MCTRL660

LED Display Controller

User Manual

Change History

Document Version	Release Date	Description
V1.4.3	2021-09-28	• Added the hot backup verification function. • Added the 10-bit Gamma adjustment function. • Support the 10-bit and 12-bit video source inputs. • Optimized the device cascading solution. Up to 20 devices can be cascaded. • Changed the document style. • Optimized the document content.

Contents

1   **Overview**

1.1 Introduction

The MCTRL660 is an LED display controller developed by NovaStar. It supports 1x DVI input, 1x HDMI input, 1x audio input, and 4x Ethernet outputs. A single MCTRL660 device supports input resolutions up to 1920×1200@60Hz.

The MCTRL660 adopts an innovative architecture to implement smart screen configuration without using a computer, allowing a screen to be configured within 30 seconds. It also allows users to adjust screen brightness manually, which is faster and more convenient.

The MCTRL660 can be mainly used in the rental and fixed applications, such as concerts, live events, security monitoring centers, Olympic Games and various sports centers.

1.2 Features

- 3 types of input connectors

  - 1x SL-DVI

  - 1x HDMI 1.3

  - 1x AUDIO

- 4x Gigabit Ethernet outputs

- 1x type-B USB control port

- 2x UART control ports

  They are used for device cascading. Up to 20 devices can be cascaded.

- Support for high-bit-depth inputs: 8bit/10bit/12bit

- Support for 18-bit grayscale processing and display

- Support for manual screen brightness adjustment, which is fast and convenient

- Quick screen configuration without using a computer

- An innovative architecture to implement smart screen configuration, allowing a screen to be configured within 30 seconds and greatly shortening the stage preparation time

- Pixel level brightness and chroma calibration

  Work with the calibration platform to perform brightness and chroma calibration on each LED to effectively remove color differences and greatly improve display brightness consistency and chroma consistency, allowing for better image quality.
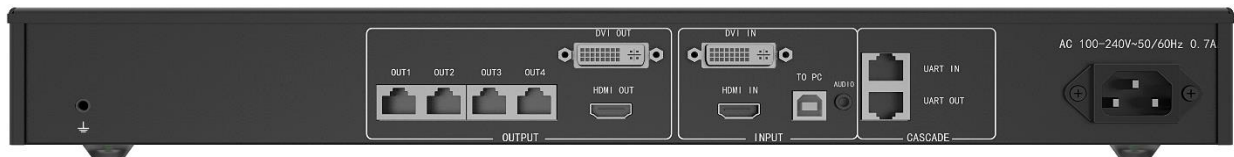
2 Appearance

Front Panel
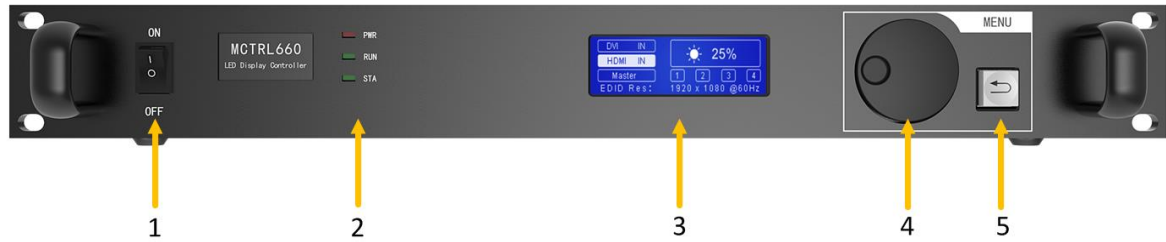
| No.	Name	Description	
1	Power switch	ON/OFF	
2	Indicator	PWR (Red)	Always on: The power supply is normal.
			Off: The power is not supplied, or the power supply is abnormal.
		RUN (Green)	Slow flashing (flashing once in 2s): The video input is unavailable.
			Normal flashing (flashing 4 times in 1s): The video input is available.
			Rapid flashing (flashing 30 times in 1s): The screen is displaying startup image.
			Breathing: The Ethernet port redundancy has taken effect.
		STA (Green)	Always on: The device is operating normally.
			Off: The device is not operating, or operating abnormally.
3	LCD screen	Display the device status, menus, submenus and messages.	
4	Knob	Rotate the knob to select a menu item or adjust the parameter value. Press the knob to confirm the setting or operation.	
5	BACK button	Go back to the previous menu or exit the current operation.	

Rear Panel

Connector Type	Connector Name	Description
Input	DVI IN	1x SL-DVI input connector • Maximum resolution: 1920×1200@60Hz • Support custom input resolutions. Maximum width: 3840 (3840×600@60Hz) Maximum height: 3840 (548×3840@60Hz) • Do NOT support interlaced signal input.
	HDMI IN	1x HDMI 1.3 input connector

|		
		• Maximum resolution: 1920×1200@60Hz
		• Support custom input resolutions. 　Maximum width: 3840 (3840×600@60Hz) 　Maximum height: 3840 (548×3840@60Hz)
		• Support HDCP 1.4.
		• Do NOT support interlaced signal input.
	AUDIO	Audio input connector
Output	4x RJ45	4x RJ45 Gigabit Ethernet ports • Capacity per port up to 650,000 pixels • Support redundancy between Ethernet ports.
	HDMI OUT	1x HDMI 1.3 output connector for cascading
	DVI OUT	1x SL-DVI output connector for cascading
Control	TO PC	Type-B USB 2.0 port to connect to PC
	UART IN/OUT	Input and output ports to cascade devices. Up to 20 devices can be cascaded.
Power	AC 100V-240V~50/60Hz	

3 Applications

Figure 3-1 Applications
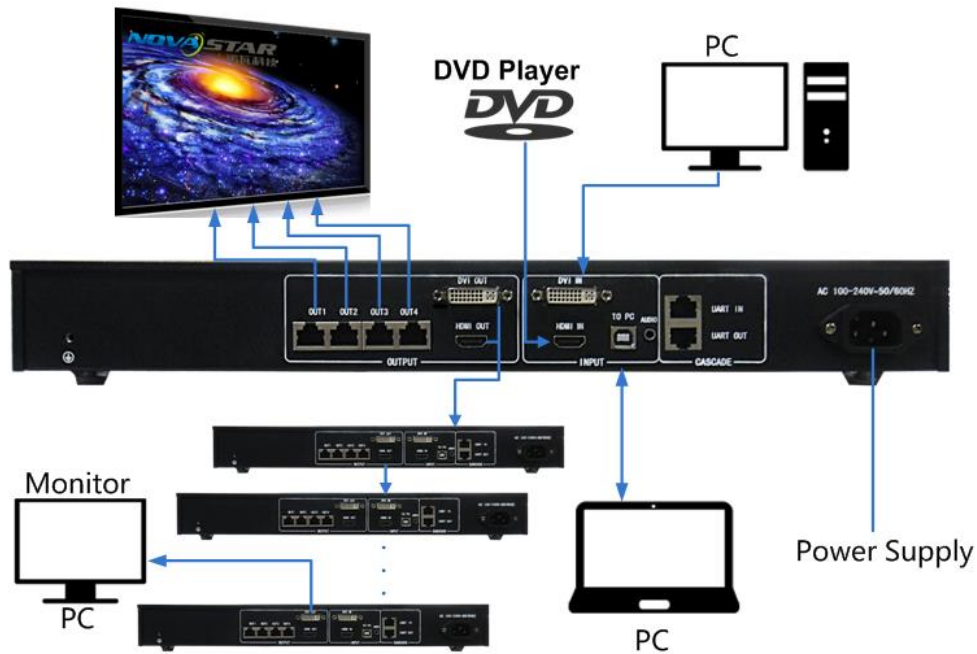
4 Cascade Devices

To control multiple MCTRL660 devices simultaneously, follow Figure 4-1 to connect them.

Figure 4-1 Cascading devices
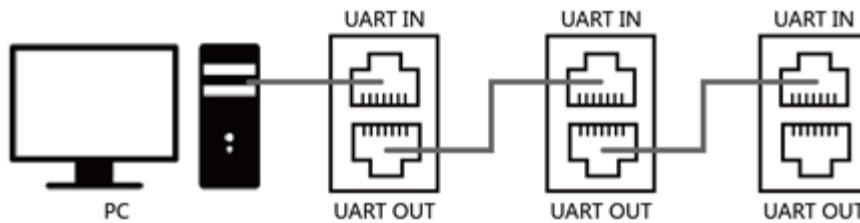
5 Home Screen

Figure 5-1 shows the home screen of the MCTRL660.

Figure 5-1 Home screen in the sending card mode

Figure 5-1 Home screen icon description

Icon	Description
DVI IN / HDMI IN	Indicate that the HDMI connector has a video source connected. It flashes when the video source has no signal.
Master	Indicate that the device is in the master mode.
1 2 3 4	These are the Ethernet output ports. Ethernet port 2 is currently used for output.
☀ 50%	The current screen brightness is 50%.
🔒	It is the button lock icon. When this icon appears, it means that the knob and **BACK** buttons are currently locked.
EDID RES: 1920×1080@60Hz	Indicate that the resolution is 1920×1080 pixels and the frame frequency is 60 Hz.

6 Menu Operations

The MCTRL660 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 6.1 . With other menu settings, you can further improve the LED screen display effect.
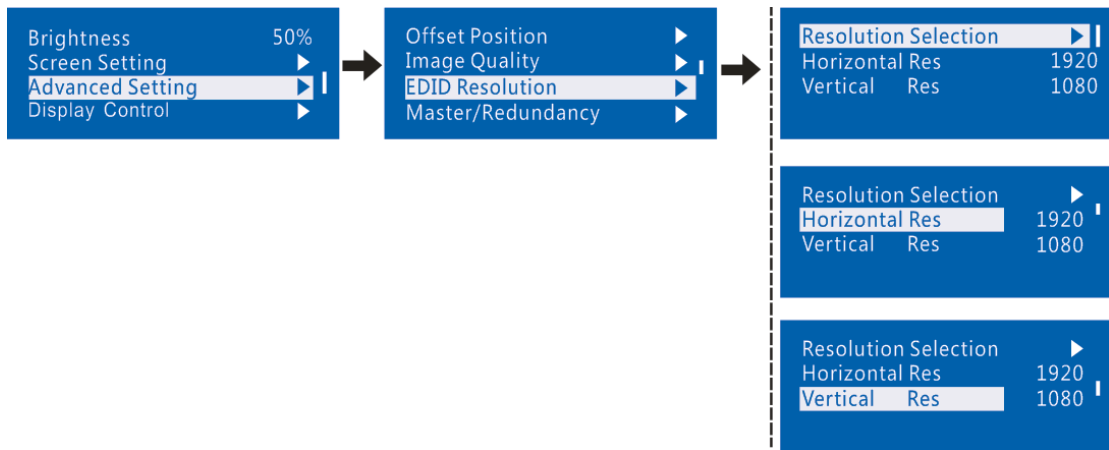
6.1 Light a Screen Quickly

Following the two steps below, namely Set Input Resolution > Quickly Configure the Screen, you can quickly light up the LED screen to display the entire input source.

6.1.1 Step 1: Set Input Resolution

This function is used to set the output resolution of the graphics card. In general, the content shown on the screen cannot exceed the output resolution of the graphics card.

Enter the **Advanced Setting** menu to set the video source resolution. It can be achieved in two methods: select a preset resolution and customize a resolution.

Brightness	50%
Screen Setting	▶
Advanced Setting	▶
Display Control	▶

Offset Position	▶
Image Quality	▶
EDID Resolution	▶
Master/Redundancy	▶

Resolution Selection	▶
Horizontal Res	1920
Vertical Res	1080

Resolution Selection	▶
Horizontal Res	1920
Vertical Res	1080

Resolution Selection	▶
Horizontal Res	1920
Vertical Res	1080

Method 1: Select a preset resolution

Select a proper resolution and refresh rate from the standard resolution presets in the controller. If there is no proper preset, use method 2 to customize a resolution.

Offset Position	▶
Image Quality	▶
EDID Resolution	▶
Master/Redundancy	▶

Resolution Selection	▶
Horizontal Res	1920
Vertical Res	1080

| 1600×1200 |
| 1920×1080 |
| 1920×1200 |
| 2560×960 |

| Input Source	Available Standard Resolution Presets
HDMI/DVI	1024×768@(24/30/48/50/60/72/75/85/100/120)Hz
	1280×1024@(24/30/48/50/60/72/75/85)Hz
	1366×768@(24/30/48/50/60/72/75/85/100)Hz
	1440×900@(24/30/48/50/60/72/75/85)Hz
	1600×1200@(24/30/48/50/60)Hz
	1920×1080@(24/30/48/50/60)Hz
	1920×1200@(24/30/48/50/60)Hz
	2560×960@(24/30/48/50)Hz

Method 2: Customize a resolution

Step 1   On the home screen, press the knob to enter the main menu.

Step 2   Choose **Advanced Setting** > **EDID Resolution**. Customize a horizontal resolution, vertical resolution and refresh rate.

Step 3   Select **Apply** and press the knob to apply the custom resolution.

If it is not applied, the customized resolution will not take effect.
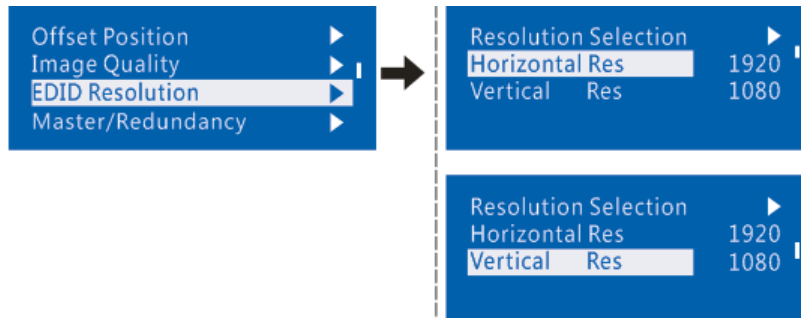
6.1.2   Step 2: Quickly Configure the Screen

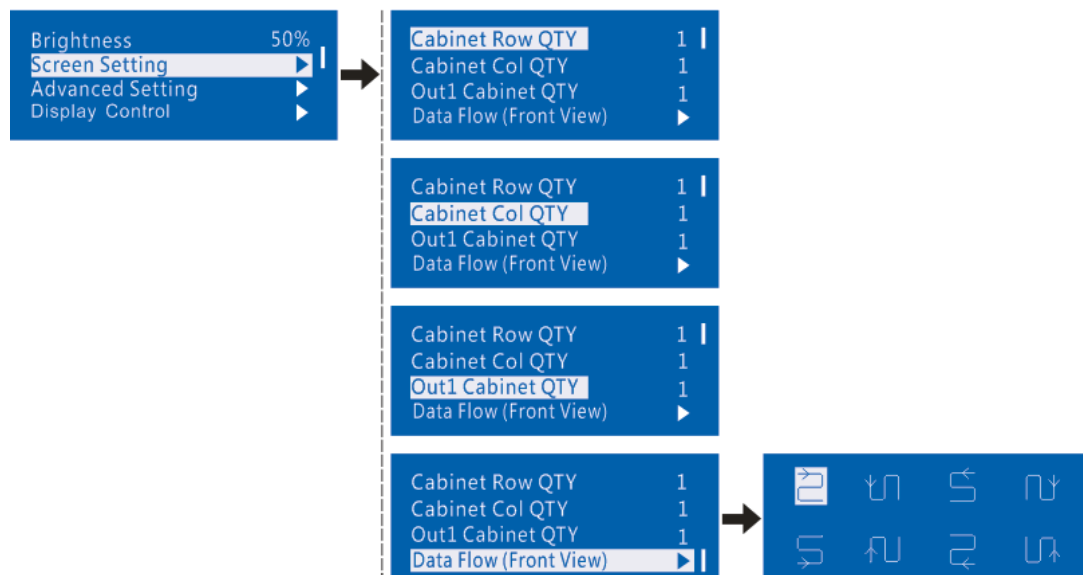Follow the steps below to complete quick screen configuration.

Step 1   Power on the screen.

- If the cabinet is in normal display, go to Step 2.

- If the cabinet is in abnormal display, load the cabinet file first and save it to the receiving card following operations in 6.3.4   Load Cabinet Files.

Step 2   Enter the **Screen Setting** submenu and set the parameters.

- Set **Cabinet Row QTY** and **Cabinet Col QTY** (numbers of cabinet rows and columns to be loaded) according to the actual situation of the screen.

- Set **Out1 Cabinet QTY** (number of cabinets loaded by Ethernet port 1). The device has restrictions on the number of cabinets loaded by the Ethernet ports. For details, see Note a).

- Set **Data Flow** of the screen. For details, see Note c), d), and e).

Figure 6-1 Quick configuration

Note:	
a). If *n* ports are used to load the screen, the number of cabinets loaded by each of the first (*n–1*) ports must be the same and the integral multiple of the number of cabinet rows or columns, and it must be greater than or equal to the number of cabinets loaded by the last port.	Example: If all the 4 Ethernet ports are used to load the screen, the number of cabinets loaded by ports 1–3 must be the same and the integral multiple of the number of cabinet rows or columns. Therefore, you need to set only the number of cabinets loaded by port 1 according to the actual situation. The number of cabinets loaded by port 4 must be less than or equal to the number of cabinets loaded by port 1.
b). For irregular screens, NovaLCT software must be connected to configure the screen.	
c). During data flow settings, you can rotate the knob to select a target data flow pattern.	
d). During data flow settings, ensure that the cabinets loaded by each Ethernet port are connected one by one in the same direction.	
e). During data flow settings, ensure that Ethernet port 1 is at the beginning position of the whole physical connection.	

6.2 Adjust Brightness

Screen brightness allows you to adjust the LED screen brightness in an eye-friendly way according to the current ambient brightness. Besides, appropriate screen brightness can extend the service life of the LED screen.

Figure 6-2 Brightness adjustment

Step 1 On the home screen, press the knob to enter the main menu.

Step 2 Select **Brightness** and press the knob to confirm the selection.

Step 3 Rotate the knob to adjust the brightness value. You can see the adjustment result on the LED screen in real-time. Press the knob to apply the brightness you set when you are satisfied with it.

6.3 Advanced Setting

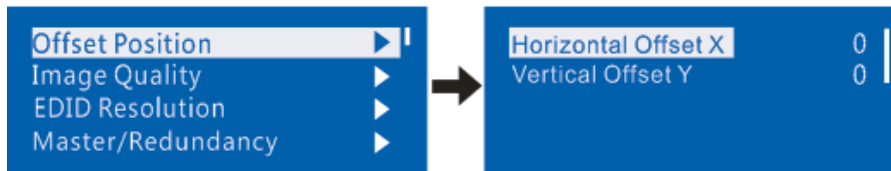Advanced settings include eight functions shown in the figure below.

Figure 6-3 Advanced setting
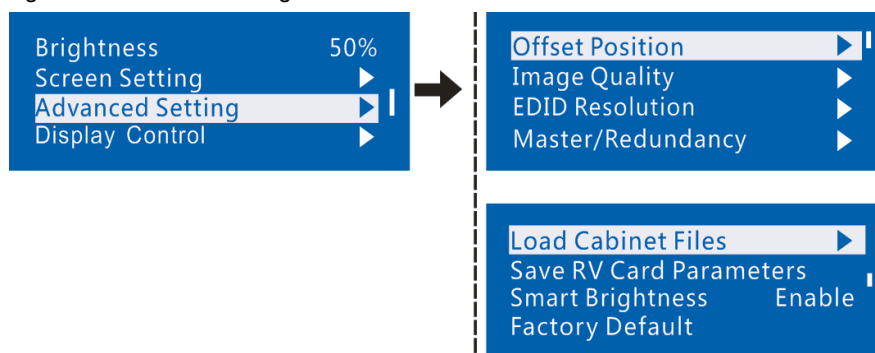
6.3.1 Offset Position

Adjust the start coordinates of the display image. There is an upper limit on the offset, that is, the total value of offset and screen size cannot exceed the output resolution of the graphics card.

Figure 6-4 Offset position

6.3.2　Image Quality

Set the gamma, contrast, saturation and hue values of image as required. After proper adjustment, select **Save RV Card Parameters** to save the parameter values to receiving cards.
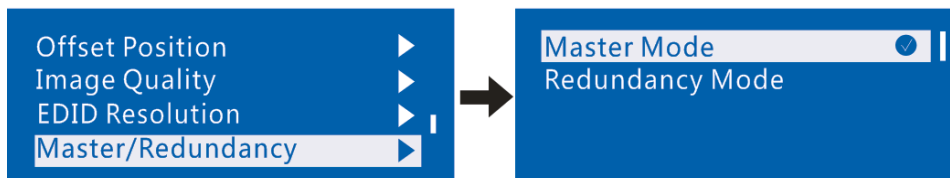
Figure 6-5 Image quality adjustment

6.3.3　Master/Redundancy

When the system has multiple controllers, set this controller to the master mode or redundancy mode.

Figure 6-6 Master/Redundancy

6.3.4　Load 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, click **Add Configuration File** to select and add a cabinet configuration file.

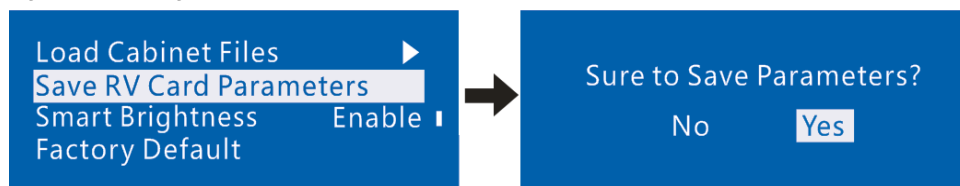Step 3　Click **Save the Change to HW** to save the change to the controller.

Figure 6-7 Importing configuration file of controller cabinet
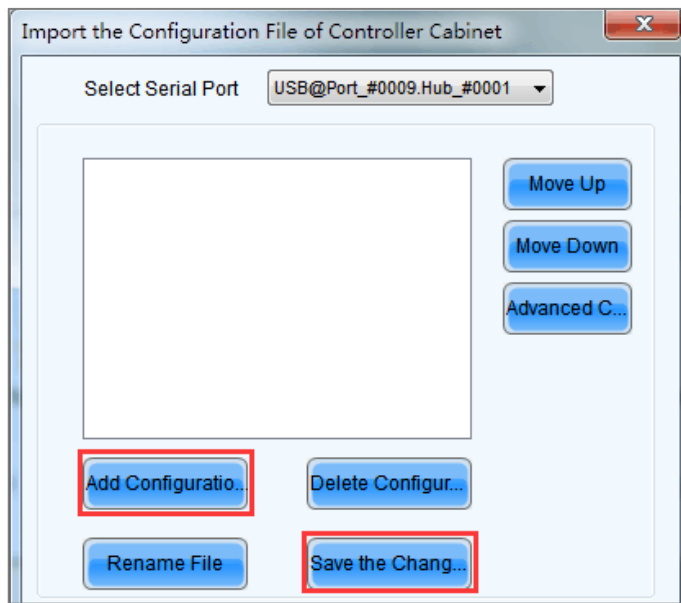
6.3.5 Save to RV Card

You can send and save the current screen configuration parameters to the receiving cards. The configuration data will not be lost after the device is powered off.

Figure 6-8 Saving to RV card

6.3.6 Smart Brightness

This parameter is set to **Disable** by default. To successfully enable this function, you must load the configuration files first. Currently, only non-pulse-width modulation (PWM) chips are supported.

Figure 6-9 Smart brightness

6.3.7 Factory Reset

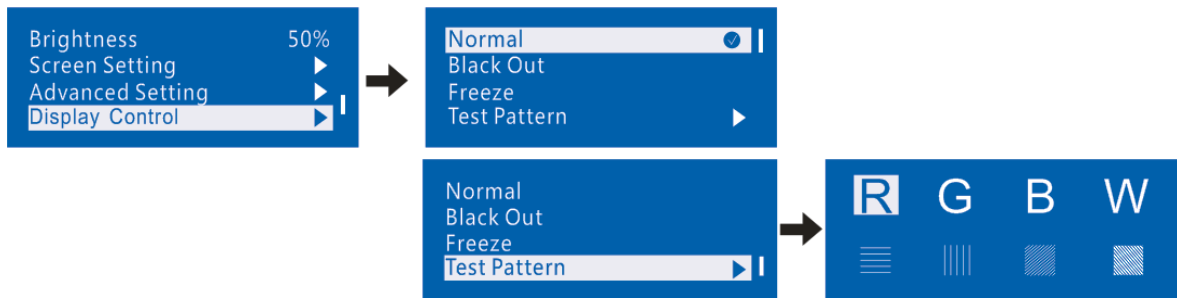Reset the controller parameters to factory settings.

Figure 6-10 Factory reset

6.4 Display Control

Control the display status on the LED screen.

Figure 6-11 Display control

- Normal: Display the content of the current input source normally.

- Black Out: Make the LED screen go black and do not display the input source. The input source is still being played in the background.

- Freeze: Make the LED screen always display 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.

6.5 Language

Set the MCTRL660 UI language. You can choose Chinese or English.

Figure 6-12 Language settings
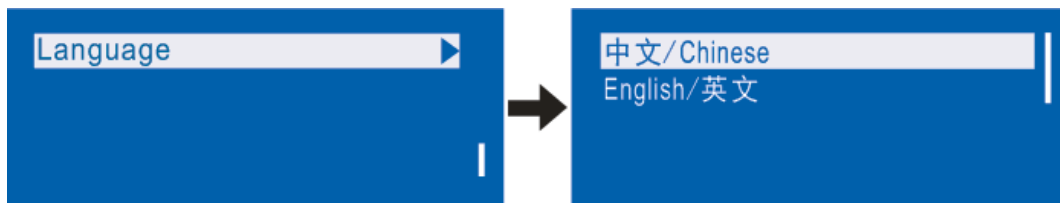
7 Operations on PC

7.1 10-bit Gamma Adjustment

The 10-bit input source supports 10-bit gamma adjustment.

Step 1 Run NovaLCT. On the menu bar, choose **User** > **Advanced Synchronous System User Login**. Enter the password and click **Login**.

Step 2 Click **Screen Configuration**, choose a communication port and click **Next**.

Step 3 On the **Sending Card** tab page, set the input source bit depth to 10bit and click **Set**.

Step 4 On the NovaLCT main window, choose **Brightness** > **Manual Adjustment**.

Step 5 Under **Advanced Settings**, choose **Gamma Adjustment** > **Gamma Value Adjustment**.

Step 6 Drag the slider to adjust the value and then click **Save to HW**.

Figure 7-1 10-bit gamma adjustment
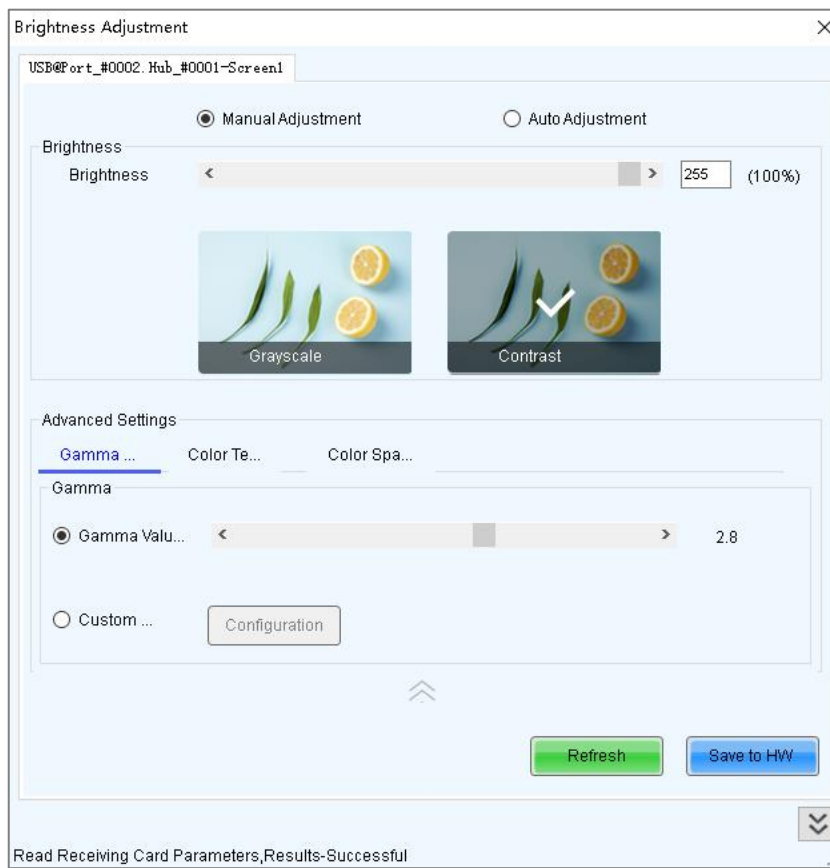
7.2 Input Source Bit Depth

Set the input source bit depth to 8bit, 10bit or 12bit.

Step 1 Run NovaLCT. On the menu bar, choose **User** > **Advanced Synchronous System User Login**. Enter the password and click **Login**.

Step 2 Click **Screen Configuration**, choose a communication port and click **Next**.

Step 3 Next to **Input Source Bit Depth** on the **Sending Card** tab page, select an option.

Step 4 Click **Save System Configuration File** and **Save**.
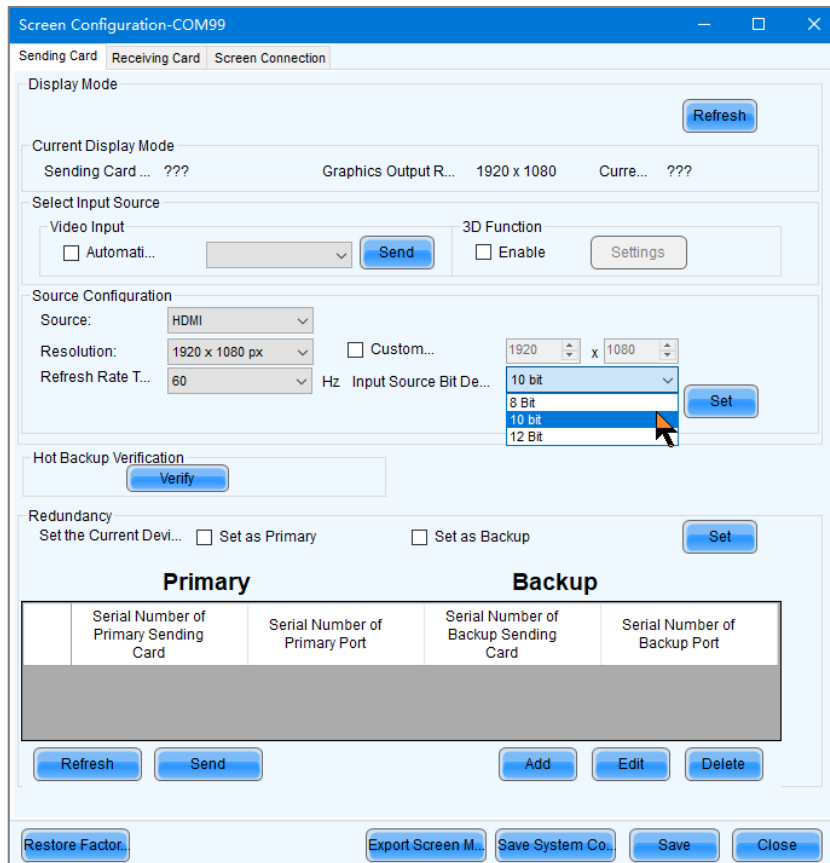
Figure 7-2 Setting input source bit depth

Figure 7-1 Input source bit depth adjustment

Input Source Bit Depth	Description
8bit	An 8-bit input source does not reduce the device loading capacity by half.
10bit	A 10-bit input source reduces the device loading capacity by half.
12bit	A 12-bit input source reduces the device loading capacity by half.

7.3 Firmware Update

7.3.1 NovaLCT

In NovaLCT, perform the following steps to update the MCTRL660 firmware.

Step 1   Run NovaLCT. On the menu bar, choose **User** > **Advanced Synchronous System User Login**. Enter the password and click **Login**.

Step 2   Type the secret code "**admin**" to open the program loading page.

Step 3   Click **Browse**, select a program package, and click **Update**.

7.3.2 SmartLCT

In SmartLCT, perform the following steps to update the MCTRL660 firmware.

Step 1   Run SmartLCT and enter the V-Sender page.

Step 2   In the properties area on the right, click [icon] to enter the **Firmware Upgrade** page.

Step 3   Click to select the update program path.

Step 4   Click **Update**.

8 Specifications

Electrical Specifications	Input voltage	AC 100V~240V-50/60Hz
	Rated power consumption	16 W
Operating Environment	Temperature	−20ºC to +60ºC
	Humidity	10% RH to 90% RH, non-condensing
Physical Specifications	Dimensions	483.0 mm × 258.1 mm × 55.3 mm
	Net weight	3.6 kg
Packing Information	Carrying case	530 mm × 370 mm × 140 mm
	Accessory box	402 mm × 347 mm × 65 mm Accessories: 1x power cord, 1x USB cable, 1x DVI cable
	Packing box	550 mm × 440 mm × 175 mm

Statement

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