2X2 4K DUAL CHANNEL, CURVED SCREEN EDGE BLENDER

User Guide

DCi/UHD 4k/60/4:4:4	HDMI 2.0 DisplayPort 1.2	HDCP 2.2/1.4	10-bit Processor	Edge Mask Irregular edge mask	Frame Lock Synchronized	RoHS CE FCC
Corner Wall Adjustment	Linearity grid line adjustment	Multi-Unit Cacade	Multi-view Discrete display	Flexible Aspect Ratio	Rotation 90/180/270	Video wall embedded	Control IR/USB/RS232 /Ethernet
Cadence Film 3:2 / 2:2	3D Motion De-interlace	Deep Color xvYCC/12-bit	Edge Blend Landscape & Portrait	Programmable EDID	Gamma Correction Indep. RGB	Ethernet WebGui & Gwarp3	USB control

Model #: MLT-EDGEPRO-2X2E

Revision History		
Rev	Changes	Date
1.0	Initial Release	2019/07/11

Table of Contents

SECTION 1: GETTING STARTED

❖ IMPORTANT SAFEGUARDS

Please read all of these instructions carefully before you use the device. Save this manual for future reference.

What the warranty does not cover
- Any product, on which the serial number has been defaced, modified or removed.
- Damage, deterioration or malfunction resulting from:
- Accident, misuse, neglect, fire, water, lightning, or other acts of nature, unauthorized product modification, or failure to follow instructions supplied with the product.
- Repair or attempted repair by anyone not authorized by us.
- Any damage of the product due to shipment.
- Removal or installation of the product.
- Causes external to the product, such as electric power fluctuation or failure.
- Use of supplies or parts not meeting our specifications.
- Normal wear and tear.
- Any other causes which does not relate to a product defect.
- Removal, installation, and set-up service charges.

❖ SAFETY INSTRUCTIONS

The HDMLT-C5SP-4 and HDMLT-C5SP-8 HDMI Splitter 1x4 / 1x8 Over CAT5E/CAT6 50m has been tested for conformance to safety regulations and requirements, and has been certified for international use. However, like all electronic equipments, the HBT-C6POE-SP8 should be used with care. Read the following safety instructions to protect yourself from possible injury and to minimize the risk of damage to the unit.

⚠ Do not dismantle the housing or modify the module.

⚠ Dismantling the housing or modifying the module may result in electrical shock or burn.

⚠ Refer all servicing to qualified service personnel.

⚠ Do not attempt to service this product yourself as opening or removing housing may expose you to dangerous voltage or other hazards

⚠ Keep the module away from liquids.

⚠ Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.

⚠ Have the module checked by a qualified service engineer before using it again.

⚠ Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

This equipment has been tested and found to comply with Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

Warning symbols	Description
	ONLY USE THE PROVIDED POWER CABLE OR POWER ADAPTER SUPPLIED. DO NOT TAMPER WITH THE ELECTRICAL PARTS. THIS MAY RESULT IN ELECTRICAL SHOCK OR BURN.
	DO NOT TAMPER WITH THE UNIT. DOING SO WILL VOID THE WARRANTY AND CONTINUED USE OF THE PRODUCT.
BEWARE this unit contains static sensitive devices	THE VIDEO BOARDS ARE VERY SENSITIVE TO STATIC. PLEASE ENSURE IF RACK MOUNTED OR INSTALLED ON A SURFACE, IT SHOULD BE IN A GROUNDED ENVIROMENT.

WARNING

Read & understand user guide before using this device.

Failure to follow the proper installation instructions could result in damage to the product and preventing expected results.

2. Introduction

EdgePro is a dual channel professional curved screen edge blending processor designed for advanced edge blending, image warping, stacking, projection mapping and much more. 4 inputs (2x HDMI, 1x DP, 1x VGA) and 2x HDMI outputs are featured in EdgePro. Input supports up to 4096*2160 @60Hz with 4:4:4 full color sampling. Output supports up to 2048*1080 @60Hz. It is integrated with 10-bit high end processor, 3D motion adaptive de-interlace, low angle smooth algorithm, 3:2/2:2 pull-down and supports non-VESA standard input timing for connecting with various input sources. Advanced warp technology is embedded in the EdgePro. Control is achieved via IR controller or WebGUI to perform edge blending and sophisticated geometry alignment up to 9x5 grids and 17x17 grids from Windows PC tool through USB or Ethernet. Selectable grid pattern size and various colors and styles are embedded. Corner Wall image adjustment for mapping image for 90 degrees corner and Linearity Grid Line Adjustment are new function in geometry alignment. Separate RGB gamma correction for edge blending region color fine-tune, individual color correction for each output, color uniformity and 9 regions non-edge blending area black level uplift are also standard functions in the EdgePro. Users can see real time geometry and color adjustment to get optimized results. HDMI loop out supports daisy chain connection up to 4096x2160 @60Hz and allows large display with multiple EdgePros cascaded. The video wall function in EdgePro 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 PC software, video distributor and splitter. EdgePro is designed to support programmable EDID and non-VESA standard input. User can create any EDID timing in the range between 1024x768 and 3840x2400 in order to optimize video performance. Using the EdgePro, users can replace high end projectors with low cost projector without lens shift, warp and edge blending. It provides easy configuration, low entry barrier, cost effective, reliable and flexible solution.

3.   Features

A.   Input and output:

1   Input ports: 2x HDMI, 1xVGA, 1x DisplayPort。

- HDMI & DisplayPort support 4096*2160 @60Hz, 3840*2400 @60Hz with 4:4:4 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: 2x HDMI. Selectable output resolutions: 720x480, XGA, WXGA, 1280x1024, 1366x768, 1400x1050, 1600x1200, 1920x1080 (24/30/50/60Hz), 2048x1080/60 & 1920*1200/60.

3.   Loop out port: 1x HDMI (supports 4096*2160@60Hz & 3840x2400@60Hz)

4.   Signal frame lock for synchronization between multiple output channels.

B.   Image warp, geometry alignment and edge blending

1.   Selectable grid pattern size for geometry alignment from 8-100 pixels in H&V with variable color and styles. 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 unit controls dual projectors and can be cascaded to control unlimited number of projectors.

4.   Integrated with full function IR remote controller. Manual geometry alignment up to 9*5 grid patterns with H=+_ 1200 pixels and V=+_1200 adjustment range in full HD output (4 corner + warp adjustment).

5.   Windows PC tool is available for warp and geometry alignment up to 17x17 grid patterns 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 EdgePro and no more PC tool is needed.

6.   Corner wall geometry alignment at 90 degrees corner wall up to 900 pixels adjustment range in H&V directions with up to 1200 pixels position adjustment in horizontal direction.

7.   Four directions 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 tune.

9.   Precise black level uplift at multiple selected areas (up to 9) to compensate light leakage in the projector.

10. White balance and individual color correction for each projector.

11. Fine pixel color uniformity adjustment across entire image.

C.   High end 10-bit video processor

1.   Integrated with 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, pre-set color temperature, independent RGB color adjustment and white balance correction.

D.   Edge mask

1   Image [SHIFT] to execute edge mask up to 500 pixels following the image after geometry adjustment and Edge [Mask] with 8 adjustment points to provide irregular edge mask up to 900 pixels in each control point.

E.   Video wall function

1.   Image cropping and location assignment for each projector.

2.   Overlap pixel adjustments up to 1800 pixels for image position shift, bezel compensation and creating overlap region for edge blending and aspect ratio adjustment.

3.   Connect with 4k/2k 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 display from single signal input source.

F.   Image rotation and flip

1   Image 90/270 degrees' rotation & flip under 4k/30Hz input. Image 0/180 degrees' rotation and flip supports up to 4k/60Hz input.

G.   System control and other features

1.   1U housing for easy rack installation. Professional design and reliable.

2.   Operation temperature: 0-45°C. Relative humidity: 10%-90% non-condensing.

3.   Replace high price projector with low cost projector and achieve the same functionality.

4.   Full function OSD by IR remote controller.

5.   Full function system setup through USB, WebGUI or Ethernet (Including through WiFi by Mobile or iPad)

6.   Firmware update via USB or Ethernet.

7.   Windows PC tool can control multiple processors simultaneously through USB or Ethernet.

8.   Internal grid pattern with selective pixel size, color and style for easy geometry alignment.

9.   RS232 & Ethernet system control compatible with most of control system.

10.   User can select blue or black background color when no input signal is detected.

11.   Programmable EDID in the range at H=1024~3840, V=720~2400.

12.   BOX ID and programmable IP address for convenient multiple unit control at the same time.

13.   User can save up to 5 settings and can be recalled by remote controller, RS232, USB or network.

14. Automatic power ON/OFF through input signal control. While no input signal is detected, it will shut down output automatically.

15. Dual AC & DC Power supply systems. Provide DC 12V 1A output for signal extender while using AC.

16. Dimension and weight: 440x190x45mm, 2.2kg (Body only)

4. Package Contents

1	The EdgePro Dual Channel Video Wall Controller	X1	
2	RC-400 IR Remote Controller with AAA battery	X1	
3	IR Extending Receiver with 1.8m cable	X1	
4	AC Main Power Cable	X1	
5	User Guide		Avenview Website

5. Specifications

TECHNICAL	DESCRIPTION
Units	MLT-EdgePro-2X2E
UNIT DESCRIPTION	4K Edge blending Video wall processor
INPUT	2x HDMI 2.0b 1x DP1.2a 1x VGA
HDCP	HDMI V2.2/V1.4, DP: HDCP: V1.3
MAX. INPUT RESOLUTION:	**HDMI & DP:** 4096*2160 @60Hz, 3840*2400 @60Hz with 4:4:4 sampling without compression **VGA:** WUXGA or 205MHz analog input signal
OUTPUT	2x HDMI up to 2048x1080/60 & WUXGA
Selectable Output Resolution	720x480, XGA, WXGA, 1280x1024, 1366x768, 1400x1050, 1600x1200, 1920x1080 (24/30/50/60Hz), 2048x1080/60 & 1920*1200/60.
LOOP OUT	1x HDMI 2.0 for multiple unit cascade & daisy chain connections (supports 4096*2160@60Hz & 3840x2400@60Hz)
MAXIMUM GEOMETRY ADJUSTMENT	1200 pixels horizontal, 1200 pixels vertical
SUPPORT CORNER WALL ADJUSTMENT	Yes: horizontal & vertical at same image scaling factor
SUPPORT LINEARITY GRID LINE	adjustments for quick horizontal & vertical line position alignment.
VIDEO WALL	Embedded full function video wall function for image split, cropping and overlap pixel setting.
video sources Timings	SUPPORT NON-VESA STANDARD INPUT TIMINGS
Settings Save	SETTINGS BACKUP AND SAVE
GRID CONTROL POINTS	17 X17
GRID PATTERN	Selectable grid pattern size from 8-100 pixels in H&V direction. Default is 32*32 pixels. Selectable grid pattern color and with optional transparency to see background image.
ASPECT RATIO ADJUSTMENT	Flexible aspect ratio adjustment in each edge up to+-1800 pixels
FREQUENCY	50Hz in/out & frame rate conversion.
PROCESSOR	10-bit processor, 3:2/2:2 cadence, low angle smooth algorithm, high quality scaling engine
3D	3D motion adaptive de-interlace
	Frame lock for multiple channel synchronized outputs
HDR SUPPORT	SMPTE ST-2084, SMPTE ST-2086
Video Adjustments	• Individual color and white balance adjustment in each output channel. • Individual 90/180/270 rotation, flip, cropping, scaling& color adjustment in each channel • 90/270 degrees rotation and flip only available under4k/30Hz input resolution
Audio	Embedded HDMI & SPDIF audio outputs
EDID	Selectable and programmable EDID
ESD Protection	±8kV (Air-gap discharge), ±4kV(Contact discharge)
Power supply	AC 100-240V
Power consumption	Max. 11w
Working environment	45°C, 10-90% RH
Control	IR, RS232, USB, Ethernet
Dimensions	440mm*180mm*45mm,
Weight	2.2kg
Certified	CE/FCC/RoHS/Green

6. Basic operation & setting

6.1. Connecting the inputs

Unprocessed signal Loop out for cascade

HDMI Input source

DP Input source

VGA Input source
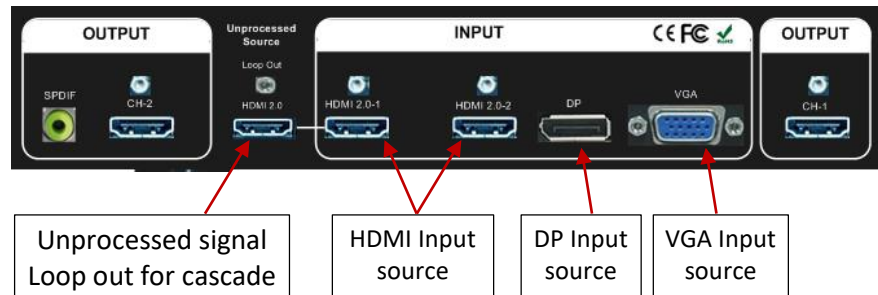
❖ HDMI & DP input ports support up to 4096x2160 @60 Hz.
❖ Only HDMI 2.0-1 input signal can be looped out. Loop out signal is unprocessed signal same as HDMI 2.0-1 input signal. User can connect to next EdgePro for cascade application or as source monitoring signal.
❖ User can select from HDMI, DP and VGA input sources and display separate contents for two projectors under below configuration: HDMI 2.0-1 (or HDMI 2.0-2) + DP, HDMI 2.0-1 (or HDMI2.0-2) + VGA or DP + VGA. Please select source for CH-1, then second source for CH-2.
❖ User can't select two different HDMI input sources and display separately in two projectors.

6.2 Connecting the outputs

CH-2 HDMI Output Connector (Max. WUXGA)

Loop out for cascade or input source monitoring

CH-1 HDMI Output Connector (Max. WUXGA)
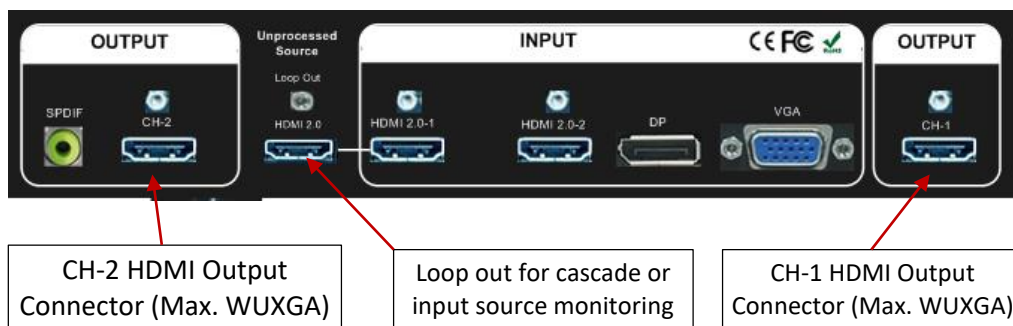
❖ If the system uses only two projectors, user can connect any output to any projector and select projector locations via [Video Wall]—[Pan] menu.
❖ If multiple units of EdgePro are used and independent content display is required, user needs to arrange the input source and output port connection and let input source be displayed at desire projector.

❖ Once input signal and output ports are properly connected, LED indicator on the front panel will show up. If any of the LED in CH-1 & CH-2 is not showed up, please check the input/output connection and cable.
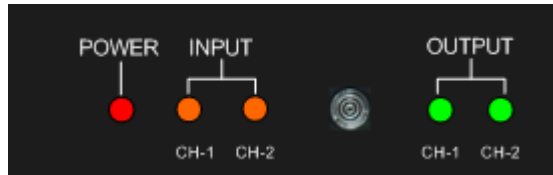
LED lights up after proper input/output signals are active

| 6.3 | Input / Output selection & LED Indicators |

| If Power SW is on, LED will light up | If Input Source is detected, LED will light | If Output projector is connected, LED will light up |

| • Select CH, then select input port and output resolution. Each CH can select different input.
• Output resolution will apply to two CH at the same time. | Press CH key to select operation channel. |
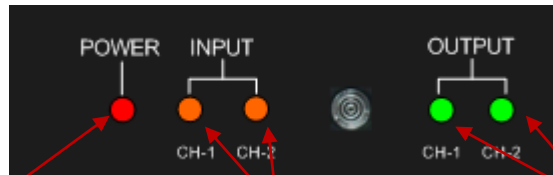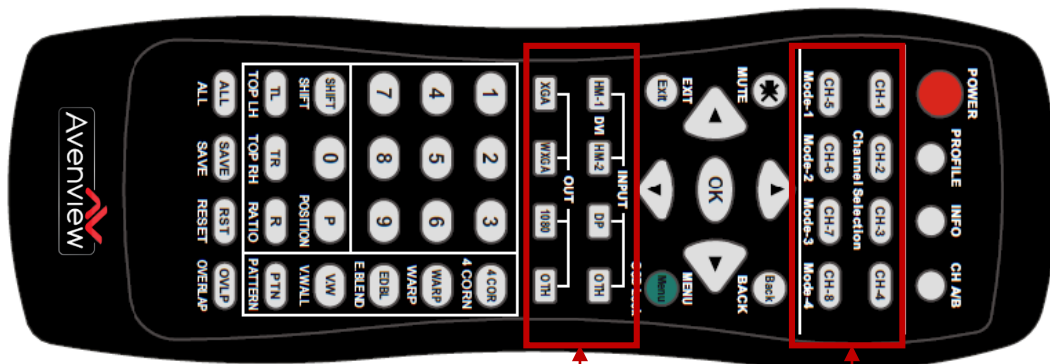
6.3.1 Input source selection

- ❖ Press CH-1/CH-2 button to select input port. Default input port is HDMI 2.0-1.
- ❖ For one content edge blending display (all-in-one), user can select any input source in one EdgePro application.
- ❖ If multiple EdgePros are cascaded for edge blending, user needs to select HDMI-1 input source and cascade to next unit through loop out port for big scale edge blending. If user wants to select other signal sources for multiple unit cascade, user needs to add video distributor (or splitter) in signal source and feeds the same signal to all EdgePro.
- ❖ User needs to select source for CH-1 first, it will apply to both channels. Then select source for CH-2 if CH-2 requires different source content.
- ❖ If user wants to display independent content in each projector, user can select any two input sources among HDMI, DP and VGA. User can't select two HDMI input sources for independent display in two projectors due to system limitation.
- ❖ In multiple unit cascade system, user still can implement independent content display in each projector through the selection of the input port for each output channel.

6.3.2 Output resolution selection

- ❖ The output resolution selection will apply to both output channels at the same time. Default output resolution for all channels is 1080p.
- ❖ The output resolution should be the same as the projector native resolution to get the best video quality. If user changes output resolution, geometry result will also be changed.
- ❖ User can select output resolution through remote controller, USB or Ethernet.
- ❖ Output resolution list: 720x480, XGA, WXGA, 1280x1024, 1366x768 ,1400x1050, 1600x1200, 1920x1080 (24/30/50/60Hz), 2048x1080/60 & 1920*1200/60。 All output default resolution is 60Hz, RGB 4:4:4 and progressive. User can select 1080p 50 Hz to avoid frame repeat issue if the input is 50Hz.
- ❖ User can set EDID to have input source provide desired resolution. However, input resolution is subjected to signal source and may not output desired resolution.
- ❖ EdgePro can support non-VESA standard input timing once signal source can provide, such as 4096x2160, 3200x2400.
- ❖ When press [OTH] key to select output resolution from remote controller, the monitor will show the timing and take few seconds to finish the selection.
- ❖ User can click [Info] key to get system information and see input / output signal resolution.

6.3.3 LED indicators

❖ LED indicators will show the input/output signal status.

❖ Green LED will show up when the input signal is detected.

❖ Orange LED will show up when the display device (projector) is detected.

❖ If user presses Menu key for 5 seconds on the remote controller, EdgePro OSD menu will be locked and the Power LED will be flashing. To press another 5 seconds, it will unlock OSD menu.

❖ If multiple units are used in the system, user can set different ID and use remote controller [85x] key to execute independent control. Press [851] following other OSD keys, the remote controller can only show Box ID #1 OSD and Power LED on front panel in other units will be flashing. User can disable OSD LOCK with [850] command via IR controller.

6.4 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 image.

❖ To ensure all cables are connected correctly, it is recommended to use locking cables.

❖ Complete edge blending system should be connected to 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 EdgePro is powered on, the booting time is about 19 seconds and the Input & Output LEDs on front panel will stay "Lighted" all the time for the channel with correct input source and output monitor connections.

❖ If continuous flashing in some LED, it means the OSD function has been Locked. Please press [Menu] key for 5 seconds to disable [OSD Locked] function. If system lock is done by remote controller through [85x] operation, please press [850] to unlock system control.

6.5	HDMI Loop Out for daisy chain connection

HDMI Loop Out to next EDGEPRO HDMI input port or signal source
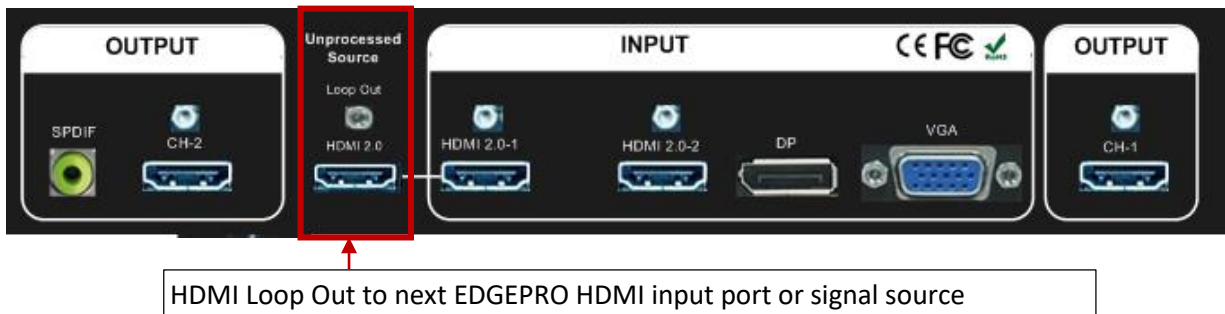
❖ Loop Out provides the same unprocessed source signal from HDMI2.0-1 input port.

❖ HDMI 2.0-2, DP and VGA ports input source signal can't be looped out. It can only be selected in the same EdgePro. If user wants to execute multi-unit edge blending through DP or VGA input ports, please add DP or VGA video distributor and feed signal to all EdgePro.

❖ User can connect any Loop Out signal to any HDMI input port in the next EdgePro. No specific HDMI input port is assigned.

❖ User can connect up to more than 10 units of EdgePro through daisy chain connection. The daisy chain connection number is related to the quality of HDMI cables and signal source resolution—good cable or lower source resolution can connect more units. User can also add HDMI splitter at the front end to increase daisy chain connection number for large scale video display.

❖ If loop out port is not connected, user can connect to a monitor for signal source monitoring purpose. HDMI Loop Out port is for daisy chain connection. It is not an input port.

6.6	System settings: Box ID, RS232, Ethernet

❖ Box ID, RS232 and Ethernet settings can be executed through CH-1 or CH-2. The setting result will be applied to both channels.

❖ User can control or operate EdgePro settings through Ethernet. Default IP address is 192.168.0.100.

❖ When multiple units are used at the same time, user can set different IP address in each EdgePro so that each EdgePro can be controlled independently.

6.6.1	Box ID

- ❖ The range of Box ID is 0 ~ 99 for RS2323 command.
- ❖ If user uses remote controller to execute system operation, the Box ID range is 0 ~ 9.

6.6.2	RS232 settings
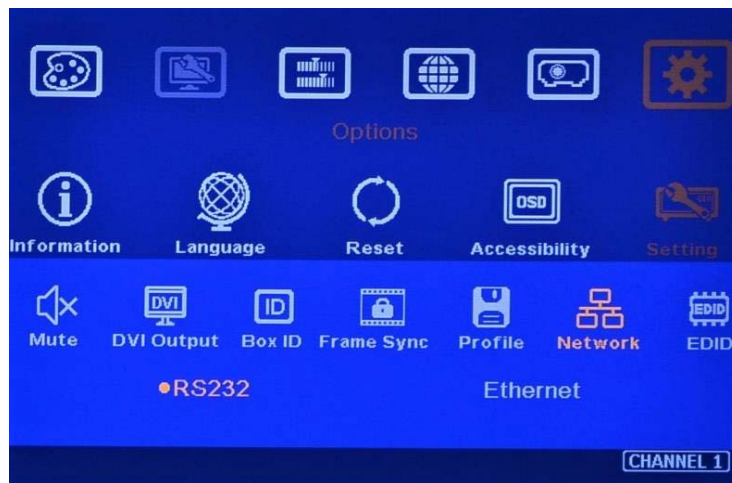
- ❖ RS232 is designed with DB-9 connector. User can select baud rate between 11520 and 9600.
- ❖ We can provide UART protocol for the control from RS-232, USB, or Ethernet.

6.6.3	Ethernet

- ❖ User needs to connect EdgePro to Wi-Fi Router or switch/hub through RJ45 to LAN port. Then User can control the system through Ethernet.
- ❖ Crossover UTP cable can be used for direct connection between PC and EdgePro. User needs to set PC TCP/IPv4 with the same domain as EdgePro (for instance, to set IP address at 192.168.0.105) and subnet mask at 255.255.255.0).
- ❖ Open web browser (Google Chrome or Internet Explorer) and input EdgePro IP address
- ❖ (default IP address is 192.168.0.100), user can see EdgePro WebGUI and see virtual keys and menu similar to OSD for further system operation. There is no additional software tool is required.
- ❖ If user can't connect the network, please power off/on EdgePro again to let PC detect EdgePro network system.

❖ Windows PC Tool is another web tool that has full function for system settings and operation. It can also update Firmware or MCU code. Windowscan be downloaded from AVENVIEW website.
❖ Each EdgePro can set different IP address for independent operation and control.
❖ Please use < > OSD keys to select OSD menu items and use ^ ⌄ OSD keys to change IP address.
❖ If EdgePro is connected with WiFi Router (through LAN port), user can control EdgePro through WiFi via PC, iPad or mobile phone.
❖ If web server function is required, please contact us for further details.

Crossover UTP cable
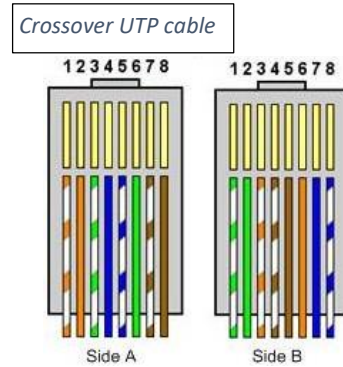
| 6.7 | How to use IR Remote Controller |

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

Profile [Load] shortcut key

System Information

Power on/off. If power off by remote controller, please power on by

Channel selection

OSD Menu operation

HDMI2.0-1 input port

Input source selection

HDMI2.0-2 input port

Output resolution selection

[4 Corner] geometry alignment

[Warp] curve geometry alignment

[Edge Blend] menu

Work with other function keys to execute function to all channels at the same time

[Video Wall] Menu

Grid pattern

Video Wall [Overlap]

Profile [Save] menu

System reset menu

6.8 Full screen and native aspect ratio

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

❖ For edge blending application, please set to [Full Screen] mode. Otherwise, there may be abnormal display in some input timing.
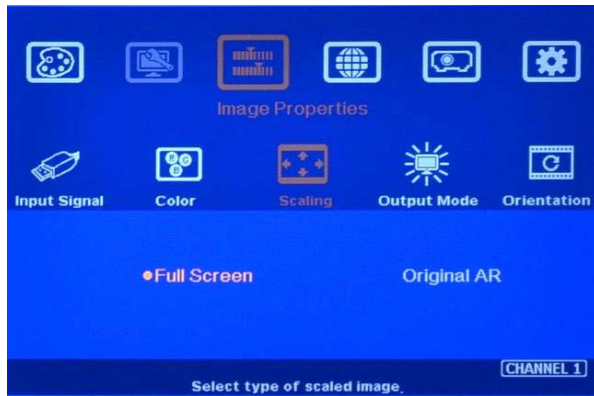
❖ [Full Screen]: to display full screen image no matter the input source is in what kind of aspect ratio.

❖ [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.

6.9	**Image rotation and flip**

Image 90/270 degrees rotation only supports up to 4k/30Hz input signal. Image 0/180 degrees rotation and flip function can support up to 4k/2k @60Hz. When the image is rotated or flipped, the OSD will still keep at original direction without change. The direction for [Video Wall] settings will follow the image after rotated or flipped.

❖ Image 90/270 degrees rotation is for edge blending with projectors at portrait position to increase image height. There is no need to rotation signal source.

❖ 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.

6.10	**Color adjustment**

In edge blending application, color adjustment is important due to multiple units of projector images are combined together.

6.10.1 Global color adjustment: [Picture]

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

6.10.2 Preset Color Temperature and independent RGB color
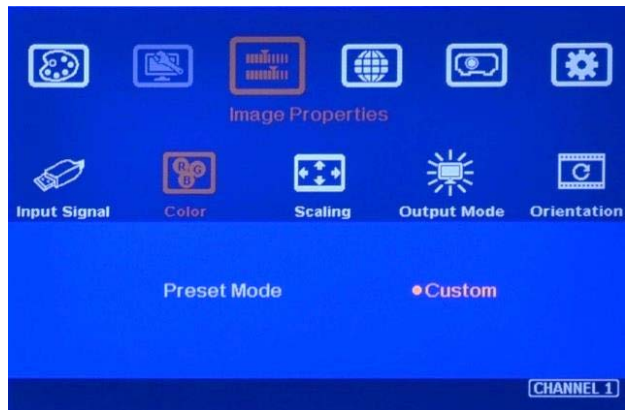
❖ [Color] under [Image Properties] menu can change preset color temperature and discrete [RGB] color in each channel.

❖ [Preset Mode]: [Neutral], [Reddish], [Bluish]

❖ [Custom]: discrete RGB color adjustment

6.10.3 Color adjustment function under [Edge Blend]
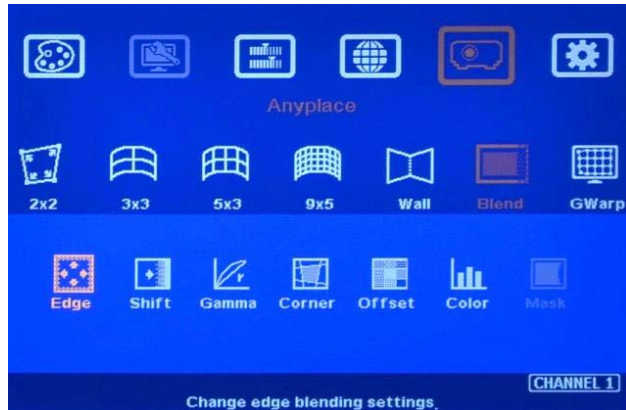
Below adjustment will apply to each channel separately.

❖ [Gamma]: for color compensation in overlap region

❖ [Offset]: for black level uplift in non-overlap region (limited adjustment range)

❖ [Color]: for color white balance correction (limited adjustment range)

6.11 OSD Lock and unlock

❖ In order to avoid interference among multiple EdgePro during the installation, user can set ID number for each EdgePro through [Options] Menu. Press number keys in Remote Controller to determine which EdgePro will be controlled.
  - 851: control EdgePro ID No. 1
  - 853: control EdgePro ID No. 3
  - 850: to unlock all units for user to control all EdgePro.
  - User will see flashing LED on front panel after press 85x number keys. It means the OSD menu in EdgePro with flash LED is locked and will not be controlled by remote controller.

❖ OSD Lock / Unlock: When continuously press [Menu] key in IR Remote Control for 5 seconds, the OSD function will be locked to prevent from setting change by negligence. To press [MENU] key for 5 seconds again, it will unlock OSD and user can manipulate the OSD again.

6.12 System synchronization

When the system uses multiple projectors, the image should be synchronized together. EdgePro uses [Frame Sync] to synchronize all outputs based on the input signal vertical sync. When [Frame Sync] is applied, it is possible to lose sync during system setup and cause the projector to re-search the signal

source. In order to provide smoother setup, EdgePro provides OSD for user to select different synchronization methods for easy setup.

- ❖ [Normal] (Frame Locked): when user uses multiple units of EdgePro, we propose to set at
- ❖ [Normal] to let all output synchronized together. The sync time will be longest. When user reset system or adjust video wall settings, you may see projector re-searching the input source.
- ❖ [Fast] (Phase lock): time to sync the input source will be fast than [Normal]. However, due to projector still needs to re-search input signal, the total signal change time including projector re-searching will be very similar. You can select [Fast] if you use single EdgePro. In other conditions, we propose to take [Normal] frame lock.
- ❖ [Disable] (Free-Run mode): when EdgePro changes input source or timing, the output will be still running without losing any signal. The projector will not search the input source again. There will be no loss signal when Reset or executing video wall settings. We propose user can set at [Disable] during system setup to save setup time. After finishing system settings, user needs to switch back to [Normal]. Otherwise, it is possible to have some frame tear or synchronization issue in the outputs.

7	Project Plan and preparation for Edge Blending
7.1	Determine source signal resolution

- ❖ The image size and watching distance are two major factors to determine source signal resolution and number of the projectors.
- ❖ If the screen size is 20m and the watching distance is 5m, the signal pixel pitch should be around 5mm (around 1mm for 1 meter watching distance). The system resolution is about 20m/5mm=4000. It means the system resolution should be around 4000 pixels in width and the

vertical resolution should follow the projector native resolution. If 1080p projector is used, the ideal system vertical resolution is 1080.

❖ After determining the system resolution, please make sure all the equipment in the signal pipe line should be able to support this resolution or higher. It includes signal source output, edge blending processor and the total resolution of the projectors after edge blending.

❖ If user uses 8x XGA projector with 250 overlapped pixels, the total projector resolution after edge blending will be 1024*8-250*7=6442 pixels. It means it is enough to use XGA resolution projectors in this 20m screen case. If user uses FHD or WUXGA high end projectors with watching distance at 5m, the final video quality will be very similar as XGA projector under 4k signal source at 5m watching distance but will be better at less than 5m watching distance.

7.2	System synchronization

When using the Excel Spread Sheet calculation, user has some flexibility to determine the overlap region size by different projector resolution, lumens and number of projectors.

❖ The most common overlap region is about 20% to 40% based on single projector native resolution. For 1024*768 projector, the overlap range is 1024*20%-1024*40%=205~409 pixels. EdgePro test pattern default size is 32x32 pixels. Therefore, the final result will be around 7 grids (224 pixels) to 13 grids (416 pixels) for XGA projector and 12 grids (384 pixels) ~ 24 grids (768 pixels) for 1080p & WUXGA projectors. If the projector has accurate color and gamma curve, the overlapped pixel can be lower to 5 grids (160 pixels) in XGA projector. The actual pixel number should be determined based on the required screen size and the projector model used. Under the same screen width, if higher image is required, then the overlap region will be also increased.

❖ Reasonable overlap region dimension between 50cm to 120cm will be good for overlap region color control.

❖ EdgePro maximum edge blend range is H=1920 pixels, V=1200 pixels. The black level compensation range is 900 pixels. If user requires black level uplift compensation, please install the projector within 900 pixels overlap limits (based on native projection area without any adjustment from either projector or EdgePro)

7.3	Relation between Overlap pixels and geometry alignment

❖ Proper selection of Overlap pixels will affect the control points in geometry alignment. If the Overlap pixel is 25% of the projector native resolution (or EdgePro output resolution), it will have less geometry alignment points due to control points in adjacent projectors will be at the same location. If the overlap pixel is not 25% of the projector native resolution, the control points will be at different positions. 37.5% overlap pixel will double the control points of the

geometry alignment if compared with 25% overlap and have the best geometry alignment accuracy.

❖ [9x5 Curved] alignment will cut the horizontal image into 8 sections and the image in each section can be independently adjusted. In different output resolutions, there will be different pixel number in each section: XGA: 1024/8=128, WXGA: 1280/8=160, 1080p: 1920/8=240. Usually, [9x5 Curved] alignment is enough for most of the curved screen edge blending.

❖ If the overlap area between two adjacent projectors has the same or multiple number as above, the geometry alignment control points in overlap region will be less. User can increase or decrease two or three grids (64 or 96 pixels) in overlap area to increase the control points in overlap region for more accurate alignment between adjacent projectors.

❖ Below figure is an example for [9x5 Curved] alignment in 1024 resolution:

• **25% overlap region:** The adjusting points in projector A & B will be at the same position in overlap region
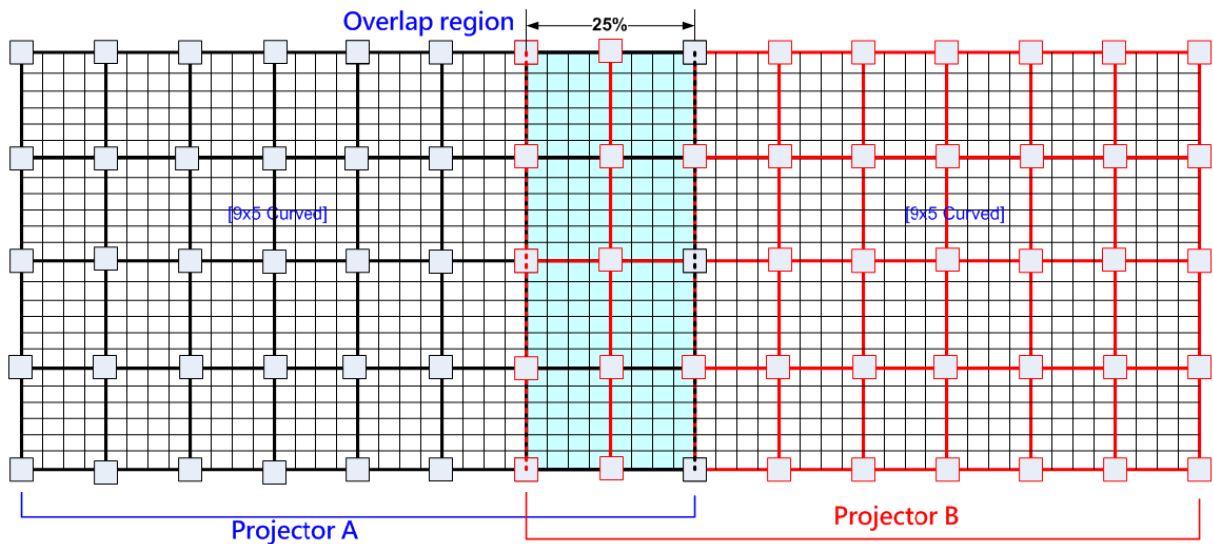
If the overlap is 256 pixels (25%) in XGA resolution, total adjusting points in overlap region are 3*5=15. The adjusting points in projector A & B will be at the same position in overlap region. User will have less adjustment flexibility. If increasing two grids (64 pixels) to 320 overlap pixels, user can have 30 adjusting points to get more accurate geometry alignment. It can align the images from two projectors on curved screen with good quality by remote controller.

- 37.5% overlap region

The adjusting points in projector A & B will be separated in 37.5% overlap region and increase geometry alignment accuracy.

Overlap region — 37.5%

[9x5 Curved]   [9x5 Curved]

Projector A   Projector B
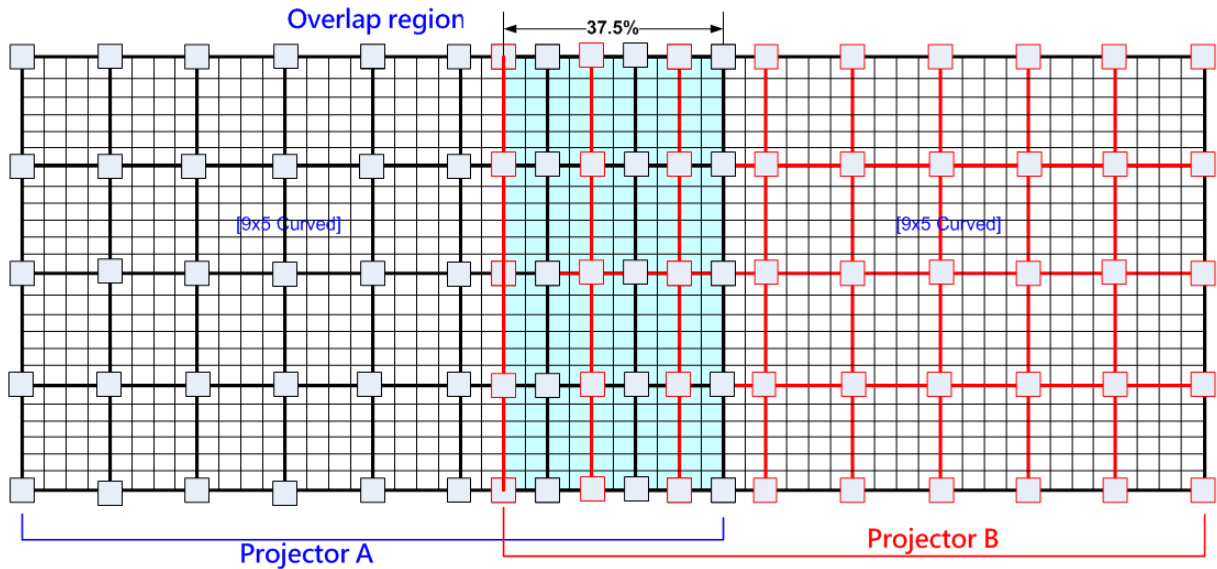
- Recommended overlap pixels in different output resolutions

Below is the list for the accuracy of geometry adjustment in different overlap pixels:

EdgePro output resolution	1920*1080	1280*800	1024*768
Min. adjusting flexibility	256/480/704	320/480/640	256/384/512
Max. adjusting flexibility	352/608/832	224/256/384/416/544/576	192/320/448/576

7.4	**Get installation data from Excel Spread Sheet**

❖ AVENVIEW can provide an Excel Spread Sheet for user to calculate necessary installation data for the project. It is important data for installation and setup.

Project basic data

Source resolution (H)	3840	Screen width	6.5	(m)
Source resolution (V)	800	Screen height	1.50	(m)
Projector resolu. (H)	1280	Projector lumen	3200	(Lum)
Projector resolu. (V)	800	Screen Aspect ratio	4.33	(required)

Overlap pixels (32 pixels per grid)		Overlap %	Recommended
Overlap pixel (H)	256	20.0%	20%~40%
Overlap pixel (V)	0	0.0%	25%~40%

Recommended overlap region: Min. 192 pixels or 50 cm width

Qty of projector (H)	3	Throw ratio (Min)	1.2
Qty of projector (V)	1	Throw ratio (Max)	1.7

Final output resolution

Horizontal resolution	3328	* Please apply Overlap pixels with 32x
Vertical resolution	800	because internal grid size for geometry
Extended pixel (H)	98	adjustment is based 32x32 for each grid.
Extended pixel (V)	0	

Final result checking list (PJT: Projector)

Final Image size (meter)		Final Illuminance Lux (Lum/m2)		Image size for each PJT	
Width	6.50	PJT lumen	3200	Width (m)	2.500
Height	1.56	Final Illumin	819	Height (m)	1.563

Overlap region size		Original aspect ratio		Projector throw distance	
				Min (m)	Max (m)
Horiz. (m)	0.500	Projector	1.60		
Vertic. (m)	0.000	Final result	4.16	3.00	4.25

* Final image height should be equal or larger than screen. User can shrink image to have the
  same image height as screen by GeoBox geometry adjustment.
* Standard luminarce is 400-800 Lux for restaurant and big conference
  room, 1000-1500 Lux for trade show. 3D: 500 Lux (single projector)
* Theater: 172 Lux (16 foot-lamberts), SMTP display standard: 377 Lux
* Final brightness of the screen needs to multiple gain value of the screen.
* The actual installation image size should be equal or larger than expected size.
* The best content resolution is the same as Final output resolution in cell D15& D16.

* Illuminance: 1 Lux = 1 lumen/m2 = 0.0929 foot-candle
  Luminance: 1 Lumen/m2/Steradian= 1Nit =0.29186 Foot-Lambert

Video wall setting value

Position of projector (H)	1	2	3	4	5	6	7	8	9	10
LH edge overlap value	0.0	98.5	196.9	x	x	x	x	x	x	x
RH edge overlap value	196.9	98.5	0.0	x	x	x	x	x	x	x

* When execute Video wall setting, user needs to connect the signal with the same resolution as [Source Resolution] in this Spread Sheet.
* When Overlap value has decimals, user can take the nearest integer value. After finishing setup, user can adjust Overlap value again to get the clearest image.

Position of projector (V)	1	2	3	4	5	6	7	8	9	10
Top edge overlap value	0.0	x	x	x	x	x	x	x	x	x
BTM edge overlap value	0.0	x	x	x	x	x	x	x	x	x

- ❖ Below are assumptions for the above 3x projectors edge blending system Excel calculation.
  - o Screen Size: 6.5m*1.5m with watching distance within 2m (pixel pitch less than 2mm)
  - o Input signal resolution: 3840*800 (Pixel pitch is 6500mm/3840=1.7mm = 1.7m watching distance, optimized vertical resolution is the same as projector native resolution: 800)
  - o Number of projectors: 3 projectors
  - o Projector resolution and lumens. 1280*800 (native resolution), 3200 ANSI Lumen
  - o Overlap pixels and dimension. 8 grids=8*32= 256 pixels (50cm)
  - o Projector throw ratio: 1.2-1.7 (based on projector spec)

How to operate Excel Spreadsheet

- ❖ Input all the data in Yellow column, including Source Resolution, Projector Resolution (EdgePro output resolution), Screen size, Projector throw ratio, Projector Lumens, No. of projector and Overlap Pixels. User can try different configurations and select most cost effective one
- ❖ User will get below data from the Spread Sheet.
  - o Final image size for each projector is 250cm*1.56cm with Overlap region of 50cm in width.
  - o The image height should be higher than the required one. User can draw the vertical height to required dimensions through geometry alignment. The vertical adjustment range in each edge is 600 pixels.
  - o Optimized content resolution: 3328*800 (This is the ideal resolution to set EDID). It is suggested to select the same vertical resolution (800) as projector native resolution to get the best result.
  - o Installation distance: 3m-4.25m.
  - o It is calculated from throw ratio and image wide for each projector. (2.5m*1.2=3m, 2.5m*1.7=4.25m)
  - o The overlap value in Video Wall setting:
    - ▪ When user sets Video Wall Zoom, it will split the image equally for each projector. However, we need to install the projectors with some Overlap Pixels for edge blending. Therefore, Overlap Value is to crop more pixels for each section based on the Overlap size between two adjacent projectors.
    - ▪ LH Projector: select RH edge: +197 (to crop more 197 pixels for LH projector. These 197 pixels are based on source resolution.
    - ▪ Projector (Center): LH edge=+98, RH edge=+99 (total 197)
    - ▪ RH Projector: LH edge: +197
    - ▪ After finish setting, user can check the image, if some overlap area is blurred, user can increase or decrease Overlap Value with 1-2 pixels and select optimized one.
  - o The final luminance is 819 Lux. It will be enough for inside room environment.

- ❖ It is allowed to have different overlap pixel among projectors. "Irregular" Spread Sheet is required to calculate the data.
- ❖ Please contact dealer or factory to get necessary assistance for the Spread Sheet.

7.5   **Apply Spread Sheet data for projector installation and EdgePro setting**

7.5.1   **Installation data from Spread Sheet from previous section:**

- ❖ Image size for each projector: 250cm *156cm
- ❖ Overlap region: 50cm
- ❖ Installation distance based on throw ratio 1.1-1.7: between 300cm-425cm
- ❖ Installation height: install the projector at a position with minimum keystone at both vertical edges.

7.5.2   **Mark projection region for each projector**

- ❖ Based on the calculation data, user can easily determine the image location for each projector.
- ❖ Using laser Level tool and mark the locations for each projector with paper tape, including 4 borders and center line of the screen. The paper tape shall not damage the surface of the screen.
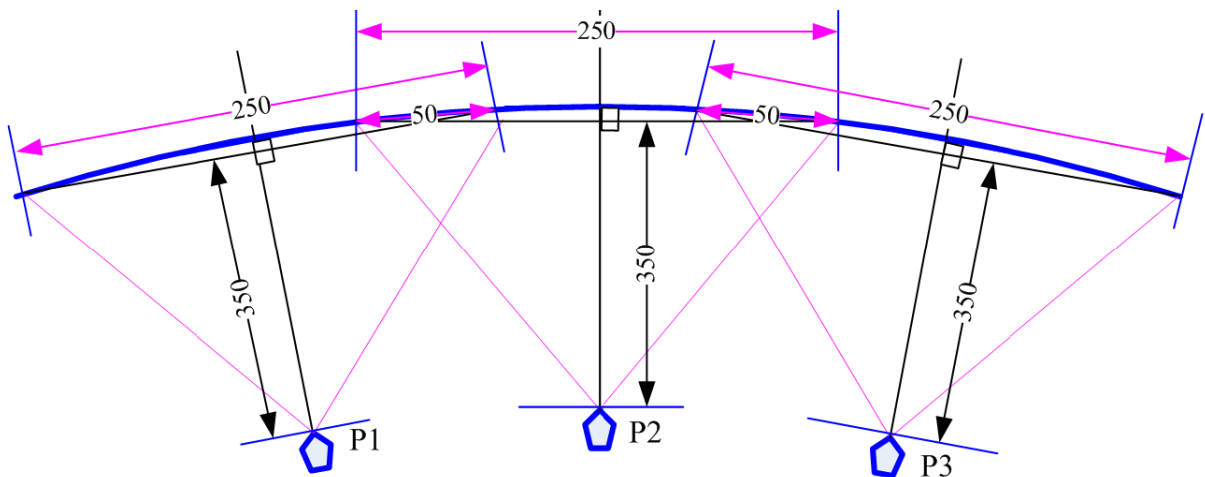
7.5.3 Installation the projector

❖ To install the projector at a location as showed above with the image just a little over required region at any point. Too large image will lose image resolution and brightness.
❖ Minimum keystone effect will optimize the image quality with less geometry alignment.
❖ The image height from the projector can be higher than required and user can draw down the image height through geometry alignment. The adjusting range is up to 1200 pixels in the top and bottom edges.

During the installation, Laser Level is a good tool to get

correct horizontal and vertical line and make sure each

projector can cover correct display

7.6 Projector settings before edge blending

❖ Please reset all projectors to factory default settings.
❖ Set to ceiling mount if necessary.
❖ Disable below items:
❖ Auto keystone, auto aspect ratio, auto color compensation, auto source searching
❖ Select a display mode with gamma 2.2 or standard display mode. After edge blending, if user still sees some banding in overlap region, please select the best one from different display modes.
❖ If there is color deviation among projectors, please try to correct color difference through projector color adjusting function to let all color as close as possible.
❖ Enable multiple projector display mode in some projector model.

7.7	Projector settings before edge blending

❖ Reset EdgePro to default setting. [Reset] will apply to two channels at the same time.
❖ Select input port. Two HDMI inputs will apply to both channels. User can't select HDMI-1 & HDMI-2 for different channels. However, user can select VGA or DP input for another channel while one channel is connected with HDMI port.
❖ Select output resolution to be the same as projector native display resolution. It will apply to two channels at the same time.
❖ Connect with a signal source with resolution not less than 1080p.
❖ Check input/output LED indicators and make sure to have correction system connection.
❖ User can set [Frame Sync] at [Disable] to eliminate [Source-Search] in projector during setup. After finish the setup, user needs to set to [Normal] to get synchronization in all outputs.

8.	Geometry alignment
8.1	Select the right 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 PC tool.

❖ The default grid size is 32*32 pixels. User can select different grid size from 8-100 pixels.
❖ The show-up time can be determined by [Options]→ [Accessibility]→ [Menu Time Out]. If set at "0", the OSD and pattern will show up all the time unless input timing is changed or OSD [Exit] .
❖ If user sees different grid size in different projectors, please check the output timing setting in each output channel and also check the aspect ratio settings in the projectors. EdgePro needs to set at [Full Screen] display mode under [Image Properties]→ [Scaling] menu.
❖ 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]
❖ User can select different pattern color while doing edge blending for easy setup.
❖ (Note: some projector RGB points are not at the same location. It will cause position deviation. Please recheck with White grid pattern for final result).
❖ User can see geometry adjusting value when select [Background + OSD] display style.
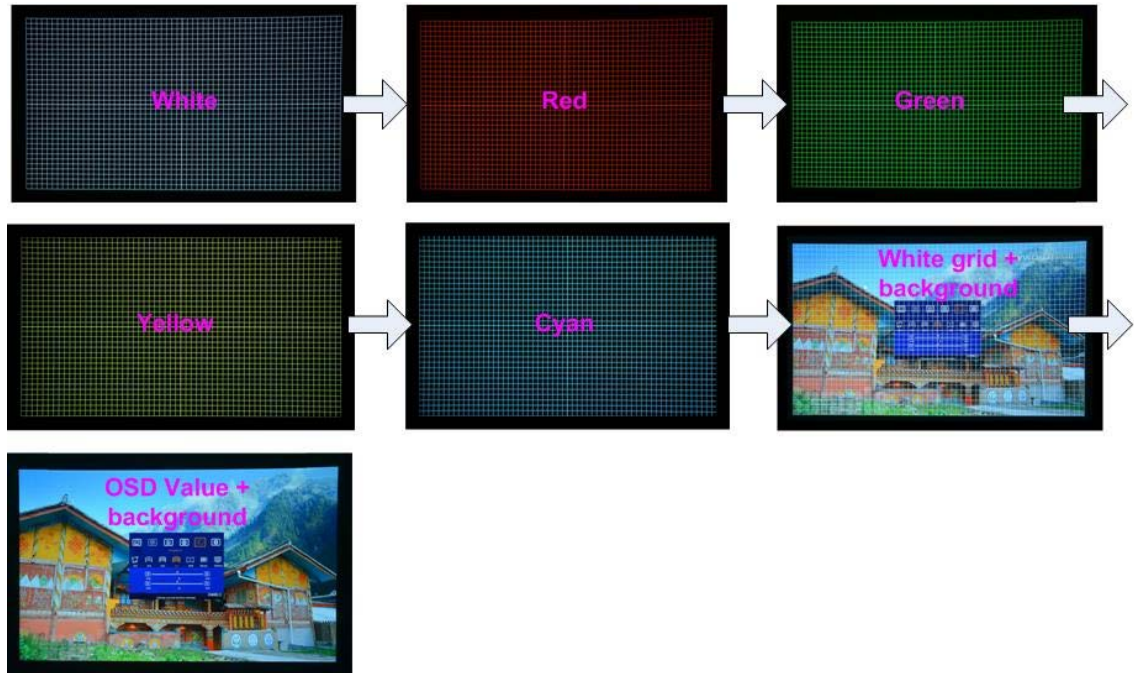
8.2   Grid pattern pixel size selection

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 from 8 to 100 pixels with 1-pixel increment. H&V grid size will be the same.

Below is the OSD menu for the selection of grid size.
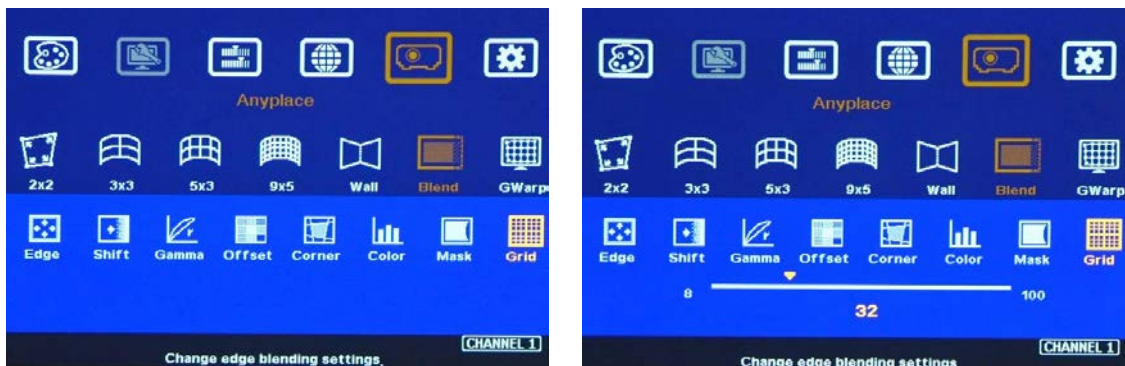
❖ The pixel size in grid pattern for geometry alignment is selectable to meet high end simulation system geometry alignment requirements. The grid size in both horizontal and vertical directions is from 8 to 100 pixels with 1-pixel increment. H&V grid size will be the same. User can select grid size under [Edge Blend] menu.

❖ Default grid size for both H&V directions are 32x32.

❖ In order to get optimized result in video wall [Overlap] value, user can use AVENVIEW Excel Spread Sheet and apply an overlap pixel in the Spread Sheet to get a near integrate number in Video Wall [Overlap] value, then select the grid size to match this overlap pixel.

❖ In low resolution projector with low overlap grid number, user can select a grid size to maximized the overlap region to improve edge blending quality. For example, when the overlap pixel is only 186 pixels, if user selects 32x32 pixels as grid size, then user needs to reduce the grid size to only 160 pixels (5 grids) to let the grids from adjacent projector to stack together. If user selects a grid size of 31x31, then user can keep 186 pixels (6 grids) as overlap pixels.
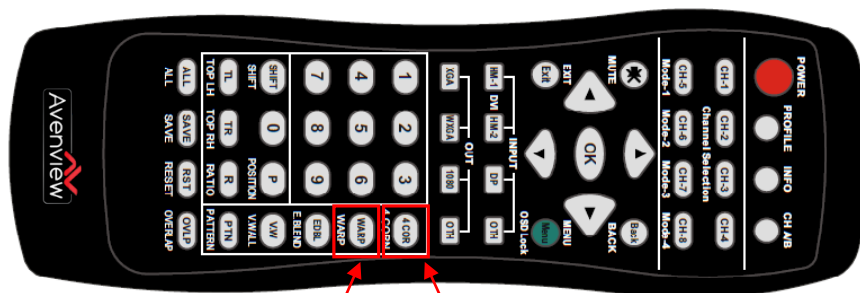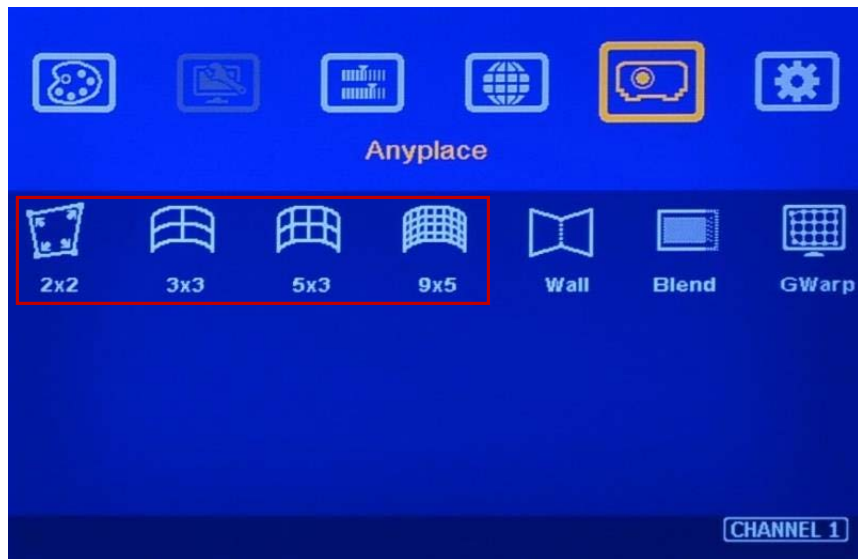
[3x3], [5x3], [9x5] Warp hotkey   [2x2] 4 Corner hotkey

8.3.1 Geometry alignment through remote controller

❖ Familiarize yourself with OSD operation from remote controller, including activating grid pattern, CH-1/CH-2 switching and hot keys for [Corner], [Warp], [Video Wall], [Edge Blend] and [Info].

❖ [OSD Time Out] is default to "0". It will ensure the grid pattern will not be turned off automatically. Input mode change will disable OSD and grid pattern.

❖ User can install IR extender receiver near each projector for easy EdgePro operation. If multiple units of EdgePro are used and IR receivers are put together, please set [Box ID] for each EdgePro so that user can control each EdgePro separately through [85x] command. Press number keys in Remote Controller following OSD menu for the control of multiple EdgePro:

- 850: will activate all EdgePro. User can execute simultaneous control for all EdgePro
- 851: activate only ID #1 EdgePro for further control.
- 852: activate only ID#2 EdgePro for further control.

❖ Each channel should execute geometry, video wall setting and edge blending setting separately.

8.3.2 Activate Grid Pattern

❖ Use [Pattern] & [CH-1/CH-2] selection keys to show grid patterns in all projectors. Press [Pattern] key again will change grid color. To set two different pattern colors in adjacent projectors will be more convenient during geometry alignment.

❖ If user finds the grid size between adjacent projectors is different. Some possibilities:
  o The projection image sizes between two projectors are different (Zoom setting or projection distance is different).
  o Output resolution settings in different EdgePro are not the same.
  o Projector aspect ratio setting is different or not set at full screen display.
  o EdgePro is set at [Original AR] under the menu of [Image Properties]→ [Scaling] menu.

❖ If user doesn't use Excel file to calculate the image size in each projector, please try to set the same projection height prior to geometry adjustment. In this case, the image width and overlap grid size for all projectors will be also similar and is ready for further geometry alignment.

8.3.3 [2x2] 4 corner geometry alignment

❖ Keystone correction in the projectors before geometry alignment is necessary when the image has too large a distortion and EdgePro can't cover the alignment range.

❖ [2x2] alignment will adjust whole image with the same scaling factor. [War] alignment will adjust only some portions of the image.

❖ Please follow the sequence [2x2]→ [3x3]→ [5x3]→ [9x5] to do geometry alignment to ensure entire image will have uniform scaling factor.

❖ Apply [2X2 Corner] geometry alignment and draw the corners to pre-marked locations.

❖ If no pre-marked location, please use [2x2] alignment to let the image in each projector with the same horizontal position and also let the vertical borders without keystone.

❖ Measure the image size in each projector, to reduce the size of the larger image at top edge through [2x2] alignment and let both projectors have similar grid size and number in overlap area. Then to adjust the bottom edge corner point to follow top edge vertical position.

❖ 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 adjustment. [Warp] alignment will adjust the image position back to required position.
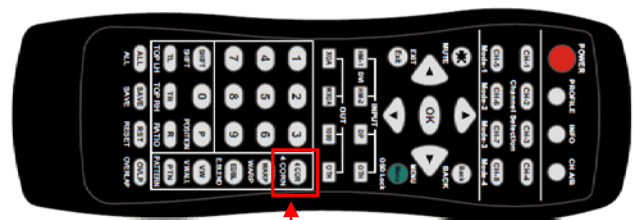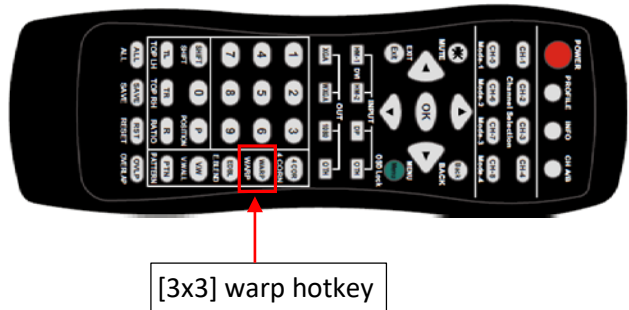

[2x2] 4 Corner hotkey

### 8.3.4 [3x3], [5x3], [9x5] Warp alignment

After completing [2x2] corner alignment, apply [3x3 Curved] geometry alignment to let 9 adjusting points be located at the required position including four corners, edge center points and center line position.

[3x3] warp hotkey

- ❖ Please use [5X3] & [9x5] for further geometry alignment and let all the grids in overlap area with good grid stacking from two projectors.
- ❖ For curved screen, if there is some difference in the grid size in adjacent projectors, please use [9x5] Linearity Grid Line adjustment (in next section) to adjust the grid size and finish the image position fine tune.
- ❖ After finish Warp alignment, user can use [2x2] for complete image position fine tune without changing the Warp result. If user executes [3x3] alignment again after [9x5] alignment, [9x5] grid position will be reset and only keep [3x3] grid point information.
- ❖ All the horizontal lines in the grids should match complete.
- ❖ In ideal condition, all grids in edge blending area between two adjacent projectors should be aligned together. In some special case, the vertical lines in edge blending area have some gap and can't match 100%. Please try to align the grids near center overlap region with good stacking. It allows small image shift in both sides of the overlap region because edge blending will reduce the effect for the mis-alignment in side borders. User can also adjust [Overlap] value in video wall settings to compensate this deviation and keep reasonable image quality.
- ❖ After the above processes, if the grid pattern in edge blending area still can't stack together, user can reduce one or two overlap grids from adjacent projectors to separate the adjusting points in each projector and get more accurate geometry alignment result. If the result is still not good, please use [EdgePro Windows Software] PC tool to apply 17x17 grid point adjustment.
- ❖ Geometry alignment range from remote controller can be up to 600 pixels in [2x2] + 600 pixels more in [3x3] for one corner/edge. If more geometry alignment range is required, please use Windows PC tool to get more alignment range. If necessary, please use projector geometry alignment function to do some adjustment.
- ❖ After geometry alignment, all the grid patterns in overlap region should be stacked together.
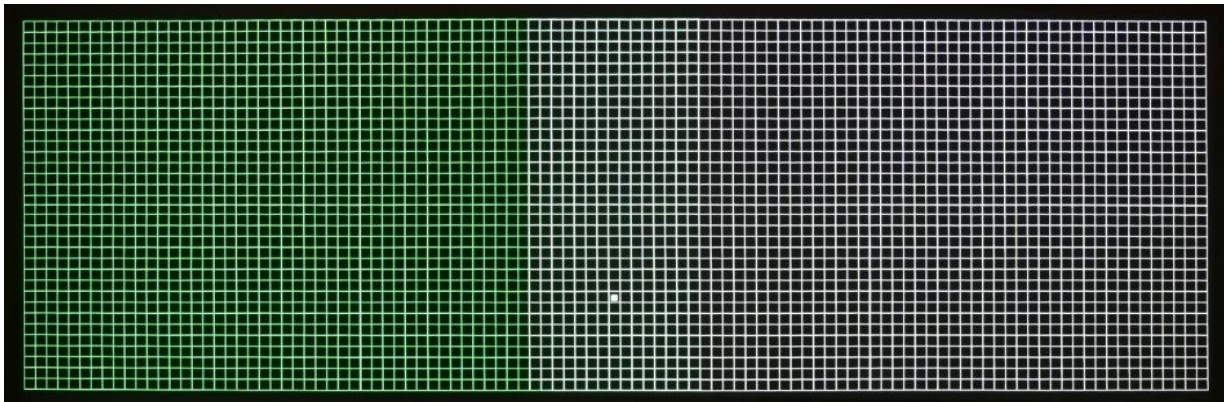
8.3.5 Linearity grid line adjustment
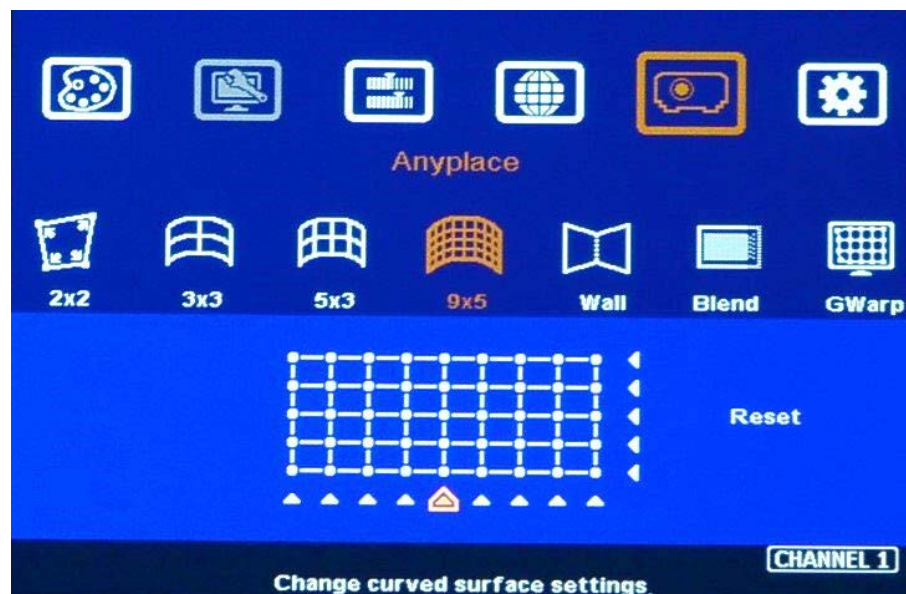
The control point can shift the lines in both horizontal and vertical directions.

❖ Linearity grid line adjustment menu is under [9x5] warp alignment. User can select the control point, then press ENTER to see complete grid line for the adjustment. Each control point can shift the image in both horizontal and vertical directions.

❖ When user projects the image to curve screen using projector, 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. This function is mainly designed to correct this kind of grid size difference.

- ❖ Linearity Grid Line adjustment can be applied to horizontal lines and vertical lines. The maximum adjusting points in OSD menu is H=9, V=5. If it is executed through Windows PC tool, it will have 17 control points in H&V directions.
- ❖ The control points can move all the lines in the control section with the same distance at the same time. It can also move the grid line at rectangular direction.
- ❖ This function can co-work with Warp and Edge Blending function.
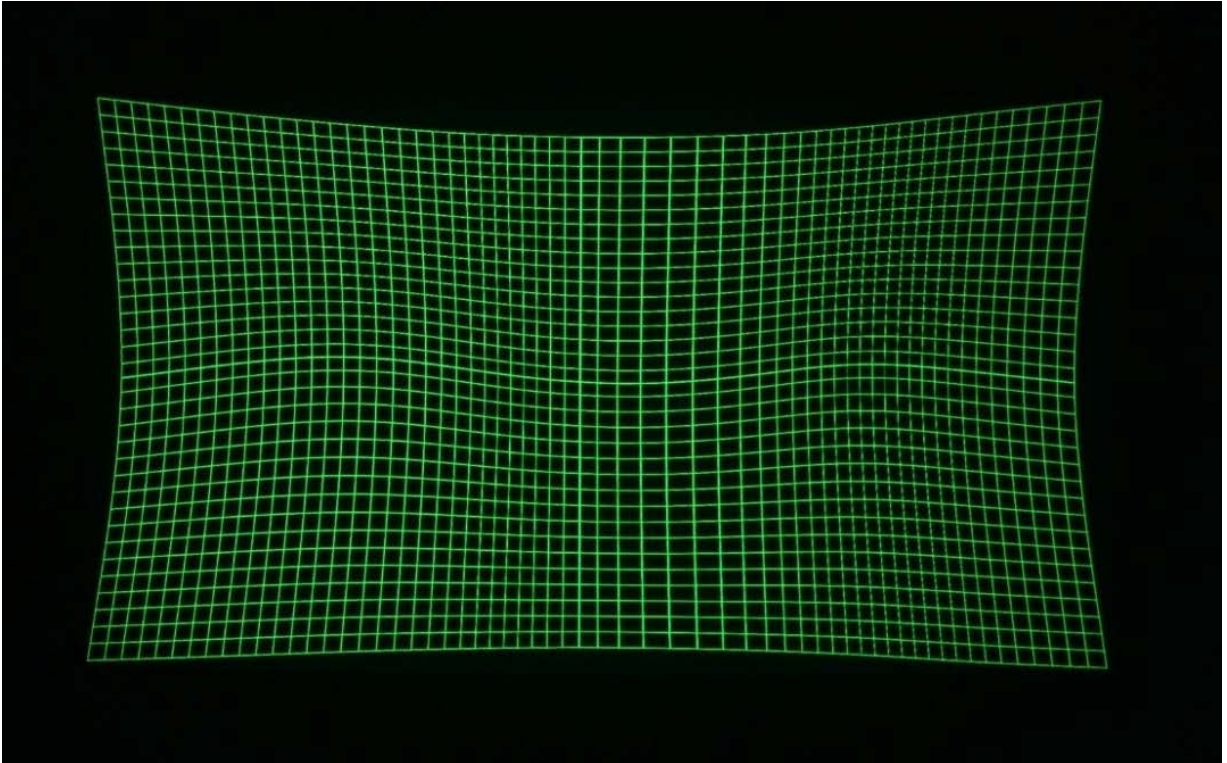
8.3.6 Corner Wall geometry adjustment

Important note: When apply Corner Wall function, all the other geometric alignment function will be disabled. User can only execute geometry alignment through 8 points of Corner Wall adjustment. 4 corner control points can execute image 4 corner alignment same as [2x2] geometry alignment function. Edge Blend function will be still available.

Corner Wall alignment allows user to adjust the image at wall corner. It can execute horizontal and vertical corner alignment. User can 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 image positions

- ❖ The curve position of the image in horizontal or vertical direction
- ❖ The maximum Corner adjusting range is +_ 900 pixels and the location adjusting range is+_900 pixels.
- ❖ The image will keep the same grid size (scaling factor) automatically.
- ❖ User can't use ultra-short throw ratio projector for corner wall application. Otherwise, the image distortion may be too big to be adjusted and will also create focus issue.
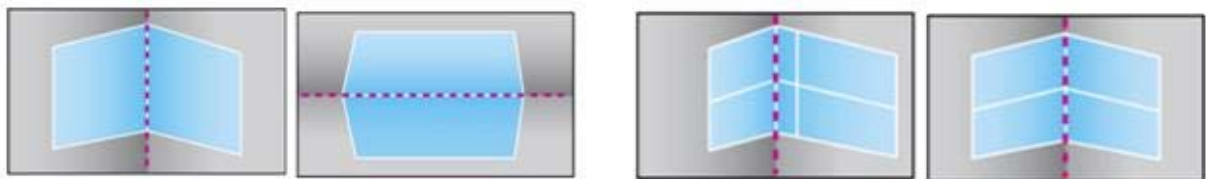
Example A: Single projector application

Example B: Dual projector application   Three projector application
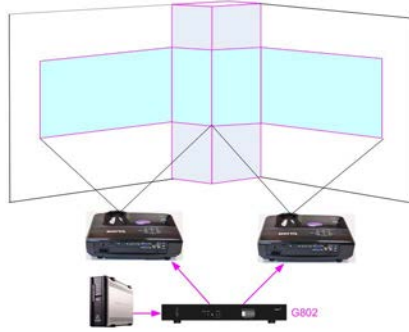
Corner wall application on curved screen

If user wants to implement Corner Wall function on curve screen, user can connect the signal to one channel or another EdgePro to do warp alignment and to connect the output to the input port of the channel for Corner Wall alignment. Then user can execute curve alignment and Corner Wall adjustment at the same time. If only only one EdgePro is used, user can only input the signal from VGA or DP port in the 1st channel and connect the output to HDMI input port in the 2nd channel to implement Corner wall adjustment on curved screen. There will be no limitation in mulitple units of EdgePro or combination with other EdgePro models.

✓ Under [Gwarp] menu, there are 10 UserMap. Each UserMap stores user geometry alignment setting from Windows PC tool through USB or Ethernet. Once user selects UserMap setting, then other geometry alignment will be reset and replaced with UserMap setting.

✓ UserMap only stores geometry alignment setting. This setting can be combined with other functions to achieve edge blending or other purposes.

✓ If user doesn't store any Windows setting to UserMap, when user clicks any UserMap menu or select one UserMap without storing any Windows data, user may not see any image on the screen. Under this condition, please press [2x2] geometry alignment hotkey on remote controller to see OSD menu on the screen and execute further operations.

✓ [Fine tune]

If the system is installed based on Windows geometry data which is stocked in UserMap, user still can execute small position modification through [Finetune] menu. This 4 corners position adjustment range is +-50 pixels for each corner. This function is important for after service and while changing lamp to return the image to original position.
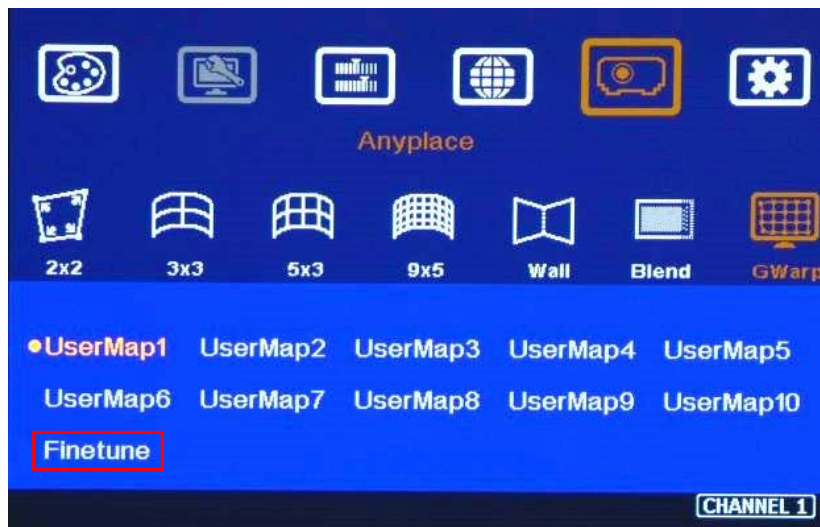
❖ After geometry alignment, it is required to crop the image and assign to each projector. Each channel shall execute [Video Wall] settings separately.

❖ The purpose for Video Wall Setting is to determine the display Matrix, split the image and assign the right image to each EdgePro/display device in the matrix. The overlap pixel between two images can be adjusted pixel by pixel. The maximum video wall can be up to 15x15 matrix display.
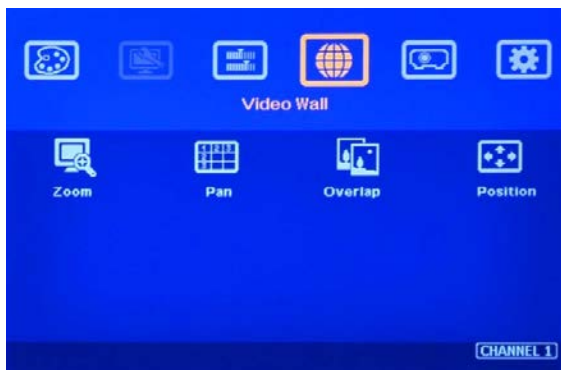
❖ Press Menu Keypad on Front Panel or remote controller to enter [Video Wall] OSD menu.

❖ [Video Wall] hotkey on the bottom right position of the remote controller is available for quick access.

❖ Video wall function can crop image for edge blending and assign to projectors.
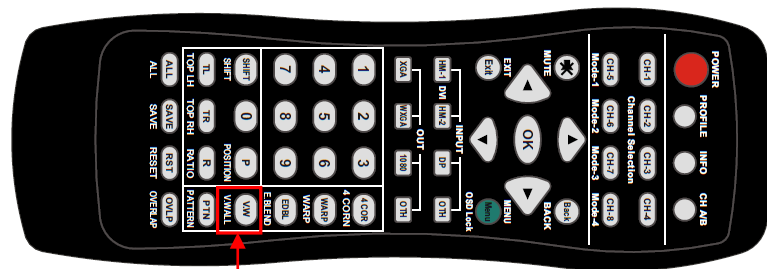
[Video Wall] menu hotkey

9.1 [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.
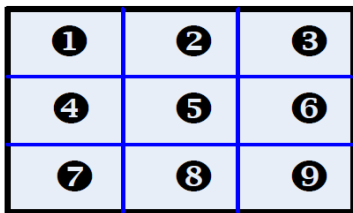
For 3 projectors at horizontal position, Horizontal Zoom=3, Vertical zoom=1

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

9.2 [Pan]: assign image location
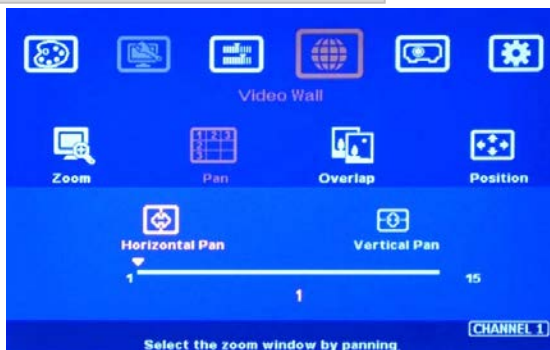
❖ Use [Pan] to determine the location of each split image in both horizontal and vertical directions.
❖ Default setting:
- Horizontal Pan=1
- Vertical Pan=1
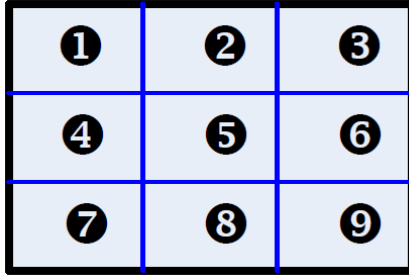
For No.❸ w projector: *For No.❻ z projector:*

Horizontal Pan = 3   *Horizontal Pan = 3*

Vertical Pan = 1   *Vertical Pan = 2*

9.3	**[Overlap]: crop the right image for each projector**
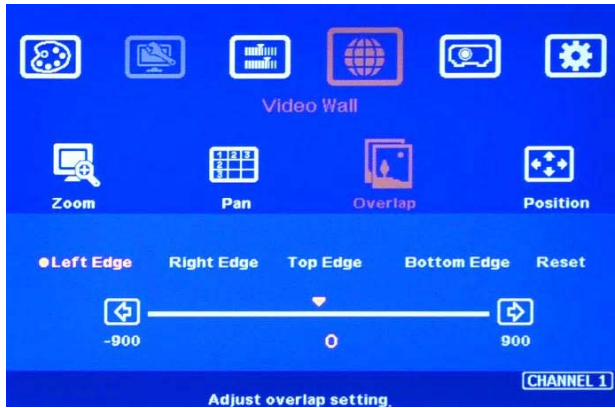
❖ Use [Overlap] to determine overlapped pixels between two adjacent projectors. It will change image cropping area and can change image aspect ratio.

❖ In projector edge blending, user needs to select correct Edge and crop the right overlapped pixels for each projector.

❖ Max. Overlap range is +_1200 Pixels

❖ In multiple projector applications, if the overlap region has different size due to installation position limitation, the overlap value may be different between projectors. However, the total overlap value should be the same to maintain the same scaling factor.

❖ Please use Irregular Excel Spread Sheet to calculate overlap value in the above irregular overlap pixel condition.

❖ User can use Video Wall overlap setting to fine-tune the image in overlap region. It can compensate geometry misalignment and let image become much clearer.

9.4   [Position]: shift image position without changing image

After cropping, user can shift image position at H&V directions without changing image size. Usually, it is for the video wall application to fine tune image position. In projector edge blending application, user only changes Overlap value in one edge but not execute image shift.

10   [Edge Blend] settings

- ❖ Edge Blend is to merge the images from multiple projectors to become one seamless image.
- ❖ The scaling factor between two adjacent images shall be the same. It means the image size under the same resolution should be the same.
- ❖ Geometry alignment is required before edge blending:
  - To let the image has the same grid size (same scaling factor in both horizontal and vertical directions
  - To let images overlapped together in horizontal lines and vertical lines.
- ❖ Sub-menu under [Edge Blend] menu
  - [Edge]: select the right edge and set overlap pixels
  - [Shift]: to shift image edge location and implement [Edge Mask] function for non-overlapped edges with black background.
  - [Gamma]: select correct gamma for overlapped area and [Offset] compensation area to eliminate banding effect.
  - [Corner]: to do precise [Offset] location alignment.
  - [Offset]: to do black level uplift in non-overlapped area to compensate light leakage in projectors.
  - [Color]: to do White Balance correction for individual projector.
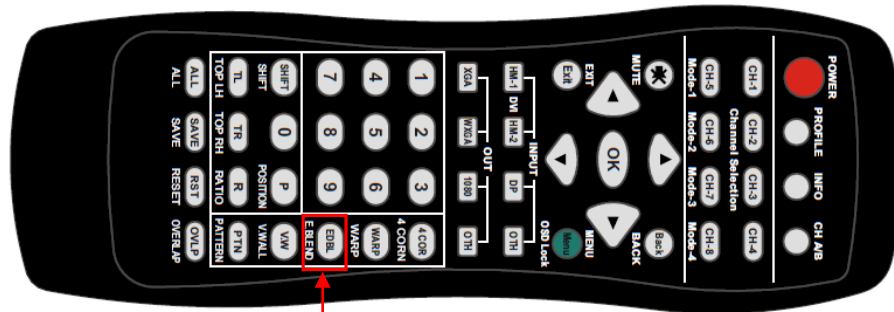
[Edge Blend] hotkey

10.1 [Edge]: select location and set edge blending value

➢ [Edge] is to select the edge for edge blend and set overlapped pixel number.

➢ User can execute edge blending at any edge.

➢ Maximum edge blend pixels are H=1920, V=1200.

➢ Color indicating lines will appear when set edge blending pixels.

➢ User needs to adjust the color indicating lines to match together (green to green, red to red).

There is no need to calculate the overlapped pixels.

For 3 projector edge blending as example:

• To select [Right Edge] for LH projector

• To select both [Right Edge] & [Left Edge] for center projector.

• To select [Left Edge] for RH projector

10.2 [Shift]: shift Edge Blend position for color fine tune and execute Edge

❖ [Shift] has two functions: one is to shift [Edge Blend] location and another function is to do

❖ [Edge Mask] in not [Edge Blend] borders.

❖ When user selects the edge with [Edge Blend], user can apply "+" value (0 to +500) to shift the whole [Edge Blend] position. If the value is "-" (0 to -100), user can see color uplift in [Edge Blend] area. The purpose is for user to do color fine tune in edge blending area.

❖ When user selects the edge without [Edge Blend], [Shift] will change image border location with black background without changing image position. It implements [Edge Mask] function follow the final result after geometry alignment without changing aspect ratio. It can execute curved edge mask up to maximum 500 pixels after geometry alignment.

❖ [Shift] is to shift [Edge Blend] location in

❖ [Edge Blend] edge. If the value is set to "-", it will uplift the color in edge blending area.

❖ It can execute [Edge Mask] on the edges in non-overlapped region.

10.3 [Gamma]: Color correction in edge blending area

❖ Different projectors may have different gamma curve. Different "Display mode" in the same projector will also have different gamma curves. These gamma curves will affect projector color and the final color in edge blending area. The common issue is gray or color banding effect. These issues are more significant in pure color or white back ground display.

[Gamma] function is to adjust the gamma curve in edge blending area for each projector through independent RGB gamma curve adjustment. It will improve video quality in overlap region.

❖ User needs to select right display mode (gamma curve 2.2 is the best gamma value in the projector setting) and fine tune the color difference among the projectors to minimize the possible banding effect in edge blending region.

❖ [Gamma] function is not functional when [Edge] setting is not executed.

Three sub-menu under [Gamma] menu:

1. [Transition]: To set edge blending area gamma value via discrete RGB gamma curve value adjustment.

2. [Gain gamma]: To do gamma curve fine-tune in each projector. It can further improve edge blending result, especially while two adjacent projectors have different gamma curve.

3. [Offset] gamma: It will apply to each projector separately and is only available while implement black level Offset adjustment. It determines the percentage of the Black Level [Offset] effect in different brightness level in source signal.

❖ Please note:
  • The major reason for banding effect in edge blending area is related to projector color setting and gamma curve. All projectors shall have the same gamma setting and [Display Mode].
  • Please disable [Dynamic] color or [Brilliant] color function in the projectors. These functions may change gamma curve based on the content and affect final edge blending image quality.
  • [Offset] gamma adjustment can be served as a tool to compensate the brightness difference between two projectors. It is only functional when user applies Black Level [Offset] function.
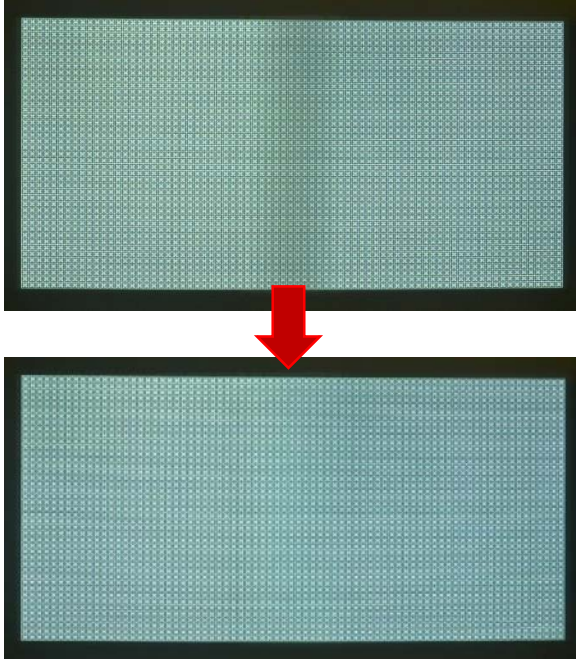
Left picture is to show banding effect in edge blending area.

This issue can be due to many factors:

- Screen: gain value under 1.0 is recommended
- Projector: shall be the same model with the same gamma and Display Mode settings.
- Usually DLP Laser projector will get the best result due to accurate gamma and color.
- Signal content: to avoid pure color or pure white color content. Multimedia is the best.
- Overlap range: too small overlap range will cause banding effect. 20%-40% with more than 60 cm width is recommended.

10.4	Black level uplift: [Offset] & [Corner] adjustment
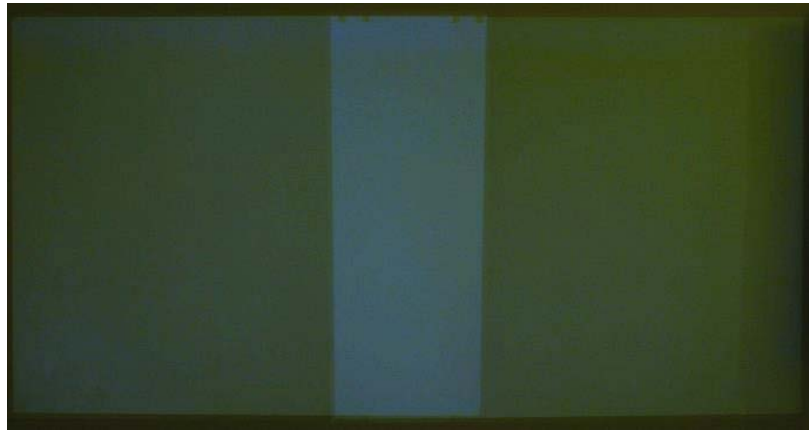
- ❖ If the ambient light is dark, audience will see grey region in Edge Blending area. It is due to light leakage from projector optical system and can't be fixed by signal processing. Low contrast ratio projector will be more serious. The only solution is to apply [Offset] function to uplift the color in non-transition area to compensate the visual color difference.
- ❖ Projector with higher native (not dynamic) contrast ratio will have less light leakage. Usually, DLP projector will have higher contrast ratio with better result. Laser projector has high contrast ratio with accurate color and gamma setting and is suitable for edge blending.
- ❖ [Corner] function is to do accurate position alignment.

[Offset] is to set the level for color uplift. It should be determined based on the brightness level in overlap region.
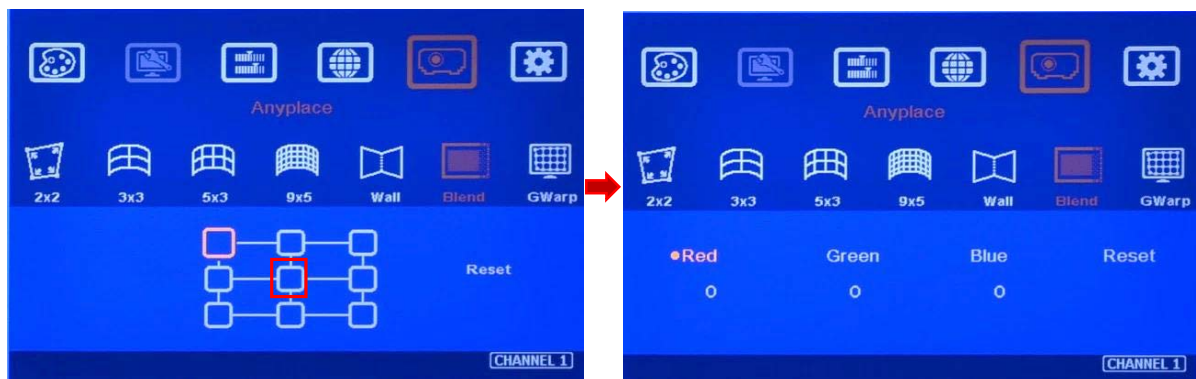
- ❖ For projector with horizontal edge blending, please select center region of the [Offset] block, then adjust RGB offset value to around 100 each.
- ❖ If user executes more complicated edge blending such as 4 projectors at 2x2 location. The maximum areas for black level uplift may increase up to 9 locations. Under this condition, user needs to select more areas for color compensation. Please select the region, to do RGB color adjustment, then back to [Corner] menu to adjust accurate location for color compensation. If RGB value is set to zero, the background color will remain the same as not adjusted.

❖ Adjust the correct location for black level uplift by [Corner] menu.

❖ When user adjust the location of the control points, user will see the change of color uplift position. If the projector is at RH side, please adjust LH control points to RH side till to the edge of the light leakage region. This region starts from original projection area before geometry alignment. It is not the same as overlap area.

❖ The maximum adjustment range is +_900 pixels in vertical direction and +_1200 pixels in horizontal direction.

❖ After this step, user will see clearly the black level uplift region and back to Offset color settings to let the color in uplift region is similar to light leakage area.

❖ Projector display imager, such as DMD, LCD and LCOS, will have some image borders due to active display window is not at full range of the imager. In dark environment, viewer may see this kind of light leakage in image borders. It is outside active display area and can't be fixed.

❖ Below is to show color adjustment in black level uplift areas through above method. It can show different colors with different shape of the borders. Maximum adjusting area is nine.

❖
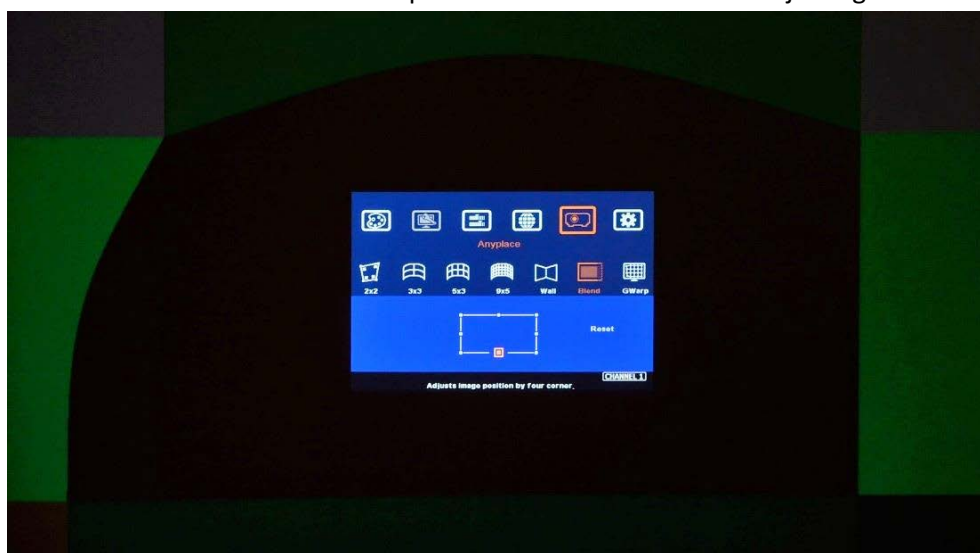
The [Color] function can be applied to individual projector for white balance and color difference correction through separate RGB Gain and Offset adjustment. It will be helpful to compensate projector color difference, lamp brightness decay and lamp replacement issue. Through [Color] adjustment, it will improve the video quality in the background and edge blending result.
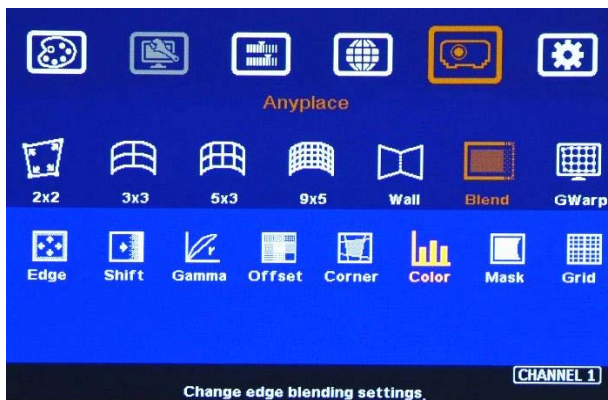
❖ Under [Color] menu, user can adjust separate RGB [Gain] and [Offset] value to change the color and white balance in each projector.

❖ [Gain] is to change the color slope and will see significant in brighter color.

❖ [Offset] is to add value in all level of brightness (0-225). User can see more effect in darker color.

❖ When apply [Color] adjustment, it will affect entire color in the projector. Please check with different video contents and minimize the side effect.

In edge blending procedures, user needs to adjust the color from projector first. If it is still not enough, user can use [Color] function to do further adjustment. Please note that, any color adjustment will reduce the color dynamic range. User needs to check the result with full range color image.

10.6 Edge [Mask]

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

- ❖ [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.
- ❖ Edge Mask]: 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 [Shift] is based on the image position after geometry alignment and the range for [Mask] is calculated from the original edge position before geometry alignment and before [Shift] edge adjustment.
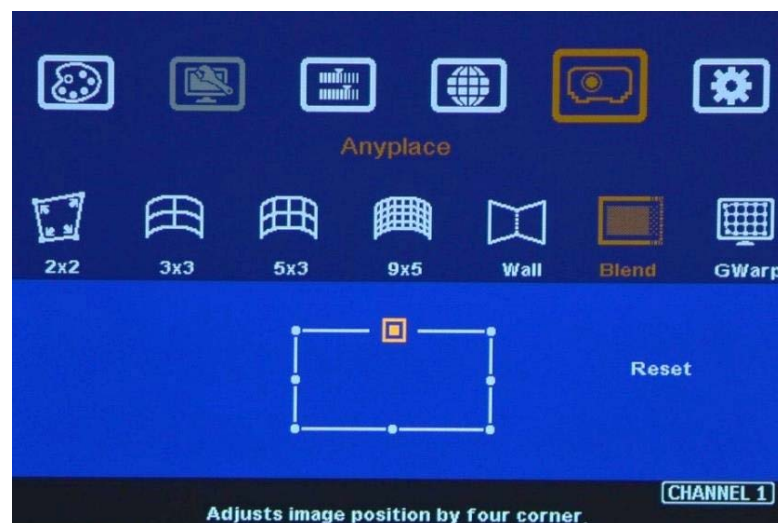
Original Image after geometry alignment

Image [Shift] (Follow geometry curve)

Image [Mask] (executed by 8 control points

Another Image [Mask] example
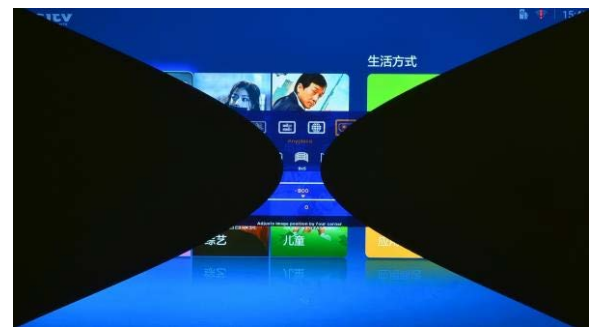
10.7 [Grid] (Please see more details in Section 8.2

❖ 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 from 8 to 100 pixels with 1-pixel increment. H&V grid size will be the same. User can select grid size under [Edge Blend] menu.

❖ Default grid size for both H&V directions are 32x32.
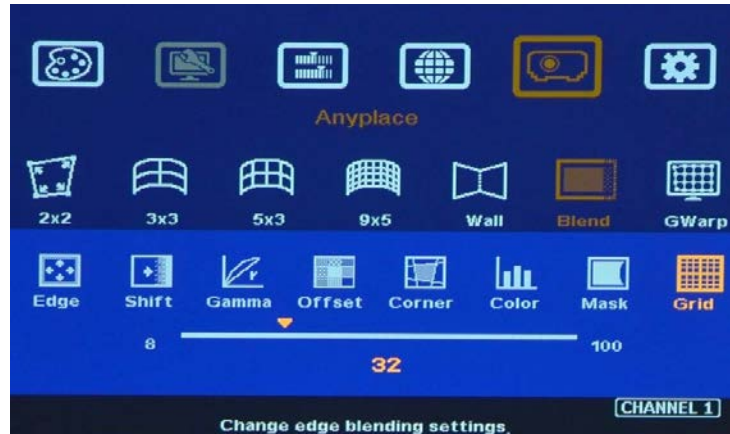
10.8 Final image quality fine-tuning

❖ The final performance will be a combination of many factors—projector characteristics, projector setting, screen, ambient light and EdgePro setting.

❖ Banding in overlap area under dark environment is caused by light leakage in the projector optic system. It is not possible to be fixed by signal manipulation. The only way is to raise the black level in none overlap area through [Offset] menu.

❖ EdgePro edge blending gamma setting range is from 0.9-3.0 and default setting is 2.2 gamma curve. Select projector display mode near 2.2 gamma setting to get the best results.

❖ The projector may retain light leakage near the border (about 20 pixels) of the imager (micro display—DMD or LCD). It is not possible to be fixed.

❖ The factors affect final image quality

1. EdgePro settings:
   - Edge Blending settings: Gamma (Transition, Gain), Shift (at "–" value), Offset, Color
   - Image Properties: To select Preset Mode to Neutral, sRGB or Bluish
   - Individual projector color adjustment by [Color] function under [Edge Blend] menu.

2. Projector:
   - Ultra-short throw ratio projector is not recommended for edge blending, especially in curved screen edge blending.
   - To reserve enough overlap area—0.6m-1.2m in width or 20%-40% (based on single projector native resolution) is recommended.
   - To adjust image position of the projector and reduce keystone angle.
   - Increase Overlap region & reduce off axis angle
   - To rest projectors with the same settings.
   - To select Display Mode. Usually Standard, sRGB/Neutral will get better result.
   - To disable projector Brilliant color adjustment or Dynamic color adjustment.

- Try different color settings in the projectors.
3. Screen: To use lower gain value screen.
  - Short throw projectors with high gain screen may cause banding effect when watch from different viewing angles due to different reflection intensity.

11		
7.1		**Example for 3 projector edge blending procedures**
7.1.1		**Get detailed edge blending information through Excel Spread Sheet**
		Assumption

❖ Input signal resolution: 3840*800 (Pixel pitch is 1.7mm, allow 1.7m watching distance, optimized vertical resolution is the same as projector native resolution: 800)

❖ Number of projectors: 3 projectors at 3x1 horizontal position

❖ Projector resolution and lumens. 1280*800 (native resolution), 3200 Lum

❖ Required image size (screen size): 6.5m*1.5m

❖ Overlap pixels and dimension. 8 grids=8*32= 256 pixels

❖ Projector throw ratio: 1.2-1.7 (based on projector spec)

11.1.2 Excel calculation

Project basic data

Source resolution (H)	3840	Screen width	6.5	(m)
Source resolution (V)	800	Screen height	1.50	(m)
Projector resolu. (H)	1280	Projector lumen	3200	(Lum)
Projector resolu. (V)	800	Screen Aspect ratio	4.33	(required)

Overlap pixels (32 pixels per grid) — Overlap % — Recommended

Overlap pixel (H)	256	20.0%	20%~40%
Overlap pixel (V)	0	0.0%	25%~40%

Recommended overlap region: Min. 192 pixels or 50 cm width

Qty of projector (H)	3	Throw ratio (Min)	1.2
Qty of projector (V)	1	Throw ratio (Max)	1.7

Final output resolution

Horizontal resolution	3328	* Please apply Overlap pixels with 32x
Vertical resolution	800	because internal grid size for geometry
Extended pixel (H)	98	adjustment is based 32x32 for each grid.
Extended pixel (V)	0	

Final result checking list (PJT: Projector)

Final Image size (meter)		Final Illuminance Lux (Lum/m2)		Image size for each PJT	
Width	6.50	PJT lumen	3200	Width (m)	2.500
Height	1.56	Final Illumin	819	Height (m)	1.563

Overlap region size		Original aspect ratio		Projector throw distance	
Horiz. (m)	0.500	Projector	1.60	Min (m)	Max (m)
Vertic. (m)	0.000	Final result	4.16	3.00	4.25

* Final image height should be equal or larger than screen. User can shrink image to have the same image height as screen by GeoBox geometry adjustment.
* Standard luminance is 400-800 Lux for restaurant and big conference room, 1000-1500 Lux for trade show. 3D: 500 Lux (single projector)
* Theater: 172 Lux (16 foot-lamberts), SMTP display standard: 377 Lux
* Final brightness of the screen needs to multiple gain value of the screen.
* The actual installation image size should be equal or larger than expected size.
* The best content resolution is the same as Final output resolution in cell D15& D16.

* Illuminance: 1 Lux = 1 lumen/m2 = 0.0929 foot-candle
  Luminance: 1 Lumen/m2/Steradian= 1Nit =0.29186 Foot-Lambert

Video wall setting value

Position of projector (H)	1	2	3	4	5	6	7	8	9	10
LH edge overlap value	0.0	98.5	196.9	x	x	x	x	x	x	x
RH edge overlap value	196.9	98.5	0.0	x	x	x	x	x	x	x

* When execute Video wall setting, user needs to connect the signal with the same resolution as [Source Resolution] in this Spread Sheet.
* When Overlap value has decimals, user can take the nearest integer value. After finishing setup, user can adjust Overlap value again to get the clearest image.

Position of projector (V)	1	2	3	4	5	6	7	8	9	10
Top edge overlap value	0.0	x	x	x	x	x	x	x	x	x
BTM edge overlap value	0.0	x	x	x	x	x	x	x	x	x

❖ Input the data in yellow column. User will get calculation result.
Final image size for each projector: 2.500m*1.563m

- ❖ User can use geometry alignment to draw the vertical height to the dimensions you need. The final image height is 1.5m after geometry alignment.
- ❖ Optimized content resolution: 3328*800 (This is the ideal resolution for the content and EDID).
- ❖ Installation distance: 3m-4.25m (based on through ratio 12-1.7).
- ❖ The overlap value in video wall setting:
  - o Projector LH: select RH edge: +197
  - o Projector (Center): LH edge=+98, RH edge=+99 (total 197)
  - o Projector RH: LH edge: +197
- ❖ The final luminance is 819 Lux. It will be enough for inside room environment.

11.2 Mark image location and install the projectors

- ❖ After Excel Spread Sheet calculation, user can understand the final image position for each projector. Please mark image position by paper adhesive tape on the screen. The positions should include 4 corners of the image for each projector and horizontal center line of the screen. Laser level is an ideal tool for marking center line, horizontal and vertical image positions.
- ❖ Please install the projector at the best position to cover the required area with minimum keystone adjustments on both sides.
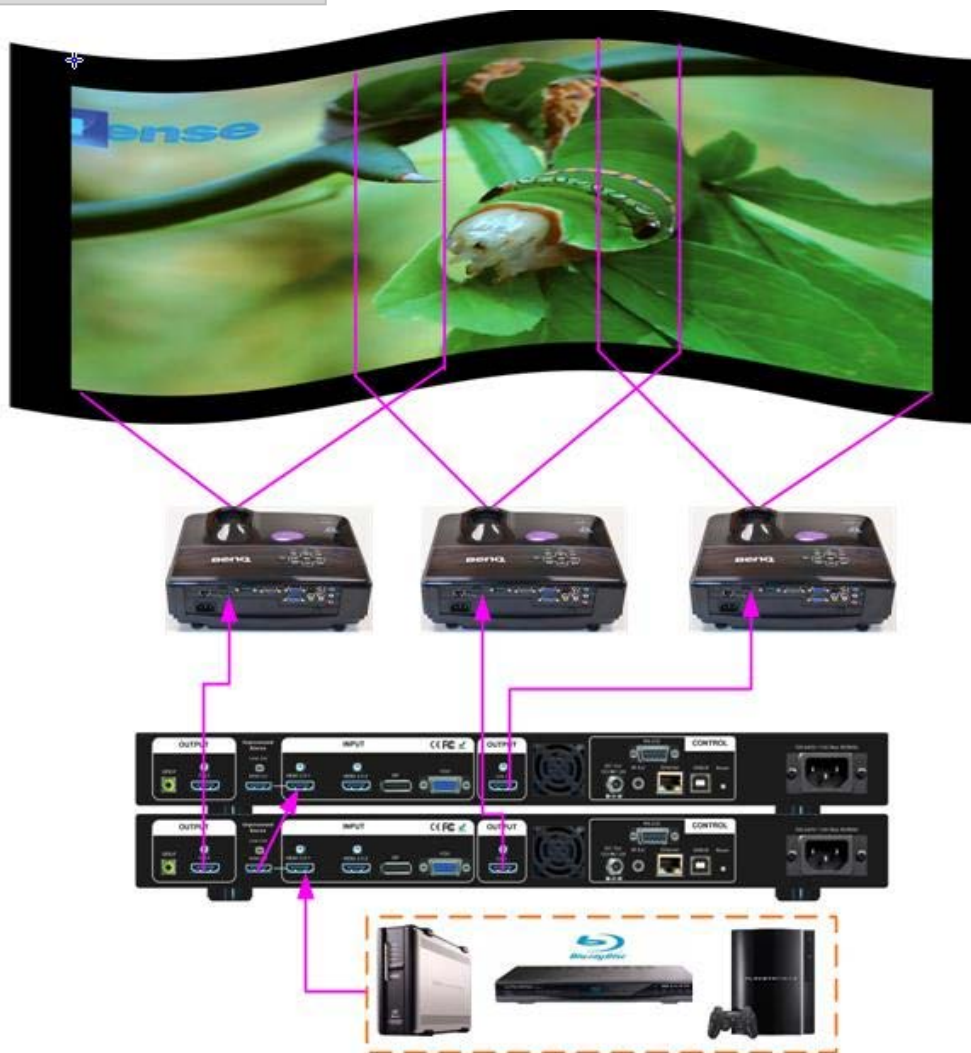
- ❖ Only the input signal from HDMI 2.0-1 input port can be looped out.
- ❖ Input signal can be connected to any EdgePro input port and looped out to next unit.
- ❖ If controlled by IR remote controller, please install two IR extender at different location for easy individual access by remote controller. Each EdgePro needs one IR extender.
- ❖ User can setup EdgePro through Ethernet. Please change IP address in each EdgePro so that user can setup each unit separately through WebGUI or Windows PC tool.
- ❖ Select input port and set EdgePro output resolution to be the same as projector native resolution.

11.4 Projector settings

- ❖ Reset projector to default setting.
- ❖ Disable dynamic color adjustment and DLP Brilliant color adjustment.
- ❖ Disable Auto Keystone function.
- ❖ Select a Display Mode with 2.2 gamma curve will reduce the color difference in overlap area. If necessary, please choose a Display Mode with the best result.
- ❖ Use projector internal color adjusting function to adjustment the color variation among projectors before implement edge blending.
- ❖ Install projectors at a place with image size that can cover required image area and with minimized keystone to get the best video quality.

11.5 EdgePro settings

- ❖ To reset EdgePro to default setting.
- ❖ Select input port.
- ❖ Select output resolution to be the same as projector native display resolution.
- ❖ Check input/output LED indicators and make sure to have correction system connection.
- ❖ Set Box ID with #1 & #2 for each EdgePro (under Options→ Setting→ Box ID menu).
- ❖ If control by Ethernet, please set different IP address in each EdgePro (under Options→ Setting → Network menu).

11.6 Geometric alignment

| Grid pattern | Warp ([3x3], [5x3], [9x5] alignment) | [2x2] (4 corner alignment) | Channel selection |
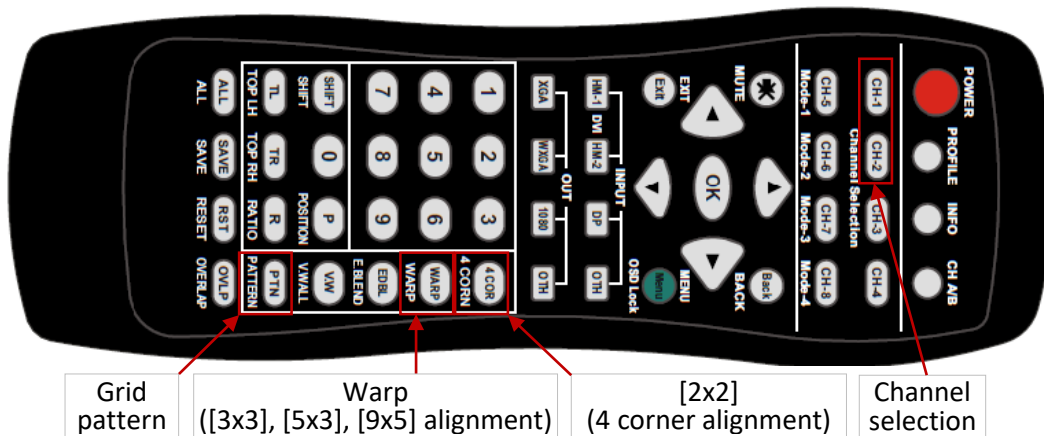
- ❖ User can install IR extender receiver separately near each projector for easy EdgePro operation. If multiple units of EdgePro are used and IR receivers are put together, please set
- ❖ [Box ID] for each EdgePro so that user can control each EdgePro separately through [85x] command. Press number keys in Remote Controller following OSD menu for the control of multiple EdgePro:
  - 850: will activate all EdgePro. User can execute simultaneous control for all EdgePro
  - 851: activate only ID #1 EdgePro for further control.
  - 852: activate only ID#2 EdgePro for further control.
- ❖ Use [Pattern] & [CH-1/CH-2] selection keys to show grid patterns in all projectors. Press
- ❖ [Pattern] key again will change grid color. To set two different pattern colors in adjacent projectors will be more convenient during geometry alignment.
- ❖ If user finds the grid size between adjacent projectors is different. Some possibilities:
  - The projection image sizes between two projectors are different (Zoom setting or projection distance is different).
  - Output resolution settings in different EdgePro are not the same.
  - Projector aspect ratio setting is different or not set at full screen display.
  - EdgePro is set at [Original AR] under the menu of [Image Properties]→ [Scaling] menu.
- ❖ Please follow the sequence [2x2]→ [3x3]→ [5x3]→ [9x5] to do geometry alignment to ensure entire image will have uniform scaling factor.
- ❖ Apply [2X2 Corner] geometry alignment and draw the corners to expected locations. It doesn't matter to have some image inside the screen once it covers entire screen before 4 corner adjustment. [Warp] alignment will adjust the image position back to the required position.
- ❖ If user doesn't execute AVENVIEW Excel calculation, please use [2x2] alignment and try to let all projectors have similar image size with the overlap area having the same grid number.
- ❖ Apply [3x3 Curved] geometry alignment to let 9 adjusting points be located at the required position including four corners, edge center points and center line position.
- ❖ Please use [5X3] & [9x5] for further geometry alignment and fine-tune. [9x5] warp function has Linearity Grid Line adjustment function for smooth the grid size on curved screen.

❖ After finish the alignment, user can use [2x2] for complete image position fine tune. If user executes [3x3] alignment again after [9x5] alignment, [9x5] grid position will be reset and only keep [3x3] grid point information.

❖ In ideal condition, all grids in edge blending area between two adjacent projectors should be aligned together.

❖ After the above processes, if the grid pattern in edge blending area still can't stack together, user can reduce overlapped grids to change the control point positions in adjacent projectors and get more accurate geometry alignment result.

❖ [EdgePro Windows Software] PC tool can provide 17x17 grid point adjustment with quicker geometry alignment.

❖ After finish geometry alignment, all grids should be matched together.

[Overlap] hotkey   [Video Wall] hotkey   Channel selection
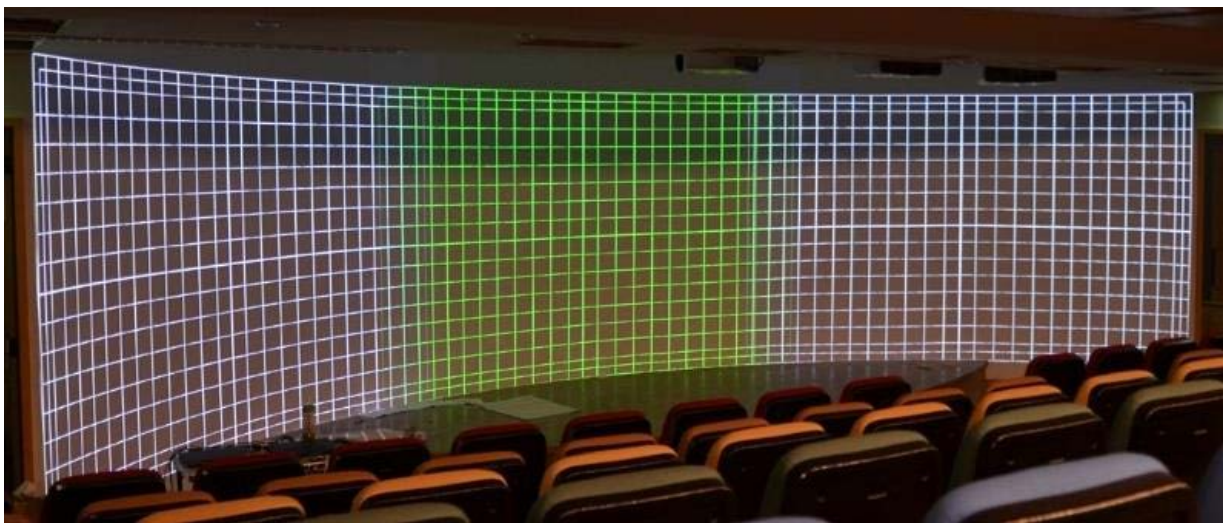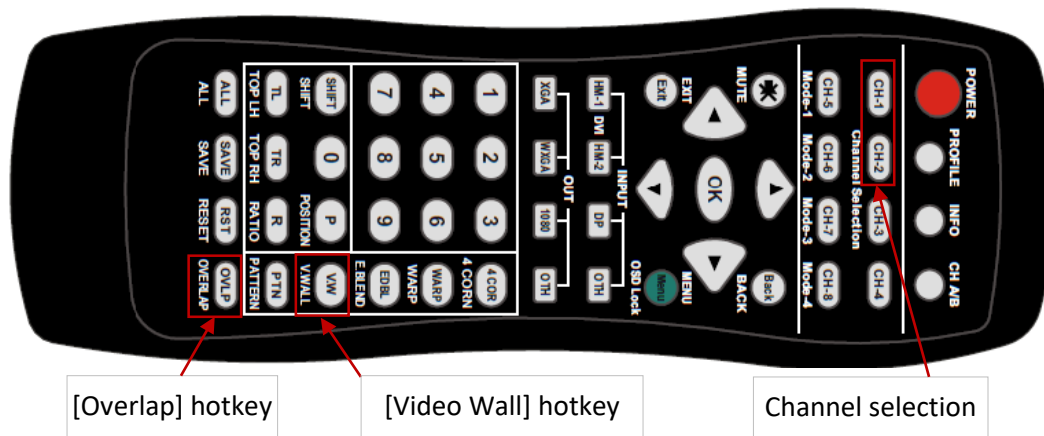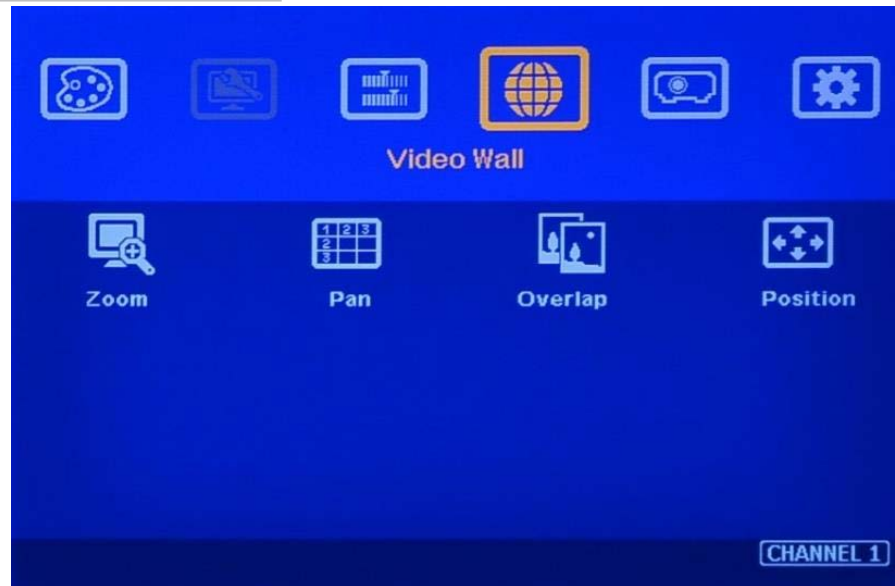
❖ Click [INFO] key to check if correct input and output timing is in the system. User needs to apply the same input/output timing as AVENVIEW Excel spread sheet calculation.

❖ Example for [Video wall] settings for 3 projectors horizontal edge blending with two EdgePro cascaded:

     o   [Zoom]: set to H=3, V=1 in all channels. Each channel should be set separately.

     o   [Pan]: LH projector (1st): H=1, Center projector (2nd): H=2, RH projector (3rd): H=3. All projector Vertical PAN is the same: V=1.

     o   [Overlap]: select the correct edge and apply the value calculated from AVENVIEW Excel file

     o   LH projector: RH edge, Center projector: both RH/LH edges, RH projector: LH edge

- o Below is overlap value calculated from AVENVIEW Excel under below condition:
  - Input: 3840*800, Output: 1280*800, Overlap pixels: 256, Projectors: 3
  - Horizontal Overlap value: Projector 1 RH edge= 197, Projector 2 RH edge= 98, LH edge= 98, Projector 3 LH edge=197
  - Vertical values in all projectors are set with the same "V=0".

Video wall setting value

Position of projector (H)	1	2	3	4
LH edge overlap value	0.0	98	197	x
RH edge overlap value	197	98	0.0	x

Position of projector (V)	1	2	3	4
Top edge overlap value	0.0	x	x	x
BTM edge overlap value	0.0	x	x	x

❖ For dual projector edge blending, user can apply still image, select correct edges and adjust
❖ [Overlap] value simultaneously and let the image in edge blending area comes closer till without double image. Two projectors shall have the same value (same cropping range). The difference shall not be over 2 pixels.
❖ If user still sees some blurred image in edge blending area, please increase or decrease
❖ [Overlap] value in [Video Wall] setting to improve video quality.
❖ Please note that projector has Thermal Drift issue (position shift due to different temperature). The image position in power ON stage may be different from the position after 15-20 minutes when the position is stable. Don't adjust image position during this period until it is stable.

11.8 [Edge Blend] setting
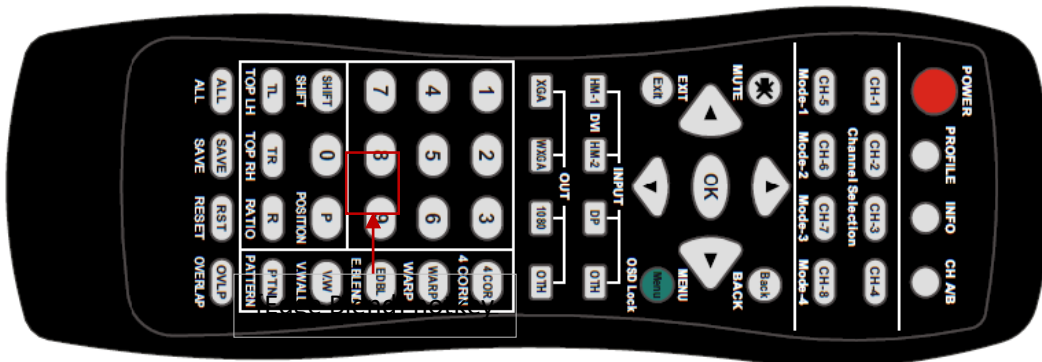
❖ Select correct Edge for the edge blending:
  - o LH projector: RH edge, Center projector: RH & LH edge, RH projector: LH edge
❖ RED and GREEN indicating lines will appear when increase edge blending pixels.

❖ User needs to adjust the color indicating lines to match together (green to green, red to red) and will see the final result.

11.9	Final Image quality fine-tune

❖ If banding effect is visible in overlap area, please try below method:

- EdgePro [Gamma] adjustment: Please try to adjust Gamma value in [Transition] & [Gain] menu and adjust [Shift] value to "-" to do color uplift in the edge of overlap region.
- Projector adjustment: please try to change projector settings
  - o All projector should have the same setting.
  - o Select color profile with gamma 2.2 will get the best result.
  - o Check Display Mode. Usually Standard, sRGB modes will get better result.
  - o Disable projector Brilliant color or Dynamic color adjustment.

❖ The video quality in overlap region is related to many factors. Please see more details in [Final Image quality fine-tune] section.

After finishing system settings, user can save the setting by [Save] hotkey in remote controller or OSD menu through [Menu]→ [Options]→ [Setting]→ [Profile]→ [Save]→ [Index 1-5]. [Save] Profile will take effect for two channels at the same time.
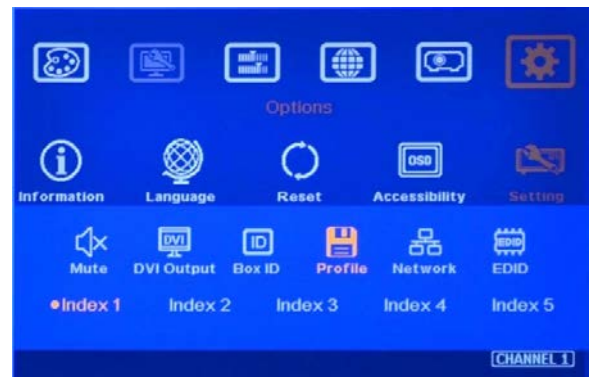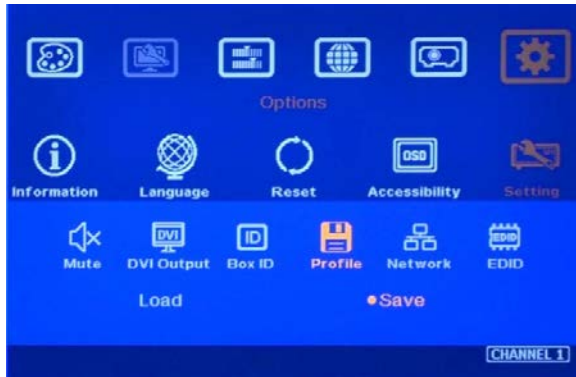
❖ User can recall (load) the setting through IR remote controller, WebGUI or EdgePro Windows Software.

❖ Five 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.

❖ When user power off the system, EdgePro will save user setting without loss even the setting is not saved into Profile Index, unless someone to change it.

❖ When system has been reset from OSD menu or update new Firmware, Profile data will be still kept inside EdgePro.

❖ Hotkeys for Profile [Save] and [Load]
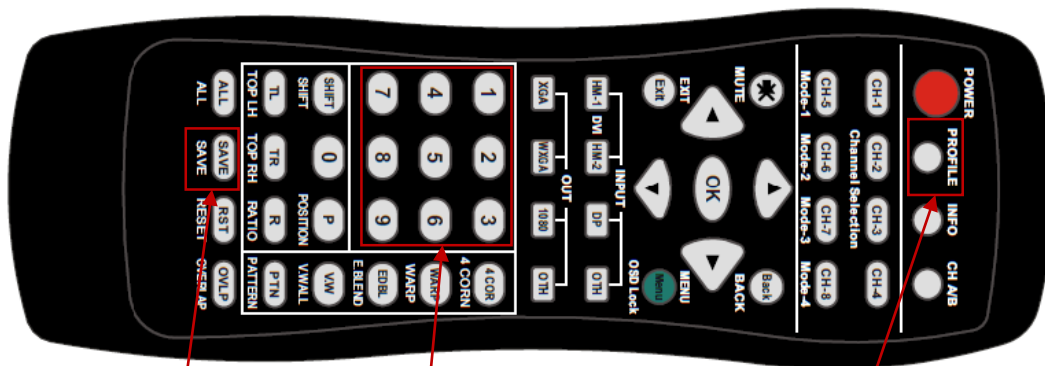
Press [Save], then select [Index #] and press [Enter] to save settings

Number keys for Profile [Load]

Press [Profile] hotkey, then select number keys on the remote control (not through OSD direction keys) to [Load] user settings

- ❖ Connect input signal to EdgePro HDMI 2.0-1 input port and looped out to next unit. No special sequence is required.
- ❖ In big scale display application, no limitation in the number of EdgePro. The key point is that the system resolution needs to meet the requirement.
- ❖ In multi-unit application, only HDMI-1 signal can be cascaded through internal HDMI splitter. If user wants to do edge blending with other input ports, please add video distributor at the front end and feeds the signal to all EdgePro.
- ❖ User can control EdgePro through Ethernet, USB or remote controller.
- ❖ IF EdgePro is installed in control room, Ethernet control through WiFi will be the most convenient. Notebook, mobile phone and Pad can execute EdgePro setup through WiFi.
- ❖ User can set individual Box ID and IP address for easy independent control of each EdgePro.

❖ Select input port and set EdgePro output resolution to be the same as projector native resolution.

❖ User needs to apply a signal source while executing video wall [Overlap] value setting. The Signal source resolution should be the same as per the Excel calculation. To apply 1080p or 4k signal is recommended. After system setup, user can use any input resolution.

❖ Press [INFO] hotkey to check if the final in/out timings are the same as expected.
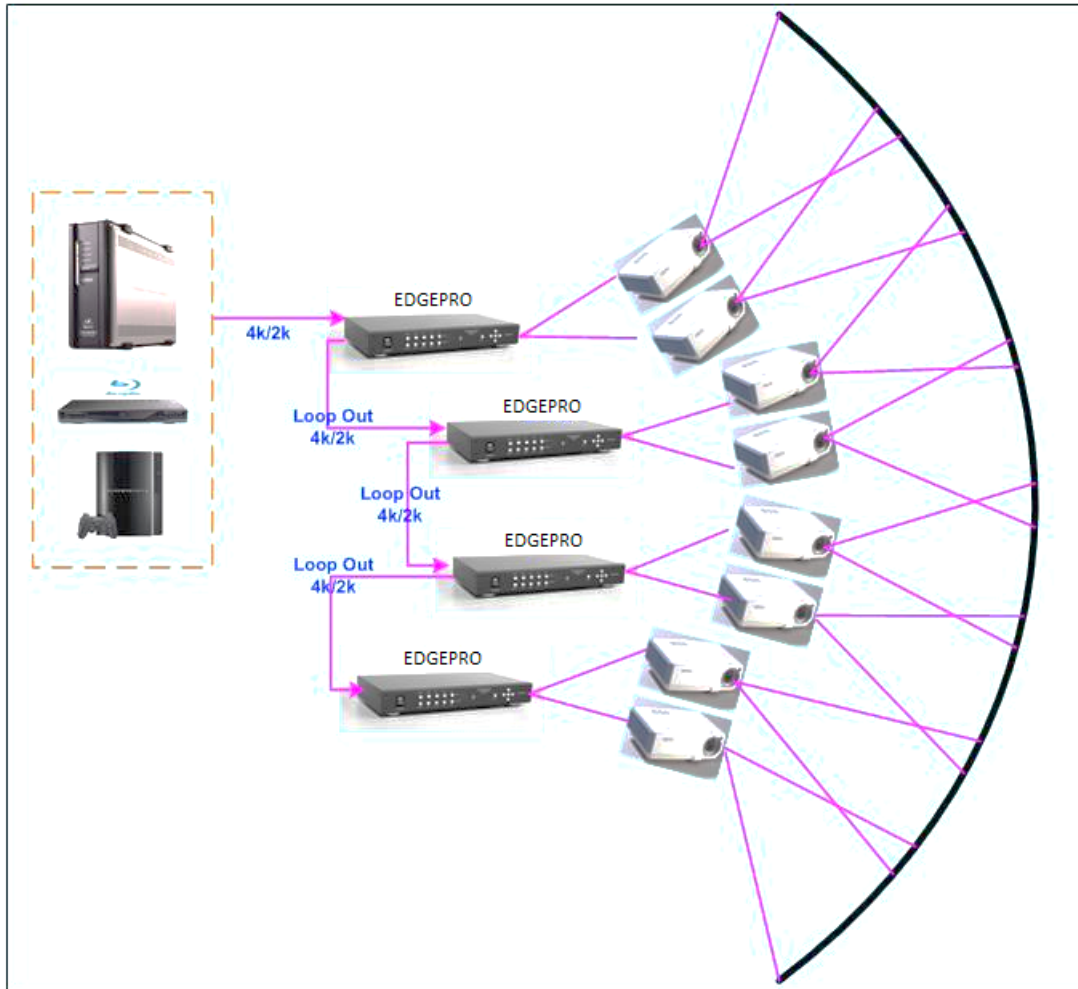
Usually, one 4k signal source can be applied for up to 20 meters screen through 4x EdgePro & 8x projectors. If bigger screen is required, user can apply multiple signal sources through multiple synchronized media player or multiple output display card to achieve higher system resolution.

If the system is larger than 20m, usually, multiple 4k signal source is required to get good enough video resolution. Below are some important points:

❖ User needs to split the content into different sections and each section is played back by one PC or media player.

❖ These PC or media player needs to be synchronized.

❖ The EdgePro can crop the right overlap pixel inside one content for each projector but not for the pixel between two independent contents.

❖ The Overlap content between two independent signal sources shall be handles through below methods:

• To set Overlap image through PC display card. In this case, the overlap cropping issue in this section will be handled by PC.

• To cut the content with same content in overlap section for edge blending. The pixel size shall be larger than Overlap region and EdgePro can crop the right pixel for edge blending. User can use synchronized media player (such as BrightSign) or low-cost multiple output display card from PC.

• PC display card should be able to set overlap pixel up to 25% of the output resolution among the outputs. User can use similar function cards as Matrox TripleHead 2 Go, ATI Display Group, NVidia SLI Surround or NVidia Mosaic mode.
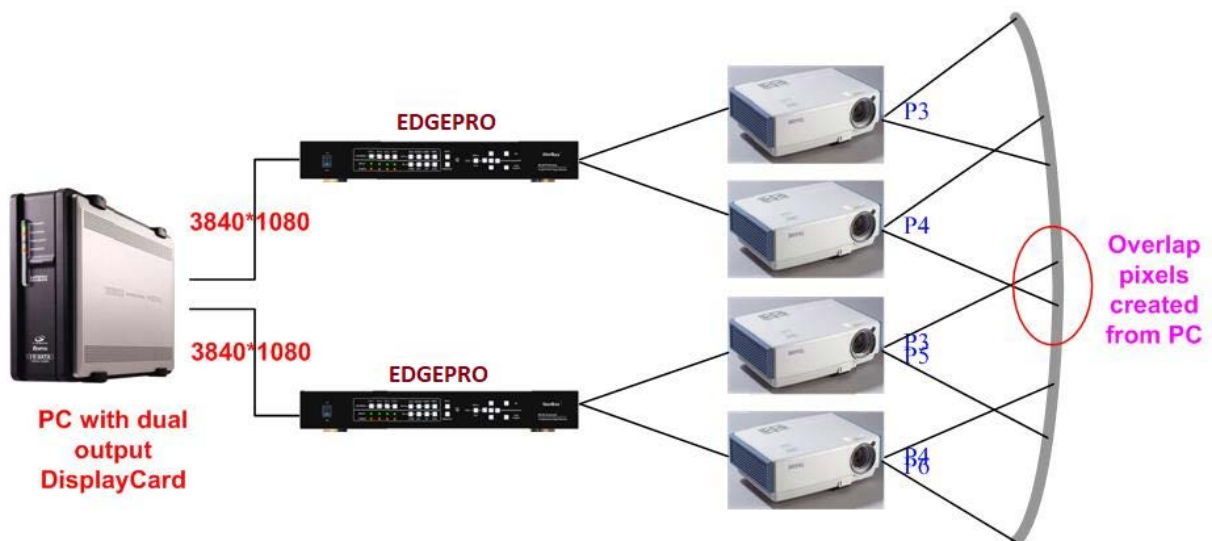
13.3 Convenient Setting and PC tools in multiple unit application

- Please see more details in [System settings: Box ID, RS232, Ethernet] section.

13.3.1 Setup by Remote Controller

- If multiple units are used, user can set different [Box ID] (#1 - #99) or IP address in each Box for individual control. For IR control, the [Box ID] number range is #1 - #9.
- When all EdgePro or IR extenders are installed together in the control range of single remote controller, user can do individual EdgePro control through below method.
  - Press ［851］, all the box OSD will be locked except ID #1. The LED light will be flashing in the locked unit and only ID #1 can be operated through OSD menu.
  - Press ［853］, all the box OSD will be locked except ID #3. The LED light will be flashing in the locked unit and only ID #3 can be operated.
  - Press ［850］, all the box OSD will be unlocked and can be operated through remote controller at the same time.

13.3.2 Setup by Ethernet

User can connect all EdgePro in one Ethernet Router (WiFi Router or switch/hub) through LAN ports and set different Static IP address for each Box, then use WebGUI virtual keys or Windows PC tool to control each EdgePro independently. Default IP address is 192.168.0.100. TCP Server port is 1226 and Telnet port is 23.

14 WebGui and PC tool

User can connect all EdgePro in one Ethernet Router (WiFi Router or switch/hub) through LAN ports and set different Static IP address for each Box, then use WebGUI virtual keys or Windows PC tool to control each EdgePro independently. Default IP address is 192.168.0.100. TCP Server port is 1266 and Telnet port is 23.

❖ WebGUI is embedded inside EdgePro. Once user connects EdgePro with PC through Ethernet, user can access WebGUI and execute all operation similar to OSD menu through Virtual Keys and OSD Menu. No PC or appropriate software tool is required.

❖ The connection can go through Ethernet router LAN port, WiFi Router or Crossover Cab 5/6 cable. User can set each EdgePro with different static IP address in the same domain, then open Google Chrome or Microsoft Explorer browser with IP address to access each unit of EdgePro for independent operation. There is no limitation in the number of EdgePro that can be controller at the same time.

❖ User can turn on/off the system through WebGUI or Windows and see the status through power indicator.

Virtual Key	Video Wall	Image	System	EDID

		UP	
MENU	LEFT	ENTER	RIGHT
		DOWN	

CH-1	CH-2		
XGA	WXGA	1080	OTHER
HDMI A	HDMI B	DP	
REBOOT	POWER	🟢	

❖ The Windows PC tool executed through a PC. Please download this tool from AVENVIEW website. Once user opens Windows and connects with PC through Ethernet or USB, user can execute all operations through PC keyboard and mouse. User can also backup system setting in PC and restore or copy to other units.

❖ Firmware and MCU code update can be executed through EdgePro Windows Software. User can control multiple units at the same time through different IP address.
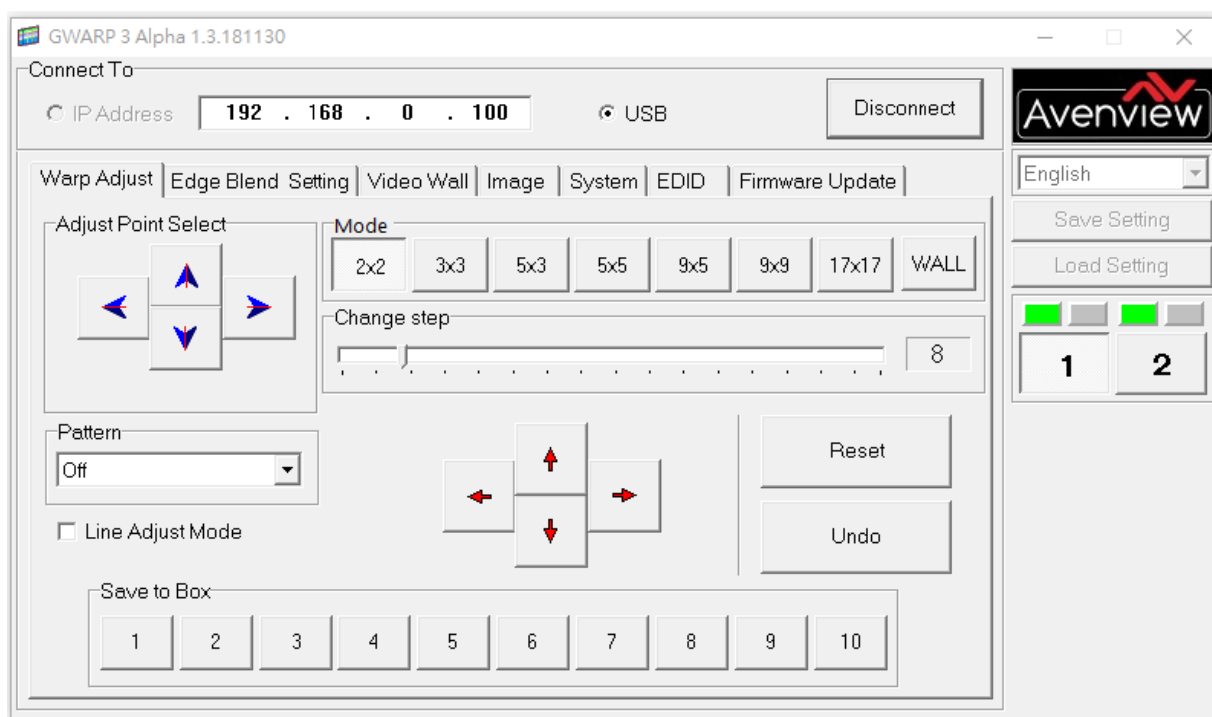
15   Advanced applications and settings
15.1   Immersive display with multiple projectors

User can use multiple projectors to execute Corner Wall display with the images from different projectors. Below is the example for a display with 3 walls and one floor to build one immersive display.

- ❖ 3 walls display: W1=2m, W2=5m, W3=3m
- ❖ Signal source: 3840x1080, EdgePro output resolution: 1920x1080

Usually, 5000 Lum projector can cover 3-4 meters image width. Four projectors are required to cover entire screen.

- ❖ W1: one projector is enough
- ❖ W2: require two projectors with edge blending to cover the space
- ❖ W3: one projector is enough
- ❖ Floor: 2-3 projectors is required.

Need to let all projectors with the same scaling factor to avoid image size difference among the walls.

- ❖ Total screen dimensions: 2.5+5+3=10.5m
- ❖ Total image width: 3840 pixels
- ❖ Pixel density: 3840/10.5= 366 pixels/m
- ❖ Assign image resolution for each wall to get the same scaling factor.

- ❖ W1 (PJ1) =366*2.5= 914 pixels (Projector #1)
- ❖ W2 (PJ2 & PJ3) =366*5= 1829 pixels (Projector #2 & #3)
- ❖ W3 (PJ4) =384*3= 1097 pixels (Projector #4)
- ❖ Based on the above data, if we convert the image location by coordinate, W1 is from 0 to 914, W2 is from 914 to 2743 (914+1829), W3 is from 2743 to 3840.

Video Wall settings:

User can set different Video Wall Zoom value for each projector separately. We assume to set Zoom at H=4, V=1 for all projectors

- ❖ W1: Zoom: H=4, V=1, Pan: H=1, V=1
    - o Overlap: 3840/4=960, 914-960= -46→ Right Edge = -46, Other Edge=0
- ❖ W3: Zoom: H=4, V=1, Pan: H=3, V=1,
    - o Overlap: 3840/4=960, 1097-960= +137→ Left Edge = +137, Other Edge=0
- ❖ W2: The image captured for W2 should be 1829. User needs to calculate Video Wall Overlap Pixel based on this resolution. If we set 320 overlap pixels, the overlap value in video wall is 86 pixels.

Source resolution (H)	1892	Screen width	5	(m)
Source resolution (V)	1080	Screen height	1.50	(m)
Projector resolu. (H)	1920	Projector lumen	5000	(Lum)
Projector resolu. (V)	1080	Screen Aspect ratio	3.33	(required)

Overlap pixels (32 pixels per grid)		Overlap %	Recommended
Overlap pixel (H)	320	16.7%	20%~40%
Overlap pixel (V)	0	0.0%	25%~40%

Recommended overlap region: Min. 192 pixels or 50 cm width

Qty of projector (H)	2	Throw ratio (Min)	1.1
Qty of projector (V)	1	Throw ratio (Max)	1.7

Final output resolution

Horizontal resolution	3520	* Please apply Overlap pixels with 32x
Vertical resolution	1056	because internal grid size for geometry
Extended pixel (H)	86	adjustment is based 32x32 for each grid.
Extended pixel (V)	0	

Final Image size (meter)		Final Illuminance Lux (Lum/m2)		Image size for each PJT	
Width	5.00	PJT lumen	5000	Width (m)	2.727
Height	1.53	Final Illumin	1195	Height (m)	1.534

Overlap region size		Original aspect ratio		Projector throw distance	
Horiz. (m)	0.455	Projector	1.78	Min (m)	Max (m)
Vertic. (m)	0.000	Final result	3.26	3.00	4.64

* Final mage height should be equal or larger than screen. User can shrink image to have the same image height as screen by Geo8ox geometry adjustment.
* Standard luminance is 400-800 Lux for restaurant and big conference room, 1000-1500 Lux for trade show. 3D. 500 Lux (single projector)
* Theater: 172 Lux (16 foot-lamberts), SMTP display standard: 377 Lux
* Final brightness of the screen needs to multiple gain value of the screen.
* The actual installation image size should be equal or larger than expected size.
* The best content resolution is the same as Final output resolution in cell D15& D16.

* Illuminance: 1 Lux = 1 lumen/m2 = 0.0929 foot-candle
Luminance: 1 Lumen/m2/Steradian= 1Nit =0.29186 Foot-Lambert

Video wall setting value

Position of projector (H)	1	2	3	4	5	6	7	8	9	10
LH edge overlap value	0.0	86.0	x	x	x	x	x	x	x	x
RH edge overlap value	86.0	0.0	x	x	x	x	x	x	x	x

Under this condition, the image cropped for PJ2 should be in the range from coordinate 914 to 1914.5 (914+1829/2+86=1914.5). The image for PJ3 should be in the range from coordinate 1742.5 (914+1829/2-86=1742.5) to 2743 (914+1829=2743).

- ❖ PJ2 Video wall setting: Zoom: H=4, V=1, Pan: H=2, V=1. The standard coordinate after Zoom setting will be from 3840/4=960 to 960*2=1920, Overlap value will be: Left Edge: 960-914= 46, Right Edge: 1914.5-1920= -5.5 (actual -5 or -6)
- ❖ PJ3 Video wall setting: Zoom: H=4, V=1, Pan: H=3, V=1. The standard coordinate after Zoom setting will be from 1920 (960*2=1920) to 2880 (960*3=2880), Overlap value will be: Left Edge: 1920-1742.5= 177.5 (actual 177 or 178), Right Edge: 2743-2880= -137
- ❖ After finishing video wall settings, user needs to set [Edge Blend] between PJ2 and PJ3 to finish complete system settings.

When executing edge blending, the image will be stretched and the aspect ratio will be changed. In order to reduce aspect ratio change, user can execute portrait edge blending to increase image height. When execute image 90/270 degrees rotation, the input source resolution is limited up to 4k/30 only.


- ❖ Some projectors are not suitable to be installed at portrait location. Laser projector has high contrast ratio, no limitation in installation angle and accurate color and gamma curve. It is the best choice for edge blending application.
- ❖ The EdgePro can rotate source image before edge blending. It will be more convenient for user to connect with all kinds of conventional signals without the need to rotate the image in advance.
- ❖ When apply portrait edge blending, the Excel Spread Sheet calculation also needs to change the output resolution. If the projector is 1920x1200, then user needs to input Output Resolution (projector resolution) at 1200x1920.
- ❖ The OSD menu will not follow rotated image. Video Wall setting direction will follow actual rotated image direction but not OSD direction.
- ❖ All the function settings under [Anyplace] menu will follow OSD menu directions but not follow rotated image direction. The items include geometry alignment & edge blending.
- ❖ Except for the directions, all the rest settings will be the same as normal display.
- ❖ Image rotation menu is under [Image Properties]

15.3	**Flexible display**

- ❖ When edge blending is implemented, the image aspect ratio will be changed.
- ❖ If the content has the same aspect ratio as the screen, the system can be setup to show no distortion image.
- ❖ In order to reserve flexibility for different user environments, EdgePro allows user to set different display modes to meet the requirements for different contents and source resolutions.
  - Case A: All-in-one: display one content across entire screen.
  - Case B: 1+1: independent content in each projector.
  - Case C: Maintain aspect ratio at the center: show content with original aspect ratio at the center. The adjusting range is 900 pixels in each edge. 900 pixels are calculated based on input source resolution.
  - Case D: Portrait Display to increase image height. User needs to execute [Orientation] settings under [Image Properties] menu if the content is at normal landscape direction.
  - User needs to re-adjust the [Overlap] value for edge blending after change the aspect ratio. User can reduce the same Overlap value at two projectors until see clear image.
- ❖ EdgePro setting for each case:
  - Case A: it is normal edge blending setting. Save the setting to Index 1 under [Profile].
  - Case B: user needs to reset all settings, select the input sources for discrete display and implement geometry alignment to separate the images apart from two projectors without overlap. Save the setting to Index 2.
  - Case C: After executing Case A for normal edge blending, user can do further [2x2] corner geometry alignment to move both side image borders to center direction till the location where customer requires. User also needs to re-adjust the video wall [Overlap] value to eliminate double image in overlap area. User can reduce the same Overlap value at two projectors until see clear image. Then save the settings into Profile Index 3. If the projector number is more than 2, user needs to check geometry alignment pixels at both sides and execute Excel Spread Sheet based on new source resolution. For instance, if original source resolution is 3840 and the image to be drawn back with 400 pixels at both sides, then the new Spread Sheet calculation should base on 3840-400x2=3040 pixels to get new Overlap value.
  - Case D: portrait edge blending. This is another case with projector installed at different direction. It is not a case that only executes EdgePro settings.
- ❖ User can store different settings into different profile Index and recall through remote controller, RS232 or Ethernet. Except for Case D, no projector installation or settings is required.

All-in-one

1+1

Original Aspect Ratio

Portrait Edge Blending
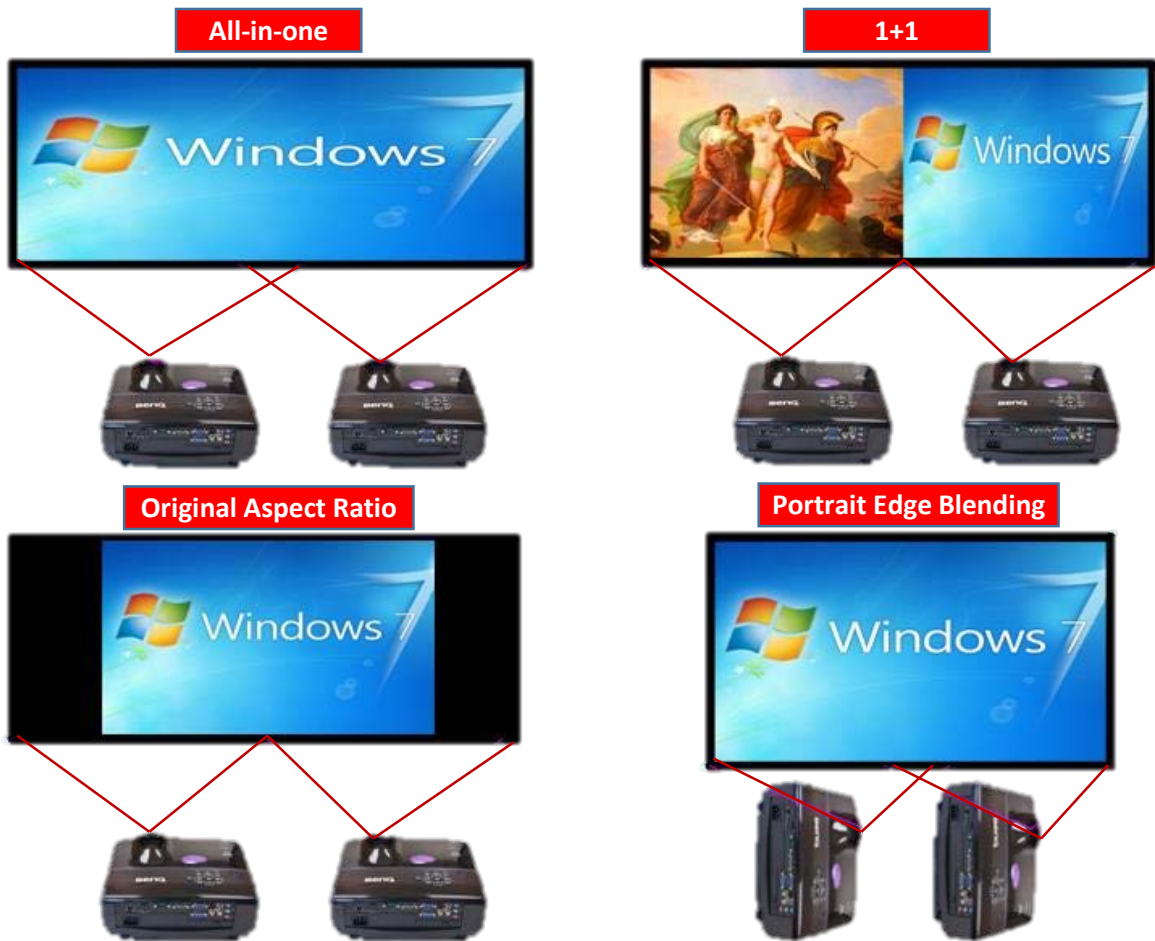
| 15.4 | Unique content displayed on each projector |

User can configure to show independent content in each projector. Below are the guidelines:

- Signal source selection: only one HDMI input source can be selected as discrete display input source. User can have below combination in two discrete displays.
- HDMI-1 + VGA, HDMI-2 + VGA, HDMI-1 + DP, HDMI-2 + DP, VGA + DP
- When execute discrete display, please reset [Video Wall] and Edge Blend] to default value.
- User need to use geometry alignment to let the images in projectors apart from each other.
- If necessary, user can use [Overlap] function under [Video Wall] to adjust image aspect ratio. This function can also let the image in overlap area apart from each other without change geometry alignment. However, Video Wall [Zoom] setting and [Edge Blend] setting shall be reset to default. In this case, the maximum source resolution should be under 4k/2k @30Hz.

15.5   Complete system aspect ratio adjustment

User can change the aspect ratio of the image with black borders 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. User can adjust [Overlap] value under

[Video Wall] menu to change the cropping area and achieve aspect ratio change.
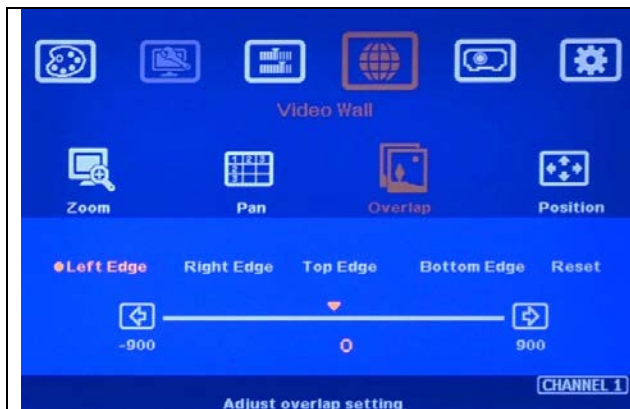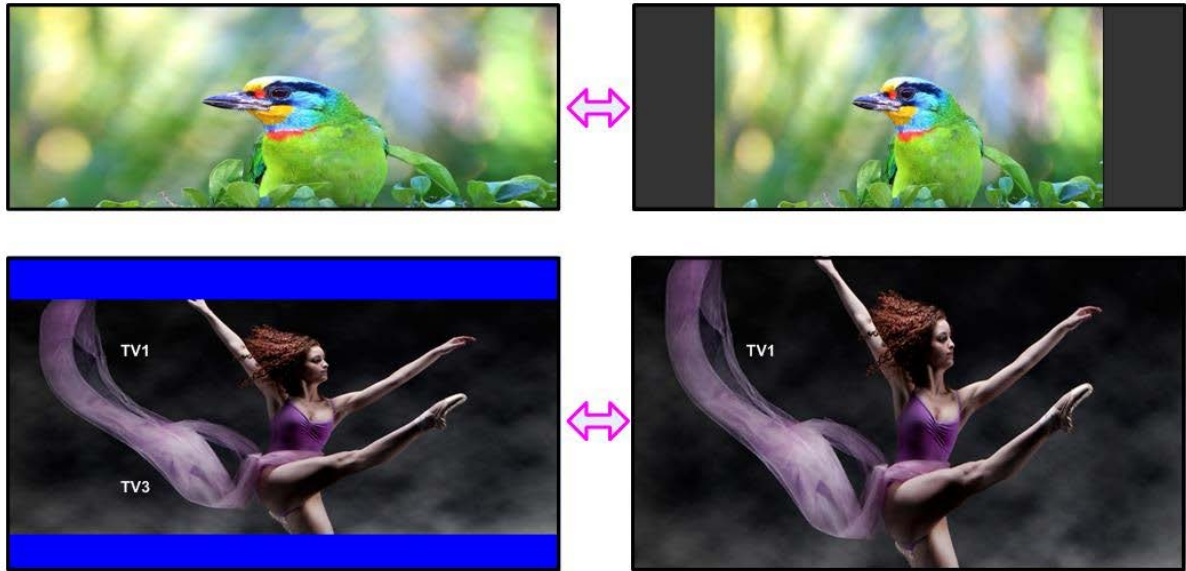
	Activate [Overlap] under [Video Wall] menu • User can select the channel and the edge required for edge shift, then adjust Overlap value to see aspect ratio change. • The image position shift range is +_1800 pixels in each edge.

❖ If the image is at portrait position or the Video Wall [Zoom] is set to H=1 & V=1, +-1800 pixels edge shift in RH and LH edges is only available under input signal up to 4k/2k @30Hz. Top Edge and Bottom edge are still functional when the input is 4k/60 with Zoom at H=1, V=1.

❖ If Video Wall [Zoom] is set to H=2 & V=2 or above, user can execute up to +_1800 pixels overlap adjustment in all edges up to 4k/60 input resolution.

❖ In multiple projector application, when user adjusts Top or Bottom Overlap value in one projector, user needs to adjust the same Overlap value in other projectors to let all projectors has the same scaling factor.

❖ In two projector edge blending, when user adjusts horizontal aspect ratio, user needs to change Videowall Overlap value with the same number in both projectors until getting clear overlap image. In AVENVIEW Excel calculation, if user calculates original Overlap value with 3840 input resolution, after increase 500 pixels in both outside edges in projector 1 (LH edge) and projector 2 (RH Edge), user can shrink the image width. However, the overlap region will become blurred. User needs to re-calculate Overlap value by new input resolution 3840+500*2=4840 to get correct video wall Overlap value.

❖ The adjustment range of 1800 pixels is calculated according to the signal source resolution. If the signal source is 4k/2k and the adjustment value is 1200 pixels, when switching to 1080p input signal, the adjustment value will be converted to 600 pixels automatically to maintain the same image position. If the input signal source is 1080p and the adjustment value is 1000 pixels, when switching to 4k/2k input signal, the adjustment value should be 2000 pixels. However due to the maximum adjustment value is only 1800 pixels, the final image will follow 1800 pixels but not 2000 pixels for 4k input. It means the image aspect ratio will not the same as 1080p input source.

16 Miscellaneous settings
16.1 Helpful tips for edge blending

❖ Image distortion and aspect ratio issues
  o If the content aspect ratio is different from the screen, it will cause image distortion. User can adjust aspect ratio through [Overlap] settings. However, you will have two choices:
    ▪ Full screen display where some content will be drawn to outside border and missing.
    ▪ Draw the image into video wall and keep some blanking border at some edges.

❖ In the case of a signal from a PC, user can set customized EDID in the EdgePro to have PC output expected output resolution. Some PC may not follow EdgePro EDID resolution setting and require customized output setting from display card settings.

❖ Pay attention to image rotation limitations and input signal resolution, the EdgePro doesn't have image rotation function when the input is 4k/60 Hz.

❖ The EdgePro can support interlaced signal source (i.e. 1080i). However, if user rotates or flips the image, there will be no 3D motion adaptive de-interlaced function. User may see some small flickering image while the input is a still image. We strongly recommend applying progressive signal to avoid this kind of issue.

- ❖ In the application with short throw ratio projector on curved screen, there will be big image distortion. User needs to apply big geometry alignment and degrade the video quality.
- ❖ The optimized EDID resolution should be the final resolution after edge blending. For instance, if user uses three XGA projectors for edge blending with 250 overlapped pixels, then the best signal for this setup will be 1024*3-250*2=2572.
- ❖ Some media players will output maximum resolution when it is powered on each time but not follow the EDID settings in sync device. It will cause abnormal display while the system has image rotation setting and the signal source resolution is more than 4k/30Hz because the EdgePro can only support image rotation under 4k/30Hz source signal.

16.2   System Structure and Control

IR remote controller, RS232 and Ethernet are available for system control. They can be used simultaneously to provide the most flexibility in system control.

16.2.1 System Structure

- ❖ HDMI-1 & HDMI-2 input signals will go through the same HDMI switcher. User can only select either one for system display.
- ❖ User can't display HDMI-1 & HDMI-2 signals to both output channels at the same time but user can select HDMI+VGA, HDMI+ DP or VGA + DP to display independent contents on both channels.

16.2.2 OSD Command Execution in Channel 1 & Channel 2

- ❖ The following command will be applied to all channels at the same time.
  - [Image Properties] ➔ [Scaling]: select full screen or original aspect ratio
  - [Image Properties] ➔ [Output Mode]: select output resolution
  - [Profile] ➔ [Load] ➔ [Index]
  - [Options] ➔ [Language]: select OSD language
  - [Options] ➔ [Reset]
  - [Options] ➔ [Accessibility] ➔ [OSD Time Out]
  - [Options] ➔ [Accessibility] ➔ [Logo Time Out]
  - [Options] ➔ [Accessibility] ➔ [Standby Time]
  - [Options] ➔ [Accessibility] ➔ [Black Screen]
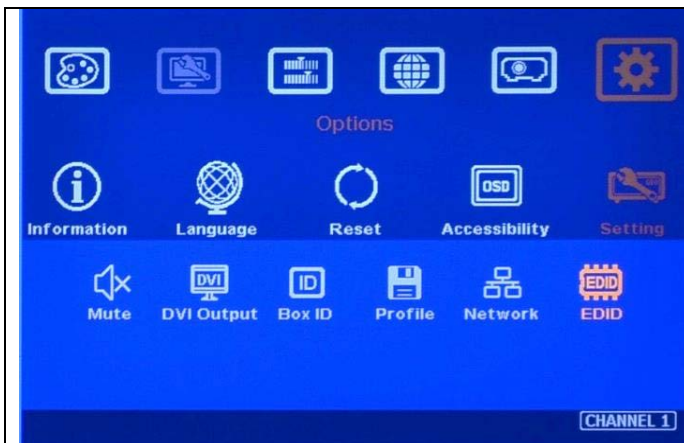 - [Options] ➔ [Setting] ➔ [Mute]
  - [Options] ➔ [Setting] ➔ [Box ID]

- [Options] ➔ [Setting] ➔ [Mute]
- [Options] ➔ [Setting] ➔ [Network]
- [Options] ➔ [Setting] ➔ [Profile] ➔ [Save]
- [Options] ➔ [Setting] ➔ [Profile] ➔ [Load]

|	
Passive Monitoring:	Passive monitoring enables an integrator to view the HDCP transactions, EDID exchange, as well as the connection events between the actual devices in the network.

16.3 EDID Setting

Selective EDID setting for input source resolution is added into the EdgePro. The settings will be applied to the selected input port. Each input port needs to set EDID separately. For daisy chain connection, user only needs to set the EDID in the first input port connected with signal source. The purposes for EDID setting are as follows:

- ❖ The EdgePro can support big range of input signal timing—from XGA up to 4k/2k @60Hz. In order to get the best video performance, user needs to select the best input signal resolution.
- ❖ Different display modes may show different final image aspect ratio. User can utilize different EDID setting to change signal source timing and get different output aspect ratio.
- ❖ Use can select different EDID directly from OSD list or use [Customize] function to create Non-VESA standard timing.

- ❖ Activate EDID setting menu:
  - o [Options]→ [Setting]→ [EDID]
- ❖ Use IR remote controller to select desired EDID.
- ❖ 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.
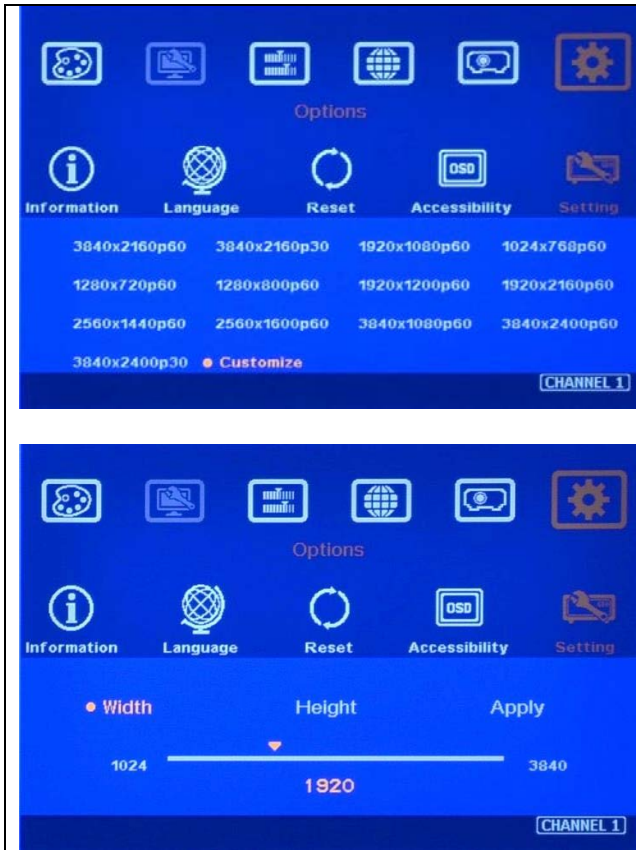
	❖ User can also set EDID manually. The range for customized EDID will be from 1024x768 to 3840x2400. ❖ Horizontal resolution is in a step of 8 pixels and vertical resolution is in 1-pixel. ❖ After creating the EDID, PC or laptop may not output required timings due to hardware limitation or driver issue. User may need to do custom setting inside PC to get desired output resolution.

16.4 HDMI vs. DVI Output Signal

HDMI digital signal is compatible with DVI signal. Most of display devices can support both digital signals. However, some old equipment may have less flexibility in digital input signal compatibility. In this case, user may need to select DVI output format for normal display in some devices.

16.5	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 EdgePro will also be terminated at the same time. If EdgePro detects input signal again, it will automatically turn on the system.
- ❖ If the monitor can automatically turn off/on by detecting input signal, user can control signal source to execute entire system on/off control.

16.6	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 on the screen without text message on it through [Options]→ [Accessibility]→ Black Screen]→ [On]

16.7	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.

16.8 Limitations in Image Flip and Rotation

Image 90/270 degrees image rotation is only available in input resolution under 4k/2k @30Hz (included). While image is rotated or flipped, there will be no 3D motion adaptive de-interlaced function. We recommend apply progressive source signal to get the best video quality.

16.9 Limitation in Audio Output

If both HDMI and DP input are selected, then only HDMI audio will be selected as audio output.

17 Troubleshooting

17.1 Front Panel LED indicators

User should see Input / Output LED lights for each channel. If no light is illuminated on a specific channel, please check the Input / Output connecting cables, signal source & monitor for that channel.

❖ If user sees continuous flashing on any channel 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].

17.2 Intermittent or Loss of Input Signal

❖ Check the HDMI cable quality and make sure all cables are inserted correctly. 4k/60 signal requires high speed certified cables.
❖ Cable length: Connecting cable length should be as short as possible. Replace a short cable to verify the possible root cause.
❖ HDCP compliant issues: If the input source or the monitors are not HDCP compliant, it is possible to stop EdgePro 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 EdgePro.

- ❖ DVI/HDMI signal compatibility: some display devices may only support HDMI or DVI video signal and execute wrong signal format detecting. The default output is HDMI. User can change output with DVI format through [Options]→ [Setting]→ [DVI]→ [On].
- ❖ Usually, to swap with different cable, output channel, signal source and monitor can verify the root cause for the failure.
- ❖ Signal compatibility issue, user can add one HDMI splitter/switcher in the middle to change signal impedance. This may fix the issue.

17.3	Video quality issues

- ❖ Use the highest resolution and number of color bits (RGB 4:4:4) at source that supported by EdgePro whenever possible.
- ❖ Quality of Source Signal, ensure your source output is of the required quality. The EdgePro will not improve a lower quality source signal. Assess color sampling bits, compression technology etc of the source.
- ❖ If the 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 or flipped, then the channel will have no [3D Motion adaptive de-interlaced] processing function. If user applies static image source, the output video will have a slight jitter phenomenon. The processing channel quality will be reduced. Use a progressive signal source setting (1080p/2160p) if possible.
- ❖ Please press [INFO] shortcut key to check the input/output signal settings.

17.4	Video quality issues

The position shift in the projector will be enlarged to more than 10x due to projection distance. One mm image shift inside projector may appear 1cm image shift on the screen. User will clearly see blurred effect on overlap region in edge blending setup.

- ❖ There can be some image position shift after system setup for the following reasons:
  - • Thermal drift due to projector internal temperature change. When power on the projector, the temperature is lower. After 20-30 minutes, the image position shift may be up to 5-10mm. It will be more obvious in overlap region. Different projector will have different thermal drift range.
  - • Stability of mounting system.
  - • Projector structure change after installation due to weight and thermal effect.

- Cable connection and cause weight balance issue.
- Change lamp
- Earth quake or caused by human reasons.

❖ The first projector image position calibration should be done within one month after installation. A second calibration may be required after 3 months, then every 6 months or once a year.

❖ If user finds big position shift and doesn't know the real issue. Please follow below procedures to confirm the issue is from EdgePro or not.
  - Turn off EdgePro and open projector internal test pattern.
  - Mark the corner positions of the projector image.
  - Check projector image shift condition after some time with EdgePro in OFF condition.
  - User will clearly identify that the position shift is from EdgePro or not after this procedure.
  - EdgePro is digital processor and will not change image position only for few pixels.

17.5	System crash and malfunction

- After FW update, please reset the system by inserting a pin to reset hole for 5 seconds to avoid abnormal settings inside the system.
- 90/270 degrees Image rotation can only be achieved under 4k/2k @30Hz input resolution.
- When the input source is 4:4:4 PC graphics signal, only [Brightness], [Contrast] and [Sharpness] three items under [Picture] menu can be executed. If the input is 4:2:2 video source, all the items are functional.
- When implementing [Corner Wall] alignment, other geometry functions will be not functional.
- Remote controller may be affected by environmental factors
- PC Tool settings: If no Windows data exist in UserMap and user click UserMap key, the image will disappear. Please select [2x2] geometry alignment key to recover OSD menu.

17.6	Synchronization issue in the outputs

- The input refresh rate should be the same as output refresh rate so that the system can implement Frame Lock to synchronize all the outputs. If the input source is 50Hz with 60Hz output, it is possible to see some lag among the displays.
- When resetting system or executing Video Wall settings, it is possible for the projectors to re-search signal source. User can Disable [Frame Sync] to have output in Free-Run mode during system settings changes. After finishing system settings changes, you are advised to Re-Enable [Frame Sync]

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