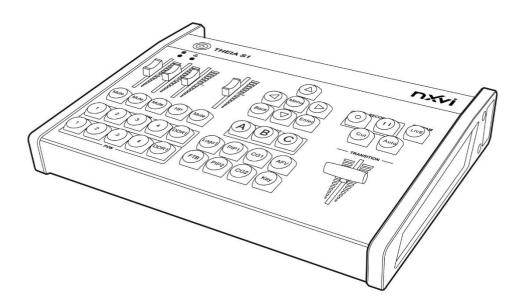


4K Live Switcher

User Manual

V1.2.5 2024.03



Theia S1

www.nxvitech.com

Cautions



- 1. Before use, please read this manual carefully and keep it safe.
- 2. Please strictly adhere to the warning signs and instructions indicated on the product.
- 3. Before cleaning the machine, unplug the power plug. Do not use liquid or corrosive cleaners; use a damp cloth for cleaning.
- 4. Ensure the product is used in an environment without the risk of water splashing or submersion.
- 5. Do not place the product in unstable locations, such as on a handcart or stand, to prevent it from falling and causing severe damage.
- 6. The product's case and venting holes are for heat dissipation. Do not cover or block these venting holes. Maintain a heat dissipation space of at least 4 centimeters during device operation to prevent overheating. Avoid placing the product on fabric surfaces to prevent blocking the venting holes.
- 7. Do not place the product near sources of heat, radiators, or hot air vents. Unless there is proper ventilation, do not place the product in a sealed space.
- 8. Use the power source specified on the power adapter.
- 9. Avoid pressing on the product's power cord and avoid placing the product on other power cords.
- 10. When using extension cords, confirm the total power/ampere does not exceed the load capacity of the extension cord.
- 11. The total current used in wall socket insertion should not exceed 15 amperes.
- 12.Do not insert anything into the venting holes of the device to avoid electric shock or short circuits. Do not splash any liquids on the product.
- 13.Do not attempt unauthorized disassembly or repairs. Opening the cover without authorization exposes you to voltage or other dangers. Consult service personnel for all service matters.
- 14. If any of the following situations occurs, unplug the product and consult an authorized dealer or service personnel:
 - a. Power cord or plug is damaged or frayed.
 - b. Liquid has entered the product.
 - c. The product is exposed to rain or water splashes.

d. If, following the instructions in this manual, the product still does not function properly, adjust only the areas mentioned in this manual, as improper adjustments elsewhere may damage the product and require qualified technicians more time for repairs.

e. The product has been dropped or the body has been damaged.

f. There are abnormal changes in the product's performance.

Product Warranty

Warranty Guidelines

- The product is covered by a one-year non man-made damage warranty from the date of purchase.
- For any repairs during the warranty period, the original purchase invoice or other relevant documents must be provided.
- The warranty period starts from the date of purchase. In case of loss of the purchase proof or if the purchase date is not specified, the warranty start date will be the product's factory date plus 30 days.
- Accidental events (natural disasters, changes in the environment, lightning, etc.), improper use (such as liquid, sand, dust infiltration, moisture, etc.), unauthorized disassembly, repairs, or modifications by unauthorized personnel are not covered by the warranty.
- Damage caused by computer system viruses and malicious software is not within the warranty coverage.
- Damage caused by the installation of third-party software on the computer without authorization is not covered by the warranty.
- All document delivery or shipping costs, including insurance, are the responsibility of the purchaser.
- Any other claims of a different nature are not within the warranty coverage.
- The warranty is only valid in the country or region where the product was purchased.
- This product warranty guideline does not affect the user's statutory rights.

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Chapter 1: Product Introduction

Theia S1 Live Switcher is a video switcher with multiple features. It supports up to 4 channels of 4K video input for multi-camera switching, including HDMI and network-based NDI sources. The mainstream video compression formats such as H.265 and H.264, and video streaming protocols such as UDP, SRT, RTP, RTMP, and HLS are supported for flexible video streaming, recording, and video playback, with the ability to push two different streaming addresses simultaneously.

In addition, Theia S1 Live Switcher includes built-in functions for video transition effects, graphic and text overlay, picture-in-picture, chroma keying, and audio mixing for multi-source video and audio processing. The all-in-one design and embedded function keys simplify the manipulation of Theia S1 Live Switcher and reduce cost, time, space, and staff required to operate.

Theia S1 Live Switcher is a powerful, versatile, and user-friendly video processing device suitable for high-quality and low-latency video broadcasting and production scenarios, such as live e-commerce, lectures, conferences, concerts, and remote production.



Product Overview

1.1 Product Features

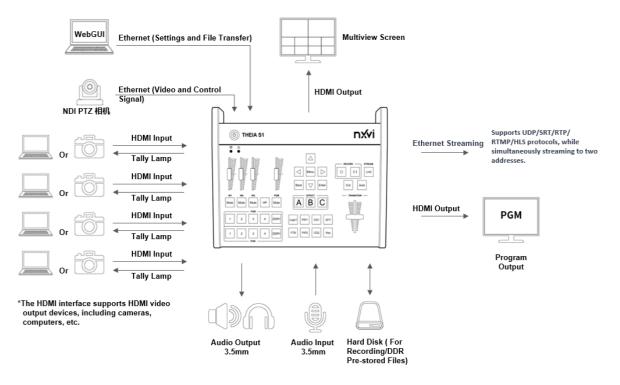
Theia S1 Live Switcher is a multifunctional video switching and streaming system with the following key features:

- Integrate video switching, graphic and text effects, multi-source audio mixing, hardware encoding, streaming, and video recording into one device.
- Support 4 channels of Full HD to 4K video input (including HDMI and NDI formats) and 1 channel of Digital Video/Audio Recorder (DDR) for multiview switching.
- Support external audio input and output.
- Support mixing of multiple video inputs with embedded audio sources (including HDMI and NDI formats), DDR audio, and external audio, along with quick function keys for audio follow video.
- Built-in 30+ video transition effects, with the ability to select 3 effects to physical function keys.
- Support user-controlled cut, auto, or T-Bar manipulated video transition speed.
- Include filter functions for implementing chroma keying (chroma key, luma Key, filter Key) graphic and text effects.
- Support Digital Video Effect (DVE) effects, with subtitle, logo and CG text overlay, as well as picture-in-picture effects.
- Support up to 5 sub-windows overlaying in picture-in-picture effect, with the option to assign 2 effects to physical keys.
- Support 1 macro function key for selecting and executing grouped functions with a single press.
- Support 2 HDMI video outputs including multiview monitoring and program (PGM) streaming preview.
- Support H.265/H.264 video compression formats.
- Support multiple streaming protocols including UDP/SRT/RTP/RTMP/HLS with the ability to assign 2 different addresses simultaneously.
- Support 2 USB ports for video recording or playback with external hard drives in NTFS format.

1.2 System Use-Case Diagram

Theia S1 Live Swticher system use-case scenario is depicted in the following figure with:

- 4 HDMI video inputs for camera or computer connection (with option for configuring one of the video inputs as networked-based NDI camera input).
- 4 Tally indicator lights connection.
- 2 HDMI video outputs for multiview screen and program output connection.
- WebGUI for system setting and file transfer configuration through Ethernet port.
- NDI camera command and control connection for compressed video input through Ethernet port.
- UDP/SRT/RTP/RTMP/HLS streaming protocols for video transport through Ethernet port.
- Audio input and output connection.
- USB port for external video recording or playback.

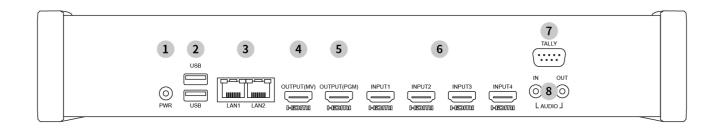


Theia S1 Live Switcher Use Case

Chapter 2: Connection and Operation

2.1 I/O Ports Layout and Description

Theia S1 Live Switcher contains I/O ports in system rear side for supporting WebGUI configuration, video and audio signal inputs and outputs, networking streaming, video and audio file recording and playback, tally control, and power input. The I/O ports layout and descriptions are shown in figure and table below.



1	Power Socket	5	HDMI Output (program)
2	USB x2 (external hard drive for DDR recording and playback)	6	HDMI Input x4
3	10M/100M/1000M Ethernet x2 (NDI input/streaming/WebGUI)	7	 TALLY Interface (4 groups of red/green light control) * Used only for light indication, no data transmission.
4	HDMI Output (multiview)	8	Audio Input & Output

 Audio Input & Output Ports (3.5mm Jack). Audio IN for non-balanced dual-channel analog audio input. Audio OUT for non-balanced dual-channel analog audio output. 		
 HDMI Video Input Ports (Type A) INPUT1/INPUT2/INPUT3/INPUT4 for video sources displayed in multiview screen. 		

	 HDMI Video Output Ports (Type A) OUTPUT (MV) for multiview screen in 1080. OUTPUT (PGM) for program video up to 4K.
	 10M/100M/1000M Ethernet Ports (RJ45) LAN1 for NDI video input, encoded video and audio streams, file upload (6GB in maximum) and download, and connection for Theia S1 WebGUI configuration (with fixed IP address: 192.168.1.10). LAN2 for NDI video input, encoded video and audio streams, and file upload (6GB in maximum) and download.
USB	 USB Ports (Type A) USB for playback of pre-stored DDR audio and video files, as well as recording of audio and video files.
O PWR	 DC Power Plug PWR for DC12V power input (a AC-to-DC power adapter is included in product accessories).
TALLY	 TALLY Interface (4 groups of red/green light control) Tally lights for video production that indicate which camera is live or in preview during a live stream or video recording.

2.2 Peripheral Accessories

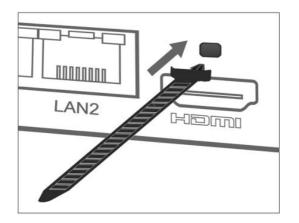
Theia S1 Live Switcher system peripheral accessories include:

- Quick Start Guide x1
- DC12V power adapter x1
- Cable tie x3
- Cable clip (strip and ring) x7

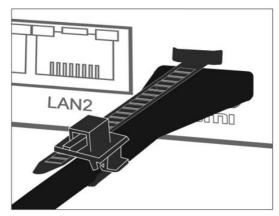
The cable clip straps and rings are provided to secure the HDMI cable connection, and prevent improper bending of cable head and accidental disconnection of cable. The installation and removal steps of cable clip strap and ring are provided below.

Installation of cable clip strap and ring

• Insert cable clip strap directly into the cable clip installation hole on the rear panel of Theia S1 Live Switcher, as figure shown below, and ensure a secure installation after insertion.

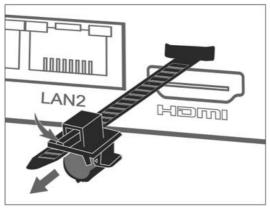


- Plug HDMI cable into HDMI interface on Theia S1 Live Switcher.
- Push HDMI cable into the hole on cable clip ring and move cable clip ring toward cable strap. Ensure cable strap pass through top hole on cable clip ring for fastening HDMI cable, as figure shown below.

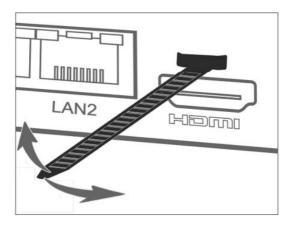


Removal of cable clip strap and ring

• Flip buckle upward on cable clip ring until cable clip ring can be moved away from cable clip strap.

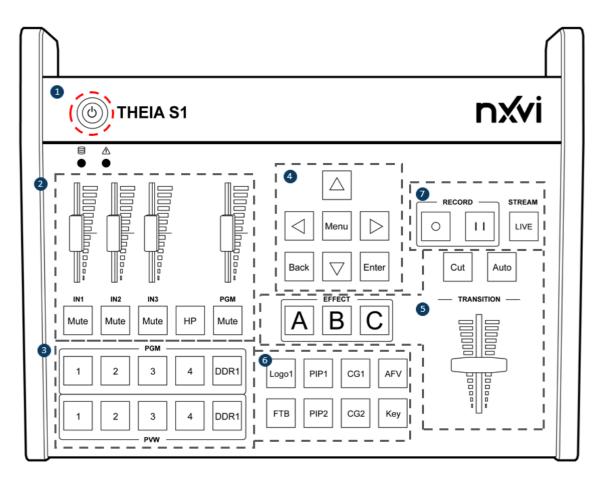


- Pull HDMI cable from the hole on cable strap ring and unplug it from HDMI interface on Theia S1 Live Switcher.
- Hold cable clip strap and gently shake it from side to side, and pull it outward for releasing, as figure shown below.



2.3 Control Panel

Theia S1 Live Switcher control panel includes function keys, audio volume sliders, and a T-Bar for video transition effect. The control panel is divided into 7 areas, as figure and description shown below.



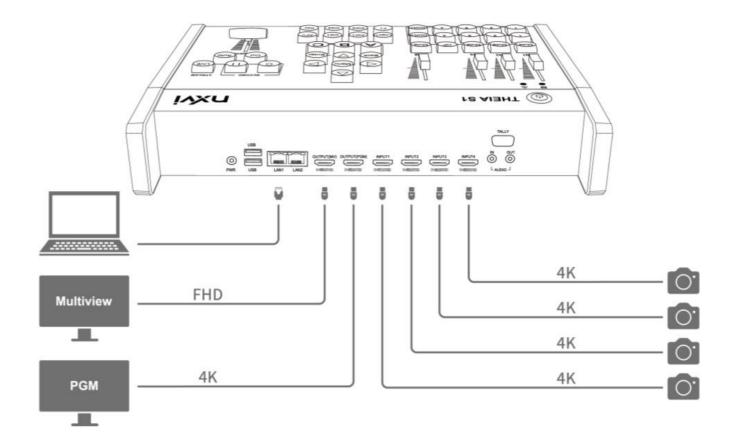
No.	Name	Description
1	Power Switch	Short press to power on. Long press for 5 seconds to power off.
2	Audio Sliders and Control Keys	 IN1/IN2/IN3: Sliders for mixing audio volume control. The association of sliders and audio sources (4 channels of embedded audio from video input (HDMI or NDI), 1 channel of DDR video audio file, and 1 external audio signal) can be establised in menu. Each slider can be associated with more than one audio source when necessary. However, each video source can only be associated with one slider. The audio volume controlled by the slider will be displayed in menu as a volume bar with intensity. PGM: Slider for final mixed PGM audio volume control. Mute: Mute/Unmute keys of mixing audio channels controlled by sliders above keys. By pressing the mute key under IN1 slider will light up key in orange color, and muting the audio channel(s) associated to IN1. HP: Enable/disable key of audio output with 3.5mm jack in headphone monitoring. Users can configure audio output to Video-IN1, Video-IN2,

	1			
		Video-IN3, Video-IN4, DDR1, MIC, or PGM in menu (default configuration		
		is PGM audio).		
		Refer to 3.2 Audio Function for details.		
3	Program (PGM) and Preview (PVW)	 PGM 1/2/3/4/DDR1: Program keys for switching video signals from source 1/2/3/4 and DDR to "PGM" (Program) channel in multiview screen. By pressing the program key, the pressed numeric key will be lit up in red and the selected video signal will be immediately displayed in PGM (Program) channel. PVW 1/2/3/4/DDR1: Preview keys for switching video signals from source 1/2/3/4 and DDR to "PVW" (Preview) channel in multiview screen. By pressing the preview key, the pressed numeric key will be lit up in green for indicating the next video signal being displayed in PGM (Program) channel, after video switching is applied (such as pressing "Cut" button). Note: DDR signal source is an internal audiovisual file that needs to be pre-stored on the hard disk. 		
4	Menu and Control Keys	 Menu: Menu key for function selection. By pressing menu key, the OSD menu will be displayed in multiview screen. Back: Back key for exit current function selection or return to previous function selection in menu. Enter: Enter key for confirmation of function selection in menu. △▽⊲▷: Up/Down/Left/Right movement keys for function selection in menu. Refer to 3 System Menu for details. 		
5	Transition Effect	 A/B/C: Selection keys for transition effects. There are more than 30 built- in transition effects supported and users can associate 3 of them with these selection keys. Cut: Hard cut key for immediate transition without applying transition effects. Auto: Automatic key for transition effect. The transition time of effect can be set from 50 to 20000ms, after pressing automatic key. T-Bar: Manual control lever for transition time. Use Cut, Auto, or T-Bar to transit between PVW and PGM. Refer to 3.7 Effect Function for details. 		

6	Digital Video Effect (DVE)	 Logo1: Enable/Disable key for logo overlay effect. Users can upload a logo image file (in BMP, JPG, JPEG, PNG, PBM, PGM, PPM, or XPM format) in menu and define position in X- and Y-axis for logo overlay. The logo is displayed in original image size and will not automatically scale. PIP1/PIP2: Enable/Disable keys for picture-in-picture effect on program channel. There are more than 10 predefined picture-in-picture effects in system and users can associate 2 of them with these keys in menu. Refer to 3.8 Picture-in-Picture Function. for details. CG1/CG2: Enable/Disable keys for computer graphic and text files overlay effect. Users can upload text and graphic files in menu and define position in X- and Y-axis for computer graphic and text overlay. Unlike logo overlay, which maintains the image original size, computer graphic and text overlay will stretch the image to full-screen in display. AFV: Audio Follows Video function Enable/Disable key for Audio-Follow-Video (AFV) function. By pressing audio-follow-video key, the pressed key will be lit up in orange, and the embedded audio of that selected PGM video source will be automatically mixed into the PGM output audio. When the selected video from the PGM is changed to another, the automatically mixed audio will also be immediately changed to the new embedded audio source. FTB: The fade to black button is an easy way to start and end live broadcasts. Fade to black performs a mix to black which happens across all video layers at the same time. When performing a fade to black, the master program audio will also fade out to silence. Key: Enable/Disable key for keyer function. Users can select video sources and set chroma, luma, and filter values in menu for performing keying function. By pressing keyer key, the associated keying functions will be activated. Refer to 3.11 Keyer Function for details.
7	Streaming and Recording	 LIVE: Start/Stop key for live streaming. By pressing live key, the program channel will be streamed out. The second pressing of live key will stop the live streaming of program channel. Refer to 3.5 Stream Function for details. O: Start/Stop key for recording. By pressing record key, the program channel content will be recorded. The second pressing of record key will stop the recording of program channel. II: Pause/Resume key for recording. By pressing pause key, the program channel recording will be paused. The second pressing of pause key will resume program channel recording. Refer to 3.6 Record Function for details.

2.4 Connection of Devices and Settings

Before pressing power button on Theia S1 Live Switcher, please connect peripheral devices as figure shown below. A configuration of multiple 4K cameras with multiview and program monitors, as well as external computer for web-based graphic user interface (WebGUI) setting, is illustrated as a reference. Theia S1 Live Switcher supports both local embedded menu and remote external WebGUI for system configuration settings and operations. Some settings can only be configured through the WebGUI (such as encoding/streaming parameters, text subtitles, logo/CG image upload, DDR video download/upload/delete, recording filename input, etc.)



2.5 Multiview (MV) Interface Screen

Theia S1 Live Switcher contains a built-in multiview (MV) interface for managing multiple videos, audio, network, and storage input and output devices, as well as tally control. The multiview interface also provides setting options to associate panel function keys with required features and effects. This section explains the key features in multiview interface.

Power-On Screen

After peripheral devices are connected, press power button on top left corner of Theia S1 Live Switcher to power on the machine. Wait for 2~3 seconds, and the startup screen with the NxVi logo, as figure shown below, will appear on the monitor (preferred in 1080 resolution) connected to OUTPUT (MV) HDMI interface for indicating the successful power-on.

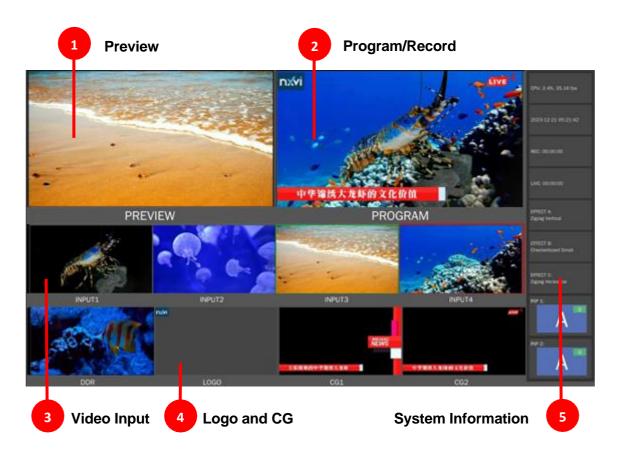


Operating Screen

Wait for another 30 seconds for system initiation (output screen will be in blank) and a blue screen will appear on **OUTPUT (MV) HDMI** monitor after the completion. The multiview operating screen, as figure shown below, will be displayed for indicating the readiness of operating. The multiview operating screen is divided into:

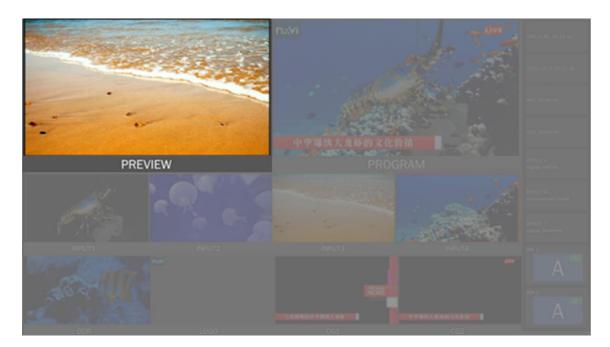
- **Preview** window
- **Program/Record** window
- Video Input windows
- Logo and CG windows
- System Information window

Each operating window is described below.



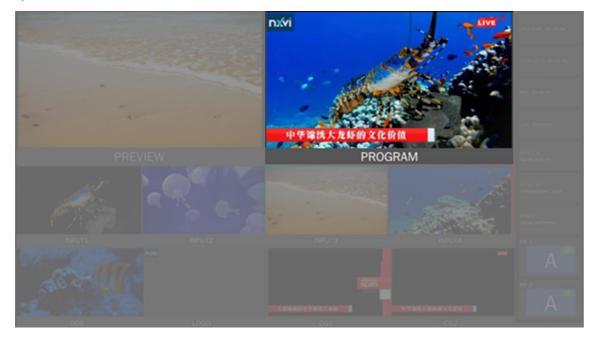
Preview Window

The **Preview** window displays the video content ready for being switched to **Program** window, when transition keys or T-bar is applied. Once the **Preview** window content is switched to **Program** window, the previous content in **Program** window will be displayed in **Preview** window instead.



Program/Record Window

The **Program/Record** window displays the video content being streamed or recorded currently. The "next" program content can be the video sources from **Preview** window or **PGM 1/2/3/4/DDR1** function keys controllered.



Video Input Windows

The Video Input windows display video sources from INPUT1/INPUT2/INPUT3/INPUT4 HDMI interfaces and DDR pre-recorded content. The video "output" resolution for these video sources can be configured in Video Output category of system menu with Base Canvas Resolution option. All the video input sources will be scaled accordingly based on the resolution selected in Base Canvas Resolution for further operations and output. One of the video input sources will be displayed in "red" rectangle for indicating the selection (by pressing function key in PGM 1/2/3/4/DDR1 area) to Program/Record window (i.e. video source being streamed or recorded currently). One of the video input sources can also be displayed in "green" rectangle for indicating the selection (by pressing function key in PVW 1/2/3/4/DDR1 area) to Preview window (i.e. video source in next for being streamed or recorded), assuming it is different from video source assigned to Program/Record windows will also be displayed through Tally control interface to facilitate the coordinating of cooperation.



■ Logo and CG Windows

The **Logo** and **CG** (computer graphic) windows display images selected for logo (**LOGO** window) and subtitle (**CG1** and **CG2** windows) processing, with the support of text input in subtitle windows. For more information description, refer to 3.9 Logo Function and 3.10 CG Function for detailed description of settings and options.



System Information Window

The **System Information** window displays following information:

- System CPU utilization status and video frame rate (in fps).
- System time (year-month-day hour:minute:second)
- Record time (hour:minute:second)
- Live streaming time (hour:minute:second)
- Transition Effect A key setting
- Transition Effect B key setting
- Transition Effect C key setting
- Picture-In-Picture (PIP) 1 key setting
- Picture-In-Picture (PIP) 2 key setting

as a quick summary of key system information and settings.



2.6 WebGUI Connection and Configuration

Theia S1 Live Switcher provides web-based graphic user interface (WebGUI) for complete system settings and configurations. The LAN1 port in system is the default Ethernet interface for connecting to external configuring device through WebGUI, and its default IP adress is configured as:

• LAN1 port IP address: 192.168.1.10

To establish connection between Theia S1 Live Switcher and external configuring device, set the external configuring device's IP address to the same subnet as Theia S1 LAN1 port (192.168.1.x).

Open a web browser in external configuring device and enter Theia S1 LAN1 port IP address in browser's address bar: <u>http://192.168.1.10:3000/</u>

The login screen will appear as figure shown below. Authenticate using the default username and password to access the WebGUI.

TXVI Theia S1 Stream Audio Video Input DDR Record Effect PIP Logo CG Keyer Netwo	k System SW Vec 123 😎
USERNAME PASSWORD	LOGIN

To authenticate external configuring device's access to Theia S1 Live Switcher, use following username and password to login WebGUI:

- Default username: admin
- Default password: NxVweb

For more information, refer to 4 Web-Based Graphical User Interface (WebGUI).

The LAN2 port in Theia S1 Live Switcher is dynamically configured by DHCP mechanism.

• LAN2 port IP Address: DHCP configured

2.7 Menu and WebGUI Setting Differences

Theia S1 Live Switcher supports both embedded menu (Menu key) and external web-based graphic user interface for system settings. Some of settings can only be configured through WebGUI, such as encoding and streaming parameters, text input for subtitles, Logo and CG image files upload, DDR video file download/upload/delete, and record filename; while video output, audio volume, and tally control mode switch settings can only be configured through embedded menu. The following table lists function settings supported by embedded menu and external WebGUI for comparison.

	Function	Menu	WebGUI
	Encoding Parameter Setting		
Streaming	Streaming Address Setting		
-	Single/Multi-Stream Switch		
	Mixing Source Settings		
	Audio Delay Settings		
Audio	Headphone Output Selection		
	Audio Volume Level Setting		
	Slider Audio Channel Binding		
	DDR Video Selection		
DDR	DDR Video Upload/Download/Delete		
	DDR Video Playback Control		
	NDI/HDMI Input Source Switching	\checkmark	
Video Input	Input Source Cropping and Rotation Setting	\checkmark	
	Input Source Chroma Keying Effect Setting		
	Output Resolution Setting	\checkmark	
Video Output	Output Frame Rate Setting	\checkmark	
	Output Canvas Orientation Setting		
Desert	Record Filename Setting		
Record	Record Path Setting		
	FTB Duration Setting		
Effect	Transition Effects Auto Transition Speed Setting		
	Transition Effects Binding Key Setting		
	Picture-in-Picture Binding Key Setting		
PIP	Picture-in-Picture Sub-Screen Style Setting		
	Picture-in-Picture Style Preview		
	Logo Image Upload		
Lana	Logo Image Selection		
Logo	Logo Position Setting		
	Logo Image Chroma Keying Effect Setting		
	Text Subtitle Input		
	Text Subtitle Size		
Text Subtitle	Text Subtitle Color		
	Text Subtitle Font		
	Text Subtitle Scroll Effect		\checkmark

	Graphics Image Upload		
Graphics Image	Graphics Image Selection	\checkmark	\checkmark
	Graphics Image Chroma Keying Effect Setting	\checkmark	\checkmark
	Filter Key Image Upload		\checkmark
Keyer	Filter Key Image Selection	\checkmark	\checkmark
	Filter Key Parameter Setting	\checkmark	\checkmark
	NDI Source Select	\checkmark	
PTZ	Pan/Tilt Setting	\checkmark	
	Zoom/Focus and Parameters Setting	\checkmark	
	Preset Location Setting	\checkmark	
Network	Network Information Display	\checkmark	\checkmark
INELWOIK	Ethernet Configuration Setting		\checkmark
	System Language Switching	\checkmark	\checkmark
System Information	Time Zone and Time Setting		
System Information	Tally Control Mode Switching		
	Log Information		

Chapter 3: System Menu

Theia S1 Live Switcher provides an embedded menu for system function settings and monitoring. By pressing the **Menu** key in multiview screen, a semi-transparent on-screen-display menu will appear and overlay with multiview operating windows. Most of system functions and settings can be configured through this embedded menu. The following sections describe these system functions and their corresponding settings one by one.

3.1 Status Function

The **Status Function** provides status information for video inputs, DDR file, streamings and bitrates, and recording and bitrate settings. The following table lists all the functions and their settings displayed in **Status Function**.

Function	Sub-Function	Value or State	Default
	Input Source	HDMI or NDI	HDMI
Video-In 1	Frame Rate	(According to source)	0
	Resolution	(According to source)	0x0
	Input Source	HDMI or NDI	HDMI
Video-In 2	Frame Rate	(According to source)	0
	Resolution	(According to source)	0x0
	Input Source	HDMI or NDI	HDMI
Video-In 3	Frame Rate	(According to source)	0
	Resolution	(According to source)	0x0
	Input Source	HDMI or NDI	HDMI
Video-In 4	Frame Rate	(According to source)	0
	Resolution	 (According to source) (According to source) HDMI or NDI (According to source) (According to source) HDMI or NDI (According to source) Inactive, LIVE, or Reconnecting Inactive or Recording Refer to 4.1 Streaming for details. Refer to 3.5 Stream & 	0x0
	Input Source	File name	
DDR	Input SourceHDMI or NDIHFrame Rate(According to source)0Resolution(According to source)0Input SourceHDMI or NDIHFrame Rate(According to source)0Resolution(According to source)0Input SourceHDMI or NDIHFrame Rate(According to source)0Input SourceHDMI or NDIHFrame Rate(According to source)0Input SourceFile name0Input SourceInactive, LIVE, or Reconnecting0Inactive, LIVE, or Reconnecting1	0	
	Resolution	(According to source)	0x0
Si	tream 1	Inactive, LIVE, or	Inactive
St	tream 2	Reconnecting	mactive
F	Record		Inactive
Strea	Stream Bitrate 1		0 Kbps
Strea	m Bitrate 2	details.	0 1000
Reco	ord Bitrate	Refer to 3.5 Stream & Record for details.	0 Kbps

Status	INPUT1	Source : HDMI
Audio	Frame Rate : 30	Resolution : 3840x2160
Input	INPUT2	Source : NDI
Dutput	Frame Rate : 30	Resolution : 3840x2160
	INPUT3	Source : HDMI
Stream	Frame Rate : 0	Resolution : 0x0
Record	INPUT4	Source : HDMI
Effect	Frame Rate : 0	Resolution : 0x0
PIP	DDR	Source :
TH.	Frame Rate :	Resolution :
Logo	Stream 1	Inactive
CG	Stream 2	Inactive
Keyer	Record	Inactive
PTZ	Stream Bitrate 1	0 Kbps

3.2 Audio Function

The **Audio Function** provides status information and settings for audio inputs (HDMI INPUT1/2/3/4 or NDI, DDR, and MIC), headphone output selection, and volume slider 1/2/3. All the selected audio inputs for mixing will be output to program (**PGM**) channel. The headphone selection selects one of the audio sources, including **PGM**, for monitoring. The association between volume sliders and the audio sources is also established in audio function through menu setting. The following table lists all the functions and their settings displayed in **Audio Function**.

Function	Sub-Function	Value or State	Default
	Input Source	HDMI-1 or NDI-1	HDMI-1
	Sound Level Meter	(According to source)	(None)
Audio-In 1Input Source Sound Level Metrice Mute Control Volume Control Delay ControlAudio-In 2Input Source Sound Level Metrice Mute Control Volume Control Delay ControlAudio-In 2Input Source Sound Level Metrice Mute Control Delay ControlAudio-In 3Input Source Sound Level Metrice Mix ControlAudio-In 3Input Source Sound Level Metrice Mute Control Delay ControlAudio-In 3Input Source Sound Level Metrice Mute Control Delay ControlAudio-In 4Input Source Sound Level Metrice Mix ControlAudio-In 4Sound Level Metrice Mix ControlAudio-In 4Input Source Sound Level Metrice Sound Level Metrice Sound Level Metrice Sound Level Metrice Mute Control Delay ControlAudio-In 4Input Source Sound Level Metrice Mute Control Delay ControlAudio-In 4Input Source Sound Level Metrice Mute Control Delay Control Mix Control	Mute Control	Mute or Unmute	Unmute
Audio-In T	Audio-In 1 Input Source HDMI-1 or NDI-1 I Audio-In 1 Mute Control Mute or Unmute I Volume Control △▽⊲▷key for adjustment I Delay Control 0-10000ms delay time I Mix Control Mix or Unmix I Mix Control Mix or Unmix I Input Source HDMI-2 or NDI-2 I Sound Level Meter (According to source) I Mute Control △▽⊲▷key for adjustment I Volume Control △▽⊲▷key for adjustment I Delay Control 0-10000ms delay time I Mute Control Mix or Unmix I Mix Control Mix or Unmix I Input Source HDMI-3 or NDI-3 I Sound Level Meter (According to source) I Mute Control Mute or Unmute I Volume Control △▽⊲▷key for adjustment I Delay Control 0-10000ms delay time I Mute Control Mute or Unmute I Volume Control △▽⊲▷key for adjustment I <	(None)	
	Delay Control	0-10000ms delay time	0ms
	Mix Control	Mix or Unmix	Unmix
	Input Source	HDMI-2 or NDI-2	HDMI-2
	Sound Level Meter	(According to source)	(None)
Audio In 2	Mute Control	Mute or Unmute	Unmute
Audio-III 2	Volume Control	$\Delta \nabla \triangleleft \triangleright$ key for adjustment	(None)
	Delay Control	0-10000ms delay time	0ms
	Mix Control	Mix or Unmix	Unmix
	Input Source HDMI-3 or NDI-3	HDMI-3	
	Sound Level Meter	(According to source)	(None)
Audio In 2	Mute Control	Mute or Unmute	Unmute
Audio-III 5	Volume Control	$\Delta \nabla \triangleleft \triangleright$ key for adjustment	(None)
	Delay Control	0-10000ms delay time	0ms
	Mix Control	Mix or Unmix	Unmix
	Input Source	HDMI-4 or NDI-4	HDMI-4
	Sound Level Meter	(According to source)	(None)
Audio In 4	Mute Control	Mute or Unmute	Unmute
Audio-in 4	Volume Control	$\Delta \nabla \triangleleft \triangleright$ key for adjustment	(None)
	Delay Control	0-10000ms delay time	0ms
	Mix Control	Mix or Unmix	Unmix
	Sound Level Meter	(According to source)	(None)
	Mute Control	Mute or Unmute	Unmute
	Volume Control	$\Delta \nabla \triangleleft \triangleright$ key for adjustment	(None)
	Delay Control	0-10000ms delay time	0ms
	Mix Control	Mix or Unmix	Unmix

	Sound Level Meter	(According to source)	(None)
	Mute Control	Mute or Unmute	Unmute
Microphone (MIC)	Volume Control	△▽⊲⊳key for adjustment	(None)
(1110)	Delay Control	0-10000ms delay time	0ms
	Mix Control	Mix or Unmix	Unmix
Headphone Selector		PGM, Audio-1/2/3/4, DDR1, or MIC	PGM
Volur	ne Slider 1	Audio-1/2/3/4, DDR1, or MIC	(None)
Volume Slider 2		Audio-1/2/3/4, DDR1, or MIC	(None)
Volur	ne Slider 3	Audio-1/2/3/4, DDR1, or MIC	(None)

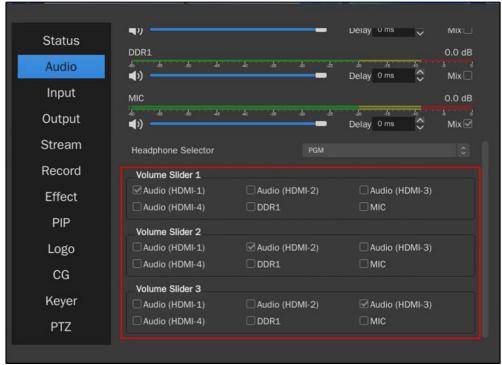
Use $\Delta \nabla \triangleleft \triangleright$ direction, **Enter**, and **Back** keys to move, select, and return for menu settings in audio function.



Audio Options(2-1)

	a v		Delay oms	MIX
Status	DDR1			0.0 dB
Audio	الملان من من من من من من من	4 4 4 4	_sotototo Delay 0 ms ♀	Mix 🗌
Input	міс			0.0 dB
Output	á á á á ∢)	ند ه ه =	Delay 0 ms	ہ ہے Mix ⊡
Stream	Headphone Selector	PGM		
Record	Volume Slider 1			
Effect	Audio (HDMI-1)	Audio (HDMI-2)	🗌 Audio (HDMI-3)	
DID	Audio (HDMI-4)	DDR1		
PIP	Volume Slider 2			
Logo	Audio (HDMI-1)	Audio (HDMI-2)	Audio (HDMI-3	
CG	🗌 Audio (HDMI-4)	DDR1		
CG	Volume Slider 3			
Keyer	Audio (HDMI-1)	Audio (HDMI-2)	Audio (HDMI-3)	
PTZ	Audio (HDMI-4)	DDR1		

Audio Options(2-2)



Audio Slider Settings

Status	Audio (HDMI-1)		0.0 dB
	do do do do do do		Mix 🗆
Audio	م ا)	Delay ^{0 ms}	
Input	Audio (HDMI-2)		0.0 dB
	å å å å å å ≰)) ———————————————————————————————————	Delay 0 ms	Mix
Output		•	
Stream	Audio (HDMI-3)	4 4 4 4	0.0 dB
	()	Delay 0 ms	Mix 🗌
Record	Audio (HDMI-4)		0.0 dB
Effect	4 5 5 5 5 5		
Liloot	4 ≫	Delay ^{0 ms}	Mix 🗆
PIP	DDR1		0.0 dB
Logo	é é é é é é é é	Ja Ja Ja Ja Delay 0 ms 🗘	Mix 🗆
LOEO			
CG	MIC		0.0 dB
Kovor	å å å å å å ∎)	La da da da Delay 0 ms 🗘	Mix
Keyer		· · · · · · · · · · · · · · · · · · ·	
PTZ	Headphone Selector PGM		

Headphone Selector

PGM

0

3.3 Input Function

The **Input Function** defines the video input sources (HDMI or NDI based, and which device in NDI network domain) and video file in DDR media for playback. After the association of video input channel and video input source is established in this function, the rest functions in menu will be able to use video input source in accordance with this association. The media player feature supports video file play, pause, loop, and stop operation in DDR device. The following table lists all the functions and their settings displayed in **Input Function**.

Function	Sub-Function	Value
	HDMI1	Select either HDMI1 or NDI1 og input
INPUT1	NDI1	Select either HDMI1 or NDI1 as input.
	NDI Source	Select one connected NDI device as source when NDI1 is selected
	HDMI2	Select either HDMI2 or NDI2 on input
INPUT2	NDI2	Select either HDMI2 or NDI2 as input.
	NDI Source	Select one connected NDI device as source when NDI2 is selected
	HDMI3	Select either HDMI2 or NDI2 on input
INPUT3	NDI3	Select either HDMI3 or NDI3 as input.
	NDI Source	Select one connected NDI device as source when NDI3 is selected
	HDMI4	Select either HDMI4 or NDI4 as input.
INPUT4	NDI4	Select either HDM14 of ND14 as input.
	NDI Source	Select one connected NDI device as source when NDI4 is selected
Media (I	DDR) Control	Play/Pause, Stop, Loop (single file loop) (Use Enter key to activate/toggle selection)
	File	Display video filename with full path
	Current Directory	Display current directory in DDR file browser
DDR	DDR File Browser	 Display sub-directories and video files with: AVI/FLV/MKV/MOV/MP4 extension H.265/H.264/VP8/VP9 codec YUV420-8bit/YUV420-10bit sampling (Use △∇ direction, and Enter keys for selection)

Status	_ INPUT				
Audio	INPUT1 • H	DMI1 ON	DI1 NDI Source		
Audio	INPUT2 H	DMI2 • N	DI2 NDI Source	MERA (NDI HX2, 192.168.10.201)	
Input	INPUT3 • H	DMI3 ON	DI3 NDI Source		
Output	INPUT4 • H	DMI4 N	DI4 NDI Source		
Stream	Media (DDR) Cont	rol 🕨 🔳	¢		
Record					
Effect	DDR				
Ellect	DDR File				
PIP	Current Director	y: /media/media	sen/		
Logo		y. /media/media	550/		
2020	S1_Rec_2024_0	2_14_16_08_52			
CG	S1_Rec_test_20	24_01_31_01_07	_05		
Keyer	1_h265_av_sync	.mp4			
Neyer	av_sync_h265_1	920x1080.mp4			
PTZ	bbb_sunflower_7	20p_30fps_norma	I.mp4		U

3.4 Output Function

The **Output Function** defines video resolution, frame rate, orientation, cropping, and rotation for the video input sources when applying the related processing functions over them, as well as the final video resolution in output.

The video input sources are processed first in **Base** canvas for any pre-processing before **Output** (in program (**PGM**) channel and network streaming port). The video input sources can be in resolutions different from **Base** canvas and the required scaling will be automatically applied to input sources in accordance with **Base** canvas resolution.

The video **Output (Scaled) Resolution** can be in different resolution from Base (Canvas) Resolution but it is preferred to set these two functions into same resolution for optimized system performance concern.

Both Landscape and Portrait modes of canvas orientation are supported and can be selected in Canvas Orientation function. Refer to 5.6 Achieve Horizontal and Vertical Screen Switching for details.

The cropping operation to video input sources can be applied when **Crop** option is selected. Depending on orientation and resolution defined in **Base** canvas, the cropping effects to video input sources may exhibit different results when **Base** canvas and input video sources are different in resolution and orientation.

The counterclockwise or clockwise rotation function is supported for video input sources in **Rotation Direction** selection, in addition to no rotation option.

Refer to 5.7 Settings to Rotate and Crop Signal Sources for details over cropping and rotation.

The following table lists all the functions and their settings displayed in C

Function	Sub-Function	Value
Base (Canvas) Resolution		3840x2160, 1920x1080, 1280x720 for landscape 2160x3840, 1080x1920, 720x1280 for portrait default is 1920x1080, or 1080x1920
Output (Sc	aled) Resolution	3840x2160, 1920x1080, 1280x720 for landscape 2160x3840, 1080x1920, 720x1280 for portrait default is 1920x1080, or 1080x1920
Common F	rame Rate (fps)	25, 29.97, 30, 50, 59.94, 60
Canvas	s Orientation	Landscape or Portrait
INPUT1	Сгор	Video cropping is applied to input source
(Input Source 1)	Rotation Direction	Counterclockwise, clockwise, or no rotation (default is no rotation)
INPUT2	Crop	Video cropping is applied to input source
(Input Source 2)	Rotation Direction	Counterclockwise, clockwise, or no rotation (default is no rotation)
INPUT3	Crop	Video cropping is applied to input source
(Input Source 3)	Rotation Direction	Counterclockwise, clockwise, or no rotation (default is no rotation)
INPUT4	Crop	Video cropping is applied to input source
(Input Source 4)	Rotation Direction	Counterclockwise, clockwise, or no rotation (default is no rotation)
DDR	Crop	Video cropping is applied to input source

Status	Base (Canvas) Reso	lution	3840x2160	
Audio	Output (Scaled) Res	olution	3840x2160	
Input	Common Frame Rate	e (fps)	60	
Output	Canvas Orientation		Landscape	
Stream				
Record	Input source setting			
		Crop	Rotation direction of	the source
Effect	INPUT1	٠	no rotation	
PIP	INPUT2	O	no rotation	
FIF	INPUT3	0	no rotation	
Logo	INPUT4	0	no rotation	
	DDR		no rotation	
CG				
Keyer				
PTZ				

3.5 Stream Function

The Stream Function defines parameters for video codec and stream including:

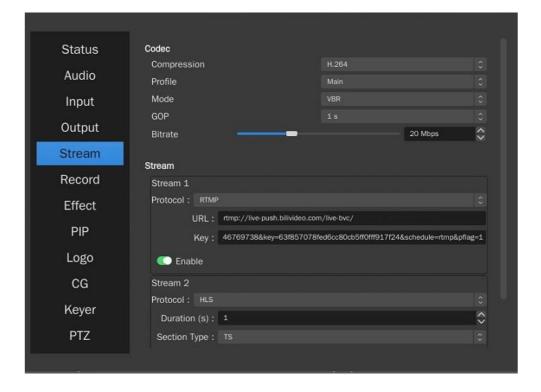
- Codec setting
 - Compression setting (HEVC, or H.264)
 - o Profile setting
 - Mode setting (constant bit rate (CBR), or variable bit rate (VBR))
 - Group-of-Picture (GOP) setting (1, 2, 3, 4, or 5-sec)
 - Bit rate setting (up to 60Mbps)
- Stream setting
 - Protocol setting (RTMP, HLS, RTP, UDP, and SRT)
 - Protocol dependent setting
 - Enable setting

Up to two streams can be enabled simultaneously.

The following table lists all the functions and their settings displayed in **Stream Function**.

Function	Sub-Function	Value or State	Default
	Comprossion	HEVC/H.265	HEVC/H.265
	Compression	H.264	ПEVC/П.200
		HEVC/H/265: Main	
	Profile	H.264: Baseline, Main, High	Main
Cadaa	Mode	Variable bitrate (VBR)	VBR
Codec	Mode	Constant bitrate (CBR)	VDIX
	Group-of-Picture (GOP)	1/2/3/4/5-second	1-second
	Bitrate 72	4K: 1~60Mbps 1080P: 1~32Mbps 720P: 1~20Mbps (Use △∇ key for adjustment)	8Mbps
		Duration	
	HLS	Section Type	
		URL Type: Local, Server	
		URL	
	RTMP	URL address	
Stream1		Кеу	
		IP address	
	RTP	Port	
		Video Packet ID (PID)	
		Audio Packet ID (PID)	
	SRT	URL address	

	IP address
חחו	Port
	Video Packet ID (PID)
	Audio Packet ID (PID)
Enable	
	Duration
	Section Type
	URL Type: Local, Server
	URL
	URL address
RIMP	Кеу
	IP address
	Port
RIP	Video Packet ID (PID)
	Audio Packet ID (PID)
SRT	URL address
	IP address
	Port
	Video Packet ID (PID)
	Audio Packet ID (PID)
Enable	
	HLS RTMP RTP SRT UDP



Status	Mode	VBR	
Audio	GOP Bitrate	1 s 20 Mb;	os 🗘
Input	Stream		
Output	Stream 1		
Stream	Protocol : RTMP URL : rtmp://live-pu	ish.bilivideo.com/live-bvc/	
Popord			
Record	Key: 46769738&k	ey=63f857078fed6cc80cb5ff0fff917f24&schedule	=rtmp&pflag=1
Effect	Key : 46769738&k	ey=63f857078fed6cc80cb5ff0fff917f24&schedule	ertmp&pflag=1
Effect		ey=63f857078fed6cc80cb5ff0fff917f24&schedule	ertmp&pflag=1
Effect PIP	C Enable	ey=63f857078fed6cc80cb5ff0fff917f24&schedule	ertmp&pflag=1
Effect	C Enable Stream 2	ey=63f857078fed6cc80cb5ff0fff917f24&schedule	
Effect PIP	Enable Stream 2 Protocol : HLS	ey=63f857078fed6cc80cb5ff0fff917f24&schedule	
Effect PIP Logo	Enable Stream 2 Protocol : HLS Duration (s) : 1	ey=63f857078fed6cc80cb5ff0fff917f24&schedule	¢

3.6 Record Function

The **Record Function** defines and displays parameters for video codec and media information in recording including:

- Codec setting
 - Compression setting (HEVC, or H.264)
 - Profile setting
 - Mode setting (constant bit rate (CBR), or variable bit rate (VBR))
 - Group-of-Picture (GOP) setting (1, 2, 3, 4, or 5-sec)
 - Bitrate setting (up to 60Mbps)
- Record setting
 - Device Type, Capacity, Used Space, and Free Space for recording media
 - USB Path info for the selected directory (note that only 1 partition info will be display, therefore, it is preferred to format record media with 1 partition only)
 - Filename for record (the complete filename will be Filename_YYYY_DD_HH_MM_SS.mp4)
 - Duration time for recording file(s)

The following table lists all the functions and their settings displayed in **Record Function**.

Function	Sub-Function	Value	Default
	Compression	HEVC/H.265	HEVC/H.265
	Compression	H.264	ΠEVC/Π.200
		HEVC/H/265: Main	
	Profile	H.264: Baseline, Main, High	Main
	Mode	Variable bitrate (VBR)	VBR
Codec		Constant bitrate (CBR)	VDR
	Group-of-Picture (GOP)	1/2/3/4/5-second	1-second
	Bitrate	4K: 1~60Mbps 1080P: 1~32Mbps 720P: 1~20Mbps (Use $\Delta \nabla$ key for adjustment)	8Mbps

	Record Type	USB (SSD option will be activated when available)
	Capacity	(According to record media)
	Used Space	(According to record media)
Record	Free Space	(According to record media)
	Path	(According to record media)
	Filename	Final saved filename in media will be: Filename_YYYY_DD_HH_MM_SS.mp4
	Duration	Record time in minute ("0" means continuous recording without split)

Status	Codec				
Audio	Compression		H.264		
Audio	Profile		Main		
Input	Mode		VBR		
0	GOP		1 s		
Output	Bitrate			8 Mbps	\Diamond
Stream	Record				
Record	Device Type	Capacity	Used Space	Free Space	
Effect	SSD	232.9 GB	370.0 MB	232.5 GB	
סוס	Path /media/me	diaSSD			
PIP	Filename S1_Re	c			
Logo	Duration (0:No sl	ice)		250 min	¢
CG					
Keyer					
PTZ					

3.7 Effect Function

The **Effect Function** defines transition speed and the association of **EFFECT A/B/C** keys in panel with transition effects and provides preview window for the selected transition. The transition effects can be applied when switching the existing program channel (**PGM**) to the selected preview (**PVW**) channel, and the video contents in these two channels will be swapped.

The **Auto** key and transition lever are used to control the execution of transition effects. Do not leave transition level in the middle position when performing transition and it is fully pushed.

There are 36 visual transition effects supported including:

- Bamdoor Bottom Left
- Bamdoor Horizontal
- Bamdoor Top Left
- Bamdoor Vertical
- Blinds Horizontal
- Box Bottom Left
- Box Bottom Right
- Box Top Left
- Box Top Right
- Burst
- Checkerboard Small
- Circles
- Clock
- Cloud
- Curtain
- Cross Fade
- Fade to Black
- Fan
- Fractal
- Iris
- Linear Horizontal
- Linear Top Left
- Linear Top Right
- Linear Vertical
- Parallel Zigzag Horizontal
- Parallel Zigzag Vertical
- Sinus 9
- Spiral

- Square
- Squares
- Stripes
- Stripes Horizontal
- Stripes Vertical
- Watercolor
- Zigzag Horizontal
- Zigzag Vertical

The visual effects for the selected transitions will be displayed in preview windows with two frames (A and B) used to simulate transition process.

The following table lists all the functions and their settings displayed in **Effect Function**.

Function	Sub-Function	Value	Default
	FTB Duration	50~10000ms	2000ms
	Transition Speed	50~20000ms	2000ms
		(Select one effect)	Bamdoor Top Left
Effect	EFFECT A Key	Preview window	
Ellect	EFFECT B Key	(Select one effect)	Checkerboard Small
		Preview window	
	EFFECT C Key	(Select one effect)	Zigzag Horizontal
		Preview window	

Status	FTB Duration (ms)	2000		\$
Audio	Transition Speed (ms)	2000		\$
Input				
Output	EFFECT A	Barndoor Top Left	0	٨
Stream				A
Record				
Effect	EFFECT B	Cross Fade	•	٨
PIP				A
Logo				
CG	EFFECT C	Fade to Black	0	۸
Keyer			, i i	A
PTZ				

The **FTB** button will fade the whole program video output to black at the rate specified in the fade to black RATE window. Once the program output has been faded to black, the **FTB** button will flash croci until it is pressed again. Doing so will fade up from black at the same rate, or you can enter a new rate in the fade to black palette in the 'switcher' window. Fade to black is mostly used at the start and end of your production, or when cutting to commercial breaks.

3.8 PIP Function

The **PIP (Picture-in-Picture) Function** associates **PIP1** and **PIP2** keys in panel with selected video sources, picture-in-picture types, positions, and sizes for overlapping with program (**PGM**) channel.

There are 12 types of picture-in-picture supported with each type supports up to 5 scenes (A/B/C/D/E) for overlapping. Each scene contains a selected video source, positions (X and Y-axis), and size of the selected video source. The following table lists all the picture-in-picture types supported and the scene layout for each type.

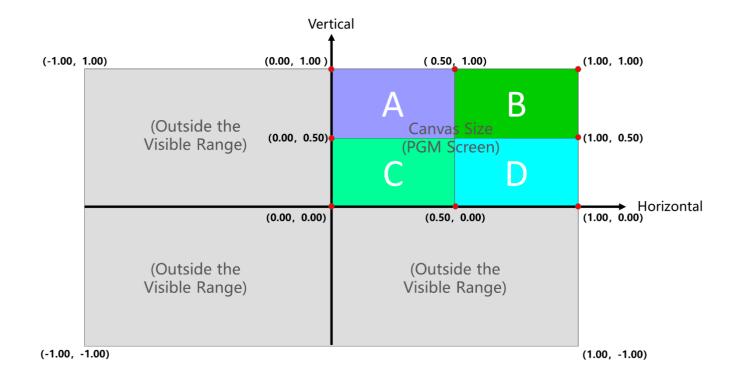
Туре	Scene Layout	Input Source to Screen
1	Л	Scene A: Video Input Selection1
'	A	Scene B: Video Input Selection2
2		Scene A: Video Input Selection1
	A B	Scene B: Video Input Selection2
		Scene A: Video Input Selection1
3	ВС	Scene B: Video Input Selection2
		Scene C: Video Input Selection3
	_ B	Scene A: Video Input Selection1
4	Δ	Scene B: Video Input Selection2
		Scene C: Video Input Selection3
		Scene A: Video Input Selection1
5	Δ	Scene B: Video Input Selection2
	в	Scene C: Video Input Selection3
	_ D	Scene A: Video Input Selection1
6		Scene B: Video Input Selection2
	в Ас	Scene C: Video Input Selection3
		Scene D: Video Input Selection4
	A B	Scene A: Video Input Selection1
7		Scene B: Video Input Selection2
	C D	Scene C: Video Input Selection3
		Scene D: Video Input Selection4

		Scene A: Video Input Selection1
8		Scene B: Video Input Selection2
0		Scene C: Video Input Selection3
		Scene D: Video Input Selection4
		Scene A: Video Input Selection1
9	Λ	Scene B: Video Input Selection2
9		Scene C: Video Input Selection3
	B C D	Scene D: Video Input Selection4
		Scene A: Video Input Selection1
	В	Scene B: Video Input Selection2
10	10 A	Scene C: Video Input Selection3
		Scene D: Video Input Selection4
		Scene E: DDR Video/Audio5
		Scene A: Video Input Selection1
	B	Scene B: Video Input Selection2
11		Scene C: Video Input Selection3
		Scene D: Video Input Selection4
		Scene E: DDR Video/Audio5
		Scene A: Video Input Selection1
		Scene B: Video Input Selection2
12		Scene C: Video Input Selection3
	B C D E	Scene D: Video Input Selection4
		Scene E: DDR Video/Audio5

The positions and size of each scene in picture-in-picture are defined by:

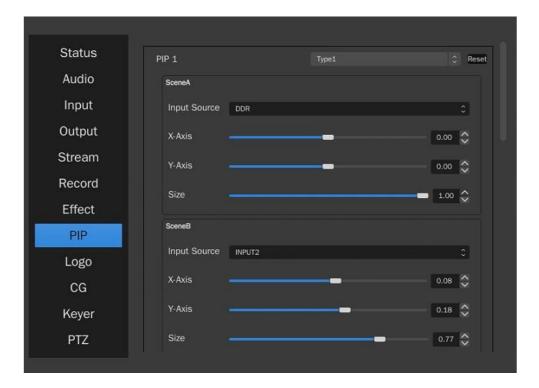
- X-axis value in range [-1.00, 1.00]
- Y-axis value in range [-1.00, 1.00]
- Size value in range [0.00, 1.00]

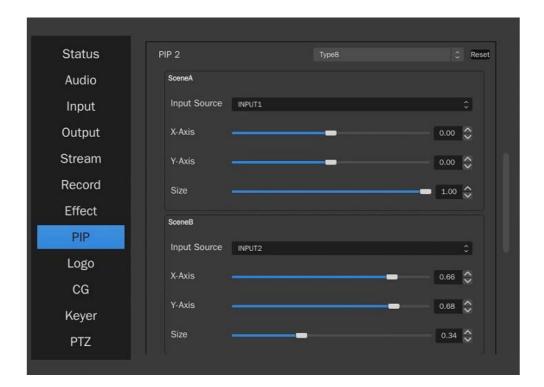
as figure shown below. Note that only scenes with [X, Y] position in between [0.00, 0.00] and [1.00, 1.00] are visible to progame (PGM) canvas.



The following table lists all the functions and their settings displayed in **PIP Function**.

Function	Sub-Function	Value	Default
	Туре	Type1 ~ Type12	Туре7
	SceneA Input Source	INPUT1/2/3/4, DDR, Preview, Program	(None)
PIP 1	SceneA X-Axis	[-1.00, 1.00]	(None)
	SceneA Y-Axis	[-1.00, 1.00]	(None)
	SceneA Size	[0.00, 1.00]	(None)
	(Expand to include Scen Type selection)	eB, SceneC, SceneD, and Sc	eneE according to
	Туре	Type1 ~ Type12	Туре8
	SceneA Input Source	INPUT1/2/3/4, DDR, Preview, Program	(None)
PIP 2	SceneA X-Axis	[-1.00, 1.00]	(None)
	SceneA Y-Axis	[-1.00, 1.00]	(None)
	SceneA Size	[0.00, 1.00]	(None)
	(Expand to include Scen Type selection)	eB, SceneC, SceneD, and Sc	ceneE according to





3.9 Logo Function

The **Logo Function** selects image file uploaded by web-based graphic user interface (WebGUI) and defines position (X and Y-axis) in accordance with **Base (Canvas) Resolution**, with the support of applying **Keyer** function.

The WebGUI supports more than one image files uploaded into system and Logo function can browse them and select one for applying. Refer to 4.8 Logo for details in WebGUI setting.

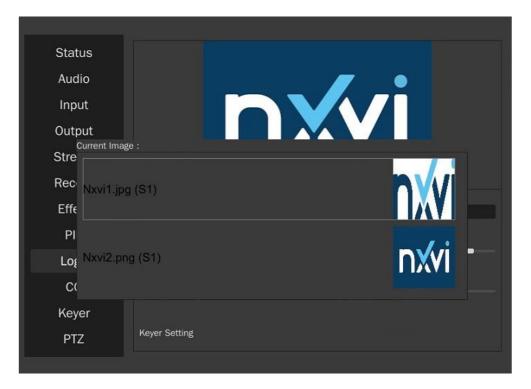
The position (X and Y-axis) of **Logo** image file is defined by setting coordinate origin [0, 0] at top left corner with the range in complying with **Base (Canvas) Resolution**. For instance, assuming **Base (Canvas) Resolution** is setting into 1080, then Y-axis will be in range [0, 1080] with single pixel granularity.

The **Keyer** function can be applied to **Logo** image file by pressing **Enter** key in menu selection and the **Keyer** function window will be displayed accordingly for setting. Refer to 3.11 Keyer Function for details.

The following table lists all the functions and their settings displayed in Logo Function.

Function	Sub-Function	Value	Default
	File Selector	(None)	(None)
	X-Axis	Range in accordance with	(None)
Logo	Y-Axis	Base Resolution	(None)
	Keyer Setting	(Pressing Enter key for applying)	(None)





3.10 CG Function

The CG (Computer Graphic) Function supports two types of format:

- Subtitle
- Graphic

for subtitle processing in program (**PGM**) channel. There are 2 **CG** windows (**CG1/CG2**) in multiview (**MV**) interface screen for preview, as figure shown below.



Text is input by web-based graphic user interface (WebGUI) and will be displayed at **CG** function window in menu when selected. Picture is selected at **CG** function window in menu from image file(s) uploaded in WebGUI with the support of applying **Keyer** function over the selected picture file.

Text is controlled with settings of enabling, content preview, size, font, color, scrolling and speed in horizontal and vertical, scrolling boundary control and width, and starting position (X and Y-axis) in accordance with **Base (Canvas) Resolution**.

Picture is controlled with settings of enabling, and file selection.

The following table lists all the functions and their settings displayed in **CG Function**.

Function	Sub-Function	Value	Default
	Subtitle Switch	Enable/Disable subtitle	Disable
	Content Preview	(Input by WebGUI)	(None)
	Size	1~100	16
	Font	Arial, Blackadder, Brushsci, Calibri, Vineritc, SimSun, SimHei, KaiTi, Caiyun, Hupo, XingKai	SimHei
	Color	RGBA in hexadecimal (Color palette available in WebGUI)	#9B9B9FFF (Grey)
	Scroll Switch	Enable/Disable scroll	Disable
	Horizontal Speed	-100 ~ 100 (Positive value for scrolling from right to left)	0
CG1	Vertical Speed	-100 ~ 100 (Positive value for scrolling from bottom to top)	0
	Limit Width Switch	Enable/Disable scroll boundary limit width	Disable
	Width	0 ~ 100 (100 for entire screen)	10
	X-Axis Starting Point	Range in accordance with	
	Y-Axis Starting Point	Base Resolution (Ex. [0, 0], [1920, 0], [1920, 1080], [0, 1080] for 4 corners in 1080 resolution)	[0, 0] (Top left corner)
	Graphic Switch	Enable/Disable picture file	Disable
	Image Selector	(None)	(None)
	Keyer Setting	(Pressing Enter key for applying)	(None)

Function	Sub-Function	Value	Default
	Subtitle Switch	Enable/Disable text input	Disable
	Content Preview	(Input by WebGUI)	(None)
	Size	1~100	16
	Font	Arial, Blackadder, Brushsci, Calibri, Vineritc, SimSun, SimHei, KaiTi, Caiyun, Hupo, XingKai	SimHei
	Color	RGBA in hexadecimal (Color palette available in WebGUI)	#9B9B9FFF (Grey)
	Scroll Switch	Enable/Disable scroll	Disable
	Horizontal Speed	-100 ~ 100 (Positive value for scrolling from right to left)	0
CG2	Vertical Speed	-100 ~ 100 (Positive value for scrolling from bottom to top)	0
	Limit Width Switch	Enable/Disable scroll boundary limit width	Disable
	Width	0 ~ 100 (100 for entire screen)	10
	X-Axis Starting Point Y-Axis Starting Point	Range in accordance with Base Resolution (Ex. [0, 0], [1920, 0], [1920, 1080], [0, 1080] for 4 corners in 1080 resolution)	[0, 0] (Top left corner)
	Graphic Switch	Enable/Disable picture file	Disable
	Image Selector	(None)	(None)
	Keyer Setting	(Pressing Enter key for applying)	(None)

Status	CG1		
Audio	Subtitle Switch		
Input	Content:		
Output			
Stream			
Record	Size:	17	
Effect	Font:	SimHei	
PIP	Color:	#989898FF	
Logo	Scroll Switch		•
CG	Horizontal Speed	0	
Keyer	Vertical Speed	0	
PTZ	Limit Width Switch		-

Status Vertical Speed 0	
Vertical Speed 0	
Audio	
Limit Width Switch	-
Output Width 10	
V Avia starting point: 0 V Avia starting point: 0	-
Stream	
Record Graphic Switch	
Effect Image Selector	
PIP Keyer Setting	
Logo	
CG CG2	
Keyer	
Content: PTZ	

3.11 Keyer Function

The **Keyer Function** provides keying operations support based on:

- Chroma Key
- Mask Key
- Luma Key

options and their individual settings for video sources mixing and compositing and applying to program (**PGM**) channel in final.

The following table lists all the functions and their settings displayed in Keyer Function.

Function	Sub-Function	Value	Default
	Signal Source	INPUT1/2/3/4, DDR1, Logo1, CG1, CG2	INPUT1
Keyer	Filter Type	Chroma Key, Mask Key, Luma Key	Chroma Key
	Switch	Enable/Disable	Disable
	Reset	(Pressing Enter key for applying)	(None)

For chroma key based filter, the following table lists all the functions and their settings in **Keyer** function.

- Key Color Type function sets the color to key out.
- **Similarity** function sets similarity threshold between defined color and signal source, with lower value removes fewer pixels.
- **Smoothness** function helps to smooth out edge, wrinkle, shadow, and spot in color removal, with lower value leaves hard edge around removed pixels.
- Key Color Spill Reduction function can be further applied to remove traces with key color spilled in signal source.
- **Opacity** function controls the opacity of signal source.
- **Contrast** function controls the contrast of signal source.
- **Brightness** function controls the brightness of signal source.
- **Gamma** function control the gamma of signal source.

Function	Sub-Function	Value	Default
	Key Color Type	RGB in hexadecimal	#00FF00 (Green)
	Similarity	1~1000	400
	Smoothness	1~1000	80
Chroma Key	Key Color Spill Reduction	1~1000	100
	Opacity	0~100 (0 for transparent)	100
	Contrast	-1.00~ 1.00	0.00
	Brightness	-1.00~1.00	0.00
	Gamma	-1.00~1.00	0.00

							-
Status	Signal Source						
Audio	Filter Type	(No Filter Is On) Chroma Key			0	Switch	
Input	Key Color T	vne	Green				
Output							
Stream	Similarity (1	L-1000)		-		400 🗘	
Record	Smoothnes	is (1-1000)	-			80 🗘	
Effect	Key Color S	Spill Reduction (1-1000)				100 🗘	
PIP	Opacity				,	100 🗘	
Logo	Contrast					0.00	
CG	Brightness					0.00	
Keyer	Gamma			_		0.00 🗘	
PTZ							

For mask key based filter, the following table lists all the functions and their settings in **Keyer Function**.

- **Type** function sets the type of mask.
- **Image** function selects an image file to mask signal source.
- **Color** function sets the color used to mask signal source.
- **Opacity** function controls the opacity of signal source.
- **Stretch Image** function controls the enabling of image stretching, regardless of aspect ratio, to full size of signal source.

Function	Sub-Function	Value	Default
	Туре	Alpha Mask (Color Channel), Alpha Mask (Alpha Channel), Blend (Multiply), Blend (Addition), Blend (Subtraction)	Alpha Mask (Color Channel)
Mask Key	Image	None	None
	Color	RGB in hexadecimal	#FFFFF (Black)
	Opacity	0~100 (0 for transparent)	100
	Stretch Image	Enable/Disable	Disable

-	R			1
Status	Signal Source	INPUT1		
Audio	Eltor Turo	(No Filter Is On)	0	Switch Reset
	Filter Type	Mask Key	~	Switch Reset
Input	Туре			0
Output				Ť
Stream	Image			
Record	Color	#FFFFF		
Effect	Opacity			= 100 🗘
PIP		Stretch Image (discard image aspect ratio)		
Logo				
CG				
Keyer				
PTZ				

For luma key based filter, the following table lists all the functions and their settings in **Keyer Function**.

- Luma Max function sets the maximum luma value allowed in image with higher-value pixels being keyed out.
- Luma Max Smooth function sets smoothness of removal with lower value leaves hard edge around removed pixels.
- Luma Min function sets the minimum luma value allowed in image with lower-value pixels being keyed out.
- Luma Min Smooth function sets smoothness of removal with lower value leaves hard edge around removed pixels.

Function	Sub-Function	Value	Default
	Luma Max	0.00~ 1.00	1.00
Luma Key	Luma Max Smooth	0.00~ 1.00	0.00
	Luma Min	0.00~ 1.00	0.00
	Luma Min Smooth	0.00~ 1.00	0.00

Status	Signal Source INPUT1	0
Audio	(No Filter Is On) Filter Type Luma Key	🗘 💭 Switch Reset
Input	Luma Max	1.00 🗘
Output		
Stream	Luma Max Smooth 🛛 💼	0.00 🗘
Record	Luma Min 💼 👘	0.00 🗘
Effect	Luma Min Smooth 💼	0.00 \$
PIP		
Logo		
CG		
Keyer		
PTZ		

Refer to 5.8 Use Luma Key to PowerPoint File for Subtitle for an example.

3.12 PTZ Function

The **PTZ Function** defines pan/tilt, zoom/focus, and preset location. Additionally, the zoom/focus feature allows for adjustment of focus length. The following table lists all the functions and the settings displayed in **PTZ Function**.

Function	Sub-Function	Value	Default
PTZ	Pan/Tilt	Up/Down/Left/Right: Control camera pan/tilt Enter: The camera returns to its original position Back: Exit camera pan/tilt control mode	(None)
	Zoom/Focus	Zoom In, Zoom Out, Focus In, Focus Out, Auto Focus	Auto Focus
	Parameters	Horizontal Speed: 1~10 Vertical Speed: 1~10 Zoom Speed: 1~10 Focus Speed: 1~10	Horizontal Speed: 5 Vertical Speed: 5 Zoom Speed: 5 Focus Speed: 5

Note: Need to connect NDI device to enable the **PTZ Function**.

Status	NDI Source NDI1 0
Audio	Pan/Tilt
Input	
Output	
Stream	
Record	
Effect	
PIP	Zoom/Focus
Logo	Zoom In Cocus Focus In Zoom Out Focus Out
CG	Parameters
Keyer	Horizontal Speed 5
PTZ	Vertical Speed 5 Focus Speed 5

Status		
Audio	Zoom/Focus	
Input		C Auto Focus
Output		
Stream	Parameters	I
Record	Horizontal Speed 5	Zoom Speed 5
Effect	Vertical Speed 5	Focus Speed 5
PIP	Preset Location	
Logo		2 3
CG	4	5 6
Keyer		
PTZ		ð 🔮

Note: When the auto focus function is enabled, adjusting the focus speed is not permitted.

3.13 System Function

The **System Function** displays system information including:

- Ethernet1 IP address
- Ethernet2 IP address
- Board ID
- Firmware Version
- Software Version
- MCU Version
- Serial Number
- Language selection
- Tally control setting for voltage high (forward) or low (backward) in tally lights

The following table lists all the system information and selection displayed in **System Function**.

Function	Sub-Function	Value	Default
	Ethernet1	IP address	192.168.1.10
	Ethernet2	IP address	(None)
	Board ID	Hardware board ID	(None)
	Firmware Version	Version number	(None)
System	Software Version	Version number	(None)
	MCU Version	Version number	(None)
	Serial Number	System serial number	(None)
	Language	English/Simplified Chinese	English
	Tally Control	Forward/Backward	Forward

Audio	Ethernet1	
Input	Ethernet2	192.168.10.166
Output	Board ID	S1
Stream	Firmware Version	1.2.0
Record	Software Version	1.2.3
Effect	MCU Version	1.0.8
PIP	Serial Number	SY8643C23240017
Logo	Language	English
	Tally Control	Forward C
CG Keyer	Restart System	Power Off
PTZ		
System		

Chapter 4: Web-Based Graphical User Interface (WebGUI)

Theia S1 Live Switcher provides web-based graphic user interface (WebGUI) for external machine to perform complete system settings and monitoring. The following sections provide overview of setting defined in WebGUI.

Refer to 2.6 WebGUI Connection and Configuration for required networking configuration setting for connecting to Theia S1 Live Switcher through WebGUI.

The WebGUI login screen is shown below.

Theia S1 Stream Audio Video Input DDR Record Effect PIP Logo CG Keyer Network System SW Ver.	123 📷 🗰
USERNAME PASSWORD LOGIN	

4.1 Streaming Setting

The Stream Setting defines parameters for:

- Codec
- Stream1/2
- Codec Dashboard
- Stream Dashboard

and the WebGUI setting screen is shown below.

Theia S1 Stream Audio Video Input DDR Record Effect PIP Logo	G Keyer Network System		SW Ver. 1.2.3 (日本) Account •
	Codec Dashboard	Stream Dashboard	
Codec			
Compression	H.264 0		
Profile	Main e Bitrate (Mbps)	30 Mode V	BR •
GOP	1s •		
Save			
Stream 1	Enabled		
Protocol	SRT ¢		
URL	srt://192.168.1.99:7001		
Stream 2	Enabled		
Protocol	RTMP ©		
URL	rtmp://a.rtmp.youtube.com/live2		
Key	wfeweqgfwq		
Save			

Refer to 3.5 Stream Function for detailed description regarding parameter settings in:

- Codec
- Stream1/2

The **Codec** setting WebGUI screen is shown below. After setting the parameters, click "**Save**" button for applying.

Compression	H.264	٠				
Profile	Main	٠	Bitrate (Mbps)	20	Mode	VBR
GOP	1 s	\$				

The **Stream** setting WebGUI screen is shown below. After setting the parameters, click "Save" button for applying.

Protocol	RTMP 🗢
URL	rtmp://live-push.bilivideo.com/live-bvc/
Key	?streamname=live_1665243077_46769738&key=63f857078fed6cc80cb5t
Stream 2	C Enabled
Stream 2 Protocol	Enabled SRT \$

The **Codec Dashboard** provides real-time information for current codec operating status including:

- Resolution
- Frame Rate
- Encoding Status

and its WebGUI screen is shown below.

Codec Dashboard			×
Resolution	Frame Rate	Encoding status	
3840 x 2160	60	0	

The **Stream Dashboard** provides real-time information for current streaming operating status including:

- Protocol
- Frame Rate
- Bitrate

for up to 2 streams simultaneously and its WebGUI screen is shown below.

Stream No	Protocol	Frame Rate	Bitrate	Frame Dropped
1	RTMP	30.00	5.45M	0
2	SRT	30.00	0.00B	0

Note that system performance and network conditions may affect frame rate in streaming. Refer to Appendix 3 Streaming and Recording Guidelines for the supported frame rates and video channel configurations.

4.2 Audio Setting

The Audio Setting defines configurations for audio sources including:

- HDMI-1
- HDMI-2
- HDMI-3
- HDMI-4
- DDR (DDR1)
- Microphone (MIC)

in terms of:

- Mute or unmute
- Mix or unmix
- Delay (0-10000ms)

to program (**PGM**) channel. The headphone selection selects one of the audio sources, including **PGM**, for monitoring. The association between volume sliders and the audio sources is also established in audio setting. The following table lists all the functions and their settings displayed in **Audio Setting**.

Function	Sub-Function	Value or State	Default
A 11	Mute Control	Mute or Unmute	Unmute
Audio (HDMI-1)	Mix Control	Mix or Unmix	Unmix
	Delay Control	0-10000ms	0ms
A 11	Mute Control	Mute or Unmute	Unmute
Audio (HDMI-2)	Mix Control	Mix or Unmix	Unmix
(11211112)	Delay Control	0-10000ms	0ms
A 11	Mute Control	Mute or Unmute	Unmute
Audio (HDMI-3)	Mix Control	Mix or Unmix	Unmix
	Delay Control	0-10000ms	0ms
A 11	Mute Control	Mute or Unmute	Unmute
Audio (HDMI-4)	Mix Control	Mix or Unmix	Unmix
	Delay Control	0-10000ms	0ms
	Mute Control	Mute or Unmute	Unmute
DDR1	Mix Control	Mix or Unmix	Unmix
	Delay Control	0-10000ms	0ms
	Mute Control	Mute or Unmute	Unmute
MIC	Mix Control	Mix or Unmix	Unmix
	Delay Control	0-10000ms	0ms

Headphone Selector	PGM, HDMI-1/2/3/4, DDR1, or MIC	PGM
Volume Slider 1	HDMI-1/2/3/4, DDR1, or MIC	(None)
Volume Slider 2	HDMI-1/2/3/4, DDR1, or MIC	(None)
Volume Slider 3	HDMI-1/2/3/4, DDR1, or MIC	(None)

The WebGUI screen of **Audio Setting** is shown below. After setting the configurations, click "**Save**" button for applying.

Theia S1 Stream Audio Video Input DDR Record Effect PIP Logo CG Keye	Network System						SW Vec. 1.2.3 (11)
Audio Sou	ce						
Audio (NDI-1	Mute -	D Mix		Delay (ms)	0		
MdH) oibuA	2) Mute 🖷	D Mix		Delay (ms)	0		
Audio (HDM	3) Mute il	E Mix	۲	Delay (ms)	0		
Audio (HDM	4) Mute 🗐	⊡ Mix		Delay (ms)	0		
DDR1	Mute =	D Mix		Delay (ms)	0		
МС	Mute il	D Mix		Delay (ms)	0		
Headphone 1	PGM	0					
Volume Sli	ler 1						
M) oibuA 🖸	-1) 🗌 Audio (HD	OMI-2) 🗌 Au	idio (HDMI+3)	Audio (HDI	vil-4) DDR1	□ міс	
Volume SI	ler 2						
I'I) oibuA	I-1) 🖸 Audio (HD	DMI-2) 🗌 Au	idio (HDMI-3)	Audio (HDI	vil-4) DDR1	□ MIC	
Volume SI	ler 3						
() oibuk	-1) 🗌 Audio (HD	DMI-2) 🛛 🖬 Au	dio (HDMI-3)	🗆 Audio (HDI	vII-4) 🗌 DDR1	MC	
Save							

4.3 Video Input Setting

The Video Input Setting defines configurations for video input sources including:

- Video Input1
- Video Input2
- Video Input3
- Video Input4

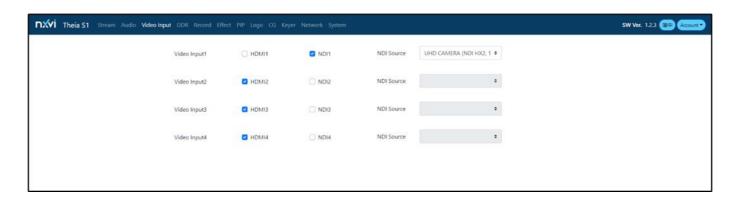
in terms of selecting one of two potential source types including:

- HDMI
- NDI

The following table lists all the functions and their settings displayed in Video Input Setting.

Function	Sub-Function	Value					
	HDMI1	Select either HDMI1 or NDI1 og ipput					
Video	NDI1	Select either HDMI1 or NDI1 as input.					
Input1	NDI Source	Select one connected NDI device as source when NDI1 is selected					
	HDMI2	Solast either HDMI2 or NDI2 os input					
Video	NDI2	Select either HDMI2 or NDI2 as input.					
Input2	NDI Source	Select one connected NDI device as source when NDI2 is selected					
	HDMI3	Salaat aithar HDMI2 or NDI2 og ipput					
Video	NDI3	Select either HDMI3 or NDI3 as input.					
Input3	NDI Source	Select one connected NDI device as source when NDI3 is selected					
Video Input4	HDMI4	Select either HDMI4 or NDI4 on input					
	NDI4	Select either HDMI4 or NDI4 as input.					
	NDI Source	Select one connected NDI device as source when NDI4 is selected					

The WebGUI screen of **Video Input Setting**, with one NDI device is selected, is shown below. After setting the configurations, click "**Save**" button for applying.



4.4 DDR Setting

The **DDR (Digital Video/Audio Recorder) Setting** provides the video file playback control over DDR recorded content. The information of DDR device for the selected video file including:

- Device Path
- Device Type
- Device Capacity
- Used Space
- Free Space

will be displayed in addition to:

- Device Selection
- File Selection

Note that it is planned to include embedded SSD storage as an option to Theia S1 Live Switcher product line in the future as well.

The video files with supported format:

- AVI
- FLV
- MKV
- MOV
- MP4

will be displayed in the browser window for selection to upload with file size of 6GB in maximum. Once the selection is done, click "**Upload**" button for applying.

The video file playback is controlled by player with:

- Play/Pause
- Stop
- Loop
- Delete
- Download

Theia S1 Stream Audio Video Input	DDR Record Effect	PIP Logo CG Keyer Network Syste	em				}	202	SW Ver	SW Ver. 1.	SW Ver. 1.2.	SW Ver. 1.2.3	SW Ver. 1.2.3 🞯	SW Ver. 1.2.3 🕮 🤇	SW Ver. 1.2.3 🐲 🛲	SW Ver. 1.2.3 🚳 🗛	SW Ver. 1.2.3 (1) Accourt
	Device Path	Device Type	Capacity	Used Space	Fre	e Space											
	/media/38DADE8C7091	AEE1 USB	29.49 GB	26.36 GB	3.13	3 GB											
	Device Selector	/media/38DADE8C7091AEE1	•														
	Upload Video	No file chosen	Browse	Upload													
		Supported video format: AVI, FLV, MKV, MOV Note: The maximum file size is limited to 66															
	Video Operation Current selection path:	/media/38DADE8C7091AEE1/S1_Rec_20	024_03_07_08_48_17/S1_R	ec_2024_03_07_08_48_17_0000	0.mp4												
	No File Name				Size	Moc											
	28 /media/38DAD	DE8C7091AEE1/S1_RecTest_2024_03_07_0	6_42_02/S1_RecTest_2024	.03_07_06_42_02_00000.mp4	1.46 G8	2024 06:5											
	29 /media/38DAD	DE8C7091AEE1/S1_RecTest_2024_03_07_0	6_56_48/S1_RecTest_2024	.03_07_06_56_48_00000.mp4	8.25 GB	202× 07:5											
	30 /media/38DAD	DE8C7091AEE1/S1_Rec_2024_03_07_08_4	8_17/51_Rec_2024_03_07_	08_48_17_00000.mp4	129.23 MB	2024 08:4											
	31 /media/38DAD	0E8C7091AEE1/S1_Rec_2024_03_07_08_5	2_03/S1_Rec_2024_03_07_	08_52_03_00000.mp4	845.34 MB	2024 08:5											
		1 &				2											

The WebGUI screen of **DDR Setting** is shown below.

4.5 Record Setting

The **Record Setting** provides the configurations of recorded file for:

- Codec
- Path selection
- Filename creation with MP4 format (the complete filename will be Filename_YYYY_DD_HH_MM_SS.mp4)
- Duration time for recording file

in the selected device. The information of the recorded device including:

- Device Path
- Device Type
- Device Capacity
- Used Space
- Free Space

will also be displayed.

Note that only 1 partition info will be displayed, therefore, it is preferred to format record media with 1 partition only.

The WebGUI screen of **Record Setting** is shown below. After setting the configurations, click "**Save**" button for applying.

Theia S1 Stream Au	udio Video Input	DDR Record Effect P	PIP Logo CG K	eyer Network System				SW Ver. 1.2.3 (简中 Account・
	[Codec Dashboard			
	L L							J
		Device Path		Device Type	Capacity	Used Space	Free Space	
		/media/38DADE8C7091/	AEE1	USB	29.49 GB	26.36 GB	3.13 GB	
		Codec						
	1	Compression	H.264	٠				
		Profile	Main	Bitrate (Mbps)	20	Mode	VBR ¢	
			Main	·	20	mode	VDR. •	
	0	GOP	1 s	٠				
	(Save						
		Record						
	ſ	Path /	/media/38DADE8C	7091AEE1				
		Su	pported filesystem for	rmat: NTFS				
	F		S1_Rec					
			ename will be saved a lename_YYYY_MM_DD					
		Ne	ote: only 1 partition w	ill be displayed. It is preferred	d to format record media w	ith only one partition.		
		Duration (min) (Duration 0 means no slice)	250					
	ſ	Save						

Refer to 3.6 Record Function for detailed description regarding parameter settings in:

- Codec
- Duration time for recording file

The **Codec** setting WebGUI screen is shown below. After setting the parameters, click "**Save**" button for applying.

Codec						
Compression	H.264	\$				
Profile	Main	\$	Bitrate (Mbps)	20	Mode	VBR \$
GOP	1 s	٠				
Save						

The WebGUI screen of **Record Setting** is shown below. After setting the configurations, click "**Save**" button for applying.

Record					
Path	/media/38DADE8C7091AEE1				
	Supported filesystem format: NTFS				
Filename	S1_Rec				
	Filename will be saved as this format: [filename_YYYY_MM_DD_hh_mm_ss.mp4]				
	Note: only 1 partition will be displayed. It is preferred to format record media with only one partition.				
Duration (min) (Duration 0 means no slice)	250				
Save					

When recording is applied, a recording status symbol (a spinning icon) in WebGUI will be observed to indicate the progress, as figure shown below.

Record		
Path	/media/38DADE8C7091AEE1	
	Supported filesystem format: NTFS	
Filename	S1_Rec	2
	Filename will be saved as this format: [filename_YYYY_MM_DD_hh_mm_ss.mp4]	
	Note: only 1 partition will be displayed. It is preferred to format reco	ord media with only one partition.
Duration (min)	250	
(Duration 0 means no slice)		

4.6 Effect Setting

The **Effect Setting** defines configurations of transition speed and the association of **EFFECT A/B/C** keys in panel with transition effects. The transition effects can be applied when switching the existing program channel (**PGM**) to the selected preview (**PVW**) channel, and the video contents in these two channels will be swapped.

Refer to 3.7 Effect Function for detailed description regarding parameter settings and the supported transition effects.

The WebGUI screen of **Effect Setting** is shown below. After setting the configurations, click "**Save**" button for applying.

Theia S1 Stream Audio Video Input DDR Record Effect PI	Þ Logo CG Keyer Network System	SW Ver. 1.2.3 (窗中) Account •
Transition		
FTB Duration (ms)	2000	
Transition Speed (ms)	2000	
EFFECT A	Barndoor Top Left •	
EFFECT B	Cross Fade	
EFFECT C	Fade to Black •	
Save		

4.7 PIP Setting

The **PIP (Picture-in-Picture) Setting** associates **PIP1** and **PIP2** keys in panel with selected video sources, PIP types, positions, and sizes for overlapping with program (**PGM**) channel.

Refer to 3.8 PIP Function for detailed description regarding parameter settings and the supported PIP types.

The WebGUI screen of **PIP Setting** is shown below. There are two tabs for **PIP1** and **PIP2** settings. After setting the configurations, click "**Save**" button for applying.

Theia S1 Stream Audio Video Input DD	DR Record Effect PIP	Logo CG Keyer Network System	SW Ver. 1.2.3 (Account •
PIP1 PIP2			
P	PIP1	Type 1 •	
	Scene A		
	Input Source	INPUT1 •	
	X-Axis	-1 0.00	
	Y-Axis	-1 0.00	
	Size	0 1 1.00	
	Scene B		
	Input Source	INPUT2 •	
	X-Axis	-1 0.73	
	Y-Axis	-1 0.71	
	Size	0 1 0.25	
(Save		

4.8 Logo Setting

The **Logo Setting** defines configurations of selecting and uploading image file to the specified position (X and Y-axis) in accordance with **Base (Canvas) Resolution**, with the support of applying **Keyer** function.

The image file with format:

- BMP
- JPG
- JPEG
- PNG
- PBM
- PGM
- PPM
- XPM

will be supported and up to 30 image files can be uploaded, with the option of deleting unrequired one(s).

Refer to 3.9 Logo Function for detailed description regarding parameter settings and 3.11 Keyer Function for keyer support.

The WebGUI screen of **Logo Setting** is shown below. After setting the configurations, click "**Save**" button for applying.

Theia S1 Stream Audio Video Input	DDR Record Effect P	IP Logo CG Keyer Network System SW Ver. 1.2.3 🐲 Account
	Upload Image	No file chosen Browse Upload Supported image format: BMP, JPG, JPG, PSG, PSG, PSG, PSG, PSG, PSG, PSG, P
	Logo File Selector X-Axis	Please upload file first Delete Y-Axis 0
	-	ik Key Luma Key
	Chroma Switch Key Color Type	Disabled Reset Green
	Similarity Smoothness	1 1000 400 1 0 1000 80
	Key Color Spill Reduction Opacity	1 000 100 0 0 100 100
	Contrast Brightness	-1 0.00 -1 0.00
	Gamma	
	Save	

4.9 CG Setting

The **CG (Computer Graphic) Setting** defines configurations of subtitle processing in program (**PGM**) channel with two types of format:

- Text
- Picture

supported and the selecting switches:

- Text Selection
- Picture Selection

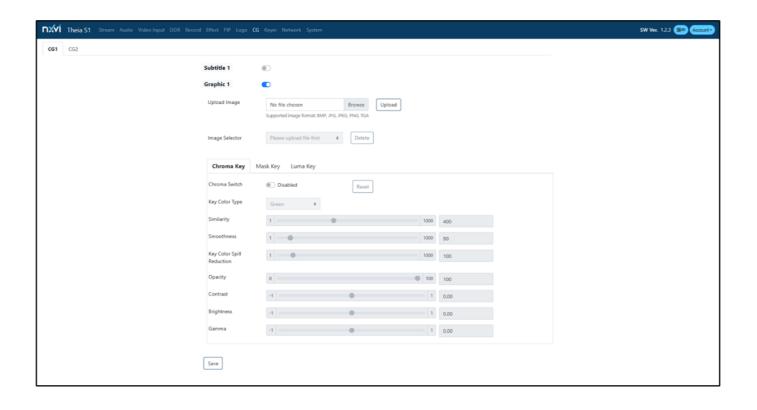
control respectively which type will be enabled in WebGUI.

For CG format in text, the input text will be displayed in **Content** preview window in WebGUI.

Refer to 3.10 CG Function for detailed description regarding parameter settings of CG in text and picture formats.

The WebGUI screens of **CG Setting** in text and picture formats are shown below. There are two tabs for **CG1** and **CG2** settings. After setting the configurations, click "**Save**" button for applying.

Theia S1 Stream Audio Video Input DDR Record Effect PIP			SW Ver. 1.2.3 (漢中) Account •
CG1 CG2			
Subtitle 1	D		
			•
Content			
Font	SimHei ¢ Size	16	
Color	#989898FF 🔮		
X-Axis	0 Y-Axis	0	
Scroll Switch			
Horizontal Speed	-100	0	
Vertical Speed	-100	0	
Limit Width Switch			
Graphic 1			
Save			



4.10 Keyer Setting

The **Keyer Setting** defines configurations of keying processing over available video sources for mixing and compositing and applying to program (**PGM**) channel in final, with three types of keying options:

- Chroma Key
- Mask Key
- Luma Key

The WebGUI screen of **Keyer Setting** is shown below. Refer to 3.11 Keyer Function for detailed description regarding parameter settings of keying processing. After setting the configurations, click "**Save**" button for applying.

Theia S1 Stream Audio Video Input	DDR Record Effect Pl	P Logo CG Keyer Network Sy	rstem			SW Ver. 1.2.3 (@#) Account
			Dashboard			
	Signal Source	INPUT1 •				, ,
	Chroma Key Mas	k Key Luma Key				
	Chroma Switch	Disabled	Reset			
	Key Color Type	Green •				
	Similarity	1		1000	400	
	Smoothness	1		1000	80	
	Key Color Spill Reduction	1		1000	100	
	Opacity	0	0	100	100	
	Contrast	4	0	1	0.00	
	Brightness	-1	0	1	0.00	
	Gamma	-1	0	1	0.00	
	Save					1

The **Dashboard** option in WebGUI provides summary regarding how keying options (Chroma Key, Luma Key, and Mask Key) are applied to video input sources respectively as figure shown below.

oard			
Signal Source	Chroma Key	Luma Key	Mask Key
INPUT1	Disabled	Disabled	Disabled
INPUT2	Disabled	Disabled	Disabled
INPUT3	Disabled	Disabled	Disabled
INPUT4	Disabled	Disabled	Disabled
DDR	Disabled	Disabled	Disabled
LOGO	Disabled	Enabled	Disabled
CG1	Disabled	Disabled	Disabled
CG2	Disabled	Disabled	Disabled

The WebGUI screens of **Keyer Setting** in Chroma Key, Luma Key and Mask Key options are shown below respectively.

		Dashboar	ď		
Signal Source	INPUT1 \$				
Chroma Key	Luma Key Mask Key				
Chroma Switch	Disabled	Reset			
Key Color Type	Green ¢				
Similarity	1	•	1000	400	
Smoothness	1		1000	80	
Key Color Spill Reduction	1		1000	100	
Opacity	0		• 100	100	
Contrast	-1	•	1	0.00	
Brightness	-1	•	1	0.00	
Gamma	-1	•	1	0.00	
Save					
		Dashboard	Ŀ		
nal Source hroma Key Lur	INPUT1 ¢				
na Switch	Disabled	Reset			
na Switch na Max	Disabled	Reset	• 1	1.00	
		Reset	• 1	1.00	
na Max	0	Reset			
na Max na Max Smooth	0	Reset		0.00	

		Dashboard		
Signal Source	INPUT1 \$			
Chroma Key I	uma Key Mask Key			
Mask Switch	Disabled	Reset		
Mask Type	Alpha Mask (Color 🕈			
Upload Image	No file chosen	Browse]	
	Supported image format: BMP, JP	PG, JPEG, PNG, TGA		
Image Selector	Please upload file first	¢ Delete		
Color	#FFFFF			
Opacity	0		100 100	
Stretch Image (Disca	rd image aspect ratio)			

4.11 Network Setting

The Network Setting provides status and defines configurations of:

- Network status of port name, interface name, MAC address, IP address, netmask, gateway address, and DNS
- IPv4 setting (DHCP enablement, IP address, netmask, gateway address, and DNS)
- IPv6 setting (DHCP enablement, IP address, netmask, gateway address, and DNS)
- Route priority

The following table lists all the functions and their settings displayed in **Network Setting**.

Function	Sub-Function	Value	Default
	Port Name	LAN1/LAN2	(Factory Default)
Status	Interface Name	Ethernet	
	MAC Address	MAC address of Theia S1	
	DHCP	Enable/Disable	Disable
	IP Address		
IPv4 Setting	Netmask	IPv4 address assigned to	
Cotting	Gateway Address	the LAN interface	
	DNS		
	DHCP	Enable/Disable	Disable
	IP Address		
IPv6 Setting	Netmask	IPv6 address assigned to	
Oetting	Gateway Address	the LAN interface	
	DNS		
Route	LAN1	High/Low	(Eastery Default)
Priority	LAN2	Low/High	(Factory Default)

The WebGUI screen of **Network Setting** is shown below. After setting the configurations, click "**Save**" button for applying.

nxvi	Theia S1	Stream Audio	Video Input	DDR Record	s Effect PIP Logo	CG Keyer Network !	System				SW Ver. 1.2.3 ((##) Account
Status	IPv4 Settin	g IPv6 Setting	Route F	Priority							
				Ethernet							
				Port	Interface	MAC	IPv4 / IPv6	Netmask / Prefix	Gateway	DNS	
				LAN 2	enP2p33s0	70:83:D5:D7:83:00	192.168.10.166	255.255.255.0	192.168.10.1	114.114.114.114 . 202.102.128.68	
1											

			Ethernet						
			Port	Interface	MAC	IPv4 / IPv6	Netmask / Prefix	Gateway	DNS
			LAN 2	enP2p33s0	70:B3:D5:D7:82:D0	192.168.10.114	255.255.255.0	192.168.10.1	114.114.114.114 , 202.102.128.68
		11							
Status	IPv4 Setting	IPv6 Setting	Route Priorit	у					
			Interface		LAN 2 (enP2p33s0) \$				
			DHCP	•	C Enabled				
			IP		192.168.10.114		Netmask	255.255.255	5.0
			Gateway		192.168.10.1				
					114.114.114.114 , 202.10	02.128.68			
			DNS		114.114.114.114 , 202.10				
			DNS Save		114.114.114.114 , 202.10				

Status	IPv4 Setting	IPv6 Setting	Route Priority	
			Interface	LAN 2 (enP2p33s0) 🗢
			Method	• Auto O DHCP O Manual
			IP	Ex: fc00::123 Prefix Ex: 64
			Gateway	Ex: fc00::1
			DNS	Ex: 2001:4860:4860::8888, 2001:b000:168::1
			Save	

Status	IPv4 Setting	IPv6 Setting	Route Priority	
			LAN 1 (eth0)	Low ¢
			LAN 2 (enP2p33s0)	High \$
				Priority will be saved in configuration file and takes effect when connected.
			Save	

4.12 System Setting

The **System Setting** defines system configurations and provides status information including:

- Time Setting for timezone, date, and time
- Control for system restart, power off, restore default, and software update
- System Monitor for CPU utilization, system temperature, and network bandwidth
- Log for checking and exporting system logs, kernel logs, and software logs
- **System Information** for model name, board ID, serial number, software version, firmware version, and MCU version

The following table lists all the functions and their settings displayed in **System Setting**.

Function	Sub-Function	Value	Default	
Language Setting	App Language	简体中文/English	English	
	Timezone	Continent/City		
Time Setting	Date	mm/dd/yyyy	(Factory Default)	
	Time	hh:mm		
	System Restart	Enable/Disable	Disable	
	Power Off	Enable/Disable	Disable	
Control	Restore Default	Enable/Disable	Disable	
	Quatara Lindata	Firmware Update	Disable	
	System Update	System Update	Disable	
	System Log			
Log	Kernel Log			
	Software Log			
	Model Name	Theia S1		
	Board ID	Hardware board ID		
System	Serial Number	System serial number	(Faster / Default)	
Information	Software Version	Version number	(Factory Default)	
	Firmware Version	Version number		
	MCU Version	Version number		

The WebGUI screen of **System Setting** are shown below.

• Language Setting

Theia S1				Network Sys	stem				SW Ver. 1.2.3 (简中) Account ~
		Model Theia S1	Board	S1	Serial	SY8643C23240017	SW Ver.	1.2.3	
Language Setting	Time Setting Control	System Monitor Log	System Information						
		APP Language	English 🗘						
		Save							

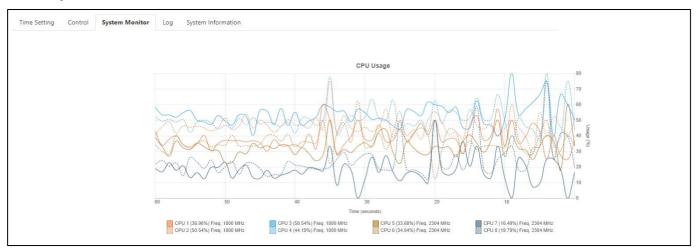
• Time Setting

	Timezone	Pacific/Tahiti	÷	NTP	
	Date & Time	2/14/2024		() 23:18	Save

• Control

Time Setting	Control	System Monitor	Log	System Information			
			Resta	rt System		Power Off	
				re Default Setting			
			No fil	e chosen	Browse	Upgrade Firmware	
			No fil	e chosen	Browse	Upgrade Software	

• System Monitor



• Log

e Setting Control System Monitor	Log System Information	
	Log File syslog Query Save Log	Export All Logs
		*
		Ŧ

• System Information

Time Setting	Control	System Monitor	Log	System Information			
					Model Name	Theia S1	
					Board ID	S1	
					Serial Number	SY8643C23240018	
					Software Version	1.2.1	
					Firmware Version	1.2.0	
					MCU Version	1.0.7	

Chapter 5: Use Cases – Keying, NDI, Rotation, and Cropping

This chapter provides examples on how to perform:

- Chroma keying
- Chroma keying with PIP processing
- NDI (Network Device Interface) based video input
- Text based subtitle scrolling
- Chroma keying with Logo and CG processing
- Landscape and portrait mode switching
- Video rotate and crop
- Luma keying with PowerPoint based video input

on Theia S1 Live Switcher, in order to assist users to be familiar with system for better productivity.

5.1 Chroma Keying

Keying operation in Theia S1 Live Switcher can be performed by using **Menu** key on system panel or through external **WebGUI**. The following steps provide example on how to use **Menu** key for chroma keying setting over **DDR** video source, while WebGUI setting will be the same.

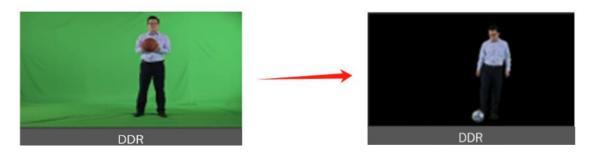
1. Prepare video file in USB storage and connect to USB port in Theia S1 Live Switcher as **DDR** source. Refer to 3.3 Video Input Function for selecting video source in **DDR** and activating playback through **Media (DDR) Control**.



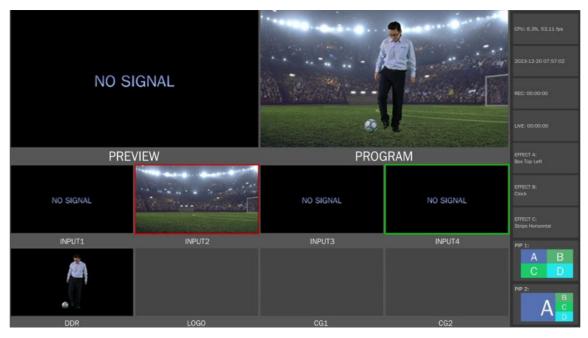
2. Select **Keyer** function in **Menu**. Select **DDR** in **Signal Source**. Refer to 3.11 Keyer Function for details.



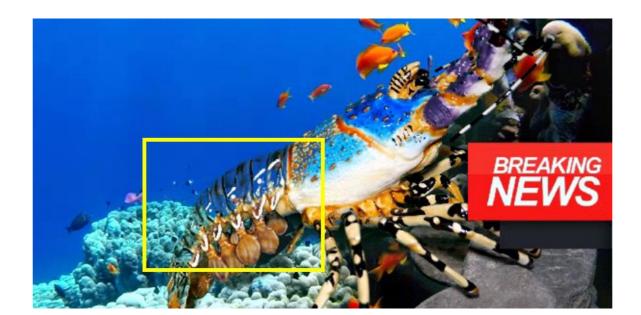
3. Select **Chroma Key** in **Filter Type**. Click **Switch** for enabling keying. The green background in **DDR** window in multiview (**MV**) screen will be keyed out, as shown below.



4. Press **Key** button on panel, and the keyed image will be overlapping over **PROGRAM (PGM)** channel, as shown below.



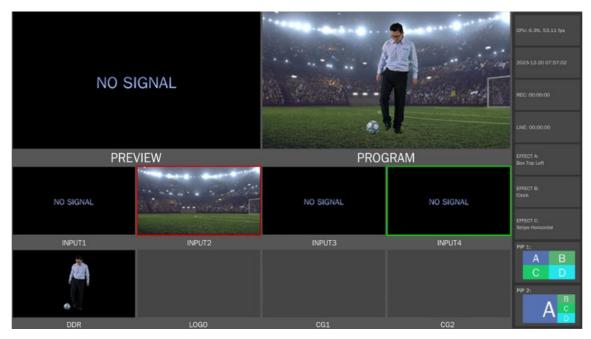
5. Adjust parameters in **Chroma Key** window to fine-tune the keying effect for better overlapped video when necessary, as shown below. Refer to 3.11 Keyer Function for details.





5.2 Chroma Keying with PIP

Similar to 5.1 Chroma Keying for using **DDR** as video source and applying Chroma Keying for overlapping with **PGM** channel, as shown below.



Continue to perform **PIP** processing by following steps.

1. Select **PIP** function in **Menu**. Select **Type1** for **PIP** mode in **PIP1** window; select **INPUT2** as **InputSource** to **SceneA**; select **DDR** as **InputSource** to **SceneB**, as shown below.

Status	PIP 1	Type1	0 Reset
Audio	SceneA		
Input	Input Source INPUT2		0
Output	X-Axis		0.00
Stream	Y-Axis		0.00
Record	Size		1.00 🗘
Effect	SceneB		
PIP	Input Source DDR		0
Logo			
CG	X-Axis		0.73 🗘
Keyer	Y-Axis		0.71
PTZ	Size		0.25 🗘

2. Adjust Size and X/Y-Axis in PIP1 window, with PIP1 preview window displayed in System Information panel in multiview (MV) screen.

			-	•••	-	CPU: 9.0%, 60.00 fps
	13		••••••		and the second	
		Status PIP 1 Audio Scenek		() Reset	Sec. H	
	-	Input Input S Output X-Axis Stream Y-Axis	purce neuti	000 0		
	PREVIEW	Stream Y-Axis Record Size Effect Scenet				EFFECT A: Barndoor Top Left
NO SIGNAL		PIP Input S Logo X-Axis CG	DUIDE N#UT2.	c 	NO SIGNAL	EFFECT B: Cross Fade
		Keyer Y-Axis PTZ Size		0.01 \$		EFFECT C: Fade to Black
INPUT1					INPUT4	PIP 1:
Å						A B PP 2: A C D
DDR		LOGO	CG1		CG2	

3. Press **PIP1** button on panel to activate **PIP** with **Type1** mode. The overlapped **INPUT2** and **DDR** video sources will be dispalyed in **PROGRAM** (**PGM**) channel, as shown below.

PREVIEW PROGRAM Effect a: Box for built NO SIGNAL NO SIGNAL NO SIGNAL FFFECT B: Code					0°U:10.3%, 54.10 (pe 2023-12:20 09:12:52 REC: 00:00:00
NO SIGNAL NO SIGNAL NO SIGNAL	PRE	/IEW	PROG	GRAM	EFFECT A: Box Top Left
	NO SIGNAL		NO SIGNAL	NO SIGNAL	Clock
INPUT1 INPUT2 INPUT3 INPUT4 PP 1:	INPUT1	INPUT2	INPUT3	INPUT4	PIP 1:

Refer to 3.8 PIP Function for details regarding parameters setting.

5.3 NDI Video Input

Theia S1 Live Switcher supports NDI (Network Device Interface) devices with options of:

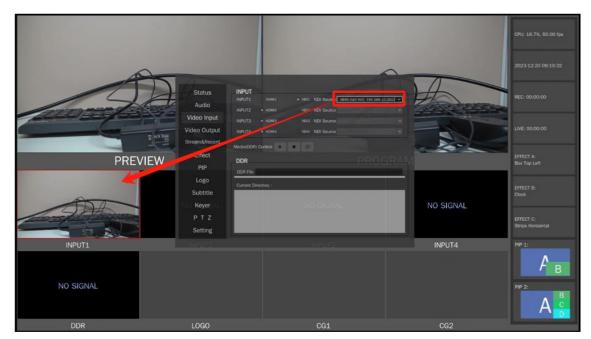
- Full NDI
- NDI NX
- NDI HX2
- NDI HX3

The following steps provide example on how to use **Menu** key for selecting NDI device as video input source, while WebGUI setting will be the same. Note that currently only one NDI video input source is supported in system.

1. Select **Video Input** function in **Menu**. Select **NDI1** for **INPUT1** in **Video Input** window. Theia S1 Live Switcher will automatically search the connecting network domain for NDI signal sources and display them in window, as shown below.

Status	INPUT
Audio	INPUT1 HDMI1 NDI1 NDI Source
	INPUT2 HDMI2
Input	INPUT3 HDMI3 NDI3 NDI Source
Output	INPUT4 HDMI4 NDI Source
Stream	Media (DDR) Control 🕨 🔳 💋
Record	DDR
Effect	DDR File
PIP	Current Directory :
Logo	mediaSSD
CG	
Keyer	
PTZ	

2. Select a NDI device from the NDI source list as the video source to **INPUT1** and the corresponding video content will be displayed in **INPUT1** window in multiview (**MV**) screen, as shown below.



5.4 Text Subtitle Scrolling

Text subtitle scrolling effect can be performed by using CG function in Menu in direction of:

- Horizontal
- Veritical
- Diagonal (both Horizontal and Vertical are enabled)

with control of scrolling enabling and speeds in both horizontal and vertical directions, as shown below, while WebGUI setting will be the same.

Status		
Audio	Size:	16
Input	Font:	SimHei 🗘
Output	Color:	#989898FF
Stream	Scroll Switch	
Record		
Effect	Horizontal Speed	0
PIP	Vertical Speed	0
Logo	Limit Width Switch	
CG	Width	10
Keyer	XAxis starting point: 0	YAxis starting point: 0
PTZ	Graphic Switch	-

The text subtitle scrolling effects in horizontal and vertical directions are show below.



Text Scrolling off

Horizontal Scrolling

Vertical Scrolling

In addition to defining the direction of test subtitle scrolling, the scrolling area can also be configured based on **Limit Width** and **Width** settings in **CG** function. The **Width** setting to 50%, 70%, and no limit for scrolling area limit are shown below.

Refer to 3.10 CG Function for details regarding parameters setting.



Width Limit 50

Width Limit 70

No Width Limit

With text subtitle scrolling support in **CG** function, and the combination of background video content, a more subtle and vivid visual presentation effect can be achieved as shown below.



5.5 Luma Keying with Logo

Keying operation can be applied to **Logo** and **CG** files as well and the following steps provide example on how to perform luma keying over **Logo** file by using **Menu** key, while WebGUI setting will be the same.

1. Select **Keyer** function in **Menu**. Select **Logo** for **Signal Source** in **Keyer** window, as shown below.

		INPUT4		
Status	Signal Source	DDR LOGO		
Audio	Filter Type	CG1 CG2		
Input	Koy Color T			
Output	Key Color T			¢
Stream	Similarity (1	l-1000)	-	400 🗘
Record	Smoothnes	s (1-1000)		80 🗘
Effect	Key Color S	pill Reduction (1-1000)		100 🗘
PIP	Opacity			= 100 🗘
Logo	Contrast			0.00
CG	Brightness			0.00 🗘
Keyer	Gamma		_	0.00
PTZ				

2. Select Luma Key in Filter Type, as shown below.

Status	Signal Source Chroma Key	¢
Audio	Mask Key Filter Type	Switch Reset
Input	Luma Max	
Output		1.00 🗘
Stream	Luma Max Smooth	0.00 🗘
Record	Luma Min 💼	0.00 🗘
Effect	Luma Min Smooth 💼	0.00 🗘
PIP		
Logo		
CG		
Keyer		
PTZ		

3. Click **Switch** button to enable luma keying, as shown below.

Status	Signal Source LOGO	0
Audio	(Luma Key Opened) Filter Type Luma Key	C Switch Reset
Input		
Output	Luma Max ——————————————————————————————————	1.00 🗘
Stream	Luma Max Smooth 💼	0.00 🗘
Record	Luma Min 💼	0.00 🗘
Effect	Luma Min Smooth 💼	0.00 🗘
PIP		
Logo		
CG		
Keyer		
PTZ		

4. Adjust the corresponding parameters in Keyer window for luma keying, as shown below.

Status	Signal Source LOGO		\$
Audio	(Luma Key Opened) Filter Type Luma Key	• •	Switch Reset
Input	Luma Max	_	
Output			1.00 🗘
Stream	Luma Max Smooth 💼		0.00 🗘
Record	Luma Min 💼		0.00 🗘
Effect	Luma Min Smooth 💼		0.00 🔷
PIP			
Logo			
CG			
Keyer			
PTZ			

Depending on how parameters are setting, the luma keying over **Logo** file can produce visual effect similar to figure shown below.



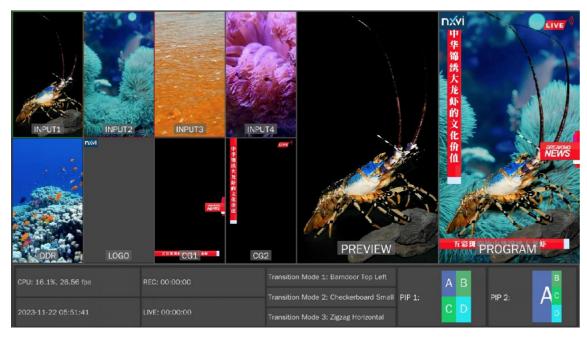
Luma Key OFF



Luma Key ON

5.6 Landscape and Portrait Mode Switch

Theia S1 Live Switcher adopts landscape mode (Ex. 1920 x 1080) as default in canvas and output for display. The portrait mode can also be supported by changing **Canvas Orientation** in **Video Output** function through **Menu**, as displayed in multiview screen shown below.



The following steps provide example on how to perform landscape and portrait mode switch by using **Menu** key.

1. Connect video source (in 1920 x 1080 as an example) **INPUT2** as shown below.



2. Select Video Output function in Menu. Select Portrait for Canvas Orientation in Video Output window, as shown below.

Status			1000 1000	
Audio	Base (Canvas) Resoluti Output (Scaled) Resolut		1920x1080 1920x1080	
Input	Common Frame Rate (f	ps)	30	
Output	Canvas Orientation		Landscape	
Stream			Portrait	
Record	Input source settings	Gran	Rotation direction of	the course
Effect	INPUT1	Crop	no rotation	
PIP	INPUT2	0	no rotation	
FIF	INPUT3		no rotation	
Logo	INPUT4	•	no rotation	
	DDR		no rotation	
CG				
Keyer				
PTZ				

3. When **Portrait** mode is selected in **Canvas Orientation** in **Video Output** window, the multiview (**MV**) screen display will be automatically rotated counterclockwise, as shown below.

NO SIGNAL	INPUT2	NO SIGML	NO SIGNAL	NO SIGNAL			
NO SIGNAL	LOGO	CG1	CG2	PREVIEW		F	PROGRAM
CPU: 0.0%, 55.08 fp		REC: 00:00:00		T A: Box Top Left T B: Clock		АВ	
2023-12-20 10:13:5		LIVE: 00:00:00		T C: Strips Horizontal	PIP 1:	CD	PIP 2: AC

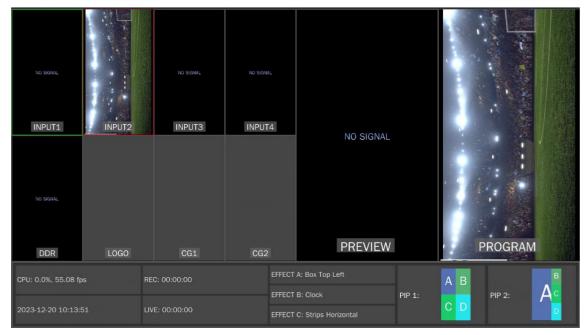
5.7 Video Rotate and Crop

Video sources can be individually configured to perform rotate and crop operations when necessary. Based on Lanscape or Portrait mode of Canvas Orientation in Video Output window in Menu, the output display will be different in visual effect after applying rotate and crop operations to video sources. The following steps provide example on how rotate and crop opertions will perform over:

- landscape mode based canvas •
- portrait mode based canvaus

and how visual effects will be obsered.

- **Rotate and Crop in Portrait Canvas**
- 1. Configure Canvas Orientation to Portrait mode as multiview (MV) screen shown below.



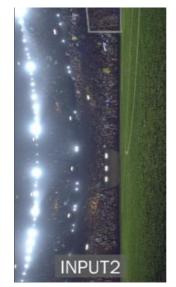
Use INPUT2 source (in 1920 x 1080) as example and rotate in clockwise and counterclockwise 2. diections are shown below.



No Rotation



Clockwise Rotation 101

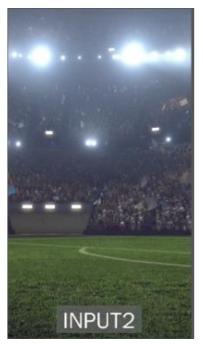


Counterclockwise Rotation

3. As **INPUT2** source (in landscape mode) cannot fill up the entire screen (in portrait mode), the cropping function can be performed to source and system will be automatically scaling source to entire screen, as shown below.



Before Cropping



After Cropping

Rotate and Crop in Landscape Canvas

1. Configure **Canvas Orientation** to **Landscapte** mode as multiview (**MV**) screen shown below.



2. Use **INPUT2** source (in 1080 x 1920) as example and select rotation direction as shown below.

Status	Base (Canvas) Resolution 1920x1080		1920x1080	
Audio	Output (Scaled) Resol	ution	1920x1080	
Input	Common Frame Rate	(fps)	30	
Output	Canvas Orientation		Landscape	
Stream				
Record	Input source settings	Gran	Rotation direction of t	
Effect		Crop		
Encor	INPUT1 INPUT2	0	no rotation	<u>ث</u>
PIP	INPUT2	-	counterclockwise	0
Loro	INPUT4	ő	no rotation	
Logo	DDR	0	no rotation	
CG				
Keyer				
PTZ				

3. **INPUT2** source rotate in clockwise and counterclockwise directions are shown below.



No Rotation



Clockwise Rotation



Counterclockwise Rotation

4. Click **Crop** button in Video Output window for performing video cropping over **INPUT2** source.

Status	Base (Canvas) Resolution	Base (Canvas) Resolution		
Audio	Output (Scaled) Resolut	ion	1920x1080	
Input	Common Frame Rate (fp	os)	30	
Output	Canvas Orientation		Landscape	
Stream				
Stream Record	Input source settings			
Record		Сгор	Rotation direction of th	
Record Effect	Input source settings INPUT1 INPUT2	0	Rotation direction of th	
Record	INPUT1		no rotation	
Record Effect PIP	INPUT1 INPUT2	□ ⊘	no rotation	
Record Effect PIP Logo	INPUT1 INPUT2 INPUT3	□ ⊘ □	no rotation counterclockwise no rotation	
Record Effect PIP	INPUT1 INPUT2 INPUT3 INPUT4		no rotation counterclockwise no rotation no rotation	
Record Effect PIP Logo	INPUT1 INPUT2 INPUT3 INPUT4		no rotation counterclockwise no rotation no rotation	

5. System will be automatically scaling **INPUT2** source to entire screen, as shown below.



Before Cropping



After Cropping

5.8 Luma Keying with PowerPoint

PowerPoint based display from external computer can be a video input source to Theia S1 Live Switcher. By applying **Keyer** function to PowerPoint based video input source, the more sophisticated subtitle effects can be achieved. The following steps provide example on how to use **Keyer** function in **Menu** over PowerPoint video input for subtitile effect creation in program (**PGM**) channel. Two types of subtitle background color:

- While
- Black (Grey)

are discussed as reference.

- Luma Keying for White Background Subtitle
- 1. Select **Keyer** function in **Menu**. Select **INPUT1** (subtitle video) for **Signal Source**, and **Luma Key** for **Filter Type** in **Keyer** window, plus clicking **Switch** button for enabling, as shown below.

Status	Signal Source INPUT1	\$
Audio	(Luma Key Opened) Filter Type Luma Key	🗘 🂽 Switch Reset
Input	Luma Max	
Output		- 1.00 🗘
Stream	Luma Max Smooth	0.07 🗘
Record	Luma Min 💼	0.00
Effect	Luma Min Smooth	0.00 🗘
PIP		
Logo		
CG		
Keyer		
PTZ		

2. Adjust Luma Max (suggesting to start from value 1.00) and Luma Max Smooth (suggesting to start from value 0.00) parameters to key out whilte background and smooth edges, as shown below.



Without Parameter Adjustment



With Parameter Adjustment

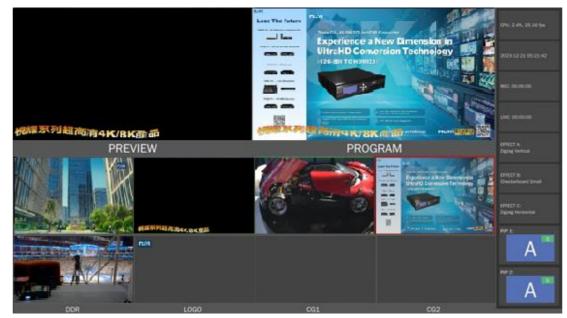
Luma Keying for Black (Grey) Background Subtitle

- Similar to step 1 in Luma Keying for Whilte Background Subtitle to select Keyer function in Menu. Select INPUT1 (subtitle video) for Signal Source, and Luma Key for Filter Type in Keyer window, plus clicking Switch button for enabling.
- 2. Adjust **Luma Max** (suggesting to start from value 0.00) and **Luma Max Smooth** (suggesting to start from value 0.00) parameters to key out black (grey) background and smooth edges, as shown below.



PowerPoint Video Input

1. Select **INPUT2** (PowerPoint based video source from external computer) in **Signal Source** and perform the required subtitle background color removal by parameters adjustment in luma keying window for applying to program (**PGM**) channel in final, as shown below.



Chapter 6: Use Cases – Streaming

This chapter provides examples on how to perform live streaming to 3rd-party platforms in:

- HLS (HTTP Live Streaming)
- RTMP (Real-Time Messaging Protocol)
- RTP (Real-time Transport Protocol) and UDP (User Datagram Protocol)

network protocols on Theia S1 Live Switcher, with the encoding of video sources from HDMI, NDI, and DDR in HEVC/H.265 and H.264 codec formats.

6.1 HLS Streaming

AWS (Amazon Web Services) cloud service platform offers support to HLS streaming. The following steps provide example on how to establish HLS streaming between Theia S1 Live Switcher and AWS platform.

The open-source VLC media player is used as a demonstration tool for playing streaming video. Visit and download VLC at:

• https://www.videolan.org/



when necessary.

- 1. Sign in and login to AWS platform at:
 - https://aws.amazon.com/
- 2. Access AWS console, select S3 service, and create bucket, as shown below.

aws Services Q Search	[Alt+S]		D	🔶 🕐 🙆 Global 🕶 🔤
👸 CloudFront 🔞 S3 🔯 MediaStore				
Amazon S3 ×	Amazon S3			0
Buckets Access Grants Access Points	Account snapshot Last updated: Jan 11, 2024 by Storage Lens. Metrics are gener	ated every 24 hours. Metrics don't include directory buckets. Lear	m more 🖸	View Storage Lens dashboard
Object Lambda Access Points Multi-Region Access Points Batch Operations	Total storage 2.9 GB	<u>Object count</u> 97.2 k	Average object size 31.7 KB	You can enable advanced metrics in the "default-account-dashboard" configuration.
IAM Access Analyzer for S3	General purpose buckets Directory buckets			
Block Public Access settings for this account ▼ Storage Lens Dashboards	General purpose buckets (7) Info Buckets are containers for data stored in 53. Learn more Q. Find buckets by name		C Copy ARM	I Empty Delete Create bucket
Storage Lens groups AWS Organizations settings	Name	AWS Region	▼ Access Only authorized users of this account	▼ Creation date ▼
Feature spotlight 7		Asia Pacific (Tokyo) ap-northeast-1 Asia Pacific (Seoul) ap-northeast-2 Asia Pacific (Seoul) ap-northeast-2	Only authorized users of this account Only authorized users of this account Only authorized users of this account	June 14, 2022, 09:27:56 (UTC+08:00) September 27, 2022, 11:07:23 (UTC+08:00) June 20, 2022, 13:39:24 (UTC+08:00)
AWS Marketplace for S3		Asia Pacific (Tokyo) ap-northeast-1 Asia Pacific (Tokyo) ap-northeast-1 Asia Pacific (Tokyo) ap-northeast-1	Public Public Only authorized users of this account	July 15, 2022, 10:22:14 (UTC+08:00) May 12, 2022, 15:48:11 (UTC+08:00) December 7, 2022, 14:23:38 (UTC+08:00)
	0	US East (N. Virginia) us-east-1	<u>A Public</u>	February 18, 2023, 11:43:56 (UTC+08:00)

3. In the created storage bucket, create and name a folder, and click **Copy URL** button, as shown below.

aws Services Q Search	[Alt+5]	•
Image: CloudFront Image: S3 Image: MediaStore Amazon S3 X	⊙ Successfully created folder " <u>test</u> ".	×
Buckets Access Grants Access Points Object Lambda Access Points Multi-Region Access Points Batch Operations IAM Access Analyzer for 53 Block Public Access settings for	Amazon 55 > Buckets > ty.nxvi ty.nxvi infi (kulidiy accessible) Objects Properties Permissions Metrics Management Access Points Objects (2) Info Object URL Copied Use Amazon 53 inventory (2) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more (2)	•
this account Storage Lens Dashboards Storage Lens groups AWS Organizations settings	Q. Find objects by prefix ■ Name ▲ Type ▼ Last modified ▼ Size ▼ Storage class □ log.backup/ Folder - - - ☑ ltst/ Folder - - -	< 1 > @
Feature spotlight 2 ► AWS Marketplace for 53		

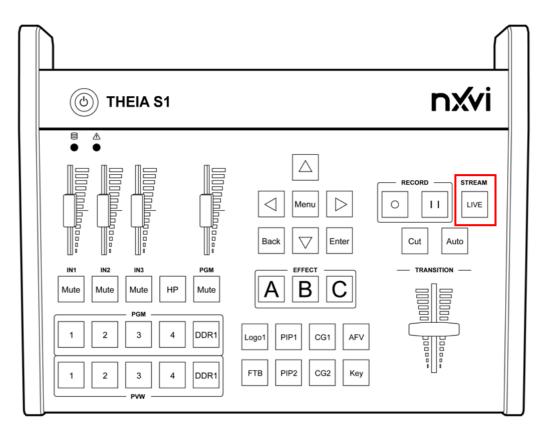
4. Open WebGUI for Theia S1 Live Switcher, select **Stream** setting, and select **HLS** in **Protocol** setting, as shown below.

NXVI Theia S1 Stream Audio Video Input DDR Record Effect PIP L			SW Ver. 1.2.3 (81) Account •
		Codec Dashboard Stream Dashboard	
	Codec		
	Compression	H264 0	
	Profile	Main a Bitrate (Mbps) 20 Mode VBR a	
	GOP	15 0	
	Save		
	Stream 1	C Enabled	
	Protocol	HLS 4	
	Duration (s)	RTMP HES KTP	
	Segment Type	UOP SRT	
	URL Type	Local	
	Stream 2	Disabled	
	Protocol	RTMP 6	
	URL	rtmp://artmp.youtube.com/live2	
	Кеу	wfeweqgfuq	
	Save		

5. Select **Server** in **URL Type**, paste URL from AWS S3 service to **URL**, and click **Save** in WebGUI for applying, as shown below.

Stream Audio Video Input DDR Record Effect PIP Lo	go CG Keyer Network	x System
		Codec Dashboard Stream Dashboard
	Codec	
	Compression	H264 •
	Profile	Main Bitrate (Mbps) 20 Mode VBR
	GOP	1s •
	Save	
	Stream 1	Enabled
	Protocol	HLS •
	Duration (s)	1
	Segment Type	TS +
	URL Type	Server • URL https://s3.amazonaws.com/media/
	Stream 2	Disabled
	Protocol	RTMP •
	URL	rtmp://a.rtmp.youtube.com/live2
	Key	wfeweqgfwq
	Save	

6. Press **LIVE** button on Theia S1 Live Switcher to start the live streaming, as shown below.



7. Check **Stream Dashboard** in **Steam** setting at WebGUI to confirm the live stream is created accordingly, as shown below.

Theia S1 Stream Audio Video Input DDR Record Effect PIP I	.ogo CG Keyer Network	System					
							7
	Codec Dashboard				Stream Dashboard		
	Codec						
	Compression	H.264 •					
	Profile	Main ¢	Bitrate (Mbps)	20	Mode	VBR	1
	GOP	15 0					
	Save						
NXVI Theia S1 Stream Audio Video Input DDR Record Effect PI	2 class CC Kous AD	estin sumer	daga				
NXVI Theia S1 Stream Audio Video Input DDR Record Effect PI	Stream Dashboard	tation the second to					×
NXVI Theia S1 Stream Audio Video Input DDR Record Effect PI		Protocol	Frame R	ate	Bit Rate	Frame Dropped	
■ Theia S1 Stream Audio Video Input DDR Record Effect Pi	Stream Dashboard		Frame R 60.00		Bit Rate 9.06M	Frame Dropped	
DXVI Theia S1 Stream Audio Video Input DDR Record Effect P	Stream Dashboard	Protocol					
NXVI Theia S1 Stream Audio Video Input DDR Record Effect P	Stream Dashboard	Protocol	60.00		9.06M	0	
NXVI Theia S1 Stream Audio Video Input DDR Record Effect P	Stream Dashboard	Protocol	60.00				
NXVI Theia S1 Stream Audio Video Input DDR Record Effect P	Stream Dashboard	Protocol	60.00 Bit Rate(Mbps)		9.06M	0	

8. In AWS S3 console, navigate the created folder and click on the file with m3u8 file extension, and copy the URL, as shown below.

WS Services Q Search		[Alt+S]		원 🗘 🕜 🎯 Global	• Sinda the
Amazon S3 ×	Amazon 53 > Buckets > ty.nxvi > test/				
Buckets	test/				🗇 Copy S3 URI
Access Grants Access Points	Objects Properties				
Object Lambda Access Points Multi-Region Access Points					
Batch Operations IAM Access Analyzer for S3	Objects (73) Info Objects are the fundamental entities stored in Ama	zon S3. You can use Amazon S3 inventory	to get a list of all objects in your bucket. For others to access your objects, your	I need to explicitly grant them permissions. Learn more	2
Block Public Access settings for this account	C C Copy S3 URI Copy	/ URL 🕑 Download O	pen [2] Delete Actions ▼ Create folder	🗭 Upload	< 1 > @
Storage Lens	Name	▲ Type	∇ Last modified ∇ Size		55 V
Dashboards Storage Lens groups	av_channel1.m3u8	m3u8	January 13, 2024, 17:18:48 (UTC+08:00)	249.0 B Standard	
AWS Organizations settings	av_channel10.ts	ts	January 13, 2024, 17:17:36 (UTC+08:00)	98.2 KB Standard	
Feature spotlight 7	av_channel11.ts	ts	January 13, 2024, 17:17:37 (UTC+08:00)	111.6 KB Standard	
AWS Marketplace for S3	av_channel110.ts	ts	January 13, 2024, 17:17:46 (UTC+08:00)	91.2 KB Standard	
	av_channel111.ts	ts	January 13, 2024, 17:17:47 (UTC+08:00)	90.9 KB Standard	
	av_channel112.ts	ts	January 13, 2024, 17:17:48 (UTC+08:00)	90.9 KB Standard	
	av_channel113.ts	ts	January 13, 2024, 17:17:49 (UTC+08:00)	90.7 KB Standard	
	av_channel114.ts	ts	January 13, 2024, 17:17:50 (UTC+08:00)	90.9 KB Standard	

9. Open VLC media player in client computer, select **Open Network Stream** in **Media** setting, as shown below.

4	差 VLC media player									
Me	dia	P <u>l</u> ayback	<u>A</u> udio	<u>V</u> ideo	Subti <u>t</u> le	Tool <u>s</u>	View	<u>H</u> elp		
Þ	Ор	oen <u>F</u> ile			Ctrl+0	C				
	<u>О</u> р	en Multiple	Files		Ctrl+S	Shift+O				
	Ор	en <u>F</u> older			Ctrl+F	:				
٠	Ор	en <u>D</u> isc			Ctrl+[)				
-	Ор	en <u>N</u> etwork	Stream.		Ctrl+N	N 🔶				
	Ор	en <u>C</u> apture	Device		Ctrl+0	2				
	Ор	en <u>L</u> ocation	from cli	pboard	Ctrl+\	/				
	Ор	en <u>R</u> ecent N	1edia			•				
	Sav	ve Playlist to	<u>F</u> ile		Ctrl+\	(
	Co	nve <u>r</u> t / Save.			Ctrl+F	2				
((-))	<u>S</u> tr	eam			Ctrl+S	\$				
	Qu	it at the end	of playl	ist						
4	<u>Q</u> u	it			Ctrl+0	Q				

10. Paste URL from AWS S3 service to **Network Protocol** in **Network** setting, and click Play button in VLC media player for playing streaming video, as shown below.

🛓 VLC media player	
Media Playback Audio Video Subtitle Tools View Help	
Open Media Image: Problem of the problem of	X
Show more options	Play V Cancel

Users can also use:

- Safari browser in iPhone, iPad, and MacBook
- Edge browser in Windows

for playing m3u8 file with streaming URL provided.

6.2 RTMP Streaming

YouTube and TikTok cloud service platform offers support to RTMP streaming. The following steps provide example on how to establish RTMP streaming between Theia S1 Live Switcher and YouTube Live platform.

- 1. Visit YouTube Live platform at:
 - https://www.youtube.com/live_dashboard
- 2. Copy Stream key and Stream URL from YouTube Live platform dashboard, as shown below.

\equiv	💽 Studio			
1) Connect streaming software to go live Viewers will be able to find your stream once you go live STREAM SETUP HELP Stream settings Analytics Stream health	Title r 」直播 Category Education Privacy ⓒ Public Viewers waiting 0 0		EDIT
N E	Stream key Select stream key test 1080 (RTMP, 1080p) Stream key (paste in incoder) Stream IRL The model of the stream IRL The stream IRL	Enable ET COPY 360° v COPY Address None	video selay	••

3. Open WebGUI for Theia S1 Live Switcher, select **Stream** setting, and select **RTMP** in **Protocol** setting, as shown below.

Theia S1 Stream Audio Video Input DDR Record Effect PIP Lo	ogo CG Keyer Network	System	SW Ver. 123 📰 Account•
		Codec Dashboard Stream Dashboard	
	Codec		
	Compression	HEVC .	
	Profile	Main a Bitrate (Mbps) 8 Mode VBR a	
	GOP	15 0	
	Save		
	Stream 1	C Enabled	
	Protocol	RTMP 0	
	Mode	Enhanced •	
	URL	rtmp://a.rtmp:youtube.com/live2	
	Кеу	wfewegyfwq	
	Stream 2	Disabled	
	Protocol	RIP ¢	
	IP	192.168.1.99 Port 6000	
	Video PID	100 Audio PID 101	
	Save		

4. Press LIVE button on Theia S1 Live Switcher to start the live streaming, as shown below.

(b) THEIA S1		nxvi
	POM Image: Constraint of the sector of t	

5. Check **Stream Dashboard** in **Steam** setting at WebGUI to confirm the live stream is created accordingly, as shown below.

■ XXVI 视耀 S1 数据波音频视频输入 DDR 录制 特	Mar Enterna Asia State						×	牧作版本 1.0.1 €N (2552)	
	St	tream No	协议	較著		码率	丢帧		
		1	RTMP	30.0)	10.81M	0		
		2							
	档次		Main •	码率	8	模式	VBR	¢	
	GOP		1 s 🗘						
	保存								
	Stream	1							
	协议		RTMP \$						

6. Users will see video streaming on YouTube Live platform, as shown below.

Ξ	🔁 Studio	17771	□	À	END STREAM
(*) (2)	Table 「」」直播 Category Education Phace ● Public Concernent viewers Likes ○ 0				EDIT
	Stream settings Analytics Stream health				
	Stream key Additional settings Select stream key Enable DVR test 1080 (RTMP, 1080p)				•
	Stream Mey (paste in encoder)				
C D	Imp://a.rtmp://a.rtmp.youtube.com/live2 Imp://a.rtmp.youtube.com/live2 Bacup server URL Copy Imp://b.rtmp.youtube.com/live2?backup=1 Closed captions				•

7. Press LIVE button on Theia S1 Live Switcher to stop RTMP streaming when necessary.

6.3 RTP/UDP Streaming

The point-to-point streaming protocols, such as RTP and UDP, are supported in Theia S1 Live Switcher. The following steps provide example on how to establish RTP and UDP streamings between Theia S1 Live Switcher (acting as a streaming server) and the remote system (acting as a client) respectively. The open-source VLC media player is used as a demonstration tool for playing streaming video.

RTP Streaming

1. Open WebGUI for Theia S1 Live Switcher, select **Stream** setting, and select **RTP** in **Protocol** setting, as shown below.

Theia S1 Stream Audio Video Input DDR Record Effect PIP Lo	ogo CG Keyer Network	System					
		Codec Dashboard			Stream Dashboard		
	Codec						
	Compression	H.264 ¢					
	Profile	Main •	Bitrate (Mbps)	20	Mode	VBR •	
	GOP	1 s •					
	Save						
	Channe 1	Cooklad					
	Stream 1	Enabled					
	Protocol	RTP •					
	IP	RTMP HLS RTP		Port	6000		
	Video PID	UDP SRT		Audio PID	101		
	Stream 2	Disabled					
	Protocol	RTMP •					
	URL						
	OKL	rtmp://a.rtmp.yout	ube.com/live2				
	Кеу	wfeweqgfwq					
	Save						

2. Enter **IP** adress, **Port** number, **Video PID**, and **Audio PID**, and click **Save** in WebGUI for applying, as example shown below, with streaming address as rtp://192.168.10.10:6000.

Theia S1 Stream Audio Video Input DDR Record Effect PIP	Logo CG Keyer Networl	k System			
		Codec Dashboard		Stream Dashboard	
	Codec				
	Compression	H.264 •			
	Profile	Main	20	Mode	VBR •
	GOP	1 s •			
	Save				
	Stream 1	Enabled			
	Protocol	RTP +			
	IP	192.168.10.10	Port	6000	
	Video PID	100	Audio PID	101	
	Stream 2 Protocol	Disabled RTMP			
	URL	rtmp://a.rtmp.youtube.com/live2			
	Key	wfeweqgfwq			
	,	memedihind			
	Save				

3. Open VLC media player in client computer, select **Open Network Stream** in **Media** setting, as shown below.

<u></u>	VLC	media play	er					
Med	dia	P <u>l</u> ayback	<u>A</u> udio	<u>V</u> ideo	Subti <u>t</u> le	Tool <u>s</u>	View	<u>H</u> elp
Þ	Ор	en <u>F</u> ile			Ctrl+0	C		
Þ	<u>О</u> р	en Multiple	Files		Ctrl+9	Shift+O		
	Ор	en <u>F</u> older			Ctrl+F	:		
⊙	Ор	en <u>D</u> isc			Ctrl+[)		
÷.	Ор	en <u>N</u> etwork	Stream.		Ctrl+1	v 🔶		
	Ор	en <u>C</u> apture	Device		Ctrl+0	2		
	Ор	en <u>L</u> ocation	from cli	pboard	Ctrl+\	/		
	Ор	en <u>R</u> ecent N	1edia			•		
	Sav	ve Playlist to	<u>F</u> ile		Ctrl+\	(
	Co	nve <u>r</u> t / Save			Ctrl+F	2		
((-))	<u>S</u> tro	eam			Ctrl+9	S		
	Qu	it at the end	of playl	ist				
÷	<u>Q</u> u	it			Ctrl+0	Q		

4. Enter RTP IP address to **Network Protocol** in **Network** setting, and click **Play** button in VLC media player for playing streaming video, as shown below.

🧉 VLO	C media play	er										- 0	\times
<u>M</u> edia	P <u>l</u> ayback	<u>A</u> udio	<u>V</u> ideo	Subti <u>t</u> le	Tool <u>s</u>	View	<u>H</u> elp						
		🧯 Op	oen Med	a					_		\times		
			File	😏 Disc	🐈 Netv	ork	🗐 Capture Device						
		Ne	twork Pr	otocol									
				er a netwo									
				168.10.10 ww.example		aam av	ń			~			
			rtp://@:										
			rtsp://s	erver.exan www.yourtub	ple.org:	8080/te	test. sdp						
											- 1		
		D She	ow more o	ptions									
								P	lay 🔻	Cance	1		
	H I H		114 =	5 %								95%	
-		in al	141 =										

UDP Streaming

1. Open WebGUI for Theia S1 Live Switcher, select Stream setting, and select UDP in Protocol setting. Enter IP adress, Port number, Video PID, and Audio PID, and click Save in WebGUI for applying, as example shown below, with streaming address as udp://192.168.10.10:6000.

NXVI Theia S1 Stream Audio Video Input DDR Record Effect PIP Logo	o CG Keyer Network	System			
(Codec Dashboard		Stream Dashboard	
	Codec				
c	Compression	H.264 •			
P	rofile	Main	20	Mode	VBR 0
G	50P	1s Ø			
[Save				
	Stream 1	C Enabled			1
	Protocol	UDP •			
	p	192.168.10.10	Port	6000	
	Video PID	100	Audio PID	101	
L	Stream 2	Disabled			J
	Protocol	RTMP •			
	URL	rtmp://a.rtmp.youtube.com/live2			
×	Key	wfeweqgfwq			
(Save				

2. Open VLC media player in client computer, select Open Network Stream in Media setting, as shown below.

4	VLC	media playe	er					
Me	dia	P <u>l</u> ayback	<u>A</u> udio	<u>V</u> ideo	Subti <u>t</u> le	Tool <u>s</u>	View	<u>H</u> elp
Þ	Ор	en <u>F</u> ile			Ctrl+C)		
	<u>О</u> р	en Multiple	Files		Ctrl+S	hift+O		
	Ор	en <u>F</u> older			Ctrl+F	:		
٠	Ор	en <u>D</u> isc			Ctrl+E)		
÷.	Ор	en <u>N</u> etwork	Stream.		Ctrl+N	N 🔶		
	Ор	en <u>C</u> apture	Device		Ctrl+C	2		
	Ор	en <u>L</u> ocation	from cli	pboard	Ctrl+\	/		
	Ор	en <u>R</u> ecent N	1edia			•		
	Sav	ve Playlist to	<u>F</u> ile		Ctrl+Y	<i>,</i>		
	Со	nve <u>r</u> t / Save.			Ctrl+F	R		
((-))	<u>S</u> tr	eam			Ctrl+S	;		
	Qu	it at the end	of playl	ist				
4	<u>Q</u> u	it			Ctrl+C	2		

3. Enter UDP IP address to **Network Protocol** in **Network** setting, and click **Play** button in VLC media player for playing streaming video, as shown below.

🥈 VLC media player	_
<u>M</u> edia Playback <u>A</u> udio <u>V</u> ideo Subti <u>t</u> le Tool <u>s</u> View <u>H</u> elp	
Copen Media	×
Show more options	
	•0

Appendix 1 System Update

Theia S1 Live Switcher will periodically introduce new features or enhancements through system updates. Customers can download new system update through web or contact distributors to obtain the latest version of update. A PC system is required in performing system update to Theia S1 Live Switcher. The following steps provide example on how to apply system update to Theia S1 Live Switcher.

Note that it may take few minutes to complete system update. Any interrupts during system update can lead to system failure and should be avoided.

- 1. Prepare a PC system for keeping Theia S1 Live Swithcer system update image(s). Connect PC to official system update images website for downloading, or contact distributor for retrieving system update. There are two types of system update images available in update:
 - Firmware image
 - Software image

and may be only one is included in specific update release. They need to be applied separately. Check version numbers of system update images to ensure correct ones are applied.

2. Open WebGUI for Theia S1 Live Switcher, select **System** setting, and select **Control** setting, as shown below. Browse PC system for selecting firmware update and software update images.

nXvi Theia S1					Network System					SW Ver. 1.2.4 📺 Account •
			Model Theia S1	Board	S1	Serial	SY8643C23240017	SW Ver.	1.2.4	
Language Setting	Time Setting	Control	System Monitor Log	System Information						
			Restart System Restore Default Setting		Power Off					
			No file chosen	Browse	Upgrade Firmware					
			No file chosen	Browse	Upgrade Software					

3. During firmware or software image update process, an updating status symbol (a spinning icon) in WebGUI will be observed to indicate the progress, as shown below. Note that firmware and software image updates need to be applied separately.

nXVI Theia S1	Stream Audic	Video Inpu	t DDR Reco	rd Effect Pli	° Logo CG Keyer	Network System					SW Ver. 1.2.4 🥡	it Account
			Model	Theia S1	Board	S1	Serial	SY8643C23240017	SW Ver.	1.2.4		
Language Setting	Time Setting	Control	System Moni	itor Log	System Information							
			Restart Syst	tem		Power Off						
			Restore Def	fault Setting								
			No file chos	sen	Browse	Upgrade Firmware]					
			\$1-SW_1.2.4	4.bin	Browse	Upgrade Software)					
						(\bigcirc					

4. Once system update is completed, a successful window will be displayed in WebGUI, as shown below. Theia S1 Live Switcher will perform automatically reboot after system update. Note that firmware image update may take longer time (in minutes) to complete.

nXvi Theia S1 Stream Audio										SW Ver, 1.2.4 (III) Account
Language Setting Time Setting	Control	System Monitor		Econo m Information	51		SY8643C23240017	SW Ver.	12.4	
		Restart System			Power Off					
		Restore Default S	stting							
		No file chosen		Browse	Upgrade Firmwar	re				
		\$1-5W_1.2.4.bin		Br	Up	ograded				
				Ļ	Wait for the	e device to r	estart			
System System upgrade success, wait for reset : 100 seconds	×									

Appendix 2 System Specification

F	eature	Specification						
	Video Input	4ch 4K video input (Full HD compatible), including HDMI and NDI interfaces (HDMI1 supports 4:2:0/4:2:2/4:4:4/RGB chroma subsampling, HDMI2/3/4 supports 4:2:2/4:4:4/RGB chroma subsampling; audio sampling rates in 32/44.1/48kHz).						
Interface		1ch HDMI output for Program (4Kp60p with 48kHz audio sample rate)						
	Video Output	1ch HDMI output for Multiview (1080p60)						
	Unbalanced Analog Audio	1ch stereo input (32/44.1/48kHz) 1ch stereo output in 3.5mm jack (48kHz)						
	Ethernet	Gigabit Ethernet x2 (10/100/1000Mbps)						
		3840×2160 in 30p, 50p, 59.94p, 60p						
	loout	1920×1080 in 25p, 29.97p, 30p, 50p, 59.94p, 60p						
	Input	1920×1080 in 50i, 59.94i, 60i						
Video		1280×720 in 25p, 29.97p, 30p, 50p, 59.94p, 60p						
Resolution		3840×2160 in 25p, 30p, 50p, 60p						
	Output	1920×1080 in 25p, 30p, 50p, 60p						
		1280×720 in 25p, 30p, 50p, 60p						
	Output (Multiview)	1920×1080 in 60p						
	Keyer	Chroma, Mask, Luma						
Graphic Keyers	CG-Keyer x2, Logo-Keyer x1	Logo, subtitle, graphic and news ticker support						
	PIP-Keyer x2	Up to 5-source selection						
Trans	ition Effect	Built-in over 30 effects						
Mod	lia Playor	DDR Player x1						
IVIEC	lia Player	External USB storage for DDR playback						
Medi	a Storage	USB x2 for recording and playback						
Program	n Recording	1ch HEVC/AVC 4K/Full HD						
	Codec	HEVC/AVC (video) with AAC (audio)						
Streaming	Protocol	HLS, RTMP, RTP, SRT, and UDP Support 2 streams pushing simultaneously						
Power	Input	AC Adapter 110-240 V, 50/60Hz with DC 12V/5A output						
FOwer	Consumption	< 40W						
Dir	nension	342mm (W) x 266.8mm (D) x 58.2mm (H)						
Operation	n Temperature	0°C ~ 40°C						
Storage	e Temperature	-20 ℃ ~ 60℃						
Cer	tification	CE/FCC (Class B)/TUV/CB/RoHS/KC						

Appendix 3 Streaming and Recording Guidelines

Theia S1 Live Switcher supports multiple video inputs with maximum resolution in 4Kp60 for streaming and recording. To achieve best system performance for streaming and recording, in terms of resolution and frame rate, under multiple video inputs circumstances, some functions in Theia S1 Live Switcher are recommended to be off, as shown below.

■ 4Kp60 Output

Video Input (HDMI/NDI/DDR)	Logo	CG	PIP	Streaming	Recording	PGM	FPS
2ch 4Kp60	Off	Off	Off	On	On	On	60
4ch 4Kp60	Off	Off	Off	Off	Off	On	≈60

■ 4Kp50 Output

Video Input (HDMI/NDI/DDR)	Logo	CG	PIP	Streaming	Recording	PGM	FPS
3ch 4Kp60	Off	Off	Off	On	On	On	50
4ch 4Kp60	Off	Off	Off	Off	Off	On	50

■ 4Kp30 Output

Video Input (HDMI/NDI/DDR)	Logo	CG	PIP	Streaming	Recording	PGM	FPS
2ch 4Kp30 + 1ch 1080p60 (Chroma Key)	On	On	On	On	On	On	30
3ch 4Kp30	On	On	On	On	On	On	30

■ 1080p60 Output

Video Input (HDMI/NDI/DDR)	Logo	CG	PIP	Streaming	Recording	PGM	FPS
4ch 1080p60 + 1ch 1080p60 (Chroma Key)	On	On	On	On	On	On	60

Appendix 4 Selection Keys in Menu

To browse functions and enable selections in **Menu** of Theia S1 Live Switcher, use:

- \triangle for up movement or value increment
- ∇ for down movement or value decrement
- for left movement
- b for right movement or move to next level
- Back for back to previous level
- Enter for selection or enabling

keys on panel to perform the required movements, adjustments, or activations. The following figures show how these keys are working in **Menu**.

Press Menu key on panel to open Menu window, as shown below.

Status		
Otatus	INPUT1	Source : HDMI
Audio	Frame Rate : 30	Resolution : 3840x2160
Input	INPUT2	Source : NDI
Output	Frame Rate : 30	Resolution : 3840x2160
	INPUT3	Source : HDMI
Stream	Frame Rate : 0	Resolution : 0x0
Record	INPUT4	Source : HDMI
Effect	Frame Rate : 0	Resolution : 0x0
PIP	DDR	Source :
FIF	Frame Rate :	Resolution :
Logo	Stream 1	Inactive
CG	Stream 2	Inactive
Keyer	Record	Inactive
PTZ	Stream Bitrate 1	0 Kbps

Press ∇ (down movement) key to select **Audio Function**, as shown below.

Status	Audio (HDMI-1)		0.0 dB
Audio	do do do do do ↓)	→ Delay 0 ms 🔷	ډ ⊔ _Mix
Input	Audio (HDMI-2)		0.0 dB
Output	Ĩ ●)	Delay 0 ms	Mix 🗌
	Audio (HDMI-3)		0.0 dB
Stream			
Depard	(1)	Delay 0 ms 🗘	Mix 🗌
Record	Audio (HDMI-4)		0.0 dB
Effect	40 50 50 40 40 35		
Lincor	()	Delay 0 ms 🗘	Mix 🗌
PIP	DDR1		0.0 dB
	40 - 40 - 40 - 40 - 40 - 40		
Logo	↓)	Delay 0 ms 🗘	Mix 🗌
CG	міс		0.0 dB
UU	k & k & k &		
Keyer	∢ ») —	Delay 0 ms 🗘	Mix 🗹
PTZ	Headphone Selector	PGM	
PIZ			

Press \triangleright (right movement) key to move to subfunction window, and keep pressing ∇ (down movement) key until **DDR1** subfunction is highlighted, as shown below.

	Audio (HDMI-4)			0.0 dB
Status	Addio (HDMI-4) ん ふ ふ ふ ふ		-40 -15 -10	0.0 uB
Audio	▲ ≫		Delay 0 ms 🗘	Mix 🗌
	DDR1			0.0 dB
Input	å <u>*</u> * *	4 5 5 <u>5</u>	Delay 0 ms	5 Mix 🗌
Output				
output	MIC			0.0 dB
Stream		ف ه ه ه	Ja Ja Ja Delay 0 ms ♀	3 ∂ Mix 🗹
Record	Headphone Selector	PGM		
Effect	Volume Slider 1			
PIP	Audio (HDMI-1)	Audio (HDMI-2)	🗌 Audio (HDMI-3	
	Audio (HDMI-4)	DDR1		
Logo	Volume Slider 2			
CG	Audio (HDMI-1)	Audio (HDMI-2)	Audio (HDMI-3)
	Audio (HDMI-4)	DDR1		
Keyer				
PTZ	Volume Slider 3			
PIZ	Audio (HDMI-1)	Audio (HDMI-2)	Audio (HDMI-3	

Press **Enter** key to select **DDR1** subfunction, and press \triangleright (right movement) key, as shown below.

Status	Audio (HDMI-4)		40 15 10	0.0 dB
Audio	■)		Delay 0 ms	Mix 🗌
	DDR1			0.0 dB
Input			Delay 0 ms	Mix 🗌
Output	MIC			0.0 dE
Stream	á á á á ≰))	* * * *	Delay 0 ms	Mix 🗹
Record	Headphone Selector	PGM		
Effect	Volume Slider 1			
PIP	Audio (HDMI-1)	🗌 Audio (HDMI-2)	🗌 Audio (HDMI-3	
	🗌 Audio (HDMI-4)	DDR1	□ MIC	
Logo	Volume Slider 2			
Logo CG	Volume Slider 2	Audio (HDMI-2)	🗌 Audio (HDMI-3	
CG		☑ Audio (HDMI-2) □ DDR1	Audio (HDMI-3	
	Audio (HDMI-1)			

Press \triangle (value increment) and ∇ (value decrement) keys for **DDR1** value adjustment, as shown below.

	Audio (HDMI-4)			0.0 dB
Status		40 .35 .50 .25	-20 -15 -10	0.0 ub
Audio	■))		Delay ^{0 ms} 🗘	Mix 🗌
Input	DDR1		یه به به Delay 0 ms	-13.4 dB
Output	MIC		`	0.0 dB
Stream	± ± ± ■)	40 .35 .30 .35	.ao .is .io Delay 0 ms ♀	ہ ا Mix 🗹
Record	Headphone Selector	PGM		
Effect	Volume Slider 1			
PIP	🗌 Audio (HDMI-1)	🗌 Audio (HDMI-2)	🗌 Audio (HDMI-:	3)
	🗌 Audio (HDMI-4)	DDR1		
Logo	Volume Slider 2			
CG	Audio (HDMI-1)	Audio (HDMI-2)	🗌 Audio (HDMI-:	3)
Keyer	🗌 Audio (HDMI-4)			
	Volume Slider 3			
PTZ	🗌 Audio (HDMI-1)	🗌 Audio (HDMI-2)	🗹 Audio (HDMI-:	3)

After the completion of adjustment, press **Back** key to exit from current selection and return to previous hightlight mode, as shown below.

Status	Audio (HDMI-4)	د_ مد مد مد 		0.0 dB
Audio	4 »		Delay 0 ms 🗘	Mix 🗌
Input	DDR1 ☆ ☆ ☆ ☆ ∢)	<u> </u>	o _o _o _o Delay 0 ms ♀	-13.4 dB
Output	MIC			0.0 dB
Stream	* * * *	40 45 46 4	s ⊸o .is .io Delay 0 ms ♀	s Mix 🗹
Record	Headphone Selector	PGM		
Effect	Volume Slider 1			
PIP	Audio (HDMI-1)	🗌 Audio (HDMI-2)	🗌 Audio (HDMI-3	
Loro	Audio (HDMI-4)	DDR1		
Logo	Volume Slider 2			
CG	Audio (HDMI-1)	Audio (HDMI-2)	🗌 Audio (HDMI-3	
Keyer	Audio (HDMI-4)	DDR1		
	Volume Slider 3			
PTZ	Audio (HDMI-1)	🗌 Audio (HDMI-2)	🗹 Audio (HDMI-3	

Press **Back** key to exit from **DDR1** subfunction to **Audio** function, when necessary. Press **Menu** key again to close **Menu** window.