AVMATRIX

SC2040

3G-SDI/HDMI Bidirectional Converter

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.

Warnings and Cautions

※ To avoid falling or damage, please do not place this unit on an unstable cart, stand, or table.

※ 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 always properly grounded 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.

※ Do not use this unit in or near water.

※ Do not allow liquids, metal pieces, or other foreign materials to enter the unit.

※ 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.

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

Content

1. Introduction

The SC2040 is a compact and versatile bi-directional cross converter that combines a converter, fiber extender, and test pattern generator in one device. It supports HDMI, 3G-SDI, and fiber optic I/O (SFP module required), enabling simultaneous multi-signal input with high-quality up/down scaling and frame rate conversion for seamless use with monitors, switchers, and recorders. It offers flexible signal conversion between HDMI, SDI, and fiber, with up to 20 km fiber transmission. Additional features include 3G-SDI Level A/B support, analog audio embedding and de-embedding, and adjustable horizontal and vertical image flipping. The SC2040 also includes 23 professional test patterns & audio tones. It features a dual power supply design (12V DC and USB-C), while the USB interface supports PC control, power, and firmware upgrades for a stable and efficient user experience.

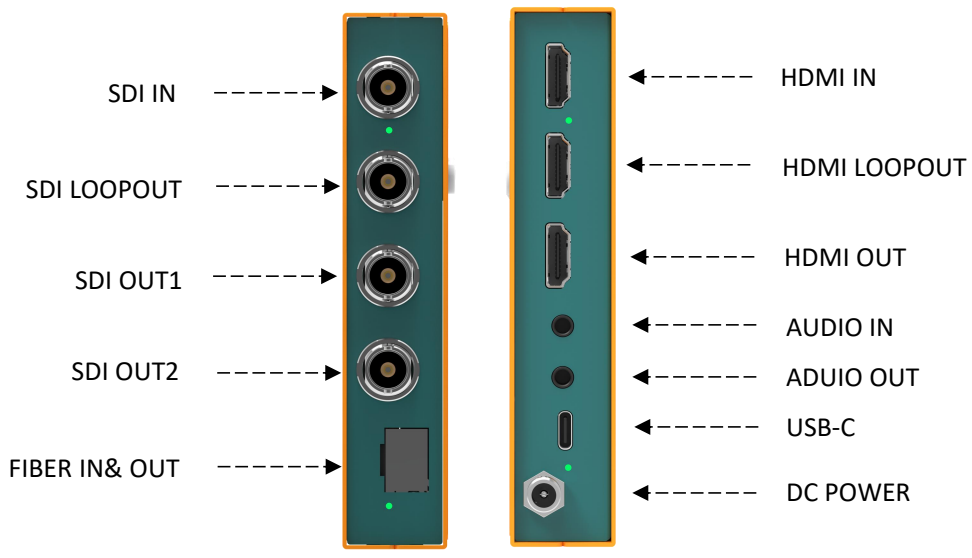
2. Main Features

- Bidirectional 3G-SDI/HDMI Conversion
- Multiple Conversion Operation Modes
- Up/Down Scaling & Frame Rate Conversion
- 3G-SDI Level A and Level B input and output
- Optional Bidirectional SFP Fiber Transmission
- Audio Embedding & De-embedding
- Built-in Test Pattern/ Audio Tone Generator
- Flexible Image Orientation Control
- Status Display & Intuitive Operation
- Dual power supply: 12V DC and USB-C
- Dual Power Supply Flexibility

3. Specification

Video Input	HDMI×1, 3G-SDI/ Fiber×1 (Select 1 of 2)
Video Output	HDMI Loop×1, HDMI×1, SDI Loop×1, SDI×2, Fiber×1
USB	USB Type-C×1(Upgrade, Power & Control)
Power In	DC 12V 2A; USB-C 5V
Resolution Support	Up to 1080p60 (1080p, 1080i, 720p, 576p, 480p, NTSC, PAL)
Audio Input	3.5mm Audio×1
Audio Output	3.5mm Audio×1
SFP Module	Optional 3G Video SFP (MSA Type)
Wide Voltage Range	DC 9-24V
Power Consumption	7W
Dimension (L×W×H)	104×125.5×24.5mm
Weight	Net Weight: 517g; Gross Weight: 826g
Temperature	Operating: -20~60℃; Storage: -30℃~70℃
Warranty	3 years

4. Interface



HDMI/SDI/SFP Input Signal Rate Indicator:

The color of the indicator LED represents the detected input signal rate format: red for SD, green for HD, blue for 3G.

5. Power

- **DC Power Adapter**

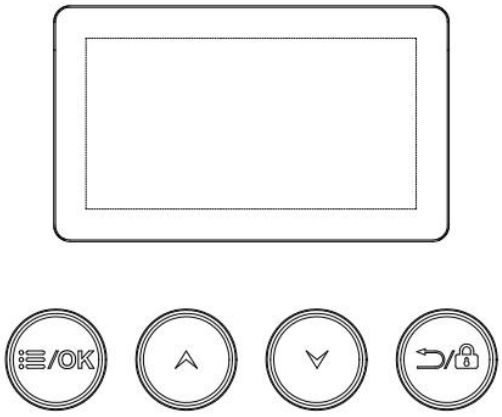
Plug the barrel connector into the converter's power socket and securely tighten the connector's locking ring. Then plug the DC adapter into a power outlet.

- **USB Power**

Use the USB cable to connect the converter's USB-C port to a power bank, battery, USB power adapter, or other 5V USB power source.

The power indicator lights up when a power source is connected, Once the converter is connected to a power source, the LCD screen turns on, and the converter is operational. The converter restarts with the most recent settings.

6. User Interface



Interface	Name	Button	
Interface	Menu/ Select		Press the Select button to open menu mode and to open a sub menu.Use the Up and Down buttons to move the cursor to the desired value, then press Select to confirm.
	Scroll Up		Use the scroll up button to scroll through the menu.
	Scroll Down		Use the scroll down button to scroll through menu. A ▼ icon at the bottom of the page means there are additional menus on the next page . Press the button to continue down to the next page.

			A ▶ icon to the right of a menu indicates there is a sub menu for that item.
	Back (Return to previous menu)		Press the Back button to return to the previous menu.

7. Main Menu

Press the Select button to open the main menu and select from the following options.

IO CONFIG, VIDEO CONFIG, AUDIO CONFIG, and SYSTEM INFO.

7.1 IO CONFIG

Menu	Function	Option
IO CONFIG	HDMI Out Source	HDMI In/SDI In(SFP In)/Scaler
	SDI Out Source	HDMI In/SDI In(SFP In)/Scaler
	Scaler Source	HDMI In/SDI In(SFP In)
	SDI/SFP In	SDI In/SFP In

7.1.1 HDMI Out Source

Sets the source signal of the HDMI output

SDI In: Routes the SDI input signal to the HDMI output.

HDMI In: Loops the HDMI input signal to the HDMI output.

Scaler: Routes the scaler's signal to the HDMI output.

If Scaler is selected, see Scaler Source below, and Output Format in the Video Menu.

7.1.2 SDI Out Source

Sets the source signal of t he SDI output.

SDI In: Routes the SDI input signal to the SDI output.

HDMI In: Loops the HDMI input signal to the SDI output.

Scaler: Routes the scaler's signal to the SDI output.

If Scaler is selected, see Scaler Source below, and Output Format in the Video Menu.

7.1.3 Scaler Source

Sets the input video signal that's routed to the scaler.

SDI In: Routes the SDI input signal to the scaler.

HDMI In: Routes the HDMI input signal to the scaler.

7.1.4 SDI/SFP IN

Select the signal source for SDI or SFP.

7.2 VIDEO CONFIG

7.2.1 Output Format

Displays the scaler's current output format.

The scaler's selected format will be output to the HDMI or SDI ports individually or simultaneously (see Scaler Source in the output menu above)

720x480i59.94/720x576i50/1920x1080i60/1920x1080i59.94/1920x1080i50/1920x1080psf30/1920x1080psf29.97/1920x1080psf25/1920x1080psf24/1920x1080psf23.98/1920x1080p30/1920x1080p29.97/1920x1080p25/1920x1080p24/1920x1080p23.98/1280x720p60/1280x720p59.94/1280x720p50/1280x720p30/1280x720p29.97/1280x720p25/1280x720p24/1280x720p23.98/1920x1080p60/1920x1080p59.94/1920x1080p50/ED480p59.94/ED576p50

7.2.2 HDMI CS

Sets the video and audio formats of the HDMI output signal.This menu is useful for formatting output signals to different types of HDMI monitors or projectors. Choose RGB or YCbCr formats along with 2-8 audio channels.

HDMI CS MENU SETTING	SIGNAL TYPE, COLOR SPACE, ANDNUMBER OF AUDIO CHANNELS
DVI RGB444	DVI-D RGB 4:4:4
RGB444 2CH	HDMI RGB 4:4:4 with 2 audio channels
YUV444 2CH	HDMI YCbCr 4:4:4 with 2 audio channels
YUV422 2CH	HDMI YCbCr 4:2:2 with 2 audio channels
RGB444 8CH	HDMI RGB 4:4:4 with 8 audio channels
YUV444 8CH	HDMI YCbCr 4:4:4 with 8 audio channels
YUV422 8CH	HDMI YCbCr 4:2:2 with 8 audio channels

7.2.3 3G-SDI OUT

Select between outputting a 3G-SDI Level-A or 3G-SDI Level-B signal.

Important: When outputting a 3G-SDI signal, make sure the switcher is set to the correct Level-A or Level-B signal.Otherwise, the video signal will not be recognized by incompatible equipment, and it will not display a picture.

7.2.4 SD2SD ASPECT

Selects the aspect ratio of the input SDI signal and the aspect ratio of the output SDI signal.

SD2SD ASPECT	Options
	Anamorphic I=16:9 FS O=14:9/16:9 LB

SD2SD ASPECT	I=16:9 FS O=4:3/16:9 LB I=16:9 FS O=14:9/16:9 CC I=16:9 FS O=4:3/16:9 CC I=16:9/14:9 PB O=4:3/14:9 LB I=16:9/14:9 PB O=4:3/14:9 CC I=16:9/14:9 PB O=16:9/14:9 ZM I=16:9/14:9 PB O=14:9/4:3 PB I=16:9/4:3 PB O=16:9/4:3 ZM I=16:9/4:3 PB O=14:9/4:3 ZM I=14:9 FS O=16:9/14:9 PB I=14:9 FS O=4:3/14:9 LB I=14:9 FS O=4:3/14:9 CC I=14:9 FS O=16:9/14:9 ZM I=14:9/4:3 PB O=16:9/4:3 PB I=14:9/4:3 PB O=16:9/4:3 ZM I=14:9/4:3 PB O=14:9/4:3 ZM I=14:9/16:9 PB O=4:3/16:9 LB I=14:9/16:9 PB O=14:9/16:9 CC I=14:9/16:9 PB O=4:3/16:9 CC I=4:3 FS O=16:9/4:3 PB I=4:3 FS O=14:9/4:3 PB I=4:3 FS O=16:9/4:3 ZM I=4:3 FS O=14:9/4:3 ZM I=4:3/16:9 LB O=14:9/16:9 LB I=4:3/16:9 LB O=14:9/16:9 CC I=4:3/16:9 LB O=4:3/16:9 CC I=4:3/14:9 LB O=16:9/14:9 PB I=4:3/14:9 LB O=4:3/14:9 CC I=4:3/14:9 LB O=16:9/14:9 ZM

7.2.5 SD2HD ASPECT

Selects the aspect ratio of the input SDI signal and the aspect ratio of the output HDMI signal.

SD2HD ASPECT	Options
SD2HD ASPECT	Anamorphic I=16:9/14:9 PB O=16:9/14:9 ZM I=16:9/4:3 PB O=16:9/4:3 ZM I=14:9 FS O=16:9/14:9 PB I=14:9 FS O=16:9/14:9 ZM I=14:9/4:3 PB O=16:9/4:3 PB I=14:9/4:3 PB O=16:9/4:3 ZM I=4:3 FS O=16:9/4:3 PB I=4:3 FS O=16:9/4:3 ZM I=4:3/14:9 LB O=14:9/16:9 PB I=4:3/14:9 LB O=14:9/16:9 ZM

7.2.6 HD2SD ASPECT

When the scaler converts HDMI to SDI, this menu selects the aspect ratio of the input HDMI signal and the aspect ratio of the output SDI signal.

HD2SD ASPECT	Options
HD2SD ASPECT	Anamorphic I=16:9 FS O=14:9/16:9 LB I=16:9 FS O=4:3/16:9 LB I=16:9 FS O=14:9/16:9 CC I=16:9 FS O=4:3/16:9 CC I=16:9/14:9 PB O=4:3/14:9 LB I=16:9/14:9 PB O=4:3/14:9 CC I=16:9/14:9 PB O=16:9/14:9 ZM I=16:9/14:9 PB O=14:9/4:3 PB

7.2.7 HD2HD ASPECT

When the scaler converts HDMI to HDMI, this menu selects the aspect ratios of the input and output HDMI signals.

HD2HD ASPECT	Options
HD2HD ASPECT	Anamorphic I=16:9/14:9 PB O=16:9/14:9 ZM I=16:9/4:3 PB O=16:9/4:3 ZM

7.2.8 1080i=1080PsF

This option helps to solve interlaced and progressive video signal compatibility issues between cameras, switchers, and monitors.

Select YES to apply PsF (Progressive segmented Frame) flag metadata to the incoming 1080i video, and allow compatible equipment to recognize the signal and reconstruct it into aprogressive-scan visual.

Selecting NO will output the 1080i signal as it is received.

7.2.9 DE-INTERLACE

The converter offers two options for converting interlaced video (i) into non-interlaced, or progressive (p) video format via the scaler.

Top and Bottom: Ideal for viewing motion or action by prioritizing smooth motion over image sharpness. The converter scales each interlaced field to fill the frame and reduces combing artifacts by maintaining the source video's field rate.

Weave:The converter simultaneously weaves the consecutive fields of interlaced video, prioritizing image sharpness for stationary objects over smooth motion by halving the source video's field rate.

7.2.10 SDI OUT FLIP

Changes the orientation of the SDI output signal. This is useful if a video is being projected from behind the screen, or if a projector is hanging upside down from a ceiling mount.

Off (default): No change to the original image.

H Flip: Flips the image horizontally (L/R).

V Flip: Flips the image vertically (U/D).

V&H Flip: Flips the image both vertically and horizontally.

7.2.11 HDMI OUT FLIP

Changes the orientation of the HDMI output signal.

Off (default): No change to the original image.

H Flip: Flips the image horizontally (L/R).

V Flip: Flips the image vertically (U/D).

V&H Flip: Flips the image both vertically and horizontally.

7.2.12 TPG

The built-in Test Pattern Generator (TPG) outputs a variety of standard test patterns, including color bars, grayscale patterns. It enables quick verification of signal integrity, resolution, frame rate, and color accuracy across the entire video workflow. TPG is ideal for system setup, troubleshooting, and display calibration without the need for external test equipment.

Off/ 100% Color Bar/ 75% Color Bar/ White/ Yellow/ Cyan/ Green/ Magenta/ Red/ Blue/ Black/ Gray/ 8H Gray Level/ 16H Gray Level/ 32H Gray Level/ 64H Gray Level/ White Ramp/ Black Ramp/ Win50 White/ Win50 Black/ Check Field/ Red Ramp/ Green Ramp/ Blue Ramp

7.2.13 TPG Overlay

The TPG Overlay function allows additional test information to be displayed on top of the test pattern output for signal monitoring and verification.

Disable: Turns off the overlay display. Only the selected test pattern is shown.

Dynamic Circle: Displays a moving circular overlay on the test pattern. This dynamic element helps verify real-time video processing, motion handling, and ensures the video output is live and not frozen.

Frame Count: Displays a continuously increasing frame counter overlay. This is used to confirm frame continuity, frame rate accuracy, and overall signal stability during transmission and processing.

7.3 AUDIO CONFIG

The audio menu routes the pairs of audio channels to the desired audio outputs of HDMI and SDI signals.

The converter offers four stereo pairs for HDMI signals and eight stereo pairs for SDI signals. Enter the audio menu and press Select for a list of audio inputs.

Each input defaults to the same output stereo pair. To change the output, scroll to the stereo pair to be rerouted and press Select. Scroll to the channels that will output the audio, and press Select to set the change.

For HDMI audio, select CH1-2, 3-4, 5-6, and 7-8.

For SDI audio, select CH1-2,3-4,5-6,7-8, 9-10,11-12,13-14,and 15-16.

The converter features a built-in Test Pattern Generator (TPG) with selectable audio output modes, allowing users to verify audio signal paths, channel mapping, and embedding performance during system setup and troubleshooting. Audio Mode Options: Users can select the following TPG audio output modes: Audio Off, L1 kHz / R1 kHz, L1 kHz / R Mute, L Mute / R1 kHz.

7.4 SYSTEM INFORMATION

7.4.1 Scaler REF

Scaler Ref syncs the scaler's frame buffer to the selected input.Manually syncing to an input can be helpful in multi-source setups where out-of-sync signals can cause unwanted artifacts during switcher transitions.

Free-run: The scaler runs independently without referencing an external signal.

SDI In: The scaler references the SDI input signal.

HDMI In: The scaler references the HDMI input signal.

Source: The scaler references the selected video input.

7.4.2 No Signal BG

Select the monitor screen color when the converter isn't receiving an input signal.

Choose between Black (default), blue, green, cyan, red, magenta, yellow, or white.

7.4.3 LCD OFF

Adjusts the length of time the LCD screen stays on after the last button press. Select from 5 seconds/ 15 seconds/ 30 seconds/ 1 minute/ 5 minutes/ 10 minutes/ 30 minutes and Never.

7.4.4 Back2Status

Set the length of time the LCD screen returns to the Status screen after the last button press.

Select from 5 seconds/ 15 seconds/ 30 seconds/ 1 minute/ 5 minutes/ 10 minutes/ 30 minutes and Never.

7.4.5 Language

Select the language of the on-screen display.

7.4.6 Factory Reset

Restarts the converter and returns all settings to the original factory defaults.

7.4.7 Version

Selecting the Version menu displays the hardware and firmware versions.

8. Processing Mode

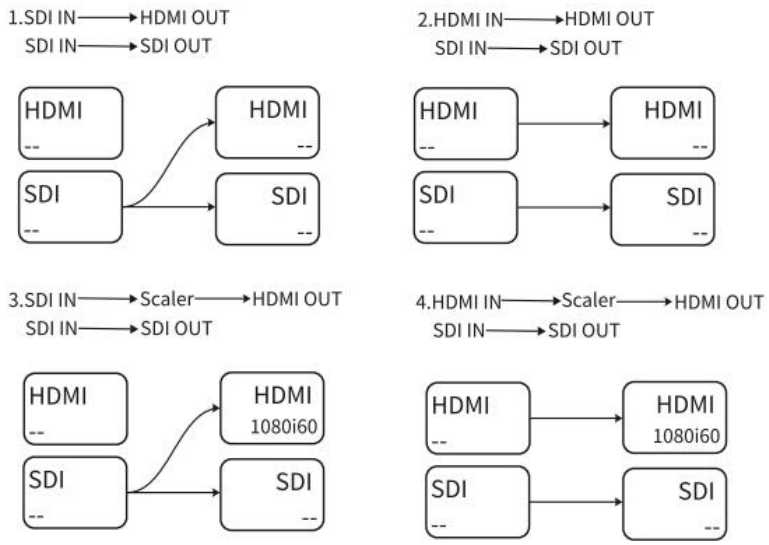
SC2040 supports 24 processing modes, allowing signal conversion between SDI, HDMI, and SFP (fiber) interfaces. Users can select the appropriate processing mode according to the required input and output configuration.

1 SDI IN to SDI and HDMI OUT

2 SDI IN to SDI OUT and HDMI IN to HDMI OUT

3 SDI IN to SDI OUT and Scaler SDI IN to HDMI OUT

4 SDI IN to SDI OUT and Scaler HDMI IN to HDMI OUT



1 HDMI IN to SDI and HDMI OUT

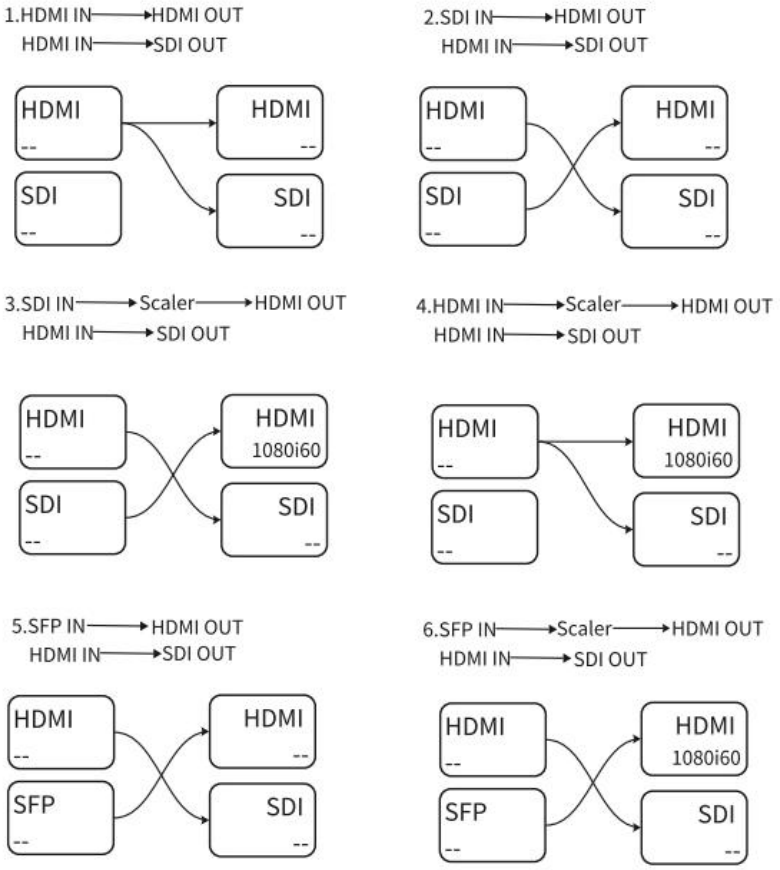
3 HDMI IN to SDI OUT and Scaler SDI IN to HDMI OUT

4 HDMI IN to SDI OUT and Scaler HDMI IN to HDMI OUT

2 HDMI IN to SDI OUT and SDI IN to HDMI OUT

5 HDMI IN to SDI OUT and SFP IN to HDMI OUT

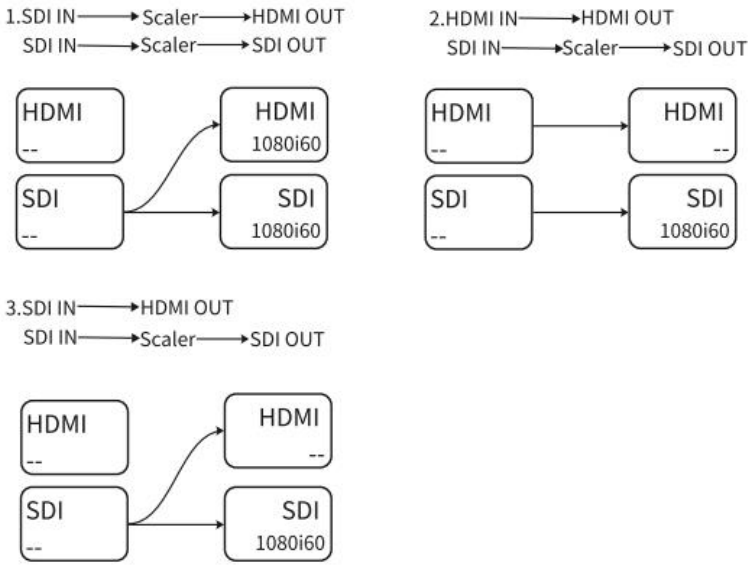
6 HDMI IN to SDI OUT and Scaler SFP IN to HDMI OUT



1 Scaler SDI IN to SDI and HDMI OUT

2 Scaler SDI IN to SDI OUT and HDMI IN to HDMI OUT

3 Scaler SDI IN to SDI OUT and SDI IN to HDMI OUT

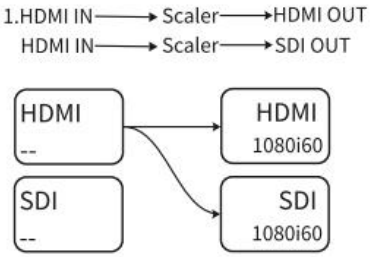


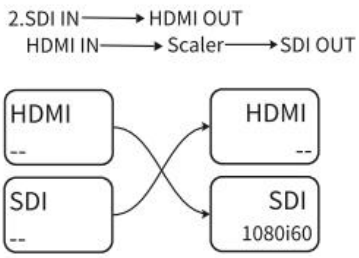
1 Scaler HDMI IN to SDI and HDMI OUT

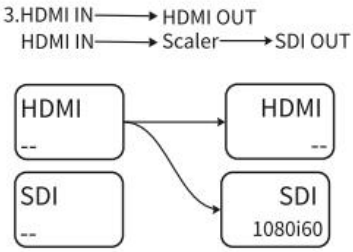
2 Scaler HDMI IN to SDI OUT and SDI IN to HDMI OUT

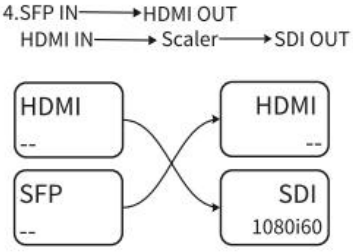
3 Scaler HDMI IN to SDI OUT and HDMI IN to HDMI OUT

4 Scaler HDMI IN to SDI OUT and SFP IN to HDMI OUT







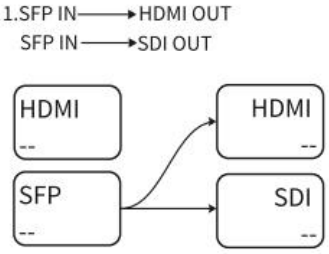


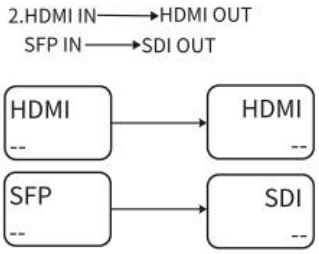
1 SFP IN to SDI and HDMI OUT

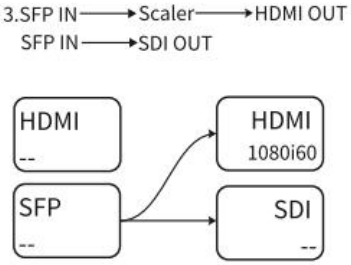
2 SFP IN to SDI OUT and HDMI IN to HDMI OUT

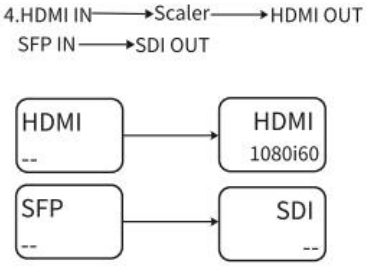
3 SFP IN to SDI OUT and Scaler SFP IN to HDMI OUT

4 SFP IN to SDI OUT and Scaler HDMI IN to HDMI OUT







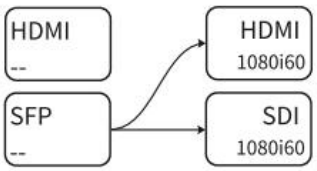


1 Scaler SFP IN to SDI and HDMI OUT

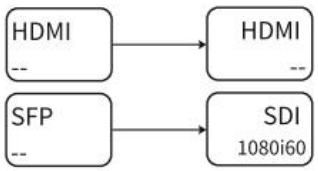
2 Scaler SFP IN to SDI OUT and HDMI IN to HDMI OUT

3 Scaler SFP IN to SDI OUT and SFP IN to HDMI OUT

1.SFP IN → Scaler → HDMI OUT
SFP IN → Scaler → SDI OUT



2.HDMI IN → HDMI OUT
SFP IN → Scaler → SDI OUT



3.SDI IN → HDMI OUT
SFP IN → Scaler → SDI OUT