MCTRL4K

LED Display Controller

Specifications

Change History

Document Version	Release Date	Description
V1.2.0	2022-04-01	• Added the function of switching from RGB limited to RGB full. • Added the phase offset function.
V1.1.1	2020-07-18	• Optimized the content and style of the document.
V1.1.0	2019-09-04	• Added the 3D function. • Added the low latency function. • Added the function of individual gamma adjustment for RGB. • Added HLG mode. • Added the function of input source bit depth settings on the control computer. • Added the function of importing custom EDID. • Added support for the 25Hz frame rate. • Optimized HDR10 performance by adding low grayscale mode adjustment.
V1.0.0	2019-09-26	First release

Introduction

The MCTRL4K is an LED display controller with an ultra-large loading capacity developed by NovaStar. A single unit features a loading capacity of up to 4096×2160@60Hz. It supports any custom resolutions with a width or height up to 7680 pixels, meeting the on-site configuration requirements of ultra-long or ultra-wide LED displays.

The MCTRL4K comes with many industry-leading technologies such as HDR, individual gamma adjustment for RGB, low latency, 3D, and pixel level brightness and chroma calibration. These technologies improve the display brightness, grayscale and color performance, presenting more uniform, detailed and vivid images.

The MCTRL4K is stable, reliable and powerful, dedicated to providing users with an ultimate visual experience. It can be mainly used in the rental and fixed installation applications, such as concerts, live events, security monitoring, Olympic Games, various sports centers, and much more.

Certifications

FCC, CE, UL&CUL, EAC, CB, IC, KC, RCM

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

Features

- A variety of input connectors
  - 1x DP 1.2
  - 1x HDMI 2.0
  - 2x DL-DVI
- 16 Neutrik Gigabit Ethernet ports and 4 optical ports

  For DP/HDMI input, the maximum loading capacity is 8,800,000 pixels.

  For DVI input, the maximum loading capacity is 8,300,000 pixels.

  The maximum output height or width of a single MCTRL4K is 7680 pixels.
- High bit-depth inputs: 8bit/10bit/12bit
- HDR function

  HDR10 and HLG are supported.

  The MCTRL4K can work with the receiving cards that support HDR to greatly enhance the image quality of the display, presenting more vivid and detailed images.
- 3D

  The MCTRL4K can work with the 3D emitter EMT200 and 3D glasses, allowing you to experience 3D display effects.
- Individual gamma adjustment for RGB

For 10-bit or 12-bit inputs, this function can individually adjust the red gamma, green gamma and blue gamma to effectively control image non-uniformity in low grayscale conditions and white balance offset, allowing for a more realistic image.

- RGB limited to RGB full

  This function automatically converts the color range of the input source from RGB limited to RGB full so as to display natural black in low grayscale conditions.

- Low latency

  When low latency and input source sync are enabled, and cabinets are connected vertically, the delay between the input source and receiving card can be reduced to one frame.

- Inputs with decimal frame rates

  Adaptive to 23.98/29.97/47.95/59.94/71.93/119.88 Hz

- Pixel level brightness and chroma calibration

  The MCTRL4K can work with NovaStar's high-precision calibration system to calibrate the brightness and chroma of each pixel, effectively removing brightness differences and chroma differences, enabling high brightness consistency and chroma consistency.

- Ultra-high resolution input

  Supports ultra-high resolution settings with NVIDIA graphics card.

- Screen configuration on web
- Cascading of up to 10 MCTRL4K units

Table 1-1 Limitations on functions

Function	Limitations	Mutually Exclusive Function
HDR	• Supports 10-bit HDMI input sources only. • The loading capacity of each Ethernet port is reduced by half. • Must work with the receiving cards that support HDR.	N\A
3D	• When the input source is DVI, DVI1 loads the images for the left eye, and DVI2 loads the images for the right eye. • When the advanced screen configuration is enabled, 3D function is not supported. • The loading capacity of each Ethernet port is reduced by half.	Low latency
Low latency	• Supports HDMI and DP input sources only. • Each Ethernet port must load cabinets vertically.	3D, GENLOCK

Appearance

Front Panel

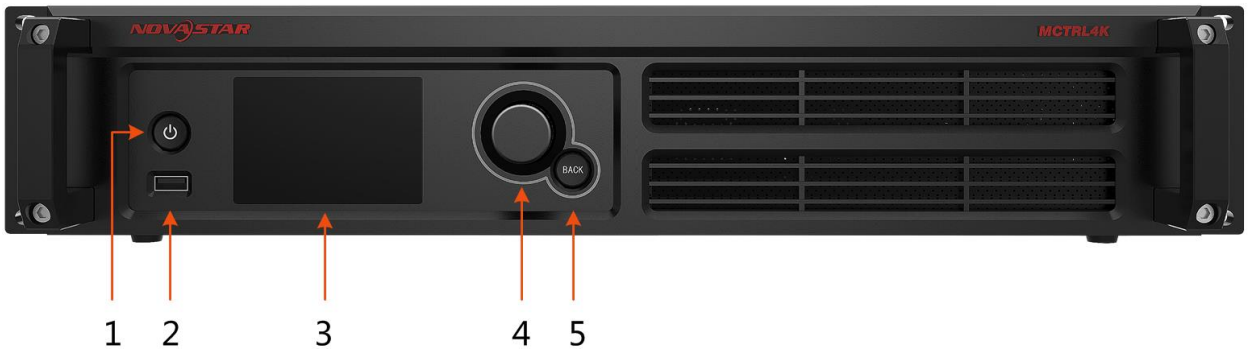
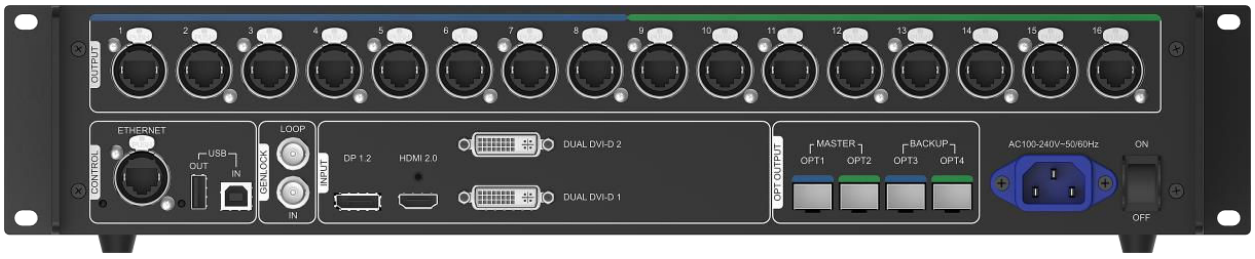


Table 1-2 Buttons and connectors

No.	Button/Connector	Description
1	Power button	Power on or off the device.

2	USB	Connect to a USB drive.
3	LCD screen	Display the device status, menus, submenus and messages.
4	Knob	Select menus, adjust parameters, and confirm operations.
5	BACK	Go back to the previous menu or exit the current operation.

Rear Panel



Connector Type	Connector Name	Description
Input	DP 1.2	1x DP 1.2 • Supported maximum resolution: 4096×2160@60Hz, supported minimum resolution: 640×480@24Hz • Custom resolutions supported Maximum width: 7680 pixels (7680×1080@60Hz) Maximum height: 7680 pixels (1080×7680@60Hz) • HDCP 1.3 compliant • Supported standard resolutions: 1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz 1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840×2160@(24/25/30/48/50/60)Hz • No support for interlaced input sources
	HDMI 2.0	1x HDMI 2.0 • Supported maximum resolution: 4096×2160@60Hz, supported minimum resolution: 800×600@30Hz • Custom resolutions supported Maximum width: 7680 pixels (7680×1080@60Hz) Maximum height: 7680 pixels (1080×7680@60Hz) • HDCP 1.4 and HDCP 2.2 compliant • Supported standard resolutions: 1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz

		1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048×1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840×2160@(24/25/30/48/50/60)Hz • No support for interlaced input sources
	DUAL DVI-D1 DUAL DVI-D2	2x DL-DVI • Each with a maximum resolution of 3840×1080@60Hz and minimum resolution of 800×600@30Hz • Custom resolutions supported Maximum width: 3840 pixels (3840×1080@60Hz) Maximum height: 3840 pixels (800×3840@60Hz) • Supported standard resolutions: 1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz 1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1200@(24/25/30/48/50/60/72/75/85/100)Hz 1920×2160@(24/25/30/48/50/60)Hz 2560×1600@(24/25/30/48/50/60)Hz 3840×1080@(24/25/30/48/50/60)Hz 3840×2160@(24/25/30)Hz • No support for interlaced input sources
Output	1~16	16x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for audio output • Support for redundancy between Ethernet ports
	OPT1~OPT4	4x 10G optical ports • OPT1 transmits the data of Ethernet ports 1 to 8. • OPT2 transmits the data of Ethernet ports 9 to 16. • OPT3 is a duplicate channel of OPT1. • OPT4 is a duplicate channel of OPT2.
Control	ETHERNET	Connect to the control computer.
	USB IN-OUT	• IN: 1x USB 2.0 (Type-B) Input port for cascading MCTRL4K units, or connecting to a PC for debugging • OUT: 1x USB 2.0 (Type-A) Output port for cascading MCTRL4K units

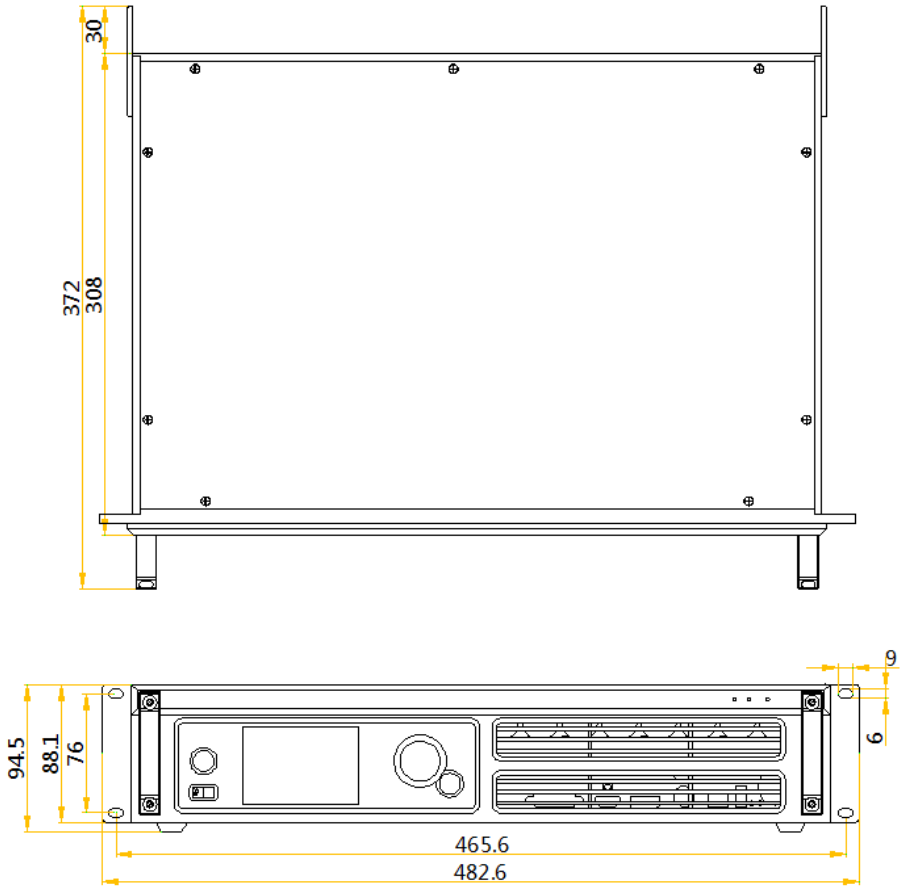
		Up to 10 units can be cascaded.
	GENLOCK IN-LOOP	Sync signal connector Support for Bi-level, Tri-level, and Blackburst • IN: Genlock input connector • LOOP: Genlock loop output connector
Power	AC 100 V~240 V-50/60 Hz	

Notes:

When the input source is HDMI or DP, the 144 Hz forced resolution input from the front end device can be parsed. In this situation, the loading capacity is reduced by half.

This product can only be placed horizontally. Do not mount vertically or upside-down.

Dimensions



Tolerance: ±0.3 Unit: mm

Specifications

Electrical Parameters	Input voltage	AC 100 V~240 V-50/60 Hz
	Rated power consumption	30 W
Operating Environment	Temperature	-20°C to +60°C
	Humidity	10% RH to 90% RH, non-condensing
Storage Environment	Temperature	-20°C to +70°C
	Humidity	10% RH to 90% RH, non-condensing
Physical Specifications	Dimensions	482.6 mm × 372.0 mm × 88.1 mm
	Weight	4.6 kg
Packing Information	Carrying case	530 mm × 420 mm × 193 mm
	Accessory box	405 mm × 290 mm × 48 mm Accessories: • 1x power cord • 1x Ethernet cable • 1x USB cable • 1x HDMI cable • 1x DP cable
	Packing box	550 mm × 440 mm × 210 mm

Video Source Features

Input Connector	Features		
	Bit Depth	Sampling Rate	Maximum Input Resolution
HDMI 2.0	8 bit	RGB 4:4:4 YCbCr 4:4:4 YCbCr 4:2:2 YCbCr 4:2:0	4096×2160@60Hz (Setting via NVIDIA graphics card)
	10 bit/12 bit	RGB 4:4:4 YCbCr 4:4:4	3840×1080@60Hz
		YCbCr 4:2:2 YCbCr 4:2:0	4096×2160@60Hz (Setting via NVIDIA graphics card)
DP 1.2	8 bit	RGB 4:4:4 YCbCr 4:4:4 YCbCr 4:2:2	4096×2160@60Hz (Setting via NVIDIA graphics card)
	10 bit/12 bit	RGB 4:4:4	3840×1080@60Hz

		YCbCr 4:4:4	
		YCbCr 4:2:2	4096×2160@60Hz (Setting via NVIDIA graphics card)
Dual-link DVI	8 bit	RGB 4:4:4 YCbCr 4:4:4 YCbCr 4:2:2	3840×1080@60Hz

Notes and Cautions

Notes for Battery

- The battery is not intended to be replaced.
- Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- Leaving a battery in an extremely high temperature surrounding environment can result in an explosion or the leakage of flammable liquid or gas.
- A battery subjected to extremely low air pressure may result in an explosion or the leakage of flammable liquid or gas.

FCC Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a 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.

Others

This is Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

This product can only be placed horizontally. Do not mount vertically or upside-down.

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