U3

Multi-picture splicing processor

Version: v3.1

Release date: February 2022

Manual

TEL 400 159 0808

Web:www.kystar.com.cn

Beijing KYSTAR Technology Co.,LTD

Professional Ultra HD Video Display

Control system integrated solution and service provider

Statement

Thank you for using our company's products.

The copyright of this manual is owned by our company, Without any written permission from our company, it is forbidden to copy, delivery, distribution or storage of content of this document in any form..The company reserves the right of modifications and improvements of any product function described in the document without prior notice.

This product may be accompanied by a related control software, which is only for your usage, and the ownership of the software is owned by the company. You are allowed to copy the software but only limited to your personal usage. If the software is to be applied to other purposes, in particular commercial purposes, please contact our company. Our company reserves the right of investigate and affix legal liabilities of any infringement act.

Please read the manual carefully before using. Any improper operation may cause damage to the product. It is operated with electricity and sufficient attention should be attached. Our company bears no responsibility for any property loss and personal injury incurred from any improper operation failing to follow the instructions in the manual. If the provision herein conflicts with local laws or regulations, the local laws or regulations shall prevail.

It means that you accept the statement above if you use the product. If not, please contact with the seller and return the product following relevant procedures.

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.

	**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.
	**High voltage** High voltage devices are contained.
	**Do not dismantle without professionals** The device is not equipped with repair parts which is 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.
	**Ensure sound grounding** For your safety, please ensure that power cable is grounded soundly
	**Keep away from strong magnetic field, engine and transformer** For normal operation of the device, please keep it away from strong magnetic field, enginer and transformer.
	**Guard against damp** Keep operational environment dry. If the equipment is inadvertently dampened, do not power the device and use it after being dried.
	**Keep away from explosives** Do not use the product in combustible or explosive environment.
	**Prevent liquid or conductive fragments getting into the chassis** Liquid or metal fragments should be stopped from getting into the chassis. If so, the device should be powered off immediately and power supply can only be allowed after clearance of foreign bodies.

Table of Contents

1. Product Introduction

The multi-image splicing 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.

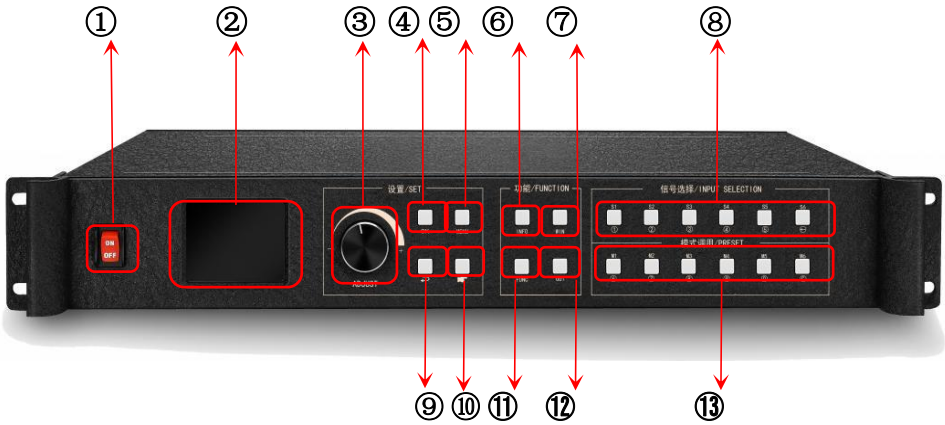
The product adopts CPT+ FST splicing technology targeted for small pixel LED display to guarantee uniformity and synchronization of splicing. The Super Resolution Zoom-in Technology can help eliminate jaggies and reduce the fuzzy sense and out-of-focus phenomenon due to image magnification.

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. Support the output of 2 million 600 thousand pixel custom in copy mode,in splicing mode the maximum level of 3840 pixels, the vertical maximum 1920 pixel output.
3. Support free-form three-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 signal and mode seamless switch, provide more than ten kinds of transitional special effects
7. Support multi - group editable global graphics and text superposition.
8. Support luma matting, 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 Pane



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.

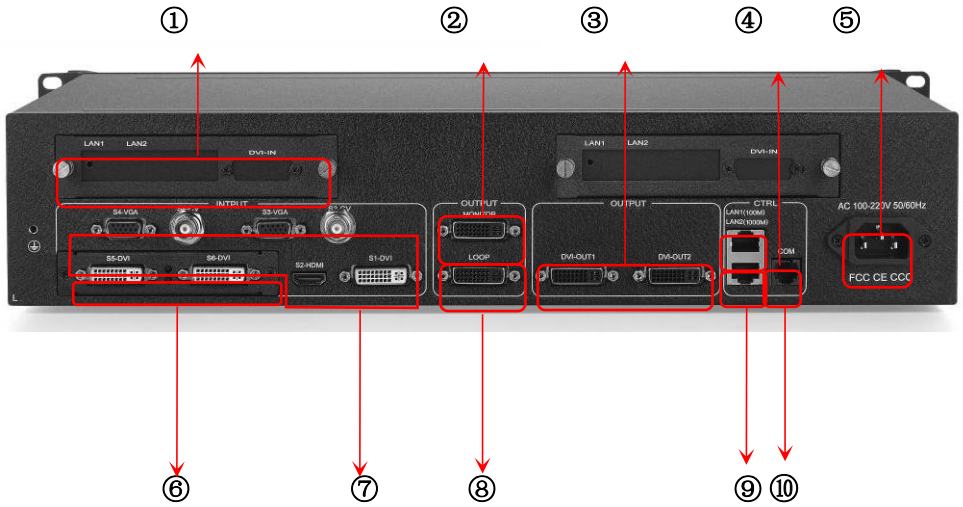
⑩  : navigation buttons; Click to enter the navigation mode.

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 **CARD：** Send card slot; The sending card can be put into the processor for power supply.

② **MONTOR：** Pre-monitoring channel; Used to monitor input signal source or output output display content.

③ **OUTPUT：** Programming output channel; Pure digital DVI-D output, connected with sending card, etc.

④ **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.

⑤ **AC 100-220V:** power interface; It can be connected to ac power supply of 100-220V.

⑥ **INPUT S5, S6:** extended INPUT; Expandable with two conventional inputs or one 4KHDMI input.

⑦ **INPUT S1-S4:** conventional INPUT; Input interface includes one set of DVI, one set of HDMI, two sets of VGA and CVBS.

⑧ **LOOP:** DVI LOOP exit; Loop out S1-DVI signal, which can be used for multi-machine cascade.

⑨ **LAN2:** GIGABit network control port; You can debug the device and implement the echo function.

⑩ **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 card→Large screen.

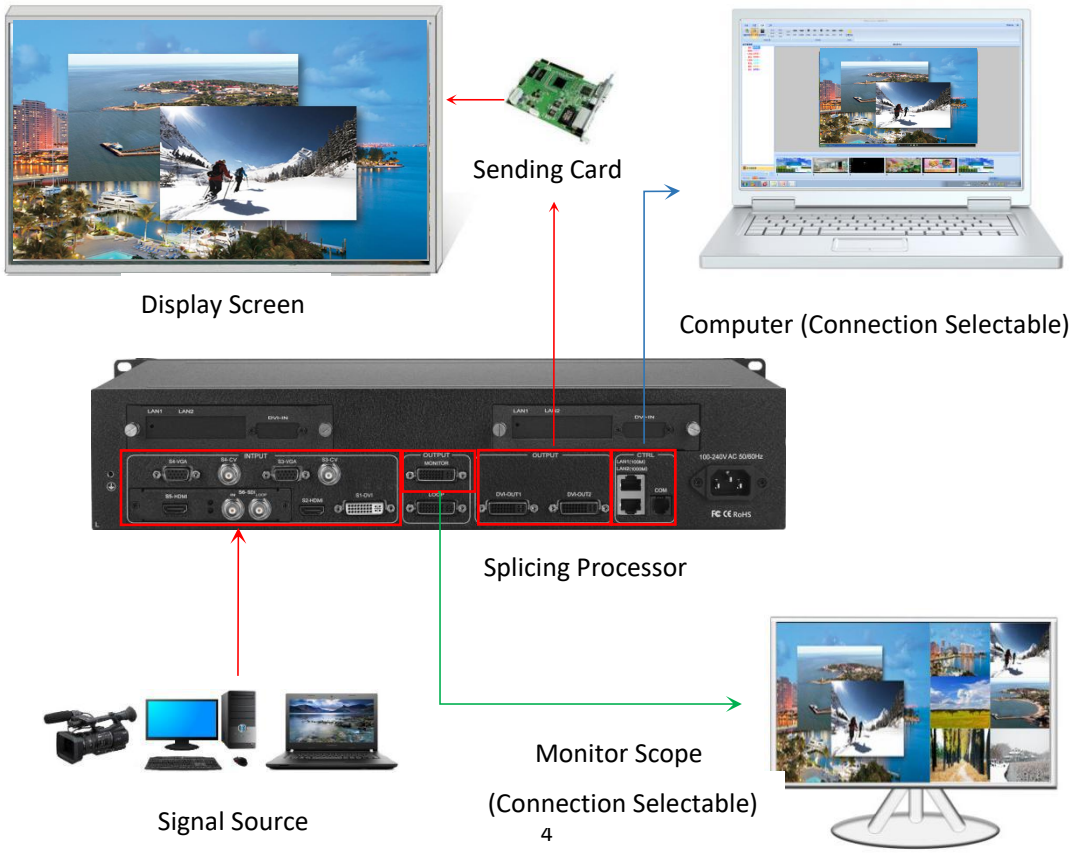
Control connection: connect computer with device control port and debug device connection method. There are three connection methods:

（1）Connect 100 mbit 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.

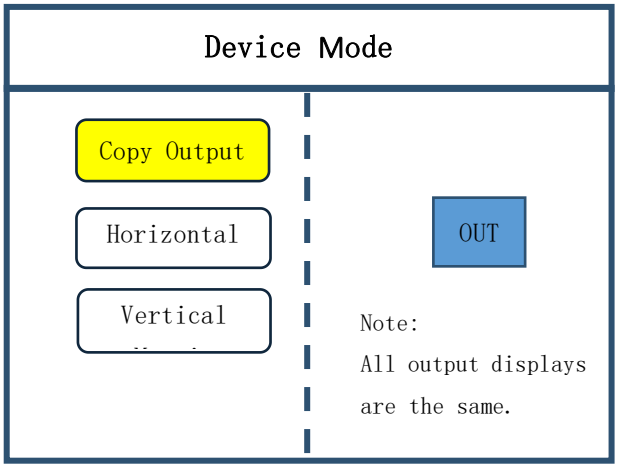
（3）Connect one crystal head of serial port line which is randomly donated by device with splicer COM port, and plug DB9 into computer serial port. Any of the three methods realizes device software control.

Connection diagram is as follows:



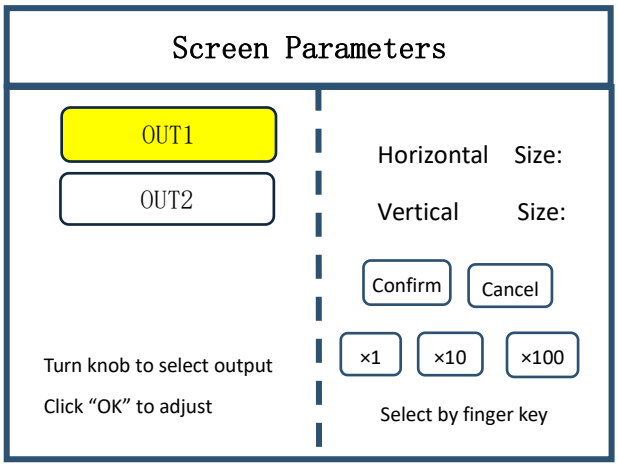
3.2 Debugging Procedure

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



Note: Copy Mode: all output contents are consistent; horizontal mosaic: contents of all outputs are arranged horizontally; vertical mosaic: contents of all outputs are arranged vertically;

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.



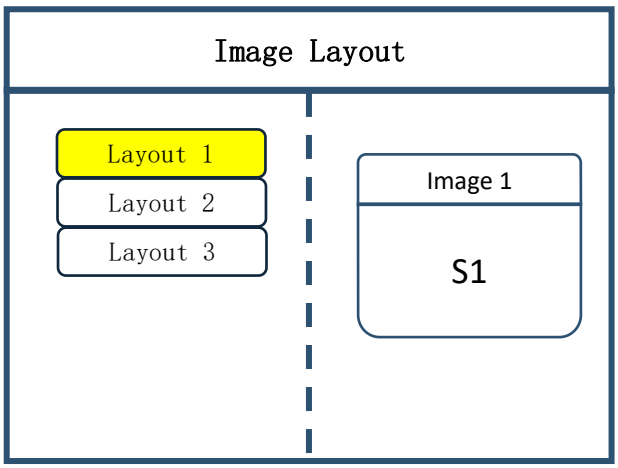
Note: there are two ways for number input:

(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 

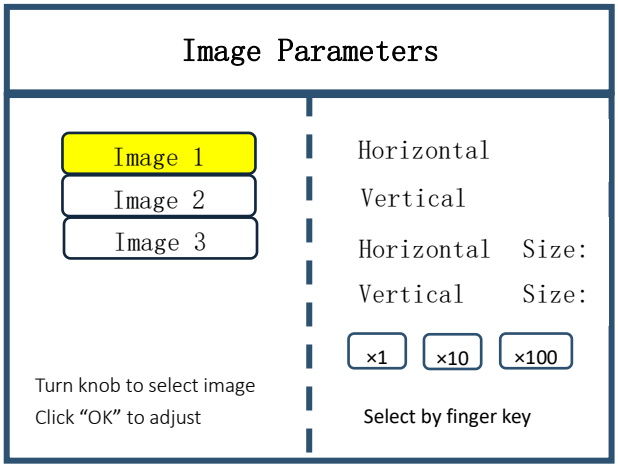
refers to figure 1.

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.

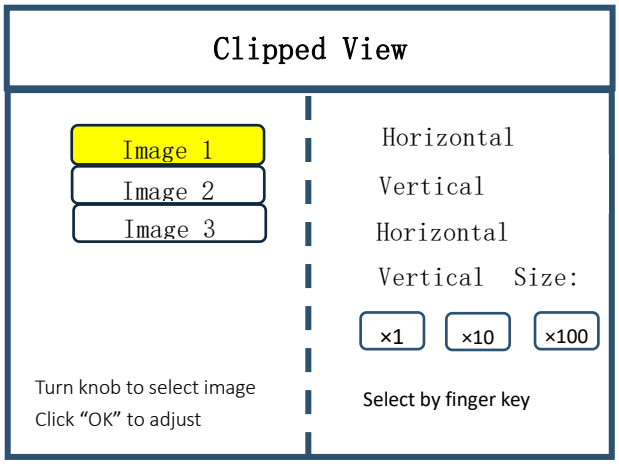


Note: In case of signal image, skip this step. For multi-image, it's OK if image number and item requirements are in consistent. Following operations can be taken when layouts are not consistent.

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.

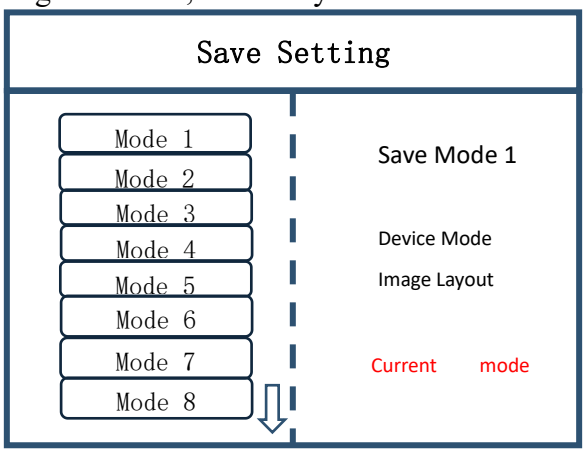


Step 5: Click "Menu" and return to main menu interface; select "Clipped view" to enter into its setting interface to set size and position of each image.



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 "MENU" and return to main menu interface; select "Save setting" to enter into Data storage interface; select any mode and click "OK" to save data.



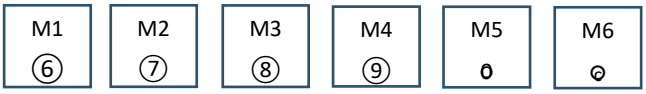
Note: Mode 1 is default startup data of device boot; it's suggested that the most common mode or that required by device boot should be saved to Mode 1.

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

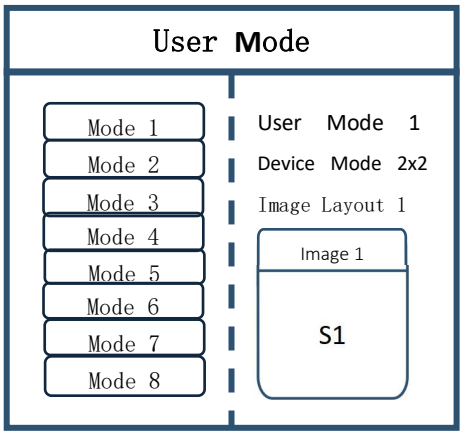
After device debugging, just call saved data according to different condition requirements in later stage.

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 desired mode and click “OK”.



3.3 Case explanation

Device debugging steps are explained by following cases.

Case 1: screen size is 2112×896 and loading transmitting card is shown as picture below:

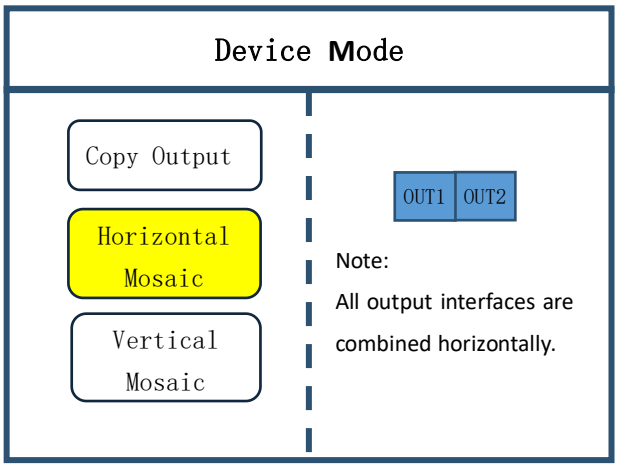
Requirement: whole computer desktop should be displayed completely.

Diagram of loaded transmitting card

Display image

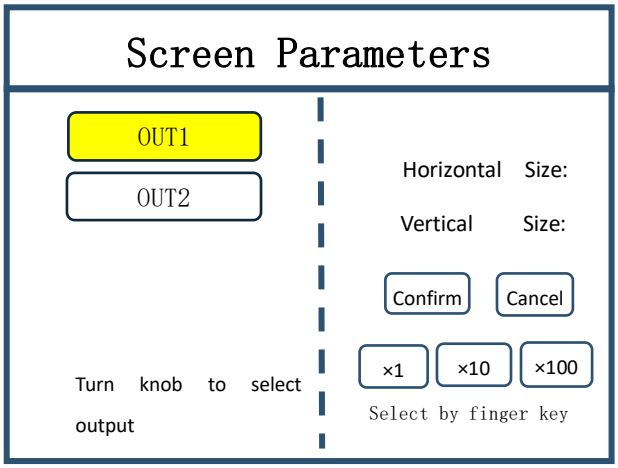
Debugging Procedure:

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



Note: as two transmitting cards are in the 1x2 arrangement, horizontal mosaics are needed then.

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

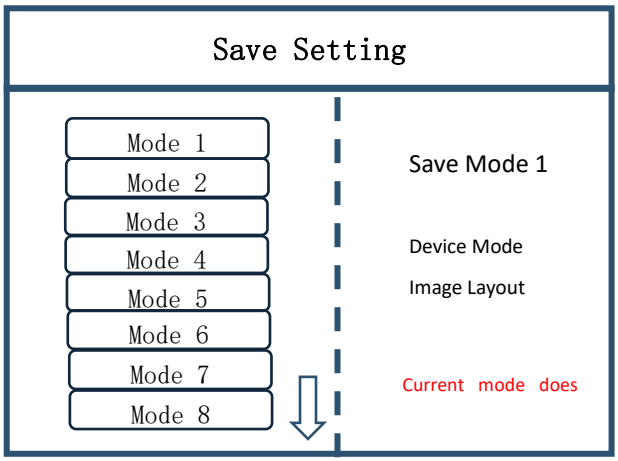


Note: Input according to corresponding transmitting card size of each output interface. For OUT1, its horizontal size is 960 and vertical size 896; for OUT2, they are 1216 and 896 respectively.

Step 3: After inputting, select “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. E.g.: 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 1792×1344 and loaded 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.

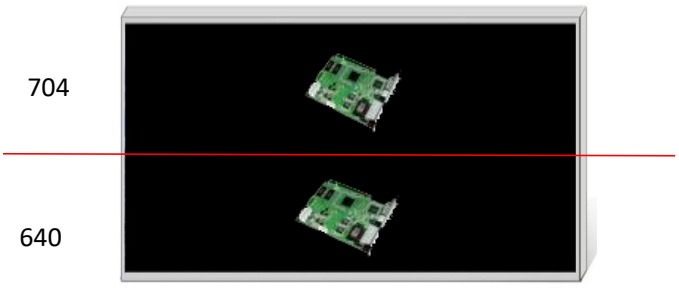


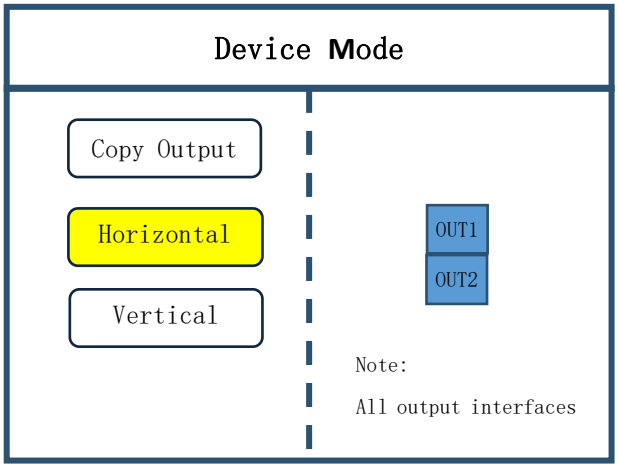
Diagram of loaded transmitting card

Display image 1

Display image 2

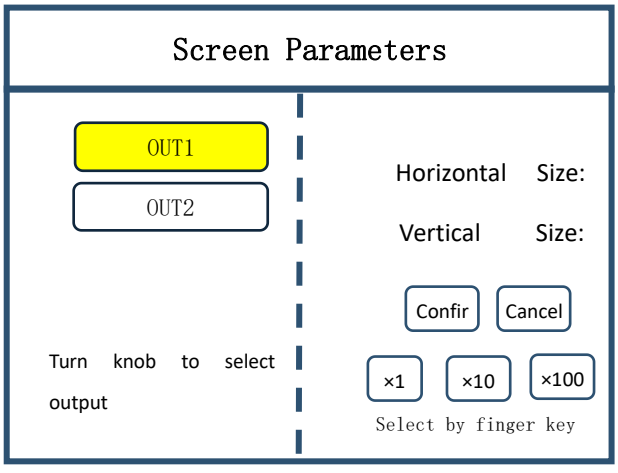
Debugging Procedure:

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



Note: as two transmitting cards are in vertical arrangement, horizontal mosaics are needed then.

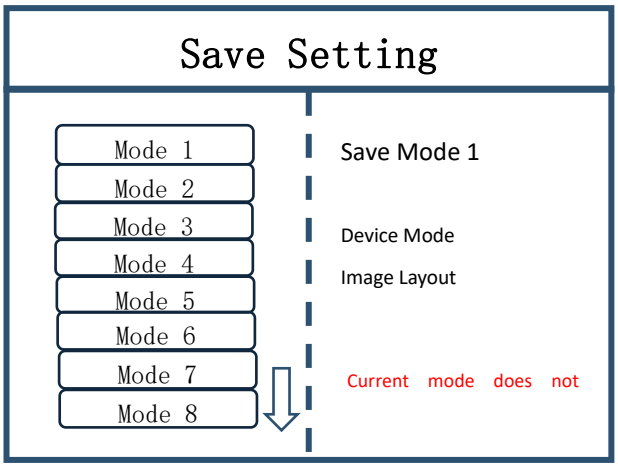
Step 2: Click “OK” to return to main menu interface; select “Large screen parameters” to set size of each output interface.



Note: Input according to corresponding transmitting card size of each output interface. For OUT1, its horizontal size is 1792 and vertical size 704; for OUT2, they are 1792 and 640 respectively.

Step 3: After inputting, select “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. E.g.: 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.

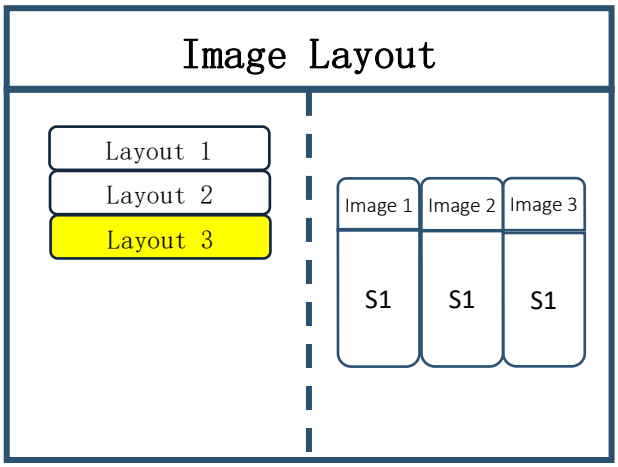
Step 4: After selecting signal and normal display of large screen, save all setting data. Click “MENU” to enter into main menu interface, and then get into “Save setting” interface to select “Mode 1” and click “OK”. Things will be fine when it suggests saving successfully.



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.

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.

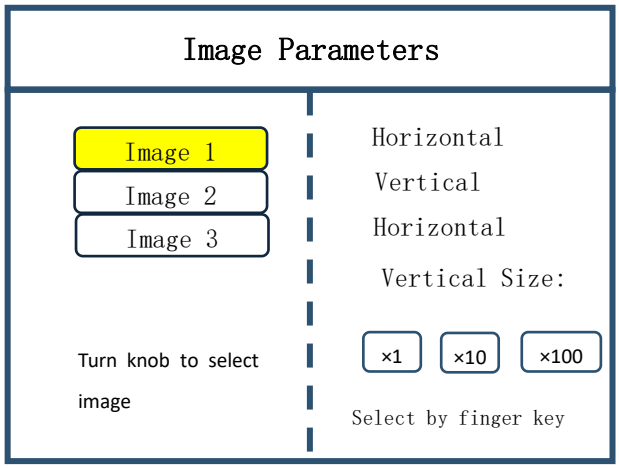
Step 5: Click “MENU” and enter into main menu interface and select “Image layout” then Layout 3.



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, the following operations are required.

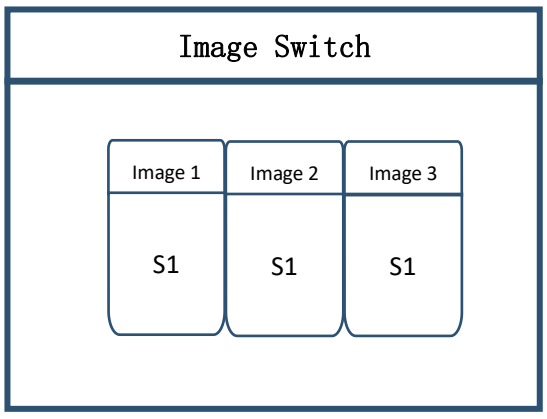
Step 6: Click “OK” to return to main menu interface and select “Image parameter” to enter into its setting interface. Set the following parameters:

Image Properties	Horizontal Position	Vertical Position	Horizontal Size	Vertical Size
Image 1	0	0	448	1344
Image 2	448	0	896	1344
Image 3	1344	0	448	1344

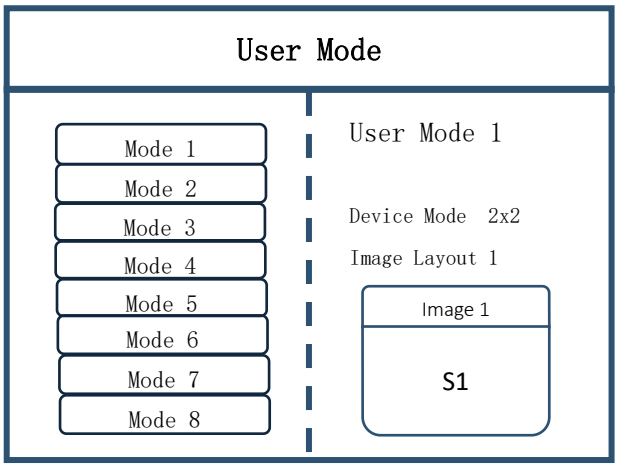


Note: The full screen size is 1792x1344 and image proportion is required as 1:2:1, so the sizes of the three images are respectively 448, 896 and 448. As the left images starts from the far left, its horizontal position is 0. The middle image follows the left image, so its horizontal position is 448. The right image follows the middle, so its horizontal position is 448+896=1344. The vertical direction always starts from the top, so the vertical position is 0. In summary, both horizontal and vertical positions of image 1 are 0 and horizontal and vertical sizes are 448 and 1344 respectively; Horizontal and vertical positions of image 2 are respectively 448 and 0 and horizontal and vertical sizes are 896 and 1344 respectively. Horizontal and vertical positions of image 3 are respectively 1344 and 0 and horizontal and vertical sizes are 448 and 1344 respectively.

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 WIN 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. E.g.: 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

Using Menu

LED-KS600 adopted a high brightness &contrast LCD screen to display the entire menu system, if the user does not have operation or operation timeout, the LED screen will show the default state.Operate the menu system by suing the knob and keys.The user can cheak and set its function and states convenient and intuitive to meet the demands.

The following will combine the keys function and the LEDscreen display,detailed introduces you to LED-KS600 of menu system.

How to use the keys

The front panel keys of LED-KS600 Dare divided into four areas:INPUTS,FUNCTION, MENU and NUMERIC.besides them,there is special numeric area including all the buttons of INPUTS and FUNCTION area.

INPUTS area

In the default menu state, press the button,then could let the LED screen to the corresponding source.

FUNCTION area

There are 4 keys: brightness, mode, output,and part.

	FUCTION
BRI	press this button and rotating knob to adjust the brightness
MODE	click the MODE, Select the corresponding mode
OUT	switch between black screen and normal. note: The blue screen switches with the knob.
PART	partial or full screen switching.

MENU area

This areas contains a knob whicl can be pressed, a confirmation key(OK), a return key and a navigation key.The knob key the same as the confirmation key.when to press the return key, the menu system may be back to the previous menu in turn until to the default state immediately. In addition,the confirmation key also switch between browsing and setting.

Ex:

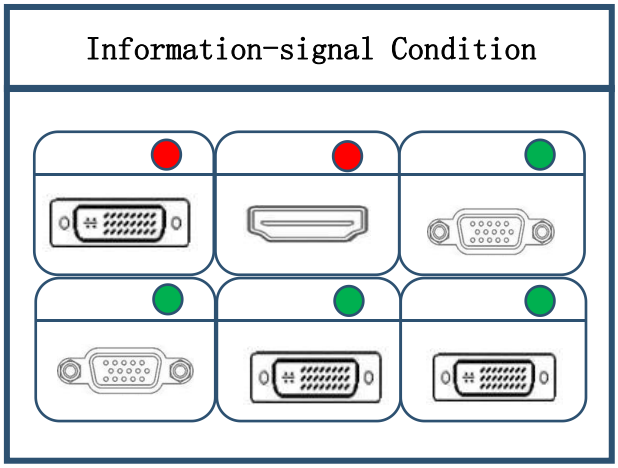
In figure . Anti-clockwise knob,the cursor moved to the above or the left.Put thecursor to the item need to adjust, press the “knob”,or confire key,namely into set mode,then anti-clockwise “knob”,can reduce the current parameter values.Clockwise “knob”,it can increase the current parameter values.If you want to continue to set this paga other item,please switch back to browse mode. In navigation mode， when user press the konb to adjust the data, can be used as a step - length switch key.

Numeric key area

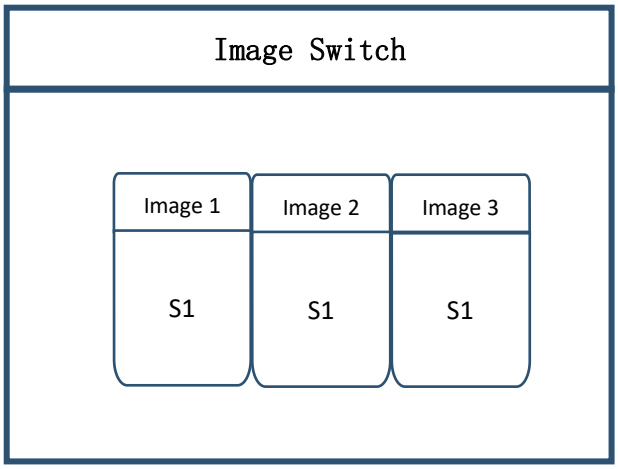
When browsing the menu,if the current item parameter is for numeric type,can though ten numeric keys to enter theneed values directly.

Below are detailed explanations of function keys:

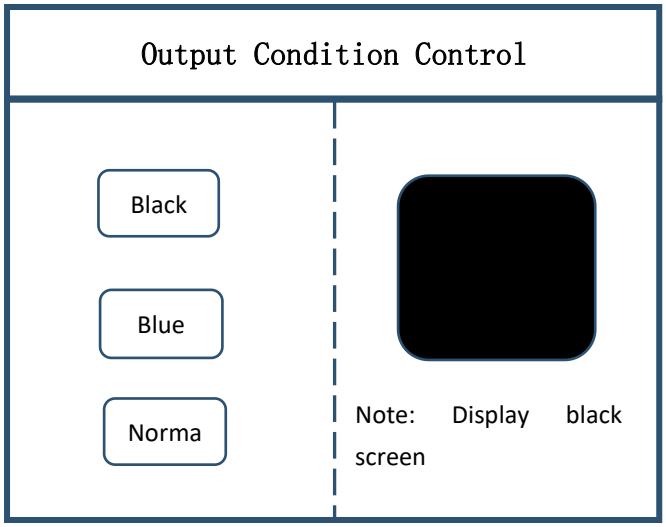
INFO: Information query key. Click this key and enter into its interface showing whether all signal sources are inputting normally. Its interface is shown as below. Red light means signal is lost while green one shows signal is normal.



WIN: Image key. Click this key to enter into its interface and signal source selection can be made in the 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. Common functions include: 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 supports switching of 16 kinds of special effects: fade in/out, seamless straight cut, vertical or horizontal comb, round cut-in or cut-out,diamond cut-in or cut-out and cross of every side.

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

As VGA is analogue signal, it tends to cause 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 offers image transparency adjustment 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

It ensures brightness adjustment to single input source.

Note: The 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 spaces.

11. IP setting

Set device IP address, mainly for software debugging.

12. Local and global

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

13. Freeze frame

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

14. Serial port setting

Set device serial port like baud rate and so on.

15. Preview setting

There are three types of monitoring: input monitoring, output monitoring and input & output monitoring.

Preview input & output: it also enables monitoring of output, namely large screen display.

Preview output channel: monitor all inputs and outputs.

Preview input channel: monitor signal sources.

3.5 Advanced Menu

1. Language Setting

Set device language: English or Chinese

2. Output resolution

Support single output resolution, user-defined resolution is available and support 30HZ, 50HZ and 60HZ frame rates.

Default output resolution is 1920×1080@60HZ.

3. Factory Setting

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

4. OSD Setting

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

5. 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.

6. Multi-machine cascade

Device cascade mosaic is commonly used to solve device de-synchronization.

7. Common Functions

Click “FUNC” to get quick access to common settings.

8. Technical Support

Inquire device version number and its IP address.

9. EDID

Reset all EDID ports.

10. Mode Delete

Delete wrongly saved or repeated mode(s).

11. 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	2	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℃
Dimensions	483×340×94mm（L×W×H）
net weight	6KG
Power consumption	100W

5. FQAs

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

A: DVI: 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 normally desktop or 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 or 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 normally 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 normally 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: No password. Just a click is ok.

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 our customer service in time. We will help 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 connection 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 our customer service in time. We will help 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.