

## **MCTRL4K** LED Display Controller



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## **Change History**

Document Version	Hardware Version	Release Date	Description
V1.1.0	V1.2.4.0	2019-09-04	Added 3D function.
			<ul> <li>Added low latency function.</li> </ul>
			<ul> <li>Added the function of individual Gamma adjustment for RGB.</li> </ul>
			Added HLG mode.
			<ul> <li>Added image quality adjustment function.</li> </ul>
			<ul> <li>Added input source bit depth settings on control computer.</li> </ul>
			<ul> <li>Added the function of importing user custom EDID.</li> </ul>
			Supports 25 Hz frame frequency.
		2	<ul> <li>Supports self-adaptation to decimal frame frequency.</li> </ul>
		$\langle P \rangle$	<ul> <li>Optimized HDR10 performance by adding low grayscale mode adjustment.</li> </ul>
	SZ		<ul> <li>Optimized Mapping function schematic diagram.</li> </ul>
V1.0.3	V1.2.3.0	2018-02-08	Added HDR function.
V1.0.2	V1.2.2.0	2017-11-16	Supports Web control.
V1.0.1	N/A	2016-10-31	Updated document style.
V1.0.0	N/A	2016-06-06	First release
-			

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The MCTRL4K is an LED display controller with 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 the maximum width or height up to 7680 pixels, meeting the on-site configuration requirements of ultra-long or ultra-wide LED displays.

The MCTRL4K has many industry-leading advanced technologies:

- Supports HDR function, both in HDR10 and HLG standards, which can greatly enhance the image quality of the display, presenting more clear and vivid images.
- Supports individual Gamma adjustment for RGB when the bit depth of input source is 10-bit or 12-bit, which effectively controls image non-uniformity under low grayscale and white balance offset to improve image quality.
- Low latency: Less than 1 ms (when the start position of image is 0.)
- Supports 3D function when working with the 3D emitter EMT200 and 3D glasses, allowing you to experience 3D display effects.
- In multi-card mode, the MCTRL4K can be used as two controllers, allowing the images of two input sources to be displayed on the screen at the same time.

The MCTRL4K is stable, reliable and powerful, dedicated to providing a best visual experience. It is can be mainly used for the fixed and rental applications, such as concerts, live events, security monitoring, Olympic Games and various sports centers.



- 1 x DP 1.2 input and 1 x HDMI 2.0 input, resolutions up to 8.8 million pixels per input
- 2 x D-DVI inputs, total resolutions up to 8.3 million pixels
- 16 × Neutrik Gigabit Ethernet ports and 4 × 10G optical ports for output
- Supported video bit depths: 8-bit, 10-bit and 12-bit
- Supports both mosaic and multi-card working modes for dual-link DVI inputs.
- Supports HDR function, both in HDR10 and HLG standards.
- Supports individual Gamma adjustment for RGB when the bit depth of input source is 10-bit or 12-bit.
- Supports 3D function when working with the 3D emitter EMT200 and 3D glasses.
- Low latency: Less than 1 ms (when the start position of image is 0.)
- Supports ultra-high resolution settings with NVIDIA graphics card.
- Adaptive to inputs with decimal frame frequencies, including 23.98 / 29.97 / 47.95 / 59.94 / 71.93 / 119.88 Hz
- Supports the new generation of pixel level calibration technology of NovaStar.
- Supports screen configuration via Web interface.
- Multiple MCTRL4K units can be cascaded together for uniform control.
- Supports a variety of video formats, as shown in Table 2-1.

Input	Features			
Connector	Bit Depth	Sampling Format	Maximum Input Resolution	
	8 bit	RGB 4:4:4 YCbCr 4:4:4 YCbCr 4:2:2 YCbCr 4:2:0	4096x2160@60Hz (Setting via NVIDIA graphics card)	
עח 2.0	10 bit/12 bit	RGB 4:4:4 YCbCr 4:4:4	3840×1080@60Hz	
		YCbCr 4:2:2	4096x2160@60Hz (Setting via NVIDIA graphics card)	

Table 2-1 Video formats

Features			
Bit Depth	Sampling Format	Maximum Input Resolution	
	YCbCr 4:2:0		
8 bit	RGB 4:4:4 YCbCr 4:4:4 YCbCr 4:2:2	4096x2160@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	4096x2160@60Hz (Setting via NVIDIA graphics card)	
8 bit	RGB 4:4:4 YCbCr 4:4:4 YCbCr 4:2:2	3840×1080@60Hz	
	Features Bit Depth Bit Dep	Features           Bit Depth         Sampling Format           YCbCr 4:2:0         YCbCr 4:2:0           8 bit         RGB 4:4:4           YCbCr 4:2:2         YCbCr 4:2:2           10 bit/12 bit         RGB 4:4:4           YCbCr 4:2:2         YCbCr 4:2:2           8 bit         RGB 4:4:4           YCbCr 4:2:2         YCbCr 4:2:2           8 bit         RGB 4:4:4           YCbCr 4:2:2         YCbCr 4:2:2	

Note:

When the input source bit depth is 10-bit/12-bit, you must set the bit depth correspondingly in NovaLCT. For detailed operations, see 8.3 Input Source Bit Depth.



The MCTRL4K can work in mosaic and multi-card modes, meeting multiple user application needs.



Figure 3-1 Application of mosaic mode

4K×2K LED Display



#### Scenario 2: Application of Multi-Card Mode



Figure 3-2 Application of multi-card mode

## 4 Cascading Devices

The control computer needs to control multiple MCTRL4K devices.
 Cascade devices via USB IN and USB OUT ports of the MCTRL4K devices. Up to 10 devices can be cascaded.



 Multiple MCTRL4K devices need to output image simultaneously.
 Cascade devices via GENLOCK IN and GENLOCK LOOP connectors of the MCTRL4K devices. Up to 10 devices can be cascaded.



## 5 Hardware Structure

## 5.1 Appearance

### Front Panel



	No.	Name	Description
	1	Power button	Press to power on the device and hold down for 4–5 seconds to power off the device.
	2	USB	Insert a USB drive only.
7	3	LCD screen	Display the menu.
	4	Knob	<ul> <li>On the home screen, press the knob to enter the operation menu screen.</li> </ul>
			<ul> <li>On the operation menu screen, press the knob to select the current menu item or enter the submenu. Rotate the knob to select a menu item or adjust the parameter.</li> </ul>
			<ul> <li>Hold down the knob and BACK button at the same time for 5 seconds or longer to lock or unlock the buttons.</li> </ul>
	5	BACK	Exit the current menu or operation.

#### **Rear Panel**



Input	
	<ul> <li>DP 1.2 input, with a maximum resolution of 4096×2160@60Hz and minimum resolution of 640x480@24Hz</li> </ul>
	Pixel capacity: 8,800,000 pixels
	Custom resolutions supported:
	Resolution limit with maximum width: 7680×1080@60Hz
	Resolution limit with maximum height: 1080×7680@60Hz
	Supports HDCP 1.3.
	Supported standard resolutions:
	1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz
DP 1.2	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
1	<ul> <li>HDMI 2.0 input, with a maximum resolution of 4096×2160@60Hz and minimum resolution of 800×600@30Hz</li> </ul>
	• Pixel capacity: 8,800,000 pixels
	Custom resolutions supported:
	Resolution limit with maximum width: 7680×1080@60Hz
	Resolution limit with maximum height: 1080×7680@60Hz
	Supports HDCP 1.4 and HDCP 2.2.
HDMI 2.0	<ul> <li>Supported standard resolutions:</li> </ul>
	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		
DUAL DVI-D1 DUAL DVI-D2	<ul> <li>2 x DVI inputs, each with a maximum resolution of 3840×1080@60Hz and minimum resolution of 800×600@30Hz</li> <li>Pixel capacity: 8,300,000 pixels</li> <li>Custom resolutions supported: Resolution limit with maximum width: 3840×2160@60Hz</li> <li>Resolution limit with maximum height: 2160×3840@60Hz</li> <li>Supported standard resolutions: 1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz</li> <li>1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz</li> <li>1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz</li> <li>1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz</li> <li>1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz</li> <li>1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz</li> <li>1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz</li> <li>3840×1080@(24/25/30/48/50/60)Hz</li> <li>3840×1080@(24/25/30/48/50/60)Hz</li> </ul>		
	3840×2160@(24/25/30)Hz		
Output			
	<ul> <li>16 Neutrik (NE8FBH) Gigabit Ethernet ports</li> </ul>		
	<ul> <li>Maximum loading capacity of a single Ethernet port:</li> </ul>		
1_16	<ul> <li>For 8-bit input sources: 650,000 pixels</li> </ul>		
1-10	For 10-bit/12-bit input sources: 320,000 pixels		
	Do not support audio output.		
	<ul> <li>Support redundancy between Ethernet ports.</li> </ul>		
	10G optical ports		
	<ul> <li>Single-mode twin-core fiber: Support LC optical connectors; wavelength: 1310 nm; transmission distance: 10 km; OS1/OS2 recommended.</li> </ul>		
	<ul> <li>Dual-mode twin-core fiber: Support LC optical connectors; wavelength: 850 nm; transmission distance: 300 m; OM3/OM4 recommended.</li> </ul>		
OPT1–OPT4	• The maximum loading capacity of a single optical port equals to that of all the 8 Ethernet ports.		
	4 OPT inputs/outputs		
	<ul> <li>OPT1 and OPT2 are main input/output ports. OPT1 corresponds to Ethernet ports 1–8 and OPT2 corresponds to Ethernet ports 9–16.</li> </ul>		
	<ul> <li>OPT3 and OPT4 are backup input/output ports. OPT3 is a duplicate channel of OPT1, and OPT4 is a duplicate channel of OPT2.</li> </ul>		

Control				
ETHERNET	For PC connection			
USB IN	Input port for cascading devices, or connecting to PC			
USB OUT	Output port for cascading devices			
GENLOCK				
IN	<ul> <li>GENLOCK input connector</li> <li>Genlock type: Blackburst</li> <li>Input Genlock sync signal to ensure synchronization and same refresh rate between the output signals of cascaded MCTRL4K units</li> </ul>			
LOOP	Genlock loop output connector Up to 10 MCTRL4K units can be cascaded.			
Power				
AC 100 V–240 V, 50/60Hz	AC power input			

Note:

- Type-A USB port is prohibited from being connected to the control computer directly.
- This product can only be worked horizontally. Wall mounting is not permitted.

## 5.2 Dimensions



## 6 Home Screen

After the MCTRL4K is powered on, its home screen appears, as shown in Figure 6-1.



No.	Description					
A	Access status of signal sources:					
	<ul> <li>On: Signal available</li> </ul>	e				
	<ul> <li>Off: Signal unavailable</li> </ul>	able				
	The interval between than 5 seconds. Othe	The interval between unplugging and plugging the DP source must be greater than 5 seconds. Otherwise, the DP source cannot be detected.				
В	Display the current input source information, including source type, resolution and frame frequency.					
	In multi-card mode, both DVI1 and DVI2 have input sources. The information about the two DVI sources will be displayed alternately.					
С	Display the resolution and frame frequency of the currently configured LED display.					
D	Supply voltage of motherboard					
	Temperature inside the controller					

Figure 6-1 Home screen

No.	Description				
	io:	Brightness of LED display			
	3D	3D function is enabled (This icon is not displayed when the function is disabled).			
		Status of DVI1 and DVI2 sources:			
	Status of the control port: USB connected/Ethernet connected/Not connected				
	🖻 , 🛋	Stutus of buttons on the front panel: Locked/Unlocked			
Е	Ethernet port connec	tion status			
	Always on: The Eth	nernet port connection works and the port serves as master.			
	Off: The Ethernet port is not connected or the connection does not work.				
	<ul> <li>Always on and a mark (not flashing) on top corner of icon: The Ethernet port is in redundancy status, but the redundancy has not taken effect.</li> <li>Always on and a mark (flashing) on top corner of icon: The Ethernet port is in redundancy status and the redundancy has taken effect.</li> </ul>				
F	OPT1/OPT2: Master optical ports				
	OPT1 corresponds to Ethernet ports 1–8 and OPT2 corresponds to Ethernet ports 9–16. Their statuses are as below.				
	<ul> <li>Always on: The opt</li> </ul>	tical port connection works and the port serves as master.			
	Off: The optical point	t is not connected or the connection does not work.			
	OPT3/OPT4: Backup	o optical ports			
	OPT3 works as the backup of OPT1, and OPT4 as the backup of OPT2. Their statuses are as below.				
Off: The optical port is not connected or the connection does not we					
	<ul> <li>Always on: The optication of the op</li></ul>	tical port connection works, but the redundancy has not			
1	<ul> <li>Always on and a mark on top-right corner of icon: The optical port connection works and the redundancy has taken effect.</li> </ul>				
Note	ote:				

When the home screen is locked, any button operations will be disabled and an icon will appear indicating that the device is locked.

To perform operations on the home screen, hold down the knob and **BACK** button for 5 seconds or longer at the same time to unlock the buttons.

## Menu Operations

The MCTRL4K is powerful and easy to use. You can quickly configure the LED screen to light it up and display the entire input source following steps in 7.1 Quick Screen Configuration. With other menu settings, you can further improve the LED screen display effect.

## 7.1 Quick Screen Configuration

## 7.1.1 Step 1 Setting Input Mode

The input mode settings include DVI mode, input source and mosaic mode settings.

Figure 7-1 Input mode settings

Main		Input Settings		Input Mode	
🔅 Brightness	100%	📲 Input Mode	►	DVI Mode	Mosaic
🎉 Input Settings	►	Input Resolution	•	Input Source	DVI×2
Screen Settings	•			Mosaic Mode	1 2
Display Control	▶	•	•		
Advanced Settings	►				
Communication Settings	►				
🚱 Language	►				

- In mosaic mode, the input source can be Auto, DP, HDMI or DVI×2.
  - When the input source is **Auto**, the device will detect the inputs automatically in the order of DP > HDMI > DVI.
  - In this mosaic mode, you can set the DVI mosaic mode. The mosaic mode can be "top and bottom" or "side by side".
- In multi-card mode, the input sources can be **DVI 1** and **DVI 2**.
  - The MCTRL4K works as two independent sending cards and the loading capacity of each card is up to 3840×1080@60Hz. The images of both DVI 1 and DVI 2 input sources can be displayed on LED display simultaneously, but they cannot be set at the same time.
  - The DVI 1 corresponds to Ethernet ports 1–8 or OPT1, and DVI 2 corresponds to Ethernet ports 9–16 or OPT2.

## 7.1.2 Step 2 Setting Input Resolution

The input resolution can be set to a preset resolution or can be customized.

#### Figure 7-2 Input resolution settings



The input resolution can be set through the following methods.

#### Method 1: Preset

Select an appropriate resolution from the preset standard resolutions. When the input source is DVI, supported preset resolutions include:

- 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

When the input source is HDMI, supported preset resolutions include:

- 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

When the input source is DP, supported preset resolutions include:

- 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

#### Note:

The MCTRL4K supports self-adaptation to decimal frame frequencies (23.98/29.97/47.95/59.94/71.93/119.88 Hz).

#### Method 2: Custom

Set a custom width, height and refresh rate.

- Step 1 Press the knob to enter the main menu.
- Step 2 Choose Input Settings > Input Resolution > Custom and set the width, height and refresh rate.
- Step 3 Select **Apply** and press the knob to apply the settings.

#### Method 3: Ultra-High Resolution Settings

When the input source is DP/HDMI, you can set an ultra-high resolution via the NVIDIA graphics card of the computer. The width or height is up to 7680 pixels.

Recommended graphics cards: NVIDIA GeForce GTX 970, NVIDIA GeForce GTX 1060, and NVIDIA GeForce GTX 750 Ti

#### Note:

When the width or height of the output image is greater than 4092 pixels, the resolution must be customized only via the NVIDIA graphics card.

- Step 1 Right-click on desktop.
- Step 2 Select NVIDIA Control Panel.
- Step 3 On the left panel, choose **Display** > **Change resolution**. On the right area, select the controller you want to set.



NVIDIA Control Panel		- a ×
Gas + O		
Select a Task  - 30 Settings - Adjust image settings with preview - Minnage 30 settings - Configure 0 manual (Burry) - Configure	The Change Resolution You can adjust the answrt of information appearing on the screen and reduce ficienting. You can also choose the high-definition (HD) format if you are using an HDTV and set a scorety specific signal for your attanda	restore: Defaults Restore: Defaults
Consigner a Suffaction, minute     Deplay     Depl	1. Select the display you usual like to change.	
Ağut video meşe setirge	2. Choose the resolution. Connector: W 1044 - 1070 Resolution: Res	
	Cathomize  Apply the following settings.  Use draft color settings  Bether NIDEA color settings  Defects color depth:  Refere VIDEA color settings  Cutput color depth:  Refere VIDEA color settings  Cutput demains: range:  Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demains: range: Cutput demain	
	Description:	0
System Information	Typical usage scenarios:	

- Step 4 Click **Customize** under **2. Apply the following settings**. In the **Customize** dialog box that appears, click **Create Custom Resolution**. In the **Create Custom Resolution** dialog box that appears, set the parameters.
  - When you set the timing standard to Manual, use the MCTRL4K Ultra-High Resolution Settings Generator (Rev 1.0) to calculate the parameters, including active pixels, front porch (pixels), sync width (pixels), polarity, total pixels and refresh rate. Then enter the parameter values manually. Note that the pixel clock must not be greater than 595.0 MHz.
  - When you set the timing standard to CVT reduced blank, the software will calculate the parameters automatically and they cannot be changed manually.

that resu	may not use a standard Windows resolution. Note that applyin It in a temporary blank display.	g these resolutions may	Create a resolution few times when tes	n that is not currently availab sting a new custom resolutio	ile in Windows. Your display may flicker a n.
(	Custom 7680 x 1080 at 60Hz (32-bit), progressive	×	Horizontal pixels: Refresh rate (Hz): Scan type:	7680 💠 60 💠 Progressive 🗸	Vertical lines: 1080 🜩 Color depth (bpp): 32 🗸
			Timing Standard: C	VT reduced blank V	Vertical
			Active pixels: Front porch (pixels): Sync width (pixels):	7680     ↓       48     ↓       32     ↓	1080 ♀ 3 ♀ 10 ♀
	Enable resolutions not exposed by the display		Total pixels: Polarity: Refresh rate:	7840 \$ Positive (+)	1111 Negative (-) Pixel dock: 60.000 Hz 522.6144 Mi
	Create Custom Resolution				(59.000 to 61.000)

Figure 7-4 Creating custom resolution

Step 5 Click **Test**. In the displayed dialog box indicating the test is successful, click **Yes** to save the custom resolution.

## 7.1.3 Step 3 Quickly Configuring Screen

This function is used to quickly configure a screen.

- Step 1 Press the knob to enter the main menu.
- Step 2 Choose Screen Settings > Quick Config to enter the submenu.
- Step 3 Enable Quick Config and set the parameters.
  - Set **Cabinet Row QTY** and **Cabinet Col QTY** (number of cabinet rows and columns to be loaded).
  - Set Port 1 Cabinet QTY (number of cabinets loaded by Ethernet port 1). The device has restrictions on loading capacity of the Ethernet ports. For details, see Note a).
  - Set **Data Flow** of the screen. For details, see Note c), d), and e).

#### Figure 7-5 Quick configuration

Main		Screen Settings			Quick Config	
O Brightness	100%	Quick Config	►		Cabinet Row QTY	13
Input Settings	•	Advanced Config	•		Cabinet Col QTY	1
🧔 Screen Settings	►	Image Offset	►		Port 1 Cabinet QTY	4
Display Control				•	Data Flow (Front View)	2
Advanced Settings	•					
Communication Settings						
Language	•					
-						

Note	
a). If n ports are used to load the screen, the	Example:

number of cabinets loaded by the first (n–1)	If Ethernet ports 1–16 are used to load the screen, the number of cabinets loaded by ports 1–15 must be the same				
ports must be:	and the integral multiple of the number of rows or columns.				
1. the same;	Therefore, you need to set only the number of cabinets				
2. the integral multiple of the number of rows or columns:	number of cabinets loaded by port 16 must be less than or equal to the number of cabinets loaded by port 1.				
3 no less than the	In multi-card mode, if DVI 2 is used as input, the				
number of cabinets loaded by the last port.	corresponding output ports are ports 9–16. That is, port 9 is considered as the first port. So it is required to set the number of cabinets loaded by port 9.				
b). If there are irregular cabinets, cabinets of different sizes, or irregular screens, it is required to connect NovaLCT software for screen configuration.					
c). During data flow settings, you can view the results of different data flow presets on LED display by rotating the knob. When you are satisfied with the LED display image effect, press the knob to save the settings.					

d). During data flow settings, you must ensure that the physical connection of each port is along the same direction and downward to next one.

e). During data flow settings, you must ensure that the Ethernet Port 1 is at the beginning position of the whole physical connection.

## 7.2 Brightness Adjustment

On the main menu, press the knob to select **Brightness** and rotate the knob to adjust the brightness value of the LED display in real time.

Figure 7-6 Brightness adjustment

Main	
🔆 Brightness	100%
Input Settings	
Screen Settings	
Display Control	
Advanced Settings	
Communication Settings	
🚱 Language	

## 7.3 Screen Settings

Configure the LED screen to ensure the screen can display the entire image normally.

Screen settings methods include quick and advanced configurations. There are constrains on these methods, explained as below.

• The two methods cannot be used at the same time.

• Do not use any of the two methods on MCTRL4K to configure the screen again after the screen is configured the in NovaLCT.

## 7.3.1 Advanced Configuration

Figure 7-7 Advanced configuration



- Step 1 Choose Advanced Config and press the knob to enter its submenu.
- Step 2 On the warning screen, click Yes to enter the advanced configuration screen.
- Step 3 Select Enable, select an Ethernet port and set its parameters, including Cabinet Row Qty, Cabinet Column Qty, Start X, Start Y and Data Flow. At last, click Apply.
- Step 4 Select the next Ethernet port to continue setting until all the ports are set.

### 7.3.2 Image Offset

After configuring the screen, adjust the horizontal and vertical offsets (**Start X** and **Start Y**) of the overall displayed image to ensure it is displayed in the target position.





## 7.4 Display Control

Figure 7-9 Display control



- Normal: The LED screen displays the current input source normally.
- Black Out: The LED screen goes black and does not display input source still being played in the background.

- Freeze: The LED screen always displays the frame when frozen. The input source is still being played in the background.
- Test Pattern: Test patterns are used to check the display effect and pixel operating status. There are 8 test patterns, including pure colors and line patterns.
- Image Settings: The settings are used to adjust the contrast, saturation and hue
  of the output image in order to improve the display effect.

Parameter	Description
Contrast	Range: 0%–100%; step: 1%
Saturation	Range: 0%–100%; step: 1%
Hue	Range: -180-+180; step: 1

Notice:

When the calibration function is enabled, image settings are unavailable.

## 7.5 Advanced Settings

Figure 7-10 Advanced Settings

Main	Advanced Settings	
- Brightness 100%	Mapping Fu	nction Enable
Input Settings	E Load Cabine	t Files
Creen Settings		hold
Display Control	🔶 😑 Save to Hard	dware
😥 Advanced Settings 🛛 🕨	Redundancy	Primary
Communication Settings	🐞 Factory Rese	et
🚱 Language 🕨 🕨	HDR HDR	
	3D 3D Setting	

## 7.5.1 Mapping Function

When mapping function is enabled, each of the cabinets will display its cabinet No. and the No. of the Ethernet port that loads the cabinet.

Note: Receiving cards used by the system must support mapping function.



Figure 7-11 Illustration of mapping function

Example: P: 01 indicates the Ethernet port No. #001 indicates the cabinet No.

Notice:

The receiving card used in the system must support Mapping function.

## 7.5.2 Loading Cabinet Files

Before you begin: Save the cabinet configuration file (\*.rcfgx or \*.rcfg) to the local PC.

Note: Configuration files of irregular cabinets are not supported.

- Step 1 Run NovaLCT and choose **Tools** > **Controller Cabinet Configuration File Import**.
- Step 2 On the displayed page, select the currently used serial port or Ethernet port, click **Add Configuration File** to select and add a cabinet configuration file.
- Step 3 Click Save the Change to HW to save the change to the controller.

Figure 7-12 Homepage of NovaLCT

System(S) Settings (C)	Tools(T) Plug-in (P) User(U) Language(L) I	Help(H)
	Calibration(C) Screen Control(P)	i+#:
Screen Configuration Brig	Monitoring(M)	-function Card Test Tool
Local System Information	Led Error Detection(T)	
	Multi-batch Adjustment(B)	
Control System 1	Controller Cabinet Configuration File Import (E)	etails of Device
Monitor Information	Quickly Adjust Dark or Bright Lines(Q)	•
	Video Control(V)	
<u>11</u>	Module ID setting	
Service Status: Service versio	ntest	

Figure 7-13	Importing	cabinet	configuration	file
<b>J</b> · · · ·	1			-

Import th	e Configuration	File of Controller Cabir	net 💌
Sel	ect Serial Port	СОМ99	•
			Move Up Move Down Advanced C
Ado	l Configuratio Rename File	Delete Configur	

## 7.5.3 Alarm Threshold Settings

Set the alarm thresholds for device temperature and voltage. When a threshold is exceeded, its corresponding icon will be flashing, instead of displaying the value.

- Voltage alarm. The voltage value is in red and flashing. The voltage threshold range is 3.5 V–7.5 V.
- Temperature alarm. The temperature value is in red and flashing. The temperature threshold range is -20°C–85°C.

### 7.5.4 Saving to Hardware

Send and save the configuration parameters of the controller to the receiving cards and those parameters will not be lost after the controller is powered off.

### 7.5.5 Redundancy

Set the controller as the primary or backup device.

- If the controller is set as the primary device, the target Ethernet port(s) on the home screen will be always on.
- If the controller is set as the backup device, the target Ethernet port(s) on the home screen will be always on and a mark is displayed on top corner of the port icon.

When the primary device fails, the backup device will immediately take over the work of the primary device, that is, the backup takes effect. After the backup takes effect, the target Ethernet port icons in the home screen will have marks on top flashing once every 1 second.

### 7.5.6 Factory Reset

Reset the controller to factory settings.

## 7.5.7 HDR

HDR is short for high dynamic range. The HDR function of the MCTRL4K works with the A8s or A10s Plus receiving card to greatly enhance the image quality of the screen, presenting more clear and vivid images.

The HDR supports HDR10 and HLG standards. You can use the following two methods to enable HDR function and set its parameters.

#### Method 1: Operation on LCD Menu

- Step 1 Choose **Advanced Settings** > **HDR** and enable HDR function.
- Step 2 Select an HDR type from HDR10 and HLG.
  - When the input source is HDR10, you can set Screen Peak Luma, Ambient Light and Low Grayscale Mode to adjust the display effect.
  - When the input source is HLG, you can select one HLG mode from the 7 modes, namely HLG1 (300 nits) to HLG7 (1700 nits).

Standard	Parameter	Description
HDR10	Screen Peak Luma	Range: 100–10000; step: 10 Used to adjust the brightness during normal operating of the screen
	Ambient Light	Range: 0–30; step: 10 Used to display the brightness of ambient light radiated to the screen (You need to enter the brightness value after measuring.)
	Low Grayscale Mode	Range: 0–50; step: 1 Used to improve the image display effect. The bigger the value is, the clearer the details in shadows will be.
HLG	HLG Mode	A total of 7 HLG modes supported, including HLG1 (300 nits), HLG2 (450 nits), HLG3 (600 nits), HLG4 (750 nits), HLG5 (1000 nits), HLG6 (1300 nits) and HLG7 (1700 nits)
	4	Used to adjust the image display effect. You can select a mode based on the actual screen peak Luma value. At the same time, you can try the adjacent HLG modes based on the on-site ambient light brightness to see their effects and select the best mode.

Step 3 (Optional) Choose **Rest** to reset the HDR settings to factory settings.

#### Figure 7-14 HDR10 operation menu



#### Figure 7-15 HLG operation menu

Main		Advanced Settings		HDR	
- Brightness	100%	Mapping Function	Enable	HDR HDR	Enable
Input Settings	•	Eoad Cabinet Files	▶	нова Туре	HLG
Screen Settings	•	-Vr Alarm Threshold	•	HLG Mode	HLG-1.4
Display Control	•	🗧 Save to Hardware	1	🔶 🍓 Reset	
🔅 Advanced Settings	►	Redundancy	Primary		
Communication Settings	•	🍓 Factory Reset			
🚱 Language	▶	HDR HDR	►		
		3D Setting	•		

#### Method 2: Operation in NovaLCT

- Step 1 Run NovaLCT and choose Settings > Adjust screen effect.
- Step 2 Under HDR Parameter Settings, select Enable.
- Step 3 Click the drop-down box to select an HDR standard (HDR10 and HLG supported).
- Step 4 Set the HDR parameters to adjust the display effect.
  - When the input source is HDR10, you can drag the sliders to adjust the peak screen brightness, ambient light and low grayscale mode in real time.
  - When the input source is HLG, you can click to select one HLG mode from the 7 modes, namely HLG1 (300 nits) to HLG7 (1700 nits).

#### Figure 7-16 Selecting Adjust screen effect



B@Port_#0005.Hu	b_#0001-Screen1				
Parameter Setting	gs				
📃 Enable 18-bi	it mode				
📃 Enable Clea	rView				
<			> 0	Sav	/e to HW
IDR Parameter 8	Settings				
🗹 Enable	HDR10	$\sim$		Resto	re defaults
Peak Screen	(		>	4005 od/	
A LI LI LI LI		-	,	4835 (0/	mz
Ampient Light:	<		>	40 Lu	IX
Low Graysca	<		>	26	
)avaan Informatia					
screen mormalic		and a start start and a start start start			•
2019-01-14 18:0	J4:22Peak scree	en brightness set s	uccessful	Iy.	
2019-01-14 18:0	)4:28Ambient bri	ightness set succe	essfully.		
2019-01-14 18:0	)4:32Ambient bri	ightness set succe	essfully.		
2019-01-14 18:0	)4:37Peak scree	n brightness set s	uccessful		
					<ul> <li>Clear</li> </ul>

Figure 7-17 Adjusting screen effect (for HDR10)

## Figure 7-18 Adjusting screen effect (for HLG)

ISB@Port_#0005.Huk	_#0001-Screen1			
Parameter Setting	s			
📃 Enable 18-bit	mode			
📃 Enable Clear	view .			
<			0 Sav	ve to HW
HDR Parameter S	ettings			
🗹 Enable	HLG	~	Resto	re defaults
HLG Mode: HLG1(300nit HLG5(1000n	s) (HLG2(450nits) ts) (HLG6(1300nits)	HLG3(600nits)	HLG4(750nits)	
Screen Information	1			
2019-01-14 18:0	I:46HDR10 type se	etting succeeded		^
2019-01-14 18:0	I:53HLG type settin	ng succeeded.		
2019-01-14 18:0:	2:01HLG2(450nits)	mode setting su	icceeded.	
2019-01-14 18:0:	2:07HLG7(1700nits	s) mode setting s	succeeded.	
				- Ulear

#### Application



#### Note:

- The HDR function supports only the HDMI input connector.
- The HDR function supports only the 10-bit input source.
- The HDR function and the calibration function of support software cannot be enabled at the same time.
- In NovaLCT, the HDR and ClearView functions cannot be enabled at the same time.
- Using the HDR function will reduce the loading capacity of the MCTRL4K by half because the HDR video source is 10-bit. Please refer to the diagram above and work out a connection solution in advance.

## 7.5.8 3D Settings

This function works with the 3D emitter EMT200 and 3D glasses to allow users to experience 3D effects on LED screen. For detailed usage, see 3D Emitter EMT200 Quick Start Guide.

#### **Applications**

Application 1: EMT200 connected behind the last receiving card

#### Figure 7-19 Application 1



#### **3D** Function Settings

- Step 1 Connect hardware devices according to the corresponding application.
- Step 2 Enable 3D function by using any of the following methods and set 3D parameters.
  - Method 1: On LCD menu
    - 1. Press the knob to enter the main menu.
      - If the input source is DUAL DVI, go to 2.

- If the input source is HDMI/DP, go to 4.
- 2. Choose Input Settings > Input Mode > DVI Mode > Mosaic.
- 3. Press the **BACK** button to return to the main menu.
- 4. Choose **Advanced Settings** > **3D Setting** to enter its submenu.
- 5. Enable 3D and set the video source format and eye priority mode.
  - Video source format: Set the format according to the format of the video source. The options include SBS (side-by-side), TAB (top-and-bottom) and Frame SEQ (frame sequential).
  - Eye priority mode: Set the priority according to the 3D glasses. The options include right eye and left eye.

Figure 7-21 3D settings on LCD menu

Main		Ad	anced Settings			3D Setting		
🔅 Bri	ightness 1009	á 🚺	Mapping Function	Enable		3D 3D		Enable
🔀 Inp	put Settings		Load Cabinet Files	•		💽 Video Source Format		SBS
Sci	creen Settings	-~	Alarm Threshold	•		💁 Eye Priority Mode	F	Right Eye
🔝 Dis	splay Control	۰ ا	Save to Hardware		•			
🔯 Ad	dvanced Settings		Redundancy	Primary				
Co	ommunication Settings	ि 🔅	Factory Reset					
🕜 Lai	inguage	но	R HDR					
		3	3D Setting					

- Method 2: In NovaLCT
  - Start NovaLCT, choose Screen Configuration > Sending Card, select Enable in 3D function area and click Settings to enter the 3D parameter settings page.

Figure 7-22 Toolbar

	Γ	System(S) Settings	(C) Tools(T)	Plug-in (P)	User(U) I	_anguage(L)	Help(H)		
Screen Configuration Brightness Calibration Screen Control Monitoring Multi-function Card Test Tool		Screen Configuration	Brightness	Calibration	Screen Control	Monitoring	Multi-function Card	Test Tool	_

Screen Configuration-COM99
Sending Card Receiving Card Screen Connection
Display Mode
Refresh
Current Display Mode
Sending Card ??? Graphics Output R 1366 x 768 Curre ???
Select Input Source
Video Input 3D Function
Automati Single DVI Send Enable Settings
Source Configuration
Source: DVI
Resolution: 1366 x 768 px Custom 1366 4 x 768 4
Set
Working Mode
Set Working
Redundancy
Set the Current Devi 📄 Set as Primary 📄 Set as Backup
Primary Backup
Sarial Number of Sarial Number of
Primary Sending Primary Port Primary Port
Card Card Card
Reliesh Send Delete
Restore Factor Save System Co Back Up Termi Save Close

#### Figure 7-23 Screen configuration page

2. Set 3D function parameters. Then, click **Save to File** to save the parameters you set as a file. Or, you can click **Load from File** to load an existing 3D configuration file.

► Mode Selection: This parameter is available when the video source is Dual DVI, as shown in Figure 7-24. It is unavailable when the video source is HDMI or DP.

t 3D Parameters   Video Source Format            Side-by-side         Top-and-botton         Frame sequential   Eye Friority            Right eye         Left eye    Mode Selection    DVI             DVII    DVII:    DVI2:    Signal Delay Time            Time   Flease set an appropriate delay time to make left and right eye   Load from File   Save to File	0 0	•		
Video Source Format Side-by-side  Top-and-bottom  Frame sequential Eye Friority Right eye  Left eye Mode Selection DVI DVI DVI: TOPIC: Restore Defa Flease set an appropriate delay time to make left and right eye Load from File Save to File	et 3D Parameters			×
Side-by-side Top-and-bottom Frame sequential Eye Priority Isight eye Left eye Mode Selection DVI DVI: DV	Video Source Format			
Eye Priority	◙ Side-by-side	🔘 Top-and-bottom	🔘 Frame sequential	
<ul> <li>Bight eye</li> <li>Left eye</li> </ul> Mode Selection DVI <ul> <li>DVI</li> <li>DVI2:</li> <li>Busignal emitter</li> </ul> 3D signal emitter <ul> <li>Enable third-party emitter</li> </ul> Signal Delay Time <ul> <li>Image: 0-20 ms)</li> <li>Restore Defa.</li> </ul> Please set an appropriate delay time to make left and right eye Load from File Save to File	Eye Priority			
Mode Selection DVI DVII: DVI2: R 3D signal emitter Enable third-party emitter Signal Delay Time T R ms Range: 0-20 ms) Restore Defa Flease set an appropriate delay time to make left and right eye Load from File Save to File	Bight eve	C Left eve		
Mode Selection DVI DVI: DVI2: R 3D signal emitter Enable third-party emitter Signal Delay Time T me ms O me us (Range: O-20 ms) Restore Defa Please set an appropriate delay time to make left and right eye Load from File Save to File	0	0 ,-	•	
DVI DVI: DVI: R 3D signal emitter Enable third-party emitter Signal Delay Time T m m m m us (Range: 0-20 ms) Restore Defa. Please set an appropriate delay time to make left and right eye Load from File Save to File	-Mode Selection			
DVII:     DVI2:     R      JUI:     DVI2:     R      JUI:     DVI2:     R      Juit     Signal emitter     Inable third-party emitter      Signal Delay Time     T     m s 0 = us (Range: 0-20 ms) Restore Defa.      Please set an appropriate delay time to make left and right eye      Load from File     Save to File	DAT			
3D signal emitter Panable third-party emitter Signal Delay Time T Restore Defa. Please set an appropriate delay time to make left and right eye Load from File Save to File	OVI1:	DVI2:		
30 signal emitter         Enable third-party emitter         Signal Delay Time         7       ms         7       ms         9       us         Renge: 0-20 ms)       Restore Defa         Please set an appropriate delay time to make left and right eye         Load from File       Save to File	20 - : 1 : + +			
Enable third-party emitter Signal Delay Time T Restore Defa Please set an appropriate delay time to make left and right eye Load from File Save to File	-SD Signal emitter			
Signal Delay Time T  ms O  us (Range: O-20 ms) Restore Defa Please set an appropriate delay time to make left and right eye Load from File Save to File	🔄 Enable third-part	y emitter		
7 in a grand with the second s	Signal Delay Time			
Please set an appropriate delay time to make left and right eye Load from File Save to File	7 🚔 ms 0	🚔 us (Range: 0-20 )	ms) Restore Defa	
Load from File Save to File	P]			
Load from File Save to File	riease set an approp	frate deray time to max	e fert and right eye	
Load from File Save to File				
Load from File Save to File				
Load from File Save to File				
Load from File Save to File				
Load from File Save to File				
Load from File Save to File				
Load from File Save to File				
Load from File Save to File				
Load from File Save to File				
Load from File Save to File				
Load from File Save to File		_		
		Load	from File Save to Fil	e

Figure 7-24 Setting 3D parameters - DVI

- **Right Eye Start**: When you set the video source format as side-by-side or topand-bottom, you must set the right eye start position.
  - Signal Delay Time: When the input source is DP/HDMI, you must set this parameter. Please set this time as required to make sure that the left and right eye image switching of the 3D glasses is in sync with the image switching on the display.

Figure 7-25 Setting 3D parameters - HDMI/DP

Set 3D Parameters			x	
-Video Source Format-				
🔘 Side-by-side	◎ Top-and-bottom	🔘 Frame sequenti:	J	
Eye Priority				
🔘 Right eye	🔘 Left eye			
Right Eye Start (X)				
3D signal emitter	y emitter			
Signal Delay Time 7 🚔 ms O	🚔 us (Range: 0-20 m	ns) Restore Defa		
Please set an approp	riate delay time to mak	e left and right eye		

3. On the screen configuration page, click **Save** to save current configuration parameters to the controller.

#### Note:

- The 3D and low latency functions cannot be enabled at the same time.
- The 3D function and the calibration function of support software cannot be enabled at the same time.
- When the advanced screen configuration is enabled, 3D function is not supported.
- When the input source is DVI, DVI1 loads the images for left eye, and DVI2 loads the images for right eye. When the 3D function is in use, the input mode cannot be switched to multi-card mode.
- When the video source format is set to side-by-side or top-and-bottom, the frame frequency of Ethernet output will be doubled (for example, if the frequency of input source is 60 Hz, the frequency of Ethernet output will be 120 Hz), and the loading capacity of Ethernet port will be reduced by half.

### 7.5.9 Hardware Version

View the hardware version of current device.

#### Note:

To upgrade the hardware version, send the upgrade file to the MCTRL4K via NovaLCT.

## 7.6 Communication Settings

Set the communication mode and network parameters.

#### Figure 7-26 Communication settings

Main	Communication Settings		[	Netw	ork Settings	
🔅 Brightness 100%	💮 Mode Select	USB Preferred		臣	Config IPv4	Manually
input Settings	Network Settings	►		IP	IP Address	192.168.0.10
Screen Settings				YLSM	Subnet Mask	255.255.255.0
🚬 Display Control 🕨 🕨				- 🚯	Reset	
Advanced Settings						
Communication Settings						
🜍 Language 🕨 🕨						

#### Communication Mode

The controller connects to PC via the USB port or ETHERNET port. The communication modes include **USB Preferred** and **LAN Preferred**.

- If **USB Preferred** is selected, the PC prefers to communicate with the controller via the USB port.
- If **LAN Preferred** is selected, the PC prefers to communicate with the controller via the ETHERNET port.

#### **Network Settings**

Network settings can be manual or automatic.

- Manual settings parameters include controller IP address and subnet mask.
- Automatic settings can read the network parameters automatically.
- Reset: Reset the network parameters to default values.

## 7.7 Language

Change the UI language of the MCTRL4K unit.

## **8** Operations on PC

## 8.1 Individual Gamma Adjustment for RGB

The MCTRL4K supports individual Gamma adjustment for RGB when the bit depth of input source is 10-bit or 12-bit, which effectively controls image non-uniformity under low grayscale and white balance offset to improve image quality.

- Step 1 Run NovaLCT, click **Screen Configuration**, choose the current operation communication port and click **Next**.
- Step 2 On the **Sending Card** tab page, select the corresponding input source bit depth and click **Set**.
- Step 3 On the home page of NovaLCT, choose Brightness > Manually Adjustment.
- Step 4 Under Advanced Settings, choose Gamma > Custom Gamma Adjustment and click Configuration to enter the Gamma Adjustment page.
- Step 5 Adjust Red Gamma, Green Gamma and Blue Gamma, respectively.
- Step 6 Click Send.
- Step 7 Close the **Gamma Adjustment** page. On the **Brightness Adjustment** page, click **Save to HW**.

/SB@Port_#0009. Hub	#0001-Screen1			Gamma Adjustme 💿 Red Gamma 🤅	Green Gamma	🔘 Blue Gamma		
Brightness	Manually Adjustment	Automatica	Ily Adjustment	Grayscale Bit Val 12				
Brightness	•		174 (68.2%)	Gamma table can be generated quickly by adjustin	Gamma table c	an he fine adjucted	by oditing	the
	🔝 Reduce Gray Ratio Loss ay F	tatio: 68.24%		Gamma table can be generated quickly by adjusti		an be nne-aujusteu	by culting	
				X-axis Range 0 255 +	X	Y	- Â	M
				Y-axis Range 0 25442 2	• 0	0	-	
				Gamma		128		Mo
		119		Recommended Gamma	2	512		
	Grayscale	Contrast			3	768		
				Original Mode A O Mode B	4	1024		L
Advanced Settings				Picture Quality	5	1280		
Gamma	Color Te Color Spa			Soft Mode Enhanced Mode	6	1536		
Contrast					7	1792		
Camma Valu	1		1 0.0		8	2048		
Gainina valu.			. 2.0		9	2304		
					10	2560		
Oustom	Configuration				11	2816		
					12	3072		
					13	3328		
					14	3584		
		Defre	ob Cousts LDM		15	3840		
		rene.	Save to Hvv		10	4110		

Figure 8-1 Gamma adjustment page

#### Note:

When the bit depth of input source is 8-bit, the individual Gamma adjustment for RGB is realized by AXs (V4.6.0.0) series receiving cards.

## 8.2 Low Latency

The MCTRL4K supports a low latency of less than 1 ms (when the start position of image is 0). Low latency is used to reduce the time delay between the input of video signal to the controller and the corresponding output. To use the low latency function, you must ensure that each Ethernet port loads the cabinets vertically during screen configuration, as shown in Figure 8-2.



Figure 8-2 Loading vertically

Step 1 Run NovaLCT, choose Screen Configuration and enter the Sending Card tab page.

Step 2 Select Enable Low Latency.

Step 3 Click Save System Configuration File and Save.

#### Figure 8-3 Low latency

System(S) Setting	s (C) Tools(T)	Plug-in (P)	User(U) La	anguage(L)	Help(H)		
	÷.		~	$\sim \sim$		~~~	
Screen Configuration	Brightness	Calibration	Screen Control	Monitoring	Multi-function Card	Test Tool	Ŧ
Local System Information	tion						
Control System	1	Other Devic	ce O	V	iew Details of Device		
Monitor Information							
	<b>P</b>					U	
			٠			•	

Display Mode       Refresh         Current Display Mode       Refresh         Sending Card ???       Graphics Output R 1920 x 1080       Curre ???         Select Input Source       3D Function       3D Function         I Automati       Send       Enable       Settings         Source Configuration       Source:       HDMI       Resolution:       1920 x 1080 px       x 1080 x         Refresh Rate T       60       Hz       Input Source Bit De       8 Bit       set         Low Latency       Refundancy       Set as Backup       Set as Backup       Set as Backup         Primary Sending       Serial Number of       Serial Number of       Serial Number of       Backup Port         Refresh       Send       Add       Edit       Delete	Sending Card Receiving Card Screen Cons	action
Current Display Mode         Sending Card ???         Graphics Output R 1920 x 1080         Current. ???         Select Input Source         Video Input         Automati         Source Configuration         Source:         HDMI         Resolution:         1920 x 1080 px         Refresh Rate T         60         Hz         Input Source Bit De         8 Bit         Set         Low Latency         Redundancy         Set the Current Devi         Set as Backup         Primary         Backup         Primary         Serial Number of         Primary Port         Backup Port         Backup Port	Display Mode	Refresh
Select Input Source       3D Function         Image: Automati       Image: Automati         Source:       Image: Automati         Image: Automati       Image: Automati         Source:       Image: Automati         Image: Automati       Image: Automati         Source:       Image: Automati         Refresh Rate T       60         Image: Automati       Image: Automati         Image: Automati       Image: Automati         Image: Automati       Image: Automati         Image: Automati       Image: Automati         Image: Automatic Autom	Current Display Mode	Graphics Output R 1920 x 1080 Curre 222
Automati       ✓       Send       Enable       Settings         Source Configuration       Source:       HDMI       ✓       Resolution:       1920 ★ x 1080 px       x 1080 ★         Refresh Rate T       60       ✓       HZ       Input Source Bit De       8 Bit       ✓       Set         Low Latency       ✓       Enable Low Latency        Set as Backup       Set as Backup         Primary       Set as Primary       Set as Backup       Serial Number of Backup Sending Card       Serial Number of Backup Port         Refresh       Send       Add       Edit       Delete	Select Input Source	3D Function
Source Configuration Source: HDMI Resolution: 1920 x 1080 px  Custom Refresh Rate T 60  Hz Input Source Bit De 8 Bit  Set Low Latency Enable Low Latency Redundancy Set the Current Devi Set as Primary Set as Backup Primary Backup Serial Number of Primary Sending Serial Number of Primary Port Serial Number of Backup Sending Card Add Edit Delete	Automati	Send     Enable     Settings
Resolution: 1920 x 1080 px   Refresh Rate T 60   Hz Input Source Bit De   8 Bit Set     Low Latency   Image: Constraint of the Current Devi   Set as Primary     Set as Backup     Primary   Backup     Serial Number of Primary Sending Card     Serial Number of Primary Sending   Serial Number of Primary Port     Serial Number of Backup Port	Source: HDMI	
Low Latency       Image: Enable Low Latency         Redundancy       Set as Primary         Set the Current Devi       Set as Primary         Primary       Backup         Serial Number of       Serial Number of         Primary Sending       Serial Number of         Primary Sending       Serial Number of         Primary Port       Serial Number of         Backup Port       Backup Port         Refresh       Send	Resolution: 1920 x 1080 px Refresh Rate T 60	Custom         1920         x         1080         ↓           Hz         Input Source Bit De         8 Bit         ▼         ▼
Low Latency Redundancy Set the Current Devi Set as Primary Set as Backup Primary Backup Serial Number of Primary Sending Card Serial Number of Primary Port Backup Sending Card Backup Port	25	Set
Redundancy         Set as Primary       Set as Backup         Primary       Backup         Serial Number of Primary Sending Card       Serial Number of Backup Sending Card       Serial Number of Backup Port         Refresh       Send       Add       Edit       Delete	Low Latency Inable Low Latency	
Primary     Backup       Serial Number of Primary Sending Card     Serial Number of Primary Port     Serial Number of Backup Sending Card     Serial Number of Backup Port       Refresh     Send     Add     Edit     Delete	Redundancy Set the Current Devi 🔲 Set as Prin	mary 📄 Set as Backup
Serial Number of Primary Sending Card       Serial Number of Primary Port       Serial Number of Backup Sending Card       Serial Number of Backup Port         Refresh       Send       Add       Edit       Delete	Primary	Backup
Refresh Send Add Edit Delete	Serial Number of Primary Sending Card	rial Number of Backup Sending Card Backup Port
Refresh Send Add Edit Delete		
	Refresh Send	
Restore Factor Save System Co Back Up Termi Save		

Notice:

- The low latency function is supported when the input source is DP/HDMI.
- The low latency and Genlock functions cannot be enabled at the same time.

• When the low latency function is enabled, the offset of image cannot exceed the size of input source.

## 8.3 Input Source Bit Depth

Set the bit depth of input source, including 8-bit, 10-bit and 12-bit.

- Step 1 Run NovaLCT and choose Screen Configuration > Sending Card.
- Step 2 Click the drop-down box next to Input Source Bit Depth and choose a bit depth.
- Step 3 Click Save System Configuration File and Save.

Figure 8-4 Input source bit depth

Display Mode       Refree         Current Display Mode       Sending Card ???         Graphics Output R 1920 x 1080       Curre ???         Select Input Source       3D Function         Video Input       3D Function         Automati       Send         Source Configuration       Send         Source:       HDMI         Resolution:       1920 x 1080 px         Refresh Rate T       60         Hz       Input Source Bit De         12 Bit       8 Bit         10 bit       12 Bit         Enable Low Latency       Set as Backup		Card Receiving Card Scre	en Connection						
Current Display Mode Sending Card ??? Graphics Output R 1920 x 1080 Curre ??? Select Input Source Video Input Automati Send 3D Function Source Configuration Source Configuration Source: HDMI Resolution: 1920 x 1080 px Custom Refresh Rate T 60 Custom 1920 $\Rightarrow$ x 1080 $\Rightarrow$ Refresh Rate T 60 Custom Refresh Rate T 60 Custom Low Latency Enable Low Latency Redundancy Set the Current Devi Set as Primary Set as Backup	Displa	ay Mode			Refresh				
Sending Card ???       Graphics Output R 1920 x 1080       Curre ???         Select Input Source       3D Function         Video Input       Send       Enable         Source Configuration       Send       Enable         Source:       HDMI       Custom         Resolution:       1920 x 1080 px       Custom         Refresh Rate T       60       Hz         Input Source Bit De       12 Bit       Set         Low Latency       Enable Low Latency         Redundancy       Set as Primary       Set as Backup	Current Display Mode								
Select Input       3D Function         Image: Automati       Image: Send         Source Configuration       Enable         Source:       Image: HDMI         Resolution:       1920 x 1080 px         Refresh Rate T       60         Image: Hz       Input Source Bit De         12 Bit       Image: Set in the set in	Ser	nding Card ???	Graphics Outp	ut R 1920 x 1080	Curre ???				
Video Input Automati  Send  Enable  Settings  Source Configuration  Source: HDMI  Resolution:  1920 x 1080 px  Custom  1920 x 1080 px  Low Latency  Enable Low Latency  Redundancy  Set the Current Devi  Set as Primary  Set as Backup	Select Input Source								
Automati       Send       Enable       Settings         Source Configuration       Source:       HDMI       Image: Custom       1920 ± x 1080 ± x	Video Input 3D Function								
Source Configuration Source: HDMI Resolution: 1920 x 1080 px • Custom Refresh Rate T 60 • Hz Input Source Bit De Low Latency Enable Low Latency Redundancy Set the Current Devi Set as Primary Set as Backup	Automati  Send Enable Settings								
Source: HDMI Resolution: 1920 x 1080 px  Custom Refresh Rate T 60 Hz Input Source Bit De 12 Bit 8 Bit 10 bit 12 Bit Set 8 Bit 10 bit 12 Bit Set 8 Bit 12 Bit Set 8 Bit 12 Bit Set 8 Bit 12 Bit Set 8 Bit 12 Bit Set 8 Bit 12 Bit Set 8 Bit 12 Bit 12 Bit Set 8 Bit 12 Bit Set 8 Bit 12 Bi	Source Configuration								
Resolution: 1920 x 1080 px   Refresh Rate T 60   Hz Input Source Bit De   12 Bit   10 bit   10 bit   12 Bit    Set  Redundancy Set the Current Devi Set as Primary Set as Backup	Sou	rce: HDMI	-						
Refresh Rate T 60 Hz Input Source Bit De 12 Bit Set 8 Bit 10 bit 12 Bit Low Latency Enable Low Latency Redundancy Set the Current Devi Set as Primary Set as Backup	Resolution: 1920 x 1080 px 🗸 🔲 Custom 1920 🚔 x 1080 🖨								
8 Bit       Set         10 bit       12 Bit         Low Latency       12 Bit         Redundancy       Set as Primary         Set the Current Devi       Set as Primary	Refresh Rate T 60 VI La Input Source Bit De 12 Bit								
Low Latency Enable Low Latency Redundancy Set the Current Devi Set as Primary Set as Backup	8 Bit Set								
Low Latency Enable Low Latency Redundancy Set the Current Devi Set as Primary Set as Backup	10 Dit 12 Bit								
Carable Low Latency  Redundancy Set the Current Devi Set as Primary Set as Backup	Low Latency								
Redundancy Set the Current Devi Set as Primary Set as Backup	Enable Low Latency								
Set the Current Devi Set as Primary	Redundancy								
	Set	the Current Devi Set	as Primary	Set as Backup					
Primary Backup	$\overline{}$	Primary	/	Backup	)				
Serial Number of Serial		Serial Number of	Serial Number of	Serial Number of	Serial Number of				
Card Primary Port Card Backup Sending Backup Port	Card Primary Sending P		Primary Port	Card	Backup Port				
Refresh Send Add Edit Dele	F	Refresh		Add	Edit Delete				

#### Table 8-1 Input source bit depth adjustment

Bit Depth	Description
8 bit	The loading capacity of the MCTRL4K will not be reduced.

10 bit	The loading capacity of the MCTRL4K will be reduced by half.
12 bit	The loading capacity of the MCTRL4K will be reduced by half.

## 8.4 Operations on Web Page

The MCTRL4K supports Web control functions, so the screen configurations can be easily and quickly performed on a PC or mobile device.

Note:

For LED screen configuration via Web, the Google Chrome browser (Chrome 50 or later) is recommended.

## 8.4.1 Environment Configuration

Figure 8-5 Environment configuration diagram



Step 2 Connect the MCTRL4K to a PC (or a mobile device) via Ethernet cable or router.

- Step 3 Obtain the IP address of the MCTRL4K.
- Step 4 On the PC (or mobile device), enter "http//the above device IP address" and press Enter to go to the device control page automatically.

Notice:

The MCTRL4K and PC (or mobile device) must be on the same LAN.

## 8.4.2 Operations

A	NEUGOSTAN NEUCOST N	
в	<ul> <li>☆ Brightness</li> <li>デ Input Settings</li> <li>Screen Settings</li> <li>Display Control</li> <li>☆ Advanced Settings</li> <li>● Network Settings</li> <li>⑦ Language/提前</li> </ul>	

#### Figure 8-6 Web control page

- Area A: Hardware connection statuses and loading capacities of the input, output and other connectors on the MCTRL4K. For details, see chapter 6 Home Screen.
- Area B: Operations can be done in this area. For details, see chapter 7 Menu Operations.

Click the menu bar on the left of area B to select the option to be adjusted, and the corresponding operations can be done on the right.

## 8.5 Software Operations on PC

## 8.5.1 NovaLCT

Connect the MCTRL4K to the control computer installed with NovaLCT (V5.2.0 or later) with USB cable to perform screen configuration, brightness adjustment, calibration, display control, monitoring, etc. For details on their operations, see *NovaLCT LED Configuration Tool for Synchronous System User Guide*.

Figure 8-7 User interface of NovaLCT



## 8.5.2 SmartLCT

Connect the MCTRL4K to the control computer installed with SmartLCT (V3.2.0 or later) with USB cable to perform building-block cabinet configuration, seam brightness adjustment, real-time monitoring, brightness adjustment, hot backup, etc. For details on their operations, see *SmartLCT User Manual*.



Figure 8-8 User interface of SmartLCT

## 8.6 Firmware Update

## 8.6.1 NovaLCT

In NovaLCT, perform the following steps to update the MCTRL4K firmware.

- Step 1 Run NovaLCT and choose User > Advanced Synchronous System User Login and log in as an advanced user.
- Step 2 Type the secret code "admin" to enter the program loading page.
- Step 3 Click **Browse** to select the update program path and then click **Update**.

### 8.6.2 SmartLCT

In SmartLCT, perform the following steps to update the MCTRL4K firmware.

- Step 1 Start SmartLCT and enter the V-Sender page.
- Step 2 In the properties area on the right, click for enter the Firmware Upgrade page.

Step 3 Click **I** to select the update program path.

Step 4 Click Update.

# **9** Specifications

	Electrical	Input voltage		AC 100 V–240 V, 50/60 Hz	
	Parameters	Rated power consumption		30 W	
	Operating	Temperature		-20°C–60°C	
	Environment	Humidity		10% RH–90% RH, non-condensing	
	Storage Environment	Temperature		-20°C–70°C	
	Dimensions	482.6 mm × 372.0 mm × 96.0 mm			
	Weight	4.6 kg			
	Certifications	FCC, EMC, LVD	D, RoHS, UL&CUL, EAC, CB, IC, KC, RCM		
P		Each MCTRL4K unit is shipped with a carrying case, accessory box and packing box. Packing rules: The product and accessory box (containing related cables) packed in the carrying case and the carrying case packed in the packing box			
	Packing Information	Carrying case	530 mm × 193 mm × 420 mm White cardboard box printed with <b>NOVASTAR</b> One unit in each case		
		Accessory box	405 mm × 290 mm × 48 mm White cardboard box printed with <b>Accessory Box</b> Accessories: 1 × power cord, 1 × Ethernet cable, 1 × USB cable, 1 × HDMI cable and 1 × DP cable		
		Packing box	550 mm × 440 mm × 210 mm Craft paper box printed with <b>NOVASTAR</b>		