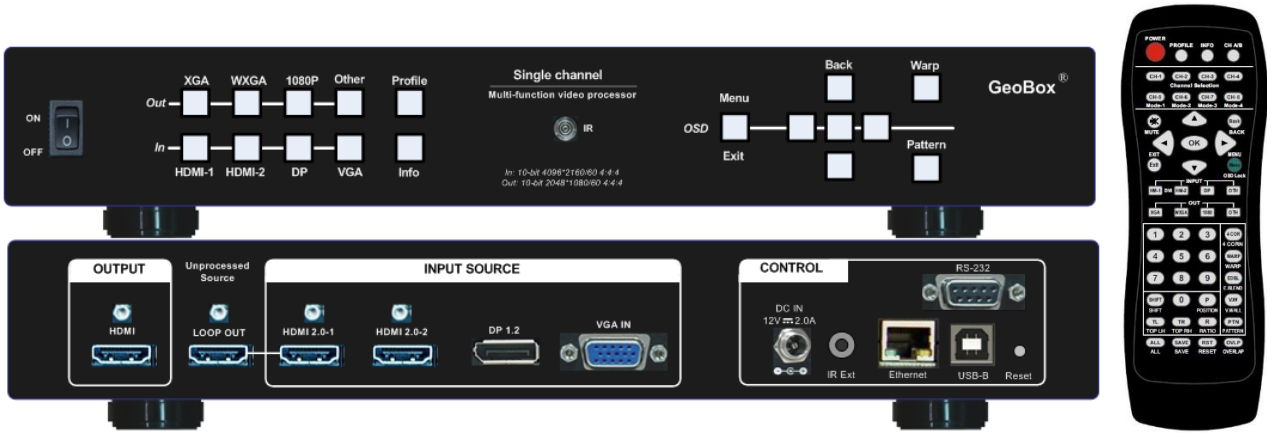
G116 Multi-function Warping Box Datasheet

Input: up to 7680*2160 @30Hz, 5760*1200 @60Hz,

4096*2160 @60Hz, 4:4:4 full color sampling

Output: 2048*1080 @60Hz

- *Single channel*
- *Image warp & geometry alignment*
- *Edge mask*
- *PIP/POP*
- *Image rotation and flip*
- *Image anyplace cropping*



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Introduction

G116 is multi-purpose warping box with multiple functions for LED, LCD and projector display. Multi-units can be cascaded for large scale display.

4 input ports (2x HDMI, 1x DP, 1x VGA) and 1x HDMI output port are designed in G116. Digital input supports up to 7680*2160 @30Hz and 5760*1200 @60Hz with 4:4:4 full color sampling. Output supports up to 2048*1080 @60Hz. It is integrated with 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 G116. User can use front panel keypads, IR controller, USB, WebGui and Ethernet for the operation. Sophisticated geometry alignment up to 17x17 control points, Linearity Grid Line Adjustment and Corner Wall image adjustment for mapping image at 90 degrees corner are integrated in G116. Users can see real time geometry and color adjustment to get optimized result.

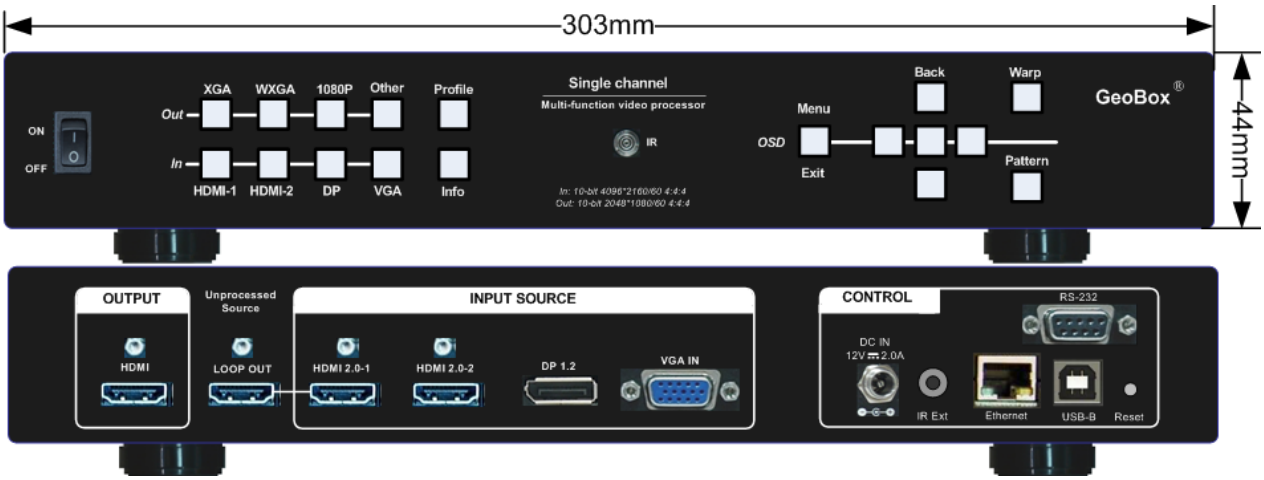
Video wall function is to split and allocate source image. Overlap function is to crop image at desired location, shift image position and change aspect ratio.

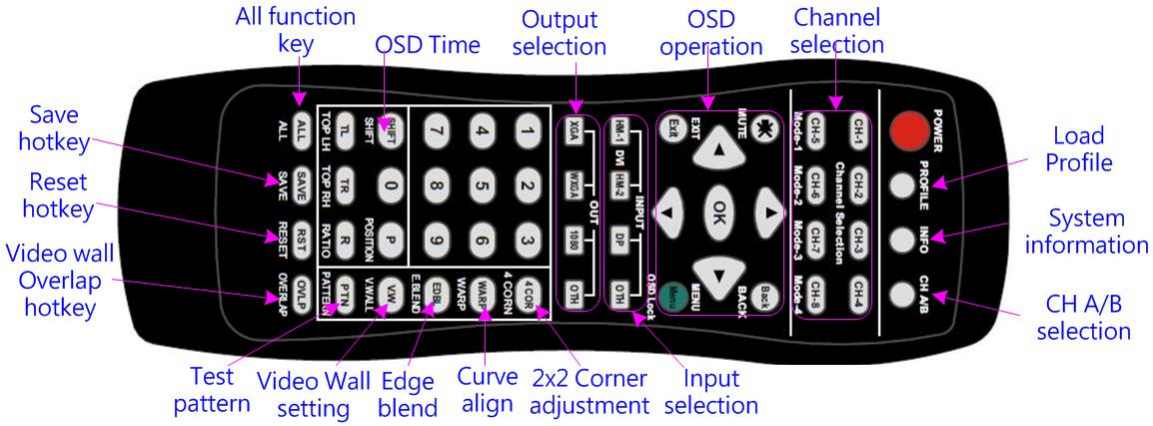
HDMI loop out is designed for signal source monitoring and multi-unit daisy chain connection.

PIP (picture in picture) and POP (Picture outside Picture) are standard functions in G116. PIP image size is from 320*180 up to 1920*1200 with flexible position and aspect ratio adjustment. Overlap function allows further image size, aspect ratio and cropping area adjustment in PIP window.

G116 is an ideal processor for image stacking, geometry alignment, PIP, POP, image format conversion, de-interlacing, image rotation and mobile mirror image displayed on portrait TV. It provides easy configuration, low entry barrier, cost effective, reliable and flexible solution.

Outlook and remote controller





Specification

- ✧ Input: 2x HDMI 2.0b, 1x DP1.2a and 1x VGA
- ✧ Output: 1x HDMI 1.4b
- ✧ Loop output: 1x HDMI 2.0b for cascade.
- ✧ HDCP compliance: Input: HDMI: HDCP V2.2/V1.4, DP: HDCP: V1.3, Output: HDCP V1.4.
- ✧ Max. input resolution: 7680*2160 @30Hz, 5760*1200 @60Hz, 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.
- ✧ Output up to 2048*1080/60, progressive 4:4:4 RGB, 15 selectable Output resolutions.
- ✧ 2 frames system latency: 33ms (@V=60Hz)
- ✧ New generation warp engine for geometry alignment up to 17x17 grid control points.
- ✧ Maximum geometry adjustment up to 1200 pixels in both H&V directions.
- ✧ Support Corner Wall adjustment in H&V at flexible location.
- ✧ Support Linearity Grid Line adjustment for quick H&V line position alignment.
- ✧ 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 position adjustment.
- ✧ Selectable grid pattern size from 8-120 pixels in H&V direction. Default is 32*32 pixels.
- ✧ Selectable grid pattern color with optional transparency to see background image for external pattern.
- ✧ Flexible aspect ratio adjustment in each edge up to +_ 1800 pixels position shift.
- ✧ 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 while multiple units are cascaded.
- ✧ Support xvYCC & 8/10/12-bit deep color processing.
- ✧ Individual color adjustment in each processing channel.
- ✧ Individual 90/180/270 rotation, flip, cropping, scaling & color adjustment.
- ✧ PIP/POP function with PIP image size from 320*180 up to 1920*1200 resolution with flexible position and adjustable aspect ratio. This function is not available when the main image is 90/270 degrees rotation.
- ✧ Selectable and programmable EDID in the range: H=1024-3840, V=720-2400.
- ✧ User can save up to 5 settings and can be recalled by remote controller, RS232, USB or network.
- ✧ ESD Protection: ±8kV (Air-gap discharge), ±4kV (Contact discharge)
- ✧ Working environment: 40° C, 10-90% RH
- ✧ Control: keypads, IR, RS232, USB, Ethernet
- ✧ Power supply: DC: 12V 2A, Max. Power consumption: 12V/0.7A, 8.4W
- ✧ Dimensions (Body only):
  Without protruding parts: 303mm*164mm*44mm.
  With protruding parts: 303mm*175mm*55mm
- ✧ Weight (Body only): 1.51kg
- ✧ CE/FCC/RoHS Certified
- ✧ 2 Year Warranty, paid extension available up to 5 years.

Function and feature:

A. Input / Output

1. Input: 2x HDMI, 1xVGA, 1x DisplayPort ◦
   - HDMI & DisplayPort support 7680*2160 @30Hz, 5760*1200 @60Hz with 4:4:4 chroma sampling without compression. VGA supports up to WUXGA or 205MHz analog input signal.
   - Connect with various video sources and support none VESA standard input resolution up to 120Hz.
2. Output ports: 1x HDMI. Selectable output resolutions: XGA, WXGA,1280x720, 1280x1024, 1366x768, 1920x1080 (24/30/50/60Hz), 1920x1200 (30/60Hz), 2048x1080/60, 1024x768 @120Hz, 1280x720 @120Hz, 1280x800 @120Hz.
3. Loop out port: 1x HDMI 2.0b, same as source signal up to 8k/2k @30Hz / 4096*2160 @60Hz.

B. Image warp, geometry alignment and edge blending

1. Selectable grid pattern size for geometry alignment from 8-120 pixels in H&V. Default is 32*32 pixels.
2. With full 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.
3. Each box controls one projector and can be cascaded to support unlimited number of projectors.
4. Integrated with full function IR remote controller. Manual geometry alignment via Remote controller and WebGui up to 9*5 control points with H=+_ 1200 pixels and V=+_1200 adjustment range in full HD output (4 corners + warp adjustment).
5. Gwarp3 PC tool is available for warp and geometry alignment up to 17x17 control points with H=+_1200 pixels and V=+_1200 pixels adjustment range in full HD output through USB or Ethernet. After finishing geometry alignment, the parameters can be stored inside PC or GeoBox and no more PC tool is needed.
6. Corner Wall geometry alignment at 90 degrees corner wall up to 900 pixels adjustment range in 4 corner position and H/V center point. Curvature point can be shifted up to +_900 points from the center.

C. High end 10-bit video processor

1. 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.
2. Complete color adjustment function, including brightness, contrast, hue, saturation, preset color mode and independent RGB color adjustment.

D. PIP/POP

1. PIP (Picture in Picture): with flexible PIP size (320*180 to 1920*1200), location and aspect ratio.
2. POP (Picture outside Picture): side by side or Top/Bottom images with full screen or maintain source signal aspect ratio.
3. PIP sub-image size, cropping area, position and aspect ratio can be further adjusted through Overlap function.
4. Limitation:

- When implement PIP/POP function, the main signal source can't be rotated at 90/270 degrees
- Source: only one HDMI source can be displayed on PIP/POP screen. Another source shall be DP or VGA.
- PIP Overlap function is only available up to 4k/30 input resolution.

E. Video wall function

1. Image cropping and location assignment for each projector.
2. Video wall overlap functions up to +_1800 pixels in H&V direction in each edge:
   - Flexible aspect ratio adjustment in each edge.
   - Image position adjustment
   - Image cropping area adjustment
   - Irregular video wall application
3. Split the image for display devices without additional PC, image splitter or other devices.
4. Serve as video wall controller for irregular video wall display up to 15x15 matrix display from single signal source through multi-unit daisy chain connection.

F. Image rotation and flip

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

G. Edge Mask

8 control points to define the area for edge mask. It can work together with geometry alignment to get various edge mask effect.

H. System control and other features

1. Professional design and reliable for 7/24 working condition.
2. Operation temperature: 0-45° C. Relative humidity: 10%-90% non-condensing.
3. Full function OSD by front panel keypad, WebGui, IR and Ethernet.
4. Firmware update via USB or Ethernet.
5. Gwarp3 PC tool can control multiple processors simultaneously through USB or Ethernet.
6. Internal grid pattern with selectable color and grid size for easy geometry alignment.
7. RS232 & Ethernet control system compatible with most of control system.
8. User can select blue or black background color when no input signal is detected.
9. Programmable EDID in the range at H=1024~3840, V=720~2400.
10. BOX ID and programmable IP address for convenient multiple unit control at the same time.
11. User can save up to 5 settings and can be recalled by remote controller, RS232, USB or network.
12. System settings can be backup in PC, USB device and copied to another unit.
13. Automatic power ON/OFF through input signal control. While no input signal is detected, it will shut down output automatically. User can power ON/OFF the system through the control in signal source.

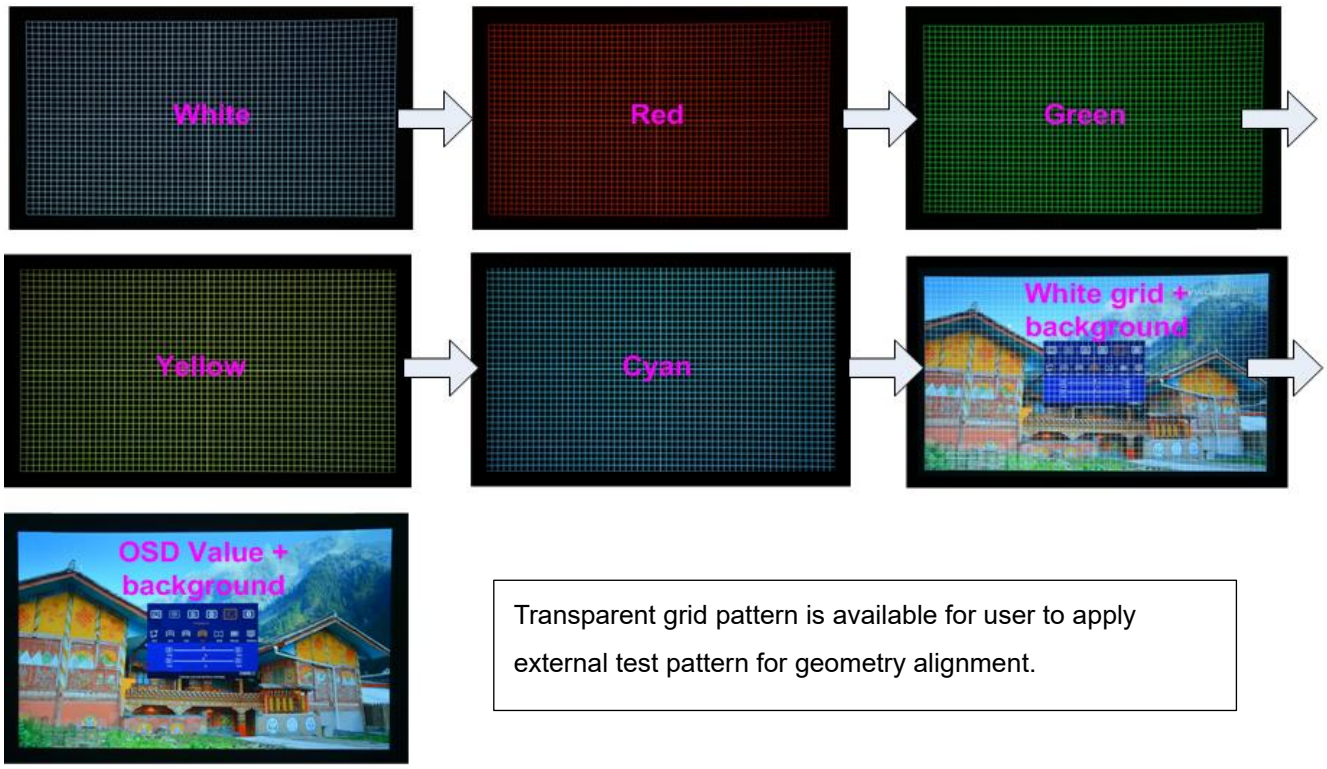
Applications

1. Projector display on curved screen with small company logo on it. It is good for golf simulation and big screen game application.
2. Change aspect ratio of the screen to meet required screen size.
3. Display mirror image of mobile phone or iPad on portrait monitor for game or commercial application.
4. PIP/POP to add second video content on the screen with flexible image size, aspect ratio and position adjustment.
5. Stacking multiple projectors to increase the brightness of the image.
6. Crop any size and location of the image for the display.
7. Image rotation for portrait display without rotating image source.
8. Correct image distortion in ultra-short throw ratio projector application.
9. Edge mask to remove unnecessary image at the edge.
10. Smooth display projection image on 90 degrees wall corner.

12.

Feature illustration

Variable Grid Patterns for geometry alignment

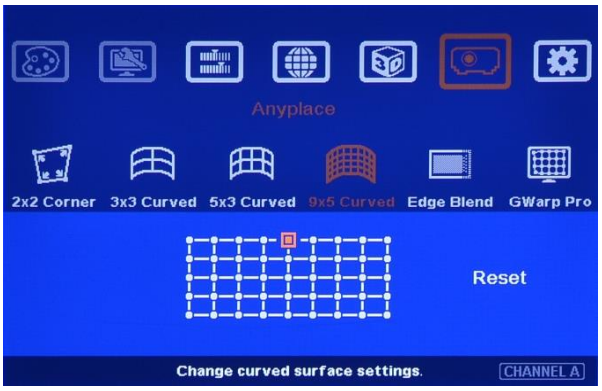


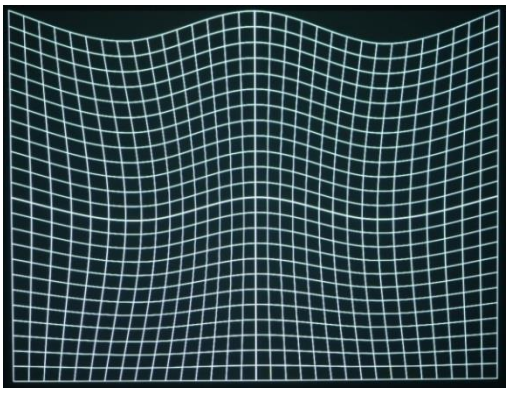
Transparent grid pattern is available for user to apply external test pattern for geometry alignment.

Selectable grid pattern size for geometry alignment

The pixel size in grid pattern for geometry alignment is selectable. The grid size in both horizontal and vertical directions is adjustable from 8 to 120 pixels with 1-pixel increasement. H&V grid size will be the same. User can select grid size under [Anyplace] menu.

Image geometry alignment and warp





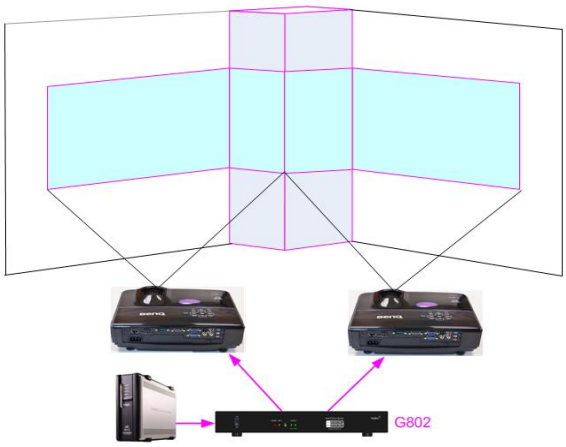
Corner wall Alignment & Display

Corner Wall alignment function is functional either in horizontal or vertical direction. Corner Wall geometry alignment range up to 900 pixels in 4 corner positions and at the edge center in H&V directions. The curvature point position can be shifted +_ 900 pixels. Example for horizontal adjustment: the control point can be moved down to 900 pixels and the curvature point can be +_900 pixels away from the center point in horizontal line. 4 Corner position alignment and Edge Blend function are still available with Corner Wall adjustment for easy image mapping and system setup.

In Horizontal and Vertical directions

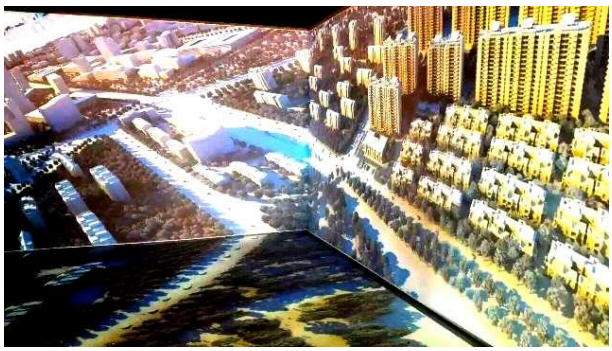
At any location but not only at center

Two projector Corner Wall application



Three projector Corner Wall application

Another Corner Wall application examples

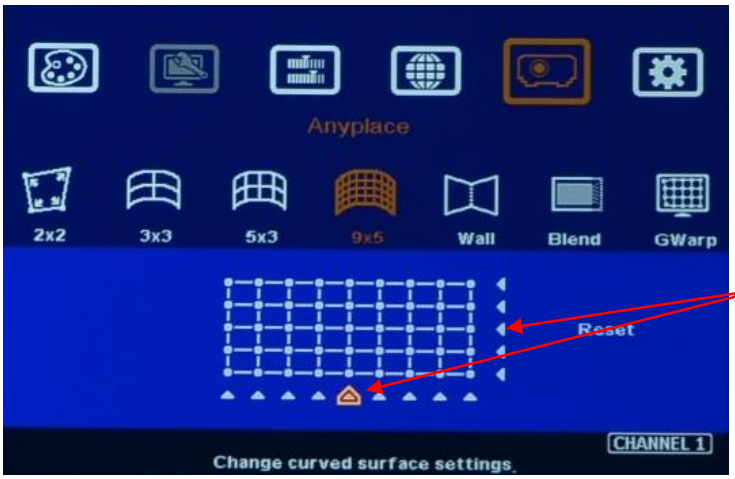


Single projector application

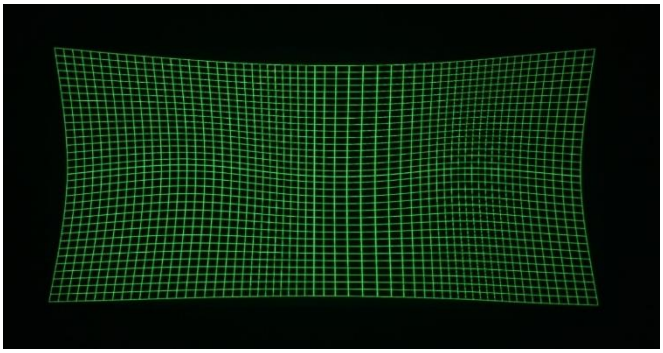
Linearity grid line adjustment

When projector projects image on curved screen, the image will change the grid size gradually and cause different scaling factor on the center and both sides. Linearity grid line adjustment is to compensate this kind of effect and make complete image with the same scaling factor. This function can be executed only through remote controller.

1. It can be applied to both horizontal and vertical directions.
2. The operation OSD menu is under 3x3, 5x3 & 9x5 warp alignment menu. The result can be further adjusted by Gwarp3 PC tool for detailed 17x17 image position fine tune.
3. Linearity grid line adjustment can be executed together with warp alignment at the same time.



Control point for Linearity Grid Line Adjustment



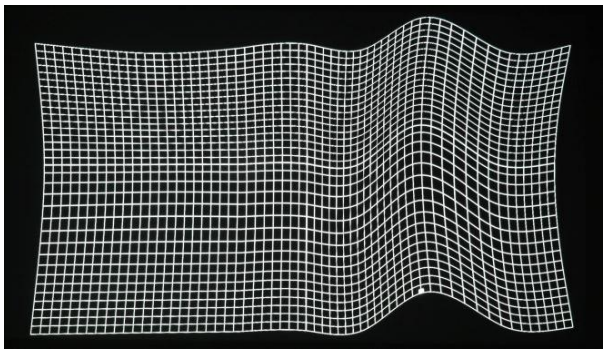
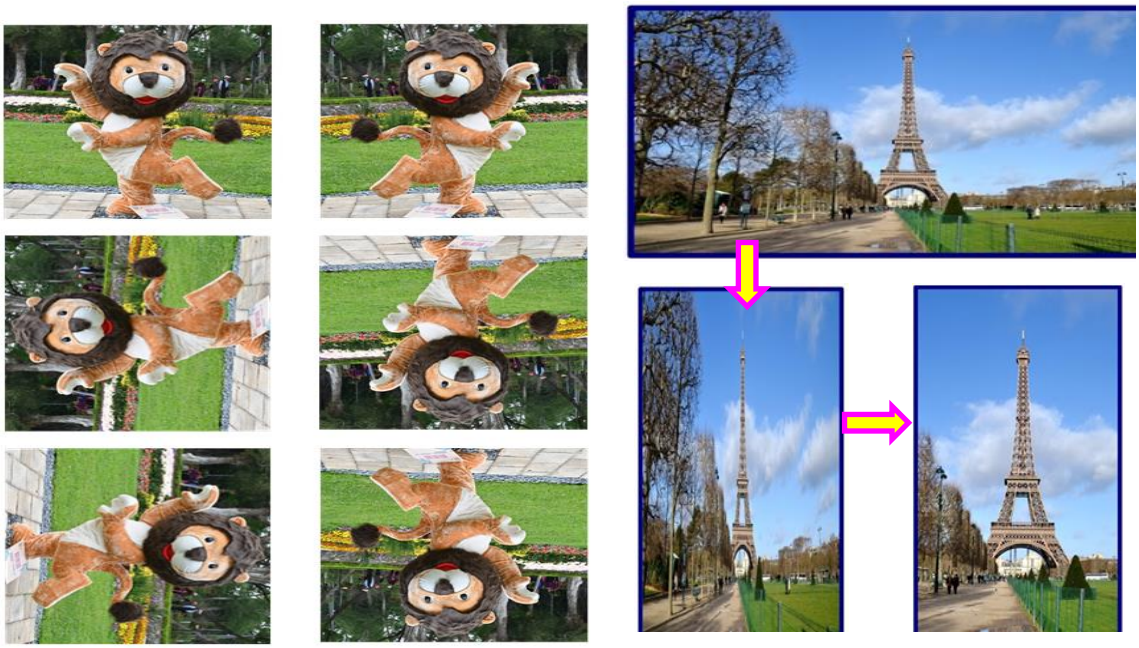
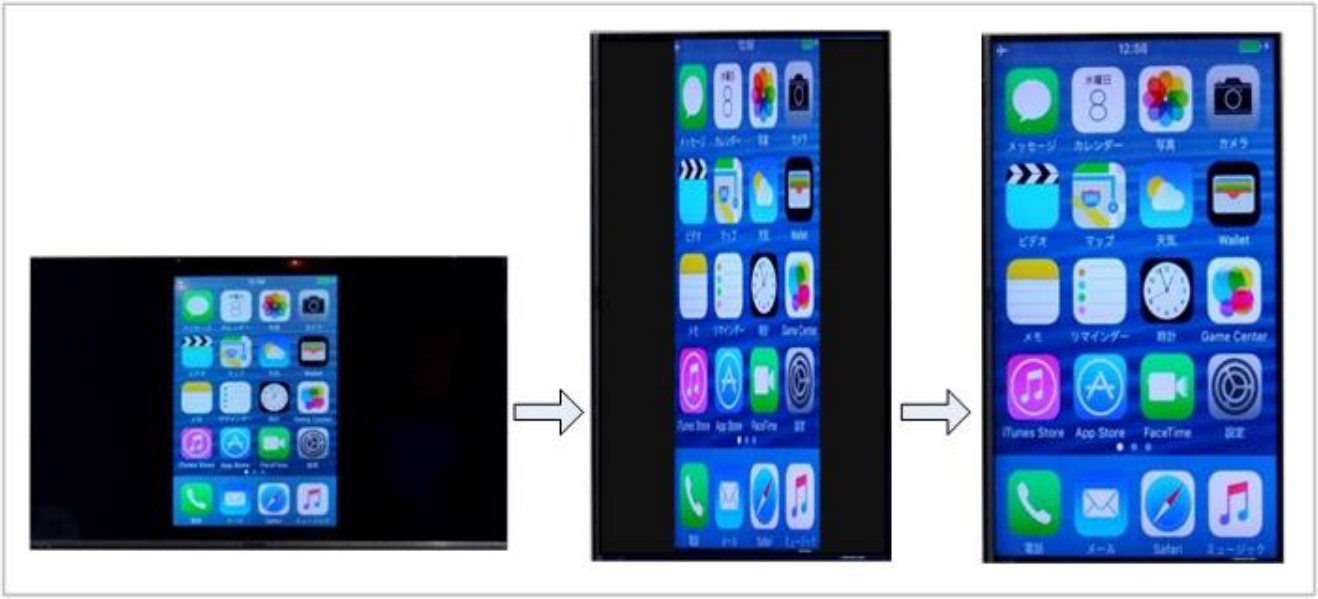


Image Flip & Rotation

Image 90/180/270 degrees rotation and flip up to 4k/60Hz resolution. After image rotation or flip, user can also adjust the aspect ratio.

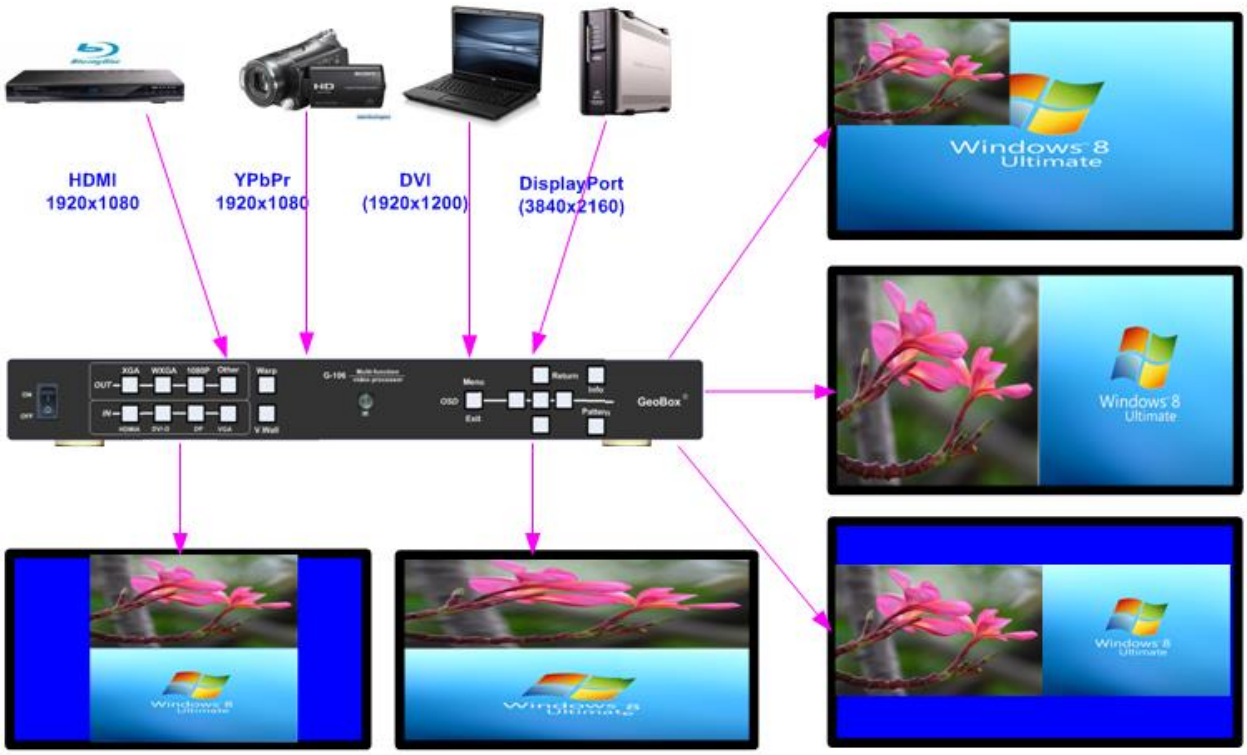


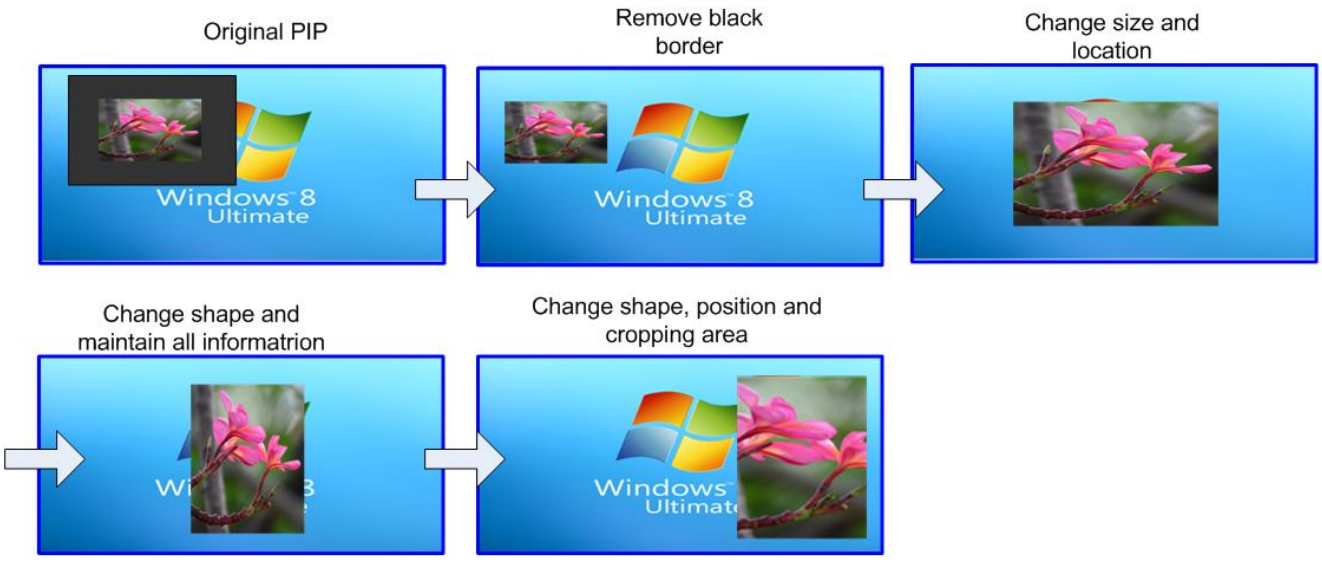
To show mobile phone/iPad mirrored image at portrait TV



PIP/POP function

G116 is designed with PIP/POP function in each processing module. Each processing module can display two contents with PIP (Picture in Picture) or POP (Picture outside picture). User can select two contents among HDMI, DP & VGA for PIP/POP display but can't select two HDMI input signals at the same time. The PIP image can be with variable size from 320*180 to 1920*1200 resolution. The location is flexible around entire display zone in each projector. The POP images can be at Side by Side or Top/Bottom position with full screen or keep original aspect ratio.





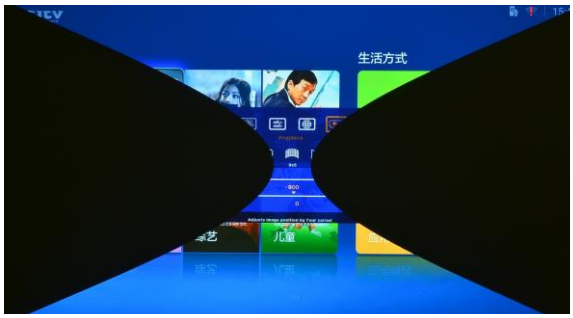
Edge Mask

8 control points to define the area for edge mask. It can work together with geometry alignment to get various edge mask effect.

Original image

Geometry adjustment + edge mask

Edge mask up to 900 pixels



Stretch image, shift position and change aspect ratio

Geometry adjustment and Video wall cropping function can compensate image size, position shift or change aspect ratio. The adjusting range is up to 1800 pixels in each edge based on signal source.