

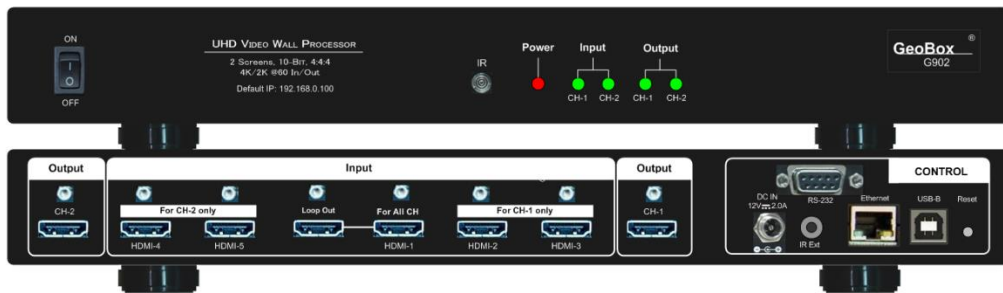


*The absolute opposite of ordinary*

## **G902 UHD Video Wall Controller Datasheet**

**(Dual CH 8k/2k-in / 4k/60-out)**

***Input: up to 4096\*2160 @60Hz, 7680\*2160 @30Hz,  
7680\*1200 @60Hz in HDMI2.0b, 4:4:4 chroma sampling  
Programmable Output resolution: up to 4096\*2267/60Hz  
or 7680\*1234/60Hz, HDMI2.0, RGB 4:4:4  
Selectable output refresh rate: 24/30/50/60/100/120Hz  
Support HDR 10, BT 2020 signal processing  
PIP/POP & 3/4 split view MultiViewer  
3D format conversion***



Technical support:

E-mail: [sales@vnstw.com](mailto:sales@vnstw.com)

Tel: +886-2-2792-2819 Cell: +886-935-678-033

Skype: vnsw-inc

Version: 1.27

Website: [www.vnsw.com](http://www.vnsw.com)

## Table of Contents

<b>Introduction</b> .....	<b>3</b>
<b>Specification</b> .....	<b>4</b>
<b>Functions and features</b> .....	<b>5</b>
<b>A. Input / Output</b> .....	<b>5</b>
<b>B. High end 10-bit scaling up and scaling down</b> .....	<b>5</b>
<b>C. PIP/POP and MultiViewer function</b> .....	<b>5</b>
<b>D. Video Wall function</b> .....	<b>6</b>
<b>E. Various color adjustment</b> .....	<b>6</b>
<b>F. Image rotation and flip</b> .....	<b>6</b>
<b>G. 3D function</b> .....	<b>6</b>
<b>H. Native 1:1 pixel to pixel image display mode</b> .....	<b>7</b>
<b>I. Image freeze</b> .....	<b>7</b>
<b>J. Quick PIP ON/OFF and two inputs seamless swap</b> .....	<b>7</b>
<b>K. System control and other features</b> .....	<b>7</b>
<b>Applications</b> .....	<b>7</b>
<b>Feature illustration</b>	
<b>A. PIP/POP and MultiViewer functions</b> .....	<b>8</b>
<b>B. 4k video wall</b> .....	<b>10</b>
<b>C. Front end processor for edge blending system</b> .....	<b>12</b>
<b>D. MultiViewer: 3 split views in one UHD monitor</b> .....	<b>14</b>
<b>E. MultiViewer: [4x Split] &amp; [4x T/B]</b> .....	<b>15</b>
<b>F. Image flip &amp; rotation</b> .....	<b>15</b>
<b>G. Stretch image and change aspect ratio</b> .....	<b>16</b>
<b>H. Image cropping and rotation</b> .....	<b>16</b>
<b>I. Crop image for LED display</b> .....	<b>17</b>
<b>J. Quick PIP ON/OFF and two inputs quick seamless swap</b> .....	<b>18</b>
<b>Disclaimer/Copyright statement</b> .....	<b>19</b>

## **Introduction**

G902 is multi-function signal processor with 8k/2k 30Hz, 4k/60Hz input and output. Each box can split signal into two outputs with programmable output resolution in each channel and be served as video wall controller to display all-in-one content across entire video wall as well as discrete true 4k/60 content in each 4k monitor. It can be serves as multi-viewer to display 3/4 split view contents in one monitor. Multiple units of G900 can be cascaded to build all kind of video wall system.

One G902 has two 4k/60 output channels and 5x HDMI 2.0 input ports. One input port is shared with two channels and each channel has two independent input ports. Input supports up to 4096\*2160 @60Hz, 7680\*2160 @30Hz with 4:4:4 chroma sampling. One HDMI 2.0 loop out port is to provide daisy chain connection with multiple units to get different configuration.

Programmable output range is from 800-7680 (8 Px/step under 230Mhz, 16 Px/step above 230Mhz) in horizontal and 600-3840 (with 1 pixel/step) in vertical. It supports up to 4096\*2267 @60Hz or 7680\*1234 @60Hz in each channel. The maximum pixel clock is limited to 600 MHz. Output refresh rate is selectable from 24/30/50/60/100/120Hz. It supports various input sources and input timings, including non-VESA standard input timings. .

It is integrated with 10-bit high end processor, motion adaptive de-interlace, low angle smooth algorithm, 3:2:2:2 pull-down cadence. Programmable EDID enables optimized input timing to get the best video performance.

It can execute color adjustment in Brightness, Contrast, Hue, Saturation, Sharpness, color temperature and discrete RGB gain adjustment. Automatically detect and process HDR BT. 2020 input signal and output with full color 4:4:4 RGB SDR signal. User can select deep color mode with true 10-bit color output to get smooth gradient color.

Video wall function in G902 can crop specific location & resolution in source image for each output. Overlap function allows user to change image position, aspect ratio and cropping area up to +\_1800 pixels in each edge. User can adjust aspect ratio and image position freely. Independent image 90/180/270 degrees flip and rotation is also available in each channel. User can build UHD video wall with any LCD array at landscape and portrait directions.

PIP (picture in picture) and POP (side by side or top/bottom) is standard functions in each output channel. 3 split views MultiViewer function is embedded. 4 split views can be implemented through dual channels. Both main and sub-images can be flipped and rotated at 90/180/270 degrees and quick seamless swap. The cropping range and position in both main and sub-image are adjustable. Maximum display windows in the video wall with 2 monitors is 5.

3D function is integrated in G902. It can convert 3D format (Line interleaved, frame packed, discrete dual camera...) into side by side, top/bottom and frame sequential 3D output format. It can also decode all 3D signals into discrete RH or LH for passive display.

User can use IR controller, USB, Web Gui and Ethernet for system operation and setup. 10 custom settings can be saved and recalled. It is designed to work in 7/24 working environment and provides easy configuration, low entry barrier, cost effective, reliable and flexible solution.

## **Specifications**

- ✧ Input & output: 5x HDMI 2.0b input ports, 2x HDMI 2.0b output ports and 1x HDMI 2.0b loop port for daisy chain connection.
- ✧ One common input port with Loop out function shares the input signal for two output channels at the same time.
- ✧ Each channel has two other independent input ports. These input ports only provide signals for individual channel.
- ✧ Loop out port is raw signal from common input port. It can be daisy chain up to 10 processing modules without HDMI splitter to build big scale display system up to 20 monitors.
- ✧ Max. input: 4096\*2160 @60Hz, 7680\*2160 @30Hz or 2160\*7680 @30Hz (up to 600MHz).
- ✧ Supports interleaved and progressive input signals with 4:4:4 10-bit color under 600 MHz.
- ✧ Support High Dynamic Range (HDR): SMPTE ST-2084, SMPTE ST-2086 and BT.2020 HDR 10 input signal processing.
- ✧ Support non-VESA standard input timings.
- ✧ Preset 17 output timing modes with selectable 8-bit/10-bit color and HDCP control settings.
- ✧ Programmable output range is from 800-7680 in horizontal (with 8 Px/step under 230Mhz, 16 Px/step above 230MHz) and 600-3840 in vertical (with 1 pixel/step). Max. programmable Output: up to 4096\*2267 @60Hz or 7680\*1234 @60Hz (maximum pixel clock < 600MHz).
- ✧ Selectable refresh rate: 24/30/50/60/100/120
- ✧ Output signal: SDR, progressive full color RGB, 4:4:4, 8/10-bits under 600MHz.
- ✧ HDCP: V2.2/V1.4 in HDMI.
- ✧ Embedded video wall function for image split, cropping, location assignment, position adjustment and precise bezel compensation.
- ✧ Decode 3D signal for passive 3D display and convert 3D format into side by side, Top/Bottom or frame sequential output.
- ✧ One frame latency: 16.6ms (V=60Hz)
- ✧ OSD menu position can be shifted for convenient OSD operation.
- ✧ Programmable EDID in the range at H= 1024-4080 (8 pix/step), V= 720-3840 (1 pix/step).
- ✧ Flexible aspect ratio adjustment in each edge up to +\_ 1800 pixels.
- ✧ Each channel has independent PIP/POP function with PIP image size from 320\*180 up to 1920\*1200 resolution with flexible position, rotation/flip and cropping area adjustment.
- ✧ Display 4 types of 3 split views on one UHD monitor.
- ✧ Display 4 split views for one UHD monitor.
- ✧ PIP main and sub-window can be quick swap under FHD in/out with full screen display.
- ✧ Individual color adjustment in main and sub-images.
- ✧ Native 1:1 pixel to pixel image display with original quality.
- ✧ Image Freeze by click keypad on IR controller.
- ✧ Frame lock for multiple unit synchronization.
- ✧ 10-bit processor, 3:2/2:2 cadence, low angle smooth algorithm and 3D motion adaptive de-interlace.
- ✧ High quality scaling engine for image scaling up and down among SVGA to UHD
- ✧ Support xvYCC 8/10/12-bit wide color gamut input signal processing.
- ✧ Individual 90/180/270 rotation, flip, cropping, scaling & color adjustment up to 4k/60 input in main & PIP/POP-image.
- ✧ Embedded HDMI audio output. While implement PIP/POP, user can select audio from main or sub-image.
- ✧ 10 system settings can be stored and backup.
- ✧ ESD Protection: ±15kV (Air-gap discharge), ±8kV (Contact discharge)
- ✧ DC power supply: DC adapter: 12V 3A (100V-240V)
- ✧ Max. Power consumption: 18W
- ✧ Working environment: 45° C, 10-90% RH
- ✧ Control: IR, RS232, USB, Ethernet
- ✧ 10 system settings can be stored and backup.
- ✧ Dimensions: 330mm\*162mm\*40mm
- ✧ Weight: 1.45kg
- ✧ CE/FCC/RoHS/UKCA/KC Certified
- ✧ 2 Year Warranty, extension package is available up to 5 years.

## **Function and features:**

### **A. Input and output**

- One common HDMI 2.0b input & two individual HDMI 2.0b inputs specific for each output channel.
  - Support 4096\*2160 @60Hz, 7680\*2160 @30Hz input resolution with 4:4:4 chroma sampling.
  - Connect with various video sources and support none VESA standard input resolution up to 120Hz and 600 MHz.
- 2x HDMI 2.0 outputs with editable output resolution: The range is from 800-7680 (8 Px/step under 230Mhz, 16 Px/step above 230Mhz) in horizontal and 600-3840 (1 pixel/step) in vertical directions (maximum pixel rate is 600 MHz). Max. output: 4096\*2267/60, 7680\*1234/60Hz (Max. 600 MHz).
- Preset output resolutions: 1024\*768, 1280\*720, 1280\*800, 1280\*1024, 1360\*768, 1400\*1050, 1600\*1200, 1920\*1080 (50/60Hz), 1920\*1200 (30/60Hz), 2560\*1440, 3200\*1800, 3840\*2160 (50/60Hz), 3840\*2400 @60.
- All outputs are RGB 4:4:4 progressive signals.
- Selectable output refresh rate: 24/30/50/60/100/120 Hz.
- Support selectable 8-bit/10-bit Deep Color output mode.
- Automatically detect HDR BT. 2020 input signal and processing with full color SDR RGB 4:4:4 output.
- One HDMI 2.0 loop output port for daisy chain connection to build big system with multiple units.

### **B. High end 10-bit video processor**

- High end 10-bit scaling engine for image scaling up and down in the range from XGA to 8K/4K.
- Processor with 3D motion adaptive de-interlace, low angle smooth algorithm and 3:2/2:2 film mode detect and recovery function.
- Complete color adjustment function, including brightness, contrast, hue, saturation, preset color mode, and independent RGB color adjustment.

### **C. PIP/POP with MultiViewer function**

- [PIP]: Picture in Picture display with any two inputs in each channel.
- [SBS]: Horizontal Side by Side display.
- [Top/Bottom]: Top/Bottom display.
- [SBS 2/1]: 2/3:1/3 side by side display with monitor at landscape position
- [POP3]: One image at LH side and top/bottom two images at RH side in landscape monitor.
- [POP4]: One image at Top and two images at bottom in landscape monitor.
- [3X SBS]: 3 split views at landscape. The center image is adjustable from 1/6 to 5/6 horizontal size.
- [3X T/B]: Three split views at portrait direction.
- [4x Split]: is not available in G904 due to only 3 inputs in each channel but this function can be implemented through 2 channels: one [4x Split] + one PIP.
- [4x T/B]: One big image at the top and 3 small images at the bottom. User can implement through two

channels: One [4x T/B] + one PIP

- PIP (picture in picture): with flexible PIP size (320\*180 to 1920\*1200), location and aspect ratio.
- PIP main and sub-window can be seamless quick swap under FHD in/out with full screen display.
- Except [4x Split] & [4x T/B], PIP/POP functions can support monitor at portrait and landscape position. PIP/POP images also support 90/180/270 degrees rotation and flip up to 4k/2k 60Hz.
- Cropping function is available in main and sub-images for further location, size and aspect ratio adjustment as well as creating image borders with black or blue color.
- Color individual adjustment in main and sub-images.
- All the inputs for main and sub-images can be up to 4k/2k 60Hz 4:4:4 signals.

#### **D. Video wall function**

- Serve as irregular video wall controller with LCD at landscape or portrait position.
- One G902 can control up to 2 monitors with unlimited cascaded with multiple units.
- Split the image up to 15x15 sections from single signal source in H&V directions. Assign split image for specific monitor. Each output can be further adjustment with +\_ 1800 pixels in H&V for image position shift, aspect ratio adjustment, bezel compensation, creative video wall and creating overlap region for projector edge blending.
- Flexible image aspect ratio and display image position adjustment.

#### **E. Various color adjustment**

- Independent R.G.B color gain adjustment.
- Preset color temperature: Standard, Reddish, Bluish
- Brightness, contrast, Hue, saturation and sharpness adjustment.
- Color adjustment can be applied to both main and sub-images

#### **F. Image rotation and flip**

- Image 90/180/270 degrees rotation up to 4k/60Hz input resolution.
- Image flip in Front/Rear, Left/Right and Top/Bottom directions.
- PIP/POP main and sub-image can be rotated independently.

#### **G. 3D function**

- Support Side by Side, Top/Bottom, Line interleaved, Frame sequential and frame packed 3D signal decoding and format conversion.
- Convert 3D signal into separate RH/LH eye frame, Side by Side, Top/Bottom or frame sequential output formats for active 3D display.
- Decode 3D formats into RH/LH for passive 3D display.

## H. Native 1:1 pixel to pixel image display mode

When single content is displayed on the screen, user has below choices for the display:

- [Full screen]: to display the content with full screen.
- [Original AR]: to display content with original aspect ratio
- [1:1]: to display native pixel to pixel image at the center of the screen.
- Further cropping and aspect ratio adjustment is still available.

## I. Image freeze

User can use remote controller [Shift] hotkey to freeze video image.

## J. Quick PIP ON/OFF and two inputs seamless swap

- User can use remote controller [CH A/B] hotkey to turn ON/OFF PIP image.
- If the output resolution is set to FHD or 1920x1200, user can assign one input signal to main and another signal to PIP channel and execute quick input seamless swap through this function.

## K. System control and other features

- Professional design and reliable for 7/24 working environment.
- Full function system setup through remote controller, USB, WebGui or Ethernet (Including through WiFi by PC, Mobile or iPad).
- Firmware update via USB or Ethernet.
- User can select main or sub-image audio while implement PIP/POP.
- OSD menu position can be shifted for convenient OSD operation.
- PC tool can control multiple processors simultaneously through USB or Ethernet.
- RS232 & Ethernet system control compatible with most of control system.
- Programmable EDID in the range at H=1024~4080, V=720~3840.
- BOX ID and programmable IP address for convenient multiple unit control at the same time.
- User can save up to 10 settings and can be recalled by remote controller, RS232, USB or network.
- System settings can be backup in PC and copied to another unit.
- Automatic power ON/OFF through input signal control.

## Applications

- 8k/2k video wall with ability to display discrete 4k content in each monitor.
- Multi-viewer: 3 split views & 4 split views for one UHD monitor.
- Cropping specific image area for selectable output resolution & refresh rate.
- 3D format conversion and 3D decoding for passive 3D display.
- Split image and set overlap pixels for 4k projector edge blending system.

## Features Description

### A. PIP/POP function and MultiViewer functions

#### PIP/POP main menu

- [PIP]: Picture in Picture display with any two inputs in each channel.
- [SBS]: Horizontal Side by Side display.
- [Top/Bottom]: Top/Bottom display.
- [SBS 2/1]: 2/3:1/3 side by side display with monitor at landscape position
- [POP3]: One image at LH side and top/bottom two images at RH side in landscape monitor.
- [POP4]: One image at Top and two images at bottom in landscape monitor.
- [3X SBS]: Three split views at landscape. The center image size is adjustable.
- [3X T/B]: Three split views at portrait.
- [4x Split]: is not available in G902 due to only 3 inputs in each channel but this function can be implemented through 2 channels: one [4x Split] + one PIP.
- [4x T/B]: One big image at the top and 3 small images at the bottom. User can implement through two channels: One [4x T/B] + one PIP

OSD menu



GCT PC Tool

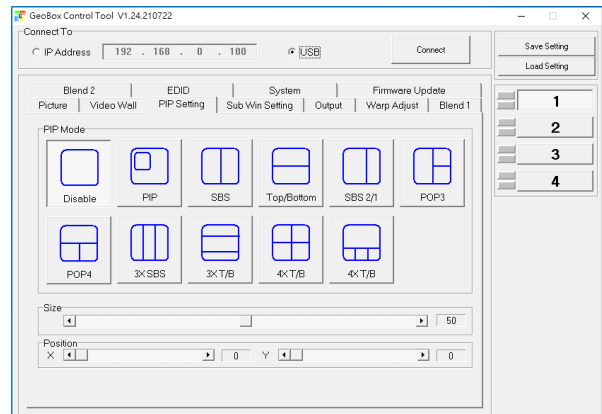
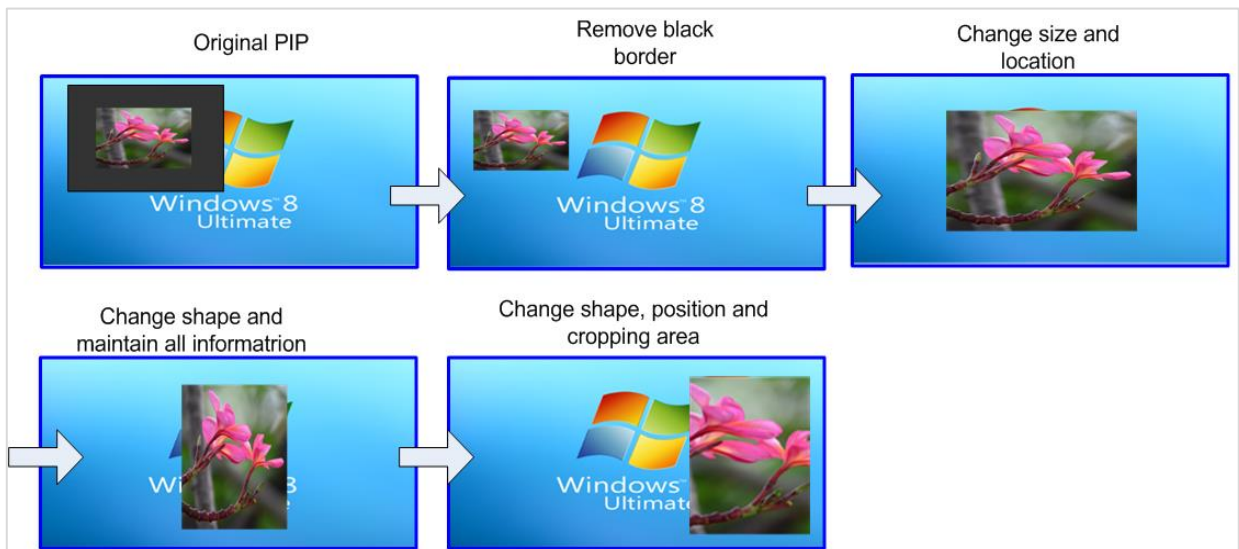






Image cropping in main and sub-images



**B. 4k video wall**

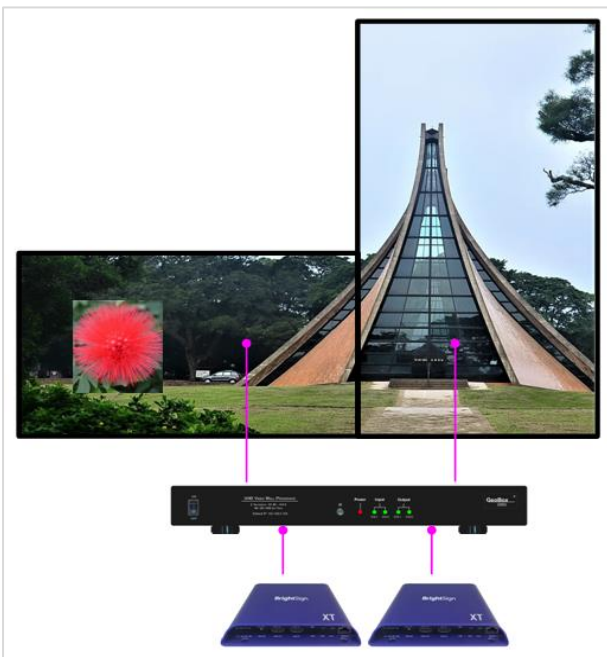
**4k video wall**



**Independent true 4k/60 content in each 4k monitor**



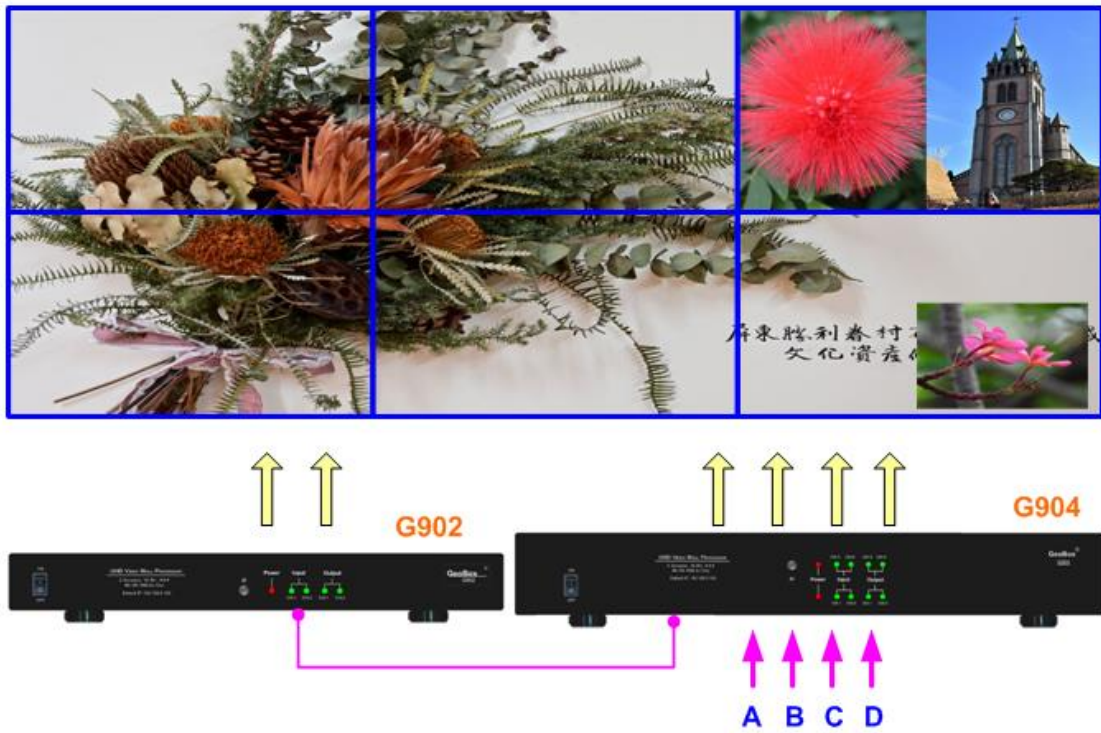
**Video wall with PIP**



**Each monitor displays different PIP images**



**G902 cascaded with G904 to build 6x monitor video wall with PIP/POP**



**Two G902 to build creative video wall (User can use one G904 to achieve the same)**



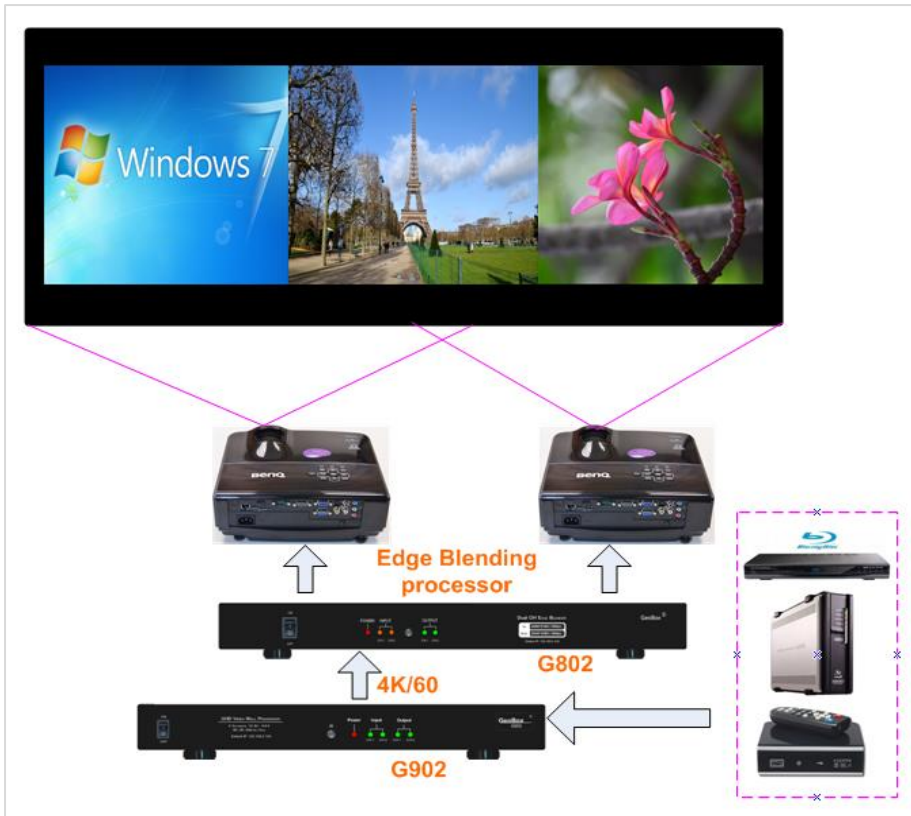
**C. Front end processor for edge blending system**



- 3x 4k contents are connected to G902
- CH1 executes PIP then output to CH2.
- CH2 executes another PIP then output to M802
- M802 executes edge blending with dual PIP images
- All signals can be 4k/2k @60Hz 4:4:4
- User can display two or three side by side images across entire screen as well.



- 16:9 image can be displayed in the center of edge blending system.
- Flexible aspect ratio adjustment is available.



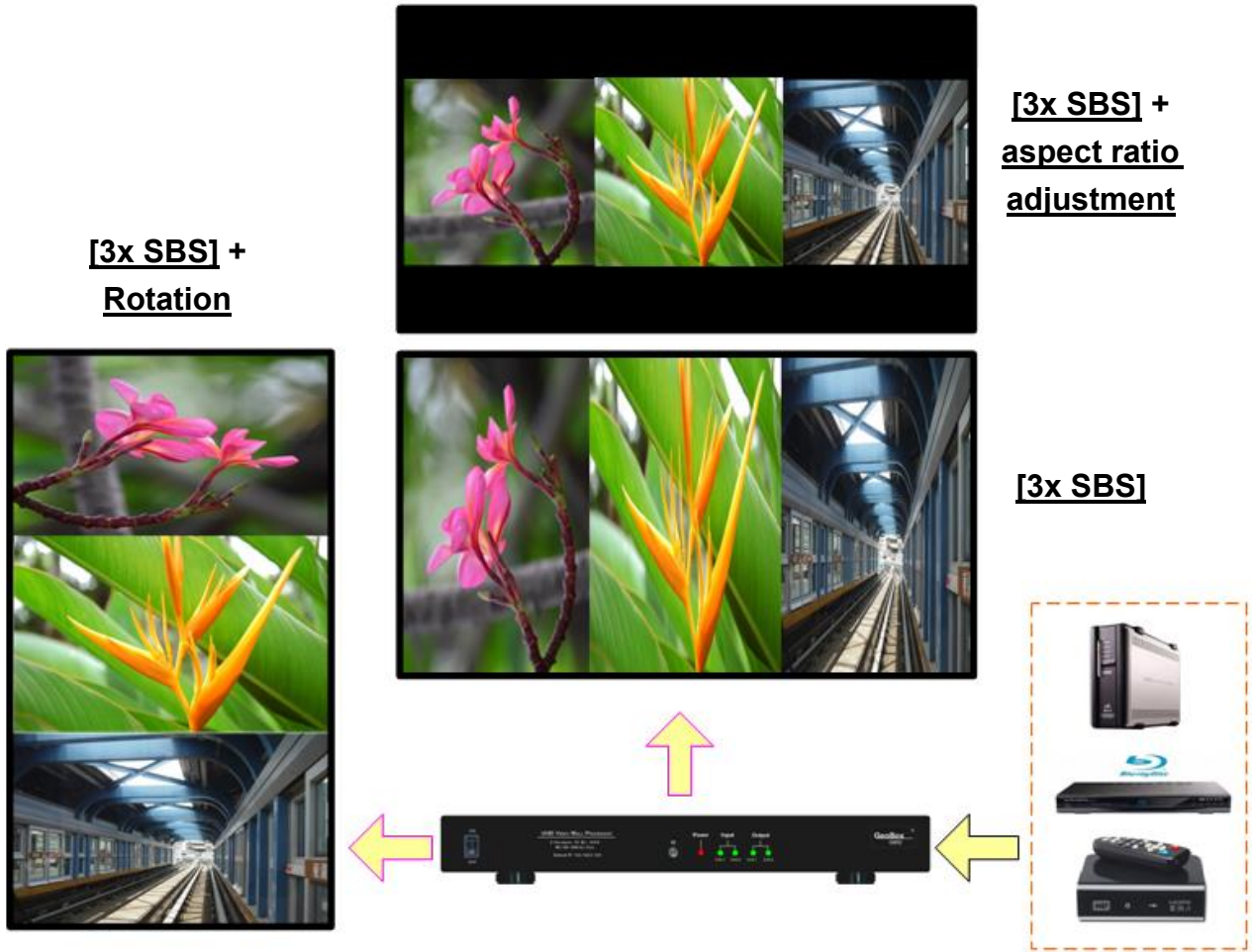
- 3x 4k contents are connected to G902
- CH1 or CH2 executes another [3x SBS] then output to G802
- G802 executes edge blending to get 3x equal size images
- If necessary, user can adjust aspect ratio.
- All signals can be 4k/2k @60Hz 4:4:4
- G902 can be replaced with one G901 in this application.



G902 can split 8k/2k image for two 4k/2k projectors and set overlap pixels for projector to do edge blending. **The projectors need to have geometry alignment and edge blending function.** No PC is required for the setup.

**D. Multi-viewer: 3 split views in one UHD monitor**

3 contents can be equally displayed on one monitor at landscape or portrait location through POP3 setting. The aspect ratio can be also adjusted based on requirements.



**3 Split Views [POP3]**

**3 Split views [POP4]**



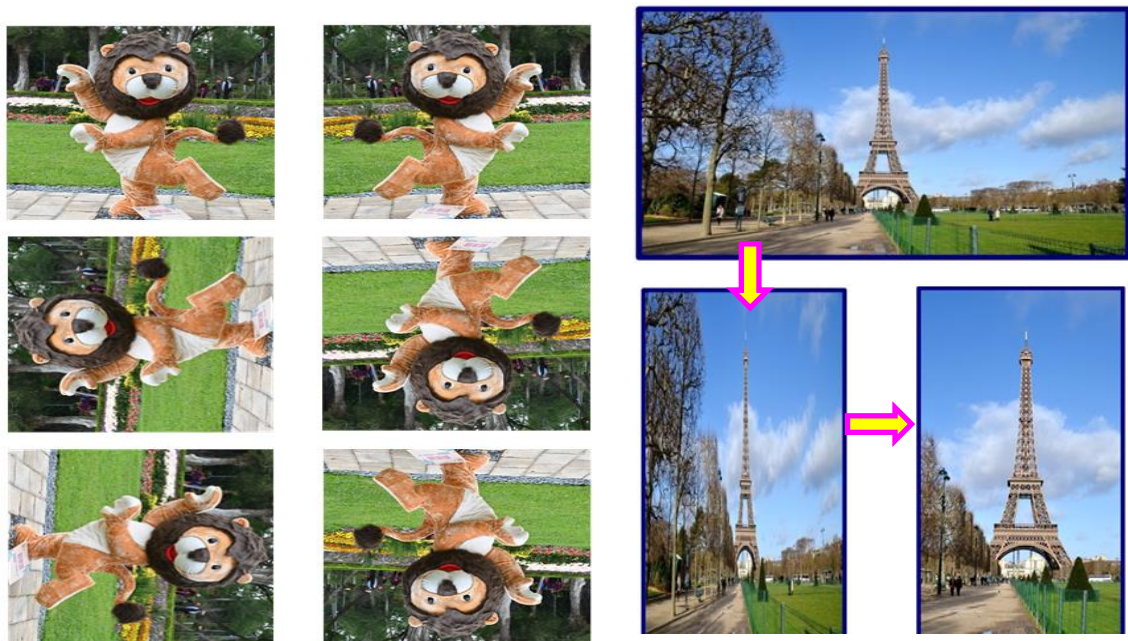
**E. MultiViewer: [4x Split] & [4x T/B]**



- Due to input port limitation, user needs to use two channels to achieve 4 Split view function. User can apply [4x Split] or [4x T/B] + one [PIP] to get the same result.
- User can use single channel processor G901 to achieve the above [4x Split] and [4x T/B] functions.

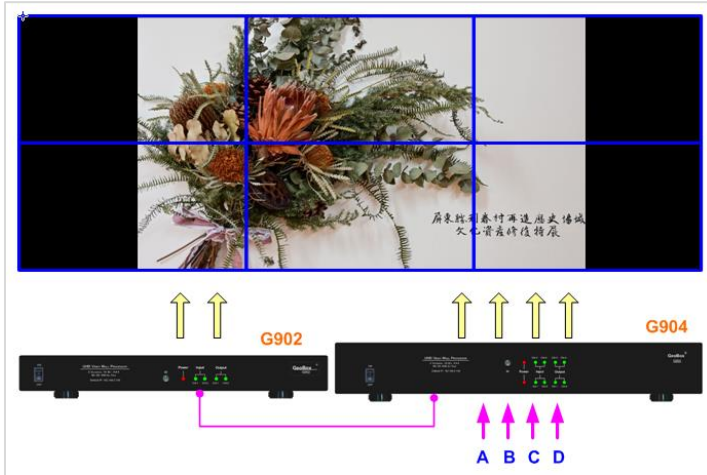
**F. Image Flip & Rotation**

Image 90/180/270 degrees rotation and flip up to 4k/60Hz resolution in both main and sub-images independently. After image rotation or flip, user can also adjust the aspect ratio and cropping area.

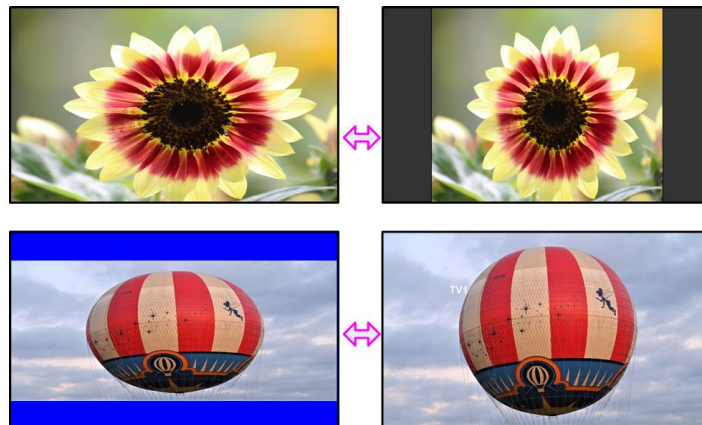


## G. Stretch image and change aspect ratio

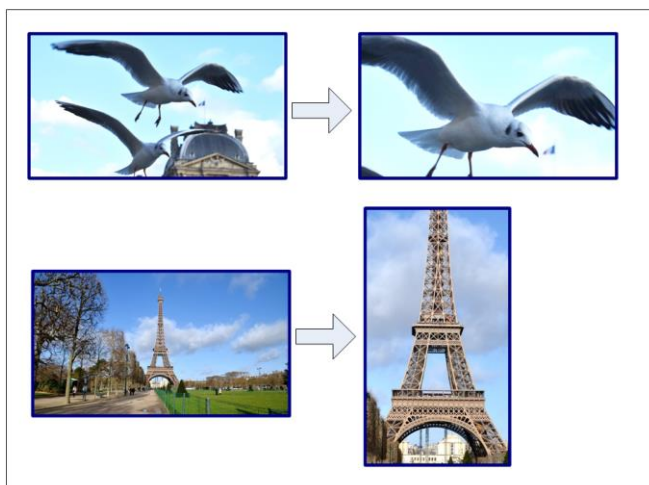
Overlap function can change image size, shift image position or change aspect ratio. The adjusting range is up to +\_1800 pixels in each edge based on signal source. It can be applied to main and PIP/POP (sub-image) independently. Background color can be black or blue.



- Maintain 16:9 aspect ratio in main windows
- To add PIP/POP sub-image to each monitor is possible.
- Aspect ratio adjustment can be applied to main and sub-image independently pixel by pixel.



## H. Image Cropping and rotation

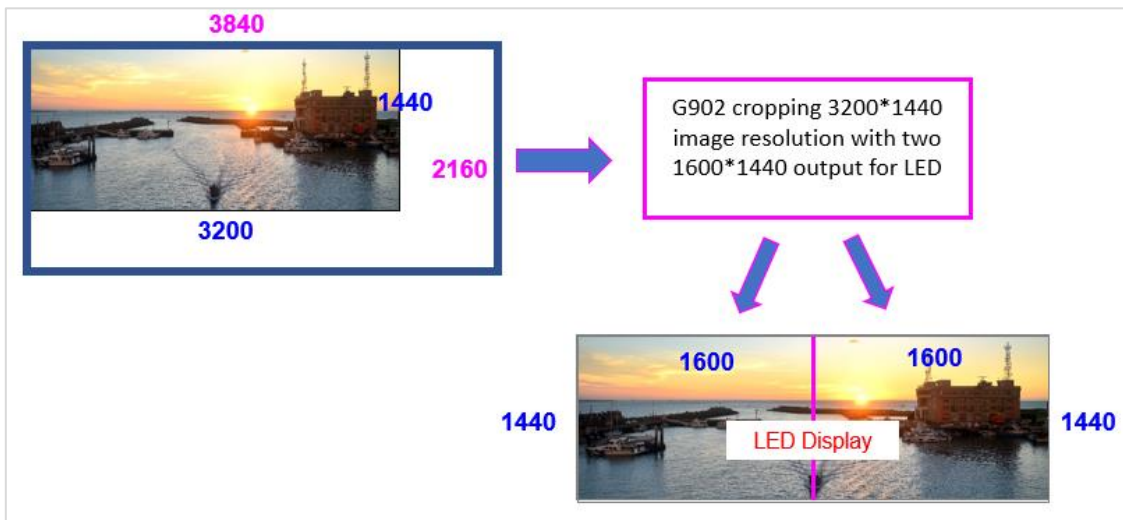
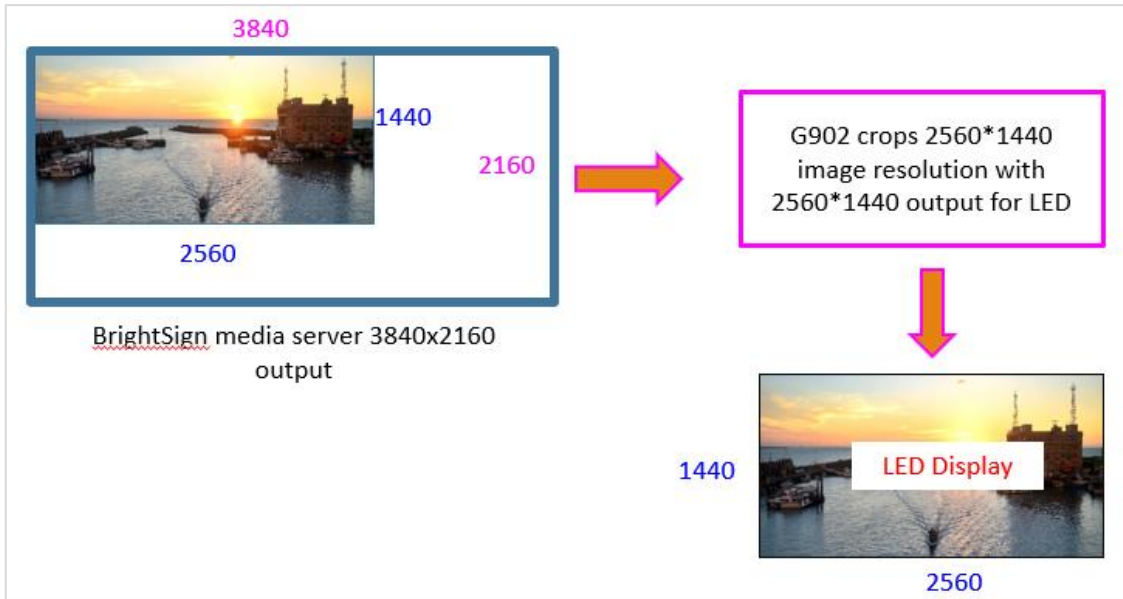


### Crop & Rotate

- Image cropping at any location in both main and PIP/POP (sub-image) independently.
- Image cropping function can co-exist with image rotation and flip functions.

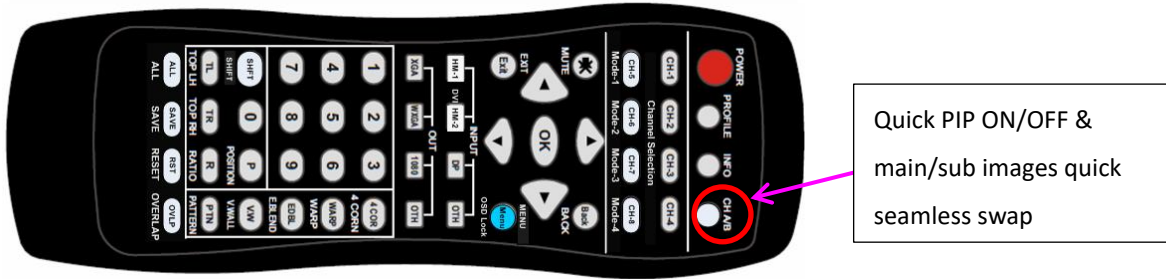


### I. Crop image for LED display

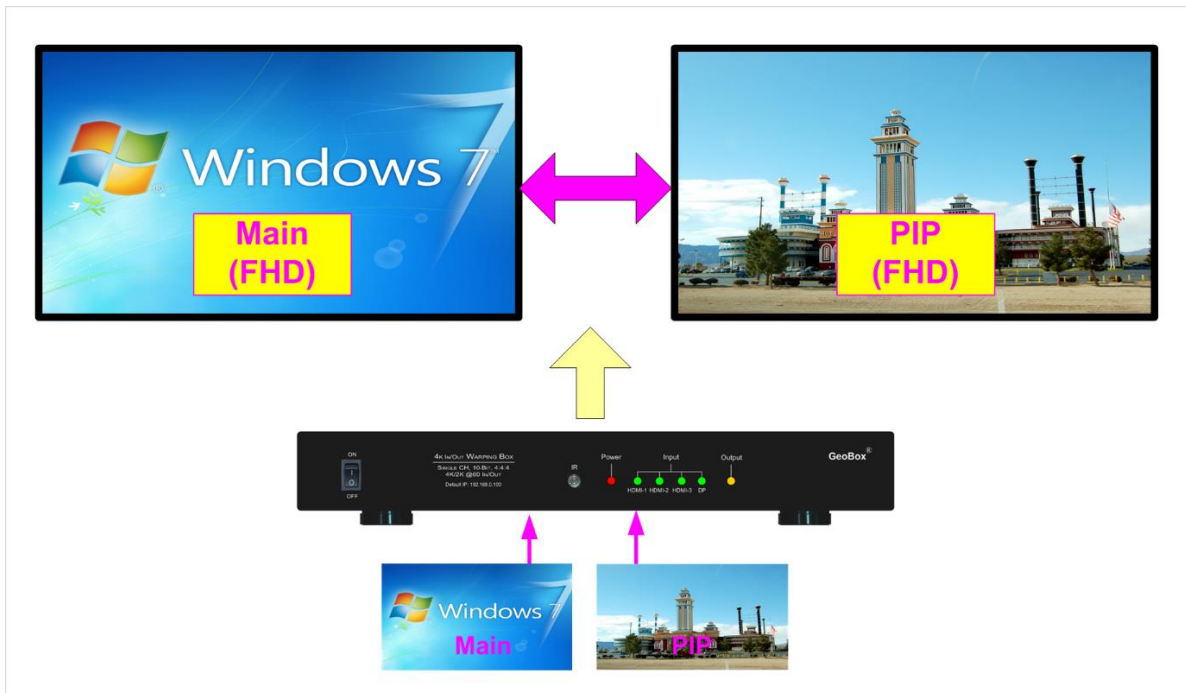


**J. Quick PIP ON/OFF and two inputs quick seamless swap**

- CH A/B key in remote controller can execute quick PIP image on/off.



- When the output resolution is set to 1920x1200 or 1920x1080, user can add full screen PIP image on top of main image. User can click [CH A/B] key to turn on/off PIP image to swap main/sub-images seamlessly.
- This image swap can be applied to any two inputs. Please assign one input to main image and another input to PIP image, then click [CH A/B] key to execute seamless quick swap between these two inputs.



**Disclaimer/Copyright Statement**

Copyright 2022, VNS Inc. All Right Reserved

This information contained in this document is protected by copyright. All rights are reserved by VNS Inc. VNS Inc. reserves the right to modify this document without any obligation to notify any person or entity of such revision. Copying, duplicating, selling, or otherwise distributing any part of this document without signing a non-disclosure agreement with an authorized representative of VNS Inc. is prohibited. VNS Inc. makes no warranty for the use of its products and bears no responsibility for any error of omission that may appear in this document. Product names mentioned herein are used for identification purposes only and may be trademarks of their respective companies.