

User Manual Ver 19.2

**4K HDR**

**High Dynamic Range LUT BOX-4K**

**HLB-4K**

*HDR Converter  
Operational Instructions*



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## 1. Precaution

Always use set voltage.

DC 12V

All these instructions should be read and understood before operating the unit.

If liquid is spilled on or impacts this product, please disconnect the product immediately and seek professional help before continued use.

Unplug the product from the wall outlet if it is not to be used for several days or more.

Keep the product in a well-ventilated place to prevent overheating.

Do not install the product near any heat-generating equipment. Also, keep the product out of direct sunlight or dusty areas.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

When using other DC 12V adapters instead of the standard adapter provided by the manufacturer, please check the proper load capacity or current capacity and use an adapter with stable voltage.

Do not overload AC outlets or extension cords. Overloading can cause fire or electric shock.

Do not attempt to service the product yourself. Removing covers can expose you to high voltage and other dangerous conditions. Request a qualified service person to perform servicing.

When the product needs replacement parts, make sure that the service person uses replacement parts specified by the manufacturer, or those with the same characteristics and performance as the original parts. Use of unauthorized parts may result in fire, electric shock and/or other danger.

Only clean the product with a noncommercial, mild and neutral detergent.

Do not throw away the carton and packing materials. When transporting the product, make use of its original packaging for safer carriage.

### FCC (Federal Communications Commission)

This equipment has been tested and found to comply with the limits for class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**⚠ Warning!!** : Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

### Disposal of Old Electrical & Electronic Equipment

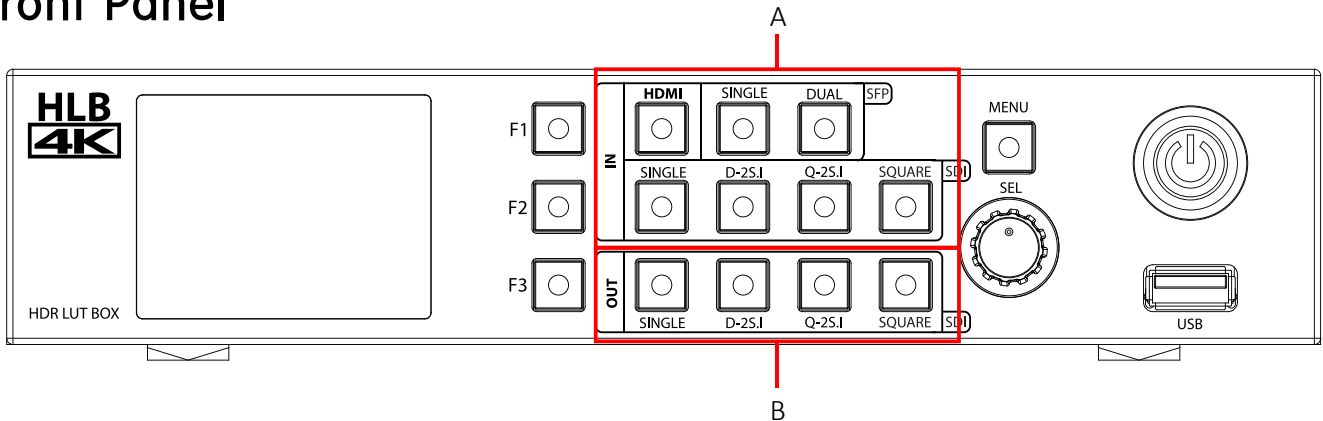
(Applicable in the European Union and other European countries with separate collection systems)



This symbol on the product or on its packing indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequence for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources.

## 2. Location and Function of Controls

### Front Panel



#### A : Input Selection Buttons

Press the button to select the signal input.

##### [HDMI]

- Press the button to select HDMI input.

##### [SFP SINGLE]

- Press the button to select one channel of SFP input. The SFP Module should be connected to the SFP 1 Connector.

##### [SFP DUAL]

- Press the button to select SFP Dual-Link.

##### [SDI SINGLE]

- Press the button to select one channel of the SDI input. The mode changes in the order of SDI 1, SDI 2, SDI 3, SDI 4.

##### [SDI D-2S.I]

- Press the button to select the SDI Dual-Link 2-Sample Interleave mode. The input cables should be connected to the SDI 1 and SDI 2 Connectors.

##### [SDI Q-2S.I]

- Press the button to select the SDI Quad-Link 2-Sample Interleave mode.

##### [SDI SQUARE]

- Press the button to select the SDI Quad-Link Square Division mode.

#### B : Output Selection Buttons

##### [SDI SINGLE]

- Press the button to select one channel of the SDI. The mode changes in the order of SDI 1, SDI 2, SDI 3, SDI 4.

##### [SDI D-2S.I]

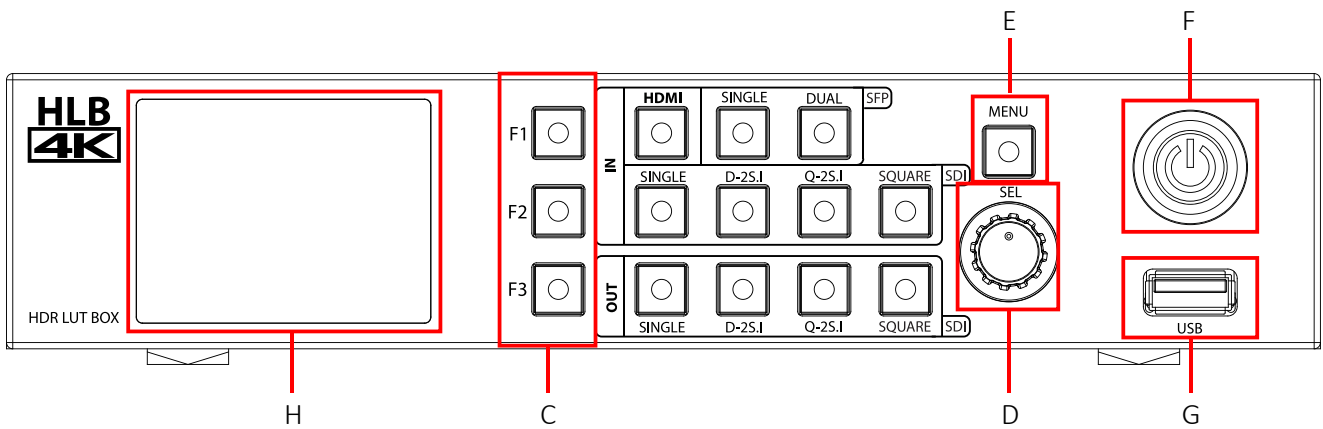
- Press the button to select the SDI Dual-Link 2-Sample Interleave mode. The input cables should be connected to the SDI 1 and SDI 2 Connectors.

##### [SDI Q-2S.I]

- Press the button to select the SDI Quad-Link 2-Sample Interleave mode.

##### [SDI SQUARE]

- Press the button to select the SDI Quad-Link Square Division mode.



## C : F1 ~ F3 Button

Press to adjust or turn on/off the assigned function.  
The following functions are assigned at the factory.

- [F1] : Conversion Mode
- [F2] : Input Color
- [F3] : User LUT

## D : Rotary Encoder [SEL] knob

When the Menu is displayed, turn this knob left or right to move up or down the menu and press this knob to confirm the selected setting.

## E : Menu Button [MENU]

Activates or deactivates the display of the Main Menu.

## F : Power Button [POWER]

Press to turn on or off the power.

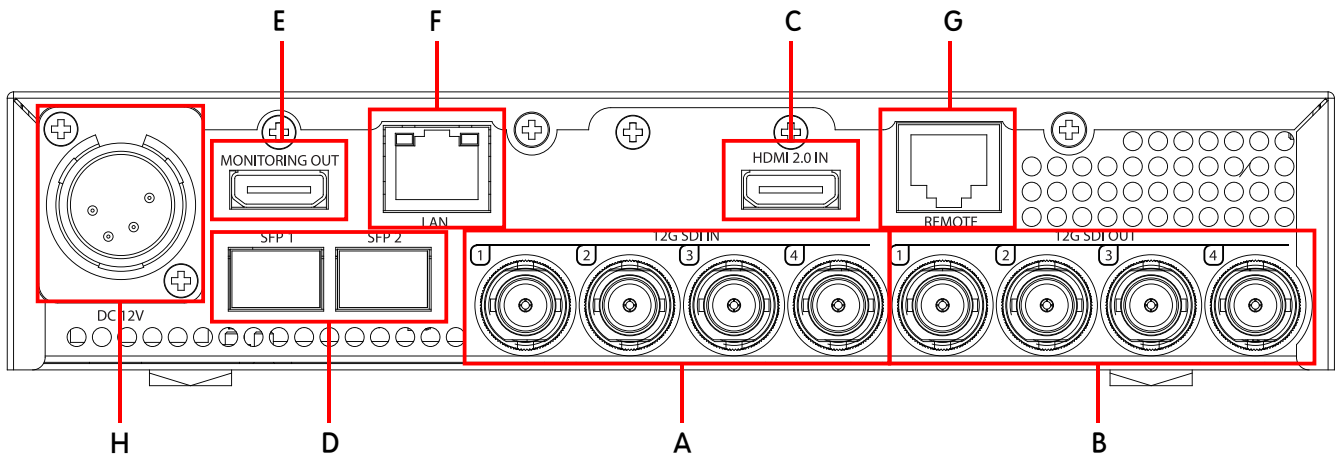
## G : USB connector [USB] Connector

- Used to update the firmware.
- If you insert the USB memory stick with the firmware file and turn on the power, the firmware update is done.

## H : LCD Module [LCD] TFT LCD

- Displays the OSD Menu and the current setting values on the LCD screen.

## Rear Panel



**A : SDI IN (SDI Input) connectors (BNC)**

Used to input the SDI signal.

**B : SDI OUT (SDI Output) connectors (BNC)**

Used to output the SDI signal.

**C : HDMI input connectors**

Used to input the HDMI signal.

- High Speed HDMI Cable with the cable type logo or HDMI 2.0 Cable is recommended.
- When inputting 4K resolution(3840 x 2160 or 4096 x 2160) signal, use a cable of 3m or less.

**D : SFP Input connector**

Used to input the SFP module.

**E : Monitoring OUT**

Will be supported.

**F : LAN**

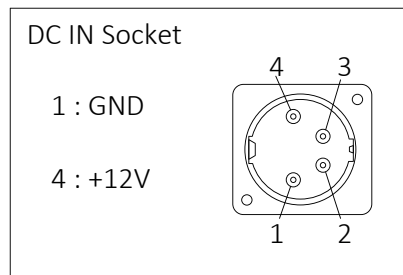
Will be supported.

**G : Remote**

Will be supported.

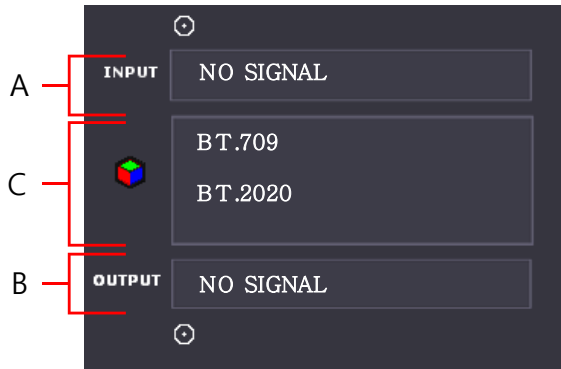
**H : DC 12V IN terminal**

Connects the DC power supply.



## 3. Menu Organization

The LCD module displays the status information as follows.

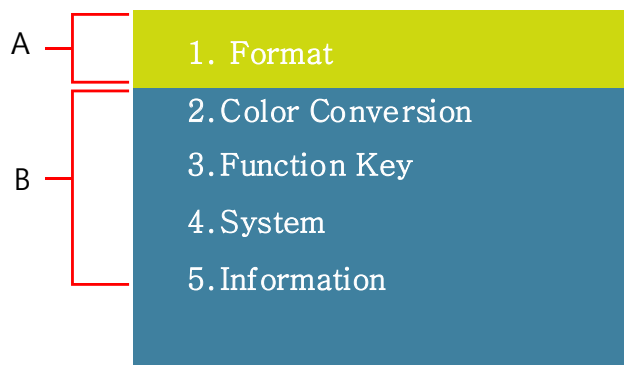


A : Displays the input signal.  
The input port which is currently connected is displayed as an icon.

B : Displays the output signal.  
The output port which is currently connected is displayed as an icon.

C : Displays the conversion data which is currently applied.

This unit is equipped with an OSD menu to make various adjustments and settings.



A : The menu currently selected is highlighted green.

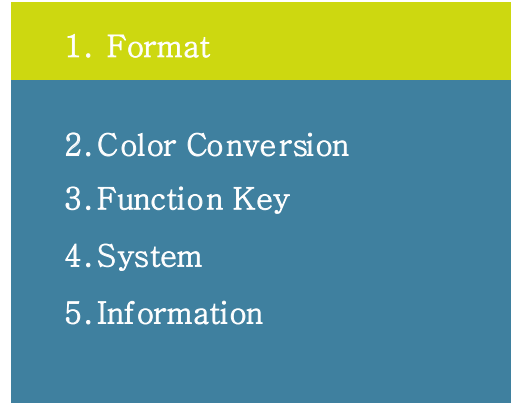
B : Other menu list



## 4. Menu Adjustment

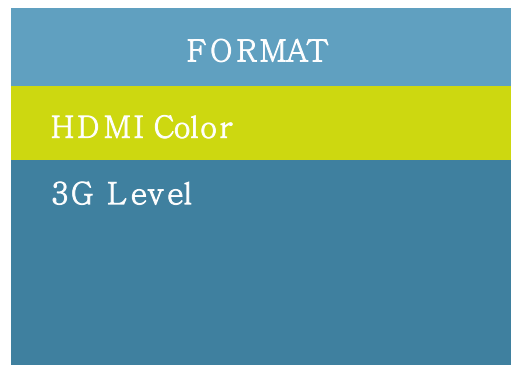
### 1. Enter the menu

When the MENU button is pressed, the OSD menu is displayed.



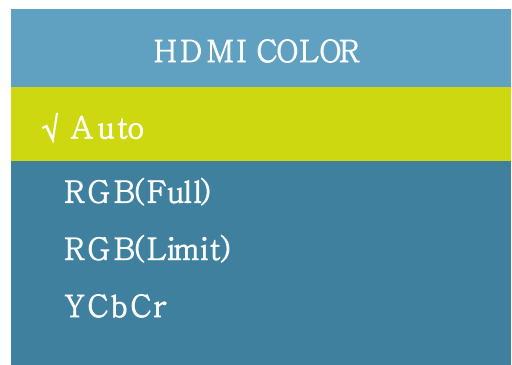
### 2. Enter the submenu

Turn the SEL knob left or right to choose the menu. Push the SEL knob to enter the submenu. The menu presently selected is shown in green.



### 3. Select an item

Turn the SEL knob to select an item, and push the knob to change the item. When an item is changed, the check mark is displayed to the item.



### 4. Previous Menu

Press the MENU button to return to the previous menu.

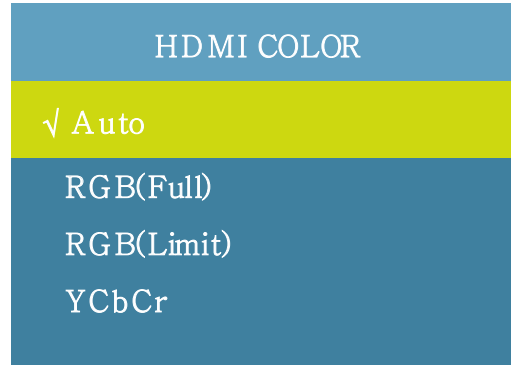
## 5. Menu Operations

### 1. Format

#### \* HDMI Color

Adjusts the color of the HDMI input.

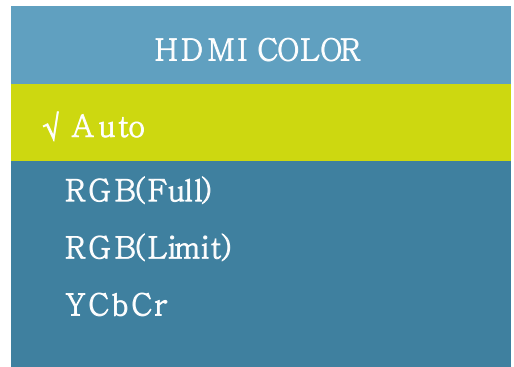
- Auto : Reads the HDMI color characteristics and adjusts the color automatically.
- RGB(Full) : Sets the HDMI color to RGB(Full).
- RGB(Limit) : Sets the HDMI color to RGB(Limit).
- YCbCr : Sets the HDMI color to YCbCr.



#### \* 3G Level

Adjusts the 3G Level type of the SDI input signal.

- Auto : Sets the SDI 3G Level automatically.
- A 444 YUV 10b : Sets the Level A 4:4:4 YCbCr 10bit type.
- A 444 GBR 10b : Sets the Level A 4:4:4 GBR 10bit type.
- A 444 YUV 12b : Sets the Level A 4:4:4 YCbCr 12bit type.
- A 444 GBR 12b : Sets the Level A 4:4:4 GBR 12bit type.
- A 422 YUV 12b : Sets the Level A 4:2:2 YCbCr 12bit type.
- B 444 YUV 10/12b : Sets the Level B 4:4:4 YCbCr 10/12bit type.
- B 444 GBR 10/12b : Sets the Level B 4:4:4 GBR 10/12bit type.
- B 422 YUV 12b : Sets the Level B 4:2:2 YCbCr 12bit type.
- B 422 YUV 10b 60p : Sets the Level B 4:2:2 YCbCr 10bit 60p type.

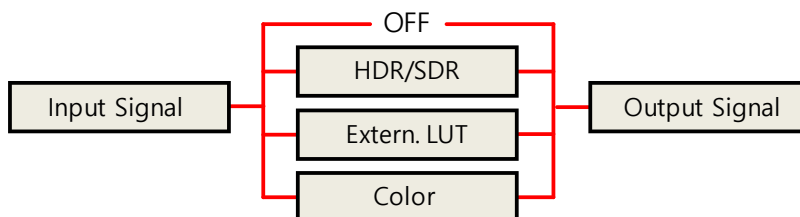
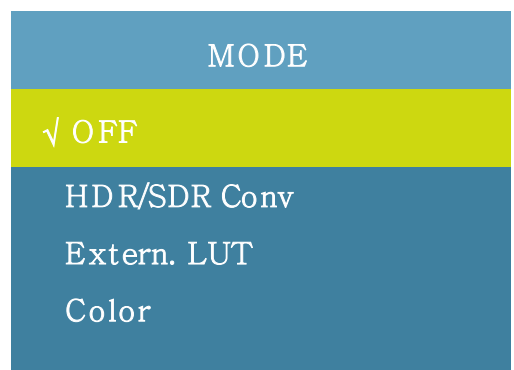


### 2. Color Conversion

#### \* Mode

Makes the settings related to the color conversion.

- OFF  
Selects OFF to not convert the color.
- HDR/SDR Conv.  
Selects this mode to convert HDR to SDR or SDR to HDR.
- Extern. LUT  
Selects this mode to use the external 3D LUT.
- Color  
Selects this mode to convert BT.709 to BT.2020 or BT.2020 to BT.709.



## \* Input

In the HDR/SDR Conv. mode, when the input video is the normal SDR signal, select SDR.

- SDR : SDR(Standard Dynamic Range)

In the HDR/SDR Conv. mode, when the input video is the HDR signal, select the type.

- ST 2084 : PQ(Perceptual Quantizer) signal
- HLG : Hybrid Log Gamma signal
- S-Log3 : Sony log signal
- C-Log : Cannon log signal
- Log-C : Arri camera log signal
- V-Log : Panasonic log signal

INPUT
√ SDR
ST2084
HLG
S-Log3

## \* Output

In the HDR/SDR Conv. mode, selects the output signal's SDR or HDR type.

- ST 2084 : PQ(Perceptual Quantizer) signal
- HLG : Hybrid Log Gamma signal
- S-Log3 : Sony log signal
- C-Log : Cannon log signal
- Log-C : Arri camera log signal
- V-Log : Panasonic log signal

INPUT
√ SDR
ST2084
HLG
S-Log3

## \* User LUT

Selects this mode to use the external 3D LUT.

- 10 files of 3D LUT can be loaded and used.

\*How to load the external 3D LUT:

See the menu [4. System] → [Load LUT]

USER LUT
√ None 1
None 2
None 3
None 4

## \* Color

Selects this mode to convert the color space.

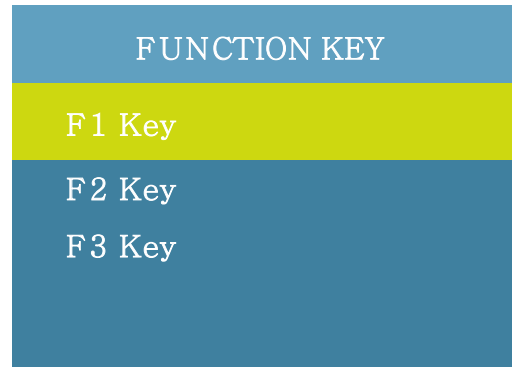
- BT.709 to BT.2020 : Change the BT.709 color to the BT.2020 color.
- BT.2020 to BT.709 : Change the BT.2020 color to the BT.709 color.

COLOR
√ BT.709 to BT.2020
BT.2020 to BT.709

### 3. Function Key

#### \* F1 key, F2 key, F3 key

Assigns the function for F1 to F3 Key.  
The following functions can be assigned.  
[Conv. Mode], [Input Color], [User LUT]

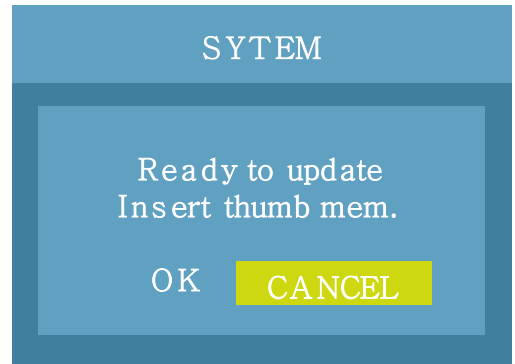


### 4. System

#### \* Update F/W

Updates the firmware with the USB memory stick.

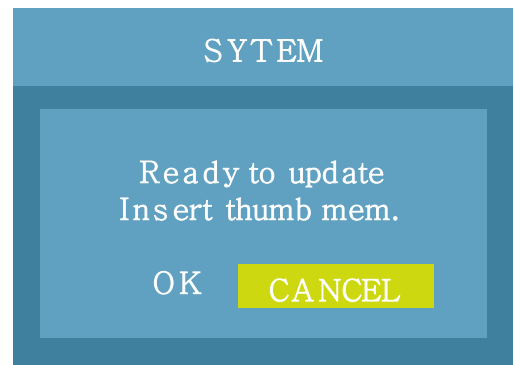
Insert the USB memory stick which includes the firmware file, and then select [OK] in the menu shown right.



#### \* Load LUT

Loads the 3D LUT file by using the USB memory stick.  
The loaded 3D LUT can be selected and used in [Extern. LUT] mode. 10 files of 3D LUT can be loaded.  
33<sup>3</sup>, 34<sup>3</sup>, 64<sup>3</sup>, 65<sup>3</sup> cube file format is supported.

Insert the USB memory stick which includes the 3D LUT file, and then select [OK] in the menu shown right.



#### \* Network

Adjusts the settings related to TCP/IP.

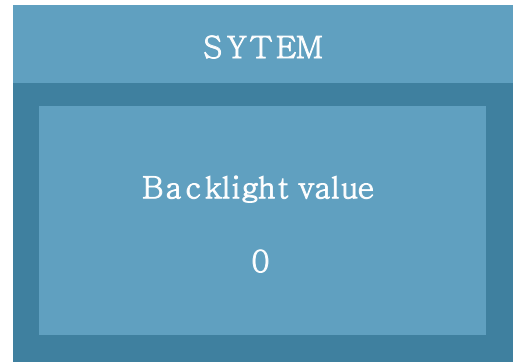
DHCP : DHCP allows the unit to receive an IP address from your network for remote control via various programs.

IP Address : The user can manually configure network settings when DHCP is disabled.



**\* Backlight**

Adjusts the brightness of the LCD display.  
Selects the value from 0 to 10.



## 5. Information

Displays the information of the unit.

**\* S/N**

Displays the serial number of the unit.

**\* Running Time**

Displays the operation time of the unit in hours.

**\* Version**

Displays the firmware version of the unit.



## 6. Available Signal Formats

### INPUT

Transmission method	Signal format			Color depth / Standards	
SINGLE SDI	3G	1920x1080	60, 59.94, 50p	LEVEL A	4:2:2 YCbCr 10bit
	3G	2048x1080	60, 59.94, 50p	LEVEL A	4:2:2 YCbCr 10bit
	HD-SDI	1920x1080	23.98, 24, 25, 29.97, 30p/Psf, 50, 59.94, 60i		4:2:2 YCbCr 10bit
			2048x1080	23.98, 24, 25, 29.97, 30p/Psf	4:2:2 YCbCr 10bit
			1280x720	50, 59.94, 60p	4:2:2 YCbCr 10bit
	6G-SDI	3840x2160	23.98, 24, 25, 29.97, 30p		4:2:2 YCbCr 10bit
			4096x2160	23.98, 24, 25, 29.97, 30p	4:2:2 YCbCr 10bit
	12G-SDI	3840x2160	50, 59.94, 60p		4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	4:2:2 YCbCr 10bit

SINGLE SDI	6G-SDI	3840x2160	23.98, 24, 25, 29.97, 30p		4:2:2 YCbCr 10bit
			4096x2160	23.98, 24, 25, 29.97, 30p	4:2:2 YCbCr 10bit
	12G-SDI	3840x2160	50, 59.94, 60p		4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	4:2:2 YCbCr 10bit

Dual Link 2-S.I.	Dual Link-6G	3840x2160	50, 59.94, 60p		4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	4:2:2 YCbCr 10bit
	Dual Link-6G	3840x2160	50, 59.94, 60p		4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	4:2:2 YCbCr 10bit

Quad Link 2-S.I.	Quad LINK-3G	3840x2160	50, 59.94, 60p	LEVEL A/B	4:2:2 YCbCr 10bit	
			4096x2160	50, 59.94, 60p	LEVEL A/B	4:2:2 YCbCr 10bit
	Quad Link-3G	3840x2160	50, 59.94, 60p		LEVEL A	4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit

SQUARE	Quad LINK-3G	3840x2160	50, 59.94, 60p	LEVEL A/B	4:2:2 YCbCr 10bit	
			4096x2160	50, 59.94, 60p	LEVEL A/B	4:2:2 YCbCr 10bit
	Quad LINK-3G	3840x2160	50, 59.94, 60p		LEVEL A/B	4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	LEVEL A/B	4:2:2 YCbCr 10bit
	Quad Link-3G	3840x2160	50, 59.94, 60p		LEVEL A/B	4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	LEVEL A/B	4:2:2 YCbCr 10bit

HDMI	3840x2160	59.94, 60p	4:2:2 YCbCr 12bit	4:4:4 YCbCr 8bit
		4096x2160	59.94, 60p	
		1920x1080	59.94, 60p	4:4:4 YCbCr 8/10/12 bit
	3840x2160	59.94, 60p		
		59.94, 60p	4:2:2 YCbCr 12bit	4:4:4 YCbCr 8bit
		4096x2160	59.94, 60p	

### OUTPUT

Transmission method	Signal format			Color depth / Standards	
SINGLE SDI	3G	1920x1080	60, 59.94, 50p	LEVEL A	4:2:2 YCbCr 10bit
	3G	2048x1080	60, 59.94, 50p	LEVEL A	4:2:2 YCbCr 10bit
	HD-SDI	1920x1080	23.98, 24, 25, 29.97, 30p/Psf, 50, 59.94, 60i		4:2:2 YCbCr 10bit
			2048x1080	23.98, 24, 25, 29.97, 30p/Psf	4:2:2 YCbCr 10bit
			1280x720	50, 59.94, 60p	4:2:2 YCbCr 10bit
	6G-SDI	3840x2160	23.98, 24, 25, 29.97, 30p		4:2:2 YCbCr 10bit
			4096x2160	23.98, 24, 25, 29.97, 30p	4:2:2 YCbCr 10bit
	12G-SDI	3840x2160	50, 59.94, 60p		4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	4:2:2 YCbCr 10bit

Quad Link 2-S.I.	Quad Link-HD	3840x2160	23.98, 24, 25, 29.97, 30p		4:2:2 YCbCr 10bit
			4096x2160	23.98, 24, 25, 29.97, 30p	4:2:2 YCbCr 10bit
	Quad Link-3G	3840x2160	50, 59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit
			4096x2160	50, 59.94, 60p	LEVEL A

SINGLE SDI	12G-SDI	3840x2160	50, 59.94, 60p		4:2:2 YCbCr 10bit	
			4096x2160	50, 59.94, 60p	4:2:2 YCbCr 10bit	
	Quad Link 2-S.I.	Quad Link-3G	840x2160	50, 59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit
				4096x2160	50, 59.94, 60p	LEVEL A

SINGLE SDI	12G-SDI	3840x2160	50, 59.94, 60p		4:2:2 YCbCr 10bit	
			4096x2160	50, 59.94, 60p	4:2:2 YCbCr 10bit	
	Quad Link 2-S.I.	Quad Link-3G	3840x2160	50, 59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit
				4096x2160	50, 59.94, 60p	LEVEL A

SINGLE SDI	12G-SDI	3840x2160	50, 59.94, 60p		4:2:2 YCbCr 10bit	
			4096x2160	50, 59.94, 60p	4:2:2 YCbCr 10bit	
	Quad Link 2-S.I.	Quad Link-3G	3840x2160	50, 59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit
				4096x2160	50, 59.94, 60p	LEVEL A
	SQUARE	Quad Link-3G	3840x2160	50, 59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit
				4096x2160	50, 59.94, 60p	LEVEL A

SINGLE SDI	3840x2160	59.94, 60p		4:2:2 YCbCr 10bit		
		4096x2160	59.94, 60p	4:2:2 YCbCr 10bit		
		1920x1080	59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit	
		2048x1080	59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit	
	Quad Link 2-S.I.	Quad Link-3G	3840x2160	59.94, 60p	LEVEL A	4:2:2 YCbCr 10bit
				4096x2160	59.94, 60p	LEVEL A

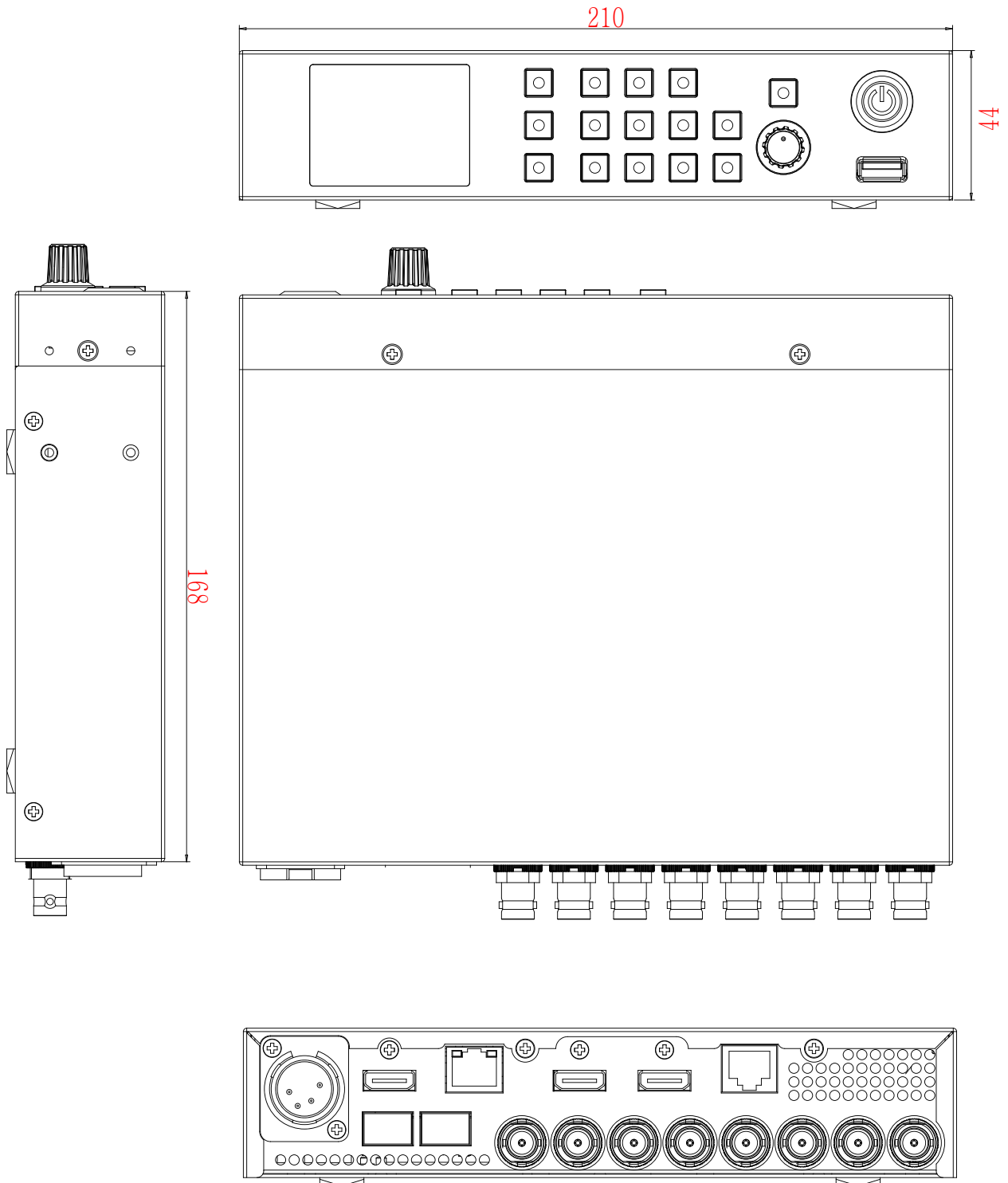
## 7. Specifications

ITEM	HLB-4K	
Input	4 x BNC	12G/6G/3G/HD/SD-SDI-1/2, 3G/HD/SD-SDI-3/4
	1 x HDMI	HDMI 2.0
	2 x SFP	Optical
Output	4 x BNC	12G/6G/3G/HD/SD-SDI-1/2/3/4 Loop Output
	1 x HDMI	1080p(Monitoring)
Input Signal Format	SMPTE ST 2082	2160p(60/59.94/50)
	SMPTE ST 2081	2160p(30/29.97/25/24/23.98)
	SMPTE ST 425-AB	1080p(60/59.94/50/30/29.97/25/24/23.98/30sF/29.97sF/25sF/24sF/23.98sF) / 1080i (60/59.94/50)
	SMPTE ST 274	1080p(30/29.97/25/24/24sF/23.98/23.98sF)
	SMPTE ST 296	1080i(60/59.94/50)
	SMPTE ST 260	1920 x 1035i(60/59.94)
	SMPTE ST 2084	2048 x 1080p(24/23.98/24sF/23.98sF)
	HDMI 2.0	~ 2160p(60)
	SFP	12Gbps, 6Gbps, 2.970Gbps, 1.485Gbps, 270Mbps
Display	Size	2.2"
	Resolution	320 X 240
	Pixel Pitch	0.315mm
	Color	262K
	Display Area (H x V)	33.84 x 45.12mm
General	1 x Ethernet	Control RJ-45P In put
	1 x GPIO	GPI-7 Port, RJ-45P Jack
	1 x USB	For firmware update
	Power Requirements	DC 12V / 2A
	Power Consumption	24W
	Operating Temperature	0°C ~ 40°C(32°F~104°F)
	Operating Humidity	20% ~ 80% RH
	Weight	1.5kg / 3.3 lbs
	Dimension(WxHxD)	210 x 44 x 168 mm / 8.26 x 1.73 x 6.61 inch
	Accessories	Adapter, Power Cable

\* Specifications are subject to change without prior notice for the product quality improvement.

## 8. Dimensions

Dimensions (W x H x D) : 210 x 44 x 168 mm / 8.26 x 1.73 x 6.61 inch







**OZO CO., LTD**

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