Z8

LED Video Controller

# Specification V3.0

1 Overview

Z8 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.

Z8 supports 5G Ethernet port output or 10G optical fiber output, with a maximum loading capacity of 47.18 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, Z8 is designed with swappable boards for flexible hardware configuration, making the device an ideal choice for various demands.
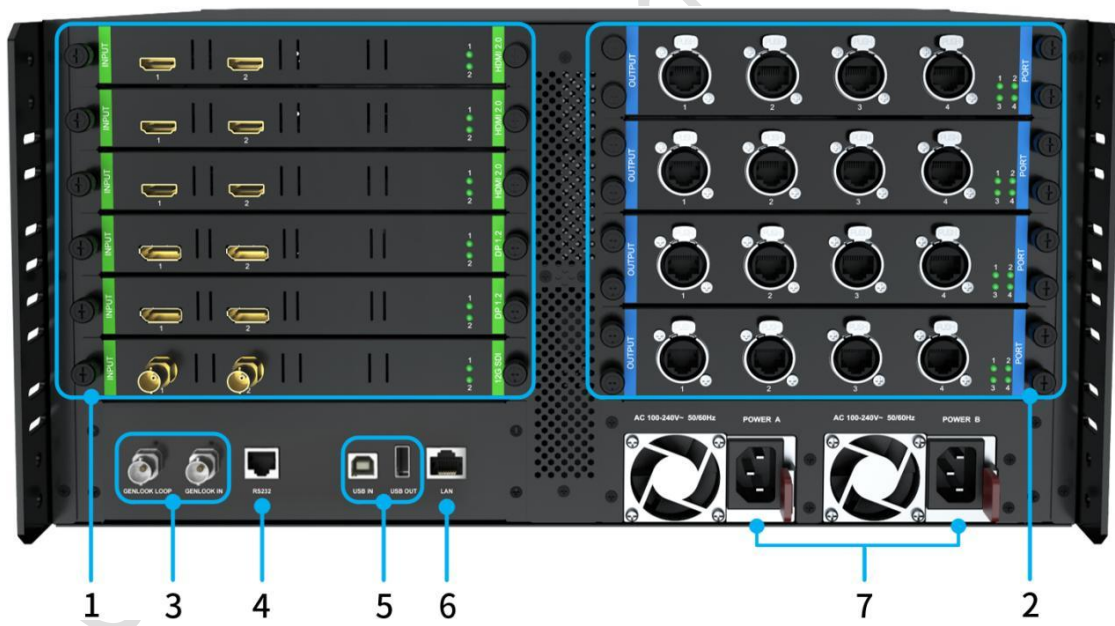
2 Hardware

Front Panel
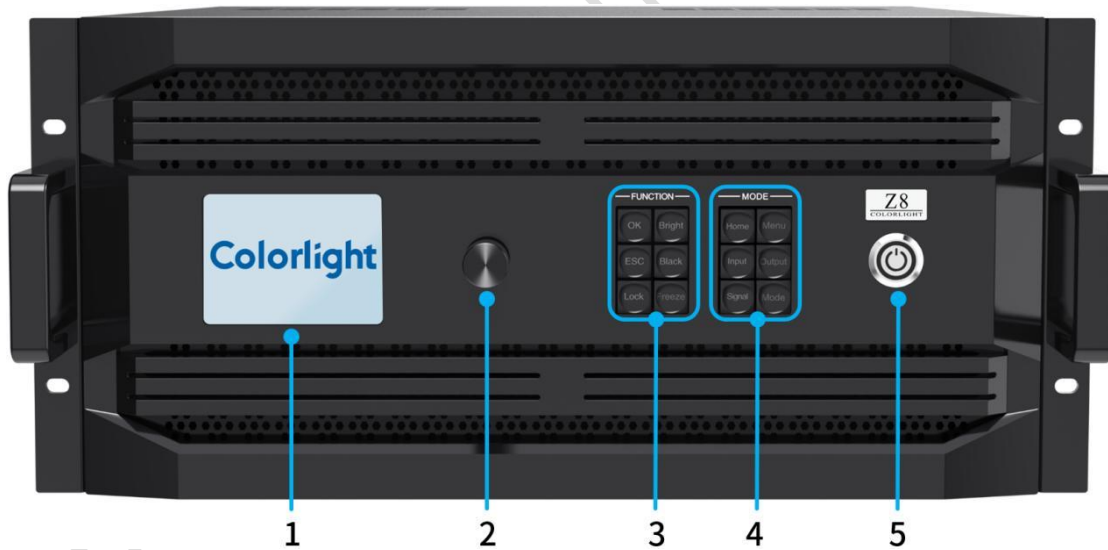
Number	Name	Description
1	LCD display	3.5-inch LCD display showing operation menu and system information.
2	Knob	• Press the knob to enter submenu or confirm selection. • Rotate the knob to select menu item or tune parameters.
3	Function Buttons	• OK: Press to confirm your selection. • ESC: Press to exit the current user interface or return to the previous menu.

		• Lock: Press to lock all function buttons on the front panel to make them inoperable.
		• Bright: Press to access brightness-related options.
		• Black: Press to make the LED screen display black.
		• Freeze: Press to pause the incoming video signal and hold the final frame indefinitely.
4	Menu Buttons	• Home: Press to access the homepage of the LCD panel.
		• Menu: Press to access the main menu.
		• Input: Press to access the menu for input settings.
		• Output: Press to access the menu for output settings.
		• Signal: Press to view signal source information.
		• Mode: Press to access the interface of presets.
	Power button	Power on/off the device.

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

Rear Panel

Input Ports		
1	INPUT	• Up to 6 boards, supporting a maximum of 2×4K (4096×2160)@60Hz inputs per board.
		• HDMI 2.0× 2 input board
		• DP 1.2× 2 input board
		• 12G SDI× 2 input board
		• 3-in-1 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.

		• ST2110 input board: Supports uncompressed 4096×2160@60Hz (RGB 12-bit) input via a single channel.
Output Ports		
2	OUTPUT	• Up to 4 output boards. Only boards of the same type can be used on one device. • 4× 5G Ethernet ports output board • 10G Fiber× 2 optical fiber output board • 10G Fiber× 4 optical fiber output board (2 Primary+ 2 Backup) • 5G Fiber× 4 optical fiber output board
Control Ports		
3	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.
4	RS232	• 1× RJ11 port (6p6c) • RS232 serial port for protocol control; Baud rate: 115200; Connects to the central control device or other devices.
5	USB IN	USB2.0 Type B port: Connects to a computer for debugging parameters; Supports cascading input.
	USB OUT	USB2.0 Type A port for cascading output.
6	LAN	• 1× RJ45 port • 100 Mbps Ethernet port; Connects to a computer or a router for LAN access; Supports communication with external devices using TCP/IP.
Power Supply		
7	AC100-240V	Power connector: Supports dual power supply redundancy, AC100-240V, 50/60Hz.

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

3 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.

- RS232

  - 1× RJ11; RS232 serial port (baud rate: 115200) for connecting to the central control device or other devices.

- LAN

    - 1× RJ45 Gigabit Ethernet port for host computer communication.

- USB IN/OUT

    - USB IN: Connects to a computer for debugging parameters; Supports cascading input.

    - USB OUT: Serves for cascading output.

Input

- Optional 5 types of swappable input board:

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

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

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

    - 3-in-1 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 13.01 million pixels output (16,384 pixels in width or 8192 pixels in height).

- 4 types of output board

    - 4× 5G Ethernet ports output board

    - 10G Fiber× 2 (2× 10G) optical fiber output board, supporting 1G/5G Ethernet port output.

    - 10G Fiber× 4 (4× 10G) optical fiber output board; Fiber3 & 4 serve as the backup ports for Fiber1 & 2.

    - 5G Fiber× 4 (4× 5G) optical fiber output board

- Supports loop redundancy for one or multiple devices.

Video processing

- Cropping, broadcast-level scaling and splicing of video signals

- 4-layer display

- HDR10/HLG HDR display

- Frame multiplexing: Developed for virtual production with multiple cameras, supporting output fusion of multiple video signals.

- Frame multiplication: Supports automatic frame multiplication and custom multiplication (up to 10 multipliers).

- Better grayscale at low brightness, improving grayscale display effect at low brightness.

- Genlock

- Virtual pixel (triple and quadruple virtual)

- Peak brightness

- Low latency (low to 0 latency)

Color Management

- Color curve: Supports adjusting the saturation of R/G/B individually and the 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: Adjusts the hue/ saturation/ contrast/ brightness compensation of the output.

- Brightness adjustment (with the receiving card as the minimum adjusting unit)

- Color temperature adjustment: Supports for precise color temperature adjustment and allows for adjusting the temperature of R/G/B individually.

Device control

- USB direct control and cascading

- LAN (100 Mbps Ethernet port) IP control; Supports star connection.

- RS232 serial port protocol control

- Supports saving and applying multiple presets.

4 Certifications

Z8 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.

5 Board Specifications

5.1 Input Boards

Z8HMX2V1001: HDMI2.0×2 Input Board						
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	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	8/10/12	
	1920×1080	YCbCr/RGB	4:4:4	8/10/12	
	2048×1080	YCbCr	4:2:2	8	100, 120
		YCbCr/RGB	4:4:4	8	
	1920×1080	YCbCr	4:2:2	8	100, 120, 240
		YCbCr/RGB	4:4:4	8	
		YCbCr/RGB	4:4:4	8/10	

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

Z8DPX2V1001: DP 1.2×2 Input Board

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.

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

		YCbCr/RGB	4:4:4	8bit	
	1920×1080	YCbCr	4:2:2	8bit	100, 120, 240
		YCbCr/RGB	4:4:4	8bit	

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

Z8SDIX2V1001: 12G SDI×2 Input Board

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.

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

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

Z8T3IN1V1001: 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. • Supports independent color adjustment, cropping, and scaling for each input. • Indicator status: Steady on for stable power supply, and blinking for normal input.

HDMI2.1

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

DP1.4

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

					240

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

12G SDI

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

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

Z8STHMV1001: 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)
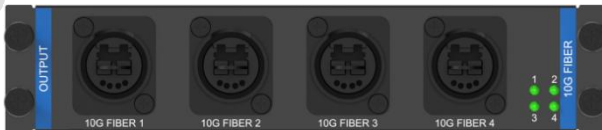 - SMPTE ST 2022-7

- 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.

5.2 Output Boards

XFIPHX4V103: 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, 8-bit source: 11.79 million pixels; 10-bitsource: 8.83 million pixels
	  - 120Hz, 8-bit source: 5.89 million pixels; 10-bit source: 4.41 million pixels
	• Loading capacity per port:
	  - 60Hz, 8-bit source: 2.94 million pixels; 10-bit source: 2.21 million pixels
	  - 120Hz, 8-bit source: 1.47 million pixels; 10-bit 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.

XFIPHX4V107: 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. • Loading capacity per board: Up to 13.10 million pixels (8192 pixels in width/height) • Loading capacity per board:

- 60Hz, 8-bit source: 13.10 million pixels; 10-bit source: 9.82 million pixels
- 120Hz, 8-bit source: 6.55 million pixels; 10-bit 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: 9/125µm).

XFIPHX4V102: 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.
• 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, 8-bit source: 13.10 million pixels; 10-bit source: 9.83 million pixels
  - 120Hz, 8-bit source: 6.55 million pixels; 10-bit source: 4.91 million pixels
• Loading capacity per board (5G Ethernet port):
  - 60Hz, 8-bit source: 11.79 million pixels; 10-bit source: 8.84 million pixels
  - 120Hz, 8-bit source: 5.89 million pixels; 10-bit 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: 9/125µm). |

XFIPHX4V104: Output Board with 4× 5G Fiber Ports

Description
• 4× Neutrik fiber ports. Each port works with single-mode duplex LC optical fiber, with 5Gb/s transmission rate.
• Built-in single-mode optical fiber module, with a transmission distance of 2km. 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, 8-bit source: 11.79 million pixels; 10-bit source: 8.83 million pixels |

	- 120Hz, 8-bit source: 5.89 million pixels; 10-bit source: 4.41 million pixels
	• Loading capacity per port:
	  - 60Hz, 8-bit source: 2.94 million pixels; 10-bit source: 2.21 million pixels
	  - 120Hz, 8-bit source: 1.47 million pixels; 10-bit source: 1.10 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: 9/125µm).

5.3 Main Board

VMBRK39V2001: Main Board	
Description	 • 1× GENLOCKIN for sync signal input; Supports Bi-Level and Tri-Level sync. • 1× GENLOCKLOOP for sync signal output • USB IN/OUT: Connects to a computer for debugging parameters; Supports cascading input/output. • 1× RJ11; RS232 serial port (baud rate: 115200) for connecting to the central control device or other devices. • 1× RJ45 Gigabit Ethernet port for host computer communication; Connects to routers, switches or PCs; Supports controlling sender via LAN using network cables.

6 Applications

7 Specifications
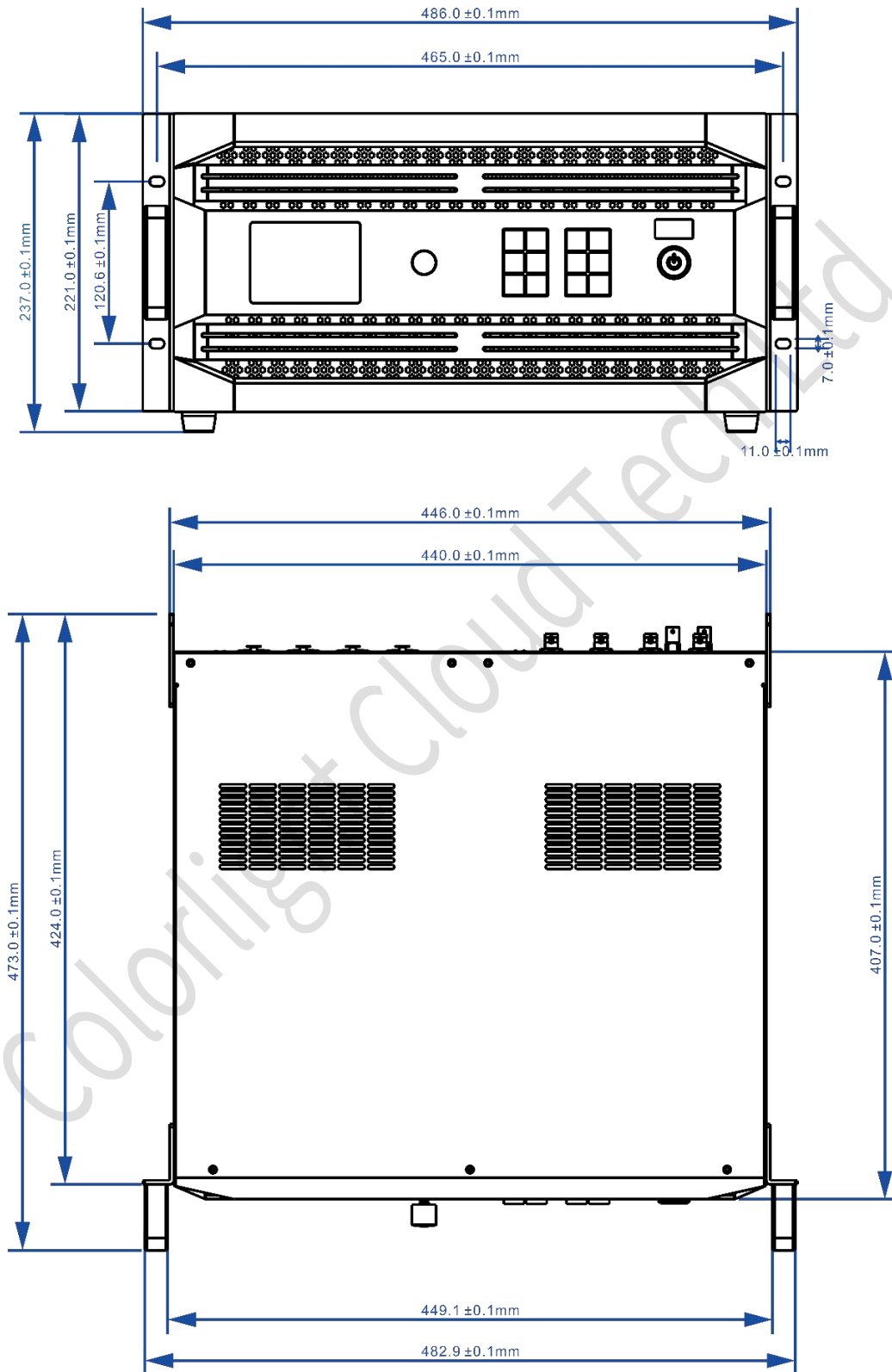
Model		Z8
Dimensions	Device (W×H×D)	486.0mm (19.1")×221.5mm (8.7")×473.0mm (18.6"); 5U chassis (w/o rubber feet)
	Packing (W×H×D)	645.0mm (25.4")×300.0mm (11.8")×540.0mm (21.3")
Weight	Net	22.50kg (49.60lbs)
	Gross	41.70kg (91.90lbs)
Electrical parameters	Power supply	AC100-240V~, 16.7A, 50/60Hz; Supports dual power supply redundancy
	Average board power	25W
	Rated power	300W
Operating environment	Temperature	-10°C~50°C (14°F~122°F)
	Humidity	10%RH-80%RH, non-condensing
	Ambient noise	33dB
Storage environment	Temperature	-30°C~80°C (-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.

8 Reference Dimensions

Unit: mm

Statement

Due to possible changes in product batches and production processes, the text and pictures in the document may be adjusted and revised to match accurate product information, specifications, and features. Colorlight may make improvements and changes to this document without prior notice. Please refer to the actual product.

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