MTB2000E-D MTB1200E-D MTB800E-D

Floor LED Sending Controller

User Manual

Applicable to MTB2000E-D MTB1200E-D MTB800E-D

Document version:： V2.0

Safety Instruction

This symbol reminds the user that there are important operation and maintenance instructions in the user manual of the equipment.

This symbol warns the user that there is dangerous voltage exposed in the casing of the equipment, and there is danger of electric shock.

Precautions

Reading Instructions Users must read and understand all safety and use instructions before using the equipment.

Save Instructions Users should save safety instructions for future use.

Obedience warning Users should observe all safety and operating instructions in the product and user's guide.

Avoid appending Do not use tools or appending equipment not recommended by the manufacturer of this product to avoid danger.

Warning

Power supply

This equipment can only use the power supply indicated on the product. The equipment must be powered by a power supply system with a ground wire. The third line (ground wire) is a safety facility, which cannot be used or skipped.

Unplug the power supply

In order to safely unplug the power supply from the equipment, please unplug the power cord of all equipment rear or desktop power supply, or any power cord connected to the mains system.

The power cord shall be properly wired to avoid being trampled or squeezed by heavy objects.

Maintenance

All repairs must be carried out by certified maintenance personnel. There are no parts in the equipment that can be replaced by users. To avoid the danger of electric shock, don't try to open the cover of the equipment to repair the equipment yourself.

Vent holes

Some equipment housings have vent slots or holes, which are used to prevent the sensitive components in the machine from overheating. Don't block the vent with anything.

Trademark

VGA and XGA are registered trademarks of IBM.

VESA is a trademark of video electronics standards association.

HDMI logo and high-definition multimedia interface are trademarks of HDMI Licensing LLC.

CONTENT

1 Update Records

Document version	Hardware version	Release time	Update record
V2.0	ST2000 (V2.0.0) ST1200 (V2.0.0)	August 22(nd), 2025	First release of document

2 Applicable Model

The product models applicable to this article are as follows:
MTB2000E-D、MTB1200E-D、MTB800E-D

3 Product Introduction

The MTB2000E-D is an Sending controller independently developed by Mooncell that supports interactive communication protocols for floor led displays, supporting up to 10.4 million pixels. It features powerful processing capabilities, ultra-stable performance, and exceptional cost performance.

The MTB2000E-D's powerful video processing and transmission capabilities make it ideal for interactive display projects in education, entertainment, gaming, and more.

3.1 Improve the display effect

- Multiple input interfaces
  - 1×HDMI2.0
  - 1×DP1.2
  - Choose one of two options

- Output interface

- 20 Gigabit Ethernet ports, supporting vertical and horizontal tiling in any configuration
- Maximum load capacity: 10.4 million pixels
- Pixel-to-pixel load depends on the input port.

- Audio interface

  Support audio input，Synchronize via network cable

- Control interface

- 1×USB interface communication, which can be controlled by cascading multiple sending cards on the same PC.
- 1×LAN, 100M network interface connected to the host computer for debugging.
- 1×RS232 serial port for connecting to central control equipment

3.2. Diversified Practical Functions

- Compatible with multiple input frame rates including 30Hz, 50Hz, 60Hz, and 120Hz
- Supports host software monitoring of sending card operating parameters and status
- Supports configuration parameter readback
- Supports Gigabit Ethernet error rate detection
- Supports multiple preset resolutions and custom resolution settings.

4 Hardware Introduction

4.1Wiring Topology Diagram

The MTB2000E-D can be widely applied in spherical, circular, and other irregular LED displays, as shown below:

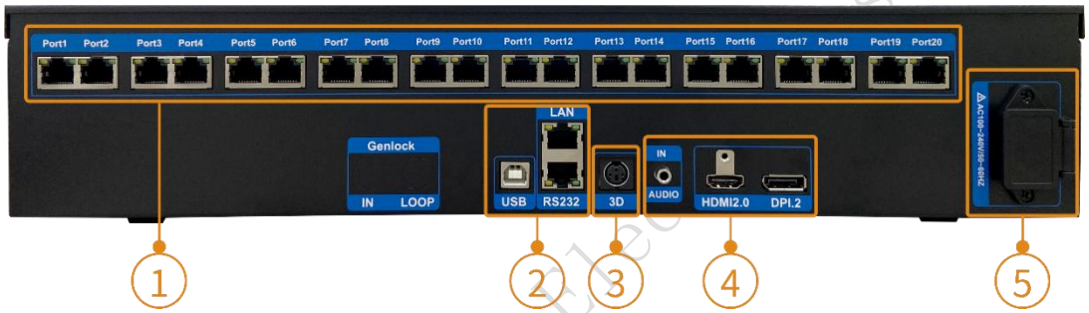
4.2 Hardware Introduction

4.2.1 Front Panel

*Product images are for reference only. The actual product shall prevail upon purchase.

#	Keys	Illustrations
1	ON/OFF	Power ON/OFF
2	LCD Display	To display the current status of the device and to have the menu settings. LCD Resolution：320×240
3	Knob	Select menus, adjust parameters, and confirm operations
4	Esc	Return(ESC)/Cancel the current menu or operation.

4.2.1 Rear Panel



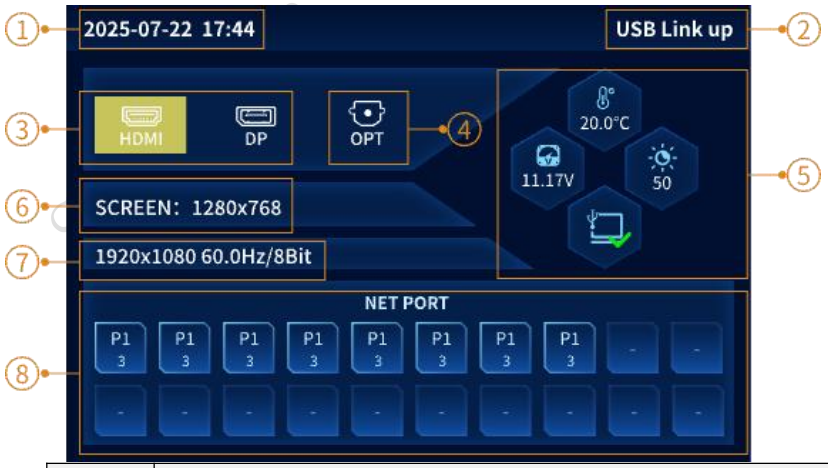
*Product images are for reference only. The actual product shall prevail upon purchase.

Rear Panel Description		
Input Interface		
#	Name	Illustration
4	HDMI2.0	1×HDMI 2.0, supports up to 3840×2160@60Hz with backward compatibility. Maximum customizable GPU width: 7680 Maximum customizable GPU height: 7680
	AUDIO	1×3.5mm audio input interface
	DP1.2	1×DP1.2, video signal input interface. Maximum resolution 3840×2160@60Hz, backward compatible. Graphics card customizable maximum width 7680 Graphics card customizable maximum height 7680

Output Interface		
#	Name	Illustration
1	Gigabit Ethernet port	◆ Port1-Port 20 correspond to output ports 1-20 ◆ Maximum single-port load capacity: 650,000 pixels, at 8-bit
Control Interface		
#	Name	Illustration
2	LAN	100Mbps Ethernet interface for connecting to host computer for debugging
	RS232	1×RS232 interface for connecting to central control equipment
	USB（B-Type）	Connects to PC software for communication
Extended Interface		
#	Name	Illustration
3	3D	3D Transceiver Communication Interface
Power supply interface		
#	Name	Illustration
5	Ac power Interface	AC-100-240V-50/60HZ AC power interface

5 Main Interface

After the processor is turned on, the LCD screen displays the use status interface.



#	Usage Status Interface Description

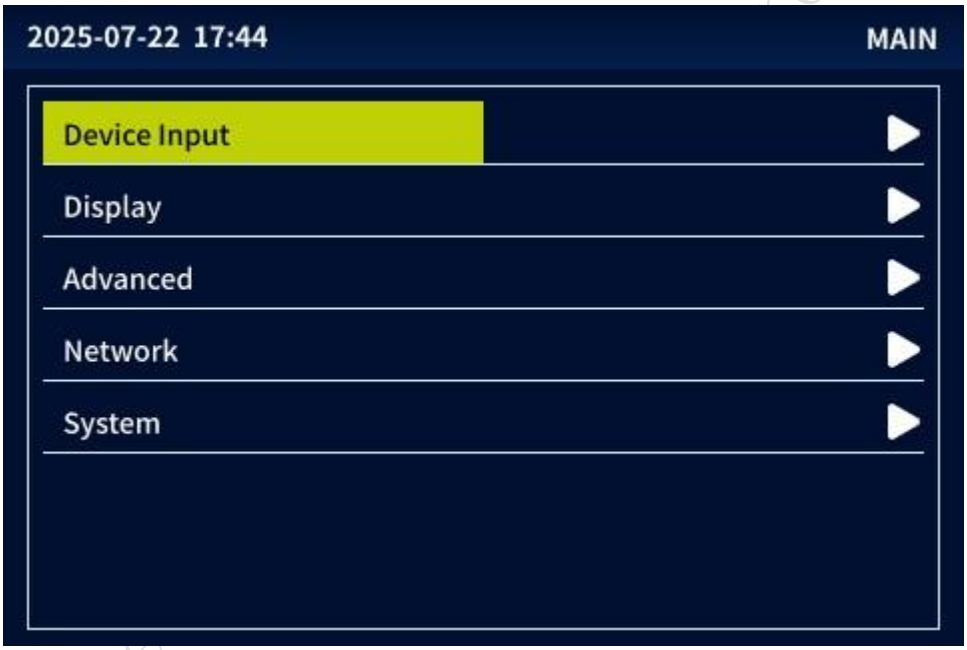
1	Real-time Time
2	100Mbps Ethernet and USB debugging connection status:  ：100 Mbps connection  ：USB Connection  ：Both USB and 100Mbps Ethernet are disconnected.
3	Currently selected input source:  ：HDMI source selected  ：HDMI source not selected
4	Fiber port: This device does not support fiber optics.
5	 ：Real-time Temperature Monitoring of Equipment  ：Real-time Power Monitoring for Equipment  ：Screen brightness value  ：USB is connected.  ：USB not connected.
6	Screen: Current output screen resolution
7	Output: Current selected signal source input resolution / selected color depth
8	Network Port Connection Status:  ：The network port is connected. Display the port number and the corresponding number of receiver cards. Note: If a receiving card is connected but its number is not displayed, unplug and replug the debugging cable.  ：The network port is not connected

6 Menu Operation

Knob:

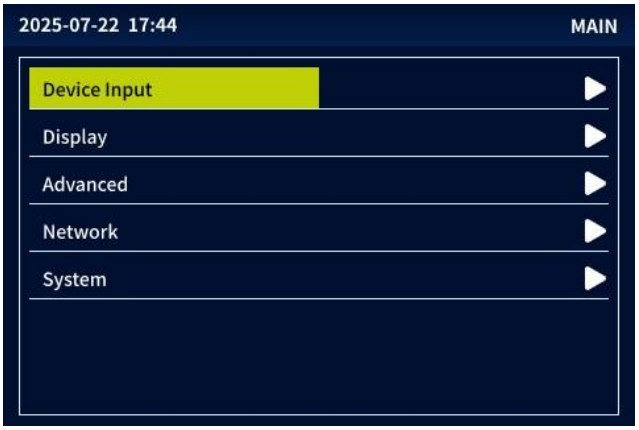
- In the main interface, press the knob to enter the menu operation interface.
- In the menu operation interface, turn the knob to select the menu function, and the selection status is blue. Press the knob to select the current menu or enter the submenu function.
- After selecting a menu with parameters, you can adjust the parameters by turning the knob. Please note that you need to press the knob again to confirm after the adjustment is completed.
- ESC: return key.
- Long press the knob to unlock the front panel keys.

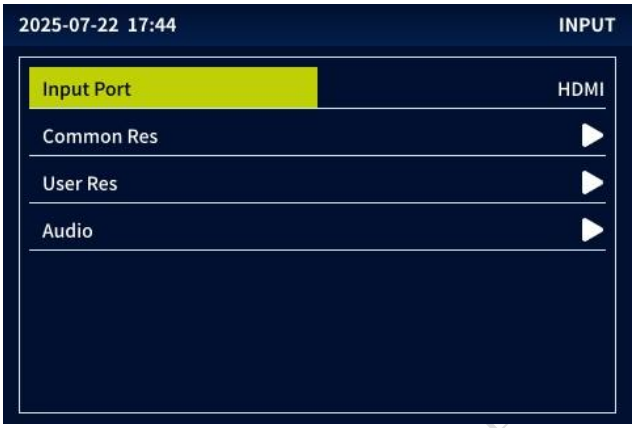
Main Menu Function Settings: The main menu contains 5 major settings categories: 【Device Input】, 【Display】, 【Advanced Functions】, 【Network Settings】, and 【System Settings】.



6.1Device Input

Device Input includes: [Input Ports], [Common Resolutions], [Customer Resolutions], [Audio Settings]

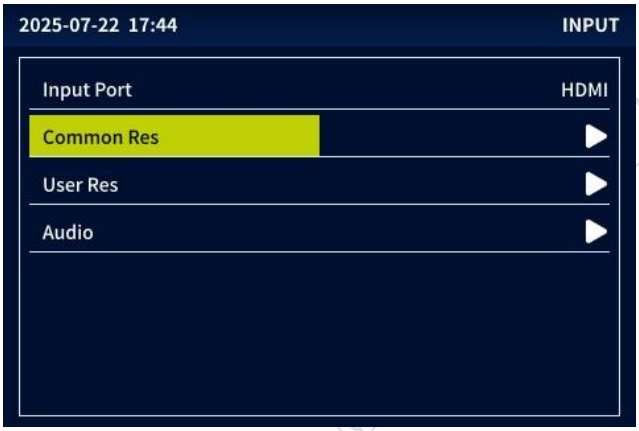


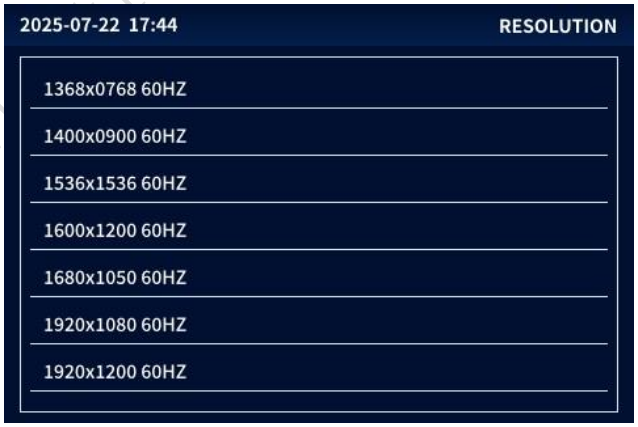


6.1.1 Common Resolution

Step 1: Rotate the knob to the 【Common Resolutions】 function, then press the knob to select.

Step 2: Choose a preset resolution as needed to set the device's output resolution.





Supported Resolution：

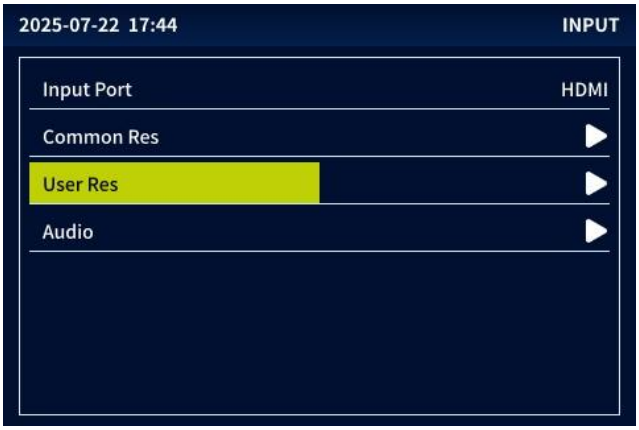
- 1368x0768 60HZ、1400x0900 60HZ、1536x1536 60HZ、
- 1600x1200 60HZ、1680x1050 60HZ、1920x1080 60HZ、
- 1920x1200 60HZ、2048x1024 60HZ、2304x1152 60HZ、
- 2560x1080 60HZ、2560x1440 60HZ、3840x1080 60HZ、
- 3840x2160 60HZ、1080x1920 60HZ、1080x3840 60HZ
- 2160x3840 60HZ

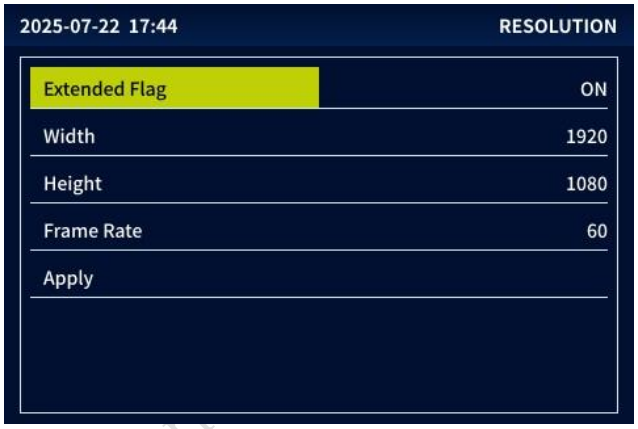
6.1.2 Customer Resolution

Step 1: Rotate the knob to the 【Custom Resolution】 function and press the knob to select it.

Step 2: Set the “Horizontal Size,” “Vertical Size,” and “Refresh Rate” parameters as needed.

Step 3: After configuration, press “Apply” to take effect.



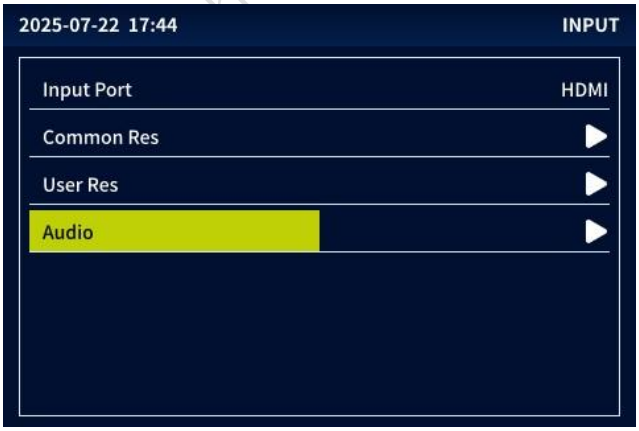


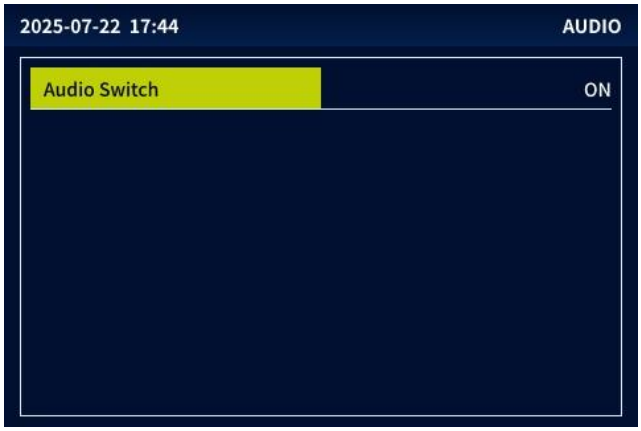
Note: Maximum horizontal resolution 4096, maximum vertical resolution 4095, refresh rate 0-150Hz. When the resolution exceeds 1920x1080 at 60Hz or when “Input Signal Audio” needs to be enabled, Extended Data must be activated.

6.1.3 Sound Setting

Step 1: Rotate the knob to the 【Sound Settings】 function, then press the knob to enter.

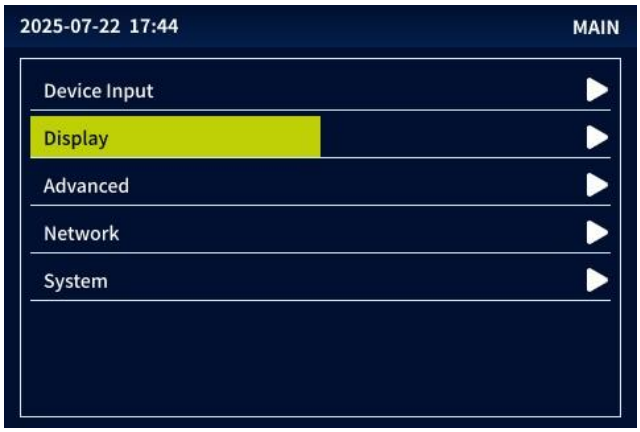
Select the audio switch status; default is off.

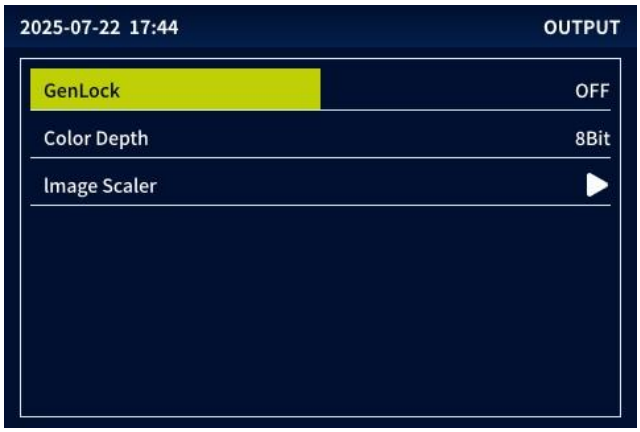




6.2 Window Display

Window display settings includes GenLock, color depth, and image scaling functions.

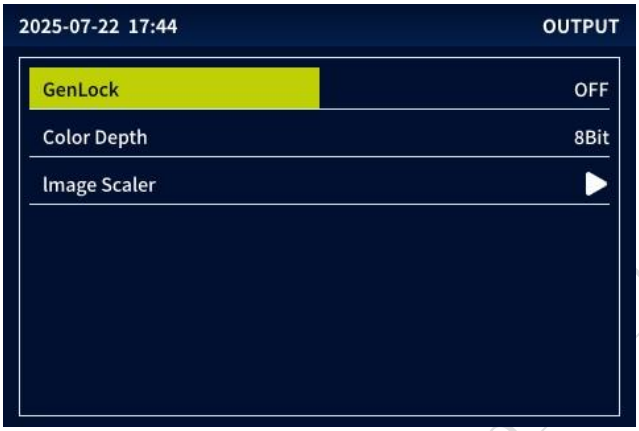




6.2.1 Genlock

Genlock is a synchronization function that uses an external reference signal to align the scanning and refresh rates of multiple video signal sources or display devices. It ensures that the internal clocks and scanning mechanisms of different devices are calibrated to a unified standard, guaranteeing stable and precise image display when processing multiple video signals or coordinating multiple devices.

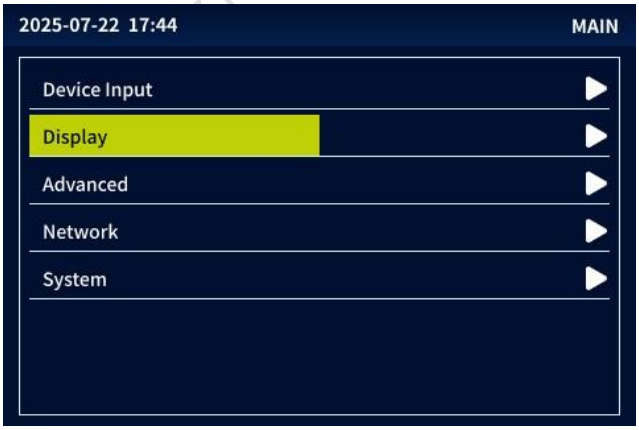
This prevents issues such as screen tearing, rolling, or flickering. It is commonly used to synchronize the display of multiple video sources—such as live camera feeds, pre-produced background videos, and special effect videos—on stage LED screens. This ensures smooth scene transitions and blended visuals, enhancing the audience's viewing experience.

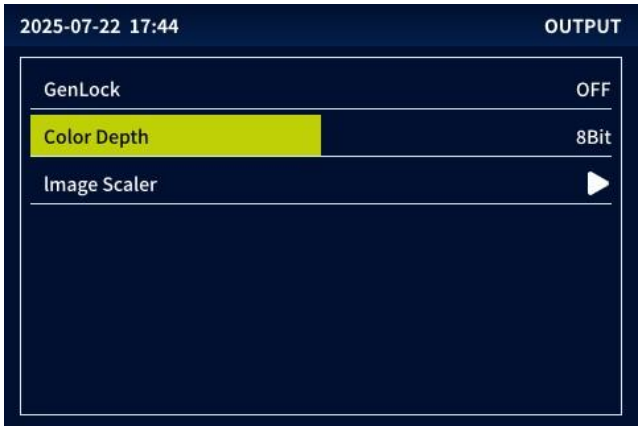


6.2.2 Color Depth

Step 1: Rotate the knob to the [Output Display] - [Color Depth] function and press to select.

Step 2: Choose between 10-bit or 8-bit color depth output.



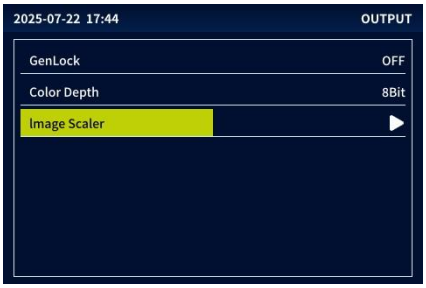


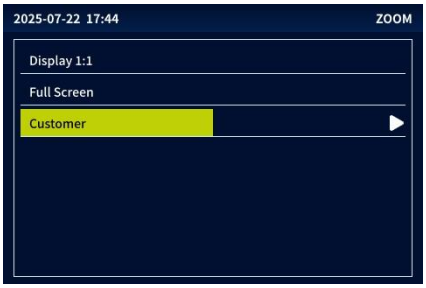
6.2.3 Scaling Functions

Note: Requires compatibility with FPGA programs that support scaling.

Step 1: Rotate the knob to the [Window Display] - [Scaling] function and press to confirm entry.

Step 2: Select as needed from [1:1 Display], [Full Screen Display], or [Customer Resolution].

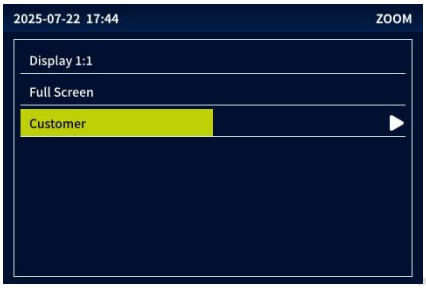




1:1 Display: The image is displayed at the input resolution size.

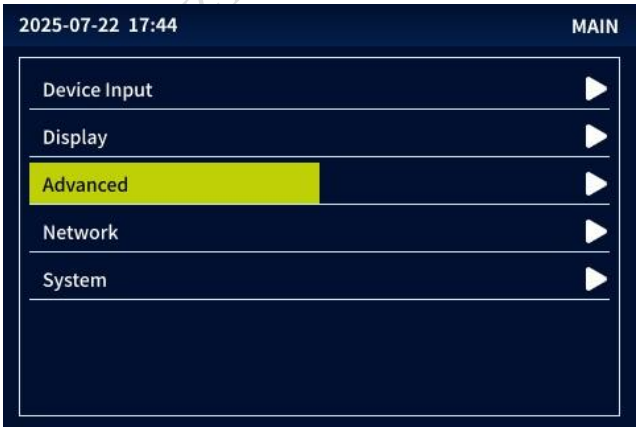
Full Screen Display: The image is scaled to the size defined in the display connection file.

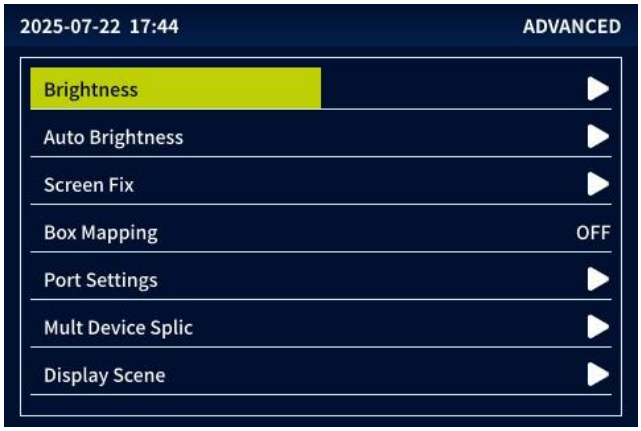
Customer Resolution: The crop function defaults to "Off". When enabled, you can manually set the horizontal and vertical starting points for cropping, the dimensions of the cropped image, and the display dimensions.



6.3 Advanced Function

The advanced function menu includes the following seven options: [Brightness Adjustment], [Ambient Brightness], [Screen Patrol], [Box Mapping], [Port Settings], [Multi-Device Splicing], and [Scenes].

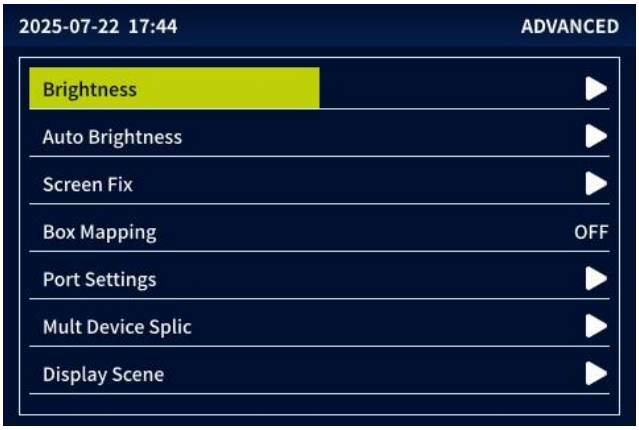


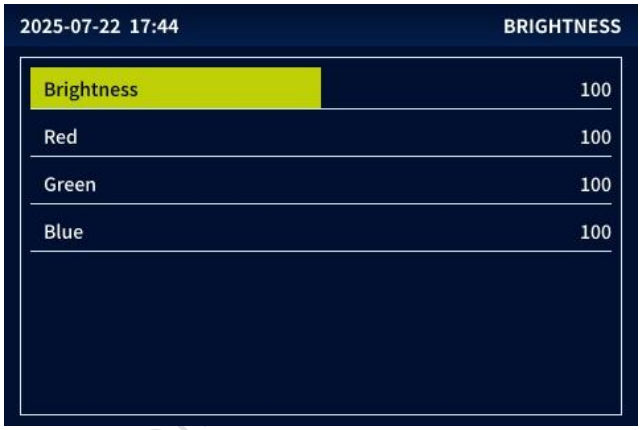


6.3.1 Brightness

Step 1: Rotate the knob to the [Brightness Adjustment] function and press the knob to confirm.

Step 2: The default brightness value is 100. Rotate the knob to adjust the receiving card brightness from 0 to 100.



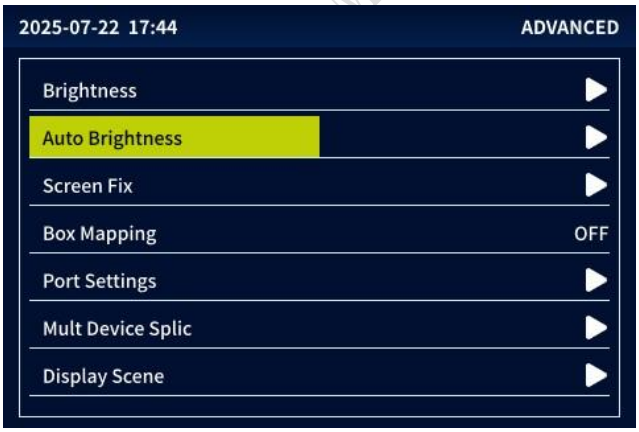


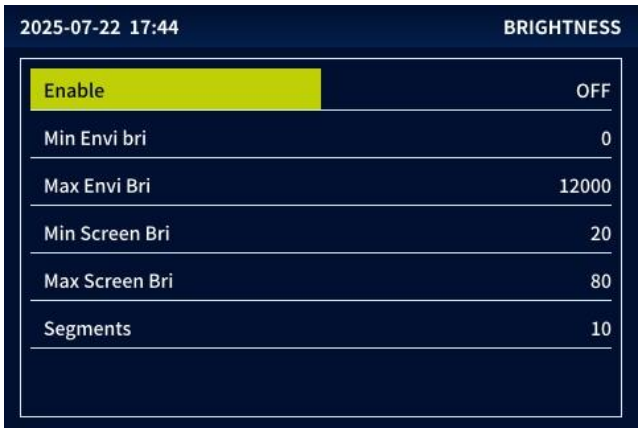
6.3.2 Ambient Brightness

Step 1: Connect the multi-function card to an external light sensor probe.

Note: The current firmware version does not support offline automatic brightness control; it must be connected to Autoled.

Step 2: Enter this interface and turn on the status to enable automatic screen brightness adjustment based on ambient brightness.



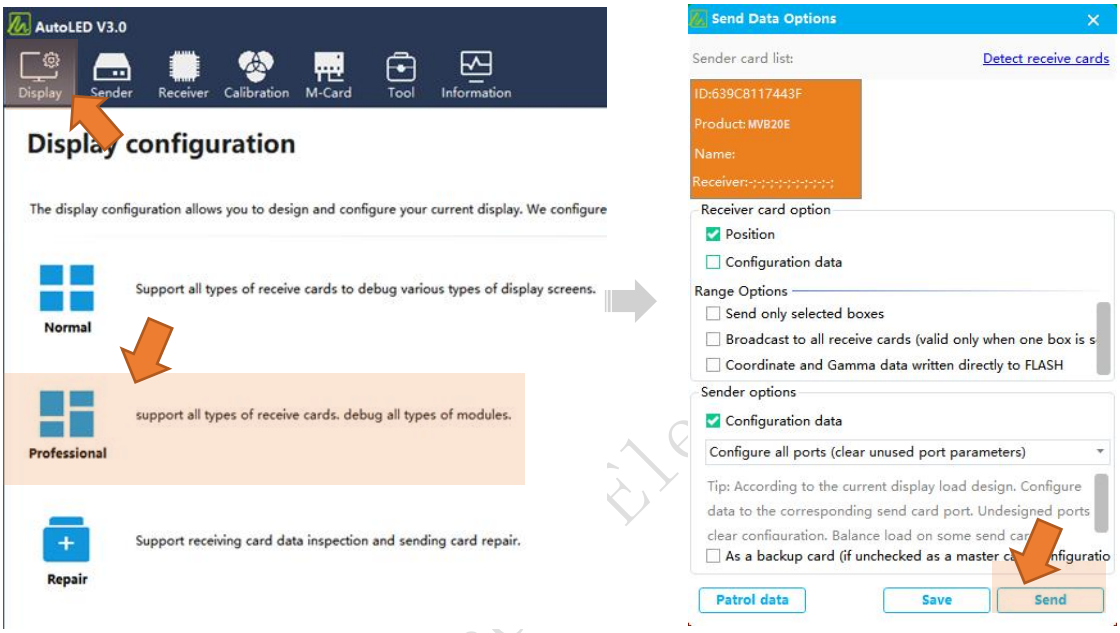


6.3.3 Screen Patrol

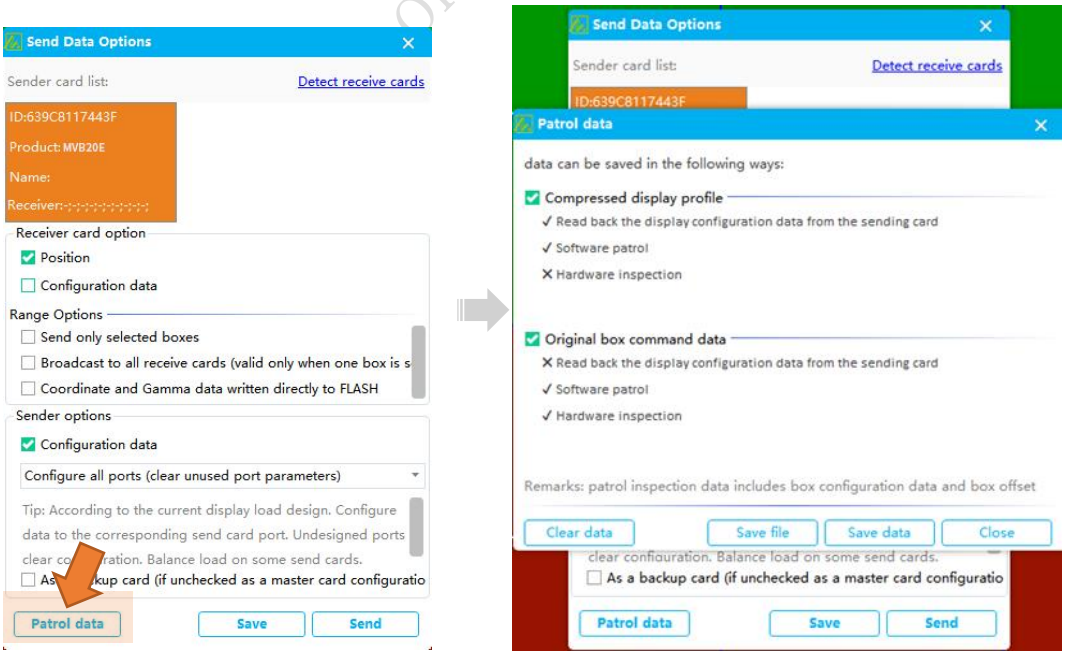
- Before executing screen patrol, it is necessary to use the host computer software to set and save the patrol data.
- Method for setting and saving patrol data using host computer software:

Step 1: In the [Screen Configuration] interface of the host computer software, send the display connection file in the [professional] section.

Send a screen mapping file



Step 2: Click [Patrol Data] to save the data.



The patrol documents can be backed up and saved to the sending card for the screen patrol function, and the parameter content of the patrol document backup is the patrol content of the "All" patrol type shown in the table below.

✧ Select the patrol type, all, sending card and receiving card;

Type	Application Scenario	patrol Content
All	When replacing the receiving card: the parameters shown on the right will be sent to the sending card and the receiving card again to restore the backup patrol data.	Location parameters of sending card: image interception parameters, network port offset parameters, (excluding scaling parameters) Receiving card: location parameters, configuration data parameters (excluding gamma value)
Sending card	Enabled only when the sending card parameters are abnormal: the sending card parameters shown on the right will be re-distributed to the sending card to restore the backup patrol data.	Location parameters: image capture parameters, portal offset parameters, (excluding scaling parameters)
Receiving card	Enabled only when the location parameters of the receiving card are abnormal: the parameters of the sending card shown on the right will be re-distributed to the sending card to restore the backup patrol data. After the unlimited patrol is started: the automatic updating parameters can be directly changed on the screen with faults, without manual distribution.	One patrol: location parameters of sending card and receiving card. Unlimited patrol: repair the location parameters of the sending card and the receiving card for the first time, and then only repair the location parameters of the receiving card.

✧ Number of patrols: You can select "Once" or "Unlimited" when selecting the patrol of receiving card, and only "Once" is available for other types.

Note: USB must be unplugged after the receiving card is turned on. After unplugging USB, the menu cannot be operated. To temporarily turn off the wireless patrol, you can press and hold the button for 10 seconds or plug in USB again to temporarily turn it off. To permanently turn it off, you need to click Turn off the patrol on the menu.

✧ Start patrol , and perform patrol according to the selected patrol patrol type and patrol patrol times.

✧ Patrol solidification, patrol back to the gamma parameter, and write and save the parameter sent by patrol to the corresponding memory, so that the parameter can be directly loaded when the equipment restarts.

Tips：

- It is necessary to start the patrol before the patrol and curing operation.
- The solidified patrol parameters correspond to the patrol type selected during patrol.
- During curing, the parameters of the sending card are stored in the flash of the sending card and the parameters of the receiving card are stored in the flash of the receiving card.

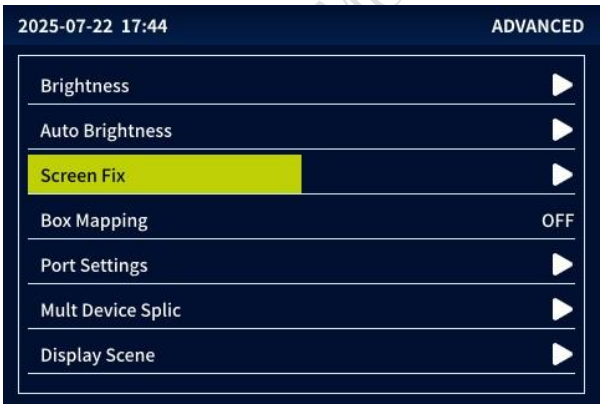
✧ Turn off the patrol. When the receiving card turns on the unlimited patrol, click to exit the patrol operation.

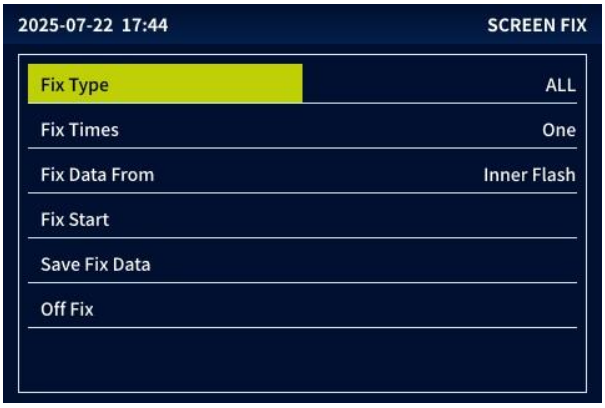
Screen patrol:

Step 1: Turn the knob to [Screen patrol], and press the knob to enter.

Step 2: Set type, times and fix data; Press the knob to confirm the selection of "Turn on patrol", "save fixed data" and " off screen fix".

Step 3: Wait for the patrol to be completed, or press and hold the knob to exit during the unlimited patrol of the receiving card.



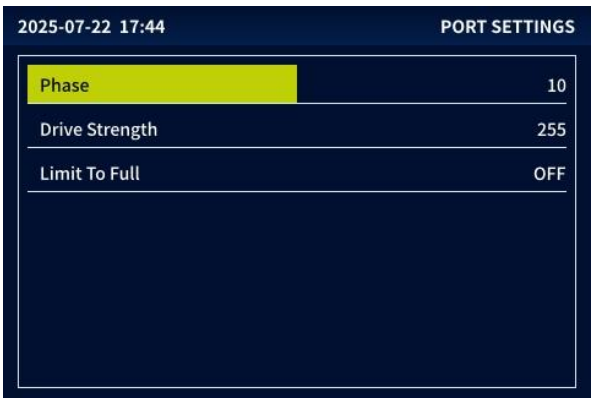


6.3.4 Box Mapping

Step 1: In the [Advanced Functions] interface, rotate the knob to [Box Mapping] and press to enter. Step 2: Select "On" or "Off". As shown in the figure below:

6.3.5 Port Setting

Step 1: Rotate the knob to the [Port Settings] function and press to confirm entry. Step 2: Phase & Drive Adjustment: If vertical lines or flickering dots appear in the image, adjust the signal source's phase and drive settings. Phase range: 0–15, Drive range: 0–255.



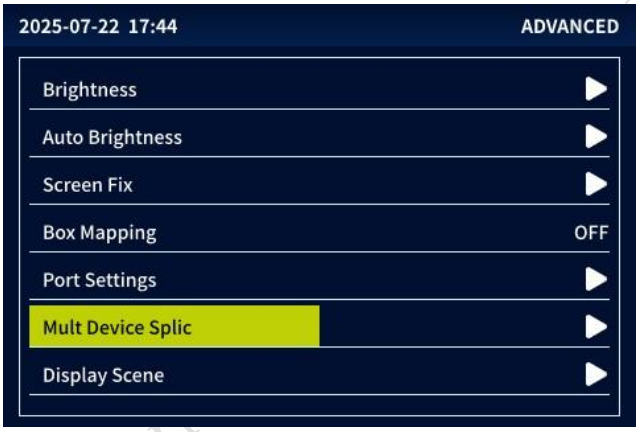
Limited to Full Range:

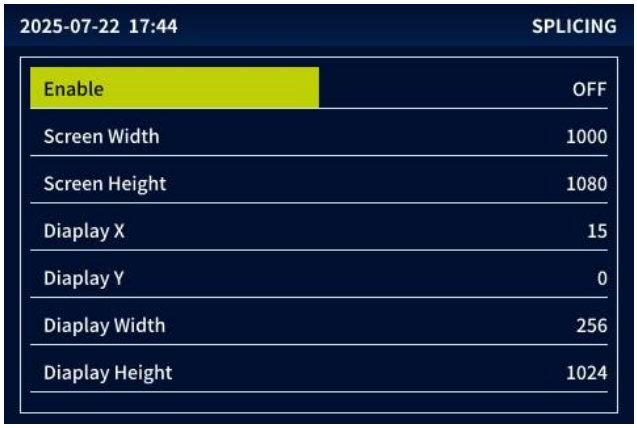
OFF：
(1) Input RGB Limited, Output RGB Limited: Grayscale starts from level 16. (2) (2) Input RGB Full, Output RGB Full: Grayscale starts from level 1. (3) (3) Input YUV422/YUV444, Output RGB Limited: Grayscale starts from level
ON：
(1) Input RGB Limited, Output RGB Full: Grayscale starts from level 1. (2) (2) Input RGB Full, Output RGB Limited: Grayscale starts from level 16. (3) (3) Input YUV422/YUV444, Output RGB Full: Grayscale starts from level 1.

6.3.6 Multi-device Splicing

Step 1: Rotate the knob to the [Multi-Device Splicing] function and press the knob to enter.

Step 2: The function defaults to "Off". It is used for splicing images from multiple devices using the same signal source. Set the screen width and height, horizontal and vertical starting points, and display horizontal and vertical dimensions as needed.





6.3.7 Scene Setting

Step 1: Rotate the knob to the [Display Scenes] function and press the knob to confirm entry.

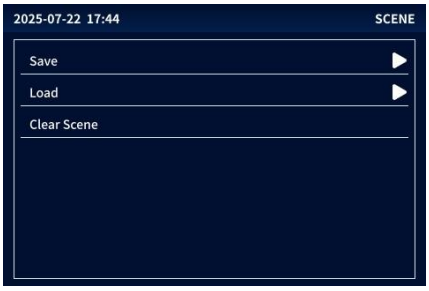
Step 2: Save multiple usage scenarios, storing parameter settings for "Screen Splicing," "Window Display," and input signal sources, enabling quick loading and application of saved scenarios.

➢ Save: Save the current display effect as a scene preset.

Rotate the knob to select "Execute Save" to open the save interface. Select the desired scene number to complete the save. If the selected scene number already contains parameters, they will be overwritten by the new scene parameters.

➢Load: Recall a previously saved scene preset.

➢Clear Data: Delete all saved scene presets.



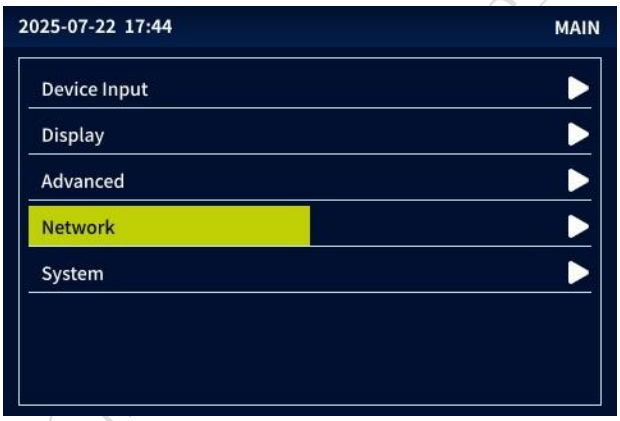
6.4 Network Settings

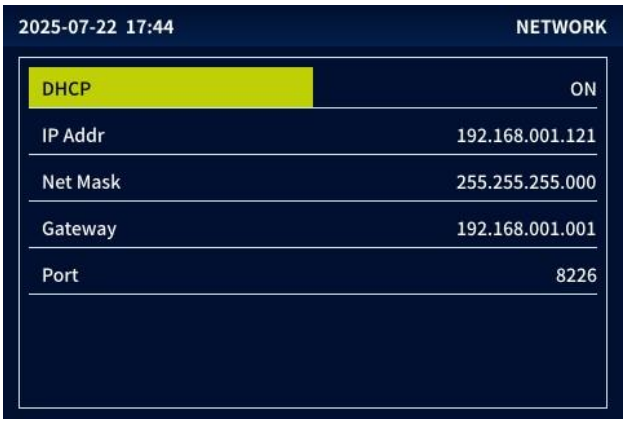
Step 1: On the Advanced Features interface, rotate the knob to Network Settings and press to enter.

Step 2: DHCP On: Automatically requests IP allocation from the router. The DHCP server can automatically assign IP addresses to devices on the network, reducing manual configuration effort.

DHCP Off: Fixed IP remains unchanged.

Step 3: Configure the “Default Gateway,” “Net Mask,” “IP Address,” and “Port Number.”





Enabled: Automatically requests IP assignment from the router device.

Automatic IP address allocation: The DHCP server can automatically assign IP addresses to devices on the network, reducing manual configuration efforts.

Disabled: The fixed IP remains unchanged.

6.5 System Settings

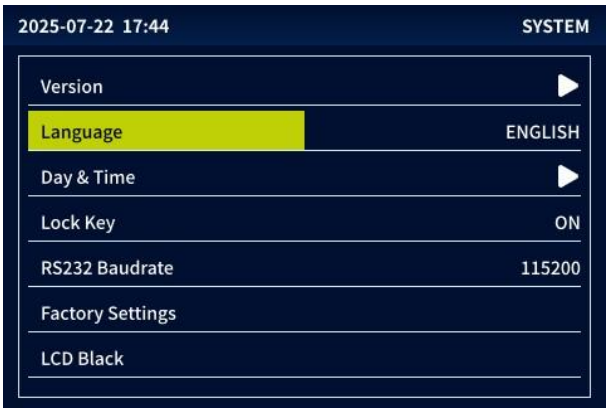
The system settings function menu includes the following seven options: [Version Information], [Time Settings], [Language], [Key Lock],, [RS232 Baud Rate], [LCD Blackout] and [Factory Settings].

6.5.1 Version Information

This function allows viewing the FPGA and MCU versions of the device.

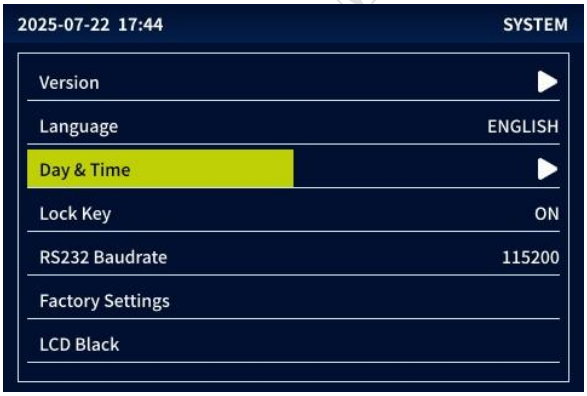
6.5.2 Language

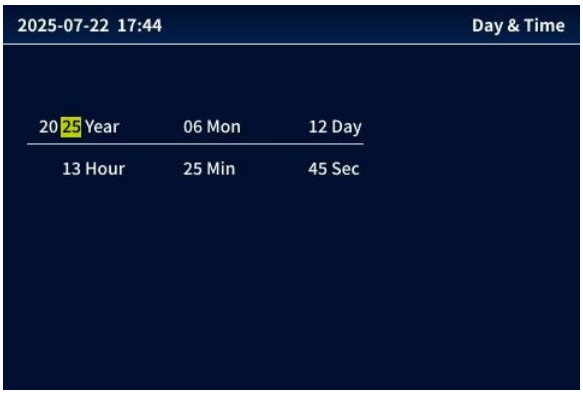
The default system language is "Simplified Chinese", which can be switched to "English" and "Traditional Chinese". Press the knob to confirm.



6.5.3 Time Setting

Set the local clock and date of the video processor. The video processor motherboard has a built-in button battery or super capacitor, allowing the clock to continue running after power loss. If the device remains unpowered for an extended period, the time and date will need to be reset upon reuse. The scheduled switching function relies on this time setting. Restoring factory settings will not alter the time configuration parameters. Rotate the knob to select the value to be adjusted, press "OK" to confirm (the selected value will turn green), then rotate the knob to adjust the value and press "OK" again to save.





6.5.4 Key Lock

The key lock function is turned on to prevent misoperation and lock the key function of the front panel. Default "on" state, automatic locking after 3 minutes of no operation; Unlocking method: After pressing the knob, there is a prompt, and long press the knob to unlock.

6.5.5 Baud rate of RS232

The data transmission rate from one device to another, that is, bits per second (bit/s), has typical baud rates of 300, 1200, 2400, 9600, 19200, 38400, 115200, 230400 and so on. It needs to be used with serial communication software.

6.5.6 Factory Settings

Press the knob to pop up the prompt message "Are you sure you want to restore the factory settings? (Confirm/Return) "; Press the knob to confirm, and press the Esc key to return.

Set Parameters:

- Output Resolution: 1920X1080 60Hz
- Signal Source: HDMI
- Scaling Parameters: 0, 0, 1920, 1080
- Crop: Off
- Freeze: off
- Black Screen: Off
- Test Screen: Off

7 AutoLED Software Application

7.1 3D Display Setting

Can be set to: Top-Bottom 3D mode or Side-by-Side 3D mode.

Step 1: Connect the 3D transmitter hardware.

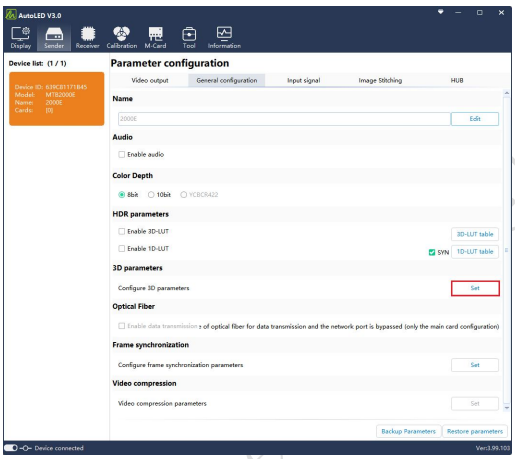
Step 2: Set the receiving card parameter to 120Hz. Note the load limitations.

Step 3: In AutoLED, go to "Sending Card - General Settings - 3D Parameters" (as shown in the figure below) to enter the debugging interface. Set either Side-by-Side 3D mode or Top-Bottom 3D mode.

Note:

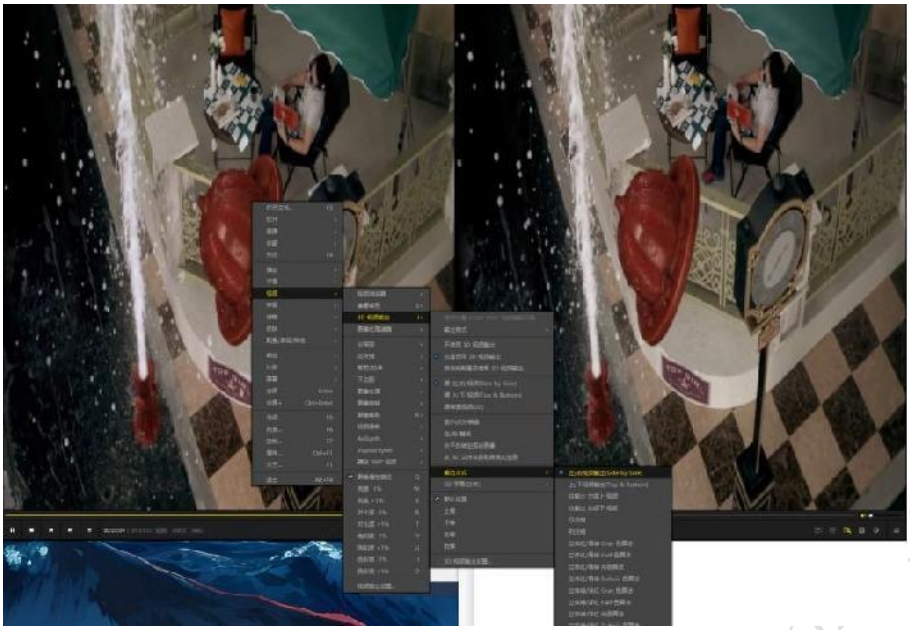
Side-by-Side 3D mode: The input resolution width must be multiplied by 2, while the height remains unchanged. Image cropping also requires the width to be multiplied by 2, with the height unchanged.

Top-Bottom 3D mode: The input resolution height must be multiplied by 2, while the width remains unchanged. Image cropping also requires the height to be multiplied by 2, with the width unchanged.

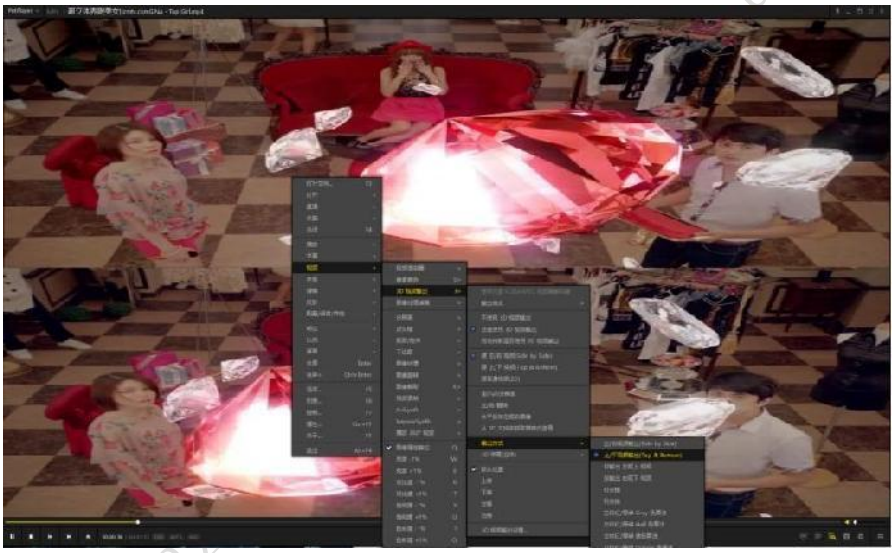


Step 4: Video Software Settings

Side by side 3D Mode, as shown below:



Top-Bottom 3D mode



Frame Doubling Mode:

Step 1:Connect the 3D transmitter hardware.

Step 2:Set the receiving card parameter to 120Hz (note the load limitations).

Step 3:In AutoLED, navigate to "Sending Card > General Settings > 3D Parameters" to enter the debugging interface, and enable Frame Doubling Mode .

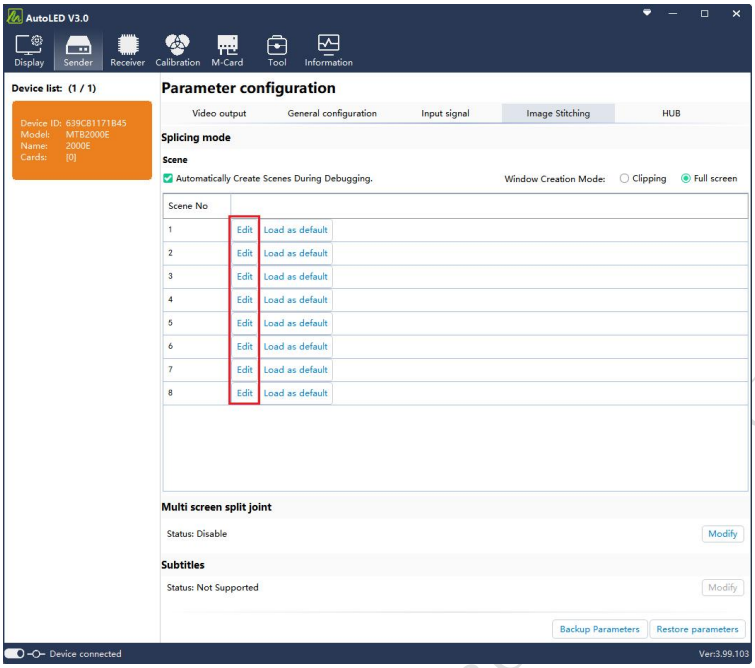
7.2 Scaling Function

Step 1: In AutoLED, navigate to "Sending Card > Screen Splicing > Scene Editing" to enter the scaling settings interface.

Step 2: Configure window cropping and window scaling parameters.

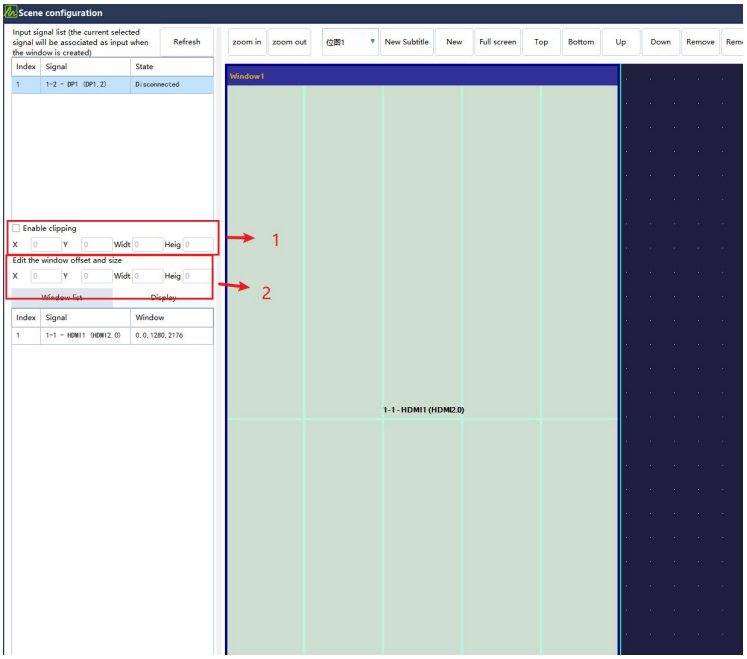
Window Cropping: Disabled by default. When enabled, the cropping size of the window can be set.

Window Scaling: Set the scaling size of the window.



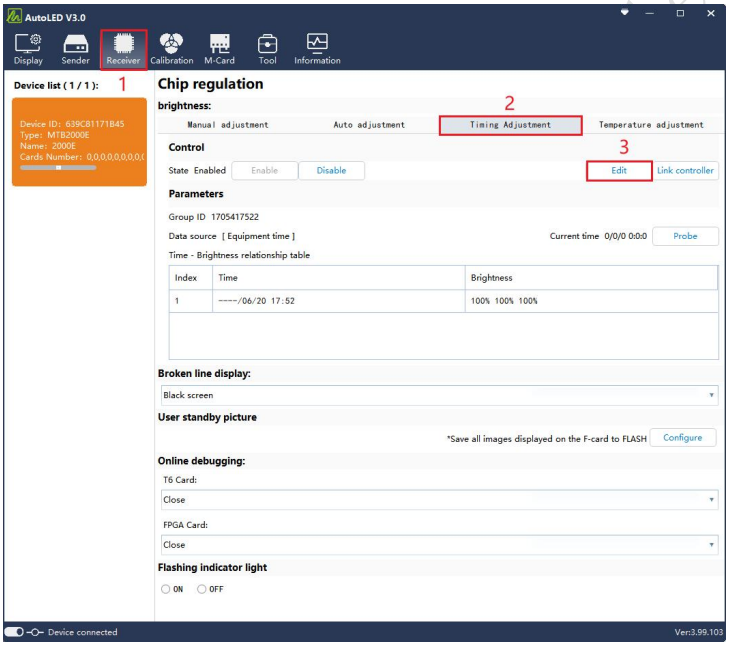
Disabled by default. Enable to set window cropping size.

Set window scaling size.

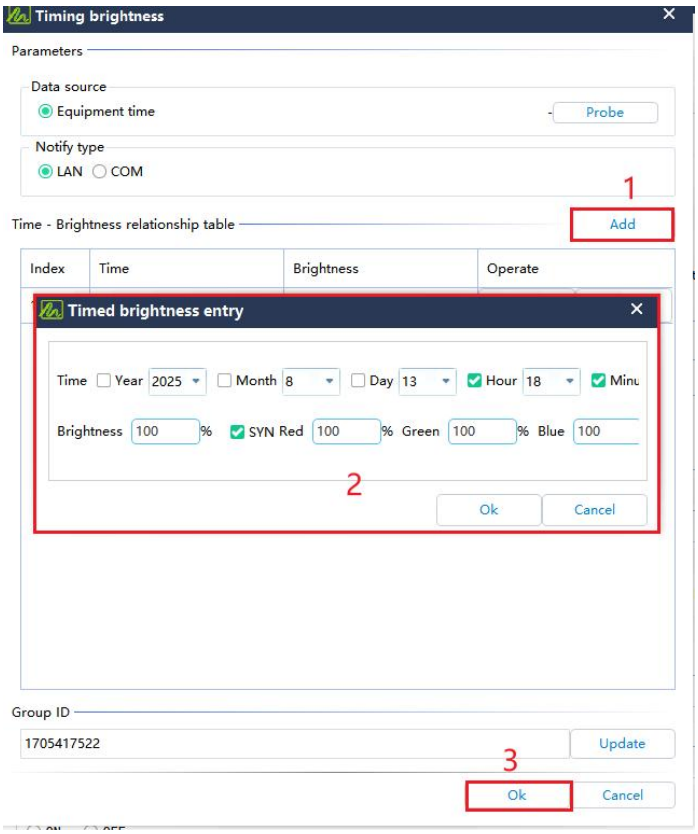


7.3 Timing Brightness

Step 1: In the software, navigate to [Screen Control] - [Timing Adjustment], and click Edit to enter.



Step 2: After entering the interface shown below, click "Add" to set the time and brightness value according to customer requirements, then confirm.



Note: The scheduled brightness function cannot be used while connected via a USB debugging cable; otherwise, it will not execute. Use a 100 Mbps Ethernet connection for debugging instead.

WeChat Official Account Platform

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