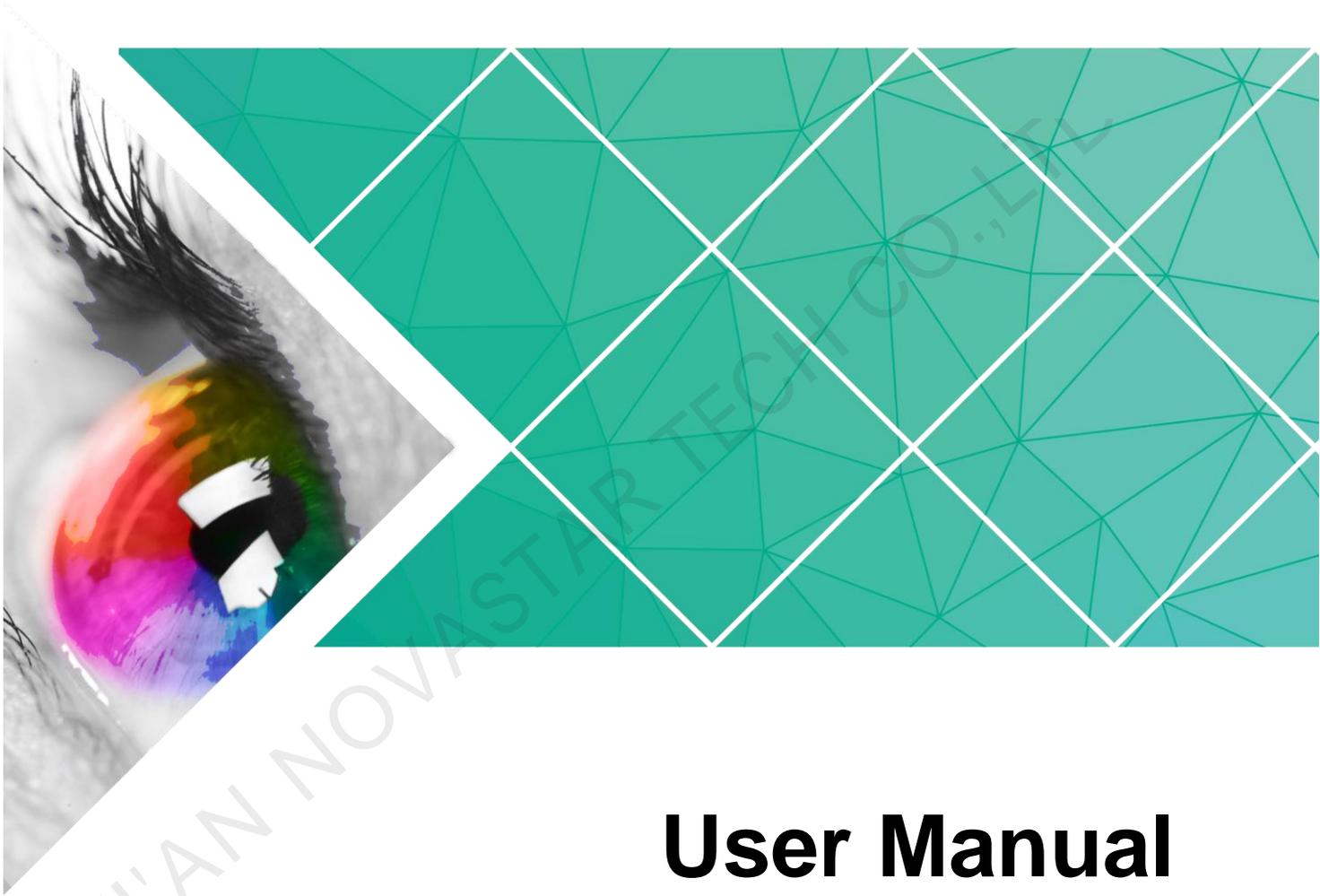


# MCTRL4K

## Independent Controller



# User Manual

Product Version: V1.0.3

Document Number: NS110100430

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## Change History

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Version	Release Date	Description
V1.0.3	2018-02-08	HDR function is added.
V1.0.2	2017-11-16	Web control is supported.
V1.0.1	2016-10-31	Document style is updated.
V1.0.0	2016-06-06	First release

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# 1 Safety

This chapter illustrates safety of the MCTRL4K independent controller to ensure the product's storage, transport, installation and use safety.

Safety instructions are applicable to all personnel who contact or use the product. First of all, pay attention to following points.

- Read through the instructions.
- Retain all instructions.
- Comply with all instructions.

## 1.1 Storage and Transport Safety

- Pay attention to dust and water prevention.
- Avoid long-term direct sunlight.
- Do not place the product at a position near fire and heat.
- Do not place the product in an area containing explosive materials.
- Do not place the product in a strong electromagnetic environment.
- Place the product at a stable position to prevent damage or personal injury caused by dropping.
- Save the packing box and materials which will come in handy if you ever have to store and ship the product. For maximum protection during storage and shipping, repack the product as it was originally packed at the factory.

## 1.2 Installation and Use Safety

- Only trained professionals may install the product.
- Plugging and unplugging operations are prohibited when the power is on.
- Ensure safe grounding of the product.
- Beware of electric shock hazards.
- Always wear a wrist band and insulating gloves.
- Do not place the product in an area having frequent or strong shake.
- Perform dust removing regularly.

- Contact NovaStar for maintenance at any time, rather than have the product disassembled and maintained by non-professionals without authorization.
- Replace faulty parts only with the spare parts supplied by NovaStar.

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# 2 Overview

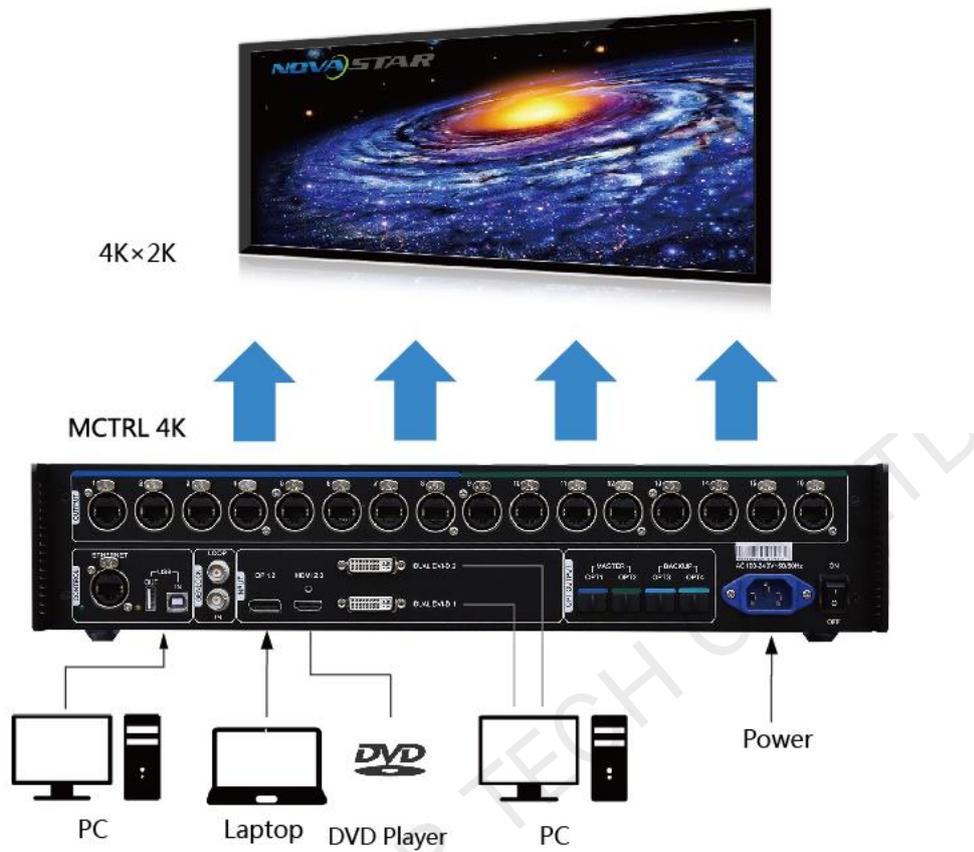
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The MCTRL4K is a 4K×2K independent controller developed by NovaStar. With up to 3840×2160@60Hz loading capacity of a single unit, it can support any custom resolution within this range as required, thus meeting the on-site configuration requirements of super-long or super-large LED displays.

In multi-card mode, the MCTRL4K can be used as two independent controllers, making the images of two input sources perfectly displayed on the screen.

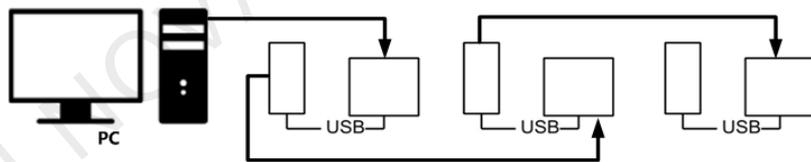
What's more, the MCTRL4K supports HDR function and can work with A8s/A10s to greatly enhance the image quality of the screen, presenting more vivid and clearer images.

The MCTRL4K is mainly applied to concert control centers, live events, security monitoring, Olympic Games and various sports centers.



Note: The device must be powered off before connection.

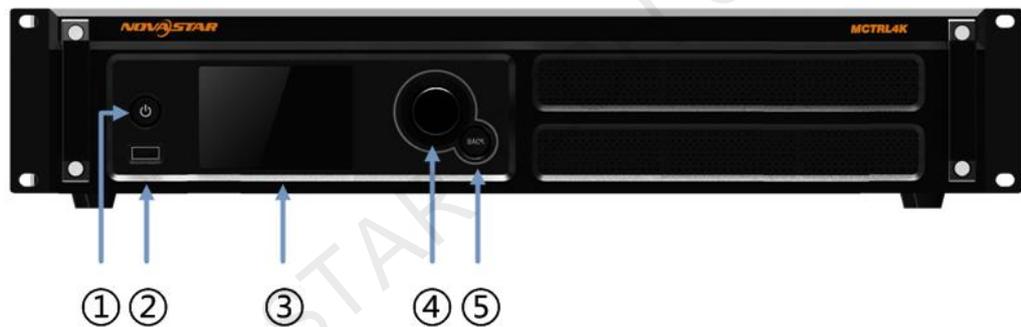
To control multiple MCTRL4K units (10 units at most), please cascade them according to the figure below.



# 3 Hardware Structure

## 3.1 Appearance

### Front Panel



No.	Name	Description
①	Power button	Pressing it powers on the device, while holding it down for 4–5 seconds powers off the device.
②	USB	Connects a USB drive only (PC cannot be connected).
③	LCD screen	Displays the menu.
④	Knob	Pressing the knob enters a menu or confirms an option or operation. Rotating the knob selects a menu item or adjusts a parameter.
⑤	BACK	Returns to the parent menu.

Instruction on knob operations:

- On the home screen, pressing the knob enters the main menu.
- On the main menu, rotating the knob selects a menu item or adjusts the parameter, and pressing the knob confirms the selection or enters the submenu.
- Holding down the knob and **BACK** button simultaneously for 5 seconds locks or unlocks all the buttons.

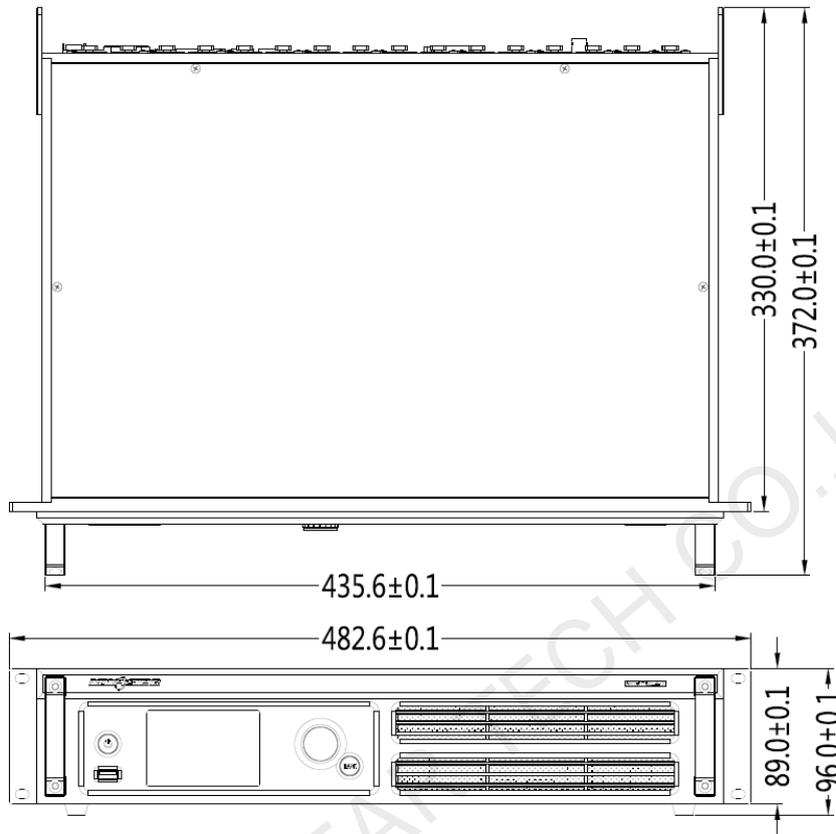
## Rear Panel



Input	
DP 1.2	DP 1.2 connector
HDMI 2.0	HDMI 2.0 connector
DUAL DVI-D1 DUAL DVI-D2	Dual-link DVI connector
Output	
1–16	16 x Neutrik (NE8FBH) Gigabit Ethernet outputs.
OPT1–4	4 x Fiber optical outputs OPT1 corresponds to Ethernet ports 1–8, while OPT2 corresponds to Ethernet ports 9–16. OPT3 serves as the backup for OPT1, while OPT4 serves as the backup for OPT2.
Control	
ETHERNET	For PC connection
USB IN	Input port for cascading devices, or for PC connection
USB OUT	Output port for cascading devices
GENLOCK	
IN	Genlock type: Blackburst It is the GenLock synchronization signal which is used to ensure synchronization between the LED screen display and external GenLock source.
LOOP	GenLock loop output
Power Connector	
AC 100-240V–50/60Hz	AC power input

**Note:** Type-A USB port is prohibited from being connected to the upper computer directly.

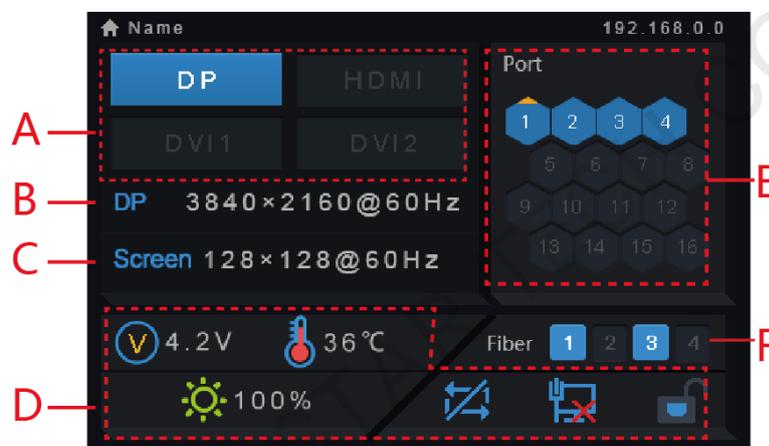
### 3.2 Dimensions



Unit: mm

# 4 Home Screen

After the MCTRL4K is powered on, the home screen is shown in the figure below.



- A: Access status of signal sources
  - Blue: Signal available
  - Gray: Signal unavailable
- B: Current input source and its resolution and frame rate  
When the dual-link DVI is selected as input, the information of the two DVI sources will be displayed alternately.
- C: Width, height and frame rate of the LED display that is currently configured
- D: Status area

The meaning of each status icon is introduced in the following table.

	Supply voltage of core mainboard
	Temperature inside the controller
	Brightness of LED display
	DVI1 and DVI2 sources in sync/not in sync
	Status of the control connector: not connected/connected to USB

	port/connected to Ethernet port
	Screen unlocked/locked

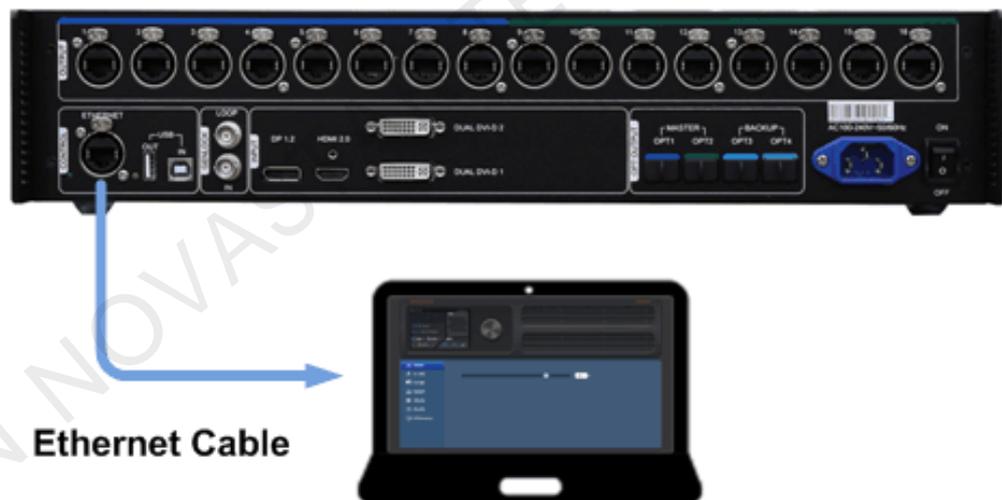
- E: Connection status of Ethernet ports
  - Blue: The connection works and the port serves as the master.
  - Gray: The port is not connected or the connection does not work.
  - Mark on the top corner of the icon: The connection works and the port is in redundancy status.
- F: Connection status of optical fiber ports
  - Blue: The connection works and the port serves as the master.
  - Gray: The port is not connected or the connection does not work.
  - Mark on the top-left corner of the icon: The connection works and the port is in redundancy status.

# 5 Web Control

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, Google browser is recommended.

## 5.1 Environment Configuration

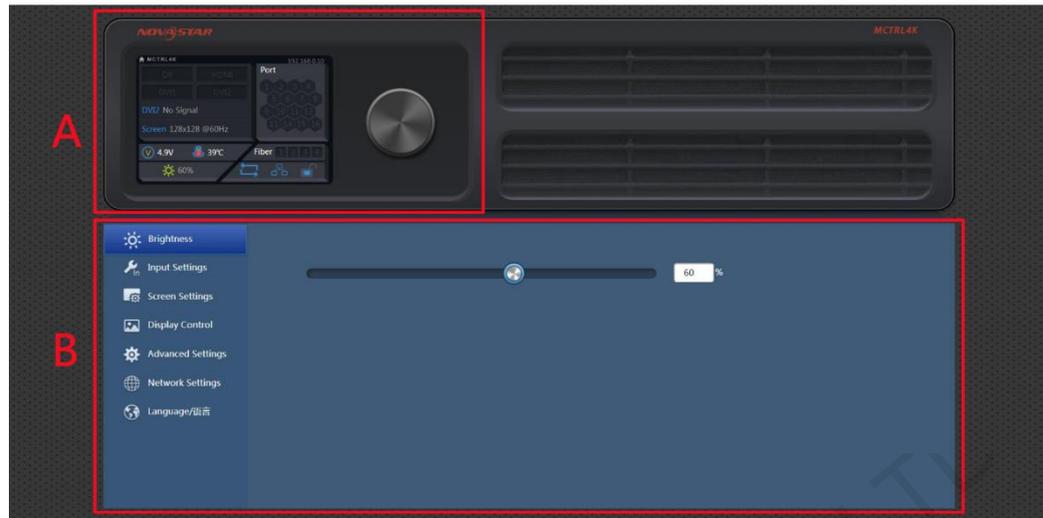


- Step 1 Connect the MCTRL4K to a PC (or a mobile device) with Ethernet cable.
- Step 2 Obtain the IP address of the MCTRL4K.
- Step 3 On the PC (or mobile device), search for the above IP address and enter the IP address.

Note: The MCTRL4K and PC (or mobile device) must be in the same LAN.

## 5.2 User Interface

The user interface of Web control is shown in the following figure.



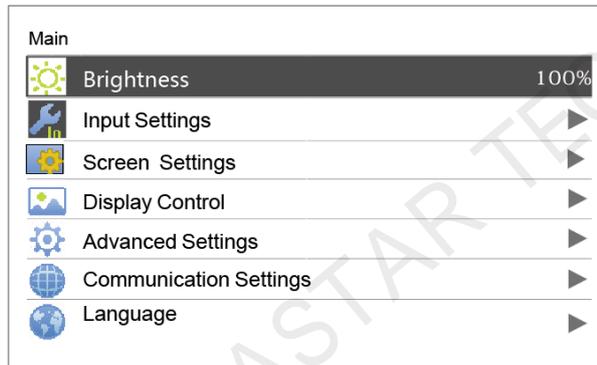
- A: Hardware connection statuses and loading capacities of the input, output and other connectors on the MCTRL4K. For details, see chapter [4 Home Screen](#).
- B: Operations can be done in this area. For details, see chapter [6 Menu Operations](#).

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

# 6 Menu Operations

## 6.1 Brightness Adjustment

On the main menu, press the knob to select the **Brightness** item and rotate the knob to adjust the brightness value.



## 6.2 Input Settings

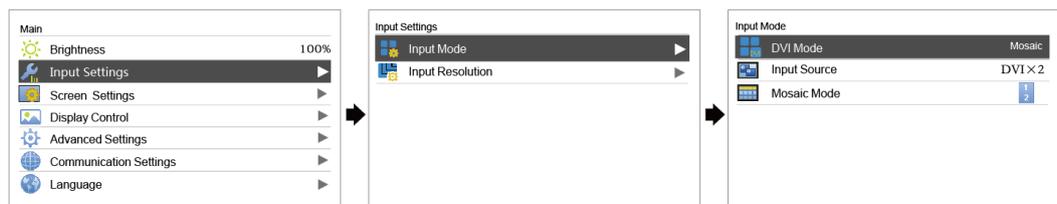
### 6.2.1 Input Mode Settings

Supported input video sources include **Auto**, **DP**, **HDMI**, **DVIx2**, **DVI1** and **DVI2**.

Note: When the input source is set to **Auto**, the controller will automatically detect the input source according to the following priority:

DP > HDMI > DVI

The MCTRL4K supports two input modes: mosaic and multi-card.

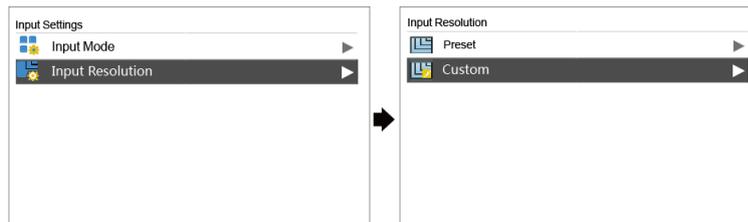


- In mosaic mode, the DVIx2 is the input source.
- In multi-card mode, the DVI1 or DVI2 is the input source.

- The MCTRL4K serves as two independent controllers and the loading capacity of each is up to 3840×2160@30Hz. 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, while DVI 2 corresponds to Ethernet ports 9–16.

## 6.2.2 Input Resolution Settings

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



The input resolution can be set through either of the following ways.

### Method 1: Preset

Select a proper resolution from the preset standard resolutions.

### Method 2: Custom

Rotate the knob to set a custom width (increasing by even numbers), custom height and custom refresh rate. Then select **Apply** and press the knob to apply the settings.

Note: The supported custom resolution is up to 4092×2160@60Hz.

## 6.2.3 Ultra-High Resolution Settings

When the input source is DP/HDMI, and the width or height of the output image is greater than 4095 pixels, the resolution must be customized only through the NVIDIA graphics card.

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

Note: The custom resolution is up to 7680×1080@60Hz or 1080×6000@60Hz.

## Procedures

- Step 1 Right-click on PC desktop.
- Step 2 Choose **NVIDIA Control Panel** to enter its window.
- Step 3 On the left panel, choose **Display > Change resolution**.
- Step 4 On the right, choose **NOVA MCTRL4K**.
- Step 5 Click **Customize** under **2. Apply the following settings**.
- Step 6 In the displayed **Customize** dialog box, click **Create Custom Resolution**.
- Step 7 In the displayed dialog box, set the parameters.
  - 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.

Step 8 Click **Test**.

Step 9 In the displayed dialog box indicating the test is successful, click **Yes** to save the custom resolution.

## 6.3 Screen Settings

### 6.3.1 Quick Configuration

Load the cabinet configuration files and save them to the receiving card.

- Step 1 On the main menu, select **Screen Settings** and press the knob to enter the submenu.
- Step 2 Choose **Quick Config** and press the knob to enter the submenu.
- Step 3 Set **Cabinet Row QTY** and **Cabinet Col QTY** (quantities of cabinet rows and columns to be loaded).
- Step 4 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, Note a).
- Step 5 Set **Data Flow** of the screen. For details, see Note c), d), and e).



#### Note

a). If  $n$  ports are used to load the screen, the number of cabinets loaded by the first  $(n-1)$  ports must be:

1. the same;
2. the integral multiple of the number of rows or columns;
3. no less than the number of cabinets loaded by the last port.

#### Example:

If Ethernet ports 1–7 are used to load the screen, the number of cabinets loaded by ports 1–6 must be the same and the integral multiple of the number of rows or columns. Therefore, you need to set only the number of cabinets loaded by port 1 according to the actual situation during quick configuration. The number of cabinets loaded by port 7 must be less than or equal to the number of cabinets loaded by port 1.

In multi-card mode, if DVI 2 is used as input, the 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 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.

### 6.3.2 Advanced Configuration



Step 1 Choose **Advanced Config** and press the knob to enter its submenu.

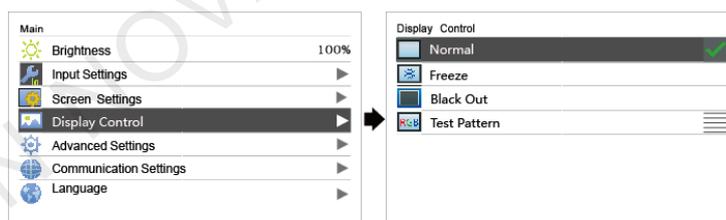
Step 2 On the warning screen, click **Yes** to enter the advanced configuration screen.

Step 3 Select **Enable** and set the parameters of targeted Ethernet ports.

### 6.3.3 Image Offset

Set **Start X** and **Start Y** (the horizontal and vertical offsets of the overall display loaded by the device).

## 6.4 Display Control



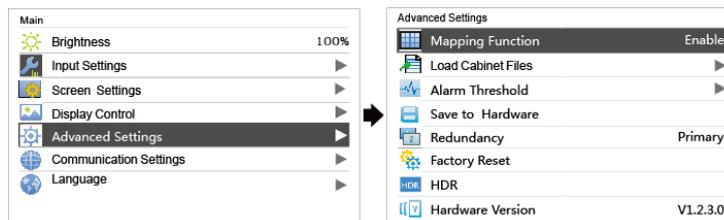
**Normal:** The LED screen displays the content of current input source normally.

**Freeze:** The content of current input source is frozen.

**Black Out:** The screen goes blacks and does not display the content.

**Test Pattern:** A total of 8 test patterns are provided, such as pure colors and line patterns.

## 6.5 Advanced Settings



### 6.5.1 Mapping Function

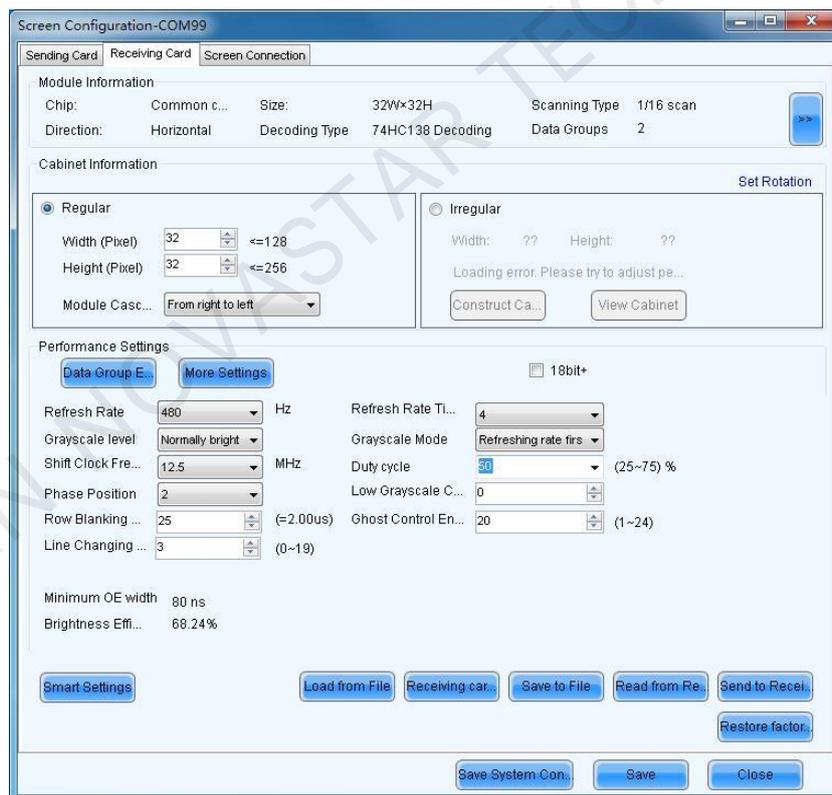
When **Mapping Function** is enabled, each of the cabinets will display the cabinet number and Ethernet port number it belongs to.

### 6.5.2 Loading Cabinet Files

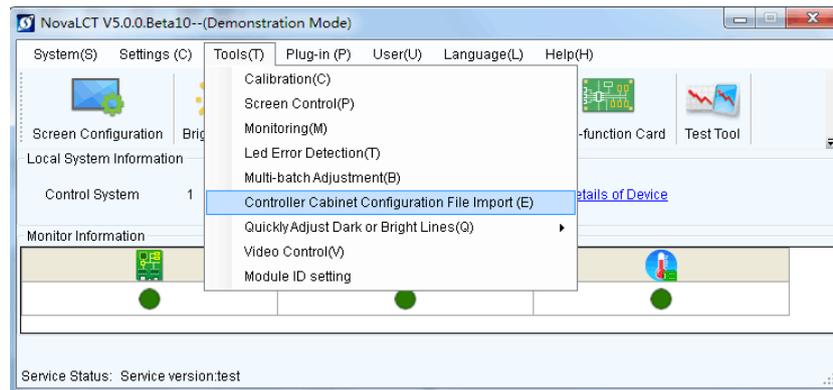
Start NovaLCT on PC and import the saved cabinet configuration files.

Step 1 Save cabinet configuration files.

After configuring the receiving cards, click **Save to File** to save the cabinet configuration files (.rcfgx) to local PC.



Step 2 Import the cabinet configuration files to the MCTRL4K.



Note: After entering the **Import the Configuration File of Controller Cabinet** window, NovaLCT will automatically read the configuration files already existed in the MCTRL4K. Users can change the names and orders of these files or delete them.

Step 3 Load the cabinet configuration files.

### 6.5.3 Alarm Threshold

Set the ranges of temperature and voltage values.

### 6.5.4 Saving to Hardware

Save all the configurations related to the receiving cards to the receiving cards and those data will not be lost even after the device is powered off.

### 6.5.5 Redundancy

Set the current device as the primary or backup device.

### 6.5.6 Factory Reset

Reset the current device to factory settings.

### 6.5.7 HDR

The MCTRL4K supports HDR function and can work with A8s/A10s to greatly enhance the image quality of the screen, presenting more vivid and clearer images.

Step 1 Choose **Advanced Settings > HDR** to enter the HDR settings screen.

Step 2 Press the knob on the HDR item and select **Enable** to enable the HDR function.

Step 3 Set **Screen Peak Luma** and **Ambient Light**.

Step 4 (Optional) Choose **Rest** to reset the HDR settings to factory settings.

Note:

- The HDR function supports only HDR video sources.
- The HDR function supports only the HDMI input connector.
- The HDR and ClearView functions cannot be used at the same time. To set the function, choose **Settings > Adjust screen effect** on NovaLCT. In the displayed window, choose to enable the HDR or ClearView function.

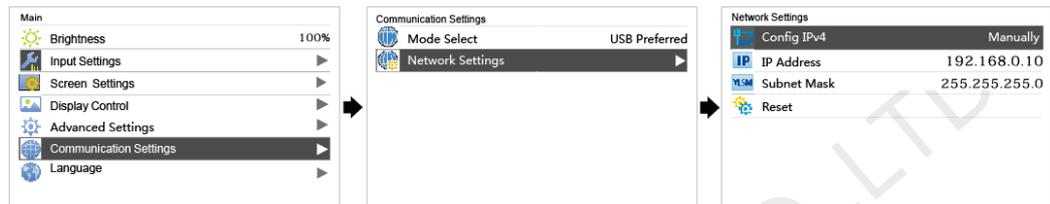
## 6.5.8 Hardware Version

View the hardware version of current device.

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

## 6.6 Communication Settings

Set the communication mode and network parameters.



Two communication modes are provided: **USB Preferred** and **LAN Preferred**.

When the USB and Ethernet ports are connected at the same time, the system will use the communication mode set by the user.

The IPv4 can be configured automatically or manually.

Note: When setting the network manually, the IP address of current device cannot conflict with IP addresses of other devices.

## 6.7 Language

Change the UI language of the MCTRL4K unit.

# 7 Specifications

Input voltage	AC 100-240V–50/60 Hz
Rated power consumption	30 W
Operating temperature	-20°C–60°C
Operating humidity	10% RH–90% RH
Dimensions	482.6 mm × 372.0 mm × 96.0 mm
Weight	4.6 kg
Certifications	<ul style="list-style-type: none"> <li>• FCC</li> <li>• RoHS</li> <li>• UL&amp;CUL</li> <li>• EAC</li> <li>• CB</li> <li>• IC</li> <li>• CE</li> </ul>
Packing	<p>Each MCTRL4K unit is equipped with a suitcase, an accessory box and a large carton.</p> <p>Packing dimensions:</p> <p>Suitcase: 530 mm × 193 mm × 420 mm, white cardboard box printed with <b>NOVASTAR</b>, one unit in a suitcase.</p> <p>Accessory box: 405 mm × 290 mm × 48 mm, white cardboard box printed with <b>Accessory Box</b>.</p> <p>Accessories include 1 × power cord, 1 × Ethernet cable, 1 × USB cable, 1 × HDMI cable and 1 × DP cable.</p> <p>Carton: 550 mm × 440 mm × 210 mm, craft paper box printed with <b>NOVASTAR</b>.</p> <p>Packing rules: Product and accessory box (containing related cables) packed in the suitcase and the suitcase packed in the large carton.</p>