FOT2000

Sending Controller

User Manual

Applicable to FOT2000

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.

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1 Update Records

Document version	Hardware version	Release time	Update record
V2.0	ST2000 (V2.0.0)	July 25(nd), 2025	First release of document

2 Applicable Model

The product models applicable to this article are as follows:
FOT2000。

In this paper, FOT2000 Sending Controller is used to explain:

3 Product Overview

3.1 Product introduction

The FOT2000 features versatile video signal reception capabilities, ultra-high-definition full 4K×2K@60Hz image processing and transmission capabilities; it can transmit processed video to LED displays via fiber optic ports; and boasts powerful processing capabilities that effectively enhance load utilization. It is a device with formidable processing power, ultra-stable performance, and exceptional cost-effectiveness.

3.2 Product Characteristics

3.2.1 Input/Output interface

- Multiple input interfaces
  - 1×HDMI2.0
  - 1×DP1.2
  - Choose one of two options
- Output interface
  - 2 fiber optic interfaces
  - Single fiber port bandwidth: 10Gbit/s
- 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

3.2.2 Diversified Practical Functions

- Support network port loop backup and dual sending controller backup.
- Support a variety of preset resolutions, and support the resolution customization function.
- Compatible with various frame rate inputs such as 30HZ, 50HZ, 60HZ and 120HZ.
- Support the upper computer software to monitor the running parameters and status of the sending card.
- Support configuration parameter readback.
- Support gigabit network error rate detection
- Support 3D display, active 3D display

4 Hardware Introduction

4.1 Wiring Topology Diagram

The wiring topology diagram takes FOT2000 as an example. As shown below:



4.2 Hardware Interface Description

4.2.1 Front panel

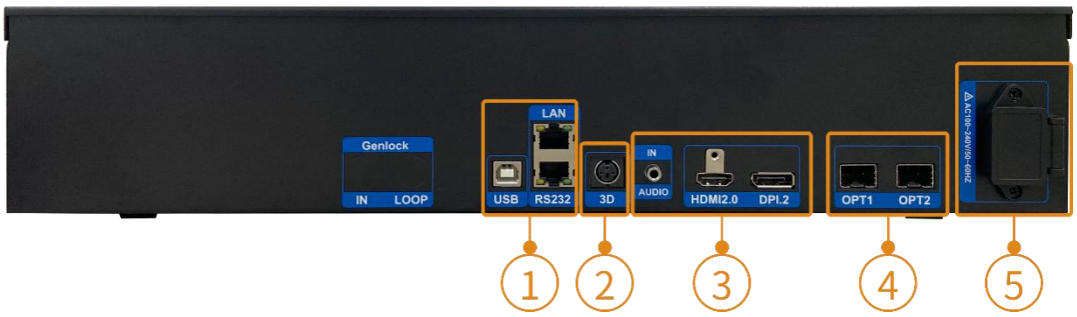


* Product photos are for reference only, please refer to the products actually purchased.

Description of data interface:

#	Interface name	Interface description
1	Switch	Main control power supply switch
2	LCD screen	Displays the current status of the device and sets menu item parameters. LCD resolution: 320×240
3	Knob	Select menu, adjust parameters and confirm the operation.
4	Back button	Exit the menu or cancel the operation

4.2.2 Rear Panel



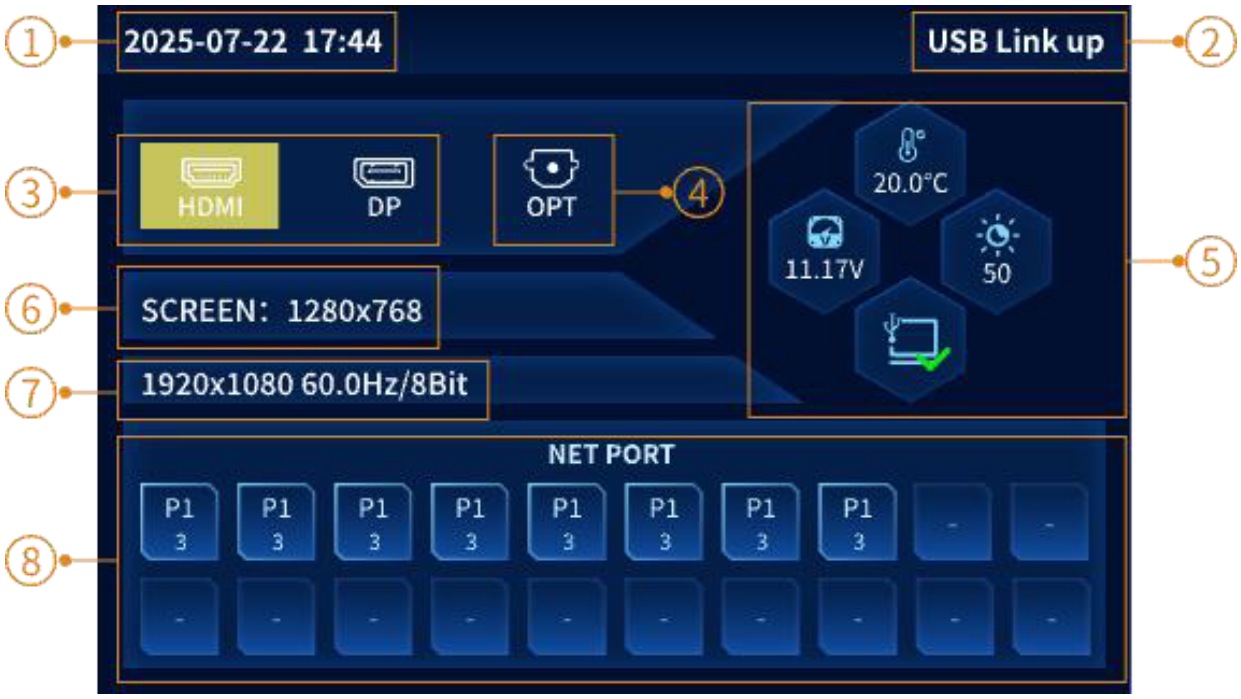
* Product photos are for reference only, please refer to the products actually purchased.

Rear Panel Description		
Input Interface		
#	Name	Illustration
3	HDMI2.0	1×HDMI2.0, which supports 3840×2160@60Hz backwards compatibility at most. - Custom maximum width of graphics card 8192 pixels - Custom maximum height of graphics card 7680 pixels
	AUDIO	1×3.5mm audio input interface
	DP1.2	1×DP1.2, video signal input interface. The maximum resolution is 3840×2160@60Hz, backwards compatibility. - Custom maximum width of graphics card 8192 pixels - Custom maximum height of graphics card 7680 pixels
Output Interface		
#	Name	Illustration
4	Fiber Optic Interface	• 2 fiber optic ports output, • 10 Gbit/s bandwidth per fiber optic port
control interface		
#	Name	Illustration
1	LAN	1×LAN, 100M network communication interface, connected to the upper computer for debugging.
	RS232	1×RS232 interface, connected with central control equipment.
	USB（Square-Type）	Connect PC-side software communication
Expansion Interface		
#	Name	Illustration
2	3D	Connect the 3D transmitter.
Power supply interface		
#	Name	Illustration
5	Ac power Interface	AC-100-240V-50/60HZ AC power interface

5 Main Interface

5.1 Main Interface

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



#	**Illustration**
1	Real time
2	100M network and USB debugging connection status: 169.254.219.009.8226-调试中(1): 100 Gigabit network connection USB连接: USB connection USB断开-网线断开: USB and 100M network are disconnected.
3	Currently selected input signal source:

	 : HDMI signal source is selected.  : HDMI signal source is not selected.
4	Fiber Optic Ports: This device supports 2 fiber optic ports.
5	 : Real-time temperature monitoring of equipment  : Real-time power monitoring of equipment  : screen brightness value  : USB is connected  : USB is not connected.
6	Screen: the current output screen resolution.
7	Output: currently selected signal source input resolution/selected color depth.
8	Network port connection status:  : The network port is connected, and the serial number of the network port and the corresponding number of receiving cards are displayed. Note: If the receiving card is connected, but the number of receiving cards is not displayed, you need to plug and unplug the debugging cable.  : the network port is not connected

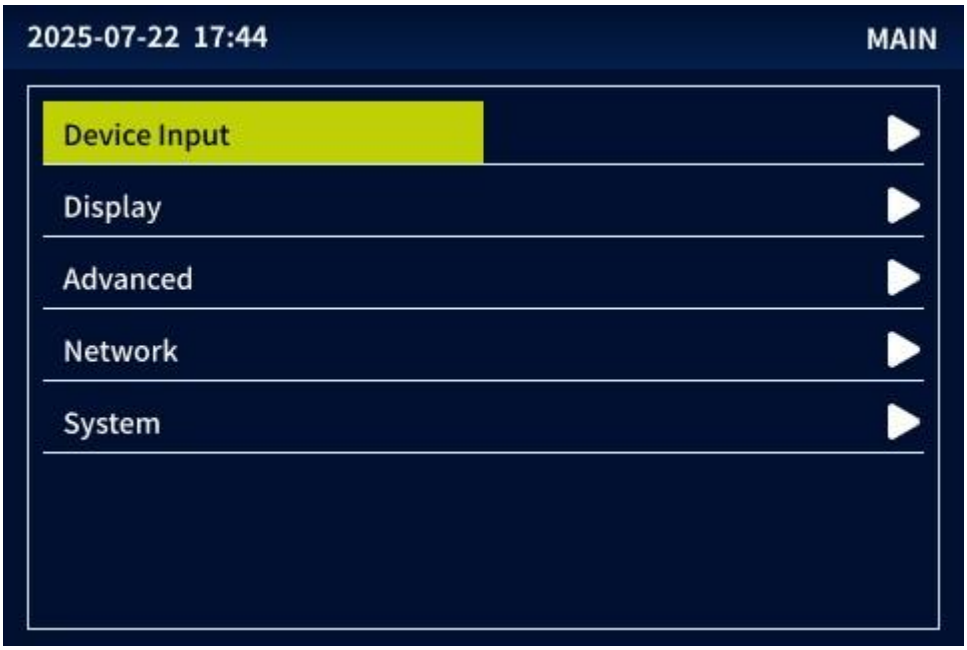
6 Menu Operation

Operating instructions:

Knob:

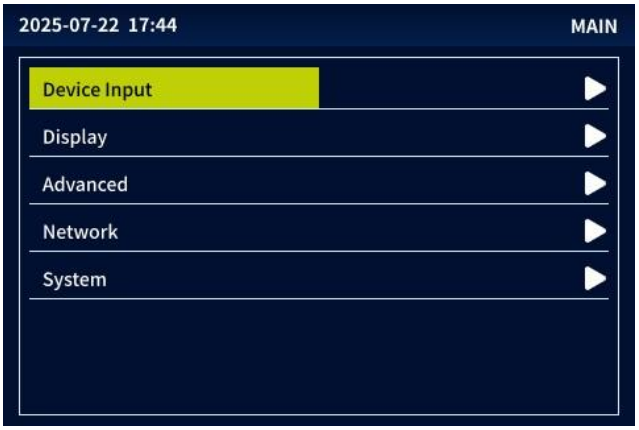
- In the main interface, press the knob to enter the menu operation interface.
- In the menu operation interface, turn the knob to select the menu function, and the selection status is blue. Press the knob to select the current menu or enter the submenu function.
- After selecting a menu with parameters, 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.

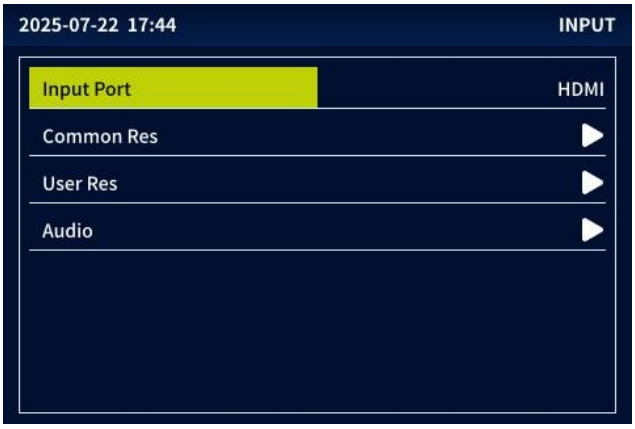
Function settings in the main menu: six categories of setting menus: Device Input, Output Display, Advanced Function, Network Settings and System Settings, which correspond to different function settings respectively.



6.1 Equipment Input

Equipment input includes Input Port, Common Resolution, Custom Resolution and Sound Settings.

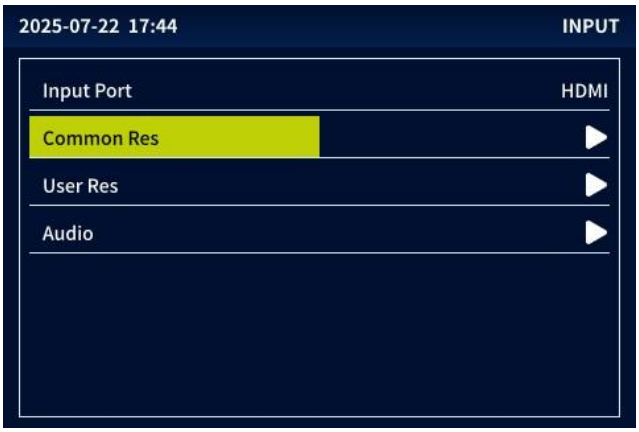


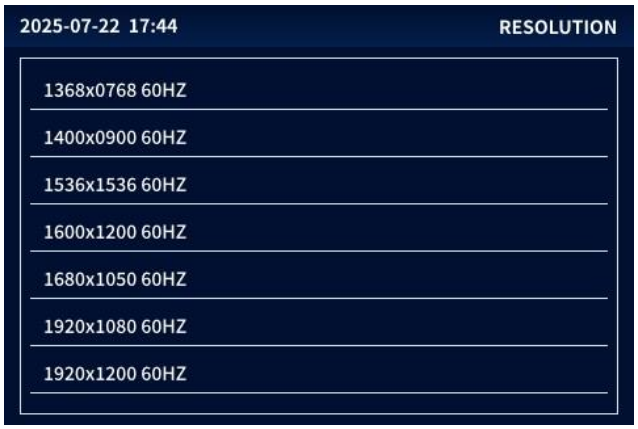


6.1.1 Common Resolutions

Step 1: Turn the knob to the [Common Resolution] function, and press the knob to select.

Step 2: Select the preset resolution as required and set the output resolution of the equipment.





Supported preset resolutions:

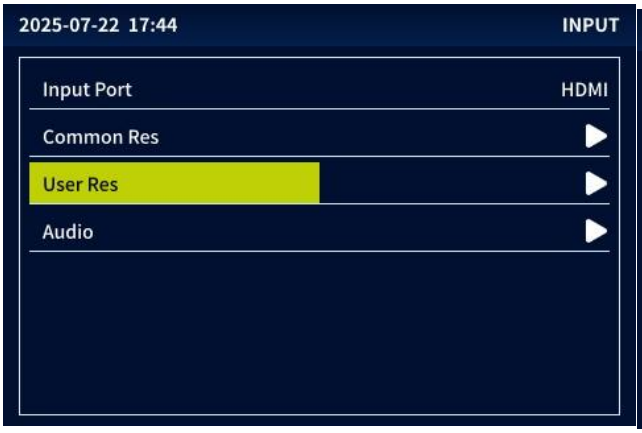
- 1368x0768 60HZ、1400x0900 60HZ、1536x1536 60HZ、
- 1600x1200 60HZ、1680x1050 60HZ、1920x1080 60HZ、
- 1920x1200 60HZ、2048x1024 60HZ、2304x1152 60HZ、
- 2560x1080 60HZ、2560x1440 60HZ、3840x1080 60HZ、
- 3840x2160 60HZ、1080x1920 60HZ、1080x3840 60HZ
- 2160x3840 60HZ

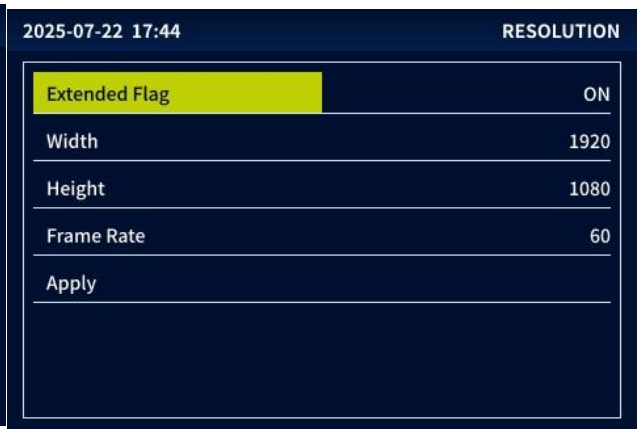
6.1.2 Custom Resolution

Step 1: Turn the knob to the [Custom Resolution] function, and press the knob to select.

Step 2: Set the parameters of Horizontal Size, Vertical Size and Refresh Rate as required.

Step 3: After setting, execute "Apply" to take effect.



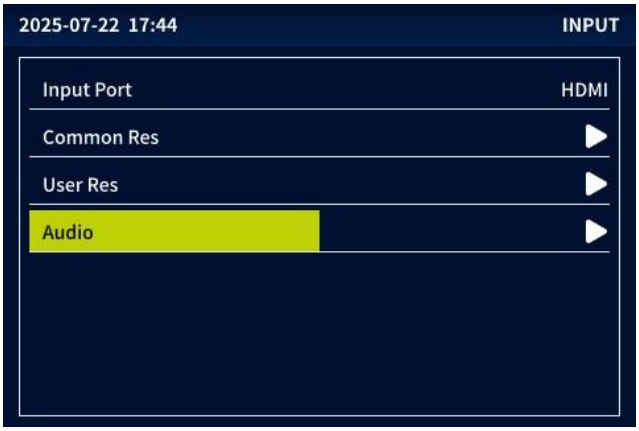


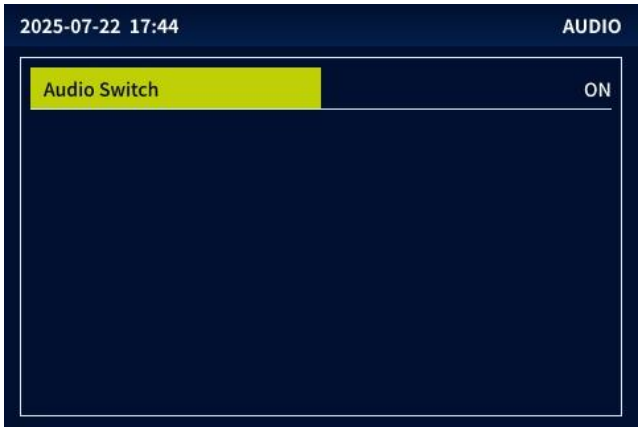
Description: the horizontal maximum is 4096, the vertical maximum is 4095, and the refresh rate is 0-150Hz. When the resolution is greater than 1920x1080 60HZ or "input signal audio" needs to be called, the extended data needs to be turned on.

6.1.3 Sound Settings

Step 1: Turn the knob to the [Sound Setting] function, and press the knob to enter.

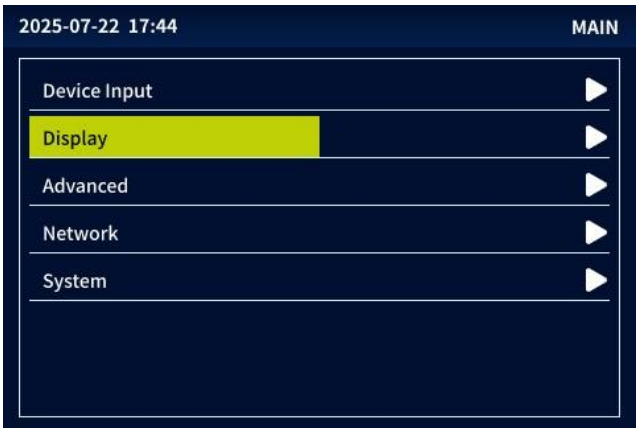
Select the state of the audio switch, which is off by default.

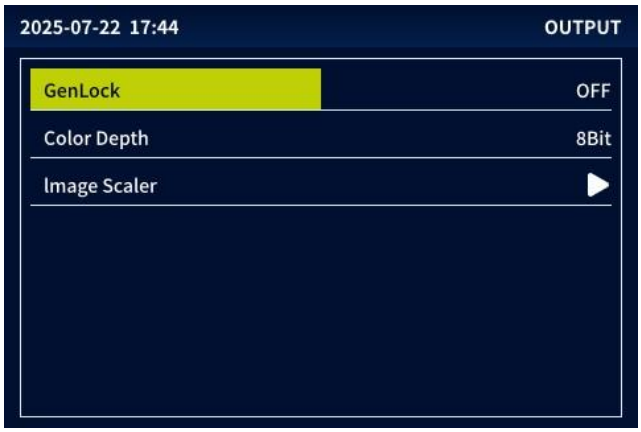




6.2 Output Display

Output display, including [GenLock], [color depth] and [image scaling] functions.

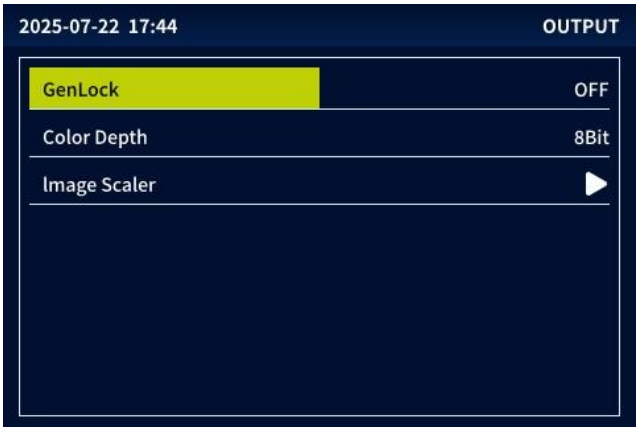




6.2.1GenLock

Genlock is a synchronization function, which synchronizes the scanning and refreshing of multiple video signal sources or display devices through external reference signals. It can align the internal clocks and scanning mechanisms of different devices according to a unified standard, ensure the stable and accurate display of the picture when processing multiple video signals or multiple devices work together, and avoid problems such as tearing, scrolling or flickering of the picture.

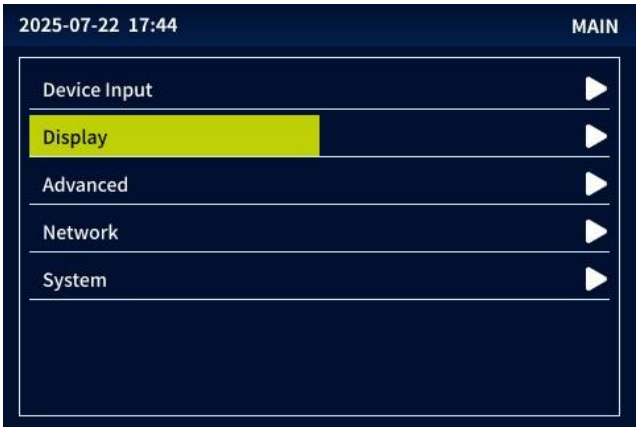
It is used to synchronously display multiple video sources such as live camera pictures, prefabricated background videos and special effects videos on the stage LED screen, so as to ensure smooth picture switching and mixed display and enhance the visual experience of the audience.

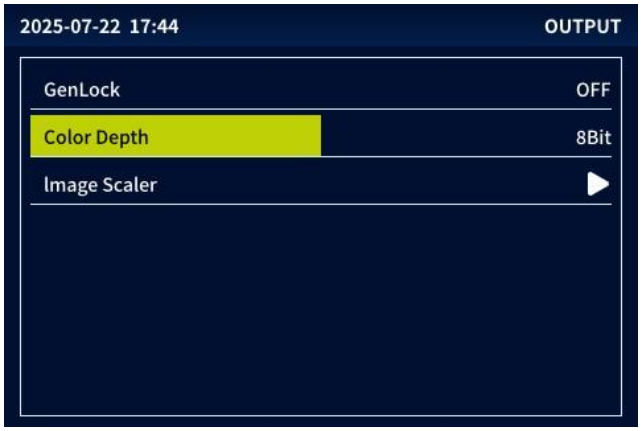


6.2.2 Color Depth

Step 1: Turn the knob to the function of [Output Display]-[Color Depth], and press Select.

Step 2: 10 bit and 8 bit color depth can be selected for output.



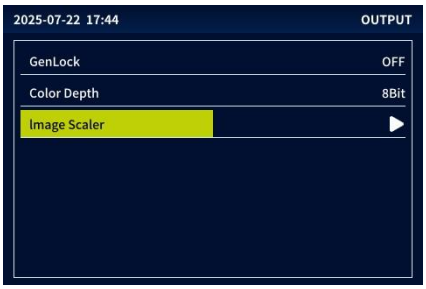


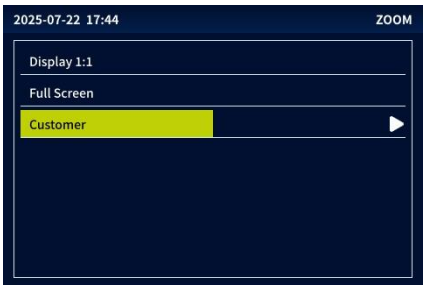
6.2.3 Image Zooming

Note: it needs to be used in conjunction with FPGA programs that support scaling.

Step 1: Turn the knob to the function of [Output Display]-[Image Zoom], and press the knob to confirm entry.

Step 2: You can select [1:1 Display], [Full Screen Display] and [Custom] as required.

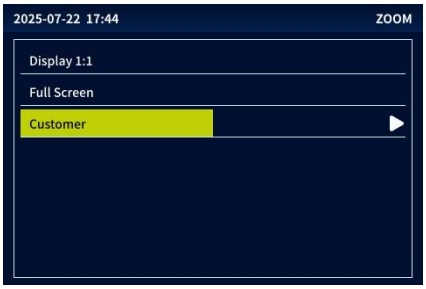




1:1 display: the image is displayed as the size of the input resolution.

Full-screen display: the screen zooms to the size of the sending display screen connection file.

Custom: The clipping switch is turned off by default. After it is turned on, you can set the horizontal and vertical start of clipping, clip the horizontal and vertical dimensions of the image and display the horizontal and vertical dimensions according to your own requirements. As shown below:

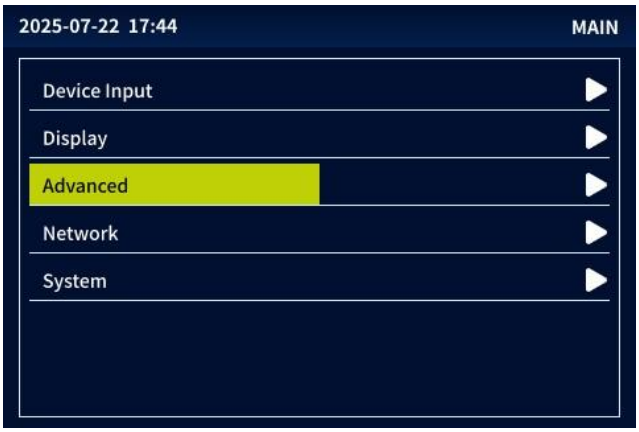


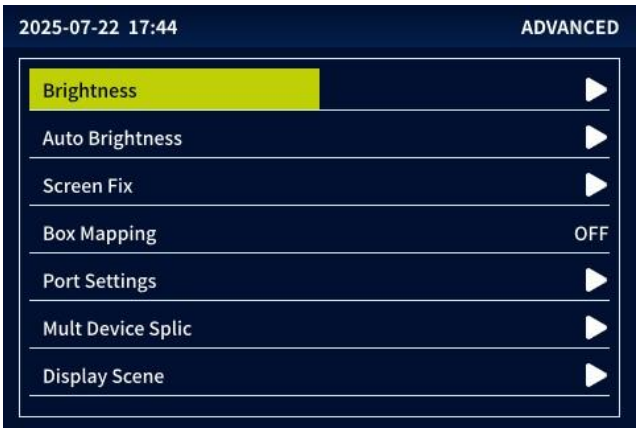


6.3 Advanced Functions

Advanced features:

The advanced function includes seven function menus: brightness level, Ambient Brightness, Screen Inspection, Box Marking, Port Setting, Multi-equipment Splicing and Display Scene.



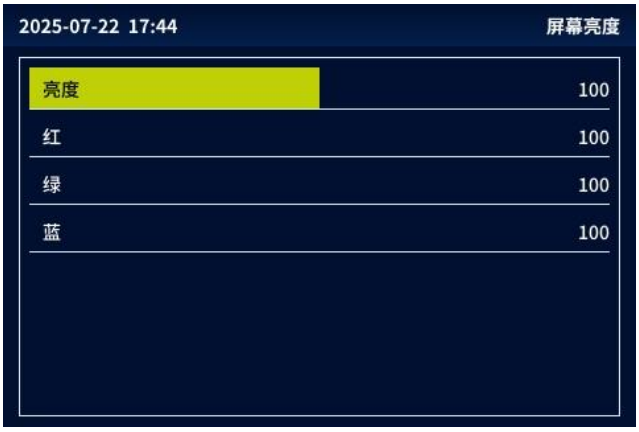


6.3.1 Brightness Level

Step 1: Turn the knob to the [brightness level] function, and press the knob to confirm.

Step 2: Default the brightness value to 100, and turn the knob to adjust the brightness of the receiving card from 0 to 100;



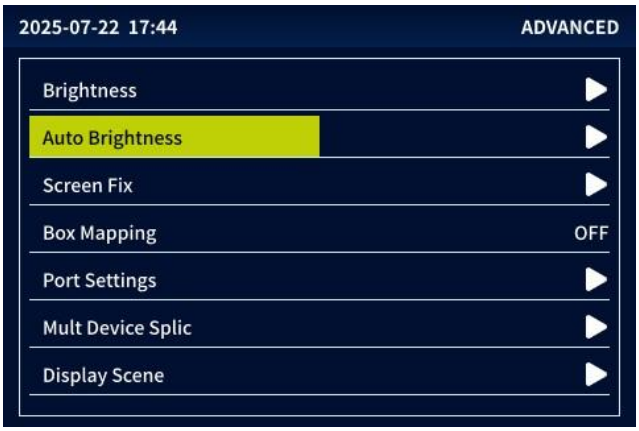


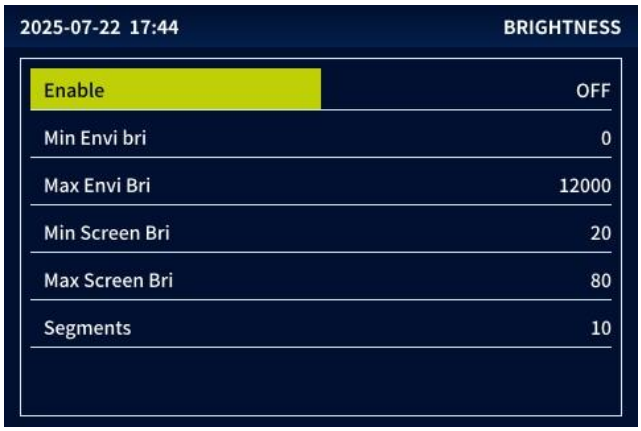
6.3.2 Ambient Brightness

Step 1: Connect the multi-function card to the hardware, and connect the external light sensing probe.

Note: The current firmware version does not support offline automatic brightness control,and must connect Autoled.

Step 2: Enter the open state of this interface, and you can set to automatically adjust the screen brightness according to the ambient brightness.





6.3.3 Screen Inspection

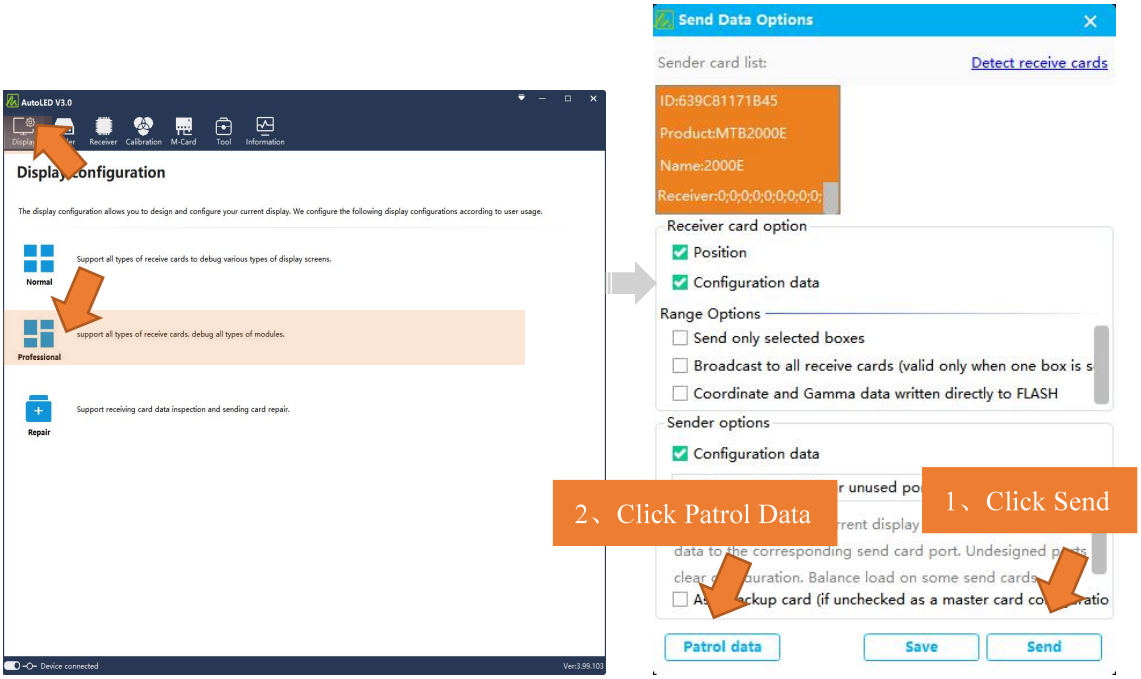
Precautions:

- Before performing screen inspection, it is necessary to use the upper computer software to set and save the inspection data.

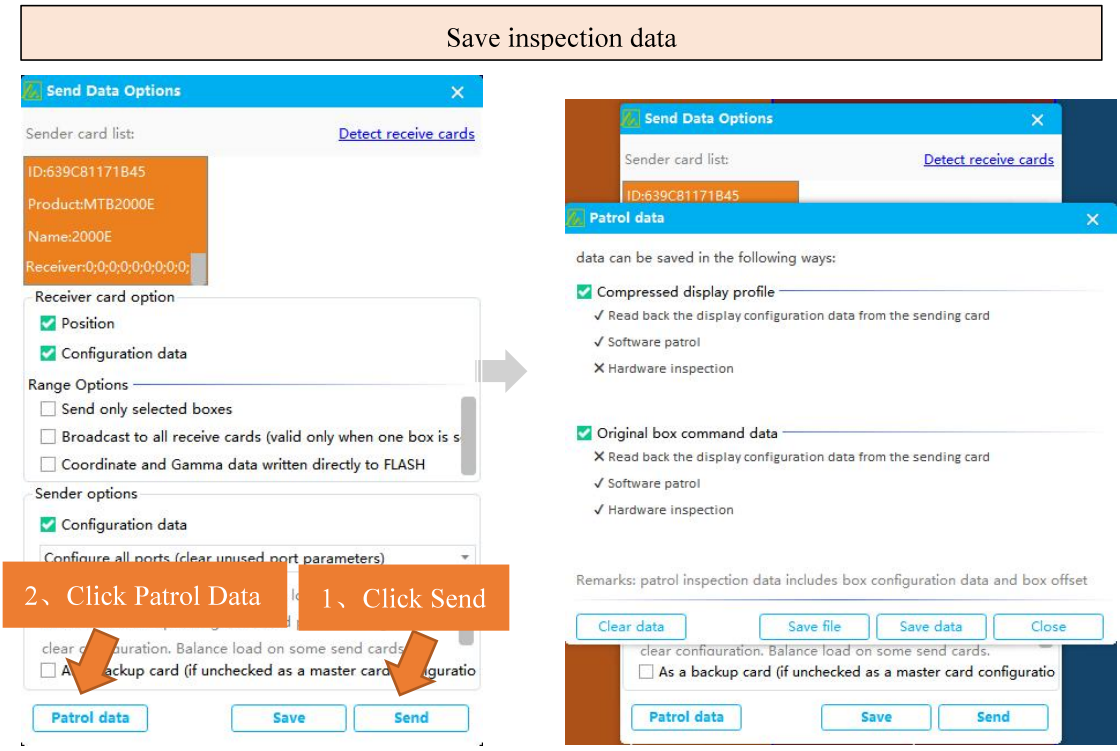
Operation method of setting and saving inspection data by upper computer software;

Step 1: Send the display screen connection file in the screen configuration interface of the upper computer software.

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 inspection type, all, sending card and receiving card;

Inspection Type	**Application Scenario**	**Inspection 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 inspection 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 inspection 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 inspection data. After the unlimited inspection is started: the automatic updating parameters can be directly changed on the screen with faults, without manual distribution.	One inspection: location parameters of sending card and receiving card. Unlimited inspection: 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 inspections: You can select "Once" or "Unlimited" when selecting the inspection 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 inspection, and perform patrol inspection according to the selected patrol inspection type and patrol inspection 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 inspection before the inspection and curing operation.
- The solidified inspection parameters correspond to the inspection type selected during inspection.
- 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.

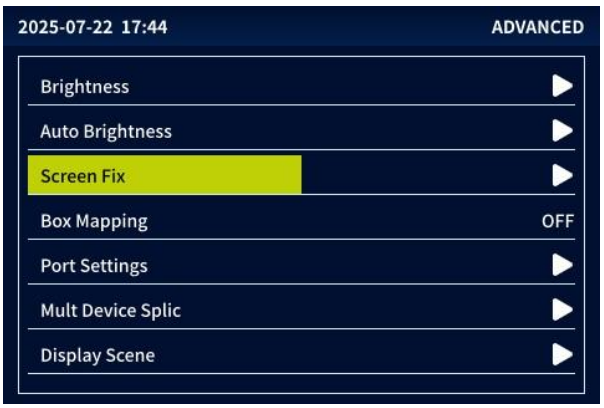
✧ Turn off the inspection. When the receiving card turns on the unlimited inspection, click to exit the inspection operation.

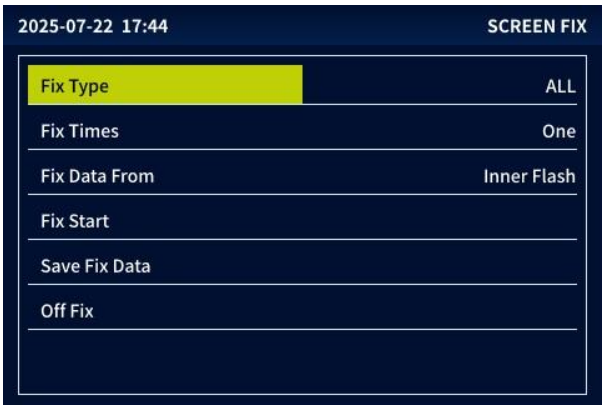
Screen Inspection:

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

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

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





6.3.4 Box Marking

Step 1: In the [Advanced Function] interface, turn the knob to [Box Mark] and press to enter.

Step 2: Select "On" or "Off".

As shown below:

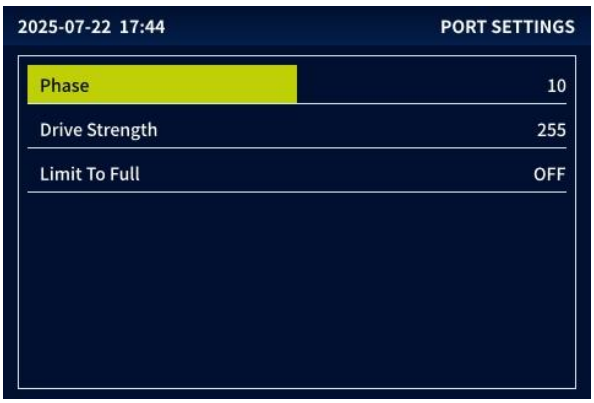


6.3.5 Port Settings

Step 1: Turn the knob to the [Port Settings] function, and click OK to enter.

Step 2: Phase drive: If vertical lines and flash points appear in the middle of the image, you can modify the phase of the signal source and adjust the drive, with the phase of 0-15 and the drive of 0-255;





Finite to complete:

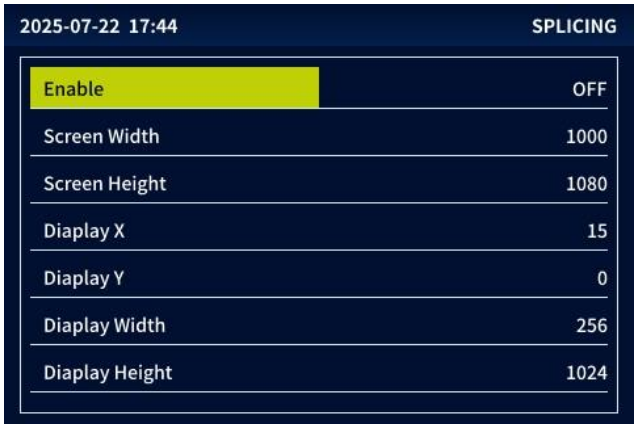
When closed:
（1） The input RGB is limited, and the output RGB is limited. Only after 16 hours, the graying is turned on. （2） The input RGB is complete, the output RGB is complete, and the level 1 starts to gray. （3） Input YUV422/YUV444, the output RGB is limited, and the graying is turned on after 16 levels.
When open:
（1） The input RGB is limited, the output RGB is complete, and the level 1 begins to gray. （2） The input RGB is complete, the output RGB is complete, and the graying is turned on after level 16. （3） Input YUV422/YUV444, the output RGB is complete, and the level 1 starts to be grayed.

6.3.6 Multi-equipment splicing

Step 1: Turn the knob to the function of 【 Multi-devices splicing 】, and press the knob to enter.

Step 2: Default "Off", which is used for splicing pictures of multiple devices with the same signal source, setting the screen width and height according to actual needs, starting horizontally and vertically, and displaying the horizontal and vertical dimensions.





6.3.7 Display the Scene

Step 1: Turn the knob to the [Show Scene] function, and press the knob to confirm entry.

Step 2: Save multiple usage scenarios, save setting parameters of "screen splicing", "window display" and input signal source, and quickly load and call the saved scenario application.

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

  Select Save with the knob to open the save interface, and select the saved scene serial number to complete the scene save. If the selected scene serial number already has parameters, it will be overwritten by new scene parameters;

- Load: call the saved scene preset;
- Clear data: Clear all saved scene presets.



6.4. Network Settings

Step 1: Press [Network Settings], turn the knob to [Network Settings], and press to enter.

Step 2: Turn on DHCP: automatically request IP allocation from router devices, and the DHCP server can automatically allocate IP addresses to devices on the network, reducing the workload of manual configuration. DHCP off: Fixed IP unchanged.

Step 3: Set Default Gateway, Subnet Mask and Port Number.



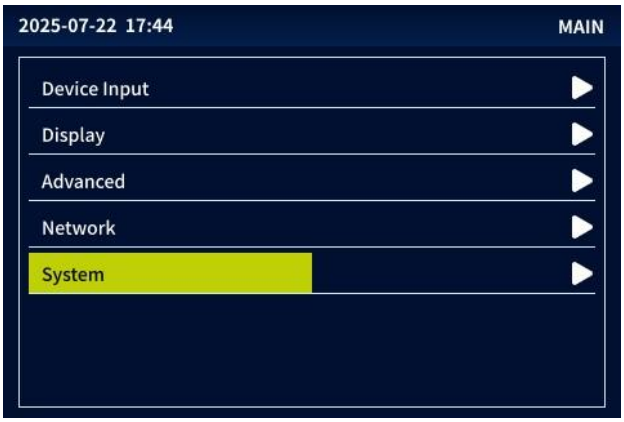
On: automatically request IP allocation from the router device.

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

Off: Fixed IP unchanged.

6.5 System Settings

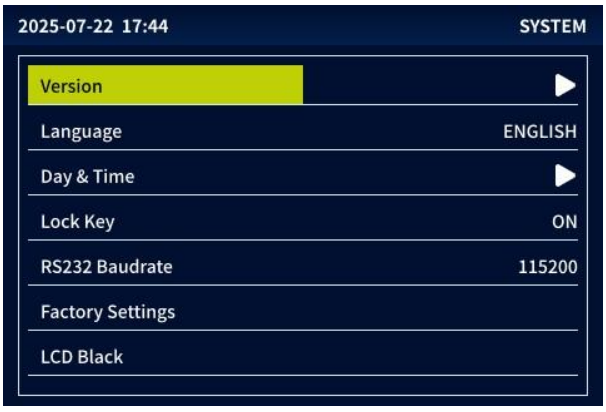
The function menu in system settings includes seven function menus: Version Information, Language, Time Setting, Keylock, RS232 Baud Rate, Factory Settings and LCD Blank Screen.

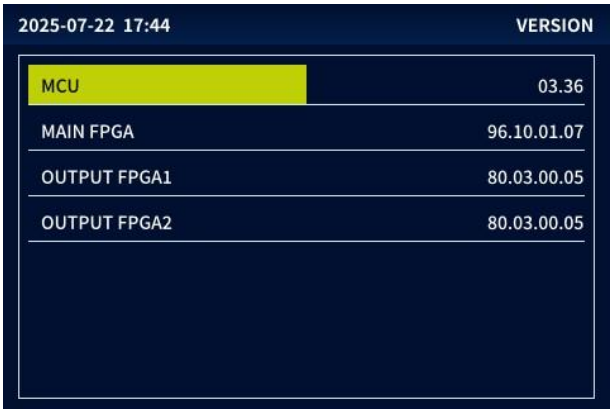




6.5.1 Version Information

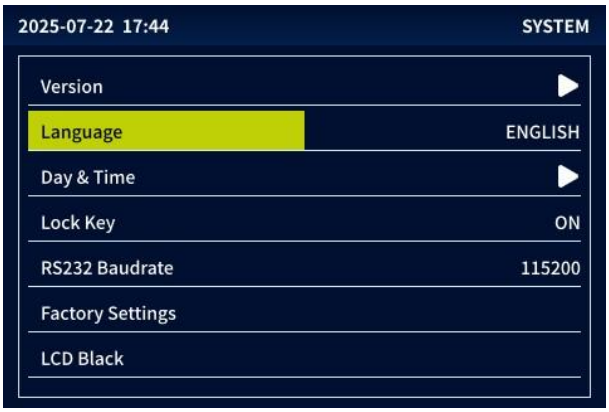
This function can view the FPGA and MCU version of the device.





6.5.2 Language

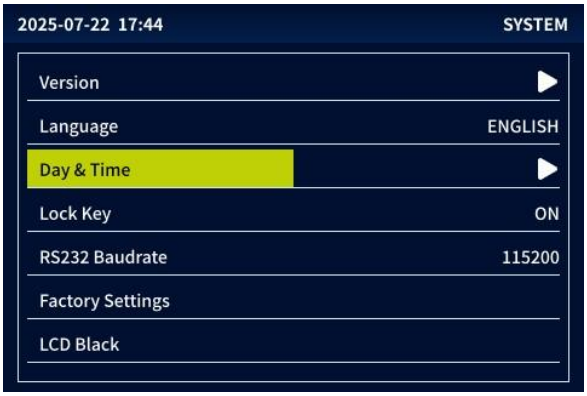
The default system language is "Simplified Chinese", which can be switched to "English" and "Traditional Chinese". Press the knob to confirm.

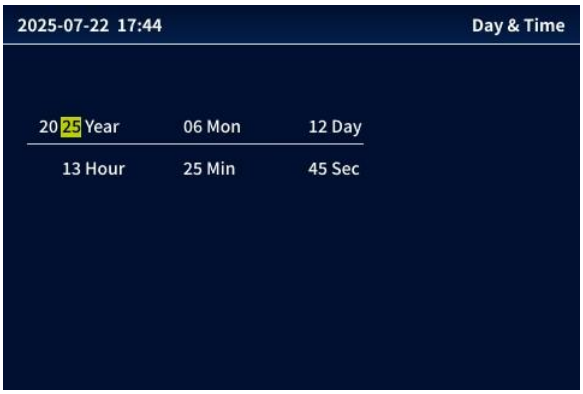


6.5.3 Time Setting

Set the local clock and date of the video processor. The motherboard of the video processor has a built-in button cell or super capacitor, which can keep the clock running normally after power failure. If you don't power on for a long time before using it, you need to reset the time and clock. The time of timing switching is based on this, and restoring the factory settings will not change the time setting parameters.

Turn the knob to select the value to be adjusted, press "OK" to select it, and it will turn green. Turn the knob and press "OK" to save it.





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:

- ✧ Signal source: HDMI
- ✧ Scaling parameters: 0, 0, 3840, 2160
- ✧ Brightness: 100

7 AutoLED Software Operation

7.1 3D display settings

Can be set to: up and down 3D mode or left and right 3D mode.

Step 1: Connect the 3D transmitter to the hardware.

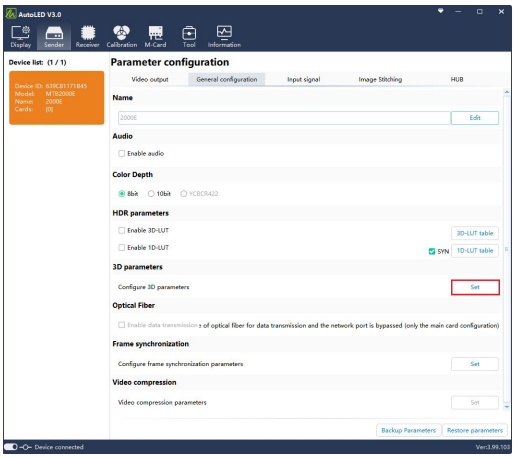
Step 2: Set the parameter of the receiving card to 120HZ, and pay attention to the load limit.

Step 3: Enter the debugging interface in the "Send Card-General Configuration -3D Parameters" of AutoLED as shown below, and set the left and right 3D modes or the up and down 3D modes.

Note:

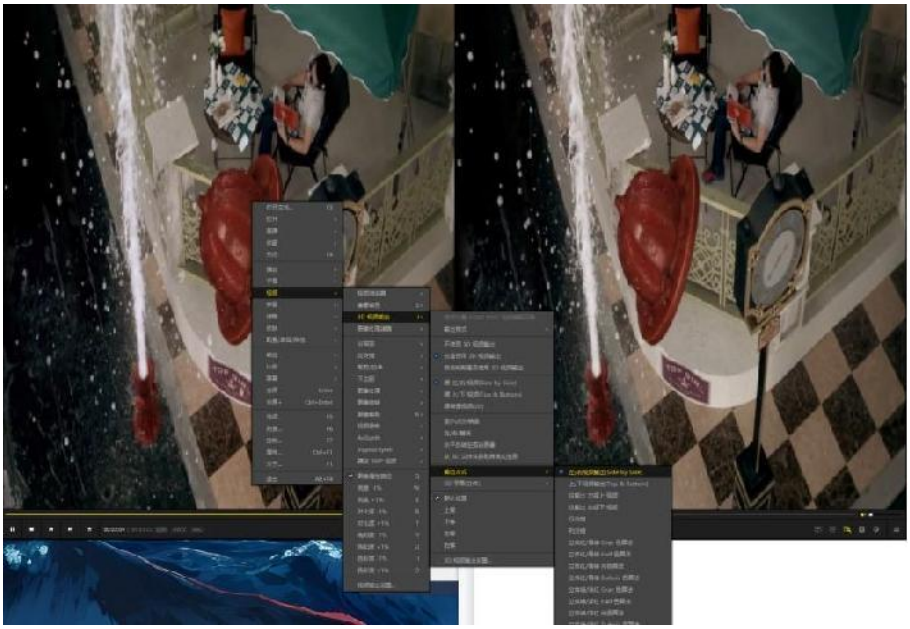
Left and right 3D mode: the width of the input resolution needs to be multiplied by 2, and the height changes, and the width of the image capture needs to be multiplied by 2, and the height remains unchanged.

Up-and-down 3D mode: the input resolution height needs to be multiplied by 2, and the width remains unchanged, and the image clipping also needs to be multiplied by 2, and the width remains unchanged.

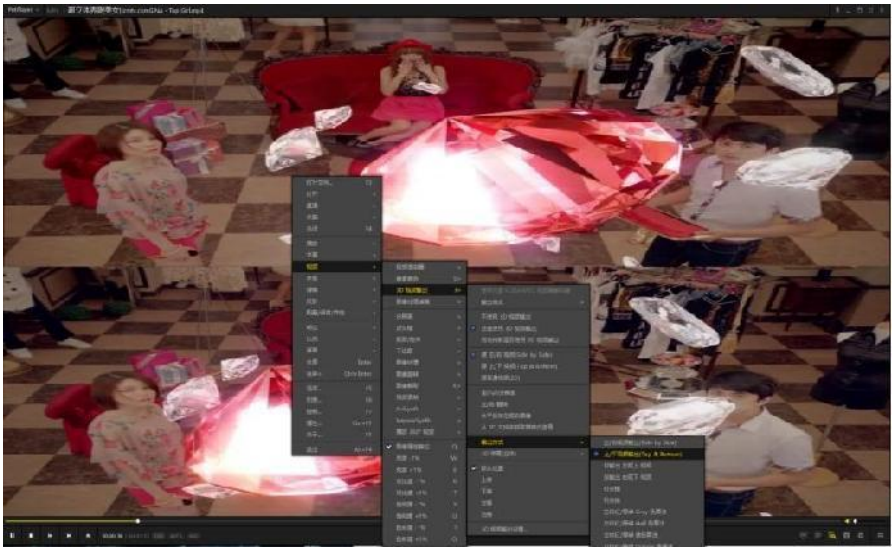


Step 4: Video Software Settings

Left and right 3D mode, as shown below:



Up and down 3D mode, as shown below:



Frequency doubling mode:

Step 1: Connect the 3D transmitter to the hardware.

Step 2: Set the parameter of the receiving card to 120HZ, and pay attention to the load limit.

Step 3: Enter the debugging interface in "Send Card-General Configuration -3D Parameters" of AutoLED, and set the frequency doubling mode.

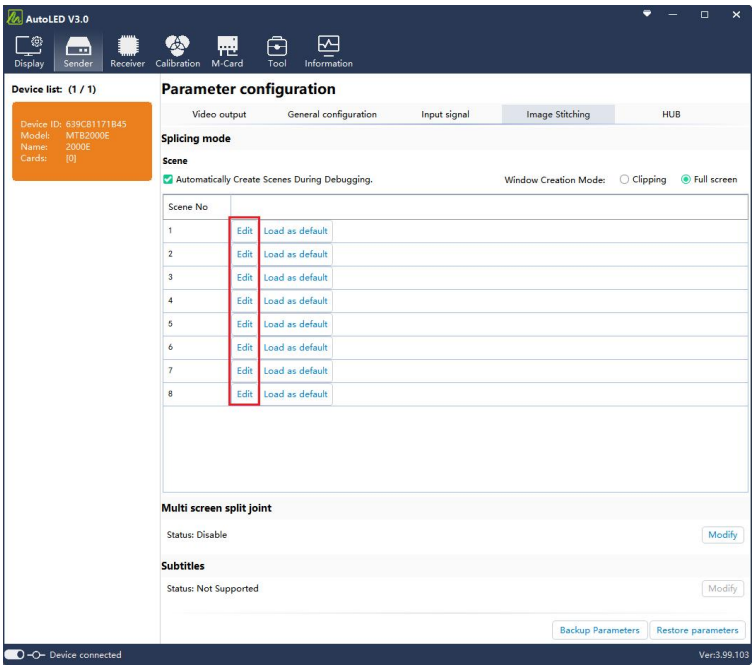
7.2 Zoom Settings

Step 1: Enter the zoom setting interface in "Send Card-Screen Splicing-Scene Editing" of AutoLED.

Step 2: Set window clipping and window scaling parameters.

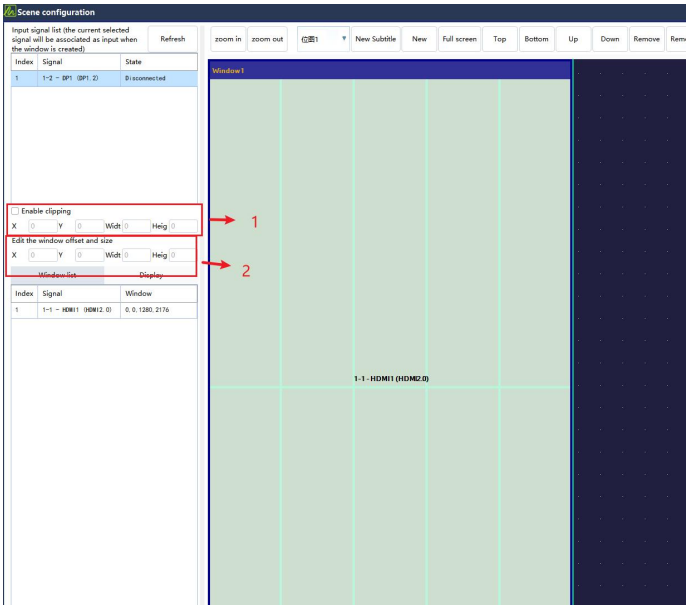
It is off by default, and can be enabled to set the window clipping size.

Set the window zoom size.



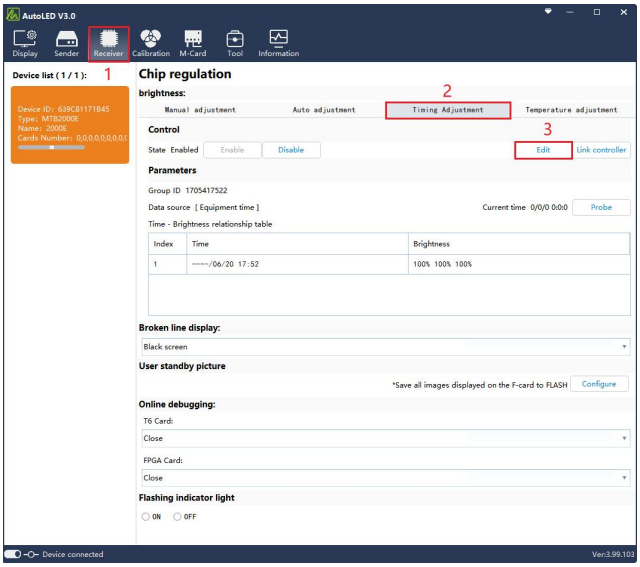
It is off by default, and can be enabled to set the window clipping size.

Set the window zoom size.

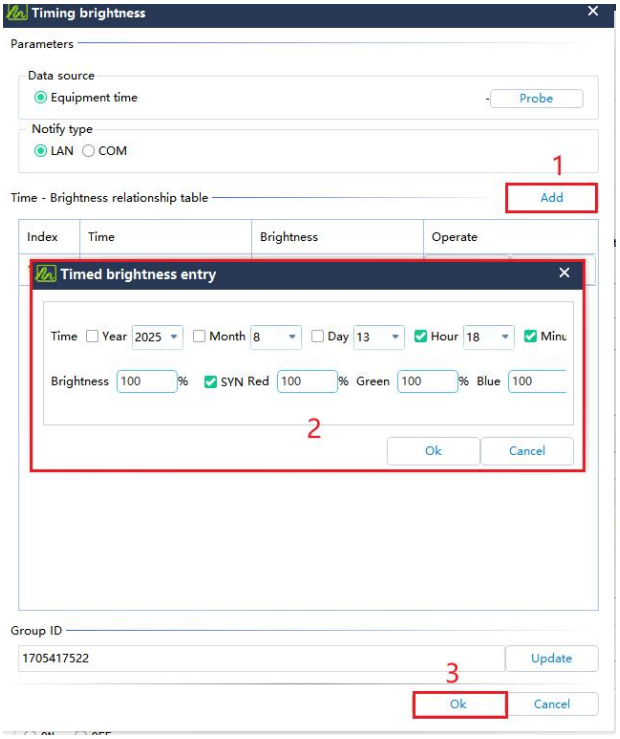


7.3 Timing Brightness

Step 1: Click Edit in "Screen Control-Timing Adjustment" of AutoLED to enter.



Step 2: Enter the interface shown below, click Add, and you can set the time and brightness value according to your requirements, and then confirm.



Note: the timing brightness function cannot be connected to the USB debugging cable, otherwise it will not be implemented, and it can be connected to the network for debugging.

WeChat Official Account Platform

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