ez-UMD+

4K HDMI/SDI Multi-Converter with Audio Mux/Demux

OPERATION
MANUAL

MANUAL
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LUMANTEK

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Warranty Period

The warranty period for products provided by Lumantek is 1 year after product delivery.
For warranty period and other inquiries, please contact the contact information below.

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Precautions Before Installation

This section describes basic precautions that users must know in preparation for situations that could cause physical injury when installing and using the product. Therefore, be sure to thoroughly read and understand the contents described here before installing or using the product.

General Precautions

- Keep the area around where the product is installed clean and dust-free during and after installation.
- When opening the cover of the product, place the cover in a safe location.
- Do not leave tools or cables in walkways, as people could suffer injuries.
- When installing the product, loose clothing, ties, scarves, or sleeves may get caught in the product, so do not wear loose clothing, make sure ties or scarves do not hang loosely, and roll up sleeves.
- Do not perform any action that may cause damage to people or equipment.
- If you must open the cover of the product to work on performance expansion or troubleshooting repairs, be sure to contact the place of purchase to receive expert help.
- Do not leave the equipment in places where water drips or splashes, and do not place objects containing water, such as flower vases, on top of the equipment.

Power Related Precautions

- When connecting power to the product, first check that the wiring is not overloaded.
- When connecting power to the product, do not wear accessories such as rings, necklaces, or watches. If such accessories are connected to power or ground, there is a risk of burning components.
- Always check whether there is any potential for hazards to occur in the workspace.
- Be sure to check for wet floors, ungrounded power extension cables, worn power cords with visible insides, or floors without safety grounding facilities.

AC Power

- This product is a standard AC power product, and the AC plug of the supplied power cord has a grounding function.
- Installation shall be performed by service personnel, ensuring that the equipment is connected to a socket-outlet with a protective earthing connection.
- Use a green/yellow wire of 0.75 mm^2 or more for the grounding wire connected to the grounding terminal.
- Use of the product is prohibited if PE is removed.
- Since the power cord and power outlet serve as the main power disconnect device in emergency situations such as fire, do not stack or block objects in front of the power outletso that the power cord can be unplugged from the power outlet at any time.
- An outlet must be located near the equipment and must be easily accessible.

1. Product Introduction

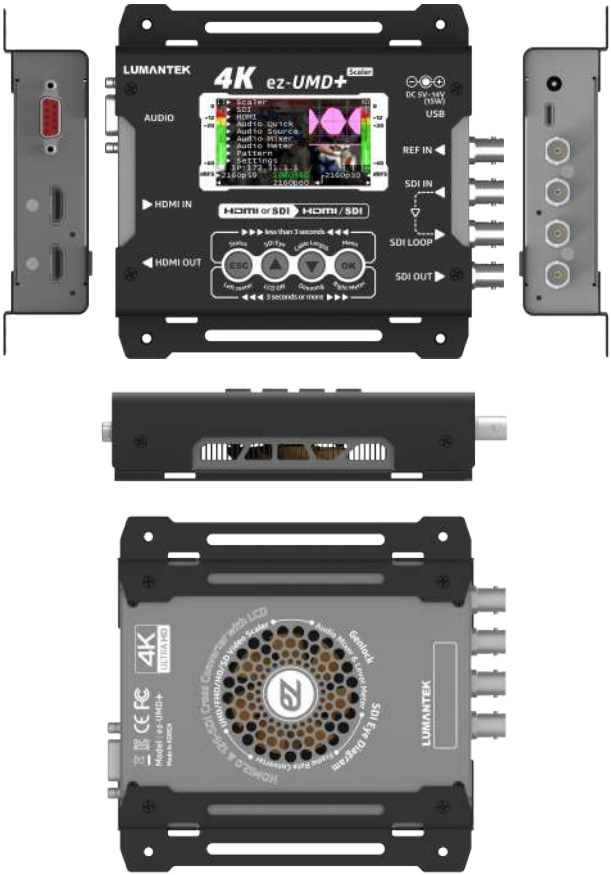
ez-UMD+ is a 4K Multi-Converter that supports 4K scaler, frame sync, genlock, analog audio mux/demux, audio down mixer, audio level meter, video test pattern generator, audio tone generator, HDMI eye scan, SDI BER eye diagram, SDI cable length indicator functions, and 12G-SDI and HDMI2.0 input/output. It can output multi-channel audio inputs such as 5.1ch and 7.1ch to SDI and HDMI, while outputting downmixed audio to stereo via XLR.It supports Reference input for Genlock, allowing it to be used to connect cameras or video devices without frame sync functions to a frame sync environment.Through the LCD screen, you can monitor input video and audio levels, and check Eye Scan of HDMI input, Eye Diagram of SDI input, and approximate cable length.All settings can be configured using 4 keys and the LCD OSD menu, and input status and detailed information can be checked.



Features

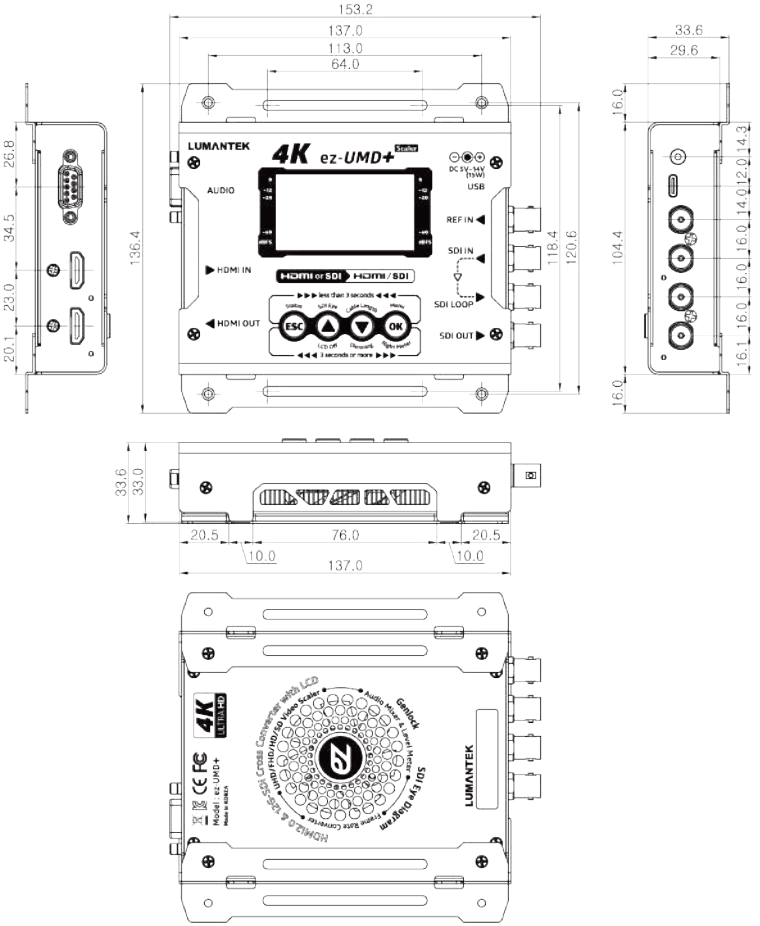
- Supports most input formats commonly used from SD to UHD (2160p60)
- Supports 40 output formats including DCI formats from SD to UHD (2160p60)
- Automatically recognizes RGB/YCbCr, 4:4:4/4:2:2, 8/10/12bit inputs and converts them to YCbCr 4:2:2 10bit
- Simultaneously supports LOOP output of SDI IN and scaler output, SDI OUT
- Supports Bypass or scaler output of HDMI IN through HDMI OUT
- AUDIO terminals are XLR IN/OUT, supporting analog stereo audio input and output
- Demuxes (de-embedding) stereo or multi-channel digital audio from SDI/HDMI IN
- Muxes (embedding) stereo or multi-channel audio into SDI & HDMI OUT
- Supports input/output and downmix of multi-channel audio up to 8 channels (7.1ch, 5.1ch, ...)
- REF IN: Supports Black Burst and Tri-Level input for Genlock
- 2.7-inch LCD to check video input, audio level meter, input/output status, SDI input Eye Diagram, HDMI Eye Scan, and SDI input cable length
- LCD OSD menu and display control with 4 keys (ESC, Up, Down, OK)
- 4 LEDs: Displays HDMI input 5V status, HDMI output HPD signal status, SDI input Equalizer Lock status, and SDI output Driver Lock status
- Various power input support: 5~14V DC-Jack and USB Type-C input supported
- Easy firmware update using UF2 (USB Flashing Format) file: Update by copying the update file to a USB disk recognized in update mode without installing separate software

2. Product Exterior



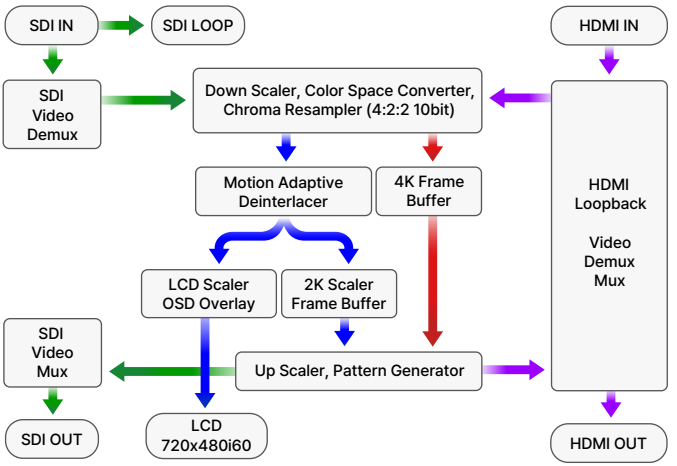
Caution: When installing the product, please be careful not to block the air inlet on the bottom and the exhaust vents on the sides!
When brackets are attached, minimal clearance is ensured

3. Product Drawing

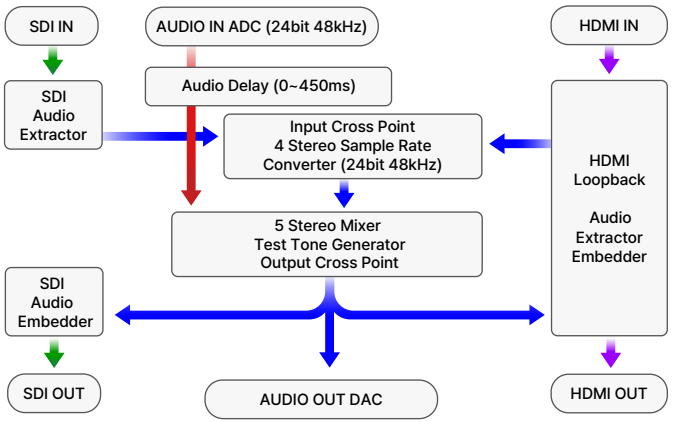


4. Video Audio Flowchart

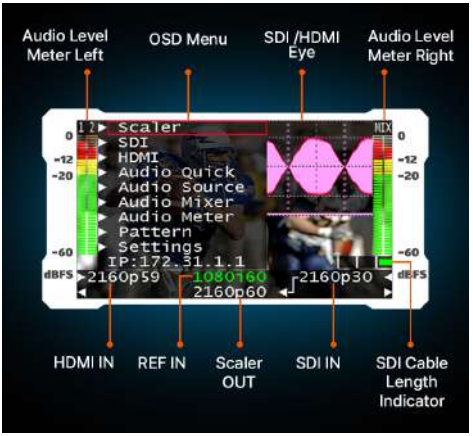
ez-UMD+ Video Flow



ez-UMD+ Audio Flow



5. LCD OSD Configuration

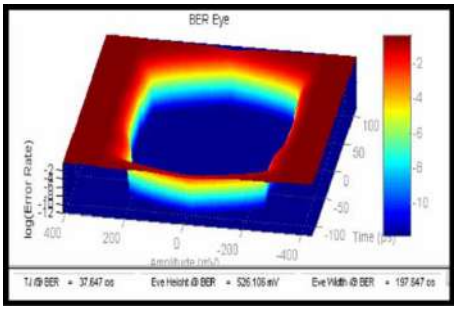


 # Audio Level Meter Left Area: Displays the levels of the built-in 5-channel stereo mixer inputs (IN1~IN5). Displays audio levels of SDI IN or HDMI IN selected according to the Audio Meter > Left IN1~IN4 menu selection from 2 channels up to 8 channels. Displays the level of the 5th input used for downmix or XLR IN mix according to the Audio Meter > Left IN5 menu selection. What is displayed during downmix is basically the level input to the left and right channels when it is not an LFE channel. When not in a menu state, it can also be changed by pressing and holding the ESC key.

 # Audio Level Meter Right Area: Displays the built-in stereo mixer output (MIX) level. Displayed according to the Audio Meter > Right MIX menu selection. When not in a menu state, it can also be changed by pressing and holding the OK key.

 # OSD Menu Area: On-screen display menu display. Pressing the OK key briefly makes it appear and enters menu mode. Pressing the ESC key at the top-level menu exits menu mode.

 # SDI / HDMI Eye Area: Displays SDI IN's BER (Bit Error Rate) Eye Diagram or HDMI Eye Scan.
- SDI Eye Diagram: The larger the Eye and the thinner and clearer the red boundary, the better the signal quality.
  The vertical axis is the signal level from 400mV to -400mV, and the horizontal axis is 1 sample period time. For reference, the BER Eye Diagram from a measuring instrument is displayed as in the figure below.



- HDMI Eye Scan: Displays eye scan waveforms of 3 HDMI data lanes. The vertical axis is he signal level from 315mV to -315mV, and the horizontal axis is time corresponding to about 66% of 1 sample period. For details, please refer to "8. HDMI IN Eye Scan Function Description".
- When not in menu mode, the display can be changed with the Up key in the order of SDI One Eye/SDI Two Eye/HDMI Eye/Off.

 # SDI Cable Length Indicator Area: Displays the cable length connected to the SDI IN port roughly in 64 steps, broadly divided into 3 areas. If displayed with a red bar up to the left area, it means the cable length is long and signal attenuation is significant; if displayed with a yellow bar up to the middle area, it means the cable length is medium and acceptable; if displayed with a green bar only in the right area, it means the cable length is short and the signal is very good. The display can be turned On/Off using the corresponding menu (SDI > Cable Length Indicator) or with the Down key when not in menu mode.

The status display area at the bottom of the screen is divided into 6 areas as follows. Scaler Source selection is indicated by an arrow between the HDMI IN/SDI IN area and the Scaler area.

 # HDMI IN Area: Displays HDMI input resolution

 # HDMI OUT Area: Displays whether Scaler output goes out to HDMI OUT or HDMI IN Bypass out put goes out

 # SDI IN Area: Displays SDI input resolution

 # SDI OUT Area: Displays that Scaler output goes out to SDI OUT

 # REF IN Area: Displays REF IN input resolution, displayed when REF is selected as Sync Source

 # Scaler Area: Displays Scaler output resolution

The color of the corresponding area changes depending on the Scaler Sync Source, Source selection, and frame sync lock status.
When Sync Source is Internal, it is always locked to the internal source, and the Scaler area color is displayed in green.
When Sync Source is Input, the color of the SDI IN or HDMI IN area changes according to Source selection. Red indicates a state where the framerate cannot be synchronized between input and output. Yellow indicates a synchronizable framerate, but not yet locked. Green indicates a synchronized state.
When Sync Source is REF, the color of the REF IN area changes with the same rule.
For framerate compatibility rules, refer to the "6.2. Scaler Menu" description.

6. OSD Menu Description

6.1. Top-level Menu

- ▶ **Scaler:** Select Scaler input source and configure output
- ▶ **SDI:** Control LCD display items related to SDI input and check information
- ▶ **HDMI:** Configure HDMI Bypass settings and check input information
- ▶ **Audio Quick:** Quick audio settings
- ▶ **Audio Source:** Configure audio input/output sources
- ▶ **Audio Mixer:** Configure audio mixer
- ▶ **Audio Meter:** Configure audio level meter
- ▶ **Pattern:** Configure video pattern displayed when there is no input
- ▶ **Settings:** LCD display settings, check version, update mode On/Off

```
▶ Scaler
▶ SDI
▶ HDMI
▶ Audio Quick
▶ Audio Source
▶ Audio Mixer
▶ Audio Meter
▶ Settings
▶ Pattern
▶ Settings
 IP:172.31.1.1
```

"IP:172.31.1.1" is the Web GUI access address that you can connect to via a browser when connected via USB. You can also connect using the domain name "umdp1.local". Connection via domain name is not supported on some older OSs that do not support mDNS. You cannot connect on older OSs such as Windows 7 that do not support the USB CDC NCM driver. Windows 10 and 11 are supported.

Pressing the ESC key at the top-level menu exits menu mode and saves setting values.

6.2. Scaler Menu

 # Source (HDMI, <SDI>): Select Scaler input source

 # Resolution(<2160p>, 1080p, 1080i, 720p, 480i, 576i): Select Scaler output resolution

 # Frame/Field Rate (table below): Select Scaler output frame or field rate The list changes as shown below depending on the Resolution selection.

```
▼ Scaler ──────────
├─ Source:
│    HDMI <SDI>
├─ Resolution:
│  <2160p> 1080p
│   1080i   720p
│    480i   576i
├─ Frame Rate:
│  <59.9>50 47.9
│   29.9 25 23.9
├─ 1/1.001: <On>
├─ DCI    : <Off>
└─ Sync Source:
   <Internal>
   Input
   REF
```

Frame/Field Rate Items according to Resolution and 1/1.001 Selection		
Resolution	1/1.001: <On>	1/1.001: <Off>
2160p 1080p	Frame Rate: <59.9> 50 47.9 29.9 25 23.9	Frame Rate: <60> 50 48 30 25 24
1080i	Field Rate: <59.9> 50 47.9	Field Rate: <60> 50 48
720p	Frame Rate: <59.9> 50	Frame Rate: <60> 50
480i	Field Rate: <59.9>	Field Rate: <59.9>
576i	Field Rate: <50>	Field Rate: <50>

 # 1/1.001 (<On>, Off): Uses 59.9, 47.9, 29.9, 23.9 multiplied by 1/1.001 according to NTSC standards instead of 60, 48, 30, 24 for Scaler output Frame Rate

 # DCI (On, <Off>): Select whether to use Digital Cinema Initiatives format If On, the horizontal pixel count becomes 2048 instead of 1920 and 4096 instead of 3840, outputting at a 17:9 aspect ratio. On general 16:9 aspect ratio monitors, depending on monitor settings, it inserts black bars (letterbox) above and below the screen for 17:9 display, changes the aspect ratio to 16:9, or crops the left and right of the input to fill the 16:9 screen.

 # Sync Source (<Internal>, Input, REF): Select Scaler output frame sync source
- Internal: Operates in non-sync mode using internal source
- Input: Selects input selected as Scaler Source; input and output frame rates must belong to the same group in the table below.
- REF: Selects REF IN as source; input and output frame rates must belong to the same group in the table below. The numbers in i60/i59/i50/i48/i47 represent field rates, corresponding to half values 30/29.9/25/24/23.9 for frame rates.

Group	Frame Rate	Input/Output Frame/Field Rate Display	Exceptions
1	60, 30	p60, p30, i60, s30	
2	59.9, 29.9	p59, p29, i59, s29	480i excludes p59
3	50, 25	p50, p25, i50, s25	576i excludes p50
4	48, 24	p48, p24, i48, s24	
5	47.9, 23.9	p47, p23, i47, s23	

6.3. SDI Menu

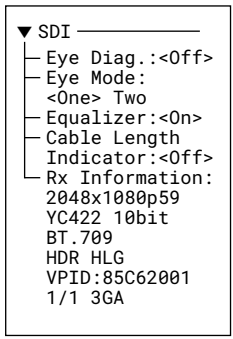
 # Eye Diag (On, <Off>): Select whether to display Eye Diagram of SDI IN

 # Eye Mode (<One>, Two): Select Eye Diagram display mode

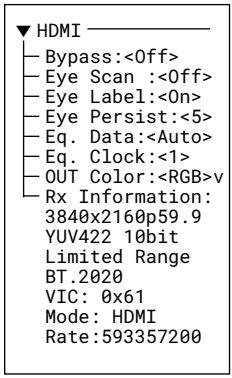
 # Equalizer (<On>, Off):
Select whether to use Cable Equalizer of SDI IN port Turning Off allows checking the input status as is via Eye Diagram, but reception performance may decrease.

 # Cable Length Indicator (On, <Off>): Select whether to display cable length at the bottom right of the LCD screen.

 # Rx Information: Displays various information related to SDI input 1/1 on the last line indicates the first link of a single link. For example, 2/4 indicates the second link of quad links.



6.4. HDMI Menu



 # Bypass (On, <Off>): HDMI IN ➡ HDMI OUT
Select whether to bypass.

 # Eye Scan (On, <Off>): Select whether to display Eye Scan of HDMI IN HDMI consists of 3 Data Lanes and 1 Clock Lane. Approximate signal quality can be checked by the eye size of the 3 Data Lanes. For details, please refer to "8. HDMI IN Eye Scan Function Description".

 # Eye Label: Displays Data Lane numbers (L0/L1/L2) on the Eye Scan background <On>/Off

 # Eye Persist: Eye Scan Persistence, data retention count 1~<5>~9

 # Eq. Data: HDMI IN Data Lane (L0/L1/L2) Equalizer Level <Auto>/0~5 If the link is not well established or unstable with Auto, you can find the optimal value by directly adjusting the Level while referring to Eye Scan.

 # Eq. Clock: HDMI IN Clock Lane (L3) Equalizer Level 0~<1>~2 Equalizer Level for Clock Lane can be adjusted separately.

 # OUT Color (YUV, <RGB>): Select the HDMI OUT color format between the default RGB 4:4:4 8bit or YUV(YCbCr) 4:2:2 10bit.

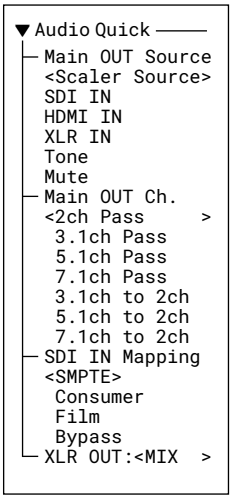
 # Rx Information: Displays various information related to HDMI IN. Rate is pixel rate including blanking area calculated from measured TMDS clock rate and format.

6.5. Audio Quick Menu

This menu simplifies general audio settings. If detailed settings are required, you can use Audio Source, Audio Mixer, and Audio Meter menus. Quick menu applies temporarily, maintaining the last applied item. Actual applied settings are the settings of Audio Source, Mixer, and Meter menus.

 # Main OUT Source : Select source to use for Main (HDMI & SDI) OUT.
- XLR IN: Selects XLR IN as source.
- <Scaler Source>: Depending on Scaler Source menu selection, SDI IN or HDMI IN is selected.
- SDI IN: Selects SDI IN as source.
- HDMI IN: Selects HDMI IN as source.
- Tone: Selects Tone as source.
- Mute: Mutes Main OUT.

 # SDI IN Mapping: Defines channel mapping of SDI input.
- <SMPTE>: Select when multi-channel mapping is in the SMPTE standard order: L-R, C-LFE, Ls-Rs,...
- Consumer: Select when multi-channel mapping is as defined in HDMI's CTA-861, which is Consumer standard order: L-R, LFE-C, Ls-Rs,...
- Film: Select when multi-channel mapping is in the order generally used in Film editing equipment or software: L-C, R-LFE, Ls-Rs,...
- Bypass: Outputs directly to SDI and HDMI without changing channel mapping. SDI typically comes in with SMPTE mapping, so select this when you want to output to HDMI with SMPTE mapping as well, or output Film mapping as is. The types of channel mapping related to Center and LFE and downmix support status for multi-channel (3.1ch, 5.1ch, 7.1ch) are as shown in the table below.



Interface	Mapping	Ch1	Ch2	Ch3	Ch4	Downmix Support
HDMI	Consumer, CTA-861	Left	Right	LFE	Center	Supported
SDI	Consumer, CTA-861	Left	Right	LFE	Center	Supported
SDI	SMPTE, ST299/ST272	Left	Right	Center	LFE	Supported
SDI	Film	Left	Center	Right	LFE	Supported

According to the SDI IN Mapping setting, it converts to Consumer mapping and downmixes. HDMI OUT is output with Consumer mapping, and SDI OUT is converted to SMPTE mapping and output.

 # Main OUT Ch.: Selects channel configuration of Main (HDMI & SDI) OUT audio.
- <2ch Pass>: Outputs Main OUT Source to Ch1~Ch2.
- 3.1ch Pass: Outputs Main OUT Source to Ch1~Ch4.
- 5.1ch Pass: Outputs Main OUT Source to Ch1~Ch6.
- 7.1ch Pass: Outputs Main OUT Source to Ch1~Ch8.
- 3.1ch to 2ch: Downmixes Ch1~Ch4 of Main OUT Source and outputs to Ch1~Ch2.
- 5.1ch to 2ch: Downmixes Ch1~Ch6 of Main OUT Source and outputs to Ch1~Ch2.
- 7.1ch to 2ch: Downmixes Ch1~Ch8 of Main OUT Source and outputs to Ch1~Ch2.

Mixer settings according to the selected channel configuration are shown in the table on the next page.

Main OUT Source	Main OUT Channel	IN1		IN2		IN3		IN4		IN5		IN5 Source
		IN1	IN1	IN1	IN1	IN1	IN1	IN1	IN1	IN1	IN1	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	
XLR, Tone, Mute	Dont' care	-INF	-INF	-INF	-INF	-INF	-INF	-INF	-INF	-INF	-INF	XLR, Tone, Mute
SDI IN HDMI IN	2ch Pass	0dB	0dB	-INF	-INF	-INF	-INF	-INF	-INF	-INF	-INF	Mute
	3.1ch Pass 3.1ch to 2ch	FL 0dB	FL 0dB	FC(R Mono) -3dB		-INF	-INF	-INF	-INF	LFE(L Mono) -12dB		Ch3&4
	5.1ch Pass 5.1ch to 2ch	FL 0dB	FL 0dB	FC(R Mono) -3dB		SL -3dB	SR -3dB	-INF	-INF	LFE(L Mono) -12dB		Ch3&4
	7.1ch Pass 7.1ch to 2ch	FL 0dB	FL 0dB	FC(R Mono) -3dB		SL -3dB	SR -3dB	RL -6dB	RR -6dB	LFE(L Mono) -12dB		Ch3&4

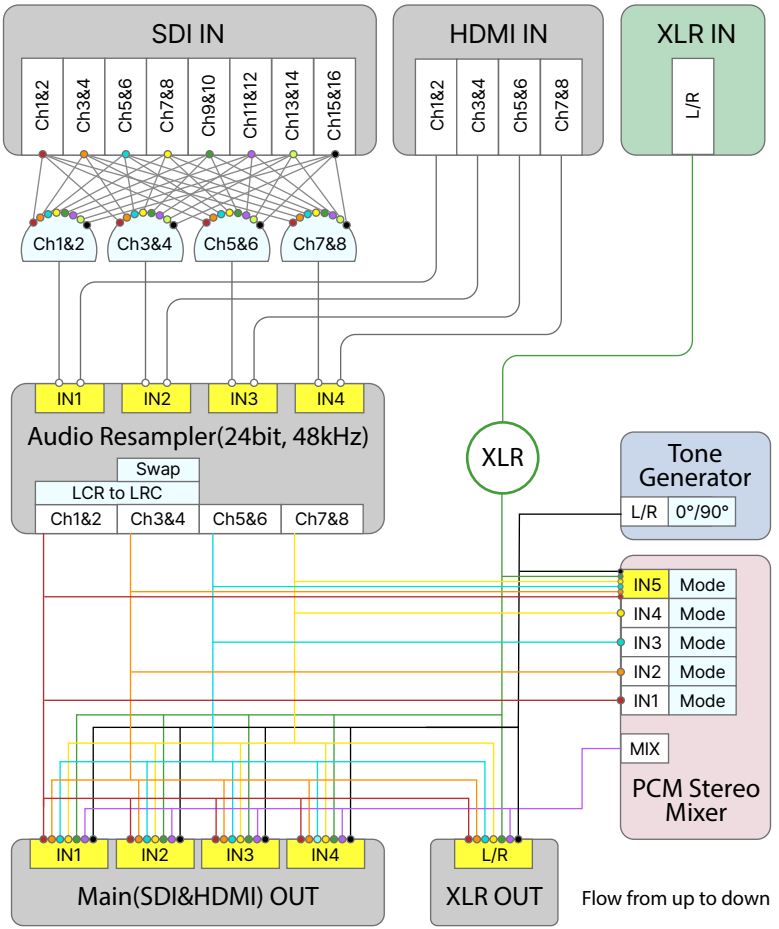
Mixer Input/Output Channel Mapping and Abbreviations during Downmix Operation

N1	Ch1	FL= Front Left, L= Left	Ch2	FR= Front Right, R= Right
N2	Ch4	FC= Front Center, C= Center	Ch4	FC= Front Center, C= Center
N3	Ch5	SL= Side Left, Ls= Left surround	Ch6	SR= Side Right, Rs= Right surround
N4	Ch7	RL= Rear Left	Ch8	RR= Rear Right
N5	Ch3	LFE= Low Frequency Effect	Ch3	LFE= Low Frequency Effect
MIX	Ch1	Lt = Left total	Ch2	Rt= Right total

 # XLR OUT (Ch1&2, Ch3&4, Ch5&6, Ch7&8, XLR, <MIX>, Tone, Mute): Selects XLR OUT audio source.

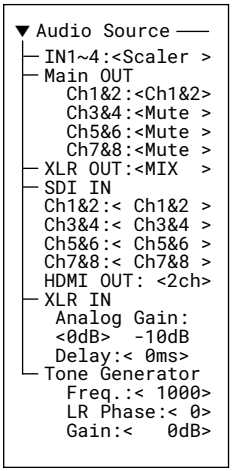
6.6. Audio Source 메뉴

Through the Audio Source menu, you can select the stereo input/output sources of the audio system as shown below. Source selection is made in the sections highlighted in yellow.



IN1~IN4 inputs pass through the Audio Resampler to be synchronized and converted to 48kHz 24bit, the same as XLR. Right/Left channels can be swapped with the Swap setting. Swap setting is used to change the order of Center and LFE channels of surround audio coming into IN2. Mode setting can convert Stereo to L mono (dual mono with left) or R mono (dual mono with right). Using the Mode setting, surround audio Center/LFE channels and mono mic inputs can be mixed into both left and right channels.

IN1~IN4 inputs can select 8 channels of SDI IN (Ch1~8 or Ch9~16), 8 channels of HDMI IN (Ch1~8), or 4 channels of SDI IN (Ch1~4) and 4 channels of HDMI IN (Ch1~4) as sources. One stereo input (IN5) can duplicate and select one of IN1~IN4 for downmix, or select XLR IN or tone generator as a source.



 # IN1~4(<Scaler>, SDI IN, HDMI IN, S2+H2):
Select multi-channel audio input source
- <Scaler>: Selects SDI IN or HDMI IN according to Scaler Source selection
- SDI IN: 4 stereo channels (Ch1~8) input through SDI IN
- HDMI IN: 4 stereo channels (Ch1~8) input through HDMI IN
- S2+H2: Selects 2 channels (Ch1~4) from SDI IN and 2 channels (Ch5~8) from HDMI IN

 # Main OUT: Select SDI OUT and HDMI OUT audio sources
- Ch1&2: <Ch1&2>, Ch3&4, Ch5&6, Ch7&8, XLR, MIX, Tone, Mute
- Ch3&4: Ch1&2, <Ch3&4>, Ch5&6, Ch7&8, XLR, MIX, Tone, Mute
- Ch5&6: Ch1&2, Ch3&4, <Ch5&6>, Ch7&8, XLR, MIX, Tone, Mute
- Ch7&8: Ch1&2, Ch3&4, Ch5&6, <Ch7&8>, XLR, MIX, Tone, Mute

 # XLR OUT(Ch1&2, Ch3&4, Ch5&6, Ch7&8, XLR, <MIX>, Tone, Mute):
Select XLR OUT audio source

 # SDI IN:
- Ch1&2: <Ch1&2>, Ch3&4, Ch5&6, Ch7&8, Ch9&10, Ch11&12, Ch13&14, Ch15&16
- Ch3&4: Ch1&2, <Ch3&4>, Ch5&6, Ch7&8, Ch9&10, Ch11&12, Ch13&14, Ch15&16
- Ch5&6: Ch1&2, Ch3&4, <Ch5&6>, Ch7&8, Ch9&10, Ch11&12, Ch13&14, Ch15&16
- Ch7&8: Ch1&2, Ch3&4, Ch5&6, <Ch7&8>, Ch9&10, Ch11&12, Ch13&14, Ch15&16

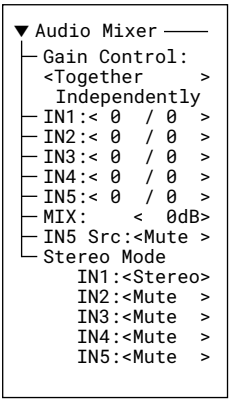
 # HDMI OUT(<2ch>, 4ch, 6ch, 8ch): Select HDMI output channel mode

 # XLR IN:
- Analog Gain (<0dB>, -10dB): Configure analog input gain
- Delay (0~450ms, 50ms step): Configure input delay

 # Tone Generator:
- Freq. (Frequency, 100~<1000>~20000Hz, 100Hz step): Selects sine wave frequency.
- LR Phase (<0>, 90, unit): 0 means Left and Right are in the same phase. 90 means there is a 90-degree phase difference, creating a sine/cosine relationship.
- Gain (<0>~-138dB, 6dB step): Configures gain relative to Full Scale (0dBFS). -138dB is effectively 0 in 24bit.

6.7. Audio Mixer Menu

It features a built-in stereo mixer that can mix five PCM stereo inputs (IN1~IN5) into a single stereo output (MIX). This allows downmixing multi-channel audio such as 3.1ch, 5.1ch, and 7.1ch coming in via SDI IN or HDMI IN, or mixing SDI IN or HDMI IN inputs with XLR IN inputs to use as output sources. To set downmix for 5.1ch or 7.1ch, you generally need to mix the LFE channel coming into Ch3 (Left) of IN2 and the Center channel coming into Ch4 (Right) equally into both left and right channels.



 # Gain Control (<Together>, Independently):

- Together: Sets left and right gain to be identical.
- Independently: Sets left and right gain individually.

Example of individual (Independently) Gain setting method, IN1

Press (▼)(▲) keys to select IN1 menu, then press (OK) key to select Left Gain of IN1. Change the value with (▼)(▲) keys, press (OK) key to confirm, or (ESC) key to cancel.	IN1: <-3 / -3 > IN1: <-6 / -3 >
Setting Left Gain automatically selects Right Gain next. Change the value with (▼)(▲) keys, press (OK) key to confirm, or (ESC) key to cancel.	IN1: <-6 / 0 > IN1: <-6 / 0 >

 # IN1~IN5, MIX (12~<0>~-58/-60/-63/-66/-72/-INF): Adjusts gain for 5 inputs (IN1~IN5) and output (MIX) of Stereo mixer, in dB units

* Audio Gain adjustment steps: Adjusted in 1dB steps from +12 to -54, and the lowest 8 steps are adjusted to -55, -57, -58, -60, -63, -66, -72, -INF(-∞).

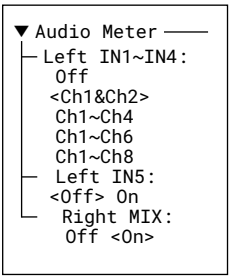
 # IN5 Src (Ch1&2, Ch3&4, Ch5&6, Ch7&8, <XLR>, Tone, Mute): Selects source for Stereo mixer IN5

 # Stereo Mode IN1~IN5: Configure Stereo mixer input mode:

- <Stereo>: Receives stereo input as is
- L Mono: Mode that copies Left channel to Right channel as well
- R Mono: Mode that copies Right channel to Left channel as well
- Mute: Mute mode

6.8. Audio Meter Menu

Audio Level Meter can selectively display the Mixer's 5 inputs, IN1~IN5, on the left side of the LCD, and the Mixer's output, MIX, on the right side of the LCD. In menu status, IN2~IN5 are not displayed, and will be displayed after exiting the menu.



 # Left IN1~IN4: Selects whether to display level meters and channel configuration of SDI/HDMI input displayed on the left side of the LCD.

- Off: No display
- <Ch1&Ch2>: Displays 2 channels, Ch1 and Ch2.
- Ch1~Ch4: Displays 4 channels, Ch1 to Ch4.
- Ch1~Ch6: Displays 6 channels, Ch1 to Ch6.
- Ch1~Ch8: Displays 8 channels, Ch1 to Ch8.

 # Left IN5 (<Off> On): Displays whether to display Mixer IN5 input displayed on the left side of the LCD. Display of XLR IN

- Off: No display
- <On>: Displayed.

* Audio Level Meter display range and unit: Range is 0~-60dBFS, and each mark corresponds to approximately 1.5dB. Peak value is displayed every frame.

Meter Left label is displayed with 4 characters per channel pair according to the rules below. '_' represents a space.

Mixer IN5 Sourc	Stereo Mode		
	Stereo	L Mono	R Mono
Ch1&2(IN1, IN5)	1_2_	1_1_	2_2_
Ch3&4(IN2, IN5)	3_4_	3_3_	4_4_
Ch5&6(IN3, IN5)	5_6_	5_5_	6_6_
Ch7&8(IN4, IN5)	7_8_	7_7_	8_8_
XLR (IN5)	L_R_	L_L_	R_R_
Tone(IN5)	Tone	Tone	Tone
Mute(IN5)	Mute	Mute	Mute

Meter right is dedicated to MIX, the output of mixer, and its label is always "_MIX".

When Main OUT Source and Main OUT Ch. settings are made in Audio Quick, Audio Meter settings and labels change as shown below.

Audio Quick Main OUT Ch./Source	Left IN1~IN4	Left IN5	Right MIX	Meter Lable
2ch Pass, XLR IN	Off	On	Off	L_R_
2ch Pass, others	Ch1&2	Off	Off	1_2_ _MIX
3.1ch Pass	Ch1~4	On	On	1_2_4_4_3_3_ _MIX
5.1ch Pass	Ch1~6	On	On	1_2_4_4_5_6_3_3_ _MIX
7.1ch Pass	Ch1~8	On	On	1_2_4_4_5_6_7_8_3_3_ _MIX
3.1ch to 2ch	Ch1~4	On	On	1_2_4_4_3_3_ _MIX
5.1ch to 2ch	Ch1~6	On	On	1_2_4_4_5_6_3_3_ _MIX
7.1ch to 2ch	Ch1~8	On	On	1_2_4_4_5_6_7_8_3_3_ _MIX

6.9. Pattern Menu

 # No Input: Select whether a Pattern will be output when the input selected as Scaler Source is in a No Input state, On <Off>

 # Motion: Selects pattern horizontal(H)/vertical(V) movement, Off <H> V H&V

 # Pattern: Selects pattern type, Solid, <Color Bar>, H/V Count

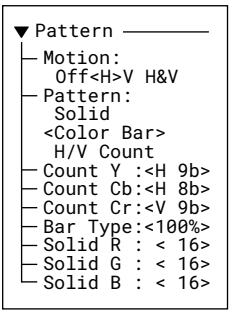
 # Count Y/Cb/Cr: Selects counter pattern type for each color value
- H 9b/8b/7b: Counter value pattern repeating horizontally with upper 9bit(0~511), 8bit(0~255), 7bit(0~127) out of 10bit color value
- V 9b/8b/7b: Counter value pattern repeating vertically with upper 9bit(0~511), 8bit(0~255), 7bit(0~127) out of 10bit color value

 # Bar Type: Selects Color Bar color range. <100%>, 75%

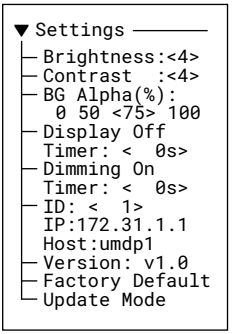
 # Solid R: Red color value of Solid pattern, <16>~235

 # Solid G: Green color value of Solid pattern, <16>~235

 # Solid B: Blue color value of Solid pattern, 16~<235>



6.10. Settings Menu



 # Brightness: Adjusts LCD screen brightness 0~<4>~9

 # Contrast: Adjusts LCD screen contrast 0~<4>~9

 # BG Alpha(%): Configures background transparency of LCD display items 0, 50, <75>, 100

 # Display Off Timer: Configures LCD screen display turn off timer <0s>(Always On), 15s, 30s, 60s, 120s, 300s, 600s (in seconds)

 # Dimming On Timer: Configures LCD screen dimming timer <0s>(Always On), 10s, 20s, 40s, 80s, 200s, 400s (in seconds)

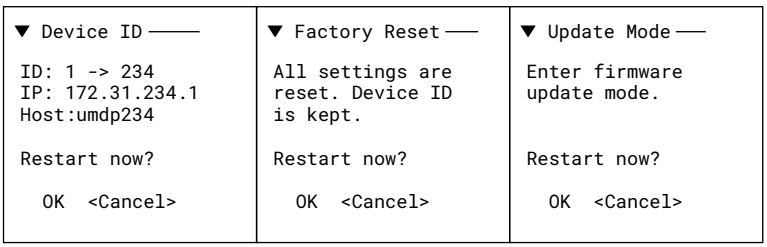
 # ID: Device Identification. <1>~255
- Applied to the 3rd octet of the web access IP Address, becoming "172.31.<ID>.1".
- Attached after the web access Host name, so the Domain name becomes "umdp<ID>.local".

 # Version: Display hardware logic version

 # Factory Default: Reset setting values

 # Update Mode: Restarts into firmware update mode. For more details, refer to "7. Firmware Update Guide"

When you press OK in ID, Factory Default, or Update Mode, a confirmation window is displayed as shown below, and pressing OK restarts the device, while pressing Cancel eturns to the previous screen.

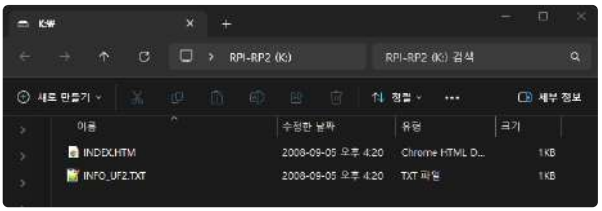


7. Firmware Update Guide

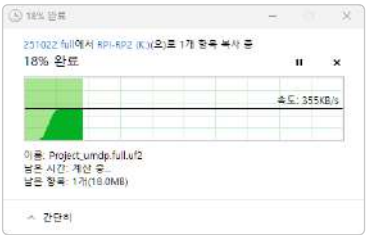
There is a possibility of malfunction if power supply to the USB port is insufficient, so proceed after disconnecting all SDI and HDMI input/output connections.

How to Use Hardware Keys

With power Off, press and hold the OK key and connect to a USB-C port of a PC capable of supplying 500mA or more current, then a USB memory explorer window like the one below appears on the PC (Windows 11).



Drag-and-drop or copy-and-paste the update file (.uf2) here, and a progress window like the one below appears. It takes approximately 40 to 60 seconds.



When copying is finished, it reboots automatically.

How to Use Menu

Selecting Menu>Settings>Update Mode: <On> displays the screen below and enters update mode. In this state, connect to a PC and copy the update file (.uf2) to the recognized USB memory in the same way as using hardware keys.



8. HDMI IN Eye Scan Feature Description

The HDMI IN Eye Scan feature is similar to the SDI IN Eye Diagram, allowing you to roughly check the relative HDMI signal quality. Like the SDI Eye Diagram, it can be used to identify issues with cables or source signal quality.

HDMI consists of 3 data lanes (L0/L1/L2) and 1 clock lane (L3), and the eye scan feature lets you check the eye waveforms of the data lanes.

The vertical axis represents signal levels of 315mV to -315mV, which is about 63% of the HDMI signal level of 500mV to -500mV, and the horizontal axis represents time of about 66% of a 1 sample period. Since it displays only within limited level and time ranges, saturated waveforms may be displayed.

Another limitation is that some resolutions below HD grade, such as SD grade or 800x600p60, are not supported. Based on ez-UMD+ output, 2160p ~ 720p is supported, and 480i and 576i are not supported.

Looking at a few examples below, like the SDI Eye Diagram, higher resolutions generally result in smaller eyes, while lower resolutions result in larger measured eyes.

For example, both cases below have a 720p59 input and are generally fine, but:

(1) represents a case where intermittent issues may occur, so cable replacement or connection status check may be needed.

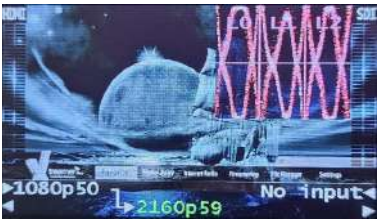
(2) appears to be normal, with the eye for L0 maximally open and the eyes for L1 and L2 appearing relatively good.



(1) Faulty cable eye scan, 720p59



(2) Normal cable eye scan 720p59(HD)



(3) Eye scan, 1080p50(FHD)



(4) Eye scan 2160p59(UHD)

Generally, the eye for L1 located in the middle is measured to be relatively small.

For reference, comparing the eye size for each lane, there appears to be a fundamental difference due to the effect of crosstalk between lanes according to the HDMI pin arrangement.

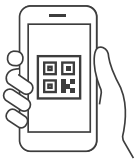
L0 is measured the largest because it is only affected by L1, L1 is measured the smallest because it is affected by both L0 and L2, and L2 has L1 on one side and the clock lane on the other side, so it is measured slightly smaller than L0.

9. Product Specifications

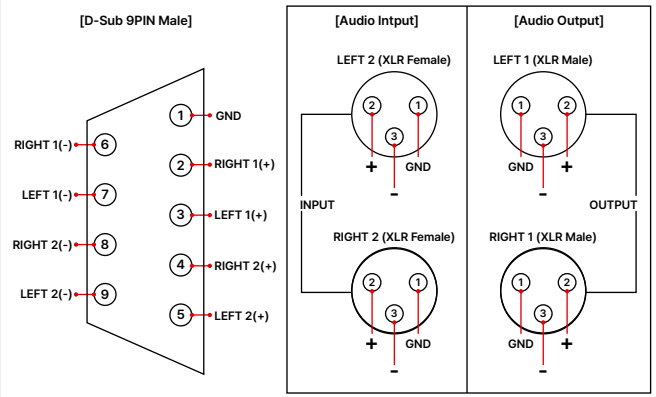
Input	
Video Sources	SDI IN: 12G-SDI, BNC 75Ω HDMI IN: HDMI 2.0, Type-A Internal: Color Bar/Solid Color, H/V Counter Pattern
SDI Standards	SD-SDI, ST 259 HD-SDI, ST 292 3G-SDI Level A, B-DL, B-DS, ST 425-1 6G-SDI, ST 2081-10 Mode 1/2 12G-SDI, ST 2082-10 Mode 1
SDI Video Resolutions	720x486i@59.94 (NTSC) 720x576i@50 (PAL) 1280x720p@50/59.94/60 1920x1080i@50/59.94/60* 1920x1080PsF@23.98/24/25/29.97/30* 1920x1080p@23.98/24/25/29.97/30* 1920x1080p@47.95/48/50/59.94/60* 3840x2160@23.98/24/25/29.97/30* 3840x2160@47.95/48/50/59.94/60* * Support DCI(ST 2048-1): 2048x1080, 4096x2160
Video Color Formats	SDI: YCbCr 4:2:2, 10bit HDMI: RGB 4:4:4, 8bit YCbCr 4:2:2 10bit
HDMI Video Resolutions	SDI Video Resolutions And, other common resolutions
Digital Audio	SDI Embedded Audio: 2ch~8ch from 16ch HDMI Embedded Audio: 2ch~8ch Sampling: 32~96kHz, 16~24bit
Analog Audio	AUDIO: DB9 to XLR Breakout Cable Female XLR 2ea(Left, Right) Sampling: 48KHz 24bit Delay Control: 0~450ms (50ms step) Analog Gain Control: 0db or -10dB
Genlock Reference	REF IN: Tri-level or Black Burst, BNC 75Ω
Output	
Bypass/Loop	HDMI IN to HDMI OUT(Menu>HDMI>Bypass: On/Off) SDI IN to SDI LOOP(Always On)
Interfaces	SDI OUT: 12G-SDI, BNC 75Ω SDI LOOP: 12G-SDI, BNC 75Ω HDMI OUT: HDMI 2.0, Type-A
Video Resolution, SDI Standard	720x486i@59.94 (NTSC), SD-SDI 720x576i@50 (PAL), SD-SDI 1280x720p@50/59.94/60, HD-SDI 1920x1080i@50/59.94/60*, HD-SDI 1920x1080p@23.98/24/25/29.97/30*, HD-SDI 1920x1080p@47.95/48/50/59.94/60*, 3G-SDI Level A 3840x2160@23.98/24/25/29.97/30*, 6G-SDI Mode1 3840x2160@47.95/48/50/59.94/60*, 12G-SDI Mode1 * Support DCI(ST 2048-1): 2048x1080, 4096x2160
Video Color Format	SDI: YCbCr 4:2:2, 10bit HDMI: RGB 4:4:4, 8bit / YCbCr 4:2:2 10bit

Digital Audio	SDI Embedded Audio: 2ch~8ch HDMI Embedded Audio: 2ch~8ch Tone Generator: Sine wave with gain and frequency control Sampling: 48KHz 24bit
Analog Audio	AUDIO: DB9 to XLR Breakout Cable Male XLR 2ea(Left, Right) Sampling: 48KHz 24bit
Video Scaler	
Internal Process	YCbCr 4:2:2 10bit
Chroma Up Sampler	4:2:2 to 4:4:4, bypass 4:4:4
Color Space Converter	RGB to YCbCr, bypass YCbCr Follow input gamut detected(BT.601, BT.709, BT.2020)
Chroma Down Sampler	4:4:4 to 4:2:2
Deinterlacer	Motion Adaptive
Frame Rate Converter/Syncer	Triple Buffering
Genlock Sync Source	Internal(free run), Input, REF IN
PCM Stereo Audio Mixer	
Input Stereo	5 channel pairs
Output Stereo	1 channel pairs
Controls	Input Gain, Output Master Gain Analog Audio Input Gain -10dB/0dB Level Meter on LCD
User Interface	
LCD	2.7inch Color TFT LCD Menu & Status Display
Control Panel	4 Keys(ESC, Up, Down, OK)
USB Device Port	USB Type-C, For firmware update & ez-Control USB Composite: CDC ACM & CDC NCM
Power	
Input Connector	DC Jack
Input Voltage	DC +5 to +14V
Consumption	15W(max.)
Environmental	
Operation Temperature	0° to 40°C(32° to 104°F)
Storage Temperature	-10° to 50°C(14° to 122°F)
Relative Humidity	10~50% non-condensing
Physical	
Dimension (W x H x D)	137 x 104 x 30mm (excluding connector and bracket)
Weight	450g(1 lbs) including bracket

10. Package Contents Main

Main Body + Bracket	DC Adapter
	 AC IN: 100~240VAC, 50/60Hz DC OUT: 12V, 2A
External Audio Breakout Cable	**User Manual QR Code**
 D-Sub 9pin Male x1 Audio Input: XLR Female x2 Audio Output: XLR Male x2	 Please check the detailed usage instructionsandmanual for the product through the enclosed QR guide card.

External Audio Breakout Cable Pinout



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