

# GeoBox

## G904 UHD Video Wall Controller Datasheet (Quad 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 Multiview*



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## **Introduction**

G904 is multi-function signal processor with 8k/2k 30Hz, 4k/60Hz input and 4k/60Hz output. Each box can display all-in-one content across entire video wall as well as display discrete true 4k/60 content in each 4k monitor. Due to special system design, it is also served as multi-viewer to display up to 7 contents in one UHD monitor. Multiple units can be cascaded to build big scale display system as well as 4/6/9/16 split views MultiViewer.

One G904 has four 4k/60 output channels. Each channel has 3x HDMI 2.0 inputs (one port is shared with another channel) and 1x HDMI 2.0 outputs. Input supports up to 4096\*2160 @60Hz, 7680\*2160 @30Hz with 4:4:4 chroma sampling. Two HDMI 2.0 loop-out ports provide a daisy chain connection for multiple unit cascades in a large-scale display system.

The programmable output range is from 800-7680 (8 Px/step under 230Mhz, 16 Px/step above 230Mhz) horizontally and 600-3840 (with 1 pixel/step) vertically. 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 timings, including non-VESA standard.

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. Users can select deep color mode with true 10-bit color output for smooth gradient color.

The video wall function in G904 can crop specific locations & resolutions in the source image for each output channel. The overlap function allows the user to change image position, aspect ratio, and cropping area up to +\_1800 pixels on each edge. Users can adjust the aspect ratio and image position freely. Independent image 90/180/270 degrees flip and rotation are also available in each channel. Users can build creative video walls with any LCD array in landscape and portrait directions.

PIP (picture in picture) and POP (side by side or top/bottom) are standard functions in each output channel. 3 split views and 4 split views MultiViewer function is embedded. PIP image can be from 4k/60 source with PIP image size from 320\*180 up to 1920x1200. It can be located at any location on one screen. 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 the main and sub-image are adjustable. The maximum number of display windows in the video wall with 4 monitors is ten.

Through the combination of PIP/POP, G904 can serve as a multi-viewer to display up to 7 images in one monitor (6 split views + one PIP). MultiViewer with 3/4 split views and 6 split views in one UHD monitor at portrait or landscape directions are standard applications in G904.

Users can use an IR controller, USB, Web Gui, and Ethernet for system operation and setup. It is designed to work in a 7/24 working environment and provides easy configuration, a low entry barrier, cost-effective, reliable, and flexible solution.

## **Specifications**

- ◇ Two processing modules in each G904. Each processing module has 5x HDMI 2.0b input ports, 2x HDMI 2.0b output port and 1x HDMI 2.0b loop out port for daisy chain connection.
- ◇ Loop out port can be daisy chain up to 10 processing modules without HDMI splitter to build big scale display system.
- ◇ Each channel will share one input port with other channel and has 2x additional HDMI 2.0b input ports for independent display, including PIP/POP/multi-viewer.
- ◇ 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.
- ◇ The programmable output range is from 800-7680 horizontally (with 8 Px/step under 230MHz, 16 Px/step above 230MHz) and 600-3840 vertically (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 the 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 an 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 or 6 split views for one UHD monitor.
- ◇ PIP main and sub-window can quickly swap under FHD in/out with a full-screen display.
- ◇ Color adjustment in main and PIP images.
- ◇ Image Freeze by clicking the keypad on the IR controller.
- ◇ Frame lock for multiple unit synchronization.
- ◇ Native 1:1 pixel-to-pixel image display with original quality.
- ◇ 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 from 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 implementing PIP/POP, the user can select audio from the main or sub-image.
- ◇ Selectable and programmable EDID
- ◇ ESD Protection: ±15kV (Air-gap discharge), ±8kV (Contact discharge)
- ◇ Power supply: AC 100V-250V /0.2A
- ◇ Max. Power consumption: 36W
- ◇ Working environment: 45 ° C, 10-90% RH
- ◇ Control: IR, RS232, USB, Ethernet
- ◇ 10 system settings can be stored and backup.
- ◇ Dimensions: 440mm\*162mm\*58mm
- ◇ Weight: 2.41kg
- ◇ CE/FCC/RoHS/UKCA/KC Certified
- ◇ 30-Month Warranty

## **Function and features:**

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

- 10 HDMI2.0b input ports and 4 HDMI2.0 output ports.
- 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.
- 4x 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 M).
- 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.
- Two 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/2K.
- 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 size is adjustable from 1/6 to 5/6 horizontal size.
- [3X T/B]: Three split views at portrait.
- [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 G904 can control up to 4 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.
- User can select blue or black background color when no input signal is detected.
- 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. While no input signal is detected, it will shut down output automatically. User can power ON/OFF the system through the control in signal source.

## Applications

- 4k/2k video wall with ability to display discrete 4k content in each monitor.
- Multi-viewer: 3 split views, 4 split views and 6 split views for UHD monitor.
- Display up to 7 contents in one UHD monitor (6 split views + one PI across entire screen).
- One G904 plus one G901 to build 9 split views.
- 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 up to 4 projector edge blending system.

## Features Description

### A. 4k video wall

#### 4K Video wall

##### **Profile 1**



##### **Profile 2**

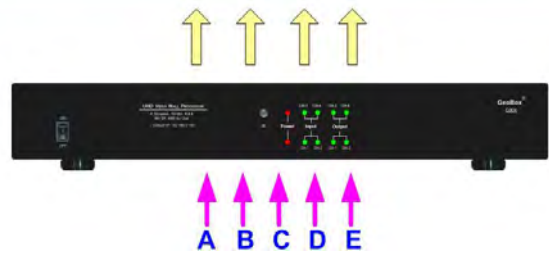
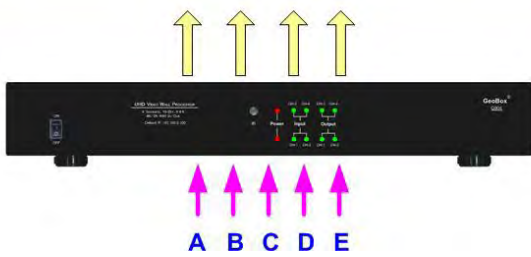
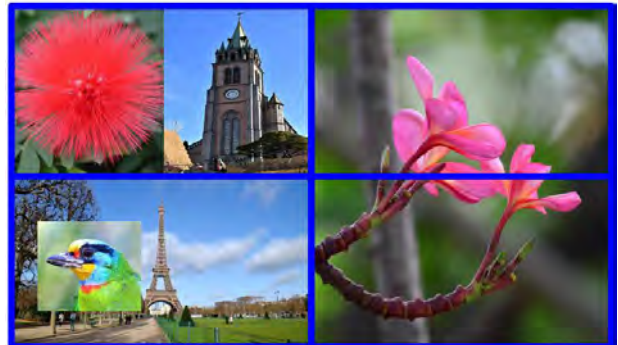


Each monitor displays different style



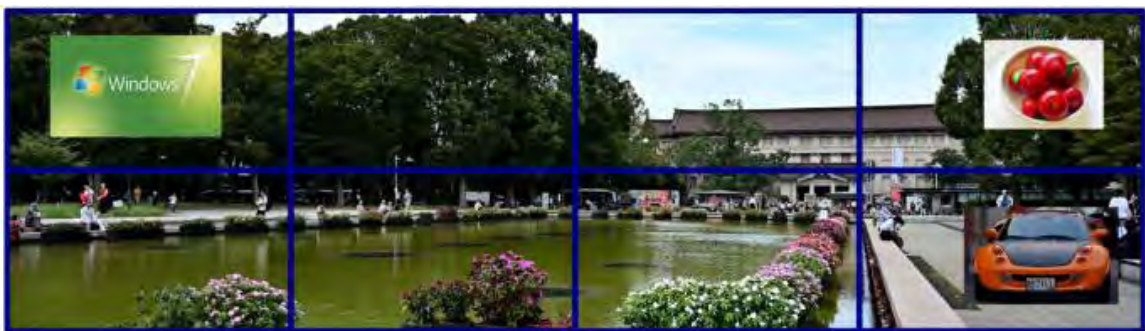
**Video wall with PIP in each monitor**

**Mixed different display mode**

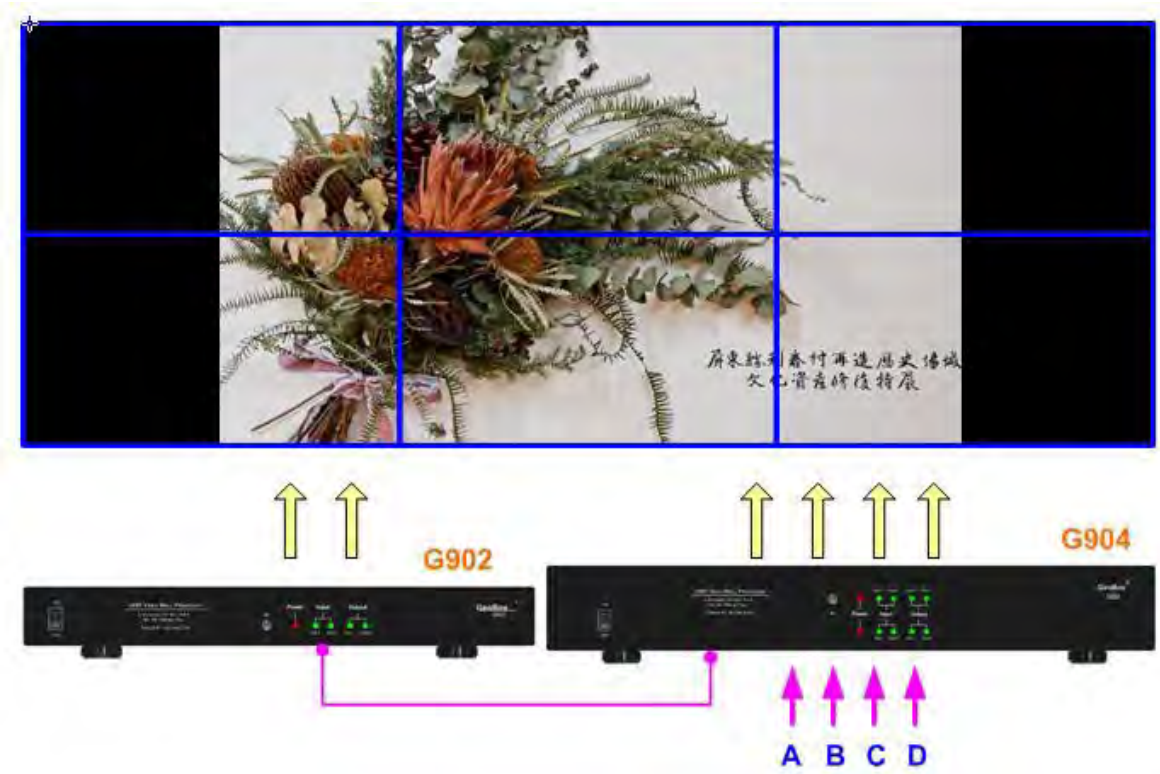


**B. Pixel to pixel 8k/2k video wall**

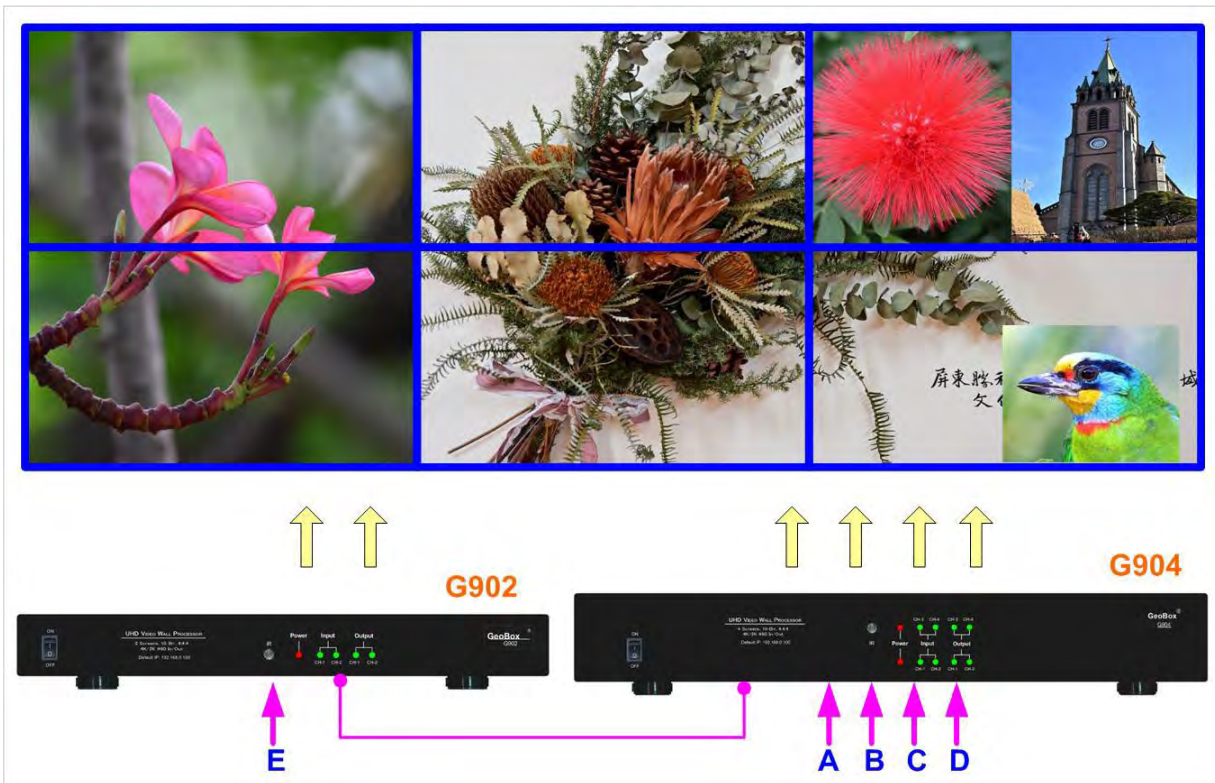
Pixel to pixel 8k/2k video wall with the pixel to pixel video quality. Each monitor can show PIP or POP multi-window images



**C. Multiple unit cascade (aspect ratio is adjustable)**



**D. Multiple unit cascade (each monitor can have independent PIP/POP)**



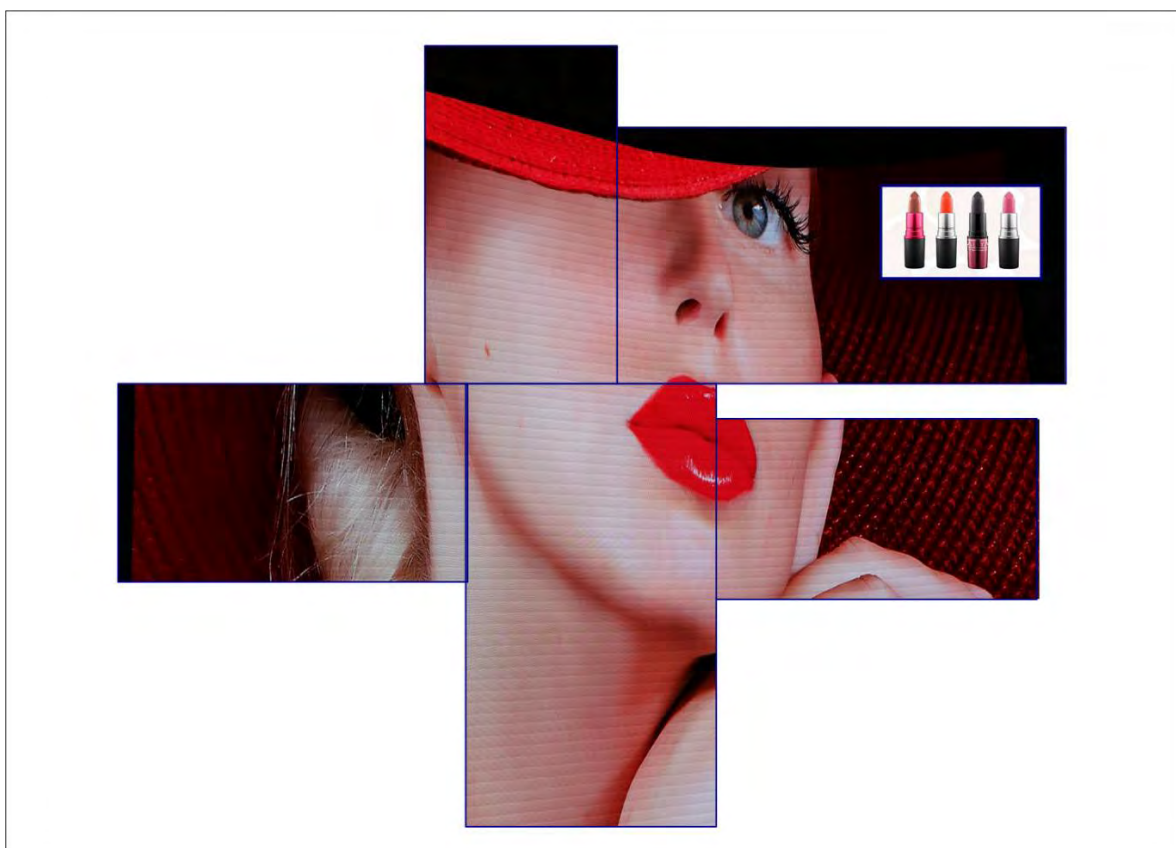
**E. 4K Creative Video wall**



**F. Creative video wall with multiple unit cascaded**

G904 can be cascaded to build big video wall with PIP/POP in each monitor or across multiple monitors. There is no quantity limitation in cascade.





## G. PIP/POP function

### 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 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

OSD menu



GCT PC Tool

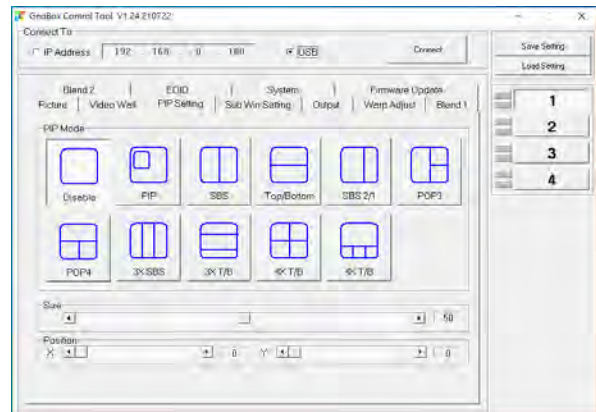
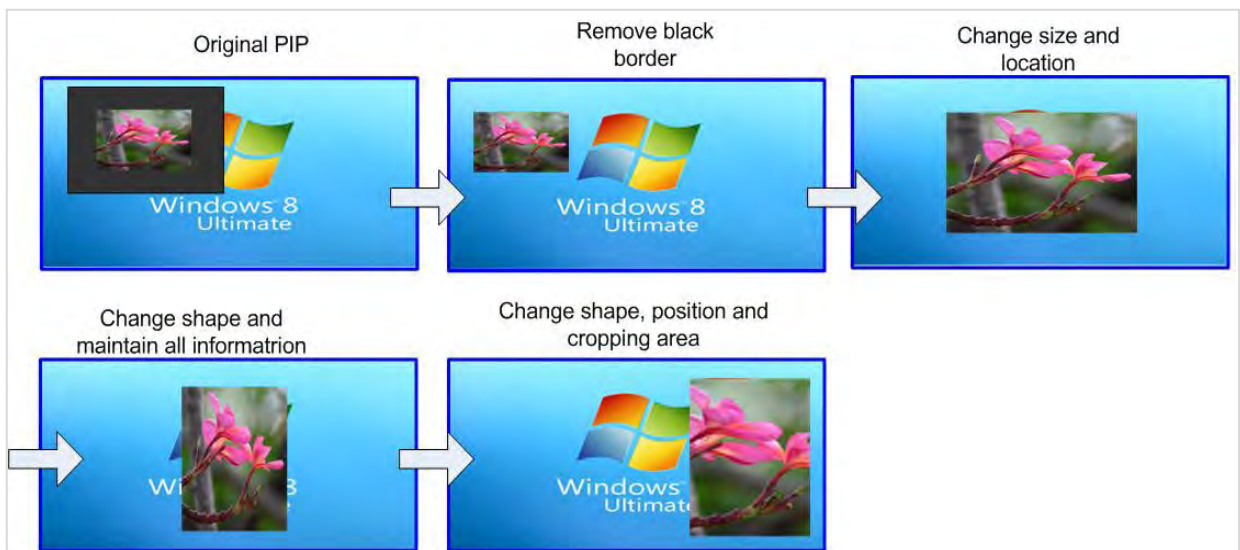


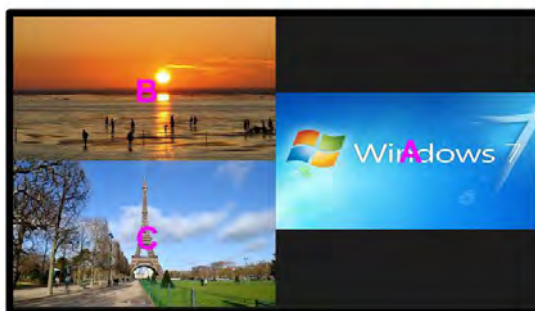
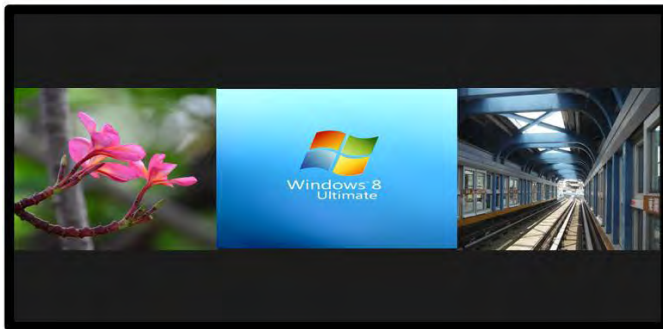
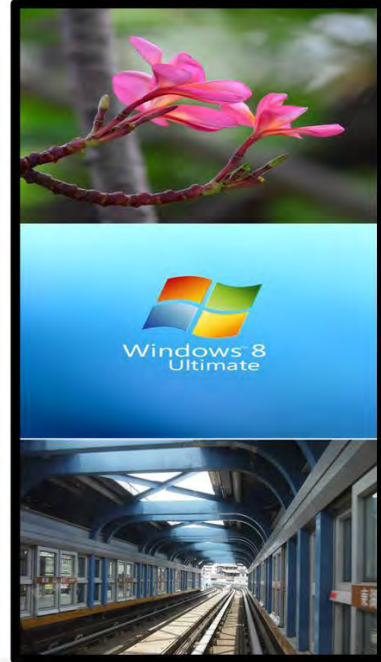


Image cropping in main and sub-images

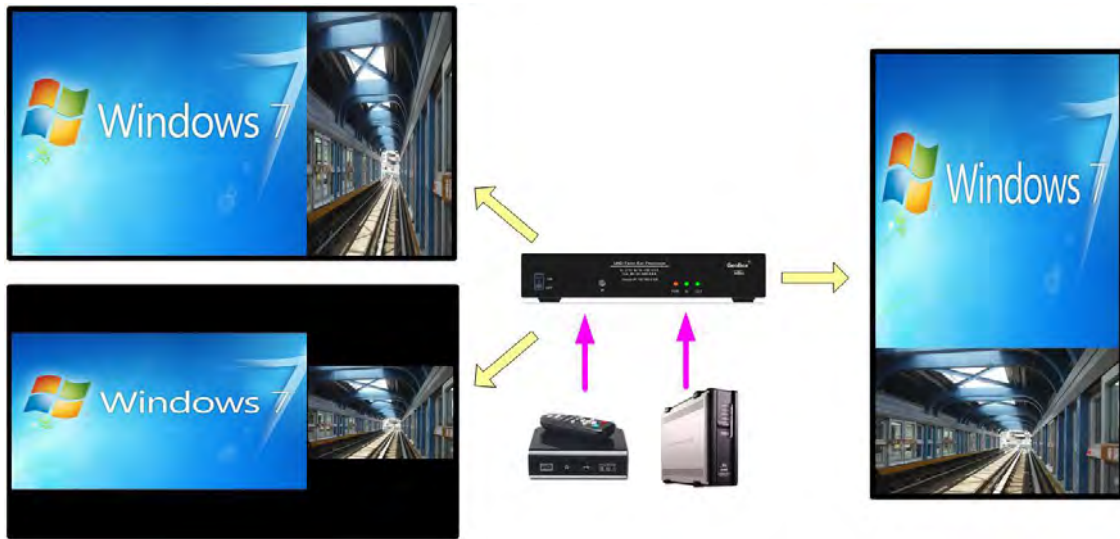


### H. MultiViewer: two 3 split views in one UHD monitor

- Each window can be cropped, rotated and adjust aspect ratio.



I. **[SBS 2/1]**



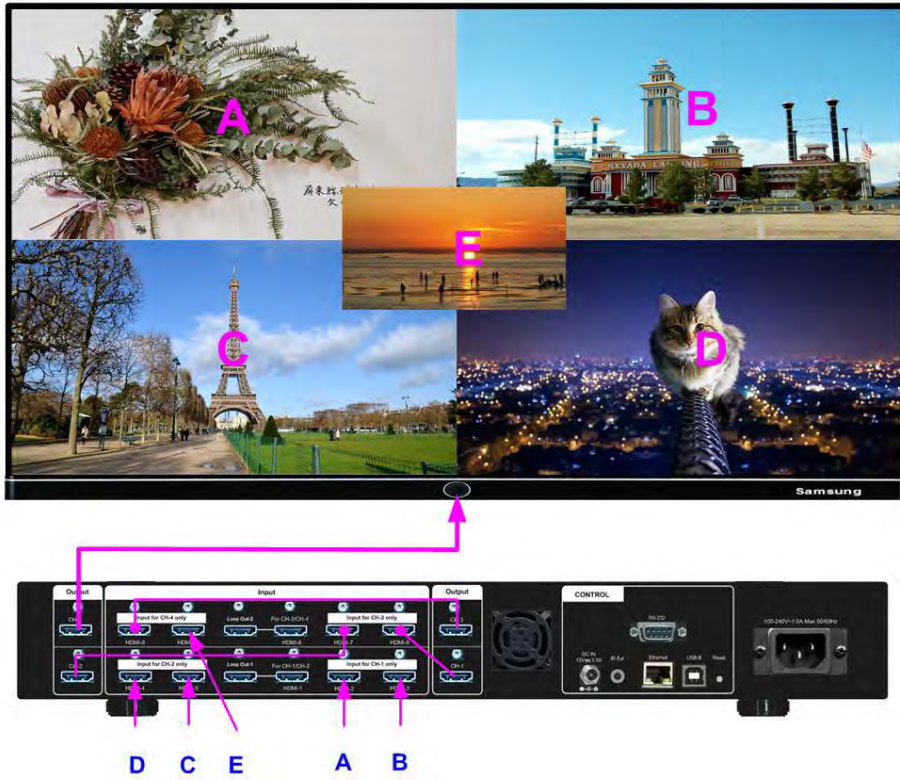
J. **[4x Split] & [4x T/B]**



- Due to input port limitation, user needs to use multiple channels to achieve [4x Split] view function.
- User can use single channel processor G901 to achieve the above [4x Split] and [4x T/B] functions.

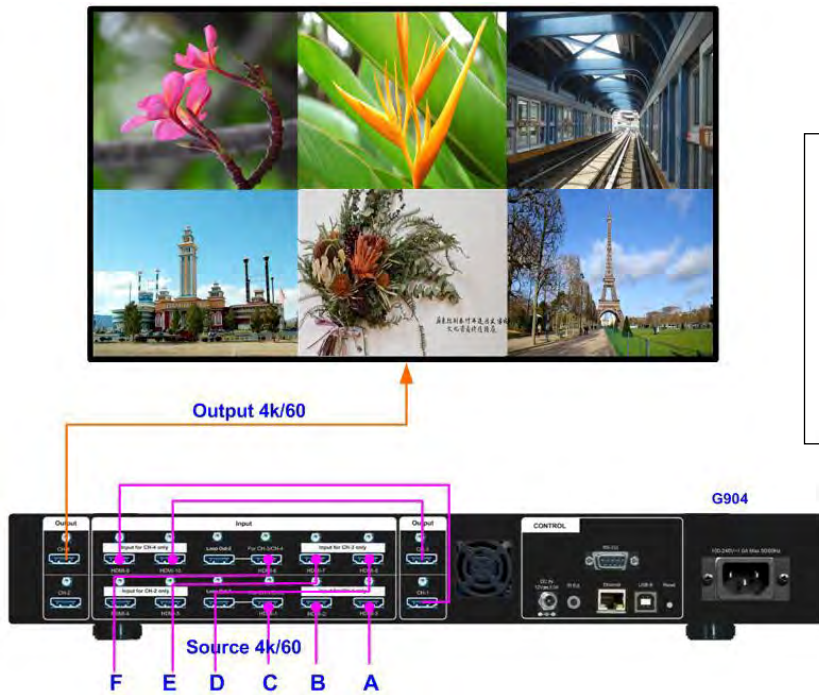


**K. 5 windows in one UHD monitor: One 4 split views + one PIP across entire window**



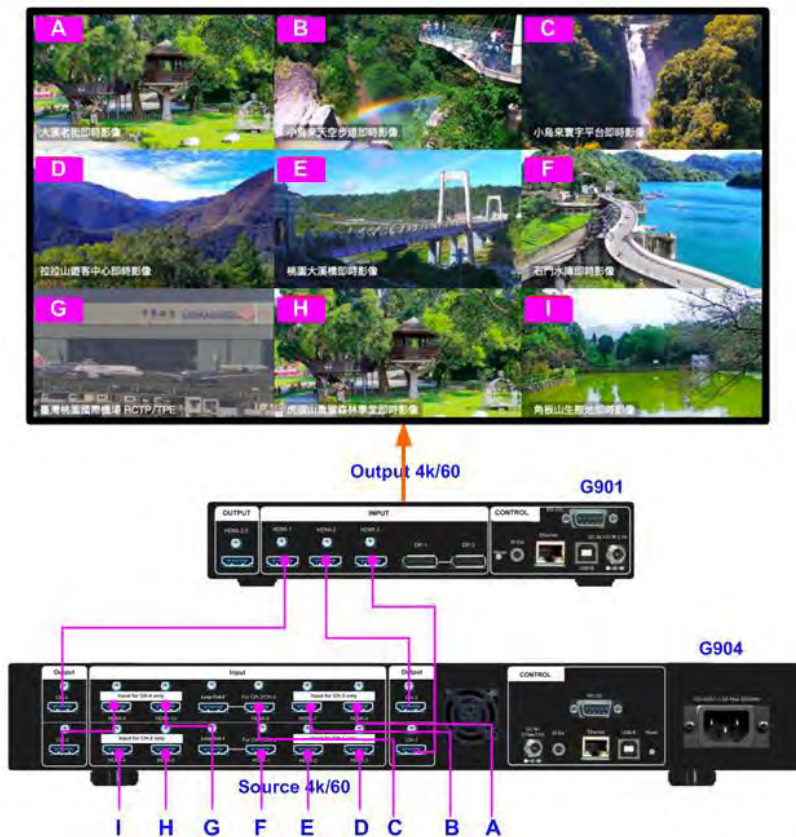
- CH1: SBS, output to 3<sup>rd</sup> CH
- CH2: SBS, output to 3<sup>rd</sup> CH
- CH3: Top/Bottom with output from CH1 & CH2
- CH4: PIP from CH3 + external signal source (PIP)

**L. MultiViewer: 6 split views in one UHD monitor**



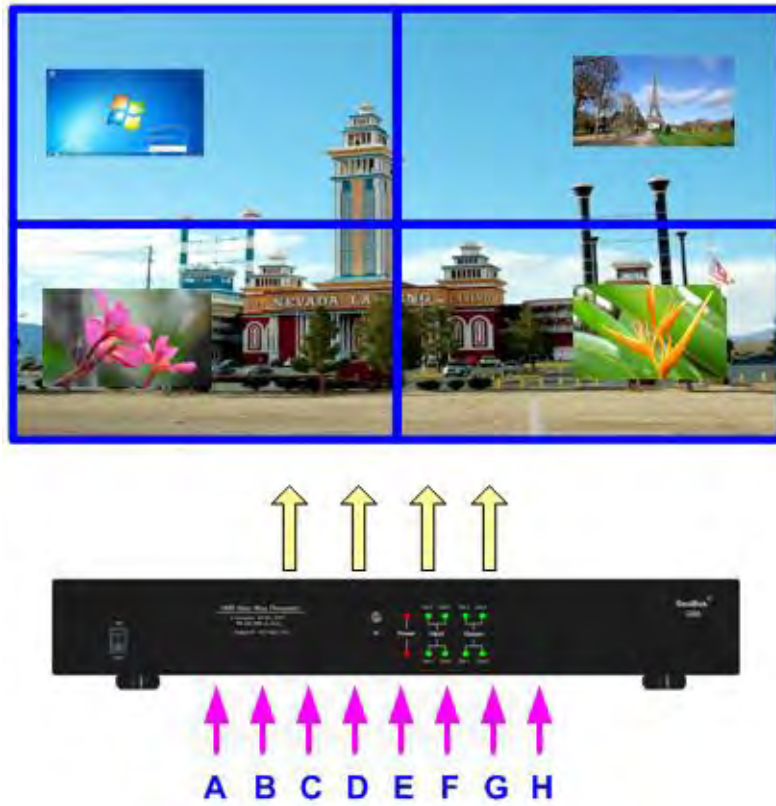
Two channels can build two 3 split view images. Another channel to execute Top/Bottom POP to combine two 3 split views images into one 6 split views for one UHD monitor.

**M. Multi-viewer: 9 split views in one UHD monitor**

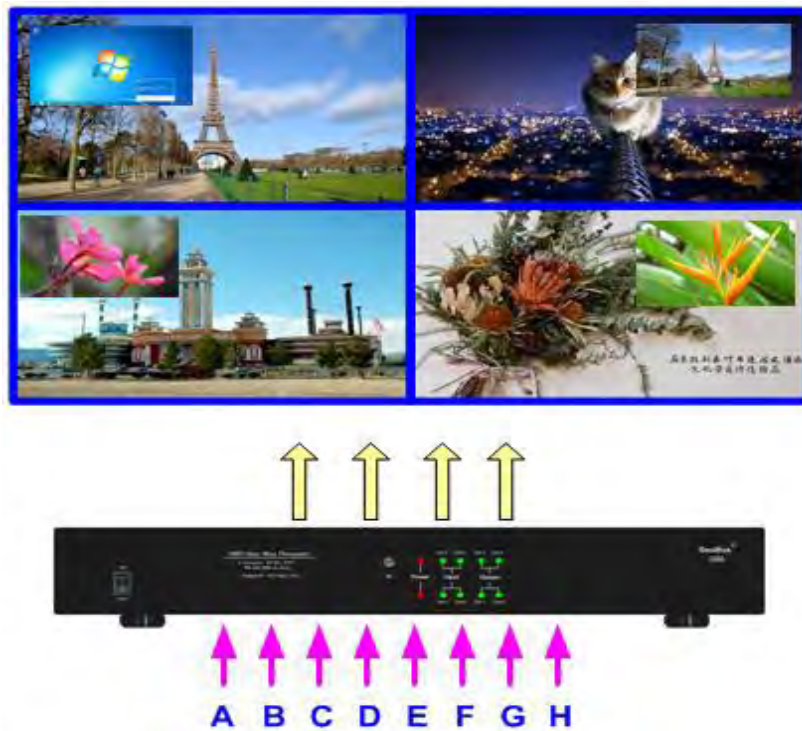


CH1 & CH3 can build two 3 split view images. CH2 & CH4 create 3<sup>rd</sup> 3 split view through [SBS2/1], then use G901 to combine three 3 split view windows into one 9 split view windows for one UHD monitor.

**N. Video wall with 4x PIP images**



**O. Video wall with 8x contents in 4x UHD monitors**



**P. Front end processor**

**G902/G904 as front-end processor for big display system to provide 3 split views.**

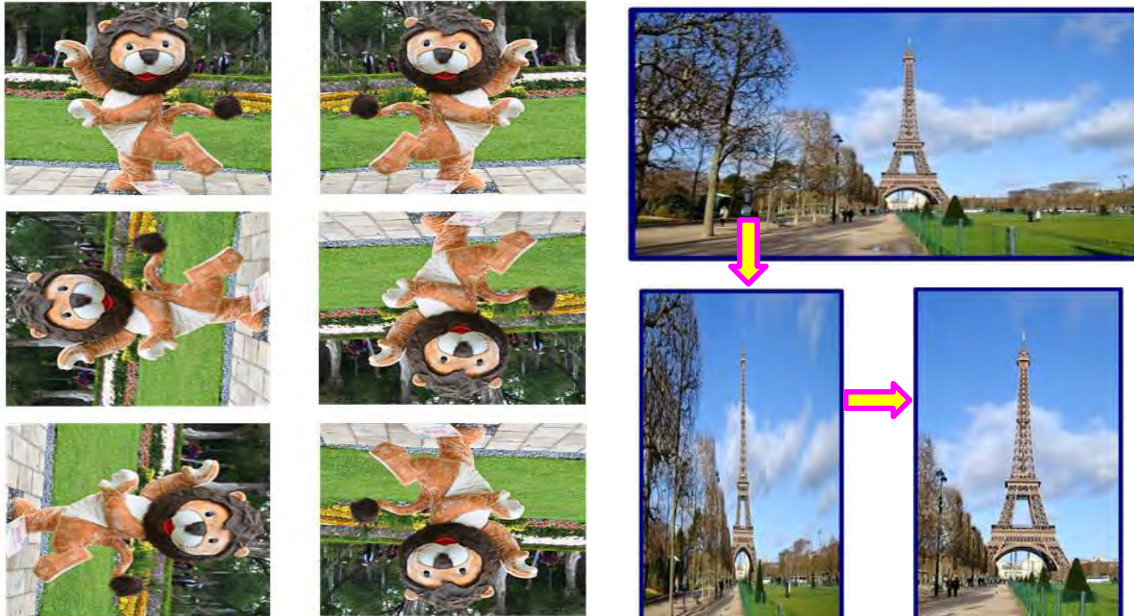


**G904 as front-end processor for big display system to provide 5/6/7 contents in one display**



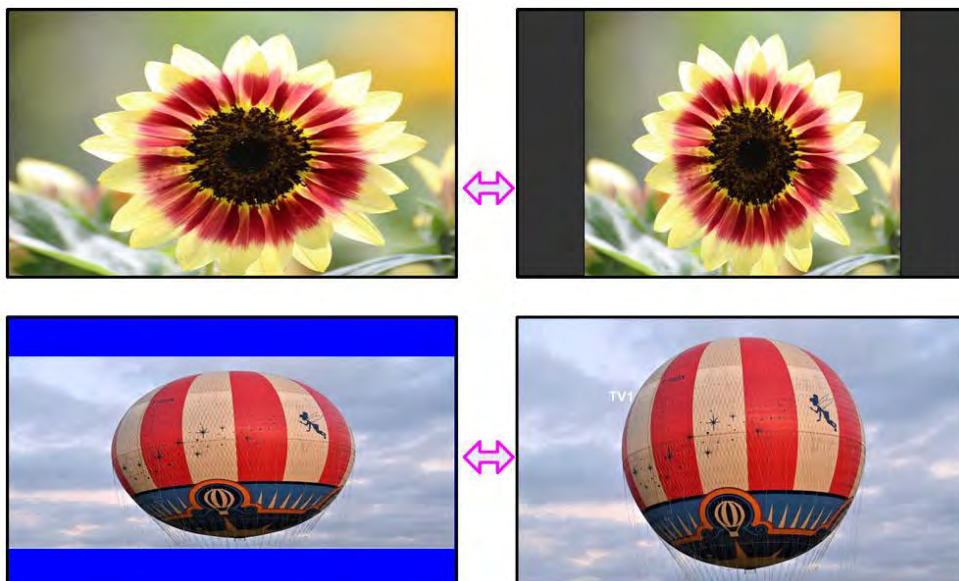
**Q. Image Flip & Rotation**

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.

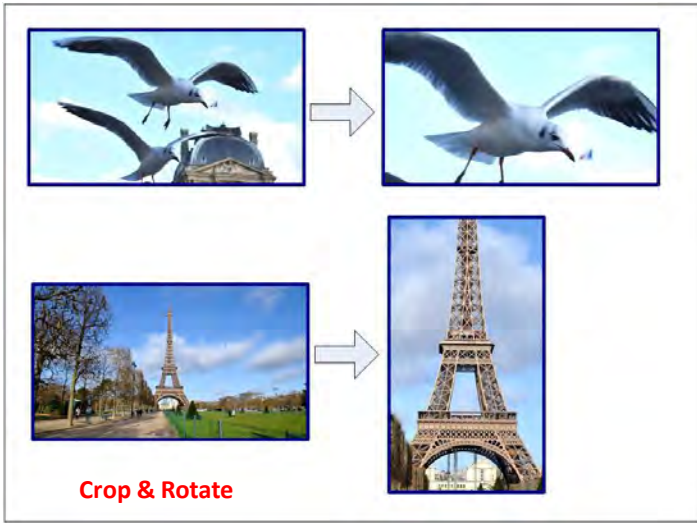


**R. Image aspect ratio adjustment**

Overlap function in Video Wall settings can change cropping area, image position and adjust aspect ratio. Each edge of the image has +-1800 pixels adjusting range.



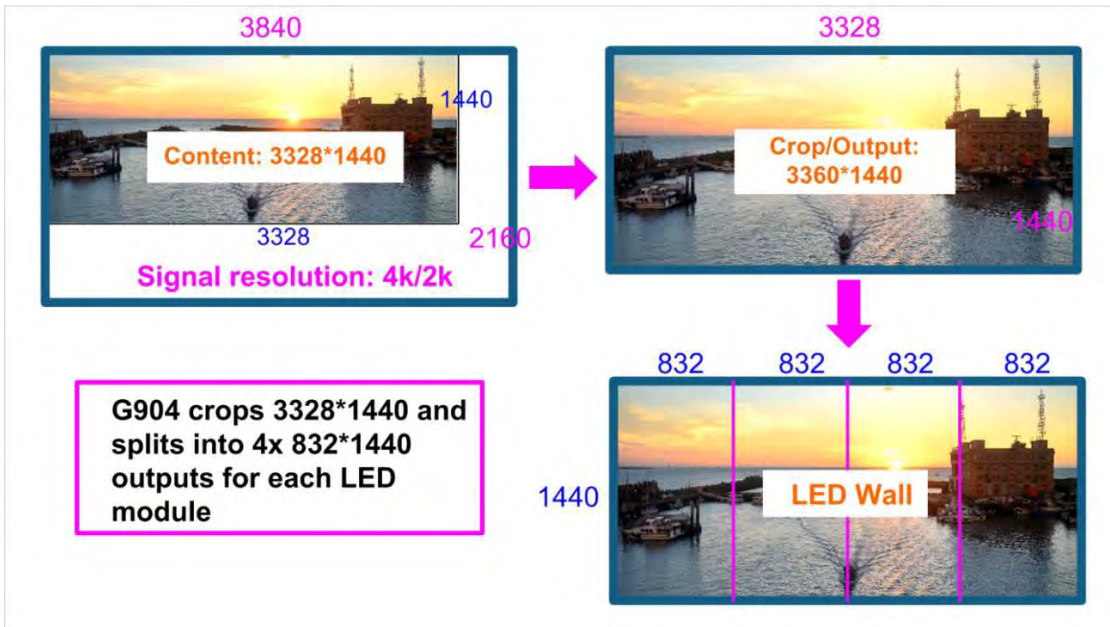
**S. Image Cropping and rotation**



- ✓ 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.

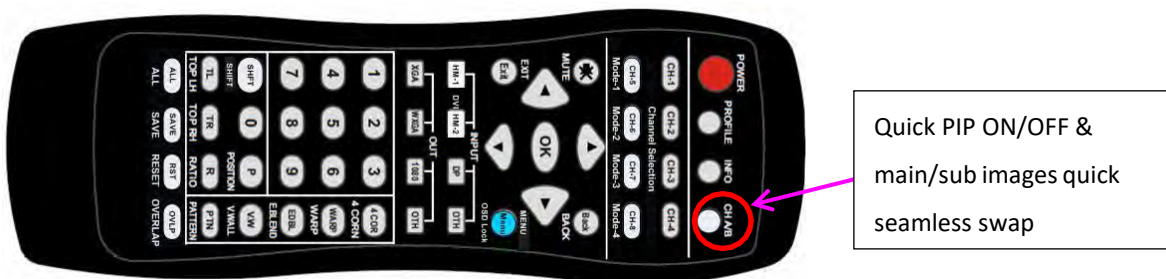
**T. Image cropping for LED display**

In order to match LED requirement, the content resolution is 3328\*1440, media player output is 4k/2k.



## U. 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.



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