

GeoBox

UD101 Lite UHD Warping Box User Guide

(Warping Box + MultiViewer)

*Input: up to 7680*2160 @30Hz, 7680*1200 @60Hz, 4096*2160 @60Hz 4:4:4 full color sampling*

*Output: up to 4096*2160 @60Hz*

- *Image warp & geometry alignment*
 - *Edge mask*
 - *PIP/POP*
- *MultiViewer function*
- *Quick, seamless input swap*



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Introduction

UD101 Lite (UD101L) is a multi-purpose warping box with multiple LED, LCD, and projector functions. Multi-units can be cascaded for large-scale display.

4 input ports (3x HDMI 2.0, 1x DP 1.4) and 1x HDMI outputs are designed in UD101L. The digital input supports up to 7680*2160 @30hz and 7680*1200 / 4096*2160 @60Hz with 4:4:4 full-color sampling. Output supports up to 4096*2160 @60Hz. It is integrated with a 10-bit high-end processor, motion adaptive de-interlace, low angle smooth algorithm, 3:2/2:2 pull-down, and supports non-VESA standard input timing. Programmable EDID can optimize input timing to get the best video result.

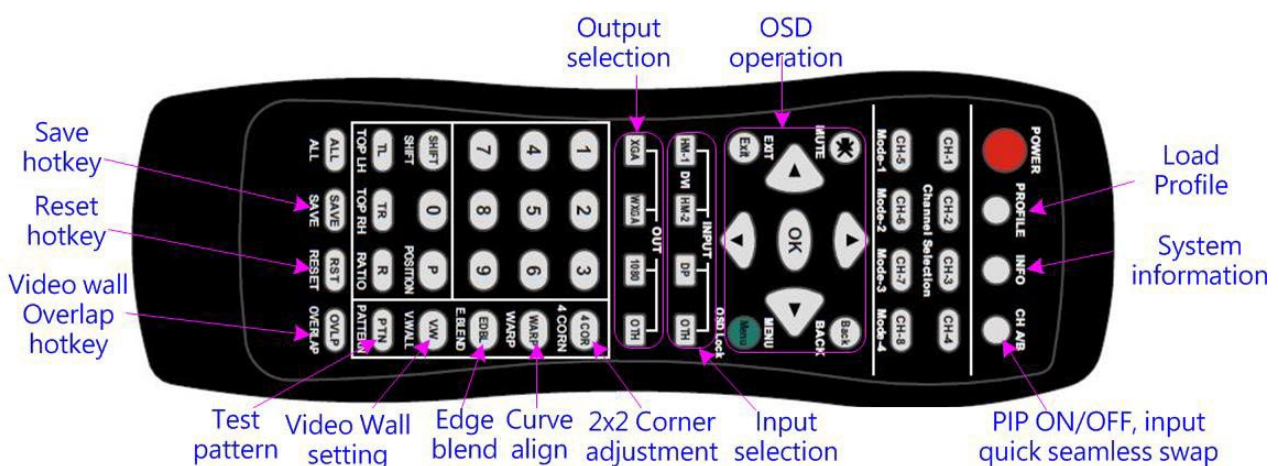
Advanced warp technology is embedded in UD101L. Users can use an IR controller, USB, WebGui, and Ethernet. Geometry alignment is up to 17x9 control points, and 120x68 grid pixel position fine-tuning is embedded. Each control point can be adjusted with 1/4 pixel/step and moved up to 12.5 pixels adjustment range. Linearity Grid Line Adjustment and Corner Wall image adjustment for mapping images at 90 degrees corners are integrated into UD101L. Users can see real-time geometry and color adjustment to get optimized results.

The video wall function is to split and allocate source images. The overlap function crops the image at the desired location, shifts the image position, and changes the aspect ratio.

HDMI loop out is designed for signal source monitoring and multi-unit daisy chain connection.

PIP (picture in picture) and POP (Picture outside Picture) are standard functions in UD101L. PIP image size is from 320*180 to 1920*1200 with flexible position and aspect ratio adjustment. Quick, seamless main/sub images swap. The overlap function allows different image sizes, aspect ratios, and cropping area adjustments in the PIP window.

UD101L is an ideal front-end processor for image stacking, geometry alignment, PIP, POP, image format conversion, de-interlacing, image rotation, and mobile mirror images displayed on portrait TV. It provides easy configuration, low-entry barriers, and cost-effective, reliable, and flexible solutions.



Functions and features

A. Input / Output (the spec may be changed)

- Input: 3x HDMI 2.0b, 1x DisplayPort 1.4.
 - Support 7680*2160 @30Hz, 7680*1200 @60Hz/4096*2160 @60Hz with 4:4:4 chroma sampling without compression.
 - DisplayPort input supports up to 7680x4320 @30Hz input resolution.
 - Connect with various video sources and support non-VESA standard input resolution.
 - Support progressive and interleaved input signals.
- Output ports: 1x HDMI2.0b. Selectable output resolutions: 1024x768, 1280x720, 1280x800, 1280x1024, 1360x768, 1400x1050, 1600x1200, 1920x1080 (50/60Hz), 1920x1200 (30/60Hz), 3840x2160 (30/50/60Hz), 4096x2160 (50/60Hz).
 - Loop out port: 1x HDMI 2.0b, same as source signal from nearby HDMI input port up to 8k/2k (2k/8k) @30Hz / 4096*2160 @60Hz.
 - All outputs are RGB 4:4:4 progressive signals.
 - Selectable 8-bit/10-bit Deep Color mode for each output port.
 - Automatically detect HDR-BT. 2020 input signal and processing with SDR full color 4:4:4 RGB output.

B. Image warp and geometry alignment

- Test pattern grid size for geometry alignment is from 8-120 pixels in H&V. Default is 32*32 pixels.
- With complete functions for quick 4 corner alignment, vertical and horizontal keystone correction, Pincushion & Barrel adjustment, image warp, and image 90/180/270 degrees rotation and flip.
- Each box controls one projector and can be cascaded to support unlimited projectors.
- Integrated with full-function IR remote controller. Manual geometry alignment via Remote controller and WebGui up to 17*9 control points.
- 120x68 grid pixel position fine-tuning is embedded. Each control point can be adjusted with 1/4 pixel/step and moved up to 12.5 pixels adjustment range. The maximum adjusting points are 100 points.
- PC tools are available for geometry alignment through USB or Ethernet. After finishing geometry alignment, the parameters can be stored inside PC or GeoBox, and no more PC tool is needed.
- Geometry alignment range:
 - Geometry alignment range is based on keystone angles in the horizontal and vertical directions. The maximum geometry alignment range is about 40° horizontal keystone and 35° vertical keystone in combination of all geometry alignment, including 2x2 and warp alignment.
 - 2x2: each control point (4 corners) can be moved up to H=+_600 pixels and V=+_600 pixels. It is about H=600/3840 and V= 600/2160 position shift when the output is 4k/2k output resolution. If the output resolution is 1920*1080, it will have a more significant keystone angle. The adjustment range will remain at about H=+_600 pixels and V=+_600 pixels before the image crash. It is about H=600/1920 and V= 600/1080 position shift.

-
- 3x3: each control point (total 9 control points) can be moved up to H=+_600, V=+_600 pixels. If the user applies both H&V adjustments, the range will be lower.
 - 2x2 and 3x3 can be executed at the same time, but the combination of the geometry alignment will be limited to H=+_1200 pixels and V=+_1200 pixels for each control point.
 - When a user applies both H&V direction geometry alignments, the adjustment range may be reduced. Users will see an abnormal display (some noise or image crush). While the image is crushed, the user can return the adjustment value or adjust adjacent control points to return the image to normal.
 - The major geometry alignment should be done through 2x2 and 3x3. Other warp functions, such as 5x3, 9x5, and 17x9 alignments, are for position fine-tuning purposes only. Geometry alignment shall follow 2x2, 3x3, 5x3, 9x5, 17x9, 120x68 sequence. If the user executes 17x9 and returns to 9x5, only 9x5 warping data will be kept. 2x2 is independent and will not affect the warp adjustment result.
 - If the user executes geometry alignment to some extent with 2160P output resolution and switches back to 1080p output resolution, the image may crush due to a more significant geometry alignment angle. If switching from low output to high input resolution, the image will not crush.
 - W shape Corner Wall geometry alignment: up to 1200 pixels adjustment range in 10 control positions at H/V directions. The image distortion range at the wall corner depends on the projector's throw ratio. A longer throw ratio will have less image distortion and be easier for Corner Wall alignment. W shape corner adjustment can correct the images on both sides of the pillar at the wall corner.
 - Linearity grid line adjustment: The user can use this function to simultaneously move the position of a group of vertical lines or horizontal lines. The primary purpose is to move the complete line position or smooth the gaps in the image horizontal or vertical lines in the curved screen display. Usually, users will see smaller grid line sizes on both sides of the curved screen. Users can use this function to leave all grid lines with the same gap quickly.
 - Embedded test pattern grid size is editable from 8-120 pixels in both H&V directions.
 - Users can select a different color in the test pattern and apply an external test pattern from the signal source.

C. High-end 10-bit video processing

- 10-bit high-end 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 temperature, and independent RGB gain adjustment.

D. PIP/POP, MultiViewer

- [PIP]: Picture in Picture display with any two inputs.
- [SBS]: Side by Side display.
- [Top/Bottom]: Top/Bottom display.
- [SBS 2/1]: 2/3:1/3 side-by-side display with a monitor at landscape position
- [POP3]: One image on the LH side and two top/bottom images on the RH side in the landscape monitor.

- [POP4]: One image at the Top and two at the bottom of the landscape monitor.
- [3X SBS]: Three split views of the landscape with the flexibility to adjust the center image size.
- [3X T/B]: Three split views at the portrait with full screen or original aspect ratio selection.
- [4x Split]: Four split view multi-viewer. (Monitor at landscape only)
- [4x T/B]: Four split views with one image at the top and three small images at the bottom.
- PIP (picture in picture): with flexible PIP size (320*180 to 1920*1200), location, and aspect ratio.
- Except for [4x split] & [4x T/B] functions, all the other PIP/POP functions can support monitor at portrait and landscape positions. Sub-images also support rotation and flip up to 4k/2k 60Hz.
- The cropping function is available in PIP and POP images for different locations, sizes, and aspect ratio adjustments and for creating image borders with black or blue color.
- Primary and sub-image colors can be further adjusted to get optimized video quality.
- All the inputs for main and sub-images can be up to 4k/2k 60Hz 4:4:4 signals.

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

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

F. Video wall function

- Image split, cropping, and location assignment for each projector.
- Video Wall overlap functions up to +_1800 pixels in H&V direction in each edge:
 - Image position adjustment
 - Image cropping area adjustment.
 - Irregular video wall application
- Aspect ratio adjustment: to stretch the 2.35:1 movie to a full-screen display on a 16:9 screen or shrink the 16:9 image on a 2.35:1 screen without changing the aspect ratio.

G. Native 1:1 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 the 16:9 monitor, it will keep a 4:3 image aspect ratio with a complete 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 a 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.

H. Image rotation and flip

- Image 90/180/270 degrees rotation, flip and mirror up to 4k/60Hz input resolution.
- Image flip in Front/Rear, Left/Right, and Top/Bottom directions.
- No 3D motion adaptive de-interlace function while the image is 90/270 degrees rotated. Please apply a progressive signal source to get the best video quality.

I. Edge Mask

8 control points to define the area for the edge mask. It can work together with geometry alignment to get various edge mask effects. The edge mask will not change the image aspect ratio.

J. 3D function

- Passive 3D: Decode 3D input signal into RH/LH eye frame output for passive 3D display.
- 3D format conversion: Convert 3D input signal into Side by Side, Top/Bottom, and frame sequential output signal for passive 3D and active 3D displays.

K. Various color adjustment

- Independent R.G.B color gain adjustment.
- Preset color temperature: Standard, Reddish, Bluish
- Brightness, contrast, Hue, saturation, and sharpness adjustment.

L. System control and other features

- Professional design and reliable for 7/24 working conditions.
- Full-function OSD through WebGui or IR.
- Firmware update via USB or Ethernet.
- GCT PC tool can control multiple processors simultaneously through USB or Ethernet.
- Internal grid pattern with selectable color and grid size for easy geometry alignment.
- Standard RS232 & Ethernet control protocol compatible with most control systems.
- Users can select blue or black background color when no input signal is detected.
- Programmable EDID in the range of H=1024-4080, V=720-3840.
- BOX ID and programmable IP address for convenient multiple unit control simultaneously.
- Users can save up to 10 settings and be recalled by 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 control. While no input signal is detected, it will shut down output automatically. If it detects the input signal again, it automatically outputs it to display devices. Users can power ON/OFF the system through the control in the signal source.

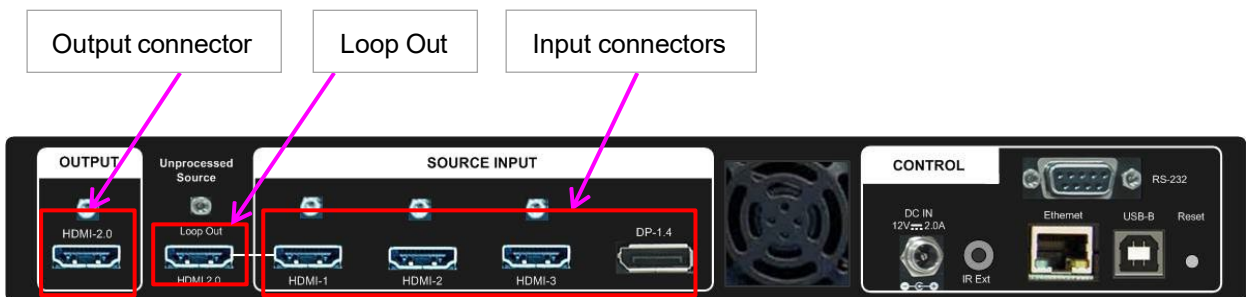
User Guide

1. Content in the packing box

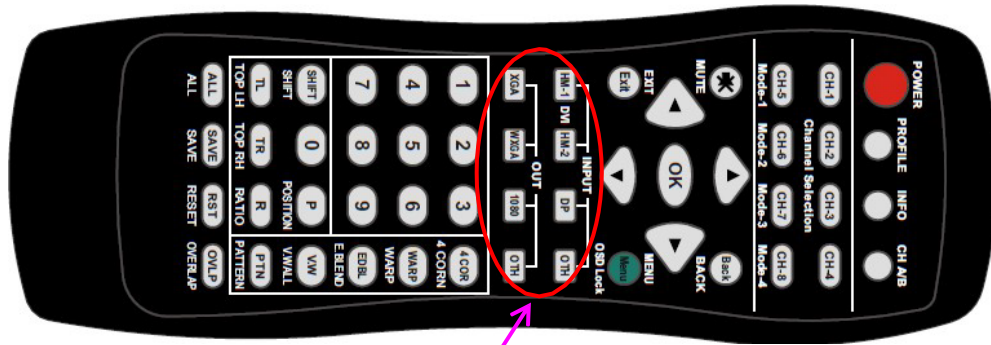
- The UD101L single-channel warping box
- 1x RC-400 IR Remote Controller (without battery)
- 1x IR Extending Receiver with 1.8m cable
- 1x DC Power supply unit with power cord, In AC 100V-240V, out: DC 12V 2A
- Mounting bracket with screw (Option)
- Please download User Guide & GCT PC Tool at www.geoboxav.com.

2. Basic operation & setting

2.1. Connecting the input and output



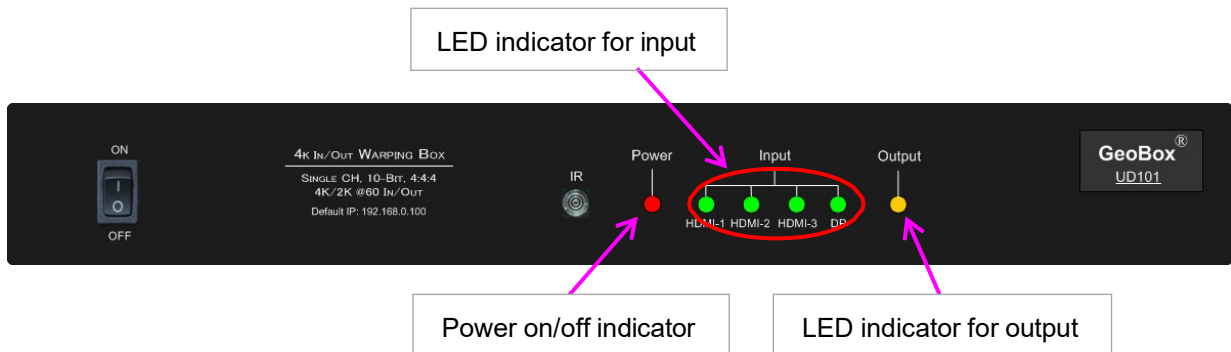
- Each UD101L has four input ports: 3x HDMI, 1x DP. Users can select an input port from the remote controller.
- HDMI & DP input ports support up to 4096x2160 @60 Hz, 8k/1k @30 Hz.
- UD101L can support non-VESA standard input timing once a signal source can provide, such as 4096x2160, 3200x3200...
- Only HDMI-1 input signals can be looped out. Loop out signal is an unprocessed source signal.
- One HDMI output up to 4096*2160/60Hz. Users can select output resolution from the remote controller. Output resolution list: 720x480, XGA, WXGA, 1280x1024, 1366x768, 1400x1050, 1600x1200, 1920x1080 (24/30/50/60Hz), 4096x2160/60 & 1920*1200/60 ° All output default resolution is 60Hz, RGB 4:4:4, and progressive.
- [OTH] key in the remote controller will show output timing at 3840*2160 60Hz.



Select input port and output resolution.

- All input signals can be selected in PIP/POP application. Please see more details in the PIP/POP section.
- Suppose the output refresh rate is different from the input refresh rate. The frame lock function will be disabled and may cause no synchronization issue in multiple unit applications. If the input is 30Hz with 60Hz output, it will have no synchronization problem. If the input is 50Hz, please select 50 Hz output to avoid frame repeat issues.
- Users can click the [Info] key to get system information and input/output signal resolution.

2.2. LED indicators



- LED indicators will show the input/output signal status.
- If the user presses the Menu key for 5 seconds on the remote controller, the GeoBox OSD menu will be locked, and the Power LED will flash. To press another 5 seconds, it will unlock the OSD menu.
- If multiple units are used in the system, the user can set different IDs and use the remote controller [85x] key to execute independent control. Press [851] following other OSD keys, and the remote controller only show Box ID #1 the OSD and Power the LED on the front panel in other units will be flashing. Users can disable OSD LOCK with the [850] command via the IR controller.

2.3. System connection and Power On

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



- The complete system should be connected to a one-power Distribution Box with proper grounding. Power on the system after finishing all connections to avoid system damage by floating voltage among devices.
- When power is switched on, the booting time is about 19 seconds, and the Input & Output LEDs on the front panel will always stay “ Lighted “ with the correct input source and output device connections.
- If continuous flashing in Power LED, it means the OSD function has been Locked. Please press [Menu] key for 5 seconds to disable the [OSD Locked] function. If the remote controller does the system lock through [85x] operation, please press [850] to unlock the system control.

2.4. System settings: Box ID, RS232, Ethernet

- Box ID, RS232, and Ethernet settings can be executed through the OSD menu, WebGui, or GCT PC Tool.
- Users can control or operate UD101L settings through Ethernet. The default IP address is 192.168.0.100.
- When multiple units are used simultaneously, the user can set a different IP address in each UD101L so that each UD101L can be controlled independently.

2.4.1. Box ID

- The range of Box ID is 0 ~ 99 for the RS232 command.
- If the user uses a remote controller to execute system operation, the Box ID range is 0 ~ 9.

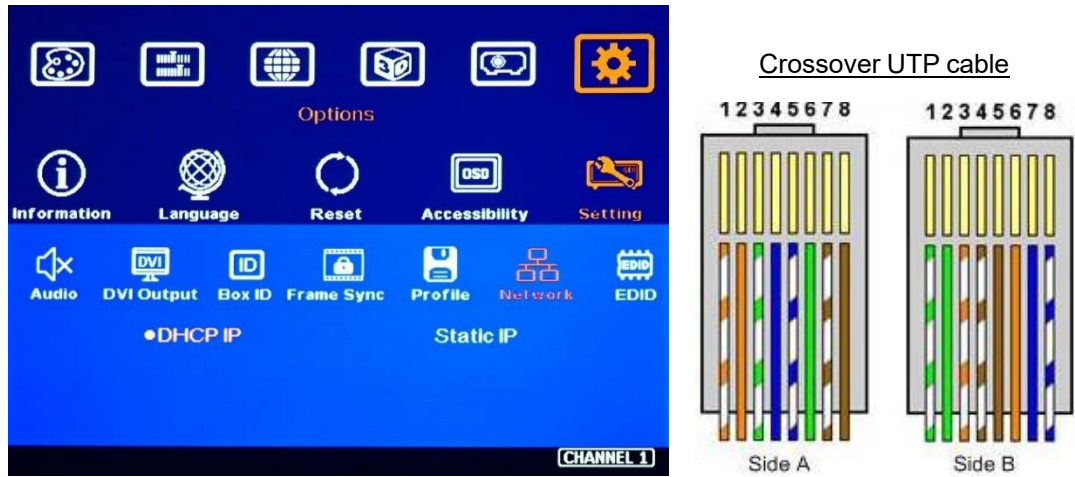
2.4.2. RS232 settings

- RS232 is designed with a DB-9 connector. Users can select a baud rate between 11520 and 9600.
- UART protocol is available for controlling the RS-232 or Ethernet.



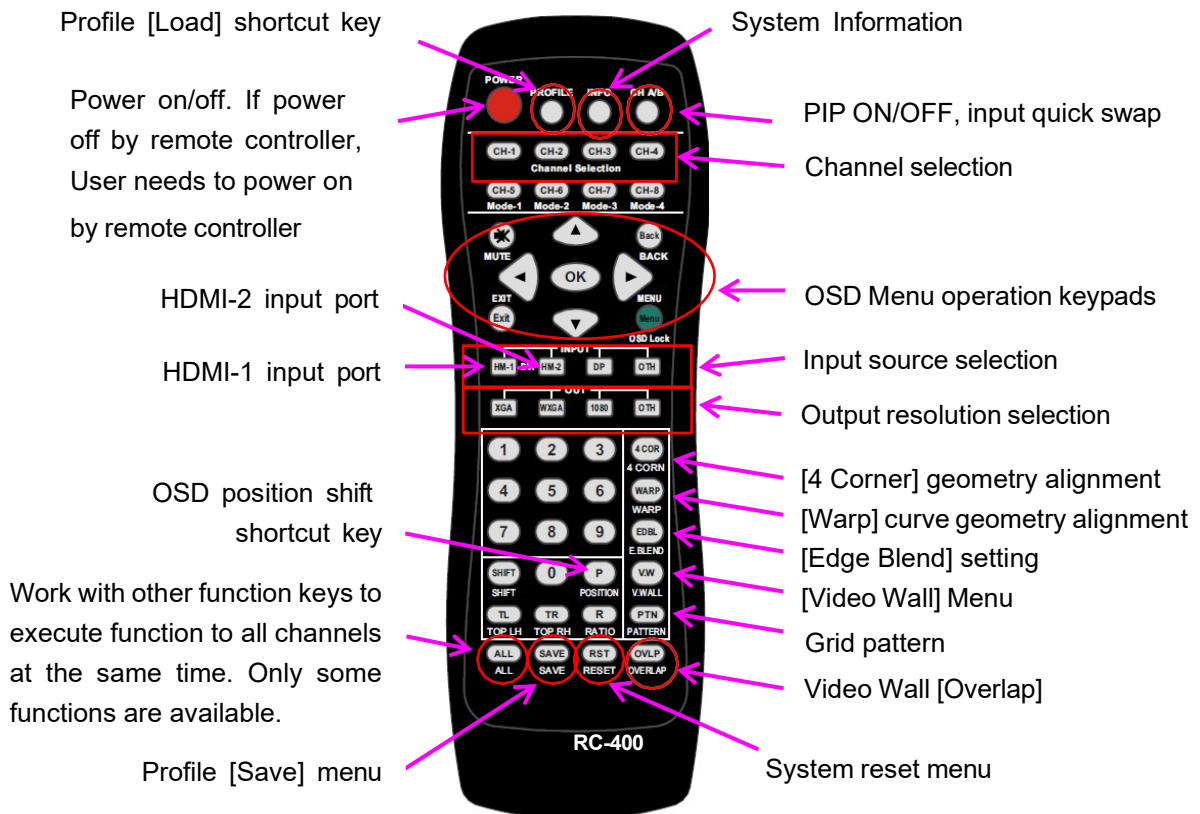
2.4.3. Ethernet

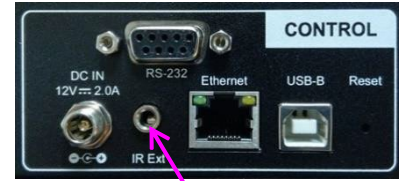
- The user must connect UD101L to WiFi Router or switch/hub through RJ45 to the LAN port. Then the user can control the system through Ethernet.
- A Crossover UTP cable can be used for direct connection between PC and GeoBox. The user needs to set PC TCP/IPv4 with the same domain segment as GeoBox (for instance, to set the IP address at 192.168.0.105 and subnet mask at 255.255.255.0).
- Open the web browser (Google Chrome or Microsoft Edge) and input the UD101L IP address (default is 192.168.0.100); the users can see GeoBox WebGui and a menu with virtual keys like OSD for further system operation. There is no additional software required.
- If the user needs help linking with Microsoft Edge, please key in the below IP: <http://192.168.0.100/>.
- If a user can't connect, please power off/on UD101L again to let the PC detect the UD101L network system.
- Users can set DHCP for the connection. Please [Renew] DHCP to get the IP address before the network connection.
- GCTGCT PC Tool is another web tool with full function for system setting and operation. It can also update Firmware or MCU code. GCTGCT can be downloaded from the GeoBoxAV website.
- Each UD101L can set a different IP address for independent operation and control.
- Please use < > OSD keys to select OSD menu items and use ^ v OSD keys to change the IP address.
- If UD101L is connected to Wi-Fi Router (through a LAN port), the user can control UD101L through Wi-Fi via PC, iPad, or mobile phone.
- The default TCP server port is 1266.



2.5. How to use IR Remote Controller

- IR remote controller has full functions for the operation of UD101L.
- IR receiver is on Front Panel. One 3.5ø mm audio connector for the IR extender is located at the Back Panel of UD101L. 1.8m IR extension cable is equipped in the packing. Users can add an audio cable to extend the distance to more than 20 meters.
- IR remote control systems can be interfered with and cause abnormal or discontinuous operation. Under this condition, Ethernet operation may be the best choice.





Audio connector for IR extender

2.6. Full screen and native aspect ratio

- [Scaling] under [Image Properties] menu is to select the display mode either following signal source original aspect ratio or full-screen display



- [Full Screen]: to display full screen image no matter the input source is in what kind of aspect ratio.
- [Original AR]: the output display will keep the same display aspect ratio as signal source original aspect ratio. If the input is 4:3, then the output display will keep the same 4:3 aspect ratio.

2.7. Image rotation and flip

Image 90/180/270 degrees rotation can support up to 4k/60Hz input signal. When the image is rotated or flipped, the OSD will still keep at its original direction without change. The direction for [Video Wall] settings still follows the image direction after being rotated or flipped.



- Image flip is for projector to project image from rear or top position.
- After image rotation or flip, the OSD will still keep at the original direction.

2.8. Color adjustment

2.8.1. Global color adjustment: [Picture]



- [Picture] can execute below color adjustment.
- When input is 4:2:2 video:
[Brightness], [Contrast], [Hue], [Saturation] & [Sharpness]
- When input is RGB 4:4:4:
[Brightness], [Contrast] & [Sharpness]

2.8.2. Preset Color Temperature and independent RGB color adjustment



- [Color] under [Image Properties] menu can change preset color temperature and discrete [RGB] color.
- [Preset Mode]: [Neutral], [Reddish], [Bluish]
- [Custom]: discrete RGB color adjustment

2.9. OSD Lock and unlock

- Suppose multiple units of GeoBox are installed together, or the IR receiver is put together to avoid interference among multiple GeoBox during the installation. In that case, the user can set a different ID number for each GeoBox through the [Options] Menu. Press the number keys in Remote Controller to determine which GeoBox will be controlled.
 - 851: controls GeoBox ID No. 1
 - 853: controls GeoBox ID No. 3
 - 850: to unlock all units, the user can control all GeoBox.
 - If a user presses 851, only ID #1 GeoBox can be controlled through OSD. The rest units of GeoBox will be locked. The channel key LED will show a flashing light with a 1.0-second interval.

- OSD Lock / Unlock: When continuously pressing the [Menu] key in IR Remote Controller or front panel for 5 seconds, the OSD function will be locked, and the channel key LED will light up with 0.5 second interval. To press the [MENU] key for 5 seconds will unlock OSD Lock.

2.10. System synchronization

When the system uses multiple UD101L, the image should be synchronized together. GeoBox uses [Frame Sync] to synchronize all outputs based on the vertical input signal sync. When [Frame Sync] is applied, it can lose signal during system setup and cause the projector to research the signal source. To provide a smoother setup, GeoBox provides OSD for users to select different synchronization methods for easy setup.



- [Normal] (Frame Locked): We propose to set it at [Normal] in most of the applications. When the user resets the system or adjusts video wall settings, the user will see the projector re-searching the input source.
- [Fast]: The time to sync the input source will be faster than [Normal]. During video wall settings, the projector reduces research behavior and has a smoother setup process.
- [Disable] (Free-Run mode): when GeoBox changes the input source or timing, the output will still send out continuous output signal. The projector has the lowest chance to research the input signal while the system is set up.
- The input refresh rate should be the same as the output refresh rate so the system can implement Frame Locked to synchronize all the outputs. If the input source is 50Hz with 60Hz output, it is possible to see some lag or frame tear in the display.

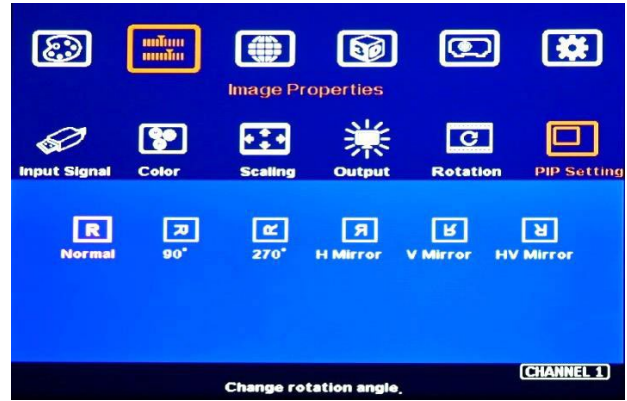
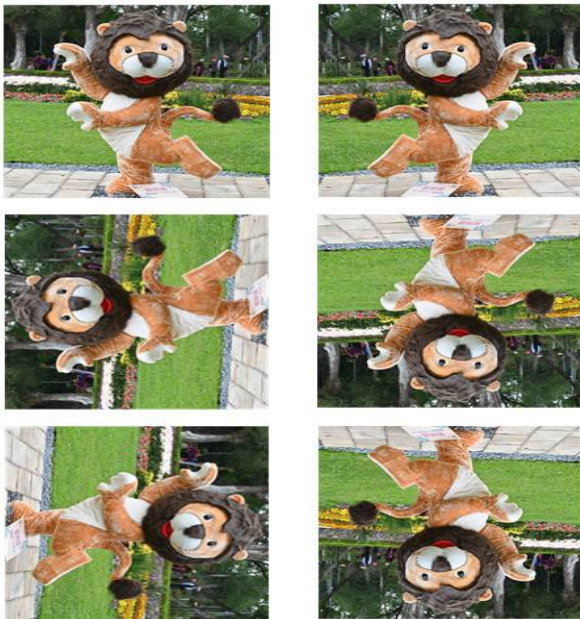
2.11. Image rotation and flip

- ✓ There are two image Orientation OSD menus. One is for the main input, and the second is for the 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.

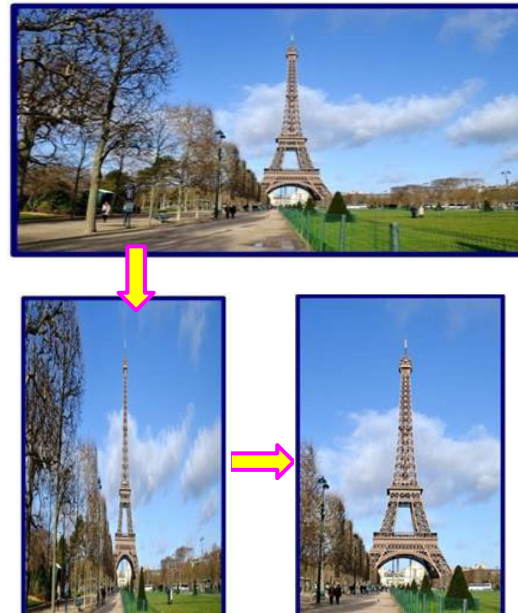
- ✓ Image 90/270 degrees rotation is for edge blending with a projector at portrait position or video wall with a monitor installed at portrait position. There is no need to rotate the signal source.
- ✓ Image flip allows the projector to project an image from the rear or top position.
- ✓ When the main image is rotated or flipped, the OSD will be rotated together with the main image.
- ✓ User can see the direction of the TEXT “R” to do image flip and rotation.
- ✓ Main image and PIP image can be rotated independently.



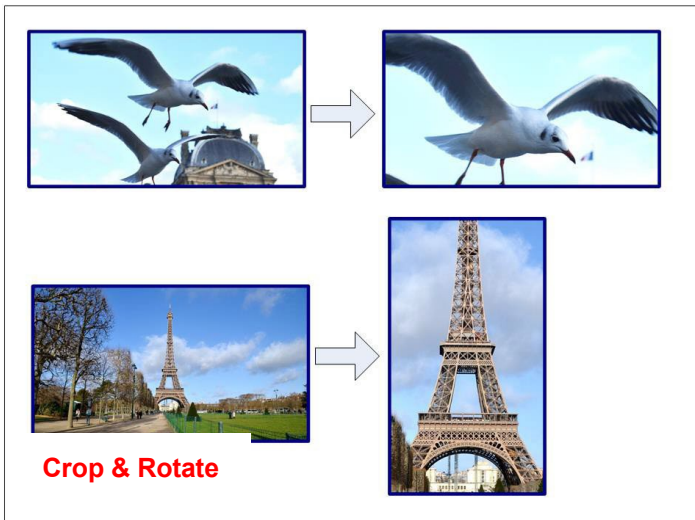
Rotation for main input



Rotation for sub-input (PIP)

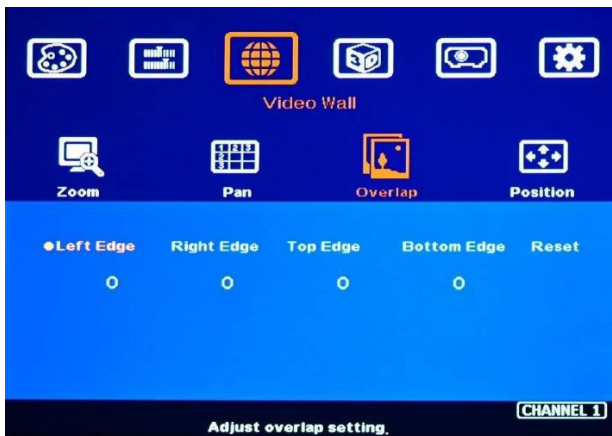


2.12. Image Cropping in main and PIP/POP (Sub-images)

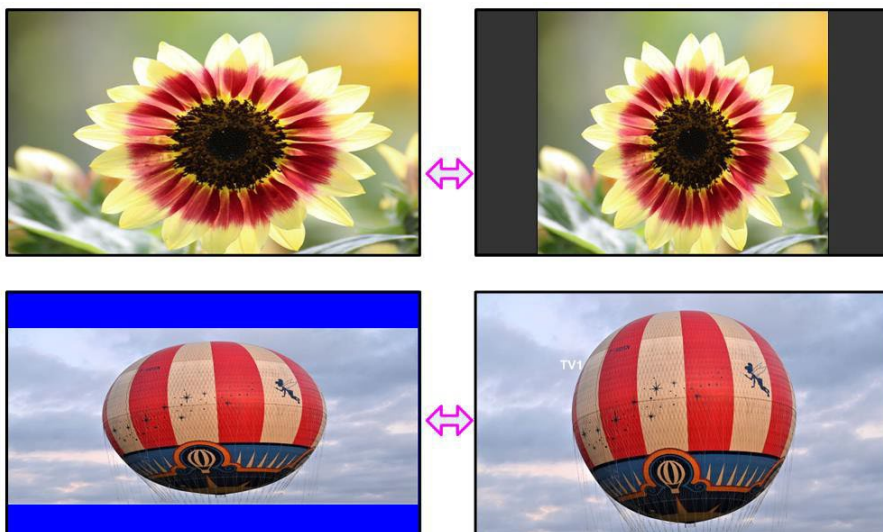


- ✓ Image cropping at any location in both main and PIP/POP (sub-image) independently.
- ✓ Image cropping function can co-exist with image rotation and flip functions.
- ✓ This function is also available when implementing the Multiview function.

2.13. Flexible Aspect Ratio Adjustment



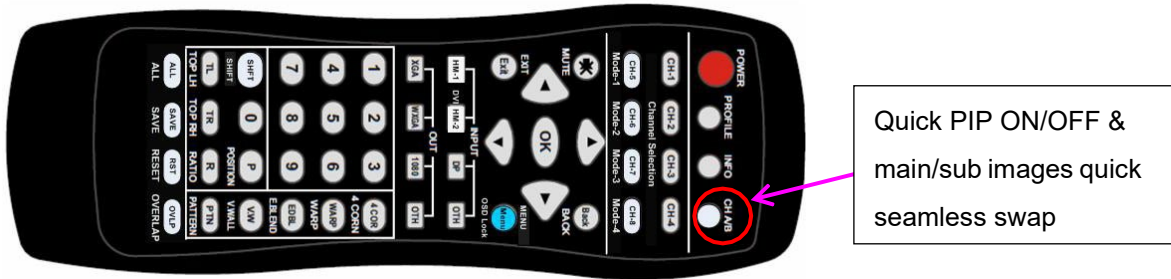
Users can use Video Wall [Overlap] function to change the aspect ratio of the image with black or blue border or to stretch the image in specific direction to compensate the aspect ratio difference between video wall and the content. The Maximum adjustment range is 1800 pixels in each edge.



Back ground color can be black or blue color

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

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



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



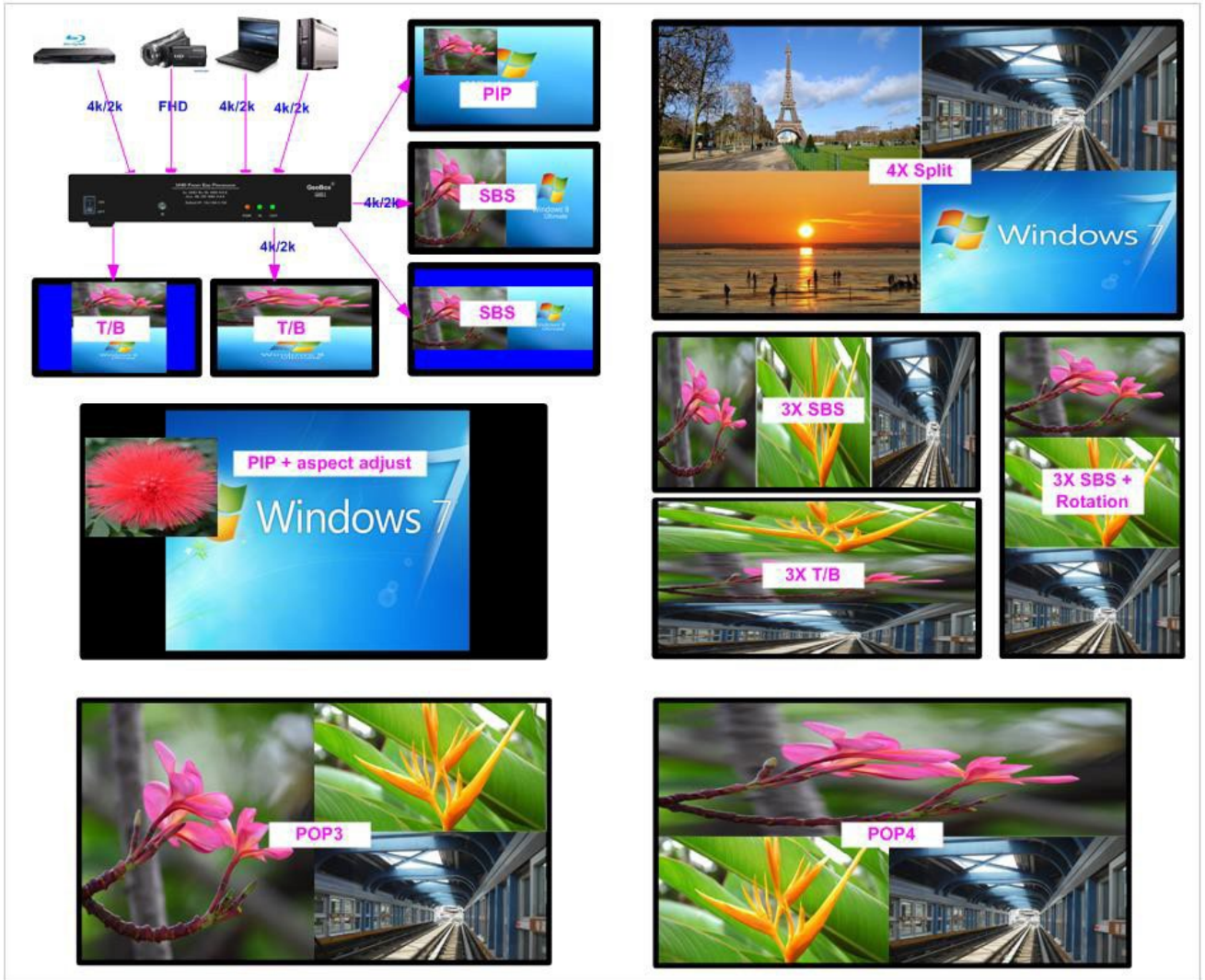
3. PIP/POP multiple image display

3.1. PIP/POP main menu

3.1.1. [Display]

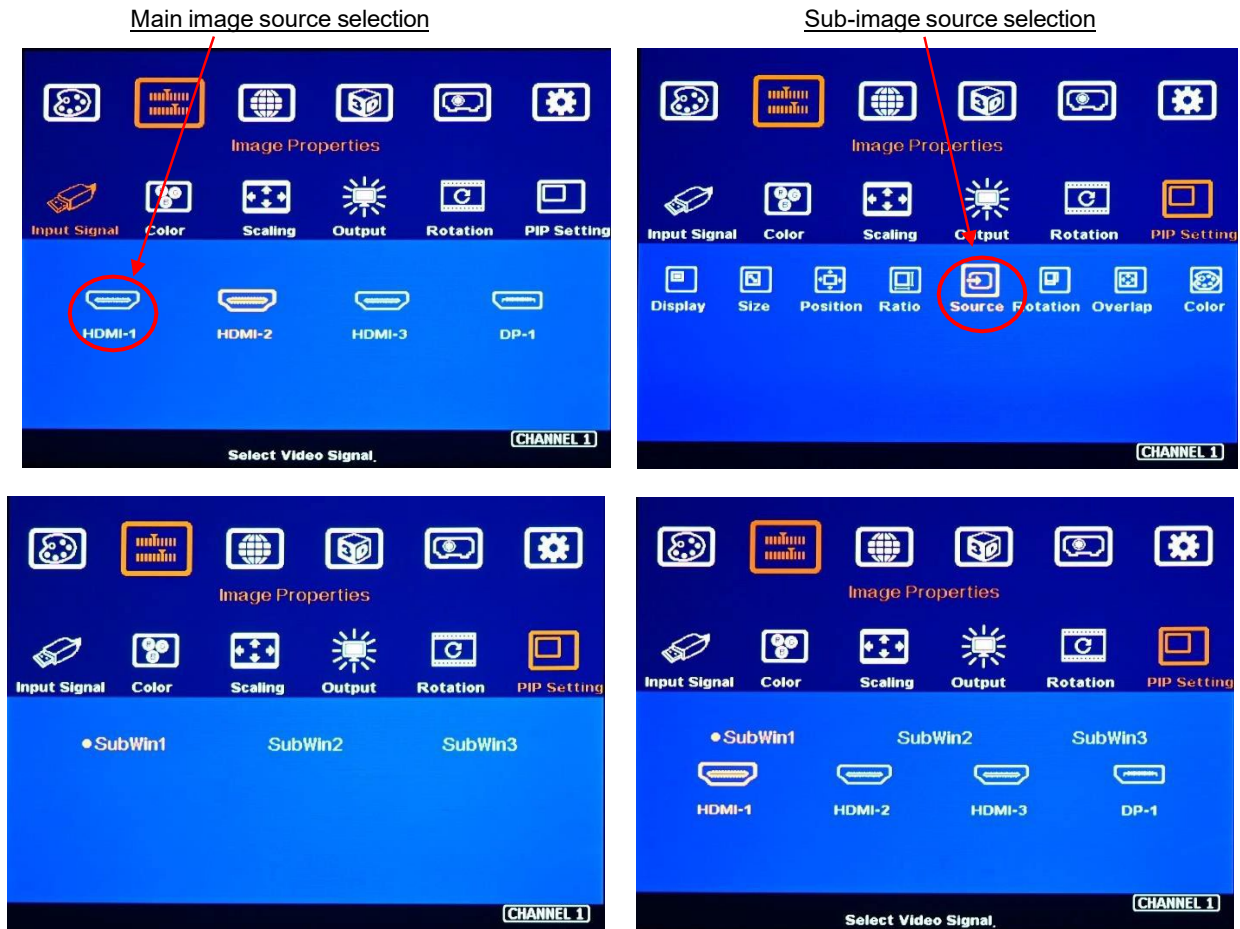


- [PIP]: Picture in Picture display with any two inputs.
- [SBS]: Side by Side display.
- [Top/Bottom]: Top/Bottom display.
- [SBS 2/1]: 2/3:1/3 side by side display with monitor at landscape position
- [POP3]: One image on the LH side and two top/bottom images on the RH side in landscape monitor.
- [POP4]: One image at the Top and two at the bottom of the landscape monitor.
- [3X SBS]: Three split views of the landscape with the flexibility to adjust the center image size.
- [3X T/B]: Three split views at the portrait with full screen or original aspect ratio selection.
- [4x Split]: Four split view multi-viewer. (Monitor at landscape only)
- [4x T/B]: Four split views with one image at the top and three small images at the bottom.
- PIP (picture in picture): with flexible PIP size (320*180 to 1920*1200), location, and aspect ratio.
- Except for [4x split] & [4x T/B] functions, all the other PIP/POP functions can support monitor at portrait and landscape positions. Sub-images also support rotation and flip up to 4k/2k 60Hz.
- The cropping function is available in PIP and POP images for further location, size, and aspect ratio adjustment, and for creating image borders with black or blue color.
- All the inputs for main and sub-images can be up to 4k/2k 60Hz 4:4:4 signals.



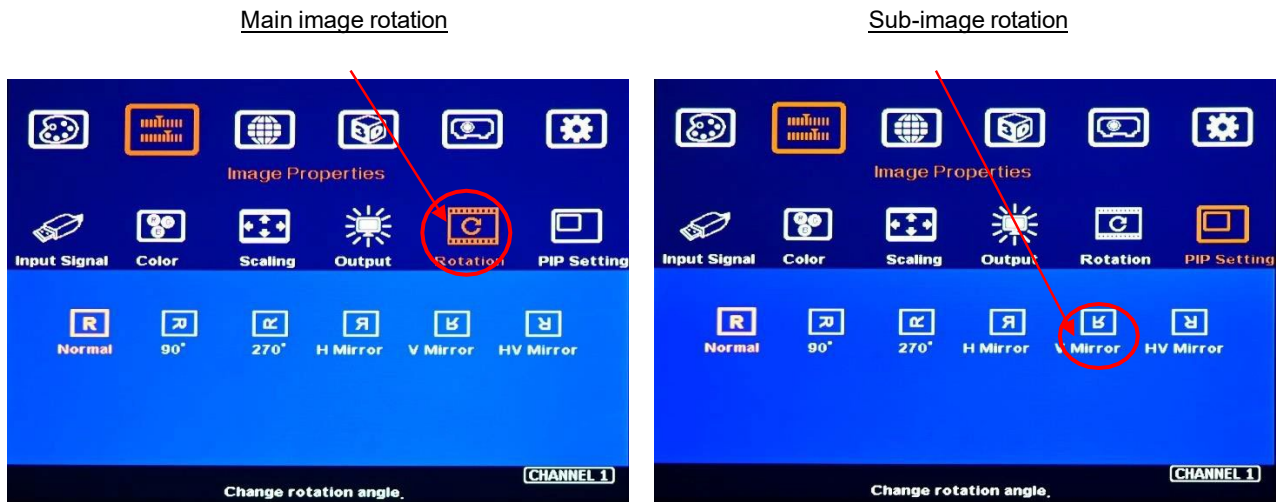
3.1.2. PIP/POP source selection

- The input source for main and sub-images can be selected separately without limitation.
- Any signal from input ports can be displayed on PIP/POP screen up to 4k/2k 60Hz.
- User can swap the position in Main and sub-image--to select a main image from [Image Properties]→ [Input Signal] Menu and select PIP image from [Image Properties]→ [PIP Setting]→ [Source]→ [SubWin1-3].
- Users can save different settings into [Profile] under the [Options] menu and recall them anytime.
- Any input port can be selected as the main or sub-image input source.



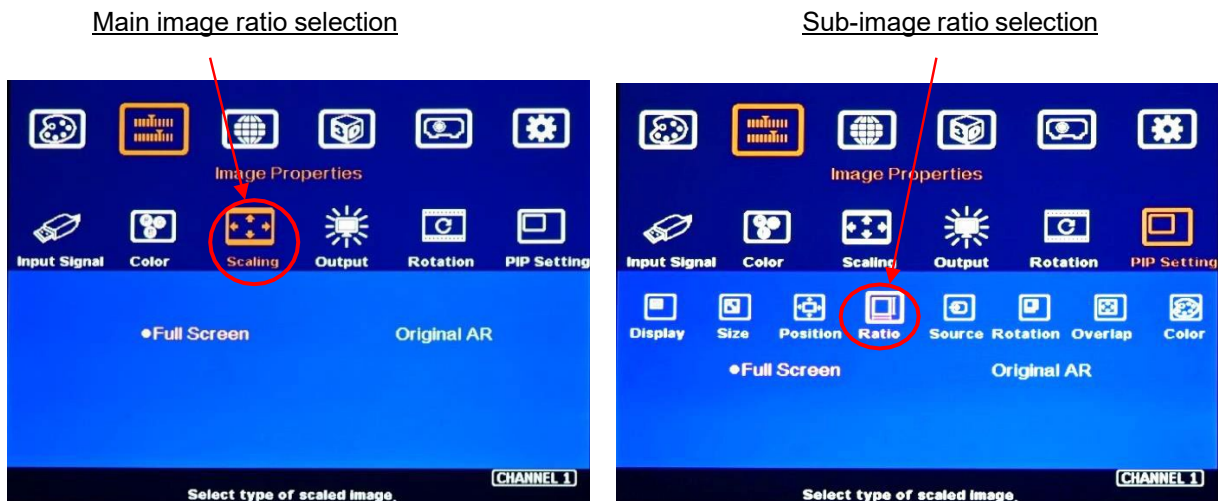
3.1.3. PIP/POP image rotation (not including 3 split and 4 split views)

- Main and sub-images can be rotated separately at 90/180/270 degrees based on the installation direction of the projector.
- Main image rotation shall be selected from [Orientation] under [Image Properties] the OSD.
- Sub-image rotation must be operated through [Orientation] under [PIP Setting] the OSD menu.



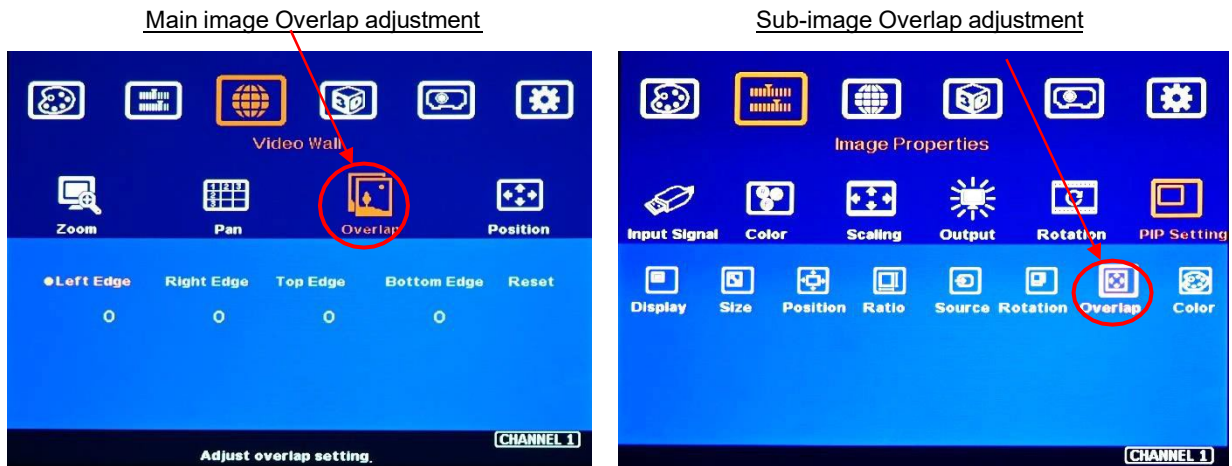
3.1.4. Maintain the original aspect ratio or follow the output aspect ratio (in the dual content display)

- Main Image: can be selected through [Scaling] OSD menu under [Image Properties].
- Sub-Image: Select [Source] → [Ratio] OSD menu under [PIP Settings].
- Under the aspect ratio menu, there are two selections: [Full Screen] & [Original AR]
 - Full Screen: to display full-screen images in PIP or POP.
 - Original AR: keep the aspect ratio the same as the signal source in PIP and POP.



3.1.5. Adjust aspect ratio or cropping area in main and sub-image

- Users can change the cropping area and aspect ratio in main and sub-image images through the Overlap the OSD menu. Each edge can adjust the overlap up to +_1800 pixels.
- When the Overlap value is decreased, the image cropping area will be reduced and cause the image to have a Zoom-In effect (enlarged). If the Overlap value is increased, the image cropping area will increase and cause the image to have a Zoom-out effect (shrunk).



3.2. PIP (Picture in Picture)

- PIP image size are from 320*180 to 1920*1200.
- Allows any possible position across the entire video wall.
- PIP image size and aspect ratio can be adjusted through the [Overlap] function.
- The Main & PIP input source is swappable.
- PIP and main images can be rotated at 90/180/270 degrees to build different display styles.

3.2.1. PIP [Size] and [Position]

- PIP image size is from 320*180 to 1920*1200.
- It can be further adjusted through the Overlap function to get about 160*90 image size.
- Users can replace the main image with a sub-image on the entire display under FHD output resolution.
- The [Overlap] function can further adjust the PIP image position.

3.3. POP and 3 split view / 4 split view MultiViewer function

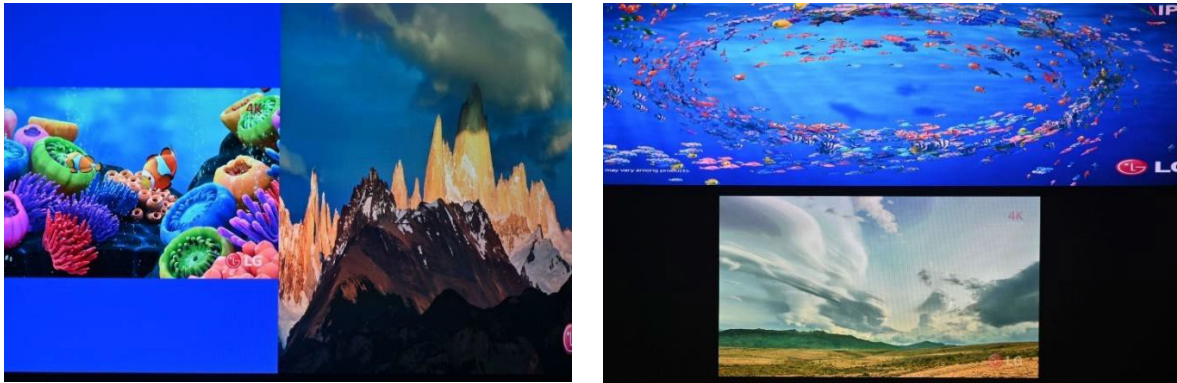
- [SBS]: Side by Side 2 split display.
- [Top/Bottom]: Top/Bottom 2 split display.
- [SBS 2/1]: 2/3:1/3 side-by-side display.
- [POP3]: One image on the LH side and top/bottom two images on the RH side.
- [POP4]: One image at the Top and two images at the bottom.
- [3X SBS]: Three split views of the landscape. The center image size is adjustable.
- [3X T/B]: Three split views in portrait direction.
- [4x Split]: Four split view multi-viewer. (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 a 16:9 aspect ratio. The main image can keep the full screen or original 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. Both the main image and the sub-image support 90/180/270 degrees rotation and flip and keep [Full Screen] or [Original AR] aspect ratio.

- In all multiple window functions, the cropping function (Overlap setting function) is available in Main image and all sub-images for further location, size and aspect ratio adjustment, and creating image borders with black or blue color.
- All the inputs for main and sub-images can be up to 4k/2k 60Hz 4:4:4 signals.

3.4. Aspect ratio adjustment

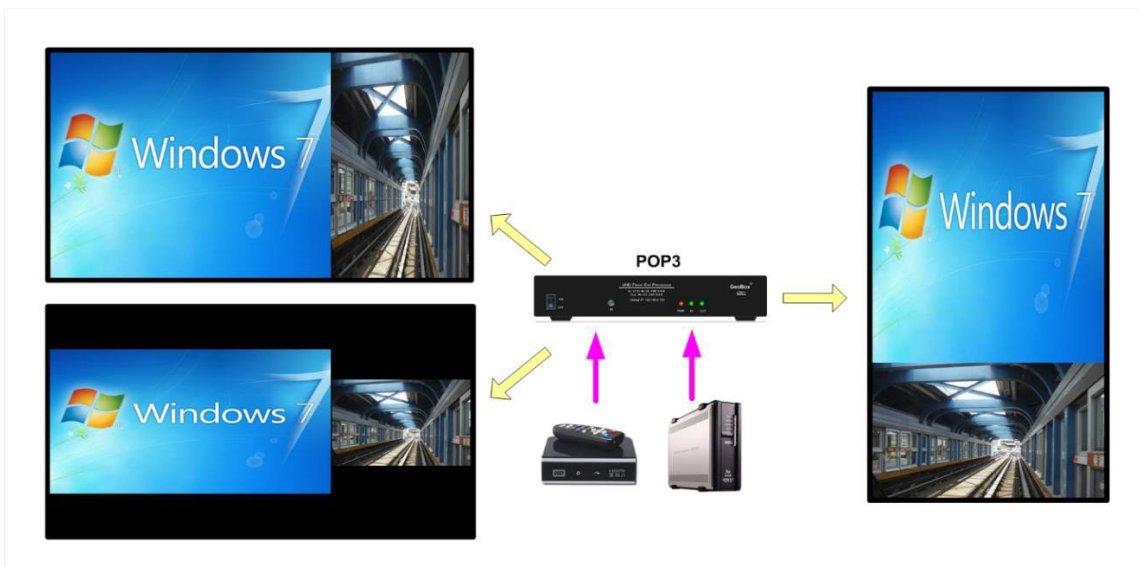
- POP image aspect ratio selection:
 - ✓ Main Image: can be selected through [Scaling] under [Image Properties].
 - ✓ Sub-Image: can be selected through [Ratio] OSD menu under [PIP Settings].
- Further aspect ratio adjustment can be executed through Overlap function.

Independent aspect ratio in main and sub-images



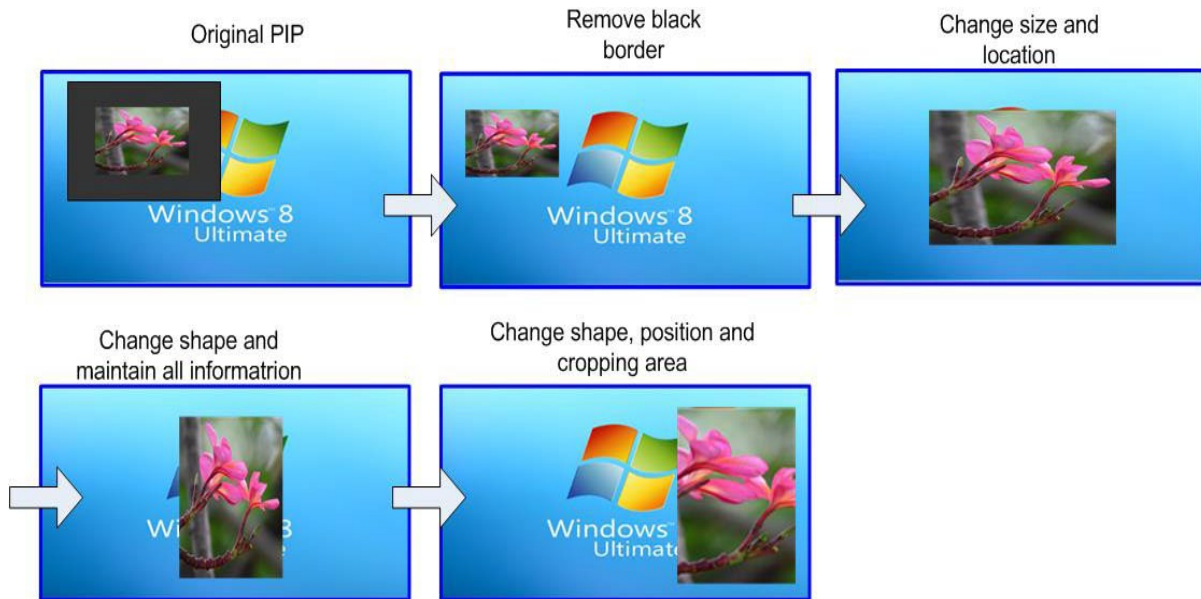
3.5. [Orientation]

- Image rotation in main and sub-image can be executed separately.
- Image rotation can be executed together with image cropping and aspect ratio adjustment functions to create more display styles.



3.6. [Overlap]

- Overlap function under [PIP Settings] will only be functional for sub-image. The function can be applied to all sub-images.
- It can change sub-image position, size and cropping area pixel by pixel.
- Through Overlap function, main image and sub-image can be displayed with various size and aspect ratio as show below.



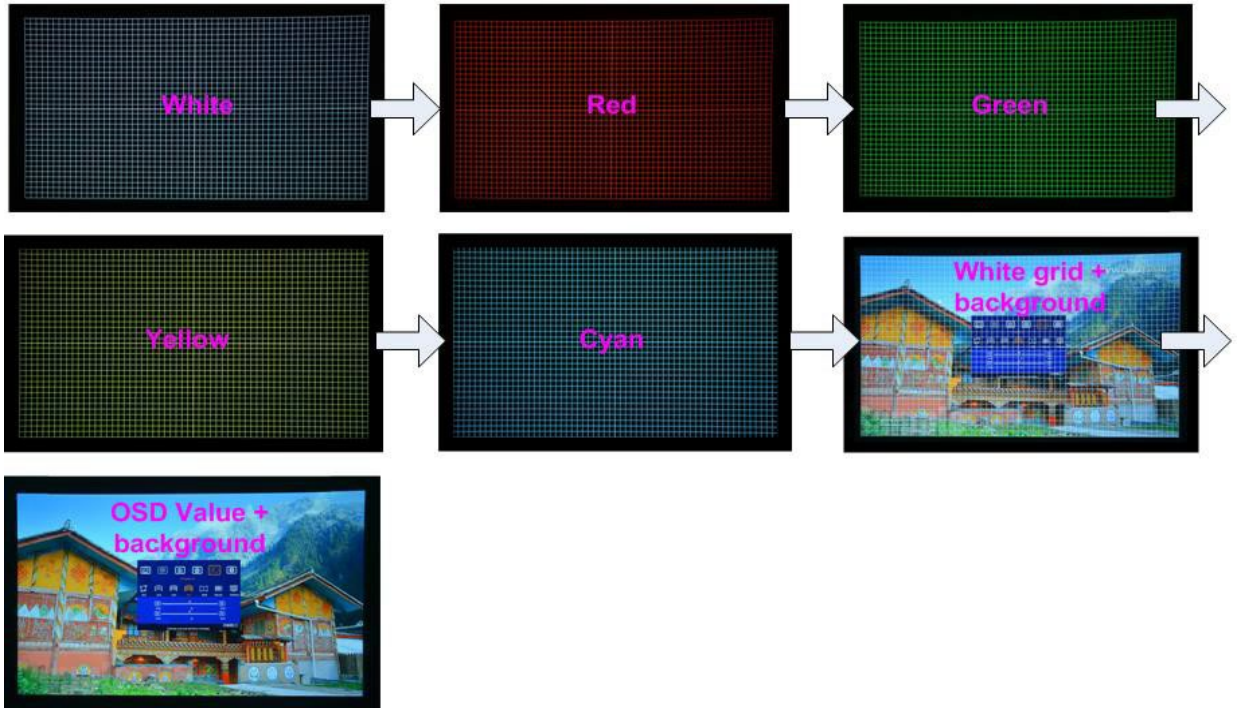
4. Geometry alignment

4.1. Select appropriate Grid Pattern for geometry alignment

Grid pattern is required for geometry alignment. User can activate test pattern through [Pattern] hotkey in remote controller or through WebGui and GCT PC tool.

- The default grid size is 32*32 pixels. User can select different grid size from 8-120 pixels.
- The OSD show-up time can be determined by [Options]→ [Accessibility]→ [Menu Time Out]. If set at "0", the OSD will show up all the time unless input timing is changed or OSD [Exit].
- If user executes Geometry alignment, the pattern will appear automatically after select the adjusting point and press Enter.
- There are 6 pattern styles for user to select. When user presses [Pattern] key, it will circulate from [White]→ [Red]→ [Green]→ [Yellow]→ [Cyan]→ [White grid + background]→ [OSD menu + Background]

- If user wants to apply his own test pattern, please select the last transparent pattern mode to show up background user pattern.
- User can select different pattern color for each projector while doing image stacking setup.
- User can see geometry adjusting value when select [Background + OSD] display style.



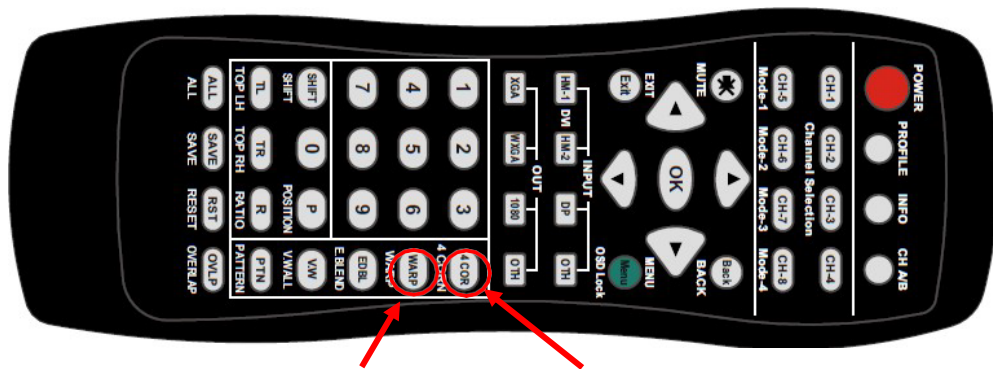
4.2. Grid pattern pixel size selection

- The grid size in both horizontal and vertical directions is from 8 to 120 pixels with 1-pixel increasement. H&V grid size will be the same.
- Default grid size for both H&V directions are 32x32.
- If 120 pixels grid size is selected, the grid pattern will be at the same horizontal position as 17x9 geometry adjustment control points.





4.3. Geometry alignment



[3x3], [5x3], [9x5], [17x9], [120x68] [2x2] 4 Corner alignment hotkey



4.3.1. Geometry alignment through remote controller

- Please be familiar with OSD operation from remote controller, including activating grid pattern and hot keys for [4 Corner], [Warp], [Video Wall], [Edge Blend], [Pattern] and [INFO].
- Grid pattern will not be turned off until input timing change or press OSD Exit.

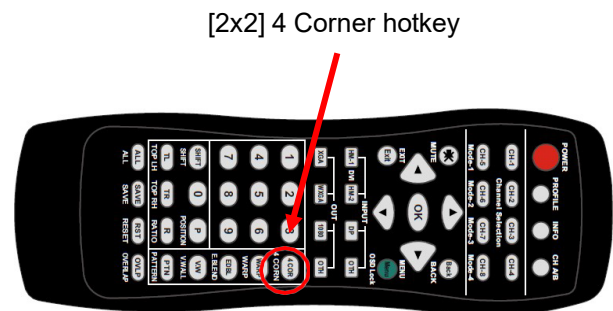
- User can install IR extender receiver near screen for easy GeoBox operation (if necessary, please add audio extending cable to extend the distance up to 20 meters). If multiple units of GeoBox are used and IR receivers are put together, please set [Box ID] for each UD101L so that user can control each UD101L separately through [85x] command.

4.3.2. Activate Grid Pattern

- Use [Pattern] hotkey to show grid patterns in the projector. Press [Pattern] key again will change grid color.

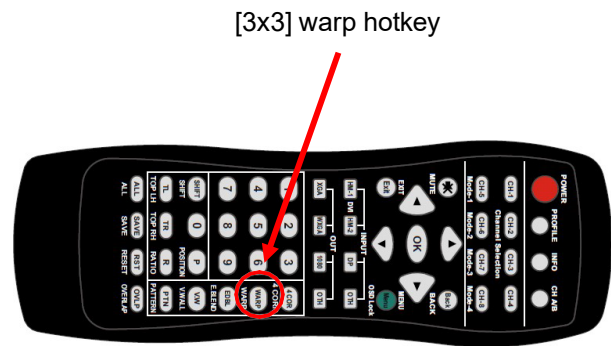
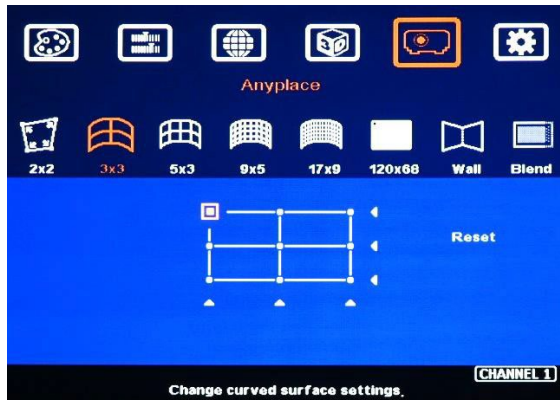
4.3.3. [2x2] 4 corner geometry alignment

- In most of applications, no need to do keystone correction in the projector before geometry alignment.
- If using short throw ratio projector in curved screen display, the image will have big distortion. Please use projector to do geometry alignment before GeoBox.
- [2x2] alignment will adjust whole image with the same scaling factor. [Warp] alignment will adjust only some portions of the image.
- Please follow the sequence [2x2]→ [3x3]→ [5x3]→ [9x5]→ [17x9]→ [120x68] to do geometry alignment to ensure entire image will have uniform scaling factor.
- If the screen is curved, it is possible to have some image inside or outside the screen after 2x2 adjustment. However, it doesn't matter once the image covers entire screen before 4 corner adjustments. [Warp] alignment can adjust the image position back to required position.



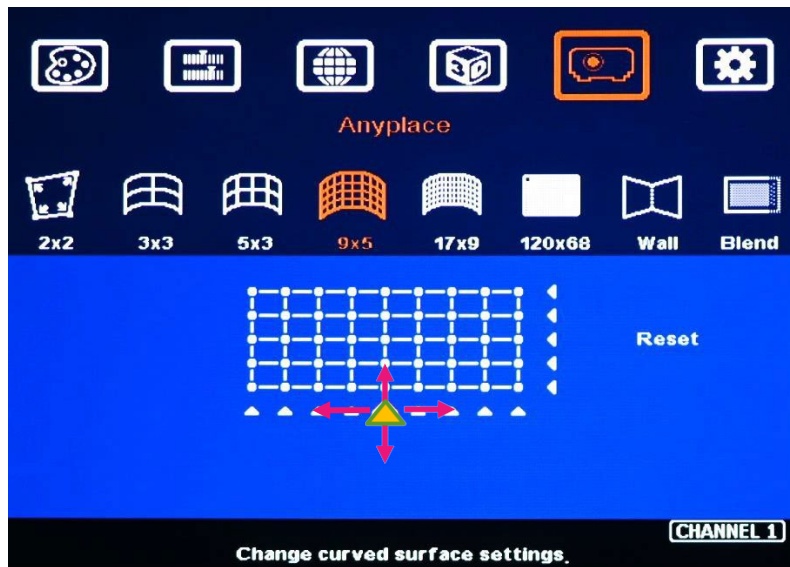
4.3.4. [3x3], [5x3], [9x5], [17x9], [120x68] Warp alignment

- After finish [2x2] corner alignment, apply [3x3] geometry alignment to let 9 adjusting points be located at the required positions including 4 corners, edge center points and center line.



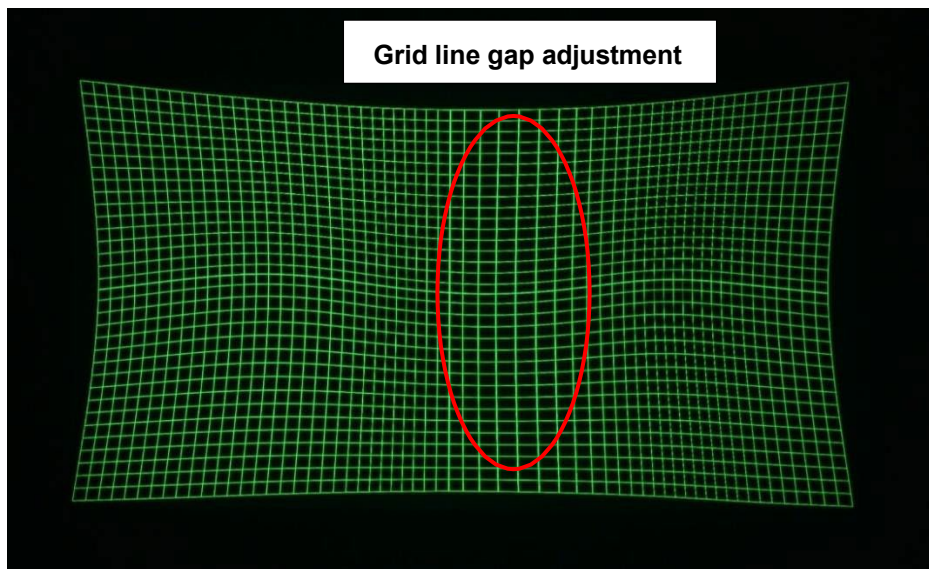
- Please follow the sequence [2x2]→ [3x3]→ [5x3]→ [9x5]→ [17x9]→ [120x68] to do alignment.
- 120x68 grid pixel position fine-tune: Each control point can be adjusted with 1/4 pixel/step and moved up to 12.5 pixels adjustment range. Maximum adjusting points are 100 points.
- For curved screen, user can use Linearity Grid Line adjustment (in next section) to adjust the line gap and finish the image position fine tune within shorter time.
- After finish Warp alignment, user can use [2x2] for complete image position fine tune without changing the Warp result. If user executes [9x5] alignment again after [17x9] alignment, [17x9] grid position will be reset and only keep [9x5] grid point information.
- Geometry alignment keystone angle is about $H=40^\circ \cdot V=35^\circ$. The range can be up to 600 pixels in [2x2] + 600 pixels more in [3x3] for one corner/edge. It also depends on the output resolution.
- If the adjustment range is too big, it is possible to get crashed image, please take below actions to improve the situation:
 - Use projector geometry alignment function to cover some adjustment.
 - Apply longer ZOOM ratio in the projector (to increase projector installation distance).
 - Adjust projector installation position.
 - Exchange with longer throw ratio projector to reduce image distortion.
- Ultra-short throw ratio projector is not suitable for curved screen display due to big image distortion. Once user can execute geometry alignment to required position, the image quality will be reduced, especially in the Text mode.

4.3.5. Linearity grid line adjustment



The control point can shift the lines in both horizontal and vertical directions.

- Linearity grid line adjustment is under [3x3], [5x3], [9x5] & [17x9] warp alignment menu. User can select the control point, then press ENTER to do grid line adjustment. Each control point can shift the image in both horizontal and vertical directions.
- When user projects the image to curved screen, the image grid size will continuously change—the grid size at the center will be bigger than both sides. Ultra-short throw projector will be more serious. Linearity grid line adjustment is designed to correct this kind of grid line gap difference.
- Linearity Grid Line adjustment can shift both horizontal and vertical grid lines. The maximum adjusting points in OSD menu is H=17, V=9. For [3x3], the adjusting range is +_600 pixels in each direction. This function is not available in GCT PC tool.

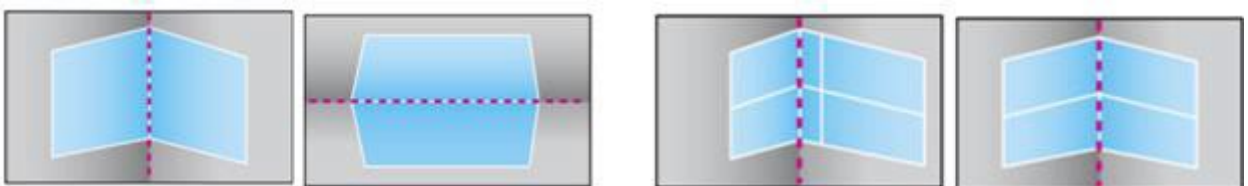
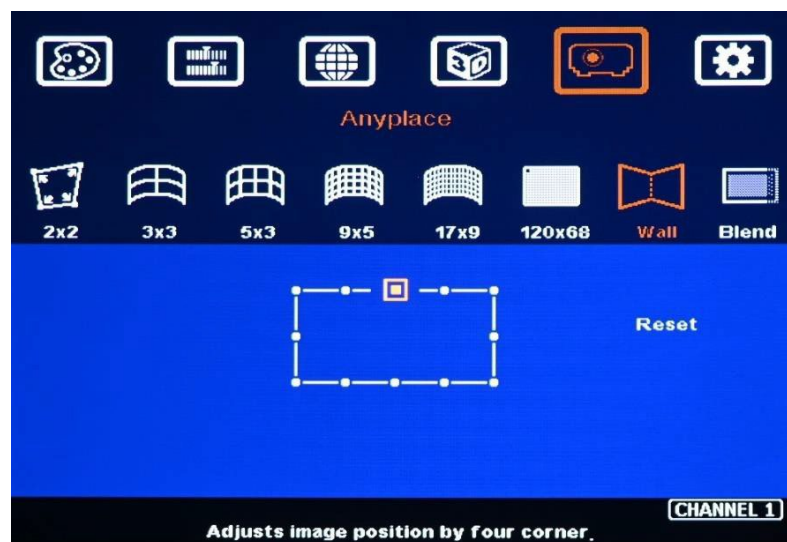


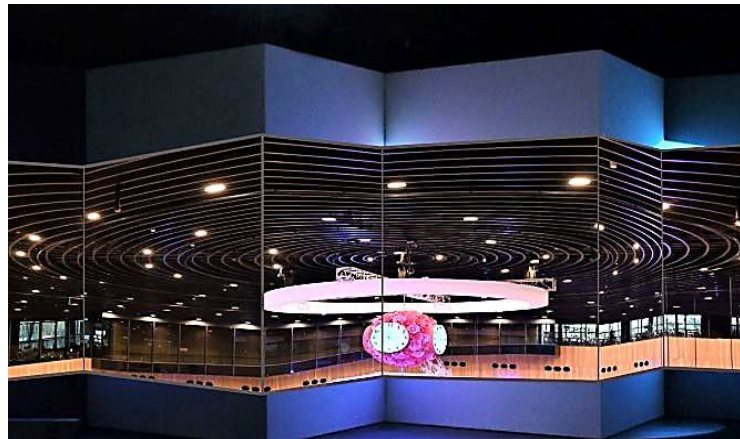
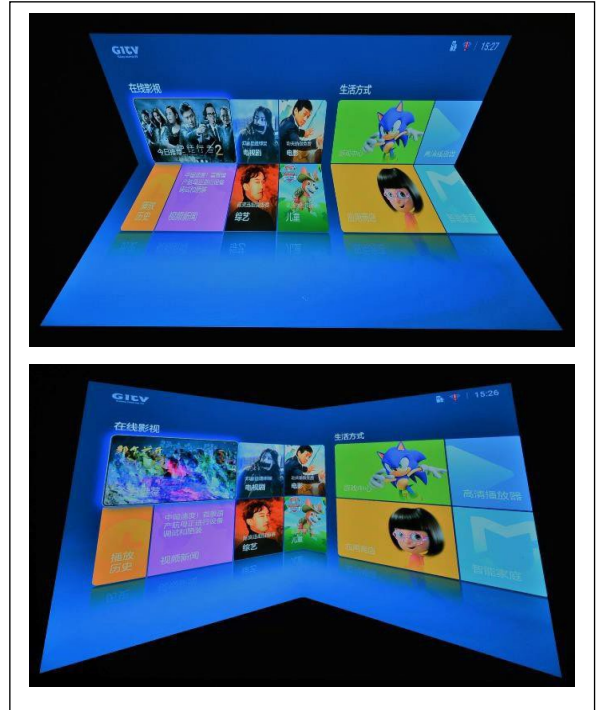
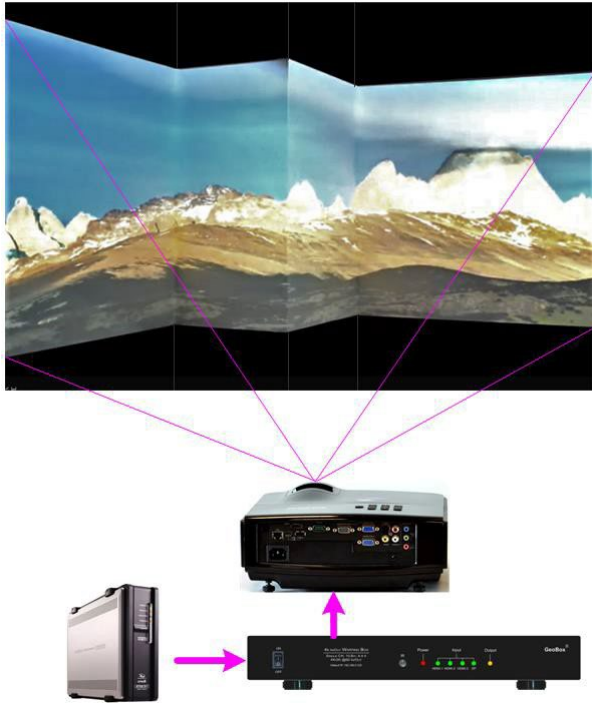
4.3.6. “W” shape Corner Wall geometry adjustment

Important note: When apply Corner Wall function, all the other geomtry alignment function will be disabled. User can only execute geometry alignment through 10 points of Corner Wall adjustment. 4 corner control points can execute 4 corner alignment same as [2x2] geometry alingment function.

Corner Wall alignment allows user to adjust the image at 90 degree corner wall or images at two sides of the pillar at wall corner through 10 control points across the edge of the image. It can execute horizontal and vertical corner wall alignment. User can only select either horizontal or vertical alignment at one time. This function can co-exist with edge blending function but not warp function. The image position can be adjusted as below:

- 4 corner positions of the image. The whole image position will be shifted the with same scaling factor. The adjustment range is 1200 pixels in both H&V directions.
- The rest 6 control points can correct the image position at wall corner or the images at two sides of the pillar at corner wall. It can shift the image positions in horizontal and vertical direction with the control range up to +_1200 pixels.
- User can't use ultra-short throw ratio projector for corner wall application. Otherwise, the image distortion will be too big to be adjusted and may also create focus issue. The ideal projector throw ratio should be larger than 1.0:1 if the output resolution is UHD.





Corner wall application on curved screen

If user wants to implement Corner Wall function on curved screen, user can connect the signal to another UD100L to do warp alignment, then connect the output to the input port in another unit for Corner Wall alignment. Then user can execute curve alignment and Corner Wall adjustment at the same time.

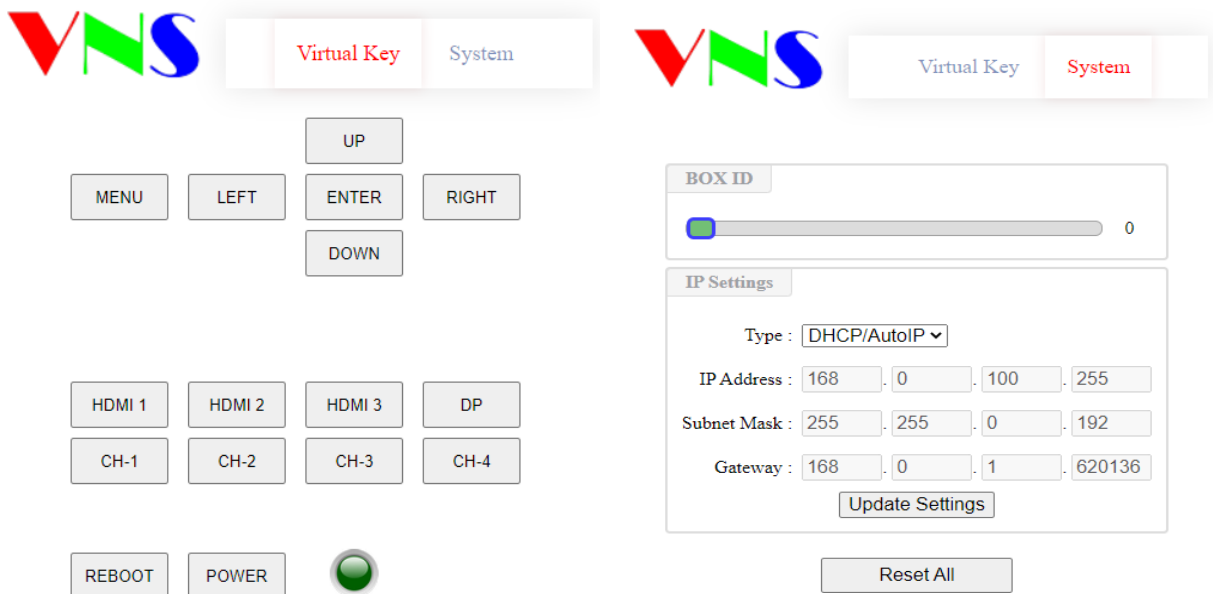
Important notice on curved screen application

The image quality in Corner wall adjustment will be degraded due to big geometry alignment. It is recommended to apply only multimedia content in this kind of applications. User can display the images at different side walls with different projectors to get the best video quality. GeoBox can crop correct image to get the right scaling factor based on the wall dimensions.

5. Geometry alignment via WebGui and GeoBox Control Tool (GCT)

5.1. WebGui

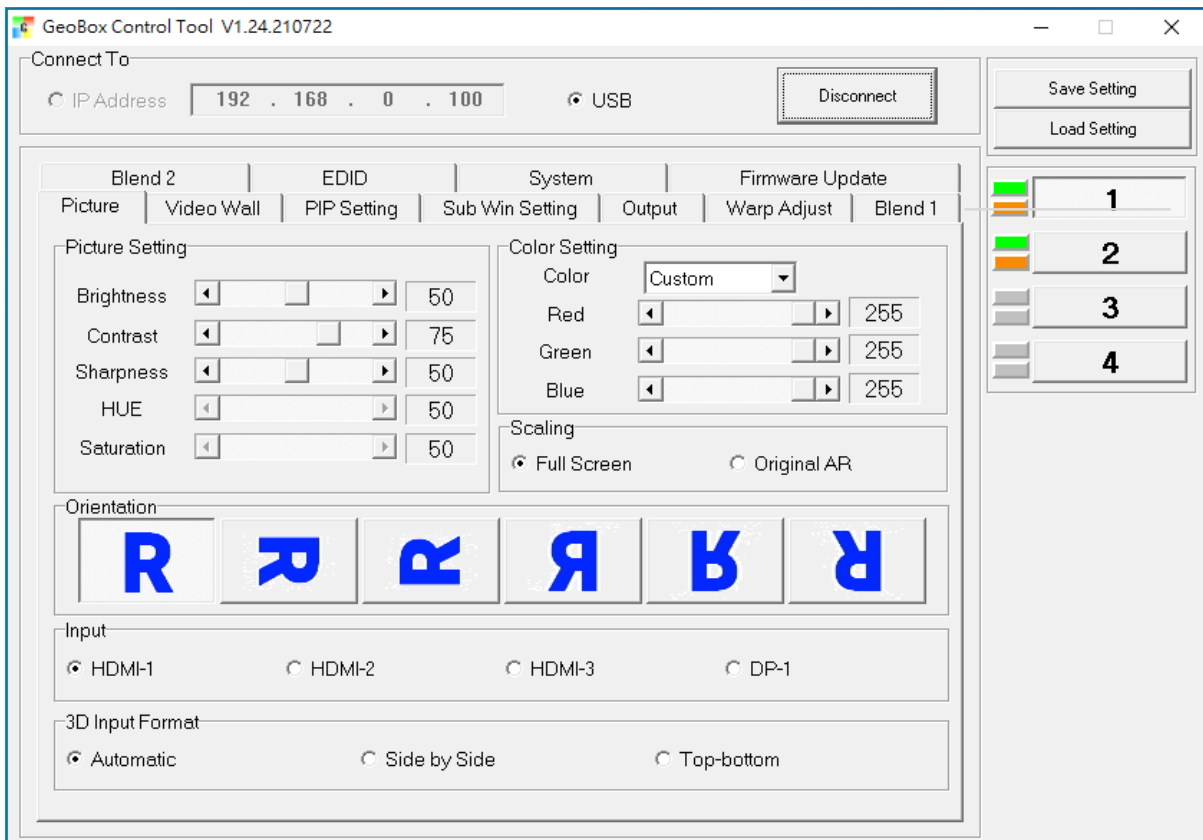
- User can connect GeoBox through web browser like Microsoft Edge or Google Chrome through input the IP address <http://192.168.0.100/>. User needs to set PC at the same IP segment such as 192.168.0.105.
- After connection, user will see WebGui as below:



- Use Mouse to click the button to do the operation. User will see OSD menu on the screen for further operation. It will be the same as control through IR keypads.
- When user wants to adjust geometry position with big value, please quickly click with the mouse at virtual key and it will increase the adjusting speed to get to the value needed.
- User can Power ON/OFF the system or reboot the system through Buttons. The Power indicator will change color to Red if the system is power off. User can also turn on the power through WebGui.
- User can set different IP address and save final settings into Profile Index through OSD menu.
- The maximum geometry control point in WebGui is 17x9, same as Remote controller or GCT operation.
- If user uses mobile phone for the operation, it may have different behavior in different OS. If meet trouble, please double check with different brand mobile phone.

5.2. GCT PC tool

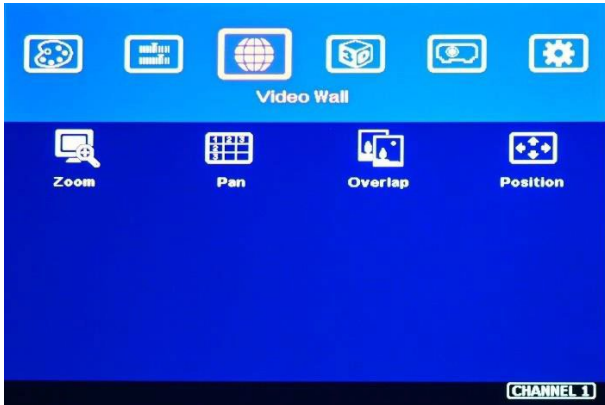
- GeoBox Control Tool (GCT) can be executed through PC. No software driver is required. Once user opens PC Tool and connects with PC through Ethernet, WiFi or USB, user can execute edge blending settings through PC keyboard and mouse remotely.
- The settings from GCT will be updated to the Box at real time. User can switch the operation between OSD menu and GCT seamlessly.
- User can backup system settings in PC and copy to other units.
- Firmware and MCU code update can be executed through PC Tool. User can control multiple units at the same time through different IP address.
- Different PC tool version requires correspondance MCU code and firmware version. Otherwise, it may not work. Please contact us if you have any trouble.



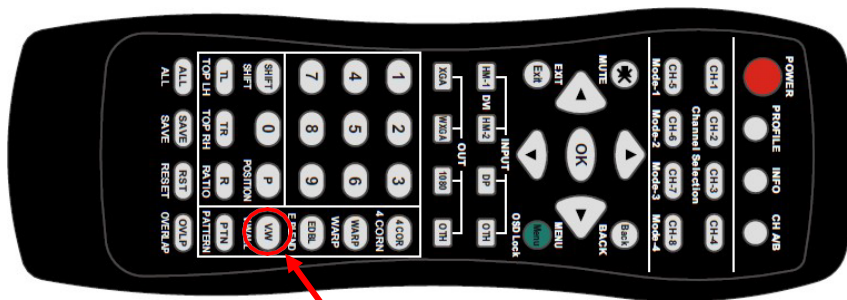
Some functions are not available in UD101L.

6. [Video Wall] setting

Video Wall function is embedded inside UD101L for image split, cropping and image position shift.



- Press Menu Keypad on remote controller to enter [Video Wall] OSD menu.
- [Video Wall] hotkey on the bottom right position of the remote controller is available for quick access.
- Video wall function can crop image and change image aspect ratio and position.



[Video Wall] menu hotkey

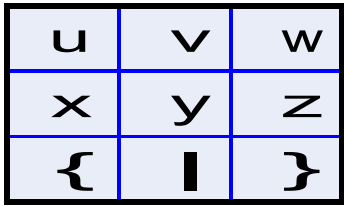
6.1. [Zoom]: split the signal source



Use [Zoom] to split input image in horizontal and vertical directions. Maximum split images are 15x15 in both horizontal and vertical directions from single input source.

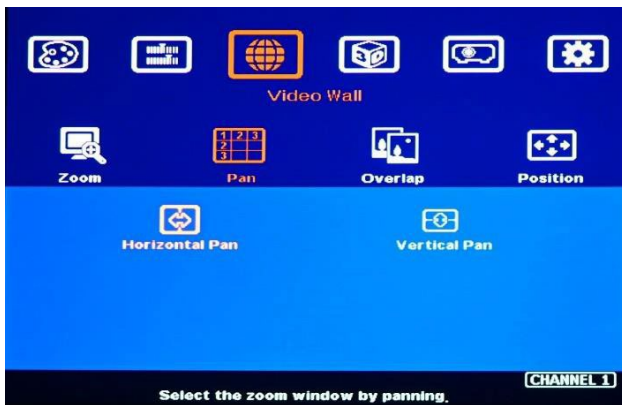


For 3 projectors at horizontal position, Horizontal Zoom=3, Vertical zoom=1

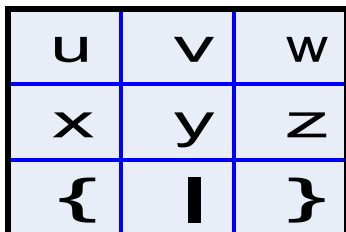


For 3x3 displays (9 projectors), Horizontal Zoom=3, Vertical Zoom=3

6.2. [Pan]: assign image location

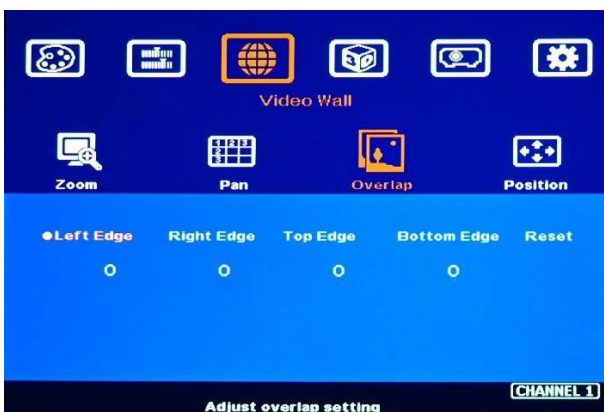


- Use [Pan] to determine the location of each split image in both horizontal and vertical directions.
- Default setting:
Horizontal Pan=1
Vertical Pan=1



For No. w projector: For No. z projector:
Horizontal Pan = 3 Horizontal Pan = 3
Vertical Pan = 1 Vertical Pan = 2

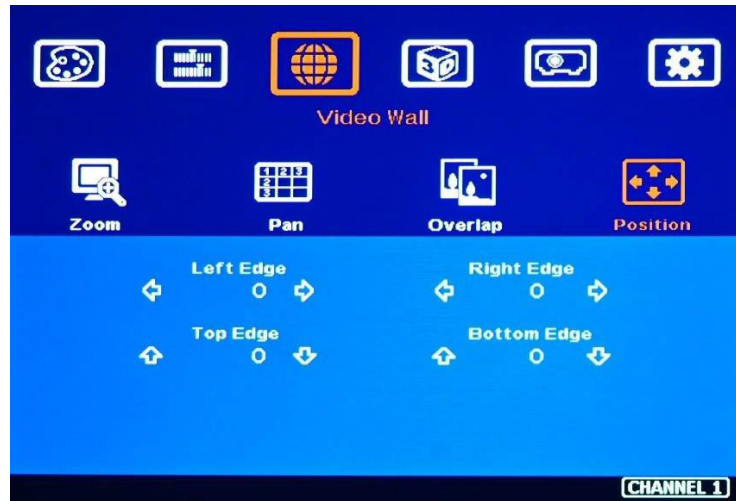
6.3. [Overlap]: image position shift and adjust cropping area



- Use [Overlap] to change image cropping area and can change image aspect ratio and position.
- Max. Overlap range is +_1800 Pixels

6.4. [Position]: shift image position without changing image size

After cropping, user can shift image position at H&V directions without changing image size. Usually, it is for video wall application to fine tune image position.

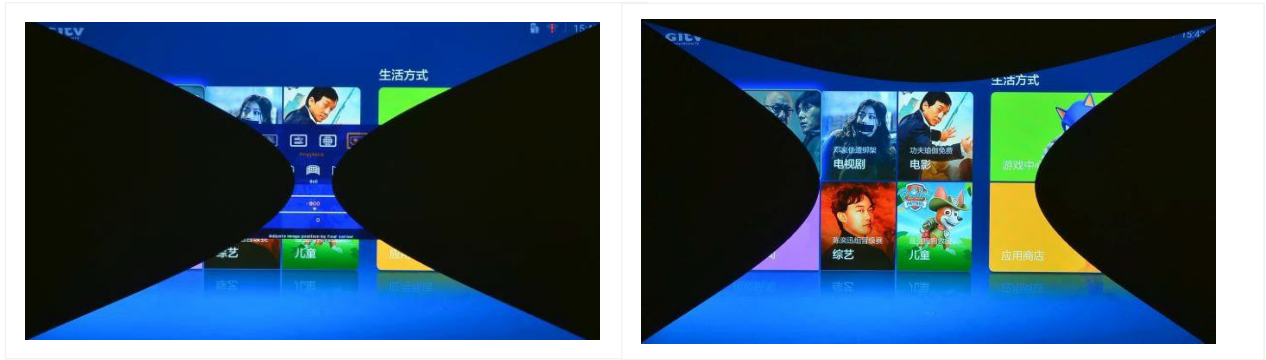


7. Edge [Mask]

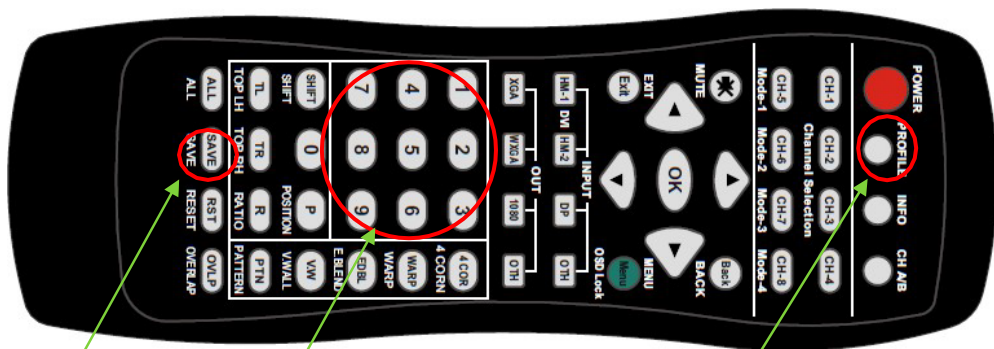
Edge mask is embedded in UD101L. The menu is under [Anyplace] menu in OSD.

- There are 8 control points for edge mask. When user moves the position for each control point it will result various edge mask pattern. The maximum position adjustment for each control point is ± 900 pixels in H&V directions.
- The adjusting range for [Mask] is calculated from the original edge position before geometry alignment and before [Shift] edge adjustment.





8. Save/Load System Settings



Press [Save], then select number key (1-9) to save settings.

Number keys (1-9) for Profile [Save] & [Load]

Press [Profile], then select number keys to [Load] user settings.

- After finishing system settings, user can save the setting via OSD menu through [Menu]➔ [Options]➔ [Setting]➔ [Profile]➔ [Save]➔ [Index 1-10].
- User can save the settings through [Save] hotkey on remote controller. Maximum Index number is 1- 9 only.
- [Save Profile] function is also available in WebGui and PC Tool.
- Max. 10 different display settings can be saved to [Profile]. The data stored in Profile include EDID setting, input source, output resolution, color settings and all user customized settings.
- User can [Load] the settings through below methods:
 - OSD menu: [Menu]➔ [Options]➔ [Setting]➔ [Profile]➔ [Load]➔ [Index 1-10].
 - Remote controller [Profile] hotkey: Press [Profile] hotkey, then select number keys (Index 1-9) on the remote control to [Load] user settings.
 - WebGui & PC Tool: user can access [System]➔ [Load Profile] menu to recall the settings through Ethernet or USB.
- When user power off the system, UD100L will save user setting without loss even the setting is not saved into Profile Index, unless someone to change it.
- Under below conditions, the settings data inside Profile Index will be kept without missing:
 - When system has been reset from OSD menu, Profile data will not be deleted.
 - Remote controller [Reset] hotkey will reset the system and Profile data will not be deleted.
 - When user update new Firmware, it will not affect Profile data.
 - Only Reset from reset hole on back panel will erase Profile Data.

9. Miscellaneous settings

9.1. EDID Setting

Selectable EDID setting for input source resolution is added into GeoBox. The settings will be applied to individual input port. Below are some guideline for EDID setting:

- 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. Some PC may not follow new EDID setting in GeoBox. 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.
 - Please use [Customize] EDID setting. This setting is from PC VESA standard and good for some PC display card. It may give much clear image for PC source. Some preset EDID modes are CEA standard and have minor difference with PC in signal details.
 - Disconnect signal source while set EDID. It will avoid interference from signal source and get correct EDID settings.
 - In some case, deep EDID reset from Factory setting mode may solve some EDID issue. Please contact your local distributor to get necessary support.

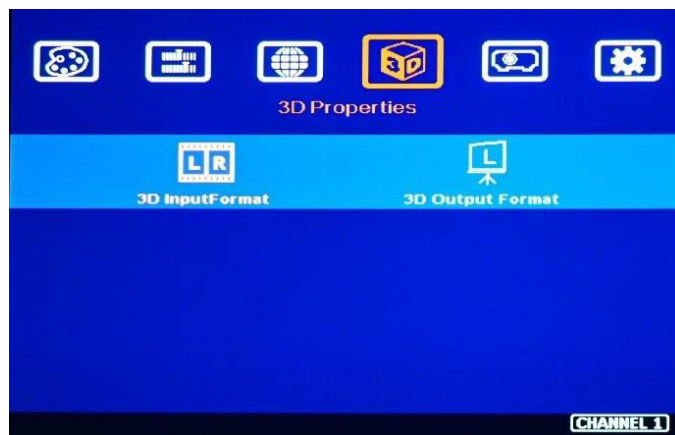


- Activate EDID setting menu: [Options]→ [Setting]→ [EDID]
- Select desired EDID.
- If necessary, select Customize EDID in the range: H=1024-4080, V=720-3840
- After select EDID, signal source will auto-change the output timing setting.
- Press [INFO] key to check if the input and output timing are set correctly.

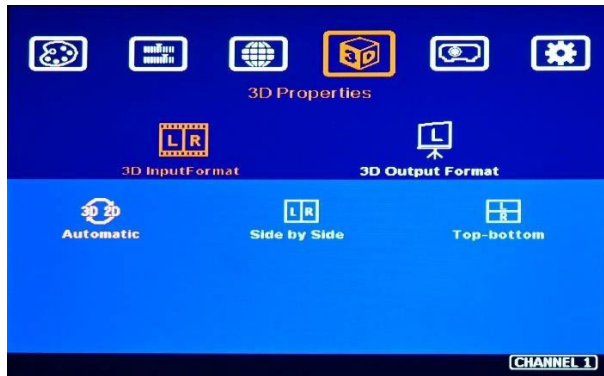


9.2. 3D format conversion

Two sub-menus under [3D properties] menu.



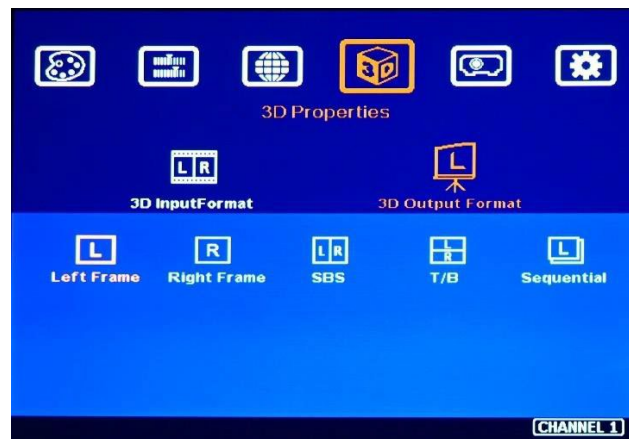
1) [Input Format]



[Input Format] selection:

- ✓ Select [Automatic] if the 3D signal is standard 3D formats from Blue Ray DVD or sources with 3D Info (flag) inside the signal.
- ✓ Select [Side By Side] or [Top-Bottom] based on 3D input format.

2) [Output Format]



For passive 3D application, user needs to use two UD101L as processor. One UD101L outputs RH eye frame and another unit outputs LH eye frame signal to implement passive 3D application. Other 3D output formats are for 3D display devices that require specific 3D input format.

3) 3D format conversion

UD100L can convert 3D formats into Side by Side and Top/Bottom outputs for passive 3D or active 3D display devices. Some 3D display devices have some limitation in supporting 3D input format. UD100 can convert 3D formats into popular 3D format output for these 3D display devices. [Sequential] output function is not available at this moment.

9.3. HDMI vs. DVI Output Signal

- HDMI digital signal is compatible with DVI signal. Most of display devices can support both digital signals. However, some equipment may have less flexibility in signal compatibility. In this case, user may need to select DVI output format to get normal display in some devices.
- HDMI signal embeds more signal information, such as audio and HDCP. Once some information is missing, it will also affect the display. It may cause intermittent or loss of image. Under this condition, user can try to set DVI output. The connection doesn't need to change.
- Some HDMI optical fiber cable requires DVI output to get smooth signal transmission.

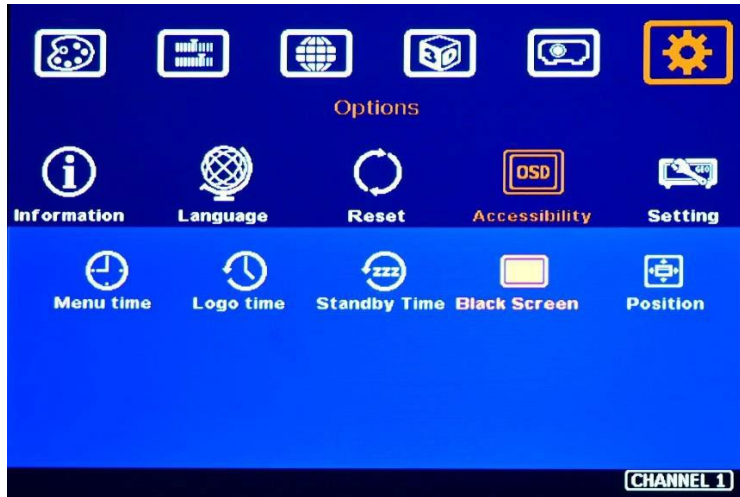


9.4. System Standby and Automatically Turn Off Output Signal

- [Options] → [Accessibility] → [Standby Time]
- If set [Standby Time] at 60, the system will get into Standby Mode after 60 seconds when no input signal is detected. The output signals from UD101L will also be terminated at the same time. If UD101L detects input signal again, it will automatically turn on the system.
- If the projector can automatically turn off/on by detecting input signal (hot plug signal), user can control signal source to execute entire system on/off control.

9.5. Change Background Color

When no signal input, the system will show blue color background with [Power Saving Mode] message on the screen. User can change background color to black with no text message on it through [Options] → [Accessibility] → [Black Screen] → [On]. Back ground color setting will be applied to not full screen display, such as aspect ratio change or PIP/POP display.



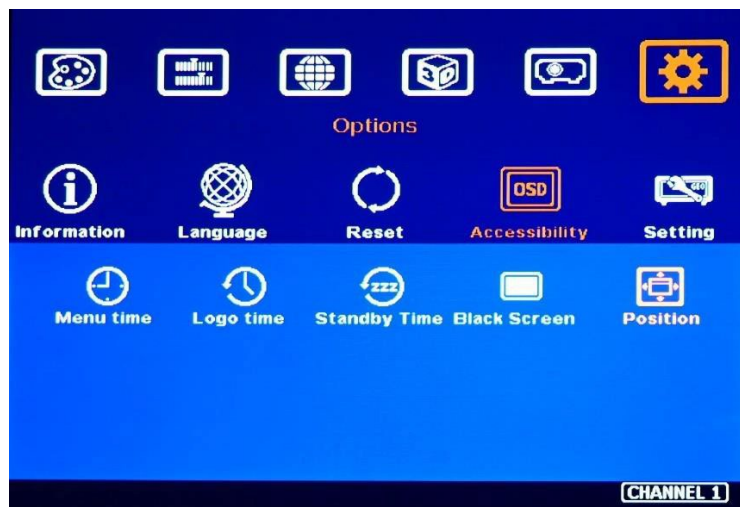
9.6. Turn off splash screen Logo

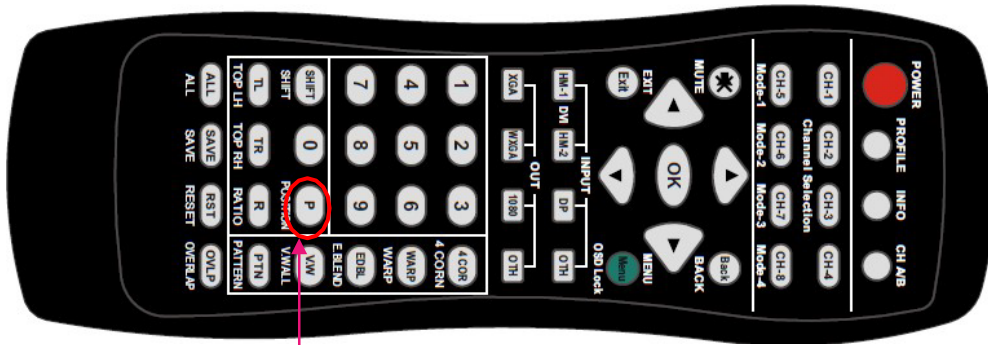
- Use can turn off splash screen Logo through [Options]→ [Accessibility]→ [Logo Time Out] and set the value at "0". Default setting is 10 seconds.
- It will reduce the boot up time.

9.7. Audio Output setting

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

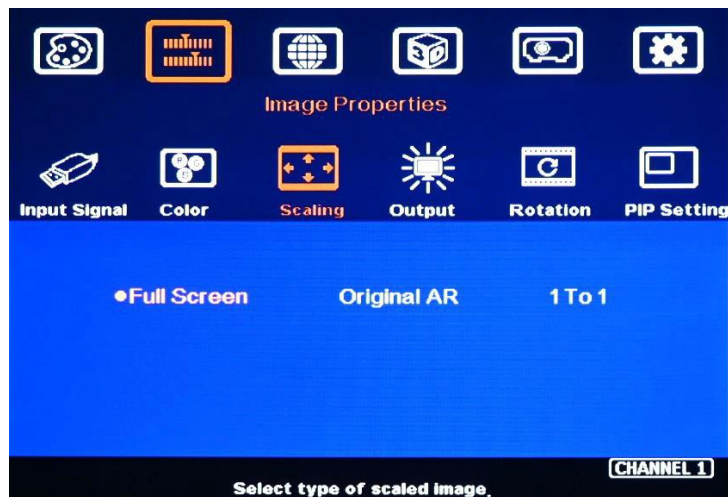
9.8. Change OSD location





Please click [Position] hotkey to activate OSD position shift menu, then use Direction key to shift OSD position to desire location.

9.9. Native 1:1 pixel to pixel display mode



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

- [Full screen]: to display the content with full screen. The image will be scaled to full screen no matter the input is with what kind of aspect ratio.
- [Original AR]: to display content with original aspect ratio. If 4:3 input content is displayed on 16:9 monitor, it will keep 4:3 image aspect ratio with vertical full screen on the monitor.
- [1:1]: to display native pixel to pixel image at the center of the screen. When XGA image is displayed on 16:9 monitor, it will show up pixel to pixel XGA image at the center of the monitor without scaling to keep original image quality.
- Further image cropping and aspect ratio adjustment is still available.

9.10. HDCP control



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

10. **Trouble Shooting**

10.1. **Front Panel LED indicators**

- User should see Input / Output LED lights. If no light illuminated, please check Input / Output connecting cables, signal source & projector.
- If user sees continuous flashing (0.5-1.0 second interval) in the LED, it means OSD may be locked. Please press [Menu] key for 5 seconds or press 850 number keys in remote controller to disable [OSD locked].
- If user sees flashing LED on Input/Output LED indicators at the same time with 1 second interval, it means the system gets wrong FW/MCU code or HW failure. User can turn off/on the system again to see if it can solve the issue or not. User can also update the MCU code and FW PC tool again. If the issue is still existing, then user needs to apply RMA and send back the unit to factory for checking.

10.2. **No image in the projector**

- If UD100 output resolution is 4k/2k/60Hz and the projector can't support 4k input, user will see no display image in the projector.
- Please use remote controller or front panel output selection keys to select [1080p] 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.

10.3. **Intermittent or Loss of Input Signal**

- 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 projectors are not HDCP compliant, it is possible to stop UD100 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 UD100.
- 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.
- Usually, to swap with different cable, signal source and projector 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.
- User can connect a monitor at the end of the Loop out port to check signal source stability.

10.4. **Video quality issues**

- Try to use the highest signal resolution and number of color bits (RGB 4:4:4) allowed by UD100. 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, it will have no [3D Motion adaptive de-interlaced] processing function. If user applies static image source, the output video may have slight jitter phenomenon. 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 smooth the gradient color when the input signal is also 10-bit. Please note that HDMI 2.0 can only support 4k/2k 60Hz 8-bit signal only.
- 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.

10.5. **System crash and malfunction**

- After FW update, please reset the system through a pin inserting to reset hole on the back panel for 5 seconds to avoid abnormal settings inside the system. It will erase Profile settings.

-
- When the input source is PC graphics, only [Brightness], [Contrast] and [Sharpness] items under [Picture] menu can be executed. If the input is 4:2:2 video source, all the items are functional.
 - When implement [Corner Wall] alignment, other geometry functions will be not functional.
 - Remote controller may be interfered by environment and can't be smoothly operation.
 - When geometry alignment is over the maximum adjusting range, the image may crash. It can be recovered by system reset or reducing adjusting value. Maximum adjustment range is about H=40°, V=35°, +_1200 pixels in each corner under 4k/2k output resolution, less adjusting range under multiple point adjusting condition.

11. **Technical support**

- User can send e-mail to sales@VigilLink.com together with as much information as possible.
- The following information is required for a swift response.
 - Sink device (projector): type and model number
 - Screen details or specific application details.
 - GeoBox model No. and series No.
 - Details of the signal source and the 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.
- Generally, we will response within 24 hours (excluding weekends)
- Please note that if the machine is sent back for repair, user needs to pay for the delivery cost.

12. **Safety Precaution and Maintenance**

12.1. **Power Supply**

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

12.2. **Working Environment**

Please locate UD101L in an environment free from dust, moisture and high temperature with good ventilation.

12.3. **Warranty**

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

12.4. **Maintenance and Repair**

Apart from what is detailed in User Guide, maintenance should be carried out by competent technician assigned by VIGILLINK. If UD101L is physically damaged, it should be returned for repair using VIGILLINK RMA procedures. If the unit is opened by user, it will lose the right for warranty protection.

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Limited Warranty and RMA statement

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

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

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

FCC/CE statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notice:

- (1) An Unshielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
- (2) Use only shielded cables to connect I/O devices to this equipment.
- (3) Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Specification

- ✧ Input: 3x HDMI 2.0b, 1x DP1.4, Output: 1x HDMI 2.0
- ✧ Loop output: 1x HDMI 2.0b for audio and daisy chain connection.
- ✧ HDCP compliance: Input: HDMI: HDCP V2.2/V1.4, DP: HDCP: V1.3, Output: HDCP V2.0/V1.4.
- ✧ Max. input resolution: DisplayPort: 7680*4320 @30Hz, HDMI: 7680*2160 @30Hz, 7680*1200 @60Hz, 4096*2400 @50Hz, 4096*2160 @60Hz.
- ✧ Input supports progressive and interlaced RGB/YUV signal, 4:4:4 Chroma sampling, up to 30 Color bits.
- ✧ Support non-VESA standard input timings for easy connection with various signal sources.
- ✧ 16 selectable Outputs: HDMI 2.0 up to 4096*2160 @60Hz, progressive 4:4:4 RGB.
- ✧ Embedded native 1:1 pixel to pixel display mode.
- ✧ 2 frames system latency: 33ms (@V=60Hz)
- ✧ Warp engine for geometry alignment up to 17x9 control points.
- ✧ 120x68 grid pixel position fine-tune. Each control point can be adjusted with 1/4 pixel/step and moved up to 12.5 pixels adjustment range. Maximum adjusting points are 100 points.
- ✧ Maximum geometry adjustment up to 1200 pixels in both H&V directions for each corner.
- ✧ Support W shape Corner Wall adjustment in H&V at flexible location.
- ✧ Support Linearity Grid Line adjustment for quick H&V line position alignment. It is good for the line gap adjustment on curved screen display.
- ✧ Edge Mask with 8 control points up to 900 pixels at each control point in H&V directions.
- ✧ Embedded video wall function for image split, cropping and aspect ratio adjustment.
- ✧ Selectable geometry alignment grid size from 8-120 pixels in H&V direction. Default is 32*32 pixels.
- ✧ Selectable grid pattern color with optional transparency to allow user to apply external test pattern.
- ✧ Flexible aspect ratio adjustment in each edge up to +_ 1800 pixels position shift.
- ✧ 3D format conversion: Convert 3D input signal into Side by Side, Top/Bottom and frame sequential output signal for passive 3D and active 3D displays.
- ✧ OSD menu location is adjustable.
- ✧ 10-bit processor, 3:2:2:2 cadence, low angle smooth algorithm, high quality scaling engine.
- ✧ 3D motion adaptive de-interlace.
- ✧ Frame lock function to get perfect synchronized outputs in multi-unit application.
- ✧ Frame rate conversion and 50Hz in/out function to eliminate image frame drop or repeat.
- ✧ Support xvYCC & 8/10/12-bit deep color processing.
- ✧ Automatically support HDR 10 input signal processing with SDR full color RGB 4:4:4 output.
- ✧ 90/180/270 rotation, flip, cropping, scaling & color adjustment up to 4k/2k 60Hz input signal. User can do more rotation angle fine-tune through geometry alignment.
- ✧ PIP/POP function with PIP image size from 320*180 up to 1920*1200 resolution with flexible position and adjustable aspect ratio. 2/3/4 split view POP is integrated.
- ✧ Quick seamless swap between two input signals.
- ✧ Selectable and programmable EDID in the range: H=1024-4080, V=720-3840.
- ✧ User can save up to 10 settings that can be recalled at any time.
- ✧ ESD Protection: ±8kV (Air-gap discharge), ±4kV (Contact discharge)
- ✧ Working environment: 40° C, 10-90% RH
- ✧ Control: IR, RS232, USB, Ethernet
- ✧ 10 system settings can be stored and backup in PC.
- ✧ CE/FCC/RoHS Certified

- ◇ Power supply: DC 12V 2A, Power consumption: DC 12V/1.1A (13.2W)
- ◇ Dimension and weight (Body Only): 303mm*190mm*40mm, 1.2Kg
- ◇ 30 month warranty.

Revision History

Revision	Date	Originator	Comments
V1.0	2021-0202	Steve Wang	First version
V2.0	2021-0622	Steve Wang	Complete check and revise
V2.01	2021-0705	Steve Wang	Add GCT PC tool
V2.02	2021-0713	Steve Wang	Add 3D format conversion
V2.03	2021-0721	Steve Wang	Seamless input swap
V2.04	2021-0816	Steve Wang	Add W shape Corner wall adjustment
V2.05	2022-1115	Steve Wang	Add native 1:1 display mode