



The absolute opposite of ordinary

G413 User Guide

Quad channel creative video wall controller

- 25 editable preset display modes
- Custom modes with LCD at any angle and position
- PIP/POP
- Multi-unit cascade
- Flexible aspect ratio and display region adjustment
- Seamless looping playback with different display modes



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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.

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FCC/CE statement

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

Notice:

(1) An Unshielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

(2) Use only shielded cables to connect I/O devices to this equipment.

(3) Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1 Introduction

VNS creative video wall controller G413 is world unique and the first pure hardware solution that can create all kinds of display styles through IR remote controller. 25 pre-defined display modes can be selected through OSD. User can also create any display mode for regular and irregular video wall using LCDs with different dimension, resolution and bezel. Conventional low-cost monitor and TV can be used as display devices. The LCD can be installed at any angle and position. User can install LCD first, then crop the required image for each LCD by remote controller or PC tool.

G413 is 4 screen video wall controller with PIP/POP function and supports up to 8k/1k 30Hz and 4k/2k 60hz input signal. HDMI 2.0 loop out port is available for daisy chain connection. It can be cascaded to create large scale video wall.

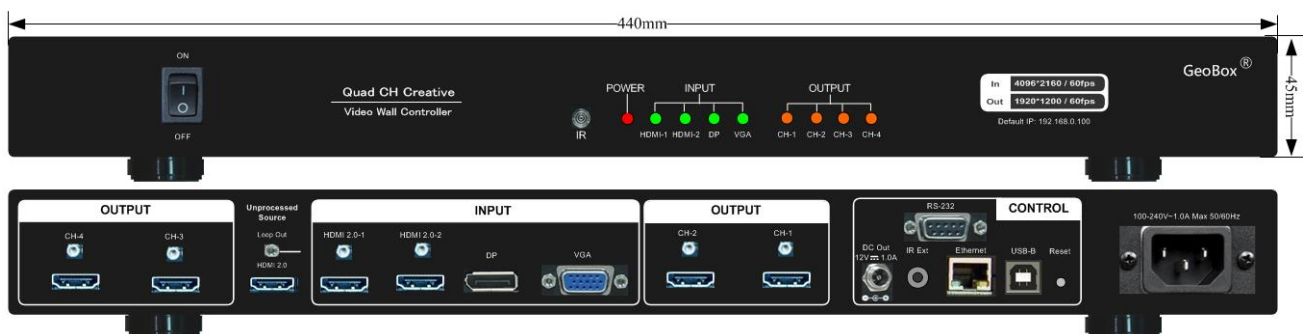
Dynamic aspect ratio and position adjustment for entire video wall are special features for G413. User has flexibility in showing different shape or cropping area contents on the video wall. It provides programmable background color in video wall blanking area if the content is not at full screen. Seamless looping playback is another feature to allow user to setup up to 10 display modes from the same source content and looping playback with selectable time interval. This function can be used to highlight specific image region or to show special effect on the video wall dynamically from the same content.

25 preset modes are integrated in G413. User can select preset mode and no adjustment or setup is required. Preset modes can be further modified to meet different panel bezel sizes and installation conditions.

System setup and control can be through IR remote controller, RS232, USB or Ethernet.

Dual power supply systems are designed in G413. User can use AC 100-240V or DC12V. When AC is applied, there will be one DC12V 1A output as the power supply for signal extender.

G413 is designed with highest industrial standard for 7/24 working environment. It provides a simple, flexible and reliable solution for creative video wall.



2 **Features:**

1) **Flexible video source connection**

- 2x HDMI 2.0b and 1x DP 1.2a: support up to 8k/1k @30 Hz or 4k/2k @60Hz resolution.
- 1x VGA: support up to WUXGA resolution.

2) **Quad channel outputs:**

4x HDMI 1.4 outputs for connecting with 4x LCD or conventional TV / monitor.

3) **System cascade display**

One HDMI 2.0 loop out port for multiple unit cascade for large scale video wall. No HDMI splitter is required.

4) **Pre-defined display modes**

25 pre-defined creative display modes that can be selected through OSD. Preset modes can be further modified to meet user's requirements.

5) **Create any irregular video wall by user**

- User can create any display mode for regular, portrait and irregular video wall using LCDs with different dimension, resolution and bezel. User can crop the required image for each LCD through inputting the coordinates of Top Left and Top Right corners in each monitor.
- Galign PC tool and remote controller are available to upload coordinates into G413.
- Windows "Paint" software can be used to capture the coordinates in each monitor.

6) **Flexible aspect ratio control**

Flexible aspect ratio control across entire video wall through OSD menu is integrated. User can decide how to display content on the video wall if the content can't match video wall aspect ratio. The adjustment range is from 25% to 200% independently in horizontal and vertical directions.

7) **Anyplace cropping**

User can crop any image location to be displayed in monitor.

8) **Flexible position adjustment**

The combination of flexible aspect ratio control and position adjustment function (25% to 200%) will allow user to determine the best image region for the display on the video wall.

9) **Auto looping playback**

User can setup up to 10 display modes from the same display content and looping playback with selectable time interval (1 second to 600 seconds). This function can be used to highlight specific image region to show special effect on the video wall dynamically from the same content.

10) **Any display devices**

Conventional TV/monitor can be used at top/bottom, LH/RH flip position to balance TV bezel difference between top and bottom edges.

11) **Programmable EDID**

Preset 23 EDID + programmable EDID setting to optimize input resolution. Programmable EDID has below resolution range: H: 1024-3840, V: 720-2400

12) **LCD burn-in mark protection**

Auto image position shift to prevent LCD from burn-in mark.

13) **Adjustable OSD position**

OSD menu position can be shifted for convenient OSD operation.

14) **PIP function**

Picture in Picture from two selected signal sources with flexible position and image size (up to 1920*1200), PIP image can be further adjusted by Overlap function to get various size and shape.

PIP image can cover full screen across entire video wall.

15) **POP function**

Image Side by Side display with full screen or maintain original aspect ratio. Two POP contents can be displayed on LCDs at RH/LH or up/down positions with monitor at landscape direction.

16) **System setup**

User can setup the system through IR remote controller, USB or Ethernet. User can connect G413 to WiFi router and execute system setup via WiFi through any device connected with the same WiFi router. WebGui and Galign PC tool is available for Ethernet operation.

17) **System control**

User can control G413 through IR remote controller, USB, RS232 and Ethernet.

18) **Auto power on/off control**

When no input signal is detected, GeoBox can auto-turn off output signal. Once input signal is detected, it will auto-turn on GeoBox and send out signal again. It is convenient for system power on/off control.

19) **Selectable background color**

When adjusting aspect ratio, user may see some blank background in the video wall. User can select background color by OSD.

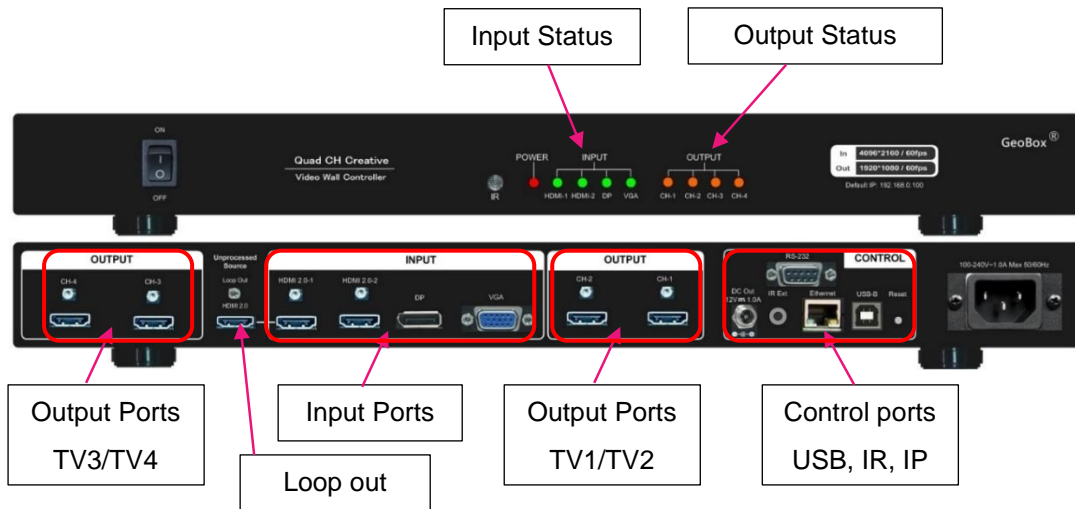
20) **Custom settings**

Up to 10 different display modes settings in the same signal source can be stored. 5 display Profiles with different input source and PIP/POP setting can be stored. User can recall at any time through remote controller, RS232, USB or Ethernet.

3 Helpful tips for installation and operation

- 1) User can set **Box ID** for independent control among multiple GeoBox by remote controller.
 - 851: control GeoBox ID No. 1, 853: control GeoBox ID No. 3,
 - 850: simultaneous control for all GeoBox
 - User will see flashing LED on front panel after press 85x number keys. It means the GeoBox with flash LED is locked and will not be controlled by remote controller.
- 2) To use Galign2 PC tool through USB or Ethernet for the setting is recommended and use remote controller for image position fine-tune.
- 3) GeoBox test pattern is important for video wall image position adjustment. It can be downloaded from website at www.vnstw.com.
- 4) 25 preset display modes selected through OSD menu. User can select preset display modes and modify as need. It will save the time for the setup.
- 5) If user wants to create his own creative video wall which is totally different from preset mode, the quickest way is to install the LCD first, take a photo of the video wall, crop and get coordinate through Windows Paint in top left and top right corners in each LCD, then input the coordinates into G413 through Galign2 PC tool to get the result.
- 6) User can use below hotkeys in remote controller for image fine-tune:
 - [Shift]: to shift image position in H&V without changing image size and direction.
 - [Top RH] / [Top LH]: to change image size, position and display angle
 - [Ratio]: to enlarge or shrink the image for full screen display or aspect ratio change
 - [Position]: after [Ratio] adjustment, user can shift entire video wall image position.
 - [Pattern]: adjust OSD position for convenient OSD operation.
- 7) **OSD Lock / Unlock:** When continuously press [MENU] key in IR Remote Controller for 5 seconds, the OSD function will be locked (LED on front panel will be flashing). To press MENU key for 5 seconds again, it will unlock OSD.
- 8) Poor **signal cable** connection or long cable may cause noise or discontinue on the display. Replace a new cable may solve the problem. Normal HDMI connection with good cable can be up to 15m. 4k/60 input signal will be more sensitive to cable quality.
- 9) User may not see complete image for signal source setup. User can use remote controller to select one display Mode # which is not stored any setting to display full image. After finish signal source setup, then return to the working Mode for further operation.
- 10) When operating via OSD, user may not see OSD menu. Please click [Pattern] hotkey together with direction keys to shift the OSD to visible position for easy OSD operation.

4 Outlook and main functions



5 Functions in Remote controller



- System Information
- Output port selection (TV1-TV4)
- Store location for Display modes

Procedures for determine each LCD image position

- 1) Select display Mode #—Mode 1~Mode 4 (please select Mode 5 to Mode 10 through OSD)
- 2) Select output port—TV1~TV4
- 3) Click Top Left [TL] and input coordinates
- 4) Click Top Right [TR] and input coordinates
- 5) Click [Shift] and adjust image position if necessary
- 6) If user can't see OSD menu, click [Pattern] to shift OSD position.
- 7) Adjust aspect ratio if necessary: [Ratio]
- 8) Adjust image position if necessary: [Position] (after aspect ratio change)
- 9) No special input sequence is required among TV1~TV4.

- Video wall Main Menu [VW]
- Entire video wall position adjustment [P]
- Shift OSD position to visible location.
- Entire video wall Aspect Ratio adjustment [R]
- To adjust image position at H&V without changing image size [Shift]
- Top Right coordinate menu [TR]
- Top Left coordinate menu [TL]

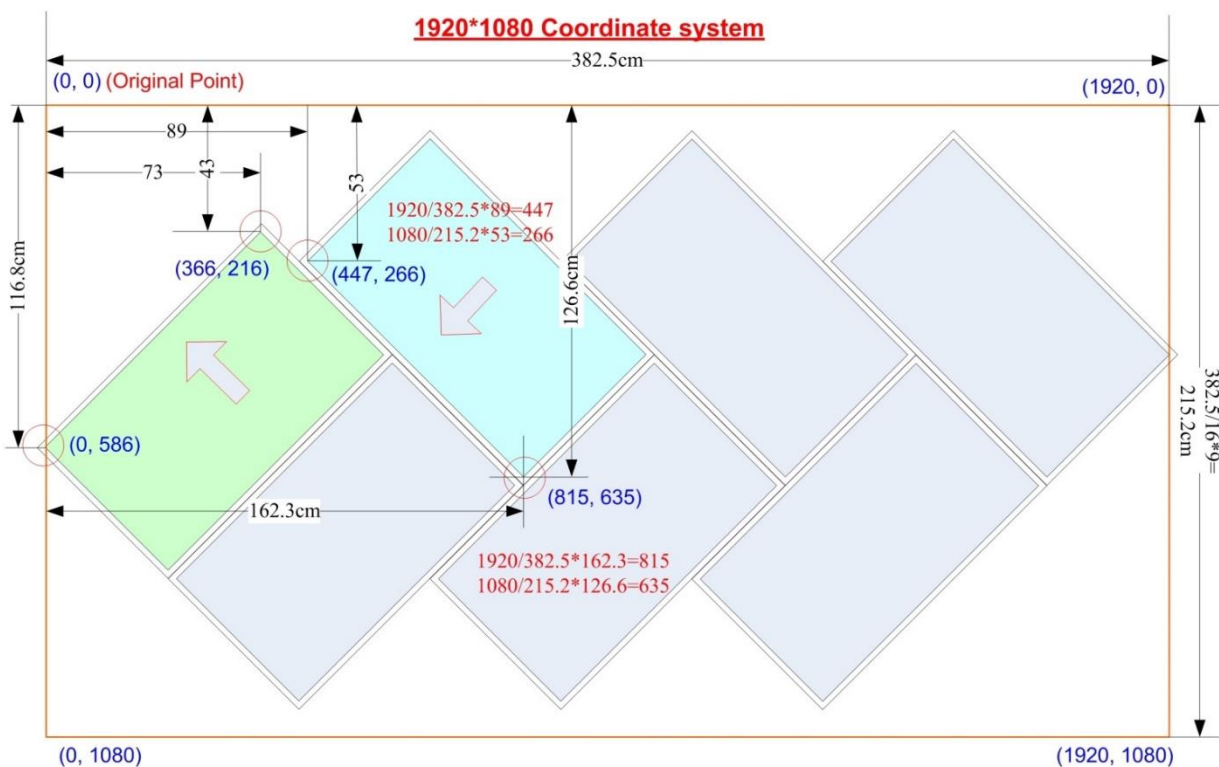
6 Basic concept for video wall configuration

11) [Top RH] & [Top LH] X/Y coordinates determine the image position

- Image allocation for each LCD is based on [Top RH] & [Top LH] corner X&Y coordinate value in 1920*1080 coordinate system. The coordinate system must keep 16:9 aspect ratio.
- Original point (0,0) is located at Top Left corner. (1920, 1080) is located at Bottom Right corner.
- No matter the LCD is located at any location, once it is 16:9 aspect ratio, user can assign the image location to each LCD through [Top RH] & [Top LH] X&Y coordinates.
- Through [Top RH] & [Top LH] coordinates change, user can adjust the image size, rotation angle and position in each output.
- User can setup creative video wall through design drawing and calculate the distance to convert into X&Y coordinates or take photo of the video wall, then convert it into X&Y coordinates through Window [Paint] software.
- After collect [Top RH] & [Top LH] X&Y coordinates, user can upload X&Y values by remote controller or Galign2 PC Tool. Galign2 PC tool is recommended for easier and quicker setup.

12) [Shift] function is to adjust X or Y values at [Top RH] & [Top LH] at the same time resulting image shifting in H&V direction without change image size. It applies to each output for position fine-tune.

13) [Ratio] & [Position] functions allow user to change complete video wall image aspect ratio and image position.



7 Preset Display Modes

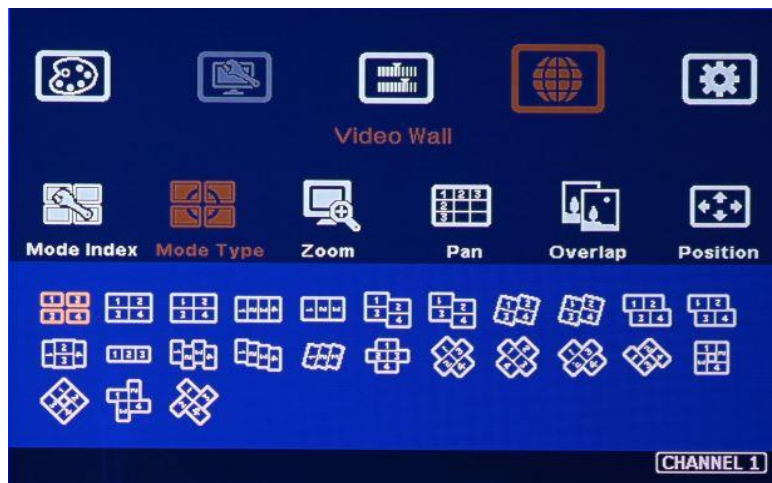
7.1 Introduction

- LCD panel used in Preset Mode must have the same size and 16:9 aspect ratio.
- Preset mode doesn't take LCD panel bezel size into consideration. It is good for slim bezel under 3.5mm active to active bezel size. If the bezel is larger, user may need to do further bezel correction through position fine-tune in each LCD.
- If the preset mode with LCD at 0/90/180/270 degrees, it will be less sensitive to bezel size. User will still see acceptable video quality even the bezel is up to 5-10mm width.
- The preset modes will fit complete source image with full screen across entire video wall. It will not consider the aspect ratio of the signal source.
- User can also use [Overlap] function under [Video Wall] menu to adjust the cropping area of the signal source for entire video wall.
- User can use [Ratio] & [Position] OSD menu to adjust final aspect ratio and position in the video wall based on the image that is cropped through [Overlap] function.
- Customized Mode can be created with all kind of LCD without size and bezel limitations.

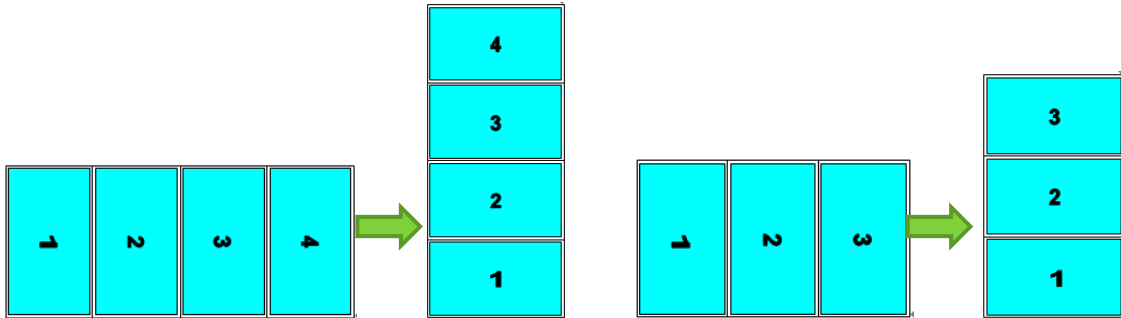
7.2 LCD (TV) selection for Preset Mode

- Type of LCD: low cost 16:9 LCD or TV can be used. No need to have matrix control feature.
- All the LCD panels used in the same video wall must have the same size and 16:9 aspect ratio.
- Some Display Modes support TV at top down flip position to balance the bezel difference.
- Output resolution: the default output resolution is 1920x1080 @60Hz in each output channel. The LCD must be able to support FHD input timing.

7.3 Select Preset Display Modes through OSD



-
- User can use remote controller to select preset display modes.
 - [Video Wall]→ [Mode Type]→ select display mode
 - 1st mode is to output 4 signals same as signal source. It is similar to 1x4 HDMI splitter.
 - User can switch the display angle in each display mode by 90/180/270 degrees. It will create different display mode.



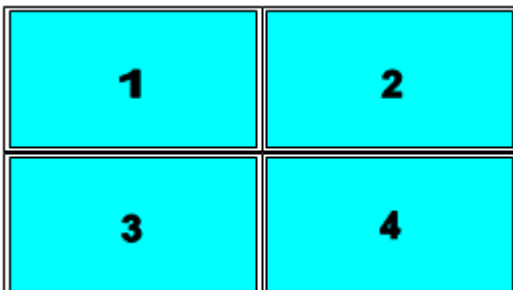
7.4 Preset display mode list

- User can select Preset Mode as base to create customized display modes.
- Image aspect ratio can be adjusted through [Ratio] & Video Wall [Overlap] function.
- Below Preset Modes don't consider Bezel size. User can use [Shift], [Ratio] and/or [Top LH] / [Top RH] coordinate adjustment function in remote controller or PC tool to get accurate bezel correction and image location.

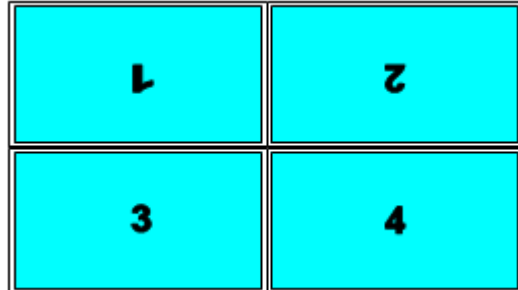
Mode 0 - Duplicate Mode

When system is reset, it will show 4 duplicated windows same as signal source in all outputs.

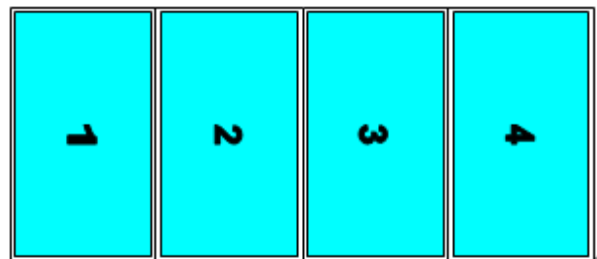
Mode 1 – 2x2 (Ratio 16:9)



Mode 2 – 2x2 with top two TV upside down (Ratio 16:9)



Mode 3– 4x1 (Ratio 2.25)



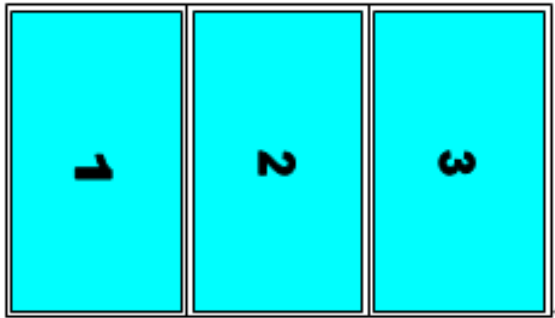
Mode 3A – 1x4



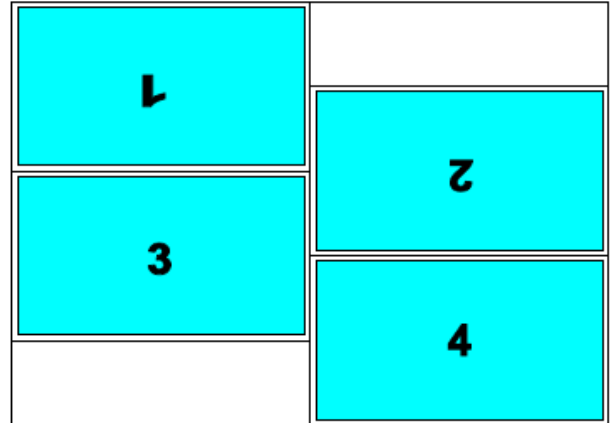
Apply 90° signal source or rotate image at 90° to get normal viewing angle from Mode #3.

Mode 4 – 3x1 (Ratio 1.69)

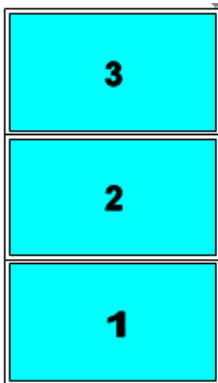
(#4 output will show full screen image)



Mode 6– 2x2 with TV2 & TV4 shift down 1/2 panel height (Ratio 1.42)

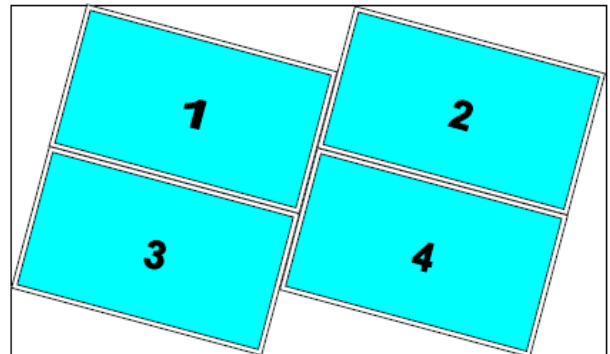


Mode 4A – 1x3

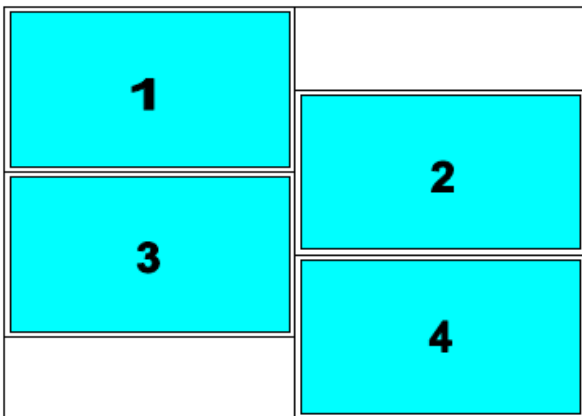


Apply 90° signal source or rotate image at 90° to get normal viewing angle from Mode #4.

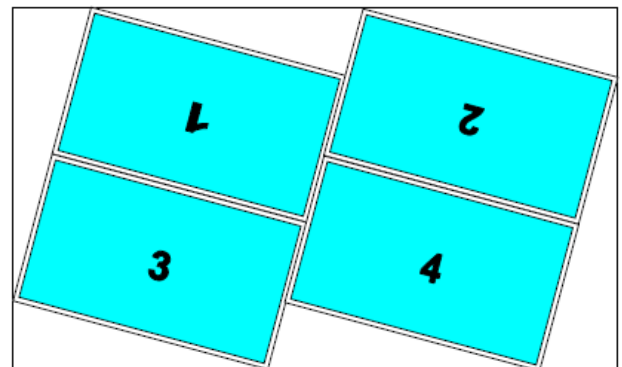
Mode 7 – 2x2 with clockwise 15° rotation (Ratio 1.7)



Mode 5– 2x2 with TV2 & TV4 shift down 1/2 panel height (Ratio 1.42)

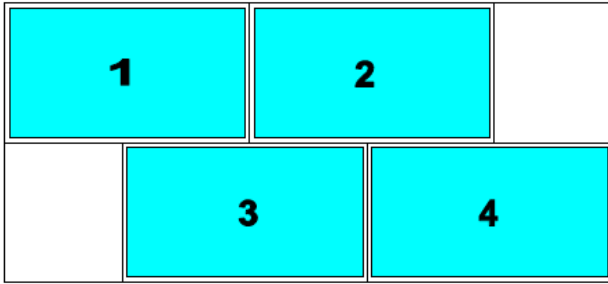


Mode 8 –2x2 with clockwise 15° rotation and TV1 & TV2 at upside down position (Ratio 1.7)



Mode 9– 2x2 with TV3 & TV4 Right shift 1/2 panel

width (Ratio 2.22)



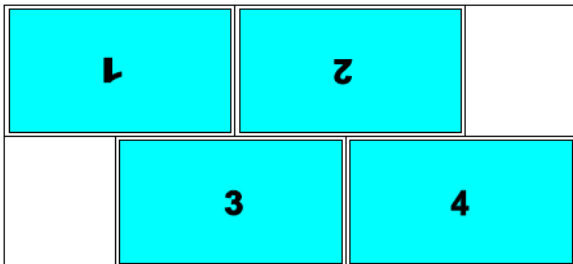
Mode 12A



Apply 90° signal source or rotate image at 90° to get normal viewing angle from Mode #12.

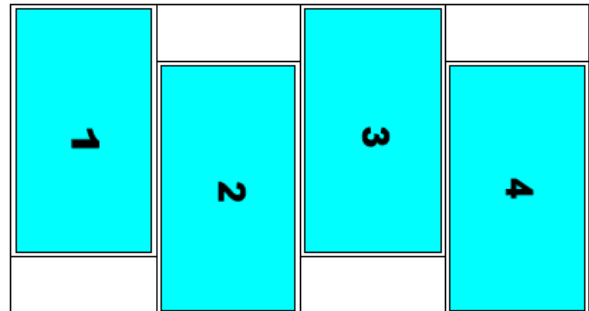
Mode 10– 2x2 with TV3 & TV4 Right shift 1/2

panel width (Ratio 2.22)

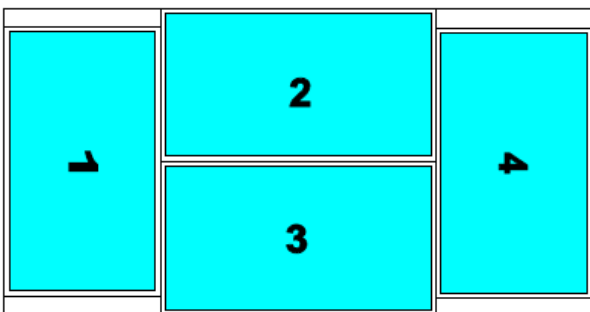


Mode 13 –TV2 & TV4 Down shift with 1/4 panel

height (Ratio 1.8)

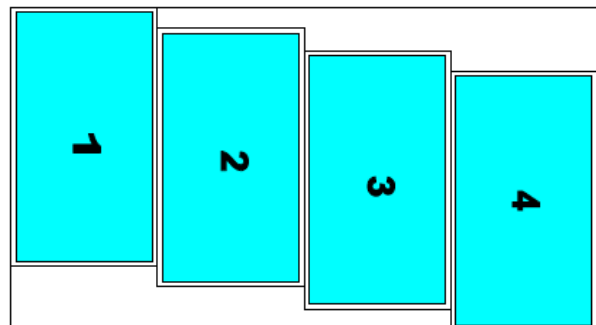


Mode 11 –(Ratio 1.89)

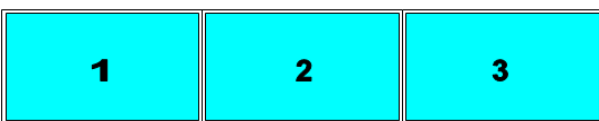


Mode 14 – TV4 Down shift 1/4 panel height (Ratio

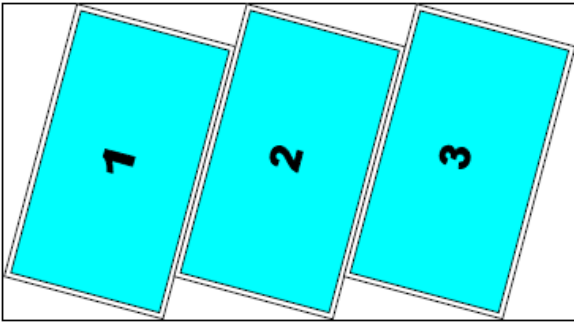
1.8)



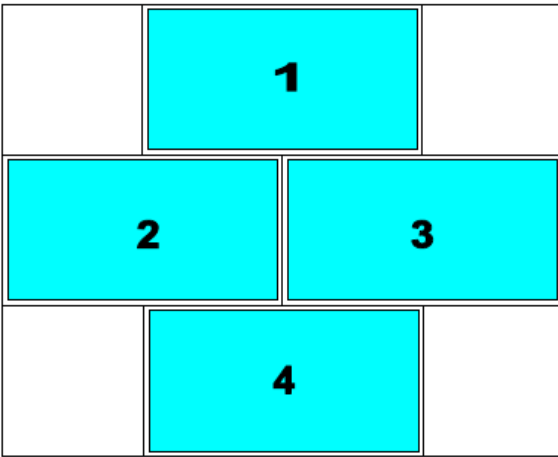
Mode 12 – (Ratio 5.33) for 3x3 application



Mode 15 – 75° counterclockwise rotation (Ratio 1.77) (#4 output will show full screen image)

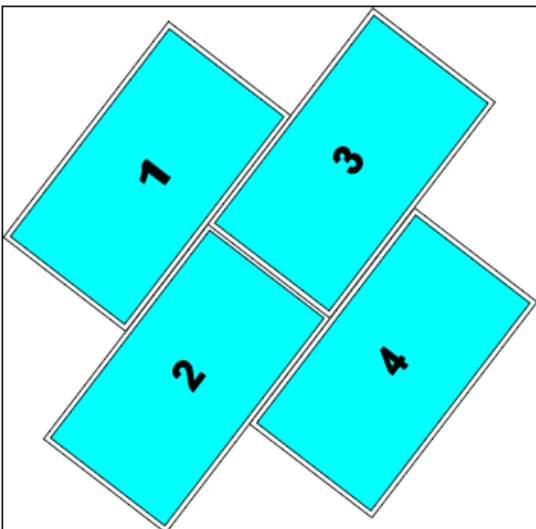


Mode 16 – (Ratio 1.16)

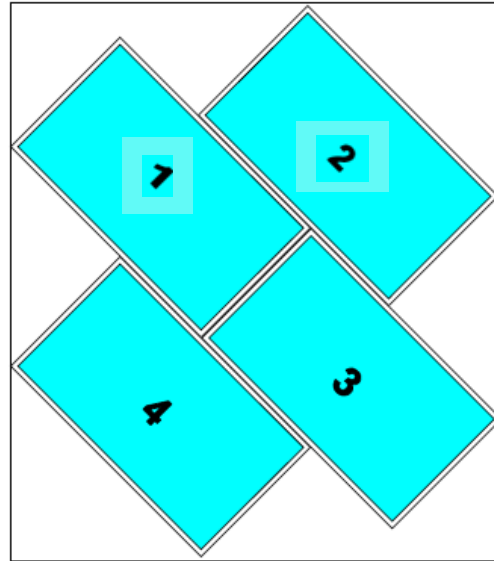


Mode 17 – 45° counterclockwise (Ratio 1.0)

- ✓ Panel location at half position



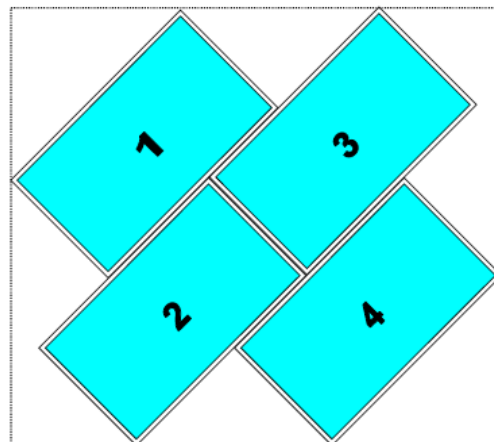
Mode 18 – 45° clockwise rotation (Ratio 1.0)



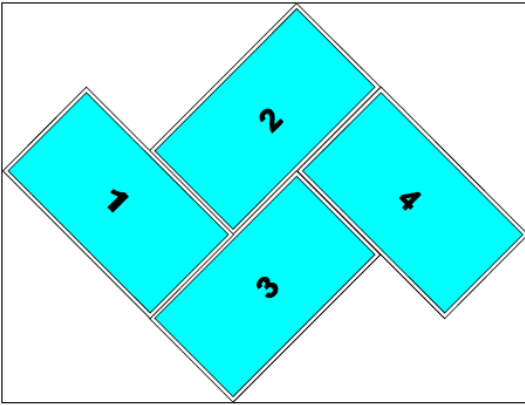
Mode 19 – 45° counterclockwise rotation

(Ratio 1.1)

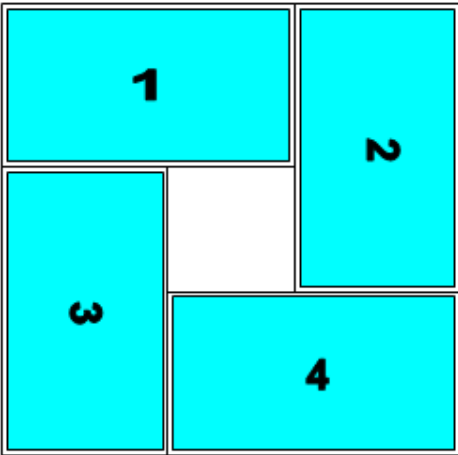
- ✓ Panel top and bottom at the same height.



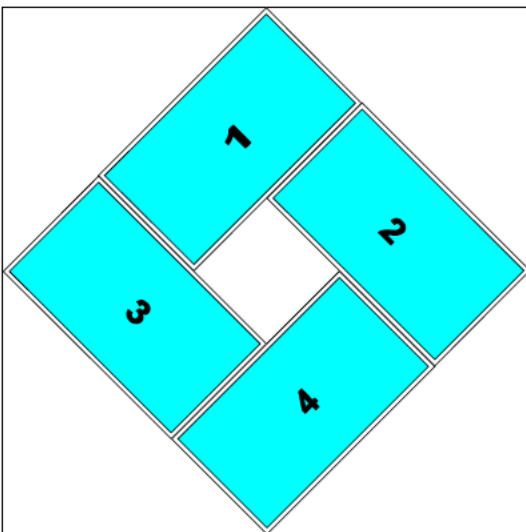
Mode 20 – 45° clockwise rotation (Ratio 1.33)



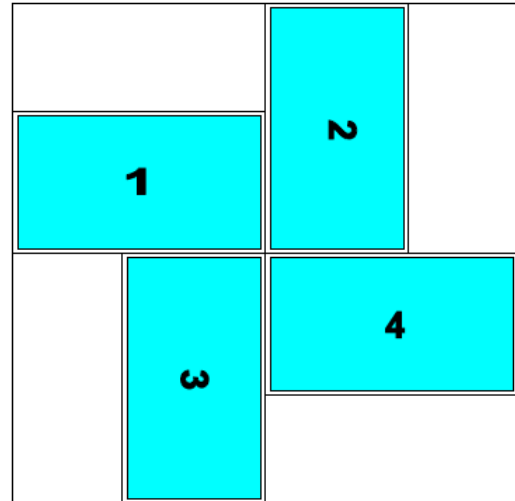
Mode 21 – (Ratio 1.0)



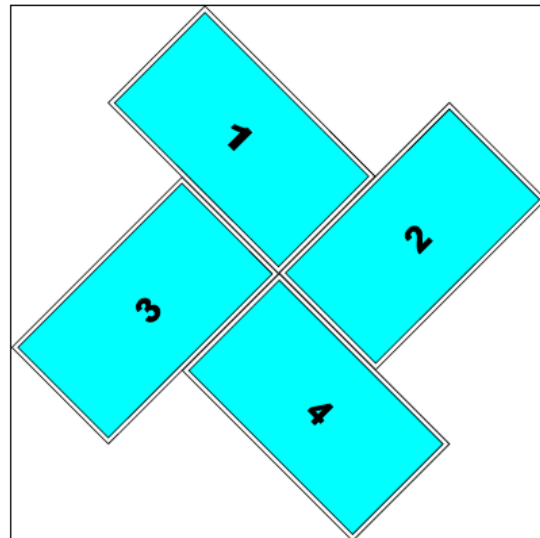
Mode 22 (Ratio 1.0)



Mode 23 (Ratio 1.0)



Mode 24 – 45 degrees rotation (Ratio 1.0)



8 **Galign2 PC tool**

8.1 **Introduction**

- Galign2 is specific PC tool for G413. User can input coordinates for [Top RH] & [Top LH] corners of the image in each LCD to get creative video wall. System setting, control and code update can also be executed through Galign2.
- If user selects Preset display mode from OSD, user can read back the setting parameters and execute further editing to match what he needs.

8.2 **Preparation for Galign2 operation**

- PC with Galign2 PC tool: please download from website at www.vnstw.com
[\[Support\]](#)--> [\[PC Tool\]](#)→ [\[G413 Creative Video Wall\]](#)
- USB Type B cable or Ethernet cable together with switcher/Hub/Router.
- Apply source signal to G413 with GeoBox Video Wall test pattern. Please download pattern from:
[\[Support\]](#)--> [\[Test Pattern\]](#)→ [\[G413 Test Pattern\]](#)
- The test pattern has number scale on it and user can estimate from the test pattern the adjusting pixels to move the image to correct position.

8.3 **Connection**

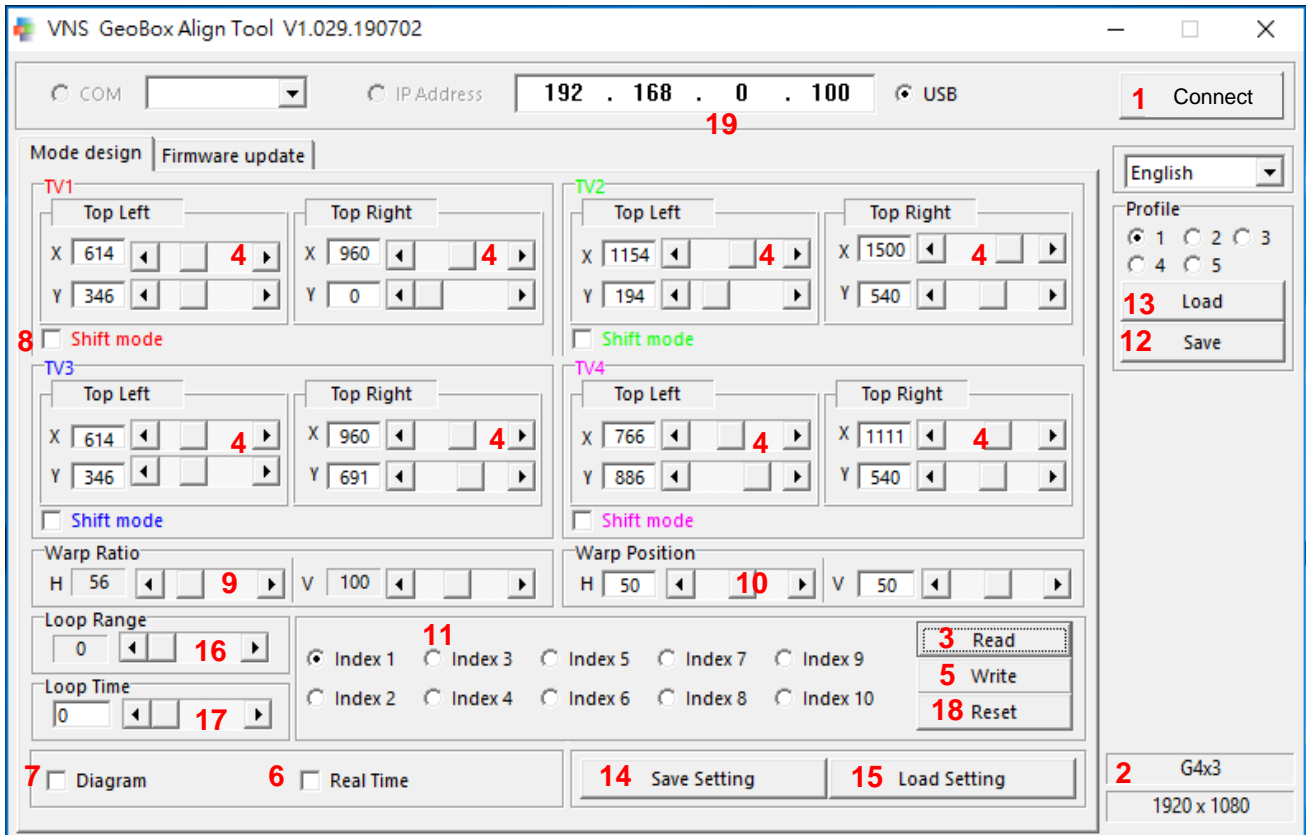
- For system setup, we propose to use USB through USB Type B connection.
- If the box is far away from installation site, Ethernet connection is recommended. G413 default IP address is 192.168.0.100. User can change it through OSD, Web Gui or Galign2 PC tool.
 - ✓ Direct connection through UTP cable: user needs to set PC/NB with the same IP segment, such as 192.168.0.10x.
 - ✓ WiFi router: user can connect G413 to WiFi router through LAN port and select DHCP or static IP for the connection in OSD. Once PC/NB connects with this WiFi router, user can find G413 and execute Galign2 operation.
 - ✓ When multiple units of G413 are used, user can set different IP address in each G413 and control multiple units at the same time through different IP address.

8.4 **Prepare coordinate value off-line**

- User can operate Galign2 without connecting with GeoBox. If the coordinates value for each LCD are available, user can input the value into Galign2 and save it in PC. After connecting with G413, user can load it from PC and upload the coordinate values into G413 by [Write] command and see the final result immediately.

8.5 **Galign2 PC Tool operation**

- TV1-TV4 represents G413 output ports from CH-1 to CH-4.
- For Preset Mode, user needs to follow the sequence, location and direction in Preset Mode menu to install the video wall.
- If no PC for Galign2 PC tool operation, user can still use remote controller or WebGui to execute coordinate key-in, position fine-tune, aspect ratio and position adjustment...etc.



Below item # corresponds with the RED # in Galign2 operation window.

(1) [Connect]:

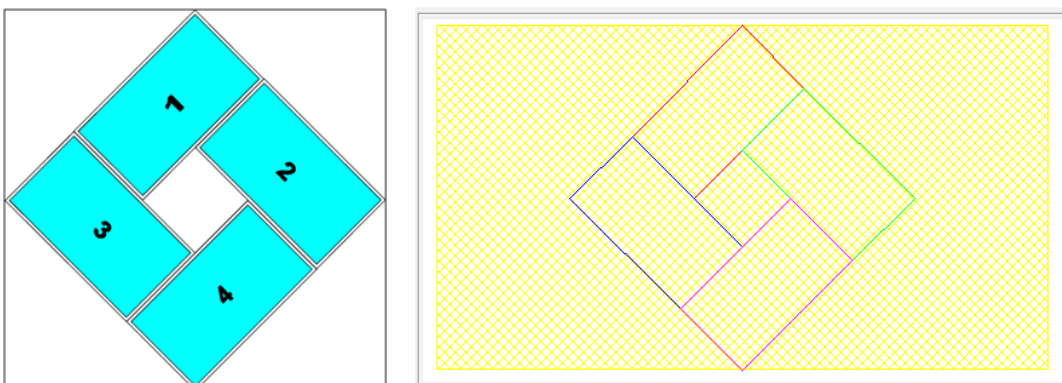
- After select type of connection, click [Connect] to connect Galign with G413. Default connection type is [USB].
- After open [Galign], all the parameters will be reset to default value. User can load previous setting by [Load Setting] (15) from PC or [Read] (3) function from video wall or Preset Mode.

(2) After connection, user will see model # and output resolution. Default output resolution is 1080p.

(3) [Read]:

- Functions: a. Read back parameters from video wall setting. b. Read back parameters from Preset Mode which is selected by remote controller. C. Read back parameters from display Mode (11).
- After user selects Preset Mode from OSD through remote controller, when user clicks [Read], Galign will read back the parameters of Preset Mode and save to Index #1 (default Index # is 1). If user selects other Index # and implement [Read] command, it may not read back Preset Mode parameters.

-
- After Read back parameters, user can select another Index # and use [Write] (5) command to save to other Index #. User can do further editing for Preset Mode and create customized display mode.
 - If user saves the setting into display Index (11), user can select the display Index and click [Read] to read back the setting. The video wall will stay the same until [Write] command is executed.
- (4) Location for Key-in or editing the coordinates of Top Left corner and Top Right corner for TV1-TV4. The coordinates can be captured from Preset Mode, video wall picture or project plan files. If user checks [Diagram] (7), user will see the adjusting result in the Diagram but not in the Video wall before executes [Write] (5) command. User can also CHECK [Real Time] (6) to see the result real time in the video wall.
- (5) [Write]
- After finish all settings in Galign, the image is still controlled by PC. User needs to use [Write] command to upload all parameters into G413.
 - User needs to disable [Real Time] function before execute [Write] command.
 - User can save up to 10 different display Indexes. Please select [Index #], then click [Write] to save Galign parameters. The settings can be saved into any display Index # and can be duplicated.
 - It only saves the image settings showed in Galign but not includes input ports, color, PIP setting, EDID...which will be saved in Profile Index.
 - If user wants to show specific Mode settings, please select Index #, click [Read] to read the parameters, then click [Write] button to upload the settings to video wall and see the final result. User can use remote controller Mode hotkey (#1~#4) to show the setting directly.
- (6) [Real Time]:
- When user executes editing preset mode or creates new custom display mode, please check [Read Time] so that user can see the image change while changing parameters.
 - [Real Time] mode shall be disable when user wants to key-in coordinate data or [Write] the result to GeoBox.
- (7) [Diagram]:
- If user check [Diagram], there will be a diagram showed up near Galign window.
 - This diagram will update real time while user changes the coordinate values in coordinates. The [Warp Ratio] and [Warp Position] changes will not be showed in the diagram.
 - Below left diagram presets mode selected by OSD and the right diagram is showed in Galign. Please note that the color in each LCD is corresponding the output channel (TV1-TV4) in Galign window.



-
- (8) [Shift Mode]:
- After check [Shift Mode], user can change [Top Left] X&Y value to shift image position in H&V directions for each TV without changing the image size and angle. Each channel is independent.
 - While executing [shift] function, X&Y values must be also in the range 0-1920 for X direction and 0-1080 for Y direction.
- (9) [Warp Ratio]:
- [Warp Ratio] will apply to all channels at the same time to enlarge or shrink complete video wall image in H&V direction from a range 25% to 200%.
 - All Preset Mode will show entire source content. If the video wall in not 16:9 aspect ratio, [Warp Ratio] has been applied to Preset Mode to show entire image in the video wall.
 - User can change [Warp Ratio] to change cropping area or change aspect ratio.
 - The result will not be showed in [Diagram].
- (10) [Warp Position]:
- When the video wall has applied [Warp Ratio], user can shift complete video wall image position by [Warp Position].
 - The adjusting range for [Warp Position] is followed the percentage in [Warp Ratio]. If user didn't adjust [Warp Ratio] (value is 100), then no [Warp Position] adjustment is allowed.
- (11) [Index #]:
- Index # is the location to save parameters created in Galign. It doesn't include other settings that is not inside Galign, such as input selection, PIP or EDID setting.
 - User saves up to 10 Indexes and executes seamless looping playback to show special effect for the video wall.
 - [Write] command is to save Galign settings into display Mode.
 - When user click Index #, then click [Write], it will erase original setting and replace with new parameters in each TV. If user click [Read], then click [Write], it will upload the settings in that Index # to the video wall and user will see the final result.
- (12) Profile [Save]:
- After select Profile index # (1-5), user can save the final settings to G413 together with other settings from Remote controller, such as input source, PIP/POP, video wall settings, color, EDID...
 - Please select one Index #, then click [Save] to save the setting. The result is the same as Profile Save executing from remote controller.
 - All channels will be saved at the same time. Maximum 5 Profile Indexes can be saved and recalled.
- (13) Profile [Load]:
- User can load back Profile settings and execute further editing.
- (14) [Save Setting] in PC:
- User can save Galign settings in PC as a backup or copy to other G413 through [Save Setting].
- (15) [Load Setting] from PC:
- User can load Galign settings from [Save Setting] command and execute further editing.

(16) [Loop Range]:

- [Loop Range] is to select display Index # for looping playback.
- It will start from Index #1. If user selects [5], it means the system will execute looping playback for Index #1 to #5.
- The display Modes for looping playback shall be continuous. User needs to arrange the sequence of the display Modes in advance.

(17) : [Loop Time]:

- [Loop Time] is to set the time interval from one display Mode to next display Mode in looping playback. If user wants to display specific display Mode with double time, user can save the same setting in the next display Mode and put it into Loop Range.

(18) [Reset]:

- [Reset] is to reset selected display Mode to default value and let GeoBox to show source image on each LCD. [Reset] only resets selected Index and the data in other Indexes will not be reset.
- User can select one display Mode without saving data and click [Reset] button to reset complete video wall to default status.
- User can also use [Reset] hotkey on the bottom of remote controller for system reset. This reset function will erase the data in all Indexes. Here is the process:
 - Reset All: [Reset] → click [Right direction key] → Enter.
 - Reset [Video wall setting]: Reset → click [Left direction key] → Enter.

(19) IP address setting:

- User can execute IP address setting from remote controller OSD menu, Web Gui or Galign.
- If multiple units are used at the same time and setup by Ethernet, user can set different IP address for each unit so that user can use one PC to control all units at the same time.

(20) [Firmware update]:

- User can update both Firmware and MCU Code through this function.
- No update sequence between Firmware and MCU code.
- The system will recognize the type of the software and install to the system automatically.

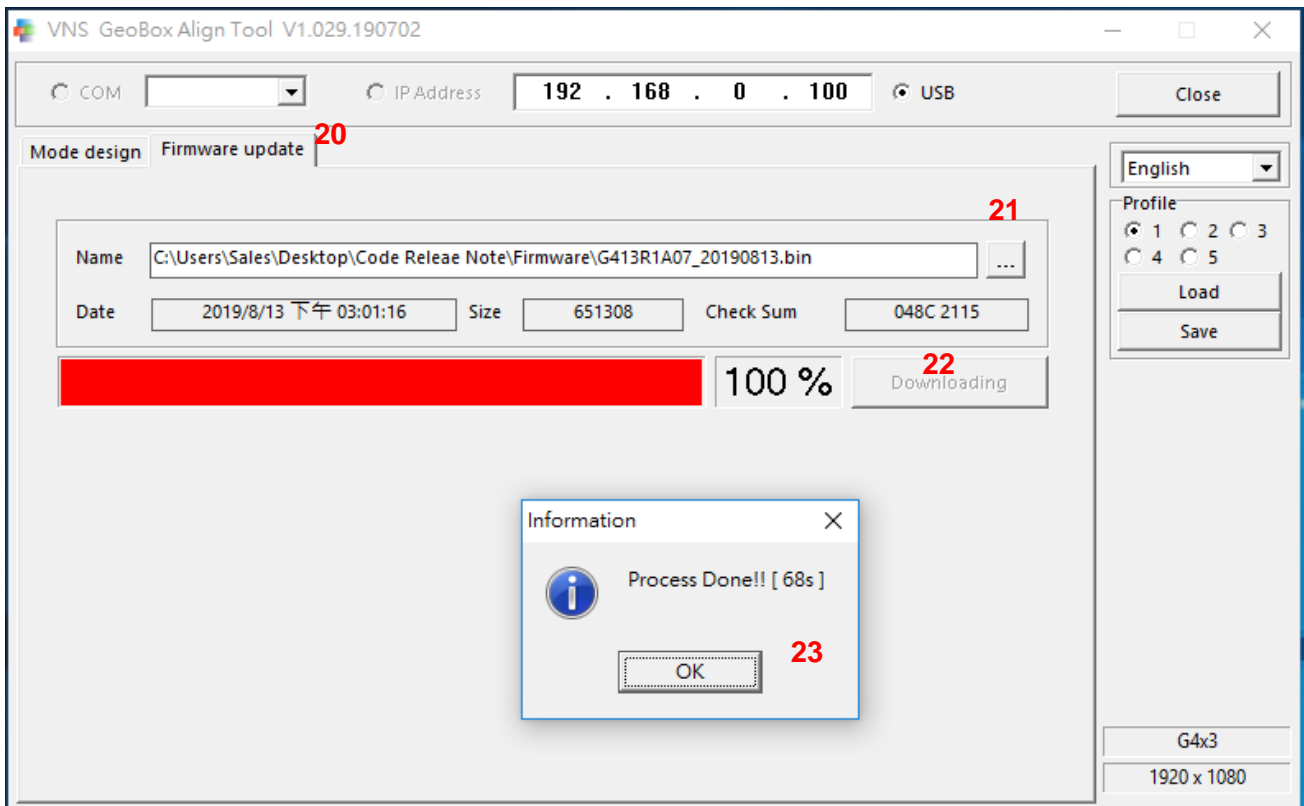
(21) Browser the file for code update

- If the file is compressed, please decompress to .bin file for execution.

(22) [Start]: After press [Star] key, the system will start to update the code. It may stop for some time in some stage. It is normal. Please wait till see [OK] message, the re-boot the system to check the result.

PS. After finish code update, please insert small pin into RESET hole of back panel for 5 seconds to reset the system again. It will remove all previous settings into default value, including all settings in display Modes and Profile Indexes. If user doesn't like to remove old settings, this process can be neglected and if user finds

abnormal conditions, user can reset through OSD menu and it will keep the settings saved in Profile Indexes but will clean display Mode settings (mode #1-Mode #10)



9 Preset Mode editing via Galign2 PC tool

If user wants to create customized display mode, user has two ways:

- To select Preset Mode as base and customize it.
- To create completely new display mode through Manual operation.

9.1 Select Preset Mode via remote controller or WebGui

- Remote Controller is attached in the shipping package.
- WebGui is available when user connects G413 with Ethernet through IP address: 192.168.0.100.
- Activate [Video wall]→ [Mode Type]→ Select Preset Mode by icon.

9.2 How to read back Preset Mode setting value

- Open [Galign2] PC tool.
- Click [Connect]. After connection, user will see model number and output resolution at Bottom Right location.
- Click [Read]. User will see current display parameters in Galign2 window.
- If user Loads the file from PC, all the parameters will be showed in Galign2. User can select Mode # and click [Write] to store the parameter settings.

9.3 **Reset Preset Mode setting**

- **Galign2:** [Reset] key will reset the settings in all channels to default. All outputs will have the same signal as signal source. It can be served as 1x4 HDMI splitter.
- **Remote Controller:** User can use remote controller to reset all channel settings. Press [Reset] hot key in the bottom of the keypads, click RH or LH of the direction key once, then press OK. RH direction key will reset [ALL Setting]. LH direction key will reset only [Video Wall] settings.

9.4 **Real time editing for Preset Mode**

- Click [Diagram], a diagram near Galign2 window will show the image allocation in 4x LCDs.
- Click [Real Time]. User will be able to see the real time image change in the LCD while changing parameters settings.
- Open GeoBox test pattern with Windows Paint and set full screen display. User can follow this pattern to stitch the image into one big image.
- Remote controller is also available for image adjustment.

9.5 **Image position adjustment in each LCD**

- [Shift Mode]: Image H&V position shift in each channel without changing image size and angle.
- [Top LH] & [Top RH] coordinates adjustment: Image rotation and size adjustment.
- X coordinate value range is 0-1920 and Y is 0-1080. While image adjustment, the value shall be under the range.
- If the image position still can't reach required location due to above range limitation, user can shift the coordinate value to change the image. The image will be enlarged or shrunk and some image may be outside the border and can't be seen. After finish all LCD images adjustment, user can use [Warp Ratio] function to shrink the complete video wall image and see full screen.

9.6 **Aspect Ratio adjustment**

User has two methods to change complete video wall aspect ratio

- To change the cropping area of signal source from [Video Wall] OSD menu. User can use [Zoom], [Pan] and [Overlap] to crop the location you want to display on the video wall.
- To use [Ratio] and [Position] in Galign 2 PC tool or remote controller to enlarge or shrink the image and select the display region. This function can only handle the image after cropped by the above [Video Wall] function.

9.7 **OSD position shift**

- While image editing by remote controller and OSD, user may not see full OSD menu. User can click [Pattern] key together with direction keys to shift OSD position to a location that user can easily see.

10 Preset Mode editing via remote controller

10.1 Select Preset Mode via remote controller

- Activate OSD→ [Video Wall]→ [Mode Type]→ select icon
- If user doesn't select Display Mode #, it will save the select Preset Mode in Mode #1.
- User can select different Mode # then to select different Preset Modes.

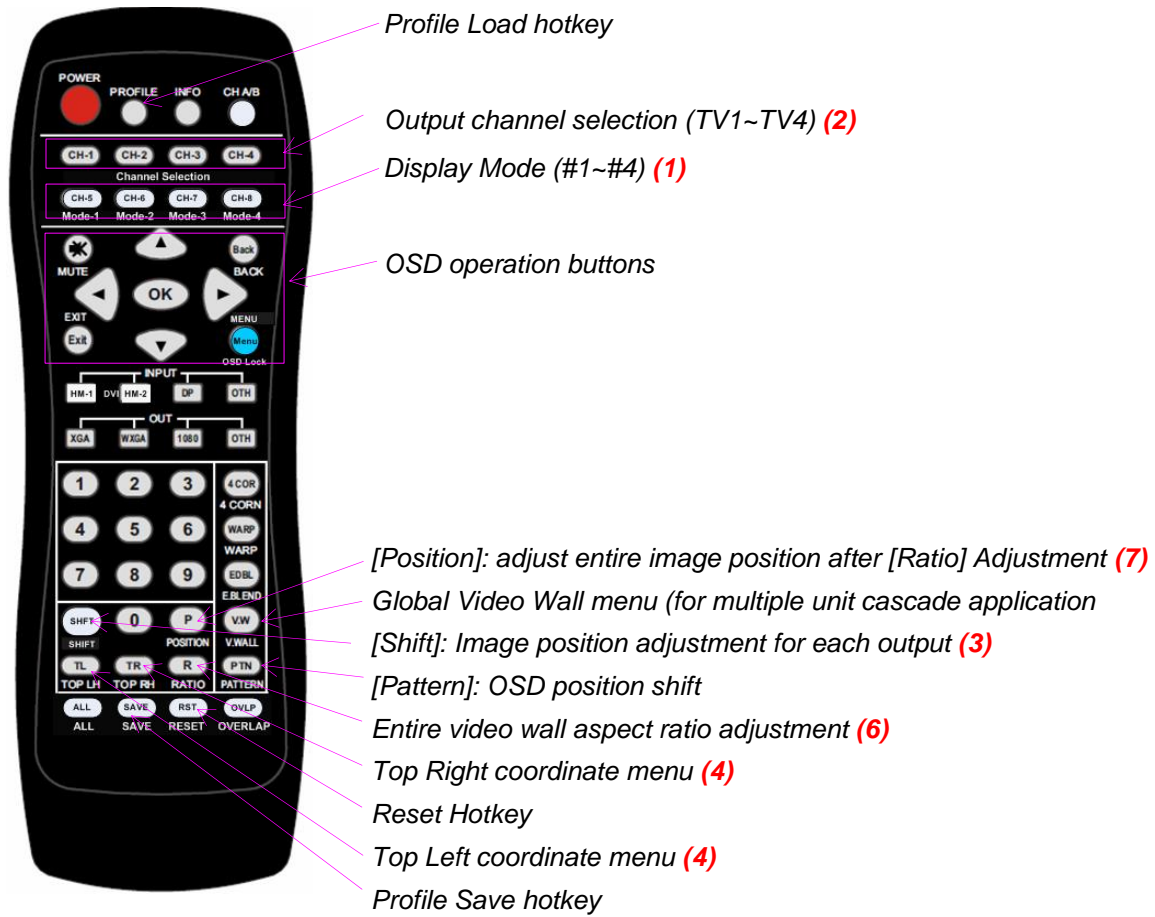
10 Mode # for store different display settings

25 preset display modes can be selected



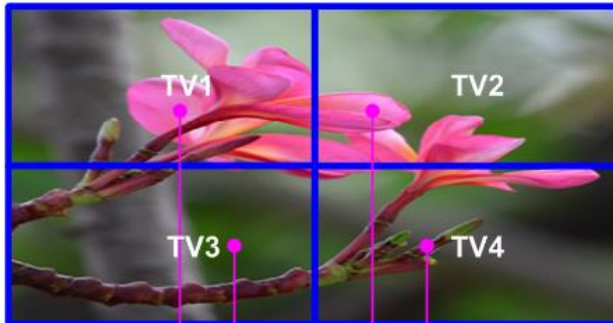
10.2 Procedures for Preset Mode editing

- 1) Select display Mode location if multiple display Modes have been saved. Remote controller can only select Mode #1~ Mode #4. If user wants to select display Mode # larger than 4, user needs to select display Mode # from OSD.
- 2) Select output port—CH-1-CH-4 (LCD1-LCD4).
- 3) Click [Shift] to do image H&V position adjustment in each.
- 4) Click Top LH and Top RH to shift image size and display angles.
- 5) If user can't see OSD for the operation, please click [Pattern] key together with direction keys to shift OSD position.
- 6) Click [R] to adjust entire video wall aspect ratio if necessary.
- 7) Click [P] to adjust entire video wall display position if necessary.
- 8) User can select Top LH/Top RH keys first, then select Mode or TV1-TV4 to key-in coordinates. No special sequence is required.
- 9) [Reset] function from remote controller will delete all settings in all output channels. Profile Indexes setting will not be deleted.



11 Preset mode application case study

11.1 Preset Mode: Mode 01



1) Connect G413 outputs to related LCD

- CH-1 to TV1
- CH-2 to TV2
- CH-3 to TV3
- CH-4 to TV4

2) If bezel compensation is required, please apply GeoBox test pattern and change coordinates in each channel.

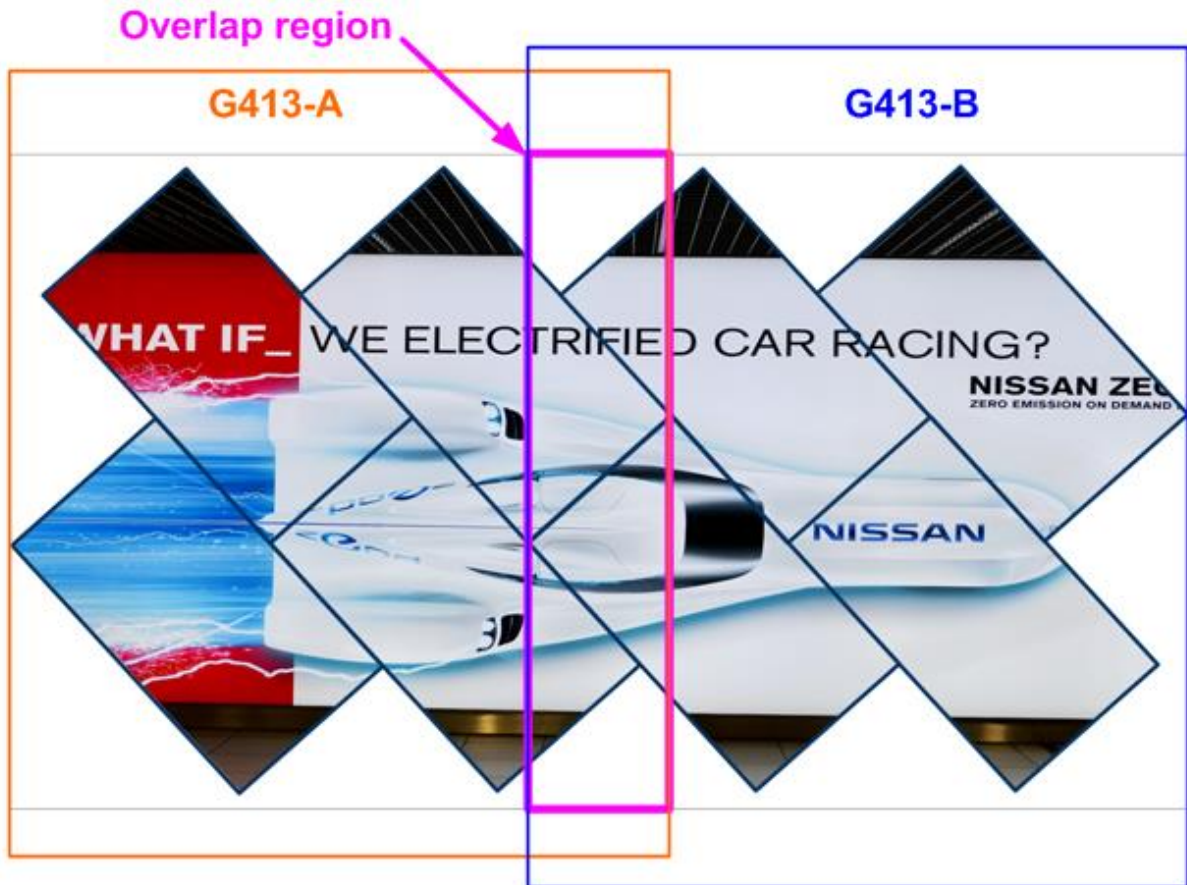
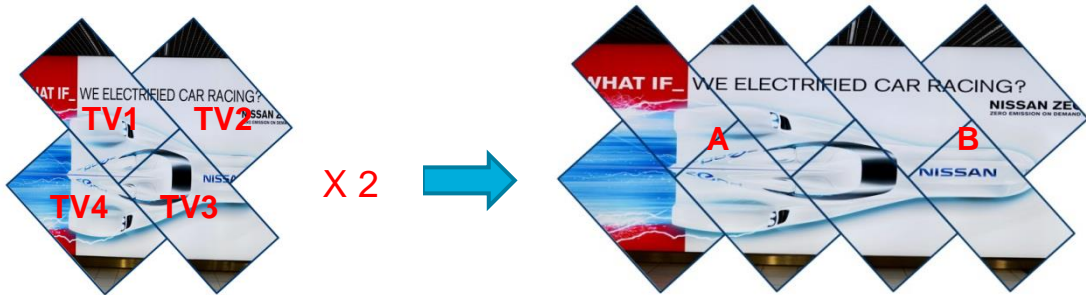
- TV1: Reduce X coordinate in Top RH to enlarge image to bezel center point in both H&V directions.
- TV2: Increase X coordinates in Top LH to enlarge image to bezel center point in both H&V directions.
- TV3: Reduce X coordinate in Top RH to enlarge the image and use [Shift] to shift the image up.
- TV4: Increase X coordinate in Top LH in TV4 to enlarge the image and use [Shift] to shift the image up.

3) After the bezel compensation, if user can't see full screen image, please use [Ratio] & [Position] to do fine-tune.

4) User can show dual contents in one 2x2 video wall through PIP or POP function. No need to change any connection. Two sources for PIP/POP shall be HDMI + DP, HDMI+VGA or DP+VGA.

11.2 Preset mode 19 with two G413 cascade

- G413 can support multiple unit cascaded with Preset Mode. Maximum unit is 15x15=225.
- Connect signal to 1st G413 HDMI-1, then daisy chain to next G413 through Loop Out port.
Maximum input resolution is 4K/2K @60Hz or 8k/1k @30Hz.



11.2.1 Setup method

- To set different IP for each G413 through OSD or PC tool if user wants to use Ethernet for the setup in multiple units at the same time.

-
- User can use IR remote control, USB or Ethernet for system setup.

11.2.2 Setup procedures

- Follow the instruction in Preset Mode 18 to do signal connection in both G413. One G413 control left four LCD and another one controls right four LCD.

- Global Video Wall settings in G413-A

Activate OSD → [Video Wall] → [Zoom] H=2, V=1 → [Pan] H=1, V=1

- Global Video Wall settings in G413-B

Activate OSD → [Video Wall] → [Zoom] H=2, V=1 → [Pan] H=2, V=1

- Video Wall [Position] settings:

When use Zoom function to split the image, it will cut the image from middle. Actually G413-A & G413-B images has some overlap. Therefore, user needs to crop more pixels for G413-A in LH side and G413-B in RH side.

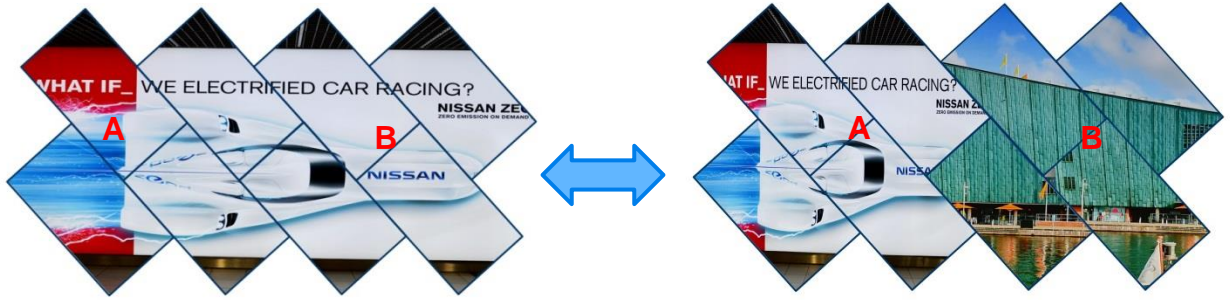
Based on the panel arrangement, the overlap is about 11.5% in horizontal direction. If the input is 3840*2160, estimated cropping pixels for each unit are $3840 * 11.5\% / 2 = 221$ pixels.

Activate OSD → [Video Wall] → [Overlap] → Select G413-A Right Edge → set value at +221, select G413-B Left Edge → set overlap value at +221. The value in two G413 should be the same to get the same scaling factor.

- Fine-tune image position may be required through the same procedures as that in single unit application by Galign2 PC Tool or remote controller.

11.2.3 Multiple contents display in cascaded video wall

- User can select different input sources for Display Unit A & B and set video wall [Zoom] H=1, V=1 in both G413 to display different contents in the video wall. It can be saved into another Profile [Index]. User can switch between different display modes to show different display style in the video wall.



- User can use PIP/POP function to add more display content in each G413. In this case, the maximum display contents will be up to 4 in the above video wall.

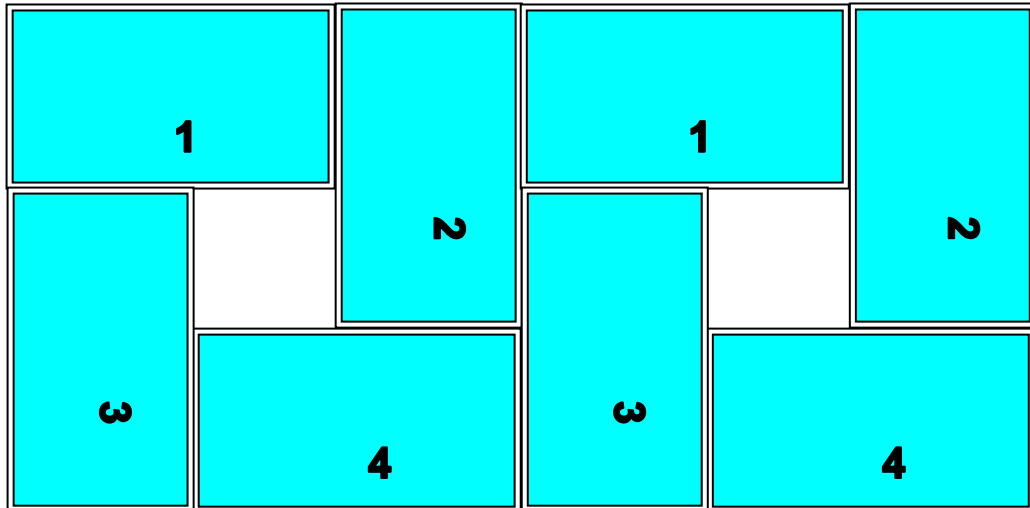
11.2.4 Six monitor creative video wall

- User can use two units of G413 to achieve 5/6/7/8 TV video wall based on the system connection with the same Preset Mode.
- For 6 LCD creative display, user can also use Preset Mode 18 to create it.
- Below is the signal connection. Only two channels of G413-B are connected.
- Video wall setting is the same as 8x LCD but the value for Overlap setting will be bigger. User can increase same overlap value in [Right Edge] in G413-A and [Left Edge] in G413-B to get it.



11.3 More Examples for Preset Mode cascade

2x Mode 21, recommended signal source resolution: 3840*1080. Use [video wall] menu to cut the image into two portions for two G413.



12 Create custom display mode through OSD menu

The purpose for [Mode Index] is to save Preset mode parameters and let user create any type of display mode as he wants. Here is the structure and concept:

- Up to 10 different display modes that can be saved in [Mode 1 to Mode 10].
- Select Mode #, then select Preset Mode from [Mode Type] menu. It will save Preset Mode into selected Mode #. User can also input Top Left and Top Right corner coordinates through OSD or remote controller and store the result in selected Mode #.
- Each Mode consists up to 4 LCD—[TV1]–[TV4]. Each TV # image position can be further edited.
- Seamless looping playback with selected display modes can be implemented by [Loop] settings.
- User can adjust Horizontal and Vertical aspect ratio through [Ratio] menu.
- User can shift entire video wall image position through [Position] menu.

12.1 Select the location to store custom display mode—[Mode Index]

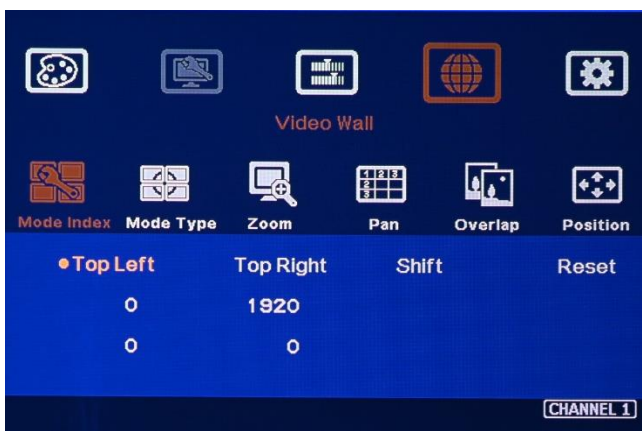


- 1) Under [Mode Index], there are 10 [Mode #] menu and [Loop] menu.
- 2) Each [Mode #] stores one display mode.
- 3) User can apply different input source and resolution without affecting display mode settings.
- 4) Loop menu is for looping playback setting.

12.2 Input coordinates for [Top LH] & [Top RH] corners in each LCD



- 1) Each [Mode #] has 4 LCD (TV1 ~TV4) for user to assign image location.
- 2) [Ratio] is to do further adjustment in aspect ratio, position shift & background color in entire display (4x LCD at the same time).
- 3) [Reset] is to reset all the settings in [TV1] ~ [TV4].

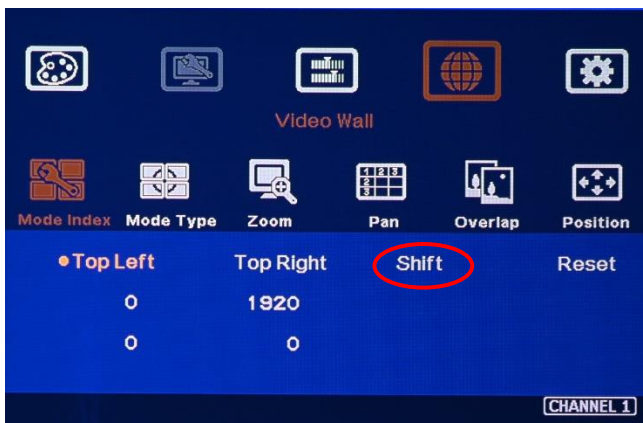


- 1) Inside each [TV], user needs to input coordinates of [Top Left] and [Top Right] corners to decide the image location.
- 2) [Reset] will reset the coordinates to default settings in current [TV] setting.
- 3) User can manually input the coordinates for [Top Left] and [Top Right] corners by remote controller or Galign2 PC tool.

12.3 Shift OSD position:

When input coordinates value, user may not see OSD menu and value. User can finish TV1 setting first, then shift OSD menu to TV1 by click [Pattern] + direction keys. Then user can see all the coordinates value for all other TV settings.

12.4 Position fine-tune by [Shift] function in each LCD



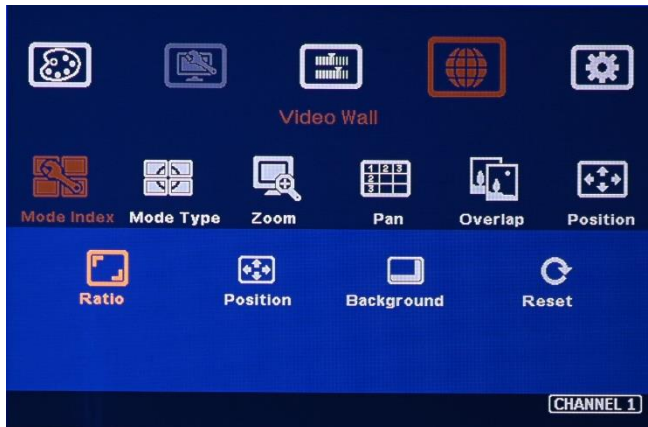
- 1) [Shift] hotkey is in remote controller to allow user shifts image position in H&V directions for each LCD without change the size and display angle.
- 2) Galign2 has [Shift Mode] in each TV to implement this function.

12.5 Change aspect ratio, position & background color—[Ratio]



Four items under [Ratio] menu:
[Ratio], [Position], [Background] & [Reset]

Note: User can also adjust image aspect ratio for entire video wall by [Overlap] under [Video Wall] menu. User can easily Zoom In (enlarge) the image by reducing image capture range and also increase Overlap value to shrink the image. [Overlap] function is to change crop range in source image and can also change entire video wall aspect ratio in Preset Mode.



- 1) [Ratio] and [Position] function will apply to entire video wall (4 LCD) at the same time.
- 2) The display aspect ratio adjust range is from 25% to 200%. The result is similar to image [Zoom In] & [Zoom Out].

12.5.1 Horizontal [Ratio] adjustment



- 1) This function can execute Image Zoom In & Zoom Out to change the aspect ratio in Horizontal direction by R/L arrow keys.
- 2) The aspect ratio adjusting range is from 25% to 200%.
- 3) This function will apply to entire video wall.



(100% Horizontal Ratio)

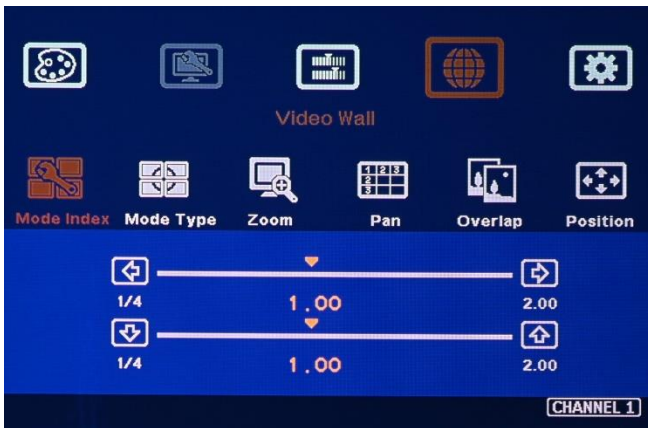


(50% Horizontal Ratio)

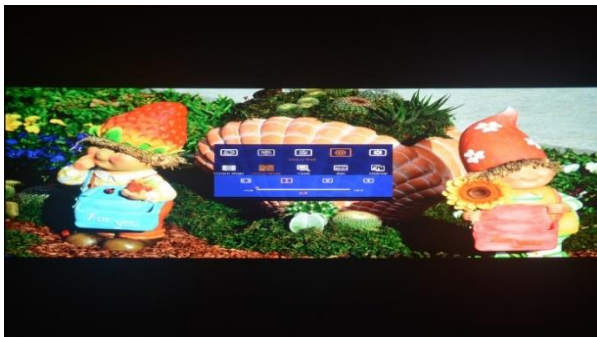


(200% Horizontal Ratio)

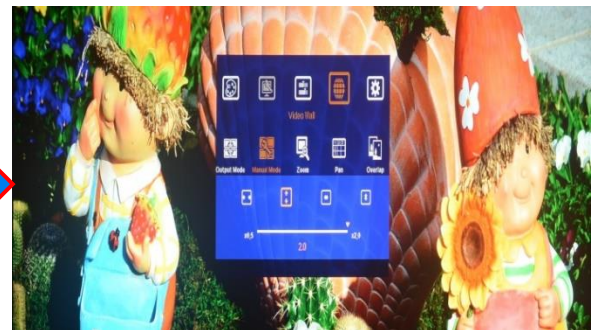
12.5.2 Vertical [Ratio] adjustment



- 1) This function can execute Image Zoom In & Zoom Out to change the aspect ratio in vertical direction by Up/Down arrow keys.
- 2) The aspect ratio adjusting range is from 25% to 200%.
- 3) This function will apply to entire video wall.

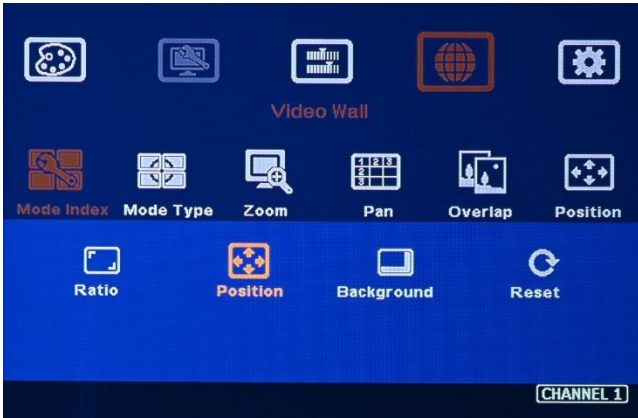


(50% Vertical Ratio)



(200% Vertical Ratio)

12.5.3 Horizontal [Position] adjustment



- 1) Image horizontal position shift can be executed by R/L arrow keys.
- 2) No image shift is possible if Horizontal [Ratio] doesn't change.
- 3) Horizontal adjusting range is from 25% to 200%, depending on [Ratio] adjustment.
- 4) This function will apply to entire video



(200% Horizontal Ratio)



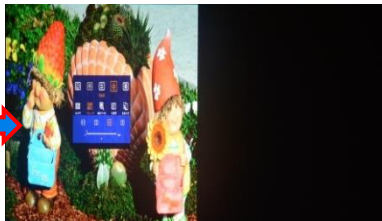
(Max. shift to right)



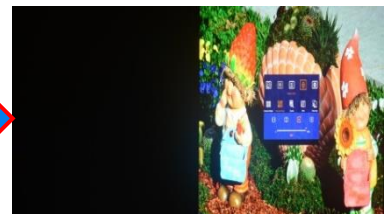
(Max. shift to left)



(50% Horizontal Ratio)

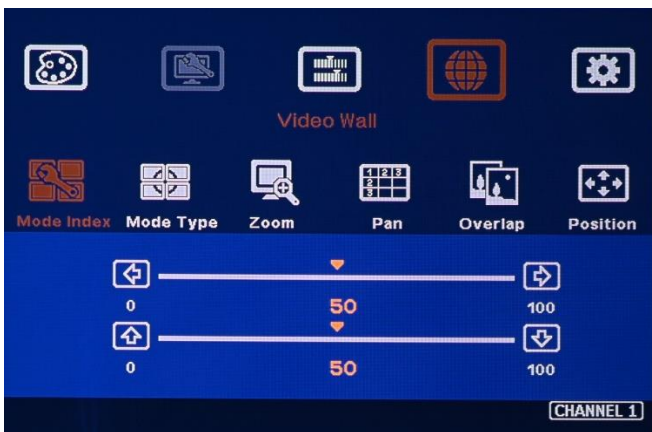


(50% shift to left)



(50% shift to right)

12.5.4 Vertical [Position] adjustment



- 1) Image vertical position shift can be executed by Up/Down arrow keys.
- 2) Vertical range will depend on the change in Vertical [Ratio], max. range is from 25% to 200%.
- 3) No image shift is possible if Vertical [Ratio] doesn't change.
- 4) This function will apply to entire video wall.

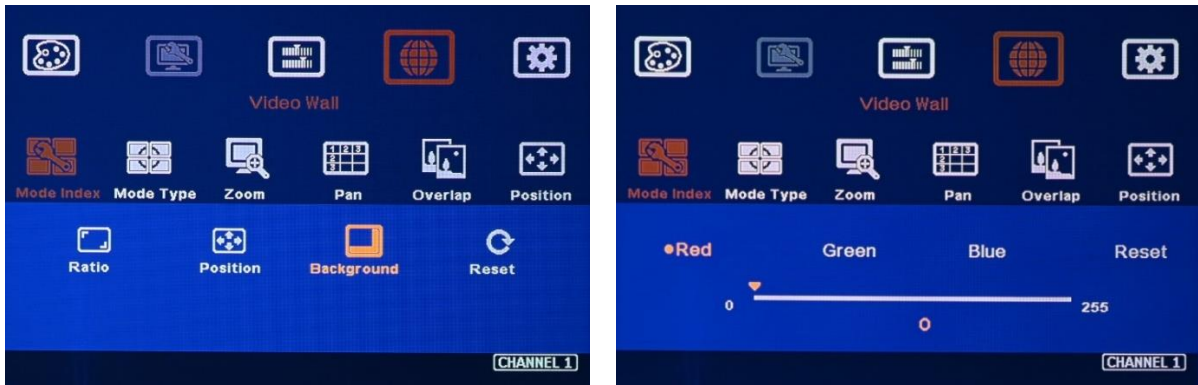




Note: By the combination of aspect ratio change and position shift, user can remove image black border or select special region of the image to highlight (pop up) specific content in the video wall.

12.5.5 Background color setting

User can change background color in no image area. RGB color can be separately adjusted in 0-255 brightness range to get any color that user wants.



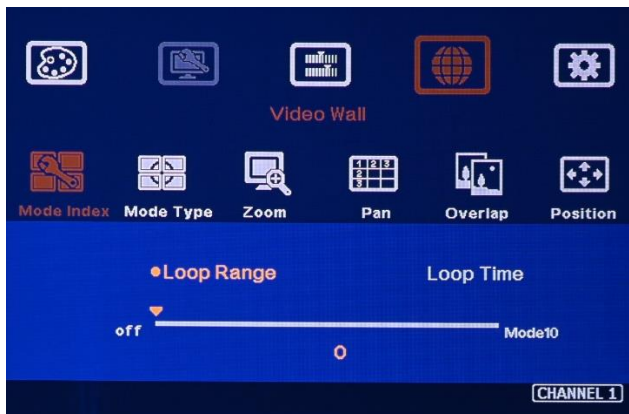
12.6 Looping playback with different display modes



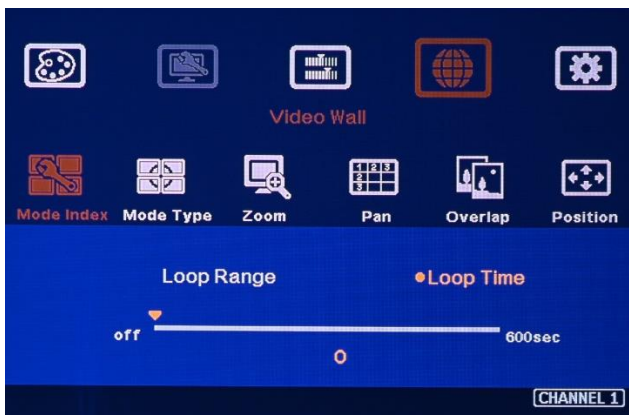
- User can create up to 10 different Display Modes and looping playback under preset time interval. This function can be used to highlight different products from the same image content without PC system. For instance, if one photo consists of 4 products. User can display all products in Mode #1, then pop-up product A in Mode #2, product B in Mode #3, product C in

Mode #4 and product D in Mode #5. After set looping playback, user will see advertisement for complete image, then highlight each product at specific LCD in sequential order.

- Display Modes and time interval from OSD is selectable.
- Please note that the looping display modes starts from Mode 1. If select "3", then only Mode 1-3 can be in the loop.
- Maximum looping playback modes is 10. If user saves two same display Mode and execute looping playback. Then this display Mode will have double display time interval.
- User can apply this function to shift image with small step each time in specific time interval to prevent from LCD burn-in mark.



- 1) User can select the Mode # for looping playback in [Loop Range].
- 2) If select "3", then only Mode #1, Mode #2 and Mode #3 can be selected for looping playback.

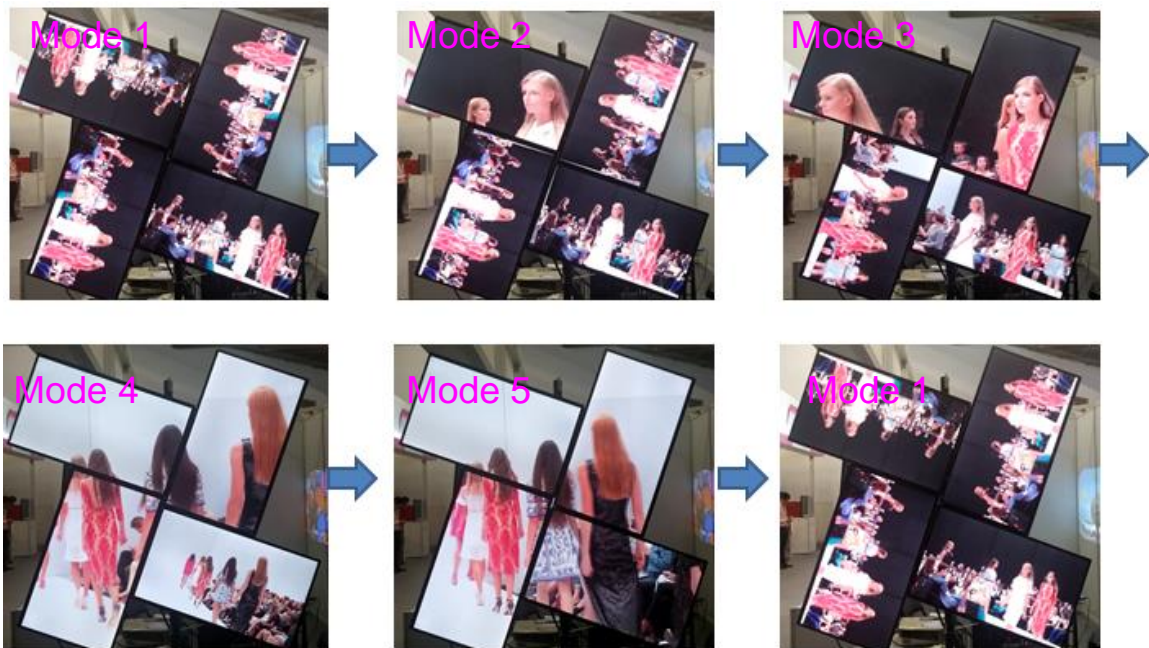


- 1) The time interval to switch among different Display Mode can be set by [Loop Time].
- 2) The max looping time interval is 10 minutes (600 seconds)
- 3) User can create different [Mode #] to highlight different products from the same input source.

12.6.1 Example for looping playback

- Please check YouTube Video at: <https://youtu.be/4Gc0KcuX27g>
- Description: 4 LCD installed at different directions.
- Looping Range: 5 (5 Modes), Looping Time: 1 second
- Display Mode settings:
 - Mode 1: factory default settings, 4 independent images with the same content at different direction
 - Mode 2: to put TV1 into 1/4 of the [All in One] image
 - Mode 3: to put TV1 & TV2 into 2/4 of the [All in One] image
 - Mode 4: to put TV1 & TV2 & TV3 into 3/4 of the [All in One] image

- Mode 5: to combine TV1, TV2, TV3 and TV4 into one complete [All in One] image



12.6.2 Procedures to create looping playback modes

- To set coordinates for TV1-TV4 to become one complete image.
- To save the same settings into Mode 2- Mode 5 by Galign2
 - Select Mode 2 and click [Write] command.
 - Select Mode 3 and click [Write] command.
 - Select Mode 4 and click [Write] command.
 - Select Mode 5 and click [Write] command.
- To modify the settings for each Mode by Galign2
 - Select [Mode 1] and click [Reset] to reset Mode 1 to show source image in all TV.
 - Modify Mode 2 to keep TV1 setting and reset all the rest to default setting
 - Modify Mode 3 to keep TV1 & TV2 setting and reset all the rest to default setting
 - Modify Mode 4 to keep TV1, TV2 and TV3 setting and reset TV4 to default setting
- To set Looping playback
 - Set [Loop Range] = 5 (looping from Mode 1 to Mode 5)
 - Set [Loop Time] = 1 (for 1 second interval)
- Save to Profile 1 & 5 (Profile 5 as Backup)

13 Detailed procedures to create custom display mode

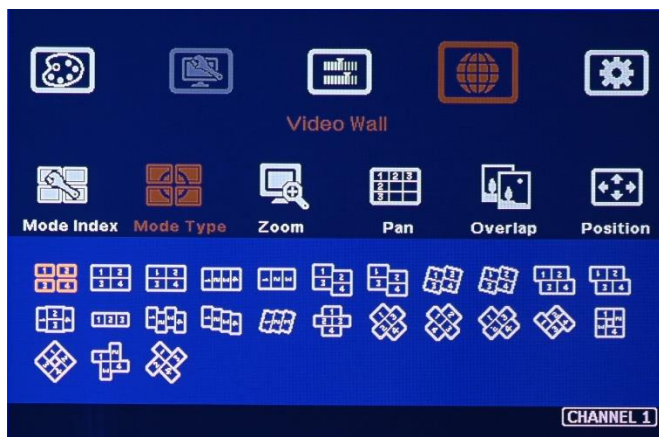
13.1 Introduction

- 1) User can create all kinds of display modes for regular, portrait and irregular video wall with different size, resolution and bezel LCDs at any angle and position through input the coordinates of two corners (Top left and Top Right) in each LCD.
- 2) 4 LCD as one display unit in each G413 and can be cascaded with multiple units without number limitation. The display panel shall be at 16:9 aspect ratio. If non-16:9 aspect ratio LCD is used, it can be customized by factory.
- 3) PIP/POP function is still available in the custom modes created by user.



13.2 Select Preset Mode from OSD

[Mode Type] is for the selection of pre-defined modes in G413.



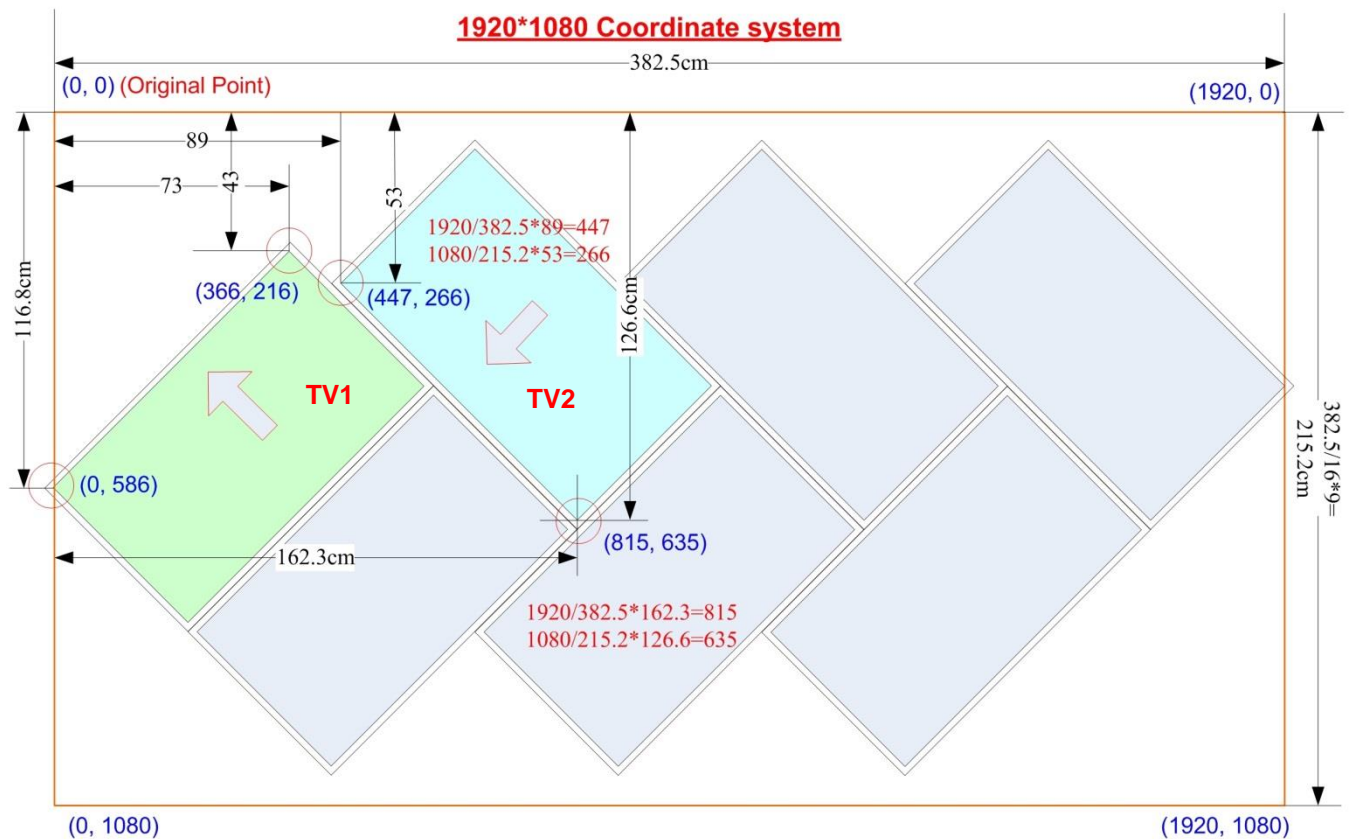
- 1) Please select Mode # first, then select Preset Mode type. It will store selected preset mode into this Mode #.
- 2) Preset Mode doesn't execute bezel compensation. User needs to do bezel compensation through remote controller or Galign2 PC Tool.

13.3 Collect coordinates from design drawing

- 1) User can convert project design drawings into 1920x1080 coordinates and pick up the coordinates at Top Left and Top Right corners in each LCD, then input to G413 through OSD or

Galign2 tool to get the result. The Original Point for the coordinate system is set at Top Left corner as (0, 0).

- 2) Please note that the coordinate system (1920*1080) in H&V directions should have the same scale. In below example, user measured horizontal active display area with dimensions of 382.5cm. The vertical dimension is determined by $382.5/16*9=215.2$ cm. Some blanking borders will appear. Please put "Video Wall" at the center position to get more flexibility for aspect ratio and position adjustment.
- 3) In above drawing, the coordinates for TV1 and TV2 are as follows:
 - ✓ TV2 coordinate for Top Left corner= (815, 635) · Top Right corner=(447, 286)
 - Top Left (815,635): $1920/382.5*162.3=815$, $1080/215.2*126.6=635$
 - Top Right (447, 266): $1920/382.5*89=447$, $1080/215.2*53=266$
 - ✓ TV1 coordinate for Top Left corner= (0, 586) · Top Right corner=(366, 216)
 - ✓ Please pay attention to the display direction of the TV
 - ✓ User can collect the coordinates for all 7x LCD in above and input the coordinates to 2x G413 according to the output connection. There is no special connection sequence is required.
- 4) Please pay attention to the display direction of the TV



13.4 Collect coordinates from video wall picture

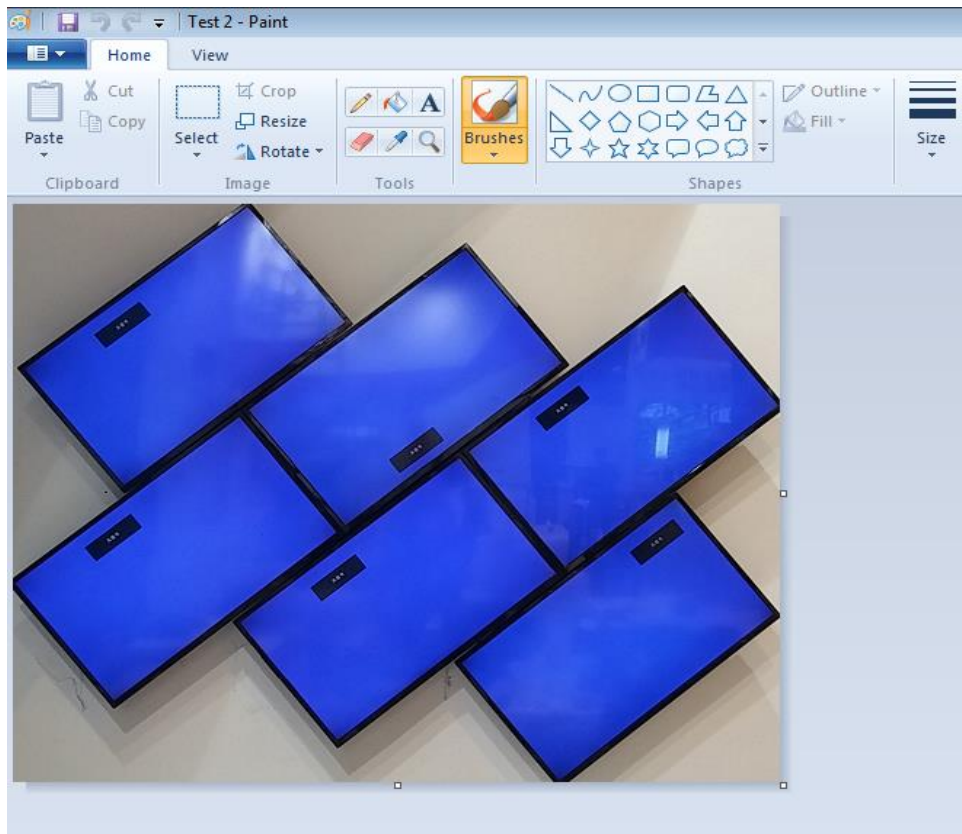
User can also take picture of the LCD array and put this photo into a 1920x1080 coordinates system and collect 8 points of the coordinates for 4x LCD, then input these numbers into G413.

Below are the processes:

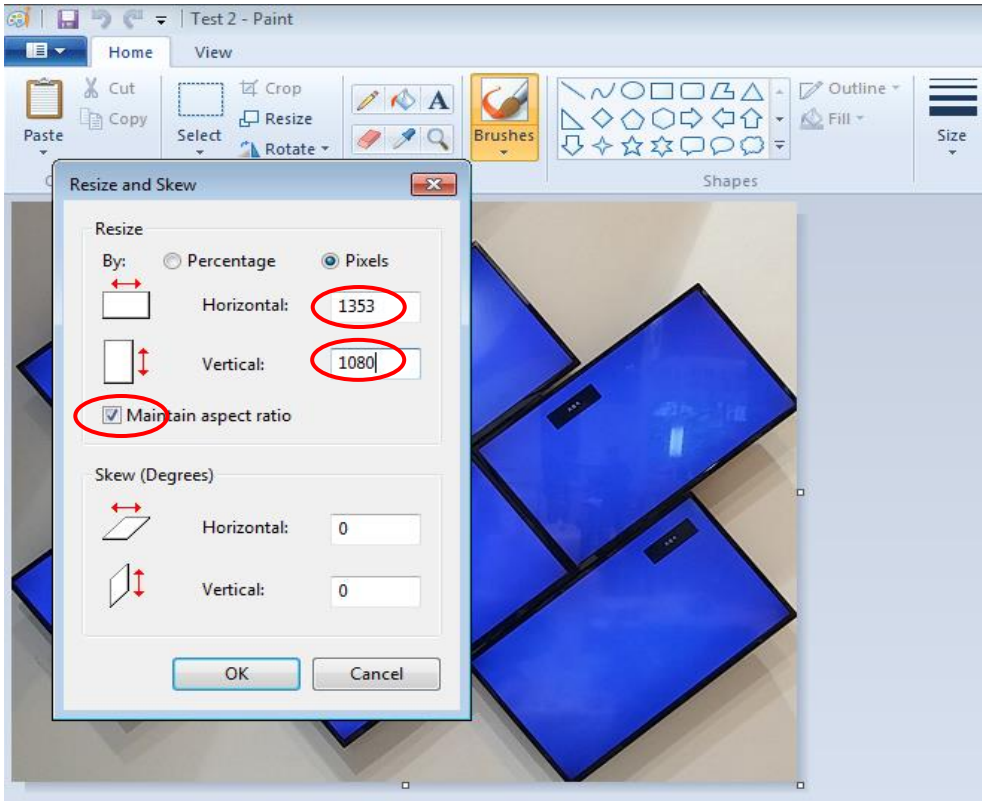
- 1) The photo shall be corrected without distortion. If distortion happens, user can use [RealWorld Paint] freeware [Transformation] function to correction image distortion, resize to 1920x1080 (Canvas size), enlarge the photo to meet border in H or V direction, then collect Top Left and Top Right coordinates.
- 2) Use Microsoft Picture Manager to trim the edge of the display area or directly use [Paint] software to trim the image. Resize to 1920x1080 image resolution in JPG or PNG format.
- 3) To view this photo file in Microsoft "Paint" and click mouse to capture the coordinates.
- 4) [RealWorld Paint] or Adobe [Photoshop] can also be used for the capture of the coordinates.
- 5) Load these coordinates into G413 to get the result.

13.4.1 Example A: 6x LCD video wall with 2x G413

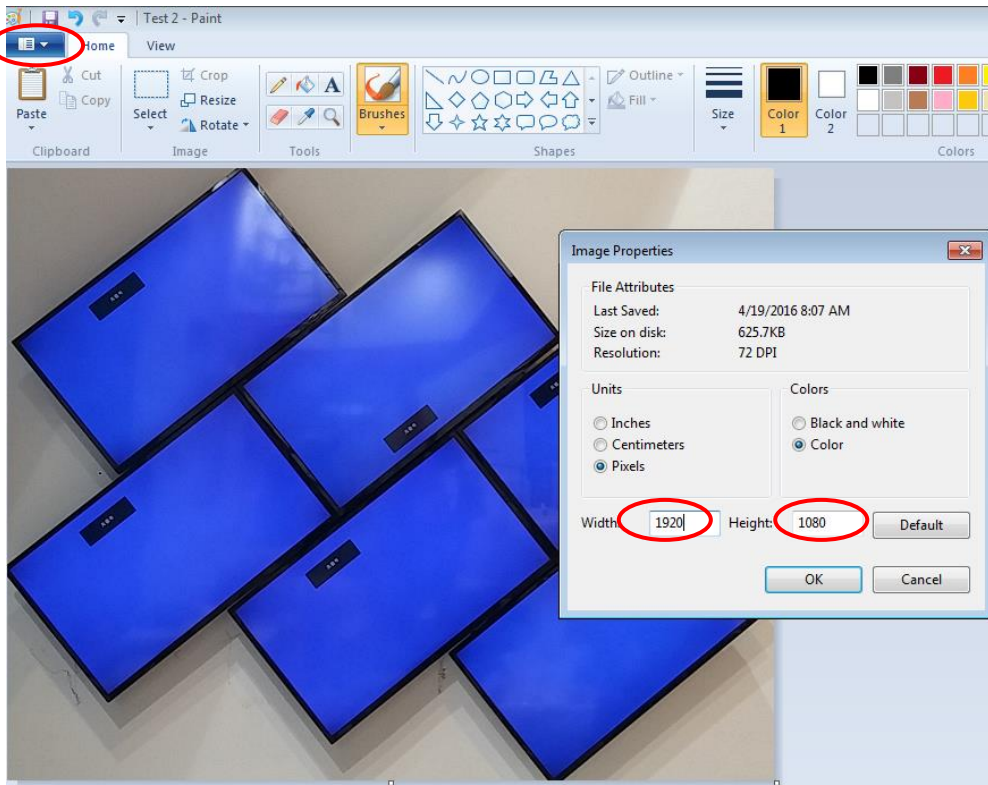
- 1) User can connect any LCD to any G413 output
- 2) To open the photo under [Paint] and trim the edge to active display area. (The outlook of [Paint] in Windows 11 is a little different from Windows 10 but the major function is the same.



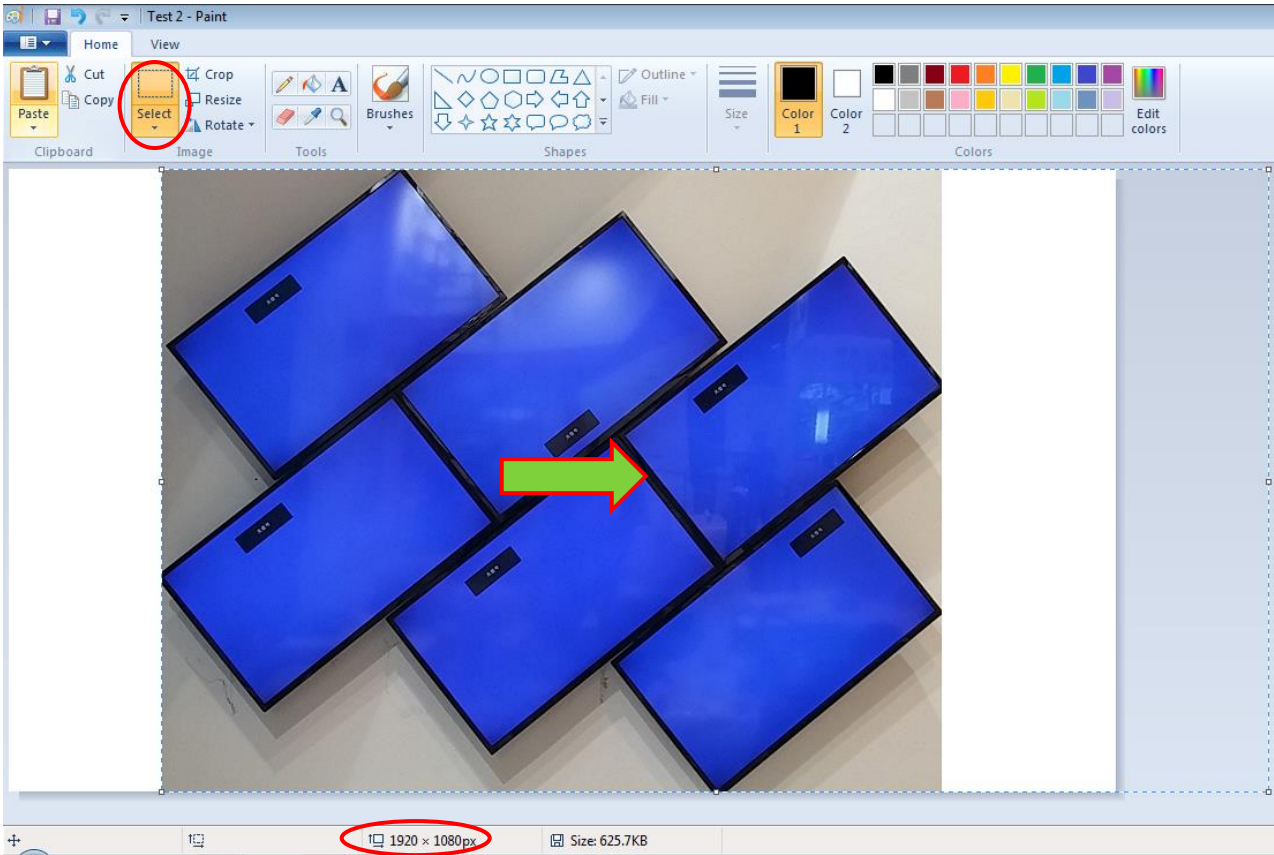
- 3) Resize the image in one edge to 1080 pixel height or 1920 pixel width and maintain aspect ratio. (It depends on the video wall aspect ratio. The final resolution should be under 1920x1080)



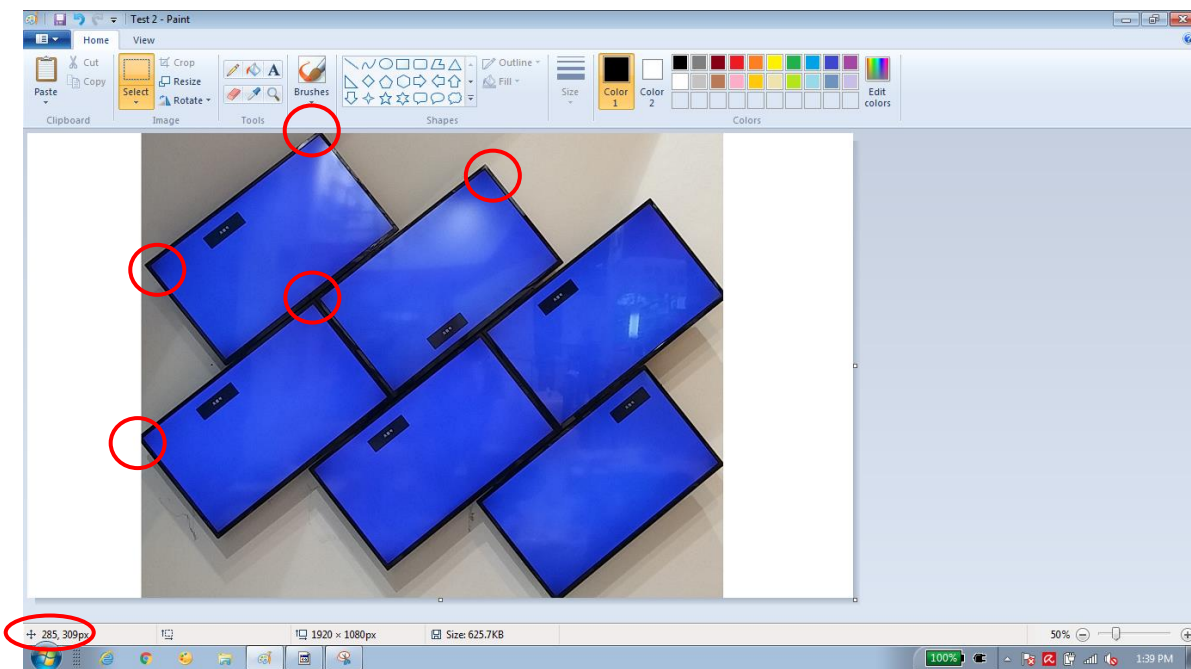
- 4) Open [File]→ [Properties] and resize the image to 1920x1080 resolution



- 5) Make sure the final resolution should be 1920*1080. Select [All], then move the image to the center of 1920x1080 coordinates by keyboard arrow key.

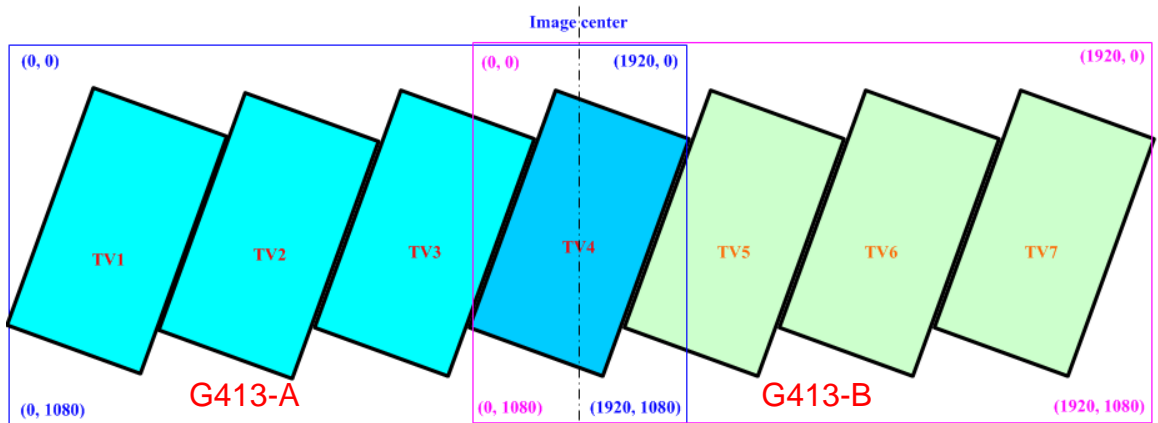


- 6) Click Top Left and Top Right corner in each LCD to collect the coordinates for each LCD. User can enlarge the image to get more accurate result.



- If the video wall has more than 4 LCD, multiple units of G413 is required.
- User can connect the signal source to all G413 through daisy chain connection via loop out port.
- User needs to capture Top Left and Top Right coordinates in each LCD and input to corresponding G413, then it can build an entire video wall.
- If the signal source is more than 4k/2k and user wants to get higher output resolution, user needs to crop the image into several FHD sections and assign each section to corresponding G413. The cropping line for adjacent G413 can be at different locations. User can use Video Wall [Zoom], [Pan] and [Overlap] function to crop, assign and align the final position among all G413. All of the operations can be done through Remote Controller and OSD. If user want to use Galign2 PC tool, user needs to open individual Galign window for each G413 for video wall settings.

13.4.2 Example B: 4K/1k signal source



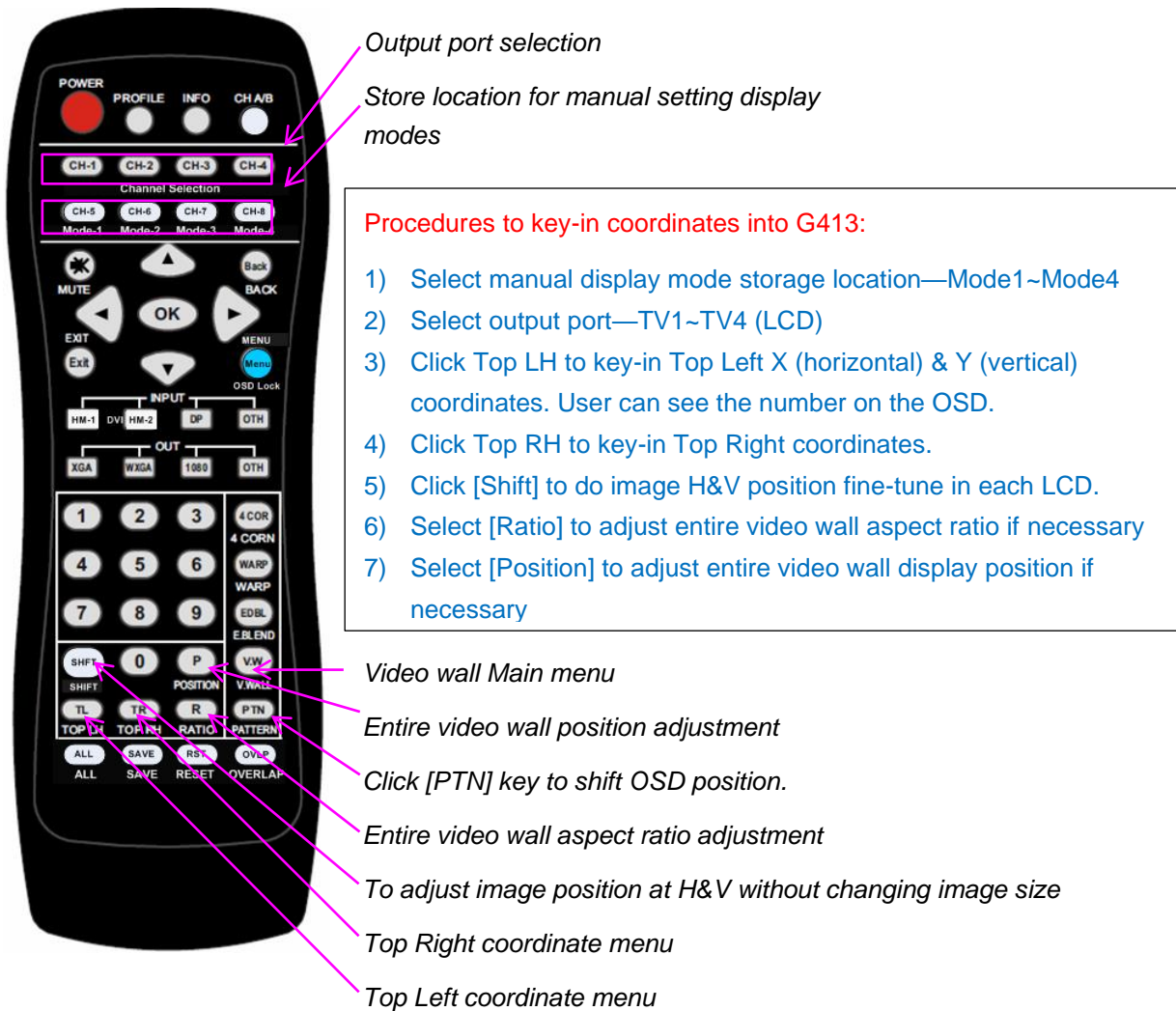
- 1) User can apply 3840x1080 signal to above configuration to get higher resolution.
- 2) To split the video wall into two 1920*1080 coordinate systems. The coordinate system should cover all the LCD connected by one G413 (Max. is 4x LCD).
- 3) TV4 is inside both coordinates and user can connect TV4 with either G413-A or G413-B output port.
- 4) To capture the coordinates by Microsoft "Paint" or calculation from measurement dimensions for each LCD. Then input the coordinates following the same previous procedures.
- 5) User needs to use G413 Video Wall menu to set [ZOOM]: H=2, V=1, [PAN]: G413-A: H=1, V=1, G413-B: H=2, V=1 and use [Overlap] to adjust the image position to let two G413 images combine into one. This value can be calculated through the distance apart from image center line.

13.5 How to input coordinate for each LCD

Two ways to key-in coordinates into G413:

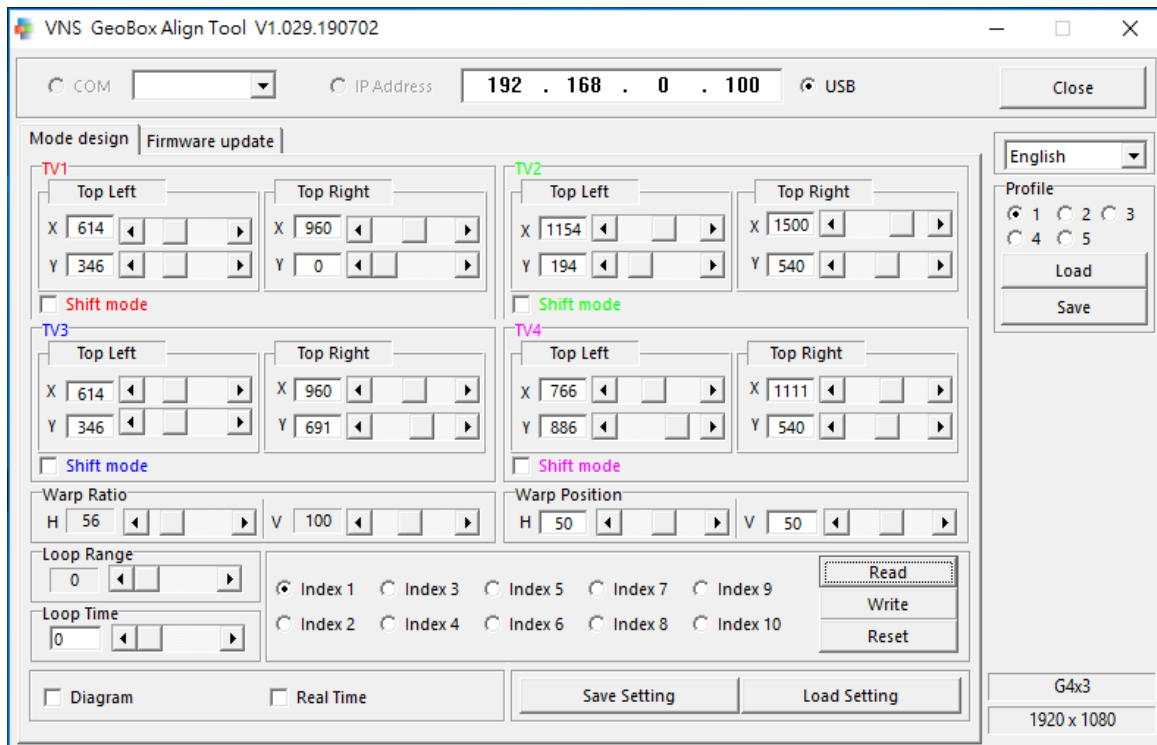
- To key-in directly from IR remote controller
- To key-in through Galign2 PC tool

13.5.1 Upload coordinates via remote controller



- 1) After collect coordinates for all LCD, user can upload the coordinates into G413 though OSD.
- 2) Example to store custom mode in Mode #2
 From OSD menu: [Video wall]→ [Mode Index]→ [Mode 2] → Select [TV1]→ Select [Top Left/Top Right]→ Arrow key to input Coordinates→ TV1 Done
 To select [TV2]→ Select [Top Left/Top Right]→ Arrow keys to input Coordinates→ TV2 Done
 Next step is to execute the same procedures for TV3 & TV4.
- 3) Input coordinates into Mode #2 from Remote controller Hotkeys:
 Select Mode #2→ select CH-1 (TV1)→ Click [TL] (Top Left)→ input Coordinates→ Click [TR] (Top Right)→ input Coordinates→ Done
 Then select CH-2 (TV2)→ follow the same process as CH-1. Then to execute the same procedures for CH-3 & CH-4.
- 4) User may have difficulty to see the OSD to set Coordinates. Please click [PTN] key together with direction keys to shift OSD position to TV1 after finishing TV1 setting.
- 5) User can use Galign2 PC tool to upload coordinates.

13.5.2 Upload coordinates via Galign2 PC tool



- 1) Above is PC tool (Galign2) for user to load coordinates of each LCD through USB or Ethernet. Please key-in the coordinates for [Top Left] & [Top Right] corner in each TV (LCD) then select Index # and press [Write] to save the settings and execute the result to G413. The result will be seen in the video wall.
- 2) To enable [Diagram], user can see the diagram of the monitor location in Galign2 window.
- 3) User can enable [Real Time] mode and use [Shift Mode], [Top Left & Top Right] menu to do image fine-tune position. Then close [Real Time] mode and click [Write] to execute the result.
- 4) User can also set H&V aspect ratio and position shift through [Warp Ratio] and [Warp Position].
- 5) Galign2 can read back the settings on the screen and modify in PC. This is good for the application while user can't see the OSD menu on the screen due to irregular array.
- 6) User can execute looping playback function for the Modes which have minor position difference among them. It will prevent from Burn-in Mark on the LCD.
- 7) User can save data in GeoBox Profile, in PC as backup or copy to another G413.

14 Important technical issues and trouble-shooting

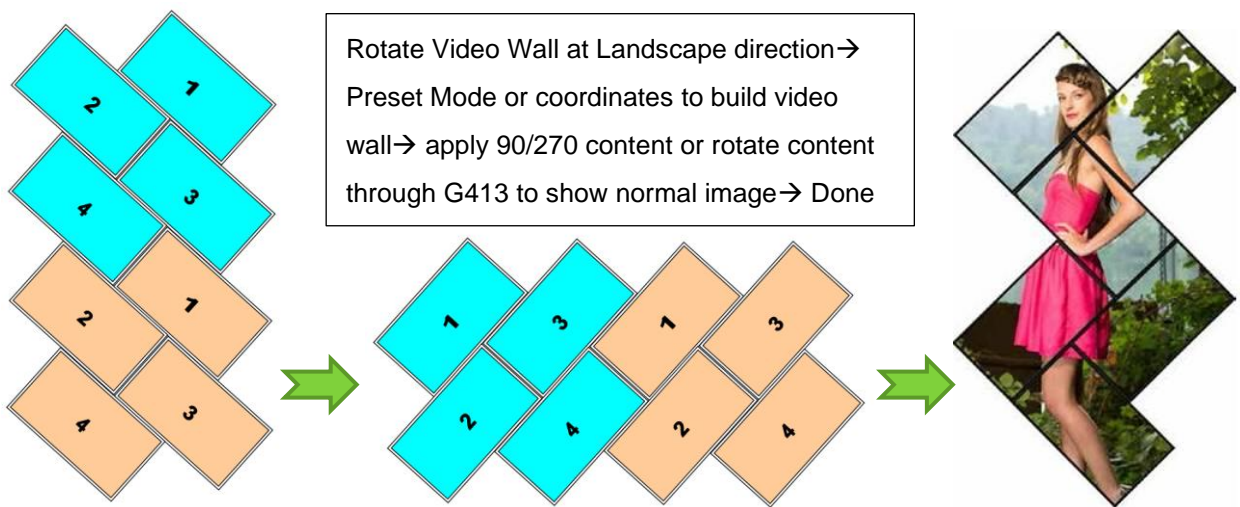
14.1 Prevent LCD from burn-in mark

- 1) User can create up to 10 display modes and execute looping playback with selectable time interval and display modes.

- 2) User can slightly shift the image position back and forth at some time interval to prevent burn-in mark in LCD. This is important for a still image display on the LCD.

14.2 How to increase portrait display resolution

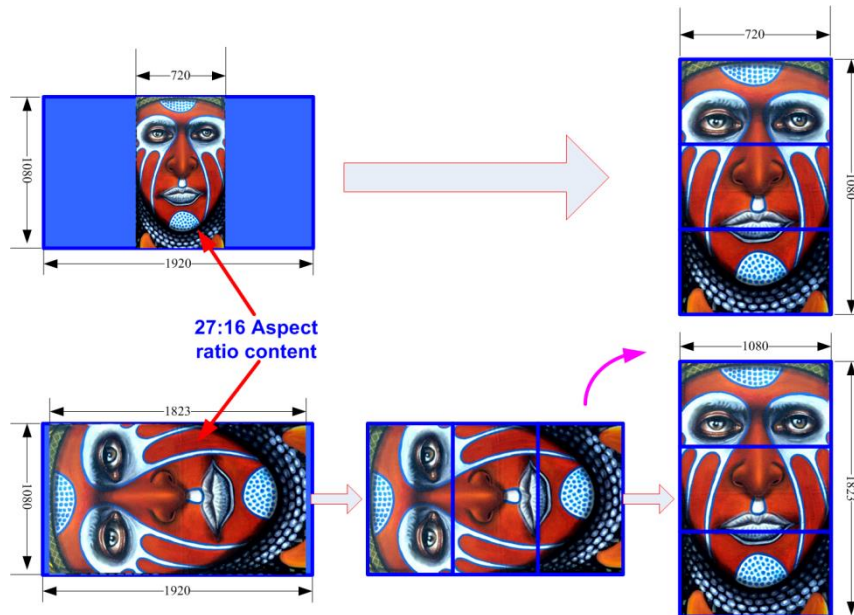
If the display is at portrait position, user can apply the same procedures as above to build the video wall. User can also rotate the video wall at 90/270 degrees and collect the coordinates to build the system to get higher output resolution and better video quality. After installation, user needs to apply 90/270 degrees rotated content or to apply GeoBox 90/270 rotation function to get correct display angle.



➤ Comparison between landscape and rotated content in portrait display

If required video wall is at portrait position as below (3x landscape LCD stacked at vertical position), the video wall aspect ratio is around 16: (9x3)=16:27 (H:V). User has two choices:

1. User can apply the content with 720*1080 (16:27) resolution to get non-distortion image with total video wall vertical resolution at 1080.
2. User can also apply a content with 1823x1080 (27:16) resolution and rotate the content at 90/270 degrees in PC or media player. The final resolution will be 1823x1080:1080x720=2.53x higher.
3. G413 can handle both cases no matter the content has been rotated or not. However, user will get higher resolution image if the content can be pre-rotated.



14.3 How to determine source resolution for a video wall

- 1) The feeling of the video image quality is related to many factors. The final display video pixel pitch and watching distance are two major factors in video wall.
- 2) If user applies FHD signal source for a 5x5 video wall with 55" LCD, the source image pixel pitch is $1220\text{mm} \times 5 / 1920 = 3.1\text{mm}$. If the watching distance is more than 3m, the video quality is acceptable. Above this dimension, user needs to apply 4k/2k signal. If watching distance can be 5m, user can apply one FHD signal to a video wall up to 8x8 matrix with 55" LCD ($5\text{mm} \times 1920 = 9.6\text{m}$ in width).
- 3) If 4k/2k signal source is applied, all the devices between signal source and LCD display shall also be able to process or deliver the signal more than 4k/2k to achieve high quality video image.
- 4) Multiple G413 cascade can process and deliver 4k/2k image with highest video quality.

14.4 How to show full operation menu in irregular video wall

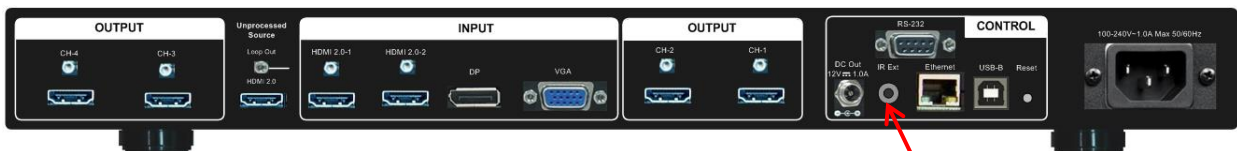
- 1) In some case, user may be difficult to see the operation menu of signal source.
- 2) After the complete setup, user may be difficult to see the menu or PC Desktop for operation in irregular video wall. User has below choices to see full screen image in LCD for further operation:
 - To connect G413 Loop out port with one monitor to see full screen image.
 - Click Remote control at empty Mode # to see full image in each LCD.
 - To use remote controller [Reset] hotkey to reset the system to default. It will reset all display modes saved in each Mode #. The Profile settings will be kept without being deleted. Below are the procedures:

Press [Reset] key → click RH or LH direction key once → Enter. If click RH direction key, the system will execute [Reset All]. If click LH direction key, the system will reset [Video Wall] settings.

- 3) After finish necessary operation, user needs to return to required settings to get desired display either select different Mode # or Profile Index.

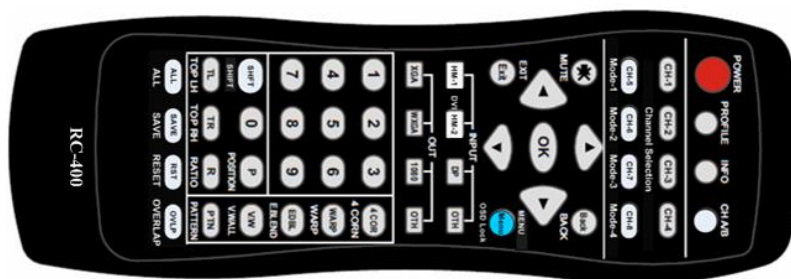
15 OSD menu and functions

- OSD menu can be activated through remote controller or Web Gui through network connection.
- OSD window will be showed on all channels at the same time.
- One IR receiver is located at front panel and one IR extender receiver connection hole is located at back panel of G413. It can be extended up to 20m through audio extender cable.
- After finished OSD operations, please save settings into Profile [Index] for long term reservation.

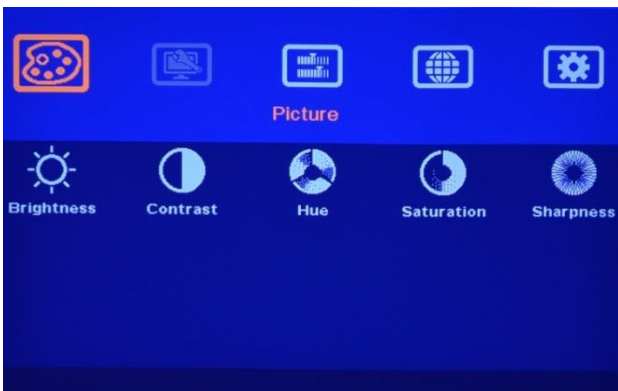


Remote controller

IR receiver extender



15.1 [Picture] color adjustment



[Picture] menu is to adjust the color for the entire display unit (4x LCD). It can't do individual colour adjustment for each LCD. When the input signal is in YUV domain, all the 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 separate RGB color adjustment under [Image Properties] menu.

15.2 [Image Setup] for VGA input

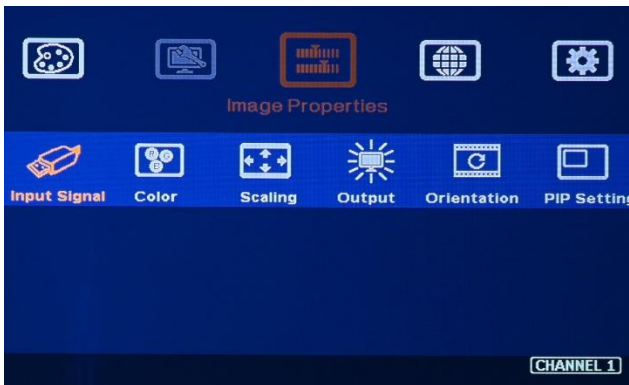


[Image Setup] menu can only be activated when video input is VGA input signal.

- Automatic: It will do automatic image alignment inside the system
- Manual: manual setting for signal Phase and Clock to eliminate image noise in analog input
- Horizontal Position: to adjust manually the image horizontal position.
- Vertical Position: to adjust manually the image vertical position.
- When the input is VGA signal, please connect signal first, then power on G413 for image position auto alignment. After this process, unless user applies other VGA input signal, G413 will not do auto alignment again to avoid image shift.

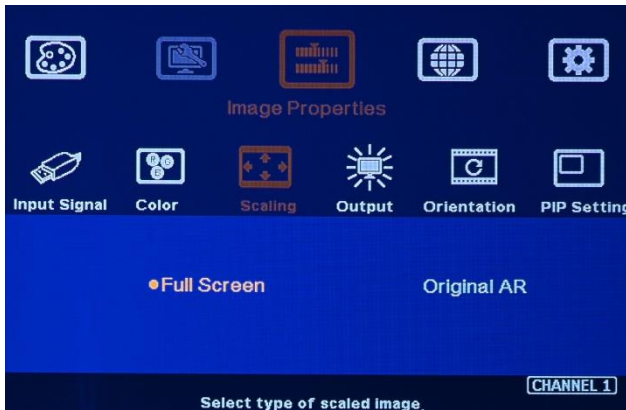
15.3 [Image Properties]

[Image properties] has six sub-menu. These functions will apply to all channels at the same time.



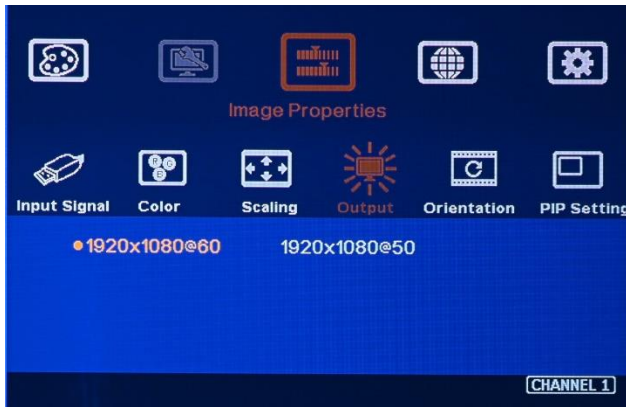
- [Input Signal]: to select input port
- [Color]: Colour temperature selection and RGB independent adjustment
- [Scaling]: to set display aspect ratio, including POP display mode
- [Output]: select output resolution. Default output is 1080p @60Hz. If the input source is 50Hz, please select 1080p @50Hz to get the best video quality.
- [Orientation]: image flip and rotation setting
- [PIP setting]: to do PIP/POP settings

15.3.1 Scaling (aspect ratio selection)



- 1) [Full Screen]:
To fit source image for full screen display
- 2) [Original AR]
To display source image with the same aspect ratio as source image
- 3) The setting will also affect POP main image display with full screen or original aspect

15.3.2 [Output] resolution setting

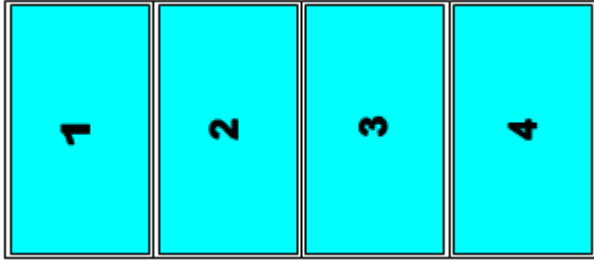


- 1) Default output is 1920*1080 @60
- 2) If the input source is @50Hz, please select 1920*1080 @50. It will reduce the risk for image frame tear and will get better video quality.

15.3.3 Image [Orientation]

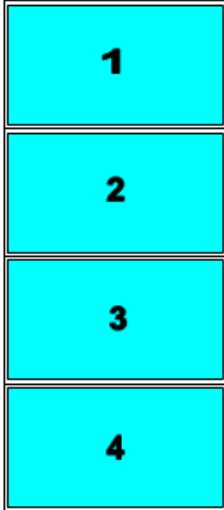


- This image orientation function will be applied to entire display units (4x LCD).
- Major purpose:
 - To create more Display Modes based on Pre-defined Display Modes.
 - To enhance and get more flexibility in multiple G413 cascade applications.
 - Through image rotation, user can get higher image resolution in portrait display mode.



Original preset

Display Mode # 03



After 90° rotation

Display Mode # 3A

- 1) Display Mode #3 is preset in G413
- 2) When user rotate image at 90° , a new display mode #03A can be achieved in G413
- 3) 4x G413 with Mode #3 with 90° rotation, user can get 4x4 video wall display. The content should be rotated at 90 degree to get the best video quality.

15.3.4 PIP/POP setting



2 PIP (Picture in Picture)

- PIP image size is from 320*180 to 1920*1200
- Flexible position across entire video wall.
- PIP image size and aspect ratio can be adjusted through Overlap function
- Main & PIP input source is swappable
- PIP image can be across entire video wall at any position

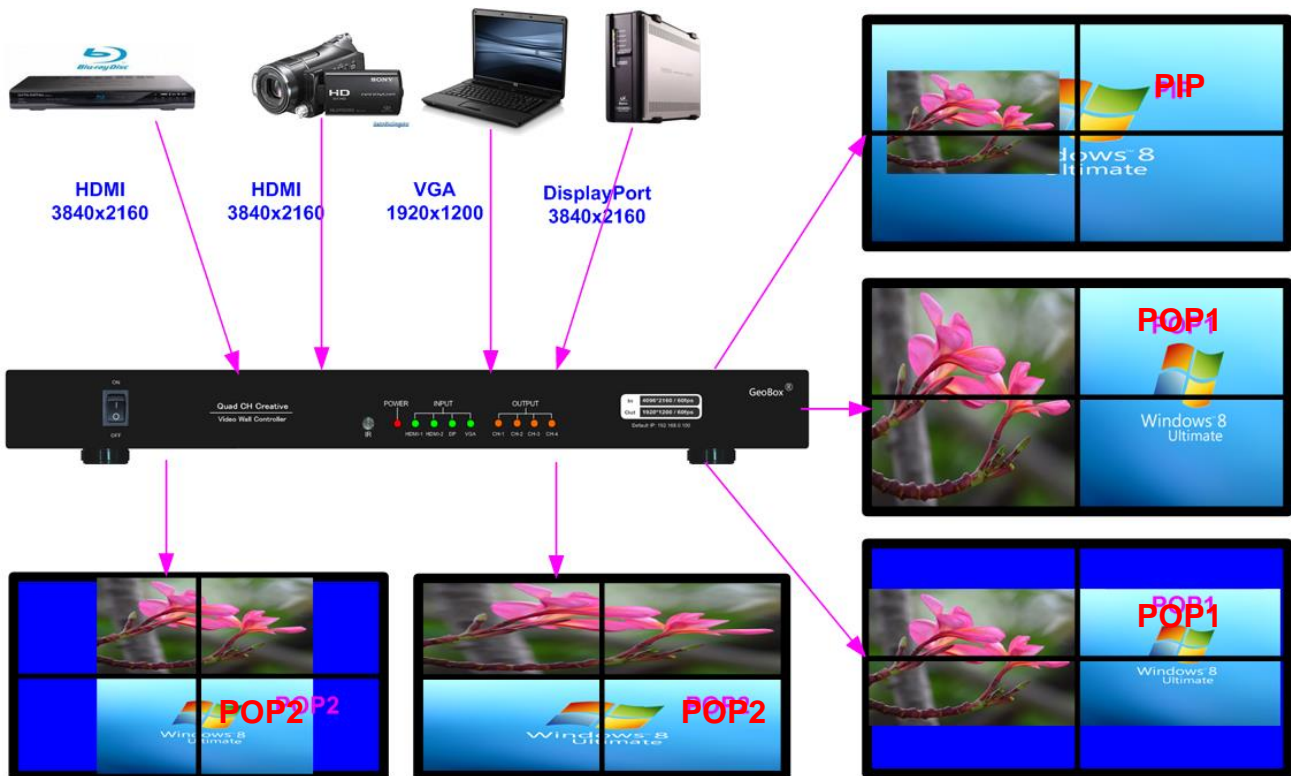
3 POP: Picture outside Picture (side by side)

- POP to fit full screen or maintain original source aspect ratio
- POP1: Two images are placed at side by side position.

- POP2: Two images are at top/bottom position

4 Limitation in PIP/POP functions:

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



5 PIP Size and Position

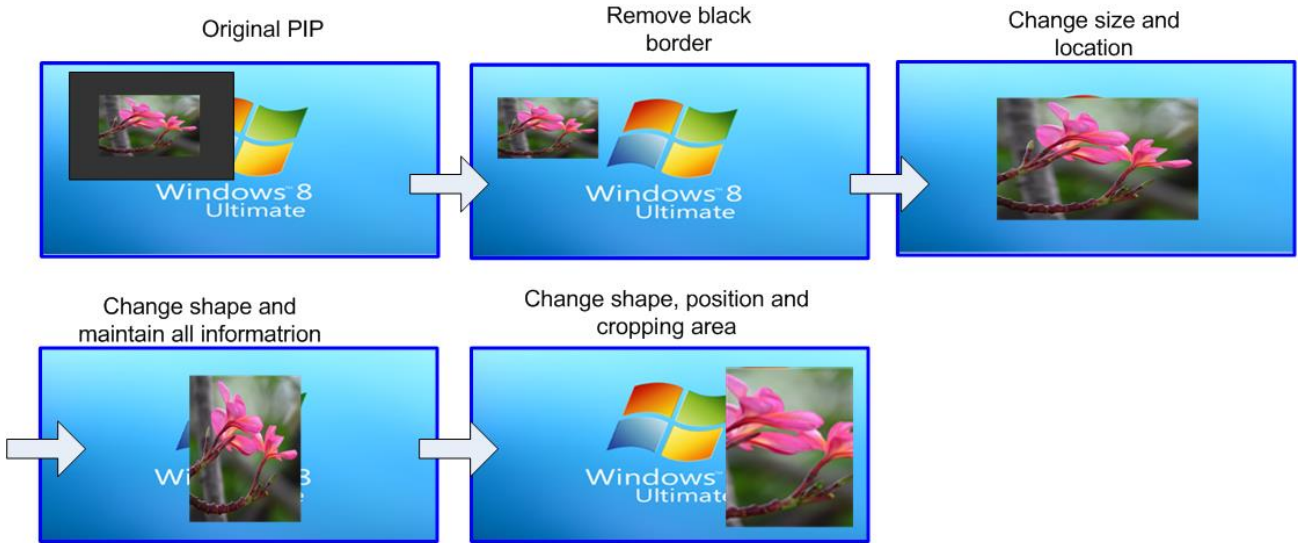
- PIP image size is from 320*180 to 1920*1200
- It can be further adjusted through Overlap function to about 160*90 image size.
- PIP image can cover entire video wall. User can replace entire main image with PIP image on the screen.
- The PIP image size can be at any location in the video wall.

6 Ratio: Aspect Ratio of the display image. (Only apply to PIP function)

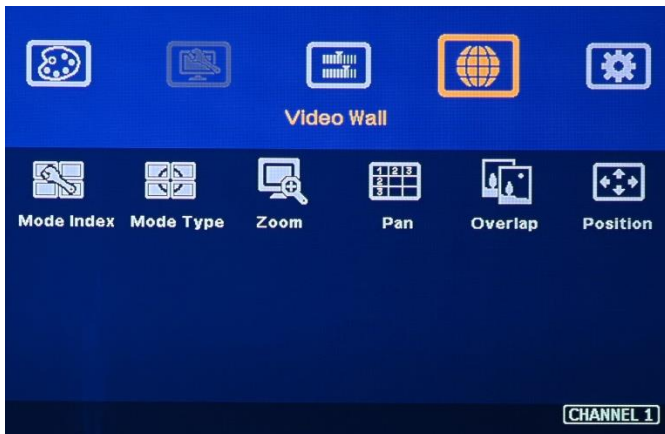
- Full Screen: the same aspect ratio as main image or
- Original AR: the same aspect ratio as PIP input source.
- POP image aspect ratio can be adjusted through [Scaling] under [Image Properties] OSD menu.

7 Source:

- User can select the input source for PIP/POP image.
- Only one HDMI, DP & VGA source can be displayed on PIP/POP screen.
- User can swap the position in Main and PIP image from change the selection in [Input Signal Menu]. If user selects different input source as main input, then PIP/POP will be the next
- User can save different settings into [Profile] under [Options] menu and recall at any time.



15.4 Video Wall Setting



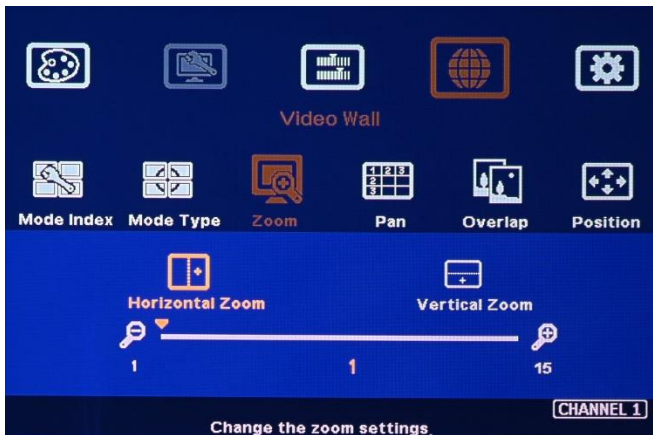
The purpose for Video Wall Setting allows user to split source image, assign images for multiple units, select Preset display Mode, create custom display modes and cascade settings for multiple G413 to become one big video wall. It consists of below functions:

- [Mode Index]: To show display modes on OSD for user to select Mode # to store settings or to recall the settings for further editing.
- [Mode Type]: To select Preset Mode from the icon.
- [Zoom]: To split source image into different sections for multiple G413.
- [Pan]: to assign each split image to each G413.
- [Overlap]: to adjust each split image position at the right location in cascade application to become a large video wall display.

- [Position]: to shift complete image in each G413 to let image match together in multiple unit cascade application.
- The maximum video wall can be up to 15x15=225 units of G413. If each G413 is connected with 4x LCDs, then theoretically maximum number of LCD displays can be up to 60x60=3600 LCDs from single signal source.

15.4.1 [Zoom]: Split Image for cascade application

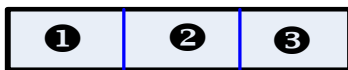
- A case study for multiple G413 cascade is described in section 11.2. Please check.



- 1) G413 is designed with 4 LCDs as one Display Unit
- 2) Zoom function is to split the source image for different Display Unit in multiple G413 cascade applications.

- *User can set both Horizontal and Vertical Zoom value based on the array of the Display Units. In below example, each number means one Display Units (4 LCDs) and also means one G413.*

Example A:



3x1 three G413 horizontal cascade:

--Horizontal Zoom=3

--Vertical zoom=1

Example B:



In 3x3 nine G413 cascade:

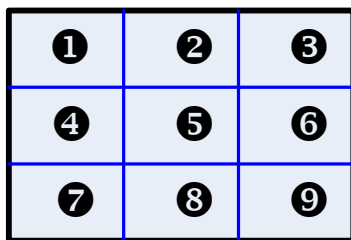
--Horizontal Zoom=3

--Vertical Zoom=3

15.4.2 [Pan]: Assign image for each G413 in cascade application



- 1) [Pan] is to assign the split image location for each Display Unit.
- 2) Horizontal value is calculated from LH to RH direction and Vertical value is calculated from top to bottom.
- 3) User needs to set H & V [Pan] value to assign the image location for each G413 to build a large video wall display.



In 3x3 nine G413 cascade application:

For No. 3 G413:

Horizontal Pan = 3

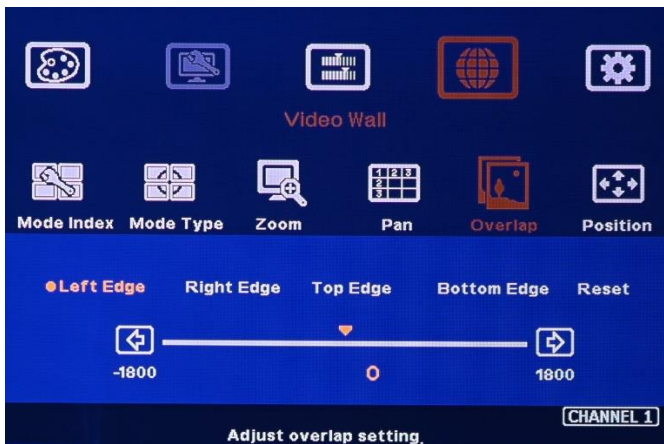
Vertical Pan = 1

For No. 6 G413:

Horizontal Pan = 3

Vertical Pan = 2

15.4.3 [Overlap]: adjust image location and cropping area



- 1) [Overlap] is to adjust image cropping location for each Display Unit (G413)
- 2) User can adjust the image location in H&V position up to +_1800 pixels.
- 3) Through [Overlap] adjustment, user can align each Display Unit into the right position in the video wall cascaded with multiple G413.

Note:

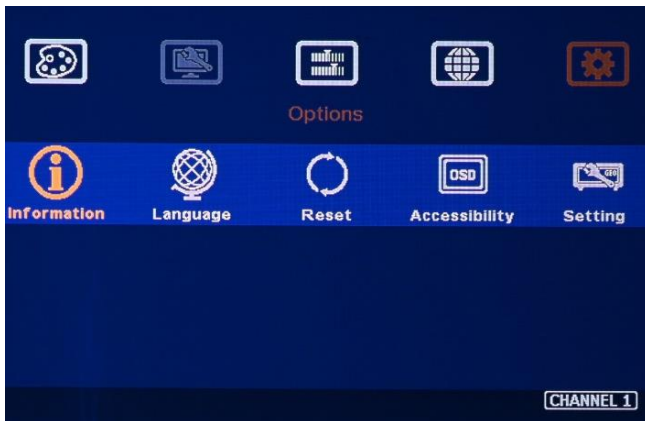
- a. The [Overlap] value will change the image captured area and scaling factor. In multiple G413 cascade application, if the cropping area for each G413 is the same size, the [Overlap] value in each G413 should be the same in order to have the same scaling factor.
- b. User can use [Overlap] adjustment to change aspect ratio in video wall. If multiple G413 is used, each G413 should apply the same Overlap value to get the same aspect ratio.

15.4.4 [Position]: Position adjustment in entire G413



1. [Position] is to change the image location of each Display Unit (G413) in H&V direction without change image cropping range.
2. User can adjust the image location in H&V position up to +_1800 pixels.
3. Through [Position] adjustment, user can shift display zone in each Display Unit with the same image size (resolution).

15.5 [Options]: OSD miscellaneous functions



- Five sub-menu under [Options]:
- 1) [Information]: system information
 - 2) [Language]: OSD language selection
 - 3) [Reset]: System reset
 - 4) [Accessibility]: Time out control
 - 5) [Setting]: system control setting

15.5.1 [Information]: System Information



[Information] menu shows the following information in GeoBox:

Input mode (Main and PIP), output mode, Model name and Firmware/MCU code version.

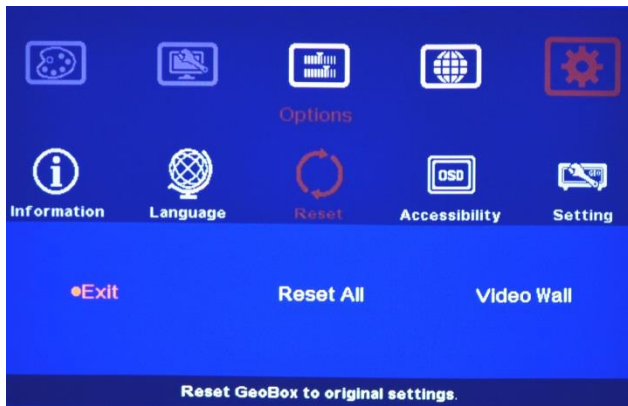
15.5.2 [Language]: OSD Language



Three OSD menu languages can be selected:
English, Simplified Chinese and Traditional Chinese

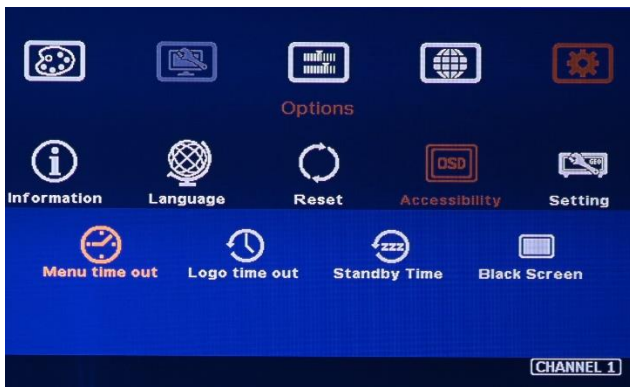
15.5.3 System [Reset]

Two types of Reset can be done: Reset All & reset Video Wall.



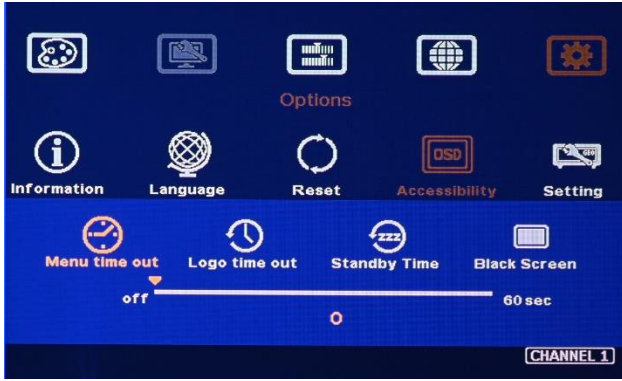
- 1) [Reset All] will reset all user settings but the settings stored in [Profile] Index will not be erased.
- 2) Reset [Video Wall] will reset the settings in Video Wall function to factory default.
- 3) [Reset] hotkey is available in the bottom of remote controller.

15.5.4 [Accessibility]



- Four sub-menu under [Accessibility]:
- 1) OSD [Menu Time out]
 - 2) Splash screen [Logo Time Out]
 - 3) No signal input [Standby time]
 - 4) [Black Screen] setting

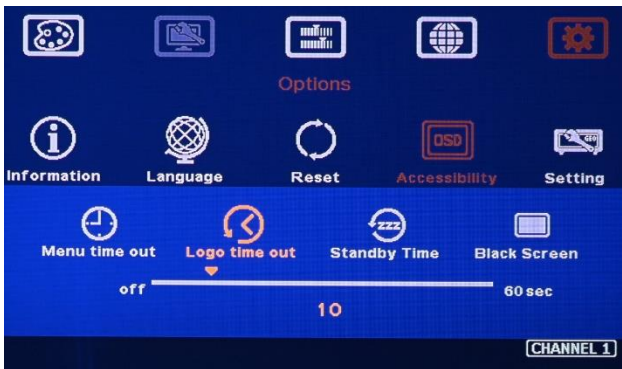
15.5.4.1 [Menu Time Out]



OSD [Menu Time]

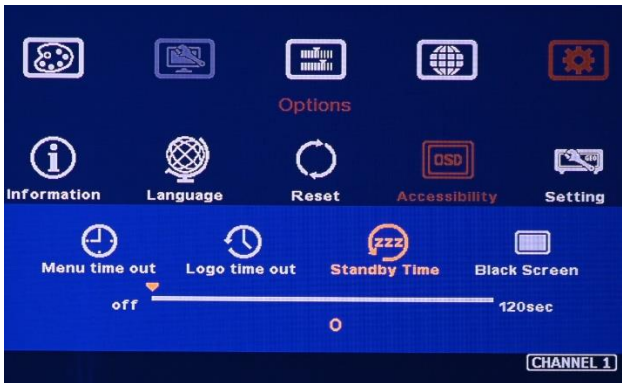
- 1) OSD menu will disappear from the screen based on time setting.
- 2) The default setting is “Off” and the OSD menu will remain in the screen until user activates other OSD function or input/output mode change.

15.5.4.2 [Logo Time Out]



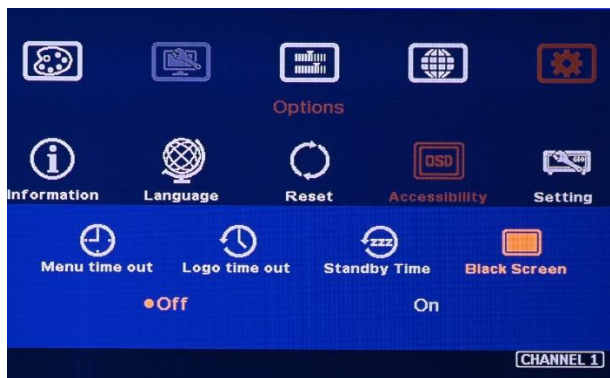
- 1) To set the time to show Splash Logo.
- 2) If zero is selected, then the splash screen will not be showed during system booting up period. It will reduce the boot up time.

15.5.4.3 [Standby Time]—auto shutdown time



- 1) The default setting for [Standby Time] is “0”. G413 will not shut down output signal when no input signal.
- 2) If the time is set to “60”, then G413 will turn off the output signal after 60 seconds when no input signal is detected.
- 3) Once G413 detects input signal, it will wake up and output signals again.

15.5.4.4 [Black screen]—background color when no signal input



When no signal input, the default color of the background is Black. User can change background color to BLUE by set it to [OFF]. Under this condition, user will see blue background with “ Power Saving Mode” message on the screen when no input signal.

Note: If user changes the aspect ratio through [Ratio] menu, it may create some no-image background. User can change this kind of background color to any color through [Video Wall]→ [Mode Index]→ [Mode #]→ [Ratio]→ [Background]

15.5.5 [Setting]



Seven sub-menu under [Setting] menu:

- 1) [Mute] Audio mute or enable
- 2) [DVI Output]: Output DVI mode
- 3) [Frame Sync]: system synchronization
- 4) [Box ID]: Set control ID
- 5) [Profile]: Save & Load settings
- 6) [Network]: set RS232 and Ethernet
- 7) [EDID]: set input EDID

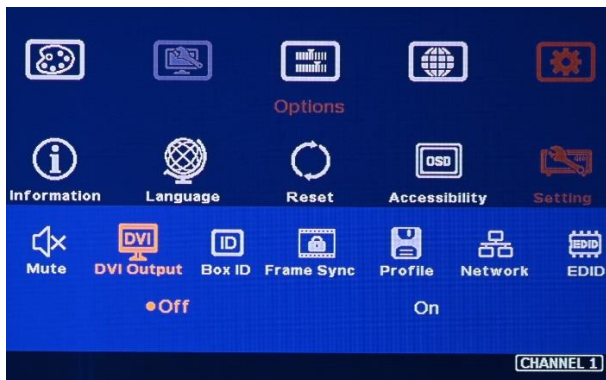
15.5.5.1 Audio [Mute]



Audio Mute:

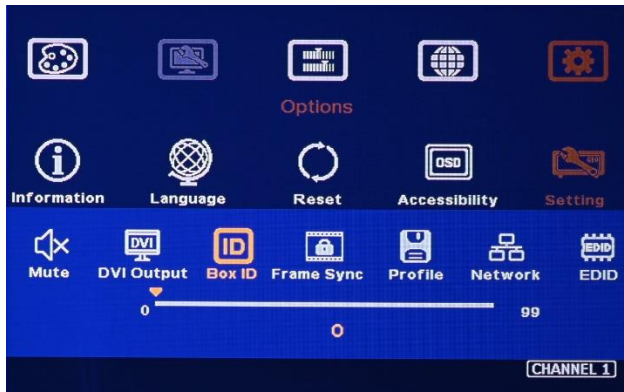
- 1) [Mute Off] will enable audio output.
- 2) [Mute On] will disable audio output.
- 3) [Mute] hot key in remote controller is available

15.5.5.2 DVI Output



If DVI Output is set to "ON", the output signal will change to DVI mode. There will be no audio output. It will increase the compatibility with some display devices, especially in some old monitors.

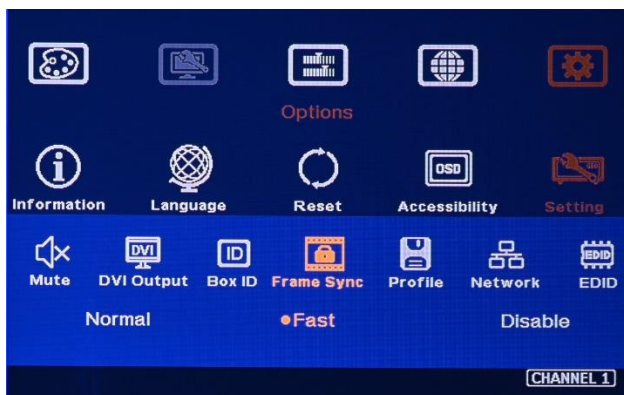
15.5.5.3 [Box ID]



[Box ID] is identification # in each G413 for Ethernet, RS232 or IR remote control.

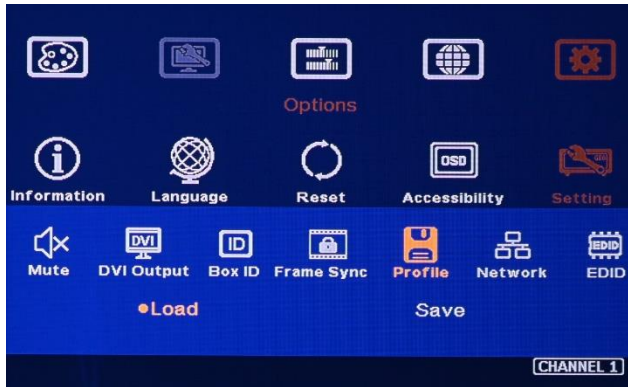
- 1) GeoBox ID No is from 1-99
- 2) After set Box ID, user can control GeoBox individually via IR Remote controller, RS232 & Ethernet
- 3) IR control ID # is from 1-9.

15.5.5.4 [Frame Sync]



- 1) [Frame Sync] menu has three sub-menu:
 - [Normal] (Frame Locked): when user uses multiple units of G413, please set at [Normal] to let all G413 output synchronize together. When user resets system or adjust video wall settings, user may see monitor re-searching the input source.
 - [Fast] (Phase lock): System default setting is [Fast]. It will eliminate signal research when change video wall settings. It is good for single G413 application.
 - [Disable] (Free-Run mode): Once [Disable] is selected, there will be no loss signal when changing signal source/input timing, Reset or executing video wall settings.
 - We propose user to set at [Fast] while execute single unit application. During multiple unit application, please set back to [Normal] to prevent from frame tear or not synchronized issues among different G413.
- 2) The input refresh rate should be the same as output refresh rate so that the system can implement Frame Lock to synchronize all the outputs. If the input source is 50Hz with 60Hz output, it is possible to see synchronization issue. Please select the output refresh rate from [Image Properties]→ [Output]→ select output with 50Hz.

15.5.5.5 [Profile]—save/load user settings



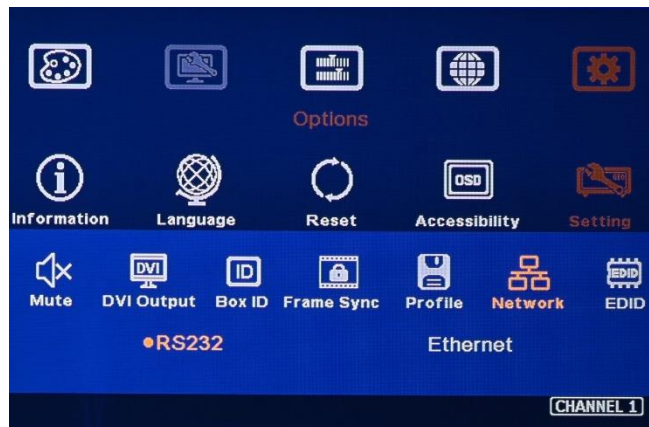
- 1) [Profile] is to save and load user settings
- 2) User can save all the settings into Profile and recall the settings by remote controller, RS232, USB or Ethernet.
- 3) When execute system reset, Profile settings will remain the same without change.

Case Study: when cascade with two G413, user can set below display modes and save in [Profile].

- 1) To show cascaded image with single content across whole video wall.
- 2) To show two side by side contents across whole video wall.
- 3) To show one PIP content in cascaded image.
- 4) To show two PIP contents in cascaded image.

User can save these different display modes in G413 and recall them by RS232, remote controller, USB or Ethernet.

15.5.5.6 [Network]



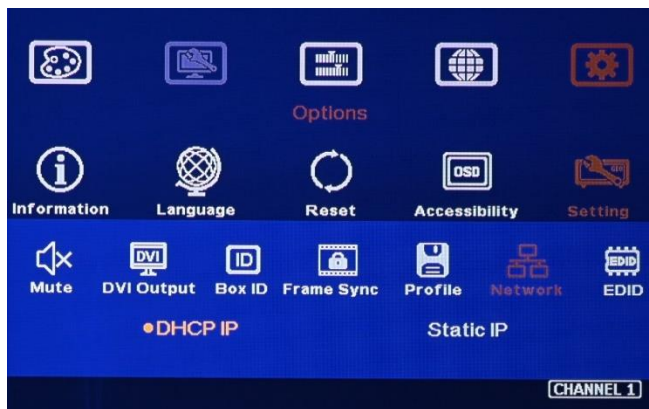
15.5.5.6.1 [RS232]

- 1) RS232 interface is designed with DB-9 connector. User can select 11520 or 9600 baud rate by OSD, WebGui or Galign2 PC Tool.
- 2) The protocol can be implemented via RS-232, USB, Ethernet or other forthcoming communication methods.

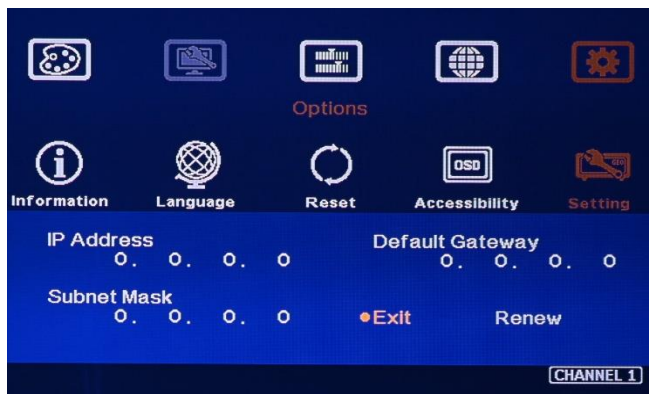
15.5.5.6.2 [Ethernet]

- 1) Ethernet control: G413 is integrated with RJ45 connector. Please connect G413 with Ethernet Router or Switch/Hub via LAN port.

- 2) User can controller G413 through Ethernet or WiFi through PC or mobile devices. A WebGui with virtual key icons will be showed in control devices for user to execute OSD function of G413.
- 3) G413 default IP address is 192.168.0.100 and can be changed in OSD, WebGui or Galign2 PC tool.
- 4) User can connect PC with G413 use UTP cable directly but user needs to set PC with the same IP segment such as 192.168.0.101.
- 5) User can connect multiple units of G413 in one Ethernet Router (WiFi Router or switch/hub) through LAN ports. After set different Static IP address for each Box, user can use WebGui virtual keys or Galign2 PC tool to control each G413 independently.
- 6) For system control, Default TCP server port is 1266.
- 7) Galign PC tool can be operated by Ethernet or USB.



- 1. DHCP & Static IP can be set in each G413 for independent operation.
- 2. User can use < > OSD direction keys to access to the item for the modification and ^ v OSD direction keys to change the IP address settings.



DHCP setting menu.



Static IP setting menu.

15.5.5.7 [EDID] setting

Selectable EDID setting is added into G413. The purpose are as follows:

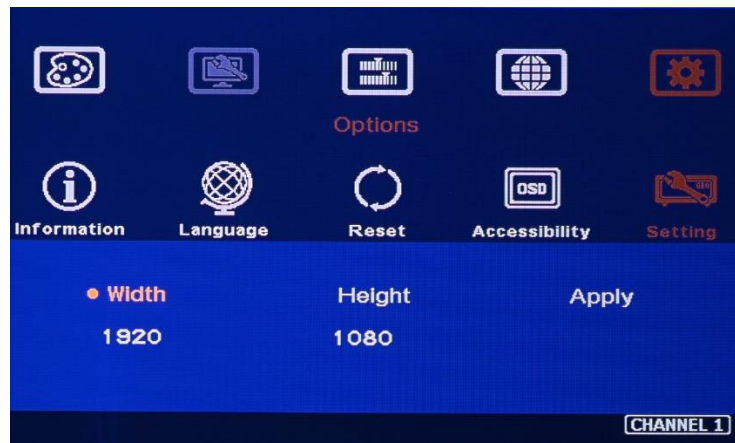
- 1) G413 can support big range of input signal timing— H=1024-3840, V= 720-2400.
- 2) Different PC display cards have different setting and behavior. Many users may not be able to do the right settings
- 3) Different display modes may show different final image aspect ratio. User can apply different EDID setting to change input signal timing and change image aspect ratio.



- 1) Activate EDID OSD setting menu: [Options]→ [Setting]→ [EDID]
- 2) Use IR remote controller, WebGui or PC tool to select desired EDID.
- 3) After select EDID, the PC should automatically change output timing.
- 4) Press [INFO] key to check if the input and output timing are set correctly.



13 preset EDID that can be selected by user. Default EDID is 3840*2160 @60Hz. User can also set non-VESA standard EDID timing manually. The range will be H=1024-3840, V= 720-2400. Based on VESA standard, Horizontal resolution is in a step of 8 pixels and vertical resolution is 1 pixel.



-
- 1) Some PC may not follow the EDID settings from G413 due to driver or setting issue and show different result. If it happens, please open PC resolution setting window and select desired output resolution from PC. User may also need to reboot PC again to get the right output resolution.
 - 2) If user wants to create custom output resolution in PC, user needs to select GeoBox as display device for further settings. Please select Reduced Blanking timing in high resolution output to reduce the output clock for easy high-speed data connection.
 - 3) After user creates custom output resolution in PC, user needs to go back to Resolution Selection Window (Display panel) in PC to select the desired output timing.
 - 4) Each input port can have different EDID timing setting.

Note: Some devices (media player) may only detect EDID information during booting stage and not output the right timing for G413. Please open GeoBox 3-5 seconds before open signal source so that signal source can detect the EDID setting in GeoBox and sends out the right timing.

16 Trouble Shooting

16.1 Front Panel LED lights

- 1) User should see Input / Output LED lights in each channel. If no LED light in specific channel, please check Input / Output connecting cables, signal source & monitor in that channel.
- 2) If user sees continuous flashing in [Power] LED with 0.5 second interval, it means OSD menu is locked. Please press [Menu] key in remote controller for 5 seconds, it will disable [OSD locked] function.
- 3) If [Power] LED is flashing with 1 second interval, the system is locked through Box ID function. Please use remote controller and press [850] number keys to disable OSD Menu Lock.

16.2 Intermittent or Loss of Input Signal

- 1) Check the HDMI cable quality and make sure all cables are fitted correctly. 4k/60 signal requires high speed certified cables.
- 2) Cable length: Connecting cable length should be short as possible. Replace a short cable to verify the possible root cause.
- 3) HDCP compliant issues: If the input source or the monitors are not HDCP compliant, it is possible to stop G413 from negotiating HDCP link and show intermittent, abnormal or no image.
- 4) Resolution issues: check if signal source and connecting cables can provide right signal requested by G413.
- 5) DVI/HDMI signal compatibility: some display devices may only support HDMI or DVI video signal and execute wrong signal format detecting. The default output is HDMI. User can change output with DVI format through [Options]→ [Setting]→ [DVI]→ [On].

-
- 6) Usually, to swap with different cable, output channel, signal source and monitor can verify the root cause for the failure.
 - 7) When it is possible to have signal compatibility issue, user can add one HDMI splitter or switch in the middle to change signal impedance. It may fix the issue.

16.3 Image rotation can't be implemented in PIP/POP mode

Image 90/270 degree rotation function will be disabled when PIP/POP is functional.

16.4 Video quality issues

- 1) Use the highest resolution and number of color bits (RGB 4:4:4) images allowed by G413 to be used as a signal source whenever possible.
- 2) If multiple units of G413 is used, please apply 4k signal source and apply Preset Mode to configure complete video wall. User needs to use [Video Wall] to split signal source for each G413 to get higher resolution.
- 3) There are a number of lower-quality AV players, the specification and actual output are difference, or because of the use of lower color sampling bits or poor image compression technology, resulting in lower quality or image is not smooth (LAG).
- 4) If use H.264/H.265 compressed files, please select a player with hardware decoding to get smooth video quality.
- 5) If the input signal is interlaced signal (interlaced-1080i), and the image is rotated or flipped, then the channel will have no [3D Motion adaptive de-interlaced] processing function. If user applies static image source, the output video will have a slight jitter phenomenon. The processing channel quality will be reduced. Use a progressive signal source setting (1080p/2160p) whenever possible.
- 6) Please press [INFO] shortcut key to check the input/output signal settings.

16.5 System setting can't be executed

- 1) Please Power ON/OFF system again or reset system through remote controller [Options]→ [Reset]→ [Reset All].
- 2) After FW update, please insert small pin into RESET hole on back panel for 5 seconds to reset the system to default to eliminate unnecessary settings. It will not affect Profile Index data.
- 3) After Reset, user will see "Reset to Default" message and the FW update process is finished.

16.6 Synchronization issue in the outputs

- 1) The input refresh rate should be the same as output refresh rate so that the system can implement Frame Lock to synchronize all the outputs. If the input source is 50Hz with 60Hz output, then it is possible to see some lag among the displays.
- 2) The display devices may have different delay time under different settings. For examples, if the

system with high end video processing, such as noise reduction or ME/MC, it may increase few frame delays. Please make sure all the display with the same settings.

17 **Technical support**

- 1) User can send e-mail to sales@vnstw.com together with as much information as possible.
- 2) The following information is required for a swift response.
 - Sink device (monitor): type and model number
 - Monitor layout or specific application details (shape of video wall).
 - GeoBox model No. and series No. (on the back of the box)
 - Detailed timing of signal source and resolution.
 - Press [Info] key to get System Information and send the data/photo to us, including input/output timing and F/W version.
 - The exact nature of the problem. Please be as detailed as possible.
 - If possible, please attach the Pictures of the issue.
- 3) Usually we will response with 24 hours (excluding weekends)
- 4) If the machine is sent back for repair under RMA, user needs to pay for return delivery cost.

18 **Safety precaution and maintenance**

1) **Power Supply**

Please connect electric power for all devices in the system from the same Power Distribution Box with correct grounding. Open the power after finishing system connection to reduce the risk for system damage from high floating voltage.

2) **Working Environment**

Please locate G413 in an environment free from dust, moisture and high temperature with good ventilation.

3) **Warranty:**

This device is designed and tested to the highest standards and backed by two years' parts and labor warranty. Warranties are effective upon the first delivery date to the end customer and are non-transferable. Warranty period extension is available up to 5 years through paying extra charges.

4) **Maintenance and Repair**

Apart from what is detailed in User Guide, maintenance should be carried out by competent technician assigned by VNS. If G413 is physically damaged, it should be returned for repair using VNS RMA procedures. If the unit is opened by user, it will lose the right for warranty protection.

Specifications

Main items	Functions	Description
General description		4 screen LCD video wall controller with preset display modes and allow user to create all kinds of irregular creative video wall
Main function	Video processor	10-bits
	LCD to be controlled via one processing box	4
	Multiple unit cascade	Yes (more than 10 boxes)
	Video wall with portrait display	Yes, no need to rotate source image
	Video wall with PIP/POP	Yes
	Support 4k/2k @60hz input without compression	Yes (up to 7680*1200 @30Hz)
	Preset modes selected by OSD	Yes (25 preset modes)
Input & Output	Video Input Ports	1x DP 1.2, 2x HDMI 2.0b, 1x VGA
	Video Output ports	4x HDMI 1.4
	Output resolution to each LCD	1920*1080P
	Loop out port for daisy chain connection	HDMI 4k/2k @60Hz or 7680*1200 @30Hz
	Audio Output	HDMI embedded audio
	System synchronization	Frame Lock
	HDCP compliant for HDMI / DisplayPort	HDMI: HDCP V2.2/1.4, DP: HDCP V1.4
Image rotation	Image 90/180/270 flip and rotation up to 4k/60	Yes (Entire video wall image)
Latency	System latency	20ms
Preset Mode	25 preset modes	Selected from OSD through remote controller or Ethernet
		Preset modes are editable to meet different bezel size and installation condition requirements.
Advanced Video Wall setting	Display Unit (group) and cascade	One G413 can control 4x LCD (as one [Display Unit]). Multiple display units can be cascaded.
	Maximum signal resolution cropped for video wall when apply 4k/2k source signal.	- Video wall with one G413 (4x LCD): G413 will shrink 4k/2k image to FHD, then split into different sections and scale up to FHD for each LCD.

		<ul style="list-style-type: none"> - Video wall with 4x G413 (16x LCD): Each G413 can crop one full HD image from 4k/2k and achieve high quality 4k/2k/60Hz video wall.
	Position shift in entire [Display Unit]	+_ 1800 pixels in horizontal and vertical directions for multiple [Display Unit] cascade alignment
	Irregular creative display modes created by user	Through remote controller or Galign PC tool
	Overall video wall image aspect ratio adjustment	25% to 200% in H&V with 1% interval continuously
	Overall video wall image position shift	The range is subject to aspect ratio adjustment. Maximum is from 25% to 200%
Looping playback	Seamless looping playback for different display modes	Up to 10 display modes with selectable time interval from 1 second to 600 seconds.
Image shift for LCD protection	Image position shift to prevent LCD from burn-in mark	Using playback function to achieve it
PIP (picture in picture) and POP (Side by Side)	PIP (picture in picture on entire video wall)	<ul style="list-style-type: none"> - PIP image size is from 320*180 to 1920*1200 - Flexible position across entire video wall. - PIP image size and aspect ratio can be adjusted through Overlap function - Main & PIP input source is swappable
	POP (show side by side image on entire video wall)	<ul style="list-style-type: none"> - Full screen or keep original signal aspect ratio. - Two images can be side by side or top/down
	High end 3D motion adaptive de-interlace in PIP/POP	Yes
	Limitation in PIP/POP function	<ul style="list-style-type: none"> - When implement PIP/POP function, the main signal source can't be rotated at 90/270° - Source: only one HDMI, DP & VGA source can be displayed on PIP/POP screen. - PIP Overlap function is only available up to 4k/30 input resolution.
Video processing	10 bits high end video processor with 4:4:4 full bandwidth uncompressed color sampling	3D motion adaptive de-interlace, smooth edge algorithm and 3:2/2:2 film mode processing
	High quality video and graphics scaling up/down	Yes
	Color adjustment (Hue, saturation, sharpness, contrast, brightness, preset modes, discrete RGB adjustment)	Applied to 4 LCD at the same time
	Full function IR Remote controller	Yes

System control for easy use	Cabled IR Receiver Extender	Can be extended up to 20m via audio cable
	Ethernet control and operation via LAN or WiFi	Yes
	Setup and control through USB	Yes
	ASCII control protocol over RS-232 & Ethernet	Yes
	[GAlign] PC tool for easy image alignment	Yes
	Auto Shut off output signal when input is missing	Yes
	Selectable EDID resolution for optimized video quality	Yes
	Ear mount	Option
Power supply	Dual power supply system, when use AC power supply, DC jack can provide DC12V 1A output power	AC: 100-240V/0.25A or DC 12V/2A Power consumption: 13.2W
Dimension	Only Box body, not including remote controller, power supply and packing	Dimensions (Body only): 440mm*181mm*44mm (without protruding parts). 440mm*192mm*55mm (including protruding part)
Weight	Without accessories	2.29kg

Revision History

Revision	Date	Originator	Comments
V1.0	2019-09-26	Steve Wang	First version release
V2.0	2020-04-29	Steve Wang	Add adjustable OSD position and related operations