GeoBox Operation Manual

(G-101/G-102)

Technical support: HH Lin
Tel: +886-2-8751-2785 ext. 305
Cell: +886-932-332-412

Version: 2.02

Table of Contents

1. PREFACE

1.1 Limited Warranty

GeoBox is designed and tested to the highest standards and backed by a one year parts and labor warranty. Warranties are effective upon the first delivery date to the OEM customer and are non-transferable.

Warranty related repairs include parts and labor, but do not include repair of faults resulting from user negligence, special modifications, abuse (mechanical damage), shipping damage, and/or other unusual damages.

The customer shall pay shipping charges when the unit is returned for repair. Manufacturer will pay shipping charges for return shipments to customers.

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

No other warranty, expressed or implied, shall apply.

1.1.1 Return Material Authorization (RMA)

In the event that a product needs to be returned for repair, inform manufacturer and ask for a Return Material Authorization number.

1.1.2 RMA Conditions

1. Prior to returning any item, you must receive a Return Material Authorization (RMA) number.
2. All RMA numbers must appear on the return-shipping label.
3. All RMA numbers are valid for ten (10) days from the issue date.
4. All shipping and insurance charges in all RMAs must be prepaid by the customer.

1.2 FCC Statement

Note: This equipment has been tested and found to comply with the limits for Class B digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential/office installation. The equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced Radio/TV technician for help.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.3 Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Take note of all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's

instructions.

8. Do not install near any heat sources such as projectors, radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade and the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged; liquid has been spilled or objects have fallen into the apparatus; the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

1.4 Installation

Attachments - Do not use attachments not recommended by the manufacturer, as they may result in the risk of fire, electric shock, or injury to persons.

Water and Moisture - Do not use this unit near water; for example, near a bathtub, washbasin, kitchen sink or laundry tub, in a wet basement, or near a swimming pool, water spa, or the like.

Heat - Do not use this unit near sources of heat, including projector ventilation holes, heating vents, stoves, or other appliances that generate heat. Also, do not place this product in temperature environments greater than 40°C (104°F).

Mounting Surface - If not installing the unit in a standard equipment rack using the recommended mounting brackets, place the unit on a flat, even surface. Do not place the unit on an unstable cart, stand, tripod, bracket, or table. Please also consider the possible location shift due to earth quake. The unit may fall causing serious injury to a person and/or serious damage to the appliance.

Portable Cart - An appliance and cart combination should be moved with extreme care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

Ventilation - Locate the unit with adequate space around it so that proper heat ventilation is assured.

Slots and openings - Slots and openings in the unit's case are provided for ventilation to ensure reliable operation of the unit and to prevent overheating. These openings must not be blocked or covered. The openings should never be blocked by operating the unit while placed on a bed, sofa, rug, or similar surface. This unit should not be placed in a built-in installation such as a bookcase unless adequate ventilation is provided.

Entry of Foreign Objects and Liquids - Never push foreign objects of any kind into this unit as they may touch dangerous voltage points or short-circuit electrical / electronic parts that could result in fire, or electric shock, or both. Never spill liquid of any kind onto the unit.

Electric Power - Only operate the unit from the type of electric power source indicated on the unit's labeling. If you are not sure of the type of power supply that is available in your home or workplace, consult your appliance supplier or local power company.

Grounding or Polarization - This unit is provided with a 3-pin, grounded, alternating current line plug. This plug will fit into the power outlet only one way. This is a safety feature. Do not try to defeat the safety purpose of the plug.

Power Cord Protection - Route power supply cords so that they are not likely to be walked on or pinched by placing items upon or against them, paying particular attention

to cords at plugs, convenience receptacles, and the point where they exit from the product.

Overloading - Do not overload wall power outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.

Lightning - For added protection for this unit during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the power outlet. This will prevent damage to the unit due to lightning or power surges.

1.5 Maintenance

Cleaning - Unplug this unit from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Only use a soft cloth dampened with a mild detergent solution. Do not use strong solvents such as alcohol, benzene, or paint thinner.

Damage Requiring Service - Unplug this unit from the power outlet and refer servicing to qualified service personnel under the following conditions:

- If liquid has been spilled or foreign objects have fallen into the unit.
- If the unit has been exposed to rain or water.
- If the unit does not operate normally, following the operating instructions. Adjust only those controls that are covered by the operating instructions as improper adjustment of other controls may result in damage and may require extensive work by a qualified technician to restore the unit to normal operation.
- If the unit has been dropped or the case has been damaged.
- When the unit exhibits a distinct change in performance - this indicates a need for service.

Do not attempt to service this unit yourself as it may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

2. Introduction

2.1 General Description

GeoBox (see **Figure** 1) is a high performance video signal processor intended as a companion for projector and video wall displays. It is a standalone system to implement format conversion, PIP, video wall, 3D decoding, sophisticated image edge blending and geometry adjustment up to WQXGA input and WUXGA (full HD) output without PC system.

Figure 1

Major features and applications:

a、 Format conversion between different signal types up to WQXGA resolution.

b、 High end video processing and 3D de-interlacing.

c、 3D decoding for stereoscopic display and Immersive Theater.

d、 Image stack for dual projector high brightness display.

e、 High resolution video wall up to 15x15 matrix display. Support AMD Eyefinity and Matrox Technology for high resolution display from one PC source via HDMI or DisplayPort input.

f、 Edge blending on flat or curved screens.

g、 With flexible PIP function from selectable input sources

h、 eWarp Pro PC tool is available for sophisticated image warping adjustment.

High end video processing and system design:

a、 True 10 bits video processing.

b、 Video processing and color technology:

i. 3-D motion adaptive de-interlace in both main and PIP channels

ii. Edge-oriented adaptive algorithm for smooth low-angle edges

iii. Automatic 3:2 & 2:2 pull-down detection and recovery

iv. Intelligent color adjustment

c、 Integrated with HDMI 1.4a receiver and transmitter to support HDMI 1.4a mandatory 3D formats.

d、 Decode HDMI 1.4a mandatory formats into left or right eye signal for Full HD 3D display in projection system. High brightness 3D stereoscopic display can be implemented through 2 low cost projectors and polarized glasses.

e、 Multiple images Edge Blending can be obtained through OSD or IR remote controller without PC system.

f、 Support input signals from PC and consumer products (such as Blue Ray DVD, Media Player or STB) to extend the flexibility in the applications.

g、 Support HDCP 1.3 High-bandwidth Digital Content Protection in HDMI and DisplayPort signals.

h、 Image split for flat panel video wall and multiple projector display with pixel base overlap adjustment.

Designed with Patented Warp technology:

a、 Pixel base 4 corner positions and geometry adjustment

b、 Multiple image alignments and edge blending

c、 Horizontal and vertical keystone correction

d、 Pincushion and barrel adjustment for curved screen display

e、 Professional Edge Blending video quality

Easy system installation and configuration

a、 Most of the applications can be installed in short time via OSD keypad and IR remote controller without PC system.

b、 RS232 and optional Ethernet control with separate ID in each GeoBox.

c、 Five profiles settings that can store all the system settings including input sources, output resolution and all other settings. User can use the same hardware setup to show different display styles (profiles).

d、 Optional Embedded Ethernet control. User can control GeoBox via wired or wireless WiFi through PC, NB, Smart Phone or iPad.

e、 Designed with IR extender for convenient system installation and control.

f、 Image Edge Mask for easy system installation.

g、 Five profiles settings that can store all the system settings including input sources, output resolution and all other settings. User can use the same hardware setup to show different display styles (profiles). For example, when implement 3x3 matrix video wall, user can show 3x3 as a complete image or show selected edge blending area but all the rest have different display contents from different input sources. Different display profiles can be easily switched via remote controller, RS232 or Ethernet.

Difference between G-101 and G-102:

a、 G-101 is a model specific for format conversion, curved screen display, PIP, passive 3D application and two projectors stacking to increase the brightness on the screen. There is no edge blending in this model.

b、 G-102 is a full function model with all features described in the user manual.

2.2 Features and Specifications

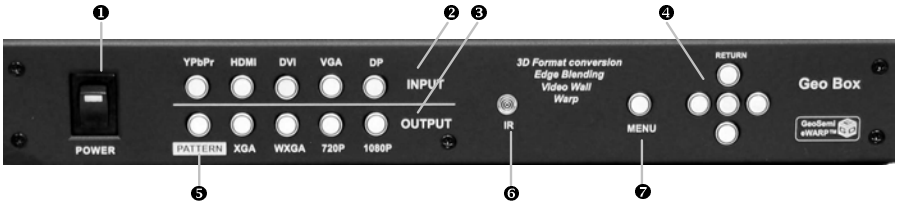
Video Input ports	1. Analog D-Sub VGA up to 205 MHz 2. DVI 1.0 compliant input up to 165 MHz 3. HDMI 1.4a compliant with HDCP 1.3 compliant input (FHD) 4. DisplayPort 1.1a compliant input up to 2560x1600 resolution with HDCP 1.3 High-bandwidth Digital Content Protection 5. YPbPr component input supports up to full HD (1920x1080P)
Audio input ports	1. Audio jack for PC audio connection 2. RCA audio jack for analog audio Line in 3. HDMI audio processing
Video Output ports	1. HDMI 1.4a compliant output for video/audio connection 2. DVI output via HDMI to DVI adapter 3. Analog VGA output 4. Simultaneous VGA & HDMI signal outputs for non-HDCP content 5. Decode 3D formats into signal for left or right eye

Audio Output ports	1. RCA jack for Analog RH/LH audio output 2. Coaxial S/PDIF digital output 3. HDMI output for video/audio connection (up to 7.1 channels for HDMI input) 4. Support mute function
System control	1. RS232 for system control. Optional RJ45 Network control 2. Support DDC2B/2Bi/2B+/CI 3. Full function OSD keypad on Front Panel 4. Optional IR receiver extender up to 20m
Image geometry correction and warp (Anyplace function)	1. Pixel based 4 corners and edge position adjustment 2. Horizontal and vertical keystone & image rotation adjustment 3. Image warp for curved display 4. Simultaneous 4 Corner and Curved adjustment for easy curved screen alignment (9 points curve adjustment). 5. Optional PC Tool for sophisticated curved screen display with grid adjustment and 3x WarpMaps save and recall function. 6. Image Edge Mask for easy system installation
Video Wall	1. Magnify, scroll & pan through all inputs 2. Image split, cropping and assign display location 3. Pixel based overlap adjustment in all edges, up to 15x15 matrix displays 4. Up to 2560x1600 input resolution via DisplayPort 5. Support AMD Eyefinity and Matrox technology for high resolution display (each channel needs one GeoBox) 6. Flexible aspect ratio, overlap region & overscan control
Multiple projectors edge blending	1. Pixel base flexible overlay region setting 2. Allow edge blending in all sides of the image such as 1x3, 3x3, 15x15…etc. with the max resolution of 2560x1600 input and Full HD output in each channel.. 3. With multiple edge blending settings to optimize video quality. 4. Easy use—implemented by OSD keypad or remote controller
High end video processing and	1. 3D motion adaptive video de-interlace for main and PIP images 2. Low angle edge smooth algorithm

de-interlace	3. Automatic 3:2 and 2:2 pull-down detection and recovery 4. Independent RGB color adjustment for PC graphics input 5. Digital Brightness, Contrast, Hue, Saturation and Sharpness adjustment for video input 6. True 10-bit data processing 7. 12 bit RGB gamma CLUT
3D stereoscopic display	1. Integrated with HDMI 1.4a receiver and transmitter to support HDMI 1.4a mandatory 3D formats. 2. Support Blue Ray DVD 3D format up to Full HD resolution. 3. Auto switch between 2D/3D in standard 3D input sources. 4. Auto select 3D input format in standard 3D input sources. 5. Decode HDMI 1.4a mandatory formats into left or right eye signal for FHD 3D display. High brightness 3D stereoscopic display can be implemented through 2 low cost projectors and low cost polarized glasses.
Picture in Picture	1. PIP function with selectable input source selection 2. Max. PIP size is 1024x768 resolution 3. Flexible image size, aspect ratio, position adjustment through OSD keypad or IR remote controller
Image Mask	Projection image can be masked out up to 250 pixels in all edges. It can simply the system installation effort.
Scalability	Video wall preset up to 15x15 displays. High output display resolution can be fulfilled by edge blending through adding Matrox “M” series display cards up to 16x full HD images from one PC source.
PC Setup Tool	eWarp Pro PC tool is an option for sophisticated image adjustment. Additional software license is required.
Power supply	1. External DC 12V/2A power supply with 2. Auto low power standby mode 3. DC 12V@1A trigger output
Weight	1.6 Kg (GeoBox body only)
Dimensions	305mmL x 155mmD x 45mmH

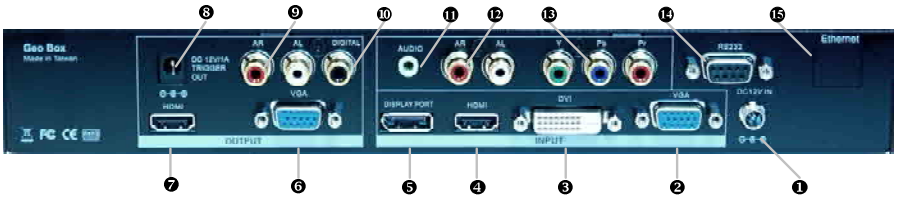
3. Outlook and Functions

3.1 Front Panel



①. Power on/off	⑤. Internal Pattern key
②. Input signal selection	⑥. IR receiver for remote controller
③. Output resolution selection	⑦. OSD Menu key
④. OSD keypad	

3.2 Back Panel



①. DC 12V @ 2A Power supply	⑨. Analog audio output
②. D-Sub (VGA) input	⑩. S/PDIF Digital audio output
③. DVI input	⑪. PC Audio input
④. HDMI input	⑫. Analog audio input
⑤. DisplayPort input	⑬. YPbPr input
⑥. D-Sub (VGA) output	⑭. RS-232 connector
⑦. HDMI output	⑮. Ethernet RJ45 (option)
⑧. DC 12V@1A trigger output	

3.3 Remote Controller

IR Remote Controller

①. Power ON/OFF
②. Input source selection
③. OSD operation keys
④. Output timing selection
⑤. 4 Corner geometry adjustment
⑥. Image Warp main menu
⑦. Internal test pattern
⑧. Edge Blending main menu
⑨. Video Wall main menu
⑩. Audio Mute ON/OFF
⑪. Information of GeoBox setting
⑫. Number Keys
⑬. OSD Time Out menu

4. Check your package Contents

The standard package has the following items:

1. One GeoBox
2. One DC 12V Power Supply Unit
3. One AC Power Cord
4. One IR Remote Controller with 2 batteries

5. Before You Start

Connect all the cables and power supply unit. Connect DC power supply to DC jack at right hand side of the back panel (not DC trigger output in left hand side). Video source should be connected to GeoBox for further operation.

A video split is required to feed the same video signal into all GeoBox in multiple images

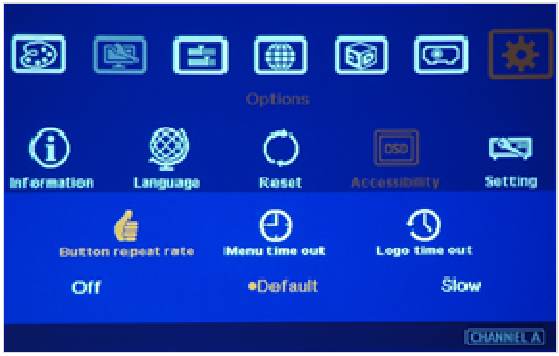
applications, such as video wall, 3D display and edge blending unless signal source can output multiple output signals simultaneously to different GeoBox.

Turn on GeoBox → wait for LED showed in Input/Output keypads on the front panel of GeoBox → select input source → wait for input LED show-up → select output resolution → wait for output LED show-up → reset GeoBox through OSD Menu Options →Reset→ Reset All (to make sure no unexpected settings inside GeoBox)

Make sure the projectors are in good focus and have the same settings before multiple image applications.

6. Basic knowledge and operation of GeoBox

1. When user needs a long time display of the OSD and internal test pattern for image adjustment, please press ⓭ hot key to set OSD Time Out to Off. After the installation, please return OSD Time Out back to other setting to let OSD disappear automatically while is not in use.



To set Menu Time Out to “0” to ensure long time display of the OSD and internal Cross Hatch test pattern.

2. Logo time out is to adjust the boot up time of GeoBox. It can be used to avoid image position shift in the projector while VGA input port in projector is used. This function will delay the boot up time of GeoBox until projector finish Auto adjustment in VGA input. It can also let splash screen logo disappear while system boot up.
3. In order to avoid interference among multiple GeoBox during the installation, user can set ID number for each GeoBox through Options in OSD Menu. Press number keys in Remote Controller for the control of multiple GeoBox:
   - 850: simultaneous control for all GeoBox
   - 851: control GeoBox ID No. 1 only

- 852: control GeoBox ID No. 2 only
- 853: control GeoBox ID No. 3 only
- A flashing LED indicator will be appeared in the Output selection key in Front Panel to indicate which GeoBox has been activated.

4. OSD Lock / Unlock: When continuously press MENU key in Front Panel or IR Remote Controller for 12 seconds, the OSD function will be locked to prevent from the changes of the settings by other people. To press MENU key for 12 seconds again, it will unlock OSD and user can manipulate the OSD again.
5. When activate ❻ Warp function in Remote Controller key, it will disable the function of 4 Corner adjustment and Edge Blend. User can see the original unadjusted images. When press remote controller 4 Corner key again, it will recall the previous setting before user activate Warp function so that user can fine tune the 4 Corner adjustment under the condition without edge blending. After fine tuning 4 Corner adjustment, user can press Edge Blend key again to recall original Edge Blend setting and see final result.
6. To press ❼ Pattern key in Remote Controller, it will show Cross Hatch internal test pattern. If press ❼ Pattern key again, different color of test patterns will appear repeatedly from White → Red → Green → Blue → Blank. It is convenient for the geometry adjustment in adjacent images. If user wants to disable test pattern, please use EXIT key in Remote Controller or MENU key in Front Panel. Each Cross Hatch pattern is 50 pixels in width and height. User can calculate the overlap pixel via the number of Cross Hatch pattern and estimate the pixel number in Video Wall Overlap region in different edge blending configuration.
7. The effective distance of remote controller is 5 meters at +_45 degrees. Some functions including Color settings will not be saved if OK key is not pressed.
8. Picture menu in the OSD can only be activated while the input signal is video and the color setting is not in Preset Mode in Image Properties. If GeoBox has been set at Preset Mode, user needs to change the setting to Custom mode and press OK (or Enter) key to active Picture Menu, then functions under Picture Menu, such as brightness, contrast, hue, saturation and sharpness can be controlled by user.

■ Picture menu is only activated while video signal input and the setting is not in Color Preset Mode in Image Properties Menu

9. If Curved screen display is required, please activate Curved Menu. Inside Curve Menu, user can adjust image curve (via Corner or Edge menu) and 4 corner positions (via Shift Menu). 4 Corner adjustment is not necessary and will be disabled.
10. Use 4 Corner adjustment menu can replace Keystone Correction with larger adjustment range and flexibility.
11. Output resolution change in GeoBox will affect geometry alignment in projectors. To select the output resolution from GeoBox same as projector native resolution will get the best result. GeoBox output resolution should be fixed before execute geometry adjustment in the image.
12. The Image Setup menu will not be activated if the input source is not VGA.

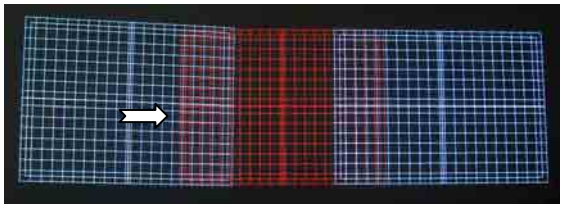
Image Setup menu will be activated only when the input source is from VGA (PC signal).

13. Internal test pattern will not appear together with OSD menu simultaneously in the screen. User needs to select OSD menu to the step that can adjust the image, then press PATTERN key to show the test pattern and starts to adjust the image with real time monitoring the result of the adjustment.

    For example:

    While 4 Corner adjustment, user needs to activate 4 Corner OSD → select the corner for the adjustment → Press OK. After the adjustment window showed as below, then activate PATTERN key to show test pattern and start to do 4 Corner geometry

adjustment. After finishing the first corner adjustment, press OK → select next corner for the adjustment →press OK → test patter will appear again automatically → start further adjustment.



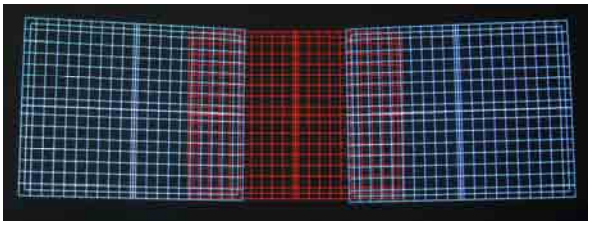
14. When change input source, output resolution or execute Warp function, GeoBox needs 1-2 seconds to re-synchronize the signal timing. Before it captures new input source or sets new output resolution, the OSD keys will be not functional. Please wait 2 seconds before go to next operation.
15. User can use two projectors with good alignment to produce double brightness in the screen. For a good double brightness application, a screen with good flatness and good geometry alignment between two projectors are required.
16. If Edge Blending with Curved screen display is required, user needs to use two GeoBox for one projector—one GeoBox (G-102) does Edge Blending and another one executes Curved adjustment (G-101). In the setup, user can put G-102 at the front end and G-101 at the back end for easier adjustment. To adjust the curved display using Curve and Center menu in G-101 to fit the images into the screen, then use 4 Corner adjustment, Video Wall and Edge Blending function in G-102 to do final adjustment. Edge blending and curve adjustment can't co-exist simultaneously.
17. If user needs to align images from different projectors, please select digital output (HDMI/DVI) to projectors. Otherwise, the image positions may be shifted after user turns off/on the projectors due to auto adjustment in VGA input in each projector.
18. The aspect ratio selection in GeoBox and signal source may affect 3D settings. Please set full screen in both GeoBox and signal source.
19. The adjustment range in 4 Corner adjustment and Curved adjustment will be ±150

horizontally and ±100 vertically while the output resolution in more than 1400x1050. In other output resolution, the adjustment range can be increase up to ±256 horizontally and ±200 vertically under the condition that the total horizontal adjustment range in both RH/LH sides shall be under 300 pixels and the total vertical adjustment range in both Up/Down sides shall be under 200 pixels.

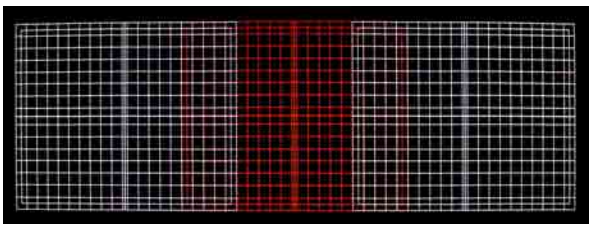
20. Due to system limitation, there will be some possibility for system hung up during image adjustment. In this case, system will restart within one minute. User can also turn OFF/ON the system to re-boot the system. This kind of situation will not happen after the complete system setup and will not affect the stability of the whole system.
21. It is possible for some DVD or Blue Ray DVD player can't detect the right HDCP/EDID from GeoBox while two devices are turned on at the same time. In this case, DVD player will not send out signal to GeoBox and turn OFF/ON the player and GeoBox again may be necessary.
22. User needs to pay attention to the compatibility and connection issue due to different devices, projectors, HDMI cable and connection distance. If necessary, user needs to select the right equipment or change installation conditions.

6. Internal Test Pattern for Geometry Adjustment

To press ❼ PATTERN key in Remote Controller, it will show Cross Hatch internal test pattern. If press ❼ PATTERN key again, different color of test patterns will appear cyclically from White → Red → Green → Blue → Blank. If user wants to disable test pattern, please use Exit key in Remote Controller or Menu key in Front Panel. It is convenient for the geometry adjustment in adjacent images. Each Cross Hatch pattern is 50 pixels in width. User can calculate the overlap pixel via the number of Cross Hatch pattern and figure out the pixel number in Video Wall Overlap region in different edge blending configuration.
This internal pattern can't co-exist with OSD menu. During 4 Corner geometry adjustment, user needs to select which corner for the adjustment, then pop-up Cross Hatch test pattern and execute horizontal/vertical position adjustment. User can see real time grid pattern change during the adjustment. Please see more details in 4 Corner adjustment section. Any external Cross Hatch test pattern from PC, Media Player or pattern generator can also be used. It is recommended to connect through DVI or HDMI to avoid any position shift from VGA input.



Internal Cross Hatch test pattern can be displayed after press PATTERN key. External pattern can also be applied.



After 4 Corner geometry adjustment

8. OSD Menu Structure

Level 1	Level 2	Level 3	Level 4	Level 5	Comments
Picture	Brightness	0-100			Only available when the input source is video and without select Preset Mode under Image Properties
	Contrast	0-100			
	Hue	0-100			
	Saturation	0-100			
	Sharpness	0-100			
Image Setup	Automatic				--Only available when the input source is VGA. --Automatic will execute Clock, Phase and position auto adjustment
	Manual	Clock	0-100		
		Phase	0-100		
		Save			
	Horizontal Position	0-100			
	Vertical Position	0-100			
Image Properties	Color	Preset Mode	Neutral		Select sRGB or Neutral while doing Multiple projector Edge Blending
			sRGB		
			Reddish		
			Bluish		
		Custom	Red	0-100	--Will disable Preset color. --Need to press Save to store settings.
			Green	0-100	
			Blue	0-100	
			Save	0-100	
	Input signal	DVI			Up to 1920x1200
		HDMI			With audio
		VGA			PC Graphics & OSG
		DisplayPort			Up to 2560x1600
		Component			YPbPr video signal
	Scaling	Original AR			Maintain original aspect ratio
		Full Screen			Full screen signal display

Level 1	Level 2	Level 3	Level 4	Level 5	Comments
Image Properties	Output Mode	720x480			--XGA/720P @120Hz input signal will be by-passed to output ports directly --Special mode can be added based on the request from customers
		800x600			
		1024x768			
		1280x720			
		1280x800			
		1280x1024			
		1360x768			
		1400x1050			
		1600x1200			
		1920x1080			
		1920x1200			
	PIP setting	Display	Disable		Disable PIP display
			Enable		Enable PIP display
		Size	0-100		Max. size: 1024x768 resolution
		Position	Horizontal	0-100	Set PIP position in the screen
			Vertical	0-100	
		Ratio	Full Screen		Same aspect ratio as main display
			Original AR		Original aspect ratio as input
		Source	DVI		PIP image input sources selection
			HDMI		
			VGA		
			DisplayPort		
			Component		YPbPr
Video Wall	Zoom	Horizontal Zoom	1~15		To determine the number of split image.
		Vertical Zoom	1~15		
	Pan	Horizontal Pan	1~15		To determine the location of each split image.
		Vertical Pan	1~15		

Level 1	Level 2	Level 3	Level 4	Level 5	Comments
Video Wall	Overlap	Left Edge	± 600		--To match the overlap region between adjacent images --To eliminate double image in overlap region
		Right Edge	± 600		
		Top Edge	± 600		
		Bottom Edge	± 600		
		Reset			Reset Video Wall function
3D Properties	Input Format	Automatic			Standard 3D formats with 3D index can be automatically detected
		Side By Side			
		Top/Bottom			
	Output Format	Left Eye Frame			--Left/Right frame selection is required based on the connection with projectors.
		Right Eye Frame			
		1080p 24Hz Output	Enable		--Enable 1080p 24Hz output for FHD 3D display.
			Disable		
Anyplace	Keystone	Horizontal	± 30		± 15 for FHD. Can be replaced by 4 corner adjustment.
		Vertical	± 30		
		Pin-Barrel	± 20		± 15 for FHD. Can be replaced by Curved adjustment.
		Lens Shift	Bottom		Determine the image horizontal axis in keystone correction
			Center		
			Top		
	Rotation	Rotation Angle	± 30		± 7 for FHD
		Pin-Barrel	± 20		± 15 for FHD
	4 Corner	Top Left	H: ± 256		--Convenient for geometry adjustment in projection. -- For resolution above 1400 x 1050, the adjusting range will be H: ± 150 & V: ± 100
			V: ± 200		
		Bottom Left	H: ± 256		
			V: ± 200		
		Top Right	H: ± 256		
			V: ± 200		

Level 1	Level 2	Level 3	Level 4	Level 5	Comments
Anyplace	4 Corner	Bottom Right	H: ± 256		
			V: ± 200		
		Reset			
	Edge Blend	Edge	Left Edge	0-800	To determine the pixel number of Edge Blending
			Right Edge	0-800	
			Top Edge	0-800	
			Bottom Edge	0-800	
			Reset		
		Gamma	Transition	0.9-2.2	Gamma setting in Transition area
			Front/Back LUT	LUT1	--Default setting is LUT3 which matches sRGB gamma curve standard. --User can select the one with the best edge blending quality.
				LUT2	
				LUT3	
				LUT4	
				LUT5	
		Gain	0.7-1.3		Image Global Gain adjustment
		Offset	Transition	± 48	Black level compensation in overlap region and non-overlap region
			Non-transition	± 48	
			Reset		
		Shift	Left Edge	± 64	To shift the borders in Edge Blending and eliminate banding effect in transition area.
			Right Edge	± 64	
			Top Edge	± 64	
			Bottom Edge	± 64	
			Reset		
	Curved	Corner	Top Left	H: ± 256	--To adjust the corner position of the image.
				V: ± 200	
			Bottom Left	H: ± 256	

Level 1	Level 2	Level 3	Level 4	Level 5	Comments
`Anyplace	Curved	Corner		V: ± 200	--The adjustment will affect other corner symmetrically. -- For resolution above 1400 x 1050, the adjusting range will be H: ± 150 & V: ± 100
			Top Right	H: ± 256	
				V: ± 200	
			Bottom Right	H: ± 256	
				V: ± 200	
			Reset		
		Edge	Left Edge	H: ± 256	--To adjust the center position of the Edge -- For resolution above 1400 x 1050, the adjusting range will be H: ± 150 & V: ± 100
				V: ± 200	
			Right Edge	H: ± 256	
				V: ± 200	
			Top Edge	H: ± 256	
				V: ± 200	
			Bottom Edge	H: ± 256	
				V: ± 200	
			Reset		
		Center	H: ± 256		-- For resolution above 1400 x 1050, the adjusting range will be H: ± 150 & V: ± 100
			V: ± 200		
		Shift	Top Left	H: ± 256	--To adjust the corner positions of the image. -- For resolution above 1400 x 1050, the adjusting range will be H: ± 150 & V: ± 100
				V: ± 200	
			Bottom Left	H: ± 256	
				V: ± 200	
			Top Right	H: ± 256	
				V: ± 200	
			Bottom Right	H: ± 256	
				V: ± 200	
			Reset		
		Order	Shift First		To decide the order of the image adjustment.
			Curved First		

Level 1	Level 2	Level 3	Level 4	Level 5	Comments
Anyplace	Edge Mask	Front Mask	Left Edge	0-250	--Edge Mask is to eliminate the image over the screen after installation. It will reduce the effort to re-install the setups. --Front Mask is to mask the image before image warping. --Rear Mask is to mask the image after image warping.
			Right Edge	0-250	
			Top Edge	0-250	
			Bottom Edge	0-250	
			Reset		
		Rear Mask	Left Edge	0-250	
			Right Edge	0-250	
			Top Edge	0-250	
			Bottom Edge	0-250	
			Reset		
	eWarp Pro	Only available in G-103 model			3 WarpMaps can be recalled
Options	Information	Output Mode			Output timing
		Input Mode			Input timing
		Model Name			Model name and number
		Microcode			Firmware version
	Language	English			English
		简体中文			Simplified Chinese
		繁體中文			Traditional Chinese
	Reset	Exit			Exit from Reset Menu
		Reset All			Reset to default setting
		Video Wall			Reset Video Wall setting
		Anyplace			Reset Anyplace setting
	Accessibility	Button repeat rate	Off		One response with one click
			Default		Variable response time while keep pressing the keypad.
			Slow		
		Menu time out	0-60"		To set OSD display time
		Logo time out	0-60"		--To set splash screen display time and GeoBox boot up time --Set “0”, the Logo will not be displayed during boot up time

Level 1	Level 2	Level 3	Level 4	Level 5	Comments
Options	Setting	Mute	Mute Off	Off	To enable audio output
			Mute On	On	To disable audio output
		Box ID	1-99		To set ID # in each display
		Profile	Load	Index 1-5	To load profile settings
			Save	Index 1-5	To save profile settings
		Network	RS232	Command Mode	GeoBox controlled via RS232
				eWarp Pro	Only available in G-103 model
			Ethernet	DHCP IP	--Geobox controlled via Ethernet --Static IP settings can be modified by IR remote controller
				Static IP	

9. Picture Color Adjustment

Picture menu can only be activated when input signal is video and Preset Mode under Image Properties Menu is not activated.

Activate Picture Menu by Front Panel keypad or Remote Controller.

- Brightness Menu allows user to do digital adjustment in the brightness of the image.
- Brightness adjustment can optimize the black level color of the image.

- Contrast Menu allows user to do digital adjustment in the contrast of the image.
- Contrast adjustment can optimize the white level color of the image.

- Hue Menu allows user to do digital adjustment in the color of the image.
- Hue adjustment can optimize personal preference color of the image.

- Saturation Menu allows user to do digital adjustment in the saturation of the color.
- Saturation adjustment can optimize personal preference saturation of the color.

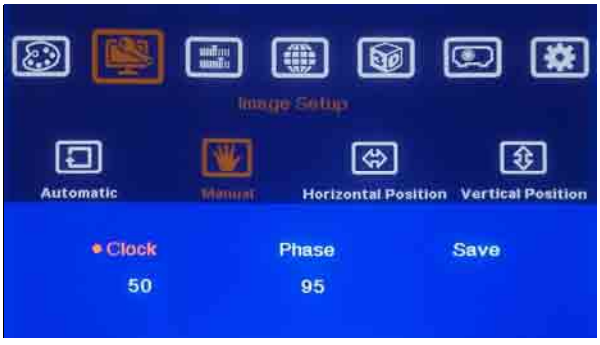
- Sharpness Menu allows user to do digital adjustment in the sharpness of the image.
- Sharpness adjustment can optimize personal preference sharpness of the image.

10. Image Setup for PC graphics

Image Setup menu can only be activated when video signal input is from VGA input port.

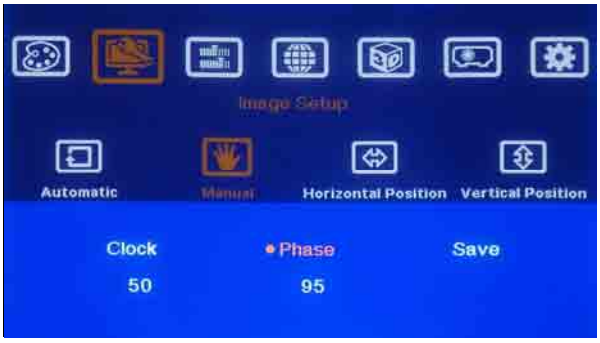
- Activate Image Setup Menu by Front Panel keypad or Remote Controller.
- Image Setup menu can only be activated when video input is from VGA input port.

When Automatic Menu is activated, GeoBox will check the input timing and automatically optimize display Position, Phase and Clock.



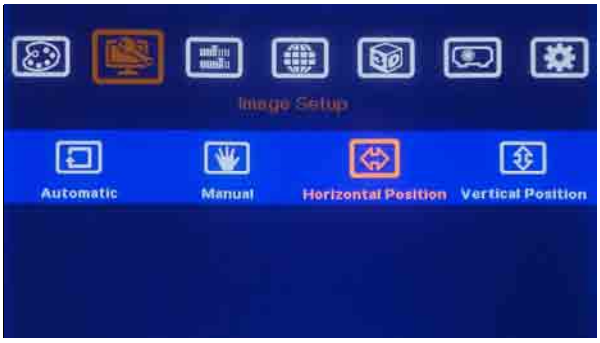
When Manual Menu is activated, there are three menu can be adjusted: Clock, Phase and Save.

Clock menu: user can fine tune horizontal width of the image. Incorrect Clock will result from vertical banding strips in the image while display a moiré or pure white image.



Phase menu: user can fine tune horizontal noise of the image. Incorrect Phase will result from a horizontal noise in the image while display a moiré or pure white image.

To activate Save menu will store user setting in Clock and Phase adjustment. Without Save, previous adjustment without Save will be invalid and discarded.



Horizontal Position menu allows user to shift the image position horizontally if the image in not in proper position on the screen.

Vertical Position menu allows user to shift the image position vertically if the image in not in proper position in the screen.

11. Image Properties

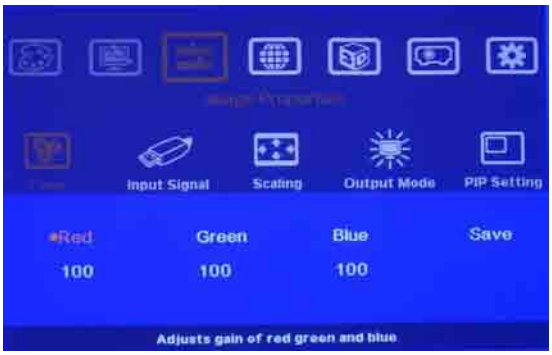
Image properties are designed for the selection of image color, input port, aspect ratio, output mode selection and PIP setting.

- Activate Image Properties Menu by Front Panel keypad or Remote Controller.
- 5 items in the menu.

11.1 Color (Preset Mode, Custom)

In Color Menu, it includes 2 color adjustment methods: Preset Mode and Custom

- In Preset Mode Menu, it includes 4 preset color schemes: Neutral, sRGB, Reddish and Bluish
- The default is sRGB which is good for multiple projector Edge Blending applications.



- In Custom Menu, it includes the color adjustment for Red, Green, and Blue color independently.
- User needs to press Save Menu to store the setting.

After Save, further color adjustment can be done in the functions under Picture Menu.

11.2 Input Signal Selection

In Input Signal Menu, it will show all the input ports for user to select.

11.3 Scaling (Aspect Ratio)

In Scaling Menu, it shows two items related to the display aspect ratio:

Original AR & Full Screen

- Original AR: GeoBox will output image with the same aspect ratio as input source to the backend display device.
- Full Screen: GeoBox will output full screen image based on selected output timing

no matter what kind of aspect ratio image is connected from input source.

11.4 Output Mode

In Output Mode Menu, it shows all the possible output modes in the list.

- To select an output mode with the same resolutions as projector or display device will get the best video quality.
- If 1080p 24Hz 3D signal is selected from Blue Ray DVD, please set the output mode to 1080p and enable 1080p 24Hz in GeoBox 3D output setting.

11.5 PIP (Picture in Picture) setting

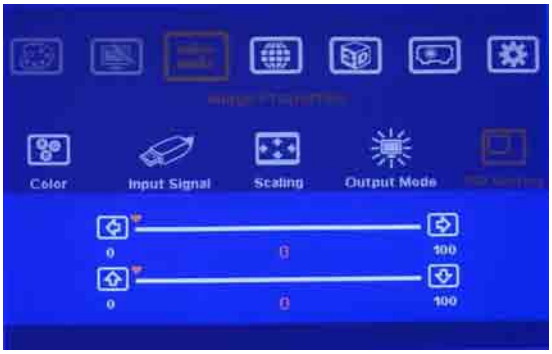
Picture in Picture (PIP) function is to display two images from one GeoBox. The maximum size of the sub-image (PIP) is 1024x768 resolution. The input source for PIP is selectable and can be any input port of GeoBox. The input for main and PIP image can be the same or swapped. The location of the PIP image can be controlled by OSD menu and be any location inside main image. The size of the PIP image is also flexible and can be controlled by OSD menu as well. Both main and PIP image will go through high end 3D motion de-interlacing. In the Edge Blending application, each PIP image is still only located within one projector. If a PIP image needs to cover more than two projectors, then user needs to set PIP with the same size and at the same position in all GeoBox, then use video wall to split the image and do edge blending. In this case, user will get PIP image covers all projectors.

- PIP setting OSD menu is under Image Properties
- There are 5 setting items in PIP setting Display, Size, Position, Ratio and Source

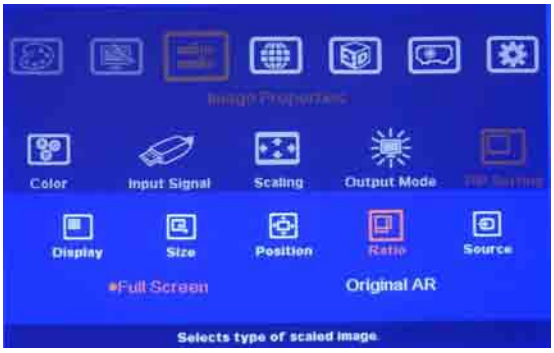
To enable and disable PIP image by selection between Disable and Enable OSD menu under Display.

- The size of the PIP image can be adjusted though Size OSD menu. It can be adjusted pixel by pixel.
- The max. size of PIP image will be 1024x768 resolution.

- The position of PIP image can be adjusted through Position OSD menu
- The PIP image will be maintained inside main image and can't be put outside the main image.



■ Pixel by Pixel PIP image position adjustment can be implemented by continuously Horizontal and Vertical position adjustments.



■ Aspect Ratio of the image is selectable between:

a. Full Screen: the same aspect ratio as main image or

b. Original AR: the same aspect ratio as PIP input source.

■ The input source for PIP image can be any video input of GeoBox. It can be the same as main image.

The input source for PIP image can be DVI, HDMI, VGA, DisplayPort or Component.

12. Video Wall Setting

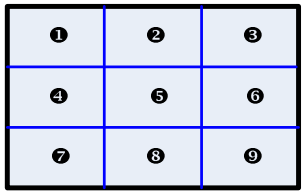
The purpose for Video Wall Setting is to determine the display Matrix, split the image and assign each GeoBox/display device to the right location in the matrix.

- Press Menu keypad in Front Panel to enter Video Wall OSD or press Video Wall Key in Remote Controller

- Use Zoom to split the display in horizontal and vertical directions. GeoBox will cut the image into different sections

For 1x3 displays:
Horizontal Zoom = 3
Vertical Zoom = 1

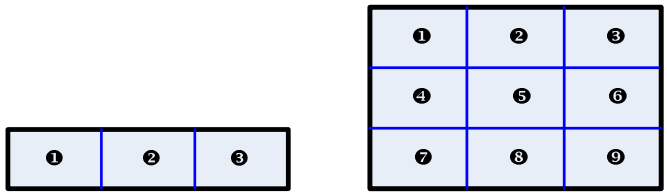
For 3x3 displays:
Horizontal Zoom = 3
Vertical Zoom = 3



- Use Pan in OSD to determine the location of the image controlled by each GeoBox. In the case of 3x3 matrix display as above,

for No. ❸ displays:
Horizontal Pan = 3
Vertical Pan = 1

for No. ❻ displays:
Horizontal Pan = 3
Vertical Pan = 2

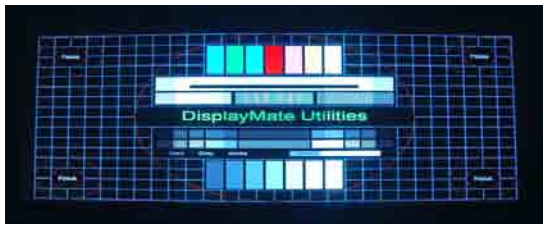


- Use Overlap in OSD to determine the overlap region and range.

(Example for a 3 projector edge blending)

■ 3 projectors were aligned together via 4 Corner adjustment.

■ After Zoom/Pan setting and before Overlap setting, Double Image can be seen in the image center.

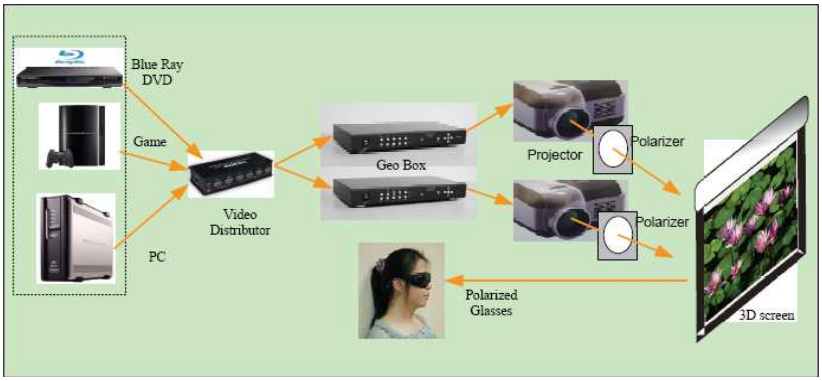


■ After Overlap adjustment: No double image in the center.

- If user needs more information about the calculation of the Video Wall Overlap setting and the number of Edge Blending, please contact us.
- In order to manage each display in the video wall, user can use OSD menu Options → Setting → ID to set ID No. in each display. The range of this ID is from 1-99. It provides easier management in the system through remote control, such as RS232 or Ethernet.

13. 3D Display with Polarized Glasses

13.1 System Configuration:



GeoBox will decode 3D format from many kinds of 3D video sources, including Blue Ray DVD, STB, Media player, Game and PC… 3D signal will be decoded by GeoBox into signal for Right/Left eyes. The signal needs to be displayed through two projectors. Each projector will display signal only for right eye or left eye. User needs to set a polarized filter in front of the projector and also wears polarized glasses. The glasses need to match the polarized filter in front of the projectors so that the right eye can only see the scene for right eye and the left eye can only see the scene for left eye. A 3D screen is also required to preserve the polarization of the light for 3D display. It is possible to use optic spectrum method from Dolby, Infitec or Omega Optical for 3D display without using 3D screen.

The output light from a projector with 3x LCD display (such as Epson) or LCOS may preserve polarization and the polarized filter and glasses need to be carefully selected. We recommend using DLP type projector for easy setup. Optical spectrum type filter and glasses can be an alternative in this case. Please check Infitec or Omega Optic for more details.

Dual projector 3D display with polarized glasses will provide benefits in higher brightness and lower cost in the glasses. It is the best 3D solution for large home theater, education and in public area.

In additional to minimize the signal interference between Right/Left eye signals, polarized film, polarized glassed and 3D screen will be also the major factors to get a good 3D display. Please contact us if user has any question.

13.2 GeoBox Setup for Stereoscopic 3D Display

1. GeoBox should not put at the side of the projector where the ventilation hot air comes out.
2. Two projectors can be put side by side or top/bottom. Closer position will reduce the 4 corner adjustment range and reduce the loss of the image resolution and brightness. Please make sure hot ventilation air will not affect the other projectors. A board between the two projectors can be added if necessary.
3. Set higher output resolutions (such as FHD) from 3D signal source and connect to any input of GeoBox. GeoBox will decode and distribute the signals for two projectors.
4. Each GeoBox is connected to one projector for right/left eye display.
5. Setup the polarized film and glasses so that right/left eye can only see the scene for one eye.
6. Use 4 Corner adjustment Menu in Remote Controller or Front Panel to align the images from two projectors completely matching together. Please place the polarized film in front of the projector before 4 Corner adjustment because polarized film may affect the direction of light beam from projectors. Some deviation is allowed for 3D display but will affect the performance in 2D display. A good alignment will give double brightness for the projection in 2D display. For a good double brightness application, the two projectors should be placed as close as possible and the screen must be flat or smooth curve.
7. 3D signal setup in GeoBox:
   - To reset Video Wall setting to default value before 3D setup. (Please see Reset procedures in section 15.3).
   - Usep 3D OSD Menu via Remote Controller or Front Panel.
   - To select 3D input format：In the case of standard 3D signal sources like Blue Ray DVD, it is not necessary to change any setting in the input format selection. The only setting required is to set output format to Right Eye Frame in the GeoBox connected to right eye projector and Left Eye Frame in the GeoBox connected to left eye projector. However, some 3D sources can’t provide standard 3D formats and require manual selection of the input format.
   - To set the output format in each projector: The projector for right eye display needs to select Right Eye Frame output format from GeoBox and Left Eye Frame for the left eye projector. (Usually, 3D Ready DLP projector can only connect with

PC signal but not Blue Ray DVD, Media player or STB)

- The menu choice 1080p 24Hz Output is designed for the projector that can support it (many projectors can't). If user Enable this function, the projector will synchronize with 24Hz 3D video input from Blue Ray DVD and will get better video performance. User needs to check the performance between Enable/Disable and select the best one for the 3D display.
- When enable 1080P 24Hz Output mode, the output resolution in GeoBox should be set to 1080p output. If GeoBox output is set to other output resolution, it will output 60Hz signal instead of 1080P 24Hz. GeoBox has applied special algorithm to synchronize RH/LH 3D image to get the best performance even the input is @24 Hz and output is @60Hz. Please note that output resolution change in GeoBox will affect geometry adjustment between two proctors in 3D display.
- Multiple GeoBox can do video wall + 3D display for big screen 3D display system.

13.3 3D OSD Menu and Operation

Activate 3D Properties Menu by Front Panel keypad or Remote Controller.

To select Input Format: Normal default setting is in Automatic. If the 3D signal is not a standard format, then manual selection is necessary.

To set the output signal for right/left eye in dual projector 3D system.

Incorrect setting in output format, 3D effect will be disabled.

■ 1080p 24Hz Output can be enable if the projector can support this signal in order to get better frame synchronization in the projector.

Some projector may not support 1080p 24Hz timing mode.

13.4 Other Tips for 3D Projection Settings:

1. Usually front projection 3D screens will be silver (aluminum) surfaced but rear screen types are not. Tests should always be done with an image where ghosting is easy to see—e.g., white letters on a black background. Many screens sold for this purpose are inadequate and any may have patches of poor polarization so if your application is demanding you should check all parts of the screen for ghosting. Likewise poor or variable performance of polarized glasses is common and you need to check or spot check every new batch.
2. There are many kinds of 3D polarized glasses with different polarizing angles or directions. User needs to check whether the glasses can match exactly with polarized film being used for the projectors. User can wear polarized glassed and see through the polarized film with different side, rotation angle and direction. In the normal case, there will always be some significant bleed through of the other eye except excellent

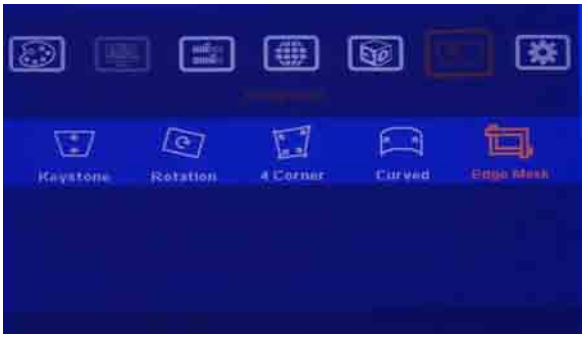
3D. When head tipping is likely (e.g. with rides and with longer films where people will often rest their heads at an angle) higher ghosting will result and the use of circular polarization should be considered. You will not get perfect cancellation (zero crosstalk) with common commercial polarizers since you need low cost and a bright image.

3. One method to display passive 3D is to divide RGB spectrum into different segments for RH/LH eyes like Dolby 3D, Infitec or Omega Optic. The cost for the filter film in the projector and the glasses will be much higher than conventional polarized system. However, it can use conventional screen but not special 3D silver matte screen. In this kind of 3D system, the ghost effect (crosstalk) can be minimized.
4. When testing the system note that head tilting (for linear polarizers) and different viewing angles (i.e., far off to the side or in the balcony vs. orthogonal) will affect crosstalk.
5. If you apply Blue Ray DVD 1080p 24Hz as the input 3D signal, please enable the output resolution of GeoBox at 1080P 24Hz to get the best full HD 3D effect. It is then necessary to recheck the overlap condition of the two projectors if there is any output mode change.
6. The output light from a projector using LCD or LCOS technology (such as Epson, SONY, JVC etc…) may partially preserve polarization. In this case more careful selection of linear or circular polarizers is required. In some cases (e.g. JVC) quarter wave or half wave plates may be used to rotate the plane of polarized light coming from the projector prior to the polarizer for maximum brightness with minimal color aberration. Another means is to use one or more layers of depolarizing acrylic plastic to eliminate the native polarization issuing from the projector LCD's. To use optic spectrum type of filter and glasses system described in item 3 above can be another alternative.
7. Unless more than 4 projectors will be used for an edge blending + 3D display, please reset Video Wall functions before 3D setting. Video Wall image split function will add to the 3D setting and may cause malfunction in side by side or Top/Bottom 3D formats.
8. Please don't use VGA output to projector. The image locations may be changed after user turns off/on the projector again due to auto adjustment in projector.
9. 2D/3D hot key on the front panel and remote controller will switch between 2D & 3D modes when the signal is not standard HDMI 1.4a 3D format. User may see a side by side image on the screen. Pressing the 2D/3D hot key will switch a side by side image

to 3D mode. When the input image is a standard 3D format, this key will be turned off automatically.

10. In 3D display mode, user may not see full OSD display from the video sources such as Media Player, STB or DVD. If you switch to 2D mode, you can see the complete OSD from the signal sources for easy OSD Menu operation.
11. Incorrect aspect ratio adjustment of signal sources may cause abnormal 3D display when the 3D format is Side by Side or Top Bottom. User needs to set the aspect ratio so that a full screen image results in both projectors.
12. XGA & 720P @120Hz 3D signals can be passed by the GeoBox for use with any 3D Ready projector for active 3D display with shutter glasses. In this case, user can do edge blending to combine multiple projectors to become big screen while still maintain 3D display in 3D Ready projectors.
13. It is possible for some DVD or Blue Ray DVD player can’t detect the right HDCP/EDID from GeoBox while two devices are turned on at the same time. In this case, DVD player will not send out signal to GeoBox and turn ON/OFF the player and GeoBox again may be necessary.
14. User needs to pay attention to the compatibility issue and connection issue due to different projectors. HDMI cable and connection distance and select the right devices or change installation conditions.

14. Warp and Geometry Correction of the Image



Activate Anyplace Menu by Front Panel keypad or Remote Controller for Warp and Geometry correction of the image.

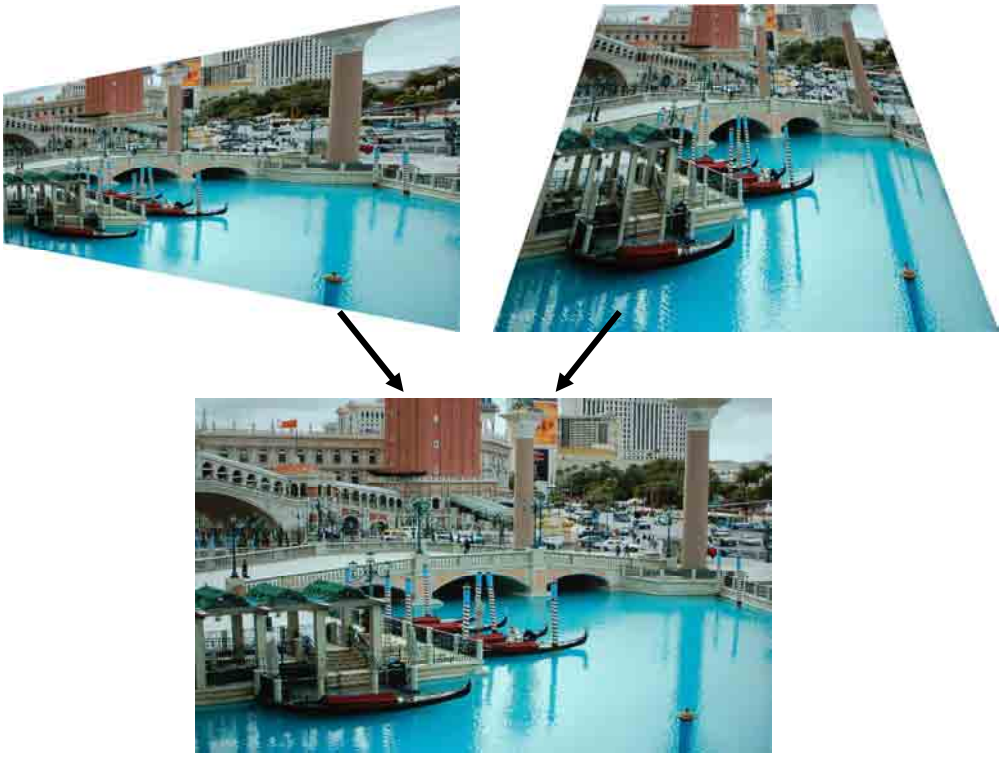
The purposes for warp and geometry correction are as follows:

1. Horizontal and Vertical Keystone correction.
2. Image rotation.
3. Image 4 corner position adjustment to match the screen or position alignment in multiple projector application.
4. Curved screen display for projection system.
5. Edge Mask can simply the installation effort.
6. eWarp Pro menu will appear in G-103 model. eWarp Pro PC tool for sophisticated curve adjustment and is only available in G-103 model.

Each function in OSD menu may not co-exist each other. In most of the cases, 4 Corner adjustment can replace Keystone correction. Inside Curved menu, there is Shift function for 4 corner position adjustment. When Curved Menu is activated, 4 Corner function will be disabled. While curved display is required, please activate Curved menu to adjust 4 corner positions by Shift menu and image curve by Corner, Edge or Center Menu.

14.1 Keystone Correction

Because the projection direction of the light from projector is not perpendicular to the screen, the image on the screen will have keystone shape as below. In order to compensate this kind of distortion, Keystone Correction is required.



User can activate the OSD menu through Remote Controller Warp Menu → Keystone or Front Panel OSD Menu keypad → Anyplace → Keystone.

- Activate Keystone Menu by Front Panel keypad or Remote Controller
- It consists of Menu for Horizontal, Vertical, Pin-Barrel, Lens Shift

When Keystone function is activated, other Anyplace functions such as Rotation, 4 Corner, Edge Blend and Curved will be disabled temporarily but the parameters are still stored in the memory. Once to activate these functions again, the system will recall original parameters.

1. Horizontal Keystone Correction is to correct the image distortion due to a screen off-axis in the horizontal direction.
2. Vertical Keystone Correction is to correct the image distortion due to a screen off-axis in the vertical direction
3. Pin-Barrel is to warp the image into pincushion or barrel to match curved screen with convex or concave shape. There are some limitations in the degree of convex or concave. Curved function under Anyplace menu will provide similar function and have more range for the adjustment.
4. Lens Shift is to determine the axis for the image change in horizontal position.
5. 4 Corner adjustment will provide similar function to Keystone correction.

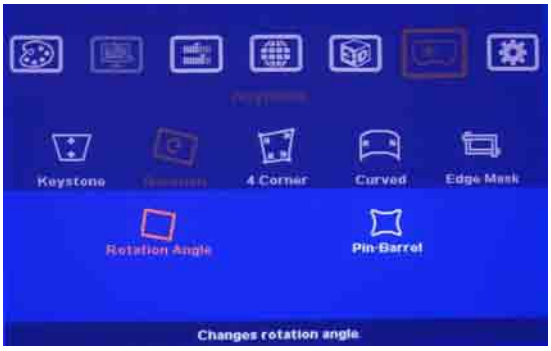
Horizontal Keystone + Bottom Lens Shift

Horizontal Keystone + Center Lens Shift

Horizontal Keystone + Top Lens Shift

14.2 Image Rotation

Image Rotation is to compensate the misalignment between projector and screen. User can activate Rotation menu via Remote Controller Warp menu or Front Panel OSD Menu keypad.



When Rotation menu is activated, Pin-Barrel function will remain functional and all the other functions in Anyplace will be disabled.

1. Image Rotation direction can be clockwise or anti-clockwise. The rotation angle is limited to ±30 degrees under 1400x1050 resolution and ±7 in full HD.
2. The image rotation may cause some image outside display borders and reduce the total display resolution. In order to compensate the disappearance of the image, user can use Video Wall → Overlap function to change the borders of the image and avoid image loss issue.
3. Pin-Barrel function will still remain functional and co-exist with Rotation function. Bigger adjustment range can be implemented in Curved Menu.

Rotation + Barrel

14.3 Four Corner Adjustment

Four-Corner can adjust each corner position of the image independently and is the simplest way for the alignment in multiple projector applications, such as Edge Blending & 3D display

.

1. Use OSD MENU in Front Panel to find 4 Corner adjustment or Press 4 CORN key in Remote Controller

2. Maximum adjustment range for each corner is ±256 pixels horizontally (max. 300 pixels in Left + Right) and ±200 pixels vertically (Top + Bottom). If this adjustment range is not enough, then need to adjust the position of the projector.
3. Internal test pattern can be displayed by pressing PATTERN hot key in GeoBox Front Panel or IR Remote Controller.
4. Please note that PATTERN and OSD can't co-exist simultaneously. Please select the command in the OSD first then press PATTERN hot key for real time adjustment and

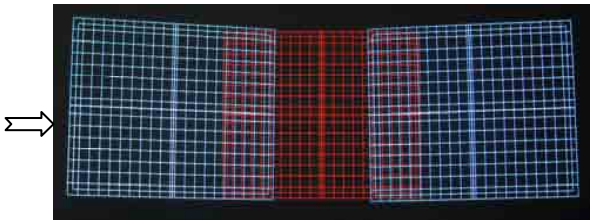
you will see the chance in the pattern on the screen.

5. Example for 4 Corner adjustment:

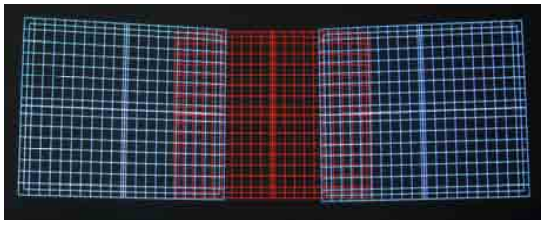
For 4 Corner adjustment, activate 4 Corner OSD then select the corner for the adjustment → Press OK → activate PATTERN key to show test pattern and start to do 4 Corner geometry adjustment. After finishing the first corner adjustment, press OK → select next corner for the adjustment → press OK then test pattern will appear again automatically and then start further adjustment.

4 Corner menu

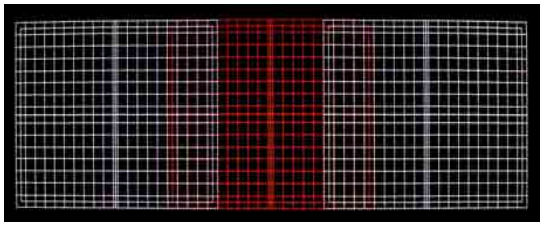
After select corner and press OK



Press PATTERN key to show pattern again



Original setup



After 4 Corner geometry adjustment

14.4 Edge Blending Setting Procedures:

14.4.1 Placement of Projectors:

To set projectors at reasonable distance from the screen with 200-500 overlap pixels between two projectors at the overlap edges of the image. If possible, to reduce the keystone effect of the image in each projector is recommended.

14.4.2 GeoBox Setting

- Reset GeoBox to default setting.
- Select the right input source. Please select digital signals output to projector (HDMI or DVI) to avoid image location shift after projector auto adjustment.
- Select the best output resolution to match projector native display resolution. However, if the setup is for Blue Ray DVD 3D display, we propose to set the output resolution to 1080P at 24Hz. Please see more details in 3D settings.
- Set OSD Time Out to ZERO to maintain the display of OSD and Internal Test Pattern during the installation period.
- Setting Color in standard gamma like sRGB or Natural will create better result. (OSD menu Image Properties→Color→Preset Mode→sRGB/Natural)

Natural or sRGB is recommended for edge blending in multiple projectors to reduce the banding effect in the image.

14.4.3 Projector setting:

- Reset projector to default setting
- Disable Auto Keystone function and set new keystone value to let vertical edges in adjunction images in parallel vertically.
- Select sRGB as Display Mode will reduce the color difference in overlap area.
- Use DLP 3D color function to adjustment the color in different projectors if there is any color variation among projectors.

14.4.4 4 Corner geometry Adjustment

- Adjust the image to match the screen
- Align the image to the shape that you want
- For a 3 projector Edge Blending, user needs to adjust the center projector first to get a rectangular image, then to adjust the projector in Right/Left side.

■ Image position can be adjusted pixel by pixel in the 4 corners of the image independently.

■ In the OSD bottom, there is a description to indicate which corner is under adjusting.

Please note that the adjustment range will be ±150 pixels (H) & ±100 (V).

14.4.5 Image split and allocation (Video Wall setting)

- Split the image for different projectors
- Determine the location of the image for each projector
- To set proper overlap region in the edge among projectors

■ Select Horizontal Zoom → 3 to split the image for 3 projectors edge blending configuration.

■ Select Horizontal Pan →1 to assign the image to the first horizontal position.

■ Use Overlap function to align the zoom ratio and image position between adjacent projectors. Correct adjustment will eliminate double image in the screen

■ Before Overlap adjustment: Double image in the center.

■ After Overlap adjustment: No double image in the center.

14.4.6 Video Wall Overlap Setting Value Table

Video Wall Overlap value in two projector horizontal Edge Blending

Input	Output	Overlap 5 grids		Overlap 6 grids		Overlap 7 grids		Overlap 8 grids	
		Overlap	Aspect	Overlap	Aspect	Overlap	Aspect	Overlap	Aspect
XGA	XGA	51	2.34	88	2.28	106	2.21	124	2.15
720p	XGA	89	2.34	110	2.28	132	2.21	155	2.15
1080P	XGA	133	2.34	165	2.28	198	2.21	233	2.15
XGA	720P	55	3.21	68	3.14	81	3.07	95	3.00
720p	720P	69	3.21	85	3.14	101	3.07	119	3.00
1080P	720P	104	3.21	127	3.14	152	3.07	178	3.00
XGA	1080p	36	3.32	43	3.28	51	3.23	60	3.19
720p	1080p	45	3.32	54	3.28	64	3.23	74	3.19
1080P	1080p	67	3.32	81	3.28	96	3.23	112	3.19

Remarks:

1. "Overlap" means the setting value in Video Wall Overlap menu. LH image needs to apply this value to Right Edge and RH image needs to apply to Left Edge.
2. "Aspect" means the output image aspect ratio between horizontal size and vertical size.
3. Each rectangular grid in internal test pattern represents 50x50 pixels.
4. The Edge Blending Value is the # of overlap grids x 50 (i.e. 6 grids means overlap 300 pixels)
5. Small overlap region less than 250 pixels can be implemented but the overlap image quality is more difficult to control. The quality will depend on the projector, video source, screen and detailed fine tuning.

An Excel Spread Sheet can be provided for the calculation in different setup.

14.4.7 Image Edge Blending

- Select the correct edge of the image for image Blending
- Set Edge Blending value based on the overlap pixels (each overlap grid cover 50 pixels).
- Fine tune color
  - Select different Gamma values and check video performance.
  - Set right Offset value to compensate black level difference between Transition area and Non-transition area.
  - Eliminate the banding effect via Shift blending position.

14.4.8 Color fine tuning

The final performance will be a combination of many factors—projector characteristics, projector setting, screen, ambient light, GeoBox setting. The follows are the functions that should be tried during the final fine-tune stage.

- GeoBox:
  - Edge Blending: Gamma, Shift, Offset, Gain
  - Image Properties: To select Preset Mode to sRGB or Bluish
- Projector:
  - To adjust installation position of the projector:
    - i、 Increase Overlap region
    - ii、 Reduce off axis angle
  - To change Display Mode and try different color settings.
  - To implement 3D color adjustment.
- To use lower gain value screen.

14.5 Image Curved Display

The purpose for Curved adjustment is to warp the image to meet non-flat screen display requirement. User can activate Curved Menu via Warp Menu in Remote Controller or Front Panel OSD Menu keypad.

Curved function should be executed independently without executing other functions under Anyplace menu simultaneously.

Edge blending and Curve Adjustment function can't co-exist. If edge blending and curved display is required, then additional GeoBox is required.

14.5.1 Corner Curve adjustment

Under Curved menu, it consists of the menu for the control of image warping through 5 control types: Corner, Edge and Center with combination of 4 corner adjustment (Shift)

Under Corner curve menu, user can adjust the curve in each corner. While adjusting one corner, the other corresponding corner will be adjusted simultaneously.

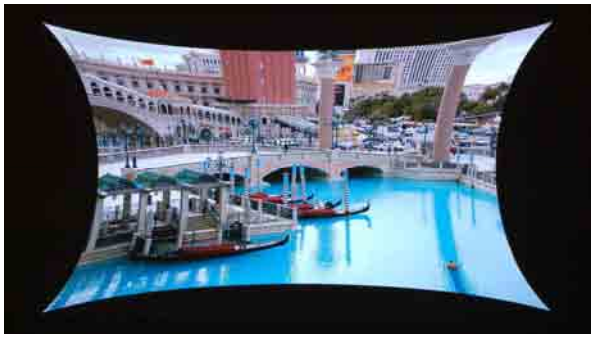
Example:
Curve adjustment in all Corners

14.5.2 Edge Curve adjustment

User can adjust the curve in each edge of the image independently.

OSD Menu under Edge Curve adjustment includes Left Edge, Right Edge, Top Edge, Bottom Edge and Reset

Example:
After adjustment in Top and Bottom Edges. (This can be applied to concave screen projection).



Example:
After applying 4 Edges curve adjustment

14.5.3 Center Curve adjustment

Under Center Menu user can adjust the positions of the axis center of the image to get non-symmetrical curved image.

For cylindrical screen, user needs to adjust both Edge and Center curves to fit the image into

the screen. Most of projector has set image bottom as the display axis.

For concave screen, the value of Center Curve adjustment is normally 50% of the Edge Curve adjustment. User can use internal grid pattern for easy curve alignment.

The axis center can be adjusted horizontally and vertically with the range of ± 256 pixels in horizontal position and ±200 pixels in vertical position.

- Corner Curve and Edge Curve adjustment can co-exist with Center Curve adjustment
- Example: 4 Edge adjustment + Center to right side.

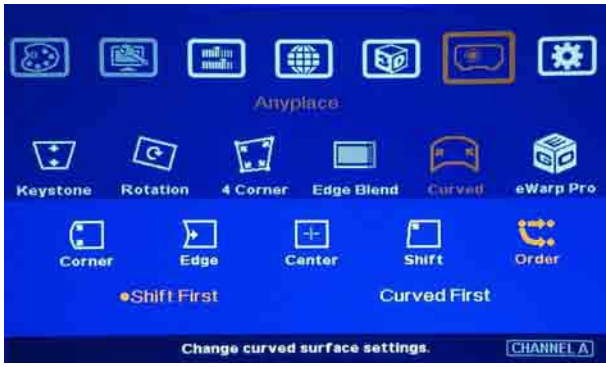
14.5.4 Shift adjustment (Corner position adjustment)

Shift function is to adjust the corners of the image before or after Curved adjustment. It can co-exist with other functions under Curved Menu.

The menu under Shift is the same as 4 Corner adjustment to allow the adjustment of the position in each edge independently in curve image.

14.5.5 Order

- Order function is to decide the order for both Shift and Curved adjustments.

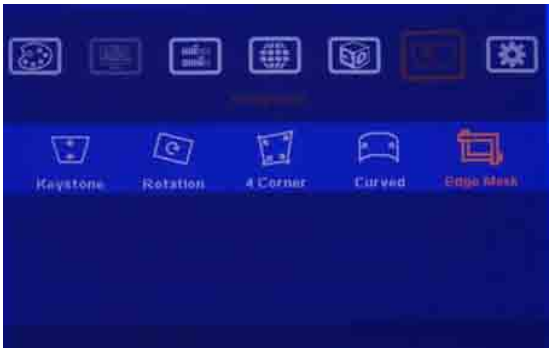


- For the correction of image distortion from source side, user can select Curved First.
- For normal curved screen projection, Shift First is defaulted and user can start with 4 corner adjustment.

14.6. Edge Mask

Edge mask is a function to adjustment the display range of the image. It can mask all the image edges up to 250 pixels to become black background. The major purpose is to fit the image into the screen especially in the edge blending application. In edge blending, if user uses 4 corner or warp function to adjust the image edges, it will change the aspect ratio in the

whole image and affect the edge blending result. Edge mask is one function to adjust the positions of the edges but still maintains the aspect ratio and location of the image. It will simplify the system installation.



- Edge Mask is under Anyplace Menu.
- When adjusting Edge Mask, it will change the position of the display edge but not affect the location and aspect ratio of the image.

- Front Edge Mask is to mask the image edge before Warp.
- Rear Edge Mask is to mask the image after Warp.
- In most of edge blending application, Rear Edge Mask will be selected.

- All Edges of the image can be masked with black background up to 250 pixels.

Edge Mask will affect 3D display from Side by Side or Top-Bottom 3D input Format. Please don't apply Edge Mask in 3D display.

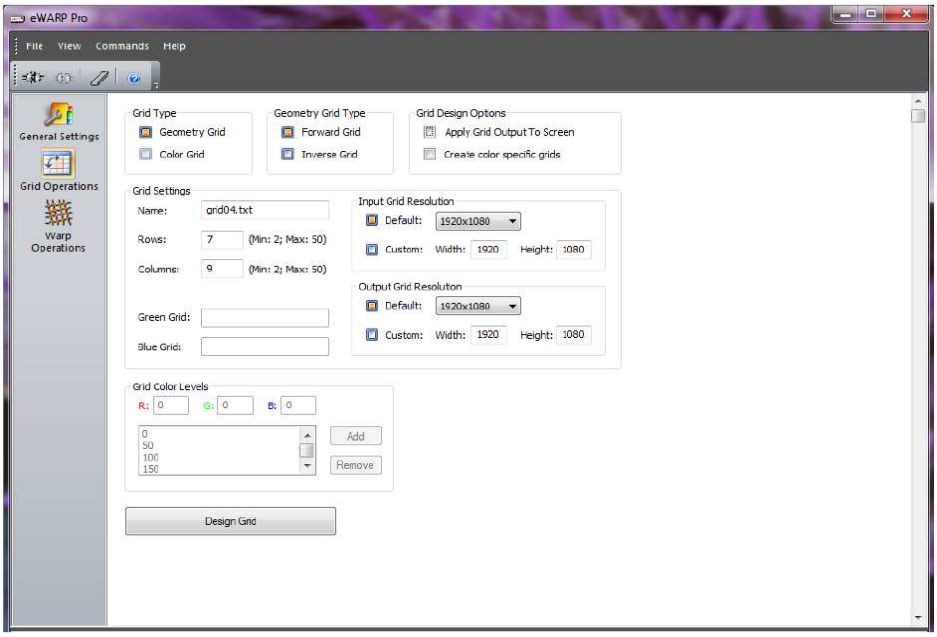
In G-103 model, there will be an icon called eWarp Pro but not Edge Mask in the menu. eWarp Pro is for sophisticated curve adjustment through PC Tool.

14.7 eWarp Pro (PC Software Tool, in G-103 only)

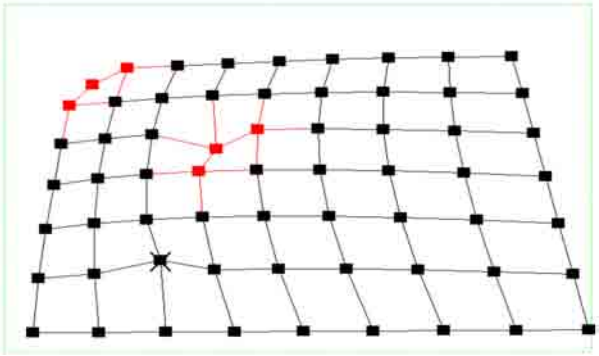
eWarp Pro is a PC software application to allow user to create a customized geometry correction solution and then apply the correction onto GeoBox. It is mainly for the applications required sophisticated or very accurate geometry adjustment.

PC video output and RS232 should be connected to GeoBox. User can run PC eWarp Pro software to adjust the shape of the image and generate a WarpMap text file, then upload this text file into GeoBox via RS232. GeoBox can store up to 3 WarpMaps and user can recall these WarpMaps from GeoBox to execute different warp settings for all input sources.

eWarp Pro software license and NRE are required. This software can be installed under Windows XP and Windows 7 operation system. The window of eWarp Pro showed in PC is as below.



For geometry adjustment, user needs to run eWarp Pro in PC and adjust the image through the Grid Pattern inside the software (showed below). The number of the grid points can be determined by user based on the accuracy requirement in curve image adjustment.



User needs to set GeoBox RS232 port to eWarp Pro as showed below so that GeoBox can be communicated through PC RS232 port. After the connection between PC and GeoBox, user can run PC eWarp Pro software to create WarpMap and upload to GeoBox to see the result immediately.

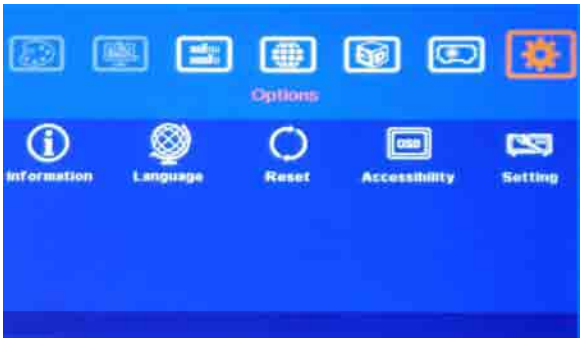
- GeoBox setting for the communication with PC: Options → Setting → Network → RS232 → eWarp Pro .
- eWarp Pro A/B is for G-503 model. In G-103, only show eWarp Pro

There is an OSD menu under AnyPlace called eWarp Pro. Under eWarp Pro, there are three UserMaps (from 1 to 3) which store the WarpMap generated from PC eWarp Pro. User can recall different UserMaps to get different geometry adjustment result.

The text files generated from PC software tool shall set the same file names as bellows: UserMap1, UserMap2 or UserMap3, otherwise these text files can't be stored in Geobox..

15. OSD miscellaneous functions--Options

15.1 System Information and Configuration:



Activate Options Menu by Front Panel keypad or Remote Controller.

In Information menu, it will show the information in GeoBox, such as output mode, input mode, Model name and Microcode version.

15.2 OSD Language

In Language menu, there are three languages can be selected as OSD Language:

English, Simplified Chinese and Traditional Chinese.

15.3 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 GeoBox to its factory default settings.
- 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.

15.4 Accessibility

In Accessibility menu, there are two items can be set:
OSD Button Repeat Rate and
OSD Menu Time out.

15.4.1 Button Repeat Rate

OSD Button Repeat Rate:
It will control the speed of the response of the OSD button while user presses OSD button continuously.

OSD Button Repeat Rate:

- 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.

15.4.2 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 to press OSD key to activate other function.
- Internal Test 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.

15.4.3 Logo Time Out

OSD Logo Time Out:

- To set the time to show Splash screen.
- If zero is selected, then the splash screen will not be showed during system booting up period.

- Before the time out of the Splash screen, GeoBox will not execute other commands in the system. When the input is VGA, if any geometry adjustment occurred, the image position may change due to projector auto adjustment function. In this case, user can disable

projector auto alignment or to set longer Logo Time Out so that GeoBox will not execute geometry adjustment before projector finishes auto alignment. A good match in the system turn ON procedure and Logo time out will maintain the image position while user turns ON/OFF the complete system.

15.5 Setting

There are 4 items under Settings menu:

- Mute: Audi mute or enable
- Box ID: Set control ID
- Profile: Save profile settings
- Network: set RS232 and network control

15.5.1 Audio Mute

Mute:

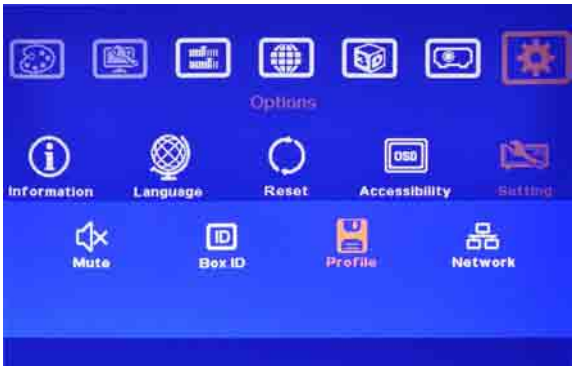
- Mute Off will enable audio output.
- Mute On will disable audio output.

15.5.2 Box ID

Box ID is the identification No of each GeoBox

- GeoBox ID No is from 1-99
- Can control GeoBox individually via IR Remote controller, RS232 & Ethernet

15.5.3 Profile setting



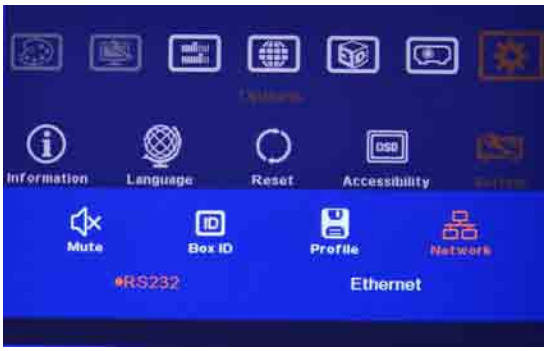
Profile is to save and load GeoBox settings including input port, output resolution and all the settings in GeoBox.

There are five indexes (profiles) that can be chosen to save GeoBox settings in each GeoBox and can be reloaded by IR remote controller, RS232 or Ethernet

- User can use profile setting function to show different display styles in the applications. If you have 3x3 matrix display setup, user can:
  1. Implement 3x3 edge blending for a big screen.
  2. Execute edge blending images in different regions with different contents and the rest to show individual content from different input sources.
  3. User can switch among different display styles (profiles) within seconds through IR remote controller, RS232 or Ethernet. It can also been programmed to show different profiles automatically via PC system.

15.5.4 Network

There are two choices under Network menu—RS232 & Ethernet



- User can only select one control method between RS232 and Ethernet.

15.5.4.1 RS232 control

- RS232 interface is designed with DB-9 connector. The UART Protocol between GeoBox and a Host computer can be provided. The protocol can be implemented via RS-232, USB, Ethernet or other forthcoming communication methods.
- Detailed RS-232 protocol can be provided as needed.

- Two sub-menu under RS232 menu: Command Mode, and eWarp Pro.
- Command Mode is for conventional RS232 control and eWarp Pro is for WarpMap upload from PC to GeoBox.

15.5.4.2 Ethernet control

- Ethernet control: GeoBox is design with optional Ethernet control interface through RJ45 connector. User can controller GeoBox through Ethernet or WiFi via PC or mobile devices, such as Smart Phone, iPhone and iPad. A webpage with keypad icons (virtual keypad) can be showed in control devices for user to control all the OSD function of GeoBox.
- Additional built-in Ethernet Module is required.

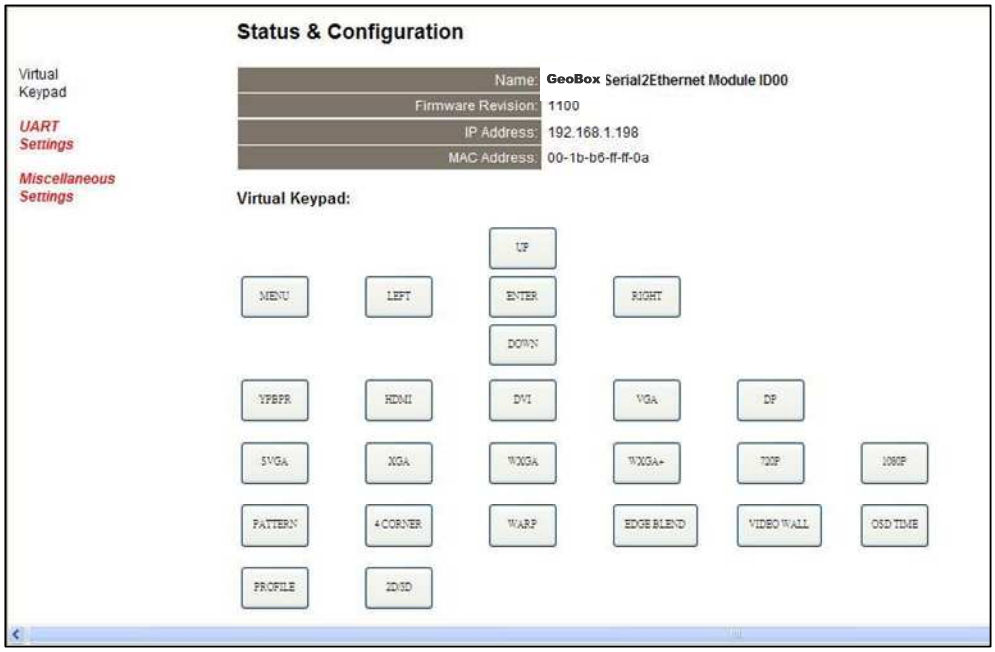
- User can also use external Ethernet to RS232 box to connect with GeoBox through RS232 port.

In Ethernet menu, there are two alternatives:
DHCP IP & Static IP

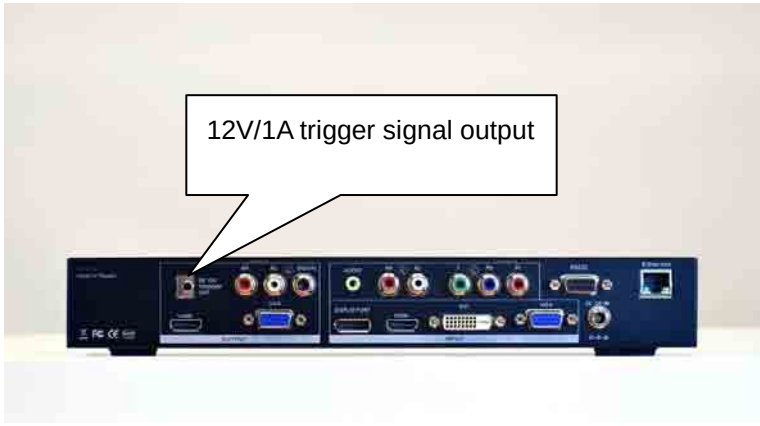
DHCP IP is assigned by Ethernet router or Ethernet switch hub.

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

- User can use **<** **>** key to access the position for the modification and **^** **v** key to change the value in the IP settings.
- Ethernet Webpage (Virtual keypad in the screen):
  If Ethernet Router supports PnP protocol, user can see GeoBox device in the network. After connection, it will show below content in the webpage. It includes virtual keys for the operation of the OSD menu.



16. Trigger signal for system control



- The trigger DC 12V output is to provide DC 12V/1A DC power for external device control or a trigger signal for system control.
- When GeoBox is powered on, this trigger signal will be turned on as well.

17. Screen selection

1. Gain value less than 3.0 will be recommended for Edge Blending application. Higher gain value will be more sensitive to color difference among different projectors and also will have viewing angle issue.
2. Silver screen is required for front projection 3D display. Higher polarization values will have less cross talk between RH/LH images but it will decrease the brightness. A balance in polarization value and brightness should be considered. This is the key factor for 3D effect and video quality.
3. Flatness of the screen is important. If curve adjustment and edge blending is required at the same time, then additional GeoBox may be required for curve adjustment and another GeoBox for edge blending. For 3D display, one GeoBox can be used for 3D plus curved screen display without problem.

18. Projector Selection

1. The projectors for the edge blending should be the same model.
2. Throw ratio under 1:1 will be more sensitive to the flatness of the screen and the focus in the whole image. We don’t recommend to be used in edge blending.
3. Black level is one of the important gating factors for the projector. If the black level is not low enough, you will see the light leakage from the projectors in the overlap area even if no signal is input or the input is black.
4. Usually, higher contrast ratio in the projector means better black level performance. A projector with contrast ratio more than 3000:1 is recommended for multiple projector edge blending in most contexts. In a dark environment, a video projector with 10,000:1 contrast ratio or higher is recommended.
5. Most DLP projectors will provide a function for 3D color adjustment—R, G, B, Y, C, M. which helps the color fine tuning of multiple images from different projectors.
6. All the projectors should have the same setting—including optical zoom ratio, color temperature, color characteristics, lamp setting, display mode...etc.
7. Usually, the projector will have different display mode for different applications, such as Presentation, Video, sRGB and User mode. We recommend user reset the projector to original settings, then change the mode to sRGB or User Mode. In

the User Mode, select sRGB as the reference mode, which permits further 3D color (RGBYCM) adjustment.

8. The mechanical stability of the optical system is important. It should be rigid enough, to avoid misalignment after installation. A projector with a large ZOOM ratio will be more likely to misalign. . A projector with fixed focal length will be the best but may create some difficulty in the installation.
9. As noted, the light output from 3x LCD or LCOS projectors may preserve polarization and affect the setup of passive 3D display systems. DLP projectors do not have this issue.

19. Specifications:

Video Input ports	1. Analog D-Sub VGA up to 205 MHz 2. DVI 1.0 compliant input up to 165 MHz 3. HDMI 1.4a compliant with HDCP 1.3 compliant input (FHD) 4. DisplayPort 1.1a compliant input up to 2560x1600 resolution with HDCP 1.3 High-bandwidth Digital Content Protection 5. YPbPr component input supports up to full HD (1920x1080P)
Audio input ports	1. Audio jack for PC audio connection 2. RCA audio jack for analog audio Line in 3. HDMI audio processing
Video Output ports	1. HDMI 1.4a compliant output for video/audio connection 2. DVI output via HDMI to DVI adapter 3. Analog VGA output 4. Simultaneous VGA & HDMI signal outputs for non-HDCP content 5. Decode 3D formats into signal for left or right eye
Audio Output ports	1. RCA jack for Analog RH/LH audio output 2. Coaxial S/PDIF digital output 3. HDMI output for video/audio connection (up to 7.1 channels for HDMI input) 4. Support mute function
System control	1. RS232 for system control. Optional RJ45 Network control 2. Support DDC2B/2Bi/2B+/CI 3. Full function OSD keypad on Front Panel 4. IR remote controller with optional IR receiver extender up to 20m
Image geometry correction and warp (Anyplace function)	1. Pixel based 4 corners and edge position adjustment 2. Horizontal and vertical keystone & image rotation adjustment 3. Image warp for curved display 4. Simultaneous 4 Corner and Curved adjustment for easy curved screen alignment (9 points curve adjustment).

	5. Optional PC Tool for sophisticated curved screen display with grid adjustment and 3x WarpMaps save and recall function. 6. Image Edge Mask for easy system installation
Video Wall	1. Magnify, scroll & pan through all inputs 2. Image split, cropping and assign display location 3. Pixel based overlap adjustment in all edges, up to 15x15 matrix displays 4. Up to 2560x1600 input resolution via DisplayPort 5. Support AMD Eyefinity and Matrox technology for high resolution display (each channel needs one GeoBox) 6. Flexible aspect ratio, overlap region & overscan control
Multiple projectors edge blending	1. Pixel base flexible overlay region setting 2. Allow edge blending in all sides of the image such as 1x3, 3x3, 15x15…etc. with the max resolution of 2560x1600 input and Full HD output in each channel.. 3. With multiple edge blending settings to optimize video quality. 4. Easy use—implemented by OSD keypad or remote controller
High end video processing and de-interlace	1. 3D motion adaptive video de-interlace for main and PIP images 2. Low angle edge smooth algorithm 3. Automatic 3:2 and 2:2 pull-down detection and recovery 4. Independent RGB color adjustment for PC graphics input 5. Digital Brightness, Contrast, Hue, Saturation and Sharpness adjustment for video input 6. True 10-bit data processing 7. 12 bit RGB gamma CLUT
3D stereoscopic display	1. Integrated with HDMI 1.4a receiver and transmitter to support HDMI 1.4a mandatory 3D formats. 2. Support Blue Ray DVD 3D format up to Full HD resolution. 3. Auto switch between 2D/3D in standard 3D input sources. 4. Auto select 3D input format in standard 3D input sources. 5. Decode HDMI 1.4a mandatory formats into left or right eye signal for FHD 3D display. High brightness 3D stereoscopic display can be implemented through 2 low cost projectors and

	low cost polarized glasses.
Picture in Picture	1. PIP function with selectable input source selection 2. Max. PIP size is 1024x768 resolution 3. Flexible image size, aspect ratio, position adjustment through OSD keypad or IR remote controller
Image Mask	Projection image can be masked out up to 250 pixels in all edges. It can simply the system installation effort.
Scalability	Video wall preset up to 15x15 displays. High output display resolution can be fulfilled by edge blending through adding Matrox “M” series display cards up to 16x full HD images from one PC source.
PC Setup Tool	eWarp Pro PC tool is an option for sophisticated image adjustment. Additional software license is required.
Power supply	1. External DC 12V/2A power supply with 2. Auto low power standby mode 3. DC 12V@1A trigger output
Weight	1.6 Kg (GeoBox body only)
Dimensions	305mmL x 155mmD x 45mmH

20. Revision History

Revision	Date	Originator	Comments
V. 2.02	2012-08-20	Steve Wang	1. Add Edge Mask 2. Add PIP function 3. Add Network details 4. Add eWarp Pro details