2. Rename

Rename the current user account name.

14.8.3. 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.



14.8.4. Delete

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

14.8.5. Import

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

14.8.6. Export

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

15. ACCESSORIES

Power supply (12V 2A) × 1; USB cable (type A-C) × 1; Tally connector (DB-15) × 1