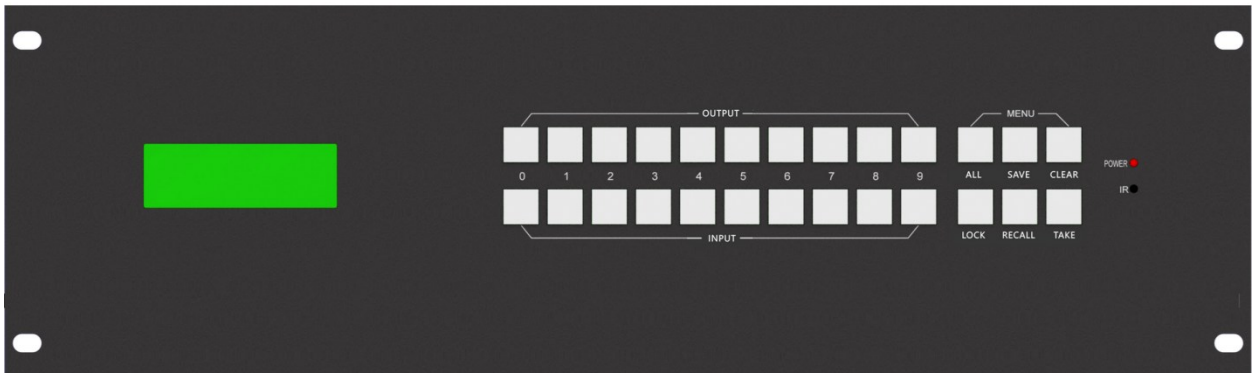
# VMP3 series
# Matrix Switcher
# User Manual




## Warning

- Do not expose this device to Rain, Moisture, and Dripping
- Only use accessories specified by the manufacture
- Unplug this device during Lightning Storms
- The manual is for reference only, maybe updated without further notice

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# 1. System description

## 1.1. Introduction

VMP3 series modular matrix switcher is a high-performance ultra high definition video signal switching device that supports 4K@60Hz-444 processing of input, output, switching, multiview and wall splicing

This product adopts a dual power redundancy design and a plug-in single card 4-way structure, which can support up to 8-80 signal inputs and 8-80 signal outputs

## 1.2. Features

1. Support seamless switching between different input resolutions
2. Comprehensive splicing display function, four screen window multiview function and zoom function
3. Support synchronization for all output ports, there are two options: general mode and sync delay mode
4. Supports 90°, and 180° rotation base on different output cards
5. Support auto output resolution and user define output resolution, suitable for LED panel display
6. RGB video processing, perfectly restoring true colors
7. Input cards: HDMI/HDBaseT/Fiber card, up to 3840x2160/4096x2160@60Hz input resolution
   SDI card, up to 1080p60 input resolution
8. Output cards: HDMI/HDBaseT/Fiber card, up to 3840x2160/4096x2160@60Hz output resolution
9. Support audio insert on input card and audio extracting on output card
10. Provide multiple control ports: front panel buttons, remote control, RS232, network and web
11. Dual power redundancy design



## 1.3. Specification-main unit

| Chassis | 8x8, 2U | 16x16, 3U | 32x32, 5U | 80x80, 11U |
|---|---|---|---|---|
| Front view |  |  |  |  |
| Rear view |  |  |  |  |
| Size（W*D*H） | 483x365x89mm | 483x365x134mm | 483x365x223mm | 483x365x512mm |
| Gross weight | 9Kg | 13Kg | 23Kg | 60Kg |
| Power module | 100W*2 or 200W*2 Redundancy | 200W*2 or 350W*2 Redundancy | 350W*2 or 500W*2 Redundancy | 350W*4 or 500W*4 Redundancy |

## 1.4. Specification-input card and output card

| | Interface | Signal | Resolution |
|---|---|---|---|
| Input card | HDMI | HDMI,DVI | Up to 3840x2160@60 |
| | RJ45 | HDbaseT | Up to 3840x2160@60<br>Support POC |
| | BNC | SDI | 480i,576i,1080i50/60,720p50/60,<br>1080p24/25/29/30/50/60 |
| | DVI | HDMI,DVI | Up to 1920x1200@60<br>If need external LR audio input，please use DVI to DVI+3.5mm adapter |
| | VGA | VGA,<br>YPbPr,<br>CVBS | VGA input card，support following three signals<br>VGA: From 640x480@60 to 1920x1200@60<br>YPbPr: Use VGA to YPbPr adapter |

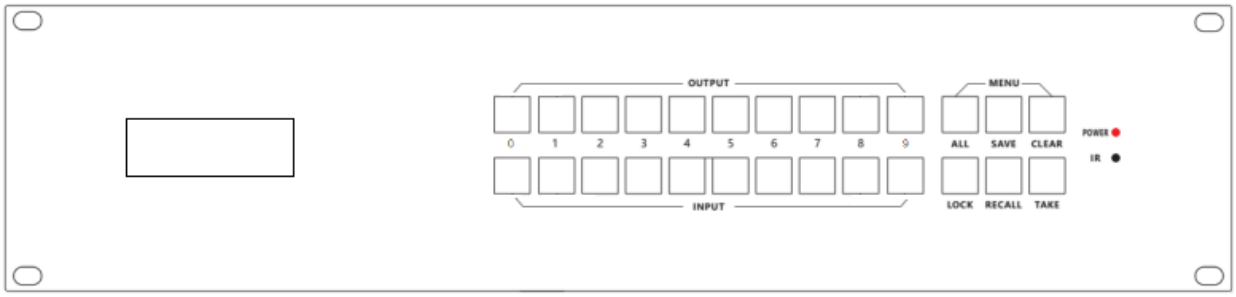
| | | | |
|---|---|---|---|
| | | | 480i,576i,480p/576p,<br>1080i50/60,720p50/60,<br>1080p50/60<br>CVBS: Use VGA to YPbPr adapter<br>PAL,NTSC |
| | Fiber | LC | Sing mode and single cable<br>480p to 3840x2160p60<br>Transmission distance 10 kilometers |
| Output card | Interface | Signal | Resolution |
| | HDMI | HDMI,DVI | From 480p to 3840x2160@60<br>Different daughter cards maybe have different resolution capability |
| | RJ45 | HDBaseT | From 480p to 3840x2160@60<br>Support POC<br>Different daughter cards maybe have different resolution capability |
| | BNC | SDI | 1080i50/60,720p50/60,1080p50/60 |
| | DVI | HDMI,DVI | From 1024x768 to 1920x1200@60<br>If need stand alone LR audio output,<br>please use DVI to DVI+3.5mm adapter |
| | VGA | VGA,<br>YPbPr,<br>CVBS | VGA output card, support following three signals<br>VGA: From 1024x768@60 to 1920x1200@60<br>YPbPr: Use VGA to YPbPr adapter<br>1080i50/60,720p50/60,<br>1080p50/60<br>CVBS: Use VGA to YPbPr adapter<br>PAL,NTSC |
| | Fiber | LC | Sing mode and single cable<br>480p to 3840x2160p60<br>Transmission distance 10 kilometers |

## 1.5. Output resolution and HEX index

| Output card type | | 4K category HDMI,HDBaseT, Fiber | 2Kcategory HDMI,HDBaseT | DVI | 3G SDI | VGA card Signal type | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | VGA | YPbPr | CVBS |
| Resolution And Hex Index | 00 | 4096x2160p60 | 1920x1200p60 | 1920x1200p60 | 1920x1080p60 | 1920x1200p60 | 1920x1080p60 | PAL |
| | 01 | 4096x2160p50 | 1920x1080p60 | 1920x1080p60 | 1920x1080i60 | 1920x1080p60 | 1920x1080i60 | NTSC |
| | 02 | 3840x2160p60 | 1920x1080p50 | 1920x1080i60 | 1920x1080p50 | 1680x1050p60 | 1920x1080p50 | |
| | 03 | 3840x2160p50 | 1920x1080p30 | 1920x1080p50 | 1920x1080i50 | 1600x1200p60 | 1920x1080i50 | |
| | 04 | 3840x2160p30 | 1680x1050p60 | 1920x1080i50 | 1920x1080p30 | 1360x768p60 | 1280x720p60 | |
| | 05 | 3840x2160p25 | 1600x1200p60 | 1920x1080p30 | 1280x720p60 | 1280x1024p60 | 1280x720p50 | |
| | 06 | 3440x144p60 | 1360x768p60 | 1680x1050p60 | 1280x720p50 | 1280x768p60 | | |
| | 07 | 2560x1600p60 | 1280x1024p60 | 1600x1200p60 | | 1280x720p60 | | |
| | 08 | 2560x1440p60 | 1280x768p60 | 1360x768p60 | | 1024x768p60 | | |
| | 09 | 1920x1200p60 | 1280x720p60 | 1280x1024p60 | | | | |
| | 0A | 1920x1080p60 | 1280x720p50 | 1280x768p60 | | | | |
| | 0B | 1920x1080p50 | 1024x768p60 | 1280x720p60 | | | | |
| | 0C | 1920x1080p30 | USER | 1280x720p50 | | | | |
| | 0D | 1680x1050p60 | AUTO | 1024x768p60 | | | | |
| | 0E | 1600x1200p60 | | | | | | |
| | 0F | 1360x768p60 | | | | | | |
| | 10 | 1280x1024p60 | | | | | | |
| | 11 | 1280x768p60 | | | | | | |
| | 12 | 1280x720p60 | | | | | | |
| | 13 | 1280x720p50 | | | | | | |
| | 14 | 1024x768p60 | | | | | | |
| | 15 | USER | | | | | | |
| | 16 | AUTO | | | | | | |

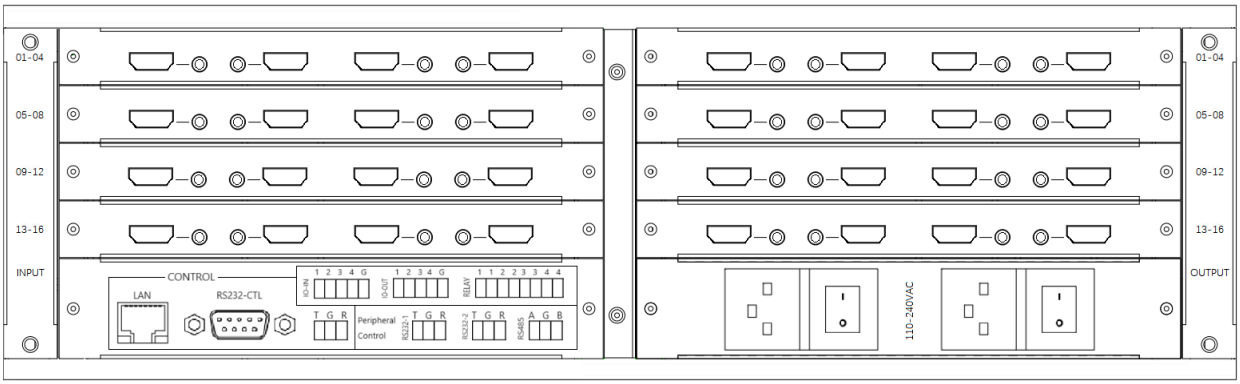
## 2. Panel introduction

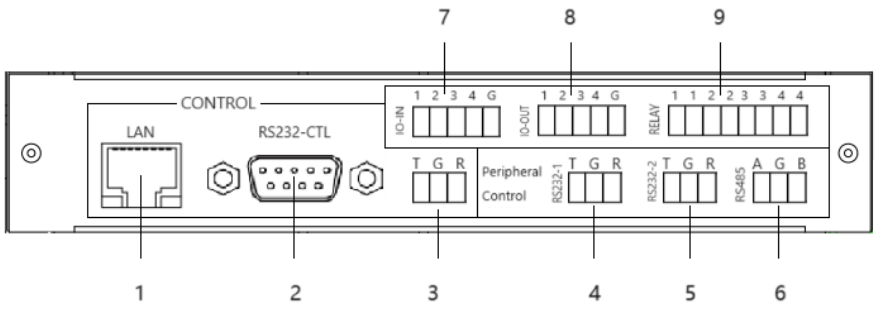
### 2.1 Front view




1. Installation screw: used to fix the control panel to the rack
2. LCM display screen: displays the routing status of each channel in the matrix.
3. Lock button : When activated, the inside light will be on, then all the buttons on the front panel will be locked and will not work. Press the button again, the light will turn off and unlock
4. TAKE/ENTER button： Execution action
5. OUT SELECT： Output 0, 1, 2...9, 10, 11... ,16
6. IN SELECT： Input 0, 1, 2...9, 10, 11... ,16
   Press OUTPUT m +INPUT n +TAKE, switch input n to output m
7. ALL button: Press ALL + INPUT n +TAKE, switch input n to all output ports
8. SAVE button : Press SAVE+ OUTPUT n +TAKE, save current routing and screen layout to scene n
9. RECALL button: Press RECALL+ OUTPUT n +TAKE, load scene for current displaying
10. IR: IR receiver, can be disabled by RS232 command
11. Directly press TAKE button, front LCD panel will loop display IR ON/OFF,RS232 Baud Rate and IP parameters

### 2.2 Rear view






| Index | Function | Description | Details |
|---|---|---|---|
| 1 | **Main Control**<br>Use PC to control this matrix switcher | TCP/IP or Web Control | IP address:192.168.0.247<br>Submask:255.255.255.0<br>Gateway:192.168.0.1<br>Baud Rate:9600<br>Web login account : admin<br>Web login password : admin |
| 2 | | RS232 Control | Baud Rate:9600 |
| 3 | | PS232-Phoenix control | T: Matrix Switcher -> PC<br>G: Ground<br>R: Matrix Switcher <- PC |
| 4 | **Peripheral Control**<br>Control other peripherals through this matrix switcher | RS232-1 Peripheral Control | T: Matrix Switcher -> Peripheral<br>G: Ground<br>R: Matrix Switcher <- Peripheral |
| 5 | | RS232-2 Peripheral Control | T: Matrix Switcher -> Peripheral<br>G: Ground<br>R: Matrix Switcher <- Peripheral |
| 6 | | RS485 Peripheral Control | Connect to peripheral's RS485 port<br>G: Ground |
| 7 | | GPIO-Input | 4 inputs level detect,high or low<br>G: Ground<br>$V_{IL}$ : 0 ~ 2.0V<br>$V_{IH}$ : 3.0 ~ 5.0V |
| 8 | | GPIO-Output | 4 outputs,high or low<br>G: Ground<br>$V_{OL}$ : 0 ~ 0.5V<br>$V_{OH}$ : 4.5 ~ 5.0V |
| 9 | | Relay Control | 4 relays control, on or off<br>G: Ground<br>Rating: 48V/1A |

## 3. Package

| Content | Quantity |
|---|---|

| | |
|---|---|
| Matrix switcher unit | 1 |
| AC cord | 2 |
| USB to RS232 cable | 1 |
| 1-meter net cable | 1 |

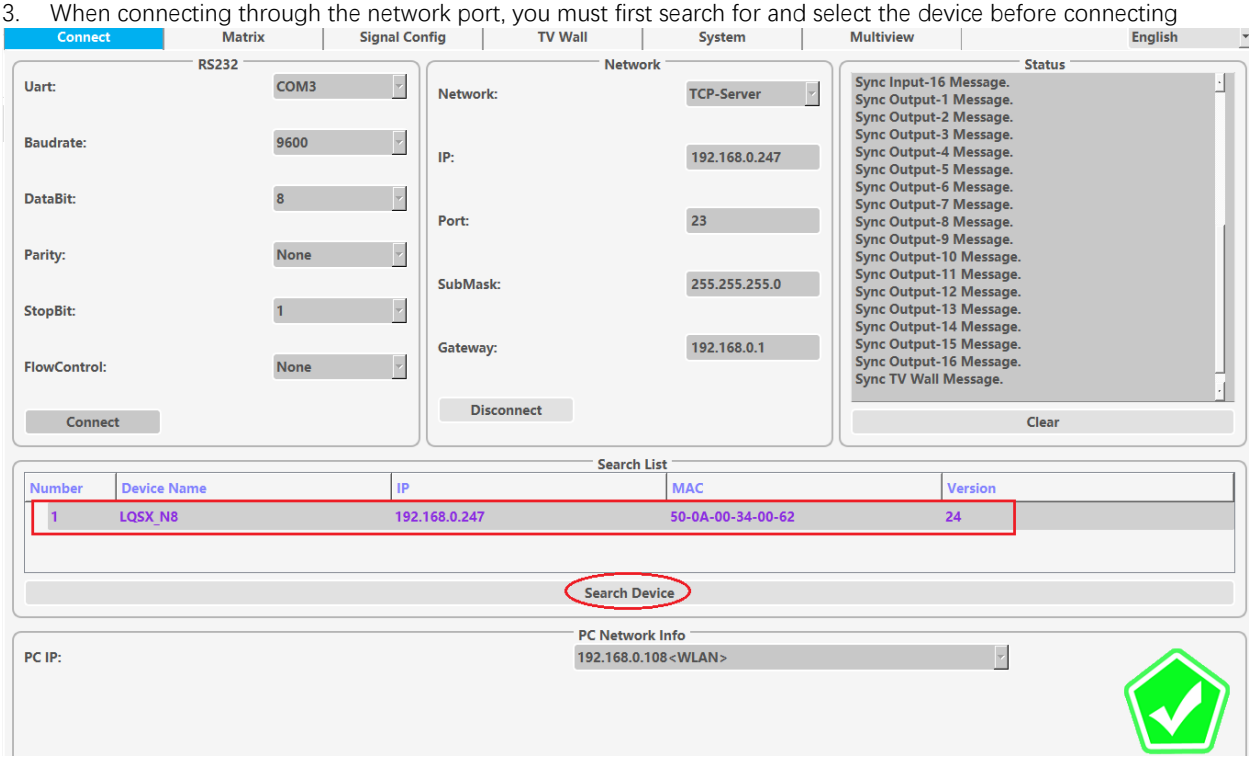
# 4. PC Tool user guide

This PC tool is an installation free control software. It is divided into seven tabs according to different functions: Connect, Matrix, Signal, TV wall, System, Multiview and Peripheral. The initial login password is: 111111

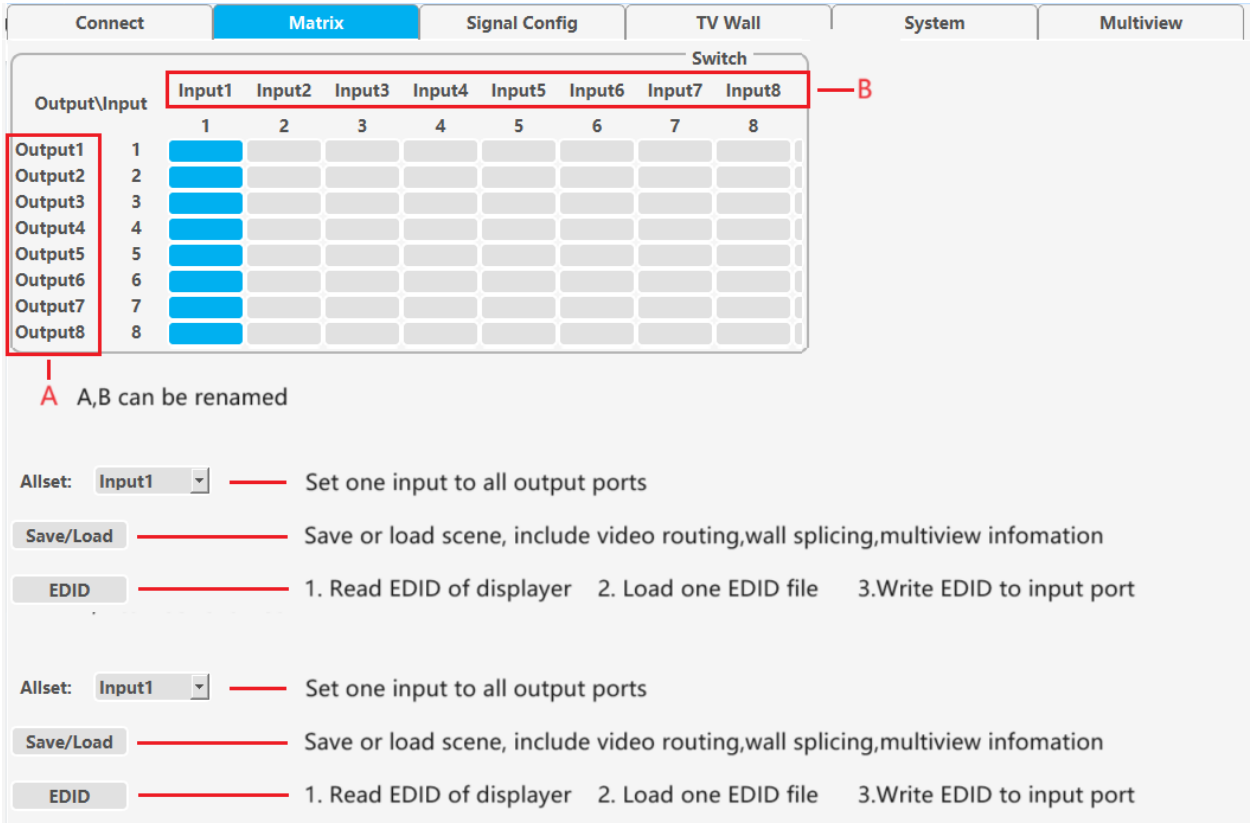
## 4.1 Connect tab

Please note:

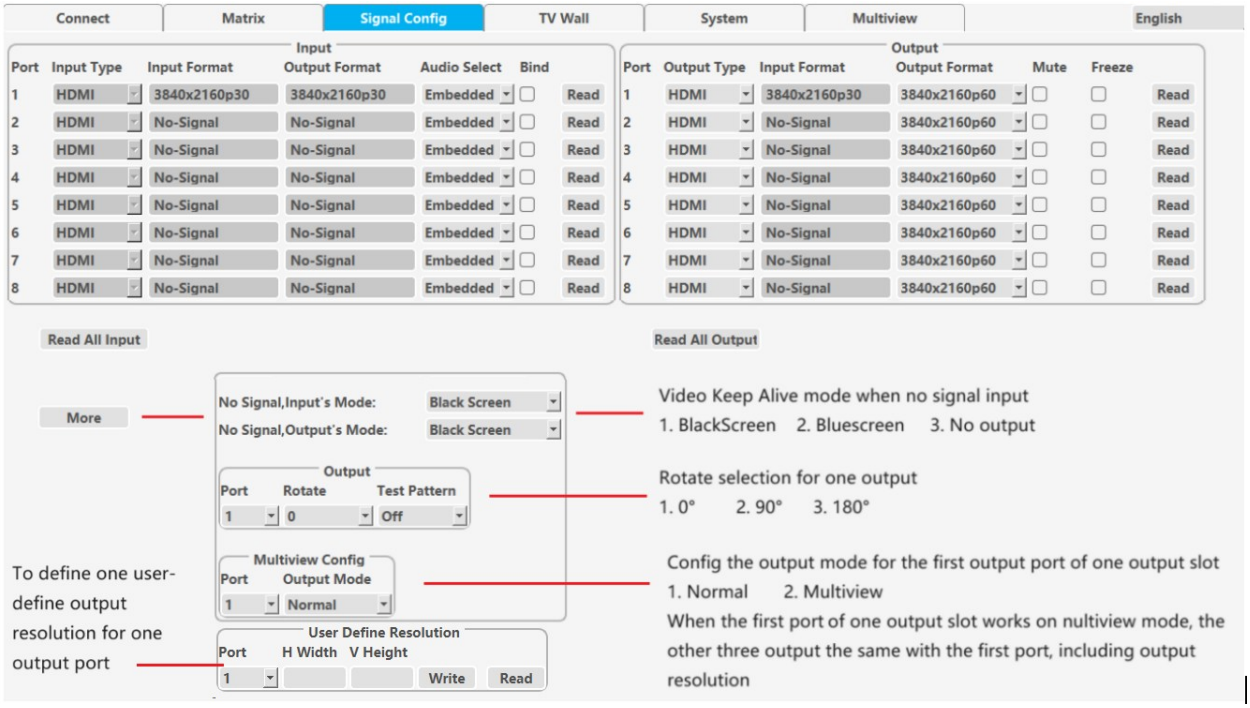
1. Use serial cable (straight line) or Ethernet cable
2. When using a serial port connection, the network port connection must be disconnected, and vice versa
3. When connecting through the network port, you must first search for and select the device before connecting



## 4.2 Matrix switch tab

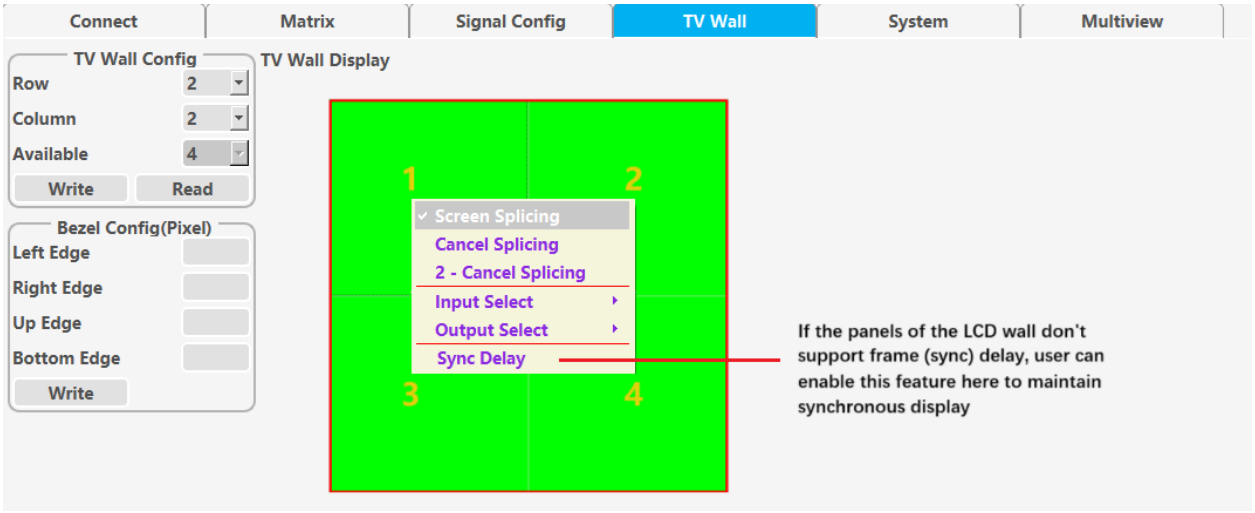


## 4.3 Signal config tab

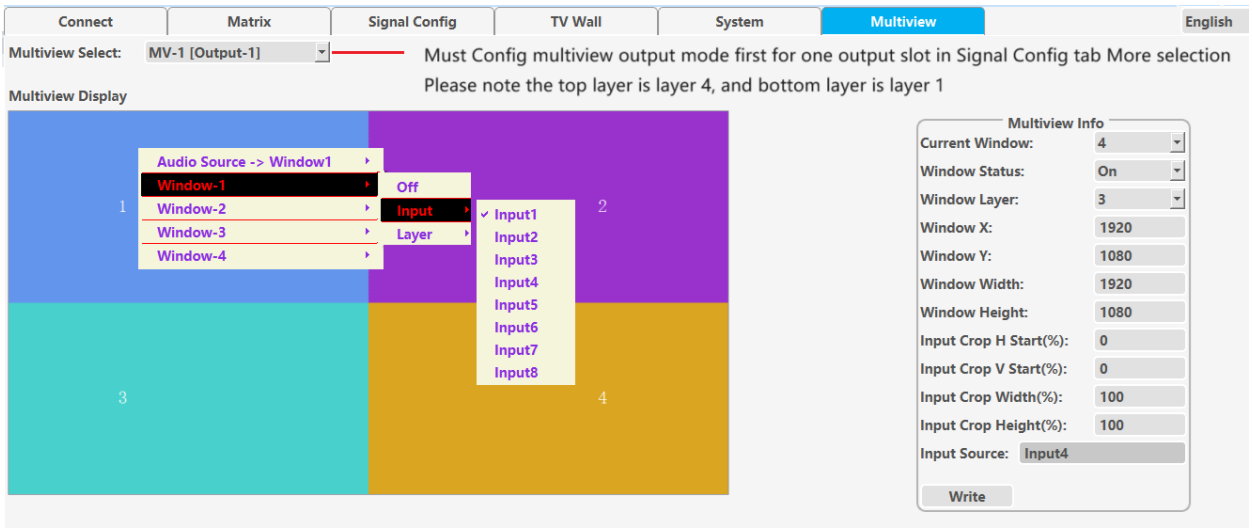



## 4.4 TV wall tab

This tab set the splicing wall parameters: layout, border, input/output settings, etc

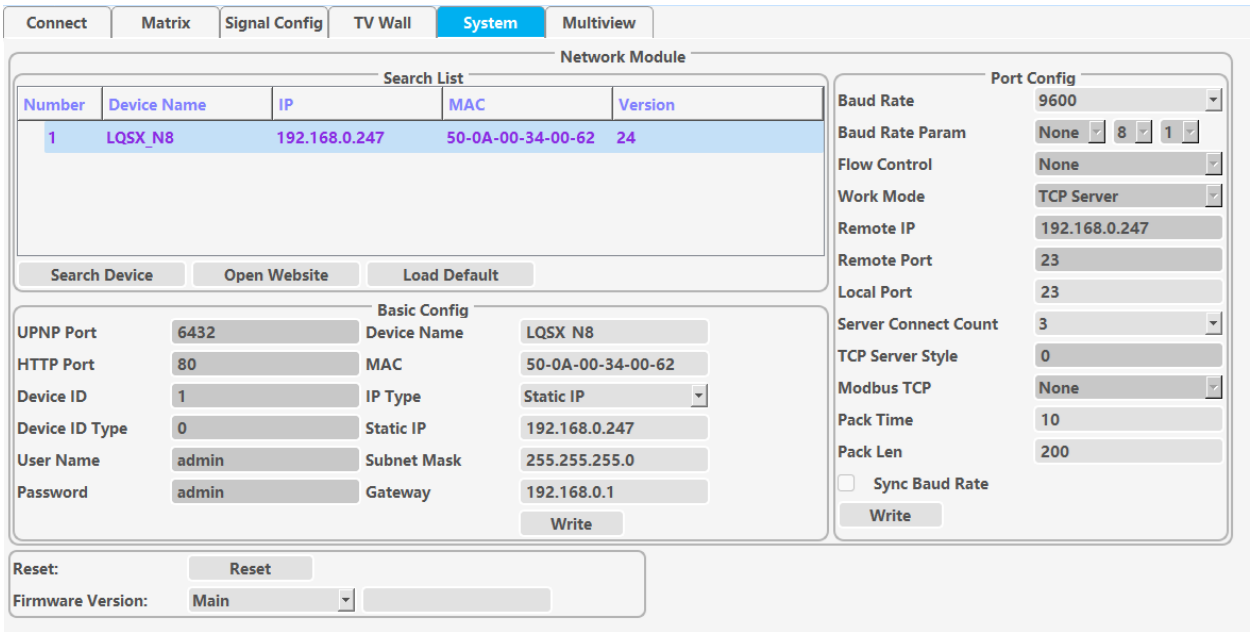


## 4.5 Multiview tab

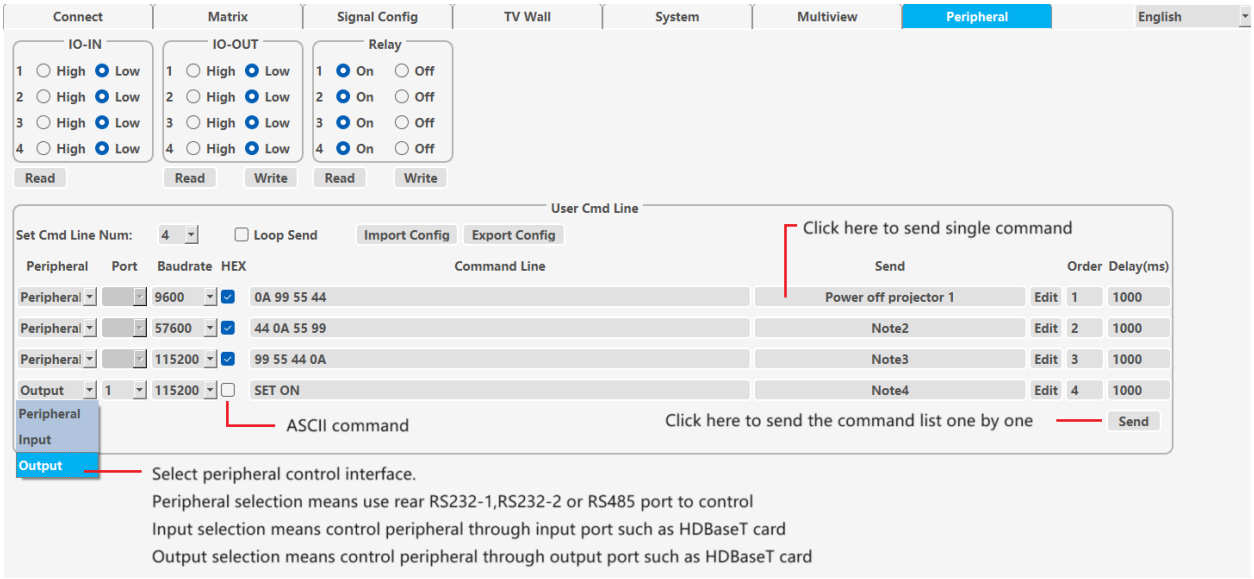



## 4.6 System tab

This tab sets network parameters, resets, reads software versions, etc



## 4.7 Peripheral tab




# 5. How to achieve multiview function of splicing wall

**Step 1**, set a certain output card ( suggest to use the last output card ) to work on the multiview mode. We call one of the output ports on this card as output port M

**Step 2**, use one of the input ports of a certain input card ( suggest to use the last input port of the last input card ) as the multiview source input port, called input port N

**Step 3**, connect an external HDMI short cable between output port M and input port N

**Step 4**, set the parameters of the splicing wall and select the input source of the splicing wall as input N

# 6. How to achieve point to point display with LED panel

**Step 1**, connect input cable between source and one input port of the matrix switcher.

**Step 2**, connect output cable between LED panel and one output port of the matrix switcher.

**Step 3**, read the EDID of LED panel 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 AUTO, or USER. When set USER, need configure the user define resolution first, and make the user defined resolution to match the physical resolution of the LED panel perfectly

# 7. Commonly used HEX commands

Baud Rate: 9600
Data bits: 8
Parity: None
Stop bits: 1

## 7.1 System command

### 7.1.1 Set matrix size (inputs/outputs number)

Cmd: 7B 7B 95 03 01 ValidOutSum ValidInSum 99 7D 7D
ValidOutSum is output ports number; ValidInSum is input ports number
For example, for an 8x8 matrix, ValidOutSum=08, ValidInSum=08

### 7.1.2 IP config

Cmd: 7B 7B 9B DataLength content 99 7D 7D
DataLength: which is the number of bytes contained in the content
content: the data bytes after converting ASCII string
"AT+WANN=IPmode,IPaddress,Subnetmask,Gateway<CR>" to HEX number
IPmode: STATIC or DHCP
IPaddress: IP address value for static IP
Subnetmask: Submask value for static IP
Gateway: Gateway value for static IP
<CR>: Carriage Return ,HEX number 0D
For example:
Set IP mode to STATIC, IP address 192.168.0.156, Subnet mask 255.255.255.0, Gateway 192.168.0.1 (please note here is a carriage return, hex number is 0D)
We need convert ASCII string AT+WANN=STATIC,192.168.0.156,255.255.255.0,192.168.0.1 to HEX number
41 54 2B 57 41 4E 4E 3D 53 54 41 54 49 43 2C 31 39 32 2E 31 36 38 2E 30 2E 31 35 36 2C 32 35 35 2E 32 35 35 2E 32 35 35 2E 30 2C 31 39 32 2E 31 36 38 2E 30 2E 31 0D
And then combined with the command header, DataLength and command tail, the overall command is
7B 7B 9B 37 41 54 2B 57 41 4E 4E 3D 53 54 41 54 49 43 2C 31 39 32 2E 31 36 38 2E 30 2E 31 35 36 2C 32 35 35 2E 32 35 35 2E 32 35 35 2E 30 2C 31 39 32 2E 31 36 38 2E 30 2E 31 0D 99 7D 7D

### 7.1.3 Save Scene

Cmd: 7B 7B 02 01 ModeIndex 99 7D 7D
ModeIndex: Scene No.

### 7.1.4 Load scene

Cmd: 7B 7B 03 01 ModeIndex 99 7D 7D

### 7.1.5 Factory reset

Cmd: 7B 7B AA 02 01 01 99 7D 7D

## 7.2 Switching, querying, and configure command

### 7.2.1 Single input and output switching

Cmd: 7B 7B 01 02 inPort outPort 99 7D 7D
inPort: Input channel, 0 represents input 1
outPort: Output channel, 0 represents output 1. If set FF,represents all output ports

### 7.2.2 Multi input and output ports switching

Cmd: 7B 7B 94 VaildLen 01 Input Output [extend data bytes，continuous Input Output port No.] 99 7D 7D
VaildLen：Add one more to the total number of input ports and output ports
For example：7B 7B 94 11 01 00 00 01 01 02 02 03 03 04 04 05 05 06 06 07 07 99 7D 7D
Switching IN1>OUT1; IN2>OUT2; ... IN8>OUT8

### 7.2.3 Query output input correspondence

Cmd：7B 7B 12 01 00 99 7D 7D
Matrix switcher will return as follows：
7B 7B 11 ValidOutNum Out1Inx Out2Inx … OutnInx 99 7D 7D
ValidOutNum：Total output port number
Out1Inx：Indicates the input port corresponding to output 1. If 0, means output 1 is switched to input 1

### 7.2.4 Set output resolution

Cmd: 7B 7B B1 03 Port 00 ResolutionIndex 99 7D 7D
Port: Ouput port No.，0 represents output 1
ResolutionIndex：Index of output resolution

| | | | |
|---|---|---|---|
| 1280x720p50 | //- 00 | 1280x720p60 | //- 01 |
| 1920x1080p50 | //- 02 | 1920x1080p60 | //- 03 |
| 3840x2160p25 | //- 04 | 3840x2160p30 | //- 05 |
| 3840x2160p50 | //- 06 | 3840x2160p60 | //- 07 |
| 1024x768p60 | //- 08 | 1280x768p60" | //- 09 |
| 1280x1024p60 | //- 0A | 1360x768p60 | //- 0B |
| 1920x1200p60 | //- 0C | 4096x2160p60 | //- 0D |
| 4096x2160p50 | //- 0E | | |

### 7.2.5 Query input information

Cmd: 7B 7B 7F 02 Port C0 99 7D 7D
Port: Input port No.，0 represents input 1
Matrix switcher will return as follows：
7B 7B 7F 14 Port C0 BoardType FuncFlag InType OutType AudioSelect IN_HresH IN_HresL IN_VresH IN_VresL IN_PorI IN_Frequency OUT_HresH OUT_HresL OUT_VresH OUT_VresL OUT_PorI OUT_Frequency OutRes 99 7D 7D
AudioSelect: = 1, represents external LR audio; 0, represents HDMI embedded audio
IN_HresH: The high 8 bits of the input image's horizontal resolution
IN_HresL: The low 8 bits of the input image's horizontal resolution
IN_VresH: The high 8 bits of the vertical resolution of the input image
IN_VresL: The low 8 bits of the vertical resolution of the input image
IN_PorI:= 1, progressive; 0, interlaced
IN_Frequency: Input frame rate
Attention, OUT_HresH and other OUT_ xx parameter here, mean the output parameters of the input channel

### 7.2.6 Query output information

Cmd: 7B 7B 7F 02 Port 80 99 7D 7D
Port: Output port No.，0 represents output 1
Matrix switcher will return as follows：
7B 7B 7F 0D Port 80 BoardType FuncFlag InType OutType IN_HresH IN_HresL IN_VresH IN_VresL IN_PorI IN_Frequency OutRes 99 7D 7D
OutRes: the index of output resolution
Attention, IN_HresHand other IN_ xx parameter here, mean the input parameters of the output channel

### 7.2.7 Audio selection of input port

Cmd: 7B 7B C4 03 Port 40 AudioSelect 99 7D 7D
Port: Input port No.，0 represents input 1
AudioSelect:= 1, means external LR audio ； 0, means embedded audio

### 7.2.8 Output rotate

Cmd: 7B 7B BA 03 OutPort 00 RotateIndex 99 7D 7D
RotateIndex: 0: 0°；1: 90°；2: 180°

## 7.3 Display mode when no input

### 7.3.1 Display mode for output port when no input

Cmd: 7B 7B D7 03 OutPort 00 OutMode 99 7D 7D
OutPort: 0 represents output 1; FF means all the output ports
OutMode = 0, Black screen；1, Blue screen；2, No output

### 7.3.2 Display mode for input port when no input

Cmd: 7B 7B D7 03 InPort 40 OutMode 99 7D 7D
InPort: 0 represents input 1; FF means all the input ports
OutMode: = 0, Black screen；1, Blue screen；2, No output

## 7.4 Wall splicing command

There are two ways to build a video wall
A. Each command is individually set for a specific output port. After setting up each output port required for splicing, a splicing wall naturally forms. The disadvantage is that the entire splicing wall information cannot be read.
B. Set the splicing parameters for all output ports used for splicing with one command. The advantage is that it can read all the parameters of this spliced wall

### 7.4.1 Splicing one output port

Cmd: 7B 7B 90 06 OutPort 00 Line Column P Q 99 7D 7D
Line: total lines of screens
Column: total columns of screens
P: What line of the splicing screen is the current output port on
Q: What column of the splicing screen is the current output port on

### 7.4.2 Set border for one output port

Cmd: 7B 7B 91 06 OutPort 00 LeftBezel RightBezel TopBezel BottomBezel 99 7D 7D

## 7.5 Multiview command

### 7.5.1 Enable multiview function for one output

Cmd: 7B 7B A1 03 Port 00 01 99 7D 7D

### 7.5.2 Disable multiview function for one output

Cmd: 7B 7B A1 03 Port 00 00 99 7D 7D

### 7.5.3 Audio selection for one multiview port

Cmd: 7B 7B A2 03 OutPort 00 AudioSrc 99 7D 7D
AudioSrc：0：Mute；1：Window 1 ；2：Window 2； 3：Window 3 ；4：Window 4

### 7.5.4 Set multiview parameters for output port

Cmd: 7B 7B 9C 12 OutPort 00 WinCount WinID WinStatus LayerRank ViewXH ViewXL ViewYH ViewYL ViewWH ViewWL ViewHH ViewHL CropXRatio CropYRatio CropWRatio CropHRatio 99 7D 7D
WinCount: total window numbers, 4（We can open or close a certain window, but the total number remains 4
ValidData: Composed of 4 consecutive data bytes
(WinID + WinStatus + LayerRank + ViewXH + ViewXL + ViewYH + ViewYL + ViewWH + ViewWL + ViewHH + ViewHL + CropXRatio + CropYRatio + CropWRatio + CropHRatio
WinID: Window ID (0~3 respectively represent window 1~4
WinStatus: 1,Open； 0,Close
LayerRank: The layer of the window (0~3 represents the first to fourth layers, 3 represents the top layer, and 0 represents the bottom layer
ViewXH: Window horizontal position, high bits
ViewXL: Window horizontal position, low bits
ViewYH: Window vertical position, high bits
ViewYL: Window vertical position, low bits
ViewWH: Window width, high bits
ViewWL: Window width, low bits
ViewHH: Window height, high bits
ViewHL: Window height, low bits
CropXRatio: Input crop，horizontal start, %，default 00
CropYRatio: Input crop，vertical start, %，default 00
CropWRatio: Input crop，width, %，default 64 (Hex digital)，means 100%
CropHRatio: Input crop，height, %，default 64 (Hex digital)，means 100%

### 7.5.5 Query multiview parameters for output port

Cmd: 7B 7B 9C 02 OutPort 80 99 7D 7D
Matrix switcher will return as follows：
7B 7B 9C 43 Port 80 ResWH ResWL ResHH ResHL 04 ValidData 99 7D 7D
ResWH OutResWL: Output resolution, width（High 8 bits and low 8 bits
ResHH ResHL: Output resolution, height（High 8 bits and low 8 bits
ValidData: Composed of 4 consecutive data bytes
(WinID + WinStatus + LayerRank + ViewXH + ViewXL + ViewYH + ViewYL + ViewWH + ViewWL + ViewHH + ViewHL + CropXRatio + CropYRatio + CropWRatio + CropHRatio)

### 7.5.6 Set display position and size for one window

Cmd: 7B 7B 9E 08 OutPort 00 04 WinID CropXRatio CropYRatio CropWRatio CropHRatio 99 7D 7D

### 7.5.7 Set the layer level of one multiview window

Cmd: 7B 7B A0 05 Port 00 04 WinID LayerRank 99 7D 7D

### 7.5.8 Query the layer level of one multiview window

Cmd: 7B 7B A0 05 Port 80 04 WinID LayerRank 99 7D 7D

### 7.5.9 Window display and hiding

Cmd: 7B 7B A0 05 OutPort 00 04 WinID WinStatus 99 7D 7D
WinStatus：1: Open, 0: Close