

GeoBox

S901 Datasheet

5x1 Seamless UHD switcher with Quad Split Views

(The most advanced product with complete flexibility)

*Input: up to 4096*2160 @60Hz, 7680*2160 @30Hz in HDMI2.0b,*

*7680*4320@30Hz in DP1.4, 4:4:4 chroma sampling*

True 10-bit processing and up/down scaling Programmable

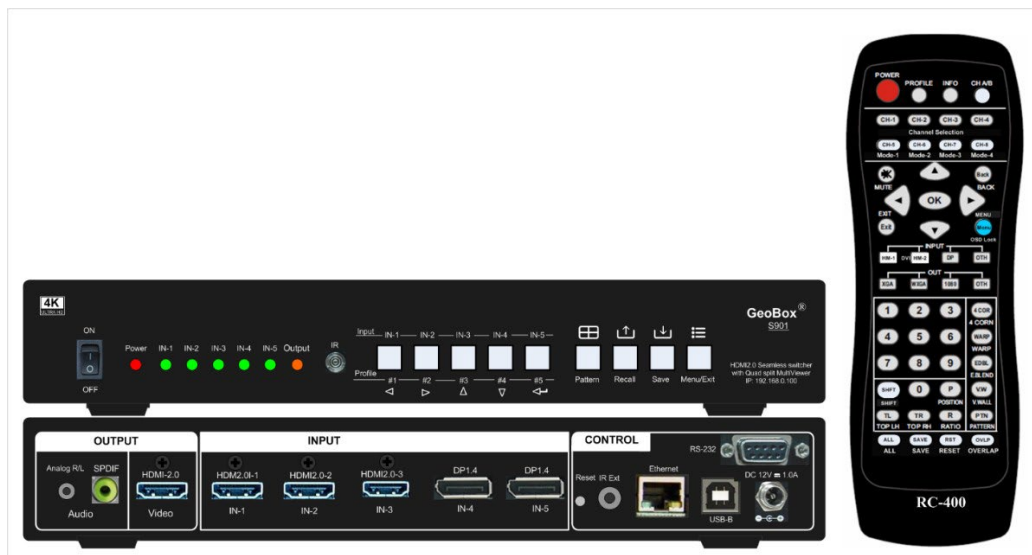
Output resolution: up to H=800-7680, V=600-3840

Selectable output: 24/30/50/60/100/120Hz, 8/10 bits

PIP/POP & 3/4 split view MultiViewer

With window cropping, resizing, and rotation

3D format conversion



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Introduction

Introducing the S901: The Ultimate Video Processor for Seamless Switching and Enhanced Visual Experience

We are thrilled to present the S901, a cutting-edge video processor that revolutionizes how you experience visuals. With its extensive features and unrivaled performance, the S901 is the ideal solution for seamless switching, format conversion, scaling, image manipulation, video wall creation, PIP/POP, 3D format conversion, and multi-viewer functions.

Designed to cater to the demanding needs of extensive display systems, the S901 serves as an exceptional front-end processor capable of handling 4K/60 input and output. Equipped with 5 input ports (3x HDMI, 2x DP) and 1x HDMI output, the S901 supports a wide range of input sources and timings. HDMI inputs accommodate resolutions up to 4096x2160 @60Hz and 7680x2160 @30Hz, while DisplayPort inputs can handle resolutions up to 7680x4320 @30Hz, all with impeccable 4:4:4 chroma sampling. Additionally, the S901 supports non-VESA standard input timings up to 600 MHz.

Enjoy complete flexibility with programmable output resolutions, offering up to 4096x2267 @60Hz or 7680x1234 @60Hz. The horizontal range spans from 800 to 7680 (with 8-pixel steps under 230 MHz and 16-pixel steps above 230 MHz), while the vertical range extends from 600 to 3840 (with 1-pixel steps). The maximum resolution is capped at an impressive 600 MHz. You can select the desired output refresh rate from various options, including 24/30/50/60/100/120Hz.

The S901 integrates a state-of-the-art 10-bit processor, motion adaptive de-interlace, low-angle smooth algorithm, and 3:2/2:2 pull-down cadence for outstanding video processing. Its programmable EDID ensures optimized input timing, guaranteeing the best possible video quality.

Experience precise color adjustment with brightness, contrast, hue, saturation, sharpness, color temperature, and discrete RGB gain adjustment options. The S901 automatically detects and processes HDR BT.2020 input signals, delivering full-color 4:4:4 RGB SDR output signals. Users can select the deep color mode for an even more impressive display, enabling true 10-bit color output for smooth gradient color reproduction.

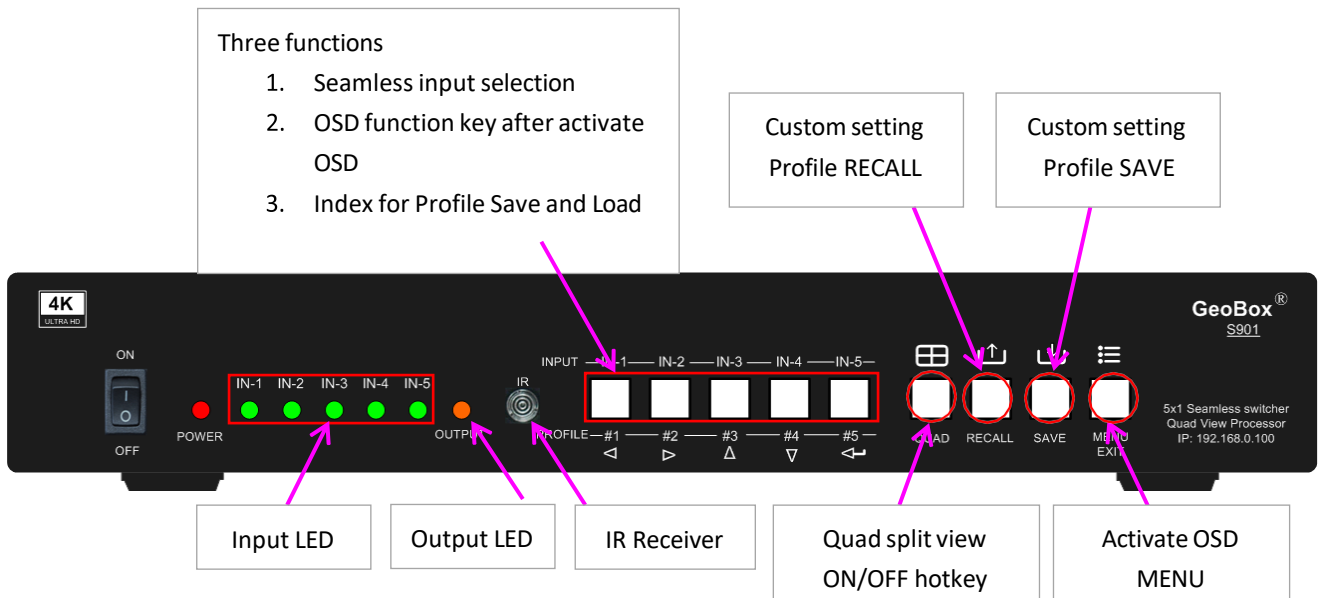
With its advanced video wall function, the S901 can crop specific locations and resolutions within the source image for a customizable output. The overlap function empowers users to change image positions, aspect ratios, and cropping areas with up to ± 1800 pixels adjustment in each edge. The S901 also offers versatile aspect ratio adjustment and image positioning capabilities. Furthermore, you can flip and rotate images at 90/180/270 degrees, making it an ideal front-end solution for LED and large display systems.

The S901 incorporates PIP (picture-in-picture) and POP (side-by-side or top/bottom) functions. It provides 3 split-view and 4 split-view Multiview functions, ensuring a dynamic and immersive viewing experience. The PIP window size can range from 320x180 up to 1920x1200 and can be placed anywhere on the display. The primary and sub-windows can be flipped and rotated at 90/180/270 degrees with seamless swapping capability. Adjust both windows' cropping range and position to achieve optimal visual composition. With the integrated color adjustment function for the sub-window, the S901 offers

unparalleled application flexibility.

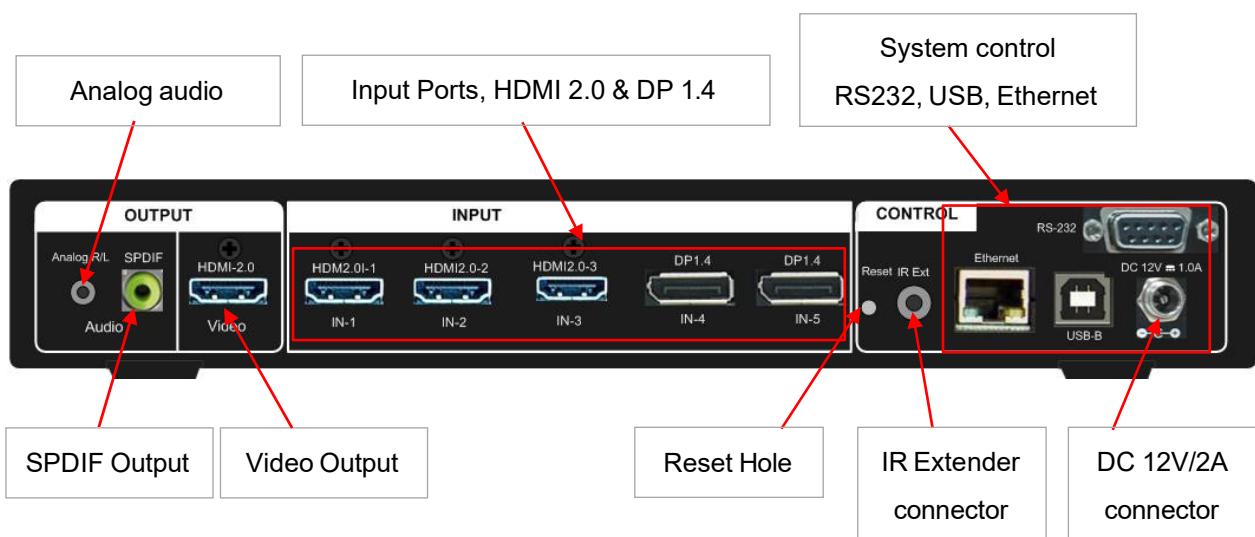
The S901's 3D format conversion capability is genuine.

Front panel



Back panel

Users can connect the signal source to any input ports for the main display and PIP/POP operation.



Specifications

- ✧ Input ports: 3x HDMI 2.0b, 2x DP1.4. Input signal source seamless switching (within one second).
- ✧ Max. input: 4096*2160 @60Hz or 7680*2160 @30Hz in HDMI (up to 600 MHz) and 7680*4320 @30Hz (true 8k/4k @30Hz) in DisplayPort (Up to 1080 MHz).
- ✧ Supports interleaved and progressive input signals with 4:4:4, 10-bit color up to 4096*2160 60Hz.
- ✧ Support High Dynamic Range (HDR): SMPTE ST-2084, SMPTE ST-2086, and BT.2020 HDR 10 input signal processing.
- ✧ Support non-VESA standard input with high-end scaling up and down functions up to 600 MHz.
- ✧ Preset 17 output timing modes with selectable 8-bit/10-bit color and HDCP control settings.
- ✧ Programmable Output: the output 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 clock 600 MHz).
- ✧ Output signal: SDR, progressive full-color RGB 4:4:4.
- ✧ 24/30/50/60/100/120Hz refresh rate selection.
- ✧ HDCP: V2.2/V1.4 in HDMI & V2.2 in DP ports.
- ✧ Embedded video wall function for image split, cropping, location assignment, and bezel compensation.
- ✧ Flexible aspect ratio adjustment in each edge up to +_ 1800 pixels.
- ✧ Support xvYCC 8/10/12-bit wide color gamut input signal processing.
- ✧ One frame latency: 16.7ms (V=60Hz)
- ✧ Programmable EDID in the range at H= 1024-4080 (8 pixels/step), V= 720-3840 (1 pixel/step)
- ✧ PIP/POP function with PIP image size from 320*180 up to 1920*1200 resolution with flexible position, cropping area, aspect ratio, rotation/flip, and color adjustment.
- ✧ A PIP-window input signal can be turned on/off seamlessly through the remote controller shortcut key.
- ✧ Individual color adjustment in main and sub-windows.
- ✧ One G901 can display 4 types of 3 split views on a landscape or portrait UHD monitor. 2 types of 4 split views can be displayed on a landscape monitor. All inputs can be up to 4k/2k 60Hz.
- ✧ 3x SBS split view with an adjustable center image size from 1/6 to 5/6.
- ✧ 5x1 seamless switching with the continuous output signal. The projector needn't research the input source.
- ✧ High-end video processing: 10-bit processor, 3:2:2:2 cadence, low angle smooth algorithm.
- ✧ High-quality scaling engine for image scaling up and down in the range from XGA to 8K/4K.
- ✧ 3D motion adaptive de-interlace for interlaced input.
- ✧ 90/180/270 rotation, flip, cropping, scaling & color adjustment in main and sub-windows.
- ✧ Embedded HDMI audio output. Users can select audio from the main or sub-window signal source.
- ✧ OSD menu position can be shifted for convenient OSD operation.
- ✧ 3D decoding and format conversion for passive and active 3D display.
- ✧ Image freeze by clicking the keypad on the remote controller.
- ✧ Native 1:1 pixel-to-pixel image display with original quality.
- ✧ ESD Protection: ±15kV (Air-gap discharge), ±8kV (Contact discharge)
- ✧ DC power supply: DC adapter: 12V 2A (100V-240V), max. Power consumption: 0.6A (7.2w)
- ✧ Working environment: 40 ° C, 10-90% RH
- ✧ Control: Front panel keypad, IR remote controller, RS232, USB, Ethernet
- ✧ 10 system settings can be stored and backup.
- ✧ Dimensions (Body only): 260mm*138mm*41mm (without protruding parts).
- ✧ Weight: 0.88kg (body only)
- ✧ CE/FCC/RoHS Certified
- ✧ 30-month warranty.

Function and features:

A. Input and output

- Input: 3x HDMI 2.0b, 2x DisplayPort V1.4.
 - HDMI 2.0b: Up to 4096*2160 @60Hz, 7680*2160 @30Hz, maximum pixel clock 600MHz.
 - DisplayPort 1.4: up to 7680*4320 @30fps (true 8k/4k)
 - Interleaved or progressive signal, 4:4:4 chroma sampling without compression
 - Connect with various video sources and support none VESA standard input up to 120Hz.
 - Seamless input source switching. The projector needn't research the input source.
- 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*1080@60.
- All outputs are RGB 4:4:4 progressive signals.
- Support xvYCC 8/10/12-bit wide color gamut input signal processing.
- Support selectable 8-bit/10-bit Deep Color output mode, even if the input is 8-bit.
- Auto-detect HDR-BT. 2020 input signal and processing with full-color SDR RGB 4:4:4 output.

B. Programmable output resolution and refresh rate

To meet the requirement in LED display, S901 is designed with programmable output resolution and refresh rate: The range is from 800-7680 (8 Pixels/step under 230Mhz, 16 Pixels/step above 230Mhz) horizontal and 600-3840 (1 Pixel/step) in vertical directions (maximum pixel clock 600 MHz). Maximum output: 4096*2267/60 HZ or 7680*1234 /60 Hz. The selectable output refresh rate is 24/30/50/60/100/120 Hz.

C. Seamless switching for the primary input

- The seamless switching function is only functional for the primary input with a single image display.
- Front panel keypad for quick input port switching.
- The projector will not research the signal source during input port switching.
- The inputs support 4k/2k 60Hz. The output is programmable up to 4k/2k/60 Hz or 7680*1200/60Hz.

D. High-end 10-bit scaling up and scaling down

- 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 gain adjustment.

E. PIP/POP and MultiViewer function

- [PIP]: Picture in Picture display with any two inputs.
- [SBS]: Horizontal Side by Side display.
- [Top/Bottom]: Top/Bottom display.
- [SBS 2/1]: 2/3:1/3 side-by-side display. It can be swapped to a 1/3:2/3 side-by-side display by image rotation and changing the monitor installation direction (top/down).
- [POP3]: One image on the LH side and top/bottom two images on the RH side. It can be swapped to one image on the RH side and the top/bottom two images on the LH side by image rotation and changing the monitor installation direction (top/down direction).
- [POP4]: One image at the Top and two at the bottom. It can be swapped to two images at the Top and one image at the Bottom by image rotation and changing the monitor installation direction (top/down direction).
- [3X SBS]: Three split views of the landscape. The center image size is adjustable from 1/6 to 5/6 screen width through [Size] under [PIP Setting]. The minimum image size on both side windows is 1/12 screen width. Each window can be rotated to display on the monitor in portrait position.
- [3X T/B]: Three split views in portrait direction.
- [4x Split]: Four equal size split views (Monitor at landscape only). The front panel hotkey can implement it.
- [4x T/B]: Display 4 split views with one image at the top and 3 at the bottom. Below 3 windows, keep a 16:9 aspect ratio.
- PIP (picture in picture): with flexible PIP size (320*180 to 1920*1200), location, and aspect ratio.
- Except for [4x split] and [4x T/B] functions, all the other multiple window functions can support monitor at portrait and landscape positions. The main image and the sub-window support 90/180/270 degrees rotation and flip and keep [Full Screen] or [Original AR] aspect ratio.
- The cropping function (Overlap setting function) is available in the Main image and all sub-windows for different locations, sizes, and aspect ratio adjustment and for creating image borders.
- Individual color adjustment in main and sub-windows.
- All the inputs for main and sub-windows can be up to 4k/2k 60Hz 4:4:4 signals.

F. Image Cropping and Video wall function

- The input source can be cropped at H&V directions with any size through the video wall function.
- Serve as video wall controller for irregular video wall with LCD at landscape or portrait position. One box can only control one monitor. Multiple boxes are required for a multi-LCD video wall.
- Split the image up to 15x15 sections from a single signal source in H&V directions. Assign the location of each split image for the output. The output can be further adjusted with +_ 1800 pixels in H&V for image position shift, aspect ratio adjustment, bezel compensation, and creating overlap region for projector edge blending.

G. Various color adjustment

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

H. Image rotation and flip

- Image 90/180/270 degrees rotation up to 4k/60Hz input resolution. The purpose is for the display installed at different directions or top/bottom to change the layout in 3/4 split views.
- Image flip in Front/Rear, Left/Right, and Top/Bottom directions.
- PIP/POP/3 split view main and each sub-window can be rotated independently.

I. 3D function

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

J. Quick PIP ON/OFF and two input seamless swap

- Users can use the remote controller [CH A/B] hotkey to turn ON/OFF PIP images seamlessly.
- Suppose the output resolution is set to FHD or 1920x1200. In that case, the user can assign one input signal to the main and another to the PIP channel and execute a quick, seamless swap through the [CH A/B] keypad on the remote controller.

K. Image freeze

- [Image Freeze] function integrated into the [Shift] shortcut key on the remote controller.
- The video will be frozen when the user clicks the [Shift] key. To click [Shift] again, it will be released and turn to a standard display.
- This function is suitable for image editing or the user wanting to see a specific video clip.

L. Native 1:1 pixel-to-pixel image display mode

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

- [Full screen]: to display the content with full screen. The image will be scaled to full screen no matter the input with what kind of aspect ratio.
- [Original AR]: to display content with original aspect ratio. If 4:3 input content is displayed on a 16:9 monitor, the 4:3 image aspect ratio will be kept with a full vertical screen.

- [1:1]: to display native pixel-to-pixel image at the center of the screen. When an XGA image is displayed on a 16:9 monitor, it will show pixel to pixel XGA image at the center of the monitor without scaling to keep the original image quality.
- Further image cropping and aspect ratio adjustment are still available.

M. System control and other features

- Professional design and reliability for a 24/7 working environment.
- Full-function system setup through front panel keypad, remote controller, USB, WebGui, or Ethernet (Including through Wi-Fi by PC, Mobile, or iPad).
- Firmware update via USB or Ethernet.
- Users can select main or sub-window-1 audio while implementing PIP/POP.
- PC tools can control multiple processors simultaneously through USB or Ethernet.
- RS232 & Ethernet system control is compatible with most of the control systems.
- Programmable EDID in the range of H=1024~4080, V=720~3840. Beyond this resolution, the user must set PC output timing through PC Customized settings.
- BOX ID and programmable IP address for convenient multiple unit control simultaneously.
- Users can save up to 10 settings and can be recalled by the front panel keypad, remote controller, RS232, USB, or network.
- System settings can be backup to PC and copied to another unit.
- Automatic power ON/OFF through input signal ON/OFF control.

Applications

- 5x1 seamless switcher with UHD input/output
- MultiViewer function to display 2/3/4 split views for UHD display.
- Front-end processor for multiple projector edge blending, LED, and video wall systems.
- Image rotation processor for a display system.
- The mobile game is displayed on a portrait TV set.
- The most powerful PIP/POP function for large display systems with the flexibility to change direction, cropping area, position, color, and aspect ratio.
- High-quality video up/down scaler with selectable output timings and refresh rate.
- Scaling down 8k/4k signal into low resolution.
- True 10-bit processor to keep smooth gradient color.
- Cropping specific image areas for selectable output resolution & refresh rate.
- 3D format conversion for medical and dual camera 3D source.
- 3D decoding for passive 3D display with two units.

Feature illustration

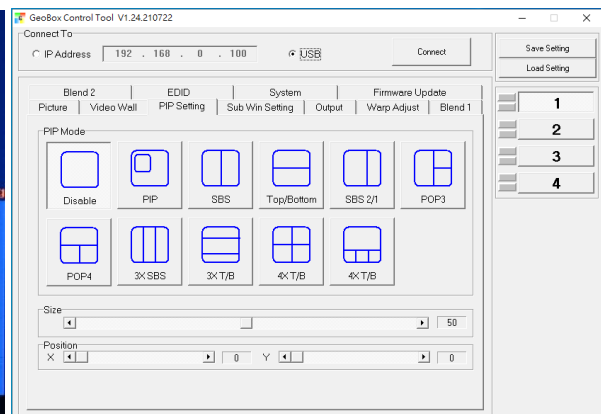
A. PIP/POP and MultiViewer functions

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- [4x Split]: Four equal size split views (Monitor at landscape only).
- [4x T/B]: Display 4 split views with one image at the top and 3 at the bottom. Below 3 windows, keep a 16:9 aspect ratio.

OSD menu



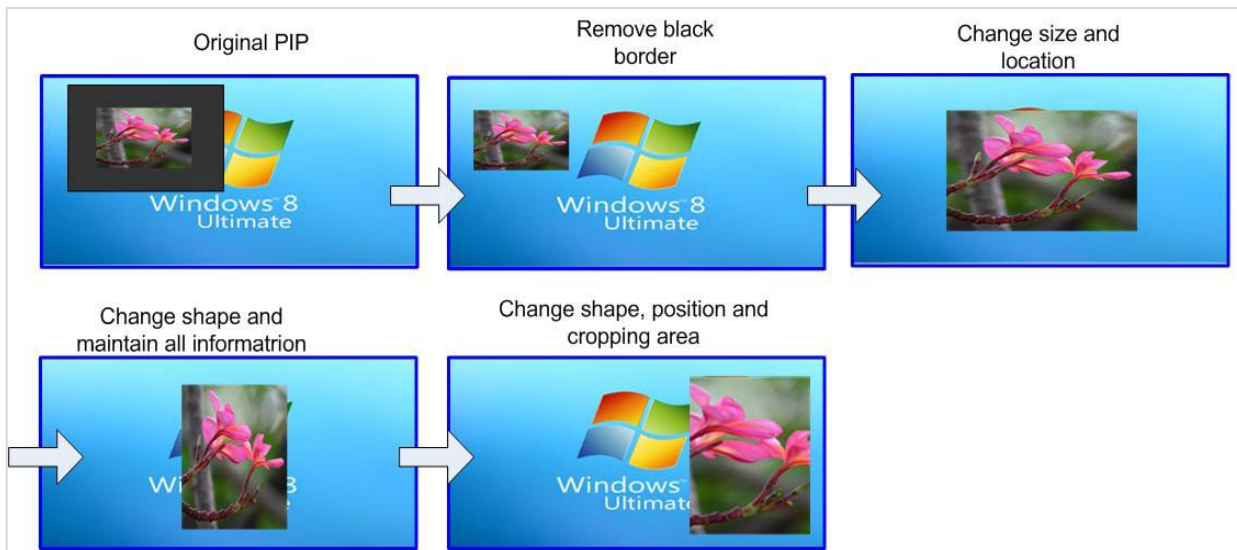
GCT PC Tool



All input/output resolutions can be up to 4k/2k @60Hz.



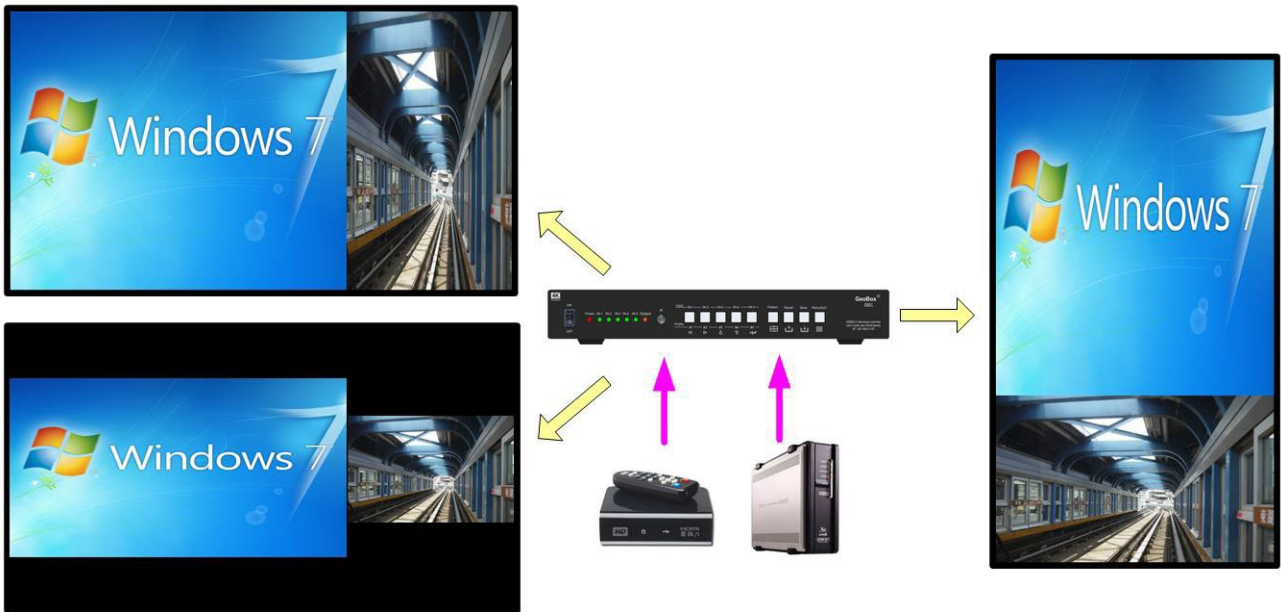
Sub-window position, size, and cropping area are flexible.



B. MultiViewer

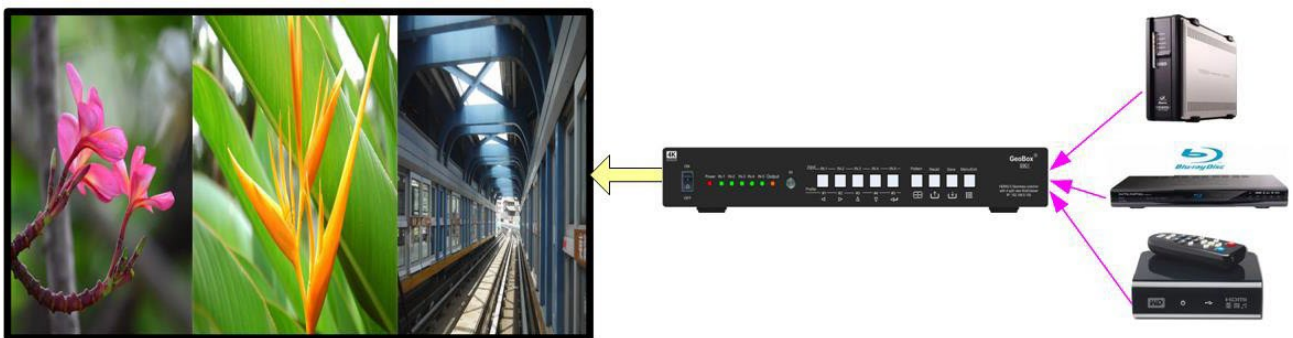
SBS 2/1 display

Users can swap to 1/3:2/3 side-by-side or top/bottom display by image rotation and change the monitor installation direction (top/down direction).



Landscape 3 split views (3x SBS)

The center image size can be adjusted from 1/6 to 5/6 horizontal size.



The image aspect ratio can be changed to 16:9

portrait 3 split views

**[3x SBS] in portrait monitor
with image rotation**



3 Split Views [POP3]



After monitor and image rotation



3 split views [POP4]

After monitor and image rotation



3x SBS in portrait monitor with image rotation

4 split views (At least one signal shall come from DisplayPort)

[4x split]

[4x T/B]

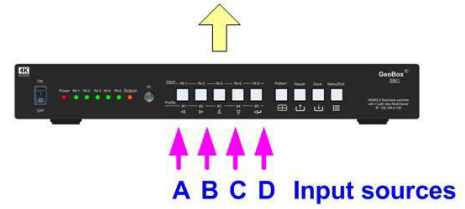
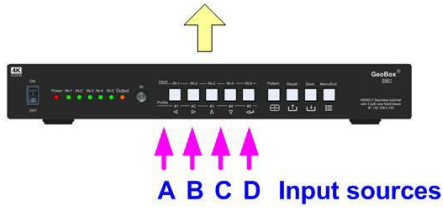
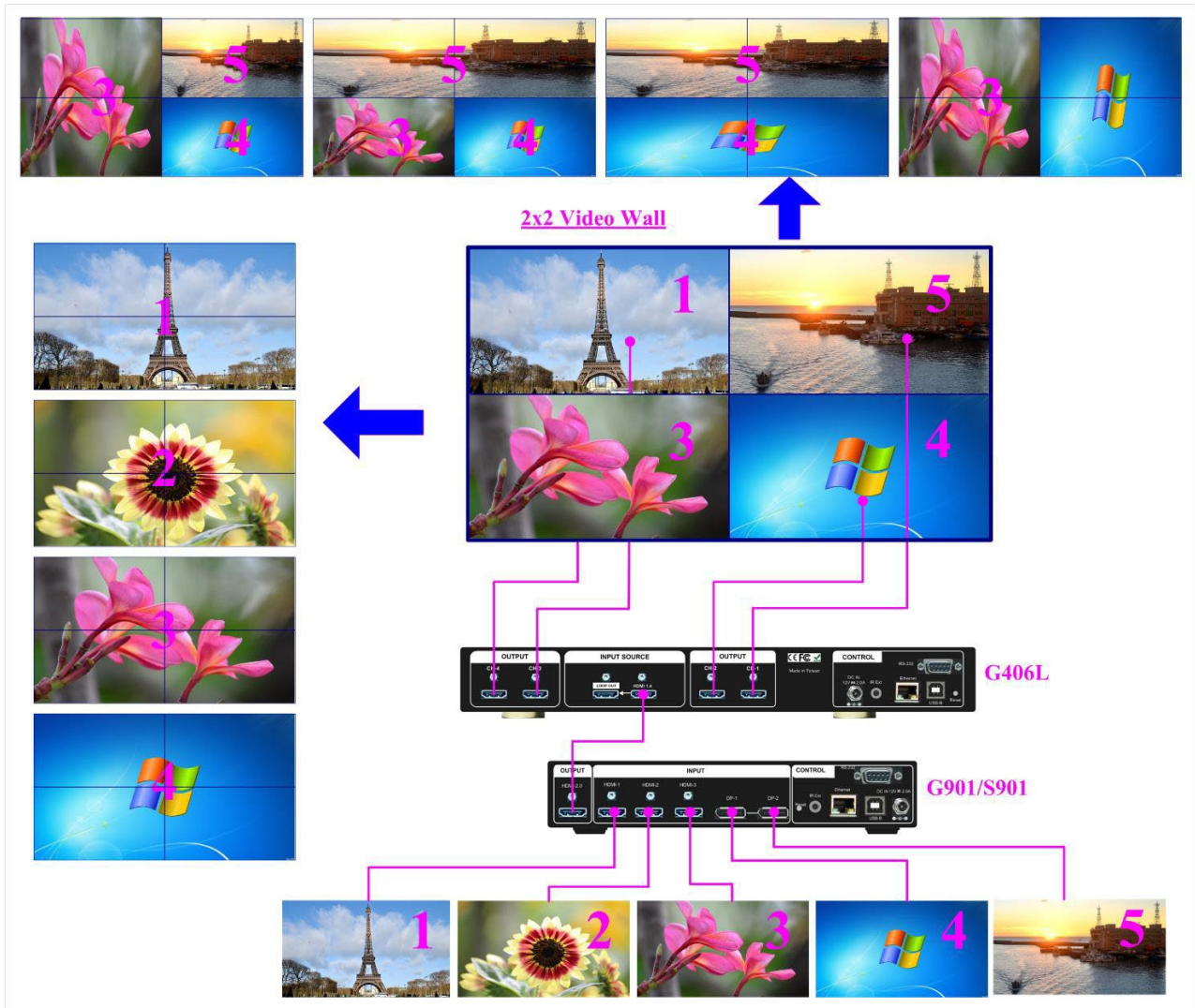


Image cropping and aspect ratio adjustment are available in each window.

C. Front-end processor

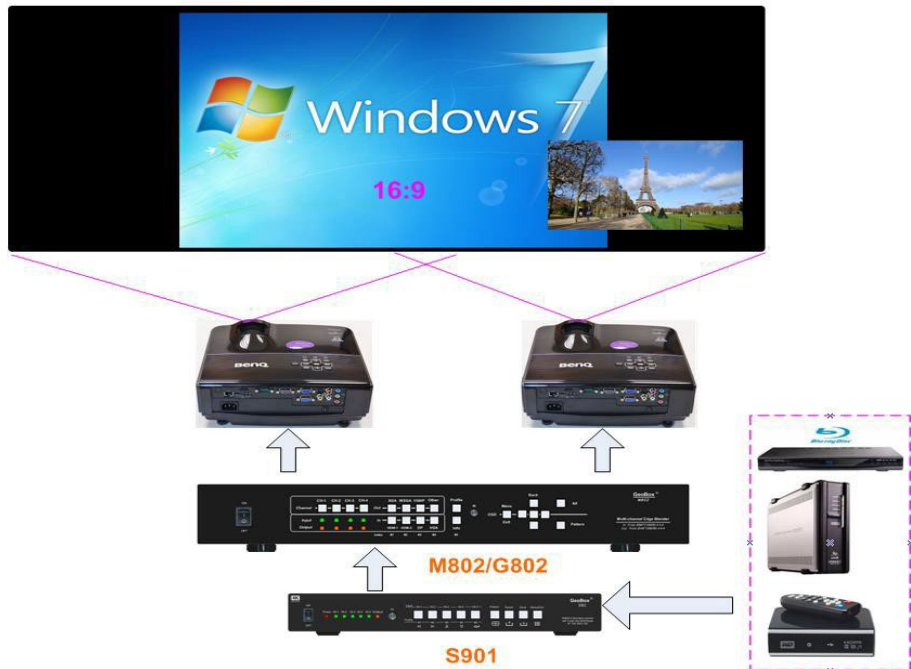
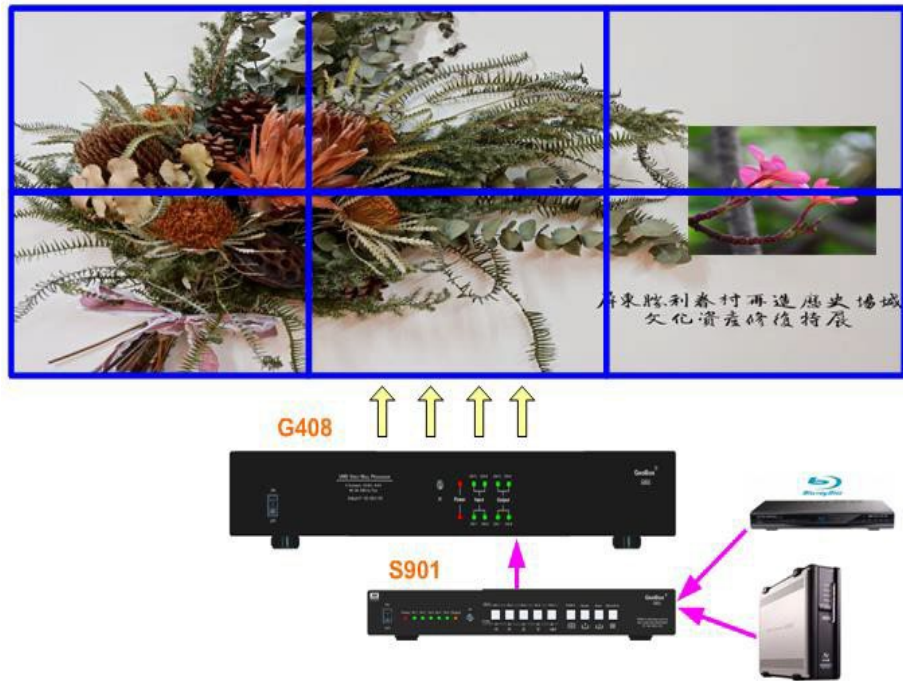
Front-end processor for Video Wall system (displayed on multiple monitors)



Multi-View in Projector edge blending system

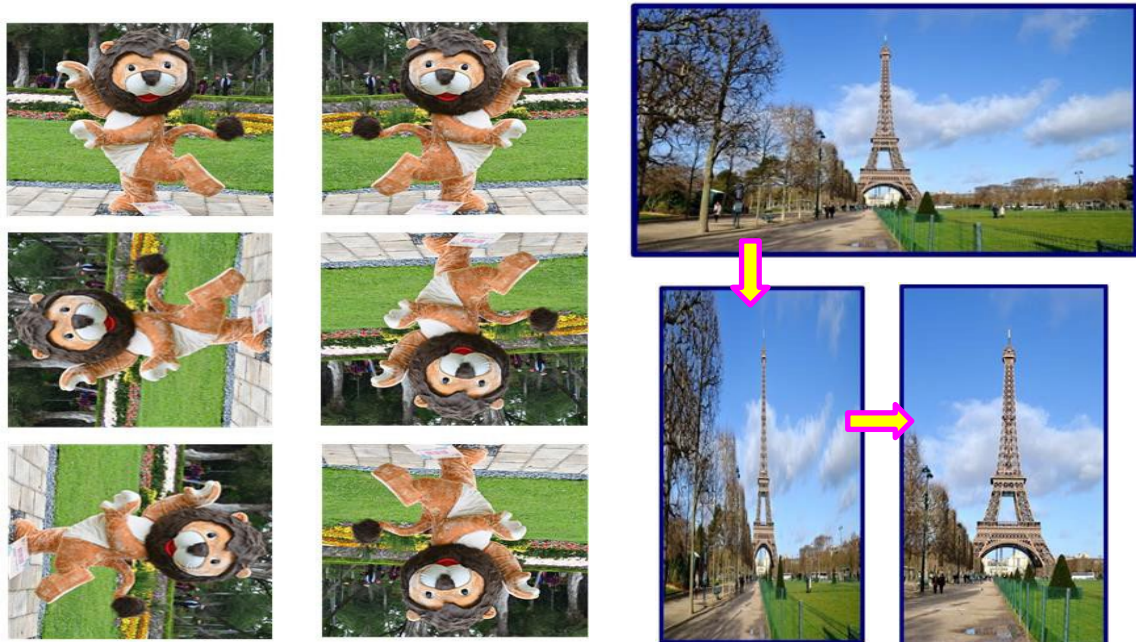


Other video wall and projector applications



D. Image Flip & Rotation

Image 90/270 degrees rotation and flip up to 4k/60Hz resolution. After image rotation or flip, the user can adjust the aspect ratio and cropping area.

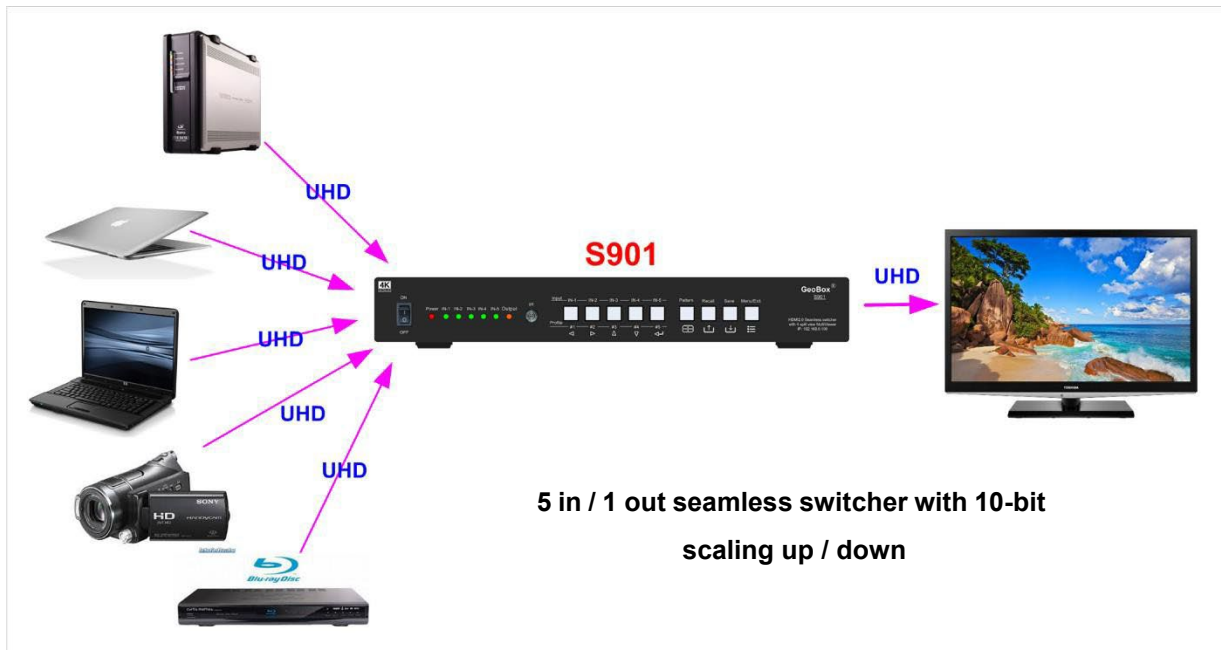


Example for mobile phone application

Mirrored image from mobile phone and displayed the image on portrait TV.



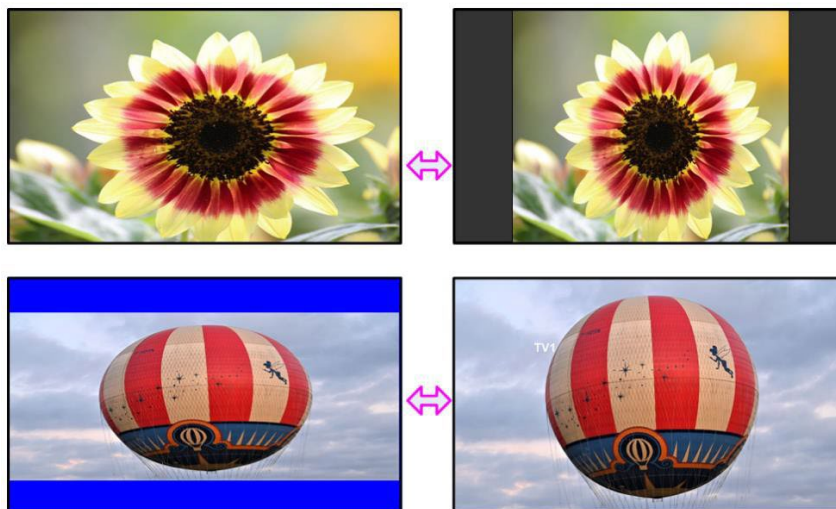
E. 5x1 4K Seamless Scaler Switcher



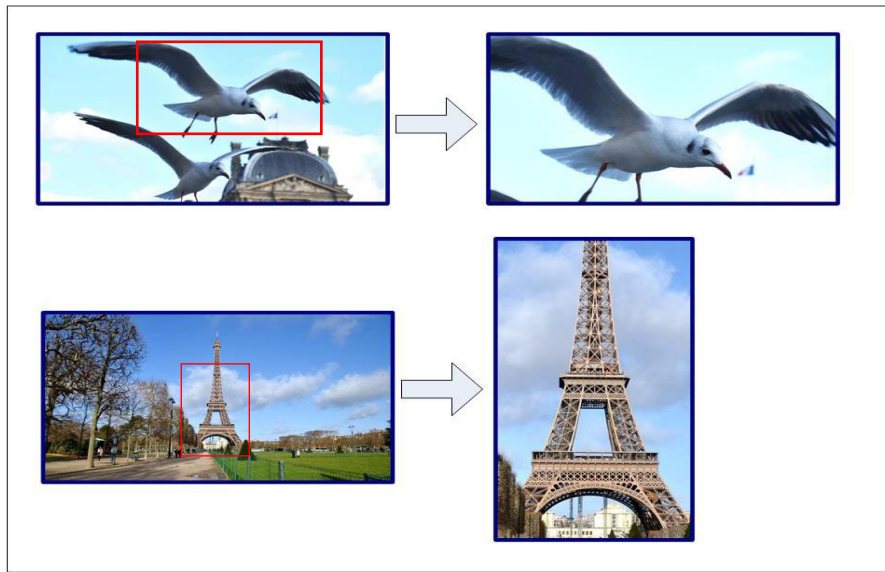
All inputs can be up to 4k/2k/60Hz

F. Stretch the image and change the aspect ratio

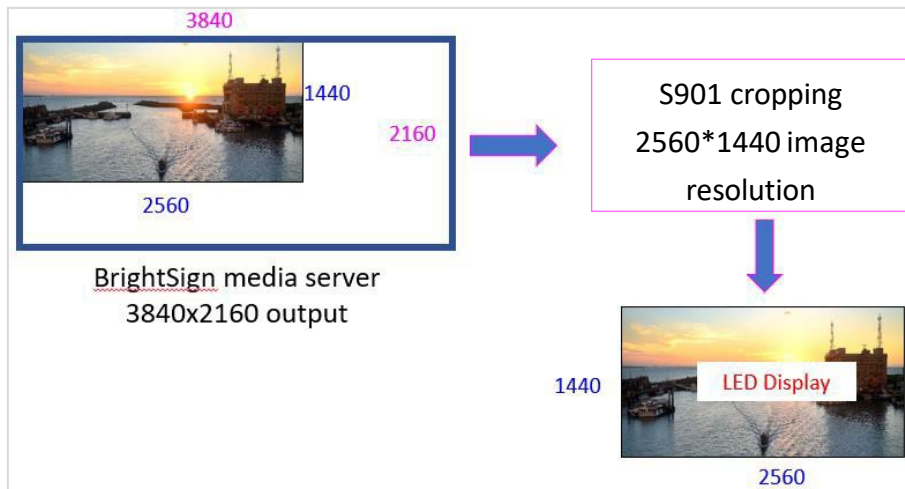
The video wall Overlap function can change image size, shift image position or change the aspect ratio. The adjusting range is up to ± 1800 pixels in each edge based on the signal source. Standard 16:9 vs. 2.35:1 movie aspect ratio can be converted through this function.



G. Image Cropping & Rotation

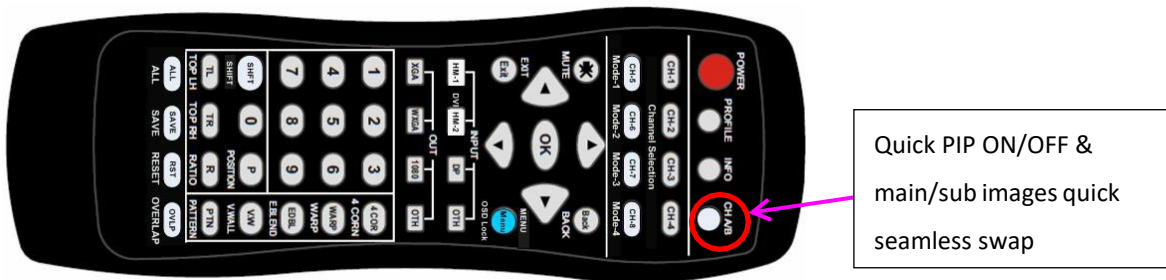


H. Image cropping application in LED display



I. Quick PIP ON/OFF and two inputs quick, seamless swap

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

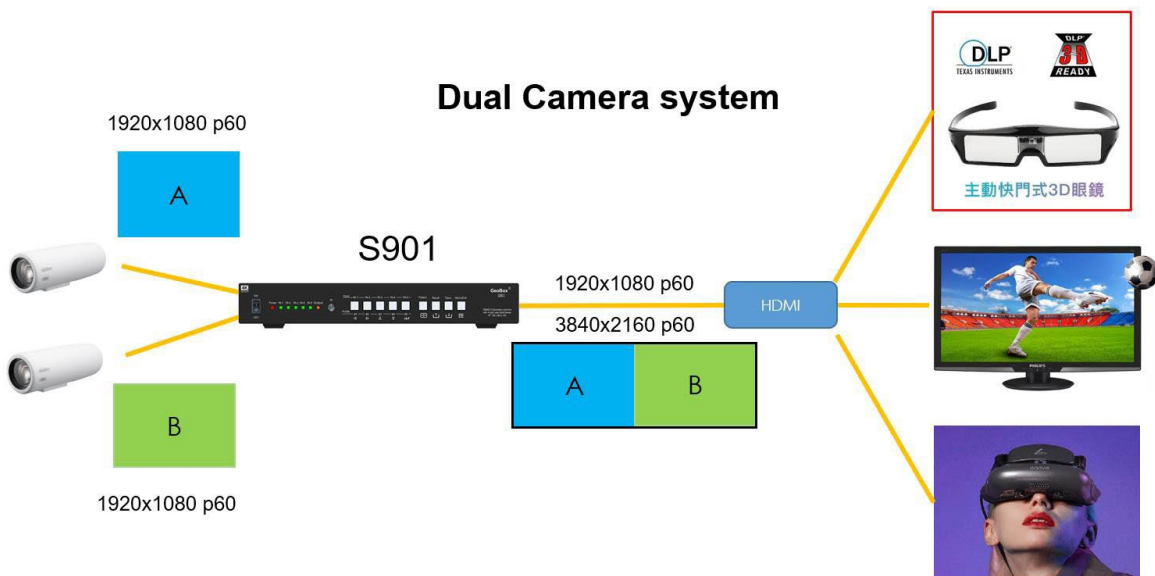
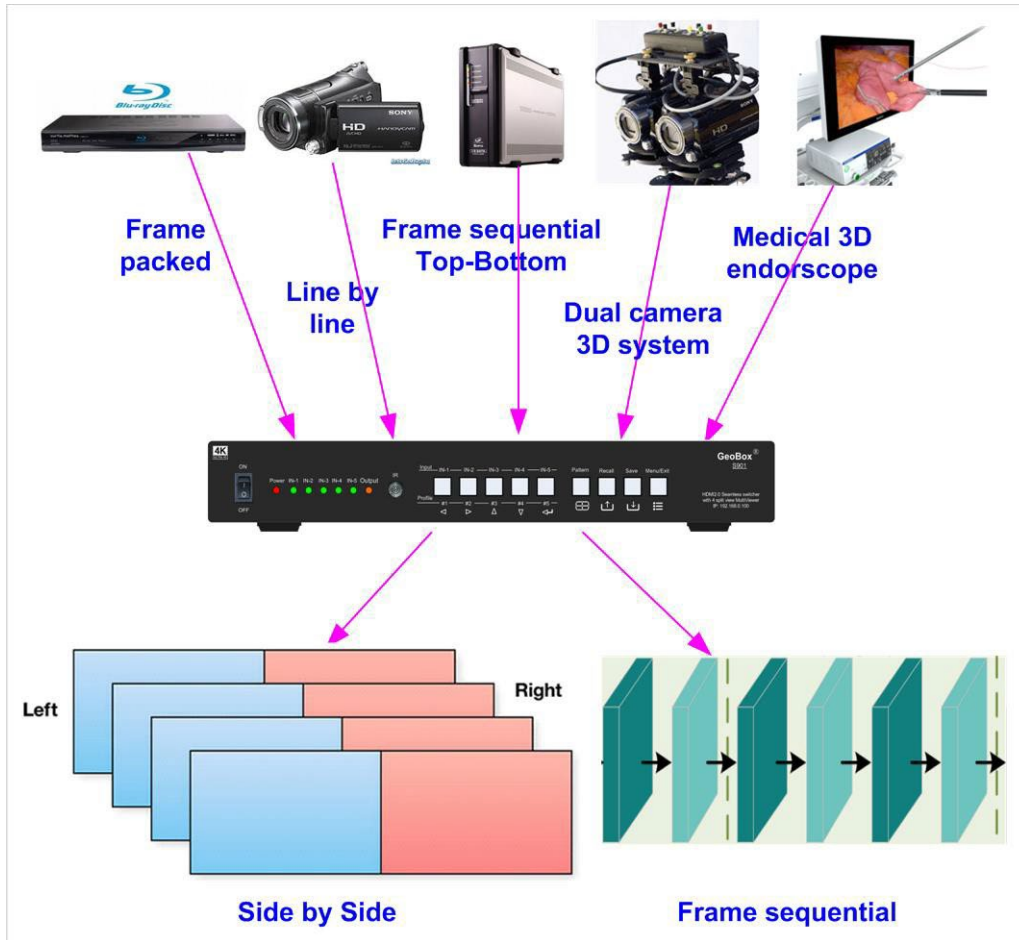


- Users can assign one input to the main image and another to the PIP image with full PIP size and set the S901 output resolution at FHD, then click the [CH A/B] key to execute a seamless, quick swap between these two inputs.



J. 3D format conversion

Dual camera 3D system can be converted to Side by Side 3D output through the POP (SBS) function in S901.



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