Colorlight

Z8t

LED Video Controller

Specification V2.1



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01 INTRODUCTION

1.1 Overview

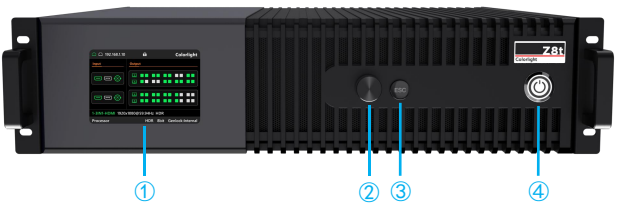
Z8t is an LED display controller specially developed for high-end scenarios. It features a variety of functions such as real-time scaling, ultra-low latency, HDR, multi-layer display, and high color depth display, providing superior image quality, accurate color reproduction, and powerful video processing capacity.

Z8t supports 5G Ethernet port output or 10G optical fiber output, with a maximum loading capacity of 23.59 million pixels (width up to 16,384 pixels). Its powerful capacity greatly reduces cabling requirements and eases hardware connection, satisfying the demand for ultra-long, ultra-high, and ultra-large screen configuration.

What's more, Z8t is designed with swappable boards for flexible hardware configuration, making the device an ideal choice for various scenarios, such as XR virtual production, commercial advertising, public welfare activities, cultural campaigns, monitoring & dispatch system, power operation & maintenance centers, data center visualization, television & radio broadcasting, stage rental, etc.

1.2 Appearance

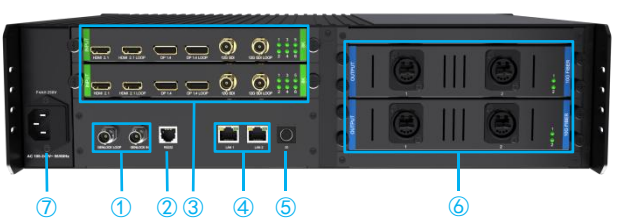
Front Panel



No.	Name	Description
1	LCD display	3.5-inch LCD display showing operation menu and system information.
2	Knob	• Press the knob to enter submenu or confirm selection. • Rotate the knob to select menu item or tune parameters.
3	ESC button	Exit or back to previous menu.
4	Power button	Power on/off the device.

Note: The illustration is for reference only. The actual product may vary due to different hardware configuration and manufacturing process. Please refer to the actual product.

Rear Panel



No.	Name	Description
1	GENLOCK IN	• 1×BNC port for sync signal input. • Supports Bi-level and Tri-level sync, and 23.98~60Hz frame rate.
	GENLOCK LOOP	1×BNC port for GENLOCK loop through.

2	RS-232	• 1×RJ11 port (6P6C) • RS-232 serial port for protocol control; Baud rate: 115200; Connects to the central control device or other devices.
3	INPUT	• Up to 2×boards, supporting a maximum of 2×4K@60Hz inputs per board. • 2×HDMI 2.0 input boards • 2×DP 1.2 input boards • 2×12G-SDI input boards • 3-in-1 input board: 1×HDMI 2.1+ 1×DP 1.4 +1×12G SDI; All ports on board support LOOP, with a maximum supported resolution of 4096×2160@60Hz. • ST2110 input board: Supports uncompressed 4096×2160@60Hz (RGB 12bit) input via a single channel.
4	LAN1, LAN2	• 2×RJ45 ports • Connects to computer for device management via TCP/IP communication; Supports cascading devices.
5	3D	1×3D port, supporting single & dual 3D effect for all types of signal.
6	OUTPUT	• Up to 2×output boards. Only boards of the same type can be used on one device. • Output board with 4×5G Ethernet ports • Optical fiber output board with 2×10G fiber ports • Optical fiber output board with 4×10G fiber ports (2×10G as the Primary + 2×10G as the Backup)
7	AC 100-240V	• Power connector: AC 100-240V, 50/60Hz. • Built-in fuse (F4AH); Input voltage: AC 250V/4A.

Note: The illustration is for reference only. The actual product may vary due to different hardware configuration and manufacturing process. Please refer to the actual product.

02 FEATURES

Main board

- GENLOCK IN/LOOP

  - 1×GENLOCK IN for sync signal input, supporting Bi-level and Tri-level sync.

  - 1×GENLOCK LOOP for sync signal output.

- RS-232:

  - 1×RJ11; RS-232 serial port (baud rate: 115200) for connecting to the central control device or other devices.

- LAN:

  - 2×RJ45 Gigabit Ethernet port for PC communication.

- 3D:

  - 1×3D VESA port for 3D sync signal output. (Optional 3D emitter and 3D glasses.)

Input

- Optional 5 types of swappable input board

  - 2×HDMI 2.0 input boards; 2×HDMI 2.0 inputs (up to 4096×2160@60Hz per channel).

  - 2×DP 1.2 input boards; 2×DP 1.2 inputs (up to 4096×2160@60Hz per channel).

  - 2×12G-SDI input boards; 2×12G-SDI inputs (up to 4096×2160@60Hz per channel).

  - 3IN input board; 1×HDMI 2.1+ 1×DP 1.4 +1×12G-SDI; All ports support LOOP, with a maximum supported resolution of 4096×2160@60Hz per channel.

  - ST2110 input board; 1×ST2110 input with up to 4K (uncompressed 4096×2160@60Hz 12bit RGB444/YCbCr444) resolution.

- Input frame rate: 23.98Hz~240Hz.

- 8bit/10bit/12bit
- HDCP 1.3/HDCP 2.3

Output

- Supports up to 23.59 million pixels output (16,384 pixels in width or 8,192 pixels in height).
- 3 types of output board
  - Output board with 4×5G Ethernet ports.
  - Optical fiber output board with 2×10G fiber ports, supporting 1G/5G Ethernet port output.
  - Optical fiber output board with 4×10G fiber ports; Fiber3 & 4 serve as the backup ports for Fiber1 & 2.
- Supports loop redundancy for one or multiple devices.
- Recommended receiving card: i10/K10. Some functions might not be available when used in pair with i9+/K9+/i9 receiving card.

Video processing

- Cropping, scaling and splicing of video signals
- 4-layer splicing display
- Low latency (low to 0 latency)
- Virtual pixel (triple and quadruple virtual)
- Peak brightness
- HDR10/HLG HDR display
- Frame multiplexing: Developed for virtual production with multiple cameras, supports output fusion of multiple video signals.
- Frame multiplication: Supports automatic frame multiplication and custom multiplication (up to 10 multiplier).
- Supports ShutterLock technology and Adaptive Sync[1].

[1] ShutterLock and Adaptive Sync are only available when the device is used in pair with some chips of the MBI/FM/ICN/SM/DP/SCL series. Please contact Colorlight technical support for details.

- Genlock

Color Management

- Color curve: Adjust individual RGB saturation and overall brightness at different gray levels.
- Color magic: Color adjustment and conversion based on HSV color model.
- 3D-LUT: Cinema-level color adjustment with 3D-LUT file. Supports custom adjustment strength.
- Image adjustment: Adjust the hue/ saturation/ contrast/ brightness compensation of the output.
- Color gamut adjustment with the receiving card as the minimum adjusting unit
- Brightness adjustment with the receiving card as the minimum adjusting unit
- Color temperature adjustment with the receiving card as the minimum adjusting unit
- Shadow-highlight adjustment
- The intensity, red, green, and blue gain can be adjusted by interface.
- Color temperature drift control[2]
- Thermal effects removal[3]

Device control

- LAN (Gigabit Ethernet port) IP control; Supports star connection.
- RS-232 serial port control protocol
- Supports saving and applying multiple presets
- Control via the software ColorAdept

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[2] Additional temperature sensor on module is required. The accuracy is affected by the position where the sensor is mounted.

[3] Additional temperature sensor on module is required. The accuracy is affected by the position where the sensor is mounted.

03 APPLICATIONS



Note: The illustration is for reference only. Please refer to the actual product.

04 BOARD SPECIFICATIONS

4.1 Input Boards

Z_IN_2HDMI20:Input Board with 2×HDMI 2.0 Ports

Description



- 2×HDMI 2.0 ports; Supports up to 4096×2160@60Hz input per port.
- Supports up to 2×4K inputs at a time, with independent color adjustment for each input.
- Supports independent cropping and scaling for each input.
- Supports custom resolution and EDID management for each input.
- Maximum width per input: 8192 pixels (8192×1024@60Hz)
- Maximum height per input: 8192 pixels (1024×8192@60Hz)
- Indicator status: Steady on for stable power supply, and blinking for normal signal input.

Specifications

Input	Max. resolution	Color space	Color sampling	Color depth (bit)	Frame rate (Hz)
4K	4096×2160	YCbCr	4:2:2	8/10/12	23.98,24,25,29.97, 30,50,59.94,60
		YCbCr /RGB	4:4:4	8/10/12	23.98,24,25,29.97, 30
		YCbCr /RGB	4:4:4	8	50,59.94,60
	3840×2160	YCbCr	4:2:2	8/10/12	23.98,24,25,29.97, 30,50,59.94,60
		YCbCr /RGB	4:4:4	8/10/12	23.98,24,25,29.97, 30
		YCbCr /RGB	4:4:4	8	50,59.94,60

	2K	2048×1080	YCbCr	4:2:2	8/10/12	23.98,24,25,29.97, 30,50,59.94,60
			YCbCr /RGB	4:4:4	8/10/12	
			YCbCr	4:2:2	8	100,120
			YCbCr /RGB	4:4:4	8	
		1920×1080	YCbCr	4:2:2	8/10/12	23.98,24,25,29.97, 30,50,59.94,60
			YCbCr /RGB	4:4:4	8/10/12	
			YCbCr /RGB	4:4:4	8/10	100,120
			YCbCr	4:2:2	8/10	
			YCbCr	4:2:2	8	240
			YCbCr /RGB	4:4:4	8	
	Note: Only a part of conventional resolutions are listed above.					

Z_IN_2DP12: Input Board with 2×DP 1.2 Ports

Description



- 2×DP 1.2 ports; Supports up to 4096×2160@60Hz input per port.
- Supports up to 2×4K inputs at a time with independent color adjustment for each input.
- Supports independent cropping and scaling for each input.
- Supports custom resolution and EDID management for each input.
- Maximum width per input: 8192 pixels (8192×1024@60Hz)
- Maximum height per input: 8192 pixels (1024×8192@60Hz)
- Indicator status: Steady on for stable power supply, and blinking for normal signal input.

Specifications

Input	Max. resolution	Color space	Color sampling	Color depth (bit)	Frame rate (Hz)
4K	4096×2160	YCbCr	4:2:2	8/10/12	23.98,24,25,29.97, 30,50,59.94,60
		YCbCr /RGB	4:4:4	8/10/12	23.98,24,25,29.97, 30
		YCbCr /RGB	4:4:4	8	50,59.94,60
	3840×2160	YCbCr	4:2:2	8/10/12	23.98,24,25,29.97, 30,50,59.94,60
		YCbCr /RGB	4:4:4	8/10/12	23.98,24,25,29.97, 30
		YCbCr /RGB	4:4:4	8	50,59.94,60
2K	2048×1080	YCbCr	4:2:2	8/10/12	23.98,24,25,29.97, 30,50,59.94,60
		YCbCr /RGB	4:4:4	8/10/12	
		YCbCr	4:2:2	8	100,120
		YCbCr /RGB	4:4:4	8	
	1920×1080	YCbCr	4:2:2	8/10/12	23.98,24,25,29.97, 30,50,59.94,60
		YCbCr /RGB	4:4:4	8/10/12	
		YCbCr /RGB	4:4:4	8/10	100,120
		YCbCr	4:2:2	8/10	
		YCbCr	4:2:2	8	240
		YCbCr /RGB	4:4:4	8	

Note: Only a part of conventional resolutions are listed above.

Z_IN_2x12GSDI: Input Board with 2×12G-SDI Ports

Description



- 2×BNC ports; Supports up to 4096×2160@60Hz input per port.
- Supports up to 2×4K inputs at a time with independent color adjustment for each input.
- Supports different resolution for each input; Supports independent cropping and scaling.
- Supports 12G-SDI, compatible with HD-SDI, 3G-SDI, and 6G-SDI.
- Supports de-interlaced display; Not support EDID settings.
- Indicator status: Steady on for stable power supply, and blinking for normal signal input.

Specifications

Input	Max. resolution	Color space	Color sampling	Color depth (bit)	Frame rate (Hz)
12G	4096×2160	YCbCr	4:2:2	10	50,59.94,60
	3840×2160	YCbCr	4:2:2	10	
6G	4096×2160	YCbCr	4:2:2	10	23.98,24,25,29.97, 30
	3840×2160	YCbCr	4:2:2	10	
3G Level A/B	2048×1080p	YCbCr	4:2:2	10	50,59.94,60
	1920×1080	YCbCr	4:2:2	10	
HD	2048×1080p	YCbCr	4:2:2	10	23.98,24,25,29.97, 30
	1920×1080p	YCbCr	4:2:2	10	
	1920×1080i	YCbCr	4:2:2	10	50,59.94,60
	1280×720p	YCbCr	4:2:2	10	23.98,24,25,29.97, 30,50,59.94,60

Note: Only a part of conventional resolutions are listed above.

Z_IN_3IN1:
Input Board with 1×HDMI 2.1+1×DP 1.4+1×12G-SDI Ports

Description



- 1×HDMI 2.1 +1×DP 1.4 +1×12G-SDI, all supporting LOOP
- HDMI 2.1 port and DP 1.4 port: Up to 4096×2160@60Hz input resolution (max. width/height: 8192 pixels)
- 12G-SDI port, compatible with HD-SDI, 3G-SDI, and 6G-SDI; Supports de-interlaced display.
- Support independent color adjustment, cropping, and scaling for each input.
- Indicator status: Steady on for stable power supply, and blinking for normal signal input.

HDMI 2.1

Specifications

Input	Max. resolution	Color space	Color sampling	Color depth (bit)	Frame rate (Hz)
4K	4096×2160	YCbCr	4:2:2	8/10	23.98,24,25,29.97, 30,50,59.94,60
		YCbCr /RGB	4:4:4	8/10	
	3840×2160	YCbCr	4:2:2	8/10	
		YCbCr /RGB	4:4:4	8/10	
2K	2048×1080	YCbCr	4:2:2	8/10	23.98,24,25,29.97, 30,50,59.94,60, 100,120
		YCbCr /RGB	4:4:4	8/10	
		YCbCr	4:2:2	8	240
		YCbCr /RGB	4:4:4	8	
	1920×1080	YCbCr	4:2:2	8/10	23.98,24,25,29.97, 30,50,59.94,60

			YCbCr /RGB	4:4:4	8/10	100,120
			YCbCr	4:2:2	8	240
			YCbCr /RGB	4:4:4	8	
	Note: Only a part of conventional resolutions are listed above.					

DP 1.4

	Input	Max. resolution	Color space	Color sampling	Color depth (bit)	Frame rate (Hz)
Specifications	4K	4096×2160	YCbCr	4:2:2	8/10	23.98,24,25,29.97, 30,50,59.94,60
			YCbCr /RGB	4:4:4	8/10	
		3840×2160	YCbCr	4:2:2	8/10	
			YCbCr /RGB	4:4:4	8/10	
	2K	2048×1080	YCbCr	4:2:2	8/10	23.98,24,25,29.97, 30,50,59.94,60, 100,120,240
			YCbCr /RGB	4:4:4	8/10	
		1920×1080	YCbCr	4:2:2	8/10	
			YCbCr /RGB	4:4:4	8/10	
	Note: Only a part of conventional resolutions are listed above.					

12G-SDI

	Input	Max. resolution	Color space	Color sampling	Color depth (bit)	Frame rate (Hz)
Specifications	12G	4096×2160p	YCbCr	4:2:2	10	50,59.94,60
		3840×2160p	YCbCr	4:2:2	10	
	6G	4096×2160p	YCbCr	4:2:2	10	23.98,24,25,29.97, 30
		3840×2160p	YCbCr	4:2:2	10	
	3G Level A/B	2048×1080p	YCbCr	4:2:2	10	50,59.94,60
		1920×1080p	YCbCr	4:2:2	10	

	HD	2048×1080p	YCbCr	4:2:2	10	23.98,24,25,29.97, 30
		1920×1080p	YCbCr	4:2:2	10	
		1920×1080i	YCbCr	4:2:2	10	50,59.94,60
		1280×720p	YCbCr	4:2:2	10	23.98,24,25,29.97, 30,50,59.94,60
	Note: Only a part of conventional resolutions are listed above.					

Z_IN_ST2110: Input Board with 1×SFP1+1×SFP2 Ports

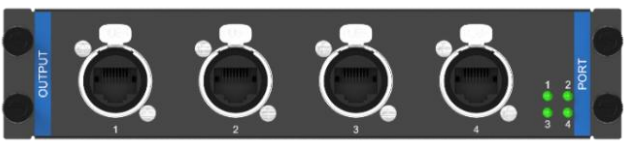
Description



- 2×SFP28 ports (SFP2 serves as the backup), supporting up to 4K (uncompressed 4096×2160@60Hz 12bit RGB444/YCbCr444) input.
- Supports 25 GbE IEEE 802.3by (25GBASE-SR/CR/CR-S) and 25 GbE IEEE 802.3cc (25GBASE-LR)
- IP addressing
  - IPV4
  - IPV6
  - DHCP(default) and static IP
- Supported protocols
  - PTP (ST-2059) sync
  - SMPTE ST 2110 (-10, -20, -21, -22, -30, -31, and -40)
  - SMPTE ST 2022-7
  - NMOS (IS-04 v1.3 and IS-05 v1.1)
- Not support interlaced display; Not support EDID settings
- Independent color adjustment, supporting signal cropping and scaling.
- 1×RJ45 port for network control
- Supports ST2110 media transport.
- Indicator status

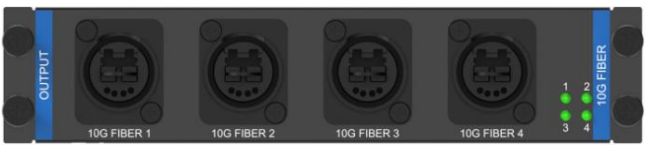
	- Ethernet port indicator: Steady on when the power supply is stable. - STATUS, signal compression indicator, and SFP1/SFP2 status: Blinking green when the signal input is normal.

4.2 Output Boards

Z_OUT_4x5G: Output Board with 4×5G Ethernet Ports	
Description	 • 4×Neutrik Ethernet ports; Data transfer rate: 5Gb/s per port; Used in pair with 5G receiving card. • Loading capacity per board: Up to 11.79 million pixels (8192 pixels in width/height). • Loading capacity per board - 60Hz, 8bit source: 11.79 million pixels; 10bit source: 8.84 million pixels - 120Hz, 8bit source: 5.89 million pixels; 10bit source: 4.41 million pixels • Loading capacity per port - 60Hz, 8bit source: 2.94 million pixels; 10bit source: 2.21 million pixels - 120Hz, 8bit source: 1.47 million pixels; 10bit source: 1.10 million pixels • Indicator status: Steady on for stable power supply, and blinking for normal signal input. • Requires CAT6 and above shielded cables with up to 80-meter transmission distance.

Z_OUT_4x10G_FIBER: Output Board with 4×Fiber Ports

Description



- 2×Neutrik fiber ports and 2 additional Neutrik fiber ports as the backup. Each port works with single-mode duplex LC optical fiber, with 10Gb/s transmission rate.
- Built-in single-mode optical fiber module, with a transmission distance of 2km. (Standard)
- Loading capacity per board: Up to 13.10 million pixels (8192 pixels in width/height)
- Loading capacity per board

  - 60Hz, 8bit source: 13.10 million pixels; 10bit source: 9.82 million pixels

  - 120Hz, 8bit source: 6.55 million pixels; 10bit source: 4.91 million pixels
- Indicator status: Steady on for stable power supply, and blinking for normal signal input.
- Preferably single-mode fiber with PC or UPC connector (cable diameter: 9/125 μ m).

Z_OUT_2x10G_FIBER: Output Board with 2×Fiber Ports

Description



- 2×Neutrik fiber ports. Each port works with single-mode duplex LC optical fiber, with 10Gb/s transmission rate.
- Built-in single-mode optical fiber module, with a transmission distance of 2km. (Standard)

	• Supports 1G/5G Ethernet port output (not exceed 10G in total). • Loading capacity per board (1G Ethernet port output): Up to 13.10 million pixels (8192 pixels in width/height) • Loading capacity per board (5G Ethernet port output): Up to 11.79 million pixels (8192 pixels in width/height) • Loading capacity per board (1G Ethernet port output) - 60Hz, 8bit source: 13.10 million pixels; 10bit source: 9.83 million pixels - 120Hz, 8bit source: 6.55 million pixels; 10bit source: 4.91 million pixels • Loading capacity per board (5G Ethernet port) - 60Hz, 8bit source: 11.79 million pixels; 10bit source: 8.84 million pixels - 120Hz, 8bit source: 5.89 million pixels; 10bit source: 4.42 million pixels • Indicator status: Steady on for stable power supply, and blinking for normal signal input. • Preferably single-mode fiber with PC or UPC connector (cable diameter: 9/125 μ m).

4.3 Main Board

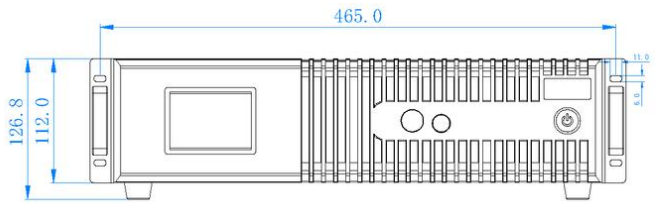
VMBRK39V2001: Main Board	
Description	 • 1×GENLOCK IN for sync signal input; Supports bi-level and tri-level sync. • 1×GENLOCK LOOP for sync signal output • 1×RJ11; RS-232 serial port (baud rate: 115200) for connecting to the central control device or other devices. • 2×RJ45 Gigabit Ethernet port for host computer communication; Connects to routers, switches or PCs; Supports controlling sender via LAN using network cables. • 1×3D VESA port. Used in pair with 3D emitter and active 3D glasses (optional 3D glasses+3D emitter).

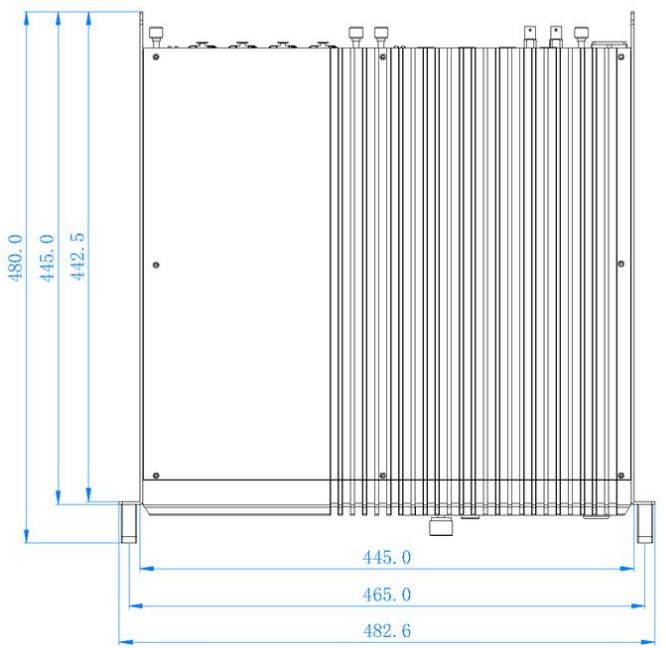
05 SPECIFICATIONS

Model		Z8t
Dimensions	Device (W×H×D)	482.6mm (19.0")×112.0mm (4.4")×480.0mm (18.9"); 2.5U chassis (w/o rubber feet)
	Packing (W×H×D)	580.0mm (22.8")×191.0mm (7.5")×540.0mm (21.3")
Weight	Net	12.70kg (28.00lbs)
	Gross	16.08kg (35.45lbs)
Electrical parameters	Power	AC 100-240V~, 16.7A, 50/60Hz
	Average board power	10W
	Rated power	130W
Operating environment	Temperature	-10℃~45℃ (14° F~113° F)
	Humidity	0%RH~80%RH, non-condensing
	Ambient noise	33dB
Storage environment	Temperature	-30℃~80℃ (-22° F~176° F)
	Humidity	0%RH~90%RH, non-condensing
Placement		The device should be placed horizontally. Do not flip or place it vertically.

06 REFERENCE DIMENSIONS

Unit: mm





07 STATEMENT

7.1 Certifications

Z8t has obtained certifications including CE, FCC, IC, CB, and cTUVus.

Note: If the product does not have the relevant certifications required by the countries or regions where it is to be sold, please contact Colorlight to confirm or address the problem as soon as possible. Otherwise, the customer shall be responsible for the legal risks or Colorlight has the right to claim compensation.

7.2 Legal Statement

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