Avenview

Control Your Video

PRODUCT MANUAL
Model: MLT-EDGEPRO-2X2

2 Channel Edge Blender
MLT-EDGEPRO-2x2

CH-A OUTPUT

HDMI-A

INPUT

LOOP OUT ← HDMI-A

HDMI Out

HDMI-B DisplayPort DualLink DVI VGA

CH-B OUTPUT

HDMI-B

CONTROL

DC IN
12V ⎓ 2.0A

IR Ext   RS-232

Ethernet

USB

**4K Dual Projector Edge Blending device
with IR/RS-232 Cascading Support**

TABLE OF CONTENTS

SECTION 1: GETTING STARTED

1.1   IMPORTANT SAFEGUARDS

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

Avenview warranty certificate please refer to page #14

Warranty does not include:-

- 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.

1.2   SAFETY INSTRUCTIONS

The Avenview MLT-EDGEPRO-2X2 Edge Blender processor has been tested for conformity to safety regulations and requirements, and has been certified for international use. However, like all electronic equipment's, the MLT-EDGEPRO-2X2 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.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Avenview is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment.

Warning symbols	Description
	ONLY USE THE PROVIDED POWER CABIE OR POWER ADAPTER SUPPLIED. DO NOT TAMPER WITH THE ELECTRICAL PARTS. THIS MAY RESULT IN ELECTRICAL SHOCK OR BURN.
	THIS WARNING SYMBOL MEANS DANGER. WHEN THIS SYMBOL IS PLACED, YOU ARE IN AN ENVIROMENT THAT CAN CAUSE BODILY INJURY.
	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

The Avenview MLT-EDGEPRO-2X2 is a professional edge- blending 4K video wall processor. Equipped with advanced edge blending, image warping, projection mapping, and passive 3D, the device enables the user to achieve a flawless unified image.

Configure the device using one of the five user-friendly control options; front panel keypad, IR controller, PC software via USB, WEB GUI via Ethernet or RS232 for 3rd party control systems. The user can easily perform independent color adjustments, black level uplift and an advanced geometric alignment of up to 17x17 grids to get live on-screen optimized results.

The device supports five (5) multi-format input ports with resolutions ranging up to 2560x1600/3840x1080@60Hz and 4K/UHD 3840x2160@30Hz. The integrated (2) HDMI output ports support a full 4:4:4 color subsampling scheme ensuring a seamless multi-projector solution for any market sector.

The MLT-EDGEPRO-2X2 processor supports a motion adaptive de-interlace which helps avoid visual artifacts by performing high video optimization. The device is also capable of converting the film frame rate directly to a video frame rate through the 3:2/2:2 pull down feature. Our product can tailor to unique setups that do not comply with standard VESA timing specifications.

Easily create larger, more impressive displays without sacrificing signal integrity through the embedded HDMI loop our port, available for daisy chain connection to cascade with multiple MLT-EDGEPRO- 2x2 devices. Users can now avoid complex and costly solutions by replacing high end projectors with lower spec devices lacking integrated land-shift, warping and edge blending capabilities.

4 Epson Projectors on curved screen for Passive 3D

A. Input and output:

1. Input ports: 2x HDMI, 1x DualLink DVI , 1x VGA, 1x DisplayPort

   - HDMI, DualLink-DVI and DisplayPort support 1920x1200, 4k/2k @30Hz, WQXGA & 3840x1080 @60Hz with 4:4:4 sampling without compression.
   - Connect with all kinds of video sources and support none VESA standard input resolution.

2. Output ports: 2x HDMII (optional DVI). Selectable output resolutions: 720x480, XGA, WXGA, 1280x1024, 1366x768,1400x1050, 1600x1200, 1920x1080 & 1920x1200.

3. Loop out port: 1x HDMII(supports 3840x2160@30Hz or 3840x1080@60Hz)

B. Image warp, geometry alignment and edge blending

1. Quick [4 Corner] alignment , vertical and horizontal keystone correction, Pin cushion & Barrel adjustment, image warp and image 180 degrees flip.

2. Each unit controls two projectors and can be expanded with multiple MLT-EDGEPRO-2X2 to support unlimited number of projectors.

3. Integrated with full function front panel keypads and IR remote controller. Manual geometry alignment up to 9x5 grid patterns and 600 pixels adjustment range in horizontal direction in full HD output. It can meet most of the curved screen edge blending requirements.

4. PC software tool for warp and geometry alignment up to 17x17 grid patterns with 1200 pixels adjustment range in horizontal direction in full HD output. Parameters can be stored to the MLT-EDGEPRO-2X2 without the need of a PC.

5. Execute 4 directions edge blending up to 1000 overlapped pixels.

6. Provide complete function for edge blending gamma selection and color fine-tune.

7. Precise black level uplift at selectable area to compensate light leakage in the projector.

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

9. One PC tool can control dual processing channels simultaneously.

10. Optional Ethernet system control and geometry alignment through WiFi.

11. Able to perform flat & curved screen seamless edge blending including irregular double curved screen and 360 degrees curved screen

C. Passive and active 3D

1. Auto decode 3D signals for passive 3D display, including signal source from Blue Ray, STB, game console, media player and PC.

2. Auto decode Stereoscopic Player/ Nvidia 3D Vision 1080p @120Hz 3D formats and Blue Ray 1080p 24Hz 3D signal into 720p/XGA 120Hz signal for active 3D display.

3. Support standard HDMI 1.4a 3D format, including 1080p/24Hz full HD, Side by Side, Top-Bottom, frame sequential & Line interleaved.

4. Support 3840x1080 Full HD Side by side 3D format and SONY 1080i/60Hz frame packed 3D.

5. "Perfect Sync" algorithm for Zero latency in RH/LH eye image to get the most comfortable 3D image.

6. 3D display can be on curved screen and be enlarged by multi-projector stacking or edge blending.

D. High end 10-bit video processor

1. 10-bit high end processor with 3D motion adaptive de-interlace, low angle smooth algorithm and 3:2/2:2 film mode detection and recovery function.

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

E. Edge mask

Edge Mask at any edge up to 500 pixels with black background without changing image position and aspect ratio.

F. Video wall function

1. Image splitting and location assignment

2. Overlap pixel adjustments up to 900 pixels for image position shift, bezel compensation and creating overlap region for edge blending.

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.

G. Image rotation and flip

Image 180 degrees mirror and flip.

H. System control

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

2. Full function front panel keypads, IR remote controller and RS232.

3. Optional Ethernet control. User can control the system and do geometry alignment through wired or WiFi by PC or mobile phone.

4. USB interface for code update and PC tool operation.

5. Internal grid pattern for easy geometry alignment.

6. Programmable EDID for user to create any EDID with timing between 1024x768 and 3840x2160.

7. BOX ID for convenient multiple units control at the same time.

8. Five preset Profiles to save user settings and can be recalled at any time.

9. Automatic power ON/OFF through input signal control. While no input signal is detected, it will shut down output so that user can power ON/OFF complete system through the control in signal source.

10. Dimension and weight: 440x189x45mm, 2.4kg (Body only)

2.1 PACKAGE CONTENTS

Before you start the installation of the MLT-EDGEPRO-2X2, please ensure that the packaging has the listed items below.

1	MLT-EDGEPRO-2X2	X 1
2	POWER BRICK (12V 3A) + C13 Either Standard US power cord * or International power cord (UK,EU,AUS) * Based on the order request.	X 1
3	IR REMOTE 28 KEYS IR Extender cable	X 1 X 1
4	USER MANUAL	X 1

2.2 BEFORE INSTALLATION

ATTENTION

- Place the product on an even and stable surface. If the product falls, it may cause an injury to a person or malfunction.
- Do not place the product in high temperatures (over 50°C), or low temperature (under 0°C) or high humidity.
- Use the DC power adapter with correct specifications. If inappropriate power supply is used then it may cause a fire.
- Take care when connecting units to the electrical power circuit, incase the maximum rated circuit is not overloaded
- Installation of the equipment must comply with local and national electrical codes.
- Do not twist or pull by force ends of the UTP /HDMI cable. It can cause malfunction.
- Keep the device away from water. If the unit becomes wet, power off immediately.
- To prevent airflow restriction, allow clearance around the ventilation openings to be at least: ONE Inch (25.4 mm).
- Unauthorized changes or modifications could void the user's authority to operate the equipment.
- Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

MLT-EDGEPRO-2X2

EDGEPRO
4K EDGE BLENDING SOLUTION

ULTRA HD (3840x2160)@30= 5m (16 feet) **HDMI 2.0/1.4**
1080p = 15m (50 feet) **HDMI 1.3**

CABLE INDEX

HDMI CABLE

UHD 3840x2160@30

OR

1080p 3D 24bit

Loop Out (Cascading)
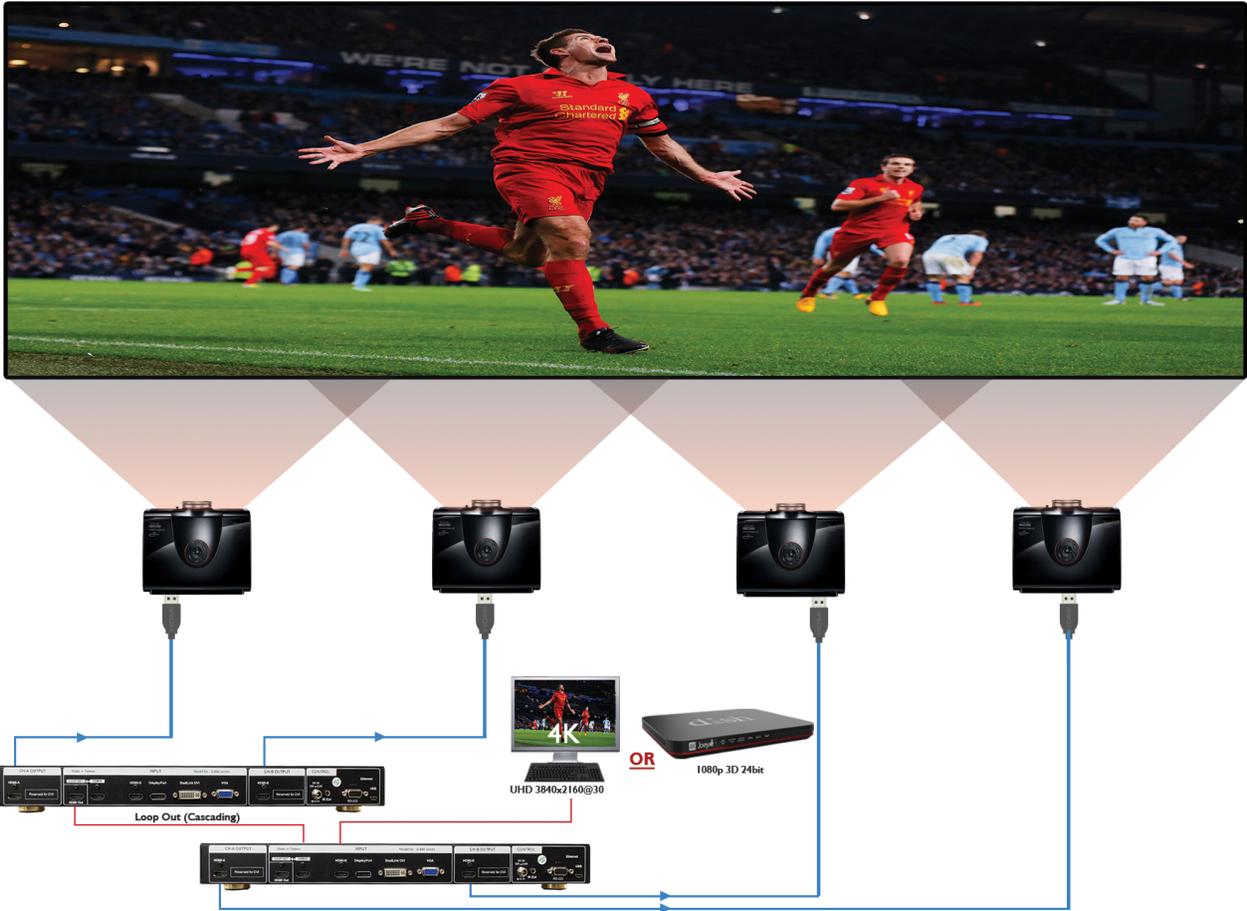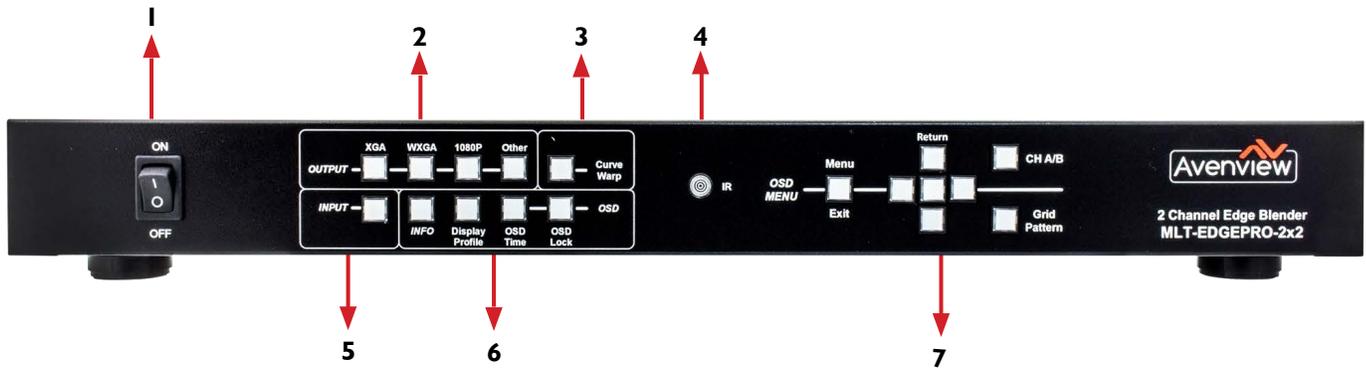
1. **POWER SWITCH:** Powers the device ON and OFF	2 **OUTPUT SELECTION:** Quick access to most commonly used resolutions (XGA, WXGA, 1080p)
3. **CURVE WARP:** Quick access button to curve or warp images.	4. **IR WINDOW:** Receives IR signals from the device remote control (Included in package)
5. **INPUT SELECTION:** Select source between HDMI, DP, DVI and VGA.	6. **ACCESSORY BUTTON:** Device info, display profile, OSD lock and time control.
7. **OSD KEYPADS:** Menu list, Return, Exit, Output Channel, Selection A/B and Grid Test Pattern display.	

* Some DLP projectors shows images with interference or cropped image, adjusting the display's picture size setting will resolve the interference issue.
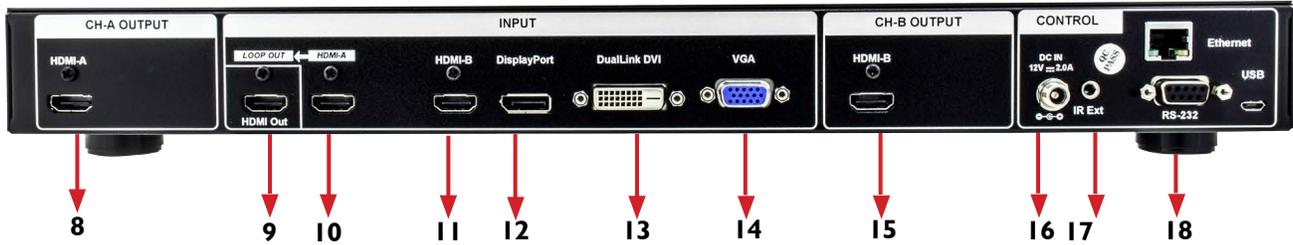
8. **HDMI-A OUTPUT:** HDMI Channel A output to the Left Side(1st) projector.	**9.** **LOOP OUT:** HDMI loop out port from HDMI-A input for daisy chain connection.
10. **HDMI-A INPUT:** HDMI Channel A input	**11.** **HDMI-B INPUT:** HDMI Channel B input.
12. **DISPLAYPORT INPUT** Connects to Displayport source device.	**13.** **DUAL LINK DVI INPUT:T** Connects to a -DVI source.
14. **VGA INPUT:** Connects to VGA soruce.	**15.** **HDMI-B OUTPUT:** HDMI Channel B output to the Right Side (2nd) projector.
16. **DC IN POWER JACK:** 12V 3A Power Supply.	
18. **RS-232/USB/Ethernet:** RS232 Serial, USB TypeB- & Ethernet for PC control software.	**17.** **IR EXT:** IR Extender for remote control

0. **PROFILE:** Save up to 5 user profile settings for custom layouts with memory for easy recall within the unit.

1. **INFO:** To view the input and output timing of the unit.

2. **CH A/B:** Allows the user to switch between Channel A and B for alignment .

3. **OSD:** Allows the user to control the OSD Menu function.

4. **INPUT:** Switch between the different video connections available HDMI/DVI-DL/DisplayPort/VGA(YPbPr) .

4. **OUT:** Quick selection of preset ouput timmings XGA/WXGA/1080p.

5. **4 CORNER:** Used for Quick Geometry alignment with just 4 corner adjustment when the surface is flat and smooth. Also can correct image keystone with vertical/horizontal position. Use this function to adjust the image height/width to change the aspect ratio of the output.

6. **WARP:** To create intricate goemetry alignment for uneven surfaces or objects up to 17x17 grid pattern alignment.

7. **EDGE BLEND:** To create seamless edge blending images with multiple projectors to create a large single image canvas.

8. **VIDEO WALL:** To create a stunning videowall with multiple screens or projectors.

9. **PATTERN:** To activate the internal grid patterns to align two or more projectors with a 32x32 pixel grid. Toggle multiple times to change the color of the grid also to select the external custom grid pattern.

HHARDWARE SETUP

To setup the Avenview MLT-EDGEPRO-2X2 Dual Projector Edge Blender please follow these steps for connecting the devices:

1. Mount or fix the MLT-EDGEPRO 2X2-4K on a secure shelf, AV rack or steady surface.
2. Ensure the power is off on the MLT-EDGEPRO 2X2, also all source devices and displays that will be connected.
3. Connect (2) two HDMI cables to the (2) two HDMI ports label HDMI A/B with sources such as (Blu-ray player, laptop or Set-Top-Box or Gaming Device.
4. Connect your HDMI cables to the dual HDMI ports to CH-A/B to the dual DLP Projectors that is receiving the video signals.
5. Power on all devices.
6. Connect your computer to MLT-EDGEPRO 2X2 via RS232, USB or Ethernet cable in order to control via Telnet or RS232.

SERIAL PORT SETTING

RS-232 Wiring (Cable Connection)

Remote Controller(PC)		HDM-SPLITPRO-4K	
PIN	Assignment	PIN	Definition
1	NC	1	NC
2	TxD	2	RxD
3	RxD	3	TxD
4	NC	4	NC
5	GND	5	GND
6	NC	6	NC
7	NC	7	NC
8	NC	8	NC
9	NC	9	NC

RS-232 Connector Pinout
DTE (PC Side)
DE-9 Male Connector

RS-232 Connector Pinout
DCE (Device Side)
DE-9 Female Connector

RS-232 SETTINGS	Baud Rate: 115200bps Data Bit: 8 bits Parity: None Flow Control: None Stop Bit: 1

GENERAL INSTRUCTIONS

- ✧ Use the Edgepro setup file and review these two files: Readme.txt and Edgepro PC tool.
- ✧ Connect Micro USB cable between PC and Edgepro (see below).
- ✧ Install Nuvoton USB driver using the files under [Edgepro Setup File folder].
- ✧ Check Device Manager to confirm [Nuvoton Virtual Com Port] is correctly installed (see below).

HARDWARE CONNECTION

Micro-USB
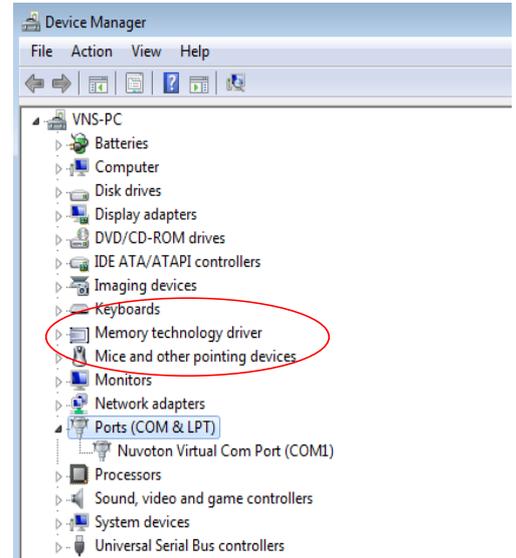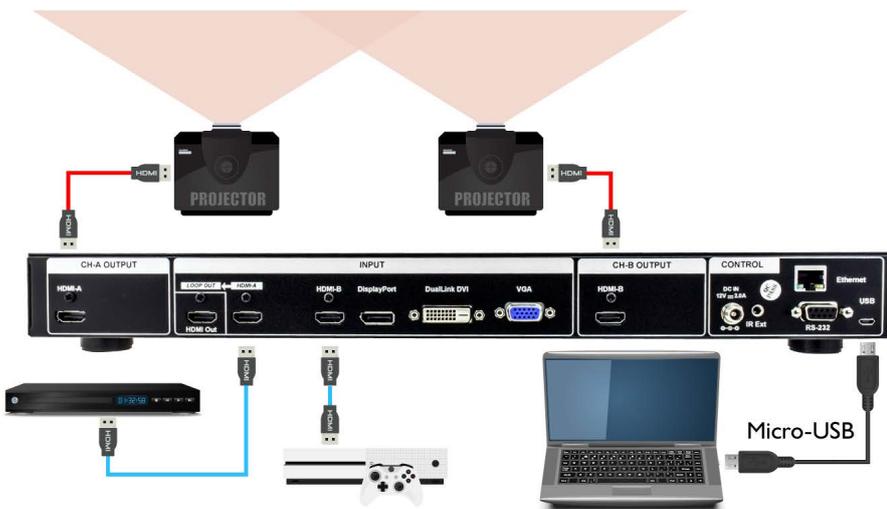
- HDMI Loop Out port on the rear panel is for daisy chain connection.
- Only the input signal from HDMI-A input port can be cascaded to another unit for larger installs.

Please dont use it as an input port.

- The Two outputs from EDGEPRO will be shown simultaneously, duplicated from the source.

NOTE: It is not designed to output to 2 independent displays. (Please contact sales@avenview for the model that supports this feature.

✧ The Edgepro PC Tool executable file (.exe) will run on your desktop once double clicked to start without installation.

✧ Once the software is started, follow the steps outlined below Click [Connect] at Edgepro PC tool to connect COM port. After connected, it will show Edgepro output resolution and [Disconnect] icon at Top Right corner.

✧ Once it is connected, the user will see input resolution in signal source. This resolution is related to Video Wall [Overlap] setting value. We propose to apply 1080p signal during installing stage.

✧ Channel A & Channel B, can be controlled separately within the software.

✧ Please see how the user can use each Tab to facilitate their project at hand, note below.

PLEASE NOTE:

[Video Wall] settings: after geometry alignment, it is required to capture image for each projector.

Click [INFO] to check if correct input and output timing modes are set in the system.

If no input signal is applied, [Overlap] value will be wrong.

[Video wall] settings (three projector horizontal edge blending as example)

[Zoom]: all units set to H=3, (V=1 (default))

[Pan]: LH projector (1st): H=1, Center projector (2nd): H=2, RH projector (3rd): H=3

[Overlap]: select the right edge and apply the value calculated from Excel file

[Edge Blend] setting: based on the actual overlap grid number.

1st projector: RH edge=[Grid #]x32

2nd projector: LH edge= [Grid #]x32, RH edge=[Grid #] x32

3rd projector: LH edge= [Grid #]x32

PC Software TAB [Warp adjust]

✧ Click [**Pattern**] and toggle to select one of the available colors and Enable test pattern to show grid pattern on the screen. The max pattern size is 32x32 pixels. User can also show the source input image on the screen.

✧ Select [**Warp adjust** tab], use the grid type and adjusting Step (default is 16 pixels) for the adjustment. BLUE direction keys are for control point selection and RED direction keys are for value adjustment.

✧ [**2x2** button] alignment is for quick image corner alignment. Step1- [2x2] geometry alignment to draw image corners to the required positons, then to [**5x5**] or [**9x9**] buttons for further geometry alignment. After [5x5] or [9x9] alignment, if user reverts to [2x2] alignment button, then only [2x2] alignment will be reserved and all other alignments will be reset.

✧ For most of the applications, we propose to follow [2x2] [5x5] [9x9] [17x17] sequence for geometry alignment. Please note that if you execute [9x9] or [17x17] and back to [5x5], it will only keep [5x5] data and reset all the others.

✧ [**Show grid**] checked, will only execute the image outline position adjustment.
  The center image also will be changed proportionally with outline position.

✧ [**Internal Grid**] checked, will only adjust the internal grid area. Best used for detailed image position and precsion fine-tune.

✧ When edge blending, please align both grids in the edge blending area, to ensure a clear image can be obtained on the output.

✧ When the geometry alignment is completed, user can execute [**Video wall button**] setting and [**Edge Blend tab**] in hardware system separately.

TAB [Warp Shift]

✧ [**Warp Shift**] is similar to [2x2] for the adjustment of image corner positions. The difference is that [2x2] will reset the other geometry adjustment [5x5] or [9x9].
  However,[Warp Shift] will not reset the other adjustment result. It will be convenient for user to re-adjust the image corner locations after finishing curve adjustment from [5x5] or [9x9]

[Save] file to Edgepro

✧ After finish all operations, user can save the result in two locations: PC and the Edgepro.

✧ [**Save file**] will only save the file in PC and [**Load file**] to download it to Edgepro.

✧ User can create up to 10 different Presets as showed on page 17. Click any number and save the layout to any of the file locations up to 1~10.

✧ Once the file is saved, disable [**Pattern**] so OSD menu on Edgepro can load the result in file locations 1~10. To quickly disable the grid pattern- continuously press [Pattern] key on IR Remote or the front panel.

✧ Activate Edgepro **OSD** to select the Preset from [Anyplace Icon] in the menu, along with [Video Wall] and [Edge Blend] function to complete edge blending processes. Then save the final result into [Profile] in the menu. Maximum 5 profiles can be saved.

✧ Once select [Gwarp] geometry alignment, all geometry alignment result in Edgepro will be replaced.
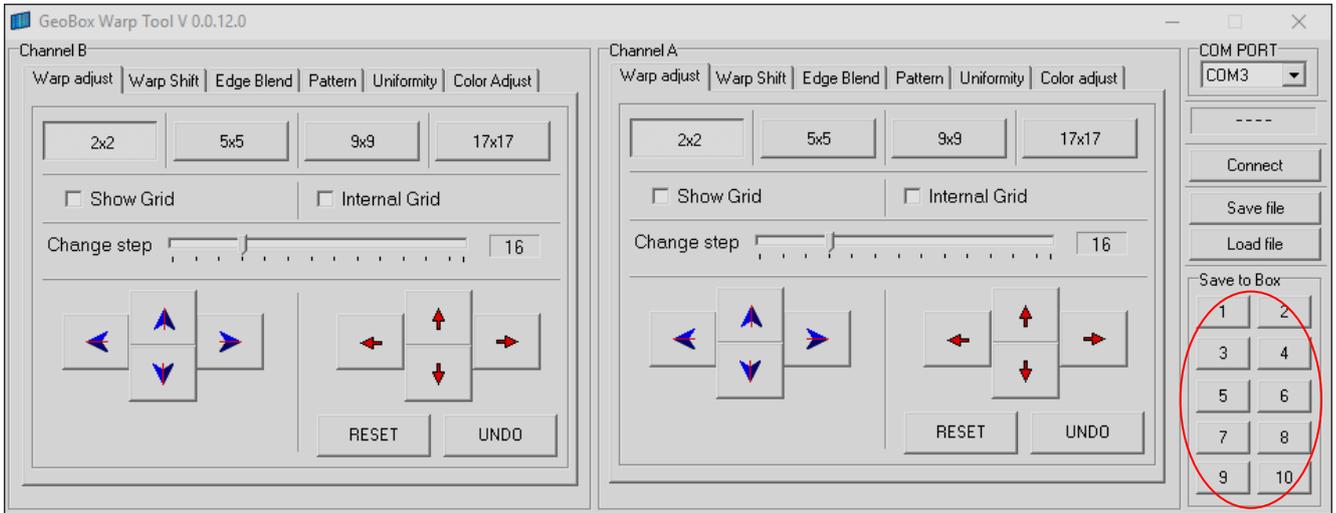
Please note the changes can only be saved in connected PC but not within the Edgepro.

To load the file from their PC to the Edgepro when the system is powered Off then On.

Except [Warp Adjustment] mode, all the other settings should be implemented in Edgepro device memory.

TAB [Edge Blend]

- ✧ To set the location and pixel number for edge blending based on geometry alignment.
- ✧ To align the color in edge blending area through Gamma adjustment.

  This function will extend the gamma adjustment to separate RGB in the future.
- ✧ [Offset] to execute the black level to uplift.
- ✧ This function can be implemented to EdgePro device memory.

TAB Color [Uniformity] correction

- ✧ To set different gain and offset value in RGB separately for uniformity adjustment.
- ✧ The minimum area for color uniformity adjustment is 64x64 pixels.
- ✧ Please adjust the color uniformity in several steps in the surrounding area to avoid big transition in the color.

TAB [Color] adjustment

- ✧ To perform white balance and color correction in each projector. Also to try to do color adjustment from the projector first. When the color difference is not fixed, go to [Color] function to do independent RGB Gain and Offset adjustment
- ✧ Any color adjustment will reduce the color dynamic range.
- ✧ Then apply color adjustment, different input sources may vary in results shown.

[Picture] - Color Adustment

- ✧ [Picture] menu will apply to both processing
- ✧ This menu is only active under below conditions:
  - • [Picture] menu will be grayed out (when the color setting is in [Preset Mode] under -[Image Properties] menu. Navigate to [Custom] menu and press [Save] menu to activate [Picture] menu.
  - • When the input signal is in YUV domain, all items under menu are free to be accessed.
  - • If the input signal is in RGB domain, only [Brightness] and [Contrast] can be adjusted.
- ✧ User can do further separate RGB individual color adjustment under [Image Properies] menu.

- • [Picture] menu has five options.

  All the adjustments will be applied to both processing channels.

- • [Edge Blend] menu, user can adjust

  the color on each projector.

[Image Setup] - For PC Graphics From VGA Input

- • Note [Image Setup] menu can only be activated when video signal input is connected to the analog input port.

- ✧ [Automatic]: Automatic image position alignment.
- ✧ [Manual]: To manually set the signal Phase and Clock to eliminate image noise on the analog input .
- ✧ [Horizontal Position]: To adjust the image horizontal position.
- ✧ [Vertical Position]: To adjust the image vertical position.
- ✧ When using a VGA signal, the unit will auto align the image and position.
  NOTE: The unit will not auto alignment unless a new VGA input is connected.

[Image Properties]

✧ [**Image properties**] to select the image color for (Preset and discrete RGB), input port, aspect ratio, output mode selection and image flip setting. The changes are made simultaneously to both processing channels.
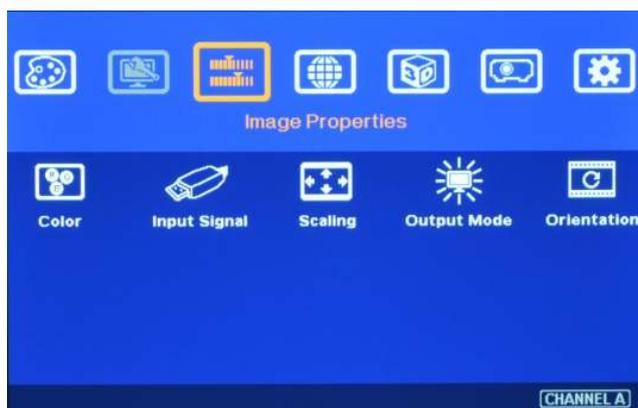
[Color] - Preset Mode & Custom Color

- [Color] menu (Preset Mode and Custom)
- [Preset Mode] Neutral, sRGB, Reddish,Blush
- Default is [Neutral]
- Any changes will be applied to both processing channels.

- [Custom] Discrete RGB color adjustment-Red, Green, Blue,
- [Save] save thechanges made under [Picture] section.
- Any changes will be applied to both processing channels.

[Input Signal] - Selection

- [Input] hotkey on the front panel also changes the input port.
  See the caption on the left

- Another method is using the IR remote controller.

✧ The DVI port is (DualLink DVI) design.
   The connection signal can be DVI-D, HDMI (HDMI to DVI adapter is required) and DualLink DVI.

✧ To apply DualLink DVI for high resolution signal (up to 4K@30Hz), user needs to enable DualLink DVI function through Factory Setting mode. Please contact us for more details.

✧ When DualLink DVI function is enabled, the HDMI input will have no audio and 3D signal can't pass through.

✧ The input signal from HDMI A port can be looped out for daisy chain connection.
   All the other input signals can't be looped out.

✧ YPbPr video signal can be connected through VGA input port (YPbPr to VGA adapter is required).

[Scaling] - Display Aspect Ratio

- [Original AR]: To display the input source with the original aspect ratio.

- [Full Screen]: To extend the image to full screen.

- For edge blending or video wall, please select [Full Screen]. Otherwise, it may show wrong result.

- Ensure to set the right aspect ratio setting in the projectors.

[Output Mode] - Selection

- 10 preset output modes.
- When the input is 50Hz refresh rate, the output will also be 50Hz to maintain high quality image.
- When the input is 120 Hz for active 3D, the output will keep 120 Hz but the output resolution is limited to XGA & 720p only.

[Orientation] - Image 180° Rotation and Flip

- 4 image flip and rotation modes available.
- User can see the illustarted TEXT in the icons on the OSD to select the one that is needed.
- When180 degree image flip is selcted, the video wall position setting [PAN] also needs to be changed.
  The image shown will change, select the right position with the IR or PC software.

To create a Video Wall using the OSD, use the selected three (3) options available- Zoom ,Pan and Overlap. These options will determine the correct display assignment and split the image also assign each display device to the right location in the setup.

NOTE: The overlap pixel between two images can also be adjusted pixel by pixel so that the video wall can meet the requirements in different application environment.
The maximum video wall can be up to 15x15 matrix display with overlap up to 900 pixels for edge blending.

[Video Wall Setting]
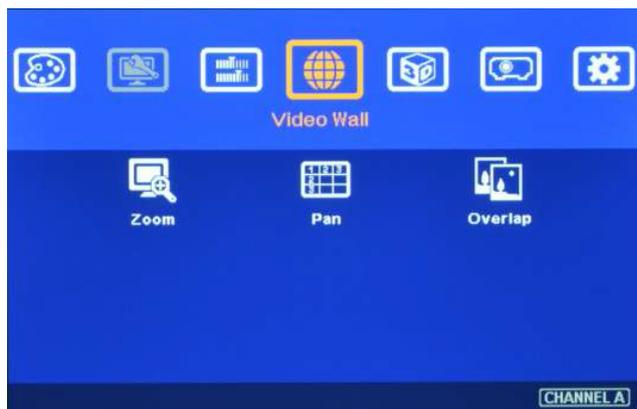
- Press menu on the Front Panel or IR Remote to enter [Video Wall] OSD menu.

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

[Zoom] - Split The Image
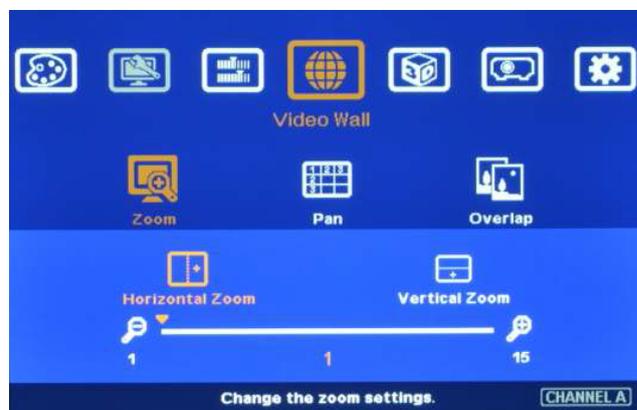
- Use [Zoom] to split input image in horizontal and vertical directions. Maximum split image is 15x15 in both horizontal and vertical directions.

For 3x1 displays, Horizontal Zoom=3, Vertical zoom=1

For 3x3 displays, Horizontal Zoom=3, Vertical Zoom=3

[Pan] - Assign Image Location
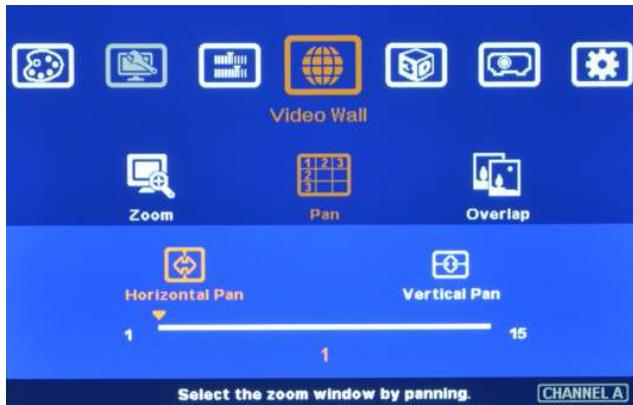
- Use [Pan] to determine the location of each split image in the display in both horizontal and vertical directions.

- Note: Default setting:

    Horizontal Pan＝1
    Vertical Pan＝1
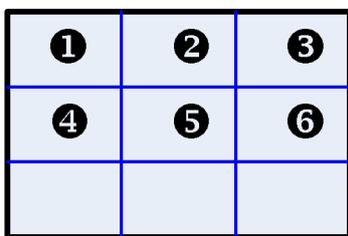
For No. ❸ displays:

Horizontal Pan = 3

Vertical Pan = 1

For No. ❻ displays:

Horizontal Pan = 3

Vertical Pan = 2

[Overlap] - To Set Image Overlap Pixels
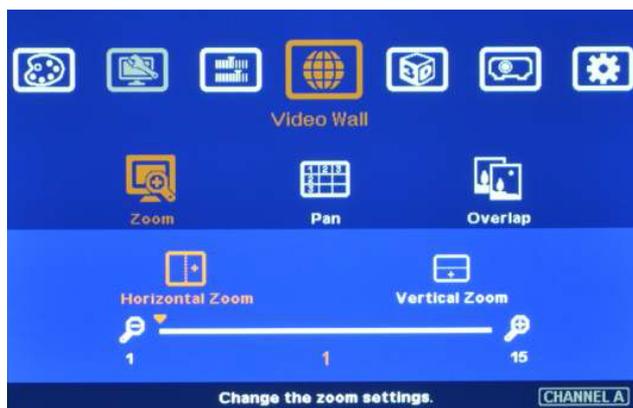
- Use [Overlap] to determine overlapped pixels between two adjacent projectors.

- In projector edge blending, this overlap pixel shall be set based on overlapped region between the projectors.

- *In multiple projector applications, if the overlap region has different size due to installation position limitation, the overlap value maybe different in each projector. However, the total overlap value should be the same to maintain the same scaling factor.*

- *User can use Video Wall overlap setting to fine-tune the image in overlap region. It can compensate the geometry mis-alignment and the image will become clear.*

Example For Three Projector Edge Blending

1. See Caption on the left shows Original images connected to three projectors before geometry alignment.

2. After geometry alignment and changes made in the [Zoom] & [Pan].

   See the caption on the left shows overlapped area with double images.

3. With video wall Overlap adjustment and Edge Blending. The double image in overlap region is smooth with uniformity in color and brightness.

- An Excel Spread Sheet can be provided for the calculation of the Video Wall Overlap setting value Contact support@avenview.com.

- For dual projector edge blending, user can increase the [Overlap] value together. The overlap images will blend until the two image 100% match together.

System Configuration

The Avenview MLT-EDGEPRO-2x2 can decode most 3D formats from all kinds of 3D video sources, including bluray DVD, STB, Media player, Game console and more.

The 3D signals needs to be displayed through two projectors, each projector will display the decoded signal for both the right/left eye.

Also have handy a set of polarized filters and polarized glasses. The glasses need to match the polarized filters in front of the projectors so that the right eye can and the left eye can only view the scene for each eye.

To preserve the polarization of the light for 3D display, please use a silver 3D screen. Also recommended the optic spectrum method from Dolby, Infitec or Omega Optical to allow 3D display on normal 2D screen.

2D or 3D Screen

LH Polarized Filter

RH Polarized Filter

3D Blu-ray Player
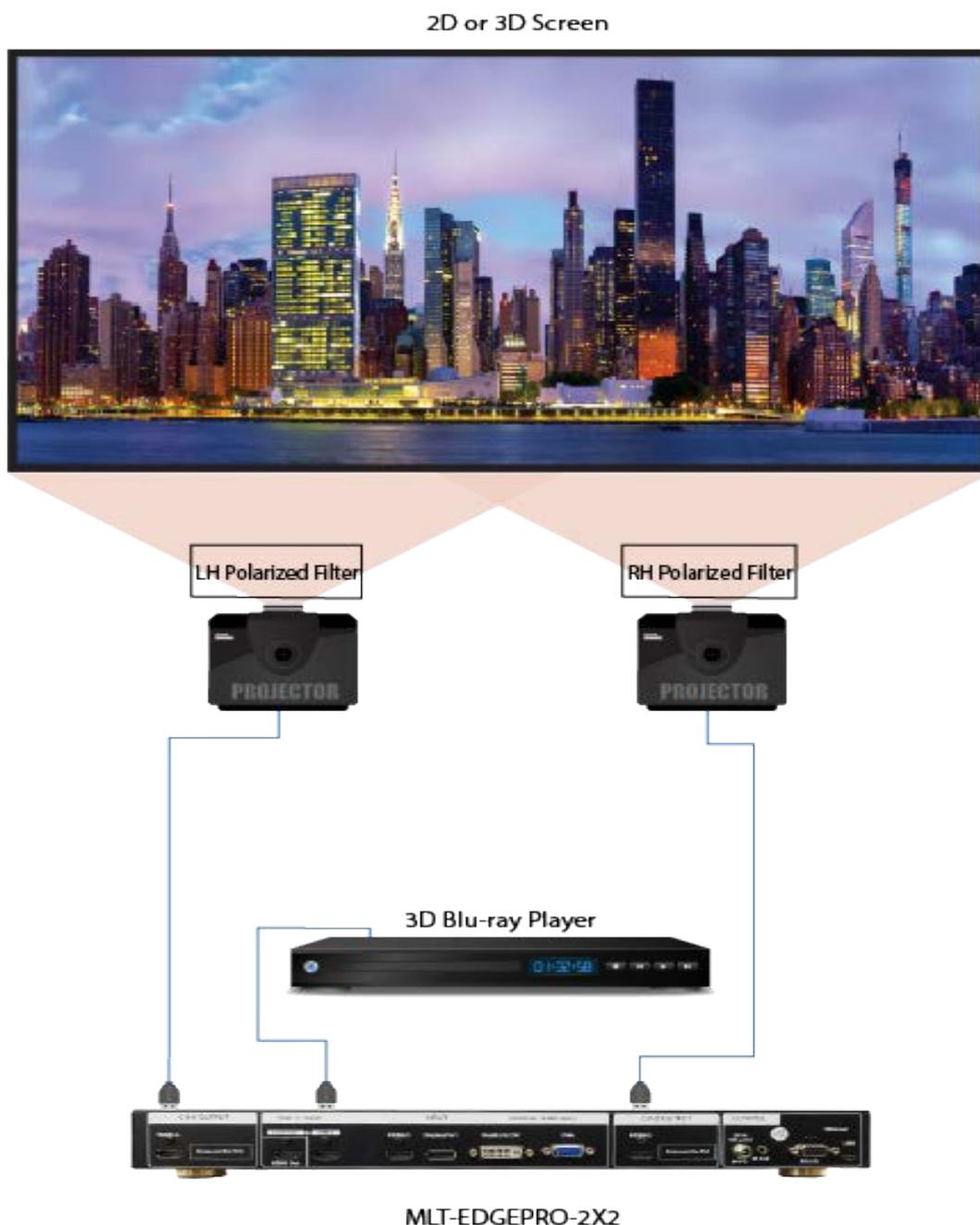
MLT-EDGEPRO-2X2

System installation and setup

1. MLT-EDGEPRO-2x2 should not be close or at the side of the projector where the hot air ventilation is blowing.

2. Place the two projectors side by side or top/bottom. Placing the projectors in close proximity to each other will reduce gap of the geometry adjustment also the loss of the image resolution and brightness.

   Please make sure the ventilation air flow will not affect the other projectors, placing an isolated board between two projectors can be added if necessary.

3. Set higher output resolutions such as from 3D signal source and connect to any input.
   Unit will decode and distribute the signals for two projectors.

4. The two projectors must be connected to the MLT-EDGEPRO-2x2 device to display an image for each right and left eye.

5. Setup the polarized filter and glasses so that right/left eye can only see the scene for one eye.

6. Use geometry alignment function to align the images from two projectors completely matching together.

   Please place the polarized filters in front of the projector before using the [4 Corner] adjustment because the polarized filter will affect the direction of light from the projectors. A good alignment will give double brightness for the projection in 2D display. For best results with the brightness the two projectors should be placed as close as possible and the screen must be flat or smooth curve.
   NOTE: Some deviation in alignment is allowed for 3D display but will affect the performance in 2D display.

3D Settings
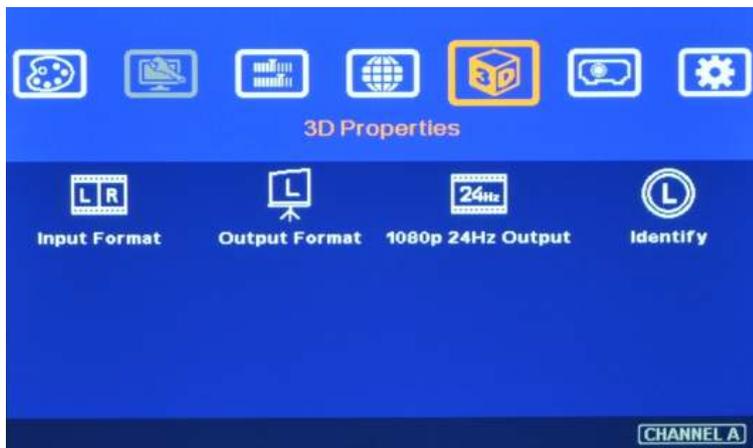
- Select [Automatic] if the 3D signal is standard 3D formats from Blu-Ray player or sources with 3D INFO inside the signal.

- Select [Side By Side] or [Top-Bottom] based on user's 3D input sources.

- [2D/3D] hotkey on remote controller is for quick switch among different 3D formats

[Input Format] - Selection
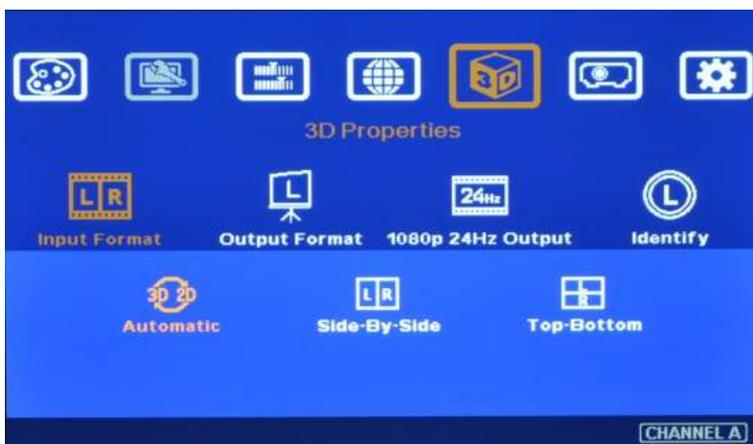
User can set [Side by Side] as normal setting. When the input signal is integrated with [3D INFO], then unit can automatically switch to [Automatic] to match 3D input format. Once [Side by Side] 3D is detected, then unit will switch to [Side by Side] 3D format automatically.

[Output Format] Mode

- To set [Right Eye Frame] for RH projector and [Left Eye Frame] for LH projector.

[Output Fromat] setting is based on the filter location. If RH optical filter is installed at LH projector, then user needs to set LH projector at [Right Eye Frame]. User can swap [Output Format] setting to fix wrong position installation in optical filters.

[1080p 24Hz Output]

If the input is 1080p 24Hz and the projectors can also support this signal with ME/MC processing, please select [Enable] in [1080p 24Hz Output] to get the best 3D performance.

[Identify] - Check Final 3D Settings
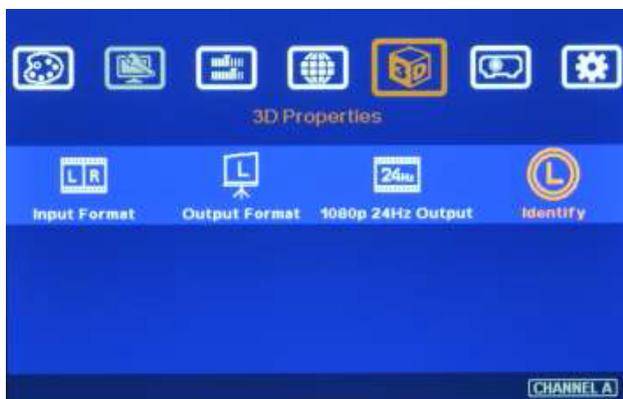
- Activate [Identify] menu to show "R & L" characters on the screen simultaneously to verify the final 3D settings in the system.

- RH eye should see only "R" and LH eye should see only "L".

If still can't verify "R" & "L" characters in both eyes, please check below again:

1. Is the screen used can support 3D?

2. Are the Glasses and polarizers the same types and paired for the RH & LH eyes?

3. Please check from [Output Format] menu and make sure [Right Eye Frame] is connected with RH eye projector and [Left Eye Frame] is connected with LH eye projector.

4. Is the Blu-Ray player or soruce set to [Auto 3D] or [1080p frame packing] mode for 3D signal output?

5. If Side by Side or Top-Bottom 3D formats are used, please check the aspect ratio in video source output to make sure unit will receive full screen image.

6. Is there any HDMI or signal source compatibility issue and only one projector shows image?

7. Are the HDMI cables qualified and the length not too long?

For DLP-Link or Nvidia 3D Vision active 3D display, user needs to provide 100/120Hz signal to projectors integrated with either DLP-Link 3D Ready or Nvidia 3D Vision capability. If multiple projectors are used, shutter glasses will only synchronize with one emitter among these 3D Ready projectors. G-602 can support 100/120Hz frame sequential 3D signal up to full HD and also 1080p 24Hz frame packed 3D format from Blue Ray player, execute geometry warp, edge blending or stacking for these signals and and output 720p or XGA 120Hz signals for active 3D display.

In multiple projector active 3D applications (edge blending or stacking), please select DLP projector with "3D Ready" function. The projector should be able to select [3D enable] and [3D Sync] functions separately because only one projector in edge blending can enable [3D Sync] and all the other projectors shall Enable 3D but turn off [3D Sync] to let the glasses only synchronize with one signal. Please also note that after edge blending in active 3D system, it will not support side by side and top/down 3D signal because once this kind of 3D signals have been gone through geometry alignment, the image location will be also changed. It can't show correct 3D effect.

The major functions of the MLT-EDGEPRO-2X2 in active 3D applications are:
a. Geometry adjustment to fit image on to curved screen.
b. Edge blending to enlarge the display with multiple active 3D projectors.
c. Image stacking to enhance the brightness using multiple active 3D projectors.
d. Format conversion: Convert Blue Ray 1080p 24Hz frame packed and PC or Nvidia 3D Vision 1080p 120Hz signals for active 3D display.
e. Unit can also convert 1080p 120Hz input into 1080p 60Hz output for passive 3D or 2D display.

Procedure For Active 3D Setting

1. To select the output resolution in the unit to XGA (for XGA projector) or 720P (for projector native resolution larger than 720P) through front panel or remote control hotkeys.

2. To set 3D output format at [XGA 120Hz output] or [720P 120Hz output] under 3D Properties menu.

3. If user selects other output resolution except XGA or 720P, [3D Ready] menu will be grayed out and user can't select 120Hz output.

4. Projector needs to have 3D Ready DLPLink or Nvidia 3D Vision function. This 3D function needs to be open while playing active 3D.

5. It is possible for user to see inverse image in R/L eyes' image. User need to swap R/L signal through projector internal function [3D Sync Invert].

Under [Anyplace] menu, the user can find the (5) five main features of MLT-EDGEPRO-2X2 such as geometry alignment, edge blending and warping.
The geometry alignment functions found in [Anyplace] is the same as tier one projector brands. It provides professional performance in single & multiple projector applications.
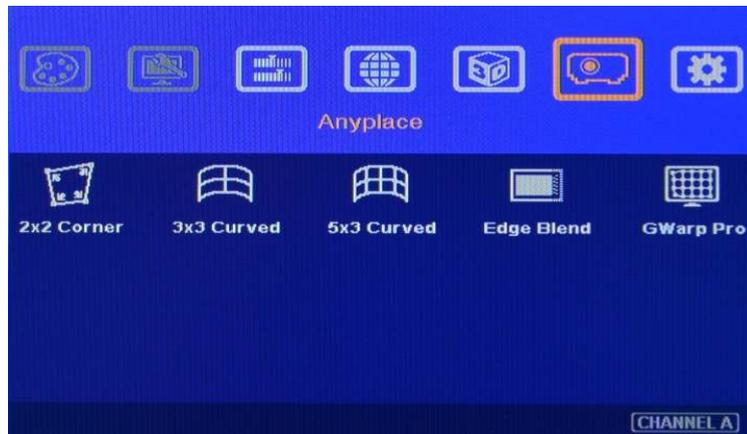
- [2x2 Corner] alignment can't co-exist with [3x3 Curved] or [5x3 curved] alignment.

   When you apply [3x3 Curved] or [5x3 curved] function, original [2x2 Corner] alignment will be reset. User needs to execute geometry alignment from the beginning.

- [3x3 Curved] and [5x3 curved] can co-exist. It means if you execute [3x3 curved] alignment first, then go to [5x3 curved] alignment for further geometry alignment, [3x3 curved] alignment will not be rest and user can continuously executing [5x3 curved] alignment.

- We suggest to start geometry alignment from [3x3 curved] alignment unless quick corner alignment is required and not necessary to have precise geometry alignment.

- Geometry adjustment range in MLT-EDGEPRO-2X2 is based on percentage of the output resolution. Higher output resolution the more adjustment pixel range.

- [Edge Blend] provides all the functions for seamless high performance edge blended image.

[2x2 Corner] - Correction

- [2x2 Corner] alignment is to adjust corner position of the image. When the screen is flat, this function will quickly align image to the desired location. If the screen is not flat or has some distortion in the screen, user needs to use [3x3 Curved] or [5x3 curved] for image geometry alignment.

- [2x2 Corner] alignment can correct image keystone at vertical and horizontal position.

- It can also adjust image height and width to change the aspect ratio of output image.

This function can't co-exist with other geometry alignment function. If user applies [3x3 Curved] or [5x3 Curved] alignment, then go back to [2x2 Corner] menu, the previous geometry alignment will be reset to default. User can go back to [3x3 Curved] or [5x3 Curved] menu again, it will recall the setting back to the screen. It means [2x2 Corner] alignment is independent adjustment and can't combine with [3x3 Curved] or [5x3 Curved] alignment.

- Activate [2x2 Corner] Menu by Front Panel keypad or Remote Controller.
- [4 Corner] hotkey is on the remote controller for quick access to this menu.

• [2x2 Corner] has the same function as keystone correction. It can do keystone correction in both horizontal and vertical directions.
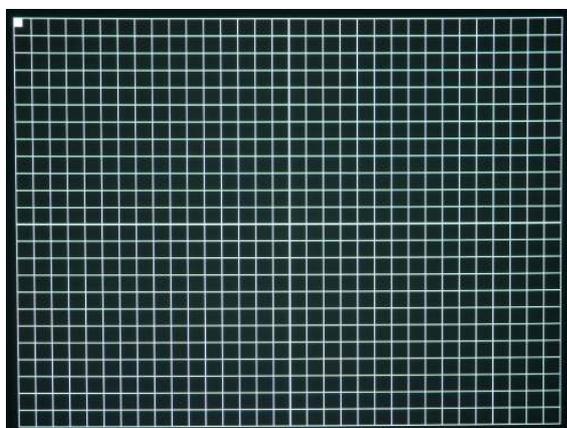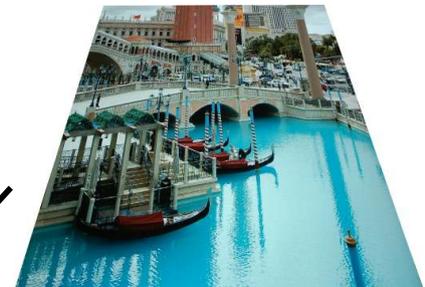
• When the corner has been selected for adjustment, user will see a flashing white block on the image to let user understand which corner is under adjustment.

[3x3 Curved] - Geometry Alignment

- [2x2 Corner] alignment **can't** co-exist with [3x3 Curved] or [5x3 curved] alignment. It means when you apply [3x3 Curved] or [5x3 curved] function, original [2x2 Corner] alignment will be reset. The process has to be restarted from the beginning.

- [3x3 Curved] and [5x3 curved] **can** co-exist. If you execute [3x3 curved] alignment first, then go to [5x3 curved] alignment for further geometry alignment, [3x3 curved] alignment will not be rest and user can continuously executing [5x3 curved] alignment.

- After executing [5x3 Curved] alignment, user can go back to [3x3 Curved] menu to do further 4 corner position fine-tune. It will not reset [5x3 Curved] alignment result

- We suggest to start geometry alignment from [3x3 curved] alignment unless quick 4 corner alignment is required and no need to have precise geometry alignment.

- There is [Warp] hotkey on remote controller for quick access for [Anyplace] menu.

[Shift] - Image 4 Corner Position Alignment
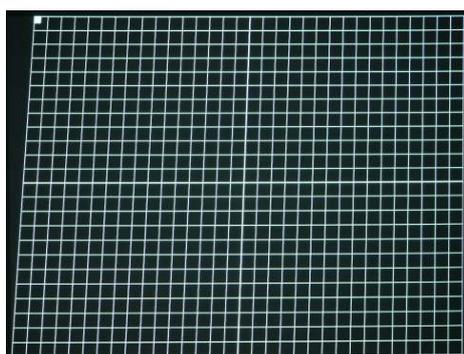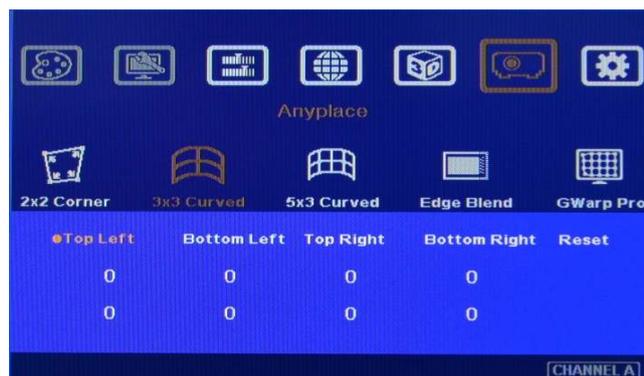
- [Shift] function is similar to [4 Corner] geometry alignment.

- The adjustment points include 4 corners of the image.

- The image change is based on straight line between two corner points.

[Corner] - Corner Curve Adjustment

- [Corner] function is to adjust the position of the image corners but the center points of each edge will maintain at the same location. The function performs a smooth curved line and not straight line.
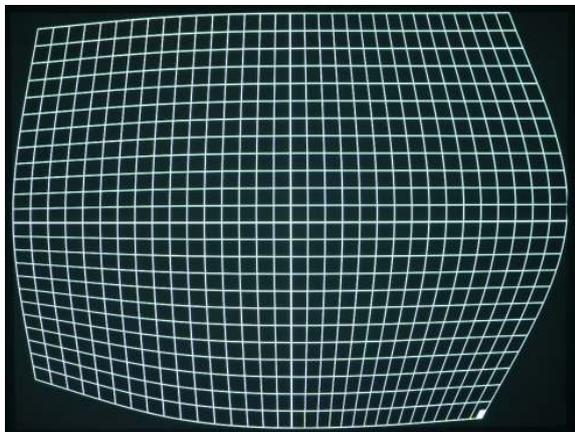
- Left photo to show the image had been changed with [Corner]curve adjustment.

[Edge] - Edge Curve Adjustment

[Edge] adjustment, the image Corner points will maintain at the same location without change. The image will change based on a smooth line between two corner points of the edge.
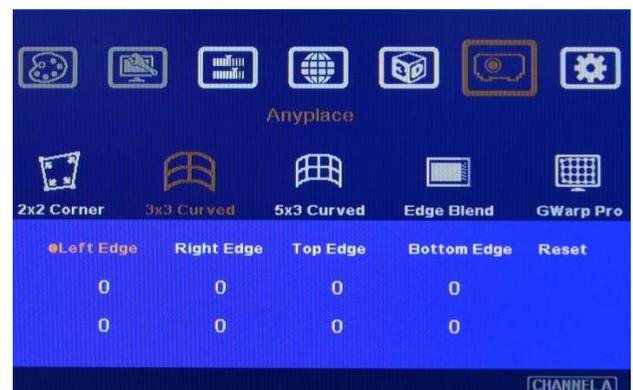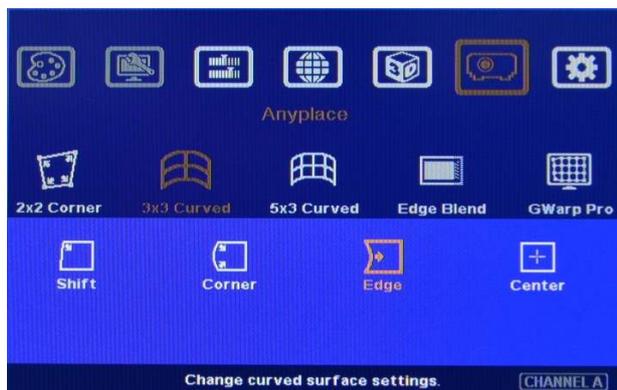
- [Edge] function is to adjust the position of the image edge (center point) and the corner points together. The image change is based on a smooth curved line but not straight line.

- Below is to show the three edges positions had been adjusted (next page).
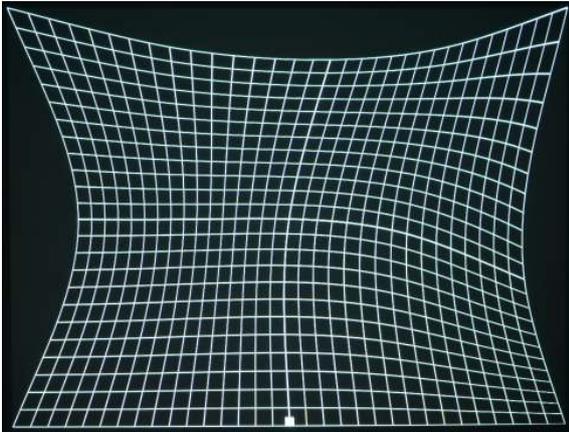
[Center] - Center Region Position Adjustment

• [Center] adjustment can adjust the image center point at the horizontal and vertical positions.

• When adjusting [Center], the edge and corner points will maintain at the same location.

• Below is to show the image center point had been adjusted.
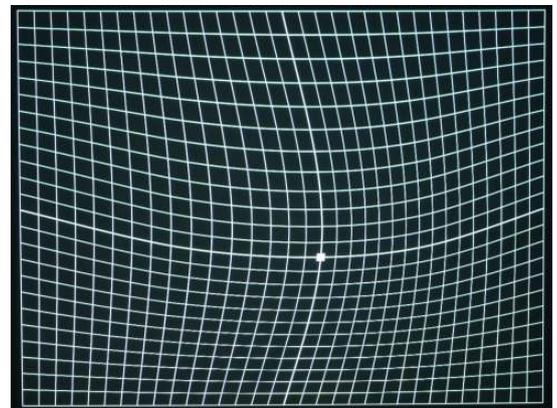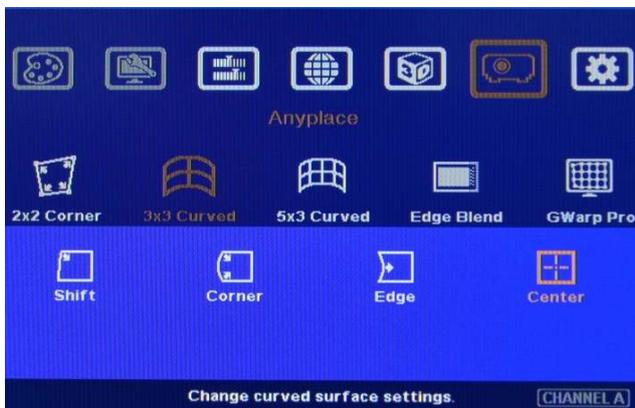
[5x3 Curved] - Geometry Adjustment

[5x3 Curved] adjustment is more precise geometry alignment. When executing curved screen edge blending, This function should be applied to align the image grids between two adjacent projectors to match together. Without good alignment, the image in overlapped area will have blurred image.

 • Note: the projector is designed with the same display grid size when the screen is flat. If the screen is not flat, due to different throw distance, the image grid size will become different gradually. The grid size dimension change between two adjacent projectors will be in different directions. This will cause the grids in overlapped area not able to overlap perfectly and required [5x3 Curved] alignment.
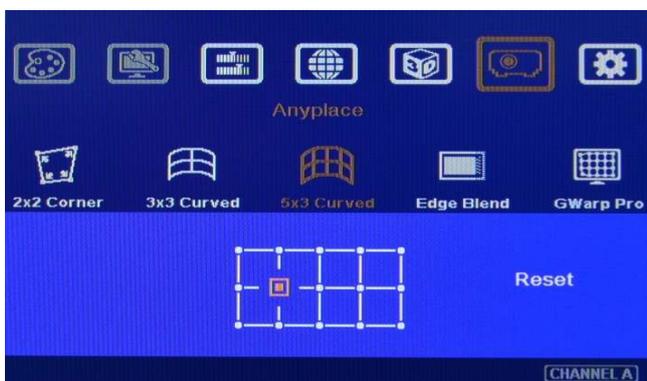
• User can see the grid location for geometry alignment on the screen.

•User can use remote controller or front panel keypad to change grid location.

•When adjusting each grid, the other grids will maintain at the same location.
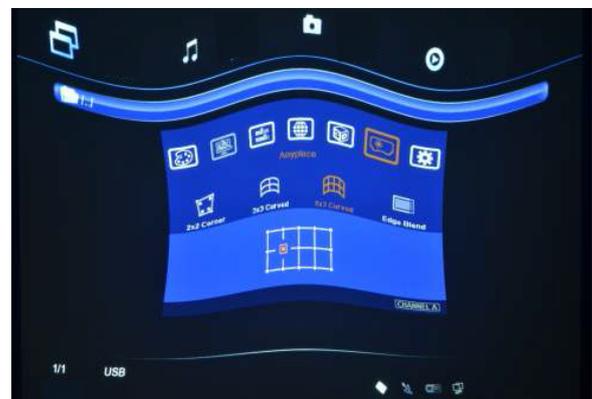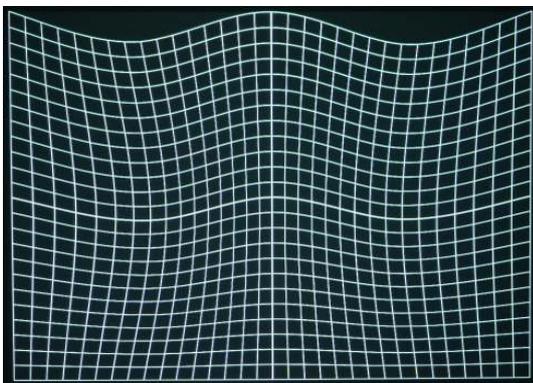
Note:
- [5x3 Curved] will cut the horizontal image into 4 sections and the image in each section can be independently adjusted. In terms of different output resolutions, there will be different pixel number: XGA: 1024/4=256 (8 grids), WXGA: 1280/4=320 (10 grids), 1080p: 1920/4=480 (15 grids). If the overlapped area between two adjacent projectors has the same pixel number as above, then the geometry alignment will have less flexibility.

- When doing edge blending plan, we suggest having some deviation with the above number to get more flexibility to do overlap alignment.

- We suggest the overlap pixels can be +_1-4 grids (32-128 pixels). Here is the recommended overlap grids for curved edge blending in different output resolutions:

[5x3 Curved] - Geometry Adjustment (Cont'd)

XGA: 6, 7, 9, 10, 11, 12 (no 8 grids);
WXGA: 7, 8, 9, 11, 12, 13, 14 (no 10 grids);
1080p: 9, 10, 11, 12, 13, 17, 18, 19, 20 (no 15 grids).
Please calculate the pixel number based on 1 grid=32 pixels.

- Please ensure the grid between the two adjacent projectors are aligned together, this will esure great results on the final output. Horizontal lines in the grid alignment should be 100% match together.
 The vertical lines are allowed to be separated. However these vertical lines should keep the same gaps between two adjacent projectors.
User can adjust Video Wall [Overlap] value to compensate the gap distance and get crisp image.
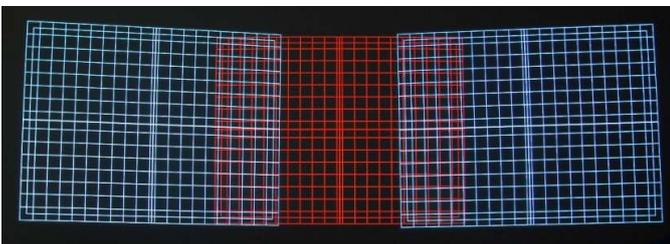
Pattern Grid before alignment.   Pattern Grid after precision alignment.
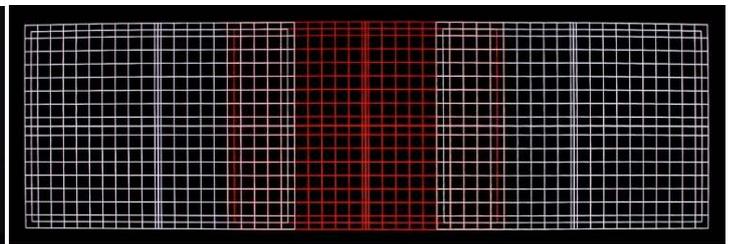
[Edge Blend]

• To merge the images from multiple projectors to become one seamless image.

• Ensure the scaling factor between two adjacent images shall be the same. Otherwise, the image will be blurred. The image size should be related to the input resolution.

• Geometry alignment before edge blending is required:
  - To let the image has the same grid size (same scaling factor in both horizontal and vertical directions)
  -To let the images overlap together in horizontal lines

• Sub-menu under [Edge Blend] menu
  - [Edge]: select the right edge and set overlap pixels
  - [Gamma]: select correct gamma for overlapped area and [Offset] compensation area to eliminate banding effect.
  - [Offset]: to do black level uplift in non-overlapped area to compensate light leakage in projectors.
  - [Shift]: shift the location in edge blend area. In some case, it may help color fine-tune.
  - [Corner]: to do precise [Offset] location alignment.
  - [Color]: to do discrete color adjustment for individual projector.

[Edge Blend] - Selection and Settings

• [Edge] is to select the edge for edge blending and set the overlapped pixel number.

• The unit can perform edge blending on any edge.

  Note: Max. edge blend pixels are 800. If over this number, please consider using image stack or change aspect ratio in projector to shrink projection image.

[Edge Blend] - Selection and Settings (Cont'd)

- Color indicating lines will appear when settings the edge blending pixels.

- To adjust the color use the indicating lines to match together (green to green, red to red). There is no need to calculate the overlap pixels.

- To select the right edge for edge blending.

  For three projector edge blending as example:
  - Select [Left Edge] for RH projector
  - Select [Right Edge] for LH projector
  - Select [Right Edge] & [Left Edge]
   for center projector.

[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 the final video result in edge blending area. The most common issues are gray or color banding effect. These issues are more significant in pure color or white back ground display.

- [Gamma] to select the right gamma curve for edge blending area and [Offset] compensation area.

- User needs to use [Color] menu to adjust the color difference among different projectors in advance. Otherwise, it is possible that the banding effect in edge blending area still visible.

- This function is not functional when [Edge] setting is not executed.

[Gamma] - Color Correction In Edge Blending Area (Cont'd)
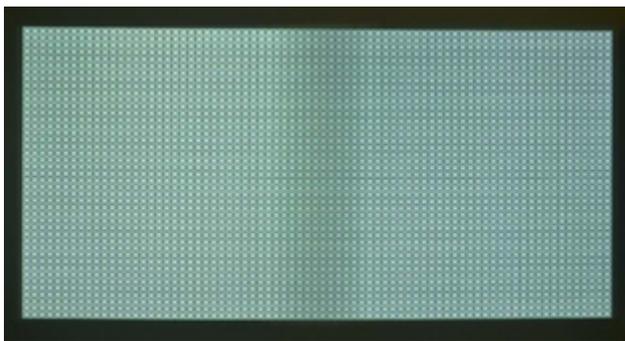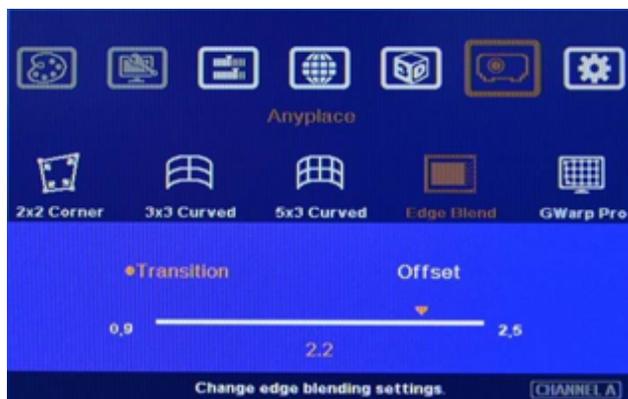
- Two sub-menu in the [Gamma] tab
  - [Transition]: To set edge blending area gamma value. The image color change in edge blending area is shown in real time to get the best quality.

  - [Offset]: To set offset area gamma value to avoid black level.
  Change the [Offset] compensation area while executing black level uplift.

  Please note:
  - Banding effect in edge blending area is related to projector gamma curve. The projector should have the same gamma setting and [Display Mode].

  - Please disable [Dynamic] color or [Brilliant] color function in the projectors. These function will change gamma curve based on the content and affect final edge blending image quality.

- Left picture shows the banding effect in edge blending area. This issue is related to many factors:

  - Screen: gain value under 1.2 is recommended

  - Projector: should have the same gamma and Display Mode. Usually DLP projector will get better result.

  - Signal content: To avoid pure color or pure white color content. Multi-media is the best

  - Overlap range: too small overlap range will be easier to see banding effect. 15%-25% with more than 50 cm is recommended. (XGA: 6-10 grids, FHD: 9-13 grids, each internal pattern grid size is 32 pixels)

[Gamma] - Color Correction In Edge Blending Area (Cont'd)
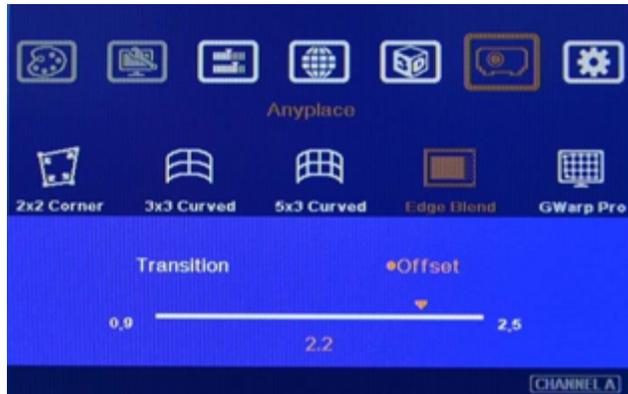
- When adjusting black level, [Offset] value will be applied to complete color range and reduce image quality. [Offset] gamma adjustment can avoid this issue and let [Offset] adjustment only affect black level but not normal image.

[Offset] - Black Level Uplift

If edge blending is performed under dark environment, due to light leakage in projector optical system, user will see gray area in overlapped area. This gray area can't be fixed by signal processing. The only way is to uplift the black level in non-overlapped area to reduce the black level difference. [Offset] function is to balance black level in the display under dark environment.

- Left picture is to show projector light leakage under dark environment. In overlapped area, the offset value is the sum from two projectors. Low contrast ratio projector will be more serious.

- Three sub-menu under [Offset]:

  [Transition]: To set black level color Offset value in edge blending area. It can't be reduced because default value is set at lowest level "0". No further adjustment can be done.

  [Non-transition]: To set black level Offset value in non-overlapped area. [Reset]: to reset [Offset] value to "0". Normally, user only adjusts [Offset] compensation in [Non-Transition] area.
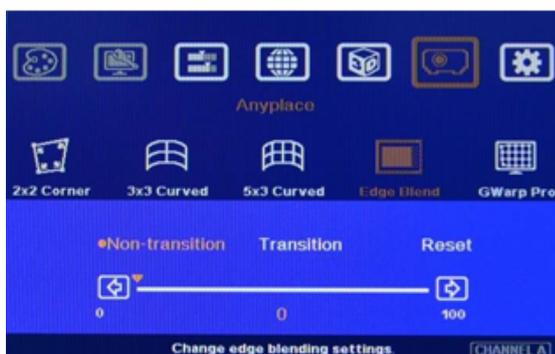
User can't reduce [Transition] area black level. The default value is set at "0" already. No adjustment is required.

The starting point for this Offset is based on Edge blend borders. The projector light leakage area is from the original projecting area before geometry alignment. Therefore Offset borders may not be the same as light leakage area. User needs to use [Corner] menu to align the border lines for Offset adjustment.

[Corner] - Adjust [Offset] Compensation Position

- After set [Offset] value in [Non-Transition] area, user can reduce the black level offset difference but user will also see small light bar near edge blending border. Below is the reason:
  The starting point of [Offset] for non-transition area compensation is based on Edge Blend borders after geometry alignment. The projector light leakage area is from the original projecting area before geometry alignment. Therefore Offset borders may not be the same as light leakage area. User needs to use [Corner] menu to align the border lines for Offset adjustment.

- The maximum range for the corner adjustment is 300 pixels. When user installs the projectors, please make sure the projector projecting area border to be as close as actual edge blending border. The maximum difference should be under 300 pixels.

- 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 uplift in black level. Usually, except near edge blending area, this kind of black level uplift is outside the display area (outside screen frame) and viewers will not see it. However, when the projector is displayed on a screen without borders, Viewers may see this black level uplift. It is outside active display area and can't be corrected.

- [Corner] can adjust the positions for black level [Offset] borders through change the end points of the borders.

- Geometry alignment on the borders of edge blending area should be very accurate. Otherwise [Offset] position in black level uplift will be affected.

[Shift] - Edge Blending Area Shift

- [Shift] is to shift the whole edge blending area to other location. The width of the edge blending area will remain the same and only change the position. This is to test the effect of banding effect and select the best location of the edge blending. Usually, user can try to adjust [Edge Blend] value to check the final image quality.

- The maximum range for the adjustment is 250 pixels.

[Color] - Individual Projector White Balance and Color Correction

The [Color] adjustment can be applied to individual projector for white balance and color difference correction through separate RGB Gain and Offset adjustment. It will be very helpful in projector system because projector has color difference, lamp brightness decay and lamp replacement issue. Through this [Color] adjustment, it will improve the video quality in edge blending

- [Corner] can adjust the positions for black level [Offset] borders through change the end points of the borders.

- Under [Color] menu, user can adjust separate RGB [Gain] and [Offset] value to change the color and white balance.

- [Gain] is to change the color slope and [Offset] is to add value in all level of brightness (0-225)

[Color] - Individual Projector White Balance and Color Correction (Cont'd)

In edge blending procedures adjust the color from projectors first. Users can also use [Color] function to do further adjustment. Please note that, any color adjustment will reduce the color dynamic range.

[Edge Blend] - Setting Procedures and Example

Edge Blend has the facility to enlarge the display screen area and change the aspect ratio with multiple projectors. Three elements are required for edge blending:
1. To perform geometry alignment the projectors have the same size (warp function).
2. Video Wall function can split,crop and assign the proper image to each projector.
3. Edge blending allow projectors to be become a seamless image. Below is example of the procedures for three projector edge blending. It is also possible to use Gwarp PC tool for sophisticated curve adjustment.

a. Excel Spread Sheet is available to for user to determine the projectors (resolution, quantity, lumens and throw ratio) and information for system installation. Based on this information, user can make detailed project plan for the complete system.

b. Placement of the Projectors:
- Select projectors with higher contrast ratio (above 3000:1 is recommended) and set projectors at reasonable distance from the screen with 200-500 overlap pixels (or 40cm-100cm overlap width) between two projectors.
- Use removable tape as temporary marks to indicate the image edges for each projector (based on the data from Excel Spread Sheet). Each projector should have the same display size. Otherwise the grid size in each projector will be different and the blending image will become blurred.
- To project each projector a little over the display range for further geometry adjustment.
 Please try to install the projector with less keystone image.
- To set parallel vertical overlap edges between 2 adjacent projectors and let the positions of the lines close to pre-marked positions will get better video quality after Edge Blending image.

c. Projector setting:
- Reset projector to default setting.
- To disable "Auto Alignment" function if user wants to use VGA analog input signal to avoid image shift during projector switching ON/OFF process.
- Disable Auto Keystone function and set new keystone value to let two vertical edges in adjacent image in parallel vertically.
- Select a Display Mode with 2.2 gamma curve will reduce the color difference in overlap area for video display. User needs to test with different Display Mode setting based on the application.
- Use projector internal color adjusting function to adjustment the color variation among projectors before implement edge blending.

d. MLT-EDGEPRO-2X2 Setting:
- Reset MLT-EDGEPRO to default setting.
- Select the input source and best output resolution to match projector native display resolution.
- Set [OSD Time Out] to [OFF] to maintain the display of OSD and Grid Test Pattern during the installation period.
- To do [Color] adjustment for the projector with bigger color deviation.

[Edge Blend] - Setting Procedures and Example (Cont'd)

e. Geometry Adjustment:
- To execute [3x3 Curved] function:

       1. Apply [Shift] function to adjust the corner positions in each projector to match preset marks
on the   screen.

       2. Apply [Edge] function to align image edges near the required positions.

       3. Apply [Center] to let image center meet image horizontal center line.

- To execute [5x3 Curved] function for image position fine-tune.

       1. To let image horizontal lines match together in all projectors.

       2. To let each projector has the same image size.

       3. To let grid patterns between two adjacent projectors overlapped together.

- If the system is for 3 projector edge blending, the center projector should be aligned first then to align the rest
two projectors to match center projector.

f. Video Wall setting (Image split and allocation):

After geometry adjustment, video wall setting is required. The functions of video wall are as follows:

 - Split the image for different projectors (Zoom)

 - Determine the location of the image for each projector. (Pan)

- To set proper overlap region in the edge between projectors (Overlap)

Example for 3x1 horizontal edge blending Video Wall setting
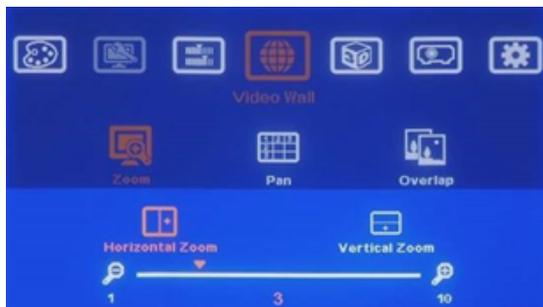
- [Zoom] setting
  - Select [Horizontal Zoom] [3] to split the image for **3** projectors horizontal edge blending.
  - Select [Vertical Zoom]   [1] because only one projector in vertical position.
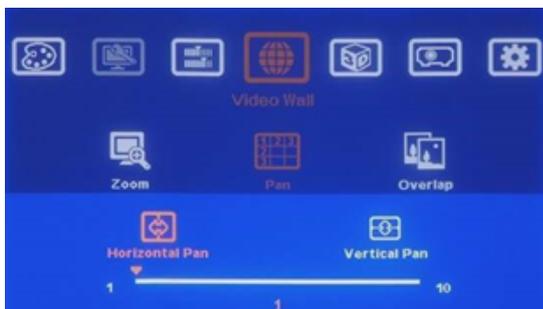
- [Pan] setting
  Select H=1, V=1 for LH projector
  Select H=3, V=1 for RH projector.
  Select H=2, V=1 for center projector

Example for 3x1 horizontal edge blending Video Wall setting (Cont'd)
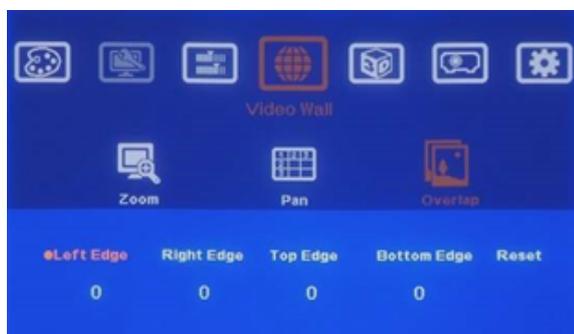
• [Overlap] setting:
 - Please apply edge blend value based on [Excel Spread Sheet]
 - Select [Right Edge] for LH projector.
 - Select [Left Edge] for RH projector.
 - Select [Right Edge] & [Left Edge] for center projector.

• Before Overlap adjustment: Double image will be showed in all overlap regions. User can apply [Overlap] value to eliminate double image at the overlap region.

• An [Excel Spread Sheet] can be provided for the calculation in different setup. Below is the calculate result of Video Wall [Overlap Value] for 2 projector edge blending. If no [Excel Spread Sheet] can be used, user can change [Overlap] value in unit simultaneously and find a value with clear image in overlap area.

Video Wall [Overlap] value in dual projector horizontal edge blending					
Input to EDGEPRO	Output to projector	Overlap 7 grids 224 Pixels	Overlap 8 grids 256 Pixels	Overlap 9 grids 288 Pixels	Overlap 10 grids 320 Pixels
		Overlap	Overlap	Overlap	Overlap
1080P	XGA	118	137	157	178
1080P	WXGA	92	107	122	137
1080P	1080P	* 59.5	68.6	77.8	87.3

Notes:
- "Overlap" means the pixel # in the overlap region between projectors. User can check the grid pattern
to calculate overlap pixel. One grid is 32x32 pixels.

- For the value "59.5" in above example, user needs to set one projector with "59 and another one with "60".

- After apply Overlap pixel, if user still finds blurred image in edge blending area, user can adjust Overlap value
up or down at the same time in adjacent projectors till clear image is found.

- The Overlap total value in each projector should be the same in order to keep the same image scaling factor.

[Edge Blend] - Setting Procedures and Example (Cont'd)

g. Edge Blending setting:
- Two images in overlap region merged gradually in different directions to become one seamless image.

The setting value is based on the actual overlap pixel number.

- Color fine tune under [Edge Blend] menu:
   1. Select different [Gamma] values and check video performance.
   2. Set right [Offset] value in None Transition area to compensate black level difference.
   3. Apply [Corner].function to fine tune the location for black level [Offset] position

h. Image quality fine tuning:
- The final performance will be a combination of many factors—projector characteristics, projector setting, screen, ambient light and units 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 transition area through [Offset] menu.
- MLT-EDGEPRO-2X2 blending default setting is for projector with 2.2 gamma settings. To select projector display mode near 2.2 gamma setting will get the best result.
- The projector may retain light leakage near the border of the imager. It is not possible to be fixed.
- These factors affect final image quality;
   i. MLT-EDGEPRO-2X2 Settings:
      1. Edge Blending: Gamma, Shift, Offset, Gain.
      2. Image Properties: To select Preset Mode to sRGB, Neutral or Bluish
      3. Individual projector color adjustment before edge blending by [Color] function under [Edge Blend] menu.
   ii. Projector & Screen Settings:
      1. To adjust installation position of the projector and reduce keystone angle.
      2. Increase Overlap region & reduce off axis angle. To change Display Mode, usually Standard, sRGB/ Neutral will get better result.
      3. Try different color settings. If necessary to use 3D color adjustment in the projector.
      4. Use a lower gain value screen.
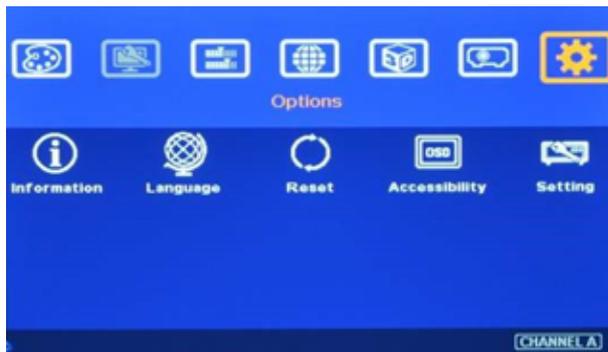
• Activate [Options] Menu by Front Panel keypad or Remote Controller.

System Information - [Information]
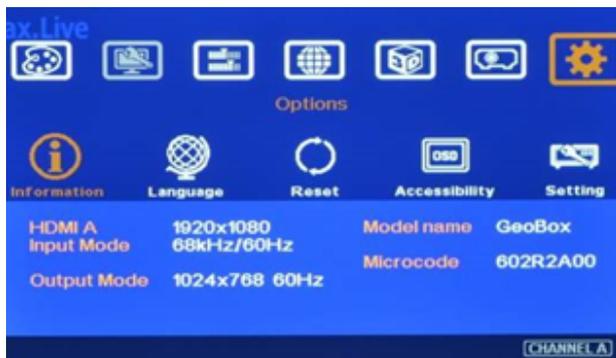
• In [Information] menu, it will show the information in the Edgepro unit, such as output mode, input mode, Model name and Microcode version.

OSD Language - [Language]

• In [Language] menu, there are three languages can be selected as OSD Language: English, Simplified Chinese and Traditional Chinese

Reset
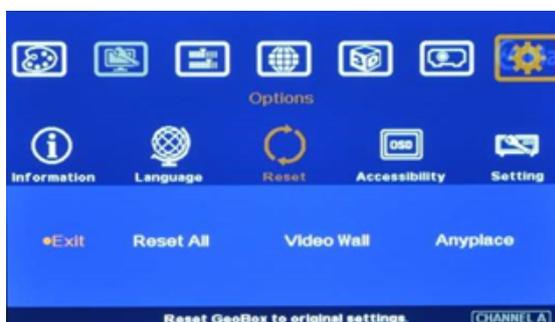
•In [Reset] menu, there are three types of Reset can be done: Reset All, reset Video Wall and reset [Anyplace] function.

- [Exit] menu will exit from [Reset] menu and the system settings will not be changed.
- [Reset All] menu will reset Edgepro unit to its factory default settings but the setting stored in [Profile] & [eWarp Pro] will be kept the same without change.
- [Video Wall] menu will reset the settings in Video Wall function to its factory default settings but all other settings will remain the same without change.
- [Anyplace] menu will reset the settings in [Anyplace] function to its factory default settings but all other settings will remain the same without change.
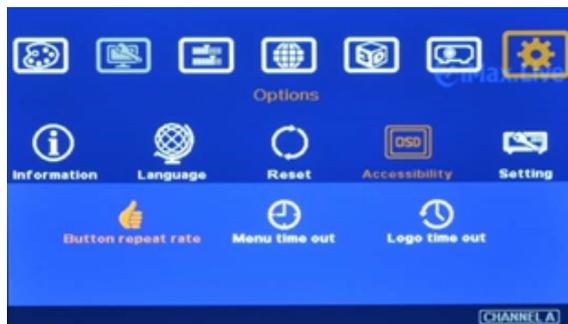
Accessibility

• In [Accessibility] menu, there are three items can be set:
OSD [Button Repeat Rate], OSD [Menu Time out] and [Logo Time Out]

Button Repeat Rate
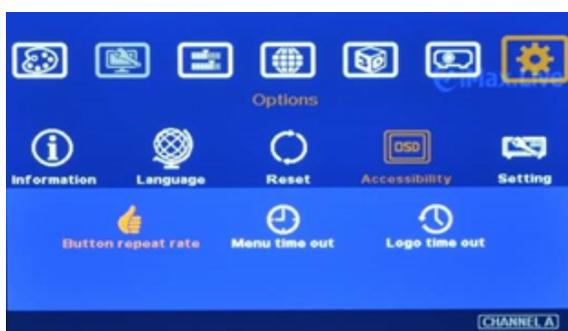
• OSD [Button Repeat Rate]:
It controls the speed of the response of the OSD button while user presses OSD button continuously.

- [Off]: OSD only responds once when every time OSD key is pressed.
- [Default]: OSD will respond slowly at the beginning but will increase the speed of the response when OSD key is pressed continuously.
- [Slow]: OSD behavior is similar to [Default] but the response speed will be slower than Default.

Menu Time Out

• OSD [Menu Time Out]
OSD menu will disappear from the screen based on time setting. The default time is 30 seconds.

When [Off] is selected, the OSD menu will remain in the screen until user activates other OSD function.

Internal Grid Pattern will be also controlled by the time setting in [Menu Time Out] menu.

For [Anyplace] geometry adjustment, we recommend user to set OSD [Menu Time Out] to [Off] to maintain continuously display of the pattern and OSD on the screen.

Logo Time Out
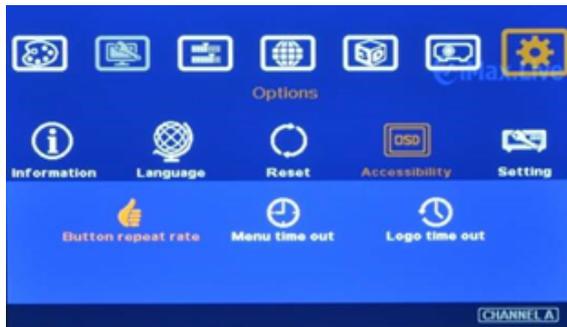
• To set duration of the Splash screen.
If zero is selected, then the splash screen will not be showed during system booting up period.

Before the Splash screen is hidden, the unit will not execute any command.
When using VGA Input the image position may change due to projector auto adjustment function performing any geometry adjustment. If the occurs disable the projector auto alignment or set a longer Logo Time Out- the unit will not execute the geometry adjustment before projector finishes auto alignment.
In the system power ON procedure and Logo time out will maintain the image position while user powers ON/OFF the complete system.

Setting
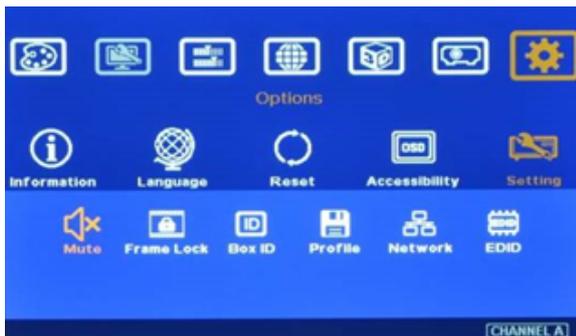
There are 4 items under [Settings] menu:
1. [Mute] Audio mute or enable
2. [Box ID]: Set control ID
3. [Profile]: Save profile settings
4. [Network]: set RS232 and network control

Audio [Mute]
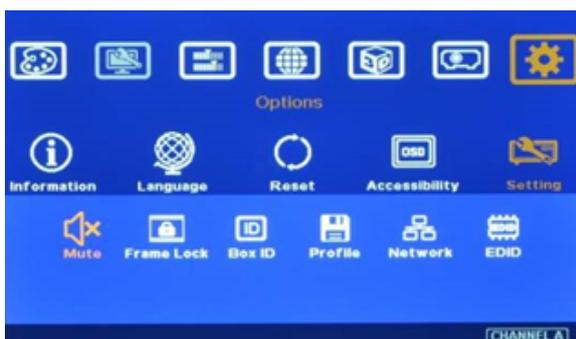
•Audio Mute:
[Mute Off] will enable audio output.
[Mute On] will disable audio output.
[Mute] hot key in remote controller is available

Frame Lock and Smooth Switching Mode

[Frame Lock] will ensure the input and output frame rate synchronize together.

-With multiple units, the signal in each unit is synchronized without frame tear.

-However, when the input timing is changed or video source, the output signal will show black temporarily and the projectors has to search for an input source also producing a "No Video Signal" shown on the screen.

-Solution- Use [Disable] frame lock to maintain continuous output in unit while input source or timing changes. This kind of Smooth Switching Mode is only available when the signal change is in same vertical frequency, such as within NTSC or Pal. If the input timing change is between NTSC or PAL, there will be still temporary signal break and the display devices will re-synchronize the input signal again. When Frame Lock is [Disable], unit will shorten the time for mode change. The system will also conduct HDCP verification. This verification process will also take some time. Therefore the time for mode change may be different in different cases.

Box ID
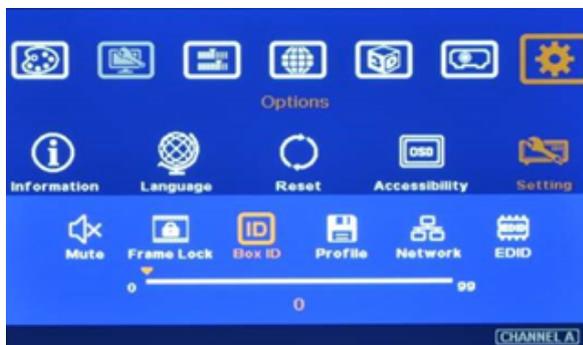
•[Box ID] is the identification No of each unit.
- Devices ID No range from 1-99
- After set Box ID, the Edgepro unit can be control individually via IR Remote controller, RS232 & Ethernet
- User can use "85+ID" key on remote controller to control each Edgepro unit.

Press number keys in Remote Controller for the control of multiple Edgepro units:

850: simultaneous control for all Edgepro unit

851: control Edgepro ID No. 1

853: control Edgepro ID No. 3

A flashing LED indicator is to show the Edgepro unit that has been locked without action.

Profile Setting
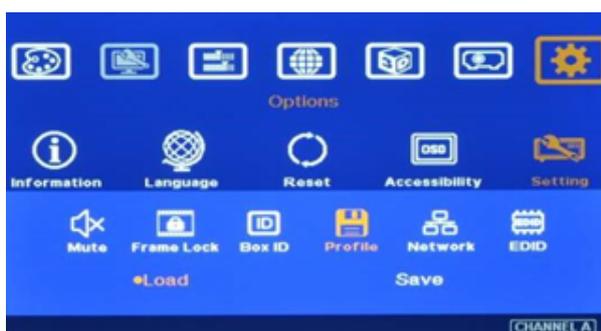
•Profile] is to save and load device settings including input port, output resolution and all the settings in unit.

Profile Setting

- Five Indexes can be chosen to save device settings in each MLT-EDGEPRO-2X2 and can be reloaded by IR remote controller, RS232 or Ethernet through [Load] menu under [Profile]

User can use profile setting function to show different display styles in the applications. If you have 3x1 display setup,
1. User can implement:
- 3x1 edge blending as a seamless screen.
- 2x projector edge blend + 1x projector displays different content.
- Each projector displays different content.

2. User can switch among different display styles (profiles) within seconds through IR remote controller, RS232 or Ethernet

Network

- Two choices under [Network] menu: RS232 & Ethernet
- User can only select one control method between RS232 and Ethernet.
- If no addition Ethernet module in unit, only RS232 can be selected.

Ethernet Control
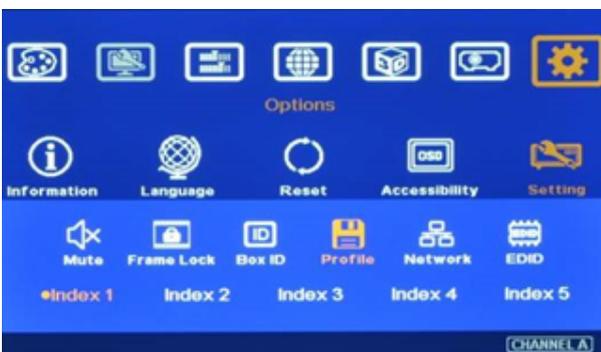
- Ethernet control: MLT-EDGEPRO-2X2 is design with optional [Ethernet] control interface through RJ45 connector. User can controlle device through Ethernet or WiFi via PC or mobile devices, such as Smart Phone, iPhone and iPad. A webpage with keypad icons (virtual keypad) will be showed in control devices for user to control all the OSD function of Edgepro unit.

Ethernet Control (Cont'd)

• Additional built-in Ethernet Module is required.
• User can use external Ethernet to RS232 conversion box to control Edgepro unit through Ethernet.

• In [Ethernet] menu, there are two alternatives: DHCP IP & Static IP.

• DHCP IP is assigned by Ethernet router or Ethernet switch hub.

• Static IP can be programmed through OSD keypad or remote controller.

• User can use < > OSD direction keys to access the position for the modification and OSD direction keys to change the value in the IP settings.

• Ethernet Webpage (Virtual keypad in the screen):

If Ethernet Router supports PnP protocol, the Edgepro unit device will be visible on the network. After connection, it will show below content in the webpage.
It includes virtual keys for the operation of the OSD menu.

EDID - Setting

Selective EDID setting is added into Edgepro unit. The purpose are as follows:
a. Edgepro unit can support a range of input signal timing—from SVGA up to 4k/2k. In order to get the best video performance, user needs to select different input signal resolution.

b. Different PC display cards have different setting and behavier. Many users may not be able to do the right settings

c. High end media player or server can support a range of outputs—from 720p to 4k/2k. If no EDID selection function, only one default EDID can be selected by media player. The system may not show the best video wall output quality.

d. Different display modes may show different final image aspect ratio. User can ultilize different EDID setting to change input signal timing and get different output image aspect ratio.
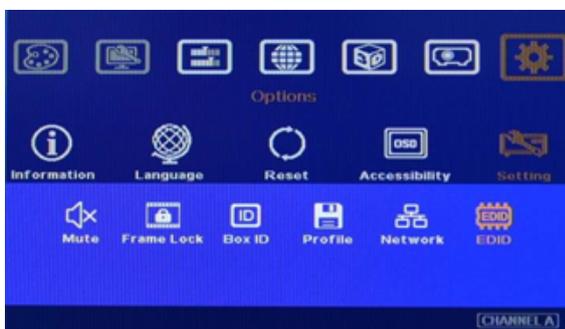
• Activate EDID setting menu:
[Options]>[Setting]>[EDID]

• Use IR remote controller to select desired EDID.

• After select EDID, the PC or medial will automatically change the output timing setting.

• Press [INFO] key to check if the input and output timing are set correctly.

Note: In very rare cases, some PC may not detect the right EDID from Edgepro unit and show different result. If it happens, please open resolution setting window and select desired output resolution and set display aspect ratio from PC.

Screen Selection

1. Gain value less than 1.5 will be recommended for Edge Blending application. Higher gain value will be more sensitive to color difference among different projectors and also will have view angle issue.

2. Flatness in the screen is critical. If the screen is not smooth or flat enough, it will create difficulty in alignment. Then the image in overlap area may become blurred due to alignment issues.

Projector Selection and Settings

1. The projectors for the edge blending had better to be the same model and the same production lot. If they are not the same models, it may create some difficulty and performance issue in the future.

2. Usually, higher contrast ratio in the projector will have better black level performance. The projector with contrast ration more than 5000:1 is recommended for multiple projector edge blending in most of the environment. In a dark environment, video projector with 10,000:1 contrast ration or higher is recommended. This contrast ratio should be native contrast ratio but not dynamic contrast ratio.

3. Most of DLP projector will provide a function for 3D color adjustment to fine-tune R, G, B, Y, C, M six colors, This will help color fine tune in multiple images from different projectors.

4. All the projectors shall have the same setting—including optical zoom ratio, color temperature, color characteristics, lamp setting, display mode...etc

5. Most projectors have different display mode for different applications, such as Presentation, Video, sRGB and User mode. Different display modes have different gamma settings inside projector and affect the video quality in overlap region. User needs to try with different display modes to find the best one for the application.

6. The mechanical stability in optical system will be important. It should be rigid enough. Otherwise it will be easy misalignment among projectors sometime after installation. A projector with big ZOOM ratio may be more convenient for the installation

ITEM	DESCRIPTION
UNITS	MLT-EDGEPRO-2X2
UNIT DESCRIPTION	Edgeblending Video wall processor
HDMI COMPLIANCE	HDMI 1.4, Full 3D & 4K@30 Yes
HDCP	1.4 and backward compatible
VIDEO BANDWIDTH	Single-link 300MHz [10.2 Gbps]
INPUT RESOLUTIONS	4K@30Hz, WQXGA & 3840x1080 @60Hz, Full HD, with 4:4:4 sampling without compression.
OUTPUT RESOLUTIONS	720x480,XGA,WXGA,1280x1024,1366x768,1400x1050,1600x1200,1920x1080 & 1920x1200
RESOLUTION AND DISTANCE @ 10-BIT	**Full HD:** (1080p) ~ 15meter (50feet) (HDMI) **4K@30:** (3840 pixels × 2160) ~ 10meter (32 feet) (HDMI)
AUDIO SUPPORT	Lossless Multi-channel audio formats (DTS-HD Master Audio, Dolby TrueHD, Dolby True HD)
IR SUPPORT	IR supported ˙UbX˙9l hˇYbgˌcb˙gˌdd˙]YX
RS-232 SUPPORT	RS232 supported ˌcf˙˙fX˙dˈUˈhˈmˈVˌbhˌcˈ
INPUT TMDS SIGNAL	1.2 Volts (peak-to-peak)
INPUT DDC SIGNAL	5 Volts (peak-to-peak, TTI)
ESD PROTECTION	- Human body model — ±19kV (air-gap discharge) & ±12kV (contact discharge) - Core chipset — ±8kV
INPUT	&ˌx HDMIˌžˈ%l ˈ8ˌgdˈUˌndˌcfhˌžˈ%l ˈ8@ˈ8J ˌžˈ%l ˈJˌ; 5˙˙ 1x 3.5mm ˈfˈ#F˙ˈ#B ˈˌcfˈ#F ˈˌYl hˈbgˌcbˈVˈUˈ˙YˈŁ 1x RS 232
OUTPUT	2 x HDMI Output for Displays or Projectors 1 x HDMI Loop Out port (Cascading to multiple outputs) Max Resolution 3840x2160@30Hz
BEZEL COMPENSATION	Available in Vidoewall mode
IMAGE SUPPORT	Geometry Grid Correction, Rotation, Image Flip and warp
HDMI CONNECTOR	Type A (19 pin female)
RS-232 SUPPORT	DB9 connector female (115,200 bps)
DIMENSIONS (L X W X H)	17.3" x 7.4" x 1.7"
WEIGHT	5.18 lbs
POWER SUPPLY	12V 3A DC / 110-240V (FCC,CE,UL)
POWER CONSUMPTION	20 Watt (max)

ENVIRONMENTAL

ITEM	DESCRIPTION
OPERATING TEMPERATURE	32° ~ 104°F (0° to 40°C)
STORAGE TEMPERATURE	-4° ~ 140°F (-20° ~ 60°C)
RELATIVE HUMIDITY	20~90% RH (no condensation)

Notes

Avenview Warranty Certificate

AVENVIEW CORP. ("Avenview") warrants Avenview-branded product(s) contained in the original packaging against defects in materials and workmanship when used normally in accordance with Avenview's enclosed manual guidelines for a period of THREE (3) YEARS from the date of original retail purchase - Warranty Period. Avenview's published guidelines include but are not limited to information contained in technical specifications, user manuals and service communications.

LABOR: During the Warranty Period of THREE (3) YEARS, Avenview will repair or replace the product(s) at no cost using new or used parts equivalent to novel performance and reliability if the product(s) is determined to have abide by Avenview's published guidelines. Cost of Labor applicable to product(s) after Warranty Period. For labor costs, please contact support@avenview.com.

PARTS: During the Warranty Period of of THREE (3) YEARS, Avenview will supply new or rebuilt replacements in exchange for defective parts of the product(s) at no cost if the product(s) is determined to have abide by Avenview's published guidelines. Cost of Parts applicable to product(s) after Warranty Period. For part(s) costs, please contact support@avenview.com.

To obtain Warranty: (a) proof of purchase in the form of a bill of sale or receipted invoice reflecting that the registered product(s) is within warranty period must be presented to obtain warranty service; (b) product(s) must be registered at time of purchase. Failure to do so will result in applicable parts and labor charges. Returning product(s) must be shipped in Avenview's original packaging or in packaging pertaining equal degree of protection to Avenview's. Both Avenview and purchaser are responsible for freight charges and brokerages when shipping the product(s) to the receiver.

NOT COVERED BY THIS WARRANTY

This warranty does not apply to any non-Avenview branded product(s); non-registered Avenview product(s). This warranty does not apply: (a) to cosmetic damage, including but not limited to scratches, dents and broken cords; (b) to damage caused by use with another product; (c) to damage caused by accident, abuse, misuse, liquid contact, fire, earthquake or other external cause; (d) to damage caused by operating the Avenview product(s) outside Avenview's manuals or guidelines; (e) to damage caused by service performed by anyone who is not a representative of Avenview or an Avenview authorized personnel; (f) to defects caused by normal wear and tear or otherwise due to the normal aging of the Avenview product(s), or (g) if any serial number has been removed or defaced from the Avenview product(s).

AVENVIEW IS NOT LIABLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOSS OF USE; LOSS OF REVENUE; LOSS OF ACTUAL OR ANTICIPATED PROFITS (INCLUDING LOSS OF PROFITS ON CONTRACTS); LOSS OF THE USE OF MONEY; LOSS OF ANTICIPATED SAVINGS; LOSS OF BUSINESS; LOSS OF OPPORTUNITY; LOSS OF GOODWILL; LOSS OF REPUTATION; LOSS OF, DAMAGE TO, COMPROMISE OR CORRUPTION OF DATA; OR ANY INDIRECT OR CONSEQUENTIAL LOSS OR DAMAGE REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER.

Some states do not allow the inclusion or limitation of incidental or consequential damages, or allow limitations on duration implements of the Warranty Period; therefore the above limitations or exclusions may not be applicable to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

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