Smart-e

444K-2850

Multi-viewer and Video Wall Processor

User manual

444K-2850 Video Processor

444K

Smart-e

For more information visit our website, or talk to one of our technical team
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Thank you for purchasing this product

For optimum performance and safety, please read these instructions carefully before connecting, operating or adjusting this product. Please keep this manual for future reference.

Surge protection device recommended

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lighting strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

Table of Contents

1. Introduction

This seamless matrix switcher is a high performance HD video signal processor, with video resolution up to 3840x2160/4096x2160@60Hz. It can be used as a video wall splicing processor or as a seamless switching matrix switcher with 4 inputs and 12 outputs. All outputs can work on multiview mode with a maximum of 4 windows.

This product supports Auto and User Define output resolution, which can be flexibly applied to the display of LED wall. In addition, it supports 180° rotation and audio de-embedding function.

This product can be controlled via front panel buttons, IR remote control, RS232, LAN and Web GUI.

2. Features

☆ HDCP 2.2 compliant

☆ Support 18Gbps video bandwidth, video resolution up to 3840x2160/4096x2160@60Hz, as specified in HDMI 2.0

☆ Support seamless switching between different input sources

☆ Comprehensive splicing display function with bezel compensation

☆ Support two synchronization mode for all output ports: General synchronization mode and Sync delay mode

☆ Free multiview up to 4 windows with all outputs

☆ Supports 180° rotation

☆ Support Auto and User Define output resolution, which can be flexibly applied to the display of LED wall

☆ Support one break away audio extractor and switcher

☆ Provide multiple control methods: front panel buttons, IR remote control, RS232, network and Web GUI

3. Package Contents

① 1x Seamless Matrix Switcher

② 1x AC Power Cord

③ 1x USB to RS-232 Cable

④ 1x RJ45 Cable

⑤ 1x IR Remote Control

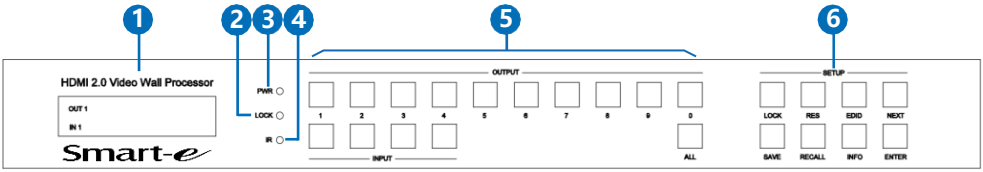
⑥ 1x User Manual

4. Specifications

Technical	
HDMI Compliance	HDMI 2.0
HDCP Compliance	HDCP 2.2
Video Bandwidth	594MHz (18Gbps)
Video Resolution	Up to 3840x2160/4096x2160@60Hz
Color Space	RGB, YCbCr 4:4:4, YCbCr 4:2:2, YCbCr 4:2:0
Color Depth	8/10/12bit
IR Level	5Vp-p
IR Frequency	Wideband 38KHz
Audio Format	LPCM 2.0
ESD Protection	IEC 61000-4-2: ±8kV (Air-gap discharge) & ±4kV (Contact discharge)
Connection	
Input	4x INPUT [HDMI Type A, 19-pin female]
Output	12x OUTPUT [HDMI Type A, 19-pin female] 1x LR/TOSLINK OUTPUT [3.5mm Stereo Mini-jack]
Control	1x RS232 [3-pin phoenix connector] 1x RS232-CTL [D-Sub 9, female] 1x LAN [RJ45]
Mechanical	
Housing	Metal Enclosure
Color	Black
Dimensions	430mm (W) × 220mm (D) × 44mm (H)
Weight	5kg
Power Supply	110~240VAC
Power Consumption	65W (Max)
Operating Temperature	0°C ~ 40°C / 32°F ~ 104°F
Storage Temperature	-20°C ~ 60°C / -4°F ~ 140°F
Operating Humidity	10%~70% (Relative Humidity, non-condensing)

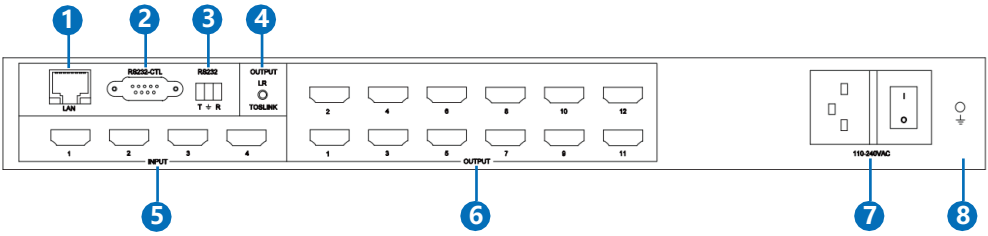
5. Operation Controls and Functions

Front Panel



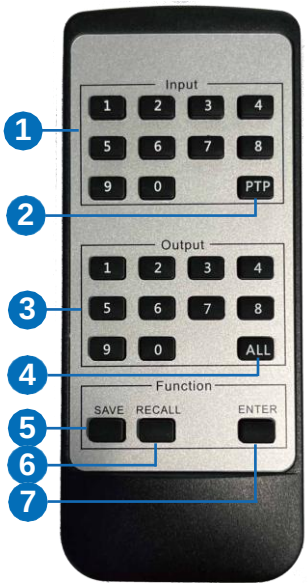
No.	Name	Function Description
1	LCM screen	The LCM display screen displays the routing status of each channel in the matrix. When used together with front panel buttons, users can view and set some parameters.
2	LOCK LED	▪ Light on: Front panel buttons are locked. ▪ Light off: Front panel buttons are unlocked.
3	POWER LED	▪ Light on: The product is powered on. ▪ Light off: The product is powered off.
4	IR Window	IR signal receiving window. It can be disabled by RS232 command.
5	INPUT/OUTPUT buttons	Used to select the corresponding input and output channels. You need to press the output button (1, 2...9, 0, ALL) firstly, then press the input button (1, 2, 3, 4) , finally press “ENTER” button to complete switching. Press “OUTPUT m→INPUT n→ENTER”: Switch input n to output m
6	SETUP buttons	**LOCK:** Press and hold the button more than 3 seconds, all fronts panel buttons will be locked and will not work. Press and hold it more than 3 seconds again to unlock. **SAVE:** Used to save the current display scene. e.g. Press “SAVE→OUTPUT m (m=1, 2...9, 0)→ENTER” to save the current routing and screen layout to Scene m. **RES:** Used to change the output resolution. e.g. Press “RES→OUTPUT m→NEXT→ENTER” with guide of front LCM screen display, to change the output resolution of OUTPUT m. **RECALL:** Used to recall the saved scene as the current displaying. e.g. Press “RECALL→OUTPUT m→ENTER” to load the saved Scene m for current displaying. **EDID:** Used to change the EDID mode of input. e.g. Press “EDID→INPUT n→NEXT→ENTER” with guide of front LCM screen display, to change the EDID mode of INPUT n. **INFO:** Continuously press INFO button, the LCM display screen will loop display IR ON/OFF, RS232 Baud Rate and IP parameters etc,. **NEXT:** Used to select the next item. **ENTER:** Used to confirm and execute the operation.

Rear Panel



No.	Name	Function Description
1	LAN port	Network port for TCP/IP or Web GUI control. IP address: 192.168.0.247; Submask: 255.255.255.0; Gateway: 192.168.0.1; Baud Rate: 9600; NetPort: 23 Web login account: admin; Password: admin
2	RS232-CTL port	RS232 serial port, used for external RS-232 commands control. Baud Rate: 9600, Data Bits:8, Parity: 0, Stop Bits:1.
3	RS232 port	RS232 serial port, used for external RS-232 commands control. 3-pin Phoenix: T: Main Unit -> PC; G: Ground; R: Main Unit <- PC
4	LR/TOSLINK OUTPUT port	• Analog L/R audio output 3.5mm Stereo Jack. 20Hz ~ 20kHz, 1.5Vrms max • Digital SPDIF audio output
5	INPUT (1~4) port	HDMI signal input ports, connected to HDMI source devices such as PC, DVD or Set-top box with HDMI cable.
6	OUTPUT (1~12) port	HDMI signal output ports, connected to HDMI display devices such as TV or Monitor with HDMI cable.
7	Power input port & switch	Power input port: Connect to 110~240VAC power supply with the included AC power cord. Power switch: Press the switch to turn on/off the power supply.
8	GND	Connect the housing to the ground.

6. IR Remote Control



① **Input 1/2/3/4:** Used to select the input channel.

② **PTP:** Used to perform one-to-one switching, that is, switch input 1 to output 1, input 2 to output 2, and so on.

③ **Output 1/2/3/4/5/6/7/8/9/0:** Used to select the output channel.
e.g. Press “OUTPUT m (m=1, 2...9, 0)→INPUT n (n=1, 2, 3, 4)→ENTER”: Switch input n to output m

④ **ALL:** Used to perform one-to-all switching.
e.g. Press “ALL→INPUT n (n=1, 2, 3, 4)→ENTER”: Switch input n to all outputs.

⑤ **Save:** Used to save the current display scene.
e.g. Press “SAVE→OUTPUT m (m=1, 2...9, 0)→ENTER” to save the current routing and screen layout to Scene m.

⑥ **RECALL:** Used to recall the saved scene as the current displaying.
e.g. Press “RECALL→OUTPUT m (m=1, 2...9, 0)→ENTER” to load the saved Scene m for current displaying.

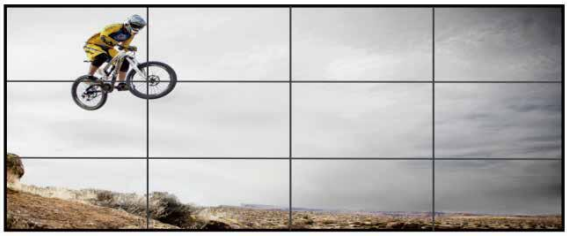
⑦ **ENTER:** Used to confirm and execute the operation.

7. Typical Application Cases

The product supports matrix switching, video wall splicing and multiview layout, therefore, there are multiple application cases for users to select.

1) General Seamless Matrix Switcher (4x inputs + 12x outputs). Users can also set multiview output as needed.

2) One View Video Wall Processor: 3x3, 3x4,etc..



3) Two or more Video Wall Processor and standalone outputs.

4) One Video Wall Processor, one Multiview output and additional standalone output.

Notes:

(1) 3 groups of multiview outputs are supported. Output 1,2,3,4 can be the first group, output 5,6,7,8 can be the second group, output 9,10,11,12 can be the third group. Each group of multiview includes four outputs.

(2) If one output of one multiview group is enabled as multiview mode, then the other three outputs will display the same content with the same output resolution.

8. Video Output Resolution

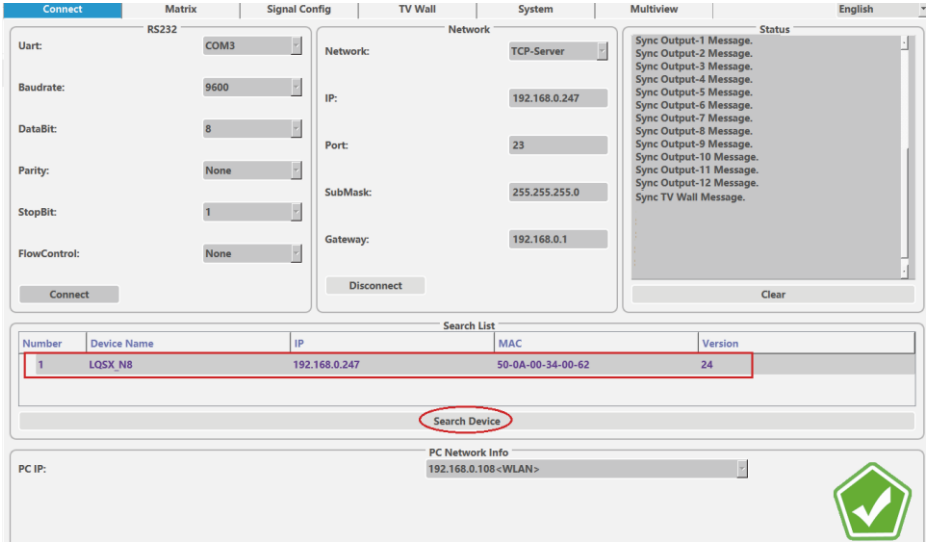
The product supports 21 default output resolution, as well as Auto and User Define output resolution, which can be flexibly applied to the display of LED wall.
The output resolution list is as following.

Hex Index	Output Resolution	Hex Index	Output Resolution
00	4096x2160p 60Hz	0C	1920x1080p 30Hz
01	4096x2160p 50Hz	0D	1680x1050p 60Hz
02	3840x2160p 60Hz	0E	1600x1200p 60Hz
03	3840x2160p 50Hz	0F	1360x768p 60Hz
04	3840x2160p 30Hz	10	1280x1024p 60Hz
05	3840x2160p 25Hz	11	1280x768p 60Hz
06	3440x1440p 60Hz	12	1280x720p 60Hz
07	2560x1600p 60Hz	13	1280x720p 50Hz
08	2560x1440p 60Hz	14	1024x768p 60Hz
09	1920x1200p 60Hz	15	USER
0A	1920x1080p 60Hz	16	AUTO
0B	1920x1080p 50Hz		

9. PC Tool User Guide

The PC tool is an installation-free control software. It consists of seven parts: Connect, Matrix, Signal Config, TV Wall, System, Multiview.
The initial login password is 111111.

9.1 Connect



On this interface, users can connect the devices via two methods.

Method 1: Serial port connection.

Connect the RS232 port of the Matrix to a PC with the included USB to RS-232 cable, and select the Uart, Baudrate, DataBit, Parity, StopBit and FlowControl on the Connect interface. Then click “Connect” to connect the device.

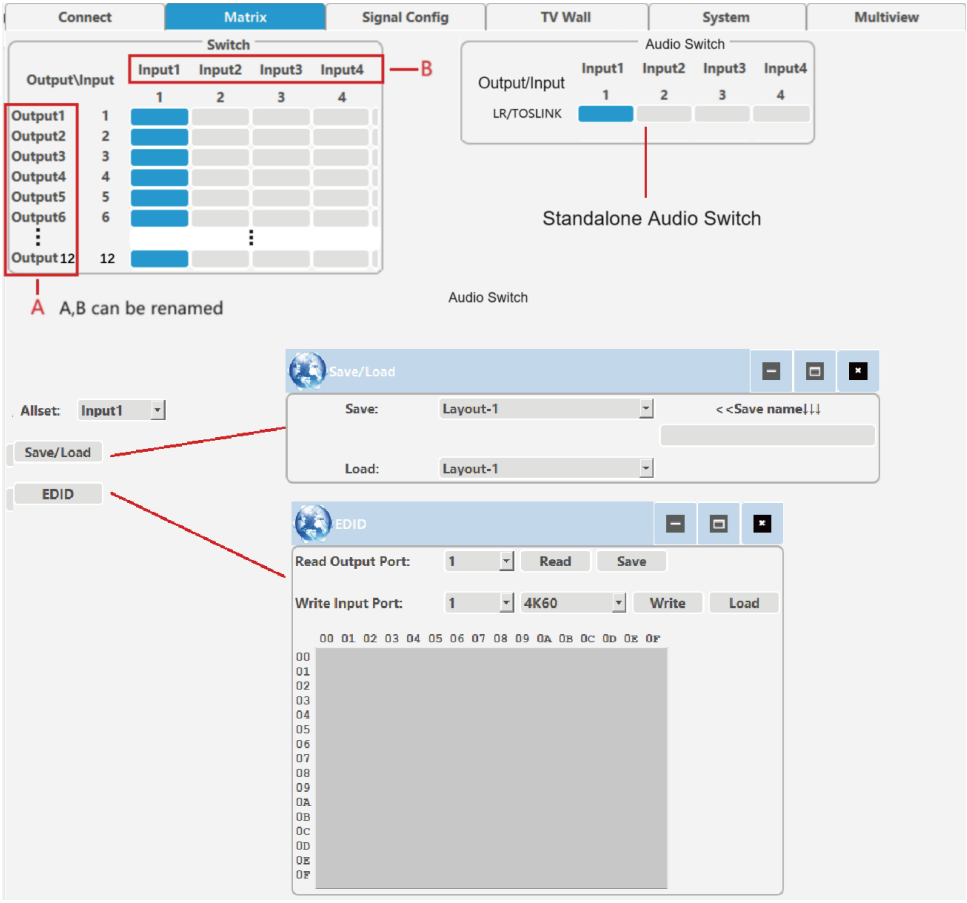
Note: When using the serial port connection, the network port connection must be disconnected, and vice versa.

Method 2: Network port connection.

Connect the LAN port of the Matrix to a PC with an UTP cable, and set the IP address of the PC to be in the same network segment with the Matrix (default IP address: 192.168.0.247). Then click “Search Device” to search the device. Then the searched device will appear in the Search List. Click to select the device, and click “Connect” to connect the device.

Note: When using the network port connection, the serial port connection must be disconnected, and vice versa.

9.2 Matrix



1. Matrix Switching

The Switch part displays the names and mapping status of all input and output ports. Users can rename the input/output port and switch the matrix correspondence.

① Modify the name: Click the input/output port to rename it. And then click outside the input box to complete the name modification.

② Switch matrix correspondence: Click the grid corresponding to the input/output channel to set the input and output switching.

2. Audio Switching

The Audio Switch part allows users to set standalone LR/TOSLINK embedding audio switching for each input port.

3. "One-to-many" Switching Setting

Click the drop-down list of "Allset" to switch the input n (1,2,3,4) signal to all the output channels.

4. Save/Load Scene

Click the Save/Load button to pop up a scene setting window, then users can click the drop-down list of Save to save the current input and output switching status as Layout X (up to 30 scenes are supported), or click the drop-down list of Load to recall a input/output routing scene which is saved before.

5. EDID Settings

Click the EDID button to pop up the EDID control window, then users can do following operations.

a) Read EDID: Select the output port, then click the Read button to read the EDID information of the connected display device.

b) Save EDID: After reading EDID successfully, click the Save button, and select the save path and file name for saving.

c) Write EDID: First read a EDID from output port, or open a EDID file that saved before, then select the input port, and click the Write button to write EDID. The written EDID will be as the "User EDID" data, Which can be selected or canceled through front panel buttons.

9.3 Signal Config

1. Input Settings

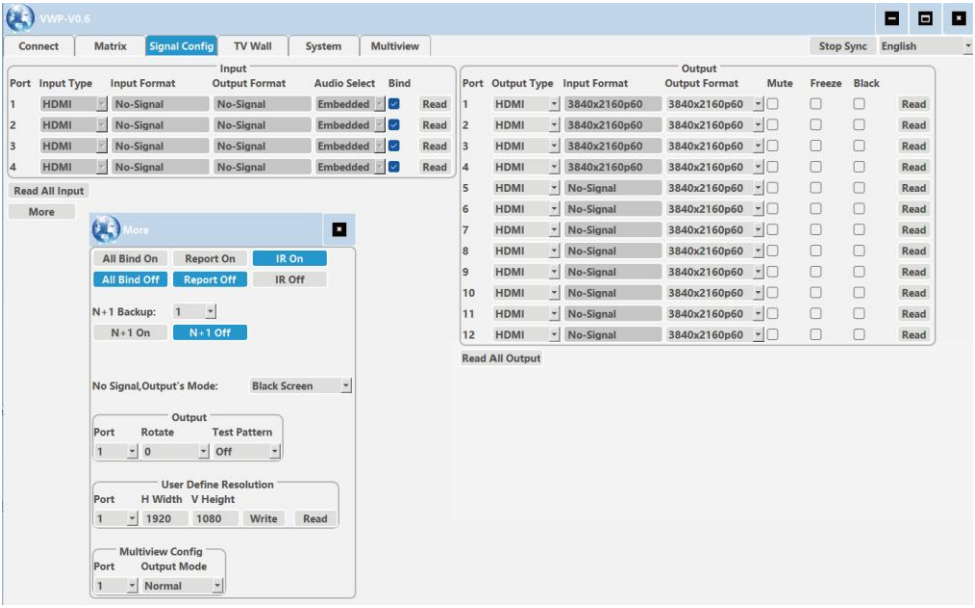
The Input part allows users to read the input format, output format, audio select, and set the audio select.

2. Output Settings

The Output part allows users to read the input format, and set the output type, output format, mute, or freeze status for each output port.

3. Read Settings

Users can click the Read button to read the information of each input/output port, or click the Read All Input/Output to read the information of all input/output ports.



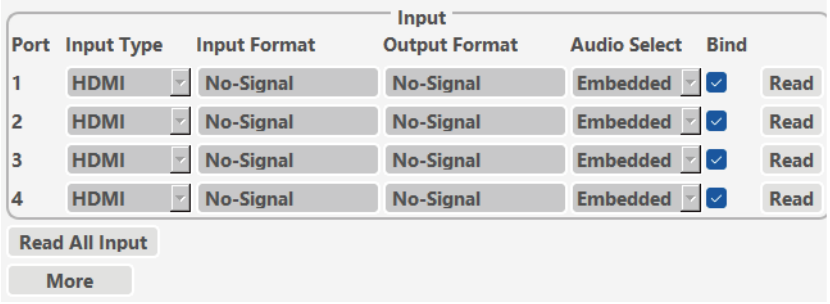
4. More Settings

Click the More button to pop up a setting window, then users can do following operations.

a) Report On/Off: When set Report On, the device will report the current signal status of all inputs after being powered on. When a certain input signal changes (no signal ->signal valid, or signal valid ->no signal), the device will automatically report an status about it.

Note: It is suggested to set Report Off if no need.

b) All Bind On/Off: After set Report On, then All Bind On can be enabled and effective. Below configure make IN1 bound with IN2 and IN3 bound with IN4 (Odd/Even binding).



After setting All Bind On, when the odd input signal is lost, the corresponding output port will automatically switch to the even input signal, and when the even input signal is lost, the corresponding output port will automatically switch to the odd input signal.

Note: It is suggested to set All Bind Off if no need.

c) IR On/Off: Click the IR On/Off button to enable or disable the IR signal receiving function of the IR window on the front panel.

d) N+1 Backup: After setting Report On, then N+1 Backup can be enabled and effective. For example, if set input 1 as the backup source, when input 2 (3, or 4) loses signal, the corresponding output will automatically switch to input 1, and when input 2 signal is recovered, the output will switch back to input 2.
Notes:
(1) All Bind On and N+1 On can't be enabled at the same time.
(2) It is suggested to set all these three functions (Report Off, Bind Off, N+1 Off) to Off when no need.

e) Video Keep Alive mode: Click the dorp-down list of "No Signal Output's Mode" to select the video keep alive mode (BlackScreen/BlueScreen/No output) for input/output when there is no signal input.
f) Output rotation: Click the dorp-down list to select the rotate angle (0°/180°) and test pattern for each output port.
g) User define resolution: This part allows users to set one user-define output resolution for each output port.
h) Multiview configuration: Click the dorp-down list to select the output mode (normal/ multiview) for each output port. If user want to build a multiview layout for one output on PC software Multiview Tab, the multiview function for this port must be enabled here.

9.4 TV Wall

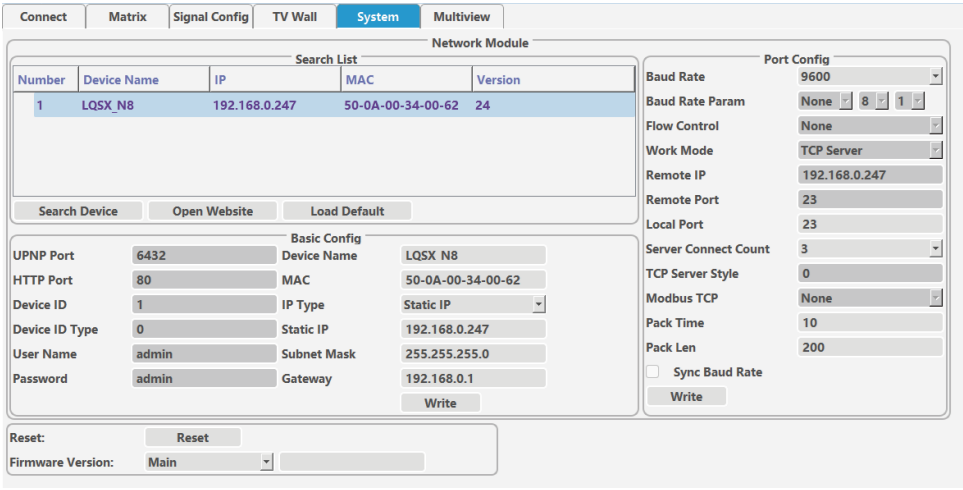
1. TV Wall Configuration
Follow the following steps to built and configure a video wall.
Step 1. Click the drop-down list of Available to set how many outputs will be used for the TV Wall.

Step 2. Click the drop-down list of Row and Column to set the horizontal and vertical display screen quantities.
Step 3. Press and hold the left mouse button to drag-select the screens that will be set for TV wall mode. The selected screens will be shown as bright blue.
Step 4. Right-click the mouse to select “Screen Splicing” from the drop-down menu to build the video wall. The selected screens will now be shown as bright green.
After successful splicing settings, the following splicing parameters can also be adjusted (right-click on the display screen to pop up the settings menu).
Cancel Splicing: Cancel the video wall, and restore to the normal outputs.
1- Cancel Splicing: Remove one screen from the video wall.
Input Select: Select the input source for the video wall.
Output Select: Select the output port which will be displayed on this screen.
Sync Delay: If the LCD panels of the TV wall don’t support sync (frame) delay, this feature should be enabled to make sure these screens are displayed synchronously.
Note: To ensure that all splicing display screens work synchronously, if the resolution of a certain output port is changed, please reboot the device.

2. Bezel Configuration (Pixel)

This part allows users to set the left edge, right edge, up edge and bottom edge for the TV wall, then click the Write button to take effect.

9.5 System



1. Search List

If you do not know the matrix IP address, click on the System tab, and click “Search Device”, and then select the searched device, click “Open Website” to open the web control web site, or can input the IP on the web browser, then enter the username (admin) and password (admin) so that you can control the matrix switch function and use the website.
Note: The computer IP and matrix IP must be in the same segment and the same local area network.

2. Basic Config

This part allows to view/set the basic configuration for the device. If the IP type is set to “Static IP”, users can manually set the IP Address, Subnet Mask and Gateway as required, then click “Write” to take effect. If the mode is set to “DHCP”, the system will search and fill the IP Address with the one assigned by the router automatically. You can't modify it now.

3. Port Config

This part allows to view/set the port configuration for the device.

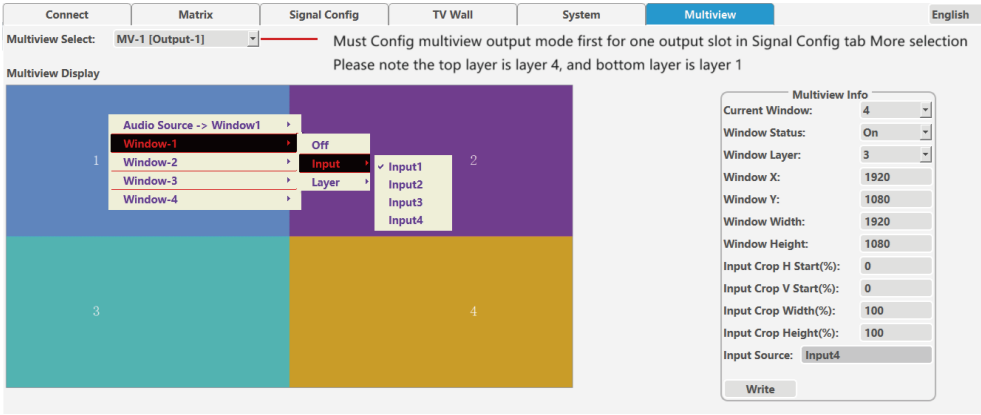
4. Reset

Click the Reset button to restore the device to factory default settings.

5. Firmware Version

This part allows to view firmware versions.

9.6 Multiview



1. Multiview Select

Click the drop-down list to select the multiview to be set.

Notes:

(1) Before select the multiview, please configure the multiview output mode for one output port on the More settings of Signal Config interface.

(2) Please note that the top layer is layer 4, and bottom layer is layer 1.

2. Multiview Info

This part allows users to view/set the multiview information. After setting, please click the Write button to take effect.

3. Multiview Display

This part displays the current multiview. Besides, users can right-click on the display screen to pop up the settings menu to set each window, such as change the audio source, video source, layer layout, or turn on/off window display.

Note: When one output port works on TV wall mode already, if users want to change it to work on mulitiview mode, users need to cancel its video wall working first.

10. Display Settings with LED Panel/Sender Card

Follow the steps below to set pixel to pixel display with LED panel/sender card.
Step 1. Connect one input port of the matrix switcher with a source device through an HDMI cable.
Step 2. Connect one output port of the matrix switcher with the LED panel/sender card through an HDMI cable.
Step 3. Read the EDID of LED panel/sender card with PC Tool and download this EDID to the input port of the matrix switcher.
Step 4. Set the output resolution of this output port as USER or AUTO. When set to USER, please configure the user define resolution first, and make the user defined resolution to match the physical resolution of the LED panel unit completely.

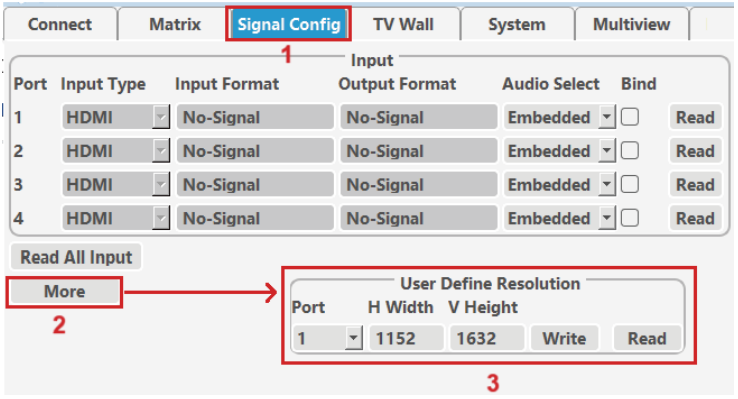
11. MultiPanel Function

Sometimes we may encounter situations where the width or height of the LED splicing panel units are different. In this case, in addition to setting up the relevant splicing operations normally firstly, then we also need to make the following configurations.

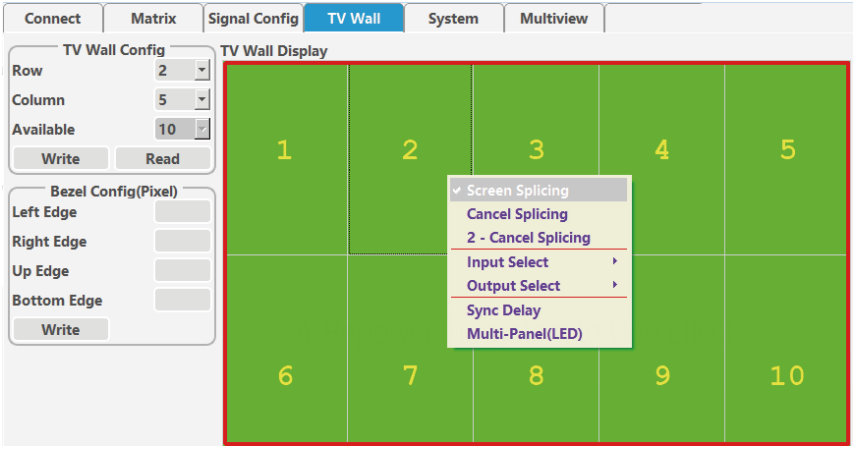
LED Wall

1152x1632 Panel 1 Out 1	1152x1632 Panel 2 Out 2	1152x1632 Panel 3 Out 3	1152x1632 Panel 4 Out 4	576x1632 Panel 5 Out 5
1152x1440 Panel 6 Out 6	1152x1440 Panel 7 Out 7	1152x1440 Panel 8 Out 8	1152x1440 Panel 9 Out 9	576x1440 Panel 10 Out 10

Step 1. Set user define output resolution to the physical display resolution of the corresponding LED panel for every output port which displayed on this LED wall.



Step 2. Turn to the TV Wall Tab and press “Alt+Q” on PC keyboard.
Step 3. Right-click on the TV Wall Display area to pop up the settings menu as below, and select Multi-Panel(LED), then system will automatically fit the different panels.
Step 4. Repower the system to take effect.



Notes:
(1) If users want to exit the MultiPanel function, it is needed to cancel this video wall, then system will automatically exit MultiPanel function.
(2) Please note that MultiPanel function is not available for scene save or recall.

12. API Commands Control

The product also supports API commands control. Connect the RS232-CTL port of the product to a PC with the included USB to RS-232 cable. Then open a Serial Command tool on PC to send ASCII commands to control the product.
The ASCII command list about the product is shown as below.

ASCII Command			
Serial port protocol: Baud rate: 9600, Data bits: 8bit, Stop bits: 1, Parity bit: 0 IP address:192.168.0.247 Port address: 23 Submask:255.255.255.0 Gateway:192.168.0.1			
Command Code	**Example**	**Feedback**	**Function Description**
[x]All.	Send：1All.	Return：001 To All	Switch input x to all outputs
All#.	Send：All#.	Return：All Through	Switch in1->out1, in2->out2,……,n->n
[x]#.	Send: 1#.	Return：001 Through	Switch input x to output x
[x]VALL.	Send：1VALL.	Return：V:001 To All	Switch input x to all outputs
[x]BALL.	Send：1BALL.	Return：V:001 To All	Switch input x to all outputs
[x1]V[x2].	Send：1V1.	Return：V:001->001	Switch input x1 to output x2
[x1]B[x2].	Send：1B1.	Return：AV:001->001	The same with [x1]V[x2].
[x1]V[x2],[x3].	Send：1V1,2,3.	Return：V:001->001,002,003	Switch input x1 to output x2 and x3
[x1]B[x2],[x3].	Send：1B1,2,3.	Return：AV:001->001,002,003	The same with [x1]V[x2],[x3].
[x]A.	Send: 1A.	Return: A:001	Audio selection for beak away output
#Save[x].	Send：#Save1.	Return：#Save->01	Save to scene x
#Recall[x].	Send：#Recall1.	Return：#Recall->01	Recall scene x

13. Connection Diagram

HDMI™
HIGH-DEFINITION MULTIMEDIA INTERFACE

The terms HDMI and HDMI High-Definition Multimedia interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.