



# User Manual



# Important Safety Instructions

1.  To reduce the risk of fire or electric shock, do not expose this appliance to rain or other forms of moisture.
2.  Indoor Use Only
3. Display must not be exposed to liquids via dripping or splashing. Please do not place liquid –filled items such as vases near the display.
4. Use only a properly grounded plug and receptacle.
5. CAUTION – These instructions are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any service other than that contained in the operating instructions unless you are qualified to do so.
6. Do not use a damaged or loose plug.
7. This may cause electrical shock or fire.
8. Operate the display only from a power source (i.e. voltage) indicated in the product specification.
9. Otherwise the product can be damaged, fire can occur or you may be electrocuted. If you are not sure what type of power supply you have, consult a certified electrician.
10. In the presence of thunder and lightning, never touch the power cord and signal cable because it can be very dangerous.
  - ▶ It can cause electric shock.
11. Do not connect several extension cords, electrical appliances or electrical heaters to a single outlet. Use a power strip with a grounding terminal designed for exclusive use with the computer.
  - ▶ A fire can break out due to overheating.
12. Do not touch the power plug with wet hands. Additionally, if the cord pin is wet or covered with dust, dry the power plug completely or wipe dust off before plugging in the cord.
  - ▶ You may be electrocuted due to excess moisture.
13. Insert the power plug firmly so it cannot come loose.
  - ▶ A loose connection can cause fire.
14. When disconnecting the display from an electrical outlet, the plug must be pulled out from the socket. Do not remove power cord from outlet by pulling from the cord. Pull from the plug head.
15. Hold the plug when pulling out the power cable. Do not pull the plug out by the wire. Do not bend the power cord with excessive force or put heavy objects on the power cord.
  - ▶ The power line can be damaged, which may cause electric shock or fire.
16. Do not insert metal or other conductive materials into the product openings. Additionally, do not touch the power cable right after plugging into the wall input terminal.
  - ▶ You may be electrocuted.
17. The appliance coupler is used as the disconnect device.
18. Please make sure the device is installed near the wall outlet to which it is connected and that the outlet is easily accessible.
19. Do not unplug the power cord while the product is in use.
  - ▶ Electrical shock can damage the product.
20. As long as this unit is connected to the AC wall outlet, it is not disconnected from the AC power source even if the unit is turned off.
21. Do not remove ground prong from three-pronged plugs. If your outlet will not accept three-pronged plugs, consult an electrician for replacement.
22. Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions
23. This is a Class A digital device

**CAUTION**  
**RISK OF ELECTRIC SHOCK**  
**DO NOT OPEN**



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

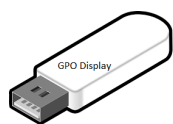
# Instructions

## Thank You for Purchasing a GPO Display EK-Series Video Wall

This manual describes how to use the product and provides safety guidelines and best practices. Please read the manual carefully before installing or using the product. After reading this manual, please retain for future reference. If you have any questions or a problem occurs, please contact either the company you purchased this product from or an authorized service center.

- ✓ **Displaying static images for an extended period of time may cause a “burn-in” effect.**
- ✓ **“Burn-in” effect and the faults in brightness and picture elements caused by extended display of static images are not subject to warranty coverage.**

## Accessories



User Manual & Wall control program



Remote Controller



Batteries (AAA x 2)



HDMI Speed Cable



RS232C Cable



Power Cable

## Dimensions & BTU

Model	Net		Gross (Packed)		Power Consumption	Amp	BTU/h
	W x H x D (in)	weight (lbs)	W x H x D (in)	weight (lbs)			
EK46MSU	40.24x22.7x3.21	50lbs	46x29x8	62lbs	120W	1.4	409
EK46HSU	40.24x22.7x3.21	50lbs	46x29x8	62lbs	160W	1.9	546
EK46MSE	40.16x22.63x3.33	43lbs	46x29x8	55lbs	120W	1.4	409
EK46HSE	40.16x22.63x3.33	43lbs	46x29x8	55lbs	160W	1.9	546
EK49MLU	42.42x23.93x3.25	51lbs	46x29x8	63lbs	90W	1.1	307
EK49HLU	42.42x23.93x3.25	51lbs	46x29x8	63lbs	150W	1.8	512
EK49MLE	42.35x23.86x3.22	51lbs	46x29x8	63lbs	90W	1.1	307
EK49HLE	42.35x23.86x3.22	51lbs	46x29x8	63lbs	150W	1.8	512
EK55MLU	47.77x26.94x3.31	64lbs	53.5x33x12	80lbs	160W	1.9	546
EK55HLU	47.77x26.94x3.31	64lbs	53.5x33x12	80lbs	230W	2.8	784
EK55MLE	47.69x26.86x3.49	54lbs	53.5x33x12	70lbs	160W	1.9	546
EK55HLE	47.69x26.86x3.49	54lbs	53.5x33x12	70lbs	230W	2.8	784

# Handling Precautions

To ensure safety, please read this manual carefully before installation and follow the instructions herein. Store this installation guide in a secure place for future reference.

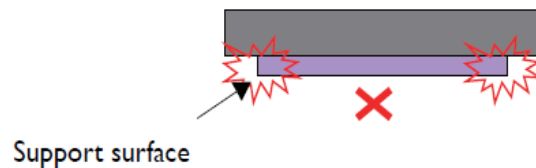
- The video wall must be installed on a flat and level surface which is strong enough to bear its weight.
- Make sure mounting brackets are tightened and secured on the wall
- The Liquid Crystal Display (LCD) panel of the display has a very thin protective layer of coating which is susceptible to marking or scratching, and cracking if struck or pressured. Please cover and protect the displays if there is construction or other work being conducted at the installation site.
- Transport and handle displays by holding the handles on the back of the display. Do not touch the LCD panel surface directly to avoid possible scratches and backlight leakage
- Leave a slight (>0.5mm) gap between displays in order to protect your LCD screens from the damage through the direct transfer of weight. See *Checking the safe distance between displays on page 6 for details.*

## Notes on handling/transporting displays:

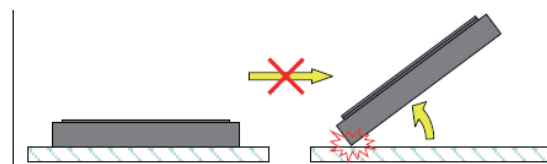
LCD video wall monitors have limited mechanical strength. To prevent the display from performance failure caused by line defects, front bezel bending, glass scratch/broken, light leakage, etc., handle with care.

- At least two (2) adults are required to move & carry displays.
- Retain the original shipping box and packaging in storage for use in the future, when you may need to transport the product.
- When placing the display face (panel side) down:
  - Prepare a flat, level, horizontal surface that is larger than the display and spread a thick protective sheet/foam on it. (Fig. 1) – Lay the display down gently and horizontally.
- When you want to place the display in an upright position:
  - Lift the display up horizontally by holding the two (2) handles at the top/rear with one hand per person and supporting the bottom bezel with the remaining hand. **Do not allow the display to rest/put weight on bezel edges and corners**
  - Be careful not to scratch any parts of the display when placing the display upright. (Fig. 3)
  - Stand the display vertically to make sure the its weight spread evenly throughout the bottom bezel.

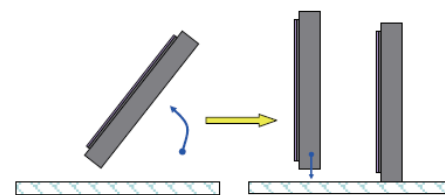
\* Do not rest on corners or lean forward/back. (Fig.4)



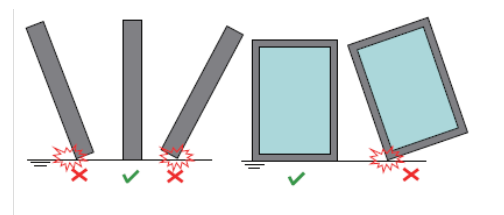
[Fig. 1]




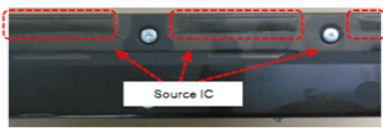
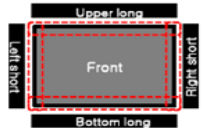
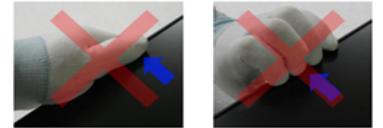
[Fig. 2]



[Fig. 3]



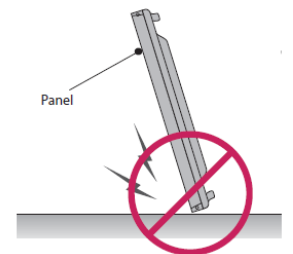
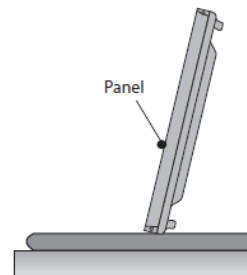
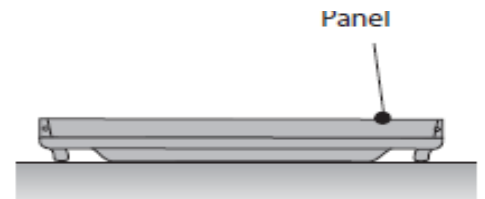
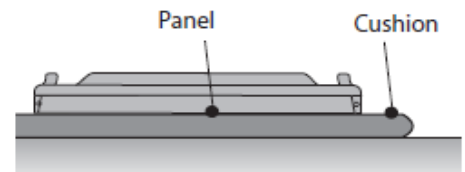
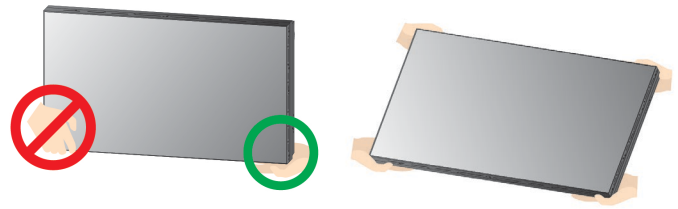
[Fig. 4]

Position	Diagram/Photo	Precaution	Possible Damage
		<p><b>DO NOT APPLY PRESSURE TO THESE AREAS</b></p>	<p>IC damage and COF Lead Crack</p>
		<p><b>DO NOT BEND/APPLY PRESSURE</b></p>	<p>Backlight leakage, deformation of bezel</p>

# Installation Precautions

## How to carry the product

- ✓ At least two people are required to carry the display. When carrying the product upright, please hold the handles on the rear as well as the bottom of the display simultaneously for stability. When carrying the product with the panel positioned upwards as shown below, please hold as shown in the diagram.
- ✓ When laying down the product, lay a cushion on a flat floor. Put the product on it with the panel the product facing down.
- ✓ If there is not a cushion available, ensure the floor is clean and then lay the product down carefully with the panel facing either upward or downward. At this time, be careful for objects not to fall on the panel.
- ✓ If the product needs to be set upright, hold both sides of the product, and tilt backward carefully for. Do not let the panel to touch the floor. If the product is tilted onto the bezel, the bottom of the panel may be damaged.

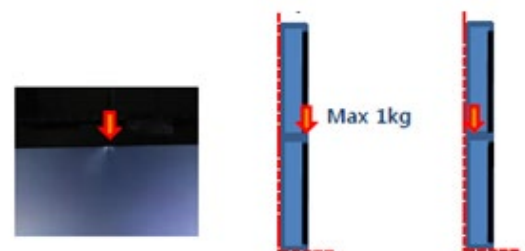


- ✓ **A minor gap between monitors is strongly recommended**  
High temperatures can cause slight expansion of panels. If there is no space between panels, damage may occur as a result of pressure resulting from the expansion of adjacent panels into one another.



\* Recommended gap between displays: 0.5mm - 1.3mm

- ✓ If more than 1kg of weight is applied to the top bezel of a panel (as illustrated to the right), backlight leakage will result. This is a sign that the panel alignment/angle must be adjusted or other countermeasures must be applied.

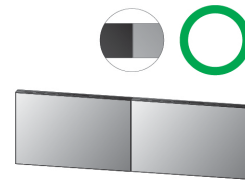


# Installation Precautions

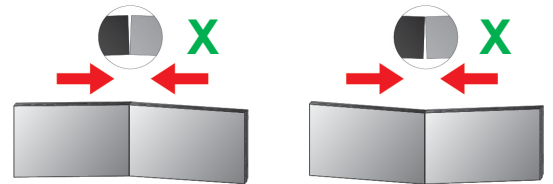
✓ Bottom of product: When resting panel on any surface (padded table, floor), do not tilt panel forwards as shown in the diagram below. The weight of the display applied in an uneven manner can result in damage.



✓ During installation, do not apply pressure to any surface of the panel. Damage to the panel may result from external pressure or even minor impact to the panel. Physical and cosmetic damage to displays is not covered under warranty.



✓ Please ensure alignment on the Z-axis for a level plane across adjacent panels (as shown in the diagram below). If precautions are not heeded, GPO Display will not accept responsibility for any Failure due to such installation errors.



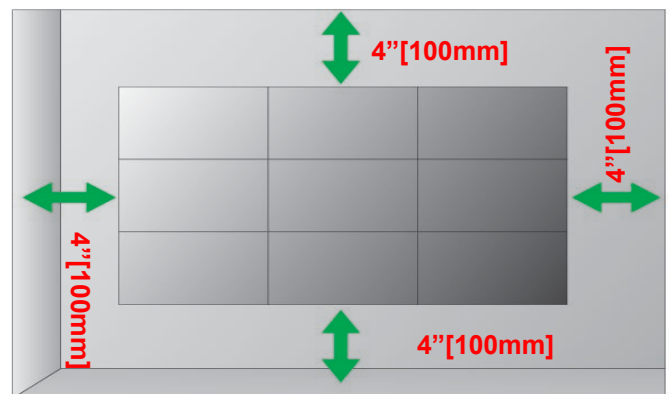
✓ Do not cover fan ventilation holes

Carefully install EK-series displays so as not to cover the fan air holes with any structural object.

If the holes are covered with anything, the inner temperature can be raised rapidly and it can cause malfunction.

✓ **Dimensions below are minimum required for proper ventilation**

- Ventilation space must not be covered or closed off at the front of the opening. If for some reason the opening needs to be covered, other means of ventilation will need to be incorporated into the design. Contact GPO Display for design review and recommendations.
- Please secure minimum clearance as shown in the picture for adequate ventilation and technical service.
- Ventilation space in front of EK-Series displays must be furnished for heat dispersion. If the area in front of EK-series displays must be sealed, there must be consideration for the heat dispersion on the rear side of EK-series to compensate.

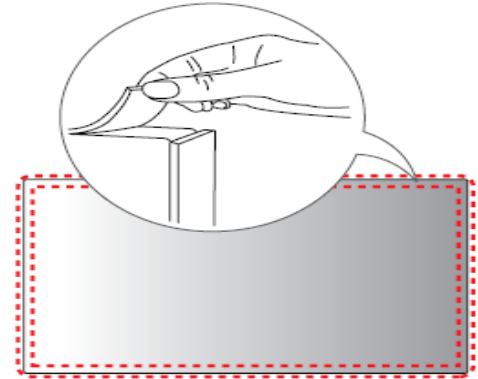


# Set up for Operation

## Remove Protective Pads Before Installation

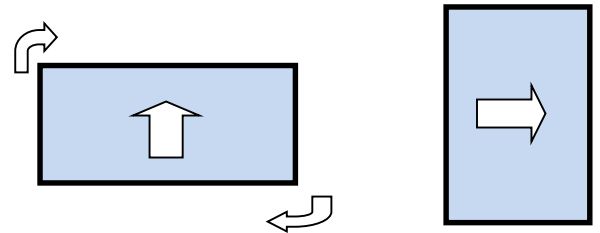
Make sure that the protection pads are removed from each corner before installing the product.

**(Note: Only for Extreme Narrow Bezel, <2mm combed bezel displays)**

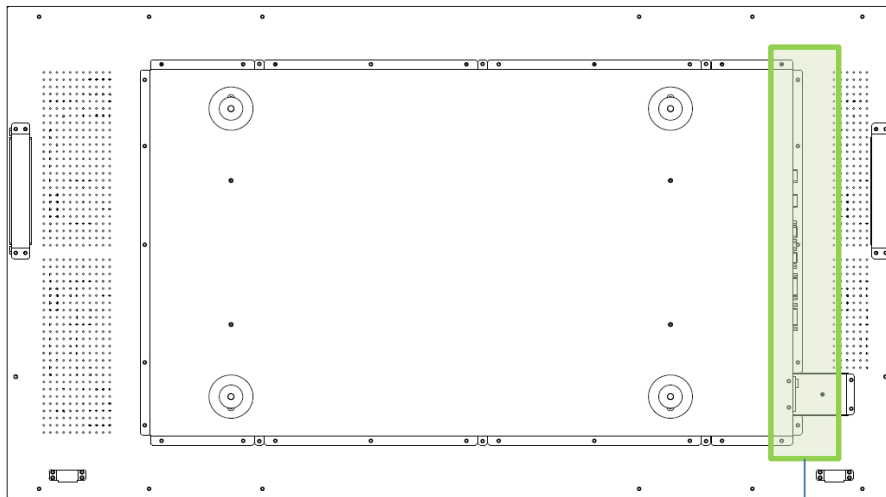


## To Install in Portrait Orientation

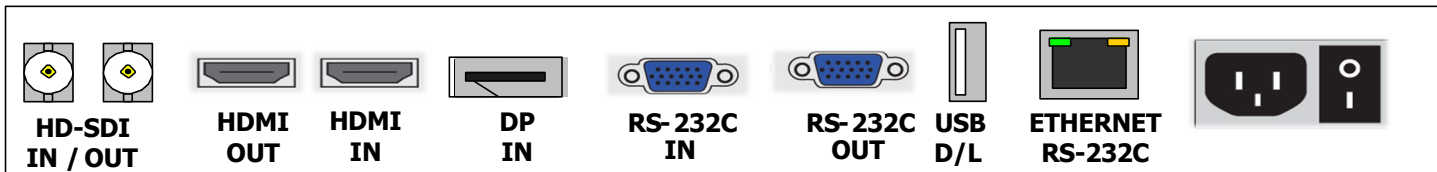
When installing in Portrait Orientation, rotate the monitor clockwise 90 degrees (when facing the screen).



# Mechanical Layout



Terminal Input / AC Inlet / IR Receiver



Interface	Description
HDMI OUT	• High Definition Output – output for the HDMI input only
HDMI IN	• High Definition Multimedia Input – up to 3840x2160 @60Hz (HDMI 2.0)
DP IN	• DisplayPort Input – up to 3840x2160 @60Hz (v1.2a)
RS-232 IN	• Serial control input
RS-232 OUT	• Output for serial control (daisy-chaining of control signal)
USB	• Download - software update
HD-SDI IN (OPTIONAL)	• Serial digital Interface Input (Optional: Models ending in –"B" only)
HD-SDI Out (OPTIONAL)	• Serial digital Interface Output (Optional: Models ending in –"B" only))
ETHERNET (RS-232)	• Communication Port via Ethernet

### IR LED Status

Status	Color	Indicator Status
Power Off	Red	On
Normal	Green	On
No signal	Green	Blink
DPMS	Red	Blink
Download	Green	Fast Blink



KeyName	Description
Power	▶ Power On/Off
Menu	▶ Same as “Menu key” on keypad.
Up	▶ Same as “Up key” on keypad
Down	▶ Same as “Down key” on keypad
Right	▶ Same as “Right key” on keypad
Left	▶ Same as “Left key” on keypad
Enter	▶ Same as “Select key” on keypad
EXIT	▶ Exit OSD menu
Info	▶ Displays input source information
Sleep	▶ Set minimum sleep timer value more than current sleep timer value when sleep timer OSD activated ▶ If sleep timer is maximum value, disables sleep timer
Mute	▶ Toggles sound status of speaker/headphone in mute.
Source	▶ Activates OSD of source change. ▶ Deactivates OSD of source change.
ARC	▶ Activates OSD of aspect ratio control. ▶ Deactivates OSD of aspect ratio control.
STILL	▶ Toggles picture status between motion and still image.
0~9	▶ Enter digit value to Active SET ID
BLUE	▶ Set Active SET ID
RED	▶ Delete Active SET ID

Button	Key Code
KEY_POWER	0x11
KEY_INPUT	0x13
KEY_MENU	0x43
KEY_EXIT	0x50
KEY_UP	0x47
KEY_DOWN	0x4B
KEY_LEFT(VOL -)	0x57
KEY_RIGHT(VOL +)	0x53
KEY_ENTER	0x04
KEY_MUTE	0x03
KEY_STILL	0x0A
KEY_INFO	0x06
KEY_SLEEP	0x0B
SET ID	0x51
SET ID EXIT	0x55

GPO Display's video wall displays have a built-in video wall processor that allows for virtually any matrix size of LCD video wall. In this manual, instructions for a 2x2 configuration will be used as an example.

## 1. Installation

To install EK Series displays in video wall configuration, please read the installation directions carefully before installation is performed. These monitors can be installed for single display/"standalone" operation, in a single row, or in multiple rows. The highest Display Sequence number is 99. Contact GPO Display for arrays comprised of more than 99 displays.

**CAUTION:** Never connect or disconnect cables from the display when the display is powered on as this may cause serious damage.

## 2. Installation Requirement

### 2.1 Structure for the installation

Support structure design and construction for the display installation is the customer's or its installer's responsibility. GPO Display does not take any responsibility on design or construction of installations. The minimum requirements for space, strength of the structure, electronic, heat dissipation and environmental condition is described in the following. If any further information or support is needed from GPO Display, please contact us in advance to ensure ample time for support. We will be glad to help with any recommendations or information. Call 510-659-9855 or e-mail [support@gpodisplay.com](mailto:support@gpodisplay.com).

### 2.2 Power Requirements

Please refer to the specifications for power consumption of displays to be installed (Page 4)

Do not plug more than two units into a given receptacle (example: all displays in 2x2 should not be plugged into quad receptacle). Using more than 70% of current on the AC circuit is strongly discouraged. Clean AC power is required for "noiseless" screen images. Avoid damages inflicted by power glitches or surges- either a power conditioner or surge protector is recommended. Contact your electric power specialist for consultation.

## 3. Heat Dissipation

Recommended LCD operational conditions are:

- Temperature: 32°F -104°F Humidity: 20-80%

## 4. General Information

### 1.1 PC Settings:

PC's need to be set to an appropriate graphics mode that has the same resolution with the panel to have clear screen image. And the vertical refresh rate should be set to 56~75Hz, non-interlaced signal. The controller has been designed to take a very wide range of input signals however to optimize the PC's graphic performance we recommend choosing 60Hz vertical refresh rate: this will prevent screen flicker. If you wish to view 4k2k@60Hz resolution, must use the PC that supported HDMI 2.0 (or DisplayPort 1.2).

### 1.2 Signal Quality:

Signal quality is very important: If there is noise or instability in the PC graphics output, this may result in visible noise on the display. Refer to the graphic modes table in specification section for supported modes. Non-interlaced & interlaced video input is acceptable. Please use the HDMI 2.0 dedicated cable. (4K2K@60Hz)

## Set Up for Operation

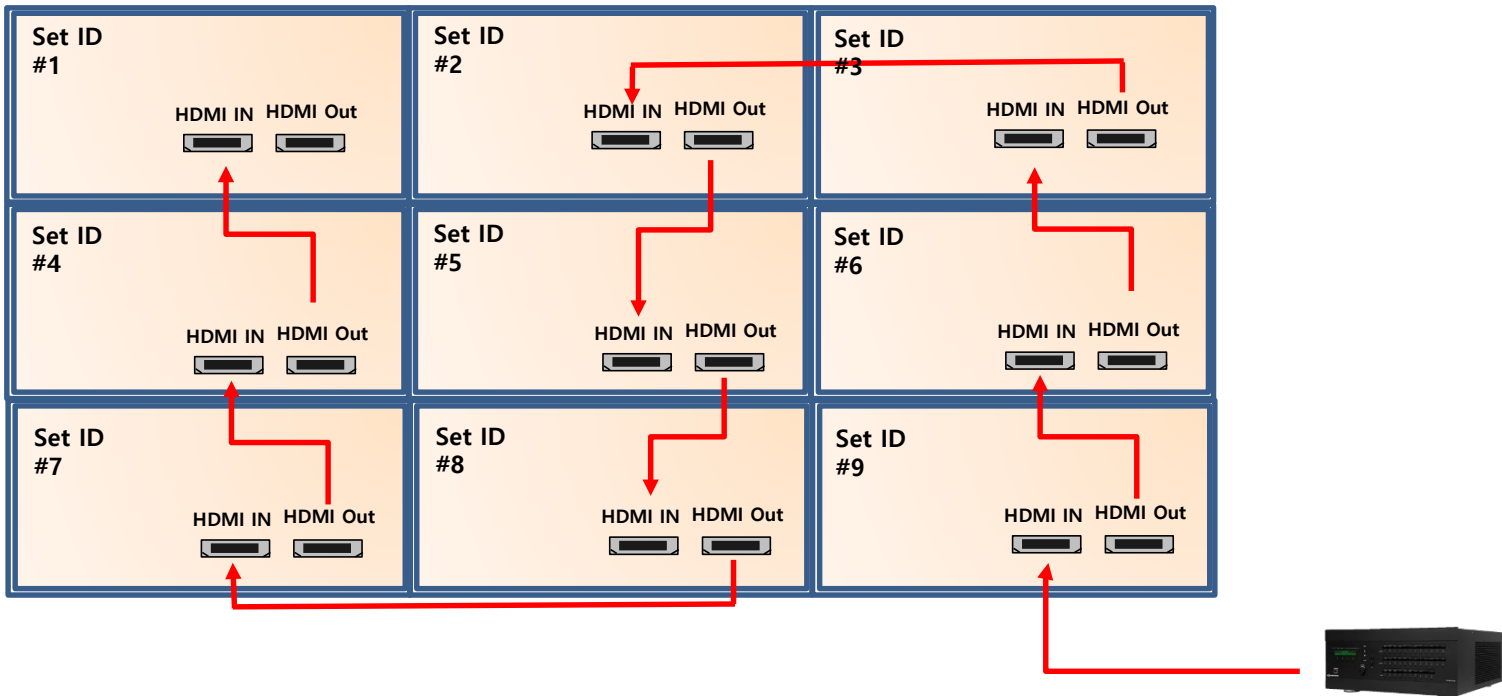
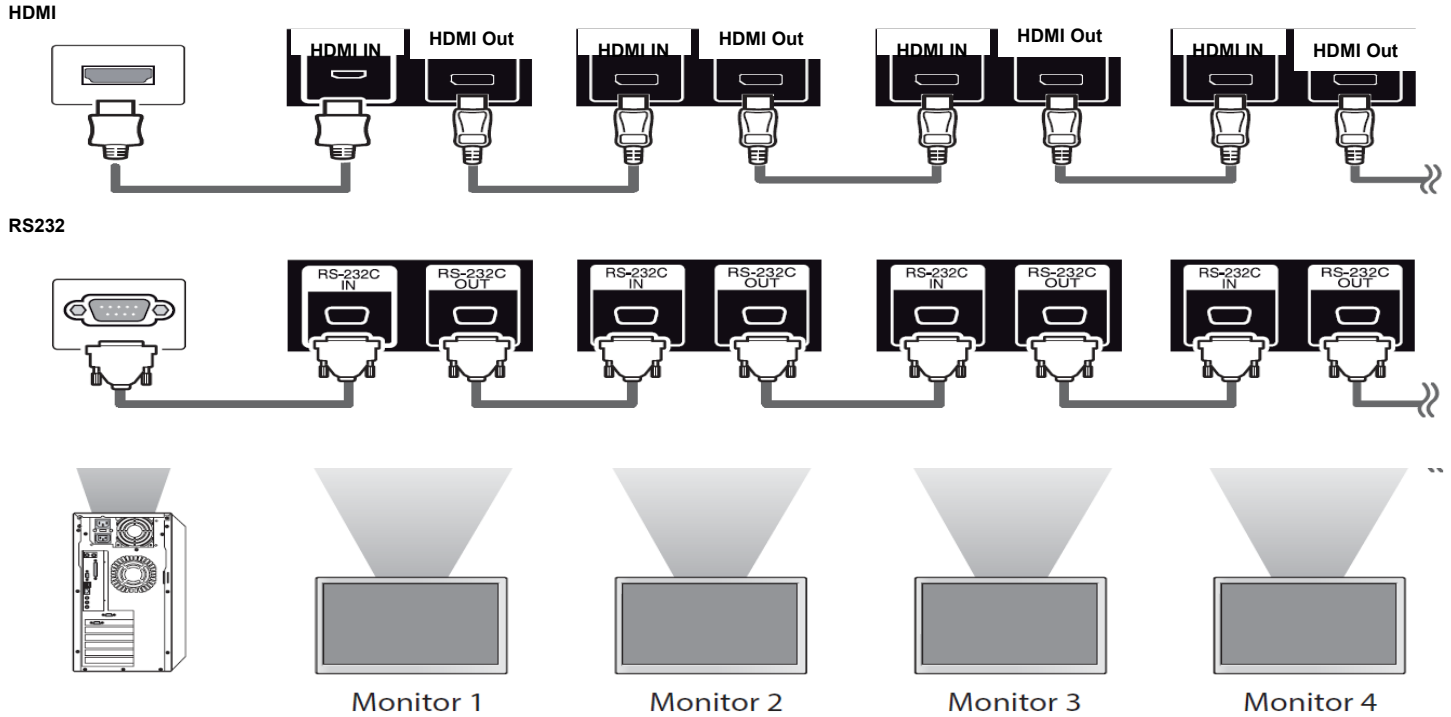
### Note:

- If you turn the monitor on when the set is cold, the screen may flicker. This is normal.
- Sometimes red, green, or blue spots may appear on the screen. This is normal.
- Use a High Speed HDMI®/TM cable.
- Use a certified cable with the HDMI logo attached. If you do not use a certified HDMI cable, the screen may not display or a connection error may occur.
- Recommended HDMI® Cable Types
  - High-Speed HDMI®/TM Cable
  - High-Speed HDMI®/TM Cable with Ethernet
- Connect the signal input cable and tighten it by turning the screws clockwise (if applicable).
- Avoid displaying static images on the screen for a long period of time to prevent image burn. Use a screensaver if possible.
- Prior to insertion of the next set into neighboring mount, insert cables from the outputs of the first set into the inputs of the second set.
- If you cannot hear any sound in HDMI mode please check your PC settings. Some PCs require you to manually change the default audio output to HDMI.
- Apple computers may require an adapter to connect to this monitor. Call or visit their web site for more information, or consult with GPO Display.

### CAUTION

- Connect the signal input cable and tighten it by turning the screws clockwise.
- Do not press the screen with your finger for a prolonged period as this may result in temporary distortion on the screen
- A wireless communication device near your monitor can affect the image.

## Daisy-Chaining Monitors

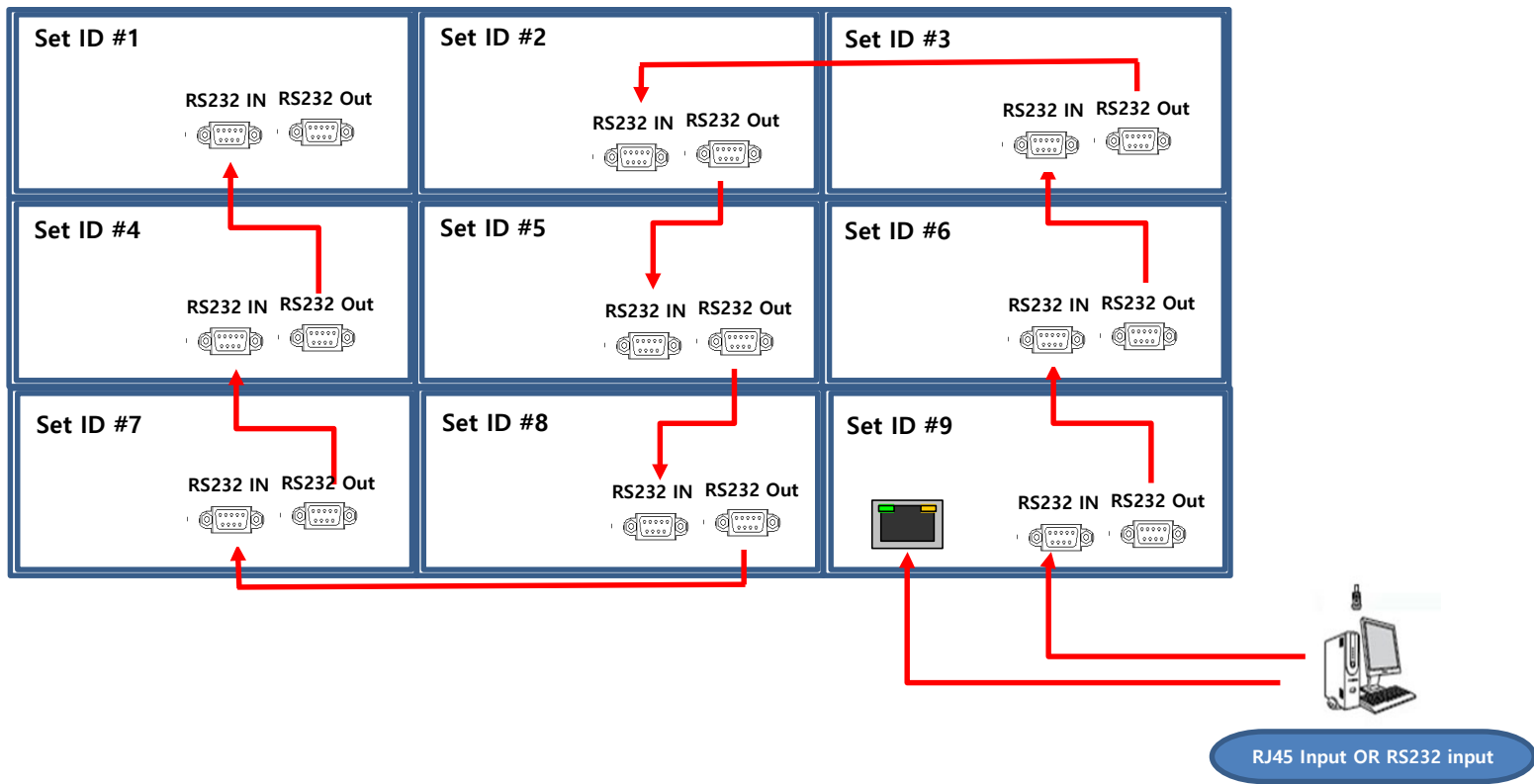


**Note:**

- If the signal cable between the product and your PC is too long, make sure to use the signal booster or optical cable.

## Connect RS-232 Cables

1. While mounting display, insert any cables used for Power, video inputs or outputs into the set.
2. Prior to insertion of the next set into neighboring Wall Unit, insert cables (including RS-232) from the outputs of the first set into the inputs of the second set.
3. Repeat steps 1-2 for next set, if necessary.
4. The RS-232 daisy chain limitation is listed as 30 displays, although theoretically more units can be accommodated.
5. Daisy-chaining can be initiated from any unit but **it is strongly recommended that you start with a display on the bottom row** for ease of access. There is no terminator at the end of the unit. It is always recommended to record/make note of the chaining diagram as it is crucial to determining issues with communication.

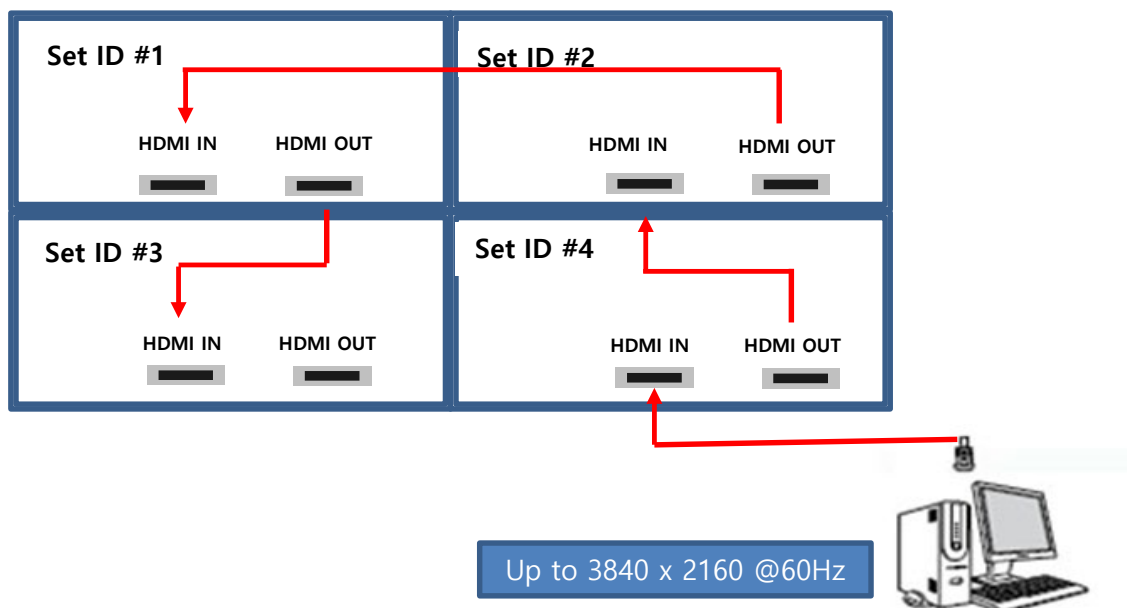


## Connect Video Cables

1. After mounting display, insert any cables used for Power, inputs or outputs into the set.
2. Prior to insertion of the next set into neighboring mount, insert cables from the outputs of the first set into the inputs of the second set.
3. Insert any cables which are to be connected to the third set into the outputs of the second set. Connect these cables into the inputs of the third set.
4. Repeat steps 1-3 for fourth set, if necessary.

- Supports HDMI 4K x 2K input – HDMI, DP
- Supports the daisy chain mode of 4K2K resolution. (HDMI input only)
- Recommended HDMI Cable Types
  - High-Speed HDMI®/TM Cable
  - High-Speed HDMI®/TM Cable with Ethernet
- Some installation sites have a high level of Electric Noise which may appear onscreen, especially with HDMI.
- Digital noise may appear due to poor quality HDMI cabling. If the video signal needs be delivered from a distance, electric noise must be accounted for. If the signal cable between the product and your PC is too long, make sure to use the Booster or optical cable.
- HDMI and DisplayPort are HDCP-compliant.
  - HDCP 2.2 Compliant    HDMI 2.0 Compliant    Display Port v1.2a Compliant
- **Signal-looping specifications (Only HDMI input / DP port doesn't support daisy-chain function)**

Input Resolution	SPEC	Remarks
3840x2160@60Hz	Supports up to 9 units	Use only HDMI 2.0 cables
3840x2160@30Hz	Supports up to 16 units	Daisy-chaining not recommended
1920x1080@60Hz	Supports up to 25 units	



## Matrix Configuration

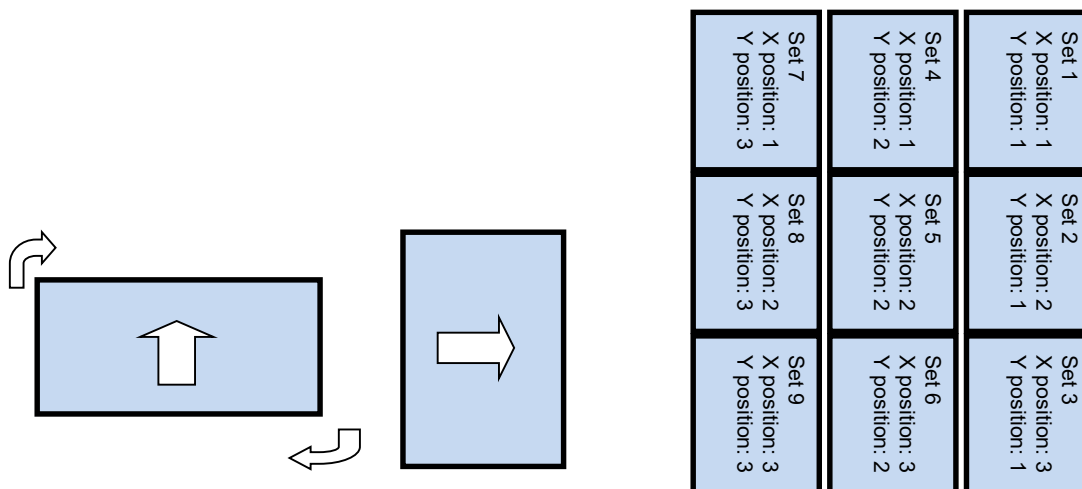
### Landscape

1. This is most common configuration, as it retains the native HD aspect ratio of 16:9.  
The number of units in rows and columns should be the same to maintain aspect ratio.
2. If the number of units in rows and columns are different (ex: 2x5), the content must be arranged to match the screen format accordingly. Images will be stretched according to the number of Horizontal & Vertical Set counts if content from a particular input is shown on the entire wall.

### Portrait

1. Rotate units 90° clockwise to install in portrait mode.
2. The X position and Y position number should be set as if it is configured in landscape mode.
3. The X max is number of rows and the Y max is number of columns in this configuration,
4. The input image should be rotated clockwise 90°.

\*GPO Display provides both landscape and portrait wall mount systems separately. Before ordering, please verify which orientation is compatible with your system.



Note: If an external video processor is employed, please refer to your video processor's manual.

## Video Wall Setting

MENU → Video Wall

### X max

This function divides the video signal according to the specified number of horizontal displays. Enter the number of horizontally-arranged displays in your array. The signal will be divided across the video wall horizontally according to this value. A maximum of 10 displays can be assigned in horizontal arrangement.

### Y max

This function divides the video signal according to the specified number of vertical displays. Enter the number of vertically-arranged displays in your array. The signal will be divided across the video wall vertically according to this value. A maximum of 10 displays can be assigned in vertical arrangement.

### X position / Y position

Users may change displays' positions in the array by adjusting X and Y Position values. The X position value indicates the display's position (numbered moving left-to-right) in the array according to the X max value (see diagram below). The same concept applies to the Y position value (numbered moving top-to-bottom) according to the Y max value.

### Example. 3 X 3 Video Wall layout setting

Picture	X MAX	1
Color	Y MAX	1
Video Wall	X Position	1
PC-RGB	Y Position	1
Audio	X Gap	0
Heat Control	Y Gap	0
Network	Set ID	11
Timer		
Other Setting		

Set ID: 1 X max: 3 Y max: 3 X position: 1 Y position: 1	Set ID: 2 X max: 3 Y max: 3 X position: 2 Y position: 1	Set ID: 3 X max: 3 Y max: 3 X position: 3 Y position: 1
Set ID: 4 X max: 3 Y max: 3 X position: 1 Y position: 2	Set ID: 5 X max: 3 Y max: 3 X position: 2 Y position: 2	Set ID: 6 X max: 3 Y max: 3 X position: 3 Y position: 2
Set ID: 7 X max: 3 Y max: 3 X position: 1 Y position: 3	Set ID: 8 X max: 3 Y max: 3 X position: 2 Y position: 3	Set ID: 9 X max: 3 Y max: 3 X position: 3 Y position: 3

- X Max** : Maximum number of columns for which video wall layout is supported (10)
- Y Max** : Maximum number of rows for which video wall layout is supported (10)
- X position** : Coordinate of display/video signal column position.
- Y position** : Coordinate of display/video signal column position.



# Configuration of Video Wall Displays

## Video Wall Settings

### Full Mode / Natural Mode

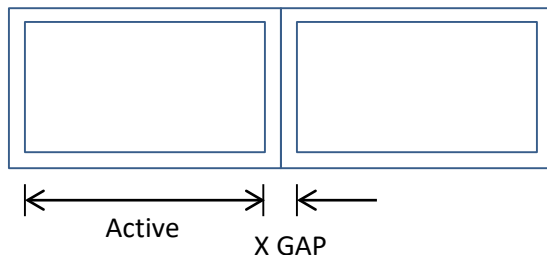
MENU → Video Wall

Full Mode: X gap: 0 ; Y gap: 0

#### Natural Mode

UNB (B2B 3.5mm): X gap: 3 ; Y gap: 5

ENB (B2B 1.8mm or 1.7mm): X gap: 2 ; Y gap: 3 or : X gap: 2 ; Y gap: 2



## Auto switch Video Input color Format

MENU → Input Color Format → Auto Select

If the display is powered on with **Input color format Auto On**, and the previously-used video source selection is not active, the display will automatically search each video input source for active video.

Check the color space of the input signal before adjusting values [ RGB / YPbPr422 (YPbPr444)]

Picture	Color Temperature	RGB
Color	Red Gain	YPbPr
Video Wall	Green Gain	Auto Select
PC-RGB	Blue Gain	
Audio	Gamma	
Heat Control	Input Color Format	
Network	Color Range	
Timer		
Other Setting		

Most menus consist of three levels to set up the options, but some require greater depth for the variety of settings. If you press the **MENU** button, up to the third level of the menu system will appear on the monitor screen. The fourth level can be displayed by pressing the **OK** button

- To show and remove the Menu:

Press the **MENU** button on the Remote Control to display the menu. A second press of the **MENU** button or a press of the **EXIT** button will take you back to monitor viewing.

- To go to the next level:

Press **OK** (or **Right arrow** button) on the Remote Control.

- To go back to the previous level:

Press **MENU** (or Left arrow button) on the Remote Control.

- To go to the next menu:

Press **Down arrow** button on the Remote Control.

- To go to the previous menu:

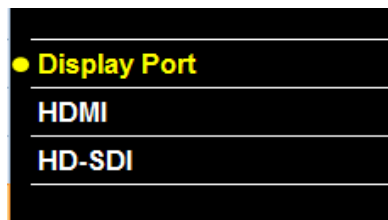
Press **Up arrow** button on the Remote Control

## To set Input Source

Source: Display Port, HDMI (HD-SDI: Optional)

**Source** → **Input Source**

To use, press the **SOURCE** key and then arrow keys to select desired video source. Press the **OK** button to go to desired video source



## To fine-tune the picture mode Contrast / Brightness /Sharpness

Adjust the picture appearance to suit your preference and viewing situations.

**Picture** → **Contrast Brightness or Sharpness** → **Adjustment**

Press the **MENU** button to select the **PICTURE** mode

Press the **OK** button or arrow key to select **Contrast** menu.

Press the **OK** key or arrow key to select **Adjustment** menu.

Press the arrow key to make desired adjustments.

Press **MENU** key or arrow key to return to the previous menu.

Or, in order to exit the menu at any time, press the **EXIT** key.

- Brightness: adjusts the overall brightness of the screen
- Contrast: adjusts the difference between the light and dark areas of the picture.
- Sharpness: adjusts the sharpness of the edges of objects

Picture	Contrast	50
Color	Brightness	50
Video Wall	Sharpness	50
PC-RGB	Hue/Saturation	
Audio	Aspect Ratio	Full Screen
Heat Control	Auto Dimming Mode	Off
Network	Dimming	100
Timer	Max Ambient	300
Other Setting	Min Ambient	100
	Ambient	0

## To set Color Temperature

Choose one of four automatic color adjustments

**Color** → **Color Temperature** → **Adjustment**

- \* Set to **warm** to enhance hotter colors such as red,
- Set to **cool** to see less intense colors with more blue

**[ 5700K, 6500K, 9300K, User ]**

If you change the GAIN value, this automatically switches to the User mode.

Picture	Color Temperature	5700K
Color	Red Gain	6500K
Video Wall	Green Gain	9300K
PC-RGB	Blue Gain	User
Audio	Gamma	
Heat Control	Input Color Format	
Network	Color Range	
Timer		
Other Setting		


## To Adjust Gamma

Adjust the color onscreen

[Color](#) → [Gamma](#) → [Adjustment](#)

Select Desired option [2.0, 2.2, 2.35, 2.4, 2.6]

Do not adjust gamma without consulting with GPO Display first. This may compromise color uniformity/calibration.

Picture	Color Temperature	User
<a href="#">Color</a>	<a href="#">Red Gain</a>	255 
Video Wall	Green Gain	255
PC-RGB	Blue Gain	255
Audio	Gamma	2.2
Heat Control	Input Color Format	Auto Select
Network	Color Range	Auto Select
Timer		
Other Setting		

## To Set Input Color Format

Check the color space of the input signal  
[RGB / YPbPr422 / YPbPr444]

[Color](#) → [Input Color Format](#) → [Adjustment](#)

[RGB, YPbPr, Auto Select]

Picture	Color Temperature	RGB
<a href="#">Color</a>	Red Gain	YPbPr
Video Wall	Green Gain	<a href="#">Auto Select</a>
PC-RGB	Blue Gain	
Audio	Gamma	
Heat Control	<a href="#">Input Color Format</a>	
Network	Color Range	
Timer		
Other Setting		

## To set Color Range

Select the desired color range. [0~255, 16~235]

[Color](#) → [Color Range](#) → [Adjustment](#)

Contact GPO Display prior to adjusting values.

[Auto Select, 0-255, 16-235]

Picture	Color Temperature	<a href="#">Auto Select</a>
<a href="#">Color</a>	Red Gain	0-255
Video Wall	Green Gain	16-235
PC-RGB	Blue Gain	
Audio	Gamma	
Heat Control	Input Color Format	
Network	<a href="#">Color Range</a>	
Timer		
Other Setting		

## To Heat Control Setting – Heat Control

Heat Control → Fan active Temperature → Adjustment

Heat Control → Hysteresis → Adjustment

Heat Control → Shutdown → Adjustment

- Fan Active Temperature: Adjusts fan activation temperature by degrees Celsius. This only works when the Fan Control setting is “Auto”.
- Hysteresis: Variable range of Fans on/off interval.
- Shutdown: Adjusts auto-shutdown temperature by degrees Celsius. When internal temperature reaches the shutdown temp, the monitor enters power-down mode.
- Temperature: Internal temperature data reading.

Picture	Fan Control	Auto
Color	Fan Active Temperature	50.0°C
Video Wall	Hysteresis	2.0°C
PC-RGB	Shutdown	85.0°C
Audio	Temperature	37.0°C
Heat Control		
Network		
Timer		
Other Setting		

## Network Setting

Network → Network → Adjustment

- Disable: Disables use of ethernet port (control via RS-232 only)
- Enable: Allows for control via ethernet port

Picture	Network	Disable
Color	Load Network Setting	Enable
Video Wall	DHCP	
PC-RGB	IP Address	
Audio	Gateway	
Heat Control	Subnet	
Network	Save Current Setting	
Timer		
Other Setting		

## Network Setting-Load Network Setting

Network → Load Network Setting → Adjustment

- Enter: Gather network information stored in the LAN board

Picture	Network	Enter
Color	Load Network Setting	
Video Wall	DHCP	
PC-RGB	IP Address	
Audio	Gateway	
Heat Control	Subnet	
Network	Save Current Setting	
Timer		
Other Setting		

## Network Setting - DHCP

### Network → DHCP → Adjustment

- **On:** Gather IP information of monitor from the Server. (to avoid IP address conflicts.)
- **Off:** User may enter IP address manually using the video wall control program (see p. 35 of this document for more detail).
- Note that when “Network” is set to “Enable”, serial communication will be disabled. When “Network” is set to “Disable”, you may communicate with displays via RS-232

## Network Setting – Network Information

- Write down your IP Address, Gateway, and Subnet values and retain for future reference.
- The use of a static IP is strongly recommended.
- Consult with your organization’s IT specialist(s) for more info on static IP’s.

## Network Setting – Save current Setting

### Network → Save current setting → Adjustment

- After assigning Network info (IP Address, Gateway, Subnet), select “Save Current Setting” and then “Enter”. If you do not select “Enter”, the settings will not be saved.

Picture	Network	Enable
Color	Load Network Setting	
Video Wall	DHCP	On
PC-RGB	IP Address	174.168.10.7
Audio	Gateway	174.168.10.1
Heat Control	Subnet	255.255.255.0
<b>Network</b>	Save Current Setting	
Timer		
Other Setting		

Picture	Network	Enable
Color	Load Network Setting	
Video Wall	DHCP	On
PC-RGB	IP Address	174.168.10.7
Audio	Gateway	174.168.10.1
Heat Control	Subnet	255.255.255.0
<b>Network</b>	Save Current Setting	
Timer		
Other Setting		

Picture	Network	Enter
Color	Load Network Setting	
Video Wall	DHCP	
PC-RGB	IP Address	
Audio	Gateway	
Heat Control	Subnet	
<b>Network</b>	<b>Save Current Setting</b>	
Timer		
Other Setting		

## Timer Settings – Current Time

### Timer → Current Time → Adjustment

- If current time setting is incorrect, reset the clock manually
- When the AC POWER is OFF, current time will be initialized

Picture	Current Time	Hour	1
Color	On Time	Min	40
Video Wall	Off Time		
PC-RGB			
Audio			
Heat Control			
Network			
Timer			
Other Setting			

## Timer Settings – On time / Off Time

### Timer → On time → Adjustment

### Timer → Off time → Adjustment

- On Time: Set the time to start automatically.
- Off Time: Set the power off time automatically.

Picture	Current Time	Enable	Off
Color	On Time	Hour	0
Video Wall	Off Time	Min	0
PC-RGB			
Audio			
Heat Control			
Network			
Timer			
Other Setting			

## Network Setting – Save current Setting

### Network → Save current setting → Adjustment

Picture	Network	Enter
Color	Load Network Setting	
Video Wall	DHCP	
PC-RGB	IP Address	
Audio	Gateway	
Heat Control	Subnet	
Network	Save Current Setting	
Timer		
Other Setting		

# OSD Menu

## Other Setting – Language

Other Setting → Language → Adjustment

Picture	Language	English
Color	Menu Transparency	20
Video Wall	OSD Time	15 sec
PC-RGB	Power Save Mode	Off
Audio	Local Dimming	On
Heat Control	MFC	Off
Network	Reset	
Timer	Software Update(USB)	
Other Setting	Version	v0.02 / Jan

## Other Setting – Menu Transparency

Other Setting → Menu Transparency → Adjustment

Set OSD menu transparency level

Picture	Language	English
Color	Menu Transparency	20
Video Wall	OSD Time	15 sec
PC-RGB	Power Save Mode	Off
Audio	Local Dimming	On
Heat Control	MFC	Off
Network	Reset	
Timer	Software Update(USB)	
Other Setting	Version	v0.02 / Jan

## Other Setting – OSD Timeout

Other Setting → OSD Timeout → Adjustment

Set the screen duration time of OSD

Picture	Language	Off
Color	Menu Transparency	5 sec
Video Wall	OSD Time	10 sec
PC-RGB	Power Save Mode	15 sec
Audio	Local Dimming	20sec
Heat Control	MFC	60 sec
Network	Reset	
Timer	Software Update(USB)	
Other Setting	Version	v0.02 / Jan



# OSD Menu

## Other Setting – Power Save Mode

[Other Setting](#) → [Power Save Mode](#) → [Adjustment](#)

Shut off the panel power after the input source has been unused for some time to save power

Picture	Language	On
Color	Menu Transparency	Off
Video Wall	OSD Time	
PC-RGB	Power Save Mode	
Audio	Local Dimming	
Heat Control	MFC	
Network	Reset	
Timer	Software Update(USB)	
Other Setting	Version	v0.02 / Jan 1

## Other Setting – Local Dimming

[Other Setting](#) → [Local Dimming](#) → [Adjustment](#)

Activate or disable local dimming on panel

Picture	Language	On
Color	Menu Transparency	Off
Video Wall	OSD Time	
PC-RGB	Power Save Mode	
Audio	Local Dimming	
Heat Control	MFC	
Network	Reset	
Timer	Software Update(USB)	
Other Setting	Version	v0.02 / Jan 1

## Other Setting – Reset

[Other Setting](#) → [Reset](#) → [Adjustment](#)

Set the screen duration time of OSD

Picture	Language	Enter
Color	Menu Transparency	
Video Wall	OSD Time	
PC-RGB	Power Save Mode	
Audio	Local Dimming	
Heat Control	MFC	
Network	Reset	
Timer	Software Update(USB)	
Other Setting	Version	v0.02 / Jan 1

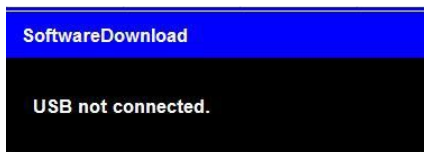
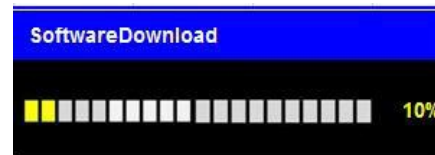
## Other Setting – Software Update

### Other Setting → Software Update → Adjustment

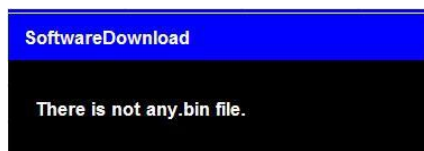
Software updates take place via the USB port. In order to conduct a software update, follow these steps:

- Save the update file to a USB stick. (ex) mergy\_170723.bin
- Insert the USB stick into the USB input for download.

Picture	Language	Enter
Color	Menu Transparency	
Video Wall	OSD Time	
PC-RGB	Power Save Mode	
Audio	Local Dimming	
Heat Control	MFC	
Network	Reset	
Timer	Software Update(USB)	
Other Setting	Version	v0.02 / Jan



If USB stick is not plugged in, you will see the following message: "USB not connected" - Please check USB stick



If the file for download is not properly loaded on the USB stick, you will receive the failure message shown on the left. Please check download file.

## Other Setting – Version

### Other Setting → Version → Check

Shows the version of the current software

Picture	Language	English
Color	Menu Transparency	20
Video Wall	OSD Time	15 sec
PC-RGB	Power Save Mode	Off
Audio	Local Dimming	On
Heat Control	MFC	Off
Network	Reset	
Timer	Software Update(USB)	
Other Setting	Version	v0.02 / Jan

## No Image is displayed

Problem	Action
Is the product power cord connected?	<ul style="list-style-type: none"> <li>✓ Check if the power cord is correctly plugged into the power outlet.</li> </ul>
Does the "Invalid Format" message appear?	<ul style="list-style-type: none"> <li>✓ The signal from the PC (graphics card) is out of the vertical or horizontal frequency range of the product. Adjust the frequency range by referring to the Specifications in this manual.</li> </ul>
Does the "No Signal" message appear?	<ul style="list-style-type: none"> <li>✓ The signal cable between PC and product is not properly connected. Check cable.</li> <li>✓ Press the INPUT button on the remote Control to check the input signal.</li> </ul>

## The screen image looks abnormal.

Problem	Action
Does the screen position appear to be incorrect?	<ul style="list-style-type: none"> <li>✓ Check if the graphics card output resolution and frequency are supported by the product. If the frequency is out of range, set to the recommended resolution in the Control Panel "Display Setting" menu.</li> </ul>
The screen is displayed abnormally.	<ul style="list-style-type: none"> <li>✓ The proper input signal is not connected to the port. Connect a cable that matches with the source input signal.</li> </ul>

## Image retention appears on the product.

Problem	Action
Faint static images are visible regardless of content being played	<ul style="list-style-type: none"> <li>✓ If a static image is displayed for a long time, the pixels may be damaged. Use the screen-saver function to prevent this.</li> <li>✓ When a dark image is displayed on the screen after an image with high contrast (black and white or gray), this may cause image sticking. This is normal for LCD screen products.</li> </ul>

## Screen color is abnormal.

Problem	Action
Screen has poor color depth (16 colors).	y Set the number of colors to more than 24 bits (true color). Select Control Panel - Display - Settings - Color Table menu in Windows.
Screen color is unstable or monochromatic	y Check the connection status of the signal cable. Or, re-insert the PC graphics card.
Do black spots appear on the screen?	y Several pixels (red, green, white, or black color) may appear on the screen, which can be attributed to the unique characteristics of the LCD panel. This is not a malfunction of the LCD.

## The operation does not work normally.

Problem	Action
Display suddenly powers off	y Is the <b>Timer</b> set? y Check the DPMS Mode y Check the power control settings. Power interrupted.

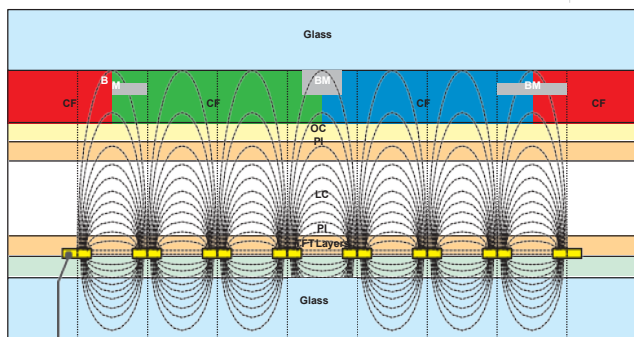
### CAUTION

- Image sticking/image retention does not occur when using constantly changing images but may occur when using a fixed/static image for an extended period of time. Therefore, it is recommended that you use the instructions below to decrease the likelihood of image sticking occurring when displaying a static image. It is recommended that you change the screen content at least once every **12 hours** at minimum. When done more frequently, the prevention of image sticking is more effective.

## Recommended operating conditions

- 1) Change the background and the character colors using the abovementioned time interval.
- 2) Change the image using the abovementioned time interval

## What is image sticking?



When the LCD panel displays a static image for an extended period of time, it can cause a voltage difference between the electrodes that operate the liquid crystals. When the voltage difference between the electrodes builds up over time, liquid crystals have a tendency to remain aligned in one direction. During this process, a previously displayed image remains visible. This phenomenon is referred to as image sticking.

## Supported Timing: Ultra-HD (HDMI, DisplayPort)

Resolution	H-Frequency (kHz)	V-Frequency (Hz)	Pixel Frequency (MHz)	Comment
640x480	31.469	59.94	25.175	
640x480	37.500	75.0	31.5	
800x600	37.879	60.317	40.0	
800x600	46.875	75.0	49.5	
1024x768	48.780	60.001	64.11	
1024x768	56.476	70.069	75.0	
1024x768	60.030	75.029	78.75	
1280x720	47.760	60.0	74.481	
1280x720	52.500	70.0	89.040	
1280x768	60.150	75.0	102.977	
1280x1024	63.600	60.0	108.883	
1360x768	47.700	60.0	84.700	
1600x1200	75.000	60.0	162.000	
720x576	15.735	50.0	13.595	
720x480	31.469	59.94	25.175	
1280x720	44.964	59.94	74.176	
1920x1080	33.750	60.0	74.25	
1920x1080	31.250	50.0	72.000	
1920x1080	56.3	50	148.5	
1920x1080	67.5	60	148.5	
3840x2160	67.5	30	297	
3840x2160	135	60	594	

## Supported Timing: HD-SDI

HD/SD-SDI Input Signal Formats	SMPTE-425M(3G)	1920x1080P (50/60Hz)
	SMPTE-260M	1920x1035i (59.94/60Hz)
	SMPTE-274M	1920x1080i (50/59.94/60Hz)
		1920x1080P (30Psf/25Psf/24Psf/30/25/24 Hz)
	SMPTE-296M	1280x720P (50/59.94/60Hz)
	SMPTE-125M	480i (59.94Hz)
	ITU-R BT.601	576i (50Hz)

## Support Signals

Items		Specifications
Supported Signals	UHD INTERFACE (HDMI, DP)	H Frequency Range: 20~82 kHz
		V Frequency Range: 55 ~ 90 Hz (VESA standard)
		Maximum resolution: 3840x2160@60Hz
		Maximum pixel rate: 594 MHz
	HD-SDI	HD-SDI: 2.970Gbps SD-SDI: 270M bps

# **Serial Interface Communication Protocol**

## **[Easy 4K Series\_Rev2.0]**

## ◆ SICP (Serial Interface Communication Protocol)

This document defines all the command and messages exchanged between the Master (a PC or the other controller) and the Slave (the displays).

It also describes the ways to send or read the commands or the messages.

### 1. Protocol definition

SICP stands for “Serial Interface Communication Protocol”.

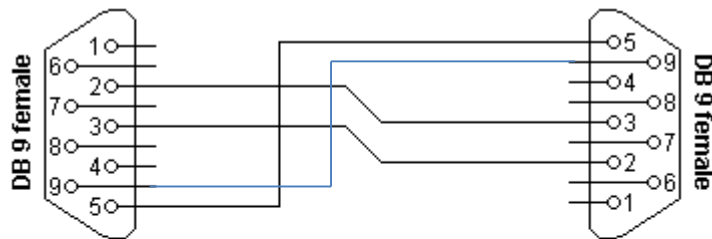
The protocol is specifically designed to allow data communication in half duplex multi-point environments, but it can also be used for half duplex point-to-point RS-232C communication.

### 2. Communication characteristics

A half duplex communication is implemented starting from the concept of a master-slave structure, where the display is supposed to be the slave.

The first action is always taken by the master, which can be either a PC or any controlling device (acting as server) interfaced to the monitor. After sending a command or a request in the appropriate format the master receives from the slave an acknowledgement, which tells the transmitter whether the command is not valid (or not executable, anyway) or it is accepted. In case of a request, the requested information is sent back and it becomes the acknowledgement by itself.

### 3. How to connect control devices (simple null modem cable)



Connector 1	Connector 2	Function
2	3	Rx ← Tx
3	2	Tx → Rx
5	5	Signal ground

\*9-9: IR LOOP signal

### 4. Hardware Protocol

Baud rate : 19200 bps

Data bits : 8 bit

Parity bits : None

Stop bits : 1 bit

Handshake : None



## 5. Protocols Formats by DSUB 9Pin RS232 Serial Port

This is the format that the computer will send to the display to execute commands.  
The format for this command transmission is as follows

### ◆ Setting Command to Display (5bytes)

STX	R/W	ID	CON	COM	Value
0xF5	0x88	Set ID (0x00~0x63)	0xFE	0xFF	0xFF

STX : Start of Text ( 0xFF )

F = Command Start Sending, X = Number of Byte to Send

Example (0xF4) : Start Sending 4 Bytes of Packet Data

(Using for Parameter Reading or Virtual Remote Control)

(0xF5) : Start Sending 5 Bytes of Packet Data

(Using for Parameter Setting)

R/W : Read and Write Protocol

0x88 = Write (Command for Setting)

ID : SET ID Number (Set ID 0~99)

0x00 = Wildcard (All Sets)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2 ), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 ),

CON : Control Command

0xFE = Set Command Control, 0xFD = Set Virtual Remote Control

COM : COMMAND (ex, 0xFE : Power , 0x01 : Input source...)

Value : COMMAND VALUE (ex 0x00 : POWER OFF, 0x01 : POWER ON)

**Acknowledgement**

0xF1	Check Sum
------	-----------

### ◆ Read Command from Display(4bytes)

STX	R/W	ID	CON	COM
0xF4	0x89	Set ID (0x00~0x63)	0xFE	0xFF

STX: 0xF4 (start sending 4 bytes of packet data )

R/W: Read and Write Protocol

0x89 = Read (Command for getting)

ID : SET ID Number (Set ID 0~99)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2 ), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 )

CON : Control Command

0xFE = Set Command Control, 0xFD = Set Virtual Remote Control

COM : COMMAND (ex, 0xFE : Power , 0x01 : Input source...)

**Acknowledgement**

0xF1	Value
------	-------

## 5. Protocols Formats by DSUB 9Pin RS232 Serial Port



### ◆ Virtual Remote Control(4bytes)

STX	R/W	ID	CON	Value
0xF4	0x88	Set ID (0x00~0x63)	0xFD	KEY CODE

STX : Start of Text ( 0xFX )

F = Command Start Sending, X = Number of Byte to Send

Example (0xF4) : Start Sending 4 Bytes of Packet Data

(Using for Parameter Reading or Virtual Remote Control)

(0xF5) : Start Sending 5 Bytes of Packet Data

(Using for Parameter Setting)

R/W : Read and Write Protocol

0x88 = Write (Command for Setting)

ID : SET ID Number (Set ID 0~99)

0x00 = Wildcard (All Sets)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2 ), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 ),

CON : Control Command

0xFE = Set Command Control, 0xFD = Set Virtual Remote Control

Value : Key code

(ex. KEY POWER = 0x11. KEY INPUT = 0x13 etc)

### Acknowledgement

0xF0
------

Button	Key Code
KEY_POWER	0x11
KEY_INPUT	0x13
KEY_MENU	0x43
KEY_EXIT	0x50
KEY_UP	0x47
KEY_DOWN	0x4B
KEY_LEFT(VOL-)	0x57
KEY_RIGHT(VOL+)	0x53
KEY_ENTER	0x04
KEY_MUTE	0x03
KEY_STILL	0x0A
KEY_INFO	0x06
KEY_SLEEP	0x0B
SET ID	0x51
SET ID EXIT	0x55

## 6. Protocols Formats *by Ethernet Port*

To set up the parameters to Displays, transfer the following instruction.

**Transport Layer : TCP**

**Port : 5000**

**Command : \*Ethernet Command + \*\*Serial Command**

**\* Ethernet CMD : ASCII : DCOM**

**HEX : 0x44 0x43 0x4F 0x4D**

### ◆ Setting Commands to Displays

Ethernet CMD				Serial CMD					
DA 1	DA2	DA3	DA4	STX	R/W	ID	CON	CMD	Value
D	C	O	M	0xF5	0x88	Set ID (0x00~0x63)	0xFE	0xFF	0xFF
ASCII				Hex					

#### \* Ethernet Command

DA1~DA4: Ethernet Command

ASCII Code: DCOM

Hex Code: 0x44 0x43 0x4F 0x4D

#### \* Serial Command

STX : Start of Text ( 0xFF )

F = Command Start Sending, X = Number of Byte to Send

Example (0xF4) : Start Sending 4 Bytes of Packet Data

(Using for Parameter Reading or Virtual Remote Control)

(0xF5) : Start Sending 5 Bytes of Packet Data

(Using for Parameter Setting)

R/W : Read and Write Protocol

0x88 = Write (Command for Setting)

ID : SET ID Number (Set ID 0~99)

0x00 = Wildcard (All Sets)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 ),

CON : Control Command

0xFE = Set Command Control, 0xFD = Set Virtual Remote Control

COM : COMMAND (ex, 0xFE : Power, 0x01 : Input source...)

Value : COMMAND VALUE (ex 0x00 : POWER OFF, 0x01 : POWER ON)

#### ❖ Acknowledgement;

Ethernet CMD(4bytes)				Serial CMD(1byte)
D	C	O	M	0xF0

#### • Example

**Switch to DP source – Set ID # 01**

Ethernet CMD				Serial CMD					
DA 1	DA2	DA3	DA4	STX	R/W	ID	CON	CMD	Value
0x44	0x43	0x4F	0x4D	0xF5	0x88	0x01	0xFE	0x01	0x01

#### Acknowledgement

DA 1	DA2	DA3	DA4	Value
0x44	0x43	0x4F	0x4D	0xF0

## 6. Protocols Formats *by Ethernet Port*



### ◆ Read Command from Display

Ethernet CMD				Serial CMD				
DA 1	DA2	DA3	DA4	STX	R/W	ID	CON	CMD
D	C	O	M	0xF4	0x89	Set ID (0x00~0x63)	0xFE	0xXX
ASCII				Hex				

#### \* Ethernet Command

##### DA1~DA4: Ethernet Command

ASCII Code: DCOM

Hex Code: 0x44 0x43 0x4F 0x4D

#### \* Serial Command

STX: 0xF4 (start sending 4 bytes of packet data )

R/W: Read and Write Protocol

0x89 = Read (Command for getting)

ID : SET ID Number (Set ID 0~99)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 )

CON : Control Command

0xFE = Set Command Control, 0xFD = Set Virtual Remote Control

COM : COMMAND (ex, 0xFE : Power , 0x01 : Input source...)

#### ❖ Acknowledgement;

Ethernet CMD				Serial CMD	
D	C	O	M	0xF1	Value

#### • Example

##### Check Current Source – Set ID # 01 (DP)

DA 1	DA2	DA3	DA4	STX	R/W	ID	CON	CMD
D	C	O	M	0xF4	0x89	0x01	0xFE	0x01

#### ❖ Acknowledgement

DA 1	DA2	DA3	DA4	CMD	Value
0x44	0x43	0x4F	0x4D	0xF1	0x01

## 6. Protocols *by Ethernet Port*

### ◆ VIRTUAL remote

Ethernet CMD(4bytes)				Serial CMD(4bytes)				
DA 1	DA2	DA3	DA4	STX	R/W	ID	CON	CMD
D	C	O	M	0xF4	0x88	Set ID (0x00~0x63)	0xFD	KEY CODE
ASCII				Hex				

#### \* Ethernet Command

ASCII Code: DCOM

Hex Code: 0x44 0x43 0x4F 0x4D

#### \* Serial Command

STX : Start of Text ( 0xFX )

F = Command Start Sending, X = Number of Byte to Send

Example (0xF4) : Start Sending 4 Bytes of Packet Data

(Using for Parameter Reading or Virtual Remote Control)

(0xF5) : Start Sending 5 Bytes of Packet Data

(Using for Parameter Setting)

R/W : Read and Write Protocol

0x88 = Write (Command for Setting)

ID : SET ID Number (Set ID 0~99)

0x00 = Wildcard (All Sets)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2 ), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 ),

CON : Control Command

0xFE = Set Command Control, 0xFD = Set Virtual Remote Control

Value : Key code

(ex. KEY POWER = 0x11. KEY INPUT = 0x13 etc)

#### ❖ Acknowledgement;

Ethernet CMD(4bytes)				Serial CMD(1byte)
D	C	O	M	0xF0

#### • Example

*Check Current Source – Set ID # 01*

DA 1	DA2	DA3	DA4	STX	R/W	ID	CON	CMD
D	C	O	M	0xF4	0x88	0x01	0xFD	11

#### ❖ Acknowledgement

Ethernet CMD(4bytes)				Serial CMD(1byte)
D	C	O	M	0xF0

Button	Key Code
KEY_POWER	0x11
KEY_INPUT	0x13
KEY_MENU	0x43
KEY_EXIT	0x50
KEY_UP	0x47
KEY_DOWN	0x4B
KEY_LEFT(VOL -)	0x57
KEY_RIGHT(VOL +)	0x53
KEY_ENTER	0x04
KEY_MUTE	0x03
KEY_STILL	0x0A
KEY_INFO	0x06
KEY_SLEEP	0x0B
SET ID	0x51
SET ID EXIT	0x55

## 7. Command List

### 7.1 Main Function Settings

#### ◆ Set Power On/Off (0xFE)

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0xFE	0xFF

STX : Start of Text ( 0xFF )

0xF5 : Start Sending 5 Bytes of Packet Data

R/W : Read and Write Protocol

0x88 = Write (Command for writing Protocol)

ID : SET ID Number (Set ID 0~99)

0x00 = Wildcard (All Sets)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2 ), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 ),

CON : 0xFE ( Set Control command)

COM : 0xFE for Power ON/OFF Command

Value : 0x00 ( OFF ), 0x01 ( ON )

#### ◆ Read(Get) Power Status(0xFE)

STX	R/W	ID	CON	CMD
0xF4	0x89	0x00 – 0x63	0xFE	0xFE

STX: 0xF4 (start sending 4 bytes of packet data )

R/W: Read and Write Protocol

0x89 = Read (Command for getting protocol)

ID : SET ID Number (Set ID 0~99)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2 ), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 )

CON : Control Command

0xFE = Set Command Control

COM : 0xFE (Power on/off command)

### ◆ Remote Control Lock On/Off

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x36	0xFF

- CMD: 0x36 for command of Remote Control Lock
- Value: 0x00 for OFF  
0x01 for ON

### ◆ Source Change

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x01	0xFF

- CMD: 0x01 for command of Video Input Source
- Value: 0x01 for Display Port  
0x02 for HDMI

### ◆ Temperature Reading

STX	R/W	ID	CON	CMD
0xF4	0x89	0x00 – 0x63	0xFC	0x3C

- CMD: 0x3C for Current Temperature Reading
- Value = Actual Temperature (by Celsius) x 2 + 60  
Ex) If reading value is 122 (0x7A),  
Actual Temperature =  $(122 - 60) / 2 = 31^{\circ}\text{C}$

### ◆ Temperature Shutdown Setting

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x48	0xFF

- CMD: 0x48 for Shutdown Temperature setting
- Value = desired shutdown temperature (by Celsius) x 2 + 60  
Ex) If desired shutdown temperature is 60°C,  
Setting Value =  $60 \times 2 + 60 = 180$  (0xB4)

### ◆ MFC Setting ( Motion Flow Compensation )

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x6A	0xFF

- CMD: 0x6A for MFC Setting ( Motion Flow Compensation )
- Value: 0x00 ( OFF ), 0x01 ( LOW ), 0x02 ( MIDDLE ), 0x03 ( HIGH )

## 7.2 Video wall Settings (Multi Vision)

### ◆ Write Set ID Number

\* Attention : Write Set ID Function must be only one connect Monitor (1 pc : 1 monitor)

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x2A	0xFF

ID : SET ID Number (Set ID 0~99)

0x01 ( Set ID# 1 ), 0x02 ( Set ID# 2 ), 0x0C ( Set ID# 12 ), 0x10 ( Set ID# 16 ) R/W: 0xFE (Set Parameter Value)

CMD: 0x2A for SETID

Value: 0x00 – 0x63 ( 0 – 99 )

### ◆ Horizontal Set Max Count

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x44	0xFF

CMD: 0x44 for X max

Value: 0x01 – 0x0B ( 1 – 11 )

### ◆ Vertical Set Max Count

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x45	0xFF

Param: 0x45 for Y max

Value: 0x01 – 0x0B ( 1 – 11 )

### ◆ Horizontal Set Position

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x42	0xFF

CMD: 0x42 for X Position

Value: 0x01 – 0x0B ( 1 – 11 )

### ◆ Vertical Set Position

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x43	0xFF

CMD: 0x43 for Y Position

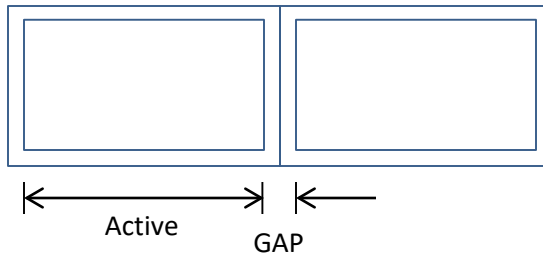
Value: 0x01 – 0x0B ( 1 – 11 )



### ◆ Horizontal Gap Adjust

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x46	0xFF

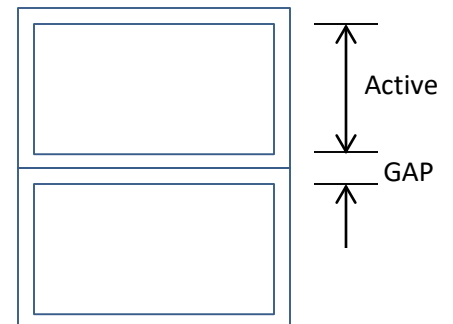
- CMD: 0x46 for X GAP
- Value: 0x03 for UNB (3.5mm B2B)  
0x02 for ENB (1.8mm B2B)



### ◆ Vertical Gap Adjust

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x47	0xFF

- CMD: 0x47 for Y GAP
- Value: 0x05 for UNB (3.5mm B2B)  
0x03 for ENB (1.8mm B2B)



## Example) 55" UNB Videowall Display (2x2)

SetID#1	SetID#2
SetID#3	SetID#4

1. **Set ID must be set before Videowall Display installation**
2. Set Videowall mode for 2x2 configuration
3. Command set for Set ID 1
  - 0xF5 0x88 0x01 0xFE 0x44 0x02 (X Max=2)
  - 0xF5 0x88 0x01 0xFE 0x45 0x02 (Y Max=2)
  - 0xF5 0x88 0x01 0xFE 0x42 0x01 (X POS=1)
  - 0xF5 0x88 0x01 0xFE 0x43 0x01 (Y POS=1)
  - 0xF5 0x88 0x01 0xFE 0x46 0x03 (X GAP=3)
  - 0xF5 0x88 0x01 0xFE 0x47 0x05 (Y GAP=5)
4. Parameter set for Set ID 2
  - 0xF5 0x88 0x02 0xFE 0x44 0x02 (X Max=2)
  - 0xF5 0x88 0x02 0xFE 0x45 0x02 (Y Max=2)
  - 0xF5 0x88 0x02 0xFE 0x42 0x02 (X POS=2)
  - 0xF5 0x88 0x02 0xFE 0x43 0x01 (Y POS=1)
  - 0xF5 0x88 0x02 0xFE 0x46 0x03 (X GAP=3)
  - 0xF5 0x88 0x02 0xFE 0x47 0x05 (Y GAP=5)
5. Parameter set for Set ID 3
  - 0xF5 0x88 0x03 0xFE 0x44 0x02 (X Max=2)
  - 0xF5 0x88 0x03 0xFE 0x45 0x02 (Y Max=2)
  - 0xF5 0x88 0x03 0xFE 0x42 0x01 (X POS=1)
  - 0xF5 0x88 0x03 0xFE 0x43 0x02 (Y POS=2)
  - 0xF5 0x88 0x03 0xFE 0x46 0x03 (X GAP=3)
  - 0xF5 0x88 0x03 0xFE 0x47 0x05 (Y GAP=5)
6. Parameter set for Set ID 4
  - 0xF5 0x88 0x04 0xFE 0x44 0x02 (X Max=2)
  - 0xF5 0x88 0x04 0xFE 0x45 0x02 (Y Max=2)
  - 0xF5 0x88 0x04 0xFE 0x42 0x02 (X POS=2)
  - 0xF5 0x88 0x04 0xFE 0x43 0x02 (Y POS=2)
  - 0xF5 0x88 0x04 0xFE 0x46 0x03 (X GAP=3)
  - 0xF5 0x88 0x04 0xFE 0x47 0x05 (Y GAP=5)

## 7.3 Picture Control Settings

### ◆ Contrast

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x04	0xFF

- CMD: 0x04 for Contrast
- Value: 0x00 – 0x64 (0 – 100)

### ◆ Brightness

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x05	0xFF

- CMD: 0x05 for Brightness
- Value: 0x00 – 0x64 (0 – 100)

### ◆ Sharpness

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x07	0xFF

- CMD : 0x07 for Sharpness
- Value: 0x00 – 0x64 (0 – 100)

### ◆ Aspect Ratio

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x0F	0xFF

- CMD : 0x0F for Aspect Ratio
- Value: 0x01 ( Full Screen), 0x02 ( 4:3 ), 0x03 ( 5:4 ), 0x04 ( 16:9 ), 0x05 ( 1:1, no aspect ratio change )

### ◆ Auto Dimming

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x3A	0xFF

- CMD : 0x3A for Auto Dimming Mode
- Value: 0x00 ( OFF ), 0x01 ( ON)

### ◆ Dimming Control

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x3B	0xFF

- CMD: 0x3B for DIM LEVEL control
- Value: 0x00 – 0x64 (0 – 100)  
     0 -> Min Brightness  
     100 -> Max Brightness

### ◆ Max Ambient Illuminance

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x38	0xFF

- CMD: 0x38 for MAX AMBIENT ILLUMINANCE Setting
- Value: 0x02– 0x00 (2 – 255 = 200 - 25000)  
     Setting Value = Ambient Level (by LUX) / 100  
     Ex) Desired Ambient is 10000Lux, setting value is 100 (0x64) (= 10000 / 100)

### ◆ Min Ambient Illuminance

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x39	0xFF

- CMD: 0x39 for MIN AMBIENT ILLUMINANCE Setting
- Value: 0x01– 0x00 (1 – 255 = 10 - 2550)  
     Setting Value = Ambient Level (by LUX) / 10  
     Ex) Desired Ambient is 200Lux, setting value is 20 (0x14) (= 200 / 10)

## 7.4 Color Control Settings

### ◆ Color Temperature

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x03	0xXX

- CMD: 0x03 for Color Temperature Control
- Value: 0x00 ( 3200K ), 0x01 ( 5600K ), 0x02 ( 6500K ),  
0x03 ( 7800K ), 0x04 ( 9300K ),  
0x05 ( USER ) : user setting will use RGB gain setting values.

## 7.5 Timer Setting

### ◆ Current Hour

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x32	0xFF

- CMD: 0x32 for Current Time Hour
- Value: 0x00 – 0x17 ( 0 – 23 )

### ◆ Current Minute

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x33	0xFF

- CMD: 0x33 for Current Time Minute
- Value: 0x00 – 0x3B ( 0 – 59 )

### ◆ On Time Hour

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x23	0xFF

- CMD: 0x23 for On Time Hour
- Value: 0x00 – 0x23 ( 0 – 17 )

### ◆ On Time Minute

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x24	0xFF

- CMD: 0x24 for On Time Minute
- Value: 0x00 – 0x3B ( 0 – 59 )

### ◆ On Time ON/OFF

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x25	0xFF

- CMD: 0x25 for On Time ON/OFF control
- Value: 0x00 ( OFF ), 0x01 ( ON )

#### ◆ Off Time Hour

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x27	0xFF

- CMD: 0x27 for Off Time Hour
- Value: 0x00 – 0x23 ( 0 – 17 )

#### ◆ Off Time Minute

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x28	0xFF

- CMD: 0x28 for Off Time Minute
- Value: 0x00 – 0x3B ( 0 – 59 )

#### ◆ Off Time ON/OFF

STX	R/W	ID	CON	CMD	Value
0xF5	0x88	0x00 – 0x63	0xFE	0x29	0xFF

- CMD: 0x29 for Off Time ON/OFF control
- Value: 0x00 ( OFF ), 0x01 ( ON )

## Supported Timing: UHD (HDMI, DP)

Resolution	H-Frequency (kHz)	V-Frequency (Hz)	Pixel Frequency (MHz)	Comment
640x480	31.469	59.94	25.175	
640x480	37.500	75.0	31.5	
800x600	37.879	60.317	40.0	
800x600	46.875	75.0	49.5	
1024x768	48.780	60.001	64.11	
1024x768	56.476	70.069	75.0	
1024x768	60.030	75.029	78.75	
1280x720	47.760	60.0	74.481	
1280x720	52.500	70.0	89.040	
1280x768	60.150	75.0	102.977	
1280x1024	63.600	60.0	108.883	
1360x768	47.700	60.0	84.700	
1600x1200	75.000	60.0	162.000	
720x576	15.735	50.0	13.595	
720x480	31.469	59.94	25.175	
1280x720	44.964	59.94	74.176	
1920x1080	33.750	60.0	74.25	
1920x1080	31.250	50.0	72.000	
1920x1080	56.3	50	148.5	
1920x1080	67.5	60	148.5	
3840x2160	67.5	30	297	
3840x2160	135	60	594	



## Support Signals

Items		Specifications
Supported Signals	UHD INTERFACE HDMI, DP	H Frequency Range : 20~82 kHz
		V Frequency Range : 55 ~ 90 Hz (VESA standard)
		Maximum resolution : 3840x2160@60Hz
		Maximum pixel rate : 594 MHz
	HD-SDI (Optional)	HD-SDI : 2.970Gbps SD-SDI : 270Mbps

## Supported 4K Format

	HDMI Input				DP Input			
	8bit	10bit	12bit	16bit	8bit	10bit	12bit	16bit
<b>4K 2K@30Hz</b>	RGB 4:4:4	RGB 4:4:4	RGB 4:4:4 4:2:2	RGB 4:4:4	RGB 4:4:4	RGB 4:4:4	RGB 4:4:4 4:2:2	RGB 4:4:4
<b>4K 2K @60Hz</b>	4:2:0	4:2:0	4:2:2 4:2:0	4:2:0	RGB 4:4:4 4:2:0	4:2:0	4:2:2 4:2:0	4:2:0