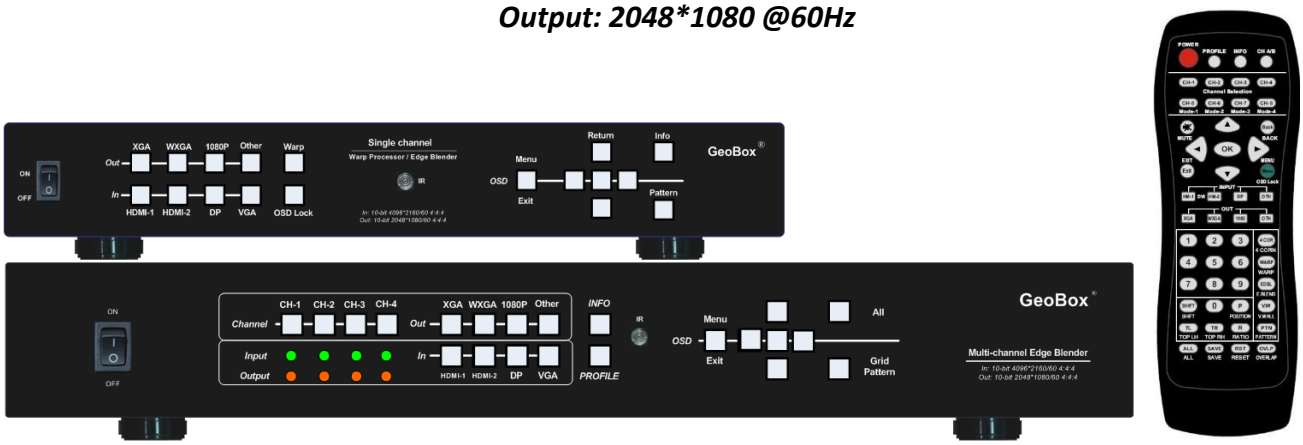

# M800 1-4 CH Edge Blending Processor Datasheet

**M801 (1 CH), M802 (2 CH), M803 (3 CH), M804 (4 CH)**

***Input: up to 7680*2160 @30Hz, 5760*1200 @60Hz,***
***4096*2160 @60Hz 4:4:4 full color sampling***
***Output: 2048*1080 @60Hz***

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DCi/UHD 4k/60/4:4:4 | HDMI 2.0 DisplayPort 1.2 | HDCP 2.2/1.4 | 10-bit High-end scaler | Cadence Film 3:2 / 2:2 | 3D Motion De-interlace | Deep Color xvYCC/12-bit | Edge Blend RGB separate Gamma | Corner wall Geometry Alignment |
| Multi-Unit Cacade | Multi-view Discrete display | Flexible Aspect Ratio | Rotation Landscape Protrait | Control IR/USB/RS232 /Ethernet | Video wall Embedded | RoHS CE FCC | | |

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# Introduction

M800 is curved screen edge blending processor with the ability to provide multiple processing modules to control from 1 to 4 projectors. M801 is integrated with one processing module to control one projector, M802 for 2 projectors, M803 for 3 projectors and M804 for 4 projectors. It was designed for sophisticated edge blending as well as image warping, stacking and projection mapping. One M804 can execute 4 projector edge blending and projection mapping without any additional equipment or splitter. Multiple M800 can be cascaded for large scale display.

4 input ports (2x HDMI, 1x DP, 1x VGA) and 1x HDMI outputs are designed in each processing module. Digital input supports up to 7680*2160 @30Hz (or 1k/8k) / 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.

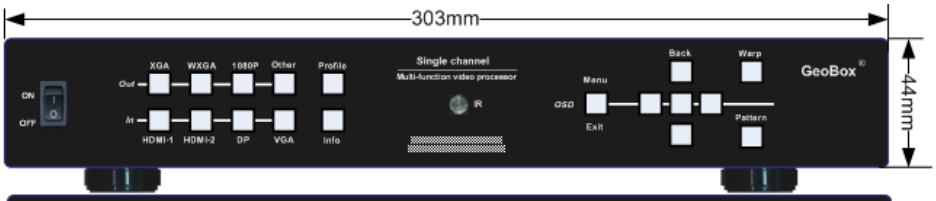
Advanced warp technology is embedded in M800. User can use IR controller, USB, WebGui and Ethernet to perform edge blending and sophisticated geometry alignment up to 17x17 control points. Linearity Grid Line Adjustment and Corner Wall image adjustment for mapping image at 90 degrees corner is a new function in geometry alignment. Separate R, G, B gamma correction for edge blending region color fine-tune, individual color correction for each output and 9 regions black level uplift to compensate light leakage in the projector are also standard functions in M800. Users can see real time geometry and color adjustment to get optimized result.

HDMI loop out supports daisy chain connection up to 8k/1k @30Hz / 4096x2160 @60Hz and allows large display with multiple units cascaded. Video wall function is to crop and allocate source image for each projector and set overlap pixels for edge blending. Complete curved edge blending can be achieved through remote controller and Ethernet without additional devices except for signal source and projectors.

PIP (picture in picture) and POP (side by side) are standard functions. PIP image size is from 320*180 up to 1920*1200. In one M804, user can display up to 8 different input contents on the screen. Image 90/180/270 degrees rotation and flip in both main and sub-image are embedded in M800. It provides more flexible system configuration.

M800 is an ideal solution for simulation. It can connect with inputs from multiple PCs and combine them into one seamless image. Unnecessary image can be masked out. It also provides flexible displays in edge blending system. For a 3x projector edge blending system, user can configure as 1+1+1 independent display, 1+2 (two projectors blended) and all-in-one (three projectors blended). User can also execute edge blending with projector at portrait position without rotating source image to increase image height. It is a good fit with laser projector without the limitation in installation angle.

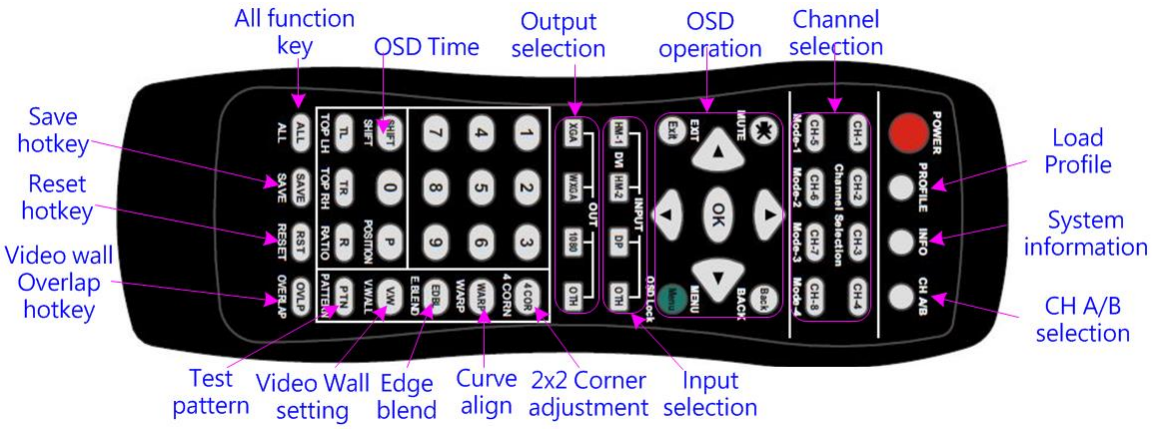
Using M800, users can replace high end projector with low cost projector without lens shift, warp and edge blending. It provides easy configuration, low entry barrier, cost effective, reliable and flexible solution.




M801 (1 CH)


M802 (2 CH)
M803 (3 CH)
M804 (4 CH)


(This back panel shows 4 CH model—M804)



# Specification

- ✧ Each box has 1-4 processing modules.
  - M801Ex: Single module processor
  - M802Ex: Dual module processor
  - M803Ex: Triple module processor
  - M804Ex: Quad module processor
- ✧ Each processing module includes:
  - Input: 2x HDMI 2.0b, 1x DP1.2a and 1x VGA
  - Output: 1x HDMI 1.4
  - 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*2160/30 Hz, 5760*1200/60 Hz, 4096*2160/60 Hz
- ✧ 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.
- ✧ 15 selectable Outputs: HDMI 1.4 up to 2048*1080/60, progressive 4:4:4 RGB.
- ✧ 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.
- ✧ Edge blending at 4 edges up to H=1920 pixels, V=1200 pixels with independent RGB gamma correction.
- ✧ 9 regions black level uplift to compensate light leakage from projector optical system.
- ✧ Edge Mask following the result of geometry alignment up to 500 pixels.
- ✧ Edge Mask with 8 control points up to 900 pixels in H&V directions at each control point.
- ✧ Support Corner Wall adjustment in H&V at flexible location.
- ✧ Support Linearity Grid Line adjustment for quick H&V line position alignment.
- ✧ Embedded video wall function for image split, cropping and edge blend overlapped pixel setting.
- ✧ 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.
- ✧ M800 is designed with projection mapping function. User can upload monochrome pattern into M800 and implement projection mapping. Each Box can store up to 10 different patterns.
- ✧ One 256 color pattern can be overlapped on the screen.
- ✧ 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 all channels.
- ✧ Frame rate conversion and 50Hz in/out function to eliminate image frame drop or repeat.
- ✧ Free-run mode provides continuous signal to output, no source searching required in projector when input source change.
- ✧ Support xvYCC & 8/10/12-bit deep color processing.
- ✧ Support HDR input signal but no HDR effect in the output.
- ✧ Individual color and white balance adjustment in each processing channel.
- ✧ Individual 90/180/270 rotation, flip, cropping, scaling & color adjustment in each channel up to 4k/60 input.
- ✧ 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: 45° C, 10-90% RH
- ✧ Control: keypads, IR, RS232, USB, Ethernet
- ✧ System settings can be stored and backup in PC.
- ✧ Power supply: DC: 12V 3.3A
- ✧ Max. Power consumption:
  M801: 8.4W, M802: 14.4W, M803: 21.6W, M804: 28.8W
- ✧ Dimensions (Body only):
  Without protruding parts: M801: 303mm*164mm*44mm, M802-M804: 440mm*190mm*58mm. With protruding parts: M801: 303mm*175mm*55mm, M802-M804: 440mm*201mm*69mm
- ✧ Weight (Body only): M801: 1.51kg, M802: 2.47kg, M803: 2.64kg, M804: 2.81kg
- ✧ CE/FCC/RoHS Certified
- ✧ 2 Year Warranty, paid extension available up to 5 years.

# Function and features:

## A. Structure

Each M800 consists of 1-4 processing modules. Each processing module can control one projector and multiple processing modules can be cascaded to control big scale display system.

## B. Each processing module includes below input and output ports

1. Input: 2x HDMI, 1xVGA, 1x DisplayPort。
   - HDMI & DisplayPort support 7680*2160 @30Hz, 5760*1200/4096*2160 @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.
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/1k (1k/8k) @30Hz / 4096*2160 @60Hz.

## C. Image warp, geometry alignment and edge blending

1. Selectable grid pattern size for geometry alignment from 8-120 pixels in H&V. Default size 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 channel 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.
7. Four direction edge blending up to H=1920, V=1200 overlapped pixels for flat, curved & cylindrical screens.
8. Independent RGB gamma selection for edge blending color fine.
9. Precise black level uplift at multiple selected areas up to 9 regions to compensate light leakage in the projector. Low native contrast ratio projector will be more serious in light leakage.
10. White balance and individual color correction for each projector.

## D. 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, independent RGB gain adjustment and white balance correction.

## E. Edge mask

Image [Shift] to execute edge mask up to 500 pixels following the image profile after geometry adjustment and [Edge Mask] with 8 adjustment points to provide irregular shape edge mask with random edge position up to 900 pixels in each control point. These two functions can be executed at the same time.

## F. 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.

## G. Video wall function

1. Image cropping and location assignment for each projector.
2. Image pixel cropping range is up to +_1800 pixels for image position shift, aspect ratio adjustment, bezel compensation and creating overlap region for edge blending.
3. Connect with up to 8k/1k input signal and 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 displays from single signal source.

## H. Image rotation and flip

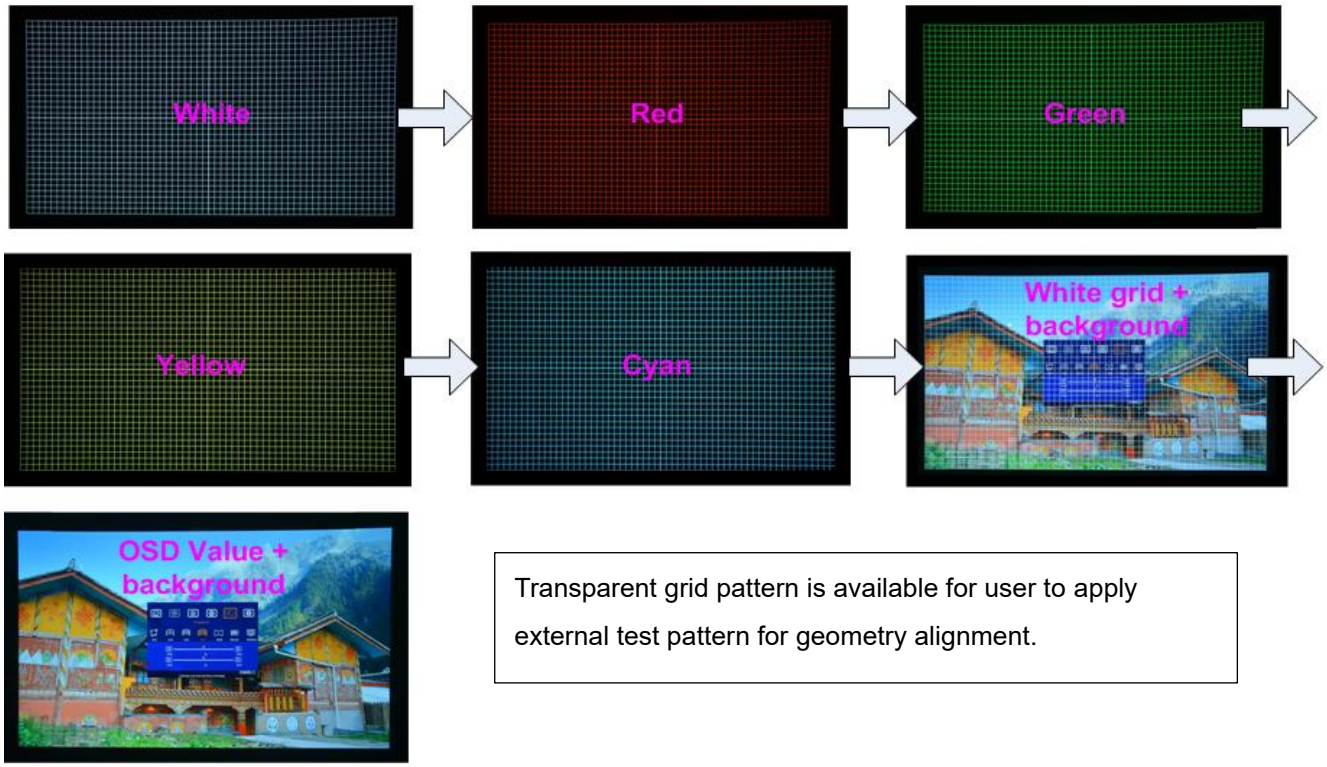
1. Image 90/180/270 degrees rotation, flip and mirror up to 4k/60Hz input resolution.
2. Image flip in Front/Rear, Left/Right and Top/Bottom directions.
3. When execute 90/270 degrees image rotation, no PIP/POP function is available.
4. No 3D motion adaptive de-interlace function while the image is 90/270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

## I. 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 (Including through WiFi by PC, Mobile or iPad).
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.

# Feature illustration

## Variable Grid Patterns for geometry alignment

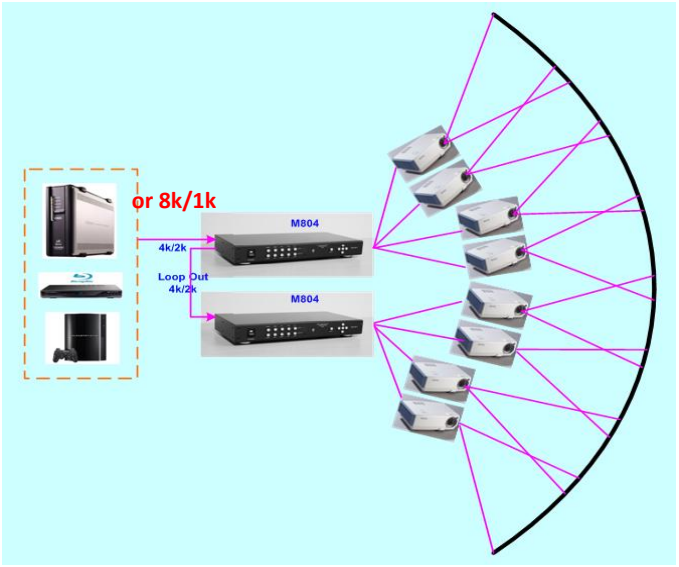



Transparent grid pattern is available for user to apply external test pattern for geometry alignment.

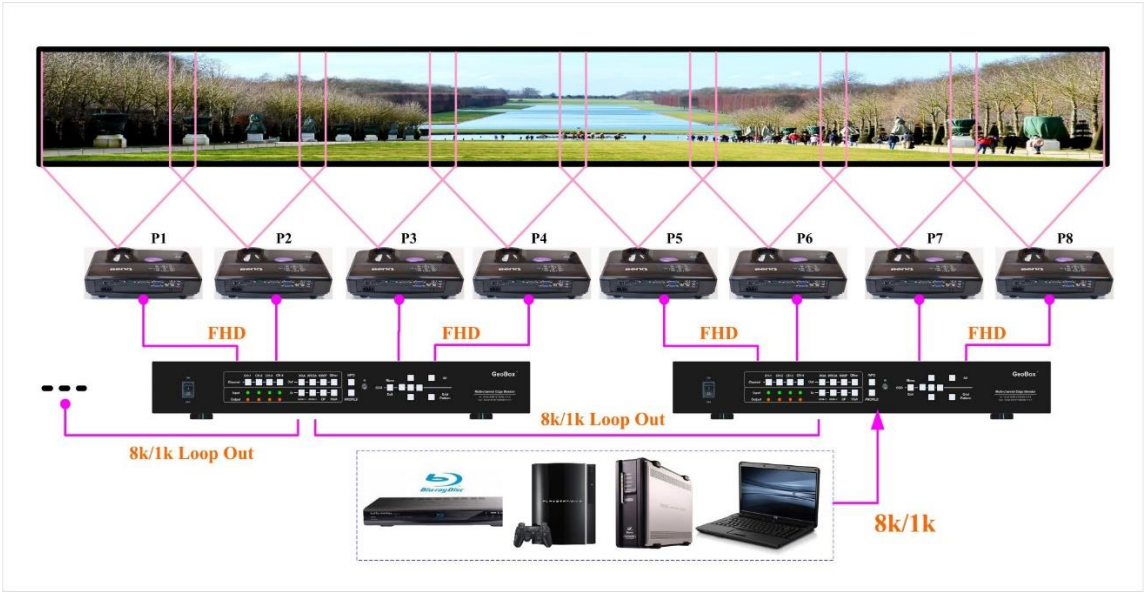
## Selectable grid pattern size for geometry alignment

The pixel size in grid pattern for geometry alignment is selectable to meet high end simulation system geometry alignment requirements. 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 [Edge Blend] menu.

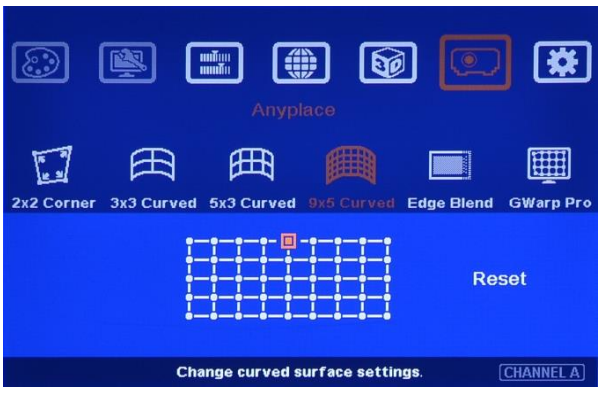
## 8k/1k, 4K/60 daisy chain connection

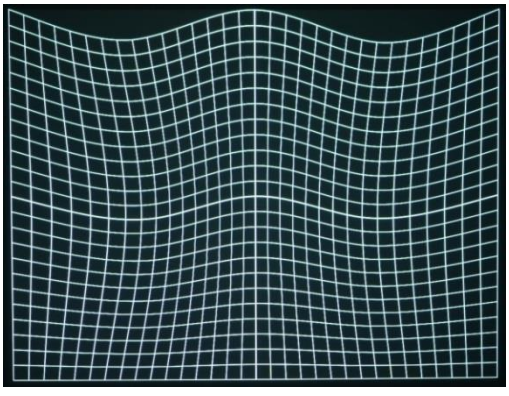



No additional device is required.




## Image geometry alignment and warp




## Edge blending on flat and curved screen

## Corner wall Alignment & Display

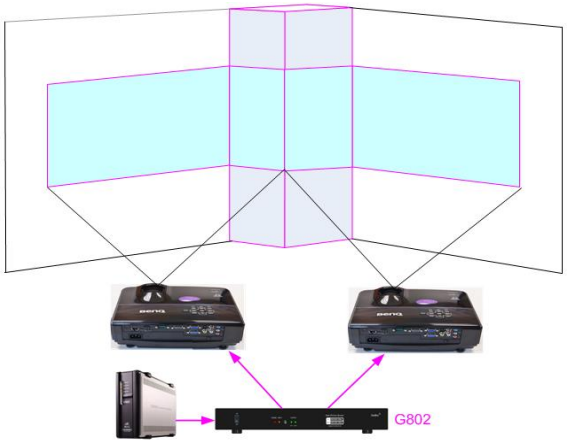
Corner Wall alignment function is functional either in horizontal or vertical direction. Corner Wall geometry alignment range up to 900 pixels in 4 corner positions and at the edge center in H&V directions. The curvature point position can be shifted +_ 900 pixels. Example for horizontal adjustment: 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**

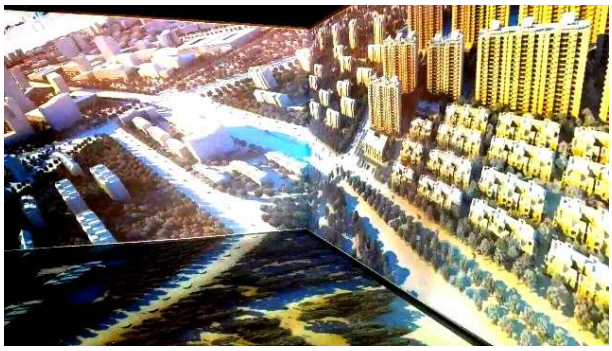
**At any location but not only at center**

**Two projector Corner Wall application**




**Three projector Corner Wall application**

**Another Corner Wall application examples**

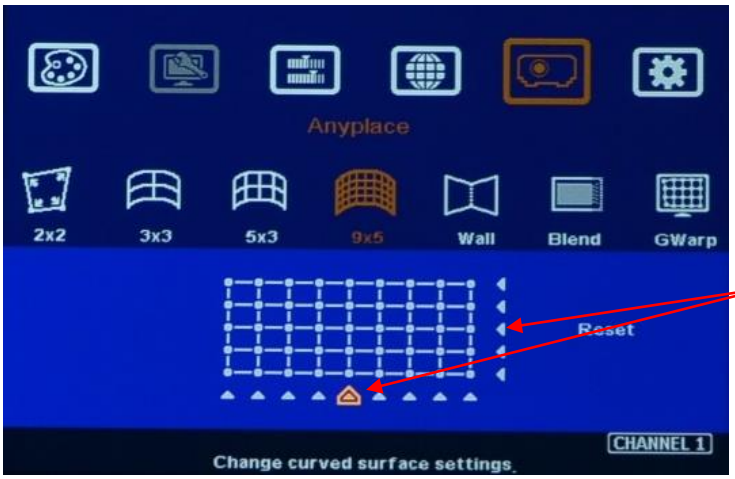


**Single projector application**

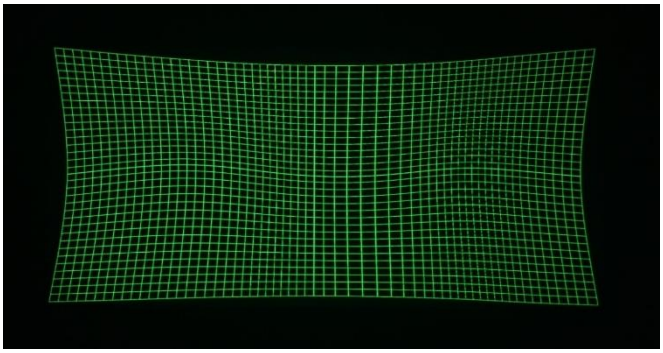
## Linearity grid line adjustment

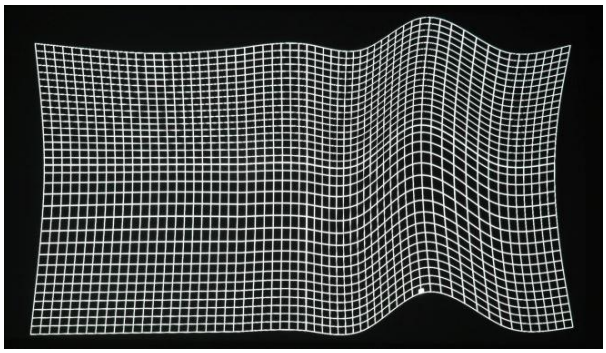
When projector projects image on curved screen, the image will change the grid size gradually and cause different scaling factor on the center and both sides. Linearity grid line adjustment is to compensate this kind of effect and make complete image with the same scaling factor. Another application is to align images from adjacent projectors in overlap region, this function can reduce the alignment time quiet a lot.

1. This function can be executed only through remote controller.
2. It can be applied to both horizontal and vertical directions.
3. 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.
4. Linearity grid line adjustment can be executed together with warp alignment & edge blending at the same time.



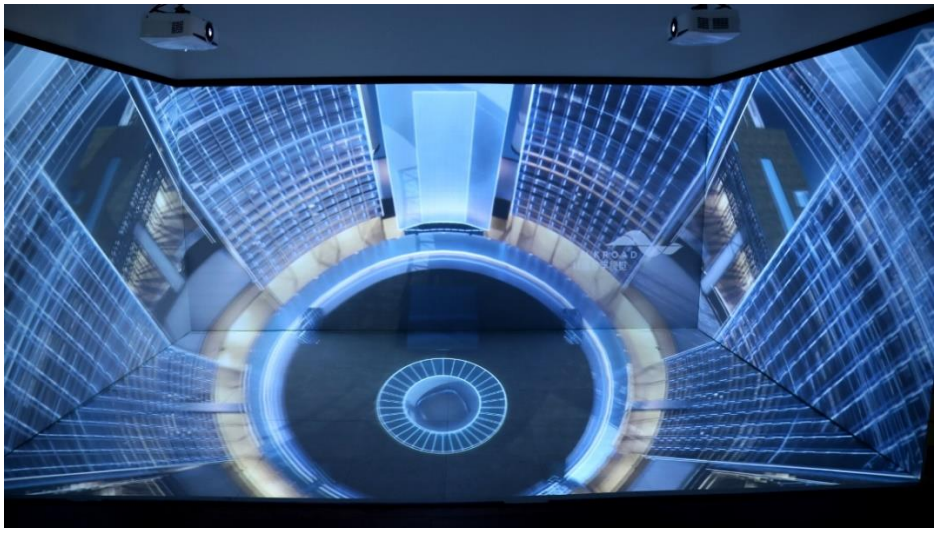

Control point for Linearity Grid Line Adjustment



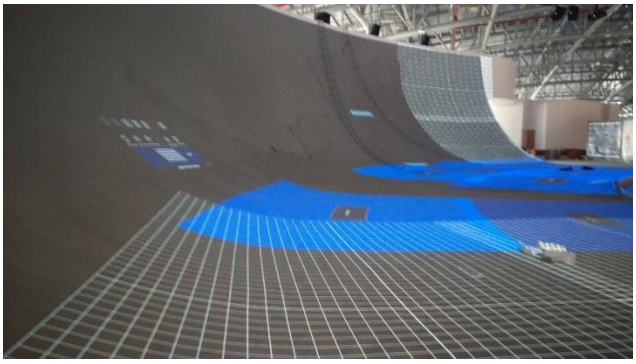


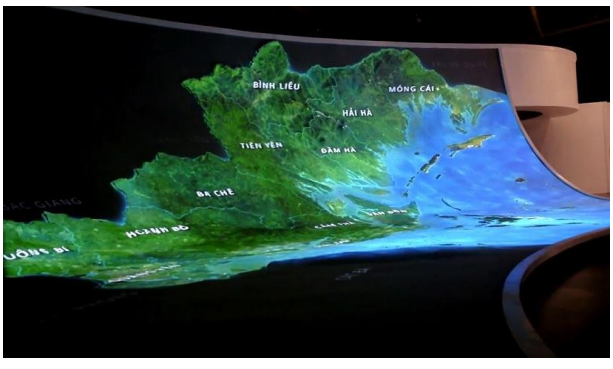
## Immersive display

Immersive system with 4 walls + one floor



## Big scale display



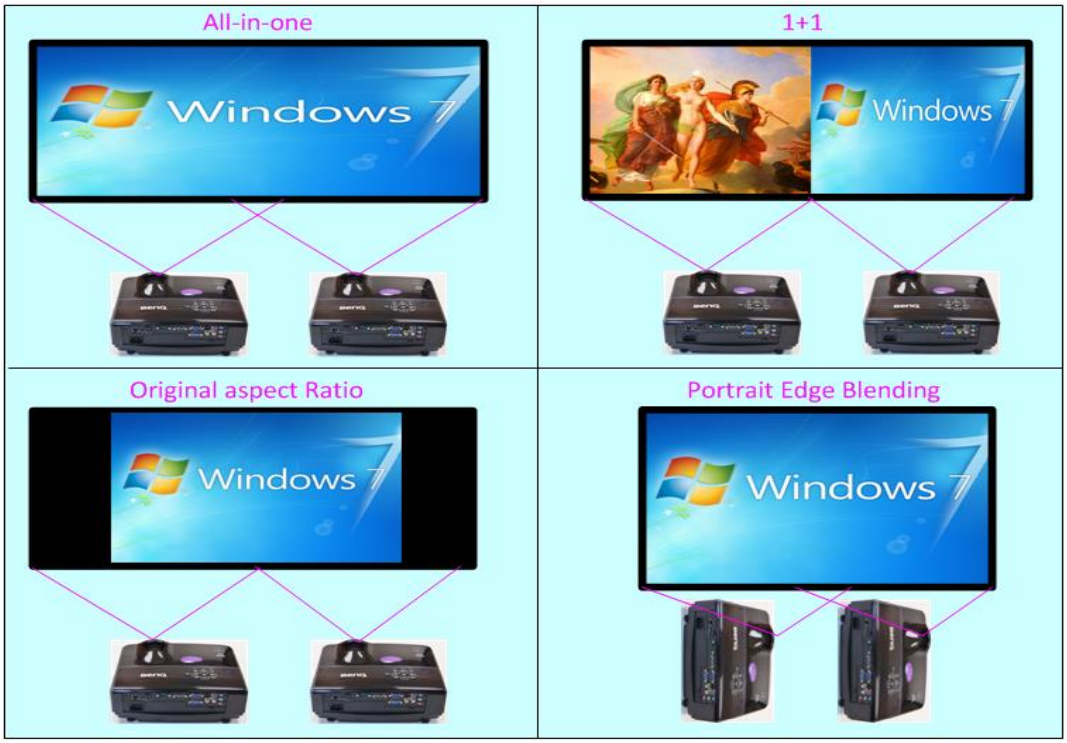



24 units of Christie projectors together with GeoBox for 35mx18m screen

## Flexible display

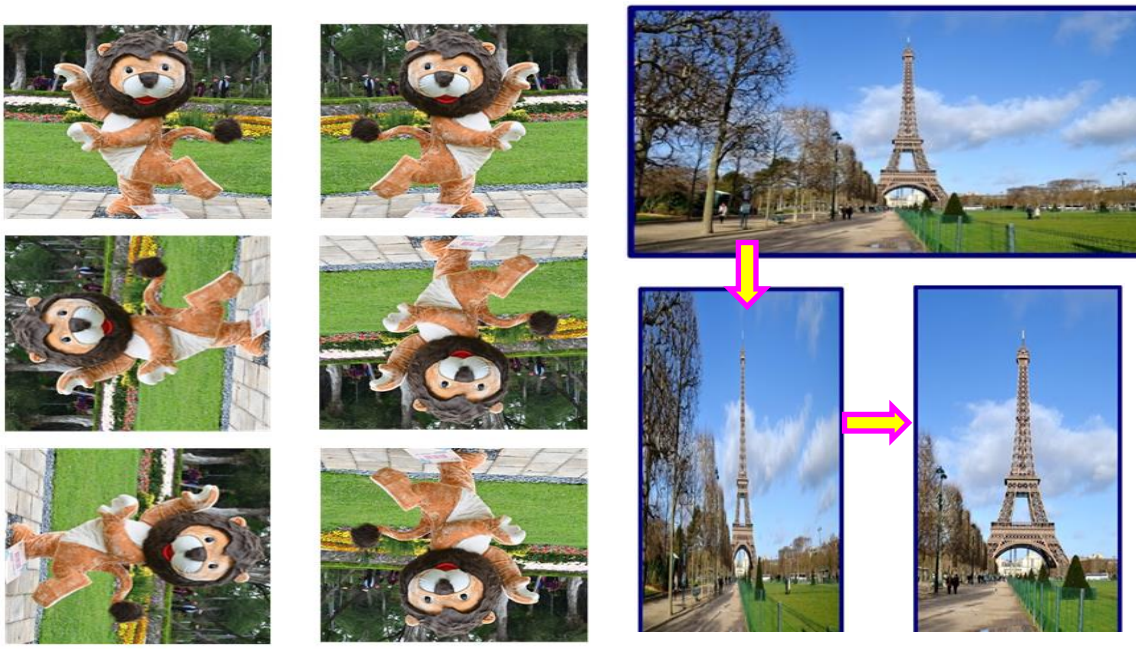
One M800 has below flexible display functions:

1. One big content edge blending.
2. Independent content display from each projector.
3. 16:9 / 16:10 image at the center.
4. Edge Blending with projector at portrait to increase image height.
5. PIP/POP in each projector.



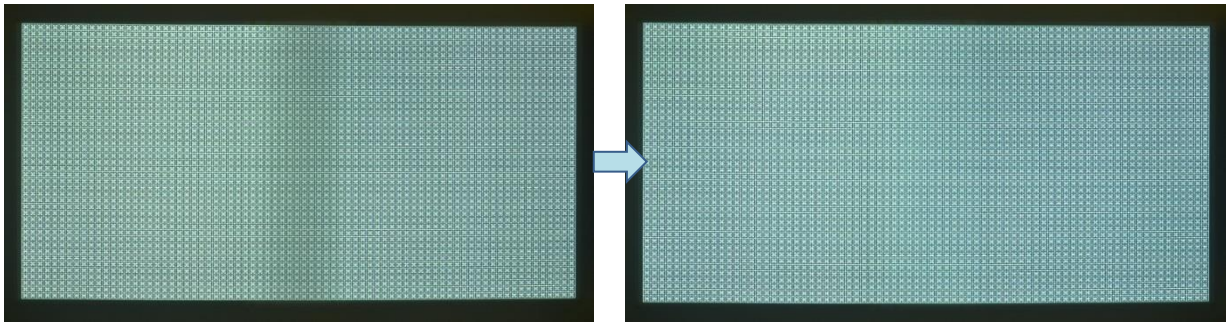

## Image Flip & Rotation

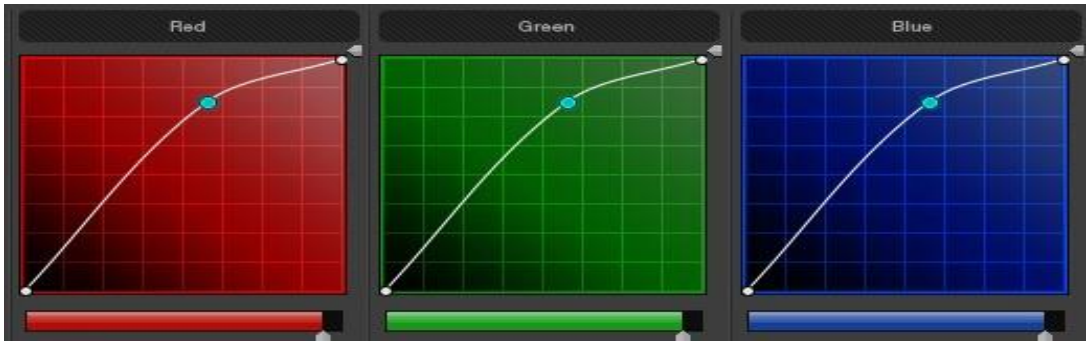
Image 90/180/270 degrees rotation and flip up to 4k/60Hz resolution. After image rotation or flip, user can also adjust the aspect ratio.



## Independent RGB gamma correction

Independent RGB gamma value adjustment in Overlapped region allows more capability to compensate color banding in overlapped region.



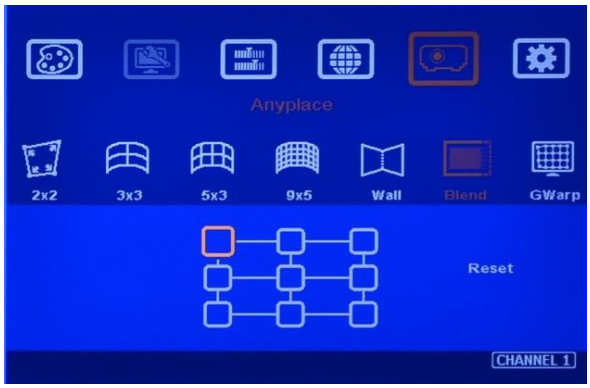


## White balance & Color correction

Each channel can be adjusted separately through RGB Gain and Offset value.

## Nine region Black level uplift

It can compensate the light leakage in the projectors, especially in low contrast ratio projector under dark working environment. The native contrast ratio is related to projector light leakage and can't be reduced through signal processing. Higher native contrast ratio will have less light leakage. Laser projector will have high contrast ratio and is the best choice for edge blending system. Separate RGB precise black level uplift can be executed in multiple regions (up to 9) in each output channel at selectable position. 2x2 edge blending system black level uplift can be implemented through 9 regions black evel uplift.



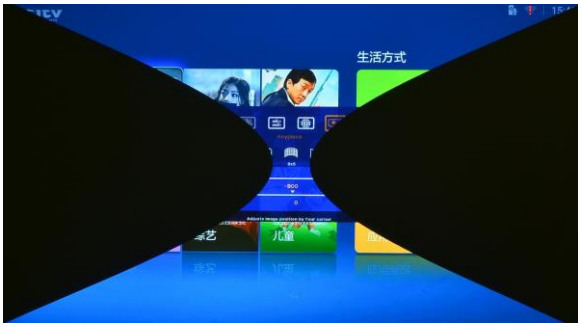

***Nine regions black level uplift. Each region can set different RGB gain and offset.***

## Edge Mask

There are two edge mask functions in M800. One is image [Shift] and another one is Edge [Mask] under Edge blending menu.

1. [Shift]: Able to do edge mask with black background in each edge up to 500 pixels. The image mask location will follow the image position after geometry alignment.
2. [Edge Mask]: There are 8 control points for edge mask. When user moves the position for each control point it will result many kinds of edge mask pattern. The maximum position adjustment for each control point is +_ 900 pixels.
3. The adjusting range in [Shift] is based on the image position after geometry alignment and the range in [Mask] is calculated from original edge position before geometry or [Shift] adjustment. Both functions can be implemented at the same time.

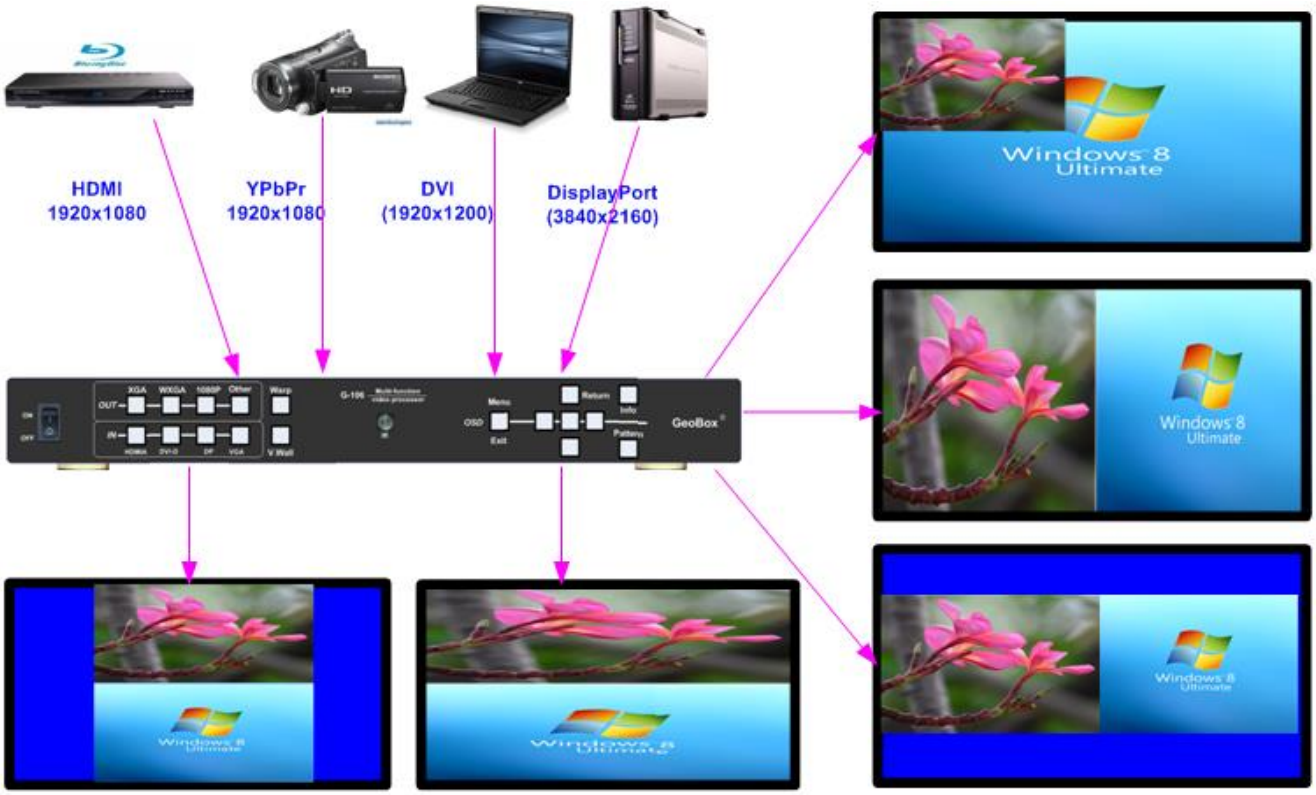
Example: Another Image [Mask]

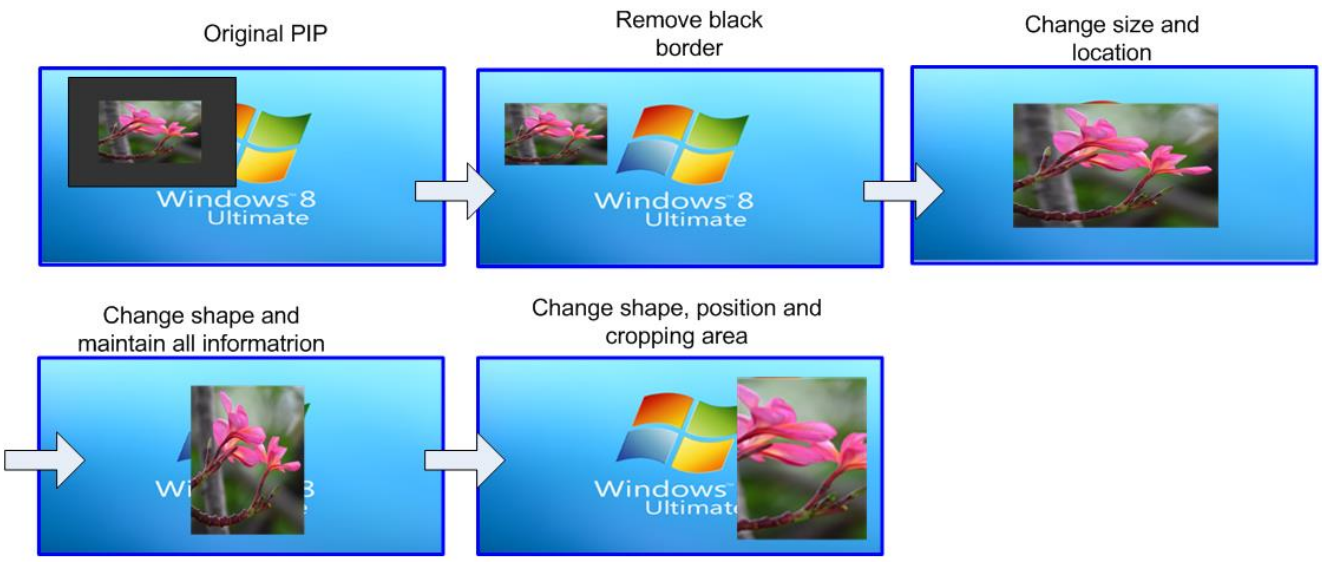




## PIP/POP function

M800 is designed with PIP/POP function in each processing module. Each processing module can display two contents in PIP (Picture in Picture) or POP (Picture outside picture) styles. 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 across 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.






## Stretch image and change aspect ratio

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