

U4Pro

Multi-picture splicing processor

Version: v3.1

Release date: February 2022



Manual



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Professional Ultra HD Video Display
Control system integrated solution and service provider

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Certification Description

“CE” Certification

EN 55022: 2010

EN 55024: 2010

EN 61000-3-3: 2013

EN 61000-3-3: 2014

EN 0950-1: 2006+A11: 2009+A1: 2010+A12: 2011+A2:2013

“FCC” Certification

FCC Part 15

ANSI C63.4: 2014

“ROHS” Certification

EPA 3050B: 1996, EN1122:2001

EPA 3052: 1996, EPA 3060A

EPA 7196, EPA 3540C, EPA 8270C

Version Information

Version: v3.1

Issue Date: February,2022

SAFETY PRECAUTIONS

For your safety, please read this section carefully.









| | |
|---|---|
|  | <p>Power Power supply of the device for normal operation is 100-200V AC. Please make sure that the product is operated within the voltage range.</p> |
|  | <p>High voltage High voltage devices are contained.</p> |
|  | <p>Do not dismantle without professionals The device is not equipped with repair parts which aimed for maintenance by customer himself, so do not open chassis and operate by yourself which may lead to unrecoverable damage of the device. If maintenance is required, please contact after-sales service personnel.</p> |
|  | <p>Assure sound grounding For your safety, please assure that power line is grounded soundly.</p> |
|  | <p>Keep away from strong magnetic field, engine and transformer For normal operation of the device, please stay away from strong magnetic field, motor and transformer.</p> |
|  | <p>Guard against damp Keep operational environment dry. If the device becomes damping inadvertently, do not power the device and use it after being dried.</p> |
|  | <p>Keep away from explosives Please do not use the product in combustible or explosive environment.</p> |
|  | <p>Prevent liquid or conductive fragments getting into the chassis Liquid or metal fragments should be stopped from getting into the case. If so, the device should be powered off immediately and power supply can only be allowed after clearance of foreign bodies.</p> |

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1. Product Introduction

The multi-image mosaic processor is a high-end video processing equipment developed and manufactured by our company for LED large screen display, performance and leasing, conference room, studio and so on.

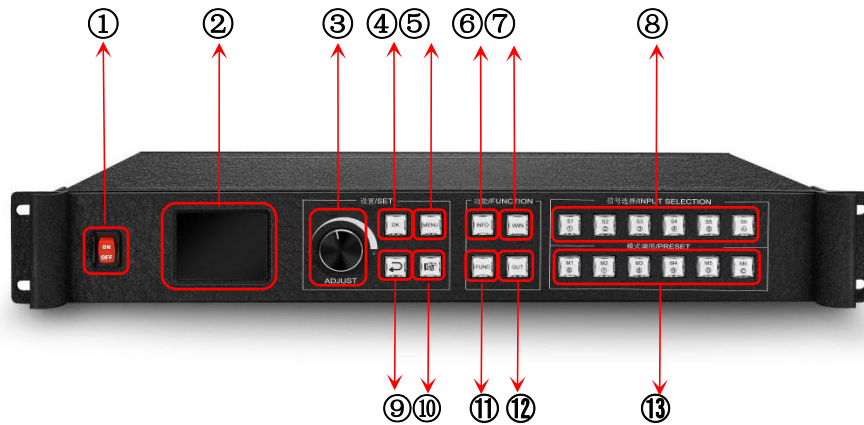
The product adopts CPT+ FST splicing technology targeted for small pixel LED display to guarantee uniformity and synchronicity of splicing. The Super Resolution Zoom-in Technology can help eliminate jaggies and reduce the fuzzy sense and out-of-focus phenomenon due to image magnification.

The product enjoys the following features:

1. Support various signal input includes conventional DVI, VGA, HDMI, CVBS, and SDI ; support 4K Ultra HD input and realize large screen point-to-point display.
2. Stand-alone can support user-defined layout of pixel 10.4 million , and support output pixels up to 15360 horizontally or 7680 vertically.
3. Support free-form four-image layout and realize central control of main screen, side screen, floor tile or canopy of the stage in an easy way.
4. Support signal echoing and view real-time input and output signals by software.
5. Support multi-image preview and output monitoring.
6. Support seamless switch of signal and mode and provide over 10 kinds of transition special effects.
7. Support overlay of multi-group editable and global image-texts and captions.
8. Support luma key, image transparency adjustment and edge feathering.
9. Support warm backup of multi-level input signal.
10. Support multi-machine synchronous cascade output.

2. Hardware Introduction

2.1 Front Panel



① **POWER:** AC 220V POWER switch; ON indicates that the power supply is ON, and OFF indicates that the power supply is OFF.

② **LCD color screen:** information display; Displays device and debugging information.

③ **ADJUST:** ADJUST knob; You can select the information in the color screen through the knob and quickly adjust various parameters, inverseClockwise to decrease, clockwise to increase, press OK.


④ **OK:** Confirm button to confirm debugging information.

⑤ **MENU:** MENU button, you can enter the main MENU interface for device debugging.

⑥ **INFO:** information query button; Example Query the real-time status of input signals.

⑦ **WIN:** Screen information button; Display screen signal source and switch screen signal source.

⑧ **S1-S6:** Signal source button; The input source behind the device is under the main menu screen, and the parameter input screen is a number1-5 and the back key.

⑨  : Return or cancel the button.

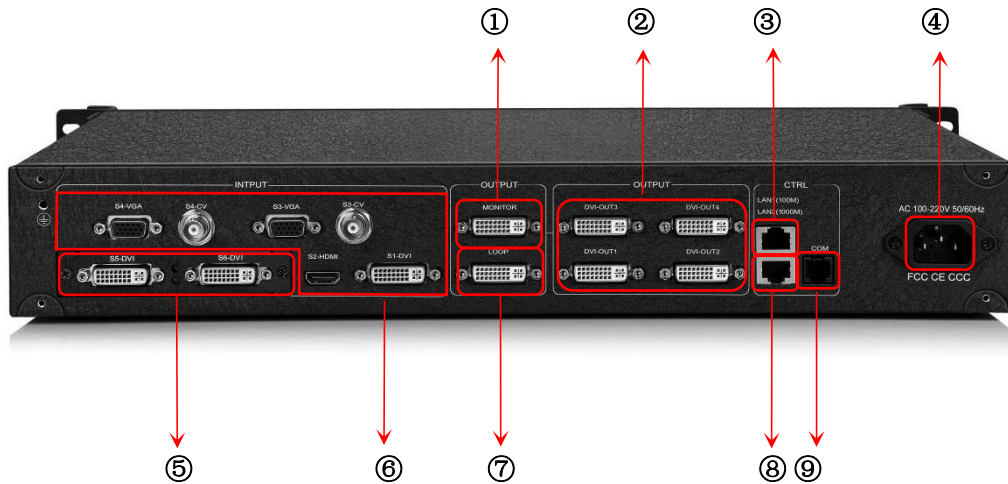
⑩  : navigation buttons; Click to enter the navigation mode.

⑪ **FUNC:** Common function buttons; Click to enter the interface of common functions.

⑫ **OUT:** output selection key; The output can be black screen, blue screen, or Normal.

⑬ **M1-M6:** Shortcut mode call button; The shortcut mode button is displayed on the main menu interface, and the parameter input interface is displayed belowThe numbers 6-0 and the clear key.

2.2 Back panel



① **MONITOR:** Pre-monitoring channel; Used to monitor input signal source or output output display content.

② **OUTPUT:** Programming output channel; Pure digital DVI-D output, connected with sending card, etc.

③ **LAN1:**100m network control port; It can debug the equipment through software when it is connected to the computer's 100 mbit/s network port.

④ **AC 100-220V:** power interface; It can be connected to ac power supply of 100-220V.

⑤ **INPUT S5, S6:** extended INPUT; Expandable with two conventional inputs or one 4KHDMI input.

⑥ **INPUT S1-S4:** conventional INPUT; Input interface includes one set of DVI, one set of HDMI, two sets of VGA and CVBS.

⑦ **LOOP:** DVI LOOP exit; Loop out S1-DVI signal, which can be used for multi-machine cascade.

⑧ **LAN2:** GIGABit network control port; You can debug the device and implement the echo function.

⑨ **COM:** RS232 control interface; Connect with the serial port of the computer, debug the

equipment through the upper computer software.

3. Device Debugging

3.1 Device Connection

Device connection could be divided into three parts: power connection, signal connection and control connection (used for software debugging).

Power connection: device power supply. Connection method: connect power cord to power plug.

Signal connection: the method transferring signal from signal source to LED large screen. Connection method: signal source (e.g.: computer)→Splicing Processor → Sending cards → Large screen.

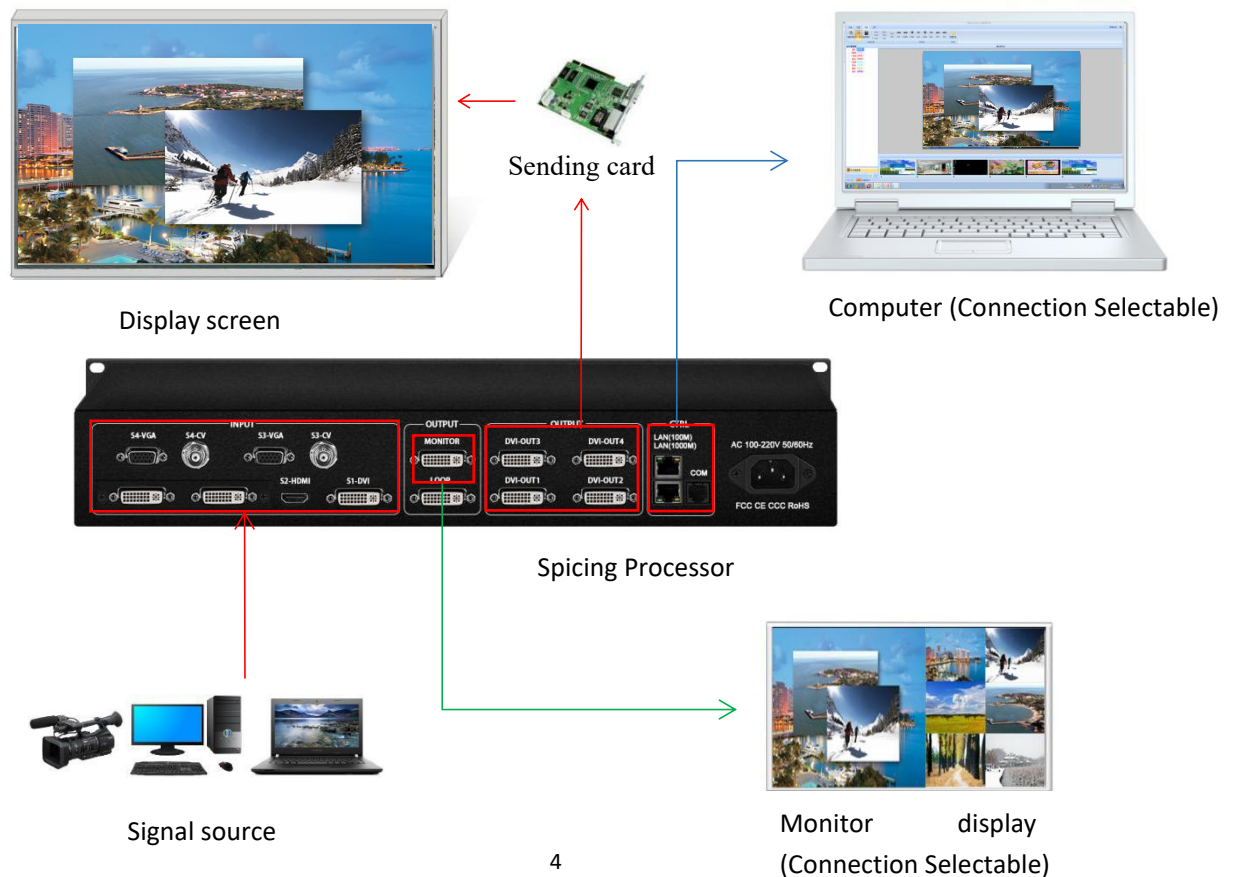
Control connection: connect computer with device control port and debug device connection method. There are three connection methods

(1) Connect 100MB network control port with splicer LAN1 port, which can set device software.

(2) Connect computer gigabit network port with splicer LAN2 port, which can not only set device but also echo signal source image.

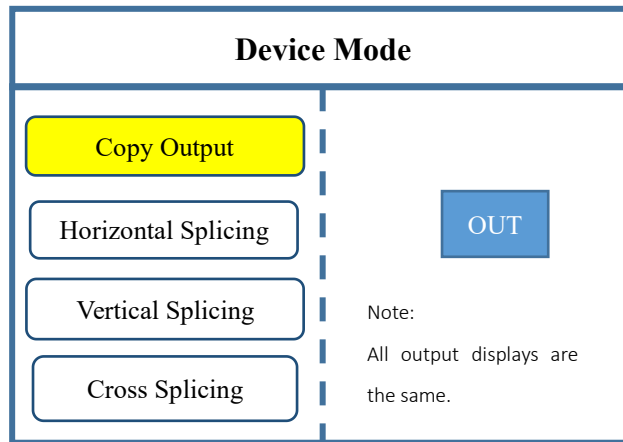
(3) Connect one crystal head of serial port line which is randomly donated by device with splicer COM port, and plug DB9 into computer serial port. Any kind of method among the three can realize device software control.

Connection diagram is as follows:



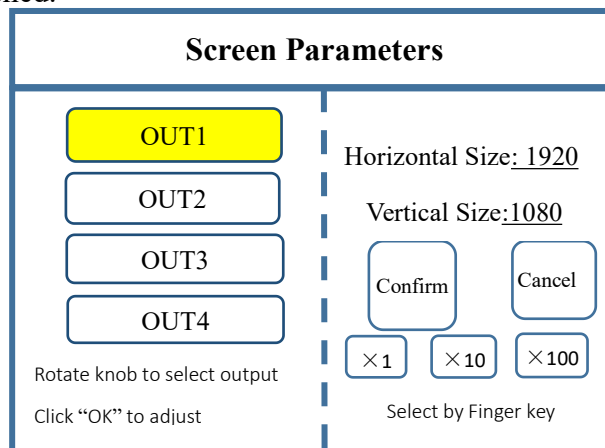
3.2 Debugging Steps

Step 1: Click “MENU” to enter into main menu interface and click “Device Mode” to select splicing mode: copy mode, horizontal mosaic, vertical mosaic and cross mosaic.



Note: Copy mode: all output contents are consistent; horizontal mosaic: content of all output are arranged horizontally; vertical mosaics: contend of all output are arranged vertically; cross mosaics: contend of all output are arranged in two rows and two columns.

Step 2: select suitable splicing mode and click “OK”; get back to main menu interface to select “Screen parameter” and enter into its setting interface. Set loaded screen point of each output interface and click “Confirm” after inputting, and then screen splice is finished.



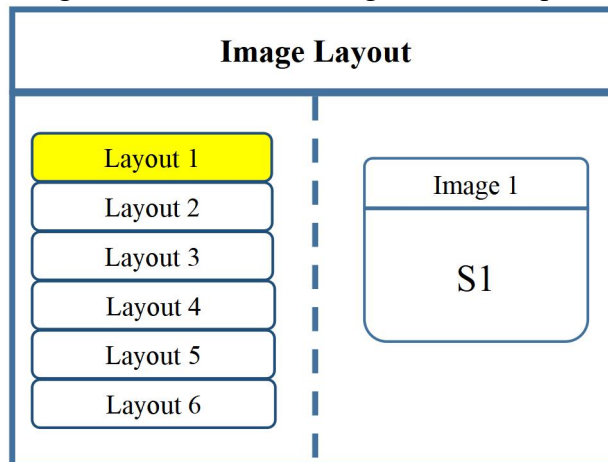
Note: there are two ways for number input:

(1) Adjust by rotate knob. Step length can be adjusted by “×1”“×10”“×100”, for instance, “×100”means that number of rotate knob increases by 100 each time.



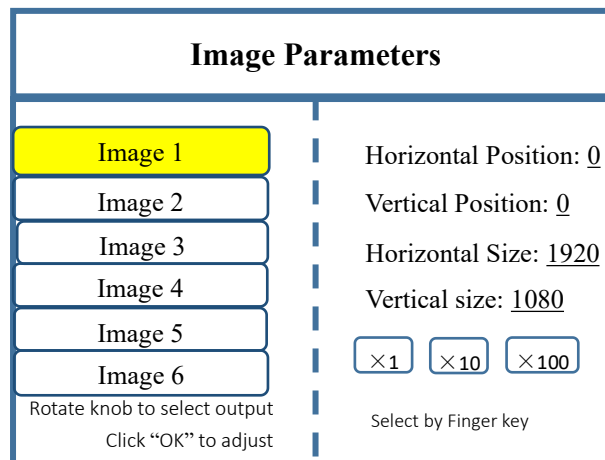
(2) Input by number of the front panel. For example, ① of the key refers to figure 1.

Step 3: get back to main menu interface to select “Image layout” and enter into image number selecting interface to select image number required to be set.

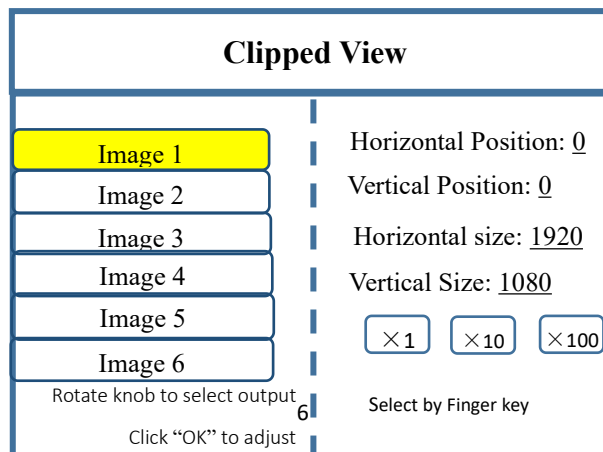


Note: This step can be skipped for signal image. For multi-image, it's OK if image number and item requirement are in consistent. Following operations can be taken to set when layout are not in consistent.

Step 4: Click “OK” and return to main menu interface; select “Image parameter” and enter into its setting interface to set size and position of each image.

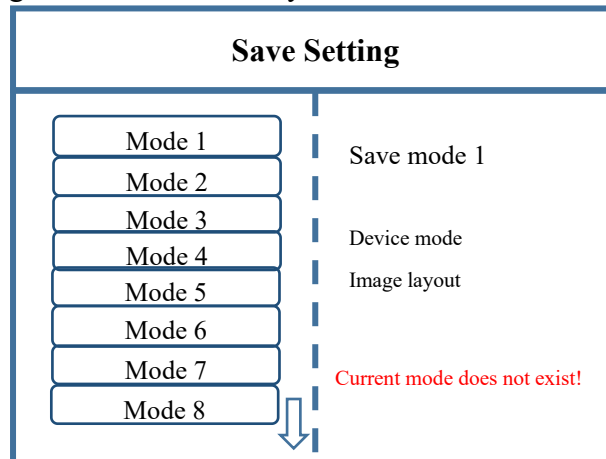


Step 5: Click “OK” and return to main menu interface; select “Clipped view” to enter into its setting interface to set size and position of each image.



Note: This step should be skipped if full display of signal source is required on large screen; while if certain signal source of multi-image is needed to be extracted, only setting of signal source image is required; if horizontal size or vertical size is 0, it means no local extraction is required in this direction.

Step 6: Click “OK” and return to main menu interface; select “Save setting” to enter into Data storage interface; select any mode and click “OK” to save data.



Note: Mode 1 is default startup data of device boot; it’s suggested that the most common mode or that required by device boot should be saved to Mode 1.

At this point, basic device debugging is completed. If there is other requirement, repeat the operation and save it as other mode.

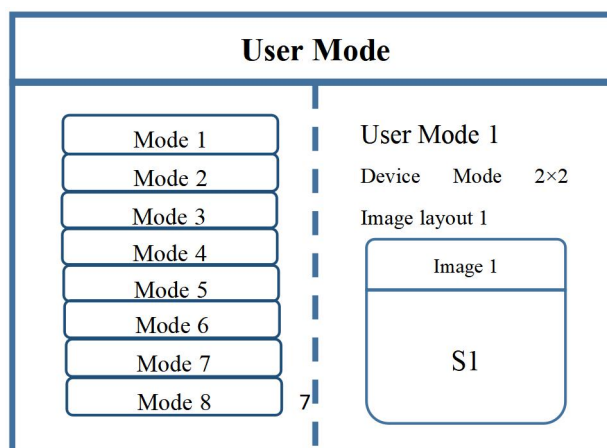
After device debugging, just call saved data according to different condition requirements in later stage.

Data call is divided into forms:

(1) For Shortcut key call, only click of “M1-M6” in front panel is required, which is convenient when mode scenario is few.



(2) For User mode call of Main Menu, click “MENU” and select “User Mode” to enter into its extraction interface. Then select needed mode and click “OK”.

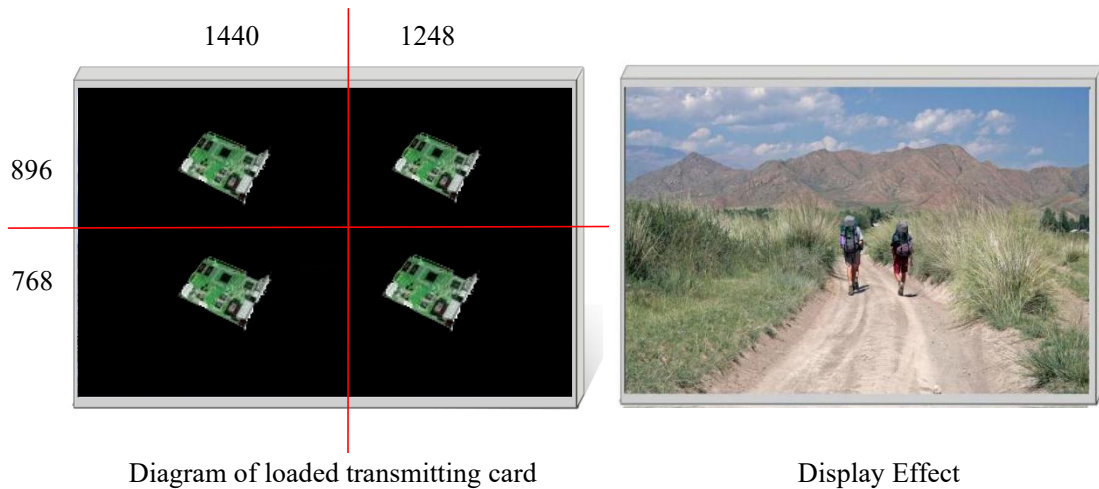


3.3 Case Study

Device debugging steps are explained by following cases.

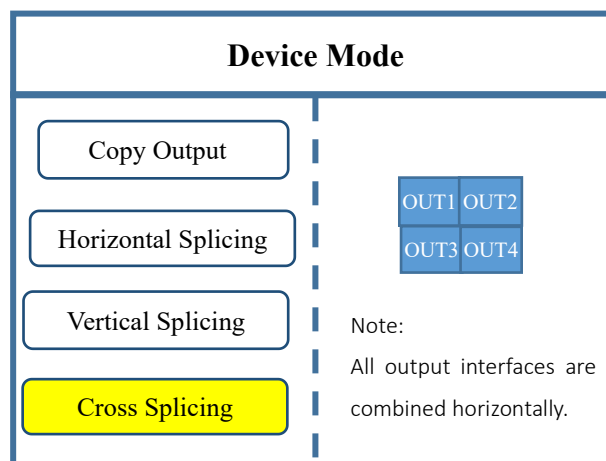
Case 1: screen size is 2688×1664 and loading transmitting card is shown as picture below:

Requirement: whole computer desktop should be displayed completely.



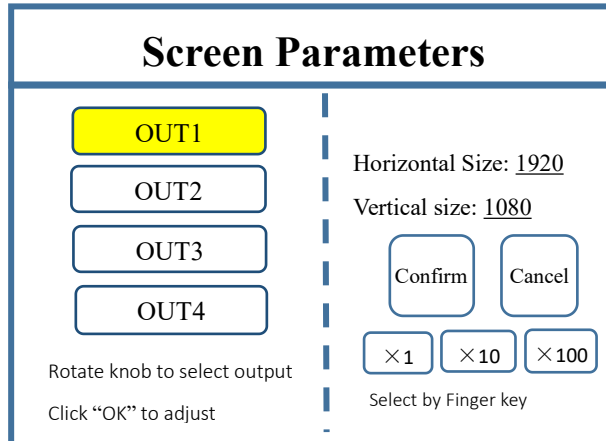
Debugging Steps:

Step 1: click “MENU” and enter into main menu interface to select “Cross Mosaic” of the first item “Device mode”.



Note: since four transmitting cards are in a 2×2 layout, cross mosaic is needed then.

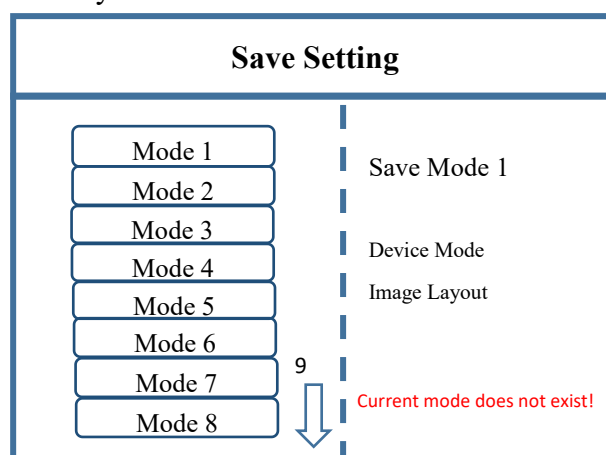
Step 2: Click “OK” to return to main menu interface; select “Large screen parameters” to set size of each output interface.



Note: Input according to corresponding transmitting card size of each output interface. For OUT1, its horizontal size is 1440 and vertical size 896; for OUT2, they are 1248 and 896 respectively; for OUT3, they are 1440 and 768; for OUT4, 1248 and 768.

Step 3: After inputting, click “Confirm” and return to main menu interface. The large screen splicing is finished, select signal source needed to display on screen and click corresponding key. For instance, for display of computer signal on large screen and connection of computer DVI interface with “S1-DVI” port of the back device, just click “S1” in the front which means choosing the signal to display on the screen.

Step 4: After selecting signal and normal display of large screen, save all setting data. Click “MENU” to enter into main menu interface, and then get into “Save setting” interface to select “Mode 1” and click “OK”. Things will be fine when it suggests saving successfully.

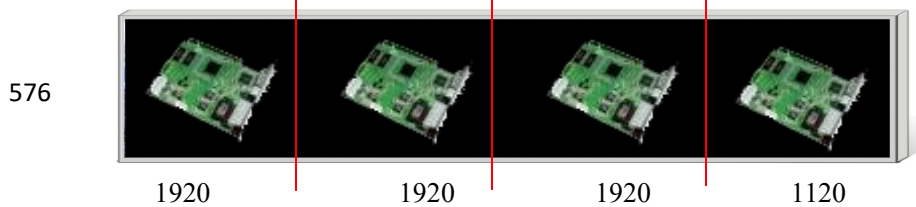


Note: Mode 1 is default startup data of device boot; it's suggested that the most common mode should be saved to Mode 1 and the device can save 32 kinds of modes at most.

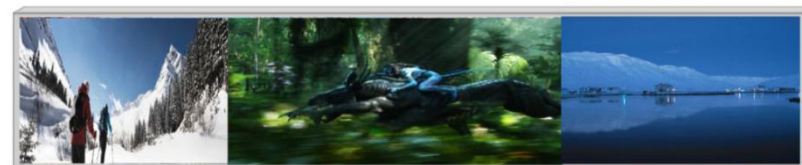
Case 2: Screen size is 6880×576 and loading transmitting card is shown as picture below:

Requirement: 1) Whole computer desktop should be displayed completely..

2) Screen is divided into three parts with proportion of 1:2:1.



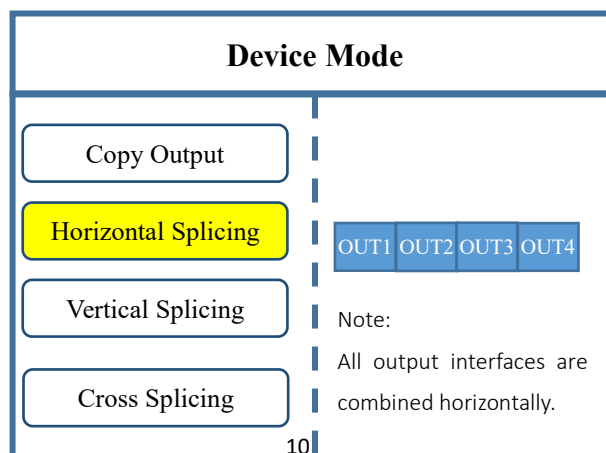
Display effect 1



Display effect 2

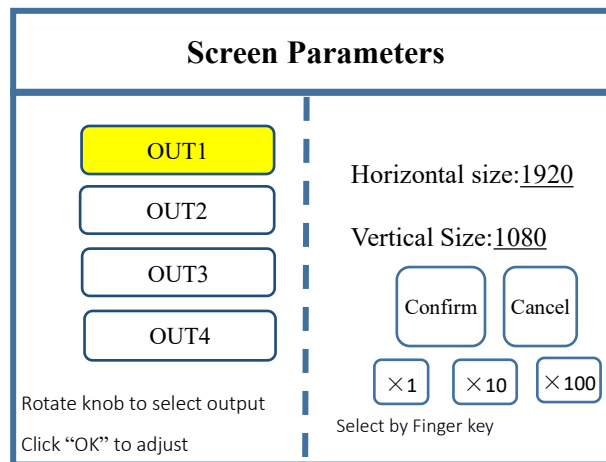
Debugging steps:

Step 1: Click “MENU” to enter into main menu interface. Select “Device mode” and then “Horizontal Mosaic”.



Note: since four transmitting cards are in a horizontal layout, horizontal mosaic is needed then.

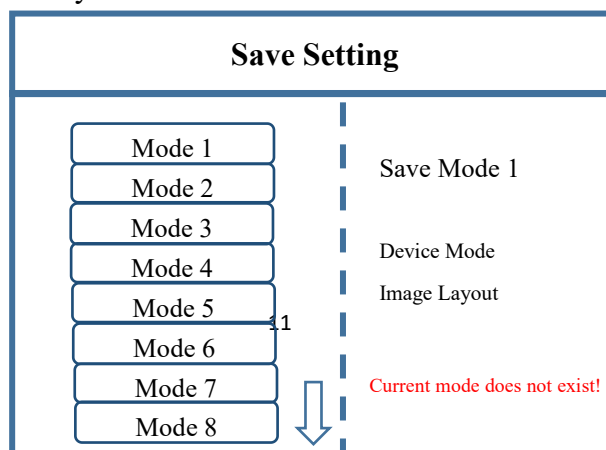
Step 2: Click “OK” to return to main menu interface; select “Large screen parameters” to set size of each output.



Note: Input according to corresponding transmitting card size of each output interface. For OUT1, its horizontal size is 1920 and vertical size 576; for OUT2, they are 1920 and 576 respectively; for OUT3, they are 1920 and 576; for OUT4, 1120 and 576.

Step 3: After inputting, click “Confirm” and return to main menu interface. The large screen splicing is finished, select signal source needed to display on screen and click corresponding key. For instance, for display of computer signal on large screen and connection of computer DVI interface with “S1-DVI” port of the back device, just click “S1” in the front which means choosing the signal to display on the screen.

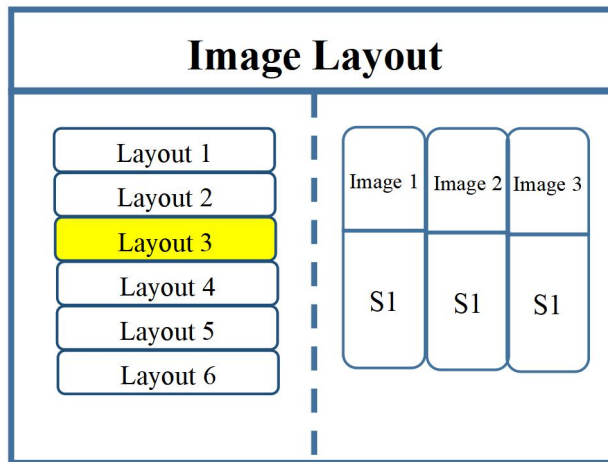
Step 4: After selecting signal and normal display of large screen, save all setting data. Click “MENU” to enter into main menu interface, and then get into “Save setting” interface to select “Mode 1” and click “OK”. Things will be fine when it suggests saving successfully.



Note: Mode 1 is default startup data of device boot; it's suggested that the most common mode should be saved to Mode 1 and the device can save 32 kinds of mode at most.

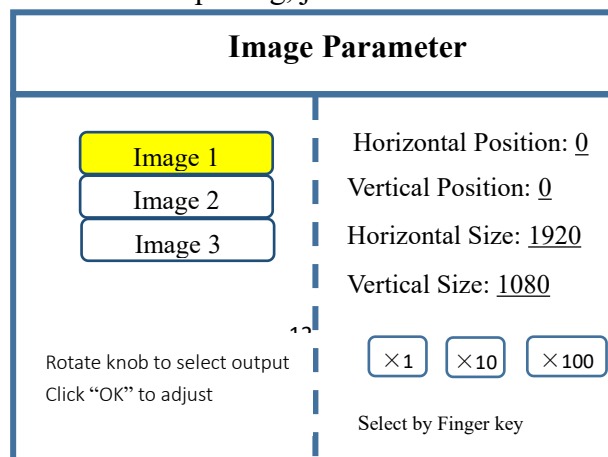
For above operation which has fulfilled the first requirement of the program, namely splicing of the whole screen, image is displayed completely and correct data are saved. For the second requirement which is that screen is divided into three parts with proportion of 1:2:1, only further setting on operation above is needed.


Step 5: Click “MENU” and enter into main menu interface and select “Image layout” then Layout 3.

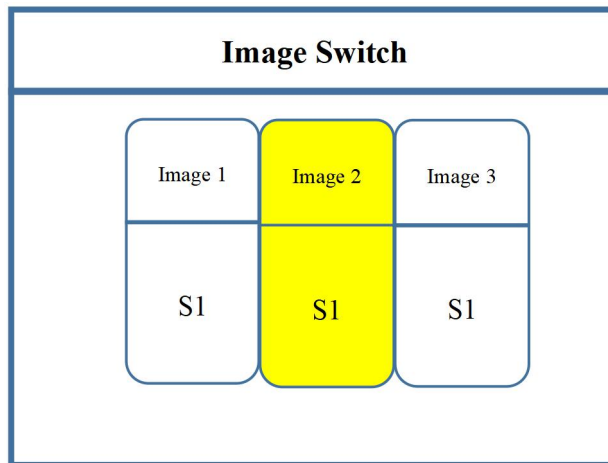


Note: Default layout of the device is three equal parts. If it is desired, there is no need to carry out step 6. If not, following operations are required.

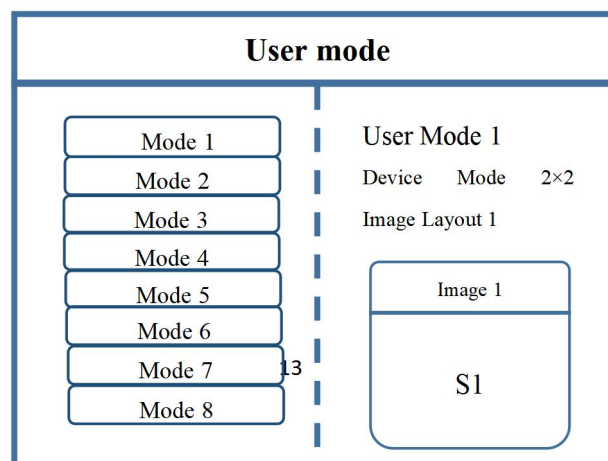
Step 6: Click “OK” to return to main menu interface and select “Image parameter” to enter into its setting interface. Since required image proportion is 1:2:1, the size of image 1, namely the left one is 1720×576, image 2 which is the middle one is 3440×576 and image 3, the right one, is 1720×576. Since image 1 starts from the left, its horizontal position is 0. In the same way, image 2 is 1720 and image 3 is 1720+3440=5160. Due to the reason that vertical position is calculated from the top, vertical position of three images are all 0. Above all, image 1’s horizontal position is 0, vertical position is 0, horizontal size is 1720 and vertical size is 576; the four parameters of image 2 are 1720, 0, 3440 and 576 respectively and those of image 3 are 5160, 0, 1720 and 576. After inputting, just click “OK”.



Step 7: According to operation above, screen body has been divided into three images with proportion of 1:2:1. Default display content of each image is S1. If different signal sources should be designated for each image, click  of front panel to enter into image switch interface. Select image by rotate knob and choose signal by click of S1-S6 of front panel. For example, if signal of image 2 is S6, click “WIN” to enter into image switch, then adjust rotate knob to image 2 (it’s selected if padded) and finally click “S6” of front panel. After selecting each image, save final data which is the same with step 4.



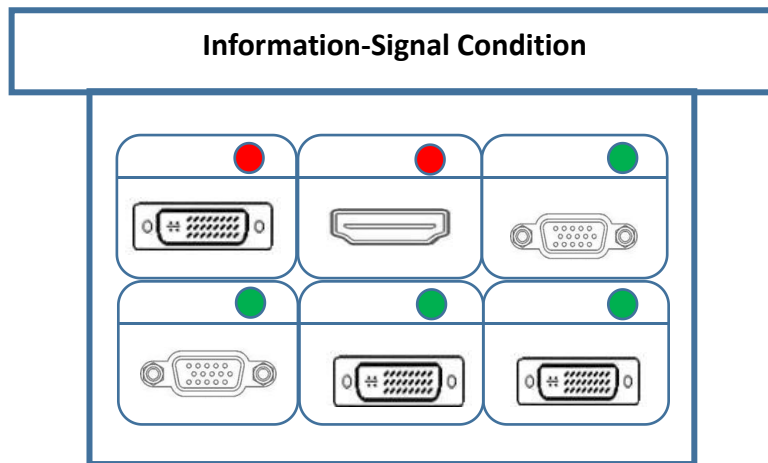
Up to now, program debugging is finished. If any display method is needed in later stage, it’s just OK to call saved mode. There are two ways for mode call. When mode number is not big, just click M1-M6 of front panel which are shortcut key for mode call; when mode number is big (over 6), user mode call should be made. Click “MENU” to enter into main menu interface, then select “User mode” and call needed mode.



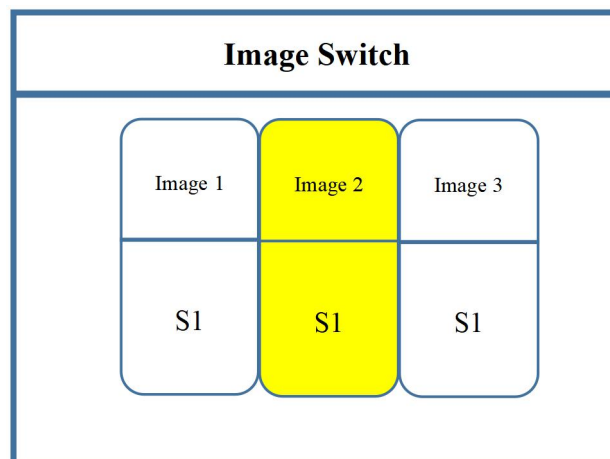
3.4 Function key:

Brief explanation of function key:

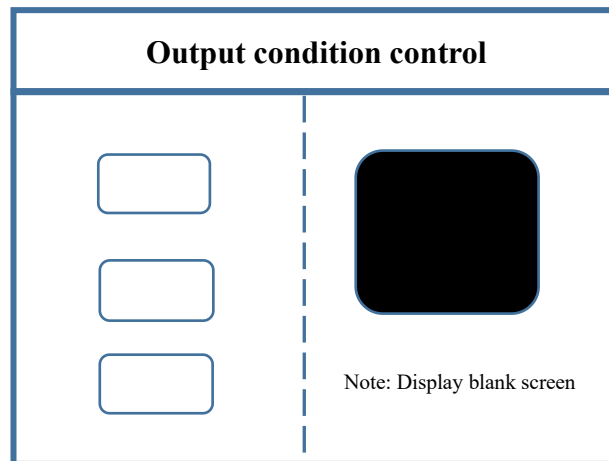
INFO: Information query key. Click this key and enter into its interface showing whether all signal sources are inputting normally. Its interface is shown as below. Red light means signal is lost while green one shows signal is normal.



WIN: Image key. Click this key to enter into its interface and signal source selection can be made in following interface. Taking image 3 as instance, click “WIN” to enter into image switch interface which shows current signal sources of three images. If signal source switch is needed, rotate the knob first to select the image and switch by “S1-S6” of the front panel.



OUT: Output condition key. Click the key to enter into its interface with three output options: blank screen, blue screen and normal screen. Selection of blank screen means all output interfaces and large screen are blank; blue screen means all those are blue; and normal screen refers to normal image output.



FUNC: Function key. Click this key to enter into its interface which includes: brightness adjustment, special effect switch, VGA adjustment, image matting setting, edge feather, transparency setting, intelligent warm backup, preview monitor, IP setting, serial port, freeze frame, local and global, color space, input brightness and switch time. The following are explanations of those common functions.

1. Brightness adjustment

The device supports 1-255 stairs brightness adjustment. Brightness of all screen body can be adjusted synchronously to meet customers' different brightness adjustment requirements for different conditions.

2. Special effect switch

The device support 16 kinds of special effect switch: round-in, round-out, diamond-in, diamond-out, upward cross, downward cross, left cross, right cross, upper right cross, lower right cross, upper left cross, lower left cross, horizontal comb and vertical comb. All those can meet requirements of different scene switch.

3. Special effect time

Set image switch times or switch time among different modes with the range of 0.2s-3s.

4. VGA adjustment

Since VGA signal belongs to analogue one, it tends to causes deviations among common functions. The product has two kinds of VGA corrections which are automatic correction and manual correction.

5. Image matting setting

Image matting setting is to extract some caption or images and delete the rest parts, which is often used in caption production. Taking red caption against black background as an example, the black base map fades away with only red caption left after image matting setting.

6. Edge feather

By image edge blanking, it makes transition more smooth and soft, and make image overlay more harmonious and vivid.

7. Transparency setting

The product can adjust image transparency and even point-by-point adjustment to make application scene more colorful.

8. Intelligent warm backup

User can set priority of backup signals. When current signal fails, the system will detect automatically and call backup signal immediately; if signal returns to normal, the system will call original signal intelligently. Parallel system constructed by this function can guarantee reliability of scene.

9. Input brightness

Make brightness adjustment to single input source.

Note: Above-mentioned brightness adjustment is for whole large screen. While input brightness adjustment is targeted for single signal source and only brightness of adjusted signal source will change with other parts unchanged.

10. Color space

Setting input signal source S1 and S2, for instance RGB, YCbCr and other color space.

11. IP setting

Set device IP address for software debugging.

12. Local and global

Switch local display or global display of certain image on the condition that data of local display is already set.

13. Freeze frame

Set stillness or movement of certain image which is often used for field change or background switch.

14. Serial port setting

Set device serial port like baud rate and etc.

15. Pre-monitoring setting

There are three kinds of monitoring settings: input monitoring, output monitoring and input and output monitoring.

Pre-monitoring input and output: can monitor large screen display, namely output.

Preview output channel: monitor all input and output.

Preview input channel: monitor signal source.

3.5 Advanced Menu

Language setting

Set device language: English or Chinese

Output resolution

Support single output resolution, user-defined resolution is available and support 30HZ, 50HZ and 60HZ frame rate. Device default output resolution is 1920×1080@60HZ.

Factory setting

All data are cleared and the device returns to default state.

OSD setting

The product support image-text and caption overlay. Hardware can be opened or closed with software setting.

Scheduled task

Device can be switched in a regular time which can be used in unattended occasions. For instance, school screen can be switched to computer signal in 8 am to play motivational slogans; and in 7 pm, it can turn to STB signal to play CCTV news periodically.

Multi-machine cascade

Device cascade mosaic is commonly used to solve device desynchrony.

Common functions

Click “FUNC” to get quick access to common setting function.

Technical Support

Inquire device version number and its IP address.

EDID

Reset all EDID ports.

Mode delete

Delete wrongly saved or repeated mode.

Keyboard lock

Lock front panel key to avoid misoperation of irrelevant personnel.

4. Technical Parameters

| Input port | | |
|------------|----------|---|
| Type | Quantity | specification |
| CVBS (BNC) | 2 | NTSC/PAL adaptive, supports 3D comb filter |
| VGA | 2 | The VESA standard supports a maximum of 1920 x 1200@60Hz |
| DVI | 1 | 1.3 Standard: supports a maximum of 1920 x 1200@60Hz |
| HDMI | 1 | 1.3 Standard: supports a maximum of 1920 x 1200@60Hz |
| EX | 1~2 | It is equipped with 2-channel DVI, supporting DVI, SDI, HDMI1.3/1.4, CVBS and other signals |

| Output port | | |
|-------------|----------|--|
| Type | Quantity | specification |
| DVI-D | 4 | The horizontal resolution is up to 3840 pixels The maximum vertical resolution is 1920 pixels |
| DVI-D | 2 | 1 channel monitoring output; 1 vessel out |

| Control port | | |
|---------------|----------|---|
| Type | Quantity | specification |
| RJ11 (RS-232) | 1 | The data transfer rate is 50、75、100、150、300、600、1200、2400、4800、9600、19200、38400、57600、115200 (BT) |
| RJ-45 | 1 | 100M |
| RJ-45 | 1 | 1000M, Support host software echo |

| Whole machine specification | |
|-----------------------------|--------------------------|
| Input power | 100-240V AC~50/60Hz 0.6A |
| Operating temperature | 0-45°C |
| Dimensions | 483×340×72mm (L×W×H) |
| net weight | 5KG |
| Power consumption | 100W |

5. Q&A

Q1: DVI, HDMI, VGA and CV Port Definition.

A: DVI: Digital (HD) Video Signal, an interface standard jointly introduced by DDWG (Digital Display Working Group) combined by Silicon Image, Intel and etc. It has been optimized in speed, resolution, HDCP agreement and so on. Its signal source is often desktop and laptop.

HDMI: High Definition Multimedia Interface, a digital audio/video interface technology. It's specialized digital interface and can send audio and video signal at the same time with the quickest data transmission of 5Gbps. Its signal source is usually

camera, laptop and information publication system.

VGA: Analog Video Signal (Video Graphics Array), a video transmission standard introduced together by IBM in 1987 with PS/2 at the same time. VGA enjoys high resolution, rapid display rate, rich color and is widely applied among color displays. Its signal source is often desktop, laptop, VOD and Matrix.

CV: Composite video signal, also called composite video, which can pack all signals together and transfer it as a whole. Its signal source is usually camera, DVD, Cable Box, VOD and video matrix.

Q2: Please give a brief introduction of the connection method of graphics, splicer, transmitting card, receiving card and LED.

A: Connect graphics DVI (VGA) output port with splicer DVI-IN(VGA-IN) input---output splicer DVI-OUT to transmitting card---connect transmitting card with terminal receiving card of the back screen by network cable---connect receiving card with each screen body with control and cover whole screen by cascade.

Q3: What is output resolution?

A: Output resolution is pixel mode output by single port of splicer and the largest control range of splicer output. Regular resolutions are: 1024*768, 1280*1024, 1600*1200 and 1920*1080, which are set with the same resolution mode of transmitting card.

Q4: What is administrator password set in PC Software.

A: There is no password and it's allowed to enter into with just a click.

Q5: What are the reasons for failure of serial connection with the application of serial splicing processor?

A: Possible reasons are as follows:

1. Wrong selection of COM port. Just click "Confirm" and re-click "opening serial port" key.
2. Occupation of serial port. Two or more software windows are not allowed to be open simultaneously.
3. Failure of serial port line connection or damage of the line.
4. Damage of COM drive of the board or serial port.

If suggestions above fail to solve your problems at last, please contact with our customer service in time. We will assist you to solve your problems as soon as possible.

Q6: What are the possible reasons for network overtime with network splicing processor?

A: Possible reasons are as follows:

1. IP address of local connection is not in the same field with splicer.
2. Failure of network line or damage of the line.
3. Damage of network port of signal source.

If suggestions above fail to solve your problems at last, please contact with our customer service in time. We will assist you to solve your problems as soon as possible.

Appendix: Graphics copy mode and extended mode setting

1. AMD Video Card

Right-click on blank space of the desktop → Property → Setting → Advanced → enter into Graphics Drive Control Board → Right click → Copy/Extended mode.

2. NVIDIA Video Card

Right-click on blank space of the desktop → Property → Setting → Advanced
→enter into Graphics Drive Control Board →Right click →Copy/Extended mode.