

# AV-BOX VWC-46L Quick User Guide

## *4 Channel 4K/60 video wall controller*



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Version: 1.1

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<u>DCi/UHD</u> 4k/60/4:4:4	<u>HDMI 2.0</u>	<u>HDCP</u> 2.2/1.4	<u>HDR</u> Ready	<u>10-bit</u> High-end scaler	<u>Cadence</u> Film 3:2 / 2:2	<u>3D Motion</u> De-interlace	<u>Deep Color</u> xvYCC/12-bit
<u>Mosaic</u> Irregular wall	<u>Multi-Unit</u> Cacade	<u>Flexible</u> Aspect Ratio Bezel Correction	<u>Rotation</u> Landscape Protrait	<u>Loop Out</u> Daisy chain	<u>Control</u> IR/USB/RS232 /Ethernet	<u>Projector</u> Output overlap	<u>RoHS</u> CE FCC

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This device is designed and tested to the highest standards and backed by two years' parts and labor warranty. Warranties are effective upon the first delivery date to the end customer and are non-transferable. Warranty related repairs include parts and labor, but do not include repair of faults resulting from user negligence, special modifications, abuse (mechanical damage), shipping damage, and/or other unusual damages. The customer shall pay shipping charges when the unit is returned for repair. Manufacturer will pay shipping charges for return shipments to customers.

Manufacturer does not assume responsibility for consequential damages, expenses or loss of revenue, inconvenience or interruption in operation experienced by the customer. Warranty service shall not automatically extend the warranty period.

User can pay extension fee to extend the warranty period. Please contact us for more details. In the event that a product needs to be returned for repair, inform manufacturer and ask for a Return Material Authorization number.

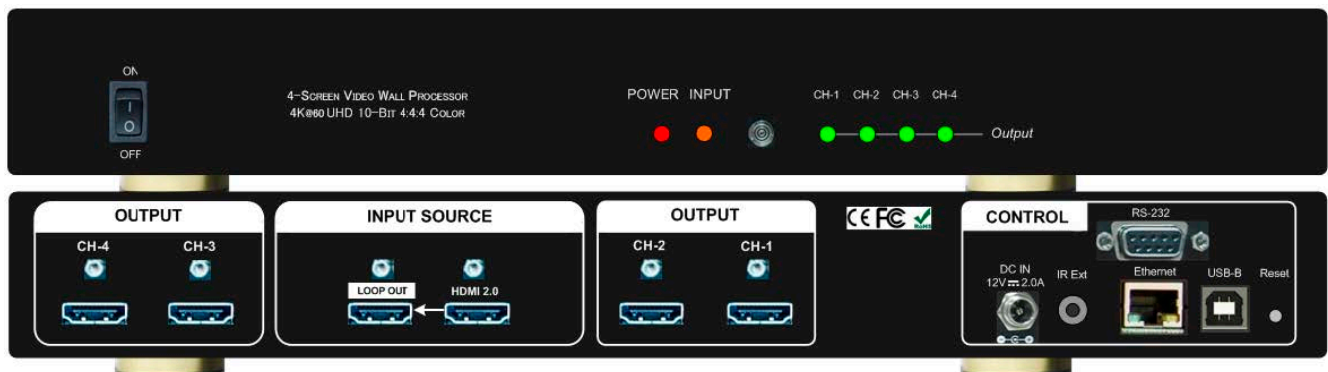
#### **FCC/CE statement**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential / commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Introduction

AV-BOX VWC-46L is 4 channel 4k/60 fps Video Wall controller. It is simplified version of VWC-46 with 1x HDMI 2.0 input, 1x HDMI 2.0 loop-out port for daisy chain connection and 4 synchronized HDMI outputs. Each output has independent image rotation/flip, scaling, cropping and color adjustment to allow great freedom in creating video wall with variable display scales and styles. Support pixel to pixel true 8k/4k video wall through 4x 4k input sources and 4x units of VWC-46L.

It is pure hardware, standalone system and easy-of-use. All operations can be executed through IR remote controller, USB, RS232 or Ethernet. No additional PC or appropriate software is required in the setup.



## Features

- ✧ Each unit consists of below I/O ports.
  - Input: 1x HDMI 2.0b, HDCP: 2.2/1.4
  - Output: 4x HDMI up to 1080P & WUXGA
  - 1x HDMI 2.0 loop out port from adjacent HDMI input port for daisy chain connection.
- ✧ Support up to 4096x2400@60Hz input source.
- ✧ Inputs support HDCP 1.4/2.2. Outputs support HDMI 1.4.
- ✧ Loop-through port for multiple units cascade in any scale display.
- ✧ Cropping ZOOM range up to 15 and pixel base position alignment up to  $\pm 900$  pixels in H&V directions for flexible image capture, cropping, position alignment, bezel compensation & asymmetric video wall.
- ✧ Set overlapped output up to 900 pixels for projector edge blending application.
- ✧ Flexible aspect ratio adjustment in each edge up to  $\pm 900$  pixels.
- ✧ Independent Image color adjustment in each channel.
- ✧ Independent image rotation and flip in each channel for variable landscape, portrait and irregular video wall.
- ✧ Selectable output resolution and programmable EDID to optimize video quality.
- ✧ Frame-Lock function to get perfect synchronization among output channels.
- ✧ Support HDR 10 high dynamic range color input signal.
- ✧ Easy setup via IR, USB, RS232 & Ethernet. No PC is required.
- ✧ Ready for 24/7 working environment.

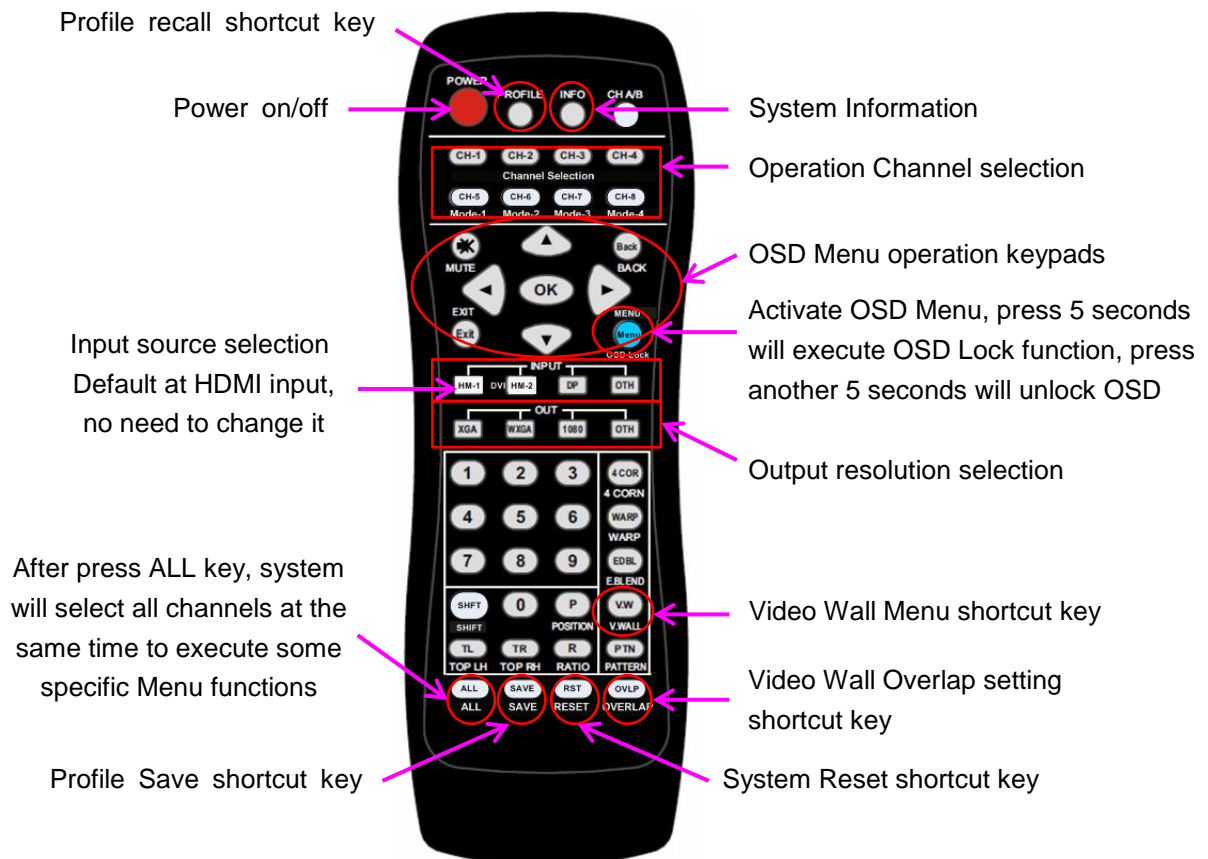
## Quick User Guide

### Content in the packing box

- The VWC-46L Quad Channel Video Wall Controller
- 1x RC-400 IR Remote Controller with battery
- 1x IR Extending Receiver with 1.8m cable
- 1x AC Main Power Cord.
- 1x DC 12V Power Supply Unit
- Mounting Rack with screw (Option)
- Please download UHD Wall Manager PC Tool at [www. av-box.ru](http://www.av-box.ru)

### How to Use IR Remote Controller

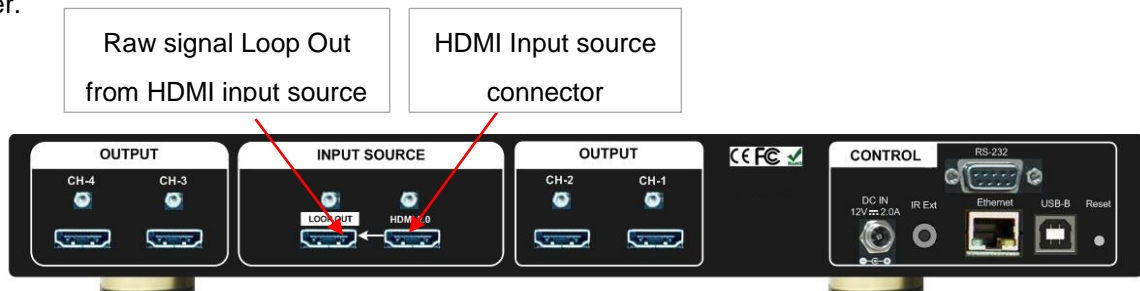
- IR remote controller has all the functions for the operation of VWC-46L.
- IR receiver is on Front Panel. One 3.5ø mm audio connector for IR extender is located at Back Panel of VWC-46L. 1.8m IR extension cable is equipped in the packing. User can add audio cable to extend the distance up to more than 20 meters.



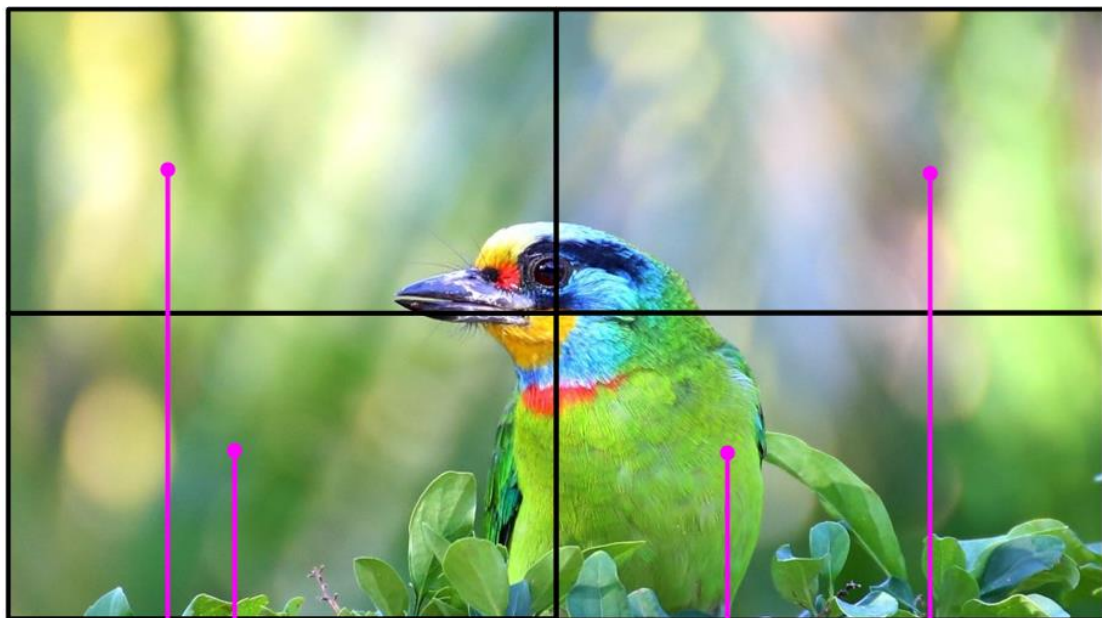
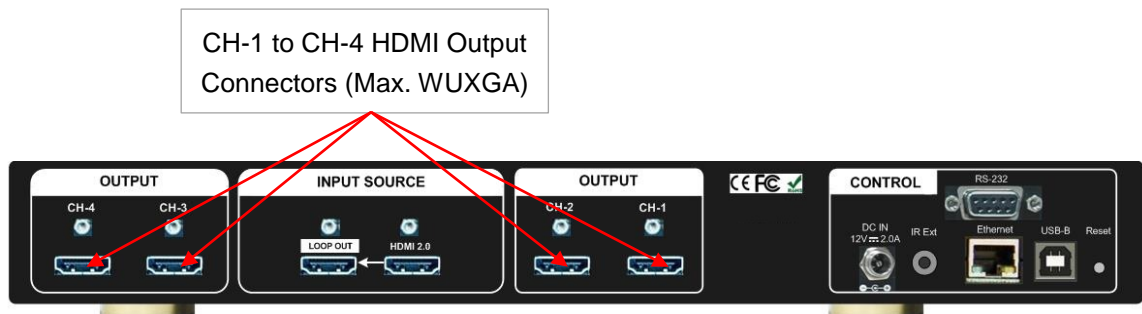
## System Setup Procedures

### 1 Step 1 – Connecting The Inputs

Please connect signal source to HDMI input port. User can also apply DVI-D signal but required DVI to HDMI adapter.



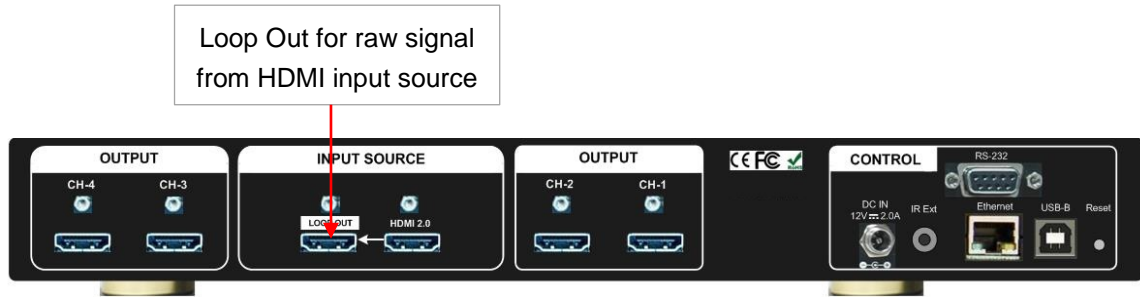
### 2 Step 2 – Connecting The Outputs



No specific connection sequence is required. It can be set by Video Wall [PAN] menu.

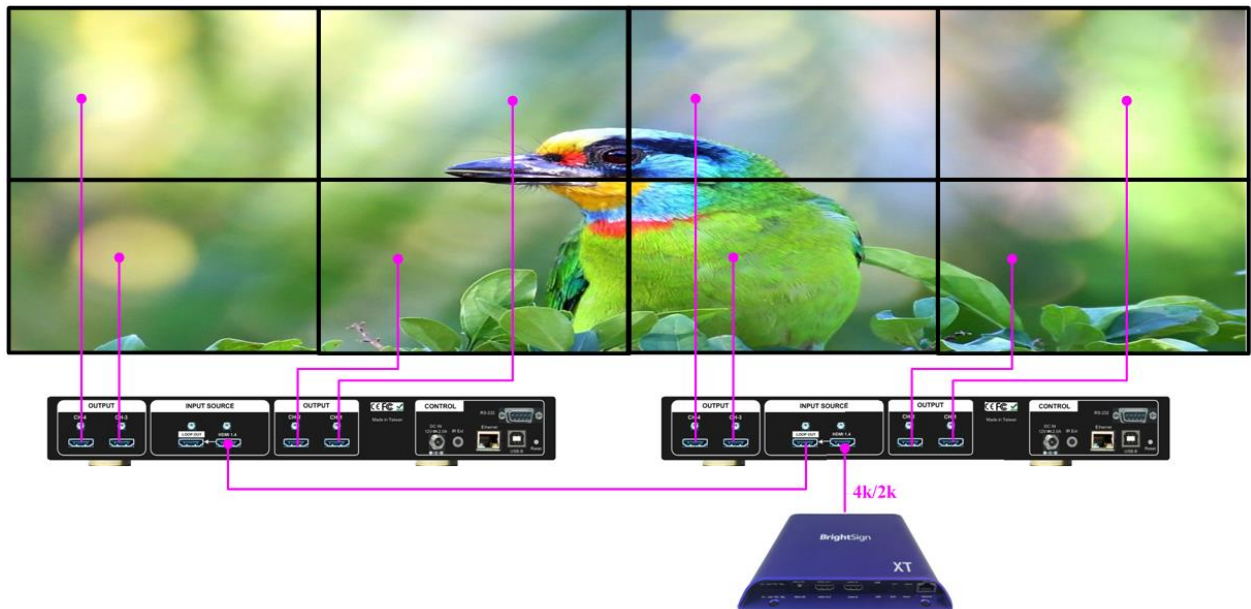


### 3 Step 3 – HDMI Loop Out for Multiple Unit Connection and monitoring



Loop out port provides the same raw signal from HDMI input. It supports up to 4k/2k @60Hz.

- 3.1 User can connect any Loop Out signal to any HDMI input port in the next processing module or other devices.
- 3.2 User can connect up to 10 units of VWC-46L through daisy chain connection. The daisy chain connection number is related to source resolution and the quality of HDMI connection cables—poor cable will have less connection number and good cable can connect more units in daisy chain connection.



- 3.3 If Loop out port has not been used, user can use loop out port to connect with monitoring system in control room to see the status of the video wall content.

## 4 Step 4 – System Connection and Power On

- 4.1 Poor quality HDMI cable and signal source will affect the connection distance and may cause signal noise.
- 4.2 To ensure all cables are connected correctly, it is recommended to use locking cables.



- 4.3 Complete video wall system should be connected to one power Distribution Box with proper grounding. Power on the system after finishing all connections to avoid system damage by floating voltage among devices.
- 4.4 When VWC-46L power is switched on, the booting time is about 19 seconds and the Input & Output LEDs on front panel will stay “Lighted” for the channel with correct input source and output monitor connections after finishing booting process.

## 5 Step 5 - System setting: Box ID, RS232, Ethernet

- 5.1 The system setting for Box ID, RS232 and Ethernet should be set through CH-1 or CH-2. Please make sure to connect monitor to CH-1 or CH-2 to see the OSD and execute system setting.
- 5.2 User can connect VWC-46L directly from Ethernet. The default static IP address is 192.168.0.100. After Ethernet connection, user can change the IP address, Box ID or RS232 for further operation.
- 5.3 When multiple units are used in the same environment, user can set different IP address or Box ID for each unit so that user can do independent control to each AV-BOX without interference.
- 5.4 Box ID range is from #0 - #99. When user uses remote controller to control the system through OSD, the maximum ID setting for remote controller is #0 - #9.

### 5.5 Remote Controller

- User can control individual AV-BOX through below method when all boxes or IR extender receivers are installed together.
  - ✓ Press 851 number key on remote controller will lock all other AV-BOX OSD menu except ID #1 AV-BOX. User can see flashing LED on the Front Panel for the units with OSD locked.
  - ✓ Press 853 will only unlock ID # 3 AV-BOX for further OSD operation.
  - ✓ Press 850 will unlock all AV-BOX OSD menu. Remote controller can access to all AV-BOX simultaneously.

### 5.6 RS232 setting

- User can set RS232 baud rate between 9600 & 115200 for different controller system.

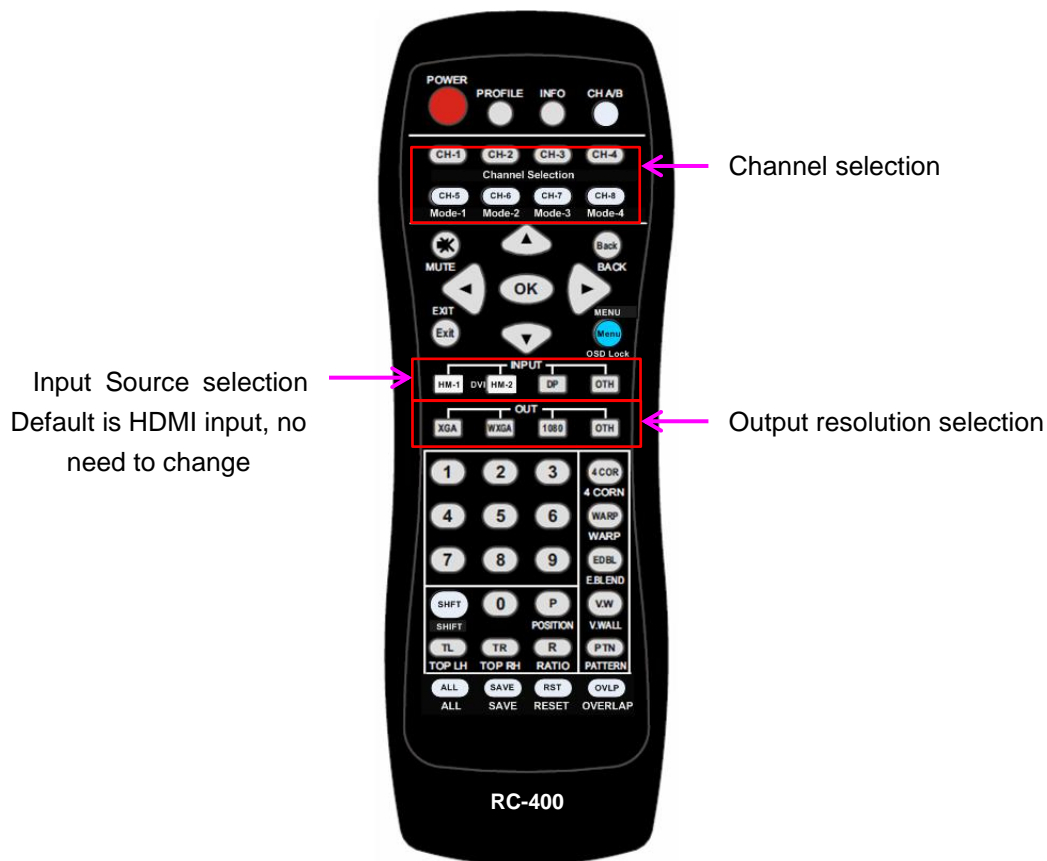
### 5.7 Ethernet

- User can connect all AV-BOX and PC in one Ethernet (or WiFi) Router (or switch hub) LAN ports and set at DHCP or different Static IP address for each Box. User can check IP address under [Ethernet] menu. Then connect AV-BOX through Chrome or Explorer by IP address to open WebGui for further operation.
- UHDWall Manager PC tool is also provided to control each AV-BOX independently through USB or Ethernet connection.



- If user connects PC to the same Router and set Router with DHCP mode, PC can access to AV-BOX directly. If PC is not connected with the same Router, user needs to set PC with the same Domain Segment as AV-BOX for Ethernet connection.
- Web Server function is also available, Please contact us for more details.

## 6 Step 6 - Input Source / Output Resolution selection & LED Indicators



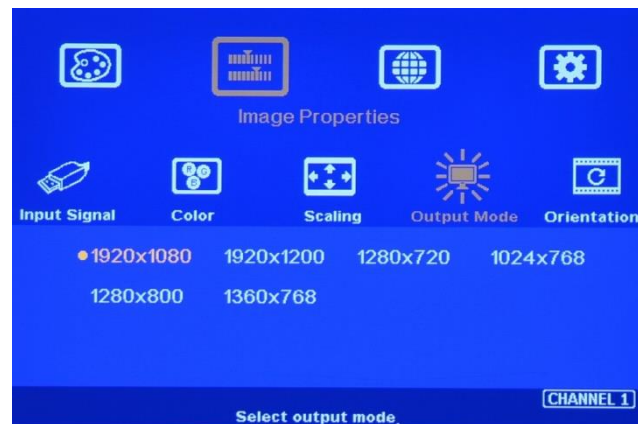
Power LED indicator.  
Red: power connected, Green: Power on, Flashing: OSD Lock

If Input Source is connected, Green LED will light up

If Monitor is connected, Green LED will light up

- VWC-46L has only one HDMI input port. System default input is HDMI. No need to change.
- The output resolution selection will apply to two output channels at the same time. For instance, CH1 & CH2 is at the same output setting. User can select CH-1 or CH-2 to do output resolution selection. Once the resolution is selected, it will apply to both CH-1 & CH-2 outputs. The same output resolution setting will be applied to CH-3/CH-4.

- Output resolution list: 1920x1200, 1920x1080, 1280x720, 1360x768, 1280x800, 1024x768
- User can select output resolution from remote controller. When press [OTH] key, it will show resolution of 1920x1200, 1280x720 and 1360x768 continuously. After release from keypad, the system will apply the selected resolution to the selected output port.



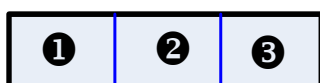
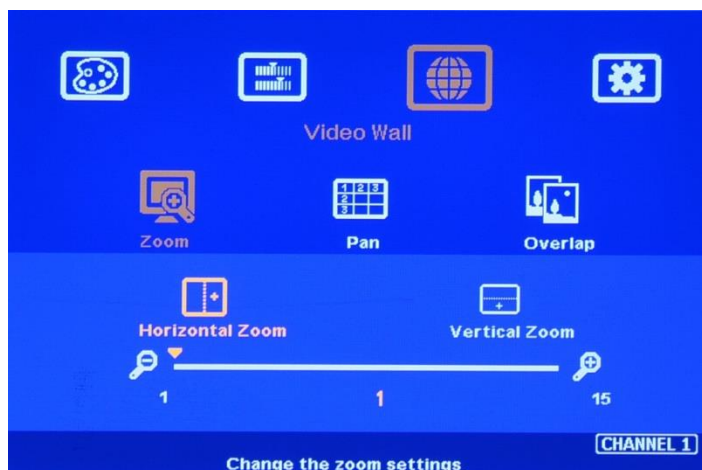
- User can also get into OSD menu to do output resolution settings: [Image Properties]→ [ Output Mode]→ Select output resolution
- Input green LED will light up when each processing module has detected input signal.
- Green LED will light up when VWC-46L has detected the monitor in each output.
- Power LED:
  - ✓ Red: Power connected
  - ✓ Green: Power on
  - ✓ Red flashing at 1" interval: OSD lock through Menu key
  - ✓ Red flashing at 0.5" interval: Box ID lock through remote controller 85x ID # control key
- All default output resolution is 60Hz, RGB 4:4:4 format and progressive. When input source is 50Hz, the output will be also set at 50Hz to reduce the artifact in frame rate conversion.
- Input resolution is determined by signal source. VWC-46L can support non-VESA standard input timing.
- User can click [Info] key to get system information and see input / output signal resolution.

## 7 Step 7 – Conventional Video Wall Settings

Press [Video Wall] hotkey on Front Panel or Remote Controller to activate [Video Wall] menu. WebGui and UHWall Manager PC tool are available for Ethernet configuration.

### 7.1 [Zoom]

Use [Zoom] to split the display in horizontal and vertical directions. AV-BOX will cut the image into different sections. Maximum split image is 15 in both horizontal and vertical directions.



*For 3x1 displays*

*Horizontal Zoom= 3, Vertical Zoom = 1*

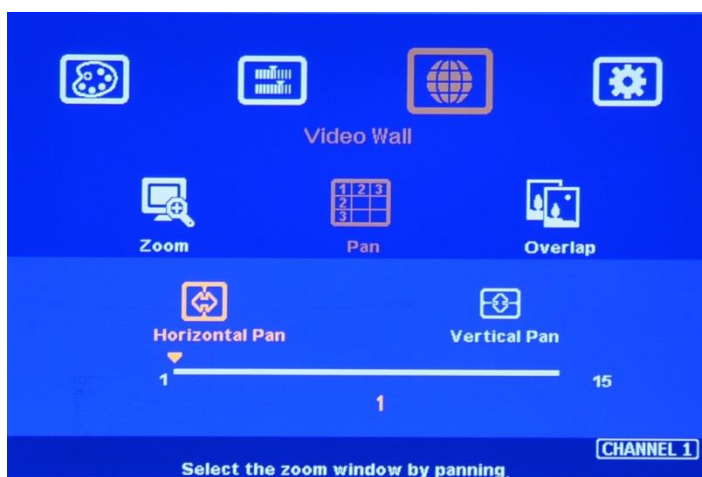


*For 3x3 displays*

*Horizontal Zoom = 3, Vertical Zoom =3*

### 7.2 [Pan]

[Pan] will assign the location of each split image in the display in both horizontal and vertical directions. Horizontal direction is counted from Left to Right and Vertical direction is counted from Top to Bottom.



In the case of 3x3 display, Pan settings are as below:

①	②	③
④	⑤	⑥
⑦	⑧	⑨

*For No. ③ monitor:*

*Horizontal Pan = 3*

*Vertical Pan = 1*

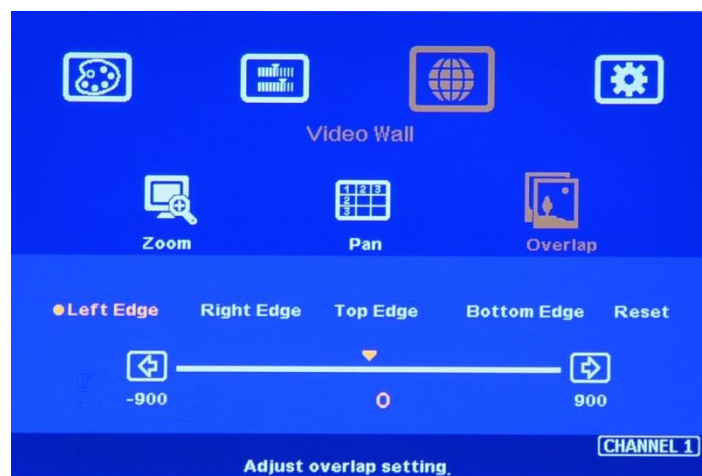
*For No. ⑥ monitor:*

*Horizontal Pan = 3*

*Vertical Pan = 2*

### 7.3 [Overlap] – Bezel Compensation and Position Alignment

[Overlap] adjustment changes the cropping area of the image so that image position in each monitor will be shifted. It can compensate Bezel Size of the monitor and correct misalignment in monitor installation. If overlap value is decreased, each monitor will crop less image area and cause [zoom in] (enlarged) effect. If overlap value is increased, each monitor will crop more image area and cause [zoom out] (shrunk) effect. User can also use this function to shift the whole image location for irregular video wall and set overlap area for projector edge blending application.



- Maximum [Overlap] adjustment value is 900 pixels in all directions.
- User can see the image and select Edge to adjust [Overlap] value for Bezel compensation.
- [Overlap] adjustment can also compensate the position mis-alignment while monitor installation.
- User can reduce [Overlap] value to stretch the image outside video wall (some image will be missing) or draw image inside video wall with Black blanking area at the edge through increase [Overlap] value. This function can adjust the aspect ratio of the content to match required aspect ratio of the video wall. Please see more details in [Flexible Aspect Ratio Adjustment] section.

## 8 Bezel Compensation

- 8.1 Video Wall [Overlap] function can adjust the cropping area resulting image position shift.
- 8.2 User can see the image and reduce [Overlap] value to enlarge the image to the center line between two bezels and achieve monitor bezel compensation.
- 8.3 User can also calculate the pixels number for bezel compensation based on the video wall dimension and bezel size. If the video wall active display area is 360cm in width and the input source is 3840, then the pixel number for each centimeter is  $3840/360=10.67$  pixel/cm. If the bezel size is 12mm in one edge, then user can decrease Overlap value  $10.67*1.2=12.8$  (13) pixels to do bezel compensation for that edge (to enlarge the image 13 pixels at that edge).
- 8.4 User can apply the same method to correct the position mis-alignment in monitor installation or set image position for irregular video wall.

## 9 Irregular / Asymmetric Video Wall Settings

### 9.1 Introduction

- Asymmetric video wall can be created by rotating monitor installation direction or position. User can crop different area image for each monitor, rotate image direction and adjust image position through VWC-46 to achieve it.

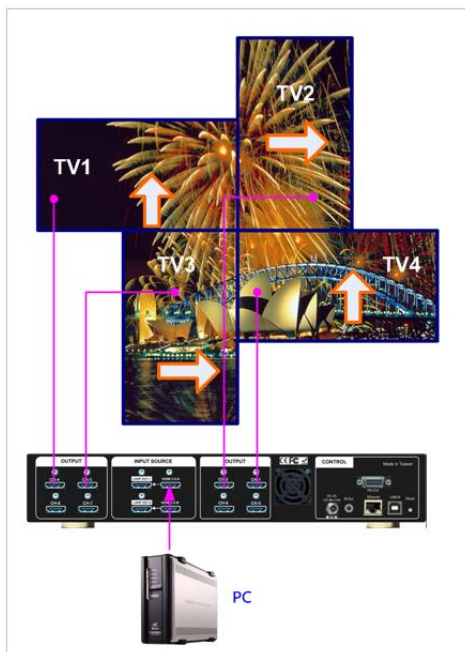
*Note: Image flip and rotation are only available when input resolution is under 4k/2k @30Hz.*

- User can use monitors with different dimensions, bezel size and resolution as display devices. No data base for monitor is required and it allows user to have installation position deviation. All of these factors can be corrected by AV-BOX video wall settings.
- VWC-46 can only rotate the image at 90/180/270 degrees. The monitors need to be installed at landscape or portrait position. If users want to install monitor at other rotation angle, VWC-43 model should be used.

### 9.2 Wind-Mill Asymmetric Video Wall Setup Procedures

- **System connection**

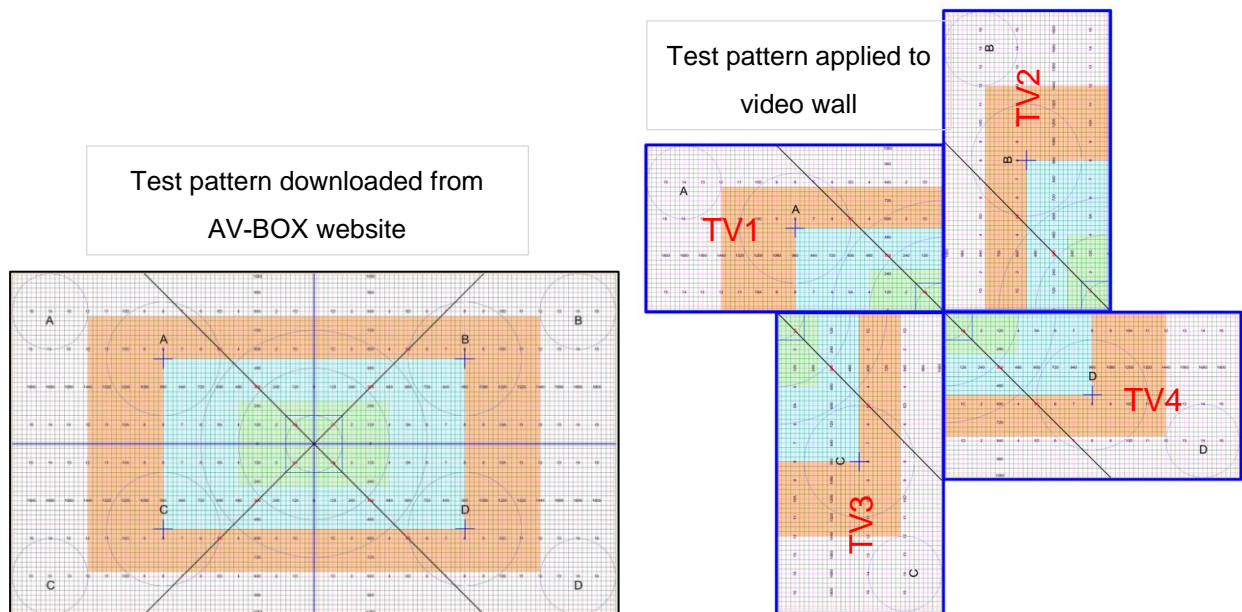
Below example is for 4 monitors only. User can apply the same setup procedures for up to 8 monitors from one VWC-46L.



- Monitor can be with different bezel size, screen dimensions, and resolution.
- All monitors can be installed at 90 / 180 / 270 degree display direction.
- Each monitor can be connected with any output port. (In this example, CH1→ TV1, CH2→ TV2, CH3→ TV3, CH4→ TV4)
- User can select any signal source to display on video wall.

- **Apply test pattern from signal source**

Below test pattern should be applied as signal source for easy setup. Please download from below website: <http://av-box.ru/upload/iblock/1ac/1ac38afde24699744442c423812a7689.png>



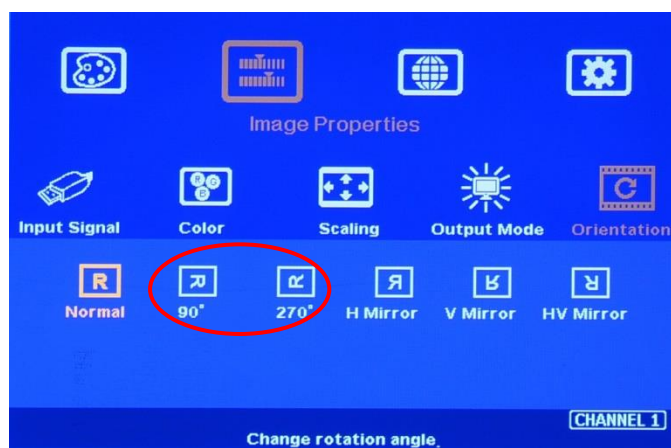
➤ **Split the content by [Zoom]**

- ✓ Set [Horizontal Zoom] = 2, [Vertical Zoom] = 2 in all channels.
- ✓ If TV2 & TV3 dimension is small, user can set TV2 & TV3 [Horizontal Zoom]=4 and [Horizontal Pan]: TV2=3, TV3=2, so that user can reduce the image position adjustment range.

➤ **Assign image location by [Pan]**

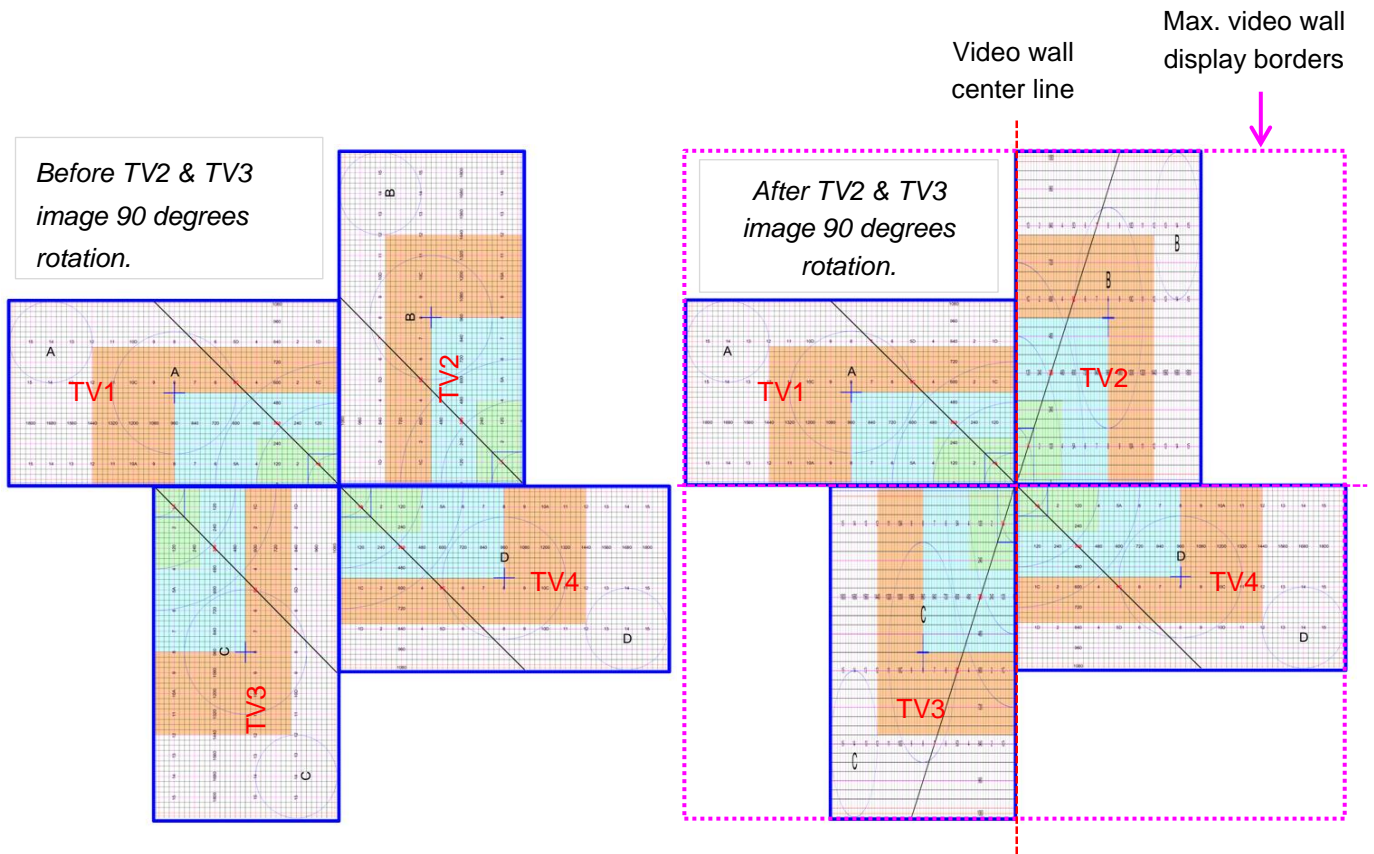
- ✓ Set [Horizontal Pan]: TV1=1, TV2=2, TV3=1, TV4=2
- ✓ Set [Vertical Pan]: TV1=1, TV2=1, TV3=2, TV4=2

➤ **Image rotation**

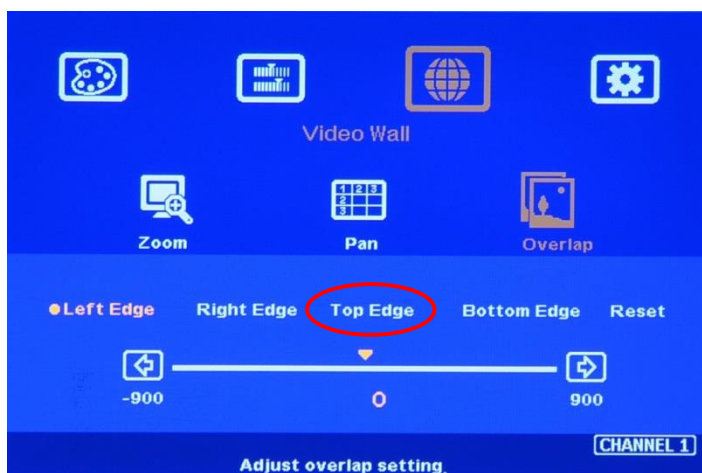


Use [Orientation] menu to rotate images in TV2 and TV3 to display the same image direction.

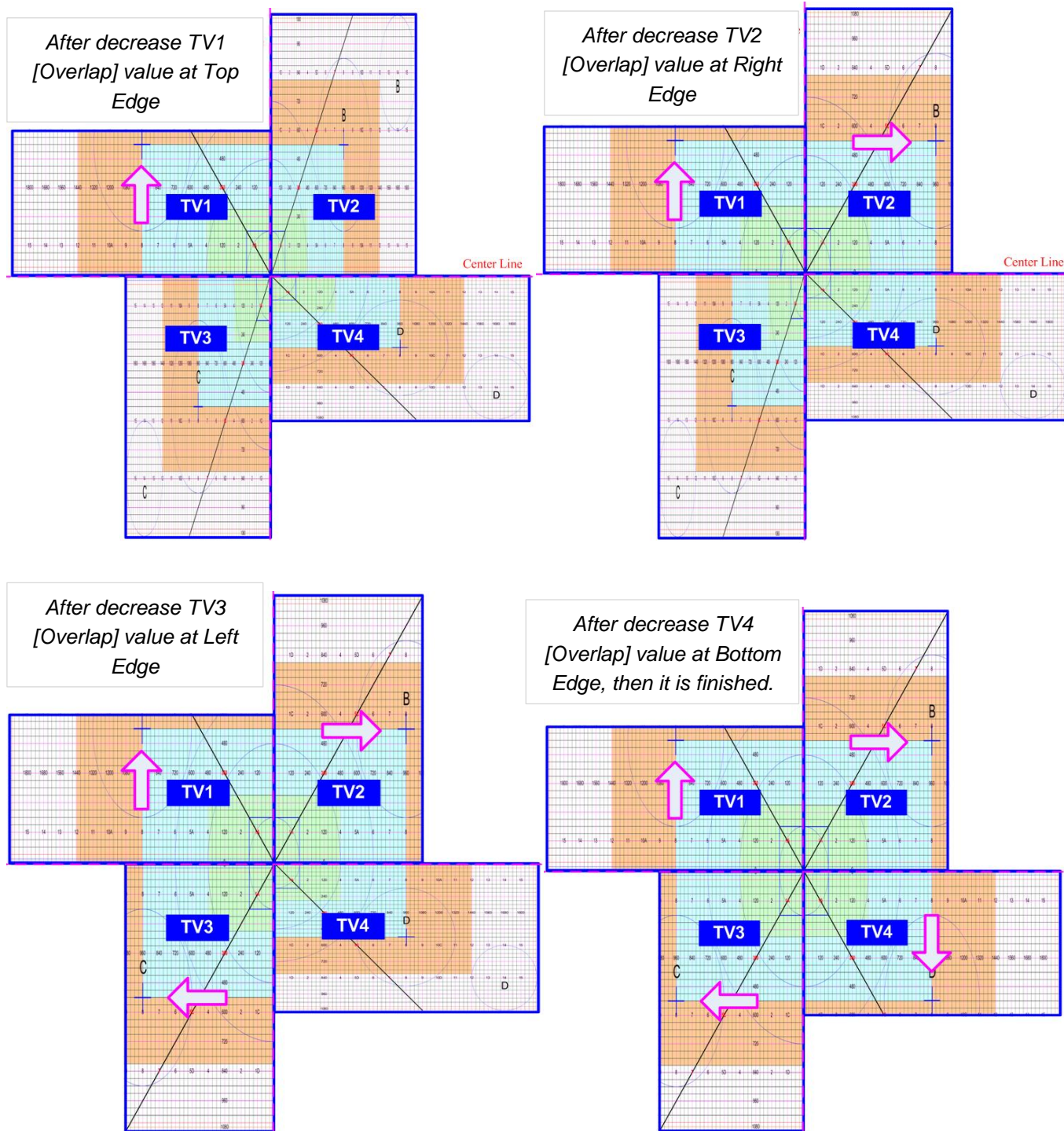




- **Set standard position as reference in horizontal and vertical directions**
  - ✓ User should determine Horizontal & Vertical image sizes and reference position so that all monitors have criteria for image position adjustment.
  - ✓ Usually, image display borders are the maximum active display borders in the video wall.
  - ✓ In the above example, the horizontal borders are decided by TV1 & TV4. Vertical borders are decided by TV2 & TV3.
  - ✓ User can decide video wall display center through test pattern. It can be asymmetric.
- **Adjust image position by [Overlap] menu to finish video wall settings**



- 1 [Overlap] is to change image capture range.
- 2 Decrease value in Top Edge of TV1 will stretch top edge of TV1 to match image position of TV2.
- 3 For TV2 adjustment, user needs to adjust Overlap value based on the actual image direction but not based on OSD direction. In this example, user needs to stretch Right Edge to match TV4.



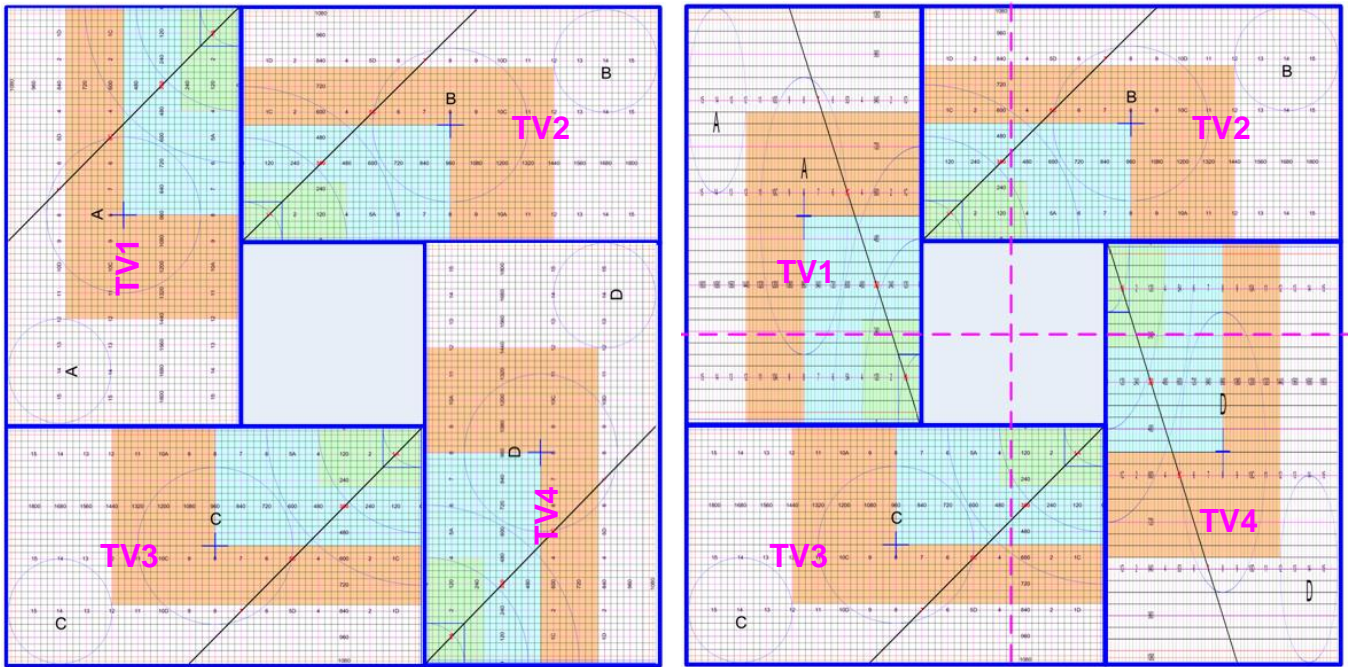
### 9.3 Square Asymmetric Video Wall Setup Procedures

- Step 1: Video Wall settings for all channels  
 [Zoom]: H=2, V=2  
 [Pan]: TV1: H=1, V=1, TV2: H=2, V=1, TV3: H=1, V=2, TV4: H=2, V=2
- Step 2: Apply Test Pattern and Rotate TV1 & TV4 images at 90 degrees

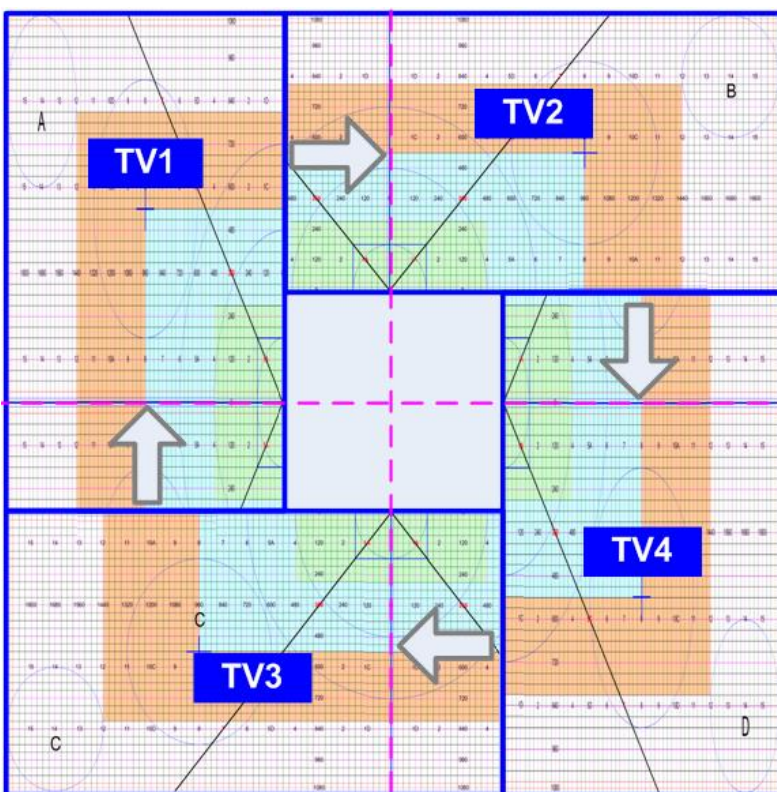
*Original Image after applied test pattern*

*Image after image rotation in TV1 & TV4*





- Step 3: Determined image center, marked with paper tape.
- Step 4: Set standard Position Reference in horizontal and vertical directions



- ✓ Horizontal Position Reference is determined by TV2 & TV3 and Vertical Position Reference is determined by TV1 & TV4.
- ✓ Once user can line up the image center to Video wall center H&V lines, it can serve as Position Reference lines.
- ✓ Left figure shows the result after setting Horizontal and Vertical Position Reference (Move TV1 center line up, TV2 center line to Right, TV3 center line to Left and TV4 center line down—please see the arrow direction)

TV1: increase [Overlap] value in Bottom Edge to move Horizontal center line up to video wall center  
 TV2: increase [Overlap] value in Left Edge to move Vertical center line right to video wall center.  
 TV3: increase [Overlap] value in Right Edge to move Vertical center line left to video wall center.  
 TV4: increase [Overlap] value in Top Edge to move Horizontal center line down to video wall center.

- Step 5: Individual monitor position adjustment based on Horizontal and Vertical Position Reference resulting from the previous step 4.

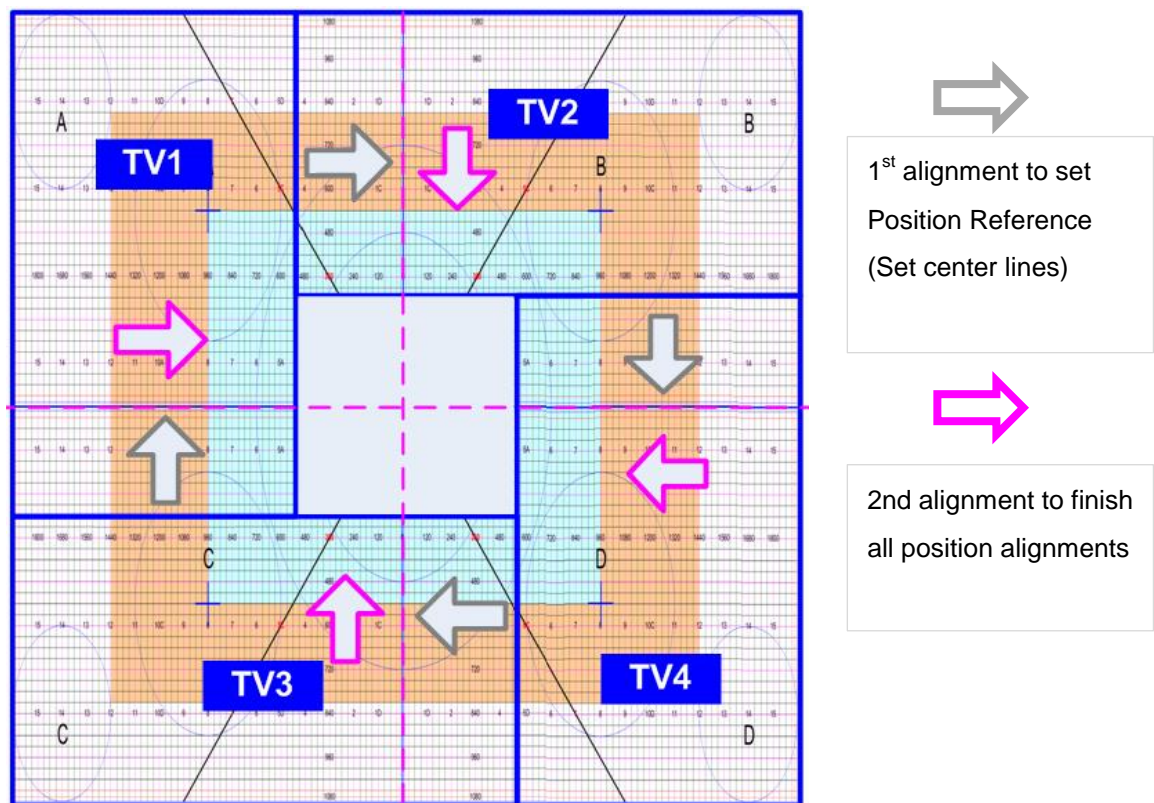
TV1: increase [Overlap] value in Left Edge and decrease [Overlap] value in Right Edge to align Vertical lines to match TV3

TV2: increase [Overlap] value in Top Edge and decrease [Overlap] value in Bottom Edge to align Horizontal lines to match TV1

TV3: increase [Overlap] value in Bottom Edge and decrease [Overlap] value in Top Edge to align Horizontal lines to match TV4

TV4: increase [Overlap] value in Right Edge and decrease [Overlap] value in Left Edge to align Vertical lines to match TV2

- Step 6: After final image position, all horizontal and vertical pattern can be matched together. The setup procedure is finished.

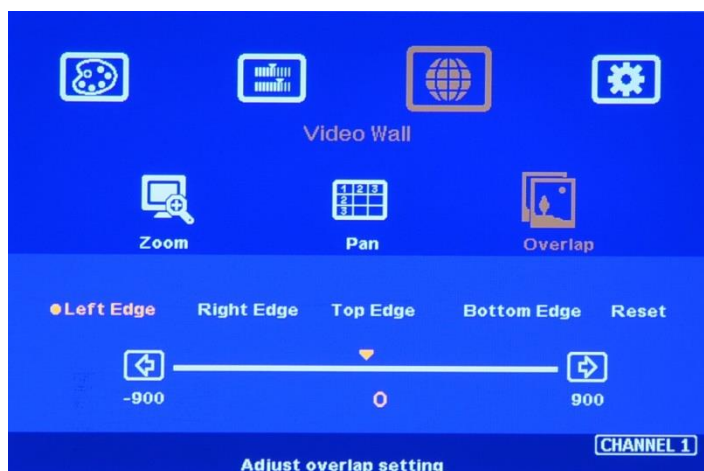
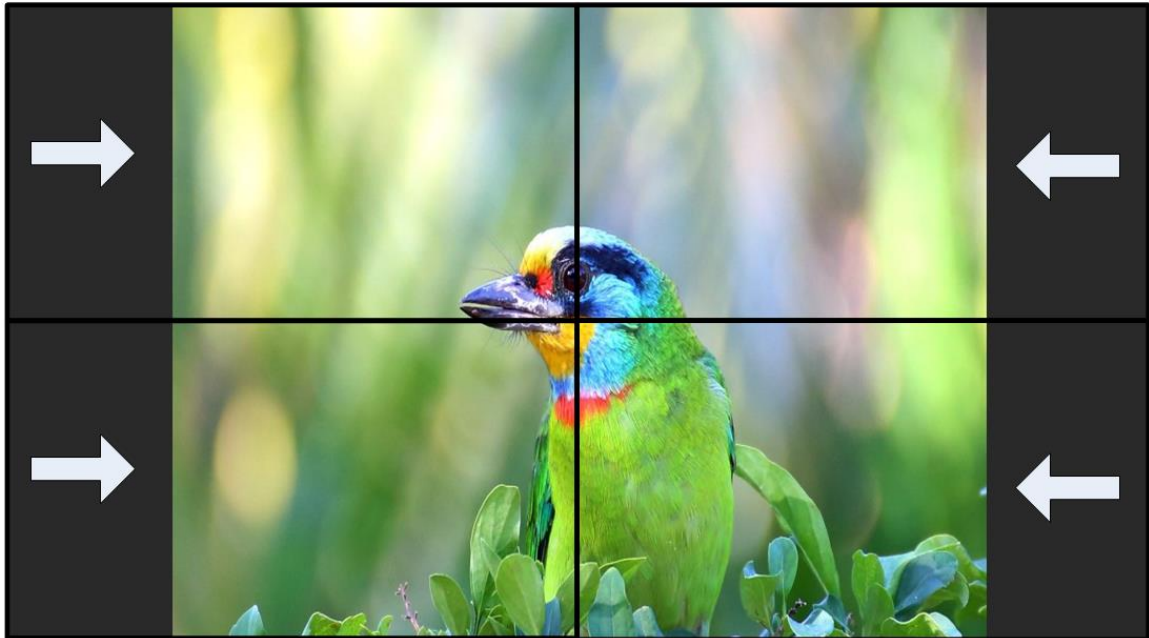


- Aspect Ratio and image distortion
- ✓ If the source content aspect ratio is not 1:1 in this Video Wall setting, the final image will have some distortion.
  - ✓ User can adjust source resolution and content aspect ratio to fix this issue
    - Set display EDID with 2160\*2160 with same as the aspect ratio of Video Wall.
    - Use PC as signal source with 2160\*2160 output resolution and apply content with 1:1 aspect ratio. Customized output resolution setting in PC may be required.
  - ✓ If source resolution and content doesn't match the above conditions, user can adjust the display aspect ratio in video wall settings to reduce image distortion but it may have below issues:
    - With some blanking area at some borders.
    - Display with full screen but some image will be stretched outside display borders and can't be seen.
  - ✓ If user wants to change video wall display image aspect ratio, user needs to adjust Position Reference Line first. In this example, if user wants to stretch horizontal image, user needs to adjust TV3 and TV2 horizontal scaling factor first, then to align TV1 and TV4 to match TV3 and TV2 test pattern.



## 10 Flexible Aspect Ratio Adjustment

User can use Video Wall [Overlap] function to change the aspect ratio of the image with black borders or to stretch the image in specific direction to compensate the aspect ratio difference between video wall and the content. The Maximum adjustment range is 900 pixels in each edge.



Activate [Overlap] under [Video Wall] menu

1. User can select the channel and the edge required for edge shift, then adjust Overlap value to see aspect ratio change.
2. The image position shift range is +\_900 pixels in each edge.

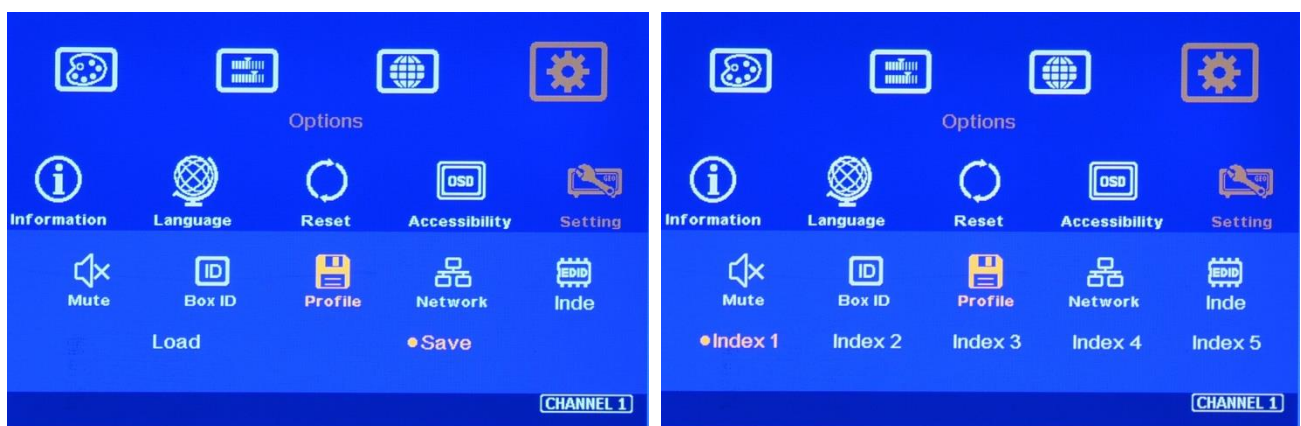


1. If Video Wall [Zoom] is set to H=2 & V=2 or above, user can apply 4k/2k @60Hz input signal.
2. If the image is at portrait position or the Video Wall [Zoom] is set to H=1 & V=1, this function is only available under input signal up to 4k/2k @30Hz.

3. The adjustment range 900 pixels is calculated based on signal source resolution.
4. When user adjusts Overlap value in one monitor, it will also change the scaling factor. User needs to adjust the Overlap value in other monitors in the video wall to let all monitors has the same scaling factor.

## 11 Step 8 – Save System Settings through Remote Controller

- After finishing system settings, user can save the setting by OSD menu through [Menu]→ [Options]→ [Setting]→ [Profile]→ [Save]→ [Index 1-5].
- [Save] Profile will take effect for two channels only. User needs to Save CH-1 / CH-2, CH-3 / CH-4, separately.
- User can recall (load) the setting through IR remote controller.
- Five different display settings can be saved to [Profile]. The data stored in Profile include EDID setting, input source, output resolution, color settings and all user customized settings.



- When user power off the system, VWC-46L will save user setting without loss even the setting is not saved into Profile Index, unless someone to change the setting.
- When system has been reset from OSD menu or update new Firmware, Profile data will still be kept inside VWC-46L.

## 12 Load Profile Index through Remote controller

- Press [Profile] shortcut key→ Select number keys 1-5 to recall Index 1 – Index 5.
- Profile Load will apply to two channels only. We will add a function to be functional in all channels..

## 13 Important notice for video wall settings

### 13.1 Image distortion and aspect ratio issues

If the content aspect ratio is different from video wall, it will cause image distortion. User can adjust aspect ratio through [Overlap] settings. However, you will have two choices:

- Full screen display but some content will be drawn outside border.
- Draw the image into video wall and keep some blanking borders at some edges.

- 13.2 If the signal is from PC, user can set customized EDID in AV-BOX to let PC output the right output resolution. Some PC may not follow AV-BOX EDID resolution and require customized output setting from display card.



- 13.3 User can set different video wall settings in each channel and crop different area for the display. In combination with ZOOM, PAN and OVERLAP settings, user can crop any location of the image for each LCD, no matter it is in landscape or portrait position.
- 13.4 Pay attention to image flip and rotation limitations in input resolution. VWC-46 doesn't have image flip and rotation function when the input is 4k/60 Hz.
- 13.5 Some media players will output maximum resolution when it is powered on each time but not follow output resolution setting in the medial player or the EDID settings in AV-BOX. It will cause abnormal display in the video wall if this video wall has image rotation or flip setting.

## 14 Easy Setting In Multiple Unit Application

### 14.1 Setup by Remote Controller

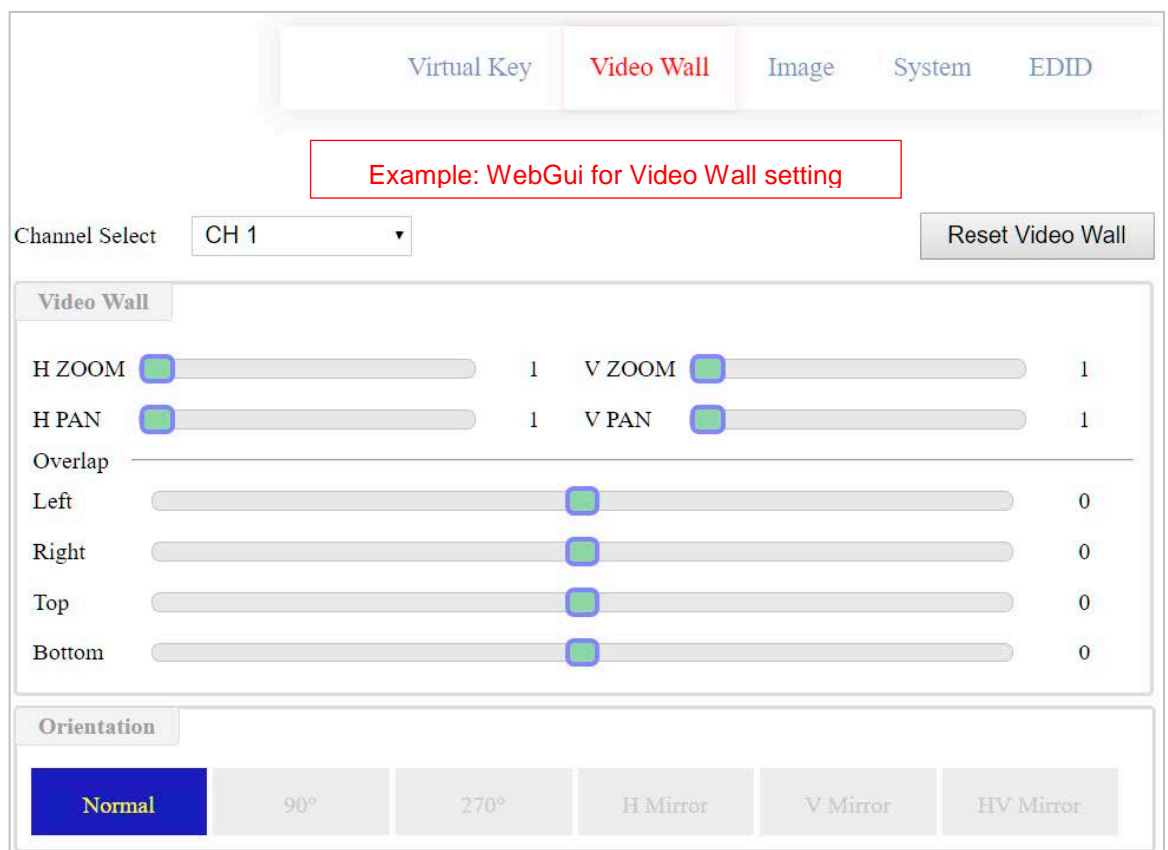
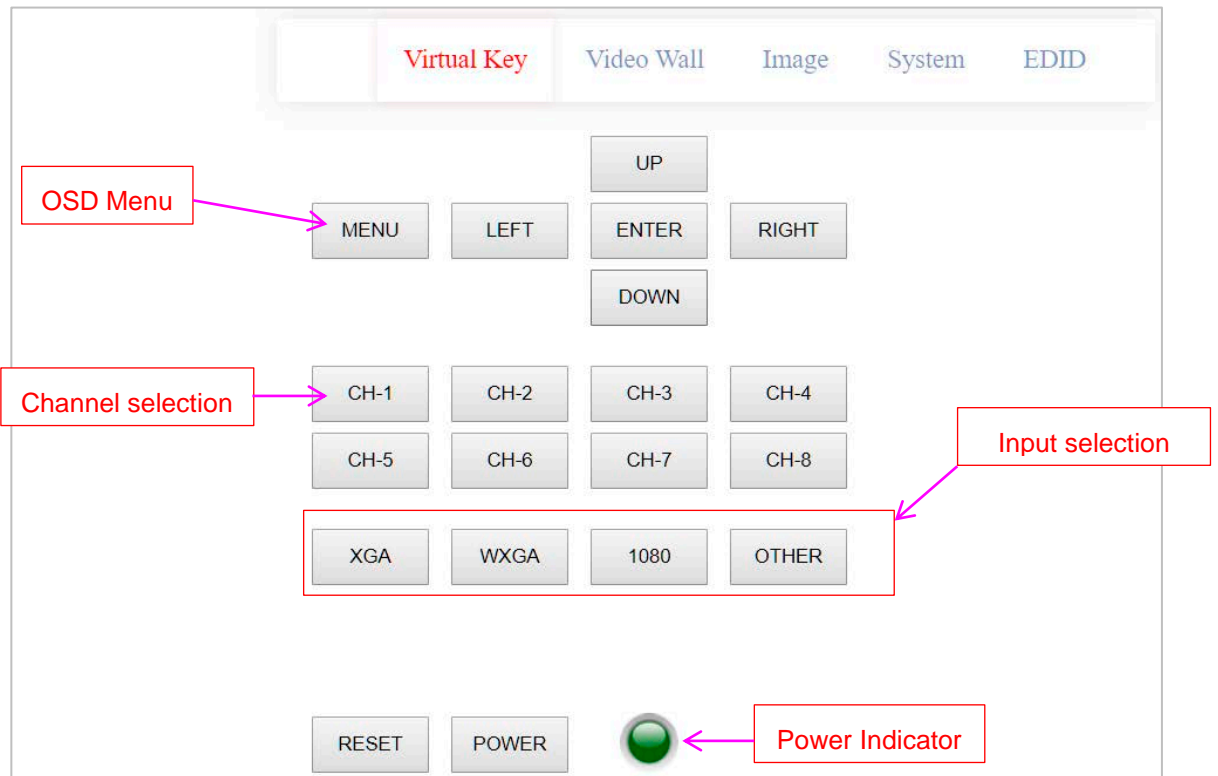
- 1.1.1 If multiple units are used, user can set different [Box ID] (#1 - #99) to each Box in control system. For IR control, the number range is #1 - #9.
- 1.1.2 User can control individual AV-BOX through below method when all boxes or IR extender receivers are installed together.
- ✓ Press 851 number key on remote controller will lock all other AV-BOX OSD menu except ID #1 VWC-46. User can see flashing LED on the Front Panel for the units with OSD locked.
  - ✓ Press 853 will only unlock ID # 3 AV-BOX for further OSD operation.
  - ✓ Press 850 will unlock all AV-BOX OSD menu. Remote controller can access to all box simultaneously.

### 14.2 Setup by Ethernet

User can connect all VWC-46L in one Ethernet (or WiFi) Router (or switch hub) Lan ports and set different Static IP address for each Box, then use WebGui virtual keys or UHWall Manager PC tool to control each VWC-46L independently. If user connects PC to the same Router and set Router with DHCP mode, PC can access to VWC-46L directly. If PC is not connected with the same Router, user needs to set PC with the same Domain Segment as VWC-46L for Ethernet connection. Web Server function is also available, Please contact us for more details.

#### 14.2.1 WebGui

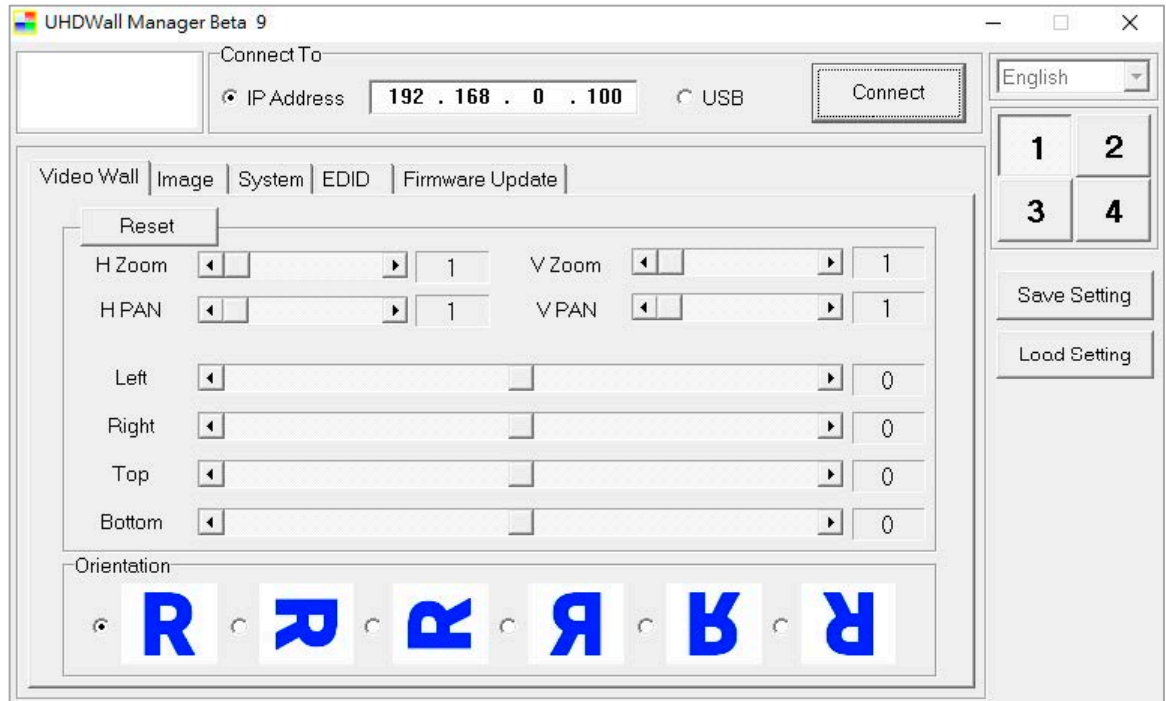
- ✓ WebGui is embedded inside VWC-46L. Once user connects VWC-46L with PC through Ethernet, user can access WebGui and execute all operation similar to OSD menu through Virtual Keys and OSD Menu. No PC tool is required.
- ✓ The connection can go through Ethernet router LAN port, WiFi Router or Cross Over Cab 5/6 cable. User can set each unit of VWC-46L with different static IP address in the same domain, then open Google Chrome or Microsoft Explorer with IP address to access each unit of VWC-46L for independent operation. There is no limitation in the number of VWC-46L that can be controller at the same time.
- ✓ User can turn on/off the system through WebGui and see the status through power indicator.



#### 14.2.2 UHDWall Manager (UWM) PC Tool

- ✓ UWM Manager is a PC tool executed through PC. User needs to download this tool from AV-BOX website. Once user connects VWC-46L with PC through Ethernet or USB and open UWM Manager, user can access UWM and execute all operation similar to OSD menu through PC keyboard and mouse. User can also backup system setting in PC and restore/copy to other units.

- ✓ UWM PC tool is designed for 40 series product. If user connects with 48, user will see 8 channels for selection instead of 4 channels.
- ✓ User can execute full operation functions and also update Firmware and MCU code through UHDWall. User can control multiple units at the same time through change IP address.



## 15 System Structure and Control

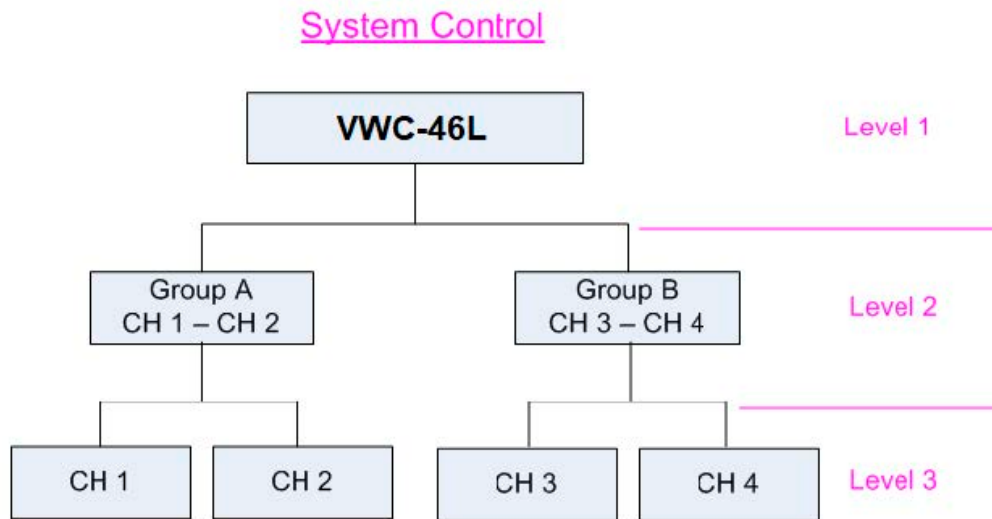
RS232 and Ethernet are available for system control. They can be used simultaneously to provide the most flexibility in system control.

### 15.1 System Structure:

- VWC-46L is 4 channel processor.
- The structure is separate into two Groups: channel 1-2 is Group A and channel 3-4 is Group B.
- HDMI input signal will apply to two groups at the same time.
- HDMI Loop out provides the same raw signal as HDMI input signal for daisy chain connection.

### 15.2 System control

- There are three system control levels.
  - ✓ Level 1: The items will apply to all channels, such as Box ID, Ethernet setting.
  - ✓ Level 2: The items will apply to Group A & Group B separately.
  - ✓ Level 3: The items will apply to each channel independently, such as Video Wall settings.



### 15.3 OSD Command Execution in Group A & Group B

- The following command will be applied to all channels at the same time (Level 1).
  - ✓ Level 1 control can only be executed from CH-1. Please connect monitor to CH-1 for system settings.
  - ✓ [Options]→ [Setting]→ [Box ID]: each VWC-46L has one Box ID for RS232 control.
  - ✓ [Options]→ [Setting]→ [Network]: RS232 and Ethernet settings
  - ✓ [Profile]→ [Load]→ [Index]
    - In RC-700 remote controller, it will apply to Group A and Group B separately.
    - In RC-400 remote controller, user can press [All] key on remote controller, then apply [Profile]→ [Load]→ [Index] function, it will apply to all channels.
- Level 2 control:
  - ✓ HDMI 2.0 input source is for both Group A and Group B.
  - ✓ Loop out signal comes from HDMI 2.0 input signal.
  - ✓ EDID setting: Group A is set by CH-1 / CH-2 and Group B is set by CH-3 / CH-4.
  - ✓ In RC-700 remote controller, [Profile]→ [Load]→ [Index] function will apply to Group A and Group B separately.
- The following commands will be applied to two channels only (Level 2).
  - ✓ [Image Properties]→ [Output Mode]: select output resolution
  - ✓ [Options]→ [Language]: select OSD language
  - ✓ [Options]→ [Reset]
  - ✓ [Options]→ [Accessibility]→ [OSD Time Out]
  - ✓ [Options]→ [Accessibility]→ [Logo Time Out]
  - ✓ [Options]→ [Accessibility]→ [Standby Time]
  - ✓ [Options]→ [Accessibility]→ [Black Screen]
  - ✓ [Options]→ [Setting]→ [Mute]
  - ✓ [Options]→ [Setting]→ [Profile]→ [Save]
- The following commands will be applied to CH-1 to CH-4 independently (Level 3).
  - ✓ [Image Properties]→ [Scaling]: select full screen or original aspect ratio
  - ✓ Color adjustment: All menu under [Picture]

- ✓ [Image Properties]→ [ Color]
- ✓ [Image Properties]→ [Orientation]
- ✓ [Options]→ [Information]: show system information

#### 15.4 EDID Setting

- ✓ [Options]→ [Setting]→[EDID]
- ✓ HDMI 2.0 is set by CH-1 / CH-2.

#### 15.5 HDMI vs. DVI Output Signal

HDMI digital signal is compatible with DVI signal. Most of display devices can support both digital signals. However, some old equipment may have less flexibility in digital input signal compatibility. In this case, user may need to select DVI output format for normal display.



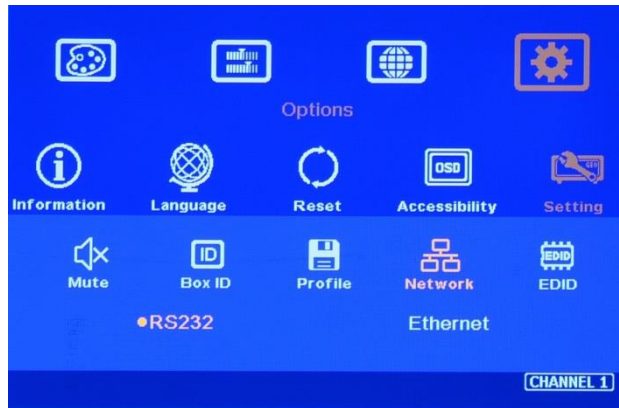
#### 15.6 System Standby and Automatically Turn Off Output Signal

- ✓ [Options]→ [Accessibility]→[Standby Time]
- ✓ If set [Standby Time] at 60, the system will get into Standby Mode after 60 seconds when no input signal is detected. The output signals from VWC-46L will also be terminated at the same time. If VWC-46L detects input signal again, it will automatically turn on the system again.
- ✓ If the monitor can automatically turn off/on function by detecting input signal, user can control signal source to execute entire system on/off control.
- ✓ The settings should be executed from CH-1 and will apply to all channels at the same time.

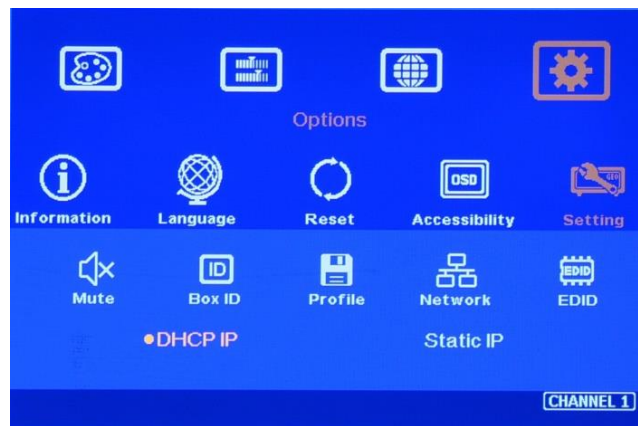
#### 15.7 RS232 Setting

1.1.3 RS232 interface is designed with DB-9 connector. User can select 11520 or 9600 baud rate. 1.1.4 The UART Protocol between AV-BOX and a Host computer can be provided. The protocol can be implemented via RS-232, USB, Ethernet or other forthcoming communication methods.

1.1.5 Please execute RS232 setting through CH-1 or CH-2. User can select baud Rate between 9600 & 115200 as needed.



## 15.8 Ethernet Setting

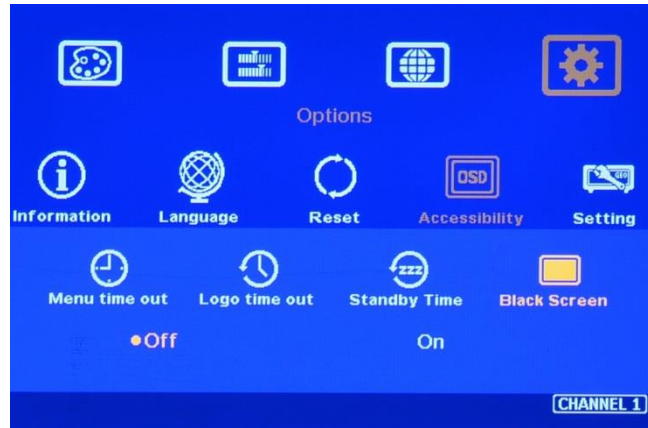


- Ethernet control: AV-BOX is integrated in VWC-46L via RJ45 connector. User can controller VWC-46L through Ethernet or WiFi via PC or mobile devices. A WebGui with keypad icons (virtual keypad) will be showed in control devices for user to control the OSD function of VWC-46L.
- UHDWall Manager PC tool is available for full function operation and firmware & MCU code update.
- DHCP & Static IP can be set in each VWC-46L for independent operation.
- User can use < > OSD direction keys to access the position for the modification and ^ v OSD direction keys to change the IP address settings.
- If WiFi router is connected, VWC-46L can be controlled through WiFi by PC, mobile phone or iPad.
- Please connect VWC-46L to LAN port of WiFi Router. Once execute correct WiFi settings in WiFi Router, user can access VWC-46L by PC, Notebook, mobile phone or iPad and control it through WebGui or UHDWall Manager.
- User can connect PC with VWC-46L use Cat5/6 crossover UTP cable directly.

## 15.9 Change Background Color

When no signal input, user can select either blue color background with [Power Saving Mode] message on the screen or black background color without message. User can change background color from the OSD menu as below through CH-1.





## 16 Limitations in Image Flip and Rotation

Image 90/270 degrees rotation and image flips are only available in input resolution under 4k/2k @30Hz (included).

## 17 Limitation in Audio Output

User will open or mute audio output in two channels at the same time: CH-1/CH-2, CH-3/CH-4.

## 18 Trouble Shooting

### 18.1 Front Panel LED lights

User should see Input/Output LED lights in each operation channels. If no light illuminated in specific channel, please check Input/Output connecting cables, signal source & monitor in that channel.

### 18.2 Intermittent or Loss of Input Signal

- Make sure to connect input signal between two display Groups through Loop out port.
- Check the HDMI cable quality and make sure all cables are fitted correctly. 4k/60 signal requires high speed certified cables.
- Cable length: Connecting cable length should be short as possible. Replace a short cable to verify the possible root cause.
- HDCP compliant issues: If the input source or the monitors are not HDCP compliant, it is possible to stop VWC-46L from negotiating HDCP link and show intermittent, abnormal or no image.
- Bit Rate or resolution issues: check if signal source and connecting cables can provide right resolution and data rate supported by VWC-46L.
- **DVI/HDMI signal compatibility: some display devices may only support HDMI or DVI video signal and execute wrong signal format detecting. The default output is HDMI. User can change output with DVI format through [Options]→ [Setting]→ [DVI]→ [On].**
- Usually, to swap with different cable, output channel, signal source and monitor can verify the root cause for the failure.
- When it is possible to have signal compatibility issue, user can add one HDMI splitter or switch in the middle to change signal impedance. It may fix the issue.

### 18.3 System setting can't be executed:

System control applied to complete system can only be executed through CH-1

## **19 Technical support**

- User can send e-mail to [i@av-box.ru](mailto:i@av-box.ru) with as much information as possible.
- The following information is required for a swift response.
  - Display device: type and model number
  - Monitor array or specific application details.
  - AV-BOX model No. and series No.
  - Detailed timing of signal source and resolution.
  - Press [Info] key to get System Information and send the data to us, including F/W version.
  - The exact nature of the problem. Please be as detailed as possible.
- Usually we will response with 24 hours (excluding weekends)

## **20 Safety Precaution and Maintenance**

### **20.1 Power Supply**

Please connect electric power for all devices in the system from the same Power Distribution Box with correct grounding. Open the power after finishing system connection to reduce the risk for system damage from high floating voltage.

### **20.2 Working Environment**

Please locate VWC-46L in an environment free from dust, moisture and high temperature with good ventilation.

### **20.3 Warranty:**

This device is designed and tested to the highest standards and backed by two years' parts and labor warranty. Warranties are effective upon the first delivery date to the end customer and are non-transferable. Warranty period extension is available up to 5 years through paying extra charges.

### **20.4 Maintenance and Repair**

Apart from what is detailed in User Guide, maintenance should be carried out by competent technician assigned by AV-BOX. If VWC-46L is physically damaged, it should be returned for repair using AV-BOX RMA procedures. If the unit is opened by user, it will lose the right for warranty protection.

## **Specifications**

- ✧ Input: 1x HDMI 2.0b, HDCP: 2.2/1.4.
- ✧ Output: 4x HDMI up to 1080P & WUXGA.
- ✧ 1x HDMI 2.0 loop out ports from adjacent HDMI input
- ✧ Max. input resolution: 4096x2400 @60Hz.
- ✧ Support non-VESA STD input timings.
- ✧ Support pixel to pixel 8k/4k display.
- ✧ Selectable output up to 1920x1200 60Hz.
- ✧ 4:4:4 Chroma sampling, 30 Color bits, 12-bit RGB gamma CLUT.
- ✧ Support sRGB & xvYCC color processing & 8/10/12-bit deep color.
- ✧ 3:2/2:2 cadence, low angle smooth algorithm, high quality scaling engine.
- ✧ Flexible aspect ratio adjustment in each edge up to +\_ 900 pixels.
- ✧ When the input is 50Hz signal, the output will also keep 50Hz to avoid video artifact.
- ✧ 10-bit processor, frame rate conversion.
- ✧ 3D motion adaptive de-interlace.
- ✧ Frame lock for synchronized outputs.
- ✧ High Dynamic Range (HDR) support: SMPTE ST-2084, SMPTE ST-2086.
- ✧ Individual 90/180/270 rotation, flip, cropping, scaling & color adjustment in each channel.
- ✧ Embedded HDMI audio in each output.
- ✧ Selectable and programmable EDID.
- ✧ ESD Protection: ±8kV (Air-gap discharge), ±4kV (Contact discharge).
- ✧ DC 12V/1.1A, max. 13w, (100-240 VAC PSU).
- ✧ Working environment: 45 ° C, 10-90% RH.
- ✧ Control: IR, RS232, USB, Ethernet.
- ✧ Dimensions: 330mm\*190mm\*36, Weight: 1.5kg
- ✧ CE/FCC/RoHS/Green Certified.
- ✧ 2 Year Warranty, paid extension is available.

## **Revision History**

Revision	Date	Originator	Comments
V1.1	2018-04-04	AV-BOX	First version