The absolute opposite of ordinary

S901 User Guide

5x1 Seamless UHD switcher with Quad Split Views

Please note that if the output resolution is not supported by the monitor, user will not see the image on the screen.

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<u>Table of Contents</u>

Introduction

      S901 is multiple purpose video processor for seamless switcher, format conversion, scaling up and down, image flip/rotation/cropping, video wall, PIP/POP, 3D format conversion and multi-viewer functions. The input supports various input sources and input timings. It is an ideal front end processor for big display system required 4k/60 input and output.

      5 input ports (3x HDMI, 2x DP) and 1x HDMI outputs are designed in S901. Input supports up to 4096*2160 @60Hz, 7680*2160 @30Hz in HDMI input and 7680*4320 @30Hz in DisplayPort input with 4:4:4 chroma sampling. No VESA standard input timings are also supported up to 600 MHz.

      Programmable output supports up to 4096*2265 @60Hz or 4096*2713 @50Hz output resolution. The range is from 800-7680 (with 8 pixel/step under 230Mhz, 16 pixel/step above 230MHz) in horizontal and 720-3840 (with 1 pixel/step) in vertical. The maximum resolution is limited to 600MHz. Output refresh rate can be selected from 24/30/50/60/100/120Hz.

      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 quality.

      It is integrated with 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 S901 can crop specific location & resolution in source image for programmable output. Overlap function allows user to change image position, aspect ratio and cropping area up to +_1800 pixels in each edge. User can also adjust aspect ratio and image position freely. Image 90/180/270 degrees flip and rotation are also available. It is an ideal front end solution for LED and big display system.

      PIP (picture in picture) and POP (side by side or top/bottom) are standard functions in S901. 3 split view and 4 split view MultiViewer function are embedded. PIP image size can be from 320*180 up to 1920x1200. It can be located at any location across entire display. Both main and sub-windows can be flipped and rotated at 90/180/270 degrees and quick seamless swap. The cropping range and position in both main and sub-window are adjustable. Maximum input sources can be displayed in one S901 is four. The color adjustment function in sub-window is also integrated to have more application flexibility.

      S901 can execute 3D format conversion function. It can convert HDMI 1.4 standard 3D format (side by side, top/bottom, frame sequential, Line interleaved, frame packed, discrete dual camera…) into side by side, top/bottom and frame sequential 3D output format. It can also decode 3D signal into discrete RH or LH for passive display. Some medical device can only output Line interleaved 3D format and can't be supported by many 3D display devices. User can use S901 to convert dual camera and Line interleaved 3D format into other 3D format so that it can be displayed in all 3D display devices.

      User can use IR controller, USB, Web Gui and Ethernet for system operation and setup. User can save up to 10 customized settings in S901 and recall through remote controller, USB and Ethernet connection. It is designed to work in 7/24 working environment and provides easy configuration, low entry barrier, cost effective, reliable and flexible solution.

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User Guide

1.   System Connection

If the output resolution is not supported by the monitor, user will not see the image.
Please select output resolution in remote controller to 1080P to see the image.

After Power on S901, user will see LED indicator lighted up.
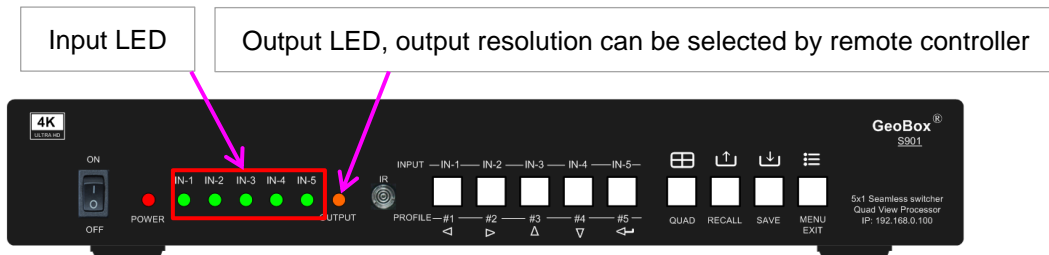
- ➢   Input LED will turn to green when S901 has detected input signal.
- ➢   When user selects the input for display, LED will turn to orange.
- ➢   Output LED will turn to orange when S901 has detected display device in the output.

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2.   Seamless switching for main input

➢   Seamless switching function is only functional for main input with single image display.

➢   Click input selection button on front panel to switch input port. The LED will turn to orange light when the input port has been selected. User can select input source through remote controller, WebGui or GCT PC tool. Default input is HDMI-1.

Input selection buttons
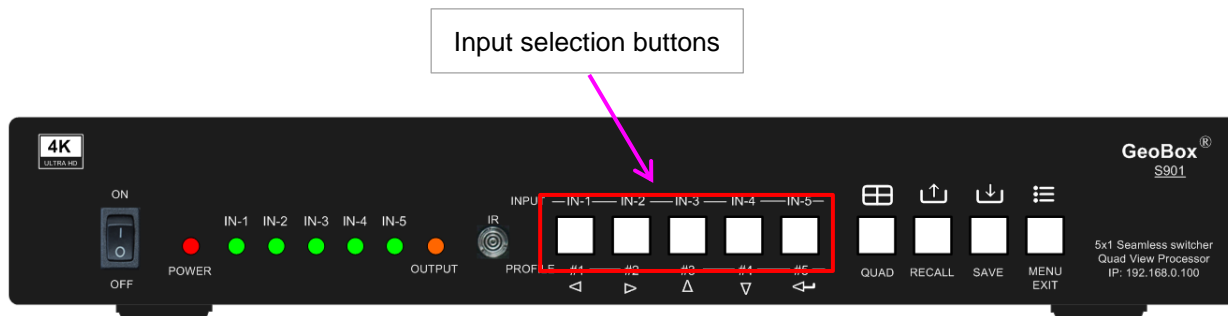
User can also select main input port from remote controller.

HDMI-1

HDMI-2

DP1

Toggle between HDMI-3 & DP-2

Input selection

Output resolution selection, more output resolution can be selected from OSD
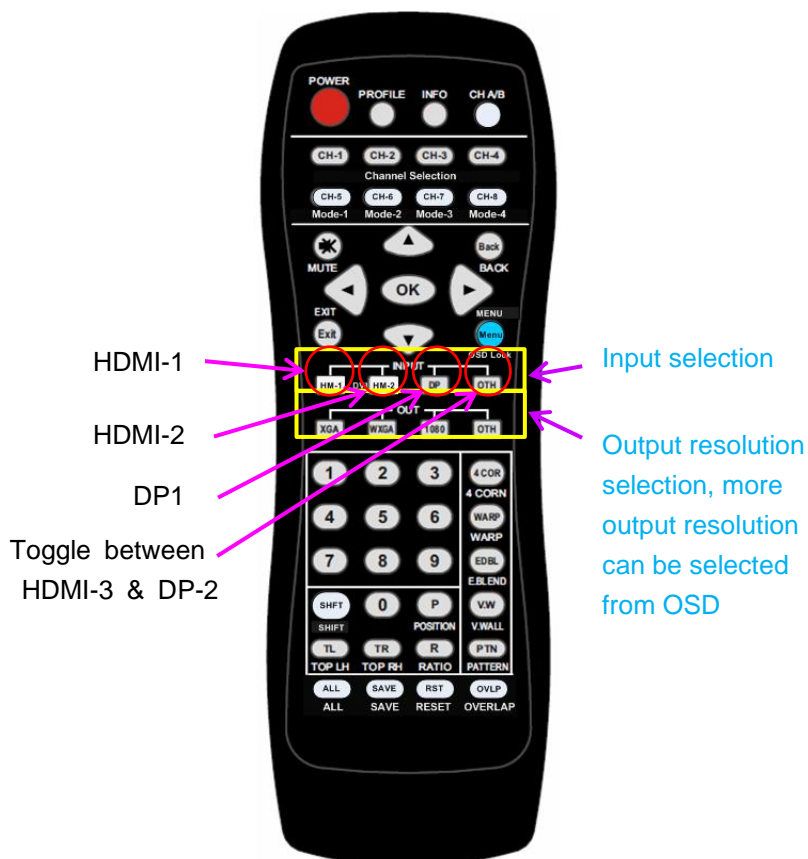
➢   When implement seamless switching function, the [Frame Sync] function is set at [Disable] and [HDCP Output] is enabled. If change the settings, seamless function may be disabled.

➢   User can check input/output resolution from [INFO] key on remote controller.

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3.   Front panel

Three functions
1.   Seamless input selection
2.   OSD function key after activate OSD
3.   Index for Profile Save and Load

Custom setting Profile RECALL

Custom setting Profile SAVE

Input LED

Output

IR Receiver

Quad split view ON/OFF hotkey
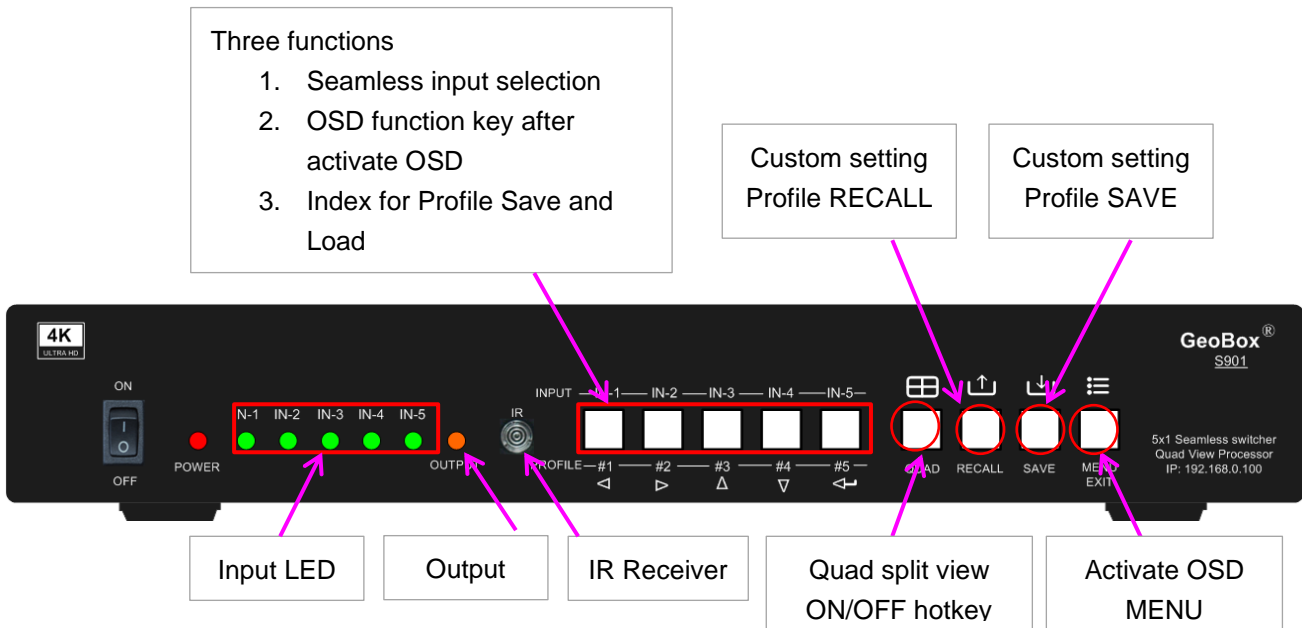
Activate OSD MENU

OSD menu operation

➢   Activate OSD menu through MENU key
➢   Manipulate OSD function through INPUT keypads (same as input selection keys). The symbols are under each input selection button.

Profile Save and Load (Custom setting Save and Recall)

➢   Press [Save] keypad, then select Profile Index # keypad (same
➢   Press [Recall] keypad, then select Profile Index # keypad (same as Input selection keys)
➢   The Index # is under each input selection key.

LED Indicator

➢   Input LED will turn to green when S901 has detected input signal.
➢   When user selects the input for display, LED will turn to orange.
➢   Output LED will turn to orange when S901 has detected display device in the output.
➢   Power LED:
  ✓   Power Red LED lighted: Power connected and has been turned off by remote controller. Need to turn on by remote controller again.
  ✓   Power Green LED flashing at 1.0s interval: OSD lock through Lock through remote controller 85x command. Press 850 on remote controller number keys to unlock OSD.
  ✓   Power Green LED flashing at 0.5s interval: OSD Lock through press MENU for 5 seconds. Hold Menu key for 5 seconds to unlock if the system.

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4.   <u>Preset Quad split view</u>

Quad split view Hotkey
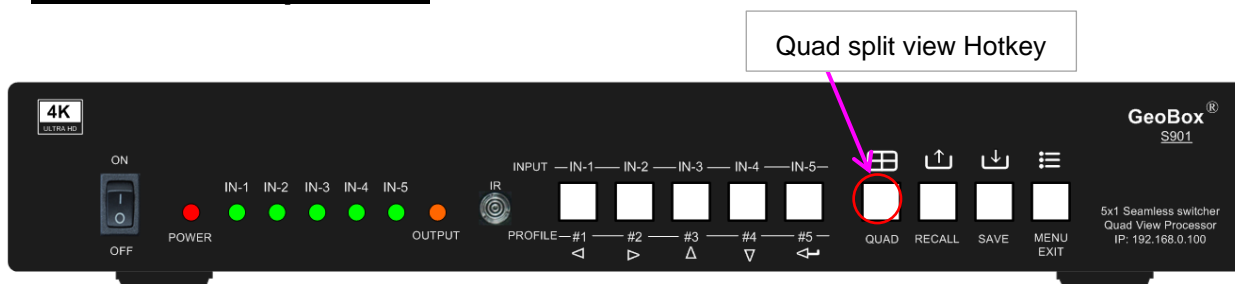
➢   Click [Pattern] key to implement quad split view.

➢   It will assign below input signals: HDMI-1→Main window. HDMI-2→ Sub-win1, HDMI-3→ Sub-win2, DP1→ Sub-win3

➢   User can swap the above input port or PIP settings and save to different Profile Index. It can be recalled from front panel keypad or remote controller.

5.   <u>More display patterns selected from OSD</u>

➢   **Step 1**

Click MENU key to open OSD→ [Image Properties]→ [PIP setting]→ [Display]

➢   **Step 2**

Select required display pattern→ Select signal source→ Save to Profile Index #.

8

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6.   Back panel

User can connect signal source to any of the input ports for main display and PIP/POP operation.
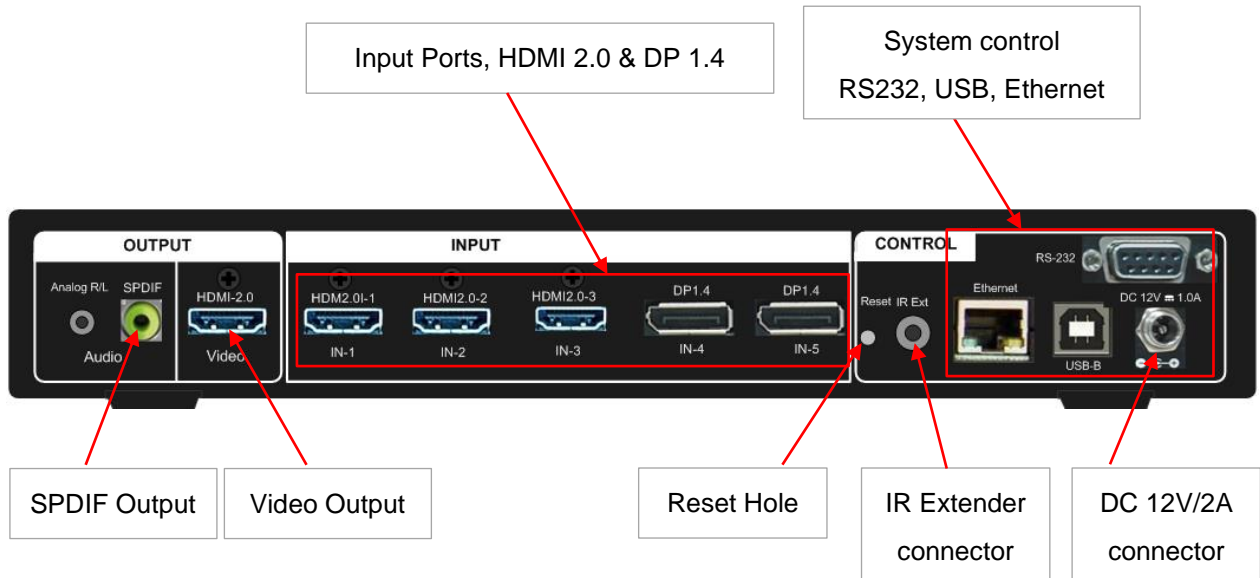
7.   Input source selection

> Main input source can be selected from front panel keypad, remote controller, OSD or PC Tool.
> Sub-window input signal can't be selected from front panel keypad. It shall go through OSD menu or PC Tool.
> Any input port can be selected as main or sub-window input source.
> User can set the cropping area of the input source through [Overlap] function.

7.1.   Main input source selection

> Directly click input selection button.
> Activate OSD MENU → [Image Properties]→ [Input Signal]→ select input port.

Select main window input port from front panel keypads

> User can select the signal source directly from front panel keypads.
> The LED indicators will show green light when the input has detected input signal.
> User can click the input selection button to select the input port. When the input port is selected, the LED green light will change to orange color.
> Sub-window input port should be selected from OSD Menu. Please click MENU key on front panel to activate OSD to select sub-window input port.

Input LED   Input selection button
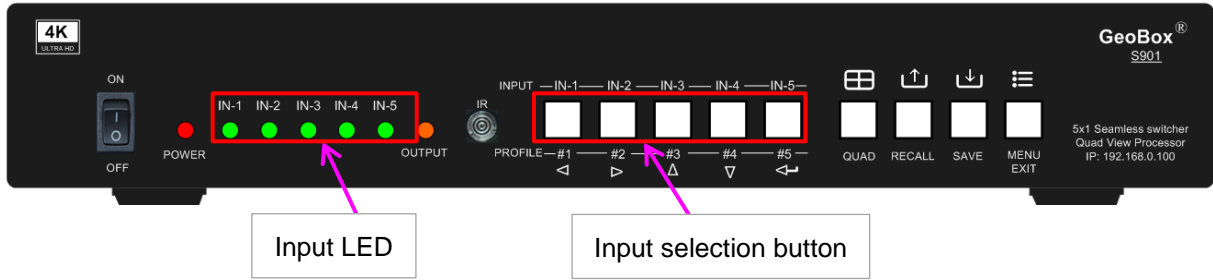
Select main window input port from OSD

- ➤ Open OSD→ [Image properties]→ [Input Signal]→ select input port
- ➤ Default is HDMI-1
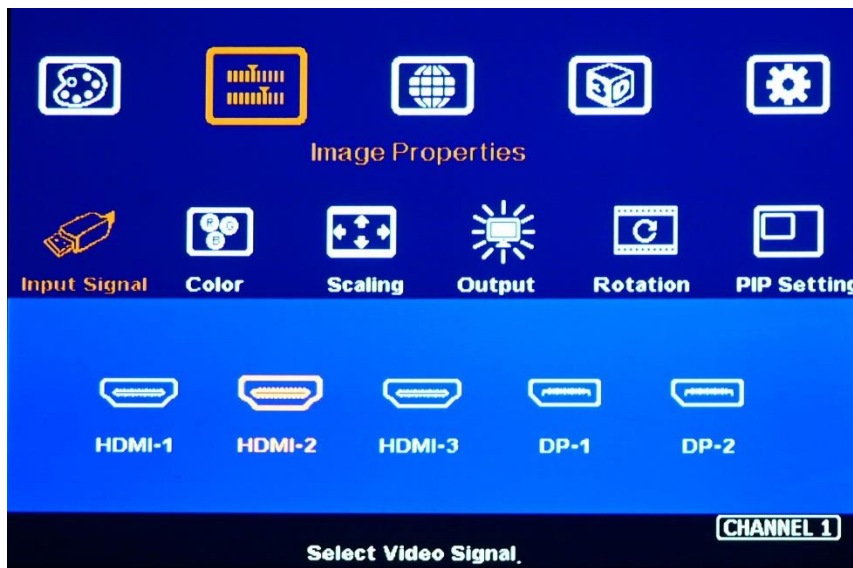
Select main window input port from remote controller

- ➤ Direct click input selection key. User can select main window input port directly from remote controller. The default input is HDMI-1.

HDMI-1   HDMI-2

DP-1   Toggle input between HDMI-3 & DP-2
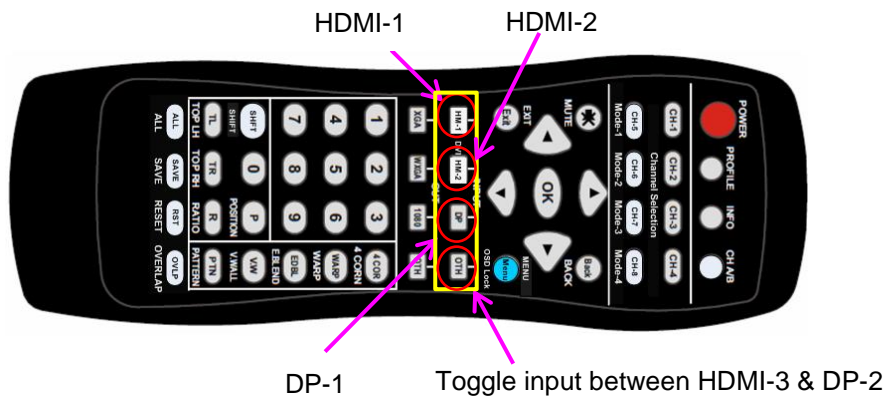
7.2.   <u>Select Sub-window input port</u>

Can only be selected by OSD menu. Click [MENU] key→ [Image Properties]→ [PIP Setting]→
[Source]→ select [Sub-Win]→ Select [input port].
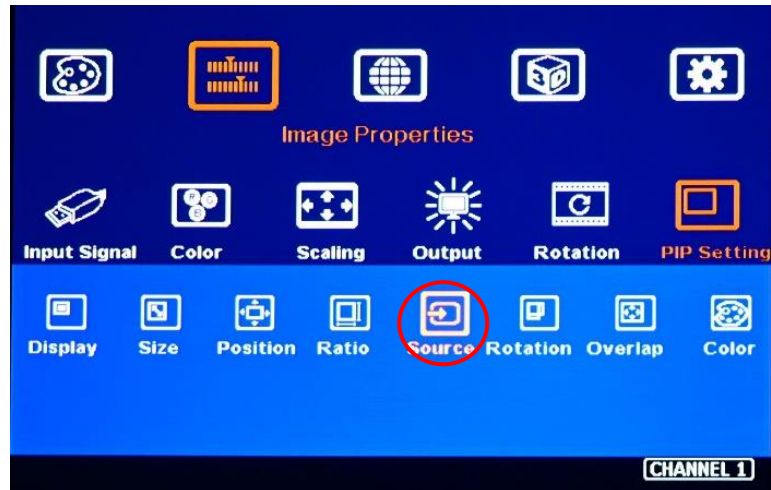
Under this example, Sub-win1 selects HDMI-2

8.   <u>Custom settings saved and recalled</u>

➢ Custom settings will be saved under Profile Index. It will be erased only when user resets the
system through inserting pin into Reset Hole on back panel for 5 seconds.

➢ Custom setting [Save] and [Load] can be implemented through front panel keypads, remote
controller, RS232 and GCT PC tool by USB WebGui or Ethernet.

➢ 5 Profile Indexes can be saved through front panel buttons. 10 indexes can be saved in remote
controller and through OSD menu.

8.1.   Save system settings

➢   **Save system settings through front panel buttons**

Click [Save] key, then select Index# to save custom settings.
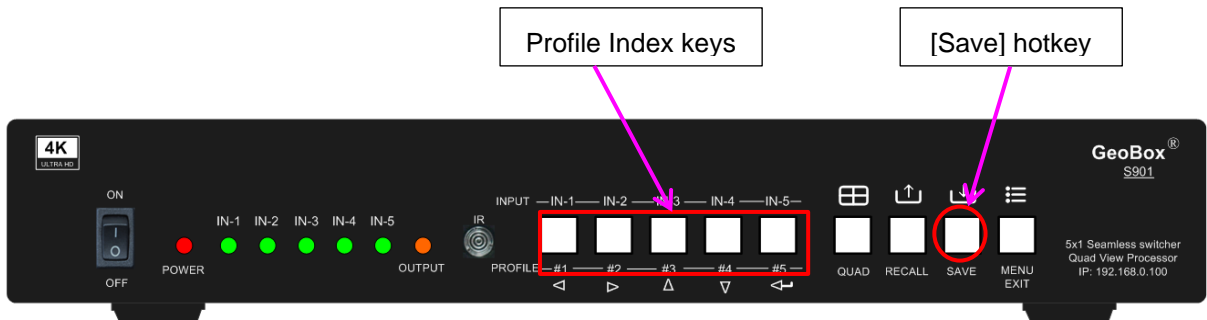
➢   **Save system settings through IR remote controller**

− Click [Save] hotkey on remote controller, then select # key to save custom settings.

− 10 profile Indexes can be saved from remote controller. "0" represents Index #10.

8.2.   Recall system settings

➢   **Recall system settings through front panel keypads**

Click [Recall] key, then select Index# to load custom settings.

S901 User Guide   Document: S901-2
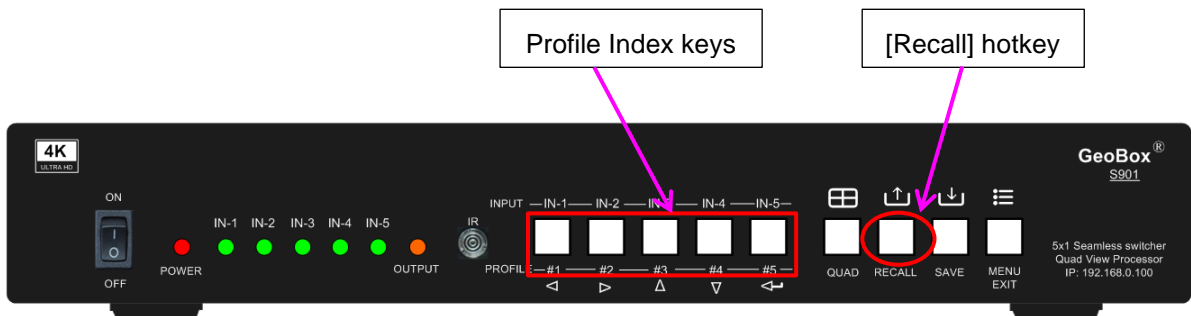
> **Recall system settings through remote controller**

  – Click [Recall] hotkey on remote controller, then select # key to load custom settings.
  – "0" represents Index #10.

Click [Profile] key, then select number key
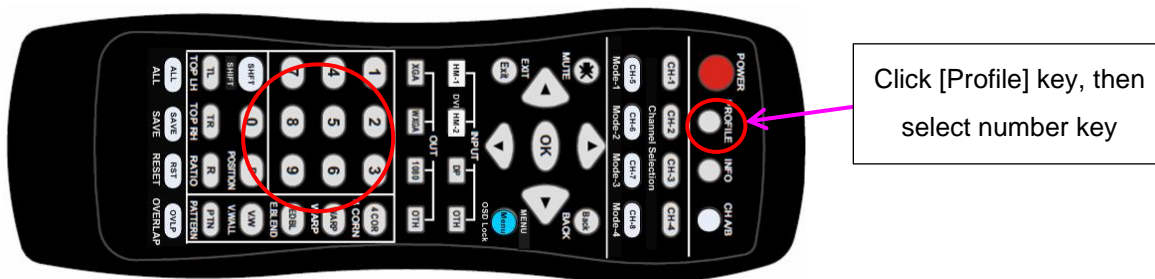
9. Output signal setting

> User can set output resolution from below methods:
  ▪ Remote controller hotkey.
  ▪ 17 preset resolutions from OSD menu.
  ▪ Programmable output for none VESA standard output timing and refresh rate.
> All default output is FHD with 60Hz refresh rate, full color RGB 4:4:4 and progressive.
> If the output resolution is set at 4k/2k, full HD monitor will not show any image. Please click [1080] key on the remote controller to set the output to 1080p.
> If the output refresh rate is not the same as input refresh rate. The frame lock function will be disabled and it may lose synchronization among multiple unit cascade application.
> User can click [Info] key to get system information and input / output signal resolution.

9.1. Select output resolution from remote controller

> Four output resolutions are preset in remote controller--1080P, WXGA, XGA and [OTH] (4k/2k) progressive output with 60Hz refresh rate.
> To select [OTH] key to get 4k/2k/60Hz output resolution.
> Other output resolution and programmable output resolution should be selected through OSD.

Select Output resolution
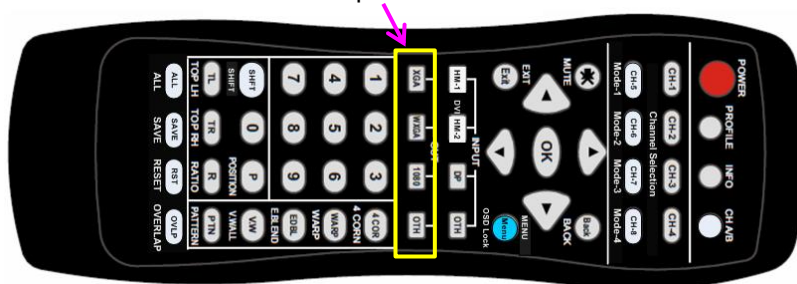
9.2. Select output resolution from OSD preset modes

➢   17 preset output modes are embedded in OSD.

➢   Preset modes without refresh rate description are VESA standard resolution at 60Hz.

➢   Open OSD via remote controller→ [Image Properties]→ [Output]→ Select [Output resolution].

➢   Default output resolution is FHD 60Hz, RGB 4:4:4 format and progressive.

➢   If user select a timing that the monitor can't support, user can't see any image,

➢   If the input refresh rate is not the same as output, it is possible to see synchronization issue when executing display with multiple units cascaded.
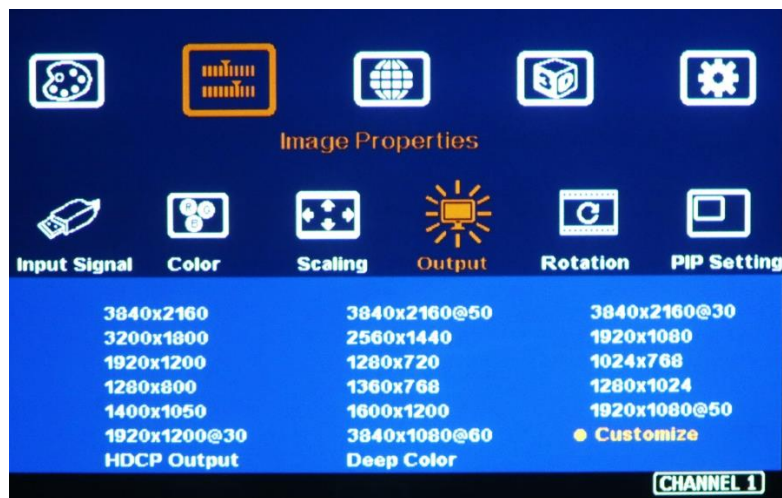
9.3. Programmable output resolution and refresh rate

➢   Programmable output resolution is embedded in S901. User can activate OSD [Image Properties]→ [Output]→ [Customize]→ [Width] / [Height] / [Refresh Rate]

➢   The maximum output resolution range is
       H: 800-7680 (8 pixels/step), V: 720-3840 (1 pixel/step), Max. output resolution is 4096*2265/60Hz or 7680*1230/60Hz. Max. pixel rate is 600 MHz.

➢   User can change refresh rate, horizontal and vertical pixels to know the limitation. Once the value can be showed on the OSD, it means S901 can support that kind of output timing.

➢   [Refresh Rate] is under [Customize] menu. User can select from 24/30/50/60/100/120Hz.

➢   All the customized output timing is reduced blanking timing with less pixel rate than standard VESA timing. If user selects output timing from preset mode at 4k/2k 50Hz with [Deep Color] enable, the system will still remain at 8-bit color. If user selects from [Customize] mode, S901 can support 4k/2k 50Hz with [Deep Color] 10-bit output.
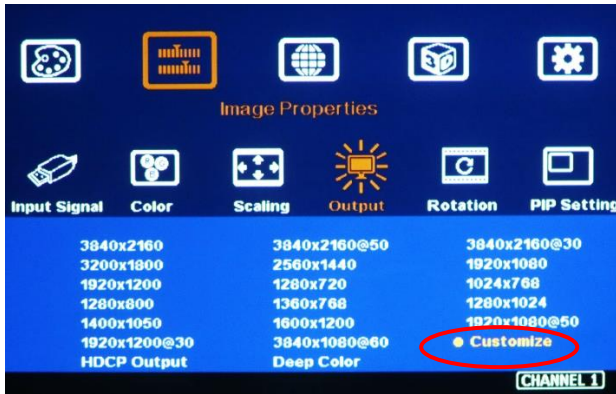
User may not see the image in Full HD monitor when the output resolution is set at 4k/2k. In this case, please click [1080] key in remote controller to let S900 output at full HD. Default resolution is Full HD.
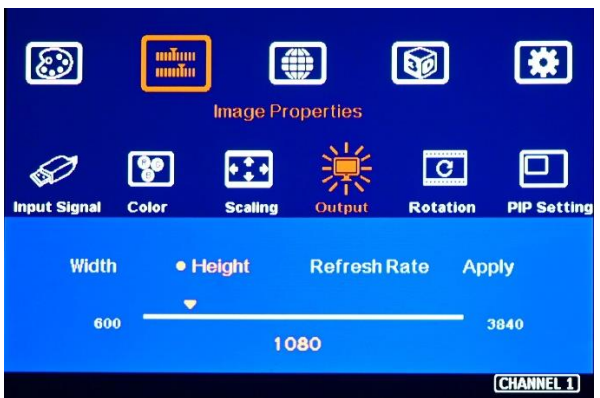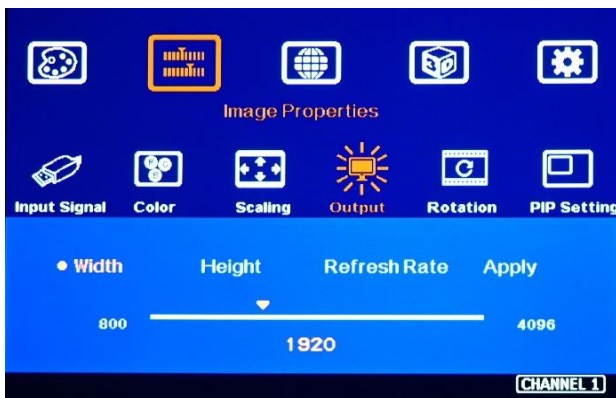
- The output refresh rate can be selected from 24/30/50/60/100/120 Hz.
- If the input and output refresh rate is not the same, it is possible to cause synchronization issues in multiple unit application.

9.4. Enable 10-bit deep color output

➢ 10-bit color will give smooth display in gradient color image.

➢ If the input source is not 10-bit, it will have no 10-bit effect.

➢ User can select 10-bit deep color through OSD [Image Properties]→ [Output Mode]→ [Deep Color]→ On

➢ Please check the result through [INFO] hotkey on remote controller to understand input/output signal status.

> Enable 10-bit color may reduce the input and output maximum resolution. HDMI 2.0 maximum is 600 MHz (18Gb/s). .

> If user selects output timing from preset mode at 4k/2k 50Hz with [Deep Color] enable, the system will still remain at 8-bit color. If user selects from [Customize] mode, S901 can support 4k/2k 50Hz with [Deep Color] 10-bit output.

> Max. output resolution is 4096*2160 @60Hz 8 bits or 4096*2160 @50Hz 10 bits. If output setting is beyond this resolution, it will turn to be 30Hz or reduce color to 8 bits automatically.
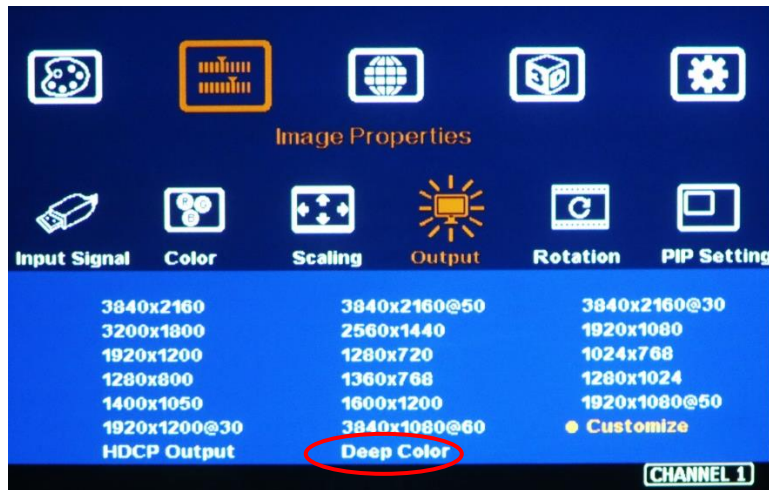
10. HDR (BT.2020) processing

> S901 can process HDR input signal and output full color range RGB 4:4:4 progressive SDR signal up to 4096*2160 @60Hz.

> If the system detects HDR input signal, it will automatically process HDR signal. User can check System Information through INFO key in remote controller to confirm the status.

> The input signal with HDR enabled will get better video quality after S901 processing.
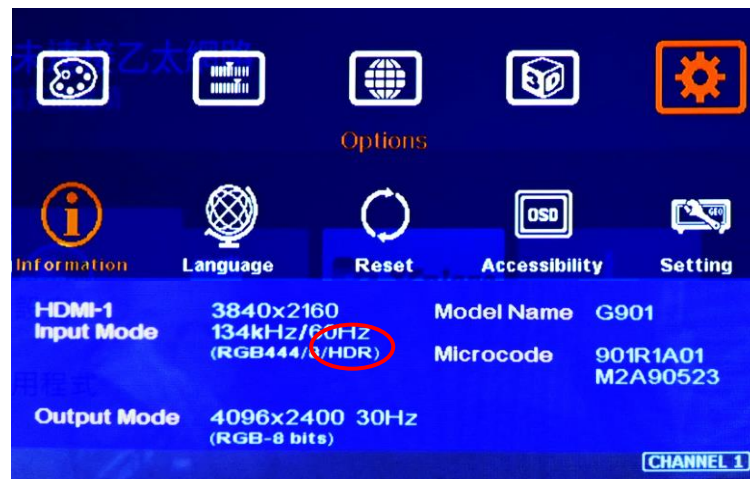
11. How to check system information

➢ The picture showed in below is the system information.

➢ The content showed in System Information will include below items:

✓ Two Inputs and one output resolution

✓ Color depth and HDR status

✓ Model No.

✓ FW and MCU code version

✓ PIP/POP input signal status (If PIP/POP is enabled)

Main Input status

PIP/POP Input status

Output status

Model #

FW version

MCU code version
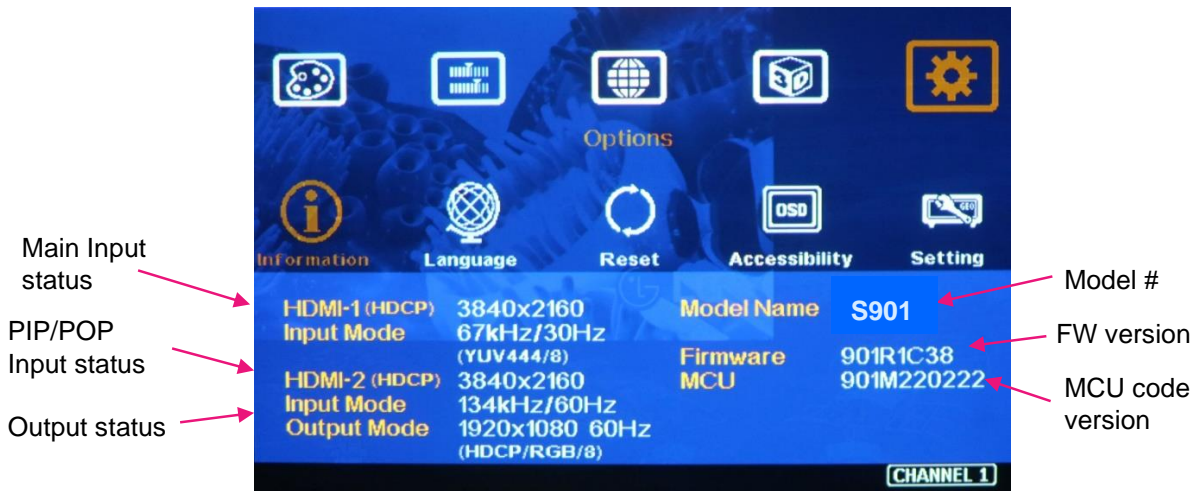
11.1. Check by OSD menu

Open OSD Menu→ [Options]→ [Information]

It will show the result as previous picture.

11.2. Check by remote controller

System Information shortcut key

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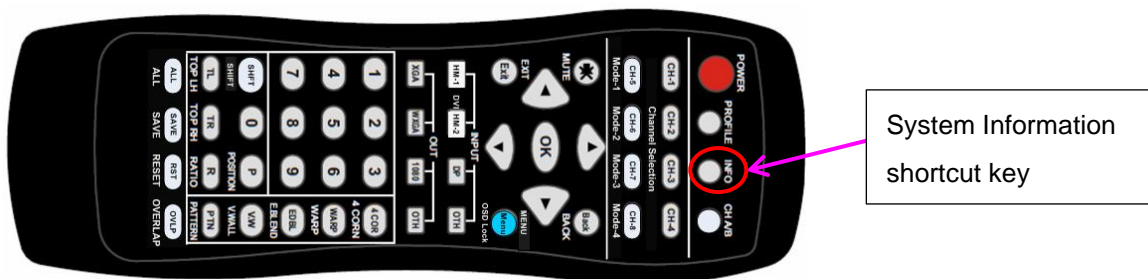
12. System Reset

When user meets some unexpected issue, please reset the system, then to do further check.

Unexpected issue may be caused by hot-plug, external interference during some setup procedures.

Once user finishes the setup, the system will have no any change.

12.1. <u>Complete system reset through Reset hole</u>

➢ Insert small pin into RESET hole on back panel for 5 seconds will reset the system to default settings. User will see "Reset to Default" message.

➢ Reset through RESET hole will erase all the settings saved inside S901, including Profile Index Data.

Reset Hole
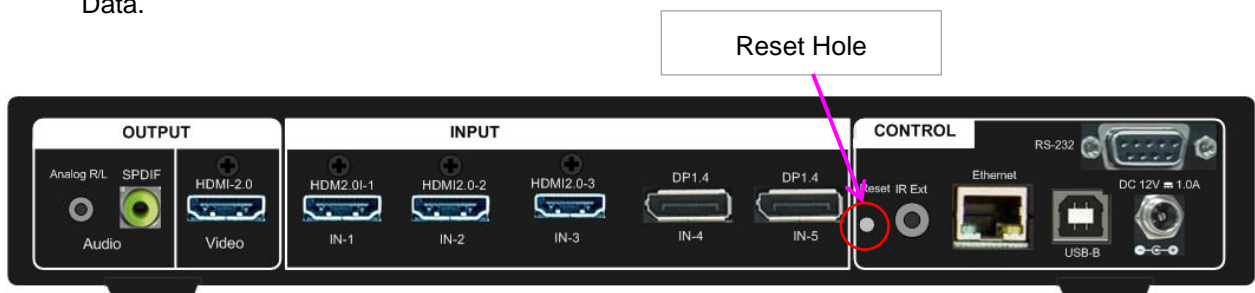
12.2. <u>Reset system and keep custom settings in Profile Index</u>

➢ User can Reset through OSD menu under: [Options]→ [Reset]→ [Reset All] without erasing custom settings that are saved in Profile Indexes.

12.3. <u>Reset system through GCT or WebGui</u>

➢ User can also reset system through GCT or WebGui. User can select reset the settings without deleting profile Index or reset all settings including Profile Index Data.

➢ Please see more details in PC tool application.

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13. How to Use IR Remote Controller

13.1. IR Key function and extension cable

➢ IR remote controller has full functions for the operation of S901.

➢ IR receiver is on Front Panel. One 3.5ø mm audio connector for IR extender is located at Back Panel of S901. 1.8m IR extension cable is equipped in the packing. User can add 2.5Ø audio cable to extend the control distance up to 20 meters.

Audio connector for IR extender

Profile recall shortcut key   Quick PIP swap

Power on/off   Quick PIP swap

OSD Menu operation keypads

Activate OSD Menu,

HDMI-1   Input selection

HDMI-2   Output resolution selection, more output resolution can be selected from OSD

DP1

Toggle between HDMI-3 & DP-2

Video Wall Menu shortcut key

Image freeze shortcut key

Video Wall Overlap setting shortcut key

Profile Save shortcut key   System Reset shortcut key

13.2. <u>Change OSD language</u>

User can change OSD language through below OSD menu:

[Options]→ [Language]→ select [English], [繁體中文], or [簡體中文]

13.3. <u>Individual OSD control in multiple unit application</u>

When multiple units are used and all boxes or IR extender receivers are installed together, user can control individual unit through below method:

➢ To set Box ID in each box through [Options]→ [Setting]→ [Box ID]. The # is 1-9 for IR control.

➢ To Press 851 number keys on remote controller, then all the following operations in remote controller will take effect only in ID #1 GeoBox and lock all other GeoBox. User can see flashing green PWR LED on the Front Panel of the locked units. The flashing interval is one second.

➢ To Press 853 will only unlock ID # 3 GeoBox for further OSD operation and lock all the others.

➢ To press 850 will unlock all GeoBox OSD menu. Remote controller can access to all GeoBox simultaneously.

➢ When power off the box, OSD Lock will be disabled but Box ID will be kept without change.

13.4. <u>OSD Lock and Unlock</u>

To press MENU key on remote controller for 5 seconds will LOCK the OSD. User will see PWR LED flashing and [Menu is Locked] message on the screen. The flashing interval is one second. To press another 5 seconds on MENU key will UNLOCK the OSD. User will see [Menu is Unlocked] message.

13.5. <u>Change OSD location</u>

➢ User can use OSD menu to change the location of the OSD menu as below.

➢ User can also use [Position] hotkey key on the remote controller to active OSD position adjustment menu.
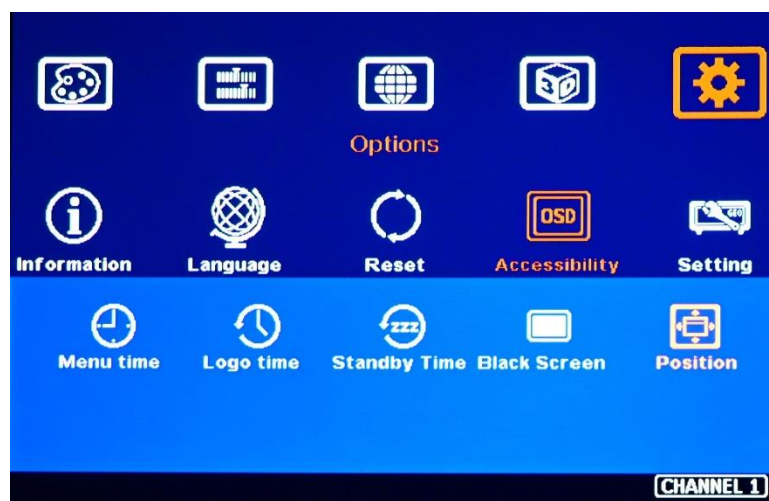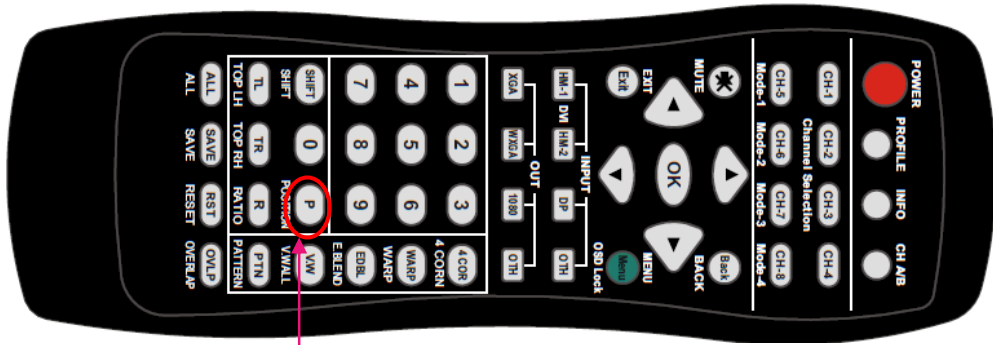
Please click [Position] hotkey to activate OSD position shift menu, then use Direction key to shift OSD position to desire location.

14. System control and setup

➢ The setting for Box ID, RS232 and Ethernet can be executed via OSD, WebGui or GCT PC Tool.

➢ User can control S901 directly from Ethernet. The default static IP address is 192.168.0.100.

➢ User can set different IP address or Box ID for each unit so that user can execute independent control to each GeoBox without interference.

14.1. Box ID

➢ Box ID is required for the application with multiple units of GeoBox.

➢ Box ID range is from #1 - #99. When user uses remote controller to control the system through OSD, the maximum ID setting for remote controller is #1 - #9.

➢ Please set Box ID through OSD [Options]→ [Setting]→ Box ID]→ select number.
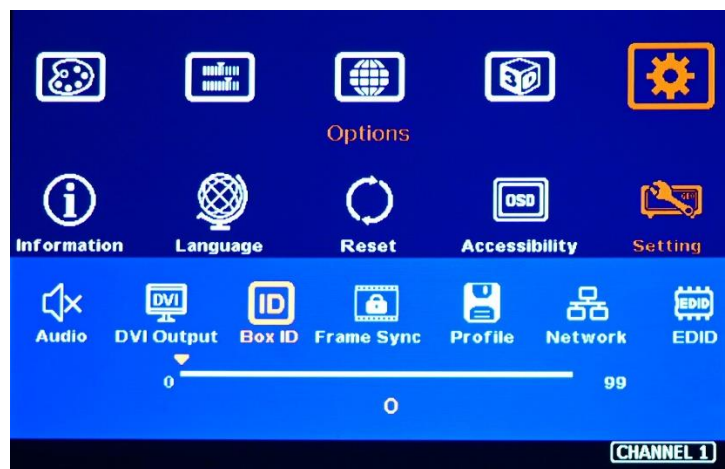
14.2. <u>Multiple units controlled by one Remote Controller</u>

➢ When multiple units are used and all boxes or IR extender receivers are installed together, user can control individual unit through below method:
 - To set Box ID in each box, press 851 number keys on remote controller, then all the following operations in remote controller will take effect only in ID #1 GeoBox and lock all other GeoBox. User can see flashing PWR LED on the Front Panel of the locked units.
  - To Press 853 will only unlock ID # 3 GeoBox for further OSD operation.
  - To press 850 will unlock all GeoBox OSD menu. Remote controller can access to all GeoBox simultaneously.
➢ When the system was locked by remote controller, the LED flashing time interval is 1.0 second. User can press 850 number keys to unlock the OSD. When turn off/on the power again, OSD will be unlocked but Box ID is still kept without changing.

14.3. <u>RS232 Setting</u>

➢ RS232 interface is designed with DB-9 connector. User can select 11520 or 9600 baud rate.
➢ The UART Protocol between GeoBox and a Host computer can be provided. The protocol can be executed via RS-232, USB, Ethernet or other forthcoming communication methods.
➢ Please execute RS232 setting through OSD, WebGui or GCT.

14.4. <u>Ethernet setting</u>

➢ User can control and setup S901 through network connection.
➢ UTP cable can be used for direct connection between PC and GeoBox. User needs to set PC TCP/IPv4 with the same domain segment as GeoBox (for instance, to set IP address at (192.168.0.105) and subnet mask at (255.255.255.0).

- ➢ Open web browser (Google Chrome or Internet Explorer) and input S901 IP address (default is 192.168.0.100), user can see GeoBox WebGui and menu with virtual keys similar to OSD for further system operation. There is no additional software is required.

- ➢ If user can't connect the network, please power off/on S901 again to let PC detect S901 network.

- ➢ If the connection is gone through WiFi router or switch/hub through RJ45 to Lan port, user can set DHCP IP or Static IP for the connection.

- ➢ If necessary, please [Renew] DHCP to get IP address for network connection.

- ➢ GCT PC Tool is another web tool that has full function for system setting and operation. It can also update Firmware or MCU code. GCT can be downloaded from VNS website.

- ➢ Each S901 can set different IP address for independent operation and control.

- ➢ Please use < > OSD keys to select OSD menu items and use ∧ ∨ OSD keys to change IP address.

- ➢ If S901 is connected with WiFi Router (through LAN port), user can control S901 through WiFi via PC, iPad or mobile phone through the same SSID.

- ➢ Default TCP server port is 1266.

- ➢ [GeoBox IP-TCP application note] is available at
  https://drive.google.com/file/d/1iw3mgLmqzsJ8m1KYarYasZbGIvp0vtK7/view

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15.   PIP/POP/3/4 multiple window display

➢ Important notice: All multi-window displays, at least one is the main window. The main window input selection, color adjustment, image rotation, image cropping and position setting are under normal OSD menu. The adjustment and setting for sub-window are all under [Image Properties]→ [PIP Settings] OSD menu.

➢ If the S901 changes ZOOM setting through the [Video Wall] Menu, the sub-window will not be affected. If S901 is used as a front-end processor and the ZOOM setting is changed by the back-end device, the main window and sub-window scaling factor will change at the same time. User can use S901 [overlap] under [PIP setting] Menu to further adjust the aspect ratio (scaling factor) of the sub-window to make it display normally.

➢ It is possible to customize all kinds of multi-view pattern from factory for bulk purchase.

15.1   Main menu

15.1.1.   [Display]—select different multi-window display types

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- ➤ [Disable]: Disable multi-view. Show single content.
- ➤ [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. Can be swapped to 1/3:2/3 side by side display by image rotation and change the monitor installation direction (top/down direction).
- ➤ [POP3]: One image at LH side and top/bottom two images at RH side. Can be swapped to one image at RH side and top/bottom two images at LH side by image rotation and change the monitor installation direction (top/down direction).
- ➤ [POP4]: One image at Top and two images at bottom. Can be swapped to two images at Top and one images at Bottom by image rotation and change the monitor installation direction (top/down direction).
- ➤ [3X SBS]: Three split views at landscape. The center image size is adjustable from 1/6 to 5/6 screen width through [Size] under [PIP Setting]. Minimum image size in both side windows is 1/12 screen width. Each window can be rotated to be displayed on monitor with portrait position.
- ➤ [3X T/B]: Three split views at portrait direction.
- ➤ [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 images at the bottom. Below 3 windows keep 16:9 aspect ratio.
- ➤ PIP (picture in picture): with flexible PIP size (320*180 to 1920*1200), location and aspect ratio.
- ➤ Except [4x split] and [4x T/B] functions, all the other multiple window functions can support monitor at portrait and landscape position. Both main image and the sub-window support 90/180/270 degrees rotation and flip and keep [Full Screen] or [Original AR] aspect ratio.
- ➤ Cropping function (Overlap setting function) is available in Main image and all sub-windows for further location, size and aspect ratio adjustment as well as 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.

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15.1.2. [Size]—Change sub-window image size under [PIP] & [3x SBS]

➢ This Menu can change sub-window size under [PIP] from 1/6 to 100% with 100 adjustment steps. The max. PIP image is 1920*1200 and minimum is 320*180. If apply [Overlap] function to PIP image, it can be further reduced to about 160*90 pixels.

➢ When [3x SBS] is applied, the center image size can be adjusted through [Size] menu. The adjustment range is from 1/6 to 5/6 in horizontal direction.

15.1.3. [Position]—Set PIP image position

➢ User can set PIP image position across any location inside the display.

➢ There are 100 steps in both horizontal and vertical position adjustment. User can apply [Overlap] function to do further position change with pixel by pixel accuracy.

15.1.4. [Ratio]—Display full range image or keep original aspect ratio

➢ Main Image: can be selected through [Scaling] OSD menu under [Image Properties].

➢ Sub-window: can be selected through [Ratio] OSD menu under [PIP Settings].

➢ Under aspect ratio menu, there are two selections: [Full Screen] & [Original AR]

- Full Screen: to display full screen image in main & sub-windows.

- Original AR: keep aspect ratio same as original signal source.

Main image ratio selection   Sub-window ratio selection
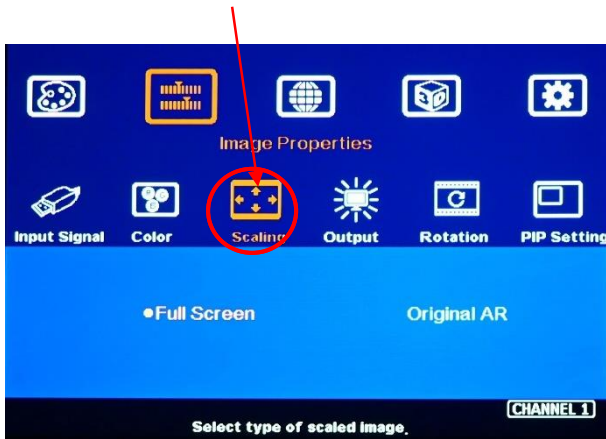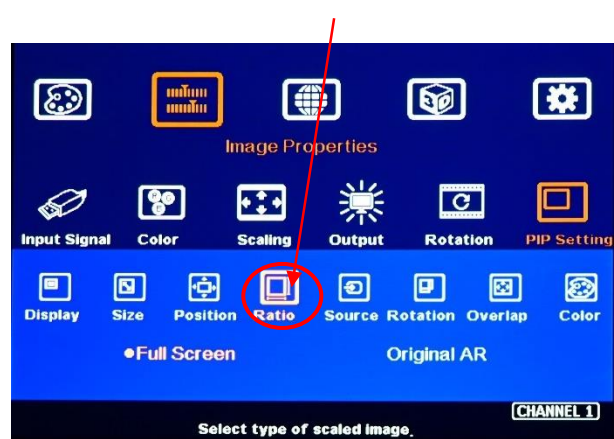
15.1.5. Source selection

> ➤ The input source for main and sub-windows can be selected separately.

> ➤ Any signal from input port can be displayed in PIP/POP or 3/4 split view.

> ➤ User can swap the position in Main and sub-window--to select main image from [Input Signal] Menu and PIP image from [Source] under [PIP Settings] menu.

> ➤ User can save different settings into [Profile] under [Options] menu and recall at any time.

> ➤ Any input port can be selected as main or sub-window input source.

> ➤ User can set the cropping area of the input source through [Overlap] function.

Main image source selection   Sub-window source selection
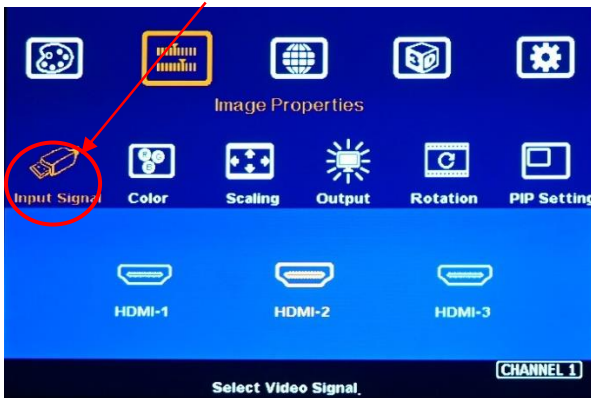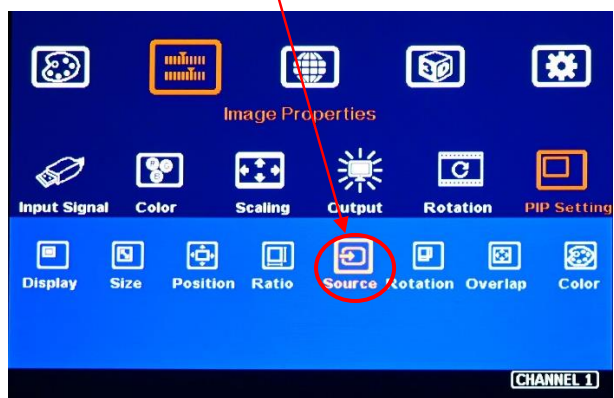
15.1.6.   [Rotation]: Sub-window image rotation

> ➤ Main and sub-windows can be rotated separately at 90/180/270 degrees based on the installation direction of the monitor.
> ➤ Main image rotation shall be selected from [Rotation] under [Image Properties] OSD menu.
> ➤ Sub-window rotation must be operated through [Rotation] under [PIP Setting] OSD menu.
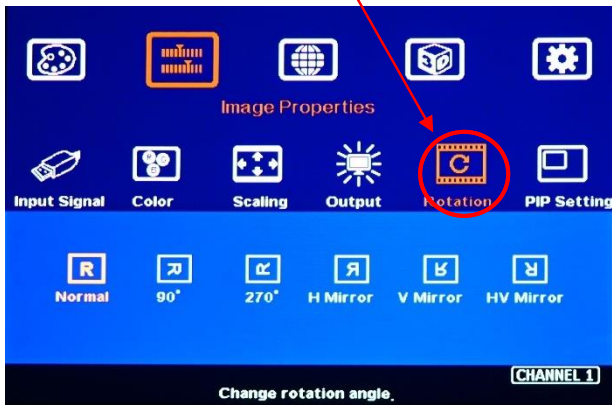
Main image rotation   Sub-window rotation
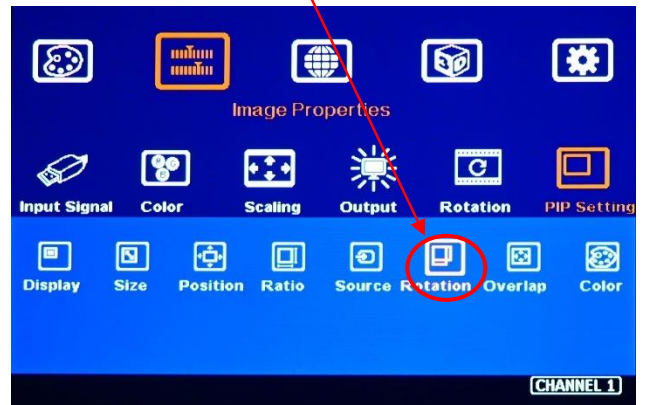
15.1.7.   [Overlap]-- Adjust cropping area and aspect ratio

Main image Overlap setting   Sub-window Overlap setting
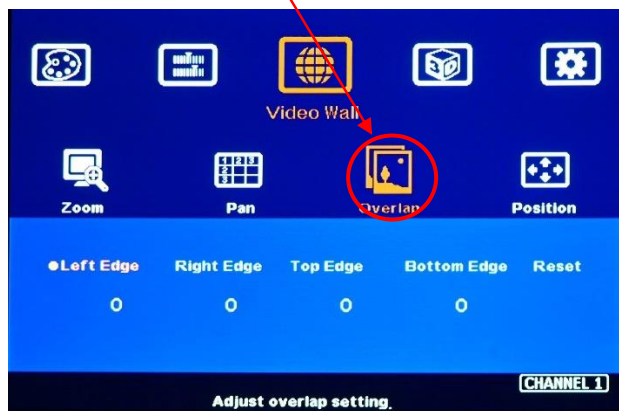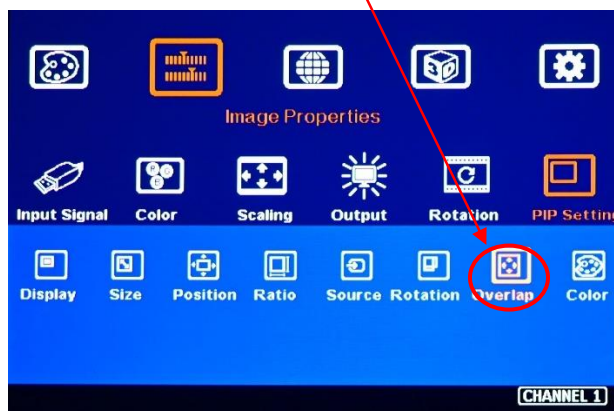
- ➢ User can change the cropping area and aspect ratio in main and sub-window images through Overlap OSD menu. Each edge can adjust the overlap up to +_1800 pixels.

- ➢ When Overlap value is decreased, the image cropping area will be reduced and cause the image have Zoom-In effect (enlarged). If the Overlap value is increased, the image cropping area will increase and cause the image to have Zoom-out effect (shrunk).

- ➢ Overlap function under [PIP Settings] will only be functional for sub-window. The function is the same as [Overlap] function under [Video Wall] for main image.

- ➢ It can change sub-window position, size and cropping area pixel by pixel.

- ➢ Through Overlap function, main image and sub-window can be displayed with various size and aspect ratio as show below.
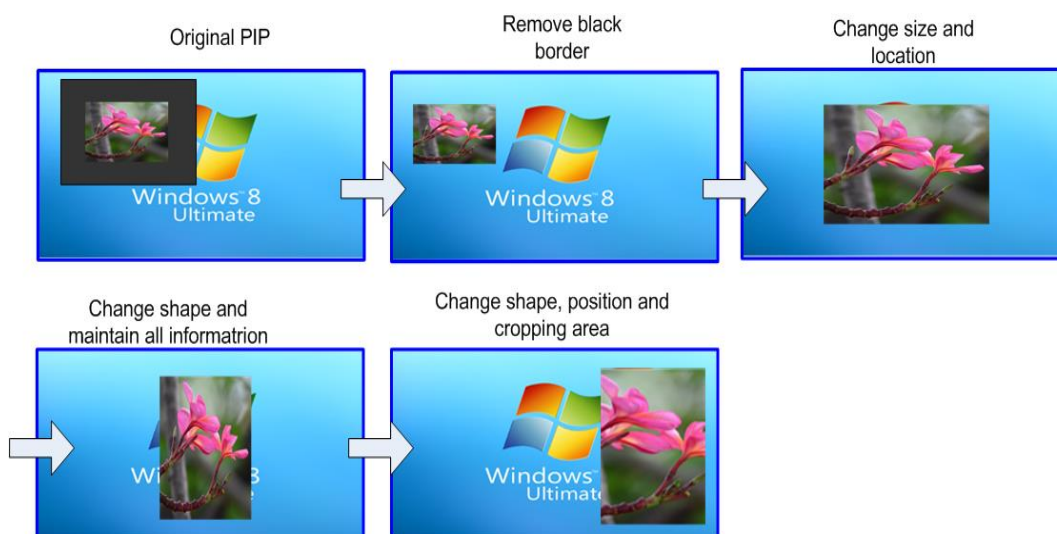
15.1.8.   [Color]—Color adjustment

User can change the color in main and sub-window images through [Color] OSD menu. The

adjustment includes Brightness, Contrast and independent RGB gain.
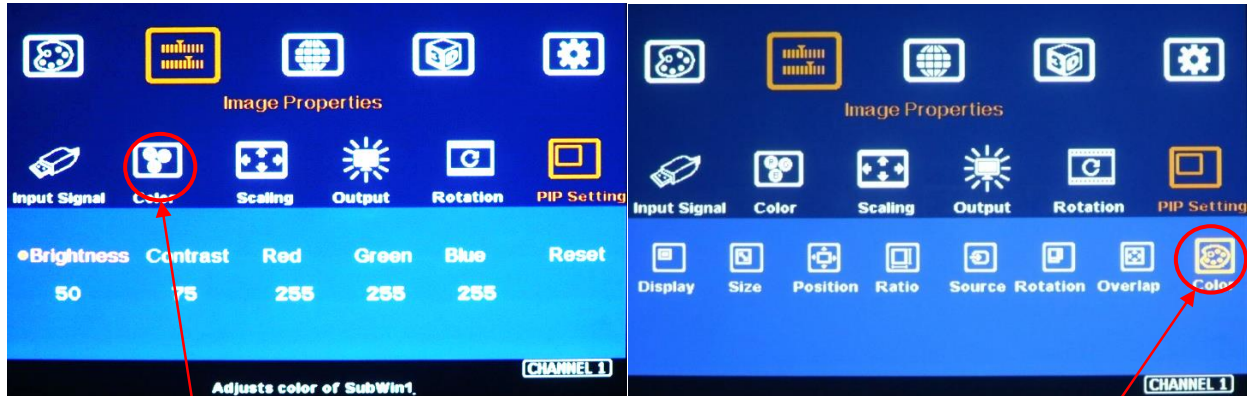
For main window   For sub-window

15.2. PIP (Picture in Picture)

- ➢ PIP image size and aspect ratio can be adjusted through [Overlap] function under [PIP Setting].

- ➢ Main & PIP input source is swappable by input selection.

- ➢ PIP window can be quick turned ON/OFF by [CH A/B] key on remote controller.

- ➢ PIP image can be across entire screen at any position

- ➢ PIP and main images can be rotated at 90/180/270 degrees to build different display styles.

- ➢ PIP image size is from 320*180 to 1920*1200

- ➢ It can be further adjusted through Overlap function to get about 160*130 image size.

- ➢ User can replace main image with sub-window on entire display under FHD output resolution.

- ➢ PIP image position is inside one monitor with 100 position adjustment steps in H&V direction.

- ➢ The PIP image position can be fine-tune through [Overlap] function pixel by pixel.

15.3. POP (or PBP): Picture outside Picture (or Picture by Picture)

- ➢ [SBS]: Horizontal Side by Side display.

- ➢ [Top/Bottom]: Top/Bottom display.

- ➢ The display window size is fixed but user can adjust the cropping area, image aspect ratio in

  each window.

- ➢ Rotation function is also available for user to display on the monitor with portrait or landscape

  installation angles.

- ➢ Back ground color for none full screen window can select Blue or Black color through [Options]➔

  [Accessibility]➔ [Black screen]➔ ON/OFF.

Independent aspect ratio in main and sub-window
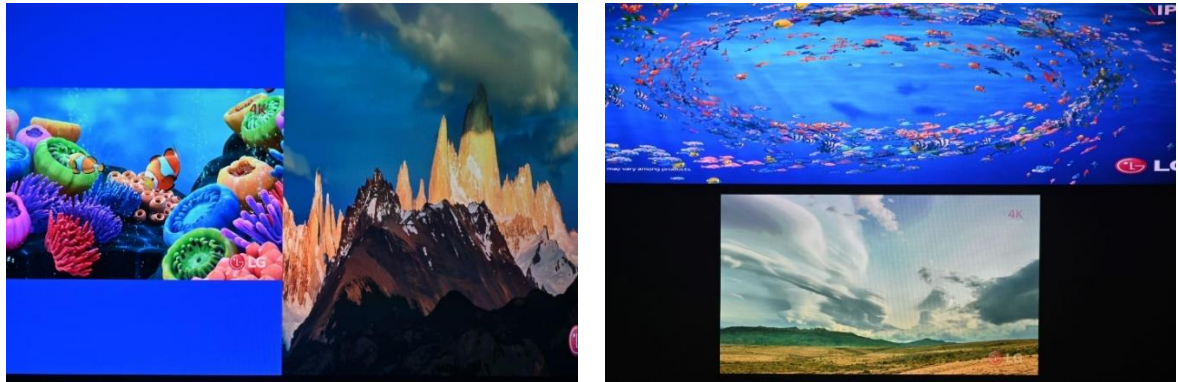
15.4. [SBS 2/1]

- ➢ SBS 2/1 is to display one image with size of 2/3 screen size and another one is 1/3. The location for 1/3 & 2/3 can't be changed but user can change the position with monitor installed at different direction together with image rotation. For instance, if user has 2/3 image at the top, when user installs the monitor with 180 degrees rotation and rotates the image with 180 degrees, then user will see 2/3 image at the bottom. User can apply same concept to POP3 & POP4.
- ➢ Image rotation in main and sub-window can be executed separately.
- ➢ Image rotation can be executed together with image cropping and aspect ratio adjustment.
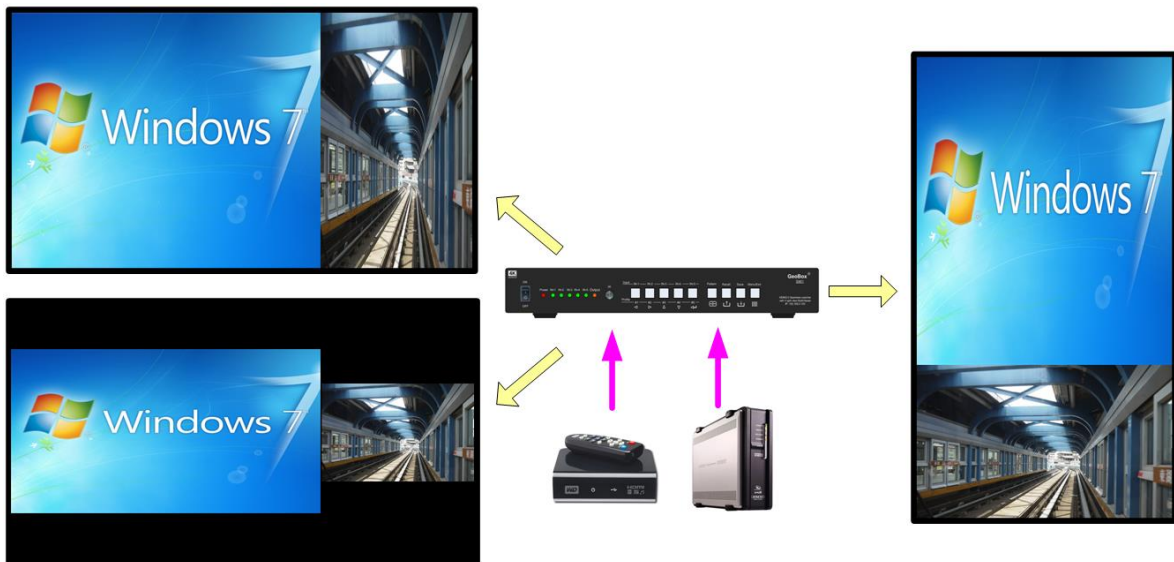
15.5. [3x SBS] in horizontal direction

> 3 split view function is integrated in S901. User can display 3 split-view in one UHD monitor.

> The center image size is adjustable from 1/6 to 5/6 screen width through [Size] under [PIP Setting]. Minimum image size in both side windows is 1/12 screen width.

> The input signal can be up to 4k/2k 60Hz.

> The monitor can be located at landscape or portrait position. The aspect ratio in each split view can also be adjusted through Overlap function under [PIP Setting] menu.

> Each window can be rotated to be displayed on monitor with portrait position.

Image rotation to fit portrait monitor
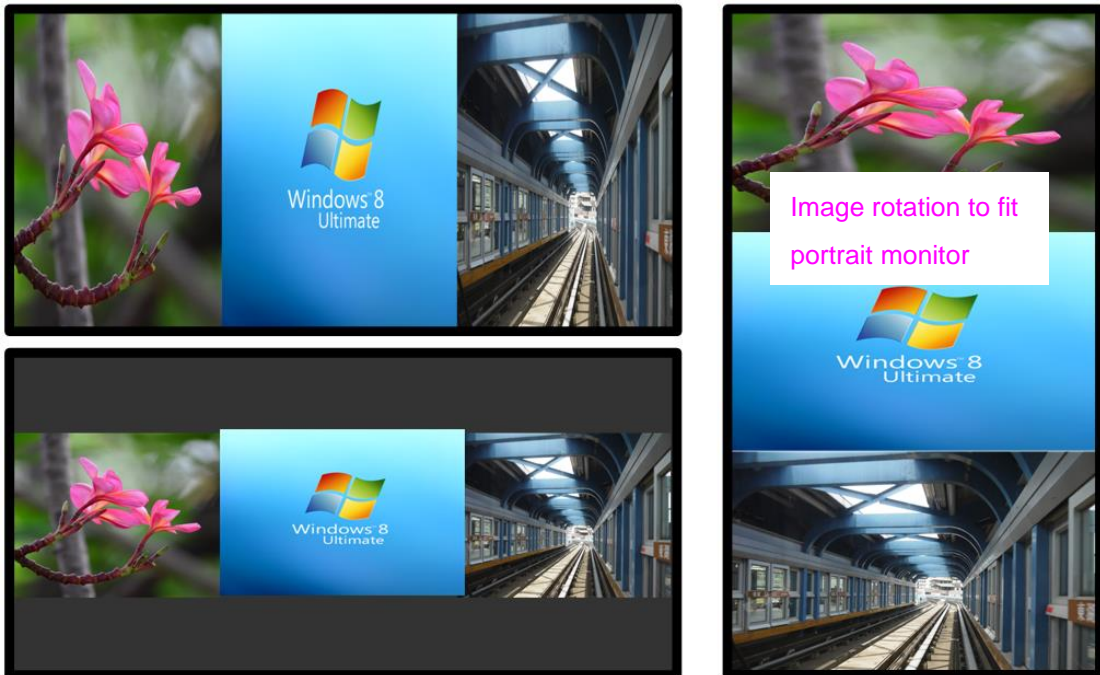
> Center image size is adjustable. Both side windows can be only 1/12 horizontal size of the screen.

> Below is the example to use one S901 as front-end processor to display 3 split contents in edge blending system. User can apply a content with the same aspect ratio as this 1/12 image to get non distortion image. User can use PC multi-window function to get display as below.

15.6. <u>3x T/B</u>

➤ [3X T/B]: Three split views at portrait direction. The image size can be full screen or keep original aspect ratio. User can do further aspect ratio adjustment through [Overlap] function under [PIP setting].

➤ When multi-units cascaded, user can create 6/912/16 split views for one display.
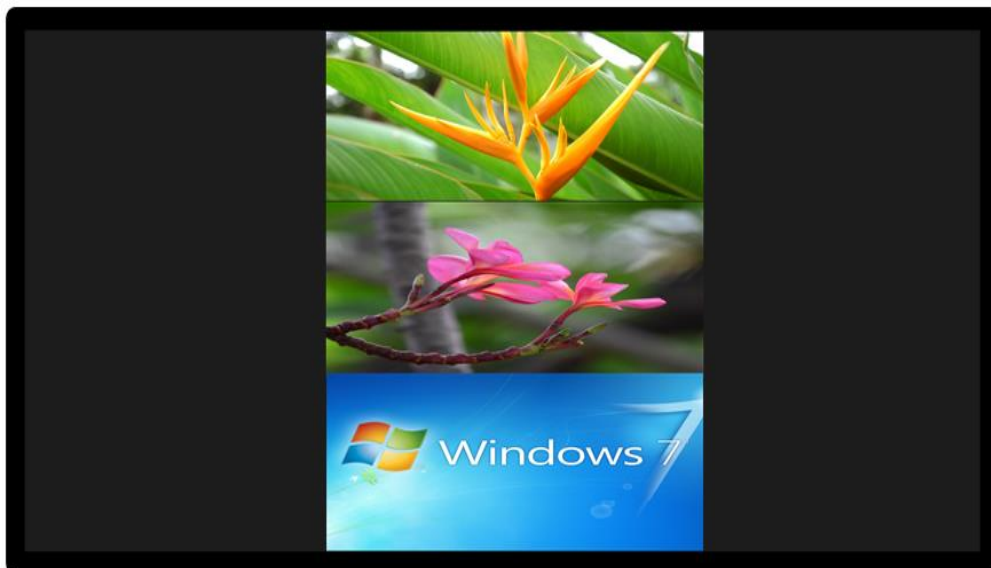
15.7. Other 3 split views

> The S901 can display 3 split views in one Ultra HD display.

> The monitor can be installed at landscape or portrait position.

> The aspect ratio of each split view can also be adjusted via [Overlap] function under the [PIP Setting] menu.

> [POP 3]: There is a large image on the left side and two images on the right side.

> [POP 4]: There is a large image at the top and two small images at the bottom.

> All windows support 90/180/270 degree rotation and flip of the image, and can also be set to maintain the original aspect ratio or full screen display. All windows also have a cropping feature through [Overlap] menu for further position, size, and aspect ratio adjustments.

> The back ground can be black or blue.

> All inputs of the main window and sub-window can reach up to 4k/2k 60Hz 4:4:4 signal.

3 Split Views [POP3]   **3 Split views [POP4]**

Monitor installed at top-down position and execute image rotation to get bottom pattern
The background for none full screen image can be blue or black color.

15.8. 4 split views

- ➢ Below are two types of 4 split views for one UHD monitor with S901—[4x Split] & [4x T/B]. 4 Split is preset and can be selected through hotkey on the front panel or OSD menu.
- ➢ OSD can be activated through MENU key on front panel or IR remote controller. The content for each window can also be selected through [Source] selection under [Image Properties]→ [PIP Settings]→[Source]
- ➢ The aspect ratio and cropping area can be adjusted through [Ratio] & [Overlap] function under [PIP Settings] menu.
- ➢ All display windows can't be rotated in 4 split view application.
- ➢ User can change the input source for each window to get different display layout.

4 split view hot-key on front panel
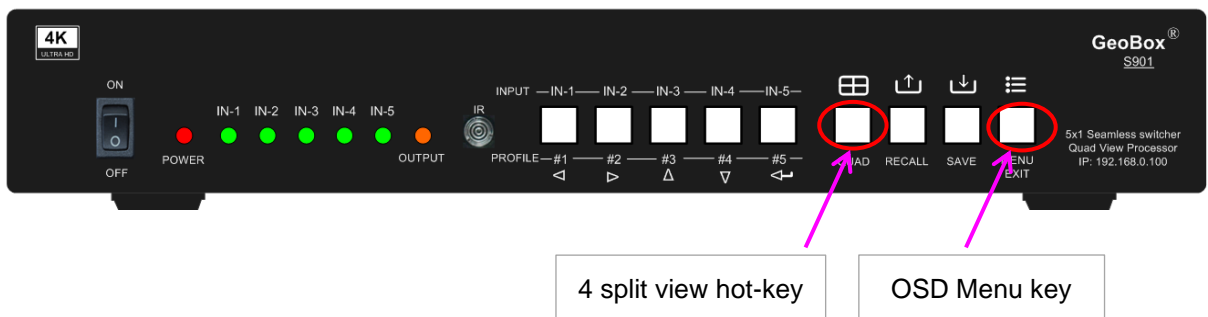
[4x Split] view   [4x T/B] view

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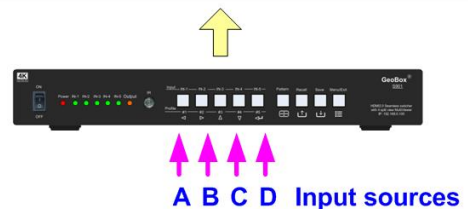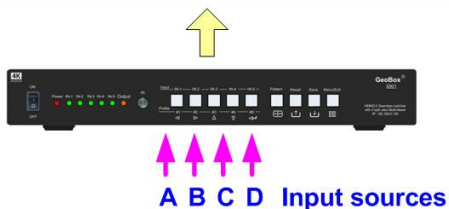
16.   Advanced functions

16.1.   EDID Setting

Selectable EDID setting for input source resolution is added into GeoBox. The settings will be applied to selected input port. Each input port to set EDID separately. Below are some guideline for EDID setting. User can access EDID setting OSD menu via: [Options]→ [Setting]→ [EDID]

➢ GeoBox can support big range of input signal timing—from XGA up to 8k/2k @30Hz. In order to get the best video performance, user needs to select the best input signal resolution.

➢ Different source resolution may show different final image aspect ratio. User can utilize different EDID setting to change signal source timing and get different output aspect ratio.

➢ User can select different EDID directly from OSD list or use [Customize] function to create Non-VESA standard timing. The range is H=1024-4080, V= 720-3840.

➢ If the signal is from PC, user can set customized EDID in GeoBox to let PC output expected resolution. Some PC may not follow GeoBox EDID resolution setting and require customized output setting from display card or re-boot.

➢ User can create some timings that is outside VESA standard, such as 7680x2160/30Hz.

➢ PC or laptop may not output required timings due to hardware limitation or driver issue. User may need to do custom setting inside PC and re-boot to get desired output.

➢ PC may memory the first EDID when it is connected with GeoBox at the first time and may not follow new EDID setting. Below are some suggestions that may fix this kind of issue.

- Power ON GeoBox first and set EDID before connected with signal source. It will make sure PC can catch correct EDID information.

- To switch to other Preset mode, then return to the required one. If Preset EDID modes still can't get satisfied result, user can try Customized setting. It may get different result.

- If Preset modes and Customize EDID setting still can't get required result, please insert small pin into Reset Hole on the back panel for 5 seconds to reset the system. It will reset the system to factory default and get different result. Please note that reset from Reset Hole will erase customer settings saved in Profile Index.

➢ User can check the input/output resolution from INFO key on remote controller.

16.2. <u>Quick PIP ON/OFF and two input seamless quick swap</u>

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

Quick PIP on/off & main/sub window seamless swap
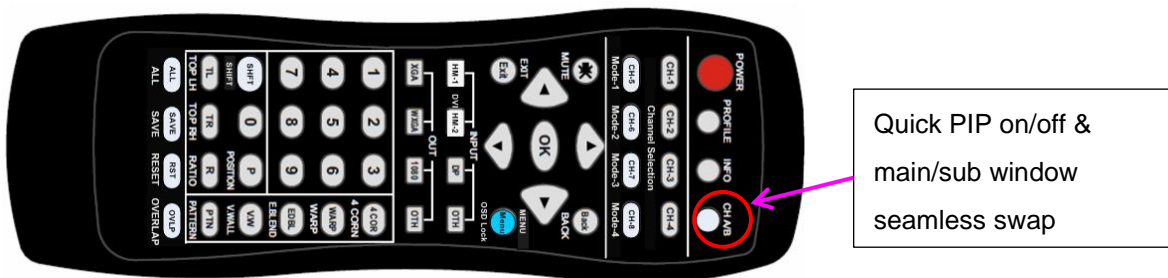
> When the output resolution is set to 1920x1200 or 1920x1080, user can add full screen PIP image on top of main image. User can click [CH A/B] key to turn on/off PIP image to see main/sub-window swap seamlessly.

> This image swap can be applied to any two inputs with maximum PIP size and FHD output in S901. To click [CH A/B] key will execute seamless quick swap between these two inputs.

16.3. Image rotation and flip

- ✓   There are two image Orientation OSD menu. One for main input and the second is for second input for PIP/POP.
- ✓   Image can be rotated at 90/180/270 degrees and flipped at Right/Left, Top/Bottom or Front/Rear. This function can support up to 4k/60Hz input signal.
- ✓   Image 90/270 degrees rotation is for monitor at portrait. There is no need to rotate signal source.
- ✓   When main image is rotated or flipped, the OSD will not be rotated together with main image.
- ✓   User can see the direction of the TEXT "R" to select image flip and rotation result.
- ✓   Main image and PIP image can be rotated independently.
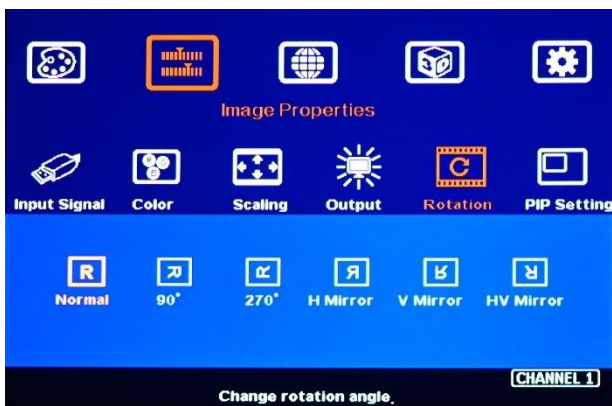
Rotation for main input
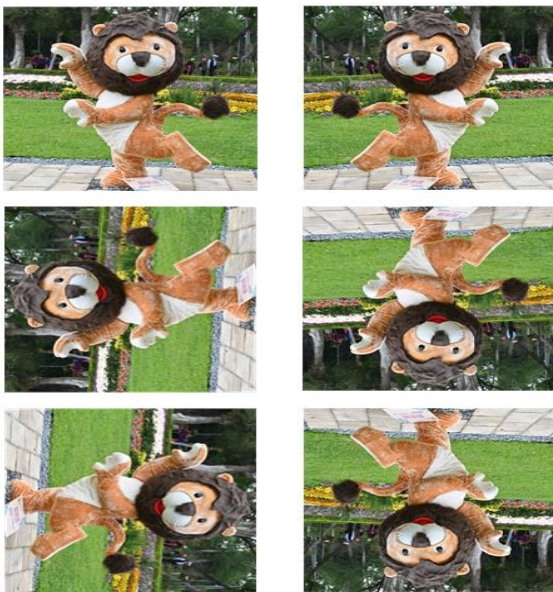
Rotation for sub-input (PIP)
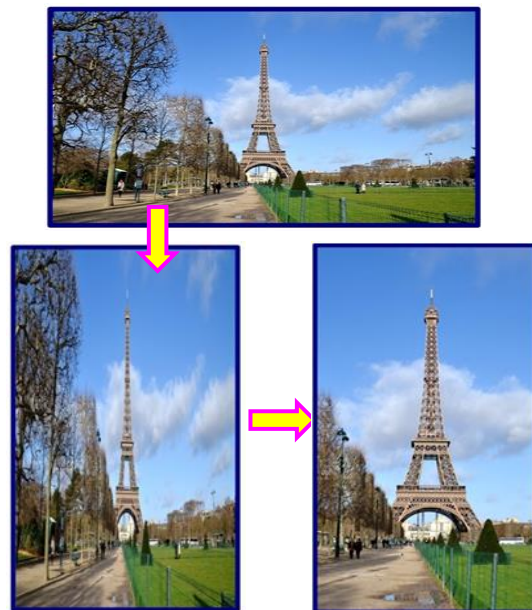
16.4. <u>Image Cropping in main and PIP/POP (Sub-windows)</u>

Crop & Rotate
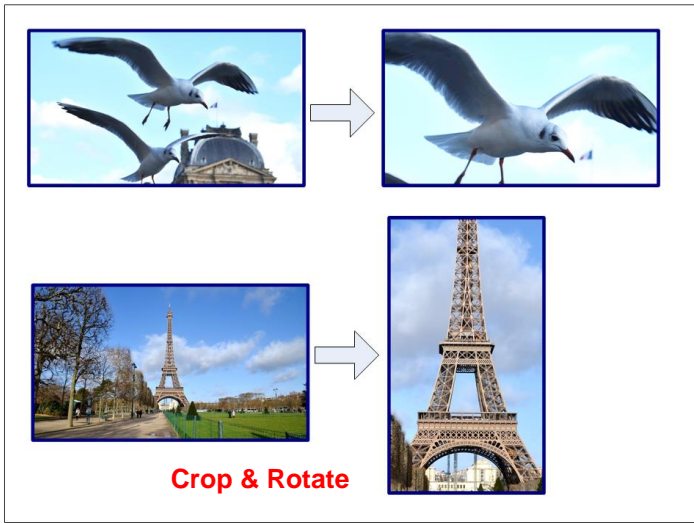
✓ Image cropping in both main and PIP/POP (sub-window) can be done separately.

✓ [Video Wall] setting is for main image cropping.

✓ [Overlap] setting under [PIP setting] menu is for sub-window cropping.

✓ Image cropping function can co-exist with image rotation and flip functions.

16.5. <u>Flexible Aspect Ratio Adjustment in main window</u>
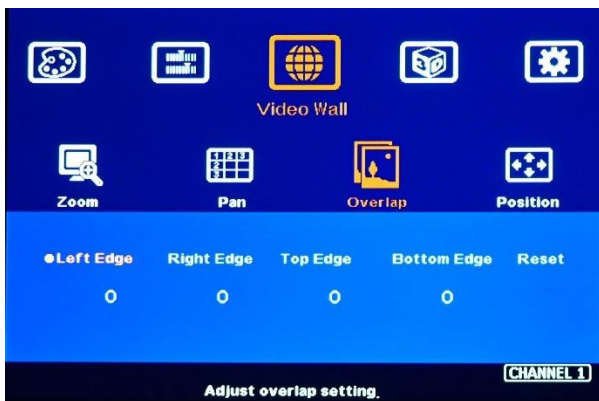
User can use Video Wall [Overlap] function to change the aspect ratio of the image with black or blue border or to stretch the image in specific direction to compensate the aspect ratio difference between video wall and the content. The Maximum adjustment range is +_1800 pixels in each edge.
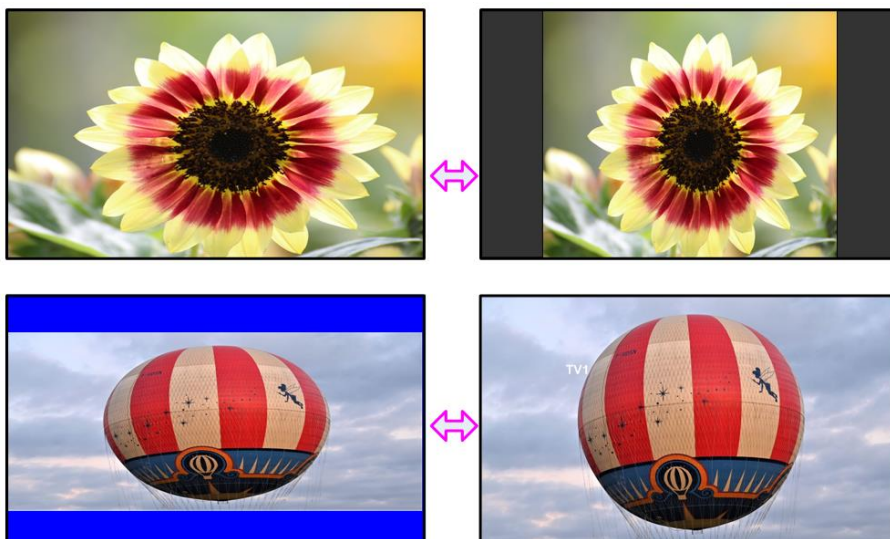
Background color can be black or blue:

[Options]→ [Accessibility] → [Black screen]

Case Study: Aspect ratio calculation

Below is case study regarding the relation between aspect ratio and overlap value settings in Video Wall. If LH edge Overlap value increase 300 pixels and RH edge increases 400 pixels on FHD image, it means the video total horizontal pixels will increase 400+300=700 pixels. As a result, the total horizontal active pixels will be 1920+700=2620. The original image in horizontal direction will become 1920/2620=73.28%. The final aspect ratio will become (16*73.28):9=11.7:9

16.6. System Standby and automatically turn off output signal

➢ OSD [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 S901 will also be terminated at the same time. If S901 detects input signal again, it will automatically turn on the system again. During Standby period, S901 will be still in ON status.

➢ 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.

16.7. Change Background Color in Blue or Black
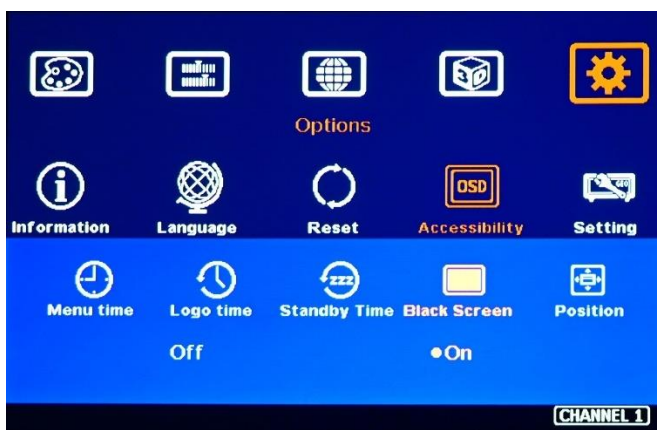
✓ OSD [Options]→ [Accessibility]→ [Black Screen]→ [Off]/[On]

✓ 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.

16.8. <u>Turn off splash screen Logo</u>

> User can turn off splash screen Logo through [Options]→ [Accessibility]→ [Logo Time] and set the value at "0". Default setting is 10 seconds.

> It will reduce some boot up time.

16.9. <u>Image freeze</u>

User can use [Shift] key in remote controller to execute image freeze. It will be useful while display video image. To press [Shift] key again, it will disable image freeze function.

Image freeze hotkey
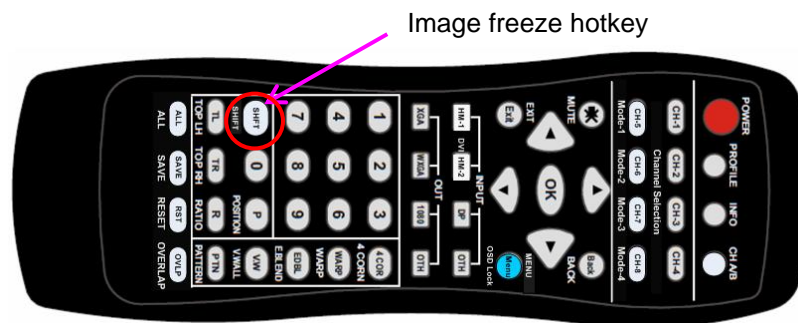
16.10. <u>Audio Output setting</u>

If user executes PIP/POP function, user can select the audio source between main and sub-window. Mute function is available. The output sound is embedded inside HDMI output signal. It is only stereo audio. Please access [Option]→ [Setting]→ [Audio] to do audio setting.

16.11. <u>HDCP control</u>
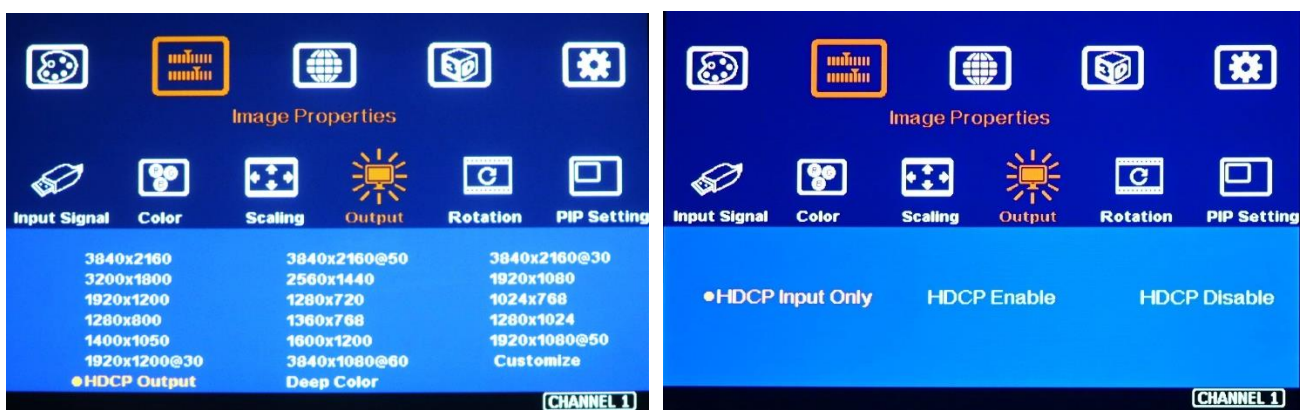
Three sub-menu under [Image Properties]→ [Output]→ [HDCP Output] settings:

> [HDCP Input Only]: Encrypts HDCP only if the input signal has HDCP.

> [HDCP Enable]: Always output with HDCP encrypt

> [HDCP Disable]: Does not encrypt HDCP. Only non-HDCP compliant input signal can be output.

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17.   <u>Video Wall settings</u>

- ➢   S901 can support up to 7680*2160/30Hz input resolution in HDMI and 8k/4k/30Hz in DisplayPort. If user adds one splitter at the front end to provide the same signal to multiple units of S901, user can build high resolution video wall. If add HDMI matrix switcher, user can build 4k video wall with one big content across entire video wall or some monitors display discrete content with true 4k quality. Each monitor can be at landscape or portrait direction with PIP/POP 3/4 split view images.
- ➢   One of the key applications in video wall function is to crop any region from the image and output specific resolution for LED display through programmable output function.
- ➢   Press [V. Wall] hotkey on Remote Controller to activate [Video Wall] menu. WebGui and GCT PC tool are available through Ethernet connection. USB can also be used for PC tool operation.

17.1. <u>[Zoom]</u>

Use [Zoom] to split the display in horizontal and vertical directions. GeoBox will split the image into different sections. Maximum split image is 15 in both horizontal and vertical directions.
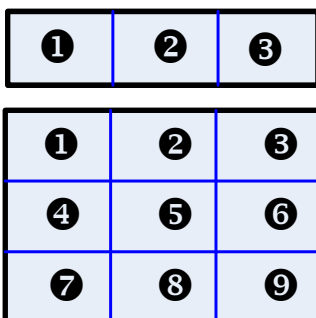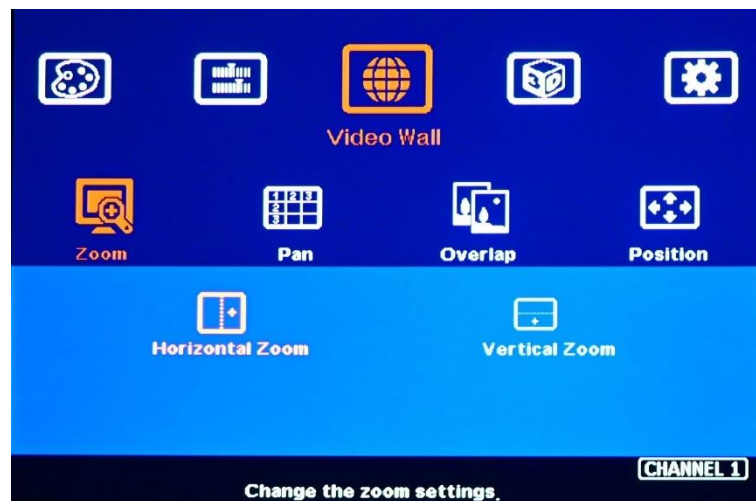
For 3x1 video wall displays

Horizontal Zoom= 3, Vertical Zoom = 1

For 3x3 video wall displays

Horizontal Zoom = 3, Vertical Zoom =3

17.2. [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.
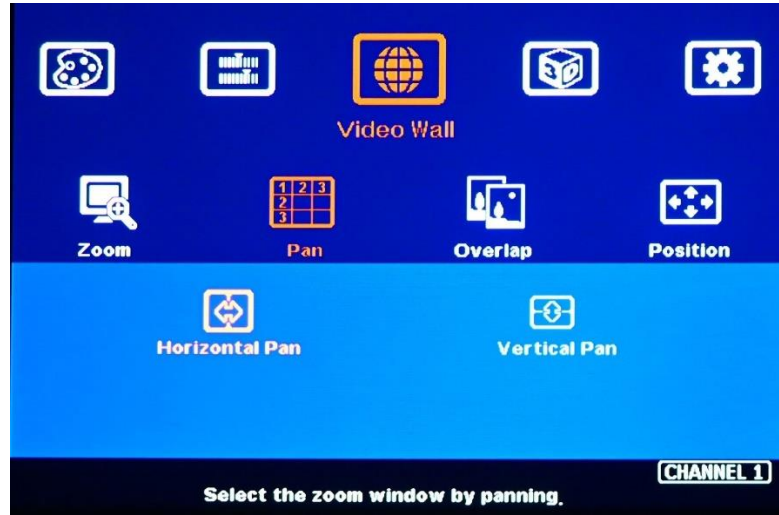
In the case of 3x3 video wall display, Pan settings are as below:

For No. ❸ monitor: *For No. ❻ monitor:*

Horizontal Pan = 3   *Horizontal Pan = 3*

Vertical Pan = 1   *Vertical Pan = 2*

17.3. [Overlap] – Image cropping, aspect ratio adjustment and position Alignment
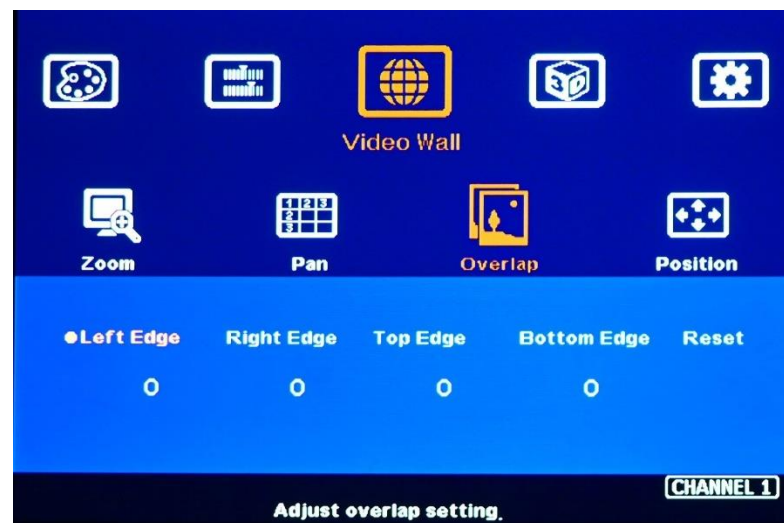
- ➢ User can use [Overlap] function to changes the cropping area, aspect ratio and image position. It can also execute Bezel compensation and correct misalignment in video wall installation.
- ➢ Maximum [Overlap] adjustment value is +_1800 pixels in all directions.
- ➢ User can reduce [Overlap] value to stretch the image outside video wall (some image will be missing) or draw image inside video wall with Black or Blue blanking area at the edge through increase [Overlap] value. This function can adjust the aspect ratio of the content to match required aspect ratio.

17.4. [Position] –Position adjustment

[Position] function is to shift image position without changing image size or aspect ratio. After activate [Position] menu, user can use direction key to change the image location. It is possible to see blank border after image position shift.

18.   3D format conversion and active/passive 3D application

18.1. 3D format conversion

S901 can convert side by side, top/bottom, frame packed, line alternative and dual camera 3D formats with Side by Side, Top/Bottom or frame sequential outputs.

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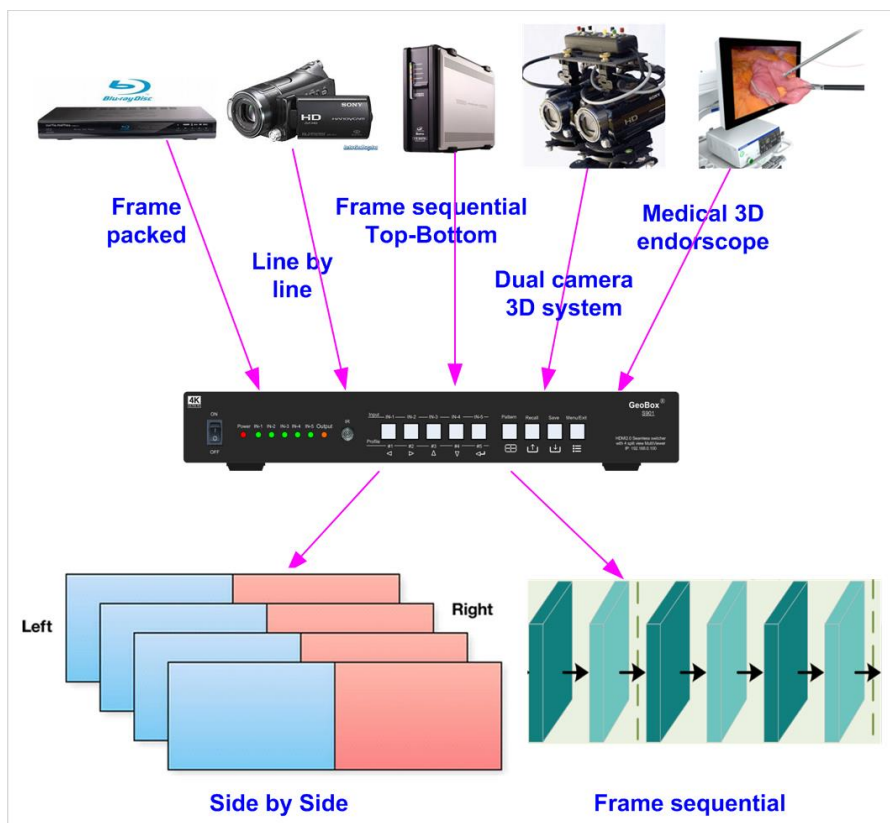
User can apply dual camera FHD 3D signals to S901. S901 can be set at POP (SBS) mode and output 4k/2k side by side image for 3D display.
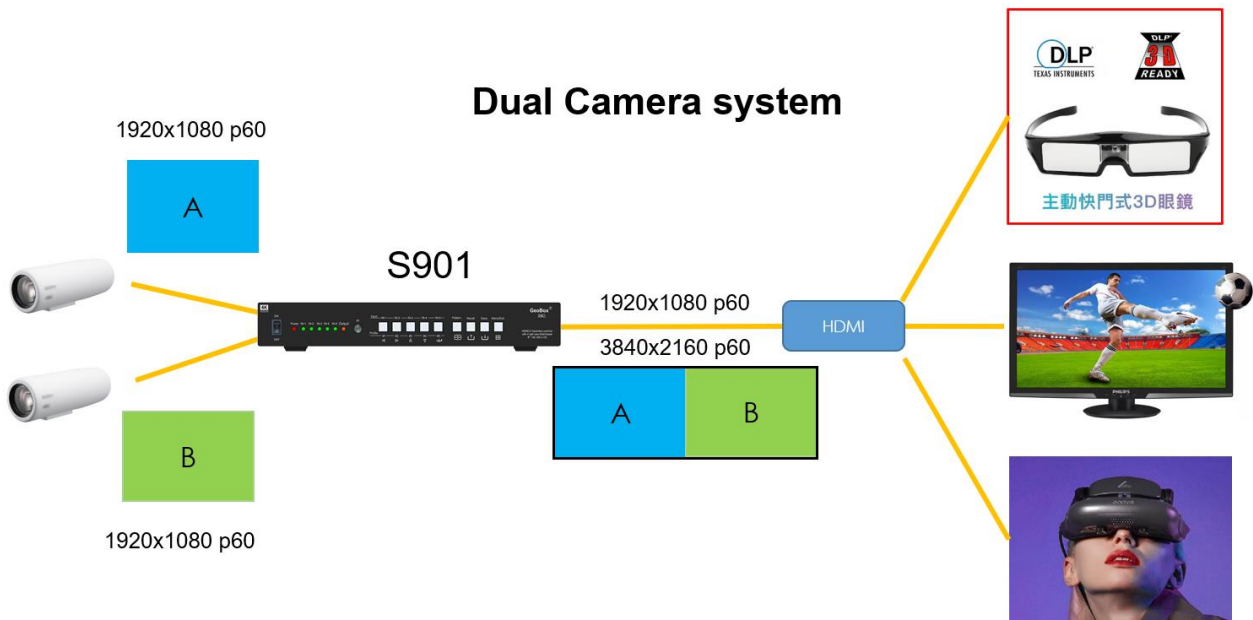
18.2. Active 3D display

➢ S901 can convert 3D formats into Side by Side, Top/Bottom or 100Hz/120Hz frame [Sequential] format for active 3D.

➢ Frame sequential 3D output can be up to full HD 120Hz.

➢ When convert into 3840x1080 or 3840*2160 side by side 3D format for active 3D display, please select the output directly from preset mode to get standard VESA timing output. The Customize output mode is reduced blanking signal. Some system may have wrong detecting in this kind of 3D signal.

➢ VR HMD system may show 3840*1080 side by side 3D signal with wider image aspect ratio. Please select 16:9 output timing (such as 4k/2k) to let HMD display normal aspect ratio.

18.3. Passive 3D display

S901 can decode 3D signal into RH eye or LH eye frame signal for passive 3D display. User need to use two units of S901 together with one HDMI splitter for this application. It will be more cost effective to use one G902 (no warp) or UD102 (with warp) for passive 3D system.

19.   WebGui and GCT PC Tool (GeoBox Control Tool)

19.1. WebGui

WebGui is embedded inside S901. Once user connects S901 with PC through Ethernet, user can access WebGui and execute all operations similar to OSD menu via Virtual Keys and OSD Menu.

➢   The connection can go through Ethernet router LAN port, WiFi Router or Cross Over Cat 5/6 cable. User can set each unit of S901 with different static IP address (default is 192.168.0.100) in the same domain, then open Google Chrome or Microsoft Edge with IP address to access each unit of S901 for independent operation. User can set different IP address to control multi-units at the same time.

➢   User can turn on/off the system through WebGui and see the status through power indicator.
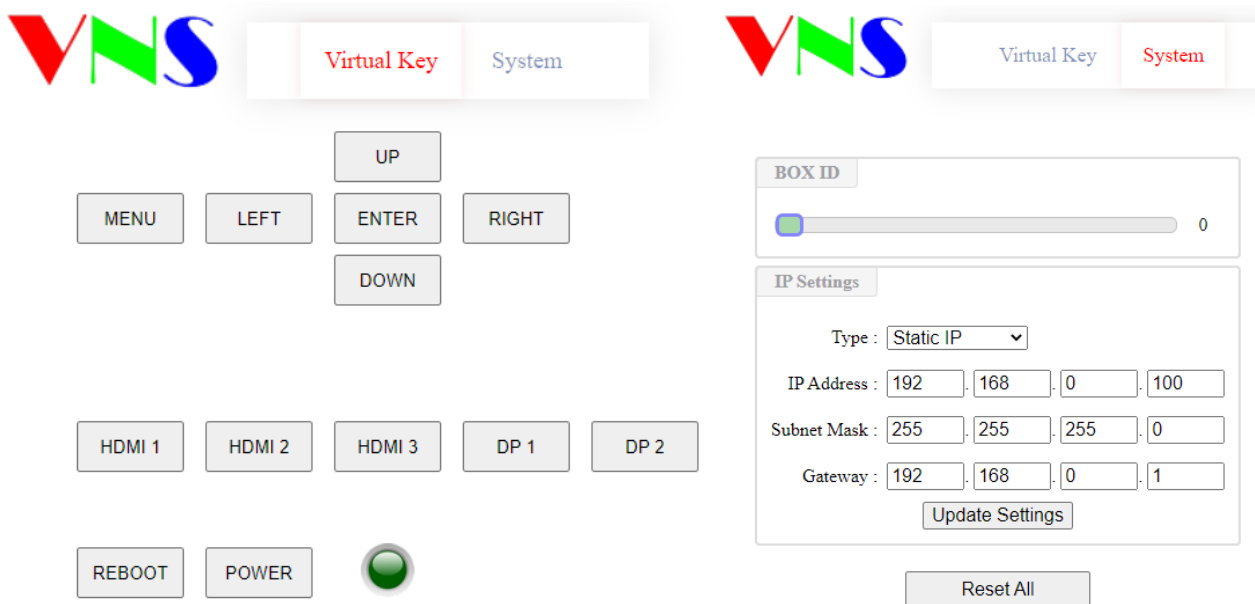
19.2. GeoBox Control Tool (GCT)

➢ GCT is a PC tool executed through PC. User needs to download this tool from VNS website. Once user connects S901 with PC through Ethernet or USB and open GCT, user can access GCT 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.

➢ GCT synchronizes the settings parameters inside GeoBox. User can swap the operation between GCT and remote controller.

➢ User can execute full operation functions and also update Firmware and MCU code through GCT. User can control multiple units at the same time through change IP address.

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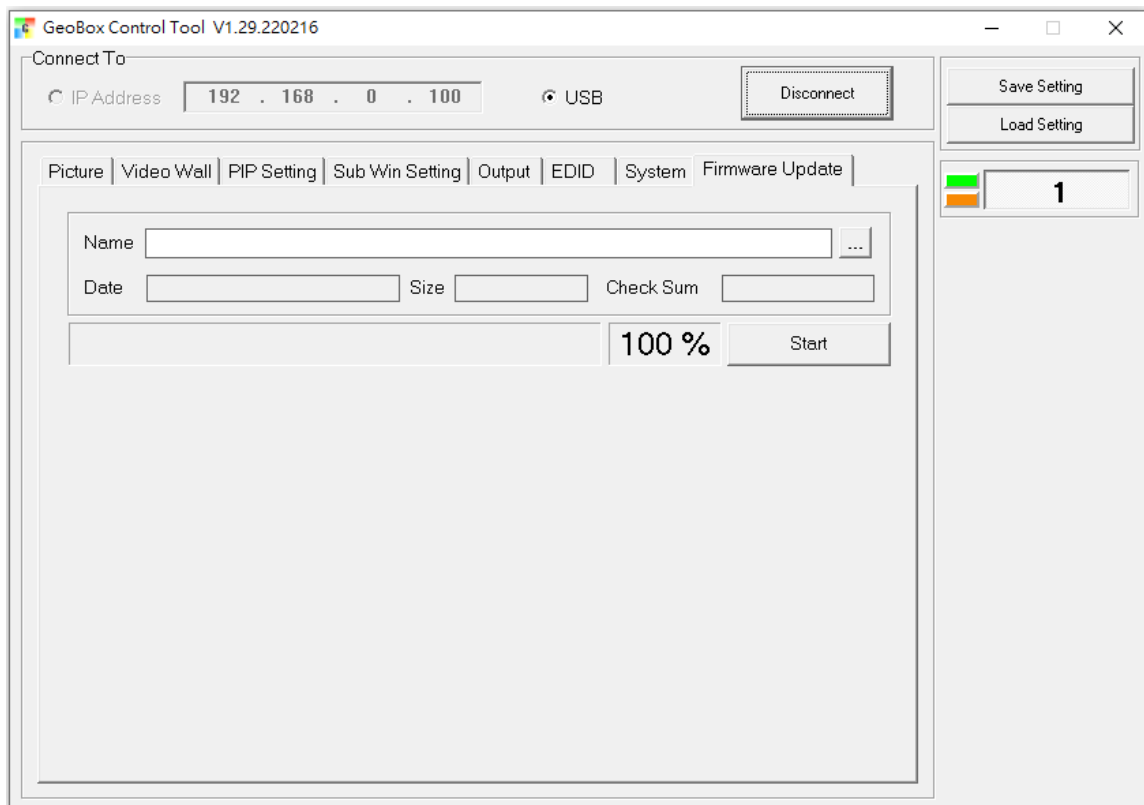
20.   <u>Application case study</u>

20.1. <u>Image **cropping** for LED display</u>

> ➢   If user wants to get the best video quality, the content, signal source, GeoBox output and display system should have the same resolution.
> ➢   LED display system resolution is based on the number of the display module. It is not fixed resolution like VESA standard, such XGA, WXGA, WUXGA,1080p or 2160p.
> ➢   Media server, Blue Ray player or low-cost media player can only output standard VESA or video timings. It doesn't have flexibility to output specific timing based on the requirement in LED or other big display system.
> ➢   S901 can crop the right image from any video and output the timings that can match the system resolution of the display device to get the best video quality.
> ➢   Below are the procedures to crop and set 2560*1440 output timing from 3840*2160 input source.

Video wall settings: (Example A)
Zoom: H= 2, V= 2, Pan: H=1, V=1
Overlap: RH edge: 2560- (3840/2) = +640, Bottom Edge: 1440-2160/2= +360

Video wall settings: (Example B)
Zoom: H= 1, V= 1, Pan: H=1, V=1
Overlap: RH edge: 2560-3840= -1280, Bottom Edge: 1440-2160= -720

Both methods will crop 2560*1440 resolution from 3840*2160 image. Then user can set output resolution of 2560*1440 by selecting the output timing list or programmable output settings from OSD menu under [Image Properties]→ [Output]→ [Customize].
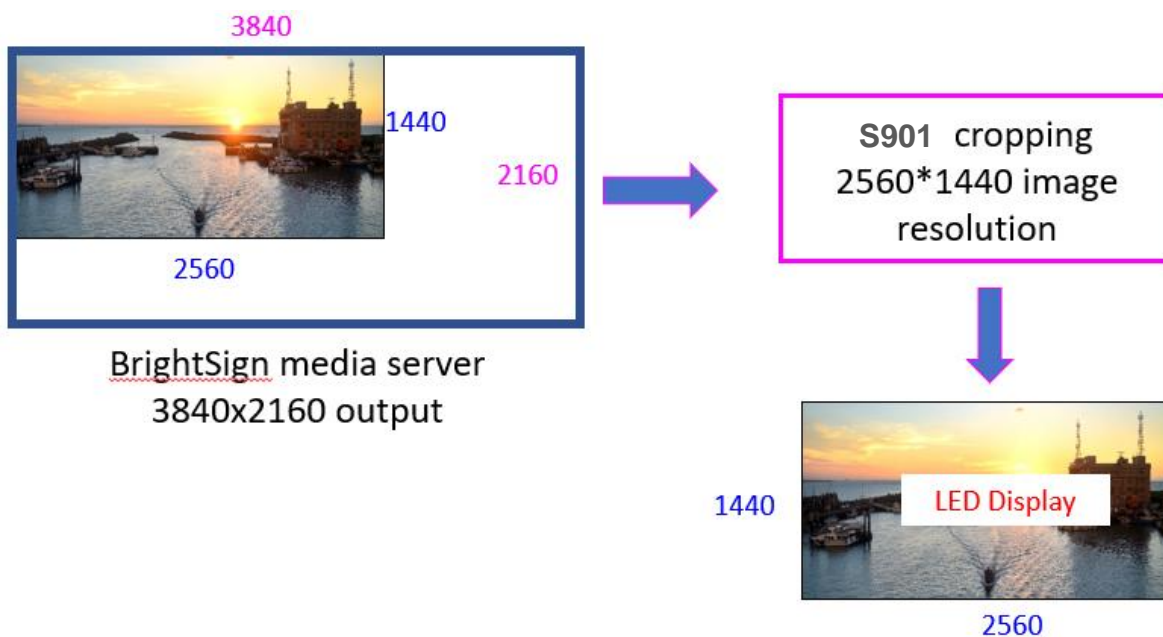
20.2.   Front end processor

20.2.1.   S901 as front-end processor for video wall

S901 can be added before video wall system to allow different display styles across or monitors.

User can also manage to display different content in each discrete monitor.
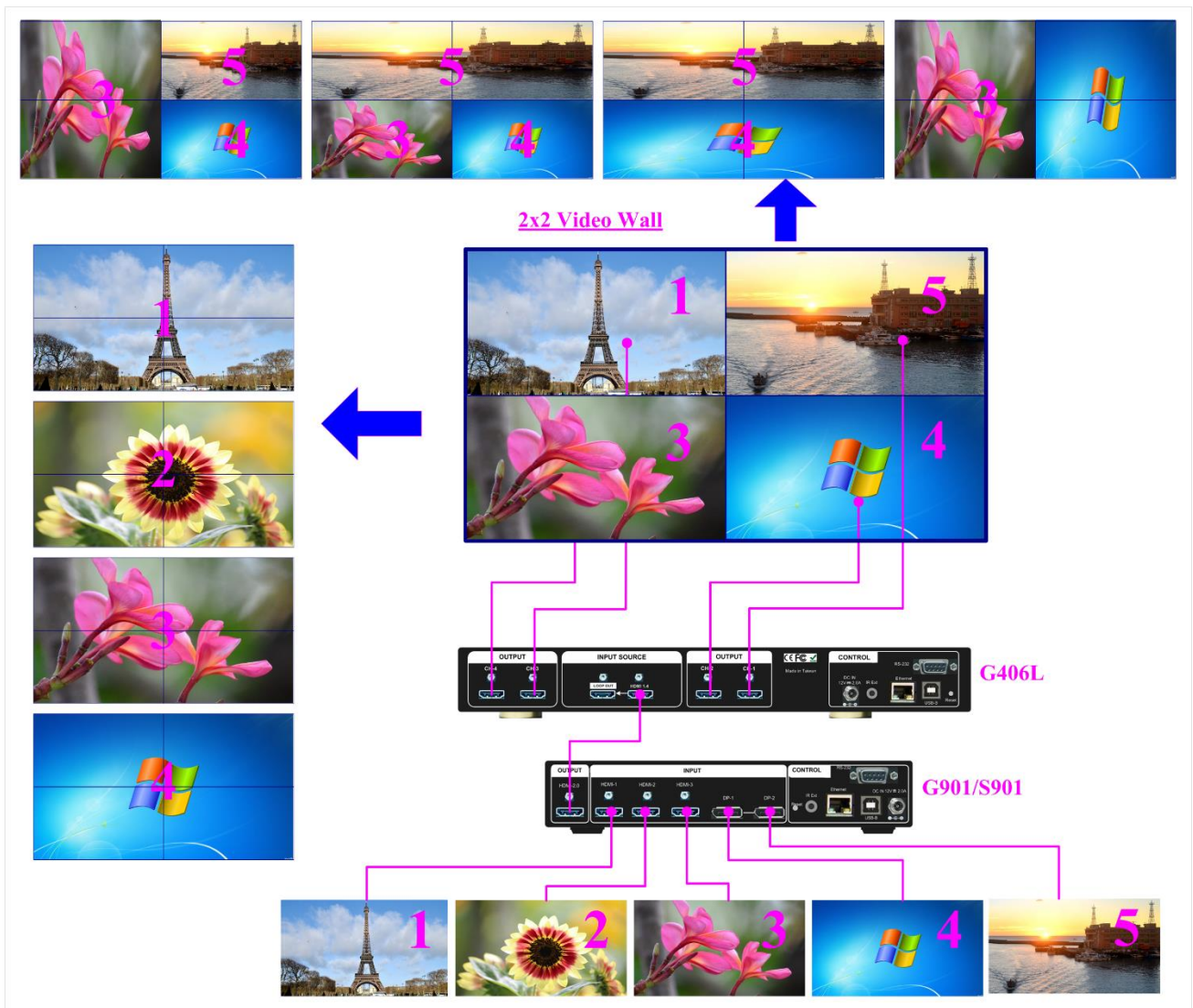
Change video wall aspect ratio and add PIP
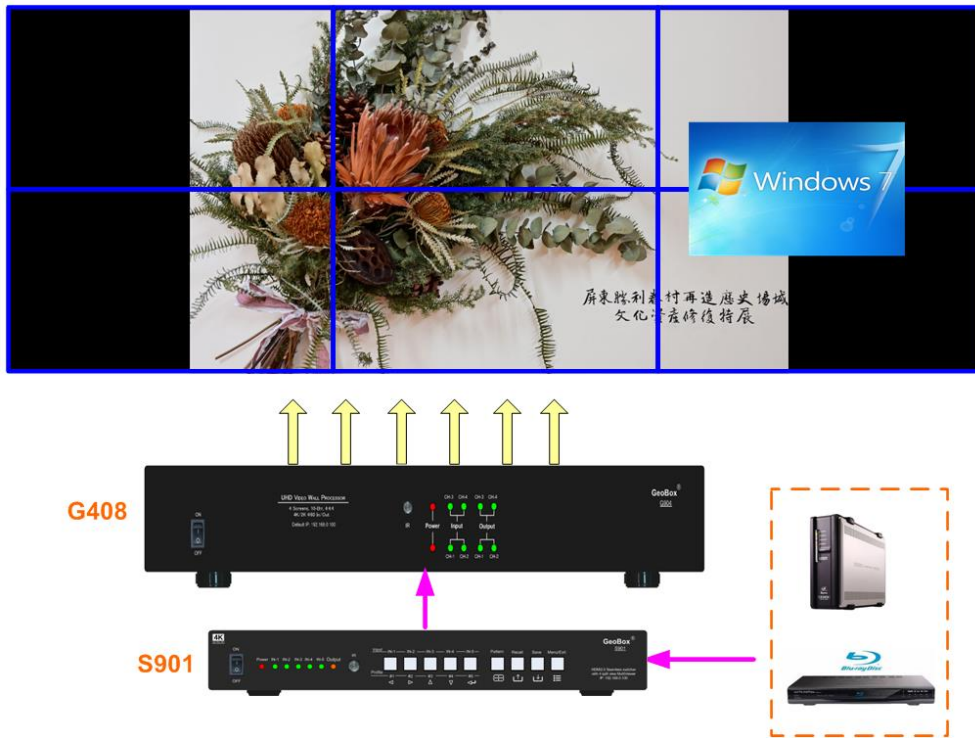
20.2.2. S901 as front-end processor for projector edge blending system

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20.2.3.   S901 as front-end processor for 3 or 4 split view in projection system

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20.3. 4K Scaler Switcher

5 in / 1 out switcher with 10-bit high end scaling up / down
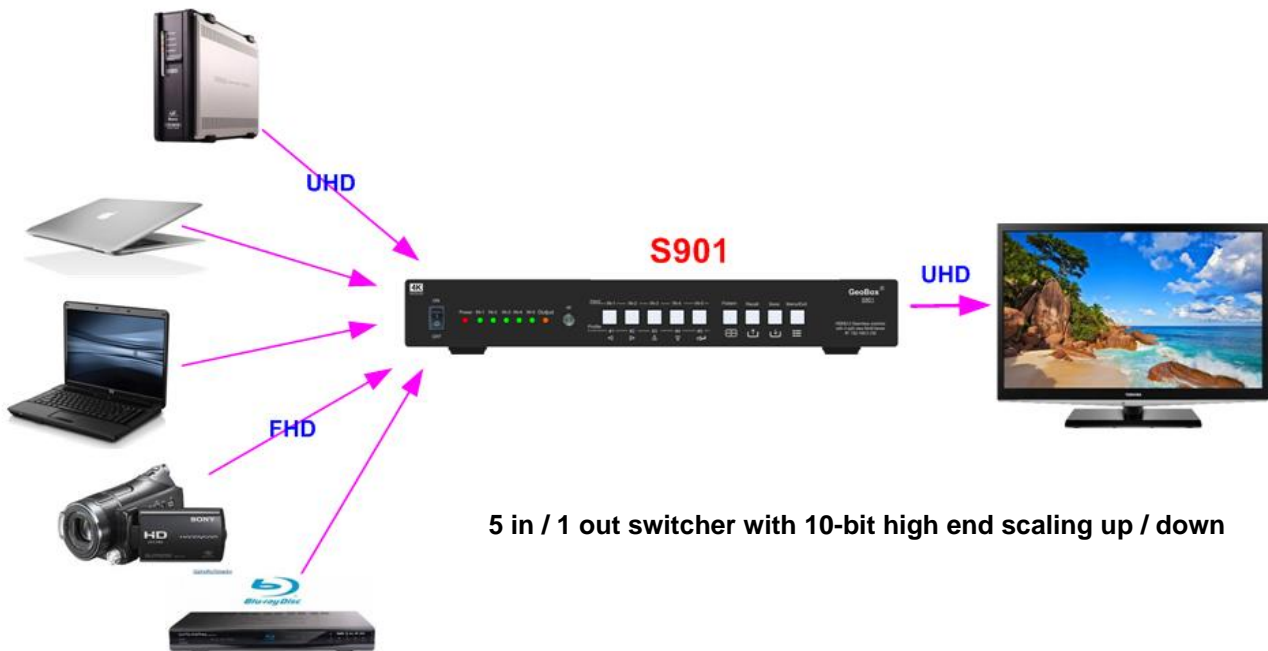
All HDMI input sources can support up to 4k/2k/60Hz 4:4:4 input signal. DisplayPort input can support up to 1080MHz (7680*4320/30Hz). The output resolution can be from 1024*720 to 4096*2160/60Hz.

Technical support

21. Trouble Shooting

21.1. No image on the screen

➢ If S901 output resolution is 4k/2k/60Hz and the monitor can't support 4k input, user will see no display image in the monitor. Please use remote controller or front panel output selection keys to select [1080] or lower output resolution to let display device be able to support it.

➢ Please check input/output LED indicators and make sure all the signals are correctly connected.

➢ If user still can't see the image, please click [Menu] key to activate OSD. If user can see normal OSD, the system should be normal. Please click [INFO] key to check input and output timings.

➢ If user still can't see the image, please change signal source, HDMI cable or display device to find the root cause of the failure.

➢ HDCP may be the reason for no image. Please make sure display device is HDCP compliant.

➢ Many HDMI extenders can only support up to 4k/2k @30Hz. Please select correct HDMI extender based on your requirements.

21.2. <u>Intermittent or loss of input signal</u>

➢   Check the HDMI cable quality and make sure all cables are fitted correctly. 4k/60 signal requires 4k/2k certified cables.

➢   Cable length: Connecting cable length should be as short as possible. Replace a short cable to verify the possible root cause. Usually, the longest standard 4k/2k HDMI cable is only up to 10m.

➢   HDCP compliant issues: If the input source or the monitors are not HDCP compliant, it is possible to stop S901 from negotiating HDCP link and show intermittent, abnormal or no image. Please check HDCP condition in signal source or display device.

➢   Resolution issues: check if signal source and connecting cables can provide source signal supported by S901.

➢   DVI/HDMI signal compatibility: some display devices may only support DVI video signal. The default output is HDMI. User can change output with DVI format through [Options]→ [Setting]→ [DVI]→ [On] to test it. DVI output can only support up to 4k/30Hz.

➢   Usually, to swap with different cable, output channel, signal source and monitor can verify the root cause for the failure.

➢   It is possible to have signal compatibility issue. User can add one HDMI splitter/switcher in the middle to change signal impedance. It may fix the issue.

➢   We propose to use signal enhanced cable, HDBaseT or Optical Fiber cable for long distance connection. Conventional 4k/60 HDMI cable can't support more than 10 meters. If using optical fiber cable, user may need to set DVI output to get smooth transmission but only up to 4k/30Hz.

➢   User can connect a monitor at the end of the Loop out port to check signal source stability.

21.3. <u>Video quality issues</u>

➢   Try to use the highest signal resolution and number of color bits (RGB 4:4:4) allowed by S901. Please click INFO key to verify input/output resolution.

➢   There are a number of lower-quality AV players, the specification and actual output are difference. These media player may be designed with lower color sampling bits or poor image compression technology, resulting lower image quality or lagged image.

➢   If use of H.264/H.265 compressed files, please select a player with hardware decoding to get smooth video quality.

➢   If the input signal is interlaced signal (interlaced-1080i), and the image is rotated, then the channel will have no [3D Motion adaptive de-interlaced] processing function. If user applies static image source, the output video may have slight jitter phenomenon. The processing channel quality will be reduced. Use a progressive signal source setting (1080p/2160p) whenever it is possible.

➢   Please press [INFO] shortcut key to check the input/output signal settings.

➢   User can select [Image Properties]→ [Output]→ [Deep Color] to set 10-bit signal output. It will

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smooth the gradient color when the input signal is also 10-bit. Please note that HDMI 2.0 can only support up to 4k/2k 50Hz 10-bit 4:4:4 signal only. 4K/2K 60Hz 10-bit is not supported.

➢ If possible, please apply 60Hz signal source. User can see smoother image while image is panning or in fast motion. User may see jitter image in 24/30Hz input source.

21.4. <u>Abnormal display in Front Panel LED indicators</u>

➢ User should see Input / Output LED light. If no LED light or LED is intermitting, please check Input / Output connecting cables, signal source & monitor.

➢ If continuous flushing in Green LED indicator with 1.0 second interval, the OSD menu has been locked. Please press 850 number keys in remote controller to disabled it.

➢ If continuous flushing in orange LED indicator with 1.0 second interval, the OSD menu has been locked by MENU key. Please press MENU key for 5 second to disabled it.

➢ If Power LED turns to Red, please open the system through remote controller POWER key.

21.5. <u>Synchronization issue in the outputs</u>

➢ While using multiple units for video wall applications, please enable [Frame Sync] menu under [Options]→ [Setting]→ [Frame Sync] → [Normal].

➢ The input refresh rate should be the same as output refresh rate so that the system can implement Frame Lock to synchronize all the outputs from multiple units. If the input source is 50Hz with 60Hz output, it is possible to see some synchronization issue.

21.6. <u>Call for technical support</u>

➢ User can send e-mail to support@vnstw.com together with as much information as possible.

➢ The following information is required for a swift response.

    ✓ Sink device (monitor): type and model number

    ✓ Monitor layout or specific application details (shape of video wall).

    ✓ GeoBox 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 input/output timing and F/W version.

    ✓ The exact nature of the problem. Please be as detailed as possible.

    ✓ If possible, please attach the Pictures of the issue.

➢ Usually, we will response with 24 hours (excluding weekends)

➢ Please note that if the machine is sent back for repair, user needs to pay for some delivery cost.

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22.   Safety Precaution and Maintenance

➢ **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.

➢ **Working Environment**

Please locate S901 in an environment free from dust, moisture and high temperature with good ventilation.

➢ **Maintenance and Repair**

Apart from what is detailed in User Guide, maintenance should be carried out by competent technician assigned by VNS. If S901 is physically damaged, it should be returned for repair using VNS RMA procedures. If the unit is opened by user, it will lose the right for warranty protection.

23.   Warranty and RMA policy

23.1. Warranty and RMA policy

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.

23.2. RMA policy

Return Material Authorization (RMA)

In the event that a product needs to be returned for repair, inform manufacturer and ask for a Return Material Authorization number.

RMA procedures:

1. Prior to returning any item, user must receive a Return Material Authorization (RMA) number.
2. All RMA numbers must appear on the return-shipping label.
3. All RMA numbers are valid for ten (10) days from the issue date.
4. All shipping and insurance charges in all RMAs must be prepaid by the customer.

Shipping charges and repair fees

1. Within warranty period: The customer shall pay shipping charges when the unit is returned for repair. Manufacturer will pay shipping charges for return shipment to customer. All the inspection, material and repairs fees shall be borne by manufacturer.

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2. Outside warranty period:

- User shall pay for the inspection, material and labor cost for the repairs and pay for all shipping freight and insurance cost.
- Manufacture shall give quotation to user and user can make decision whether this repair shall be executed or not. If user decides to return the unit, user shall pay for the return cost.

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Specifications

✧ Input ports: 3x HDMI 2.0b, 2x DP1.4. Input signal source seamless switching (within one second).

✧ Max. input: 4096*2160 @60fps or 7680*2160 @30fps in HDMI up to 600 MHz and 7680*4320 @30Hz (true 8k/4k @30Hz) in DisplayPort.

✧ 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 scaling down function up to 600 MHz.

✧ Preset 17 output timing modes with selectable 8-bit/10-bit color and HDCP control settings.

✧ Programmable Output: 1x HDMI 2.0 up to 4096*2265@60fps or 7680*1234 @60fps

✧ 24/30/50/60/100/120Hz refresh rate selection.

✧ The output range is from 800-7680 in horizontal (8 pixel/step under 230Mhz, 16 pixel/step above 230Mhz) and 600-3840 in vertical (1 pixel/step) (maximum pixel clock < 600MHz).

✧ Output signal: SDR, progressive full color RGB 4:4:4.

✧ 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.

✧ PIP-window input signal can be quickly turn on/off seamless through remote controller shortcut key.

✧ Individual color adjustment in main and sub-windows.

✧ One S901 can display 4 types of 3 split views on landscape or portrait UHD monitor. 2 types of 4 split views can be displayed in landscape monitor. All inputs can be up to 4k/2k 60Hz.

✧ 3x SBS split view with the center image size from 1/6 to 5/6 adjustable.

✧ 5x1 seamless switching with continuous output signal. Projector needn't re-search 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. User can select audio from 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 click keypad on remote controller.

✧ ESD Protection: ±8kV (Air-gap discharge), ±4kV (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

✧ 2 Year Warranty, extension package is available up to 5 years.

✧   **Revision History**

Revision	Date	Originator	Comments
V1.0	2022-0428	Steve Wang	Preliminary version
V1.01	2022-0602	Steve Wang	First version

✧   **Revision History**