G416
4K Video Wall Controller

with
Seamless Matrix Switcher
Quadview Multiviewer

SEADA
Showing the World

User Manual V1.0

Warning

- Do not expose this device to Rain, Moisture, and Dripping
- Only use accessories specified by the manufacture
- Unplug this device during Lightning Storms

CONTENTS

1. System Description

1.1 Introduction

The G416 is a high-performance HDMI 2.0 video wall controller. It can not only be used as a video wall controller but also as a seamless matrix switcher with 4x 4K@60 inputs and 16x 4K@60 outputs.

In addition to the video wall and matrix switching capabilities, G416 supports multiview on both single display and video wall with up to 4 windows simultaneously. This makes the G416 a great solution not only for digital signage, broadcasting and security, but also for meeting and conference rooms.

The G416 video wall controller can be easily configured via IP/serial port connection to a Windows based PC, running the management software, from the front panel of the unit, or through 3rd party controllers. The Windows based software provides a user-friendly User Interface, greatly simplifying the system configuration. G416 controllers can run standalone without the connection to the control PC, once configured.

1.2 Features

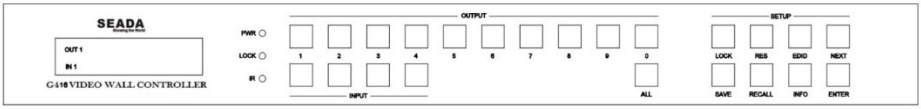
- Support video wall with up to 16 screens
- Support seamless switching between different input sources
- Support multiview with up to 4 windows simultaneously
- Support sync mode and sync delay mode for different types of displays
- Supports 180° rotation function
- 4 Inputs and 16 Outputs：HDMI 2.0, up to 3840x2160/4096x2160@60Hz resolution
- Support customised output resolution
- Support one break away audio extractor and switcher
- Provide multiple control ports: front panel buttons, remote control, RS232, network and WebUI control
- Supports up to 4K and HDCP 2.2 compliant.
- Supports controllable via network, RS232, remote control, and front panel buttons
- Supports customised preset layouts

2. Specification

Band Width	594MHz (18Gbps), HDMI 2.0, HDCP2,2
Audio Format	LPCM 2.0
Input ports	4 HDMI
Output ports	16 HDMI, 1 Mini Toslink port
Power Supply	110-240VAC
Power Consumption	75W Max
Operating Temperature	0 to +40°C (+32 to +104 °F)
Operating Humidity	10 to 90 % RH (non-condensing)
ESD	Air: ± 8KV, Contact: ± 4KV,
Dimensions	L430 x W220 x H44 mm
Weight	5kg

3. Panel Layout

3.1. Front View



1) LCM display: It displays the status of each channel in the matrix. Together with the front panel buttons, user will be able to set and view parameters of G416.

2) OUT SELECT: 1, 2...9, 0, ALL

3) IN SELECT: 1, 2, 3, 4

Press OUTPUT m +INPUT n +ENTER, switch input n to output m

4) ALL button: Press ALL + INPUT n +ENTER, switch input n to all outputs

5) Lock button: By holding this button for more than 3 seconds, all the front buttons will be locked and stop working, and by holding it more than 3 seconds again, the front buttons will get unlocked

6) Press buttons RES + OUTPUT m + NEXT + ENTER with guide of front LCM display to change output resolution of OUTPUT m

7) Press buttons EDID + INPUT n + NEXT + ENTER with guide of front LCM screen display to change the EDID mode of INPUT n

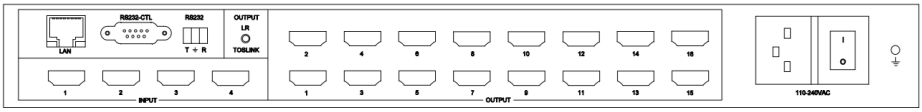
8) SAVE button: Press SAVE+ OUTPUT m +ENTER, save current routing and screen layout to layout m

9) RECALL button: Press RECALL+ OUTPUT m +ENTER, load layout m for current display

10) INFO button: By pressing the INFO button, front LCD panel will loop display IR ON/OFF, RS232 Baud Rate and IP parameters etc.

11) IR: IR receiver

3.2. Rear View



1) LAN control (TCP/IP or Web Control)

IP address: 192.168.0.247

Submask: 255.255.255.0

Gateway: 192.168.0.1.1

Port: 23

Web login account: admin

password: admin

2) RS232-CTL

Baud Rate: 9600

3) RS232-Phoenix

Baud Rate: 9600

T: Main Unit -> PC, G: Ground, R: Main Unit <- PC

4) Input and output

4 HDMI inputs,16 HDMI outputs,1 LR/Toslink (Spdif-Optical) audio output

Note: The audio output can be switched between IN1, IN2, IN3, IN4 via RS232 command or PC control software

4. Application

1) General Seamless Matrix Switcher, 4 inputs, 16 outputs. Users can also set multiview outputs as needed

2) One input across the whole Video Wall: 3x3, 3x4, 3x5, 4x4 etc.

3) Two or more Video Walls with one input source across the whole wall and standalone outputs. The number of screens cannot exceed 16.

4) One Video Wall with up to 4 inputs displayed simultaneously. The number of screens cannot exceed 12, please refer to the limit below.

5) One Video Wall with up to 4 inputs displayed simultaneously, and standalone outputs.

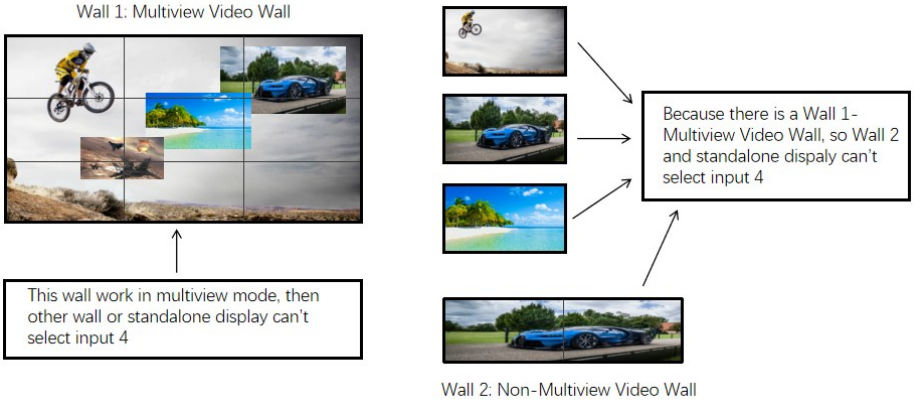
5. Limitation

1) There can be 4 groups of multiview display: 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 and output 13,14,15,16 can be the fourth group. If any output of a multiview group is enabled as multiview mode, the other three will display the same content and output at the same resolution.

2) If a user wants to display multiview video on a video wall, he must enable multiview function on output 13 and control the multiview layout on output 13 for the video wall multiview layout.

3) If a video wall works in multiview mode, then input 4 can't be a source for standalone output display or non-multiview video wall display.

4) If a video wall works in multiview mode, the maximum screen number is 12, because output 13,14,15,16 needs working in multiview mode and can't be the member of video wall outputs.



Output resolution list

Hex Index	Output Resolution	Hex Index	Output Resolution
00	4096x2160p 60Hz	0C	1920x1080p30 Hz
01	4096x2160p 50Hz	0D	1680x1050p60 Hz
02	3840x2160p 60Hz	0E	1600x1200p60 Hz
03	3840x2160p 50Hz	0F	1360x768p60 Hz
04	3840x2160p 30Hz	10	1280x1024p60 Hz
05	3840x2160p 25Hz	11	1280x768p60 Hz
06	3440x1440p 60Hz	12	1280x720p60 Hz
07	2560x1600p 60Hz	13	1280x720p50 Hz
08	2560x1440p 60Hz	14	1024x768p60 Hz
09	1920x1200p 60Hz	15	USER
0A	1920x1080p 60Hz	16	AUTO
0B	1920x1080p 50Hz		

USER: Output resolution can be customised

AUTO: Unit will read the EDID of the screen and output the right resolution in the list above

6. PC Software User Guide

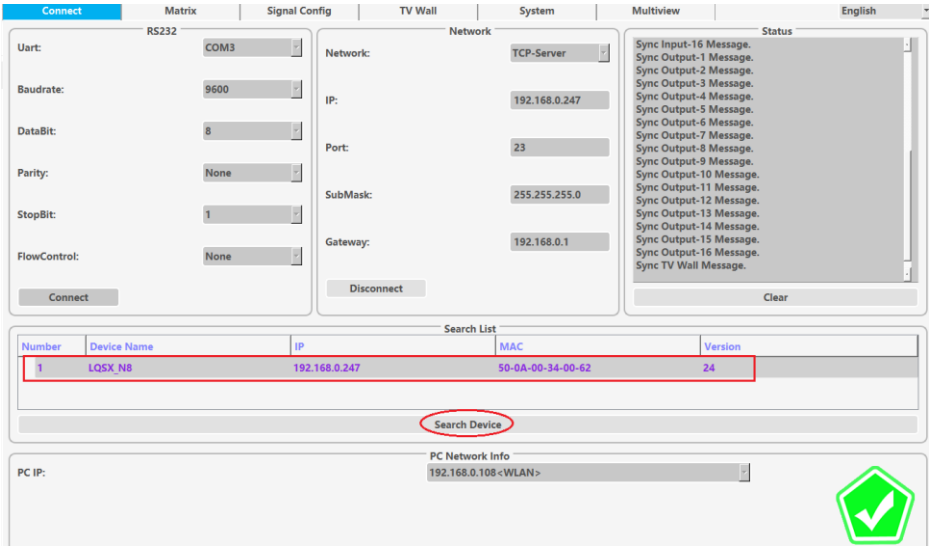
6.1. Connect tab

Please note:

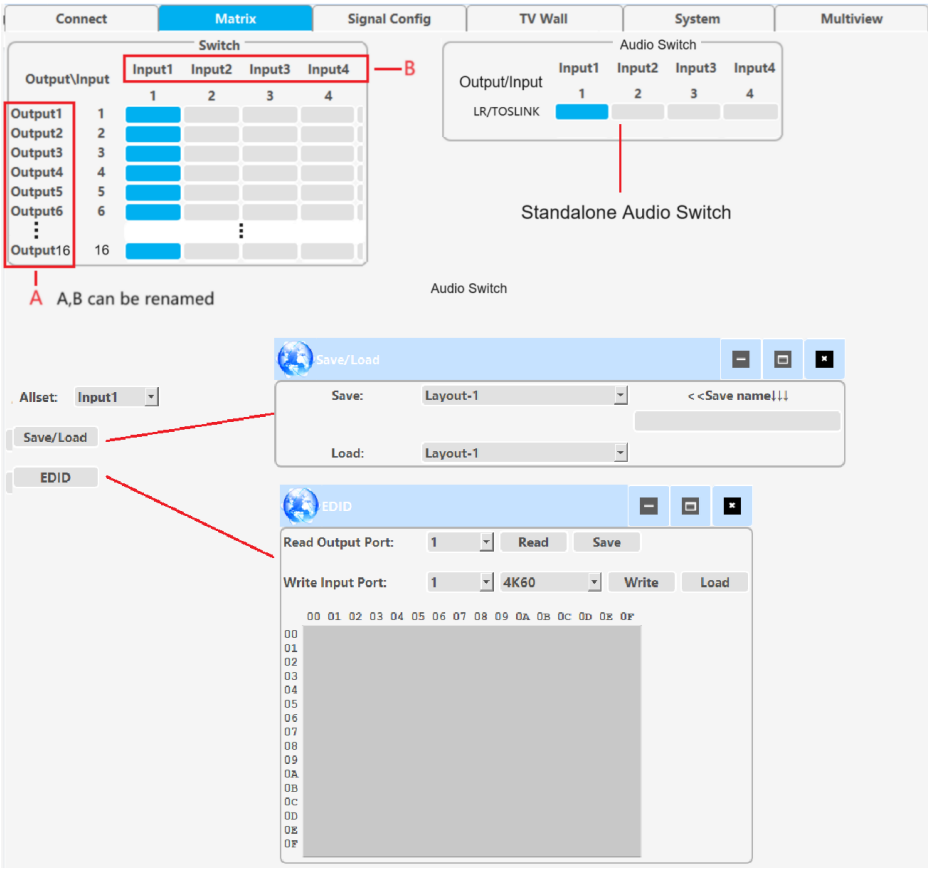
1. Use serial cable or Ethernet cable.

2. When using a serial port connection, the network port connection must be disconnected, and vice versa.

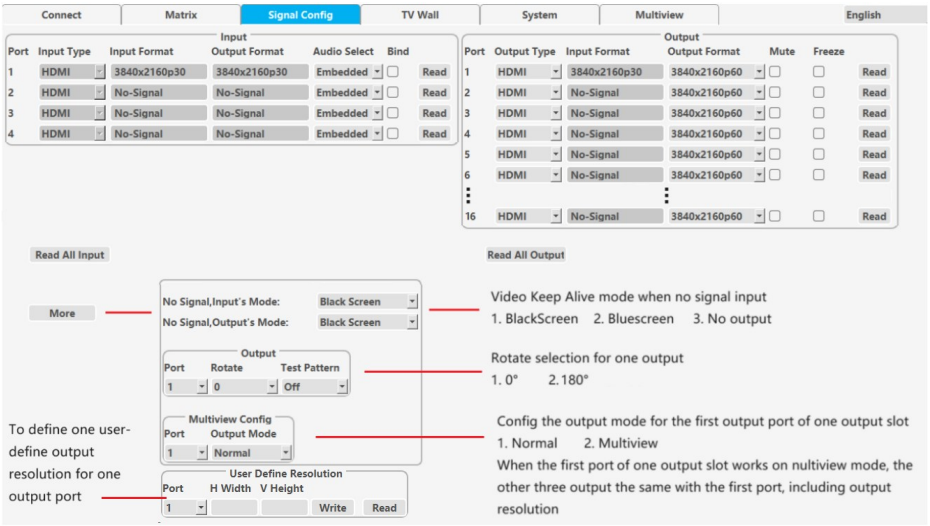
3. When connecting through the network port, you must first search for and select the device before connecting.



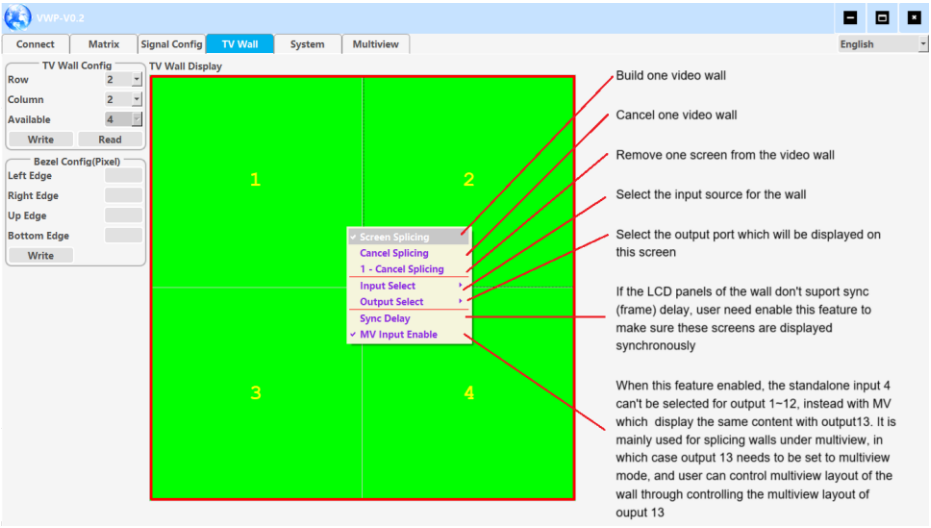
6.2. Matrix Switch Tab



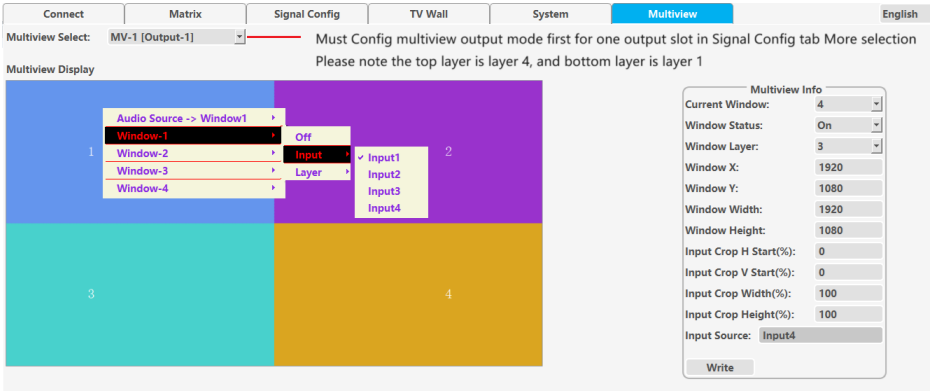
6.3. Signal Config Tab



6.4. TV Wall Tab

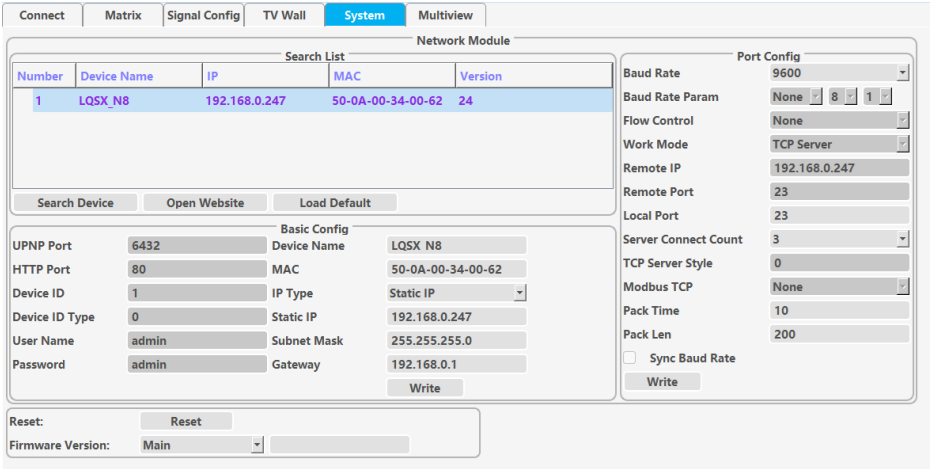


6.5. Multiview Tab



6.6. System Tab

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



7. Point to Point Display with LED Panel

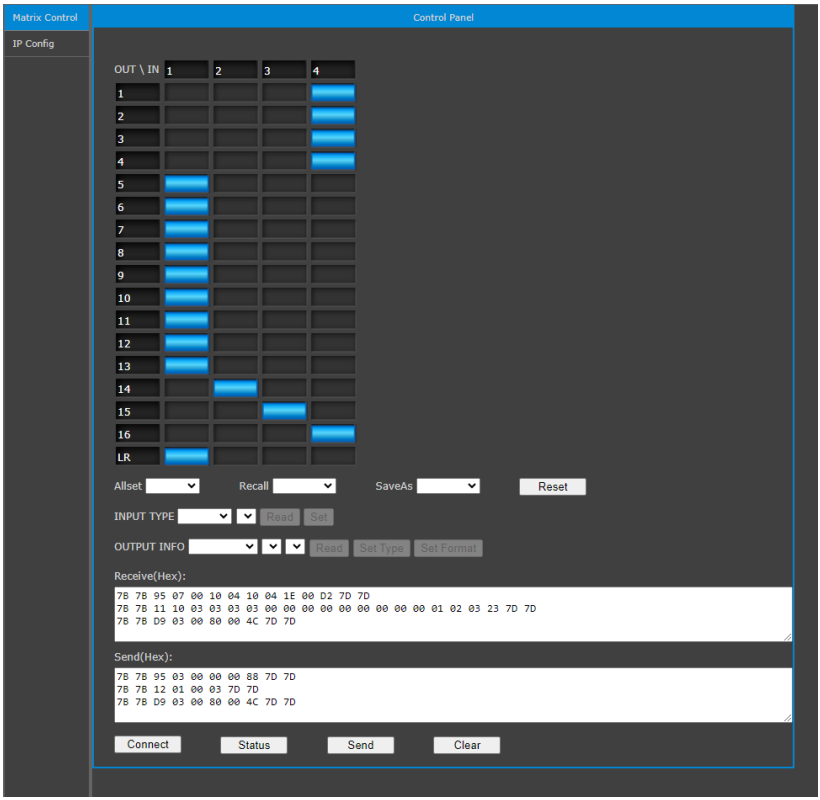
Step 1, connect input cable between source and one input port of the matrix switcher.

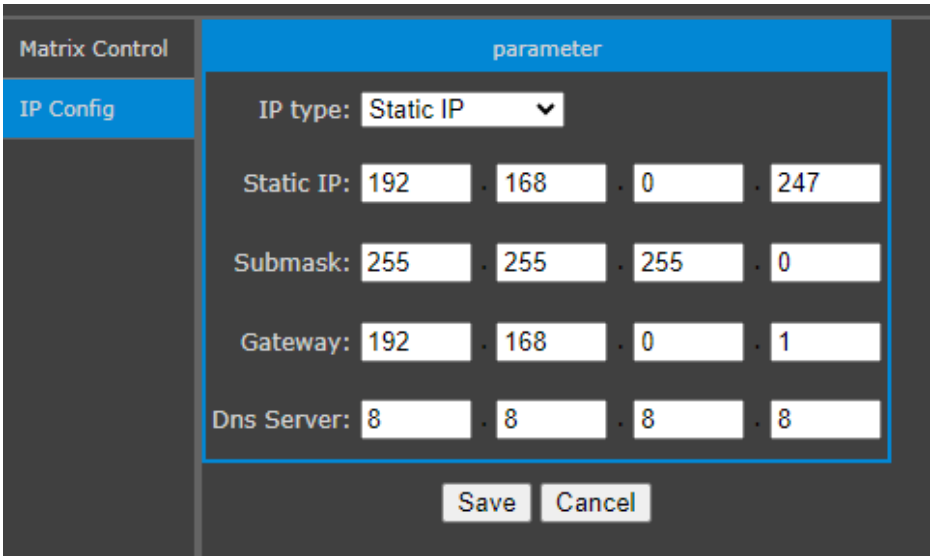
Step 2, connect the output cable between LED panel and one output port of the matrix switcher.

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 setting USER, it is necessary to configure the user define resolution first, and make the user defined resolution to match the physical resolution of the LED panel.

8. WebUI User Guide





User can control the Matrix/Audio of G416, save/recall layout, read information and configure IP address in the WebUI.

9. Remote Control User Guide

Press OUTPUT a + INPUT b + Enter to switch input b to output a

PTP: Display all inputs to all outputs respectively

ALL: Press ALL + INPUT a + Enter to switch input a to all outputs

SAVE: Press SAVE + OUTPUT a + ENTER to save current layout a

RECALL: Press RECALL + OUPTUT a + ENTER to load layout a

10. Command Line

RS232:

Baud Rate: 9600

Data bits: 8

Stop bits: 1

Parity: 0

Network:

IP address:192.168.0.247

Port address: 23

Submask:255.255.255.0

Gateway:192.168.0.1

Command Name	Commands	Note
Switch, Input, Output		
Single input and output switching	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
Multi input and output ports switching	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
Query output/input	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

Save Layout	7B 7B 02 01 ModeIndex 99 7D 7D	ModeIndex: Layout No.
Load Layout	7B 7B 03 01 ModeIndex 99 7D 7D	ModeIndex: Layout No.
Input: Query information	7B 7B 7F 02 Port C0 99 7D 7D	**See Note 1**
Output: Query information	7B 7B 7F 02 Port 80 99 7D 7D	**See Note 2**
Output: Set output resolution	7B 7B B1 03 Port 00 ResolutionIndex 99 7D 7D	Port: Ouput port No., 0 represents output 1 **See Note 3**
Output: Set user-define resolution	7B 7B A4 06 Port 00 H-WidthH H-WidthL V-HeightH V-HeightL 99 7D 7D	
Output: rotation	7B 7B BA 03 Port 00 RotateIndex 99 7D 7D	RotateIndex: 0: 0°；1: 180°
Output: Display mode for output port when no input	7B 7B D7 03 Port 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
Output: Set output Test Pattern	7B 7B D8 03 Port 01 TestPatternIndex CB 7D 7D	
Wall splicing		
Splicing one output port	7B 7B 90 06 Port 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

Set bezel for one output port	7B 7B 91 06 Port 00 LeftBezel RightBezel TopBezel BottomBezel 99 7D 7D	
Set sync delay flag	7B 7B 92 03 Port 00 Sync-delay 99 7D 7D	Sync-delay = 1, Sync (Frame) delay for the video wall enabled
MV function enable allowed for video wall	7B 7B A5 01 MVInputEn 99 7D 7D	MVInputEn = 1, The input source selection for splicing walls is: Input 1/Input 2/Input 3/MV MVInputEn = 0, The input source selection for splicing walls is: Input 1/Input 2/Input 3/Input4
Multiview		
Enable multiview function for one output	7B 7B A1 03 Port 00 01 99 7D 7D	
Disable multiview function for one output	7B 7B A1 03 Port 00 00 99 7D 7D	
Audio selection for one multiview port	7B 7B A2 03 Port 00 AudioSrc 99 7D 7D	AudioSrc：0：Mute；1：Window 1 ；2：Window 2; 3：Window 3 ；4：Window 4
Set multiview parameters for output port	7B 7B 9C 12 Port 00 WinCount WinID WinStatus LayerRank ViewXH ViewXL ViewYH ViewYL ViewWH ViewWL ViewHH ViewHL CropXRatio CropYRatio CropWRatio CropHRatio 99 7D 7D	**See Note 5**

Query multiview parameters for output port	7B 7B 9C 02 Port 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
Set display position and size for one window	7B 7B 9E 08 Port 00 04 WinID CropXRatio CropYRatio CropWRatio CropHRatio 99 7D 7D	
Set the layer level of one multiview window	7B 7B A0 05 Port 00 04 WinID LayerRank 99 7D 7D	4 means top layer
Query the layer level of one multiview window	7B 7B A0 05 Port 80 04 WinID LayerRank 99 7D 7D	
Window display and hiding	7B 7B A0 05 Port 00 04 WinID WinStatus 99 7D 7D	WinStatus：1: Open, 0: Close
Audio selection for beak away output		
Set Audio selection for beak away output	7B 7B D9 03 00 00 Input 99 7D 7D	Input=0, means Input1
Get Audio selection for beak away output	7B 7B D9 03 00 80 00 99 7D 7D	
System Command		
IP config	7B 7B 9B DataLength content 99 7D 7D	**See Note 6**
Factory reset	7B 7B AA 02 01 01 99 7D 7D	

Note 1

Input status	Port: Input port No.， 0 represents input 1 Matrix switcher will return as follows： 7B 7B 7F 16 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 Reserve1 Reserve2 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

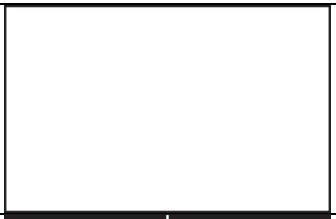
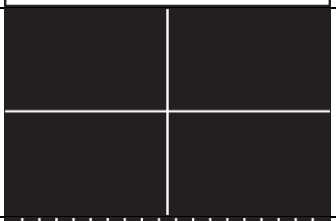
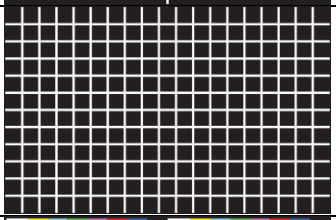
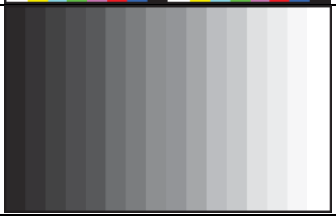
Note 2

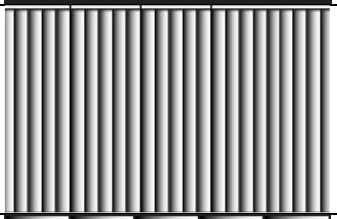
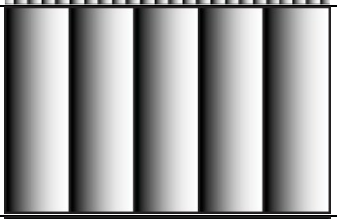
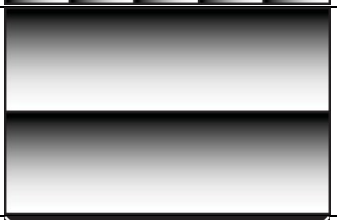
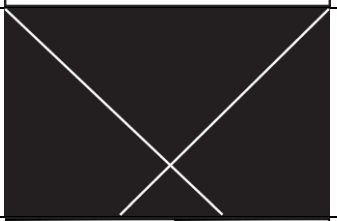
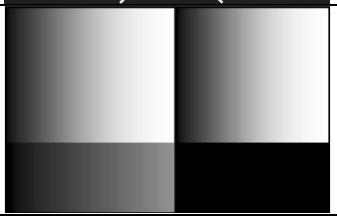
Output status	Port: Output port No.， 0 represents output 1 Matrix switcher will return as follows： 7B 7B 7F 16 Port 80 BoardType FuncFlag InType OutType IN_HresH IN_HresL IN_VresH IN_VresL IN_PorI IN_Frequency OutRes AudioMute Freeze Black Reserve1 Reserve2 Reserve3 Reserve4 Reserve5 Reserve6 99 7D 7D OutRes: the index of output resolution Attention, IN_HresHand other IN_ xx parameter here, mean the input parameters of the output channel

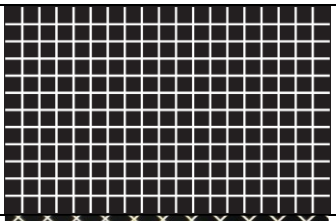
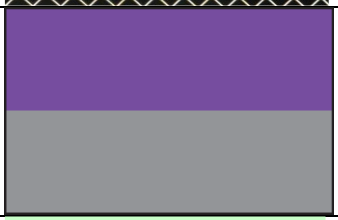
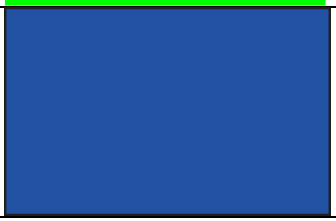
Note 3

	Output Cards
Index (Hex)	Resolution
00	4096x2160p60
01	4096x2160p50
02	3840x2160p60
03	3840x2160p50
04	3840x2160p30
05	3840x2160p25
06	3440x1440p60
07	2560x1600p60
08	2560x1440p60
09	1920x1200p60
0A	1920x1080p60
0B	1920x1080p50
0C	1920x1080p30
0D	1680x1050p60
0E	1600x1200p60
0F	1360x768p60
10	1280x1024p60
11	1280x768p60
12	1280x720p60
13	1280x720p50
14	1024x768p60
15	USER
16	AUTO

Note 4

Index		Picture	HEX Command
0	Off	video	7B 7B D8 03 outPort 00 00 99 7D 7D
1	White		7B 7B D8 03 outPort 01 00 99 7D 7D
2	Cross		7B 7B D8 03 outPort 01 01 99 7D 7D
2	Cross Hatch		7B 7B D8 03 outPort 01 02 99 7D 7D
3	Color bar		7B 7B D8 03 outPort 01 03 99 7D 7D
4	Horizontal Gray Scale		7B 7B D8 03 outPort 01 04 99 7D 7D

5	White Window		7B 7B D8 03 outPort 01 05 99 7D 7D
6	Multiple Ramp		7B 7B D8 03 outPort 01 06 99 7D 7D
7	Horizontal Ramp		7B 7B D8 03 outPort 01 07 99 7D 7D
8	Vertical Ramp		7B 7B D8 03 outPort 01 08 99 7D 7D
9	Diagonal Lines		7B 7B D8 03 outPort 01 09 99 7D 7D
10	Quater Ramp		7B 7B D8 03 outPort 01 0A 99 7D 7D

11	Cross Hatch		7B 7B D8 03 outPort 01 0B 99 7D 7D
12	Diagonal Cross Hatch		7B 7B D8 03 outPort 01 0C 99 7D 7D
13	SDI Pathological Pattern		7B 7B D8 03 outPort 01 0D 99 7D 7D
14	Two Level Green		7B 7B D8 03 outPort 01 0E 99 7D 7D
15	YUV420 out		7B 7B D8 03 outPort 01 0F 99 7D 7D
16	Off		7B 7B D8 03 outPort 00 00 99 7D 7D

Note 5

multiview parameters	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%

Note 6

IP config	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