Splicing Video processor with card

User Manual

Contents

1. SAFETY NOTICE

To protect the device and operating personnel from electrostatic discharge, you need to check and ensure that the device is grounding well before the device is powered on. Please observe the following when you install, use, maintain this equipment.

Make sure the device ground connection.

Disposal Instruction (US)

For better protection of our earth, please don't throw this electronic device into municipal trash bin when discarding.

To minimize pollution and ensure utmost protection of the global environment, please recycle the product. For more information about the collection and recycling of Waste Electrical and Electronic Equipment (WEEE), please contact your local dealers.

There is high voltage in the equipment, non-professionals are not allowed to open the case cover to avoid danger.

NOTICE

1. The device is strictly prohibited from being subjected to water droplets or splashes, and it is strictly prohibited to sprinkle any chemicals or liquids on or near the device;
2. In order to prevent fire, this equipment is forbidden to be close to the fire source;
3. In order to maintain good ventilation, a gap of at least ≧ 20cm should be maintained around the panel of the equipment;
4. If the equipment makes strange noises, smells or smokes, unplug the power plug immediately and contact the equipment supplier;
5. It is strictly forbidden to plug and unplug the DVI/HDMI signal cable under power.

Safety Instructions

1. Please read these safety instructions carefully.
2. Please keep this User Manual for later reference.
3. Please disconnect this equipment from connecter before cleaning. Don’t use liquid or prayed detergent for cleaning. Use moisture sheet or cloth for cleaning.
4. Make sure the equipment is connected to the power source with the correct voltage, frequency, and ampere.
5. All cautions and warnings on the equipment should be noted.
6. Never pour any liquid into opening, this could cause fire or electrical shock.
7. Never open the equipment. For safety reason, the equipment should only be opened by qualified service personnel.
8. If one of the following situations arises, get the equipment checked by a service personnel :
    a. Liquid has penetrated into the equipment.
    b. The equipment has been exposed to moisture.

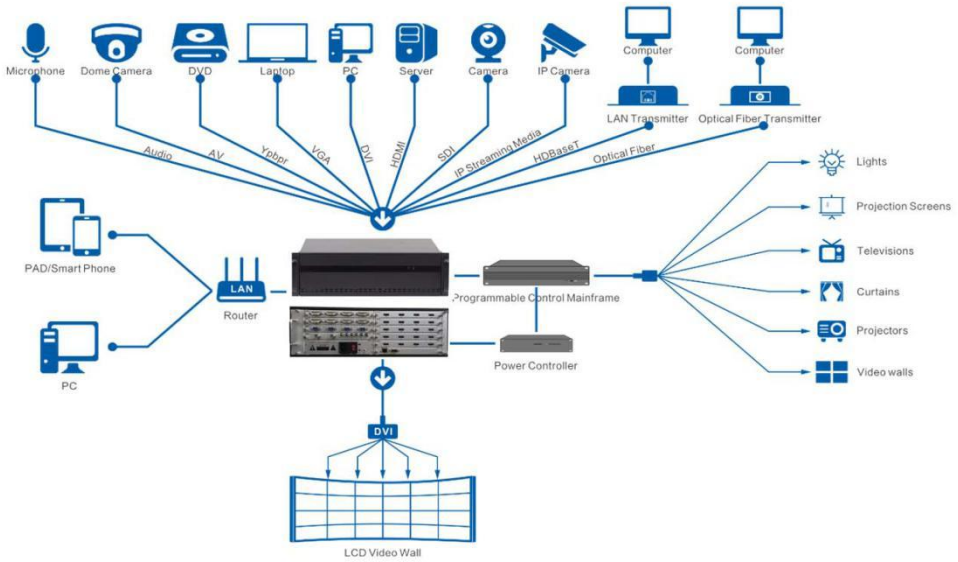
c. The equipment has not work well or you can not get it work according to user's manual.
d. The equipment has dropped and damaged.

9. If the equipment has obvious sign of breakage.
10. Ambient operation temperature: 0 ~ 45 degrees.
11. Risk of overheating! Don't put operating/installing equipment inside too closed space, be sure the installation space at least 1 to 2 inches or 2 to 5 cm of space for ventilation. To ensure that other objects do not cover the equipment.

2. PRODUCT DESCRIPTION

The large-screen splicing image processor series products supports to connect a variety of digital/analog images and video sources to the large-screen splicing wall, monitoring system or other display terminals. Modular concept, a single machine can freely combine input and output modules, and multiple machines can be seamlessly cascaded to realize the connection of control and signal transmission.

2.1 CONNECTION DISGRAM



2.2 SPECIFICATION

Input interface (optional)	DVI/HDMI/VGA/YPbPr/VIDEO/SDI/ /IP stream media/DP/HDBase-T/optical fiber
Input resolution	XGA/SXGA/SXGA+/UVGA/WUXGA/1080p etc., and compatible with special customized ultra-high resolution
Output interface	DVI / HDMI / VGA
Output resolution	1920*1080/60HZ（Backward compatible with normal resolutions）
Software	Windows console software
Power	100VAC～240VAC，50/60Hz
Consumption	4W / road
Operation temperature	-20℃——60℃
Operation humidity	5-95%

Dimension	Standard industrial control chassis
Serial interface	RS-232，DB9 female
Baud rate	115200
Serial control port structure	2=TX，3=RX，5=GND
Ethernet Control Interface	RJ-45 female， TCP、UDP Protocol，auto adjustment 10Mor100M，full duplex or half duplex

2.3 Features

1. High reliability

The large-screen splicing image adopts a modular independent hardware structure design. The equipment power supply, fan, signal acquisition board, signal output board, etc. all support hot-swappable operation. The failure or abnormality of any module will not affect the normal operation of the entire system. This design makes MTTR (Mean Time to Repair) the shortest and MTBF (Mean Time Between Failures) the longest, perfectly meeting the user's requirements for system reliability and stability.

2. Unique virtual screen display technology

Provide users with professional system solutions, can customize ultra-high resolution perfect display for users, the resolution can reach N×M, N=1920*n (column), M=1080*m (row) to provide users with perfect display. Detailed image display.

3. CAN bus control technology

CAN is Controller Area Network. It is a serial communication network that effectively supports distributed control or real-time control. With its flexible and convenient communication method, new data encoding, non-destructive bus arbitration technology, advanced short frame structure makes the transmission time shorter, as well as the powerful troubleshooting ability, the diversification of communication media and the flexibility of the combination mode, which are fully applied to this series of products. When multiple devices are cascaded, the response speed of controlling the device through CAN is faster.

4. Full digital processing

All digital channels, pure digital signal processing system, input and output signals can be digital or analog according to the specifications of specific equipment interfaces, but all signals are transmitted in pure digital mode within the system, and can be transmitted over long distances without attenuation. All signal processing, including clipping, scaling, de-interlacing, noise reduction, etc., is done within the system.

5. Full channel full HD 1080P signal processing

Ordinary devices that can perform 1080P high-definition input and 1080P high-definition output often compress the full HD 1080P signal inside the device due to bandwidth

limitations, and then amplify it to 1080P output. This series of products is not only a pure digital signal processing system, but also a full-channel full-HD 1080P signal processing system. It adopts the company's unique distributed control technology to independently process each 1080P input signal, and the processing process is always complete. HD 1080P signal without any compression.

6. Advanced pure hardware structure

Pure hardware architecture, internal self-built core computing mechanism, no CPU and operating system, no blue screen and virus troubles, no card processor crash failure, startup time less than 5 seconds, dual backup redundant power supply, support power hot backup.

7. Powerful image processing capabilities

Powerful data computing and transmission capabilities, the data transmission rate reaches 6.25Gbps, all modular boards use the company's independent research and development of chips specially used for massive data transmission in the splicing system, completely eradicate the multi-screen processor data bus bandwidth caused by the problem of slow and unstable display speed of splicing system .

The multi-screen processor adopts the high-speed data transmission technology of the full cross-scheduling architecture, and the underlying data transmission is controlled by the company's original data scheduling chip technology, which dynamically sets a point-to-point dedicated line data channel for each signal, and the images and video signals of each DVI, HDMI, RGB, video, network channel are transmitted exclusively through their own dedicated channels to ensure that all information of each signal can be displayed in full real-time, the signal display speed can reach 60 frames per second, and all input channels can play high-definition dynamic images smoothly at the same time with unlimited channels.

8. Flexible and convenient operation control system

All output ports can be arbitrarily assigned the output serial number, the arrangement mode can be arbitrarily combined, and the customer can arbitrarily combine the screens, which greatly facilitates the construction. Any channel of video input signal can be zoomed in, zoomed out, cross-screen or full screen at any ratio at any position. All signal windows can be freely roamed, superimposed, and zoomed (no zoom ratio limitation), and the aspect ratio can be adjusted arbitrarily.

9. Input signal character labeling function

It supports the function of character labeling of input signals, and can characterize all input channels, so that customers can grasp the source of the displayed signal in real time.

10. Convenient controls method

The processor can be controlled locally through the network port and the RS232 port, and at the same time, it supports control of almost all central control devices on the market. As well as, it also supports remote control. Through UDP/IP network protocol, it can be connected to Windows, Linux and other networks. Any PC connected to the network can be used as a remote console or control PC without changing the existing network

environment. The terminal only needs to input the IP address of the device and it can be easily controlled.

11. Input signal can be selected

You can choose different input signal types according to your needs, there are DVI/VGA, YPbPr/AV, AV, DVI, HDMI, DP, HDBaseT, optical fiber, SDI and other input boards. To change the type of input signal, you only need to replace the corresponding board.

2.4 Main Function

1.Picture-by-picture mode: Multi-channel or part of the signal is displayed in full or non-full screen in any rectangular display format, and a single screen can open up to four windows.

2.Multiple windows can be opened on a single screen (optional): In the same screen, 2 to 4 windows can be displayed at the same time as required, and the same or different pictures can be displayed (Note: For the specific maximum number of windows displayed on a single screen, please receive the goods shall prevail).

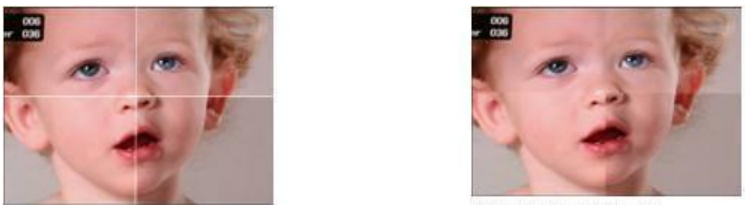
3.Picture-in-picture mode: take a picture as the background, and other window signals are displayed in a tiled window

4.Overlay mode: With the screen of a certain channel as the background, when the screen of other channels is displayed, the window and the window are partially or completely covered, and the covered part is not displayed.

5.Zoom and displacement: The size and position of the window can be adjusted arbitrarily.

6.Edge shielding technology: The traditional splicing technology, when encountering display devices with edges (the video wall with borders that composed of such as rear projection, flat-panel TV, LCD/PDP or DLP and CRT), splicing display after divided picture is re-displayed, the adjacent two groups of display devices are divided due to the presence of unimageable edges, resulting in unnatural deformation of the picture.
Our original edge shielding technology, through fine pixel adjustment, automatically expands the edge signal, shields part of the content covered by the edge of the display device, and achieves a natural and intuitive display effect. When debugging, users only need to control the software. Enter the size of the display unit and the approximate black border width of the edge, and the technology will automatically calculate the required shield range for covering.

7.Edge fine-tuning technology: By performing related operations on the control software, the display pixels on the edge of the spliced display screen can be precisely adjusted for a single pixel, so that the left and right spliced images are completely seamless. This technology is suitable for front projection, rear projection, DLP display, etc.



Before and after edge fine-tuning

8.Mode customization: Provide users with rich mode definition functions, 30 built-in custom modes, large-capacity external mode customization, and support the calling mode of the central control.

9. Adjustment of image parameters (white balance/brightness/contrast/saturation): Various image parameters are set as standard at the factory, and users can adjust individual parameters according to their needs. The white balance parameters can be adjusted for each output image, so that the comprehensive white balance of the video wall/splicing wall can be as perfect as possible.

10.Basemap display function (special customization requirements): The segmented images can be stored in the corresponding boards according to customer requirements, and displayed as basemaps. The basemaps can be spliced into a complete image, and the displayed basemap can be opened and closed freely, and can be freely replaced as needed.

3.Structure and operation

3.1 Structure

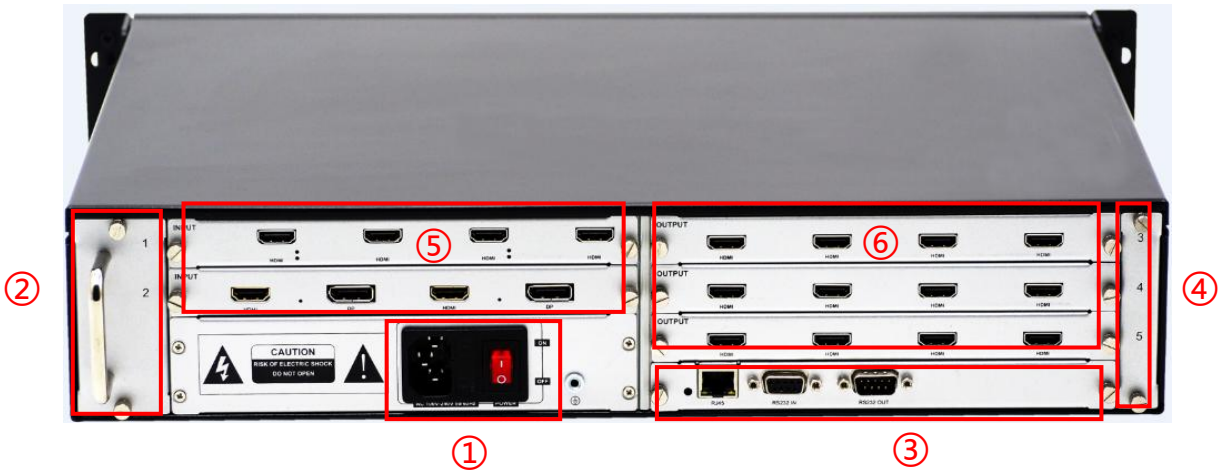
3U host image

Due to the different types and quantities of signal sources that need to be collected, the company's large-screen splicing image series processors are completely in line with the actual user needs, using different types and quantities of signal source input and output boards. Chassis size increases with the number of boards. Only the 3U chassis elevation is listed here. The following panels and their hardware operations are illustrated by 3U chassis products. Other size chassis products are similar or identical.

3.2 Front panel

As below：

3.3 Rear panel



①Power supply and button: The power supply is connected to the AC220V 50HZ power. Some models have dual backup power supplies. After the power switch is turned on, the equipment starts to work normally;

② Fan: After turning on the power button, the fan starts to work normally;

③ RS232 IN and RJ45 network port: serial communication input, connect to control computer or other control equipment, and can also connect the equipment to the network for remote control;

④ Dustproof net: Prevent dust from entering the machine, protect the board, and clean the dust regularly;

⑤Input board: input signal interface, which can be directly connected with external signal source;

⑥Output board: signal output to the screen video wall;

Note: Due to the actual situation of users, the number and type of input and output signals are different, so the type and number of installed boards may not match the above picture. If this happens, the contents of this section are not errors or omissions. Please refer to the actual power supply and quantity. If you have any questions, please contact our customer service.

4.Software instruction

4.1 software installation

To protect environment, this control software will be sent by email and copy to computer, after download or have the software ready, please follow the guide below to get started:
When open the control software folder, please click and run the “VWC_V5.1” .exe file

Program running environment: CPU: P4 or above; Memory: 512M or above; Hard disk: 40G or above.

Note: 1. All the above files are necessary files to ensure their normal operation, please ensure their integrity when moving or copying;

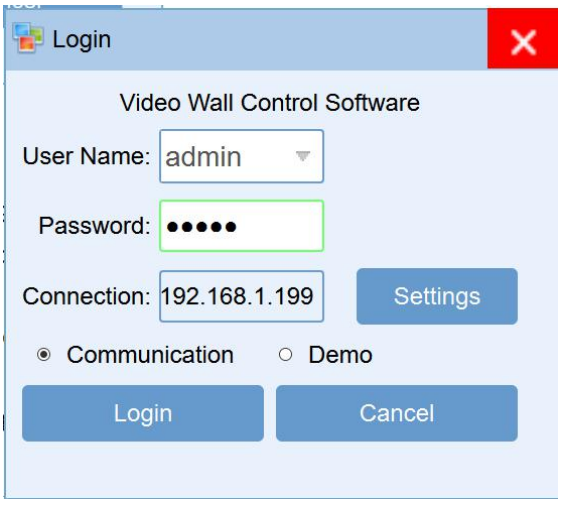
2. Double-click the software running icon, name: VWC_V5.1, and the login interface will pop up. You can directly enter the user authority operation interface by selecting the serial port or network confirmation. When you enter the authority password set by our company, you can configure the software.

3. The company reserves the right to product development and design. Due to factors such as software upgrades, the end user's control software interface may not be exactly the same as this article. For details, please refer to the control software in the engraved disk file.

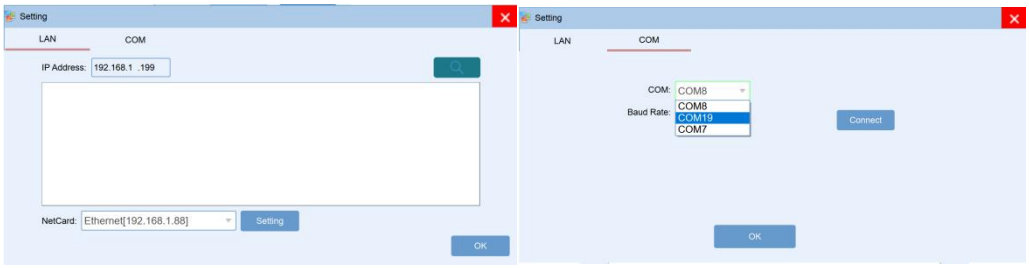
4.2 Start software

1.Execute program

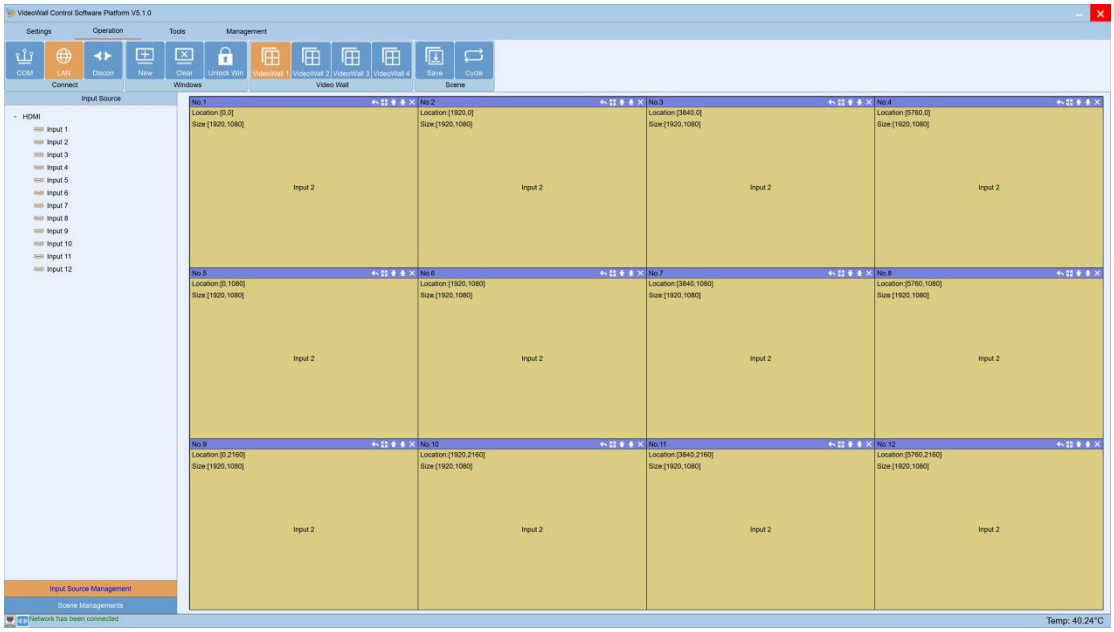
Double-click to run the VWC_V5.1 application to open the control software login interface, By default, the user name is Admin and the password is blank, then click "OK" button to log in. as shown below:



To click “Settings” login, it will be showing below interface, users can set up the LAN(IP) or the COM(RS232) as below, the default IP address is 192.168.1.199, and the baud rate is 115200.



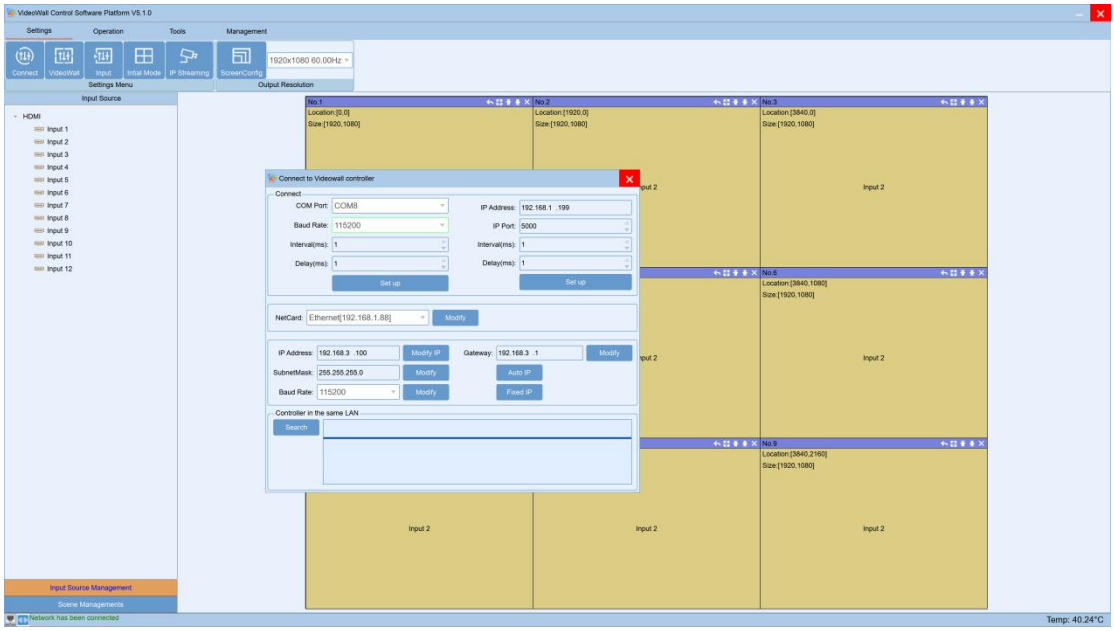
After click OK to login, it will be showing the “Main” interface as below:



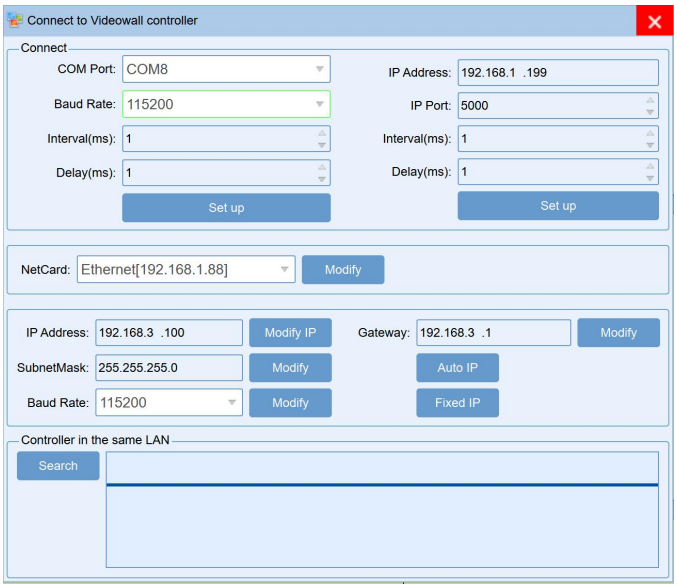
“Main” interface

4.3 Setting

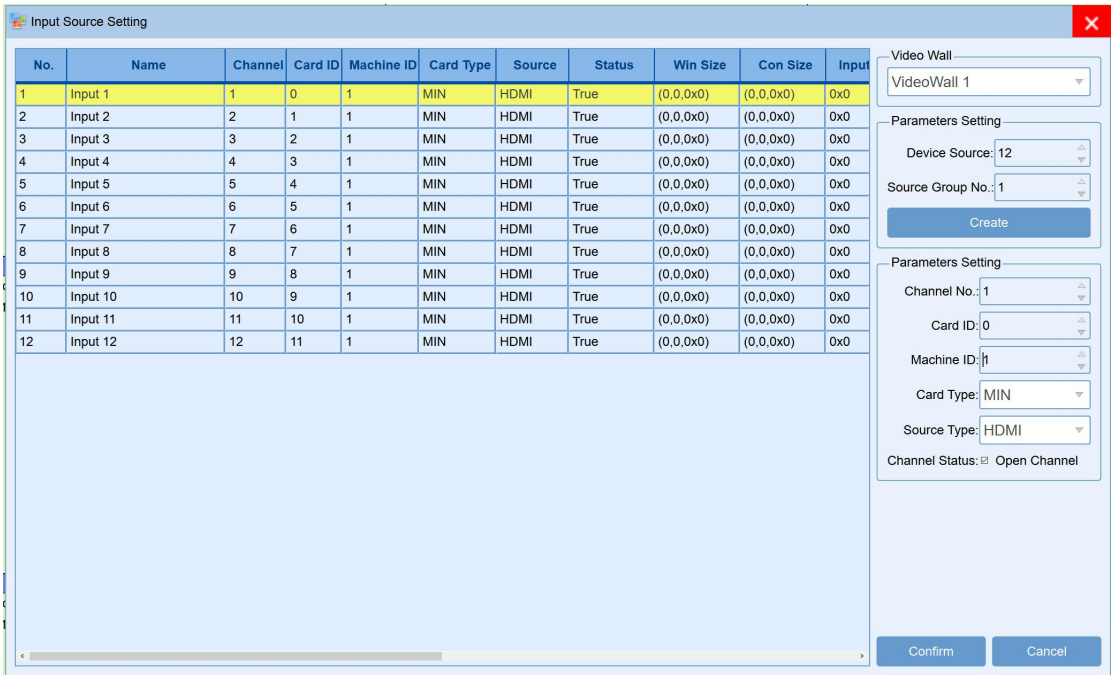
This interface is for users to setup the connect method, Video Wall, Input etc settings:



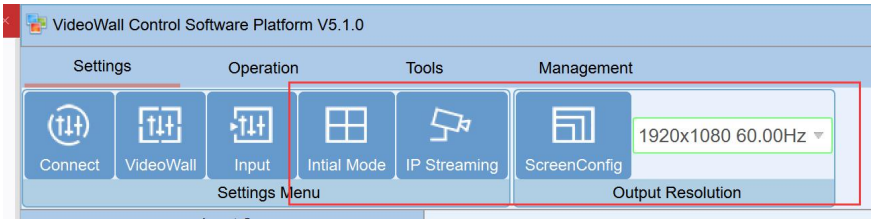
Connect is for users to setup the communication methods for the control PC and the controller, users can set up the COM and IP address those parameters here. After modified the parameters, will need to reconnect and restart the controller.



For the ***Input source*** setting, it's for users to setup the input source group, source and card type

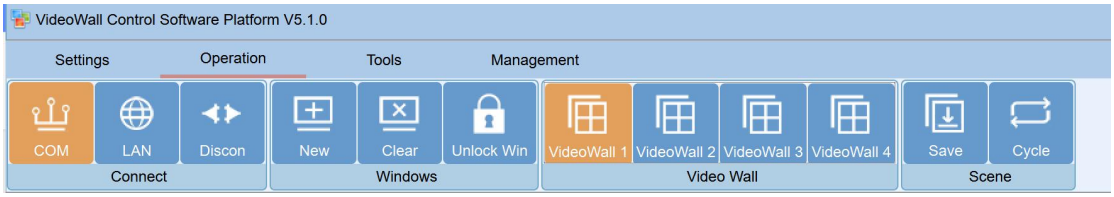


For the ***Initial mode, IP streaming and the Screen config*** settings are only used when have the specific cards plugged into the controller.



4.4 The operation of Windows

Under this interface, users can see the **Connect**, **Windows**, **Video Wall** and **Scene** those function.



Connect is for users to click to snyc with controller either by the COM, LAN or to Discon(disconnect). Once click the LAN or COM to sync, the software will pop-up and “wait” window to sync.

Windows is for users to open a new window, clear all the windows or lock/unlock the windows

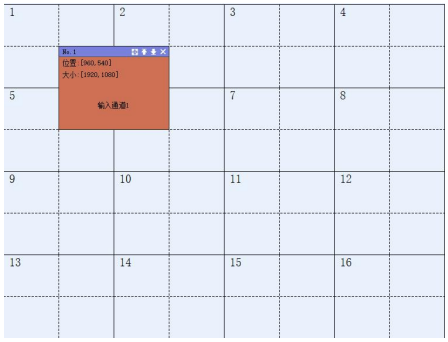
Click “New”, it will open a window of the selected source to all the connected displays, also show the windows on the control software; Users also can select the source and then use the mouse to drag any size window on the video wall.

Video Wall is for users to select and control the specific Video Wall, this processor can support 4 video wall groups.

Scene is for users to save the current switching status and setup for the scenes cycling to save the current status, users will only need to click the “Save” button, it will pop-up the Save scene window, users can enter the scene name and click to save.

4.4.1 Open the Windows

Press the left mouse button to pull a rectangle on the operation interface, release the left button, a rectangular window will appear in the control interface.



4.4.2 Change window size and position

Move the cursor to the windows, holding, drag to the position user want, then release mouse to change position.

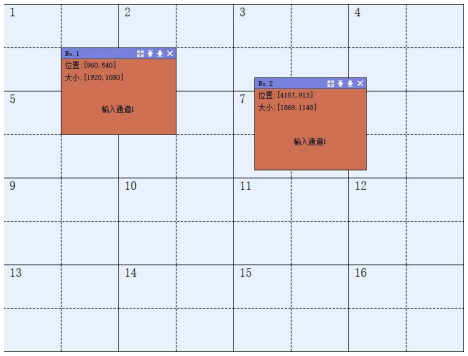
Place the mouse in the lower right corner of the window, and then drag it after it change to the two-way arrow to change the size of the window.

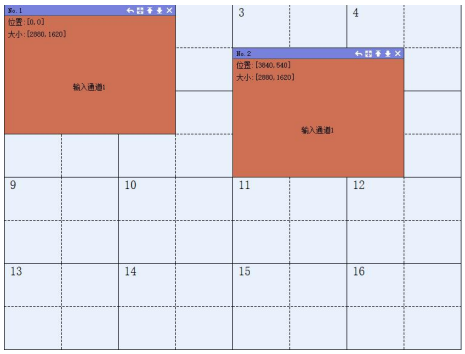
4.4.3 Windows menu operation

At the top of window, there are these items  , allows the user to perform corresponding operations on the window, right-clicking on the window will also pop up some shortcuts for window operations. The following describes the functions of each menu.

4.4.3.1  **Close：** Close the currently window。

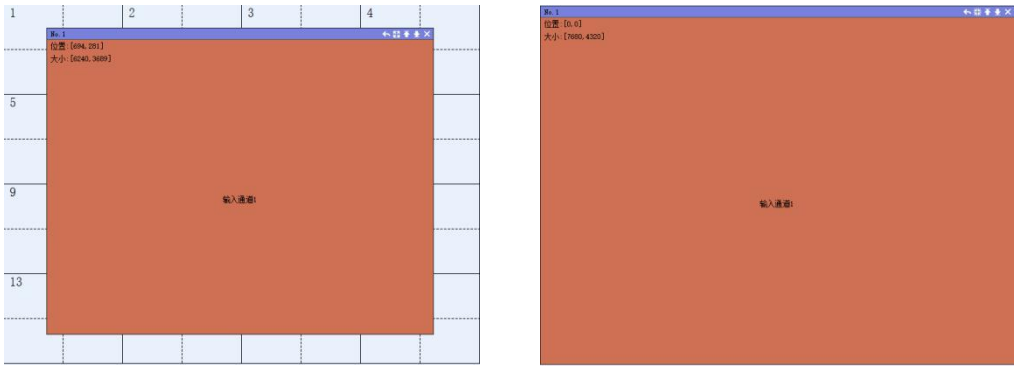
4.4.3.2 Single-screen and full-screen display: The black solid line in the control software operation area represents the screen edge, and the dashed line represents the dividing line within the screen. Pull two windows within the single screen and across the screen, as shown in the left figure below, and then double-click the window with the mouse. , the operated window will be displayed in full screen on the screen where the upper left corner is located, as shown in the right figure below.





Single-screen and full-screen display

4.4.3.3 **Full screen**：Open a window in the control software operation area, click the button at the top of the window menu bar, the window will cover the entire screen display , as shown in the figure below. Click this button again, and the window will return to the original state.



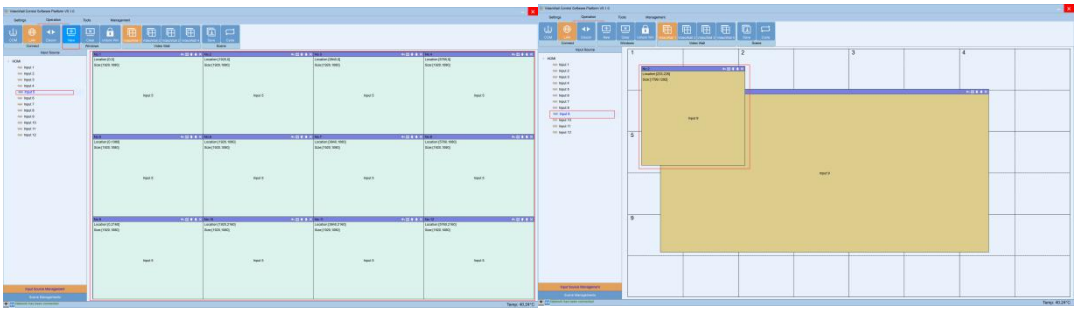
Full screen

4.4.3.4 **Return**：After clicking this button or selecting this function, the current operation window returns to the first screen of the current row and column, which is displayed on full screen.

4.4.3.5 **Put top and bottom**：Change the level of the current window to the top or bottom

4.4.3.6 **Clear**：Clicking this button will clear the opened windows in the operating area of the control software

4.4.3.7 **New:** Every single screen in the entire splicing screen is covered with windows, as shown in the following figure。



4.4.3.8 **Lock/ Unlock Win**：Lock window: lock all currently opened windows, the window cannot be moved after locking, but you can continue to open new windows on top

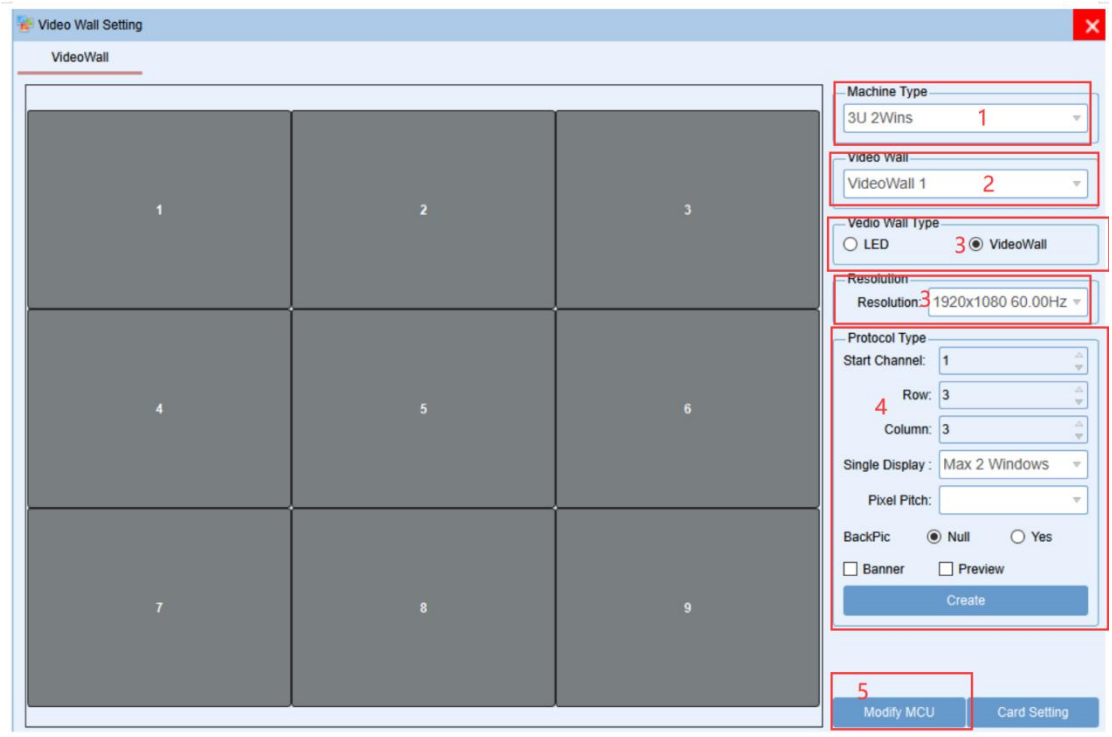
of the locked window;Unlock Window: After clicking this button, all windows are unlocked, and all windows can be freely moved and dragged arbitrarily after the solution is resolved;

4.4.3.9 

Intial Mode: You can select the number of windows quickly opened on a single screen when creating a new window

4.5 VideoWall

For the ***VideoWall*** setting, it's for users to setup the Video Wall accordingly.
Step 1: According to the controller size&feature to choose the right one, here take example with the 3U 2 wins
Step2: Choose the video wall group, here take example VideoWall 1.
Step3: Choose the resolution for the video wall, usually recommend the 1920x1080P@60Hz.
Step4: Set up the Video Wall size, here take example of a 3x3 Video Wall, so the Row is 3, Column is 3, and the click "Create"
Step5: After all the above 4 steps, still need to click the "modify MCU" to finish the settings.

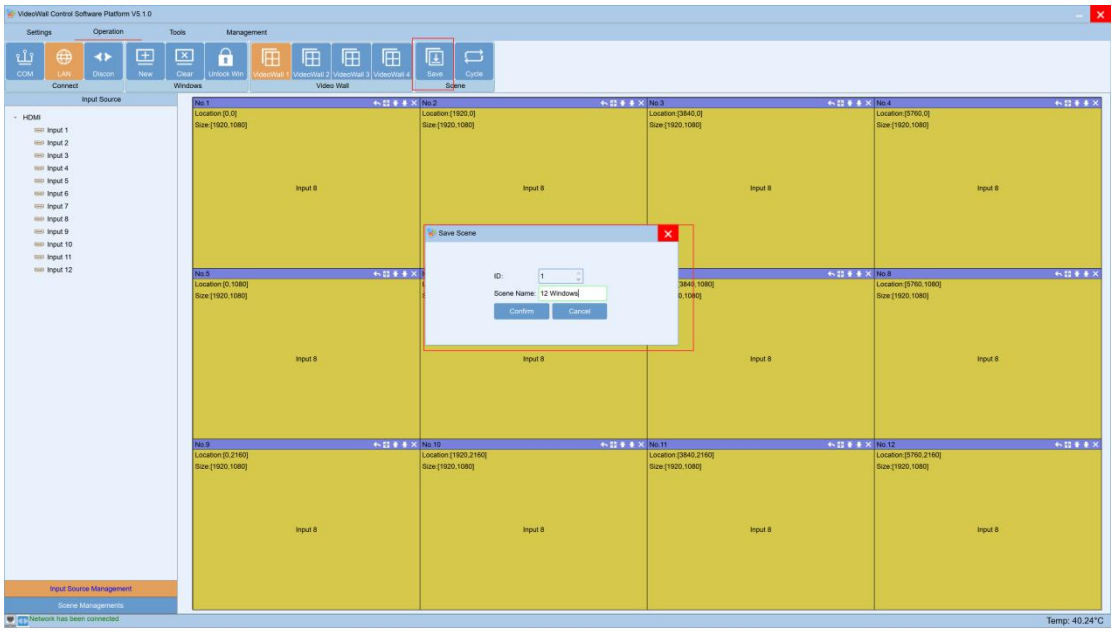


4.6 Scene saving and recall

4.6.1 Scene saving

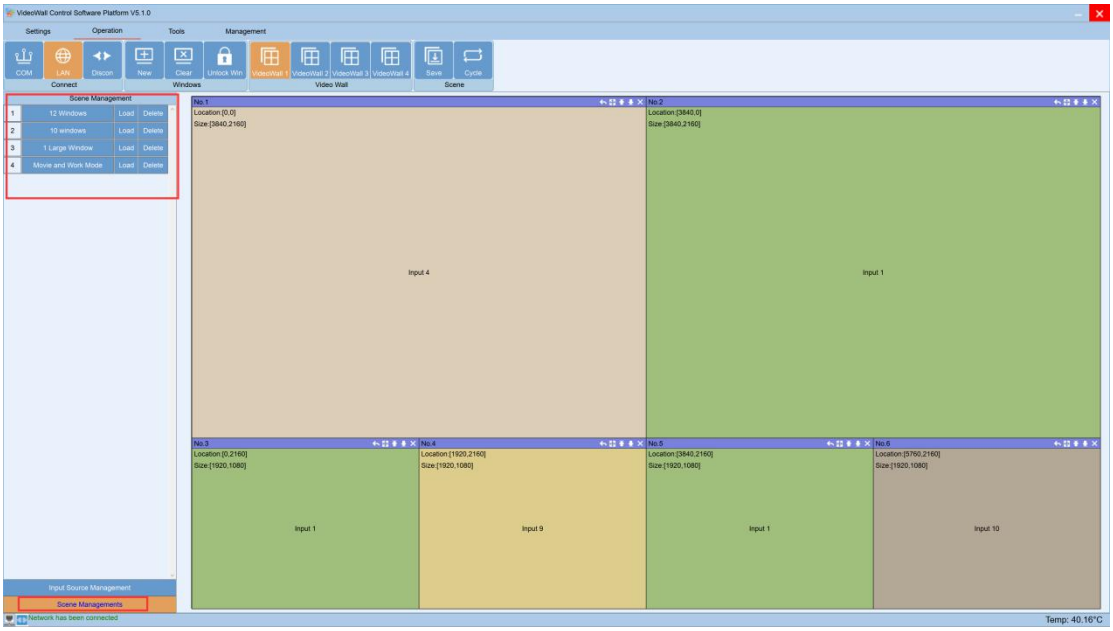
Click this button 

, the state of all splicing windows in the current main interface will be stored, and the mode name can be edited by yourself. After editing, click OK to save.



4.6.2 Recall

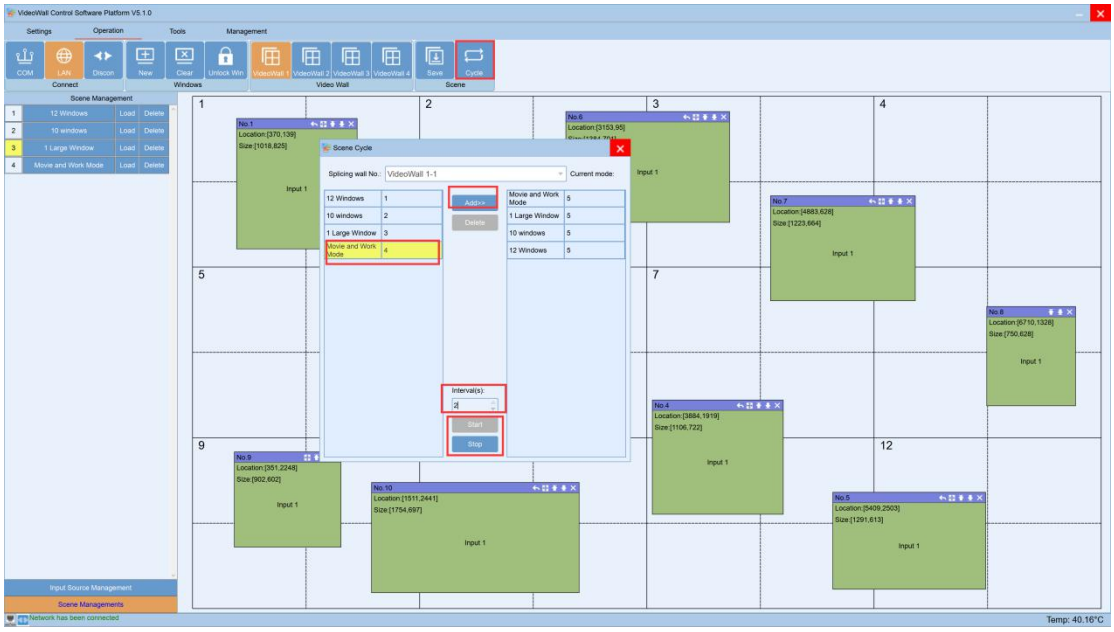
Users can click the “Scene Management” at the left down corner, it will show all the saved scenes. Then users can rename it, load or delete it.



4.6.3 Cycle

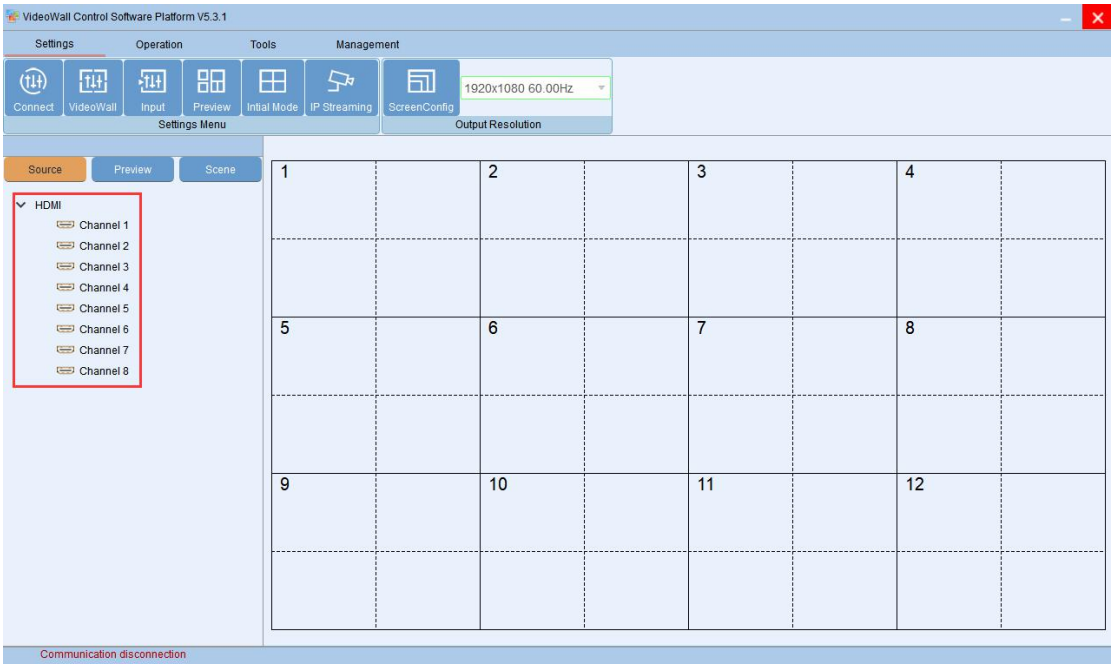
Click this cycle button 

, Select this cycle button, and set the time interval, add the cycle mode, click Start to switch the mode cycle

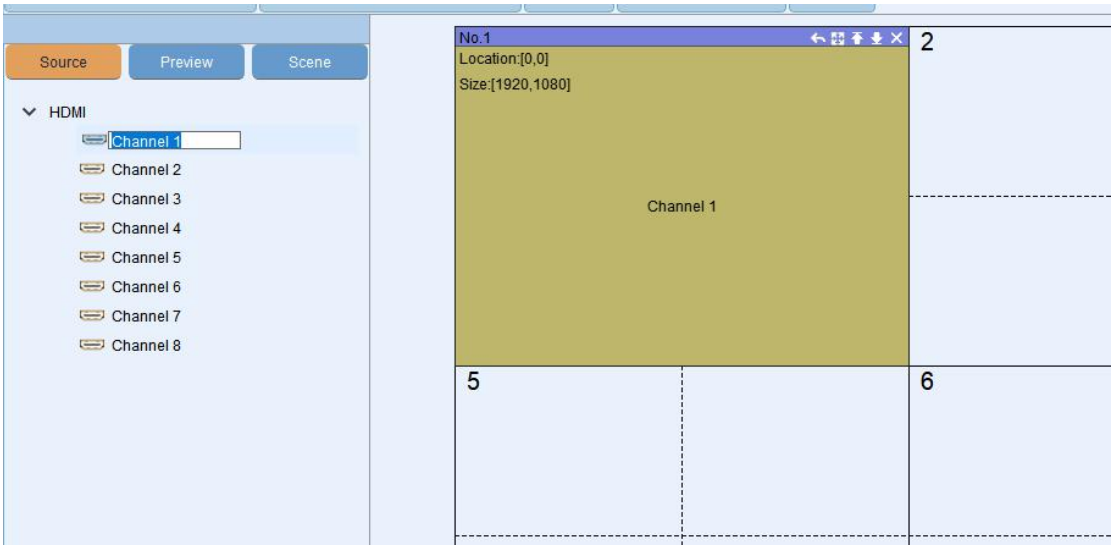


4.7 Source Management

In the input signal source management on the far left of the control software, all input signals of the device will be displayed, as shown in the following figure:



Select a certain input signal, hold down the left mouse button and drag it into a window on the right to switch between signal sources. Double-click an input signal channel to rename the input signal channel.

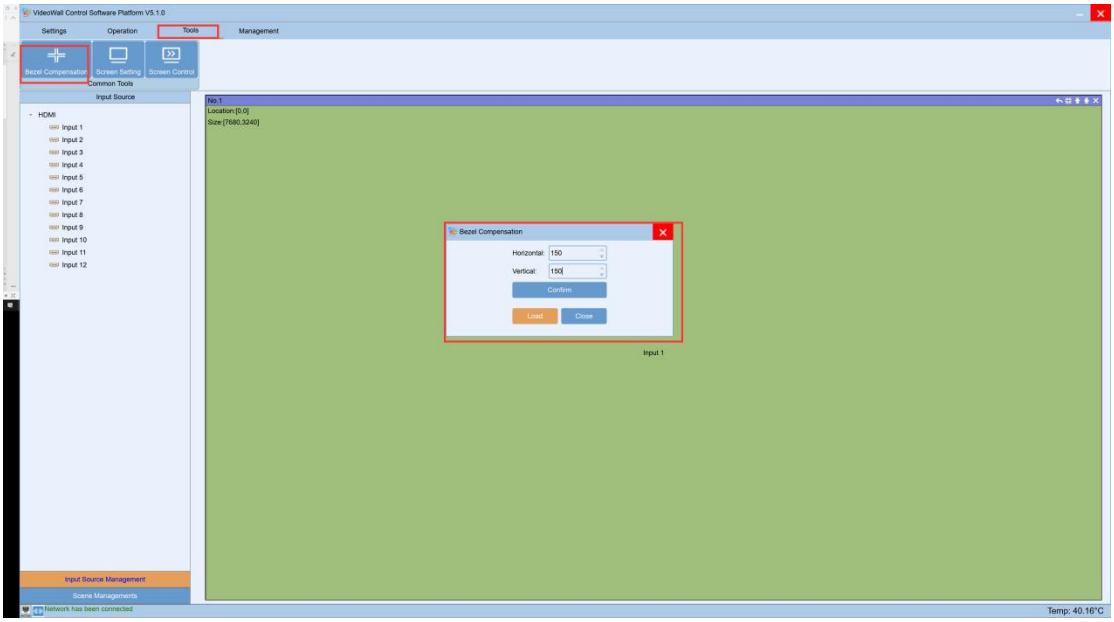


When the selected signal source is configured as the corresponding input card, right-click the input channel, and there are several professional settings, such as ADC/ Auto, Character overlay, signal clipping

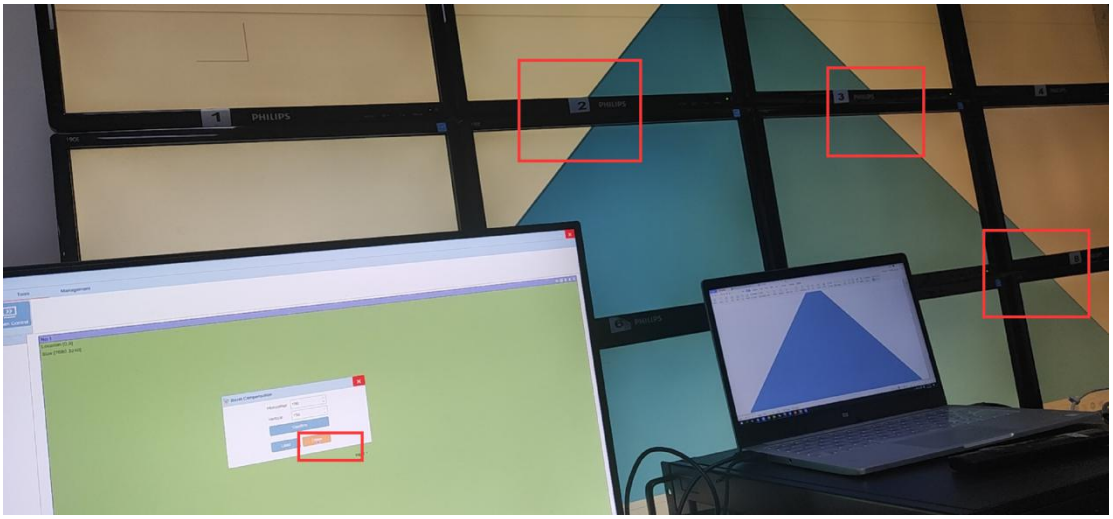
4.8 Tool

Under this interface, users can setup the bezel correction, screen settings, screen control.

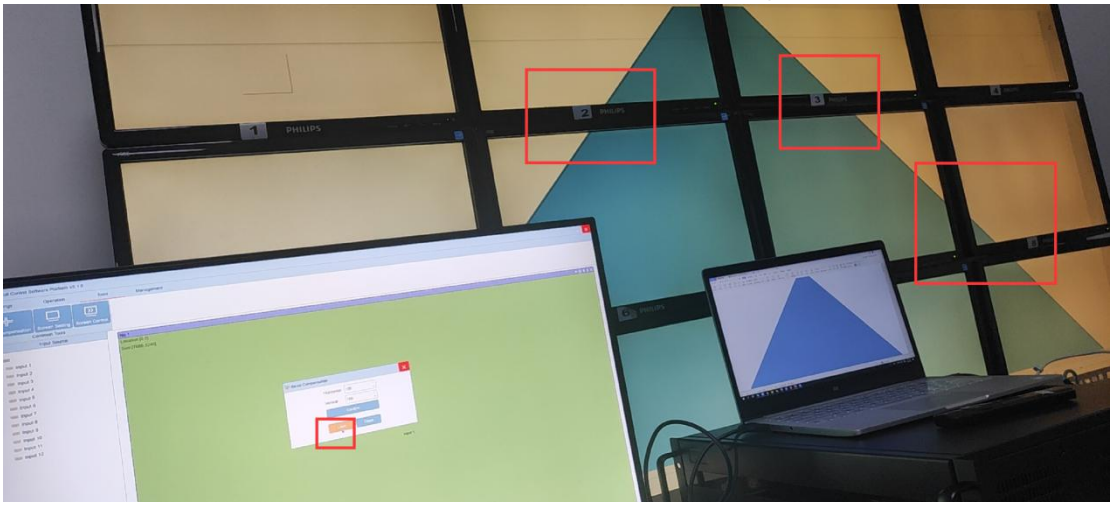
Bezel compensation is for the users who have old and large bezel TV, users can set up the Horizontal and Vertical parameter to correct the image showing the displays.



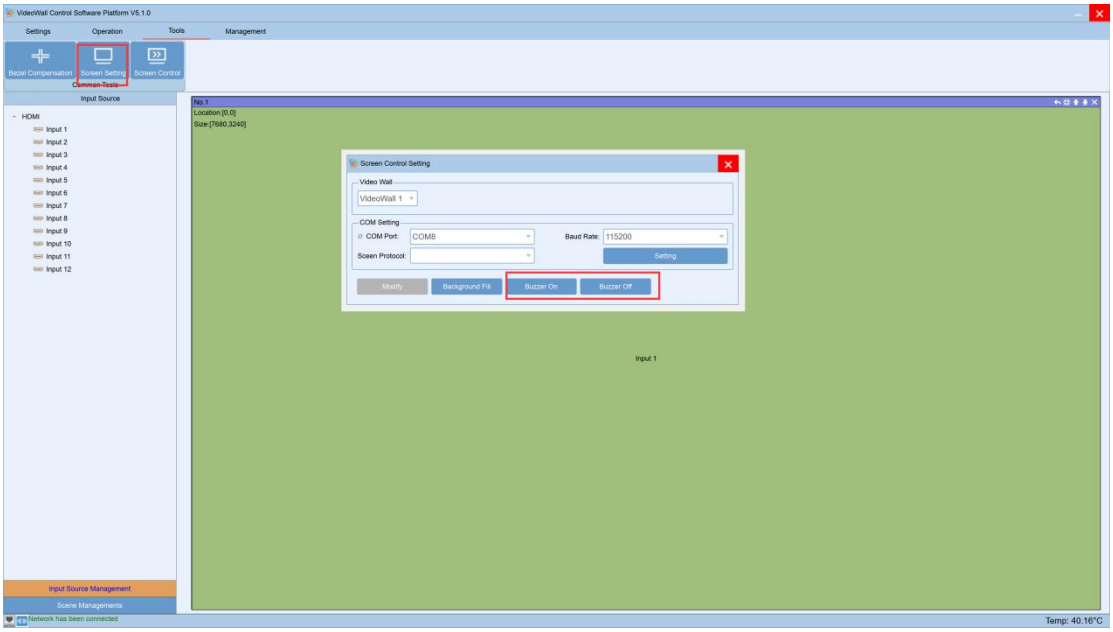
When no bezel correction or correction OFF, it will be showing as below:



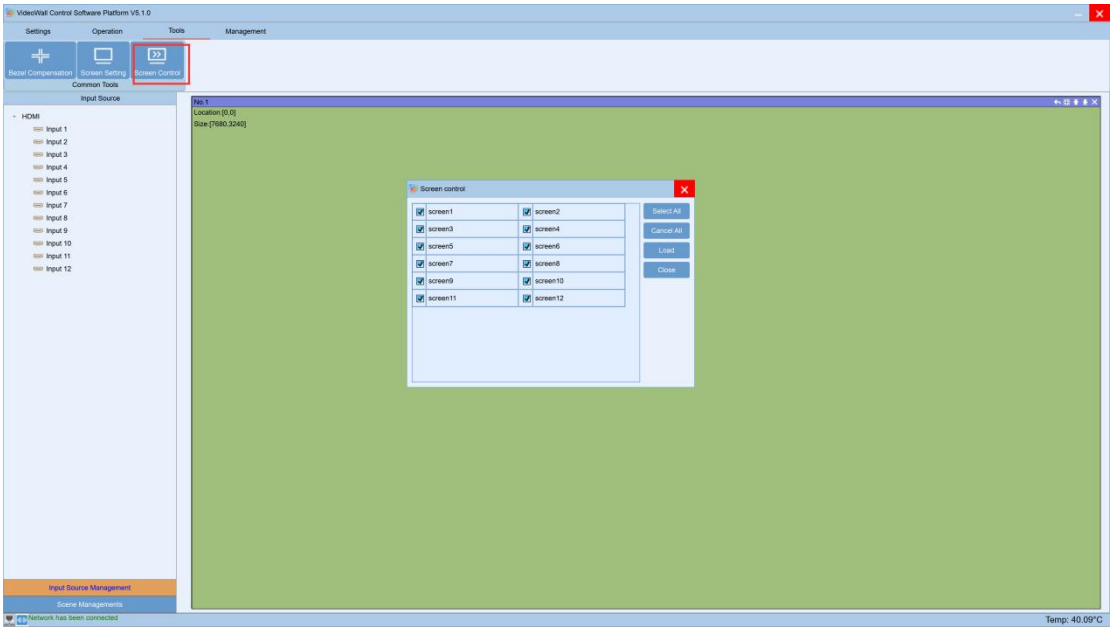
When with bezel correction or correction ON, it will be showing as below:



Screen setting is for the users to set up the parameter to control the screens, Turn on or turn off the beep sound of the controller.



The screen control is to select the screens for controller to control them, this function is mainly for turning off or turning on the screens. This function will need to make sure there's a RS232 cable connected the screens and controller, also need to know the COM commands for the screens.



You can load the existing screen control switch protocol or custom command set through the screen control settings. Pay attention to the sending method of the custom command set: HEX sending or character sending.

5.RS232 communication

5.1 RS232 connection

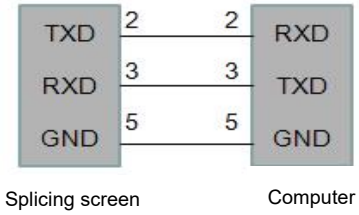
The product provides standard DB9 RS-232 serial communication port, users can use various remote control equipment for remote control. The RS-232 port is a 9-pin female connector, the pin description is as follows

Pin No.	Pin	Description
1	NC	None
2	TXD	Signal sender, connected to the receiver of the control device (RXD end)
3	RXD	Signal receiver, connected to the sender of the control device (TXD end)
4	NC	None
5	GND	Signal ground
6	NC	None
7	NC	None

8	NC	None
9	NC	None

RS-232 Port Pin Definition

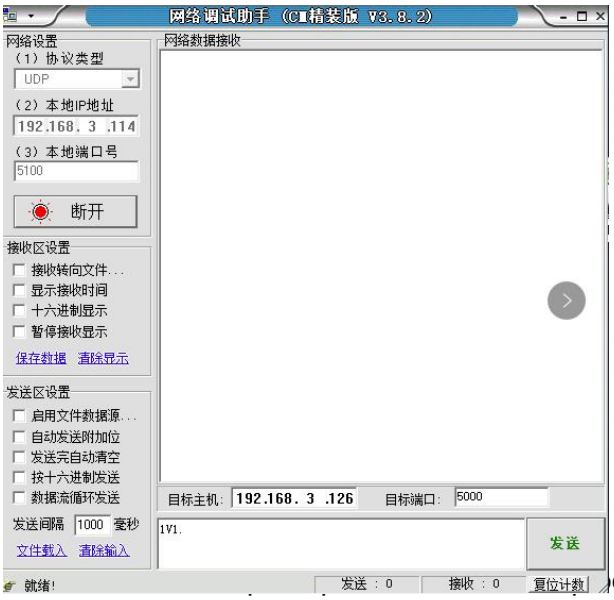
Note: When connecting the RS-232 port of the splicer to a computer or central control, pay attention to the line sequence of TXD and RXD. As shown below:



Schematic diagram of communication line structure

5.2 RJ45 connection

The network cable adopts 568B standard network cable connection, UDP protocol, and the specific parameter settings can refer to the following figure:



Note: Protocol type: cessor port number: 5000

5.3 In-scene call protocol code

The user can simply call the internal scene mode of the splicer through the code protocol, or directly implant the control code of the protocol into the "central control" system. Through the central control system, a very convenient mode call operation can be realized. The specific in-scene call protocol code is:

Control mode: RS232 serial port control or RJ45 network control

Baud rate: 115200

Format: ASK code

According to the calling protocol corresponding to the key storage mode on the control interface

Standard configuration is 30 types:

Call Mode 1

<load,mode,0,0>

Call Mode 2

<load,mode,0,1>

Call Mode 3

<load,mode,0,2>

……

Call Mode 30

<load,mode,0,29>

6. Common Troubleshooting and Maintenance

1) Unable to run VWC_V5.1 software

Possible reasons: There is no corresponding applicator for the operating system software that controls the computer;

Solution: Install Microsoft's related applicator dotNetFx40_Full_x86_x64.exe and VC_x86Runtime.exe.

Note: You can download the applicator from Microsoft's official website, or you can install it from the CD-ROM that comes with the processor.

2) The network control connection fails or the search fails to connect

Possible reasons: The IP address and gateway of the control computer are inconsistent with the network card of the device;

Solution: The device defaults to a 3-segment random IP address. You can directly connect the device through the network cable, turn off the firewall of the control computer, disable the wireless network card, set a fixed IP address of 3 segments, and fill in the gateway and subnet mask. If you want to modify the IP address of another network segment, you can modify it through a serial cable connection, or you can modify it through a network cable connection.

3) The serial port operation fails and the processor cannot be controlled

Possible reasons:

A. The control software does not open the serial port;

B. The serial port has been damaged;

C. The serial port using USB to RS232 is not installed correctly;

Solution:

A. Check the connection status of the serial port;

B. Replace the serial port cable or the main control device;

C. Correctly install the USB to RS232 device;

4) The image is not displayed

Possible reasons:

A. No signal input;

B. Signal channel switching error, such as input VGA signal, but the channel selection is AV;

C. VGA input and VGA output are reversed;

D. The display device has not adjusted the input channel. If the display device needs to be adjusted to VGA or DVI;

E. The output is a pure black background;

F. The output VGA or DVI/ HDMI cable is damaged.

Solution:

A. Check whether the input signal source is normal; (the input signal source can be directly connected to the display device for detection)

B. Confirm the channel input is normal; use the control software to perform channel switching detection;

C. Confirm that the output of the processor is correctly connected to the display device, and the input signal is correctly connected.

D. Adjust the status of the display device, see the instruction manual of the display device for specific operations;

E. To adjust the output content of the output signal, it is recommended to use a dynamic picture instead of a monochrome picture.

F. Use a VGA or DVI/HDMI cable with better quality to ensure the stability and high quality of the picture.

5) The screen appears color cast

Possible reasons:

A. VGA or DVI/HDMI interface is not well connected, poor contact;

B. The VGA or DVI/HDMI cable is damaged;

C. The color adjustment of the display device is incorrect;

D. The use of control software to color excessively;

Solution:

A. After the VGA or DVI/HDMI cable is connected, please tighten the fixing bolts at the connector to prevent loosening caused by pulling;

B. Replace the VGA or DVI/HDMI cable with better quality;

C. Refer to the instruction manual of the display device to adjust the color balance of the display device;

D. Readjust the color and white balance through the control software;

E. If the front-end input signal is VGA, perform ADC correction on the input signal;

6) The screen is not fully displayed on the display device, and black borders appear

Possible reasons:

A. The splicing display device cuts the back end of the signal;

B. Too many positions of the image are adjusted by the control software;

C. The output resolutions of different display units are different;

D. The setting method of the graphics card is incorrect;

E. The resolution of the input signal of the front-end computer is not standard;

Solution:

A. Refer to the instruction manual of the display device and make an automatic adjustment to the display device;

B. Re-adjust the image position through the control software;

C. Select the current signal source, click "Auto"; enter the "Settings" module, and select the desired output resolution;

D. Enter the advanced menu of the graphics card and change the scan mode to overscan;

E. Change the input signal to the correct resolution;

7) A screen of a splicing unit appears flickering, jittering or flowery

Possible reasons:

A. VGA or DVI/HDMI cable is too long, resulting in serious signal attenuation;

B. The equipment of the input signal source is unstable or the wire is damaged;

C. Display unit failure;

D. The output of the splicer does not match the display unit;

Solution:

A. Connect the independent display unit to the corresponding output port of the splicer in question. If the picture is normal, the processor is normal. Please check the display unit and the connecting cable;

B. Swap the faulty output port on the splicer with the transmission cable on the normal output port. If the faulty display unit does not move, the display device is faulty;

C. Connect the input signal directly to the display device without going through the processor to check whether the output image is normal;

D. If the above method test finds that the processor and the display device are normal, there may be a matching problem between the processor and the display device, please contact the engineer of the device supplier to solve it.

Note: 1. The faults listed above are only the common faults found by our company's after-sales maintenance department. If the user finds that the fault of your equipment does not fall within the scope of the above, please notify the equipment supplier as soon as

possible to solve the problem, and do not disassemble the case without authorization maintenance.

2. The company declares once again: the consequences caused by the user opening the device without the permission of the company shall be borne by the user.